SIMATIC S7-200

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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)
- Shipbuilding certification from
  - American Bureau of Shipping (ABS)
  - Bureau Veritas (BV)
  - Des Norske Veritas (DNV)
  - Germanischer Lloyd (GL)
  - Lloyds Register of Shipping (LRS)
  - Registro Italiano Navale (RINA)
  - Nippon Kaiji Kyokai (NK)

SIPLUS S7-200

- The PLC for use under extremely harsh environmental conditions
- With enhanced temperature range from -25 °C to +70 °C
- Use in environments with pollutant gases (corrosive gas atmospheres)
- Occasional short-term 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

For more information, go to:

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Technical specifications

General technical specifications SIMATIC S7-200	
Degree of protection	IP20 in accordance with 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 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 SIPLUS S7-200	
Climatic environmental conditons	
Temperature	Horizontal installation: -25 °C to 70 °C vertical installation: -25 °C to 50 °C
Relative humidity	5 to 95%; short-term condensation permissible, corresponds to relative humidity (RH) load 2 according to IEC 1131-2 and IEC 721 3-3 Cl. 3K5
Short-term ice formation	-25 °C to 0 °C IEC 721 3-3 Cl. 3K5
Air pressure	1080 to 795 hPa corresponds to an altitude of -1000 to 2000 m
Contaminant concentration	SO_2: < 0.5 ppm; relative humidity < 60% test: 10 ppm, 4 days H_2S: < 0.1 ppm; relative humidity < 60% test: 1 ppm, 4 days (to IEC 721 3-3; Class 3C3)
Mechanical environmental condtions	
Vibrations	Type of vibration: Frequency sweeps with a rate of change of 1 octave/minute. 2 Hz ≤ f ≤9 Hz, constant amplitude 3.0 mm, 9 Hz ≤ f ≤150 Hz, constant acceleration 1 g, duration of oscillation: 10 frequency cycles per axis in each of the three mutually perpendicular axes Vibration tests according to IEC 68 Part 2-6 (sine wave) and IEC 721 3-3, Class 3M4
Shock	Type of shock: Half-sine, intensity of shock: 15 g peak value, 11 ms duration, direction: 3 shocks each in +/- direction in each of the 3 perpendicular axes Shock testing in accordance with IEC 68 Part 2-27
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes[1)]

[1)] 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

Central processing units

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

Overview CPU 221

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

Overview CPU 224

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

Overview CPU 222

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

Overview CPU 224 XP / CPU 224 XPsi

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

Overview CPU 226

- The high-performance package for complex technical tasks
- With additional PPI port for added 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				
• DC 24 V	Yes		Yes	
• permissible range, lower limit (DC)	20.4 V		20.4 V	
• permissible range, upper limit (DC)	28.8 V		28.8 V	
• AC 120 V		Yes		Yes
• AC 230 V		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

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Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
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
Backup battery				
• Backup time, max.	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module	50 Hours; (min. 8 h at 40 °C); 200 days (typ.) with optional battery module
Memory				
Type of storage				
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
Times/counters and their remanence				
S7 counter				
• Number	256	256	256	256
• of which remanent 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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
S7 times				
• Number	256	256	256	256
• of which remanent 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
Data areas and their remanence				
Flag				
• Number, max.	32 byte	32 byte	32 byte	32 byte
• Remanence 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 remanent 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 remanent 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 config.				
Connectable programming devices/PCs	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC	SIMATIC PG/PC, standard PC
Expansion devices, max.			2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.	2; Only expansion modules of the S7-22x series can be used. Due to the limited output current, the use of expansion modules may be limited.
Extension of distributed I/O				
• Analog inputs/outputs, max.			10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)	10; max. 8 inputs and 2 outputs (EM) or max. 0 inputs and 4 outputs (EM)
• Digital inputs/outputs, max.			78; max. 40 inputs and 38 outputs (CPU + EM)	78; max. 40 inputs and 38 outputs (CPU + EM)
• AS interface inputs/outputs max.			62; AS-Interface A/B slaves (CP 243-2)	62; AS-Interface A/B slaves (CP 243-2)
Connection point				
pluggable I/O terminals	No	No	No	No
1st interface				
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral 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 communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 Kbit/s			
• PPI	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication ; 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			

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
MPI				
• Transmission speeds, max.	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s
• Transmission speeds, min.	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s
CPU/programming				
Programming language				
• LAD	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes
Operational stocks	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
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
Program processing	free cycle (OB 1), interrupt-controller, time-controlled (1 to 255 ms)	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
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
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				
- programmable	Yes; all	Yes; all	Yes; all	Yes; all
- at " 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				
- programmable	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				
- programmable	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
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

Technical specifications (continued)

	6ES7 211-0AA23-0XB0	6ES7 211-0BA23-0XB0	6ES7 212-1AB23-0XB0	6ES7 212-1BB23-0XB0
Digital outputs				
Number of digital outputs	4; Transistor	4; Relay	6; Transistor	4; Relay
Short-circuit protection of the output	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	DC 20 V	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. (Q0.2 to Q0.3) 15 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 Q0.5) 15 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 Q0.3) 100 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 Q0.5) 100 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
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 the 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, 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		1E7; mechanically 10 million, at rated load voltage 100,000		1E7; 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: 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 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

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 bits (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			
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	
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
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				
Environmental conditions	For further environmental conditions, see "Automation System S7-200, System Manual"			
Operating termperature				
• 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%			
• Operation, max.	95%; RH class 2 in accordance with IEC 1131-2			
Degree of protection				
IP20	Yes	Yes	Yes	Yes
Dimensions				
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
Weights				
• Weight, approx.	270 g	310 g	270 g	310 g

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
Supply voltages							
Rated value							
• DC 24 V	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	
• AC 120 V		Yes		Yes			Yes
• AC 230 V		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 (DC 5 V) 660 mA		900 mA; 120 to 900 mA, output current for expansion modules (DC 5 V) 660 mA		900 mA; 120 to 900 mA, output current for expansion modules (DC 5 V) 660 mA	1 050 mA; 150 to 1050 mA output current for expansion modules (DC 5 V) 1000 mA	
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

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
Backup battery							
• Backup time, max.	100 Hours; (min. 70 h at 40 °C); 200 days (typ.) with optional battery module						
Memory							
Type of storage							
Number of memory modules (optional)	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 on active run-time edit	12 Kibyte; 8 KB on active run-time edit	16 Kibyte; 12 KB for active run-time edit	16 Kibyte; 12 KB for active run-time edit	16 Kibyte; 12 KB for 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						
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
Times/counters and their remanence							
S7 counter							
• Number	256	256	256	256	256	256	256
• of which remanent with battery							
- adjustable	Yes; via high-performance capacitor or battery						
- lower limit	1						
- upper limit	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 remanent with battery							
- adjustable	Yes; via high-performance capacitor or battery						
- upper limit	64						
• Time range							
- lower limit	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						
Data areas and their remanence							
Flag							
• Number, max.	32 byte						
• Remanence available	Yes; M 0.0 to M 31.7						
• of which remanent with battery	0 to 255, via high-performance capacitor or battery, adjustable						
• of which remanent without battery	0 to 112 in EEPROM, adjustable						
Hardware config.							
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
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.						

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
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 point							
pluggable I/O terminals	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1st interface							
Type of interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral 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 communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 Kbit/s						
• PPI	Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication ; 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						
MPI							
• Transmission speeds, 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 speeds, 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			Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral RS 485 interface	Integral 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 communication is possible in the MPI network with restrictions; transmission rates: 19.2/187.5 kbit/s				
• PPI			Yes; with PPI protocol for program functions, HMI functions (TD 200, OP), S7-200-internal CPU/CPU communication ; transmission rates 9.6/19.2/187.5 kbit/s				
• serial data exchange			Yes; as a freely programmable interface with an interrupt option for serial data transmission with external units with ASCII protocol baud rates: 1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2 kbit/s; the PC/PPI cable can be used as an RS232/RS485 converter				

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
MPI							
• Transmission speed, max.			187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s	187.5 kBit/s
• Transmission speed, min.			19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s	19.2 kBit/s
CPU/programming							
Programming language							
• LAD	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• FUP	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• AWL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Operational stocks	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						
User program protection/password protection	Yes; 3-stage password protection						
Program processing	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						
Number of subroutines, max.	64	64	64	64	64	64	64
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							
- programmable	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all	Yes; all
- at " 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							
- programmable	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							
- programmable	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						
• cable length unshielded, max.	300 m; not for high-speed signals						

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 of the output	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 VDC	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 the 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, 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		1E7; mechanically 10 million, at rated load voltage 100,000		1E7; mechanically 10 million, at rated load voltage 100,000			1E7; 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; permis-sible range: 15.4 to 28.8 V	Yes; permis-sible range: 20.4 bis 28.8 V	Yes; permis-sible range: 15.4 to 28.8 V	Yes; permis-sible range: 20.4 bis 28.8 V	Yes; permis-sible range: 15.4 to 28.8 V	Yes; permis-sible range: 15.4 to 28.8 V	Yes; permis-sible 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 bits (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)); parameter-izable 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 bits (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)); parameter-izable 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 bits (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)); parameter-izable 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 bits (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)); parameter-izable 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 bits (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)); parameter-izable 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 bits (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)); parameter-izable 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 bits (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)); parameter-izable 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	200 kHz	200 kHz	200 kHz	30 kHz	30 kHz

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
Number of alarm inputs	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	
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
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; 1500 V AC between 24 V DC and 230 V AC	500 V DC between 24 V DC and 5 V DC
Environmental requirements							
Environmental conditions	For further environmental conditions, see "Automation System S7-200, System Manual"						
Operating termperature							
• 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%						
• Operation, max.	95%; RH class 2 in accordance with IEC 1131-2						
Degree of protection							
IP 20	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dimensions							
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
Weights							
• 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, main memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	**6ES7 211-0AA23-0XB0**
Compact CPU, main 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, main memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	**6ES7 212-1AB23-0XB0**
Compact CPU, expandable, main 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, main 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, main 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, main 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, main 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, main 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, main 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, main 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	B9	**6ES7 298-0AA20-0AA3**
English	B9	**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)	B7	**6ES7 292-1AE20-0AA0**
With 18 terminals (for CPU 224/224 XP)	B7	**6ES7 292-1AG20-0AA0**
With 14 terminals (for CPU 226)	B7	**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	B7	**6ES7 290-6AA20-0XA0**
For interconnection of the two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226		
Optional battery module		**6ES7 291-8BA20-0XA0**
Optional combined clock and battery module		**6ES7 297-1AA23-0XA0**
only for CPU 221/222		

B7: Subject to export regulations: AL: N and ECCN: EAR99H
B9: Subject to export regulations: AL: N and ECCN: EAR99T

Ordering Data (continued)

		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**
SIMATIC Manual Collection	B3	**6ES7 998-8XC01-8YE0**
Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET		
SIMATIC Manual Collection update service for 1 year	B3	**6ES7 998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates		
STEP 7-Micro/WIN V4 programming software		
Target system: All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on programming device or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
Single license	B8	**6ES7 810-2CC03-0YX0**
Upgrade Single License[1]	B8	**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 972-0BA41-0XA0**
• With PG connection		**6ES7 972-0BB41-0XA0**
PROFIBUS FC standard cable		**6XV1 830-0EH10**
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		
RS 485 repeater for PROFIBUS		**6ES7 972-0AA01-0XA0**

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

B3: Subject to export regulations: AL: N and ECCN: 5D992B1

B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

Overview SIPLUS CPU 221

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

	SIPLUS CPU 221	
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Overview SIPLUS CPU 222

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

	SIPLUS CPU 222	
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Overview SIPLUS CPU 224

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

SIPLUS CPU 224		
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Overview SIPLUS CPU 224 XP

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

SIPLUS CPU 224 XP		
Order No.	**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; condensation permitted	
Ambient conditions	Suited for exceptional medial exposure (e. g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	No
Certifications and approvals	CE	
Technical data	The technical data are identical with those of the based on modules.	

SIPLUS Central processing units

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

Overview SIPLUS CPU 226

- The power packet 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

	SIPLUS CPU 226	
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Ordering Data

		Order No.
SIPLUS CPU 221		
(extended temperature and mediale exposure)		
Compact CPU, main memory 4 KB, power supply 24 V DC, 6 DI/4 DO integrated	B7	**6AG1 211-0AA23-2XB0**
Compact CPU, main memory 4 KB, power supply 100 to 230 V AC, 6 DI/4 DO integrated, relay outputs	B7	**6AG1 211-0BA23-2XB0**
SIPLUS CPU 222		
(extended temperature and mediale exposure)		
Compact CPU, expandable, main memory 4 KB, power supply 24 V DC, 8 DI/6 DO integrated	B7	**6AG1 212-1AB23-2XB0**
Compact CPU, expandable, main memory 4 KB, power supply 100 to 230 V AC, 8 DI/6 DO integrated, relay outputs	B7	**6AG1 212-1BB23-2XB0**
SIPLUS CPU 224		
(extended temperature and mediale exposure)		
Compact CPU, expandable, main memory 8 KB, power supply 24 V DC, 14 DI/10 DO integrated	B7	**6AG1 214-1AD23-2XB0**
Compact CPU, expandable, main memory 8 KB, power supply 100 to 230 V AC, 14 DI/10 DO integrated, relay outputs	B7	**6AG1 214-1BD23-2XB0**

		Order No.
SIPLUS CPU 224 XP		
(extended temperature and mediale exposure)		
Compact CPU, expandable, main memory 12/16 KB program, 10 KB data, power supply 24 V DC, 14 DI/10 DO/2 AI/1 AO integrated		**6AG1 214-2AD23-2XB0**
Compact CPU, expandable, main memory 12 KB program, 8 KB data, power supply 100 to 230 V AC, 14 DI/10 DO (relay outputs)/2 AI/1 AO integrated	B7	**6AG1 214-2BD23-2XB0**
SIPLUS CPU 226		
(extended temperature and mediale exposure)		
Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 24 V DC, 24 DI/16 DO integrated	B7	**6AG1 216-2AD23-2XB0**
Compact CPU, expandable, main memory 16/24 KB program, 10 KB data, power supply 100 to 230 V AC, 24 DI/16 DO integrated, relay outputs	B7	**6AG1 216-2BD23-2XB0**
Accessories		see SIMATIC S7-200 central processing units, page 3/18

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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 DC 5 V, max.	70 mA	30 mA	30 mA
Current consumption/power loss			
Power loss, typ.	3 W	2 W	3 W
Connection point			
pluggable I/O terminals	Yes	Yes	Yes
Digital inputs			
Number of digital inputs	16	8	8
m/p-reading	Yes	Yes	
Input characteristic curve 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
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)

Technical specifications EM 221 (continued)

	6ES7 221-1BH22-0XA0	6ES7 221-1BF22-0XA0	6ES7 221-1EF22-0XA0
Dimensions			
Dimensions			
• Width	71.2 mm	46 mm	71.2 mm
• Height	80 mm	80 mm	80 mm
• Depth	62 mm	62 mm	62 mm
Weights			
• 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 DC 5 V, max.	40 mA	50 mA
Current consumption/power loss		
Power loss, typ.	3 W	2 W
Connection point		
pluggable I/O terminals	Yes	Yes
Digital outputs		
Number of digital outputs	4	8
Short-circuit protection of the output	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 the 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, shielded, max.	500 m	500 m
• cable length unshielded, max.	150 m	150 m
Relay outputs		
Switching capacity of the 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
Isolation		
Isolation, digital outputs		
• Galvanic isolation, digital outputs	Yes	Yes; Optocoupler
• between the channels, in groups of	1	4

Technical specifications EM 222 (continued)

	6ES7 222-1BD22-0XA0	6ES7 222-1BF22-0XA0
Dimensions		
Dimensions		
• Width	45 mm	45 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• 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
• permissible frequency range, lower limit		47 Hz	47 Hz
• permissible frequency range, upper limit		63 Hz	63 Hz
Current consumption			
from backplane bus DC 5 V, 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	
Current consumption/power loss			
Power loss, typ.	4 W	2 W	4 W
Connection point			
pluggable I/O terminals	Yes	Yes	Yes
Digital outputs			
Number of digital outputs	4; Relay	8; Relay	8
Short-circuit protection of the output	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 S7-00")
Output voltage			
• for signal "1", min.			L1 (-0,9 V)
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 the 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, shielded, max.	500 m	500 m	500 m
• cable length unshielded, max.	150 m	150 m	150 m

Technical specifications EM 222 (continued)

	6ES7 222-1HD22-0XA0	6ES7 222-1HF22-0XA0	6ES7 222-1EF22-0XA0
Relay outputs			
Number of operating cycles	3E7; mechanically 30 million, at rated load voltage 30,000	1E7; mechanically 10 million, at rated load voltage 100,000	
Switching capacity of the 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
Isolation			
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			
Dimensions			
• Width	45 mm	45 mm	71.2 mm
• Height	80 mm	80 mm	80 mm
• Depth	62 mm	62 mm	62 mm
Weights			
• 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 DC 5 V, max.	40 mA	80 mA	160 mA	240 mA
from sensor current supply or external current supply (DC 24 V), max.				128 mA; ON: 4 mA/input
Current consumption/power loss				
Power loss, typ.	2 W	3 W	6 W	9 W
Connection point				
pluggable 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

Technical specifications EM 223 (continued)

	6ES7 223-1BF22-0XA0	6ES7 223-1BH22-0XA0	6ES7 223-1BL22-0XA0	6ES7 223-1BM22-0XA0
Digital outputs				
Number of digital outputs	4	8	16	32
Short-circuit protection of the output	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 the 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, 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 the 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
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
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				
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
Weights				
• Weight, approx.	160 g	200 g	360 g	500 g

Technical specifications EM 223 (continued)

	6ES7 223-1HF22-0XA0	6ES7 223-1PH22-0XA0	6ES7 223-1PL22-0XA0	6ES7 223-1PM22-0XA0
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 DC 5 V, 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 (DC 24 V), max.	72 mA	72 mA	72 mA	128 mA
Current consumption/power loss				
Power loss, typ.	2 W	3 W	6 W	13 W
Connection point				
pluggable 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 of the output	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 the outputs (per group)				
• maximum current per conductor/group	8 A	8 A	8 A	2 A; 10 A per group
• cable length, shielded, max.	500 m	500 m	500 m	500 m
• cable length unshielded, max.	150 m	150 m	150 m	150 m

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	1E7; mechanically 10 million, at rated load voltage 100,00	1E7; mechanically 10 million, at rated load voltage 100,000	1E7; mechanically 10 million, at rated load voltage 100,000	1E7; mechanically 10 million, at rated load voltage 100,000
Switching capacity of the 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
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
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				
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
Weights				
• Weight, approx.	160 g	300 g	400 g	580 g

EM 221, EM 222, EM 223

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	B7	**6ES7 221-1EF22-0XA0**
Digital output module EM 222		
for CPU 221/222/224/224 XP/226		
• 4 outputs, 24 V DC; 5A, isolated	B7	**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	B7	**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 24V DC, 4 outputs 24 V DC; 0.75 A, isolated		**6ES7 223-1BF22-0XA0**
• 8 inputs, 24V DC, 8 outputs 24 V DC; 0.75 A, isolated		**6ES7 223-1BH22-0XA0**
• 16 inputs, 24V DC, 16 outputs 24 V DC; 0.75 A, isolated		**6ES7 223-1BL22-0XA0**
• 32 inputs, 24V 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)	B7	**6ES7 292-1AD20-0AA0**
• With 12 terminals (for EM 223)	B7	**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**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview

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

SIPLUS EM 221 digital input modules for CPU 22x		
	8 DI	**16 DI**
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

SIPLUS EM 222 digital output modules for CPU 22x		
	8DO	**8RO**
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Overview (continued)

SIPLUS EM 223 digital input/output modules for CPU 22x			
	4 DI / 4 DO	**8 DI / 8 DO**	**16 DI / 16 DO**
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Approvals	CE, cUL		
Technical specifications	The technical data are identical with those of the based-on modules.		

SIPLUS EM 223 digital input/output modules for CPU 22x			
	4 DI / 4 DO	**8 DI / 8 DO**	**16 DI / 16 DO**
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible		
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).		
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes	Yes	Yes
Approvals	CE, cUL		
Technical specifications	The technical data are identical with those of the based-on modules.		

Ordering Data

		Order No.
Digital input module SIPLUS EM 221		
(extended temperature and medial exposure)		
for CPU 222/224/224 XP/226		
• 8 inputs, 24 V DC, isolated, source/sink output	B7	**6AG1 221-1BF22-2XB0**
• 16 inputs, 24 V DC, isolated, source/sink output	B7	**6AG1 221-1BH22-2XA0**
Digital input module SIPLUS EM 222		
(extended temperature and medial exposure)		
for CPU 222/224/224 XP/226		
• 8 outputs, 24 V DC; 0,75 A, isolated	B7	**6AG1 222-1BF22-2XB0**
• 8 outputs, 24 V DC/24 to 230 V AC; 2 A, isolated, relay outputs	B7	**6AG1 222-1HF22-2XB0**

		Order No.
Digital input/output module SIPLUS EM 223		
(extended temperature and medial exposure)		
for CPU 222/224/224 XP/226		
• 4 inputs 24 V DC, 4 outputs 24 V DC; 0,75 A, isolated	B7	**6AG1 223-1BF22-2XB0**
• 8 inputs, 24 V DC, 8 outputs, 24 V DC; 0,75 A, isolated	B7	**6AG1 223-1BH22-2XB0**
• 16 inputs, 24 V DC, 16 outputs, 24 V DC; 0,75 A, isolated	B7	**6AG1 223-1BL22-2XB0**
• 4 inputs 24 V DC, 4 outputs, relay	B7	**6AG1 223-1HF22-2XB0**
• 8 inputs, 24 V DC, 8 outputs, relay	B7	**6AG1 223-1PH22-2XB0**
• 16 inputs, 24 V DC, 16 outputs, relay	B7	**6AG1 223-1PL22-2XB0**
Accessories		see S7-200 digital modules, page 3/30

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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 DC 5 V, max.	20 mA	20 mA
Current consumption/power loss		
Power loss, typ.	2 W	2 W
Connection point		
pluggable 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

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
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
• permissible input frequency for voltage input (destruction limit), max.	30 V	30 V
• permissible input current for current input (destruction limit), max.	32 mA	40 mA

Technical specifications EM 231 (continued)

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Characteristic curve linearization		
• for voltage measurement	No	No
• for current measurement	No	No
Temperature compensation		
• programmable	No	No
Analog value creation		
Integration and conversion time/resolution per channel		
• Resolution with overload area (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	-32,000 to +32,000	-32,000 to +32,000
• unipolar signals	0 to 32,000	0 to 32,000

	6ES7 231-0HC22-0XA0	6ES7 231-0HF22-0XA0
Errors/accuracies		
Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency		
• common mode voltage, max.	12 V	12 V
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	No	No
Dimensions		
Dimensions		
• Width	71,2 mm	71,2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	183 g	190 g

Technical specifications EM 232

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Current consumption		
from backplane bus DC 5 V, max.	20 mA	20 mA
from sensor current supply or external current supply (DC 24 V), max.	70 mA	70 mA
Current consumption/power loss		
Power loss, typ.	2 W	2 W
Connection point		
pluggable I/O terminals	No	No
Analog outputs		
Number of analg 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

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Analog value creation		
Integration and conversion time/resolution per channel		
• Resolution (incl. overload area)	V/12 bits, I/11 bits	V/12 bits, I/11 bits
Settling time		
• for voltage output	100 µs	100 µs
• for current output	2 ms	2 ms
Displayable conversion value range		
• bipolar signals	-32,000 to +32,000	-32,000 to +32,000
• unipolar signals	0 to 32,000	0 to 32,000
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 %

Technical specifications EM 232 (continued)

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Isolation		
Isolation, analog outputs		
• Galvanic isolation, analog outputs	No	No

	6ES7 232-0HB22-0XA0	6ES7 232-0HD22-0XA0
Dimensions		
Dimensions		
• Width	46 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	148 g	190 g

Technical specifications EM 235

	6ES7 235-0KD22-0XA0
Current consumption	
from backplane bus DC 5 V, max.	30 mA
from sensor current supply or external current supply (DC 24 V), max.	60 mA
Current consumption/power loss	
Power loss, typ.	2 W
Connection point	
pluggable 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
• permissible input frequency for voltage input (destruction limit), max.	30 V
• permissible input current for current input (destruction limit), max.	32 mA

	6ES7 235-0KD22-0XA0
Characteristic curve linearization	
• for voltage measurement	No
• for current measurement	No
Temperature compensation	
• programmable	No
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	
Integration and conversion time/resolution per channel	
• Resolution with overload area (bit including sign), max.	12 Bit; 11 bits 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	-32,000 to +32,000
• unipolar signals	0 to 32,000
Errors/accuracies	
Operational limit in overall temperature range	
• Voltage, relative to output area	+/- 2 %
• Current, relative to output area	+/- 2 %

Technical specifications EM 235 (continued)

	6ES7 235-0KD22-0XA0
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
Isolation	
Isolation, analog inputs	
• Isolation, analog inputs	No
Isolation, analog outputs	
• Galvanic isolation, analog outputs	No
Dimensions	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	186 g

Ordering Data

	Order No.
Analog input module EM 231	
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**
Analog output module EM 232	
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**
Analog input/output module EM 235	**6ES7 235-0KD22-0XA0**
for CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, 12 bit resolution	
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**

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 DC 5 V, max.	87 mA	87 mA
Current consumption/power loss		
Power loss, typ.	1.8 W	1.8 W
Connection point		
pluggable 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
Input ranges (rated values), resistors		
• permissible input frequency for voltage input (destruction limit), max.	30 V	30 V

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/resolution per channel		
• Resolution with overload area (bit including sign), max.	16 Bit; Temperature 0.1 °C / 0.1 °F	16 Bit; T 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 voltage, min.	120 db; at 120 V AC	120 db; at 120 V AC

EM 231 thermocouple module

Technical specifications (continued)

	6ES7 231-7PD22-0XA0	6ES7 231-7PF22-0XA0
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
Dimensions		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	210 g	210 g

Ordering Data

		Order No.
Thermocouple module EM 231		
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	B7	**6ES7 290-6AA20-0XA0**
For interconnection of the two rows of devices with double-row configuration, for CPU 222/224/224 XP/226		
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**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview

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

Technical specifications

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Current consumption		
from load voltage L+ (without load), max.	60 mA	60 mA
from backplane bus DC 5 V, max.	87 mA	87 mA
Current consumption/power loss		
Power loss, typ.	1.8 W; Sensor: 1 mW	1.8 W; Sensor: 1 mW
Connection point		
pluggable 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

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Input ranges (rated values), resistors		
• 0 to 150 Ohm	Yes	Yes
• 0 to 300 Ohm	Yes	Yes
• 0 to 600 Ohm	Yes	Yes
• permissible input frequency 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)
Analog value creation		
Measurement principle	Sigma Delta	Sigma Delta
Integration and conversion time/resolution per channel		
• Resolution with overload area (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 voltage, min.	120 db; at 120 V AC	120 db; at 120 V AC

EM 231 RTD module

Technical specifications (continued)

	6ES7 231-7PB22-0XA0	6ES7 231-7PC22-0XA0
Isolation		
Isolation, analog inputs		
• Isolation, analog inputs	Yes	Yes
Dimensions		
Dimensions		
• Width	71.2 mm	71.2 mm
• Height	80 mm	80 mm
• Depth	62 mm	62 mm
Weights		
• Weight, approx.	210 g	210 g

Ordering Data

		Order No.
RTD module EM 231		
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 sensors, resistor 150/300/600 ohm, resolution 15 bit + sign		**6ES7 231-7PC22-0XA0**
Ground terminal		**6ES5 728-8MA11**
10 units		
Backplane bus expansion cable	B7	**6ES7 290-6AA20-0XA0**
For interconnection of the two rows of devices with double-row configuration, for CPU 222/224/224 XP/226		
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**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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

SIPLUS EM 231 analog input module for CPU 22x	
	4 AI
Order No.	**6AG1 231-0HC22-2XB0**
Order No. based on	**6ES7 231-0HC22-0XA0**
Ambient temperature range	-25 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes
Approvals	CE, cUL
Technical specifications	The technical data are identical with those of the based-on modules.

SIPLUS EM 232 analog output modules for CPU 22x	
	2 AO
Order No.	**6AG1 232-0HB22-2XB0**
Order No. based on	**6ES7 232-0HB22-0XA0**
Ambient temperature range	-25 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Technical specifications	The technical data are identical with those of the based-on modules.

SIPLUS EM 235 analog input/output modules for CPU 22x	
	4 AI/1 AO
Order No.	**6AG1 235-0KD22-2XB0**
Order No. based on	**6ES7 235-0KD22-0XA0**
Ambient temperature range	-25 ... +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL
Technical specifications	The technical data are identical with those of the based-on modules.

Ordering Data

		Order No.
SIPLUS EM 231 analog input module (enhanced temperature range and medial exposure) For CPU 222/224/224 XP/226; 4 inputs, 0 to 10 V, resolution 12 bit	B7	**6AG1 231-0HC22-2XB0**
SIPLUS EM 232 analog output module (enhanced temperature range and medial exposure) For CPU 222/224/224 XP/226; 2 outputs, ± 10 V, resolution 12 bit	B7	**6AG1 232-0HB22-2XB0**
SIPLUS EM 235 analog input/output module (enhanced temperature range and medial exposure) For CPU 222/224/224 XP/226; 4 inputs, 1 output, ±10 V DC, resolution 12 bit	B7	**6AG1 235-0KD22-2XB0**
Accessories		see S7-200 analog modules, page 3/36

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS EM 231 RTD module

Overview

- To measure temperatures easily and with high accuracy
- 31 common resistance temperature detectors can be used
- Easy to retrofit in existing systems

SIPLUS EM 231 RTD module for CPU 22x		
	2 AI Thermo	**2 AI Thermo**
Order No.	**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 to +55 °C (for applications with cUL approval), condensation permissible	
Environmental conditions	Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere).	
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	No	Yes
Approvals	CE, cUL	
Technical specifications	The technical data are identical with those of the based-on modules.	

Ordering Data

		Order No.
SIPLUS EM 231 RTD module (enhanced 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	B7	**6AG1 231-7PB22-2XA0**
SIPLUS EM 231 RTD module (enhanced temperature range and medial exposure) Conforming to EN 50155; 2 inputs for resistance temperature detector Pt100/200/500/1000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 bit + sign	B7	**6AG1 231-7PB22-2XY0**
Accessories		see S7-200 RTD module, page 3/40

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview

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

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 DC 5 V, max.	190 mA
from supply voltage L+, max.	300 mA; from 12 V DC, 130 mA from 24 V DC
Hardware config.	
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- DC 5 V; ZP DC 1 V
• for signal "1"	STP, RPS, LMT+, LMT- DC 15 V; ZP DC 3 V
Input delay (for rated value of input voltage)	
• for standard inputs	
- programmable	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 ohms
• 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
Isolation	
Galvanic isolation, digital inputs	
• between the channels	Yes
• between the channels, in groups of	1 (STP, RPS, ZP), 2 (LMT-, LMT+)
Dimensions	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	190 g

EM 253 positioning module

Ordering Data		Order No.
EM 253 positioning modules for activating stepper motors or servo drives		**6ES7 253-1AA22-0XA0**
Grounding terminal 10 items		**6ES5 728-8MA11**
Backplane bus expansion cable for connecting the two equipment tiers in a two-tier configuration, for CPU 222/224/224 XP/226	B7	**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**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview

SIWAREX MS is a versatile weighing module for all simple weighing and force measuring tasks. The compact module is easy to install in the SIMATIC S7-200 automation systems. The data for the actual weight can be accessed directly in the SIMATIC CPU without the need for any additional interfaces.

Technical specifications

	SIWAREX MS
Integration in S7-200 automation systems • CPU 222 (6ES7212-1*B23-0XB0) • CPU 224 (6ES7214-1*D23-0XB0) • CPU 224XP (6ES7214-2*D23-0XB0) • CPU 226 (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 Data format of weight values	65535 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 typ.
• Max. supply current	≤150 mA

	SIWAREX MS
Load cell powering (cont.)	
• 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
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.
Supply voltage 24 V DC	
• Rated voltage	24 V DC
• Max. current consumption	130 mA
Supply voltage 5 V DC (from CPU)	
• Rated voltage	5 V DC
• Max. current consumption	145 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

SIWAREX MS

Ordering Data		Order No.
SIWAREX MS	B7	**7MH4 930-0AA01**
Weighing electronics for scales in SIMATIC S7-200 for applications without obligation of verification		
SIWAREX MS Manual		
• available in a range of languages		
Free download on the Internet at: www.siemens.com/weighing-technology		
Configuration package SIWAREX MS on CD-ROM for STEP7 Micro/WIN, version 4.0 SP2 or higher		**7MH4 930-0AK01**
• 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		
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		**6ES5 728-8MA11**
Pack of 10; 1 item required for each shielded cable		
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.: 06806/980-0 Fax: 06806/980-999		
Internet: http://www.siebert.de		
Detailed information available from manufacturer.		
Accessories		
SIWAREX JB junction box, aluminium housing		**7MH4 710-1BA**
for connecting up to 4 load cells in parallel, and for connecting several junction boxes		
SIWAREX JB junction box, stainless steel housing		**7MH4 710-1EA**
for connecting up to 4 load cells in parallel		
Ex interface, type SIWAREX Pi		**7MH4 710-5AA**
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.		
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		**7MH4 702-8AG**
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 to +80 °C		
Cable Li2Y 1 x 2 x 0.75 ST + 2 x (2 x 0.34 ST) - CY, blue sheath		**7MH4 702-8AF**
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		
Cable LiYCY 4 x 2 x 0.25 mm²	B7	**7MH4 407-8BD0**
for TTY (connect 2 pairs of conductors in parallel), for connection of a remote display		

B7: Subject to export regulations: AL: N and ECCN: EAR99H

SIPLUS DCF 77 radio clock module

Overview

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

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

http://www.siemens.com/siplus – Support – Tools and Downloads!

Technical specifications

Radio clock module SIPLUS DCF 77	
Radio frequency	77,5 Hz
Power supply	DC 24 V (DC 20,4 ... 28, 8)
Power consumption, typ.	50 mA
Dimensions (W x H x D)	75 x 125 [1] x 75

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	B7	**6AG1 057-1AA03-0AA0**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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 communications 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 DC 5 V, max.	80 mA; from expansion bus
Current consumption/ power loss	
Power loss, typ.	2,1 W
Communication functions	
Bus protocol/transmission protocol	PPI, Modbus
Connection point	
Telephone lines	RJ11 (4 cables, 6 contacts)
Modem	
Standards	Bell 103, Bell 212, V. 21, V. 22, V. 22 bis, V. 23c, V. 32, V. 32 to, V. 34 (preset)
Touch tone service	Yes
Pulse dialing	Yes
Dimensions	
Dimensions	
• Width	71,2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	190 g

Ordering Data

		Order No.
Modem EM 241	B7	**6ES7 241-1AA22-0XA0**
Analog modem for remote maintenance/remote diagnostics; CPU-to-CPU/PC communication, SMS/pager messaging		
Grounding terminal		**6ES5 728-8MA11**
10 items		
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**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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-xxx**21**-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 DC 5 V, max.	150 mA
from sensor current supply or external current supply (DC 24 V), max.	180 mA; 30 to 180 mA
Current consumption/ power loss	
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
- MPI connections reserved for OP communication	1
- MPI connections reserved for PG communication	1
interfaces	
Number of RS 485 interfaces	1
DC 5 V	
• Output current, max.	90 mA
DC 24 V	
• Voltage range	20.4 to 28.8 V
• Output current, max.	120 mA
• Current limiting	0.7 to 2.4 A
Connection point	
pluggable I/O terminals	No
PROFIBUS DP	
Transmission speed, 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	
Dimensions	
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Weights	
• Weight, approx.	175 g

Ordering Data

	Order No.
PROFIBUS DP EM 277 input module for CPU 222/224/224 XP/226, for connecting to PROFIBUS DP (slave) and MPI	**6ES7 277-0AA22-0XA0**

SIPLUS 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-xxx**21**-xxxx and higher can be used with CPU

PROFIBUS DP EM 277 module	
Order No.	**6AG1 277-0AA22-2XA0**
Order No. based on	**6ES7 277-0AA22-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (e.g. by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	Yes
Approvals	CE, cUL
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering Data

		Order No.
SIPLUS EM 277 PROFIBUS DP module (enhanced temperature range and medial exposure) for CPU 222/224/224 XP/226, for connecting to PROFIBUS DP (slave) and MPI	B7	**6AG1 277-0AA22-2XA0**

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Overview

The CP 243-2 is the AS-Interface master for the innovated generation of SIMATIC S7-200. The communications processor (6GK1 243-2AX01-0AX0) supports the extended AS-Interface specification V2.1 and has the following functions:

- Up to 62 AS-Interface slaves can be connected and integrated analog value transfer (according to the extended AS-Interface specification V2.1)
- Supports all AS-Interface master functions in accordance with the extended AS-Interface specification V2.1
- Status displays for operating states and display of the functional readiness of connected slaves with LEDs in the front panel
- Indication of errors (incl. AS-Interface voltage errors, configuration errors) with LEDs in the front panel
- Compact enclosure designed to match the new generation of SIMATIC S7-200.

Technical specifications

Order No.	6GK7 243-2AX01-0XA0
Product type description	**CP 243-2**
Interfaces	
Version of electrical connection of the AS-Interface	Terminal connection
Supply voltage	
Supply voltage from backplane bus	5 V
Current consumption	
• from 5 V DC backplane bus, max.	220 mA
• from AS-Interface cable, max.	100 mA
Effective power loss	
Effective power loss	2 W
Permitted ambient conditions	
Ambient temperature	
• when installed vertically	
- during operation	0 … 45 °C
• when installed horizontally	
- during operation	0 … 55 °C
Permitted ambient conditions (continued)	
Ambient temperature during storage	-40 … +70 °C
Ambient temperature during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Expansion module in S7-200 design
Width	71 mm
Height	80 mm 1)
Depth	62 mm
Net weight	250 g
Number of slots required	1
Standards and specifications	
Version of the AS-Interface specification	V 2.1
Bus cycle time of the AS-Interface	
• with 31 slaves	5 ms
• with 62 slaves	10 ms
Performance data	
Data volume	
• of the address area of the analog inputs as allocation in the PLC	16 byte
• of the address area of the analog outputs as allocation in the PLC	16 byte
• of the address area of the digital inputs as allocation in the PLC	1 byte
• of the address area of the digital outputs as allocation in the PLC	1 byte

1) Height +16 mm with holes for wall fixing

Ordering Data

	Order No.
CP 243-2 communications processor	**6GK7 243-2AX01-0XA0**
for connection of the SIMATIC S7-200 to AS-Interface	
Electronic manuals	**6GK1 975-1AA00-3AA0**
Communication systems, protocols, products on CD-ROM, German/English Free download from the Internet at http://support.automation.siemens.com/WW/view/com/10805930/133300	

CP 243-1

Overview

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

- Connection of S7-200 to Industrial Ethernet with
  - 10/100 Mbit/s
  - Half/full duplex
  - RJ 45 socket
  - TCP/IP
- 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, 8 S7 connections + 1 PG connection)
- An S7 OPC server (e.g. SOFTNET-S7 or S7-1613) allows PLC data to be further processed in PC applications
- Module replacement possible without PG

Technical specifications

Order No.	6GK7 243-1EX00-0XE0
Product type description	**CP 243-1**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	1 x RJ45 (TP)
• for voltage supply	2-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
• Relative symmetrical tolerance at 24 V DC	5%
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	55 mA
• from external supply voltage at 24 V DC typical	60 mA
Effective power loss	1.75 W
Permitted ambient conditions	
Ambient temperature for vertical installation	
• during operation	0 … +45 °C
Ambient temperature for horizontal installation	
• during operation	0 … +55 °C
Ambient temperature during storage	-40 … +70 °C
Ambient temperature during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module S7-200, double width
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Net weight	150 g
Performance data	
S7 communication	
Number of possible connections for S7 communication	
• Maximum	8
• for PG connections, maximum	1
Configuration	
Configuration software for full scope of functions from STEP 7-Micro/WIN V3.2 SP1	Yes

Ordering Data		Order No.
CP 243-1 communications processor for connection of SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication with electronic manual on CD-ROM, German, English, French, Italian, Spanish	B3	**6GK7 243-1EX00-0XE0**
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English		
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections		
• Single license for 1 installation	B3	**6GK1 704-1CW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-1CW00-3AL0**
• Upgrade from V6.4 to 2007 edition	B3	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition	B3	**6GK1 704-1CW00-3AE1**
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections		
• Single license for 1 installation	B3	**6GK1 704-1LW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-1LW00-3AL0**
• Upgrade from V6.4 to 2007 Edition	B3	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition	B3	**6GK1 704-1LW00-3AE1**

B3: Subject to export regulations: AL: N and ECCN: 5D992B1
B8: Subject to export regulations: AL: N and ECCN: EAR99S

		Order No.
S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English		
• Single license for 1 installation	B3	**6GK1 716-1CB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 716-1CB00-3AL0**
• Upgrade S7-1613 from V6.4 to 2007 Edition	B3	**6GK1 716-1CB00-3AE0**
• Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007	B3	**6GK1 716-1CB00-3AE1**
STEP 7-Micro/WIN V4 programming software *Target system:* All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on PG or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
• Single license	B8	**6ES7 810-2CC03-0YX0**
• Upgrade Single License[1]	B8	**6ES7 810-2CC03-0YX3**
IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter		**6XV1 840-2AH10**
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter		**6XV1 873-2A**
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports IE FC RJ45 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		**6GK5 204-2BB10-2AA3**
IE FC RJ45 Plug 180 180° cable outlet		
• 1 unit		**6GK1 901-1BB10-2AA0**
• 10 units		**6GK1 901-1BB10-2AB0**
• 50 units		**6GK1 901-1BB10-2AE0**

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

CP 243-1 IT

Overview

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

- Connection of S7-200 to Industrial Ethernet with
  - 10/100 Mbit/s
  - Half/full duplex
  - RJ 45 socket
  - TCP/IP
- 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, 8 S7 connections + 1 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 with 8 MB memory
- 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 243-1GX00-0XE0
Product type description	**CP 243-1 IT**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	10 Mbit/s
• Maximum	100 Mbit/s
Interfaces	
Electrical connection version	
• at Industrial Ethernet interface 1	1 x RJ45 (TP)
• for voltage supply	1 x 2-pin terminal block
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Relative symmetrical tolerance at 24 V DC	5%
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	55 mA
• from external supply voltage at 24 V DC typical	60 mA
Effective power loss	1.75 W
Permitted ambient conditions	
Ambient temperature for vertical installation	
• during operation	0 … +45 °C
Ambient temperature for horizontal installation	
• during operation	0 … +55 °C
Ambient temperature during storage	-40 … +70 °C
Ambient temperature during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module S7-200, doublewidth
• Width	71.2 mm
• Height	80 mm
• Depth	62 mm
Net weight	150 g
Performance data	
S7 communication	
Number of possible connections for S7 communication	
• Maximum	8
• for PG connections, maximum	1
IT functions	
Number of possible connections	
• as client by means of FTP, max.	1
• as server by means of HTTP, max.	4
• to an e-mail server as e-mail client, max.	1
Number of e-mails with 1024 characters of the e-mail client, max.	32
Number of access authorizations of the access protection	8
Memory capacity of the user memory as FLASH memory file system	8 MB
Number of possible write cycles of the flash memory cells	1000000
Configuration	
Configuration software for full scope of functions from STEP 7-Micro/WIN V3.2 SP3	Yes

Ordering Data		Order No.
CP 243-1 IT communications processor 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	B3	**6GK7 243-1GX00-0XE0**
SOFTNET Edition 2007 for Industrial Ethernet Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; German/English		
SOFTNET-S7 Edition 2007 for Industrial Ethernet up to 64 connections		
• Single license for 1 installation	B3	**6GK1 704-1CW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-1CW00-3AL0**
• Upgrade from V6.4 to 2007 edition	B3	**6GK1 704-1CW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition	B3	**6GK1 704-1CW00-3AE1**
SOFTNET-S7 Lean Edition 2007 for Industrial Ethernet up to 8 connections		
• Single license for 1 installation	B3	**6GK1 704-1LW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 704-1LW00-3AL0**
• Upgrade from V6.4 to 2007 Edition	B3	**6GK1 704-1LW00-3AE0**
• Upgrade from V6.0, V6.1, V6.2 or V6.3 to 2007 Edition	B3	**6GK1 704-1LW00-3AE1**
S7-1613 Edition 2007 Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 1613/CP 1613 A2/CP 1623; German/English		
• Single license for 1 installation	B3	**6GK1 716-1CB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version		**6GK1 716-1CB00-3AL0**
• Upgrade S7-1613 from V6.4 to 2007 Edition	B3	**6GK1 716-1CB00-3AE0**
• Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2007	B3	**6GK1 716-1CB00-3AE1**
STEP 7-Micro/WIN V4 programming software *Target system:* All CPUs of the SIMATIC S7-200 *Prerequisite:* Windows 2000/XP on PG or PC *Type of delivery:* German, English, French, Spanish, Italian, Chinese; with online documentation		
• Single license	B8	**6ES7 810-2CC03-0YX0**
• Upgrade Single License[1]	B8	**6ES7 810-2CC03-0YX3**
IE FC TP Standard Cable GP 2x2 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter		**6XV1 840-2AH10**
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter		**6XV1 873-2A**
SCALANCE X204-2 Industrial Ethernet switch Industrial Ethernet switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports		**6GK5 204-2BB10-2AA3**
IE FC RJ45 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables		
IE FC RJ45 Plug 180 180° cable outlet		
• 1 unit		**6GK1 901-1BB10-2AA0**
• 10 units		**6GK1 901-1BB10-2AB0**
• 50 units		**6GK1 901-1BB10-2AE0**

B3: Subject to export regulations: AL: N and ECCN: 5D992B1
B8: Subject to export regulations: AL: N and ECCN: EAR99S

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

GSM/GPRS MD720-3 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 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)

Technical specifications

	MD720-3
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

	MD720-3
Supply voltage	12 … 30 V DC
Power loss	typ. 5 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 http://www.siemens.com/simatic-net/ik-info

Ordering Data		Order No.
GSM/GPRS MD720-3 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; manual on CD-ROM in German, English, Chinese, Russian		**6NH9 720-3AA00**
Accessories		
SINAUT MICRO SC Single license for one installation; OPC server for GPRS communication with S7-200; connection management with 8, 64 or 256 remote stations; routing for connections between S7-200 stations; connection monitoring; German and English GUI; for Windows XP Professional SP 2 and higher, Windows 2003 Server SP 1, Windows 2000 Professional/Server SP 4; manual on CD-ROM in German, English, Chinese, Russian		
• **SINAUT MICRO SC8** Connection management for 8 S7-200 stations;	B8	**6NH9 910-0AA10-0AA3**
• **SINAUT MICRO SC64** Connection management for 64S7-200 stations;	B8	**6NH9 910-0AA10-0AA6**
• **SINAUT MICRO SC256** Connection management for 256 S7-200 stations;	B8	**6NH9 910-0AA10-0AA8**
ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable		**6NH9 860-1AA00**
SIMATIC S7-200 PPI modem cable For connecting the S7-200 to the GSM/GPRS modem SINAUT MD720-3	B7	**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**

B7: Subject to export regulations: AL: N and ECCN: EAR99H
B8: Subject to export regulations: AL: N and ECCN: EAR99S

ANT794-4MR GSM/GPRS antenna

Overview

- Omnidirectional antenna for use in GSM/GPRS networks
- Remote antenna for indoors/outdoors
- Suitable for quad band
- Complete with cable and mounting bracket for direct connection to SINAUT GPRS modems

Technical specifications

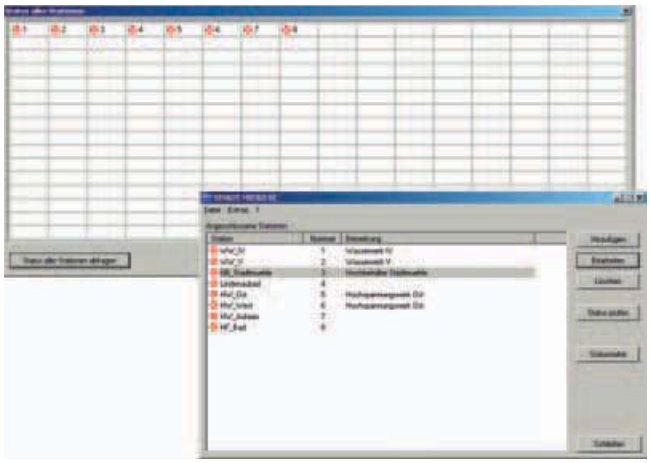
	ANT794-4MR
Mobile telephone networks	GSM / GPRS
Frequencies	850 MHz, 900 MHz, 1800 MHz, 1900 MHz, 2200 MHz
Characteristic	Omnidirectional
Antenna amplification	0 dB
SWR	< 2.0
Max. power	20 W
Polarity	Linear vertical
Connectors	SMA
Length of antenna cable	5 m
Perm. ambient conditions	
• Operating temperature	- 40 °C … +70 °C
• Transport/storage temperature	- 40 °C … +70 °C
• Relative humidity	100 %
Design	
• Dimensions (D x H) in mm	25 x 193
• Weight	380 g (incl. packaging)
• Assembly	Using supplied bracket
Degree of protection	IP65
Outer material	Hard PVC UV-resistance

Ordering Data

		Order No.
GSM/GPRS antenna ANT794-4MR antenna GSM/GPRS quad band antenna; weather-resistant for indoor/outdoor use; 5 m cable with fixed connection to antenna; SMA connector; including mounting bracket, screws, wall plugs		**6NH9 860-1AA00**
Accessories		
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, including gender changer for RS232/PPI adapter; manual on CD-ROM in German, English, Chinese, Russian		**6NH9 720-3AA00**
EGPRS router MD741-1 For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; GPRS Multislot Class 12	C3	**6NH9 741-1AA00**

C3: Subject to export regulations: AL: 5A002A1A2 and ECCN: 5A002ENC3

Overview



- Software package for PC and SIMATIC S7-200, comprising:
  - *Software for the PC:*
    OPC server,
    connection manager
  - *Software for S7-200:*
    PLC block library
- OPC server for GPRS linking of SIMATIC S7-200 stations to a control center
- Permanent, bidirectional and wireless online connection to the S7-200 via GPRS
- GPRS communication between S7-200 stations by means of routing function
- Clear monitoring of GPRS station connections
- Low GPRS mobile radio costs due to optimized communication with effective frame design
- Encrypted transmission for protection against data manipulation and tapping

Technical specifications

	SINAUT MICRO SC
Controls that are supported	S7-200 CPU 224 or higher (block library included in scope of supply)
Number of stations that can be used	8, 64 or 256 controllers
Interfaces to the OPC Client	• DCOM protocol • OPC "data access interface V2.05" • Synchronous and asynchronous reading of variables
Interfaces and functions for the SIMATIC S7-200	• Writing of variables in the SIMATIC S7 in the case of values 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 S7-200 stations • Protocol optimized for GRPS; tunnel configuration from GPRS modem • Via Internet access as server with public IP address (recommendation: fixed public Internet address)
Operating systems	Microsoft Windows XP Professional from SP2; Microsoft Windows 2003 Server SP1; Microsoft Windows 2000 Professional/Server SP4
Diagnostics	Integral OPC client for connection monitoring
Configuration	Using integral configuration tool

Ordering Data

		Order No.
SINAUT MICRO SC Single license for one installation; OPC server for GPRS communication with S7-200; connection management for as many as 8, 64 or 256 S7-200 stations; routing for connections between S7-200 stations; connection monitoring; German and English user interface; for Windows XP Professional SP2 or higher, Windows 2003 Server Standard Edition SP1, Windows 2000 Professional/Server SP4; electronic manual in German, English, Chinese, Russian		
• **SINAUT MICRO SC8** Connection management for 8 S7-200 stations;	B8	**6NH9 910-0AA10-0AA3**
• **SINAUT MICRO SC64** Connection management for 64S7-200 stations;	B8	**6NH9 910-0AA10-0AA6**
• **SINAUT MICRO SC256** Connection management for 256 S7-200 stations;	B8	**6NH9 910-0AA10-0AA8**
Accessories		
GSM/GPRS modem MD720-3 GPRS modem for IP-based data transmission over GSM networks		**6NH9 720-3AA00**
ANT794-4MR antenna Quad band antenna, omnidirectional with 5 m cable		**6NH9 860-1AA00**
Alarm Control Center Micro Edition Remote alarm tool for SINAUT MICRO SC for up to four receivers, message dispatch as acknowledgeable SMS (incl. GSM modem & accessories, without SIM card)	B3	**9AE4 310-3BM01**

B3: Subject to export regulations: AL: N and ECCN: 5D992B1
B8: Subject to export regulations: AL: N and ECCN: EAR99S

Power supplies

Overview

SITOP modular

The controlled load power supply for the SIMATIC S7-200:

- Harmonized in design and functionality with trouble-free integration in PLC network.
- For reliable 24 V DC; 3.5 A power to controllers, encoders and sensors.
- Flexible, whether in industrial or house-hold networks.

SITOP smart

Slimline universal power supplies

Slimline dimensions, strong performance. This new range of power supplies requires approximately a third less width space on the top-hat rail than its predecessor and features excellent overload behavior. Numerous certifications permit universal use around the world.

LOGO!Power

LOGO!Power supplies are switched mode power supplies that match the functionality and design of the LOGO! logic modules optimally.

Technical specifications SITOP power 3,5 A

Type	3.5 A
Order No.	**6EP1 332-1SH31**[1]
Input	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** Set via wire jumper
Voltage range	93 ... 132 V/187 ... 264 V AC
Overvoltage resistance	2.3 x $V_{inrated}$, 1.3 ms
Mains buffering $I_{out\ rated}$	> 20 ms at V_{in} = 187 V
Rated line frequency; rated line-frequency range	50/60 Hz; 47 ... 63 Hz
Rated current $I_{n\ rated}$	1.65/0.95 A
Switch-on current limit (+25 °C)	< 33 A, < 3 ms (V_{in} = 230 V)
$I^2 t$	< 1.0 A^2s
Built-in-line-side fuse	T 2.5 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	Tc
Output	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**24 V DC**
Total tolerance	±5 % (typ. ±2 %)
• Static mains compensation	Approx. ±0.1 %
• Static load smoothing	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 display	-
Response on activation/deactivation	v
Startup delay/voltage rise	< 1 s/typ. 80 ms
Rated current $I_{out\ rated}$	**3.5 A**
Current range	
• Up to +45 °C	0 ... 3.5 A
• Up to +60 °C	0 ... 3.5 A
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 $V_{out\ rated}$, $I_{out\ rated}$	Approx. 84 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 16 W
Closed-loop control	
Dynamic mains compensation ($V_{in\ rated}$ ±15 %)	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±3 % V_{out}
Load-step settling time	
• 50 to 100 %	< 5 ms
• 100 to 50 %	< 5 ms

Type	3,5 A
Protection and monitoring	
Output overvoltage protection	Yes, according to EN 60950
Current limit	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	-
Safety	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage V_{out} to EN 60950
Protective class	Class I
Leakage current	< 3.5 mA
German Technical Inspectorate approval	Yes
CE marking	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 142), File E143289
Explosion protection	-
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/storage temperature range	-25 ... +85 °C
Humidity class	Climatic class 3K3 to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw terminal each for 0.5 ... 1 mm^2 finely stranded, 0.5 ... 1.5 mm^2 single-core
• 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
Installation	Snaps onto DIN rail EN 60715 35x7,5/15, wall installation
Accessories	Mounting bracket

1) SIPLUS module 6AG1 203-1SH31-2AA0 for extended temperature range from -25 to + 70 °C and use under medial load (e.g. chlorine-sulphur athmosphere).

Power supplies

Technical specifications LOGO!Power 4 A

Type	24 V/4 A
Order number	**6EP1 332-1SH51**
Input	Single-phase AC
Rated voltage $U_{inrated}$	**100 V - 240 V AC** wide-range input
Voltage range	85 V to 264 V AC
Overvoltage strength	2.3 x $U_{in\ rated}$/1.3 ms
Line buffering at $I_{out\ rated}$	> 40 ms at U_{in} = 187 V
Rated line frequency, rated line-frequency range	50/60 Hz; 47 Hz to 63 Hz
Rated current $I_{inrated}$	1,95-0,97 A
Switch-on current limit (+25 °C)	< 30 A
I^2t	< 2.5 A^2s
Built-in line-side fuse	Internal
Recommended miniature circuit breaker (IEC 898) in the supply feeder	At and above 16 A, B characteristic or at and above 10 A, C characteristic
Output	Controlled, isolated DC voltage
Rated voltage $U_{outrated}$	**24 V DC**
Total tolerance, static	±3 %
• Static line smoothing	Approx. 0.1 %
• Static load smoothing	Approx. 1.5 %
Ripple content (clock frequency approx. 90 kHz)	< 200 m V_{pp}
Spikes (bandwidth approx. 20 MHz)	< 300 m V_{pp}
Adjustment range	22.2 V to 26.4 V
Operation indicator	Green LED for output voltage OK
Response on activation/deactivation	No overshoot of U_{out} (soft start)
Startup delay/voltage rise	< 0.5 s/typ. 35 ms
Rated current $I_{outrated}$	**4 A**
Current range up to +55 °C	0 A to 4 A
Parallel switching for enhanced performance	Yes
Efficiency	
Efficiency at $U_{outrated}$, $I_{out\ rated}$	Typically 89 %
Heat loss at $U_{outrated}$, $I_{out\ rated}$	Typically12 W
Control	
Dynamic line smoothing ($U_{in\ rated}$ ±15 %)	< 0,2 % U_a
Dynamic load smoothing (I_{out}: 10/90/10 %)	±1.5 % U_{out}
Load-step settling time	
• 10 at 90 %	Typically 20 ms
• 90 at 10 %	Typically 20 ms

Type	24 V/4 A
Order number	**6EP1 332-1SH51**
Protection and monitoring	
Current limit	Typically 4.7 A
Short-circuit protection	Constant-current characteristic
Sustained-short-circuit-current rms value	< 10 A
Overload/short-circuit indicator	-
Security	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage U_{out} to EN 60950 and EN 50178
Protection class	Class II (without protective conductor)
CE marking	Yes
UL/cUL (CSA) approval	Yes, cULus-listed (UL 508, CSA 22.2), file E197259; cURus-recognized (UL 60950, CSA 22.2), file E151273
FM approval	Yes, Class I Div. 2, Group A, B, C, D T4
Marine Type Approval	Yes, GL, ABS
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	-20 °C to +55 °C with natural convection
Transport/storage temperature range	-40 °C to +70 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation
Mechanical system	
Supply-input connections L1, N	Solid/finely-stranded per screw-type terminal for 0.5 mm to 2.5 mm^2
Connections	
• Output +	Per 2 screw-type terminals for 0.5 mm to 2.5 mm^2
• Output -	
Dimensions (W x H x D) in mm	90 x 90 x 55
Weight	Approx. 0.34 kg
Mounting	Snaps onto DIN rail DIN EN 50022-35x15/7.5

Technical specifications SITOP smart

Power supply, type	2.5 A
Order No.	**6EP1 332-2BA10**
Input	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** set by means of selector switch
Voltage range	85 … 132 V/170 … 264 V AC
Overvoltage resistance	2.3 x $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 93/187 V
Rated line frequency; rated line-frequency range	50/60 Hz; 47 … 63 Hz
Rated current $I_{in\ rated}$	1.1/0.65 A
Switch-on current limit (+25°C)	< 27 A, typ. 3 ms
$I^2 t$	< 0.3 A^2s
Built-in line-side fuse	T 2 A/250 V (non accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 3 A, C characteristic
Output	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**24 V DC**
Total tolerance	±3 %
• Static mains compensation	Approx. 0.1 %
• Static load smoothing	Approx. 0.5 %
Residual ripple	< 150 mV_{pp} (typ. 10mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 50mV_{pp})
Adjustment range	22.8 … 28.0 V
Status display	Green LED for 24 V OK
Response on activation/deactivation	Overshoot of V_{out} approx. 4 %
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{out\ rated}$	**2.5 A**
Current range	
• Up to +45°C	0 … 3 A
• Up to +60°C	0 ...2.5 A
Dynamic overcurrent on	
• Power-up on short-circuit	Typ. 7 A for 100 ms
• Short-circuit during operation	Typ. 7 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units
Efficiency	
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 85 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 9 W
Closed-loop control	
Dynamic mains compensation ($V_{in\ rated}$ ±15 %)	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1 % V_{out}
Load-step settling time	
• 50 at 100 %	Typ. 0.2 ms
• 100 at 50 %	Typ. 0.2 ms

Power supply, type	2.5 A
Order No.	**6EP1 332-2BA10**
Protection and monitoring	
Output overvoltage protection	< 33 V
Current limit	Typ. 3.2 … 3.4 A, overload capability 150 % $I_{out\ rated}$ … 5 s/min
Short-circuit protection	Constant-current characteristic
Sustained short-circuit current rms value	Approx. 5 A
Overload/short-circuit indicator	-
Safety	
Primary/secondary galvanic isolation	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN 50178
Protection class	Class I I
Leakage current	< 3.5 mA (typ. 0.4 mA)
German Technical Inspectorate approval	Notified Body (CB Scheme)
CE marking	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX EX II 3G EEx nA II T4 U; UL 1604
Marine approval	GL
Degree of protection (EN 60 529)	IP20
EMC	
Emitted interference	EN 55022, Class B
Supply-harmonics limitation	Not applicable
Noise immunity	EN 61000-6-2
Operating data	
Ambient temperature range	0 … +60 °C with natural convection
Transport/storage temperature range	-40 … +85 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation
Mechanics	
Connections	
• Supply input L, N, PE	One screw terminal each for 0.5 … 2.5 mm^2 single-core/ finely-stranded
• Output +	2 screw terminals for 0.5 … 2.5 mm^2
• Output -	2 screw terminals for 0.5 … 2.5 mm^2
Dimensions (W x H x D) in mm	32.5 x 125 x 125
Weight, approx.	0.32 kg
Installation	Snaps onto DIN rail EN 60715-35x7,5/15
Accessories	-

Power supplies

Technical specifications SITOP smart (continued)

Power supply, type	5 A	5 A
Order No.	**6EP1 333-2AA01**	**6EP1 333-2BA01**
Input	Single-phase AC	Single-phase AC
Rated voltage $V_{inrated}$	**120/230 V AC** set by means of selector switch on device	**120/230 V AC** set by means of selector switch on device
Voltage range	85 ... 132 V/170 ... 264 V AC	85 ... 132 V /170 ... 264 V AC
Overvoltage resistance	2.3 x $V_{inrated}$, 1.3 ms	2.3 x $V_{inrated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V
Rated line frequency; rated-line-frequency range	50/60 Hz; 47 ... 63 Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	2.1/1.15 A	2.1/1.15 A
Switch-on current limit (+25 °C)	< 32 A, typ. 3 ms	< 32 A, typ. 3 ms
I^2t	< 0.8 A^2s	< 0.8 A^2s
Built-in line-side fuse	T 3.15 A/250 V (not accessible)	T 3.15 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in mains power input	From 6 A, Characteristic C	From 6 A, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{outrated}$	**24 V DC**	**24 V DC**
Total tolerance	±3 %	±3 %
• Static mains compensation	Approx. 0.1 %	Approx. 0.1 %
• Static load smoothing	Approx. 0.5 %	Approx. 0.5 %
Residual ripple	< 150 mV_{pp} (typ. 50mV_{pp})	< 150 mV_{pp} (typ. 50mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 150mV_{pp})	< 240 mV_{pp} (typ. 150mV_{pp})
Adjustment range	22.8 ... 28.0 V	22.8 ... 28.0 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK
Response on activation/deactivation	Overshoot of V_{out} approx. 4 %	Overshoot of V_{out} approx. 4 %
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{outrated}$	**5 A**	**5 A**
Current range		
• Up to +45 °C	0 ... 6 A	0 ... 6 A
• Up to +60 °C	0 ... 5 A	0 ... 5 A
Dynamic overcurrent on		
• Power-up on short-circuit	Typ. 17 A for 100 ms	Typ. 17 A for 100 ms
• Short-circuit during operation	Typ. 17 A for 200 ms	Typ. 17 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units
Efficiency		
Efficiency at $V_{outrated}$, $I_{outrated}$	Approx. 87 %	Approx. 87 %
Power loss at $V_{outrated}$, $I_{out\ rated}$	Approx. 17 W	Approx. 17 W
Closed-loop control		
Dynamic mains compensation ($V_{in\ rated}$ ±15 %)	Typ. ±0.3 % V_{out}	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1 % V_{out}	Typ. ±1 % V_{out}
Load-step settling time		
• 50 to 100 %	Typ. 0.2 ms	Typ. 0.2 ms
• 100 to 50 %	Typ. 0.2 ms	Typ. 0.2 ms

Technical specifications SITOP smart (continued)

Power supply, type	5 A	5 A
Order No.	**6EP1 333-2AA01**	**6EP1 333-2BA01**
Protection and monitoring		
Output overvoltage protection	< 33 V	< 33 V
Current limit	Typ. 6.4 ... 6.6 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min	Typ. 6.4 ... 6.6 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Constant-current characteristic	Constant-current characteristic
Sustained short-circuit current rms value	ca. 10 A	ca. 10 A
Overload/short-circuit indicator	-	-
Safety		
Primary/secondary electrical isolation	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN EN 50178	Yes, safety extra-low output voltage V_{out} to EN 60950 and EN EN 50178
Protection class	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.4 mA)	< 3.5 mA (typ. 0.4 mA)
German Technical Inspectorate approval	Notified Body (CB Scheme)	Notified Body (CB Scheme)
CE marking	Yes	Yes
UL/cUL (CSA) approval	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX-Richtlinie 94/9/EG, EX II 3G EEx nA II T4 U; UL 1604	ATEX-Richtlinie 94/9/EG, EX II 3G EEx nA II T4 U; UL 1604
FM approval	-	-
Marine type approval	GL	GL
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply-harmonics limitation		EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature range	0... +60 °C with natural convection	0 ... +60°C with natural convection
Transportation/storage temperature range	-40 ... +85 °C	-40 ... +85°C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanics		
Connections		
• Supply input L, N, PE	One screw terminal each for 0.5 ... 2.5 mm^2, single-core/finely stranded	One screw terminal each for 0.5 ... 2.5 mm^2 , single-core/finely stranded
• Output +	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
• Output -	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	50 x 125 x 125	50 x 125 x 125
Weight, approx.	0.5 kg	0.5 kg
Installation	Snaps onto DIN rail EN 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15
Accessoires	-	-

Power supply, type	10 A	10 A
Order No.	**6EP1 334-2AA01**	**6EP1 334-2BA01**[1)]
Input	Single-phase AC	Single-phase AC
Rated voltage $V_{in\ rated}$	**120/230 V AC** Set by means of selector switch on device	**120/230 V AC** Set by means of selector switch on device
Voltage range	85 ... 132 V/170 ... 264 V AC	85 ... 132 V/170 ... 264 V AC
Overvoltage resistance	2.3 x $V_{in\ rated}$, 1.3 ms	2.3 x $V_{in\ rated}$, 1.3 ms
Mains buffering at $I_{out\ rated}$	> 20 ms at V_{in} = 93/187 V	> 20 ms at V_{in} = 93/187 V

Power supplies

3

Technical specifications SITOP smart (continued)

Power supply, type	10 A	10 A
Order No.	**6EP1 334-2AA01**	**6EP1 334-2BA01**[1)]
Rated line frequency; rated line-frequency range	50/60Hz; 47 ... 63Hz	50/60 Hz; 47 ... 63 Hz
Rated current $I_{in\ rated}$	4.1/2.4 A	4.1/2.0 A
Switch-on current limit (+25 °C)	< 65 A, typ. 3 ms	< 65 A, typ. 3 ms
I^2t	< 3.3 A^2s	< 3.3 A^2s
Built-in line-side fuse	T 6.3 A/250 V (not accessible)	T 6.3 A/250 V (not accessible)
Recommended miniature circuit breaker (IEC 898) in the mains power input	From 10 A, Characteristic C	From 10 A, Characteristic C
Output	Controlled, isolated DC voltage	Controlled, isolated DC voltage
Rated voltage $V_{out\ rated}$	**24 V DC**	**24 V DC**
Total tolerance	±3 %	±3 %
• Stat. mains compensation	Approx. 0.1 %	Approx. 0.1 %
• Static load smoothing	Approx. 0.5 %	Approx. 0.5 %
Residual ripple	< 150 mV_{pp} (typ. 50 mV_{pp})	< 150 mV_{pp} (typ. 50 mV_{pp})
Spikes (bandwidth: 20 MHz)	< 240 mV_{pp} (typ. 150 mV_{pp})	< 240 mV_{pp} (typ. 150 mV_{pp})
Adjustment range	22.8 ... 28 V	22.8 ... 28 V
Status display	Green LED for 24 V OK	Green LED for 24 V OK
Response on activation / deactivation	Overshoot of V_{out} approx. 4 %	Overshoot of V_{out} approx. 4 %
Startup delay/voltage rise	< 0.1 s at 230 V AC/typ. 50 ms	< 0.1 s at 230 V AC/typ. 50 ms
Rated current $I_{out\ rated}$	**10 A**	**10 A**
Current range		
• Up to +45 °C	0 ... 12 A	0 ... 12 A
• Up to +60 °C	0 ... 10 A	0 ... 10 A
Dynamic overcurrent on		
• Power-up on short-circuit	Typ. 30 A for 100 ms	Typ. 30 A for 100 ms
• Short-circuit during operation	Typ. 33 A for 200 ms	Typ. 33 A for 200 ms
Parallel switching for enhanced performance	Yes, 2 units	Yes, 2 units
Efficiency		
Efficiency at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 90 %	Approx. 91 %
Power loss at $V_{out\ rated}$, $I_{out\ rated}$	Approx. 27 W	Approx. 24 W
Closed-loop control		
Dyn. mains compensation ($V_{in\ rated}$ ±15 %)	Typ. ±0.3 % V_{out}	Typ. ±0.3 % V_{out}
Dynamic load smoothing (I_{out}: 50/100/50 %)	Typ. ±1 % V_{out}	Typ. ±1 % V_{out}
Load-step settling time		
• 50 to 100 %	Typ. 0.2 ms	Typ. 0.2 ms
• 100 to 50 %	Typ. 0.2 ms	Typ. 0.2 ms
Protection and monitoring		
Output overvoltage protection	< 33 V	< 33 V
Current limitation	Typ. 12.5 to 13.5 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min	Typ. 12.5 ... 13.5 A, overload capability 150 % $I_{out\ rated}$ up to 5 s/min
Short-circuit protection	Constant current characteristic	Constant current characteristic
Sustained short-circuit current rms value	Approx. 16 A	Approx. 16 A
Overload/short-circuit indicator	-	-

1) SIPLUS module 6AG1 334-2BA01-4AA0 for use under medial load (e.g. sulfur chloride atmosphere).

Technical specifications SITOP smart (continued)

Power supply, type	10 A	10 A
Order No.	**6EP1 334-2AA01**	**6EP1 334-2BA01**[1]
Safety		
Primary/secondary electrical isolation	Safety extra-low output voltage V_{out} to EN 60950 and EN 50178	Safety extra-low output voltage V_{out} to EN 60950 and EN 50178
Protection class	Class I	Class I
Leakage current	< 3.5 mA (typ. 0.8 mA)	< 3.5 mA (typ. 0.8 mA)
German Technical Inspectorate approval	Notified Body (CB certificate)	Notified Body (CB certificate)
CE marking	Yes	Yes
UL/cUL (CSA) approval	Yes, cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)	Yes, cULus-Listed (UL 508, CSA C22.2 No. 14), File E197259, cCSAus (CSA C22.2 No. 60950-1, UL 60950-1)
Explosion protection	ATEX EX II 3G EEx nA II T4 U; UL 1604	ATEX EX II 3G EEx nA II T4 U; UL 1604
FM approval	-	-
Marine approval	GL	GL
Degree of protection (EN 60529)	IP20	IP20
EMC		
Emitted interference	EN 55022 Class B	EN 55022 Class B
Supply-harmonics limitation	-	EN 61000-3-2
Noise immunity	EN 61000-6-2	EN 61000-6-2
Operating data		
Ambient temperature range	0 ... +60 °C with natural convection	0 ... +60 °C with natural convection
Transport/storage temperature range	-40 ... +85 °C	40 ... +85 °C
Humidity class	Climate class 3K3 to EN 60721, no condensation	Climate class 3K3 to EN 60721, no condensation
Mechanics		
Connections		
Supply input L, N, PE	One screw terminal each for 0.5 ... 2.5 mm^2 single-core/finely stranded	One screw terminal each for 0.5 ... 2.5 mm^2 single-core/finely stranded
Output +	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Output -	2 screw terminals for 0.5 ... 2.5 mm^2	2 screw terminals for 0.5 ... 2.5 mm^2
Dimensions (W x H x D) in mm	70 x 125 x 125	70 x 125 x 125
Weight, approx.	0.75 kg	0.8 kg
Installation	Snaps onto DIN rail EN 60715 35x7,5/15	Snaps onto DIN rail EN 60715 35x7,5/15
Accessories	-	-

1) SIPLUS module 6AG1 334-2BA01-4AA0 for use under medial load (e.g. sulfur chloride atmosphere).

Ordering Data

	Order No.
Regulated load current supply SITOP power 3.5 A	
120/230 V AC, 24 V DC /3.5 A	**6EP1 332-1SH31**
120/230 V AC, 24 V DC /3.5 A; (enhanced temperature range and medial exposure)	**6AG1 203-1SH31-2AA00**
Mounting bracket	**6EP1 971-1AA01**
For space-saving assembly of the SITOP power load current supply unit to the rear panel of the control cabinet (power supply is attached to the rear panel of the housing with the side wall); for control cabinets with depths of 240 mm or more	
Regulated load current supply LOGO!Power 24 V/4 A	**6EP1 332-1SH51**
100 ... 240 V AC, 24 V DC/4 A	

	Order No.
Regulated load current supply SITOP smart	
120/230 V AC, 24 V DC	
2.5 A	**6EP1 332-2BA10**
5 A	**6EP1 333-2AA01**
5 A, with restriction of the supply harmonics acc. to EN 61000-3-2	**6EP1 333-2BA01**
10 A	**6EP1 334-2AA01**
10 A, with restriction of the supply harmonics acc. to EN 61000-3-2	**6EP1 334-2BA01**
10 A, with restriction of the supply harmonics acc. to EN 61000-3-2; medial exposure	**6AG1 334-2BA01-4AA0**

Text Display TD 100C

Overview

- The low-cost text display for the S7-200 with customized display
- For HMI functions:
  Display of message texts, interventions in the control program, setting of inputs and outputs
- Direct connection to CPU interface
- No separate power supply required
- No separate parameterization software required
- Front design can be selected individually
- Addressing and setting of contrast in supplied menu

Technical specifications

	6ES7 272-1BA10-0YA1
Power supply	
Input voltage	
• Rated value (DC)	24 V; Supply from S7-200 communication interface
Input current	
• Rated value at DC 24 V	25 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	
• Type	LC display (reflecting)
Operating/fault messages	
• Number of lines	4
• Number of characters per line	12; characters/line: 12 or 16 characters/line: Chinese 8
• Font size	3.34 mm
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-20 °C
• max.	70 °C
Degree of protection	
IP 65	Yes
Dimensions	
Cabinet/switchboard strength	1,5 mm; 1,5 to 4 mm
Dimensions	
Dimensions	
• Width	90 mm
• Height	76 mm
• Depth	36 mm; max. 44 mm with fittings
• Mounting cutout, width	82 mm
• Mounting cutout, height	69.5 mm
Weights	
• Weight, approx.	120 g

Ordering Data

		Order No.
Text Display TD 100C		
With individually configurable control elements on the device front; for connecting to SIMATIC S7-200; for use with STEP 7 Micro/WIN V4 and higher, plug-in cable required	B7	**6ES7 272-1BA10-0YA1**
Connecting cables		
For connecting TD 100C or TD 200C to S7-200		**6ES7 901-3EB10-0XA0**
Blank foils		
For printing customized keyboard layouts; 6 perforated foils per sheet; 10 sheets per packing unit		**6ES7 272-1BF00-7AA0**
Accessories		
Accessories for supplementary ordering		see catalog ST 80

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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 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
Power supply	
Input voltage	
• Rated value (DC)	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 DC 24 V	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	
• Type	LCD backlit
Operating/fault messages	
• Number of lines	2
• Number of characters per line	20; Chars/line: ASCII, Cyrillic; 10 chars/line: Chinese
• Font size	5 mm
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Degree of protection IP 65	Yes; at front
Dimensions	
Cabinet/switchboard strength	0.3 mm; 0.3 to 4 mm
Dimensions	
Dimensions	
• Width	148 mm
• Height	76 mm
• Depth	27 mm
• Mounting cutout, width	138 mm
• Mounting cutout, height	68 mm
Weights	
• Weight, approx.	250 g

Ordering Data

	Order No.
Text Display TD 200	
for connection to SIMATIC S7-200; can be used with STEP 7-Micro/WIN V3.2 SP4 or higher, incl. connecting cable B7	**6ES7 272-0AA30-0YA1**
Connecting cables	
For connecting TD 100C or TD 200C to S7-200	**6ES7 901-3EB10-0XA0**
Accessories	
Accessories for supplementary ordering	see catalog ST 80

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Text Display TD 200C

Overview

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

Technical specifications

	6ES7 272-1AA10-0YA1
Power supply	
Input voltage	
• Rated value (DC)	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 DC 24 V	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	
• Type	LCD backlit
Operating/fault messages	
• Number of lines	2
• Number of characters per line	20; Chars/line: ASCII, Cyrillic; 10 chars/line: Chinese
• Font size	5 mm
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-20 °C
• max.	70 °C
Degree of protection IP 65	Yes; at front
Dimensions	
Cabinet/switchboard strength	0.3 mm; 0.3 to 4 mm
Dimensions	
Dimensions	
• Width	148 mm
• Height	76 mm
• Depth	28 mm
• Mounting cutout, width	138 mm
• Mounting cutout, height	68 mm
Weights	
• Weight, approx.	200 g

Ordering Data

		Order No.
Text Display TD 200C		
With individually configurable control elements on the device front; for connecting to SIMATIC S7-200; for use with STEP 7-Micro/WIN V4 and higher, incl. plug-in cable	B7	**6ES7 272-1AA10-0YA1**
Connecting cables		**6ES7 901-3EB10-0XA0**
For connecting TD 100C or TD 200C to S7-200		
Blank foils	B7	**6ES7 272-1AF00-7AA0**
For printing customized keyboard layouts; 3 perforated faceplates per sheet; 10 sheets per packing unit		
Accessories		
Accessories for supplementary ordering		see catalog ST 80

B7: Subject to export regulations: AL: N and ECCN: EAR99H

Text Display TD 400C

Overview

- Multi-screen workstation 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
Supply voltage	
Supply voltage	24 V DC
permissible range	DC
Memory	
Type of storage	
• Memory usable for project data/Options	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
MTBF backlighting (at 25 °C)	about 20,000 hours
Operating mode	
Operating 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)
Dimensions	
Weights	
• Weight	0.33 kg

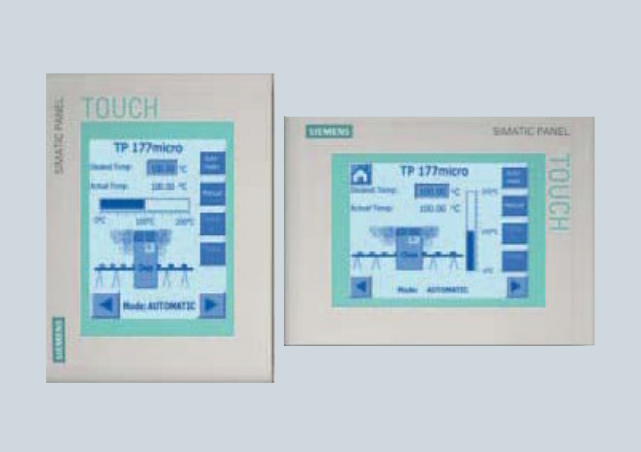
Ordering Data

		Order No.
Text Display TD 400C	B7	**6AV6 640-0AA00-0AX1**
With customizable 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		
Connecting cables		**6ES7 901-3EB10-0XA0**
For connecting TD 100C/TD 200C or TD 400C to S7-200		
Blank foils		**6AV6 671-0AP00-0AX0**
For printing customized keyboard layouts; 2 perforated films per sheet; 10 sheets per pack		
Accessories		
Accessories for supplementary ordering		see catalog ST 80

B7: Subject to export regulations: AL: N and ECCN: EAR99H

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
Supply voltage	
Supply voltage	24 V DC
permissible range	+20.4 V to +28.8 V DC
Rated current	0.24 A
Memory	
Type of storage	
Type	Flash
Memory usable for project data/Options	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 levels
Size	5.7"
Resolution (WxH in pixel)	320 x 240
MTBF backlighting (at 25 °C)	about 50,000 hours
Operating mode	
Operating elements	Touch screen
Function keys, programmable	None
System keys	0
Touchscreen	analog, resistive
Numeric/alphabetical input	Yes / Yes
Ambient conditions	
Mounting position	Vertical
maximum permissible angle of incliniation without external ventilation	+/- 35 °
max. relative humidity (in %)	90%

	6AV6 640-0CA11-0AX1
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
Message system	
• 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

Technical specifications (continued)

	6AV6 640-0CA11-0AX1
Image elements	
• Text objects	500 text elements
• Graphics object	Bit maps, icons, icon (full-screen), vector graphics
• dynamic objects	Diagrams, bar graphs
Lists	
• Text lists	150
• Graphics list	100
• Libraries	Yes
Security	
• Number of user groups	1
• Passwords exportable	Yes
• Number of users	1
Data medium 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
• Fonts	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/D) in mm	198 mm x 142 mm / 45 mm device depth
Dimensions	
Weights	0.75 kg

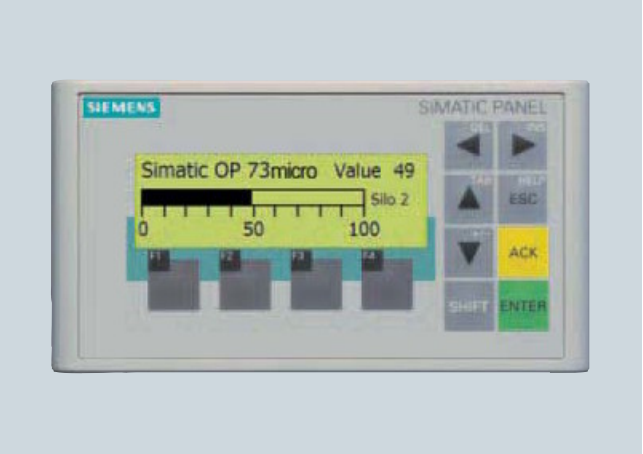
Ordering Data

		Order No.
SIMATIC TP 177micro	B9	**6AV6 640-0CA11-0AX1**
Touch Panel for connection to the SIMATIC S7-200, 5.7" STN display		
TP 177micro starter package	B1	**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)		
Operating Instructions OP 73micro, TP 177micro		
• 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	B8	**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

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3
B8: Subject to export regulations: AL: N and ECCN: EAR99S
B9: Subject to export regulations: AL: N and ECCN: EAR99T

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
Supply voltage	
Supply voltage	24 V DC
permissible range	+20.4 V to +28.8 V DC
Rated current	0.1 A
Memory	
Type of storage	
Type	Flash
Memory usable for project data/Options	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
MTBF backlighting (at 25 °C)	about 100,000 hours
Operating mode	
Operating elements	Membrane keyboard
Function keys, programmable	4 function keys
System keys	8
Touchscreen	No
Numeric/alphabetical input	Yes / Yes
Connection for mouse/keyboard/barcode reader	- / - / -

	6AV6 640-0BA11-0AX0
Ambient conditions	
Mounting position	Vertical
maximum permissible angle of incliniation without external ventilation	+/- 80 °
max. relative humidity (in %)	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
Message system	
• Number of messages	250
• Bit messages	Yes
• Analog messages	Yes
• Message buffer	Ring buffer (n x 100 entries)

Technical specifications (continued)

	6AV6 640-0BA11-0AX0
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
Data medium 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
• Fonts	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)	154 mm x 84 mm
Mounting cutout/Device depth (W x H/D) in mm	138 mm x 68 mm / 28.5 mm device depth
Dimensions	
Weights	
Weight	0.25 kg

Ordering Data

		Order No.
SIMATIC OP 73micro Operator panel for connection to the SIMATIC S7-200, with 3" display, monochrome incl. mounting accessories	B9	**6AV6 640-0BA11-0AX0**
OP 73micro starter package 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)	B1	**6AV6 650-0BA01-0AA0**
Configuration with SIMATIC WinCC flexible		
Documentation (to be ordered separately)		
Operating Instructions OP 73micro/TP 177micro		
• 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**
User Manual WinCC flexible Micro		
• 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 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	B8	**6AV6 691-1SA01-0AX0**
Accessories		
Accessories for supplementary ordering		see catalog ST 80

B1: Subject to export regulations: AL: N and ECCN: 5D002ENC3
B8: Subject to export regulations: AL: N and ECCN: EAR99S
B9: Subject to export regulations: AL: N and ECCN: EAR99T

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

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; RS 232 not required	187.5 kBit/s; 9.6/19.2/187.5 Kbit/s; setting: not necessary
Status information/ alarms/diagnostics		
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

	6ES7 901-3CB30-0XA0	6ES7 901-3DB30-0XA0
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		
Weights		
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**

Overview

Intelligent RS 232/PPI multi-master 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 in a multi-master PPI network

	SIPLUS cable 901
Order No.	**6AG1 901-3CB30-2XA0**
Order No. based on	**6ES7 901-3CB30-0XA0**
Ambient temperature range	-25 to +70 °C; -25 to +55 °C (for applications with cUL approval), condensation permissible
Ambient conditions	Suitable for extraordinary medial load (e.g. by chloric and sulphuric atmospheres).
Conformity with standard for electronic devices on rail vehicles (EN 50155, temperature T1, category 1).	No
Approvals	CE, cUL (available soon)
Technical data	The technical data are identical with the technical data of the based on modules.

Ordering Data

	Order No.
SIPLUS cable 901 (extended temperature and mediale exposure) For connecting devices with an RS 232 interface to SIMATIC S7-200 or PPI network Master in multi-master PPI network	**6AG1 901-3CB30-2XA0**

SIMATIC S7-300

Brochures

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

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

S7-300/S7-300F/SIPLUS S7-300

Overview

S7-300

- The modular mini PLC system for the low and mid-performance ranges
- With comprehensive range of modules for optimum adaptation to the automation task
- Flexible use through simple implementation of distributed structures and versatile networking
- User-friendly handling and uncomplicated design without a fan
- Can be expanded without problems when the tasks increase
- Powerful thanks to a range of integrated functions

S7-300F

- Failsafe automation system for plants with increased safety requirements for production technology
- Based on S7-300
- Additional ET 200S and ET 200M distributed I/O stations complete with safety-related modules can be connected; safety-related communication over PROFIBUS DP with the PROFIsafe profile
- Standard modules can be used in addition for non-safety-relevant applications

SIPLUS S7-300

- The PLC for use under extremely harsh environmental conditions
- With enhanced temperature range from -25 °C to +60 °C
- Use in environments with pollutant gases (corrosive gas atmospheres)
- Occasional short-term condensation and enhanced mechanical stress permissible
- With the proven PLC technology of the S7-300
- 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

For more information, go to:

http://www.siemens.com/siplus

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

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

Technical specifications

General technical specifications S7-300, S7-300F	
Degree of protection	Degree of protection IP20 to IEC 60 529
Ambient temperature	
• With horizontal mounting	0 … 60 °C
• With vertical mounting	0 … 40 °C
Relative humidity	5 to 95 %, no condensation (RH severity level 2 in accordance with IEC 61131-2)
Atmospheric pressure	795 … 1080 hPa
Isolation	
• 24 V DC circuits	Test voltage 500 V DC
• 230 V AC circuits	Test voltage 1460 V AC
Electromagnetic compatibility	Requirements of EMC law; Noise immunity according to IEC 61000-6-2, tested according to: IEC 61000-4-2, 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6 Emitted interference according to EN 50081-2, tested according to EN 55011, class A, group 1
Mechanical rating	
• Vibrations, tested according to/tested with	IEC 60068, Part 2-6/10 up 58 Hz; constant amplitude 0.075 mm; 58 to 150 Hz; constant acceleration 1 g; oscillation period: 10 frequency cycles per axis in each direction of the 3 mutually perpendicular axes
• Shock, tested according to/tested with	IEC 60068, Part 2-27/half-sine: strength of impact 15 g (peak value), duration 11 ms

General technical data of the SIPLUS S7-300	
Climatic environmental conditions	
Temperature	Horizontal installation: -25 °C to 60 °C vertical installation: -25 °C to 40 °C
Relative humidity	5 to 95%; short-term condensation permissible, corresponds to relative humidity (RH) load 2 according to IEC 1131-2 and IEC 721 3-3 Cl. 3K5
Short-term ice formation	-25 °C to 0 °C IEC 721 3-3 Cl. 3K5
Air pressure	1080 to 795 hPa corresponds to an altitude of -1000 to 2000 m
Contaminant concentration	SO_2: < 0.5 ppm; relative humidity < 60% test: 10 ppm, 4 days H_2S: < 0.1 ppm; relative humidity < 60% test: 1 ppm, 4 days (to IEC 721 3-3; Class 3C3)
Mechanical environmental conditions	
Vibrations	Type of vibration: Frequency sweeps with a rate of change of 1 octave/minute. 2 Hz ≤ f ≤9 Hz, constant Amplitude 3.0 mm, 9 Hz ≤ f ≤150 Hz, constant acceleration 1 g, duration of oscillation: 10 frequency cycles per axis in each of the three mutually perpendicular axes Vibration tests according to IEC 68 Part 2-6 (sine wave) and IEC 721 3-3, Class 3M4
Shock	Type of shock: Half-sine, intensity of shock: 15 g peak value, 11 ms duration, direction: 3 shocks each in +/- direction in each of the 3 perpendicular axes Shock testing in accordance with IEC 68 Part 2-27
Conforms with standard for electronic equipment used on rolling stock (EN 50155, temperature T1, category 1).	Yes [1]

[1] Does not apply to 6AG1314-6CF02-2AB0, 6AG1315-6EG10-2AB0, 6AG1317-6EJ10-2AB0, 6AG1336-1HE00-2AB0, 6AG1314-6CF02-2AB0, 6AG1331-7KF02-2AB0, 6AG1331-7PF02-2AB0, 6AG1332-5HF00-2AB0, 6AG1334-0KE00-2AB0, 6AG1331-7TB00-2AB0

Compact CPUs

Overview CPU 312C

- The compact CPU with integrated digital inputs and outputs
- For small applications with high requirements in terms of processing power
- With process-related functions

Micro memory card required to operate the CPU.

Overview CPU 313C-2 PtP

- The compact CPU with integrated digital I/Os and second serial interface
- For installations with high requirements in terms of processing power and response time.
- With process-related functions

Micro memory card required to operate the CPU.

Overview CPU 313C

- The compact CPU with integrated digital and analog inputs and outputs
- For installations with high requirements in terms of processing power and response time.
- With process-related functions

Micro memory card required to operate the CPU.

Overview 313C-2 DP

- The compact CPU with integrated digital I/Os and PROFIBUS DP master/slave interface
- With process-related functions
- For tasks with special functions
- For the connection of standalone I/O devices

Micro memory card required to operate the CPU.