

## DIY sensor profiles SP



EN | Installation instructions

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## Safety first!



- Read the manual carefully before use.
- Warning signs in the manual warn of unexpected dangers. Always observe warning signs.
- Retain the manual throughout the service life of the product.
- Pass the manual on to every subsequent owner or user of the product.
- Insert every supplement received from the manufacturer into the manual.
- **Observe chapter on Safety starting on page 5.**

## Conformity

### EC design test

The product was tested by an independent institute.

An EC design type test certificate confirms conformity.

The EC design type test certificate is available in the download section of the website: [www.mayser.com](http://www.mayser.com).

## UL certification

The design type of the product complies with the basic requirements of UL certification:

- UL 325

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## About this manual

This manual is an integral part of the product.  
 Mayser will assume no liability and provide no guarantee whatsoever for damages and consequential damages resulting from failure to comply with the manual.

**Validity**

This manual is valid only for the product specified on the title page.

**Target group**

This manual is intended for the owner and electricians. The electrician must be familiar with the installation and commissioning.

**Other applicable documents**

- ➔ Also observe the following documents:
  - Product information
  - Drawing of the sensor system (optional)
  - Wiring diagram (optional)
  - Operating manual for the switching device used

**Symbols used**

Symbol	Meaning
➔ ...	Action with one or more steps whose order is not relevant.
1. ...	Action with several steps whose order is relevant.
• ... - ...	Bullets first level Bullets second level
(see Section <i>Installation</i> )	Cross-reference

**Danger symbols and information**

Symbol	Meaning
<b>⚠ DANGER</b>	Immediate danger leading to death or serious injury.
<b>⚠ WARNING</b>	Imminent danger which may lead to death or serious injury.
<b>⚠ CAUTION</b>	Possible danger which may lead to minor or moderate injuries.
<b>NOTE</b>	Potential danger of property damage or environmental degradation. Information on easier and safer working practices.

**Dimensions in drawings**

Unless otherwise indicated, all dimensions are stated in millimetres (mm).

## Safety

### Intended use

This product is designed as a linear pressure-sensitive protective device for hazardous closing edges. The sensor is activated by pressure on the actuation area. In the idle state, no pressure must be applied to the sensor.

#### Limits

- max. 5 sensors type /BK on one control unit
- max. 4 sensors type /BK and 1 sensor type /W on one control unit

### Safety instructions

For your **own safety** the following safety instructions apply.

#### ➔ Prevent electric shock

When working on electrical systems, always disconnect them from the power supply and secure them against being switched on again, to prevent injuries from electric shock.

#### ➔ Ensure careful configuration of interface

The quality and reliability of the interface between the safety device and the machine affects the overall safety. Take special care when setting up this interface.

#### ➔ Do not enclose or cover the sensors

Outer profiles and covers have a negative effect on the sensor functions. Take measures to ensure that the sensors are never pulled into an outer profile or covered by other elements.

#### ➔ Prevent restarting of the machine

As long as a hazard continues to exist, take measures to prevent the machine from restarting, for example by means of a startup lockout.

#### ➔ Disable in case of error

Disable the safety device in case of malfunctions or visible damage.

To prevent irreparable damage to the **product**, the following safety instructions apply.

#### ➔ Avoid kinks in cables

Avoid extreme cable kinking.

➔ **Observe minimum bend radius thresholds**

Never exceed the lower minimum bending radius thresholds specified in the Technical Data.

➔ **Do not pull on cables**

Avoid pulling on cables.

➔ **Do not use sensors as seals; exception: L version**

Never use a sensor as a seal for the closing edge. Constant actuation of sensors can result in permanent damage.

**Exception:** The L-version with an attached edge seal. The edge seal can be in full contact with the closing edge, which allows it to repel wind and water.

➔ **Handling of long sensors**

Always have two people carry sensors with a length of more than 3 m, in order to prevent impacts during transport.

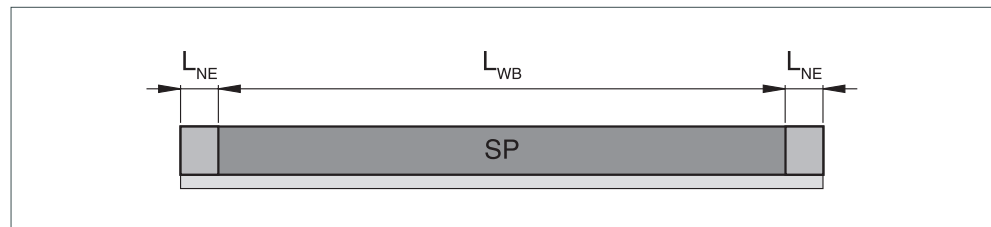
➔ **No sharp-edged objects**

Do not allow the sensor to be subjected to sharp-edged objects.

## Residual dangers

### Non-sensitive areas

The edge areas of the sensor are not sensitive. Actuation of non-sensitive areas disables the safety function of the sensor.



$L_{NE}$  = non-sensitive edges

$L_{WB}$  = effective actuation length

SP	17-3 TPE	37-1 TPE 37(L)-2 TPE 37-3 TPE	57(L)-2 TPE 57-3 TPE 57(L)-4 TPE	67-2 TPE	87-2 TPE
End cap	without	with	with	with	with
$L_{NE}$	60 mm	20 mm	10 mm	20 mm	10 mm

➔ Always protect the closing edge with a single sensor.

➔ Do not assemble sensors across corners.

## Parts supplied

The scope of supply is listed in the delivery note.

- ➔ Upon receipt of the parts supplied, check immediately for completeness and good condition.

## Storage

- ➔ Store the sensors in the original package, in a dry place.
- ➔ Do not stack packaging materials or allow them to be subjected to pressure.
- ➔ Store cardboard tube packaging horizontally.
- ➔ Comply with the storage temperature specified in the technical data.
- ➔ Store assembled sensors either flat or rolled. Never folded.

## Installation

➔ Prior to installation, check on the basis of the technical data whether the product is suitable for your particular application (see *Technical data*).

### Overview

Depending on the type of do-it-yourself (DIY) solution and the choice of aluminium profile there will be slight differences in the order of the assembly steps.

Assembly steps \ Assembly variants	DIY completely on site	DIY in shop, assembly on site	DIY with Type M aluminium profile
<b>Prepare assembly</b>	X	X	X
<b>DIY</b>			
Cut to length	X	X	X
Insert	X	X	X
Clamp	X	X	X
Clip in for transport	–	X	X
Closing	–	–	X
Separate SP from aluminium profile (on site)	–	X	–
Separate aluminium profile lower section	–	–	X
Mount aluminium profile on closing edge	X	X	X
Fasten aluminium profile upper section with SP	–	–	X
Clip in	X	X	–
Closing	X	X	–
Final test after completion of DIY assembly	X	X	X

The assembly steps for „DIY on site“ are described below.

If the sensor profile is pre-assembled in the shop, there are two additional assembly steps. They are necessary to ensure safe transport of the sensor.

To facilitate handling during mounting of pre-assembled sensors, Mayser recommends using the Type M aluminium profile.



## Preparing the installation

- ➔ Prepare the installation surface as follows:
  - Remove any dirt particles from the installation surface.
  - Make sure that the installation surface is level and firm.
  - Make sure that cable bushings have been deburred.
  
- ➔ Have the necessary tools and aids ready for installation.
  - Profile scissors (1005906)
  - Notching pliers (1005741)
  - Assembly aid SH3 (7502868)
  - Vice-grip pliers (1005729)
  - Drill and drill bit for M5 screws
  - M5 countersunk or cheese head screws
  - Brush and seam roller, if necessary

### Unpacking the product

Follow the handling instructions in the chapter *Safety instructions*.

1. Place the single parts and the installation accessories next to each other at the installation location.
2. Check whether all needed parts are present and in perfect condition.

## DIY

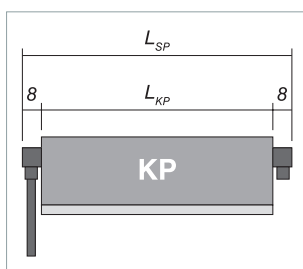
This chapter describes

- cutting the contact profile to length,
- insertion and clamping of the closing plug,
- mounting to the closing edge,
- putting on the end caps and
- final testing.

The end product is an SP sensor profile with degree of protection IP67.

### Cutting to length

**without** end caps



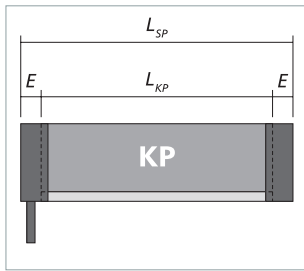
1. Measure out the required length of the contact profile (CP) and mark the cutting point. The following applies:

$$L_{KP} = L_{SP} - 16 \text{ mm (without end caps)}$$

$$L_{KP} = \text{Length of contact profile}$$

$$L_{SP} = \text{Length of sensor profile}$$

with end caps



Or:  $L_{KP} = L_{SP} - (2 \times E)$  mm (**with** end caps)  
 $L_{KP}$  = Length of Contact profile  
 $L_{SP}$  = Length of sensor profile  
 E = end cap

SP	37-1	37(L)-2	37-3	57(L)-2	57-3	57(L)-4	67-2	87-2
E	9	11	11	11	11	11	11	11

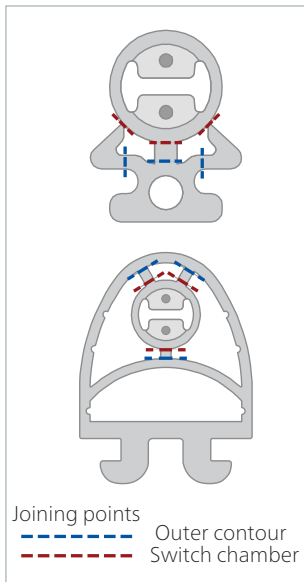
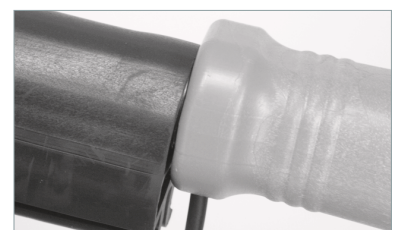
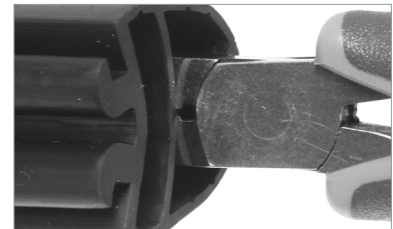
- Cut the contact profile at the marked point with the profile scissors



### Insertion

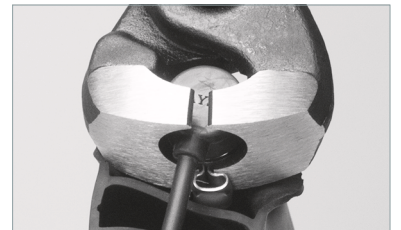
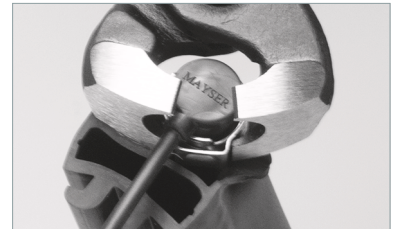
Cut into all 3 webs with the notching pliers by approx. 10 mm (full cut length):

- First cut into the webs at the points where they join the outer contour.
- Fold out the outer contour. (This step is not necessary for SP 17-3.)
- Cut into the webs at the points where they join the switch chamber.
- Tear off the cut web pieces.
- Place an ear clamp onto the switch chamber.  
Tip: Turn ear so it points down at 6 o'clock position.
- Place a closing plug into assembly aid SH3.
- Insert closing plug as far as it will go into contact profile.



### Clamping

1. Place the vice-grip wrench onto the ear.
2. With the vice-grip wrench, turn the ear clamp to 4 o' clock position.  
Alternative: 8 o' clock position.
3. Check that the ear clamp is flush with the edge of the closing plug.
4. Check that the cable lies safely inside the recess of the vice-grip wrench.
5. Clamp the ear with sufficient pressure until the wrench is closed as far as it will go.



**⚠ Warning: Failure of the safety function**

A squeezed cable can result in functional impairment of the sensor or loss of the safety function.

➔ Replace the closing plug immediately if the cable is squeezed from being jammed.

6. Repeat steps *Insertion* and *Clamping* at the other end of the contact profile with a second closing plug.

**Final test after completion of DIY assembly**

- ➔ Conduct a visual check to ensure a flush connection of the end elements all the way around.
- ➔ Use a multimeter to check for compliance with the set values.

Set value of sensor profile **not actuated:**

SP/W with 8k2      8.2 kOhm ±0.25 kOhm

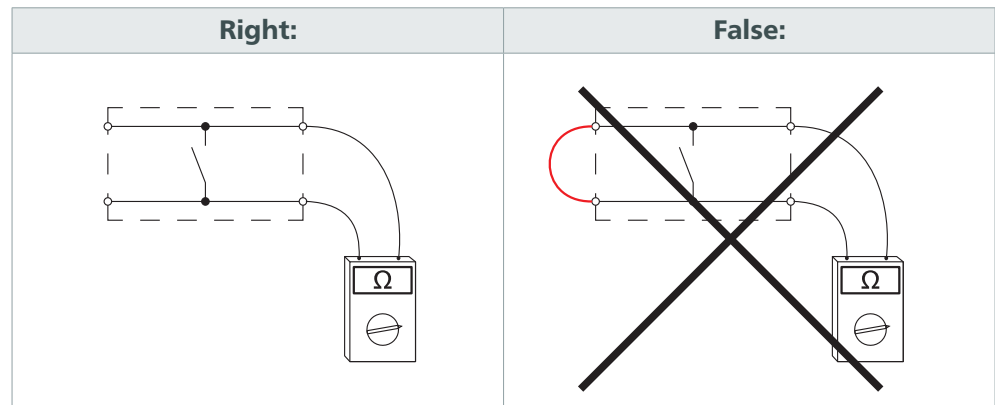
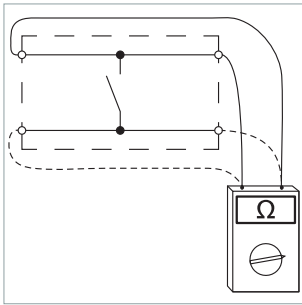
SP/BK              > 1 MOhm

Continuity check  
per channel      < 100 Ohm

Set value of sensor profile **actuated:**

each SP            < 400 Ohm

Continuity check:



In the case of severe deviations in the values, please consult the chapter *Troubleshooting and remedies*.

## Attachment

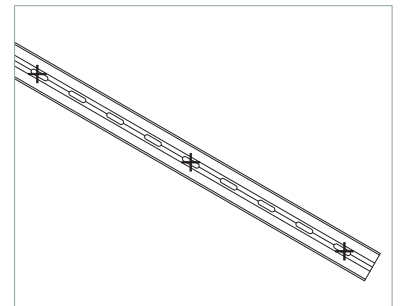
Depending on the sensor profile, mounting consists of the following steps:

- Mount on closing edge
- Clipping in and fixing
- Attach end caps

### Installation on closing edge

1. Align the aluminium profile with the closing edge:
  - Have the non-sensitive ends been taken into account?
  - Are the cable bushings freely accessible?

2. Mark the drill holes by means of the aluminium profile:
  - at the first and last oblong hole.
  - additionally at the fourth or fifth oblong hole.
  - if not yet present, for cable bushings.

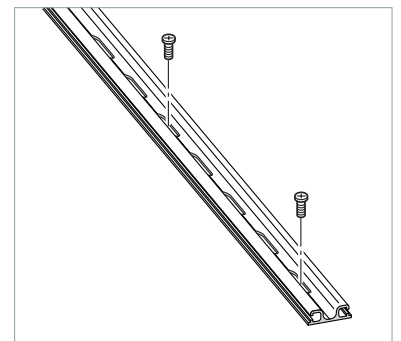


3. Remove the aluminium profile again.

4. Drill holes for M5 on the marks.

5. Deburr the holes and remove the chips.

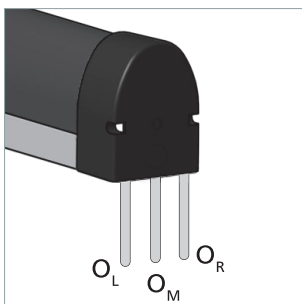
6. Fasten the aluminium profile at the oblong holes by means of countersunk screws or cheese-head screws M5.



Alternatively, the aluminium profile may be fastened by means of rivets.

For sensors with cable exit  $O_L$ ,  $O_M$  or  $O_R$ :

- ➔ Guide the cables through the prepared cable bushings before the sensor profile is fixed.



### Clipping in and fixing: Middle snap-in foot

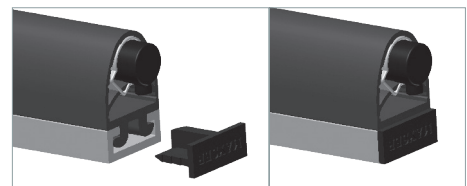
The steps in this chapter apply to the sensor profiles

- **SP 37-1**

Possible aid:

- Brushing of the aluminum profile and snap-in foot with a volatile lubricant (e.g. water with dishwashing liquid).

1. First press one side of the snap-in foot into the aluminium profile along the whole length.
2. Then clip the other side in bit by bit.
3. Press the sensor profile bit by bit against the aluminium profile from above over the entire length so that the second snap-in foot snaps in completely.
4. Insert an end stopper (1000606 or 1001223) into each end of the aluminium profile.



Finished! Now the sensor profile is functional.

This profile can also be fixed with end caps (see Chapter *Attach end caps: Middle snap-in foot*).

### Clipping in and fixing: External clip bars

The steps in this chapter apply to the sensor profiles

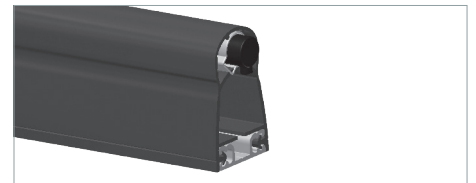
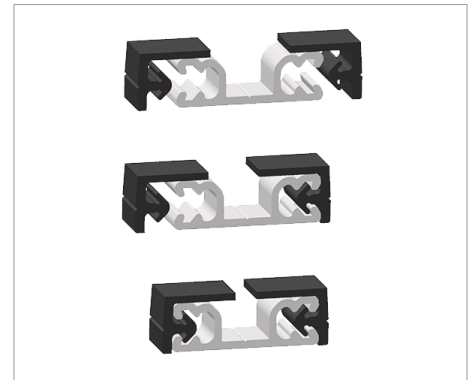
- **SP 37(L)-2**
- **SP 57(L)-2**
- **SP 67-2**
- **SP 87-2**

Possible aid:

- Brushing of the aluminum profile and clip bars with a volatile lubricant (e.g. water with dishwashing liquid).
- A joint roller for easier pressing in of the clips.

1. First clip one of the two snap-in segments into the aluminium profile along the whole length.
2. Then clip the other snap-in segment in bit by bit.

In this case, fixing is achieved only with end caps (see Chapter *Attach end caps: External clip bars*).



**Clipping in and fixing: Middle T foot**

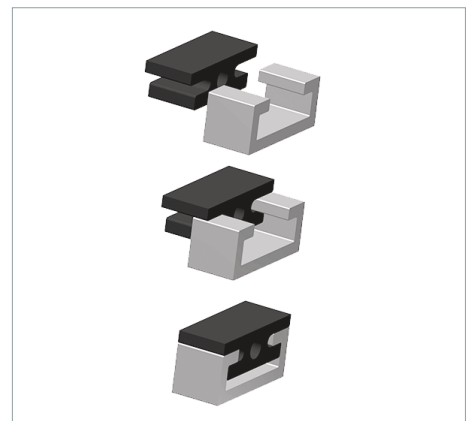
The steps in this chapter apply to the sensor profiles

- **SP 17-3**
- **SP 37-3**
- **SP 57-3**
- **SP 57(L)-4**

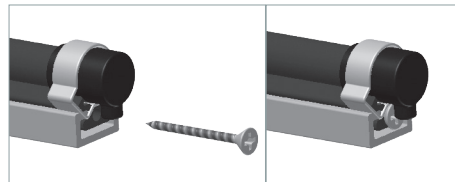
Possible aid:

- Brushing of the aluminum profile and T foot with a volatile lubricant (e.g. water with dishwashing liquid).

1. Slide the T foot into the aluminium profile along the whole length.
2. Then check that the contact profile ends flush with the aluminium profile.



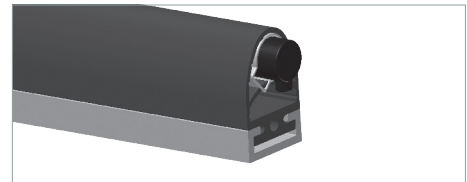
Applies only to SP 17-3:



3. Fix the aluminium profile to the contact profile with the counter-sunk screws (1005786).

Finished! Now the sensor profile is functional.

Applies to all others:



In this case, fixing is achieved only with end caps (see Chapter *Attach end caps: Middle T foot*).

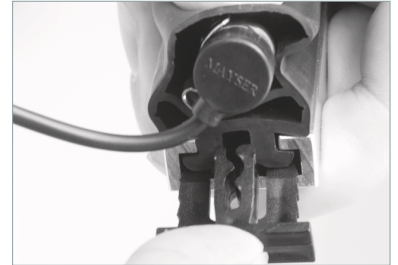


**Attach end caps: Middle snap-in foot**

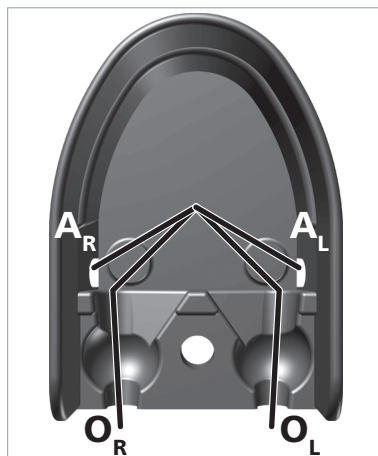
The steps in this chapter apply to the sensor profiles

- **SP 37-1** with set of end caps 7503008

Closure with end caps is technically not necessary but gives a better appearance.



1. Remove the end cap, if present.
2. If necessary, press the sensor profile together so the snap-in foot makes room for the fixing stopper.
3. Press the fixing stoppers as far as they will go into the aluminium profile.



Viewed from outside:

- A = axial
  - O = orthogonal
  - R = right
  - M = middle
  - L = left
- (Figure shows inner side)

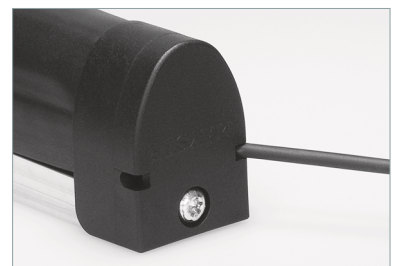
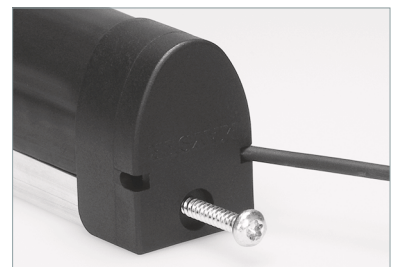
**Case A:** lateral (axial) cable exit

4. Pull cable through the desired cut-out.
5. Continue with step 6.

**Case O:** bottom (orthogonal) cable exit

4. Initially place end cap on loosely.
5. Place cable into channel provided.

6. Slide the end cap on completely and press it firmly against the aluminium profile.
7. Screw on the end cap with the self-cutting screw on the fixing stopper.
8. Close the other end of the sensor profile in the same way with a second end cap.



**Attach end caps: External clip bars**

The steps in this chapter apply to the sensor profiles

- **SP 37(L)-2** with set of end caps 7503988
- **SP 57(L)-2** with set of end caps 7503603
- **SP 67-2** with set of end caps 7503655
- **SP 87-2** with set of end caps 7504118

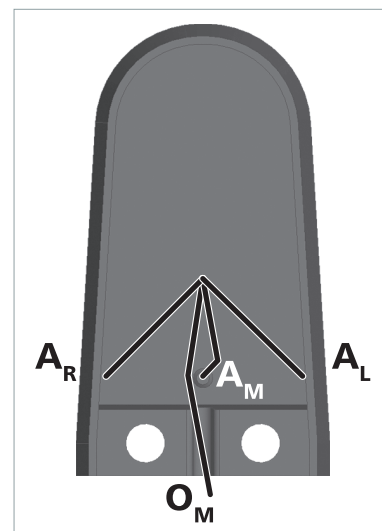
To fasten the sensor profile on the aluminium profile, the end caps are missing on the ends.

For sensor profiles **with** lip (SP 37L-2 and SP 57L-2) a 10 mm notch (full length of cut) must be cut with notching pliers into the end caps for holding the lip. For sensor profiles **without** lip steps 1 and 2 do not apply.

1. Mark the location on the end cap that is to hold the lip (red in photo) when the end cap is put on.
2. Cut a notch in the end cap at the marking.



**Alternatively:** Leave the end cap intact and cut a 10 mm notch into the lip along the seam of the sensor profile.



Viewed from outside:

A = axial

O = orthogonal

R = right

M = middle

L = left

(Figure shows inner side)

**Case A:** lateral (axial) cable exit

3. Use a hole punch to punch out the required cut-out at one of the specified points.
4. Pull cable through the desired cut-out.

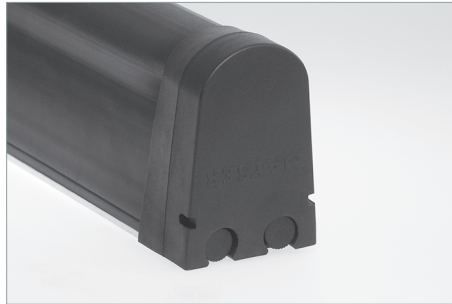
**Case O:** bottom (orthogonal) cable exit

3. Initially place end cap on loosely.
4. Place cable into channel provided.
5. Slide the end cap on completely and press it firmly against the aluminium profile.

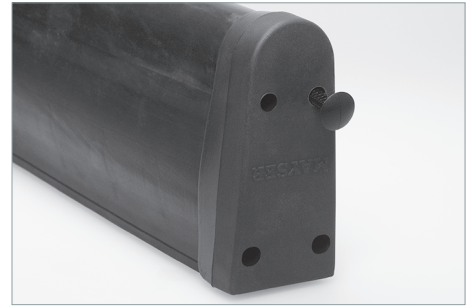
Applies to SP 67-2:



6. Fix the end cap to the aluminium profile with the pine tree clips.



Applies to all others:



6. Fix the end cap to the contact profile with the pine tree clips.



7. Close the other end of the sensor profile in the same way with a second end cap.

**Alternatively:** Mounting with screws

- **SP 57(L)-2** with set of end caps 7503062

6. Screw down the end caps with the two flat head self-tapping screws AEM 5x20.



7. Close the other end of the sensor profile in the same way with a second end cap.

**Attach end caps: Middle T foot**

The steps in this chapter apply to the sensor profiles

- **SP 37-3** with set of end caps 7503505 or 7503654
- **SP 57-3** with set of end caps 7503618
- **SP 57(L)-4** with set of end caps 7503618

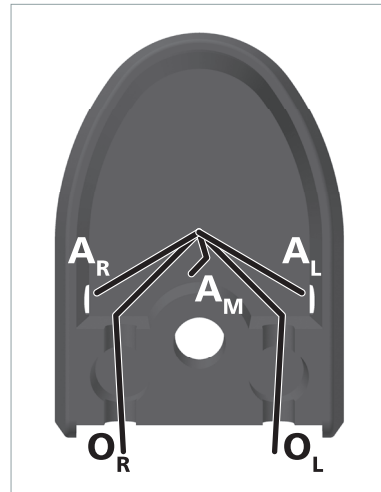
To fasten the sensor profile on the aluminium profile, the end caps are missing on the ends.

Viewed from outside:

- A = axial
- O = orthogonal
- R = right
- M = middle
- L = left

(Figure shows inner side)

A<sub>M</sub> not possible with  
SP 37-3



**Case A:** lateral (axial) cable exit

1. Use a hole punch to punch out the required cut-out at one of the specified points.
2. Pull cable through the desired cut-out.

**Case O:** bottom (orthogonal) cable exit

1. Initially place end cap on loosely.
2. Place cable into channel provided.
3. Slide the end cap on completely and press it firmly against the aluminium profile.

4. Fix the end cap to the contact profile with the pine tree clip(s).
5. Close the other end of the sensor profile in the same way with a second end cap.



## Laying cables

The type of cabling depends on the operation principle of your system.

1. Wire up the sensors in accordance with wiring diagram (optional) or in accordance with the wiring technologies described below. Observe the following:
  - Connect the wire ends of the sensors in accordance with the colour coding.
  - Insulate soldering points and seal with heat-shrinkable sleeves.

2. Lay the cables all the way to the control unit. Connection of the wiring to the control unit will be completed later.

### Is sensor system correctly wired?

3. Use an ohmmeter to check the electrical resistance between the ends of the wires on sensors, both actuated and non-actuated.

The measured resistance must have the following values:

- Actuated sensor system: < 400 Ohm
- Non-actuated sensor system:
  - Without monitoring resistor: > 1 MOhm
  - With monitoring resistor: dependent on the connected resistor

4. Wire the sensor system to the control unit (see operating manual for the control unit).

### NOTICE

Cables can be damaged from incorrect installation.

- ➔ Take measures to prevent cables from being kinked or crushed.
- ➔ Ensure that cables are installed without tension.

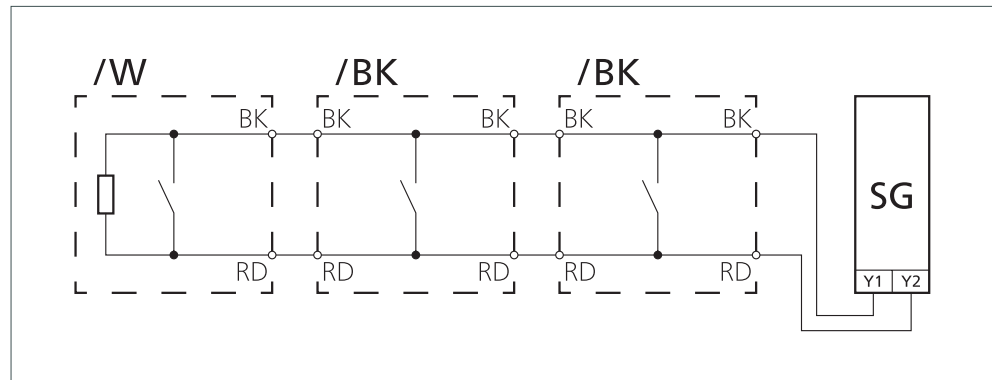
**Key to the following wiring diagrams**

- /W Sensor with integrated monitoring resistor
- /BK Sensor with two-sided cables as feed-through sensors or for connection of an external monitoring resistor
- SG Control unit
- R Resistor for functional monitoring of the system

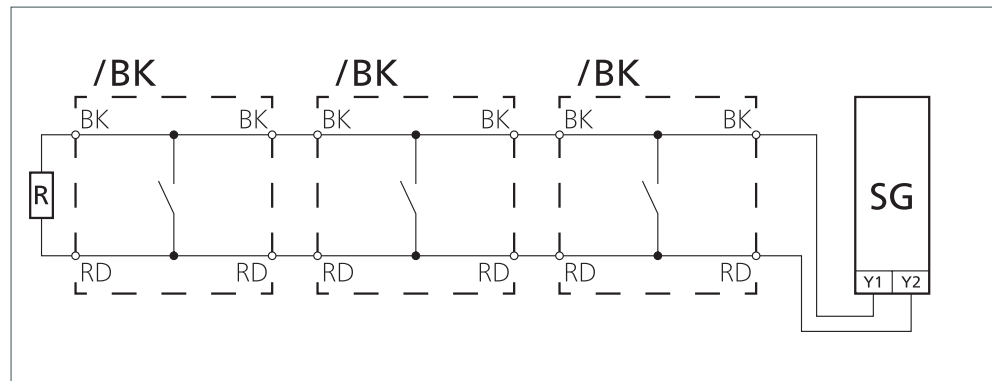
**Colour coding**

- BK Black
- RD Red

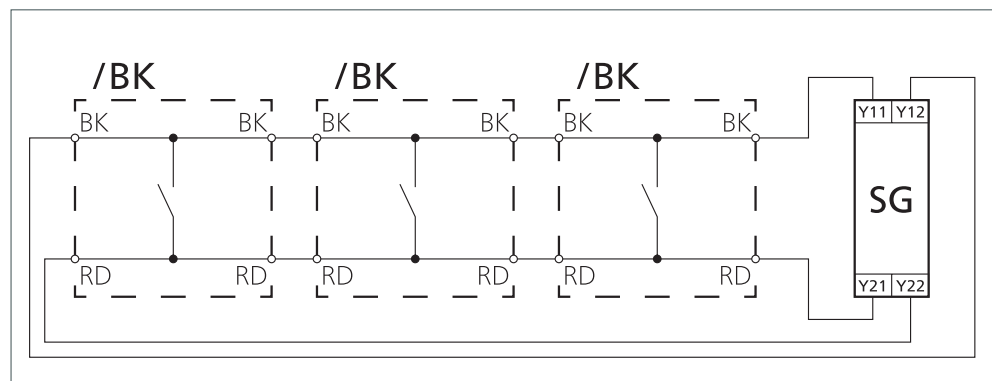
**Sensor /W and /BK:  
2-wire technology**



**Sensor /BK:  
2-wire-technology**

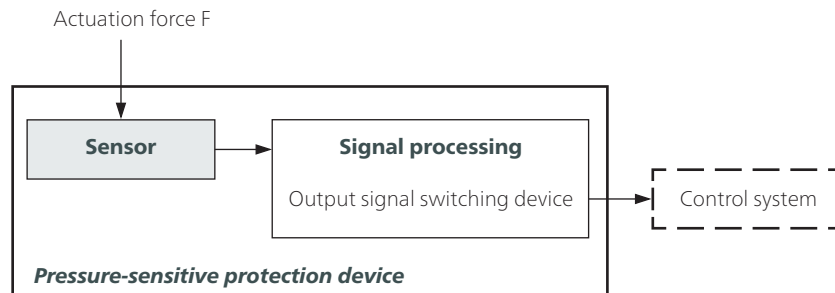


**Sensor /BK:  
4-wire-technology**



## Marking

Cut-to-size sensor profiles can be used as sensors for pressure-sensitive protection devices. Depending on the signal processing (control unit), safeguards up to PL d according to ISO 13849-1 are possible.



If you combine sensors with control units and thereby release pressure-sensitive safeguards onto the market, observe the basic regulations in ISO 13856.

Apart from technical requirements, this applies in particular also to marking and information for use.

The safety edges are marked according to ISO 13856-2 chapter 5, and the necessary selection and user information is provided according to ISO 13856-2 chapter 6.

## Commissioning

The sensors can be commissioned in combination with a suitable control unit. Commissioning is described in the operating manual for the control unit.

## Decommissioning

The sensors are decommissioned together with the connected control unit. Decommissioning is described in the operating manual for the control unit.

## Recommissioning

The sensors can be re-commissioned in combination with a suitable control unit. Re-commissioning is described in the operating manual for the control unit.

## Maintenance and cleaning

### Maintenance

The sensors are virtually maintenance-free.

The control unit also monitors the sensor.

**⚠ WARNING Failure of the safety function**

Damage to the sensor can result in failure of the safety function.

- ➔ Discontinue use of the safety device immediately if you detect damage that could affect safe operation.

Depending on the utilisation, sensors must be inspected at regular intervals (at least monthly). The inspection interval must be defined by the owner in accordance with the applicable national regulations.

- ➔ Check the safety function by actuating it or attaching the respective test piece.
- ➔ Conduct a visual inspection of the sensor for signs of damage.
- ➔ Conduct a visual inspection of the sensor to ensure it is properly mounted.

### Cleaning

- ➔ Clean dirty sensors with a mild cleaning product.
- ➔ After cleaning, wipe dry to remove any remaining moisture.



## Troubleshooting and remedies

Fault display	Possible cause	Solution
Resistance values deviate from specifications	Cables of the single sensors are not correctly connected	➔ Check connections between the sensors
	Cables are kinked or damaged	➔ Replace affected sensors
	Sensors are not mounted evenly	➔ Check mounting surface under the sensors
		➔ Eliminate unevenness and remove dirt particles
	Sensor is already actuated in end position	➔ Ensure that the signal is not under pressure in end position
Sensor faulty	➔ Replace the sensor	

The fault can still not be removed?

- ➔ Contact Mayser support: Phone +49 731 2061-0.
- ➔ In case of queries, have the information on the type plate at hand.

### Type plate

Applies only to sensors manufactured in-house by Mayser.  
A type plate stating the sensor type is affixed to the bottom of the aluminium profile at the cable exit.

## Replacement parts

### ⚠ CAUTION Overall safety endangered

If the sensor is not replaced with original Mayser parts, operation of the protective device may be impaired.

- ➔ Only use original parts from Mayser.

## Disposal

The products included in the scope of supply contain the following materials:

- Sensor**
- plastics
  - copper (safety edge interior, cables)
  - steel

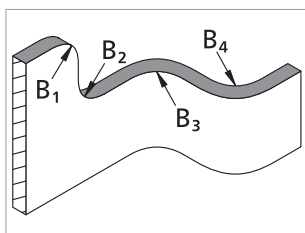
- Installation accessories**
- steel (screws)
  - aluminium (aluminium profile)

- Packaging**
- Wood, cardboard, plastics

- ➔ Observe the following with respect to disposal:
- Comply with the relevant national disposal regulations and legal stipulations for these materials.
  - If you engage a disposal firm, make sure that a list of the above materials is included.
  - Materials should be recycled or disposed of in an eco-friendly manner.

## Technical data

Bend radii:



Sensor profile	SK SP
IEC 60529: Degree of protection sensor	IP67
Operating forces to trigger signal	according to ISO 13856-2
Finger detection	yes
Behaviour in the event of a fault e. g. with SG-EFS 104/4L	ISO 13849-1:2015 Category 3 PL d
Bend radii (min): B <sub>1</sub> / B <sub>2</sub> / B <sub>3</sub> / B <sub>4</sub> SP 17-3 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	200 / 200 / 50 / 50 mm 500 / 500 / 200 / 200 mm 1000 / 1000 / 200 / 200 mm
Operating temperature	-25 to +55 °C
Storage temperature	-40 to +80 °C
Max. load (signal)	600 N
2006/42/EC: Emission sound pressure level	< 70 dB(A)
Weight:	without/with Aluminium profile (Type)
SP 17-3	0.12 / 0.28 kg/m (C 15)
SP 37-1	0.33 / 0.64 kg/m (C 25)
SP 37-2	0.36 / 0.69 kg/m (C 26)
SP 37L-2	0.41 / 0.74 kg/m (C 26)
SP 37-3	0.34 / 0.66 kg/m (C 25)
SP 57-2	0.44 / 0.74 kg/m (C 30)
SP 57L-2	0.47 / 0.77 kg/m (C 30)
SP 57-3	0.60 / 1.00 kg/m (C 35)
SP 57-4	0.58 / 0.99 kg/m (C 35)
SP 57L-4	0.62 / 1.03 kg/m (C 35)
SP 67-2	0.49 / 0.79 kg/m (C 30)
SP 87-2	0.64 / 1.06 kg/m (C 36)

This table is an excerpt from the detailed table in the product information (see *Technical data* in product information).