MAYSER®

Innovative by tradition.

DIY Miniature safety edges

EN | Installation instructions

Original 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.**

UL certification

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

- UL 325

Contents

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 *Installation*)	Cross-reference

Danger symbols and information

Symbol	Meaning
⚠ **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.
NOTE	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.

➔ **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.

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

➔ **Do not load the ends**
Avoid pressure loads and tensile loads on the EKS ends.

➔ **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.

➔ **Generously wind EKS**
Ensure that a minimum diameter of 600 mm is complied with when winding EKS.

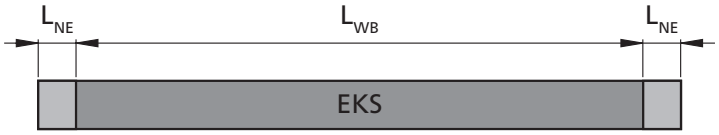
➔ **Do not pull on cables**
Avoid pulling on cables.

➔ **Only clip-in the snap-in foot, never pull it in**
Always clip-in EKS with snap-in foot, piece-by-piece. Never pull it in!

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.



EKS with	End piece W	End piece cable angled 90°	End piece cable axial
L_{NE}	27 mm	28.5 mm	27 mm
L_{NE} = non-sensitive edges			
L_{WB} = effective actuation length			

➔ 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 individual parts 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.

➔ Store assembled sensors either flat or rolled. Never folded.

➔ Comply with the storage temperature specified in the technical data.

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

Assembly consists of the specific steps
- Preparing for installation
- DIY
- Attachment

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.
- Make sure that groove edges are deburred.

➔ Have the necessary tools ready for installation.
- Scissors with stop (1004988)
- Assembly aid SH1 (Part of 7502412)
- Assembly aid SH2 (Part of 7502412)

Unpacking the product

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

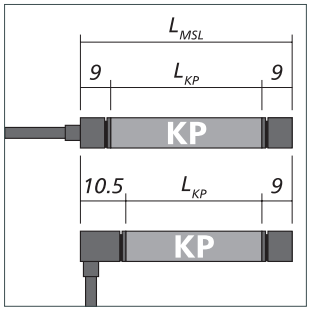
1. Place the single parts and the installation accessories next to each other at the installation location.

2. Check whether all needed parts are present and in perfect condition.

DIY

This chapter describes
- cutting the contact profile to length
- insertion of the end pieces
- final testing.

The end product is a SK EKS Miniature safety edge with degree of protection IP40.



Cutting to length

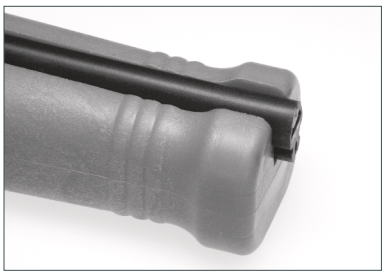
1. Measure out the required length of the contact profile (CP) and mark the cutting point. The following applies:

$L_{KP} = L_{MSL}$ - (2 × End pieces)
L_{KP} = Length of contact profile
L_{MSL} = Length of Miniature safety edge

2. Place the contact profile on the stop of the scissors and cut it off at the marked point.

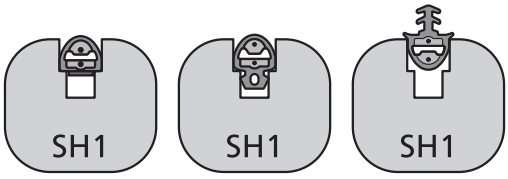
Insertion

1. Insert the contact profile into the SH1 assembly aid, in such a manner that the contact profile protrudes 2 to 3 mm beyond the edge.

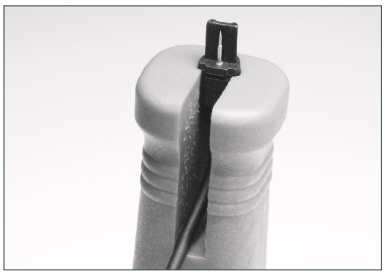


Position of the contact profile in the SH1 assembly aid:

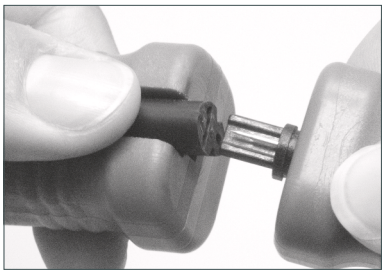
EKS 011 EKS 014 EKS 052



2. Insert the cable end elements into the SH2 assembly aid.



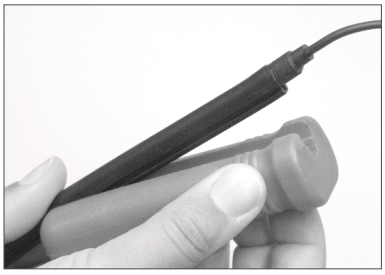
3. Fix the contact profile in place in the SH1 assembly aid with firm thumb pressure.



4. Using the SH2 assembly aid, guide the end element straight into the contact profile and press it firmly against the SH1 assembly aid, until the gap between end element and contact profile disappears.

5. Remove the SH2 assembly aid and remove the semi-finished miniature safety edge of the SH1 assembly aid.

Tip: Use leverage – with light pressure on the contact profile at the end of the handle.



6. Proceed in the same manner on the other end of the contact profile with a resistor end piece (EKS/W) or another cable end piece (EKS/BK).

Alternatively with special adhesive

The special adhesive (1004987) is recommended for a better bond of the end piece to the contact profile. With this adhesive higher degrees of protection up to IP64 are possible.

1. Apply a thin layer of special adhesive to the end of the contact profile.
2. Proceed as described in the chapter *Insertion*.
3. Remove excessive adhesive from the assembly aids.

Final test after completion of DIY assembly

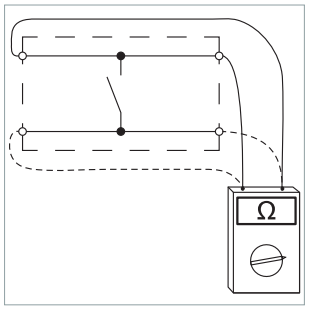
➔ Conduct a visual check to ensure a flush connection of the end elements all the way around.

➔ Use a multimeter to check for compliance with the set values.

Set value of EKS **not actuated**:

EKS/W with 1k2	1.2 kOhm ±10%
EKS/W with 2k2	2.2 kOhm ±5%
EKS/W with 8k2	8.2 kOhm ±3%
EKS/BK	> 1 MOhm
Continuity check per channel	< 100 Ohm

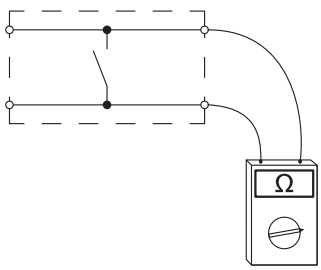
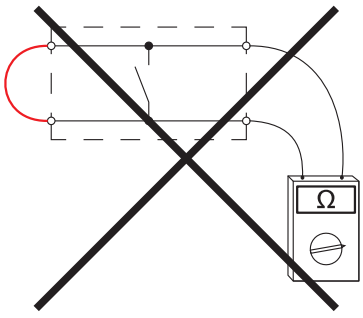
Continuity check:



Set value of EKS **actuated**:

each EKS	< 400 Ohm

For type /BK sensors, the wires of the second cable must not be short-circuited.

Right:	False:
	

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

Attachment

Three mounting types are available:
- Acrylic foam adhesion
- Snap-in foot
- Clamp foot

The mounting type depends on the selected contact profile.

Mounting type	EKS 011	EKS 014	EKS 052
Acrylic foam adhesion	•	–	–
Snap-in foot	–	•	–
Clamp foot	–	–	•

By means of acrylic-foam adhesive tape

The following procedure applies to miniature safety edges that are already equipped with acrylic foam (double-sided foam adhesive tape) such as EKS 011. They are glued onto a clean bonding surface.

Requirements

The following applies for optimal attachment:

➔ Ensure that the bonding surface is
- clean,
- dry and
- smooth.

➔ Avoid bonding surfaces that are
- very uneven or
- are sharp-edged.

Recommended working temperature: +15 to +25 °C.

Check with adhesion tests before serial use whether bonding is possible on the selected installation surface.

Explanation of symbols:

+ = suitable
- = not suitable
1 = Primer 4298UV
2 = Primer 4297
3 = Multiprimer

Bonding with ... / on ...	with Primer	without Primer
ABS	1	-
Aluminium: natural	1	+
Aluminium: anodised	1 / 3	-
Aluminium: powder-coated	1	-
CAB	-	-
Glass	-	-
Wood: natural	-	-
Wood: glazed, varnished	2 a)	-
Wood: veneered, lightweight building board	2 a)	-
PA6, PA66	3	-
PE, HDPE	-	-
PMMA	1	-
PP	1	-
PS	-	-
PVC	2 b)	-
SAN	1	-
Steel, stainless steel	1 / 3	-
Tests are carried out at room temperature (+23 °C).		
a) in the USA: Rubber & Vinyl 80 b) in the USA: 2262AT		

Bonding

1. Clean and degrease the bonding surface (e.g. with isopropyl alcohol).
2. With a brush apply as thin a coating of primer as possible on the entire bonding surface.*
3. Allow the primer to flash off for approx. 10 minutes.*
4. Pull off the liner from the acrylic foam 10 to 15 cm.
5. Place the EKS **without** tensile load** on the bonding surface and press it on firmly.
6. Repeat items 4. and 5. until the EKS is completely bonded on.
7. Wait another 24 hours until the maximum adhesion is reached.

* Applies to natural aluminium only as an option.
If you are working **with tensile load, the EKS can be extended by several millimetres

By means of snap-in foot

The following procedure applies to miniature safety edges with snap-in foot, such as EKS 014. They are clipped into a suitable aluminium profile.

Requirements
The following applies for optimal attachment:

➔ Ensure that the aluminium profile is
- suitable (e.g. C 10 for EKS 014),
- clean and
- smooth.

➔ Avoid holes
- drilling dust or
- sharp-edged burrs.

Clipping

1. Fix aluminium profile with countersunk screws, e.g. M2×2.5.

2. Clip miniature safety edge with snap-in foot into the aluminium profile.

Tip 1: Brush the aluminium profile and snap-in foot with a volatilizing **lubricant** (e.g. water with washing up liquid).
Tip 2: Use a **seam roller** for pressing in.

By means of clamp foot

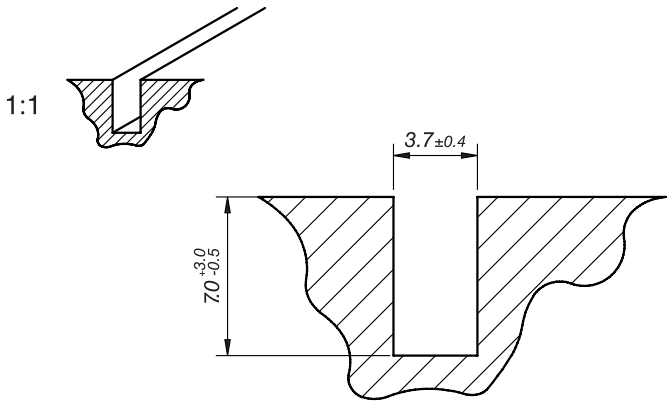
The following procedure applies for miniature safety edges with clamp foot, such as EKS 052. They are pressed into a precisely fitting groove.

Requirements

The following applies for optimal attachment:

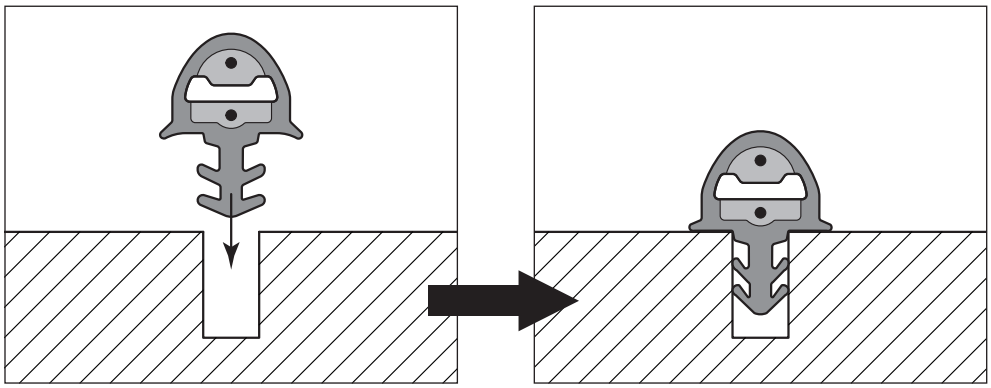
➔ Ensure that the groove is
- made for a perfect fit
- clean and
- smooth.

➔ On and in the groove, avoid
- contamination or
- sharp-edged burrs.



Clamping

➔ Press the clamp foot into the groove until the miniature safety edge is evenly inserted.



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 particular 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.

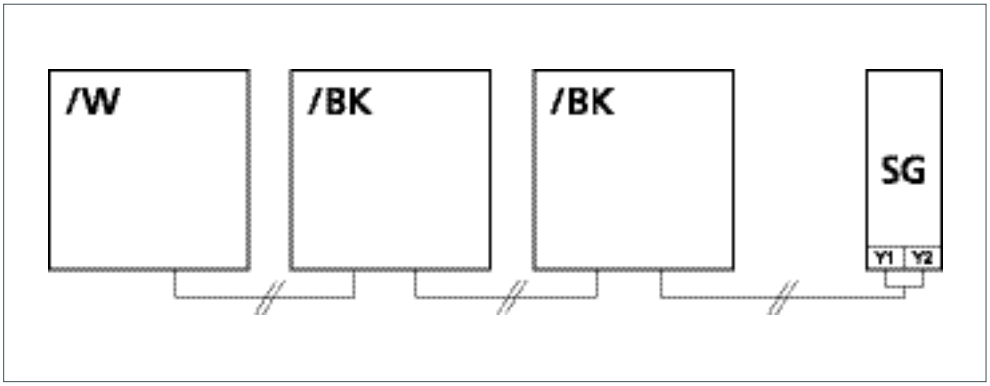
Key to the following wiring diagrams

/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
X	Sub-distribution with series terminals
R	Resistor for functional monitoring of the system

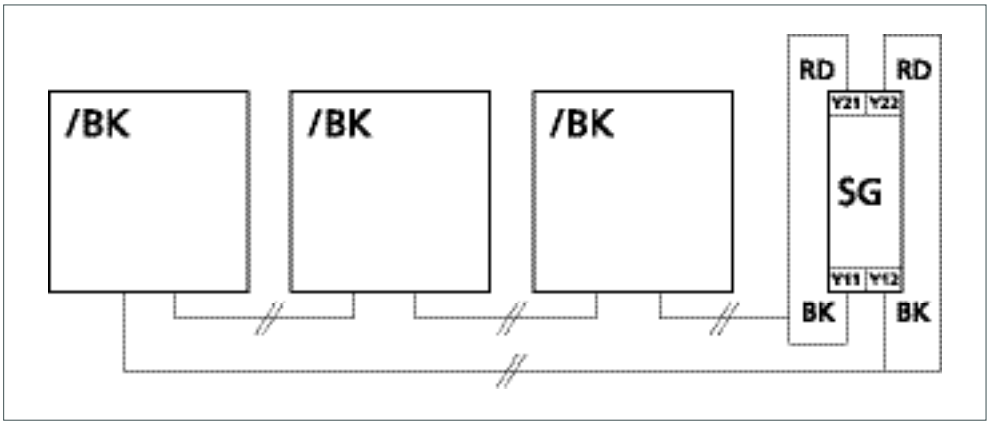
Colour coding

BK	Black
RD	Red

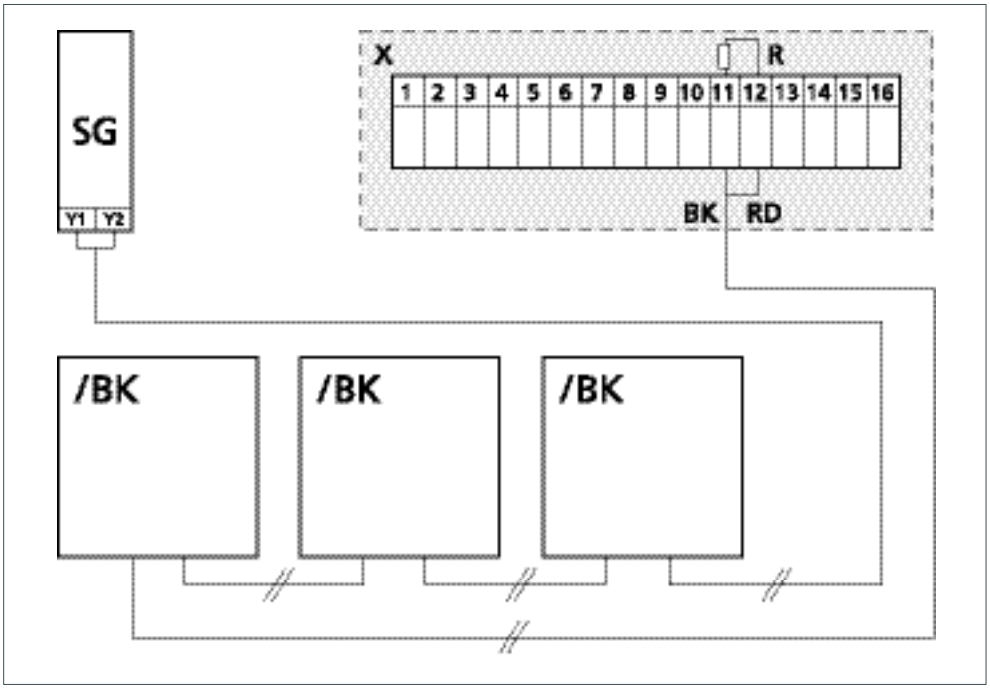
Sensor /W and /BK: 2-wire technology wired straight to the control unit



Sensor /BK: 4-wire-technology wired straight to the control unit

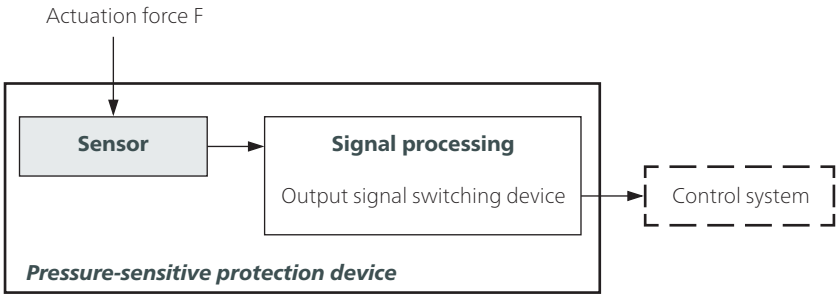


Sensor /BK: 2-wire-technology with terminal box



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.

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

Refer also to the section *Troubleshooting and remedies* in the operating manual for the control unit.

The fault can still not be removed?

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

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

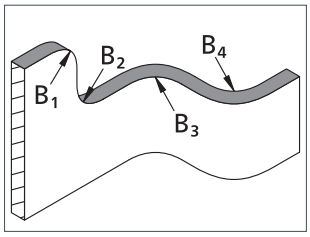
Installation accessories
- steel (screws)
- aluminium (aluminium profile)

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:



Miniature safety edge	SK MSL
IEC 60529: Degree of protection Sensors without special adhesive Sensors with special adhesive	 IP40 to IP64
Operating forces to trigger signal	< 50 N
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_1 / B_2 / B_3 / B_4	120 / 150 / 20 / 20 mm
Operating temperature	-25 to +80 °C
Storage temperature	-40 to +80 °C
Max. load (signal)	600 N
2006/42/EC: Emission sound pressure level	< 70 dB(A)
Weight: EKS 011 EKS 014 (without / with C10) EKS 052	 43 g/m 49 g/m / 125 g/m 54 g/m

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