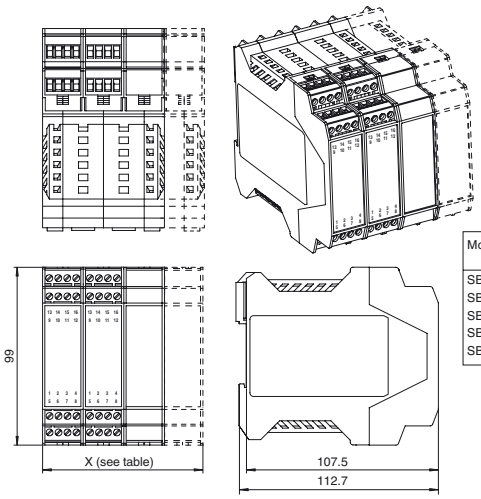
Dimensions



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-B

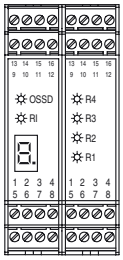
SB4 series safety control unit with optional module slots for functional enhancement

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



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	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

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_M)		20 a
PFH_d		3.5 E-9 (These specifications only apply to the basic device. If additional must be requested.)
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)
Pre-fault indicator		LED yellow flashing: Indicator lamp channel 1 ... 4
Electrical specifications		
Operating voltage	U_B	24 V DC, ± 20 %
No-load supply current	I_0	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 AC: max. 230 VA
Response time		30 ms

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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^2
Material	
Housing	Polyamide (PA)
Mass	433 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.

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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

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