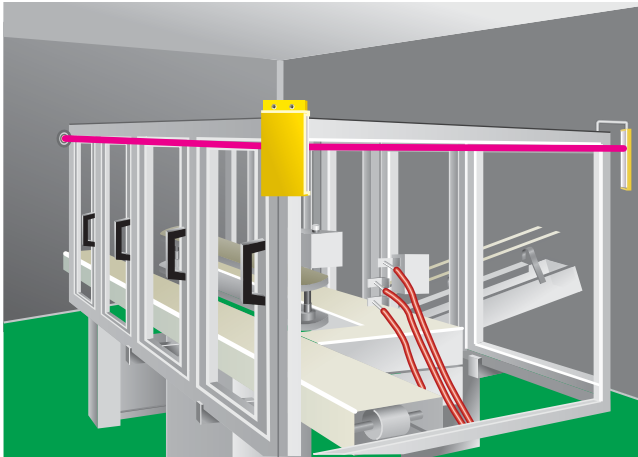
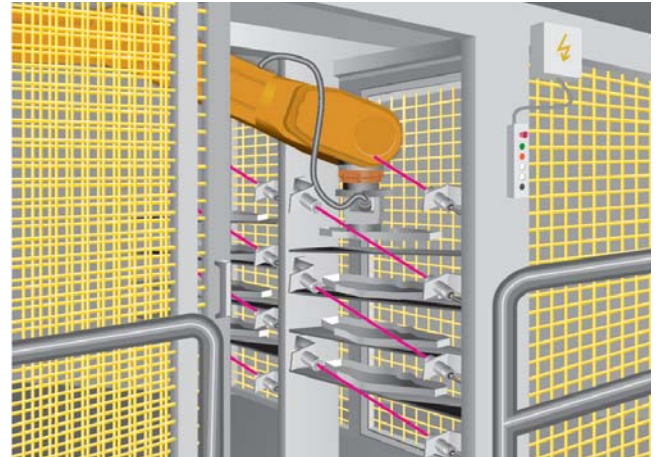


Electro-sensitive access protection of hazardous areas with type 2 and type 4 single-beam photoelectric safety switches



Door monitoring on a packaging machine



Monitoring robot presence at a loading station

SICK's single-beam photoelectric safety switches consist either of testable senders and receivers, or of testable senders and receivers combined with an evaluation unit. These devices impress both with their large scanning range and the variety of shapes and sizes available. They also offer maximum safety performance as they comply with type 2 or type 4 in accordance with EN 61496.

The possible applications are very wide-ranging: Whether on robots, processing machines, machining centres, palletising systems, high-bay warehouses or transfer lines – with products from SICK you will profit from a customer-friendly solution of the highest quality.

Double benefit for low stock-keeping costs

You profit twice with SICK devices, as you can also use the photoelectric safety switches for your automation applications. You only need to keep one type of through-beam photoelectric switch in stock and can thus reduce your costs.

Also safe in extreme situations

All single-beam photoelectric safety switches from SICK have an IP 67 enclosure rating and are therefore very well equipped to withstand extreme conditions such as heat (up to +60 °C), cold (to -40 °C) or humidity. SICK also provides solutions for changing ambient conditions and the outdoor area.

Flexible technology that adapts as required

SICK photoelectric safety switches offer you more flexibility than ever before. You will profit from the very wide range of shapes, sizes and types and will have a very large choice of housing materials. Whether rectangular or cylindrical photoelectric switches, at SICK you will always find the right solution for your application.

Impressive performance, optimum price

You will also profit from an optimum price-performance ratio. SICK products are optimally matched to one another.

Services for productive safety


With services tailored specifically to your needs, SICK offers all-embracing support for the safety of your machine or system.

Address productivity and cost-effectiveness from the start: From selection and planning, through commissioning and inspection, to maintenance and modernisation.

→ For information about the services please refer to chapter A

Single-beam photoelectric safety switches



Safety application	Type according to IEC/EN 61496	Number of sensors	Scanning range (m)	Ambient operating temperature (°C)	Type	Construction size (mm), (H x W x D or Ø x L)	Functions			Product	Page
							Muting	Restart interlock	External device monitoring		
	Type 4	8 ¹⁾	0 ... 5	-20 ... +55	Cylindrical	M18 x 108	-	✓ ¹⁾	✓ ¹⁾	L4000/L400	G-2
			0 ... 10			M18 x 98		✓ ¹⁾	✓ ¹⁾		
			0 ... 60			M30 x100		✓ ¹⁾	✓ ¹⁾		
	Type 2	6 ²⁾	0.5 ... 18	-25 ... +55	Rectangular	156 x 50 x 116	-	✓ ⁴⁾	✓ ⁴⁾	WSU/WEU26/2	G-11
			15 ... 70					✓ ⁴⁾	✓ ⁴⁾		
Type 2	6 ²⁾	0 ... 12/18 ³⁾	-25 ... +60	Rectangular	75.5 x 17.6 x 33.5	✓ ²⁾	✓ ²⁾	✓ ²⁾	WS/WE18-3	G-17	
		0 ... 25/35 ³⁾					✓ ²⁾	✓ ²⁾			
		0 ... 16/22 ³⁾					✓ ²⁾	✓ ²⁾			
			-40 ... +60	Cylindrical	M18 x 80	✓ ²⁾	✓ ²⁾	✓ ²⁾	VS/VE18-2	G-27	

¹⁾ With UE401

²⁾ With LE20 / LE20 Muting / UE410 Flexi

³⁾ Typical / maximum

⁴⁾ With LCU-X



- Restart interlock (RES)
- External device monitoring (EDM)
- Maximum 8 sensor pairs
- Simple alignment
- Simple diagnostics and service



Overview of technical specifications

Scanning range (depending on type)	0 m ... 10 m / 0 m ... 5 m / 0 m ... 60 m
Construction size (depending on type)	M18 x 107.7 mm / M18 x 97.7 mm / M30 x 100 mm
Enclosure rating	IP 67
Ambient operating temperature from ... to	-20 °C ... +55 °C
Type	Type 4 (IEC 61496), only in conjunction with UE401

Product description

The L4000 photoelectric safety switch system comprises the UE401 safety evaluation unit, to which up to 4 L4000/L400 sensors (sender/receiver combinations) can be connected as single pairs or up to 8 sensors can be connected in cascade. The UE401 safety evaluation device is the connecting link between sensors and machine controller.

Colour LEDs provide in-situ information on operational status. The indication of status

and error messages on the 7-segment display of the UE401 safety evaluation unit allows rapid diagnostics. The possibility of connecting 4 individual sensor pairs or 8 sensors, the range of versions providing the right scanning range for the specific application, the suitability for outdoor applications, and the use of deflector mirrors also allow for the solution of complex protection tasks.

In-system added value

- Combination with SICK safe control solutions

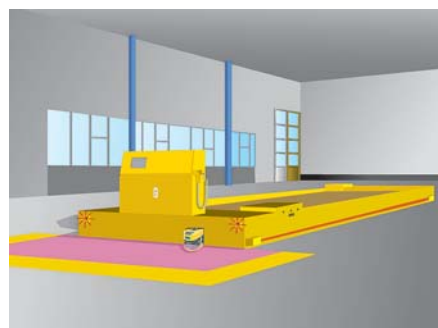
Combination with	Number of enable current paths	Number of signalling current paths	Further information
UE10-30S	3	1	N-3

→ More combinations see appendix "Sensor systems and safe control solutions from SICK"

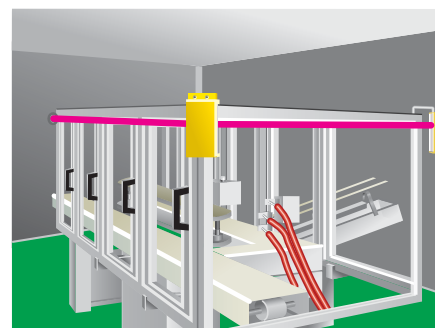
Applications

→ You can find more applications using the application finder at www.sick.com

- Robots
- Processing machines
- Machining centres
- Palletiser systems
- High-bay warehouses
- Transfer lines



Lateral protection on an automated guided vehicle



Door monitoring on a packaging machine

Further information	Page
→ Technical specifications	G-4
→ Dimensional drawings	G-7
→ Connection diagrams	G-8
→ Accessories	G-9
→ Services	A-2

Ordering information

Evaluation unit UE401

Type	Part number
UE401-A0010	6027343

Single-beam photoelectric safety switch L4000

- Construction size M30 x 100 mm
- Plug M12 x 4, angled

Scanning range	Optical axis	Housing material	System part	Type	Part number
0 m ... 60 m	Axial	Metal	Sender	L40S-33MA2A	6027335
			Receiver	L40E-33MA2A	6027336

Single-beam photoelectric safety switch L400

- Plug M12 x 4, straight

Scanning range	Optical axis	Construction size	Housing material	System part	Type	Part number
0 m ... 5 m	Radial	M18 x 107.7 mm	Metal	Sender	L40S-11MA1A	6027341
				Receiver	L40E-11MA1A	6027342
0 m ... 10 m	Axial	M18 x 97.7 mm	Plastic	Sender	L40S-21KA1A	6027337
				Receiver	L40E-21KA1A	6027338
			Metal	Sender	L40S-21MA1A	6027339
				Receiver	L40E-21MA1A	6027340

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Detailed technical specifications

→ You can find further data in the operating instructions. Download at www.sick.com

Evaluation unit UE401

General data

Number of single-beam photoelectric safety switches from ... to	Sensor pairs 1 ... 8
Maximum response time	30 ms
Protection class	III
Enclosure rating	IP 20
Type	Type 4 (IEC 61496)
Ambient operating temperature from ... to	-20 °C ... +55 °C
Air humidity from ... to	15 % ... 95 %, non-dewing
Storage temperature from ... to	-25 °C ... +75 °C
Vibration resistance	5 g, 10 Hz ... 55 Hz (IEC 60068-2-6)
Shock resistance	10 g, 16 ms (IEC 60068-2-29)
Weight	160 g
Mounting	Snap-on mounting on mounting rail acc. to EN 50022

Electrical data

Connector technology	Interchangeable, coded screw-type terminals
Cable length	100 m
Conductor cross-section	0.25 mm ² ... 2.5 mm ²
Supply voltage V_S	24 V DC (19.2 V DC ... 28.8 V DC)
Safety outputs	2 PNP semiconductors, short-circuit protected, cross-circuit monitored
Power consumption	< 3.6 W
Switching voltage HIGH	24 V DC (17.5 V DC ... 28.8 V DC)
Maximum switching voltage LOW	1.3 V DC
Switching current	0.5 A

Single-beam photoelectric safety switch L4000

General data

	L40S-33MA2A	L40E-33MA2A
System part	Sender	Receiver
Scanning range	0 m ... 60 m	
Number of beams	1	
Optical axis	Axial	
Light beam diameter	26 mm	
Aperture angle/receive angle	$\pm 2.5^\circ / \pm 2.5^\circ$	
Light sender/type of light	LED (visible red light)	—
Wave length	660 nm	—
Protection class	III	
Enclosure rating	IP 67	
Type	Type 4 (IEC 61496), only in conjunction with UE401	
Ambient operating temperature from ... to	-20 °C ... +55 °C	
Storage temperature from ... to	-25 °C ... +75 °C	
Air humidity from ... to	15 % ... 95 %, non-dewing	
Vibration resistance	5 g, 10 Hz ... 55 Hz (IEC 60068-2-6)	
Shock resistance	10 g, 16 ms (IEC 60068-2-29)	
Design	Cylindrical	
Dimensions (diameter x length)	M30 x 100 mm	
Housing material	Brass nickel-plated	
Lens material	Glass	
Weight	212 g	

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Electrical data

	L40S-33MA2A	L40E-33MA2A
System part	Sender	Receiver
Connection type	Plug M12 x 4, angled	
Supply voltage V_S	24 V DC (19.2 V DC ... 28.8 V DC)	
Maximum power consumption	60 mA	30 mA

Single-beam photoelectric safety switch L400

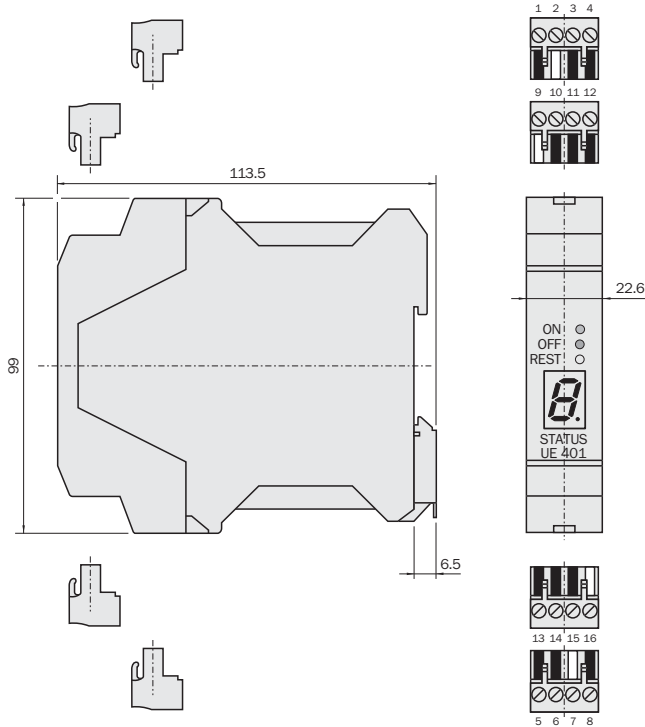
	L40S-11MA1A	L40E-11MA1A	L40S-21KA1A	L40E-21KA1A	L40S-21MA1A	L40E-21MA1A
System part	Sender	Receiver	Sender	Receiver	Sender	Receiver
Scanning range	0 m ... 5 m		0 m ... 10 m			
Number of beams	1					
Optical axis	Radial		Axial			
Light beam diameter	12 mm					
Aperture angle/receive angle	±2.5°/±2.5°					
Light sender/type of light	LED (visible red light)	—	LED (visible red light)	—	LED (visible red light)	—
Wave length	660 nm	—	660 nm	—	660 nm	—
Protection class	III					
Enclosure rating	IP 67					
Type	Type 4 (IEC 61496), only in conjunction with UE401					
Ambient operating temperature from ... to	-20 °C ... +55 °C					
Storage temperature from ... to	-25 °C ... +75 °C					
Air humidity from ... to	15 % ... 95 %, non-dewing					
Vibration resistance	5 g, 10 Hz ... 55 Hz (IEC 60068-2-6)					
Shock resistance	10 g, 16 ms (IEC 60068-2-29)					
Design	Cylindrical					
Dimensions (diameter x length)	M18 x 107.7 mm		M18 x 97.7 mm			
Housing material	Brass nickel-plated		Plastic		Brass nickel-plated	
Lens material	Glass					
Weight	67 g		30 g		67 g	

Electrical data

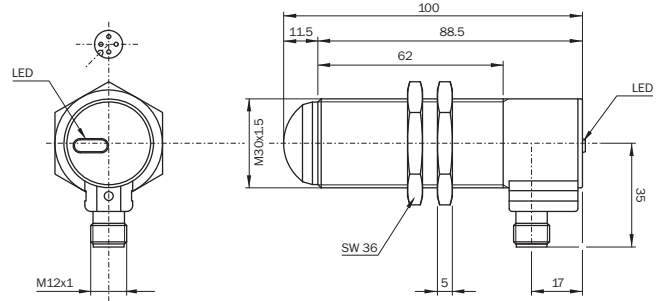
	L40S-11MA1A	L40E-11MA1A	L40S-21KA1A	L40E-21KA1A	L40S-21MA1A	L40E-21MA1A
System part	Sender	Receiver	Sender	Receiver	Sender	Receiver
Connection type	Plug M12 x 4, straight					
Supply voltage V_S	24 V DC (19.2 V DC ... 28.8 V DC)					
Maximum power consumption	60 mA	30 mA	60 mA	30 mA	60 mA	30 mA

Dimensional drawings

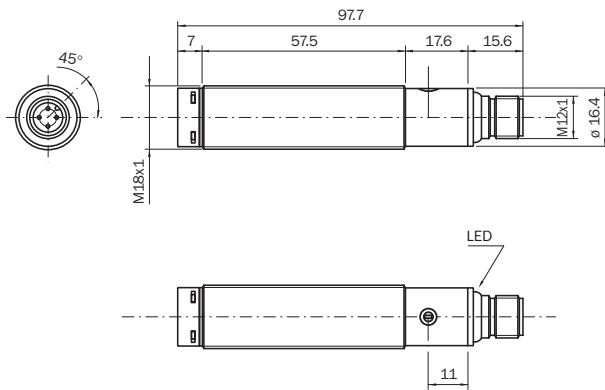
Evaluation unit UE401



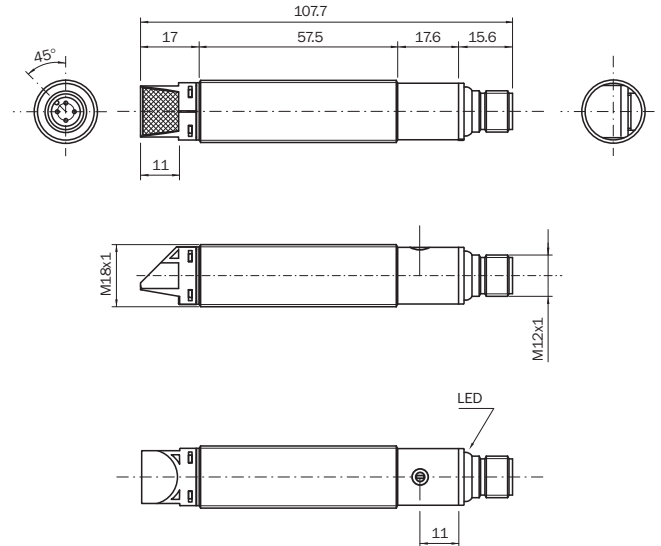
L4000



L400, axial



L400, radial

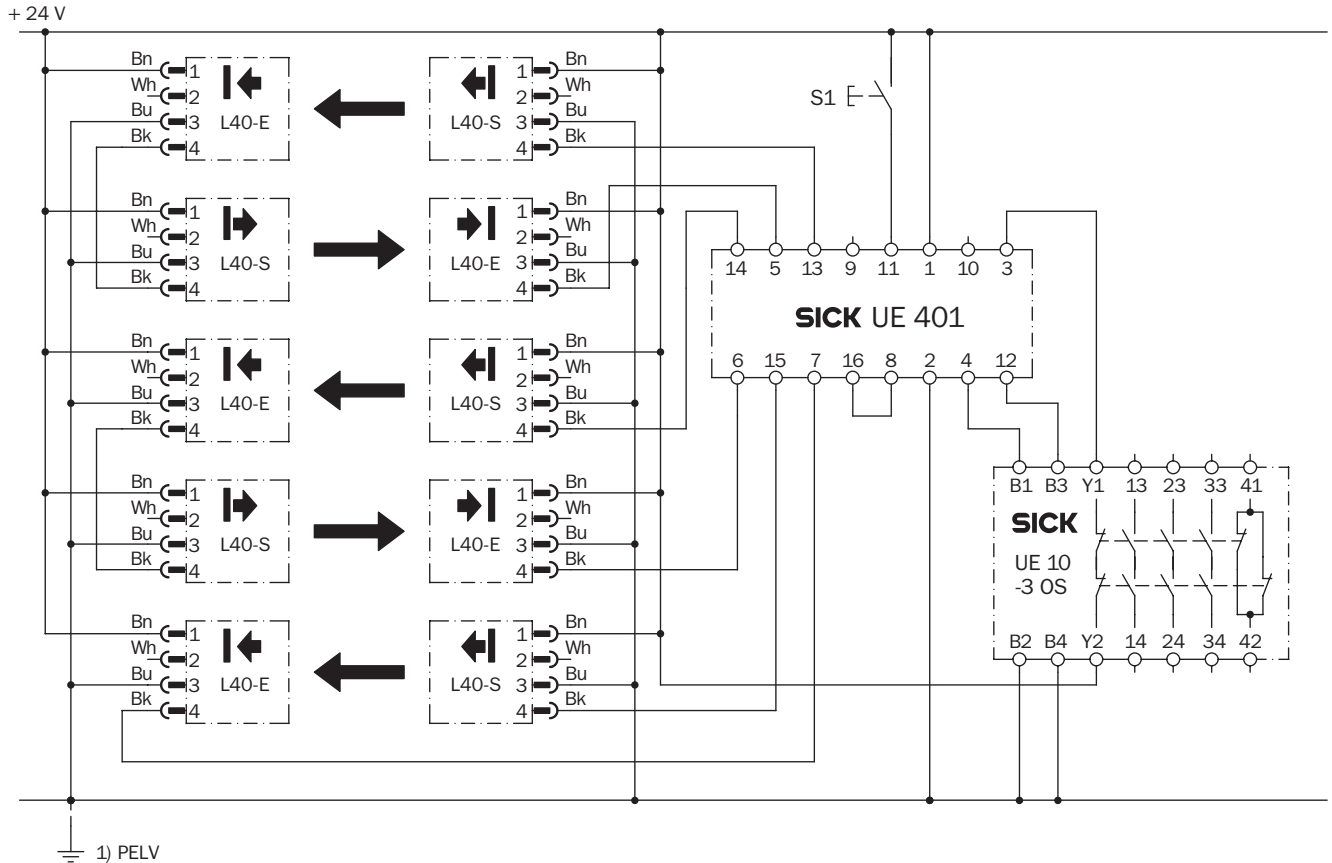


Dimensions in mm

Connection diagrams

→ You can find more connection diagrams at www.sick.com

5 x L4000 (two pairs cascaded) on UE401 with UE10-3OS



Task

Integration of five single-beam photoelectric safety switches L400/L4000 (2 pairs cascaded) with safety evaluation device UE401 and safety relay UE10-3OS. Operating mode with restart interlock and external device monitoring.

Function

When the light path is clear and the UE10 is de-energised and functioning correctly, the yellow LED on the UE401 flashes. The system is ready to be switched on. The system is enabled by pressing S1 (button is pressed and released). The OSSD1 and OSSD2 outputs are live, the UE10 is switched on. On the interruption of one of the light beams, the UE10 is deactivated by the OSSD1 and OSSD2 outputs.

Possible faults




Cross-circuits and short-circuits of the OSSDs are being detected and lead to the inhibited state (lock-out). The incorrect functioning of the UE10 will be detected and will not result in the loss of the shutdown function. Jamming of the S1 button prevents output circuit to enable.

Comments

1) PELV as required in EN 60204-1 / 6.4

The related operating instructions for the integrated devices must be observed!

Safe control solutions

	Product group	Applications	Further information
	Safety relays	Safety relays allow simple integration of safety components into machinery or plant.	Page N-0
	Safety controllers	Safety controllers are utilised when the safety function (e.g. switching off a dangerous movement) is to be accomplished in a flexible way by logical combination of safety relevant signals. Operation of machinery becomes more flexible as well as generation of machine variants becomes more easy.	Page O-0
	Safety network solutions	Safety network solutions are utilised in plants and machinery of larger scale. This is saving cabling and enables modular design of the safety automation. Potential errors or faults can be easily localised and quickly trouble shooted thanks to comprehensive diagnostics functions. That significantly reduces machine down times. SICK offers solutions for the open automation standards: AS-i Safety at Work, DeviceNet Safety and PROFIsafe.	Page P-0



Accessories

Mounting systems

Description	Construction size	Mounting	Property	Type	Part number
Mounting bracket	M18	With fixing holes 4 mm	Adjustable	BEF-HA-M18-R	5313513
	M30	With tapering thread M6		BEF-HA-M30-A	5311527
		With fixing holes for M4		BEF-HA-M30-R	5311528
	M18	—	—	BEF-WN-M18	5308446
	M30	—	—	BEF-WN-M30	5308445

Connectors

Description	Connection type	Cable alignment	Cable length	Cable material	Type	Part number
Cable socket	M12 x 4	Straight	2 m	PVC	DOL-1204-G02M	6009382
			5 m	PVC	DOL-1204-G05M	6009866
				PUR halogen free	DOL-1204-G05MC	6025901
		10 m	PVC	DOL-1204-G10M	6010543	
		Angled	2 m	PVC	DOL-1204-W02M	6009383
			5 m	PVC	DOL-1204-W05M	6009867
				PUR halogen free	DOL-1204-W05MC	6025904
		10 m	PVC	DOL-1204-W10M	6010541	
		Straight	Can be preformed	—	DOS-1204-G	6007302
		Angled		—	DOS-1204-W	6007303
Cable plug	M12 x 4	Straight	—	STE-1204-G	6009932	

Deflector mirrors

Description	Usage	Mirror surface	Delivery	Type	Part number
Deflector mirrors ¹⁾	—	105 mm x 160 mm	—	PNS105-1	1004076
	—	75 mm x 80 mm	Including mounting adapter (two pieces swivel mount)	PNS75-008	1026647
	—	96 mm x 124 mm	—	PSK1	1005229
	For 90° deflection	—	Incl. mounting set, not suitable for column mounting	PSK45	5306053
Mounting bracket	For PSK 1	—	—	BEF-GH	2009292
Spring fastening				—	2012473

¹⁾ Reduction of the scanning range

Laser alignment aid

Type	Part number
Laser alignment aid AR60	1015741
AR60 adapter for L4000	5311529
AR60 adapter for L400	5313533

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Overview of technical specifications

Scanning range (depending on type)	0.5 m ... 18 m / 15 m ... 70 m
Construction size	156 mm x 50 mm x 116 mm
Supply voltage (depending on type)	24 V DC / 115 V AC / 230 V AC
Enclosure rating (depending on type)	IP 65 / IP 67
Ambient operating temperature from ... to	-25 °C ... +55 °C
Type	Type 4 (EN 61496 part 1 and EN 50100 part 2)

Product description

The photoelectric safety switch WSU/WEU26/2 is used for access protection of hazardous areas on machines or plants.

The devices are permanently mounted in the access area with the necessary safety distance from the nearest hazardous point and send a shutdown signal to the machine or system when the light beam is interrupted.

In-system added value

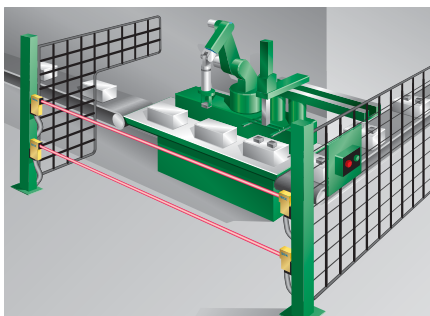
- Combination with SICK safe control solutions

→ Combinations see appendix "Sensor systems and safe control solutions from SICK"

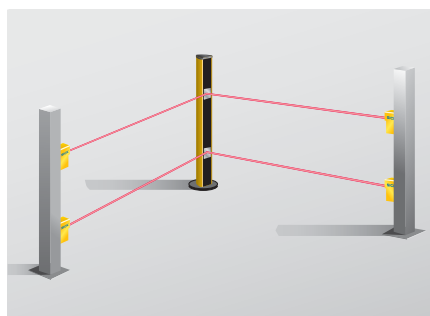
Applications

→ You can find more applications using the application finder at www.sick.com

- Robots
- Processing machines
- Machining centres
- Palletiser systems
- High-bay warehouses
- Transfer lines



Access protection on a machining centre



Access protection with mirror deflection



- Universal in application
- Relay outputs
- Universal power supply
- Robust design
- Large scanning range
- Front screen heating

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CE

Further information	Page
→ Ordering information	G-12
→ Technical specifications	G-13
→ Dimensional drawings	G-14
→ Connection diagrams	G-15
→ Accessories	G-15
→ Services	A-2

Ordering information

Scanning range	Supply voltage	Connection type	Enclosure rating	Sender		Receiver	
				Type	Part number	Type	Part number
0.5 m ... 18 m	230 V AC	PG gland	IP 67	WSU26/2-110	1015615	WEU26/2-110	1015616
		Plug 6 + PE	IP 65	WSU26/2-111	1015712	WEU26/2-111	1015713
		Plug 6 + PE ¹⁾		WSU26/2-113	1015716	WEU26/2-112	1015714
		Plug 6 + PE ¹⁾		WSU26/2-113	1015716	WEU26/2-113	1015715
		Plug 15 + PE	IP 65	WSU26/2-114	1015834	WEU26/2-114	1015835
15 m ... 70 m	230 V AC	PG gland	IP 67	WSU26/2-210	1015731	WEU26/2-210	1015743
		Plug 6 + PE	IP 65	WSU26/2-211	1015733	WEU26/2-211	1015744
		Plug 6 + PE ¹⁾		WSU26/2-213	1015736	WEU26/2-212	1015746
		Plug 6 + PE ¹⁾		WSU26/2-213	1015736	WEU26/2-213	1015748
		Plug 15 + PE	IP 65	WSU26/2-214	1015840	WEU26/2-214	1015841
0.5 m ... 18 m	115 V AC	PG gland	IP 67	WSU26/2-120	1015717	WEU26/2-120	1015718
		Plug 6 + PE	IP 65	WSU26/2-121	1015719	WEU26/2-121	1015720
		Plug 6 + PE ¹⁾		WSU26/2-123	1015723	WEU26/2-122	1015721
		Plug 6 + PE ¹⁾		WSU26/2-123	1015723	WEU26/2-123	1015722
		Plug 15 + PE	IP 65	WSU26/2-124	1015836	WEU26/2-124	1015837
15 m ... 70 m	115 V AC	PG gland	IP 67	WSU26/2-220	1015738	WEU26/2-220	1015749
		Plug 6 + PE	IP 65	WSU26/2-221	1015740	WEU26/2-221	1015750
		Plug 6 + PE ¹⁾		WSU26/2-223	1015737	WEU26/2-222	1015751
		Plug 6 + PE ¹⁾		WSU26/2-223	1015737	WEU26/2-223	1015505
		Plug 15 + PE	IP 65	WSU26/2-224	1015842	WEU26/2-224	1015843
0.5 m ... 18 m	24 V DC	PG gland	IP 67	WSU26/2-130	1015724	WEU26/2-130	1015725
		Plug 6 + PE	IP 65	WSU26/2-131	1015726	WEU26/2-131	1015727
		Plug 6 + PE ¹⁾		WSU26/2-133	1015730	WEU26/2-132	1015728
		Plug 6 + PE ¹⁾		WSU26/2-133	1015730	WEU26/2-133	1015729
		Plug 15 + PE	IP 65	WSU26/2-134	1015838	WEU26/2-134	1015839
15 m ... 70 m	24 V DC	PG gland	IP 67	WSU26/2-230	1015745	WEU26/2-230	1015504
		Plug 6 + PE	IP 65	WSU26/2-231	1015747	WEU26/2-231	1015753
		Plug 6 + PE ¹⁾		WSU26/2-233	1015739	WEU26/2-232	1015754
		Plug 6 + PE ¹⁾		WSU26/2-233	1015739	WEU26/2-233	1015755
		Plug 15 + PE	IP 65	WSU26/2-234	1015844	WEU26/2-234	1015845

¹⁾ Alternative internal wiring of the normally closed and normally open contacts (see technical description)

Detailed technical specifications

→ You can find further data in the operating instructions. Download at www.sick.com

General data

	Sender	Receiver
Scanning range (depending on type)	0.5 m ... 18 m / 15 m ... 70 m	
Number of beams	1	
Synchronisation	Optical, without separate synchronisation cable	
Light beam diameter	23 mm	
Aperture angle/receive angle	4° / 4°	
Wave length	950 nm	—
Protection class	I	
Enclosure rating (depending on type)	IP 67 / IP 65	
Type	Type 4 (EN 61496 part 1 and EN 50100 part 2)	
Dimensions (W x H x D)	156 mm x 50 mm x 116 mm	
Housing material	Zinc die-cast	
Ambient operating temperature from ... to	-25 °C ... +55 °C	
Storage temperature from ... to	-25 °C ... +70 °C	
Air humidity from ... to	15 % ... 95 %, non-dewing	
Vibration resistance	5 g, 10 Hz ... 55 Hz (IEC 60068-2-6)	
Shock resistance	10 g, 16 ms (IEC 68-2-29)	
Weight (depending on type)	1.00 kg ... 1.35 kg	1.47 kg ... 1.87

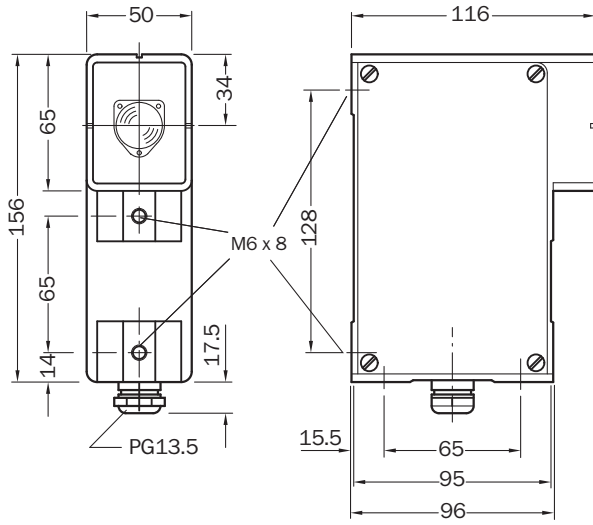
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Electrical data

	Sender	Receiver
Connection type (depending on type)	PG13.5 PG gland / Plug 6 + PE / Plug 15 + PE	
Supply voltage V_S (depending on type)	230 V AC (195.5 V AC ... 253 V AC) / 115 V AC (97.8 V AC ... 126 V AC) / 24 V DC (19.2 V DC ... 28.8 V DC)	
Supply frequency	48 Hz	
Power consumption (depending on type)	7 VA / 4 W	10 VA / 6 W
Switching outputs	—	Relay
Maximum response time	—	22 ms
Switching current	—	0.02 A ... 2 A
Switching voltage min ... max	—	24 V DC ... 250 V AC
Maximum switching power AC/DC	—	1380 VA / 144 W
Mechanical life (relay contacts)	—	1 x 10 ⁷ switching cycles
Electrical life (relay contacts) (depending on type)		
DC version	—	5 x 10 ⁴ switching cycles, with 2 A switching current /
AC version	—	8 x 10 ⁴ switching cycles, with 2 A switching current
Test input	Volt-free switch	—

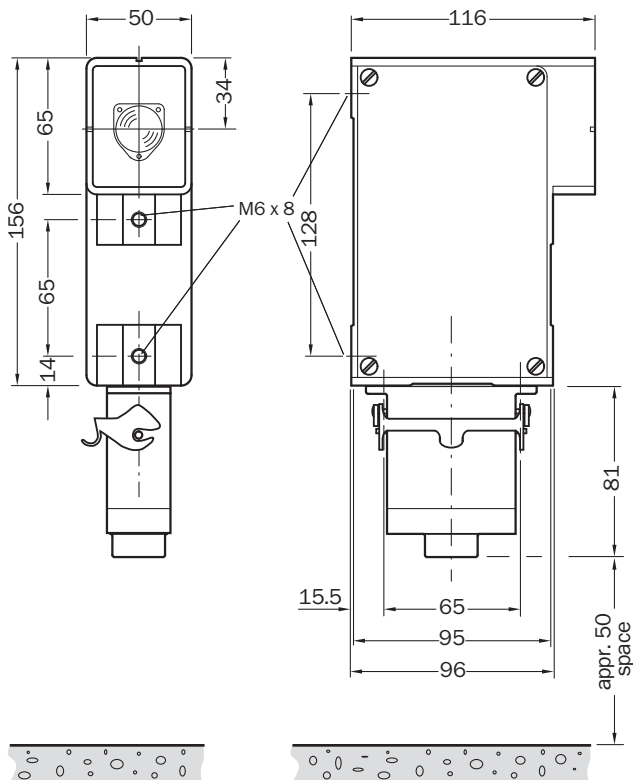
Dimensional drawings

PG gland

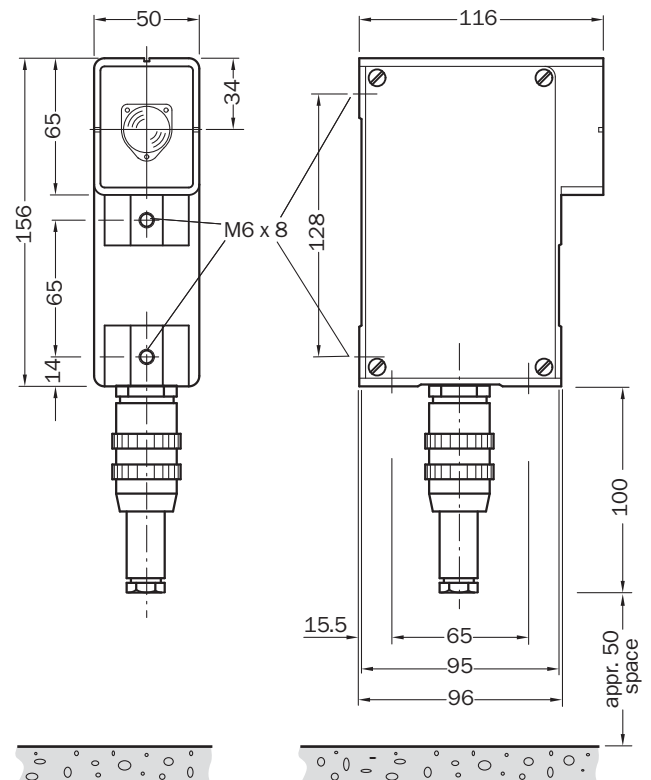


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Plug 15 + PE



Plug 6 + PE






Dimensions in mm

Connection diagrams

→ You can find connection diagrams at www.sick.com

Safe control solutions

	Product group	Applications	Further information
	Safety relays	Safety relays allow simple integration of safety components into machinery or plant.	Page N-0
	Safety controllers	Safety controllers are utilised when the safety function (e.g. switching off a dangerous movement) is to be accomplished in a flexible way by logical combination of safety relevant signals. Operation of machinery becomes more flexible as well as generation of machine variants becomes more easy.	Page O-0
	Safety network solutions	Safety network solutions are utilised in plants and machinery of larger scale. This is saving cabling and enables modular design of the safety automation. Potential errors or faults can be easily localised and quickly trouble shooted thanks to comprehensive diagnostics functions. That significantly reduces machine down times. SICK offers solutions for the open automation standards: AS-i Safety at Work, DeviceNet Safety and PROFI-safe.	Page P-0

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Accessories

Mounting systems

Property	Description	Part number
Mounting bracket	For WSU/WEU26/2	2007900

Deflector mirrors

Description	Usage	Mirror surface	Remark	Type	Part number
Deflector mirrors ¹⁾	—	105 mm x 160 mm	—	PNS105-1	1004076
	—	75 mm x 80 mm	Including mounting adapter (two pieces swivel mount)	PNS75-008	1026647
	—	96 mm x 124 mm	—	PSK1	1005229
	For 90° deflection	—	Incl. mounting set, not suitable for column mounting	PSK45	5306053
Mounting bracket	For PSK 1	—	—	BEF-GH	2009292
Spring fastening				—	2012473

¹⁾ Reduction of the scanning range

Cable receptacles

Description	Construction size	Cable alignment	Part number
Hirschmann cable receptacle	6-pin + PE	Straight	6006612
		Angled	6006613
Cable receptacles	PG13.5	Straight	2019075
	PG16	Lateral	2019076

PG expansion

Description	Construction size	Type	Part number
PG expansion	PG13/21	—	5307052
	PG21	Two-way splitter	5305978

Device protection

Description	Part number
Snow protection tube	1003619
Dust protection tube	1003556

Arc-suppressor

Description	Type	Part number
0.22 μ F/220 Ohm for 110 V AC ... 220 V AC	RC-A	6001224
2.2 μ F/100 Ohm for 24 V AC/DC ... 48 V AC/DC	RC-AD	6001225

Laser alignment aid

Description	Part number
Laser alignment aid AR60	1015741
Adapter AR60 WSU/WEU26/2	4031156

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Overview of technical specifications

Scanning range (typical/maximum)	0 m... 12 m / 0 ... 18 m
Light sender/type of light	LED/visible red light
Construction size	75.5 mm x 17.6 mm x 33.5 mm
Enclosure rating	IP 67
Ambient operating temperature from ... to	-40 °C ... +60 °C
Type	Type 2 (EN 61496), only in conjunction with suitable testing device

Product description

The SICK single-beam photoelectric safety switch WS/WE18-3 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK safe control solutions

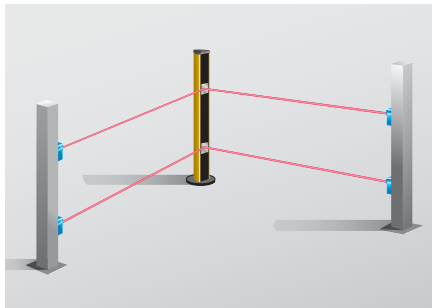
Combination with	Type of output	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE20	PNP, monitored and short-circuit protected	6	✓	✓	—	N-57
LE20 Muting		6	✓	✓	✓	N-64
UE10-30S	Relay contacts	—	—	—	—	N-3
UE410 Flexi	PNP semiconductors, short-circuit protected, cross-circuit monitored	4	✓	✓	✓	O-2

→ More combinations see appendix "Sensor systems and safe control solutions from SICK"

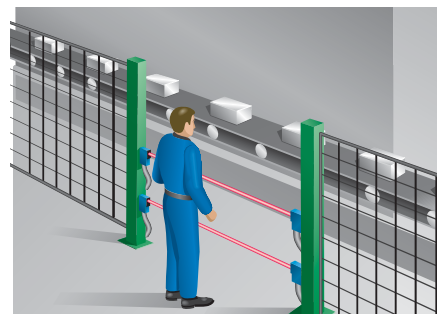
Applications

→ You can find more applications using the application finder at www.sick.com

- Processing machines
- Machining centres
- Palletiser systems
- High-bay warehouses
- Transfer lines



Access protection with mirror deflection



Access protection on a conveyor system



- Compact design
- Red light
- Plastic housing, ABS



Further information	Page
→ Ordering information	G-18
→ Technical specifications	G-18
→ Dimensional drawings	G-19
→ Connection diagrams	G-20
→ Accessories	G-21
→ Services	A-2

Ordering information

Scanning range	Connection type	Type of output	System part	Type	Part number
12 m	Plug M12 x 4	PNP, Q and \bar{Q}	Sender/receiver	WS/WE18-3P460	1026751
			Sender	WS18-3D460	2031731
			Receiver	WE18-3P460	2031732

Detailed technical specifications

→ You can find further data in the operating instructions. Download at www.sick.com

General data

	WS18-3D460	WE18-3P460
System part	Sender	Receiver
Scanning range (typical/maximum)	0 m ... 12 m / 0 m ... 18 m	
Number of beams	1	
Light spot diameter (distance)	300 mm/10 m	
Aperture angle/receive angle	$\pm 1.5^\circ / \pm 5^\circ$	
Light sender/type of light	LED/visible red light	
Wave length	660 nm	
Average service life (T_A)	100000 h (+25 °C)	
Protection class	II	
Enclosure rating	IP 67	
Type	Type 2 (EN 61496), only in conjunction with suitable testing device	
Design	Rectangular	
Dimensions (W x H x D)	75.5 mm x 17.6 mm x 33.5 mm	
Housing material	ABS	
Ambient operating temperature from ... to	-40 °C ... +60 °C	
Storage temperature from ... to	-40 °C ... +75 °C	
Weight	40 g	

Electrical data

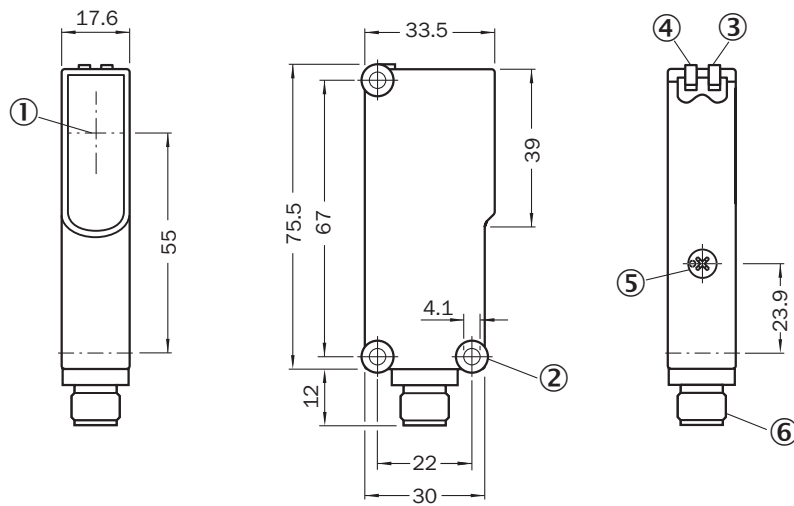
	WS18-3D460	WE18-3P460
System part	Sender	Receiver
Connection type	Plug M12 x 4	
Supply voltage V_S	24 V DC (16.8 V DC ... 28.8 V DC) ¹⁾	
Maximum power consumption	35 mA	20 mA
Test input voltage	V_S or not connected (sender on) 0 V DC (sender off)	—
Test duration	2 ms ²⁾	—
Switching outputs	—	PNP, Q and \bar{Q} ³⁾
Maximum response time	—	500 μ S
Maximum switching sequence	—	1000 Hz
Maximum switching current	—	100 mA
Diagnosis display	LED	

¹⁾ Reverse polarity protected

²⁾ Signal propagation time for Ohmic load, for test signal application (sender) and output signal reaction (receiver)

³⁾ Short-circuit protected interference suppression

Dimensional drawings



- ① Centre of optical axis
- ② Fastening hole
- ③ LED, yellow; light reception status
- ④ LED, green; operating voltage active
- ⑤ Sensitivity adjuster on WE
- ⑥ Device plug M12, 4-pin

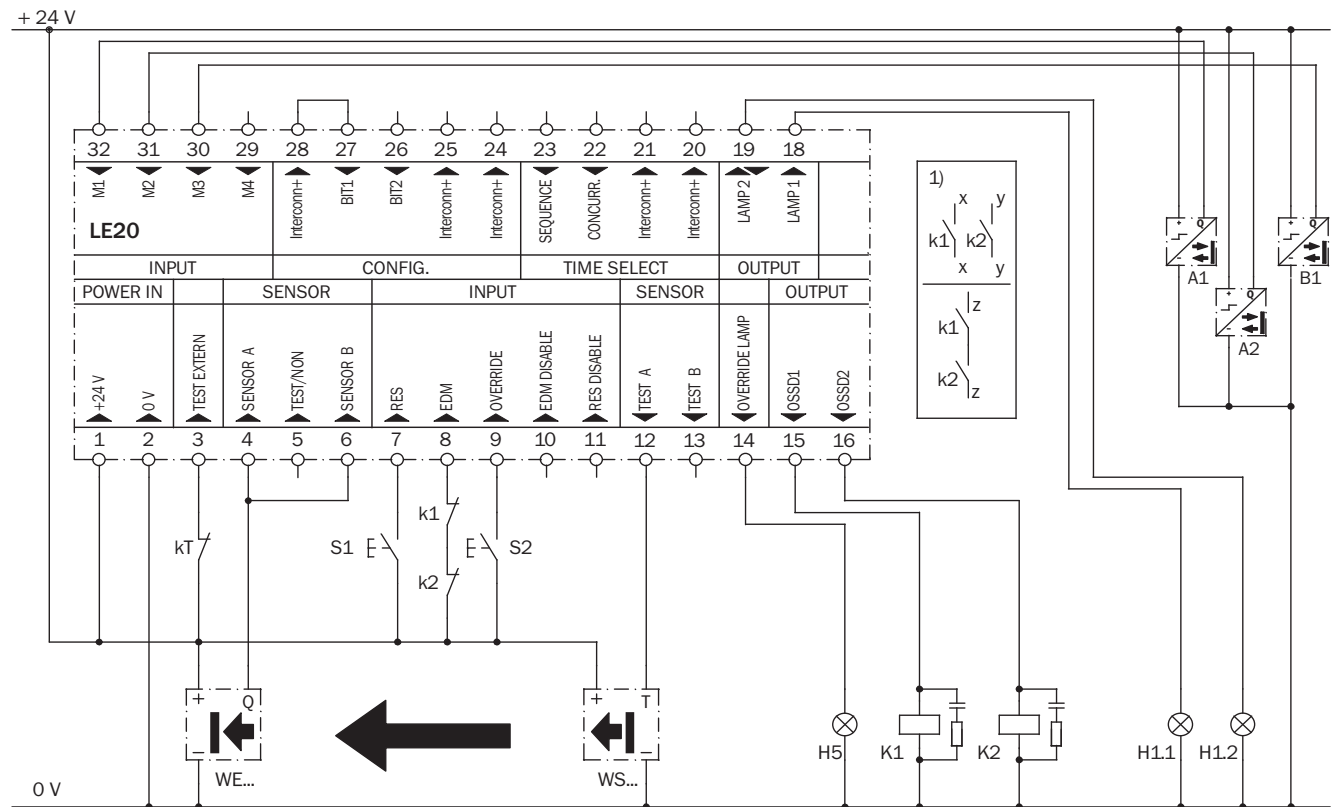
Dimensions in mm

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Connection diagrams

→ You can find more connection diagrams at www.sick.com

WS/WE18-3 on LE20 Muting safety evaluation unit



Task

Integration of the single-beam photoelectric safety switch in a control via an LE20. Muting using 2 photoelectric proximity switches (light switching PNP) and override circuit. Concurrence monitoring of the muting sensors, operating mode with restart interlock and external device monitoring.

Function

If the light beam is clear and the contactors K1 and K2 are de-energised, the OSSDs in the LE20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE20 (terminals 15 and 16) activate the contactors K1 and K2. If the light beam is interrupted, the LE20 deactivates the contactors K1 and K2.

Muting

The protective field must be clear, and the OSSDs on the LE20 switched on, to allow initiation of the muting function. Muting is prevented if photoelectric proximity switch pair A is not activated within 3 seconds. The muting inputs must remain activated without interruption for the duration of the muting.

Override

If, after a power failure or a muting error, the object to be muted is present in the light beam, the object can be moved out of the protective field by operating the S2 button. This is only possible if both muting signals (A1 and A2) are present at the LE20. This situation is indicated by illumination of the override lamp H5.

Possible faults




The incorrect functioning of one of the K1 or K2 contactors does not result in the loss of the shutdown function. The outputs of the LE20 are monitored PNP semiconductor outputs. Jamming of the S1 button prevents output circuit to enable. Failure of a muting sensor is detected so that renewed muting is prevented. Muting cannot be initiated if the muting lamp H1.1 is not connected or is faulty, or if there is a short-circuit in this circuit. If a replacement indicator (H1.2) is connected, it will indicate the failure of the muting lamp H1.1 by flashing and muting can be initiated. Jamming of the S2 button will be detected after no more than 30 minutes and will bring the override to an end.

Comments

1) Output circuits: These contacts are to be connected to the controller such that, with the output circuit open, the dangerous state is disabled. For categories 4 and 3, the integration must be dual-channel (x/y paths). Single-channel integration in the control (z path) is only possible with a single-channel control and taking into account the risk analysis.

The related operating instructions for the integrated devices must be observed.

Safe control solutions

	Product group	Applications	Further information
	Safety relays	Safety relays allow simple integration of safety components into machinery or plant.	Page N-0
	Safety controllers	Safety controllers are utilised when the safety function (e.g. switching off a dangerous movement) is to be accomplished in a flexible way by logical combination of safety relevant signals. Operation of machinery becomes more flexible as well as generation of machine variants becomes more easy.	Page O-0
	Safety network solutions	Safety network solutions are utilised in plants and machinery of larger scale. This is saving cabling and enables modular design of the safety automation. Potential errors or faults can be easily localised and quickly trouble shooted thanks to comprehensive diagnostics functions. That significantly reduces machine down times. SICK offers solutions for the open automation standards: AS-i Safety at Work, DeviceNet Safety and PROFIsafe.	Page P-0

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Accessories

Mounting systems

Description	Usage	Type	Part number
Mounting bracket	For WS/WE12-2	BEF-WN-W18	2009317

Connectors

Description	Connection type	Cable alignment	Cable length	Cable material	Type	Part number
Cable socket	M12 x 4	Straight	2 m	PVC	DOL-1204-G02M	6009382
			Can be preformed	—	DOS-1204-G	6007302

Deflector mirrors

Description	Usage	Mirror surface	Remark	Type	Part number
Deflector mirrors ¹⁾	—	105 mm x 160 mm	—	PNS105-1	1004076
	—	75 mm x 80 mm	Including mounting adapter (two pieces swivel mount)	PNS75-008	1026647
	—	96 mm x 124 mm	—	PSK1	1005229
	For 90° deflection	—	Incl. mounting set, not suitable for column mounting	PSK45	5306053
Mounting bracket	For PSK 1	—	—	BEF-GH	2009292
Spring fastening				—	2012473

¹⁾ Reduction of the scanning range



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- Integrated heating
- High scanning range
- Plastic housing, ABS
- Compact design
- Red light



Overview of technical specifications

Scanning range (typical/maximum)	0 m ... 25 m / 0 m ... 35 m
Light sender/type of light	LED/visible red light
Construction size	80 mm x 24 mm x 53.5 mm
Enclosure rating	IP 67
Ambient operating temperature from ... to	-40 °C ... +60 °C
Type	Type 2, EN 61496, only in conjunction with suitable testing device

Product description

The SICK single-beam photoelectric safety switch WS/WE27-2 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK safe control solutions

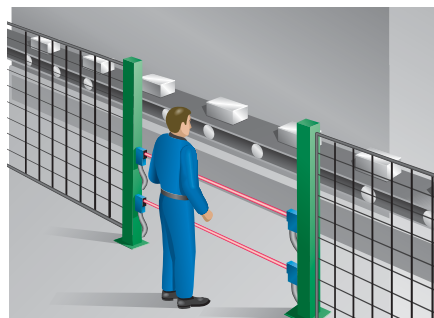
Combination with	Type of output	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE20	PNP, monitored and short-circuit protected	6	✓	✓	—	N-57
LE20 Muting		6	✓	✓	✓	N-64
UE10-30S	Relay contacts	—	—	—	—	N-3
UE410 Flexi	PNP semiconductors, short-circuit protected, cross-circuit monitored	4	✓	✓	✓	O-2

→ More combinations see appendix "Sensor systems and safe control solutions from SICK"

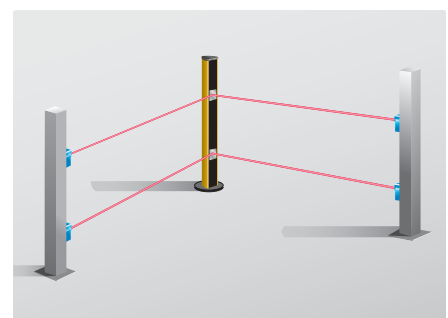
Applications

→ You can find more applications using the application finder at www.sick.com

- Processing machines
- Machining centres
- Palletiser systems
- High-bay warehouses
- Transfer lines



Access protection on a conveyor system



Access protection with mirror deflection

Further information	Page
→ Dimensional drawings	G-24
→ Connection diagrams	G-25
→ Accessories	G-26
→ Services	A-2

Ordering information

Scanning range	Connection type	System part	Front screen heating	Type	Part number
0 m ... 25 m	Plug M12 x 4	Sender/receiver	✓	WS/WE27-2F450S05	1016025
			–	WS/WE27-2F460	1019561
	Plug 7-pin		–	WS/WE27-2F730	1015124
			✓	WS/WE27-2F750	1015752
	Plug M12 x 4	Sender	✓	WS27-2D450S05	2018932
		Receiver	✓	WE27-2F450S05	2018933
		Sender	–	WS27-2D460	2021365
		Receiver	–	WE27-2F460	2021708
	Plug, 7-pin	Sender	–	WS27-2D730	2017894
		Receiver	–	WE27-2F730	2017895
		Sender	✓	WS27-2D750	2018618
		Receiver	✓	WE27-2F750	2018619

Detailed technical specifications

→ You can find further data in the operating instructions. Download at www.sick.com

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General data

	Sender	Receiver
Scanning range (typical/maximum)	0 m ... 25 m / 0 m ... 35 m	
Light spot diameter (distance)	1200 mm (25 m)	
Aperture angle/receive angle	±4°/±5°	
Light sender/type of light	LED/visible red light	
Wave length	660 nm	
Average service life (T _A)	100000 h (+25 °C)	
Protection class	II	
Enclosure rating	IP 67	
Type	Type 2 (EN 61496), only in conjunction with suitable testing device	
Design	Rectangular	
Dimensions (W x H x D)	80 mm x 24 mm x 53.5 mm	
Housing material	ABS	
Ambient operating temperature from ... to	–40 °C ... +60 °C	
Storage temperature from ... to	–40 °C ... +75 °C	
Weight	100 g	

Electrical data

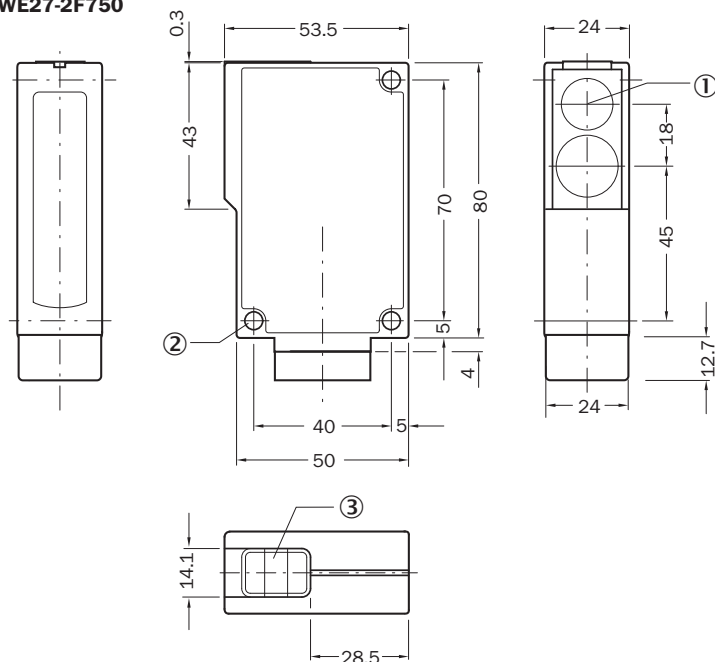
Connection type (depending on type)	Plug M12 x 4 / Plug, 7-pin	
Supply voltage V_S	24 V DC (16.8 V DC ... 28.8 V DC) ¹⁾	
Maximum power consumption (depending on type)	50 mA / 35 mA	45 mA / 35 mA
Test input voltage	V_S (sender on), 0 V DC (sender off)	—
Switching outputs	—	PNP, Q and \bar{Q} ²⁾
Maximum response time	—	500 μ S
Maximum switching sequence	—	1000 Hz
Diagnosis display	LED	

¹⁾ Reverse polarity protected

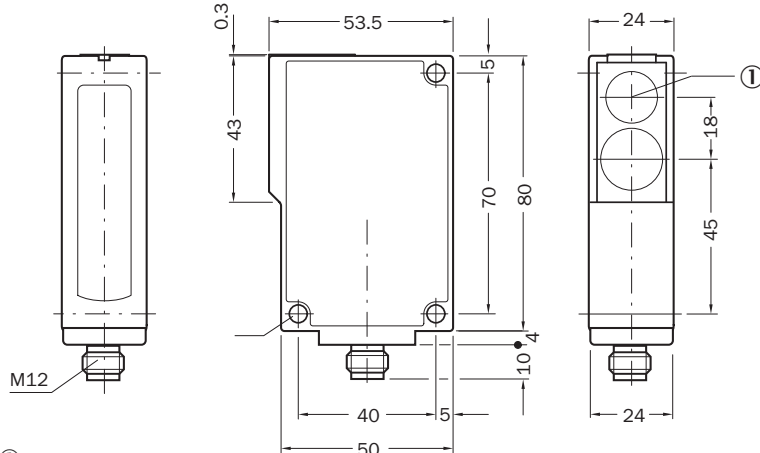
²⁾ Short-circuit protected interference suppression

Dimensional drawings

WS/WE27-2F730
WS/WE27-2F750



WS/WE27-2F460
WS/WE27-2F450S05



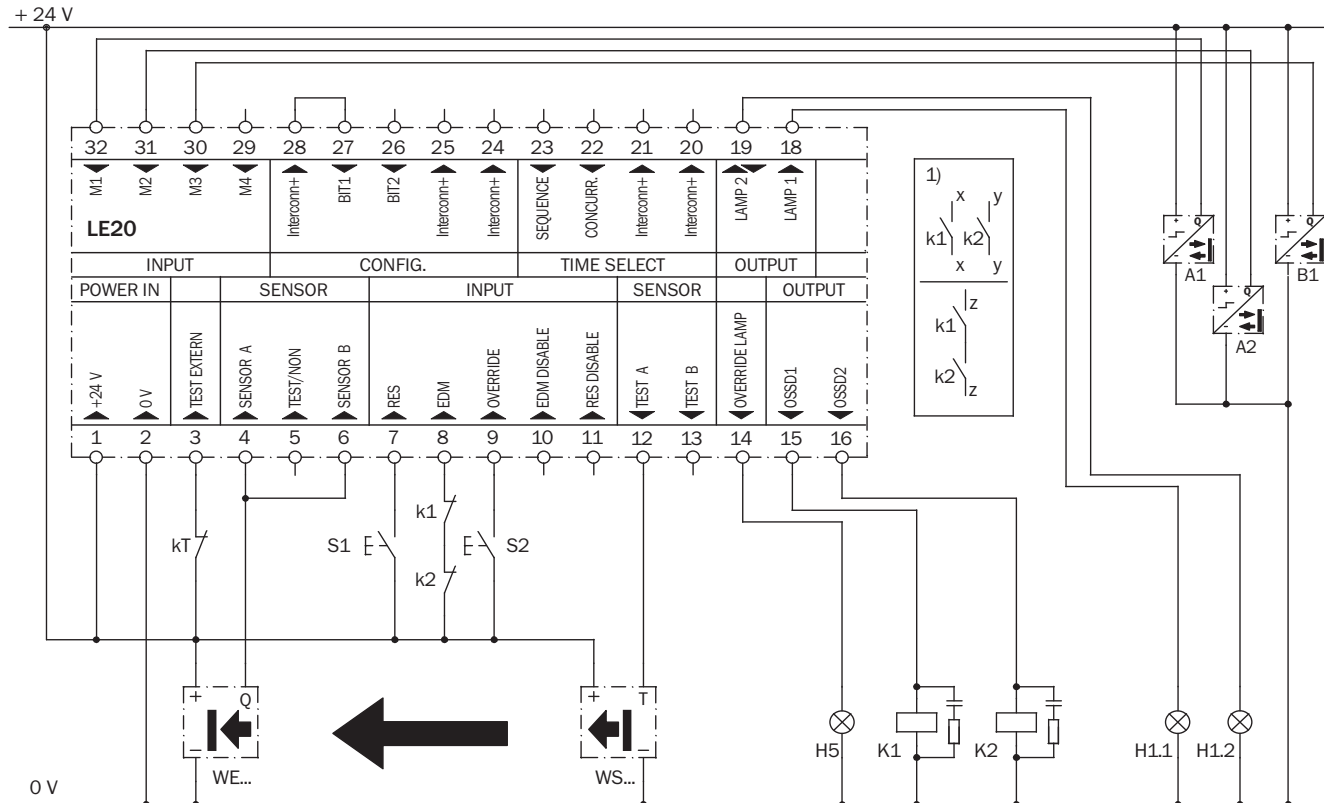
- ① Centre of optical axis
- ② Fastening hole \varnothing 5.2 mm
- ③ LED

Dimensions in mm

Connection diagrams

→ You can find more connection diagrams at www.sick.com

WS/WE27-2 on LE20 Muting safety evaluation unit



Task

Integration of the single-beam photoelectric safety switch in a control via an LE20. Muting using 3 photoelectric proximity switches (light switching PNP) and override circuit. Concurrence monitoring of the muting sensors A1-A2, operating mode with restart interlock and external device monitoring.

Function

If the light beam is clear and the contactors K1 and K2 are de-energised, the OSSDs in the LE20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE20 (terminals 15 and 16) activate the contactors K1 and K2. If the light beam is interrupted, the LE20 deactivates the contactors K1 and K2.

Muting

The protective field must be clear, and the OSSDs on the LE20 switched on, to allow initiation of the muting function. If photoelectric proximity switch pair A is not activated within 3 seconds, the muting is prevented. The muting inputs must remain activated without interruption for the duration of the muting, also on switching from B1 to A1 & A2.

Override

If, after a power failure or a muting error, the object to be muted is in the light beam, the object can be moved out of the protective field by operating the S2 button. This is only possible if a valid combination of muting signals is present at the LE20. This situation is indicated by illumination of the override lamp H5.

Possible faults




The incorrect functioning of one of the K1 or K2 contactors does not result in the loss of the shutdown function. The outputs of the LE20 are monitored PNP semiconductor outputs. Jamming of the S1 button prevents output circuit to enable. Failure of a muting sensor is detected so that renewed muting is prevented. Muting cannot be initiated if the muting lamp H1.1 is not connected or is faulty, or if there is a short-circuit in this circuit. If a replacement indicator (H1.2) is connected, it will indicate the failure of the muting lamp H1.1 by flashing and muting can be initiated. Jamming of the S2 button will be detected after no more than 30 minutes and will bring the override to an end.

Comments

1) Output circuits: These contacts are to be connected to the controller such that, with the output circuit open, the dangerous state is disabled. For categories 4 and 3, the integration must be dual-channel (x/y paths). Single-channel integration in the control (z path) is only possible with a single-channel control and taking into account the risk analysis.

The related operating instructions for the integrated devices must be observed.

Safe control solutions

	Product group	Applications	Further information
	Safety relays	Safety relays allow simple integration of safety components into machinery or plant.	Page N-0
	Safety controllers	Safety controllers are utilised when the safety function (e.g. switching off a dangerous movement) is to be accomplished in a flexible way by logical combination of safety relevant signals. Operation of machinery becomes more flexible as well as generation of machine variants becomes more easy.	Page O-0
	Safety network solutions	Safety network solutions are utilised in plants and machinery of larger scale. This is saving cabling and enables modular design of the safety automation. Potential errors or faults can be easily localised and quickly trouble shooted thanks to comprehensive diagnostics functions. That significantly reduces machine down times. SICK offers solutions for the open automation standards: AS-i Safety at Work, DeviceNet Safety and PROFIsafe.	Page P-0

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Accessories

Mounting systems

Description	Usage	Type	Part number
Mounting bracket	For WS/WE27-2	BEF-WN-W27	2009122

Connectors

Description	Connection type	Cable alignment	Cable length	Cable material	Remark	Type	Part number
Cable socket	M12 x 4	Straight	2 m	PVC	—	DOL-1204-G02M	6009382
			—	—	—	DOS-1204-G	6007302
	Q7, 7-pin, DC	Angled	—	—	With coding for DC	DOS-2107-W	6006823

Deflector mirrors

Description	Usage	Mirror surface	Delivery	Type	Part number
Deflector mirrors ¹⁾	—	105 mm x 160 mm	—	PNS105-1	1004076
	—	75 mm x 80 mm	Including mounting adapter (two pieces swivel mount)	PNS75-008	1026647
	—	96 mm x 124 mm	—	PSK1	1005229
	For 90° deflection	—	Incl. mounting set, not suitable for column mounting	PSK45	5306053
Mounting bracket	For PSK 1	—	—	BEF-GH	2009292
Spring fastening				—	2012473

¹⁾ Reduction of the scanning range

Laser alignment aid

Type	Part number
Laser alignment aid AR60	1015741
AR60 adapter for WS/WE27-2	4032828

Overview of technical specifications

Scanning range (typical/maximum)	0 m ... 16 m / 0 m ... 22 m
Light sender/type of light	LED/visible red light
Construction size (depending on type)	M18 x 85.3 mm / M18 x 97.7 mm
Enclosure rating	IP 67
Ambient operating temperature from ... to	-25 °C ... +70 °C
Type	Type 2 (EN 61496), only in conjunction with LE20

Product description

The SICK single-beam photoelectric safety switch VS/VE18-2 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK safe control solutions

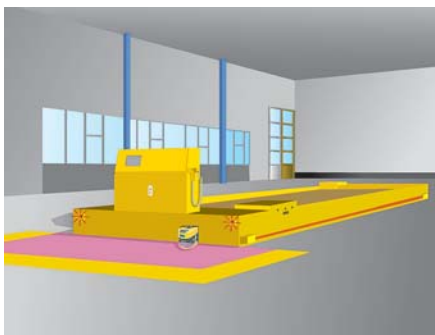
Combination with	Type of output	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE20	PNP, monitored and short-circuit protected	6	✓	✓	—	N-57
LE20 Muting		6	✓	✓	✓	N-64
UE10-30S	Relay contacts	—	—	—	—	N-3
UE410 Flexi	PNP semiconductors, short-circuit protected, cross-circuit monitored	4	✓	✓	✓	O-2

→ More combinations see appendix "Sensor systems and safe control solutions from SICK"

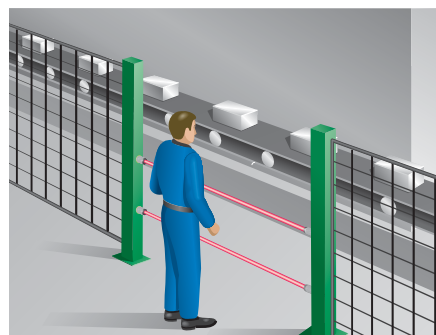
Applications

→ You can find more applications using the application finder at www.sick.com

- Processing machines
- Machining centres
- Palletiser systems
- High-bay warehouses
- Transfer lines



Hazardous area protection using the VS/VE18 and the LE20 on an automated guided vehicle (AGV)



Access protection on a conveyor system



- Metal housing
- High scanning range
- Cylindrical design
- Red light



Further information	Page
→ Ordering information	G-28
→ Technical specifications	G-28
→ Dimensional drawings	G-29
→ Connection diagrams	G-30
→ Accessories	G-31
→ Services	A-2

Ordering information

Scanning range	System part	Connection type	Type	Part number
0 m ... 16 m	Sender/receiver	Plug M12 x 4, angled	VS/VE18-204550	6011845
		Plug M12 x 4, straight	VS/VE18-204450	6011846
	Sender	Plug M12 x 4, angled	VS18-2D5550	6011847
		Plug M12 x 4, straight	VS18-2D5450	6011849
	Receiver	Plug M12 x 4, angled	VE18-204550	6011850
		Plug M12 x 4, straight	VE18-204450	6011848

Detailed technical specifications

→ You can find further data in the operating instructions. Download at www.sick.com

General data

	VS18-2D5450	VE18-204450	VS18-2D5550	VE18-204550
System part	Sender	Receiver	Sender	Receiver
Scanning range (typical/maximum)	0 m ... 16 m / 0 m ... 22 m			
Number of beams	1			
Light spot diameter (distance)	1200 mm (25 m)			
Aperture angle/receive angle	±4°/±5°			
Light sender/type of light	LED/visible red light			
Wave length	660 nm			
Average service life (T _A)	100000 h (+25 °C)			
Protection class	III			
Enclosure rating	IP 67			
Type	Type 2 (EN 61496), only in conjunction with LE20			
Design	Cylindrical			
Dimensions (diameter x length)	M18 x 97.7 mm		M18 x 85.3 mm	
Housing material	Brass nickel-plated			
Ambient operating temperature from ... to	-25 °C ... +70 °C			
Weight	250 g			

Electrical data

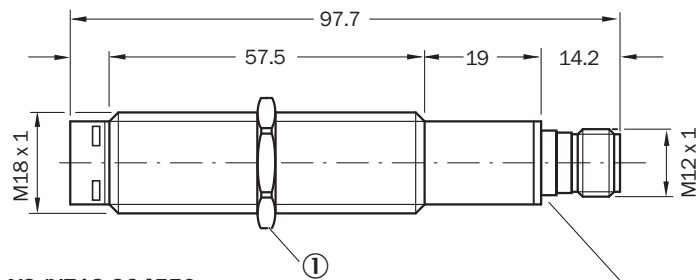
	VS18-2D5450	VE18-204450	VS18-2D5550	VE18-204550
System part	Sender	Receiver	Sender	Receiver
Connection type	Plug M12 x 4, straight		Plug M12 x 4, angled	
Supply voltage V _S	24 V DC (16.8 V DC ... 28.8 V DC) ¹⁾			
Maximum power consumption	35 mA	25 mA	35 mA	25 mA
Switching outputs	—	PNP, Q and \bar{Q} ²⁾	—	PNP, Q and \bar{Q} ²⁾
Maximum response time	—	2 ms	—	2 ms
Maximum switching sequence	—	250 Hz	—	250 Hz
Maximum switching current	—	100 mA	—	100 mA
Diagnosis display	LED			

¹⁾ Reverse polarity protected

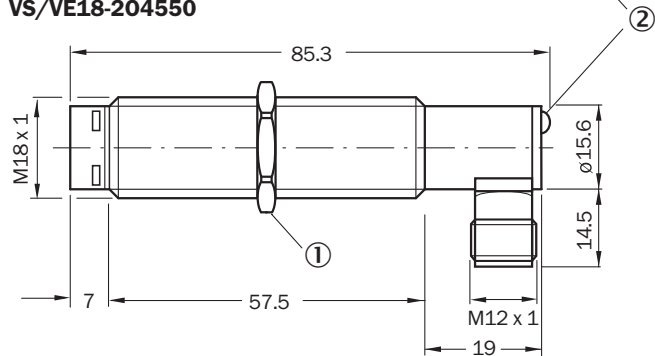
²⁾ Short-circuit protected, interference suppression

Dimensional drawings

VS/VE18-204450



VS/VE18-204550



Dimensions in mm

- ① Mounting nut M18
- ② LED

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