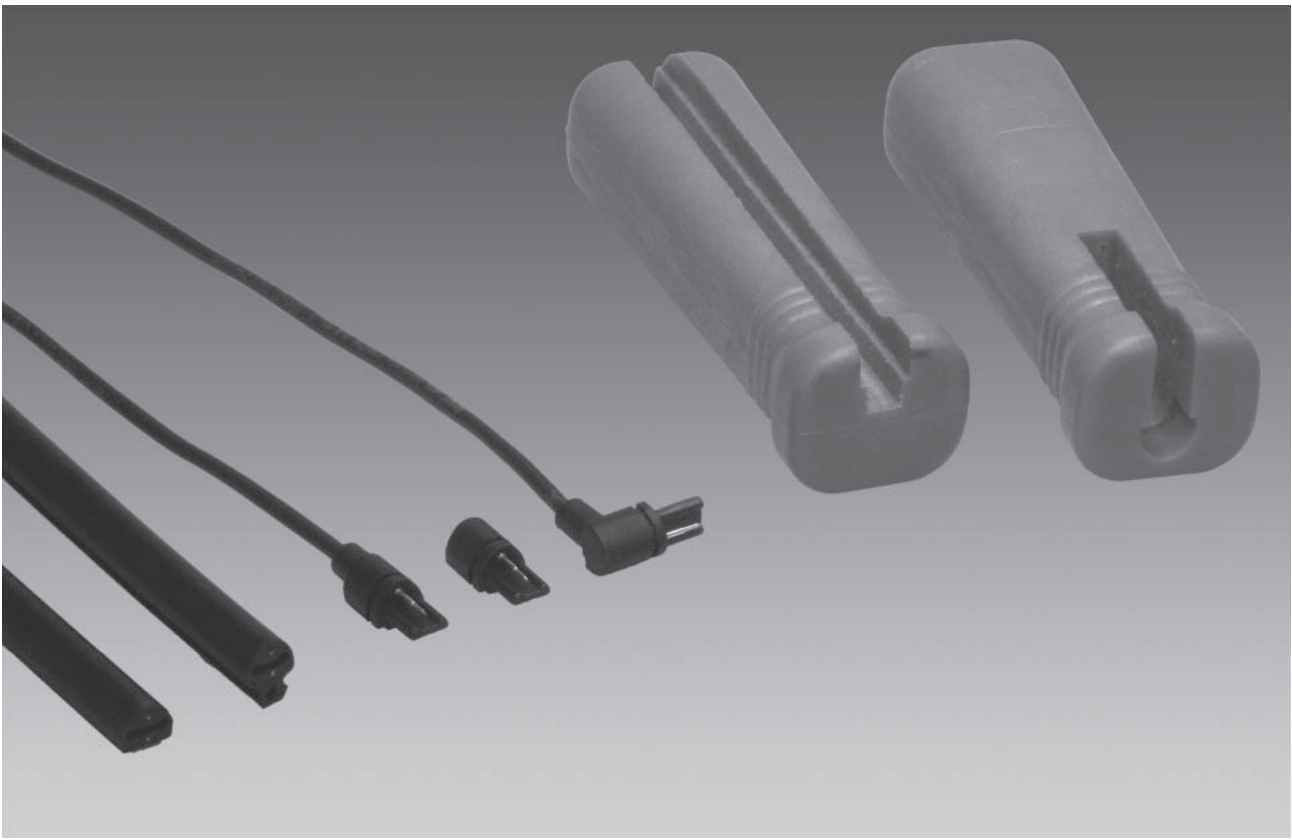


MAYSER®

Polymer Electric



Product Information



DIY Miniature Safety Edges

Mayser GmbH & Co. KG

Örlinger Straße 1–3

89073 Ulm

GERMANY

Tel.: +49 731 2061-0

Fax: +49 731 2061-222

E-Mail: info.ulm@mayser.com

Internet: www.mayser.com

Content

Materials list **3**

Contact tubes **3**

 Dimensions 3

 Physical resistance 4

 Chemical resistance..... 4

DIY in 3 steps..... **5**

 1. Cutting to length..... 5

 2. Insertion 5

 3. Check..... 6

Attachment..... **7**

 Per acrylic-foam adhesive tape 7

 Per clip foot 8

 Per clamp foot 9

Technical data DIY EKS 011 **10**

Technical data DIY EKS 014..... **11**

Technical data DIY EKS 052 **12**

Copyright

The reproduction, distribution and utilization of this document as well as the communication of its contents without express authorization is prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

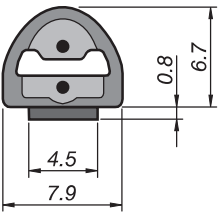
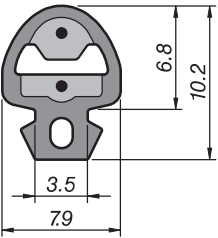
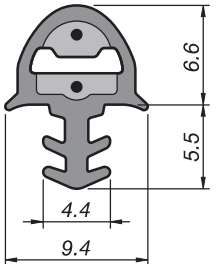
© Mayser Ulm 2016

Materials list

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

Contact tubes

Dimensions

EKS 011 TPE	EKS 014 TPE	EKS 052 TPE
		
Actuating force: < 50 N actuating distance at 50 mm/s < 2 mm	Actuating force: < 50 N actuating distance at 50 mm/s < 2 mm	Actuating force: < 50 N actuating distance at 50 mm/s < 2 mm

Notes: Dimensional tolerances as per ISO 3302 E2/L2.

Subject to technical modifications.

Physical resistance

Notes:

Higher degrees of protection up to IP64 are possible using special adhesive (part no. 1004987).

Miniature Safety Edge EKS	TPE
IEC 60529: Degree of protection	IP40
Hardness as per Shore A	50 ±5

Chemical resistance

Explanation of symbols:

+ = resistant

± = limited resistance

- = not resistant

Miniature Safety Edge EKS	TPE
Acetone	-
Formic acid	-
Armor All	+
Car shampoo	+
Petrol	-
Brake fluid	+
Buraton	+
Butanol	-
Sodium hypochlorite	-
Disinfectant	+
Diesel	-
Acetic acid 10 %	-
Ethanol	+
Ethyl acetate	-
Ethylene glycol	+
Greases	±
Anti-frost agent	+
Skin cream	+
Icidine	+
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	+
UV-resistance	+
Centring oil	-

Notes:

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

Subject to technical modifications.

The Safety Element 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.

DIY in 3 steps

These instructions describe cutting the contact tube to the required length, application of the end pieces and final testing. The end product is a Miniature Safety Edge EKS 011, EKS 014 or EKS 052 with degree of protection IP40.

1. Cutting to length

- Measure contact tube (KS) to length and mark.

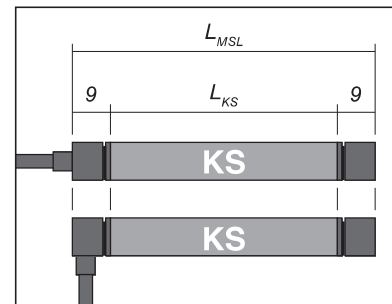
The following applies: $L_{KS} = L_{MSL} - 18 \text{ mm}$

where:

L_{KS} = length of contact tube

L_{MSL} = length of Miniature Safety Edge

- Place contact tube against stop of the scissors and cut off at marking

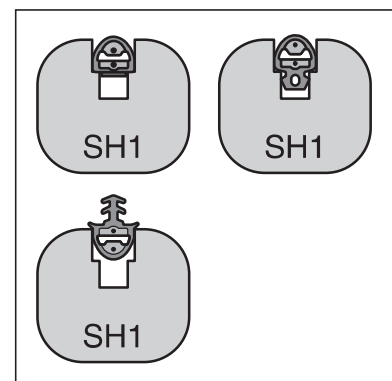


2. Insertion

- Insert contact tube in assembly aid SH1 so that the contact tube protrudes 2 to 3 mm beyond the edge.



- Insert cable end piece in assembly aid SH2.



Subject to technical modifications.

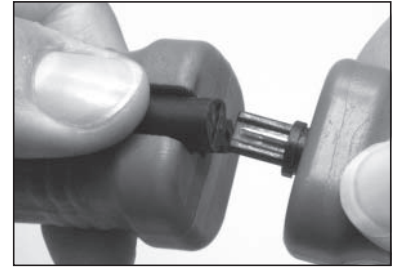
Tip

For a better bond between the end piece and the end of the contact tube, brush with a thin layer of special adhesive (part no. 1004987). When finished, wipe away any excess adhesive from assembly aid.

Tip

Use leverage effect – with slight pressure on contact tube at the end of the handle.

- Fix contact tube in assembly aid SH1 by pressing firmly with thumb.
- Insert end piece straight into contact tube with assembly aid SH2 and press firmly against assembly aid SH1 until the air gap between the end piece and the contact tube disappears.



- Loosely detach assembly aid SH2 and remove semi-finished Miniature Safety Edge.



- Assemble the other end of the contact tube with a resistor end piece in the same way.

3. Check

- Visual check for flush connection of the end pieces all round.
- Check operation with multimeter: Are set values met?



Set values:

Miniature Safety Edge not activated

EKS/W with 1k2: 1.2 kOhm $\pm 10\%$

EKS/W with 2k2: 2.2 kOhm $\pm 5\%$

EKS/BK: $> 20 \text{ MOhm}$

Continuity test per channel: $< (5 + (L_{KS} \times 0.5/m)) \text{ Ohm}$

Miniature Safety Edge activated

all EKS: $< 400 \text{ Ohm}$



Miniature Safety Edge may be irreparably damaged!

- ➔ No tensile load may be applied to the cable.
- ➔ Do not pull Miniature Safety Edge into an outer profile.
- ➔ Clip EKS 014 into aluminium profile C 10, do not pull in.
- ➔ No pressure may be exerted on the contact tube in non-operative mode.

Subject to technical modifications.

Attachment

Per acrylic-foam adhesive tape

e.g. EKS 011

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

Explanation of symbols:

+ = suitable

- = not suitable

1 = Primer 4298UV

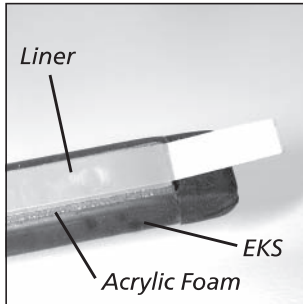
2 = Primer 4297

3 = Multiprimer

4 = Silan Primer

5 = Primer 4299

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:

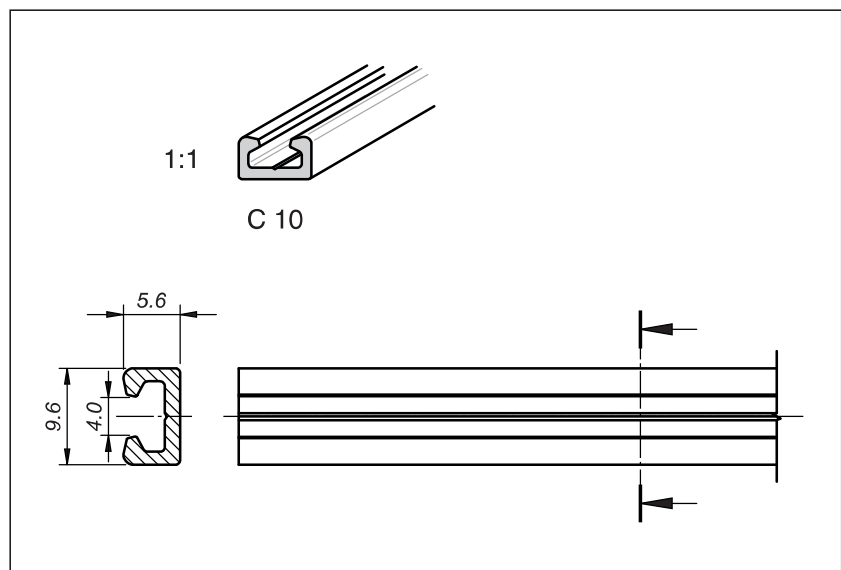
If tensile stress is applied, the EKS can become several millimetres longer.

Per clip foot

e.g. EKS 014

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.

Subject to technical modifications.

Requirements

To ensure optimum fixing, the aluminium profile must be

- + compatible (e.g. C 10 for EKS 014)
- + clean
- + smooth.

Avoid

- drilling dust
- sharp-edged burrs on holes.

Recommended aids: sliding agents and seam rollers.

Note on aids:

- Brush aluminium profile and clip foot with a volatile **sliding agent** (e.g. water with washing-up liquid).
- **Seam roller** for pushing in.

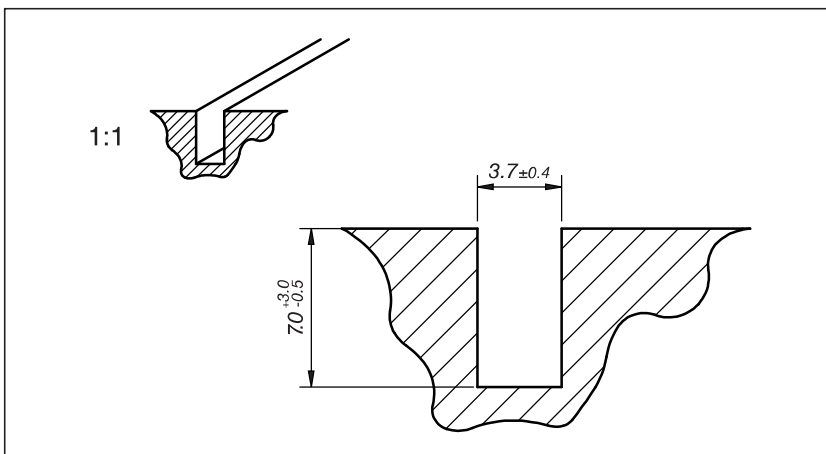
Clipping

1. Fix aluminium profile with countersunk screws, e.g. M2x2.5.
2. Clip Miniature Safety Edge with clip foot into the aluminium profile.

Per clamp foot

e.g. EKS 052

The Miniature Safety Edge is pressed into a groove.



Requirements

To ensure optimum fixing, the groove must be

- + manufactured for an exact fit
- + clean
- + smooth.

Avoid

- dirt
- sharp-edged burrs.

Recommended aids: seam roller.

Clamping

- ➔ Press the clamp foot into the groove until the Miniature Safety Edge is evenly inserted.

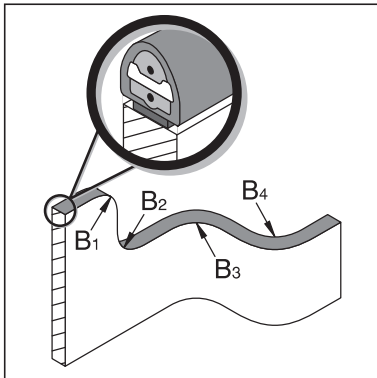
Subject to technical modifications.

Technical data DIY EKS 011

Miniature Safety Edge EKS 011
manufactured with resistor for 2-wire technology
or without resistor for 4-wire technology.



Bend radii:



Note:

Higher degrees of protection up to IP64 and a tensile load on the cable of up to 60 N are possible using special adhesive (part no. 1004987).

Switching characteristics at $v_{\text{test}} = 50 \text{ mm/min}$		
Switching operations		
Test piece (rod) Ø 10 mm, F = 100 N	$> 1 \times 10^5$	
Actuating force	+23 °C	-25 °C
Test piece (rod) Ø 4 mm	$< 15 \text{ N}$	$< 30 \text{ N}$
Test piece (rod) Ø 200 mm	$< 25 \text{ N}$	$< 50 \text{ N}$
Actuating distance		
Test piece (cylinder) Ø 80 mm	$< 2.0 \text{ mm}$	
Actuation angle		
Test piece (cylinder) Ø 80 mm	$\pm 40^\circ$	
Safety classifications		
ISO 13849-1: B _{10d}	2×10^6	
Mechanical operating conditions		
Acrylic foam		
Peel force	15 N/cm	
Bend radii, minimum		
B ₁ / B ₂ / B ₃ / B ₄	120 / 150 / 20 / 20 mm	
Tensile load, cable (max.)	20 N	
IEC 60529: Degree of protection	IP40	
Operating temperature		
temporary (15 min)	-25 to +80 °C -40 to +100 °C	
Behaviour in fire		
as per DIN 75200	approx. 40 mm/min	
Electrical operating conditions		
Terminal resistance 1k2/2k2	$\pm 10\% / \pm 5\%$	
Switching capacity (max.)	250 mW	
Contact transition resistance	$< 400 \text{ Ohm}$ (per sensor)	
More than one sensor	max. 3 in series	
Electrical rating		
Voltage (max.)	DC 24 V	
Current (min./max.)	1 mA / 10 mA	
Connection cable	Ø 2.7 mm PVC 2x 0.25 mm ²	
Chemical resistance		
The sensor is resistant against normal chemical influences over a period of exposure of 24 hrs (see p. 4).		
Dimensional tolerances		
Length as per	ISO 3302 L2	
Profile section as per	ISO 3302 E2	

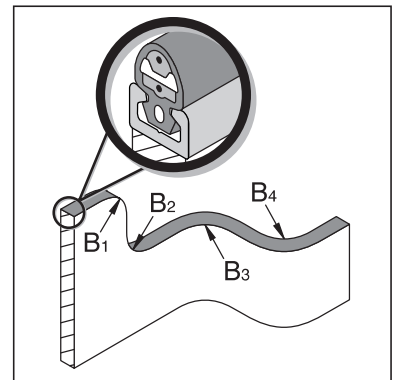
Technical data DIY EKS 014

Miniature Safety Edge EKS 014
manufactured with resistor for 2-wire technology
or without resistor for 4-wire technology.



Switching characteristics at $v_{\text{test}} = 50 \text{ mm/min}$		
Switching operations		
Test piece (rod) Ø 10 mm, F = 100 N	$> 1 \times 10^5$	
Actuating force	+23 °C	-25 °C
Test piece (rod) Ø 4 mm	$< 15 \text{ N}$	$< 30 \text{ N}$
Test piece (rod) Ø 200 mm	$< 25 \text{ N}$	$< 50 \text{ N}$
Actuating distance		
Test piece (cylinder) Ø 80 mm	$< 2.0 \text{ mm}$	
Actuation angle		
Test piece (cylinder) Ø 80 mm	$\pm 40^\circ$	
Safety classifications		
ISO 13849-1: B _{10d}	2×10^6	
Mechanical operating conditions		
Clip foot width	3.5 mm	
Aluminium profile (recommended)	C 10	
Bend radii, minimum		
B ₁ / B ₂ / B ₃ / B ₄	120 / 150 / 20 / 20 mm	
Tensile load, cable (max.)	20 N	
IEC 60529: Degree of protection	IP40	
Operating temperature	-25 to +80 °C	
temporary (15 min)	-40 to +100 °C	
Behaviour in fire		
as per DIN 75200	approx. 40 mm/min	
Electrical operating conditions		
Terminal resistance 1k2/2k2	$\pm 10\% / \pm 5\%$	
Switching capacity (max.)	250 mW	
Contact transition resistance	$< 400 \text{ Ohm}$ (per sensor)	
More than one sensor	max. 3 in series	
Electrical rating		
Voltage (max.)	DC 24 V	
Current (min./max.)	1 mA / 10 mA	
Connection cable	Ø 2.7 mm PVC 2x 0.25 mm ²	
Chemical resistance		
The sensor is resistant against normal chemical influences over a period of exposure of 24 hrs (see p. 4).		
Dimensional tolerances		
Length as per	ISO 3302 L2	
Profile section as per	ISO 3302 E2	

Bend radii:



Note:

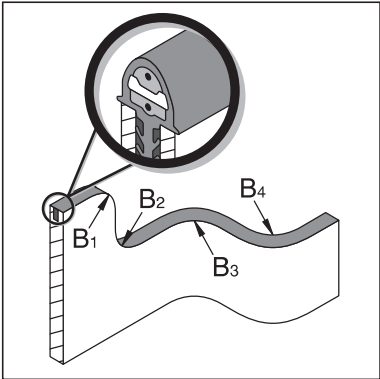
Higher degrees of protection up to IP64 and a tensile load on the cable of up to 60 N are possible using special adhesive (part no. 1004987).

Technical data DIY EKS 052

Miniature Safety Edge EKS 052
manufactured with resistor for 2-wire technology
or without resistor for 4-wire technology.



Bend radii:



Note:
Higher degrees of protection
up to IP64 and a tensile load
on the cable of up to 60 N are
possible using special adhe-
sive (part no. 1004987).

Switching characteristics at v _{Prüf} = 50 mm/min		
Switching operations		
Test piece (rod) Ø 10 mm, F = 100 N	> 1× 10 ⁵	
Actuating force	+23 °C	-25 °C
Test piece (rod) Ø 4 mm	< 15 N	< 30 N
Test piece (rod) Ø 200 mm	< 25 N	< 50 N
Actuating distance		
Test piece (cylinder) Ø 80 mm	< 2.0 mm	
Actuation angle		
Test piece (cylinder) Ø 80 mm	± 40°	
Safety classifications		
ISO 13849-1: B _{10d}	2× 10 ⁶	
Mechanical operating conditions		
Groove width for clamp foot	3.7 ±0.4 mm	
Bend radii, minimum		
B ₁ / B ₂ / B ₃ / B ₄	120 / 150 / 20 / 20 mm	
Tensile load, cable (max.)	20 N	
IEC 60529: Degree of protection	IP40	
Operating temperature		
temporary (15 min)	-25 to +80 °C -40 to +100 °C	
Behaviour in fire		
as per DIN 75200	approx. 40 mm/min	
Electrical operating conditions		
Terminal resistance 1k2/2k2	±10% / ±5%	
Switching capacity (max.)	250 mW	
Contact transition resistance	< 400 Ohm (per sensor)	
More than one sensor	max. 3 in series	
Electrical rating		
Voltage (max.)	DC 24 V	
Current (min./max.)	1 mA / 10 mA	
Connection cable	Ø 2.7 mm PVC 2× 0.25 mm ²	
Chemical resistance		
The sensor is resistant against normal chemical influences over a period of exposure of 24 hrs (see p. 4).		
Dimensional tolerances		
Length as per	ISO 3302 L2	
Profile section as per	ISO 3302 E2	

Subject to technical modifications.