



RailFR®: Sensors, cables



EN | Data sheet

Sensors

EKS 002 TPE RailFR®

EKS 030 TPE RailFR®

SE 1 TPE 15 RailFR®

SE 1 TPE 18 RailFR®

Cables

MAYSER RailFR® 2× 0.25 mm²

MAYSER RailFR® 3× 0.25 mm²

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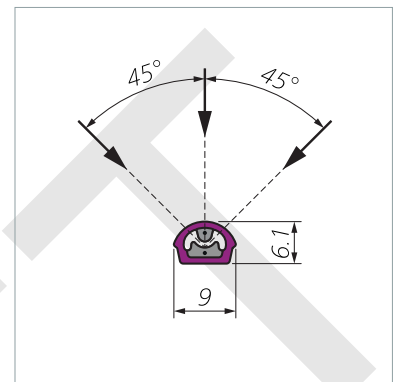
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Sensors

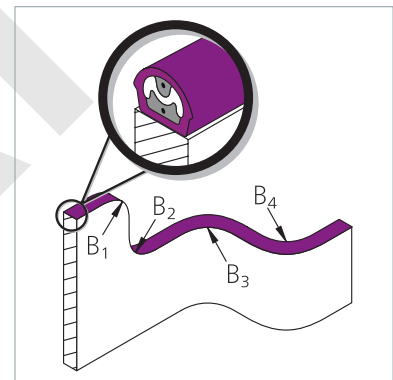
EKS 002 TPE RailFR

Switching characteristics at $v_{test} = 50 \text{ mm/min}$	
Switching operations	
Test piece (cylinder) Ø 80 mm / F = 50 N	$> 1 \times 10^6$
Actuation force	+23 °C -25 °C -40 °C
Test piece (cylinder) Ø 80 mm	< 30 N < 60 N < 80 N
Test piece (rod) Ø 20 mm	< 15 N < 20 N < 30 N
Actuation distance	
Test piece (cylinder) Ø 80 mm	< 2.0 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	$\pm 45^\circ$
Safety classifications	
ISO 13849-1: B _{10D}	2×10^6
Mechanical operating conditions	
Sensor length (min. / max.)	70 mm / 50 m
Cable length (min. / max.)	200 mm / 100 m
Tensile load, cable (max.)	60 N
Device for easier pull-in	TBD
Bend radii, minimum	
B1 / B2 / B3 / B4	40 / 40 / 40 / 40 mm
Installation position	Any
IEC 60529: degree of protection	IP67
Weight (without cable)	43 g/m
EN 50125-1: air temperature classes	T3
short-term (max. 10 min)	TX
EN 50125-1: classes for the height	AX, max. 2000 m NHN
area	
Operating temperature	-40 to +60 °C
Higher operating temperatures	Undergoing testing
EN 50125: max. humidity at	TBD %
max. temperature change	> TBD K/s
Electrical operating conditions	
Not actuated sensor	
Terminal resistance	1k2 \pm 1 %, 8k2 \pm 1 %, others on request
Nominal output	250 mW
Actuated sensor	
Contact transition resistance	< 400 ohms
Switching current (min. / max.)	DC 1 mA / DC 10 mA
More than one sensor	Max. 5 in series
Connection cable	Ø 3.8 \pm 0.2 mm, 2x 0.25 mm ²



Dimensional tolerances according to ISO 3302 E2/L2

Bend radii:



Physical resistance

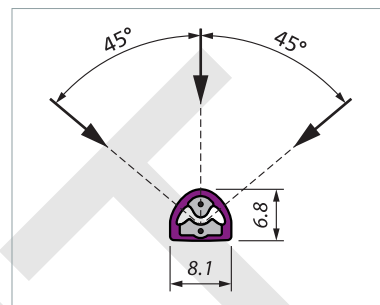
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Chemical resistance

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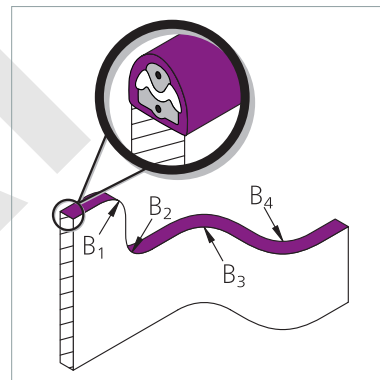
EKS 030 TPE RailFR

Switching characteristics at $v_{test} = 50 \text{ mm/min}$	
Switching operations	
Test piece (cylinder) Ø 80 mm / F = 50 N	$> 1 \times 10^6$
Actuation force	+23 °C -25 °C -40 °C
Test piece (cylinder) Ø 80 mm	< 70 N Undergoing testing
Test piece (rod) Ø 20 mm	< 15 N Undergoing testing
Actuation distance	
Test piece (cylinder) Ø 80 mm	< 1.5 mm
Actuation angle	
Test piece (cylinder) Ø 80 mm	$\pm 45^\circ$
Safety classifications	
ISO 13849-1: B _{10D}	2×10^6
Mechanical operating conditions	
Sensor length (min./max.)	70 mm / 50 m
Cable length (min./max.)	200 mm / 100 m
Tensile load, cable (max.)	60 N
Device for easier pull-in	TBD
Bend radii, minimum	
B1 / B2 / B3 / B4	40 / 40 / 25 / 25 mm
Installation position	Any
IEC 60529: degree of protection	IP67
Weight (without cable)	43 g/m
EN 50125-1: air temperature classes	T3
short-term (max. 10 min)	TX
EN 50125-1: classes for the height area	AX, max. 2000 m NHN
Operating temperature	
Higher operating temperatures	Undergoing testing
EN 50125: max. humidity at max. temperature change	TBD % > TBD K/s
Electrical operating conditions	
Not actuated sensor	
Terminal resistance	1k2 ± 1 %, 8k2 ± 1 %, others on request
Nominal output	250 mW
Actuated sensor	
Test piece (cylinder) / F = 150 N	
Contact transition resistance	< 400 ohms
Switching current (min. / max.)	DC 1 mA / DC 10 mA
More than one sensor	Max. 5 in series
Connection cable	Ø 3.8 ± 0.2 mm, 2 × 0.25 mm ²



Dimensional tolerances according to ISO 3302 E2/L2

Bend radii:



Physical resistance

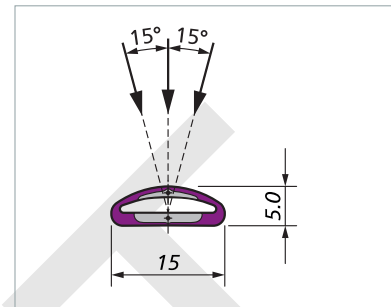
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Chemical resistance

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SE 1 TPE 15 RailFR

Switching characteristics at $v_{test} = 50 \text{ mm/min}$	
Switching operations	
Test piece (cylinder) $\varnothing 80 \text{ mm}$ / $F = 20 \text{ N}$	$> 1 \times 10^6$
Actuation force	+23 °C -25 °C -40 °C
Test piece (cylinder) $\varnothing 80 \text{ mm}$	$< 40 \text{ N}$ Undergoing testing
Test piece (rod) $\varnothing 20 \text{ mm}$	Undergoing testing
Actuation distance	
Test piece (cylinder) $\varnothing 80 \text{ mm}$	$< 1.8 \text{ mm}$
Actuation angle	
Test piece (cylinder) $\varnothing 80 \text{ mm}$	$\pm 15^\circ$
Safety classifications	
ISO 13849-1: B_{10D}	2×10^6
Mechanical operating conditions	
Sensor length (min./max.)	100 mm / 50 m
Cable length (min./max.)	200 mm / 100 m
Tensile load (max.)	
Cable	50 N
Pull-in tab	30 N
Device for easier pull-in	TBD
Bend radii, minimum	
B1 / B2 / B3 / B4	70 / 100 / 150 / 150 mm
Installation position	Any
IEC 60529: degree of protection	IP67
Weight (without cable)	47 g/m
EN 50125-1: air temperature classes	
short-term (max. 10 min)	T3
EN 50125-1: classes for the height area	AX, max. 2000 m NHN
Operating temperature	
Higher operating temperatures	Undergoing testing
EN 50125: max. humidity at	
max. temperature change	$> \text{TBD K/s}$
Electrical operating conditions	
Not actuated sensor	
Terminal resistance	$1\text{k}2 \pm 1 \%$, $8\text{k}2 \pm 1 \%$, others on request
Nominal output	250 mW
Actuated sensor	
Contact transition resistance	Test piece (cylinder) / $F = 150 \text{ N}$
Switching current (min. / max.)	$< 400 \text{ ohms}$ DC 1 mA / DC 10 mA
More than one sensor	Max. 5 in series
Connection cable	$\varnothing 3.8 \pm 0.2 \text{ mm}$, $2 \times 0.25 \text{ mm}^2$

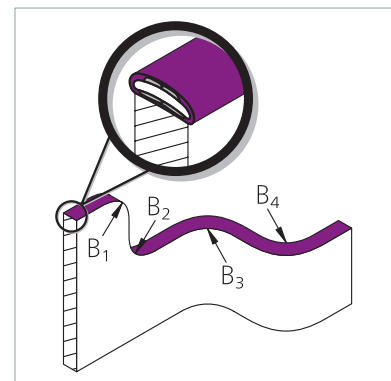


Dimensional tolerances according to ISO 3302 E2/L2

Pull-in tab:



Bend radii:



Physical resistance

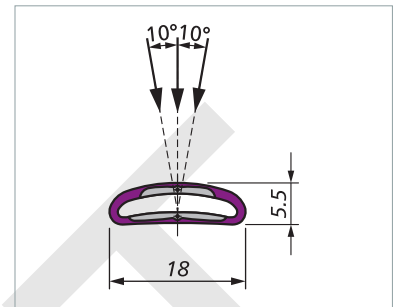
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Chemical resistance

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SE 1 TPE 18 RailFR

Switching characteristics at $v_{test} = 50 \text{ mm/min}$	
Switching operations	
Test piece (cylinder) $\varnothing 80 \text{ mm}$ / $F = 20 \text{ N}$	$> 1 \times 10^6$
Actuation force	+23 °C -25 °C -40 °C
Test piece (cylinder) $\varnothing 80 \text{ mm}$	Undergoing testing
Test piece (rod) $\varnothing 20 \text{ mm}$	Undergoing testing
Actuation distance	
Test piece (cylinder) $\varnothing 80 \text{ mm}$	$< 2.0 \text{ mm}$
Actuation angle	
Test piece (cylinder) $\varnothing 80 \text{ mm}$	$\pm 10^\circ$
Safety classifications	
ISO 13849-1: B_{10D}	2×10^6
Mechanical operating conditions	
Sensor length (min./max.)	100 mm / 50 m
Cable length (min./max.)	200 mm / 100 m
Tensile load	
Cable (max.)	50 N
Pull-in tab	30 N
Device for easier pull-in	TBD
Bend radii, minimum	
B1 / B2 / B3 / B4	70 / 100 / 150 / 150 mm
Installation position	Any
IEC 60529: degree of protection	IP67
Weight	55 g/m
EN 50125-1: air temperature classes	T3
short-term (max. 10 min)	TX
EN 50125-1: classes for the height area	AX, max. 2000 m NHN
Operating temperature	
Higher operating temperatures	Undergoing testing
EN 50125: max. humidity at max. temperature change	TBD % > TBD K/s
Electrical operating conditions	
Not actuated sensor	
Terminal resistance	$1k2 \pm 1 \%$, $8k2 \pm 1 \%$, others on request
Nominal output	250 mW
Actuated sensor	
Test piece (cylinder) / $F = 150 \text{ N}$	
Contact transition resistance	$< 400 \text{ ohms}$
Switching current (min. / max.)	DC 1 mA / DC 10 mA
More than one sensor	Max. 5 in series
Connection cable	$\varnothing 3.8 \pm 0.2 \text{ mm}$ $2 \times 0.25 \text{ mm}^2$



Dimensional tolerances according to ISO 3302 E2/L2

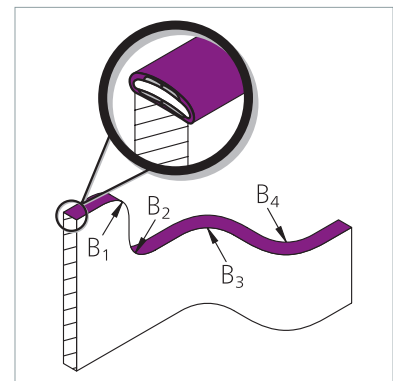
With pull-in tab:



Without pull-in tab:



Bend radii:



Physical resistance

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Chemical resistance

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Physical resistance

	TPE
EN 45545-2: suitable for hazard level	HL3
Set of requirements	R26
IEC 60529: degree of protection	IP67
UV resistance	Yes

Chemical resistance

The product is resistant to normal chemical influences over an exposure time of 24 hours.

Material	TPE
Cyanoacrylate adhesive	*
Graffiti remover	*
Greases	*
Skin cream	*
Isopropanol	*
Neutral cleaner	*
Alkaline cleaner	*
Hydrochloric acid cleaner	*
Phosphoric acid cleaner	*
Plastic cleaner	*
Soap solution	*
Saline solution 5 %	*
Spirit (ethyl alcohol)	*
Talc	*

Explanation of symbols:

+ = resistant

± = resistant to a certain extent

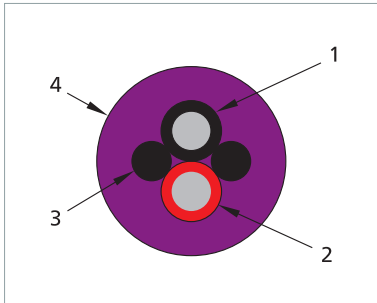
- = not resistant

* undergoing testing

All tests were carried out at room temperature (+23 °C).

Cables

MAYSER RailFR 2x 0.25 mm²



Cable structure	
Conductors, Nos. 1 and 2	CU wire, tinned, wire EN 13602 – Cu-ETP1
Nominal cross-section	0.25 mm ²
Insulation No. 1	Black, TPE
No. 2	Red, TPE
Dummy wire No. 3	Black, TPE
Sheath No. 4	Traffic purple (RAL 4006), TPE
Outer diameter	3.8 ±0.2 mm
Weight	22 g/m
Electrical operating conditions	
Conductor resistance at 20 °C	≤ 80 ohms/km
Operating voltage (max.)	DC 48 V
Test voltage	1.5 kV
Mechanical operating conditions	
Bend radii (min.)	
Fixed installation	r = 20 mm
Moving / free installation	r = 40 mm
Drag chain	r = 42 mm (cycles: min 1x 10 ⁶)
Operating temperature (fixed)	-40 to +90 °C
Operating temperature (flexible)	-30 to +90 °C

Physical resistance

Cable RailFR 2x 0.25 mm ²	TPE
EN 45545-2: suitable for hazard level	HL3
Set of requirements	R15 and R16
EN 60332-1-2	Flame-retardant and self-extinguishing
EN 60332-3-25	No spreading of fire
EN 60754-1	Halogen-free
2011/65/EU	RoHS-compliant

Chemical resistance

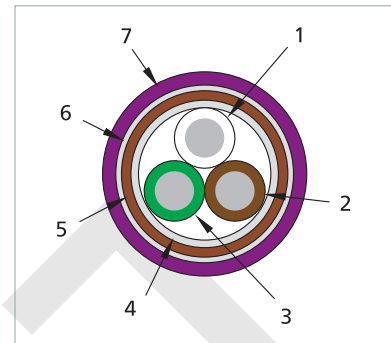
Cable RailFR 2x 0.25 mm ²	TPE
Hydrolysis	+
EN 50264, EM102	
Oil	+
EN 50264, EM104	
Fuels	+
Acids	+

Explanation of symbols:

+ = resistant

MAYSER RailFR 3x 0.25 mm²

Cable structure	
Conductors, Nos. 1, 2 and 3	CU wire, tinned, wire EN 13602 – Cu-ETP1
Nominal cross-section	0.25 mm ²
Insulation	No. 1 White, TPE No. 2 Brown, TPE No. 3 Green, TPE
Separating foil Nos. 4 and 6	Polypropylene
Shielding No. 5	Copper braid, tinned
Sheath No. 7	Traffic purple (RAL 4006), TPE
Outer diameter	4.6 ±0.2 mm
Weight	36 g/m
Electrical operating conditions	
Conductor resistance at 20 °C	≤ 78 ohms/km
Operating voltage (max.)	DC 48 V
Test voltage	1.5 kV
Mechanical operating conditions	
Bend radii (min.)	
Fixed installation	r = 24 mm
Moving / free installation	r = 48 mm
Drag chain	r = 40 mm (cycles: min 7× 10 ⁵)
Operating temperature (fixed)	-40 to +90 °C
Operating temperature (flexible)	-30 to +90 °C



Physical resistance

Cable RailFR 3x 0.25 mm ²	TPE
EN 45545-2: suitable for hazard level	HL3
Set of requirements	R15 and R16
EN 60332-1-2	Flame-retardant and self-extinguishing
EN 60332-3-25	No spreading of fire
EN 60754-1	Halogen-free
2011/65/EU	RoHS-compliant

Chemical resistance

Cable RailFR 3x 0.25 mm ²	TPE
Hydrolysis	+
EN 50264, EM102	
Oil	+
EN 50264, EM104	
Fuels	+
Acids	+

Explanation of symbols:

+ = resistant