

## Safety control unit module SB4 Module 4X

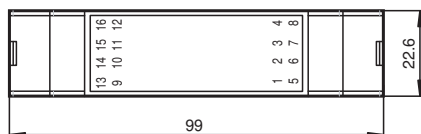
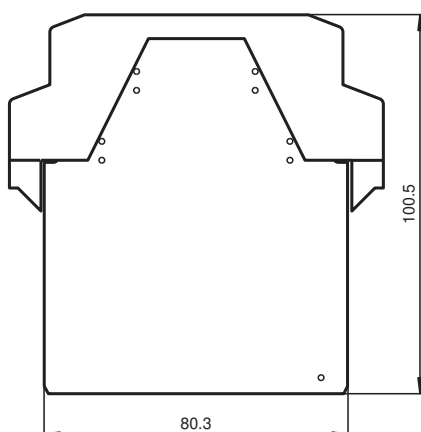


- Sensor module
- 4 sensor channels
- Operating mode can be selected by means of DIP switches
- Individual module for SLA5(S), SLA20, SLA25, SLA28 and SLA40 security through-beam sensors; for SLP safety light grids, for SLC safety light curtains; for switching pads and emergency stop buttons of categories 2 or 4
- Screw terminals or spring terminals

### Safety control unit module



### Dimensions



### Technical Data

#### 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   |
| Type                           | 4      |

#### Indicators/operating means

|                           |                                                     |
|---------------------------|-----------------------------------------------------|
| Function indicator        | LED yellow (4x): indicator lamp channel 1 ... 4     |
| Stability alarm indicator | LED yellow flashing: Indicator lamp channel 1 ... 4 |
| Control elements          | DIP switch                                          |

## Technical Data

### Electrical specifications

Operating voltage  $U_B$  24 V DC  $\pm$  20 % , via SB4 Housing

### Input

Actuating voltage approx. 10 V

Activation current approx. 4 ... 20 mA

### Conformity

Functional safety ISO 13849-1 ; EN 61508 part1-4

Product standard EN 61496-1

### Approvals and certificates

CE conformity CE

UL approval cULus

TÜV approval TÜV

### 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>  
Option /165: Cage tension spring terminals , Cable cross-section 0.2 ... 1.5 mm<sup>2</sup>

Material

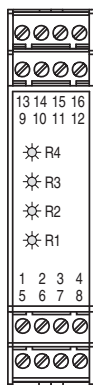
Housing Polyamide (PA)

Mass approx. 150 g

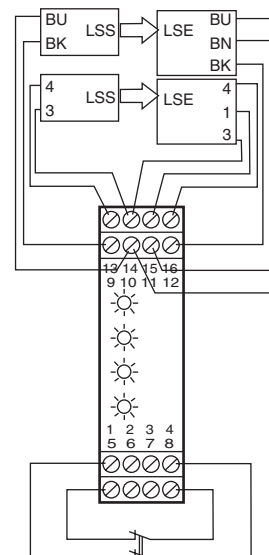
### General information

Ordering information without Option /165 -> with screw terminals  
with Option /165 -> spring clamp terminals

## Connection



| Terminal | Function            | Channel classification | Connection Beam sensor / Light grid safety feature | Connection 2-channel p ON | Connection Switching pad |
|----------|---------------------|------------------------|----------------------------------------------------|---------------------------|--------------------------|
| 1        | Receiver 2 Input    | Channel 2              | Receiver output 2                                  | OSSD Output 1.2           | Switching pad 1.4        |
| 2        | Sensor 2 24 V DC +U |                        | 24 V Receiver2                                     | 24 V Power supply 1       |                          |
| 3        | Sensor 2 Mass GND   |                        | 0 V Receiver 2, Emitter 2                          | 0 V Power supply 1        | Switching pad 1.3        |
| 4        | Emitter 2 Output    | Output                 | Emitter input 2                                    |                           |                          |
| 5        | Receiver 1 Input    | Channel 1              | Receiver output 1                                  | OSSD Output 1.1           | Switching pad 1.2        |
| 6        | Sensor 1 24 V DC +U |                        | 24 V Receiver 1                                    |                           |                          |
| 7        | Sensor 1 Mass GND   |                        | 0 V Receiver 1, Emitter 1                          |                           | Switching pad 1.1        |
| 8        | Emitter 1 Output    | Output                 | Emitter input 1                                    |                           |                          |
| 9        | Emitter 3 Output    | Channel 3              | Emitter input 3                                    |                           | Switching pad 2.4        |
| 10       | Sensor 3 Mass GND   |                        | 0 V Receiver 3, Emitter 3                          | 0 V Power supply 2        |                          |
| 11       | Sensor 3 24 V DC +U |                        | 24 V Receiver 3                                    | 24 V Power supply 2       |                          |
| 12       | Receiver 3 Input    | Input                  | Receiver output 3                                  | OSSD Output 2.2           | Switching pad 2.3        |
| 13       | Emitter 4 Output    | Channel 4              | Emitter input 2                                    |                           | Switching pad 2.2        |
| 14       | Sensor 4 Mass GND   |                        | 0 V Receiver 4, Emitter 4                          |                           |                          |
| 15       | Sensor 4 24 V DC +U |                        | 24 V Receiver 4                                    |                           |                          |
| 16       | Receiver 4 Input    | Input                  | Receiver output 4                                  | OSSD Output 2.1           | Switching pad 2.1        |



## Function

The 4-channel sensor module -4X\* provides the facility to connect so-called "3-Wire" Safety Light Barriers in the SLA family (for example SLA5) and Light Grids of the type SLP. However, it can also be used to provide a connection for p-switching safety devices with their own (Querschlussüberwachung = crossover/short-circuit?) monitoring, for example Safety Light Curtains in the SLC family. As well as this, switch mats devised on the 4-conductor principle and non-solid state safety sensors in single and 2-channel versions can also be connected.

The module features a plug-in jumper. If the system contains other assemblies, then this plug-in jumper must be plugged into the last plug-in station.

There is a 6-position DIP switch on the assembly, with which the sensors that are to be connected are selected. Two switches must be actuated as a pair to make the selection. Connection of the safety sensors takes place on channels 1 and 2 or 3 and 4. "3-wire" light barriers and grids in the SLA and SLP families can be connected to channels 1 to 4.

The cables and the laying of the cables to the safety light barriers and grids must be selected such that a short-circuit is not possible between the receiver and the emitter cable.

Light curtains with semiconductor switch outputs and non-solid state safety sensors in 2-channel versions are monitored for simultaneity/coincidence. During the coincidence monitoring the safety devices are monitored for simultaneous opening and signal changeover. The monitoring time is 2 s.

The connection is made on channels 3 and 4 and/or 1 and 2.

Care should be taken, that these sensors have their own short-circuit monitoring, because the module does not carry out short-circuit monitoring on these sensors.

Non-solid state safety sensors, which are connected to the SafeBox, must operate on the basis of the Normally-Open principle. An open contact means a "Safe condition".

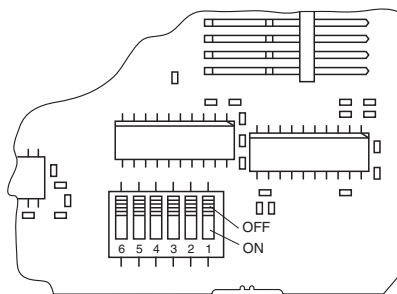
Switch mats based on the 4-conductor principle can be connected to channels 1 and 2 and/or 3 and 4. If an incorrect contacting of the switch mat is present, then the system signals the fault 9 or fault 8, as in the detection of a non-solid state safety sensor in a 2-channel version.

## Operating modes

The assembly has 6 DIP switches for the selection of the sensor type and position. There are six possible options for combining sensors. The desired combination is set up in binary form. It is always necessary to actuate 2 switches when selecting a function, i.e. DIP switches 1 ... 3 have the same switch position as DIP switches 4 ... 6.

| DIP-Switches |         |         | Operating mode                                                |
|--------------|---------|---------|---------------------------------------------------------------|
| 3 and 6      | 2 and 5 | 1 and 4 |                                                               |
| 0            | 0       | 0       | SLA /SLP/jumper channels 1 + 2 and channels 3 + 4             |
| 0            | 0       | 1       | SLA /SLP/jumper on channels 1 + 2 and SLC channels 3 + 4      |
| 0            | 1       | 0       | SLC channels 1 + 2 and channels 3 + 4                         |
| 0            | 1       | 1       | SLA /SLP/jumper channels 1 + 2 and switch mats channels 3 + 4 |
| 1            | 0       | 0       | switch mats channels 1 + 2 and channels 3 + 4                 |
| 1            | 0       | 1       | SLC channels 1 + 2 and switch mats channels 3 + 4             |

Position of the DIP switches



## Displays

There is a yellow LED on the front panel of the module for each channel, which indicates the status of the input channel.

| Display | LED | Meaning |
|---------|-----|---------|
|---------|-----|---------|

|                      |        |                                                                                                                                                                                                    |
|----------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R1 - R4<br>(R1 - R6) | yellow | Status, sensor input 1 ..4<br>Off: broken<br>On: free<br>Flashing: light beam free, stability control inadequate<br>(Frequency approx. 2.5 Hz)<br>Fast flashing: Fault (Frequency approx.<br>5 Hz) |
|----------------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Connections

The connections take the form of removable screw terminals. The adjacent table indicates the terminal assignment.

Up to 4 light barriers or 2 two-channel p-switching safety devices or 2 switch mats can be connected to the 4-channel sensor module. Unused channels are to be rendered ineffective by means of a jumper between the emitter output and the receiver input.

