## EM 221, EM 222, EM 223



### Overview


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

### Technical specifications EM 221

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

## Technical specifications EM 221 (continued)

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

## Technical specifications EM 222

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

## Technical specifications EM 222 (continued)

| | 6ES7 222-1BD22-0XA0 | 6ES7 222-1BF22-0XA0 |
|---|---|---|
| **Relay outputs** | | |
| Switching capacity of contacts | | |
| • with inductive load, max. | 5 A | 0.75 A |
| • on lamp load, max. | 50 W | 5 W |
| • with resistive load, max. | 5 A | 0.75 A |
| **Galvanic isolation** | | |
| Galvanic isolation digital outputs | | |
| • Galvanic isolation digital outputs | Yes | Yes; Optocoupler |
| • Between the channels, in groups of | 1 | 4 |
| **Dimensions and weight** | | |
| Dimensions | | |
| • Width | 45 mm | 45 mm |
| • Height | 80 mm | 80 mm |
| • Depth | 62 mm | 62 mm |
| Weight | | |
| • Weight, approx. | 120 g | 150 g |

| | 6ES7 222-1HD22-0XA0 | 6ES7 222-1HF22-0XA0 | 6ES7 222-1EF22-0XA0 |
|---|---|---|---|
| **Supply voltages** | | | |
| Load voltage L+ | | | |
| • Rated value (DC) | 24 V | 24 V | |
| • Permissible range, lower limit (DC) | 12 V | 5 V | |
| • Permissible range, upper limit (DC) | 30 V | 30 V | |
| Load voltage L1 | | | |
| • Rated value (AC) | 24 V; 24 to 230 V AC | 24 V; 24 to 230 V AC | 230 V; 220/230 V AC |
| • Permissible range, lower limit (AC) | 12 V | 5 V | 65 V |
| • Permissible range, upper limit (AC) | 250 V | 250 V | 264 V |
| • Ppermissible frequency range, lower limit | | 47 Hz | 47 Hz |
| • Permissible frequency range, upper limit | | 63 Hz | 63 Hz |
| **Current consumption** | | | |
| from backplane bus 5 V DC, max. | 30 mA | 40 mA | 110 mA |
| Digital outputs | | | |
| • from load voltage L+, max. | 80 mA; 20 mA per switched output | 72 mA; 9 mA per switched output | |
| **Power losses** | | | |
| Power loss, typ. | 4 W | 2 W | 4 W |
| **Connection method** | | | |
| Plug-in I/O terminals | Yes | Yes | Yes |
| **Digital outputs** | | | |
| Number of digital outputs | 4; Relay | 8; Relay | 8 |
| Short-circuit protection | No; to be provided externally (see manual package "Setting up an S7-200") | No; to be provided externally (see manual package "Setting up an S7-200") | No; to be provided externally (see manual package "Setting up an S7-200") |
| Limitation of inductive shutdown voltage to | to be provided externally (see manual package "Setting up an S7-200") | to be provided externally (see manual package "Setting up an S7-200") | to be provided externally (see manual package "Setting up an S7-200") |
| Output voltage | | | |
| • for signal "1", min. | | | L1 (-0.9 V) |

## Technical specifications EM 222 (continued)

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

## Technical specifications EM 223

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

## Technical specifications EM 223 (continued)

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

## Technical specifications EM 223 (continued)

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

## Technical specifications EM 223 (continued)

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

## Ordering data

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

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

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

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## Overview SIPLUS EM 221


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

***Note:***

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

| SIPLUS EM 221 digital input modules for CPU 22x | | |
|---|---|---|
| | **8 DI** | **16 DI** |
| **Order number** | **6AG1 221-1BF22-2XA0** | **6AG1 221-1BH22-2XB0** |
| **Order No. based on** | **6ES7 221-1BF22-0XA0** | **6ES7 221-1BH22-0XA0** |
| Ambient temperature range | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval) | |
| Conformal coating | Coating of the printed circuit boards and the electronic components | |
| Technical data | The technical data of the standard product applies except for the ambient conditions | |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes | Yes |
| Approvals | CE, cUL | |
| **Ambient conditions** | | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible | |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) | |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)] | |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] | |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K | |

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

## Overview SIPLUS EM 222

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

***Note:***

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

| SIPLUS EM 222 digital output modules for CPU 22x | | |
|---|---|---|
| | **8 DO** | **16 RO** |
| **Order number** | **6AG1 222-1BF22-2XB0** | **6AG1 222-1HF22-2XB0** |
| **Order No. based on** | **6ES7 222-1BF22-0XB0** | **6ES7 222-1HF22-0XB0** |
| Ambient temperature range | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval) | |
| Conformal coating | Coating of the printed circuit boards and the electronic components | |
| Technical data | The technical data of the standard product applies except for the ambient conditions | |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes | Yes |
| Approvals | CE, cUL | |
| **Ambient conditions** | | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible | |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) | |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1)2)] | |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] | |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... 2000 m)<br>see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m)<br>derating 20 K | |

[1)] ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

## SIPLUS EM 221, EM 222, EM 223



### Overview SIPLUS EM 223

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

***Note:***

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

| **SIPLUS EM 223 digital input/output modules for CPU 22x** | | | |
|---|---|---|---|
| | **4 DI/4 O** | **8 DI/8 DO** | **16 DI/16 DO** |
| **Order number** | **6AG1 223-1BF22-2XB0** | **6AG1 223-1BH22-2XB0** | **6AG1 223-1BL22-2XB0** |
| **Order No. based on** | **6ES7 223-1BF22-0XA0** | **6ES7 223-1BH22-0XA0** | **6ES7 223-1BL22-0XA0** |
| Ambient temperature range | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval) | | |
| Conformal coating | Coating of the printed circuit boards and the electronic components | | |
| Technical data | The technical data of the standard product applies except for the ambient conditions | | |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes | Yes | Yes |
| Approvals | CE, cUL | | |

| **SIPLUS EM 223 digital input/output modules for CPU 22x** | | | |
|---|---|---|---|
| | **4 DI/4 O** | **8 DI/8 DO** | **16 DI/16 DO** |
| **Order number** | **6AG1 223-1HF22-2XB0** | **6AG1 223-1PH22-2XB0** | **6AG1 223-1PL22-2XB0** |
| **Order No. based on** | **6ES7 223-1HF22-0XA0** | **6ES7 223-1PH22-0XA0** | **6ES7 223-1PL22-0XA0** |
| Ambient temperature range | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval) | | |
| Conformal coating | Coating of the printed circuit boards and the electronic components | | |
| Technical data | The technical data of the standard product applies except for the ambient conditions | | |
| Compliant with the standard for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes | Yes | Yes |
| Approvals | CE, cUL | | |

## Overview SIPLUS EM 223 (continued)

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

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

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

## Ordering data

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

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

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

# Analog modules

## EM 231, EM 232, EM 235



### Overview


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

### Technical specifications EM 231

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

## Technical specifications EM 231 (continued)

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

## Technical specifications EM 232

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

## Technical specifications EM 235

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

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

## EM 231, EM 232, EM 235

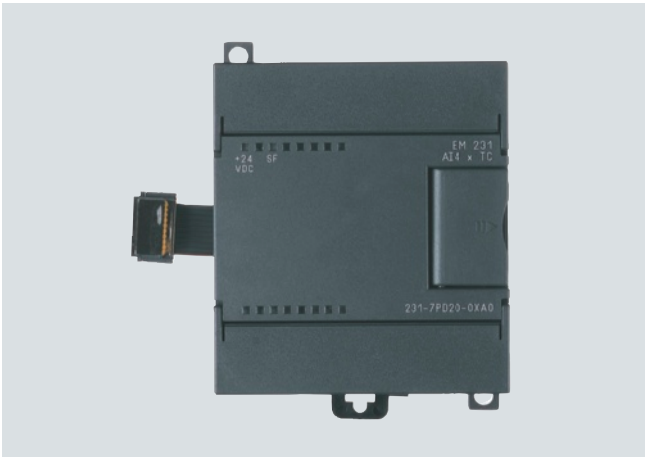


### Ordering data

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

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

## Overview




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



## Technical specifications

| | 6ES7 231-7PD22-0XA0 | 6ES7 231-7PF22-0XA0 |
|---|---|---|
| **Current consumption** | | |
| from load voltage L+ (without load), max. | 60 mA | 60 mA |
| from backplane bus 5 V DC, max. | 87 mA | 87 mA |
| **Power losses** | | |
| Power loss, typ. | 1.8 W | 1.8 W |
| **Connection method** | | |
| Plug-in I/O terminals | No | No |
| **Analog inputs** | | |
| Number of analog inputs | 4 | 8 |
| Cable length, shielded, max. | 100 m; to the sensor | 100 m; to the sensor |
| Loop resistance cable | 100 Ω | 100 Ω |
| Updating time (all channels) | 405 ms | 810 ms |
| Input ranges (rated values), voltages | | |
| • -80 mV to +80 mV | Yes | Yes |
| Input ranges (rated values), thermoelements | | |
| • Type E | Yes | Yes |
| • Type J | Yes | Yes |
| • Type K | Yes | Yes |
| • Type N | Yes | Yes |
| • Type R | Yes | Yes |
| • Type S | Yes | Yes |
| • Type T | Yes | Yes |
| Voltage input | | |
| • Permissible input voltage for voltage input (destruction limit), max. | 30 V | 30 V |
| **Analog value creation** | | |
| Measurement principle | Sigma Delta | Sigma Delta |
| Integrations and conversion time/ resolution per channel | | |
| • Resolution with overrange (bit including sign), max. | 16 bit; Temperature 0.1 °C / 0.1 °F | 16 bit; Temperature 0.1 °C / 0.1 °F |
| • Interference voltage suppression for interference frequency f1 in Hz | 85 dB at 50 / 60 / 400 Hz | 85 dB at 50 / 60 / 400 Hz |
| Displayable conversion value range | | |
| • Bipolar signals | -27,648 to +27,648 | -27,648 to +27,648 |
| **Errors/accuracies** | | |
| cold connection point | +/-1.5 °C | +/-1.5 °C |
| Repeat accuracy in settled status at 25 °C (relative to input area) | +/- 0.05 % | +/- 0.05 % |
| Operational limit in overall temperature range | | |
| • Voltage, relative to output area | +/- 0.1 % | +/- 0.1 % |
| Interference voltage suppression for f = n x (fl +/- 1%), fl = interference frequency | | |
| • Common mode voltage, max. | 120 V; AC | 120 V; AC |
| • Common mode interference, min. | 120 dB; at 120 V AC | 120 dB; at 120 V AC |
| **Galvanic isolation** | | |
| Galvanic isolation analog inputs | | |
| • Galvanic isolation analog inputs | Yes | Yes |
| **Dimensions and weight** | | |
| Dimensions | | |
| • Width | 71.2 mm | 71.2 mm |
| • Height | 80 mm | 80 mm |
| • Depth | 62 mm | 62 mm |
| Weight | | |
| • Weight, approx. | 210 g | 210 g |

## EM 231 thermocouple module

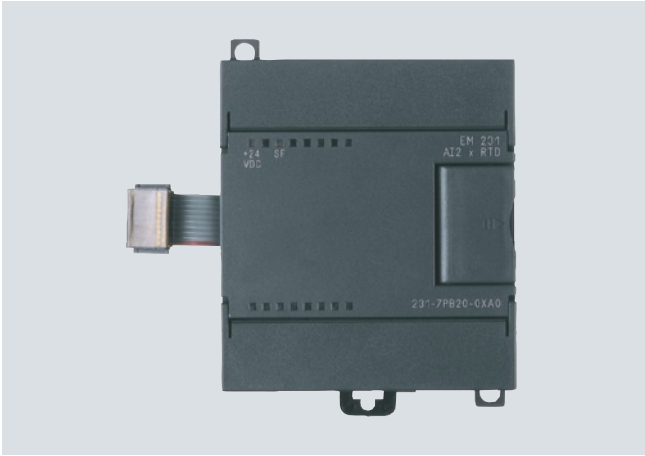


| Ordering data | Order No. |
|---|---|
| **EM 231 thermocouple module** | |
| Inputs +/- 80 mV, resolution 15 bit + sign, thermocouples J, K, S, T, R, E, N | |
| 4 inputs | **6ES7 231-7PD22-0XA0** |
| 8 inputs | **6ES7 231-7PF22-0XA0** |
| **Ground terminal** | **6ES5 728-8MA11** |
| 10 units | |
|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

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

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

## Overview



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

## Technical specifications

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

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

## EM 231 RTD module



| Ordering data | Order No. |
|---|---|
| **EM 231 RTD module** | |
| 2 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 bit + sign | **6ES7 231-7PB22-0XA0** |
| 4 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; 14 GOST temperature resistance sensor, resistor 150/300/600 Ohm, resolution 15 bit + sign | **6ES7 231-7PC22-0XA0** |
| **Ground terminal** | **6ES5 728-8MA11** |
| 10 units | |
| **Backplane bus expansion cable** I | **6ES7 290-6AA20-0XA0** |
| for connecting two rows of modules with double-tier configuration, for CPU 222/224/224 XP/226 | |

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

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

## Overview SIPLUS EM 231

- Analog inputs for SIPLUS S7-200

***Note:***

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

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

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

## Overview SIPLUS EM 232


- Analog outputs for SIPLUS S7-200

***Note:***

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

| **SIPLUS EM 232 analog output modules for CPU 22x** | **2 AO** |
|---|---|
| **Order number** | **6AG1 232-0HB22-2XB0** |
| **Order No. based on** | **6ES7 232-0HB22-0XA0** |
| Ambient temperature range | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval) |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the ambient conditions |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No |
| Approvals | CE, cUL |
| **Ambient conditions** | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA-S71.04 severity level G1; G2; G3; GX [1) 2)] |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

## Overview SIPLUS EM 235

- Analog inputs and outputs for SIPLUS S7-200

***Note:***

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

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

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:

www.siemens.com/siplus-extreme

## SIPLUS EM 231, EM 232, EM 235



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

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

## Overview


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

***Note:***

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

| **SIPLUS EM 231 RTD module for CPU 22x** | **2 AI Thermo** | **2 AI Thermo** |
|---|---|---|
| **Order number** | **6AG1 231-7PB22-2XA0** | **6AG1 231-7PB22-2XY0** |
| **Order No. based on** | **6ES7 231-7PB22-0XA0** | **6ES7 231-7PB22-0XA0** |
| Ambient temperature range | -25 ... +70 °C;<br>-25 ... +55 °C (for applications with cUL approval) | |
| Conformal coating | Coating of the printed circuit boards and the electronic components | |
| Technical data | The technical data of the standard product applies except for the ambient conditions | |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | No | Yes |
| Approvals | CE, cUL | |
| **Ambient conditions** | | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible | |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) | |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)] | |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] | |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m) derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m) derating 20 K | |

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

## SIPLUS EM 231 RTD module

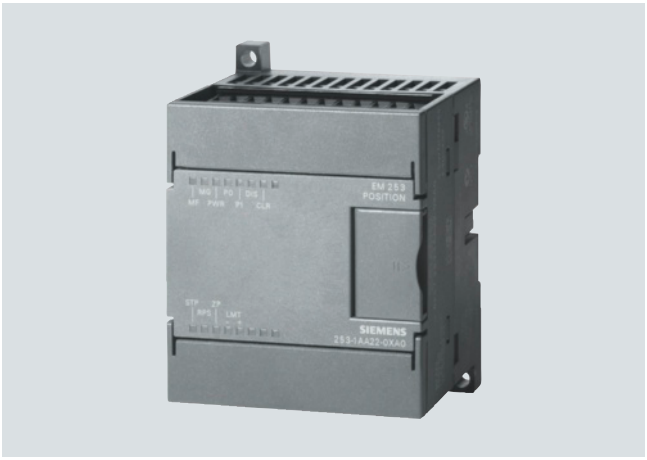


| Ordering data | | Order No. |
|---|---|---|
| **SIPLUS EM 231 RTD module** | | |
| (extended temperature range and medial exposure) | | |
| 2 inputs for resistance temperature detector Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistor 150/300/600 Ohm, resolution 15 bit + sign | H | **6AG1 231-7PB22-2XA0** |
| Conforms to EN 50155; 2 inputs for resistance temperature detectors Pt100/200/500/1000/10000, Ni100/120/1000, Cu10; resistors 150/300/600 Ohm, resolution 15 bit + sign | H | **6AG1 231-7PB22-2XY0** |

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

H: Subject to export regulations AL: 9I999 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 5 V DC, max. | 190 mA |
| from supply voltage L+, max. | 300 mA; from 12 V DC, 130 mA from 24 V DC |
| **Hardware configuration** | |
| Number of modules per CPU | max. 5 with CPU 226/226XM, max. 3 with CPU 224, max. 1 with CPU 222 |
| **Digital inputs** | |
| Number of digital inputs | 5 |
| Type | IEC Type 1, active-high |
| Functions | Stop (STP), reference point switch (RPS), upper limit switch (LMT+), lower limit switch (LMT-), zero point (ZP) |
| Input voltage | |
| • Rated value, DC | 24 V |
| • for signal "0" | STP, RPS, LMT+, LMT- 5 V DC; ZP 1 V DC |
| • for signal "1" | STP, RPS, LMT+, LMT- 15 V DC; ZP 3 V DC |
| Input delay (for rated value of input voltage) | |
| • for standard inputs | |
| - parameterizable | Yes; STP, RPS, LMT+, LMT- 0.2 to 12.8 ms; ZP min 2 µs |
| Cable length | |
| • Cable length, shielded, max. | 100 m; STP, RPS, LMT+, LMT- 100 m, ZP 10 m |
| • Cable length unshielded, max. | 30 m; STP, RPS, LMT+, LMT- 30 m, ZP not recommended |

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

## EM 253 positioning module



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

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

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

## 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)<br>• CPU 224 (6ES7214-1*D23-0XB0)<br>• CPU 224XP (6ES7214-2*D23-0XB0)<br>• CPU226 (6ES7216-2*D23-0XB0) |
| **Communication interfaces** | SIMATIC S7 Bus, RS 232, TTY |
| **Connection of remote displays (through TTY interface)** | Weight value (gross, net) |
| **Adjustment of scales settings** | Using PC parameterization software SIWATOOL MS (RS 232) |
| **Measuring properties** | |
| • Error limit to DIN 1319-1 of full-scale value at 20 °C ± 10 K | 0.05 % |
| • Internal resolution<br>Data format of weight values | 65535<br>2 byte (fixed-point) |
| **Number of measurements/second** | 50 or 30 |
| **Digital filter** | 0.05 - 5 Hz (in 7 steps), mean-value filter |
| **Weighing functions** | |
| • Weight values | Gross, net |
| • Limit values | 2 (min./max.) |
| • Zero setting function | Per command |
| • Tare function | Per command |
| • Tare specification | Per command |
| **Load cells** | Strain gages in 4-wire or 6-wire system |
| **Load cell powering** | |
| • Supply voltage $U_s$ (rated value) | 6 V DC typical |
| • Max. supply current | ≤ 150 mA |
| • Permissible load impedance | |
| - $R_{Lmin}$ | > 40 Ω |
| - $R_{Lmax}$ | < 4010 Ω |
| | With SIWAREX IS Ex interface or SIWAREX Pi: |
| - $R_{Lmin}$ | > 87 Ω |
| - $R_{Lmax}$ | < 4010 Ω |

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

## SIWAREX MS



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

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

# SIPLUS DCF 77 radio clock module

## Overview

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

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

www.siemens.com/siplus - Support - Tools and Downloads!

## Technical specifications

| SIPLUS DCF 77 radio clock module | |
|---|---|
| Radio frequency | 77.5 Hz |
| Power supply | 24 V DC (20.4 to 28.8 DC) |
| Power consumption, typ. | 50 mA |
| Dimensions (W x H x D) | 75 mm x 125 mm[1] x 75 mm |

[1] Additionally 25 mm (0.98 in) for heavy duty threaded joint and bending radius for cables

## Ordering data

| | | Order No. |
|---|---|---|
| **SIPLUS DCF 77 radio clock module**<br>For synchronizing SIMATIC S7-200, S7-300 and S7-400 with the official time of the DCF 77 time signal transmitter of the Physikalisch-Technische Bundesanstalt Braunschweig | H | **6AG1 057-1AA03-0AA0** |

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

## EM 241 modem



### Overview

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

### Technical specifications

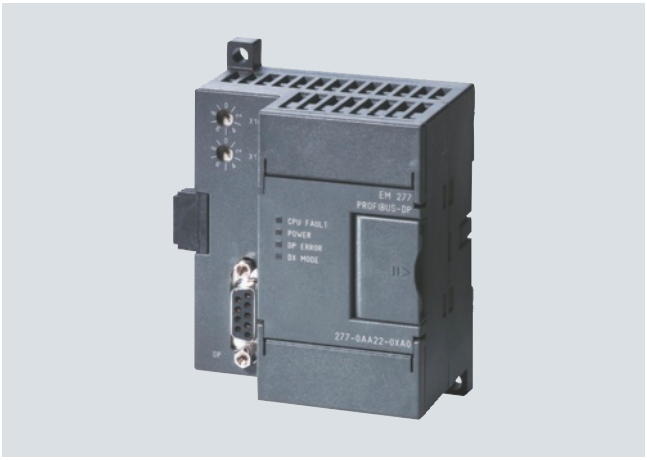
| | 6ES7 241-1AA22-0XA0 |
|---|---|
| **Supply voltages** | |
| Load voltage L+ | |
| • Rated value (DC) | 24 V |
| • Permissible range, lower limit (DC) | 20.4 V |
| • Permissible range, upper limit (DC) | 28.8 V |
| **Current consumption** | |
| from load voltage L+ (without load), max. | 70 mA |
|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

### Ordering data

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

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

## Overview



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

## Technical specifications

| | 6ES7 277-0AA22-0XA0 |
|---|---|
| **Supply voltages** | |
| Load voltage L+ | |
| • Rated value (DC) | 24 V |
| • permissible range, lower limit (DC) | 20.4 V |
| • permissible range, upper limit (DC) | 28.8 V |
| **Current consumption** | |
| from backplane bus 5 V DC, max. | 150 mA |
| from sensor current supply or external current supply (24 V DC), max. | 180 mA; 30 to 180 mA |
| **Power losses** | |
| Power loss, typ. | 2.5 W |
| **Hardware configuration** | |
| Connectable nodes | TD 200 as of V2.0, OP, TP, PG/PC, S7-300/400, PROFIBUS DP master |
| **Communication functions** | |
| Bus protocol/transmission protocol | PROFIBUS DP (slave), MPI (slave) |
| Number of connections | |
| • MPI connections, max. | 6 |
| - number of which are reserved for OP communication | 1 |
| - of which reserved for PG communication | 1 |
| **Interfaces** | |
| Number of RS 485 interfaces | 1 |
| 5 V DC | |
| • Output current, max. | 90 mA |
| 24 V DC | |
| • Voltage range | 20.4 to 28.8 V |
| • Output current, max. | 120 mA |
| • Current limiting | 0.7 to 2.4 A |
| **Connection method** | |
| Plug-in I/O terminals | No |
| **PROFIBUS DP** | |
| Transmission rate, max. | 12 Mbit/s; 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 Kbit/s; 1 / 1.5 / 3 / 6 / 12 Mbit/s |
| Node addresses | 0 to 99, adjustable |
| Cable length, max. | 1 200 m; 100 to 1200 m, depending on transmission speed |
| Number of stations in network, max. | 126; of which max. 99 EM 277 |
| Number of stations per segment, max. | 32 |
| Automatic detection of transmission speed | Yes |
| **Dimensions and weight** | |
| Dimensions | |
| • Width | 71.2 mm |
| • Height | 80 mm |
| • Depth | 62 mm |
| Weight | |
| • Weight, approx. | 175 g |

## Ordering data

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

## CP 243-2



### Overview


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

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

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

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

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

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

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

### Ordering data

| | Order No. |
|---|---|
| **CP 243-2 communication processors**<br>For connection of the SIMATIC S7-200 to AS-Interface;<br>corresponds to AS-Interface Specification V2.1;<br>dimensions (W x H x D / mm): 71 x 80 x 62<br>(dimensions without fixing lugs) | **6GK7 243-2AX01-0XA0** |

## Overview

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

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

## Technical specifications

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

3

## Technical specifications (continued)

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

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

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

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

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

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

## MD720-3 GSM/GPRS modem



### Overview


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

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

### Technical specifications

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

| Ordering data | | Order No. |
|---|---|---|
| **GSM/GPRS modem MD720-3**<br>GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS232;<br>manual on CD-ROM in German, English, Chinese, Russian | | **6NH9 720-3AA00** |
| **Accessories** | | |
| **Telecontrol Server Basic**<br>Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATICS7-1200 and SIMATIC S7-200; connection management to 8 remote GPRS stations; routing for connections between S7 GPRS stations; English and German user interface; for Windows 7 Professional, Windows 7 Enterprise, Windows 7 Ultimate, and Windows Server 2008 (32-bit); documentation on CD-ROM in German and English | | |
| • **Telecontrol Server Basic 8**<br>Connection management for eight SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AA0** |
| • **Telecontrol Server Basic 64**<br>Connection management for 64 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AB0** |
| • **Telecontrol Server Basic 256**<br>Connection management for 256 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AC0** |
| • **Telecontrol Server Basic 1000**<br>Connection management for 1000 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AD0** |
| • **Telecontrol Server Basic 5000**<br>Connection management for 5000 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AE0** |

| | Order No. |
|---|---|
| **ANT794-4MR antenna**<br>Quad band antenna, omnidirectional with 5 m cable | **6NH9 860-1AA00** |
| **ANT794-3M antenna**<br>Tri-band flat antenna, in enclosure with 1.2 m cable | **6NH9 870-1AA00** |
| **SIMATIC S7-200 PPI modem cable**<br>For connecting the S7-200 to the GSM/GPRS modem SINAUT MD720-3 | **6NH9 701-0AD** |
| **Connecting cable**<br>For connecting a TIM3V-IE/TIM4 (RS232) with the GSM modem MD720-3 (access to GSM network). Also suitable for third-party modems or radio equipment with RS232 standard; cable length 2.5 m. | **6NH7 701-5AN** |
| **SITOP compact 24 V/ 0.6 A**<br>1-phase power supply with wide-range input 85 … 264 V AC/110 … 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design | **6EP1 331-5BA00** |

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

# MD741-1 EGPRS router



## Overview


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

## Technical specifications

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

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

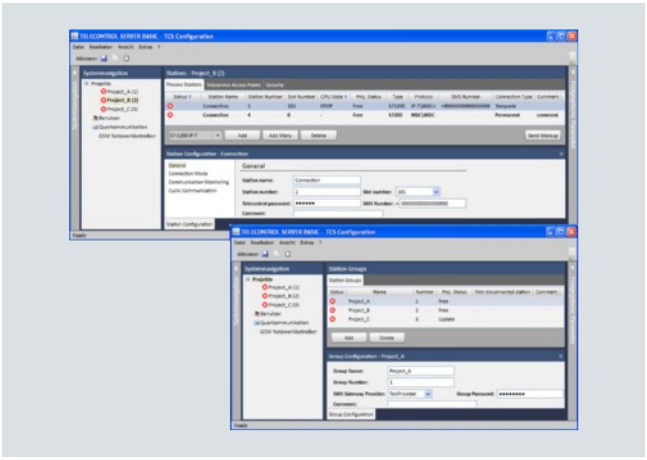
| Ordering data | | Order No. |
|---|---|---|
| **MD741-1 EGPRS router**<br>For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12 | | **6NH9 741-1AA00** |
| **Accessories** | | |
| **IE FC RJ45 Plug 180**<br>RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | |
| • 1 pack = 1 unit | | **6GK1 901-1BB10-2AA0** |
| • 1 pack = 10 units | | **6GK1 901-1BB10-2AB0** |
| • 1 pack = 50 units | | **6GK1 901-1BB10-2AE0** |
| **ANT794-4MR antenna**<br>Quad band antenna for MD720-3 and MD741-1, omnidirectional with 5 m cable | | **6NH9 860-1AA00** |
| **ANT794-3M antenna**<br>Tri-band flat antenna, in enclosure with 1.2 m cable | | **6NH9 870-1AA00** |
| **SCALANCE S Industrial Security Modules**<br>For protection of programmable controllers and automation networks, and for safeguarding of industrial communication; configuring tool and electronic manual on CD-ROM;<br>German, English, French, Italian, Spanish | | |
| • **SCALANCE S612**<br>uses the Stateful Inspection Firewall to protect network segments against unauthorized access;<br>protects up to 32 devices<br>up to 64 VPN tunnels simultaneously | B | **6GK5 612-0BA00-2AA3** |
| • **SCALANCE S613**<br>uses Stateful Inspection Firewall to protect network segments against unauthorized access;<br>protects up to 64 devices,<br>up to 128 VPN tunnels simultaneously;<br>enhanced temperature range (-20 ... +70 °C) | B | **6GK5 613-0BA00-2AA3** |
| **IE TP Cord RJ45/RJ45**<br>TP cable 4 x 2 with 2 RJ45 connectors | | |
| • 0.5 m | | **6XV1 870-3QE50** |
| • 1 m | | **6XV1 870-3QH10** |
| • 2 m | | **6XV1 870-3QH20** |
| • 6 m | | **6XV1 870-3QH60** |
| • 10 m | | **6XV1 870-3QN10** |

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

## Telecontrol Server Basic



### Overview



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

### Technical specifications

| | Telecontrol Server Basic |
|---|---|
| Supported controllers | S7-1200 with CP1242-7<br>S7-200/S7-1200 with MD720-3 modem (block library included in the scope of supply) |
| Number of connections (stations) that can be operated (depending on the order version) | 8, 64, 256, 1000, or 5000 connections |
| Number of STEP 7 projects that can be operated in parallel | 2000 projects (structured representation, separation of the projects via programmable user rights) |
| Number of STEP 7 Teleservice connections that can be operated in parallel | 5 connections per project (separation of the projects via programmable user rights) |
| Interfaces to the OPC Client | • DCOM protocol<br>• OPC interface "Data Access Interface 3.0"<br>• Synchronous and asynchronous reading of variables |
| Interfaces and functions between the OPC server and SIMATIC S7 | • Writing of variables in the SIMATIC S7 in the case of value changes to OPC variables<br>• Transfer of SIMATIC S7 data to OPC variables (for event-driven communication from the SIMATIC S7)<br>• Activatable cyclic reading of variables; adjustable time interval<br>• Monitoring of connected SIMATIC S7 with time-of-day synchronization<br>• Routing of data packets between connected SIMATIC S7-1200 stations or between S7-200 stations<br>• Permanent GPRS connection; the tunnel is established from the GPRS modem<br>• Temporary GPRS connection (as required); the tunnel is established from the GPRS modem and can be initiated by a text message sent automatically by the OPC server ("wake-up"). Manual "wake-up" using a mobile phone is also possible.<br>• Via Internet access as server with public IP address (recommendation: fixed public Internet address) |
| Operating systems | Microsoft Windows 7 Professional<br>Microsoft Windows 7 Enterprise<br>Microsoft Windows 7 Ultimate<br>Microsoft Windows Server 2008 (32-bit) |
| Diagnostics | Station group monitoring<br>Station monitoring<br>Connection monitoring<br>STEP 7 Teleservice across Internet and router boundaries – S7-1200 only |
| Configuration | Integral configuration tool<br>Multi-project-capable<br>Multi-user-capable with user management<br>Configurations can be expanded at runtime |

| Ordering data | | Order No. |
|---|---|---|
| **Telecontrol Server Basic** | | |
| Software for 8 to 5000 stations; Single License for one installation; OPC server for GPRS communication with SIMATIC S7-1200 and SIMATIC S7-200; connection management to remote GPRS stations; routing for connections between S7 GPRS stations; German and English operator interface; for Windows 7 Professional, Windows 7 Enterprise, Windows 7 Ultimate and Windows Server 2008 (32-bit); documentation on CD-ROM, German and English | | |
| • **Telecontrol Server Basic 8** Connection management for eight SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AA0** |
| • **Telecontrol Server Basic 64** Connection management for 64 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AB0** |
| • **Telecontrol Server Basic 256** Connection management for 256 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AC0** |
| • **Telecontrol Server Basic 1000** Connection management for 1000 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AD0** |
| • **Telecontrol Server Basic 5000** Connection management for 5000 SIMATIC S7-1200 or S7-200 stations | J | **6NH9 910-0AA20-0AE0** |

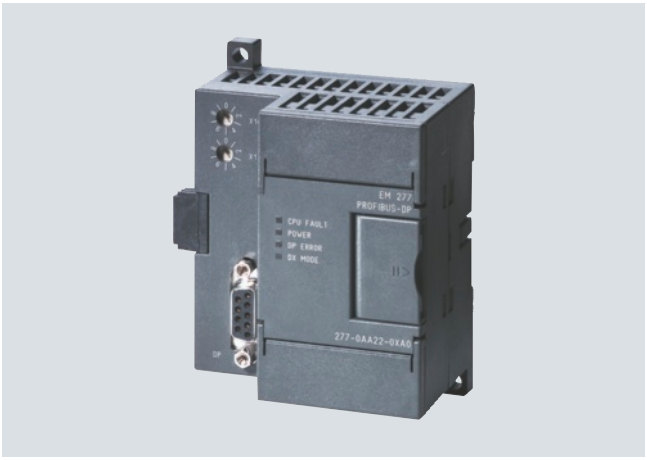
| | Order No. |
|---|---|
| Accessories | |
| **CP 1242-7 communication processor** Communication processor for connecting SIMATIC S7-1200 to GSM/GPRS mobile wireless network | **6GK7 242-7KX30-0XE0** |
| **MD720-3 GSM/GPRS modem** GPRS modem for IP-based data transmission over GSM networks, quad band, AT command interface, automatic establishment of GPRS connection, switchable to CSD mode, RS232, including gender changer for RS232/PPI adapter; manual on CD-ROM in German, English, Chinese, Russian | **6NH9 720-3AA00** |
| **ANT794-4MR antenna** Quad band antenna, omnidirectional with 5 m cable | **6NH9 860-1AA00** |
| **ANT794-3M antenna** Triband flat antenna, in enclosure with 1.2 m cable | **6NH9 870-1AA00** |

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

## SIPLUS PROFIBUS DP EM 277



### Overview




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

***Note:***

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

| **SIPLUS EM 277 PROFIBUS DP module** | |
|---|---|
| **Order number** | **6AG1 277-0AA22-2XA0** |
| **Order No. based on** | **6ES7 277-0AA22-0XA0** |
| Ambient temperature range | -25 ... +70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Ambient conditions | Suitable for exceptional exposure to media (e.g. sulfur chlorine atmosphere). |
| Compliant with the standards for electronic equipment used on railway rolling stock (EN 50155, temperature T1, category 1). | Yes |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)] |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

| **Ordering data** | **Order No.** |
|---|---|
| **SIPLUS EM 277 input module for PROFIBUS DP**<br>(extended temperature range and medial exposure)<br>For CPU 222/224/224 XP/226; for connecting to PROFIBUS DP (slave) and MPI | **6AG1 277-0AA22-0XA0** |

## Overview


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

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

***Note:***

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

| **SIPLUS MD702-3 GSM / GPRS modem** | |
|---|---|
| **Order No.** | **6AG1 720-3AA00-7AA0** |
| **Order No. based on** | **6NH9 720-3AA00** |
| Ambient temperature range | -25 ... +70 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)] |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

1) SA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

## Ordering data

| | Order No. |
|---|---|
| **SIPLUS MD720-3 GSM/GPRS modem**<br>(extended temperature range and medial exposure)<br>GPRS modem for IP-based data transmission over GSM networks, quad-band, AT command interface, automatic establishment of GPRS connection, switchable to CSD operation, RS232;<br>manual on CD-ROM in German, English, Chinese, Russian | **6AG1 720-3AA00-7AA0** |
| **Accessories** | see GSM/GPRS modem MD720-3, page 3/69 |

## SIPLUS MD741-1 EGPRS routers



### Overview


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

***Note:***

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

| **SIPLUS MD741-1 EGPRS ROUTER** | |
|---|---|
| **Order number** | **6AG1 741-1AA00-2AA0** |
| **Order No. based on** | **6NH9 741-1AA00** |
| Ambient temperature range | -25 ... +60 °C |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 5 ... 100 %<br>Condensation permissible |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1] [2] |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2] |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa<br>(-1000 ... +2000 m)<br>see ambient temperature range<br>795 ... 658 hPa<br>(+2000 ... +3500 m)<br>derating 10 K<br>658 ... 540 hPa<br>(+3500 ... +5000 m)<br>derating 20 K |

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here:
www.siemens.com/siplus-extreme

| **Ordering data** | **Order No.** |
|---|---|
| **SIPLUS MD741-1 EGPRS router**<br>(extended temperature range and medial exposure)<br>For wireless IP communication by industrial Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12 | **6AG1 741-1AA00-2AA0** |
| **Accessories** | see EGPRS router MD741-1, page 3/71 |

## Overview


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

## Technical specifications

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

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

## The S7-200 version

### Technical specifications (continued)

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

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

### Ordering data

| | | Order No. |
|---|---|---|
| **SIPLUS S7-200 PS203**<br>-25 … +70°C with conformal coating<br>based on 6EP1332-1SH31<br>S7-200 style,<br>stabilized power supply<br>Input: 120/230 V AC<br>Output: 24 V DC/3.5 A<br>S7-200 design | H | **6AG1203-1SH31-2AA0** |
| **SITOP power 3.5**<br>Universal Line<br>stabilized power supply<br>Input: 120/230 V AC,<br>Output: 24 V DC/3.5 A<br>S7-200 design | | **6EP1332-1SH31** |
| ***Accessories*** | | |
| **SITOP power mounting bracket**<br>90 degree 35 mm DIN rail,<br>M5 fixing screws,<br>for Special Line flat | | **6EP1971-1AA01** |

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

### More information

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

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

You can find more information in Catalog KT 10.1 and in the Internet at
www.siemens.com/sitop

## SIPLUS S7-200 PS 203



### Overview


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

***Note:***

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

| **SIPLUS S7-200 PS 203** | |
|---|---|
| **Order number** | **6AG1 203-1SH31-2AA0** |
| **Order No. based on** | **6EP1 332-1SH31** |
| Conformal coating | Coating of the printed circuit boards and the electronic components |
| Ambient temperature range | -25 ... +70 °C |
| Technical data | The technical data of the standard product applies except for the ambient conditions. |
| **Ambient conditions** | |
| Relative humidity | 5 ... 100%, condensation allowed |
| Biologically active substances | Conformity with EN 60721-3-3, Class 3B2 mold and fungal spores (except fauna) |
| Chemically active substances | Conformity with EN 60721-3-3, Class 3C4 incl. salt mist and ISA–S71.04 severity level G1; G2; G3; GX [1) 2)] |
| Mechanically active substances | Conformity with EN 60721-3-3, Class 3S4 including conductive sand, dust [2)] |
| Air pressure (depending on the highest positive temperature range specified) | 1080 ... 795 hPa (-1000 ... +2000 m) see ambient temperature range<br>795 ... 658 hPa (+2000 ... +3500 m) derating 10 K<br>658 ... 540 hPa (+3500 ... +5000 m) derating 20 K |

1) ISA-S71.04 severity level GX: Long-term load: $SO_2$ < 4.8 ppm; $H_2S$ < 9.9 ppm; Cl < 0.2 ppm; HCl < 0.66 ppm; HF < 0.12 ppm; NH < 49 ppm; $O_3$ < 0.1 ppm; NOX < 5.2 ppm
Limit value (max. 30 min/d): $SO_2$ < 17.8 ppm; $H_2S$ < 49.7 ppm; Cl < 1.0 ppm; HCl < 3.3 ppm; HF < 2.4 ppm; NH < 247 ppm; $O_3$ < 1.0 ppm; NOX < 10.4 ppm

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

The technical documentation on SIPLUS can be found here: www.siemens.com/siplus-extreme

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

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