CE SafeBox c(UL)us TÜV SÜD

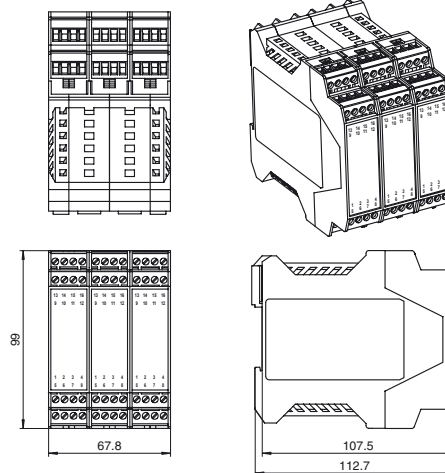## Model Number

SB4-OR-4CP-4M

Safety control unit

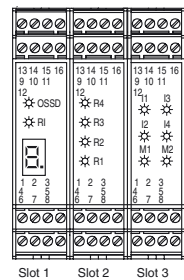Safety control unit of series SB4

Features

- Evaluation device for safety thru-beam sensors SLA12 and SLA29 and for 2 channel safety devices (emergency off)

- 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

- Pre-fault indication

- Clearly visible LED functional display

- 7-segment diagnostic display

- Safety outputs OSSD, external status displays OSSD

Dimensions

99
67.8
107.5
112.7

Electrical connection

Slot 1   Slot 2   Slot 3

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 2

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

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

Technical data

General specifications

Operating mode	Start/restart disable, relay monitor, muting operating modes

Functional safety related parameters

Safety Integrity Level (SIL)		SIL 3
Performance level (PL)		PL e
Category		Cat. 4
Mission Time (T_M)		20 a
PFH_d		3.5 E-9
Type		4

Indicators/operating means

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

Electrical specifications

Operating voltage	U_B	24 V DC, ± 20 %
No-load supply current	I_0	500 mA

Input

Activation current	approx. 7 mA

Subject to modifications without notice

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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
Switch power	DC: max. 24 VA AC: max. 230 VA
Response time	38 ms
Ambient conditions	
Ambient temperature	0 ... 50 °C (32 ... 122 °F)
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)
Mechanical specifications	
Protection degree	IP20
Connection	screw terminals , lead cross section 0.2 ... 2 mm^2
Material	
Housing	Polyamide (PA)
Mass	430 g
Compliance with standards and directives	
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 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. Instead of the light barriers, other contact safety equipment can be connected.

The module on slot 3 realises the muting function. Detailed notes on the functions can be found in the instruction manual.

The user has to ensure that he only connects to the sensor card, which is assigned to the muting module, those sensors for which muting is required. These are, for example, light barriers and 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	Operation type
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:

Switch	Position	Operation type
1 and 3	OFF	No antivalent evaluation
	ON	Antivalent evaluation active
2 and 4	OFF	No simultaneousness evaluation
	ON	Simultaneousness evaluation active

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Switches on the third assembly:

Switch	Position	Operation type
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 slot 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 position does not match
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
E	System error
F	Relay monitor error
H	Selection chain error
U	Low voltage or voltage surge detected