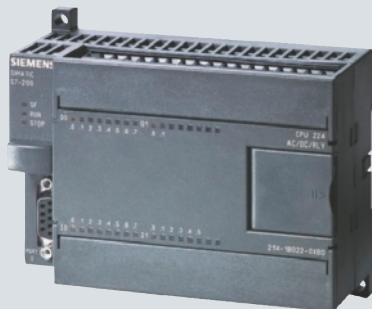


## SIMATIC S7-200

**3/2 Introduction****3/4 Central processing units**

- 3/4 CPU 221
- 3/4 CPU 222
- 3/4 CPU 224
- 3/4 CPU 224 XP, CPU 224 XPsi
- 3/4 CPU 226

**3/24 SIPLUS central processing units**

- 3/24 SIPLUS CPU 221
- 3/25 SIPLUS CPU 222
- 3/26 SIPLUS CPU 224
- 3/27 SIPLUS CPU 224 XP
- 3/28 SIPLUS CPU 226

**3/30 Digital modules**

- 3/30 EM 221
- 3/30 EM 222
- 3/30 EM 223

**3/38 SIPLUS digital modules**

- 3/38 SIPLUS EM 221
- 3/38 SIPLUS EM 222
- 3/38 SIPLUS EM 223

**3/42 Analog modules**

- 3/42 EM 231
- 3/42 EM 232
- 3/42 EM 235
- 3/47 EM 231 thermocouple module
- 3/49 EM 231 RTD module

**3/51 SIPLUS analog modules**

- 3/51 SIPLUS EM 231
- 3/51 SIPLUS EM 232
- 3/51 SIPLUS EM 235
- 3/55 SIPLUS EM 231 RTD module

**3/57 Function modules**

- 3/57 EM 253 positioning module
- 3/59 SIWAREX MS
- 3/61 SIPLUS DCF 77 radio clock module

**3/62 Communication**

- 3/62 EM 241 modem
- 3/63 EM 277 PROFIBUS DP module
- 3/64 CP 243-2
- 3/65 CP 243-1
- 3/68 MD720-3 GSM/GPRS modem
- 3/70 MD741-1 EGPRS router
- 3/72 Telecontrol Server Basic

**3/74 SIPLUS communication**

- 3/74 SIPLUS PROFIBUS DP EM 277
- 3/75 SIPLUS MD720-3 GSM/GPRS modem
- 3/76 SIPLUS MD741-1 EGPRS routers

**3/77 Power supplies**

- 3/77 The S7-200 version

**3/79 SIPLUS power supplies**

- 3/79 SIPLUS S7-200 PS 203

**3/80 Operator control and monitoring**

- 3/80 TD 200 text display
- 3/81 TD 400C text display
- 3/82 SIMATIC OP 73micro
- 3/84 SIMATIC TP 177micro

**3/86 SIPLUS operator control and monitoring**

- 3/86 SIPLUS S7-200 TD 200
- 3/87 SIPLUS S7-200 TD 400C

**3/88 Software**

- 3/88 Software
- 3/89 S7-200 PC Access

**3/90 Accessories**

- 3/90 PPI cable

**3/91 SIPLUS accessories**

- 3/91 SIPLUS cables 901

**Brochures**

For brochures serving as selection guides for SIMATIC products refer to:

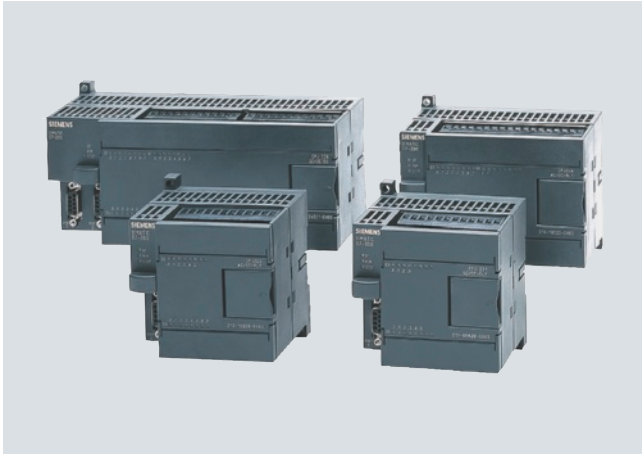
<http://www.siemens.com/simatic/printmaterial>

# SIMATIC S7-200

## Introduction

### S7-200

#### Overview



#### **SIMATIC S7-200**

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

#### **SIPLUS S7-200**

- The PLC for use under extremely harsh ambient conditions
- With extended temperature range from -25 °C to +70 °C
- Use in environments with pollutant gases (corrosive gas atmospheres)
- Condensation and enhanced mechanical stress permissible
- With the proven PLC technology of the S7-200
- Easy handling, programming, maintenance and service
- Ideal for use in automobile construction, environmental technology, mining, chemical plants, conveying technology, food & beverages industry etc.
- The substitute for expensive special solutions

You will find more information at:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

For brochures serving as selection guides for SIMATIC products refer to:

[www.siemens.com/simatic/printmaterial](http://www.siemens.com/simatic/printmaterial)

## Technical specifications

## General technical specifications SIMATIC S7-200

|   |   |
|---|---|
| Degree of protection  | IP20 according to IEC 529   |
| Ambient temperature   |   |
| • Operation<br>(95 % relative humidity)                             |   |
| - With horizontal mounting  | 0 ... 55°C  |
| - With vertical mounting  | 0 ... 45°C  |
| • Transport and storage   | -40 ... +70 °C  |
| - with 95 % relative humidity                                       | 25 ... 55 °C  |
| Isolation   |   |
| • 5/24 V DC circuits  | Test voltage 500 V AC   |
| • 115/230 V AC circuits to ground                                   | Test voltage 1500 V AC  |
| • 115/230 V AC circuits to<br>115/230 V AC circuits                 | Test voltage 1500 V AC  |
| • 230 V AC circuits to<br>5/24 V DC circuits                        | Test voltage 1500 V AC  |
| • 115 V AC circuits to<br>5/24 V DC circuits                        | Test voltage 1500 V AC  |
| Electromagnetic compatibility                                       | Requirements of EMC law   |
| • Noise immunity according to<br>EN 50082-2                         | Tested according to:<br>IEC 801-2, IEC 801-3, IEC 801-4,<br>EN 50141, EN 50204, IEC 801-5,<br>VDE 0160  |
| • Emitted interference according to<br>EN 50081-1 and<br>EN 50081-2 | Tested according to<br>EN 55011, Class A,<br>Group 1 and<br>EN 55011, Class B,<br>Group 1   |
| Mechanical rating   |   |
| • Vibrations, tested according to/<br>tested with                   | IEC 68, Part 2-6:<br>10 to 57 Hz;<br>constant amplitude<br>0.3 mm;<br>58 ... 150 Hz;<br>constant acceleration 1 g<br>(mounted on DIN rail) or<br>2 g (mounted in control cabinet);<br>type of vibration:<br>frequency cycles with a rate of<br>change of 1 octave/minute;<br>vibration duration:<br>10 frequency cycles per axis in<br>each direction of the 3 mutually<br>perpendicular axes |
| • Shock, tested according to/tested<br>with                         | IEC 68, Part 2-27/half-sine:<br>shock strength 15 g (peak value),<br>duration 11 ms, 6 shocks on each<br>of the 3 mutually perpendicular<br>axes  |

## General technical specifications SIMATIC S7-200

|   |  |
|---|--|
| Conformal coating   | Coating of the printed circuit boards and the electronic components  |
| Ambient temperature range   | -25 ... +70 °C   |
| Technical data  | The technical data of the standard product applies except for the ambient conditions.  |
| <b>Ambient conditions:</b>  |  |
| • Relative humidity   | 5 ... 100%, condensation allowed   |
| • Biologically active substances  | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| • Chemically active substances  | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1)2)</sup>   |
| • Mechanically active substances  | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified)                                    | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... + 3500 m)<br>Derating 10K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |
| Conforms with standard for electronic equipment used on rolling stock<br>(EN 50155, temperature T1, category 1) | Yes <sup>3)</sup>  |

1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

3) Does not apply to:  
6AG1 214-2AD23-2XB0  
6AG1 214-2BD23-2XB0  
6AG1 232-0HB22-2XB0  
6AG1 235-0KD22-2XB0  
6AG1 231-7PB22-2XA0  
6AG1 901-3CB30-2XA0

# SIMATIC S7-200

## Central processing units

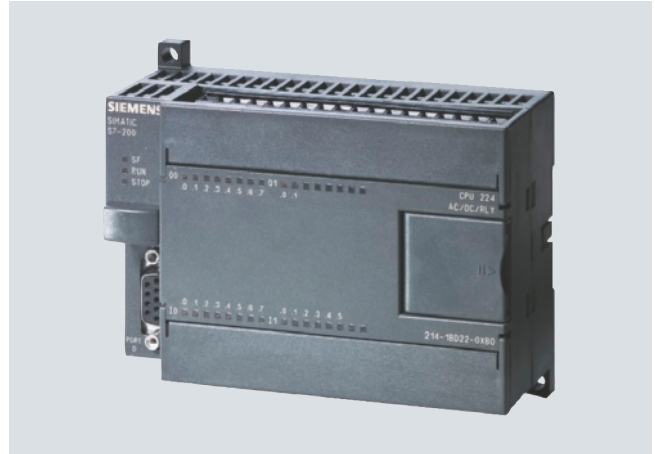
CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

### Overview CPU 221



- The smart compact solution
- With 10 inputs/outputs on board
- Not expandable

### Overview CPU 224



- The compact high-performance CPU
- With 24 inputs/outputs on board
- Expandable with up to 7 expansion modules

### Overview CPU 222



- The superior compact solution
- With 14 inputs/outputs on board
- Expandable with up to 2 expansion modules

### Overview CPU 224 XP/224 XPsi



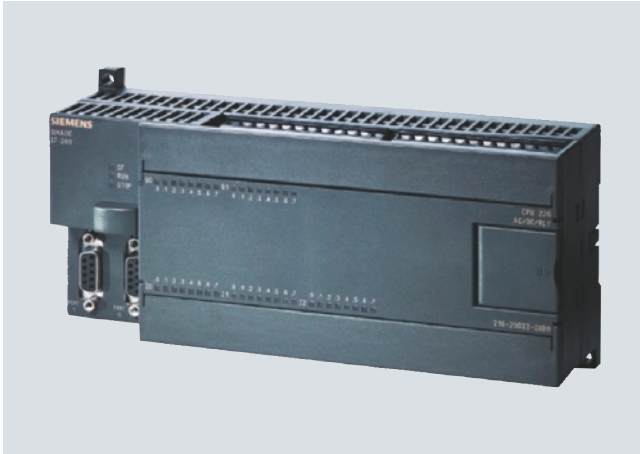
- The power CPU
- With 24 digital and 3 analog inputs/outputs onboard
- Expandable with up to 7 expansion modules

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPSi, CPU 226

### Overview CPU 226



- The high-performance package for complex technical tasks
- With additional PPI port for more flexibility and communication options
- With 40 inputs/outputs on board
- Expansion capability for max. 7 expansion racks

3

### Technical specifications

|  | 6ES7 211-0AA23-0XB0  | 6ES7 211-0BA23-0XB0   | 6ES7 212-1AB23-0XB0  | 6ES7 212-1BB23-0XB0   |
|--|----------------------|---|--|---|
| <b>Supply voltages</b>                     |                      |   |  |   |
| Rated value                                |                      |   |  |   |
| • 24 V DC                                  | Yes                  |   | Yes  |   |
| • permissible range, lower limit (DC)      | 20.4 V               |   | 20.4 V   |   |
| • permissible range, upper limit (DC)      | 28.8 V               |   | 28.8 V   |   |
| • 120 V AC                                 |                      | Yes   |  | Yes   |
| • 230 V AC                                 |                      | Yes   |  | Yes   |
| • permissible range, lower limit (AC)      |                      | 85 V  |  | 85 V  |
| • permissible range, upper limit (AC)      |                      | 264 V   |  | 264 V   |
| • permissible frequency range, lower limit |                      | 47 Hz   |  | 47 Hz   |
| • permissible frequency range, upper limit |                      | 63 Hz   |  | 63 Hz   |
| <b>Load voltage L+</b>                     |                      |   |  |   |
| • Rated value (DC)                         | 24 V                 | 24 V  | 24 V   | 24 V  |
| • permissible range, lower limit (DC)      | 20.4 V               | 5 V   | 20.4 V   | 5 V   |
| • permissible range, upper limit (DC)      | 28.8 V               | 30 V  | 28.8 V   | 30 V  |
| <b>Load voltage L1</b>                     |                      |   |  |   |
| • Rated value (AC)                         |                      | 100 V; 100 to 230 V AC  |  | 100 V; 100 to 230 V AC  |
| • permissible range, lower limit (AC)      |                      | 5 V   |  | 5 V   |
| • permissible range, upper limit (AC)      |                      | 250 V   |  | 250 V   |
| • permissible frequency range, lower limit |                      | 47 Hz   |  | 47 Hz   |
| • permissible frequency range, upper limit |                      | 63 Hz   |  | 63 Hz   |
| <b>Current consumption</b>                 |                      |   |  |   |
| Inrush current, max.                       | 10 A; at 28.8 V      | 20 A; at 264 V  | 10 A; at 28.8 V  | 20 A; at 264 V  |
| from supply voltage L+, max.               | 450 mA; 80 to 450 mA |   | 500 mA; 85 to 500 mA, output current for expansion modules (DC 5 V) 340 mA |   |
| from supply voltage L1, max.               |                      | 120 mA; 15 to 60 mA (240 V); 30 to 120 mA (120 V); output current for expansion modules (5 V DC) 340 mA |  | 140 mA; 20 to 70 mA (240 V); 40 to 140 mA (120 V); output current for expansion modules (5 V DC) 340 mA |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

## Technical specifications (continued)

|   | 6ES7 211-0AA23-0XB0   | 6ES7 211-0BA23-0XB0   | 6ES7 212-1AB23-0XB0   | 6ES7 212-1BB23-0XB0   |
|---|---|---|---|---|
| <b>Backup battery</b>                             |   |   |   |   |
| Battery operation                                 |   |   |   |   |
| • Backup time, max.                               | 50 h; (min. 8 h at 40 °C);<br>200 days (typ.) with<br>optional battery module   | 50 h; (min. 8 h at 40 °C);<br>200 days (typ.) with<br>optional battery module   | 50 h; (min. 8 h at 40 °C);<br>200 days (typ.) with<br>optional battery module   | 50 h; (min. 8 h at 40 °C);<br>200 days (typ.) with<br>optional battery module   |
| <b>Memory</b>                                     |   |   |   |   |
| Number of memory modules<br>(optional)            | 1; pluggable memory<br>module, content identical<br>with integral EEPROM; can<br>additionally store recipes,<br>data logs and other files   | 1; pluggable memory<br>module, content identical<br>with integral EEPROM; can<br>additionally store recipes,<br>data logs and other files   | 1; pluggable memory<br>module, content identical<br>with integral EEPROM; can<br>additionally store recipes,<br>data logs and other files   | 1; pluggable memory<br>module, content identical<br>with integral EEPROM; can<br>additionally store recipes,<br>data logs and other files   |
| Data and program memory                           |   |   |   |   |
| • Data memory, max.                               | 2 Kibyte  | 2 Kibyte  | 2 Kibyte  | 2 Kibyte  |
| • Program memory, max.                            | 4 Kibyte  | 4 Kibyte  | 4 Kibyte  | 4 Kibyte  |
| <b>Backup</b>                                     |   |   |   |   |
| • present   | Yes; Program: Entire<br>program maintenance-free<br>on integral EEPROM,<br>programmable via CPU;<br>data: Entire DB 1 loaded<br>from PG/PC maintenance-<br>free on integral EEPROM,<br>current values of DB 1 in<br>RAM, retentive memory<br>bits, timers, counters, etc.<br>maintenance-free via high-<br>performance capacitor;<br>optional battery for long-<br>term buffering | Yes; Program: Entire<br>program maintenance-free<br>on integral EEPROM,<br>programmable via CPU;<br>data: Entire DB 1 loaded<br>from PG/PC maintenance-<br>free on integral EEPROM,<br>current values of DB 1 in<br>RAM, retentive memory<br>bits, timers, counters, etc.<br>maintenance-free via high-<br>performance capacitor;<br>optional battery for long-<br>term buffering | Yes; Program: Entire<br>program maintenance-free<br>on integral EEPROM,<br>programmable via CPU;<br>data: Entire DB 1 loaded<br>from PG/PC maintenance-<br>free on integral EEPROM,<br>current values of DB 1 in<br>RAM, retentive memory<br>bits, timers, counters, etc.<br>maintenance-free via high-<br>performance capacitor;<br>optional battery for long-<br>term buffering | Yes; Program: Entire<br>program maintenance-free<br>on integral EEPROM,<br>programmable via CPU;<br>data: Entire DB 1 loaded<br>from PG/PC maintenance-<br>free on integral EEPROM,<br>current values of DB 1 in<br>RAM, retentive memory<br>bits, timers, counters, etc.<br>maintenance-free via high-<br>performance capacitor;<br>optional battery for long-<br>term buffering |
| <b>CPU processing times</b>                       |   |   |   |   |
| for bit operations, max.                          | 0.22 µs   | 0.22 µs   | 0.22 µs   | 0.22 µs   |
| <b>Counters, timers and their<br/>retentivity</b> |   |   |   |   |
| <b>S7 counter</b>                                 |   |   |   |   |
| • Number  | 256   | 256   | 256   | 256   |
| • of which retentive with<br>battery              |   |   |   |   |
| - adjustable                                      | Yes; via high-performance<br>capacitor or battery   | Yes; via high-performance<br>capacitor or battery   | Yes; via high-performance<br>capacitor or battery   | Yes; via high-performance<br>capacitor or battery   |
| - lower limit                                     | 1   | 1   | 1   | 1   |
| - upper limit                                     | 256   | 256   | 256   | 256   |
| • Counting range                                  |   |   |   |   |
| - lower limit                                     | 0   | 0   | 0   | 0   |
| - upper limit                                     | 32 767  | 32 767  | 32 767  | 32 767  |
| <b>S7 times</b>                                   |   |   |   |   |
| • Number  | 256   | 256   | 256   | 256   |
| • of which retentive with<br>battery              |   |   |   |   |
| - adjustable                                      | Yes; via high-performance<br>capacitor or battery   | Yes; via high-performance<br>capacitor or battery   | Yes; via high-performance<br>capacitor or battery   | Yes; via high-performance<br>capacitor or battery   |
| - upper limit                                     | 64  | 64  | 64  | 64  |
| • Time range                                      |   |   |   |   |
| - lower limit                                     | 1 ms  | 1 ms  | 1 ms  | 1 ms  |
| - upper limit                                     | 54 min; 4 timers: 1 ms to<br>30 s; 16 timers: 10 ms to<br>5 min; 236 timers: 100 ms<br>to 54 min  | 54 min; 4 timers: 1 ms to<br>30 s; 16 timers: 10 ms to<br>5 min; 236 timers: 100 ms<br>to 54 min  | 54 min; 4 timers: 1 ms to<br>30 s; 16 timers: 10 ms to<br>5 min; 236 timers: 100 ms<br>to 54 min  | 54 min; 4 timers: 1 ms to<br>30 s; 16 timers: 10 ms to<br>5 min; 236 timers: 100 ms<br>to 54 min  |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

### Technical specifications (continued)

|   | 6ES7 211-0AA23-0XB0   | 6ES7 211-0BA23-0XB0   | 6ES7 212-1AB23-0XB0   | 6ES7 212-1BB23-0XB0   |
|---|---|---|---|---|
| <b>Data areas and their retentivity</b> |   |   |   |   |
| Flag                                    |   |   |   |   |
| • Number, max.                          | 32 byte   | 32 byte   | 32 byte   | 32 byte   |
| • Retentivity available                 | Yes; M 0.0 to M 31.7  | Yes; M 0.0 to M 31.7  | Yes; M 0.0 to M 31.7  | Yes; M 0.0 to M 31.7  |
| • of which retentive with battery       | 0 to 255, via high-performance capacitor or battery, adjustable   | 0 to 255, via high-performance capacitor or battery, adjustable   | 0 to 255, via high-performance capacitor or battery, adjustable   | 0 to 255, via high-performance capacitor or battery, adjustable   |
| • of which retentive without battery    | 0 to 112 in EEPROM, adjustable  | 0 to 112 in EEPROM, adjustable  | 0 to 112 in EEPROM, adjustable  | 0 to 112 in EEPROM, adjustable  |
| <b>Hardware configuration</b>           |   |   |   |   |
| Connectable programming devices/PCs     | SIMATIC PG/PC, standard PC  | SIMATIC PG/PC, standard PC  | SIMATIC PG/PC, standard PC  | SIMATIC PG/PC, standard PC  |
| Expansion devices, max.                 |   |   | 2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   |
| Extension of distributed I/O            |   |   |   |   |
| • Analog inputs/outputs, max.           |   |   | 10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)  | 10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)  |
| • Digital inputs/outputs, max.          |   |   | 78; max. 40 inputs and 38 outputs (CPU + EM)  | 78; max. 40 inputs and 38 outputs (CPU + EM)  |
| • AS-Interface inputs/outputs max.      |   |   | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  |
| <b>Connection method</b>                |   |   |   |   |
| Plug-in I/O terminals                   | No  | No  | No  | No  |
| <b>1st interface</b>                    |   |   |   |   |
| Type of interface                       | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   |
| Physics                                 | RS 485  | RS 485  | RS 485  | RS 485  |
| Functionality                           |   |   |   |   |
| • MPI                                   | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s |
| • PPI                                   | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

## Technical specifications (continued)

|  | 6ES7 211-0AA23-0XB0   | 6ES7 211-0BA23-0XB0   | 6ES7 212-1AB23-0XB0   | 6ES7 212-1BB23-0XB0   |
|--|---|---|---|---|
| • Serial data exchange                         | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   |
| MPI  |   |   |   |   |
| • Transmission rate, max.                      | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  |
| • Transmission rate, min.                      | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   |
| <b>Programming</b>                             |   |   |   |   |
| Programming language                           |   |   |   |   |
| • LAD  | Yes   | Yes   | Yes   | Yes   |
| • FBD  | Yes   | Yes   | Yes   | Yes   |
| • STL  | Yes   | Yes   | Yes   | Yes   |
| Command set                                    | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions |
| Program processing                             | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)  | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)  | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)  | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)  |
| Program organization                           | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer   | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer   | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer   | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer   |
| Number of subroutines, max.                    | 64  | 64  | 64  | 64  |
| • User program protection/ password protection | Yes; 3-stage password protection  | Yes; 3-stage password protection  | Yes; 3-stage password protection  | Yes; 3-stage password protection  |
| <b>Digital inputs</b>                          |   |   |   |   |
| Number of digital inputs                       | 6; Integrated   | 6; Integrated   | 8   | 8   |
| m/p-reading                                    | Yes; optionally, per group  | Yes; optionally, per group  | Yes; optionally, per group  | Yes; optionally, per group  |
| Input voltage                                  |   |   |   |   |
| • Rated value, DC                              | 24 V  | 24 V  | 24 V  | 24 V  |
| • for signal "0"                               | 0 to 5 V  | 0 to 5 V  | 0 to 5 V  | 0 to 5 V  |
| • for signal "1"                               | min. 15 V   | min. 15 V   | min. 15 V   | min. 15 V   |
| Input current                                  |   |   |   |   |
| • for signal "1", typ.                         | 2.5 mA  | 2.5 mA  | 2.5 mA  | 2.5 mA  |
| Input delay (for rated value of input voltage) |   |   |   |   |
| • for standard inputs                          |   |   |   |   |
| - parameterizable                              | Yes; all  | Yes; all  | Yes; all  | Yes; all  |
| - at "0" to "1", min.                          | 0.2 ms  | 0.2 ms  | 0.2 ms  | 0.2 ms  |
| - at "0" to "1", max.                          | 12.8 ms   | 12.8 ms   | 12.8 ms   | 12.8 ms   |
| • for interrupt inputs                         |   |   |   |   |
| - parameterizable                              | Yes; I 0.0 to I 0.3   | Yes; I 0.0 to I 0.3   | Yes; I 0.0 to I 0.3   | Yes; I 0.0 to I 0.3   |
| • for counter/technological functions          |   |   |   |   |
| - parameterizable                              | Yes; (E0.0 to E0.5) 30 kHz  | Yes; (E0.0 to E0.5) 30 kHz  | Yes; (E0.0 to E0.5) 30 kHz  | Yes; (E0.0 to E0.5) 30 kHz  |



**Technical specifications** (continued)

|   | 6ES7 211-0AA23-0XB0  | 6ES7 211-0BA23-0XB0  | 6ES7 212-1AB23-0XB0  | 6ES7 212-1BB23-0XB0  |
|---|--|--|--|--|
| Cable length                                      |  |  |  |  |
| • Cable length, shielded, max.                    | 500 m; Standard input: 500 m, high-speed counters: 50 m  | 500 m; Standard input: 500 m, high-speed counters: 50 m            | 500 m; Standard input: 500 m, high-speed counters: 50 m  | 500 m; Standard input: 500 m, high-speed counters: 50 m            |
| • Cable length unshielded, max.                   | 300 m; not for high-speed signals  | 300 m; not for high-speed signals                                  | 300 m; not for high-speed signals  | 300 m; not for high-speed signals                                  |
| <b>Digital outputs</b>                            |  |  |  |  |
| Number of digital outputs                         | 4; Transistor  | 4; Relay   | 6; Transistor  | 6; Relay   |
| Short-circuit protection                          | No; to be provided externally  | No; to be provided externally                                      | No; to be provided externally  | No; to be provided externally                                      |
| Limitation of inductive shutdown voltage to       | 1 W  |  | 1 W  |  |
| Switching capacity of the outputs                 |  |  |  |  |
| • with resistive load, max.                       | 0.75 A   | 2 A  | 0.75 A   | 2 A  |
| • on lamp load, max.                              | 5 W  | 30 W DC; 200 W AC  | 5 W  | 30 W DC; 200 W AC  |
| Output voltage                                    |  |  |  |  |
| • for signal "1", min.                            | 20 V DC  | L+/L1  | 20 V DC  | L+/L1  |
| Output current                                    |  |  |  |  |
| • for signal "1" rated value                      | 750 mA   | 2 A  | 750 mA   | 2 A  |
| • for signal "0" residual current, max.           | 0.1 mA   | 0 mA   | 10 µA  | 0 mA   |
| Output delay with resistive load                  |  |  |  |  |
| • 0 to "1", max.                                  | 15 µs; of the standard outputs, max. (Q 0.2 to Q 0.3) 15 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 2 µs    | 10 ms; all outputs   | 15 µs; of the standard outputs, max. (Q 0.2 to Q 0.5) 15 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 2 µs    | 10 ms; all outputs   |
| • 1 to "0", max.                                  | 130 µs; of the standard outputs, max. (Q 0.2 to Q 0.3) 100 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 10 µs | 10 ms; all outputs   | 130 µs; of the standard outputs, max. (Q 0.2 to Q 0.5) 100 µs; of the pulse outputs, max. (Q 0.0 to Q 0.1) 10 µs | 10 ms; all outputs   |
| Parallel switching of 2 outputs                   |  |  |  |  |
| • for increased power                             | Yes  | No   | Yes  | No   |
| Switching frequency                               |  |  |  |  |
| • of the pulse outputs, with resistive load, max. | 20 kHz; Q 0.0 to Q 0.1   |  | 20 kHz; Q 0.0 to Q 0.1   |  |
| Aggregate current of outputs (per group)          |  |  |  |  |
| • horizontal installation                         |  |  |  |  |
| - up to 55 °C, max.                               | 3 A  | 6 A  | 4.5 A  | 6 A  |
| • up to 40 °C, max.                               | 3 A  | 6 A  | 4.5 A  | 6 A  |
| Cable length                                      |  |  |  |  |
| • Cable length, shielded, max.                    | 500 m  | 500 m  | 500 m  | 500 m  |
| • Cable length unshielded, max.                   | 150 m  | 150 m  | 150 m  | 150 m  |
| <b>Relay outputs</b>                              |  |  |  |  |
| Number of operating cycles                        |  | 10 000 000; mechanically 10 million, at rated load voltage 100,000 |  | 10 000 000; mechanically 10 million, at rated load voltage 100,000 |
| <b>Analog inputs</b>                              |  |  |  |  |
| Number of analog potentiometers                   | 1; Analog potentiometer; resolution 8 bit  | 1; Analog potentiometer; resolution 8 bit                          | 1; Analog potentiometer; resolution 8 bit  | 1; Analog potentiometer; resolution 8 bit                          |
| <b>Encoder supply</b>                             |  |  |  |  |
| 24 V encoder supply                               |  |  |  |  |
| • 24 V  | Yes; permissible range: 15.4 to 28.8 V   | Yes; permissible range: 20.4 bis 28.8 V                            | Yes; permissible range: 15.4 to 28.8 V   | Yes; permissible range: 20.4 bis 28.8 V                            |
| • Short-circuit protection                        | Yes; electronic at 600 mA  | Yes; electronic at 600 mA  | Yes; electronic at 600 mA  | Yes; electronic at 600 mA  |
| • Output current, max.                            | 180 mA   | 180 mA   | 180 mA   | 180 mA   |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

## Technical specifications (continued)

|  | 6ES7 211-0AA23-0XB0   | 6ES7 211-0BA23-0XB0   | 6ES7 212-1AB23-0XB0   | 6ES7 212-1BB23-0XB0   |
|--|---|---|---|---|
| <b>Encoder</b>                                       |   |   |   |   |
| Connectable encoders                                 |   |   |   |   |
| • 2-wire BEROs                                       | Yes   | Yes   | Yes   | Yes   |
| - permissible quiescent current (2-wire BEROs), max. | 1 mA  | 1 mA  | 1 mA  | 1 mA  |
| <b>Integrated Functions</b>                          |   |   |   |   |
| Number of counters                                   | 4; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 4; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 4; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 4; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. |
| Counter frequency (counter) max.                     | 30 kHz  | 30 kHz  | 30 kHz  | 30 kHz  |
| Number of alarm inputs                               | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges  |
| Number of pulse outputs                              | 2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option   |   | 2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option   |   |
| Limit frequency (pulse)                              | 20 kHz  |   | 20 kHz  |   |
| <b>Galvanic isolation</b>                            |   |   |   |   |
| Galvanic isolation digital inputs                    |   |   |   |   |
| • between the channels                               | Yes   | Yes   | Yes   | Yes   |
| • between the channels, in groups of                 | 2 and 4   | 2 and 4   | 4   | 4   |
| Galvanic isolation digital outputs                   |   |   |   |   |
| • between the channels                               | Yes; Optocoupler  | Yes; Relay  | Yes; Optocoupler  | Yes; Relay  |
| • between the channels, in groups of                 | 4   | 1 and 3   | 6   | 3   |
| <b>Permissible potential difference</b>              |   |   |   |   |
| between different circuits                           | 500 V DC between 24 V DC and 5 V DC   | 500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC   | 500 V DC between 24 V DC and 5 V DC   | 500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC   |
| <b>Environmental requirements</b>                    |   |   |   |   |
| Ambient conditions                                   | For further ambient conditions, see "Automation System S7200, System Manual"  | For further ambient conditions, see "Automation System S7-200, System Manual"   | For further ambient conditions, see "Automation System S7-200, System Manual"   | For further ambient conditions, see "Automation System S7-200, System Manual"   |
| Operating temperature                                |   |   |   |   |
| • vertical installation, min.                        | 0 °C  | 0 °C  | 0 °C  | 0 °C  |
| • vertical installation, max.                        | 45 °C   | 45 °C   | 45 °C   | 45 °C   |
| • horizontal installation, min.                      | 0 °C  | 0 °C  | 0 °C  | 0 °C  |
| • horizontal installation, max.                      | 55 °C   | 55 °C   | 55 °C   | 55 °C   |
| Air pressure   |   |   |   |   |
| • permissible range, min.                            | 860 hPa   | 860 hPa   | 860 hPa   | 860 hPa   |
| • permissible range, max.                            | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   |
| Relative humidity                                    |   |   |   |   |
| • Operation, min.                                    | 5 %   | 5 %   | 5 %   | 5 %   |
| • Operation, max.                                    | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2  |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

### Technical specifications (continued)

|                              | 6ES7 211-0AA23-0XB0 | 6ES7 211-0BA23-0XB0 | 6ES7 212-1AB23-0XB0 | 6ES7 212-1BB23-0XB0 |
|------------------------------|---------------------|---------------------|---------------------|---------------------|
| <b>Degree of protection</b>  |                     |                     |                     |                     |
| IP20                         | Yes                 | Yes                 | Yes                 | Yes                 |
| <b>Dimensions and weight</b> |                     |                     |                     |                     |
| Dimensions                   |                     |                     |                     |                     |
| • Width                      | 90 mm               | 90 mm               | 90 mm               | 90 mm               |
| • Height                     | 80 mm               | 80 mm               | 80 mm               | 80 mm               |
| • Depth                      | 62 mm               | 62 mm               | 62 mm               | 62 mm               |
| Weight                       |                     |                     |                     |                     |
| • Weight, approx.            | 270 g               | 310 g               | 270 g               | 310 g               |

|  | 6ES7 214-1AD23-0XB0   | 6ES7 214-1BD23-0XB0    | 6ES7 214-2AD23-0XB0   | 6ES7 214-2BD23-0XB0    | 6ES7 214-2AS23-0XB0   | 6ES7 216-2AD23-0XB0   | 6ES7 216-2BD23-0XB0    |
|--|---|------------------------|---|------------------------|---|---|------------------------|
| <b>Supply voltages</b>                     |   |                        |   |                        |   |   |                        |
| Rated value                                |   |                        |   |                        |   |   |                        |
| • 24 V DC                                  | Yes   |                        | Yes   |                        | Yes   | Yes   |                        |
| • permissible range, lower limit (DC)      | 20.4 V  |                        | 20.4 V  |                        | 20.4 V  | 20.4 V  |                        |
| • permissible range, upper limit (DC)      | 28.8 V  |                        | 28.8 V  |                        | 28.8 V  | 28.8 V  |                        |
| • 120 V AC                                 |   | Yes                    |   | Yes                    |   |   | Yes                    |
| • 230 V AC                                 |   | Yes                    |   | Yes                    |   |   | Yes                    |
| • permissible range, lower limit (AC)      |   | 85 V                   |   | 85 V                   |   |   | 85 V                   |
| • permissible range, upper limit (AC)      |   | 264 V                  |   | 264 V                  |   |   | 264 V                  |
| • permissible frequency range, lower limit |   | 47 Hz                  |   | 47 Hz                  |   |   | 47 Hz                  |
| • permissible frequency range, upper limit |   | 63 Hz                  |   | 63 Hz                  |   |   | 63 Hz                  |
| Load voltage L+                            |   |                        |   |                        |   |   |                        |
| • Rated value (DC)                         | 24 V  | 24 V                   | 24 V  | 24 V                   | 24 V  | 24 V  | 24 V                   |
| • permissible range, lower limit (DC)      | 20.4 V  | 5 V                    | 20.4 V  | 5 V                    | 20.4 V  | 20.4 V  | 5 V                    |
| • permissible range, upper limit (DC)      | 28.8 V  | 30 V                   | 28.8 V  | 30 V                   | 28.8 V  | 28.8 V  | 30 V                   |
| Load voltage L1                            |   |                        |   |                        |   |   |                        |
| • Rated value (AC)                         |   | 100 V; 100 to 230 V AC |   | 100 V; 100 to 230 V AC |   |   | 100 V; 100 to 230 V AC |
| • permissible range, lower limit (AC)      |   | 5 V                    |   | 5 V                    |   |   | 5 V                    |
| • permissible range, upper limit (AC)      |   | 250 V                  |   | 250 V                  |   |   | 250 V                  |
| • permissible frequency range, lower limit |   | 47 Hz                  |   | 47 Hz                  |   |   | 47 Hz                  |
| • permissible frequency range, upper limit |   | 63 Hz                  |   | 63 Hz                  |   |   | 63 Hz                  |
| <b>Current consumption</b>                 |   |                        |   |                        |   |   |                        |
| Inrush current, max.                       | 12 A; at 28.8 V   | 20 A; at 264 V         | 12 A; at 28.8 V   | 20 A; at 264 V         | 12 A; at 28.8 V   | 10 A; at 28.8 V   | 20 A; at 264 V         |
| from supply voltage L+, max.               | 700 mA; 110 to 700 mA, output current for expansion modules (5 V DC) 660 mA |                        | 900 mA; 120 to 900 mA, output current for expansion modules (5 V DC) 660 mA |                        | 900 mA; 120 to 900 mA, output current for expansion modules (5 V DC) 660 mA | 1 050 mA; 150 to 1050 mA output current for expansion modules (D5 V DC) 1000 mA |                        |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 Xpsi, CPU 226

## Technical specifications (continued)

|                                     | 6ES7 214-1AD23-0XB0  | 6ES7 214-1BD23-0XB0  | 6ES7 214-2AD23-0XB0  | 6ES7 214-2BD23-0XB0  | 6ES7 214-2AS23-0XB0  | 6ES7 216-2AD23-0XB0  | 6ES7 216-2BD23-0XB0  |
|-------------------------------------|--|--|--|--|--|--|--|
| from supply voltage L1, max.        |  | 200 mA; 30 to 100 mA (240 V); 60 to 200 mA (120 V); output current for expansion modules (5 V DC) 600 mA   |  | 220 mA; 35 to 100 mA (240 V); 70 to 220 mA (120 V); output current for expansion modules (5 V DC) 600 mA   |  |  | 320 mA; 40 to 160 mA (240 V); 80 to 320 mA (120 V); output current for expansion modules (5 V DC) 1000 mA  |
| <b>Backup battery</b>               |  |  |  |  |  |  |  |
| Battery operation                   |  |  |  |  |  |  |  |
| • Backup time, max.                 | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  | 100 h; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module  |
| <b>Memory</b>                       |  |  |  |  |  |  |  |
| Number of memory modules (optional) | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  | 1; pluggable memory module, content identical with integral EEPROM; can additionally store recipes, data logs and other files  |
| Data and program memory             |  |  |  |  |  |  |  |
| • Data memory, max.                 | 8 Kibyte   | 8 Kibyte   | 10 Kibyte  | 10 Kibyte  | 10 Kibyte  | 10 Kibyte  | 10 Kibyte  |
| • Program memory, max.              | 12 Kibyte; 8 KB with active run-time edit  | 12 Kibyte; 8 KB with active run-time edit  | 16 Kibyte; 12 KB with active run-time edit   | 16 Kibyte; 12 KB with active run-time edit   | 16 Kibyte; 12 KB with active run-time edit   | 24 Kibyte; 16 KB with active run-time edit   | 24 Kibyte; 16 KB with active run-time edit   |
| Backup                              |  |  |  |  |  |  |  |
| • present                           | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering | Yes; Program: Entire program maintenance-free on integral EEPROM, program-mable via CPU; data: Entire DB 1 loaded from PG/PC maintenance-free on integral EEPROM, current values of DB 1 in RAM, retentive memory bits, timers, counters, etc. maintenance-free via high-performance capacitor; optional battery for long-term buffering |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

### Technical specifications (continued)

|   | 6ES7 214-1AD23-0XB0  | 6ES7 214-1BD23-0XB0  | 6ES7 214-2AD23-0XB0  | 6ES7 214-2BD23-0XB0  | 6ES7 214-2AS23-0XB0  | 6ES7 216-2AD23-0XB0  | 6ES7 216-2BD23-0XB0  |
|---|--|--|--|--|--|--|--|
| <b>CPU processing times</b><br>for bit operations, max. | 0.22 µs  | 0.22 µs  | 0.22 µs  | 0.22 µs  | 0.22 µs  | 0.22 µs  | 0.22 µs  |
| <b>Counters, timers and their retentivity</b>           |  |  |  |  |  |  |  |
| S7 counter  |  |  |  |  |  |  |  |
| • Number  | 256  | 256  | 256  | 256  | 256  | 256  | 256  |
| • of which retentive with battery                       |  |  |  |  |  |  |  |
| - adjustable  | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   |
| - lower limit   | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| - upper limit   | 256  | 256  | 256  | 256  | 256  | 256  | 256  |
| • Counting range  |  |  |  |  |  |  |  |
| - lower limit   | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| - upper limit   | 32 767   | 32 767   | 32 767   | 32 767   | 32 767   | 32 767   | 32 767   |
| S7 times  |  |  |  |  |  |  |  |
| • Number  | 256  | 256  | 256  | 256  | 256  | 256  | 256  |
| • of which retentive with battery                       |  |  |  |  |  |  |  |
| - adjustable  | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   | Yes; via high-performance capacitor or battery   |
| - upper limit   | 64   | 64   | 64   | 64   | 64   | 64   | 64   |
| • Time range  |  |  |  |  |  |  |  |
| - lower limit   | 1 ms   | 1 ms   | 1 ms   | 1 ms   | 1 ms   | 1 ms   | 1 ms   |
| - upper limit   | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min | 54 min;<br>4 timers: 1 ms to 30 s;<br>16 timers: 10 ms to 5 min;<br>236 timers: 100 ms to 54 min |
| <b>Data areas and their retentivity</b>                 |  |  |  |  |  |  |  |
| Flag  |  |  |  |  |  |  |  |
| • Number, max.  | 32 byte  | 32 byte  | 32 byte  | 32 byte  | 32 byte  | 32 byte  | 32 byte  |
| • Retentivity available                                 | Yes; M 0.0 to M 31.7   | Yes; M 0.0 to M 31.7   | Yes; M 0.0 to M 31.7   | Yes; M 0.0 to M 31.7   | Yes; M 0.0 to M 31.7   | Yes; M 0.0 to M 31.7   | Yes; M 0.0 to M 31.7   |
| • of which retentive with battery                       | 0 to 255, via high-performance capacitor or battery, adjustable                                  | 0 to 255, via high-performance capacitor or battery, adjustable                                  | 0 to 255, via high-performance capacitor or battery, adjustable                                  | 0 to 255, via high-performance capacitor or battery, adjustable                                  | 0 to 255, via high-performance capacitor or battery, adjustable                                  | 0 to 255, via high-performance capacitor or battery, adjustable                                  | 0 to 255, via high-performance capacitor or battery, adjustable                                  |
| • of which retentive without battery                    | 0 to 112 in EEPROM, adjustable   | 0 to 112 in EEPROM, adjustable   | 0 to 112 in EEPROM, adjustable   | 0 to 112 in EEPROM, adjustable   | 0 to 112 in EEPROM, adjustable   | 0 to 112 in EEPROM, adjustable   | 0 to 112 in EEPROM, adjustable   |
| <b>Hardware configuration</b>                           |  |  |  |  |  |  |  |
| Connectable programming devices/PCs                     | SIMATIC PG/PC, standard PC   | SIMATIC PG/PC, standard PC   | SIMATIC PG/PC, standard PC   | SIMATIC PG/PC, standard PC   | SIMATIC PG/PC, standard PC   | SIMATIC PG/PC, standard PC   | SIMATIC PG/PC, standard PC   |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 Xpsi, CPU 226

## Technical specifications (continued)

|                                    | 6ES7 214-1AD23-0XB0   | 6ES7 214-1BD23-0XB0   | 6ES7 214-2AD23-0XB0   | 6ES7 214-2BD23-0XB0   | 6ES7 214-2AS23-0XB0   | 6ES7 216-2AD23-0XB0   | 6ES7 216-2BD23-0XB0   |
|------------------------------------|---|---|---|---|---|---|---|
| Expansion devices, max.            | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   | 7; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.   |
| Extension of distributed I/O       |   |   |   |   |   |   |   |
| • Analog inputs/outputs, max.      | 35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  | 35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  | 38; 2 onboard inputs and 1 output, also max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  | 38; 2 onboard inputs and 1 output, also max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  | 38; 2 onboard inputs and 1 output, also max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  | 35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  | 35; max. 28 inputs and 7 outputs (EM) or max. 0 inputs and 14 outputs (EM)  |
| • Digital inputs/outputs, max.     | 168; max. 94 inputs and 74 outputs (CPU + EM)   | 168; max. 94 inputs and 74 outputs (CPU + EM)   | 168; max. 94 inputs and 74 outputs (CPU + EM)   | 168; max. 94 inputs and 74 outputs (CPU + EM)   | 168; max. 94 inputs and 74 outputs (CPU + EM)   | 148; max. 128 inputs and 120 outputs (CPU+EM)   | 148; max. 128 inputs and 120 outputs (CPU+EM)   |
| • AS-Interface inputs/outputs max. | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  | 62; AS-Interface A/B slaves (CP 243-2)  |
| <b>Connection method</b>           |   |   |   |   |   |   |   |
| Plug-in I/O terminals              | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| <b>1st interface</b>               |   |   |   |   |   |   |   |
| Type of interface                  | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   |
| Physics                            | RS 485  | RS 485  | RS 485  | RS 485  | RS 485  | RS 485  | RS 485  |
| <b>Functionality</b>               |   |   |   |   |   |   |   |
| • MPI                              | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s | Yes; as MPI slave for data exchange with MPI masters (S7-300/ S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/ CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

### Technical specifications (continued)

|                           | 6ES7 214-1AD23-0XB0   | 6ES7 214-1BD23-0XB0   | 6ES7 214-2AD23-0XB0   | 6ES7 214-2BD23-0XB0   | 6ES7 214-2AS23-0XB0   | 6ES7 216-2AD23-0XB0   | 6ES7 216-2BD23-0XB0   |
|---------------------------|---|---|---|---|---|---|---|
| • PPI                     | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s  |
| • Serial data exchange    | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter |
| MPI                       |   |   |   |   |   |   |   |
| • Transmission rate, max. | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  |
| • Transmission rate, min. | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   |
| <b>2nd interface</b>      |   |   |   |   |   |   |   |
| Type of interface         |   |   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   | Integrated RS 485 interface   |
| Physics                   |   |   | RS 485  | RS 485  | RS 485  | RS 485  | RS 485  |
| Functionality             |   |   |   |   |   |   |   |
| • MPI                     |   |   | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s                                     | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s                                     | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s                                     | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s                                     | Yes; as MPI slave for data exchange with MPI masters (S7-300/S7-400 CPUs, OPs, TDs, Push Button Panels); S7-200-internal CPU/CPU communications is possible in the MPI network with restrictions; transmission rates: 19.2 / 187.5 kbit/s                                     |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 Xpsi, CPU 226

### Technical specifications (continued)

|                            | 6ES7 214-1AD23-0XB0   | 6ES7 214-1BD23-0XB0   | 6ES7 214-2AD23-0XB0   | 6ES7 214-2BD23-0XB0   | 6ES7 214-2AS23-0XB0   | 6ES7 216-2AD23-0XB0   | 6ES7 216-2BD23-0XB0   |
|----------------------------|---|---|---|---|---|---|---|
| • PPI                      |   |   | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s   | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s   | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s   | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s   | Yes; with PPI protocol for programming functions, HMI functions (TD 200, OP), S7-200-internal CPU/ CPU communications; transmission rates 9.6 / 19.2 / 187.5 kbit/s   |
| • serial data exchange     |   |   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   | Yes; as freely programmable interface with interrupt facility for serial data exchange with third-party devices with ASCII protocol transfer rates: 1.2 / 2.4 / 4.8 / 9.6 / 19.2 / 38.4 / 57.6 / 115.2 kbit/s; the PC / PPI cable can also be used as RS232 / RS485 converter   |
| MPI                        |   |   |   |   |   |   |   |
| • Transmission rate, max.  |   |   | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  | 187.5 kbit/s  |
| • Transmission rates, min. |   |   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   | 19.2 kbit/s   |
| <b>Programming</b>         |   |   |   |   |   |   |   |
| Programming language       |   |   |   |   |   |   |   |
| • LAD                      | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| • FBD                      | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| • STL                      | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Command set                | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions | Bit logic instructions, compare instructions, timer instructions, counter instructions, clock instructions, transmissions instructions, table instructions, logic instructions, shift and rotate instructions, conversion instructions, program control instructions, interrupt and communications instructions, logic stack instructions, integer maths, floating-point math instructions, numerical functions |



# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPSi, CPU 226

### Technical specifications (continued)

|  | 6ES7 214-1AD23-0XB0  | 6ES7 214-1BD23-0XB0  | 6ES7 214-2AD23-0XB0  | 6ES7 214-2BD23-0XB0  | 6ES7 214-2AS23-0XB0  | 6ES7 216-2AD23-0XB0  | 6ES7 216-2BD23-0XB0  |
|--|--|--|--|--|--|--|--|
| Program processing                             | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) | free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms) |
| Program organization                           | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          | 1 OB, 1 DB, 1 SDB subroutines with/without parameter transfer          |
| Number of subroutines, max.                    | 64   | 64   | 64   | 64   | 64   | 64   | 64   |
| • User program protection/password protection  | Yes; 3-stage password protection                                       | Yes; 3-stage password protection                                       | Yes; 3-stage password protection                                       | Yes; 3-stage password protection                                       | Yes; 3-stage password protection                                       | Yes; 3-stage password protection                                       | Yes; 3-stage password protection                                       |
| <b>Digital inputs</b>                          |  |  |  |  |  |  |  |
| Number of digital inputs                       | 14   | 14   | 14   | 14   | 14   | 24   | 24   |
| m/p-reading                                    | Yes; optionally, per group   | Yes; optionally, per group   | Yes; optionally, per group   | Yes; optionally, per group   | Yes; optionally, per group   | Yes; optionally, per group   | Yes; optionally, per group   |
| Input voltage                                  |  |  |  |  |  |  |  |
| • Rated value, DC                              | 24 V   | 24 V   | 24 V   | 24 V   | 24 V   | 24 V   | 24 V   |
| • for signal "0"                               | 0 to 5 V   | 0 to 5 V   | 0 to 5 V;<br>0 to 1 V<br>(I 0.3 to I 0.5)                              | 0 to 5 V;<br>0 to 1 V<br>(I 0.3 to I 0.5)                              | 0 to 5 V;<br>0 to 1 V<br>(I 0.3 to I 0.5)                              | 0 to 5 V   | 0 to 5 V   |
| • for signal "1"                               | min. 15 V  | min. 15 V  | min. 15 V; min. 4 V<br>(I 0.3 to I 0.5)                                | min. 15 V; min. 4 V<br>(I 0.3 to I 0.5)                                | min. 15 V; min. 4 V<br>(I 0.3 to I 0.5)                                | min. 15 V  | min. 15 V  |
| Input current                                  |  |  |  |  |  |  |  |
| • for signal "1", typ.                         | 2.5 mA   | 2.5 mA   | 2.5 mA; 8 mA<br>for I 0.3 to I 0.5                                     | 2.5 mA; 8 mA<br>for I 0.3 to I 0.5                                     | 2.5 mA; 8 mA<br>for I 0.3 to I 0.5                                     | 2.5 mA   | 2.5 mA   |
| Input delay (for rated value of input voltage) |  |  |  |  |  |  |  |
| • for standard inputs                          |  |  |  |  |  |  |  |
| - parameterizable                              | Yes; all   | Yes; all   | Yes; all   | Yes; all   | Yes; all   | Yes; all   | Yes; all   |
| - at "0" to "1", min.                          | 0.2 ms   | 0.2 ms   | 0.2 ms   | 0.2 ms   | 0.2 ms   | 0.2 ms   | 0.2 ms   |
| - at "0" to "1", max.                          | 12.8 ms  | 12.8 ms  | 12.8 ms  | 12.8 ms  | 12.8 ms  | 12.8 ms  | 12.8 ms  |
| • for interrupt inputs                         |  |  |  |  |  |  |  |
| - parameterizable                              | Yes; I 0.0 to I 0.3  | Yes; I 0.0 to I 0.3  | Yes; I 0.0 to I 0.3  | Yes; I 0.0 to I 0.3  | Yes; I 0.0 to I 0.3  | Yes; I 0.0 to I 0.3  | Yes; I 0.0 to I 0.3  |
| • for counter/technological functions          |  |  |  |  |  |  |  |
| - parameterizable                              | Yes; (E0.0 to E1.5) 30 kHz   | Yes; (E0.0 to E1.5) 30 kHz   | Yes; (E0.0 to E1.5) up to 200 kHz                                      | Yes; (E0.0 to E1.5) up to 200 kHz                                      | Yes; (E0.0 to E1.5) up to 200 kHz                                      | Yes; (E0.0 to E1.5) 30 kHz   | Yes; (E0.0 to E1.5) 30 kHz   |
| Cable length                                   |  |  |  |  |  |  |  |
| • Cable length, shielded, max.                 | 500 m; Standard input: 500 m, high-speed counters: 50 m                | 500 m; Standard input: 500 m, high-speed counters: 50 m                | 500 m; Standard input: 500 m, high-speed counters: 50 m                | 500 m; Standard input: 500 m, high-speed counters: 50 m                | 500 m; Standard input: 500 m, high-speed counters: 50 m                | 500 m; Standard input: 500 m, high-speed counters: 50 m                | 500 m; Standard input: 500 m, high-speed counters: 50 m                |
| • Cable length unshielded, max.                | 300 m; not for high-speed signals                                      | 300 m; not for high-speed signals                                      | 300 m; not for high-speed signals                                      | 300 m; not for high-speed signals                                      | 300 m; not for high-speed signals                                      | 300 m; not for high-speed signals                                      | 300 m; not for high-speed signals                                      |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

## Technical specifications (continued)

|   | 6ES7 214-1AD23-0XB0  | 6ES7 214-1BD23-0XB0            | 6ES7 214-2AD23-0XB0  | 6ES7 214-2BD23-0XB0            | 6ES7 214-2AS23-0XB0  | 6ES7 216-2AD23-0XB0  | 6ES7 216-2BD23-0XB0            |
|---|--|--------------------------------|--|--------------------------------|--|--|--------------------------------|
| <b>Digital outputs</b>                            |  |                                |  |                                |  |  |                                |
| Number of digital outputs                         | 10; Transistor   | 10; Relay                      | 10; Transistor   | 10; Relay                      | 10; Transistor<br>current sinking  | 16; Transistor   | 16; Relay                      |
| Short-circuit protection                          | No; to be provided externally  | No; to be provided externally  | No; to be provided externally  | No; to be provided externally  | No; to be provided externally  | No; to be provided externally  | No; to be provided externally  |
| Limitation of inductive shutdown voltage to       | 1 W  |                                | 1 W  |                                | 1 W  | 1 W  |                                |
| Switching capacity of the outputs                 |  |                                |  |                                |  |  |                                |
| • with resistive load, max.                       | 0.75 A   | 2 A                            | 0.75 A   | 2 A                            | 0.75 A   | 0.75 A   | 2 A                            |
| • on lamp load, max.                              | 5 W  | 200 W;<br>30 W DC;<br>200 W AC | 5 W  | 200 W;<br>30 W DC;<br>200 W AC | 5 W  | 5 W  | 200 W;<br>30 W DC;<br>200 W AC |
| Output voltage                                    |  |                                |  |                                |  |  |                                |
| • for signal "1", min.                            | 20 V DC  | L+/L1                          | L+ (-0.4 V (5 V / 20.4 V for A 0.0 to A 0.4; 20.4 V A 0.5 to A1.1))  | L+/L1                          | 1M -0.4 V  | 20 V DC  | L+/L1                          |
| Output current                                    |  |                                |  |                                |  |  |                                |
| • for signal "1" rated value                      | 750 mA   | 2 A                            | 750 mA   | 2 A                            | 750 mA   | 750 mA   | 2 A                            |
| • for signal "0" residual current, max.           | 10 µA  | 0 mA                           | 10 µA  | 0 mA                           | 10 µA  | 10 µA  | 0 mA                           |
| Output delay with resistive load                  |  |                                |  |                                |  |  |                                |
| • 0 to "1", max.                                  | 15 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>2 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 2 µs    | 10 ms; all outputs             | 15 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>15 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 0.5 µs   | 10 ms; all outputs             | 15 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>15 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 0.5 µs   | 15 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>2 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 2 µs    | 10 ms; all outputs             |
| • 1 to "0", max.                                  | 130 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>10 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 10 µs | 10 ms; all outputs             | 130 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>130 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 1.5 µs | 10 ms; all outputs             | 130 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>130 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 1.5 µs | 130 µs; of the standard outputs, max. (Q0.2 to Q1.1)<br>10 µs; of the pulse outputs, max. (Q0.0 to Q0.1) 10 µs | 10 ms; all outputs             |
| Parallel switching of 2 outputs                   |  |                                |  |                                |  |  |                                |
| • for increased power                             | Yes  | No                             | Yes  | No                             | Yes  | Yes  | No                             |
| Switching frequency                               |  |                                |  |                                |  |  |                                |
| • of the pulse outputs, with resistive load, max. | 20 kHz; Q 0.0 to Q 0.1   | 1 Hz                           | 100 kHz; Q 0.0 to Q 0.1  | 1 Hz                           | 100 kHz; Q 0.0 to Q 0.1  | 20 kHz; Q 0.0 to Q 0.1   | 1 kHz                          |
| Aggregate current of outputs (per group)          |  |                                |  |                                |  |  |                                |
| • horizontal installation                         |  |                                |  |                                |  |  |                                |
| - up to 55 °C, max.                               | 6 A  | 10 A                           | 3.75 A   | 10 A                           | 3.75 A   | 6 A  | 10 A                           |
| • up to 40 °C, max.                               | 6 A  | 10 A                           | 3.75 A   | 10 A                           | 3.75 A   | 6 A  | 10 A                           |
| Cable length                                      |  |                                |  |                                |  |  |                                |
| • Cable length, shielded, max.                    | 500 m  | 500 m                          | 500 m  | 500 m                          | 500 m  | 500 m  | 500 m                          |
| • Cable length unshielded, max.                   | 150 m  | 150 m                          | 150 m  | 150 m                          | 150 m  | 150 m  | 150 m                          |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

### Technical specifications (continued)

|   | 6ES7 214-1AD23-0XB0   | 6ES7 214-1BD23-0XB0   | 6ES7 214-2AD23-0XB0  | 6ES7 214-2BD23-0XB0  | 6ES7 214-2AS23-0XB0  | 6ES7 216-2AD23-0XB0   | 6ES7 216-2BD23-0XB0   |
|---|---|---|--|--|--|---|---|
| <b>Relay outputs</b>                                |   |   |  |  |  |   |   |
| Number of operating cycles                          |   | 10 000 000; mechanically 10 million, at rated load voltage 100,000  |  | 10 000 000; mechanically 10 million, at rated load voltage 100,000   |  |   | 10 000 000; mechanically 10 million, at rated load voltage 100,000  |
| <b>Analog inputs</b>                                |   |   |  |  |  |   |   |
| Number of analog potentiometers                     | 2; Analog potentiometer; resolution 8 bit   | 2; Analog potentiometer; resolution 8 bit   | 2; Analog potentiometer; resolution 8 bit  | 2; Analog potentiometer; resolution 8 bit  | 2; Analog potentiometer; resolution 8 bit  | 2; Analog potentiometer; resolution 8 bit   | 2; Analog potentiometer; resolution 8 bit   |
| <b>Encoder supply</b>                               |   |   |  |  |  |   |   |
| 24 V encoder supply                                 |   |   |  |  |  |   |   |
| • 24 V  | Yes; permissible range: 15.4 to 28.8 V  | Yes; permissible range: 20.4 bis 28.8 V   | Yes; permissible range: 15.4 to 28.8 V   | Yes; permissible range: 20.4 bis 28.8 V  | Yes; permissible range: 15.4 to 28.8 V   | Yes; permissible range: 15.4 to 28.8 V  | Yes; permissible range: 20.4 bis 28.8 V   |
| • Short-circuit protection                          | Yes; electronic at 280 mA   | Yes; electronic at 280 mA   | Yes; electronic at 280 mA  | Yes; electronic at 280 mA  | Yes; electronic at 280 mA  | Yes; electronic at 400 mA   | Yes; electronic at 400 mA   |
| • Output current, max.                              | 280 mA  | 280 mA  | 280 mA   | 280 mA   | 280 mA   | 400 mA  | 400 mA  |
| <b>Encoder</b>                                      |   |   |  |  |  |   |   |
| Connectable encoders                                |   |   |  |  |  |   |   |
| • 2-wire BERS                                       | Yes   | Yes   | Yes  | Yes  | Yes  | Yes   | Yes   |
| - permissible quiescent current (2-wire BERS), max. | 1 mA  | 1 mA  | 1 mA   | 1 mA   | 1 mA   | 1 mA  | 1 mA  |
| <b>Integrated Functions</b>                         |   |   |  |  |  |   |   |
| Number of counters                                  | 6; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 6; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 6; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bit (incl. sign), can be used as up/down counters or for connecting incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 6; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bit (incl. sign), can be used as up/down counters or for connecting incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 6; High-speed counters (2 to 200 kHz and 4 to 30 kHz), 32 bit (incl. sign), can be used as up/down counters or for connecting incremental encoders with 2 pulse trains offset by 90° (max. 1 to 100 kHz and 3 to 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 6; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. | 6; High-speed counters (30 kHz each), 32 bit (incl. sign), can be used as up/down counters or for connecting 2 incremental encoders with 2 pulse trains offset by 90° (max. 20 kHz (A/B counters)); parameterizable enable and reset input; interrupt facilities (incl. call of subroutine with any content) when the setpoint is reached; reversal in counting direction, etc. |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 Xpsi, CPU 226

## Technical specifications (continued)

|   | 6ES7 214-1AD23-0XB0   | 6ES7 214-1BD23-0XB0   | 6ES7 214-2AD23-0XB0   | 6ES7 214-2BD23-0XB0   | 6ES7 214-2AS23-0XB0   | 6ES7 216-2AD23-0XB0   | 6ES7 216-2BD23-0XB0   |
|---|---|---|---|---|---|---|---|
| Counter frequency (counter) max.        | 30 kHz  | 30 kHz  | 200 kHz   | 200 kHz   | 200 kHz   | 30 kHz  | 30 kHz  |
| Number of alarm inputs                  | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges                                      | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges                                      | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges  | 4; 4 rising edges and/or 4 falling edges                                      |
| Number of pulse outputs                 | 2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option |   | 2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option |   | 2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option | 2; high-speed outputs, 20 kHz, with interrupt option; pulse-width and frequency modulation option |   |
| Limit frequency (pulse)                 | 20 kHz  |   | 20 kHz  |   | 20 kHz  | 20 kHz  |   |
| <b>Galvanic isolation</b>               |   |   |   |   |   |   |   |
| Galvanic isolation digital inputs       |   |   |   |   |   |   |   |
| • between the channels                  | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes; Optocoupler  |
| • between the channels, in groups of    | 6 and 8   | 6 and 8   | 6 and 8   | 6 and 8   | 6 and 8   | 13 and 11   | 13 and 11   |
| Galvanic isolation digital outputs      |   |   |   |   |   |   |   |
| • between the channels                  | Yes; Optocoupler  | Yes; Relay  | Yes; Optocoupler  | Yes; Relay  | Yes; Optocoupler  | Yes; Optocoupler  | Yes; Relay  |
| • between the channels, in groups of    | 5   | 3 and 4   | 5   | 3 and 4   | 10  | 8 and 8   | 4, 5 and 7  |
| <b>Permissible potential difference</b> |   |   |   |   |   |   |   |
| between different circuits              | 500 V DC between 24 V DC and 5 V DC   | 500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC   | 500 V DC between 24 V DC and 5 V DC   | 500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC   | 500 V DC between 24 V DC and 5 V DC   | 500 V DC between 24 V DC and 5 V DC   | 500 V DC between 24 V DC and 5 V DC; 1500 V AC between 24 V DC and 230 V AC   |
| <b>Environmental requirements</b>       |   |   |   |   |   |   |   |
| Environmental conditions                | For further ambient conditions, see "Automation System S7-200, System Manual"                     | For further ambient conditions, see "Automation System S7-200, System Manual" | For further ambient conditions, see "Automation System S7-200, System Manual"                     | For further ambient conditions, see "Automation System S7-200, System Manual" | For further ambient conditions, see "Automation System S7-200, System Manual"                     | For further ambient conditions, see "Automation System S7-200, System Manual"                     | For further ambient conditions, see "Automation System S7-200, System Manual" |
| Operating temperature                   |   |   |   |   |   |   |   |
| • vertical installation, min.           | 0 °C  | 0 °C  | 0 °C  | 0 °C  | 0 °C  | 0 °C  | 0 °C  |
| • vertical installation, max.           | 45 °C   | 45 °C   | 45 °C   | 45 °C   | 45 °C   | 45 °C   | 45 °C   |
| • horizontal installation, min.         | 0 °C  | 0 °C  | 0 °C  | 0 °C  | 0 °C  | 0 °C  | 0 °C  |
| • horizontal installation, max.         | 55 °C   | 55 °C   | 55 °C   | 55 °C   | 55 °C   | 55 °C   | 55 °C   |
| Air pressure                            |   |   |   |   |   |   |   |
| • permissible range, min.               | 860 hPa   | 860 hPa   | 860 hPa   | 860 hPa   | 860 hPa   | 860 hPa   | 860 hPa   |
| • permissible range, max.               | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   | 1 080 hPa   |
| Relative humidity                       |   |   |   |   |   |   |   |
| • Operation, min.                       | 5 %   | 5 %   | 5 %   | 5 %   | 5 %   | 5 %   | 5 %   |
| • Operation, max.                       | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2                                | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2                                | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2  | 95 %; RH class 2 in accordance with IEC 1131-2                                |

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPSi, CPU 226

### Technical specifications (continued)

|                              | 6ES7 214-1AD23-0XB0 | 6ES7 214-1BD23-0XB0 | 6ES7 214-2AD23-0XB0 | 6ES7 214-2BD23-0XB0 | 6ES7 214-2AS23-0XB0 | 6ES7 216-2AD23-0XB0 | 6ES7 216-2BD23-0XB0 |
|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <b>Degree of protection</b>  |                     |                     |                     |                     |                     |                     |                     |
| IP20                         | Yes                 | Yes                 | Yes                 | Yes                 | Yes                 | Yes                 | Yes                 |
| <b>Dimensions and weight</b> |                     |                     |                     |                     |                     |                     |                     |
| Dimensions                   |                     |                     |                     |                     |                     |                     |                     |
| • Width                      | 120.5 mm            | 120.5 mm            | 140 mm              | 140 mm              | 140 mm              | 196 mm              | 196 mm              |
| • Height                     | 80 mm               | 80 mm               | 80 mm               | 80 mm               | 80 mm               | 80 mm               | 80 mm               |
| • Depth                      | 62 mm               | 62 mm               | 62 mm               | 62 mm               | 62 mm               | 62 mm               | 62 mm               |
| Weight                       |                     |                     |                     |                     |                     |                     |                     |
| • Weight, approx.            | 360 g               | 410 g               | 390 g               | 440 g               | 390 g               | 550 g               | 660 g               |

## SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPsi, CPU 226

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| Ordering data   | Order No.  | Order No.  |
|---|--|--|
| <b>CPU 221</b><br>Compact CPU, work memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated<br>Compact CPU, work memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs   | <b>6ES7 211-0AA23-0XB0</b><br><b>6ES7 211-0BA23-0XB0</b> | <b>S7-200 True Power Box</b><br>Complete package, comprising CPU 222, STEP 7 Micro/WIN V4, simulator, intelligent USB/PPI multi-master cable, manual; delivered in a practical box<br>German J <b>6ES7 298-0AA20-0AA3</b><br>English J <b>6ES7 298-0AA20-0BA3</b>  |
| <b>CPU 222</b><br>Compact CPU, expandable, work memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated<br>Compact CPU, expandable, work memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs   | <b>6ES7 212-1AB23-0XB0</b><br><b>6ES7 212-1BB23-0XB0</b> | <b>MC 291 memory module, EEPROM</b><br>for CPU 221/222//224/224 XP/226<br>64 KB <b>6ES7 291-8GF23-0XA0</b><br>256 KB <b>6ES7 291-8GH23-0XA0</b>  |
| <b>CPU 224</b><br>Compact CPU, expandable, work memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated<br>Compact CPU, expandable, work memory 8/12 KB program, 8 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO integrated, relay outputs                               | <b>6ES7 214-1AD23-0XB0</b><br><b>6ES7 214-1BD23-0XB0</b> | <b>Ground terminal</b><br>10 units <b>6ES5 728-8MA11</b><br><b>Front flap set</b><br>contains various cover flaps for CPUs and EMs; spare part <b>6ES7 291-3AX20-0XA0</b>  |
| <b>CPU 224 XP</b><br>Compact CPU, expandable, work memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated<br>Compact CPU, expandable, work memory 12/16 KB program, 10 KB data, power supply 100 V to 230 V AC, 14 DI/10 DO (relay outputs)/ 2 AI/1 AO integrated | <b>6ES7 214-2AD23-0XB0</b><br><b>6ES7 214-2BD23-0XB0</b> | <b>SIM 274 simulator (optional)</b><br>with 8 terminals for CPU 221/222 <b>6ES7 274-1XF00-0XA0</b><br>with 14 terminals for CPU 224/224 XP <b>6ES7 274-1XH00-0XA0</b><br>with 24 terminals for CPU 226 <b>6ES7 274-1XK00-0XA0</b>  |
| <b>CPU 224 XPsi</b><br>Compact CPU, with current-sinking outputs, expandable, work memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/ 2 AI/1 AO integrated   | <b>6ES7 214-2AS23-0XB0</b>                               | <b>Pluggable terminal block (spare part)</b><br>With 12 terminals (for CPU 22x) I <b>6ES7 292-1AE20-0AA0</b><br>With 18 terminals (for CPU 224/224 XP) I <b>6ES7 292-1AG20-0AA0</b><br>With 14 terminals (for CPU 226) I <b>6ES7 292-1AF20-0AA0</b>  |
| <b>CPU 226</b><br>Compact CPU, expandable, work memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated<br>Compact CPU, expandable, work memory 16/24 KB program, 10 KB data, power supply 100 V to 230 V AC, 24 DI/16 DO integrated, relay outputs                           | <b>6ES7 216-2AD23-0XB0</b><br><b>6ES7 216-2BD23-0XB0</b> | <b>Intelligent RS 232/PPI multi-master cable</b><br>For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network <b>6ES7 901-3CB30-0XA0</b><br><b>Intelligent USB/PPI multi-master cable</b><br>For connecting devices with an USB interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network <b>6ES7 901-3DB30-0XA0</b> |
|   |  | <b>MPI cable</b><br>5 m; for connecting the S7-200 to MPI <b>6ES7 901-0BF00-0AA0</b>   |
|   |  | <b>Backplane bus expansion cable</b> I <b>6ES7 290-6AA20-0XA0</b><br>for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226   |

I: Subject to export regulations AL: N and ECCN: EAR99H

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## Central processing units

CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 224 XPSi, CPU 226

| Ordering data   | Order No.                  | Order No.  |
|---|----------------------------|--|
| <b>Optional battery module</b>  | <b>6ES7 291-8BA20-0XA0</b> |  |
| <b>Optional combined clock and battery module</b>   | <b>6ES7 297-1AA23-0XA0</b> |  |
| only for CPU 221/222  |                            |  |
| <b>S7-200 programmable controller, system manual</b>  |                            |  |
| for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4  |                            |  |
| German  | <b>6ES7 298-8FA24-8AH0</b> |  |
| English   | <b>6ES7 298-8FA24-8BH0</b> |  |
| French  | <b>6ES7 298-8FA24-8CH0</b> |  |
| Spanish   | <b>6ES7 298-8FA24-8DH0</b> |  |
| Italian   | <b>6ES7 298-8FA24-8EH0</b> |  |
| Chinese   | <b>6ES7 298-8FA24-8FH0</b> |  |
| <b>SIMATIC manual collection</b> J  | <b>6ES7 998-8XC01-8YE0</b> |  |
| Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC |                            |  |
| <b>SIMATIC manual collection update service for 1 year</b> D  | <b>6ES7 998-8XC01-8YE2</b> |  |
| Current Manual Collection DVD and the three subsequent updates  |                            |  |
|   |                            | <b>STEP 7 Micro/WIN32 V4 programming software</b>  |
|   |                            | Target system:<br>All CPUs of the SIMATIC S7-200<br>Requirements:<br>Windows 2000/XP on PG or PC<br>Type of delivery:<br>German, English, French, Spanish, Italian, Chinese; with online documentation |
|   |                            | Single license J <b>6ES7 810-2CC03-0YX0</b>  |
|   |                            | Upgrade Single License <sup>1)</sup> J <b>6ES7 810-2CC03-0YX3</b>  |
|   |                            | <b>PROFIBUS bus connector, IP20 with 90° cable outlet</b>  |
|   |                            | • Without PG connection <b>6ES7 972-0BA12-0XA0</b>   |
|   |                            | • With PG connection <b>6ES7 972-0BB12-0XA0</b>  |
|   |                            | <b>PROFIBUS bus connector, IP20 with 35° cable outlet</b>  |
|   |                            | • Without PG connection <b>6ES7 972-0BA42-0XA0</b>   |
|   |                            | • with PG connection <b>6ES7 972-0BB42-0XA0</b>  |
|   |                            | <b>PROFIBUS FC standard cable</b>  |
|   |                            | <b>6XV1 830-0EH10</b>  |
|   |                            | For connection to PPI; standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m                            |
|   |                            | <b>RS 485 repeater for PROFIBUS</b>  |
|   |                            | <b>6ES7 972-0AA02-0XA0</b>   |

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

D: Subject to export regulations AL: N and ECCN: 5D992

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## SIPLUS central processing units

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 226

### Overview SIPLUS CPU 221



- The clever compact solution
- With 10 inputs/outputs on board
- Cannot be expanded

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS CPU 221  |  |                     |
|---|--|---------------------|
| Order number  | 6AG1 211-0AA23-2XB0  | 6AG1 211-0BA23-2XB0 |
| Order No. based on  | 6ES7 211-0AA23-0XB0  | 6ES7 211-0BA23-0XB0 |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                     |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                     |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                     |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                 |
| Approvals   | CE, cUL  |                     |

#### Ambient conditions

|  |   |  |
|--|---|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible   |  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>   |  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K |  |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH<sub>3</sub> < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH<sub>3</sub> < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)



# SIMATIC S7-200

## SIPLUS central processing units

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 226

### Overview SIPLUS CPU 222



- The superior compact solution
- With 14 input/outputs on board
- Expandable with up to 2 expansion modules

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS CPU 222  |  |                     |
|---|--|---------------------|
| Order number  | 6AG1 212-1AB23-2XB0  | 6AG1 212-1BB23-2XB0 |
| Order No. based on  | 6ES7 212-1AB23-0XB0  | 6ES7 212-1BB23-0XB0 |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                     |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                     |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                     |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                 |
| Approvals   | CE, cUL  |                     |

#### Ambient conditions

|  |   |  |
|--|---|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible   |  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>   |  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K |  |

1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS central processing units

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 226

### Overview SIPLUS CPU 224



- The compact high-performance CPU
- With 24 input/outputs on board
- Expandable with up to 7 expansion modules

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS CPU 224  |  |                     |
|---|--|---------------------|
| Order number  | 6AG1 214-1AD23-2XB0  | 6AG1 214-1BD23-2XB0 |
| Order No. based on  | 6ES7 214-1AD23-0XB0  | 6ES7 214-1BD23-0XB0 |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                     |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                     |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                     |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                 |
| Approvals   | CE, cUL  |                     |

#### Ambient conditions

|  |   |  |
|--|---|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible   |  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>   |  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K |  |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS central processing units

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 226

### Overview SIPLUS CPU 224 XP



- The power CPU
- With 24 digital and 3 analog I/Os onboard
- Expandable with up to 7 expansion modules

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS CPU 224 XP   |   |                            |
|---|---|----------------------------|
| <b>Order number</b>   | <b>6AG1 214-2AD23-2XB0</b>  | <b>6AG1 214-2BD23-2XB0</b> |
| <b>Order No. based on</b>   | <b>6ES7 214-2AD23-0XB0</b>  | <b>6ES7 214-2BD23-0XB0</b> |
| Ambient temperature range   | -25 ... +70 °C  |                            |
| Conformal coating   | Coating of the printed circuit boards and the electronic components   |                            |
| Technical data  | The technical data of the standard product applies except for the ambient conditions  |                            |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No  | No                         |
| Approvals   | CE  |                            |
| <b>Ambient conditions</b>   |   |                            |
| Relative humidity   | 5 ... 100 %<br>Condensation permissible   |                            |
| Biologically active substances  | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |                            |
| Chemically active substances  | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>   |                            |
| Mechanically active substances  | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |                            |
| Air pressure (depending on the highest positive temperature range specified)  | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K |                            |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH<sub>3</sub> < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH<sub>3</sub> < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS central processing units

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP, CPU 226

### Overview SIPLUS CPU 226



- The power pack for larger technical tasks
- With additional PPI connection for even more flexibility and communication facilities
- With 40 input/outputs on board
- Expandable with up to 7 expansion modules

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS CPU 226  |  |                     |
|---|--|---------------------|
| Order number  | 6AG1 216-2AD23-2XB0  | 6AG1 216-2BD23-2XB0 |
| Order No. based on  | 6ES7 216-2AD23-0XB0  | 6ES7 216-2BD23-0XB0 |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                     |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                     |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                     |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                 |
| Approvals   | CE, cUL  |                     |

#### Ambient conditions

|  |   |  |
|--|---|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible   |  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>   |  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K |  |

1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS central processing units

SIPLUS CPU 221, CPU 222, CPU 224, CPU 224 XP,  
CPU 226

| Ordering data   | Order No.                  | Order No.   |
|---|----------------------------|---|
| <b>SIPLUS CPU 221</b><br>(extended temperature and media exposure)<br>Compact-CPU, work memory 4 KByte, power supply DC 24 V, 6 DE/4 DA integrated          | <b>6AG1 211-0AA23-2XB0</b> |   |
| Compact-CPU, work memory 4 KByte, power supply AC 100 to 230 V, 6 DE/4 DA integrated, relay outputs   | <b>6AG1 211-0BA23-2XB0</b> |   |
| <b>SIPLUS CPU 222</b><br>(extended temperature range and media exposure)  | <b>6AG1 212-1AB23-2XB0</b> |   |
| Compact CPU, expandable, 4 KB work memory, 24 V DC supply voltage, 8 DI/6 DO integrated   | <b>6AG1 212-1BB23-2XB0</b> |   |
| <b>SIPLUS CPU 224</b><br>(extended temperature range and media exposure)  | <b>6AG1 214-1AD23-2XB0</b> |   |
| Compact CPU, expandable, work memory 8/12 KB for program and 8 KB for data, 24 V DC supply voltage, 14 DI/10 DO integrated                                  | <b>6AG1 214-1BD23-2XB0</b> |   |
| Compact CPU, expandable, work memory 8/12 KB for program, 8 KB for data, 100-230 V AC supply voltage, 14 DI/10 DO integrated, relay outputs                 |                            |   |
| <b>SIPLUS CPU 224 XP</b><br>(extended temperature range and media exposure)   |                            |   |
| Compact CPU, expandable, work memory 12/16 KB for program, 10 KB for data, 24 V DC supply voltage, 14 DI/10 DO/2 AI/1 AO integrated                         | <b>6AG1 214-2AD23-2XB0</b> |   |
| Compact CPU, expandable, work memory 12/16 KB for program, 10 KB for data, 100 to 230 V AC supply voltage, 14 DI/10 DO (relay outputs)/2 AI/1 AO integrated | <b>6AG1 214-2BD23-2XB0</b> |   |
| <b>SIPLUS CPU 226</b><br>(extended temperature range and media exposure)  |                            |   |
| Compact CPU, expandable, work memory 16/24 KB for program, 10 KB for data, 24 V DC supply voltage, 24 DI/16 DO integrated                                   | <b>6AG1 216-2AD23-2XB0</b> |   |
| Compact CPU, expandable, work memory 16/24 KB for program, 10 KB for data, 100-230 V AC supply voltage, 24 DI/16 DO integrated, relay outputs               | <b>6AG1 216-2BD23-2XB0</b> |   |
| <b>Accessories</b><br><b>SIPLUS Upminter upstream device</b>  |                            | <b>6AG1 203-1AA00-2AA0</b>                                    |
| for reliable operation at the battery of combustion engines   |                            |   |
| <b>Additional accessories</b>   |                            | See SIMATIC S7-200 CPU 222 central processing unit, page 3/22 |

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

L: Subject to export regulations AL: 91999 and ECCN: N

# SIMATIC S7-200

## Digital modules

EM 221, EM 222, EM 223

### Overview



- Digital inputs/outputs to supplement the onboard I/Os of the CPUs
- For flexible adaptation of PLC to respective task
- For subsequent upgrading of the system with additional inputs and outputs

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### Technical specifications EM 221

|  | 6ES7 221-1BH22-0XA0 | 6ES7 221-1BF22-0XA0 | 6ES7 221-1EF22-0XA0               |
|--|---------------------|---------------------|-----------------------------------|
| <b>Current consumption</b>                           |                     |                     |                                   |
| from backplane bus 5 V DC, max.                      | 70 mA               | 30 mA               | 30 mA                             |
| <b>Power losses</b>                                  |                     |                     |                                   |
| Power loss, typ.                                     | 3 W                 | 2 W                 | 3 W                               |
| <b>Connection method</b>                             |                     |                     |                                   |
| Plug-in I/O terminals                                | Yes                 | Yes                 | Yes                               |
| <b>Digital inputs</b>                                |                     |                     |                                   |
| Number of digital inputs                             | 16                  | 8                   | 8                                 |
| m/p-reading  | Yes                 | Yes                 |                                   |
| Input characteristic curve acc. to IEC 1131, Type 1  | Yes                 |                     | Yes                               |
| Input voltage  |                     |                     |                                   |
| • Rated value, AC                                    |                     |                     | 230 V; 220/230 V AC (47 to 63 Hz) |
| • Rated value, DC                                    | 24 V                | 24 V                |                                   |
| • for signal "0"                                     | 0 to 5 V            | 0 to 5 V            | up to 20 V AC                     |
| • for signal "1"                                     | 15 to 30 V          | 15 to 30 V          | 79 V AC or more                   |
| Input current  |                     |                     |                                   |
| • for signal "1", typ.                               | 4 mA                | 4 mA                | 2.5 mA                            |
| Input delay (for rated value of input voltage)       |                     |                     |                                   |
| • for standard inputs                                |                     |                     |                                   |
| - at "0" to "1", max.                                | 4.5 ms              | 4.5 ms              | 15 ms                             |
| Cable length   |                     |                     |                                   |
| • Cable length, shielded, max.                       | 500 m               | 500 m               | 500 m                             |
| • Cable length unshielded, max.                      | 300 m               | 300 m               | 300 m                             |
| <b>Encoder</b>                                       |                     |                     |                                   |
| Connectable encoders                                 |                     |                     |                                   |
| • 2-wire BEROS                                       | Yes                 | Yes                 | Yes                               |
| - permissible quiescent current (2-wire BEROS), max. | 1 mA                | 1 mA                | 1 mA                              |

### Technical specifications EM 221 (continued)

|  | 6ES7 221-1BH22-0XA0   | 6ES7 221-1BF22-0XA0   | 6ES7 221-1EF22-0XA0               |
|--|-----------------------|-----------------------|-----------------------------------|
| <b>Galvanic isolation</b>  |                       |                       |                                   |
| Galvanic isolation digital inputs                                      |                       |                       |                                   |
| • Galvanic isolation digital inputs between the channels, in groups of | Yes; Optocoupler<br>4 | Yes; Optocoupler<br>4 | Yes; Optocoupler<br>1; (8 groups) |
| <b>Dimensions and weight</b>   |                       |                       |                                   |
| Dimensions   |                       |                       |                                   |
| • Width  | 71.2 mm               | 46 mm                 | 71.2 mm                           |
| • Height   | 80 mm                 | 80 mm                 | 80 mm                             |
| • Depth  | 62 mm                 | 62 mm                 | 62 mm                             |
| Weight   |                       |                       |                                   |
| • Weight, approx.  | 160 g                 | 150 g                 | 160 g                             |

### Technical specifications EM 222

|   | 6ES7 222-1BD22-0XA0 | 6ES7 222-1BF22-0XA0   |
|---|---------------------|---|
| <b>Supply voltages</b>                                  |                     |   |
| Load voltage L+   |                     |   |
| • Rated value (DC)                                      | 24 V                | 24 V  |
| • permissible range, lower limit (DC)                   | 20.4 V              | 20.4 V  |
| • permissible range, upper limit (DC)                   | 28.8 V              | 28.8 V  |
| <b>Current consumption</b>                              |                     |   |
| from backplane bus 5 V DC, max.                         | 40 mA               | 50 mA   |
| <b>Power losses</b>                                     |                     |   |
| Power loss, typ.  | 3 W                 | 2 W   |
| <b>Connection method</b>                                |                     |   |
| Plug-in I/O terminals                                   | Yes                 | Yes   |
| <b>Digital outputs</b>                                  |                     |   |
| Number of digital outputs                               | 4                   | 8   |
| Short-circuit protection                                | No                  | No; to be provided externally (see manual package "Setting up an S7-200") |
| Limitation of inductive shutdown voltage to             | L+ (-48 V)          | L+ (-48 V)  |
| Output voltage  |                     |   |
| • for signal "1", min.                                  | 20 V DC             | 20 V  |
| Output current  |                     |   |
| • for signal "1" permissible range for 0 to 55 °C, max. | 5 A                 | 750 mA  |
| • for signal "0" residual current, max.                 | 30 µA               | 10 µA   |
| Parallel switching of 2 outputs                         |                     |   |
| • for increased power                                   |                     | Yes   |
| Aggregate current of outputs (per group)                |                     |   |
| • horizontal installation                               |                     |   |
| - up to 55 °C, max.                                     | 20 A                | 3 A   |
| • up to 40 °C, max.                                     | 20 A                | 3 A   |
| • maximum current per conductor/group                   | 5 A                 | 3 A   |
| Cable length  |                     |   |
| • Cable length, shielded, max.                          | 500 m               | 500 m   |
| • Cable length unshielded, max.                         | 150 m               | 150 m   |

# SIMATIC S7-200

## Digital modules

EM 221, EM 222, EM 223

**Technical specifications EM 222** (continued)

|   | 6ES7 222-1BD22-0XA0   | 6ES7 222-1BF22-0XA0   |   |
|---|---|---|---|
| <b>Relay outputs</b>                        |   |   |   |
| Switching capacity of contacts              |   |   |   |
| • with inductive load, max.                 | 5 A   | 0.75 A  |   |
| • on lamp load, max.                        | 50 W  | 5 W   |   |
| • with resistive load, max.                 | 5 A   | 0.75 A  |   |
| <b>Galvanic isolation</b>                   |   |   |   |
| Galvanic isolation digital outputs          |   |   |   |
| • Galvanic isolation digital outputs        | Yes   | Yes; Optocoupler  |   |
| • Between the channels, in groups of        | 1   | 4   |   |
| <b>Dimensions and weight</b>                |   |   |   |
| Dimensions                                  |   |   |   |
| • Width                                     | 45 mm   | 45 mm   |   |
| • Height                                    | 80 mm   | 80 mm   |   |
| • Depth                                     | 62 mm   | 62 mm   |   |
| Weight                                      |   |   |   |
| • Weight, approx.                           | 120 g   | 150 g   |   |
|   | 6ES7 222-1HD22-0XA0   | 6ES7 222-1HF22-0XA0   | 6ES7 222-1EF22-0XA0   |
| <b>Supply voltages</b>                      |   |   |   |
| Load voltage L+                             |   |   |   |
| • Rated value (DC)                          | 24 V  | 24 V  |   |
| • Permissible range, lower limit (DC)       | 12 V  | 5 V   |   |
| • Permissible range, upper limit (DC)       | 30 V  | 30 V  |   |
| Load voltage L1                             |   |   |   |
| • Rated value (AC)                          | 24 V; 24 to 230 V AC  | 24 V; 24 to 230 V AC  | 230 V; 220/230 V AC   |
| • Permissible range, lower limit (AC)       | 12 V  | 5 V   | 65 V  |
| • Permissible range, upper limit (AC)       | 250 V   | 250 V   | 264 V   |
| • Permissible frequency range, lower limit  |   | 47 Hz   | 47 Hz   |
| • Permissible frequency range, upper limit  |   | 63 Hz   | 63 Hz   |
| <b>Current consumption</b>                  |   |   |   |
| from backplane bus 5 V DC, max.             | 30 mA   | 40 mA   | 110 mA  |
| Digital outputs                             |   |   |   |
| • from load voltage L+, max.                | 80 mA; 20 mA per switched output  | 72 mA; 9 mA per switched output   |   |
| <b>Power losses</b>                         |   |   |   |
| Power loss, typ.                            | 4 W   | 2 W   | 4 W   |
| <b>Connection method</b>                    |   |   |   |
| Plug-in I/O terminals                       | Yes   | Yes   | Yes   |
| <b>Digital outputs</b>                      |   |   |   |
| Number of digital outputs                   | 4; Relay  | 8; Relay  | 8   |
| Short-circuit protection                    | No; to be provided externally (see manual package "Setting up an S7-200") | No; to be provided externally (see manual package "Setting up an S7-200") | No; to be provided externally (see manual package "Setting up an S7-200") |
| Limitation of inductive shutdown voltage to | to be provided externally (see manual package "Setting up an S7-200")     | to be provided externally (see manual package "Setting up an S7-200")     | to be provided externally (see manual package "Setting up an S7-200")     |
| Output voltage                              |   |   |   |
| • for signal "1", min.                      |   |   | L1 (-0.9 V)   |



**Technical specifications EM 222** (continued)

|   | 6ES7 222-1HD22-0XA0   | 6ES7 222-1HF22-0XA0  | 6ES7 222-1EF22-0XA0 |
|---|---|--|---------------------|
| Output current  |   |  |                     |
| • for signal "1" permissible range for 0 to 55 °C, max. | 10 A  | 2 A  | 500 mA; AC          |
| • for signal "1" minimum load current                   |   |  | 50 mA               |
| • for signal "0" residual current, max.                 | 0 mA  | 0 mA   | 1.8 mA; at 264 V AC |
| Aggregate current of outputs (per group)                |   |  |                     |
| • Horizontal installation                               |   |  |                     |
| - up to 55 °C, max.                                     | 20 A  | 8 A  | 0.5 A               |
| • Up to 40 °C, max.                                     | 40 A  | 8 A  | 0.5 A               |
| • Maximum current per conductor/group                   | 10 A  | 8 A  | 0.5 A               |
| Cable length  |   |  |                     |
| • Cable length, shielded, max.                          | 500 m   | 500 m  | 500 m               |
| • Cable length unshielded, max.                         | 150 m   | 150 m  | 150 m               |
| <b>Relay outputs</b>                                    |   |  |                     |
| Number of operating cycles                              | 30 000 000; mechanically 30 million, at rated load voltage 30,000 | 10 000 000; mechanically 10 million, at rated load voltage 100,000 |                     |
| Switching capacity of contacts                          |   |  |                     |
| • with inductive load, max.                             | 3 A; 2 A (DC), 3 A (AC)   | 2 A  | 0.5 A               |
| • on lamp load, max.                                    | 1 000 W; 100/1000 W (DC/AC)                                       | 200 W; 30 W DC; 200 W AC   | 60 W                |
| • with resistive load, max.                             | 10 A  | 2 A  | 0.5 A               |
| <b>Galvanic isolation</b>                               |   |  |                     |
| Galvanic isolation digital outputs                      |   |  |                     |
| • Galvanic isolation digital outputs                    | Yes; Relay  | Yes; Relay   | Yes; Optocoupler    |
| • Between the channels, in groups of                    | 1; 4 groups   | 4  | 1; 8 groups         |
| <b>Dimensions and weight</b>                            |   |  |                     |
| Dimensions  |   |  |                     |
| • Width   | 45 mm   | 45 mm  | 71.2 mm             |
| • Height  | 80 mm   | 80 mm  | 80 mm               |
| • Depth   | 62 mm   | 62 mm  | 62 mm               |
| Weight  |   |  |                     |
| • Weight, approx.                                       | 150 g   | 170 g  | 170 g               |

**Technical specifications EM 223**

|   | 6ES7 223-1BF22-0XA0 | 6ES7 223-1BH22-0XA0 | 6ES7 223-1BL22-0XA0 | 6ES7 223-1BM22-0XA0   |
|---|---------------------|---------------------|---------------------|-----------------------|
| <b>Supply voltages</b>  |                     |                     |                     |                       |
| Load voltage L+   |                     |                     |                     |                       |
| • Rated value (DC)  | 24 V                | 24 V                | 24 V                | 24 V                  |
| • Permissible range, lower limit (DC)                                 | 20.4 V              | 20.4 V              | 20.4 V              | 20.4 V                |
| • Permissible range, upper limit (DC)                                 | 28.8 V              | 28.8 V              | 28.8 V              | 28.8 V                |
| <b>Current consumption</b>  |                     |                     |                     |                       |
| from backplane bus 5 V DC, max.                                       | 40 mA               | 80 mA               | 160 mA              | 240 mA                |
| from sensor current supply or external current supply (24 V DC), max. |                     |                     |                     | 128 mA; ON: 4ma/Input |
| <b>Power losses</b>   |                     |                     |                     |                       |
| Power loss, typ.  | 2 W                 | 3 W                 | 6 W                 | 9 W                   |
| <b>Connection method</b>  |                     |                     |                     |                       |
| Plug-in I/O terminals   | Yes                 | Yes                 | Yes                 | Yes                   |

# SIMATIC S7-200

## Digital modules

EM 221, EM 222, EM 223

**Technical specifications EM 223** (continued)

|  | 6ES7 223-1BF22-0XA0           | 6ES7 223-1BH22-0XA0           | 6ES7 223-1BL22-0XA0           | 6ES7 223-1BM22-0XA0               |
|--|-------------------------------|-------------------------------|-------------------------------|-----------------------------------|
| <b>Digital inputs</b>                                |                               |                               |                               |                                   |
| Number of digital inputs                             | 4                             | 8                             | 16                            | 32                                |
| Input voltage  |                               |                               |                               |                                   |
| • Rated value, DC                                    | 24 V                          | 24 V                          | 24 V                          | 24 V                              |
| • for signal "0"                                     | 0 to 5 V                      | 0 to 5 V                      | 0 to 5 V                      | 0 to 5 V                          |
| • for signal "1"                                     | 15 to 30 V DC                 | 15 to 30 V DC                 | 15 to 30 V DC                 | 15 to 30 V DC                     |
| Input current  |                               |                               |                               |                                   |
| • for signal "1", typ.                               | 4 mA                          | 4 mA                          | 4 mA                          | 4 mA                              |
| Input delay (for rated value of input voltage)       |                               |                               |                               |                                   |
| • for standard inputs                                |                               |                               |                               |                                   |
| - at "0" to "1", max.                                | 4.5 ms                        | 4.5 ms                        | 4.5 ms                        | 4.5 ms                            |
| <b>Digital outputs</b>                               |                               |                               |                               |                                   |
| Number of digital outputs                            | 4                             | 8                             | 16                            | 32                                |
| Short-circuit protection                             | No; to be provided externally | No; to be provided externally | No; to be provided externally | No; to be provided externally     |
| Limitation of inductive shutdown voltage to          | L+ (-48 V)                    | L+ (-48 V)                    | L+ (-48 V)                    | L+ (-48 V)                        |
| Output voltage                                       |                               |                               |                               |                                   |
| • for signal "0" (DC), max.                          | 0.1 V                         | 0.1 V                         | 0.1 V                         | 0.1 V                             |
| • for signal "1", min.                               | 20 V                          | 20 V                          | 20 V                          | 20 V                              |
| Output current                                       |                               |                               |                               |                                   |
| • for signal "1" rated value                         | 750 mA                        | 750 mA                        | 750 mA                        | 750 mA                            |
| Aggregate current of outputs (per group)             |                               |                               |                               |                                   |
| • Maximum current per conductor/group                | 3 A                           | 3 A                           | 3 A; 3 / 3 / 6                | 0.75 A; 10 A per group            |
| Cable length   |                               |                               |                               |                                   |
| • Cable length, shielded, max.                       | 500 m                         | 500 m                         | 500 m                         | 500 m                             |
| • Cable length unshielded, max.                      | 150 m                         | 150 m                         | 150 m                         | 150 m                             |
| <b>Relay outputs</b>                                 |                               |                               |                               |                                   |
| Switching capacity of contacts                       |                               |                               |                               |                                   |
| • with inductive load, max.                          | 0.75 A; each output           | 0.75 A; each output           | 0.75 A; each output           | 0.75 A; each output               |
| • on lamp load, max.                                 | 5 W                           | 5 W                           | 5 W                           | 5 W                               |
| • with resistive load, max.                          | 0.75 A; each output           | 0.75 A; each output           | 0.75 A; each output           | 0.75 A; each output               |
| <b>Encoder</b>                                       |                               |                               |                               |                                   |
| Connectable encoders                                 |                               |                               |                               |                                   |
| • 2-wire BEROs                                       | Yes                           | Yes                           | Yes                           | Yes                               |
| - permissible quiescent current (2-wire BEROs), max. | 1 mA                          | 1 mA                          | 1 mA                          | 1 mA                              |
| <b>Isolation</b>                                     |                               |                               |                               |                                   |
| Isolation checked with                               | 500 V AC                      | 500 V AC                      | 500 V AC                      | 500 V AC                          |
| <b>Galvanic isolation</b>                            |                               |                               |                               |                                   |
| Galvanic isolation digital inputs                    |                               |                               |                               |                                   |
| • Galvanic isolation digital inputs                  | Yes; Optocoupler              | Yes; Optocoupler              | Yes; Optocoupler              | Yes; Optocoupler                  |
| • Between the channels, in groups of                 | 4                             | 4                             | 4                             | 16; 2 groups with 16 inputs each  |
| Galvanic isolation digital outputs                   |                               |                               |                               |                                   |
| • Galvanic isolation digital outputs                 | Yes; Optocoupler              | Yes; Optocoupler              | Yes; Optocoupler              | Yes; Optocoupler                  |
| • Between the channels, in groups of                 | 4                             | 4                             | 4; 4 / 4 / 8                  | 16; 2 groups with 16 outputs each |
| <b>Dimensions and weight</b>                         |                               |                               |                               |                                   |
| Dimensions   |                               |                               |                               |                                   |
| • Width  | 46 mm                         | 71.2 mm                       | 137.5 mm                      | 196 mm                            |
| • Height   | 80 mm                         | 80 mm                         | 80 mm                         | 80 mm                             |
| • Depth  | 62 mm                         | 62 mm                         | 62 mm                         | 62 mm                             |
| Weight   |                               |                               |                               |                                   |
| • Weight, approx.                                    | 160 g                         | 200 g                         | 360 g                         | 500 g                             |

**Technical specifications EM 223 (continued)**

|   | 6ES7 223-1HF22-0XA0                 | 6ES7 223-1PH22-0XA0                 | 6ES7 223-1PL22-0XA0                 | 6ES7 223-1PM22-0XA0                 |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <b>Supply voltages</b>  |                                     |                                     |                                     |                                     |
| Load voltage L+   |                                     |                                     |                                     |                                     |
| • Rated value (DC)  | 24 V                                | 24 V                                | 24 V                                | 24 V                                |
| • Permissible range, lower limit (DC)                                 | 5 V                                 | 5 V                                 | 5 V                                 | 5 V                                 |
| • Permissible range, upper limit (DC)                                 | 30 V                                | 30 V                                | 30 V                                | 30 V                                |
| Load voltage L1   |                                     |                                     |                                     |                                     |
| • Rated value (AC)  | 230 V; 24 to 230 V AC               | 230 V; 24 to 230 V AC               | 230 V; 24 to 230 V AC               | 230 V; 24 to 230 V AC               |
| • Permissible range, lower limit (AC)                                 | 5 V                                 | 5 V                                 | 5 V                                 | 5 V                                 |
| • Permissible range, upper limit (AC)                                 | 250 V                               | 250 V                               | 250 V                               | 250 V                               |
| <b>Current consumption</b>  |                                     |                                     |                                     |                                     |
| from backplane bus 5 V DC, max.                                       | 40 mA                               | 80 mA                               | 150 mA                              | 205 mA                              |
| from coil current, max.   | 9 mA; for each output on signal "1" | 9 mA; for each output on signal "1" | 9 mA; for each output on signal "1" | 9 mA; for each output on signal "1" |
| from sensor current supply or external current supply (24 V DC), max. | 72 mA                               | 72 mA                               | 72 mA                               | 128 mA                              |
| <b>Power losses</b>   |                                     |                                     |                                     |                                     |
| Power loss, typ.  | 2 W                                 | 3 W                                 | 6 W                                 | 13 W                                |
| <b>Connection method</b>  |                                     |                                     |                                     |                                     |
| Plug-in I/O terminals   | Yes                                 | Yes                                 | Yes                                 | Yes                                 |
| <b>Digital inputs</b>   |                                     |                                     |                                     |                                     |
| Number of digital inputs  | 4                                   | 8                                   | 16                                  | 32                                  |
| Input voltage   |                                     |                                     |                                     |                                     |
| • Rated value, DC   | 24 V                                | 24 V                                | 24 V                                | 24 V                                |
| • for signal "0"  | 0 to 5 V                            | 0 to 5 V                            | 0 to 5 V                            | 0 to 5 V                            |
| • for signal "1"  | 15 to 30 V DC                       | 15 to 30 V DC                       | 15 to 30 V DC                       | 15 to 30 V DC                       |
| Input current   |                                     |                                     |                                     |                                     |
| • for signal "1", typ.  | 4 mA                                | 4 mA                                | 4 mA                                | 4 mA                                |
| Input delay (for rated value of input voltage)                        |                                     |                                     |                                     |                                     |
| • for standard inputs - at "0" to "1", max.                           | 4.5 ms                              | 4.5 ms                              | 4.5 ms                              | 4.5 ms                              |
| <b>Digital outputs</b>  |                                     |                                     |                                     |                                     |
| Number of digital outputs   | 4; Relay                            | 8; Relay                            | 16; Relay                           | 32; Relay                           |
| Short-circuit protection  | No; to be provided externally       | No; to be provided externally       | No; to be provided externally       | No; to be provided externally       |
| Output voltage  |                                     |                                     |                                     |                                     |
| • for signal "0" (DC), max.   | 0.1 V; with 10 kOhm load L+/L1      | 0.1 V; with 10 kOhm load L+/L1      | 0.1 V; with 10 kOhm load L+/L1      | 0.1 V; with 10 kOhm load L+/L1      |
| • for signal "1", min.  |                                     |                                     |                                     |                                     |
| Output current  |                                     |                                     |                                     |                                     |
| • for signal "1" rated value  | 2 000 mA                            | 2 000 mA                            | 2 000 mA                            | 2 000 mA                            |
| Aggregate current of outputs (per group)                              |                                     |                                     |                                     |                                     |
| • Maximum current per conductor/group                                 | 8 A                                 | 8 A                                 | 8 A                                 | 2 A; 10 A per group                 |
| Cable length  |                                     |                                     |                                     |                                     |
| • Cable length, shielded, max.  | 500 m                               | 500 m                               | 500 m                               | 500 m                               |
| • Cable length unshielded, max.                                       | 150 m                               | 150 m                               | 150 m                               | 150 m                               |

# SIMATIC S7-200

## Digital modules

EM 221, EM 222, EM 223

**Technical specifications EM 223 (continued)**

|  | 6ES7 223-1HF22-0XA0  | 6ES7 223-1PH22-0XA0  | 6ES7 223-1PL22-0XA0  | 6ES7 223-1PM22-0XA0  |
|--|--|--|--|--|
| <b>Relay outputs</b>                                 |  |  |  |  |
| Number of operating cycles                           | 10 000 000; mechanically 10 million, at rated load voltage 100,000 | 10 000 000; mechanically 10 million, at rated load voltage 100,000 | 10 000 000; mechanically 10 million, at rated load voltage 100,000 | 10 000 000; mechanically 10 million, at rated load voltage 100,000 |
| <b>Switching capacity of contacts</b>                |  |  |  |  |
| • with inductive load, max.                          | 0.75 A; each output  | 0.75 A; each output  | 0.75 A; each output  | 0.75 A; each output  |
| • on lamp load, max.                                 | 200 W; 30 W DC; 200 W AC   | 200 W; 30 W DC; 200 W AC   | 200 W; 30 W DC; 200 W AC   | 200 W; 30 W DC; 200 W AC   |
| • with resistive load, max.                          | 0.75 A; each output  | 0.75 A; each output  | 0.75 A; each output  | 2 A; each output   |
| <b>Encoder</b>                                       |  |  |  |  |
| Connectable encoders                                 |  |  |  |  |
| • 2-wire BEROs                                       | Yes  | Yes  | Yes  | Yes  |
| - permissible quiescent current (2-wire BEROs), max. | 1 mA   | 1 mA   | 1 mA   | 1 mA   |
| <b>Isolation</b>                                     |  |  |  |  |
| Isolation checked with                               | 500 V AC   | 500 V AC   | 500 V AC   | 500 V AC   |
| <b>Galvanic isolation</b>                            |  |  |  |  |
| Galvanic isolation digital inputs                    |  |  |  |  |
| • Galvanic isolation digital inputs                  | Yes; Optocoupler   | Yes; Optocoupler   | Yes; Optocoupler   | Yes; Optocoupler   |
| • between the channels, in groups of                 | 4  | 4  | 8  | 16   |
| Galvanic isolation digital outputs                   |  |  |  |  |
| • Galvanic isolation digital outputs                 | Yes; Relay   | Yes; Relay   | Yes; Relay   | Yes; Relay   |
| • between the channels, in groups of                 | 4  | 4  | 4  | 11; 11/11/10   |
| <b>Dimensions and weight</b>                         |  |  |  |  |
| Dimensions   |  |  |  |  |
| • Width  | 46 mm  | 71.2 mm  | 137.5 mm   | 196 mm   |
| • Height   | 80 mm  | 80 mm  | 80 mm  | 80 mm  |
| • Depth  | 62 mm  | 62 mm  | 62 mm  | 62 mm  |
| Weight   |  |  |  |  |
| • Weight, approx.                                    | 160 g  | 300 g  | 400 g  | 580 g  |

3

| Ordering data   | Order No.  | Order No.  |
|---|--|--|
| <b>Digital input module EM 221</b><br>for CPU 221/222/224/224 XP/226 <ul style="list-style-type: none"> <li>• 8 inputs, 24 V DC, isolated, current sourcing/sinking</li> <li>• 16 inputs, 24 V DC, isolated, current sourcing/sinking</li> <li>• 8 inputs, 120/230 V AC, isolated, current sourcing/sinking</li> </ul>  | <b>6ES7 221-1BF22-0XA0</b><br><br><b>6ES7 221-1BH22-0XA0</b><br><br><b>6ES7 221-1EF22-0XA0</b>   | <b>Front flap set</b><br>contains various cover flaps for CPUs and EMs; spare part<br><br><b>Pluggable terminal block (spare part)</b> <ul style="list-style-type: none"> <li>• With 7 terminals (for EM 221/222)</li> <li>• With 12 terminals (for EM 223)</li> </ul>   |
| <b>Digital output module EM 222</b><br>for CPU 221/222/224/224 XP/226 <ul style="list-style-type: none"> <li>• 4 outputs, 24 V DC; 5A, isolated</li> <li>• 8 outputs, 24 V DC; 0.75 A, isolated</li> <li>• 4 outputs, 24 V DC, 24 to 230 V AC; 10 A, isolated, relay outputs</li> <li>• 8 outputs, 24 V DC, 24 to 230 V AC; 2 A, isolated, relay outputs</li> <li>• 8 outputs, 120/230 V AC; 0.5 A, isolated</li> </ul>   | <b>6ES7 222-1BD22-0XA0</b><br><b>6ES7 222-1BF22-0XA0</b><br><br><b>6ES7 222-1HD22-0XA0</b><br><br><b>6ES7 222-1HF22-0XA0</b><br><br><b>6ES7 222-1EF22-0XA0</b>   | <b>SIM 274 simulator (optional)</b><br>with 8 terminals for EM 221 and EM 223<br><br><b>S7-200 programmable controller, System Manual</b><br>for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4<br>German<br>English<br>French<br>Spanish<br>Italian<br>Chinese  |
| <b>Digital input/output module EM 223</b><br>for CPU 221/222/224/224 XP/226 <ul style="list-style-type: none"> <li>• 4 inputs 24 V DC, 4 outputs 24 V DC; 0.75 A, isolated</li> <li>• 8 inputs, 24 V DC, 8 outputs 24 V DC; 0.75 A, isolated</li> <li>• 16 inputs, 24 V DC, 16 outputs 24 V DC; 0.75 A, isolated</li> <li>• 32 inputs, 24 V DC, 32 outputs 24 V DC; 0.75 A, isolated</li> <li>• 4 inputs, 24 V DC; 4 outputs, relays</li> <li>• 8 inputs, 24 V DC; 8 outputs, relays</li> <li>• 16 inputs, 24 V DC; 16 outputs, relays</li> <li>• 32 inputs, 24 V DC; 32 outputs, relays</li> </ul> | <b>6ES7 223-1BF22-0XA0</b><br><br><b>6ES7 223-1BH22-0XA0</b><br><br><b>6ES7 223-1BL22-0XA0</b><br><br><b>6ES7 223-1BM22-0XA0</b><br><br><b>6ES7 223-1HF22-0XA0</b><br><br><b>6ES7 223-1PH22-0XA0</b><br><br><b>6ES7 223-1PL22-0XA0</b><br><br><b>6ES7 223-1PM22-0XA0</b> | <b>6ES7 291-3AX20-0XA0</b><br><br><b>6ES7 292-1AD20-0AA0</b><br><br><b>6ES7 292-1AE20-0AA0</b><br><br><b>6ES7 274-1XF00-0XA0</b><br><br><b>6ES7 298-8FA24-8AH0</b><br><b>6ES7 298-8FA24-8BH0</b><br><b>6ES7 298-8FA24-8CH0</b><br><b>6ES7 298-8FA24-8DH0</b><br><b>6ES7 298-8FA24-8EH0</b><br><b>6ES7 298-8FA24-8FH0</b> |

I: Subject to export regulations AL: N and ECCN: EAR99H

# SIMATIC S7-200

## SIPLUS digital modules

SIPLUS EM 221, EM 222, EM 223

### Overview SIPLUS EM 221



- Digital inputs as supplement to the integral I/O of the CPUs

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS EM 221 digital input modules for CPU 22x

|   | 8 DI   | 16 DI                      |
|---|--|----------------------------|
| <b>Order number</b>   | <b>6AG1 221-1BF22-2XA0</b>   | <b>6AG1 221-1BH22-2XB0</b> |
| <b>Order No. based on</b>   | <b>6ES7 221-1BF22-0XA0</b>   | <b>6ES7 221-1BH22-0XA0</b> |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                            |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                            |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                            |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                        |
| Approvals   | CE, cUL  |                            |

#### Ambient conditions

|  |   |
|--|---|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible   |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1)2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m) derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m) derating 20 K |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

### Overview SIPLUS EM 222



- Digital outputs as a supplement to the integral I/O of the CPUs

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS EM 222 digital output modules for CPU 22x

|   | 8 DO   | 16 RO                      |
|---|--|----------------------------|
| <b>Order number</b>   | <b>6AG1 222-1BF22-2XB0</b>   | <b>6AG1 222-1HF22-2XB0</b> |
| <b>Order No. based on</b>   | <b>6ES7 222-1BF22-0XB0</b>   | <b>6ES7 222-1HF22-0XB0</b> |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)   |                            |
| Conformal coating   | Coating of the printed circuit boards and the electronic components  |                            |
| Technical data  | The technical data of the standard product applies except for the ambient conditions   |                            |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                        |
| Approvals   | CE, cUL  |                            |
| <b>Ambient conditions</b>   |  |                            |
| Relative humidity   | 5 ... 100 %<br>Condensation permissible  |                            |
| Biologically active substances  | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |                            |
| Chemically active substances  | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1)2)</sup>   |                            |
| Mechanically active substances  | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |                            |
| Air pressure (depending on the highest positive temperature range specified)  | 1080 ... 795 hPa (-1000 ... 2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m) derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m) derating 20 K |                            |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS digital modules

SIPLUS EM 221, EM 222, EM 223

### Overview SIPLUS EM 223



- Digital inputs and outputs as supplement to the integral I/O of the CPUs

**Note:**

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS EM 223 digital input/output modules for CPU 22x

|   | 4 DI/4 O   | 8 DI/8 DO                  | 16 DI/16 DO                |
|---|--|----------------------------|----------------------------|
| <b>Order number</b>   | <b>6AG1 223-1BF22-2XB0</b>   | <b>6AG1 223-1BH22-2XB0</b> | <b>6AG1 223-1BL22-2XB0</b> |
| <b>Order No. based on</b>   | <b>6ES7 223-1BF22-0XA0</b>   | <b>6ES7 223-1BH22-0XA0</b> | <b>6ES7 223-1BL22-0XA0</b> |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                            |                            |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                            |                            |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                            |                            |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                        | Yes                        |
| Approvals   | CE, cUL  |                            |                            |

#### SIPLUS EM 223 digital input/output modules for CPU 22x

|  | 4 DI/4 O   | 8 DI/8 DO                  | 16 DI/16 DO                |
|--|--|----------------------------|----------------------------|
| <b>Order number</b>  | <b>6AG1 223-1HF22-2XB0</b>   | <b>6AG1 223-1PH22-2XB0</b> | <b>6AG1 223-1PL22-2XB0</b> |
| <b>Order No. based on</b>  | <b>6ES7 223-1HF22-0XA0</b>   | <b>6ES7 223-1PH22-0XA0</b> | <b>6ES7 223-1PL22-0XA0</b> |
| Ambient temperature range  | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                            |                            |
| Conformal coating  | Coating of the printed circuit boards and the electronic components                  |                            |                            |
| Technical data   | The technical data of the standard product applies except for the ambient conditions |                            |                            |
| Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  | Yes                        | Yes                        |
| Approvals  | CE, cUL  |                            |                            |



### Overview SIPLUS EM 223 (continued)

| Ambient conditions             |   |
|--------------------------------|---|
| Relative humidity              | 5 ... 100 %<br>Condensation permissible   |
| Biologically active substances | Conformity with EN 60721-3-3,<br>Class 3B2 mold and fungal<br>spores (except fauna)   |
| Chemically active substances   | Conformity with EN 60721-3-3,<br>Class 3C4 incl. salt mist and<br>ISA-S71.04 severity level G1; G2;<br>G3; GX <sup>1)2)</sup> |
| Mechanically active substances | Conformity with EN 60721-3-3,<br>Class 3S4 including conductive<br>sand, dust <sup>2)</sup>                                   |

| Ambient conditions   |  |
|--|--|
| Air pressure (depending on the<br>highest positive temperature range<br>specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

- 1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm;  
H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm;  
NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm;  
Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm;  
O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm
- 2) The supplied plug covers must remain in place over the unused  
interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

| Ordering data   | Order No.  | Ordering data   | Order No.  |
|---|--|---|--|
| <b>SIPLUS EM 221 digital input module</b><br>(extended temperature range and<br>medial exposure)<br>for CPU 222/224/224XP/226<br>• 8 inputs, 24 V DC, isolated,<br>current sourcing/sinking H<br>• 16 inputs, 24 V DC, isolated,<br>current sourcing/sinking H            | <b>6AG1 221-1BF22-2XB0</b><br><br><b>6AG1 221-1BH22-2XA0</b> | <b>SIPLUS EM 223 digital input/<br/>           output module</b><br>(extended temperature range and<br>medial exposure)<br>for CPU 222/224/224XP/226<br>• 4 inputs, 24 V DC, 4 outputs,<br>24 V DC; 0.75 A, isolated H<br>• 8 inputs, 24 V DC, 8 outputs,<br>24 V DC; 0.75 A, isolated H<br>• 16 inputs, 24 V DC, 16 outputs,<br>24 V DC; 0.75 A, isolated H<br>• 4 inputs, 24 V DC, 4 outputs,<br>relay H<br>• 8 inputs, 24 V DC, 8 outputs,<br>relay H<br>• 16 inputs, 24 V DC, 16 outputs,<br>24 V DC; 0.75 A, relay H | <b>6AG1 223-1BF22-2XB0</b><br><br><b>6AG1 223-1BH22-2XB0</b><br><br><b>6AG1 223-1BL22-2XB0</b><br><br><b>6AG1 223-1HF22-2XB0</b><br><br><b>6AG1 223-1PH22-2XB0</b><br><br><b>6AG1 223-1PL22-2XB0</b> |
| <b>SIPLUS EM 222 digital output module</b><br>(extended temperature range and<br>medial exposure)<br>for CPU 222/224/224XP/226<br>• 8 outputs, 24 V DC; 0.75 A,<br>isolated H<br>• 8 outputs, 24 V DC / 24 to<br>230 V AC, 2 A, electrically<br>isolated, relay outputs H | <b>6AG1 222-1BF22-2XB0</b><br><br><b>6AG1 222-1HF22-2XB0</b> | <b>Accessories</b><br>See SIMATIC S7-200 EM 221<br>digital input modules, page 3/37   |  |

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

# SIMATIC S7-200

## Analog modules

EM 231, EM 232, EM 235

### Overview



- Analog inputs and outputs for the SIMATIC S7-200
- With extremely short conversion times
- For connections of analog sensors and actuators without additional amplifier
- For solving the more complex automation tasks

3

### Technical specifications EM 231

|  | 6ES7 231-0HC22-0XA0  | 6ES7 231-0HF22-0XA0            |
|--|----------------------|--------------------------------|
| <b>Current consumption</b>                           |                      |                                |
| from load voltage L+ (without load), max.            | 60 mA                | 60 mA                          |
| from backplane bus 5 V DC, max.                      | 20 mA                | 20 mA                          |
| <b>Power losses</b>                                  |                      |                                |
| Power loss, typ.                                     | 2 W                  | 2 W                            |
| <b>Connection method</b>                             |                      |                                |
| Plug-in I/O terminals                                | No                   | No                             |
| <b>Analog inputs</b>                                 |                      |                                |
| Number of analog inputs                              | 4; Difference        | 8; Difference                  |
| Cable length, shielded, max.                         | 100 m; to the sensor | 100 m; to the sensor           |
| Input ranges (rated values), voltages                |                      |                                |
| • 0 to +5 V  | Yes                  | Yes                            |
| • 0 to +10 V   | Yes                  | Yes                            |
| • -2.5 V to +2.5 V                                   | Yes                  | Yes                            |
| • -5 V to +5 V                                       | Yes                  | Yes                            |
| • -80 mV to +80 mV                                   | No                   | No                             |
| Input ranges (rated values), currents                |                      |                                |
| • 0 to 20 mA   | Yes                  | Yes; for channels 6 and 7 only |
| Input ranges (rated values), thermoelements          |                      |                                |
| • Type E   |                      | No                             |
| • Type J   |                      | No                             |
| • Type K   |                      | No                             |
| • Type N   |                      | No                             |
| • Type R   |                      | No                             |
| • Type S   |                      | No                             |
| • Type T   |                      | No                             |
| Input ranges (rated values), resistance thermometers |                      |                                |
| • Cu 10  |                      | No                             |
| • Ni 10  |                      | No                             |
| • Ni 1000  |                      | No                             |
| • Ni 120   |                      | No                             |
| • Pt 100   |                      | No                             |
| • Pt 1000  |                      | No                             |
| • Pt 10000   |                      | No                             |
| • Pt 200   |                      | No                             |
| • Pt 500   |                      | No                             |
| Input ranges (rated values), resistors               |                      |                                |
| • 0 to 150 Ohm                                       |                      | No                             |
| • 0 to 300 Ohm                                       |                      | No                             |
| • 0 to 600 Ohm                                       |                      | No                             |

**Technical specifications EM 231 (continued)**

|  | <b>6ES7 231-0HC22-0XA0</b>   | <b>6ES7 231-0HF22-0XA0</b>   |
|--|--|--|
| Voltage input<br>• permissible input voltage for voltage input (destruction limit), max.   | 30 V   | 30 V   |
| Current input<br>• permissible input current for current input (destruction limit), max.   | 32 mA  | 40 mA  |
| Characteristic linearization<br>• for voltage measurement<br>• for current measurement   | No<br>No   | No<br>No   |
| Temperature compensation<br>• Temperature compensation parameterizable   | No   | No   |
| <b>Analog value creation</b><br>Integrations and conversion time/ resolution per channel<br>• Resolution with overrange (bit including sign), max.<br>• Interference voltage suppression for interference frequency $f_1$ in Hz<br>• Conversion time (per channel) | 12 bit<br>40 dB, DC to 60 V for interference frequency 50 / 60 Hz<br>250 $\mu$ s | 12 bit<br>40 dB, DC up to 60 V for interference frequency<br>250 $\mu$ s |
| Displayable conversion value range<br>• bipolar signals<br>• unipolar signals  | -32000 to +32000<br>0 to 32000   | -32000 to +32000<br>0 to 32000   |
| <b>Errors/accuracies</b><br>Interference voltage suppression for $f = n \times (f_1 \pm 1\%)$ , $f_1$ = interference frequency<br>• common mode voltage, max.  | 12 V   | 12 V   |
| <b>Galvanic isolation</b><br>Galvanic isolation analog inputs<br>• Galvanic isolation analog inputs  | No   | No   |
| <b>Dimensions and weight</b><br>Dimensions<br>• Width<br>• Height<br>• Depth   | 71.2 mm<br>80 mm<br>62 mm  | 71.2 mm<br>80 mm<br>62 mm  |
| Weight<br>• Weight, approx.  | 183 g  | 190 g  |

## SIMATIC S7-200

## Analog modules

EM 231, EM 232, EM 235

## Technical specifications EM 232

|   | 6ES7 232-0HB22-0XA0 | 6ES7 232-0HD22-0XA0 |
|---|---------------------|---------------------|
| <b>Current consumption</b>  |                     |                     |
| from backplane bus 5 V DC, max.                                       | 20 mA               | 20 mA               |
| from sensor current supply or external current supply (24 V DC), max. | 70 mA               | 70 mA               |
| <b>Power losses</b>   |                     |                     |
| Power loss, typ.  | 2 W                 | 2 W                 |
| <b>Connection method</b>  |                     |                     |
| Plug-in I/O terminals   | No                  | No                  |
| <b>Analog outputs</b>   |                     |                     |
| Number of analog outputs  | 2                   | 4                   |
| Output ranges, voltage  |                     |                     |
| • -10 to +10 V  | Yes                 | Yes                 |
| Output ranges, current  |                     |                     |
| • 4 to 20 mA  | Yes                 | Yes                 |
| Load impedance (in rated range of output)                             |                     |                     |
| • with voltage outputs, min.  | 5 kΩ                | 5 kΩ                |
| • with current outputs, max.  | 0.5 kΩ              | 0.5 kΩ              |
| <b>Analog value creation</b>  |                     |                     |
| Integrations and conversion time/ resolution per channel              |                     |                     |
| • Resolution (incl. overrange)  | U/12 bit, I/11 bit  | U/12 bit, I/11 bit  |
| Settling time   |                     |                     |
| • for voltage output  | 100 μs              | 100 μs              |
| • for current output  | 2 ms                | 2 ms                |
| Displayable conversion value range                                    |                     |                     |
| • bipolar signals   | -32000 to +32000    | -32000 to +32000    |
| • unipolar signals  | 0 to 32000          | 0 to 32000          |
| <b>Errors/accuracies</b>  |                     |                     |
| Operational limit in overall temperature range                        |                     |                     |
| • Voltage, relative to output area                                    | +/- 2 %             | +/- 2 %             |
| • Current, relative to output area                                    | +/- 2 %             | +/- 2 %             |
| Basic error limit (operational limit at 25 °C)                        |                     |                     |
| • Voltage, relative to output area                                    | +/- 0,5 %           | +/- 0,5 %           |
| • Current, relative to output area                                    | +/- 0,5 %           | +/- 0,5 %           |
| <b>Galvanic isolation</b>   |                     |                     |
| Galvanic isolation analog outputs                                     |                     |                     |
| • Galvanic isolation analog outputs                                   | No                  | No                  |
| <b>Dimensions and weight</b>  |                     |                     |
| Dimensions  |                     |                     |
| • Width   | 46 mm               | 71.2 mm             |
| • Height  | 80 mm               | 80 mm               |
| • Depth   | 62 mm               | 62 mm               |
| Weight  |                     |                     |
| • Weight, approx.   | 148 g               | 190 g               |

### Technical specifications EM 235

| 6ES7 235-0KD22-0XA0   |               |
|---|---------------|
| <b>Current consumption</b>  |               |
| from backplane bus 5 V DC, max.   | 30 mA         |
| from sensor current supply or external current supply (24 V DC), max.   | 60 mA         |
| <b>Power losses</b>   |               |
| Power loss, typ.  | 2 W           |
| <b>Connection method</b>  |               |
| Plug-in I/O terminals   | No            |
| <b>Analog inputs</b>  |               |
| Number of analog inputs   | 4; Difference |
| • Voltage   | Yes           |
| • Current   | Yes           |
| Input ranges (rated values), voltages                                   |               |
| • 0 to +50 mV   | Yes           |
| • 0 to +100 mV  | Yes           |
| • 0 to +500 mV  | Yes           |
| • 0 to +1 V   | Yes           |
| • 0 to +5 V   | Yes           |
| • 0 to +10 V  | Yes           |
| • -1 V to +1 V  | Yes           |
| • -10 V to +10 V  | Yes           |
| • -100 mV to +100 mV  | Yes           |
| • -2.5 V to +2.5 V  | Yes           |
| • -25 mV to +25 mV  | Yes           |
| • -250 mV to +250 mV  | Yes           |
| • -5 V to +5 V  | Yes           |
| • -50 mV to +50 mV  | Yes           |
| • -500 mV to +500 mV  | Yes           |
| Input ranges (rated values), currents                                   |               |
| • 0 to 20 mA  | Yes           |
| Voltage input   |               |
| • permissible input voltage for voltage input (destruction limit), max. | 30 V          |
| Current input   |               |
| • permissible input current for current input (destruction limit), max. | 32 mA         |
| Characteristic linearization  |               |
| • for voltage measurement   | No            |
| • for current measurement   | No            |
| Temperature compensation  |               |
| • Temperature compensation parameterizable                              | No            |

| 6ES7 235-0KD22-0XA0  |                                   |
|--|-----------------------------------|
| <b>Analog outputs</b>  |                                   |
| Number of analog outputs   | 1                                 |
| Output ranges, voltage   |                                   |
| • -10 to +10 V   | Yes                               |
| Output ranges, current   |                                   |
| • 0 to 20 mA   | Yes                               |
| Load impedance (in rated range of output)  |                                   |
| • with voltage outputs, min.   | 5 kΩ                              |
| • with current outputs, max.   | 0.5 kΩ                            |
| <b>Analog value creation</b>   |                                   |
| Integrations and conversion time/ resolution per channel                                       |                                   |
| • Resolution with overrange (bit including sign), max.   | 12 bit; 11 bit for current output |
| • Basic conversion time, ms  | < 0.25 ms                         |
| • Interference voltage suppression for interference frequency f1 in Hz                         | 40 dB, DC to 60 Hz                |
| Settling time  |                                   |
| • for voltage output   | 100 μs                            |
| • for current output   | 2 ms                              |
| Displayable conversion value range   |                                   |
| • bipolar signals  | -32000 to +32000                  |
| • unipolar signals   | 0 to 32000                        |
| <b>Errors/accuracies</b>   |                                   |
| Operational limit in overall temperature range   |                                   |
| • Voltage, relative to output area   | +/- 2 %                           |
| • Current, relative to output area   | +/- 2 %                           |
| Basic error limit (operational limit at 25 °C)   |                                   |
| • Voltage, relative to output area   | +/- 0.5 %                         |
| • Current, relative to output area   | +/- 0.5 %                         |
| Interference voltage suppression for $f = n \times (f1 \pm 1\%)$ , f1 = interference frequency |                                   |
| • common mode voltage, max.  | 12 V                              |
| <b>Galvanic isolation</b>  |                                   |
| Galvanic isolation analog inputs   |                                   |
| • Galvanic isolation analog inputs   | No                                |
| Galvanic isolation analog outputs  |                                   |
| • Galvanic isolation analog outputs  | No                                |
| <b>Dimensions and weight</b>   |                                   |
| Dimensions   |                                   |
| • Width  | 71.2 mm                           |
| • Height   | 80 mm                             |
| • Depth  | 62 mm                             |
| Weight   |                                   |
| • Weight, approx.  | 186 g                             |

## SIMATIC S7-200

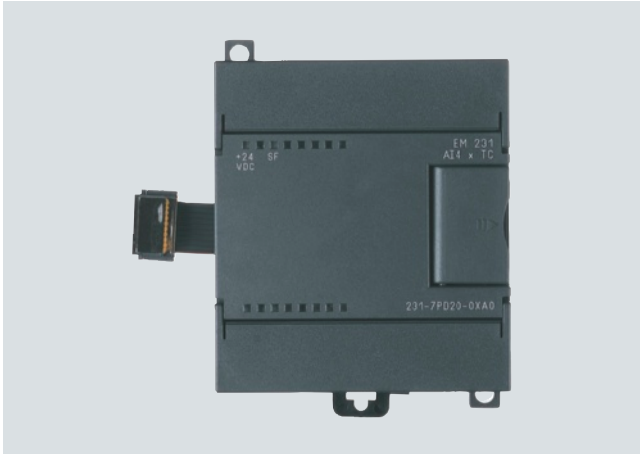
## Analog modules

EM 231, EM 232, EM 235

3

| Ordering data  | Order No.  |  | Order No.  |
|--|--|--|--|
| <b>EM 231 analog input module</b><br>for CPU 221/222/224/224 XP/226<br>4 inputs, 0 to 10 V, 12 bit resolution<br>8 inputs, 0 to 10 V, of which max. 2 inputs also 0 to 20 mA, 11/12 bit resolution | <b>6ES7 231-0HC22-0XA0</b><br><br><b>6ES7 231-0HF22-0XA0</b> | <b>Ground terminal</b><br>10 units   | <b>6ES5 728-8MA11</b>  |
| <b>EM 232 analog output module</b><br>for CPU 221/222/224/224 XP/226<br>2 outputs, ±10 V, 12 bit resolution<br>4 outputs, ±10 V, 12-bit resolution   | <b>6ES7 232-0HB22-0XA0</b><br><b>6ES7 232-0HD22-0XA0</b>     | <b>Front flap set</b><br>contains various cover flaps for CPUs and EMs; spare part   | <b>6ES7 291-3AX20-0XA0</b>   |
| <b>EM 235 analog input/output module</b><br>for CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, 12 bit resolution  | <b>6ES7 235-0KD22-0XA0</b>                                   | <b>S7-200 programmable controller, system manual</b><br>for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4<br><br>German<br>English<br>French<br>Spanish<br>Italian<br>Chinese | <b>6ES7 298-8FA24-8AH0</b><br><b>6ES7 298-8FA24-8BH0</b><br><b>6ES7 298-8FA24-8CH0</b><br><b>6ES7 298-8FA24-8DH0</b><br><b>6ES7 298-8FA24-8EH0</b><br><b>6ES7 298-8FA24-8FH0</b> |

### Overview



- For user-friendly, high precision temperature detection
- 7 standard types of thermocouple can be used
- For measuring low-level analog signals ( $\pm 80$  mV), as well
- Easy to install in an existing system

3

### Technical specifications

|   | 6ES7 231-7PD22-0XA0                 | 6ES7 231-7PF22-0XA0                 |
|---|-------------------------------------|-------------------------------------|
| <b>Current consumption</b>  |                                     |                                     |
| from load voltage L+ (without load), max.                               | 60 mA                               | 60 mA                               |
| from backplane bus 5 V DC, max.   | 87 mA                               | 87 mA                               |
| <b>Power losses</b>   |                                     |                                     |
| Power loss, typ.  | 1.8 W                               | 1.8 W                               |
| <b>Connection method</b>  |                                     |                                     |
| Plug-in I/O terminals   | No                                  | No                                  |
| <b>Analog inputs</b>  |                                     |                                     |
| Number of analog inputs   | 4                                   | 8                                   |
| Cable length, shielded, max.  | 100 m; to the sensor                | 100 m; to the sensor                |
| Loop resistance cable   | 100 $\Omega$                        | 100 $\Omega$                        |
| Updating time (all channels)  | 405 ms                              | 810 ms                              |
| Input ranges (rated values), voltages                                   |                                     |                                     |
| • -80 mV to +80 mV  | Yes                                 | Yes                                 |
| Input ranges (rated values), thermoelements                             |                                     |                                     |
| • Type E  | Yes                                 | Yes                                 |
| • Type J  | Yes                                 | Yes                                 |
| • Type K  | Yes                                 | Yes                                 |
| • Type N  | Yes                                 | Yes                                 |
| • Type R  | Yes                                 | Yes                                 |
| • Type S  | Yes                                 | Yes                                 |
| • Type T  | Yes                                 | Yes                                 |
| Voltage input   |                                     |                                     |
| • Permissible input voltage for voltage input (destruction limit), max. | 30 V                                | 30 V                                |
| <b>Analog value creation</b>  |                                     |                                     |
| Measurement principle   | Sigma Delta                         | Sigma Delta                         |
| Integrations and conversion time/ resolution per channel                |                                     |                                     |
| • Resolution with overrange (bit including sign), max.                  | 16 bit; Temperature 0.1 °C / 0.1 °F | 16 bit; Temperature 0.1 °C / 0.1 °F |

|  | 6ES7 231-7PD22-0XA0       | 6ES7 231-7PF22-0XA0       |
|--|---------------------------|---------------------------|
| • Interference voltage suppression for interference frequency $f_1$ in Hz                          | 85 dB at 50 / 60 / 400 Hz | 85 dB at 50 / 60 / 400 Hz |
| Displayable conversion value range   |                           |                           |
| • Bipolar signals  | -27,648 to +27,648        | -27,648 to +27,648        |
| <b>Errors/accuracies</b>   |                           |                           |
| cold connection point  | +/- 1.5 °C                | +/- 1.5 °C                |
| Repeat accuracy in settled status at 25 °C (relative to input area)                                | +/- 0.05 %                | +/- 0.05 %                |
| Operational limit in overall temperature range   |                           |                           |
| • Voltage, relative to output area   | +/- 0.1 %                 | +/- 0.1 %                 |
| Interference voltage suppression for $f = n \times (f_1 \pm 1\%)$ , $f_1$ = interference frequency |                           |                           |
| • Common mode voltage, max.  | 120 V; AC                 | 120 V; AC                 |
| • Common mode interference, min.   | 120 dB; at 120 V AC       | 120 dB; at 120 V AC       |
| <b>Galvanic isolation</b>  |                           |                           |
| Galvanic isolation analog inputs   |                           |                           |
| • Galvanic isolation analog inputs   | Yes                       | Yes                       |
| <b>Dimensions and weight</b>   |                           |                           |
| Dimensions   |                           |                           |
| • Width  | 71.2 mm                   | 71.2 mm                   |
| • Height   | 80 mm                     | 80 mm                     |
| • Depth  | 62 mm                     | 62 mm                     |
| Weight   |                           |                           |
| • Weight, approx.  | 210 g                     | 210 g                     |

## SIMATIC S7-200

## Analog modules

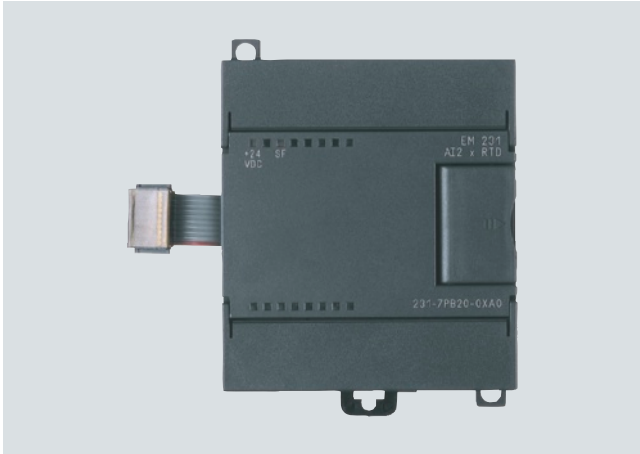
## EM 231 thermocouple module

| Ordering data   | Order No.                  |  | Order No.                  |
|---|----------------------------|--|----------------------------|
| <b>EM 231 thermocouple module</b>   |                            | <b>S7-200 programmable controller, system manual</b>   |                            |
| Inputs +/- 80 mV, resolution 15 bit + sign, thermocouples J, K, S, T, R, E, N                 |                            | for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4 |                            |
| 4 inputs  | <b>6ES7 231-7PD22-0XA0</b> | German   | <b>6ES7 298-8FA24-8AH0</b> |
| 8 inputs  | <b>6ES7 231-7PF22-0XA0</b> | English  | <b>6ES7 298-8FA24-8BH0</b> |
| <b>Ground terminal</b>  | <b>6ES5 728-8MA11</b>      | French   | <b>6ES7 298-8FA24-8CH0</b> |
| 10 units  |                            | Spanish  | <b>6ES7 298-8FA24-8DH0</b> |
| <b>Backplane bus expansion cable</b>  | <b>6ES7 290-6AA20-0XA0</b> | Italian  | <b>6ES7 298-8FA24-8EH0</b> |
| for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226 |                            | Chinese  | <b>6ES7 298-8FA24-8FH0</b> |

I: Subject to export regulations AL: N and ECCN: EAR99H



### Overview



- To measure temperatures easily and with high accuracy
- 2 versions with 2 or 4 inputs
- The latest resistance temperature detectors can be used
- Easy to retrofit in existing systems

### Technical specifications

|   | 6ES7 231-7PB22-0XA0                    | 6ES7 231-7PC22-0XA0                    |
|---|--|--|
| <b>Current consumption</b>  |  |  |
| from load voltage L+ (without load), max.                               | 60 mA                                  | 60 mA                                  |
| from backplane bus 5 V DC, max.   | 87 mA                                  | 87 mA                                  |
| <b>Power losses</b>   |  |  |
| Power loss, typ.  | 1.8 W; Sensor: 1 mW                    | 1.8 W; Sensor: 1 mW                    |
| <b>Connection method</b>  |  |  |
| Plug-in I/O terminals   | No                                     | No                                     |
| <b>Analog inputs</b>  |  |  |
| Number of analog inputs   | 2                                      | 4                                      |
| Cable length, shielded, max.  | 100 m; to the sensor                   | 100 m; to the sensor                   |
| Loop resistance cable   | 20 Ω; max. 2.7 Ohm for Cu              | 20 Ω; max. 2.7 Ohm for Cu              |
| Updating time (all channels)  | 405 ms; 700 ms with Pt10000            | 810 ms; 1400 ms with Pt10000           |
| Input ranges (rated values), resistance thermometers                    |  |  |
| • Cu 10   | Yes                                    | Yes                                    |
| • Ni 10   | Yes                                    | Yes                                    |
| • Ni 1000   | Yes                                    | Yes                                    |
| • Ni 120  | Yes                                    | Yes                                    |
| • Pt 100  | Yes                                    | Yes                                    |
| • Pt 1000   | Yes                                    | Yes                                    |
| • Pt 10000  | Yes                                    | Yes                                    |
| • Pt 200  | Yes                                    | Yes                                    |
| • Pt 500  | Yes                                    | Yes                                    |
| Input ranges (rated values), resistors                                  |  |  |
| • 0 to 150 Ohm  | Yes                                    | Yes                                    |
| • 0 to 300 Ohm  | Yes                                    | Yes                                    |
| • 0 to 600 Ohm  | Yes                                    | Yes                                    |
| Voltage input   |  |  |
| • permissible input voltage for voltage input (destruction limit), max. | 30 V; 30 V DC (probe), 5 V DC (source) | 30 V; 30 V DC (probe), 5 V DC (source) |

|   | 6ES7 231-7PB22-0XA0                 | 6ES7 231-7PC22-0XA0                 |
|---|-------------------------------------|-------------------------------------|
| <b>Analog value creation</b>  |                                     |                                     |
| Measurement principle   | Sigma Delta                         | Sigma Delta                         |
| Integrations and conversion time/resolution per channel                               |                                     |                                     |
| • Resolution with overrange (bit including sign), max.                                | 16 bit; Temperature 0.1 °C / 0.1 °F | 16 bit; Temperature 0.1 °C / 0.1 °F |
| • Interference voltage suppression for interference frequency f1 in Hz                | 85 dB at 50 / 60 / 400 Hz           | 85 dB at 50 / 60 / 400 Hz           |
| Displayable conversion value range  |                                     |                                     |
| • bipolar signals   | -27,648 to +27,648                  | -27,648 to +27,648                  |
| <b>Errors/accuracies</b>  |                                     |                                     |
| Repeat accuracy in settled status at 25 °C (relative to input area)                   | +/- 0.05 %                          | +/- 0.05 %                          |
| Operational limit in overall temperature range  |                                     |                                     |
| • Voltage, relative to output area  | +/- 0.1 %                           | +/- 0.1 %                           |
| Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency |                                     |                                     |
| • common mode voltage, max.   | 0 V                                 | 0 V                                 |
| • Common mode interference, min.  | 120 dB; at 120 V AC                 | 120 dB; at 120 V AC                 |
| <b>Galvanic isolation</b>   |                                     |                                     |
| Galvanic isolation analog inputs  |                                     |                                     |
| • Galvanic isolation analog inputs  | Yes                                 | Yes                                 |
| <b>Dimensions and weight</b>  |                                     |                                     |
| Dimensions  |                                     |                                     |
| • Width   | 71.2 mm                             | 71.2 mm                             |
| • Height  | 80 mm                               | 80 mm                               |
| • Depth   | 62 mm                               | 62 mm                               |
| Weight  |                                     |                                     |
| • Weight, approx.   | 210 g                               | 210 g                               |

## SIMATIC S7-200

## Analog modules

## EM 231 RTD module

3

| Ordering data   | Order No.  | Order No.  |
|---|--|--|
| <b>EM 231 RTD module</b><br>2 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 bit + sign<br><br>4 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; 14 GOST temperature resistance sensor, resistor 150/300/600 Ohm, resolution 15 bit + sign | <b>6ES7 231-7PB22-0XA0</b><br><br><b>6ES7 231-7PC22-0XA0</b> | <b>S7-200 programmable controller, system manual</b><br>for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4<br><br>German<br>English<br>French<br>Spanish<br>Italian<br>Chinese |
| <b>Ground terminal</b><br>10 units  | <b>6ES5 728-8MA11</b>  | <b>6ES7 298-8FA24-8AH0</b><br><b>6ES7 298-8FA24-8BH0</b><br><b>6ES7 298-8FA24-8CH0</b><br><b>6ES7 298-8FA24-8DH0</b><br><b>6ES7 298-8FA24-8EH0</b><br><b>6ES7 298-8FA24-8FH0</b>   |
| <b>Backplane bus expansion cable</b><br>for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226   | <b>6ES7 290-6AA20-0XA0</b>                                   |  |

I: Subject to export regulations AL: N and ECCN: EAR99H

### Overview SIPLUS EM 231



- Analog inputs for SIPLUS S7-200

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

|   |  |
|---|--|
| <b>SIPLUS EM 231 analog input module for CPU 22x</b>  | <b>4 AI</b>  |
| <b>Order number</b>   | <b>6AG1 231-0HC22-2XB0</b>   |
| <b>Order No. based on</b>   | <b>6ES7 231-0HC22-0XA0</b>   |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)   |
| Conformal coating   | Coating of the printed circuit boards and the electronic components  |
| Technical data  | The technical data of the standard product applies except for the ambient conditions   |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes  |
| Approvals   | CE, cUL  |
| <b>Ambient conditions</b>   |  |
| Relative humidity   | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances  | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances  | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances  | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified)  | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS analog modules

SIPLUS EM 231, EM 232, EM 235

### Overview SIPLUS EM 232



- Analog outputs for SIPLUS S7-200

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

|   |  |
|---|--|
| <b>SIPLUS EM 232 analog output modules for CPU 22x</b>  | <b>2 AO</b>  |
| <b>Order number</b>   | <b>6AG1 232-0HB22-2XB0</b>   |
| <b>Order No. based on</b>   | <b>6ES7 232-0HB22-0XA0</b>   |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No   |
| Approvals   | CE, cUL  |

#### Ambient conditions

|  |  |
|--|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

### Overview SIPLUS EM 235



- Analog inputs and outputs for SIPLUS S7-200

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

|   |  |
|---|--|
| <b>SIPLUS EM 235 analog input/output modules for CPU 22x</b>  | <b>4 AI/1 AO</b>   |
| <b>Order number</b>   | <b>6AG1 235-0KD22-2XB0</b>   |
| <b>Order No. based on</b>   | <b>6ES7 235-0KD22-0XA0</b>   |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)   |
| Conformal coating   | Coating of the printed circuit boards and the electronic components  |
| Technical data  | The technical data of the standard product applies except for the ambient conditions   |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No   |
| Approvals   | CE, cUL  |
| <b>Ambient conditions</b>   |  |
| Relative humidity   | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances  | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances  | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances  | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified)  | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS analog modules

### SIPLUS EM 231, EM 232, EM 235

#### Ordering data

#### Order No.

##### SIPLUS EM 231 analog input module

H 6AG1 231-0HC22-2XB0

(extended temperature range and medial exposure)

for CPU 222/224/224 XP/226;  
4 inputs, 0-10 V, resolution 12 bit

##### SIPLUS EM 232 analog output module

H 6AG1 232-0HB22-2XB0

(extended temperature range and medial exposure)

for CPU 222/224/224 XP/226;  
2 outputs, ± 10 V, resolution 12 bit

#### Order No.

##### SIPLUS EM 235 analog input/output module

H 6AG1 235-0KD22-2XB0

(extended temperature range and medial exposure)

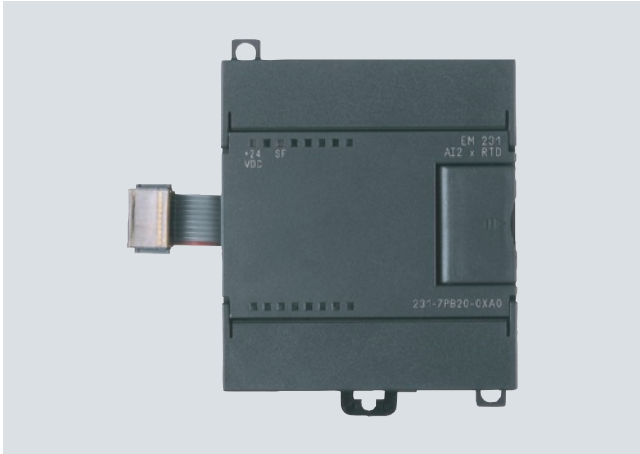
for CPU 222/224/224 XP/226;  
4 inputs, 1 output, ± 10 V DC,  
resolution 12 bit

##### Accessories

See SIMATIC S7-200 EM 231  
analog output modules,  
page 3/46

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

### Overview



- For the convenient recording of temperatures with great accuracy
- 31 common resistance temperature detectors can be used
- Can easily be retrofitted to existing plant

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS EM 231 RTD module for CPU 22x  | 2 AI Thermo  | 2 AI Thermo                |
|---|--|----------------------------|
| <b>Order number</b>   | <b>6AG1 231-7PB22-2XA0</b>   | <b>6AG1 231-7PB22-2XY0</b> |
| <b>Order No. based on</b>   | <b>6ES7 231-7PB22-0XA0</b>   | <b>6ES7 231-7PB22-0XA0</b> |
| Ambient temperature range   | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval)               |                            |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                  |                            |
| Technical data  | The technical data of the standard product applies except for the ambient conditions |                            |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No   | Yes                        |
| Approvals   | CE, cUL  |                            |

#### Ambient conditions

|  |   |
|--|---|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible   |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)   |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1)2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>   |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K |

<sup>1)</sup> ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH<sub>3</sub> < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH<sub>3</sub> < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

# SIMATIC S7-200

## SIPLUS analog modules

### SIPLUS EM 231 RTD module

#### Ordering data

#### Order No.

#### SIPLUS EM 231 RTD module

(extended temperature range and  
medial exposure)

2 inputs for resistance temper-  
ature detector Pt100/200/500/  
1000/10000, Ni100/120/1000,  
Cu10; resistor 150/300/600 Ohm,  
resolution 15 bit + sign

H

**6AG1 231-7PB22-2XA0**

Conforms to EN 50155;

H

**6AG1 231-7PB22-2XY0**

2 inputs for resistance temper-  
ature detectors Pt100/200/500/  
1000/10000, Ni100/120/1000,  
Cu10; resistors 150/300/  
600 Ohm,  
resolution 15 bit + sign

#### Order No.

#### Accessories

See SIMATIC S7-200 EM 231 RTD  
module, page 3/50

H: Subject to export regulations AL: 91999 and ECCN: EAR99H



### Overview



- Function modules for simple positioning tasks (1 axis)
- Stepper motors and servo motors from the Micro Stepper to the high-performance servo drive can be connected
- Flexible connection possibilities
- Full support from STEP 7-Micro/WIN with parameterization and startup

3

### Technical specifications

| 6ES7 253-1AA22-0XA0                                   |  |
|---|--|
| <b>Supply voltages</b>                                |  |
| Rated value   |  |
| • permissible range, lower limit (DC)                 | 11 V   |
| • permissible range, upper limit (DC)                 | 30 V   |
| <b>Current consumption</b>                            |  |
| from backplane bus 5 V DC, max.                       | 190 mA   |
| from supply voltage L+, max.                          | 300 mA; from 12 V DC, 130 mA<br>from 24 V DC   |
| <b>Hardware configuration</b>                         |  |
| Number of modules per CPU                             | max. 5 with CPU 226/226XM,<br>max. 3 with CPU 224, max. 1 with<br>CPU 222  |
| <b>Digital inputs</b>                                 |  |
| Number of digital inputs                              | 5  |
| Type  | IEC Type 1, active-high  |
| Functions   | Stop (STP), reference point switch<br>(RPS), upper limit switch (LMT+),<br>lower limit switch (LMT-), zero<br>point (ZP) |
| <b>Input voltage</b>                                  |  |
| • Rated value, DC                                     | 24 V   |
| • for signal "0"                                      | STP, RPS, LMT+, LMT- 5 V DC;<br>ZP 1 V DC  |
| • for signal "1"                                      | STP, RPS, LMT+, LMT- 15 V DC;<br>ZP 3 V DC   |
| <b>Input delay (for rated value of input voltage)</b> |  |
| • for standard inputs<br>- parameterizable            | Yes; STP, RPS, LMT+, LMT- 0.2 to<br>12.8 ms; ZP min 2 μs   |
| <b>Cable length</b>                                   |  |
| • Cable length, shielded, max.                        | 100 m; STP, RPS, LMT+,<br>LMT- 100 m, ZP 10 m  |
| • Cable length unshielded, max.                       | 30 m; STP, RPS, LMT+,<br>LMT- 30 m, ZP not recommended   |

| 6ES7 253-1AA22-0XA0                                     |  |
|---|--|
| <b>Encoder</b>  |  |
| Connectable encoders                                    |  |
| • 2-wire BEROs  | Yes  |
| - permissible quiescent current<br>(2-wire BEROs), max. | 1 mA   |
| <b>Drive interface</b>                                  |  |
| <b>Signal output I</b>                                  |  |
| • Number  | 4; optionally RS 422/RS 485 or<br>5 V DC     |
| • Type  | RS 422 / RS 485<br>(P0+, P0-, P1+, P1-)      |
| • Differential output voltage, min.                     | 2.8 V; RL = 200 Ohm                          |
| • Pulse frequency                                       | 200 kHz;<br>(P0+, P0-, P1+, P1-, P0, P1)     |
| • Cable length, max.                                    | 10 m; shielded; 1 m unshielded               |
| <b>Signal output III</b>                                |  |
| • Type  | 5 V DC(P0, P1, DIS, CLR)                     |
| • Output voltage  | 30 V DC                                      |
| • Output current  | 50 mA; output delay (DIS, CLR)<br>max. 30 μs |
| <b>Galvanic isolation</b>                               |  |
| <b>Galvanic isolation digital inputs</b>                |  |
| • between the channels                                  | Yes  |
| • between the channels, in groups<br>of                 | 1 (STP, RPS, ZP), 2 (LMT-, LMT+)             |
| <b>Dimensions and weight</b>                            |  |
| <b>Dimensions</b>                                       |  |
| • Width   | 71.2 mm                                      |
| • Height  | 80 mm  |
| • Depth   | 62 mm  |
| <b>Weight</b>   |  |
| • Weight, approx.                                       | 190 g  |

# SIMATIC S7-200

## Function modules

### EM 253 positioning module

#### Ordering data

##### EM 253 positioning module

For controlling stepper motors or servo drives

##### Ground terminal

10 units

##### Backplane bus expansion cable

for connecting two rows of modules with double-tier configuration, for CPU 221/222/224/224 XP/226

#### Order No.

**6ES7 253-1AA22-0XA0**

**6ES5 728-8MA11**

**6ES7 290-6AA20-0XA0**

##### S7-200 programmable controller, system manual

for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4

German

English

French

Spanish

Italian

Chinese

#### Order No.

**6ES7 298-8FA24-8AH0**

**6ES7 298-8FA24-8BH0**

**6ES7 298-8FA24-8CH0**

**6ES7 298-8FA24-8DH0**

**6ES7 298-8FA24-8EH0**

**6ES7 298-8FA24-8FH0**

I: Subject to export regulations AL: N and ECCN: EAR99H

### Overview

SIWAREX MS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-200 automation systems.

The data for the actual weight can be accessed directly in the SIMATIC CPU without the need for any additional interfaces.

### Technical specifications

| SIWAREX MS  |   |
|---|---|
| <b>Integration in S7-200 automation systems</b>                 | <ul style="list-style-type: none"> <li>• CPU 222 (6ES7212-1*B23-0XB0)</li> <li>• CPU 224 (6ES7214-1*D23-0XB0)</li> <li>• CPU 224XP (6ES7214-2*D23-0XB0)</li> <li>• CPU226 (6ES7216-2*D23-0XB0)</li> </ul> |
| <b>Communication interfaces</b>                                 | SIMATIC S7 Bus, RS 232, TTY   |
| <b>Connection of remote displays (through TTY interface)</b>    | Weight value (gross, net)   |
| <b>Adjustment of scales settings</b>                            | Using PC parameterization software SIWATOOL MS (RS 232)   |
| <b>Measuring properties</b>                                     |   |
| • Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K | 0.05 %  |
| • Internal resolution<br>Data format of weight values           | 65535<br>2 byte (fixed-point)   |
| <b>Number of measurements/second</b>                            | 50 or 30  |
| <b>Digital filter</b>   | 0.05 - 5 Hz (in 7 steps), mean-value filter   |
| <b>Weighing functions</b>                                       |   |
| • Weight values   | Gross, net  |
| • Limit values  | 2 (min./max.)   |
| • Zero setting function   | Per command   |
| • Tare function   | Per command   |
| • Tare specification  | Per command   |
| <b>Load cells</b>   | Strain gages in 4-wire or 6-wire system   |
| <b>Load cell powering</b>                                       |   |
| • Supply voltage $U_s$ (rated value)                            | 6 V DC typical  |
| • Max. supply current   | ≤ 150 mA  |
| • Permissible load impedance                                    |   |
| - $R_{Lmin}$  | > 40 Ω  |
| - $R_{Lmax}$  | < 4010 Ω  |
|   | With SIWAREX IS Ex interface or SIWAREX Pi:   |
| - $R_{Lmin}$  | > 87 Ω  |
| - $R_{Lmax}$  | < 4010 Ω  |

| SIWAREX MS  |  |
|---|--|
| <b>Load cell characteristic</b>   | 1 mV/V ... 4 mV/V                                      |
| <b>Permissible range of measuring signal (at greatest set characteristic value)</b>     | -2.4 ... +26.4 mV                                      |
| <b>Max. distance of load cells</b>  | 500 m  |
| <b>Intrinsically-safe load cell powering</b>  |  |
| <b>Connection to load cells in Ex zone 1</b>  | Optionally over SIWAREX IS Ex interface or SIWAREX Pi: |
| <b>Ex approvals and safety</b>  | CE, ATEX 95, FM, cUL <sub>US</sub> Haz. Loc.           |
| <b>Power supply</b>   |  |
| • Rated voltage   | 24 V DC  |
| - Max. current consumption  | 30 mA  |
| • Rated voltage (from CPU)  | 5 V DC   |
| - Max. current consumption  | 140 mA   |
| <b>IP degree of protection to EN 60529; IEC 60529</b>                                   | IP20   |
| <b>Climatic requirements</b>  |  |
| <b><math>T_{min} (IND)</math> to <math>T_{max} (IND)</math> (operating temperature)</b> |  |
| • Vertical installation   | 0 ... +55 °C   |
| • Horizontal installation   | 0 ... +40 °C   |
| <b>EMC requirements according to</b>  | EN 61326, EN 45501<br>NAMUR NE21, Part 1               |
| <b>Dimensions</b>   | 71.2 x 80 x 62 mm                                      |

## SIMATIC S7-200

## Function modules

## SIWAREX MS

3

| Ordering data   | Order No.                                  | Order No.   |
|---|--|---|
| <b>SIWAREX MS</b><br>Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification  | 7MH4 930-0AA01                             | <b>SIWAREX JB junction box, stainless steel housing</b><br>for connecting up to 4 load cells in parallel  |
| <b>SIWAREX MS manual</b><br>available in a range of languages<br>Free download on the Internet at: <a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a>   |  | <b>Ex interface, type SIWAREX Pi</b><br>With UL and FM approvals, but <b>without ATEX approval</b><br>for intrinsically safe connection of load cells, suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and M.<br>Not approved for use in the EU.  |
| <b>SIWAREX MS onfiguration package on CD-ROM for STEP7 Micro/WIN, version 4.0 SP2 or higher</b> <ul style="list-style-type: none"> <li>• Software for SIWATOOL MS scale adjustment (in a range of languages)</li> <li>• Manuals available on CD (in a range of languages)</li> <li>• Micro/WIN Library MicroScale for communication with SIWAREX MS</li> </ul>  | 7MH4 930-0AK01                             | <b>Manual for Ex interface type SIWAREX Pi</b><br><b>C71000-T5974-C29</b>   |
| <b>SIWAREX MS "Getting started"</b><br>Sample software show beginners how to program the scales.<br>Free download on the Internet at: <a href="http://www.siemens.com/weighing-technology">www.siemens.com/weighing-technology</a>  |  | <b>Ex interface, type SIWAREX IS</b><br>With ATEX approval, but <b>without UL and FM approvals</b><br>for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules.<br>Approved for use in the EU. <ul style="list-style-type: none"> <li>• With short-circuit current &lt; 199 mA DC</li> <li>• With short-circuit current &lt; 137 mA DC</li> </ul> |
| <b>SIWATOOL cable</b><br>from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232) <ul style="list-style-type: none"> <li>• 2 m long</li> <li>• 5 m long</li> </ul>   | <b>7MH4 702-8CA</b><br><b>7MH4 702-8CB</b> | <b>Cable (optional)</b><br><b>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath</b><br>to connect SIWAREX U, CS, MS, FTA, FTC, M and CF to the junction box (JB), extension box (EB) or Ex interface (Ex-I) or between two JB's, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C  |
| <b>Shield clamps for shield termination</b><br>Pack of 10; 1 unit required for each shielded cable  | 6ES5 728-8MA11                             | <b>Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath</b><br>to connect the junction box (JB) or extension box (EB) in a potentially explosive atmosphere to the Ex interface (Ex-I), for fixed laying, occasional bending permitted, blue PVC insulating sheath, approx. 10.8 mm outer diameter, for ambient temperature -40 ... +80 °C  |
| <b>Remote displays (option)</b><br>The digital remote displays can be connected directly to the SIWAREX MS through the TTY interface.<br>The following remote display can be used: S102<br>Siebert Industrieelektronik GmbH<br>P.O. Box 1180<br>D-66565 Eppelborn<br>Tel.: +49 6806/980-0<br>Fax: +49 6806/980-999<br>Internet: <a href="http://www.siebert.de">www.siebert.de</a><br>Detailed information available from manufacturer. |  | <b>Cable LIYCY 4 x 2 x 0.25 mm<sup>2</sup></b><br>for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display   |
| <b>Accessories</b><br><b>SIWAREX JB junction box, aluminium housing</b><br>for connecting up to 4 load cells in parallel, and for connecting several junction boxes   | 7MH4 710-1BA                               |   |

I: Subject to export regulations AL: N and ECCN: EAR99H

### SIPLUS DCF 77 radio clock module

#### Overview



This module can be used to synchronize the real-time clock of the SIMATIC S7-200, S7-300 and S7-400 automation systems with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig.

The time is received by means of a DCF receiver (antenna with electronics) which is connected via two digital inputs on the SIMATIC and SIPLUS together with a software driver included in the scope of delivery (function block FB). The function blocks are available on the Internet for downloading.

[www.siemens.com/siplus](http://www.siemens.com/siplus) - Support - Tools and Downloads!

#### Technical specifications

##### SIPLUS DCF 77 radio clock module

|                         |                                      |
|-------------------------|--------------------------------------|
| Radio frequency         | 77.5 Hz                              |
| Power supply            | 24 V DC (20.4 to 28.8 DC)            |
| Power consumption, typ. | 50 mA                                |
| Dimensions (W x H x D)  | 75 mm x 125 mm <sup>1)</sup> x 75 mm |

<sup>1)</sup> Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

#### Ordering data

#### Order No.

##### SIPLUS DCF 77 radio clock module

H **6AG1 057-1AA03-0AA0**

For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

# SIMATIC S7-200

## Communication

### EM 241 modem

#### Overview



- Modem expansion module for SIMATIC S7-200
- The Plug&Play solution for all classical modem tasks in the PLC field
- Used for remote maintenance/remote diagnostics, CPU-to-CPU/PC communication or SMS/pager messaging
- Minimal engineering outlay required
- Replaces external modems connected via the communication interface of the CPU
- Easy to retrofit

#### Technical specifications

| 6ES7 241-1AA22-0XA0                       |  |
|---|--|
| <b>Supply voltages</b>                    |  |
| Load voltage L+                           |  |
| • Rated value (DC)                        | 24 V   |
| • Permissible range, lower limit (DC)     | 20.4 V   |
| • Permissible range, upper limit (DC)     | 28.8 V   |
| <b>Current consumption</b>                |  |
| from load voltage L+ (without load), max. | 70 mA  |
| from backplane bus 5 V DC, max.           | 80 mA; from expansion bus  |
| <b>Power losses</b>                       |  |
| Power loss, typ.                          | 2.1 W  |
| <b>Communication functions</b>            |  |
| Bus protocol/transmission protocol        | PPI, Modbus  |
| <b>Interfaces</b>                         |  |
| Number of RS 485 interfaces               | 0  |
| <b>Connection method</b>                  |  |
| Telephone lines                           | RJ11 (4 cables, 6 contacts)  |
| <b>Modem</b>                              |  |
| Physics                                   | Bell 103, Bell 212, V. 21, V. 22, V. 22 bis, V. 23c, V. 32, V. 32 to, V. 34 (preset) |
| Tone dialing                              | Yes  |
| Pulse dialing                             | Yes  |
| <b>Dimensions and weight</b>              |  |
| Dimensions                                |  |
| • Width                                   | 71.2 mm  |
| • Height                                  | 80 mm  |
| • Depth                                   | 62 mm  |
| Weight                                    |  |
| • Weight, approx.                         | 190 g  |

#### Ordering data

#### Order No.

|   |                            |
|---|----------------------------|
| <b>EM 241 modem</b>   | <b>6ES7 241-1AA22-0XA0</b> |
| Analog modem for remote maintenance/diagnostics; CPU-CPU/PC communication, SMS/pager message transmission |                            |
| <b>Grounding terminal</b>   | <b>6ES5 728-8MA11</b>      |
| 10 units  |                            |
| <b>Front door set</b>   | <b>6ES7 291-3AX20-0XA0</b> |
| contains different cover flaps for CPU and EM; spare part   |                            |
| <b>S7-200 automation system, system manual</b>  |                            |
| for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4  |                            |
| German  | <b>6ES7 298-8FA24-8AH0</b> |
| English   | <b>6ES7 298-8FA24-8BH0</b> |
| French  | <b>6ES7 298-8FA24-8CH0</b> |
| Spanish   | <b>6ES7 298-8FA24-8DH0</b> |
| Italian   | <b>6ES7 298-8FA24-8EH0</b> |
| Chinese   | <b>6ES7 298-8FA24-8FH0</b> |

I: Subject to export regulations AL: N and ECCN: EAR99H

### EM 277 PROFIBUS DP module

#### Overview



- For connecting S7-22x to PROFIBUS DP (as a slave) and MPI
- Simultaneous operation as MPI slave and DP slave is possible
- Transmission rate max. 12 Mbit/s
- Version 6ES7 2xx-xxx21-xxxx and higher can be used with CPU

#### Technical specifications

| 6ES7 277-0AA22-0XA0   |  |
|---|--|
| <b>Supply voltages</b>  |  |
| Load voltage L+   |  |
| • Rated value (DC)  | 24 V   |
| • permissible range, lower limit (DC)                                 | 20.4 V   |
| • permissible range, upper limit (DC)                                 | 28.8 V   |
| <b>Current consumption</b>  |  |
| from backplane bus 5 V DC, max.                                       | 150 mA   |
| from sensor current supply or external current supply (24 V DC), max. | 180 mA; 30 to 180 mA   |
| <b>Power losses</b>   |  |
| Power loss, typ.  | 2.5 W  |
| <b>Hardware configuration</b>   |  |
| Connectable nodes   | TD 200 as of V2.0, OP, TP, PG/PC, S7-300/400, PROFIBUS DP master |
| <b>Communication functions</b>  |  |
| Bus protocol/transmission protocol                                    | PROFIBUS DP (slave), MPI (slave)                                 |
| Number of connections   |  |
| • MPI connections, max.   | 6  |
| - number of which are reserved for OP communication                   | 1  |
| - of which reserved for PG communication                              | 1  |
| <b>Interfaces</b>   |  |
| Number of RS 485 interfaces   | 1  |
| 5 V DC  |  |
| • Output current, max.  | 90 mA  |
| 24 V DC   |  |
| • Voltage range   | 20.4 to 28.8 V   |
| • Output current, max.  | 120 mA   |
| • Current limiting  | 0.7 to 2.4 A   |

| 6ES7 277-0AA22-0XA0                       |   |
|---|---|
| <b>Connection method</b>                  |   |
| Plug-in I/O terminals                     | No  |
| <b>PROFIBUS DP</b>                        |   |
| Transmission rate, max.                   | 12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1 / 1.5 / 3 / 6 / 12 Mbit/s |
| Node addresses                            | 0 to 99, adjustable   |
| Cable length, max.                        | 1 200 m; 100 to 1200 m, depending on transmission speed                                 |
| Number of stations in network, max.       | 126; of which max. 99 EM 277  |
| Number of stations per segment, max.      | 32  |
| Automatic detection of transmission speed | Yes   |
| <b>Dimensions and weight</b>              |   |
| Dimensions                                |   |
| • Width                                   | 71.2 mm   |
| • Height                                  | 80 mm   |
| • Depth                                   | 62 mm   |
| Weight                                    |   |
| • Weight, approx.                         | 175 g   |

#### Ordering data

#### Order No.

#### EM 277 PROFIBUS DP input module

6ES7 277-0AA22-0XA0

For CPU 222/224/224 XP/226; for connecting to PROFIBUS DP (slave) and MPI

# SIMATIC S7-200

## Communication

### CP 243-2

#### Overview



The CP 243-2 is the AS-Interface master for the SIMATIC S7-200 and has the following features:

- Connection of up to 62 AS-Interface slaves
- Integrated analog value transmission
- (Analog profiles 7.3 and 7.4)
- Supports all AS-Interface master functions according to the extended AS-Interface specification V2.1
- Indication of the operating state and readiness for operation of connected slaves by means of LEDs in the front plate
- Indication of faults (e.g. AS-Interface voltage fault, configuration fault) by means of LEDs in the front plate
- Compact enclosure in the design of the SIMATIC S7-200

The CP 243-2 is connected like an expansion module to the S7-200. It has:

- two screw connections for direct connection of the AS-Interface cable
- LEDs in the front plate for indicating the operating state and functional readiness of all connected and activated slaves
- two pushbuttons for indicating the status information of the slaves, for switching over the operating state and for adopting the existing ACTUAL configuration as the DESIRED configuration

The CP 243-2 supports all the specified functions of extended version 2.1 of AS-Interface specification.

In the process image of the S7-200 the CP 243-2 occupies one digital input byte (status byte), one digital output byte (control byte), as well as 8 analog input and 8 analog output words. The CP 243-2 thus occupies two (logic) slots. The operating mode of the CP 243-2 can be set with the status byte and the control byte using the user program. Depending on the operating mode the CP 243-2 saves either the digital or analog I/O data of the AS-Interface slaves or diagnostic values in the analog address area of the S7-200, or it enables master calls (e.g. re-addressing of the slaves).

All connected AS-Interface slaves are configured at the press of a button. No further configuration of the CP is required.

#### Ordering data

#### Order No.

##### CP 243-2 communication processors

**6GK7 243-2AX01-0XA0**

For connection of the SIMATIC S7-200 to AS-Interface;  
corresponds to AS-Interface Specification V2.1;  
dimensions (W x H x D / mm):  
71 x 80 x 62  
(dimensions without fixing lugs)



## Overview



| ISO | TCP | PN | MRP | IT | IP-R | PG/OP | S7 |
|-----|-----|----|-----|----|------|-------|----|
|     |     |    |     | ●  |      | ●     | ●  |

- Connection of S7-200 to Industrial Ethernet
  - 1 x RJ45 interface for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation and autocrossover function
- Communication services:
  - PG/OP communication
  - S7 communication
- Configuration, remote programming and service with STEP 7 Micro/WIN over Industrial Ethernet possible (program upload and program download, status)
- CPU/CPU communication over Industrial Ethernet possible (client + server, eight S7 connections + one PG connection)
- IT communication
  - Web function
  - E-mail function
  - FTP client function for program-controlled data communication (e.g. DOS, UNIX, Linux, embedded systems)
- FTP server
- An S7 OPC server (e.g. SOFTNET-S7 or S7-1613) allows PLC data to be further processed in PC applications

## Technical specifications

|   |                                     |
|---|-------------------------------------|
| <b>Order No.</b>  | <b>6GK7 243-1EX01-0XE0</b>          |
| <b>Product type designation</b>   | <b>CP 243-1</b>                     |
| <b>Transmission rate</b>  |                                     |
| Transmission rate at interface 1  | 10 ... 100 Mbit/s                   |
| <b>Interfaces</b>   |                                     |
| Number of electrical connections  |                                     |
| • at interface 1 in accordance with Industrial Ethernet                         | 1                                   |
| • for power supply  | 1                                   |
| Design of electrical connection   |                                     |
| • at interface 1 in accordance with Industrial Ethernet                         | RJ45 port                           |
| • for power supply  | 3-pin terminal strip                |
| <b>Supply voltage, current consumption, power loss</b>                          |                                     |
| Type of power supply  | DC                                  |
| Power supply  |                                     |
| • 1 from backplane bus  | 5 V                                 |
| • External  | 24 V                                |
| Relative positive tolerance at 24 V DC  | 20 %                                |
| Relative negative tolerance at 24 V DC  | 15 %                                |
| Current consumed  |                                     |
| • from backplane bus at 5 V DC, typical   | 0.06 A                              |
| • from external power supply with 24 V DC                                       |                                     |
| - Typical   | 0.053 A                             |
| - Maximum   | 0.06 A                              |
| Effective power loss  | 1.5 W                               |
| <b>Permitted ambient conditions</b>   |                                     |
| Ambient temperature   |                                     |
| • With vertical installation during operating phase                             | 0 ... 45 °C                         |
| • With horizontal installation during operating phase                           | 0 ... 55 °C                         |
| • During storage  | -40 ... +70 °C                      |
| • During transport  | -40 ... +70 °C                      |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 %                                |
| IP degree of protection   | IP 20                               |
| <b>Design, dimensions and weights</b>   |                                     |
| Module format   | S7-200 compact module, double-width |
| Width   | 71.2 mm                             |
| Height  | 80 mm                               |
| Depth   | 62 mm                               |
| Net weight  | 0.15 kg                             |
| Type of mounting  |                                     |
| • 35 mm DIN rail mounting   | -                                   |
| • Wall mounting   | -                                   |

# SIMATIC S7-200

## Communication

CP 243-1

### Technical specifications (continued)

| Order No.  | 6GK7 243-1EX01-0XE0 |
|--|---------------------|
| Product type designation   | CP 243-1            |
| <b>Product properties, functions, components General</b>         |                     |
| Maximum number of modules per CPU                                | 1                   |
| <b>Performance data</b>  |                     |
| <u>Performance data S7 communication</u>                         |                     |
| Maximum number of possible connections for S7 communication      | 8                   |
| Number of possible connections for S7 communication - Note       | -                   |
| <u>Performance data IT functions</u>                             |                     |
| Number of possible connections                                   |                     |
| • as client with FTP, maximum                                    | 1                   |
| • as server with HTTP, maximum                                   | 4                   |
| • as e-mail client, maximum                                      | 1                   |
| Number of e-mails with 1024 characters of e-mail client, maximum | 32                  |
| Number of access privileges of access protection function        | 8                   |
| Storage capacity of user memory as FLASH memory file system      | 8 Mibyte            |
| Number of possible write cycles of flash memory cells            | 100000              |

| Order No.   | 6GK7 243-1EX01-0XE0                  |
|---|--------------------------------------|
| Product type designation  | CP 243-1                             |
| <b>Product functions Management, configuration, programming</b> |                                      |
| Product function: MIB support                                   | No                                   |
| Protocol is supported SNMP v1                                   | No                                   |
| Configuration software required                                 | STEP 7-Micro/WIN V4.0 SP8 and higher |
| <b>Product functions Diagnostics</b>                            |                                      |
| Product function: Web-based diagnostics                         | Yes                                  |
| <b>Product functions Switch</b>                                 |                                      |
| Product feature: Switch   | No                                   |

3

| Ordering data  | Order No.  | Order No.  |
|--|--|--|
| <b>CP 243-1 communication processor</b><br>for connection of SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication, E-mail and WWW server; with electronic manual on CD-ROM<br>German, English, French, Italian, Spanish   | <b>6GK7 243-1EX01-0XE0</b>   |  |
| <b>SOFTNET S7 for Industrial Ethernet</b><br>Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A<br><b>SOFTNET V8.0 for Industrial Ethernet</b><br>for 32-bit Windows 7 Professional/Ultimate; German/English<br>up to 64 connections<br>• Single license for 1 installation   | <b>6GK1 704-1CW80-3AA0</b>   | <b>SOFTNET S7 Lean Edition 2008 for Industrial Ethernet</b><br>up to 8 connections<br>• Single license for 1 installation<br>• 1-year Software Update Service, with automatic extension; requirement: Current software version<br>• Upgrade from Edition 2006 to V8.0<br>• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0<br><b>STEP 7-Micro/WIN V4 programming software</b><br>Target system: All CPUs of the SIMATIC S7-200<br>Requirements: Windows 2000/XP on PG or PC,<br>Type of delivery:<br>German, English, French, Spanish, Italian, Chinese; with online documentation<br>• Single license J <b>6ES7 810-2CC03-0YX0</b><br>• Upgrade Single license <sup>1)</sup> J <b>6ES7 810-2CC03-0YX3</b> |
| <b>SOFTNET Edition 2008 for Industrial Ethernet</b><br>for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English<br>up to 64 connections<br>• Single license for 1 installation<br>• 1-year Software Update Service, with automatic extension; requirement: Current software version<br>• Upgrade from Edition 2006 to V8.0<br>• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0 | <b>6GK1 704-1CW71-3AA0</b><br><b>6GK1 704-1CW00-3AL0</b><br><br><b>6GK1 704-1CW00-3AE0</b><br><b>6GK1 704-1CW00-3AE1</b> | <b>IE TP Cord RJ45/RJ45</b><br>TP cable 4 x 2 with 2 RJ45 connectors<br>• 0.5 m<br>• 1 m<br>• 2 m<br>• 6 m<br><b>SCALANCE X005</b> I <b>6GK5 005-0BA00-1AA3</b><br>Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures   |
| <b>SOFTNET S7 Lean Edition V8 for Industrial Ethernet</b><br>up to 8 connections<br>• Single license for 1 installation  | <b>6GK1 704-1LW80-3AA0</b>   |  |

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

I: Subject to export regulations AL: N and ECCN: EAR99H

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## Communication

### MD720-3 GSM/GPRS modem

#### Overview



- SINAUT mobile radio modem with RS232 interface
- DIN rail mounting
- 24 V DC power supply
- Supports the GSM services CSD<sup>\*)</sup>, SMS and GPRS
- Use with SINAUT MICRO: Data transmission via tunnelled GPRS connection with SIMATIC S7
- Use with SINAUT ST7: Data transmission via CSD, GPRS, transmission of SMS
- AT command interface: for remote maintenance via CSD with TS adapter II or for transmission of SMS

<sup>\*)</sup> CSD – **C**ircuit **S**witched **D**ata (data transmission via GSM dialup connection)

#### Technical specifications

|   |   |
|---|---|
| <b>Transfer rate</b>  |   |
| <ul style="list-style-type: none"> <li>• RS232</li> <li>• GSM data calls</li> <li>• GPRS               <ul style="list-style-type: none"> <li>- Up to 2 uplinks</li> <li>- Up to 4 downlinks</li> </ul> </li> </ul> | 300 bit/s to 57,600 bit/s<br>CSD 9,600 bit/s<br><br>13.4 Kbit/s to 27 Kbit/s gross upload (modem to Internet); net approx. 30 % lower<br>40 Kbit/s to 54 Kbit/s gross download (Internet to modem); net is approx. 30 % lower |
| <b>Interfaces</b>   |   |
| <ul style="list-style-type: none"> <li>• RS232</li> <li>• Antenna connection</li> </ul>   | 1 x 9-pin Sub-D socket<br>1 x SMA antenna socket (50 Ohm)   |
| <b>Frequency ranges</b>   | 850, 900, 1800, 1900 MHz  |
| <b>Transmitted output power</b>   | 2 W at 850, 900 MHz<br>1 W at 1800, 1900 MHz  |
| <b>Current consumption</b>  |   |
| Send mode   |   |
| <ul style="list-style-type: none"> <li>• at 12 V</li> <li>• at 24 V</li> </ul>  | 430 mA<br>140 mA  |
| Receive mode  |   |
| <ul style="list-style-type: none"> <li>• at 12 V</li> <li>• at 24 V</li> </ul>  | 90 mA<br>50 mA  |
| <b>Supply voltage</b>   | 12 ... 30 V DC  |
| <b>Power loss</b>   | typ. 5 W<br>max. 6.2 W  |
| <b>Permissible ambient conditions</b>   |   |
| <ul style="list-style-type: none"> <li>• Operating temperature</li> <li>• Transport/storage temperature</li> <li>• Relative humidity</li> </ul>   | - 20 °C ... +60 °C<br>- 25 °C ... +85 °C<br>Max. 95 % at +25 °C   |
| <b>Design</b>   |   |
| <ul style="list-style-type: none"> <li>• Dimensions (W x H x D) in mm</li> <li>• Weight</li> <li>• Assembly</li> </ul>  | 22.5 x 99 x 114<br>Approx. 150 g<br>Standard rail   |
| <b>Degree of protection</b>   | IP40  |
| <b>Configuration</b>  | AT commands using S7-200 program blocks;<br>MC45-compatible AT commands for use with SINAUT ST7 modules   |
| <b>National approvals</b>   | Current approvals can be found in the Internet at <a href="http://www.siemens.com/simatic-net/ik-info">www.siemens.com/simatic-net/ik-info</a>  |

| Ordering data  | Order No.             | Order No.  |
|--|-----------------------|--|
| <b>GSM/GPRS modem MD720-3</b><br>GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS232; manual on CD-ROM in German, English, Chinese, Russian  | <b>6NH9 720-3AA00</b> | <b>ANT794-4MR antenna</b><br>Quad band antenna, omnidirectional with 5 m cable   |
| <b>Accessories</b><br><b>Telecontrol Server Basic</b><br>Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATIC S7-1200 and SIMATIC S7-200; connection management to 8 remote GPRS stations; routing for connections between S7 GPRS stations; English and German user interface; for Windows 7 Professional, Windows 7 Enterprise, Windows 7 Ultimate, and Windows Server 2008 (32-bit); documentation on CD-ROM in German and English  |                       | <b>ANT794-3M antenna</b><br>Tri-band flat antenna, in enclosure with 1.2 m cable   |
| <ul style="list-style-type: none"> <li>• <b>Telecontrol Server Basic 8</b> J <b>6NH9 910-0AA20-0AA0</b><br/>               Connection management for eight SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 64</b> J <b>6NH9 910-0AA20-0AB0</b><br/>               Connection management for 64 SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 256</b> J <b>6NH9 910-0AA20-0AC0</b><br/>               Connection management for 256 SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 1000</b> J <b>6NH9 910-0AA20-0AD0</b><br/>               Connection management for 1000 SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 5000</b> J <b>6NH9 910-0AA20-0AE0</b><br/>               Connection management for 5000 SIMATIC S7-1200 or S7-200 stations</li> </ul> |                       | <b>SIMATIC S7-200 PPI modem cable</b><br>For connecting the S7-200 to the GSM/GPRS modem SINAUT MD720-3  |
|  |                       | <b>Connecting cable</b><br>For connecting a TIM3V-IE/TIM4 (RS232) with the GSM modem MD720-3 (access to GSM network). Also suitable for third-party modems or radio equipment with RS232 standard; cable length 2.5 m. |
|  |                       | <b>SITOP compact 24 V/ 0.6 A</b><br>1-phase power supply with wide-range input 85 ... 264 V AC/110 ... 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design                         |

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## Communication

### MD741-1 EGPRS router

#### Overview



- EGPRS (GPRS with Edge) and GPRS router for wireless IP communication from Ethernet-based automation devices over GSM mobile radio networks
- Four times the transmission speed by means of EGPRS
- Integrated security functions with firewall and VPN (IPsec)

3

#### Technical specifications

| MD741-1                                |   |
|--|---|
| <b>Transfer rate</b>                   |   |
| • GPRS/EGPRS Multislot Class 12        | GPRS:<br>13.4 ... 27 Kbit/s upload  |
| - Up to 2 uplinks                      | EGPRS:<br>53.5 ... 108 Kbit/s upload<br>(modem to Internet);<br>net rate approx. 30 % lower   |
| - Up to 4 downlinks                    | EGPRS:<br>40 ... 54 Kbit/s download gross<br>EGPRS:<br>160 ... 208 Kbit/s download gross<br>(Internet to modem);<br>net rate approx. 30 % lower |
| <b>Interfaces</b>                      |   |
| • Communication connection, electrical | RJ45 socket;<br>(10/100 Mbit/s; TP;<br>auto-crossover)  |
| • Antenna connection                   | 1 x SMA antenna socket<br>(50 Ohm)  |
| <b>Frequency ranges</b>                | Quad band:<br>850, 900, 1800, 1900 MHz  |
| <b>Transmitted output power</b>        | 2 W at 850, 900 MHz;<br>1 W at 1800, 1900 MHz   |
| EGPRS connection set-up                | Automatically when supply<br>voltage is switched on;<br>fallback to GPRS if EGPRS is not<br>available   |
| Virtual Private Network (VPN)          |   |
| • Protocol                             | IPsec (tunnel and transport<br>mode)  |
| • Encryption mechanisms                | IPsec 3DES with 168 bit;<br>IPsec AES with 128, 192 and<br>256 bit  |
| • Packet authentication                | MD5;<br>SHA-1   |
| • Internet Key Exchange (IKE)          | with Main and Quick Mode  |
| • Authentication                       | Pre-Shared Key (PSK);<br>X.509v3 certificates   |

| MD741-1   |   |
|---|---|
| <b>Firewall</b>                                       | Stateful Packet Inspection;<br>Anti-Spoofing  |
| <b>Router functions</b>                               | NAT-Traversal;<br>NAT (IP Masquerading);<br>Port Forwarding;<br>Dead Peer Detection (DPD);<br>DynDNS;<br>DNS Cache;<br>NTP;<br>Remote Logging             |
| <b>Current consumption</b>                            |   |
| Send mode   |   |
| • For existing EGPRS connection<br>with data exchange | 182 mA at 24 V ( $I_{Burst}$ 550 mA);<br>4.62 ms burst repetition<br>frequency  |
| <b>Supply voltage</b>                                 | 24 V DC (12 V ... 30 V)   |
| <b>Power loss</b>                                     | typ. 5 W  |
| <b>Permissible ambient conditions</b>                 |   |
| • Operating temperature                               | -20 °C ... +60 °C   |
| • Transport/storage temperature                       | -40 °C ... +70 °C   |
| • Relative humidity                                   | max. 95% at +25 °C, no dewing   |
| <b>Design</b>   |   |
| • Dimensions (W x H x D) in mm                        | 45 x 114 x 99   |
| • Weight  | approx. 280 g   |
| • Assembly  | Standard rail   |
| <b>Degree of protection</b>                           | IP20  |
| <b>Configuration</b>                                  | Over Internet browser   |
| <b>National approvals</b>                             | Current approvals can be found<br>in the Internet at<br><a href="http://www.siemens.com/simatic-net/ik-info">www.siemens.com/<br/>simatic-net/ik-info</a> |

| Ordering data   | Order No.  | Order No.  |
|---|--|--|
| <b>MD741-1 EGPRS router</b><br>For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12   | <b>6NH9 741-1AA00</b>  |  |
| <b>Accessories</b><br><b>IE FC RJ45 Plug 180</b><br>RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPU with Industrial Ethernet interface <ul style="list-style-type: none"> <li>• 1 pack = 1 unit</li> <li>• 1 pack = 10 units</li> <li>• 1 pack = 50 units</li> </ul> | <b>6GK1 901-1BB10-2AA0</b><br><b>6GK1 901-1BB10-2AB0</b><br><b>6GK1 901-1BB10-2AE0</b> |  |
| <b>ANT794-4MR antenna</b><br>Quad band antenna for MD720-3 and MD741-1, omnidirectional with 5 m cable  | <b>6NH9 860-1AA00</b>  |  |
| <b>ANT794-3M antenna</b><br>Tri-band flat antenna, in enclosure with 1.2 m cable  | <b>6NH9 870-1AA00</b>  |  |
|   |  | <b>SCALANCE S Industrial Security Modules</b><br>For protection of programmable controllers and automation networks, and for safeguarding of industrial communication; configuring tool and electronic manual on CD-ROM; German, English, French, Italian, Spanish <ul style="list-style-type: none"> <li>• <b>SCALANCE S612</b> B <b>6GK5 612-0BA00-2AA3</b><br/>               uses the Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 32 devices up to 64 VPN tunnels simultaneously</li> <li>• <b>SCALANCE S613</b> B <b>6GK5 613-0BA00-2AA3</b><br/>               uses Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 64 devices, up to 128 VPN tunnels simultaneously; enhanced temperature range (-20 ... +70 °C)</li> </ul> |
|   |  | <b>IE TP Cord RJ45/RJ45</b><br>TP cable 4 x 2 with 2 RJ45 connectors <ul style="list-style-type: none"> <li>• 0.5 m</li> <li>• 1 m</li> <li>• 2 m</li> <li>• 6 m</li> <li>• 10 m</li> </ul>  |
|   |  | <b>6XV1 870-3QE50</b><br><b>6XV1 870-3QH10</b><br><b>6XV1 870-3QH20</b><br><b>6XV1 870-3QH60</b><br><b>6XV1 870-3QN10</b>  |

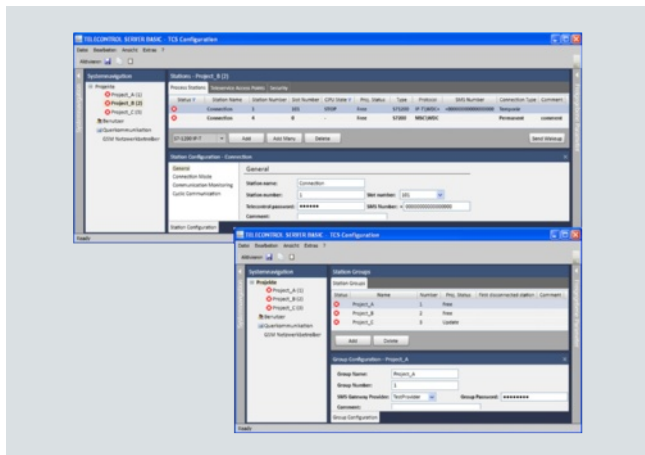
B: Subject to export regulations AL: 5A002A1A2 and ECCN: 5A002ENCU

# SIMATIC S7-200

## Communication

### Telecontrol Server Basic

#### Overview



- Software package for the PC, comprising:
  - OPC server and connection manager for telecontrol and teleservice tasks (diagnostics with STEP 7 for the S7-1200)
  - OPC configuring software for the S7-1200 and S7-200
  - PLC block library for the S7-200
- GPRS operation
  - of the SIMATIC S7-1200 with CP 1242-7 via dynamic IP addresses with a standard mobile phone flat-rate contract
  - of the SIMATIC S7-200 with SINAUT modem MD720-3 via dynamic IP addresses with a standard mobile phone flat-rate contract
  - of the S7-1200 with CP 1242-7 via fixed IP addresses
- Connection of up to 5000 telecontrol stations to the control center via the OPC interface
- Operation and diagnostics of S7-1200 and S7-200 stations on an OPC server with different STEP 7 projects and separate users with user administration
- Integral teleservice gateway for diagnostics of S7-1200 stations via the CP 1242-7 with STEP 7 via the Internet, also with dynamic IP addresses. This works on every PC with STEP 7 and standard Internet access without parameterizing firewalls or routers.
- GPRS communication between S7-1200 or S7-200 stations by means of routing function (also when using dynamic IP addresses)
- Encrypted transmission for protection against data manipulation and tapping
- Import of SINAUT MICRO SC projects

#### Technical specifications

| Telecontrol Server Basic   |   |
|--|---|
| Supported controllers  | S7-1200 with CP1242-7<br>S7-200/S7-1200 with MD720-3 modem (block library included in the scope of supply)  |
| Number of connections (stations) that can be operated (depending on the order version) | 8, 64, 256, 1000, or 5000 connections   |
| Number of STEP 7 projects that can be operated in parallel                             | 2000 projects (structured representation, separation of the projects via programmable user rights)  |
| Number of STEP 7 Teleservice connections that can be operated in parallel              | 5 connections per project (separation of the projects via programmable user rights)   |
| Interfaces to the OPC Client   | <ul style="list-style-type: none"> <li>• DCOM protocol</li> <li>• OPC interface "Data Access Interface 3.0"</li> <li>• Synchronous and asynchronous reading of variables</li> </ul>   |
| Interfaces and functions between the OPC server and SIMATIC S7                         | <ul style="list-style-type: none"> <li>• Writing of variables in the SIMATIC S7 in the case of value changes to OPC variables</li> <li>• Transfer of SIMATIC S7 data to OPC variables (for event-driven communication from the SIMATIC S7)</li> <li>• Activatable cyclic reading of variables; adjustable time interval</li> <li>• Monitoring of connected SIMATIC S7 with time-of-day synchronization</li> <li>• Routing of data packets between connected SIMATIC S7-1200 stations or between S7-200 stations</li> <li>• Permanent GPRS connection; the tunnel is established from the GPRS modem</li> <li>• Temporary GPRS connection (as required); the tunnel is established from the GPRS modem and can be initiated by a text message sent automatically by the OPC server ("wake-up"). Manual "wake-up" using a mobile phone is also possible.</li> <li>• Via Internet access as server with public IP address (recommendation: fixed public Internet address)</li> </ul> |
| Operating systems  | Microsoft Windows 7 Professional<br>Microsoft Windows 7 Enterprise<br>Microsoft Windows 7 Ultimate<br>Microsoft Windows Server 2008 (32-bit)  |
| Diagnostics  | Station group monitoring<br>Station monitoring<br>Connection monitoring<br>STEP 7 Teleservice across Internet and router boundaries – S7-1200 only  |
| Configuration  | Integral configuration tool<br>Multi-project-capable<br>Multi-user-capable with user management<br>Configurations can be expanded at runtime  |



| Ordering data  | Order No. | Order No.   |
|--|-----------|---|
| <b>Telecontrol Server Basic</b><br>Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATIC S7-1200 and SIMATIC S7-200; connection management to remote GPRS stations; routing for connections between S7 GPRS stations; German and English operator interface; for Windows 7 Professional, Windows 7 Enterprise, Windows 7 Ultimate and Windows Server 2008 (32-bit); documentation on CD-ROM, German and English   |           |   |
| <ul style="list-style-type: none"> <li>• <b>Telecontrol Server Basic 8</b> J <b>6NH9 910-0AA20-0AA0</b><br/>               Connection management for eight SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 64</b> J <b>6NH9 910-0AA20-0AB0</b><br/>               Connection management for 64 SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 256</b> J <b>6NH9 910-0AA20-0AC0</b><br/>               Connection management for 256 SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 1000</b> J <b>6NH9 910-0AA20-0AD0</b><br/>               Connection management for 1000 SIMATIC S7-1200 or S7-200 stations</li> <li>• <b>Telecontrol Server Basic 5000</b> J <b>6NH9 910-0AA20-0AE0</b><br/>               Connection management for 5000 SIMATIC S7-1200 or S7-200 stations</li> </ul> |           |   |
|  |           | <b>Accessories</b><br><b>CP 1242-7 communication processor</b><br>6GK7 242-7KX30-0XE0<br>Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network   |
|  |           | <b>MD720-3 GSM/GPRS modem</b><br>6NH9 720-3AA00<br>GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS232, including gender changer for RS232/PPI adapter; manual on CD-ROM in German, English, Chinese, Russian |
|  |           | <b>ANT794-4MR antenna</b><br>6NH9 860-1AA00<br>Quad band antenna, omnidirectional with 5 m cable  |
|  |           | <b>ANT794-3M antenna</b><br>6NH9 870-1AA00<br>Triband flat antenna, in enclosure with 1.2 m cable   |

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## SIPLUS communication

### SIPLUS PROFIBUS DP EM 277

#### Overview



- For connecting the S7-22x to PROFIBUS DP (as slave) and MPI
- Simultaneous operation as MPI slave and DP slave possible
- Max. transmission rate 12 Mbit/s
- Can be used with CPU version 6ES7 2xx-xxx21-xxxx and higher

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS EM 277 PROFIBUS DP module

|   |   |
|---|---|
| <b>Order number</b>   | <b>6AG1 277-0AA22-2XA0</b>  |
| <b>Order No. based on</b>   | <b>6ES7 277-0AA22-0XA0</b>  |
| Ambient temperature range   | -25 ... +70 °C  |
| Conformal coating   | Coating of the printed circuit boards and the electronic components                   |
| Ambient conditions  | Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere).         |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes   |
| Technical data  | The technical data of the standard product applies except for the ambient conditions. |

#### Ambient conditions

|  |  |
|--|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br><br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br><br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH<sub>3</sub> < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH<sub>3</sub> < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

#### Ordering data

#### Order No.

#### SIPLUS EM 277 input module for PROFIBUS DP

(extended temperature range and medial exposure)

For CPU 222/224/224 XP/226;  
for connecting to PROFIBUS DP (slave) and MPI

**6AG1 277-0AA22-0XA0**

### Overview



- SINAUT mobile radio modem with RS232 interface
- DIN rail mounting:
- 24 V DC power supply
- Supports the GSM services CSD<sup>\*)</sup>, SMS and GPRS
- Use with SINAUT MICRO: Data transmission via GPRS; switchable to CSD for remote maintenance (incoming call only)
- Use with SINAUT ST7: Data transmission via CSD, transmission of SMS

<sup>\*)</sup> CSD – **C**ircuit **S**witched **D**ata (data transmission via GSM dialup connection)

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS MD702-3 GSM / GPRS modem

|                           |   |
|---------------------------|---|
| <b>Order No.</b>          | <b>6AG1 720-3AA00-7AA0</b>  |
| <b>Order No. based on</b> | <b>6NH9 720-3AA00</b>   |
| Ambient temperature range | -25 ... +70 °C  |
| Conformal coating         | Coating of the printed circuit boards and the electronic components                   |
| Technical data            | The technical data of the standard product applies except for the ambient conditions. |

#### Ambient conditions

|  |  |
|--|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

<sup>1)</sup> SA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

<sup>2)</sup> The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:  
[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

#### Ordering data

#### Order No.

|                                      |                            |
|--------------------------------------|----------------------------|
| <b>SIPLUS MD720-3 GSM/GPRS modem</b> | <b>6AG1 720-3AA00-7AA0</b> |
|--------------------------------------|----------------------------|

(extended temperature range and medial exposure)  
GPRS modem for IP-based data transmission over GSM networks, quad-band, AT command interface, automatic establishment of GPRS connection, switchable to CSD operation, RS232;  
manual on CD-ROM in German, English, Chinese, Russian

#### Accessories

see GSM/GPRS modem MD720-3, page 3/69

# SIMATIC S7-200

## SIPLUS communication

### SIPLUS MD741-1 EGPRS routers

#### Overview



- EGPRS (Edge GPRS) and GPRS router for wireless IP communication of Industrial Ethernet-based automation devices over GSM mobile networks
- EGPRS offers four times the transfer speed
- Integrated security features with firewall and VPN (IPsec)

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS MD741-1 EGPRS ROUTER

|                           |   |
|---------------------------|---|
| <b>Order number</b>       | <b>6AG1 741-1AA00-2AA0</b>  |
| <b>Order No. based on</b> | <b>6NH9 741-1AA00</b>   |
| Ambient temperature range | -25 ... +60 °C  |
| Conformal coating         | Coating of the printed circuit boards and the electronic components                   |
| Technical data            | The technical data of the standard product applies except for the ambient conditions. |

#### Ambient conditions

|  |  |
|--|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1)2)</sup>   |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

- 1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH<sub>3</sub> < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH<sub>3</sub> < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:  
[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

#### Ordering data

#### Order No.

|  |                                     |
|--|-------------------------------------|
| <b>SIPLUS MD741-1 EGPRS router</b><br>(extended temperature range and medial exposure)<br>For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12 | <b>6AG1 741-1AA00-2AA0</b>          |
| <b>Accessories</b>   | see EGPRS router MD741-1, page 3/71 |

### Overview



Optimally matched in design and functionality to the SIMATIC S7-200 micro PLC; flat design, particularly suitable for low cabinet depths.

### Technical specifications

| Power supplies, type   | 3.5 A   |
|--|---|
| Order No.  | 6EP1 332-1SH31 <sup>1)</sup>  |
| <b>Input</b>   | 1-phase AC  |
| Rated voltage $U_{in \text{ rated}}$                                     | <b>120/230 V AC</b><br>Set via wire jumper  |
| Voltage range  | 93 ... 132 V/187 ... 264 V  |
| Overvoltage strength   | $2.3 \times U_{in \text{ rated}}$ , 1.3 ms  |
| Mains buffering at $I_{out \text{ rated}}$                               | > 20 ms at $U_{in} = 187 \text{ V}$   |
| Rated line frequency; rated line frequency range                         | 50/60 Hz, 47 ... 63 Hz  |
| Rated current $I_{in \text{ rated}}$                                     | 1.65/0.95 A   |
| Switch-on current limitation (+25 °C) $\hat{I}_t$                        | < 33 A, < 3 ms ( $U_{in} = 230 \text{ V}$ )<br>< 1.0 A <sup>2</sup> s                                   |
| Built-in incoming fuse   | T 2.5 A/250 V (not accessible)  |
| Recommended miniature circuit breaker (IEC 898) in the mains power input | Two-pole miniature circuit breaker, 10 A or higher, Characteristic C or 6 A or higher, Characteristic D |
| <b>Output</b>  | Controlled, isolated DC voltage   |
| Rated voltage $U_{out \text{ rated}}$                                    | <b>24 V DC</b>  |
| Total tolerance  | ±5% (typ. ±2%)  |
| • Static line compensation   | Approx. ±0.1%   |
| • Static load compensation   | Approx. ±0.2%   |
| Residual ripple  | < 150 mV <sub>pp</sub> (typ. 30 mV <sub>pp</sub> )  |
| Spikes (bandwidth: 20 MHz)   | < 240 mV <sub>pp</sub> (typ. 110 mV <sub>pp</sub> )   |
| Adjustment range   | -   |
| Status indicator   | -   |
| On/Off behavior  | No overshoot of $U_{out}$ (soft start)  |
| Startup delay/voltage rise   | < 1 s/typ. 80 ms  |
| Rated current $I_{out \text{ rated}}$                                    | <b>3.5 A</b>  |

| Power supplies, type  | 3.5 A  |
|---|--|
| Order No.   | 6EP1 332-1SH31 <sup>1)</sup>   |
| Current range   | 0 ... 3.5 A  |
| • Up to +60°C   | -  |
| • Derating  | -  |
| Dynamic overcurrent on  | Typ. 5 A for 100 ms  |
| • Power-up on short-circuit                                     | Typ. 5 A for 100 ms  |
| • Short-circuit during operation                                | Yes, up to 5 units   |
| Parallel switching for enhanced performance                     | Yes, up to 5 units   |
| <b>Efficiency</b>   |  |
| Efficiency at $U_{out \text{ rated}}$ , $I_{out \text{ rated}}$ | Approx. 84%  |
| Power loss at $U_{out \text{ rated}}$ , $I_{out \text{ rated}}$ | Approx. 16 W   |
| <b>Closed-loop control</b>                                      |  |
| Dyn. line compensation ( $U_{in \text{ rated}} \pm 15\%$ )      | Typ. ±0.3% $U_{out}$   |
| Dynamic load compensation ( $I_{out}$ : 50/100/50 %)            | Typ. ±3% $U_{out}$   |
| Load step settling time   |  |
| • 50 to 100%  | < 5 ms   |
| • 100 to 50 %   | < 5 ms   |
| <b>Protection and monitoring</b>                                |  |
| Output overvoltage protection                                   | Yes, according to EN 60950   |
| Current limitation  | 3.8 A  |
| Short-circuit protection  | Constant current characteristic up to typ. 14 V, electronic shutdown below that, automatic restart |
| Sustained short-circuit current rms value                       | < 4 A  |
| Overload/short-circuit indicator                                | -  |

## SIMATIC S7-200

## Power supplies

## The S7-200 version

## Technical specifications (continued)

|   |  |
|---|--|
| <b>Power supplies, type</b>             | <b>3.5 A</b>   |
| <b>Order No.</b>                        | <b>6EP1 332-1SH31<sup>1)</sup></b>   |
| <b>Safety</b>                           |  |
| Primary/secondary isolation             | Yes, safety extra low output voltage $U_{out}$ according to EN 60950-1       |
| Safety class                            | Class I  |
| Leakage current                         | < 3.5 mA   |
| Safety test                             | Yes  |
| CE marking                              | Yes  |
| UL/cUL (CSA) approval                   | cULus-listed (UL 508, CSA C22.2 No. 142), File E143289                       |
| Protection against explosion            | -  |
| FM approval                             | -  |
| Marine approval                         | -  |
| Degree of protection (EN 60529)         | IP20   |
| <b>EMC</b>                              |  |
| Emitted interference                    | EN 55022 Class B   |
| Supply harmonics limitation             | EN 61000-3-2   |
| Noise immunity                          | EN 61000-6-2   |
| Operating data                          |  |
| Ambient temperature range               | 0 ... +60°C with natural convection  |
| Transport and storage temperature range | -40 ... +85°C  |
| Humidity class                          | Climate class 3K3 according to EN 60721, no condensation                     |
| <b>Mechanics</b>                        |  |
| Connections                             |  |
| • Supply input L, N, PE                 | One screw terminal each for 0.5 ... 1 mm <sup>2</sup> solid/finely stranded  |
| • Output +                              | 1 screw terminal for 0.5 ... 1 mm <sup>2</sup>                               |
| • Output -                              | 2 screw terminals for 0.5 ... 1 mm <sup>2</sup>                              |
| Dimensions (W x H x D) in mm            | 160 x 80 x 62  |
| Weight, approx.                         | 0.5 kg   |
| Mounting                                | Can be snapped onto standard mounting rail EN 60715 35x7.5/15, wall mounting |
| <b>Accessories</b>                      | Mounting bracket (6EP1 971-1AA1)   |

<sup>1)</sup> SIPLUS module 6AG1 203-1SH31-2AA0 for extended temperature range -25 °C to +70 °C and use under medial load (e.g. chlorine-sulfur atmosphere).

## Ordering data

## Order No.

**SIPLUS S7-200 PS203** H **6AG1203-1SH31-2AA0**

-25 ... +70°C with conformal coating based on 6EP1332-1SH31 S7-200 style, stabilized power supply  
Input: 120/230 V AC  
Output: 24 V DC/3.5 A  
S7-200 design

**SITOP power 3.5** **6EP1332-1SH31**

Universal Line stabilized power supply  
Input: 120/230 V AC,  
Output: 24 V DC/3.5 A  
S7-200 design

**Accessories**

**SITOP power mounting bracket** **6EP1971-1AA01**

90 degree 35 mm DIN rail, M5 fixing screws, for Special Line flat

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

## More information

In addition to various power supply product lines, the perfectly coordinated complete SITOP range offers a unique range of add-on modules with which the 24 V power supply can be additionally protected against interference on the primary and secondary side – right up to all-round protection:

- Redundancy module for setting up a redundant power supply
- Uninterruptible 24 V power supplies with batteries or maintenance-free capacitors for continued operation in the event of a power failure
- Selectivity modules for electronic protection of 24 V branches from overload and short-circuit

You can find more information in Catalog KT 10.1 and in the Internet at

[www.siemens.com/sitop](http://www.siemens.com/sitop)

### Overview



- Design and functionality of the power supply are optimally adapted to the SIPLUS S7-200 micro PLC
- Slim design
- Particularly suitable for low cabinet depths

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS S7-200 PS 203

|  |  |
|--|--|
| <b>Order number</b>  | <b>6AG1 203-1SH31-2AA0</b>   |
| <b>Order No. based on</b>  | <b>6EP1 332-1SH31</b>  |
| Conformal coating  | Coating of the printed circuit boards and the electronic components  |
| Ambient temperature range  | -25 ... +70 °C   |
| Technical data   | The technical data of the standard product applies except for the ambient conditions.  |
| <b>Ambient conditions</b>  |  |
| Relative humidity  | 5 ... 100%, condensation allowed   |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1)2)</sup>   |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

- 1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH<sub>3</sub> < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH<sub>3</sub> < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

| Ordering data   | Order No.                                    |
|---|--|
| <b>SIPLUS S7-200 PS 203 stabilized load current supply</b><br>(extended temperature range and medial exposure)<br>120/230 V AC, 24 V DC/3.5 A | <b>6AG1 203-1SH31-2AA0</b>                   |
| <b>Accessories</b>  | See SIMATIC S7-200 power supplies, page 3/78 |

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# SIMATIC S7-200

## Operator control and monitoring

### TD 200 text display

#### Overview



- The user-friendly text display for the S7-200
- For control and monitoring: Message text display, intervention in PLC program, setting of inputs and outputs
- Direct connection to CPU interface using a supplied cable or incorporation into network (also via EM 277)
- No separate power supply required
- No separate parameterization software required
- Addressing and setting of contrast in supplied menu

#### Technical specifications

| <b>6ES7 272-0AA30-0YA1</b>             |  |
|--|--|
| <b>Product type designation</b>        | TD 200 text display  |
| <b>Power supply</b>                    |  |
| Input voltage                          | 24 V; Power supplied over the S7-200 communications interface or optional external power supply unit; the CPU sensor power supply (24 V DC) is not subjected to load |
| • Rated value                          |  |
| Input current                          |  |
| • Rated value at 24 V DC               | 120 mA   |
| <b>MPI</b>                             |  |
| Transmission speed (PPI), max.         | 187.5 kbit/s   |
| <b>1st interface</b>                   |  |
| Physics                                | RS 485   |
| Functionality                          |  |
| • PPI                                  | Yes  |
| PPI                                    |  |
| • Number of nodes, max.                | 126; S7-200, OP, TP, TBP, PG/PC  |
| <b>Operator control and monitoring</b> |  |
| Display                                |  |
| • Design of display                    | LCD backlit  |
| Operating                              |  |
| • Number of lines                      | 2  |
| • Number of characters per line        | 20; Characters/line: ASCII, cyrillic; 10 characters/line: Chinese  |
| • Character size                       | 5 mm   |
| <b>Environmental requirements</b>      |  |
| Operating temperature                  |  |
| • Min.                                 | 0 °C   |
| • max.                                 | 60 °C  |
| Storage/transport temperature          |  |
| • Min.                                 | -40 °C   |
| • max.                                 | 70 °C  |
| <b>Degree of protection</b>            |  |
| IP65                                   | Yes; at front  |
| <b>Dimensions</b>                      |  |
| Cabinet/switchboard strength           | 0.3 mm; 0.3 to 4 mm  |
| <b>Dimensions and weight</b>           |  |
| Dimensions                             |  |
| • Width                                | 148 mm   |
| • Height                               | 76 mm  |
| • Depth                                | 27 mm  |
| • Mounting cutout, width               | 138 mm   |
| • Mounting cutout, height              | 68 mm  |
| Weight                                 |  |
| • Weight, approx.                      | 250 g  |

#### Ordering data

#### Order No.

##### TD 200 text display

for connection to SIMATIC S7-200; can be used with STEP 7-Micro/WIN V3.2 SP4 or higher, incl. connecting cable

**6ES7 272-0AA30-0YA1**

##### Connecting cables

For connecting TD 200C or TD 400C to S7-200

**6ES7 901-3EB10-0XA0**

##### Accessories

**Accessories for supplementary ordering**

See Catalog ST 80/ST PC

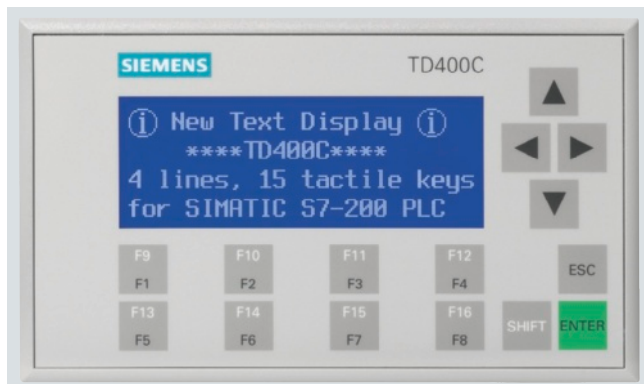


# SIMATIC S7-200

## Operator control and monitoring

### TD 400C text display

#### Overview



- More screen space and extremely good readability thanks to backlit four-line display
- Customizable operator interface with 15 tactile keys
- Acoustic and visual feedback from key operation
- Optimal support of the S7-200:
  - Direct connection to the S7-200 interface via supplied cable
  - No separate power supply required
  - Parameterization with STEP 7-Micro/WIN V4 SP6

#### Technical specifications

|                                       | 6AV6 640-0AA00-0AX1   |
|---------------------------------------|---|
| <b>Product type designation</b>       | Text Display TD 400C  |
| <b>Supply voltage</b>                 |   |
| Supply voltage                        | 24 V DC   |
| permissible range                     | DC  |
| <b>Memory</b>                         |   |
| Usable memory for user data           | No info   |
| <b>Configuration</b>                  |   |
| Configuration tool                    | MicroWin (to be ordered separately)                         |
| <b>Display</b>                        |   |
| Display type                          | STN, Black/White  |
| Size                                  | 3.7"  |
| Resolution (WxH in pixel)             | 192 x 64  |
| <b>Backlighting</b>                   |   |
| • MTBF backlighting (at 25 °C)        | about 20,000 hours  |
| <b>Operating mode</b>                 |   |
| Control elements                      | Membrane keyboard   |
| Function keys, programmable           | 15 function keys  |
| Membrane keyboard                     | Yes   |
| <b>Ambient conditions</b>             |   |
| Temperature                           |   |
| • Operation                           | 0 °C to +50 °C  |
| • Transport, storage                  | -20 °C to +60 °C  |
| <b>Degree of protection</b>           |   |
| Front                                 | IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)             |
| Rear                                  | IP20  |
| <b>Certifications &amp; standards</b> |   |
| Certifications                        | CE, FM Class I Div. 2, UL, C-TICK, NEMA 4, NEMA 4x, NEMA 12 |

| 6AV6 640-0AA00-0AX1                       |                               |
|---|-------------------------------|
| <b>Interfaces</b>                         |                               |
| Interfaces                                | 1 x RS485 (max. 187.5 Mbit/s) |
| <b>Functionality under WinCC flexible</b> |                               |
| Security                                  |                               |
| • Number of user groups                   | 1                             |
| <b>Dimensions and weight</b>              |                               |
| Weight                                    |                               |
| • Weight                                  | 0.33 kg                       |

| Ordering data  | Order No.                  |
|--|----------------------------|
| <b>TD 400C text display</b>  | <b>6AV6 640-0AA00-0AX1</b> |
| with customized operator interface on the device front; for connecting to SIMATIC S7-200; can be used from STEP 7-Micro/WIN V4 SP6, incl. connecting cable |                            |
| <b>Promotion package</b>   | <b>6ES7 298-1AA20-0YA3</b> |
| Consisting of:   |                            |
| • TD 400C  |                            |
| • SIMATIC S7-200   |                            |
| • SIMATIC STEP 7 Micro/WIN V4.0  |                            |
| • Simulator module   |                            |
| • Memory module  |                            |
| • PPI cable  |                            |
| • CD-ROM with documentation  |                            |
| • TANOS Box  |                            |
| <b>Connecting cables</b>   | <b>6ES7 901-3EB10-0XA0</b> |
| for connecting TD 100C/TD 200C or TD 400C to S7-200  |                            |
| <b>Blank foils</b>   | <b>6AV6 671-0AP00-0AX0</b> |
| for printing customized keyboard layouts; 2 perforated films per sheet; 10 sheets per pack   |                            |
| <b>Accessories</b>   |                            |
| <b>Accessories for supplementary ordering</b>  | See Catalog ST 80/ST PC    |

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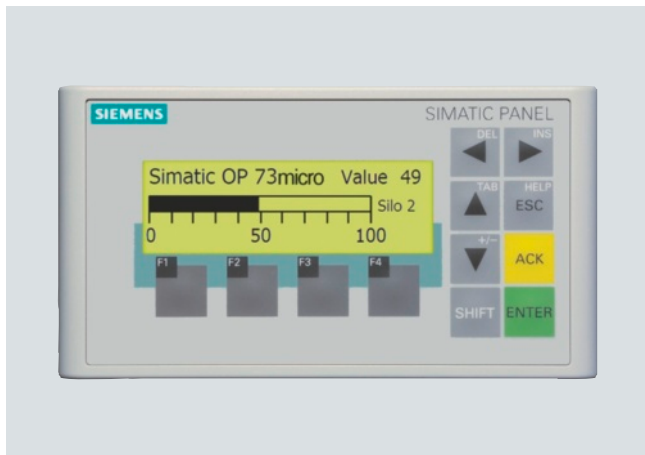
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# SIMATIC S7-200

## Operator control and monitoring

### SIMATIC OP 73micro

#### Overview



- Operator Panel for controlling and monitoring machines and systems
- Graphics in a new dimension: small and smart
- Pixel-graphics 3" LCD, monochrome
- 8 system keys, 4 user-configurable function keys
- Specific to the SIMATIC S7-200: Communication with the controller takes place via the integrated interface (point-to-point)
- Connection to the controller via MPI or PROFIBUS DP cable

#### Technical specifications

| <b>6AV6 640-0BA11-0AX0</b>      |   |
|---------------------------------|---|
| <b>Product type designation</b> | OP 73micro  |
| <b>Supply voltage</b>           | 24 V DC   |
| Supply voltage                  | 24 V DC   |
| Permissible range               | +20.4 V to +28.8 V DC   |
| <b>Memory</b>                   |   |
| Type                            | Flash   |
| Usable memory for user data     | 128 KB usable memory for user data  |
| <b>Time</b>                     |   |
| Clock                           |   |
| • Type                          | Software clock, not battery backed  |
| <b>Configuration</b>            |   |
| Configuration tool              | WinCC flexible Micro Version 2004 SP1, HSP or higher (to be ordered separately) |
| <b>Display</b>                  |   |
| Display type                    | STN, Black/White  |
| Size                            | 3"  |
| Resolution (WxH in pixel)       | 160 x 48  |
| Backlighting                    |   |
| • MTBF backlighting (at 25 °C)  | about 100,000 hours   |
| <b>Operating mode</b>           |   |
| Control elements                | Membrane keyboard   |
| Function keys, programmable     | 4 function keys   |

| <b>6AV6 640-0BA11-0AX0</b>  |  |
|---|--|
| Connection for mouse/keyboard/barcode reader                          | - / - / -  |
| Touch operation   |  |
| • Touch screen  | No   |
| • System keys   | 8  |
| • Numeric/alphabetical input  | Yes / Yes  |
| <b>Ambient conditions</b>   |  |
| Mounting position   | vertical   |
| Maximum permissible angle of inclination without external ventilation | +/- 80 °   |
| Max. relative humidity  | 90 %   |
| Temperature   |  |
| • Operation (vertical installation)                                   | 0 °C to +50 °C   |
| • Operation (max. tilt angle)   | 0 °C to +40 °C   |
| • Transport, storage  | -20 °C to +60 °C   |
| <b>Degree of protection</b>   |  |
| Front   | IP65, NEMA 4x, (when installed)                            |
| Rear  | IP20   |
| <b>Certifications &amp; standards</b>                                 |  |
| Certifications  | CE, GL, ABS, BV, DNV, LRS, UL, CSA, cULus, C-TICK, NEMA 4x |
| <b>Interfaces</b>   |  |
| Interfaces  | 1 x RS485 (max. 187.5 Mbit/s)                              |
| <b>Operating systems</b>  |  |
| Operating system  | LINUX  |
| <b>Processor</b>  |  |
| Processor   | ARM  |
| <b>Functionality under WinCC flexible</b>                             |  |
| Task planner  | Yes  |
| Help system   | Yes  |
| Status/control  | Not possible   |
| With alarm logging system (incl. buffer and acknowledgment)           |  |
| • Number of messages  | 250  |
| • Bit messages  | Yes  |
| • Analog messages   | Yes  |
| • Message buffer  | Ring buffer (n x 100 entries)                              |
| Number of process images  |  |
| • Process images  | 250  |
| • Variables   | 500  |
| • Limit values  | Yes  |
| • Multiplexing  | Yes  |
| Image elements  |  |
| • Text objects  | 1,000 text elements  |
| • Graphics object   | Bit maps, icons, icon (full-screen)                        |
| • dynamic objects   | Bar graphs   |
| Lists   |  |
| • Text lists  | 150  |
| • Graphics list   | 0  |
| • Libraries   | Yes  |
| Security  |  |
| • Number of user groups   | 1  |
| • Passwords exportable  | Yes  |
| • Number of users   | 1  |

**Technical specifications** (continued)

| 6AV6 640-0BA11-0AX0         |   |
|-----------------------------|---|
| Data carrier support        |   |
| • Multi Media Card          | No  |
| Recording                   |   |
| • Printer driver            | -   |
| Fonts                       |   |
| • Keyboard fonts            | US American (English)   |
| Languages                   |   |
| • Online languages          | 5   |
| • Configuration languages   | D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H |
| • Character sets            | WinCC flexible Standard, symbol languages   |
| Transfer (upload/download)  |   |
| • Transfer of configuration | serial  |

| 6AV6 640-0BA11-0AX0                      |  |
|--|--|
| Process coupling                         |  |
| • Connection to controller               | for S7-200, see section on "System interfaces" |
| Expandability/openness                   |  |
| • Open Platform Program                  | No   |
| <b>Dimensions</b>                        |  |
| Front of enclosure (W x H)               | 154 mm x 84 mm                                 |
| Mounting cutout/<br>device depth (W x H) | 138 mm x 68 mm / 28.5 mm<br>device depth       |
| <b>Dimensions and weight</b>             |  |
| Weight                                   |  |
| • Weight                                 | 0.25 kg  |

**Ordering data**

|   | Order No.                  |
|---|----------------------------|
| <b>SIMATIC OP 73micro</b>   | <b>6AV6 640-0BA11-0AX0</b> |
| Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories   |                            |
| <b>OP 73micro starter package</b> C   | <b>6AV6 650-0BA01-0AA0</b> |
| Consisting of:  |                            |
| • OP 73micro Operator Panel   |                            |
| • SIMATIC WinCC flexible Micro engineering software   |                            |
| • SIMATIC HMI Manual Collection, 5 languages (English, French, German, Italian, Spanish), comprising: all currently available user manuals, manuals and communication manuals for SIMATIC HMI |                            |
| • MPI cable (5 m) (for test purposes)   |                            |
| <b>Configuration</b>  |                            |
| with SIMATIC WinCC flexible   |                            |
| <b>Documentation (to be ordered separately)</b>   |                            |
| <b>OP 73micro/TP 177micro operating instructions</b>  |                            |
| • German  | <b>6AV6 691-1DF01-0AA0</b> |
| • English   | <b>6AV6 691-1DF01-0AB0</b> |
| • French  | <b>6AV6 691-1DF01-0AC0</b> |
| • Italian   | <b>6AV6 691-1DF01-0AD0</b> |
| • Spanish   | <b>6AV6 691-1DF01-0AE0</b> |

|   | Order No.                  |
|---|----------------------------|
| <b>WinCC flexible Micro user manual</b>   |                            |
| • German  | <b>6AV6 691-1AA01-3AA0</b> |
| • English   | <b>6AV6 691-1AA01-3AB0</b> |
| • French  | <b>6AV6 691-1AA01-3AC0</b> |
| • Italian   | <b>6AV6 691-1AA01-3AD0</b> |
| • Spanish   | <b>6AV6 691-1AA01-3AE0</b> |
| <b>SIMATIC HMI manual collection</b> J  | <b>6AV6 691-1SA01-0AX0</b> |
| Electronic documentation, on DVD  |                            |
| 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI |                            |
| <b>Accessories</b>  |                            |
| <b>Accessories for supplementary ordering</b>   | see catalog ST 80/ST PC    |

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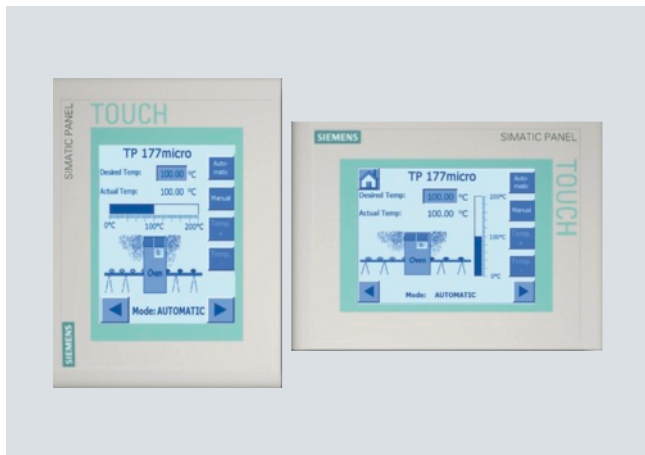
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# SIMATIC S7-200

## Operator control and monitoring

### SIMATIC TP 177micro

#### Overview



- Touch Panel for operator control and monitoring of small machines and plants
- Low-cost entry-level product in the category of touch panels with graphics capability and all the basic functions required for simple tasks
- Pixel graphics 5.7" STN touch screen (analog/resistive), Bluemode (4 levels)
- Specially for SIMATIC S7-200: Communication to the PLC through the integrated interface over a point-to-point link
- Connection to the PLC over MPI or PROFIBUS DP cable
- SIMATIC TP 177micro is the innovative successor to the Touch Panels SIMATIC TP 070/TP 170micro

#### Technical specifications

| 6AV6 640-0CA11-0AX1             |   |
|---------------------------------|---|
| <b>Product type designation</b> | TP 177micro   |
| <b>Supply voltage</b>           |   |
| Supply voltage                  | 24 V DC   |
| Permissible range               | +20.4 V to +28.8 V DC   |
| Rated current                   | 0.24 A  |
| <b>Memory</b>                   |   |
| Type                            | Flash   |
| Usable memory for user data     | 256 KB usable memory for user data  |
| <b>Time</b>                     |   |
| Clock                           |   |
| • Type                          | Software clock, not battery backed  |
| <b>Configuration</b>            |   |
| Configuration tool              | WinCC flexible Micro Version 2004 SP1, HSP or higher (to be ordered separately) |
| <b>Display</b>                  |   |
| Display type                    | STN, 4 Blue mode, 4 levels  |
| Size                            | 5.7"  |
| Resolution (WxH in pixel)       | 320 x 240   |

| 6AV6 640-0CA11-0AX1   |  |
|---|--|
| <b>Backlighting</b>   |  |
| • MTBF backlighting (at 25 °C)  | about 50,000 hours   |
| <b>Operating mode</b>   |  |
| Control elements  | Touch screen   |
| Function keys, programmable   | None   |
| <b>Touch operation</b>  |  |
| • Touch screen  | analog, resistive  |
| • System keys   | 0  |
| • Numeric/alphabetical input  | Yes / Yes  |
| <b>Ambient conditions</b>   |  |
| Mounting position   | vertical   |
| maximum permissible angle of inclination without external ventilation | +/- 35 °   |
| max. relative humidity  | 90 %   |
| <b>Temperature</b>  |  |
| • Operation (vertical installation)                                   | 0 °C to +50 °C   |
| • Operation (max. tilt angle)   | 0 °C to +40 °C   |
| • Transport, storage  | -20 °C to +60 °C   |
| <b>Degree of protection</b>   |  |
| Front   | IP65, NEMA 4x, (when installed)  |
| Rear  | IP20   |
| <b>Certifications &amp; standards</b>                                 |  |
| Certifications  | CE, GL, ABS, BV, DNV, LRS, FM Class I Div. 2, UL, CSA, cULus, EX-Zone 2 (available soon), EX-Zone 22 (available soon), C-TICK, NEMA 4x |
| <b>Interfaces</b>   |  |
| Interfaces  | 1 x RS485 (max. 187.5 Mbit/s)  |
| <b>Operating systems</b>  |  |
| Operating system  | LINUX  |
| <b>Processor</b>  |  |
| Processor   | ARM  |
| <b>Functionality under WinCC flexible</b>                             |  |
| Task planner  | Yes  |
| Help system   | Yes  |
| Status/control  | Not possible   |
| With alarm logging system (incl. buffer and acknowledgment)           |  |
| • Number of messages  | 500  |
| • Bit messages  | Yes  |
| • Analog messages   | Yes  |
| • Message buffer  | Ring buffer (n x 128 entries)  |
| Number of process images  |  |
| • Process images  | 250  |
| • Variables   | 250  |
| • Limit values  | Yes  |
| • Multiplexing  | Yes  |
| <b>Image elements</b>   |  |
| • Text objects  | 500 text elements  |
| • Graphics object   | Bit maps, icons, icon (full-screen), vector graphics   |
| • dynamic objects   | Diagrams, bar graphs   |

# SIMATIC S7-200

## Operator control and monitoring

SIMATIC TP 177micro

3

**Technical specifications** (continued)

| <b>6AV6 640-0CA11-0AX1</b>           |   |
|--------------------------------------|---|
| Lists                                |   |
| • Text lists                         | 150   |
| • Graphics list                      | 100   |
| • Libraries                          | Yes   |
| Security                             |   |
| • Number of user groups              | 1   |
| • Passwords exportable               | Yes   |
| • Number of users                    | 1   |
| Data carrier support                 |   |
| • Multi Media Card                   | No  |
| Recording                            |   |
| • Printer driver                     | -   |
| Fonts                                |   |
| • Keyboard fonts                     | US American (English)   |
| Languages                            |   |
| • Online languages                   | 5   |
| • Configuration languages            | D, GB, F, I, E, CHN "traditional", CHN "simplified", DK, FIN, GR, J, KP / ROK, NL, N, PL, P, RUS, S, CZ / SK, TR, H |
| • Character sets                     | WinCC flexible Standard, symbol languages   |
| Transfer (upload/download)           |   |
| • Transfer of configuration          | serial  |
| Process coupling                     |   |
| • Connection to controller           | for S7-200, see section on "System interfaces"  |
| Expandability/openness               |   |
| • Open Platform Program              | No  |
| <b>Dimensions</b>                    |   |
| Front of enclosure (W x H)           | 212 mm x 156 mm   |
| Mounting cutout/device depth (W x H) | 198 mm x 142 mm / 45 mm device depth  |
| <b>Dimensions and weight</b>         |   |
| Weight                               |   |
| • Weight                             | 0.75 kg   |

**Ordering data****Order No.**

|   |   |  |
|---|---|--|
| <b>SIMATIC TP 177micro</b>  | I | <b>6AV6 640-0CA11-0AX1</b>   |
| Touch Panel for connection to the SIMATIC S7-200, 5.7" STN display  |   |  |
| <b>TP 177micro starter package</b>  | C | <b>6AV6 650-0DA01-0AA0</b>   |
| Consisting of:  |   |  |
| <ul style="list-style-type: none"> <li>• TP 177micro Touch Panel</li> <li>• SIMATIC WinCC flexible Micro engineering software</li> <li>• SIMATIC HMI Manual Collection (DVD), 5 languages (English, French, German, Italian, Spanish), comprising: all currently available user manuals, manuals and communication manuals for SIMATIC HMI</li> <li>• MPI cable (5m) (for test purposes)</li> </ul> |   |  |
| <b>Configuration</b>  |   |  |
| with SIMATIC WinCC flexible   |   |  |
| <b>Documentation (to be ordered separately)</b>   |   |  |
| <b>OP 73micro, TP 177micro operating instructions</b>   |   | <b>6AV6 691-1DF01-0AA0</b><br><b>6AV6 691-1DF01-0AB0</b><br><b>6AV6 691-1DF01-0AC0</b><br><b>6AV6 691-1DF01-0AD0</b><br><b>6AV6 691-1DF01-0AE0</b> |
| <b>WinCC flexible Micro user manual</b>   |   | <b>6AV6 691-1AA01-3AA0</b><br><b>6AV6 691-1AA01-3AB0</b><br><b>6AV6 691-1AA01-3AC0</b><br><b>6AV6 691-1AA01-3AD0</b><br><b>6AV6 691-1AA01-3AE0</b> |
| <b>SIMATIC HMI manual collection</b>  | J | <b>6AV6 691-1SA01-0AX0</b>   |
| Electronic documentation, on DVD  |   |  |
| 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI  |   |  |
| <b>Accessories</b>  |   |  |
| <b>Accessories for supplementary ordering</b>   |   | see catalog ST 80/ST PC  |

C: Subject to export regulations AL: N and ECCN: 5D002ENCU

I: Subject to export regulations AL: N and ECCN: EAR99H

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## SIPLUS operator control and monitoring

### SIPLUS S7-200 TD 200

#### Overview



- The user-friendly text display for the S7-200
- For operation and monitoring: display of message texts, interventions in the control program, setting of inputs and outputs
- Direct connection to CPU interface via included cable, or integration into network (also via EM 277)
- No separate power supply required
- No separate configuration software required
- Addressing and contrast adjustment via provided menu

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

#### SIPLUS S7-200 TD 200

|  |  |
|--|--|
| <b>Order number</b>  | <b>6AG1 272-0AA30-2YA1</b>   |
| <b>Order No. based on</b>  | <b>6ES7 272-0AA30-0YA1</b>   |
| Ambient temperature range  | -25 ... +60 °C   |
| Conformal coating  | Coating of the printed circuit boards and the electronic components  |
| Technical data   | The technical data of the standard product applies except for the ambient conditions.  |
| <b>Ambient conditions</b>  |  |
| Relative humidity  | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

- 1) ISA-S71.04 severity level GX: Long-term load: SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NOX < 5.2 ppm  
Limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm; H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NOX < 10.4 ppm

- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

#### Ordering data

#### Order No.

##### SIPLUS S7-200 TD 200 text display

(extended temperature range and medial exposure)

for connection to SIMATIC S7-200, used from STEP 7 Micro / WIN V3.2 SP4, including cable

**6AG1 272-0AA30-2YA1**

##### Connection cable

for connection of TD 200C or TD 400C to S7-200

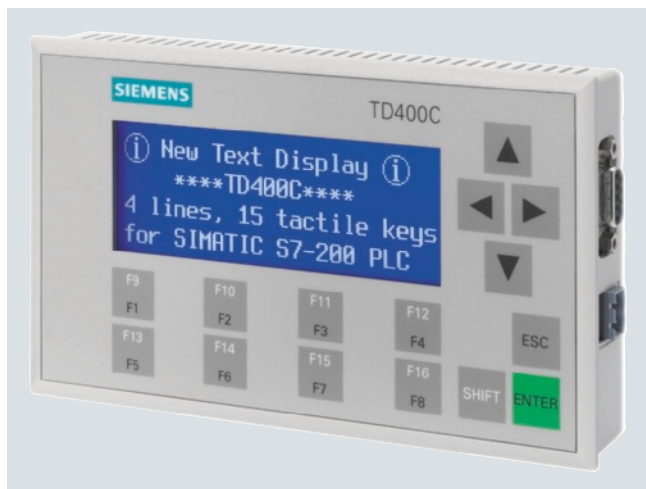
**6ES7 901-3EB10-0XA0**

##### Accessories for re-ordering

See HMI accessories, ST 80 / ST PC Catalog

H: Subject to export regulations AL: 9I999 and ECCN: EAR99H

## Overview



- Additional screen space and high readability via backlit four-line display
- Customizable user interface with 15 tactile keys
- Audible and visual feedback upon pressing of key
- Optimal support of the S7-200:
  - Direct connection to the S7-200 interface via included cable
  - No separate power supply required
  - Configuration with STEP 7 Micro / WIN V4 SP6

**Note:**

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

**SIPLUS S7-200 TD 400C**

|                           |   |
|---------------------------|---|
| <b>Order number</b>       | <b>6AG1 640-0AA00-2AX1</b>  |
| <b>Order No. based on</b> | <b>6AV6 640-0AA00-0AX1</b>  |
| Ambient temperature range | -10 ... + 60 °C   |
| Conformal coating         | Coating of the printed circuit boards and the electronic components                   |
| Technical data            | The technical data of the standard product applies except for the ambient conditions. |

**SIPLUS S7-200 TD 400C****Ambient conditions**

|  |  |
|--|--|
| Relative humidity  | 5 ... 100 %<br>Condensation permissible  |
| Biologically active substances   | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna)  |
| Chemically active substances   | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX <sup>1) 2)</sup>  |
| Mechanically active substances   | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust <sup>2)</sup>  |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

- 1) ISA-S71.04 severity level GX: Long-term load:  
SO<sub>2</sub> < 4.8 ppm; H<sub>2</sub>S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm;  
HF < 0.12 ppm; NH < 49 ppm; O<sub>3</sub> < 0.1 ppm; NO<sub>x</sub> < 5.2 ppm  
Threshold/limit value (max. 30 min/d): SO<sub>2</sub> < 17.8 ppm;  
H<sub>2</sub>S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm;  
NH < 247 ppm; O<sub>3</sub> < 1.0 ppm; NO<sub>x</sub> < 10.4 ppm

- 2) The supplied plug covers must remain in place over the unused interface when operated in atmospheres containing corrosive gases!

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

**Ordering data****Order No.**

|  |   |  |
|--|---|--|
| <b>SIPLUS S7-200 TD 400C</b><br>(extended temperature range and medial exposure)<br>with individually adaptable user interface on the front plate; for connection to SIMATIC S7-200; usable from STEP 7 Micro/ WIN V4 SP6, including cable | H | <b>6AG1 640-0AA00-2AX1</b>                 |
| <b>Connection cable</b><br>for connection of TD 100C/ TD 200C or TD 400C to S7-200   |   | <b>6ES7 901-3EB10-0XA0</b>                 |
| <b>Empty sheets</b><br>for printing customized keyboard layouts;<br>2 perforated sheets per document;<br>10 sheets per packing unit  |   | <b>6AV6 671-0AP00-0AX0</b>                 |
| <b>Accessories for re-ordering</b>   |   | See HMI accessories, ST 80 / ST PC Catalog |

H: Subject to export regulations AL: 91999 and ECCN: EAR99H

#### Overview

- Software for the SIMATIC S7-200
- Functions for all phases of an automation project:
  - Planning, configuring and parameterization of hardware and communication
  - Creation of a user program
  - Documentation
  - Testing, commissioning and service
  - Process control
  - Archiving

The following are available:

- STEP 7- Micro/Win
- STEP 7 Micro/Win command library
- WinCC flexible micro
- S7-200 PC-Access

You will find more information in catalog part 11.



### Overview

- OPC server as the bridge between the SIMATIC S7-200 and the PC world
- For processing and visualizing data from the S7-200 with standard Windows applications
- Database applications, human/machine interfaces (HMI), tools for statistical evaluations with Excel, for instance, or calculation modules for complex requirements are examples of what can be created.

### Ordering data

### Order No.

#### S7-200 PC Access V1.0

Task: OPC server for SIMATIC S7-200.  
 Target system: SIMATIC S7-22x.  
 Requirements: Windows 2000/XP; on PG or PC; STEP 7-Micro/Win V4.

Type of delivery: German, English, French, Spanish, Italian, Chinese; with electronic documentation

Single license J **6ES7 840-2CC01-0YX0**

Multi Copy License for 15 installations J **6ES7 840-2CC01-0YX1**

#### Intelligent RS 232/PPI multi-master cable

For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network

**6ES7 901-3CB30-0XA0**

#### Intelligent USB/PPI multi-master cable

For connecting devices with an USB interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network

**6ES7 901-3DB30-0XA0**

#### CP 5512

PC card (CardBus, 32-bit) for connecting a programming device or Notebook computer to PROFIBUS or MPI, with 32-bit Windows XP Professional (Windows 2000 Professional available soon), executable under 32-bit Windows 2000 Professional and Windows XP Professional in conjunction with STEP 7 V5.2 German/English

**6GK1 551-2AA00**

#### CP 5611

PCI card for connecting a PC to the CPU interface or PROFIBUS DP module (187.5 Kbit/s or 12 Mbit/s) over an MPI cable

**6GK1 561-1AA01**

J: Subject to export regulations AL: N and ECCN: EAR99S

# SIMATIC S7-200

## Accessories

### PPI cable

#### Overview

- For connecting devices with RS 232 or USB interface to SIMATIC S7-200 or PPI network (RS 485)
- The following are available:
  - Intelligent RS 232/PPI multimaster cable: For connecting devices with RS 232 interface to the RS 485 interface of the SIMATIC S7-200 or to the PPI network; can be used as master on a multimaster PPI network.
  - Intelligent USB/PPI multimaster cable: For connecting devices with USB interface to the RS 485 interface on SIMATIC S7-200 or to the PPI network; can be used as master on a multimaster PPI network.

#### Technical specifications

|  | 6ES7 901-3CB30-0XA0  | 6ES7 901-3DB30-0XA0  |
|--|--|--|
| <b>Power supply</b>                          |  |  |
| Description                                  | from CPU   | from USB interface   |
| <b>Protocols</b>                             |  |  |
| PPI  | Yes; 10/11 bit   | Yes; 10/11 bit   |
| ASCII  | Yes; Freeport  |  |
| <b>MPI</b>                                   |  |  |
| Transmission speed (PPI), max.               | 187.5 kbit/s; 9.6/19.3/187.5 Kbit/s; setting: DIP switch; RS232 not required   | 187.5 kbit/s; 9.6/19.2/187.5 Kbit/s; setting: not necessary  |
| <b>Alarms/diagnostics/status information</b> |  |  |
| Diagnostics indication LED                   |  |  |
| • Description                                | Tx (green): RS-232-transmit indication; Rx (green): RS-232-receive indication; PPI (green): RS-485-transmit indication | Tx (green): USB transmit indication; Rx (green): USB receive indication; PPI (green): RS-485-transmit indication |
| <b>Galvanic isolation</b>                    |  |  |
| Galvanic isolation                           | 1  | 1  |
| <b>Software requirement</b>                  |  |  |
| Software required                            | STEP 7 Micro/WIN V3.2 SP4 or higher  | STEP 7 Micro/WIN V3.2 SP4 or higher  |
| <b>Dimensions and weight</b>                 |  |  |
| Weight                                       |  |  |
| • Weight, approx.                            | 300 g  | 300 g  |

#### Ordering data

#### Order No.

##### Intelligent RS 232/PPI multi-master cable

6ES7 901-3CB30-0XA0

For connecting devices with an RS 232 interface to SIMATIC S7-200 or PPI network Master in multi-master PPI network

##### Intelligent USB/PPI multi-master cable

6ES7 901-3DB30-0XA0

For connecting devices with a USB interface to SIMATIC S7-200 or PPI network; Master in multi-master PPI network

### Overview

- Intelligent RS 232/PPI multi-master cable; for connecting devices with RS 232 interface to the RS 485 interface of SIPLUS S7-200 modules or the PPI network; can be used as master in a multi-master PPI network

#### Note:

SIPLUS extreme products are based on Siemens Industry standard products. The contents listed here were taken from the respective standard products. SIPLUS extreme-specific information was added.

| SIPLUS cable 901   |   |
|--|---|
| Order No.  | 6AG1 901-3CB30-2XA0   |
| Order No. based on   | 6ES7 901-3CB30-0XA0   |
| Ambient temperature range  | - 25 ... + 70 °C;<br>- 25 ... + 55 °C (for applications with cUL approval)    |
| Ambient conditions   | Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere). |
| Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No  |
| Approvals  | CE, cUL   |
| Technical data   | The technical data is identical to those based on modules.                    |

The technical documentation on SIPLUS can be found here:

[www.siemens.com/siplus-extreme](http://www.siemens.com/siplus-extreme)

### Ordering data

### Order No.

#### Intelligent SIPLUS RS 232/PPI multi-master cable

L 6AG1 901-3CB30-2XA0

(extended temperature range and medial exposure)

For connecting devices with RS 232 interface to SIMATIC S7-200 or PPI network; master in multi-master PPI network

L: Subject to export regulations AL: 91999 and ECCN: N

# SIMATIC S7-200



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