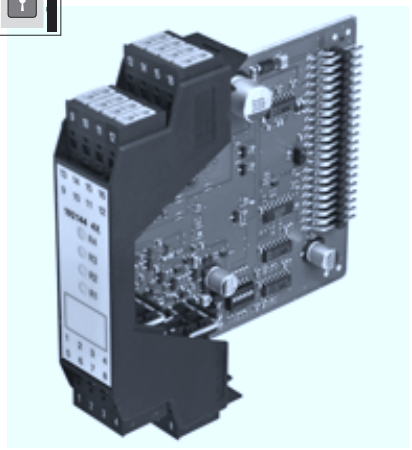
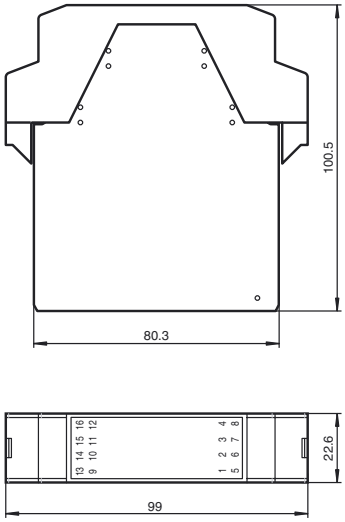


Dimensions



Model Number

SB4 Module 4X/165

Safety control unit module

Module for Evaluation unit SafeBox - series SB4

Features

- 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

Accessories

SB4 Cape
cover sheet

SB4 Housing 2
Empty housing for Evaluation unit SB4

SB4 Housing 3
Empty housing for Evaluation unit SB4

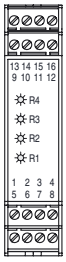
SB4 Housing 4
Empty housing for Evaluation unit SB4

SB4 Housing 5
Empty housing for Evaluation unit SB4

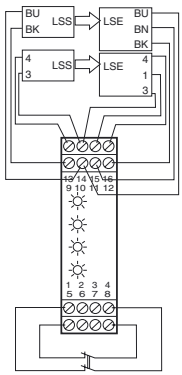
SB4 Housing 6
Empty housing for Evaluation unit SB4

SB4 Housing 8
Empty housing for Evaluation unit SB4

Electrical connection



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



Technical data

Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 3
Performance level (PL)		PL e
Category		Cat. 4
Mission Time (T_M)		20 a
Type		4
Indicators/operating means		
Function display		LED yellow (4x): indicator lamp channel 1 ... 4
Pre-fault indication		LED yellow flashing: Indicator lamp channel 1 ... 4
Controls		DIP-switch
Electrical specifications		
Operating voltage	U_B	24 V DC ± 20 % , via SB4 Housing
Input		
Actuating voltage		approx. 10 V
Activation current		approx. 4 ... 20 mA
Ambient conditions		
Ambient temperature		0 ... 50 °C (32 ... 122 °F)
Storage temperature		-20 ... 70 °C (-4 ... 158 °F)
Mechanical specifications		
Protection degree		IP20
Connection		Cage tension spring terminals , Cable cross-section 0.2 ... 1.5 mm^2
Material		
Housing		Polyamide (PA)
Mass		approx. 150 g
Compliance with standards and directives		

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Standard conformity	(extract)
Standards	EN IEC 61496-1 EN IEC 61508 EN ISO 13849-1
Approvals and certificates	
SIL classification	up to SIL3 acc. to IEC 61508 tested and certified by TÜV SÜD according to: IEC 61508:1998 part 1, 3.4 IEC 61508: 2000 ISO 13849-1:2006 EN 50178:1997 IEC 61496-1:2004 IEC 61496-2:2006
UL approval	cULus
TÜV approval	TÜV

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 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

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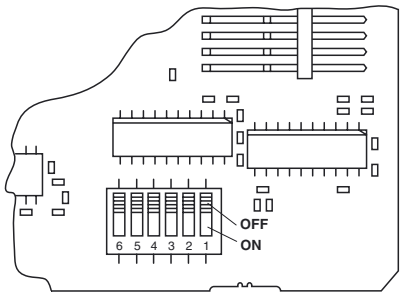
Lage der DIP-Schalter



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

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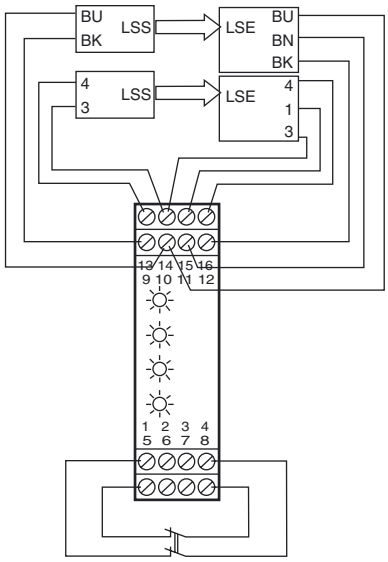

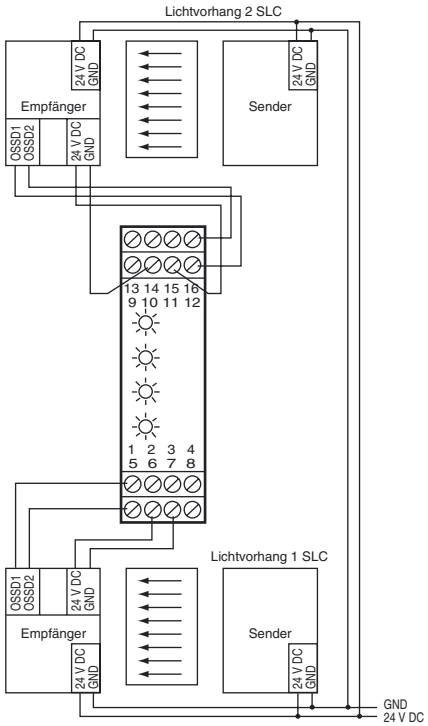

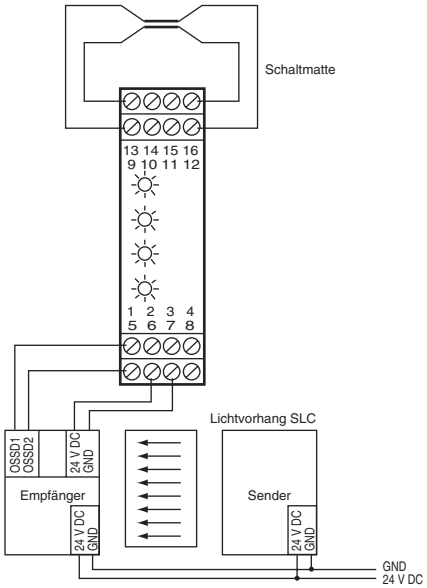

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