

### Product Information Miniature Safety Edges

# Miniature Safety Edges (EKS) – the "invisible" protection against trapping and nipping

Miniature Safety Edges ...

... inside values

Tiny dimensions, enormous reliability. The Miniature Safety Edges are the result of consistent further development and miniaturisation of our Safety Edges which are well known for their reliability in safety applications. Endowed with the same safety and reliability features, the Miniature Safety Edges also have a visual advantage: absolutely tiny and the profile comes in almost any shape and size.

- The heart of the Miniature Safety Edges is the switching chamber which is integrated in the profile. A small amount of pressure to the Miniature Safety Edge suffices to short-circuit two conductive areas which are separated from each other. A sure signal for the evaluating unit connected up.
  - Electrically, the Miniature Safety Edge works on the closed circuit principle, i.e. a break in connection is recognized, the danger- bringing movement is brought to a halt.



... outside values

- In addition to the three standard shapes depicted we can also provide customized profiles.
- The design of the Miniature Safety Edge can be practically effortlessly adapted to suit the surroundings.
- The Miniature Safety Edge is in its element in places where only very short overtravel distances are possible.
- Thanks to the minimal dimensions (see to the right) the Miniature Safety Edge can be intregrated into its surroundings in an optimal way.





### Product Information Miniature Safety Edges

# Miniature Safety Edges (EKS) – the "invisible" protection against trapping and nipping

... diverse uses

#### Medical Technology

- Diagnostic equipment
- Radiation apparatus
- Electrically adjustable tables/chairs
- Movable protective hoods
- Rehabilitation equipment (Sports Medicine)
   Elevator doors

Bus doors and electric roof lights (finger protection)

Electrically operated screens

- Cash dispensers
- Skylights
- Glass sliding doors

Electrically adjustable furniture

- Computer tables
- Recliners
- Electrically operated writing boards



• can be recycled

Electrical operating conditions

- max. voltage 24 V DC
- max. current 10 mA

Protection class • IP65

- Actuating force: < 25 N (Test piece: Ø 200 mm)
- Actuating force: < 15 N (Test piece: Ø 4 mm)

Application temperatures - 40 °C to + 80 °C (short-time exposure to temperatures up to + 95 °C also possible)

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# Product Information



## Miniature Safety Edge EKS 038

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#### Important information

Read through the product information carefully. It contains important information on operation, safety and maintenance of the product. Retain the product information for later reference. Always observe the safety instructions on the following pages under **ATTENTION.** Only use the product for the purpose described in the product information. © Mayser Ulm 2017



### Definitions

Miniature Safety Edges are sensors for tactile protective devices. A suitable Control Unit is required for evaluation of the signals.

#### **Intended use**

A Miniature Safety Edge detects a person or part of the body when pressure is applied to the actuation area. It is part of a linear tripping device. The task of the protective device is to avoid potential hazardous situations for a person within a danger zone such as shearing or pinching edges.

Typical application areas are automatic windows, covers on machines, medical diagnostic equipment and height-adjustable furniture.

Safe operation of a Miniature Safety Edge depends entirely on

- the surface condition of the mounting surface,
- the correct selection of the size and resistance,

- correct installation as well as

- selection of the suitable Control Unit according to ISO 13849-1.

#### Limits

A maximum of 5 Miniature Safety Edges may be connected to one Control Unit.

### Design



The Miniature Safety Edge EKS 038 consists of (1) insulating TPE-covering, (2) conductive contact layers with embedded wires and (3) self-adhesive acrylic foam on the base of profile.



#### **Effective actuation area**

The parameters X, Y, Z,  $\textbf{L}_{\text{\tiny NE}}$  and angle  $\alpha$  describe the effective actuation area.

For the effective actuation area, the following applies:

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



MSL	EKS 038		
α	60°		
L <sub>NE</sub>	10 mm		
x	2 mm		
Y	2.65 mm		
Z	2.9 mm		

#### **Available lengths**



Parameters:

- $L_{_{WB}}$  = effective actuation length
- L<sub>MSL</sub> = overall length of the Miniature Safety Edge
- L<sub>NE</sub> = non-sensitive length at the end
- $\alpha$  = effective actuation angle



#### Bend angles and bend radii

#### **Bend angles**

Bend angles are not possible on the Miniature Safety Edge.

#### **Bend radius**



Bend radius min.	EKS 038
Bı	500 mm
<b>B</b> 2	300 mm
Вз	15 mm
B4	15 mm



Small 90° bends can also be implemented: Small bend radii up to 5 mm are possible for  $B_3$  and  $B_4$  with two opposite cuts in the protruding parts of the profile base.

#### Installation position

The installation position can be selected as required.

#### CAUTION

No pressure must be exerted on the Miniature Safety Edge in non-operative mode.



### Connection

#### **Cable exits**

Axial exit

#### Tip

With more than one sensor connected one behind the other, we recommend the BK versions.





#### Version: EKS 038/BK

#### **Cable connection**

#### CAUTION

The cables must be laid free of tension.

- Cable: 0.35 mm<sup>2</sup> per strand, Ø 1.4 mm, black
- Cable length: 2.0 m
  - Option: to max. 200 m
- Cable ends: strands stripped Option: cable ends available with plug and coupling

#### **Connection example**





#### Key:

SG 4L

SG 2W 2-wire-technology evaluation

4-wire-technology evaluation

Y11, Y12 lower cables; Y21, Y22 upper cables



### **Profiles**

### Dimensions and operating paths

EKS 038	
4.0 5.3	
Actuation force: < 50 N Actuation distance: < 1.2 mm	

#### **Physical resistance**

Miniature Safety Edges EKS	TPE
Degree of protection (IEC 60529)	IP65
Hardness as per Shore A	50 ±5
Behaviour in fire	approx. 40
(DIN 75200)	mm/min



#### **Chemical resistance**

The Miniature Safety Edge is resistant against normal chemical influences such as diluted acids and alkalis as well as alcohol over an exposure period of 24 hrs.

The values in the table are results of tests carried out in our laboratory to the best of our knowledge and belief. The suitability of our products for your special area of application must always be verified with your own practical tests.

Miniature Safety Edge EKS	ТРЕ
Acatana	
Formic acid	-
	-
Annor An	+
Burston	+
Butanal	+
Bulanoi	-
Sodium hypochiorite	-
Disinfectant	+
Acetic acid 10 %	-
Ethanol	+
Ethyl acetate	-
Ethylene glycol	+
Window cleaner	
Alcohol-based	+
Alkaline cleaner	+
Neutral cleaner	+
Greases	±
Volatile softeners	-
Anti-frost agent	+
Skin cream	+
Icidine	+
Incidine	+
Incidine plus	+
Plastic cleaner	+
Lyso FD 10	+
Metal working oil	-
Microbac	+
Microbac forte	+
Minutil	+
Saline solution 5 %	+
Spirit (ethyl alcohol)	+
Terralin	+
UV-resistance	+
Centring oil	-

Explanation of symbols:

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

Note:
-------

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



### Attachment

#### Per acrylic-foam adhesive tape

#### Requirements

For ideal bonding, the bonding surface must be

- + clean
- + dry
- + smooth.

Avoid

- very uneven

- sharp-edged bonding surfaces.

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

#### Note:

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

Bonding with on	with Primer	without Primer
ABS	1	-
Aluminium: natural	1	+
Aluminium: anodised	1/3	-
Aluminium: powder-coated	1	-
САВ	-	-
Glass	4 / 5	-
Wood: natural	-	-
Wood: glazed, varnished	2	-
Wood: veneered, light weight building board	2	-
PA6, PA66	3	-
PE, HDPE	-	-
РММА	1	-
РР	1	-
PS	-	-
PVC	2	-
SAN	1	-
Steel, stainless steel	1/3	-

Explanation of symbols:

- + = suitable
- = not suitable
- 1 = Primer 4298UV
- 2 = Primer 4297
- 3 = Multiprimer
- 4 = Silan Primer
- 5 = Primer 4299

#### Note:

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

#### CAUTION

Damage to the rest of the TPE-covering renders the Miniature Safety Edge unusable. Dispose of faulty Miniature Safety Edge.

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1. Measure bend locations and mark on both sides.

Only applies to bend radii < 15 mm.

2. Carefully cut into both profile sides at the markings, making sure you only cut the projecting part.

Preparation





#### Bonding

- 1. Clean and degrease bonding surface (e.g. with isopropanol).
- 2. Apply primer as thinly as possible to complete bonding surface with brush.
- 3. Air dry primer for approx.10 minutes.
- 4. Remove 10 to 15 cm of liner from acrylic foam.
- 5. Place on bonding surface and press on firmly, without any tensile stress.
- 6. Repeat items 4. and 5. until EKS is completely bonded.
- 7. Maximum adhesion is achieved after 24 hrs.

#### Note:

If tensile stress is applied, the EKS can become several millimetres longer.

#### Tip:

For long straight sections, an extended try square may be useful for alignment.

#### Installation accessories

Part no.	Designation	Pack. unit
7500462	Primer 4298 type 3M, 125 ml, in can	1 pc.
7501995	Primer 4297 type 3M, 125 ml, in can	1 рс.
1003360	Multiprimer, 250 ml 24-P	1 pc.

#### **ATTENTION**

Smaller winding diameters cause separation of the liner and therefore damage to the selfadhesive acrylic foam.

### Storage

Correct storage of the Miniature Safety Edge requires a winding diameter of at least 600 mm.



### **Technical data**

Miniature Safety Edge EKS 038 cut-to-size with resistor (type W) or without resistor (type BK).

ß

1:1

Switching characteristics at v <sub>test</sub> = 50	0 mm/min	
Switching operations	> 1× 10 <sup>5</sup>	
Actuating force	+23 °C	-25 °C
Test piece (rod) Ø 4 mm	< 15 N	< 25 N
Test piece (rod) Ø 200 mm	< 35 N	< 50 N
Actuating distance	< 35 N	< 50 N
Test niece (cylinder) Ø 80 mm	< 1.2 mm	
Actuation angle	< 1.2 mm	
Test niece (cylinder) Ø 80 mm	+ 30°	
	± 50	
Safety classifications		
B <sub>10d</sub> as per ISO 13849-1	2× 10 <sup>6</sup>	
Mechanical operating conditions		
Sensor length (min./max.)	70 mm / 150	m
Cable length (min./max.)	2 / 200 m	
Attachment	Using acrylic-	foam adhesive
Peel force	15 N/cm	
Bend radii, minimum		
$B_1 / B_2 / B_3 / B_4$	500 / 300 / 1	5 / 15 mm
IEC 60529: Degree of protection	IP65	
Operating temperature	-25 °C to +80 °C	
short-term (15 min)	-40 °C to +100 °C	
Electrical operating conditions		
Terminal resistance	1k2 + 5%	
Output	max 250 mW	/
Contact transition resistance	< 400 Ohm (n	er sensor)
More than one sensor	max 5 in serie	
Electrical rating	max. 5 m serv	
Voltage	max 24 V DC	
Current (min /max)	$1 \text{ m} \Delta / 10 \text{ m} \Delta$	<b>A</b>
Connection cable	0.1.4 mm par strand	
Connection cable	$2 \times 0.35 \text{ mm}^2$	
Control Unit (recommendation)	2~ 0.551	
ISO 13849-1 Cat 3	SG-EFS 104/2	W (type W)
ISO 13849-1 Cat 3	SG-EFS $104/21$ (type W)	
Chemical resistance		
The Miniature Safety Edge is resistant	t against normal	chemical in-
fluences over a period of exposure of	24 hrs (see p. 8).	
Dimensional tolerances		
Length as per	ISO 3302 L2	
Profile section as per	ISO 3302 E2	

nd radii:





### **Request for quotation**

From:			Fax:
Company	Company		+49 731 2061-222
Department			_
Name, first name			_
P. O. Box	Post c	code City	_
Street	Post c	code City	_
Phone	Fax	E-mail	_
Area of application			Please keep free! For internal use only
(e.g., window construction, transport,)	medical technology, ma	achine closing edges, public	_
Mechanical condition	15		_
EKS	O Type BK		
length: m	O Type W V Packing unit	with resistor K\Omega	
Attachment per:	Q Bonding	umts	
· · · · · · · · · · · · · · · · · · ·	O Snap-in f	foot	
Angle piece			
construction:	× per Ek	٢S	
Cable length:	m (stai	ndard: 2.0 m)	
Number of monitor	oring circuits:	□ SG	
<b>Pinching and shearin</b> (Diagram incl. mounting po	<b>g edges to be pro</b> ssibility and cable routi	ng)	_
	,		

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# **DIY Miniature safety edges**

EN | Product information

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### **Overview**

#### Contact profile – Miniature safety edge

The semi-finished contact profile is cut to length and assembled with the other components. The functioning product is then called a miniature safety edge.



#### **EKS 011 TPE**

- 1 End piece with resistor
- 2 Contact profile
- 3 End piece with cable





#### EKS 014 TPE

- 1 End piece with resistor
- 2 Contact profile
- 3 Aluminium profile
- 4 End piece with cable

#### **EKS 052 TPE**

- 1 End piece with resistor
- 2 Contact profile
- 3 End piece with cable



### **Materials list**

Part No.	Designation	PU
7502395	Contact profile EKS 011 TPE, self-adhesive	50 m
7502394	Contact profile EKS 014 TPE, with snap-in foot	50 m
7502773	Contact profile EKS 052 TPE, with clamp foot	45 m
1004580	End piece with resistor 1k2	50 pc.
1004747	End piece with resistor 2k2	50 pc.
1005835	End piece with resistor 8k2	50 pc.
1004579	End piece with PUR cable 2.5 m, axial	50 pc.
1004581	End piece with PUR cable 2.5 m, angled 90°	50 pc.
1003436	Aluminium profile C 10 for EKS 014 with snap-in foot	6 m
1004988	Scissors with stop	1 рс.
7502412	Assembly aid set	1 рс.
1004987	Special adhesive Contact VA 250 Black, 12 g, for IP64	1 рс.
7501995	Primer 4297 Type 3M, 125 ml, in can	1 рс.

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### Definitions

### Pressure-sensitive protection device

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



#### Sensor

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

#### **Signal processing**

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





#### Criteria for selecting the sensor type

- Category according to ISO 13849-1
- Performance level of pressure-sensitive protection device = at least PL,
- Temperature range
- Degree of protection in accordance with IEC 60529: IP40 is the standard for diy miniature safety edges. Higher degree of protection possible with special adhesive (part no.: 1004987).
- Low switching forces
- Minimum overall height

### Operation principle 2-wire-technology



The monitoring resistor must be compatible with the control unit. Standard value is 8k2.

For your safety:

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

#### Design

EKS/BK with cables on both sides as a through sensor or as an end sensor with external monitoring resistor

EKS/W as an end sensor with integrated monitoring resistor





**Combination of sensors** 



Combination:

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

### Operation principle 4-wire-technology



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

For your safety:

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

#### Design

EKS/BK with cables on both sides as a through sensor





#### **Combination of sensors**



Combination:

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

### Safety

### Intended use

A safety edge detects a person or the person's limbs from the pressure exerted on the effective actuation area. It is a linear tripping device. It is designed to prevent potential hazardous situations such as shearing and pinching edges for a person within a danger zone.

Typical areas of use are automated windows and façade systems, automation technology and moving units in medical technology.

- The reliable functioning of a safety edge depends onthe surface condition of the mounting surface,
- the surface condition of the mounting surface condition of the mounting surface.
- the correct choice of EKS profile,
- and proper installation.

Due to the design, the visible actuation area is reduced by the non-sensitive edges. What remains is the actual effective actuation area (see chapter *Effective actuation area*).

### Limits

- max. 3 sensors type BK on one control unit
- max. 2 sensors type BK and 1 sensor type W on one control unit If more sensors are required, please contact Mayser's service department.



### Exclusions

The sensors are not suitable for performing a sealing function. Constant actuation of sensors can result in permanent damage.

### Other safety aspects

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

#### Performance Level (PL)

Exclusion of error according to ISO 13849-2, Table D.8: Non-closing of contacts in the case of pressure-sensitive safety devices according to ISO 13856. In this case, none of the sensor parameters are used for determining the PL. Assuming the control unit has a high  $\text{MTTF}_{\text{D}}$  value, the entire miniature safety edge system (pressure-sensitive safety device) can achieve the maximum value PL d.

#### Is the safeguard appropriate?

The PL required for the hazard must be decided by the integrator. This is followed by the choice of safeguard.

Finally, the integrator needs to check whether the category and PL of the safeguard chosen are appropriate.

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



### Design



The miniature safety edge consists of a sensor (1 to 3) (1) contact profile EKS with (2) integrated NO contact safety element, (3) mounting element.

### Effective actuation area

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

For the effective actuation area, the following applies:

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



- $L_{WB}$  = effective actuation length
- L<sub>EKS</sub>= total length of miniature safety edge
- L<sub>NE</sub> = non-sensitive length at end of miniature safety edge
- $\alpha \ = \text{effective actuation angle}$



		EKS 011	EKS 014	EKS 052
α		80°	80°	80°
	End piece W	27 mm	27 mm	27 mm
L <sub>ne</sub>	End piece cable angled 90°	28.5 mm	28.5 mm	28.5 mm
	End piece cable axial	32 mm	32 mm	32 mm
Х		2.05 mm	2.3 mm	2.1 mm
Y		3.95 mm	3.9 mm	4.7 mm
Ζ		4.6 mm	4.5 mm	4.5 mm



### Installation position

The installation position is variable. In idle state, it must be ensured that no pressure is exerted on the sensors.

### Connection

### Cable exits

Two cable exits are available: axial and 90° angle.





### Cable connection

- Standard cable lengths L = 2,5 m
- Maximum total cable length to the control unit  $L_{max} = 100 \text{ m}$

#### Sensor type W

- As a single sensor type W or an end sensor type W
- Integrated resistor
- 2-wire cable (Ø 2.9 mm PUR, 2× 0.25 mm<sup>2</sup> Cu)

#### Sensor type BK with 2 lines

- As a feed-through sensor type BK
- Without resistor
- Two 2-wire cables (Ø 2.9 mm PUR, 2× 0.25 mm<sup>2</sup> Cu)





### Wire colours

#### Sensor type W

#### **Colour coding**

ΒK	Black
RD	Red



#### Sensor type BK with 2 lines



### Sensor surface

### **Physical resistance**

#### Higher degree of protection

A special adhesive (part no. 1004987) allows a higher degree of protection up to IP64.

Miniature safety edge EKS	TPE
IEC 60529: Degree of protection	IP40
UV-resistance	yes

### **Chemical resistance**

The sensor is resistant against normal chemical influences such as diluted acids and alkalis as well as alcohol over an exposure period of 24 hrs.

The specifications in the table are the result of tests conducted in our lab at room temperature (+23 °C). The suitability of our products for your special area of application must always be verified with your own practical tests.



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	+
lcidine	+
Incidine	+
Incidine plus	+
Cooling lubricant	-
Plastic cleaner	+
Lyso FD 10	+
Metal working oil	-
Microbac	+
Microbac forte	+
Minutil	+
Saline solution 5 %	+
White spirit (ethyl alcohol)	+
Terralin	+
Centring oil	-

#### **Explanation of symbols:**

- + = resistant
- $\pm$  = resistant to a certain extent
- = not resistant



### 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	_	_	•

### Per acrylic foam adhesion

The miniature safety edge is equipped with double-sided foam adhesive tape. The double-sided foam adhesive tape (acrylic foam) is already affixed to the bottom side of the contact profile.

#### With primer

The clean, dry and smooth bonding surface must be treated with primer before the miniature safety edge is mounted.

#### Without primer

Only in the case of uncoated aluminium, the acrylic foam also adheres dependably without primer.

#### Not suitable

The following materials are not suitable for acrylic foam adhesive tape: CAB, glass, natural wood, PE, HDPE and PS.



### Per snap-in foot

The miniature safety edge is clipped into an aluminium profile.



#### Aluminium profile C 10

Standard profile for EKS 014:

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

### Per clamp foot

The miniature safety edge is pressed into a groove. A precise groove provides for an accurate and lasting fit.





### **Maintenance and cleaning**

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

#### **Regular inspection**

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

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

#### Cleaning

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

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### **Technical data**

### SK EKS 011 TPE

Miniature safety edge (without sensor)	SK EKS/W 011 TPE or SK EKS/BK 011 TPE	
Test principles	based on ISO 13856-2	
Switching characteristics at $v_{test} = 5$	50 mm/s	
Switching operations Test piece Ø 10 mm, F = 100 N	> 1× 10 <sup>5</sup>	
Actuation force	+23 °C -25 °C	
Test piece Ø 4 mm	< 15 N < 30 N	
Test piece (cylinder) Ø 200 mm	< 25 N < 50 N	
Actuation distance		
Test piece (cylinder) Ø 80 mm	< 2.0 mm	
Actuation angle	. 400	
Finder detection	$\pm 40^{\circ}$	
	yes	
Safety classifications		
ISO 13849-1: B <sub>10D</sub>	2×10 <sup>6</sup>	
Mechanical operating conditions		
Sensor length (min./max.)	10 cm / 50 m	
Cable length	2.5 m	
Acrylic foam: Peel force	15 N/cm	
Bend radii (min.): $B_1 / B_2 / B_3 / B_4$	120 / 150 / 20 / 20 mm	
max. load capacity (signal)	600 N	
lensile load, cable (max.)	20 N	
IEC 60529: Degree of protection	1P40	
chort torm (15 min)	-25 10 + 80 C	
Short-term (15 mm)	$-40 t_0 + 100 C$	
DIN 75200: Behaviour in fire	-40.00+80 C	
Weight (with Acrylic foam)	43 g/m	
Electrical operating conditions		
Terminal resistance (+1%)	162 262 or 862	
Rated capacity (max )	250 mW/	
Contact transition resistance	< 400 Ohm (per sensor)	
Number of sensors type BK	max. 3 in series (For more	
	information refer to the chapter <i>Limits</i> )	
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>	
Dimensional tolerances		
Length according to	ISO 3302 L2	
Profile section according to	ISO 3302 E2	



Bend radii:



# Higher degree of protection, higher tensile load

A special adhesive (part no. 1004987) allows a higher degree of protection up to IP64 and a tensile load on the cable up to 60 N.





Bend radii:



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### **Technical data**

### SK EKS 014 TPE

Miniature safety edge	SK EKS/W 014 TPE or
(without sensor)	SK EKS/BK 014 TPE
Test principles	based on ISO 13856-2
Switching characteristics at $v_{test} = 50$	) mm/s
Switching operations	
Test piece Ø 10 mm, F = 100 N	$> 1 \times 10^{5}$
Actuation force	+23 °C -25 °C
Test piece Ø 4 mm	< 15 N < 30 N
Test piece (cylinder) Ø 200 mm	< 25 N < 50 N
Actuation distance	
lest piece (cylinder) Ø 80 mm	< 2.0 mm
Actuation angle	. 10°
Finder detection	$\pm 40^{-1}$
	yes
Safety classifications	
ISO 13849-1: B <sub>10D</sub>	2× 10 <sup>6</sup>
Mechanical operating conditions	
Sensor length (min./max.)	10 cm / 50 m
Cable length	2.5 m
Snap-in foot width	3.5 mm
Alu-Profil (empfohlen)	C 10
Bend radii (min.): B <sub>1</sub> / B <sub>2</sub> / B <sub>2</sub> / B <sub>4</sub>	120 / 150 / 20 / 20 mm
max. load capacity (signal)	600 N
Tensile load, cable (max.)	20 N
IEC 60529: Degree of protection	IP40
Operating temperature	-25 to +80 °C
short-term (15 min)	-40 to +100 °C
Storage temperature	-40 to +80 °C
DIN 75200: Behaviour in fire	ca. 40 mm/min
Weight (without/with Aluuminium	49 g/m / 125 g/m
profile)	
Electrical operating conditions	
Terminal resistance (±1%)	1k2, 2k2 or 8k2
Nennleistung (max.)	250 mW
Contact transition resistance	< 400 Ohm (per sensor)
Number of sensors type BK	max. 3 in series (For more
	information refer to the
Switching voltage (max )	DC 24 V
Switching current (min / max)	$1 \text{ m}\Delta / 10 \text{ m}\Delta$
Connection cable	$\emptyset$ 2 9 mm PLJR 2x 0 25 mm <sup>2</sup>
Dimensional tolerances	
Length according to	150 3302 1 2
Profile section according to	ISO 3302 E2
	IJU JJUZ LZ



### **Technical data**

### SK EKS 052 TPE

Miniature safety edge (without sensor)	SK EKS/W 052 TPE oder SK EKS/BK 052 TPE		
Test principles	based on ISO 13856-2		
Switching characteristics at v <sub>test</sub> = 50 mm/s			
Switching operations Test piece Ø 10 mm, F = 100 N Actuation force	> 1× 10 <sup>5</sup> +23 °C -25 °C		
Test piece Ø 4 mm	< 15 N < 30 N		
Test piece (cylinder) Ø 200 mm Actuation distance Test piece (cylinder) Ø 80 mm	< 25 N < 50 N		
Actuation angle	× 2.0 mm		
Finder detection			
Safety classifications	J C S		
ISO 138/19-1. B	2× 10 <sup>6</sup>		
No charged an evention and ditions	2X 10		
	4.0 / 45		
Sensor length (min./max.)	10 cm / 45 m		
Cable length	2.5 m		
Groove width for clamp foot	3.7 ±0,4 mm		
Bend radii (min.): $B_1 / B_2 / B_3 / B_4$	1207 1507 207 20 mm		
Tansila land, cable (max)			
IEC 60520: Degree of protection			
Operating temperature	$-25 \pm 0 \pm 80^{\circ}$		
short-term (15 min)	-40  to  +100  °C		
Storage temperature	$-40 \text{ to } +80 ^{\circ}\text{C}$		
DIN 75200: Behaviour in fire	ca 40 mm/min		
Weight	54 g/m		
Electrical operating conditions			
Terminal resistance (±1%)	1k2, 2k2 or 8k2		
Nennleistung (max.)	250 mW		
Contact transition resistance	< 400 Ohm (per sensor)		
Number of sensors type BK	max. 3 in series (For more information refer to the chapter <i>Limits</i> )		
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			
Dimensional tolerances			
Length according to	ISO 3302 L2		
Profile section according to	ISO 3302 E2		



Bend radii:



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### Marking

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.