# Safety control unit
SB4-OR-4CP-B-B-B-B-B-B

- 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

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

Dimensions
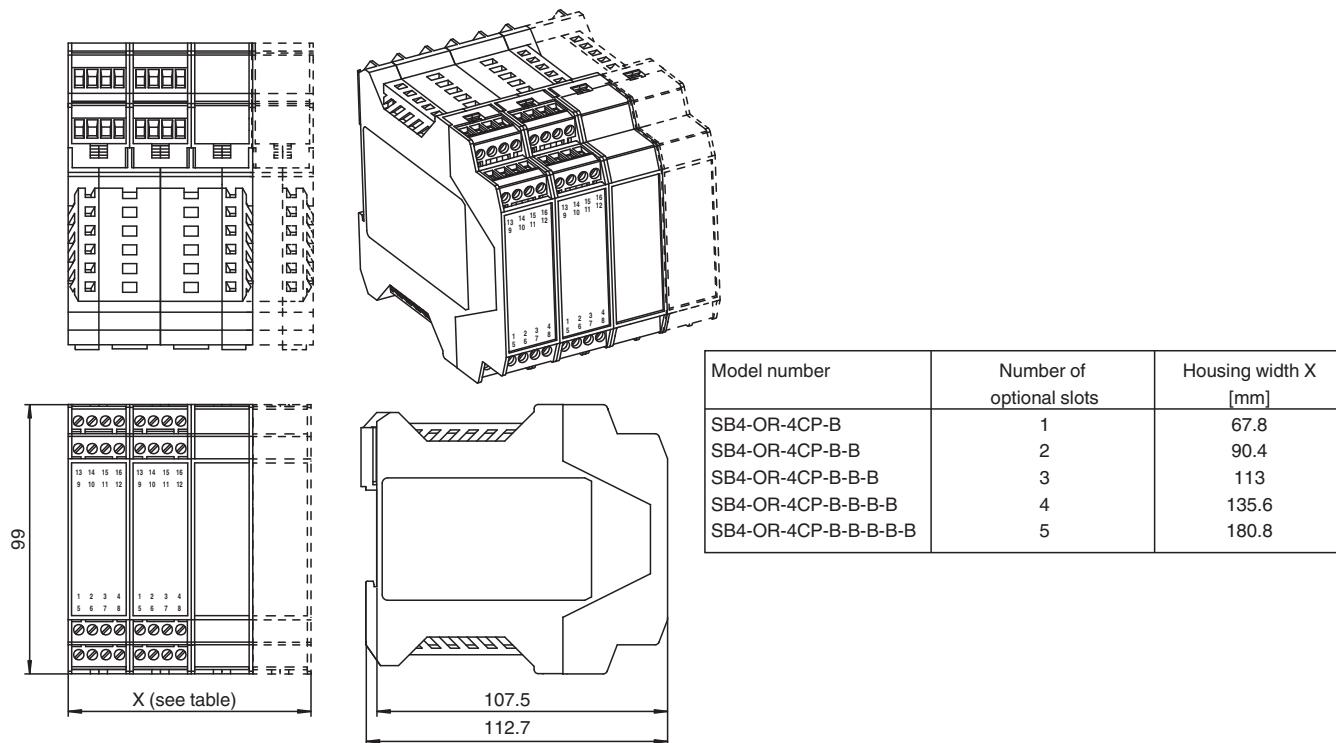
Model number	Number of optional slots	Housing width X [mm]
SB4-OR-4CP-B	1	67.8
SB4-OR-4CP-B-B	2	90.4
SB4-OR-4CP-B-B-B	3	113
SB4-OR-4CP-B-B-B-B	4	135.6
SB4-OR-4CP-B-B-B-B-B	5	180.8

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	see instruction manuals
B_{10d}	see instruction manuals
Type	4

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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1

Technical Data

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, ± 20 %
No-load supply current	I_0	max. 500 mA
Protection class		no identification ; see instruction manuals
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

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 mm²
Material	
Housing	Polyamide (PA)
Mass	545 g

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Connection

Position 1 Position 2
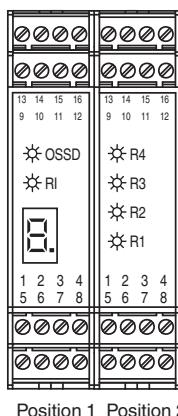
Terminal position 1

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.

Matching System Components

	SLA12/115	Safety thru-beam sensor
	SLA12-LAS-T/124	Safety thru-beam sensor with laser
	SLA12-LAS-T/35/124	Safety thru-beam sensor with laser
	SLA12/124	Safety thru-beam sensor
	SLA29/105/106	Safety thru-beam sensor
	SLA29/116	Safety thru-beam sensor
	SLA29/35/116 R=65m	Safety thru-beam sensor
	SLA29/35/73c R=65m	Safety thru-beam sensor
	SLA29/73c	Safety thru-beam sensor

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3

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.

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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4