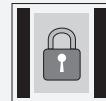




Safety control unit

SB4-OR-4XP-4M

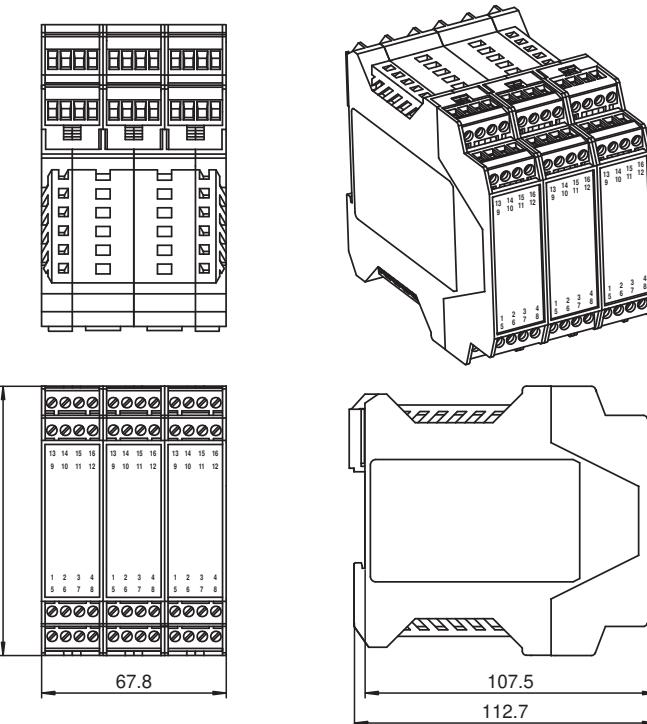


- Evaluation unit for security through-beam sensors SLA5(S) and SLA40; for safety light grids SLP, for safety light curtains SLC; for switching pads and emergency stop buttons of categories 2 and 4
- 4 sensor channels
- Self-monitoring (type 4 according to IEC/EN 61496-1)
- Operating mode can be selected by means of DIP switches
- Start/Restart disable
- Relay monitor
- Sequential and parallel muting in various operating modes
- Double muting
- Emergency muting for the correction of the material jam
- Stability alarm indication
- Clearly visible LED functional display
- 7-segment diagnostic display
- Safety outputs OSSD, external status displays OSSD

Safety control unit



Dimensions



Technical Data

General specifications

Operating mode	Start/restart disable, relay monitor, muting operating modes
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Functional safety related parameters

Safety Integrity Level (SIL)	SIL 3
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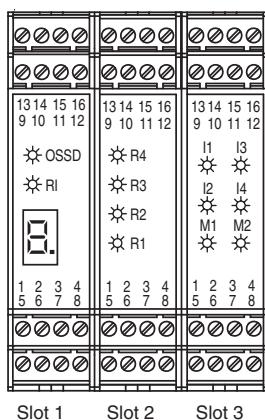
Performance level (PL)	PL e
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Category	Cat. 4
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Technical Data

Mission Time (T_M)	20 a
PFH_d	3.5 E-9
B_{10d}	see instruction manuals
Type	4
Indicators/operating means	
Diagnostics indicator	7-segment display
Function indicator	LED red: OSSD OFF LED green: OSSD ON Yellow LED: start readiness channel 1 - 4 LED yellow: switching state (receiver)
Stability alarm indicator	LED yellow flashing: Indicator lamp channel 1 ... 4
Electrical specifications	
Operating voltage	U_B 24 V DC, $\pm 20\%$
No-load supply current	I_0 500 mA
Protection class	no identification ; see instruction manuals
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	1 PNP each, max. 300 mA for start readiness, OSSD on, OSSD off, muting lamp
Switching voltage	10 V ... 250 V AC/DC
Switching current	min. 10 mA , max. 6 A AC/DC
Switching power	DC: max. 24 VA AC: max. 230 VA
Response time	38 ms
Conformity	
Functional safety	ISO 13849-1 ; EN 61508 part1-4
Product standard	EN 61496-1
Approvals and certificates	
CE conformity	CE
UKCA conformity	UKCA
UL approval	cULus
TÜV approval	TÜV
Ambient conditions	
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)
Relative humidity	max. 95 %, not condensing
Shock resistance	see instruction manuals
Vibration resistance	see instruction manuals
Mechanical specifications	
Degree of protection	IP20
Connection	screw terminals , lead cross section 0.2 ... 2 mm ²
Material	
Housing	Polyamide (PA)
Mass	430 g

Connection



Terminal Slot 1

Terminal	Function
1	Reset input; normally closed contact
2	Restart input (RI); normally closed contact
3	24 V DC connection for reset, restart and RM
4	Relay monitor (RM)
5 - 6	OSSD1; potential free relay contact; normally open contact
7 - 8	OSSD2; potential free relay contact; normally open contact
9	Signal output OSSD OFF
10	Signal output OSSD ON
11	Signal output restart
12	Leave free (n.c.)
13	+24 V DC supply voltage
14	0 V DC supply voltage
15	Earth
16	Leave free (n.c.)

Terminal Slot 3

Terminal	Function
1	24 V sensor supply
2	Sensor 2 IN
3	Sensor 4 IN
4	0 V sensor supply
5	24 V sensor supply
6	Sensor 1 IN
7	Sensor 3 IN
8	0 V sensor supply
9	Input override 1
10	24 V override 1
11	24 V override 2
12	Input override 2
13	+24 V DC supply voltage for muting lamps
14	0 V DC supply voltage for muting lamps
15	Output muting lamp 1
16	Output muting lamp 2

Terminal Slot 2

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

Matching System Components

	SLP8-2	Safety light grid
	SLP8-2-A-L	Safety light grid, active column
	SLP8-2-L	Safety light grid
	SLP8-2-M	Deviation mirror
	SLP10-2	Safety light grid
	SLP10-2-L	Safety light grid
	SLP10-3	Safety light grid
	SLP10-3-L	Safety light grid

Matching System Components

	SLP10-4	Safety light grid
	SLP10-4-L	Safety light grid
	SLCT14	Safety light curtain
	SLCT14-*3702	Safety light curtain
	SLCT30	Safety light curtain
	SLCT30/35	Safety light curtain
	SLCT30-*3702	Safety light curtain
	SLCT60	Safety light curtain
	SLCT60/35	Safety light curtain
	SLCT90	Safety light curtain
	SLCT90/35	Safety light curtain
	SLCS14	Safety light curtain
	SLCS14-*3702	Safety light curtain
	SLCS14-*3702	Safety light curtain
	SLCS30	Safety light curtain
	SLCS30/35	Safety light curtain
	SLCS30-*3702	Safety light curtain
	SLCS30-*3702	Safety light curtain
	SLCS60	Safety light curtain
	SLCS60/35	Safety light curtain

Matching System Components

	SLCS90	Safety light curtain
	SLCS90/35	Safety light curtain
	SLCT-M-01	Inclined mirror for stable 90° deflection with cover plate
	SLCT-M-01-1200	Inclined mirror for stable 90° deflection with cover plate
	SLCT-M-01-1500	Inclined mirror for stable 90° deflection with cover plate
	SLCT-M-01-2100	Inclined mirror for stable 90° deflection with cover plate
	SLC-XXX-M	Safety light grid mirror

Function

The evaluation system SB4 is an ESPE of type 4 (EN 61496-1 or IEC 61496-1) or category 4 (EN 954-1). This system is also designed and tested according to IEC 61508. It meets the requirements for the SIL3.

The operating instructions supplied with the device must be observed for planning, installation and operation.

A maximum of 4 safety light barriers can be connected to the evaluation device.

With the sensor card on position 2, it is possible to connect "3-wire" light barriers of the SLA family (for example SLA5) and light grids of the SLP type. But also p-switching safety devices with dedicated cross circuit monitoring can be connected, for example safety light curtains from the SLC family. In addition switch-off mats of the 4-wire principle or integrated safety sensors in the 1 or 2 channel version can be connected.

The cable or the manner it is laid to the light barriers and light grids must be chosen that no short circuit between the receiver and transmitter wires is possible.

Light curtains with semiconductor switch outputs and integrated safety sensors in 2 channel design are monitored for simultaneousness. The monitoring time is 2 s.

The connection is done on channels 3 and 4 and/or 1 and 2. Note that these sensors must feature a dedicated cross circuit monitoring, because the module does not

carry out the cross circuit monitoring for these sensors. Integrated safety sensors, which are connected to the Safebox must work according to the normally closed principle.

An open contact means "safe status". Switch-off mats of the 4-wire principle can be connected to channels 1 and 2 and/or 3 and 4.

The module on position 3 implements the muting function. Refer to the operating instructions for detailed notes on the functions.

The user must make sure to only connect sensors that can be muted to the sensor card that is assigned to the muting module. These are, for example, light barriers or light grids.

Operating modes

By default, the restart interlock is activated.

Each assembly contains DIP switches for selecting the functions. For selecting functions, 2 selector switches must always be actuated.

Switches on the first assembly:

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

Switches on the second assembly:

The assembly contains 6 DIP switches for selecting the sensor type and the position. Six possibilities are offered for combining sensors. The desired combination is to be set binary. For function selection, always 2 switches must be actuated, that means DIP switches 1 - 3 have the same switch position as DIP switches 4 - 6.

DIP switch			Operating mode
3 and 6	2 and 5	1 and 4	
0	0	0	SLA /SLP/bridge channel 1 + 2 and channel 3 + 4
0	0	1	SLA /SLP/bridge on channel 1 + 2 and SLC channel 3 + 4
0	1	0	SLC channel 1 + 2 and channel 3 + 4
0	1	1	SLA /SLP/bridge channel 1 + 2 and safety mat channel 3 + 4
1	0	0	Safety mat channel 1 + 2 and channel 3 + 4
1	0	1	SLC channel 1 + 2 and safety mat channel 3 + 4

Switches on the third assembly:

Switch	Position	Operating mode
1 Group 1 and 2	OFF	Muting lamp monitoring inactive
	ON	Muting lamp monitoring active
2 Group 1 and 2	OFF	Single muting
	ON	Double muting
3 Group 1 and 2	OFF	Time window-limited muting
	ON	Protection beam-limited muting
4 Group 1 and 2	OFF	Sequential muting
	ON	Parallel muting

Displays

The OSSD-R/supply module on position 1 has a red/green LED for indicating the OSSD on/off statuses, a yellow LED for the start-ready status and a 7 segment display for system diagnosis.

The 7 segment display indicates the status and the error codes of the system.

Display	7 segment display
1	DIP switch positions differ
2	Incorrect configuration
3	Time-out at one or more muting sensors
4	Transmitter error
6	Muting lamp error
7	Simultaneousness monitoring error
8	Receiver error
9	Error at sensor channel
C	Error at sensor channel
E	System error
F	Relay monitor error
H	Selection chain error
L	Configuration error
U	Low voltage or voltage surge detected