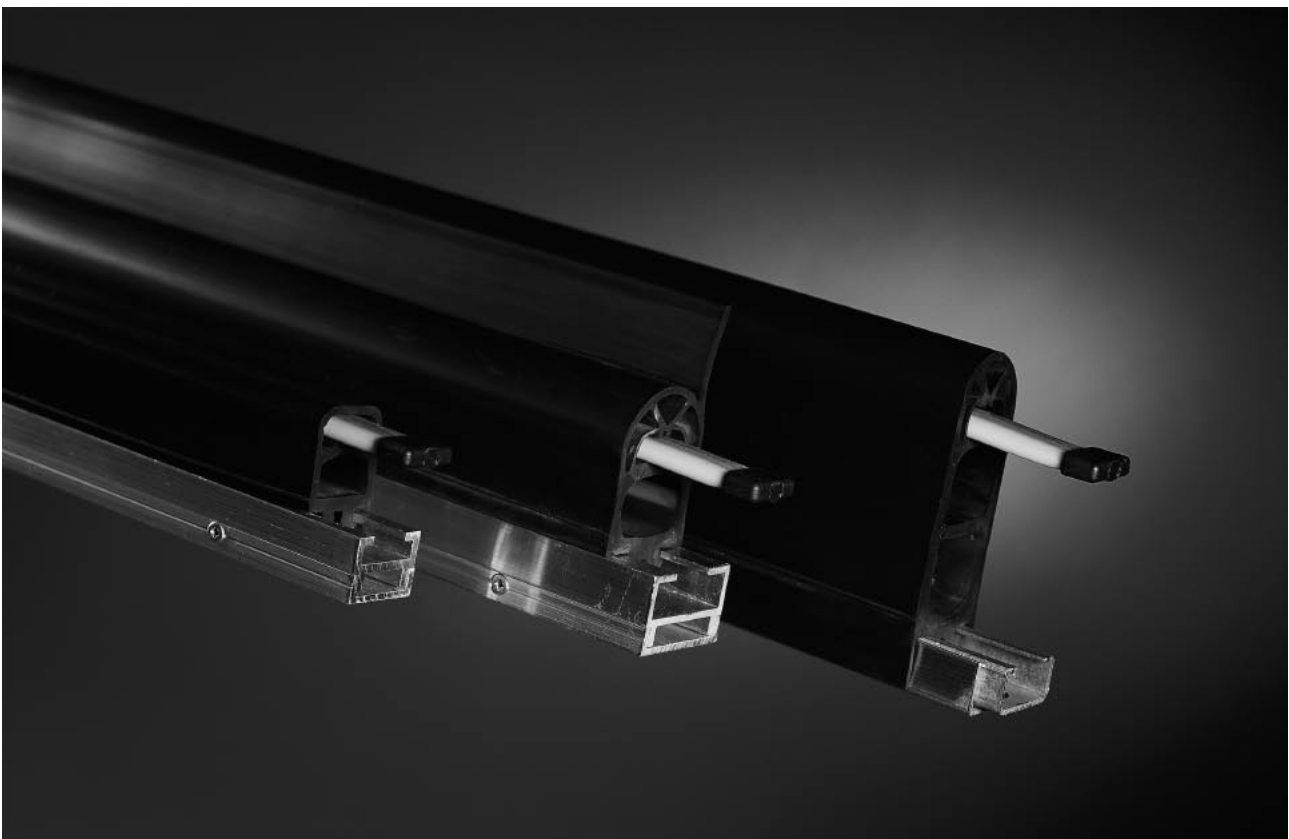


MAYSER®

Polymer Electric



Product Information



Safety Edges SL/W and SL/BK

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Important information

Read through the product information carefully. It contains important information on operation, safety and maintenance of the normally open Safety Edge. Retain the product information for later reference.

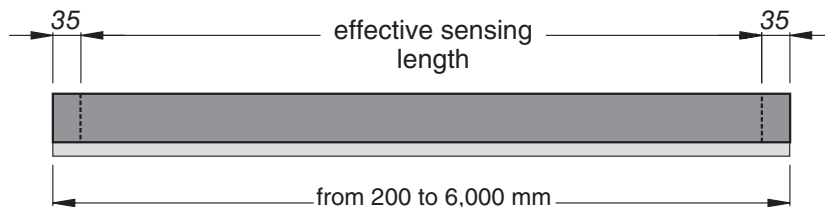
Always observe the safety instructions on the following pages under **ATTENTION**. Only use the normally open Safety Edge for the purpose described in the product information.

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Available lengths

The contact elements can be supplied in lengths between 200 and 6,000 mm.

In the case of the standard Safety Edge both ends have a non-sensitive area 35 mm long



Calculation for selection of the Safety Edge height

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:

$$C = 1.2$$

Overtravel distances: see 3.5

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.

Cable connection

Standard

- Cables: \varnothing 3.7 mm TPE, 2x 0.22 mm²
Wire colours: red, black
- Cable length: 2 m / 5 m / 10 m
- Cable ends without plug and coupling

ATTENTION

Max. cable length to signal processing unit: 200 m

Subject to technical modifications.

Chemical resistance

Rubber profile GP Identification rills on side of profile	EPDM v	NBR vv	CR vvv
Material Rating			
Hardness as per Shore A	55 ±5	60 ±5	60 ±5
Application area Machines		x	x
Application area Doors+Gates	x		
Chemical resistance			
Acetone	+	±	+
Formic acid	+	+	+
Ammonia	+	+	+
Petrol	-	+	±
Brake fluid	±	±	±
Chloride solutions	+	+	+
Diesel oils	-	+	+
Greases	-	+	+
Isopropyl alcoho	+	+	+
Cooling lubricant	-	+	+
Metal working oil	-	+	+
Methyl alcohol	+	+	±
Oils	-	+	+
Ozone and weather conditions	+	-	+
Hydrochloric acid 10 %	+	+	+
Spirit (ethyl alcohol)	+	+	+
Carbon tetrachloride	-	+	-
Water and frost	+	-	±
Hydrogen peroxide 10 %	+	+	-
Household/sanitary cleaners	+	+	+

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

Explanation of symbols:

- + = resistant
- ± = limited resistance
- = not resistant

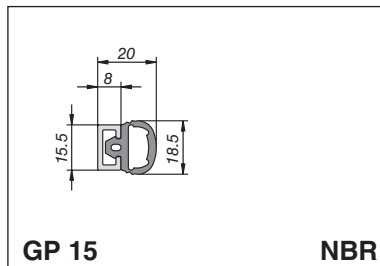
The values in the table are results of tests carried out in our laboratory to the best of our knowledge and belief. The suitability of our products for your special area of application must always be verified with your own practical tests.

Subject to technical modifications.

Rubber profiles and operating distances

Actuation force: < 150 N (bei 23 °C und Prüfkörper Ø 80 mm)

Dimensional tolerances: ISO 3302 E2/L2

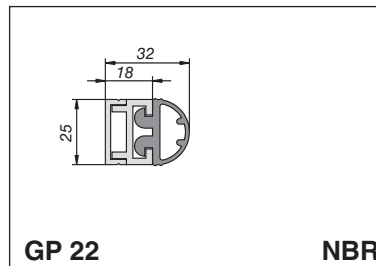


GP 15 **NBR**

Actuation distance:
at 10 mm/s 2 - 4 mm

Overtravel distance: -

Al - profile range: C 15

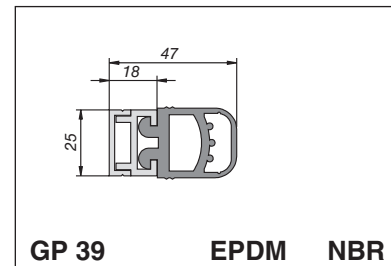


GP 22 **NBR**

Actuation distance:
at 10 mm/s 5 mm

Overtravel distance:
at 10 mm/s 1 mm

Al - profile range: C 25

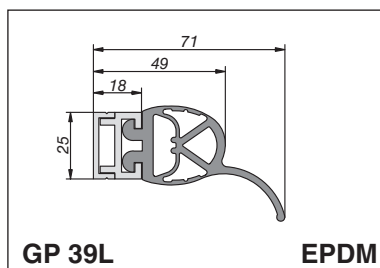


GP 39 **EPDM** **NBR**

Actuation distance:
at 10 mm/s 4 mm 5 mm

Overtravel distance:
at 10 mm/s 2 mm 2 mm

Al - profile range: C 25 C 25

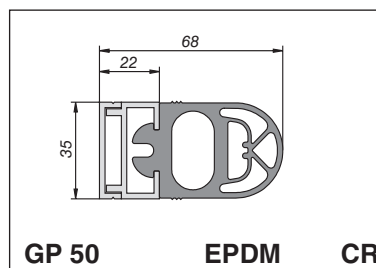


GP 39L **EPDM**

Actuation distance:
at 10 mm/s 23 mm

Overtravel distance:
at 10 mm/s 7 mm

Al - profile range: C 25

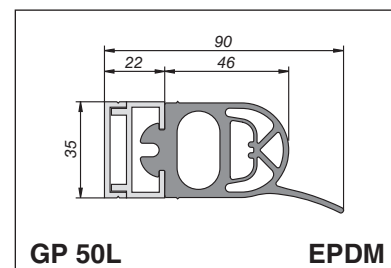


GP 50 **EPDM** **CR**

Actuation distance:
at 10 mm/s 8 mm 7 mm
at 100 mm/s 15 mm 8 mm

Overtravel distance:
at 10 mm/s 13 mm 5 mm
at 100 mm/s 5 mm 4 mm

Al - profile range: C 35 C 35

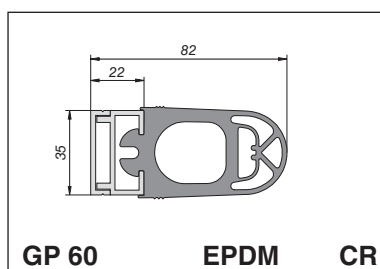


GP 50L **EPDM**

Actuation distance:
at 10 mm/s 20 mm

Overtravel distance:
at 10 mm/s 12 mm

Al - profile range: C 35

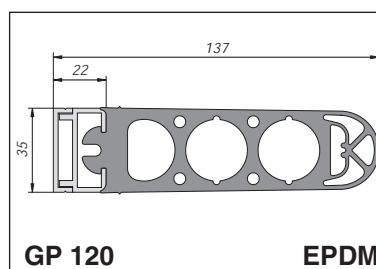


GP 60 **EPDM** **CR**

Actuation distance:
at 10 mm/s 7 mm 8 mm
at 100 mm/s 10 mm 9 mm

Overtravel distance:
at 10 mm/s 20 mm 7 mm
at 100 mm/s 16 mm 6 mm

Al - profile range: C 35 C 35

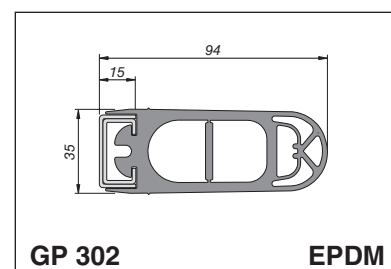


GP 120 **EPDM**

Actuation distance:
at 10 mm/s 11 mm

Overtravel distance:
at 10 mm/s ca. 45 mm

Al - profile range: C 35



GP 302 **EPDM**

Actuation distance:
at 10 mm/s 13 mm
at 100 mm/s 12 mm

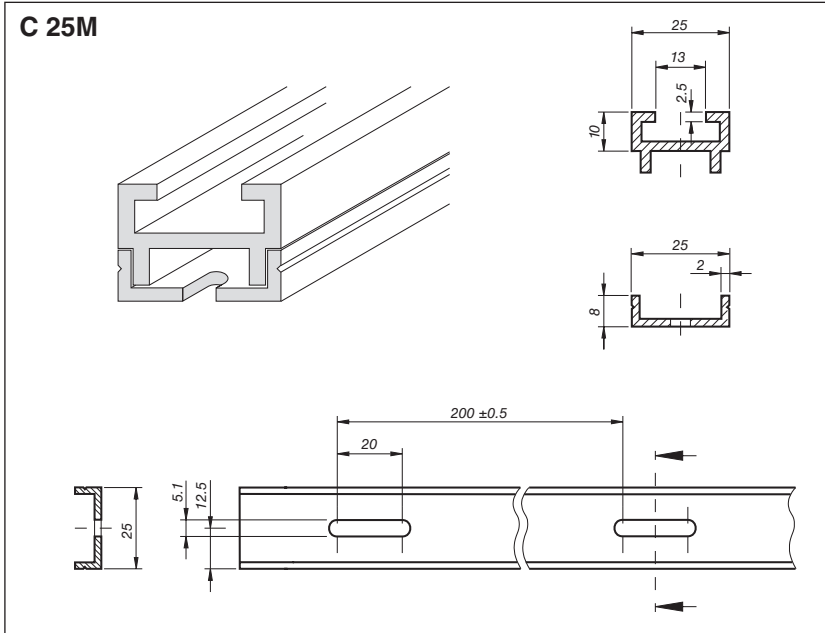
Overtravel distance:
at 10 mm/s 25 mm
at 100 mm/s 22 mm

Steel profile: C 27

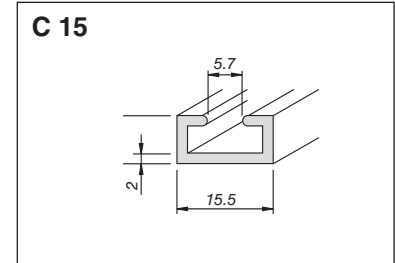
Aluminium profile range C 15, C 25 and C 35

Dimensional tolerances: ISO 2768-v

Aluminium profile range C 25 for GP 22 and GP 39(L)

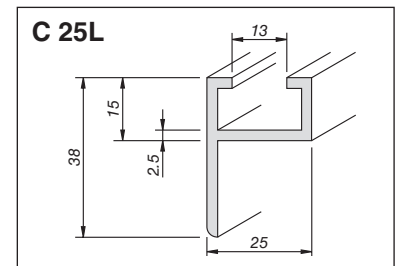
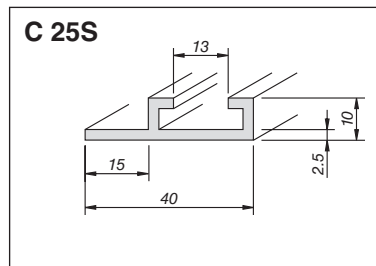
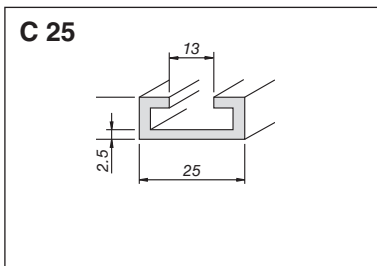


Al-profile C 15 for GP 15

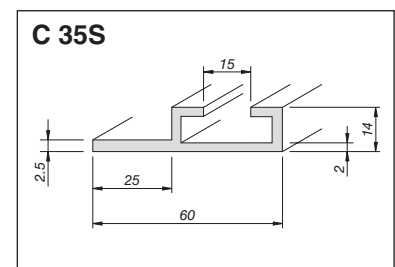
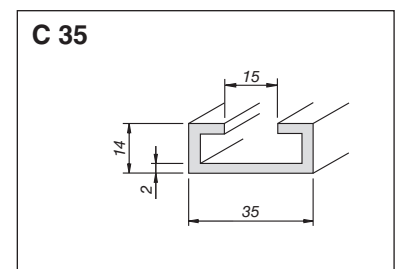
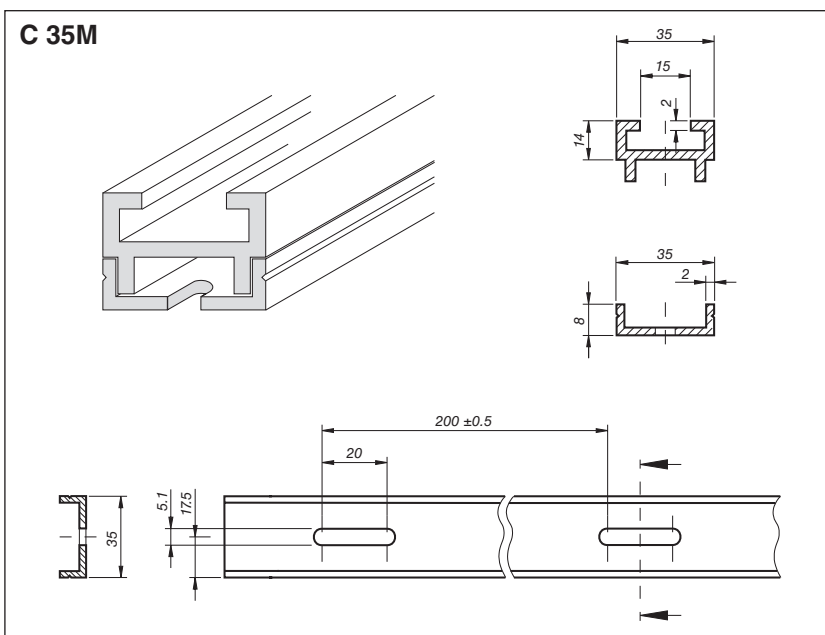


Note C 25M / C 35M:

Fix upper part to the lower part using self-tapping SK M3x8 DIN 7500 countersunk screws in pre-drilled positions



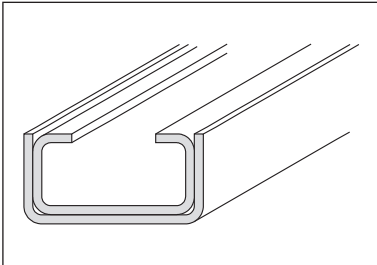
Aluminium profile range C 35 for GP 50(L), GP 60 and GP 120



Steel-Profile C 27 / U 27

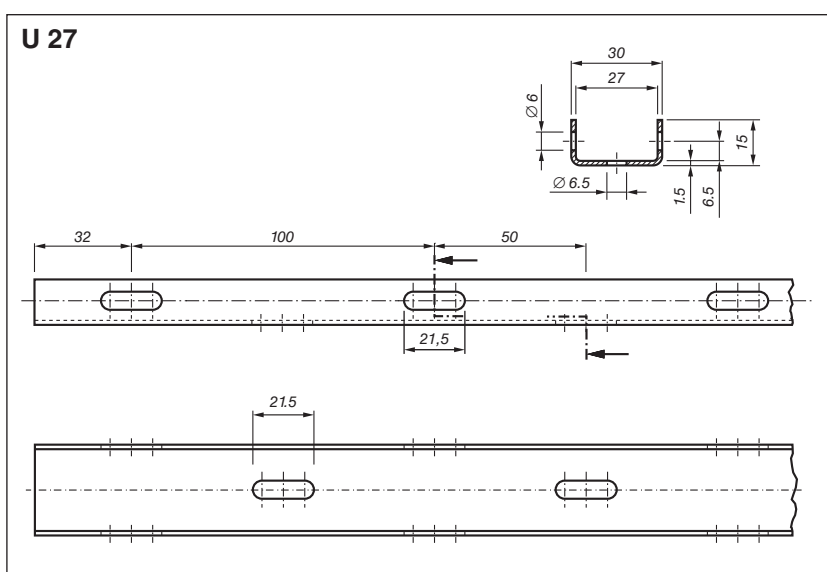
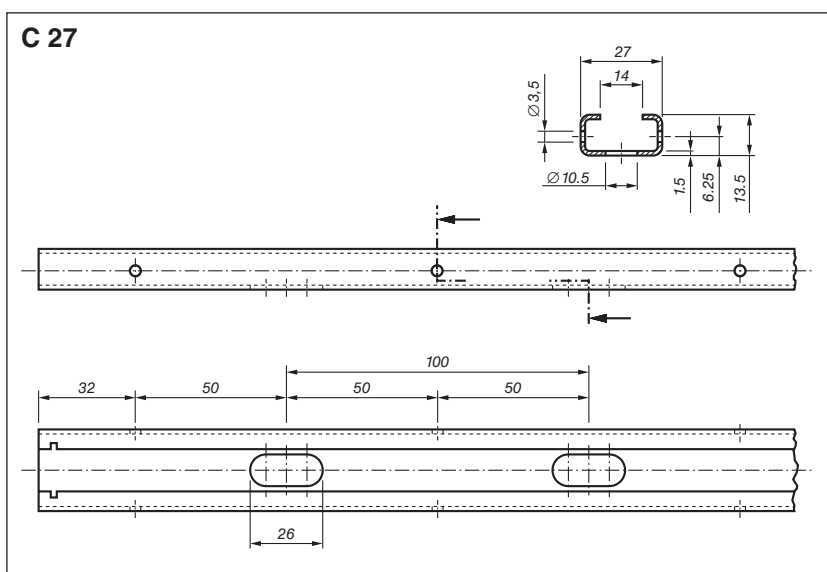
Dimensional tolerances: ISO 2768-v

Profile for GP 302



Fix the C-Profile

to the U-Profile using self-tapping SK M4x10 DIN 7500 countersunk screws in pre-drilled positions



270710 v1.0

Subject to technical modifications.

Cable exits KA

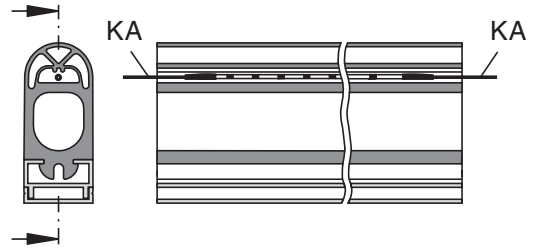
some with cable sleeves KT

Note: non-sensitive end = c. 35mm (standard)

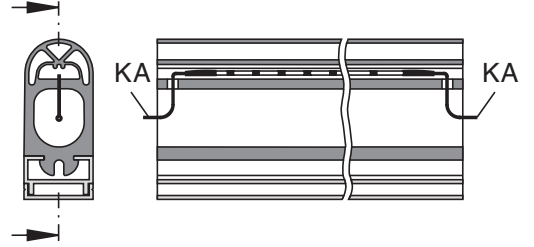
Safety Edge Type BK

with cable sleeves KT

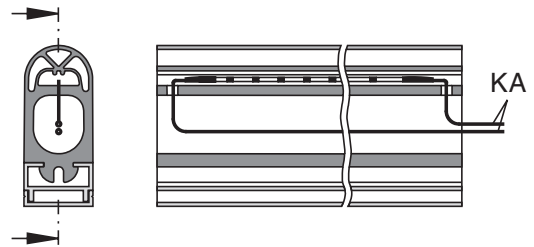
Version 1 GP 15, 22, 39(L), 50(L), 60, 120, 302



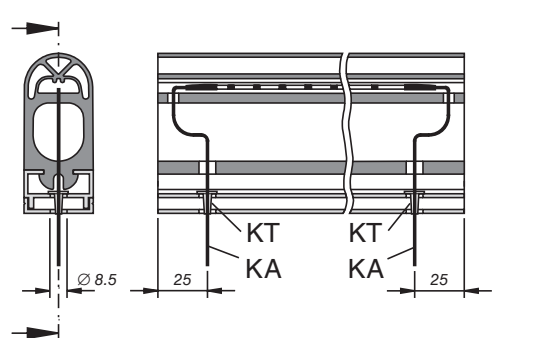
Version 3 GP 39(L), 50(L), 60, 120, 302



Version 4 GP 39(L), 50(L), 60, 120, 302



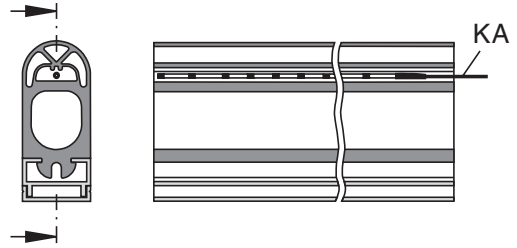
Version 5 GP 39(L), 50(L), 60, 120, 302



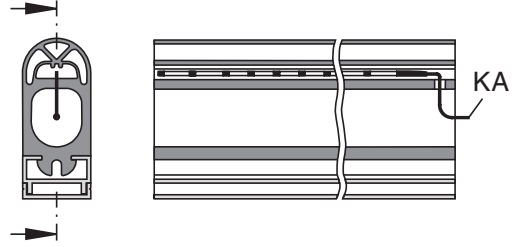
Safety Edge Type W

with integrated resistor

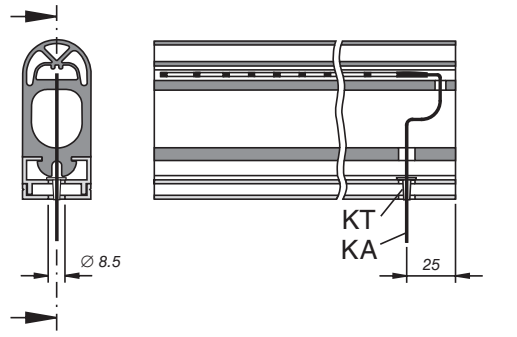
Version 9 GP 15, 22, 39(L), 50(L), 60, 120, 302



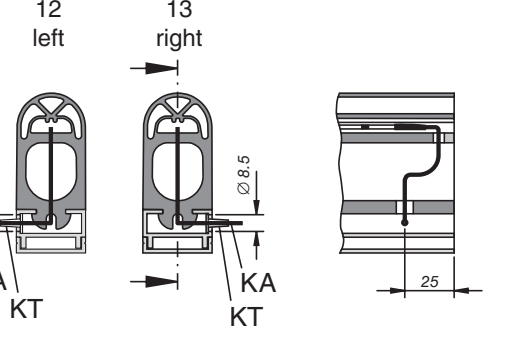
Version 10 GP 39(L), 50(L), 60, 120, 302



Version 11 GP 39(L), 50(L), 60, 120, 302



Version 12/13 GP 39(L), 50(L), 60



ATTENTION
Max. cable length to signal processing unit: 200 m

Subject to technical modifications.

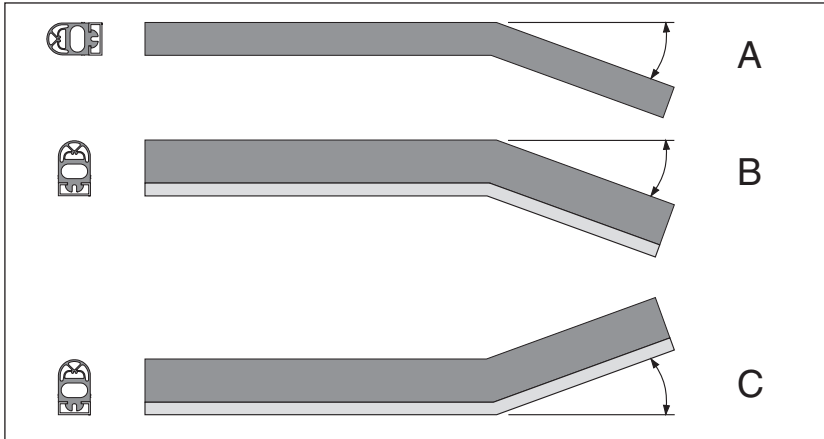
For rubber profiles, type L, please note: the rubber lip is always on the left side looking at the cross section (to the left of the intersection line).

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

Lateral bends and radii

Lateral bends

All AI-profiles from the C25 and C35 range are suitable for bend angles.
The AI-profile must be prepared at our plant for this.



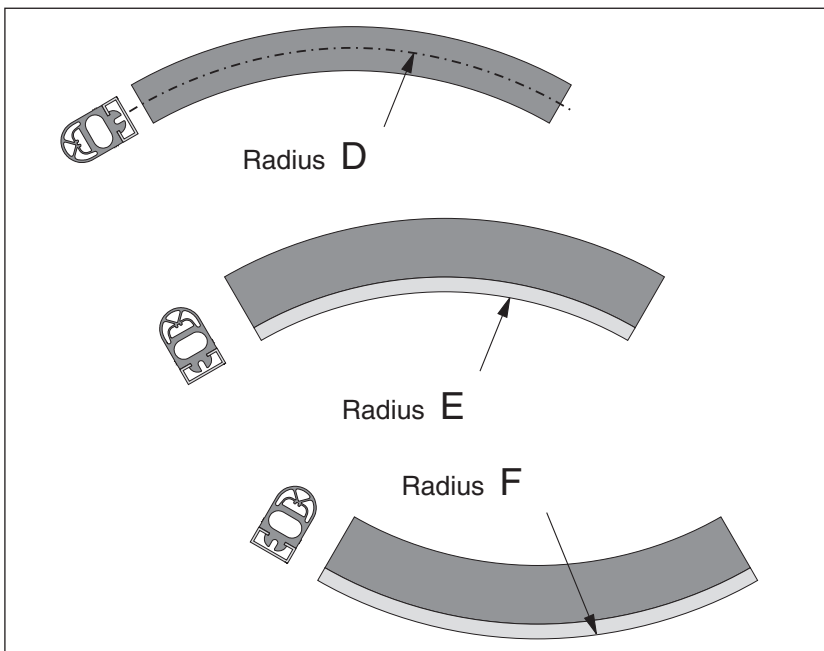
Maximum lateral bend

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°

Angled Safety Edges (type A to 90°): see custom-made section.

Radii

Safety Edges with a radius are only available with C 25 and C 35 AI-profiles. The AI-profile must be prepared at our plant for this.



Minimum radius in mm

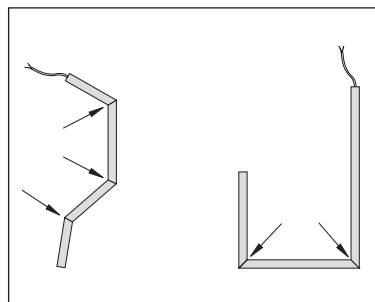
Radius type:	D	E	F
GP 22	300	300	350
GP 39	300	300	350
GP 50	350	400	400
GP 60	350	450	550
GP 120	500	–	–

Note:

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

Custom-made

- temperature resistant version
short term (< 5 min) up to 120 °C
long term (> 5 min) up to 100 °C
Degree of protection: IP50
- angled Safety Edges with sensitive zones in problem areas
- Safety Edges with active ends possible using GP39 upwards



Subject to technical modifications.

Overall view of combinations

Safety Edges SL	GP 15	GP 22	GP 39	GP 39L	GP 50	GP 50L	GP 60	GP 120	GP 302
Material									
NBR	●	●	●						
EPDM			●	●	●	●	●	●	●
CR					●		●		
Mounting									
C 15	●								
C 25M/S/L		●	●	●					
C 35M/S					●	●	●	●	
C 27 / U 27									●
Monitoring resistor									
1k2	●	●	●	●	●	●	●	●	○
8k2	○	○	○	○	○	○	○	○	○
22k1	○	○	○	○	○	○	○	○	●
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 + AI-Profile C 35M
Cable 10 m, Version 4 (siehe 3.8)

Example 2 - Fully assembled Safety Edge with control unit (230 V):
SL/W 3,700 mm GP 60 EPDM + AI-Profile C 35M
Cable 5 m, Version 11 (see 3.8)
Control Unit SG-EFS 134 ZK 2/1 (1k2)

Example 3 - Fully assembled Safety Edge, 4-wire-connection system
with control unit (230V):
SL/BK 1,650 mm GP 39 NBR + AI-Profile C 25M
Cable 2 m, Version 3 (see 3.8)
Control Unit SG-SUE 4134 NA

Subject to technical modifications.

Technical data GP 39, GP 50, GP 60

Safety Edges consisting of sensor SL/W and SL/BK
at rubber profiles GP 39/50/60 with aluminium profile and Control Unit.

1	Degree of protection sensor	IP65			IP65		
2	Switching operations sensor	> 10 ⁵			> 10 ⁵		
3	Sensor	GP 39 EPDM	GP 50 EPDM	GP 60 EPDM	GP 50 CR	GP 60 CR	GP 50 EPDM
	with Control Unit SG-	EFS 1X4 ZK2/1			EFS 1X4 ZK2/1		SLE 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	Control command reset	either manual or automatic			manual / automatic		automatic
4	Actuation force, actuation distance, overtravel and switching angle	Testing basis: EN 1760-2					
4.1	Actuation force	< 150 N	< 150 N	< 150 N	< 150 N	< 150 N	< 150 N
4.2	Actuation distance						
	at 10 mm/s	4 mm	8 mm	7 mm	7 mm	8 mm	6 mm
	at 100 mm/s	4 mm	15 mm	10 mm	8 mm	9 mm	–
4.3	Overtravel distance						
	at 10 mm/s	2 mm	13 mm	20 mm	5 mm	7 mm	13 mm
	at 100 mm/s	1 mm	5 mm	16 mm	4 mm	6 mm	–
4.4	Effective actuation angle	45°	90°	90°	90°	90°	90°
5	Error behaviour	EN 954 Category 3			EN 954 Category 3		
6	Operating and environmental conditions						
6.1	Operating temperature						
	Sensor	-20 °C to +55 °C			-20 °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)	<ul style="list-style-type: none"> • Depending on the amount of use the sensors are to be checked regularly for correct operation and visible signs of damage by manual operation or by applying the relevant test piece. • The correct position of the rubber profile in the aluminium profile is to be checked. 					
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						
	Rubber profile	ISO 3302 E2/L2					
	Al-profile	ISO 2768-v					

Technical data GP 302

Safety Edges consisting of sensor SL/W and SL/BK
at rubber profiles GP 302 with Steel-Profile and Control Unit

1	Degree of protection sensor	IP65	IP65
2	Switching operations sensor	> 10 ⁴	> 10 ⁴
3	Sensor	GP 302 EPDM	GP 302 EPDM
	with Control Unit SG-	EFS 1X4 ZK2/1	SLE 04-0X1
3.1	Response time	115 ms	120 ms
	Test speed	100 mm/s	100 mm/s
3.2	Control command reset	either manual or automatic	automatic
4	Actuation force, actuation distance, overtravel and switching angle		
	Testing basis: EN 1760-2		
4.1	Actuation force	< 150 N	< 150 N
4.2	Actuation distance		
	at 10 mm/s	13 mm	13 mm
	at 100 mm/s	12 mm	12 mm
4.3	Overtravel distance		
	at 10 mm/s	25 mm	25 mm
	at 100 mm/s	22 mm	22 mm
4.4	Effective actuation angle	90°	90°
5	Error behaviour	EN 954 Category 3	EN 954 Category 3
6	Operating and environmental conditions		
6.1	Operating temperature		
	Sensor	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)	<ul style="list-style-type: none"> • Depending on the amount of use the sensors are to be checked regularly for correct operation and visible signs of damage by manual operation or by applying the relevant test piece. • The correct position of the rubber profile in the aluminium profile is to be checked. 	
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		
	Rubber profile	ISO 3302 E2/L2	
	Steel-profile	ISO 2768-v	

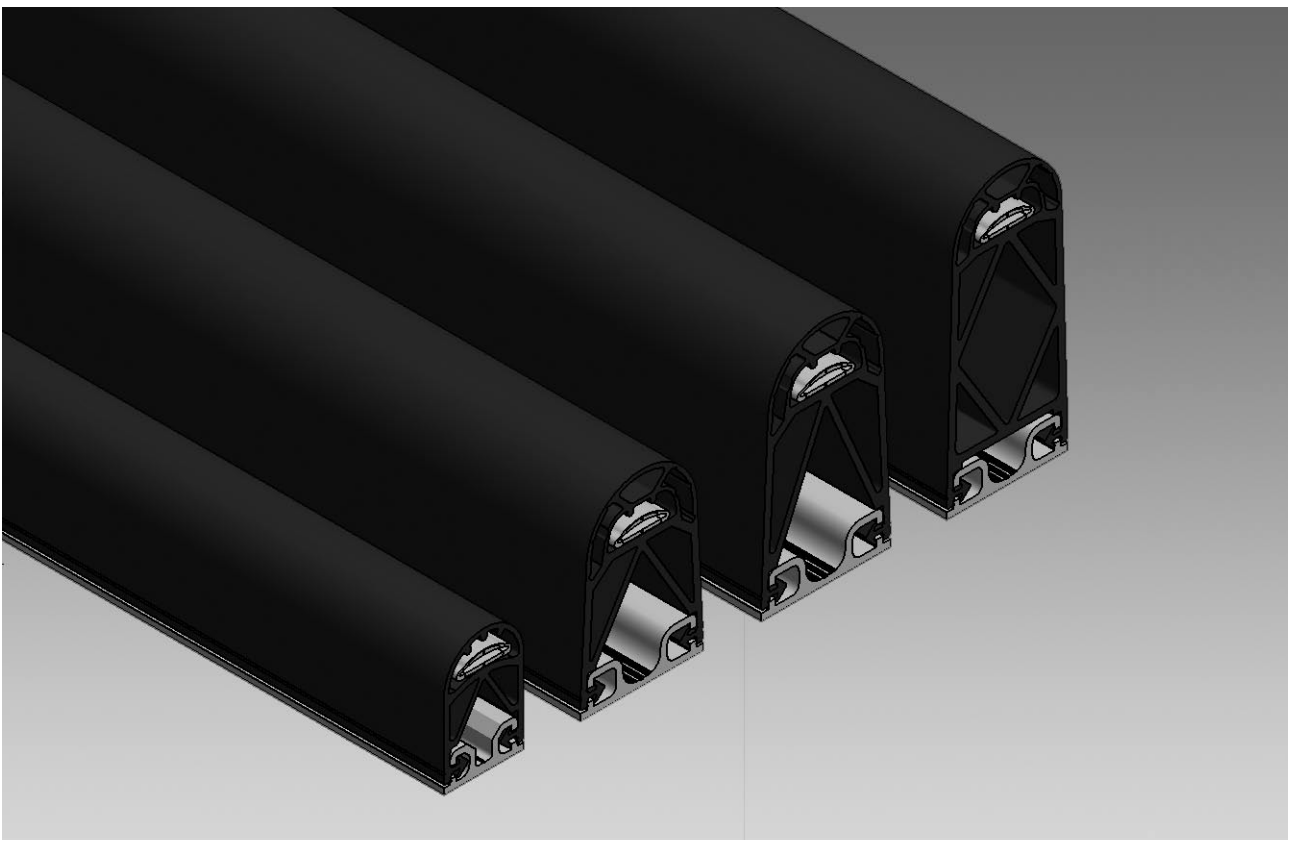
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MAYSER®

Polymer Electric



Product Information



Normally Open Safety Edges SL/NO

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Important information

Read through the product information carefully. It contains important information on operation, safety and maintenance of the NO contact Safety Edge. Retain the product information for later reference.

Always observe the safety instructions on the following pages under **ATTENTION**. Only use the NO Safety Edge for the purpose described in the product information.

© Mayser Ulm 2011

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.

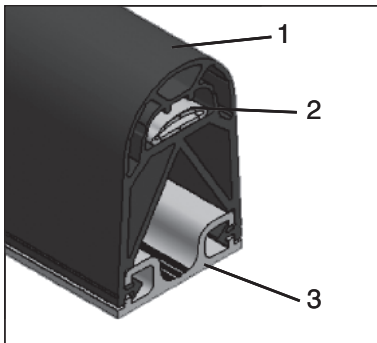
Tip

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 C26 or 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”

Effective actuation area

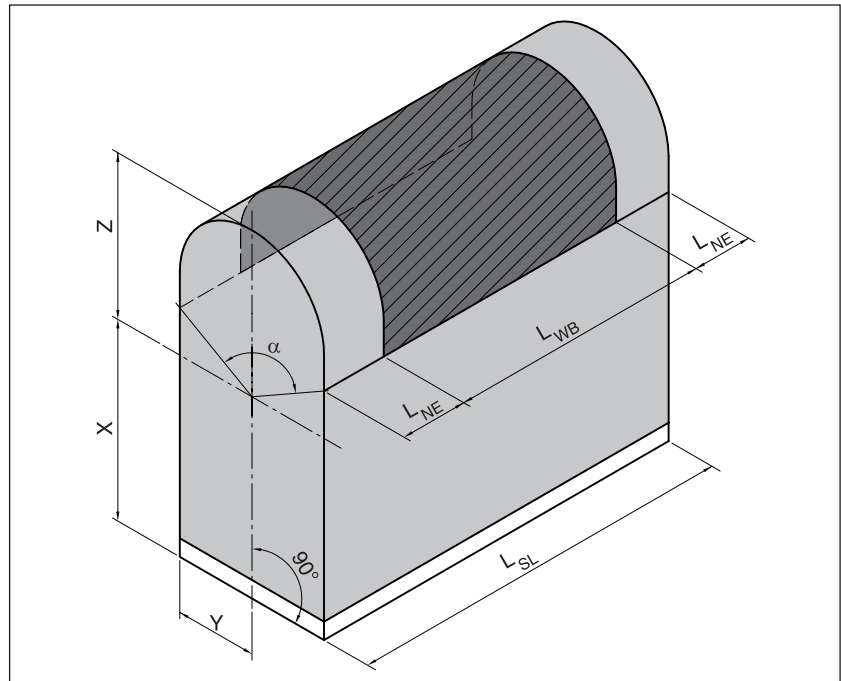
The parameters X, Y, Z, L_{NE} and angle α describe the effective actuation area.

For the effective actuation area, the following applies:

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

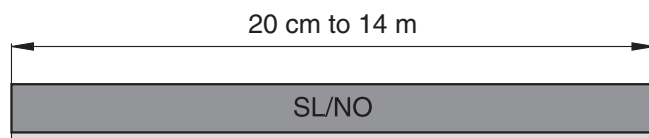
Parameters:

- 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(L)	GP 58(L)	GP 68	GP 88
α	90°	90°	90°	90°
L _{NE}	35 mm	35 mm	35 mm	35 mm
X	30.5 mm	43.2 mm	53.2 mm	71,7 mm
Y	13 mm	18 mm	18 mm	20 mm
Z	9.5 mm	16.8 mm	16.8 mm	18,3 mm

Available lengths



Subject to technical modifications.

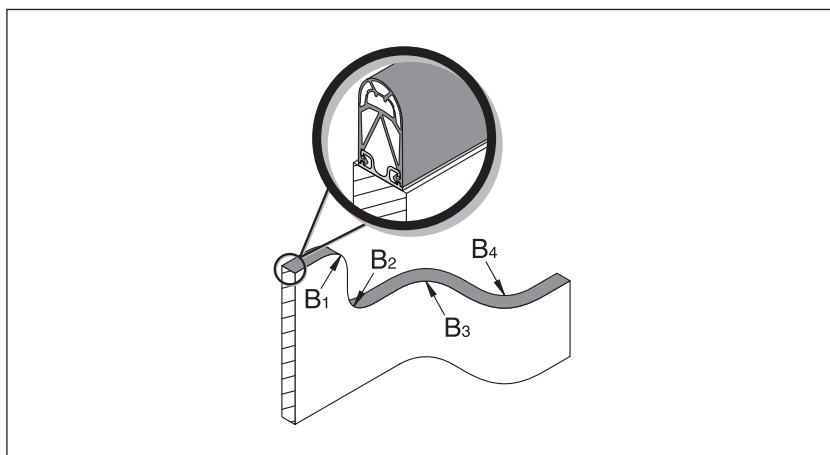
Bend angles and bend radii

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 36 and C 36S. The aluminium profile must be prepared in the factory for this.



Bend radii min.	GP 38	GP 58	GP 68	GP 88
B ₁	750 mm	750 mm	750 mm	750 mm
B ₂	750 mm	750 mm	750 mm	750 mm
B ₃	750 mm	750 mm	750 mm	750 mm
B ₄	750 mm	750 mm	750 mm	750 mm

Note:

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

Note:

Bend radii are not possible with GP 38L and GP 58L.

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.

ATTENTION

No pressure may be exerted on the NO Safety Edge in non-operative mode.

Subject to technical modifications

Connection

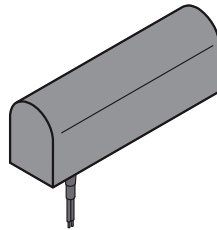
Cable exits

90° exit

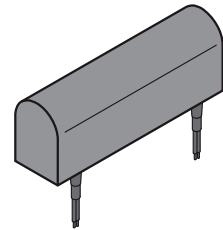
Distance from front face 25 mm each; incl. cable bushing

Tip

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



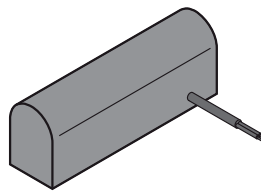
Version 11: SL/W



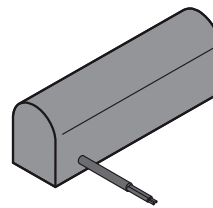
Version 5: SL/BK

Lateral exit

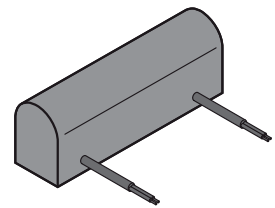
Distance to front face 25 mm each



Version 12: SL/W

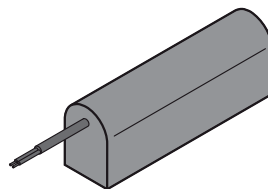


Version 13: SL/W

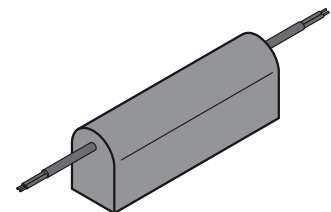


Version 14: SL/BK

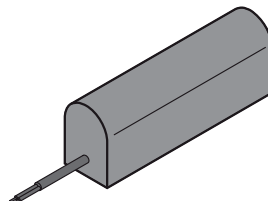
Axial exit



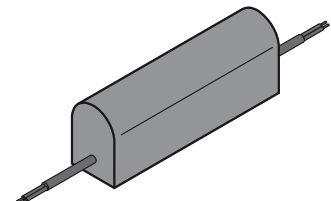
Version 9: SL/W



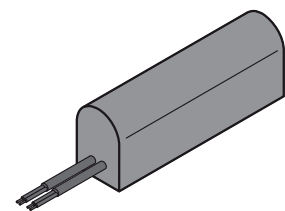
Version 1: SL/BK



Version 10: SL/W



Version 3: SL/BK



Version 4: SL/BK

Subject to technical modifications.

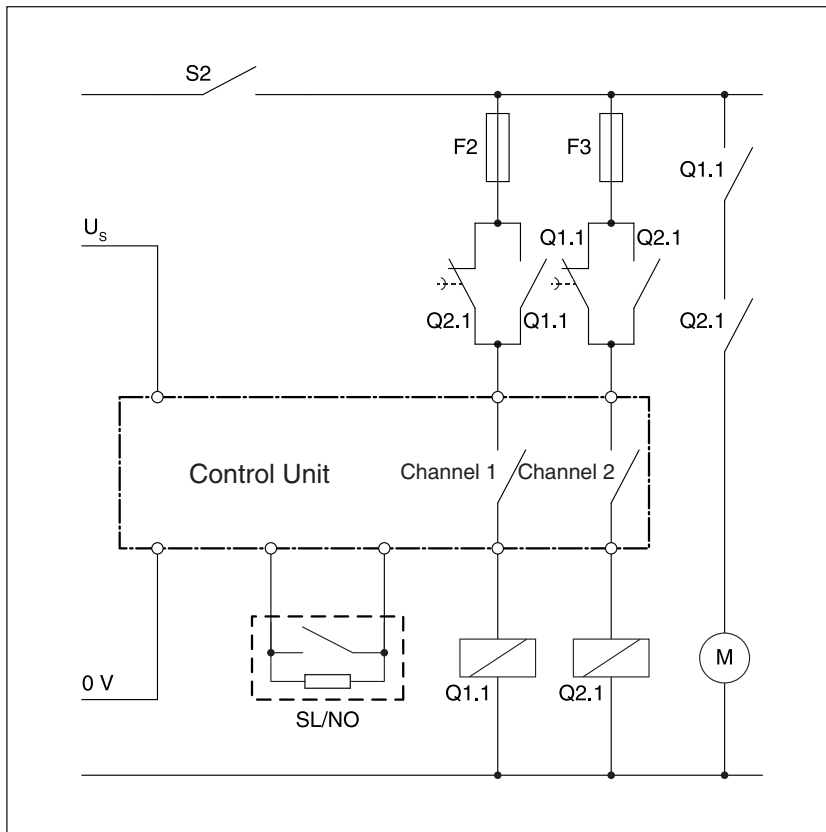
Cable connection

- 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.



Rubber profiles

GP 38 and GP 58

Note:

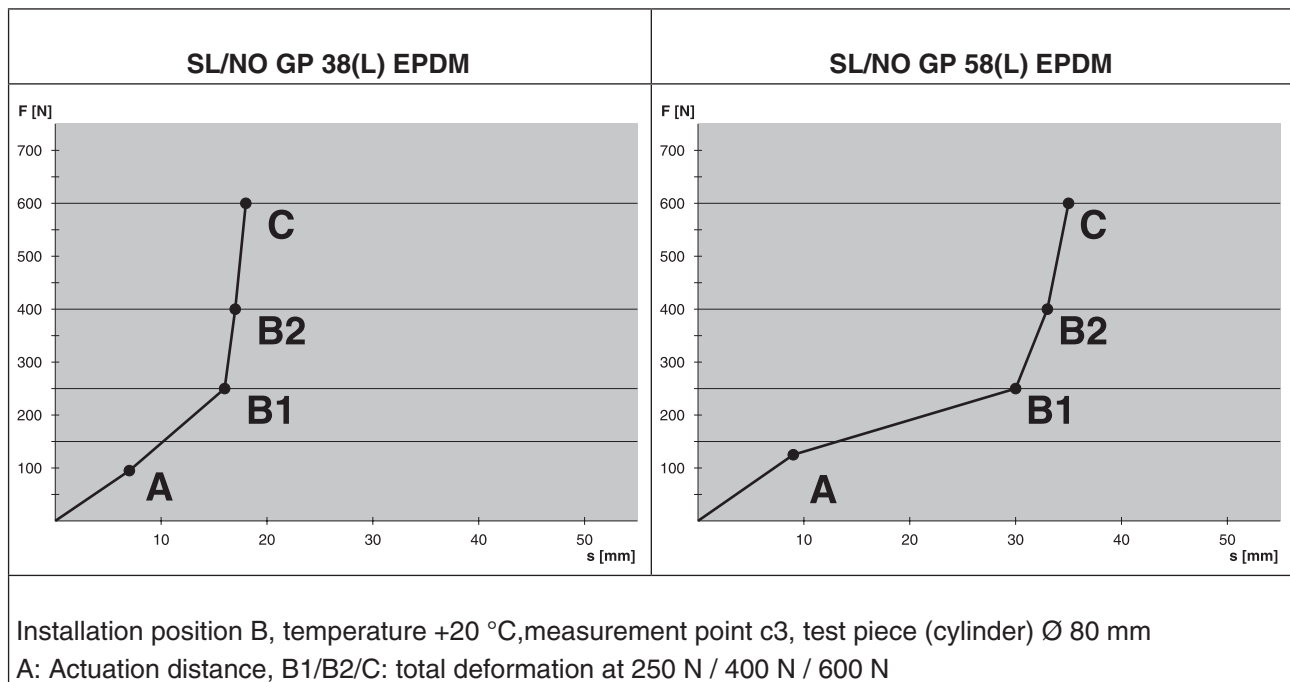
Dimensional tolerances as per ISO 3302 E2/L2.

GP 38(L) EPDM		GP 58(L) EPDM	
Actuation force:	< 150 N	Actuation force:	< 150 N
Response time		Response time	
at 10 mm/s	600 ms	at 10 mm/s	800 ms
at 100 mm/s	60 ms	at 100 mm/s	80 ms
Actuation distance (A)		Actuation distance (A)	
at 10 mm/s	6 mm	at 10 mm/s	8 mm
at 100 mm/s	7 mm	at 100 mm/s	9 mm
Overtravel distance up to 250 N (B1)		Overtravel distance up to 250 N (B1)	
at 10 mm/s	10 mm	at 10 mm/s	22 mm
at 100 mm/s	9 mm	at 100 mm/s	19 mm

Note:

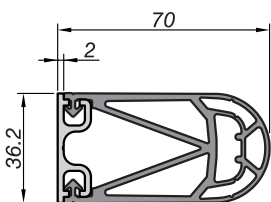
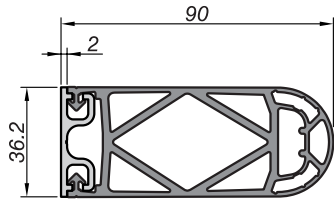
Test piece (cylinder): Ø 80 mm.
Values apply at temperature +20 °C and without Control Unit

Force-distance ratios



Subject to technical modifications.

GP 68 and GP 88

GP 68 EPDM		GP 88 EPDM	
			
Actuation force:	< 150 N	Actuation force:	< 150 N
Response time		Response time	
at 10 mm/s	800 ms	at 10 mm/s	900 ms
at 100 mm/s	80 ms	at 100 mm/s	90 ms
Actuation distance (A)		Actuation distance (A)	
at 10 mm/s	8 mm	at 10 mm/s	9 mm
at 100 mm/s	9 mm	at 100 mm/s	10 mm
Overtravel distance up to 250 N (B1)		Overtravel distance up to 250 N (B1)	
at 10 mm/s	30 mm	at 10 mm/s	36 mm
at 100 mm/s	27 mm	at 100 mm/s	32 mm

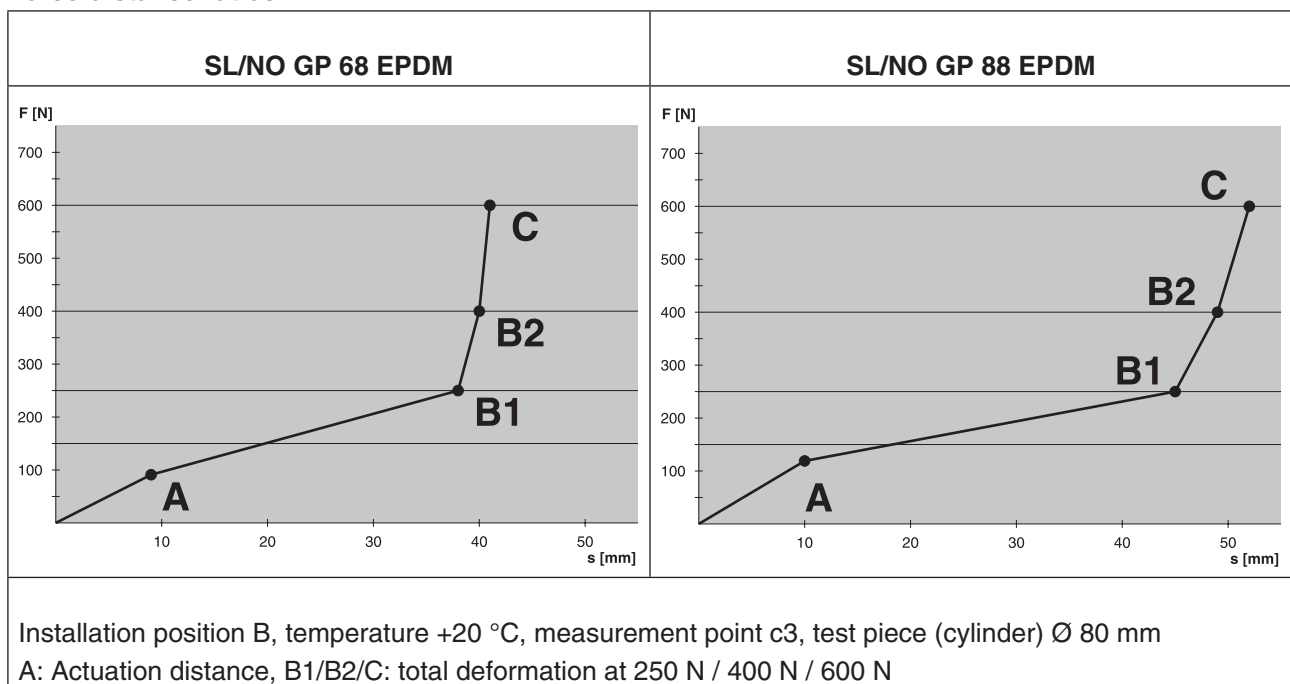
Note:

Dimensional tolerances as per ISO 3302 E2/L2.

Note:

Test piece (cylinder): Ø 80 mm.
Values apply at temperature +20 °C and without Control Unit

Force-distance ratios



Subject to technical modifications

040711 v1.1

ATTENTION

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

Physical resistance

Rubber profile GP	EPDM
Degree of protection (IEC 60529)	IP65
Hardness as per Shore A	
GP 58, GP 68, GP 88	65 ±5
GP 38	57 ±5

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.

Explanation of symbols:

+ = resistant

± = resistant to a certain extent

- = not resistant

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	+

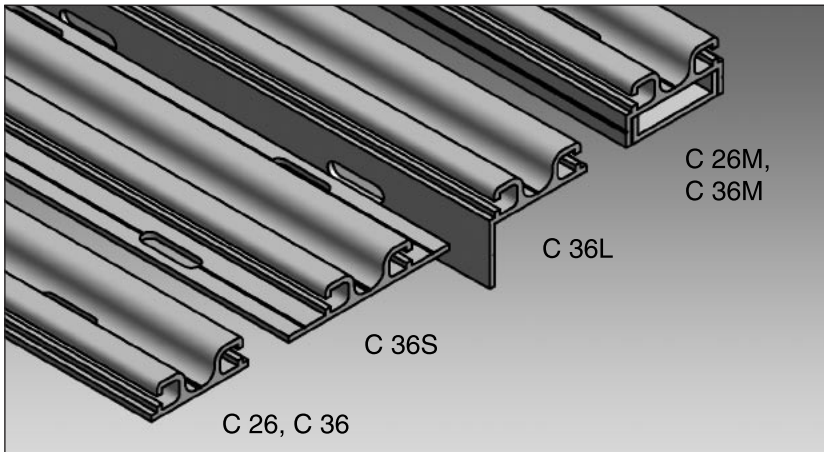
Note:

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

Subject to technical modifications.

Fixing rails

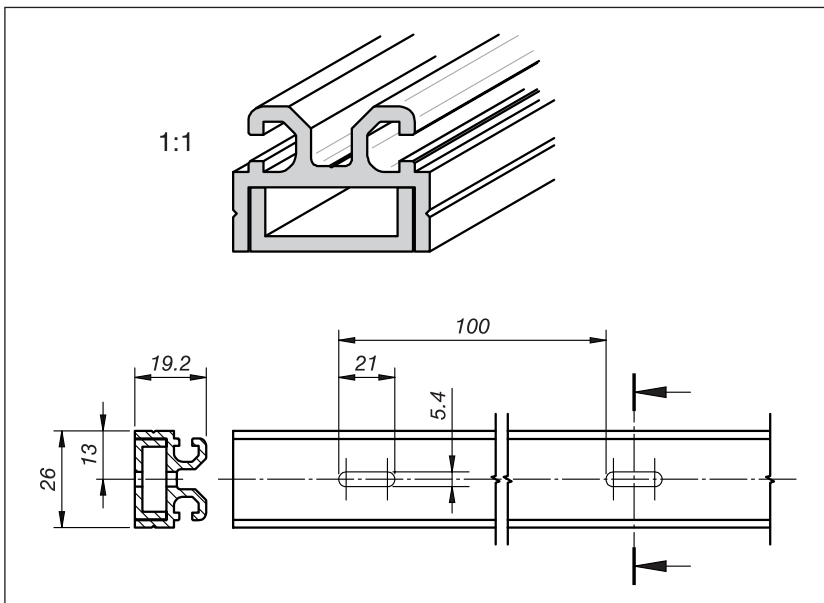
Normally open Safety Edges SL/NO are mounted directly to the dangerous main and secondary closing edges. The aluminium profiles C 26 and C 36 are used for mounting. The aluminium profiles are mounted with screws M5 or rivets.



Material properties

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

Aluminium profile C 26M

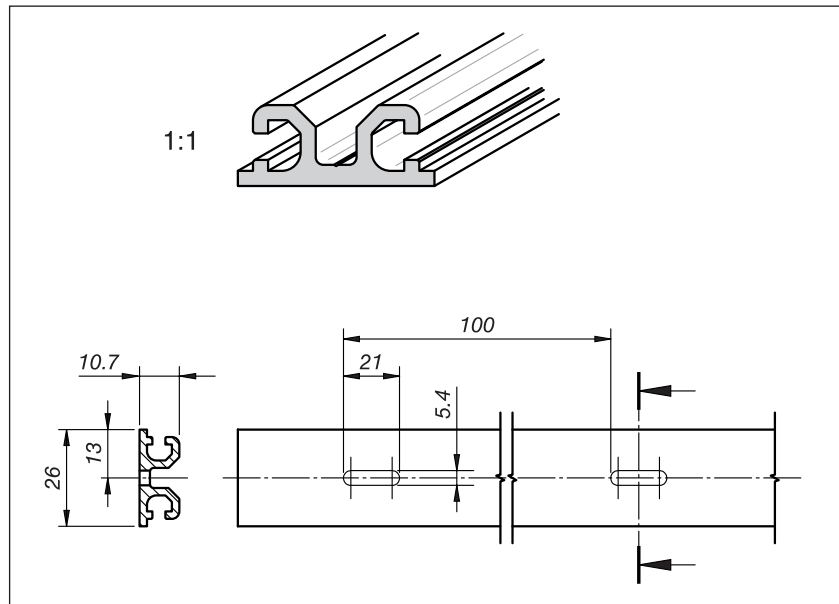


Two-part profile for GP 38 (L):

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.

Subject to technical modifications

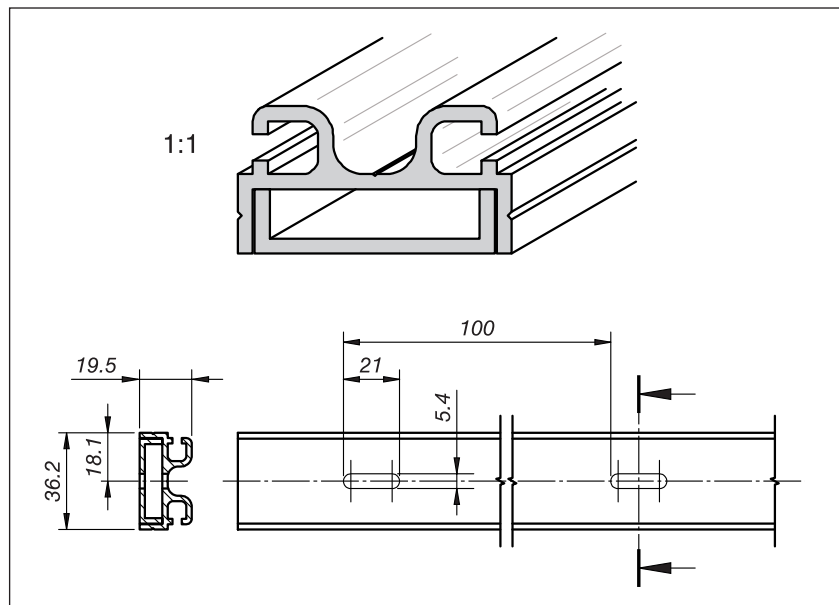
Aluminium profile C 26



Standard profile for GP 38 (L)

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

Aluminium profile C 36M

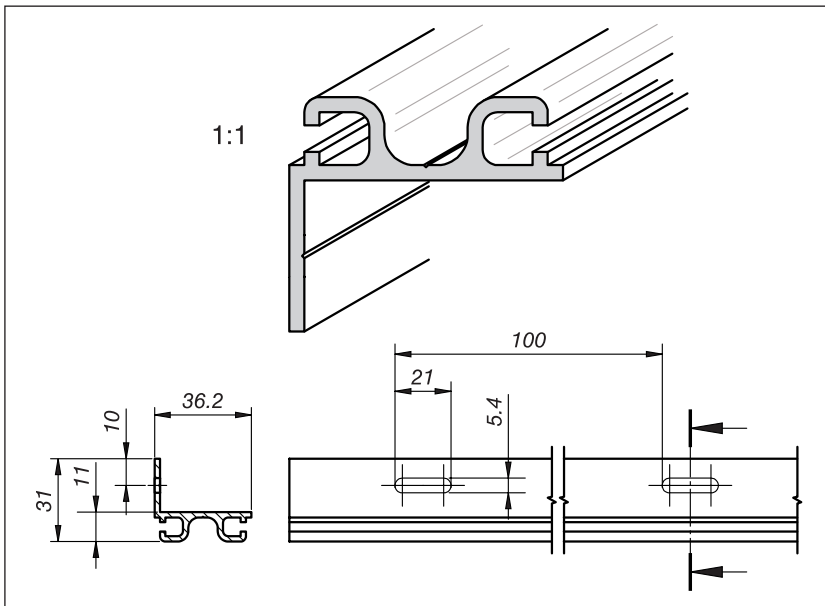


Two-part profile for GP 58 (L), GP 68 and GP 88:

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.

Subject to technical modifications.

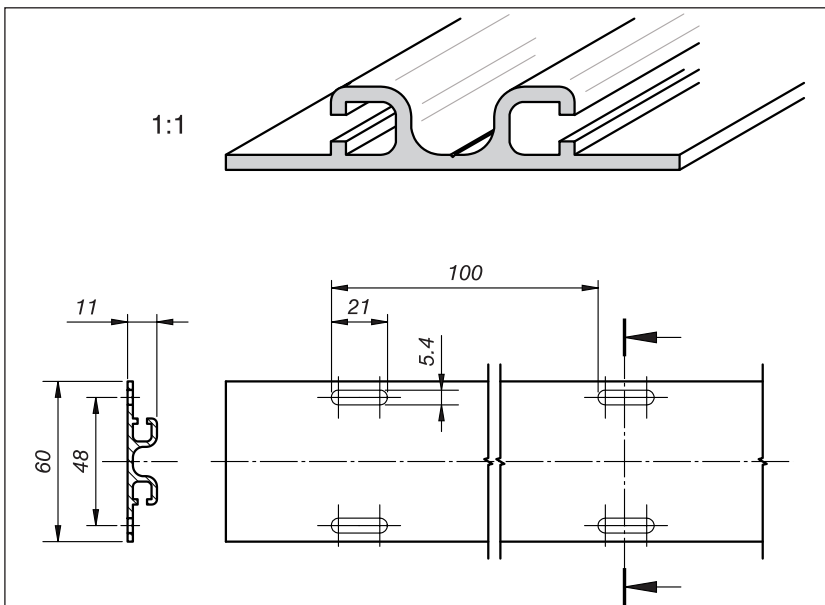
Aluminium profile C 36L



Angle profile for GP 58 (L), GP 68 and GP 88:

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.

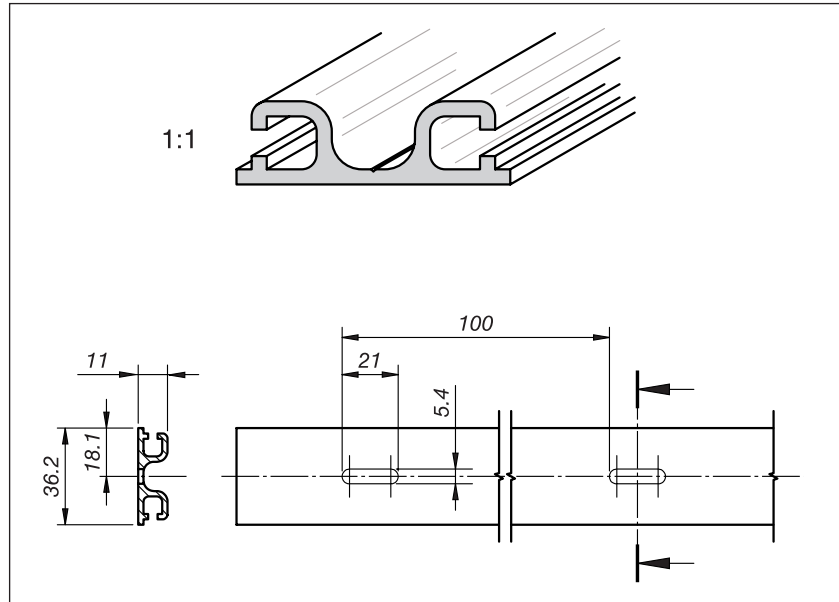
Aluminium profile C 36S



Flange profile for GP 58 (L), GP 68 and GP 88:

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 (L), GP 68 and GP 88:

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

Explanation of symbols:

- = Standard
- = Option

Aluminium-profile: Overview of combinations

	C 26M	C 26	C 36M	C 36L	C 36S	C 36
GP 38	○	●				
GP 38L	○	●				
GP 58			○	○	○	●
GP 58L			○	○	○	●
GP 68			○	○	○	●
GP 88			○	○	○	●

Subject to technical modifications.

SL/NO: The right selection

Calculation for selection of the Safety Edge height

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

$$s_1 = 1/2 \times v \times T \quad \text{where: } T = t_1 + t_2$$

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

$$s = s_1 \times C \quad \text{where: } C = 1.2$$

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 $v = 10$ mm/sec. and can be brought to a standstill within $t_2 = 300$ 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 $t_1 = 700$ ms.

$$s_1 = 1/2 \times v \times T \quad \text{where: } T = t_1 + t_2$$

$$s_1 = 1/2 \times 10 \text{ mm/s} \times (700 \text{ ms} + 300 \text{ ms})$$

$$s_1 = 1/2 \times 10 \text{ mm/s} \times 1.0 \text{ s} = \mathbf{5 \text{ mm}}$$

$$s = s_1 \times C \quad \text{where: } C = 1.2$$

$$s = 5 \text{ mm} \times 1.2 = \mathbf{6 \text{ mm}}$$

The Safety Edge must have a minimum overtravel distance of $s = 6$ mm. The selected SL/NO GP 38 EPDM has an overtravel distance of at least 10 mm. This is more than the required 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 $v = 100$ mm/s.

The response time of the Safety Edge is $t_1 = 70$ ms

$$s_1 = 1/2 \times v \times T \quad \text{where: } T = t_1 + t_2$$

$$s_1 = 1/2 \times 100 \text{ mm/s} \times (70 \text{ ms} + 300 \text{ ms})$$

$$s_1 = 1/2 \times 100 \text{ mm/s} \times 0.37 \text{ s} = \mathbf{18.5 \text{ mm}}$$

- 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 required limit forces are not exceeded [mm]
- C = Safety factor; if components susceptible to failures (braking system) exist in the system, a higher factor must be selected.

$$s = s_1 \times C \quad \text{where: } C = 1.2$$
$$s = 18.5 \text{ mm} \times 1.2 = \mathbf{22.2 \text{ mm}}$$

The Safety Edge must have a minimum overtravel distance of $s = 22.2 \text{ mm}$. The selected SL/NO GP 38 EPDM has an overtravel distance of at least 9 mm. This is less than the required 22.2 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 $t_1 = 80 \text{ ms}$.

$$s_1 = 1/2 \times v \times T \quad \text{where: } T = t_1 + t_2$$
$$s_1 = 1/2 \times 100 \text{ mm/s} \times (80 \text{ ms} + 300 \text{ ms})$$
$$s_1 = 1/2 \times 100 \text{ mm/s} \times 0.38 \text{ s} = \mathbf{19 \text{ mm}}$$

$$s = s_1 \times C \quad \text{where: } C = 1.2$$
$$s = 19 \text{ mm} \times 1.2 = \mathbf{22.8 \text{ mm}}$$

The Safety Edge must have a minimum overtravel distance of $s = 22.8 \text{ mm}$. The selected SL/NO GP 68 EPDM has an overtravel distance of at least 27 mm. This is more than the required 22.8 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
- Safety Edges with sealing lip (GP 38L, GP58L)
- Durability at high temperatures:
 - short-term (< 5 min) up to +120 °C
 - long-term (> 5 min) up to +100 °C
 - in the case of degree of protection: IP50
- Durability at low temperatures:
 - long term up to -40 °C
- higher degree of protection: IP67

SL/NO with transponder technology

The SL/TRS is a normally open 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.

Subject to technical modifications.

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

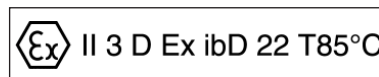
Equipment category 3

Ignition protection class

„ibD 22“

Temperature class T85 °C

Marking:



Corresponds to IEC 61241-11

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 2006/42/EC and EMC Directive 2004/108/EC.



Technical data GP 38 and GP 58

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

	GP 38(L) EPDM with C 26 and SG-EFS 1X4 ZK2/1	GP 58(L) 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	$> 5 \times 10^4$	$> 5 \times 10^4$
Actuation force	< 150 N	< 150 N
Actuation distance	8 mm	10 mm
Response time	70 ms	90 ms
Effective actuation angle	90°	90°
Safety classifications		
EN 1760: Reset	with/without	with/without
ISO 13849-1:2006	Category 3	Category 3
B_{10d} (Sensor)	2×10^6	2×10^6
Mechanical operating conditions		
Sensor length (min./max.)	20 cm / 14 m	20 cm / 14 m
Cable length (min./max.)	2.0 m / 200 m	2.0 m / 200 m
Operating velocity (min./max.)	10 mm/s / 100 mm/s	10 mm/s / 100 mm/s
max. load capacity	600 N	600 N
IEC 60529: Degree of protection	IP65 (Sensor)	IP65 (Sensor)
max. humidity (23 °C)	95% (non-condensing)	95% (non-condensing)
Operating temperature	-20 °C to +55 °C	-20 °C to +55 °C
Storage temperature	-30 °C to +70 °C	-30 °C to +70 °C
Weight	0.8 kg/m (L:0.9 kg/m)	1.2 kg/m (L:1.3 kg/m)
Electrical operating conditions		
Connection cable	Ø 3.7 mm TPE 2x 0.22 mm ²	Ø 3.7 mm TPE 2x 0.22 mm ²
Chemical resistance		
	The sensor is resistant against normal chemical resistances over an exposure period of 24 hours. (see page 3.10).	
Maintenance, service		
Maintenance Monitoring Inspection	<p>The Safety Edge is maintenance-free. Possible via external control.</p> <ul style="list-style-type: none"> 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	ISO 3302 E2/L2	ISO 3302 E2/L2
Aluminium profile	EN 755-9	EN 755-9

Subject to technical modifications.

Technical data GP 68 und GP 88

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	GP 88 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 $v_{test} = 100 \text{ mm/s}$		
Switching operations	> 5×10^4	> 5×10^4
Actuation force	< 150 N	< 150 N
Actuation distance	10 mm	11 mm
Response time	90 ms	100 ms
Effective actuation angle	90°	90°
Safety classifications		
EN 1760: Reset	with/without	with/without
ISO 13849-1:2006	Category 3	Category 3
B_{10d} (Sensor)	2×10^6	2×10^6
Mechanical operating conditions		
Sensor length (min./max.)	20 cm / 14 m	20 cm / 14 m
Cable length (min./max.)	2.0 m / 200 m	2.0 m / 200 m
Operating velocity (min./max.)	10 mm/s / 100 mm/s	10 mm/s / 100 mm/s
max. load capacity	600 N	600 N
IEC 60529: Degree of protection	IP65 (Sensor)	IP65 (Sensor)
max. humidity (23 °C)	95% (non-condensing)	95% (non-condensing)
Operating temperature	-20 °C to +55 °C	-20 °C to +55 °C
Storage temperature	-30 °C to +70 °C	-30 °C to +70 °C
Weight	1.4 kg/m	1.6 kg/m
Electrical operating conditions		
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm ²	Ø 3,7 mm TPE 2× 0,22 mm ²
Chemical resistance		
	The sensor is resistant against normal chemical resistances over an exposure period of 24 hours. (see page 3.10).	
Maintenance, service		
Maintenance Monitoring Inspection	<p>The Safety Edge is maintenance-free. Possible via external control.</p> <ul style="list-style-type: none"> 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	ISO 3302 E2/L2	ISO 3302 E2/L2
Aluminium profile	EN 755-9	EN 755-9

Request for quotation

Fax:

+49 731 2061-222

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Department

Name, first name

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Post code

City

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E-mail

Area of application

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

Environmental conditions

- dry water oil
 aggressive sub- Coolant, type: _____
stances: 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)

Subject to technical modifications.