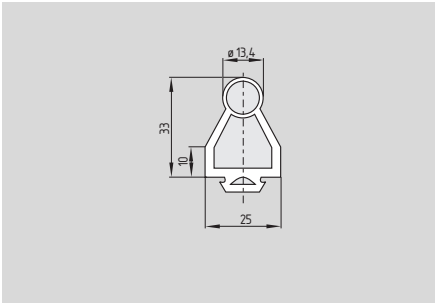


# Safety edges

## 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 IP 67
- Insensitive to environmental conditions
- Max. distance sensors / evaluation 200 m

Other product variantes and notices can be found on page 3-18.

### Approvals

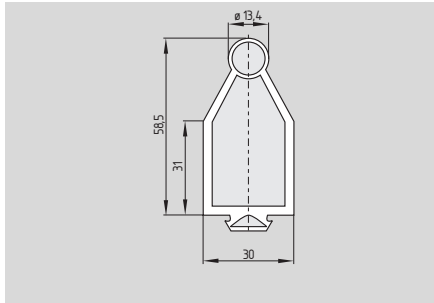


## Ordering details

### Gummiprofil SE-P①②-③

No.	Replace	Description
①	40	40 mm high EPDM
	40NBR	70 mm high NBR
	70	70 mm high EPDM
②	C	Uncoated profile
	xxxx	Coated profile
③		Profile length in mm
		Available lengths:
		Uncoated profile
		1.250 mm
		2.500 mm
		5.000 mm
		10.000 mm
		Coated profile
		1.250 mm
		2.500 mm

## SE 70



- Resistant to chemicals of the rubber material:**
- International abbreviation EPDM (APTK)  
 Chemical name: ethylene propylene ter polymer  
 good
- 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 to + 170 °C  
 Long exposition: ± - 30 to + 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.

## 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

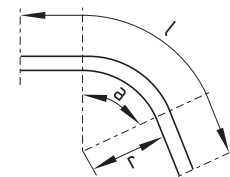
In the extremities of the safety edge at approx. 60 mm (SE 40) or 50 mm (SE 70) finger guard is not guaranteed. Upon actuation of this area, the transmitter/receiver is pushed into the lower profile section and the switching signal is evaluated, but the required forces are high though. If this restriction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

## Technical data

Standards:	EN 1760-2
Material:	
Rubber profil:	EPDM, 65 Shore A (optionally with 20 µm plastic coating)
Emitter/Receiver:	polyurethane
Profiles:	Al-Mg Si OF22
Protection class:	IP 68 to EN 60529
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 mm <sup>2</sup> flexible
Cable length:	Transmitter 3 m, receiver 6.6 m or 10.5 m
Mechanical life:	20 million operations

## Note

Slight bowing of profile is compensated, reduces the max. total length possible

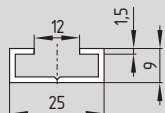


Approximative values for the lengths that can be achieved

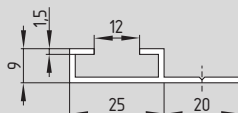
Length l	Radius r	Angle a
8.00 m	0.0 m	0°
4.50 m	1.0 m	15°
2.50 m	0.5 m	63°
1.25 m	0.3 m	90°

# Safety edges

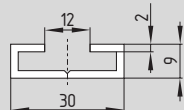
## System components



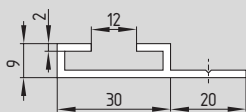
Aluminium profile SE-AL10



with aluminium leg SE-AL12



Aluminium profile SE-AL20



with aluminium leg SE-AL22

## System components



SE-100C



SE-304C



SE-400C



SE-SET

## System components



Junction box SE-J1



Rubber scissors SE-SC



End plugs SE-T.40



End plugs SE-T.70

## Ordering details

### Aluminium profile SE-AL<sup>①②③</sup>

No.	Replace	Description
①	1	For rubber profile SE-40
	2	For rubber profile SE-70
②	0	Without aluminium socket
	2	With aluminium socket
③	xxxx	Profile length in mm:
	1250	1.250 mm
	2500	2.500 mm
		Larger lengths possible by connecting multiple aluminium profiles

## Ordering details

### Monitoring of safety edges using

Typ	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 number
Transmitter cable	Receiver cable	
3 m	6 m	SE-SET
3 m	10.5 m	SE-SET 3/10,5

## Ordering details

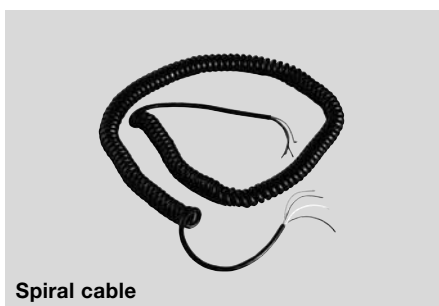
Junction box	SE-J1
Rubber scissors	SE-SC
End plugs for SE-P40	
uncoated /	SE-T40
coated	SE-TC40
End plugs for SE-P70	
uncoated	SE-T70
coated	SE-TC70
Gluing of the end caps:	
Primer (without drawing)	SE-PR
Glue (without drawing)	SE-G 8406

# Safety edges

## System components

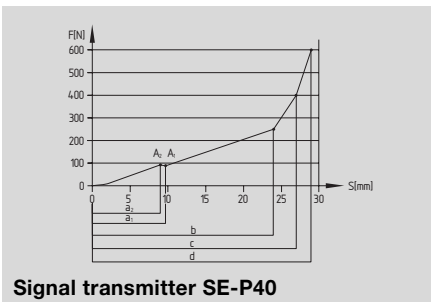


Wiring tool SE-WA



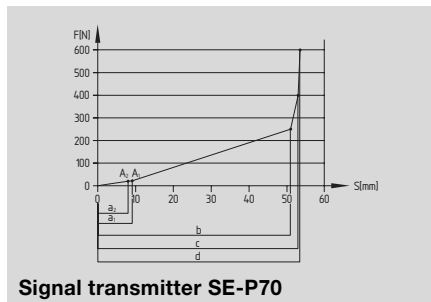
Spiral cable

## Force-travel diagram



Signal transmitter SE-P40

## Force-travel diagram



Signal transmitter SE-P70

Speed [mm/s]	up to A		as of A		
	100	40	10		
Curve section	a1	a2	b	c	d
Deformation travel [mm]	9	9.7	24	27	29
Force [N]	92	88	250	400	600
Connected module	①	②	①②	①②	①②
	① SE-100C		② SE-400C		

Speed [mm/s]	up to A		as of A		
	100	10	10		
Curve section	a1	a2	b	c	d
Deformation travel [mm]	8	9.1	51	53	54
Force [N]	22	23	250	400	600
Connected module	①	②	①②	①②	①②
	① SE-100C		② SE-400C		

## Ordering data

Wiring tool, 6 m

SE-WA

Spiral cable, 1 m extendable to 3 m

3 x 0.25 mm<sup>2</sup>

SE-CC 1301

5 x 0.5 mm<sup>2</sup>

SE-CC 1302

## Notice

### Legend

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

$$\text{Run-on travel} = a_{1,2} - b / c / d$$

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

## Notice

### Applicable test conditions

Parameters of the measurement:

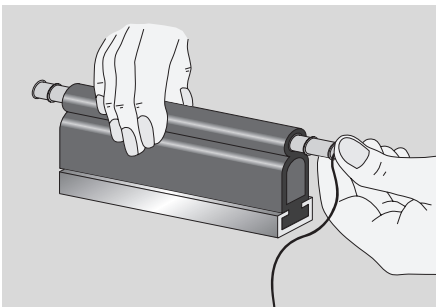
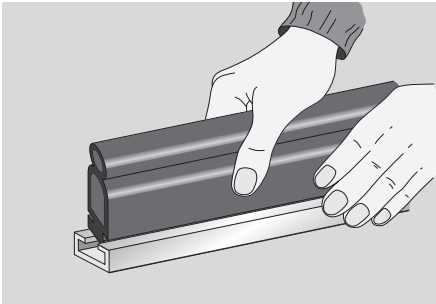
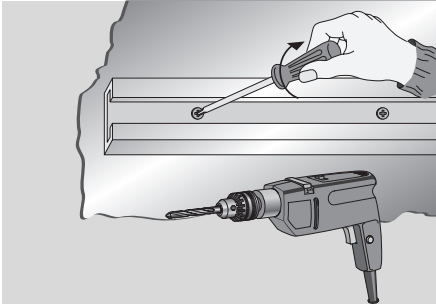
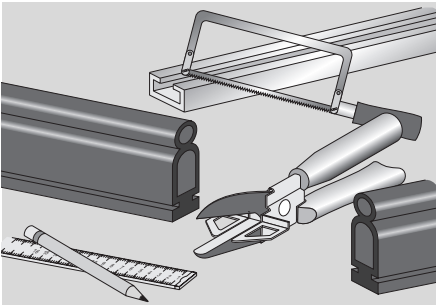
Temperature: T = 23 °C

Mounting position: B (to EN 1760-2)

Place of measurement: C 3 (to EN 1760-2)

## Safety edges

### Mounting



### Notice

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

## Safety edges

### SE-100C



- Control Category 1 to EN 954-1
- To monitor 1 or 2 safety edges
- 1 enabling path
- 1 signal output (changeover contact)
- LED: supply voltage, safety edge function
- Operating voltage 24 VDC

### Technical data

Standards:	EN 1760-2
Control category:	1 to EN 954-1
Start conditions:	Automatic
Enclosure:	PE (black), Crastin (grey)
Mounting:	snaps onto standard DIN rail to EN 50022
Connection:	screw terminals
Cable section:	max. 2 x 1.5 mm <sup>2</sup> (incl. conductor ferrules)
Protection class:	terminals IP 20 enclosure IP 40 to EN 60529
U <sub>e</sub> :	24 VDC (+ 20 % / - 10 %)
I <sub>e</sub> :	approx. 150 mA
Monitored inputs	1 or 2 pairs transmitter/receiver SE-T/R
Feedback circuit:	no
Enabling contacts:	1 enabling path
Max. cable length:	200 m
Utilisation category:	AC-15, DC-13
I <sub>e</sub> /U <sub>e</sub> :	2 A/230 VAC 2 A/24 VDC
Contact load capacity:	max. 250 VAC, max. 6 A (cos φ = 1)
Max. fuse rating:	6 A gG D-fuse
Signalling output:	1 change-over contact, 36 V, 50 mA
Response time:	16 ms
Time to readiness:	max. 300 ms
Closing duration:	max. 300 ms
Opening duration:	typ. 15 ms
Function display:	2 LEDs
EMC rating:	conforming to EMC Directive
Overvoltage category:	III / 4 kV, VDE 0110
Degree of pollution:	2 to DIN VDE 0110
Resistance to shock:	< 5 g / 33 Hz (VDE 0160)
Mechanical life:	20 million operations
Ambient temperature:	+ 5 °C ... + 55 °C
Dimensions:	22.5 x 100 x 120 mm

#### Approvals



#### Ordering details

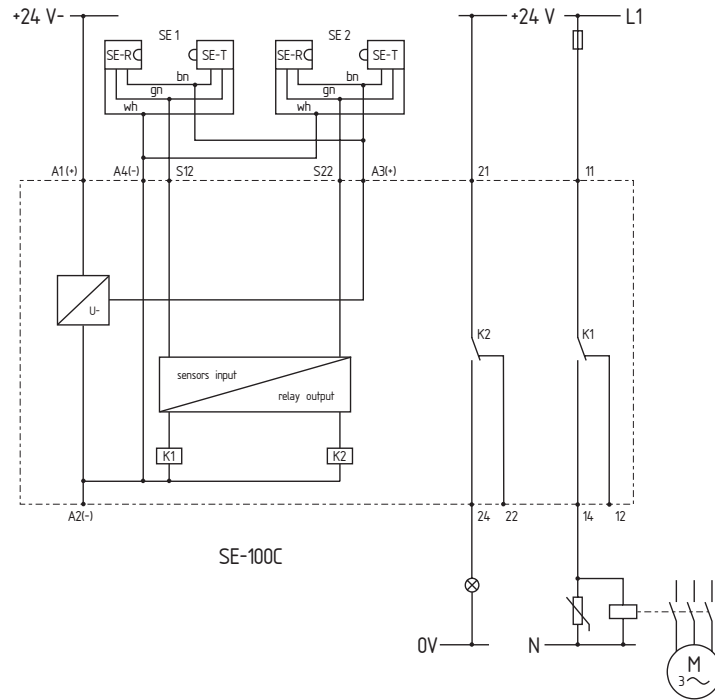
SE-100C

## Safety edges

### Note

- Monitoring the safety edges SE 40 / SE 70 with a safety monitoring unit SE-100C for Control Category 1 to EN 954-1.
- 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 realised in the machine control. Both re-initialisation 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-energised condition.

## Safety edges

### SE-304C



- Control Category 3 to EN 954-1
- To monitor 1 to 4 safety edges
- 1 enabling path
- LED status indications: supply voltage, system enabled, function of 4 safety edges, fault indication
- Operating voltage 24 VAC/DC
- 1 semi-conductor signal output
- Start-function with trailing edge (optional)

### Technical data

Standards:	EN 1760-2
Control category:	3
Start conditions:	automatic or start button
Enclosure:	thermoplastic
Mounting:	snaps onto standard DIN rail to EN 50022
Connection:	screw terminals
Cable section:	max. 2 x 1.5 mm <sup>2</sup> (incl. conductor ferrules)
Protection class:	terminals IP 20 enclosure IP 40 to EN 60529
U <sub>e</sub> :	24 VDC (+ 20 % / -10%) 24 VAC (+ 10 % / - 10%)
I <sub>e</sub> :	approx. 500 mA (for 4 safety edges)
Monitored inputs	4 pairs of transmitter/receiver SE-T/-R
Feedback circuit:	yes
Enabling contacts:	1 enabling path
Max. cable length:	200 m
Signalling output:	1 transistor output max. 50 mA, short-circuit proof
Utilisation category:	AC-15, DC-13
I <sub>e</sub> /U <sub>e</sub> :	2 A/230 VAC 2 A/24 VDC
Contact load capacity:	max. 250 VAC, max. 2 A (cos φ = 1)
Max. fuse rating:	2 A gG D-fuse
Response time:	< 17 ms
Function display:	5 LEDs
EMC rating:	conforming to EMC Directive
Overvoltage category:	III to DIN VDE 0110
Degree of pollution:	3 to DIN VDE 0110
Resistance to shock:	< 5 g / 33 Hz (VDE 0160)
Mechanical life:	> 10 million operations
Ambient temperature:	+ 5 °C ... + 55 °C
Dimensions:	22.5 x 100 x 121 mm

#### Approvals



in preparation



#### Ordering details

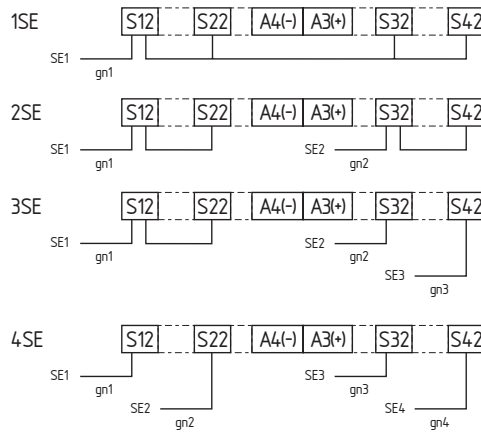
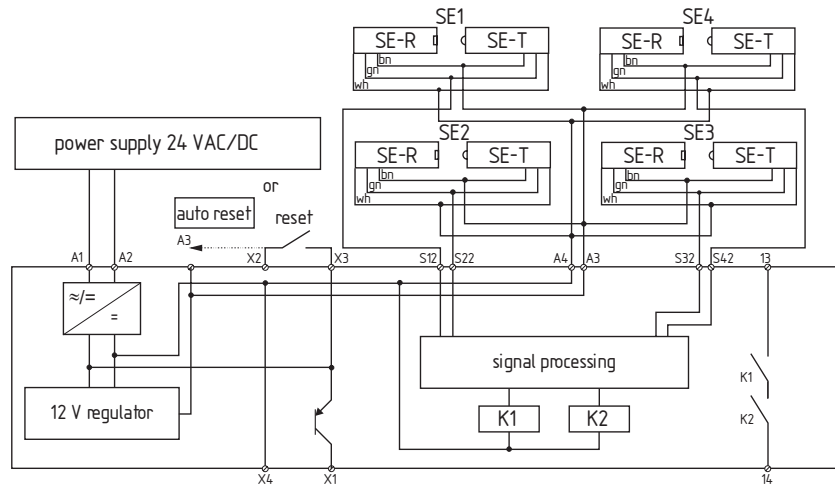
SE-304C

# Safety edges

## Note

- Monitoring 1 – 4 safety edges SE 40 / SE 70 using safety monitoring module SE-304C for control category 3 to EN 954-1.
- 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-initialisation 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-energised condition.



## Safety edges

### SE-400C



- Control Category 4 to EN 954-1
- To monitor 1 safety edge
- 2 enabling paths
- LED: supply voltage, safety edge function
- Operating voltage 24 VDC
- 1 semi-conductor signal output
- Start function

### Technical data

Standards:	EN 1760-2
Control category:	4
Start conditions:	automatic or start button
Feedback circuit:	yes
Enclosure:	PE (black), Crastin (grey)
Mounting:	snaps onto standard DIN rail to EN 50022
Connection:	screw terminals
Cable section:	max. 2 x 1.5 mm <sup>2</sup> (incl. conductor ferrules)
Protection class:	terminals IP 20 enclosure IP 40 to EN 60529
U <sub>e</sub> :	24 VDC (+ 20 % / - 10 %)
I <sub>e</sub> :	approx. 150 mA
Monitored inputs	1 pair transmitter/receiver SE-T/R
Enabling contacts:	2 enabling paths
Max. cable length:	200 m
Utilisation category:	AC-15, DC-13
I <sub>e</sub> /U <sub>e</sub> :	2 A/230 VAC 3 A/24 VDC
Contact load capacity:	max. 250 VAC, max. 4 A (cos φ = 1)
Max. fuse rating:	4 A gG D-fuse
Signalling output:	1 transistor output 36 V, 50 mA
Response time:	32 ms
Time to readiness:	approx. 32 ms
Closing duration:	approx. 32 ms
Opening duration:	typ. 15 ms
Function display:	2 LEDs
EMC rating:	conforming to EMC Directive
Overvoltage category:	III / 4 kV, VDE 0110
Degree of pollution:	2 to DIN VDE 0110
Resistance to shock:	< 5 g / 33 Hz (VDE 0160)
Mechanical life:	30 million operations
Ambient temperature:	+ 5 °C ... + 55 °C
Dimensions:	22.5 x 100 x 120 mm

#### Approvals



### Ordering details

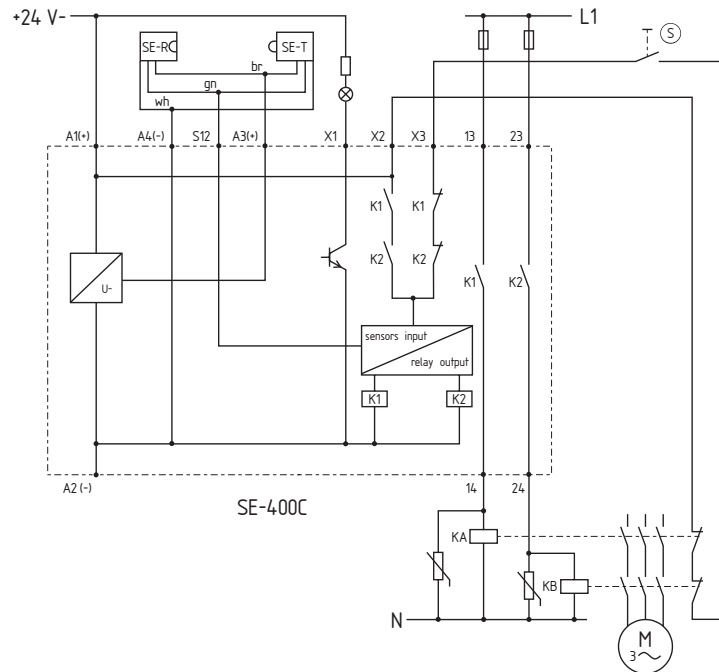
SE-400C

## Safety edges

### Note

- Monitoring the safety edges SE 40 / SE 70 with a safety monitoring unit SE-400C for Control Category 4 to EN 954-1.
- The feedback circuit monitors positions of the contactors KA and KB.
- A Start-Reset-Taster  $\text{\textcircled{S}}$  can optionally be connected to the feedback circuit. Both re-initialisation 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-energised condition.