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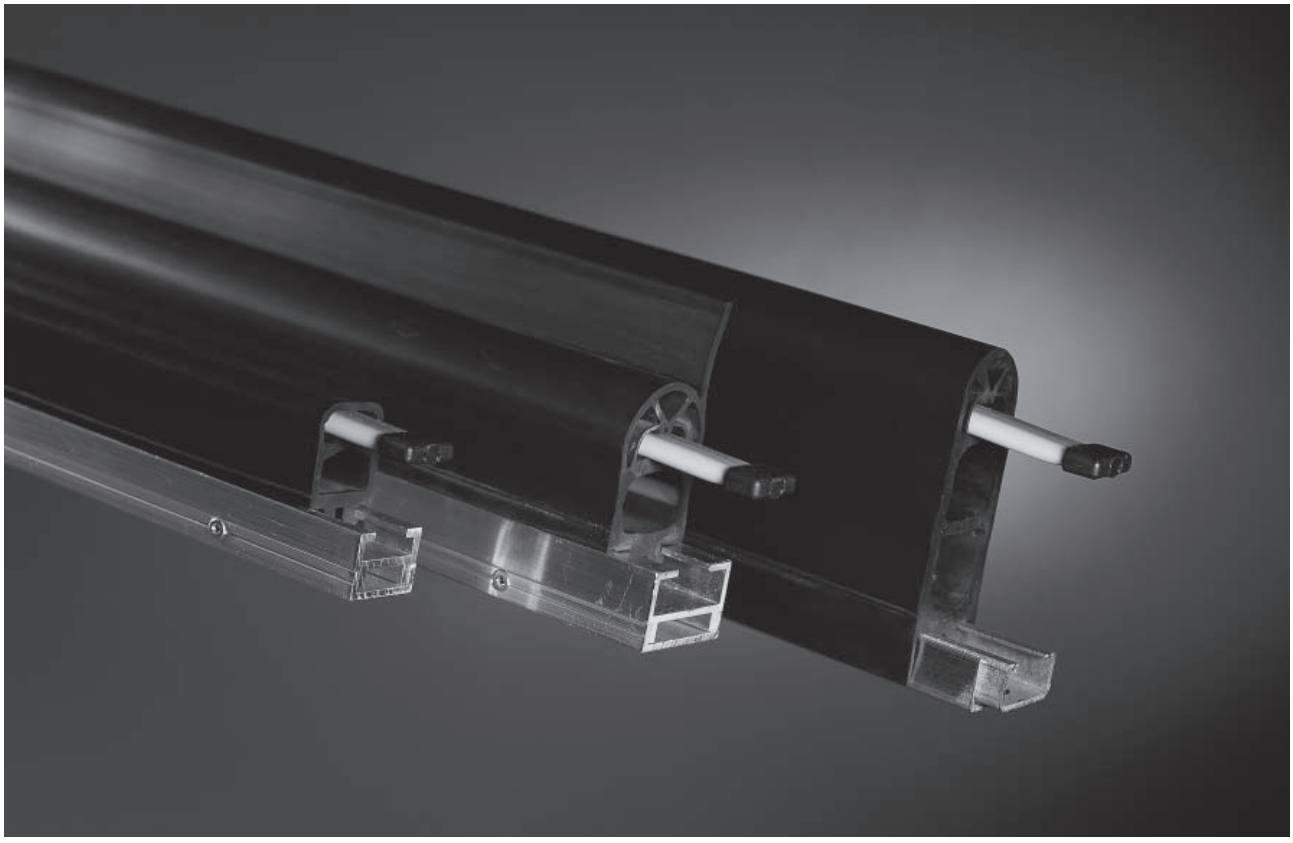
Product Information



Safety Edges SL/W and SL/BK

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Contents

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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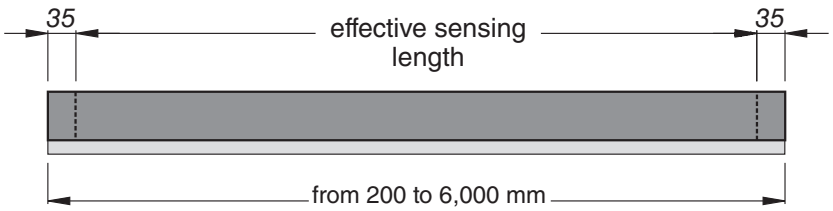
Available lengths

The contact elements can be supplied in lengths between200 und 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

Mit dem Ergebnis kann nun ein geeignetes Schaltleistenprofil ausgewählt werden.

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: ∅ 3.7 mm TPE, 2× 0.22 mm²
  Wire colours: red, black
- Cable length: 2 m / 5 m / 10 m
- Cable ends without plug and coupling
  Option: Kabelenden mit Stecker bzw. Kupplung lieferbar

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

Subject to technical modifications.

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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.

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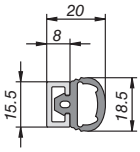
Subject to technical modifications.

Rubber profiles and operating distances

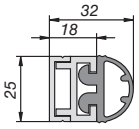
Actuation force: < 150 N (bei 23 °C und Prüfkörper ∅ 80 mm)
Dimensional tolerances: ISO 3302 E2/L2



GP 15 **NBR**

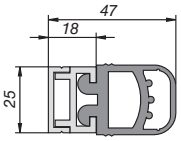
Actuation distance:
at 10 mm/s 2 - 4 mm
Overtravel distance: –

Al - profile range: C 15



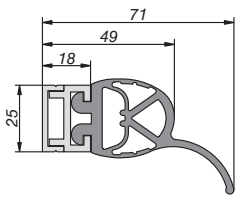
GP 22 **NBR**

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

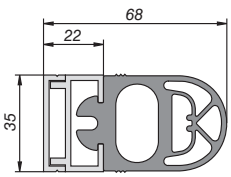


GP 39L **EPDM**

Actuation distance:
at 10 mm/s 23 mm

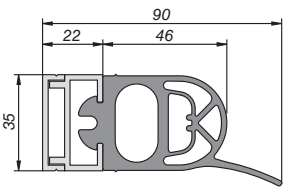
Overtravel distance:
at 10 mm/s 7 mm

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

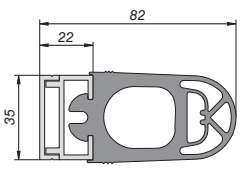


GP 50L **EPDM**

Actuation distance:
at 10 mm/s 20 mm

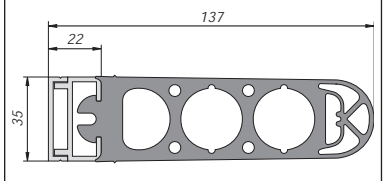
Overtravel distance:
at 10 mm/s 12 mm

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

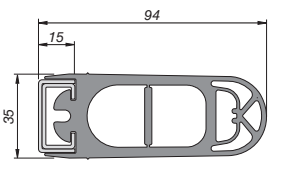


GP 120 **EPDM**

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

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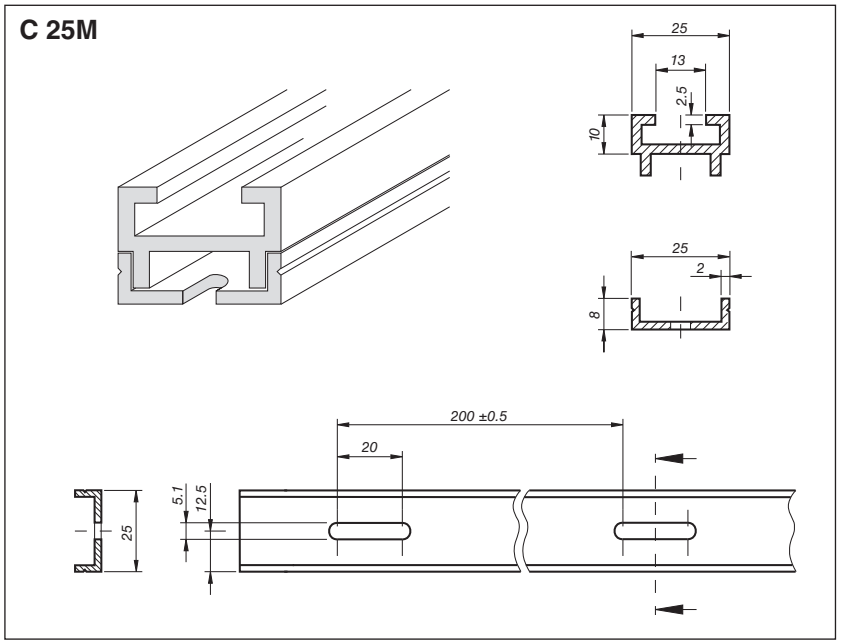
Aluminium profile range C 15, C 25 and C 35

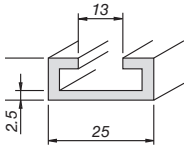
Dimensional tolerances: ISO 2768-v

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

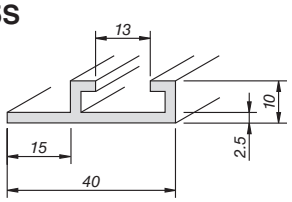
C 25M



C 25

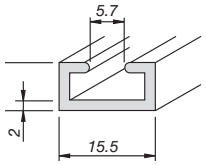


C 25S



Al-profile C 15 for GP 15

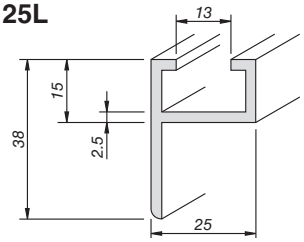
C 15



Note C 25M / C 35M:

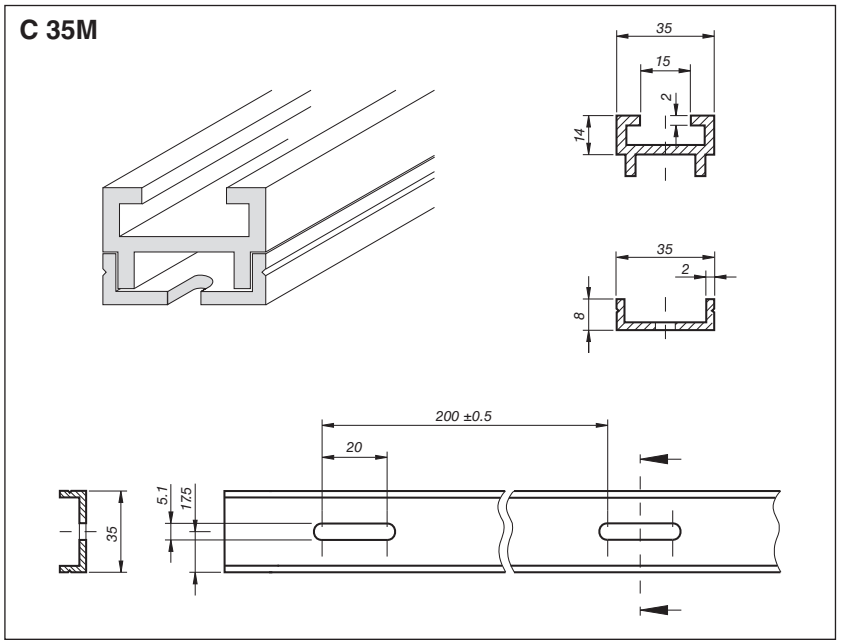
Fix upper part to the lower part using self-tapping SK M3×8 DIN 7500 countersunk screws in pre-drilled positions

C 25L

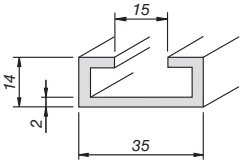


Aluminium profile range C 35 for GP 50(L), GP 60 and GP 120

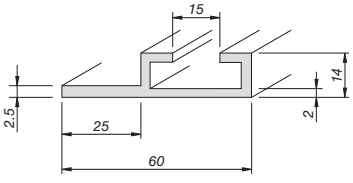
C 35M



C 35



C 35S



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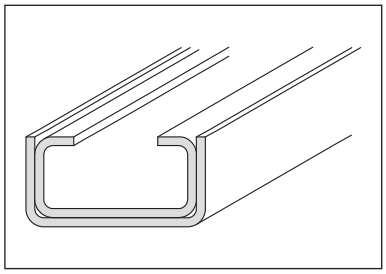
Steel-Profile C 27 / U 27

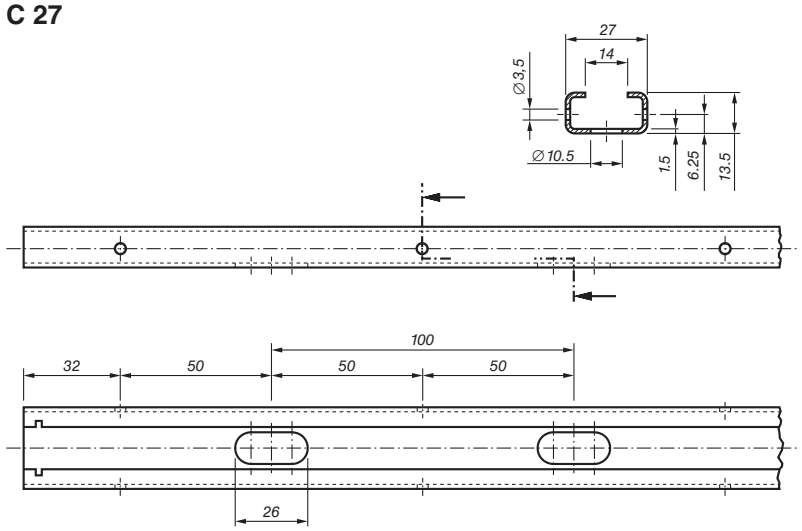
Dimensional tolerances: ISO 2768-v

Profile for GP 302

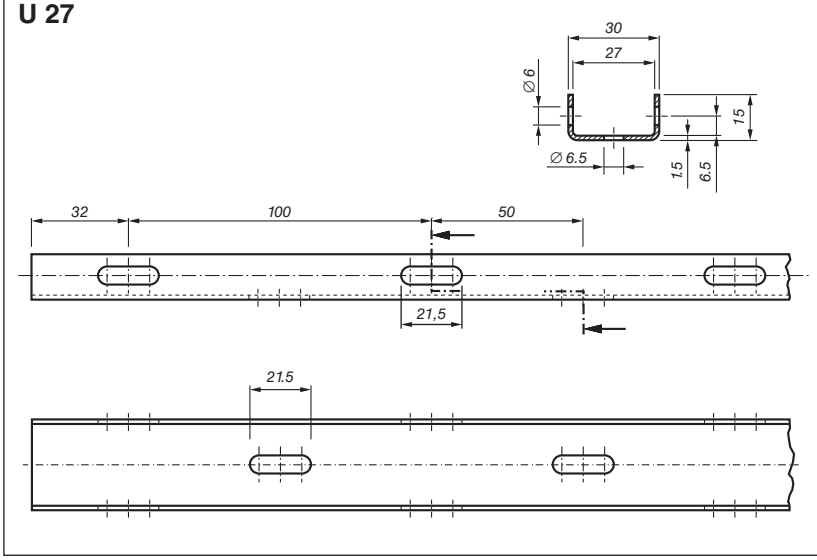


Fix the C-Profile
to the U-Profile using self-tapping SK M4×10 DIN 7500 countersunk screws in pre-drilled positions

C 27



U 27



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Subject to technical modifications.

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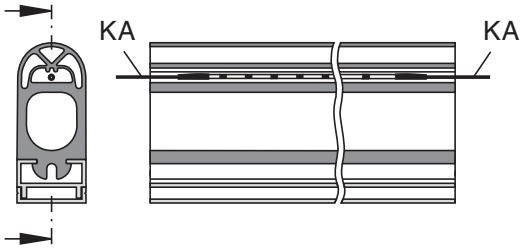
Cable exits KA

some with cable sleeves KT

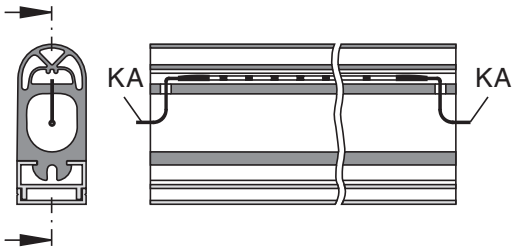
Note: non-sensitive end = c. 35mm (standard)

Safety Edge Type BK
cable on both ends

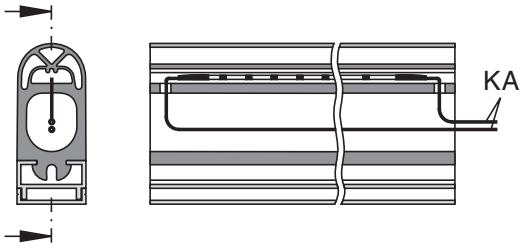
Version 1 GP 15, 22, 39(L), 50(L), 60, 120, 302



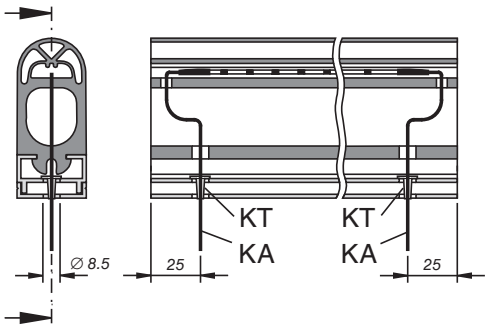
Version 3 GP 39(L), 50(L), 60, 120, 302



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



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

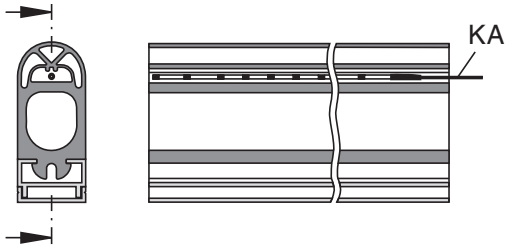


ATTENTION
Max. cable length to signal processing unit: 200 m

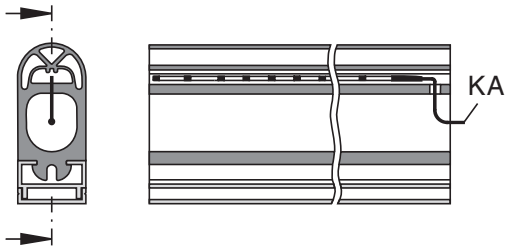
Subject to technical modifications.

Safety Edge Type W
with integrated resistor

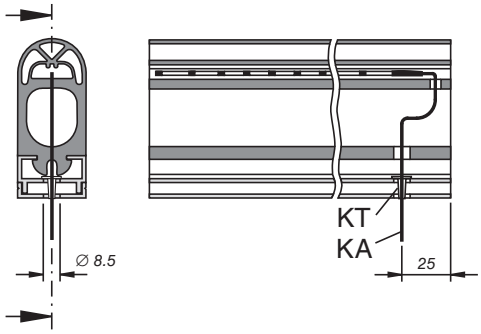
Version 9 GP 15, 22, 39(L), 50(L), 60, 120, 302



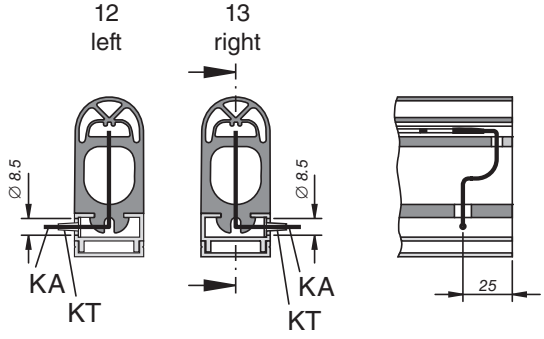
Version 10 GP 39(L), 50(L), 60, 120, 302



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



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



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

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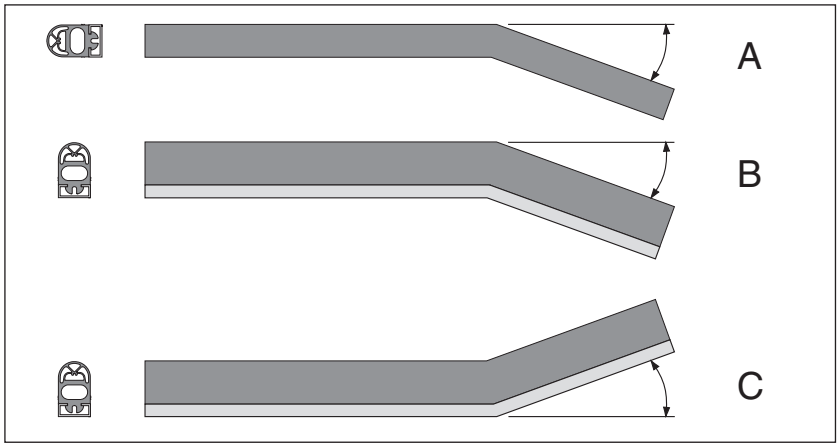
Lateral bends and radii

Lateral bends

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



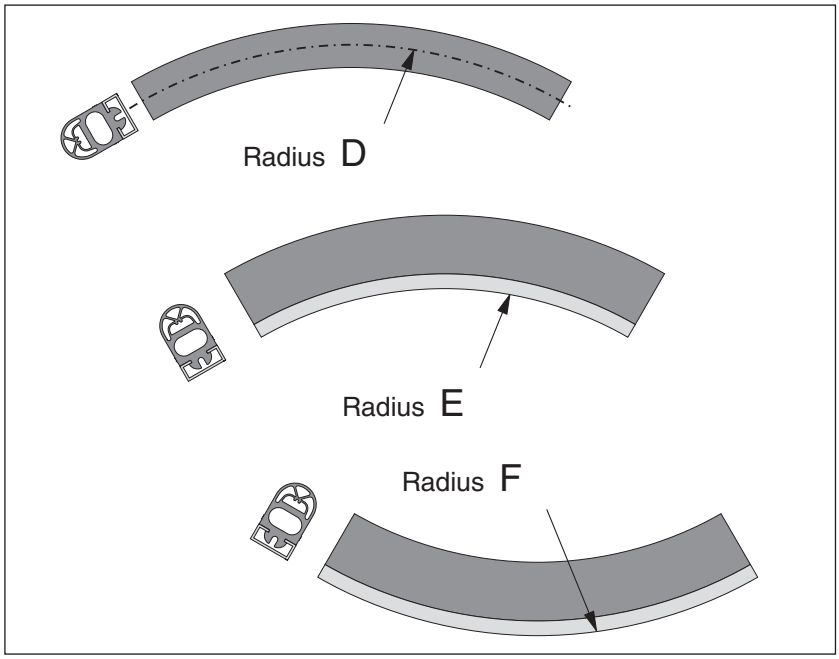
Maximum lateral bend

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 Al-profiles. The Al-profile must be prepared at our plant for this.



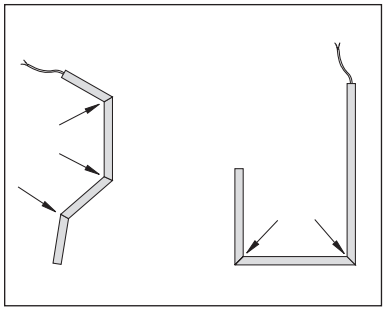
Minimum radius in mm

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.

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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 + Al-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 + Al-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 withcontrol unit (230V):
SL/BK 1,650 mm GP 39 NBR + Al-Profile C 25M
Cable 2 m, Version 3 (see 3.8)
Control Unit SG-SUE 4134 NA

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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)	• 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					

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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)	• 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 Steel-profile	ISO 3302 E2/L2 ISO 2768-v	

270710 v1.0

Request for quotation

From:

Fax:

+49 731 2061-222

Company

Department

Name, first name

P. O. Box | Post code | City

Street | Post code | City

Phone | Fax | E-mail

Area of application

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

⇩ Please keep free ⇩
For internal use only

Environmental conditions

- ❑ dry
- ❑ water
- ❑ oil
- ❑ aggressive substances::
- ❍ 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)

270710 v1.0

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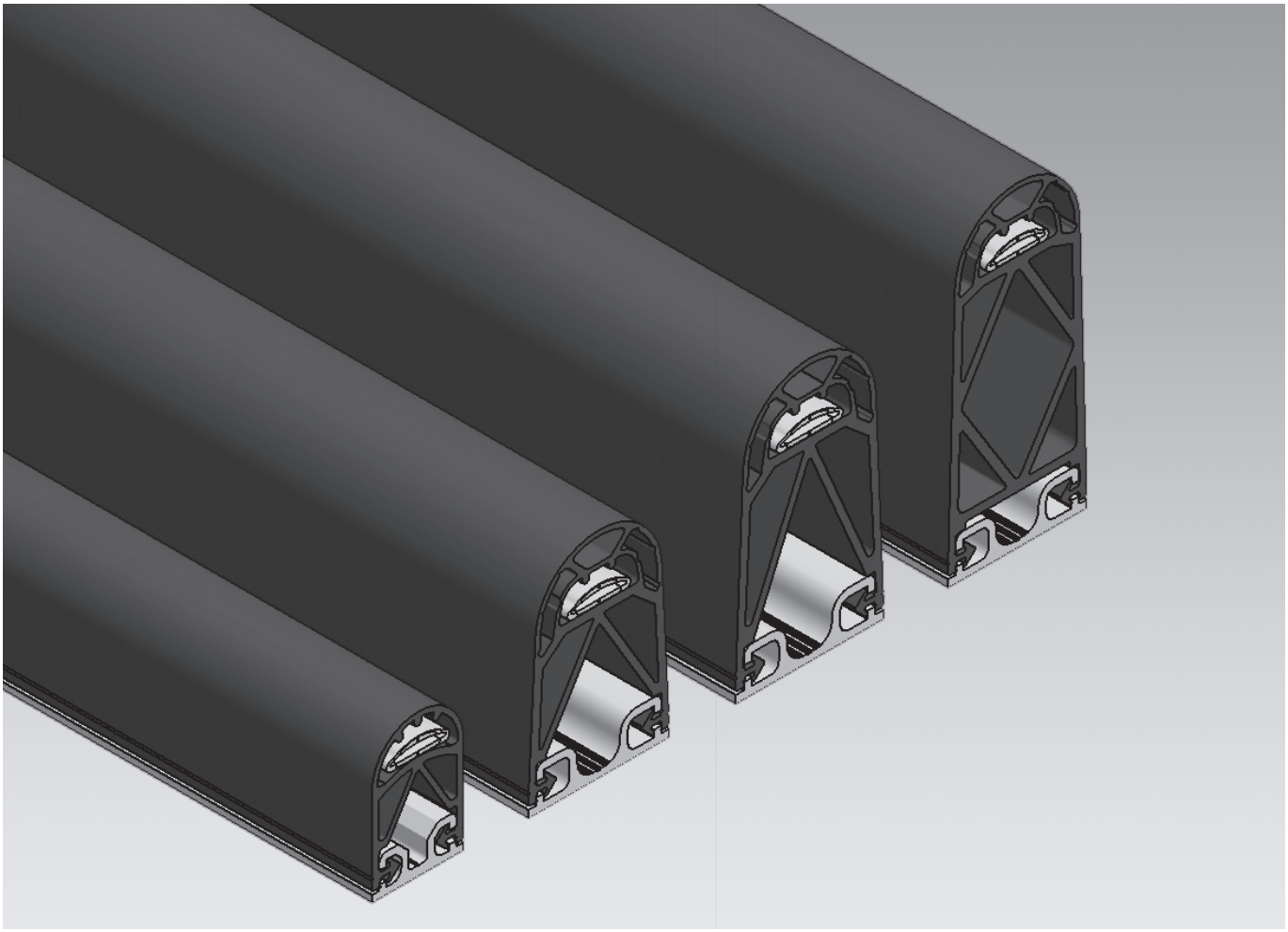
Innovative by tradition.



Normally open safety edges SL NO

EN | Product information

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Contents

Important information

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

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

291117 v2.02

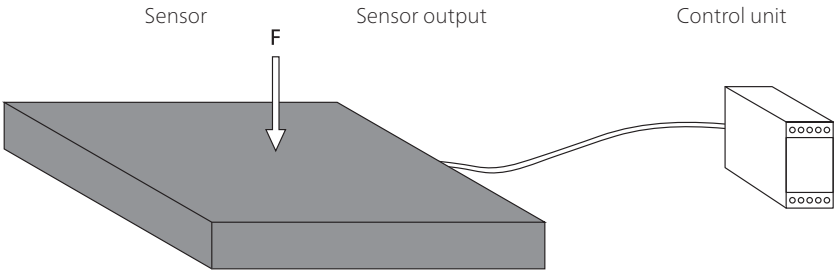
291117 v2.02

Definitions

Pressure-sensitive protection device

A pressure-sensitive protection device consists of pressure-sensitive sensor(s), signal processing and output signal switching device(s). The control unit is made up of the signal processing and output signal switching device(s). The pressure-sensitive protection device is triggered when the sensor is activated.

Note:
See also chapter 3 **Terms** in ISO 13856-2.

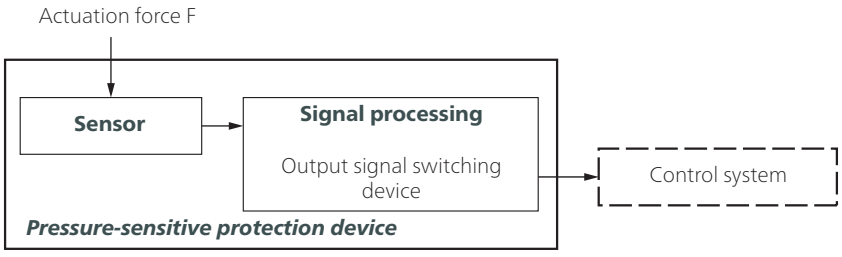


Sensor

The sensor is the part of the pressure-sensitive protection device that generates a signal when the actuating force F is applied. Mayser safety systems have a sensor whereby the actuating surface is deformed locally.

Signal processing

The signal processing is the part of the pressure-sensitive protection device that converts the output signal of the sensor and controls the status of the output signal switching device. The output signal switching device is that part of the signal processing which is connected to the machine controls and transmits safety output signals such as STOP.



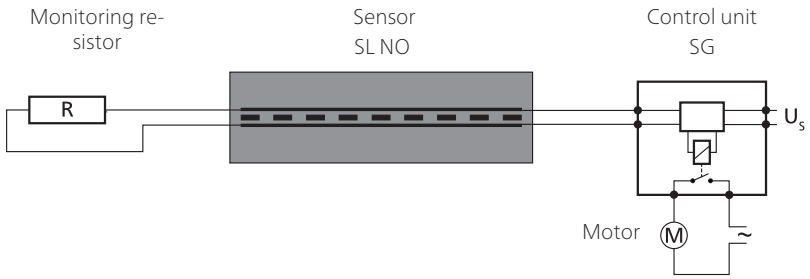
291117 v2.02

Subject to technical modifications.

Criteria for selecting the sensor type

- B_{10D}-value according to ISO 13849-1
- Performance level of pressure-sensitive protection device = at least PL_r
- Temperature range
- Degree of protection in accordance with IEC 60529:
  IP65 is the standard for safety edges.
  Higher degrees of protection must be checked individually.
- Environmental influences such as swarf, oil, coolant, outdoor use...
- Finger detection necessary?

Operation principle 2-wire-technology



The monitoring resistor must be compatible with the control unit.
Standard value is 1k2. 8k2 and 22k1 are also available.

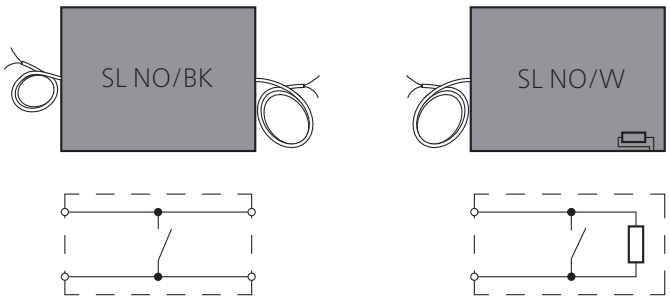
For your safety:
Sensor and connecting cables are constantly monitored for function.
Monitoring is carried out by controlled bridging of the contact surfaces with a monitoring resistor (closed current principle).

291117 v2.02

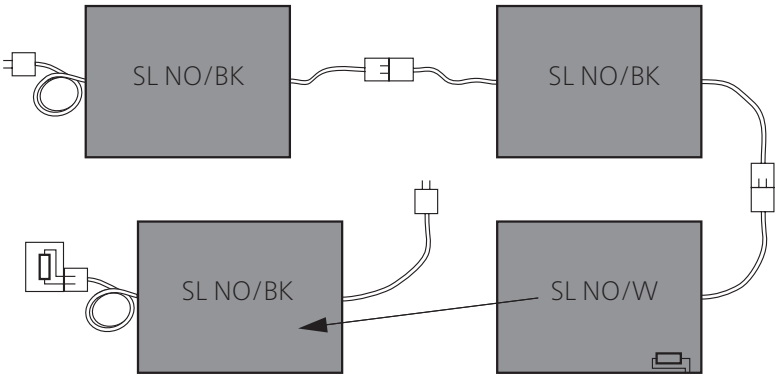
Design

SL NO/BK with cables on both sides as a through sensor or as an end sensor with external monitoring resistor

SL NO/W as an end sensor with integrated monitoring resistor



Combination of sensors



Model with external resistor, thus avoiding variety in type

Combination:

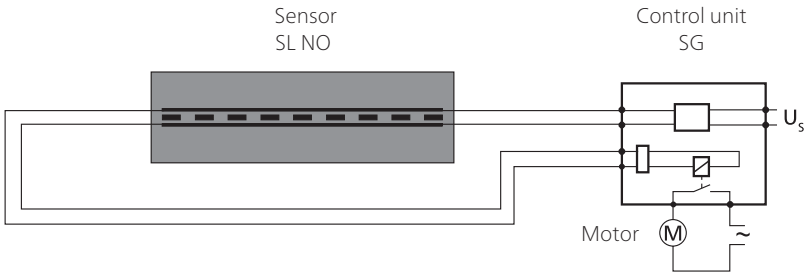
- Connection of more than one sensor
- Only one control unit required
- Safety edge design with custom lengths and angles

291117 v2.02

Subject to technical modifications.

Operation principle 4-wire-technology

Unlike 2-wire technology, 4-wire-technology works **without** a monitoring resistor.

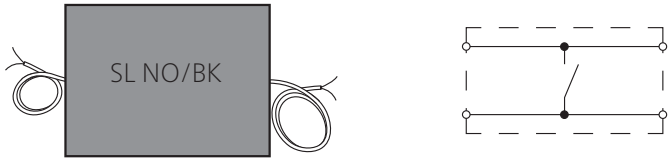


Note:
The 4-wire technology can be used only together with control unit SG-EFS 104/4L.

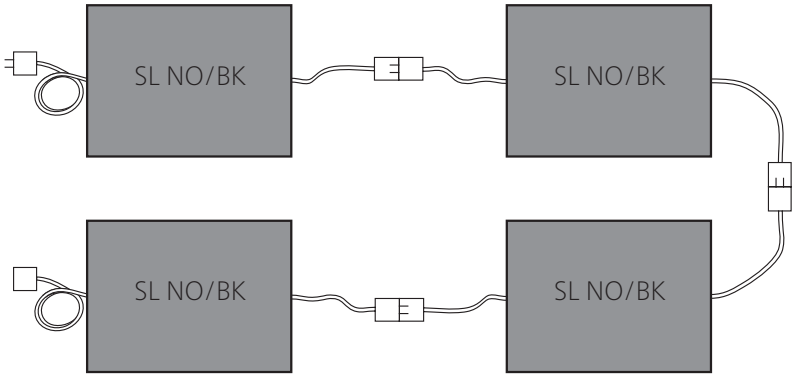
For your safety:
Sensor and connecting cables are constantly monitored for function.
This is possible because of signal transmission feedback – without monitoring resistor.

Design

SL NO/BK with cables on both sides as a through sensor



Combination of sensors



Combination:
- Connection of more than one sensor
- Only one control unit required
- Safety edge design with custom lengths and angles

291117 v2.02

Subject to technical modifications.

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.

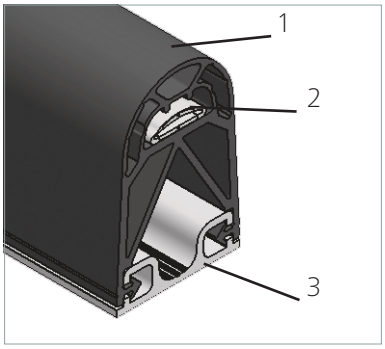
Tip
See ISO 13856-2 Appendix E.

Limits

- Max. 10 sensors type BK on one control unit
- Max. 9 sensors type BK and 1 sensor type W on one control unit
- GP 38(L)-2, GP 58(L)-2 and GP 68-2 deviate with respect to the actuation angle from the requirements in ISO 13856-2 and EN 12978; the suitability for doors and gates must be examined on an individual basis.

Design

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



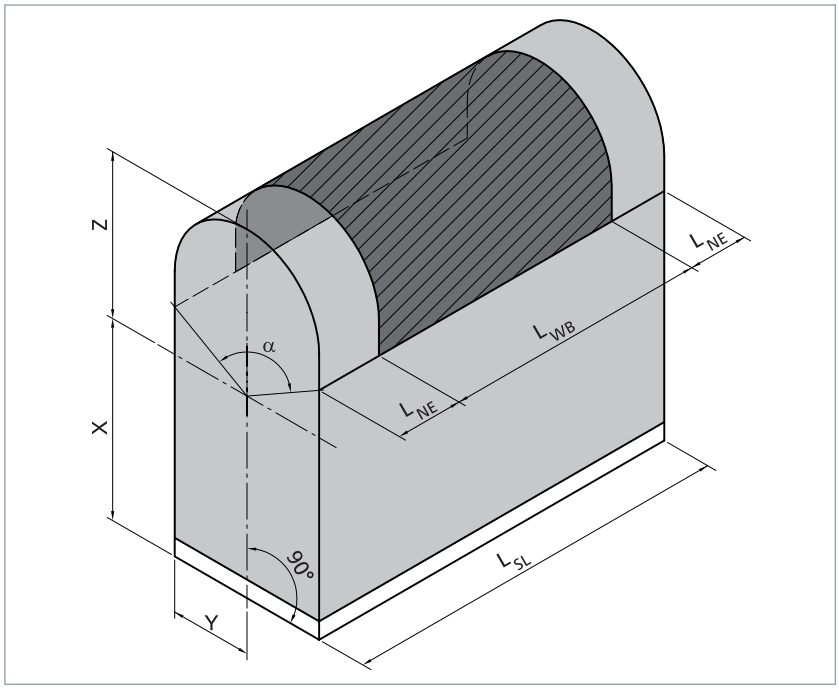
The normally open safety edge SL NO consists of one sensor (1 to 3)
(1) Rubber profile GP,
(2) Normally open safety element SE 1 TPE,
(3) Aluminium profile C 26 or C 36 and an evaluating control unit SG.

291117 v2.02

Effective actuation area

The parameters X, Y, Z, L_{NE} and the 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

	GP 38(L)-2	GP 58(L)-2	GP 68-2	GP 88-2
α	60°	60°	60°	90°
L_{NE}	30 mm	30 mm	40 mm	30 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

ATTENTION
The effective actuation angle α of GP 38(L)-2, GP 58(L)-2 and GP 68-2 is 60°, which is smaller than the requirement of ISO 13856-2 and EN 12978.

Available lengths

Subject to technical modifications.

291117 v2.02

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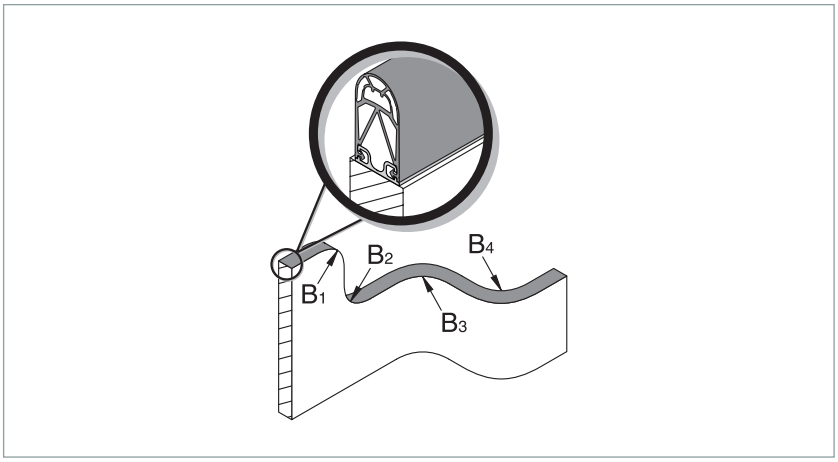
Bend angles and bend radii

Bend angles
Bend angles are not possible on the safety edge.

Bend radii
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.

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



Bend radii min.	GP 38-2	GP 58-2	GP 68-2	GP 88-2
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 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 D as per ISO 13856-2 are possible.

ATTENTION
No pressure may be exerted on the safety edge in non-operative mode.

291117 v2.02

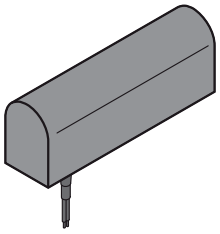
Subject to technical modifications.

Connection

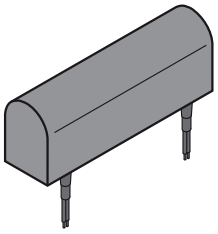
Cable exits

90° exit

Distance from front face 25 mm each; versions with cable bushing



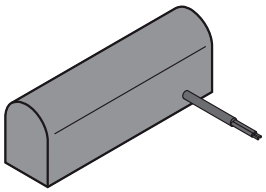
Version 11: SL NO/W



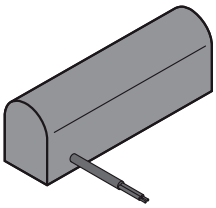
Version 5: SL NO/BK

Lateral exit

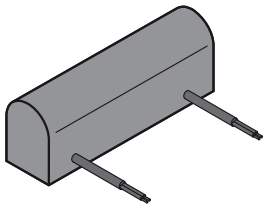
Distance to front face 25 mm each; versions without cable bushing



Version 15: SL NO/W



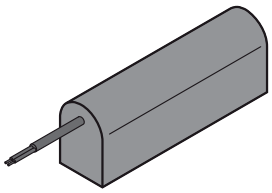
Version 16: SL NO/W



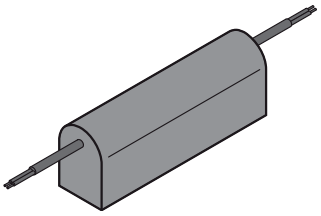
Version 17: SL NO/BK

Axial exit

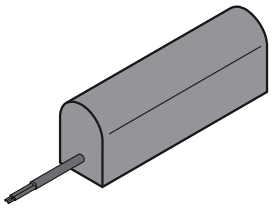
Versions without cable bushing



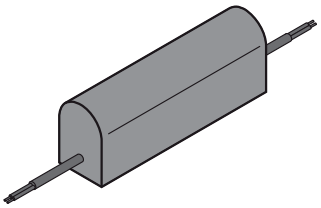
Version 9: SL NO/W



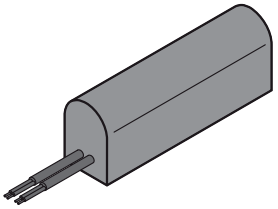
Version 1: SL NO/BK



Version 10: SL NO/W



Version 3: SL NO/BK



Version 4: SL NO/BK

Note

The standard is SL NO/W1k2. Optionally, SL NO/W8k2 or SL NO/W22k1 are also available.

Tip

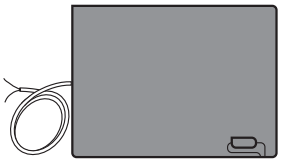
With more than one sensor connected one behind the other, we recommend version 1, 3, 5 or 17.

ATTENTION

The cables must be laid free of tension.

Subject to technical modifications.

291117 v2.02



Cable connection

Sensor type W

- As an individual sensor type W or an end sensor type W
- Integrated resistor
- 2-wire cable (Ø 3.7 mm TPE, 2× 0.22 mm²)
- Cable ends: Wires stripped
  Option: Cable ends available with plug and coupling

Sensor type BK with 2 lines

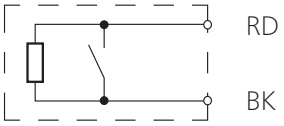
- As a feed-through sensor type BK
- Without resistor
- 2 two-wire cable (Ø 3.7 mm TPE, 2× 0.22 mm²)
- Cable ends: Wires stripped
  Option: Cable ends available with plug and coupling

Wire colours

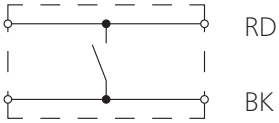
Colour coding

RD Red BK Black

Sensor type W



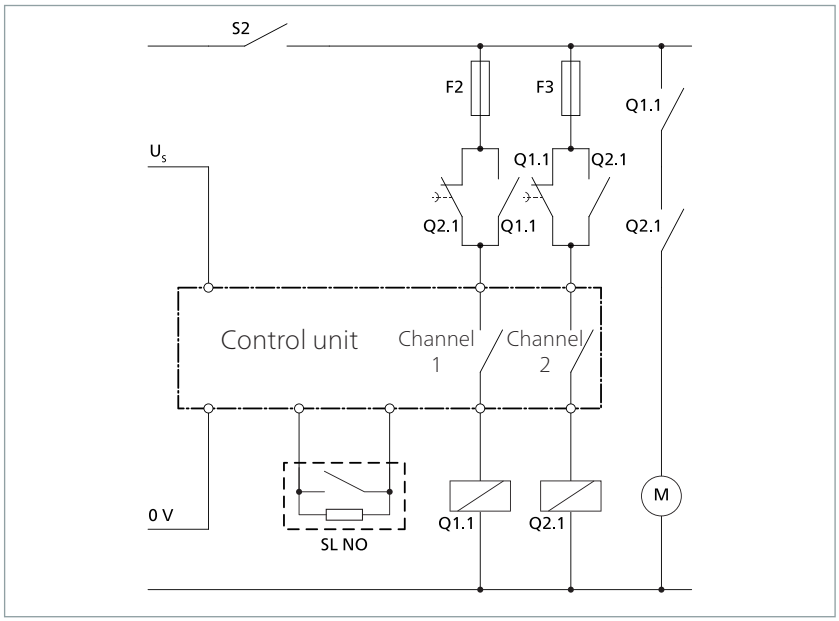
Sensor type BK with 2 lines



Connection examples

Connection example 1

Normally open safety edge to single-fault-safe control unit with dual channel extension.



Subject to technical modifications.

291117 v2.02

Physical resistance

Rubber profile GP	EPDM
Degree of protection (IEC 60529)	IP67
Hardness as per Shore A	
GP 58(L)-2, GP 68-2, GP 88-2	63 ±5
GP 38(L)-2	57 ±5

Chemical resistance

The sensor 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. The suitability of our products for your special area of application must always be verified with your own practical tests.

Rubber profile GP	PDM
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

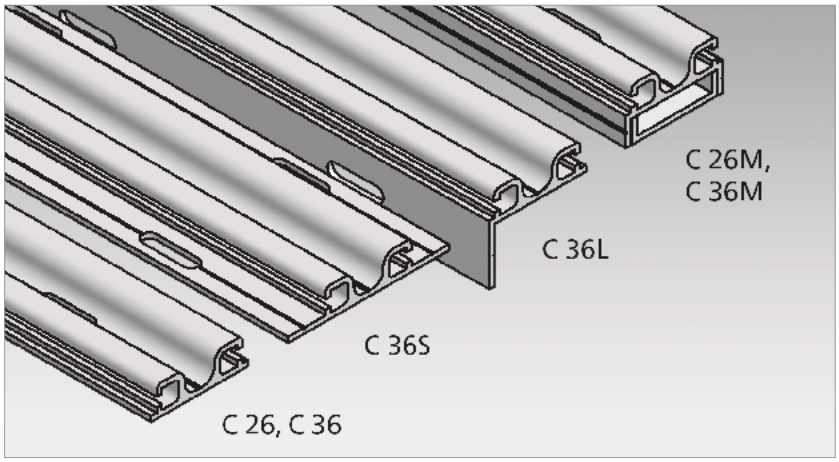
Note:
Tests are carried out at room temperature (+23 °C).

291117 v2.02

Subject to technical modifications.

Attachment

The sensors 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

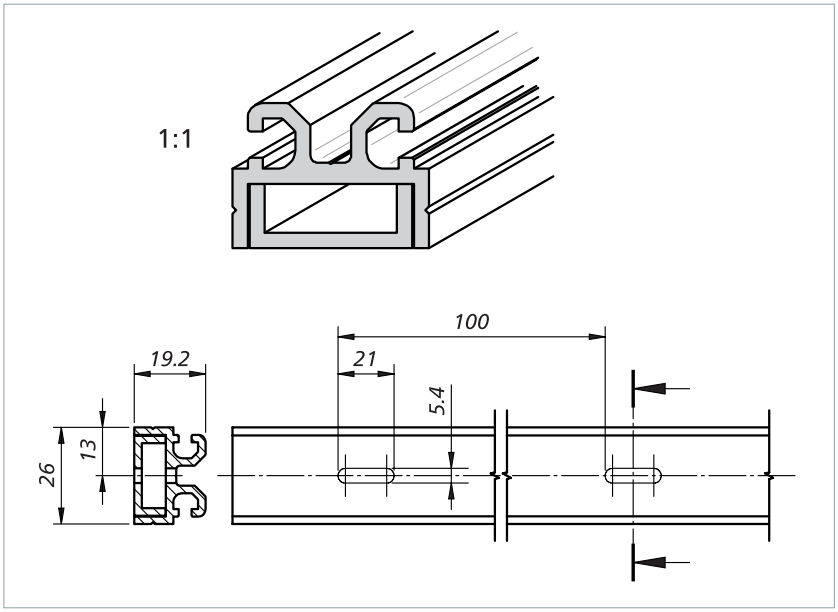
Aluminium profiles: Overview of combinations

Aluminium profiles for		GP 38(L)-2	GP 58(L)-2	GP 68-2	GP 88-2
Clip bars (outside)	...-2	C 26 C 26M	C 36 C 36M, C 36L, C 36S	C 36 C 36M, C 36L, C 36S	C 36 C 36M, C 36L, C 36S

291117 v2.02

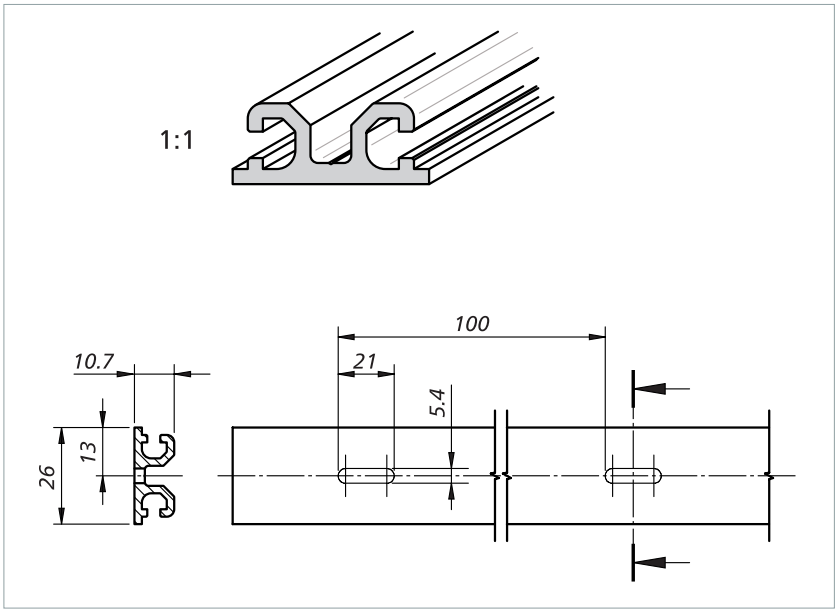
Subject to technical modifications.

Aluminium profile C 26M



Two-part profile for GP 38(L)-2:
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.

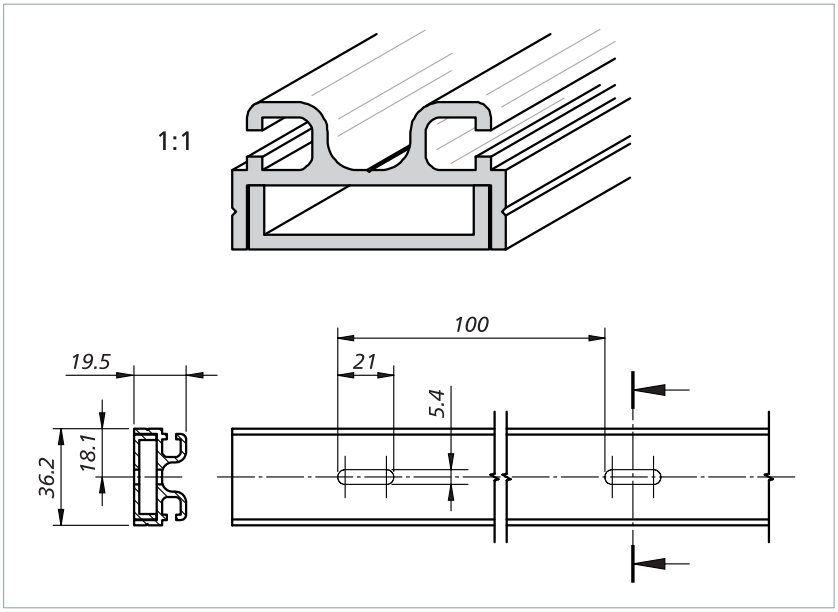
Aluminium profile C 26



Standard profile for GP 38(L)-2:
First the aluminium profile must be mounted to the closing edge and then the rubber profile clipped into the aluminium profile.

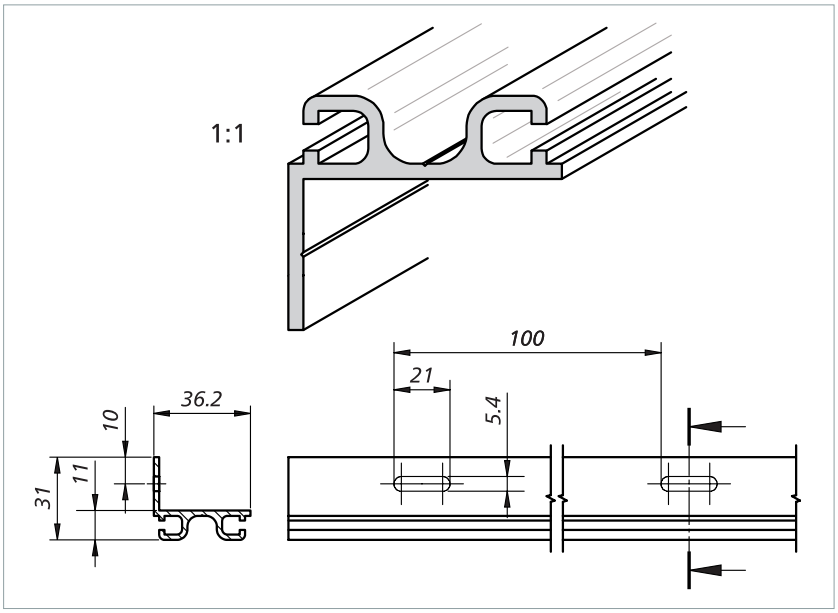
Subject to technical modifications.

Aluminium profile C 36M



Two-part profile for GP 58(L)-2, GP 68-2 and GP 88-2:
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

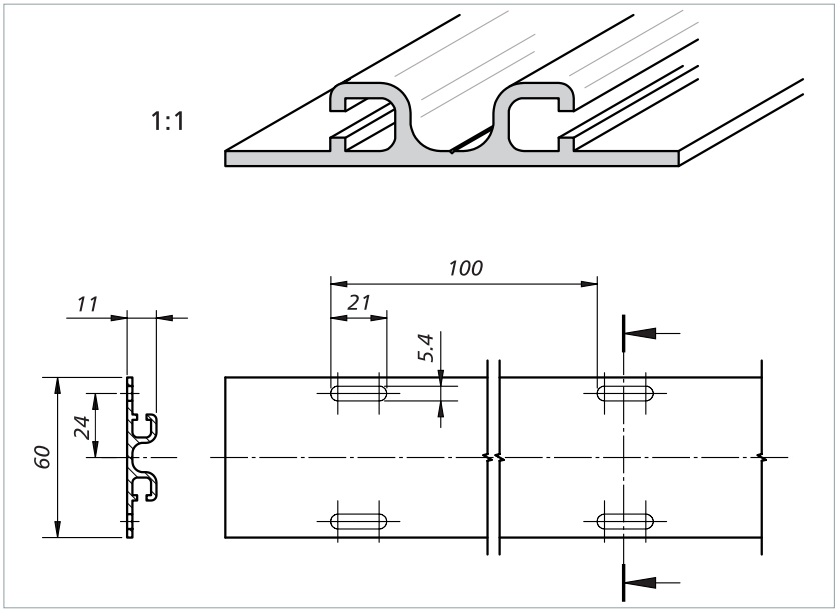


Angle profile for GP 58(L)-2, GP 68-2 and GP 88-2:
If the closing edge should or must not have assembly holes, this "round-the-corner" solution is suitable. Final assembly is also possible when the rubber profile is already clipped into the aluminium profile.

Subject to technical modifications.

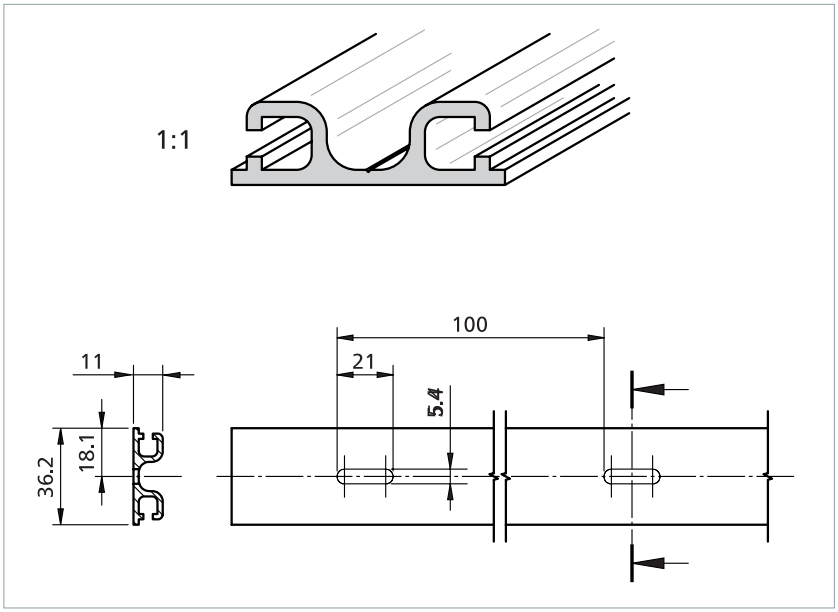
291117 v2.02

Aluminium profile C 36S



Flange profile for GP 58(L)-2, GP 68-2 and GP 88-2:
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)-2, GP 68-2 and GP 88-2:
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.

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 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

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 ISO 13856-2 , 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 safety edge profile: see chapter "Dimensions and distances".

Calculation examples

Example 1

The dangerous movement on your machine has a velocity of v = 10 mm/s and can be brought to a standstill within t_2 = 200 ms. The relatively low velocity suggests that a short overtravel distance is to be expected. Therefore the safety edge SL NO GP 38-2 EPDM could be sufficient. The response time of the safety edge is t_1 = 920 ms.

$s_1 = 1/2 \times v \times T$ where: $T = t_1 + t_2$
$s_1 = 1/2 \times 10$ mm/s $\times$ (0.92 s + 0.2 s)
$\mathbf{s_1} = 1/2 \times 10$ mm/s $\times$ 1.12 s **= 5.6 mm**

$s = s_1 \times C$ where: $C = 1.2$
s = 5.6 mm $\times$ 1.2 **= 6.72 mm**

The safety edge must have a minimum overtravel distance of s = 6.7 mm. The selected SL NO GP 38-2 EPDM has an overtravel distance of at least 10.8 mm. This is more than the required 6.7 mm.
Result: The SL NO GP 38-2 EPDM is **suitable** for this case.

Note:
t_1 = sensor response time + control unit response time (typically 10 ms).

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Subject to technical modifications.

Example 2

The same conditions as in calculation example 1 with the exception of the velocity of the dangerous movement. This is now v = 200 mm/s. The response time of the safety edge is t_1 = 54 ms.

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

$s_1 = 1/2 \times 200$ mm/s $\times$ (0.054 s + 0.2 s)

s_1 = 1/2 × 200 mm/s × 0.254 s = 25.4 mm

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

s = 25.4 mm × 1.2 **= 30.48 mm**

The safety edge must have a minimum overtravel distance of s = 30.5 mm. The selected SL NO GP 38-2 EPDM has an overtravel distance of at least 10.1 mm. This is less than the required 30.5 mm.
Result: The SL NO GP 38-2 EPDM is **not suitable** for this case.

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

Example 3

The same conditions as in calculation example 2. Instead of SL NO GP 38-2 EPDM the SL NO GP 68-2 EPDM is selected. The response time of the safety edge is t_1 = 56 ms.

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

$s_1 = 1/2 \times 200$ mm/s $\times$ (0.056 s + 0.2 s)

s_1 = 1/2 × 200 mm/s × 0.256 s = 25.6 mm

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

s = 25.6 mm × 1.2 **= 30.72 mm**

The safety edge must have a minimum overtravel distance of s = 30.7 mm haben. The selected SL NO GP 68-2 EPDM has an overtravel distance of at least 32.2 mm. This is more than the required 30.7 mm.
Result: The SL NO GP 68-2 EPDM is **suitable** for this case.

Customised designs

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

- Safety edges with sensitive ends
- Durability at high temperatures:
  short-term (< 5 min) up to +100 °C
  long-term (> 5 min) up to +80 °C
  in the case of degree of protection: IP50
- Durability at low temperatures:
  long term up to -40 °C

Subject to technical modifications.

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Conformity

CE

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 the product complies with the basic requirements of the following directives:

- 2006/42/EG (Safety of Machinery)
- 2004/108/EG(EMC)

Safety aspects

Without reset function
When a safeguard without reset function is used (automatic reset), the reset function must be made available in some other way.

Performance Level (PL)
The PL was determined during a simplified procedure according to ISO 13849-1.
Fault exclusion according to ISO 13849-2 Table D.8: Non-closing of contact by pressure-sensitive equipment according to ISO 13856. In this case the sensor will no longer be taken into account in determining the PL. The entire pressure sensitive safety edge (Pressure-sensitive protection device) system can reach a maximum of PL d.

Is the safeguard appropriate?
The PL required for the hazard must be decided by the integrator. This is followed by the choice of safeguard.
Finally, the integrator needs to check whether the category and PL of the safeguard chosen are appropriate.

Maintenance and servicing

The sensor is maintenance-free.
The control unit also monitors the sensor.

Regular inspection
Depending on the utilisation, sensors need to be inspected at regular intervals (at least monthly)

- for functionality: by activating or applying the respective test sample.
- for damage: by a visual check.
- for fit between rubber and aluminium profile: by a visual check.

Cleaning
If necessary, clean the sensor with a mild cleaning agent.

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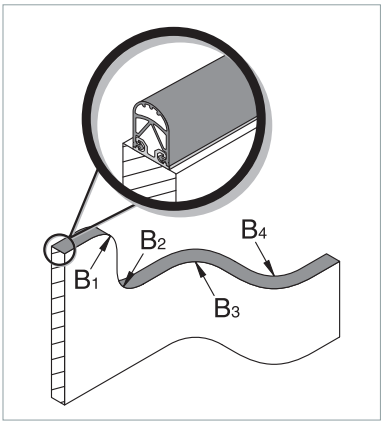
Technical data

GP 38-2 EPDM

Normally open safety edge SL NO consisting of sensor, aluminium profile C 26 and control unit SG-EFS 1X4 ZK2/1.

Testing basis	
ISO 13856-2	
Switching characteristics at v_{test} = 200 mm/s	
Switching operations	10,000
Actuation force	
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	11 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	60°
Response time	54 ms
Finger detection	yes
Safety classifications	
ISO 13856: reset function	with/witout
ISO 13849-1:2015	Category 3 PL d
$MTTF_D$ (pressure-sensitive protection device)	222 a
$MTTF_D$ (sensor)	761 a
B_{10D} (sensor)	4×10^6
n_{op} (acceptance)	52560/a
Mechanical operating conditions	
Sensor length (min./max.)	20 cm / 14 m
Cable length (min./max.)	2 m / 100 m
Bend radii, minimum	
B1 / B2 / B3 / B4	750 / 750 / 750 / 750 mm
Operating speed (min. / max.)	10 mm/s / 200 mm/s
max. load capacity	600 N
IEC 60529: degree of protection	IP67
Humidity (max. at 23 °C)	95 % (non-condensing)
Operating temperature	-10 to +55 °C
Storage temperature	-30 to +70 °C
Weight	0.8 kg/m
Electrical operating conditions	
Number of sensors type BK	max. 10 in series
Switching voltage (max.)	DC 24 V
Switching current (max.)	10 mA
Connection cable	Ø 3.7 mm TPE 2×0.22 mm²
Dimensional tolerances	
Length as per	ISO 3302 L2
Profile section as per	ISO 3302 E2
Aluminium profile	EN 755-9

Bend radii:



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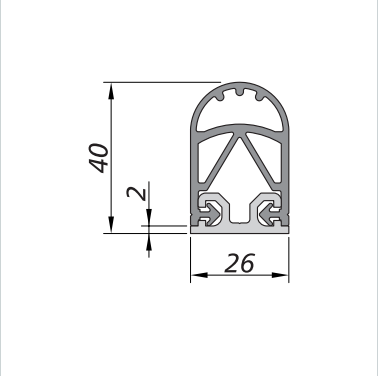
Dimensions and distances

GP 38-2 EPDM (1:2)



Test conditions
according to ISO 13856-2

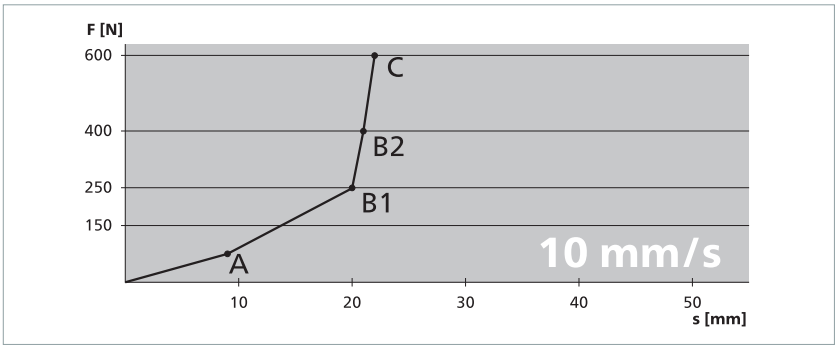
- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- without control unit

All data stated here is documented in EC design type test certificates.

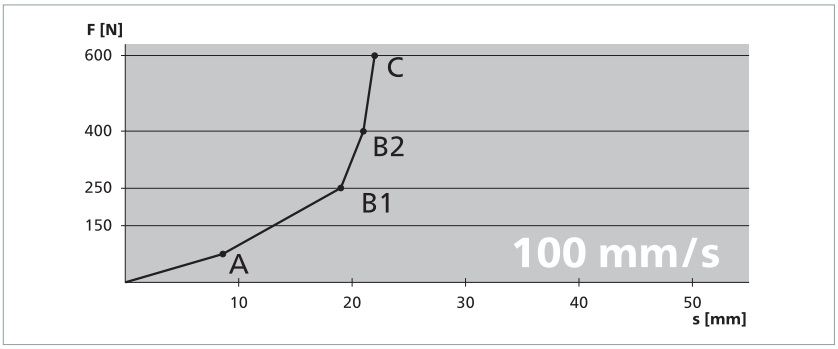
Note:
Dimensional tolerances according to ISO 3302 E2/L2.

Force-distance ratios

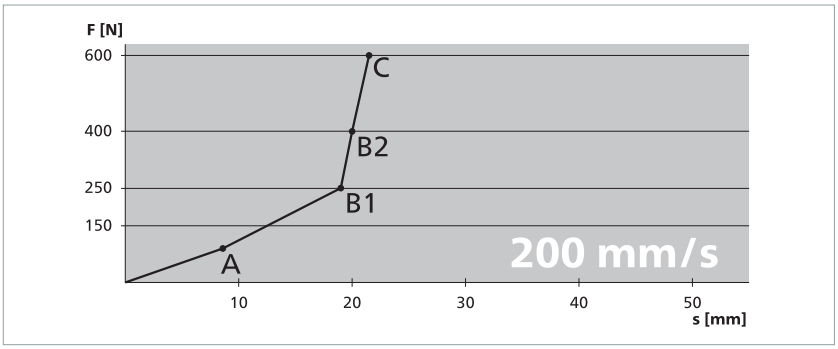
Actuation force	72 N
Response time	910 ms
Actuation distance (A)	9.1 mm
Overtravel distance	
up to 250 N (B1)	10.8 mm
up to 400 N (B2)	11.8 mm
up to 600 N (C)	12.9 mm
Total deformation	22 mm



Actuation force	83 N
Response time	86 ms
Actuation distance (A)	8.6 mm
Overtravel distance	
up to 250 N (B1)	10.5 mm
up to 400 N (B2)	12.1 mm
up to 600 N (C)	13.6 mm
Total deformation	22.2 mm



Actuation force	93
Response time	44 ms
Actuation distance (A)	8.8 mm
Overtravel distance	
up to 250 N (B1)	10.1 mm
up to 400 N (B2)	11.5 mm
up to 600 N (C)	12.7 mm
Total deformation	21.5 mm



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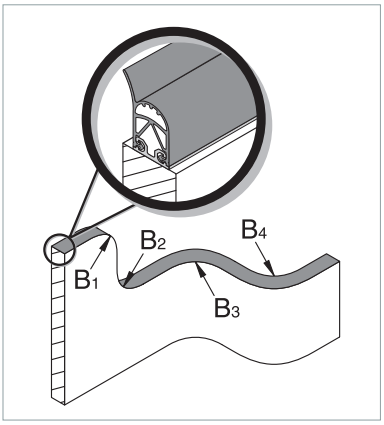
Technical data

GP 38L-2 EPDM

Normally open safety edge SL NO consisting of sensor, aluminium profile C 26and control unit SG-EFS 1X4 ZK2/1.

Testing basis	
ISO 13856-2	
Switching characteristics at v_{test} = 200 mm/s	
Switching operations	10,000
Actuation force	
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	17 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	60°
Response time	84 ms
Finger detection	yes
Safety classifications	
ISO 13856: reset function	with/witout
ISO 13849-1:2015	Category 3 PL d
$MTTF_D$ (pressure-sensitive protection device)	222 a
$MTTF_D$ (sensor)	761 a
B_{10D} (sensor)	4×10^6
n_{op} (acceptance)	52560/a
Mechanical operating conditions	
Sensor length (min./max.)	20 cm / 14 m
Cable length (min./max.)	2 m / 100 m
Bend radii, minimum	
B1 / B2 / B3 / B4	750 / 750 / 750 / 750 mm
Operating speed	
(min. / max.)	10 mm/s / 200 mm/s
max. load capacity	600 N
IEC 60529: degree of protection	IP67
Humidity (max. at 23 °C)	95 % (non-condensing)
Operating temperature	+5 to +55 °C
Storage temperature	-30 to +70 °C
Weight	0.9 kg/m
Electrical operating conditions	
Number of sensors type BK	max. 10 in series
Switching voltage (max.)	DC 24 V
Switching current (max.)	10 mA
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm^2
Dimensional tolerances	
Length as per	ISO 3302 L2
Profile section as per	ISO 3302 E2
Aluminium profile	EN 755-9

Bend radii:



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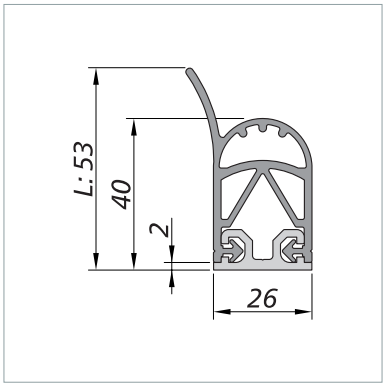
Dimensions and distances

GP 38L-2 EPDM (1:2)



Test conditions
according to ISO 13856-2

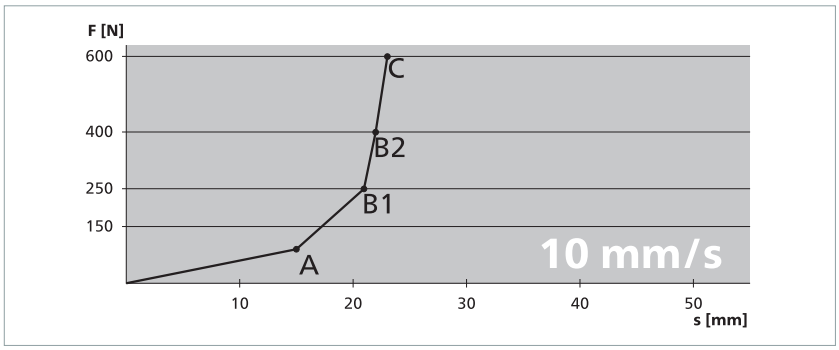
- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- without control unit

All data stated here is documented in EC design type test certificates.

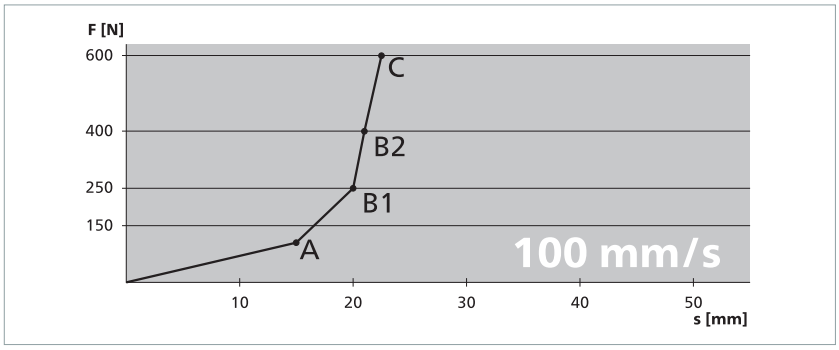
Note:
Dimensional tolerances according to ISO 3302 E2/L2.

Force-distance ratios

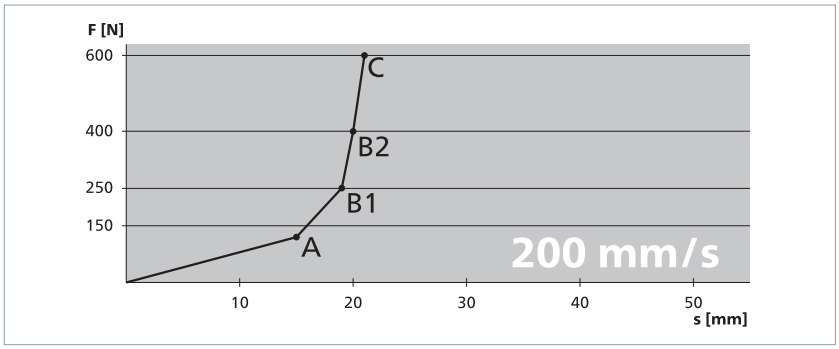
Actuation force	85 N
Response time	1470 ms
Actuation distance (A)	14.7 mm
Overtravel distance	
up to 250 N (B1)	6.1 mm
up to 400 N (B2)	7.4 mm
up to 600 N (C)	8.6 mm
Total deformation	23.3 mm



Actuation force	108 N
Response time	153 ms
Actuation distance (A)	15.3 mm
Overtravel distance	
up to 250 N (B1)	4.8 mm
up to 400 N (B2)	5.9 mm
up to 600 N (C)	7.2 mm
Total deformation	22.5 mm



Actuation force	120 N
Response time	73.5 ms
Actuation distance (A)	14.7 mm
Overtravel distance	
up to 250 N (B1)	4.2 mm
up to 400 N (B2)	5.1 mm
up to 600 N (C)	6.1 mm
Total deformation	20.8 mm



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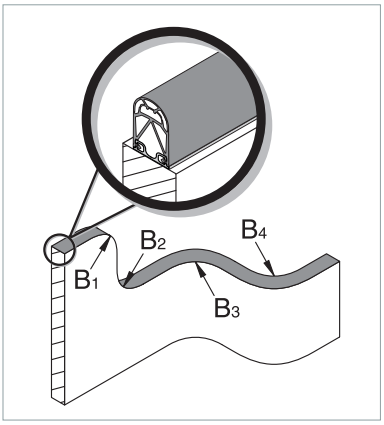
Technical data

GP 58-2 EPDM

Normally open safety edge SL NO consisting of sensor, aluminium profile C 36 and control unit SG-EFS 1X4 ZK2/1.

Testing basis	
ISO 13856-2	
Switching characteristics at v_{test} = 200 mm/s	
Switching operations	10,000
Actuation force	
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	12 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	60°
Response time	70 ms
Finger detection	yes
Safety classifications	
ISO 13856: reset function	with/witout
ISO 13849-1:2015	Category 3 PL d
$MTTF_D$ (pressure-sensitive protection device)	222 a
$MTTF_D$ (sensor)	761 a
B_{10D} (sensor)	4× 10^6
n_{op} (acceptance)	52560/a
Mechanical operating conditions	
Sensor length (min./max.)	20 cm / 14 m
Cable length (min./max.)	2 m / 100 m
Bend radii, minimum	
B1 / B2 / B3 / B4	750 / 750 / 750 / 750 mm
Operating speed (min. / max.)	10 mm/s / 200 mm/s
max. load capacity	600 N
IEC 60529: degree of protection	IP67
Humidity (max. at 23 °C)	95 % (non-condensing)
Operating temperature	0 to +55 °C
Storage temperature	-30 to +70 °C
Weight	1.3 kg/m
Electrical operating conditions	
Number of sensors type BK	max. 10 in series
Switching voltage (max.)	DC 24 V
Switching current (max.)	10 mA
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm^2
Dimensional tolerances	
Length as per	ISO 3302 L2
Profile section as per	ISO 3302 E2
Aluminium profile	EN 755-9

Bend radii:



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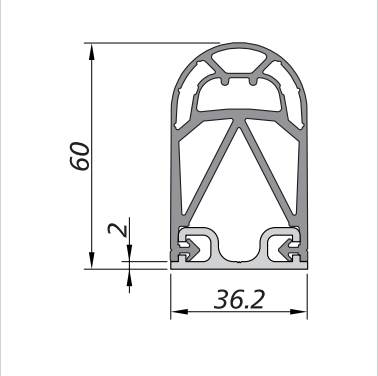
Dimensions and distances

GP 58-2 EPDM (1:2)



Test conditions
according to ISO 13856-2

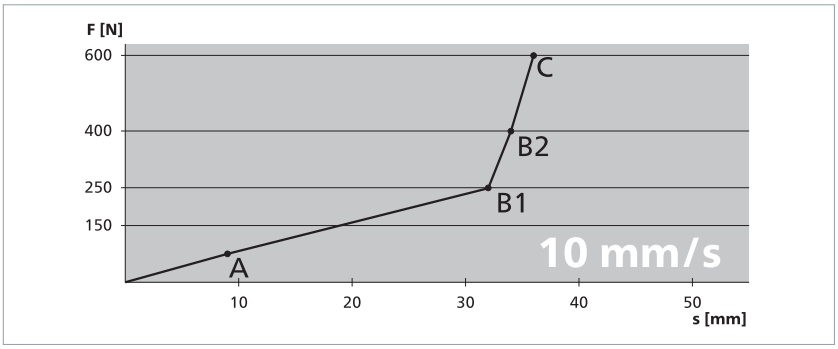
- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- without control unit

All data stated here is documented in EC design type test certificates.

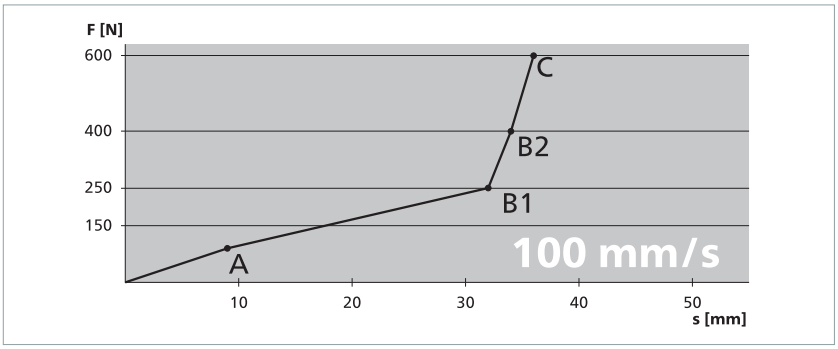
Note:
Dimensional tolerances according to ISO 3302 E2/L2.

Force-distance ratios

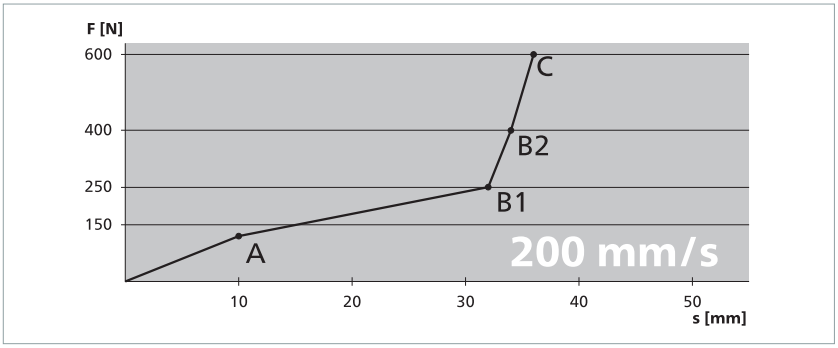
Actuation force	79 N
Response time	800 ms
Actuation distance (A)	8 mm
Overtravel distance	
up to 250 N (B1)	24.4 mm
up to 400 N (B2)	26.2 mm
up to 600 N (C)	28.8 mm
Total deformation	36.8 mm



Actuation force	99 N
Response time	87 ms
Actuation distance (A)	8.7 mm
Overtravel distance	
up to 250 N (B1)	23.1 mm
up to 400 N (B2)	25.2 mm
up to 600 N (C)	27.7 mm
Total deformation	36.4 mm



Actuation force	115 N
Response time	60 ms
Actuation distance (A)	9.8 mm
Overtravel distance	
up to 250 N (B1)	22 mm
up to 400 N (B2)	24.2 mm
up to 600 N (C)	26.3 mm
Total deformation	36.1 mm



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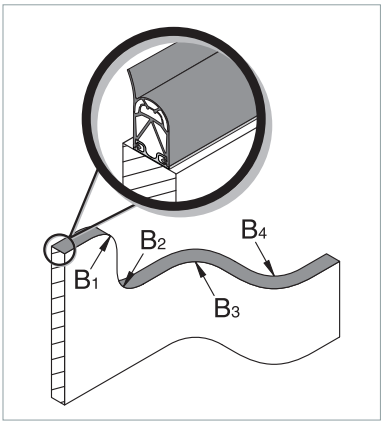
Technical data

GP 58L-2 EPDM

Normally open safety edge SL NO consisting of sensor, aluminium profile C 36 and control unit SG-EFS 1X4 ZK2/1.

Testing basis	
ISO 13856-2	
Switching characteristics at v_{test} = 200 mm/s	
Switching operations	10,000
Actuation force	
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	12 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	60°
Response time	70 ms
Finger detection	yes
Safety classifications	
ISO 13856: reset function	with/witout
ISO 13849-1:2015	Category 3 PL d
$MTTF_D$ (pressure-sensitive protection device)	222 a
$MTTF_D$ (sensor)	761 a
B_{10D} (sensor)	4×10^6
n_{op} (acceptance)	52560/a
Mechanical operating conditions	
Sensor length (min./max.)	20 cm / 14 m
Cable length (min./max.)	2 m / 100 m
Bend radii, minimum	
B1 / B2 / B3 / B4	750 / 750 / 750 / 750 mm
Operating speed (min. / max.)	10 mm/s / 200 mm/s
max. load capacity	600 N
IEC 60529: degree of protection	IP67
Humidity (max. at 23 °C)	95 % (non-condensing)
Operating temperature	0 to +55 °C
Storage temperature	-30 to +70 °C
Weight	1.3 kg/m
Electrical operating conditions	
Number of sensors type BK	max. 10 in series
Switching voltage (max.)	DC 24 V
Switching current (max.)	10 mA
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm^2
Dimensional tolerances	
Length as per	ISO 3302 L2
Profile section as per	ISO 3302 E2
Aluminium profile	EN 755-9

Bend radii:



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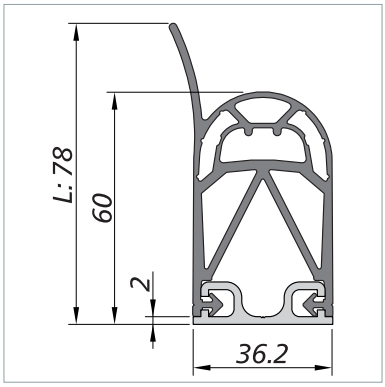
Dimensions and distances

GP 58L-2 EPDM (1:2)



Test conditions
according to ISO 13856-2

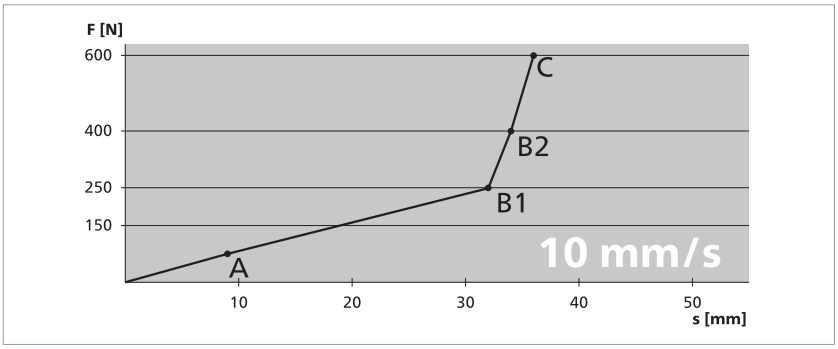
- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- without control unit

All data stated here is documented in EC design type test certificates.

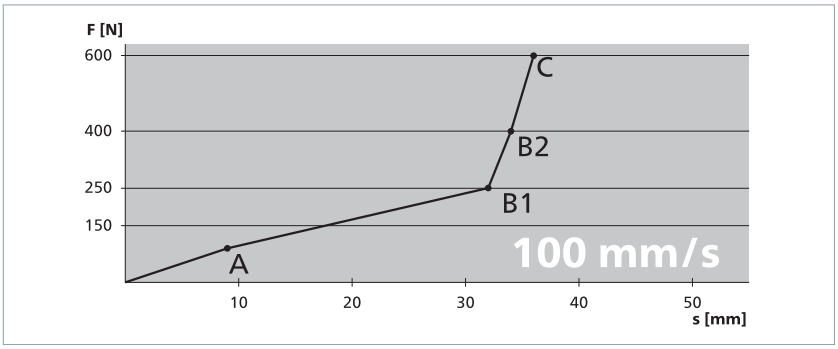
Note:
Dimensional tolerances according to ISO 3302 E2/L2.

Force-distance ratios

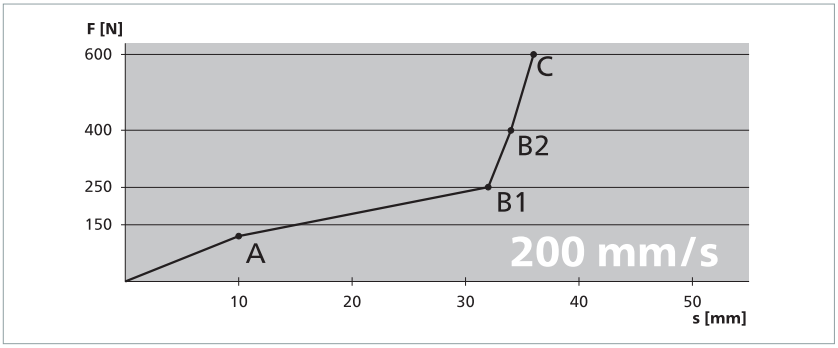
Actuation force	79 N
Response time	800 ms
Actuation distance (A)	8 mm
Overtravel distance	
up to 250 N (B1)	24.4 mm
up to 400 N (B2)	26.2 mm
up to 600 N (C)	28.8 mm
Total deformation	36.8 mm



Actuation force	99 N
Response time	87 ms
Actuation distance (A)	8.7 mm
Overtravel distance	
up to 250 N (B1)	23.1 mm
up to 400 N (B2)	25.2 mm
up to 600 N (C)	27.7 mm
Total deformation	36.4 mm



Actuation force	115 N
Response time	60 ms
Actuation distance (A)	9.8 mm
Overtravel distance	
up to 250 N (B1)	22 mm
up to 400 N (B2)	24.2 mm
up to 600 N (C)	26.3 mm
Total deformation	36.1 mm



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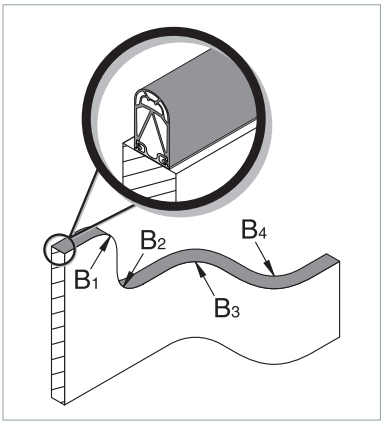
Technical data

GP 68-2 EPDM

Normally open safety edge SL NO consisting of sensor, aluminium profile C 36 and control unit SG-EFS 1X4 ZK2/1.

Testing basis	
ISO 13856-2	
Switching characteristics at v_{test} = 200 mm/s	
Switching operations	10,000
Actuation force	
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	11 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	60°
Response time	56 ms
Finger detection	yes
Safety classifications	
ISO 13856: reset function	with/witout
ISO 13849-1:2015	Category 3 PL d
$MTTF_D$ (pressure-sensitive protection device)	222 a
$MTTF_D$ (sensor)	761 a
B_{10D} (sensor)	4×10^6
n_{op} (acceptance)	52560/a
Mechanical operating conditions	
Sensor length (min./max.)	20 cm / 14 m
Cable length (min./max.)	2 m / 100 m
Bend radii, minimum	
B1 / B2 / B3 / B4	750 / 750 / 750 / 750 mm
Operating speed	
(min. / max.)	10 mm/s / 200 mm/s
max. load capacity	600 N
IEC 60529: degree of protection	IP67
Humidity (max. at 23 °C)	95 % (non-condensing)
Operating temperature	0 to +55 °C
Storage temperature	-30 to +70 °C
Weight	1.4 kg/m
Electrical operating conditions	
Number of sensors type BK	max. 10 in series
Switching voltage (max.)	DC 24 V
Switching current (max.)	10 mA
Connection cable	Ø 3.7 mm TPE 2×0.22 mm²
Dimensional tolerances	
Length as per	ISO 3302 L2
Profile section as per	ISO 3302 E2
Aluminium profile	EN 755-9

Bend radii:



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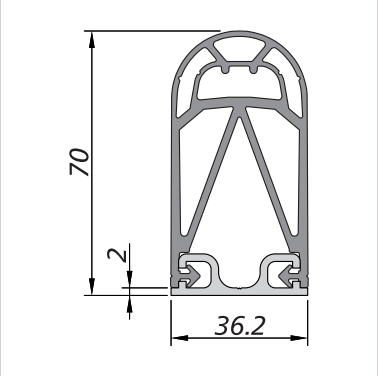
Dimensions and distances

GP 68-2 EPDM (1:2)



Test conditions
according to ISO 13856-2

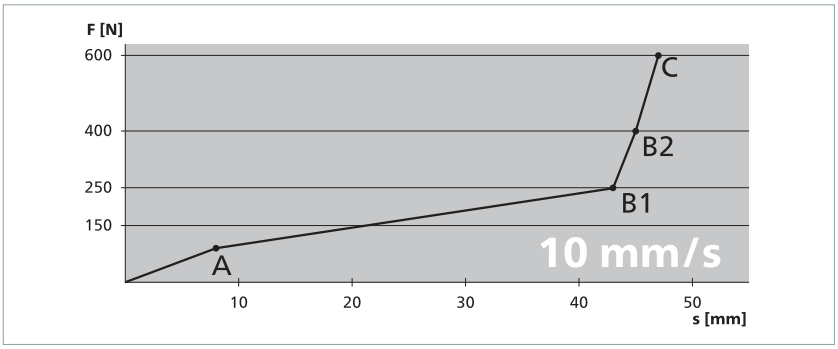
- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- without control unit

All data stated here is documented in EC design type test certificates.

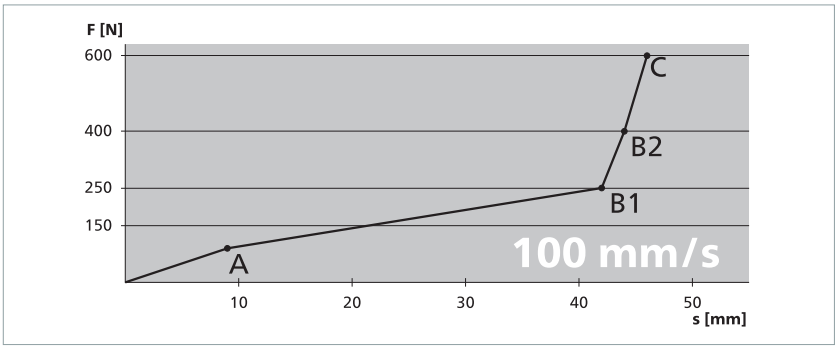
Note:
Dimensional tolerances according to ISO 3302 E2/L2.

Force-distance ratios

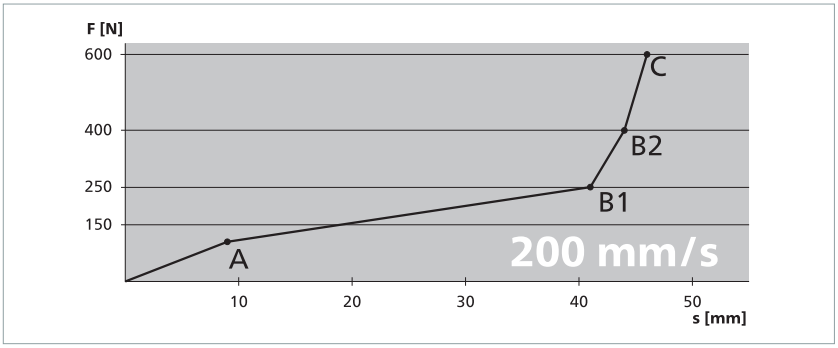
Actuation force	84 N
Response time	830 ms
Actuation distance (A)	8.3 mm
Overtravel distance	
up to 250 N (B1)	34.5 mm
up to 400 N (B2)	36.8 mm
up to 600 N (C)	38.8 mm
Total deformation	47.1 mm



Actuation force	96 N
Response time	91 ms
Actuation distance (A)	9.1 mm
Overtravel distance	
up to 250 N (B1)	32.6 mm
up to 400 N (B2)	36.6 mm
up to 600 N (C)	37.3 mm
Total deformation	46.4 mm



Actuation force	105 N
Response time	46 ms
Actuation distance (A)	9.2 mm
Overtravel distance	
up to 250 N (B1)	32.2 mm
up to 400 N (B2)	34.8 mm
up to 600 N (C)	37.3 mm
Total deformation	45.8 mm



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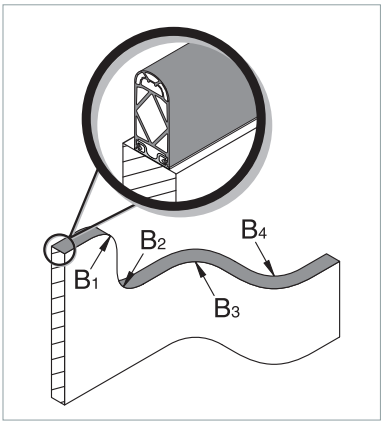
Technical data

GP 88-2 EPDM

Normally open safety edge SL NO consisting of sensor, aluminium profile c 36 and control unit SG-EFS 1X4 ZK2/1.

Testing basis	
ISO 13856-2	
Switching characteristics at v_{test} = 200 mm/s	
Switching operations	10,000
Actuation force	
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	14 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	90° (Finger protection: 60°)
Response time	70 ms
Finger detection	yes
Safety classifications	
ISO 13856: reset function	with/witout
ISO 13849-1:2015	Category 3 PL d
$MTTF_D$ (pressure-sensitive protection device)	222 a
$MTTF_D$ (sensor)	761 a
B_{10D} (sensor)	4× 10^6
n_{op} (acceptance)	52560/a
Mechanical operating conditions	
Sensor length (min./max.)	20 cm / 14 m
Cable length (min./max.)	2 m / 100 m
Bend radii, minimum	
B1 / B2 / B3 / B4	750 / 750 / 750 / 750 mm
Operating speed	
(min. / max.)	10 mm/s / 200 mm/s
max. load capacity	600 N
IEC 60529: degree of protection	IP67
Humidity (max. at 23 °C)	95 % (non-condensing)
Operating temperature	0 to +55 °C
Storage temperature	-30 to +70 °C
Weight	1.6 kg/m
Electrical operating conditions	
Number of sensors type BK	max. 10 in series
Switching voltage (max.)	DC 24 V
Switching current (max.)	10 mA
Connection cable	Ø 3.7 mm TPE 2× 0.22 mm^2
Dimensional tolerances	
Length as per	ISO 3302 L2
Profile section as per	ISO 3302 E2
Aluminium profile	EN 755-9

Bend radii:



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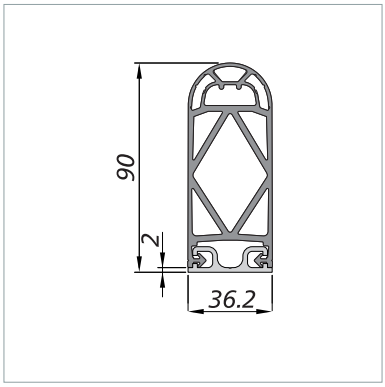
Dimensions and distances

GP 88-2 EPDM (1:3)



Test conditions
according to ISO 13856-2

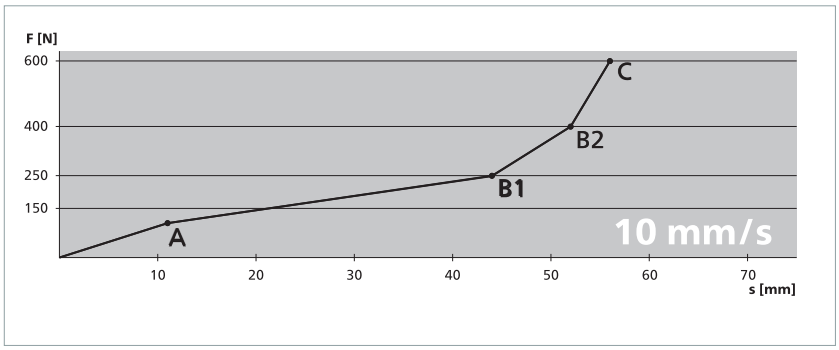
- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- without control unit

All data stated here is documented in EC design type test certificates.

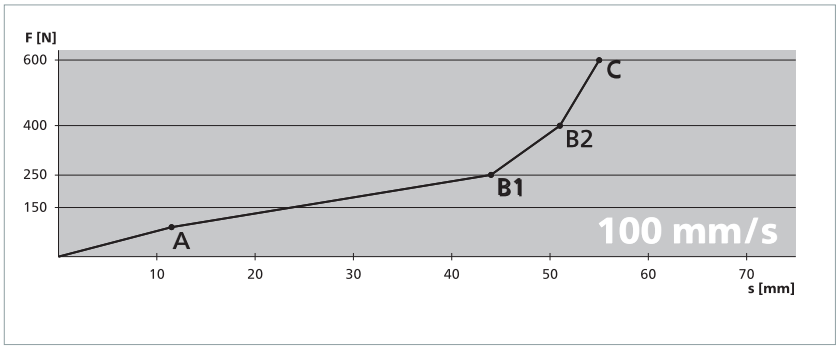
Note:
Dimensional tolerances according to ISO 3302 E2/L2.

Force-distance ratios

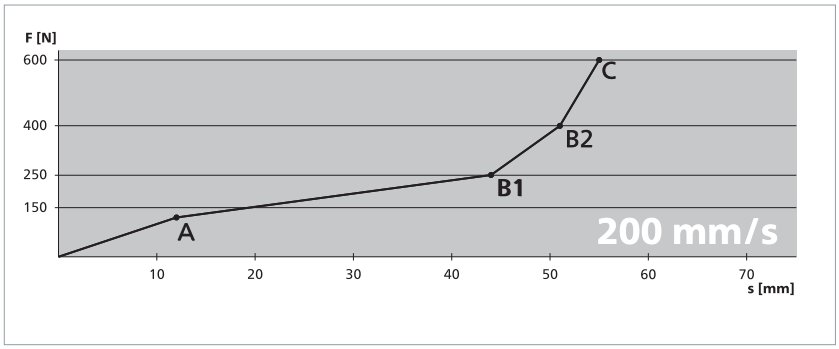
Actuation force	106 N
Response time	1100 ms
Actuation distance (A)	11 mm
Overtravel distance	
up to 250 N (B1)	33.7 mm
up to 400 N (B2)	41.3 mm
up to 600 N (C)	45.9 mm
Total deformation	56.9 mm



Actuation force	111 N
Response time	114 ms
Actuation distance (A)	11.4 mm
Overtravel distance	
up to 250 N (B1)	33.1 mm
up to 400 N (B2)	40 mm
up to 600 N (C)	43.7 mm
Total deformation	55.1 mm



Actuation force	127 N
Response time	60 ms
Actuation distance (A)	12 mm
Overtravel distance	
up to 250 N (B1)	32 mm
up to 400 N (B2)	38.9 mm
up to 600 N (C)	42.9 mm
Total deformation	54.9 mm



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Request for quotation

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Submitted by

Company

Department

Surname, first name

P.O. Box | Postcode | Town/city

Street | Postcode | Town/city

Phone | Fax | E-mail

⇩ Please do not write in this column! ⇩
For internal notes only

Area of application

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

Environmental conditions

❑ dry ❑ water ❑ oil
❑ aggressive substances: ❍ 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 allowed
❑ cable exit version ____
❑ number of monitoring circuits: ____ ❑ SG- _____

Pinching and shearing edges to be protected:

(Sketch incl. mounting possibility and cable routing)

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