Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page C-80

Designation	Description	Part number
Mounting kit 1	▪ 4 pieces ▪ Pivoting ▪ Swivel mount ▪ For protective field height 150 mm ... 1200 mm	2 019 649
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount ▪ For protective field height 1350 mm ... 1800 mm	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ For protective field height 150 mm ... 1200 mm	2 030 288
	▪ 4 pieces ▪ Pivoting ▪ For protective field height 1350 mm ... 1800 mm	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16ms ▪ For protective field height 1350 mm ... 1800 mm	2 026 850

Connector technology

System connection	Designation	Description	Connection cable	Part number
M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343

Continued on next page

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C

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

Device columns [1)]

Designation	Description	Part number
Device column with front screen	▪ For C 2000 Standard (protective field height 150 mm ... 1050 mm) ▪ For C 2000 cascadable and RES/EDM (protective field height 150 mm ... 900 mm) ▪ 1200 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 333
	▪ For C 2000 (protective field height 150 mm ... 1200 mm) ▪ 1500 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 242
	▪ For C 2000 (protective field height 150 mm ... 1200 mm) ▪ 1700 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 337
	▪ For C 2000 (protective field height 1350 mm ... 1500 mm) ▪ 1700 mm high ▪ Including mounting kit 2 (2 pieces)	2 021 332

[1)] Warning, reduction of the scanning range!

Additional front screens [1)]

Designation	For protective field height (mm)	Part number
Additional front screen (weld spark guard)	300	2 022 405
	450	2 022 406
	600	2 022 407
	750	2 022 408
	900	2 022 409
	1050	2 022 410
	1200	2 022 411

[1)] Warning, reduction of the scanning range!

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Additional front screens Heavy Duty [1)]

Designation	For protective field height (mm)	Part number
Additional front screen Heavy Duty (weld spark guard) with bracket	1350	2 026 860
	1500	2 026 861
	1650	2 026 862
	1800	2 026 863

1) Warning, reduction of the scanning range!

C

Deflector mirrors [1)] (incl. mounting kit 2)

Designation	For protective field height (mm)	Type	Part number
For overall protective field width 0 m ... 4 m	300	PNS75-034	1 019 414
	450	PNS75-049	1 019 415
	600	PNS75-064	1 019 416
	750	PNS75-079	1 019 417
	900	PNS75-094	1 019 418
	1050	PNS75-109	1 019 419
	1200	PNS75-124	1 019 420
	1350	PNS75-139	1 019 421
	1500	PNS75-154	1 019 422
	1650	PNS75-169	1 019 423
	1800	PNS75-184	1 019 424
For overall protective field width 4 m ... 15 m	300	PNS125-034	1 019 425
	450	PNS125-049	1 019 426
	600	PNS125-064	1 019 427
	750	PNS125-079	1 019 428
	900	PNS125-094	1 019 429
	1050	PNS125-109	1 019 430
	1200	PNS125-124	1 019 431
	1350	PNS125-139	1 019 432
	1500	PNS125-154	1 019 433
	1650	PNS125-169	1 019 434
	1800	PNS125-184	1 019 435

1) Warning, reduction of the scanning range!

Laser alignment aid

Designation	Description	Type	Part number
Laser alignment aid	▪ Does not require connection to power supply	AR 60	1 015 741
Adapter for AR 60	▪ For large housing profile	–	4 032 461
	▪ For small housing profile	–	4 032 462

➜ For dimensional drawings of the device columns and deflector mirrors please refer to the operating instructions/technical description. Download at www.sick.com

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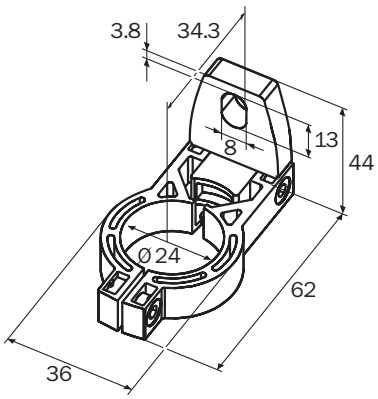
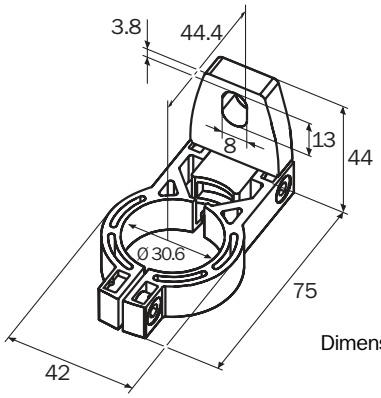
C

Dimensional drawings mounting accessories

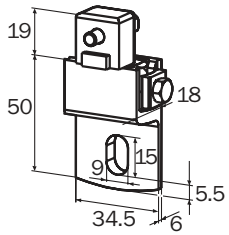


Swivel mount
Mounting kit 1
for protective field height 150 mm ... 1200 mm

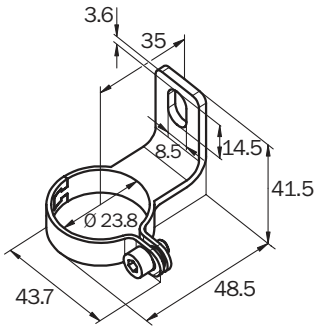


Swivel mount
Mounting kit 2
for protective field height 1350 mm ... 1800 mm

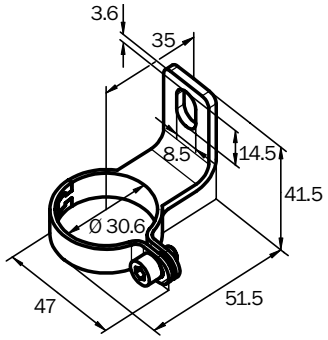
Dimensions in mm



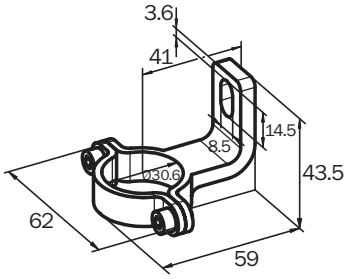
Side bracket
Mounting kit 6



Stainless steel bracket
for protective field height 150 mm ... 1200 mm



Stainless steel bracket
for protective field height 1350 mm ... 1800 mm



Reinforced stainless steel bracket for
protective field height 1350 mm ... 1800 mm

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Overview of technical specifications

Resistant materials	Stainless steel (V4A), PMMA, PA, PVC
Enclosure rating	IP 67
Protective field width (depending on type)	0 m ... 4.5 m / 2.5 m ... 14.5 m
Protective field height (depending on type)	150 mm ... 1200 mm
Resolution (depending on type)	30 mm
Type	Type 2 according to EN 61496

Product description

The IP 67 housing in conjunction with the safety light curtain C 2000 achieves the enclosure rating IP 67. A high level of resistance against the usual cleaning agents is achieved by using suitable materials (V4A, PMMA, PA, PVC).

A compensating element (membrane) prevents the plastic tubes misting up and the entry of liquids. The cable is fed into the device through the proven PG connector.

In-system added value

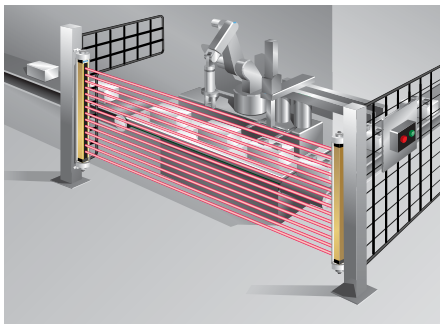
- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20	✔	–	L-53
LE 20 Muting	✔	✔	L-60
UE 48-2 OS	✔	–	L-42
UE 48-3 OS	✔	–	L-48

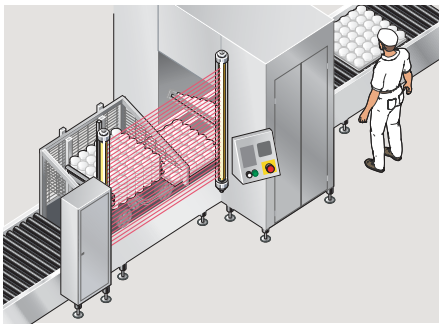
Applications

→ For more applications please refer to the application finder at www.sick.com

- Packaging industry
- Food industry
- Chemical industry
- Pharmaceutical industry
- Clean-room systems



Hazardous point protection on a processing centre in the hygiene area



Hazardous point protection on a cheese-making machine

C

- High durability
- Compact design
- External device monitoring (EDM)
- Self-testing
- On-site diagnostics
- Beam coding

CE

Further information	Page
→ Ordering information	C-82
→ Technical specifications	C-82
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→ Connection diagram	C-76
→ Accessories	C-84
→ Dimensional drawings accessories	C-85
→ Services	A-0

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Ordering information

IP 67 housing with integrated sender or receiver unit C 2000 Standard, including 15 m PVC cable

→ Accessories see page C-84

Scanning range 0 ... 4.5 m

C

Resolution (mm)	Protective field height (mm)	Sender unit		Receiver unit	
		Type	Part number	Type	Part number
30	150	C25S-015103C11	1 024 184	C25E-015303C11	1 024 185
	300	C25S-030103C11	1 024 187	C25E-030303C11	1 024 188
	450	C25S-045103C11	1 024 190	C25E-045303C11	1 024 191
	600	C25S-060103C11	1 024 193	C25E-060303C11	1 024 194
	750	C25S-075103C11	1 024 196	C25E-075303C11	1 024 197
	900	C25S-090103C11	1 024 199	C25E-090303C11	1 024 200
	1050	C25S-105103C11	1 024 202	C25E-105303C11	1 024 203
	1200	C25S-120103C11	1 024 205	C25E-120303C11	1 024 206

Scanning range 2.5 ... 14.5 m

Resolution (mm)	Protective field height (mm)	Sender unit		Receiver unit	
		Type	Part number	Type	Part number
30	150	C25S-015203C11	1 024 186	C25E-015303C11	1 024 185
	300	C25S-030203C11	1 024 189	C25E-030303C11	1 024 188
	450	C25S-045203C11	1 024 192	C25E-045303C11	1 024 191
	600	C25S-060203C11	1 024 195	C25E-060303C11	1 024 194
	750	C25S-075203C11	1 024 198	C25E-075303C11	1 024 197
	900	C25S-090203C11	1 024 201	C25E-090303C11	1 024 200
	1050	C25S-105203C11	1 024 204	C25E-105303C11	1 024 203
	1200	C25S-120203C11	1 024 207	C25E-120303C11	1 024 206

Detailed technical specifications

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

C 2000 Standard in IP 67 housing

→ C 2000 specific data see C 2000 Standard page C-73

Protective field width (depending on type)	0 m ... 4.5 m / 2.5 m ... 14.5 m
Protective field height (depending on type)	150 mm ... 1200 mm
Resolution	30 mm
Enclosure rating	IP 66, IP 67
Type	Type 2 according to EN 61496
Materials	
End caps	Stainless steel (V4A)
Plastic tube	PMMA
Compensating element (membrane)	PA 6
PG connector	PA 6
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C

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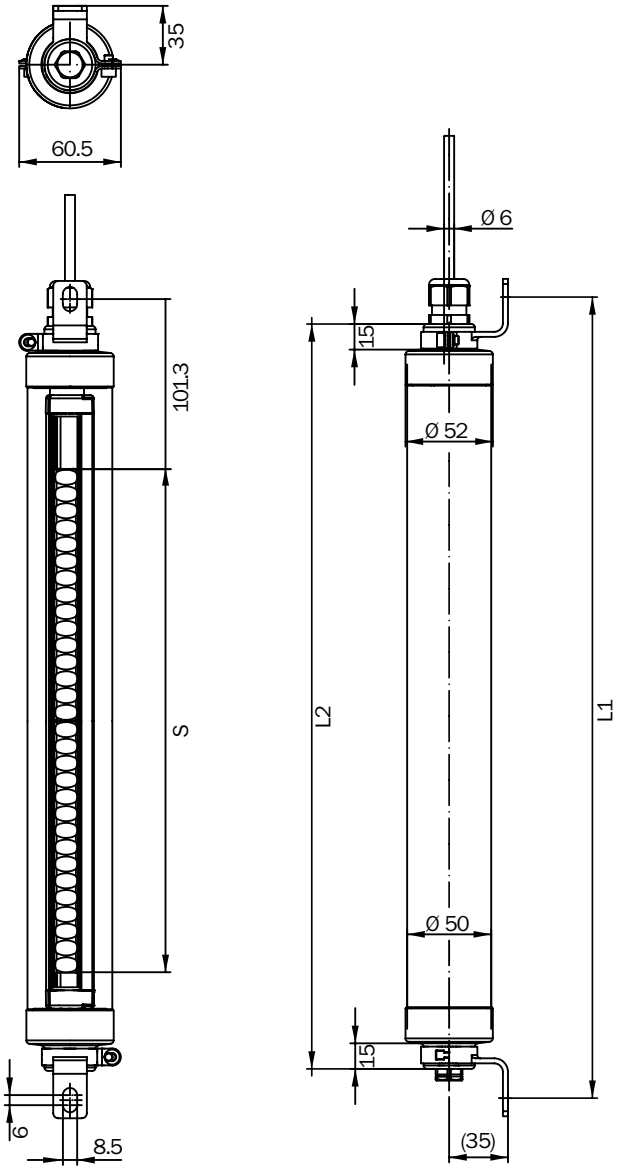
C

Dimensional drawings



Dimensions in mm

Illustration with stainless steel bracket (not supplied with delivery)

Protective field height S	L 1	L 2
150	357	324
300	476	443
450	626	593
600	777	744
750	927	894
900	1078	1045
1050	1228	1195
1200	1382	1349

Dimensions in mm

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Connection diagram

→ Connection diagram C 2000 Standard on safety relay UE 10 see page C-76
→ You can find more connection diagrams at www.sick.com

Accessories

C

Mounting accessories

Designation	Description	Part number
Stainless steel bracket	▪ 4 pieces ▪ Pivoting	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16ms	2 026 850
Stainless steel support bracket	▪ 2 pieces ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16ms	2 026 849
Mounting key	▪ For M12 cable socket on device replacement	4 034 690
Venting membrane	–	5 309 082

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

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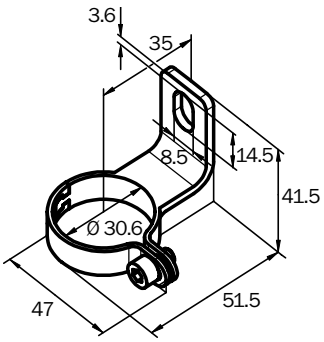
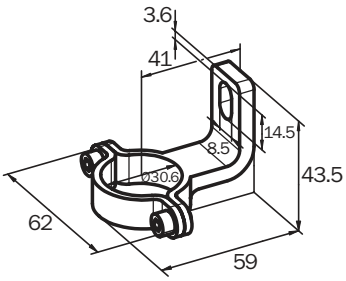
Dimensional drawings mounting accessories

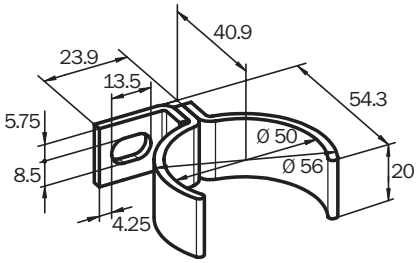
Dimensions in mm



Stainless steel bracket



Reinforced stainless steel bracket



Stainless steel support bracket

Mounting key

C

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C

- Restart interlock (RES)
- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid
- Beam coding

Further information	Page
→ Technical specifications	C-89
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Overview of technical specifications

Protective field width (depending on type)	0 m ... 6 m / 2.5 m ... 19 m
Protective field height (depending on type)	300 mm ... 1800 mm
Resolution (depending on type)	20 mm / 30 mm / 40 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

With its high signal reserve, the C 2000 RES/EDM safety light curtain is also reliable under harsh industrial conditions. Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtimes. The modular concept achieves maximum machine security while taking into account economic considerations by precisely coordinating the characteristics of the device to the requirements. Interfaces and service concepts complete the product range to provide an ideal solution for the sector. Compared to traditional solutions the integrated restart interlock in the C 2000 RES/EDM offers the advantages of shorter cable runs and quicker commissioning.

In-system added value

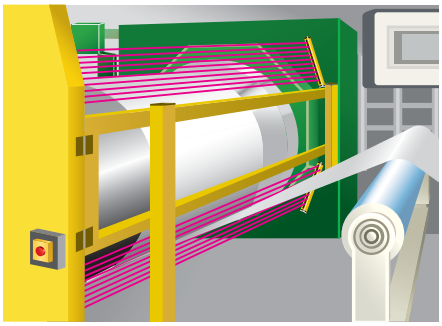
- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20 Muting	✔	✔	L-60

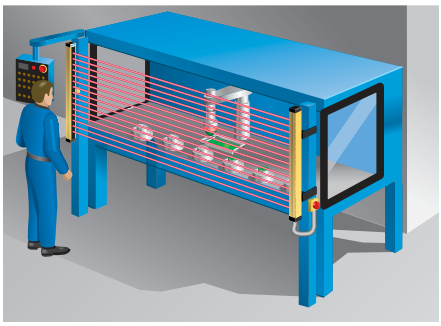
Applications

→ For more applications please refer to the application finder at www.sick.com

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry



C 2000 RES/EDM on a warping machine



C 2000 RES/EDM on a pad printing machine

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Ordering information

C 2000 RES/EDM
- With restart interlock (RES) and external device monitoring (EDM)
- For usage as a standalone system
- Consisting of sender and receiver unit

→ Accessories see page C-93

C

Scanning range 0 ... 6 m

Resolution (mm)	Housing cross-section (mm)	Protective field height (mm)	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
20	34 x 29	300	C20S-030102A11	1 016 448	C20E-030302A21	1 018 073
		450	C20S-045102A11	1 016 573	C20E-045302A21	1 018 079
		600	C20S-060102A11	1 016 574	C20E-060302A21	1 018 056
		750	C20S-075102A11	1 016 579	C20E-075302A21	1 018 096
		900	C20S-090102A11	1 016 584	C20E-090302A21	1 018 105
		1050	C20S-105102A11	1 016 589	C20E-105302A21	1 018 114
		1200	C20S-120102A11	1 016 464	C20E-120302A21	1 016 970
30	34 x 29	300	C20S-030103A11	1 016 568	C20E-030303A21	1 016 974
		450	C20S-045103A11	1 016 454	C20E-045303A21	1 018 081
		600	C20S-060103A11	1 016 477	C20E-060303A21	1 018 089
		750	C20S-075103A11	1 016 479	C20E-075303A21	1 018 098
		900	C20S-090103A11	1 016 481	C20E-090303A21	1 018 107
		1050	C20S-105103A11	1 016 483	C20E-105303A21	1 018 116
		1200	C20S-120103A11	1 016 594	C20E-120303A21	1 018 124
	48 x 40	1350	C20S-135103A12	1 016 600	C20E-135303A22	1 018 058
		1500	C20S-150103A12	1 016 605	C20E-150303A22	1 018 134
		1650	C20S-165103A12	1 016 610	C20E-165303A22	1 018 140
		1800	C20S-180103A12	1 016 615	C20E-180303A22	1 018 147
40	34 x 29	300	C20S-030104A11	1 016 570	C20E-030304A21	1 016 973
		450	C20S-045104A11	1 016 456	C20E-045304A21	1 018 083
		600	C20S-060104A11	1 016 576	C20E-060304A21	1 018 091
		750	C20S-075104A11	1 016 581	C20E-075304A21	1 018 100
		900	C20S-090104A11	1 016 586	C20E-090304A21	1 018 109
		1050	C20S-105104A11	1 016 591	C20E-105304A21	1 018 118
		1200	C20S-120104A11	1 016 596	C20E-120304A21	1 018 126
	48 x 40	1350	C20S-135104A12	1 016 603	C20E-135304A22	1 018 130
		1500	C20S-150104A12	1 016 608	C20E-150304A22	1 018 136
		1650	C20S-165104A12	1 016 613	C20E-165304A22	1 018 142
		1800	C20S-180104A12	1 016 618	C20E-180304A22	1 018 149

Continued on next page

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C

Scanning range 2.5 ... 19 m

Resolution (mm)	Housing cross-section (mm)	Protective field height (mm)	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
20	34 x 29	300	C20S-030202A11	1 016 632	C20E-030302A21	1 018 073
		450	C20S-045202A11	1 016 458	C20E-045302A21	1 018 079
		600	C20S-060202A11	1 016 633	C20E-060302A21	1 018 056
		750	C20S-075202A11	1 016 634	C20E-075302A21	1 018 096
		900	C20S-090202A11	1 016 635	C20E-090302A21	1 018 105
		1050	C20S-105202A11	1 016 636	C20E-105302A21	1 018 114
		1200	C20S-120202A11	1 016 466	C20E-120302A21	1 016 970
30	34 x 29	300	C20S-030203A11	1 016 572	C20E-030303A21	1 016 974
		450	C20S-045203A11	1 016 460	C20E-045303A21	1 018 081
		600	C20S-060203A11	1 016 578	C20E-060303A21	1 018 089
		750	C20S-075203A11	1 016 583	C20E-075303A21	1 018 098
		900	C20S-090203A11	1 016 588	C20E-090303A21	1 018 107
		1050	C20S-105203A11	1 016 593	C20E-105303A21	1 018 116
		1200	C20S-120203A11	1 016 599	C20E-120303A21	1 018 124
	48 x 40	1350	C20S-135203A12	1 016 602	C20E-135303A22	1 018 058
		1500	C20S-150203A12	1 016 607	C20E-150303A22	1 018 134
		1650	C20S-165203A12	1 016 612	C20E-165303A22	1 018 140
		1800	C20S-180203A12	1 016 617	C20E-180303A22	1 018 147
40	34 x 29	300	C20S-030204A11	1 016 638	C20E-030304A21	1 016 973
		450	C20S-045204A11	1 016 462	C20E-045304A21	1 018 083
		600	C20S-060204A11	1 016 639	C20E-060304A21	1 018 091
		750	C20S-075204A11	1 016 640	C20E-075304A21	1 018 100
		900	C20S-090204A11	1 016 641	C20E-090304A21	1 018 109
		1050	C20S-105204A11	1 016 642	C20E-105304A21	1 018 118
		1200	C20S-120204A11	1 016 643	C20E-120304A21	1 018 126
	48 x 40	1350	C20S-135204A12	1 016 644	C20E-135304A22	1 018 130
		1500	C20S-150204A12	1 016 646	C20E-150304A22	1 018 136
		1650	C20S-165204A12	1 016 647	C20E-165304A22	1 018 142
		1800	C20S-180204A12	1 016 648	C20E-180304A22	1 018 149

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Protective field width (depending on type)	0 m ... 6 m / 2.5 m ... 19 m
Protective field height (depending on type)	300 mm ... 1800 mm
Resolution (depending on type)	20 mm / 30 mm / 40 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender unit

Power consumption	Max. 6.2 W

Receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 7 ms ... 34 ms
Switching voltage **$HIGH_{min}$** **LOW_{max}**	 V_S – 2.25 V 1 V
Switching current	Max. 500 mA
Power consumption	Max. 8 W

Operating data

Type of connection	M12 plug, 8-pin
Connection cable wire cross-section	Max. 0.25 mm^2
Connection cable length	Max. 15 m
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section (depending on type) **for protective field heights of 300 mm to 1200 mm** **for protective field heights of 1350 mm to 1800 mm**	 34 mm x 29 mm 48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 m according to IEC 60068-2-29
Weight (depending on type)	0.27 kg ... 3.88 kg

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Dimensional drawings

➜ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com

Protective field heights 300 mm ... 1200 mm

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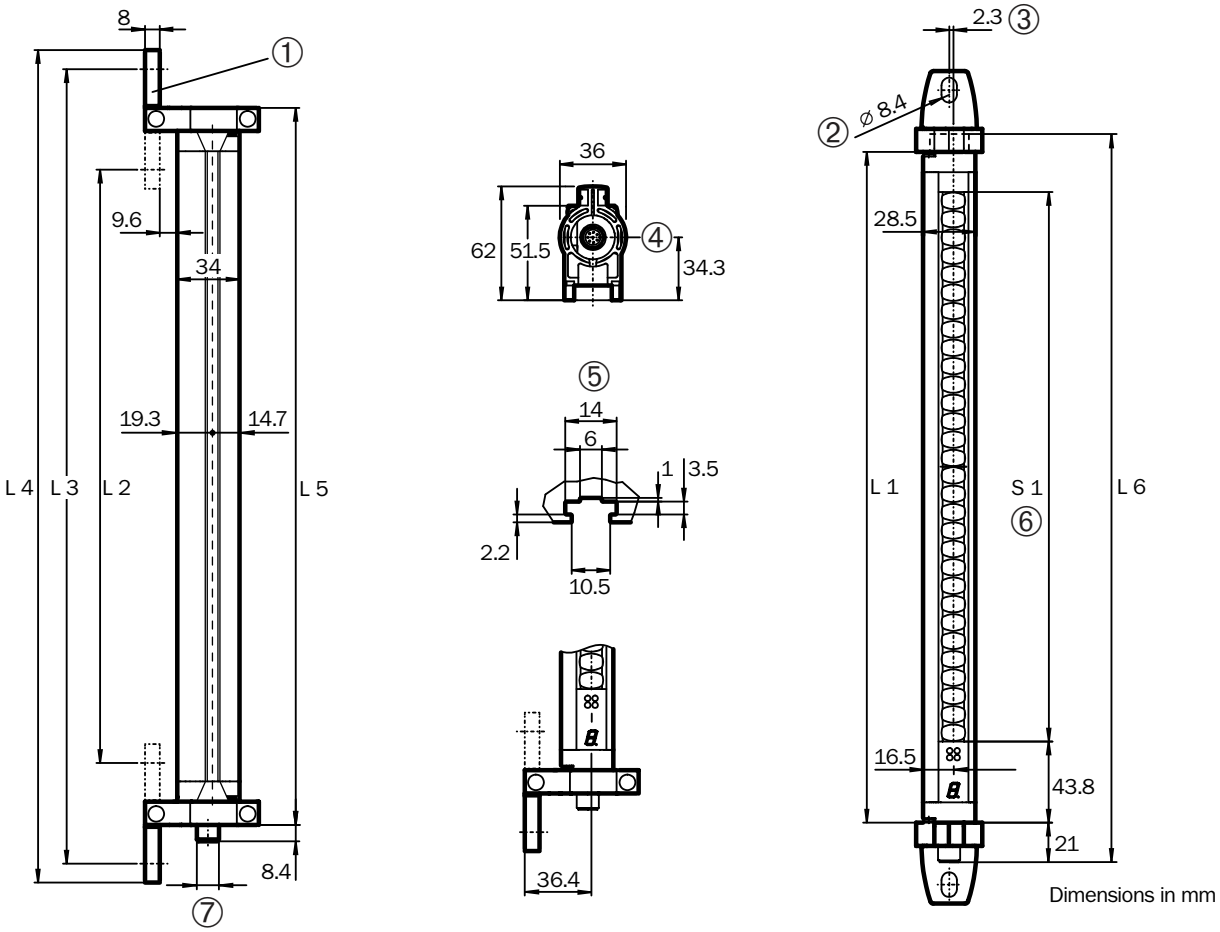

Dimensions in mm

Sender unit with swivel mount, small housing profile (receiver unit not mirror image. Dimensions as C 2000 cascadable, see page C-101)

① Mounting clamp
② Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
③ Centre of light beam offset
④ Adjustment
⑤ Sliding nut groove for side mounting
⑥ Protective field height
⑦ Plug M12 x 1

S 1	L 1	L 2	L 3	L 4	L 5	L 6
300	364	322	432	452	390	394
450	515	473	582	603	540	545
600	666	623	733	754	691	696
750	816	774	884	904	841	846
900	967	924	1034	1055	992	997
1050	1117	1075	1185	1205	1142	1147
1200	1266	1224	1334	1354	1292	1298

S1 = protective field height

Dimensions in mm

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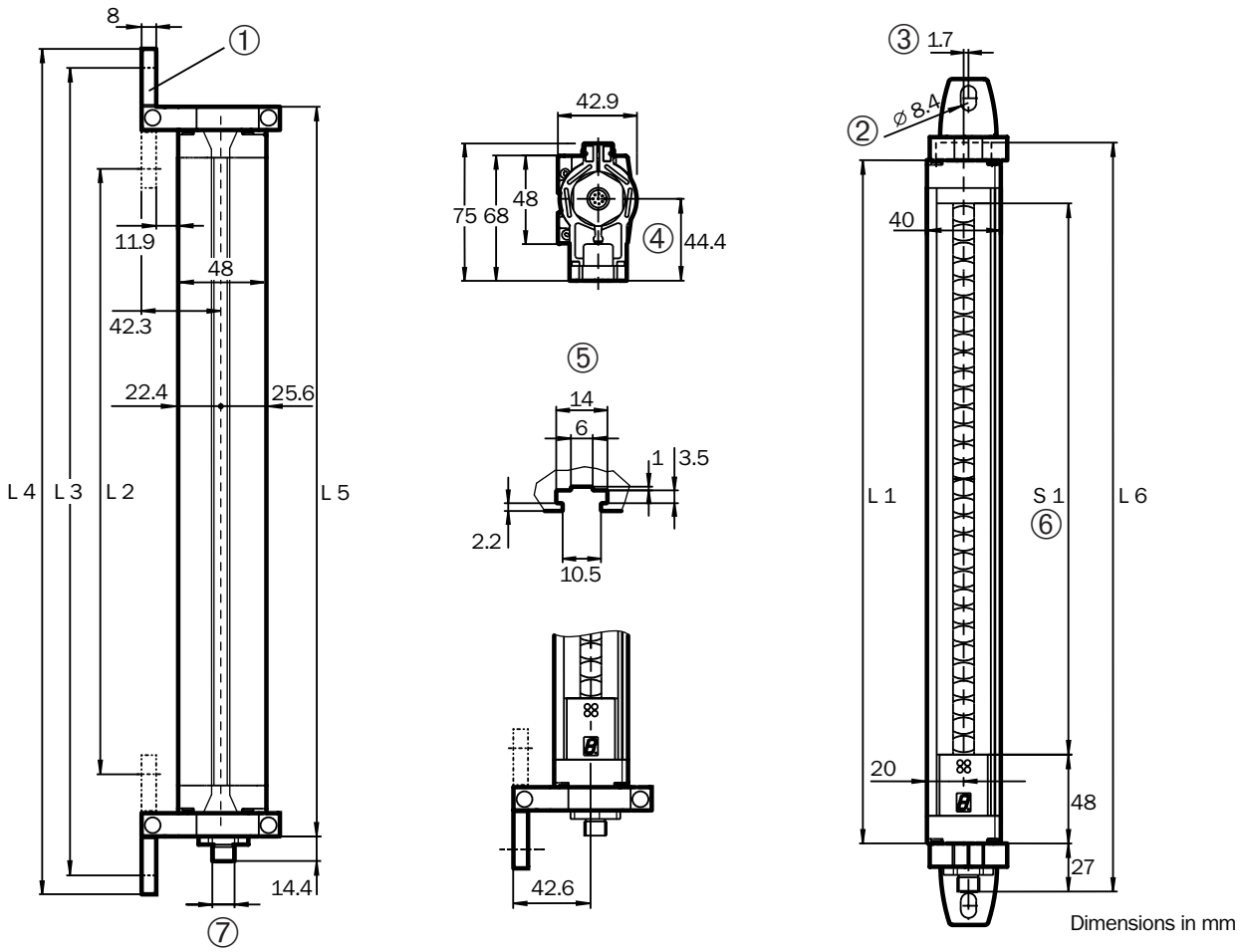
Protective field heights 1350 mm ... 1800 mm



Dimensions in mm

Sender unit with swivel mount, large housing profile (receiver unit not mirror image, see C 2000 cascadable, page C-102)

① Mounting clamp
② Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
③ Centre of light beam offset
④ Adjustment
⑤ Sliding nut groove for side mounting
⑥ Protective field height
⑦ Plug M12 x 1

S 1	L 1	L 2	L 3	L 4	L 5	L 6
1350	1426	1384	1494	1514	1452	1463
1500	1577	1535	1644	1665	1602	1614
1650	1727	1685	1795	1815	1752	1764
1800	1878	1836	1945	1966	1903	1915

S1 = protective field height

Dimensions in mm

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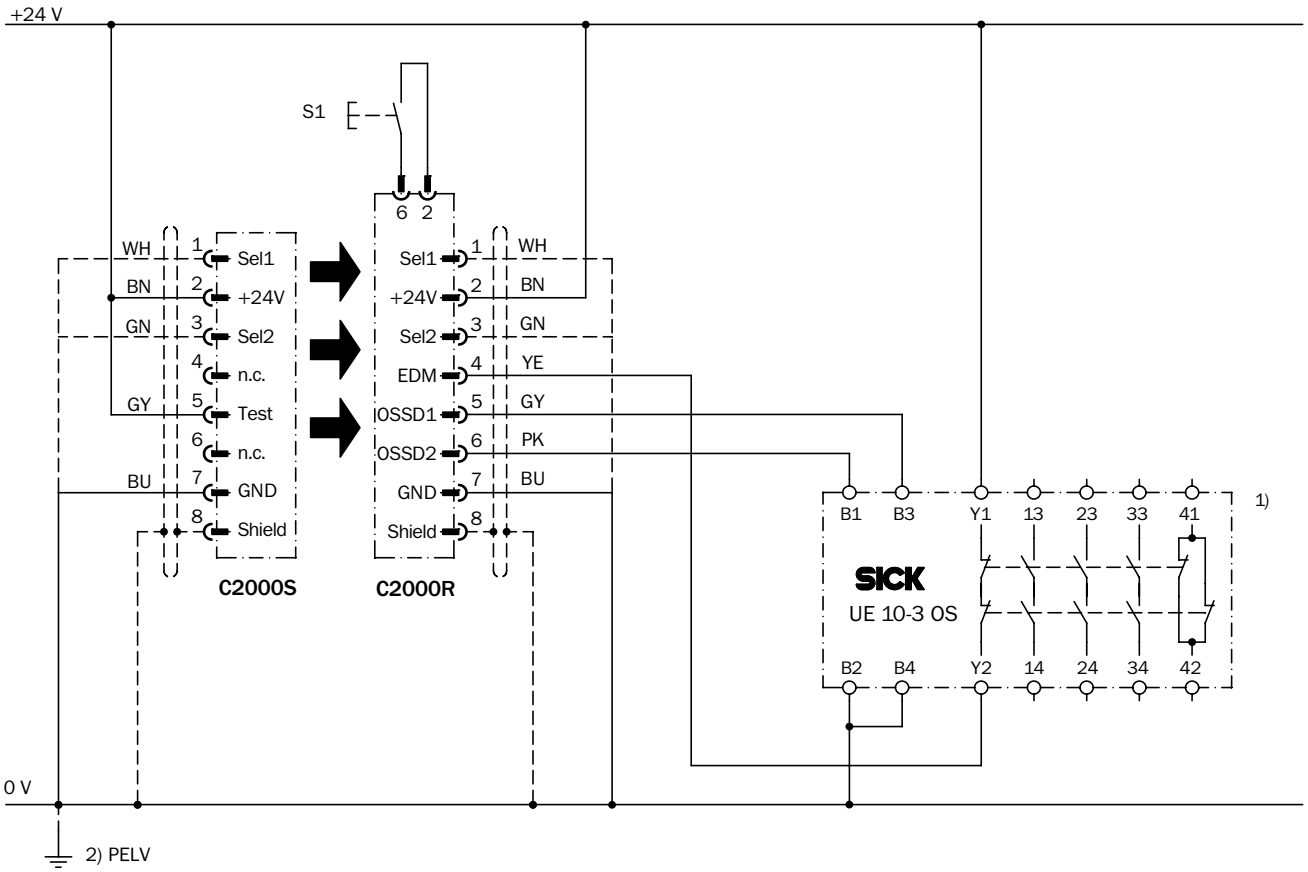
Connection diagram

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

C 2000 RES/EDM on safety relay UE 10



Task

Interfacing a C 2000 RES/EDM safety light curtain to UE 10-3 OS. Operating mode with restart interlock and external device monitoring.

Function

The yellow LED on the receiver flashes when the light path is clear and the UE 10 is de-energised and functioning correctly. 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 UE 10 is switched on. On the interruption of one of the light beams, the UE 10 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 UE 10 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) 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 the risk analysis into account.

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

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

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Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page C-96

Designation	Description	Part number
Mounting kit 1	▪ 4 pieces ▪ Pivoting ▪ Swivel mount ▪ For protective field height 300 mm ... 1200 mm	2 019 649
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount ▪ For protective field height 1350 mm ... 1800 mm	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ For protective field height 300 mm ... 1200 mm	2 030 288
	▪ 4 pieces ▪ Pivoting ▪ For protective field height 1350 mm ... 1800 mm	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16ms ▪ For protective field height 1350 mm ... 1800 mm	2 026 850

Connector technology

System connection	Designation	Description	Connection cable	Part number
M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343
Extension connection	M12 cable plug	▪ Straight ▪ For the connection of a control switch	5.0 m	6 021 204
			15.0 m	6 021 205
		▪ Angled ▪ For the connection of a control switch	5.0 m	6 021 830
			15.0 m	6 021 831
	Plug	▪ Pre-assembled ▪ For deactivation of the integrated restart interlock ▪ M12	–	6 021 238

Continued on next page

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Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

Device columns [1)]

Designation	Description	Part number
Device column with front screen	▪ For C 2000 Standard (protective field height 150 mm ... 1050 mm) ▪ For C 2000 cascadable and RES/EDM (protective field height 150 mm ... 900 mm) ▪ 1200 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 333
	▪ For C 2000 (protective field height 150 mm ... 1200 mm) ▪ 1500 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 242
	▪ For C 2000 (protective field height 150 mm ... 1200 mm) ▪ 1700 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 337
	▪ For C 2000 (protective field height 1350 mm ... 1500 mm) ▪ 1700 mm high ▪ Including mounting kit 2 (2 pieces)	2 021 332

[1)] Warning, reduction of the scanning range!

Additional front screens [1)]

Designation	For protective field height (mm)	Part number
Additional front screen (weld spark guard)	300	2 022 405
	450	2 022 406
	600	2 022 407
	750	2 022 408
	900	2 022 409
	1050	2 022 410
	1200	2 022 411

[1)] Warning, reduction of the scanning range!

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Additional front screens Heavy Duty [1)]

Designation	For protective field height (mm)	Part number
Additional front screen Heavy Duty (weld spark guard) with bracket	1350	2 026 860
	1500	2 026 861
	1650	2 026 862
	1800	2 026 863

1) Warning, reduction of the scanning range!

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Deflector mirrors [1)] (incl. mounting kit 2)

Designation	For protective field height (mm)	Type	Part number
For overall protective field width 0 m ... 4 m	300	PNS75-034	1 019 414
	450	PNS75-049	1 019 415
	600	PNS75-064	1 019 416
	750	PNS75-079	1 019 417
	900	PNS75-094	1 019 418
	1050	PNS75-109	1 019 419
	1200	PNS75-124	1 019 420
	1350	PNS75-139	1 019 421
	1500	PNS75-154	1 019 422
	1650	PNS75-169	1 019 423
	1800	PNS75-184	1 019 424
For overall protective field width 4 m ... 15 m	300	PNS125-034	1 019 425
	450	PNS125-049	1 019 426
	600	PNS125-064	1 019 427
	750	PNS125-079	1 019 428
	900	PNS125-094	1 019 429
	1050	PNS125-109	1 019 430
	1200	PNS125-124	1 019 431
	1350	PNS125-139	1 019 432
	1500	PNS125-154	1 019 433
	1650	PNS125-169	1 019 434
	1800	PNS125-184	1 019 435

1) Warning, reduction of the scanning range!

Laser alignment aid

Designation	Description	Type	Part number
Laser alignment aid	▪ Does not require connection to power supply	AR 60	1 015 741
Adapter for AR 60	▪ For large housing profile	–	4 032 461
	▪ For small housing profile	–	4 032 462

→ For dimensional drawings of the device columns and deflector mirrors please refer to the operating instructions/technical description. Download at www.sick.com

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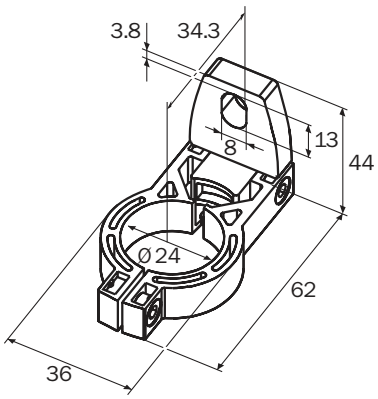
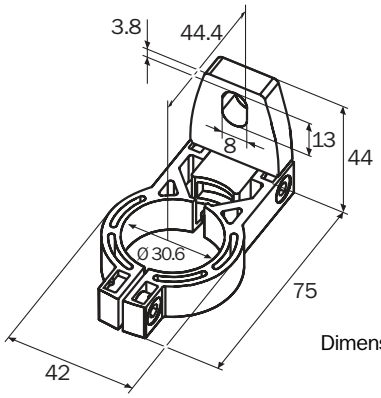
Dimensional drawings mounting accessories

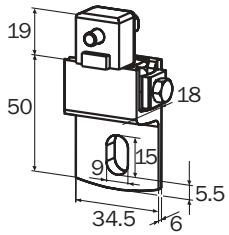


Swivel mount
Mounting kit 1
for protective field height 150 mm ... 1200 mm

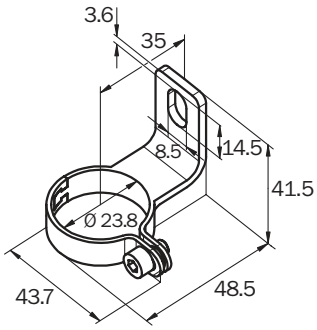


Swivel mount
Mounting kit 2
for protective field height 1350 mm ... 1800 mm

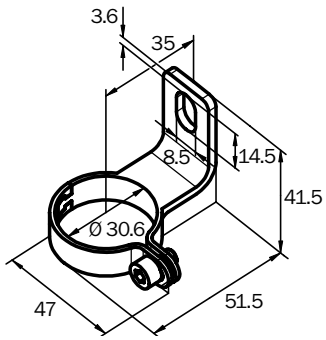
Dimensions in mm



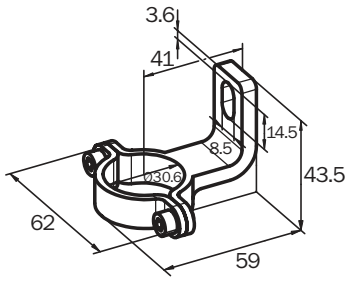
Side bracket
Mounting kit 6



Stainless steel bracket
for protective field height 150 mm ... 1200 mm



Stainless steel bracket
for protective field height 1350 mm ... 1800 mm



Reinforced stainless steel bracket for
protective field height 1350 mm ... 1800 mm

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Overview of technical specifications

Protective field width (depending on type)	0 m ... 6 m / 2.5 m ... 19 m
Protective field height (depending on type)	300 mm ... 1800 mm
Number of beams in complete system	Max. 180 beams
Resolution (depending on type)	20 mm / 30 mm / 40 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

With its high signal reserve, the C 2000 cascadable safety light curtain is also reliable under harsh industrial conditions. Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtimes. The modular concept achieves maximum machine security while taking into account economic considerations by precisely coordinating the characteristics of the device to the requirements. Interfaces and service concepts complete the product range to provide an ideal solution for the sector. With the cascadable variants, safety light curtains can be flexibly adapted to the existing installation situation.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20	✔	–	L-53
LE 20 Muting	✔	✔	L-60
UE 48-2 OS	✔	–	L-42
UE 48-3 OS	✔	–	L-48

Applications

→ For more applications please refer to the application finder at www.sick.com

C 2000 cascadable on a pad printing machine

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry

C

- Cascade
  - Max. 3 devices
  - Max. 3 m cable length
- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid
- Beam coding

Further information	Page
→ Ordering information	C-98
→ Technical specifications	C-100
→ Dimensional drawings	C-101
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→ Accessories	C-104
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Ordering information

C 2000 cascadable
- With external device monitoring (EDM)
- For usage as cascaded device
- Consisting of sender and receiver unit

→ Accessories page C-104

C

Scanning range 0 ... 6 m

Resolution (mm)	Housing cross-section (mm)	Protective field height (mm)	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
20	34 x 29	300	C20S-030102A21	1 018 072	C20E-030302A21	1 018 073
		450	C20S-045102A21	1 018 078	C20E-045302A21	1 018 079
		600	C20S-060102A21	1 018 055	C20E-060302A21	1 018 056
		750	C20S-075102A21	1 018 095	C20E-075302A21	1 018 096
		900	C20S-090102A21	1 018 104	C20E-090302A21	1 018 105
		1050	C20S-105102A21	1 018 113	C20E-105302A21	1 018 114
		1200	C20S-120102A21	1 018 122	C20E-120302A21	1 016 970
30	34 x 29	300	C20S-030103A21	1 018 074	C20E-030303A21	1 016 974
		450	C20S-045103A21	1 018 080	C20E-045303A21	1 018 081
		600	C20S-060103A21	1 018 087	C20E-060303A21	1 018 089
		750	C20S-075103A21	1 018 097	C20E-075303A21	1 018 098
		900	C20S-090103A21	1 018 106	C20E-090303A21	1 018 107
		1050	C20S-105103A21	1 018 115	C20E-105303A21	1 018 116
		1200	C20S-120103A21	1 018 123	C20E-120303A21	1 018 124
	48 x 40	1350	C20S-135103A22	1 018 057	C20E-135303A22	1 018 058
		1500	C20S-150103A22	1 018 133	C20E-150303A22	1 018 134
		1650	C20S-165103A22	1 018 139	C20E-165303A22	1 018 140
		1800	C20S-180103A22	1 018 145	C20E-180303A22	1 018 147
40	34 x 29	300	C20S-030104A21	1 016 967	C20E-030304A21	1 016 973
		450	C20S-045104A21	1 018 082	C20E-045304A21	1 018 083
		600	C20S-060104A21	1 018 090	C20E-060304A21	1 018 091
		750	C20S-075104A21	1 018 099	C20E-075304A21	1 018 100
		900	C20S-090104A21	1 018 108	C20E-090304A21	1 018 109
		1050	C20S-105104A21	1 018 117	C20E-105304A21	1 018 118
		1200	C20S-120104A21	1 018 125	C20E-120304A21	1 018 126
	48 x 40	1350	C20S-135104A22	1 018 129	C20E-135304A22	1 018 130
		1500	C20S-150104A22	1 018 135	C20E-150304A22	1 018 136
		1650	C20S-165104A22	1 018 141	C20E-165304A22	1 018 142
		1800	C20S-180104A22	1 018 148	C20E-180304A22	1 018 149

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Scanning range 2.5 ... 19 m

Resolution (mm)	Housing cross-section (mm)	Protective field height (mm)	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
20	34 x 29	300	C20S-030202A21	1 018 075	C20E-030302A21	1 018 073
		450	C20S-045202A21	1 018 084	C20E-045302A21	1 018 079
		600	C20S-060202A21	1 018 092	C20E-060302A21	1 018 056
		750	C20S-075202A21	1 018 101	C20E-075302A21	1 018 096
		900	C20S-090202A21	1 018 110	C20E-090302A21	1 018 105
		1050	C20S-105202A21	1 018 119	C20E-105302A21	1 018 114
		1200	C20S-120202A21	1 016 964	C20E-120302A21	1 016 970
30	34 x 29	300	C20S-030203A21	1 016 968	C20E-030303A21	1 016 974
		450	C20S-045203A21	1 018 085	C20E-045303A21	1 018 081
		600	C20S-060203A21	1 018 093	C20E-060303A21	1 018 089
		750	C20S-075203A21	1 018 102	C20E-075303A21	1 018 098
		900	C20S-090203A21	1 018 111	C20E-090303A21	1 018 107
		1050	C20S-105203A21	1 018 120	C20E-105303A21	1 018 116
		1200	C20S-120203A21	1 018 127	C20E-120303A21	1 018 124
	48 x 40	1350	C20S-135203A22	1 018 131	C20E-135303A22	1 018 058
		1500	C20S-150203A22	1 018 137	C20E-150303A22	1 018 134
		1650	C20S-165203A22	1 018 143	C20E-165303A22	1 018 140
		1800	C20S-180203A22	1 018 150	C20E-180303A22	1 018 147
40	34 x 29	300	C20S-030204A21	1 018 077	C20E-030304A21	1 016 973
		450	C20S-045204A21	1 018 086	C20E-045304A21	1 018 083
		600	C20S-060204A21	1 018 094	C20E-060304A21	1 018 091
		750	C20S-075204A21	1 018 103	C20E-075304A21	1 018 100
		900	C20S-090204A21	1 018 112	C20E-090304A21	1 018 109
		1050	C20S-105204A21	1 018 121	C20E-105304A21	1 018 118
		1200	C20S-120204A21	1 018 128	C20E-120304A21	1 018 126
	48 x 40	1350	C20S-135204A22	1 018 132	C20E-135304A22	1 018 130
		1500	C20S-150204A22	1 018 138	C20E-150304A22	1 018 136
		1650	C20S-165204A22	1 018 144	C20E-165304A22	1 018 142
		1800	C20S-180204A22	1 018 151	C20E-180304A22	1 018 149

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

C

General system data

Protective field width (depending on type)	0 m ... 6 m / 2.5 m ... 19 m
Protective field height (depending on type)	300 mm ... 1800 mm
Resolution (depending on type)	20 mm / 30 mm / 40 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender unit

Power consumption	Max. 6.2 W

Receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 7 ms ... 34 ms
Switching voltage **$HIGH_{min}$** **LOW_{max}**	 V_S – 2.25 V 1 V
Switching current	Max. 500 mA
Power consumption	Max. 8 W

Operating data

Type of connection	M12 plug, 8-pin
Connection cable wire cross-section	Max. 0.25 mm^2
Connection cable length	Max. 15 m
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section (depending on type) **for protective field heights of 300 mm to 1200 mm** **for protective field heights of 1350 mm to 1800 mm**	 34 mm x 29 mm 48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight (depending on type)	0.27 kg ... 3.88 kg

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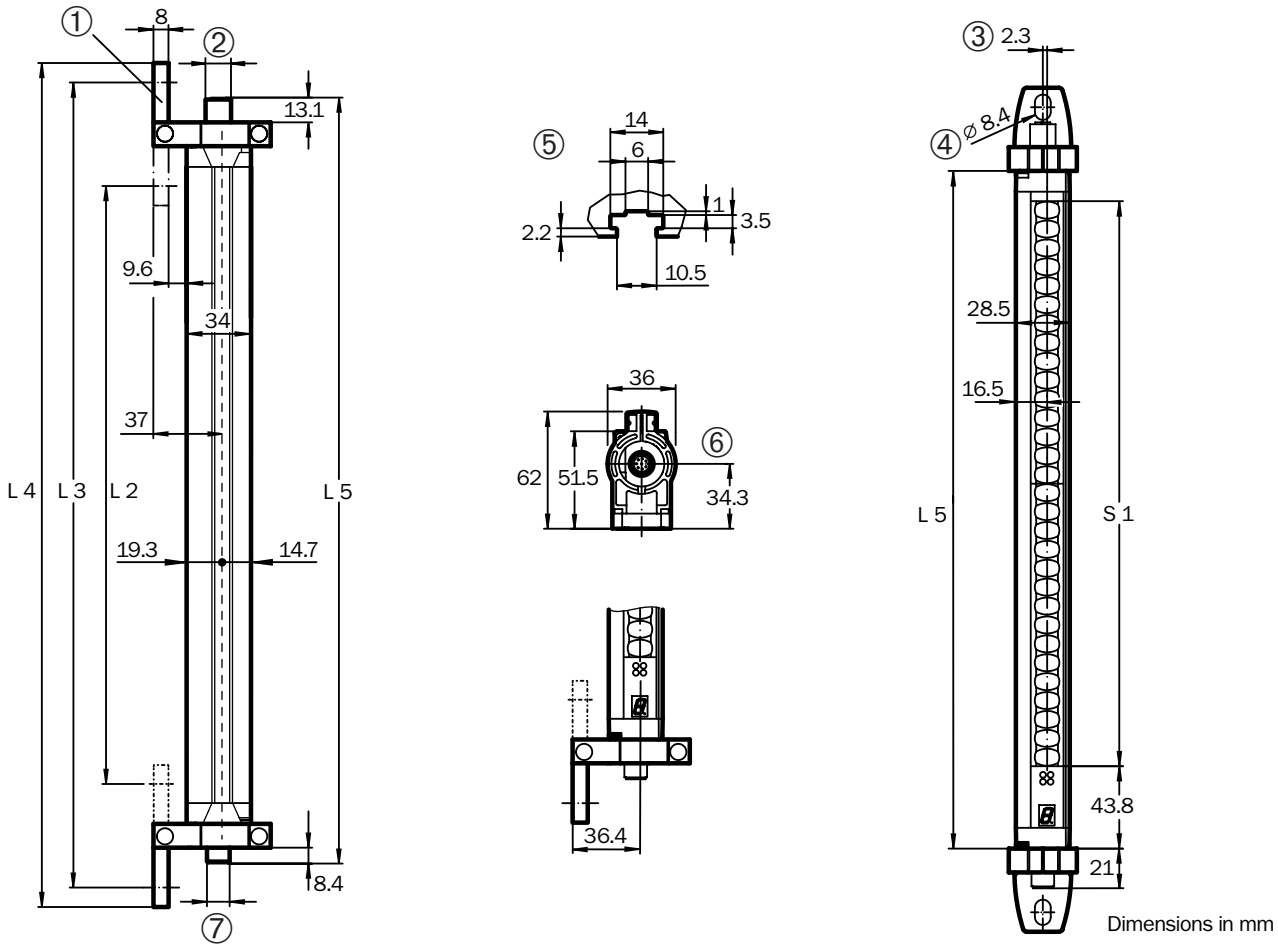
Dimensional drawings

➜ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com

Protective field heights 300 mm ... 1200 mm



Dimensions in mm

Sender unit with swivel mount, small housing profile (receiver unit mirror image)

① Mounting clamp
② Plug M12 x 1
③ Centre of light beam offset
④ Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
⑤ Sliding nut groove for side mounting
⑥ Adjustment
⑦ Plug M12 x 1

S 1	L 1	L 2	L 3	L 4	L 5
300	364	322	432	452	411
450	515	473	582	603	562
600	666	623	733	754	712
750	816	774	884	904	863
900	967	924	1034	1055	1013
1050	1117	1075	1185	1205	1164
1200	1266	1224	1334	1354	1313

S1 = protective field height

Dimensions in mm

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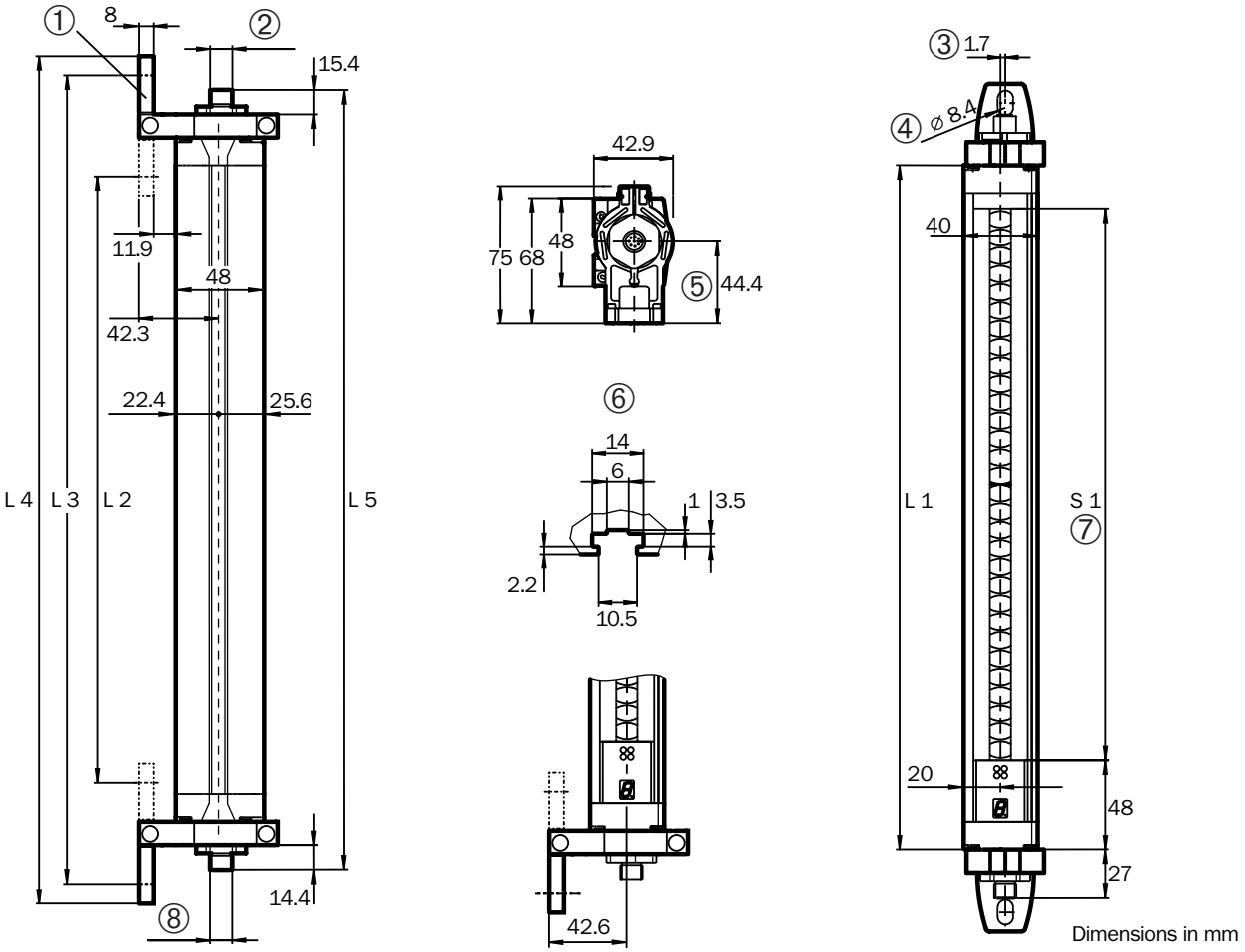
Protective field heights 1350 mm ... 1800 mm



Dimensions in mm

Sender unit with swivel mount, large housing profile (receiver unit mirror image)

① Mounting clamp
② M12 x 1 socket
③ Centre of light beam offset
④ Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
⑤ Adjustment
⑥ Sliding nut groove for side mounting
⑦ Protective field height
⑧ Plug M12 x 1

S 1	L 1	L 2	L 3	L 4	L 5
1350	1426	1384	1494	1514	1481
1500	1577	1535	1644	1665	1632
1650	1727	1685	1795	1815	1782
1800	1878	1836	1945	1966	1933

S1 = protective field height

Dimensions in mm

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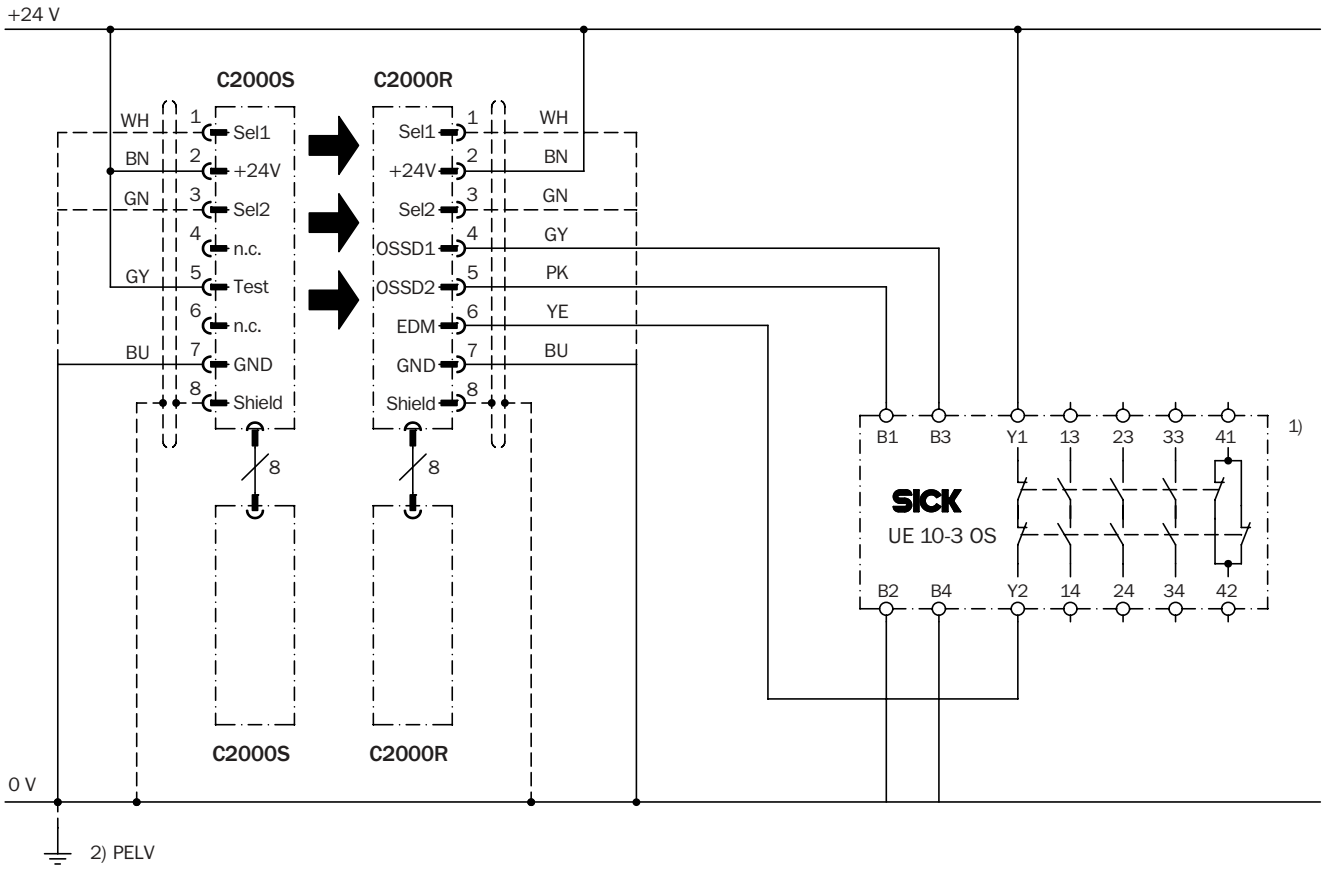
Connection diagram

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

C 2000 cascadable on safety relay UE 10



Task

Interfacing two cascaded C 2000 safety light curtains to UE 10-3 OS. Operating mode without restart interlock with external device monitoring. Restart interlock is realised via the machine control.

Function

The system is enabled when the light path is clear and the UE 10 is de-energised and functioning correctly. The OSSD1 and OSSD2 outputs are live, the UE 10 is switched on. On the interruption of one of the light beams, the UE 10 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 UE 10 will be detected and will not result in the loss of the shutdown function.

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 the risk analysis into account.

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

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

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Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page C-106

Designation	Description	Part number
Mounting kit 1	▪ 4 pieces ▪ Pivoting ▪ Swivel mount ▪ For protective field height 300 mm ... 1200 mm	2 019 649
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount ▪ For protective field height 1350 mm ... 1800 mm	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ For protective field height 300 mm ... 1200 mm	2 030 288
	▪ 4 pieces ▪ Pivoting ▪ For protective field height 1350 mm ... 1800 mm	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16ms ▪ For protective field height 1350 mm ... 1800 mm	2 026 850

Connector technology

System connection	Designation	Description	Connection cable	Part number
M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343
Extension connection	Cable sockets/plugs	▪ Pre-assembled ▪ M12 ▪ 8-pin ▪ Straight	0.25 m	6 021 000
			0.5 m	6 021 001
			1 m	6 021 002
			1.5 m	6 021 003
			2 m	6 021 004
			2.5 m	6 021 005
			3 m	6 021 006

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Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

Device columns [1)]

➜ For dimensional drawings of the device columns please refer to the operating instructions/technical description. Download at www.sick.com

Designation	Description	Part number
Device column with front screen	▪ For C 2000 Standard (protective field height 300 mm ... 1050 mm) ▪ For C 2000 cascadable and RES/EDM (protective field height 150 mm ... 900 mm) ▪ 1200 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 333
	▪ For C 2000 (protective field height 150 mm ... 1200 mm) ▪ 1500 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 242
	▪ For C 2000 (protective field height 150 mm ... 1200 mm) ▪ 1700 mm high ▪ Including mounting kit 1 (2 pieces)	2 021 337
	▪ For C 2000 (protective field height 1350 mm ... 1500 mm) ▪ 1700 mm high ▪ Including mounting kit 2 (2 pieces)	2 021 332

[1)] Warning, reduction of the scanning range!

Laser alignment aid

Designation	Description	Type	Part number
Laser alignment aid	▪ Does not require connection to power supply	AR 60	1 015 741
Adapter for AR 60	▪ For large housing profile	–	4 032 461
	▪ For small housing profile	–	4 032 462

Continued on next page

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C

Additional front screens [1)]

Designation	For protective field height (mm)	Part number
Additional front screen (weld spark guard)	300	2 022 405
	450	2 022 406
	600	2 022 407
	750	2 022 408
	900	2 022 409
	1050	2 022 410
	1200	2 022 411

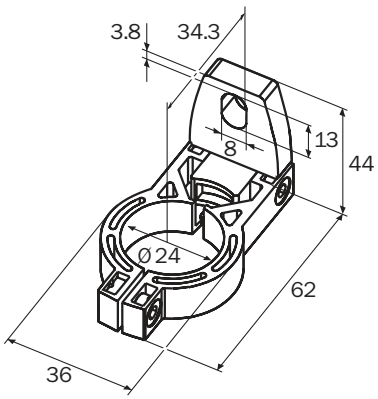
[1)] Warning, reduction of the scanning range!

Additional front screens Heavy Duty [1)]

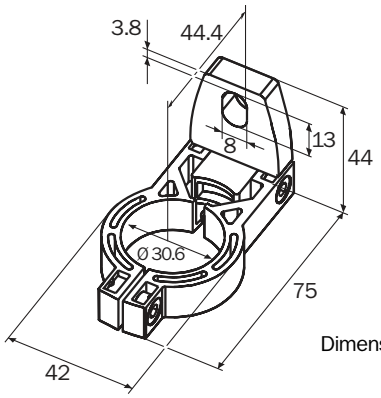
Designation	For protective field height (mm)	Part number
Additional front screen Heavy Duty (weld spark guard) with bracket	1350	2 026 860
	1500	2 026 861
	1650	2 026 862
	1800	2 026 863

[1)] Warning, reduction of the scanning range!

Dimensional drawings mounting accessories

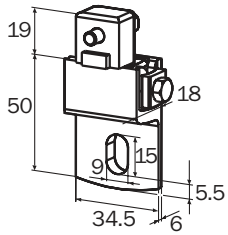


Swivel mount
Mounting kit 1
for protective field height 150 mm ... 1200 mm

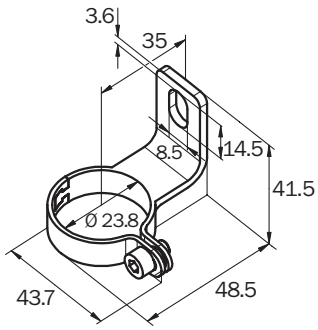


Swivel mount
Mounting kit 2
for protective field height 1350 mm ... 1800 mm

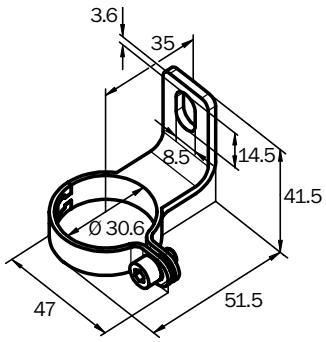
Dimensions in mm



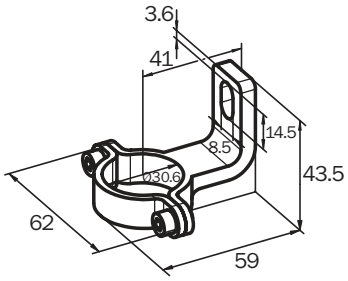
Side bracket
Mounting kit 6



Stainless steel bracket
for protective field height 150 mm ... 1200 mm



Stainless steel bracket
for protective field height 1350 mm ... 1800 mm



Reinforced stainless steel bracket for
protective field height 1350 mm ... 1800 mm

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Overview of technical specifications

Protective field width	0.1 m ... 6 m
Protective field height (depending on type)	150 mm ... 900 mm
Resolution	30 mm
Type	Type 2 according to EN 50100
Enclosure rating	
Sender/receiver unit	IP 65
Control unit	IP 54

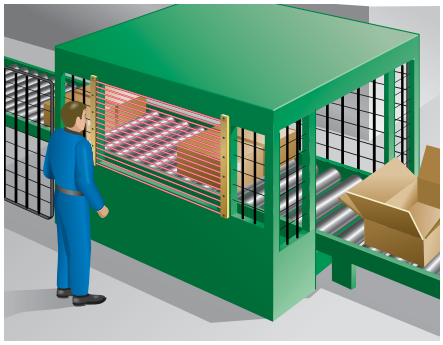
Product description

Due to its compact design, the LGT safety light curtain is suitable for applications on small machines, where space is limited. Functions and status information integrated in the control unit allow rapid commissioning and prevent unnecessary machine downtimes. Sector-oriented service concepts round off the product range and can be combined to form a customer-specific package of solutions.

Applications

→ For more applications please refer to the application finder at www.sick.com

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry



Packaging industry: LGT on a packaging machine

C

- Restart interlock (RES)
- External device monitoring (EDM)
- 7-segment display
- Diagnostics
- Blanking
- Small design

CE

Further information	Page
→ Ordering information	C-108
→ Technical specifications	C-109
→ Dimensional drawings	C-110
→ Services	A-0

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Ordering information

LGT

LGT consisting of:
- Sender unit (LGTS) and receiver unit (LGTE)
- Control unit (LGTN)

C

Sender and receiver units

Protective field height (mm)	Sender unit		Receiver unit	
	Type	Part number	Type	Part number
150	LGTS015-051	1 013 413	LGTE015-051	1 013 414
300	LGTS030-111	1 013 415	LGTE030-111	1 013 416
450	LGTS045-171	1 013 417	LGTE045-171	1 013 418
600	LGTS060-231	1 013 419	LGTE060-231	1 013 420
750	LGTS075-291	1 013 421	LGTE075-291	1 013 422
900	LGTS090-351	1 013 423	LGTE090-351	1 013 424

Control units

Designation	Description	Type	Part number
Control unit	▪ DC 24 V	LGTN101-511	6 010 683
	▪ AC 115 / 230 V + DC 24 V	LGTN101-311	6 010 521
	▪ DC 24 V ▪ For installation in control cabinets	LGTN101-521	6 008 527
	▪ AC 115 / 230 V + DC 24 V ▪ For installation in control cabinets	LGTN101-321	6 008 526

Accessories

Designation	Connection cable	Part number
Connection cable with socket	2.5 m	6 009 923
	5 m	6 009 924
	10 m	6 009 926
	15 m	6 008 410
	20 m	6 008 411
Snap-on clip	–	4 028 654

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Protective field width	0.1 m ... 6 m
Protective field height (depending on type)	150 mm ... 900 mm
Resolution	30 mm
Enclosure rating	
Sender/receiver unit	IP 65
Control unit LGTN	IP 54
Type	Type 2 according to EN 50100
Synchronisation	Electrical synchronisation
Supply voltage V_s [1]	
Direct current	24 V (19.2 V ... 28.8 V) DC
Residual ripple	5 V_{PP}
Alternating current	115 V (92 V ... 126,5 V) AC / 230 V (184 V ... 253 V) AC
Frequency	50 Hz (48 Hz ... 62 Hz)
Power consumption	Max. 13 W / 16 VA
Response time (depending on type)	Max. 50 ms
Master relay	
Resistive switching capacity	Max. 4 A, 45 V DC
Inductive switching capacity	Max. 4 A, 25 V DC
Auxiliary relay	
Resistive switching capacity	Max. 8 A, 55 V DC
Inductive switching capacity	Max. 8 A, 15 V DC

Operating data

Type of connection	PG11
Connection cable length	Max. 10 m
Ambient operating temperature T_A	–10 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section	10 mm x 30 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29

[1] A power supply unit with safe isolation (SELV, PELV circuit) is to be used

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Dimensional drawings

Sender unit LGTS and receiver unit LGTE

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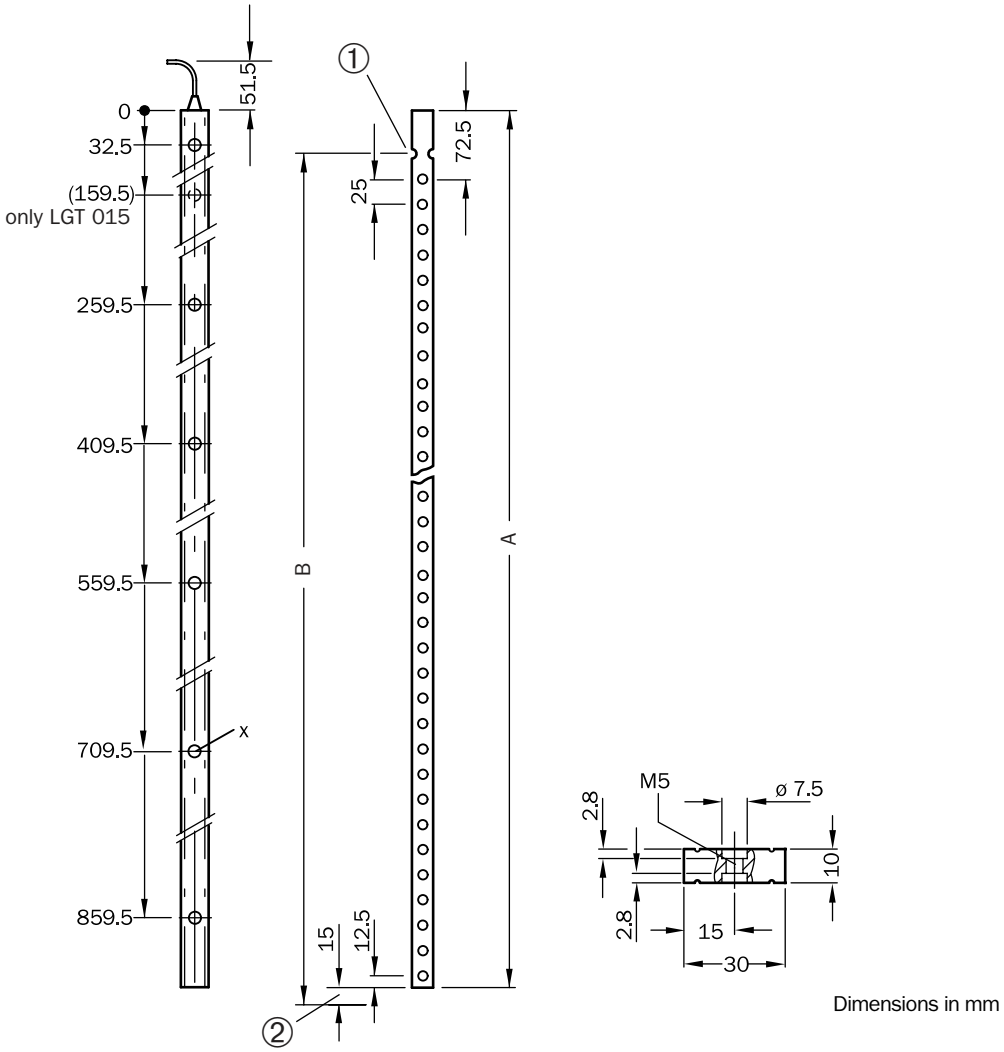

Dimensions in mm

① The upper limit of the protective field is indicated by a cut-out in the housing
② The lower limit of the protective field is 15 mm from the end of the housing

LGT type	Number of beams	Housing length A (mm)	Protective field height B (mm)
015	5	185	155
030	11	335	305
045	17	485	455
060	23	635	605
075	29	785	755
090	35	935	905

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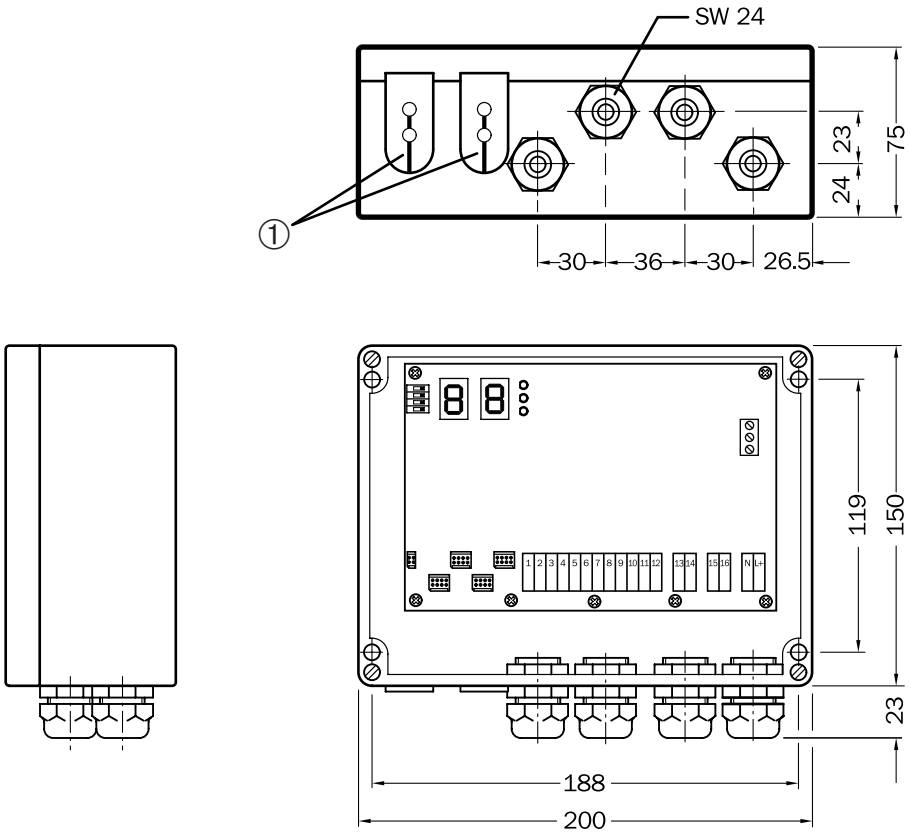
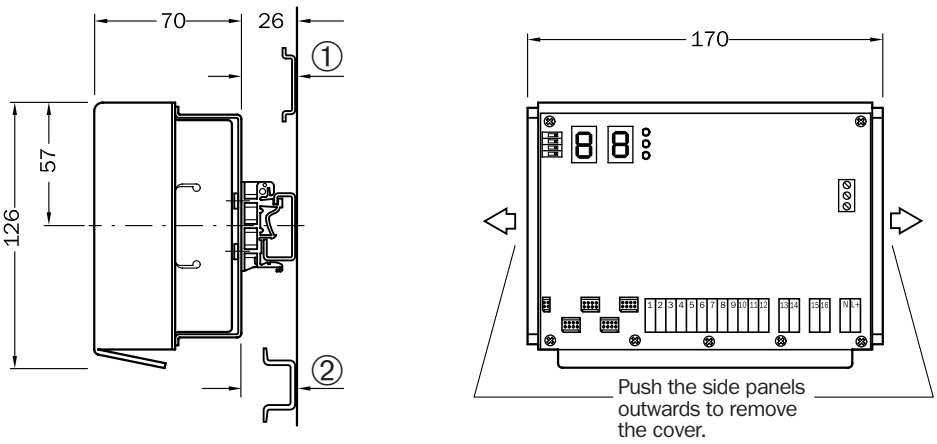
Control unit LGTN with housing



Dimensions in mm

① To insert cable: remove bush and push apart

Control unit LGTN for installation in control cabinets



Dimensions in mm

① For mounting on low 20 mm mounting rail
② For mounting on high 28 mm mounting rail

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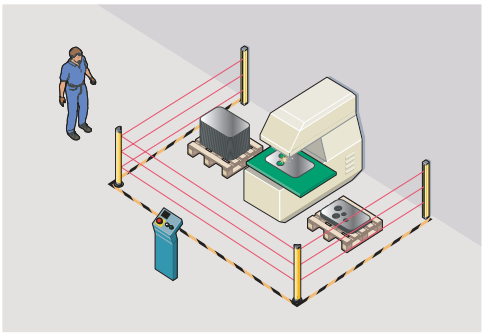
Principle of operation of multi-beam photoelectric safety switches

Multi-beam photoelectric safety switches are electro-sensitive protective devices comprising a sender unit and a receiver unit or a sender/receiver unit on the active side and one or more deflector mirrors on the passive side. If one or more light beams are interrupted, the multi-beam photoelectric safety switch provides a shutdown signal that is suitable for interrupting the dangerous state on a machine or system.

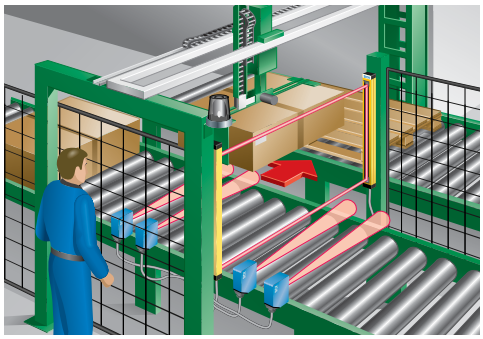
Applications for multi-beam photoelectric safety switches

Multi-beam photoelectric safety switches are used wherever access to a hazardous area must be protected or the hazardous area itself must be monitored.

In some applications, the protective device must be able to unambiguously differentiate between man and material.



Machine tool industry: MSL with mirror columns on a punching machine



Access protection with muting on a transfer station

Advantages of the SICK multi-beam photoelectric safety switches

SICK's range of multi-beam photoelectric safety switches provides a reliable, cost-effective solution for almost every hazardous area protection and access protection application. Custom solutions are produced using standard components that are flexible in use: From simple access protection to the complex muting application with override function.
The MSL can be used for access protection and for hazardous area protection (horizontal use) if a type 4 multi-beam photoelectric safety switch is required. The MSM muting module expands the functionality of this standard product: In sectors such as warehouse systems and conveyor systems, the MSL with MSM not only complies with safety requirements, but also provides highly efficient automatic material transport.
The M 2000 is the right choice for applications where a type 2 multi-beam photoelectric safety switch is desired. Product variants with differing functionalities are available for countless applications. The use of SICK interfaces (e.g. the LE 20 Muting) also offers numerous advantages. The M 2000 variants in IP 67 housings were designed for environments in which very high demands are made of the enclosure rating (IP 67) and the material strength.

Mounting and operation made easy

SICK provides a comprehensive range of accessories for multi-beam photoelectric safety switches. These accessories make it possible to integrate the devices in the machine control and also to mount the devices rapidly, reliably and safely. Device and mirror columns complete the range.

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

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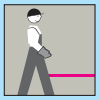
Multi-beam photoelectric safety switches

D

Safety application	Type according to IEC 61496	Number of beams	Scanning range (m)	Functions: Sender/receiver system	Functions: Active/passive system	Functions: Muting	Functions: Beam coding	Functions: Restart interlock	Functions: External device monitoring	Product	Page
	Type 4 [1]	2 ... 35	0.5 ... 20 15 ... 70	✔	–	✔[4]	–	✔	✔	MSL	D-2
		2 ... 12	0.5 ... 70	✔	–	✔[5]	✔	✔	✔	MSL coded version	D-11
		1[2], 2[2]	Max. 7.5[3]	–	✔	✔[4]	–	✔	✔	MSLZ	D-20
				–	✔	✔[5]	✔	✔	✔	MSLZ coded version	D-28
	Type 2	2 ... 9 2 ... 4	0 ... 25 0 ... 70	✔	–	✔[6]	✔	–	✔	M 2000 Standard	D-37
				✔	–	✔[6]	✔	–	✔	M 2000 Standard in IP 67 housing	D-45
				✔	–	✔[6]	✔	✔	✔	M 2000 RES/EDM	D-50
		2 ... 9	0 ... 25	✔	–	✔[6]	✔	–	✔	M 2000 cascadable	D-58
		1[2]	0 ... 6	–	✔	✔[6]	–	–	✔	M 2000-A/P Standard	D-66
				–	✔	✔[6]	–	✔	✔	M 2000-A/P RES/EDM	D-74

[1] According to prEN 50100
[2] Passive side using deflector mirror
[3] Depending on type and mirror
[4] Muting using safety module MSM with integrated override
[5] Muting using safety module MSM
[6] Muting using safety evaluation unit LE 20 Muting

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- Actively monitored semiconductor outputs
- Restart interlock (RES)
- External device monitoring (EDM)
- Output weak signal
- Modular safety muting (MSM)

CE

Further information	Page
→ Technical specifications	D-4
→ Dimensional drawings	D-5
→ Connection diagrams	D-7
→ Accessories	D-7
→ Services	A-0

Overview of technical specifications

Number of beams (depending on type)	2 ... 35
Scanning range (depending on type)	20 m / 70 m
Beam separation (depending on type)	50 mm ... 500 mm
Type	Type 4 according to EN 50100
Enclosure rating	IP 65

Product description

MSL multi-beam photoelectric safety switches from SICK are electro-sensitive protective equipment. They are 2-part through beam configurations, consisting of a sender and receiver unit and are suitable for access protection and hazardous area protection. The devices were designed for industrial applications and benefit from the following advantages:

- No mechanically wearing parts
- Stable modular construction
- Simple installation

Special features of the MSL multi-beam photoelectric safety switch are listed below:

- Plug-in terminal chamber with PG screws or different device connectors
- Short response time (20 ms)
- Large signal reserve (factor 2)
- Optical synchronisation of sender and receiver unit
- Multiple protection by means of deflector mirrors and columns
- Operating modes:
  - External device monitoring
  - Restart interlock
- Muting as a supplementary module

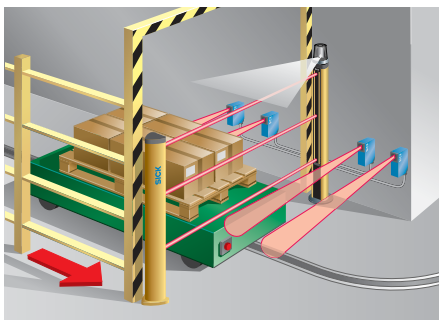
In-system added value

- Combination with SICK interfaces
- Safe integration in bus systems

Applications

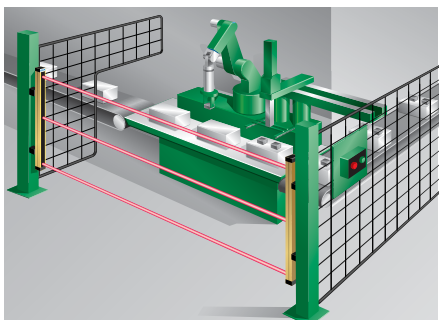
→ You can find more applications using the application finder at www.sick.com

Provides access protection of hazardous areas on machining centres in mechanical engineering applications, robot systems



Access protection with muting on a system with floor transporter

(such as welding lines in the automotive industry) and automated conveying, storage and transport systems



Access protection on a robot machining station

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8 010 889/15-10-04

Ordering information

→ Accessories see page D-7

MSL for access protection

Number of beams	Beam separation (mm)	Scanning range (m)	Muting	Muting with over-ride	Receiver unit		Sender unit	
					Type	Part number	Type	Part number
2	500	20	–	–	MSLE02-15011	1 012 296	MSLS02-15021	1 013 748
			✔	✔	MSLE02-15061A	1 015 701	MSLS02-15021	1 013 748
		70	–	–	MSLE02-15011	1 012 296	MSLS02-15011	1 012 295
			✔	✔	MSLE02-15061A	1 015 701	MSLS02-15011	1 012 295
3	220	20	–	–	MSLE03-12211	1 013 764	MSLS03-12221	1 013 749
			✔	✔	MSLE03-12261A	1 015 851	MSLS03-12221	1 013 749
		70	–	–	MSLE03-12211	1 013 764	MSLS03-12211	1 013 763
			✔	✔	MSLE03-12261A	1 015 851	MSLS03-12211	1 013 763
	400	20	–	–	MSLE03-14011	1 013 747	MSLS03-14021	1 013 750
			✔	✔	MSLE03-14061A	1 015 700	MSLS03-14021	1 013 750
		70	–	–	MSLE03-14011	1 013 747	MSLS03-14011	1 013 746
			✔	✔	MSLE03-14061A	1 015 700	MSLS03-14011	1 013 746

MSL for hazardous area protection

Number of beams	Beam separation (mm)	Scanning range (m)	Muting	Muting with over-ride	Receiver unit		Sender unit	
					Type	Part number	Type	Part number
20	70	20	–	–	MSLE20-10711	1 015 703	MSLS20-10721	1 016 067
		70	–	–	MSLE20-10711	1 015 703	MSLS20-10711	1 015 702
23	70	20	–	–	MSLE23-10711	1 015 867	MSLS23-10721	1 015 924
		70	–	–	MSLE23-10711	1 015 867	MSLS23-10711	1 015 866
14	50	20	–	–	MSLE14-10511	1 016 536	MSLS14-10521	1 016 529
		70	–	–	MSLE14-10511	1 016 536	MSLS14-10511	1 016 522
17	50	20	–	–	MSLE17-10511	1 016 537	MSLS17-10521	1 016 530
		70	–	–	MSLE17-10511	1 016 537	MSLS17-10511	1 016 523
20	50	20	–	–	MSLE20-10511	1 016 538	MSLS20-10521	1 016 531
		70	–	–	MSLE20-10511	1 016 538	MSLS20-10511	1 016 524
23	50	20	–	–	MSLE23-10511	1 016 392	MSLS23-10521	1 016 391
		70	–	–	MSLE23-10511	1 016 392	MSLS23-10511	1 016 390
26	50	20	–	–	MSLE26-10511	1 016 539	MSLS26-10521	1 016 532
		70	–	–	MSLE26-10511	1 016 539	MSLS26-10511	1 016 525
29	50	20	–	–	MSLE29-10511	1 016 540	MSLS29-10521	1 016 533
		70	–	–	MSLE29-10511	1 016 540	MSLS29-10511	1 016 526
32	50	20	–	–	MSLE32-10511	1 016 541	MSLS32-10521	1 016 534
		70	–	–	MSLE32-10511	1 016 541	MSLS32-10511	1 016 527
35	50	20	–	–	MSLE35-10511	1 016 542	MSLS35-10521	1 016 535
		70	–	–	MSLE35-10511	1 016 542	MSLS35-10511	1 016 528

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

D

General system data

Number of beams (depending on type)	2 ... 35
Beam separation (depending on type)	50 mm ... 500 mm
Protection class	I
Enclosure rating	IP 65
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC
Type	Type 4 according to EN 50100
Synchronization	Optical, without separate synchronization cable

Receiver unit

Maximum response time	20 ms
Output voltage from ... to	V_S – 3 V ... V_S
Maximum output current	500 mA
Maximum power consumption without MSM	<5 W (without load)
Maximum power consumption with MSM	<10 W (without load, without sensors and without muting indicator lamp)
Maximum output current output weak signal	≤100 mA

Sender unit

Scanning range (depending on type)	20 m / 70 m
Maximum power consumption	<7 W

Operating data

Maximum cable cross-section with sleeve	1 mm²
Maximum cable cross-section without sleeve	1.5 mm²
Ambient operating temperature from ... to	0 °C ... +55 °C
Storage temperature from ... to	–25 °C ... +70 °C
Air humidity from ... to	15 % ... 95 %
Vibration resistance	5 g, 10 Hz ... 55 Hz according toIEC 60068-2-6
Shock resistance	10 g according to IEC 60068-2-29

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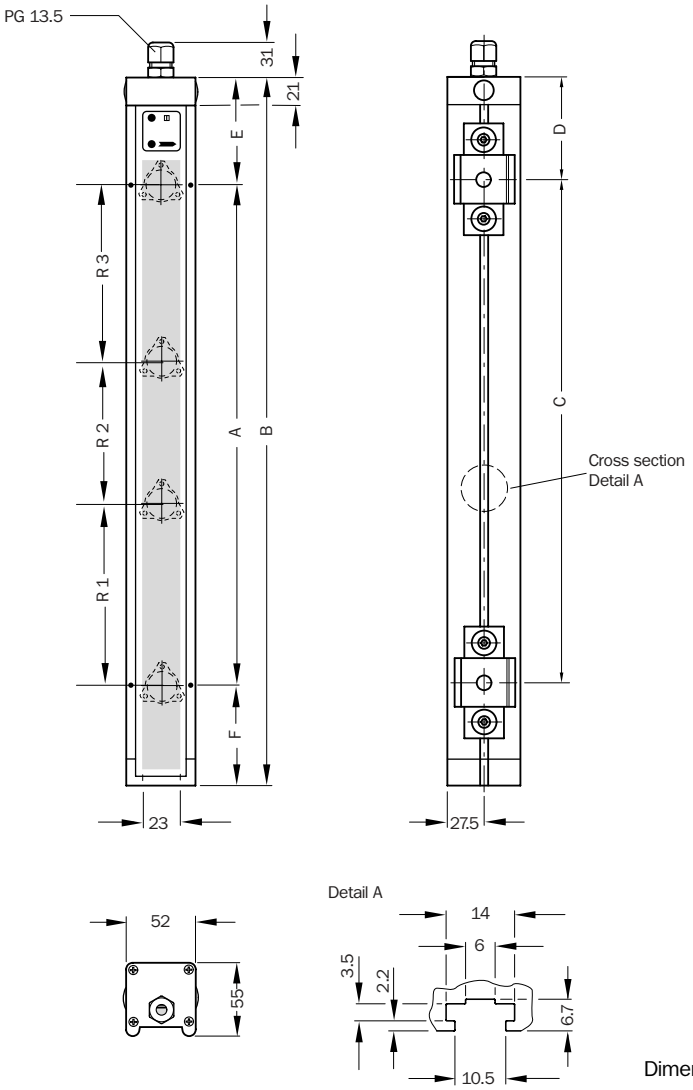
Dimensional drawings

MSL



Dimensions in mm

Type	A	B	C	D	E	F	R 1	R 2	R 3
MSL 02-150	500	684	524	80	107	77	500	–	–
MSL 03-122	440	597	437	80	107	50	220	–	–
MSL 03-140	800	985	825	80	107	78	400	–	–
MSL 20-107	1330	1585	1425	80	107	148	70	–	–
MSL 23-107	1540	1736	1576	80	107	89	70	–	–
MSL 14-105	650	835	675	80	107	78	50	–	–
MSL 17-105	800	985	825	80	107	78	50	–	–
MSL 20-105	950	1135	975	80	107	78	50	–	–
MSL 23-105	1100	1285	1125	80	107	78	50	–	–
MSL 26-105	1250	1435	1275	80	107	78	50	–	–
MSL 29-105	1400	1586	1426	80	107	79	50	–	–
MSL 32-105	1550	1736	1576	80	107	79	50	–	–
MSL 35-105	1700	1886	1726	80	107	79	50	–	–

Dimensions in mm

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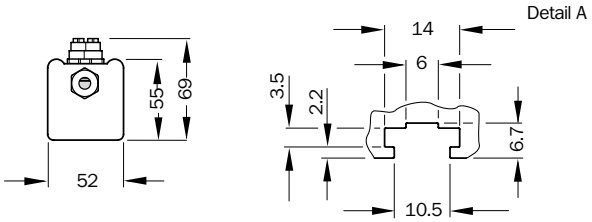
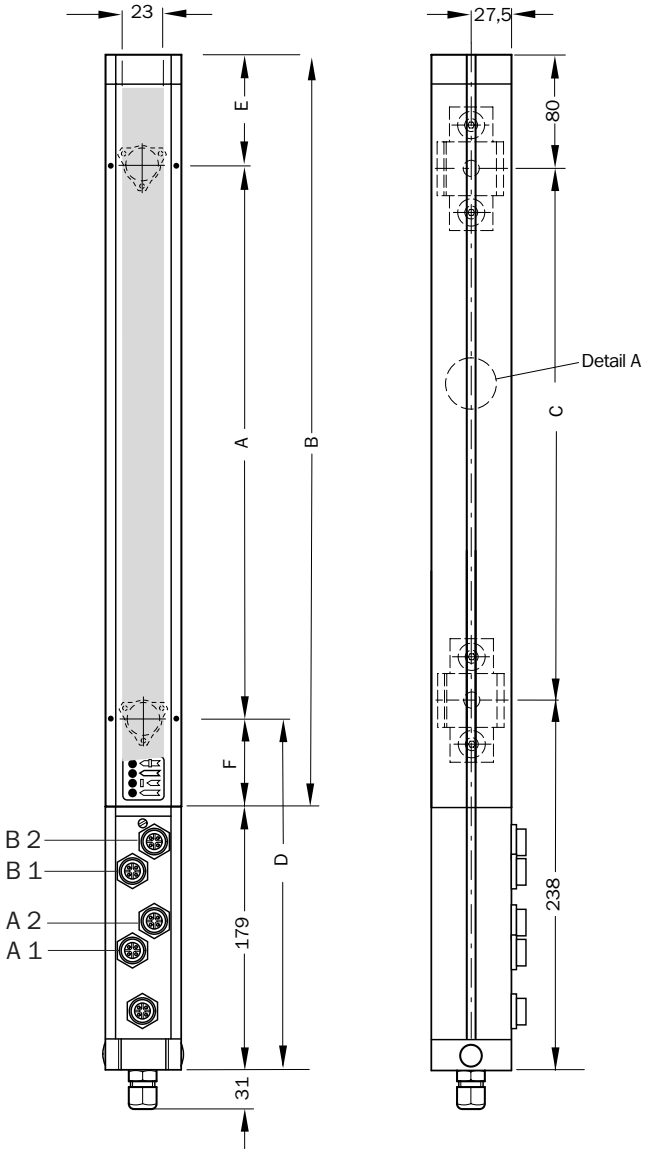
MSL with MSM muting expansion module





Dimensions in mm

Type	A	B	C	D	E	F
MSL 02-x50	500	663	524	265	77	86
MSL 03-x22	440	576	437	265	50	86
MSL 03-x40	800	964	825	265	78	86

Dimensions in mm

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Connection diagrams

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

Accessories

Mounting systems

Description	Type of fastening	Packing unit	Part number
Mounting kit 1	Rigid	4	7 021 352
Mounting kit 2	Adjustable	4	2 017 751
Mounting kit 3	Adjustable, vibration-absorbing	4	2 017 752

Sliding nuts/sliding blocks

Description	Packing unit	Remark	Part number
Sliding block (sliding nut)	4	Supplied with delivery	2 017 550
	1	–	5 305 719

Plug-in terminal chambers

Description	Number of poles	For system part	Direction of the cable outlet on the plug	Enclosure rating	Remark	Part number
Harting terminal chamber	8	Receiver	Straight	IP 65	–	2 018 550
			Angled	IP 65	–	2 018 551
		Sender	Straight	IP 65	–	2 018 549
			Angled	IP 65	–	2 019 081
Hirschmann terminal chamber	7	Receiver	Straight	IP 67	Output weak signal not connected	2 018 539
		Sender	Straight	IP 67	–	7 021 354
	12	Receiver	Straight	IP 67	–	2 018 584
Interconnectron terminal chambe	9	Sender	Straight	IP 65	–	2 017 536
	12	Receiver	Straight	IP 65	–	2 017 537
			Angled	IP 65	–	2 017 755

Cable sockets

Description	Enclosure rating	Connection type	Direction of the cable outlet on the plug	Cable diameter	Part number
Harting cable socket M26 x 8	IP 65	Crimped	Straight	11 mm ... 15 mm	6 011 105
				15 mm ... 20.5 mm	6 011 058
Hirschmann cable socket M26 x 7	IP 65	Crimped	Straight	–	6 006 612
			Angled	–	6 006 613
Hirschmann cable socket M26 x 11 + FE	IP 65	Crimp contacts	Straight	–	6 020 757
			Angled	–	6 020 758
Interconnectron cable socket M26 x 9	IP 65	Crimped	Straight	–	6 008 440
Interconnectron cable socket M26 x 12	IP 65	Crimped	Straight	–	6 008 441

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D

Connection cables muting sensor to MSM

Number of poles	Enclosure rating	Type of connection to the muting sensor	Cable length	Remark	Part number
4	IP 65	Cable socket	2 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 649
			5 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 650
			2 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 092
			5 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 093
		Cable connection	2 m	–	6 010 974
			5 m	–	6 010 976
			10 m	–	6 008 652

Angled plug for MSM

Number of poles	Direction of the cable outlet on the plug	Enclosure rating	Part number
4	Angled	IP 65	6 008 651

Muting indicator lamps

Type of muting indicator	Type of connection to the indicator	Cable length	Delivery	Part number
Indicator lamp (bulb)	Cable connection	2 m	Incl. connection cable and mounting kit	2 017 768
		10 m	Incl. connection cable	2 018 504
LED lamp	Cable connection	2 m	Incl. connection cable and mounting kit	2 019 909
		10 m	Incl. connection cable and mounting kit	2 019 910

Muting accessories, miscellaneous

Description	Part number
Exchange bulb, muting indicator lamp	6 008 654
Replacement housing, muting indicator lamp	6 008 645
Protective cap for quick-disconnect socket on MSM	6 011 170

Power supplies

Input voltage from ... to	Output voltage	Maximum output current	Part number
120 V ... 230 V AC	24 V AC	2.5 A	6 010 361
		4 A	6 010 362

Mirror columns [1)]

Front cover material	Length	Deflection angle	Beam separation	Part number
Front metal sheet	1121 mm	90°	500 mm	1 015 041
			400 mm	1 015 040

[1)] Warning, reduction of the scanning range!

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Device columns and muting device columns

Description	Length	Beam separation	Front cover material	Muting	Type of muting indicator	Remark	Part number
Device column	1221 mm	400 mm	Front metal sheet	–	–	Incl. mounting kit	2 018 153
		500 mm	Front metal sheet	–	–	Incl. mounting kit	2 018 154
		–	Front screen [1]	–	–	Incl. mounting kit	2 018 608
	1721 mm	–	Front screen [1]	–	–	Incl. mounting kit	2 018 767
Muting device column	1286 mm	500 mm	Front metal sheet	✔	Indicator lamp (bulb)	Incl. lamps, lamp cable and mounting kit	2 018 741
			Front metal sheet	✔	LED lamp	Incl. lamps, lamp cable and mounting kit	2 022 998
	1521 mm	400 mm	Front metal sheet	✔	–	Incl. mounting kit	2 018 781
	1586 mm	400 mm	Front metal sheet	✔	Indicator lamp (bulb)	Incl. lamps, lamp cable and mounting kit	2 018 729
					LED lamp	Incl. lamps, lamp cable and mounting kit	2 022 995

[1] Warning, reduction of the scanning range!

➜ For dimensional drawings of the device columns and mirror columns please refer to the “Easy Order – MSL and Accessories”. Download at www.sick.com

Other mirror parts

Description	Height	Remark	Part number
Mirror insert	–	Complete for mounting in mirror column	2 018 537
Adapter plate	3 mm	Suitable for floor mounting of mirror or device column	4 031 053

Muting modules

Description	Muting with override	Part number
MSM01-1A	–	1 013 769
MSM02-1A	✔	1 015 699

Laser alignment aid

Description	Maximum scanning range	Type of light	Part number
Laser alignment aid AR 60	60 m	Red light	1 015 741
Adapter AR 60 / MSL, click-on	–	–	4 030 282
Adapter AR 60 / MSL, screwable	–	–	2 016 629

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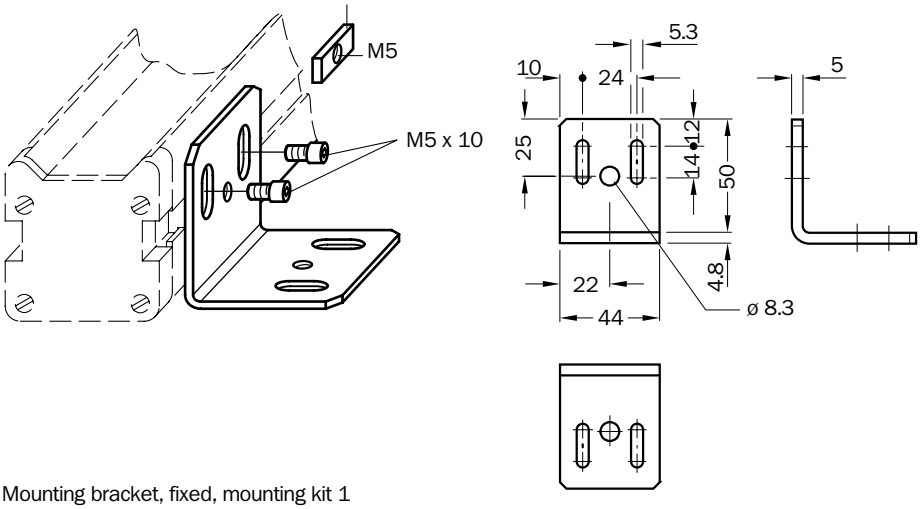
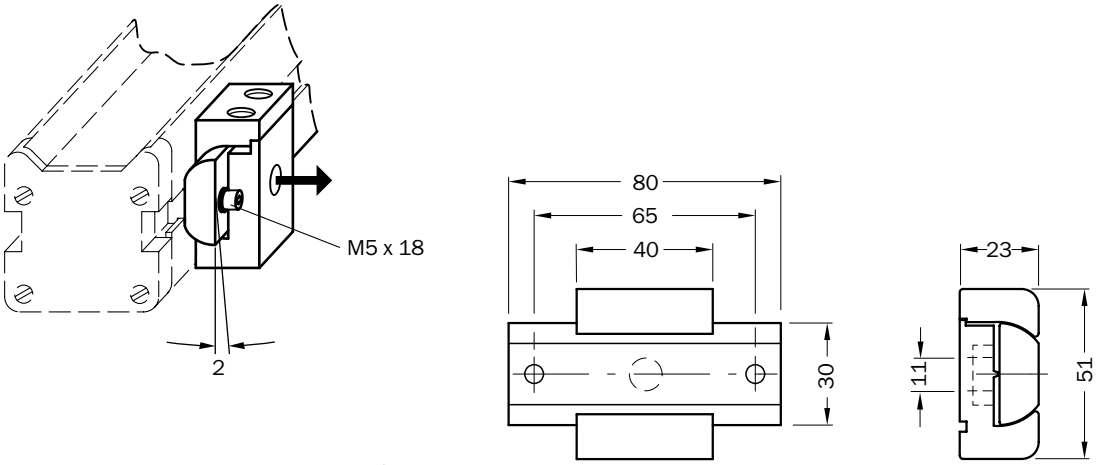
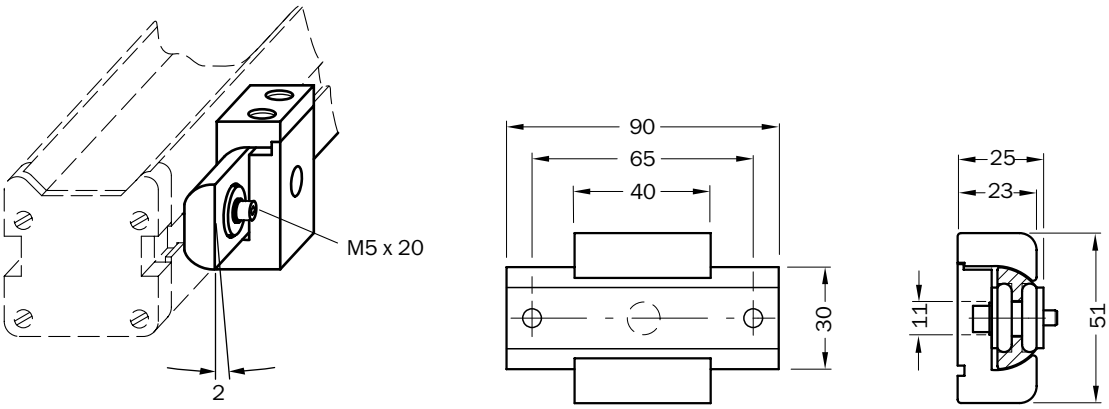
Dimensional drawings mounting accessories



Mounting bracket, fixed, mounting kit 1



Mounting bracket, pivotable, mounting kit 2



Mounting bracket, pivotable, vibration-absorbing, mounting kit 3

Dimensions in mm

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Overview of technical specifications

Number of beams (depending on type)	2 ... 12
Scanning range	70 m
Beam separation (depending on type)	120 mm ... 500 mm
Type	Type 4 according to EN 50100
Enclosure rating	IP 65

Product description

MSL multi-beam photoelectric safety switches from SICK are electro-sensitive protective equipment. They are 2-part through beam configurations, consisting of a sender and receiver unit and are suitable for access protection and hazardous area protection. The devices were designed for industrial applications and benefit from the following advantages:

- No mechanically wearing parts
- Stable modular construction
- Simple installation

Special features of the MSL coded version multi-beam photoelectric safety switch are listed below:

- Plug-in terminal chamber with PG screws or different device connectors
- Short response time (20 ms)
- Large signal reserve (factor 2)
- Optical synchronisation of sender and receiver unit
- Multiple protection by means of deflector mirrors and columns
- Operating modes:
  - External device monitoring
  - Restart interlock
  - Beam coding
- Muting as a supplementary module

In-system added value

- Combination with SICK interfaces
- Safe integration in bus systems

Applications

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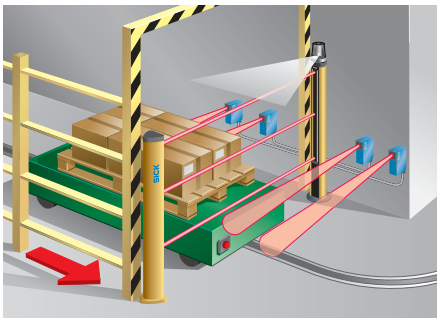
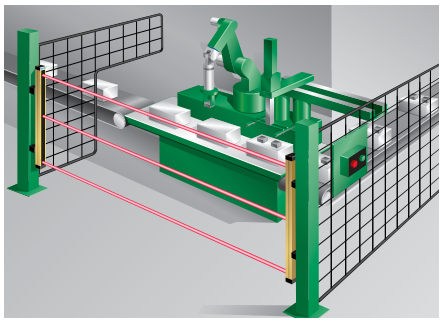
Provides access protection of hazardous areas on machining centres in mechanical engineering applications, robot systems (such as welding lines in the automotive industry) and automated conveying, storage and transport systems



Access protection with muting on a system with floor transporter



Access protection on a robot machining station

D

- Actively monitored semiconductor outputs
- Restart interlock (RES)
- External device monitoring (EDM)
- Output weak signal
- Modular safety muting (MSM)

CE

Further information	Page
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Ordering information

→ Accessories see page D-16

Number of beams	Beam separation (mm)	Scanning range (m)	Muting	Muting with override	Receiver unit		Sender unit	
					Type	Part number	Type	Part number
2	500	70	–	–	MSLE02-25011	1 015 620	MSLS02-25071	1 015 619
			✔	–	MSLE02-25051A	1 015 635	MSLS02-25071	1 015 619
3	220	70	–	–	MSLE03-22211	1 015 624	MSLS03-22271	1 015 623
			✔	–	MSLE03-22251A	1 015 637	MSLS03-22271	1 015 623
	400	70	–	–	MSLE03-24011	1 015 618	MSLS03-24071	1 015 617
			✔	–	MSLE03-24051A	1 015 636	MSLS03-24071	1 015 617
4	120	70	–	–	MSLE04-21211	1 015 626	MSLS04-21271	1 015 625
5	220	70	–	–	MSLE05-22211	1 015 622	MSLS05-22271	1 015 621
6	220	70	–	–	MSLE06-22211	1 015 628	MSLS06-22271	1 015 627
7	120	70	–	–	MSLE07-21211	1 015 630	MSLS07-21271	1 015 629
	130	70	–	–	MSLE07-21311	1 015 639	MSLS07-21371	1 015 638
8	120	70	–	–	MSLE08-21211	1 015 632	MSLS08-21271	1 015 631
12	120	70	–	–	MSLE12-21211	1 015 634	MSLS12-21271	1 015 633

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Number of beams (depending on type)	2 ... 12
Beam separation (depending on type)	120 mm ... 500 mm
Protection class	I
Enclosure rating	IP 65
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC
Type	Type 4 according to EN 50100
Synchronization	Optical, without separate synchronization cable

Receiver unit

Maximum response time	15 ms
Output voltage from ... to	V_S – 3 V ... V_S
Maximum output current	500 mA
Maximum power consumption without MSM	<5 W (without load)
Maximum power consumption with MSM	<10 W (without load, without sensors and without muting indicator lamp)
Maximum output current output weak signal	≤200 mA

Sender unit

Scanning range (depending on type)	70 m
Maximum power consumption	<7 W

Operating data

Maximum cable cross-section with sleeve	1 mm²
Maximum cable cross-section without sleeve	1.5 mm²
Ambient operating temperature from ... to	0 °C ... +55 °C
Storage temperature from ... to	–25 °C ... +70 °C
Air humidity from ... to	15 % ... 95 %
Vibration resistance	5 g, 10 Hz ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g according to IEC 60068-2-29

D

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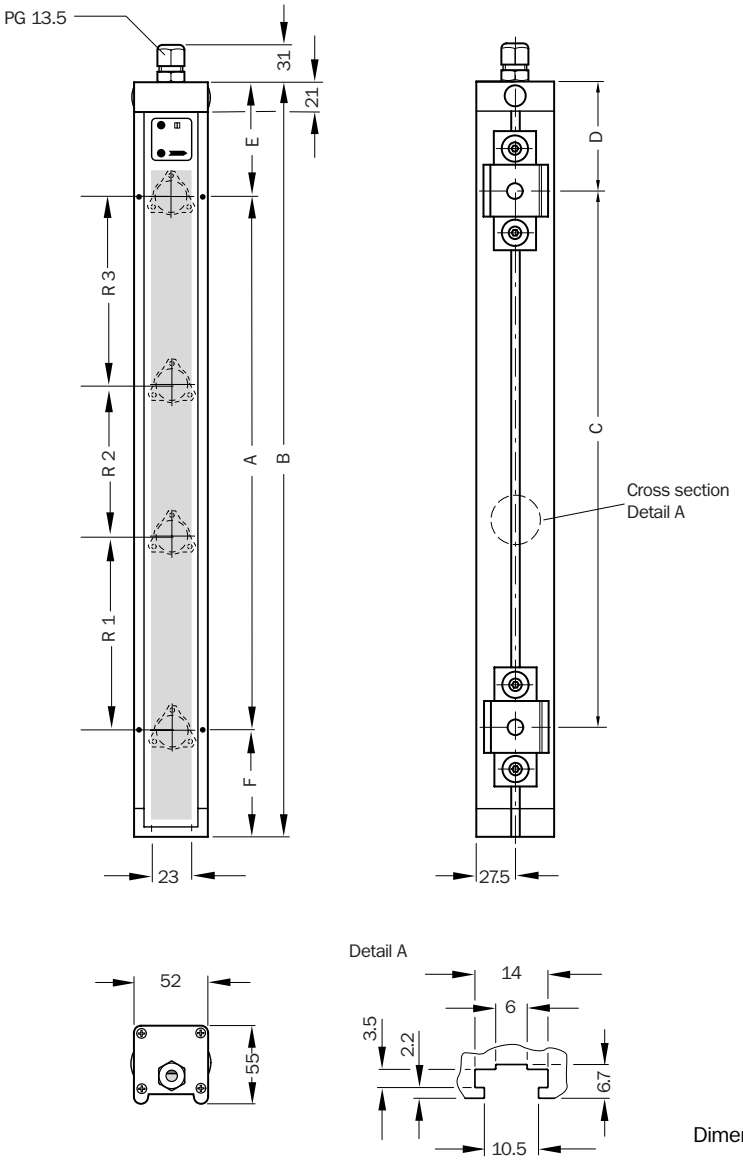
Dimensional drawings

MSL coded version



Dimensions in mm

Type	A	B	C	D	E	F	R 1	R 2	R 3
MSL 02-250	500	684	524	80	107	77	500	–	–
MSL 03-222	440	597	437	80	107	50	220	–	–
MSL 03-240	800	985	825	80	107	78	400	–	–
MSL 04-212	360	534	374	80	107	67	120	–	–
MSL 05-222	880	1041	881	80	107	54	220	–	–
MSL 06-222	1100	1285	1125	80	107	78	220	–	–
MSL 07-212	720	880	720	80	107	53	120	–	–
MSL 07-213	780	985	825	80	107	98	130	–	–
MSL 08-212	840	1041	881	80	107	94	120	–	–
MSL 12-212	1320	1486	1326	80	107	59	120	–	–

Dimensions in mm

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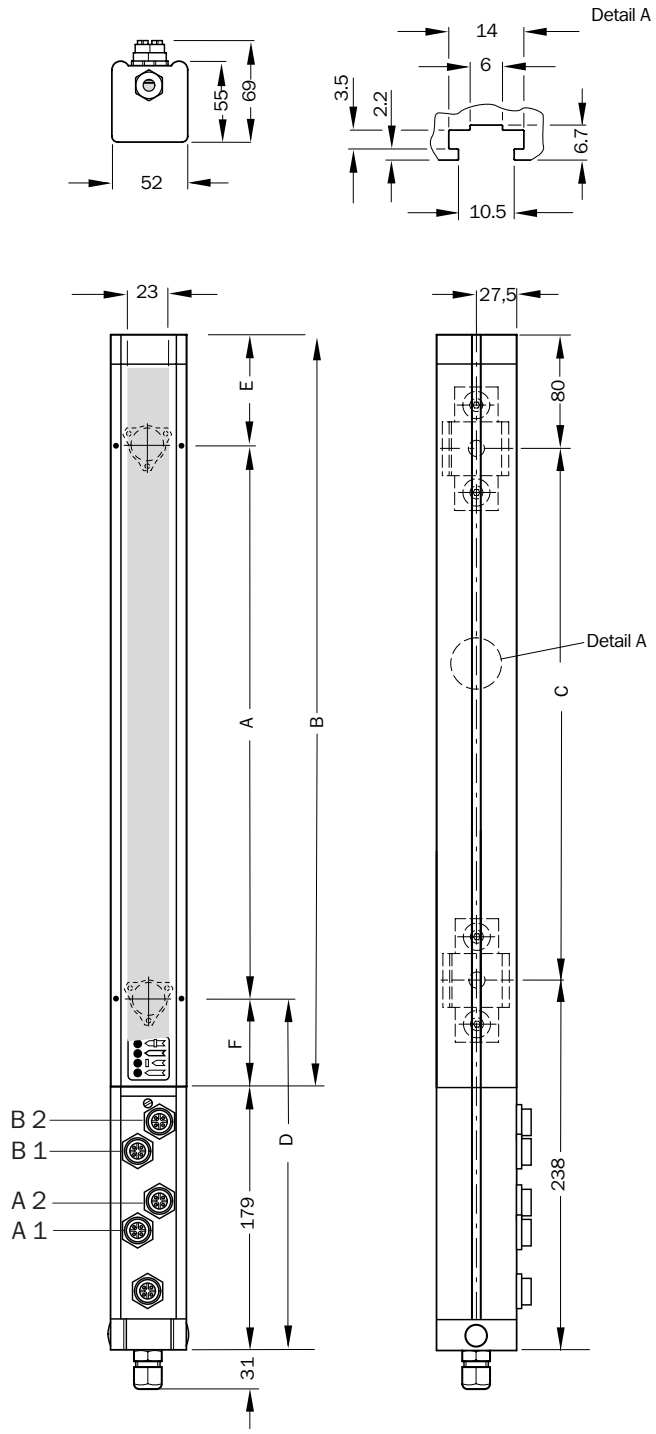
MSL coded version with MSM muting expansion module



Dimensions in mm

Type	A	B	C	D	E	F
MSL 02-x50	500	663	524	265	77	86
MSL 03-x22	440	576	437	265	50	86
MSL 03-x40	800	964	825	265	78	86

Dimensions in mm

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Connection diagrams

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

Accessories

Mounting systems

Description	Type of fastening	Packing unit	Part number
Mounting kit 1	Rigid	4	7 021 352
Mounting kit 2	Adjustable	4	2 017 751
Mounting kit 3	Adjustable, vibration-absorbing	4	2 017 752

D

Sliding nuts/sliding blocks

Description	Packing unit	Remark	Part number
Sliding block (sliding nut)	4	Supplied with delivery	2 017 550
	1	–	5 305 719

Plug-in terminal chambers

Description	Number of poles	For system part	Direction of the cable outlet on the plug	Enclosure rating	Remark	Part number
Harting terminal chamber	8	Receiver	Straight	IP 65	–	2 018 550
			Angled	IP 65	–	2 018 551
		Sender	Straight	IP 65	–	2 018 549
			Angled	IP 65	–	2 019 081
Hirschmann terminal chamber	7	Receiver	Straight	IP 67	Output weak signal not connected	2 018 539
		Sender	Straight	IP 67	–	7 021 354
	12	Receiver	Straight	IP 67	–	2 018 584
Interconnectron terminal chamber	9	Sender	Straight	IP 65	–	2 017 536
	12	Receiver	Straight	IP 65	–	2 017 537
			Angled	IP 65	–	2 017 755

Cable sockets

Description	Enclosure rating	Connection type	Direction of the cable outlet on the plug	Cable diameter	Part number
Harting cable socket M26 x 8	IP 65	Crimped	Straight	11 mm ... 15 mm	6 011 105
				15 mm ... 20.5 mm	6 011 058
Hirschmann cable socket M26 x 7	IP 65	Crimped	Straight	–	6 006 612
			Angled	–	6 006 613
Hirschmann cable socket M26 x 11 + FE	IP 65	Crimp contacts	Straight	–	6 020 757
			Angled	–	6 020 758
Interconnectron cable socket M26 x 9	IP 65	Crimped	Straight	–	6 008 440
Interconnectron cable socket M26 x 12	IP 65	Crimped	Straight	–	6 008 441

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Connection cables muting sensor to MSM

Number of poles	Enclosure rating	Type of connection to the muting sensor	Cable length	Remark	Part number
4	IP 65	Cable socket	2 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 649
			5 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 650
			2 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 092
			5 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 093
		Cable connection	2 m	–	6 010 974
			5 m	–	6 010 976
			10 m	–	6 008 652

D

Angled plug for MSM

Number of poles	Direction of the cable outlet on the plug	Enclosure rating	Part number
4	Angled	IP 65	6 008 651

Muting indicator lamps

Type of muting indicator	Type of connection to the indicator	Cable length	Delivery	Part number
Indicator lamp (bulb)	Cable connection	2 m	Incl. connection cable and mounting kit	2 017 768
		10 m	Incl. connection cable	2 018 504
LED lamp	Cable connection	2 m	Incl. connection cable and mounting kit	2 019 909
		10 m	Incl. connection cable and mounting kit	2 019 910

Muting accessories, miscellaneous

Description	Part number
Exchange bulb, muting indicator lamp	6 008 654
Replacement housing, muting indicator lamp	6 008 645
Protective cap for quick-disconnect socket on MSM	6 011 170

Power supplies

Input voltage from ... to	Output voltage	Maximum output current	Part number
120 V ... 230 V AC	24 V AC	2.5 A	6 010 361
		4 A	6 010 362

Mirror columns [1)]

Front cover material	Length	Deflection angle	Beam separation	Part number
Front metal sheet	1121 mm	90°	500 mm	1 015 041
			400 mm	1 015 040

Continued on next page

[1)] Warning, reduction of the scanning range!

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D

Device columns and muting device columns

Description	Length	Beam separation	Front cover material	Muting	Type of muting indicator	Remark	Part number
Device column	1221 mm	400 mm	Front metal sheet	–	–	Incl. mounting kit	2 018 153
		500 mm	Front metal sheet	–	–	Incl. mounting kit	2 018 154
		–	Front screen [1]	–	–	Incl. mounting kit	2 018 608
	1721 mm	–	Front screen [1]	–	–	Incl. mounting kit	2 018 767
Muting device column	1286 mm	500 mm	Front metal sheet	✔	Indicator lamp (bulb)	Incl. lamps, lamp cable and mounting kit	2 018 741
			Front metal sheet	✔	LED lamp	Incl. lamps, lamp cable and mounting kit	2 022 998
	1521 mm	400 mm	Front metal sheet	✔	–	Incl. mounting kit	2 018 781
	1586 mm	400 mm	Front metal sheet	✔	Indicator lamp (bulb)	Incl. lamps, lamp cable and mounting kit	2 018 729
					LED lamp	Incl. lamps, lamp cable and mounting kit	2 022 995

[1] Warning, reduction of the scanning range!

➜ For dimensional drawings of the device columns and mirror columns please refer to the “Easy Order – MSL and Accessories”. Download at www.sick.com

Other mirror parts

Description	Height	Remark	Part number
Mirror insert	–	Complete for mounting in mirror column	2 018 537
Adapter plate	3 mm	Suitable for floor mounting of mirror or device column	4 031 053

Muting module

Description	Muting with override	Part number
MSM01-1A	–	1 013 769

Laser alignment aid

Description	Maximum scanning range	Type of light	Part number
Laser alignment aid AR 60	60 m	Red light	1 015 741
Adapter AR 60 / MSL, click-on	–	–	4 030 282
Adapter AR 60 / MSL, screwable	–	–	2 016 629

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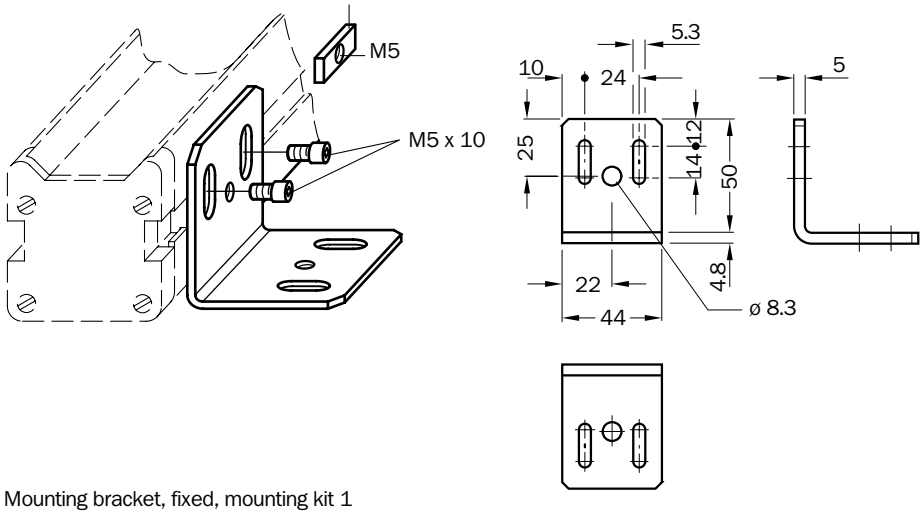
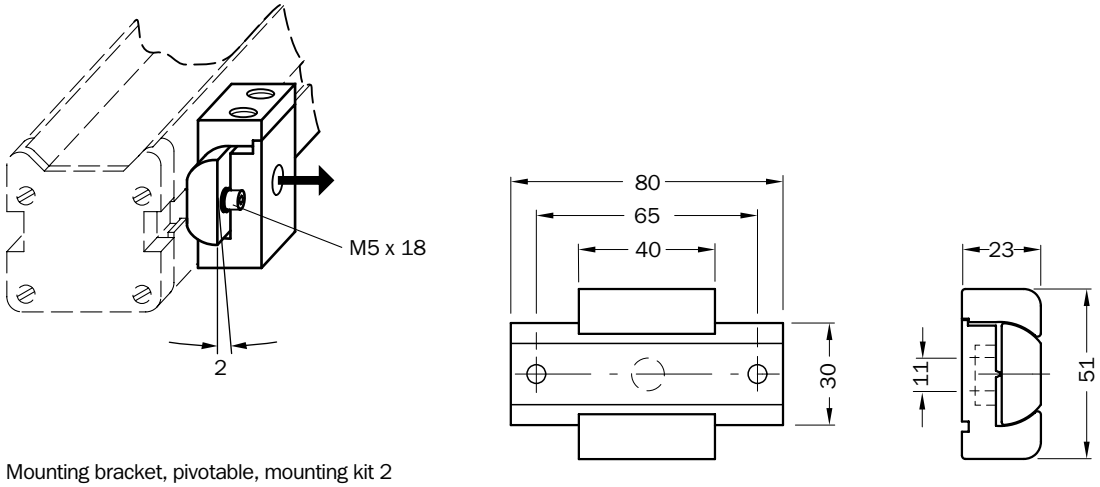
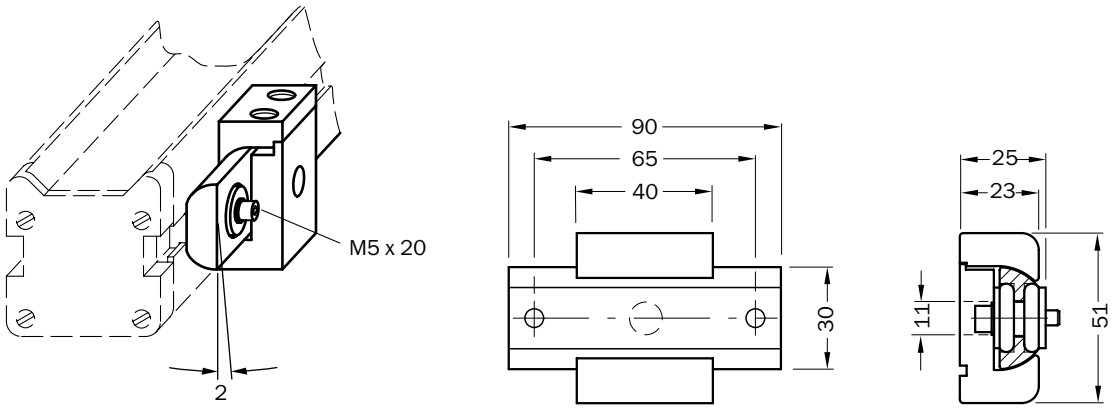
Dimensional drawings mounting accessories



Mounting bracket, fixed, mounting kit 1



Mounting bracket, pivotable, mounting kit 2



Mounting bracket, pivotable, vibration-absorbing, mounting kit 3

Dimensions in mm

D

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D

- Actively monitored semiconductor outputs
- Integral evaluation circuit
- Only one active side, so less wiring
- Modular safety muting (MSM)

CE

Further information	Page
→ Dimensional drawings	D-22
→ Connection diagrams	D-24
→ Accessories	D-24
→ Services	A-0

Overview of technical specifications

Number of beams (depending on type)	1 / 2
Scanning range	Max. 7.5 m
Beam separation (depending on type)	500 mm / 400-170-400 mm
Type	Type 4 according to EN 50100
Enclosure rating	IP 65

Product description

The MSLZ multi-beam photoelectric safety switch comprises a sender/receiver unit on the active side (Z) and one or more deflector mirrors on the passive side. It is suitable for access protection of hazardous areas. The devices were designed for industrial applications and benefit from the following advantages:

- No mechanically wearing parts
- Stable modular construction
- Simple installation

Special features of the MSLZ multi-beam photoelectric safety switch are listed below:

- Plug-in terminal chamber with PG screws or different device connectors
- Short response time (20 ms)
- Large signal reserve (factor 2)
- Only one active side, simpler wiring
- Operating modes:
  - External device monitoring
  - Restart interlock
- Muting as a supplementary module

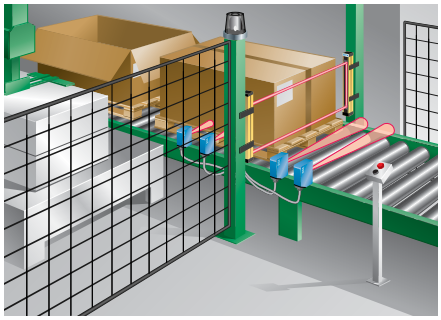
In-system added value

- Combination with SICK interfaces
- Safe integration in bus systems

Applications

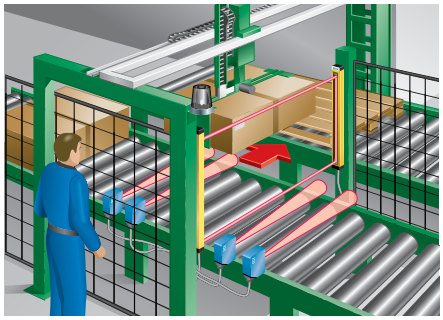
→ You can find more applications using the application finder at www.sick.com

Provides access protection of hazardous areas on machining centres in mechanical engineering applications, robot systems



Access protection with muting on a packaging machine

(such as welding lines in the automotive industry) and automated conveying, storage and transport systems



Access protection with muting on a transfer station

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8 010 889/15-10-04

Ordering information

→ Accessories see page D-24

Number of beams	Beam separation (mm)	Scanning range (m)	Muting	Muting with override	Sender/reiceiver in one housing		Mirror	
					Type	Part number	Type	Part number
1	500	6.1	✔	–	MSLZ01-15061A	1 015 569	PSZ01-1501	1 015 693
				✔	MSLZ01-15021A	1 015 803	PSZ01-1501	1 015 693
			–	–	MSLZ01-15031	1 013 771	PSZ01-1501	1 015 693
2	400-170-400	4.5	✔	✔	MSLZ02-10321A	1 019 177	PSZ02-1011S01	1 019 225
			–	–	MSLZ02-10331	1 019 176	PSZ02-1011S01	1 019 225

D

Detailed technical specifications

→ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Number of beams (depending on type)	1 / 2
Beam separation (depending on type)	500 mm / 400-170-400 mm
Protection class	I
Enclosure rating	IP 65
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC
Type	Type 4 according to EN 50100
Synchronization	Optical, without separate synchronization cable

Sender/reiceiver in one housing

Maximum response time	20 ms
Output voltage from ... to	V_S – 3 V ...V_S
Maximum output current	500 mA
Maximum power consumption without MSM	<12 W (without load)
Maximum power consumption with MSM	<17 W (without load, without sensors and without muting indicator lamp)
Maximum output current output weak signal	≤100 mA

Operating data

Maximum cable cross-section with sleeve	1 mm²
Maximum cable cross-section without sleeve	1.5 mm²
Ambient operating temperature from ... to	0 °C ... +55 °C
Storage temperature from ... to	–25 °C ... +70 °C
Air humidity from ... to	15 % ... 95 %
Vibration resistance	5 g, 10 Hz ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g according to IEC 60068-2-29

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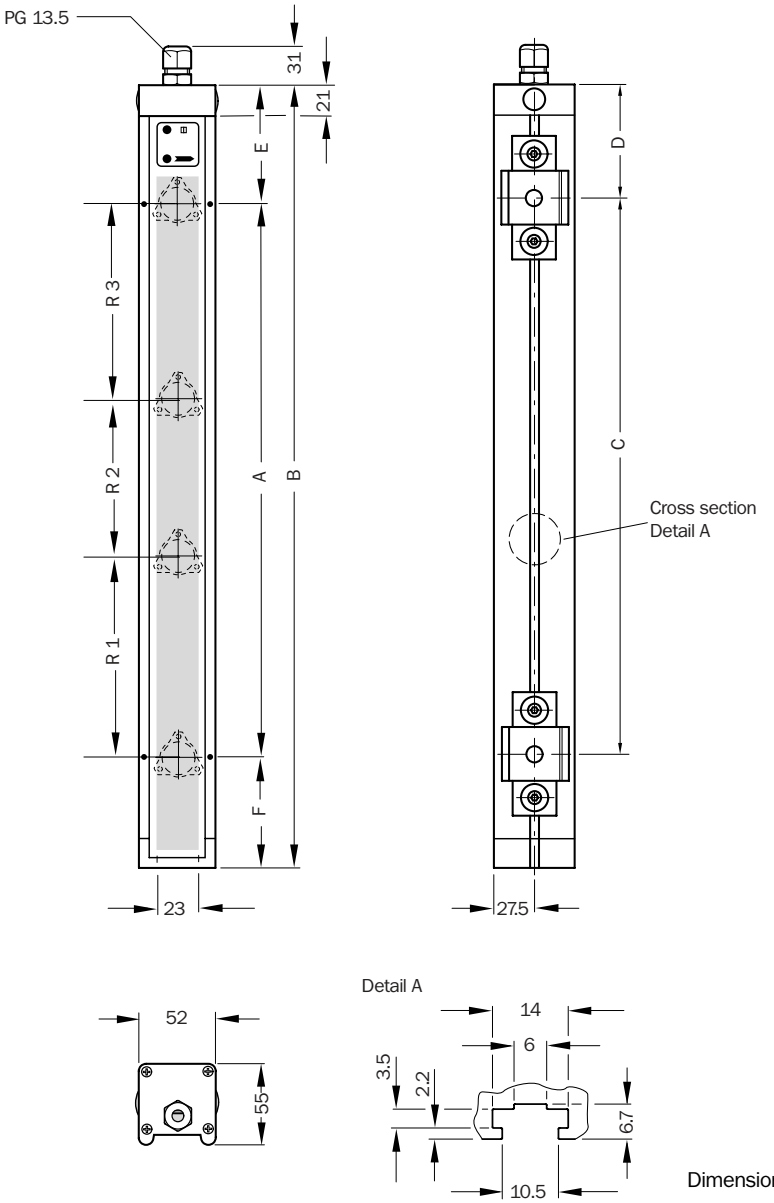
Dimensional drawings

MSLZ



Dimensions in mm

Type	A	B	C	D	E	F	R 1	R 2	R 3
MSLZ 01-150	500	684	524	80	97	87	500	–	–
MSLZ 02-103	970	1285	1125	80	107	208	400	170	400

Dimensions in mm

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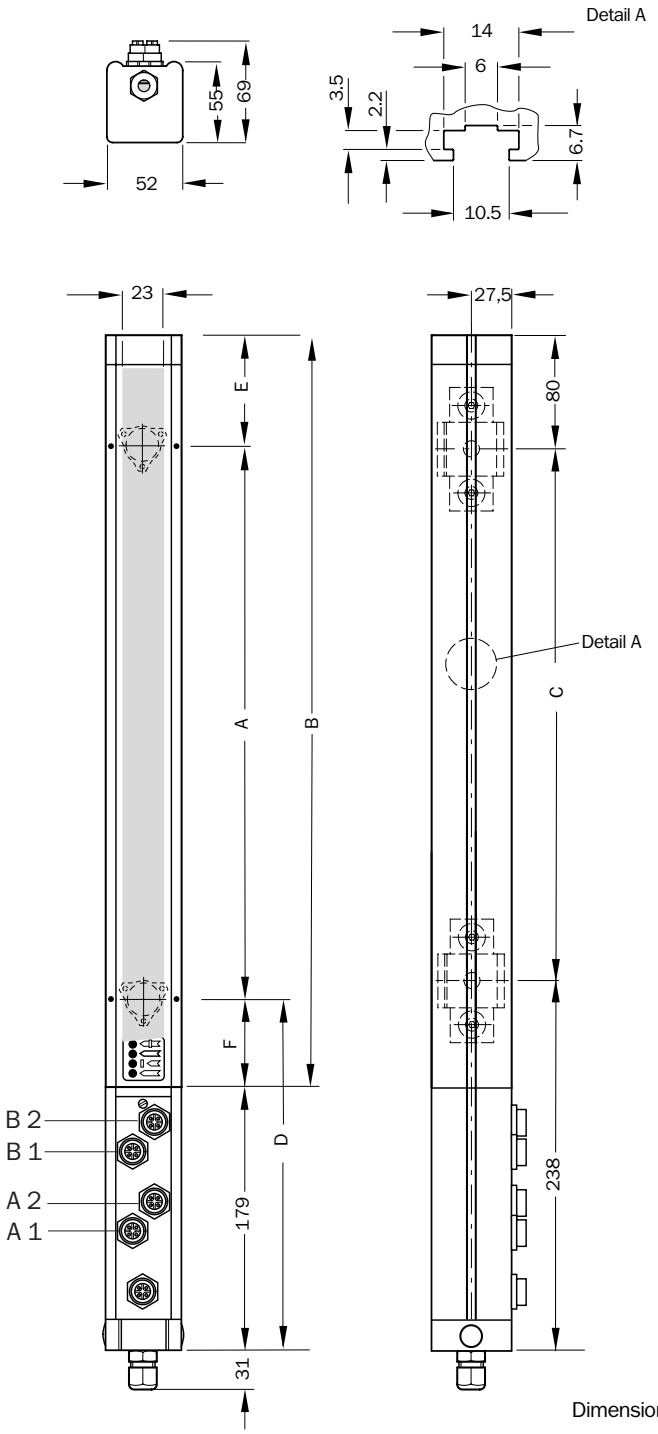
MSLZ with MSM muting expansion module



Dimensions in mm

Type	A	B	C	D	E	F
MSLZ 01-x50	500	663	524	255	87	76

Dimensions in mm

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Connection diagrams

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

Accessories

Mounting systems

Description	Type of fastening	Packing unit	Part number
Mounting kit 1	Rigid	4	7 021 352
Mounting kit 2	Adjustable	4	2 017 751
Mounting kit 3	Adjustable, vibration-absorbing	4	2 017 752

Sliding nuts/sliding blocks

Description	Packing unit	Remark	Part number
Sliding block (sliding nut)	4	Supplied with delivery	2 017 550
	1	–	5 305 719

Plug-in terminal chambers

Description	Number of poles	Direction of the cable outlet on the plug	Enclosure rating	Remark	Part number
Harting terminal chamber	8	Straight	IP 65	–	2 018 550
		Angled	IP 65	–	2 018 551
Hirschmann terminal chamber	7	Straight	IP 67	Output weak signal not connected	2 018 539
	12	Straight	IP 67	–	2 018 584
Interconnectron terminal chamber	12	Straight	IP 65	–	2 017 537
		Angled	IP 65	–	2 017 755

Cable sockets

Description	Enclosure rating	Connection type	Direction of the cable outlet on the plug	Cable diameter	Part number
Harting cable socket M26 x 8	IP 65	Crimped	Straight	11 mm ... 15 mm	6 011 105
				15 mm ... 20.5 mm	6 011 058
Hirschmann cable socket M26 x 7	IP 65	Crimped	Straight	–	6 006 612
			Angled	–	6 006 613
Hirschmann cable socket M26 x 11 + FE	IP 65	Crimp contacts	Straight	–	6 020 757
			Angled	–	6 020 758
Interconnectron cable socket M26 x 12	IP 65	Crimped	Straight	–	6 008 441

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Connection cables muting sensor to MSM

Number of poles	Enclosure rating	Type of connection to the muting sensor	Cable length	Remark	Part number
4	IP 65	Cable socket	2 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 649
			5 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 650
			2 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 092
			5 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 093
		Cable connection	2 m	–	6 010 974
			5 m	–	6 010 976
			10 m	–	6 008 652

D

Angled plug for MSM

Number of poles	Direction of the cable outlet on the plug	Enclosure rating	Part number
4	Angled	IP 65	6 008 651

Muting indicator lamps

Type of muting indicator	Type of connection to the indicator	Cable length	Delivery	Part number
Indicator lamp (bulb)	Cable connection	2 m	Incl. connection cable and mounting kit	2 017 768
		10 m	Incl. connection cable	2 018 504
LED lamp	Cable connection	2 m	Incl. connection cable and mounting kit	2 019 909
		10 m	Incl. connection cable and mounting kit	2 019 910

Muting accessories, miscellaneous

Description	Part number
Exchange bulb, muting indicator lamp	6 008 654
Replacement housing, muting indicator lamp	6 008 645
Protective cap for quick-disconnect socket on MSM	6 011 170

Power supplies

Input voltage from ... to	Output voltage	Maximum output current	Part number
120 V ... 230 V AC	24 V AC	2.5 A	6 010 361
		4 A	6 010 362

Mirror column [1)]

Front cover material	Length	Deflection angle	Beam separation	Part number
Front metal sheet	1121 mm	90°	500 mm	1 015 042

Continued on next page

[1)] Warning, reduction of the scanning range!

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Device columns and muting device columns

Description	Length	Beam separation	Front cover material	Muting	Type of muting indicator	Remark	Part number
Device column	1221 mm	500 mm	Front metal sheet	–	–	Incl. mounting kit	2 018 154
		–	Front screen [1]	–	–	Incl. mounting kit	2 018 608
	1721 mm	–	Front screen [1]	–	–	Incl. mounting kit	2 018 767
Muting device column	1286 mm	500 mm	Front metal sheet	✔	LED lamp	Incl. lamps, lamp cable and mounting kit	2 022 998
	1586 mm	400 mm	Front metal sheet	✔	Indicator lamp (bulb)	Incl. lamps, lamp cable and mounting kit	2 018 741

D

[1] Warning, reduction of the scanning range!

➜ For dimensional drawings of the device columns and mirror columns please refer to the “Easy Order – MSL and Accessories”. Download at www.sick.com

Deflector mirror

Description	Scanning range	Remark	Part number
PSK45	7.5 m (with MSLZ01-150) 4.5 m (with MSLZ02-103)	Incl. mounting set, not suitable for column mounting	5 306 053

Other mirror parts

Description	Height	Remark	Part number
Mirror insert	–	Complete for mounting in mirror column	2 018 537
Adapter plate	3 mm	Suitable for floor mounting of mirror or device column	4 031 053

Muting modules

Description	Muting with override	Part number
MSM01-1A	–	1 013 769
MSM02-1A	✔	1 015 699

Laser alignment aid

Description	Maximum scanning range	Type of light	Part number
Laser alignment aid AR 60	60 m	Red light	1 015 741
Adapter AR 60 / MSL, click-on	–	–	4 030 282
Adapter AR 60 / MSL, screwable	–	–	2 016 629

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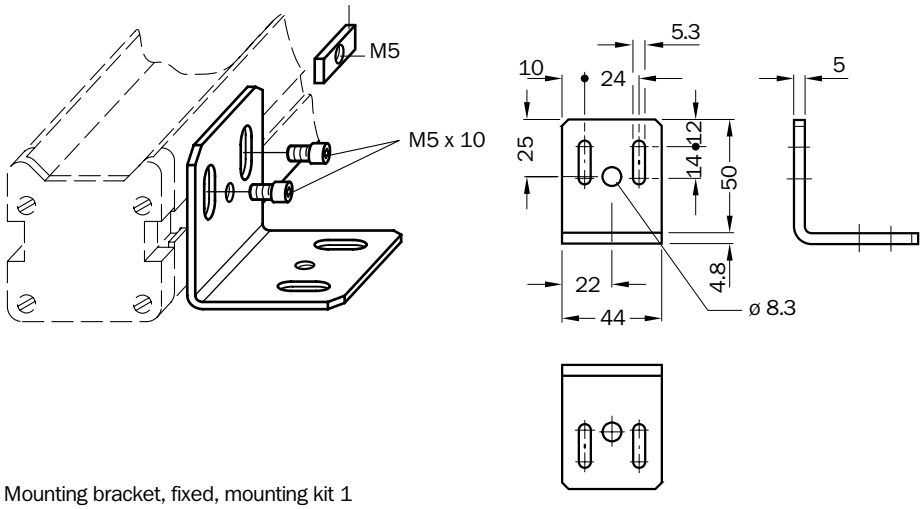
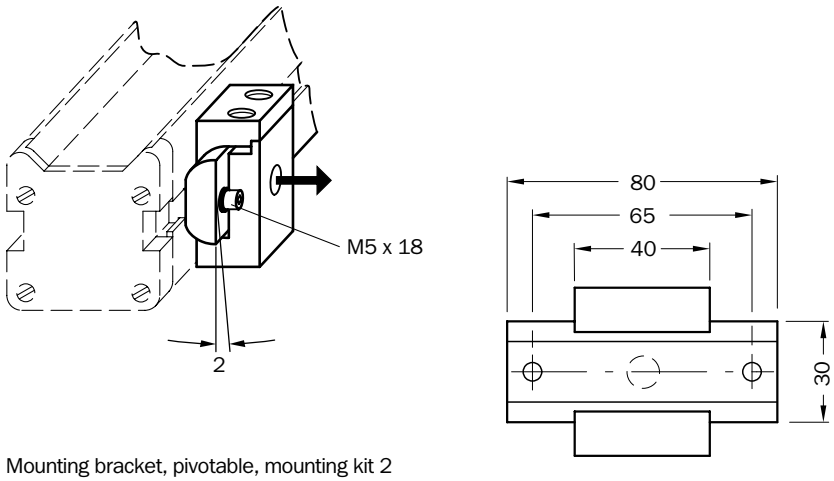
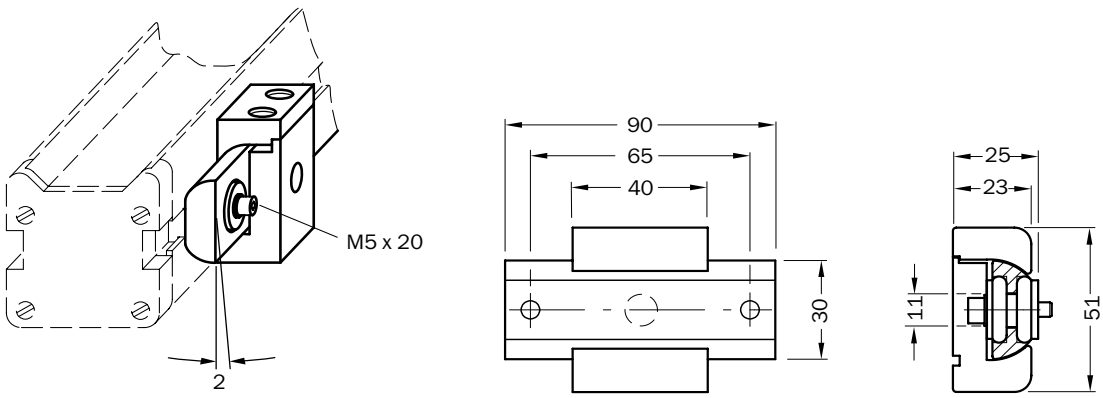
Dimensional drawings mounting accessories



Mounting bracket, fixed, mounting kit 1



Mounting bracket, pivotable, mounting kit 2



Mounting bracket, pivotable, vibration-absorbing, mounting kit 3

Dimensions in mm

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D

- Actively monitored semiconductor outputs
- Integral evaluation circuit
- Only one active side, so less wiring
- Modular safety muting (MSM)

CE

Further information	Page
→ Dimensional drawings	D-30
→ Connection diagrams	D-32
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Overview of technical specifications

Number of beams (depending on type)	1 / 2
Scanning range	Max. 7.5 m
Beam separation (depending on type)	500 mm / 400-170-400 mm
Type	Type 4 according to EN 50100
Enclosure rating	IP 65

Product description

The MSLZ coded version multi-beam photoelectric safety switch comprises a sender/receiver unit on the active side (Z) and one or more deflector mirrors on the passive side. It is suitable for access protection of hazardous areas. The devices were designed for industrial applications and benefit from the following advantages:

- No mechanically wearing parts
- Stable modular construction
- Simple installation

Special features of the MSLZ coded version multi-beam photoelectric safety switch are listed below:

- Plug-in terminal chamber with PG screws or different device connectors
- Short response time (20 ms)
- Large signal reserve (factor 2)
- Only one active side, simpler wiring
- Operating modes:
  - External device monitoring
  - Restart interlock
  - Beam coding
- Muting as a supplementary module

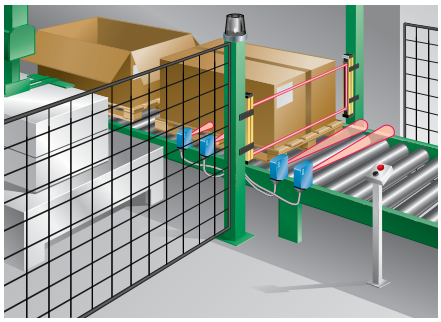
In-system added value

- Combination with SICK interfaces
- Safe integration in bus systems

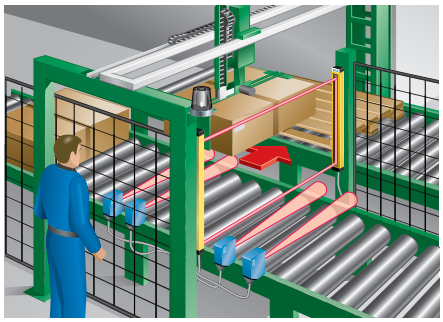
Applications

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

Provides access protection of hazardous areas on machining centres in mechanical engineering applications, robot systems (such as welding lines in the automotive industry) and automated conveying, storage and transport systems



Access protection with muting on a packaging machine



Access protection with muting on a transfer station

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8 010 889/15-10-04

Ordering information

➜ Accessories see page D-32

Number of beams	Beam separation (mm)	Scanning range (m)	Muting	Muting with override	Sender/reiceiver in one housing		Mirror	
					Type	Part number	Type	Part number
1	500	6.1	–	–	MSLZ01-25031	1 015 670	PSZ01-1501	1 015 693
			✔	–	MSLZ01-25061A	1 015 671	PSZ01-1501	1 015 693
2	400-170-400	4.5	–	–	MSLZ02-20331	1 016 264	PSZ02-1011S01	1 019 225

D

Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Number of beams (depending on type)	1 / 2
Beam separation (depending on type)	500 mm / 400-170-400 mm
Protection class	I
Enclosure rating	IP 65
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC
Type	Type 4 according to EN 50100
Synchronization	Optical, without separate synchronization cable

Sender/receiver in one housing

Maximum response time	15 ms
Output voltage from ... to	V_S – 3 V ...V_S
Maximum output current	500 mA
Maximum power consumption without MSM	<12 W (without load)
Maximum power consumption with MSM	<17 W (without load, without sensors and without muting indicator lamp)
Maximum output current output weak signal	≤200 mA

Operating data

Maximum cable cross-section with sleeve	1 mm²
Maximum cable cross-section without sleeve	1.5 mm²
Ambient operating temperature from ... to	0 °C ... +55 °C
Storage temperature from ... to	–25 °C ... +70 °C
Air humidity from ... to	15 % ... 95 %
Vibration resistance	5 g, 10 Hz ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g according to IEC 60068-2-29

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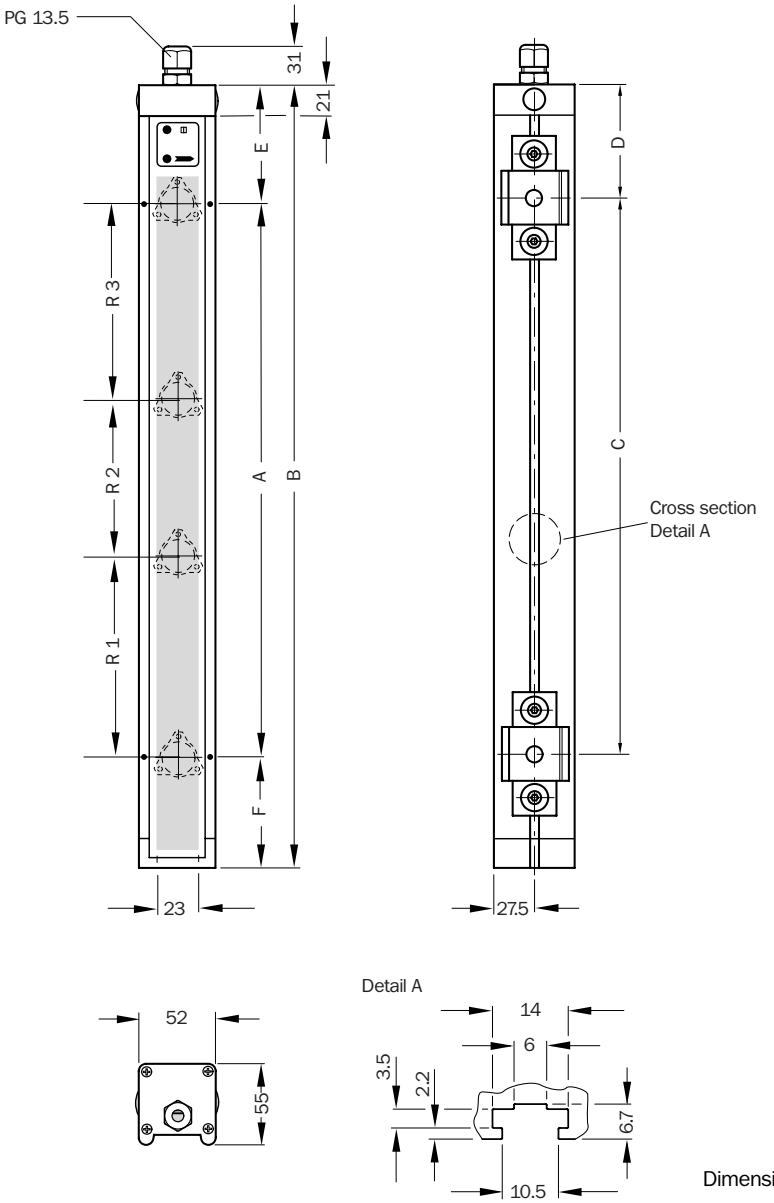
Dimensional drawings

MSLZ coded version



Dimensions in mm

Type	A	B	C	D	E	F	R 1	R 2	R 3
MSLZ 01-250	500	684	524	80	97	87	500	–	–
MSLZ 02-203	970	1285	1125	80	107	208	400	170	400

Dimensions in mm

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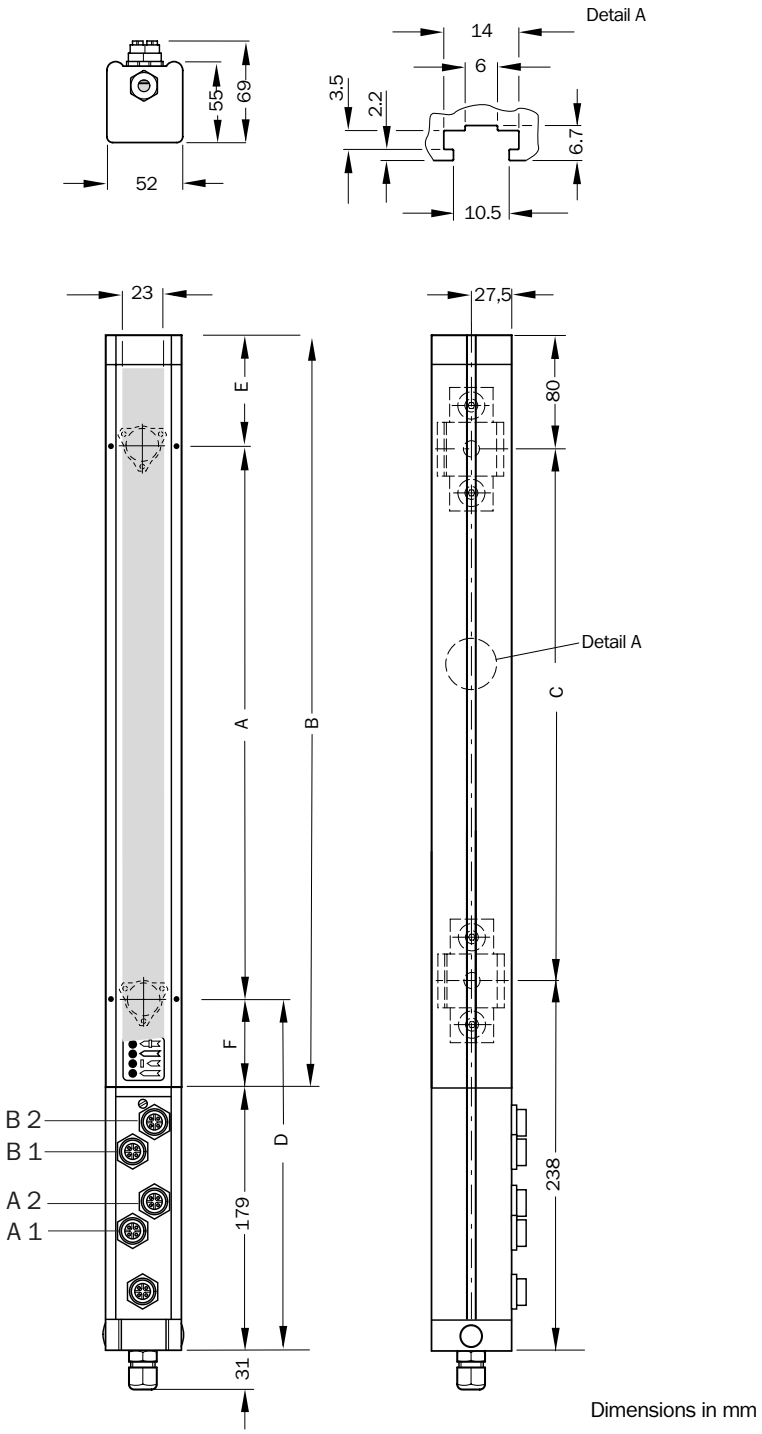
MSLZ with MSM muting expansion module



Dimensions in mm

Type	A	B	C	D	E	F
MSLZ 01-x50	500	663	524	255	87	76

Dimensions in mm

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Connection diagrams

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

Accessories

Mounting systems

Description	Type of fastening	Packing unit	Part number
Mounting kit 1	Rigid	4	7 021 352
Mounting kit 2	Adjustable	4	2 017 751
Mounting kit 3	Adjustable, vibration-absorbing	4	2 017 752

D

Sliding nuts/sliding blocks

Description	Packing unit	Remark	Part number
Sliding block (sliding nut)	4	Supplied with delivery	2 017 550
	1	–	5 305 719

Plug-in terminal chambers

Description	Number of poles	Direction of the cable outlet on the plug	Enclosure rating	Remark	Part number
Harting terminal chamber	8	Straight	IP 65	–	2 018 550
		Angled	IP 65	–	2 018 551
Hirschmann terminal chamber	7	Straight	IP 67	Output weak signal not connected	2 018 539
	12	Straight	IP 67	–	2 018 584
Interconnectron terminal chamber	12	Straight	IP 65	–	2 017 537
		Angled	IP 65	–	2 017 755

Cable sockets

Description	Enclosure rating	Connection type	Direction of the cable outlet on the plug	Cable diameter	Part number
Harting cable socket M26 x 8	IP 65	Crimped	Straight	11 mm ... 15 mm	6 011 105
				15 mm ... 20.5 mm	6 011 058
Hirschmann cable socket M26 x 7	IP 65	Crimped	Straight	–	6 006 612
			Angled	–	6 006 613
Hirschmann cable socket M26 x 11 + FE	IP 65	Crimp contacts	Straight	–	6 020 757
			Angled	–	6 020 758
Interconnectron cable socket M26 x 12	IP 65	Crimped	Straight	–	6 008 441

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Connection cables muting sensor to MSM

Number of poles	Enclosure rating	Type of connection to the muting sensor	Cable length	Remark	Part number
4	IP 65	Cable socket	2 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 649
			5 m	Suitable for muting sensor WT 24, WL 24, WT 260	6 008 650
			2 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 092
			5 m	Suitable for muting sensor WL 12, WL 14, WL 18, WL 23 and WL 27	6 021 093
		Cable connection	2 m	–	6 010 974
			5 m	–	6 010 976
			10 m	–	6 008 652

D

Angled plug for MSM

Number of poles	Direction of the cable outlet on the plug	Enclosure rating	Part number
4	Angled	IP 65	6 008 651

Muting indicator lamps

Type of muting indicator	Type of connection to the indicator	Cable length	Delivery	Part number
Indicator lamp (bulb)	Cable connection	2 m	Incl. connection cable and mounting kit	2 017 768
		10 m	Incl. connection cable	2 018 504
LED lamp	Cable connection	2 m	Incl. connection cable and mounting kit	2 019 909
		10 m	Incl. connection cable and mounting kit	2 019 910

Muting accessories, miscellaneous

Description	Part number
Exchange bulb, muting indicator lamp	6 008 654
Replacement housing, muting indicator lamp	6 008 645
Protective cap for quick-disconnect socket on MSM	6 011 170

Power supplies

Input voltage from ... to	Output voltage	Maximum output current	Part number
120 V ... 230 V AC	24 V AC	2.5 A	6 010 361
		4 A	6 010 362

Mirror column [1)]

Front cover material	Length	Deflection angle	Beam separation	Part number
Front metal sheet	1121 mm	90°	500 mm	1 015 042

Continued on next page

[1)] Warning, reduction of the scanning range!

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Device columns and muting device columns

Description	Length	Beam separation	Front cover material	Muting	Type of muting indicator	Remark	Part number
Device column	1221 mm	500 mm	Front metal sheet	–	–	Incl. mounting kit	2 018 154
		–	Front screen [1]	–	–	Incl. mounting kit	2 018 608
	1721 mm	–	Front screen [1]	–	–	Incl. mounting kit	2 018 767
Muting device column	1286 mm	500 mm	Front metal sheet	✔	LED lamp	Incl. lamps, lamp cable and mounting kit	2 022 998
	1586 mm	400 mm	Front metal sheet	✔	Indicator lamp (bulb)	Incl. lamps, lamp cable and mounting kit	2 018 741

D

[1] Warning, reduction of the scanning range!

➜ For dimensional drawings of the device columns and mirror columns please refer to the “Easy Order – MSL and Accessories”. Download at www.sick.com

Deflector mirror

Description	Scanning range	Remark	Part number
PSK45	7.5 m (with MSLZ01-250) 4.5 m (with MSLZ02-203)	Incl. mounting set, not suitable for column mounting	2 018 537

Other mirror parts

Description	Height	Remark	Part number
Mirror insert	–	Complete for mounting in mirror column	2 018 537
Adapter plate	3 mm	Suitable for floor mounting of mirror or device column	4 031 053

Muting module

Description	Muting with override	Part number
MSM01-1A	–	1 013 769

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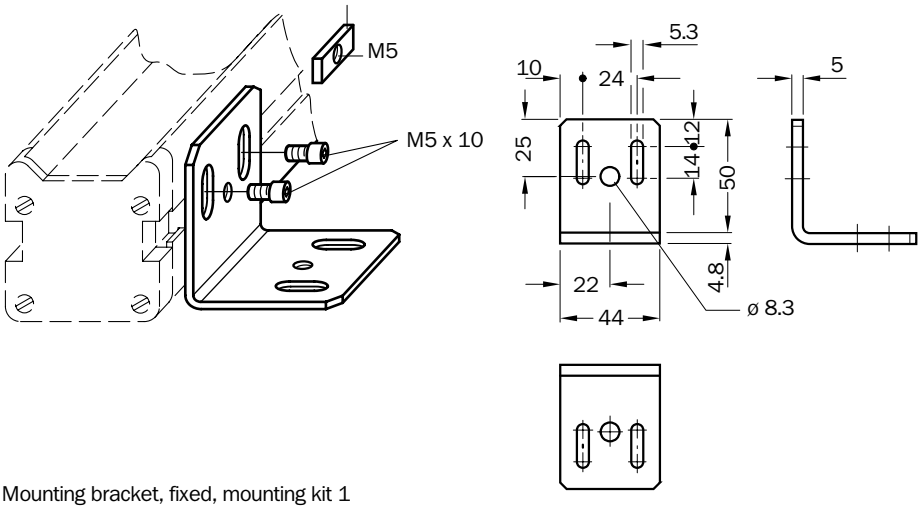
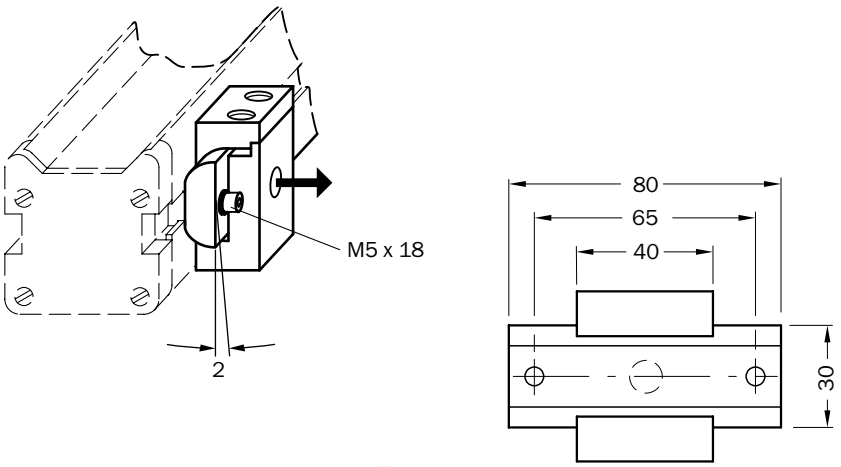
Laser alignment aid

Description	Maximum scanning range	Type of light	Part number
Laser alignment aid AR 60	60 m	Red light	1 015 741
Adapter AR 60/MSL, click-on	–	–	4 030 282
Adapter AR 60/MSL, screwable	–	–	2 016 629

Dimensional drawings mounting accessories



Mounting bracket, fixed, mounting kit 1



Mounting bracket, pivotable, mounting kit 2

Dimensions in mm

Continued on next page

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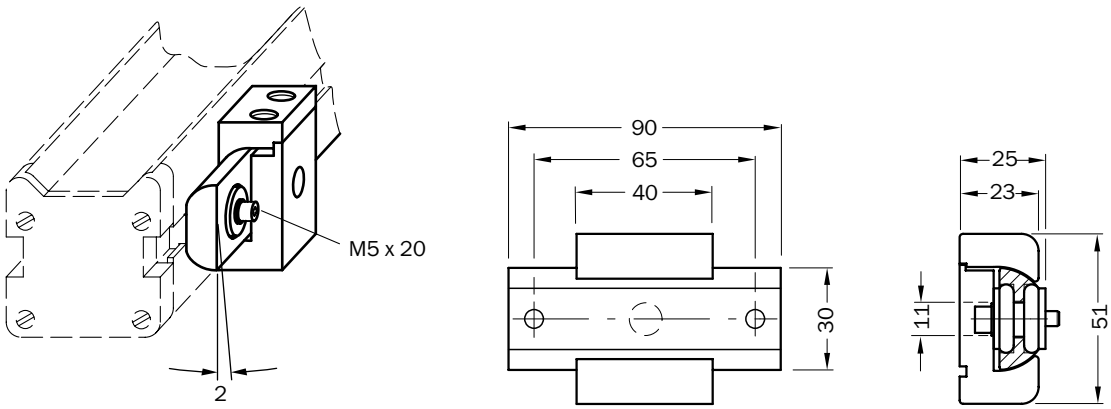

Mounting bracket, pivotable, vibration-absorbing, mounting kit 3

Dimensions in mm

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Overview of technical specifications

Scanning range (depending on type)	0 m ... 25 m / 0 m ... 70 m
Number of beams (depending on type)	2 ... 9
Beam separation or resolution (depending on type)	116 mm / 170 mm / 300 mm / 400 mm / 500 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

With its high signal reserve, the M 2000 Standard multi-beam photoelectric safety switch is also reliable under harsh industrial conditions. Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtimes. The modular concept achieves maximum machine security while taking into account economic considerations by precisely co-ordinating the characteristics of the device to the requirements. Interfaces and service concepts complete the product range to provide an ideal solution for the sector.

In-system added value

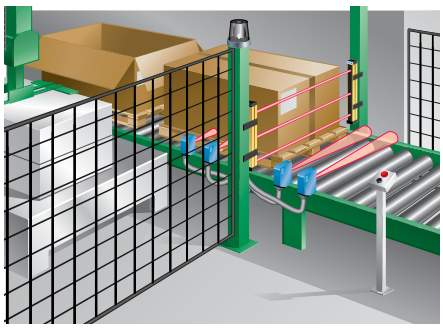
- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20	✔	–	L-53
LE 20 Muting	✔	✔	L-60
UE 48-2 OS	✔	–	L-42
UE 48-3 OS	✔	–	L-48

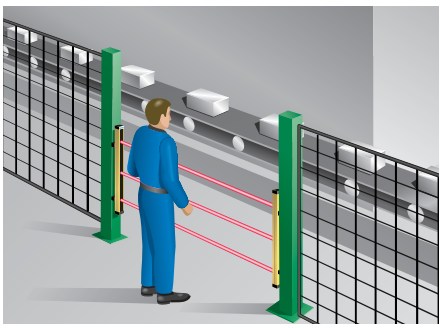
Applications

→ For more applications please refer to the application finder at www.sick.com

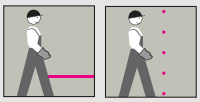
- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry



Packaging industry: M 2000 Standard with LE 20 on a packaging machine



Storage and conveyor technology: M 2000 on a conveyor belt system



D

- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid
- Beam coding

Further information	Page
→ Ordering information	D-38
→ Technical specifications	D-39
→ Dimensional drawings	D-40
→ Connection diagram	D-41
→ Accessories	D-42
→ Dimensional drawings accessories	D-44
→ Services	A-0

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Ordering information

M 2000 Standard
- With external device monitoring [1] (EDM)
- Consisting of sender and receiver unit

→ Accessories see page D-42

Scanning range 0 ... 25 m

D

Number of beams	Beam separation / Resolution (mm)	Connection plug	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
2	500	Hirschmann 6-pin + PE	M20S-02150A120	1 016 405	M20E-02150A120	1 016 421
		M12, 8-pin	M20S-02150A122	1 018 186	M20E-02150A122	1 018 187
3	400	Hirschmann 6-pin + PE	M20S-03140A120	1 016 428	M20E-03140A120	1 016 429
		M12, 8-pin	M20S-03140A122	1 018 188	M20E-03140A122	1 018 189
4	300	Hirschmann 6-pin + PE	M20S-04130A120	1 016 509	M20E-04130A120	1 016 510
		M12, 8-pin	M20S-04130A122	1 018 190	M20E-04130A122	1 018 191
6	170	Hirschmann 6-pin + PE	M20S-061A3A120	1 016 446	M20E-061A3A120	1 016 447
		M12, 8-pin	M20S-061A3A122	1 018 192	M20E-061A3A122	1 018 193
7	170	Hirschmann 6-pin + PE	M20S-071A3A120	1 016 434	M20E-071A3A120	1 016 435
		M12, 8-pin	M20S-071A3A122	1 018 194	M20E-071A3A122	1 018 195
8	116	Hirschmann 6-pin + PE	M20S-081A2A120	1 016 438	M20E-081A2A120	1 016 439
		M12, 8-pin	M20S-081A2A122	1 018 196	M20E-081A2A122	1 018 197
	170	Hirschmann 6-pin + PE	M20S-081A3A120	1 016 440	M20E-081A3A120	1 016 441
		M12, 8-pin	M20S-081A3A122	1 018 198	M20E-081A3A122	1 018 199
9	170	Hirschmann 6-pin + PE	M20S-091A3A120	1 016 442	M20E-091A3A120	1 016 443
		M12, 8-pin	M20S-091A3A122	1 018 200	M20E-091A3A122	1 018 201

Scanning range 0 ... 70 m

Number of beams	Beam separation (mm)	Connection plug	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
2	500	Hirschmann 6-pin + PE	M20S-02250A120	1 018 172	M20E-02250A120	1 018 173
		M12, 8-pin	M20S-02250A122	1 018 174	M20E-02250A122	1 018 175
3	400	Hirschmann 6-pin + PE	M20S-03240A120	1 018 176	M20E-03240A120	1 018 177
		M12, 8-pin	M20S-03240A122	1 018 178	M20E-03240A122	1 018 179
4	300	Hirschmann 6-pin + PE	M20S-04230A120	1 018 180	M20E-04230A120	1 018 181
		M12, 8-pin	M20S-04230A122	1 018 182	M20E-04230A122	1 018 183

[1] External device monitoring only available with devices with M12 plug!

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Scanning range (depending on type)	0 m ... 25 m / 0 m ... 70 m
Number of beams (depending on type)	2 ... 9
Beam separation or resolution (depending on type)	116 mm / 170 mm / 300 mm / 400 mm / 500 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender unit

Power consumption	Max. 3.7 W

Receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 8 ms
Switching voltage	
$HIGH_{min}$	V_S – 2.25 V
LOW_{max}	1 V
Switching current	Max. 500 mA
Power consumption	Max. 5 W

Operating data

Type of connection (depending on type)	Hirschmann plug 6-pin + PE M12 plug, 8-pin
Connection cable wire cross-section	
Hirschmann plug	Max. 1 mm^2
M12 plug	Max. 0.25 mm^2
Connection cable length	
for wire cross-section 1 mm^2	Max. 60 m
for wire cross-section 0.25 mm^2	Max. 15 m
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section	48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight (depending on type)	1.25 kg ... 2.86 kg

D

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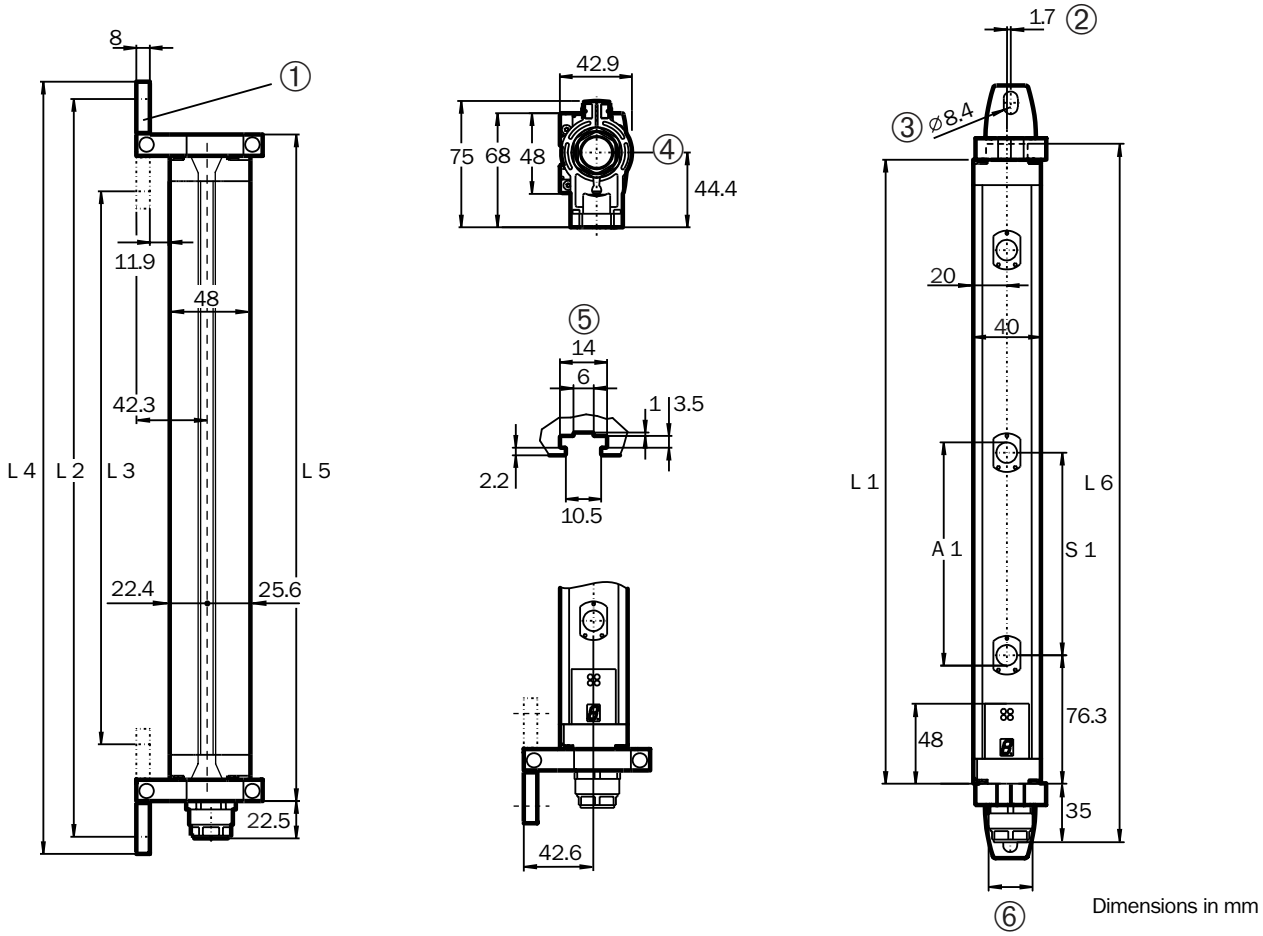
Dimensional drawings

D

➜ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com



Dimensions in mm

Sender unit with swivel mount (receiver unit mirror image)

① Mounting clamp

② Centre of light beam offset

③ Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)

④ Adjustment

⑤ Sliding nut groove for side mounting

⑥ Plug PG13.5 according to DIN 43651

N	S 1	A 1	L 1	L 2	L 3	L 4	L 5	L 6
2	500	–	630	697	588	718	655	675
3	400	–	931	998	888	1019	956	976
4	300	–	1031	1098	989	1119	1056	1076
8	–	116	851	919	809	939	877	896
6	–	170	916	983	874	1004	941	960
7	–	170	1073	1140	1031	1161	1098	1118
8	–	170	1231	1298	1189	1319	1256	1275
9	–	170	1388	1455	1346	1476	1413	1433

Dimensions in mm

N Number of beams

S 1 Beam separation

A 1 Resolution

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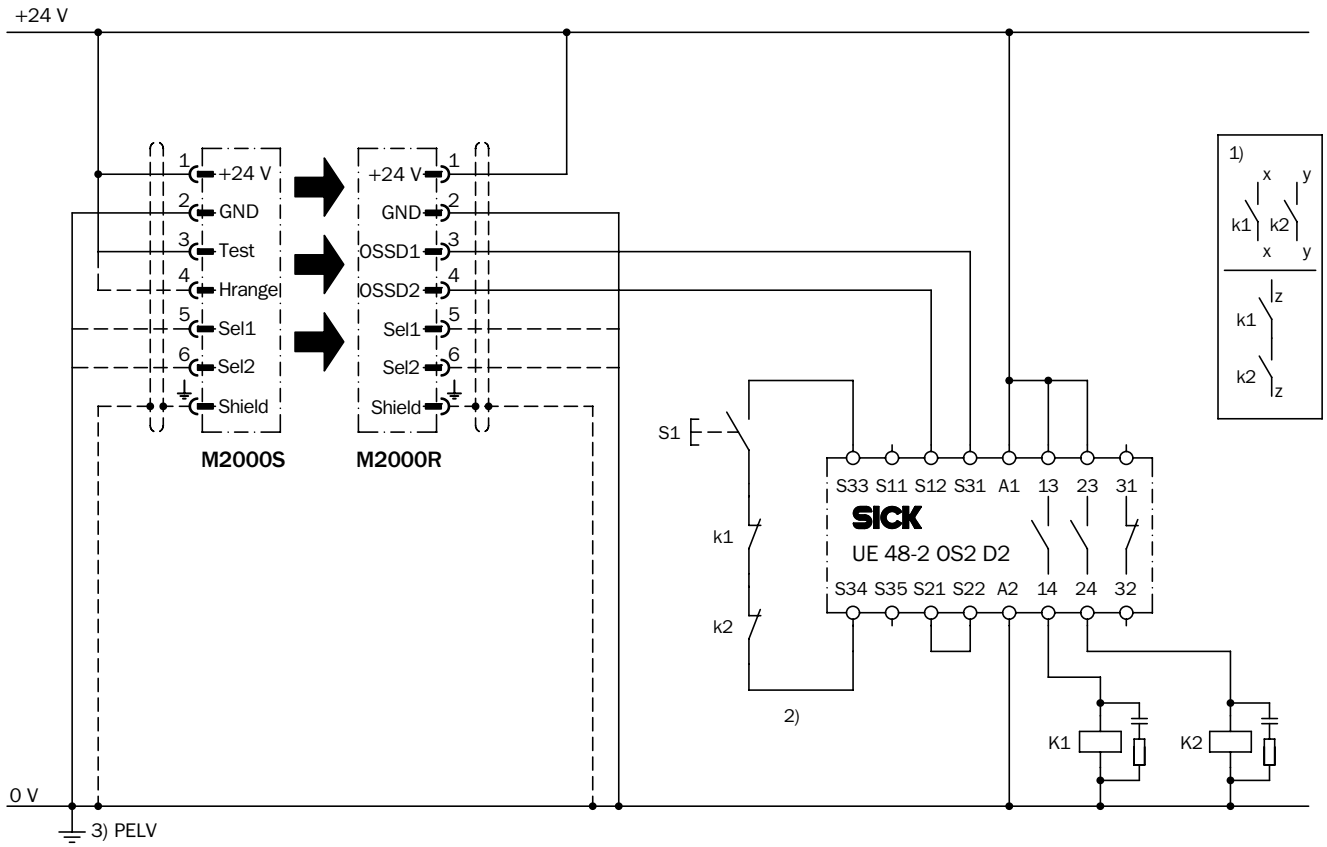
Connection diagram

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

M 2000 Standard on safety relay UE 48



Task

Interfacing an M 2000 Standard multi-beam photoelectric safety switch to UE 48-2 OS. Operating mode with restart interlock and external device monitoring.

Function

If the light path is clear, the OSSD1 and OSSD2 outputs are live. The system is ready to switch on if K1 and K2 are de-energised. By pressing S1 (button is pressed and released) the UE 48 relay is energised and its contacts 13-14 and 23-24 activate K1 and K2. On interruption of one of the light beams, the UE 48 is de-energised by the OSSD1 and OSSD2 outputs and K1 and K2 are deactivated.

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 one of the K1 or K2 contactors will be detected and does not result in the loss of the shutdown function. Jamming of the S1 button will prevent the UE 48 from enabling.

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 the risk analysis into account.

2) The external device monitoring is only static.

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

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

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Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page D-44

Designation	Description	Part number
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Large housing profile	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 850

Connector technology

System connection	Designation	Description	Connection cable	Part number
Hirschmann plug	Hirschmann cable socket	▪ 6-pin + PE ▪ Straight	–	6 006 612
		▪ 6-pin + PE ▪ Angled with screw connections	–	6 007 363
M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343

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Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

D

Device columns

Designation	Description	Part number
Device column without front screen	▪ 2-beam, 500 mm beam separation ▪ Including mounting kit	2 021 328
	▪ 3-beam, 400 mm beam separation ▪ Including mounting kit	2 021 329
Device column with front screen [1]	▪ Length 1200 mm ▪ Including mounting kit	2 021 330
	▪ Length 1500 mm ▪ Including mounting kit	2 021 331
	▪ Length 1700 mm ▪ Including mounting kit	2 021 332

[1] Warning, reduction of the scanning range!

Device columns for outdoor use

Designation	Description	Part number
Device column with heating 220 V	▪ Suitable for M20-02x50Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 023 707
	▪ Suitable for M20-03x40Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 025 441

Continued on next page

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Mirror columns [1)]

Designation	Description	Part number
Mirror column, fully assembled with mirrors	▪ Suitable for M20x-02xxxxx, 2-beam, 500 mm beam separation	1 015 041
	▪ Suitable for M20x-03xxxxx, 3-beam, 400 mm beam separation	1 015 040
	▪ Suitable for M20x-04xxxxx, 4-beam, 300 mm beam separation	1 019 115

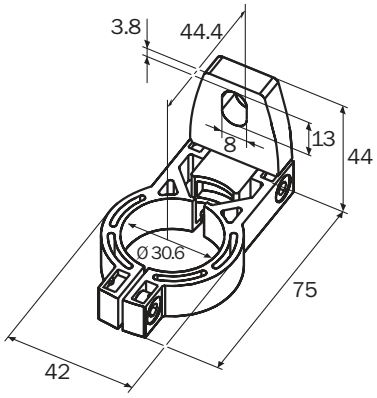
[1)] Warning, reduction of the scanning range!

D

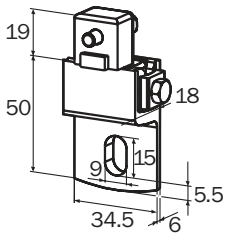
➜ For dimensional drawings of the device columns and mirror columns please refer to the operating instructions/technical description. Download at www.sick.com

Dimensional drawings mounting accessories

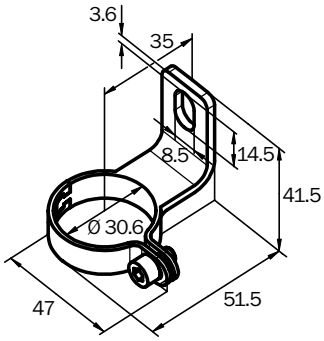
Dimensions in mm



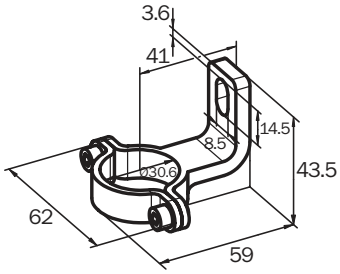
Swivel mount
Mounting kit 2



Side bracket
Mounting kit 6



Stainless steel bracket



Reinforced stainless steel bracket

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Overview of technical specifications

Resistant materials	Stainless steel (V4A), PMMA, PA, PVC
Enclosure rating	IP 67
Scanning range	0 m ... 19 m
Number of beams (depending on type)	2 / 3 / 4
Beam separation (depending on type)	300 mm / 400 mm / 500 mm
Type	Type 2 according to EN 61496

Product description

The IP 67 housing in conjunction with the multi-beam photoelectric safety switch M 2000 achieves the enclosure rating IP 67. The materials used (V4A, PMMA, PA, PVC) have a high level of resistance against common cleaning agents.

A compensating element (membrane) prevents the plastic tubes misting up and the entry of liquids.
The cable is fed into the device through the proven PG connector.

In-system added value

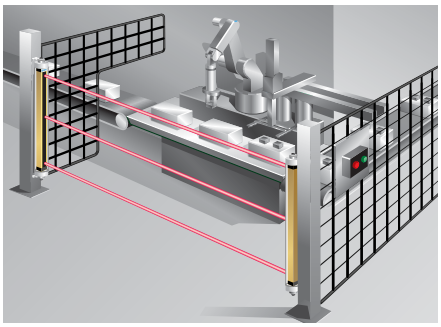
- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20	✔	–	L-53
LE 20 Muting	✔	✔	L-60
UE 48-2 OS	✔	–	L-42
UE 48-3 OS	✔	–	L-48

Applications

➜ For more applications please refer to the application finder at www.sick.com

- Packaging industry
- Food industry
- Chemical industry
- Pharmaceutical industry
- Clean-room systems



Access protection on a processing centre in the hygiene area

D

- High durability
- Compact design
- External device monitoring (EDM)
- Self-testing
- On site diagnostics
- Beam coding

CE

Further information	Page
➜ Ordering information	D-46
➜ Technical specifications	D-46
➜ Dimensional drawings	D-47
➜ Connection diagram	D-41
➜ Accessories	D-48
➜ Dimensional drawings accessories	D-49
➜ Services	A-0

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Ordering information

IP 67 housing with integrated sender or receiver unit M 2000, including 15 m PVC cable

→ Accessories see page D-48

Scanning range 0 ... 19 m

Number of beams	Beam separation (mm)	Sender unit		Receiver unit	
		Type	Part number	Type	Part number
2	500	M25S-02150C112	1 024 208	M25E-02150C112	1 024 209
3	400	M25S-03140C112	1 024 210	M25E-03140C112	1 024 211
4	300	M25S-04130C112	1 024 212	M25E-04130C112	1 024 213

D

Detailed technical specifications

→ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

M 2000 Standard in IP 67 housing

→ M 2000 specific data see M 2000 Standard, page D-46

Scanning range	0 m ... 19 m
Number of beams (depending on type)	2 / 3 / 4
Beam separation (depending on type)	300 mm / 400 mm / 500 mm
Enclosure rating	IP 66, IP 67
Type	Type 2 according to EN 61496
Materials	
End caps	Stainless steel
Plastic tube	PMMA
Compensating element (membrane)	PA 6
PG connector	PA 6
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C

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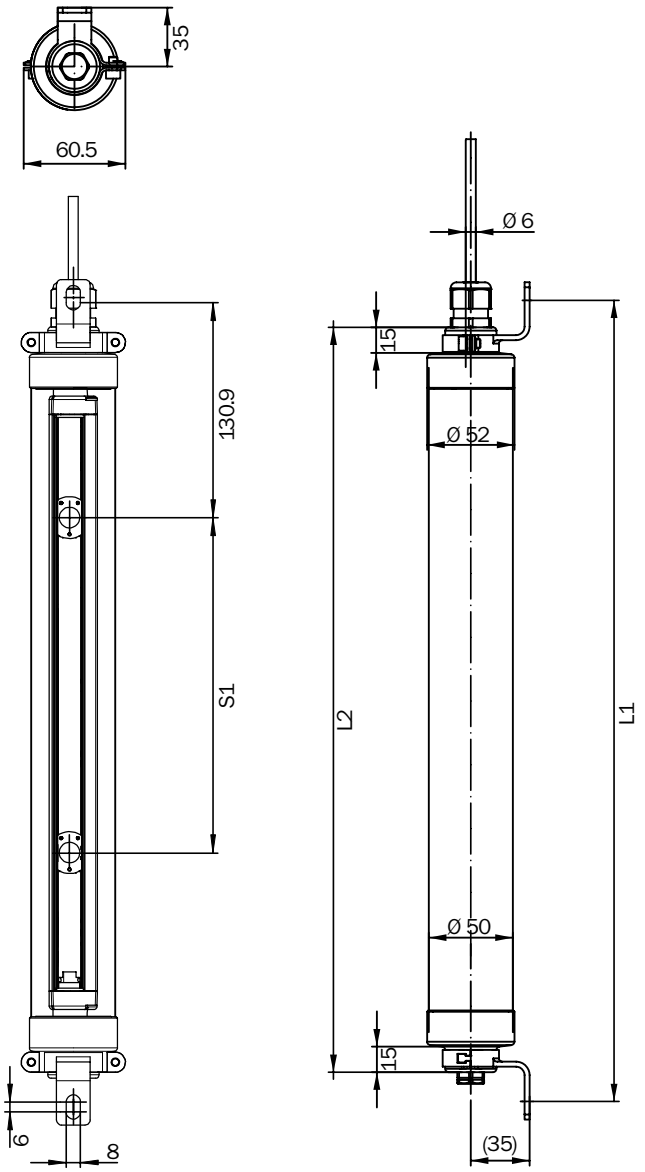
Dimensional drawings



Dimensions in mm

Illustration with stainless steel bracket (not supplied with delivery)

Number of beams	Beam separation S 1	L 1	L 2
2	500	777	744
3	400	1078	1045
4	300	1228	1195

Dimensions in mm

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Connection diagram

→ Connection diagram M 2000 Standard on safety relay UE 48 see page D-41
→ You can find more connection diagrams at www.sick.com

Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page D-49

D

Designation	Description	Part number
Stainless steel bracket	▪ 4 pieces ▪ Pivoting	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 850
Stainless steel support bracket	▪ 2 pieces ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 849
Mounting key	▪ For M12 cable socket on device replacement	4 034 690
Venting membrane	–	5 309 082

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

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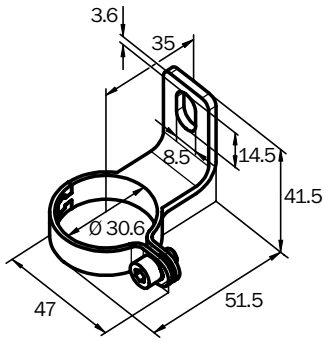
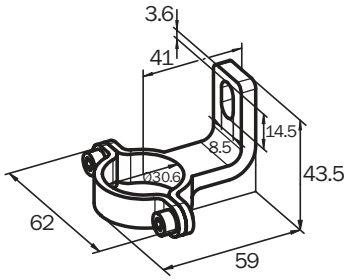
Dimensional drawings mounting accessories

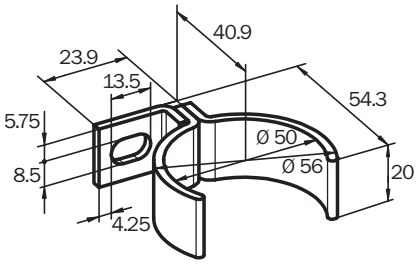
Dimensions in mm



Stainless steel bracket



Reinforced stainless steel bracket



Stainless steel support bracket

Mounting key

D

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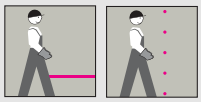


- Restart interlock (RES)
- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid
- Beam coding

Further information	Page
→ Technical specifications	D-52
→ Dimensional drawings	D-53
→ Connection diagram	D-54
→ Accessories	D-55
→ Dimensional drawings accessories	D-57
→ Services	A-0

Overview of technical specifications

Scanning range (depending on type)	0 m ... 25 m / 0 m ... 70 m
Number of beams (depending on type)	2 ... 9
Beam separation or resolution (depending on type)	116 mm / 170 mm / 300 mm / 400 mm / 500 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

With its high signal reserve, the M 2000 RES/EDM multi-beam photoelectric safety switch is also reliable under harsh industrial conditions. Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtimes. The modular concept achieves maximum machine security while taking into account economic considerations by precisely co-ordinating the characteristics of the device to the requirements. Interfaces and service concepts complete the product range to provide an ideal solution for the sector.

The integrated restart interlock in the M 2000 RES/EDM offers the advantages of shorter cable runs and quicker commissioning compared to traditional solutions.

In-system added value

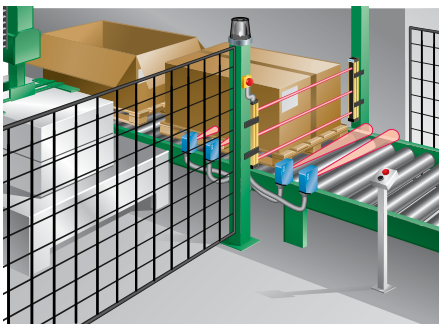
- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20 Muting	✔	✔	L-60

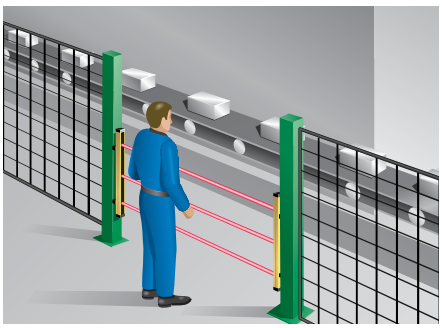
Applications

→ For more applications please refer to the application finder at www.sick.com

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry



Packaging industry: M 2000 RES/EDM with LE 20 on a packaging machine



Storage and conveyor technology: M 2000 on a conveyor belt system

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8 010 889/15-10-04

Ordering information

M 2000 RES/EDM
- With restart interlock (RES) and external device monitoring (EDM)
- For usage as a standalone system
- Consisting of sender and receiver unit

→ Accessories see page D-55

Scanning range 0 ... 25 m

Number of beams	Beam separation / Resolution (mm)	Connection plug Sender unit / Receiver unit	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
2	500	Hirschmann 6-pin + PE / 11-pin + PE	M20S-02150A120	1 016 405	M20E-02150A221	1 018 032
		M12, 8-pin	M20S-02150A122	1 018 186	M20E-02150A222	1 018 213
3	400	Hirschmann 6-pin + PE / 11-pin + PE	M20S-03140A120	1 016 428	M20E-03140A221	1 018 034
		M12, 8-pin	M20S-03140A122	1 018 188	M20E-03140A222	1 018 215
4	300	Hirschmann 6-pin + PE / 11-pin + PE	M20S-04130A120	1 016 509	M20E-04130A221	1 018 217
		M12, 8-pin	M20S-04130A122	1 018 190	M20E-04130A222	1 018 219
6	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-061A3A120	1 016 446	M20E-061A3A221	1 018 221
		M12, 8-pin	M20S-061A3A122	1 018 192	M20E-061A3A222	1 018 223
7	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-071A3A120	1 016 434	M20E-071A3A221	1 018 225
		M12, 8-pin	M20S-071A3A122	1 018 194	M20E-071A3A222	1 018 227
8	116	Hirschmann 6-pin + PE / 11-pin + PE	M20S-081A2A120	1 016 438	M20E-081A2A221	1 018 229
		M12, 8-pin	M20S-081A2A122	1 018 196	M20E-081A2A222	1 018 231
	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-081A3A120	1 016 440	M20E-081A3A221	1 018 233
		M12, 8-pin	M20S-081A3A122	1 018 198	M20E-081A3A222	1 018 235
9	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-091A3A120	1 016 442	M20E-091A3A221	1 018 036
		M12, 8-pin	M20S-091A3A122	1 018 200	M20E-091A3A222	1 018 237

Scanning range 0 ... 70 m

Number of beams	Beam separation (mm)	Connection plug Sender unit / Receiver unit	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
2	500	Hirschmann 6-pin + PE / 11-pin + PE	M20S-02250A120	1 018 172	M20E-02250A221	1 018 206
		M12, 8-pin	M20S-02250A122	1 018 174	M20E-02150A222	1 018 207
3	400	Hirschmann 6-pin + PE / 11-pin + PE	M20S-03240A120	1 018 176	M20E-03240A221	1 018 208
		M12, 8-pin	M20S-03240A122	1 018 178	M20E-03240A222	1 018 209
4	300	Hirschmann 6-pin + PE / 11-pin + PE	M20S-04230A120	1 018 180	M20E-04230A221	1 018 210
		M12, 8-pin	M20S-04230A122	1 018 182	M20E-04230A222	1 018 211

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

D

General system data

Scanning range (depending on type)	0 m ... 25 m / 0 m ... 70 m
Number of beams (depending on type)	2 ... 9
Beam separation or resolution (depending on type)	116 mm / 170 mm / 300 mm / 400 mm / 500 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender unit

Power consumption	Max. 3.7 W

Receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 8 ms
Switching voltage	
$HIGH_{min}$	V_S – 2.25 V
LOW_{max}	1 V
Switching current	Max. 500 mA
Power consumption	Max. 5 W

Operating data

Type of connection (depending on type)	Hirschmann plug (sender unit: 6-pin + PE, receiver unit: 11-pin + PE) M12 plug, 8-pin
Connection cable wire cross-section	
Hirschmann plug	Max. 1 mm^2
M12 plug	Max. 0.25 mm^2
Connection cable length	
for wire cross-section 1 mm^2	Max. 60 m
for wire cross-section 0.25 mm^2	Max. 15 m
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section	48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight (depending on type)	1.25 kg ... 2.86 kg

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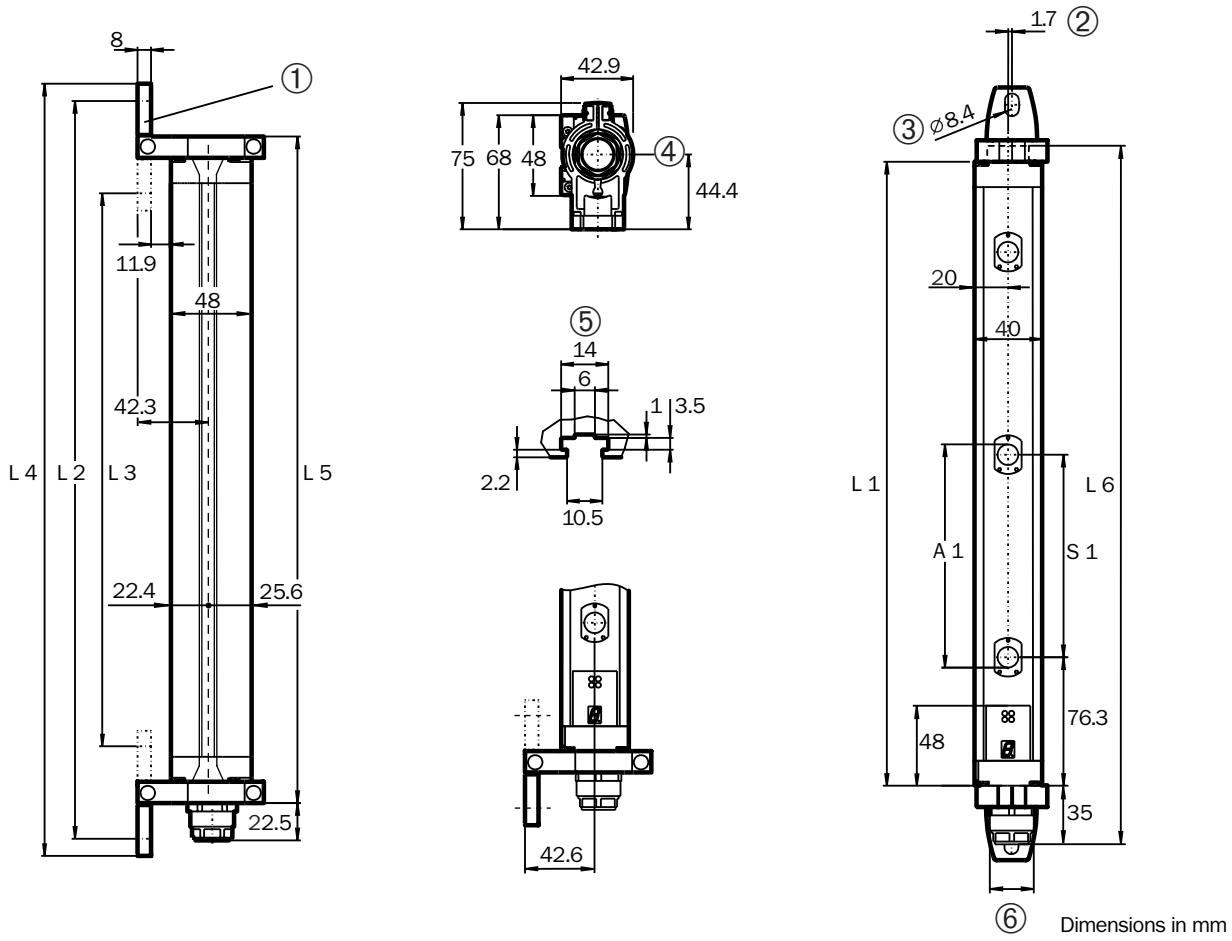
Dimensional drawings

➜ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com



Dimensions in mm

Sender unit with swivel mount (receiver unit not mirror image. Dimensions as M 2000 cascadable, see page D-61)

① Mounting clamp
② Centre of light beam offset
③ Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
④ Adjustment
⑤ Sliding nut groove for side mounting
⑥ Plug PG13.5 according to DIN 43651

N	S 1	A 1	L 1	L 2	L 3	L 4	L 5	L 6
2	500	–	630	697	588	718	655	675
3	400	–	931	998	888	1019	956	976
4	300	–	1031	1098	989	1119	1056	1076
8	–	116	851	919	809	939	877	896
6	–	170	916	983	874	1004	941	960
7	–	170	1073	1140	1031	1161	1098	1118
8	–	170	1231	1298	1189	1319	1256	1275
9	–	170	1388	1455	1346	1476	1413	1433

Dimensions in mm

N Number of beams
S 1 Beam separation
A 1 Resolution

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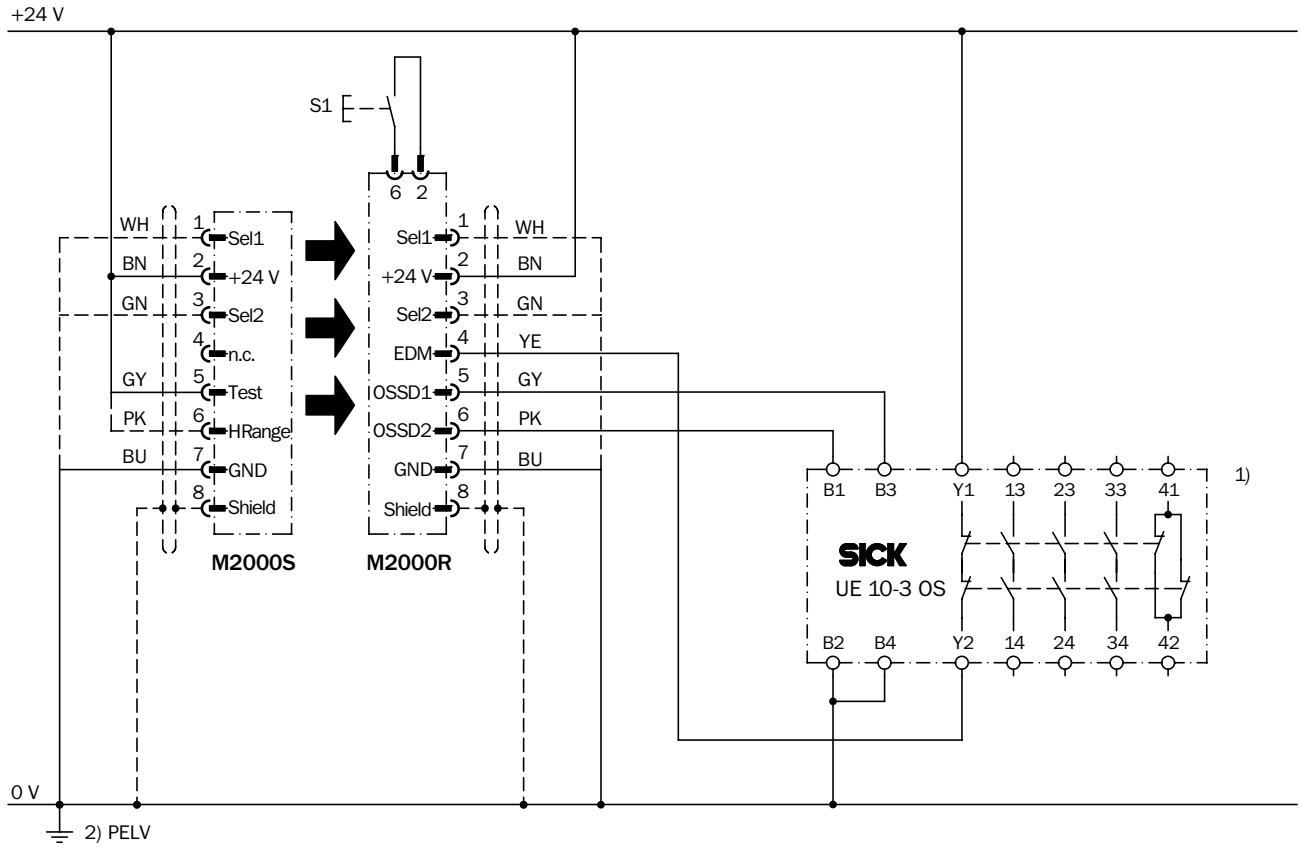
Connection diagram

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

M 2000 RES/EDM on safety relay UE 10



Task

Interfacing an M 2000 RES/EDM multi-beam photoelectric safety switch to UE 10-3 OS. Operating mode with restart interlock and external device monitoring.

Function

The yellow LED on the receiver flashes when the light path is clear and the UE 10 is de-energised and functioning correctly. 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 UE 10 is switched on. On the interruption of one of the light beams, the UE 10 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 UE 10 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) 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 the risk analysis into account.

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

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

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Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page D-57

Designation	Description	Part number
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Large housing profile	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 850

Connector technology

Connection	Designation	Description	Connection cable	Part number
System connection Hirschmann plug	Hirschmann cable socket	▪ 6-pin + PE ▪ Straight	–	6 006 612
		▪ 6-pin + PE ▪ Angled with screw connections	–	6 007 363
		▪ 11-pin + PE ▪ Straight	–	6 020 757
		▪ 11-pin + PE ▪ Angled	–	6 020 758
System connection M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343
Extension connection	M12 cable plug	▪ For the connection of a control switch ▪ 8-pin ▪ Straight	5 m	6 021 204
			15 m	6 021 205
		▪ For the connection of a control switch ▪ 8-pin ▪ Angled	5 m	6 021 830
			15 m	6 021 831
	M12 plug	▪ For deactivation of the integrated restart interlock ▪ Pre-assembled	–	6 021 238

Continued on next page

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Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

D

Device columns

Designation	Description	Part number
Device column without front screen	▪ 2-beam, 500 mm beam separation ▪ Including mounting kit	2 021 328
	▪ 3-beam, 400 mm beam separation ▪ Including mounting kit	2 021 329
Device column with front screen [1]	▪ Length 1200 mm ▪ Including mounting kit	2 021 330
	▪ Length 1500 mm ▪ Including mounting kit	2 021 331
	▪ Length 1700 mm ▪ Including mounting kit	2 021 332

[1] Warning, reduction of the scanning range!

Device columns for outdoor use

Designation	Description	Part number
Device column with heating 220 V	▪ Suitable for M20-02x50Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 023 707
	▪ Suitable for M20-03x40Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 025 441

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Mirror columns [1)]

Designation	Description	Part number
Mirror column, fully assembled with mirrors	▪ Suitable for M20x-02xxxxx, 2-beam, 500 mm beam separation	1 015 041
	▪ Suitable for M20Z-02xxxxxxx, 2-beam, 500 mm beam separation ▪ Fully assembled with mirrors 45°	1 015 042
	▪ Suitable for M20x-03xxxxx, 3-beam, 400 mm beam separation	1 015 040
	▪ Suitable for M20x-04xxxxx, 4-beam, 300 mm beam separation	1 019 115

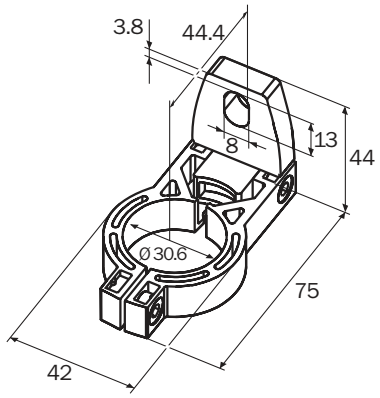
[1)] Warning, reduction of the scanning range!

D

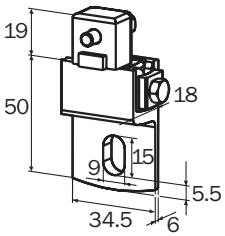
➜ For dimensional drawings of the device columns and mirror columns please refer to the operating instructions/technical description. Download at www.sick.com

Dimensional drawings mounting accessories

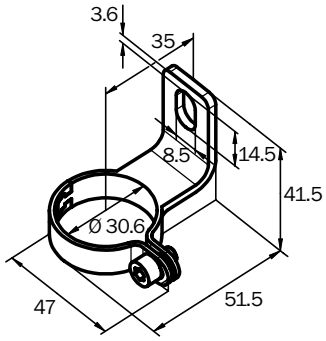
Dimensions in mm



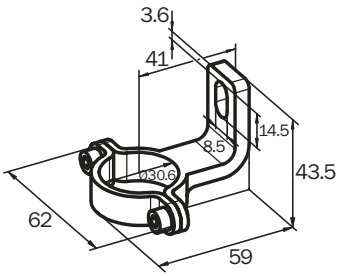
Swivel mount
Mounting kit 2



Side bracket
Mounting kit 6



Stainless steel bracket



Reinforced stainless steel bracket

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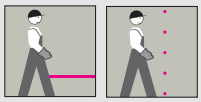

- Cascade
  - Max. 3 devices
  - Max. 3 m cable length
- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid
- Beam coding

Further information	Page
→ Technical specifications	D-60
→ Dimensional drawings	D-61
→ Connection diagram	D-62
→ Accessories	D-63
→ Dimensional drawings accessories	D-65
→ Services	A-0

Overview of technical specifications

Scanning range	0 m ... 25 m
Number of beams	2 ... 9
Beam separation or resolution (depending on type)	116 mm / 170 mm / 300 mm / 400 mm / 500 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

With its high signal reserve, the M 2000 cascadable multi-beam photoelectric safety switch is also reliable under harsh industrial conditions. Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtime. The modular concept achieves maximum machine security while taking into account economic considerations by precisely co-ordinating the characteristics of the device to the requirements. Interfaces and service concepts complete the product range to provide an ideal solution for the sector.
With the cascadable variants, photoelectric safety switches can be flexibly adapted to the existing installation.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20	✔	–	L-53
LE 20 Muting	✔	✔	L-60
UE 48-2 OS	✔	–	L-42
UE 48-3 OS	✔	–	L-48

Applications

→ For more applications please refer to the application finder at www.sick.com

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry

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Ordering information

M 2000 cascadable
- With integrated external device monitoring function (EDM)
- For usage as cascaded device
- Consisting of sender and receiver unit

→ Accessories see page D-63

Scanning range 0 ... 25 m

Number of beams	Beam separation / Resolution (mm)	Connection plug Sender unit / Receiver unit	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
2	500	Hirschmann 6-pin + PE / 11-pin + PE	M20S-02150A220	1 018 031	M20E-02150A221	1 018 032
		M12, 8-pin	M20S-02150A222	1 018 212	M20E-02150A222	1 018 213
3	400	Hirschmann 6-pin + PE / 11-pin + PE	M20S-03140A220	1 018 033	M20E-03140A221	1 018 034
		M12, 8-pin	M20S-03140A222	1 018 214	M20E-03140A222	1 018 215
4	300	Hirschmann 6-pin + PE / 11-pin + PE	M20S-04130A220	1 018 216	M20E-04130A221	1 018 217
		M12, 8-pin	M20S-04130A222	1 018 218	M20E-04130A222	1 018 219
6	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-061A3A220	1 018 220	M20E-061A3A221	1 018 221
		M12, 8-pin	M20S-061A3A222	1 018 222	M20E-061A3A222	1 018 223
7	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-071A3A220	1 018 224	M20E-071A3A221	1 018 225
		M12, 8-pin	M20S-071A3A222	1 018 226	M20E-071A3A222	1 018 227
8	116	Hirschmann 6-pin + PE / 11-pin + PE	M20S-081A2A220	1 018 228	M20E-081A2A221	1 018 229
		M12, 8-pin	M20S-081A2A222	1 018 230	M20E-081A2A222	1 018 231
	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-081A3A220	1 018 232	M20E-081A3A221	1 018 233
		M12, 8-pin	M20S-081A3A222	1 018 234	M20E-081A3A222	1 018 235
9	170	Hirschmann 6-pin + PE / 11-pin + PE	M20S-091A3A220	1 018 035	M20E-091A3A221	1 018 036
		M12, 8-pin	M20S-091A3A222	1 018 236	M20E-091A3A222	1 018 237

D

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

D

General system data

Scanning range	0 m ... 25 m
Number of beams	2 ... 9
Beam separation or resolution (depending on type)	116 mm / 170 mm / 300 mm / 400 mm / 500 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender unit

Power consumption	Max. 3.7 W

Receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 8 ms
Switching voltage	
$HIGH_{min}$	V_S – 2.25 V
LOW_{max}	1 V
Switching current	Max. 500 mA
Power consumption	Max. 5 W

Operating data

Type of connection (depending on type)	Hirschmann plug (sender unit: 6-pin + PE, receiver unit: 11-pin + PE) M12 plug, 8-pin
Connection cable wire cross-section	
Hirschmann plug	Max. 1 mm^2
M12 plug	Max. 0.25 mm^2
Connection cable length	
for wire cross-section 1 mm^2	Max. 60 m
for wire cross-section 0.25 mm^2	Max. 15 m
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section	48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight (depending on type)	1.25 kg ... 2.86 kg

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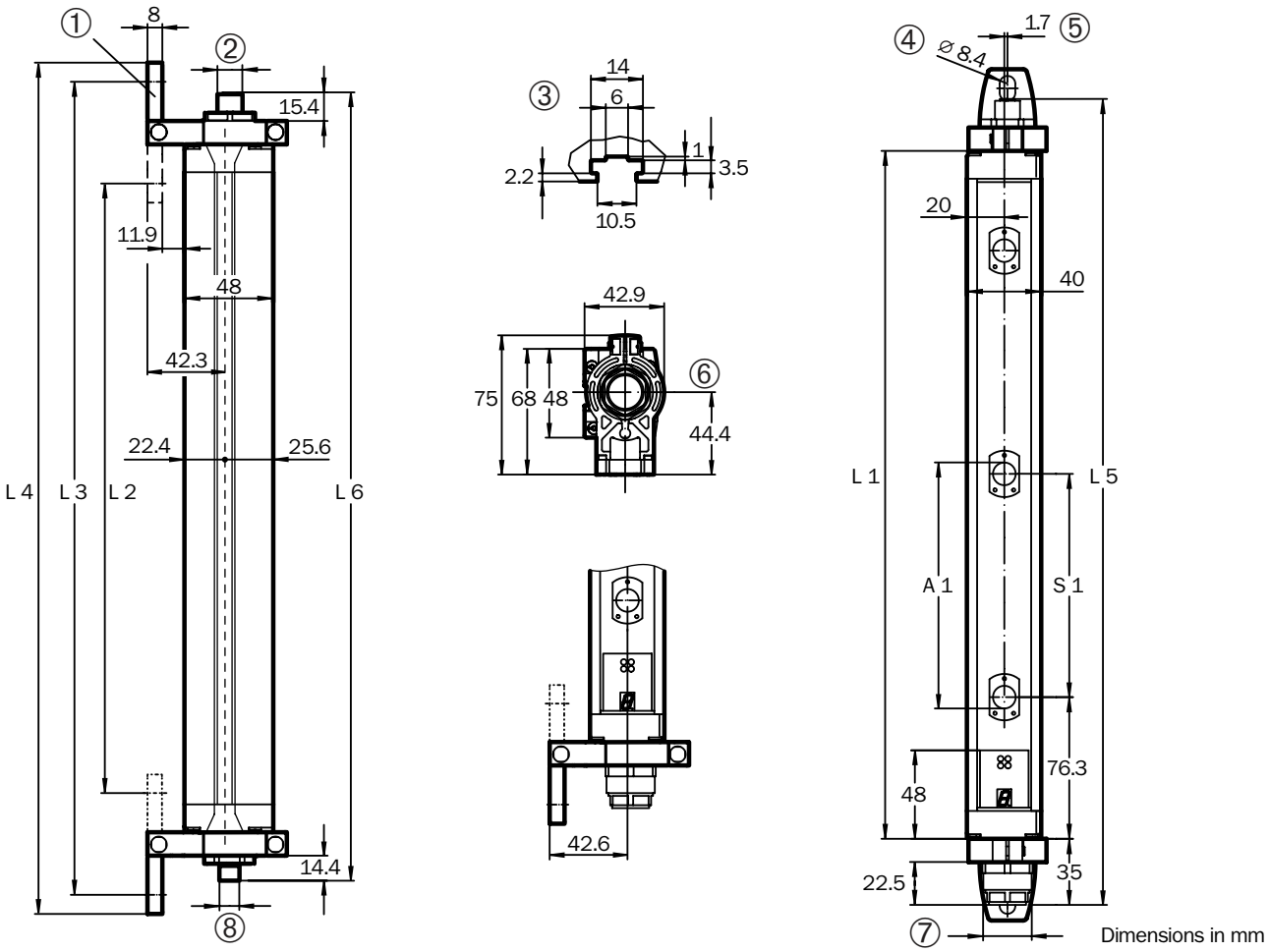
Dimensional drawings

➜ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com



Sender unit with swivel mount (receiver unit mirror image)

① Mounting clamp
② M12 x 1 socket (standard)
③ Sliding nut groove for side mounting
④ Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
⑤ Centre of light beam offset
⑥ Adjustment
⑦ Plug PG13.5 according to DIN 43651
⑧ Plug M12 x 1

N	S 1	A 1	L 1	L 2	L 3	L 4	L 5	L 6
2	500	–	630	588	697	718	694	686
3	400	–	931	888	998	1019	995	987
4	300	–	1031	989	1098	1119	1095	1087
8	–	116	851	809	919	939	915	907
6	–	170	916	874	983	1004	979	971
7	–	170	1073	1031	1140	1161	1137	1129
8	–	170	1231	1189	1298	1319	1294	1286
9	–	170	1388	1346	1455	1476	1452	1444

N Number of beams **A 1** Resolution **S 1** Beam separation

Dimensions in mm

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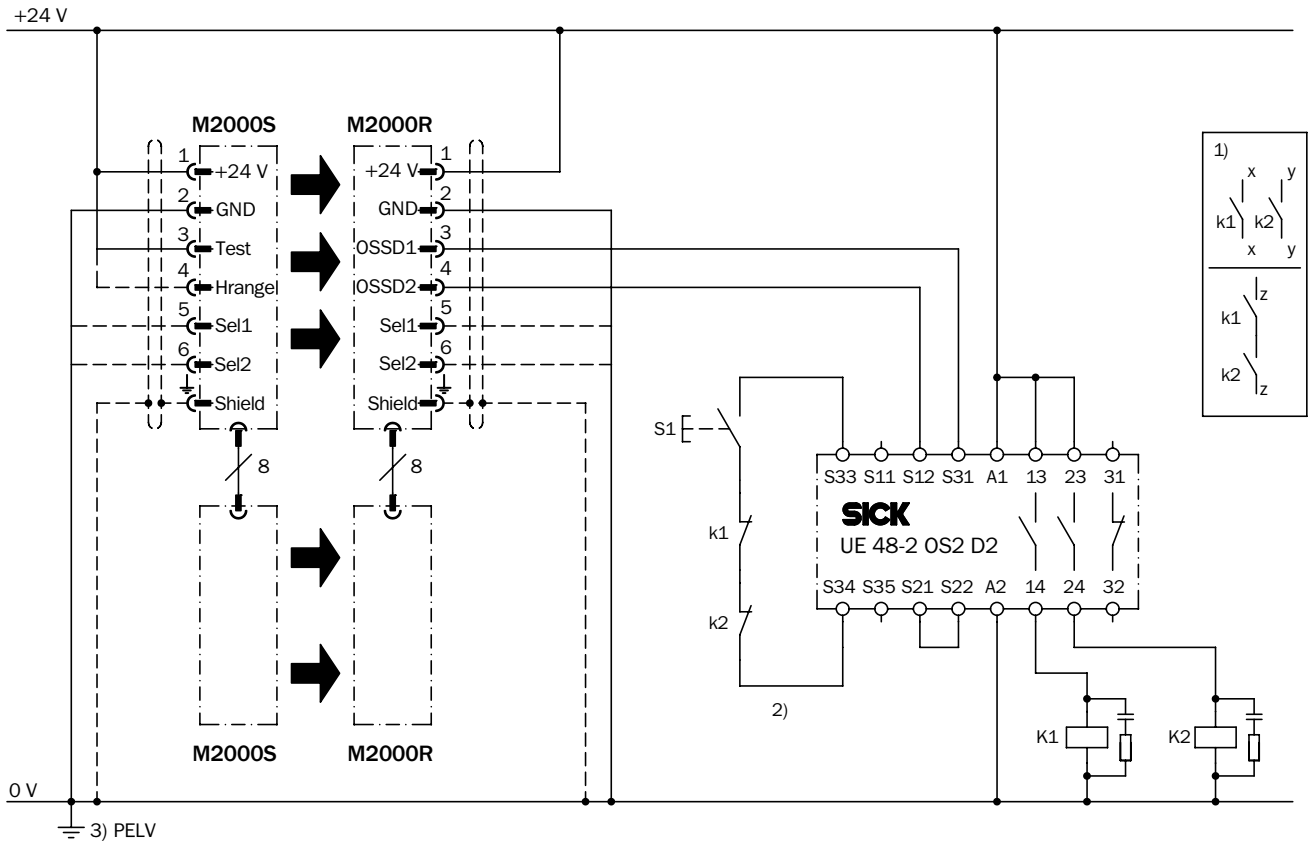
Connection diagram

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

M 2000 cascadable on safety relay UE 48



Task

Interfacing two M 2000 cascadable multi-beam photoelectric safety switches to UE 48-2 OS. Operating mode with restart interlock and external device monitoring.

Function

If the light path is clear, the OSSD1 and OSSD2 outputs are live. The system is ready to switch on if K1 and K2 are de-energised. By pressing S1 (button is pressed and released) the UE 48 relay is energised and its contacts 13-14 and 23-24 activate K1 and K2.

On interruption of one of the light beams, the UE 48 is de-energised by the OSSD1 and OSSD2 outputs and K1 and K2 are deactivated.

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 one of the K1 or K2 contactors will be detected and does not result in the loss of the shutdown function. Jamming of the S1 button will prevent the UE 48 from enabling.

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 the risk analysis into account.

2) The external device monitoring is only static.

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

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

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Accessories

Mounting accessories

→ Dimensional drawings mounting accessories see page D-65

Designation	Description	Part number
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Large housing profile	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 850

Connector technology

Connection	Designation	Description	Connection cable	Part number
System connection Hirschmann plug	Hirschmann cable socket	▪ 6-pin + PE ▪ Straight	–	6 006 612
		▪ 6-pin + PE ▪ Angled with screw connections	–	6 007 363
System connection M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343
Extension connection	M12 cable sockets and plugs	▪ Pre-assembled ▪ 8-pin ▪ Straight	0.25 m	6 021 000
			0.5 m	6 021 001
			1 m	6 021 002
			1.5 m	6 021 003
			2 m	6 021 004
			2.5 m	6 021 005
			3 m	6 021 006

Continued on next page

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Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

D

Device columns

Designation	Description	Part number
Device column without front screen	▪ 2-beam, 500 mm beam separation ▪ Including mounting kit	2 021 328
	▪ 3-beam, 400 mm beam separation ▪ Including mounting kit	2 021 329
Device column with front screen [1]	▪ Length 1200 mm ▪ Including mounting kit	2 021 330
	▪ Length 1500 mm ▪ Including mounting kit	2 021 331
	▪ Length 1700 mm ▪ Including mounting kit	2 021 332

[1] Warning, reduction of the scanning range!

Device columns for outdoor use

Designation	Description	Part number
Device column with heating 220 V	▪ Suitable for M20-02x50Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 023 707
	▪ Suitable for M20-03x40Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 025 441

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Mirror columns [1)]

Designation	Description	Part number
Mirror column, fully assembled with mirrors	▪ Suitable for M20x-02xxxxx, 2-beam, 500 mm beam separation	1 015 041
	▪ Suitable for M20Z-02xxxxxxx, 2-beam, 500 mm beam separation ▪ Fully assembled with mirrors 45°	1 015 042
	▪ Suitable for M20x-03xxxxx, 3-beam, 400 mm beam separation	1 015 040
	▪ Suitable for M20x-04xxxxx, 4-beam, 300 mm beam separation	1 019 115

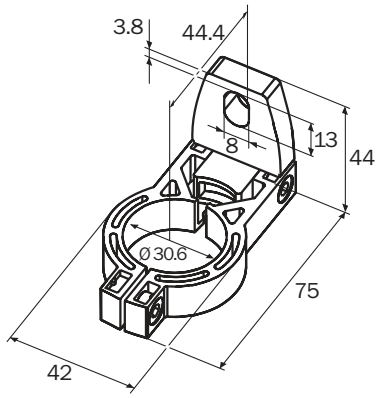
[1)] Warning, reduction of the scanning range!

D

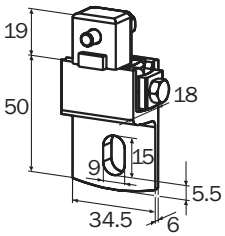
➜ For dimensional drawings of the device columns and mirror columns please refer to the operating instructions/technical description. Download at www.sick.com

Dimensional drawings mounting accessories

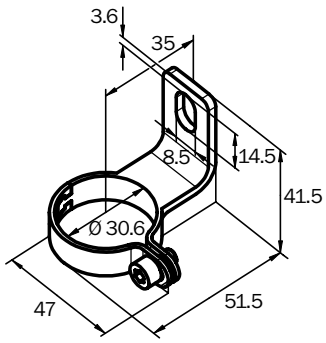
Dimensions in mm



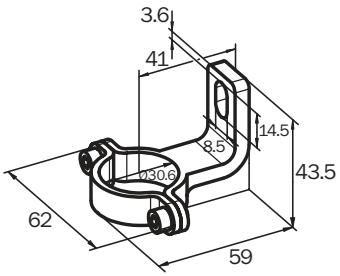
Swivel mount
Mounting kit 2



Side bracket
Mounting kit 6



Stainless steel bracket



Reinforced stainless steel bracket

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D

- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid

Overview of technical specifications

Scanning range	0 m ... 6 m
Number of beams	1
Beam separation	500 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

The M 2000-A/P Standard multi-beam photoelectric safety switch comprises a sender/receiver unit on the active side (A) and one or more deflector mirrors on the passive side (P).
With their high signal reserve, they are also reliable under harsh industrial conditions.

Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtime.
Interfaces and service concepts complete the product range to provide an ideal solution.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Restart interlock	Muting	Further information
LE 20	✔	–	L-53
LE 20 Muting	–	✔	L-60
UE 48-2 OS	✔	–	L-42
UE 48-3 OS	✔	–	L-48

Applications

→ For more applications please refer to the application finder at www.sick.com

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry

Further information	Page
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Ordering information

M 2000-A/P Standard
- With external device monitoring [1] (EDM)
- Comprising a sender/receiver unit as the active side and a deflector mirror as the passive side

→ Accessories see page D-71

Scanning range 0 ... 6 m

Number of beams	Beam separation (mm)	Connection plug	Sender and receiver unit		Deflector mirror	
			Type	Part number	Type	Part number
1	500	Hirschmann 11-pin + PE	M20Z-02550A121	1 016 513	PSR01-1501	1 016 677
		M12, 8-pin	M20Z-02550A122	1 018 361		

[1] External device monitoring only available with devices with M12 plug!

Detailed technical specifications

→ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Scanning range	0 m ... 6 m
Number of beams	1
Beam separation	500 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender/receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 7 ms
Switching voltage **$HIGH_{min}$** **LOW_{max}**	 V_S – 2.25 V 1 V
Switching current	Max. 500 mA
Power consumption	Max. 7.5 W

Operating data

Type of connection (depending on type)	Hirschmann plug 11-pin + PE M12 plug, 8-pin
Connection cable wire cross-section **Hirschmann plug** **M12 plug**	 Max. 1 mm^2 Max. 0.25 mm^2
Connection cable length **for wire cross-section 1 mm^2** **for wire cross-section 0.25 mm^2**	 Max. 60 m Max. 15 m

Continued on next page

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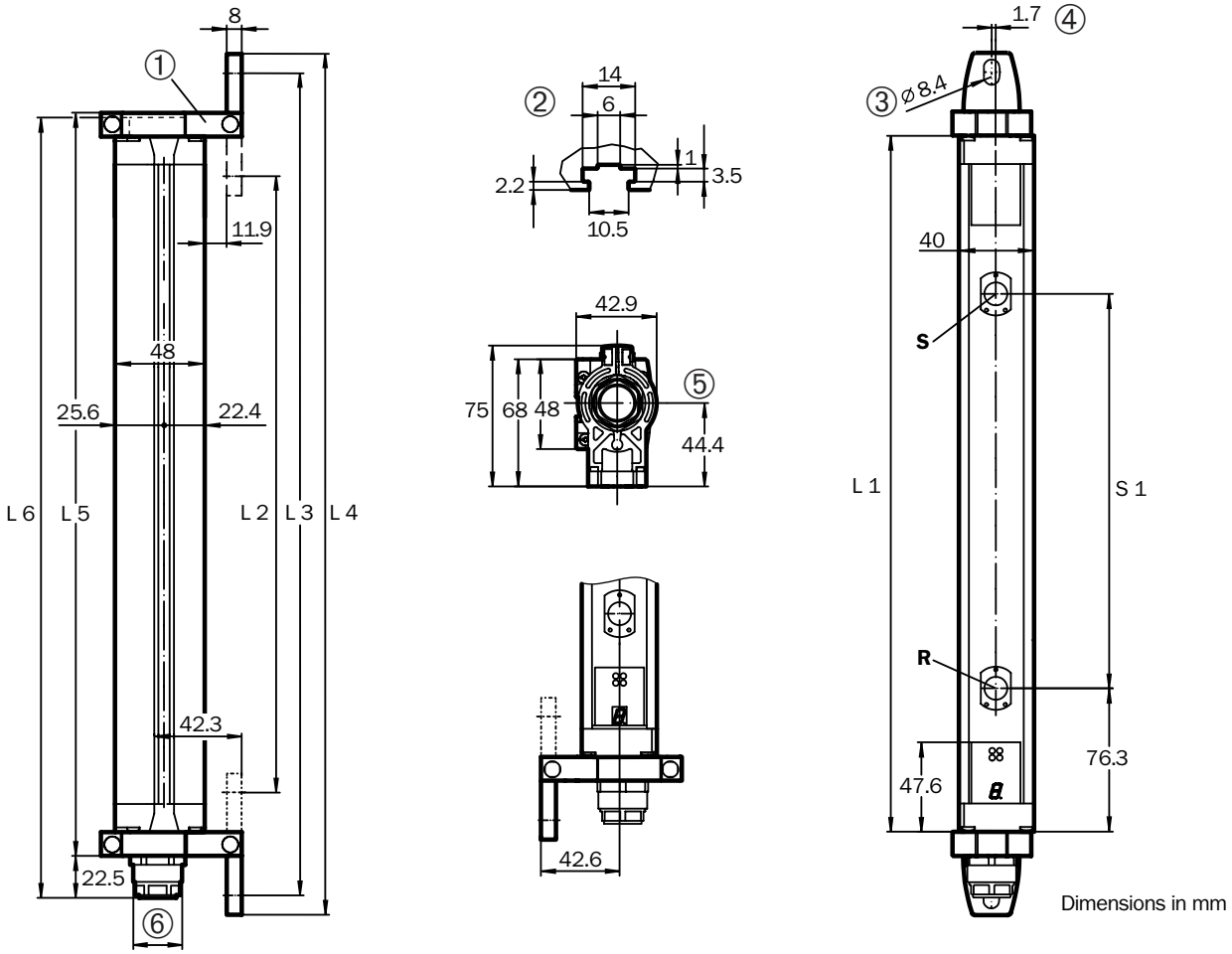
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section	48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight	1.41 kg

Dimensional drawings

D

→ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com



Sender/receiver unit with swivel mount

① Mounting clamp
② Sliding nut groove for side mounting
③ Hexagon screw M8 DIN 933 with washer DIN 9021 (not supplied with delivery)
④ Adjustment
⑤ Centre of light beam offset
⑥ Hirschmann plug DIN 43651

S Sender **R** Receiver

N	S 1	L 1	L 2	L 3	L 4	L 5	L 6
2	500	653	611	720	741	678	700

N Number of beams **S 1** Beam separation

Dimensions in mm

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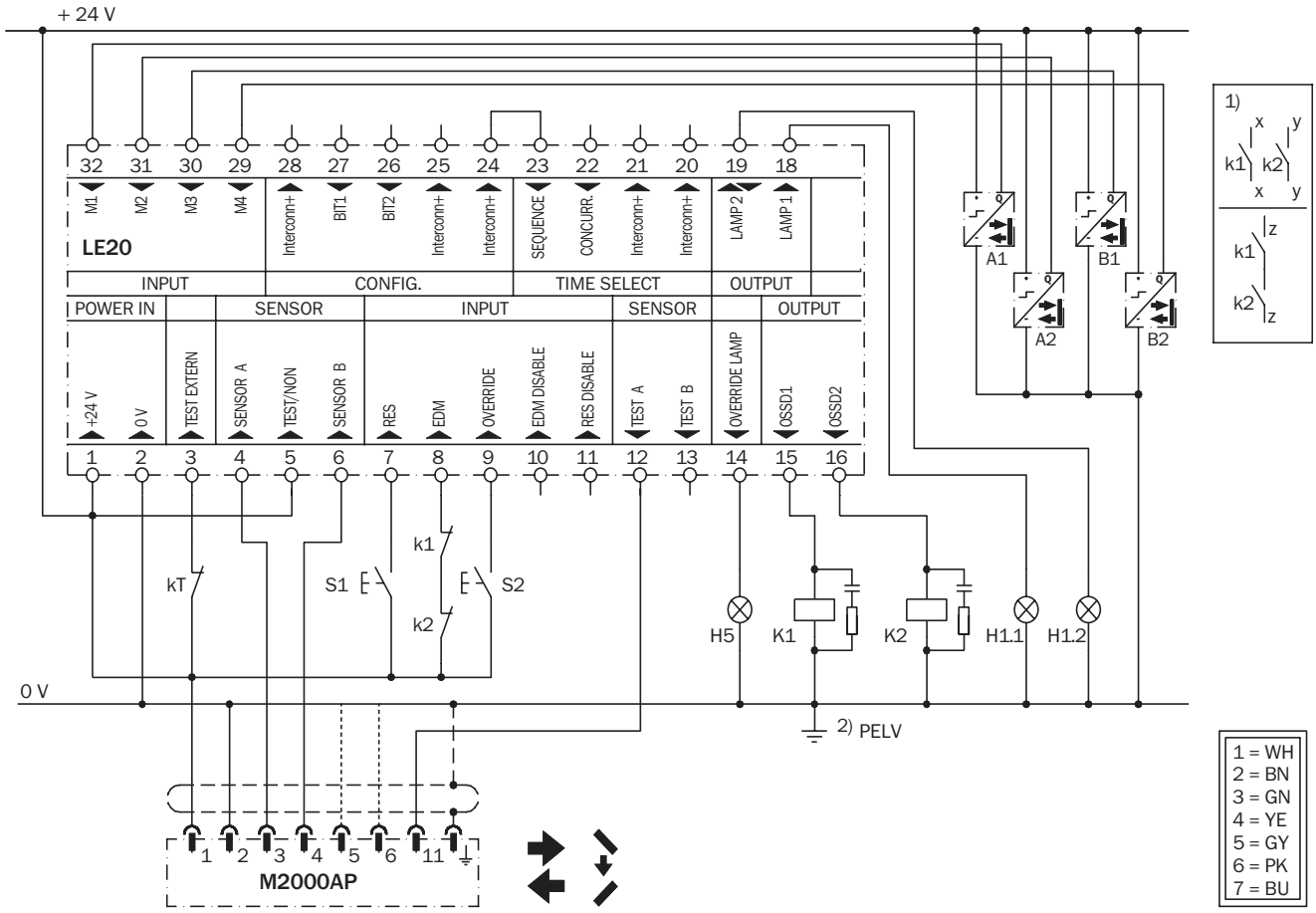
Connection diagram

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

M 2000-A/P Standard on safety evaluation unit LE 20 Muting



See next page for a description of the connection diagram

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Task

Integration of an M 2000-A/P Standard multi-beam photoelectric safety switch in a control system via an LE 20. Muting using 4 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 beams are clear and the K1 and K2 contactors are de-energised, the OSSDs on the LE 20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE 20 (terminals 15 and 16) activate the contactors K1 and K2. If a light beam is interrupted, the LE 20 deactivates the contactors K1 and K2.

D

Muting

The protective field must be clear, and the OSSDs on the LE 20 switched on, to allow initiation of the muting function. Muting is prevented if photoelectric proximity switch pair A or B is not activated within 3 seconds. The muting inputs must remain activated without interruption for the duration of the muting, also on switching from A1 & A2 to B1 & B2.

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 S 2000 button. This is only possible if a valid combination of muting signals is present at the LE 20. 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 LE 20 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 the risk analysis into account.

[2] PELV as required in EN 60204-1 / 6.4

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

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Accessories

Mounting accessories

➜ Dimensional drawings mounting accessories see page D-73

Designation	Description	Part number
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Mounting kit 9	▪ 2 pieces swivel mount, pivoting for sender/receiver unit M 2000-A/P/active ▪ 2 pieces side brackets, pivoting for deflector mirror PSR01-1501	2 021 569
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Large housing profile	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 850

Connector technology

Connection	Designation	Description	Connection cable	Part number
System connection Hirschmann plug	Hirschmann cable socket	▪ 11-pin + PE ▪ Straight	–	6 020 757
		▪ 11-pin + PE ▪ Angled	–	6 020 758
System connection M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343

Continued on next page

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Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342
	▪ With screw type terminals	–	UE48-2OS2D2	6 024 915
	▪ With plug-in terminals	–	UE48-2OS3D2	6 024 916
	▪ With screw type terminals	–	UE48-3OS2D2	6 025 089
	▪ With plug-in terminals	–	UE48-3OS3D2	6 025 097

Device columns

Designation	Description	Part number
Device column without front screen	▪ 2-beam, 500 mm beam separation ▪ Including mounting kit	2 021 328
Device column with front screen [1]	▪ Length 1200 mm ▪ Including mounting kit	2 021 330
	▪ Length 1500 mm ▪ Including mounting kit	2 021 331
	▪ Length 1700 mm ▪ Including mounting kit	2 021 332

[1] Warning, reduction of the scanning range!

Mirror column [1]

Designation	Description	Part number
Mirror column, fully assembled with mirrors 45°	▪ Suitable for M20Z-02xxxxxx, 2-beam, 500 mm beam separation	1 015 042

[1] Warning, reduction of the scanning range!

Deflector mirror [1]

Designation	Description	Part number
Deflector mirror PSR01-S04	▪ Suitable for M20Z-02550xxxx with end caps for swivel mount bracket (large housing) and front screen	1 025 227

[1] Warning, reduction of the scanning range!

→ For dimensional drawings of the device columns, mirror columns and deflector mirrors please refer to the operating instructions/technical description. Download at www.sick.com

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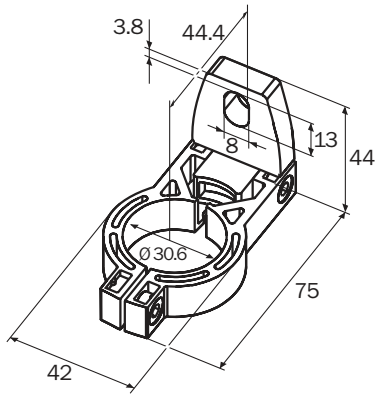
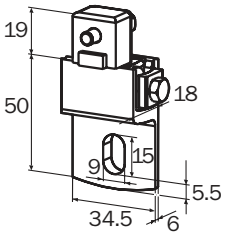
Dimensional drawings mounting accessories

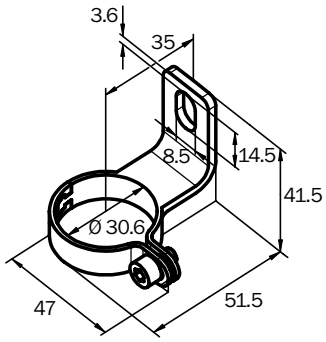
Dimensions in mm



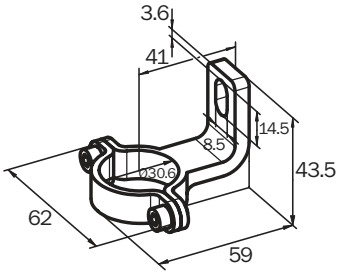
Swivel mount
Mounting kit 2
Mounting kit 9



Side bracket
Mounting kit 6
Mounting kit 9



Stainless steel bracket



Reinforced stainless steel bracket

D

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- Restart interlock (RES)
- External device monitoring (EDM)
- Self-testing
- 7-segment display
- Diagnostics
- Alignment aid

Overview of technical specifications

Scanning range	0 m ... 6 m
Number of beams	1
Beam separation	500 mm
Type	Type 2 according to EN 61496
Enclosure rating	IP 65

Product description

The M 2000-A/P RES/EDM multi-beam photoelectric safety switch comprises a sender/receiver unit on the active side (A) and one or more deflector mirrors on the passive side (P).
With their high signal reserve, they are also reliable under harsh industrial conditions. Functions and status information integrated in the device allow rapid commissioning and prevent unnecessary machine downtime. Interfaces and service concepts complete the product range to provide an ideal solution for the sector.
The integrated restart interlock in the M 2000-A/P RES/EDM offers the advantages of shorter cable runs and quicker commissioning compared to traditional solutions.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Muting	Further information
LE 20 Muting	✔	L-60

Applications

→ For more applications please refer to the application finder at www.sick.com

- Storage and conveyor technology
- Wood industry
- Textile industry
- Stone production
- Electronics industry
- Packaging industry

Further information	Page
→ Dimensional drawings	D-76
→ Connection diagram	D-77
→ Accessories	D-78
→ Dimensional drawings accessories	D-79
→ Services	A-0

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8 010 889/15-10-04

Ordering information

M 2000-A/P RES/EDM
- Comprising a sender/receiver unit as the active side and a deflector mirror as the passive side

→ Accessories see page D-78

Scanning range 0 ... 6 m

Number of beams	Beam separation (mm)	Connection plug	Sender and receiver unit		Deflector mirror	
			Type	Part number	Type	Part number
1	500	Hirschmann 11-pin + PE	M20Z-02550A221	1 018 239	PSR01-1501	1 016 677
		M12, 8-pin	M20Z-02550A222	1 018 362		

D

Detailed technical specifications

→ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

Scanning range	0 m ... 6 m
Number of beams	1
Beam separation	500 mm
Enclosure rating	IP 65
Type	Type 2 according to EN 61496
Synchronisation	Optical, without separate synchronisation
Supply voltage V_S	24 V (19.2 V ... 28.8 V) DC

Sender/receiver unit

Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Response time (depending on type)	Max. 7 ms
Switching voltage **$HIGH_{min}$** **LOW_{max}**	 V_S – 2.25 V 1 V
Switching current	Max. 500 mA
Power consumption	Max. 7.5 W

Operating data

Type of connection (depending on type)	Hirschmann plug 11-pin + PE M12 plug, 8-pin
Connection cable wire cross-section **Hirschmann plug** **M12 plug**	 Max. 1 mm^2 Max. 0.25 mm^2
Connection cable length **for wire cross-section 1 mm^2** **for wire cross-section 0.25 mm^2**	 Max. 60 m Max. 15 m
Ambient operating temperature T_A	0 °C ... +55 °C
Storage temperature T_S	–25 °C ... +70 °C
Air humidity	15 % ... 95 %
Housing cross-section	48 mm x 40 mm
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight (depending on type)	1.25 kg ... 2.86 kg

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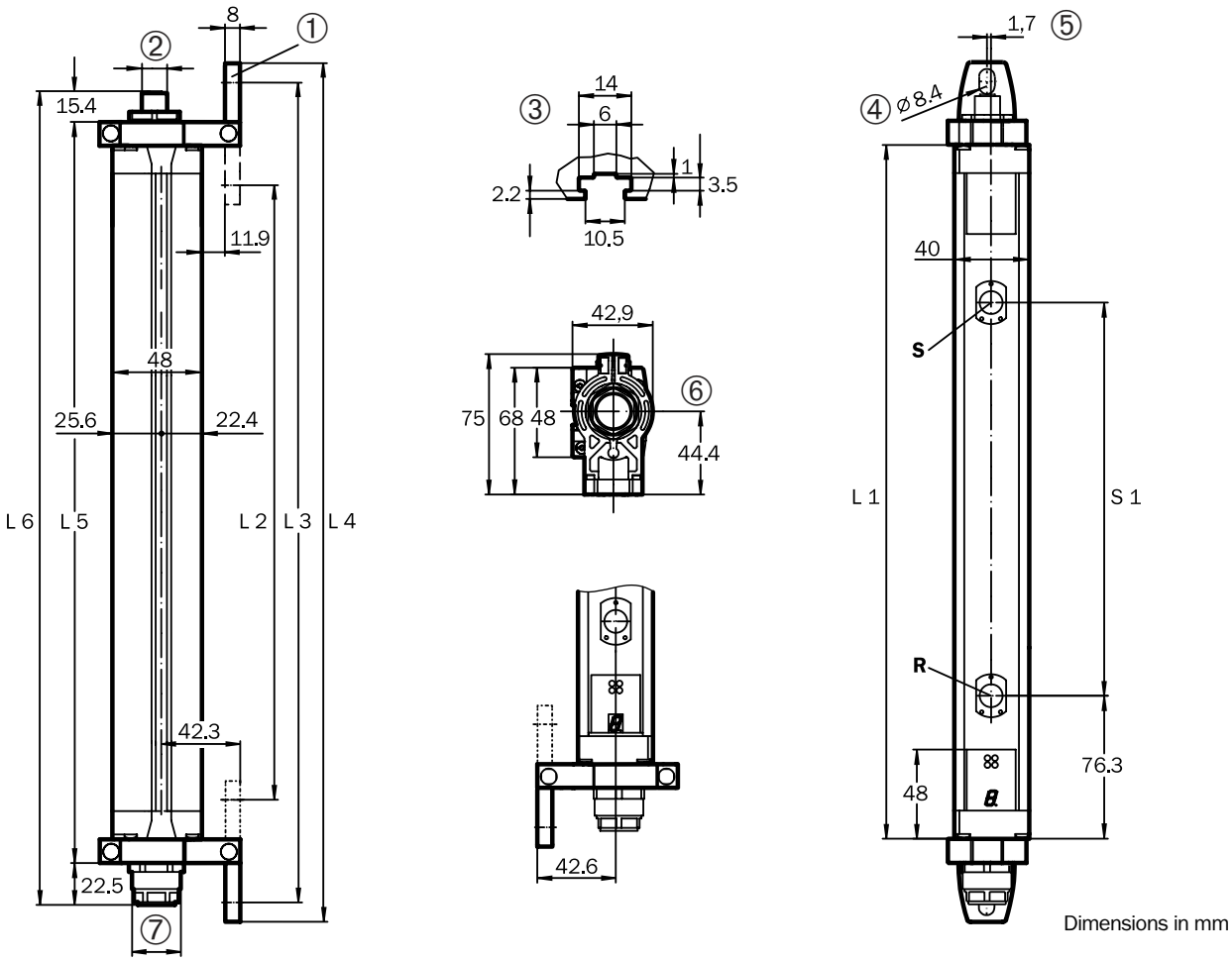
Dimensional drawings

D

➜ You will find more dimensional drawings in the technical description/operating instructions. Download at www.sick.com



Dimensions in mm

Sender/receiver unit with swivel mount

① Mounting clamp
② M12 x 1 socket (standard)
③ Sliding nut groove for side mounting
④ Hex screw M8, DIN 933 with washer. DIN 9021 (not supplied with delivery)
⑤ Centre of light beam offset
⑥ Adjustment
⑦ Plug PG13.5 according to DIN 43651
S Sender
R Receiver

N	S 1	L 1	L 2	L 3	L 4	L 5	L 6
2	500	653	611	720	741	678	716

N Number of beams **S 1** Beam separation

Dimensions in mm

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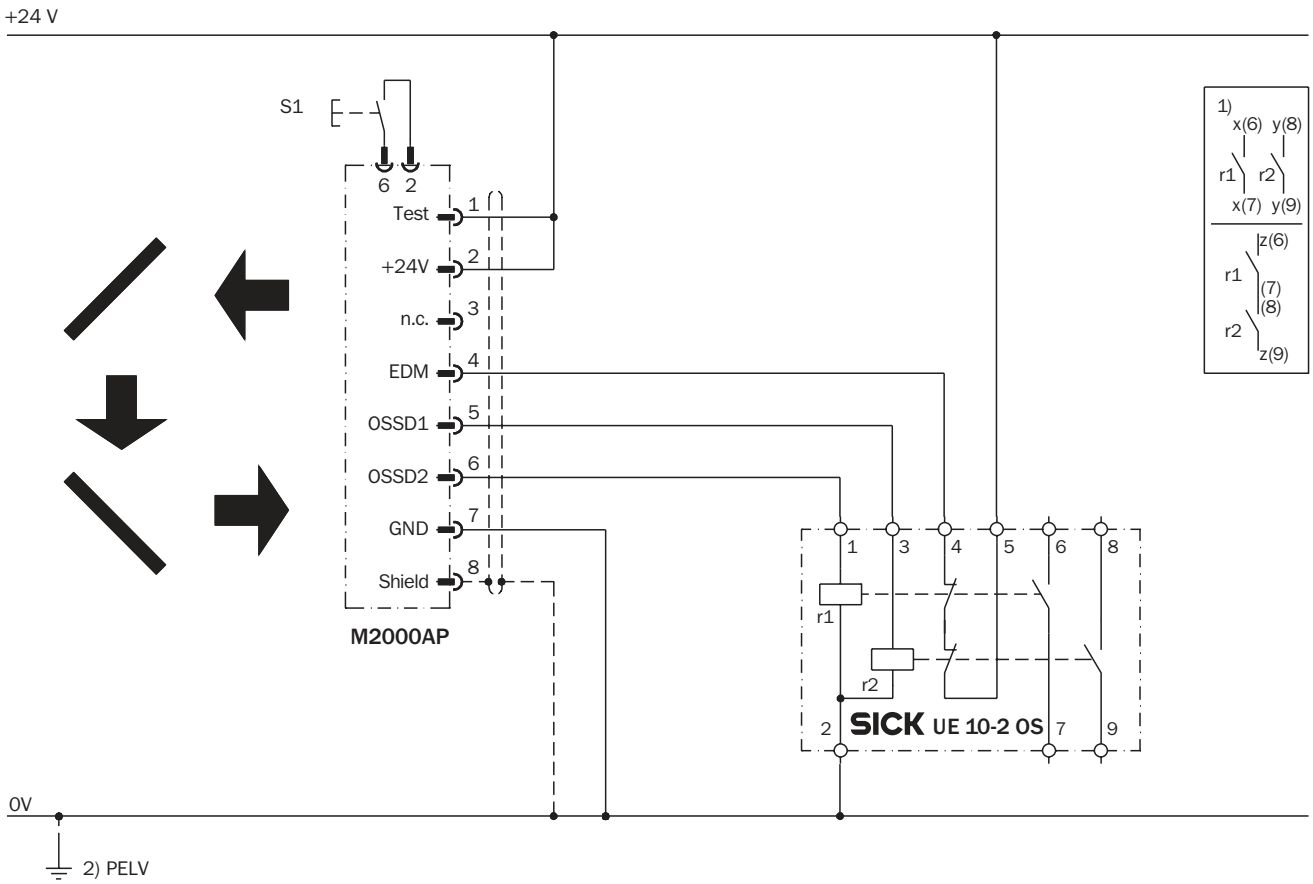
Connection diagram

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

M 2000-A/P RES/EDM on safety relay UE 10



Task

Interfacing an M 2000-A/P RES/EDM multi-beam photoelectric safety switch to UE10-2OS. Operating mode with restart interlock and external device monitoring.

Function

The yellow LED on the M 2000-A/P RES/EDM flashes when the light path is clear and the UE 10 is de-energised and functioning correctly. 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 UE 10 is switched on. On interruption of one of the light beams, the UE 10 is de-energised 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) 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 the risk analysis into account.

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

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

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Accessories

Mounting accessories

Designation	Description	Part number
Mounting kit 2	▪ 4 pieces ▪ Pivoting ▪ Swivel mount	2 019 659
Mounting kit 6	▪ 4 pieces ▪ Pivoting ▪ Side bracket	2 019 506
Mounting kit 9	▪ 2 pieces swivel mount, pivoting for sender/receiver unit M 2000-A/P/active ▪ 2 pieces side brackets, pivoting for deflector mirror PSR01-1501	2 021 569
Stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Large housing profile	2 023 708
Reinforced stainless steel bracket	▪ 4 pieces ▪ Pivoting ▪ Vibration resistance 5 g, 10 Hz ... 55 Hz ▪ Shock resistance 10 g, 16 ms	2 026 850

Connector technology

Connection	Designation	Description	Connection cable	Part number
System connection Hirschmann plug	Hirschmann cable socket	▪ 11-pin + PE ▪ Straight	–	6 020 757
		▪ 11-pin + PE ▪ Angled	–	6 020 758
System connection M12 plug	M12 cable socket	▪ 8-pin ▪ Straight	2.5 m	6 020 537
			5.0 m	6 020 354
			7.5 m	6 020 353
			10.0 m	6 020 352
			15.0 m	6 020 872
		▪ 8-pin ▪ Angled	5.0 m	6 021 342
			15.0 m	6 021 343

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

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Device columns

Designation	Description	Part number
Device column without front screen	▪ 2-beam, 500 mm beam separation ▪ Including mounting kit	2 021 328
Device column with front screen [1]	▪ Length 1200 mm ▪ Including mounting kit	2 021 330
	▪ Length 1500 mm ▪ Including mounting kit	2 021 331
	▪ Length 1700 mm ▪ Including mounting kit	2 021 332

[1] Warning, reduction of the scanning range!

Device columns for outdoor use

Designation	Description	Part number
Device column with heating 220 V	▪ Suitable for M20-02x50Axxx and M 20Z-02x50Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 023 707
	▪ Suitable for M20-03x40Axxx ▪ With brackets and cable socket ▪ Without photoelectric safety switch	2 025 441

Mirror column [1]

Designation	Description	Part number
Mirror column, fully assembled with mirrors 45°	▪ Suitable for M20Z-02xxxxxxx, 2-beam, 500 mm beam separation	1 015 042

[1] Warning, reduction of the scanning range!

Deflector mirror [1]

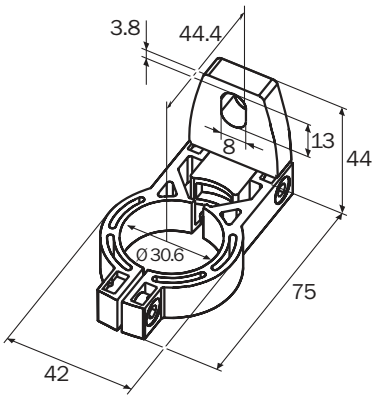
Designation	Description	Part number
Deflector mirror PSR01-S04	▪ Suitable for M 20Z-02550xxxx with end caps for swivel mount bracket (large housing) and front screen	1 025 227

[1] Warning, reduction of the scanning range!

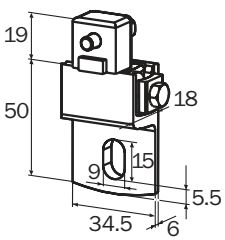
➜ For dimensional drawings of the device columns, mirror columns and deflector mirrors please refer to the operating instructions/technical description. Download at www.sick.com

Dimensional drawings mounting accessories

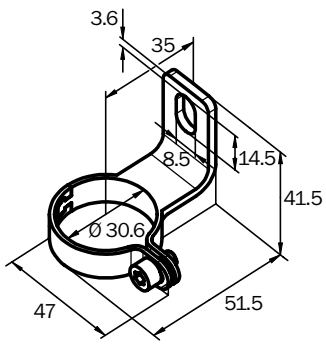
Dimensions in mm



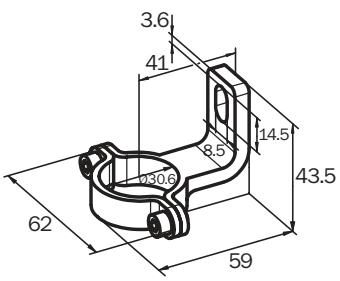
Swivel mount
Mounting kit 2
Mounting kit 9



Side bracket
Mounting kit 6
Mounting kit 9



Stainless steel bracket



Reinforced stainless steel bracket

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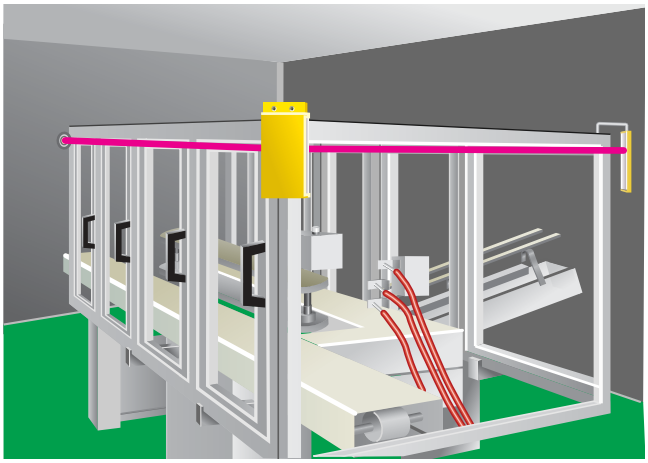
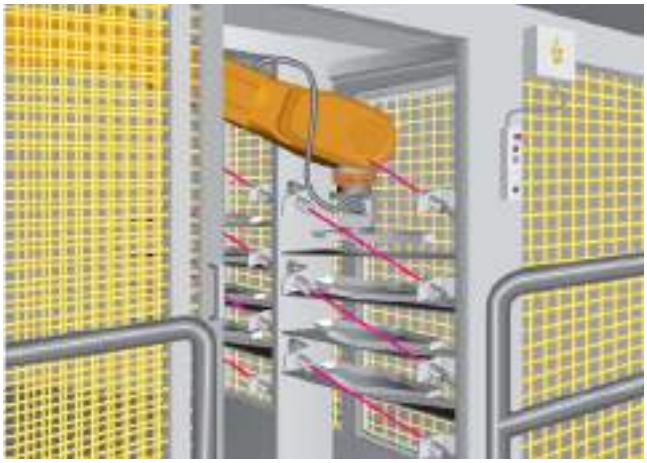
Electro-sensitive access protection of hazardous areas with type 2 and type 4 single-beam photoelectric safety switches



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 control categories 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

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Single-beam photoelectric safety switches

E

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: Muting	Functions: Restart interlock	Functions: External device monitoring	Product	Page
	Type 4	8 [1]	0 ... 5 0 ... 10 0 ... 60	–20 ... +55	Cylindrical	M18 x 108 M18 x 98 M30 x100	–	✔ [1]	✔ [1]	L 4000 / L 400	E-2
		1	0.5 ... 18 15 ... 70	–25 ... +55	Rectangular	156 x 50 x 116	–	✔ [4]	✔ [4]	WSU/WEU 26/2	E-11
	Type 2	6 [2]	0 ... 10/12 [3]	–40 ... +60	Rectangular	49 x 15 x 41.5	✔ [2]	✔ [2]	✔ [2]	WS/WE 12-2	E-16
			0 ... 12/18 [3]	–25 ... +60	Rectangular	75.5 x 17.6 x 33.5	✔ [2]	✔ [2]	✔ [2]	WS/WE 18-3	E-21
			0 ... 40/50 [3]	–40 ... +60	Rectangular	87.5 x 27 x 65	✔ [2]	✔ [2]	✔ [2]	WS/WE 24-2	E-26
			0 ... 25/35 [3]	–40 ... +60	Rectangular	80 x 24 x 53.5	✔ [2]	✔ [2]	✔ [2]	WS/WE 27-2	E-31
			0 ... 16/22 [3]	–40 ... +60	Cylindrical	M18 x 80	✔ [2]	✔ [2]	✔ [2]	VS/VE 18-2	E-37

[1] With UE 401
[2] With LE 20 / LE 20 Muting
[3] Typical / maximum
[4] With LCU-X

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- Restart interlock
- External device monitoring
- Max. 8 sensor pairs
- Simple alignment
- Simple diagnostics and service

E

Overview of technical specifications

Scanning range (depending on type)	0 m ... 60 m
Construction sizes (depending on type)	M18 / M30
Enclosure rating	IP 67
Ambient operating temperature	–20 °C ... +55 °C
Type	Type 4 according to EN 61496 (only in conjunction with UE 401)

Product description

The L 4000 photoelectric safety switch system comprises the UE 401 safety evaluation unit, to which up to 4 L 4000/L 400 sensors (sender/receiver combinations) can be connected as single pairs or up to 8 sensors can be connected in cascade.
The UE 401 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 UE 401 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

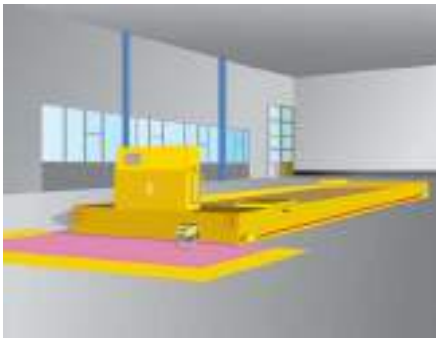
- Combination with SICK interfaces
- Safe interface to bus systems

	Switching outputs		
Combination with	**N/O contact**	**N/C contact**	**Further information**
UE 10-3 OS	3	1	L-3
UE 10-2 OS	2	–	L-59

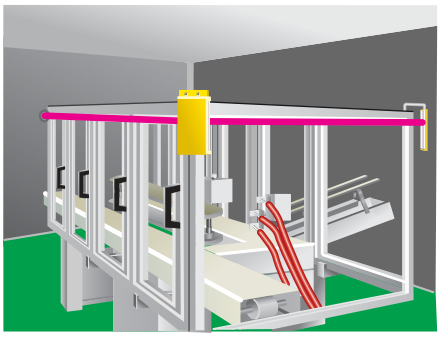
Applications

→ For more applications please refer to 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

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Ordering information

The L 4000 photoelectric safety switch system, consisting of:
- Safety evaluation device UE 401
- Sensor pair(s) L 400 or L 4000

→ Accessories see page E-9

Evaluation device

Description	Type	Part number
Safety evaluation device UE 401	UE401-A0010	6 027 343

L 4000 sensors

- Construction size M30, angled
- M12 plug, 4-pin

Scanning range	Description	Housing	For	Type	Part number
0 m ... 60 m	Axial optics	Metal	Sender	L40S-33MA2A	6 027 335
			Receiver	L40E-33MA2A	6 027 336

L 400 sensors

- Construction size M18, straight
- M12 plug, 4-pin

Scanning range	Description	Housing	For	Type	Part number
0 m ... 10 m	Axial optics	Plastic	Sender	L40S-21KA1A	6 027 337
		Metal		L40S-21MA1A	6 027 339
0 m ... 5 m	Radial optics	Metal		L40S-11MA1A	6 027 341
0 m ... 10 m	Axial optics	Plastic	Receiver	L40E-21KA1A	6 027 338
		Metal		L40E-21MA1A	6 027 340
0 m ... 5 m	Radial optics	Metal		L40E-11MA1A	6 027 342

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions. Download at www.sick.com

Safety evaluation device UE 401

Sensor connection	Up to 8 sensor pairs
Response time	Max. 30 ms
Protection class	III
Enclosure rating	IP 20
Type	Type 4 according to IEC 61496
Supply voltage	24 V (19.2 V ... 28.8 V) DC
Power consumption	Max. 3.6 W at 28.8 V
Switching outputs (OSSDs)	2 PNP semiconductors (short-circuit protected, cross-circuit monitored)
Switching voltage HIGH (active, U_{eff})	24 V (17.5 V ... 28.8 V) DC
Switching voltage LOW (inactive)	Max. 1.3 V
Switching current	Max. 0.5 A
Type of connection	Interchangeable, coded screw-type terminals
Cable lengths	Max. 100 m between evaluation device, sender, receiver and signal sources, with wire cross-section 0.25 mm^2
Wire cross-section	0.25 mm^2 ... 2.5 mm^2
Ambient operating temperature	–20 °C ... +55 °C
Air humidity (non-dewing)	15 % ... 95 %
Storage temperature	–25 °C ... +75 °C
Housing fastening	Snap-in fastening for mounting rail 35 mm, DIN EN 500022
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight	160 g

L 4000 sensor

Scanning range	0 m ... 60 m
Light beam diameter	26 mm
Aperture angle/receive angle	Max. ±2.5
Light sender/type of light	LED / visible red light (660 nm)
Protection class	III
Enclosure rating	IP 67
Type	Type 4 according to IEC 61496 (only in conjunction with safety evaluation device UE 401)
Supply voltage	24 V (19.2 V ... 28.8 V) DC
Power consumption **Sender** **Receiver**	 Max. 60 mA Max. 30 mA
Type of connection	M12 plug, 4-pin, angled
Construction size	M30
Housing material	Brass nickel-plated
Lens material	Glass

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Ambient operating temperature	–20 °C ... +55 °C
Air humidity (non-dewing)	15 % ... 95 %
Storage temperature	–25 °C ... +75 °C
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight	212 g

L 400 sensor

Scanning range (depending on type)	
Axial optics	0 m ... 10 m
Radial optics	0 m ... 5 m
Light beam diameter	12 mm
Aperture angle/receive angle	Max. ±2.5
Light sender/type of light	LED, visible red light (660 nm)
Protection class	III
Enclosure rating	IP 67
Type	Type 4 according to IEC 61496 (only in conjunction with safety evaluation device UE 401)
Supply voltage	24 V (19.2 V ... 28.8 V) DC
Power consumption	
Sender	Max. 60 mA
Receiver	Max. 30 mA
Type of connection	M12 plug, 4-pin, straight
Construction size	M18
Housing material	Plastic or brass nickel-plated
Lens material	Glass
Ambient operating temperature	–20 °C ... +55 °C
Air humidity (non-dewing)	15 % ... 95 %
Storage temperature	–25 °C ... +75 °C
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29
Weight	
Plastic housing	30 g
Metal housing	67 g

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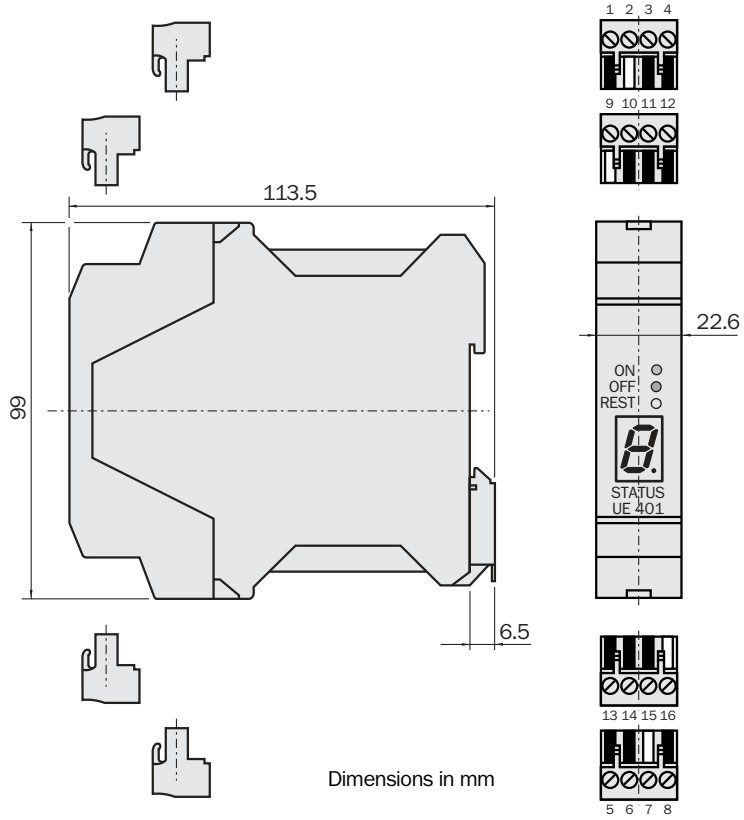
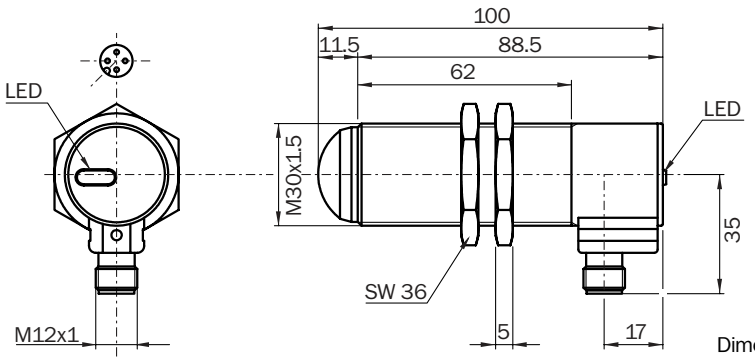
Dimensional drawings

Safety evaluation device UE 401



Dimensions in mm

L 4000 sensor



Dimensions in mm

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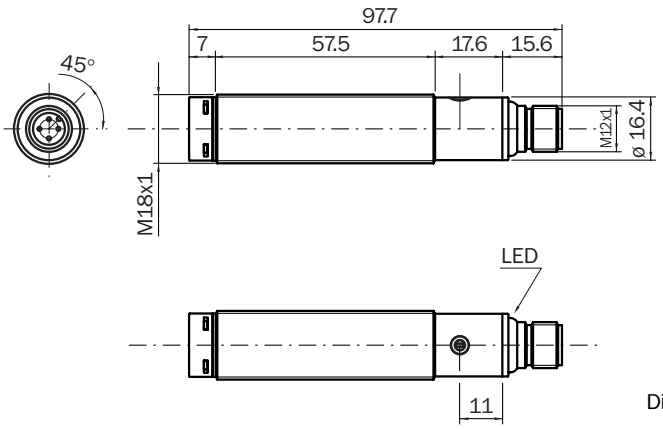
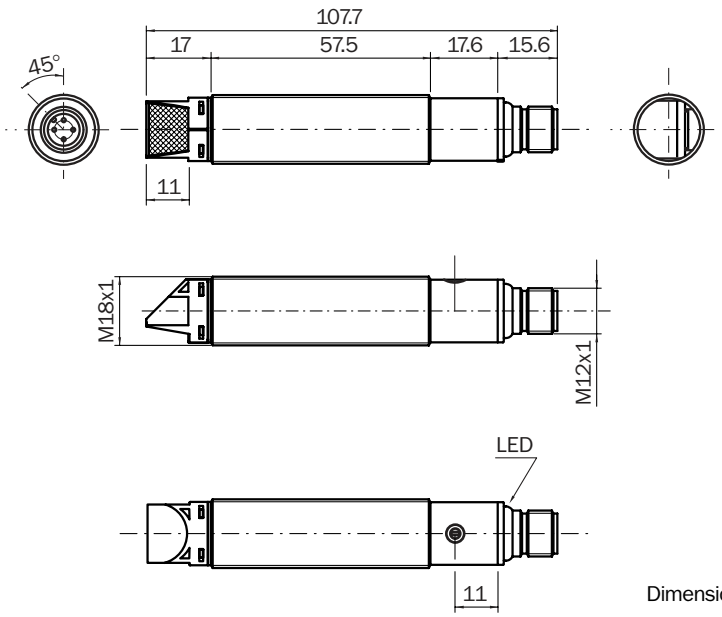
L 400 sensor, axial optics



Dimensions in mm

L 400 sensor, radial optics



Dimensions in mm

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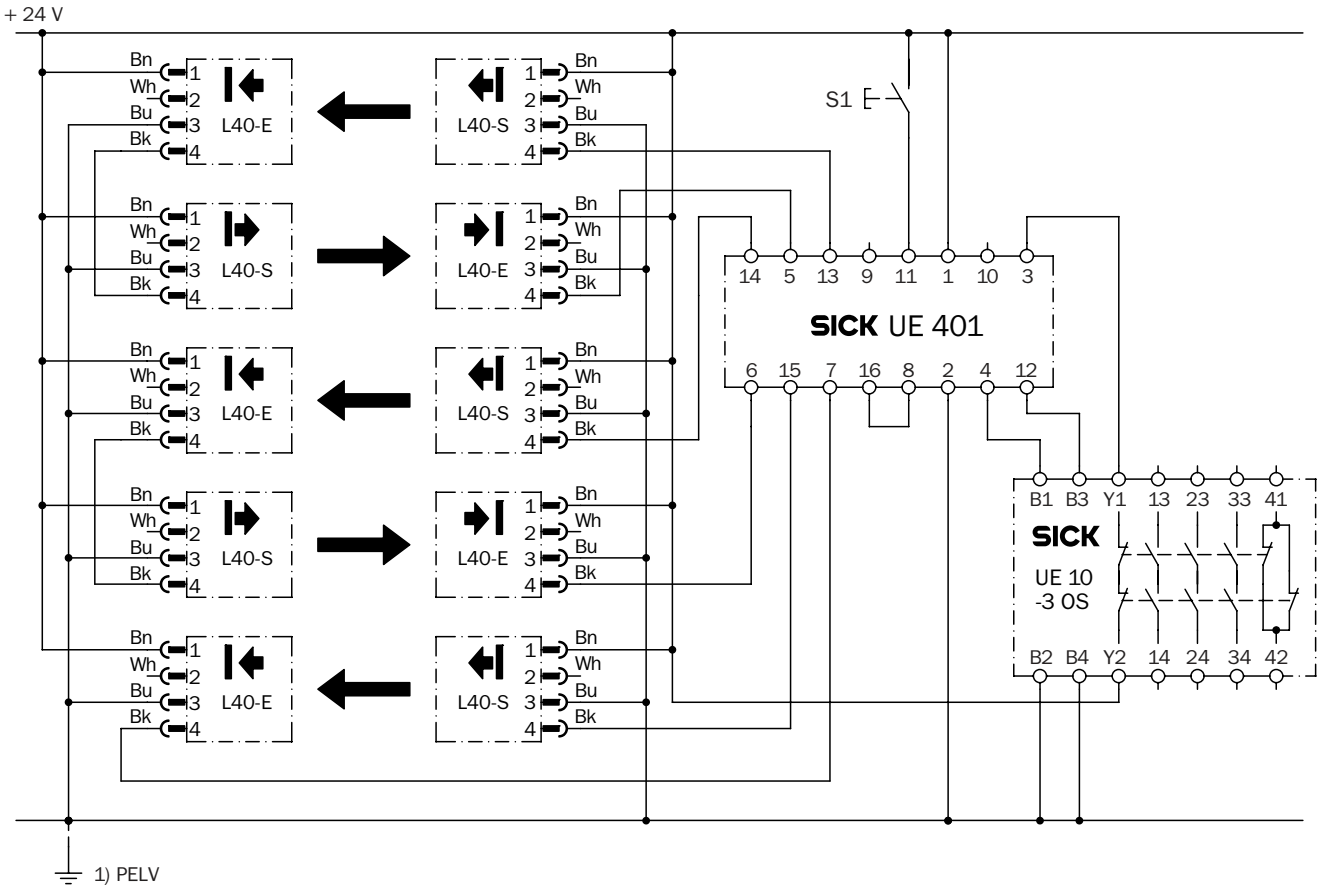
Connection diagram

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

5 x L 4000 (2 pairs cascaded) on UE 401 with UE 10-3 OS



Task

Integration of five single-beam photoelectric safety switches L 400 / L 4000 (2 pairs cascaded) with safety evaluation device UE 401 and safety relay UE 10-3 OS. Operating mode with restart interlock and external device monitoring.

Function

When the light path is clear and the UE 10 is de-energised and functioning correctly, the yellow LED on the UE 401 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 UE 10 is switched on. On the interruption of one of the light beams, the UE 10 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 UE 10 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!

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Accessories

Interfaces

Designation	Description	Switching outputs	Type	Part number
Safety relay	▪ For opto-electronic protective devices	▪ 3 N/O contacts ▪ 1 N/C contact	UE10-3OS2D0	6 024 917
			UE10-3OS3D0	6 024 918
	▪ With screw type terminals	▪ 2 N/O contacts	UE10-2OS2D0	2 019 772
	▪ With spring terminals		UE10-2OS4D0	2 019 771
	▪ Without terminals		UE10-2OS1D0	6 020 342

Mounting accessories

Designation	Description	Type	Part number
Mounting bracket	▪ M18	BEF-WN-M18	5 308 446
	▪ M30	BEF-WN-M30	5 308 445
Mounting bracket	▪ M30 ▪ Pivoting ▪ With fastening thread M6	BEF-HA-M30-A	5 311 527
	▪ M30 ▪ Pivoting ▪ With fixing holes for M4	BEF-HA-M30-R	5 311 528
	▪ M18 ▪ Pivoting ▪ With fixing holes 4 mm	BEF-HA-M18-R	5 313 513

Connector technology

Designation	Design	Description	Type	Part number
Cable socket M12	4-pin straight	▪ Can be preformed	DOS-1204-G	6 007 302
		▪ Cable 2 m ▪ PVC	DOL-1204-G02M	6 009 382
		▪ Cable 5 m ▪ PVC	DOL-1204-G05M	6 009 866
		▪ Cable 10 m ▪ PVC	DOL-1204-G10M	6 010 543
		▪ Cable 5 m ▪ PUR halogen-free	DOL-1204-G05MC	6 025 901
	4-pin angled	▪ Can be preformed	DOS-1204-W	6 007 303
		▪ Cable 2 m ▪ PVC	DOL-1204-W02M	6 009 383
		▪ Cable 5 m ▪ PVC	DOL-1204-W05M	6 009 867
		▪ Cable 10 m ▪ PVC	DOL-1204-W10M	6 010 541
		▪ Cable 5 m ▪ PUR halogen-free	DOL-1204-W05MC	6 025 904
Cable plug M12	4-pin straight	▪ Can be preformed	STE-1204-G	6 009 932

Continued on next page

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Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1] Warning, reduction of the scanning range!

Other accessories

Designation	Description	Part number
AR 60 adapter	▪ For L 4000, M30	5 311 529
	▪ For L 400, M18	5 313 533
Replacement terminal strip	▪ For UE401-A0010	6 025 841

E

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Overview of technical specifications

Scanning range (depending on type)	0.5 m ... 18 m / 15 m ... 70 m
Supply voltage (depending on type)	24 V DC / 230 V AC / 115 V AC
Enclosure rating	
with connection plug	IP 65
with PG connector	IP 67
Type	Type 4 according to EN 61496 part 1 and EN 50100 part 2
Construction size (H x W x D)	156 mm x 50 mm x 116 mm

Product description

The photoelectric safety switch WSU/WEU 26/2 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.

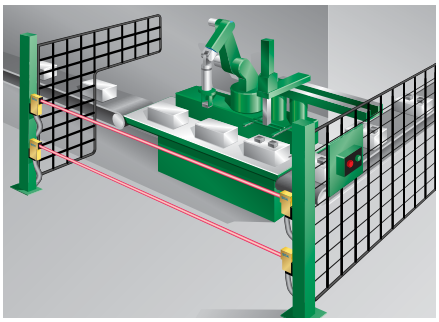
In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

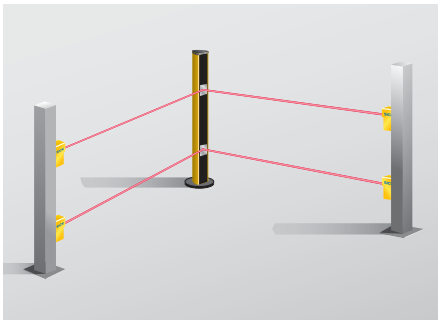
Applications

→ For more applications please refer to the application finder at www.sick.com

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



Access protection on a machining centre



Access protection with mirror deflection

E

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

CE

Further information	Page
→ Ordering information	E-12
→ Technical specifications	E-13
→ Dimensional drawings	E-14
→ Connection diagrams	E-14
→ Accessories	E-15
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Ordering information

→ Accessories see page E-15

Photoelectric safety switch WSU/WEU 26/2

Scanning range	Supply voltage	Type of connection	Sender unit		Receiver unit	
			Type	Part number	Type	Part number
0.5 m ... 18 m	230 V AC	PG	WSU26/2-110	1 015 615	WEU26/2-110	1 015 616
		Plug, 6-pin + PE	WSU26/2-111	1 015 712	WEU26/2-111	1 015 713
		Plug, 6-pin + PE [1]	WSU26/2-113	1 015 716	WEU26/2-113	1 015 715
		Plug, 6-pin + PE [1]	–	–	WEU26/2-112	1 015 714
		Plug, 15-pin + PE	WSU26/2-114	1 015 834	WEU26/2-114	1 015 835
15 m ... 70 m	230 V AC	PG	WSU26/2-210	1 015 731	WEU26/2-210	1 015 743
		Plug, 6-pin + PE	WSU26/2-211	1 015 733	WEU26/2-211	1 015 744
		Plug, 6-pin + PE [1]	WSU26/2-213	1 015 736	WEU26/2-213	1 015 748
		Plug, 6-pin + PE [1]	–	–	WEU26/2-212	1 015 746
		Plug, 15-pin + PE	WSU26/2-214	1 015 840	WEU26/2-214	1 015 841
0.5 m ... 18 m	115 V AC	PG	WSU26/2-120	1 015 717	WEU26/2-120	1 015 718
		Plug, 6-pin + PE	WSU26/2-121	1 015 719	WEU26/2-121	1 015 720
		Plug, 6-pin + PE [1]	WSU26/2-123	1 015 723	WEU26/2-123	1 015 722
		Plug, 6-pin + PE [1]	–	–	WEU26/2-122	1 015 721
		Plug, 15-pin + PE	WSU26/2-124	1 015 836	WEU26/2-124	1 015 837
15 m ... 70 m	115 V AC	PG	WSU26/2-220	1 015 738	WEU26/2-220	1 015 749
		Plug, 6-pin + PE	WSU26/2-221	1 015 740	WEU26/2-221	1 015 750
		Plug, 6-pin + PE [1]	WSU26/2-223	1 015 737	WEU26/2-223	1 015 505
		Plug, 6-pin + PE [1]	–	–	WEU26/2-222	1 015 751
		Plug, 15-pin + PE	WSU26/2-224	1 015 842	WEU26/2-224	1 015843
0.5 m ... 18 m	24 V DC	PG	WSU26/2-130	1 015 724	WEU26/2-130	1 015 725
		Plug, 6-pin + PE	WSU26/2-131	1 015 726	WEU26/2-131	1 015 727
		Plug, 6-pin + PE [1]	WSU26/2-133	1 015 730	WEU26/2-133	1 015 729
		Plug, 6-pin + PE [1]	–	–	WEU26/2-132	1 015 728
		Plug, 15-pin + PE	WSU26/2-134	1 015 838	WEU26/2-134	1 015 839
15 m ... 70 m	24 V DC	PG	WSU26/2-230	1 015 745	WEU26/2-230	1 015 504
		Plug, 6-pin + PE	WSU26/2-231	1 015 747	WEU26/2-231	1 015 753
		Plug, 6-pin + PE [1]	WSU26/2-233	1 015 739	WEU26/2-233	1 015 755
		Plug, 6-pin + PE [1]	–	–	WEU26/2-232	1 015 754
		Plug, 15-pin + PE	WSU26/2-234	1 015 844	WEU26/2-234	1 015 845

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

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Detailed technical specifications

➜ You can find more detailed data in the operating instructions/technical description. Download at www.sick.com

General system data

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°
Wavelength of sender	950 nm
Protection class	I
Enclosure rating	
Connection plug	IP 65
PG connector	IP 67
Operating mode	Protective operation without start and restart interlock
Supply voltage V_S (depending on type)	24 V (19.2 V ... 28.8 V) DC 230 V (195.5 V ... 253 V) AC 115 V (97.75 V ... 126 V) AC
Type	Type 4 according to EN 61496 part 1 and EN 50100 part 2
AC supply frequency	Min. 48 Hz

Sender unit

Test output	For volt-free switch
Output current	10 mA
Power consumption	
24 V DC version	4 W
115 V AC version	7 VA
230 V AC version	7 VA
Weight (depending on type)	0.9 kg to 1.3 kg

Receiver unit

Switching outputs	Relay, max. switching frequency 0.2/s (1 switching operation in 5 s)
Response time	Max. 22 ms
Switching current	0.02 A ... 2 A
Switching voltage	24 V DC ... 250 V AC
Switching capacity (DC/AC)	Max. 144 W / 1380 VA
Mechanical service life (switching operations)	Max. 10^7
Electrical service life (switching operations)	
DC with 2 A switching current	Max. 8×10^4
AC with 2 A switching current	Max. 5×10^4
Power consumption	
24 V DC version	6 W
115 V AC version	10 VA
230 V AC version	10 VA
Weight (depending on type)	1.0 kg to 1.4 kg

Operating data

Type of connection (depending on type)	Connection cable (PG 13.5), connection plug
Ambient operating temperature	–25 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
Air humidity (non-dewing)	15 % ... 95 %
Vibration resistance	5 g, 10 ... 55 Hz according to IEC 60068-2-6
Shock resistance	10 g, 16 ms according to IEC 60068-2-29

E

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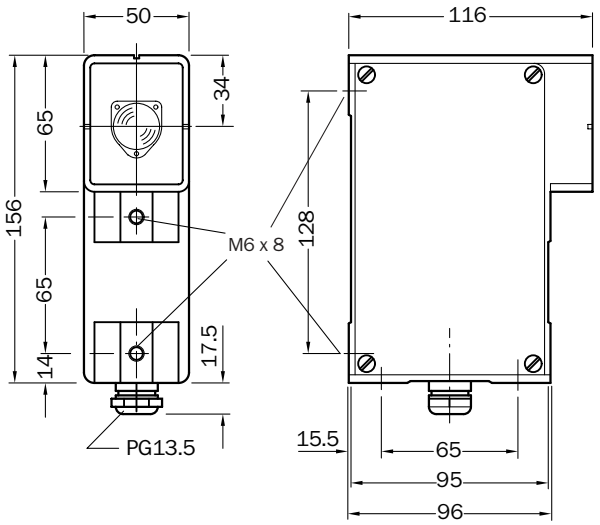
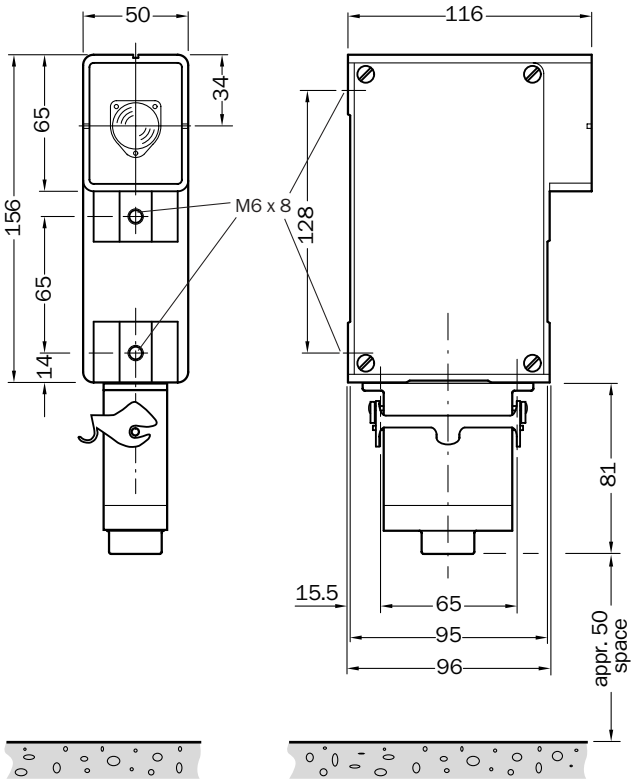
Dimensional drawings

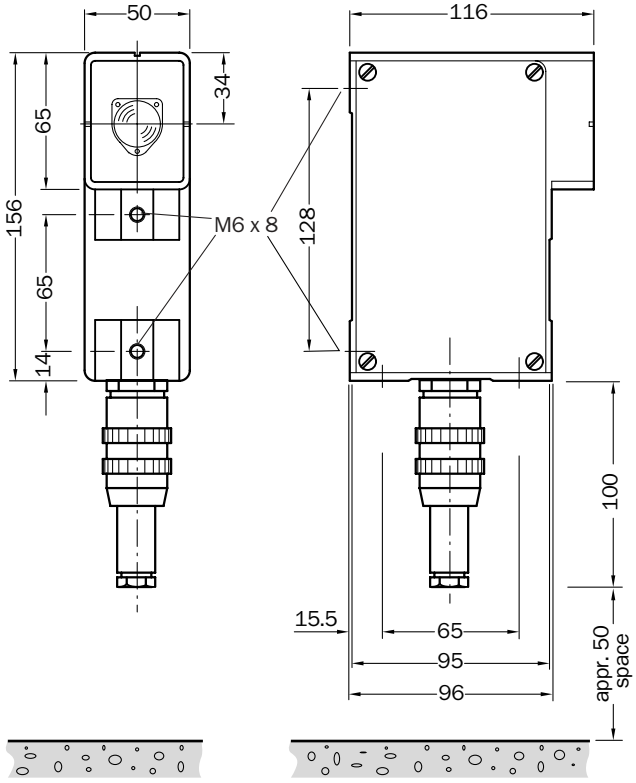
Dimensional drawing WSU/WEU 26/2-xx0



Dimensional drawing WSU/WEU 26/2-xx4



Dimensional drawing WSU 26/2-xx1 and -xx3 and WEU 26/2-xx1, -xx2 u. -xx3



Dimensions in mm

Connection diagrams

➜ For connection diagrams please refer to the technical description. Download at www.sick.com

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Accessories

Mounting accessories

Designation	Description	Part number
Mounting bracket	▪ For WSU/WEU 26/2	2 007 900

Connector technology

Designation	Description	Part number
Cable socket	▪ Straight ▪ 6-pin + PE (plastic)	6 006 612
	▪ Angled ▪ 6-pin + PE (plastic)	6 006 613
	▪ Straight cable outlet PG 13.5 ▪ 15-pin + PE (plastic)	2 019 075
	▪ Lateral cable outlet PG 16 ▪ 15-pin + PE (plastic)	2 019 076

Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1] Warning, reduction of the scanning range!

Other accessories

Designation	Description	Type	Part number
PG expansion	▪ With 2 cable entries PG 21	–	5 305 978
	▪ PG expansion PG 13/21	–	5 306 052
Dust protection tube	–	–	1 003 556
Snow protection tube	–	–	1 003 619
Arc-suppressor	▪ 0.22 µF/220 Ω for 110 V AC ... 220 V AC	RC-A	6 001 224
	▪ 2.2 µF/100 Ω for 24 V AC/DC ... 48 V AC/DC	RC-AD	6 001 225

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- Compact design
- Infrared light
- Insensitive to external light sources
- Die-cast housing

CE

E

Overview of technical specifications

Scanning range (typical/maximum)	0 m ... 10 m / 0 m ... 12 m
Light sender/type of light	LED / infrared
Ambient operating temperature	–40 °C ... +60 °C
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Construction size (H x W x D)	49 mm x 15 mm x 41,5 mm

Product description

The SICK single-beam photoelectric safety switch WS/WE 12-2 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

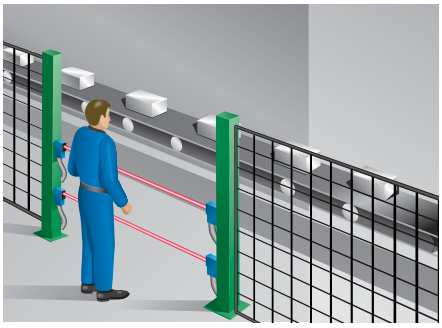
Combination with	Type according to EN 61496	Switching outputs	Muting	Further information
LE 20	2	2 PNP semiconductors [1]	–	L-53
LE 20 Muting	2	2 PNP semiconductors [1]	✔	L-60
UE 10-3 OS	–	Relay (3 N/O contacts, 1 N/C contact)	–	L-3
UE 10-2 OS	–	Relay, 2 N/O contacts	–	L-59

[1] Short-circuit protected, cross-circuit monitored

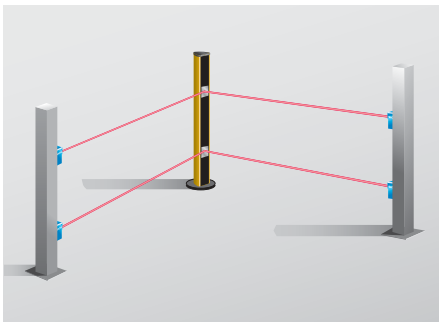
Applications

→ For more applications please refer to the application finder at www.sick.com

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



Access protection on a conveyor system



Access protection with mirror deflection

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→ Accessories	E-20
→ Services	A-0

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Ordering information

→ Accessories see page E-20

Single-beam photoelectric safety switch WS/WE 12-2

Designation	Description	Connection	Type	Part number
Light sender and light receiver	▪ Scanning range 10 m ▪ PNP ▪ Q and $\overline{Q}$	Connection cable 2 m	WS/WE12-2P160	1 018 046
		Device plug M12, 4-pin	WS/WE12-2P460	1 018 047
Light receiver	▪ Scanning range 10 m ▪ PNP ▪ Q and $\overline{Q}$	Connection cable 2 m	WE12-2P160	2 021 440
		Device plug M12, 4-pin	WE12-2P460	2 021 442
Light sender	▪ Scanning range 10 m	Connection cable 2 m	WS12-2D160	2 021 439
		Device plug M12, 4-pin	WS12-2D460	2 021 441

Detailed technical specifications

→ You can find more detailed data in the operating instructions/technical description for the safety evaluation unit LE 20.
Download at www.sick.com

General system data

Scanning range (typical/maximum)	0 m ... 10 m / 0 m ... 12 m
Light spot diameter	Approx. 500 mm in 10 m distance
Aperture and receive angle (typically/maximum)	±1,5° / ±5°
Light sender	LED
Type of light	Infrared light (880 nm), pulsating, average service life 100 000 h (at $T_A = 25$ °C)
Protection class	II
Circuit protection	Reverse polarity protected V_S connections, short-circuit protected output Q and $\overline{Q}$, interference suppression
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Supply voltage V_S	24 V DC (–30 % ... +20 %)

Sender unit

Test input TI	
Sender on	TI to V_S
Sender off	TI to 0 V
Power consumption	Max. 35 mA

Receiver unit

Switching outputs	PNP, Q and $\overline{Q}$
Response time/switching sequence	Max. 500 µs / max. 1000/s
Output current I_O	Max. 100 mA
Power consumption	Max. 25 mA

Operating data

Type of connection	Plug-in connection, 4-pin or cable 2 m
Ambient operating temperature T_A	–40 °C ... +60 °C
Storage temperature T_S	–40 °C ... +75 °C
Weight	
Cable version	200 g
Plug version	120 g

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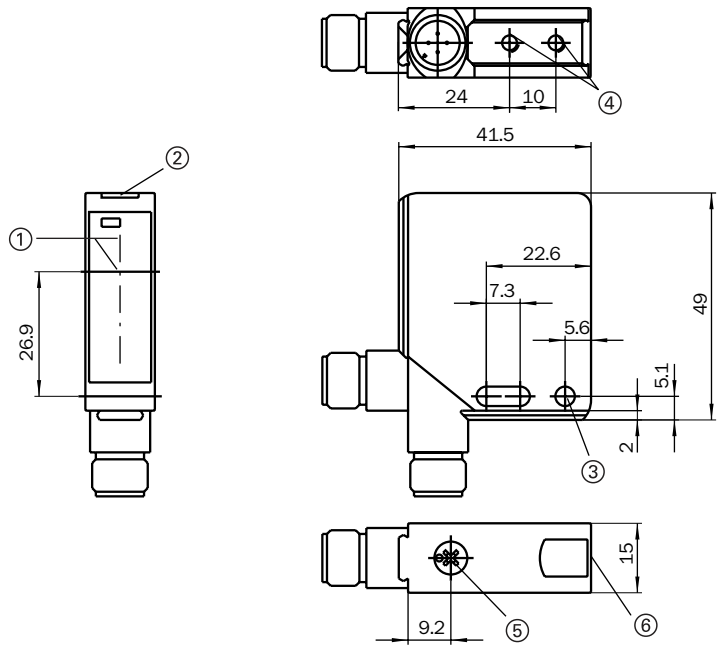
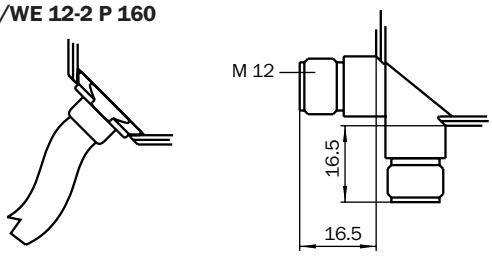
Dimensional drawings

WS/WE 12-2 P 460



WS/WE 12-2 P 160



Dimensions in mm

① Centre of optical axis
② LED
③ Fixing holes Ø 4.2 mm
④ Fastening thread M4, 4 mm deep
⑤ Sensitivity adjuster (WE)
⑥ Alignment sight

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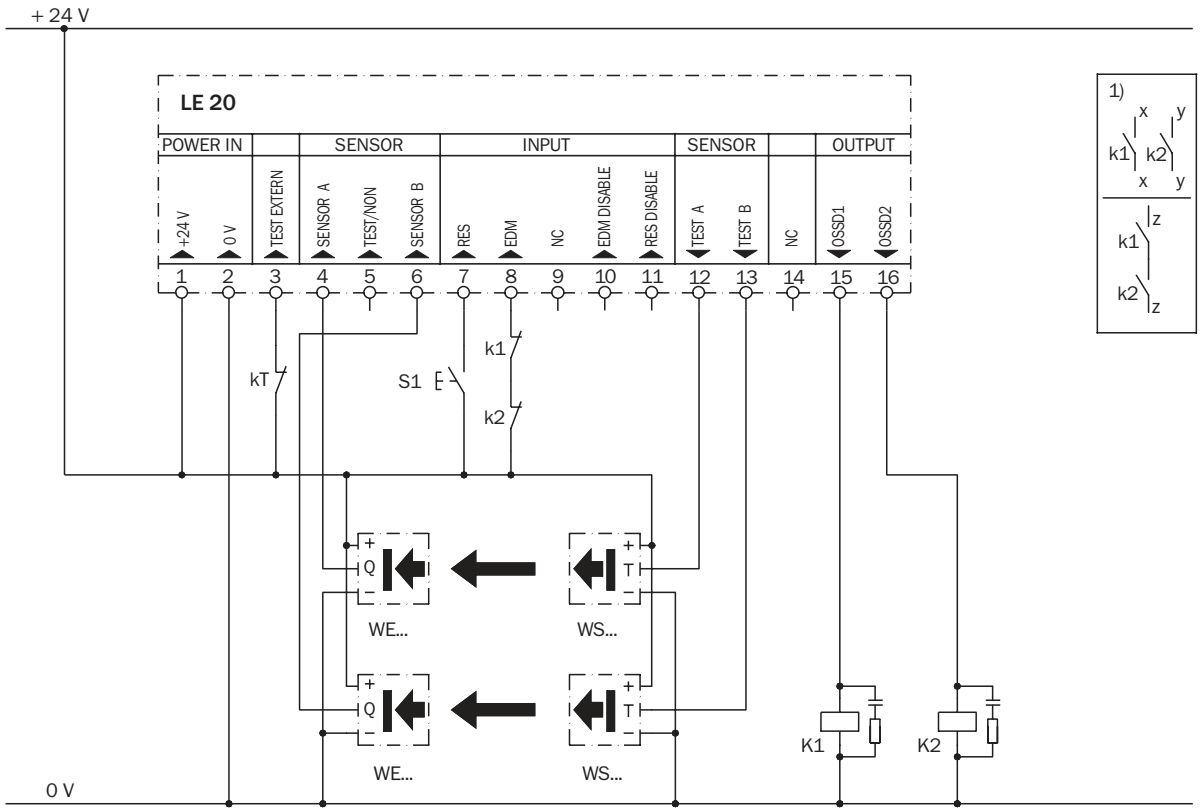
Connection diagram

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

2 x WS/WE 12-2 on safety evaluation unit LE 20



Task

Integration of two single-beam photoelectric safety switches (only approved types as per technical description) with LE 20 in a relay/contactor control. Operating mode with restart interlock and external device monitoring.

Function

If the light path is clear and the contactors K1 and K2 are de-energised, the OSSDs in the LE 20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE 20 (terminals 15 and 16) activate the contactors K1 and K2. On interruption of one of the light beams, the LE 20 deactivates the contactors K1 and K2. The contact (kT) is connected to terminal 3 and is tested by the control system. If this contact is opened, the LE 20 deactivates the contactors K1 and K2. If testing is not possible, terminal 5 is to be connected to +24 V DC potential and dual-channel integration in the control is necessary.

Possible faults

The incorrect functioning of one of the K1 or K2 contactors does not result in the loss of the shutdown function. Jamming of the S1 button prevents output circuit to enable.

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!

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Accessories

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

Mounting accessories

Designation	Description	Type	Part number
Mounting bracket	▪ Small for WS/WE 12-2	BEF-WK-W12	2 012 938

Connector technology

Designation	Description	Type	Part number
Cable socket M12	▪ 4-pin ▪ Straight	DOS-1204-G	6 007 302
	▪ 4-pin ▪ Straight ▪ Cable 2 m, PVC	DOL-1204-G02M	6 009 382

Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1)]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1)] Warning, reduction of the scanning range!

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Overview of technical specifications

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

Product description

The SICK single-beam photoelectric safety switch WS/WE 18-3 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

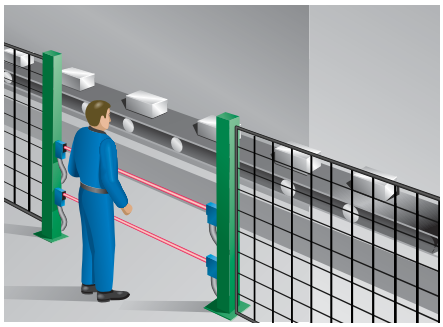
Combination with	Type according to EN 61496	Switching outputs	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE 20	2	2 PNP semiconductors [1]	6	✔	✔	–	L-53
LE 20 Muting	2	2 PNP semiconductors [1]	6	✔	✔	✔	L-60
UE 10-3 OS	–	Relay (3 N/O contacts, 1 N/C contact)	–	–	✔	–	L-3
UE 10-2 OS	–	Relay, 2 N/O contacts	–	–	✔	–	L-59

[1] Short-circuit protected, cross-circuit monitored

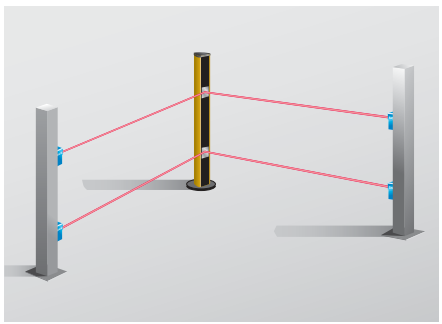
Applications

→ For more applications please refer to the application finder at www.sick.com

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



Access protection on a conveyor system



Access protection with mirror deflection

- Compact design
- Red light
- Plastic housing, ABS

E

Further information	Page
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→ Technical specifications	E-22
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Ordering information

→ Accessories see page E-25

Single-beam photoelectric safety switch WS/WE 18-3

Designation	Description	Connection	Type	Part number
Light sender and light receiver	▪ Scanning range 12 m ▪ PNP ▪ Q and $\overline{Q}$	Device plug M12, 4-pin	WS/WE18-3P460	1 026 751
Light receiver			WE18-3P460	2 031 732
Light sender	▪ Scanning range 12 m		WS18-3D460	2 031 731

Detailed technical specifications

E

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

General system data

Scanning range (typical/maximum)	0 m ... 12 m / 0 m ... 18 m
Light spot diameter	Approx. 300 mm in 10 m distance
Aperture and receive angle (typically/maximum)	±1,5° / ±5°
Light sender	LED
Type of light	Visible red light, average service life 100 000 h (at T_A = 25 °C)
Protection class	II
Circuit protection	Reverse polarity protected V_S connections, short-circuit protected output Q and $\overline{Q}$, interference suppression
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Supply voltage V_S	24 V DC (–30 % ... +20 %)

Sender unit

Test input TI	
Sender on	TI to V_S
Sender off	TI to 0 V
Power consumption	Max. 35 mA

Receiver unit

Switching outputs	PNP, Q and $\overline{Q}$
Response time/switching sequence	Max. 500 µs / max. 1000/s
Output current I_O	Max. 100 mA
Power consumption	Max. 20 mA

Operating data

Type of connection	Plug-in connection M12, 4-pin
Ambient operating temperature T_A	–40 °C ... +60 °C
Storage temperature T_S	–40 °C ... +75 °C
Weight	120 g

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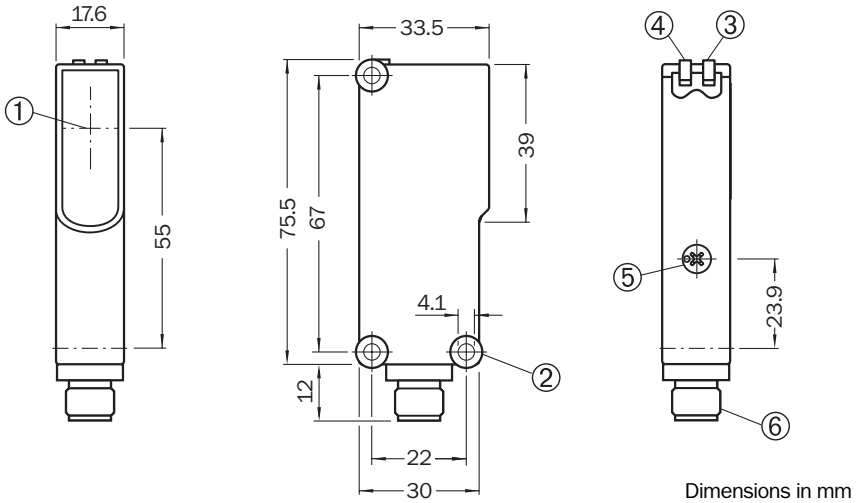
Dimensional drawings

WS 18-3 D460
WE 18-3 P460



Dimensions in mm

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

E

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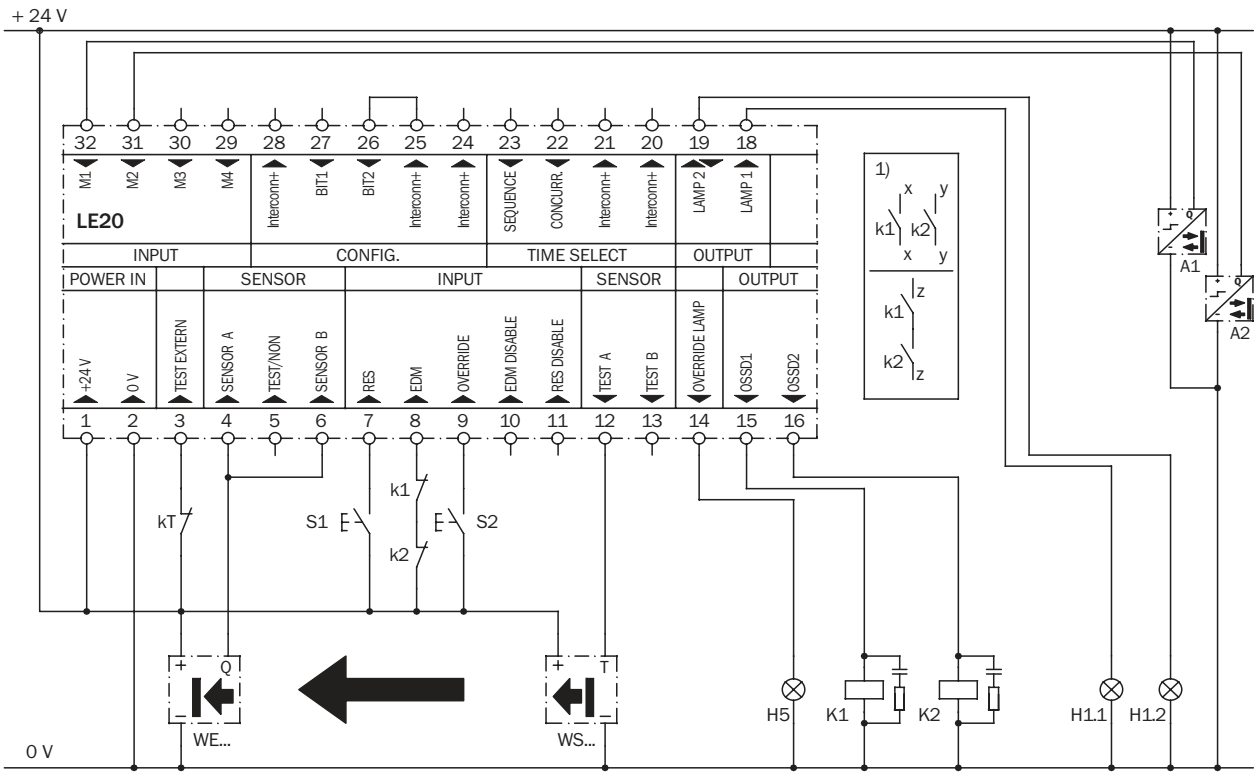
Connection diagram

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

WS/WE 18-3 on safety evaluation unit LE 20 Muting



Task

Integration of the single-beam photoelectric safety switch in a control via an LE 20. 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 LE 20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE 20 (terminals 15 and 16) activate the contactors K1 and K2. If the light beam is interrupted, the LE 20 deactivates the contactors K1 and K2.

Muting

The protective field must be clear, and the OSSDs on the LE 20 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 LE 20. 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 LE 20 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.

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Accessories

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

Mounting accessories

Designation	Description	Type	Part number
Mounting bracket	▪ For WS/WE 18-3	BEF-WN-W18	2 009 317

Connector technology

Designation	Description	Type	Part number
Cable socket M12	▪ 4-pin ▪ Straight	DOS-1204-G	6 007 302
	▪ 4-pin ▪ Straight ▪ Cable 2 m, PVC	DOL-1204-G02M	6 009 382

Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1] Warning, reduction of the scanning range!

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- Integrated heating
- High scanning range
- Die-cast housing
- Compact design
- Red light

E

Overview of technical specifications

Scanning range (typical/maximum)	0 m ... 40 m / 0 m ... 50 m
Light sender/type of light	LED / visible red light
Ambient operating temperature	–40 °C ... +60 °C
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Construction size (H x W x D)	87.5 mm x 27 mm x 65 mm

Product description

The SICK single-beam photoelectric safety switch WS/WE 24-2 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

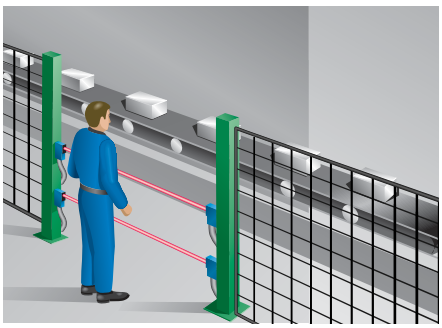
Combination with	Type according to EN 61496	Switching outputs	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE 20	2	2 PNP semiconductors [1]	6	✔	✔	–	L-53
LE 20 Muting	2	2 PNP semiconductors [1]	6	✔	✔	✔	L-60
UE 10-3 OS	–	Relay (3 N/O contacts, 1 N/C contact)	–	–	✔	–	L-3
UE 10-2 OS	–	Relay, 2 N/O contacts	–	–	✔	–	L-59

[1] Short-circuit protected, cross-circuit monitored

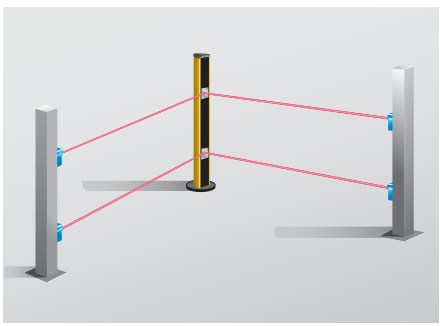
Applications

➜ For more applications please refer to the application finder at www.sick.com

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



Access protection on a conveyor system



Access protection with mirror deflection

Further information	Page
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➜ Accessories	E-30
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Ordering information

→ Accessories see page E-30

Single-beam photoelectric safety switch WS/WE 24-2

Designation	Description	Connection	Type	Part number
Light sender and light receiver without heating	▪ Scanning range 40 m ▪ PNP ▪ Q and $\overline{Q}$	Cable gland	WS/WE24-2P250	1 018 049
		Device plug M12, 4-pin	WS/WE24-2P450	1 018 051
Light sender and light receiver with heating		Cable gland	WS/WE24-2P260	1 018 050
		Device plug M12, 4-pin	WS/WE24-2P460	1 018 052
Light receiver without heating	▪ Scanning range 40 m ▪ PNP ▪ Q and $\overline{Q}$	Cable gland	WE24-2P250	2 021 449
		Device plug M12, 4-pin	WE24-2P450	2 021 453
Light receiver with heating		Cable gland	WE24-2P260	2 021 451
		Device plug M12, 4-pin	WE24-2P460	2 021 455
Light sender without heating	▪ Scanning range 40 m	Cable gland	WS24-2D250	2 021 448
		Device plug M12, 4-pin	WS24-2D450	2 021 452
Light sender with heating		Cable gland	WS24-2D260	2 021 450
		Device plug M12, 4-pin	WS24-2D460	2 021 454

E

Detailed technical specifications

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

General system data

Scanning range (typical/maximum)	0 m ... 40 m / 0 m ... 50 m
Light spot diameter	Approx. 600 mm in 50 m distance
Aperture and receive angle (typically/maximum)	±4° / ±5°
Light sender	LED
Type of light	Visible red light (660 nm), pulsating, average service life 100 000 h (with $T_A = 25$ °C)
Protection class	II
Circuit protection	Reverse polarity protected V_S connections, short-circuit protected output Q and $\overline{Q}$, interference suppression
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Supply voltage V_S	24 V DC (±20 %)

Sender unit

Test input TI	
Sender on	TI to V_S or not connected
Sender off	TI to 0 V
Power consumption	
WS 24-2 D250/D450	Max. 50 mA
WS 24-2 D260/D460	Max. 70 mA

Continued on next page

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Receiver unit

Switching outputs	PNP, Q and $\overline{Q}$
Response time/switching sequence	Max. 500 µs / max. 1000/s
Output current I_0	Max. 100 mA
Power consumption	
WE 24-2 D250/D450	Max. 150 mA
WE 24-2 D260/D460	Max. 170 mA

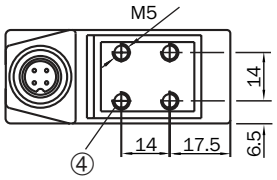
Operating data

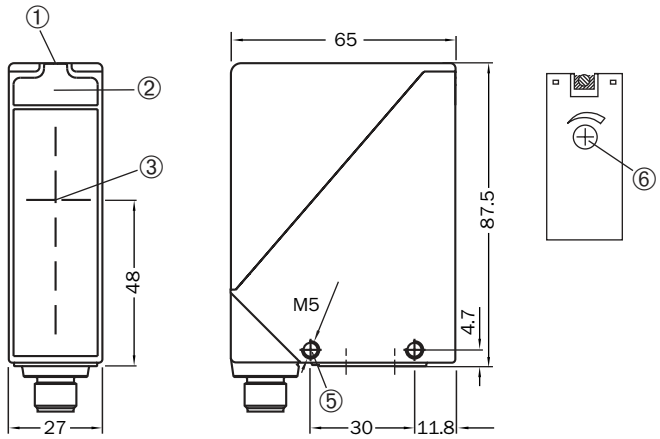
Type of connection	Connector M12, 4-pin or cable gland
Ambient operating temperature T_A	–40 °C ... +60 °C
Storage temperature T_S	–40 °C ... +75 °C
Weight	Approx. 330 g
Front screen heating	WS/WE 24-2 P260 and WS/WE 24-2 P460

E

Dimensional drawings

WS/WE 24-2 P 450
P 460





WS/WE 24-2 P 250
P 260

Dimensions in mm

① Alignment sight
② LED
③ Sender/receiver optical axis
④ Fastening thread M5, 6 mm deep
⑤ Fastening thread M5, through hole
⑥ Sensitivity adjuster (WE)

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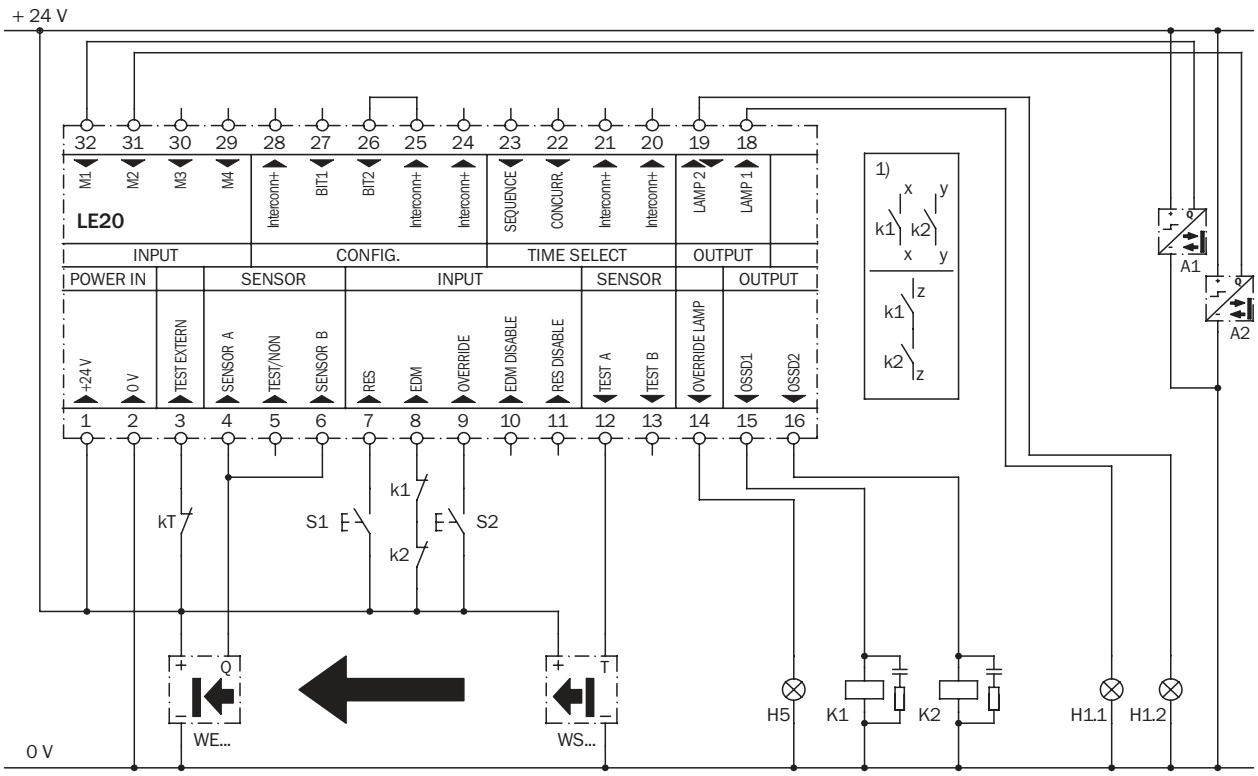
Connection diagram

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

WS/WE 24-2 on safety evaluation unit LE 20 Muting



Task

Integration of the single-beam photoelectric safety switch in a control via an LE 20. 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 LE 20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE 20 (terminals 15 and 16) activate the contactors K1 and K2. If the light beam is interrupted, the LE 20 deactivates the contactors K1 and K2.

Muting

The protective field must be clear, and the OSSDs on the LE 20 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 LE 20. 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 LE 20 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.

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Accessories

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

Mounting accessories

Designation	Description	Type	Part number
Mounting bracket	▪ Large for WS/WE 24-2	BEF-WG-W24	4 026 324

Connector technology

Designation	Description	Type	Part number
Cable socket M12	▪ 4-pin ▪ Straight	DOS-1204-G	6 007 302
	▪ 4-pin ▪ Straight ▪ Cable 2 m, PVC	DOL-1204-G02M	6 009 382

Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1] Warning, reduction of the scanning range!

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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
Ambient operating temperature	–40 °C ... +60 °C
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Construction size (H x W x D)	80 mm x 24 mm x 53,5 mm

Product description

The SICK single-beam photoelectric safety switch WS/WE 27-2 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

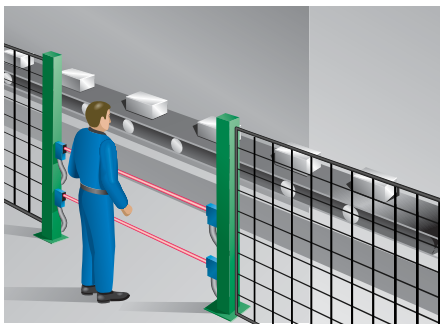
Combination with	Type according to EN 61496	Switching outputs	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE 20	2	2 PNP semiconductors [1]	6	✔	✔	–	L-53
LE 20 Muting	2	2 PNP semiconductors [1]	6	✔	✔	✔	L-60
UE 10-3 OS	–	Relay (3 N/O contacts, 1 N/C contact)	–	–	✔	–	L-3
UE 10-2 OS	–	Relay, 2 N/O contacts	–	–	✔	–	L-59

[1] Short-circuit protected, cross-circuit monitored

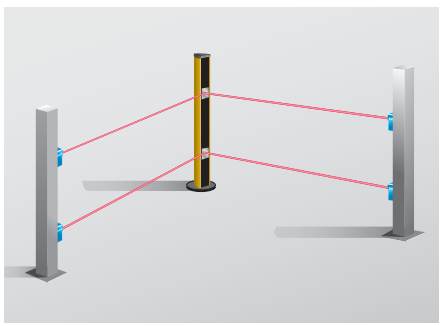
Applications

→ For more applications please refer to the application finder at www.sick.com

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



Access protection on a conveyor system



Access protection with mirror deflection

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

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Further information	Page
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Ordering information

→ Accessories see page E-36

Single-beam photoelectric safety switch WS/WE 27-2

Designation	Description	Connection	Type	Part number
Light sender and light receiver without heating	▪ Scanning range 35 m ▪ PNP ▪ Q and $\overline{Q}$	Device plug M12, 4-pin	WS/WE27-2F460	1 019 561
		Device plug, 7-pin	WS/WE27-2F730	1 015 124
Light sender and light receiver with heating		Device plug M12, 4-pin	WS/WE2-2F450S05	1 016 025
		Device plug, 7-pin	WS/WE27-2F750	1 015 752
Light receiver without heating	▪ Scanning range 35 m ▪ PNP ▪ Q and $\overline{Q}$	Device plug M12, 4-pin	WE27-2F460	2 021 708
		Device plug, 7-pin	WE27-2F730	2 017 895
Light receiver with heating		Device plug M12, 4-pin	WE2-2F450S05	2 018 933
		Device plug, 7-pin	WE27-2F750	2 018 619
Light sender without heating	▪ Scanning range 35 m	Device plug M12, 4-pin	WS27-2D460	2 021 365
		Device plug, 7-pin	WS27-2D730	2 017 894
Light sender with heating		Device plug M12, 4-pin	WS27-2D450S05	2 018 932
		Device plug, 7-pin	WS27-2D750	2 018 618

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Detailed technical specifications

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

General system data

Scanning range (typical/maximum)	0 m ... 25 m / 0 m ... 35 m
Light spot diameter	Approx. 1200 mm in 25 m distance
Aperture and receive angle (typically/maximum)	±4° / ±5°
Light sender	LED
Type of light	Visible red light (660 nm), pulsating, average service life 100 000 h (at $T_A = 25$ °C)
Protection class	II
Circuit protection	Reverse polarity protected V_S connections, short-circuit protected output Q and $\overline{Q}$, interference suppression
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with suitable testing device)
Supply voltage V_S	24 V DC (–30 % ... +20 %)

Sender unit

Test input TI	
Sender on	TI to V_S
Sender off	TI to 0 V
Power consumption	
WS 27-2 D460 and WS 27-2 D730	Max. 35 mA
WS 27-2 D450S05 und WS 27-2 D750	Max. 50 mA

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Receiver unit

Switching outputs	PNP, Q and $\overline{Q}$
Response time/switching sequence	Max. 500 µs / max. 1000/s
Output current I_O	Max. 100 mA
Power consumption	
WE 27-2 D460 and WE 27-2 D730	Max. 35 mA
WE 27-2 D450S05 and WE 27-2 D750	Max. 45 mA

Operating data

Type of connection	Plug-in connection M12, 4-pin, plug-in connection 7-pin
Ambient operating temperature T_A	–40 °C ... +60 °C
Storage temperature T_S	–40 °C ... +75 °C
Weight	Approx. 100 g
Front screen heating	WS/WE 27-2 F450S05 and WS/WE 27-2 F750

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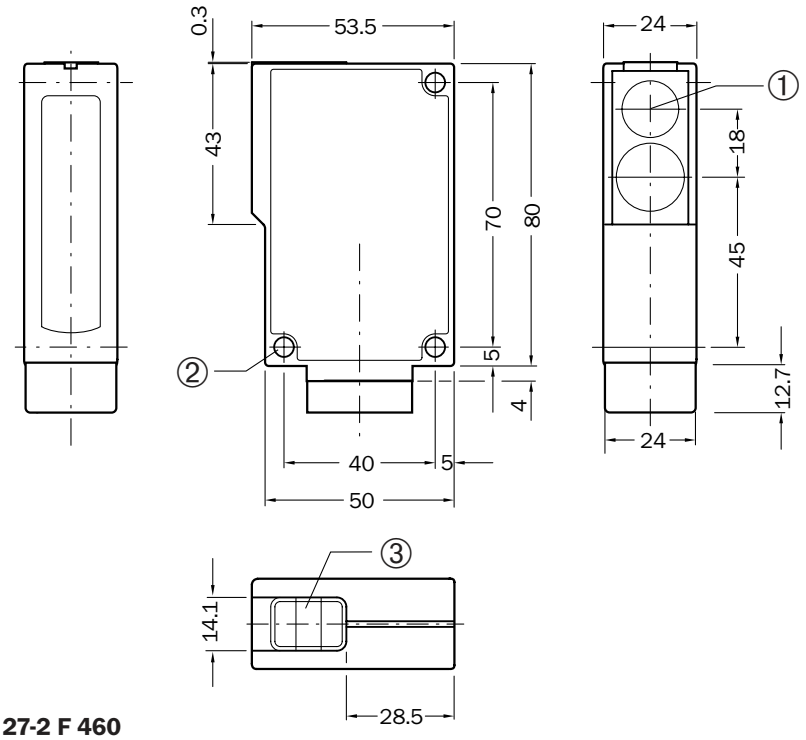
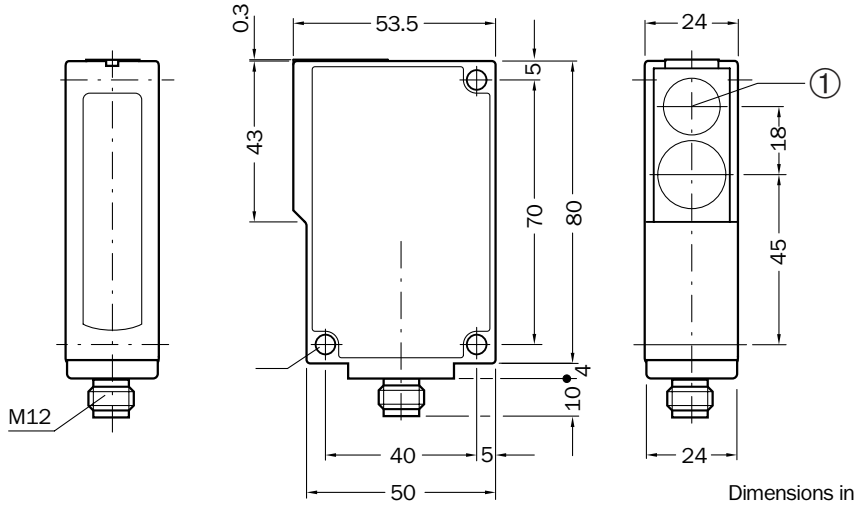
Dimensional drawings

WS/WE 27-2 F 730
WS/WE 27-2 F 750



WS/WE 27-2 F 460
WS/WE 27-2 F 450 S 05



Dimensions in mm

① Centre of optical axis
② Fastening hole Ø 5.2 mm
③ LED

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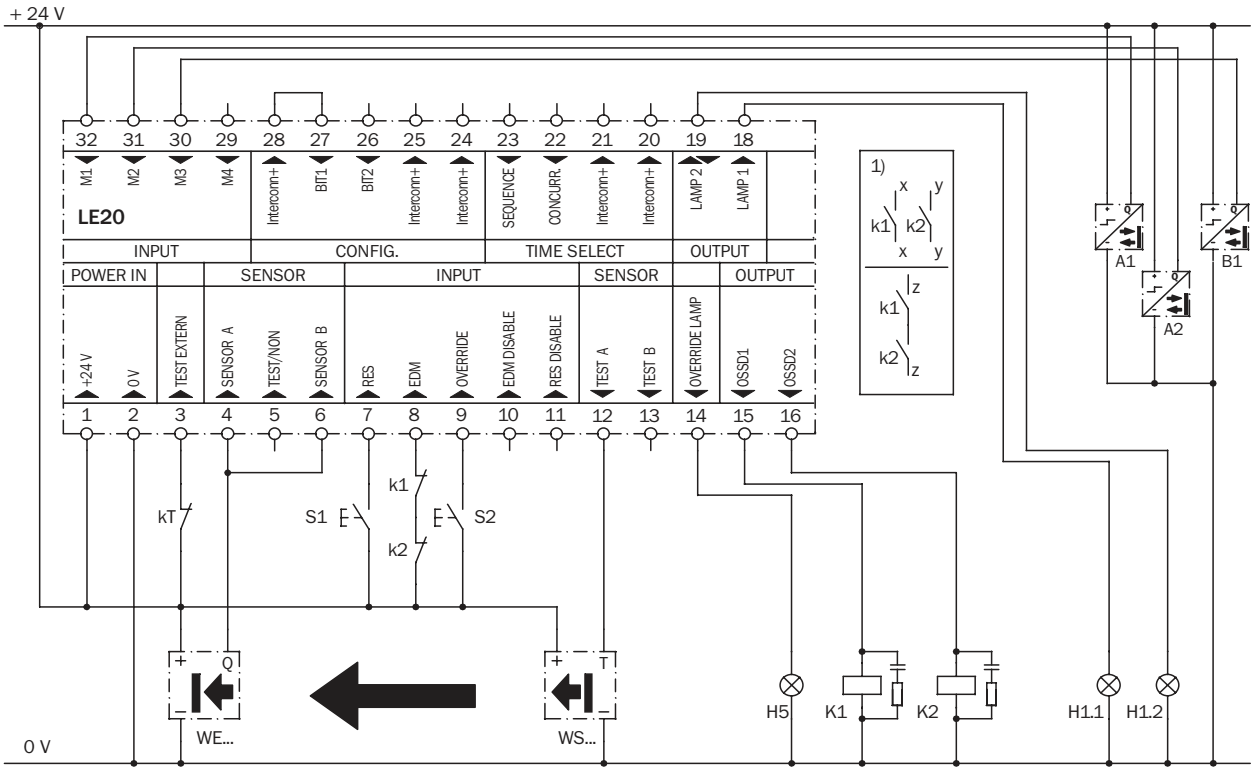
Connection diagram

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

WS/WE 27-2 on safety evaluation unit LE 20 Muting



Task

Integration of the single-beam photoelectric safety switch in a control via an LE 20. 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 LE 20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE 20 (terminals 15 and 16) activate the contactors K1 and K2. If the light beam is interrupted, the LE 20 deactivates the contactors K1 and K2.

Muting

The protective field must be clear, and the OSSDs on the LE 20 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 LE 20. 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 LE 20 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.

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Accessories

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

Mounting accessories

Designation	Description	Type	Part number
Mounting bracket	▪ For WS/WE 27-2	BEF-WN-W27	2 009 122

Connector technology

Designation	Description	Type	Part number
Cable socket M12	▪ 4-pin ▪ Straight	DOS-1204-G	6 007 302
	▪ 4-pin ▪ Straight ▪ Cable 2 m, PVC	DOL-1204-G02M	6 009 382
Rectangular plug-in system cable socket	▪ 7-pin ▪ With coding for DC	DOS-2107-W	6 006 823

Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1] Warning, reduction of the scanning range!

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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
Ambient operating temperature	–25 °C ... +70 °C
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with LE 20)
Construction size (Ø x L)	M18 x 98 mm (straight connection) M18 x 86 mm (angled connection)

Product description

The SICK single-beam photoelectric safety switch VS/VE 18-2 consists of a testable sender and receiver combined with an evaluation unit.

In-system added value

- Combination with SICK interfaces
- Safe interface to bus systems

Combination with	Type according to EN 61496	Switching outputs	Number of sensors	Restart interlock	External device monitoring	Muting	Further information
LE 20	2	2 PNP semiconductors [1]	6	✔	✔	–	L-53
LE 20 Muting	2	2 PNP semiconductors [1]	6	✔	✔	✔	L-60
UE 10-3 OS	–	Relay (3 N/O contacts, 1 N/C contact)	–	–	✔	–	L-3
UE 10-2 OS	–	Relay, 2 N/O contacts	–	–	✔	–	L-59

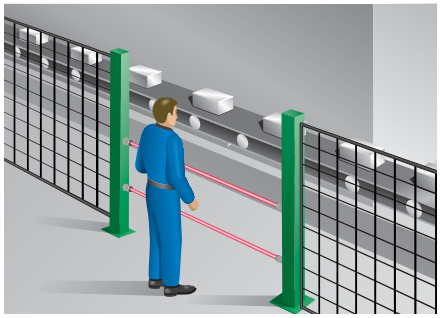
[1] Short-circuit protected, cross-circuit monitored

Applications

→ For more applications please refer to the application finder at www.sick.com

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

Lateral protection on an automated guided vehicle



Access protection on a conveyor system

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

E

CE

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Ordering information

→ Accessories see page E-41

Single-beam photoelectric safety switch VS/VE 18-2

Designation	Description	Connection	Type	Part number
Light sender and light receiver	▪ Scanning range 16 m ▪ Metal housing	M12, 4-pin, angled	VS/VE18-204550	6 011 845
		M12, 4-pin, straight	VS/VE18-204450	6 011 846
Light receiver	▪ Scanning range 16 m ▪ Metal housing	M12, 4-pin, angled	VE18-204550	6 011 850
		M12, 4-pin, straight	VE18-204450	6 011 848
Light sender	▪ Scanning range 16 m ▪ Metal housing	M12, 4-pin, angled	VS18-2D5550	6 011 847
		M12, 4-pin, straight	VS18-2D5450	6 011 849

E

Detailed technical specifications

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

General system data

Scanning range (typical/maximum)	0 m ... 16 m / 0 m ... 22 m
Light spot diameter	Approx. 1200 mm in 25 m distance
Aperture and receive angle (typically/maximum)	±4° / ±5°
Light sender	LED
Type of light	Visible red light (660 nm), pulsating, average service life 100 000 h (at T_A = 25 °C)
Protection class	III
Circuit protection	Reverse polarity protected V_S connections, short-circuit protected output, interference suppression
Enclosure rating	IP 67
Type	Type 2 according to EN 61496 (only in conjunction with LE 20)
Supply voltage V_S	24 V DC (–30 % ... +20 %)

Sender unit

Power consumption **VS 18-2 D5450/D5550**	Max. 35 mA

Receiver unit

Switching outputs	PNP
Response time/switching sequence	Max. 2 ms / max. 250/s
Output current I_O	Max. 100 mA
Power consumption **VE 18-2 04450/04550**	Max. 25 mA

Operating data

Type of connection	M12, 4-pin, straight/angled
Ambient operating temperature T_A	–25 °C ... +70 °C
Weight	Approx. 250 g

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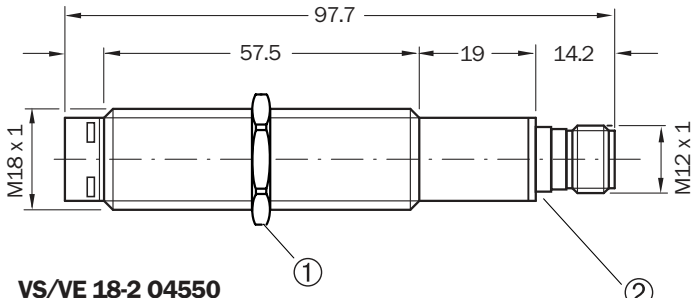
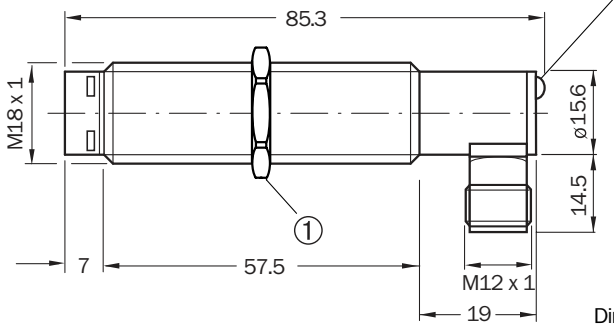
Dimensional drawings

VS/VE 18-2 04450



VS/VE 18-2 04550



Dimensions in mm

① Mounting nut M18
② LED

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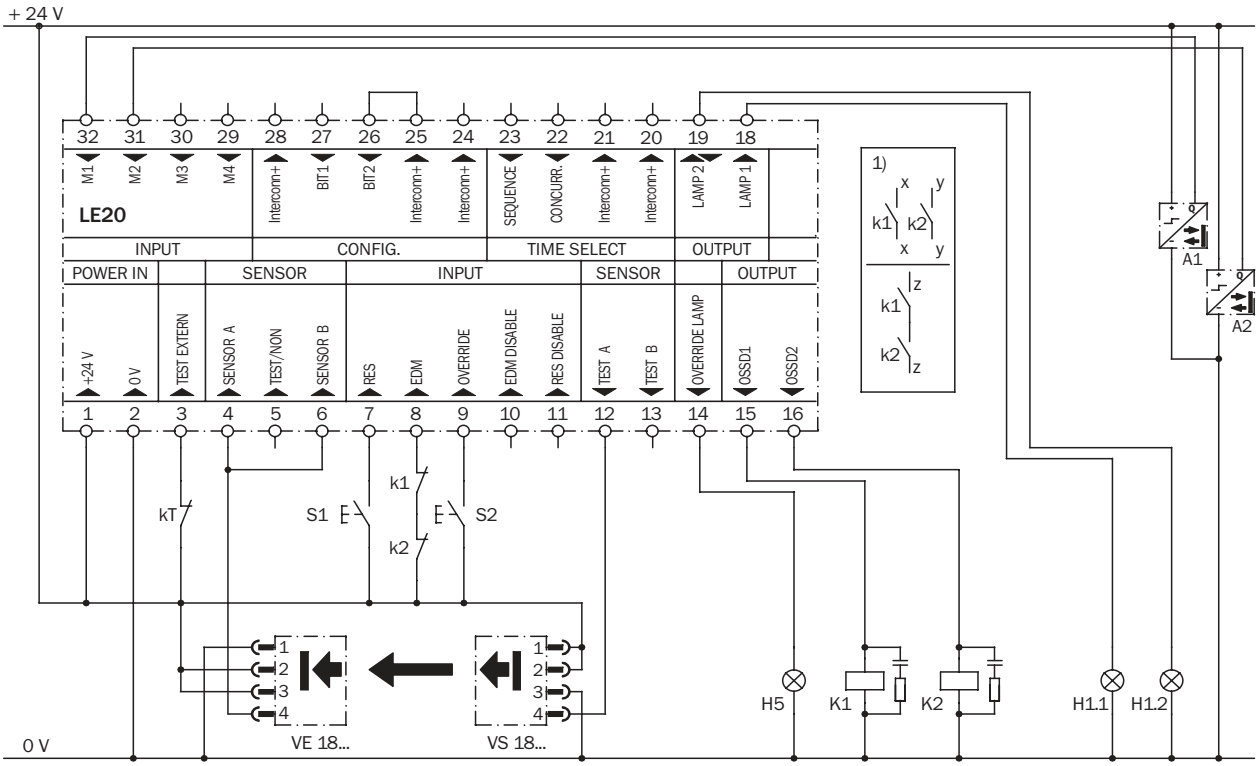
Connection diagram

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

VS/VE 18-2 on safety evaluation unit LE 20 Muting



Task

Integration of the VS/VE 18-2 04450 or VS/VE 18-2 04550 single-beam photoelectric safety switch in a control via an LE 20. 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 LE 20 are switched on by pressing S1 (button is pressed and released). The OSSDs of the LE 20 (terminals 15 and 16) activate the contactors K1 and K2. If the light beam is interrupted, the LE 20 deactivates the contactors K1 and K2.

Muting

The protective field must be clear, and the OSSDs on the LE 20 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 in the light beam, the object can be moved out of the protective field by operating the button S2. This is only possible if both muting signals (A1 and A2) are present at the LE 20. 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 LE 20 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.

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Accessories

Interfaces

Designation	Description	Connection	Type	Part number
Safety evaluation unit LE 20	▪ IP 20 ▪ 2 PNP OSSDs, 500 mA	▪ With screw terminal connector ▪ 16-pin	LE20-2612	1 016 503
		▪ With terminal plug spring ▪ Angled ▪ 16-pin	LE20-2614	1 016 505
Safety evaluation unit LE 20 Muting		▪ With screw terminal connector ▪ 15- and 16-pin	LE20-2622	1 016 502
		▪ With terminal plug spring ▪ 15- and 16-pin	LE20-2624	1 016 501
Safety relay	▪ For opto-electronic protective devices	–	UE10-3OS2D0	6 024 917
	▪ For opto-electronic protective devices	–	UE10-3OS3D0	6 024 918
	▪ With screw type terminals	–	UE10-2OS2D0	2 019 772
	▪ With spring terminals	–	UE10-2OS4D0	2 019 771
	▪ Without terminals	–	UE10-2OS1D0	6 020 342

Mounting accessories

Designation	Description	Type	Part number
Mounting bracket	▪ For VS/VE 18-2	BEF-M18	5 308 446

Connector technology

Designation	Description	Type	Part number
Cable socket M12	▪ 4-pin ▪ Straight	DOS-1204-G	6 007 302
	▪ 4-pin ▪ Straight ▪ Cable 2 m, PVC	DOL-1204-G02M	6 009 382

Deflector mirrors

Designation	Description	Type	Part number
Deflector mirror [1]	▪ Mirror surface 96 mm x 124 mm	PSK1	1 005 229
	▪ Mirror surface 105 mm x 160 mm	PNS105-1	1 004 076
	▪ Mirror surface 75 mm x 80 mm ▪ Including mounting adapter (2 pc. swivel mount)	PNS75-008	1 026 647
	▪ For 90° beam deflection ▪ Including mounting kit	PSK45	5 306 053
Bracket	▪ For PSK 1	BEF-GH	2 009 292
Spring fastening		–	2 012 473

[1] Warning, reduction of the scanning range!

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Explanations of features

Positive action normally closed contacts/normally open contacts

Safety switches have contact elements in normally closed contact/normally open contact combinations. The normally closed contacts of a safety switch are of the “positive action” type, i.e. the forced movement of the normally closed contact ensures that the contacts are separated every time. Normally open contacts primarily serve as signalling contacts and must not be used for the safety circuit.

Housing material

The housing materials used can be separated into two large groups - “metals” and “plastics”. The metal housing materials are available as both anodised die-cast light metal and painted die-cast zinc versions. Glass-fibre reinforced thermoplastics are exclusively used for the plastic housings.

Number of actuation directions

Safety switches can be actuated in different axes. The setting of the actuating direction is facilitated by the head, which can be rotated through 90 or 180 degrees. Up to 5 actuation directions can be implemented, depending on the type.

Type of actuator

The majority of safety switches have appropriately coded tongue-operated actuators that prevent simple manipulation of the switch.

The i1000 series has an additional handle-operated actuator with coded spindle. It is not actuated by applying a force but by applying a torque.

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Safety switches with separate actuator

F

Safety application	Number of positive action normally closed contacts/ normally open contacts [1]	Housing material [1]	Number x size of cable gland	Locking force	Type of actuator [1]	Product	Page
	1 / 1 2 / 0	Plastic	1 x M20	10 N	Tongue operated	i10	F-2
	1 / 0 2 / 1		1 x M16 or 3 x M16	10 N		i11 mini	F-7
	1 / 1 2 / 1		1 x M16	–		i12 S	F-12
	1 / 1 2 / 0		3 x M20	30 N		i16 S	F-17
	2 / 1		3 x M20	–		i17 S	F-21
	3 / 1	Metal	1 x M20	–	Tongue operated	i100 S	F-25
	3 / 1 2 / 2		1 x M20	5 N		i110 S	F-31
	2 / 1		1 x PG13.5	–	Handle operated	i1001	F-35
	2 / 1		1 x PG13.5	–	Tongue operated	i1002	F-41

[1] Explanation see page F-0

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- Housing material glass-fibre reinforced thermoplastic
- Five actuating directions
- Cable gland M20
- Enclosure rating IP 67

F

Overview of technical specifications

Number of positive action normally closed contacts (depending on type)	1 / 2
Number of normally open contacts (depending on type)	1 / 0
Type of actuator	Tongue operated
Housing material	Plastic
Number of cable entries	1
Size of the cable gland	M20
Locking force	10 N

Product description

- Safety switches with separate coded actuator
- 2-pole contact element
- Various actuator versions available

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. ➜ see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. ➜ see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

➜ see N-0

Ordering information

Positive action normally closed	Normally open	Type	Part number
1	1	i10-A113	6 022 530
2	0	i10-A203	6 022 529

Please order actuator separately

Further information	Page
➜ Actuators	F-4
➜ Lockout bar	F-6
➜ Other accessories	F-6
➜ Services	A-0

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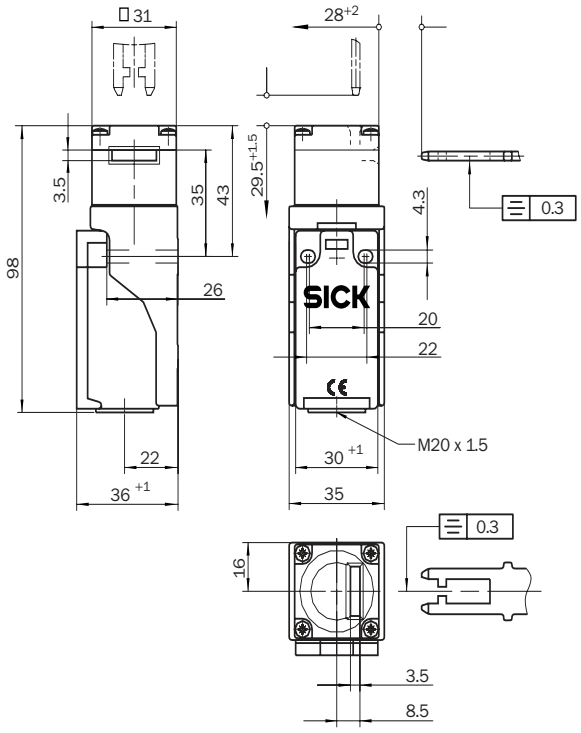
8 010 889/15-10-04

Detailed technical specifications

Type	i10-A113	i10-A203
Housing material	Glass-fibre reinforced thermoplastic	
Enclosure rating	IP 67	
Mechanical life (relay contacts)	10^6 switching cycles	
Ambient operating temperature from ... to	–20 °C ... +80 °C	
Maximum approach speed	333 mm/s	
Switching principle	Slow-action-switch	
Number of positive action normally closed contacts	1	2
Number of normally open contacts	1	0
Usage category in compliance with IEC 947-5-1	AC-15/DC-13	
Rated operating current (voltage)	4 A (230 V AC), 4 A (24 V DC)	
Rated insulation voltage U_i	400 V	
Impulse withstand voltage U_{imp}	2500 V AC	
Minimum switching voltage	24 V DC	
Minimum switching current (switching voltage)	30 mA (24 V DC)	
Contact material	Silver alloy, gold flashed	
Connection type	Cable gland	
Maximum connection cable cross-section	1.5 mm²	
Short circuit protection	T6/F10	
Weight	0.15 kg	0.14 kg

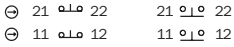
F

Dimensional drawings



Dimensions in mm

Switching elements

Actuator inserted	Actuator removed	
		11, 1 positive action NC contact + 2 NO contacts
		20, 2 positive action NC contacts

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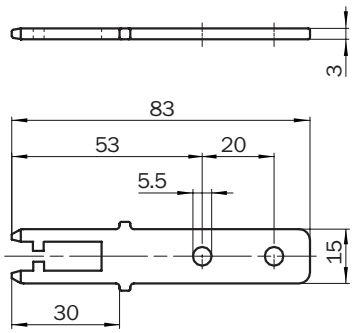
Actuators

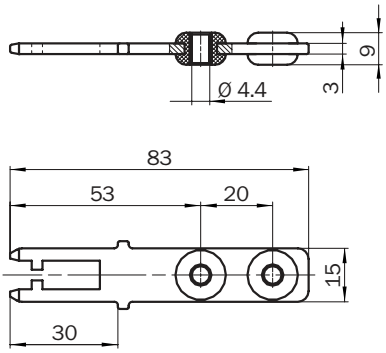
Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	1000 mm	iE10-S1	5 306 527
	Rubber-mounted	1000 mm	iE10-S2	5 306 530
Angled	Rigid	1000 mm	iE10-A1	5 306 535
Radius	Semi flexible	90 mm	iE10-R1	5 306 528
		100 mm	iE10-R2	5 306 529

iE10-S1



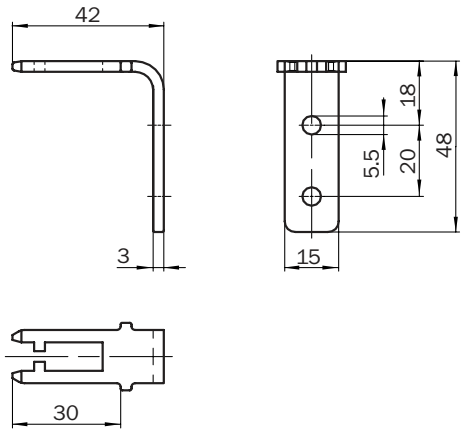
2 safety screws included.
Min. door radius 1000 mm.

iE10-S2



2 safety screws included.
Min. door radius 1000 mm.

iE10-A1



2 safety screws included.
Min. door radius 1000 mm.

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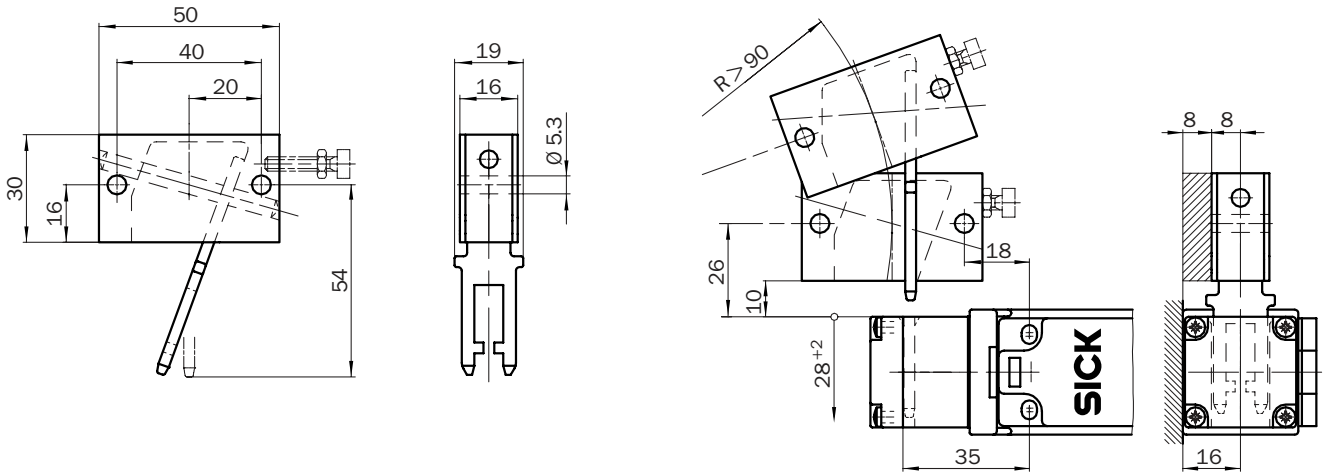
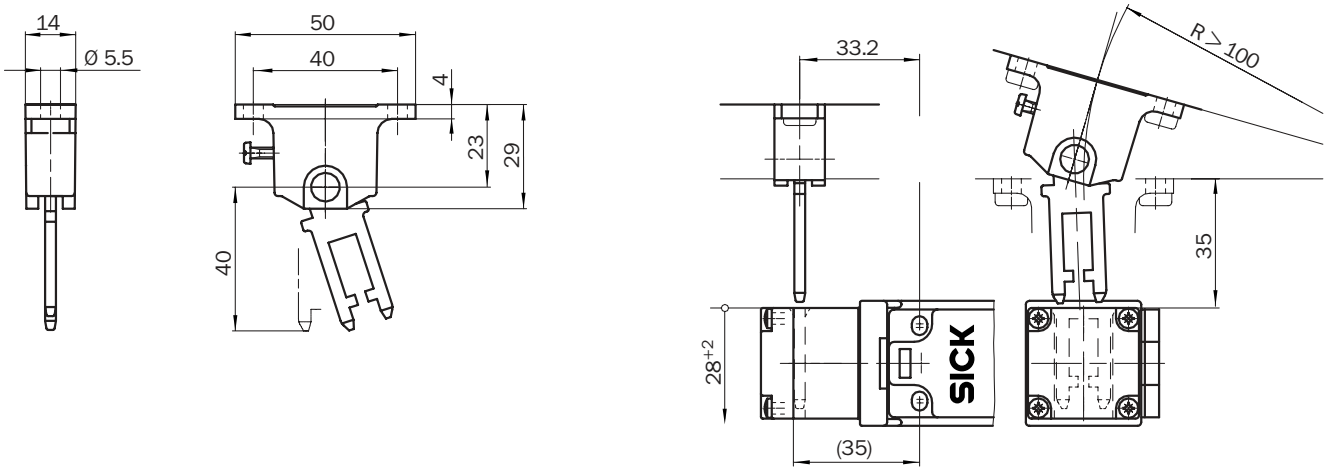
iE10-R1



2 safety screws included.
Min. door radius 90 mm.

iE10-R2



2 safety screws included.
Min. door radius 100 mm.

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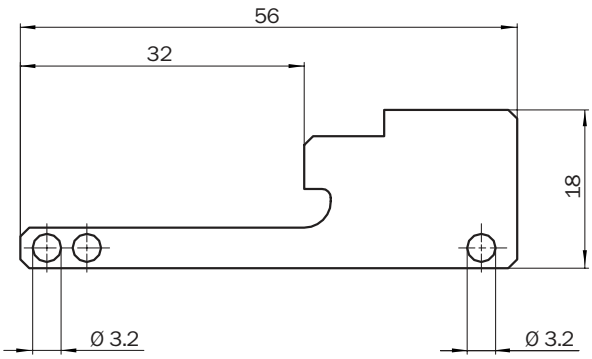
Lockout bar

Type	Part number
iE10-S3	5 306 536

iE10-S3



The locking bar can be inserted into the safety switch in place of the actuator when the safety guard is in the open condition and can be secured to prevent its removal by standard commercially available padlocks (max. 2 pcs.). This guarantees reliable protection for persons who have to enter potentially hazardous areas.

F

Other accessories

Cable gland

Type	Part number
Cable gland M20	5 309 164

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Overview of technical specifications

Number of positive action normally closed contacts (depending on type)	1 / 2
Number of normally open contacts (depending on type)	0 / 1
Type of actuator	Tongue operated
Housing material	Plastic
Number of cable entries (depending on type)	1 / 3
Size of the cable gland	M16
Locking force	10 N

Product description

- Safety switches with separate coded actuator
- 1- or 3-pole contact element
- Miniature design - ideal for direct mounting on framework

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. ➜ see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. ➜ see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

➜ see N-0

Ordering information

Positive action normally closed	Normally open	Type	Part number
1	0	i11-S103 mini	6 022 584
2	1	i11-S213 mini	6 022 583

Please order actuator separately

F

- Housing material glass-fibre reinforced thermoplastic
- Five actuating directions
- Cable gland M16
- Enclosure rating IP 67

Further information	Page
➜ Technical specifications	F-8
➜ Dimensional drawings	F-9
➜ Switching elements	F-9
➜ Actuators	F-10
➜ Other accessories	F-11
➜ Services	A-0

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Detailed technical specifications

Type	i11-S103 mini	i11-S213 mini
Housing material	Glass-fibre reinforced thermoplastic	
Enclosure rating	IP 67	
Mechanical life (relay contacts)	10^6 switching cycles	
Ambient operating temperature from ... to	–20 °C ... +80 °C	
Maximum approach speed	333 mm/s	
Actuation force	6 N	
Switching principle	Slow-action-switch	
Number of positive action normally closed contacts	1	2
Number of normally open contacts	0	1
Usage category in compliance with IEC 947-5-1	AC-15/DC-13	
Rated operating current (voltage)	6 A (230 V AC), 6 A (24 V DC)	
Rated insulation voltage U_i	250 V	
Impulse withstand voltage U_{imp}	2500 V AC	
Minimum switching voltage	12 V DC	
Minimum switching current (switching voltage)	10 mA (24 V DC)	
Contact material	Silver alloy, gold flashed	
Connection type	Cable gland	
Maximum connection cable cross-section	1.5 mm²	
Short circuit protection	T10/F20	
Weight	0.1 kg	

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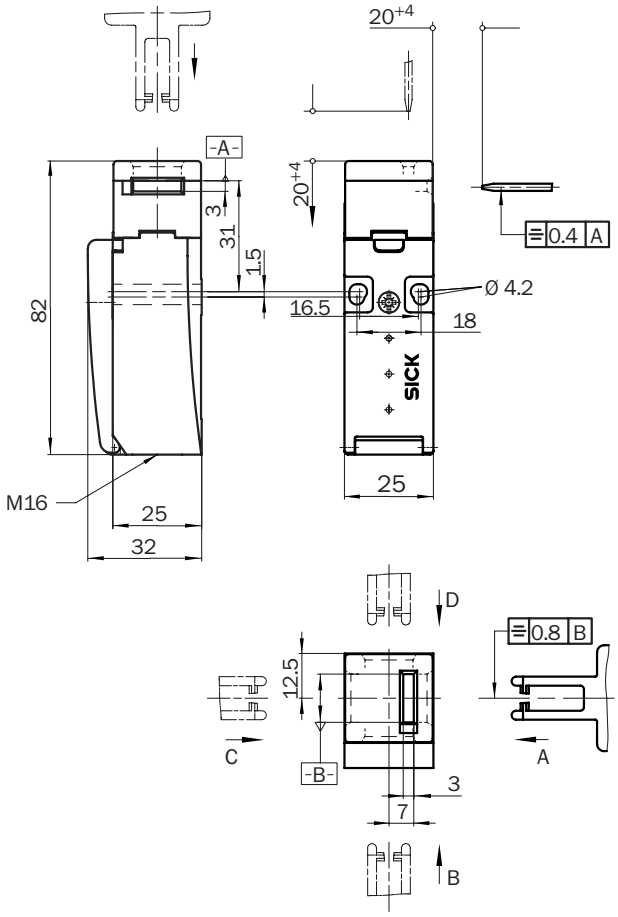
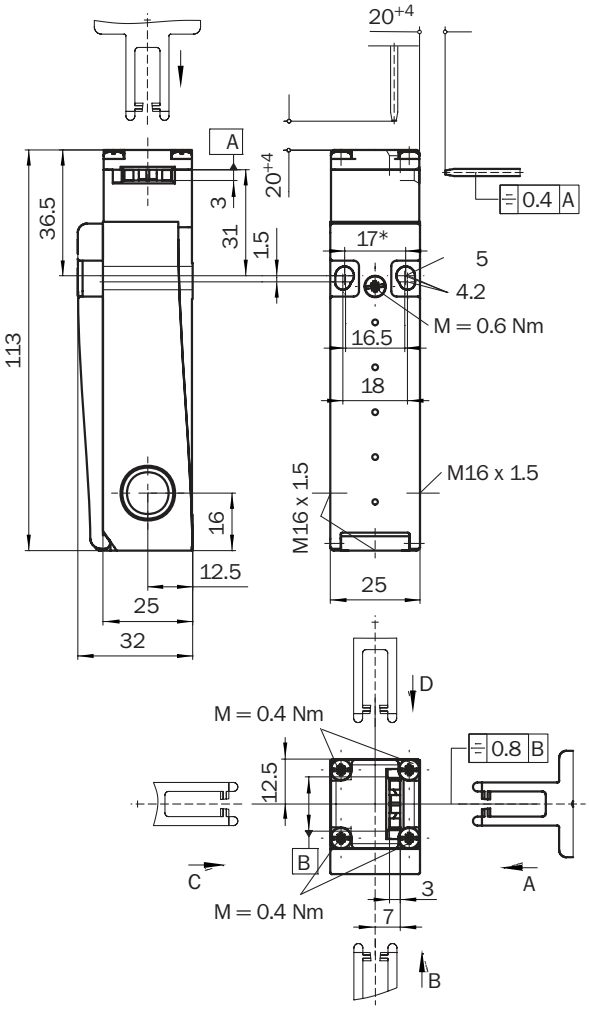
Dimensional drawings

i11-S103 mini

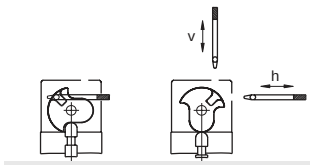
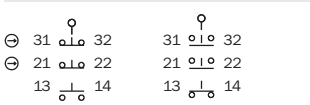


i11-S213 mini



Dimensions in mm

Switching elements

Actuator inserted	Actuator removed	
		10, 1 positive action NC contact
		21, 2 positive action NC contacts + 1 NO contact

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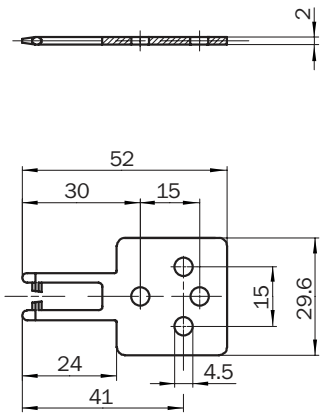
Actuators

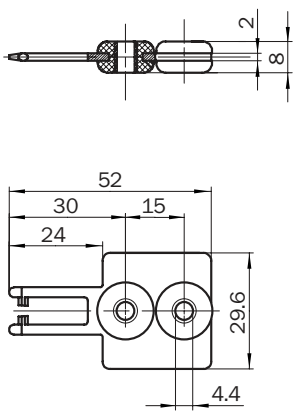
Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	150 mm	iE11-S1	5 306 537
	Rubber-mounted, in line	150 mm	iE11-S2	5 306 539
	Rubber-mounted, transversal	150 mm	iE11-S3	5 306 540
Angled	Rigid	150 mm	iE11-A1	5 306 538
	Rubber-mounted, transversal	150 mm	iE11-A2	5 306 541

iE11-S1



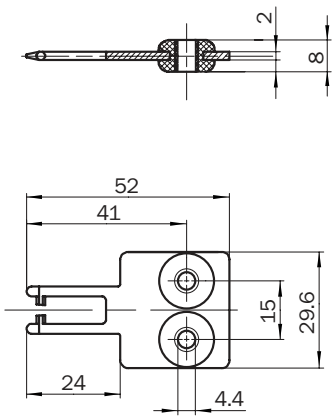
2 safety screws M4 x 14 included

iE11-S2



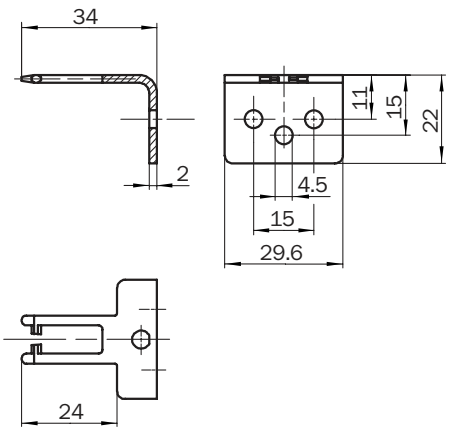
2 safety screws M4 x 14 included

iE11-S3



2 safety screws M4 x 14 included

iE11-A1



2 safety screws M4 x 14 included

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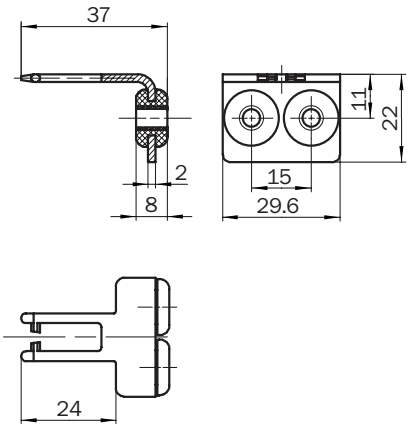
iE11-A2



2 safety screws M4 x 14 included

Other accessories

F

Cable gland

Type	Part number
Cable gland M16	5 309 163

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F

- Housing material glass-fibre reinforced thermoplastic
- Five actuating directions
- Cable gland M16
- Two designs: miniature design and design according to EN 50047
- Enclosure rating IP 67

Further information	Page
→ Dimensional drawings	F-14
→ Switching elements	F-15
→ Actuators	F-15
→ Other accessories	F-16
→ Services	A-0

Overview of technical specifications

Number of positive action normally closed contacts (depending on type)	1 / 2
Number of normally open contacts (depending on type)	1 / 2
Type of actuator	Tongue operated
Housing material	Plastic
Number of cable entries	1
Size of the cable gland	M16

Product description

- Safety switches with separate coded actuator
- 2-, or 3-pole contact element
- One version as miniature design - ideal for direct mounting on framework
- Small door radius (60mm) possible

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

→ see N-0

Ordering information

Positive action normally closed	Normally open	Type	Part number
1	1	i12-SA113	6 025 057
2	1	i12-SB213	6 025 059

Please order actuator separately

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8 010 889/15-10-04

Detailed technical specifications

Type	i12-SA113	i12-SB213
Housing material	Glass-fibre reinforced thermoplastic	
Enclosure rating	IP 67	
Mechanical life (relay contacts)	10^6 switching cycles	
Ambient operating temperature from ... to	–20 °C ... +80 °C	
Maximum approach speed	160 mm/s	
Actuation force	6 N	
Switching principle	Slow-action-switch	
Number of positive action normally closed contacts	1	2
Number of normally open contacts	1	
Usage category in compliance with IEC 947-5-1	AC-15/DC-13	
Rated operating current (voltage)	3 A (240 V AC), 6 A (120 V AC), 1.1 A (250 V DC), 2.2 A (125 V DC)	
Rated insulation voltage U_i	250 V	
Impulse withstand voltage U_{imp}	2500 V AC	
Minimum switching voltage	5 V DC	
Minimum switching current (switching voltage)	5 mA (5 V DC)	
Connection type	Cable gland	
Maximum connection cable cross-section	1.5 mm²	
Short circuit protection	T10/F10	
Weight	0.08 kg	0.11 kg

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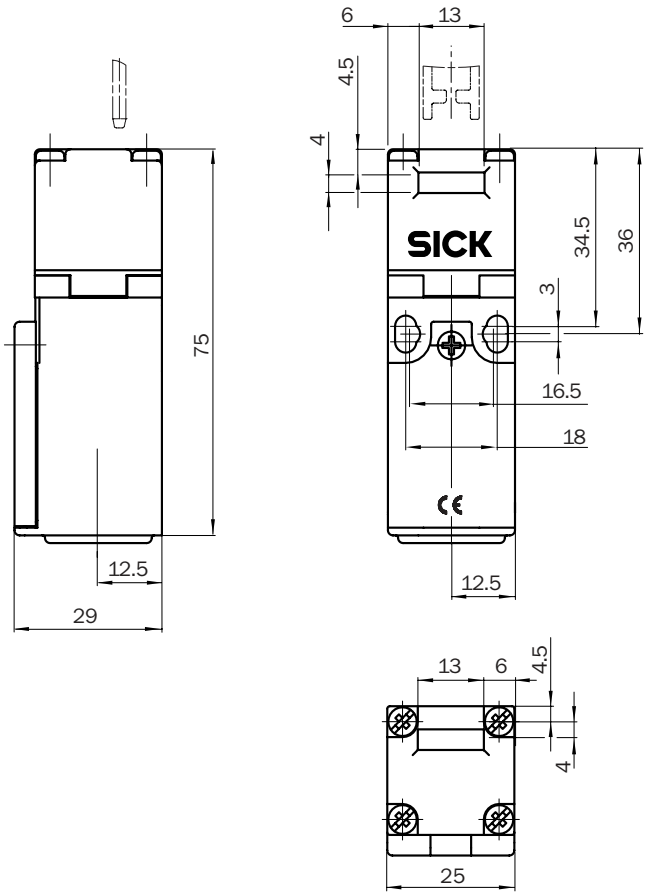
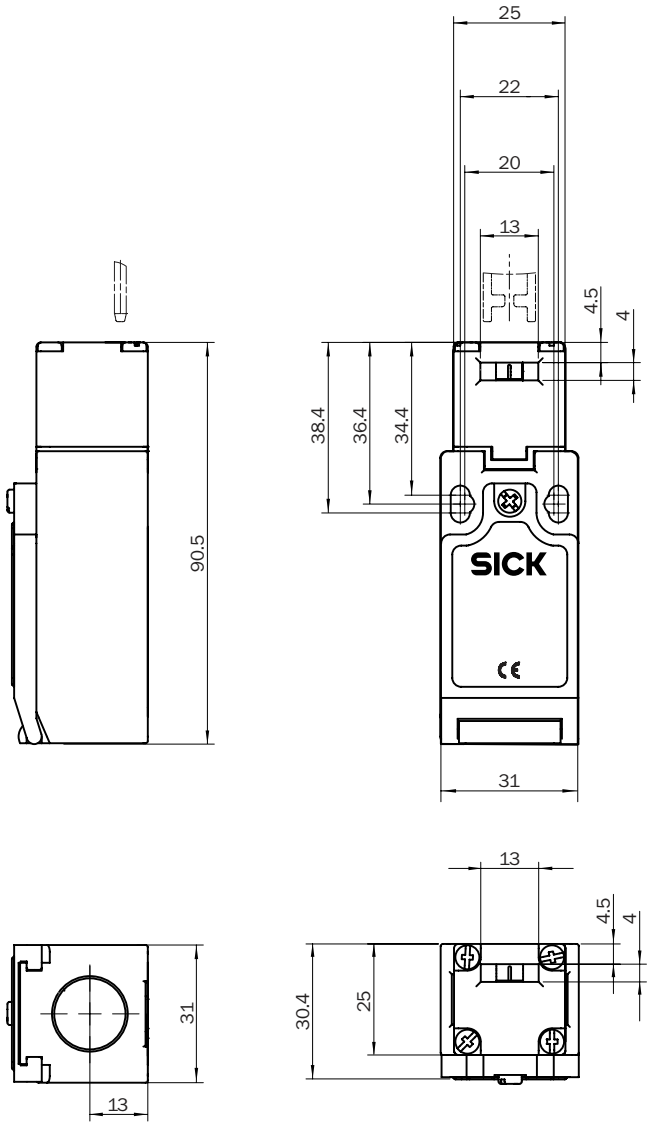
Dimensional drawings

i12-SA113



i12-SB213



Dimensions in mm

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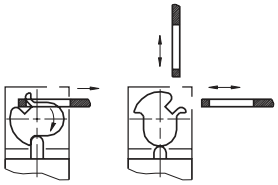
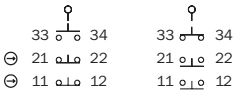
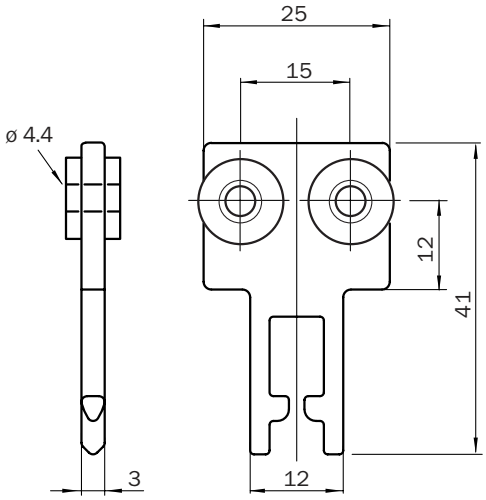
Switching elements

Actuator inserted	Actuator removed	
		
		11, 1 positive action NC contact + 1 NO contact
		21, 2 positive action NC contacts + 1 NO contact

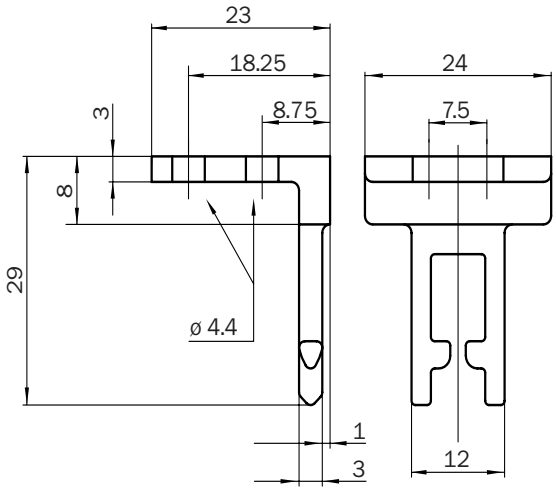
Actuators

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	150 mm	iE12-S1	5 311 131
Angled	Rigid	150 mm	iE12-A1	5 311 132
Radius	Semi flexible	60 mm	iE12-F1	5 308 842

iE12-S1



iE12-A1



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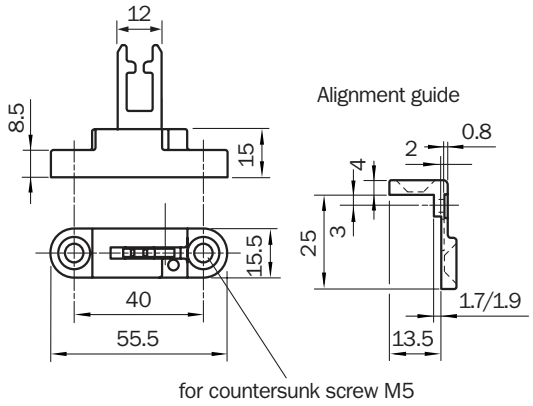
iE12-F1



Other accessories

Cable gland

Type	Part number
Cable gland M16	5 309 163

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Overview of technical specifications

Number of positive action normally closed contacts (depending on type)	1 / 2
Number of normally open contacts (depending on type)	1 / 0
Type of actuator	Tongue operated
Housing material	Plastic
Number of cable entries	3
Size of the cable gland	M20
Locking force	30 N

Product description

- Safety switches with separate coded actuator
- 2-pole contact element
- Easy conversion of actuating direction through rotatable head

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

→ see N-0

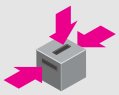
Ordering information

Positive action normally closed	Normally open	Type	Part number
1	1	i16-SA113	6 025 065
2	0	i16-SA203	6 025 063

Please order actuator separately

- Housing material glass-fibre reinforced thermoplastic
- Three actuating directions
- 30 N locking force
- Cable gland 3 x M20
- Enclosure rating IP 67

F



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Detailed technical specifications

Type	i16-SA113	i16-SA203
Housing material	Glass-fibre reinforced polybutylene terephthalate (PBT)	
Enclosure rating	IP 67	
Mechanical life (relay contacts)	10^6 switching cycles	
Ambient operating temperature from ... to	–20 °C ... +80 °C	
Maximum approach speed	160 mm/s	
Actuation force	30 N	
Switching principle	Slow-action-switch	
Number of positive action normally closed contacts	1	2
Number of normally open contacts	1	0
Usage category in compliance with IEC 947-5-1	AC-15/DC-13	
Rated operating current (voltage)	2 A (250 V AC), 5 A (100 V AC), 0.5 A (250 V DC), 2 A (24 V DC)	
Rated insulation voltage U_i	500 V	
Impulse withstand voltage U_{imp}	2500 V AC	
Minimum switching voltage	5 V DC	
Minimum switching current (switching voltage)	5 mA (5 V DC)	
Contact material	Silver, nickel	
Connection type	Cable gland	
Maximum connection cable cross-section	1.5 mm²	
Short circuit protection	T10/F10	
Weight	0.14 kg	

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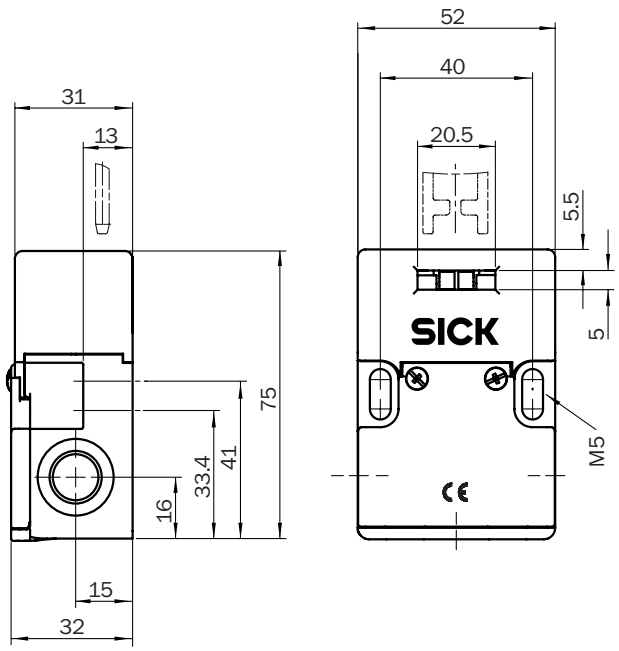
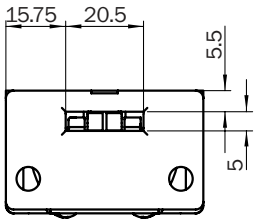
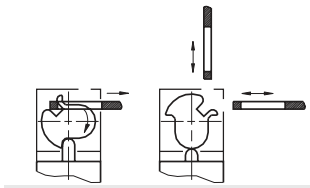
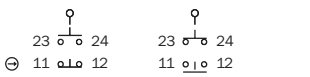
Dimensional drawings





Dimensions in mm

Switching elements

Actuator inserted	Actuator removed	
		20, 2 positive action NC contacts
		11, 1 positive action NC contact + 1 NO

Actuators

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	175 mm	iE16-S1	5 311 128
	Fully flexible	60 mm	iE16-F1	5 311 129
Radius	Semi flexible	60 mm	iE16-F2	5 311 278

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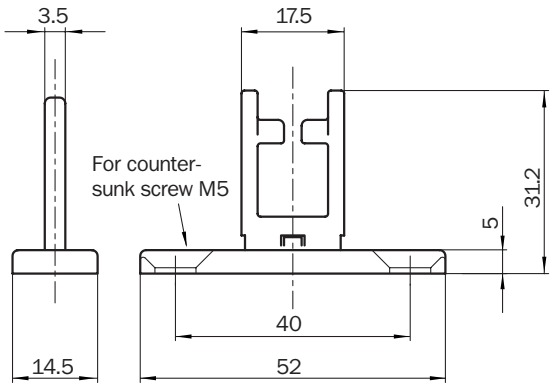
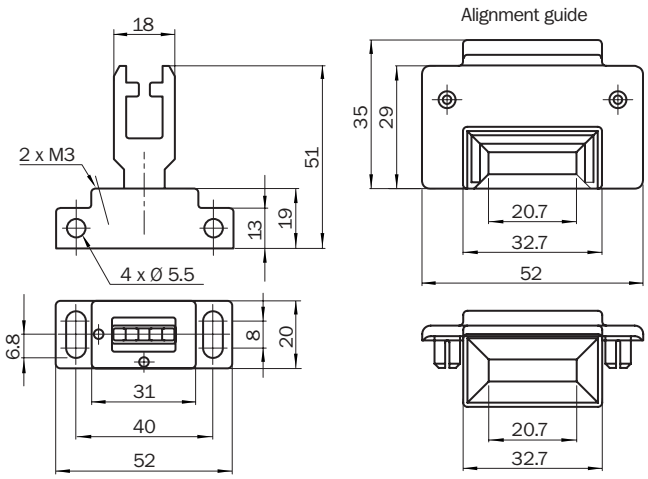
iE16-S1



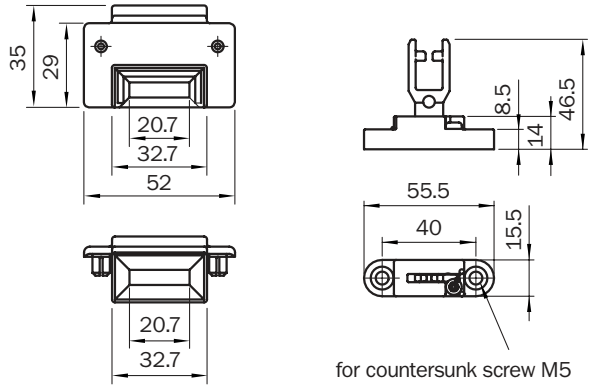
iE16-F1



The actuator facilitates movement in both horizontal and vertical planes.

F

iE16-F2

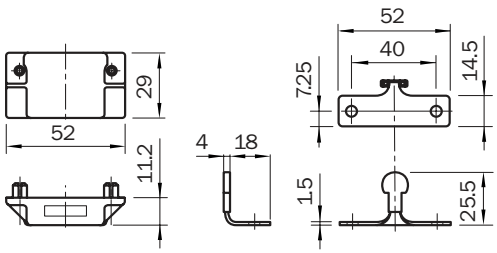


The actuator facilitates movement in the horizontal plane only.

Catch and retainer kit

Type	Part number
iE16-SCR	5 310 780

E16-SCR



An increase in the locking force by 50 N.
Only in connection with rigid actuators.

Other accessories

Cable gland

Type	Part number
Cable gland M20	5 309 164

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Overview of technical specifications

Number of positive action normally closed contacts	2
Number of normally open contacts	1
Type of actuator	Tongue operated
Housing material	Plastic
Number of cable entries	3
Size of the cable gland	M20

Product description

- Safety switch with separate coded actuator
- 3-pole contact element
- Easy conversion of actuating direction through rotatable head

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

→ see N-0

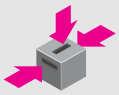
Ordering information

Positive action normally closed	Normally open	Type	Part number
2	1	i17-SA213	6 025 067

Please order actuator separately

- Housing material glass-fibre reinforced thermoplastic
- Three actuating directions
- Cable gland 3 x M20
- Enclosure rating IP 67

F



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Detailed technical specifications

Housing material	Glass-fibre reinforced thermoplastic
Enclosure rating	IP 67
Mechanical life (relay contacts)	10^6 switching cycles
Ambient operating temperature from ... to	–20 °C ... +80 °C
Maximum approach speed	1000 mm/s
Actuation force	12 N
Switching principle	Slow-action-switch
Number of positive action normally closed contacts	2
Number of normally open contacts	1
Usage category in compliance with IEC 947-5-1	AC-15/DC-13
Rated operating current (voltage)	2 A (250 V AC), 5 A (100 V AC), 0.5 A (250 V AC), 2 A (24 V DC)
Rated insulation voltage U_i	500 V
Impulse withstand voltage U_{imp}	2500 V AC
Minimum switching voltage	5 V DC
Minimum switching current (switching voltage)	5 mA (5 V DC)
Contact material	Silver, nickel
Connection type	Cable gland
Maximum connection cable cross-section	1.5 mm²
Short circuit protection	T10/F10
Weight	0.16 kg

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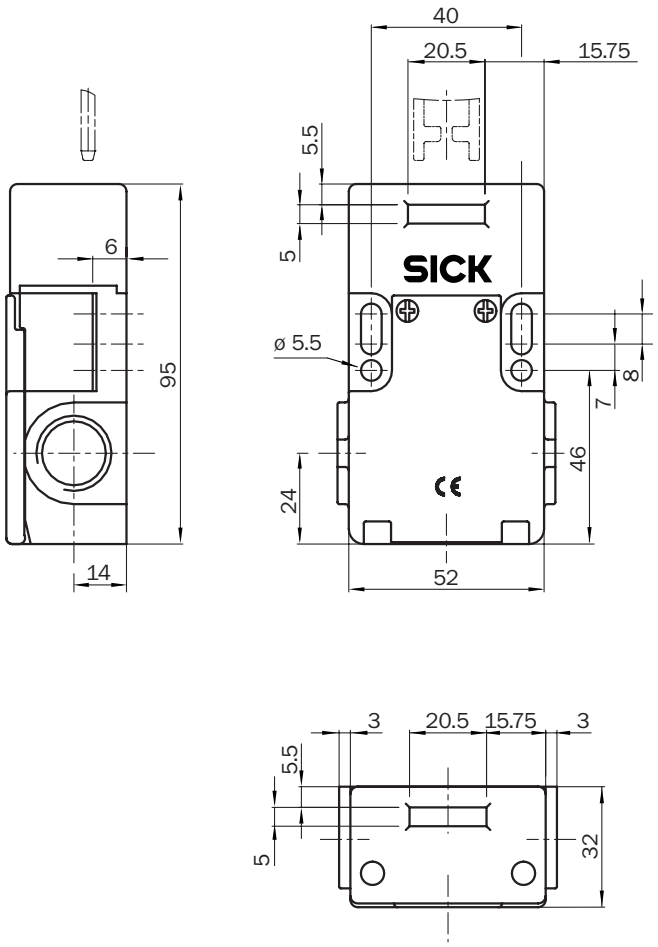
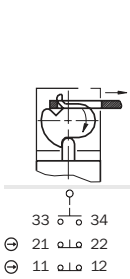
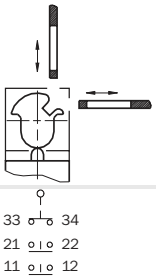
Dimensional drawings



Dimensions in mm

Switching elements

Actuator inserted	Actuator removed	
		21, 2 positive action NC contact + 1 NO

F

Actuators

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	175 mm	iE17-S1	5 311 130
	Fully flexible	60 mm	iE16-F1	5 311 129
Radius	Semi flexible	60 mm	iE16-F2	5 311 278

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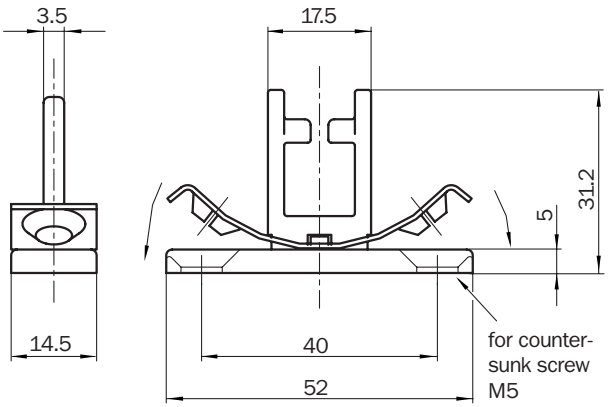
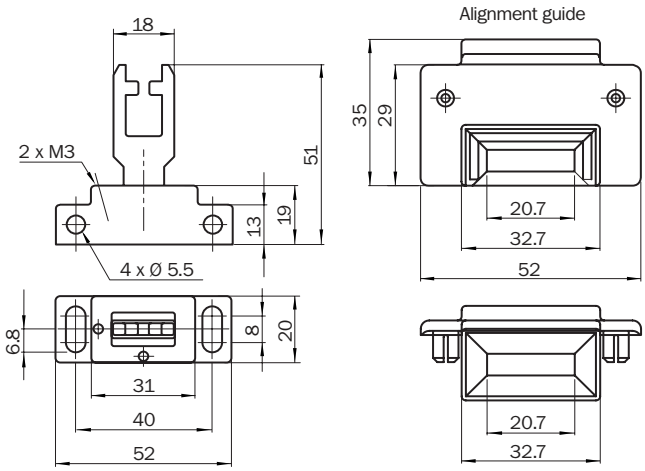
iE17-S1



The actuator facilitates movement in the horizontal plane only.

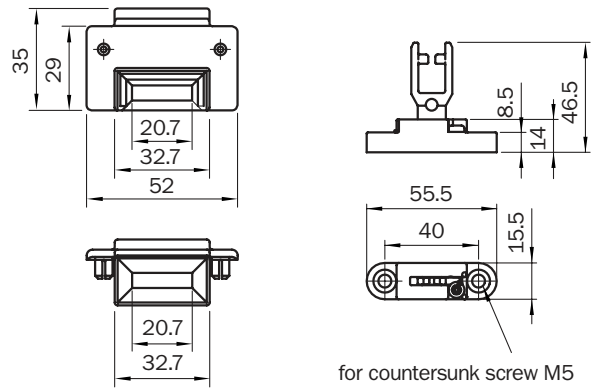
iE16-F1



The actuator facilitates movement in both horizontal and vertical planes.

F

iE16-F2

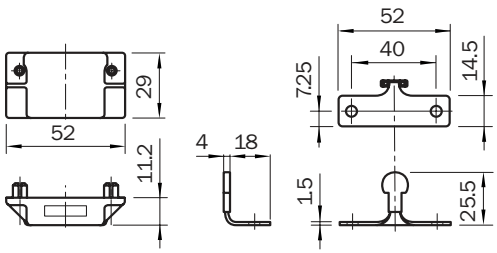


The actuator facilitates movement in the horizontal plane only.

Catch and retainer kit

Type	Part number
iE16-SCR	5 310 780

iE16-SCR



An increase in the locking force by 50 N.
Only in connection with rigid actuators.

Other accessories

Cable gland

Type	Part number
Cable gland M20	5 309 164

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Overview of technical specifications

Number of positive action normally closed contacts	3
Number of normally open contacts	1
Type of actuator	Tongue operated
Housing material	Metal
Number of cable entries	1
Size of the cable gland	M20

Product description

- Safety switches with separate coded actuator
- 4-pole contact element
- Self-cleaning head element - elimination of contamination through actuator movement

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

→ see N-0

Ordering information

Positive action normally closed	Normally open	Type	Part number
3	1	i100-S313	6 022 590

Please order actuator separately

F

- Housing material die-cast light alloy
- Four actuating directions
- Cable gland M20
- Enclosure rating IP 67
- Three-dimensional coded actuator
- Design according to EN 50041

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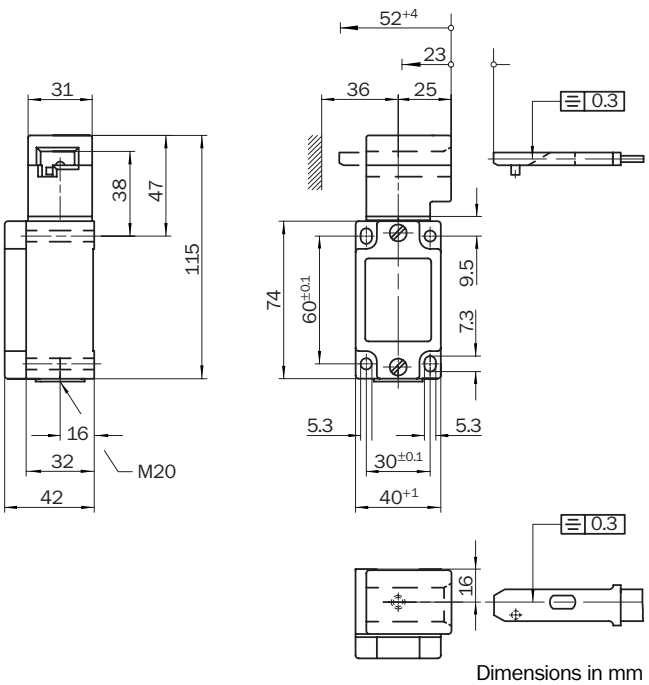
Detailed technical specifications

Housing material	Die-cast light alloy
Surface treatment	Anodized
Enclosure rating	IP 67
Mechanical life (relay contacts)	2 x 10^6 switching cycles
Ambient operating temperature from ... to	–25 °C ... +80 °C
Maximum approach speed	333 mm/s
Actuation force	35 N
Switching principle	Slow-action-switch
Number of positive action normally closed contacts	3
Number of normally open contacts	1
Usage category in compliance with IEC 947-5-1	AC-15/DC-13
Rated operating current (voltage)	6 A (230 V AC), 6 A (24 V DC)
Rated insulation voltage U_i	250 V
Impulse withstand voltage U_{imp}	4000 V AC
Minimum switching voltage	12 V DC
Minimum switching current (switching voltage)	10 mA (24 V DC)
Contact material	Silver alloy, gold flashed
Connection type	Cable gland
Maximum connection cable cross-section	1.5 mm²
Short circuit protection	T10/F20
Weight	0.37 kg

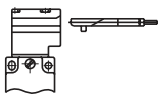
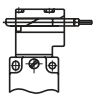
F

Dimensional drawings



Dimensions in mm

Switching elements

Actuator removed	Actuator inserted
	
41 42 33 34 21 22 11 12	41 42 33 34 21 22 11 12

31, 3 positive action NC contacts + 1 NO contact

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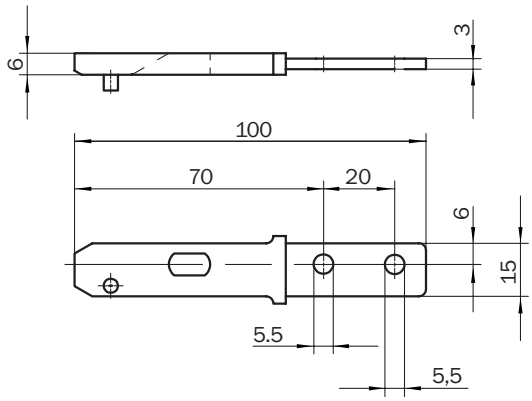
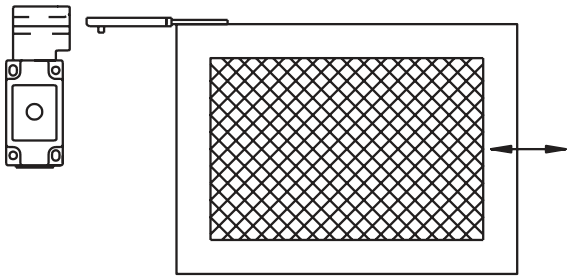
Actuators

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	1000 mm	iE100-S1	5 306 497
Radius, door hinged on left	Semi flexible	400 mm	iE100-R1	5 306 498
Radius, door hinged on right	Semi flexible	400 mm	iE100-R2	5 306 499
Radius, safety flap hinged at bottom	Semi flexible	165 mm	iE100-R3	5 306 500
Radius, safety flap hinged at top	Semi flexible	165 mm	iE100-R4	5 306 526

iE100-S1 straight





Min. door radius 1000 mm.
With two safety screws for each actuator.

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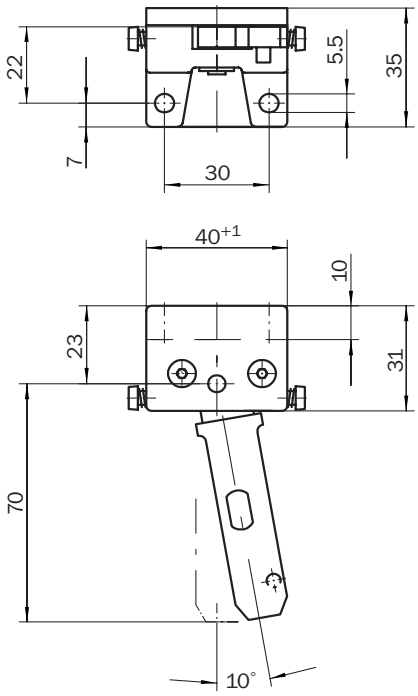
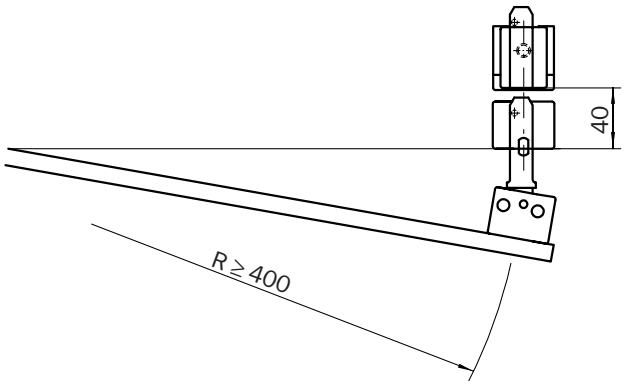
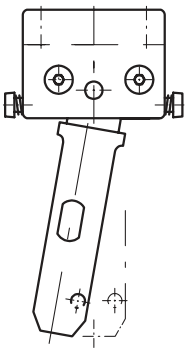
iE100-R1 radius, door hinged on left

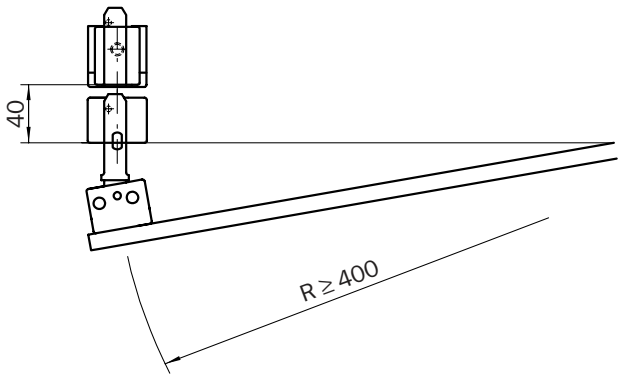




2 safety screws included.
Min. door radius 400 mm.

iE100-R2 radius, door hinged on right





2 safety screws included.
Min. door radius 400 mm.

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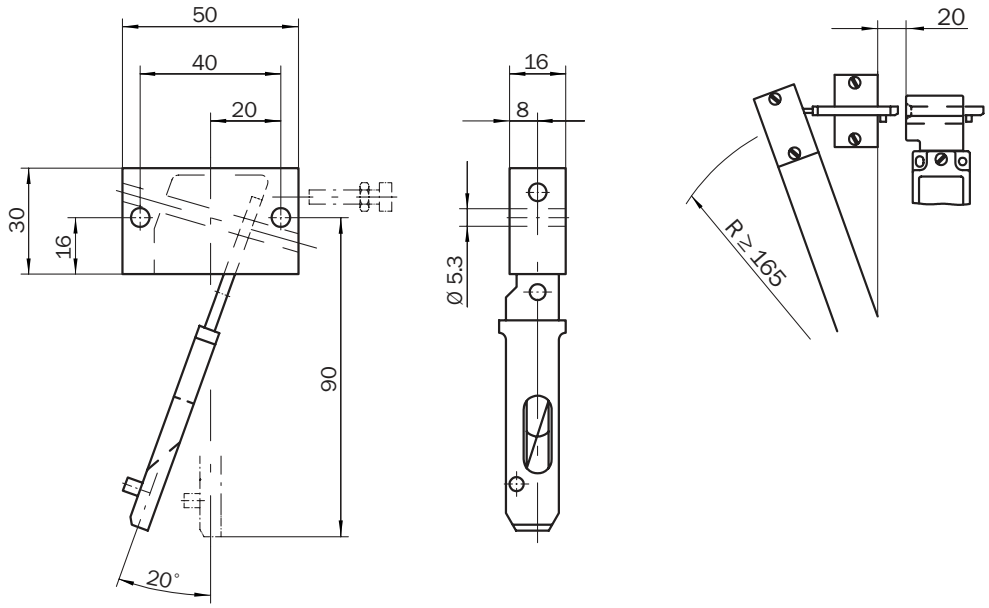
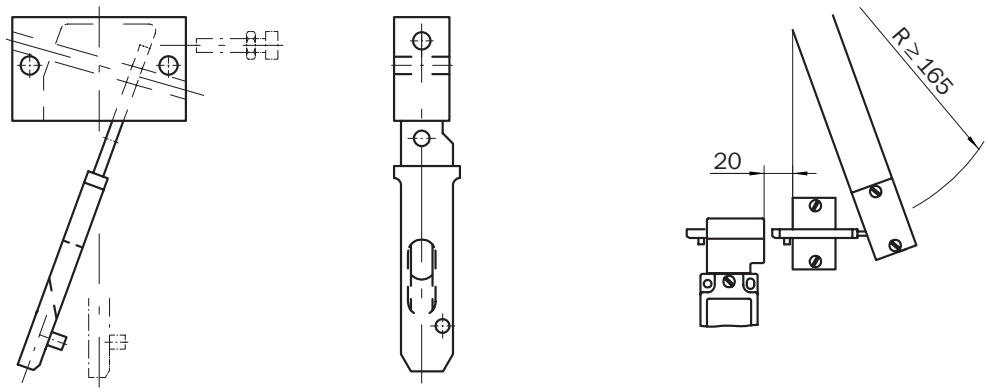
iE100-R3 radius, safety flap hinged at bottom



2 safety screws included.
Min. door radius 165 mm.

iE100-R4 radius, safety flap hinged at top



2 safety screws included.
Min. door radius 165 mm.

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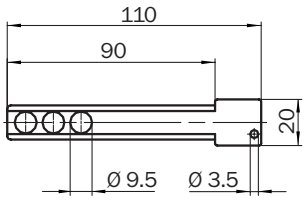
Lockout bar

Type	Part number
iE100-S2	5 306 534

iE100-S2



The lockout bar can be inserted in the safety switch instead of the actuator when the safety guard is in open condition and can then be secured to prevent removal by standard commercially available padlocks (max. 3 pcs.). This guarantees reliable protection for persons who have to enter potentially hazardous areas.

F

Other accessories

Cable gland

Type	Part number
Cable gland M20	5 309 164

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Overview of technical specifications

Number of positive action normally closed contacts (depending on type)	2 / 3
Number of normally open contacts (depending on type)	2 / 1
Type of actuator	Tongue operated
Housing material	Metal
Number of cable entries	1
Size of the cable gland	M20
Locking force	5 N

Product description

- Safety switches with separate coded actuator
- 4-pole contact element
- Small door radius (175 mm) possible even with standard actuator

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. ➜ see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. ➜ see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

➜ see N-0

Ordering information

Positive action normally closed	Normally open	Type	Part number
2	2	i110-SA223	6 025 074
3	1	i110-SA313	6 025 073

Please order actuator separately

- Housing material die-cast zinc
- Five actuating directions
- Cable gland M20
- Enclosure rating IP 67
- Design according to EN 50 041

F

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Detailed technical specifications

Type	i110-SA223	i110-SA313
Housing material	Zinc die-cast	
Surface treatment	Varnished	
Enclosure rating	IP 67	
Mechanical life (relay contacts)	10^6 switching cycles	
Ambient operating temperature from ... to	–20 °C ... +80 °C	
Maximum approach speed	100 mm/s	
Actuation force	12 N	
Switching principle	Slow-action-switch	
Number of positive action normally closed contacts	2	3
Number of normally open contacts	2	1
Usage category in compliance with IEC 947-5-1	AC-15/DC-13	
Rated operating current (voltage)	2 A (250 V AC), 5 A (100 V AC), 0.5 A (250 V DC), 2 A (24 V DC)	
Rated insulation voltage U_i	500 V	
Impulse withstand voltage U_{imp}	2500 V AC	
Minimum switching voltage	5 V DC	
Minimum switching current (switching voltage)	5 mA (5 V DC)	
Contact material	Silver, nickel	
Connection type	Cable gland	
Maximum connection cable cross-section	1.5 mm²	
Short circuit protection	T10/F10	
Weight	0.34 kg	

F

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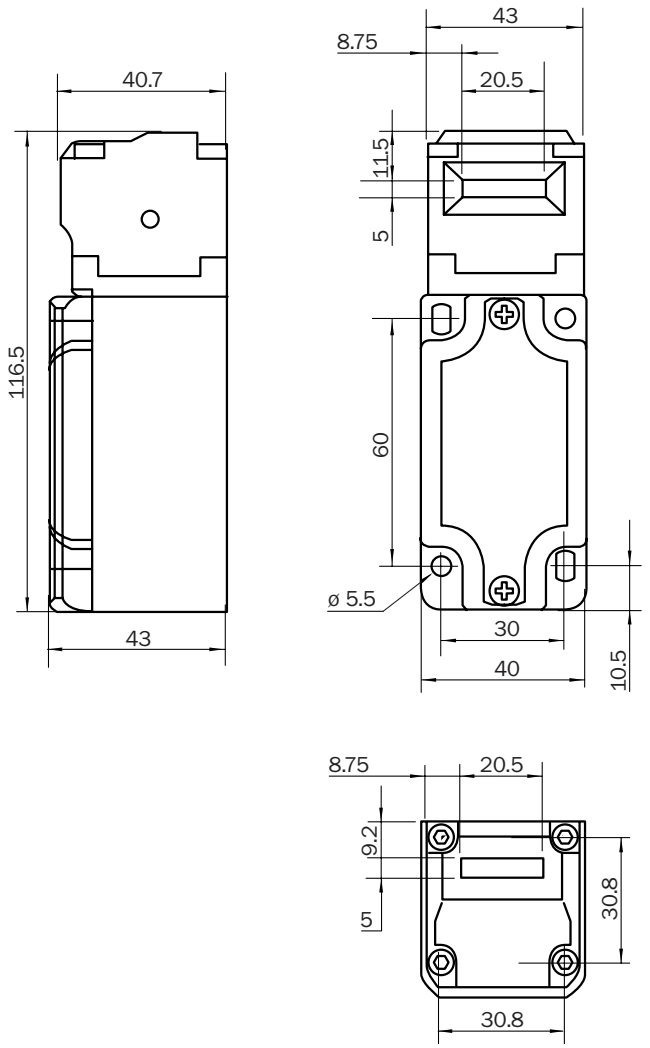
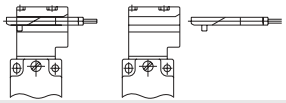
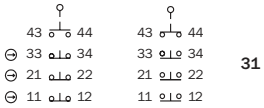
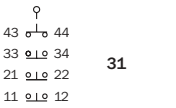
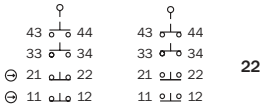
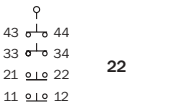
Dimensional drawings



Dimensions in mm

Switching elements

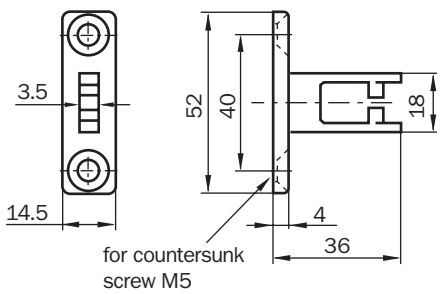
Actuator inserted	Actuator removed	
		
		31, 3 positive action NC contacts + 1 NO
		22, 2 positive action NC contacts + 2 NO

F

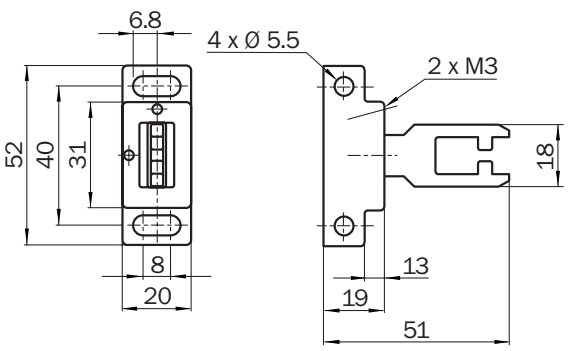
Actuators

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	175 mm	iE110-S1	5 311 134
	Fully flexible	60 mm	iE110-F1	5 311 135

iE110-S1



iE110-F1



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Other accessories

Cable gland

Type	Part number
Cable gland M20	5 309 164

F

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Overview of technical specifications

Number of positive action normally closed contacts	2
Number of normally open contacts	1
Type of actuator	Handle operated
Housing material	Metal
Number of cable entries	1
Size of the cable gland	PG13.5

Product description

- Safety switch with separate handle-operated actuator
- 3-pole contact element
- The system can compensate for any misalignment, such as caused by door drop

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

→ see N-0

Ordering information

Positive action normally closed	Normally open	Supply voltage	Type	Part number
2	1	24 V DC	i1001-24	6 021 016

Actuator supplied with delivery

F

- Housing material powder-coated die-cast zinc
- Cable gland PG13.5
- Four actuating directions
- Enclosure rating IP 67
- LED function indicator
- Handle-operated actuator

Further information	Page
→ Technical specifications	F-36
→ Dimensional drawings	F-36
→ Internal circuitry	F-37
→ Trapped key systems	F-37
→ Actuator	F-39
→ Lockout bar	F-39
→ Other accessories	F-40
→ Services	A-0

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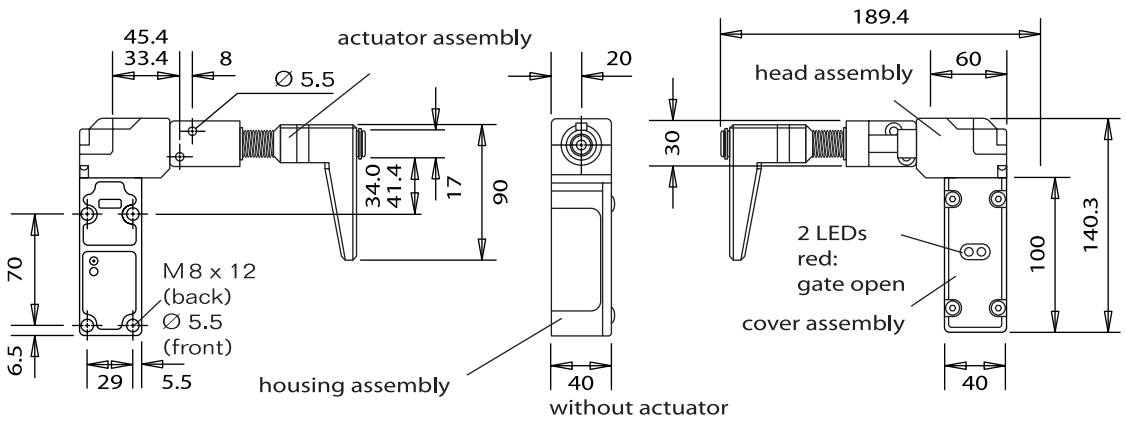
Detailed technical specifications

Housing material	Zinc alloy and stainless steel
Surface treatment	Varnished
Enclosure rating	IP 67
Mechanical life (relay contacts)	10^6 switching cycles
Ambient operating temperature from ... to	–5 °C ... +40 °C
Maximum approach speed	333 mm/s
Switching principle	Slow-action-switch
Number of positive action normally closed contacts	2
Number of normally open contacts	1
Usage category in compliance with IEC 947-5-1	DC-13
Rated operating current (voltage)	10 A (24 V DC)
Impulse withstand voltage U_{imp}	2500 V AC
Contact material	90 % silver and 10 % nickel
Connection type	Cable gland
Maximum connection cable cross-section	2.5 mm²
Weight	1.37 kg

F

Dimensional drawings



Dimensions in mm

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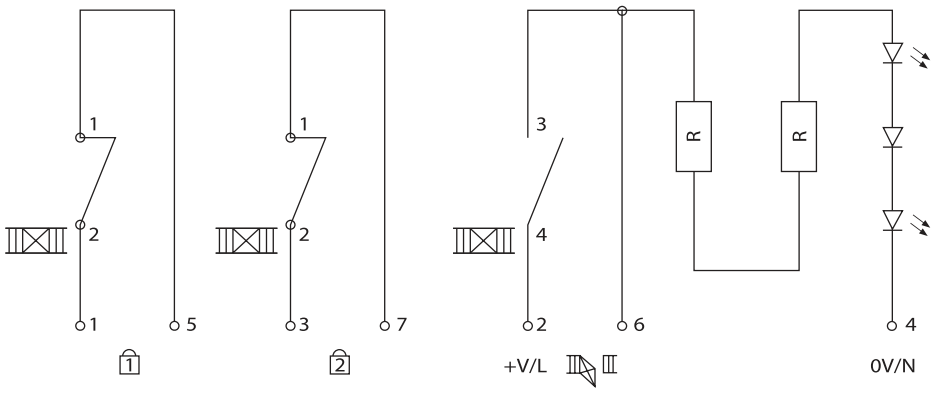
Internal circuitry



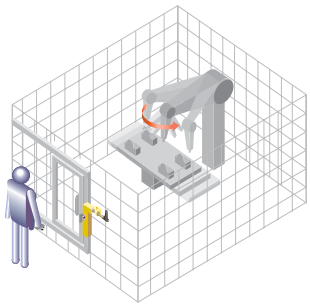
Trapped key systems

Accessory type	Coding	Delivery	Type	Part number
Access key adapter	1	Key supplied with delivery	iE1000-AK1	5 308 302
	2	Key supplied with delivery	iE1000-AK2	5 308 303
Safety key adapter	1	Key supplied with delivery	iE1000-SK1	5 308 297
	2	Key supplied with delivery	iE1000-SK2	5 308 298
Enabling unit	1	Key supplied with delivery	iE1000-ES1	6 021 019
	2	Key supplied with delivery	iE1000-ES2	6 021 020

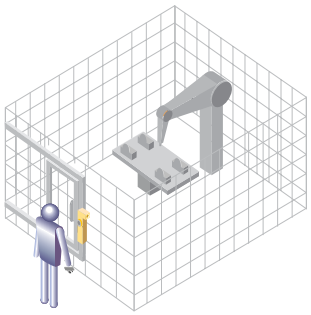
Additional types on request

F

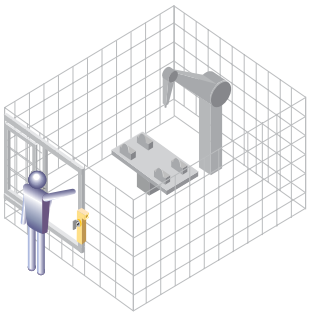
Access key adapter



Plant in action, no key inserted



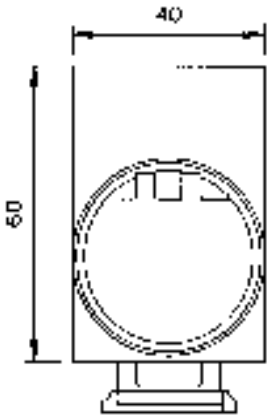
Key is inserted, plant comes to a standstill



Door can now be opened

Access function

■ Application example
Basic unit + head unit + access key adapter. Only those with an access key can gain access to the machine.



The access key adapter is installed between the head and the housing of the safety switch. If no key present in the adapter, the door is in the closed position. The door can only be opened if the safety key is inserted and turned (enabling access).

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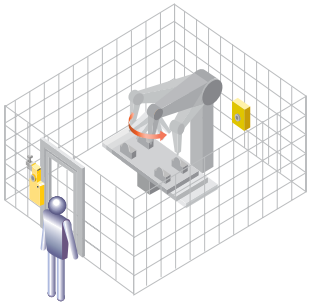
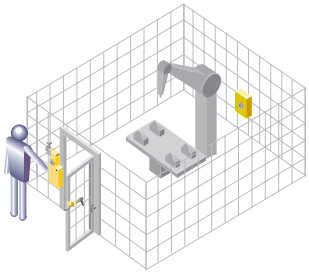
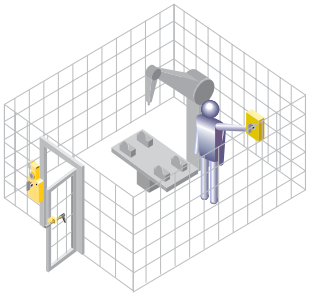
Safety key adapter



Plant in action, door closed, key inserted



Key is removed, plant comes to standstill, door can be opened

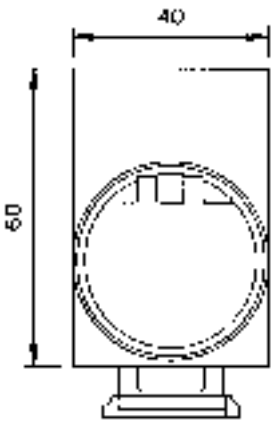


Person enters, key inserted inside, plant runs in enable mode

Enable function

■ Application example

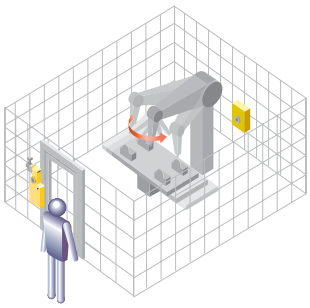
Basic unit + head unit + safety key adapter. In enable mode no person can set the machine in motion from outside. The machine is started from inside with the safety key.



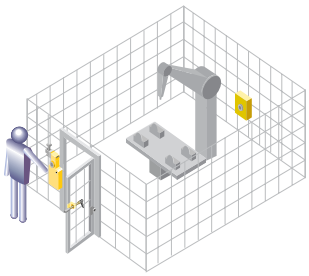
The safety key adapter is installed between the head and the housing of the safety switch. The key is securely held in the unit and the door is kept in the closed position. Only when the safety key is turned and withdrawn access is possible.

F

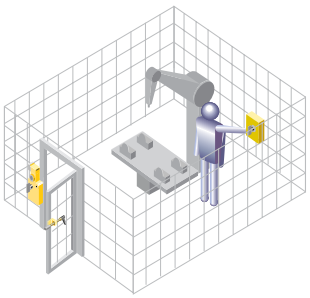
Enabling unit



Plant in action, door closed, key inserted



Key is removed, plant comes to standstill, door can be opened

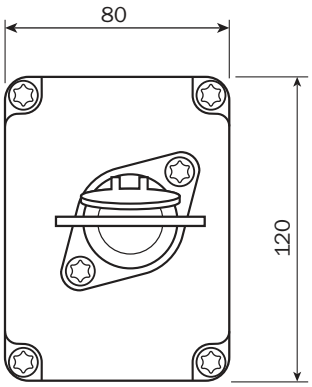


Person enters, key inserted inside, plant runs in enable mode

Enable function

■ Application example

Basic unit + head unit + safety key adapter. In enable mode no person can set the machine in motion from outside. The machine is started from inside with the safety key.



Contact set 2 x NO + 2 x NC for connections into the machine's stop circuit.

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Actuator

Actuation option	Way of actuation	Type	Part number
Turning lever	Fully flexible	iE1001-R1	5 308 316

iE1001-R1

Lockout bar

Type	Part number
iE1002-R1	5 308 313

iE1002-R1

F

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Other accessories

Keys

Prevention of unintentional machine starts	Access function	Enabling function	Coding	Type	Part number
–	✔	–	1	Key AK1	5 308 686
			2	Key AK2	5 308 687
✔	–	✔	1	Key SK1	5 308 307
			2	Key SK2	5 308 308

Cable gland

Type	Part number
Cable gland PG13.5	5 305 811

Safety screws

Type	Part number
Safety allen screws	5 308 317

Safety switch accessories, miscellaneous

Usage	Type	Part number
For safety allen screws	BIT	5 308 319

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Overview of technical specifications

Number of positive action normally closed contacts	2
Number of normally open contacts	1
Type of actuator	Tongue operated
Housing material	Metal
Number of cable entries	1
Size of the cable gland	PG13.5

Product description

- Safety switch with remote multi-coded actuator
- 3-pole contact element
- The system can compensate for any misalignment, such as caused by door drop

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.

→ see N-0

Ordering information

Positive action normally closed	Normally open contacts	Supply voltage	Type	Part number
2	1	24 V DC	i1002-24	6 021 010

Actuator supplied with delivery

F

- Housing material powder-coated die-cast zinc
- Four actuating directions
- Cable gland PG13.5
- Enclosure rating IP 67
- LED function indicator
- Separate actuator

Further information	Page
→ Technical specifications	F-42
→ Dimensional drawings	F-42
→ Internal circuitry	F-43
→ Trapped key systems	F-43
→ Actuator	F-45
→ Lockout bar	F-46
→ Other accessories	F-47
→ Services	A-0

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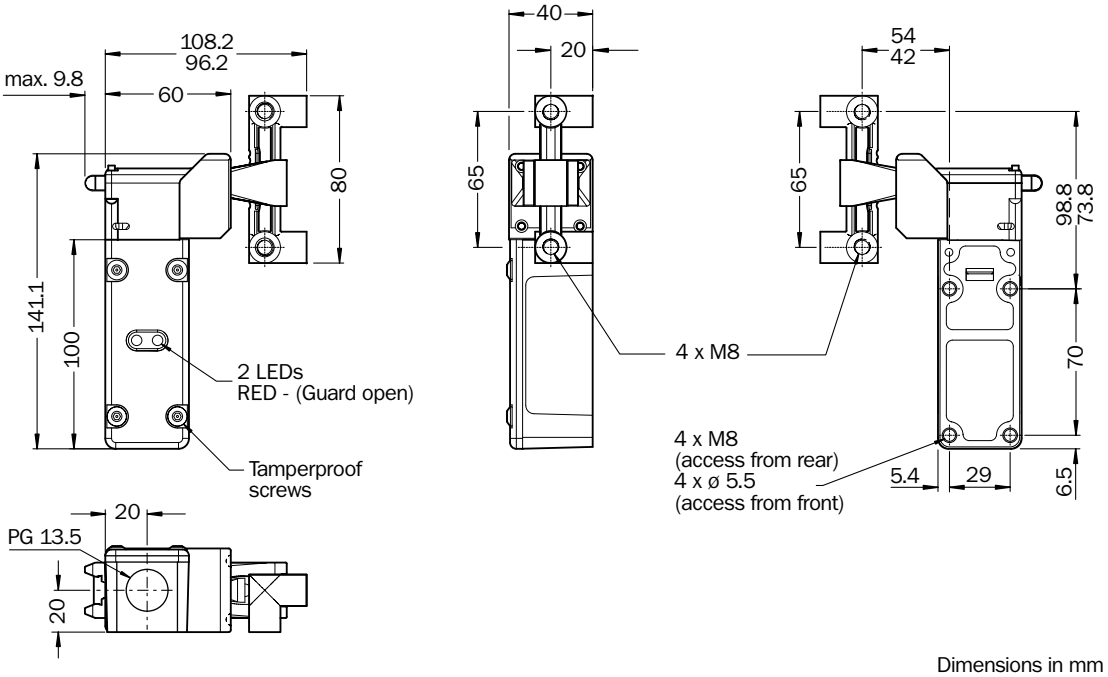
Detailed technical specifications

Housing material	Zinc alloy and stainless steel
Surface treatment	Varnished
Enclosure rating	IP 67
Mechanical life (relay contacts)	10^6 switching cycles
Ambient operating temperature from ... to	–5 °C ... +40 °C
Maximum approach speed	333 mm/s
Actuation force	5 N
Switching principle	Slow-action-switch
Number of positive action normally closed contacts	2
Number of normally open contacts	1
Usage category in compliance with IEC 947-5-1	DC-13
Rated operating current (voltage)	10 A (24 V DC)
Impulse withstand voltage U_{imp}	2500 V AC
Contact material	90 % silver and 10 % nickel
Connection type	Cable gland
Maximum connection cable cross-section	2.5 mm²
Weight	1.11 kg

F

Dimensional drawings



Dimensions in mm

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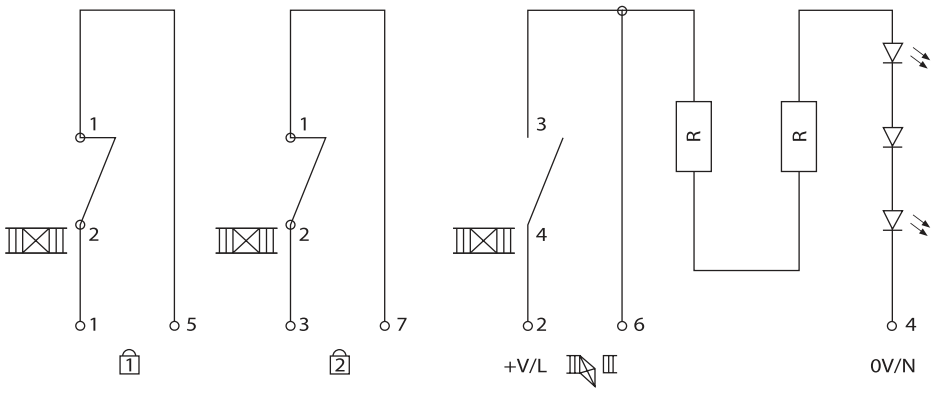
Internal circuitry



Trapped key systems

Accessory type	Coding	Delivery	Type	Part number
Access key adapter	1	Key supplied with delivery	iE1000-AK1	5 308 302
	2	Key supplied with delivery	iE1000-AK2	5 308 303
Safety key adapter	1	Key supplied with delivery	iE1000-SK1	5 308 297
	2	Key supplied with delivery	iE1000-SK2	5 308 298
Enabling unit	1	Key supplied with delivery	iE1000-ES1	6 021 019
	2	Key supplied with delivery	iE1000-ES2	6 021 020

Additional types on request

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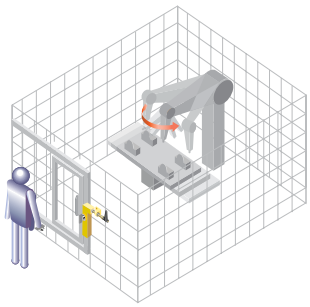
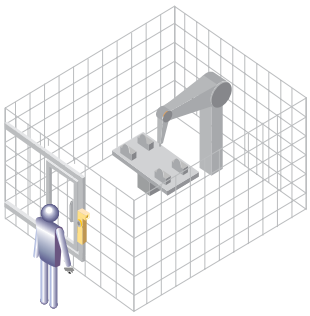
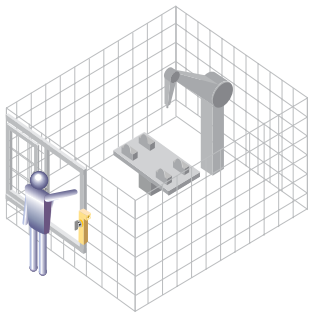
Access key adapter



Plant in action, no key inserted



Key is inserted, plant comes to a standstill

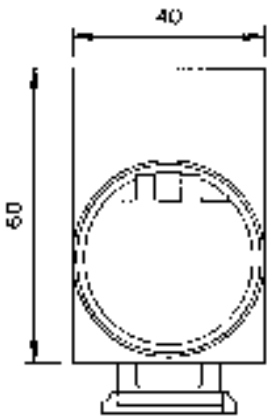


Door can now be opened

Access function

■ Application example

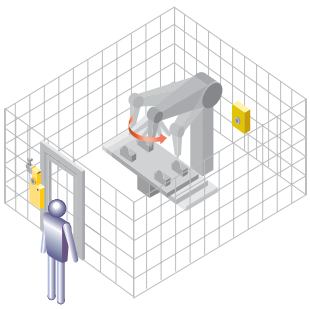
Basic unit + head unit + access key adapter. Only those with an access key can gain access to the machine.



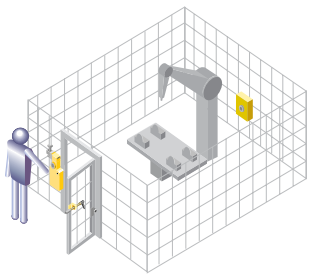
The access key adapter is installed between the head and the housing of the safety switch. If no key present in the adapter, the door is in the closed position. The door can only be opened if the safety key is inserted and turned (enabling access).

F

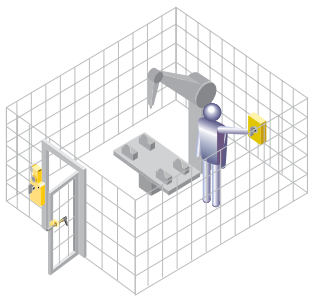
Safety key adapter



Plant in action, door closed, key inserted



Key is removed, plant comes to standstill, door can be opened

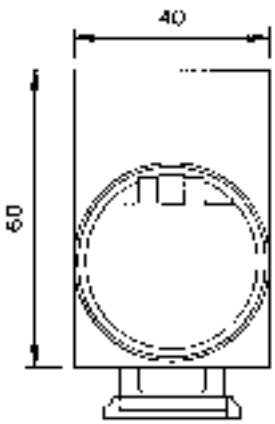


Person enters, key inserted inside, plant runs in enable mode

Enable function

■ Application example

Basic unit + head unit + safety key adapter. In enable mode no person can set the machine in motion from outside. The machine is started from inside with the safety key.



The safety key adapter is installed between the head and the housing of the safety switch. The key is securely held in the unit and the door is kept in the closed position. Only when the safety key is turned and withdrawn access is possible.

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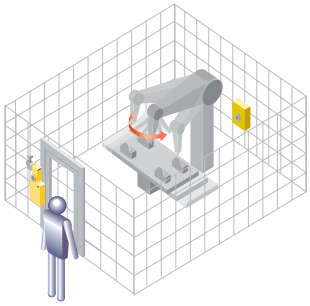
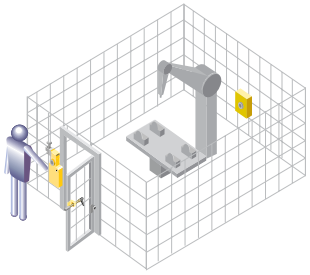
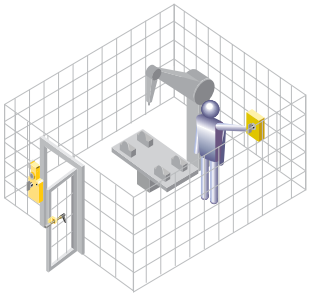
Enabling unit



Plant in action, door closed, key inserted



Key is removed, plant comes to standstill, door can be opened

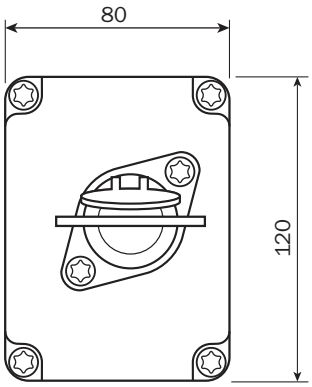


Person enters, key inserted inside, plant runs in enable mode

Enable function

■ Application example

Basic unit + head unit + safety key adapter. In enable mode no person can set the machine in motion from outside. The machine is started from inside with the safety key.



Contact set 2 x NO + 2 x NC for connections into the machine's stop circuit.

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Actuator

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Semi flexible	300 mm	iE1002-S2	5 308 315

iE1002-S2

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Lockout bar

Type	Part number
iE1002-S3	5 308 312

iE1002-S3

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Other accessories

Keys

Prevention of unintentional machine starts	Access function	Enabling function	Coding	Type	Part number
–	✔	–	1	Key AK1	5 308 686
			2	Key AK2	5 308 687
✔	–	✔	1	Key SK1	5 308 307
			2	Key SK2	5 308 308

Cable gland

Type	Part number
Cable gland PG13.5	5 305 811

Safety screws

Type	Part number
Safety allen screws	5 308 317

Safety switch accessories, miscellaneous

Usage	Type	Part number
For safety allen screws	BIT	5 308 319

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Explanations of features

Positive action normally closed contacts/normally open contacts

Safety switches have contact elements in normally closed contact/normally open contact combinations. The normally closed contacts of a safety switch are of the "positive action" type, i.e. the forced movement of the normally closed contact ensures that the contacts are separated every time. Normally open contacts primarily serve as signalling contacts and must not be used for the safety circuit.

Door signalling contact

The three possible states of a safety locking device are "Door locked and closed", "Door unlocked and closed" and "Door unlocked and open". Depending on the version, there is a contact element for the third state, which is activated when the door is opened. Both positive action normally closed contact/normally open contact combinations and normally closed contacts without positive action, are used as door signalling contacts.

Housing material

The housing materials used can be separated into two large groups - "metals" and "plastics". The metal housing materials are available as both anodised die-cast light metal and painted die-cast zinc versions. Glass-fibre reinforced thermoplastics are exclusively used for the plastic housings.

Locking force

The locking force gives the maximum force which can act on the locking mechanism. Depending on the type, the maximum locking force is only achieved by using additional fixing screws that are included in the supply (e.g. i200-Lock).

Locking type

Safety locking devices are equipped either with a mechanical or electric locking device.

For the mechanical locking device, the locking is activated after inserting the actuator. It can be released by applying the voltage to the locking magnet.

For the electric locking device, the voltage must be applied to the locking magnet after inserting the actuating element in order to activate the locking.

Type of actuator

The majority of safety switches have appropriately coded tongue-operated actuators that prevent simple manipulation of the switch.

The i1000 series has an additional handle-operated actuator with coded spindle. It is not actuated by applying a force but by applying a torque.

Mechanical unlocking mechanism

The locking device can be unlocked, e.g. on a power failure, using the mechanical unlocking mechanism.

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Safety locking devices

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Safety application	Number of positive action normally closed contacts/ normally open contacts [1]	Housing material [1]	Type of actuator [1]	Door signalling contacts [1]	Number x size of cable gland	Locking force [1]	Locking type [1] mechanical (m)/electrical (e)	Product	Page
	2 / 1	Plastic	Tongue operated	✔	3 x M20	1200 N	m / e	i10 Lock	G-2
	2 / 1 3 / 0	Plastic	Tongue operated	–	1 x M20	1200 N	m	i14 Lock	G-8
	4 / 1 3 / 2	Plastic	Tongue operated	✔	3 x M20	2000 N	m / e	i200 Lock	G-12
	4 / 2	Metal	Handle operated	✔	1 x PG13.5	2500 N	m	i1001 Lock	G-16
	4 / 2	Metal	Tongue operated	✔	1 x PG13.5	2500 N	m	i1002 Lock	G-22

[1] Explanation see page G-0

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- Housing material glass-fibre reinforced thermoplastic
- Locking force 1200 N
- Five actuating directions
- Cable gland 3 x M20
- Enclosure rating IP 67
- Mechanical unlocking mechanism

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Overview of technical specifications

Number of positive action normally closed contacts	2 / 2
Number of normally open contacts (depending on type)	1 / 0
Number of positive action normally closed door monitoring contacts	0 / 0
Number of normally open door monitoring contacts (depending on type)	0 / 1
Number of normally closed door monitoring contacts	1 / 1
Housing material	Plastic
Locking force	1200 N
Locking type (depending on type)	Electrical / mechanical

Product description

- Safety switches with separate coded actuator and guard locking
- 4-pole contact element
- Small design - ideal for direct mounting on framework
- Various actuator versions available

In-system added value

Safety Relays UE 10 - 48

The UE 10 to 48 series of the Safety Relays allows simple integration of safety components into machinery or plant. → see L-0

Safety Controllers UE 100

The UE 100 series is designed for complex applications requiring a medium level of networking capability. It is possible to connect varying safety components. Their connections can be tailored to the relevant machines or plant via drag & drop software. → see M-0

Safety Bus Modules UE 1000

The series UE 1000, Safety Bus Modules, are designed for machinery and plant requiring a high level of networking and programmable logic controls (PLC). The modules enable the linking of safety components to the bus systems PROFIsafe or AS-I Safety at Work.
→ see N-0

Ordering information

Positive action normally closed	Normally open	Door monitoring: Positive action normally closed	Door monitoring: Normally open	Door monitoring: Normally closed	Solenoid operating voltage	Locking type	Type	Part number
2	1	0	0	1	24 V DC	Electrical	i10-E0233 Lock	6 022 585
					230 V AC	Electrical	i10-E2233 Lock	6 022 586
					24 V DC	Mechanical	i10-M0233 Lock	6 022 580
	0	0	1	1	24 V DC	Mechanical	i10-M0253 Lock	6 027 397
	1	0	0	1	230 V AC	Mechanical	i10-M2233 Lock	6 022 582

Please order actuator separately

Further information	Page
→ Dimensional drawings	G-4
→ Switching elements	G-4
→ Actuators	G-4
→ Lockout bar	G-6
→ Locks	G-7
→ Other accessories	G-7
→ Services	A-0

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Detailed technical specifications

Type	i10-E0233 Lock	i10-E2233 Lock	i10-M0233 Lock	i10-M0253 Lock	i10-M2233 Lock
Housing material	Glass-fibre reinforced thermoplastic				
Enclosure rating	IP 67				
Mechanical life (relay contacts)	10^6 switching cycles				
Ambient operating temperature from ... to	–20 °C ... +55 °C				
Maximum approach speed	333 mm/s				
Locking force	1200 N				
Switching principle	Slow-action-switch				
Number of positive action normally closed contacts	2				
Number of normally open contacts	1	1	1	0	1
Number of positive action normally closed door monitoring contacts	0				
Number of normally open door monitoring contacts	0	0	0	1	0
Number of normally closed door monitoring contacts	1				
Usage category in compliance with IEC 947-5-1	AC-15/DC-13				
Rated operating current (voltage)	6 mA (230 V AC), 6 mA (24 V DC)				
Rated insulation voltage U_i	250 V				
Impulse withstand voltage U_{imp}	2500 V				
Minimum switching voltage	12 V DC				
Minimum switching current (switching voltage)	10 mA (24 V DC)				
Solenoid operating voltage	24 V (20.4 V ... 26.4 V) DC	230 V (195.5 V ... 253 V) AC	24 V (20.4 V ... 26.4 V) DC		230 V (195.5 V ... 253 V) AC
Duty cycle	100 %				
Contact material	Silver alloy, gold flashed				
Connection type	Cable gland				
Maximum connection cable cross-section	1.5 mm²				
Short circuit protection	6A gG				
Weight	0.46 kg				

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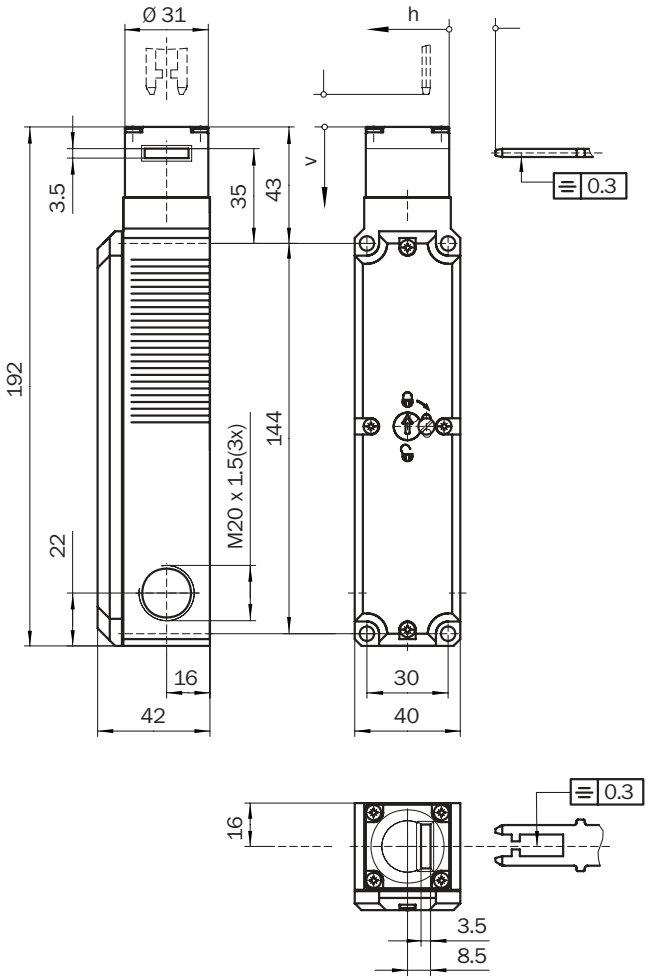
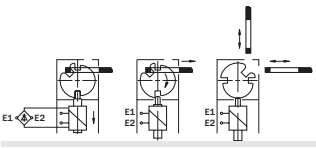
Dimensional drawings

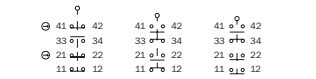


Dimensions in mm

Switching elements

Actuator inserted	Actuator removed
locked	unlocked





23, 2 positive action NC contacts + 1 NO contact + 1 NC as door contact

25, 2 positive action NC contacts + 1 NO contact as door contact + 1 NC as door contact

Actuators

Actuation option	Way of actuation	Minimum door radius	Type	Part number
Straight	Rigid	1000 mm	iE10-S1	5 306 527
	Rubber-mounted	1000 mm	iE10-S2	5 306 530
Angled	Rigid	1000 mm	iE10-A1	5 306 535
Radius	Semi flexible	90 mm	iE10-R1	5 306 528
		100 mm	iE10-R2	5 306 529

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