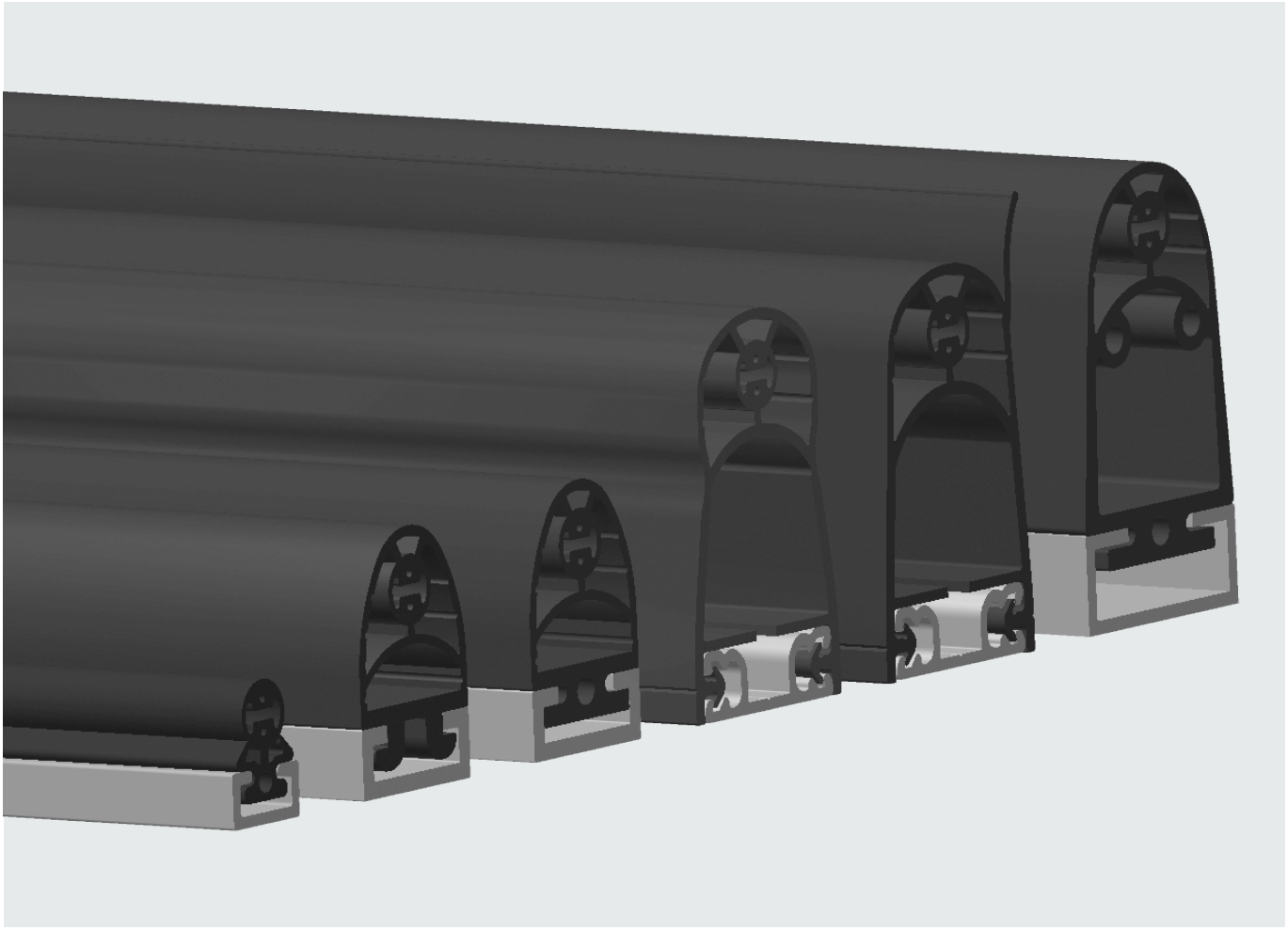
MAYSER®

Innovative by tradition.



Sensor profiles SP

EN | Installation instructions

Original instructions

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Contents

About these installation instructions

These installation instructions are part of the product.
Mayser accepts no responsibility or warranty claims for damage and consequential damage due to failure to observe the installation instructions.

➔ Read the installation instructions carefully before use.

➔ Keep the installation instructions for the complete service life of the product.

➔ Pass the installation instructions on to every subsequent owner or user of the product.

➔ Add any supplement received from the manufacturer to the installation instructions.

Validity

These installation instructions are only valid for the products specified on the title page.

Target group

The target group of these installation instructions are operators and trained specialist personnel who are familiar with installation and commissioning.

Other applicable documents

➔ The following documents are to be observed in addition to the installation instructions:
- drawing of the sensor system (optional)
- wiring diagram (optional)
- operating instructions of the control unit used

Symbols used

Symbol	Meaning
➔ ...	Action with one or more steps whose order is not relevant.
1. ... 2. ... 3. ...	Action with several steps whose order is relevant.
• ... - ...	Bullets first level Bullets second level
(see Section *Installation*)	Cross-reference

Danger symbols and information

DANGER	Immediate danger leading to death or serious injury
WARNING	Imminent danger which may lead to death or serious injury
CAUTION	Possible danger which may lead to minor or moderate injuries
	Information on easier and safer working practices

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.

Residual dangers

The end areas of the sensor profiles are not sensitive. When pressure is applied to any non-sensitive area, the protective function of the sensor profile is annulled.

SP	17-3 TPE	37-1 TPE	37-1 TPE	37-3 TPE	57(L)-2 TPE	57-3 TPE
End cap	without	hard	soft/without	soft/without	soft	soft
L_{NE}	60 mm	60 mm	20 mm	20 mm	10 mm	10 mm
L_{NE} = non-sensitive ends						
L_{WB} = effective actuation length						

➔ Use only one sensor profile per closing edge.

➔ Do not join sensor profiles at a corner.

Replacement parts

When using non-OEM replacement parts, the safety of the sensor profiles may be impaired.

➔ Only use OEM replacement parts from Mayser.

Applicable standards

The construction type of the product complies with the EC Machinery Directive 2006/42/EC and EMC Directive 2014/30/EU.
Applicable standards:

- ISO 13856-2 "Safety of machinery – Pressure-sensitive protective devices – Part 2: Safety edges and pressure-sensitive bars"
- EN 12978 "Industrial, commercial and garage doors and gates – protective devices for power-operated doors and gates"
- IEC 13849 "Safety of Machinery – Safety-related parts of control systems"

Technical data

IEC 60529: Sensor degree of protection	IP67
Actuation forces for signal triggering	According to 13856-2
Finger detection	yes
Error behaviour (with SG-RST 204)	ISO 13849-1:2015 Category 3 PL d
Operating temperature	-25 to +55 °C
Storage temperature	-30 to +70 °C
Maximum load (signal)	600 N
Weight: SP 17-3 SP 37-1 SP 37-3 SP 57-2 SP 57L-2 SP 57-3	without/with aluminium profile 0.12 / 0.26 kg/m (C 15) 0.32 / 0.62 kg/m (C 25) 0.32 / 0.62 kg/m (C 25) 0.40 / 0.70 kg/m (C 30) 0.45 / 0.75 kg/m (C 30) 0.53 / 0.93 kg/m (C 35)

Type plate

Applies only for sensor profiles manufactured by Mayser:
For identifying the sensor profile type, a type plate is attached to the bottom of the aluminium profile next to the cable exit. In the event of enquiries, have the specified information to hand.

Transport and storage

Packaging and transport

The sensor profiles are packed in a skid-proof manner and can be transported by crane or lifting vehicle to the place of installation. The installation accessories have either been added to the sensor profiles or packed separately, depending on volume.

CAUTION

Danger of injury by falling components!

- ➔ Only use tested, suitable load bearing equipment.
- ➔ Use appropriate load securing devices (e.g. transport belts, anti-slip devices).
- ➔ Do not step or stand under suspended loads.

Storage

- ➔ Store the sensor profiles in the original packing in a dry place.
- ➔ Store packagings pressure-free; do not stack.
- ➔ Store board tube packagings horizontally.
- ➔ Observe and maintain the storage temperature in accordance with the technical data.

Installation

This section describes DIY assembly on site.
If the sensor profile has been pre-cut in the workshop, two additional assembly steps must be carried out. In this case, Mayser recommends using aluminium profile type M.
The chapter ***Different order*** provides a table showing the differences in detail.

Preparing the installation site

WARNING

Danger of injury due to electrocution

➔ Disconnect all devices and live parts in the immediate environment of the power supply and protect them against being switched on again (see relevant operating instructions).

➔ Check that all devices and parts are disconnected from the power supply.

➔ Prepare the installation surface:
- Remove any dirt particles.
- Make sure that the installation surface is flat and solid.
- Cable bushing must be deburred.

➔ Keep the necessary tools ready.

Unpacking

Damage to property due to incorrect handling!

Sensor profiles can be damaged by bending or due to the effects of sharp objects.

➔ Do not use the connection cable of the sensor profiles as a carrying handle.

➔ Avoid sagging of the sensor profiles:
- Transport them upright, if possible
- Sensor profiles that are longer than 3 m should always be carried by 2 people.

➔ Always place sensor profiles on a flat, clean surface.

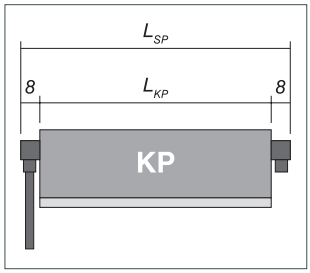
1. Check that the contents of the packaging are undamaged.

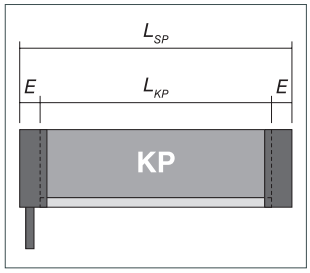
2. Lay out the individual DIY components or pre-cut sensor profiles next to each other at the assembly site.

DIY

This chapter describes how to cut the contact profile to length, insert and clamp the closing plug, mount the profile onto the closing edge, fit the end caps and subsequently check and test the assembly. The final product is a sensor profile SP with the IP67 degree of protection.

Cutting to length

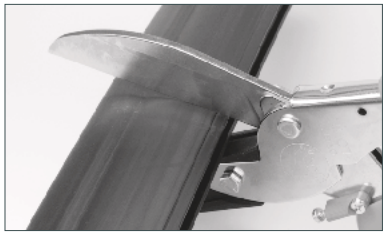




SP	37-1	37-3	57-2
E	*10*	*10*	*11*

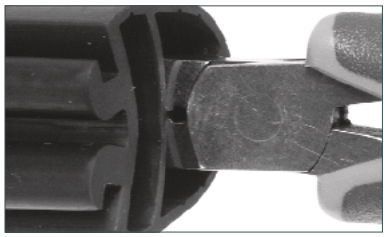
SP	57L-2	57-3
E	*11*	*11*

1. Measure out the required length of the contact profile (CP) and mark the cutting point.
   The following applies: $L_{KP} = L_{SP}$ - 16 mm (without end caps)
   Or: $L_{KP} = L_{SP}$ - (2 × *E*) mm (with 2 end caps)
   where:
   L_{KP} = length of contact profile
   L_{SP} = length of sensor profile
   E = end cap

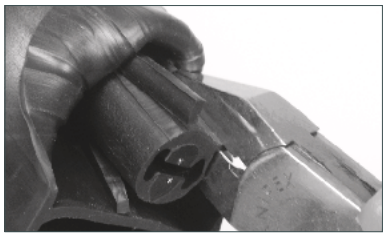


2. Cut the contact profile at the marked point with the profile cutter (1005906).

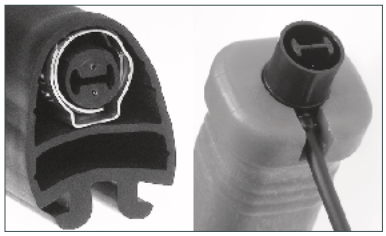
Insertion



Cut into all 3 webs with the notching pliers by approx. 10 mm (1005741: full cut length):

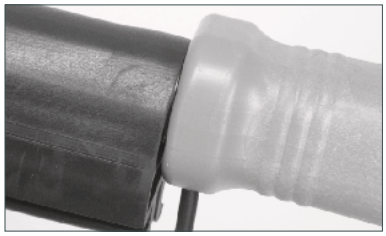


1. First cut into the webs at the points where they join the outer contour.



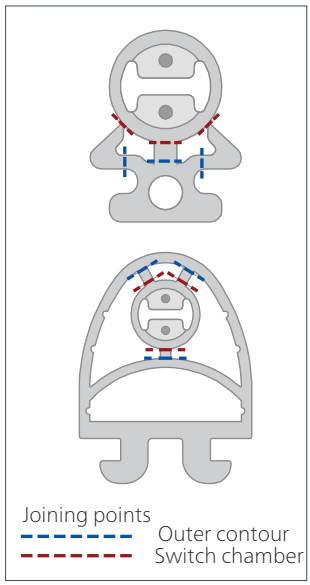
2. Fold out the outer contour. (This step is not necessary for SP 17-3.)

3. Cut into the webs at the points where they join the switch chamber.



4. Tear off the cut web pieces.

5. Place an ear clamp onto the switch chamber. **Tip:** Turn ear so it points down at 6 o' clock position.



6. Place a closing plug into assembly aid SH3.

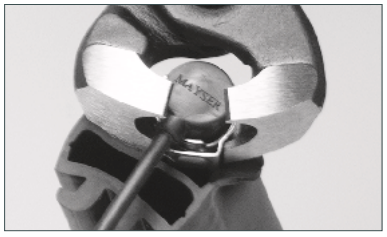
7. Press closing plug as far as it will go into contact profile.

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.

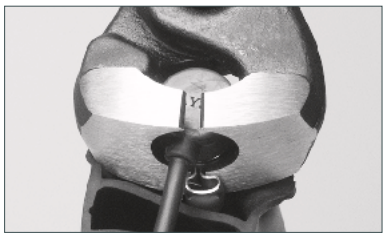
3. Check that the ear clamp is flush with the edge of the closing plug.



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.

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

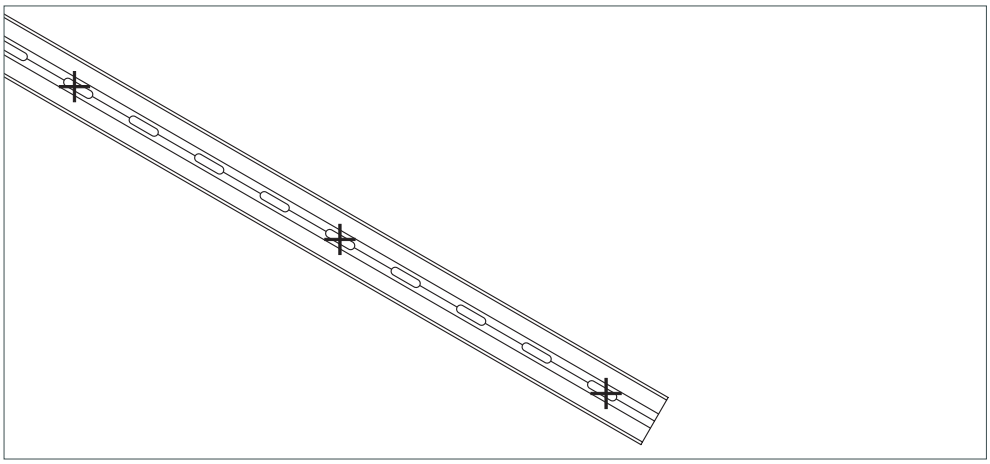


Pinched cable impairs functioning!

➔ Replace the closing plug if the cable is pinched.

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?



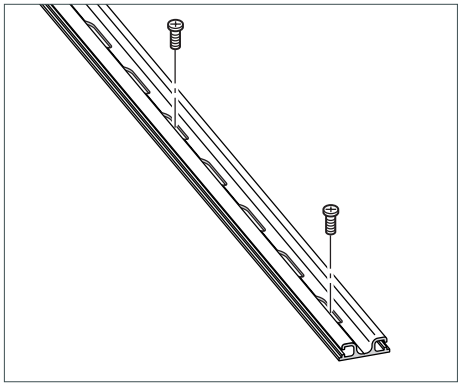
2. Mark the drill holes by means of the aluminium profile:
   - at the first and last oblong hole
   - in between at every fourth or fifth oblong hole
   - for cable bushing(s), if not yet present

3. Remove the aluminium profile again.

4. Drill holes for M5 on the marks.

5. Deburr the drill holes and remove the drilling dust.

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



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

Clipping in

Middle snap-in foot for SP XX-1

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.

External clip bars for SP XX-2

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.

Middle T foot for SP XX-3

1. Slide the T foot into the aluminium profile along the whole length.

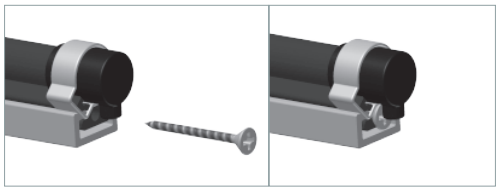
2. Then check that the contact profile ends flush with the aluminium profile.

Closing

Closure with end caps is not necessary but gives a better appearance.
The positive side effect of this is Die Endkappen fixieren das Sensorprofil auf dem Alu-Profil.

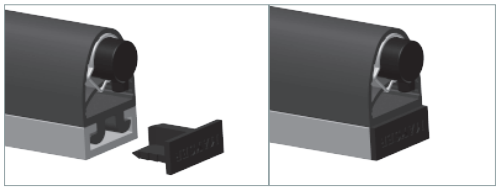
SP 17-3 – without end cap, with screws

1. Fix the aluminium profile to the contact profile with the counter-sunk screws (10005786).



SP 37-1 – without end cap, with end stopper

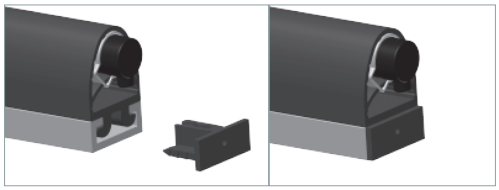
➔ Insert an end stopper (1000606 for C 25/C 25S or 1001223 for C 25M) into each end of the aluminium profile.



SP 37-1 – hard/soft end cap, with screws

Note:
The hard end caps can withstand a load of up to 1000 N.

1. If necessary, remove the end stoppers used earlier.
2. Press the fixing stoppers as far as they will go into the aluminium profile.

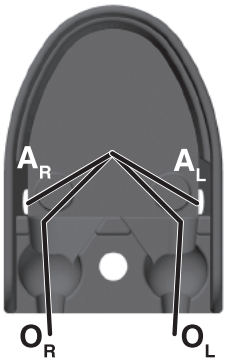


Case A: lateral (axial) cable exit

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

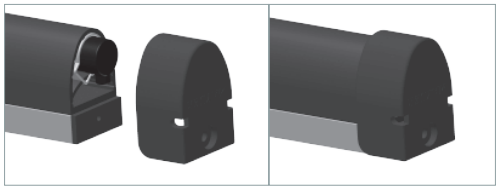
Case O: bottom (orthogonal) cable exit

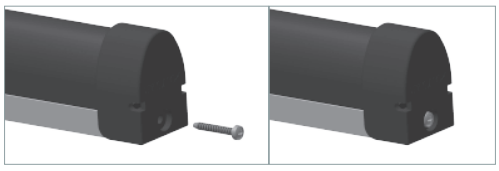
3. Initially place end cap on loosely.
4. Place cable into channel provided.



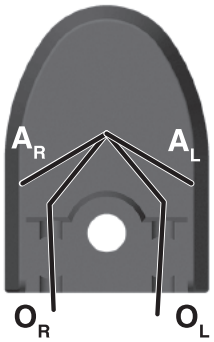
Viewed from outside:
A = axial
O = orthogonal
R = right
M = middle
L = left
(Figure shows inner side)

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





SP 37-3 – end cap, with pine tree clips



Viewed from outside:
A = axial
O = orthogonal
R = right
M = middle
L = left
(Figure shows inner side)

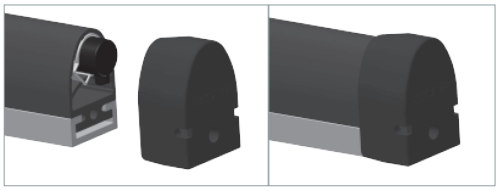
Case A: lateral (axial) cable exit

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

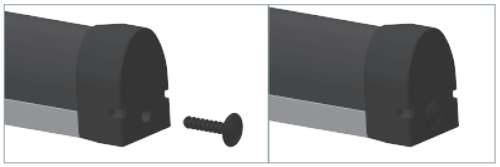
Case O: bottom (orthogonal) cable exit

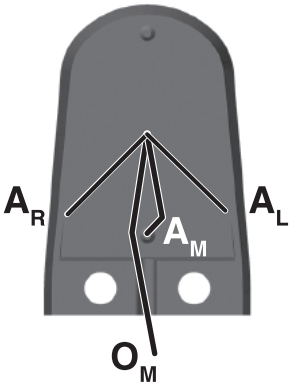
1. Initially place end cap on loosely.
2. Place cable into channel provided.

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.





Viewed from outside:
A = axial
O = orthogonal
R = right
M = middle
L = left
(Figure shows inner side)

SP 57-2 – soft end cap, with screws or pine tree clips

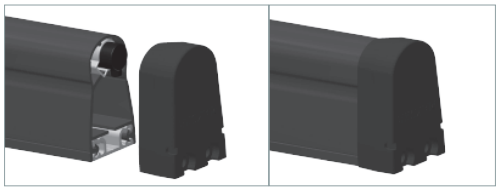
Case A: lateral (axial) cable exit

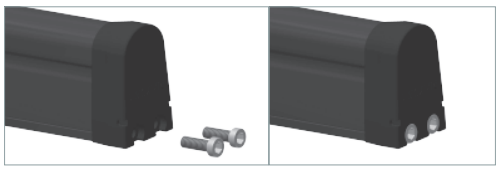
1. Use a hole punch to punch out the required cut-out at one of the specified points.
2. Pull the cable through the cut-out

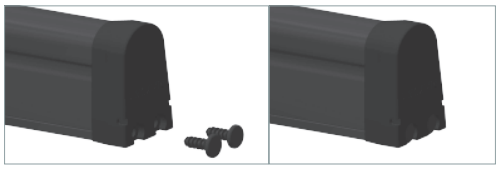
Case O: bottom (orthogonal) cable exit

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. For end cap with screws:
   Screw on the end cap with the two self-cutting, flat-head screws AEM 5×20.
4. For end caps with pine tree clip:
   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.



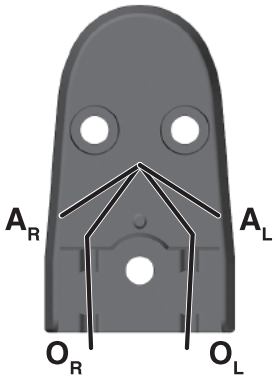




SP 57L-2 – soft end cap, with screws or pine tree clips

For SP 57L-2, cut the sensor profile approx. 10 mm (1005741: full cutting length) along the seam of the lip with the notching pliers and follow steps 1 through 5 of SP 57-2.

SP 57-3 – soft end cap with pine tree clips



Viewed from outside:
A = axial
O = orthogonal
R = right
M = middle
L = left
(Figure shows inner side)

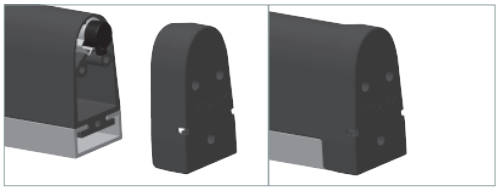
Case A: lateral (axial) cable exit

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

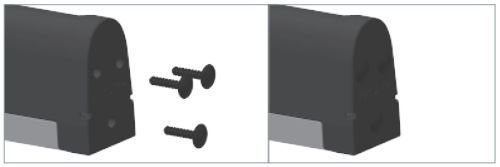
Case O: bottom (orthogonal) cable exit

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.



Checking the sensor

➔ Check visually that the end stoppers, closing plugs or end caps fit flush all round.

➔ Test functioning with a multimeter: are set values achieved?

Set value: Sensor profile not actuated

SP/W with 8k2: 8.2 kOhm ±3%
SP/BK: > 1 MOhm
Continuity test per channel: < (5 + (L_{KP} × 0.5/m)) Ohm

Set value: Sensor profile actuated

all SP: < 400 Ohm

Sensor profile can be irreparably damaged!

➔ No tensile load may be applied to the cable.

➔ Do not insert the sensor profile into an outer profile.

➔ In the idle state, no pressure may be applied to the contact profile.

Different order

Depending on the type of DIY assembly as well as the aluminium profile selected, there are slight differences in the order of the assembly steps.

Complete DIY assembly on site	Pre-cutting in workshop, assembly on site	DIY assembly with type M aluminium profile
Cutting to length	Cutting to length	Cutting to length
Insertion	Insertion	Insertion
Clamping	Clamping	Clamping
–	Clipping in (for transport)	Clipping in
–	–	Closing
–	Separation of SP from aluminium profile (on site)	–
–	–	Separation of lower section of aluminium profile
Installation on closing edge	Installation on closing edge	Installation on closing edge
–	–	Fixation of upper section of aluminium profile
Clipping in	Clipping in	–
Closing	Closing	–
Checking	Checking	Checking

Commissioning

When sensor profiles (sensors) are combined with a suitable control unit, this produces a pressure-sensitive protection device in compliance with ISO 13856-2.
This chapter describes the commissioning of a pressure-sensitive protection device.

Laying cables

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

1. Connect up sensor profiles in accordance with the wiring diagram (optional) or in accordance with the wiring technologies described below. Observe the following:

   - Connect the wire ends of the safety edges in accordance with the colour coding

   - If no connecting plugs and sockets (optional) are available, insulate the soldered connections and seal them with heat-shrinkable sleeves.

   - Wire each closing edge separately and route the cables to a separate control unit.

Damage to cables due to incorrect laying

➔ Do not pinch or bend cables.

2. Lay the cables and route them to the control unit.

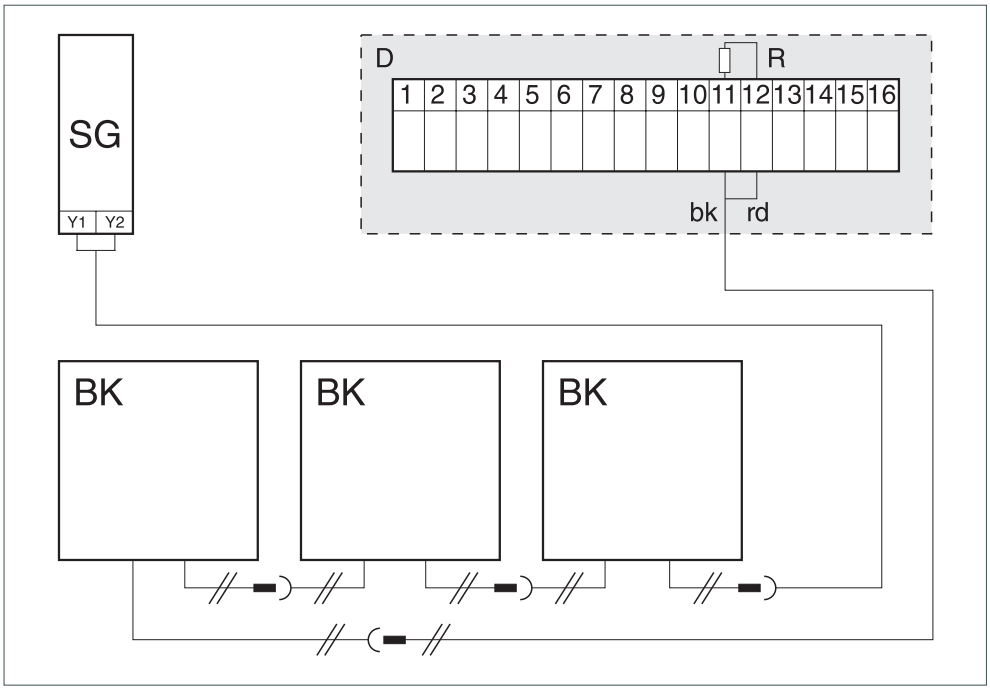
Key to the following wiring diagrams

BK	Safety edge with two-sided cables as feed-through sensors or for connection of an external monitoring resistor
W	Safety edge with integrated monitoring resistor
R	Resistor for functional monitoring of the system (8k2 ±3 %)
SG	Control unit
D	Sub-distribution with series terminals

Colour coding

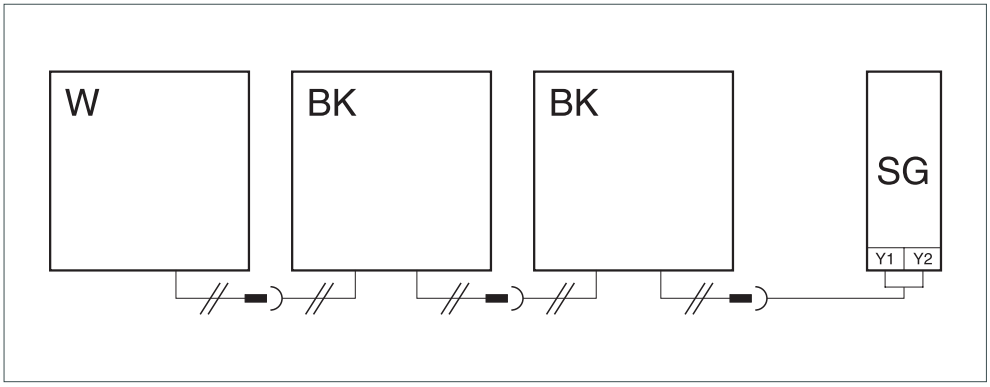
BK	Black
RD	Red

Safety edges BK: 2-wire technology



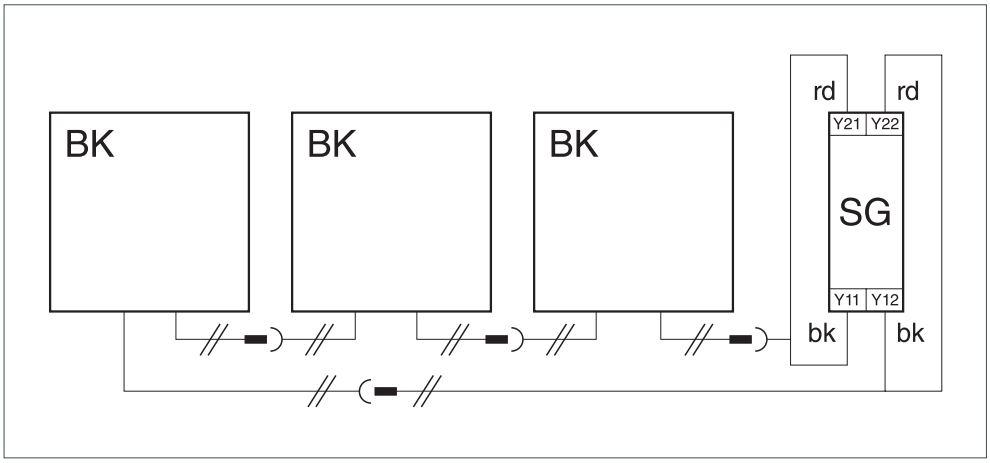
Wiring of the safety edges BK for 2-wire technology

Safety edges W and BK: 2-wire technology wired straight to the control unit



Wiring of the safety edges W and BK for 2-wire technology

Safety edges BK: 4-wire technology wired straight to the control unit



Wiring of the safety edges BK for 4-wire technology

Testing

Perform the following steps for each cable of the safety edge system:

1. Set the ohmmeter for measuring in a high resistance range.

2. Connect the ohmmeter to the two wires of the cable.

3. Measure the electrical resistance between the wire ends while the safety edge is activated and non-activated.

The measured resistance must have the following values:
- Safety edge system loaded (activated): < 400 Ohm
- Safety edge system not loaded (not activated):
  - Sensor W: 8k2 Ohm ±3 %
  - Sensor BK: > 1 MOhm

Test failed?

If the resistance measurement does not produce the specified values, this may have the following causes:
- The cables of the individual safety edges are incorrectly connected
- The cables are bent or damaged
- The safety edge is not adequately fastened or is sagging
- The distance between the safety edge and the closing edge is too small in the end position, causing the safety edge to actuate.

The fault can still not be removed?

➔ Contact the Mayser support: phone +49 731 2061-0.

Replacement parts

CAUTION

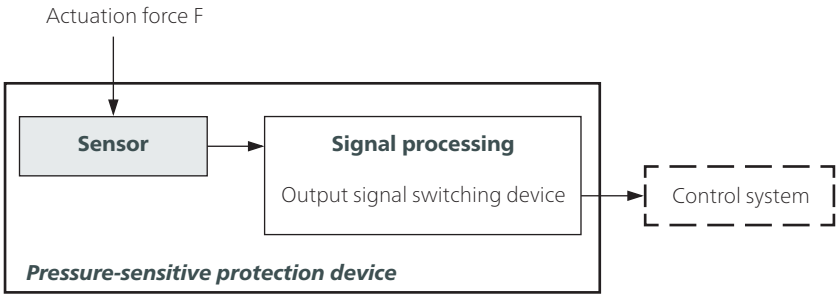
Overall safety endangered

If the sensor and control unit are not replaced with original Mayser parts, operation of the protective device may be impaired.

➔ Only use original parts from Mayser.

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 protection devices 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.

Tip: 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.

Maintenance and cleaning

The safety edges are virtually maintenance-free.

Regular inspections

➔ Check the rubber profile for damage at regular intervals.

WARNING

In case of damage, failure of the safety function!

➔ Immediately switch off the safety edge if you find damage that could impair safe operation.

➔ Test the safety function of the safety edges at regular intervals.

Cleaning

➔ Clean the surface of the safety edges at regular intervals using mild detergents.

➔ After cleaning, remove any remaining fluid.

Disposal

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

Safety edges

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

Installation accessories

- steel (screws)
- aluminium (aluminium profile)

Packaging

- Wood, cardboard, plastics

When disposing of these materials:

➔ Observe all relevant national disposal regulations and statutory conditions.

➔ Provide the material list given above when using a disposal company.

➔ Recycle or dispose of materials in an environmentally friendly way.