## Modules

Table 1-1 lists all modules which satisfy the extended environmental conditions.

The Order No. of the corresponding ”standard” module has additionally been included in the Table as a configuring aid. Refer to these ”standard” modules for a detailed description and technical specifications.

Table 1-1 Modules for extended environmental conditions

| Module | SIMATIC outdoor module for use under extended environmental conditions | “Standard” modules |
|---|---|---|
| | as of order no. | |
| IM 153-1 | 6ES7 153-1AA**82**-0XB0 | 6ES7 153-1AA02-0XB0 |
| IM 153-2 FO | 6ES7 153-2AB**80**-0XB0 | 6ES7 153-2AB00-0XB0 |
| CPU 315-2 DP | 6ES7 315-2AF**82**-0AB0 | 6ES7 315-2AF02-0AB0 |
| CPU 312 | 6ES7 312-5AC**81**-0AB0 | 6ES7 312-5AC01-0AB0 |
| CPU 314 | 6ES7 314-1AE**83**-0AB0 | 6ES7 314-1AE03-0AB0 |
| CPU 314 IFM | 6ES7 314-5AE**83**-0AB0 | 6ES7 314-5AE03-0AB0 |
| IM 365 | 6ES7 365-0BA**81**-0AA0 | 6ES7 365-0BA01-0AA0 |
| SM 321 digital input module; | | |
| SM 321; DI 16 × 24 VDC | 6ES7 321-1BH**81**-0AA0 | 6ES7 321-1BH01-0AA0 |
| SM 321; DI 16 x 48 to 125 VDC | 6ES7 321-1CH**80** 0AA0 | 6ES7 321-1CH80-0AA0 |
| SM 321; DI 32 × 24 VDC | 6ES7 321-1BL**80**-0AA0 | 6ES7 321-1BL00-0AA0 |
| SM 321; DI 16 × 24 VDC | 6ES7 321-7BH**80**-0AB0 | 6ES7 321-7BH00-0AB0 |
| SM 321; DI 8 × 120/230 VAC | 6ES7 321-1FF**81**-0AA0 | 6ES7 321-1FF01-0AA0 |
| SM 322 digital output module; | | |
| SM 322; DO 16 × 24 VDC/0.5 A | 6ES7 322-1BH**81**-0AA0 | 6ES7 322-1BH01-0AA0 |
| SM 322; DO 8 ××Rel. 230 VAC/5 A | 6ES7 322-1HF**80**-0AA0 | 6ES7 322-1HF10-0AA0 |
| SM 322; DO 32 ××24 VDC/0,5 A | 6ES7 322-1BL**80**-0AA0 | 6ES7 322-1BL00-0AA0 |
| SM 322; DO 8 x 48 to 125 VDC/1,5 A | 6ES7 322-1CF**80**- 0AA0 | 6ES7 322-1CF80-0AA0 |
| SM 322; DO 8 ××120/230 VAC/2 A | 6ES7 322-1FF**81**-0AA0 | 6ES7 322-1FF01-0AA0 |
| SM 323 digital I/O module; | | |
| DI8/DO8 ××24 VDC/0.5 A | 6ES7 323-1BH**80**-0AA0 | 6ES7 323-1BH00-0AA0 |
| SM 331 analog input module; AI 2×12 Bit | 6ES7 331-1KB**81**-0AB0 | 6ES7 331-1KB01-0AB0 |
| SM 332 analog output module; AO 2×12 Bit | 6ES7 332-5HB**81**-0AB0 | 6ES7 332-5HB01-0AB0 |
| SM 334 analog I/O module; | | |
| AI4/AO 2×12 Bit | 6ES7 334-0KE**80**-0AB0 | 6ES7 334-0KE00-0AB0 |
| FEPROM 64 KByte memory card | 6ES7 951-0KF**80**-0AA0 | 6ES7 951-0KF00-0AA0 |
| FEPROM 32 kByte memory card | 6ES7 951-0KE**80**-0AA0 | 6ES7 951-0KE00-0AA0 |
| FEPROM 16 kByte memory card | 6ES7 951-0KD**80**-0AA0 | 6ES7 951-0KD00-0AA0 |
| Bus connector | 6ES7 972-0BAx0-0XA0<br>6ES7 972-0BBx0-0XA0 | |

## 1.1.1 Digital Input Module SM 321; DI 16 × 48 to 125 VDC

### Order No.

6ES7 321–1CH80–0AA0

### Characteristics

The digital input module SM 321; DI 16 × 48 to 125 VDC has the following salient features:

- 16 input points, isolated in groups of 8
- 48 to 125 VDC rated input voltage
- Suitable for switches and 2/3/4-wire BEROs (proximity switches).

## Terminal Connection Diagram and Block Diagram

Figure 1-1 shows the terminal connection diagram and block diagram of the digital input module SM 321; DI 16 × 48 to 125 VDC

You will find the detailed technical specifications of the module on the following page.

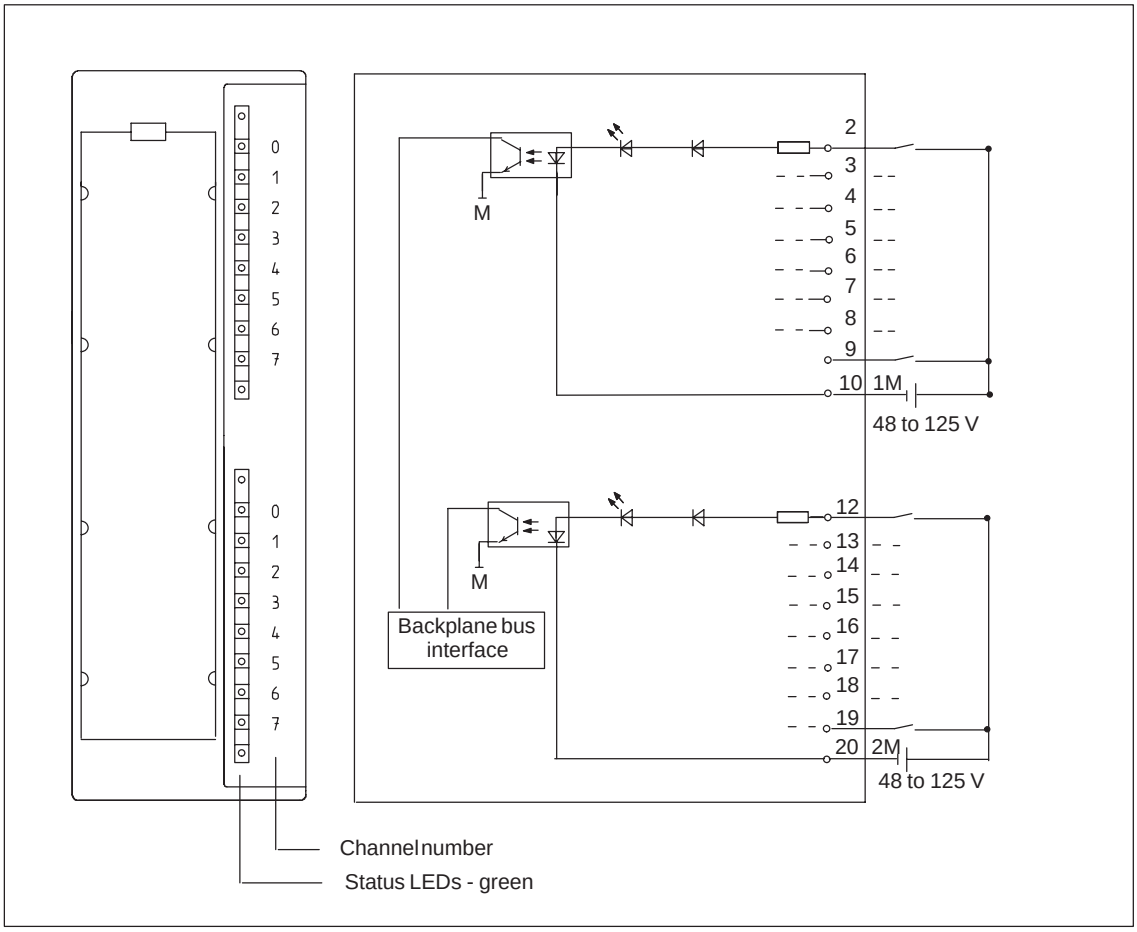



Figure 1-1 Module View and Block Diagram of Digital Input Module SM 321; DI 16 x 48 to 125 VDC

| Dimensions and Weight | | |
|---|---|---|
| Dimensions W × H × D | 40 × 125 × 120 mm (1.56 × 4.88 × 4.68 in.) | |
| Weight | approx. 200 g (7 oz.) | |
| **Module-Specific Data** | | |
| Number of input points | 16 | |
| Length of cable | | |
| • Unshielded | max. 600 m (654 yd.) | |
| • Shielded | max. 1000 m (1090 yd.) | |
| **Voltages, Currents, Potentials** | | |
| Number of input points that can be driven simultaneously (per group) | Up to 60V | Up to 146V |
| • Horizontal installation | | |
| up to 50 °C/122 °F | 8 | 8 |
| up to 60 °C/140 °F | 8 | 6 |
| • Vertical installation | | |
| up to 40 °C/104 °F | 8 | 8 |
| Galvanic isolation | | |
| • between channels and backplane bus | Yes | |
| • between the channels in groups of | Yes<br>8 | |
| Permissible potential differences | | |
| • between inputs of different groups | 146 VDC<br>132 VAC | |
| Insulation tested with | 1500 VDC | |
| Current drawn | | |
| • from backplane bus | max. 40 mA | |
| Module power losses | typ. 4.3 W | |
| **Status, Interrupts, Diagnostics** | | |
| Status display | Green LED per channel | |
| Interrupts | None | |
| Diagnostics functions | None | |

| Sensor Selection Data | |
|---|---|
| Input voltage | |
| • Rated value | 48 to 125 VDC |
| • for “1” signal | 30 to 146 V |
| • for “0” signal | – 30 to 15 V |
| • Reverse polarity protection | Yes |
| Input current | |
| • at “1” signal | 2.0 to 3.5 mA |
| Input delay | |
| • from “0” to “1” | 0.1 to 3.5 ms |
| • from “1” to “0” | 0.7 to 3.0 ms |
| Input characteristic | To IEC 1131, type 1 |
| Connection of 2-wire BEROs | Possible with PLC type BERO |
| • Permissible closed-circuit current | max. 1 mA |

## 1.1.2 Digital Output Module SM 322; DO 8 X 48 to 125 VDC/1.5 A

### Order No.

6ES7 322-1CF80-0AA0

### Characteristics

The digital output module SM 322; DO 8 × 48 to 125 VDC/1.5 A has the following salient features.

- 8 output points, isolated and reverse polarity protected in groups of 4
- 1.5 A output current
- 48 to 125 VDC rated load voltage
- Suitable for solenoid valves, DC contactors and indicator lights.
- Module fault LED
- Channel-by-channel overcurrent protected

### Special Feature

When the power supply is switched on via a mechanical contact, the digital output module SM 322; DO 8 × 48 to 125 VDC/1.5 A sends a “1” signal to its outputs for approximately 50 μs. You must observe this when using the digital output module SM 322; DO 8 × 48 to 125 VDC/1.5 A for high-speed counters!

## Terminal Connection Diagram and Block Diagram

Figure 1-2 shows the terminal connection diagram and block diagram of the module SM 322; DO 8 × 48 to 125 VDC/1.5 A.

You will find the detailed technical specifications of the module SM 322; DO 8 × 48 to 125 VDC/1.5 A on the following page.

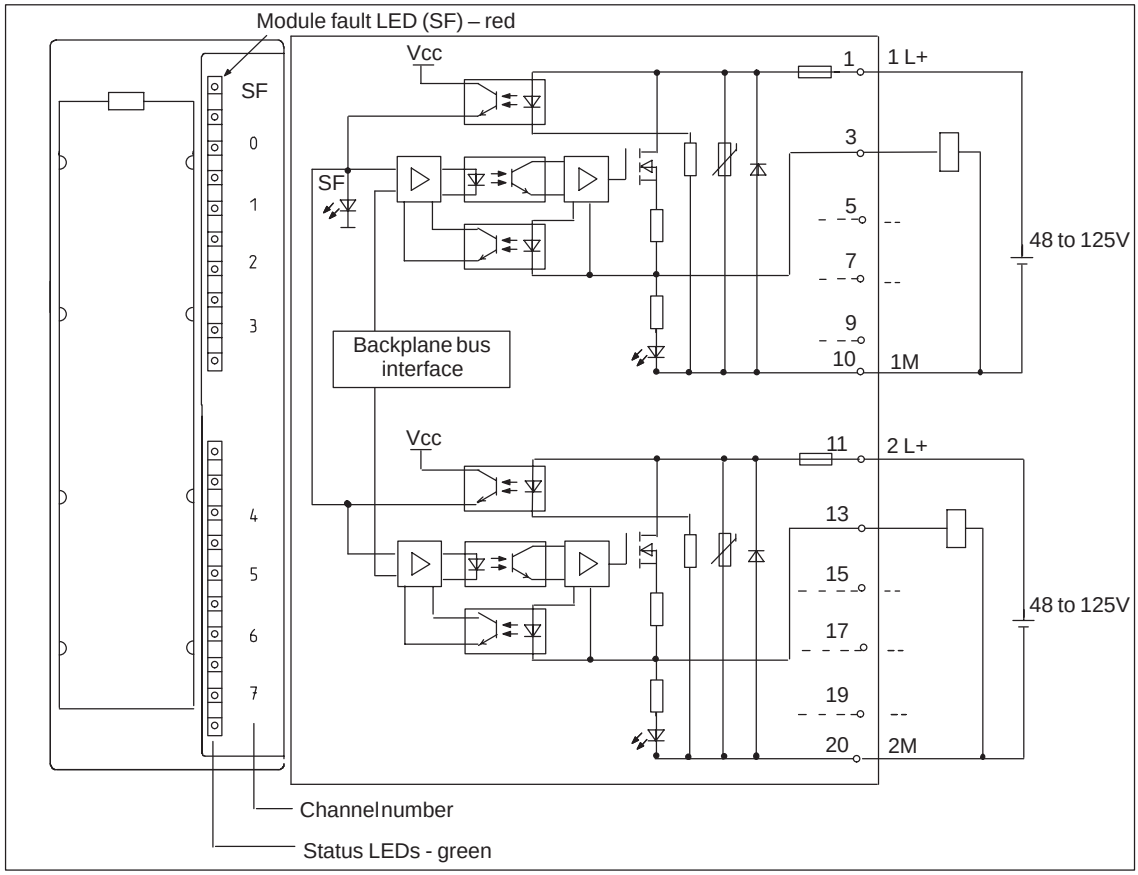



Figure 1-2 Module View and Block Diagram of Digital Output Module SM 322; DO 8 × 48 to 125 VDC/1.5 A

| Dimensions and Weight | |
|---|---|
| Dimensions<br>W × H × D | 40 × 125 × 120 mm<br>(1.56 × 4.88 × 4.68 in.) |
| Weight | approx. 250 g<br>(8.81 oz.) |
| **Module-Specific Data** | |
| Number of output points | 8 |
| Length of cable | |
| • Unshielded | max. 600 m (654 yd.) |
| • Shielded | max. 1000 m (1090 yd.) |
| **Voltages, Currents, Potentials** | |
| Rated load voltage L + | 48 to 125 VDC |
| Total current of the outputs (per group) | |
| • horizontal installation<br>up to 40 °C / 104 °F<br>up to 50 °C / 122 °F<br>up to 60 °C / 140 °F | <br>max. 6 A<br>max. 4 A<br>max. 3 A |
| • vertical installation<br>up to 40 °C / 104 °F | <br>max. 4 A |
| Galvanic isolation | |
| • between channels and backplane bus | Yes |
| • between the channels | Yes |
| in groups of | 4 |
| Permissible potential differences | |
| • between different circuits | 146 VDC<br>132 VAC |
| Insulation tested with | 1500 VAC |
| Current drawn | |
| • from backplane bus | max. 100 mA |
| • from load voltage L+ (without load) | max. 2 mA |
| Module power losses | typ. 7.2 W |
| **Status, Interrupts, Diagnostics** | |
| Status display | Green LED per channel |
| Interrupts | None |
| Diagnostics functions | None |
| • Fault indication | Red LED (SF)[1] |

| Actuator Selection Data | |
|---|---|
| Output voltage | |
| • at “1” signal | min. L + – 1.2 V |
| Output current | |
| • at “1” signal<br>Rated value<br>Permissible range | <br>1.5 A<br>10 mA to 1.5 A |
| • Surge current | max. 3 A for 10 ms |
| • at “0” signal residual current | max. 0.5 mA |
| Output delay | |
| • at “0” to “1” | max. 2 ms |
| • at “1” to “0” | max. 15 ms |
| Lamp load | max. 15 W at 48 V<br>max. 40 W at 125 V |
| Parallel connection of 2 outputs | |
| • for redundant actuation of a load | Possible (only outputs of the same group) |
| • to increase power | Not possible |
| Actuation of digital input | Possible |
| Switching frequency | |
| • Resistive loads | max. 25 Hz |
| • Inductive loads | max. 0.5 Hz |
| • Lamp loads | max. 10 Hz |
| Short-circuit protection of output | Yes, electronic[2] |
| • Response threshold | typ. 4.4 A |
| Reverse polarity protection of outputs (per group) | Yes, via fuse |
| Replacement fuses | Fuse, 6.3A, 250V, fast-acting, 5 x 20 mm |
| Fuse carrier | |
| • Schurter | FEK 0031.3562 |

1 If this LED is on it can indicate that the load voltage is missing, there is a blown fuse, or there is an overcurrent of a channel.
2 Once an overload condition is detected, the output is disabled for approximately 2.4 seconds.