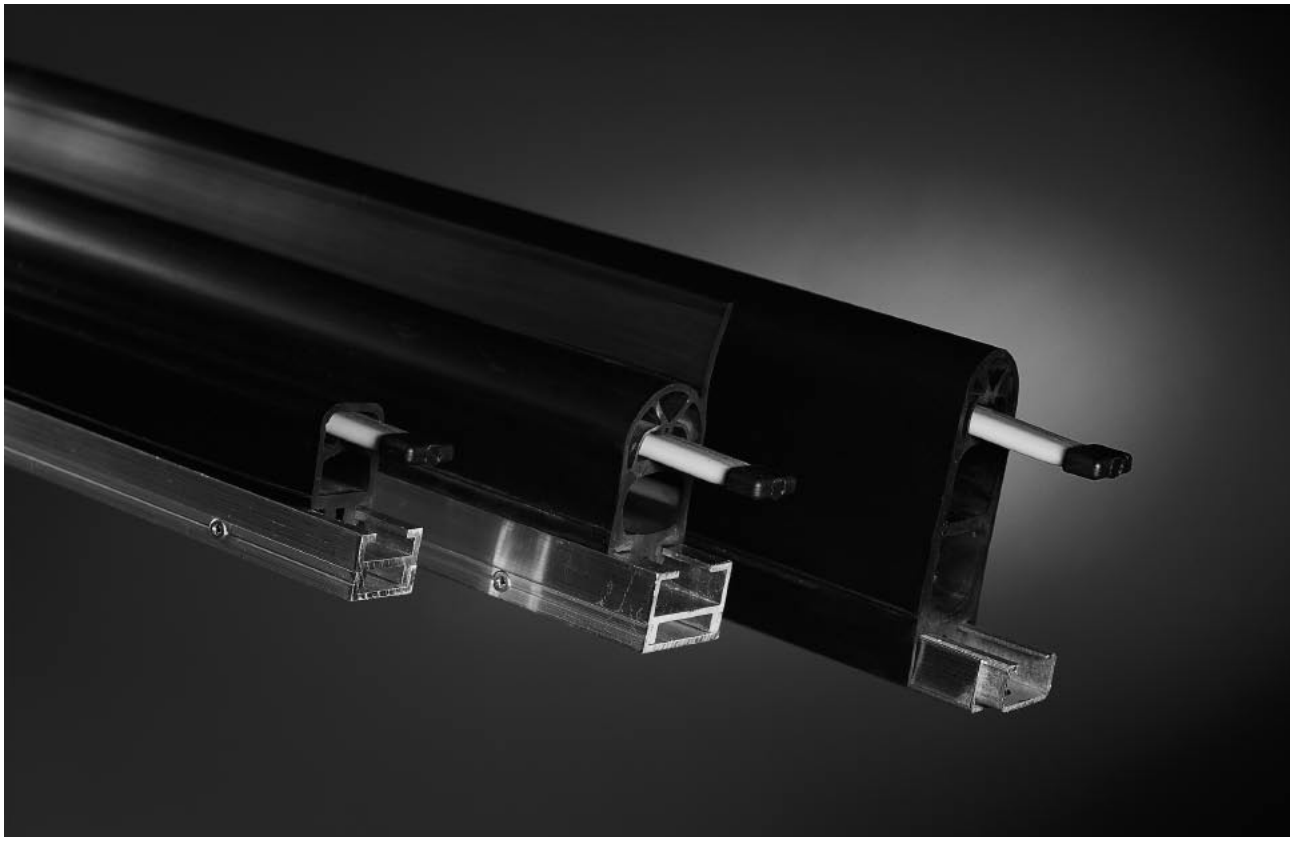
MAYSER®
Polymer Electric

Product Information



Safety Edges SL/W and SL/BK

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Safety Edges

Contents

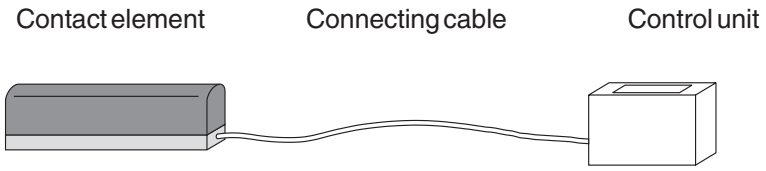
MAYSER Polymer Electric P.O. Box 30 48 89020 Ulm Germany Tel. +49 731 2061-0 Fax +49 731 2061-222

Proven Safety

Safety Edges Definitions

2.1.1

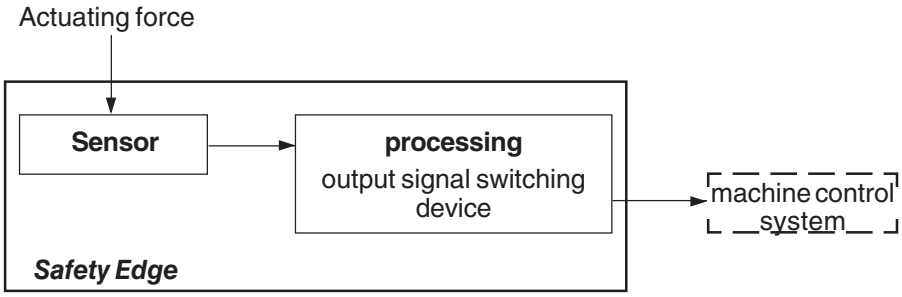
Safety Edges
Safety Edges are protective devices comprising sensor, signal transmission, signal processing and signal switching.



The control unit is made up of control device and output signal switching device(s).

Sensor
The sensor is that part of the Safety Edge which produces the control command when the actuating force is applied. The sensor of the Safety Edge constitutes a line. Mayser Safety Edges have a sensor whereby the actuating surface is deformed locally, eg. it is made of rubber.

Signal processing
The signal processing is that part of the Safety Edge which converts the signal from the sensor.
Signal transmission
The signal transmission is that part of the Safety Edge which produces the control command.



The following points should be considered when choosing the sensors:
- temperature range
- response time
- protection (standard: IP65)
- environmental considerations (oil, coolant, ...)

ATTENTION:
The certification of design becomes invalid if our products are used with control units which do not comply with the tested types.

Subject to technical modifications.

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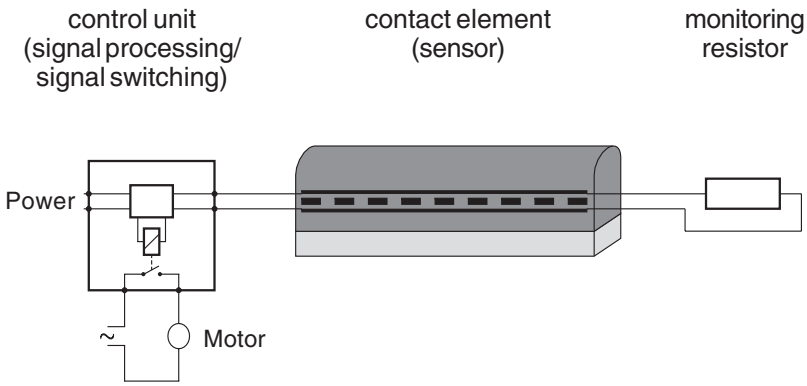
Safety Edges 2.2.1
Functional principle

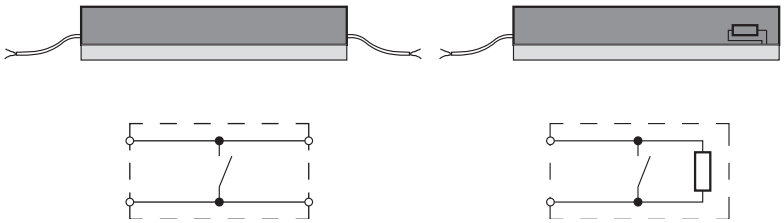
2-wire-connection-system
(with monitoring resistor)



The Safety Edge comprises contact element (sensor), connecting cable (signal transmission), signal processing and signal switching. The signal processing and the signal switching are combined in the control unit.

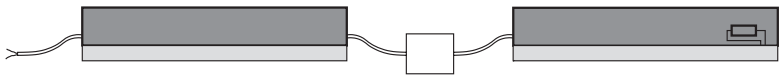
Monitoring resistor

SL/BK through contact element with cable exit on both ends
or for connecting up a monitoring reistor externally
SL/W with integrated monitoring resistor

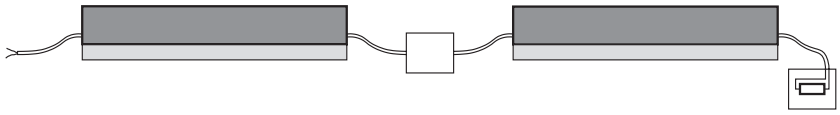


For your safety:
The contact elements and the connecting cable are constantly monitored for function.
A control function is attained by bridging the conductive areas with a monitoring resistor.

Combination of contact elements



Combination:
- connection of several sensors
- only one control unit necessary



Model with external resistor, thus avoiding variety in type

Cable connection

- length of cable: 2 m
  extra cable possible
- cable ends without plug/socket
  option: cable ends can be supplied with plug/socket

Subject to technical modifications.

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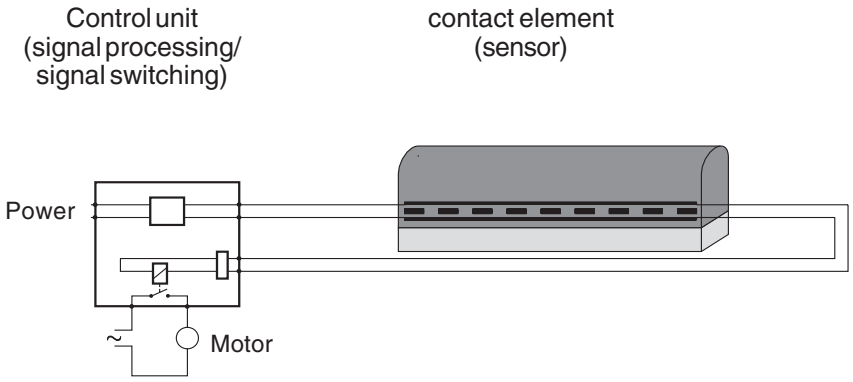
Safety Edges 2.2.2
Functional principle

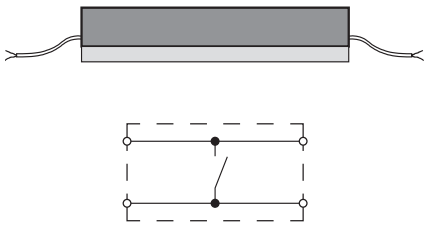
4-wire-connection-system
(without monitoring resistor)



The Safety Edge comprises contact element (sensor), connecting cable (signal transmission), signal processing and signal switching. The signal processing and the signal switching are combined in the control unit.

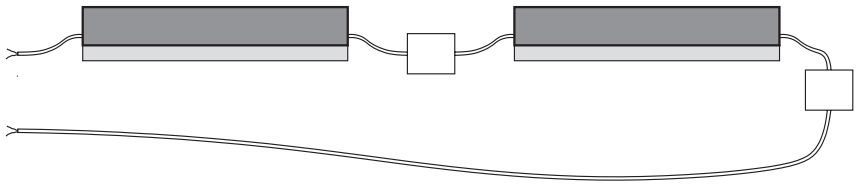
Type

SL/BK Through contact element with cable exit on both ends



For your safety:
The closed circuit current principle constantly monitors the contact element and the connecting cable for function.
The monitoring resistor is not required due to signal transmisson feedback.

Combination of contact elements



Combination:
- connection of several sensors
- only one control unit necessary
- connection to Safety Mats and Safety Bumpers possible

Cable connection (Standard)

- length of cable: 2 m
  extra cable possible
- cable ends without plug/socket
  option: cable ends can be supplied with plug/socket

Note:
The 4-wire-connection-system can only be applied using the control unit SG-SUE 41X2 NA.

Subject to technical modifications.

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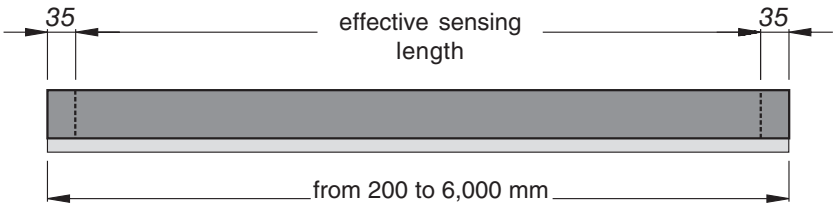
Safety Edges Standard Range 2.3.1

Available lengths

The contact elements can be supplied in lengths between 200 und 6,000 mm. Custom-built Edges on request.
In the case of the standard Safety Edge both ends have a non-sensitive area 35 mm long.



Chemical resistance

Rubber Profile GP	**EPDM**	**NBR**	**CR**
Identification rills on side of profile	v	vv	vvv
Material Rating			
Shore A-hardness	55 ±5	60 ±5	60 ±5
Application area	Doors/Gates	Machines	Machines
Chemical resistance			
Acetone	+	±	+
Formic acid	+	+	+
Ammonia	+	+	+
ASTM-Oel Nr. 1/ 2/ 3	-	+	+
Fuel	-	+	±
Brake fluid	±	±	±
Chloride solution	+	+	+
Diesel oil	-	+	+
Fats	-	+	+
Isopropyl alcohol	+	+	+
Methanol	+	+	±
Mineral oils	-	+	+
Ozone + meteorlogical conditions	+	-	+
Hydrochloric acid 10%	+	+	+
Spirit (ethyl alcohol)	+	+	+
Carbon tetrachloride	-	+	-
Water and frost	+	-	±
Hydrogen peroxide 10%	+	+	-
Household and sanitary Cleaning agents	+	+	+

Tests were done at 23°C room temperature

Key to symbols:
+ = resistant
± = limited resistance
- = not resistant

The above data are results of tests which were done in our laboratory to the best of our knowledge and belief. We cannot accept any obligations being deduced from them. You must always test the suitability of our products for your special application purpose under practical conditions.

Subject to technical modifications.

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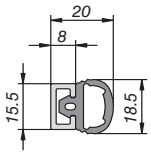
Dimensions and switching distances

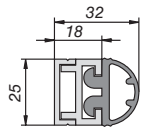
Safety Edges Standard Range 2.3.2

Actuating force: < 150 N (at 23 °C and with testpiece Ø 80 mm)
Dimensional tolerances: DIN 7715 - E2/L2



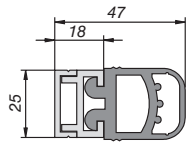
GP 15 **NBR**

Actuation distance:	
- at 10 mm/s	2 - 4 mm
Overtravel:	-
AL-rail type:	C15



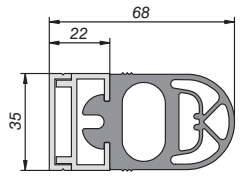
GP 22 **NBR**

Actuation distance:	
- at 10 mm/s	5 mm
Overtravel:	
- at 10 mm/s	1 mm
Al-rail type:	C 25



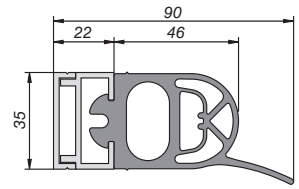
GP 39 **EPDM *)** **NBR**

Actuation distance:		
- at 10 mm/s	4 mm	8 mm
Overtravel:		
- at 10 mm/s	2 mm	9 mm
Al-rail type:	C 25	C 25



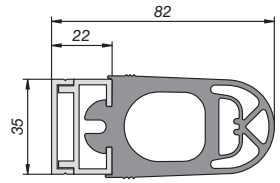
GP 50 **EPDM *)** **CR *)**

Actuation distance:		
- at 10 mm/s	9 mm	7 mm
- at 100 mm/s	15 mm	8 mm
Overtravel:		
- at 10 mm/s	13 mm	5 mm
- at 100 mm/s	5 mm	4 mm
Al-rail type:	C 35	C 35



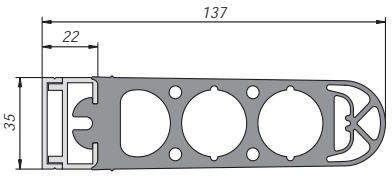
GP 50 L **EPDM**

Actuation distance:	
- at 10 mm/s	20 mm
Overtravel:	
- at 10 mm/s	12 mm
Al-rail type:	C 35



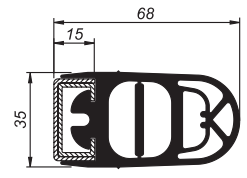
GP 60 **EPDM *)** **CR *)**

Actuation distance:		
- at 10 mm/s	7 mm	8 mm
- at 100 mm/s	10 mm	9 mm
Overtravel:		
- at 10 mm/s	20 mm	7 mm
- at 100 mm/s	16 mm	6 mm
Al-rail type:	C 35	C 35



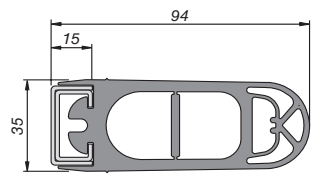
GP 120 **EPDM**

Actuation distance:	
- at 10 mm/s	11 mm
Overtravel:	
- at 10 mm/s	ca. 45 mm
Al-rail type:	C 35



GP 301 **EPDM *)**

Actuation distance:	
- at 10 mm/s	12 mm
- at 100 mm/s	12 mm
Overtravel:	
- at 10 mm/s	14 mm
- at 100 mm/s	8 mm
Steel rail type:	C 27



GP 302 **EPDM *)**

Actuation distance:	
- at 10 mm/s	10 mm
- at 100 mm/s	12 mm
Overtravel:	
- at 10 mm/s	25 mm
- at 100 mm/s	22 mm
Steel rail type:	C 27

All given data marked with *) are verified by EEC-type-examination certificates.

Subject to technical modifications.

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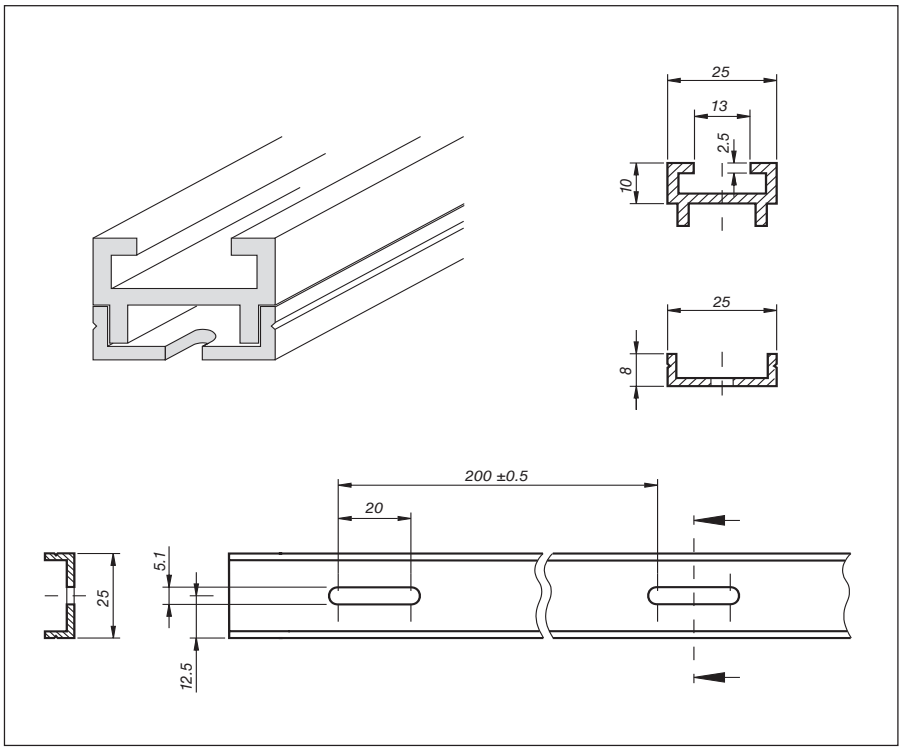
Dimensions of Aluminium Rails C 25

Safety Edges Standard Range 2.3.3

Rail for GP 22 / GP39

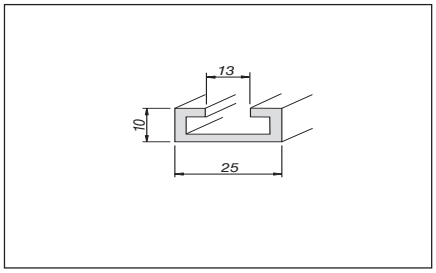


Al-Rail C 25 M

Width:	25 mm
Height:	18 mm
Thickness:	
- top rail	2.5 mm
- bottom rail	2.0 mm

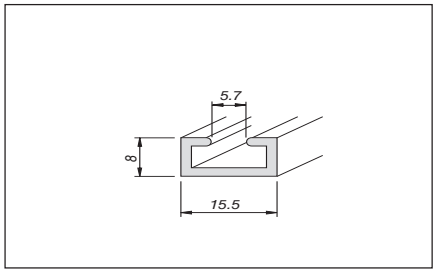
Fix upper part

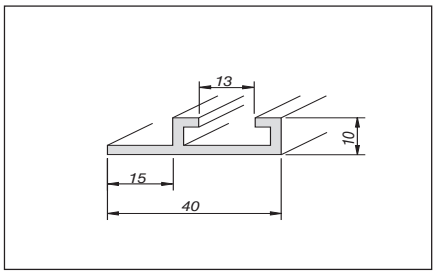
to the lower part using self-tapping M3X8 DIN 7500 countersunk screws in pre-drilled positions



Al-Rail C 25

Width:	25 mm
Height:	10 mm
Thickness:	2.5 mm





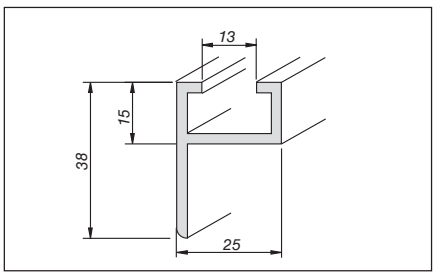
Al-Rail C 25 S

Width:	40 mm
Height:	10 mm
Thickness:	2.5 mm

As Al-Rail C 25 except for side mounting flange

Al-Rail C 15 (for GP 15)

Width:	15.5 mm
Height:	8 mm
Thickness:	2 mm



Al-Rail C 25 L

Width:	25 mm
Height:	15 mm
Height of mounting flange:	23 mm
Thickness:	2.5 mm

As Al-Rail C 25 except for rear mounting flange

Al-Rails: dimensional variation DIN 17615 (Part 3)

Subject to technical modifications.

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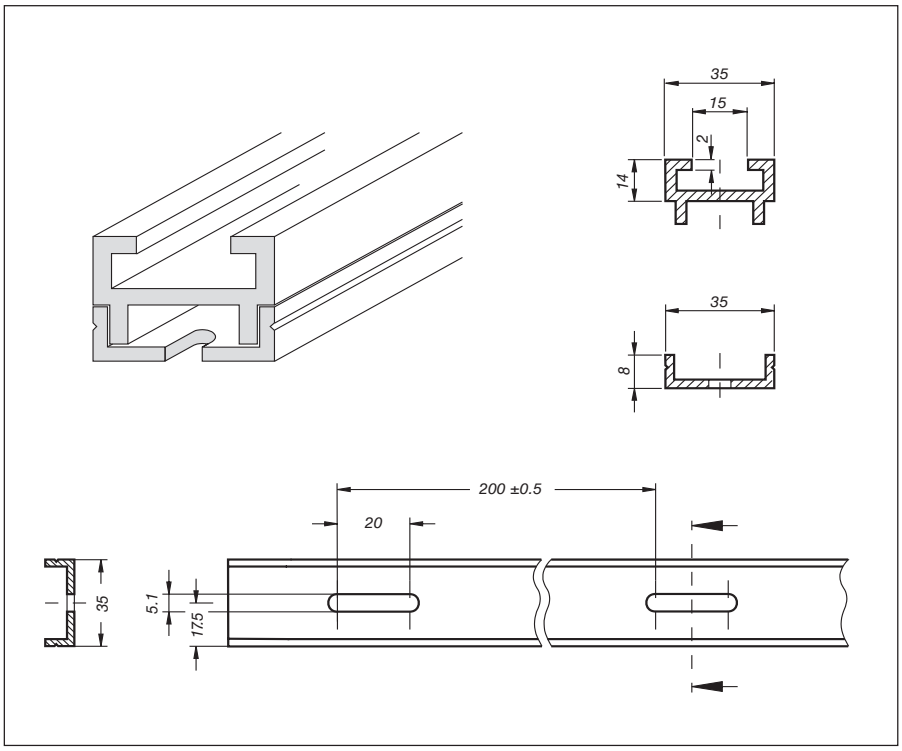
Dimensions of Aluminium Rails C 35

Safety Edges Standard Range 2.3.4

Rail for GP 50 / GP 60 / GP 120

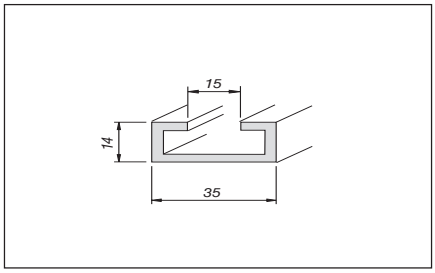


Al-Rail C 35 M

Width:	35 mm
Height:	22 mm
Thickness:	
- top rail	2 mm
- bottom rail	2 mm

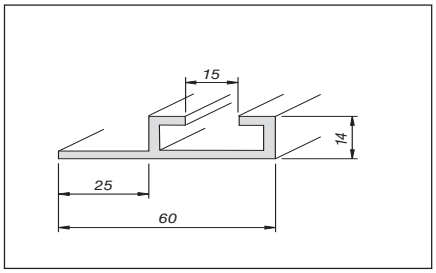
Fix upper part

to the lower part using self-tapping M3X8 DIN 7500 countersunk screws in pre-drilled positions



Al-Rail C 35

Width:	35 mm
Height:	14 mm
Thickness:	2 mm



Al-Rail C 35 S

Width:	60 mm
Height:	14 mm
Thickness:	2 mm
Thickness of mounting flange:	2.5 mm

As Al-Rail C 35 except for side mounting flange

Al-Rails: dimensional variation DIN 17615 (Part 3)

Subject to technical modifications.

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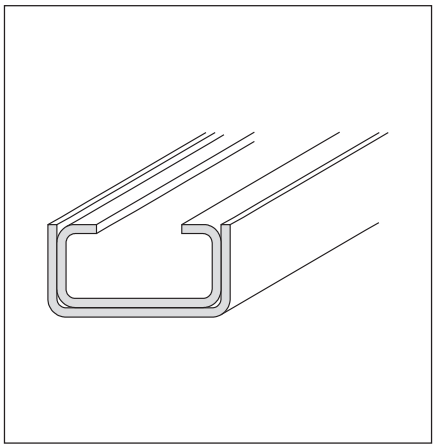
Dimensions - Steel Rail C 27 / U 27

Safety Edges Standard Range 2.3.5

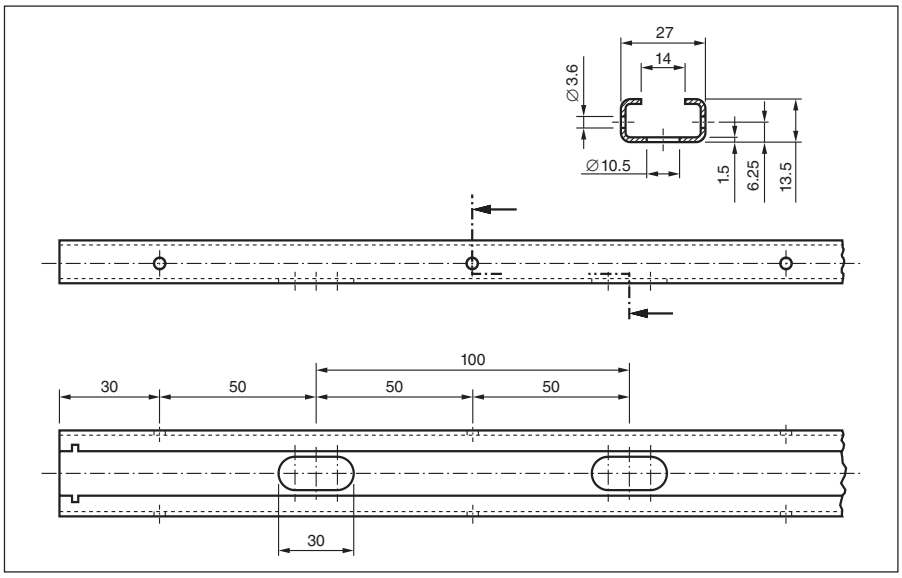
Rail for GP 301 / GP 302



Steel Rail C 27 / U 27

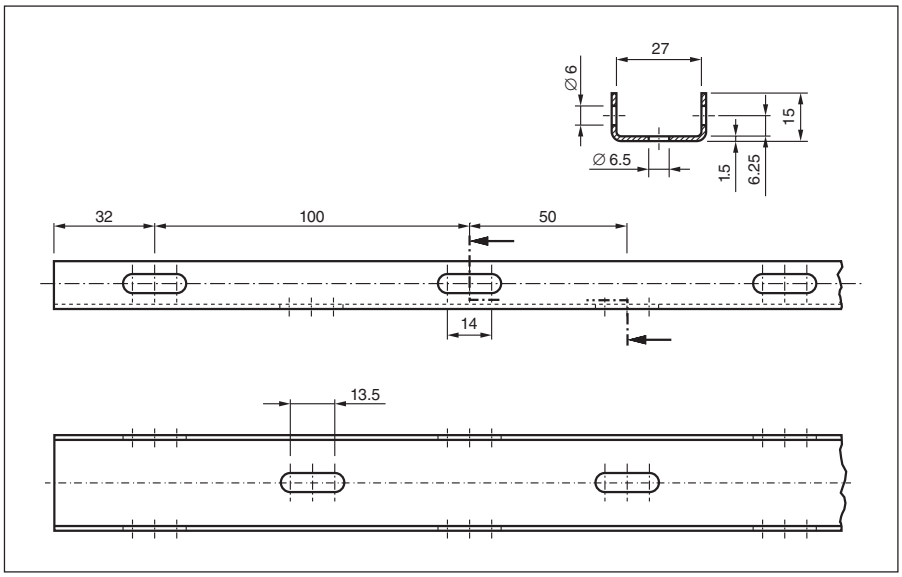
Width:	30 mm
Height:	15 mm
Thickness:	1.5 mm

Fix the C-Rail
to the U-Profile using self-tapping SK M4X10 DIN 7500 countersunk screws in pre-drilled positions



Steel Rail C 27

Width:	27 mm
Height:	13.5 mm
Thickness:	1.5 mm



Steel Rail U 27

Outside width:	30 mm
Inside width:	27 mm
Height:	15 mm
Thickness:	1.5 mm

Subject to technical modifications.

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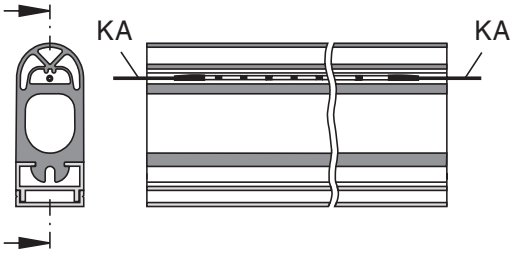
Cable exits KA
some with cable sleeves KT

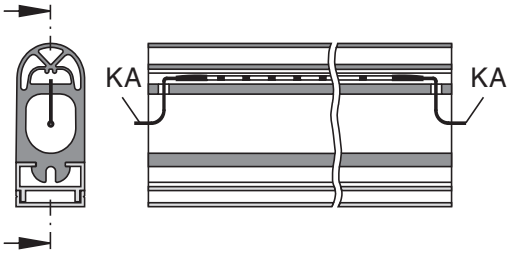
Safety Edges 2.3.6
Standard Range

Safety Edge Type BK
cable on both ends

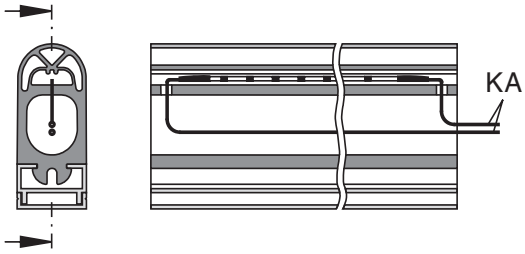
Version 1 - for GP 15, 22, 39, 50, 60, 120, 301, 302



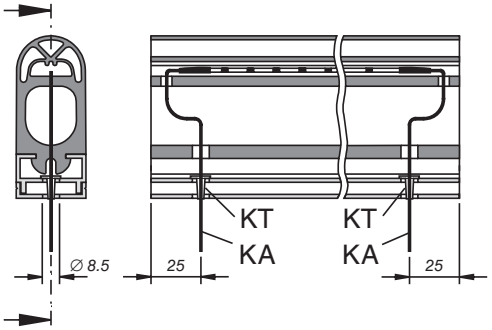
Version 3 - for GP 39, 50, 60, 120, 301, 302



Version 4 - for GP 39, 50, 60, 120, 301, 302

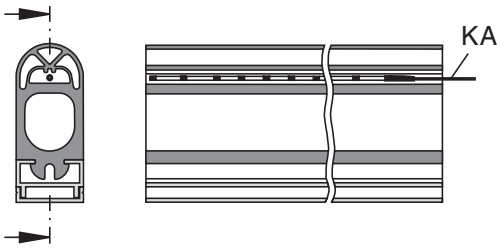


Version 5 - for GP 39, 50, 60, 120, 301, 302

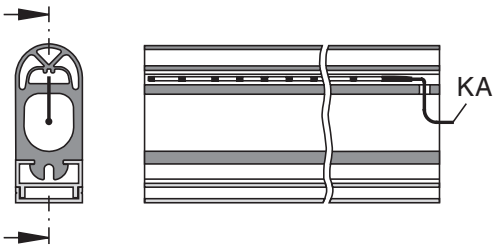


Safety Edge Type W
with integrated resistor

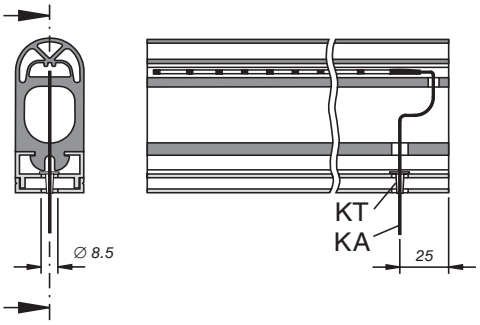
Version 9 - for GP 15, 22, 39, 50, 60, 120, 301, 302



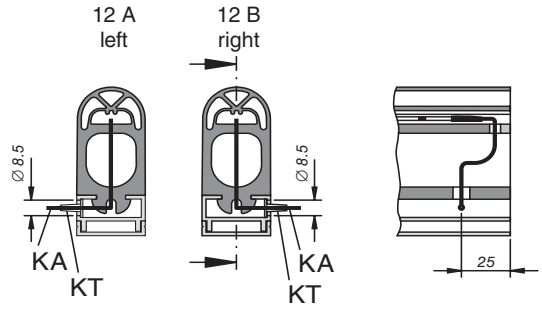
Version 10 - for GP 39, 50, 60, 120, 301, 302



Version 11 - for GP 39, 50, 60, 120, 301, 302



Version 12 - for GP 39, 50, 60



other variations
(e.g. smaller non-sensitive areas on ends)
on enquiry

Note: **non-sensitive area on both ends**
standard c. 35 mm
for GP 15 c. 50 mm

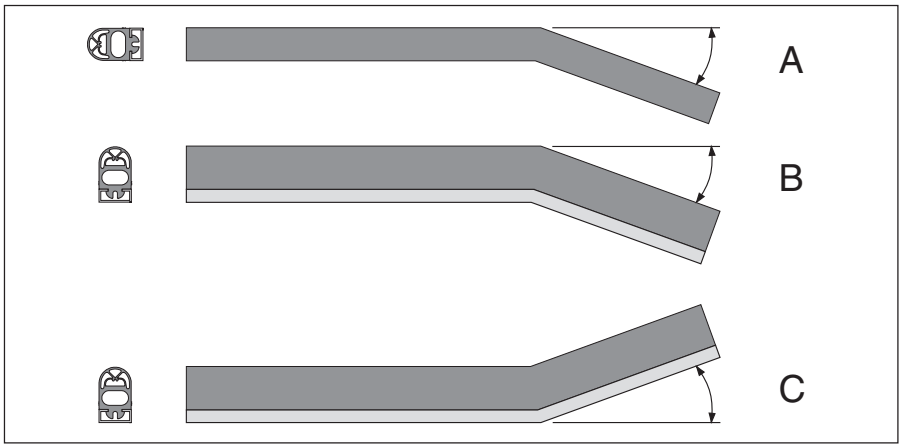
Subject to technical modifications.

290900

Safety Edges 2.7.1
Customised items

Lateral bends and radii

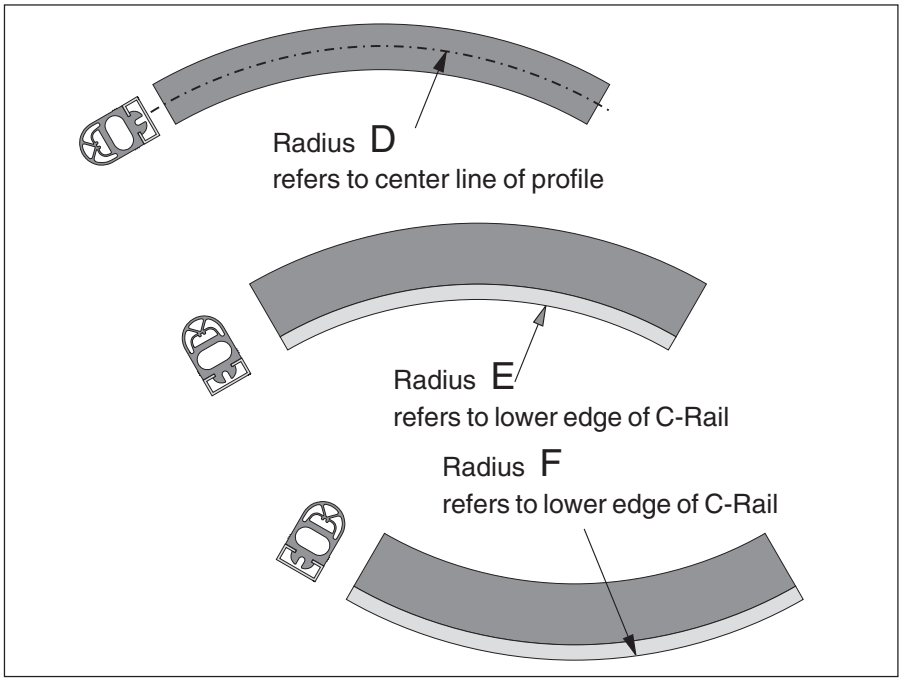
Lateral bends
All C 25 and C 35 Al-rails can be bent laterally to suit in our factory.



Maximum lateral bend

Bend type:	A	B	C
GP 22	30°	25°	10°
GP 39	25°	20°	5°
GP 50	20°	20°	15°
GP 60	16°	15°	10°
GP 120	15°	15°	5°

Radii
Safety Edges with a radius are only available with C 25 and C 35 Al-rails. The Al-rails have to be bent in our factory.



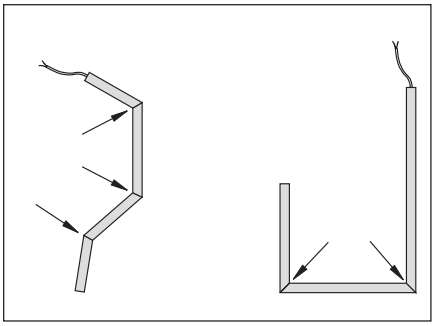
Minimum radius in mm

Radius type:	D	E	F
GP 22	300	300	350
GP 39	300	300	350
GP 50	350	400	400
GP 60	350	450	550
GP 120	500	–	–

Please note:
Lateral bends and radii are not covered by the EC-certification of design.

Custom-built Safety Edges

- temperature resistant
  short term up to 120 °C
  long term up to 100 °C
  Protection class: IP 50
- angled Safety Edges with sensitive zones in problem areas
- all Safety Edges can be supplied with sensitive ends except those with GP 15 or GP 22



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Overall view of combinations

Safety Edges Overview

2.8.1

Safety Edges SL	GP 15	GP 22	GP 39	GP 50	GP 60	GP 120	GP 301	GP 302	GP 302
Material									
NBR	●	●	●						
EPDM			●	●	●	●	●	●	
CR					●		●		
Mounting									
C 15	●								
C 25 M / S / L		●	●	●					
C 35 M / S					●	●	●		
C 27 / U 27								●	
Monitoring resistor									
1.2 kΩ	●	●	●	●	●	●	●	○	
8.2 kΩ	○	○	○	○	○	○	○	○	
22.1 kΩ	○	○	○	○	○	○	○	●	
Control Unit									
SG-EFS 1X4 ZK2/1	●	●	●	●	●	●	●	○	
SG-SLE 04-0X1	○	○	○	○	○	○	○	●	
SG-SUE 41X4 NA	○	○	○	○	○	○	○	○	

● = Standard ○ = Option

How to order:

Example 1 - *Fully assembled Safety Edge without control unit:*
SL/BK 2,250 mm GP 50 NBR + C 35 M al-rail
Cable 10 m, Version 4 (see 2.3.6)

Example 2 - *Fully assembled Safety Edge with control unit (230 V):*
SL/W 3,700 mm GP 60 EPDM + C 35 M al-rail
Cable 5 m, Version 11 (see 2.3.6)
Control unit SG-EFS 134 ZK 2/1 (1.2 kΩ)

Example 3 - Fully assembled Safety Edge, 4-wire-connection system with control unit (230V):
SL/BK 1,650 mm GP 39 NBR + C 25 M al-rail
Cable 2 m, Version 3 (see 2.3.6)
Control unit SG-SUE 4134 NA

Subject to technical modifications.

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Data Sheet

Safety Edges 2.9.1
Data sheet

Safety Edge comprising sensor SL/W and SL/BK assembled in rubber profile GP 39/50/60 with mounting rail and control unit

1.	Protection class sensor *)	IP 65			IP 65		
2.	Switching operations sensor *)	> 10^5			> 10^5		
3.	Switching times	**GP 39 EPDM**	**GP 50 EPDM**	**GP 60 EPDM**	**GP 50 CR**	**GP 60 CR**	**GP 50 EPDM**
	Control unit SG-	EFS 1X4 ZK2/1			EFS 1X4 ZK2/1SLE 04-0X1		
3.1	Response time *)	38 ms	144 ms	95 ms	72 ms	82 ms	575 ms
	Test speed	100 mm/s	100 mm/s	100 mm/s	100 mm/s	100 mm/s	10 mm/s
3.2	Reset	manual or automatic			manual / automatic		automatic
4.	Actuating force, actuating distance, overtravel and switching angle						
	Testing basis:						
	prEN 1760-2	–	–	–	yes	yes	–
	DIN V 31006 T2, Type	A	B	B	A	A	A
	GS-BE-17	yes	yes	yes	yes	yes	–
4.1	Actuating force *)	< 150 N	< 150 N	< 150 N	< 150 N	< 150 N	< 150 N
4.2	Actuating distance *)						
	at 10 mm/s	4 mm	9 mm	7 mm	7 mm	8 mm	11 mm
	at 100 mm/s	4 mm	15 mm	10 mm	8 mm	9 mm	–
4.3	Overtravel *)						
	at 10 mm/s	2 mm	13 mm	20 mm	5 mm	7 mm	11 mm
	at 100 mm/s	1 mm	5 mm	16 mm	4 mm	6 mm	–
4.4	Effective switching angle *)	45°	90°	90°	90°	90°	40°
5.	Behaviour in fault instance	EN 954 Category 3			EN 954 Category 3		
6.	Operating and environmental conditions						
6.1	Ambient temperature sensor *)						
	GS-BE-17	- 20 °C to + 55 °C			- 20 °C to + 55 °C		
	DIN V 31 006 T2, Type A	- 20 °C to + 55 °C			+ 5 °C to + 55 °C		
	DIN V 31 006 T2, Type B	+ 5 °C to + 55 °C			–		

7.	Operation – Maintenance	
7.1	Maintenance	The sensor is maintenance free.
7.2	Monitoring	The control unit aids monitoring.
7.3	Expert inspection (once per year) per ZH 1/494	• Depending on the working rate, the sensors should be tested for function at regular intervals either manually or by applying the relevant testpiece. A visual examination for damages should also be carried out. • Test to insure that the rubber profile is sitting properly in the aluminium retaining rail.
8.	Chemical resistance	The sensor is resistant to customary chemical influences such as diluted acids, alkaline solutions and alcohol for an exposure duration of 24 hours.
9.	Dimensional tolerances	• Length of SL per DIN 7715-L2 • Distances per DIN ISO 2768-v

All given data marked with *) are verified by EEC-type-examination certificates.

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Data Sheet

Safety Edges 2.9.2
Data sheet

Safety Edge comprising sensor SL/W and SL/BK assembled in rubber profile GP 301/302 with mounting rail and control unit

1.	Protection class sensor *)	IP 65		IP 65	
2.	Switching operations sensor *)	> 10^4		> 10^4	
3.	Switching times	**GP 301 EPDM**	**GP 302 EPDM**	**GP 301 EPDM**	**GP 302 EPDM**
	Control unit	SG-EFS 1X4 ZK2/1		SG-SLE 04-0X1	
3.1	Response time *)	124 ms	125 ms	112 ms	113 ms
	Test speed	100 mm/s	100 mm/s	100 mm/s	100 mm/s
3.2	Reset	manual or automatic		automatic	
4.	Actuating force, actuating distance, overtravel and switching angle				
	Testing basis:	prEN 1760-2, GS-BE-17		prEN 1760-2, GS-BE-17	
4.1	Actuating force *)	< 150 N	< 150 N	< 150 N	< 150 N
4.2	Actuating distance *)				
	at 10 mm/s	12 mm	13 mm	13 mm	10 mm
	at 100 mm/s	12 mm	12 mm	12 mm	12 mm
4.3	Overtravel *)				
	at 10 mm/s	14 mm	25 mm	8 mm	25 mm
	at 100 mm/s	8 mm	22 mm	6 mm	22 mm
4.4	Effective switching angle *)	90°	90°	90°	90°
5.	Behaviour in fault instance	EN 954 Category 3		EN 954 Category 3	
6.	Operating and environmental conditions				
6.1	Ambient temperature sensor *)				
	GS-BE-17	- 20 °C to + 55 °C		- 20 °C to + 55 °C	
	DIN V 31 006 T2, Type A	0 °C to + 55 °C		0 °C to + 55 °C	

7.	Operation – Maintenance	
7.1	Maintenance	The sensor is maintenance free.
7.2	Monitoring	The control unit aids monitoring.
7.3	Expert inspection (once per year) per ZH 1/494	• Depending on the working rate, the sensors should be tested for function at regular intervals either manually or by applying the relevant testpiece. A visual examination for damages should also be carried out. • Test to insure that the rubber profile is sitting properly in the aluminium retaining rail.
8.	Chemical resistance	The sensor is resistant to customary chemical influences such as diluted acids, alkaline solutions and alcohol for an exposure duration of 24 hours.
9.	Dimensional tolerances	• Length of SL per DIN 7715-L2 • Distances per DIN ISO 2768-v

All given data marked with *) are verified by EEC-type-examination certificates.

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Fax: +49-(0)7 31 / 20 61-222

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Polymer Electric

Safety Edges Request For Quotation

2.10.1

Sender:

Company

Department

Last name, first name

P.O.Box | Post code | Town, Country

Street address | Post code | Town, Country

Fon | Fax | E-mail

Area of application:

(e.g. Doors/Gates, closing edge of machine, textile machine, public transport ...)

⇩ Do not write in this column! ⇩
For internal use

Environmental conditions:

- ❑ dry ❑ water ❑ oil
- ❑ agressive agents: ❍ coolant, type: _____
  ❍ solvent, type: _____
  ❍ other: _____
- ❑ Room temperature ❑ other: from____ °C to____ °C

Mechanical conditions:

- ❑ Max. braking distance of system ____ mm
- ❑ sensitive ends ❑ non-sensitive ends (max. 35 mm) OK
- ❑ Cable exit version no. ____
- ❑ No. of monitoring circuits: ____ ❑ SG- _____

Nipping and shearing points to be made safe:
(Sketch should include mounting possiblity and cable run)

290900

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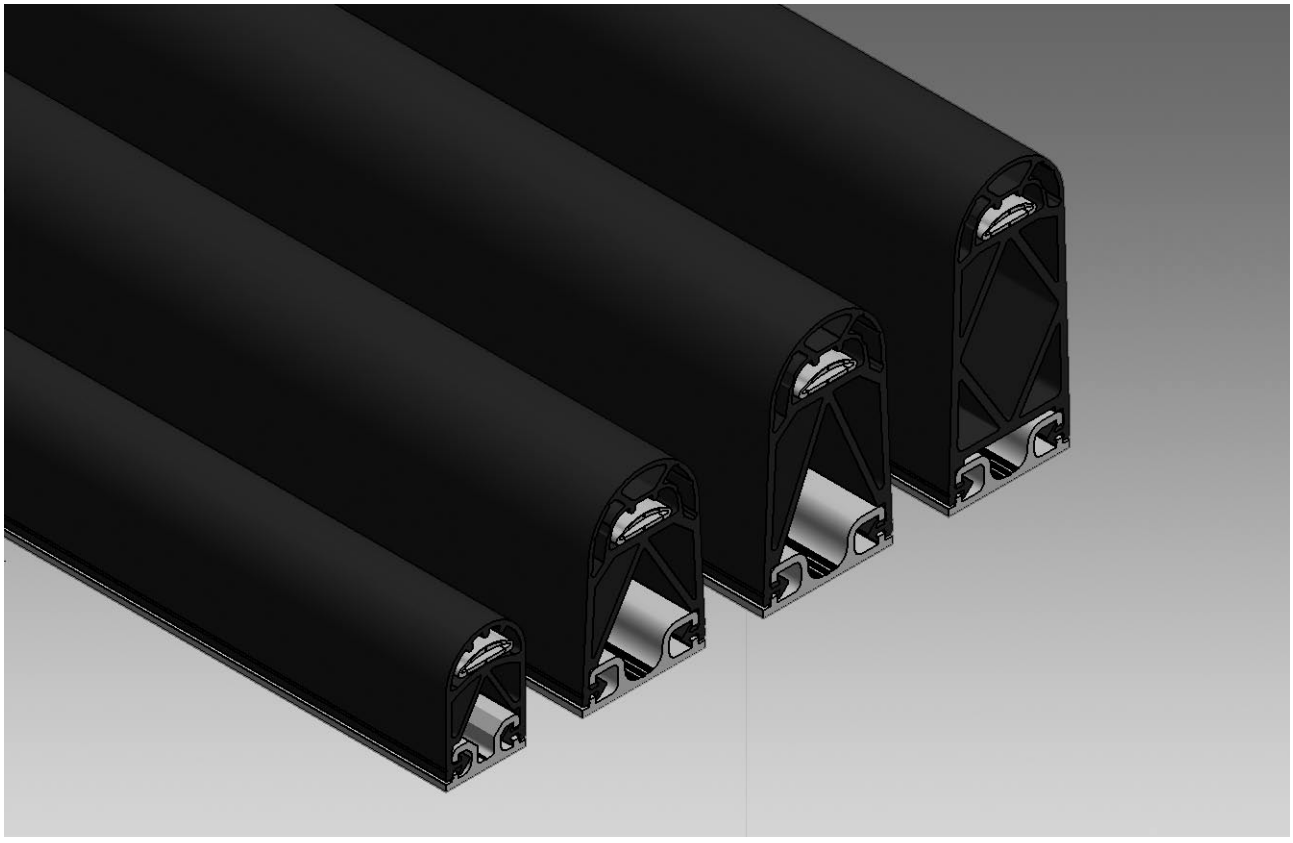
Polymer Electric

Product Information



Normally Open Safety Edges SL/NO

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Polymer Electric

Contents

Important information

Read through the product information carefully. It contains important information on operation, safety and maintenance of the SL/NO (normally open) Safety Edge. Retain the product information for later reference.
Always observe the safety instructions on the following pages under **ATTENTION**. Only use the SL/NO (normally open) Safety Edge for the purpose described in the product information.

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Definitions

See Definitions and Operation Principles in chapter 1 of the catalogue.

Intended use

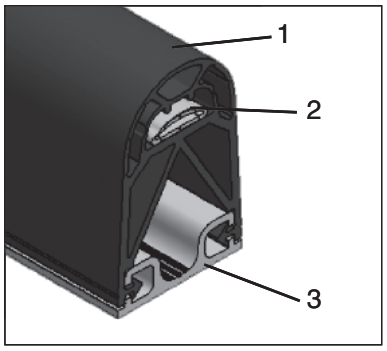
A Safety Edge detects a person or part of the body when pressure is applied to the actuation area. It is a linear tripping device. Its task is to avoid possible hazardous situations for a person within a danger zone, such as shearing and pinching edges.
Typical areas of application are door and gate systems, moving parts on machines, platforms and lifting devices.
Safe operation of a Safety Edge depends entirely on
- the surface condition of the mounting surface,
- the correct selection of the size and resistance as well as
- correct installation.

Tip
See EN 1760-2 Appendix E or ISO 13856-2 Appendix E.

Limits

A maximum of 10 SL/NO (normally open) Safety Edges may be connected to one signal processing.

Design



The normally open Safety Edge SL/NO consists of
(1) Rubber profile GP,
(2) Normally open Safety Element SE 1 TPE,
(3) Aluminium profile C 36 and an evaluating Control Unit SG.

Tip
For the risk and safety assessment of your machine, we recommend ISO 12100 “Safety of machinery – Basic concepts, general principles for design”

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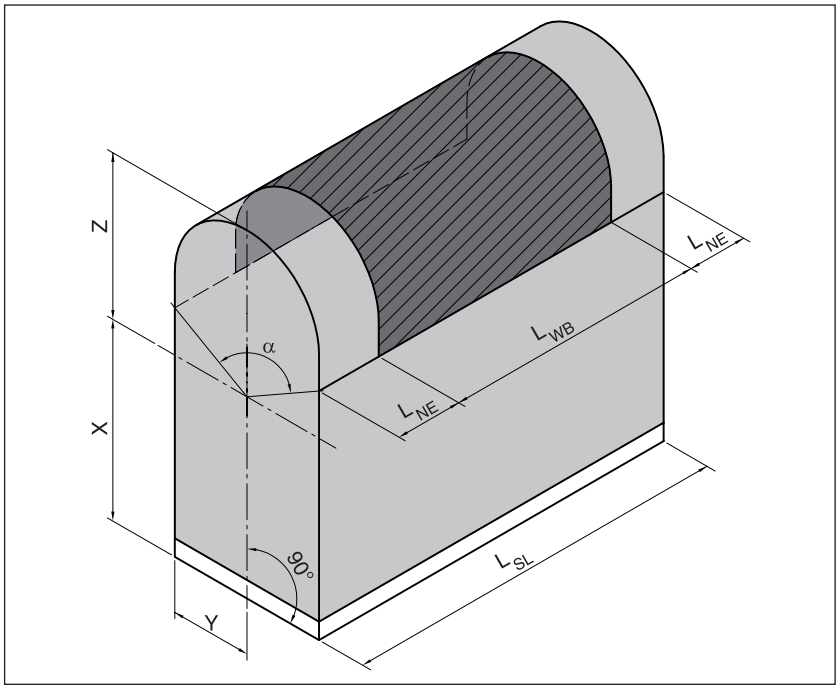
Effective actuation area

The parameters X, Y, Z, L_{NE} and angle α describe the effective actuation area.
For the effective actuation area, the following applies:

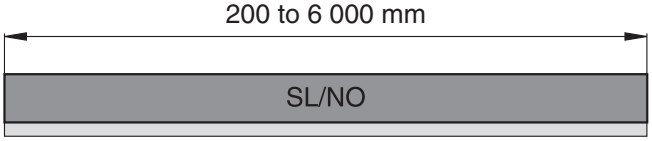
$$L_{WB} = L_{SL} - 2\times L_{NE}$$

Parameters:
- L_{WB} = effective actuation length
- L_{SL} = overall length of the Safety Edge
- L_{NE} = non-sensitive length at the end of the Safety Edge
- α = effective actuation angle



SL	GP 38	GP 58	GP 68	
α	90°	90°	90°	
L_{NE}	35 mm	35 mm	35 mm	
X	30.5 mm	43.2 mm	53.2 mm	
Y	13 mm	18 mm	18 mm	
Z	9.5 mm	16.8 mm	16.8 mm	

Available lengths



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Subject to technical modifications.

Bend angles and bend radii

Bend angles
Bend angles are not possible on the normally open Safety Edge SL/NO.

Bend radii
Normally open Safety Edges with a bend radius are only possible with the aluminium profiles C 26, C 26S, C 36 and C 36S.The aluminium profile must be prepared in the factory for this.

Note:
Bend angles and bend radii are not part of the EC design tests.

Bend radii min.	GP 38	GP 58	GP 68	
D	750 mm	750 mm	750 mm	
E	750 mm	750 mm	750 mm	
F	750 mm	750 mm	750 mm	

Installation position

The installation position can be selected as required, i.e. all installation positions A to E as per EN 1760-2 are possible.

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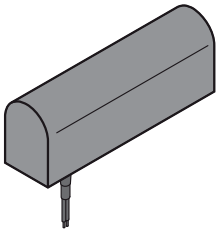
Connection

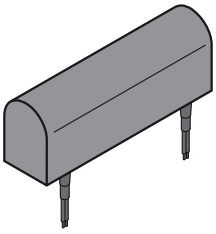
Cable exits

Tip
With more than one sensor connected one behind the other, we recommend version 1, 3, 5 or 14.

90° exit
Distance from front face 25 mm each; incl. cable bushing

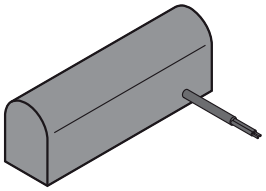


Version 11: SL/W

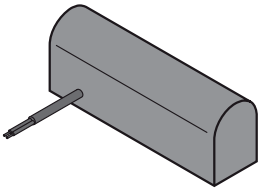


Version 5: SL/BK

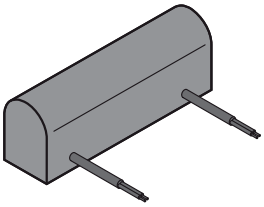
Lateral exit
Distance to front face 25 mm each



Version 12: SL/W

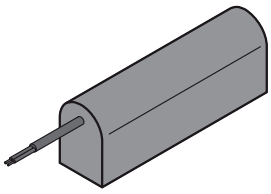


Version 13: SL/W

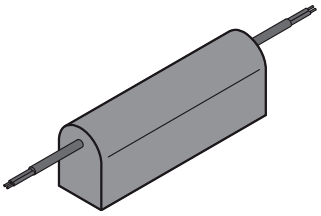


Version 14: SL/BK

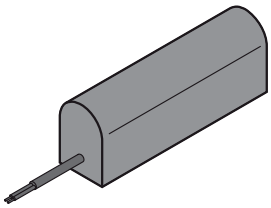
Axial exit



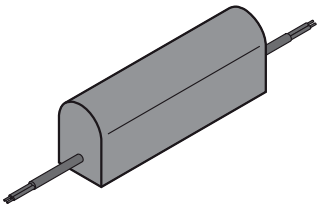
Version 9: SL/W



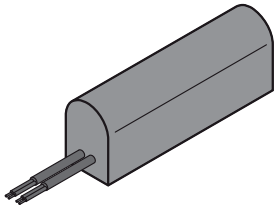
Version 1: SL/BK



Version 10: SL/W



Version 3: SL/BK



Version 4: SL/BK

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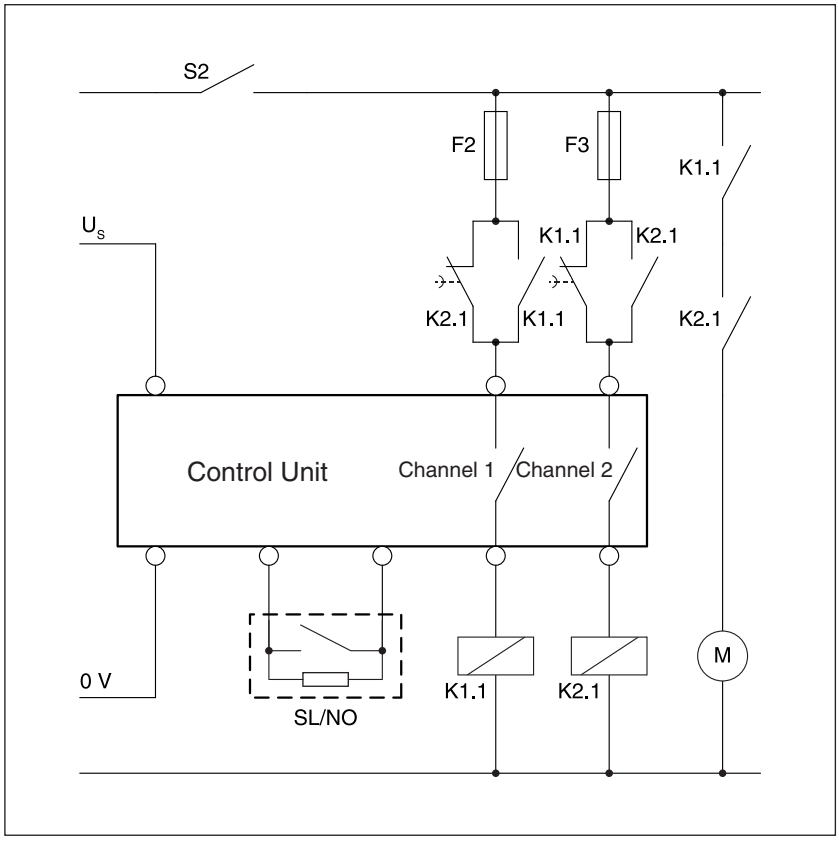
Subject to technical modifications.

Cable connection

- Cables: Ø 3.7 mm TPE, 2× 0,22 mm²
  Wire colours: red, black
- Cable length: 2.0 m
  Option: up to max. 200 m
- Cable ends: Wires stripped
  Option: Cable ends available with plug and coupling

Connection examples

Connection example 1
Normally open Safety Edge to single-fault-safe Control Unit with dual channel extension.

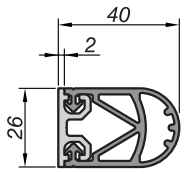
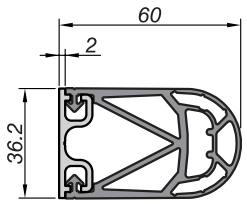


170409 v0.1

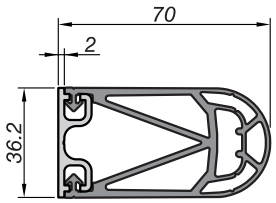
Subject to technical modifications

Rubber profiles

Dimensions and operating distances

GP 38 EPDM	GP 58 EPDM
	
Actuation force: < 150 N Actuation distance (A) at 10 mm/s 5 mm Overtravel distance up to 250 N (B1) at 10 mm/s 10 mm	Actuation force: < 150 N Actuation distance (A) at 10 mm/s 9 mm Overtravel distance up to 250 N (B1) at 10 mm/s 20 mm

Note:
Dimensional tolerances as per ISO 3302 E2/L2.

GP 68 EPDM	
	
Actuation force < 150 N Actuation distance (A) at 10 mm/s 9 mm Overtravel distance up to 250 N (B1) at 10 mm/s 30 mm	

Note:
Test piece (cylinder): Ø 80 mm.
Values apply at temperature +20 °C.

170409 v0.1

Subject to technical modifications.

Physical resistance

Rubber profile GP	EPDM
Degree of protection (IEC 60529)	IP65
Hardness as per Shore A	65 ±5

ATTENTION
IP65 means: Safety Edge must not be cleaned with high-pressure cleaners etc.

Chemical resistance

The Safety Edge is resistant against normal chemical influences such as diluted acids and alkalis as well as alcohol over an exposure period of 24 hrs.

The values in the table are results of tests carried out in our laboratory to the best of our knowledge and belief. The suitability of our products for your special area of application must always be verified with your own practical tests.

Rubber profile GP	EPDM
Acetone	+
Formic acid	+
Ammonia	+
Petrol	-
Brake fluid	±
Chloride solutions	+
Diesel oils	-
Greases	-
Household/sanitary cleaners	+
Isopropyl alcohol	+
Cooling lubricant	-
Metal working oil	-
Methyl alcohol	+
Oils	-
Ozone and weather conditions	+
Hydrochloric acid 10 %	+
Spirit (ethyl alcohol)	+
Carbon tetrachloride	-
Hydrogen peroxide 10 %	+
Water and frost	+

Explanation of symbols:
+ = resistant
± = resistant to a certain extent
- = not resistant

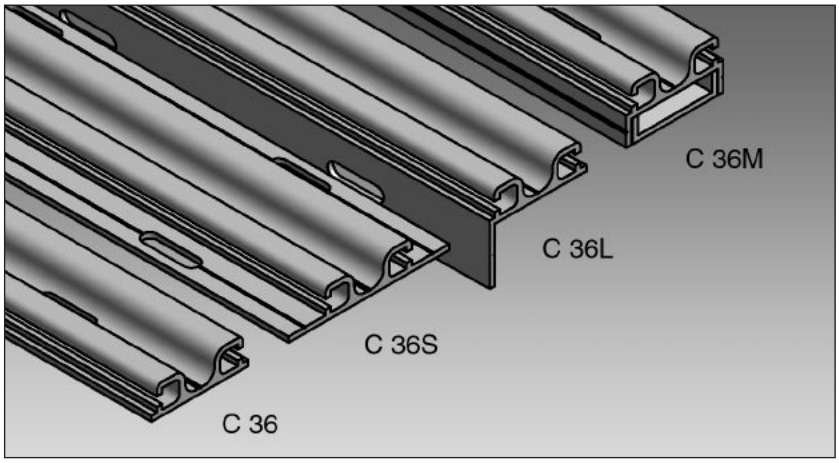
Note:
Tests are carried out at room temperature (+23 °C).

170409 v0.1

Subject to technical modifications

Fixing rails

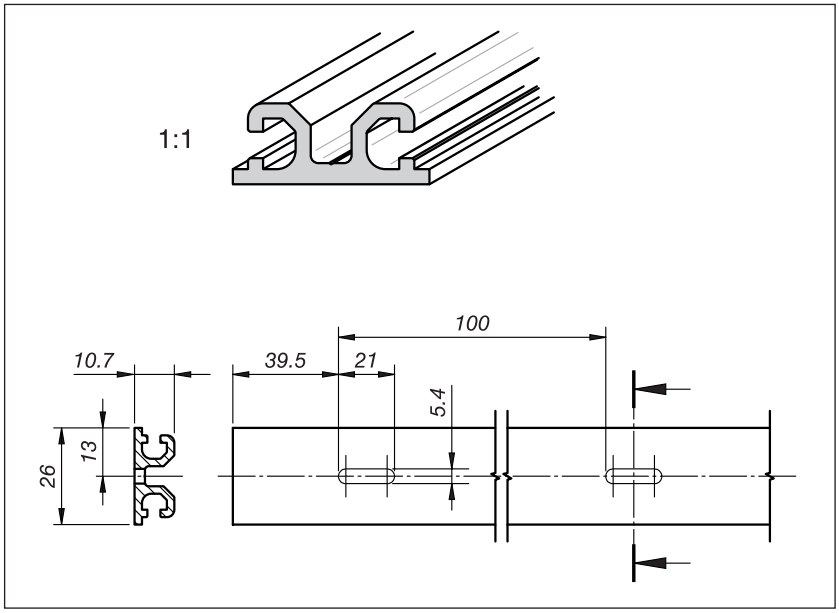
Normally open Safety Edges SL/NO are mounted directly to the dangerous main and secondary closing edges. The aluminium profiles C 26 and C 36 are used for mounting. The aluminium profiles are mounted with screws M5 or rivets.



Material properties

- AlMgSi0.5 F22
- Wall thickness 2 mm
- Tolerances as per EN 755-9
- extruded
- hot hardened

Aluminium profile C 26



Standard profile for GP 38
First the aluminium profile must be mounted to the closing edge and then the rubber profile clipped into the aluminium profile.

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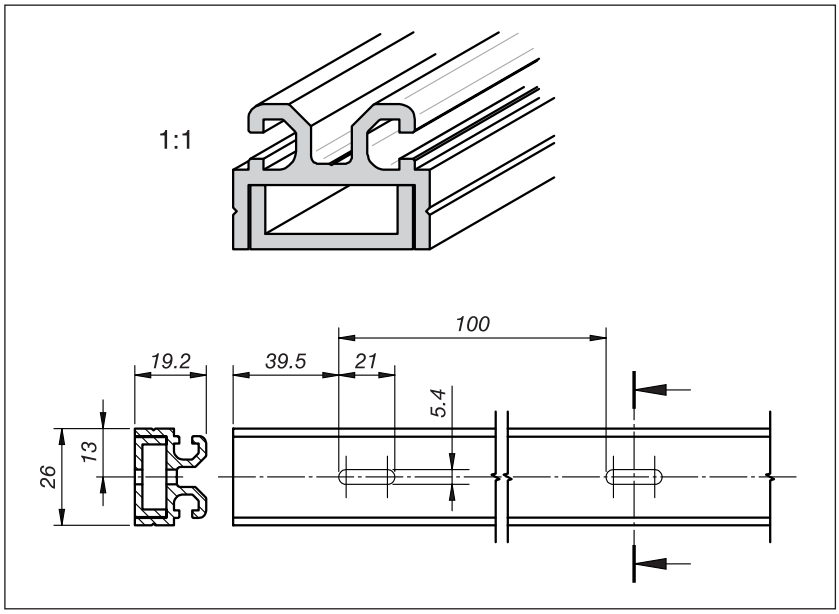
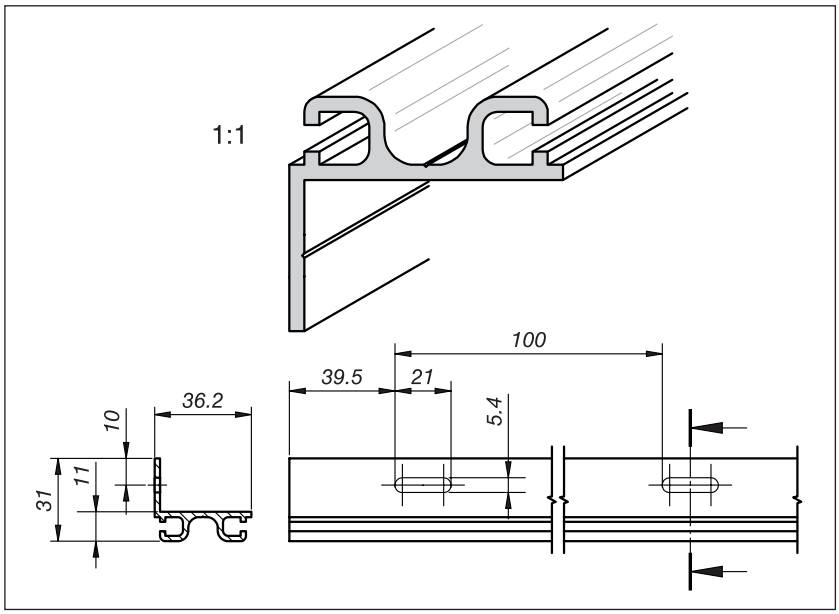
Aluminium profile C 26M



Two-part profile:
For convenient assembly and disassembly. The rubber profile is clipped into the upper section and the upper section inserted in the installed lower section and fastened.

Aluminium profile C 36L



Angle profile:
If the closing edge should or must not have assembly holes, this “round-the-corner” solution is suitable. Final assembly is also possible when the rubber profile is already clipped into the aluminium profile.

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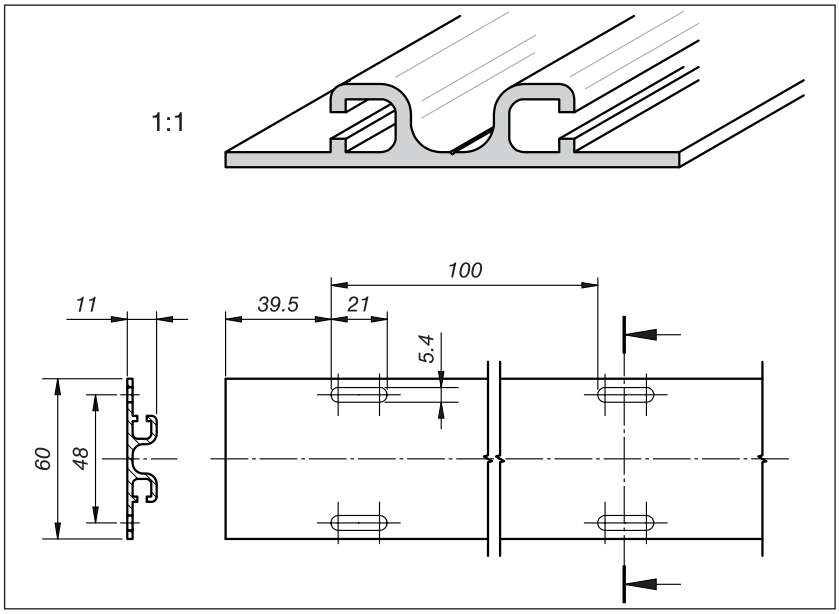
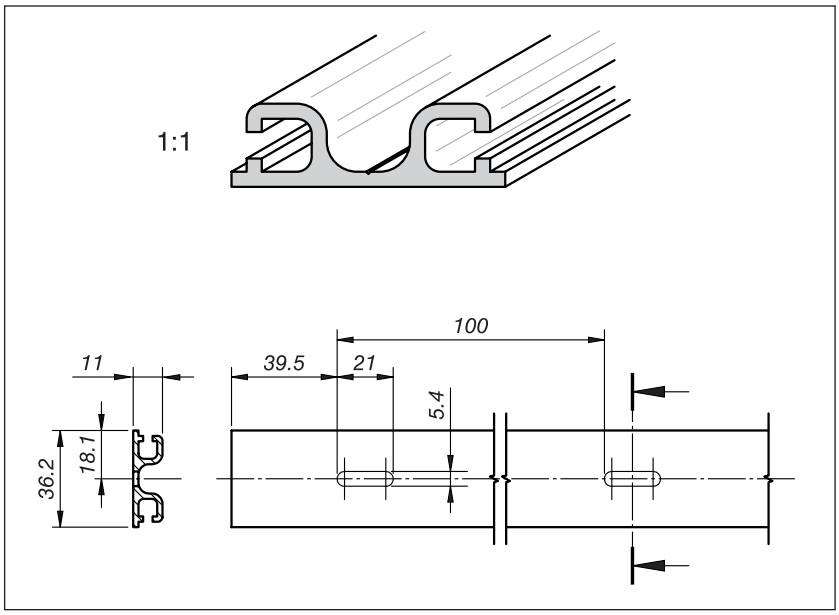
Aluminium profile C 36S



Flange profile:
Final assembly is also possible when the rubber profile is already clipped into the aluminium profile.

Aluminium profile C 36



Standard profile for GP 58 and GP 68:
First the aluminium profile must be mounted to the closing edge and then the rubber profile clipped into the aluminium profile.

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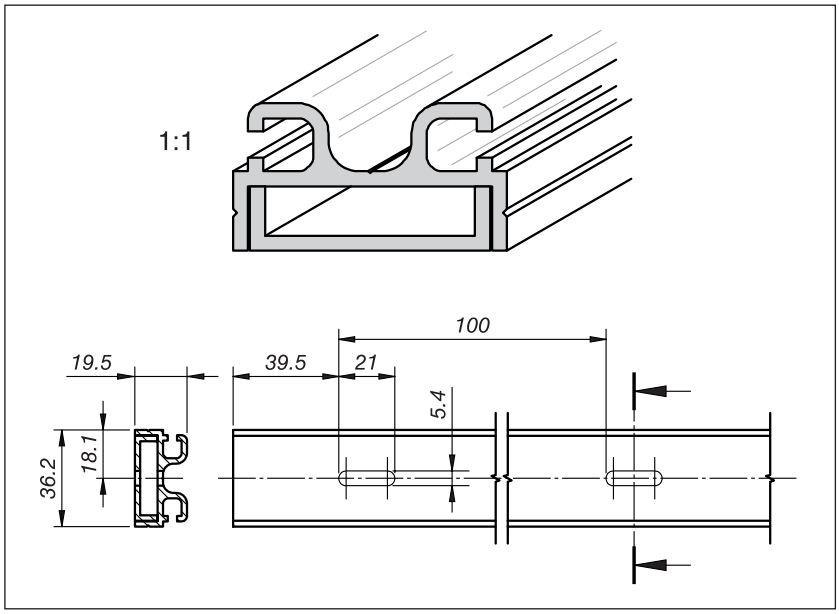
Subject to technical modifications.

Aluminium profile C 36M



Two-part profile:
For convenient assembly and disassembly. The rubber profile is clipped into the upper section and the upper section inserted in the installed lower section and fastened.

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SL/NO: The right selection

Calculation for selection of the Safety Edge height

s_1 = Stopping distance of the dangerous movement [mm]
v = Velocity of the dangerous movement [mm/s]
T = Follow-through of the complete system [s]
t_1 = Response time Safety Edge
t_2 = Stopping time of the machine
s = Minimum overtravel distance of the Safety Edge so that the pinching force does not exceed a limit value [mm]
C = Safety factor; if components susceptible to failures (braking system) exist in the system, a higher factor must be selected.

The stopping distance of the dangerous movement is calculated using the following formula:

$s_1 = 1/2 \times v \times T$ where: $T = t_1 + t_2$

In accordance with EN 1760-2, the minimum overtravel distance of the Safety Edge is calculated using the following formula:

$s = s_1 \times C$ where: $C = 1.2$

A suitable Safety Edge profile can now be selected based on the result.
Overtravel distances of normally open Safety Edges: see “Rubber profiles”, “Dimensions and operating distances”.

Calculation examples

Calculation example 1
The dangerous movement on your machine has a velocity of v = 20 mm/sec. and can be brought to a standstill within t_2 = 290 ms. The relatively low velocity suggests that a short overtravel distance is to be expected. Therefore the Safety Edge SL/NO GP 38 EPDM could be sufficient. The response time of the Safety Edge is t_1 = 510 ms.

$s_1 = 1/2 \times v \times T$ where: $T = t_1 + t_2$
$s_1 = 1/2 \times 20$ mm/s $\times$ (510 ms + 290 ms)
$\mathbf{s_1} = 1/2 \times 20$ mm/s $\times 0.8$ s **= 8 mm**

$s = s_1 \times C$ where: $C = 1.2$
s = 8 mm $\times$ 1.2 **= 9.6 mm**

The Safety Edge must have a minimum overtravel distance of s = 9.6 mm. The selected SL/NO GP 38 EPDM has an overtravel distance of at least 12 mm. This is more than the required 9.6 mm.
Result: The SL/NO GP 38 EPDM is **suitable** for this case.

Calculation example 2
The same conditions as in calculation example 1 with the exception of the velocity of the dangerous movement. This is now v = 40 mm/s.

$s_1 = 1/2 \times v \times T$ where: $T = t_1 + t_2$
$s_1 = 1/2 \times 40$ mm/s $\times$ (510 ms + 290 ms)
$\mathbf{s_1} = 1/2 \times 40$ mm/s $\times 0.8$ s **= 16 mm**

$s = s_1 \times C$ where: $C = 1.2$
s = 16 mm $\times$ 1.2 **= 19.2 mm**

The Safety Edge must have a minimum overtravel distance of s = 19.2 mm. The selected SL/NO GP 38 EPDM has an overtravel

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distance of at least 12 mm. This is less than the required 19.2 mm.
Result: The SL/NO GP 38 EPDM is **not suitable** for this case.

Calculation example 3
The same conditions as in calculation example 2. Instead of SL/NO GP 38 EPDM, the SL/NO GP 68 EPDM is selected. The response time of the Safety Edge is t_1 = 910 ms.

$s_1 = 1/2 \times v \times T$ where: $T = t_1 + t_2$
$s_1 = 1/2 \times 40$ mm/s $\times$ (910 ms + 290 ms)
$\mathbf{s_1} = 1/2 \times 40$ mm/s $\times$ 1.2 s **= 24 mm**

$s = s_1 \times C$ where: C = 1.2
s = 24 mm $\times$ 1.2 **= 28.8 mm**

The Safety Edge must have a minimum overtravel distance of s = 28.8 mm. The selected SL/NO GP 68 EPDM has an overtravel distance of at least 30 mm. This is more than the required 28.8 mm.
Result: The SL/NO GP 68 EPDM is **suitable** for this case.

Tip
For further selection criteria, see appendices C and E in EN 1760-2 or ISO 13856-2.

Customised designs

In addition to the standard range, special solutions are also possible, such as

- Safety Edges with sensitive ends
- temperature-resistant version:
  - short-term (< 5 min) up to +120 °C
  - long-term up to +100 °C
  - degree of protection: IP50
- higher degree of protection: IP67

SL/NO in ATEX version

The normally open Safety Edge ATEX SL/NO safety system consists of the sensor SL/NO, aluminium profile, safety barrier and Control Unit.
Safety Edges of the type ATEX SL/NO are only designed for the equipment group II, i.e. for all potentially explosive environments except for mining. The potentially explosive medium splits the area of application into the atmospheres G and D:

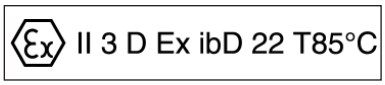
Atmosphere G
Gases, vapours, mist
Zones 1 and 2
Equipment categories 2 and 3
Ignition protection class„ib“

Explosion group IIC
Temperature class T4
Marking:

Corresponds to IEC 60079-11

Atmosphere D
Dusts
Zone 22
Equipment category 3
Ignition protection class „ibD 22“

Temperature class T85 °C
Marking:



Corresponds to IEC 61241-11

SL/NO with transponder technology

The SL/TRS is a normally closed Safety Edge with an integrated transponder especially adapted to the TRS transponder system. The TRS transponder system is a wireless and therefore wear-free transmission system for gate systems.

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Subject to technical modifications.

Technical data GP 38 and GP 58

Normally closed Safety Edge SL/NO consisting of sensor, aluminium profile and Control Unit.

	GP 38 EPDM with C 26 and SG-EFS 1X4 ZK2/1	**GP 58 EPDM with C 36 and SG-EFS 1X4 ZK2/1**
Testing basis	EN 1760-2, ISO 13856-2	EN 1760-2, ISO 13856-2
Switching characteristics at v_{test} = 100 mm/s		
Switching operations Actuation forcet Actuation distance Response time Effective actuation angle	> 5× 10^4 < 150 N 6 mm 72 ms 90°	> 5× 10^4 < 150 N 8 mm 82 ms 90°
Safety classifications		
Error behaviour PFH_S value as per IEC 61508	EN 954 category 3 –	EN 954 category 3 –
Mechanical operating conditions		
Sensor length (min./max.) Cable length (min./max.) Operating velocity (min./max.) max. load capacity Degree of protection as per IEC 60529 max. humidity (23 °C) Operating temperature Storage temperature Weight	200 mm / 6000 mm 2.0 m / 200 m 10 mm/s / 100 mm/s 600 N IP65 95% (non-condensing) -20 °C to +55 °C -30 °C to +70 °C 0.8 kg/m	200 mm / 6000 mm 2.0 m / 200 m 10 mm/s / 100 mm/s 600 N IP65 95% (non-condensing) -20 °C to +55 °C -30 °C to +70 °C 1.2 kg/m
Electrical operating conditions		
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm²	Ø 3.7 mm TPE 2× 0.22 mm²
Chemical resistance (see page 3.9)		
	The sensor is resistant against normal chemical resistances over an exposure period of 24 hours. (see page 3.9).	
Maintenance, service		
Maintenance Monitoring Inspection	The Safety Edge is maintenance-free. Possible via external control. • Depending on the amount of use, the Safety Edges are to be checked regularly for correct operation and visible signs of damage by manual operation or by applying the relevant test piece (cylinder). • The correct position of the rubber profile in the aluminium profile is to be checked	
Dimensional tolerances		
Rubber profile Aluminium profile	ISO 3302 E2/L2 EN 12020-2	ISO 3302 E2/L2 EN 12020-2

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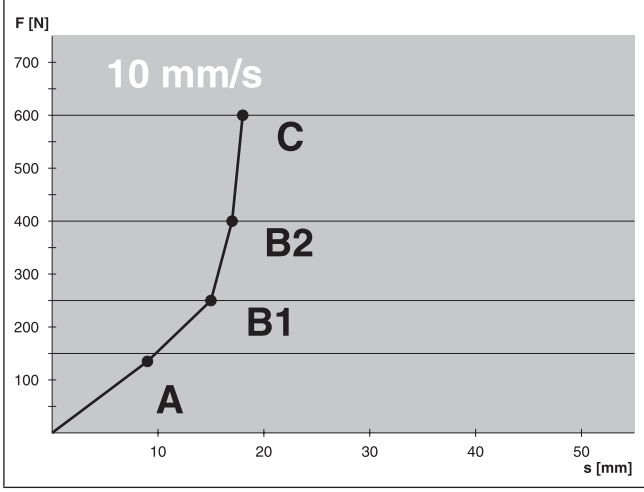
Subject to technical modifications

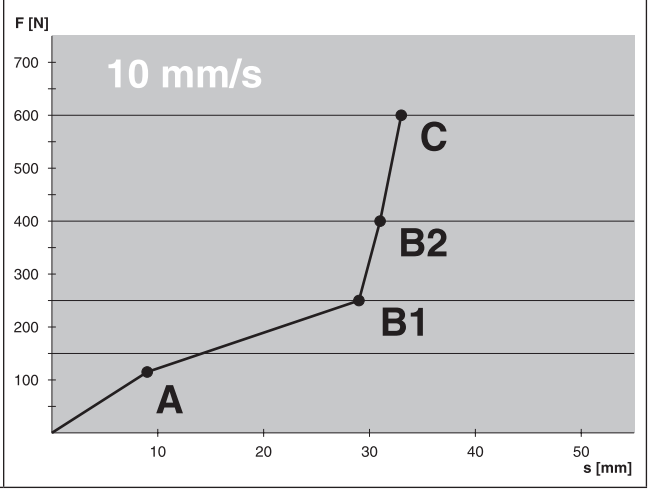
Force-distance ratios

Measurement point c3, test piece (cylinder) Ø 80 mm, temperature 20 °C
A: Actuation distance
B1: Total deformation at 250 N
B2: Total deformation at 400 N
C: Total deformation at 600 N

SL/NO GP 38 EPDM



SL/NO GP58 EPDM



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Subject to technical modifications.

Technical data GP 68

Normally closed Safety Edge SL/NO consisting of sensor, aluminium profile and Control Unit.

	GP 68 EPDM with C 36 and SG-EFS 1X4 ZK2/1	
Testing basis	EN 1760-2, ISO 13856-2	
Switching characteristics at v_{test} = 100 mm/s		
Switching operations Actuation force Actuation distance Response time Effective actuation angle	> 5× 10^4 < 150 N 9 mm 92 ms 90°	
Safety classifications		
Error behaviour PFH_S value as per IEC 61508	EN 954 category 3 –	
Mechanical operating conditions		
Sensor length (min./max.) Cable length (min./max.) Operating velocity (min./max.) max. load capacity Degree of protection as per IEC 60529 max. humidity (23 °C) Operating temperature Storage temperature Weight	200 mm / 6000 mm 2.0 m / 200 m 10 mm/s / 100 mm/s 600 N IP65 95% (non-condensing) -20 °C to +55 °C -30 °C to +70 °C 1.4 kg/m	
Electrical operating conditions		
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm^2	
Chemical resistance (see page 3.9)		
	The sensor is resistant against normal chemical resistances over an exposure period of 24 hours. (see page 3.9).	
Maintenance, service		
Maintenance Monitoring Inspection	The Safety Edge is maintenance-free. Possible via external control. • Depending on the amount of use, the Safety Edges are to be checked regularly for correct operation and visible signs of damage by manual operation or by applying the relevant test piece (cylinder). • The correct position of the rubber profile in the aluminium profile is to be checked.	
Dimensional tolerances		
Rubber profile Aluminium profile	ISO 3302 E2/L2 EN 12020-2	

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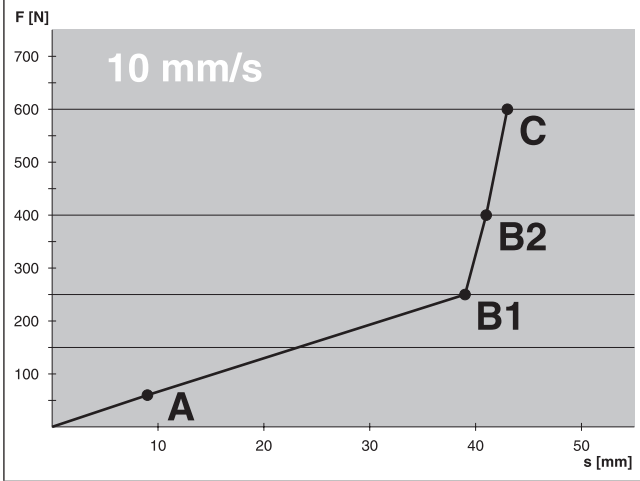
Subject to technical modifications

Force-distance ratios

Measurement point c3, test piece (cylinder) Ø 80 mm, temperature 20 °C
A: Actuation distance
B1: Total deformation at 250 N
B2: Total deformation at 400 N
C: Total deformation at 600 N

SL/NO GP 68 EPDM	
	

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Conformity

The CE symbol indicates that this Mayser product complies with the relevant EC directives and that the stipulated conformity assessments have been carried out.
The design type of this Mayser product complies with the EC Machinery Directive 98/37/EC and EMC Directive 2004/108/EC.

Certificates

EC design type test certificate –
UL certification –

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MAYSER®
Polymer Electric

Request for quotation

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Department

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⇩ Please keep free ⇩
For internal use only

Area of application

(e.g. door and gate systems, machine closing edges, textile machines, local public transport, ...)

Environmental conditions

❑ dry ❑ water ❑ oil
❑ aggressive sub-stances: ❍ Coolant, type: _____
❍ Solvent, type:_____
❍ other: _____
❑ room temperature ❑ other: from _____ °C to _____°C

Mechanical conditions

❑ The stopping distance of the system is max. ____ mm
❑ sensitive ends ❑ non-sensitive ends permitted
❑ cable exit version ____
❑ number of monitoring circuits: ____ ❑ SG- _____

Pinching and shearing edges to be protected:
(Diagram incl. mounting possibility and cable routing)

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