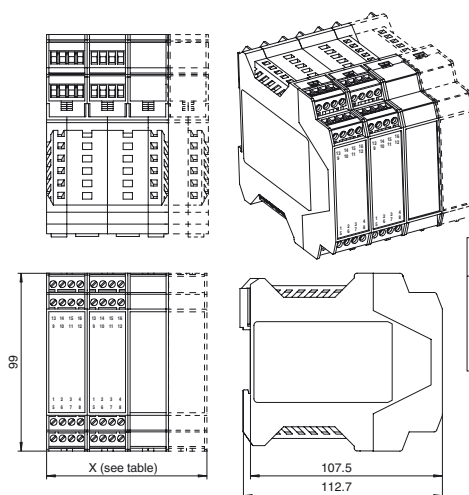




SafeBox



## Dimensions



| Model number         | Number of optional slots | Housing width X [mm] |
|----------------------|--------------------------|----------------------|
| SB4-OR-4CP-B         | 1                        | 67.8                 |
| SB4-OR-4CP-B-B       | 2                        | 90.4                 |
| SB4-OR-4CP-B-B-B     | 3                        | 113                  |
| SB4-OR-4CP-B-B-B-B   | 4                        | 135.6                |
| SB4-OR-4CP-B-B-B-B-B | 5                        | 180.8                |

## Model Number

### SB4-OR-4CP-B-B

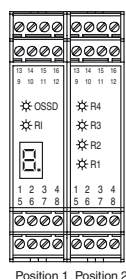
SB4 series safety control unit with optional module slots for functional enhancement

Safety control unit of series SB4

## Features

- Evaluation device for safety thru-beam sensors SLA12 and SLA29 and for 2 channel safety devices (emergency off)
- Expansion slots for SB4 modules for optional enhanced functionality
- Self-monitoring (type 4 according to IEC/EN 61496-1)
- Operating mode can be selected by means of DIP switches
- 7-segment diagnostic display
- Safety outputs OSSD, external status displays OSSD

## Electrical connection



Position 1 Position 2

### Terminal position 1

| Terminal | Function                                     |
|----------|----------------------------------------------|
| 1        | Reset input; NC contact                      |
| 2        | Restart input (RI); NC contact               |
| 3        | 24 V DC connection for reset, restart and RM |
| 4        | Relay monitor (RM)                           |
| 5 - 6    | OSSD1; floating relay contact; NO contact    |
| 7 - 8    | OSSD2; floating relay contact; NO contact    |
| 9        | Signal output OSSD OFF                       |
| 10       | Signal output OSSD ON                        |
| 11       | Signal output Restart                        |
| 12       | Reserved (n.c.)                              |
| 13       | +24 V DC supply voltage                      |
| 14       | 0 V DC supply voltage                        |
| 15       | Functional ground                            |
| 16       | Reserved (n.c.)                              |

### Terminal position 2

| Terminal | Function             | Channel assignment |
|----------|----------------------|--------------------|
| 1        | Receiver 2 input     | Channel 2          |
| 2        | Receiver 2 +U        |                    |
| 3        | Transmitter 2 +U     |                    |
| 4        | Transmitter 2 output | Output             |
| 5        | Receiver 1 input     | Channel 1          |
| 6        | Receiver 1 +U        |                    |
| 7        | Transmitter 1 +U     |                    |
| 8        | Transmitter 1 output | Output             |
| 9        | Transmitter 3 output | Channel 3          |
| 10       | Transmitter 3 +U     |                    |
| 11       | Receiver 3 +U        |                    |
| 12       | Receiver 3 input     | Channel 4          |
| 13       | Transmitter 4 output |                    |
| 14       | Transmitter 4 +U     |                    |
| 15       | Receiver 4 +U        | Input              |
| 16       | Receiver 4 input     |                    |

These specifications only apply to the basic device. If additional SB4 modules are used, the operating instructions that accompany the device must be observed during planning, installation and operation.

## Technical data

### General specifications

|                |                                       |
|----------------|---------------------------------------|
| Operating mode | Start/restart disable, relay monitor, |
|----------------|---------------------------------------|

### Functional safety related parameters

|                                |                                                                                                 |
|--------------------------------|-------------------------------------------------------------------------------------------------|
| Safety Integrity Level (SIL)   | SIL 3                                                                                           |
| Performance level (PL)         | PL e                                                                                            |
| Category                       | Cat. 4                                                                                          |
| Mission Time (T <sub>M</sub> ) | 20 a                                                                                            |
| PFH <sub>d</sub>               | 3.5 E-9 (These specifications only apply to the basic device. If additional must be requested.) |
| B <sub>10d</sub>               | see instruction manuals                                                                         |
| Type                           | 4                                                                                               |

### Indicators/operating means

|                       |                                                                                                                                |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Diagnostics indicator | 7-segment display                                                                                                              |
| Function indicator    | LED red: OSSD OFF<br>LED green: OSSD ON<br>Yellow LED: start readiness channel 1 - 4<br>LED yellow: switching state (receiver) |
| Pre-fault indicator   | LED yellow flashing: Indicator lamp channel 1 ... 4                                                                            |

### Electrical specifications

|                        |                |                                           |
|------------------------|----------------|-------------------------------------------|
| Operating voltage      | U <sub>B</sub> | 24 V DC, ± 20 %                           |
| No-load supply current | I <sub>0</sub> | max. 500 mA                               |
| Power dissipation      |                | If additional modules are used, max. 50 W |

### Input

|                    |                             |
|--------------------|-----------------------------|
| Activation current | approx. 7 mA                |
| Activation time    | 0.4 ... 1.2 s               |
| Test input         | Reset-input for system test |

### Output

|                   |                                                        |
|-------------------|--------------------------------------------------------|
| Safety output     | 2 relay outputs, force-guided NO-contact               |
| Signal output     | Output for displaying the switching state of the OSSDs |
| Switching voltage | 10 V ... 250 V AC/DC                                   |
| Switching current | min. 10 mA, max. 6 A AC/DC                             |
| Switching power   | DC: max. 24 VA<br>AC: max. 230 VA                      |
| Response time     | 30 ms                                                  |

**Conformity**

|                   |                                |
|-------------------|--------------------------------|
| Functional safety | ISO 13849-1 ; EN 61508 part1-4 |
| Product standard  | EN 61496-1                     |

**Ambient conditions**

|                     |                               |
|---------------------|-------------------------------|
| Ambient temperature | 0 ... 50 °C (32 ... 122 °F)   |
| Storage temperature | -20 ... 70 °C (-4 ... 158 °F) |

**Mechanical specifications**

|                      |                                                                |
|----------------------|----------------------------------------------------------------|
| Degree of protection | IP20                                                           |
| Connection           | screw terminals , lead cross section 0.2 ... 2 mm <sup>2</sup> |
| Material             |                                                                |
| Housing              | Polyamide (PA)                                                 |
| Mass                 | 395 g                                                          |

**Approvals and certificates**

|               |       |
|---------------|-------|
| CE conformity | CE    |
| UL approval   | cULus |
| TÜV approval  | TÜV   |

**Function**

The operating instructions that accompany the unit must be observed during planning, installation and operation.

The SB4 evaluation system is a type 4 (EN 61496-1 or IEC 61496-1) and category 4 (EN 954-1) AOPD. This system has also been designed and tested in accordance with IEC 61508. The system meets the requirements of SIL3.

At most 4 safety thru-beam sensors can be connected to the control interface in the default setting. Other contact-equipped safety devices can be connected instead of the thru-beam sensors.

The control interface has empty slots. They are used for individual function extensions with SB4 modules.

The following SB4 modules can be employed:

- SB4 modules 4C: SB4 modules 4C in various versions.  
SB4 module for connecting four 2-wire sensors
- SB4 modules 4X: SB4 modules 4X in various versions.  
SB4 module for connecting 3-wire sensors and safety devices with semiconductor switching outputs
- SB4 modules 6C: SB4 modules 6C in various versions.  
SB4 module for connecting six 2-wire sensors
- SB4 modules 2E: SB4 modules 2E in various versions.  
Additional 2 OSSDs, relay monitoring, restart connection and 2 connections for contact-equipped safety signals (e.g. emergency off switch), timer functions
- SB4 modules 4M: SB4 modules 4M in various versions.  
Muting module for connecting up to 4 muting sensors

**Operating modes**

The startup/restart interlock is activated by default.

All groups feature DIP switches to select the functions. Two switches must always be actuated in order to select a function.

Switches on the first group:

| Switch  | Position | Operating mode                                  |
|---------|----------|-------------------------------------------------|
| 1 and 3 | OFF      | Without startup/restart interlock (restart, RI) |
|         | ON       | With startup/restart interlock (restart, RI)    |
| 2 and 4 | OFF      | Without relay monitor (RM)                      |
|         | ON       | With relay monitor (RM)                         |

Switches on the second group:

| Switch  | Position | Operating mode                  |
|---------|----------|---------------------------------|
| 1 and 3 | OFF      | No complementary evaluation     |
|         | ON       | Complementary evaluation active |
| 2 and 4 | OFF      | No simultaneous evaluation      |
|         | ON       | Simultaneous evaluation active  |

**Indicators**

The OSSD-R/supply module in position 1 features a red/green LED to signal the OSSD off/on statuses, a yellow LED to indicate the "Ready for startup" status and a 7-segment display for system diagnostics.

The 7-segment display signals the system status and error codes.

| Display | 7-segment display                      |
|---------|----------------------------------------|
| 1       | DIP switch setting not identical       |
| 2       | Incorrect configuration                |
| 3       | Time-out of one or more muting sensors |
| 4       | Transmitter fault                      |
| 6       | Muting lamp fault                      |
| 7       | Simultaneous monitoring fault          |
| 8       | Receiver fault                         |
| 9       | Sensor channel fault                   |
| E       | System fault                           |
| F       | Relay monitor fault                    |
| H       | Selection chain fault                  |
| U       | Under/overvoltage detected             |