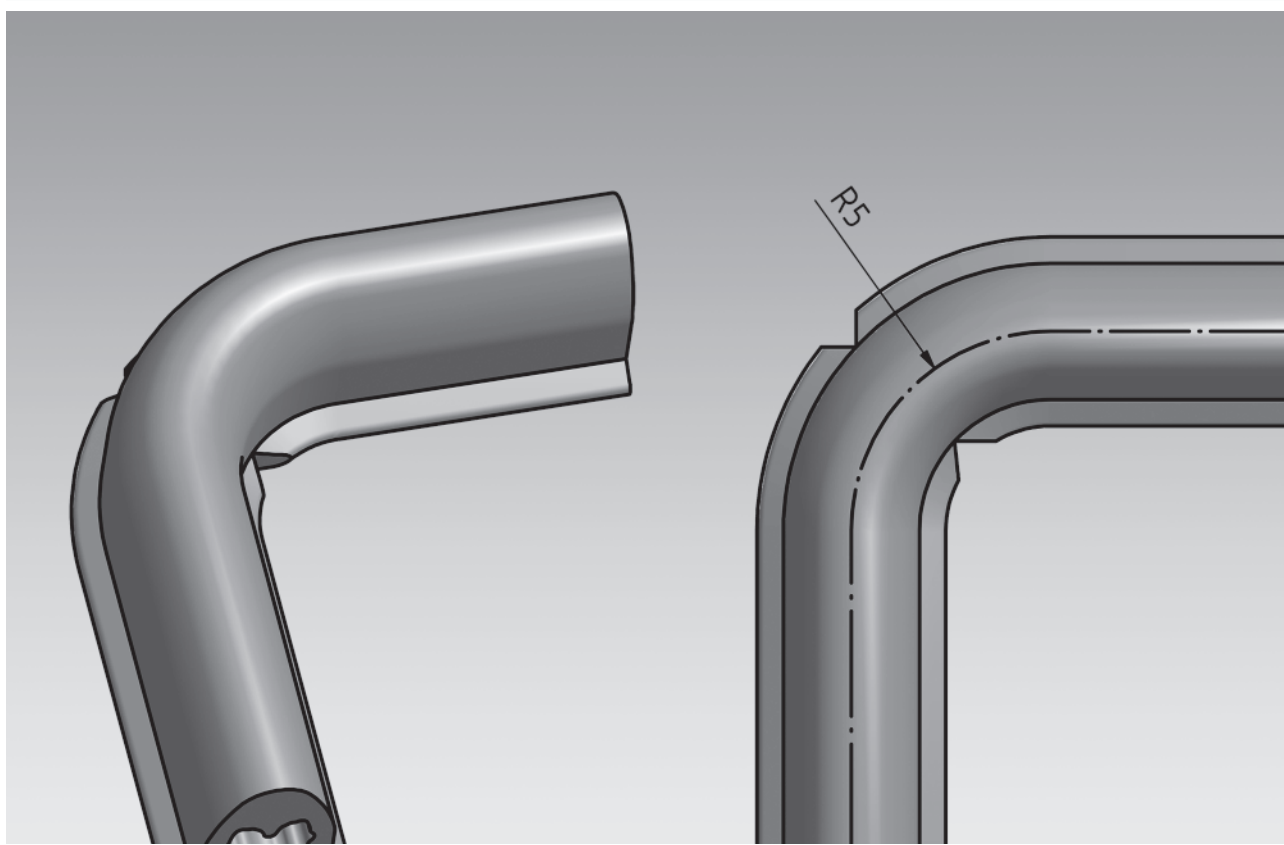




Product Information



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.

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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.

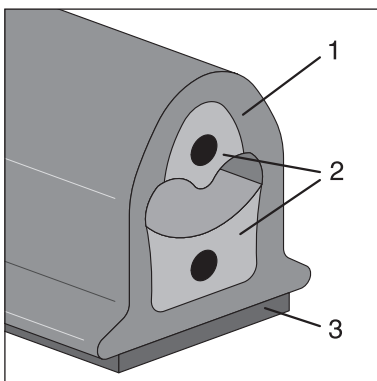
Safe operation of a Miniature Safety Edge depends entirely on

- 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

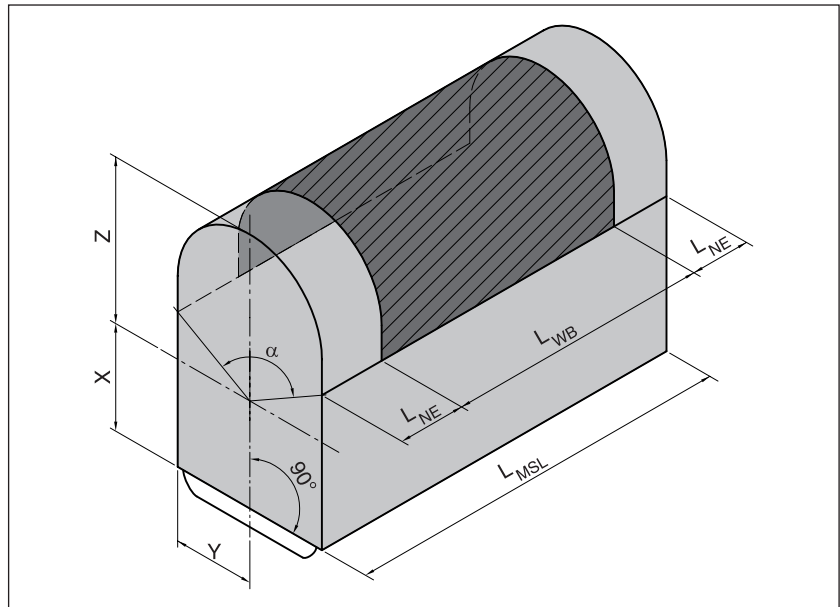
The parameters X, Y, Z, L_{NE} and angle α describe the effective actuation area.

For the effective actuation area, the following applies:

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

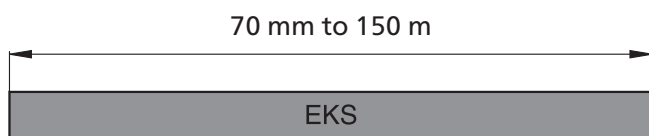
Parameters:

- L_{WB} = effective actuation length
- L_{MSL} = overall length of the Miniature Safety Edge
- L_{NE} = non-sensitive length at the end
- α = effective actuation angle



MSL	EKS 038			
α	60°			
L _{NE}	10 mm			
X	2 mm			
Y	2.65 mm			
Z	2.9 mm			

Available lengths



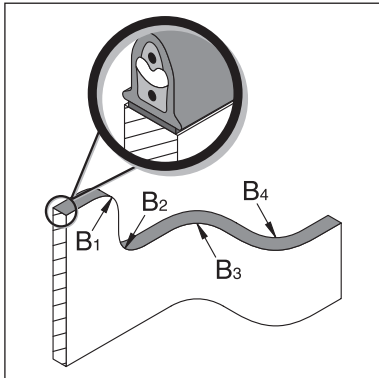
060217 v1.4c

Bend angles and bend radii

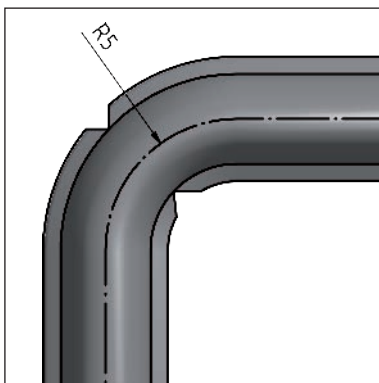
Bend angles

Bend angles are not possible on the Miniature Safety Edge.

Bend radius



Bend radius min.	EKS 038
B ₁	500 mm
B ₂	300 mm
B ₃	15 mm
B ₄	15 mm



Small 90° bends can also be implemented: Small bend radii up to 5 mm are possible for B₃ and B₄ 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.

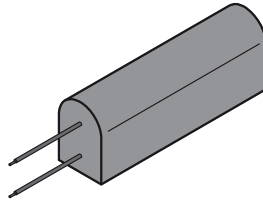
Connection

Cable exits

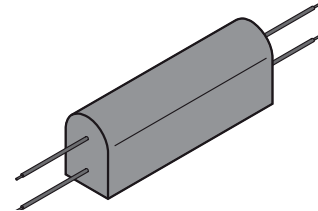
Tip

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

Axial exit



Version: EKS 038/W



Version: EKS 038/BK

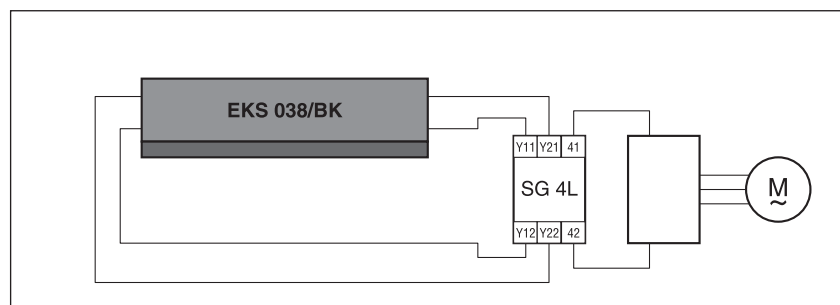
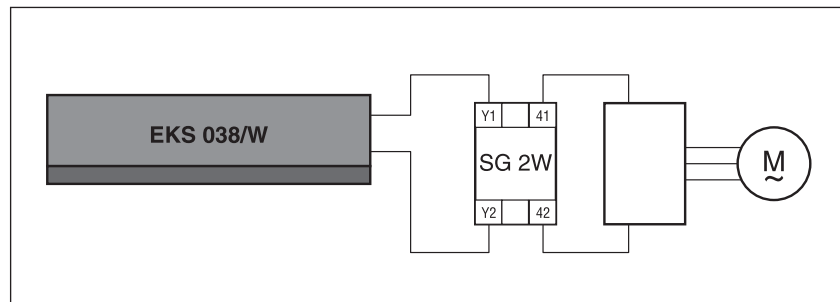
Cable connection

CAUTION

The cables must be laid free of tension.

- Cable: 0.35 mm² 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 2W

2-wire-technology evaluation

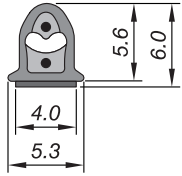
SG 4L

4-wire-technology evaluation

Y11, Y12 lower cables; Y21, Y22 upper cables

Profiles

Dimensions and operating paths

EKS 038	
	
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 (DIN 75200)	approx. 40 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.

Explanation of symbols:

+ = resistant

± = resistant to a certain extent

- = not resistant

Miniature Safety Edge EKS	TPE
Acetone	-
Formic acid	-
Armor All	+
Car shampoo	+
Buraton	+
Butanol	-
Sodium hypochlorite	-
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	-

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.

on ...	Bonding with ...	with Primer	without Primer
ABS		1	-
Aluminium: natural		1	+
Aluminium: anodised		1 / 3	-
Aluminium: powder-coated		1	-
CAB		-	-
Glass		4 / 5	-
Wood: natural		-	-
Wood: glazed, varnished		2	-
Wood: veneered, light weight building board		2	-
PA6, PA66		3	-
PE, HDPE		-	-
PMMA		1	-
PP		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).

Preparation

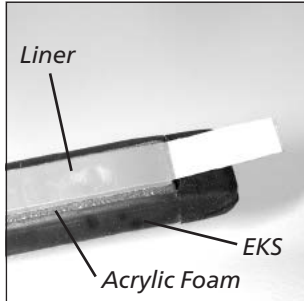
Only applies to bend radii < 15 mm.

1. Measure bend locations and mark on both sides.
2. Carefully cut into both profile sides at the markings, making sure you only cut the projecting part.

CAUTION

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

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 pc.
1003360	Multiprimer, 250 ml 24-P	1 pc.

ATTENTION

Smaller winding diameters cause separation of the liner and therefore damage to the self-adhesive acrylic foam.

Storage

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

Technical data

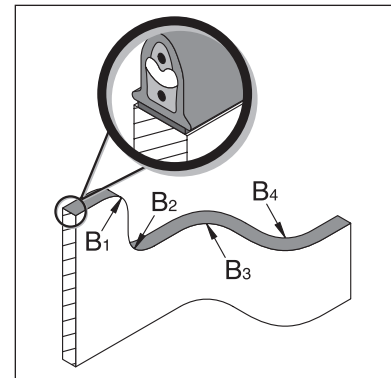
Miniature Safety Edge EKS 038 cut-to-size
with resistor (type W) or
without resistor (type BK).



1:1

Switching characteristics at $v_{test} = 50 \text{ mm/min}$	
Switching operations	$> 1 \times 10^5$
Actuating force	+23 °C -25 °C
Test piece (rod) Ø 4 mm	$< 15 \text{ N}$ $< 25 \text{ N}$
Test piece (rod) Ø 200 mm	$< 35 \text{ N}$ $< 50 \text{ N}$
Actuating distance	
Test piece (cylinder) Ø 80 mm	$< 1.2 \text{ mm}$
Actuation angle	
Test piece (cylinder) Ø 80 mm	$\pm 30^\circ$
Safety classifications	
B_{10d} as per ISO 13849-1	2×10^6
Mechanical operating conditions	
Sensor length (min./max.)	70 mm / 150 mm
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 / 15 / 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	$1k\Omega \pm 5\%$
Output	max. 250 mW
Contact transition resistance	$< 400 \text{ Ohm}$ (per sensor)
More than one sensor	max. 5 in series
Electrical rating	
Voltage	max. 24 V DC
Current (min./max.)	1 mA / 10 mA
Connection cable	Ø 1.4 mm per strand $2 \times 0.35 \text{ mm}^2$
Control Unit (recommendation)	
ISO 13849-1 Cat. 3	SG-EFS 104/2W (type W)
ISO 13849-1 Cat. 3	SG-EFS 104/4L (type BK)
Chemical resistance	
The Miniature Safety Edge is resistant against normal chemical influences 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

Bend radii:



Request for quotation

From:

Company

Department

Name, first name

P. O. Box

Post code

City

Street

Post code

City

Phone

Fax

E-mail

Fax:**+49 731 2061-222****Area of application**

(e.g.. window construction, medical technology, machine closing edges, public transport, ...)

↓ Please keep free! ↓
For internal use only

Mechanical conditions

EKS _____

 Type BK Type W with resistor _____ kΩ

Length: _____ m

Packing unit: _____ units

Attachment per:

 Bonding Snap-in foot Angle piece

construction: _____ x per EKS

 Cable length: _____ m (standard: 2.0 m) Number of monitoring circuits: _____ SG- _____**Pinching and shearing edges to be protected:**

(Diagram incl. mounting possibility and cable routing)