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SIMATIC S7-200

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Brochures

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

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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

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

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Technical specifications

General technical specifications SIMATIC S7-200	
Degree of protection	IP20 according to IEC 529
Ambient temperature	
• Operation (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 115/230 V AC circuits	Test voltage 1500 V AC
• 230 V AC circuits to 5/24 V DC circuits	Test voltage 1500 V AC
• 115 V AC circuits to 5/24 V DC circuits	Test voltage 1500 V AC
Electromagnetic compatibility	Requirements of EMC law
• Noise immunity according to EN 50082-2	Tested according to: IEC 801-2, IEC 801-3, IEC 801-4, EN 50141, EN 50204, IEC 801-5, VDE 0160
• Emitted interference according to EN 50081-1 and EN 50081-2	Tested according to EN 55011, Class A, Group 1 and EN 55011, Class B, Group 1
Mechanical rating	
• Vibrations, tested according to/ tested with	IEC 68, Part 2-6: 10 to 57 Hz; constant amplitude 0.3 mm; 58 … 150 Hz; constant acceleration 1 g (mounted on DIN rail) or 2 g (mounted in control cabinet); type of vibration: frequency cycles with a rate of change of 1 octave/minute; vibration duration: 10 frequency cycles per axis in each direction of the 3 mutually perpendicular axes
• Shock, tested according to/tested with	IEC 68, Part 2-27/half-sine: shock strength 15 g (peak value), duration 11 ms, 6 shocks on each of the 3 mutually perpendicular 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.
Ambient conditions:	
• 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 [1) 2)]
• Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... + 3500 m) Derating 10K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1)	Yes [3)]

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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

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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

Technical specifications

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Supply voltages				
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
Load voltage L+				
• 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
Load voltage L1				
• 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
Current consumption				
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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Backup battery				
Battery operation				
• Backup time, max.	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 h; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module
Memory				
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
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
Backup				
• present	Yes; Program: Entire program maintenance-free on integral EEPROM, programmable 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, programmable 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, programmable 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, programmable 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
CPU processing times				
for bit operations, max.	0.22 µs	0.22 µs	0.22 µs	0.22 µs
Counters, timers and their retentivity				
S7 counter				
• Number	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
- 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
S7 times				
• Number	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
- 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 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Data areas and their retentivity				
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
Hardware configuration				
Connectable programming devices/PCs	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, tandard 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)
Connection method				
Plug-in I/O terminals	No	No	No	No
1st interface				
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

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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
Programming				
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
Digital inputs				
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

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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
Digital outputs				
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
Relay outputs				
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
Analog inputs				
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
Encoder supply				
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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA
Integrated Functions				
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	
Galvanic isolation				
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
Permissible potential difference				
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
Environmental requirements				
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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Dimensions and weight				
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
Supply voltages							
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
Current consumption							
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	

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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
Backup battery							
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
Memory							
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, programmable 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, programmable 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, programmable 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, programmable 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, programmable 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, programmable 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, programmable 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

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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
CPU processing times							
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
Counters, timers and their retentivity							
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; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min	54 min; 4 timers: 1 ms to 30 s; 16 timers: 10 ms to 5 min; 236 timers: 100 ms to 54 min
Data areas and their retentivity							
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
Hardware configuration							
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

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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)
Connection method							
Plug-in I/O terminals	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1st interface							
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
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	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

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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
2nd interface							
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

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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
Programming							
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

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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
Digital inputs							
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; 0 to 1 V (I 0.3 to I 0.5)	0 to 5 V; 0 to 1 V (I 0.3 to I 0.5)	0 to 5 V; 0 to 1 V (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 (I 0.3 to I 0.5)	min. 15 V; min. 4 V (I 0.3 to I 0.5)	min. 15 V; min. 4 V (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 for I0.3 to I0.5	2.5 mA; 8 mA for I0.3 to I0.5	2.5 mA; 8 mA for I0.3 to I0.5	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

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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
Digital outputs							
Number of digital outputs	10; Transistor	10; Relay	10; Transistor	10; Relay	10; Transistor 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; 30 W DC; 200 W AC	5 W	200 W; 30 W DC; 200 W AC	5 W	5 W	200 W; 30 W DC; 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) 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) 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) 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) 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) 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) 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) 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) 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

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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
Relay outputs							
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
Analog inputs							
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
Encoder supply							
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
Encoder							
Connectable encoders							
• 2-wire BEROS	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA	1 mA
Integrated Functions							
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.

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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	
Galvanic isolation							
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
Permissible potential difference							
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
Environmental requirements							
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

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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
Degree of protection							
IP20	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions and weight							
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

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Ordering data

	Order No.
CPU 221	
Compact CPU, work memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	**6ES7 211-0AA23-0XB0**
Compact CPU, work memory 4 KB, power supply 100 V to 230 V AC, 6 DI/4 DO integrated, relay outputs	**6ES7 211-0BA23-0XB0**
CPU 222	
Compact CPU, expandable, work memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	**6ES7 212-1AB23-0XB0**
Compact CPU, expandable, work memory 4 KB, power supply 100 V to 230 V AC, 8 DI/6 DO integrated, relay outputs	**6ES7 212-1BB23-0XB0**
CPU 224	
Compact CPU, expandable, work memory 8/12 KB program, 8 KB data, power supply 24 V DC, 14 DI/10 DO integrated	**6ES7 214-1AD23-0XB0**
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	**6ES7 214-1BD23-0XB0**
CPU 224 XP	
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	**6ES7 214-2AD23-0XB0**
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	**6ES7 214-2BD23-0XB0**
CPU 224 XPsi	**6ES7 214-2AS23-0XB0**
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	
CPU 226	
Compact CPU, expandable, work memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated	**6ES7 216-2AD23-0XB0**
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	**6ES7 216-2BD23-0XB0**

		Order No.
S7-200 True Power Box		
Complete package, comprising CPU 222, STEP 7 Micro/WIN V4, simulator, intelligent USB/PPI multi-master cable, manual; delivered in a practical box		
German	J	**6ES7 298-0AA20-0AA3**
English	J	**6ES7 298-0AA20-0BA3**
MC 291 memory module, EEPROM		
for CPU 221/222//224/224 XP/226		
64 KB		**6ES7 291-8GF23-0XA0**
256 KB		**6ES7 291-8GH23-0XA0**
Ground terminal		**6ES5 728-8MA11**
10 units		
Front flap set		**6ES7 291-3AX20-0XA0**
contains various cover flaps for CPUs and EMs; spare part		
SIM 274 simulator (optional)		
with 8 terminals for CPU 221/222		**6ES7 274-1XF00-0XA0**
with 14 terminals for CPU 224/ 224 XP		**6ES7 274-1XH00-0XA0**
with 24 terminals for CPU 226		**6ES7 274-1XK00-0XA0**
Pluggable terminal block (spare part)		
With 12 terminals (for CPU 22x)	I	**6ES7 292-1AE20-0AA0**
With 18 terminals (for CPU 224/ 224 XP)	I	**6ES7 292-1AG20-0AA0**
With 14 terminals (for CPU 226)	I	**6ES7 292-1AF20-0AA0**
Intelligent RS 232/PPI multi-master cable		**6ES7 901-3CB30-0XA0**
For connecting devices with an RS 232 interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network		
Intelligent USB/PPI multi-master cable		**6ES7 901-3DB30-0XA0**
For connecting devices with an USB interface to SIMATIC S7-200 or the PPI network; master in the multi-master PPI network		
MPI cable		**6ES7 901-0BF00-0AA0**
5 m; for connecting the S7-200 to MPI		
Backplane bus expansion cable	I	**6ES7 290-6AA20-0XA0**
for connecting two rows of modules with double-tier configu-ration, 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

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Ordering data

		Order No.
Optional battery module		**6ES7 291-8BA20-0XA0**
Optional combined clock and battery module only for CPU 221/222		**6ES7 297-1AA23-0XA0**
S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4		
German		**6ES7 298-8FA24-8AH0**
English		**6ES7 298-8FA24-8BH0**
French		**6ES7 298-8FA24-8CH0**
Spanish		**6ES7 298-8FA24-8DH0**
Italian		**6ES7 298-8FA24-8EH0**
Chinese		**6ES7 298-8FA24-8FH0**
SIMATIC manual collection 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	J	**6ES7 998-8XC01-8YE0**
SIMATIC manual collection update service for 1 year Current Manual Collection DVD and the three subsequent updates	D	**6ES7 998-8XC01-8YE2**
STEP 7 Micro/WIN32 V4 programming software Target system: All CPUs of the SIMATIC S7-200 Requirements: Windows 2000/XP on PG or PC Type of delivery: German, English, French, Spanish, Italian, Chinese; with online documentation		
Single license	J	**6ES7 810-2CC03-0YX0**
Upgrade Single License[1)]	J	**6ES7 810-2CC03-0YX3**
PROFIBUS bus connector, IP20 with 90° cable outlet		
• Without PG connection		**6ES7 972-0BA12-0XA0**
• With PG connection		**6ES7 972-0BB12-0XA0**
PROFIBUS bus connector, IP20 with 35° cable outlet		
• Without PG connection		**6ES7 972-0BA42-0XA0**
• with PG connection		**6ES7 972-0BB42-0XA0**
PROFIBUS FC standard cable 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		**6XV1 830-0EH10**
RS 485 repeater for PROFIBUS		**6ES7 972-0AA02-0XA0**

[1)] 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

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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; -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 % 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 [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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; -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 % 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 [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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; -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 % 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 [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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	
Order number	**6AG1 214-2AD23-2XB0**	**6AG1 214-2BD23-2XB0**
Order No. based on	**6ES7 214-2AD23-0XB0**	**6ES7 214-2BD23-0XB0**
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	
Ambient conditions		
Relative humidity	5 ... 100 % 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 [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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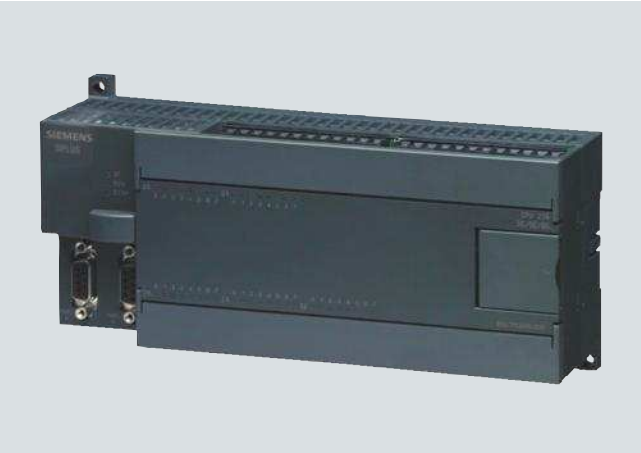
Overview SIPLUS CPU 226



- 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; -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 % 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 [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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Ordering data

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

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

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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

Technical specifications EM 221

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Current consumption			
from backplane bus 5 V DC, max.	70 mA	30 mA	30 mA
Power losses			
Power loss, typ.	3 W	2 W	3 W
Connection method			
Plug-in I/O terminals	Yes	Yes	Yes
Digital inputs			
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
Encoder			
Connectable encoders			
• 2-wire BEROS	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA

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Technical specifications EM 221 (continued)

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Galvanic isolation			
Galvanic isolation digital inputs			
• Galvanic isolation digital inputs	Yes; Optocoupler	Yes; Optocoupler	Yes; Optocoupler
• between the channels, in groups of	4	4	1; (8 groups)
Dimensions and weight			
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
Supply voltages		
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
Current consumption		
from backplane bus 5 V DC, max.	40 mA	50 mA
Power losses		
Power loss, typ.	3 W	2 W
Connection method		
Plug-in I/O terminals	Yes	Yes
Digital outputs		
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

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Technical specifications EM 222 (continued)

	6ES7 222-1BD22-0XA0	6ES7 222-1BF22-0XA0
Relay outputs		
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
Galvanic isolation		
Galvanic isolation digital outputs		
• Galvanic isolation digital outputs	Yes	Yes; Optocoupler
• Between the channels, in groups of	1	4
Dimensions and weight		
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
Supply voltages			
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
• Ppermissible frequency range, lower limit		47 Hz	47 Hz
• Permissible frequency range, upper limit		63 Hz	63 Hz
Current consumption			
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	
Power losses			
Power loss, typ.	4 W	2 W	4 W
Connection method			
Plug-in I/O terminals	Yes	Yes	Yes
Digital outputs			
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)

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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
Relay outputs			
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
Galvanic isolation			
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
Dimensions and weight			
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
Supply voltages				
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
Current consumption				
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
Power losses				
Power loss, typ.	2 W	3 W	6 W	9 W
Connection method				
Plug-in I/O terminals	Yes	Yes	Yes	Yes

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Technical specifications EM 223 (continued)

	6ES7 223-1BF22-0XA0	6ES7 223-1BH22-0XA0	6ES7 223-1BL22-0XA0	6ES7 223-1BM22-0XA0
Digital inputs				
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
Digital outputs				
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
Relay outputs				
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
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA
Isolation				
Isolation checked with	500 V AC	500 V AC	500 V AC	500 V AC
Galvanic isolation				
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
Dimensions and weight				
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

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Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0	6ES7 223-1PM22-0XA0
Supply voltages				
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
Current consumption				
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
Power losses				
Power loss, typ.	2 W	3 W	6 W	13 W
Connection method				
Plug-in I/O terminals	Yes	Yes	Yes	Yes
Digital inputs				
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
Digital outputs				
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	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load	0.1 V; with 10 kOhm load
• for signal "1", min.	L+/L1	L+/L1	L+/L1	L+/L1
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

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Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0	6ES7 223-1PM22-0XA0
Relay outputs				
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
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.	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
Encoder				
Connectable encoders				
• 2-wire BEROS	Yes	Yes	Yes	Yes
- permissible quiescent current (2-wire BEROS), max.	1 mA	1 mA	1 mA	1 mA
Isolation				
Isolation checked with	500 V AC	500 V AC	500 V AC	500 V AC
Galvanic isolation				
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
Dimensions and weight				
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

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Ordering data

	Order No.
Digital input module EM 221	
for CPU 221/222/224/224 XP/226	
• 8 inputs, 24 V DC, isolated, current sourcing/sinking	**6ES7 221-1BF22-0XA0**
• 16 inputs, 24 V DC, isolated, current sourcing/sinking	**6ES7 221-1BH22-0XA0**
• 8 inputs, 120/230 V AC, isolated, current sourcing/sinking	**6ES7 221-1EF22-0XA0**
Digital output module EM 222	
for CPU 221/222/224/224 XP/226	
• 4 outputs, 24 V DC; 5A, isolated	**6ES7 222-1BD22-0XA0**
• 8 outputs, 24 V DC; 0.75 A, isolated	**6ES7 222-1BF22-0XA0**
• 4 outputs, 24 V DC, 24 to 230 V AC; 10 A, isolated, relay outputs I	**6ES7 222-1HD22-0XA0**
• 8 outputs, 24 V DC, 24 to 230 V AC; 2 A, isolated, relay outputs	**6ES7 222-1HF22-0XA0**
• 8 outputs, 120/230 V AC; 0.5 A, isolated	**6ES7 222-1EF22-0XA0**
Digital input/output module EM 223	
for CPU 221/222/224/224 XP/226	
• 4 inputs 24 V DC, 4 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BF22-0XA0**
• 8 inputs, 24 V DC, 8 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BH22-0XA0**
• 16 inputs, 24 V DC, 16 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BL22-0XA0**
• 32 inputs, 24 V DC, 32 outputs 24 V DC; 0.75 A, isolated	**6ES7 223-1BM22-0XA0**
• 4 inputs, 24 V DC; 4 outputs, relays	**6ES7 223-1HF22-0XA0**
• 8 inputs, 24 V DC; 8 outputs, relays	**6ES7 223-1PH22-0XA0**
• 16 inputs, 24 V DC; 16 outputs, relays	**6ES7 223-1PL22-0XA0**
• 32 inputs, 24 V DC; 32 outputs, relays	**6ES7 223-1PM22-0XA0**

	Order No.
Front flap set	
contains various cover flaps for CPUs and EMs; spare part	**6ES7 291-3AX20-0XA0**
Pluggable terminal block (spare part)	
• With 7 terminals (for EM 221/222) I	**6ES7 292-1AD20-0AA0**
• With 12 terminals (for EM 223) I	**6ES7 292-1AE20-0AA0**
SIM 274 simulator (optional)	
with 8 terminals for EM 221 and EM 223	**6ES7 274-1XF00-0XA0**
S7-200 programmable controller, System Manual	
for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

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

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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**
Order number	**6AG1 221-1BF22-2XA0**	**6AG1 221-1BH22-2XB0**
Order No. based on	**6ES7 221-1BF22-0XA0**	**6ES7 221-1BH22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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 % 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 [1)2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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**
Order number	**6AG1 222-1BF22-2XB0**	**6AG1 222-1HF22-2XB0**
Order No. based on	**6ES7 222-1BF22-0XB0**	**6ES7 222-1HF22-0XB0**
Ambient temperature range	-25 ... +70 °C; -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 % 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 [1)2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... 2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

[1)] ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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**
Order number	**6AG1 223-1BF22-2XB0**	**6AG1 223-1BH22-2XB0**	**6AG1 223-1BL22-2XB0**
Order No. based on	**6ES7 223-1BF22-0XA0**	**6ES7 223-1BH22-0XA0**	**6ES7 223-1BL22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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**
Order number	**6AG1 223-1HF22-2XB0**	**6AG1 223-1PH22-2XB0**	**6AG1 223-1PL22-2XB0**
Order No. based on	**6ES7 223-1HF22-0XA0**	**6ES7 223-1PH22-0XA0**	**6ES7 223-1PL22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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		

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Overview SIPLUS EM 223 (continued)

Ambient conditions	
Relative humidity	5 ... 100 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]

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

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

Ordering data

		Order No.
SIPLUS EM 221 digital input module		
(extended temperature range and medial exposure)		
for CPU 222/224/224XP/226		
• 8 inputs, 24 V DC, isolated, current sourcing/sinking	H	**6AG1 221-1BF22-2XB0**
• 16 inputs, 24 V DC, isolated, current sourcing/sinking	H	**6AG1 221-1BH22-2XA0**
SIPLUS EM 222 digital output module		
(extended temperature range and medial exposure)		
for CPU 222/224/224XP/226		
• 8 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 222-1BF22-2XB0**
• 8 outputs, 24 V DC / 24 to 230 V AC, 2 A, electrically isolated, relay outputs	H	**6AG1 222-1HF22-2XB0**

		Order No.
SIPLUS EM 223 digital input/ output module		
(extended temperature range and medial exposure)		
for CPU 222/224/224XP/226		
• 4 inputs, 24 V DC, 4 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 223-1BF22-2XB0**
• 8 inputs, 24 V DC, 8 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 223-1BH22-2XB0**
• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, isolated	H	**6AG1 223-1BL22-2XB0**
• 4 inputs, 24 V DC, 4 outputs, relay	H	**6AG1 223-1HF22-2XB0**
• 8 inputs, 24 V DC, 8 outputs, relay	H	**6AG1 223-1PH22-2XB0**
• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0.75 A, relay	H	**6AG1 223-1PL22-2XB0**
Accessories		See SIMATIC S7-200 EM 221 digital input modules, page 3/37

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

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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

Technical specifications EM 231

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus 5 V DC, max.	20 mA	20 mA
Power losses		
Power loss, typ.	2 W	2 W
Connection method		
Plug-in I/O terminals	No	No
Analog inputs		
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
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

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Technical specifications EM 231 (continued)

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Voltage input		
• permissible input voltage for voltage input (destruction limit), max.	30 V	30 V
Current input		
• permissible input current for current input (destruction limit), max.	32 mA	40 mA
Characteristic linearization		
• for voltage measurement	No	No
• for current measurement	No	No
Temperature compensation		
• Temperature compensation parameterizable	No	No
Analog value creation		
Integrations and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	12 bit	12 bit
• Interference voltage suppression for interference frequency f1 in Hz	40 dB, DC to 60 V for interference frequency 50 / 60 Hz	40 dB, DC up to 60 V for interference frequency
• Conversion time (per channel)	250 µs	250 µs
Displayable conversion value range		
• bipolar signals	-32000 to +32000	-32000 to +32000
• unipolar signals	0 to 32000	0 to 32000
Errors/accuracies		
Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency		
• common mode voltage, max.	12 V	12 V
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	No	No
Dimensions and weight		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• Weight, approx.	183 g	190 g

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Technical specifications EM 232

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Current consumption		
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
Power losses		
Power loss, typ.	2 W	2 W
Connection method		
Plug-in I/O terminals	No	No
Analog outputs		
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
Analog value creation		
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
Errors/accuracies		
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 %
Galvanic isolation		
Galvanic isolation analog outputs		
• Galvanic isolation analog outputs	No	No
Dimensions and weight		
Dimensions		
• Width	46 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weight		
• Weight, approx.	148 g	190 g

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Technical specifications EM 235

	6ES7 235-0KD22-0XA0
Current consumption	
from backplane bus 5 V DC, max.	30 mA
from sensor current supply or external current supply (24 V DC), max.	60 mA
Power losses	
Power loss, typ.	2 W
Connection method	
Plug-in I/O terminals	No
Analog inputs	
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
Analog outputs	
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
Analog value creation	
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
Errors/accuracies	
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 x (fl +/- 1%), fl = interference frequency	
• common mode voltage, max.	12 V
Galvanic isolation	
Galvanic isolation analog inputs	
• Galvanic isolation analog inputs	No
Galvanic isolation analog outputs	
• Galvanic isolation analog outputs	No
Dimensions and weight	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weight	
• Weight, approx.	186 g

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EM 231, EM 232, EM 235

Ordering data

	Order No.
EM 231 analog input module	
for CPU 221/222/224/224 XP/226	
4 inputs, 0 to 10 V, 12 bit resolution	**6ES7 231-0HC22-0XA0**
8 inputs, 0 to 10 V, of which max. 2 inputs also 0 to 20 mA, 11/12 bit resolution	**6ES7 231-0HF22-0XA0**
EM 232 analog output module	
for CPU 221/222/224/224 XP/226	
2 outputs, ±10 V, 12 bit resolution	**6ES7 232-0HB22-0XA0**
4 outputs, ±10 V, 12-bit resolution	**6ES7 232-0HD22-0XA0**
EM 235 analog input/output module	**6ES7 235-0KD22-0XA0**
for CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, 12 bit resolution	

	Order No.
Ground terminal	**6ES5 728-8MA11**
10 units	
Front flap set	
contains various cover flaps for CPUs and EMs; spare part	**6ES7 291-3AX20-0XA0**
S7-200 programmable controller, system manual	
for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

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Overview

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

Technical specifications

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus 5 V DC, max.	87 mA	87 mA
Power losses		
Power loss, typ.	1.8 W	1.8 W
Connection method		
Plug-in I/O terminals	No	No
Analog inputs		
Number of analog inputs	4	8
Cable length, shielded, max.	100 m; to the sensor	100 m; to the sensor
Loop resistance cable	100 Ω	100 Ω
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
Analog value creation		
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
Errors/accuracies		
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 x (fl +/- 1%), fl = 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
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	Yes	Yes
Dimensions and weight		
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

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EM 231 thermocouple module

Ordering data

	Order No.
EM 231 thermocouple module	
Inputs +/- 80 mV, resolution 15 bit + sign, thermocouples J, K, S, T, R, E, N	
4 inputs	**6ES7 231-7PD22-0XA0**
8 inputs	**6ES7 231-7PF22-0XA0**
Ground terminal	**6ES5 728-8MA11**
10 units	
Backplane bus expansion cable I	**6ES7 290-6AA20-0XA0**
for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226	

	Order No.
S7-200 programmable controller, system manual	
for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

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

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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
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus 5 V DC, max.	87 mA	87 mA
Power losses		
Power loss, typ.	1.8 W; Sensor: 1 mW	1.8 W; Sensor: 1 mW
Connection method		
Plug-in I/O terminals	No	No
Analog inputs		
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
Analog value creation		
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
Errors/accuracies		
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
Galvanic isolation		
Galvanic isolation analog inputs		
• Galvanic isolation analog inputs	Yes	Yes
Dimensions and weight		
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

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EM 231 RTD module

Ordering data

	Order No.
EM 231 RTD module	
2 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 bit + sign	**6ES7 231-7PB22-0XA0**
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	**6ES7 231-7PC22-0XA0**
Ground terminal	**6ES5 728-8MA11**
10 units	
Backplane bus expansion cable I	**6ES7 290-6AA20-0XA0**
for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226	

	Order No.
S7-200 programmable controller, system manual	
for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

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

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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.

SIPLUS EM 231 analog input module for CPU 22x	**4 AI**
Order number	**6AG1 231-0HC22-2XB0**
Order No. based on	**6ES7 231-0HC22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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
Ambient conditions	
Relative humidity	5 ... 100 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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.

SIPLUS EM 232 analog output modules for CPU 22x	**2 AO**
Order number	**6AG1 232-0HB22-2XB0**
Order No. based on	**6ES7 232-0HB22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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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.

SIPLUS EM 235 analog input/ output modules for CPU 22x	**4 AI/1 AO**
Order number	**6AG1 235-0KD22-2XB0**
Order No. based on	**6ES7 235-0KD22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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SIPLUS EM 231, EM 232, EM 235

Ordering data

		Order No.
SIPLUS EM 231 analog input module (extended temperature range and medial exposure) for CPU 222/224/224 XP/226; 4 inputs, 0-10 V, resolution 12 bit	H	**6AG1 231-0HC22-2XB0**
SIPLUS EM 232 analog output module (extended temperature range and medial exposure) for CPU 222/224/224 XP/226; 2 outputs, ± 10 V, resolution 12 bit	H	**6AG1 232-0HB22-2XB0**
SIPLUS EM 235 analog input/ output module (extended temperature range and medial exposure) for CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, resolution 12 bit	H	**6AG1 235-0KD22-2XB0**
Accessories		See SIMATIC S7-200 EM 231 analog output modules, page 3/46

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

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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**
Order number	**6AG1 231-7PB22-2XA0**	**6AG1 231-7PB22-2XY0**
Order No. based on	**6ES7 231-7PB22-0XA0**	**6ES7 231-7PB22-0XA0**
Ambient temperature range	-25 ... +70 °C; -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 % 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 [1) 2)]	
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]	
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K	

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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SIPLUS EM 231 RTD module

Ordering data		Order No.
SIPLUS EM 231 RTD module		
(extended temperature range and medial exposure)		
2 inputs for resistance temperature 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; 2 inputs for resistance temperature detectors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistors 150/300/600 Ohm, resolution 15 bit + sign	H	**6AG1 231-7PB22-2XY0**

	Order No.
Accessories	See SIMATIC S7-200 EM 231 RTD module, page 3/50

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

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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

Technical specifications

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

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

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EM 253 positioning module

Ordering data

	Order No.
EM 253 positioning module For controlling stepper motors or servo drives	**6ES7 253-1AA22-0XA0**
Ground terminal 10 units	**6ES5 728-8MA11**
Backplane bus expansion cable I for connecting two rows of modules with double-tier configuration, for CPU 221/222/224/224 XP/226	**6ES7 290-6AA20-0XA0**

	Order No.
S7-200 programmable controller, system manual for CPU 221/222/224/224 XP/226 and STEP 7 Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

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

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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	
Integration in S7-200 automation systems	• CPU 222 (6ES7212-1*B23-0XB0) • CPU 224 (6ES7214-1*D23-0XB0) • CPU 224XP (6ES7214-2*D23-0XB0) • CPU226 (6ES7216-2*D23-0XB0)
Communication interfaces	SIMATIC S7 Bus, RS 232, TTY
Connection of remote displays (through TTY interface)	Weight value (gross, net)
Adjustment of scales settings	Using PC parameterization software SIWATOOL MS (RS 232)
Measuring properties	
• Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K	0.05 %
• Internal resolution	65535
Data format of weight values	2 byte (fixed-point)
Number of measurements/second	50 or 30
Digital filter	0.05 - 5 Hz (in 7 steps), mean-value filter
Weighing functions	
• Weight values	Gross, net
• Limit values	2 (min./max.)
• Zero setting function	Per command
• Tare function	Per command
• Tare specification	Per command
Load cells	Strain gages in 4-wire or 6-wire system
Load cell powering	
• 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	
Load cell characteristic	1 mV/V ... 4 mV/V
Permissible range of measuring signal (at greatest set characteristic value)	-2.4 ... +26.4 mV
Max. distance of load cells	500 m
Intrinsically-safe load cell powering	
Connection to load cells in Ex zone 1	Optionally over SIWAREX IS Ex interface or SIWAREX Pi:
Ex approvals and safety	CE, ATEX 95, FM, cUL_{US} Haz. Loc.
Power supply	
• Rated voltage	24 V DC
- Max. current consumption	30 mA
• Rated voltage (from CPU)	5 V DC
- Max. current consumption	140 mA
IP degree of protection to EN 60529; IEC 60529	IP20
Climatic requirements	
$T_{min\ (IND)}$ to $T_{max\ (IND)}$ (operating temperature)	
• Vertical installation	0 ... +55 °C
• Horizontal installation	0 ... +40 °C
EMC requirements according to	EN 61326, EN 45501 NAMUR NE21, Part 1
Dimensions	71.2 x 80 x 62 mm

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SIWAREX MS

Ordering data	Order No.
SIWAREX MS I Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification	**7MH4 930-0AA01**
SIWAREX MS manual available in a range of languages Free download on the Internet at: www.siemens.com/weighing-technology	
SIWAREX MS onfiguration package on CD-ROM for STEP7 Micro/WIN, version 4.0 SP2 or higher • Software for SIWATOOL MS scale adjustment (in a range of languages) • Manuals available on CD (in a range of languages) • Micro/WIN Library MicroScale for communication with SIWAREX MS	**7MH4 930-0AK01**
SIWAREX MS "Getting started" Sample software show beginners how to program the scales. Free download on the Internet at: www.siemens.com/weighing-technology	
SIWATOOL cable from SIWAREX M, FTA, FTC, MS with serial PC interface, for 9-pin PC interfaces (RS 232)	
• 2 m long	**7MH4 702-8CA**
• 5 m long	**7MH4 702-8CB**
Shield clamps for shield termination Pack of 10; 1 unit required for each shielded cable	**6ES5 728-8MA11**
Remote displays (option) The digital remote displays can be connected directly to the SIWAREX MS through the TTY interface. The following remote display can be used: S102 Siebert Industrieelektronik GmbH P.O. Box 1180 D-66565 Eppelborn Tel.: +49 6806/980-0 Fax: +49 6806/980-999 Internet: www.siebert.de Detailed information available from manufacturer.	
Accessories	
SIWAREX JB junction box, aluminium housing for connecting up to 4 load cells in parallel, and for connecting several junction boxes	**7MH4 710-1BA**
SIWAREX JB junction box, stainless steel housing for connecting up to 4 load cells in parallel	**7MH4 710-1EA**
Ex interface, type SIWAREX Pi With UL and FM approvals, but **without ATEX approval** for intrinsically safe connection of load cells, suitable for weighing modules SIWAREX U, CS, MS, FTA, FTC and M. Not approved for use in the EU.	**7MH4 710-5AA**
Manual for Ex interface type SIWAREX Pi	**C71000-T5974-C29**
Ex interface, type SIWAREX IS With ATEX approval, but **without UL and FM approvals** for intrinsically-safe connection of load cells, including manual, suitable for the SIWAREX U, CS, MS, FTA, FTC, M and CF weighing modules. Approved for use in the EU.	
• With short-circuit current < 199 mA DC	**7MH4 710-5BA**
• With short-circuit current < 137 mA DC	**7MH4 710-5CA**
Cable (optional)	
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, orange sheath 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 JBs, for fixed laying, occasional bending permitted, 10.8 mm outer diameter, for ambient temperature -40 … +80 °C	**7MH4 702-8AG**
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath 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	**7MH4 702-8AF**
Cable LiYCY 4 x 2 x 0.25 mm² I for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display	**7MH4 407-8BD0**

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

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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 - 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[1] x 75 mm

[1] 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 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	**6AG1 057-1AA03-0AA0**

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

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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
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• Permissible range, lower limit (DC)	20.4 V
• Permissible range, upper limit (DC)	28.8 V
Current consumption	
from load voltage L+ (without load), max.	70 mA
from backplane bus 5 V DC, max.	80 mA; from expansion bus
Power losses	
Power loss, typ.	2.1 W
Communication functions	
Bus protocol/transmission protocol	PPI, Modbus
Interfaces	
Number of RS 485 interfaces	0
Connection method	
Telephone lines	RJ11 (4 cables, 6 contacts)
Modem	
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
Dimensions and weight	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weight	
• Weight, approx.	190 g

Ordering data

	Order No.
EM 241 modem I	**6ES7 241-1AA22-0XA0**
Analog modem for remote maintenance/diagnostics; CPU-CPU/PC communication, SMS/pager message transmission	
Grounding terminal	**6ES5 728-8MA11**
10 units	
Front door set	
contains different cover flaps for CPU and EM; spare part	**6ES7 291-3AX20-0XA0**
S7-200 automation system, system manual	
for CPU 221/222/224/224 XP/226 and STEP 7-Micro/Win V4	
German	**6ES7 298-8FA24-8AH0**
English	**6ES7 298-8FA24-8BH0**
French	**6ES7 298-8FA24-8CH0**
Spanish	**6ES7 298-8FA24-8DH0**
Italian	**6ES7 298-8FA24-8EH0**
Chinese	**6ES7 298-8FA24-8FH0**

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

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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
Supply voltages	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
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
Power losses	
Power loss, typ.	2.5 W
Hardware configuration	
Connectable nodes	TD 200 as of V2.0, OP, TP, PG/PC, S7-300/400, PROFIBUS DP master
Communication functions	
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
Interfaces	
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
Connection method	
Plug-in I/O terminals	No
PROFIBUS DP	
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
Dimensions and weight	
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 For CPU 222/224/224 XP/226; for connecting to PROFIBUS DP (slave) and MPI	**6ES7 277-0AA22-0XA0**

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

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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

Order No.	6GK7 243-1EX01-0XE0
Product type designation	**CP 243-1**
Transmission rate	
Transmission rate at interface 1	10 … 100 Mbit/s
Interfaces	
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
Supply voltage, current consumption, power loss	
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
Permitted ambient conditions	
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
Design, dimensions and weights	
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	-

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Technical specifications (continued)

Order No.	6GK7 243-1EX01-0XE0
Product type designation	**CP 243-1**
Product properties, functions, components General	
Maximum number of modules per CPU	1
Performance data	
Performance data S7 communication	
Maximum number of possible connections for S7 communication	8
Number of possible connections for S7 communication - Note	-
Performance data IT functions	
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**
Product functions Management, configuration, programming	
Product function: MIB support	No
Protocol is supported SNMP v1	No
Configuration software required	STEP 7-Micro/WIN V4.0 SP8 and higher
Product functions Diagnostics	
Product function: Web-based diagnostics	Yes
Product functions Switch	
Product feature: Switch	No

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Ordering data

		Order No.
CP 243-1 communication processor		**6GK7 243-1EX01-0XE0**
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 German, English, French, Italian, Spanish		
SOFTNET S7 for Industrial Ethernet		
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		
SOFTNET V8.0 for Industrial Ethernet		
for 32-bit Windows 7 Professional/ Ultimate; German/English		
up to 64 connections		
• Single license for 1 installation		**6GK1 704-1CW80-3AA0**
SOFTNET Edition 2008 for Industrial Ethernet		
for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English		
up to 64 connections		
• Single license for 1 installation		**6GK1 704-1CW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version		**6GK1 704-1CW00-3AL0**
• Upgrade from Edition 2006 to V8.0		**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0		**6GK1 704-1CW00-3AE1**
SOFTNET S7 Lean Edition V8 for Industrial Ethernet		
up to 8 connections		
• Single license for 1 installation		**6GK1 704-1LW80-3AA0**
SOFTNET S7 Lean Edition 2008 for Industrial Ethernet		
up to 8 connections		
• Single license for 1 installation		**6GK1 704-1LW71-3AA0**
• 1-year Software Update Service, with automatic extension; requirement: Current software version		**6GK1 704-1LW00-3AL0**
• Upgrade from Edition 2006 to V8.0		**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to V8.0		**6GK1 704-1LW00-3AE1**
STEP 7-Micro/WIN V4 programming software		
Target system: All CPUs of the SIMATIC S7-200 Requirements: Windows 2000/XP on PG or PC, Type of delivery: German, English, French, Spanish, Italian, Chinese; with online documentation		
• Single license	J	**6ES7 810-2CC03-0YX0**
• Upgrade Single license [1]	J	**6ES7 810-2CC03-0YX3**
IE TP Cord RJ45/RJ45		
TP cable 4 x 2 with 2 RJ45 connectors		
• 0.5 m		**6XV1 870-3QE50**
• 1 m		**6XV1 870-3QH10**
• 2 m		**6XV1 870-3QH20**
• 6 m		**6XV1 870-3QH60**
SCALANCE X005	I	**6GK5 005-0BA00-1AA3**
Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures		

[1] 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

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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*), 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

*) CSD – **C**ircuit **S**witched **D**ata (data transmission via GSM dialup connection)

Technical specifications

Transfer rate	
• RS232	300 bit/s to 57,600 bit/s
• GSM data calls	CSD 9,600 bit/s
• GPRS	
- Up to 2 uplinks	13.4 Kbit/s to 27 Kbit/s gross upload (modem to Internet); net approx. 30 % lower
- Up to 4 downlinks	40 Kbit/s to 54 Kbit/s gross download (Internet to modem); net is approx. 30 % lower
Interfaces	
• RS232	1 x 9-pin Sub-D socket
• Antenna connection	1 x SMA antenna socket (50 Ohm)
Frequency ranges	850, 900, 1800, 1900 MHz
Transmitted output power	2 W at 850, 900 MHz 1 W at 1800, 1900 MHz
Current consumption	
Send mode	
• at 12 V	430 mA
• at 24 V	140 mA
Receive mode	
• at 12 V	90 mA
• at 24 V	50 mA
Supply voltage	12 … 30 V DC
Power loss	typ. 5 W max. 6.2 W
Permissible ambient conditions	
• Operating temperature	- 20 °C … +60 °C
• Transport/storage temperature	- 25 °C … +85 °C
• Relative humidity	Max. 95 % at +25 °C
Design	
• Dimensions (W x H x D) in mm	22.5 x 99 x 114
• Weight	Approx. 150 g
• Assembly	Standard rail
Degree of protection	IP40
Configuration	AT commands using S7-200 program blocks; MC45-compatible AT commands for use with SINAUT ST7 modules
National approvals	Current approvals can be found in the Internet at www.siemens.com/simatic-net/ik-info

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Ordering data		Order No.
GSM/GPRS modem MD720-3 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		**6NH9 720-3AA00**
Accessories		
Telecontrol Server Basic Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATICS7-1200 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		
• **Telecontrol Server Basic 8** Connection management for eight SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AA0**
• **Telecontrol Server Basic 64** Connection management for 64 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AB0**
• **Telecontrol Server Basic 256** Connection management for 256 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AC0**
• **Telecontrol Server Basic 1000** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AD0**
• **Telecontrol Server Basic 5000** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AE0**

	Order No.
ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable	**6NH9 860-1AA00**
ANT794-3M antenna Tri-band flat antenna, in enclosure with 1.2 m cable	**6NH9 870-1AA00**
SIMATIC S7-200 PPI modem cable For connecting the S7-200 to the GSM/GPRS modem SINAUT MD720-3	**6NH9 701-0AD**
Connecting cable 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.	**6NH7 701-5AN**
SITOP compact 24 V/ 0.6 A 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	**6EP1 331-5BA00**

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

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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)

Technical specifications

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

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

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Ordering data

	Order No.
MD741-1 EGPRS router 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	**6NH9 741-1AA00**
Accessories	
IE FC RJ45 Plug 180 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/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
ANT794-4MR antenna Quad band antenna for MD720-3 and MD741-1, omnidirectional with 5 m cable	**6NH9 860-1AA00**
ANT794-3M antenna Tri-band flat antenna, in enclosure with 1.2 m cable	**6NH9 870-1AA00**

		Order No.
SCALANCE S Industrial Security Modules 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		
• **SCALANCE S612** uses the Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 32 devices up to 64 VPN tunnels simultaneously	B	**6GK5 612-0BA00-2AA3**
• **SCALANCE S613** 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)	B	**6GK5 613-0BA00-2AA3**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors		
• 0.5 m		**6XV1 870-3QE50**
• 1 m		**6XV1 870-3QH10**
• 2 m		**6XV1 870-3QH20**
• 6 m		**6XV1 870-3QH60**
• 10 m		**6XV1 870-3QN10**

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

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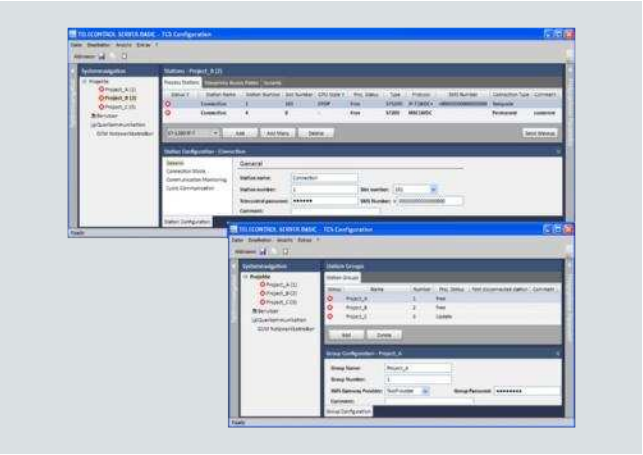
Telecontrol Server Basic

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 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	• DCOM protocol • OPC interface "Data Access Interface 3.0" • Synchronous and asynchronous reading of variables
Interfaces and functions between the OPC server and SIMATIC S7	• Writing of variables in the SIMATIC S7 in the case of value changes to OPC variables • Transfer of SIMATIC S7 data to OPC variables (for event-driven communication from the SIMATIC S7) • Activatable cyclic reading of variables; adjustable time interval • Monitoring of connected SIMATIC S7 with time-of-day synchronization • Routing of data packets between connected SIMATIC S7-1200 stations or between S7-200 stations • Permanent GPRS connection; the tunnel is established from the GPRS modem • 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. • Via Internet access as server with public IP address (recommendation: fixed public Internet address)
Operating systems	Microsoft Windows 7 Professional Microsoft Windows 7 Enterprise Microsoft Windows 7 Ultimate Microsoft Windows Server 2008 (32-bit)
Diagnostics	Station group monitoring Station monitoring Connection monitoring STEP 7 Teleservice across Internet and router boundaries – S7-1200 only
Configuration	Integral configuration tool Multi-project-capable Multi-user-capable with user management Configurations can be expanded at runtime

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Ordering data

		Order No.
Telecontrol Server Basic		
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		
• **Telecontrol Server Basic 8** Connection management for eight SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AA0**
• **Telecontrol Server Basic 64** Connection management for 64 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AB0**
• **Telecontrol Server Basic 256** Connection management for 256 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AC0**
• **Telecontrol Server Basic 1000** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AD0**
• **Telecontrol Server Basic 5000** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations	J	**6NH9 910-0AA20-0AE0**

	Order No.
Accessories	
CP 1242-7 communication processor Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network	**6GK7 242-7KX30-0XE0**
MD720-3 GSM/GPRS modem 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	**6NH9 720-3AA00**
ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable	**6NH9 860-1AA00**
ANT794-3M antenna Triband flat antenna, in enclosure with 1.2 m cable	**6NH9 870-1AA00**

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

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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	
Order number	**6AG1 277-0AA22-2XA0**
Order No. based on	**6ES7 277-0AA22-0XA0**
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 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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**

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Overview

- SINAUT mobile radio modem with RS232 interface
- DIN rail mounting:
- 24 V DC power supply
- Supports the GSM services CSD*), 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

*) 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	
Order No.	**6AG1 720-3AA00-7AA0**
Order No. based on	**6NH9 720-3AA00**
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 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) SA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

Ordering data	**Order No.**
SIPLUS MD720-3 GSM/GPRS modem (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	**6AG1 720-3AA00-7AA0**
Accessories	see GSM/GPRS modem MD720-3, page 3/69

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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	
Order number	**6AG1 741-1AA00-2AA0**
Order No. based on	**6NH9 741-1AA00**
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 % 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 [1] [2]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

Ordering data	**Order No.**
SIPLUS MD741-1 EGPRS router (extended temperature range and medial exposure) 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	**6AG1 741-1AA00-2AA0**
Accessories	see EGPRS router MD741-1, page 3/71

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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**[1]
Input	1-phase AC
Rated voltage $U_{in\ rated}$	**120/230 V AC** Set via wire jumper
Voltage range	93 ... 132 V/187 ... 264 V
Overvoltage strength	2.3 x $U_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at U_{in} = 187 V
Rated line frequency; rated line frequency range	50/60 Hz, 47 ... 63 Hz
Rated current $I_{in\ rated}$	1.65/0.95 A
Switch-on current limitation (+25 °C)	< 33 A, < 3 ms (U_{in} = 230 V)
I^2t	< 1.0 A^2s
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
Output	Controlled, isolated DC voltage
Rated voltage $U_{out\ rated}$	**24 V DC**
Total tolerance	±5% (typ. ±2%)
• Static line compensation	Approx. ±0.1%
• Static load compensation	Approx. ±0.2%
Residual ripple	< 150 mV_{pp} (typ. 30 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 110 mV_{pp})
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 $I_{out\ rated}$	**3.5 A**

Power supplies, type	**3.5 A**
Order No.	**6EP1 332-1SH31**[1]
Current range	
• Up to +60°C	0 ... 3.5 A
• Derating	-
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 5 A for 100 ms
• Short-circuit during operation	Typ. 5 A for 100 ms
Parallel switching for enhanced performance	Yes, up to 5 units
Efficiency	
Efficiency at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 84%
Power loss at $U_{out\ rated}$, $I_{out\ rated}$	Approx. 16 W
Closed-loop control	
Dyn. line compensation ($U_{in\ rated}$ ±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
Protection and monitoring	
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	-

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The S7-200 version

Technical specifications (continued)

Power supplies, type	3.5 A
Order No.	**6EP1 332-1SH31**[1]
Safety	
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
EMC	
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
Mechanics	
Connections	
• Supply input L, N, PE	One screw terminal each for 0.5 ... 1 mm^2 solid/finely stranded
• Output +	1 screw terminal for 0.5 ... 1 mm^2
• Output -	2 screw terminals for 0.5 ... 1 mm^2
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
Accessories	Mounting bracket (6EP1 971-1AA1)

[1] 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

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SIPLUS S7-200 PS 203

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	
Order number	**6AG1 203-1SH31-2AA0**
Order No. based on	**6EP1 332-1SH31**
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.
Ambient conditions	
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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

Ordering data

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

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

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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

	6ES7 272-0AA30-0YA1
Product type designation	TD 200 text display
Power supply	
Input voltage	
• Rated value	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
Input current	
• Rated value at 24 V DC	120 mA
MPI	
Transmission speed (PPI), max.	187.5 kbit/s
1st interface	
Physics	RS 485
Functionality	
• PPI	Yes
PPI	
• Number of nodes, max.	126; S7-200, OP, TP, TBP, PG/PC
Operator control and monitoring	
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
Environmental requirements	
Operating temperature	
• Min.	0 °C
• max.	60 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Degree of protection	
IP65	Yes; at front
Dimensions	
Cabinet/switchboard strength	0.3 mm; 0.3 to 4 mm
Dimensions and weight	
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

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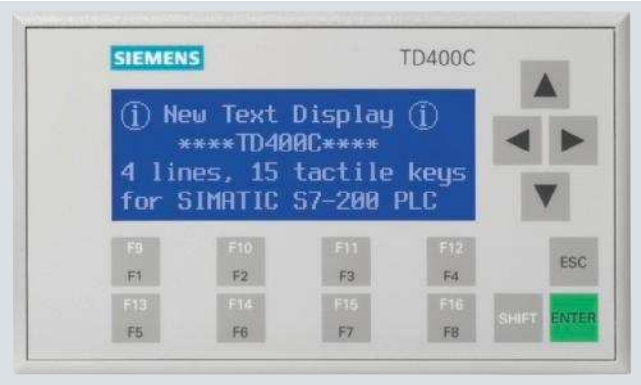
TD 400C text display

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
Product type designation	Text Display TD 400C
Supply voltage	
Supply voltage	24 V DC
permissible range	DC
Memory	
Usable memory for user data	No info
Configuration	
Configuration tool	MicroWin (to be ordered separately)
Display	
Display type	STN, Black/White
Size	3.7"
Resolution (WxH in pixel)	192 x 64
Backlighting	
• MTBF backlighting (at 25 °C)	about 20,000 hours
Operating mode	
Control elements	Membrane keyboard
Function keys, programmable	15 function keys
Membrane keyboard	Yes
Ambient conditions	
Temperature	
• Operation	0 °C to +50 °C
• Transport, storage	-20 °C to +60 °C
Degree of protection	
Front	IP65, NEMA 4, NEMA 4x, NEMA 12 (when installed)
Rear	IP20
Certifications & standards	
Certifications	CE, FM Class I Div. 2, UL, C-TICK, NEMA 4, NEMA 4x, NEMA 12
Interfaces	
Interfaces	1 x RS485 (max. 187.5 Mbit/s)
Functionality under WinCC flexible	
Security	
• Number of user groups	1
Dimensions and weight	
Weight	
• Weight	0.33 kg

Ordering data

		Order No.
TD 400C text display 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	I	**6AV6 640-0AA00-0AX1**
Promotion package 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	J	**6ES7 298-1AA20-0YA3**
Connecting cables for connecting TD 100C/TD 200C or TD 400C to S7-200		**6ES7 901-3EB10-0XA0**
Blank foils for printing customized keyboard layouts; 2 perforated films per sheet; 10 sheets per pack		**6AV6 671-0AP00-0AX0**
Accessories		
Accessories for supplementary ordering		See Catalog ST 80/ST PC

I: Subject to export regulations AL: N and ECCN: EAR99H
J: Subject to export regulations AL: N and ECCN: EAR99S

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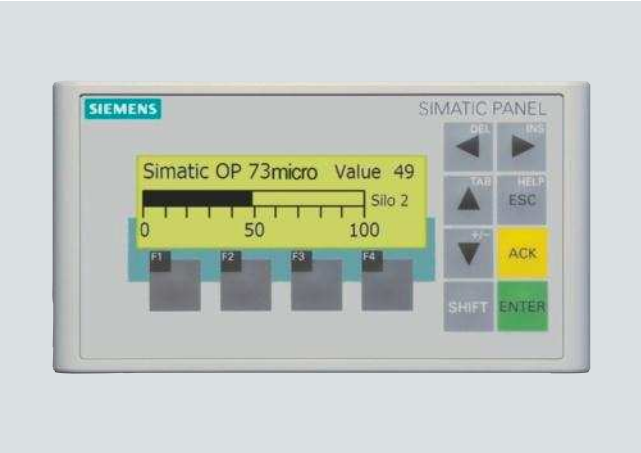
SIMATIC OP 73micro

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

	6AV6 640-0BA11-0AX0
Product type designation	OP 73micro
Supply voltage	
Supply voltage	24 V DC
Permissible range	+20.4 V to +28.8 V DC
Memory	
Type	Flash
Usable memory for user data	128 KB usable memory for user data
Time	
Clock	
• Type	Software clock, not battery backed
Configuration	
Configuration tool	WinCC flexible Micro Version 2004 SP1, HSP or higher (to be ordered separately)
Display	
Display type	STN, Black/White
Size	3"
Resolution (WxH in pixel)	160 x 48
Backlighting	
• MTBF backlighting (at 25 °C)	about 100,000 hours
Operating mode	
Control elements	Membrane keyboard
Function keys, programmable	4 function keys
Connection for mouse/keyboard/ barcode reader	- / - / -
Touch operation	
• Touch screen	No
• System keys	8
• Numeric/alphabetical input	Yes / Yes
Ambient conditions	
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
Degree of protection	
Front	IP65, NEMA 4x, (when installed)
Rear	IP20
Certifications & standards	
Certifications	CE, GL, ABS, BV, DNV, LRS, UL, CSA, cULus, C-TICK, NEMA 4x
Interfaces	
Interfaces	1 x RS485 (max. 187.5 Mbit/s)
Operating systems	
Operating system	LINUX
Processor	
Processor	ARM
Functionality under WinCC flexible	
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

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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
Dimensions	
Front of enclosure (W x H)	154 mm x 84 mm
Mounting cutout/ device depth (W x H)	138 mm x 68 mm / 28.5 mm device depth
Dimensions and weight	
Weight	
• Weight	0.25 kg

Ordering data

		Order No.
SIMATIC OP 73micro		**6AV6 640-0BA11-0AX0**
Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories		
OP 73micro starter package	C	**6AV6 650-0BA01-0AA0**
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)		
Configuration		
with SIMATIC WinCC flexible		
Documentation (to be ordered separately)		
OP 73micro/TP 177micro operating instructions		
• German		**6AV6 691-1DF01-0AA0**
• English		**6AV6 691-1DF01-0AB0**
• French		**6AV6 691-1DF01-0AC0**
• Italian		**6AV6 691-1DF01-0AD0**
• Spanish		**6AV6 691-1DF01-0AE0**

		Order No.
WinCC flexible Micro user manual		
• German		**6AV6 691-1AA01-3AA0**
• English		**6AV6 691-1AA01-3AB0**
• French		**6AV6 691-1AA01-3AC0**
• Italian		**6AV6 691-1AA01-3AD0**
• Spanish		**6AV6 691-1AA01-3AE0**
SIMATIC HMI manual collection	J	**6AV6 691-1SA01-0AX0**
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		
Accessories		
Accessories for supplementary ordering		see catalog ST 80/ST PC

C: Subject to export regulations AL: N and ECCN: 5D002ENCU
J: Subject to export regulations AL: N and ECCN: EAR99S

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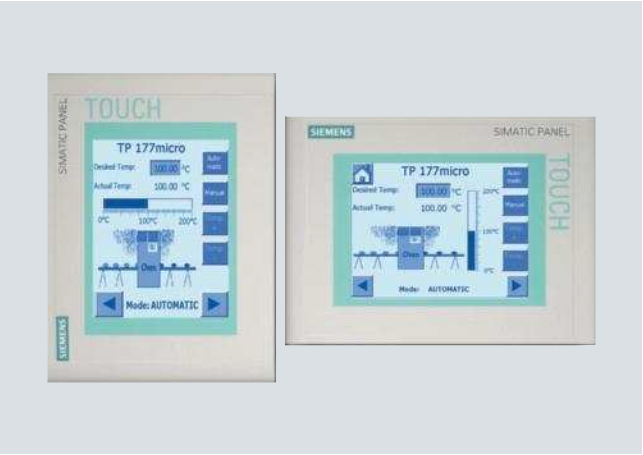
SIMATIC TP 177micro

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
Product type designation	TP 177micro
Supply voltage	
Supply voltage	24 V DC
Permissible range	+20.4 V to +28.8 V DC
Rated current	0.24 A
Memory	
Type	Flash
Usable memory for user data	256 KB usable memory for user data
Time	
Clock	
• Type	Software clock, not battery backed
Configuration	
Configuration tool	WinCC flexible Micro Version 2004 SP1, HSP or higher (to be ordered separately)
Display	
Display type	STN, 4 Blue mode, 4 levels
Size	5.7"
Resolution (WxH in pixel)	320 x 240
Backlighting	
• MTBF backlighting (at 25 °C)	about 50,000 hours
Operating mode	
Control elements	Touch screen
Function keys, programmable	None
Touch operation	
• Touch screen	analog, resistive
• System keys	0
• Numeric/alphabetical input	Yes / Yes
Ambient conditions	
Mounting position	vertical
maximum permissible angle of inclination without external ventilation	+/- 35 °
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
Degree of protection	
Front	IP65, NEMA 4x, (when installed)
Rear	IP20
Certifications & standards	
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
Interfaces	
Interfaces	1 x RS485 (max. 187.5 Mbit/s)
Operating systems	
Operating system	LINUX
Processor	
Processor	ARM
Functionality under WinCC flexible	
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
Image elements	
• Text objects	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams, bar graphs

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Technical specifications (continued)

	6AV6 640-0CA11-0AX1
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
Dimensions	
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
Dimensions and weight	
Weight	
• Weight	0.75 kg

Ordering data

		Order No.
SIMATIC TP 177micro	I	**6AV6 640-0CA11-0AX1**
Touch Panel for connection to the SIMATIC S7-200, 5.7" STN display		
TP 177micro starter package	C	**6AV6 650-0DA01-0AA0**
Consisting of: • TP 177micro Touch Panel • SIMATIC WinCC flexible Micro engineering software • 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 • MPI cable (5m) (for test purposes)		
Configuration		
with SIMATIC WinCC flexible		
Documentation (to be ordered separately)		
OP 73micro, TP 177micro operating instructions		
• German		**6AV6 691-1DF01-0AA0**
• English		**6AV6 691-1DF01-0AB0**
• French		**6AV6 691-1DF01-0AC0**
• Italian		**6AV6 691-1DF01-0AD0**
• Spanish		**6AV6 691-1DF01-0AE0**
WinCC flexible Micro user manual		
• German		**6AV6 691-1AA01-3AA0**
• English		**6AV6 691-1AA01-3AB0**
• French		**6AV6 691-1AA01-3AC0**
• Italian		**6AV6 691-1AA01-3AD0**
• Spanish		**6AV6 691-1AA01-3AE0**
SIMATIC HMI manual collection	J	**6AV6 691-1SA01-0AX0**
Electronic documentation, on DVD 5 languages (English, French, German, Italian, Spanish); contains: all currently available user manuals, manuals and communication manuals for SIMATIC HMI		
Accessories		
Accessories for supplementary ordering		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

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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	
Order number	**6AG1 272-0AA30-2YA1**
Order No. based on	**6ES7 272-0AA30-0YA1**
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 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 < 4.8 ppm; H_2S < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; O_3 < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O_3 < 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

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	H	**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

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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	
Order number	**6AG1 640-0AA00-2AX1**
Order No. based on	**6AV6 640-0AA00-0AX1**
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 % 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 [1) 2)]
Mechanically active substances	Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)]
Air pressure (depending on the highest positive temperature range specified)	1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range 795 ... 658 hPa (+2000 ... +3500 m) derating 10 K 658 ... 540 hPa (+3500 ... +5000 m) derating 20 K

1) ISA-S71.04 severity level GX: Long-term load: SO_2 <4.8 ppm H_2S <9.9 ppm; Cl <0.2 ppm; HCl <0.66 ppm; HF <0.12 ppm; NH <49 ppm; O3 <0.1 ppm; NO x <5.2 ppm Threshold/ limit value (max. 30 min/d): SO_2 < 17.8 ppm; H_2S < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; O3 < 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

Ordering data

		Order No.
SIPLUS S7-200 TD 400C (extended temperature range and medial exposure) 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	**6AG1 640-0AA00-2AX1**
Connection cable for connection of TD 100C/ TD 200C or TD 400C to S7-200		**6ES7 901-3EB10-0XA0**
Empty sheets for printing customized keyboard layouts; 2 perforated sheets per document; 10 sheets per packing unit		**6AV6 671-0AP00-0AX0**
Accessories for re-ordering		See HMI accessories, ST 80 / ST PC Catalog

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

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Software

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.

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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

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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
Power supply		
Description	from CPU	from USB interface
Protocols		
PPI	Yes; 10/11 bit	Yes; 10/11 bit
ASCII	Yes; Freeport	
MPI		
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
Alarms/diagnostics/status information		
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
Galvanic isolation		
Galvanic isolation	1	1
Software requirement		
Software required	STEP 7 Micro/WIN V3.2 SP4 or higher	STEP 7 Micro/WIN V3.2 SP4 or higher
Dimensions and weight		
Weight		
• Weight, approx.	300 g	300 g

Ordering data

	Order No.
Intelligent RS 232/PPI multi-master cable For connecting devices with an RS 232 interface to SIMATIC S7-200 or PPI network Master in multi-master PPI network	**6ES7 901-3CB30-0XA0**
Intelligent USB/PPI multi-master cable For connecting devices with a USB interface to SIMATIC S7-200 or PPI network; Master in multi-master PPI network	**6ES7 901-3DB30-0XA0**

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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; - 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

Ordering data

		Order No.
Intelligent SIPLUS RS 232/ PPI multi-master cable (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	**6AG1 901-3CB30-2XA0**

L: Subject to export regulations AL: 9I999 and ECCN: N

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