



## SP DIY sensor profiles for toolless self-assembly



EN | Product information

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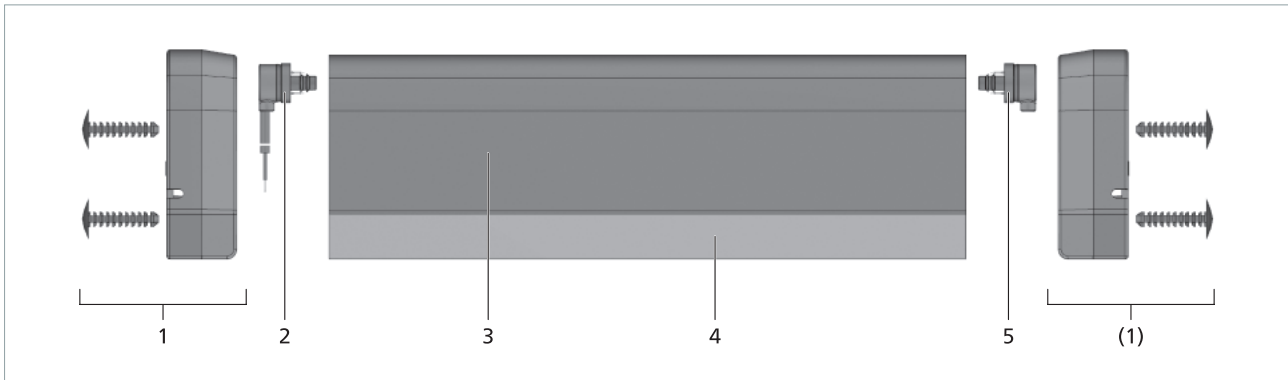
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## Overview

### Contact profile – Sensor profile

The semi-finished contact profile (No. 3) is cut to length and assembled with the other components. This results in a functioning product called a sensor profile.



Nos. 2 and 5 are identical for all sensor profiles.

No. 2 Closing plug with 2.5 m cable 7504038

No. 5 Closing plug with resistor 7504039

Alternatives for No. 2:

Closing plug with 5.0 m cable 7504103

Closing plug with 10 m cable 7504102

Sensor profile	No. 1 Set of end caps	No. 3 Contact profile		No. 4 Aluminium profile	
SP 17-3 without end caps	1005786	SP 17-3	7503461	C 15	1000016
SP 37-1 without end caps	1000606	SP 37-1	7502853	C 25	1000004
SP 37-1 with end caps	7503008	SP 37-1	7502853	C 25	1000004
SP 37-2 with end caps	7503988	SP 37-2	7503318	C 26	1004330
SP 37L-2 with end caps	7503988	SP 37L-2	7504192	C 26	1004330
SP 37-3 with end caps	7503505 (7503654)	SP 37-3	7503343	C 25	1000004
SP 57-2 with end caps	7503603	SP 57-2	7503055	C 30	1005844
SP 57L-2 with end caps	7503603	SP 57L-2	7503412	C 30	1005844
SP 57-3 with end caps	7503618	SP 57-3	7503521	C 35	1000006

Subject to technical modifications.

Sensor profile	No. 1 Set of end caps	No. 3 Contact profile		No. 4 Aluminium profile	
SP 57-4 with end caps	7503618	SP 57-4	7503633	C 35	1000006
SP 57L-4 with end caps	7503618	SP 57L-4	7503711	C 35	1000006
SP 67-2 with end caps	7503655	SP 67-2	7503285	C 30	1005844
SP 87-2 with end caps	7504118	SP 87-2	7503722	C 36	1003848

## Materials list

Part No.	Designation	Pack- ing unit
7503461	Contact profile SP 17-3 TPE	80 m
7502853	Contact profile SP 37-1 TPE	30 m
7503318	Contact profile SP 37-2 TPE	30 m
7504192	Contact profile SP 37L-2 TPE	30 m
7503343	Contact profile SP 37-3 TPE "black"	30 m
7503534	Contact profile SP 37-3 TPE "red"	30 m
7503055	Contact profile SP 57-2 TPE	30 m
7503412	Contact profile SP 57L-2 TPE	30 m
7503521	Contact profile SP 57-3 TPE	25 m
7503633	Contact profile SP 57-4 TPE	25 m
7503711	Contact profile SP 57L-4 TPE	25 m
7503285	Contact profile SP 67-2 TPE	30 m
7503722	Contact profile SP 87-2 TPE	25 m
7504039	Closing plug with resistor 8k2	10 pcs.
7504038	Closing plug with 2.5 m PUR cable, angled 90°	10 pcs.
7504103	Closing plug with 5.0 m PUR cable, angled 90°	10 pcs.
7504102	Closing plug with 10 m PUR cable, angled 90°	10 pcs.
7504101	Closing plug without resistor	10 pcs.
1005786	Countersunk tapping screw 3.5 x 25 for SP 17-3	20 pcs.
7503008	Set of end caps for SP 37-1: 2 end caps, 2 fixing stoppers and 2 screws 3.9 x 25	10 pcs.
7503988	Set of end caps for SP 37(L)-2: 2 end caps and 4 pine tree clips	10 pcs.

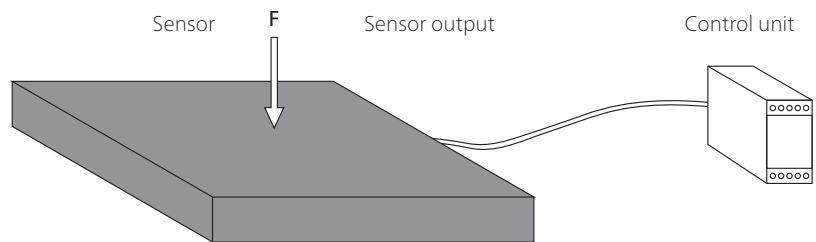
Part No.	Designation	Pack- ing unit
7503505	Set of end caps for SP 37-3 "black": 2 end caps and 2 pine tree clips	10 pcs.
7503654	Set of end caps for SP 37-3 "red": 2 end caps and 2 pine tree clips	10 pcs.
7503603	Set of end caps for SP 57(L)-2 with clips: 2 end caps and 4 pine tree clips	10 pcs.
7503618	Set of end caps for SP 57-3 and SP 57(L)-4: 2 end caps and 6 pine tree clips	10 pcs.
7503655	Set of end caps for SP 67-2: 2 end caps and 4 pine tree clips	10 pcs.
7504118	Set of end caps for SP 87-2: 2 end caps and 8 pine tree clips	10 pcs.
1000016	Aluminium profile C 15	6 m
1000854	Aluminium profile C 25M, upper section	6 m
1000855	Aluminium profile C 25M, lower section	6 m
1000829	Aluminium profile C 25L	6 m
1000012	Aluminium profile C 25S	6 m
1000004	Aluminium profile C 25	6 m
1004626	Aluminium profile C 26M, upper section	6 m
1004627	Aluminium profile C 26M, lower section	6 m
1004330	Aluminium profile C 26, perforated	6 m
1005844	Aluminium profile C 30	6 m
1001398	Aluminium profile C 35M, upper section	6 m
1001399	Aluminium profile C 35M, lower section	6 m
1000013	Aluminium profile C 35S	6 m
1000006	Aluminium profile C 35	6 m
1004629	Aluminium profile C 36M, upper section	6 m
1004630	Aluminium profile C 36M, lower section	6 m
1003849	Aluminium profile C 36L, perforated	6 m
1003850	Aluminium profile C 36S, perforated	6 m
1003848	Aluminium profile C 36, perforated	6 m
1001223	End stopper for C 25M, for SP without end caps	1 pc.
1000606	End stopper for C 25 or C 25S, for SP without end caps	1 pc.
1005906	Section cutter, cutting length 87 mm	1 pc.

Subject to technical modifications.

## Definitions

### Pressure-sensitive protection device

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

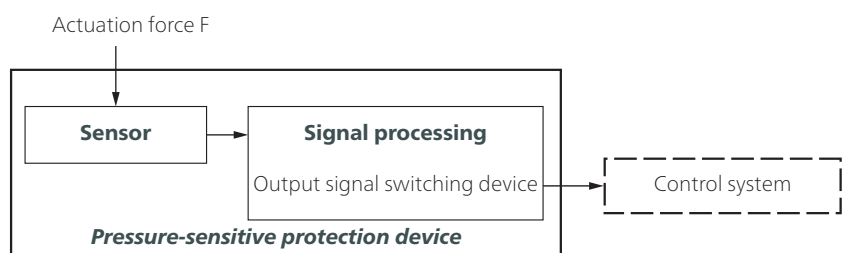


#### Sensor

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

#### Signal processing

The signal processing unit 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 the part of the signal processing unit which is connected to the forwarding control system and which transmits safety output signals such as STOP.

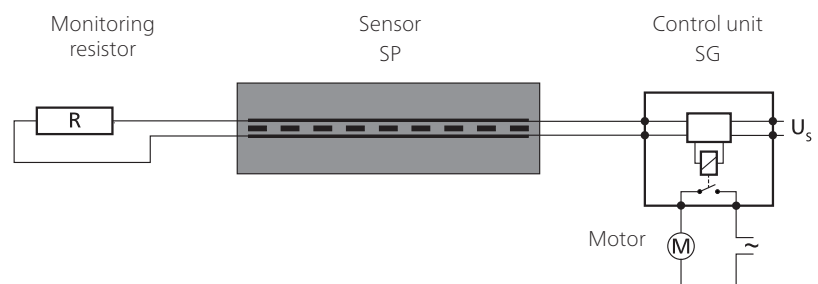


Tip: Terms are defined in ISO 13856-2 Section 3.

## Criteria for selecting the sensor type

- Category according to ISO 13849-1
- Performance level of the pressure-sensitive protection device  
= at least  $PL_r$
- Temperature range
- Degree of Protection in accordance with IEC 60529:  
IP67 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 of 2-wire technology



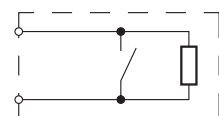
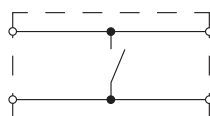
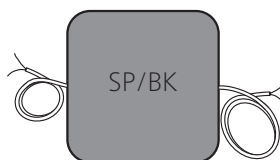
The monitoring resistor must be compatible with the control unit. The standard type is 8k2.

For your safety:

The sensor and connecting cables are constantly monitored to ensure they are functioning correctly. Monitoring relies on controlled bridging of the contact surfaces with a monitoring resistor (closed-circuit principle).

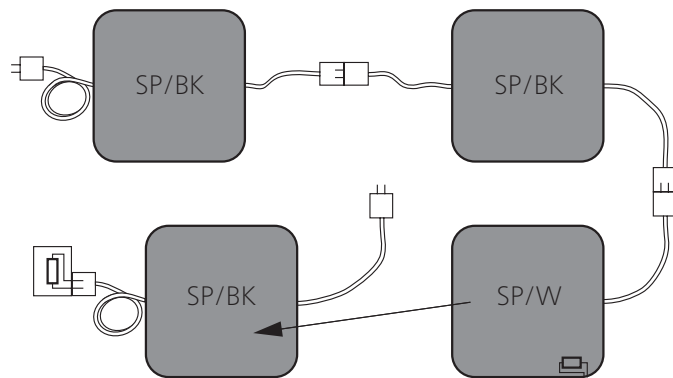
### Types

- SP/BK With cables on both sides for use as a through sensor or with an external monitoring resistor for use as an end sensor
- SP/W With an integrated monitoring resistor for use as an end sensor





## Sensor combination

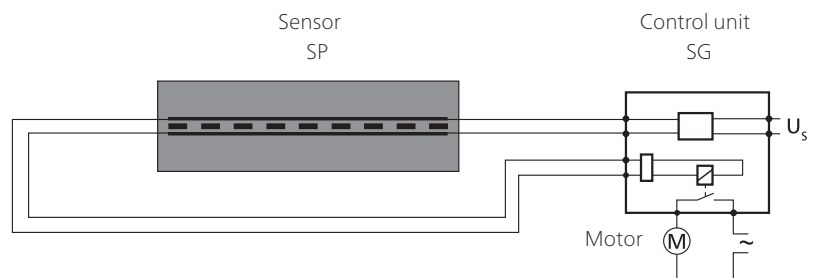


Version with external resistor, therefore no variety of models

Combination:

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

## Operation principle of 4-wire technology



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

For your safety:

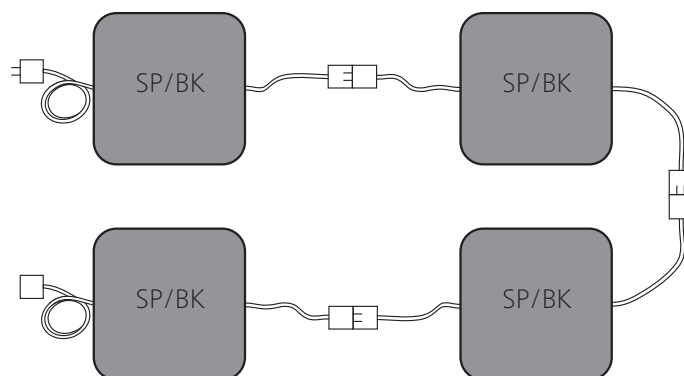
The sensor and connecting cables are constantly monitored to ensure they are functioning correctly. Monitoring relies on signal transmission feedback – without a monitoring resistor.

### Types

SP/BK With cables on both sides for use as a through sensor



## Sensor combination



Combination:

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

*Subject to technical modifications.*

## Safety

### Intended use

A safety edge detects a person or part of the body when pressure is applied to the effective actuation area. It is a linear tripping device. Its task is to prevent possible hazardous situations that could affect someone 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 rating as well as
- correct installation.

For additional application guidelines, please refer to ISO 13856-2 Annex E.

Due to the design, the actuation area is actually smaller than it looks because of the non-sensitive edges. Once these have been allowed for, what remains is the effective actuation area (see chapter *Effective actuation area*).

### Limits

- No more than 5 /BK-type sensors can be connected to one control unit.
- No more than 4 /BK-type sensors and 1 /W-type sensor can be connected to one control unit.

### Exclusions

The sensors are not suitable for:

- performing a sealing function. Constant actuation of sensors can result in permanent damage.

**Exception:** The L version with an attached lip seal.

The lip seal can be in full contact with the closing edge, which allows it to repel wind and water.

### Selecting the appropriate product line

If you opt for our line of SP DIY sensor profiles for toolless self-assembly, the maximum class of protection that can be achieved is IP67 and IPX8 (13 days). If a higher protection class of IP68 or IPX8 (20 weeks) is required for your application, we recommend using our line of SP DIY sensor profiles for **assembly with tools** instead.

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## Other safety aspects

The following safety aspects relate to pressure-sensitive protection devices consisting of a sensor and a control unit.

### Performance Level (PL)

The PL has been determined using the procedure defined by ISO 13849-1.

Fault exclusion according to ISO 13849-2 Table D.8: Non-closing of contacts by pressure-sensitive equipment according to ISO 13856. In this case, the diagnostic coverage (DC) is not calculated or taken into account when determining the PL. Assuming a high  $MTTF_D$  value for the control unit, a performance level of up to PL d can be achieved by the safety edge system (pressure-sensitive protection device) as a whole.

### Is the protection device suitable?

First, the integrator must decide what  $PL_r$  is required for the hazard. After that, they must select the protection device.

Finally, the integrator needs to check whether the category and PL of the selected protection device are appropriate.

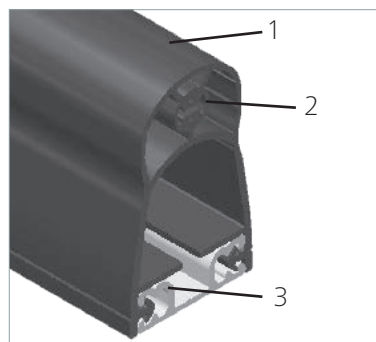
### Risk and safety assessment

For the risk and safety assessment of your machine, we recommend ISO 12100 "Safety of machinery — General principles for design".

### Without reset function

When a protection device without reset function is used (automatic reset), the reset function must be provided in some other way.

## Design



The SP sensor profile consists of one sensor (1 to 3)  
(1) SP contact profile with  
(2) integrated normally open switching element,  
(3) aluminium profile and an evaluating control unit SG.

*Subject to technical modifications.*

## Effective actuation area

The parameters X, Y, Z,  $L_{WB}$  and the angle  $\alpha$  describe the effective actuation area.

For the effective actuation area, the following applies:

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

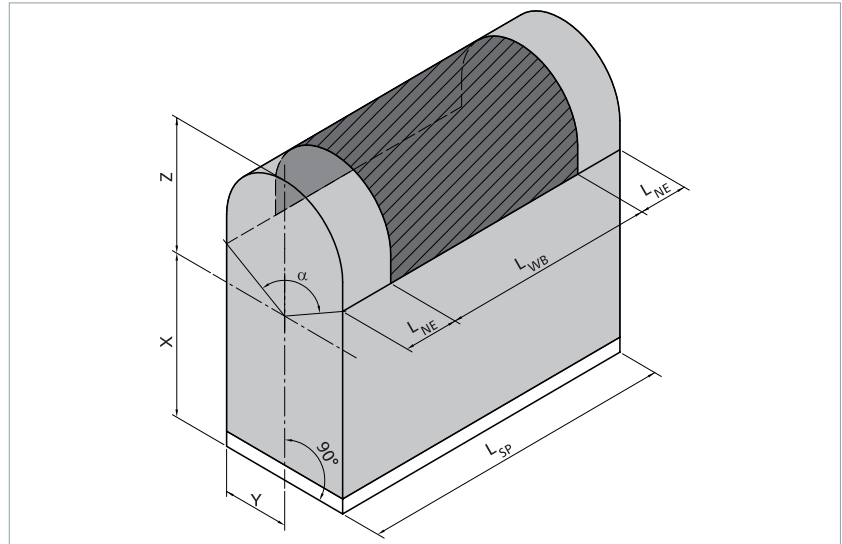
Parameters:

$L_{WB}$  = effective actuation length

$L_{SP}$  = total length of sensor profile

$L_{NE}$  = non-sensitive length at end of sensor profile

$\alpha$  = effective actuation angle



	SP 17-3 <sup>1)</sup>	SP 37-1	SP 37(L)-2	SP 37-3	SP 57(L)-2	SP 57-3	SP 57(L)-4	SP 67-2	SP 87-2
Incl.									
$\alpha$	90°	100°	100°	100°	90°	90°	90°	90°	90°
$L_{NE}$	60 mm	20 mm	20 mm	20 mm	10 mm <sup>2)</sup>	10 mm <sup>2)</sup>	10 mm <sup>2)</sup>	20 mm <sup>2)</sup>	10 mm <sup>2)</sup>
Y	6.7 mm	12.5 mm	13 mm	12.5 mm	17 mm	17.5 mm	17.5 mm	17 mm	18.1 mm
X	15.3 mm	28.5 mm	30 mm	29 mm	44 mm	52 mm	52 mm	57.3 mm	72 mm
Z	5 mm	9 mm	9 mm <sup>3)</sup>	9 mm	12 mm <sup>3)</sup>	12 mm	12 mm <sup>3)</sup>	10 mm	15 mm
X + Z	20.3 mm	37.5 mm	39 mm <sup>3)</sup>	38 mm	56 mm <sup>3)</sup>	64 mm	64 mm <sup>3)</sup>	67.3 mm	87 mm

<sup>1)</sup> without end cap

<sup>2)</sup> with finger protection

<sup>3)</sup> without lip

## Installation position

The installation position can be selected as required, i.e. all installation positions from A to D as per ISO 13856-2 are possible.

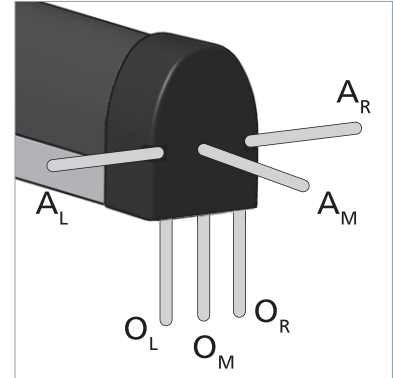
*Subject to technical modifications.*

## Connection

### Cable exits

Depending on the end cap, the following cable exits are available.

- A<sub>L</sub> = axial left
- A<sub>M</sub> = axial middle
- A<sub>R</sub> = axial right
- O<sub>L</sub> = orthogonal left
- O<sub>M</sub> = orthogonal middle
- O<sub>R</sub> = orthogonal right

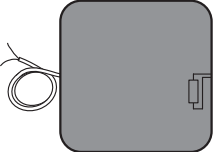



Orientation		Cable exit					
Lateral exit		A <sub>L</sub>		A <sub>R</sub>			
Axial exit			A <sub>M</sub>				
90° exit					O <sub>L</sub>	O <sub>M</sub>	O <sub>R</sub>
Combination							
Contact profile	Set of end caps						
SP 17-3	–					●	
SP 37-1	7503008	●		●	●		●
SP 37(L)-2	7503988	●	●	●		●	
SP 37-3 black	7503505	●		●	●		●
SP 37-3 red	7503654	●		●	●		●
SP 57(L)-2	7503062	●	●	●		●	
	7503603	●	●	●		●	
SP 57-3	7503618	●	●	●		●	
SP 57(L)-4	7503796	●	●	●	●		●
SP 67-2	7503655	●	●	●		●	
SP 87-2	7504118	●	●	●		●	

● = possible

## Cable connection

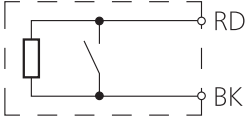
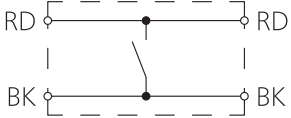
- Standard cable lengths  
L = 2.5 m / 5.0 m / 10 m
- Maximum total cable length to the control unit  
L<sub>max</sub> = 100 m

/W-type sensor with 1 line	/BK-type sensor with 2 lines
<ul style="list-style-type: none"> <li>• As an individual /W-type sensor or a /W-type end sensor</li> <li>• Integrated resistor</li> <li>• 1 two-wire cable</li> </ul>	<ul style="list-style-type: none"> <li>• As a /BK-type through sensor</li> <li>• Without resistor</li> <li>• 2 two-wire cables</li> </ul>
	

## Wire colours

### Colour coding

BK Black  
RD Red

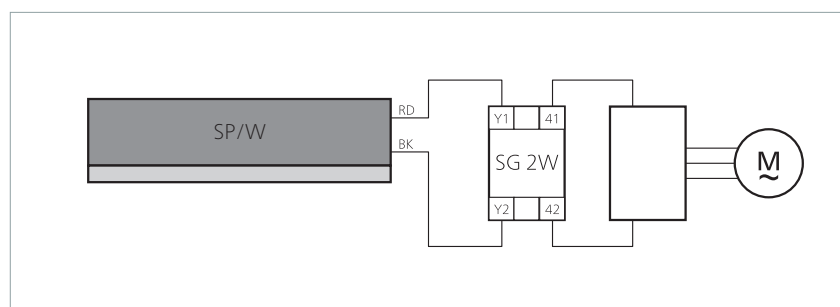
/W-type sensor with 1 line	/BK-type sensor with 2 lines
	

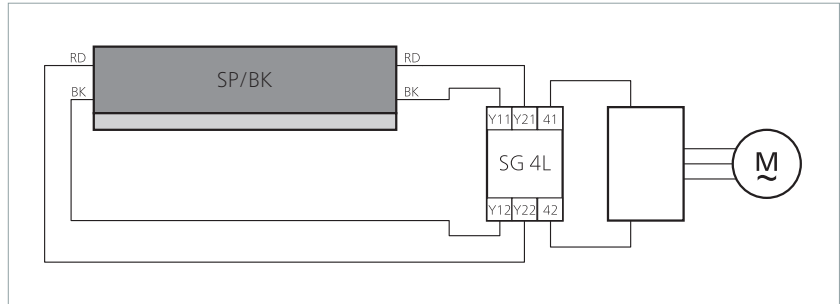
## Connection examples

Key:

SG 2W evaluation with 2-wire technology

SG 4L evaluation with 4-wire technology





## Sensor surface

### Resistance

The resistance ratings listed below (at a room temperature of 23 °C) depend on the sensor having an undamaged surface.

#### Physical resistance

	<b>TPE</b>
UV resistance	Yes

#### Chemical resistance

The sensor is broadly resistant to 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 the results of tests carried out in our laboratory. You must always conduct your own practical tests to verify that our products are suitable for your specific area of application.

*Subject to technical modifications.*



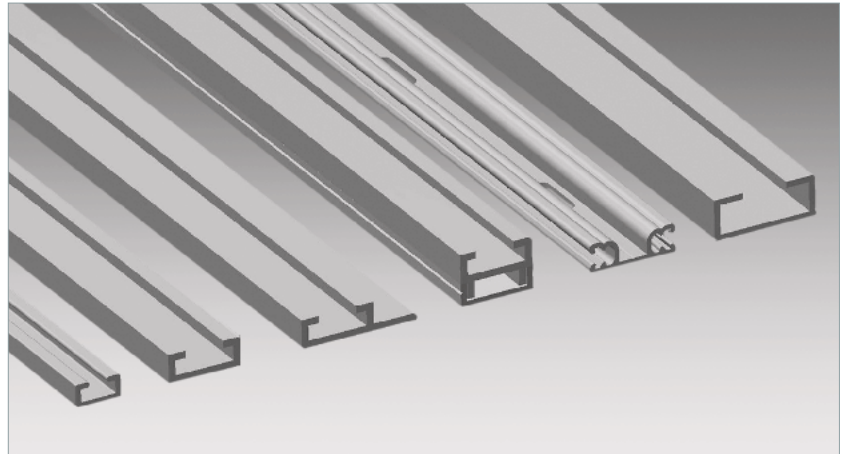
## Explanation of symbols:

- + = resistant
- ± = resistant to a certain extent
- = not resistant

Material	TPE
Acetone	-
Formic acid	-
Armor All	+
Car shampoo	+
Petrol	-
Brake fluid	+
Buraton	+
Butanol	-
Sodium hypochlorite	-
Disinfectant 1%	+
Diesel	-
Acetic acid 10%	-
Ethanol	+
Ethyl acetate	-
Ethylene glycol	+
Greases	±
Anti-frost agent	+
Skin cream	+
Incidin	+
Incidin Plus	+
Cooling lubricant	-
Plastic cleaner	+
Lyso FD 10	+
Metal working oil	-
Microbac	+
Microbac forte	+
Minutil	+
Saline solution 5%	+
Spirit (ethyl alcohol)	+
Terralin	+
Centring oil	-

## Mounting





The sensors are mounted directly onto the main and secondary closing edges that present a danger. They are fixed using special aluminium profiles. The profiles are fastened with screws or rivets.



### Material properties

- AlMgSi0.5 F22
- Wall thickness at least 2.0 mm
- C 15: at least 1.7 mm
- C 30: at least 1.5 mm
- Extruded
- Hot hardened
- Tolerances as per EN 755-9

## Aluminium profiles: Overview of combinations







Sensor profile foot		C 15	C 25 C 25M C 25S C 25L	C 26 C 26M	C 30	C 35 C 35M C 35S	C 36 C 36M C 36S C 36L
Snap-in foot (middle)	...-1 	–	SP 37-1	–	–	–	–
Clip bars (outside)	...-2 	–	–	SP 37(L)-2	SP 57(L)-2 SP 67-2	–	SP 87-2
T-foot (middle)	...-3 	SP 17-3	SP 37-3	–	–	SP 57-3	–
T-foot narrow (middle)	...-4 	–	–	–	–	SP 57(L)-4	–

*Subject to technical modifications.*

## Aluminium profiles: Mounting types


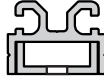
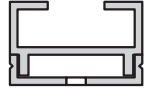

### Standard profile

First the aluminium profile must be mounted onto the closing edge and then the sensor profile clipped into the aluminium profile.

C 15	C 25	C 26	C 30	C 35	C 36
					



### Two-part profile, type M

For convenient assembly and disassembly. The sensor profile is clipped into the upper section and the upper section inserted into the installed lower section and fastened.

-	C 25M	C 26M	C 35M	C 36M
				

### Flange profile, type S

Final assembly is also possible when the sensor profile is already clipped into the aluminium profile.

-	C 25S	-	C 35S	C 36S
				

### Angle profile, type L

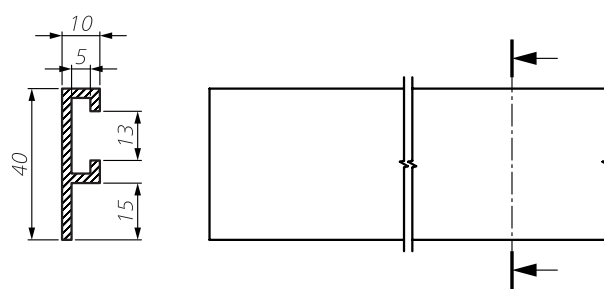
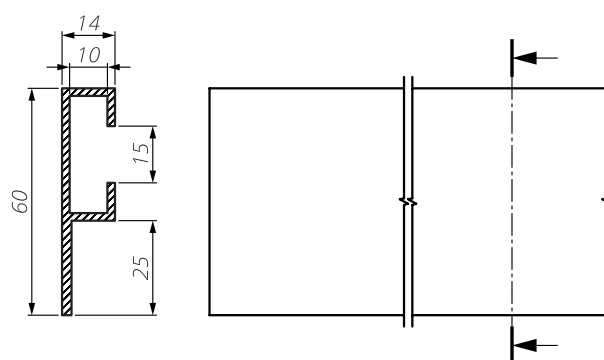
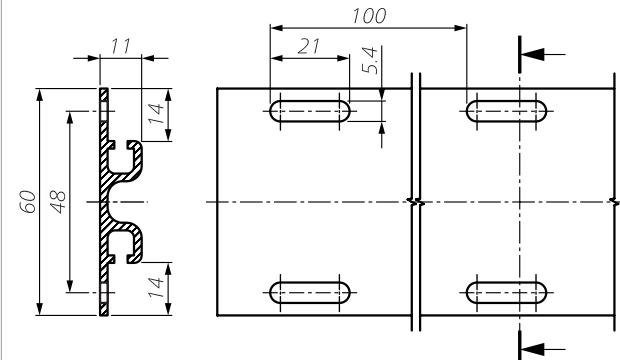
If the closing edge should or must not have assembly holes, this "round-the-corner" solution is suitable. Final assembly is also possible when the sensor profile is already clipped into the aluminium profile.

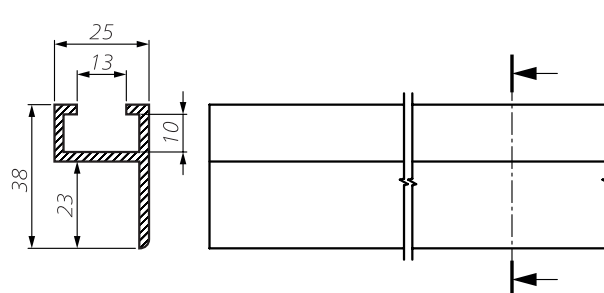
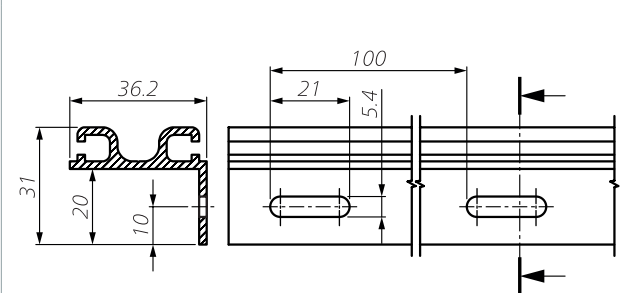
-	C 25L	-	-	C 36L
				

## Aluminium profiles: Dimensions

Standard profile		1:2
<p>C 15</p>	<p>C 26</p>	
<p>C 25</p>	<p>C 30</p>	
<p>C 35</p>	<p>C 36</p>	
Two-part profile, type M		1:2
<p>C 25M</p>	<p>C 26M</p>	
<p>C 35M</p>	<p>C 36M</p>	

Subject to technical modifications.

Flange profile, type S		1:2
C 25S		
C 35S		C 36S
		

Angle profile, type L		1:2
C 25L		C 36L
		

## SP: Making 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 time of the complete system [ s ]
- $t_1$  = Safety edge response time
- $t_2$  = Stopping time of the machine
- $s$  = Minimum overtravel distance of the safety edge to ensure that the stipulated 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:

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

In accordance with ISO 13856-2, the minimum overtravel distance of the safety edge is calculated using the following formula:

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

A suitable safety edge profile can now be selected based on the result. For details of the overtravel distances for safety edge profiles, see chapter *Technical data*.

### Calculation examples

#### Calculation 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 sensor profile SP 37-1 TPE could be sufficient. The response time of the safety edge (SP 37-1 TPE + control unit\*) is  $t_1 = 600$  ms.

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

$$s_1 = 1/2 \times 10 \text{ mm/s} \times (0.6 \text{ s} + 0.2 \text{ s})$$

$$s_1 = 1/2 \times 10 \text{ mm/s} \times 0.8 \text{ s} = \mathbf{4.0 \text{ mm}}$$

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

$$s = 4.0 \text{ mm} \times 1.2 = \mathbf{4.8 \text{ mm}}$$

The safety edge must have a minimum overtravel distance of  $s = 4.8$  mm. The selected SP 37-1 TPE has an overtravel distance of at least 9.2 mm. This is more than the required 4.8 mm.

**Result:** The SP 37-1 TPE is **suitable** for this case.

*Subject to technical modifications.*

\* Assumption: Typical reaction time of a control unit = 20 ms

### Calculation example 2

The same conditions apply as in calculation example 1 with the exception of the velocity of the dangerous movement. This is now  $v = 200 \text{ mm/s}$ . The response time of the safety edge (SP 37-1 TPE + control unit\*) is  $t_1 = 55 \text{ ms}$ .

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

$$s_1 = 1/2 \times 200 \text{ mm/s} \times (0.055 \text{ s} + 0.2 \text{ s})$$

$$\mathbf{s_1 = 1/2 \times 200 \text{ mm/s} \times 0.255 \text{ s} = 25.5 \text{ mm}}$$

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

$$\mathbf{s = 25.5 \text{ mm} \times 1.2 = 30.6 \text{ mm}}$$

The safety edge must have a minimum overtravel distance of  $s = 30.6 \text{ mm}$ . The selected SP 37-1 TPE has an overtravel distance of at least  $3.8 \text{ mm}$ . This is less than the required  $30.6 \text{ mm}$ .

**Result:** The SP 37-1 TPE is **not suitable** for this case.

### Calculation example 3

The same conditions apply as in calculation example 2. Instead of SP 37-1 EPDM, the SP 67-1 TPE is selected. The response time of the safety edge (SP 67-2 TPE + control unit\*) is  $t_1 = 72 \text{ ms}$ .

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

$$s_1 = 1/2 \times 200 \text{ mm/s} \times (0.072 \text{ s} + 0.2 \text{ s})$$

$$\mathbf{s_1 = 1/2 \times 200 \text{ mm/s} \times 0.272 \text{ s} = 27.2 \text{ mm}}$$

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

$$\mathbf{s = 27.2 \text{ mm} \times 1.2 = 32.6 \text{ mm}}$$

The safety edge must have a minimum overtravel distance of  $s = 32.6 \text{ mm}$ . The selected SP 67-2 TPE has an overtravel distance of at least  $36.5 \text{ mm}$ . This is more than the required  $32.6 \text{ mm}$ .

**Result:** The SP 67-2 TPE is **suitable** for this case.

## Maintenance and cleaning

The sensors are virtually maintenance-free.  
The control unit also monitors the sensor at the same time.

### Regular inspection

Depending on the operational demands, the sensors must be inspected at regular intervals (at least monthly)

- for proper functioning,
- for damage and
- for correct mounting.

### Cleaning

If the sensors become dirty, they can be cleaned with a mild cleaning product.

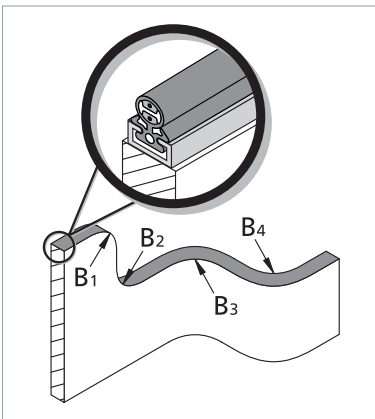


## Technical data

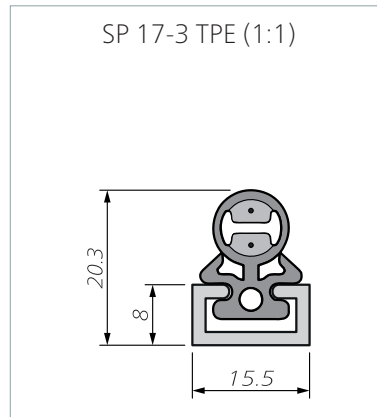
### SK SP 17-3 TPE

Sensor profile (without control unit)	SK SP/W 17-3 TPE or SK SP/BK 17-3 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 10 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	1.5 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±45°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 80 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	200 / 200 / 50 / 50 mm
Operating velocity (min. / max.)	10 mm/s / 10 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	SP 17-3
without aluminium profile	0.12 kg/m
with aluminium profile C 15	0.28 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

Bend radii:



## Dimensions and distances



Dimensional tolerances according to ISO 3302 E2/L2

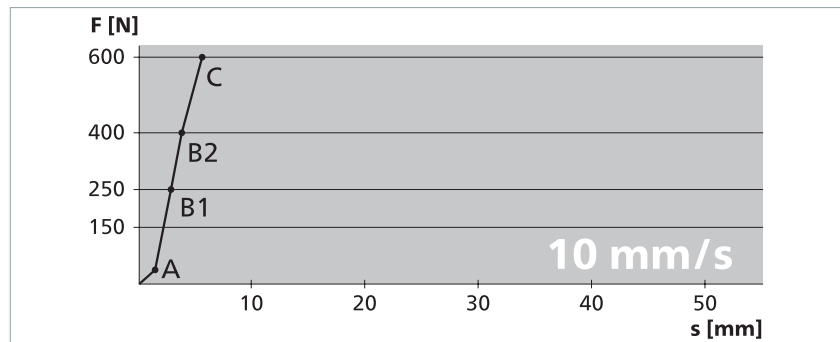
**Test conditions** according to ISO 13856-2

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

All the data given here has been verified by Mayser GmbH & Co. KG.

## Force-distance ratios

Test velocity	<b>10 mm/s</b>
Actuation force	38 N
Response time	140 ms
Actuation distance (A)	1.4 mm
Overtravel distance	
up to 250 N (B1)	1.4 mm
up to 400 N (B2)	2.3 mm
up to 600 N (C)	4.1 mm
Total deformation	5.5 mm

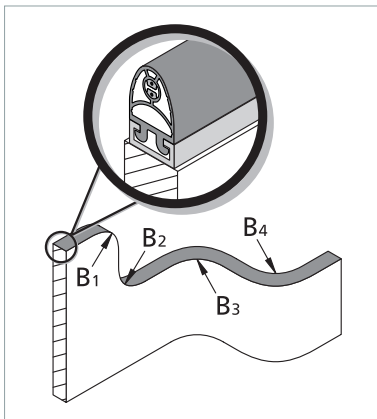


## Technical data

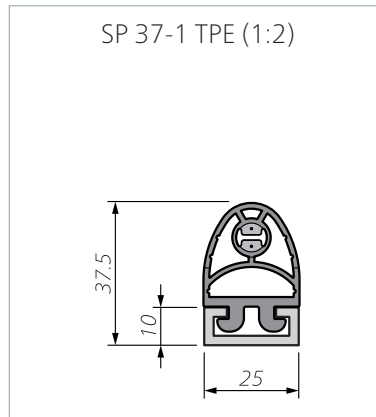
### SK SP 37-1 TPE

Sensor profile (without control unit)	SK SP/W 37-1 TPE or SK SP/BK 37-1 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	6 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±50°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2x 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 30 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	500 / 500 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	SP 37-1
without aluminium profile	0.33 kg/m
with aluminium profile C 25	0.64 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2x 0.25 mm <sup>2</sup>

Bend radii:



## Dimensions and distances



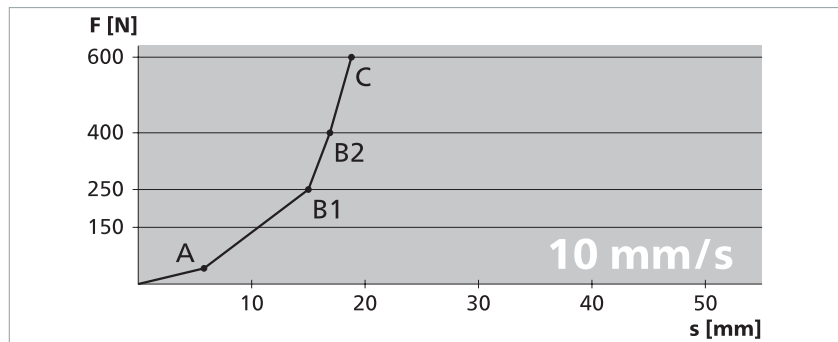
Dimensional tolerances according to ISO 3302 E2/L2

**Test conditions** according to ISO 13856-2

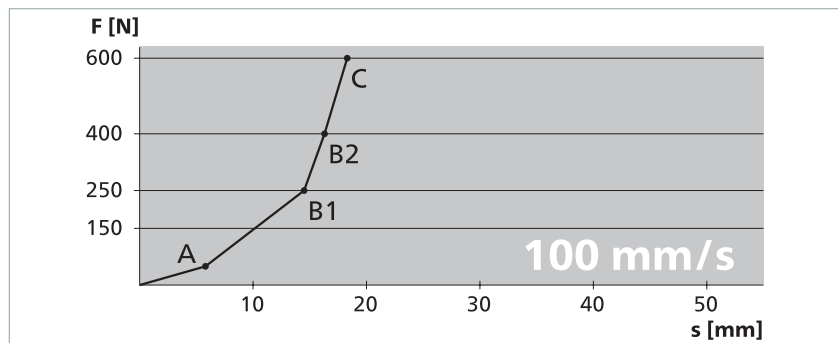
- Installation position B
  - Temperature +20 °C
  - Measurement point c3
  - Test sample 1 with Ø 80 mm
  - Without control unit
- All data stated here is documented in EC type examination certificates.

### Force-distance ratios

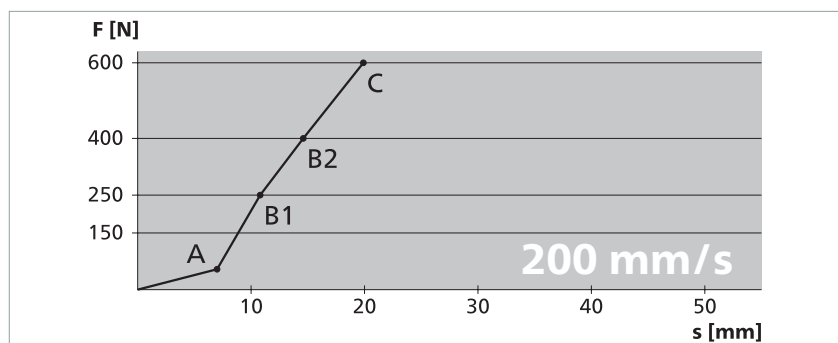
Test velocity	<b>10 mm/s</b>
Actuation force	42 N
Response time	580 ms
Actuation distance (A)	5.8 mm
Overtravel distance	
up to 250 N (B1)	9.2 mm
up to 400 N (B2)	11.1 mm
up to 600 N (C)	13.0 mm
Total deformation	18.8 mm



Test velocity	<b>100 mm/s</b>
Actuation force	50 N
Response time	58 ms
Actuation distance (A)	5.8 mm
Overtravel distance	
up to 250 N (B1)	8.7 mm
up to 400 N (B2)	10.5 mm
up to 600 N (C)	12.5 mm
Total deformation	18.3 mm



Test velocity	<b>200 mm/s</b>
Actuation force	54 N
Response time	35 ms
Actuation distance (A)	7.0 mm
Overtravel distance	
up to 250 N (B1)	3.8 mm
up to 400 N (B2)	7.6 mm
up to 600 N (C)	12.9 mm
Total deformation	19.9 mm

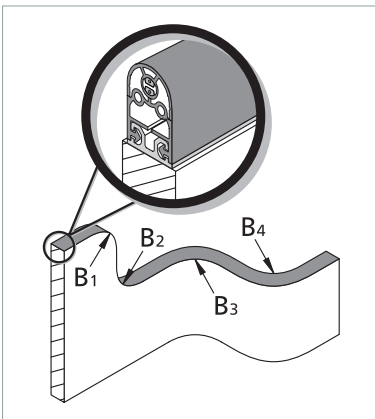


## Technical data

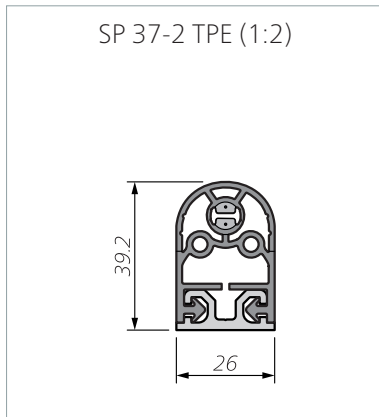
### SK SP 37(L)-2 TPE

Sensor profile (without control unit)	SK SP/W 37(L)-2 TPE or SK SP/BK 37(L)-2 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	6 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±50°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 30 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	500 / 500 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	<b>SP 37-2</b> <b>SP 37L-2</b>
without aluminium profile	0.36 kg/m    0.41 kg/m
with aluminium profile C 26	0.69 kg/m    0.74 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

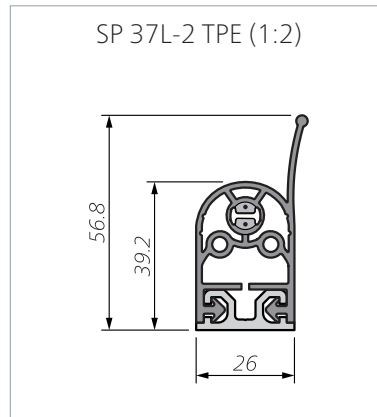
Bend radii:



## Dimensions and distances



Dimensional tolerances according to ISO 3302 E2/L2



Dimensional tolerances according to ISO 3302 E2/L2

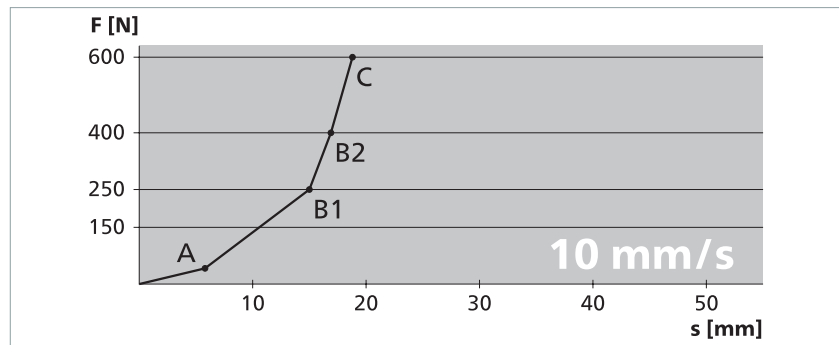
**Test conditions** according to ISO 13856-2

- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- Without control unit
- Lip not taken into account

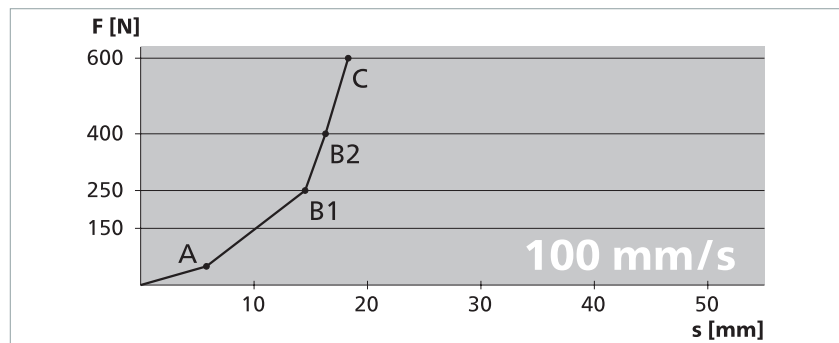
All data stated here is documented in EC type examination certificates.

### Force-distance ratios

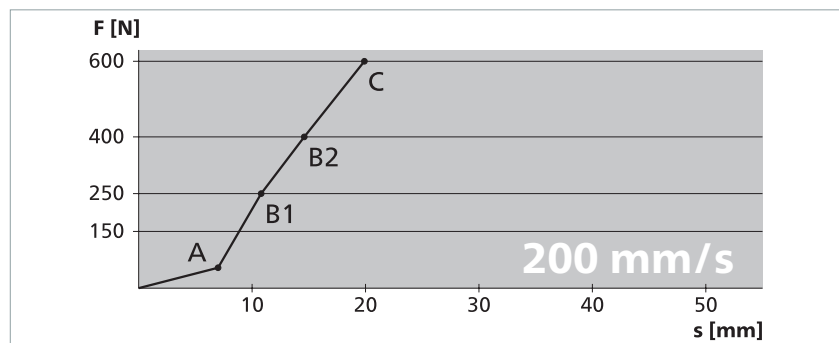
Test velocity	<b>10 mm/s</b>
Actuation force	42 N
Response time	580 ms
Actuation distance (A)	5.8 mm
Overtravel distance	
up to 250 N (B1)	9.2 mm
up to 400 N (B2)	11.1 mm
up to 600 N (C)	13.0 mm
Total deformation	18.8 mm



Test velocity	<b>100 mm/s</b>
Actuation force	50 N
Response time	58 ms
Actuation distance (A)	5.8 mm
Overtravel distance	
up to 250 N (B1)	8.7 mm
up to 400 N (B2)	10.5 mm
up to 600 N (C)	12.5 mm
Total deformation	18.3 mm



Test velocity	<b>200 mm/s</b>
Actuation force	54 N
Response time	35 ms
Actuation distance (A)	7.0 mm
Overtravel distance	
up to 250 N (B1)	3.8 mm
up to 400 N (B2)	7.6 mm
up to 600 N (C)	12.9 mm
Total deformation	19.9 mm

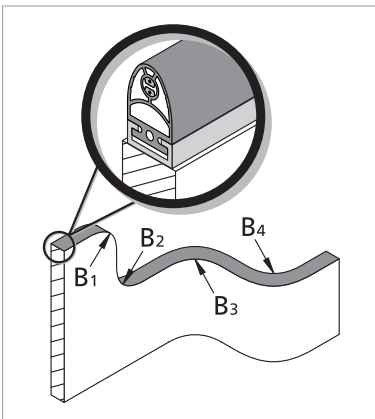


## Technical data

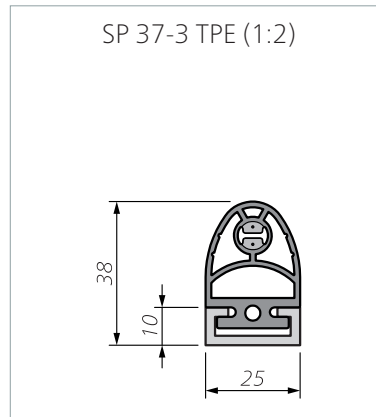
### SK SP 37-3 TPE

Sensor profile (without control unit)	SK SP/W 37-3 TPE or SK SP/BK 37-3 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	6 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±50°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 30 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	500 / 500 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	SP 37-3
without aluminium profile	0.34 kg/m
with aluminium profile C 25	0.66 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

Bend radii:



## Dimensions and distances



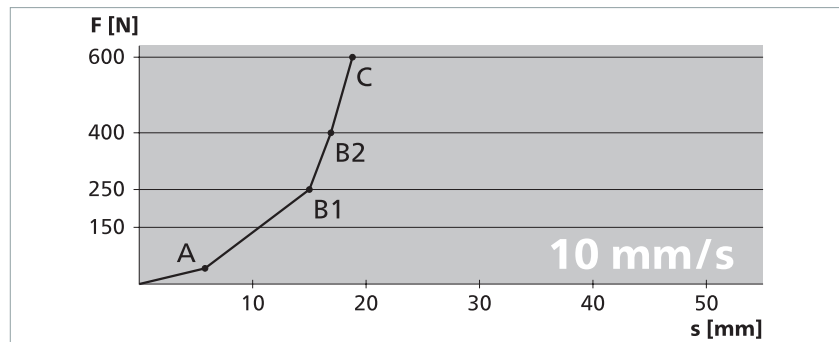
Dimensional tolerances according to ISO 3302 E2/L2

**Test conditions** according to ISO 13856-2

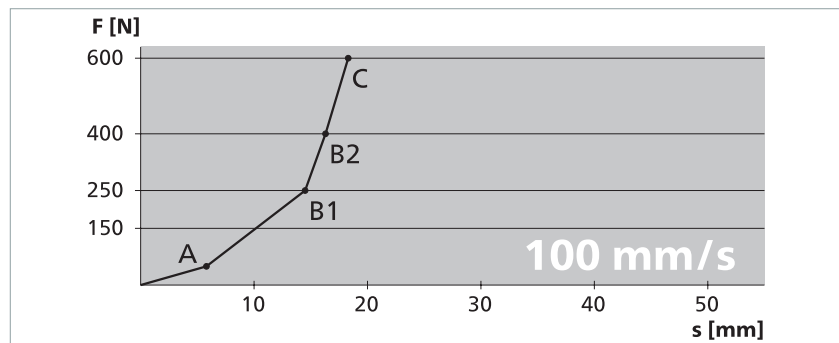
- Installation position B
  - Temperature +20 °C
  - Measurement point c3
  - Test sample 1 with Ø 80 mm
  - Without control unit
- All data stated here is documented in EC type examination certificates.

### Force-distance ratios

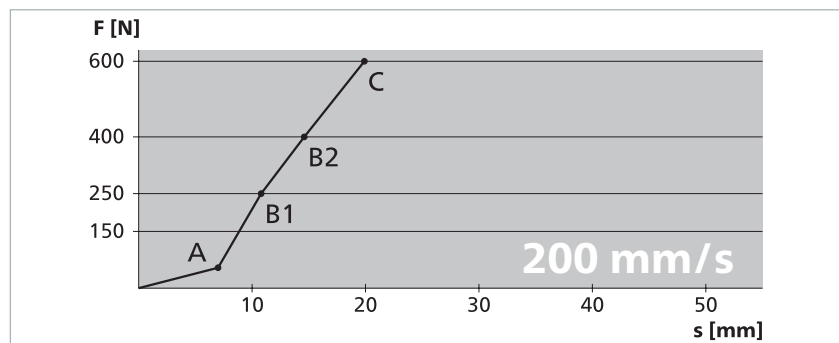
Test velocity	<b>10 mm/s</b>
Actuation force	42 N
Response time	580 ms
Actuation distance (A)	5.8 mm
Overtravel distance	
up to 250 N (B1)	9.2 mm
up to 400 N (B2)	11.1 mm
up to 600 N (C)	13.0 mm
Total deformation	18.8 mm



Test velocity	<b>100 mm/s</b>
Actuation force	50 N
Response time	58 ms
Actuation distance (A)	5.8 mm
Overtravel distance	
up to 250 N (B1)	8.7 mm
up to 400 N (B2)	10.5 mm
up to 600 N (C)	12.5 mm
Total deformation	18.3 mm



Test velocity	<b>200 mm/s</b>
Actuation force	54 N
Response time	35 ms
Actuation distance (A)	7.0 mm
Overtravel distance	
up to 250 N (B1)	3.8 mm
up to 400 N (B2)	7.6 mm
up to 600 N (C)	12.9 mm
Total deformation	19.9 mm



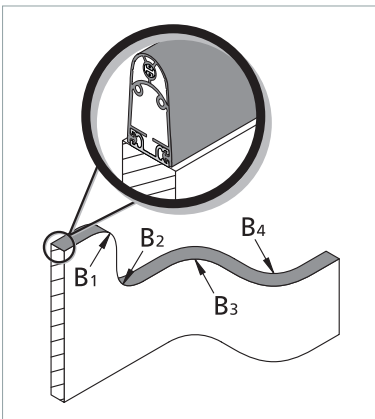


## Technical data

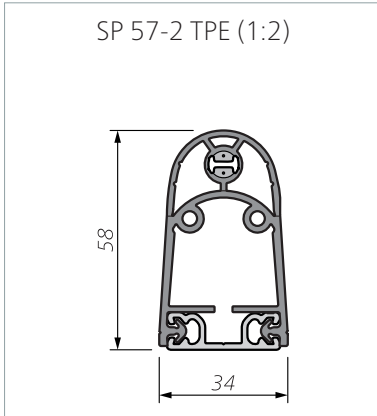
### SK SP 57(L)-2 TPE

Sensor profile (without control unit)	SK SP/W 57(L)-2 TPE or SK SP/BK 57(L)-2 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	8 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±45°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 30 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	1000 / 1000 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	<b>SP 57-2</b> <b>SP 57L-2</b>
without aluminium profile	0.44 kg/m    0.47 kg/m
with aluminium profile C 30	0.74 kg/m    0.77 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

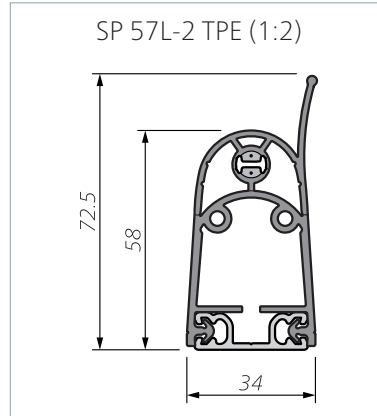
Bend radii:



## Dimensions and distances



Dimensional tolerances according to ISO 3302 E2/L2



Dimensional tolerances according to ISO 3302 E2/L2

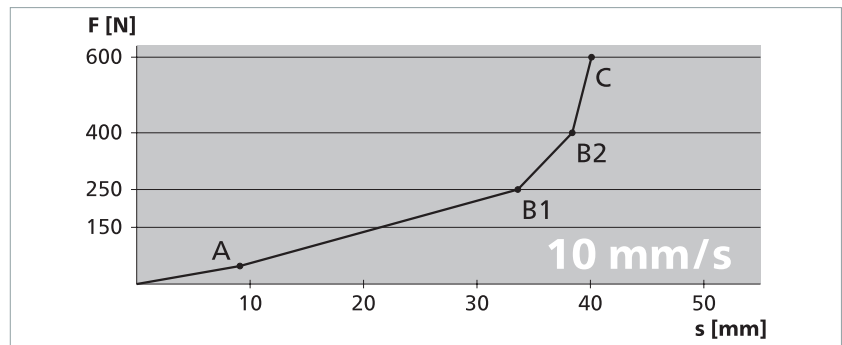
**Test conditions** according to ISO 13856-2

- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- Without control unit
- Lip not taken into account

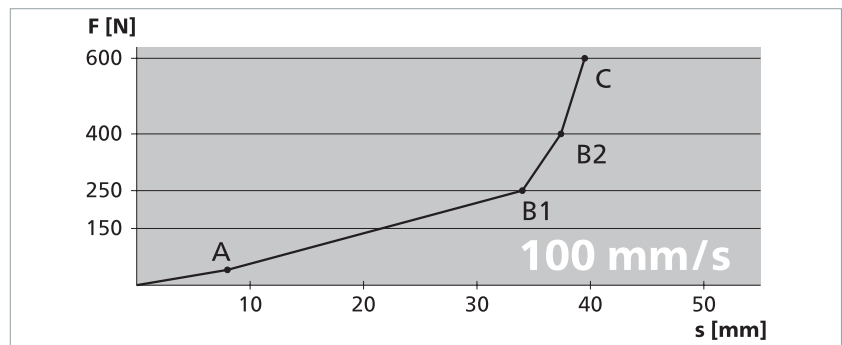
All data stated here is documented in EC type examination certificates.

### Force-distance ratios

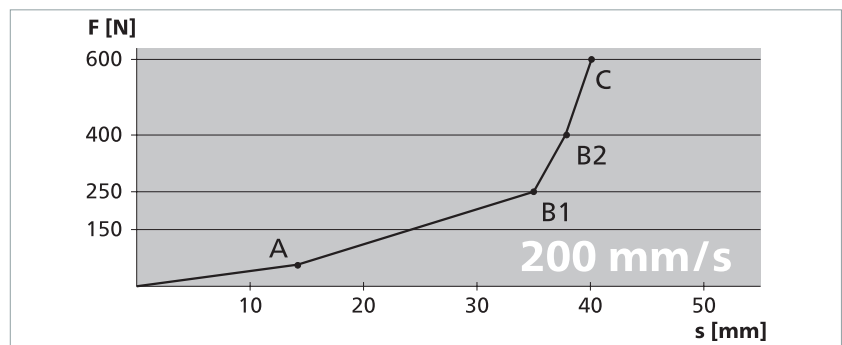
Test velocity	<b>10 mm/s</b>
Actuation force	48 N
Response time	910 ms
Actuation distance (A)	9.1 mm
Overtravel distance	
up to 250 N (B1)	24.5 mm
up to 400 N (B2)	29.3 mm
up to 600 N (C)	31.0 mm
Total deformation	40.1 mm



Test velocity	<b>100 mm/s</b>
Actuation force	41 N
Response time	80 ms
Actuation distance (A)	8.0 mm
Overtravel distance	
up to 250 N (B1)	26.0 mm
up to 400 N (B2)	29.4 mm
up to 600 N (C)	31.5 mm
Total deformation	39.5 mm



Test velocity	<b>200 mm/s</b>
Actuation force	58 N
Response time	71 ms
Actuation distance (A)	14.2 mm
Overtravel distance	
up to 250 N (B1)	20.8 mm
up to 400 N (B2)	23.7 mm
up to 600 N (C)	25.9 mm
Total deformation	40.1 mm

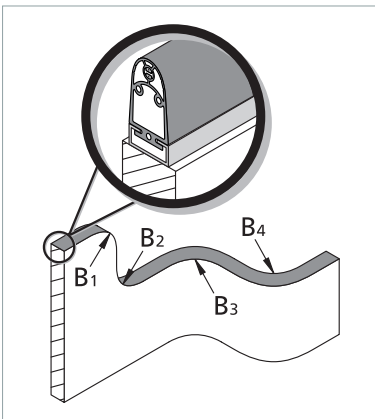


## Technical data

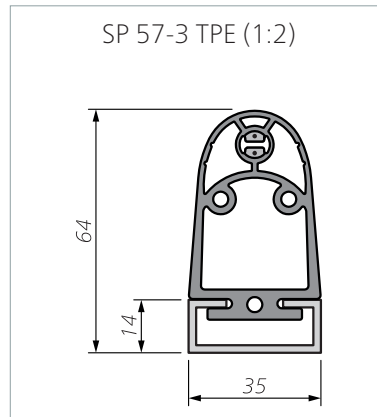
### SK SP 57-3 TPE

Sensor profile (without control unit)	SK SP/W 57-3 TPE or SK SP/BK 57-3 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	8 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±45°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 25 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	1000 / 1000 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	SP 57-3
without aluminium profile	0.60 kg/m
with aluminium profile C 35	1.00 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

Bend radii:



## Dimensions and distances



Dimensional tolerances according to ISO 3302 E2/L2

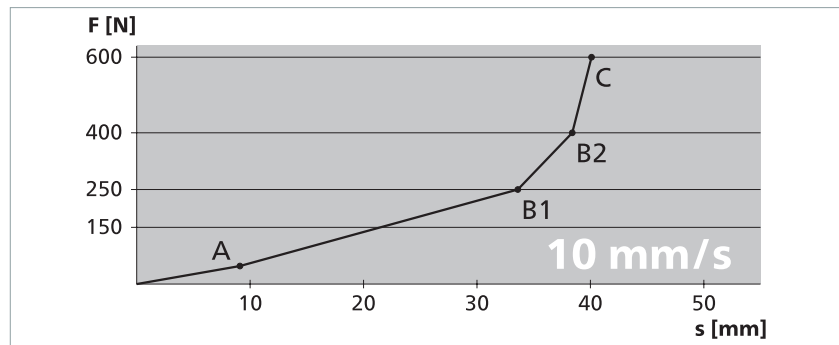
**Test conditions** according to ISO 13856-2

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

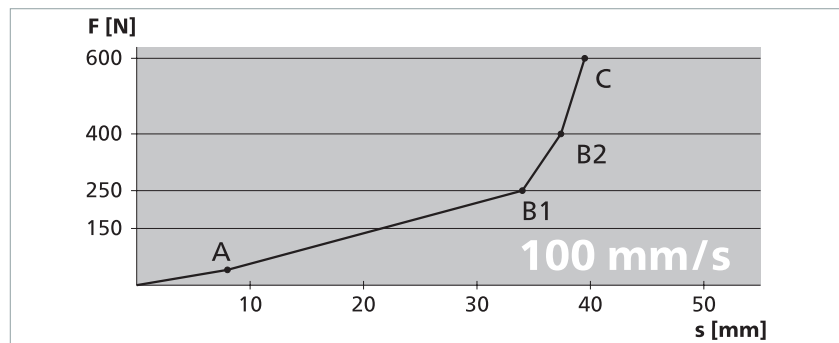
All data stated here is documented in EC type examination certificates.

### Force-distance ratios

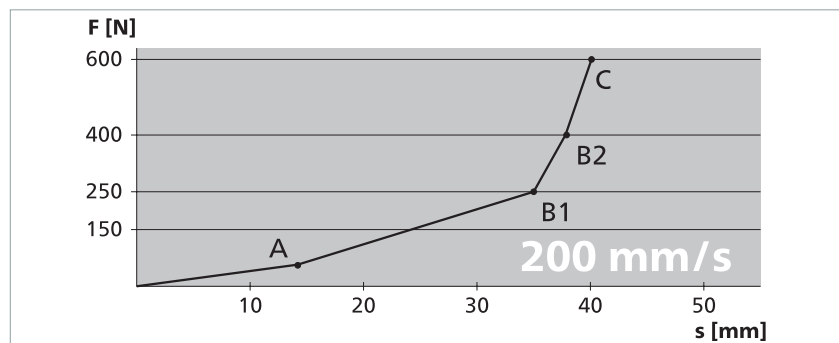
Test velocity	<b>10 mm/s</b>
Actuation force	48 N
Response time	910 ms
Actuation distance (A)	9.1 mm
Overtravel distance	
up to 250 N (B1)	24.5 mm
up to 400 N (B2)	29.3 mm
up to 600 N (C)	31.0 mm
Total deformation	40.1 mm



Test velocity	<b>100 mm/s</b>
Actuation force	41 N
Response time	80 ms
Actuation distance (A)	8.0 mm
Overtravel distance	
up to 250 N (B1)	26.0 mm
up to 400 N (B2)	29.4 mm
up to 600 N (C)	31.5 mm
Total deformation	39.5 mm



Test velocity	<b>200 mm/s</b>
Actuation force	58 N
Response time	71 ms
Actuation distance (A)	14.2 mm
Overtravel distance	
up to 250 N (B1)	20.8 mm
up to 400 N (B2)	23.7 mm
up to 600 N (C)	25.9 mm
Total deformation	40.1 mm

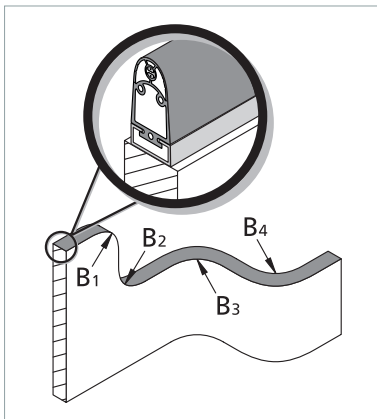


## Technical data

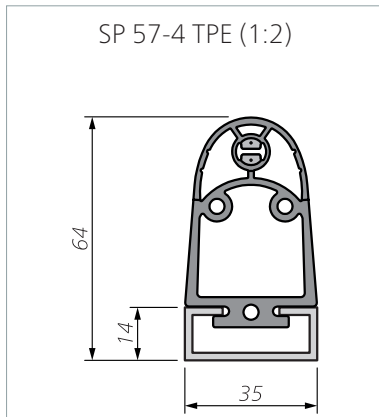
### SK SP 57(L)-4 TPE

Sensor profile (without control unit)	SK SP/W 57(L)-4 TPE or SK SP/BK 57(L)-4 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	8 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	±45°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 25 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	1000 / 1000 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	<b>SP 57-4</b> <b>SP 57L-4</b>
without aluminium profile	0.58 kg/m    0.62 kg/m
with aluminium profile C 35	0.99 kg/m    1.03 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

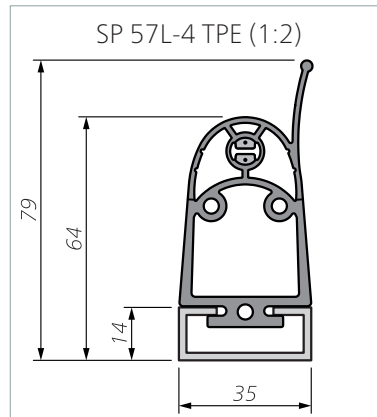
Bend radii:



## Dimensions and distances



Dimensional tolerances according to ISO 3302 E2/L2



Dimensional tolerances according to ISO 3302 E2/L2

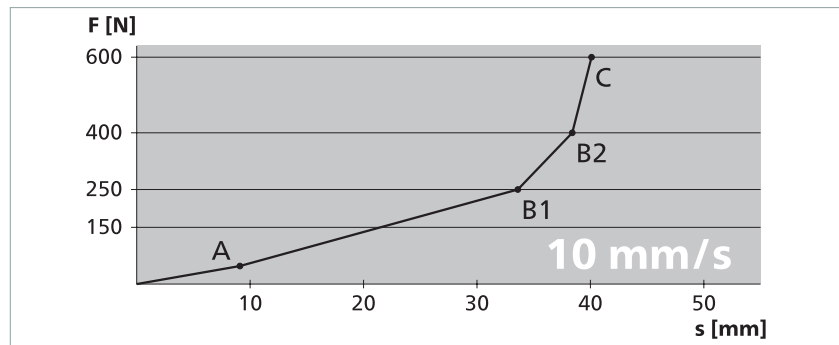
**Test conditions** according to ISO 13856-2

- Installation position B
- Temperature +20 °C
- Measurement point c3
- Test sample 1 with Ø 80 mm
- Without control unit
- Lip not taken into account

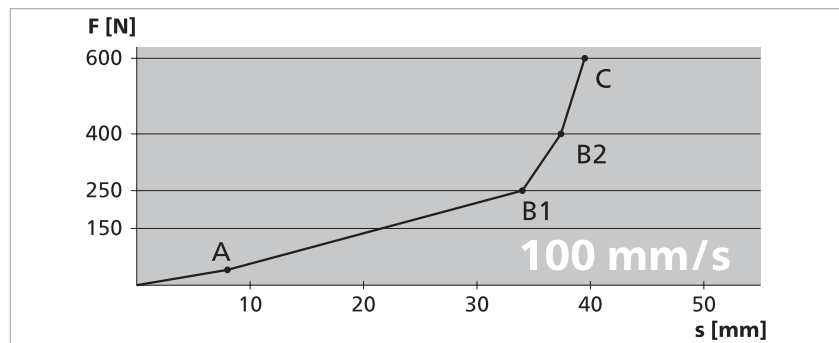
All data stated here is documented in EC type examination certificates.

### Force-distance ratios

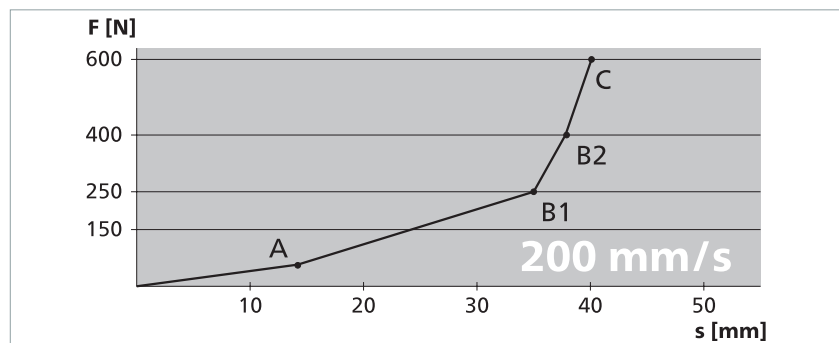
Test velocity	<b>10 mm/s</b>
Actuation force	48 N
Response time	910 ms
Actuation distance (A)	9.1 mm
Overtravel distance	
up to 250 N (B1)	24.5 mm
up to 400 N (B2)	29.3 mm
up to 600 N (C)	31.0 mm
Total deformation	40.1 mm



Test velocity	<b>100 mm/s</b>
Actuation force	41 N
Response time	80 ms
Actuation distance (A)	8.0 mm
Overtravel distance	
up to 250 N (B1)	26.0 mm
up to 400 N (B2)	29.4 mm
up to 600 N (C)	31.5 mm
Total deformation	39.5 mm



Test velocity	<b>200 mm/s</b>
Actuation force	58 N
Response time	71 ms
Actuation distance (A)	14.2 mm
Overtravel distance	
up to 250 N (B1)	20.8 mm
up to 400 N (B2)	23.7 mm
up to 600 N (C)	25.9 mm
Total deformation	40.1 mm

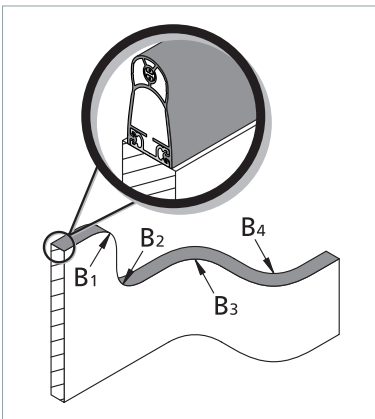


## Technical data

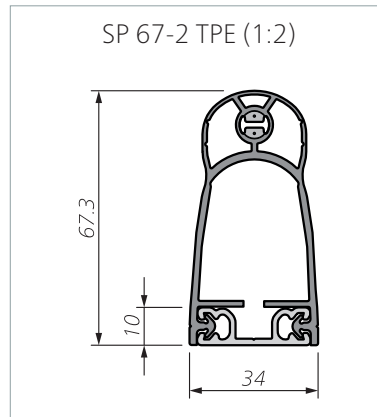
### SK SP 67-2 TPE

Sensor profile (without control unit)	SK SP/W 67-2 TPE or SK SP/BK 67-2 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
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	± 45°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 30 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	1000 / 1000 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	SP 67-2
without aluminium profile	0.49 kg/m
with aluminium profile C 30	0.79 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2× 0.25 mm <sup>2</sup>

Bend radii:



## Dimensions and distances



Dimensional tolerances according to ISO 3302 E2/L2

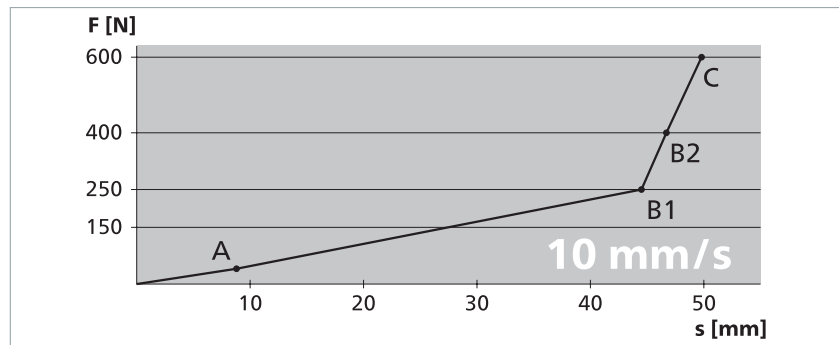
**Test conditions** according to ISO 13856-2

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

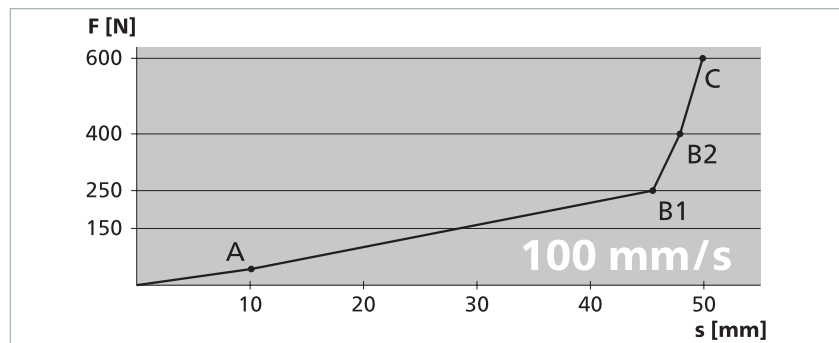
All data stated here is documented in EC type examination certificates.

### Force-distance ratios

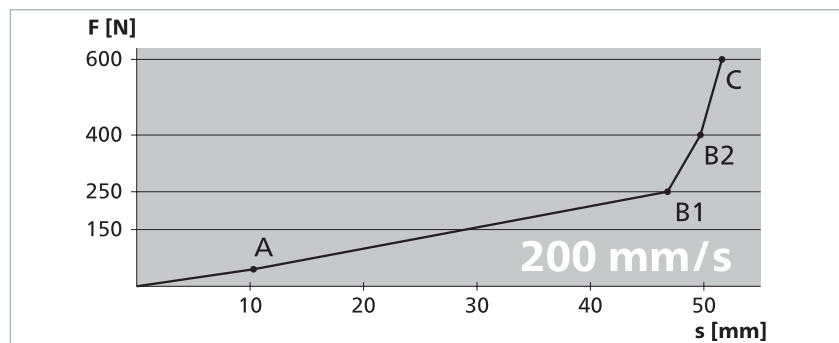
Test velocity	<b>10 mm/s</b>
Actuation force	41 N
Response time	880 ms
Actuation distance (A)	8.8 mm
Overtravel distance	
up to 250 N (B1)	35.7 mm
up to 400 N (B2)	37.9 mm
up to 600 N (C)	41 mm
Total deformation	49.8 mm



Test velocity	<b>100 mm/s</b>
Actuation force	43 N
Response time	101 ms
Actuation distance (A)	10.1 mm
Overtravel distance	
up to 250 N (B1)	35.4 mm
up to 400 N (B2)	37.8 mm
up to 600 N (C)	39.8 mm
Total deformation	49.9 mm



Test velocity	<b>200 mm/s</b>
Actuation force	45 N
Response time	51.5 ms
Actuation distance (A)	10.3 mm
Overtravel distance	
up to 250 N (B1)	36.5 mm
up to 400 N (B2)	39.4 mm
up to 600 N (C)	41.3 mm
Total deformation	51.6 mm



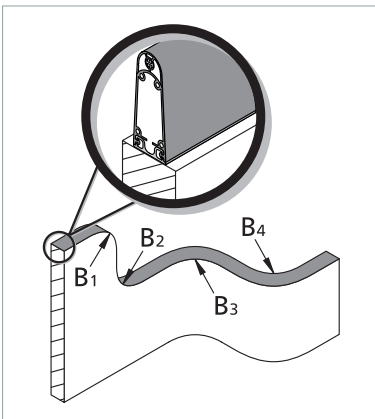


## Technical data

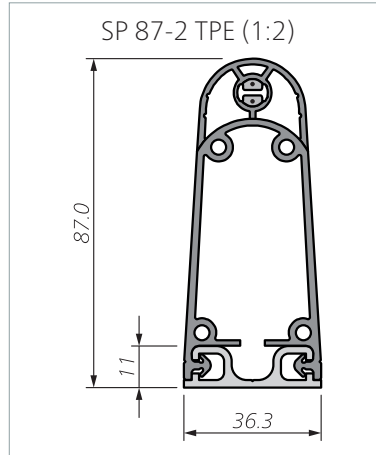
### SK SP 87-2 TPE

Sensor profile (without control unit)	SK SP/W 87-2 TPE or SK SP/BK 87-2 TPE
Testing basis	EN 12978, ISO 13849-1, ISO 13856-2
<b>Switching characteristics at <math>v_{\text{test}} = 100 \text{ mm/s}</math></b>	
Switching operations	10,000
Actuation force	
Test piece (rod) Ø 20 mm	< 50 N
Test piece (cylinder) Ø 80 mm	< 150 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	9 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	± 45°
Finger detection	Yes
<b>Safety classifications</b>	
ISO 13849-1: B <sub>10D</sub>	2x 10 <sup>6</sup>
<b>Mechanical operating conditions</b>	
Sensor length (min./max.)	10 cm / 25 m
Cable length (min./max.)	10 cm / 100 m
Bend radii, minimum	
B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub>	1000 / 1000 / 200 / 200 mm
Operating velocity (min. / max.)	10 mm/s / 200 mm/s
Max. load capacity (impulse)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP67
SP in water: 9 cm bottom edge	IPX8: 13 days
Operating temperature	-25 to +55 °C
short-term (15 min)	-40 to +80 °C
Storage temperature	-40 to +80 °C
Weight	SP 87-2
without aluminium profile	0.64 kg/m
with aluminium profile C 36	1.06 kg/m
<b>Electrical operating conditions</b>	
Terminal resistance	8k2 ±1%
Nominal output (max.)	250 mW
Contact transition resistance	< 400 ohms (per sensor)
Number of BK-type sensors	Max. 5 in series
Switching voltage (max.)	DC 24 V
Switching current (min./max.)	1 mA / 10 mA
Connection cable	Ø 2.9 mm PUR 2x 0.25 mm <sup>2</sup>

Bend radii:



## Dimensions and distances



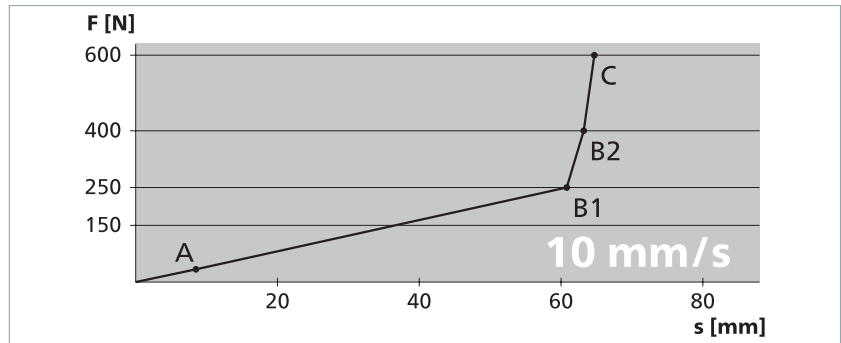
Dimensional tolerances according to ISO 3302 E2/L2

**Test conditions** according to ISO 13856-2

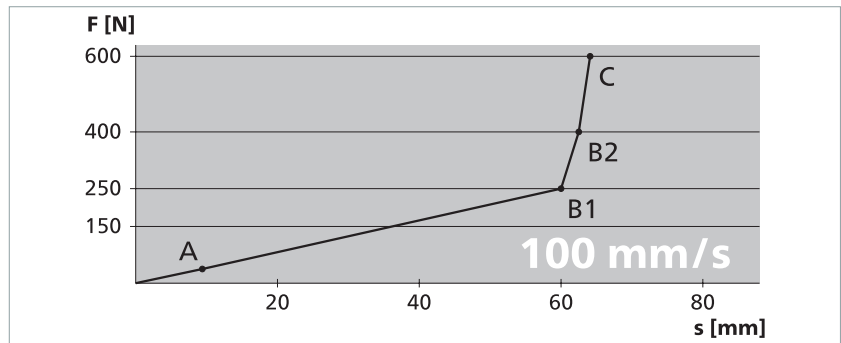
- Installation position B
  - Temperature +20 °C
  - Measurement point c3
  - Test sample 1 with Ø 80 mm
  - Without control unit
- All data stated here is documented in EC type examination certificates.

### Force-distance ratios

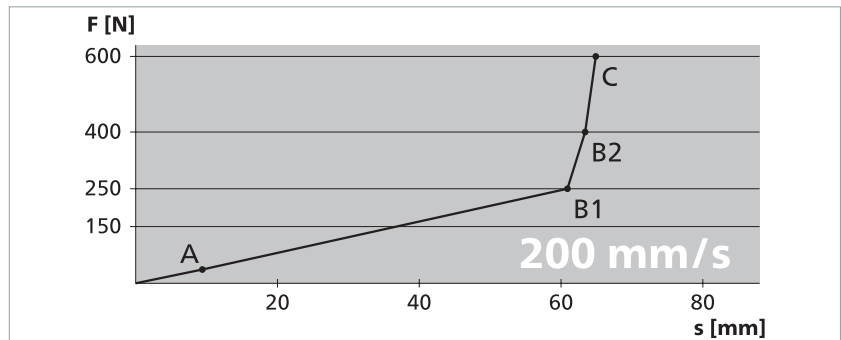
Test velocity	<b>10 mm/s</b>
Actuation force	34 N
Response time	850 ms
Actuation distance (A)	8.5 mm
Overtravel distance	
up to 250 N (B1)	52.3 mm
up to 400 N (B2)	54.7 mm
up to 600 N (C)	56.2 mm
Total deformation	64.7 mm



Test velocity	<b>100 mm/s</b>
Actuation force	38 N
Response time	81 ms
Actuation distance (A)	8.1 mm
Overtravel distance	
up to 250 N (B1)	51.9 mm
up to 400 N (B2)	54.4 mm
up to 600 N (C)	56.0 mm
Total deformation	64.1 mm



Test velocity	<b>200 mm/s</b>
Actuation force	37 N
Response time	47 ms
Actuation distance (A)	9.4 mm
Overtravel distance	
up to 250 N (B1)	51.5 mm
up to 400 N (B2)	54.0 mm
up to 600 N (C)	55.5 mm
Total deformation	64.9 mm



## Marking

If you combine sensors with control units and thereby place pressure-sensitive protection devices on the market, you should observe the basic requirements according to ISO 13856.

As well as meeting technical requirements, this also means – in particular – observing any that relate to marking and information for use.

## Conformity

### EC type examination

The product has been tested by an independent institute.

There is an EC type examination certificate to confirm conformity.

The EC type examination certificate is stored in the Downloads section of our website: [www.mayser.com](http://www.mayser.com).

## UL certification

The design type of the product conforms to the basic requirements of UL certification:

- UL 325

