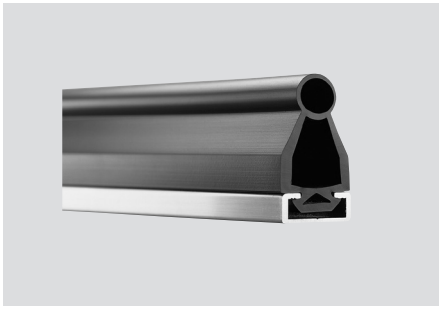
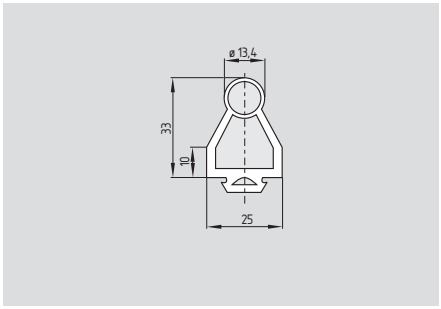
Safe switching and monitoring
Tactile safety devices

Wherever crushing or shearing points are to be safeguarded, such as on elevating platforms, rising stages, sliding doors or industrial gates, tactile safety devices offer a simple and easy to fit solution. In the hazardous area, two-dimensional safety devices could be useful as well, for instance at industrial robots, punching machines and woodworking machines.

Safety edges

SE 40

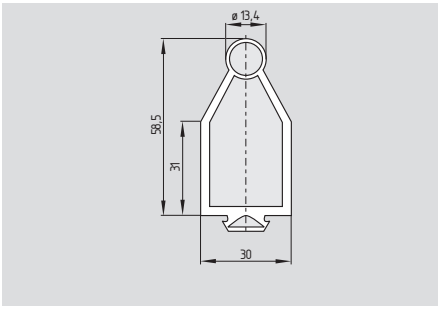




- Control category optionally 1, 3 or 4 in combination with the SE-100C, SE-304C or SE-400C safety-monitoring module
- Modulated infra-red signal
- Interference-proof against external light
- Regulated transmitter, i.e. automatic adaptation for distance to receiver
- Constant sensitivity independently of the length of the safety edge
- Lengths from 0.4 m to 8 m possible
- Dirt and moisture in the profile are to a great extent compensated
- Transmitter/receiver potted, protection class of the signal transmitter IP67
- Insensitive to environmental conditions
- Max. distance sensors / evaluation 200 m

Approvals

SE 70



Resistant to chemicals of the rubber material:

International abbreviation	EPDM (APTK)
Chemical name:	ethylene propylene ter polymer
Resilience at 20°C:	good
Resistance against permanent deformation:	good
General resistance against atmospheric conditions:	excellent
Resistance against ozone:	excellent
Resistance against oil:	low
Resistance against fuels:	low
Resistance against solvents:	low to satisfactory
General resistance against acids:	good
Temperature resistance:	
Short exposition:	− 50°C … + 170°C
Long exposition:	− 30°C … + 140°C

If a higher resistance is required, choose safety edge profiles with 20 µm plastic coating. The coating must be submitted to low mechanical loads only.

Technical data

Standards:	EN 1760-2
Material:	
- Rubber profile:	EPDM, 65 Shore A (optionally with 20 µm plastic coating)
- Emitter/Receiver:	polyurethane
- Mounting profile:	Al-Mg Si OF22
Protection class:	to EN 60529
- Emitter/Receiver :	IP68
- Signal transmitter, complete:	IP67
Mode of operation:	Optoelectronic
Possible length:	40 cm … 8 m
Operating range of the homologated signal transmitter:	+5 °C … +55 °C
Max. permanent load:	on the operational switching zone 500 N
Operating speed:	Signal transmitters: max. 100 mm/s, (Exception: SE-P40 with SE-400C: max. 40 mm/s)
Response travel:	max. 9 mm
After-travel:	P 40: max. 18 mm P 70: max. 45 mm
Connection:	Transmitter/Receiver: cable 3 x 0.14 mm² flexible
Cable length:	
- Receiver:	3 m or 20 m
- Emitter:	6.5 m or 10.5 m
Mechanical life:	20 million operations

* Certification in combination with safety monitoring modules SE-100C, SE-304C or SE-400C.
Coated and NBR profiles are not included in this approval.

Ordering details

Rubber profile SE-P①②-③

No.	Replace	Description
①		Uncoated profile
	C	Coated profile
②	40	40 mm high EPDM
	40NBR	40 mm high NBR
	70	70 mm high EPDM
③	XXXX	Profile length in mm
	1250	1,250 mm
	2500	2,500 mm
	5000	5,000 mm
	10000	10,000 mm

Note

A safety edge system consists of individual components. The components must be ordered separately.

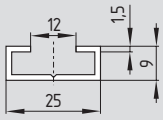
(Example)
- Rubber profile, SE-P40-1250
- Al profile, SE-AL 10-1250
- Emitter/ Receiver SE-SET
- Safety-monitoring module, SE-304 C
- Options: Caps, SE-T40; Sticker, SE-G8406
- Other accessories

Note

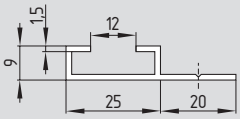
In the extremities of the safety edge at approx. 60 mm (SE 40) or 50 mm (SE 70) finger guard is not guaranteed. Upon actuation of this area, the transmitter/receiver is pushed into the lower profile section and the switching signal is evaluated, but the required forces are high though. If this restriction is not acceptable for the specific application, constructive measures must be taken.

Safety edges

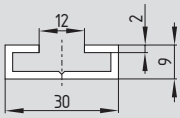
System components



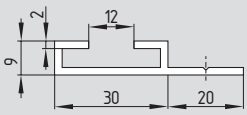
Aluminum profile SE-AL10



with Aluminum leg SE-AL12



Aluminum profile SE-AL20



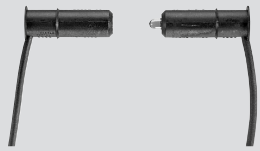
with Aluminum leg SE-AL22

System components

SE-100C

SE-304C

SE-400C



SE-SET

System components

Junction box SE-J2

Rubber scissors SE-SC

End plugs SE-T.40

End plugs SE-T.70

Ordering details

Aluminum profile SE-AL①②-③

No.	Replace	Description
①	1	For rubber profile SE-40
	2	For rubber profile SE-70
②	0	Without mounting flange
	2	With mounting flange
③	1250	1,250 mm Larger lengths possible by connecting multiple Aluminum profiles

Ordering details

Monitoring of safety edges using

Part	Number of safety edges	Max. control category	Refer to page
SE-100C	2	1	3-6
SE-304C	4	3	3-8
SE-400C	1	4	3-10

Sensor-Sets

Part	Transmitter cable	Receiver cable
SE-SET	6.5 m	3 m
SE-SET 3M/10.5M	10.5 m	3 m
SE-SET10.5M/20M	10.5 m	20 m

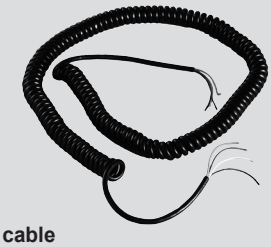
Ordering details

Junction box	**SE-J2**
Rubber scissors	**SE-SC**
End plugs for SE-P40	
uncoated	**SE-T40**
coated	**SE-TC40**
End plugs for SE-P70	
uncoated	**SE-T70**
coated	**SE-TC70**
Gluing of the end caps:	
Primer (without drawing)	**SE-PR**
Glue (without drawing)	**SE-G 8406**

Safety edges

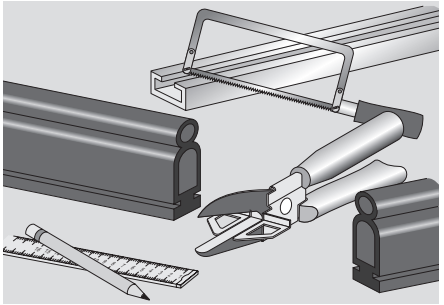
System components

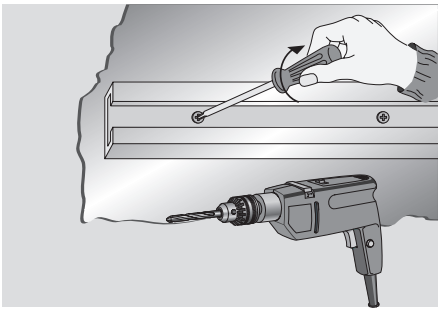
Wiring tool SE-WA

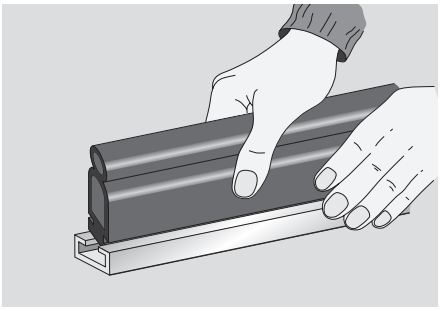


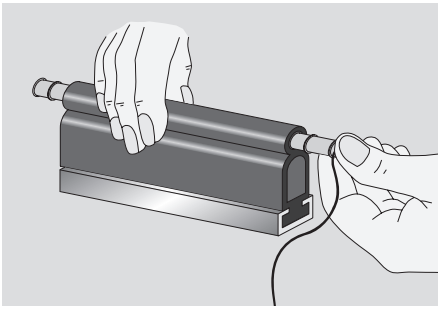
Spiral cable

Mounting









Ordering details

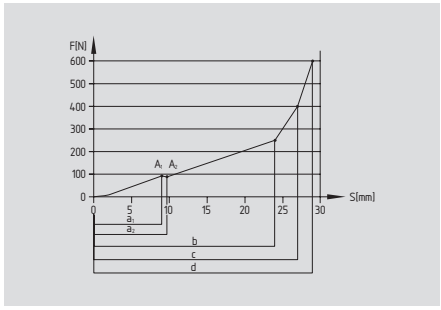
Wiring tool, 6 m	**SE-WA**
Spiral cable, 1 m extendable to 3 m	
4 x 0.25 mm²	**SE-CC 1301**
5 x 0.5 mm²	**SE-CC 1302**

Notice

- Saw off Aluminum rails and fit.
- Cut the rubber profile to length
- Clip the rubber profile into the Aluminum rail
- Press the transmitter and receiver units into the ends of the profile

Safety edges

Force-travel diagram



Legend

A	actuating point, switching point of the module
a	actuating travel
b, c, d	overall deformation travel until the indicated force is achieved

Run-on travel = $a_{1,2}$ – b / c / d

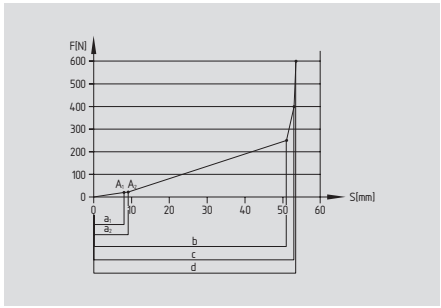
Applicable test conditions
Parameters of the measurement:
Temperature: T = 23 °C
Mounting position: B (nach EN 1760-2)
Place of measurement: C 3 (nach EN 1760-2)

The run-on travel is affected by the response time of the connected module.

SE-P40

Speed [mm/s]	Curve section	Deformation travel [mm]	Force [N]	Connected module
up to A 100	a_1	9	92	SE-100C SE-304C SE-400C
40	a_2	9.7	88	
up to A 10	b	24	250	SE-100C SE-304C SE-400C
	c	27	400	SE-100C SE-304C SE-400C
	d	29	600	SE-100C SE-304C SE-400C

Force-travel diagram



Legend

A	actuating point, switching point of the module
a	actuating travel
b, c, d	overall deformation travel until the indicated force is achieved

Run-on travel = $a_{1,2}$ – b / c / d

Applicable test conditions
Parameters of the measurement:
Temperature: T = 23 °C
Mounting position: B (nach EN 1760-2)
Place of measurement: C 3 (nach EN 1760-2)

The run-on travel is affected by the response time of the connected module.

SE-P70

Speed [mm/s]	Curve section	Deformation travel [mm]	Force [N]	Connected module
up to A 100	a_1	8	22	SE-100C SE-304C SE-400C
100	a_2	9.1	23	
up to A 10	b	51	250	SE-100C SE-304C SE-400C
	c	53	400	SE-100C SE-304C SE-400C
	d	54	600	SE-100C SE-304C SE-400C

SE-100C

- To monitor 1 or 2 safety edges
- 1 safety contact, STOP 0
- 1 signalling output (changeover contact)
- Operating voltage 24 VDC
- LED display

Technical data

Standards:	EN 1760-2, IEC 60947-5-3, IEC 61508
Start conditions:	automatic
Feedback circuit (Y/N):	no
Response time:	16 ms
Time to readiness:	max. 300 ms
Opening duration:	max. 300 ms
Closing duration:	typ. 15 ms
Rated operating voltage U_e:	24 VDC (+ 20 % / -10%)
Rated operating current I_e:	ca. 150 mA
Internal electronic protection (Y/N):	yes
Power consumption:	< 4 W
Monitored inputs:	
- Short-circuit recognition:	yes
- Wire breakage detection:	yes
- Earth connection detection:	yes
Outputs:	
Stop category 0:	1
Stop category 1:	0
Number of safety contacts:	1
Number of auxiliary contacts:	1
Number of signalling outputs:	1
Max. switching capacity of the safety contacts:	2 A / 230 VAC 2 A / 24 VDC
Utilization category to EN 60947-5-1:	AC-15: 230 V / 2 A DC-13: 24 V / 2 A
Mechanical life:	20 million operations
LED display:	supply voltage, safety edge function
Ambient conditions:	
Environmental temperature:	+5 °C … +55 °C
Protection class:	Enclosure: IP40, Terminals: IP20, Clearance: IP54
Mounting:	Snaps onto standard DIN rail to EN 60715
Connection type:	Screw connection
- max. cable section:	max. 2 x 1.5 mm² (incl. conductor ferrules)
Weight:	164 g
Dimensions (Height/Width/Depth):	100 x 22.5 x 120 mm

Approvals

Ordering details

SE-100C

Classification

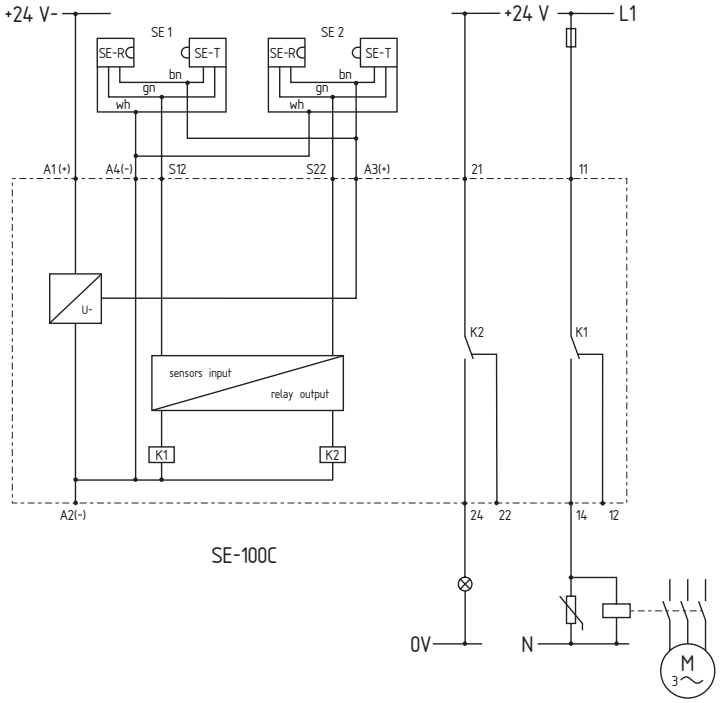
Safety parameters:	
Standards:	EN ISO 13849-1; IEC 61508; IEC 60947-5-3
PL:	up to c
Category:	up to 1
PFH value:	1.73 x 10^{-6} /h for max. 36,500 switching cycles/year and max. 60% contact load
SIL:	up to 1
Mission time:	20 years

Safety edges

Note

- Monitoring the safety edges SE 40 / SE 70 with a safety monitoring unit SE-100C for PL c and category 1.
- If only one safety edges SE 40 / SE 70 is connected, the terminals S12-S22 must be bridged.
- The manual reset function, if required, must be realized in the machine control. Both re-initialization and auto-reset must comply with the requirements of EN 1760-2 (diagram A2, A3).

Wiring diagram



Note

- The wiring diagram is shown for the de-energized condition.
- The overall machine safety depends on the professional mounting and installation of the safety monitoring module and the signal transmitter, as well as on the correct and professional electrical connection of the components.
- If there it any risk whatsoever, the machine may not be restarted.
- Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

SE-304C

- To monitor 1 to 4 safety edges
- 1 safety contact, STOP 0
- 1 semi-conductor signalling output
- Operating voltage 24 VAC/DC
- LED display
- Start-function with trailing edge (optional)

Technical data

Standards:	EN 1760-2, IEC 60947-5-3, IEC 61508
Start conditions:	automatic or start button
Feedback circuit (Y/N):	yes
Response time:	< 17 ms
ON delay with reset button:	100 ms up to 2 s
Rated operating voltage U_e:	24 VDC (+ 20 % / -10%) 24 VAC (+ 10 % / - 10%)
Rated operating current I_e:	ca. 500 mA (for 4 safety edges)
Frequency range:	50 Hz
Internal electronic protection (Y/N):	yes
Power consumption:	< 4 W
Monitored inputs:	
- Short-circuit recognition:	yes
- Wire breakage detection:	yes
- Earth connection detection:	yes
Outputs:	
Stop category 0:	1
Stop category 1:	0
Number of safety contacts:	1
Number of auxiliary contacts:	0
Number of signalling outputs:	1
Max. switching capacity of the safety contacts:	2 A / 230 VAC 2 A / 24 VDC
Utilization category to EN 60947-5-1:	AC-15: 230 V / 2 A DC-13: 24 V / 2 A
Mechanical life:	> 10 million operations
LED display:	supply voltage, safety edge function
Ambient conditions:	
Environmental temperature:	+5 °C … +55 °C
Protection class:	Enclosure: IP40, Terminals: IP20, Clearance: IP54
Mounting:	Snaps onto standard DIN rail to EN 60715
Connection type:	Screw connection
- max. cable section:	max. 2 x 1.5 mm² (incl. conductor ferrules)
Weight:	175 g
Dimensions (Height/Width/Depth):	100 x 22.5 x 121 mm

Approvals

Ordering details

SE-304C

Classification

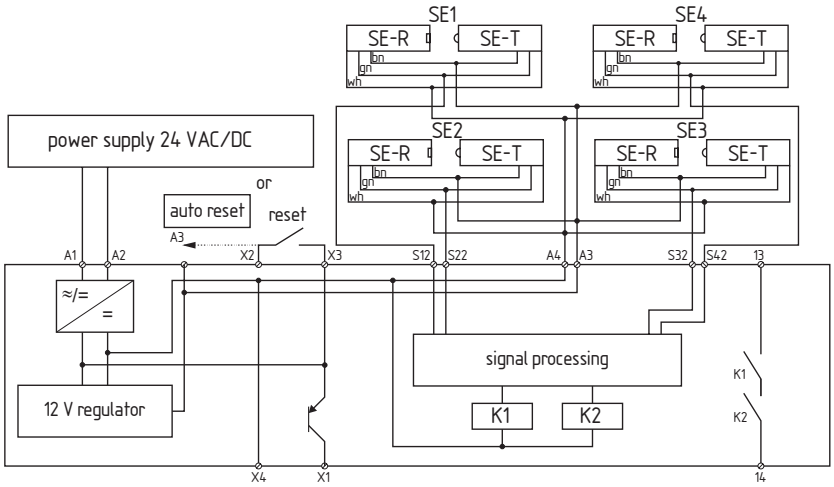
Safety parameters:	
Standards:	EN ISO 13849-1; IEC 61508; IEC 60947-5-3
PL:	up to d
Category:	up to 3
PFH value:	1.0 x 10^{-7} /h for max. 36,500 switching cycles/year and max. 60% contact load
SIL:	up to 2
Mission time:	20 years

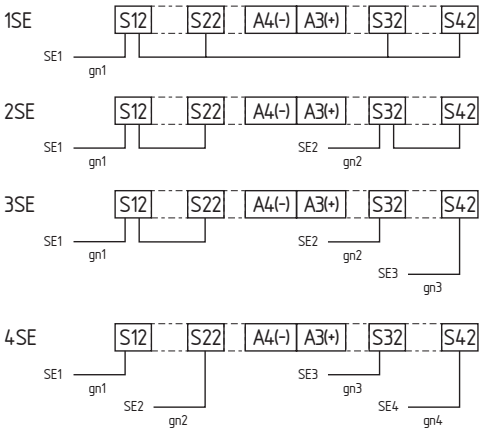
Safety edges

Note

- Monitoring 1 – 4 safety edges SE 40 / SE 70 using safety monitoring module SE-304C for PL d and category 3.
- Manual reset function or auto-reset: The manual reset function is triggered by an edge-sensitive signal (edge switching „0-1-0“ within 100 ms up to 2 s) (X2/X3). Alternatively, the auto-reset function can be activated by a connection (A3/X2). Both re-initialization and auto-reset must comply with the requirements of EN 1760-2 (diagram A2, A3).
- If less than 4 safety edges are connected, the following diagram must be observed.

Wiring diagram

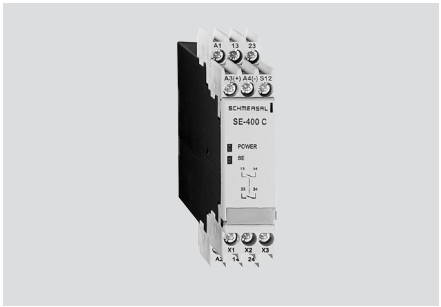




Note

- The wiring diagram is shown for the de-energized condition.
- The overall machine safety depends on the professional mounting and installation of the safety monitoring module and the signal transmitter, as well as on the correct and professional electrical connection of the components.
- If there it any risk whatsoever, the machine may not be restarted.
- Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

SE-400C



- To monitor 1 safety edge
- 2 safety contacts, STOP 0
- 1 semi-conductor signalling output
- Operating voltage 24 VDC
- LED display
- Start function

Technical data

Standards:	EN 1760-2, IEC 60947-5-3, IEC 61508
Start conditions:	automatic or start button
Feedback circuit (Y/N):	yes
Response time:	32 ms
Time to readiness:	ca. 32 ms
Opening duration:	ca. 32 ms
Closing duration:	typ. 15 ms
Rated operating voltage U_e:	24 VDC (+ 20 % / -10%)
Rated operating current I_e:	ca. 150 mA
Internal electronic protection (Y/N):	yes
Power consumption:	< 4 W
Monitored inputs:	
- Short-circuit recognition:	yes
- Wire breakage detection:	yes
- Earth connection detection:	yes
Outputs:	
Stop category 0:	2
Stop category 1:	0
Number of safety contacts:	2
Number of auxiliary contacts:	0
Number of signalling outputs:	1
Max. switching capacity of the safety contacts:	2 A / 230 VAC 2 A / 24 VDC
Utilization category to EN 60947-5-1:	AC-15: 230 V / 2 A DC-13: 24 V / 3 A
Mechanical life:	30 million operations
LED display:	supply voltage, safety edge function
Ambient conditions:	
Environmental temperature:	+5 °C … +55 °C
Protection class:	Enclosure: IP40, Terminals: IP20, Clearance: IP54
Mounting:	Snaps onto standard DIN rail to EN 60715
Connection type:	Screw connection
- max. cable section:	max. 2 x 1.5 mm² (incl. conductor ferrules)
Weight:	184 g
Dimensions (Height/Width/Depth):	100 x 22.5 x 120 mm

Approvals

Ordering details

SE-400C

Classification

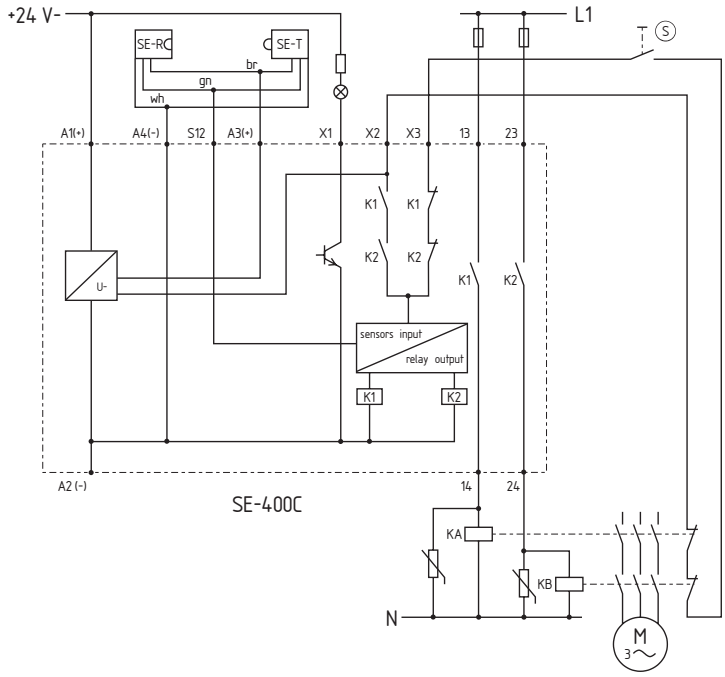
Safety parameters:	
Standards:	EN ISO 13849-1; IEC 61508; IEC 60947-5-3
PL:	up to e
Category:	up to 4
PFH value:	5.0 x 10^{-9} /h for max. 36,500 switching cycles/year and max. 60% contact load
SIL:	up to 3
Mission time:	20 years

Safety edges

Note

- Monitoring the safety edges SE 40 / SE 70 with a safety monitoring unit SE-400C for PL e and category 4.
- The feedback circuit monitors positions of the contactors KA and KB.
- A Start-Reset- push button Ⓢ can optionally be connected to the feedback circuit. Both re-initialization and auto-reset must comply with the requirements of EN 1760-2 (diagram A2, A3).

Wiring diagram

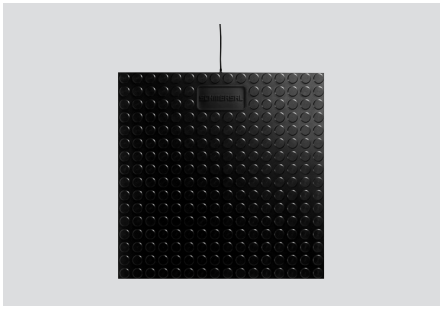


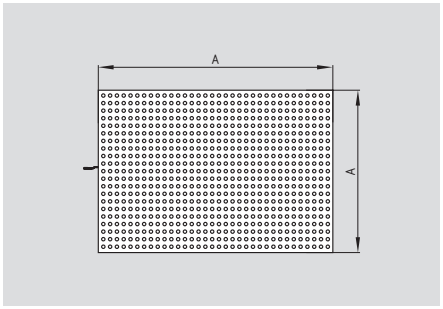
Note

- The wiring diagram is shown for the de-energized condition.
- The overall machine safety depends on the professional mounting and installation of the safety monitoring module and the signal transmitter, as well as on the correct and professional electrical connection of the components.
- If there it any risk whatsoever, the machine may not be restarted.
- Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

Safety mat

SMS 4





- Certified to EN 1760-1
- Response time max. 25 ms
- Robust design
- High resistance to chemicals
- Slip-free surface
- Cascading possible
- Special sizes and shapes available on request
- No additional terminating resistor required
- Aluminum frame and corner sections available

Legend:
A: active surface

Approvals

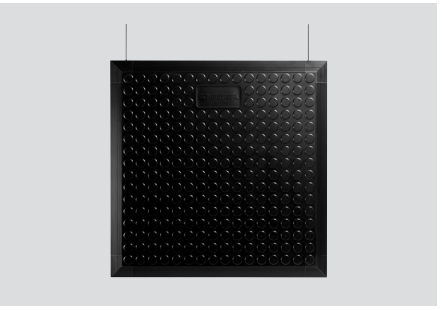
TÜV CE

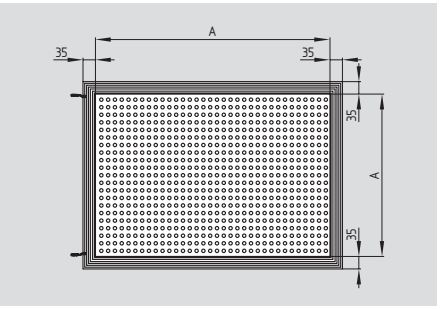
Ordering details

SMS 4-①

No.	Option	Description
		Active surface
①	250-500	250 x 500 mm
	500-500	500 x 500 mm
	500-1000	500 x 1000 mm
	750-1000	750 x 1000 mm
	1000-1000	1000 x 1000 mm
	1000-1500	1000 x 1500 mm

SMS 5





- Certified to EN 1760-1
- Response time max. 25 ms
- Robust design
- High resistance to chemicals
- Slip-free surface
- Cascading possible
- Special sizes and shapes available on request
- No additional terminating resistor required
- With molded ramp profile

Legend: A: active surface
Total size = A + 2 x 35 mm

Approvals

TÜV CE

Ordering details

SMS 5-①

No.	Option	Description
		Active surface
①	250-500	250 x 500 mm
	500-500	500 x 500 mm
	500-1000	500 x 1000 mm
	750-1000	750 x 1000 mm
	1000-1000	1000 x 1000 mm
	1000-1500	1000 x 1500 mm

Technical data

Standards:	EN 1760-1
Control category:	3 to EN 954-1
Surface material:	polyurethane, black
Protection class:	IP65 to EN 60529
Ambient temperature:	0° C … +60°C
Fitting height:	14 mm
Weight:	17 Kg / m²
Actuating force:	150N with round body Ø 80mm
Cable:	
- SMS 4:	4 x 0,34 mm²
- SMS 5:	2 pc. 2 x 0,34 mm²
Cable length:	6 m
Response time:	≤ 25 ms
Mechanical life:	>1.5 million operations
Admissible load:	2000 N / 80 mm Ø
Inactive edge	≤ 10mm
Classification:	(In combination with safety monitoring module SRB 301 HC)
Standards:	EN ISO 13849-1; IEC 61508; IEC 60947-5-3
PL:	up to d
Category:	up to 3
PFH value:	1.0×10^{-7} /h for max. 52,500 switching cycles/year and max. 60% contact load
SIL:	up to 2 in combination with safety monitoring module
Mission time:	20 years
Chemical resistance:	
Water:	Resistant
10% acids:	Resistant
10% caustic solutions:	Resistant
Oils:	Resistant
Gasoline:	Resistant

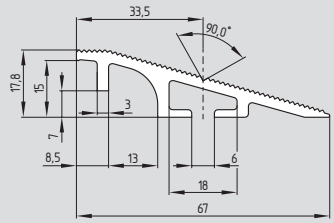
Other on request

Note

Safety Distance Calculations:
S = 1600 mm/s x (T) + 1200 mm
Legend:
T = Total response time from triggering to machine stop, in seconds.

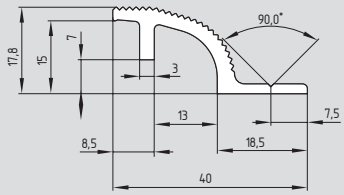
SMS 4 safety mats accessories

System components



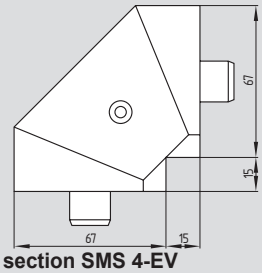
Ramp rail SMS 4-RS-3000

System components

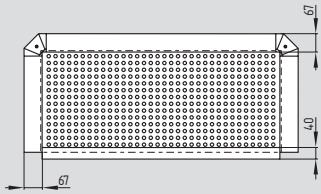


SMS 4-BS-3000 fixing rail

System components



Corner section SMS 4-EV



SMS 4

Ordering details

Ramp rail
3000 mm long — **SMS 4-RS 3000**

Precut trim kits
includes 4 rails, 4 corners sections
For mat size:

250 x 500 mm	**SMS4-RS 250-500**
500 x 500 mm	**SMS4-RS 500-500**
500 x 1000 mm	**SMS4-RS 500-1000**
750 x 1000 mm	**SMS4-RS 750-1000**
1000 x 1000 mm	**SMS4-RS 1000-1000**
1000 x 1500 mm	**SMS4-RS 1000-1500**

Ordering details

Fixing rail
3000 mm long — **SMS 4-BS-3000**

Ordering details

Corner section (1 pc) — **SMS 4-EV**

SRB 301HC

- Safety-monitoring module for safety mats
- 3 enabling contacts
- 1 signalling contact
- Cross-wire detection
- Feedback circuit to monitor external contactors
- Monitored start or automatic start
- LED status indication
- Plug-in terminals

Approvals

Technical data

Standards:	IEC/EN 60204-1, IEC/EN 60947-5-1, EN ISO 13849-1; IEC 61508
Start conditions:	automatic or start button (optionally monitored)
With feedback circuit (Y/N):	yes
ON delay with reset button:	≤ 50 ms
Drop-out delay on „emergency stop“:	≤ 20 ms
Drop-out delay on „supply failure“:	≤ 100 ms
Rated operating voltage U_e:	48 ... 240 VAC; 24 VAC/DC
Frequency range:	50 / 60 Hz
Fuse rating for the operating voltage:	
230 VAC version: primary side:	smelting fuse, tripping current >1.0 A;
secondary side:	internal electronic fuse, tripping current > 0.12 A;
24 VAC/DC version:	internal electronic fuse, tripping current > 0.5 A
Internal electronic fuse (Y/N):	230 VAC version: no 24 VAC/DC version: yes
Current consumption:	230 VAC version: 1.6 W; 4.2 VA 24 VAC/DC version: 1.4 W; 3.3 VA
Inputs monitoring:	
-Cross-wire detection:	yes
- Wire breakage detection:	yes
- Earth leakage detection:	yes
Number of NC contacts:	2
Number of NO contacts:	0
Max. total line resistance:	40 W
Outputs:	
Stop category 0:	3
Stop category 1:	0
Number of safety contacts:	3
Number of signaling outputs:	1
Max. switching capacity of the safety contacts:	250 VAC, 8 A resistive (inductive with suitable protective circuit)
Utilization category to EN 60947-5-1:	AC-15: 230 V / 6 A; DC-13: 24 V / 6 A
Mechanical life:	107 operations
Ambient conditions:	
Operating ambient temperature:	−25°C … +60°C
Storage and transport temperature:	−25°C … +85°C
Protection class:	enclosure: IP40, terminals: IP20, terminal space: IP54
Mounting:	snaps onto standard DIN rails to DIN EN 60715
Connection type:	plug-in type screw terminals
- min. cable section:	0.25 mm²
- max. cable section:	2.5 mm²
Weight:	230 VAC version: 340 g; 24 VAC/DC version: 320 g
Dimensions (height/width/depth):	100 x 45 x 121 mm

Ordering details

SRB 301HC/①-②

No.	Option	Description
①	R	Manual start
	T	Automatic start
②	230 V	48 … 240 VAC
	24 V	24 VAC/DC

Classification

Safety parameters:	
Standards:	EN ISO 13849-1, IEC 61508, EN 60947-5-1
PL:	STOP 0: up to e
Category:	STOP 0: up to 4
PFH value:	STOP 0: ≤ 2.00 x 10^{-8}/h
SIL:	STOP 0: up to 3
Mission time:	20 years

The PFH value of 2.00 x 10^{-8}/h applies to the combinations of contact load (current through enabling contacts) and number of switching cycles (n-op/y) mentioned in the table below. At 365 operating days per year and a 24-hours operation, this results in the below-mentioned switching cycle times (t-cycle) for the relay contacts.
Diverging applications upon request.

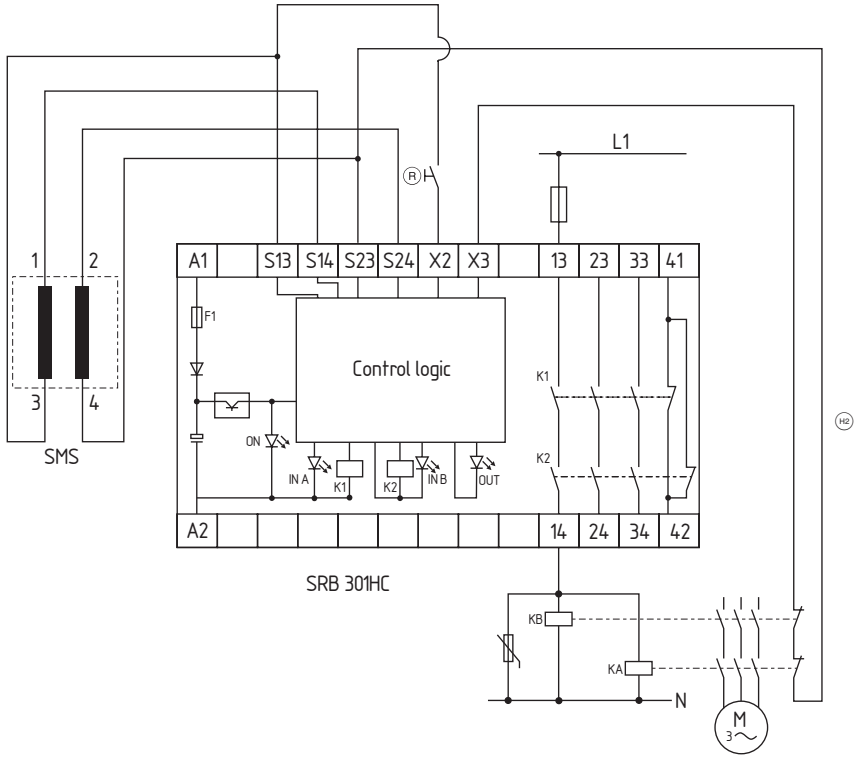
Contact load	n-op/y	t-cycle
20 %	525,600	1.0 min
40 %	210,240	2.5 min
60 %	75,087	7.0 min
80 %	30,918	17.0 min
100 %	12,223	43.0 min

Safety mat

Note

- Protection of a safety mat
- Start button with edge detection
- Feedback circuit (H2) to monitor the external contactors
- Series-wiring of multiple safety mats possible
- Reset button (R)

Wiring example



LED

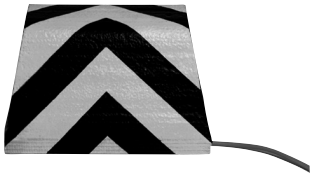
The integrated LEDs indicate the following operating states.

- Position relay K1
- Position relay K2
- Supply voltage U_B

Note

- The wiring example is shown with the safety mat in non-actuated and de-energized condition.
- Inductive loads (e.g. contactors, relays, etc.) are to be supressed by means of a suitable circuit

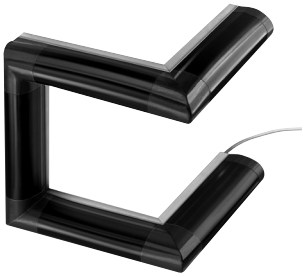
Further products and program extensions



SSG-SBL safety bumper

Safety bumpers are often used to monitor automated-guided vehicles or at rotating machine components where long run-ons, up to approximately 400 mm, can be expected.

Contrary to the conventional safety devices of this kind, the BIA-approved SSG-SBL has a dual-channel design. Several modules are available for signal monitoring.



STW-SL safety edges

Safety edges are used for the protection of shearing and crushing points.

Depending on the application, different rubber profiles and rails are available.

Special advantage: Depending on the system, geometrically more complicated and customer-specific models without dead corners can be produced.