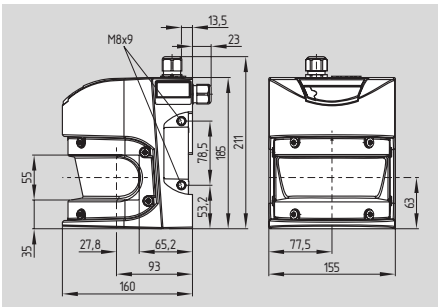
LS 30



- Electro-sensitive protective device for protection of persons or for detection of objects which operates by measuring the time taken for light to travel
- Compact device with integrated evaluation
- Monitoring zones can be freely and precisely defined
- 4 warning and 4 protection zones, freely programmable
- System connector with integrated configuration memory
- Various modes of operation can be selected
- 7-segment display for diagnosis
- Interactive, user-friendly computer configuration, parameter setting and error diagnosis
- Serial interfaces for start-up and configuration
- Simple flexible mounting and adjustment
- Large range
- Short response time
- Safe, wearproof and maintenance-free semi-conductor outputs
- Complete soiling check and contamination control

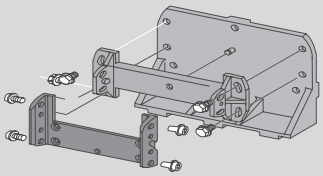
Approvals

TÜV CE

Technical data

Standards:	EN 61496-1/-3
Range:	Protection zone: 4 m radius Warning zone: 49 m radius Monitoring area: 49 m
Scanning angle:	190°
Angle resolution:	max. 0.25° min. 0.50°
Response time:	60 ms
Light source:	laser diode
Light emission wavelength:	905 nm
Laser protection class:	1
Configuration:	configuration software SCS
U_e:	24 VDC
Outputs:	2 safe solid state outputs, short-circuit proof; 3 not safe signalling outputs
Dimensions:	185 x 155 x 160 mm
Weight:	3,3 kg
Connection:	30 pin system connector
Ambient temperature:	– 10 °C ... + 50 °C
Protection class:	IP 65 to EN 60529
Number of warning zones:	4
Number of protection zones:	4
Serial interface:	RS 232

System components



Mounting angle

System connector

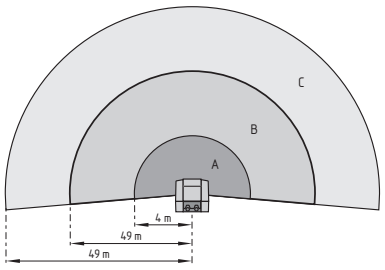
Connecting cable

Ordering details

LS 30-4015 CAS01 4 warning and 4 protection zones

The system connector is not included in delivery of the safety laser scanner.

Function table

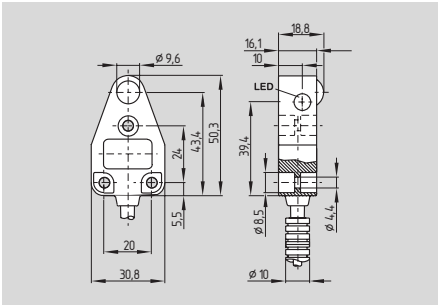


Legend
A protection zone
B warning zone
C monitoring area

Ordering details

Mounting bracket for direct mounting at the rear on wall or machine. No adjustment facility	**BF10**
Bracket only in conjunction with BF10. Mounting at the rear on wall or machine. Longitudinal and cross-wise adjustment	**BF20**
Bracket only in conjuction with BF10 and BF20. Mounting at the rear or below on wall, floor or machine. Longitudinal and cross-wise adjustment	**BF30**
System connector without cable	**S0VA-A0000BS01**
5 m cable, 13 cores, pre-assembled	**SV00-B1305BS01**
Verbindungsleitung Connection cable between the PC and the configuration interface	**SRS02**

SLB 200



- Control Category 2 to EN 954-1 only in combination with safety monitoring module SLB 200-C04-1R
- Extremely compact design
- Range to 4 m
- Protection class IP 67
- Maintenance free
- Integral soiling check
- LEDs visible from both sides
- Simple flexible mounting and adjustment

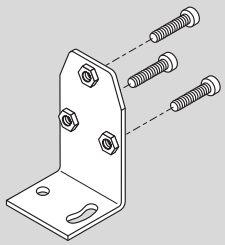
Technical data

Comprising:	emitter SLB 200-E31-21 receiver SLB 200-R31-21
Standards:	IEC/EN 61496
Control Category:	2 (only in combination with SLB 200-C)
Enclosure:	ABS 10 % GF
Enclosure dimensions:	31 x 50.5 x 19 mm
Connection:	emitter: 10 cm conductor, M 8 x 1, 3-pole coupler socket receiver: 10 cm conductor, M 8 x 1, 4-pole coupler socket
Max. cable length:	50 m
Protection class:	IP 67 to EN 60529
Response time:	30 ms (only in combination with SLB 200-C)
Range:	4 m
Start/Restart interlock:	only in combination with safety monitoring module
Contactor control:	only in combination with safety monitoring module
Light emission wavelength:	880 nm
U_e:	24 VDC ± 20%
Safety outputs:	only in combination with safety monitoring module
Angle of radiation:	± 4°
Min. size of object:	9 mm Ø
LED status indication:	soiling, switching condition and power on
Ambient temperature:	– 10 °C ... + 55 °C
Storage and transport temperature:	– 20 °C ... + 80 °C

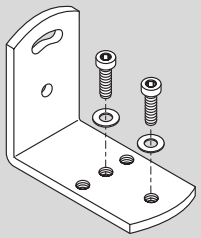
System components

SLB 200-C04-1R

Connector plug M 8 x 1 (with cable)



Mounting angle BF 31



Mounting angle BF UNI 1

Approvals

TÜV CE

Ordering details

SLB 200-①31-21

No.	Replace	Description
①	E/R	Emitter / receiver

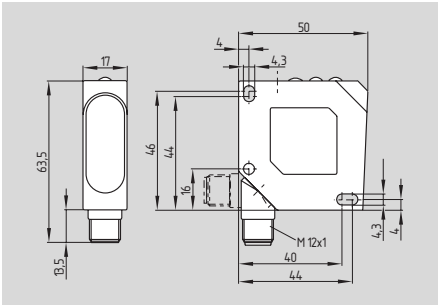
Note

The safety monitoring module is not included in delivery.

Ordering details

Monitoring of safety light barriers	
SLB 200-C04-1R	**refer to page 4-6**
Connector plug M 8 x 1	
emitter:	**KDE M8-3**
	KDE M8-3-2m
	KDE M8-3-5m
receiver:	**KDR M8-4**
	KDR M8-4-2m
	KDR M8-4-5m
Mounting angles	**BF 31**
Mounting angles universal	**BF UNI 1**

SLB 400



- Control Category 4 to EN 954-1 only in combination with safety monitoring module SLB 400-C10-1R
- Very compact design
- Range to 15 m
- Protection class IP 67
- Connecting plug can be rotated
- Maintenance free
- Integral soiling check
- LED switching conditions display
- Simple flexible mounting and adjustment

Approvals

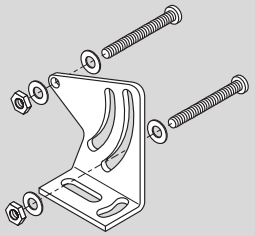
Technical data

Comprising:	emitter SLB 400-E 50-21P receiver SLB 400-R 50-21P
Standards:	IEC/EN 61496
Control Category:	4 (only in combination with SLB 400-C)
Enclosure:	ABS
Enclosure dimensions:	50 x 50 x 17 mm
Connection:	M 12 x 1, 4-pole coupler socket, can be rotated
Max. cable length:	100 m
Protection class:	IP 67 to EN 60529
Response time:	25 ms (only in combination with SLB 400-C)
Range:	15 m
Start/Restart interlock:	only in combination with safety monitoring module
Contactor control:	only in combination with safety monitoring module
Light emission wavelength:	880 nm
U_e:	24 VDC ± 20%
Safety outputs:	only in combination with safety monitoring module
Angle of radiation:	± 2°
Min. size of object:	13 mm Ø
LED status indication:	soiling, switching condition and power on
Ambient temperature:	0 °C ... + 60 °C
Storage and transport temperature:	– 20 °C ... + 80 °C

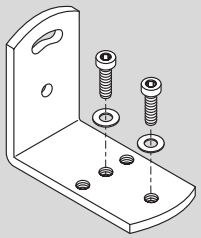
System components

SLB 400-C10-1R

Connector plug M 12 x 1 (with cable)



Mounting angle BF 50



Mounting angle BF UNI 1

Ordering details

SLB 400-①50-21P

No.	Replace	Description
①	E/R	Emitter / receiver

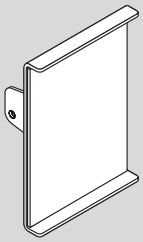
Note

The safety monitoring module is not included in delivery.

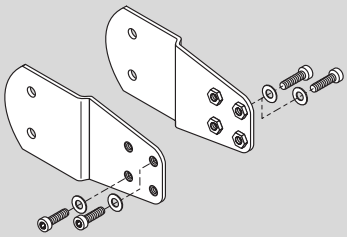
Ordering details

Monitoring of safety light barriers	
SLB 400-C10-1R	**refer to page 4-8**
Connector plug M 12 x 1 emitter/receiver:	**KD M12-4** **KD M12-4-2m** **KD M12-4-5m**
Mounting angles	**BF 50**
Mounting angles universal	**BF UNI 1**

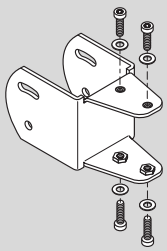
System components



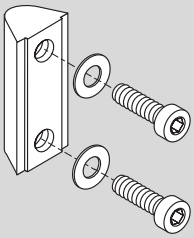
Mirror SLB 200/400 SMA 80



Mounting angle BF SMA 80-1



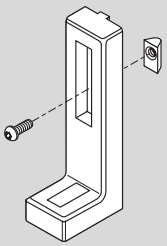
Mounting angle BF SMA 80-2



T-slot nut NST 20-8

System components

Mounting post ST 1250



Floor-stand base STB 1

Ordering details

Mirror	**SMA 80**
Mounting angles for mirror	**BF SMA 80-1** **BF SMA 80-2**
T-slot nut	**NST 20-8**

Ordering details

Mounting post	**ST 1250**
Floor-stand base	**STB 1**

SLB 200-C

- To IEC 61496
- Control Category 2 to EN 954-1, BWS-T
- Up to two pairs of light barrier devices can be connected
- 1 enabling path
- 1 signalling output
- Operating voltage 24 VDC
- Test input
- LED display of switching conditions
- Response time ≤ 30 ms
- Start/Restart interlock can be switched active or inactive
- Contactor monitoring can be switched active or inactive
- Additional cyclic testing
- Co-ordinated for use with SLB 200 R/E safety light barriers

Approvals

TÜV CE

Technical data

Standards:	IEC/EN 61496-1/-2, EN 954-1
Control category:	2
Start-up test:	yes
Start conditions:	Test button, start-reset button, on/off coding
Feedback circuit:	yes
Enclosure:	polycarbonate
Mounting:	snaps onto standard DIN rail to EN 50022
Connection:	screw terminals
Cable section:	max. 4 mm² (incl. conductor ferrules)
Protection class:	IP 20 to EN 60529
U_e:	24 VDC ± 20%
I_e:	180 mA
Power consumption:	–
Inputs:	test input: command device: NC contact release start/restart interlock (start/reset): enable via command device (NO contact), contactor monitoring (NC contacts)
Monitored inputs	max. 2 pairs of light barriers
Input resistance:	–
Max. cable length:	–
Test and feedback:	potential-free contact
Outputs:	1 enabling path
Enabling contacts:	1 enabling path
Utilisation category:	AC-15, DC-13
I_e/U_e:	2 A / 250 VAC, 2 A / 24 VDC
Contact load capacity:	max. 250 VAC, max. 2 A (cos φ = 1)
Switching voltage:	max. 250 VAC
Load current:	8 A
Max. fuse rating:	4 A gG D-fuse
Signalling output:	1 transistor output
Switch-on conditions:	test duration: ≤ 150 ms (without relay control) ≤ 450 ms (with relay control)
Switch-off time:	response time (complete sy.): ≤ 30 ms
Indications:	red LED for light barrier interrupted green LED for light barrier free soiling: flashing red/green
Function display:	4 LEDs
EMC rating:	conforming to EMC Directive
Max. switching frequency:	10 Hz
Overvoltage category:	II to DIN VDE 0110
Degree of pollution:	3 to DIN VDE 0110
Resistance to vibration:	10 ... 55 Hz / amplitude 0.35 mm
Resistance to shock:	10 g / 16 ms
Ambient temperature:	0 °C … + 50 °C
Storage and transport temperature:	– 20 °C … + 80 °C
Dimensions:	45 x 84 x 118 mm
Note:	Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

Ordering details

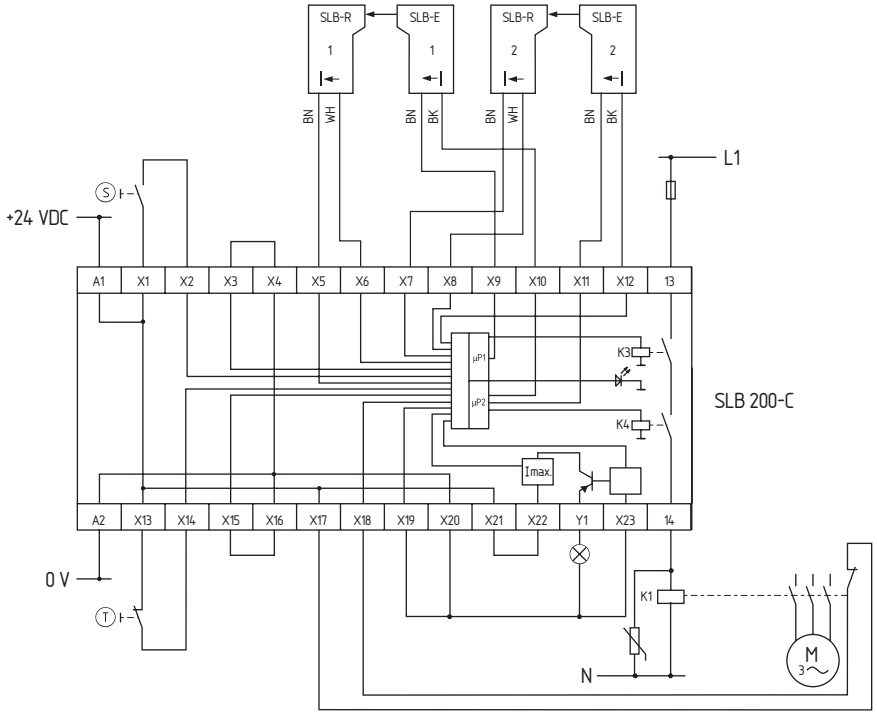
SLB 200-C04-1R ①

No.	Replace	Description
①		24 VDC

Note

- For protection in Control Category 2 to EN 954-1
- Monitoring two pairs of light barrier devices and the power contactor using the SLB 200-C safety monitoring module
- Test push button Ⓣ
  The test push button is connected to X13 and X14 in order to carry out a check of the light barrier monitoring function. The terminals X15 and X16 must be bridged.
- The wiring diagram is shown for the de-energised condition.
- Contactor check
  To monitor an external contactor, the feedback circuit is connected to X17 and X18. The terminals X19 and X20 must be bridged.
- Start push button Ⓢ
  The start push button can be used to start the monitoring of the light barriers for a new start or after an interruption. The terminals X3 and X4 must be bridged.
- It is also possible to connect only one pair of light barrier devices.

Wiring diagram



Note

In order to set for the desired mode of operation and number of light barriers connected, remove the front cover of the safety monitoring module. As supplied all switches are in Position 1.

Note

The required functions can be selected by means of the internal DIP switches.

	DIP switch 1	DIP switch 2	DIP switch 3
Position 1	With contactor check	With start/restart interlock	Connection of two light barriers
Position 2	Without contactor check	Without start/restart interlock	Connection of one light barrier

SLB 400-C

- To IEC 61496
- Control Category 4 to EN 954-1, BWS-S
- Cross-wire monitoring
- ISD Integral System Diagnostics
- Operating voltage 24 VDC
- Feedback circuit to monitor external contactors
- Two short-circuit proof additional transistor outputs
- Response time ≤ 30 ms
- Start/Restart interlock can be switched active or inactive
- Contactor monitoring can be switched active or inactive
- Can be coded
- Up to 4 light barrier pairs SLB 400 can be connected

Approvals

Technical data

Standards:	IEC/EN 61496-1/-2, EN 954-1
Control category:	4
Start-up test:	yes
Start conditions:	Start-reset button, on/off coding
Feedback circuit:	yes
Enclosure:	glass-fibre reinforced thermoplastic
Mounting:	snaps onto standard DIN rail to EN 50022
Connection:	screw terminals
Cable section:	max. 4 mm² (incl. conductor ferrules)
Protection class:	terminals IP 20, enclosure IP 40 to EN 60529
U_e:	24 VDC ± 15%
I_e:	0.3 A without additional transistor outputs
Power consumption:	–
Inputs:	S1, S2
Monitored inputs	max. 4 pairs of light barriers
Input resistance:	approx. 2 kΩ to ground
Input signal „1“:	10 ... 30 VDC
Input signal „0“:	0 ... 2 VDC
Max. cable length:	100 m of 0.75 mm² conductor
Outputs:	2 enabling paths
Enabling contacts:	2 enabling paths
Utilisation category:	AC-15, DC-13
I_e/U_e:	2 A / 250 VAC, 2 A / 24 VDC
Contact load capacity:	max. 250 VAC, max. 2 A (cos φ = 1)
Switching voltage:	max. 250 VAC
Load current:	max. 2 A
Switching capacity:	max. 500 VA
Max. fuse rating:	2 A gG D-fuse
Additional outputs:	additional transistor outputs Y1, Y2, Ue – 4 V, 100 mA total, short-circuit proof, p-type
Signalling output:	2 transistor outputs, Y1 + Y2 = max. 100 mA, p-type, short-circuit proof
Switch-on time:	–
Response time:	≤ 25 ms
Monitoring for synchronism of muting sensors:	–
Indications:	ISD
Function display:	9 LEDs (ISD*)
EMC rating:	conforming to EMC Directive
Max. switching frequency:	10 Hz
Overvoltage category:	II to DIN VDE 0110
Degree of pollution:	3 to DIN VDE 0110
Resistance to vibration:	10 ... 55 Hz / amplitude 0.35 mm, ± 15 %
Resistance to shock:	30 g / 11 ms
Ambient temperature:	0 °C ... + 55 °C
Storage and transport temperature:	– 25 °C ... + 70 °C
Dimensions:	99.7 x 75 x 110 mm
Note:	Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

Ordering details

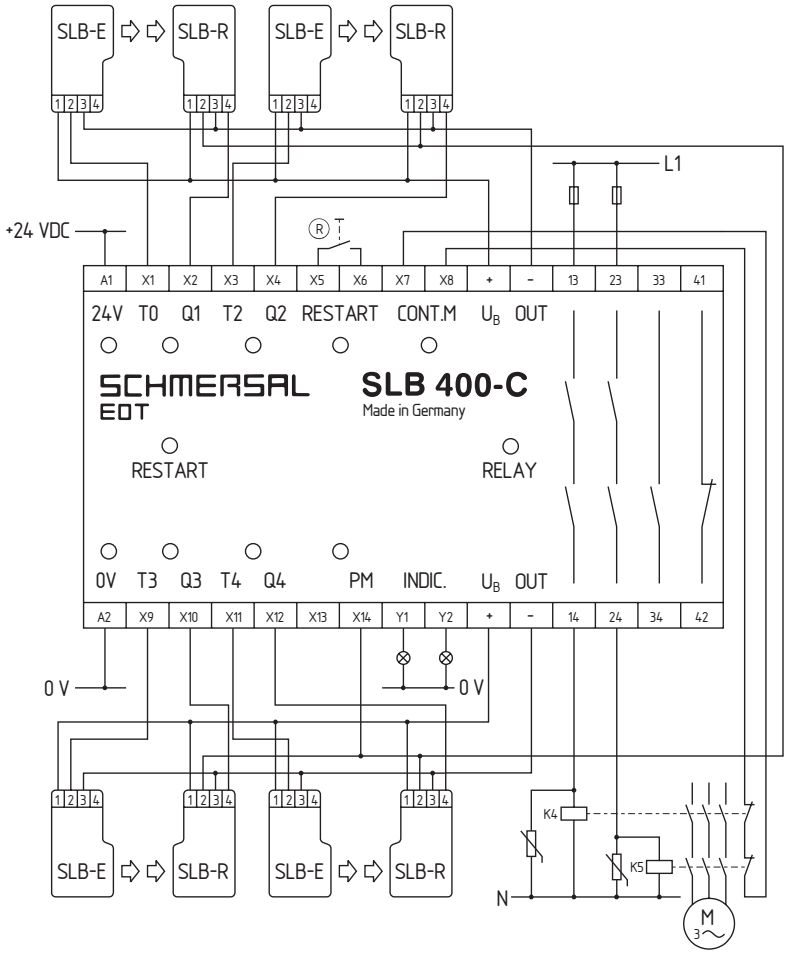
SLB 400-C10-1R ①

No.	Replace	Description
①		24 VDC

Note

- For protection in Control Category 4 to EN 954-1
- Monitoring up to four pairs of light barrier devices and the power contactors using the SLB 400-C safety monitoring module
- The wiring diagram is shown for the de-energised condition.
- Connection of two pairs of safety light barrier devices
  When two pairs of safety light barriers are connected, the terminals X9-X10 and X11-X12 must be bridged.
- Restart push button Ⓡ
  The restart function can be selected by means of the DIP switches. When a start push button is connected to X5 and X6, it must be operated for min. 250 ms and max. 5 s after an interruption of the safety light barriers.

Wiring diagram



ISD

The following faults are registered by the safety monitoring modules and indicated by ISD

- Short-circuit on the connecting leads
- Interruption of the connecting leads
- Failure of the safety relay to pull-in or drop-out
- Fault on the input circuits or the relay control circuits of the safety monitoring module
- Mutual influence between the connected pairs of light barrier device and others on neighbouring systems

Note

The ISD tables (Intergral System Diagnostics) for analysis of the fault indications and their causes are shown in the appendix.