

Magnetic cylinder sensors



Magnetic cylinder sensors, reed or electronic

SICK offers a range of special magnetic cylinder sensors, which are used for detecting the position of pistons in pneumatic cylinders. They are attached directly to the cylinder body. The sensors reliably detect a magnetic ring on the piston through the housing wall (made of aluminium, brass or stainless steel) and trigger a switching signal.

- **Weld immune**
Strong magnetic fields capable of impairing the functioning of the sensors are produced during welding. The MZU 2 magnetic cylinder sensors from SICK can be used under these difficult conditions.
- **Easy mounting**
The magnetic cylinder sensors for profile cylinders with T-slot can be inserted from above into all standard T-slots. This makes additional assembly work unnecessary and also allows the sensors to be used for applications where space is restricted.

Magn



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Sensors for short-stroke cylinders

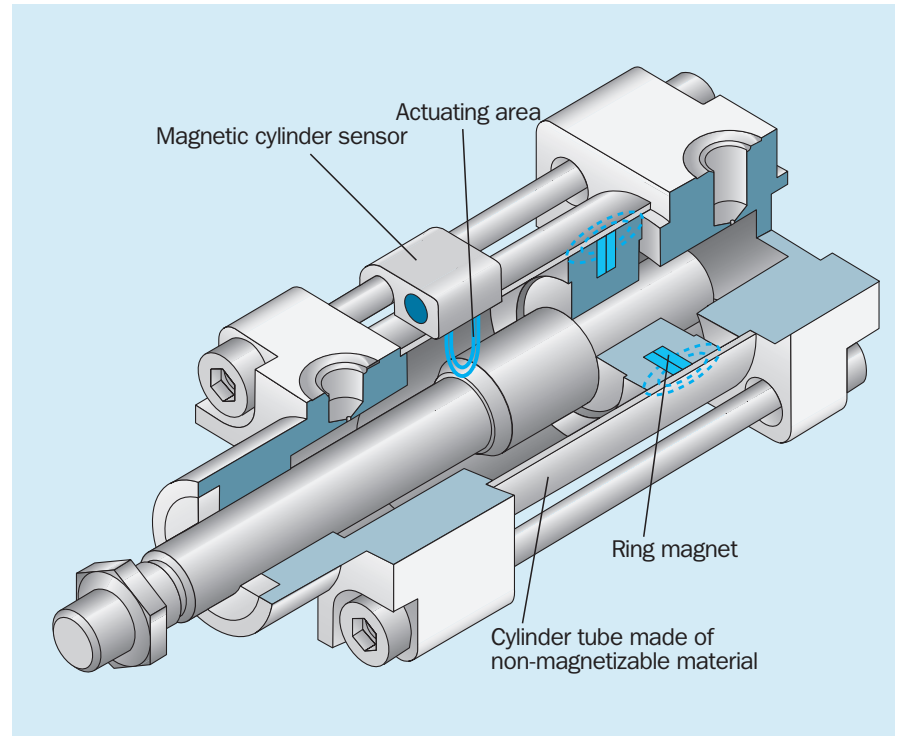
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magnetic cylinder sensors →

Operating principle

Magnetic cylinder sensors are used to detect the position of pistons in pneumatic cylinders. They are attached directly to the cylinder body and operate according to the same principle as for magnetic proximity sensors.

They detect a ring magnet in the piston through the housing wall made of non-magnetizable material (aluminium, brass, stainless steel).



Glossary

Actuating speed

The short response times of the sensors allow actuating speeds of up to 5 m/s.

Response sensitivity

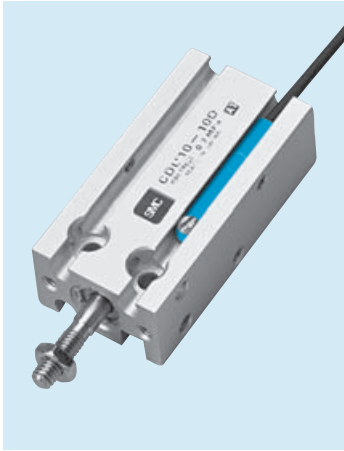
The magnetic induction of pneumatic cylinders is between 5 and 25 m Tesla. A response sensitivity of 3 m Tesla is enough to ensure signal triggering.

The sensitivity of 3 m Tesla is a guide value which depends on the design of the cylinder.

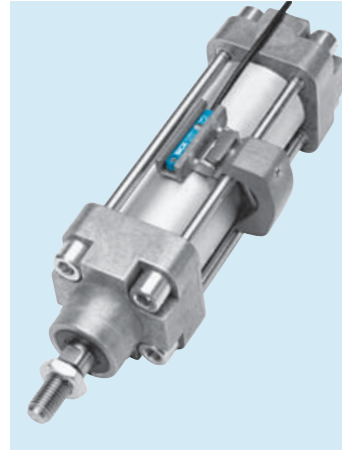
Traverse distance $s_{\bar{u}}$

The traverse distance $s_{\bar{u}}$ is between 5 and 20 mm, depending on the cylinder's construction (wall thickness, diameter, and magnetic induction). The typical hysteresis is 1 mm and remains constant.

Highlights



MZN1/RZN1
For mounting in
C-slot cylinders



BEF-KHZ-PT1
Mounting adapter
For mounting of
MZT6/RZT6 and MZT1/RZT1
on tie-rod and integrated pro-
file cylinders



MZT6/RZT6
For mounting in
T-slot cylinders



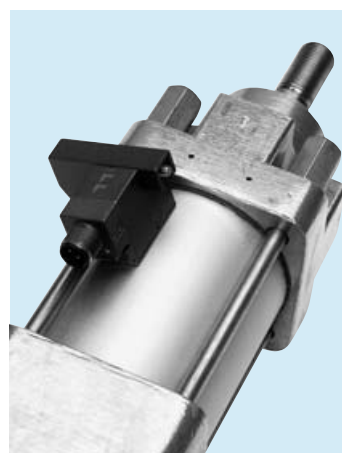
BEF-KHZ-RT1
Mounting adapter
For mounting of
MZT6/RZT6 and MZT1/RZT1
on round body cylinders



MZT1/RZT1
For mounting in
T-slot cylinders

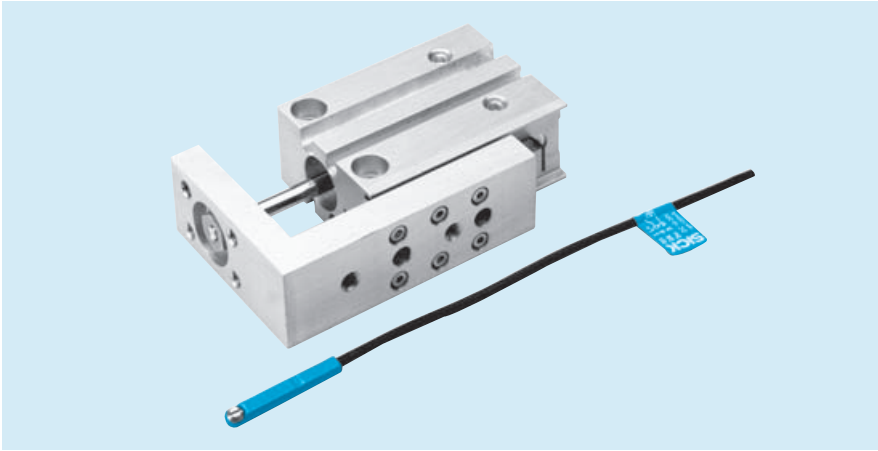


BEF-KHZ-ST1
Mounting adapter
For mounting of
MZT6/RZT6 and MZT1/RZT1
on profile cylinders with dove-
tail groove

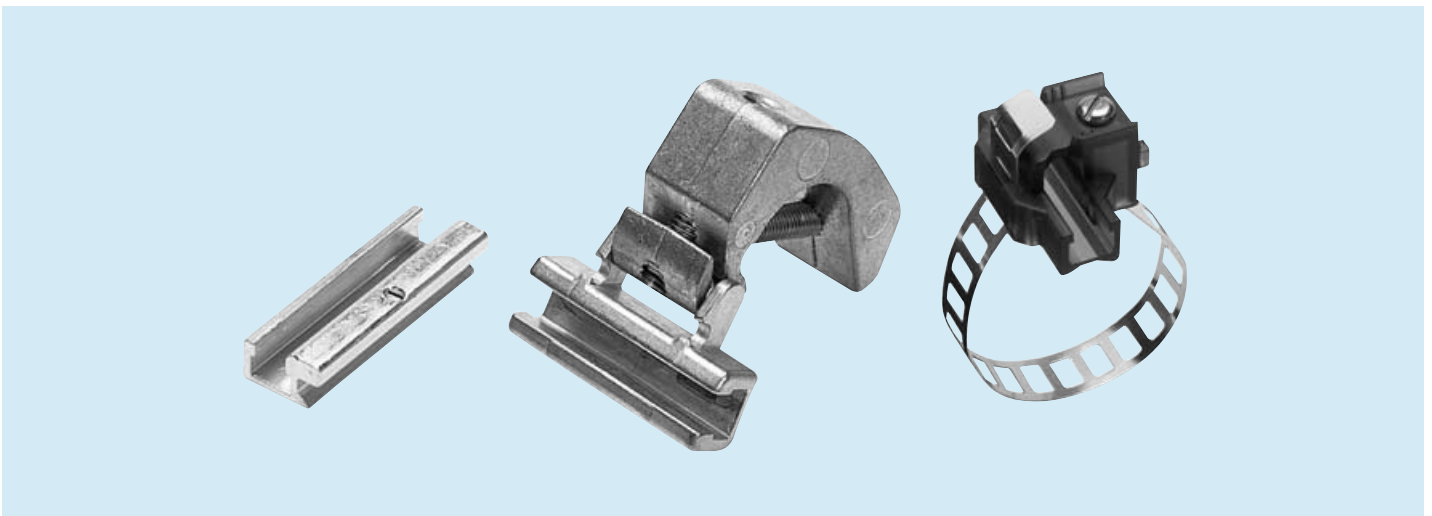


MZU2 –
weld immune version
For mounting onto different
types of cylinders by means
of adapters, with optional Tef-
lon coating

Highlights



- Drop-in mounting
- Fits into the grooves of all common pneumatic cylinders
- Simple assembly with standard tool



Mounting adapters for MZT6/RZT6 and MZT1/RZT1

- Simple installation reduces plant downtime
- Optimising inventory costs
- A sensor for different types of pneumatic cylinders

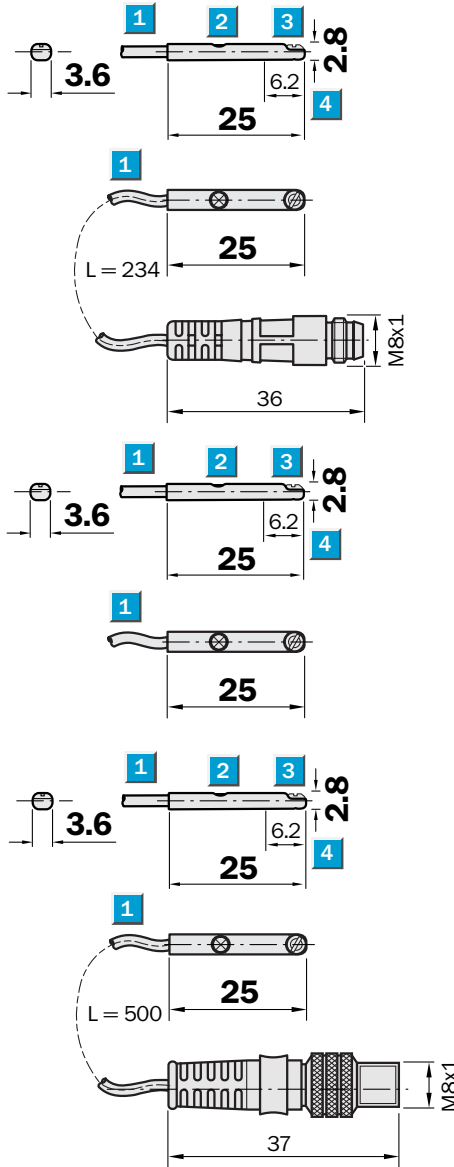
Type code

	MZ	R1	03V	P	S	A	U	O	
Sensor technology									Additional marking
Magnetic	M								Resistant to humidity
Reed contact	R								Cables and connectors
Design							W		Cable, PVC
Cylinder sensor		Z					U		Cable, PUR-PVC
Application							P		Cable with plug, M8x1
Round body cylinder		R1					Q		Cable with plug, M12x1
Round body cylinder		R2					T		Plug, M8x1
Tie-rod type cylinder		Z1					C		Plug, M12x1
Tie-rod type cylinder		Z2							Housing material
Profile rod type cylinder		P3				A			Aluminium
Profile rod type cylinder		P4				K			Plastic
Short-stroke cylinder		K1				D			Zinc die-cast
Short-stroke cylinder		K3				T			Zinc die-cast with Teflon coating
"T" slot		U2							Output
Universal		F1			S				Closed
"T" slot		T1			N				NAMUR
"T" slot		T6							Interface
"C" slot		N1							DC (3 core conductor) PNP
Response sensitivity/sensor position				P					DC (3 core conductor) NPN
In mT			02	N					AC/DC (2 core conductor)
In mT			03	U					Reed (3 core)
Sensor, front			V	R					NAMUR
Sensor, centred			Z	-					

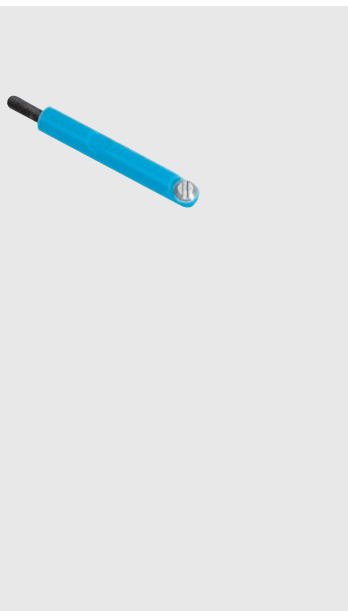
for C-slot cylinders
Magnetic cylinder sensor

- Mountable from the top
- For all common used roundslot-cylinder e.g. Festo, SMC
- LED status indicator
- Connection cable or connector on cable
- Enclosure rating IP 67

Dimensional drawing



- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element



Connection type

MZN1-06VPS-KPO

MZN1-06VPS-KRD

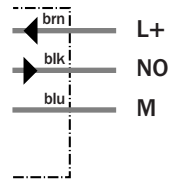
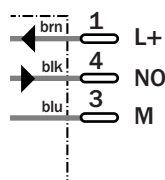
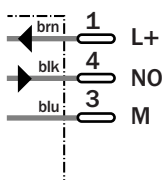
MZN1-06VPS-KUO



M8, 3-pin

M8, 3-pin, w/ kn. scr.

3 x 0.09 mm²



See chapter Accessories

Connector, M8, 3-pin

Technical specifications		MZN1-	06VPS-KPO	06VPS-KRD	06VPS-KUO								
Sensing face	Centre												
Electrical configuration	DC 3-wire												
Supply voltage V_s	DC 10 ... 30 V												
Ripple U_{pp}	$\leq 10\%$ ¹⁾												
Voltage drop U_d	≤ 2.5 V												
Power consumption	≤ 8 mA ²⁾												
Continuous current I_a	≤ 70 mA												
Time delay before availability t_v	≤ 0.1 ms												
Hysteresis H typ.	≤ 1.5 mT												
Repeatability R	≤ 0.1 mm (U_b and T_a constant)												
EMC	According to EN 60947-5-2												
Switching output	PNP												
Output function	Normally open												
Connection type	Cable with plug, M8, 3-pin, PUR, 0.24 m												
	Cable with plug, M8, 3-pin, w. knurled screws, PUR, 0.5 m												
	Cable, PUR, 2 m												
Enclosure rating	IP 67 ³⁾												
Max. switching frequency	1,000 Hz												
Short-circuit protection	✓ ⁴⁾												
Reverse polarity protection	✓												
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm												
Ambient temperature T_a	-25 °C ... +75 °C												
Housing material	PA												

¹⁾ of U_b

²⁾ without load

³⁾ according to EN 40050

⁴⁾ (pulsed)

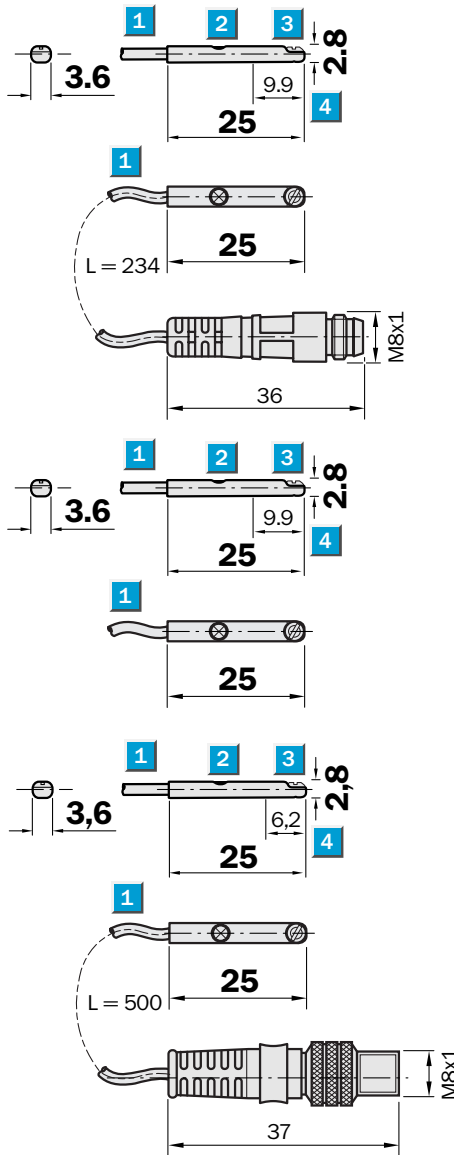
Ordering information

Type	Order no.
MZN1-06VPS-KPO	1 022 054
MZN1-06VPS-KRD	1 023 985
MZN1-06VPS-KUO	1 022 053

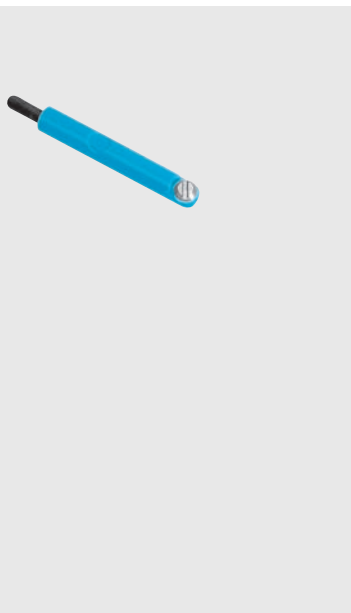
for C-slot cylinders
Magnetic cylinder sensor

- Mountable from the top
- For all common used roundslot-cylinder e.g. Festo, SMC
- LED status indicator
- Connection cable or connector on cable
- Enclosure rating IP 67

Dimensional drawing

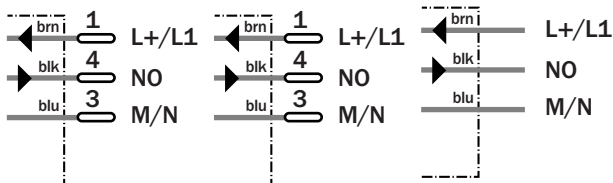


- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element



Connection type

RZN1-05ZRS-KPO	RZN1-05ZRS-KRD	RZN1-05ZRS-KUO
M8, 3-pin	M8, 3-pin, w/ kn. scr.	3 x 0.09 mm ²



See chapter Accessories
Connector, M8, 3-pin

Technical specifications		RZN1-	05ZRS -KPO	05ZRS -KRD	05ZRS -KUO							
Sensing face	Centre											
Electrical configuration	AC/DC 3-wire											
Supply voltage V_s	AC/DC 10 ... 30 V											
Max. switching power	10 W/VA											
Continuous current I _a DC/AC	≤ 500 mA / ≤ 300 mA											
Switch on delay	Approx. 1.0 ms											
Time delay off	Approx. 0.5 ms											
Hysteresis H typ.	< 0.7 mT											
Repeatability R	≤ 0.1 mm (U _b and T _a constant)											
EMC	According to EN 60947-5-2											
Switching output	Reed											
Output function	Normally open											
Connection type	Cable with plug, M8, 3-pin, PUR, 0.24 m											
	Cable with plug, M8, 3-pin, w. knurled screws, PUR, 0.5 m											
	Cable, PUR, 2 m											
Enclosure rating	IP 67 ¹⁾											
Max. switching frequency	500 Hz											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T _a	-25 °C ... +75 °C											
Housing material	PA12											

¹⁾ according to EN 40050

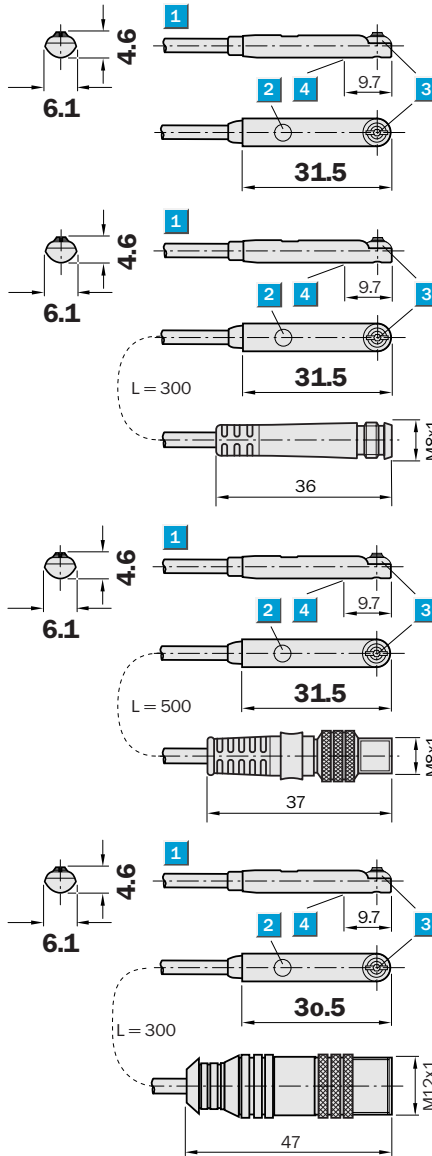
Ordering information	
Type	Order no.
RZN1-05ZRS-KPO	1 022 056
RZN1-05ZRS-KRD	1 022 939
RZN1-05ZRS-KUO	1 022 055



- With new ASIC for maximum switching accuracy
- Mountable from the top
- For all common used T-slot cylinder
- Plastic housing with nickel silver bushing and hexagon socket/slotted screw
- Enclosure rating IP 68, IP 69K
- ATEX 3D / 3G



Dimensional drawing



- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element

Connection type

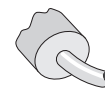
MZT6-03VPS-KPO	MZT6-03VPS-KRO	MZT6-03VPO-KWD	MZT6-03VPS-KQO
MZT6-03VPS-KPX		MZT6-03VPS-KWD	MZT6-03VPS-KQX
		MZT6-03VPS-KW0	
		MZT6-03VPS-KWX	



M8, 3-pin



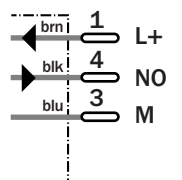
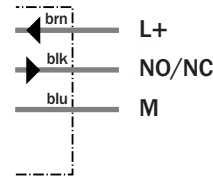
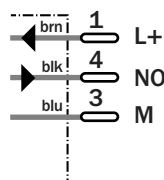
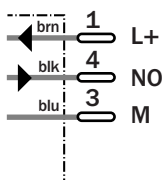
M8, 3-pin, w/kn. scr.



3 x 0.14 mm²



M12, 3-pin



See chapter Accessories

- Connector, M12, 4-pin
- Connector, M8, 3-pin
- Mounting systems

Technical specifications		MZT6-	03VPS -KPO	03VPO -KWD	03VPS -KWD	03VPS -KQ0	03VPS -KRO	03VPS -KWO	03VPS -KWX	03VPS -KQX	03VPS -KPX
Sensing face	Front										
Electrical configuration	DC 3-wire										
Supply voltage V_s	DC 10 ... 30 V										
	DC 18 ... 30 V										
Response sensitivity	2.6 mT										
Overrun distance typ.	3 mm										
Ripple U _{pp}	≤ 10 %										
Voltage drop U _d	≤ 2.2 V										
Power consumption	≤ 10 mA ¹⁾										
Continuous current I_a	≤ 200 mA										
	≤ 70 mA										
Hysteresis H typ.	> 0.5 mT										
Repeatability R	≤ 0.1 mT (U _b and T _a constant)										
EMC	According to EN 60947-5-2										
Switching output	PNP										
Output function	Normally open										
	Normally closed										
Connection type	Cable with plug, M8, 3-pin, PUR, 0.3 m										
	Cable, PVC, 10 m										
	Cable with plug, M12, 3-pin, PUR, 0.3 m										
	Cable with plug, M8, 3-pin, w. knurled screws, PUR, 0.5 m										
	Cable, PVC, 2 m										
	Cable with plug, M12, 3-pin, PUR, 0.22 m										
Enclosure rating	IP 68										
	IP68, IP 69K ²⁾										
Approval for ATEX-zone	3G / 3D ³⁾										
	3G ⁴⁾										
Max. switching frequency	1,000 Hz										
Wire-break protection	✓										
Short-circuit protection	✓ ⁵⁾										
Reverse polarity protection	✓										
Power-up pulse suppression	✓										
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm										
Ambient temperature T _a	-30 C ... +80 C										
	-20 °C ... +45 °C										
Housing material	Plastic										

¹⁾ without load

²⁾ according to DIN 40050 part 9

³⁾ Ex II 3G EEx nA II T4 X/Ex II 3D T135°C IP 67 ⁵⁾ (pulsed)

⁴⁾ Ex II 3G EEx nA II T4 X

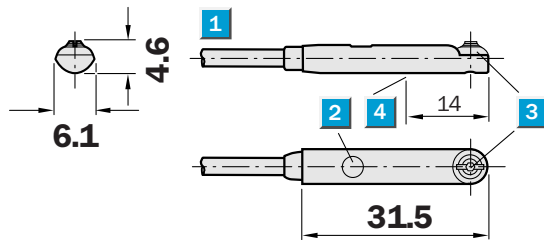
Ordering information

Type	Order no.
MZT6-03VPS-KPO	1 023 971
MZT6-03VPO-KWD	1 029 639
MZT6-03VPS-KWD	1 026 246
MZT6-03VPS-KQ0	1 025 550
MZT6-03VPS-KRO	1 023 972
MZT6-03VPS-KWO	1 023 970
MZT6-03VPS-KWX	1 025 827
MZT6-03VPS-KQX	1 029 161
MZT6-03VPS-KPX	1 028 629



- Mountable from the top
- For all common used T-slot cylinder e.g. Festo, SMC
- Plastic housing with nickel silver bushing and hexagon socket/slotted screw
- LED function indicator
- Enclosure rating IP 68

Dimensional drawing



- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element

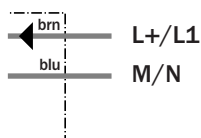


Connection type

RZT6-03ZUS-KW0



2 x 0.12 mm²



See chapter Accessories

Mounting systems

Technical specifications		RZT6-	03ZUS												
			-KWO												
Sensing face	Centre														
Electrical configuration	AC/DC 2-wire														
Supply voltage V_s	AC/DC 10 ... 120 V														
Max. switching power	6 W/VA														
Response sensitivity	3 mT														
Continuous current I_a	≤ 100 mA														
Switch on delay	Approx. 1.5 ms														
Time delay off	Approx. 0.5 ms														
Hysteresis H typ.	> 0.5 mT														
Repeatability R	≤ 0.1 mT (U_b and T_a constant)														
EMC	According to EN 60947-5-2														
Switching output	Reed														
Output function	Normally open														
Connection type	Cable, PVC, 2 m														
Enclosure rating	IP 68 ¹⁾														
Max. switching frequency	400 Hz														
Reverse polarity protection	✓														
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm														
Ambient temperature T_a	-25 °C ... +75 °C														
Housing material	Plastic														

¹⁾ according to EN 60529

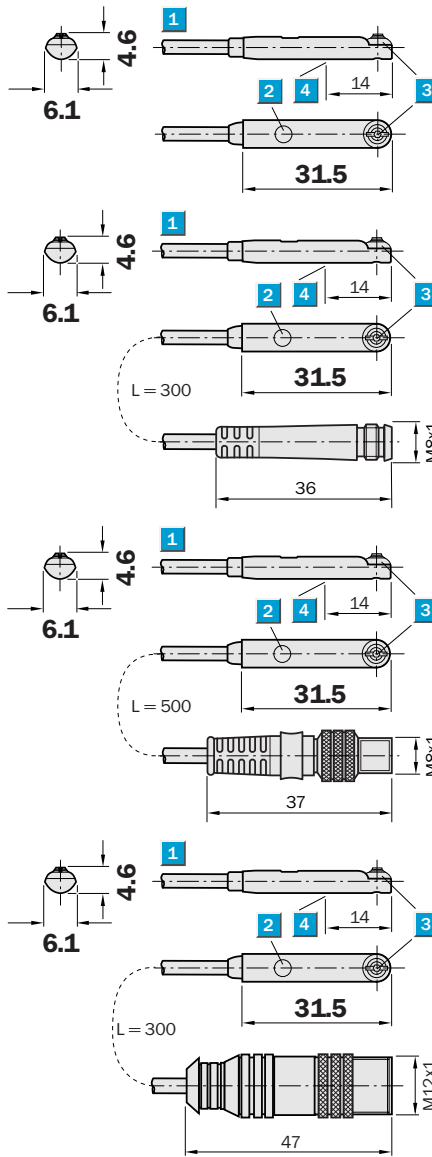
Ordering information

Type	Order no.
RZT6-03ZUS-KWO	1 025 522

for T-slot cylinders
Magnetic cylinder sensor

- Mountable from the top
- For all common used T-slot cylinder e.g. Festo, SMC
- Plastic housing with nickel silver bushing and hexagon socket/slotted screw
- LED function indicator
- Enclosure rating IP 68

Dimensional drawing



- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element

Connection type

RZT6-03ZRS-KP0	RZT6-03ZRS-KR0	RZT6-03ZRS-KW0	RZT6-03ZRS-KQ0
M8, 3-pin	M8, 3-pin, w/ kn. scr.	3 x 0.14 mm ²	M12, 3-pin



See chapter Accessories

- Connector, M12, 4-pin
- Connector, M8, 3-pin
- Mounting systems

Technical specifications		RZT6-	03ZRS -KPO	03ZRS -KQO	03ZRS -KRO	03ZRS -KWO						
Sensing face	Centre											
Electrical configuration	AC/DC 3-wire											
Supply voltage V_s	AC/DC 10 ... 30 V											
Max. switching power	6 W/VA											
Response sensitivity	3 mT											
Voltage drop U _d	≤ 2.5 V											
Power consumption	≤ 10 mA ¹⁾											
Continuous current I_a	≤ 500 mA											
Switch on delay	Approx. 1.5 ms											
Time delay off	Approx. 0.5 ms											
Hysteresis H typ.	> 0.5 mT											
Repeatability R	≤ 0.1 mT (U _b and T _a constant)											
EMC	According to EN 60947-5-2											
Switching output	Reed											
Output function	Normally open											
Connection type	Cable with plug, M8, 3-pin, PUR, 0.3 m											
	Cable with plug, M12, 3-pin, PUR, 0.3 m											
	Cable with plug, M8, 3-pin, w. knurled screws, PUR, 0.5 m											
	Cable, PVC, 2 m											
Enclosure rating	IP 68 ²⁾											
Max. switching frequency	400 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ³⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T _a	-25 °C ... +75 °C											
Housing material	Plastic											

¹⁾ without load

²⁾ according to EN 60529

³⁾ (pulsed)

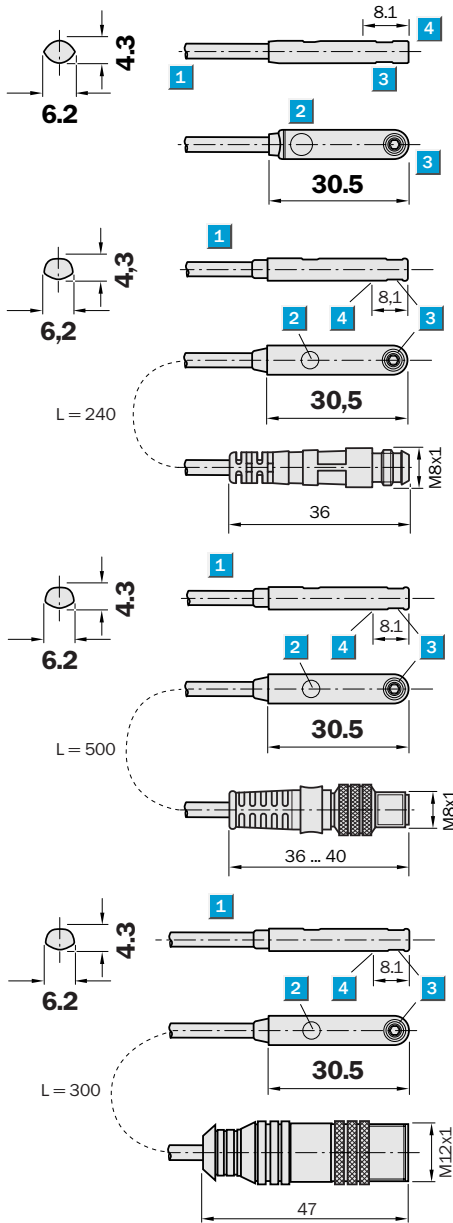
Ordering information

Type	Order no.
RZT6-03ZRS-KPO	1 023 973
RZT6-03ZRS-KQO	1 025 549
RZT6-03ZRS-KRO	1 023 975
RZT6-03ZRS-KWO	1 023 974



- Mountable from the top
- For all common used T-slot cylinder e.g. Festo, SMC
- Connection cable or connector on cable
- LED status indicator
- Magneto-resistive element
- IP 67

Dimensional drawing



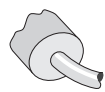
- 1** Connection
- 2** Display LED
- 3** Mounting screw
- 4** Position sensor element

Connection type

MZT1-03VNS-KPO	MZT1-03VNS-KUO	MZT1-03VPS-KRO	MZT1-03VPS-KQO
MZT1-03VPS-KPO	MZT1-03VPS-KUB		
	MZT1-03VPS-KWO		



M8, 3-pin



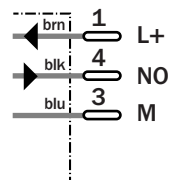
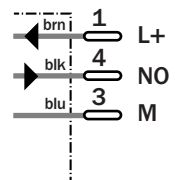
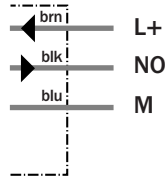
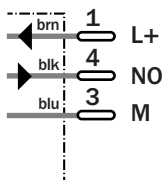
3 x 0.14 mm²



M8, 3-pin, w/ kn. scr.



M12, 3-pin



See chapter Accessories
 Connector, M12, 4-pin
 Connector, M8, 3-pin
 Mounting systems

Technical specifications		MZT1-	03VNS -KPO	03VPS -KRO	03VPS -KPO	03VNS -KU0	03VPS -KQ0	03VPS -KUB	03VPS -KW0			
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	≤ 2.8 mT											
Ripple U_{pp}	≤ 10 % ¹⁾											
Voltage drop U_d	≤ 2 V ²⁾											
Power consumption	≤ 10 mA ³⁾											
Continuous current I_a	≤ 100 mA											
Time delay before availability t_v	≤ 2 ms											
Hysteresis H, of s_r	≤ 1.5 mm											
Repeatability R	≤ 0.1 mT (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	NPN											
	PNP											
Output function	Normally open											
Connection type	Cable with plug, M8, 3-pin, PUR, 0.23 m											
	Cable with plug, M8, 3-pin, w. knurled screws, PUR, 0.5 m											
	Cable, PVC, 2 m											
	Cable with plug, M12, 3-pin, PUR, 0.3 m											
	Cable, PVC, 5 m											
Enclosure rating	IP 67 ⁴⁾											
Max. switching frequency	5,000 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁵⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 °C ... +75 °C											
Housing material	Plastic											

1) of U_b 2) at I_a max

3) without load

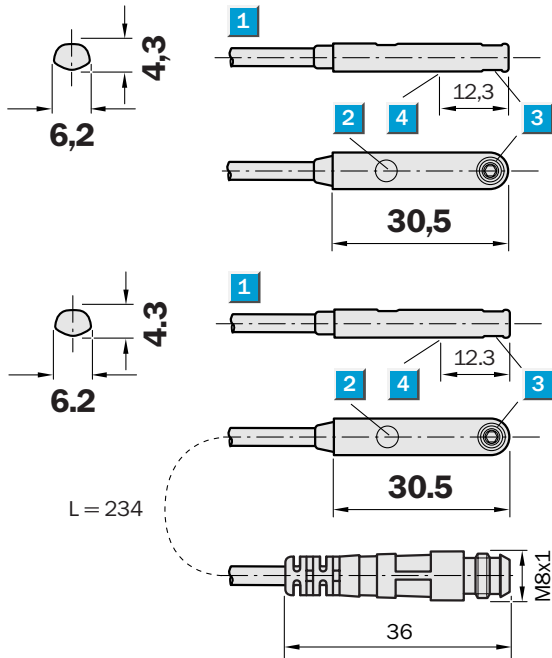
4) according to EN 60529
5) (pulsed)**Ordering information**

Type	Order no.
MZT1-03VNS-KPO	1 017 851
MZT1-03VPS-KRO	1 019 005
MZT1-03VPS-KPO	1 016 910
MZT1-03VNS-KU0	1 023 009
MZT1-03VPS-KQ0	1 022 188
MZT1-03VPS-KUB	1 018 999
MZT1-03VPS-KW0	1 016 809

for T-slot cylinders
Magnetic cylinder sensor

- Mountable from the top
- For all common used T-slot cylinder e.g. Festo, SMC
- Connection cable or connector on cable
- Enclosure rating IP 67
- LED status indicator

Dimensional drawing



- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element



See chapter Accessories
Connector, M8, 3-pin
Mounting systems

Connection type

RZT1-03ZUS-KPO

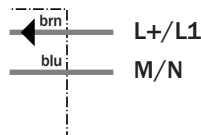
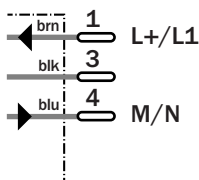
RZT1-03ZUS-KWD

RZT1-03ZUO-KWO



M8, 3-pin

2 x 0.12 mm²



Technical specifications		RZT1-	03ZUS -KPO	03ZUS -KWD	03ZUO -KWO								
Sensing face	Centre												
Electrical configuration	AC/DC 2-wire												
Supply voltage V_s	AC/DC 10 ... 30 V												
	AC/DC 10 ... 120 V												
Max. switching power	6 W/VA												
Response sensitivity	≤ 3 mT												
Continuous current I_a	≤ 100 mA												
Switch on delay	Approx. 1.5 ms												
Time delay off	Approx. 0.5 ms												
Hysteresis H, of s _r	≤ 1.5 mm												
Repeatability R	≤ 0.1 mm (U _b and T _a constant)												
EMC	According to EN 60947-5-2												
Switching output	Reed												
Output function	Normally open												
	Normally closed												
Connection type	Cable with plug, M8, 3-pin, PUR, 0.23 m												
	Cable, PVC, 2.5 m												
	Cable, PVC, 2 m												
Enclosure rating	IP 67 ¹⁾												
Max. switching frequency	400 Hz												
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm												
Ambient temperature T _a	-25 °C ... +75 °C												
Housing material	Plastic												

¹⁾ according to EN 60529

Ordering information

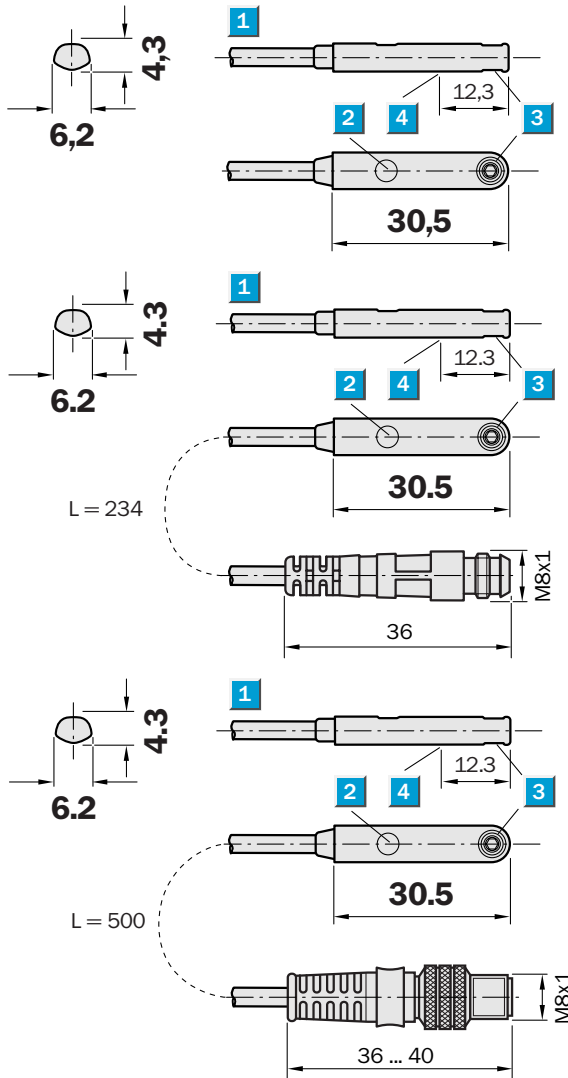
Type	Order no.
RZT1-03ZUS-KPO	1 025 381
RZT1-03ZUS-KWD	1 025 380
RZT1-03ZUO-KWO	1 026 469

for T-slot cylinders
Magnetic cylinder sensor

- Mountable from the top
- For all common used T-slot cylinder e.g. Festo, SMC
- Connection cable or connector on cable
- Enclosure rating IP 67
- LED status indicator



Dimensional drawing



- 1 Connection
- 2 Display LED
- 3 Mounting screw
- 4 Position sensor element

Connection type

RZT1-03ZRS-KPO	RZT1-03ZRS-KRO	RZT1-03ZRS-KWA
		RZT1-03ZRS-KWB
		RZT1-03ZRS-KWD
		RZT1-03ZRS-KWO



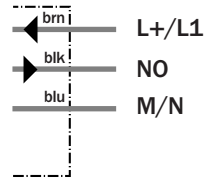
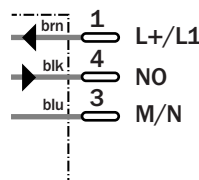
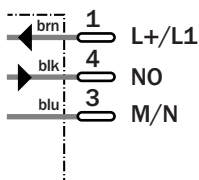
M8, 3-pin



M8, 3-pin, w/ kn. scr.



3 x 0.14 mm²



See chapter Accessories

- Connector, M8, 3-pin
- Mounting systems

Technical specifications		RZT1-	03ZRS -KPO	03ZRS -KRO	03ZRS -KWA	03ZRS -KWB	03ZRS -KWD	03ZRS -KWO				
Sensing face	Centre											
Electrical configuration	AC/DC 3-wire											
Supply voltage V_s	AC/DC 10 ... 30 V											
Max. switching power	6 W/VA											
Response sensitivity	≤ 3 mT											
Continuous current I_a	≤ 500 mA											
Switch on delay	Approx. 1.5 ms											
Time delay off	Approx. 0.5 ms											
Hysteresis H, of s_r	≤ 1.5 mm											
Repeatability R	≤ 0.2 mm (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	Reed											
Output function	Normally open											
Connection type	Cable with plug, M8, 3-pin, PUR, 0.23 m											
	Cable with plug, M8, 3-pin, w. knurled screws, PUR, 0.5 m											
	Cable, PVC, 3 m											
	Cable, PVC, 5 m											
	Cable, PVC, 10 m											
	Cable, PVC, 2 m											
Enclosure rating	IP 67 ¹⁾											
Max. switching frequency	400 Hz											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 °C ... +75 °C											
Housing material	Plastic											

¹⁾ according to EN 60529

Ordering information

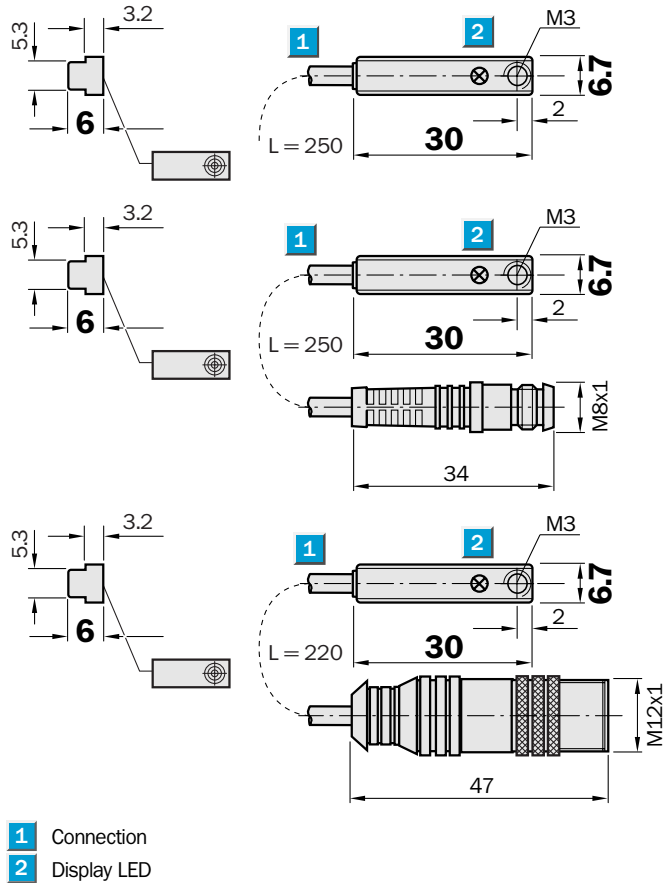
Type	Order no.
RZT1-03ZRS-KPO	1 016 912
RZT1-03ZRS-KRO	1 019 698
RZT1-03ZRS-KWA	1 028 079
RZT1-03ZRS-KWB	1 018 579
RZT1-03ZRS-KWD	1 022 786
RZT1-03ZRS-KWO	1 016 911

for T-slot cylinders
Magnetic cylinder sensor

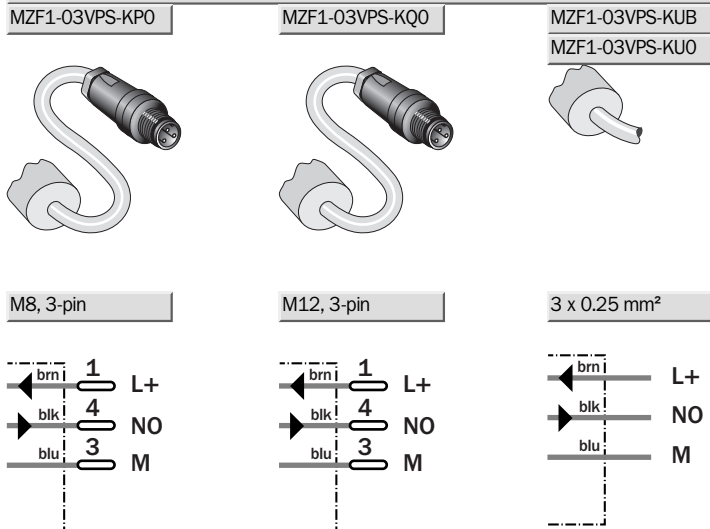
- High repeat accuracy
- Connection cable or connector on cable
- Enclosure rating IP 67
- LED status indicator
- Magneto-resistive element



Dimensional drawing



Connection type



See chapter Accessories
Connector, M12, 4-pin
Connector, M8, 3-pin

Technical specifications		MZF1-	03VPS -KPO	03VPS -KQO	03VPS -KUB	03VPS -KUO						
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	3 mT											
Ripple U _{pp}	≤ 10 % ¹⁾											
Voltage drop U _d	≤ 2 V ²⁾											
Power consumption	≤ 10 mA ³⁾											
Continuous current I_a	≤ 100 mA											
Time delay before availability t _v	≤ 2 ms											
Hysteresis H, of s _r	≤ 1.5 mm											
Repeatability R	≤ 0.2 mm (U _b and T _a constant)											
EMC	According to EN 60947-5-2											
Switching output	PNP											
Output function	Normally open											
Connection type	Cable with plug, M8, 3-pin, PUR											
	Cable with plug, M12, 3-pin, PVC											
	Cable, PVC/PUR, 5 m											
	Cable, PVC/PUR, 2 m											
Enclosure rating	IP 67 ⁴⁾											
Max. switching frequency	5,000 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁵⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T _a	-25 °C ... +75 °C											
Housing material	Plastic											

¹⁾ of U_b

²⁾ at I_a max

³⁾ without load

⁴⁾ according to EN 60529
⁵⁾ (pulsed)

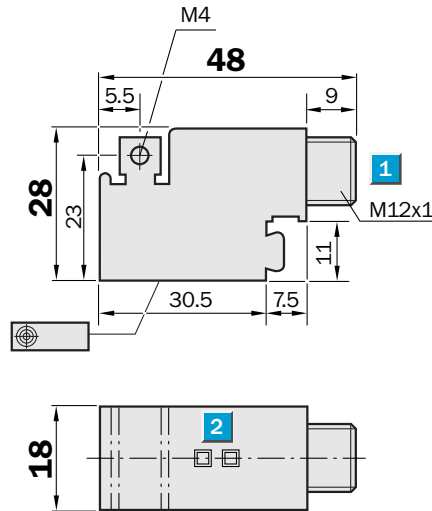
Ordering information

Type	Order no.
MZF1-03VPS-KPO	7 900 597
MZF1-03VPS-KQO	1 016 406
MZF1-03VPS-KUB	7 903 147
MZF1-03VPS-KUO	7 900 596



- Weld immune in welding applications
- The sensors locks the output during the welding process. When the welding process stops, the sensor updates the output accordingly
- Flexible mounting technique for different cylinder styles
- Housing with teflon coating optional

Dimensional drawing

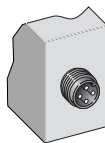


- 1 Connection
- 2 Display LED

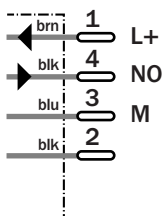


Connection type

- MZU2-03VPS-DCM
- MZU2-03VPS-TCM



M12, 4-pin



See chapter Accessories
Connector, M12, 4-pin
Mounting systems

Technical specifications		MZU2-	03VPS -DCM	03VPS -TCM								
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	≤ 3 mT											
Ripple U_{pp}	≤ 10 % ¹⁾											
Voltage drop U_d	≤ 2 V											
Power consumption	≤ 18 mA ²⁾											
Continuous current I_a	≤ 300 mA											
Time delay before availability t_v	≤ 20 ms											
Hysteresis H, of s_r	≤ 1.5 mm											
Repeatability R	≤ 0.1 mm (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	PNP											
Output function	Normally open											
Connection type	Connector, M12, 4-pin											
Enclosure rating	IP 67 ³⁾											
Max. switching frequency	40 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁴⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 °C ... +75 °C											
Housing material	Zinc die-cast											
	Zinc die cast/Teflon coated											

¹⁾ of U_b

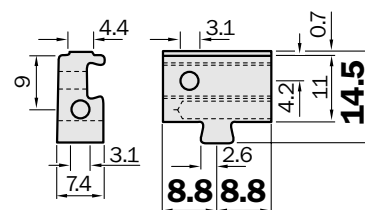
²⁾ without load

³⁾ according to EN 60529

⁴⁾ (pulsed)

Accessories:

Mounting clamp:	BEF-KS-U2-T1
Material:	Aluminium
Order-No:	2 019 822
Cylinder with T-slot	



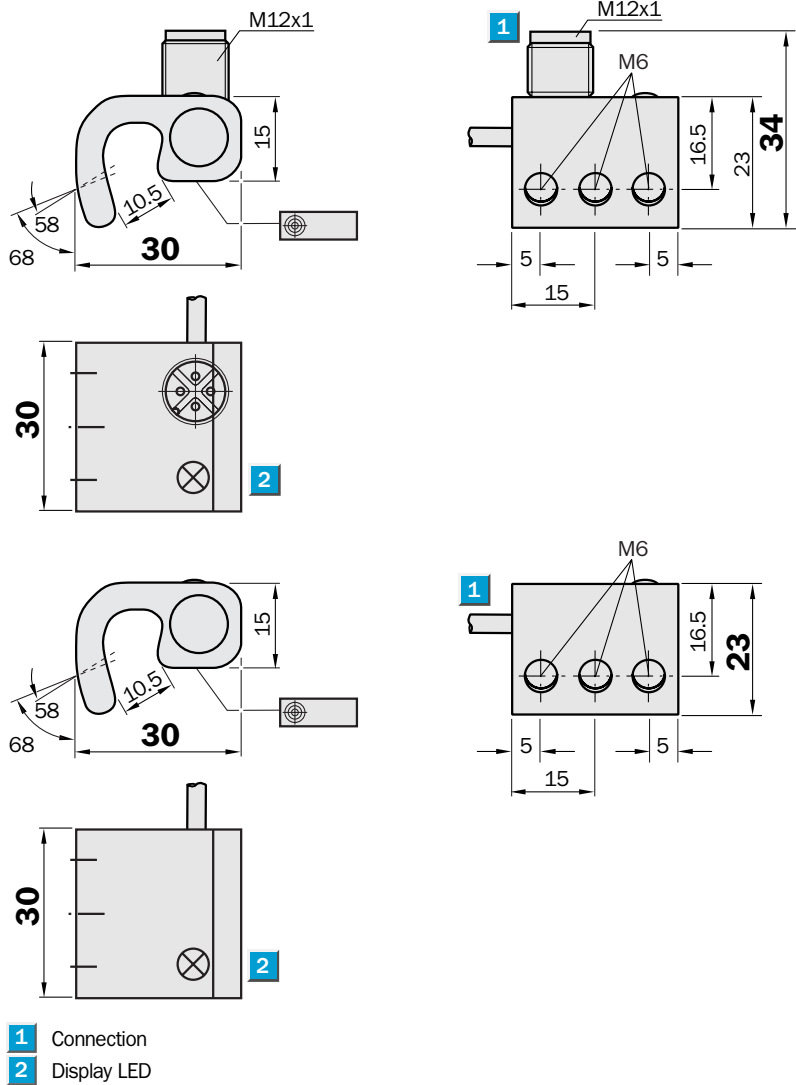
Ordering information

Type	Order no.
MZU2-03VPS-DCM	1 017 450
MZU2-03VPS-TCM	1 017 451

for tie-rod cylinders
Magnetic cylinder sensor

- Tie-rod mounting for max. rod diameter of 10 mm
- High repeat accuracy
- Solid aluminium housing with integrated mounting
- Cable or connector
- LED status indicator

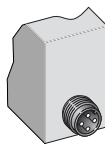
Dimensional drawing



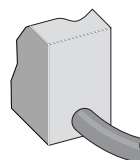
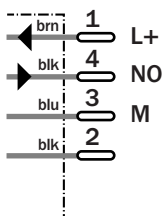
Connection type

MZZ1-03VNS-ACO
 MZZ1-03VPS-ACO

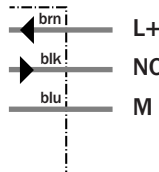
MZZ1-03VPS-AUO



M12, 4-pin



3 x 0.25 mm²



See chapter Accessories

Connector, M12, 4-pin

Technical specifications		MZZ1-	03VNS-ACO	03VPS-ACO	03VPS-AUO							
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	3 mT											
Ripple U_{pp}	$\leq 10\%$ ¹⁾											
Voltage drop U_d	$\leq 1.5\text{ V}$ ²⁾											
Power consumption	$\leq 10\text{ mA}$ ³⁾											
Continuous current I_a	$\leq 300\text{ mA}$											
Time delay before availability t_v	$\leq 2\text{ ms}$											
Hysteresis H, of s_r	$\leq 1\text{ mm}$											
Repeatability R	$\leq 0.1\text{ mm}$ (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	NPN											
	PNP											
Output function	Normally open											
Connection type	Connector, M12, 4-pin											
	Cable, PVC/PUR, 2 m											
Enclosure rating	IP 67 ⁴⁾											
Max. switching frequency	5,000 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁵⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 °C ... +75 °C											
Housing material	Aluminium, plastic											

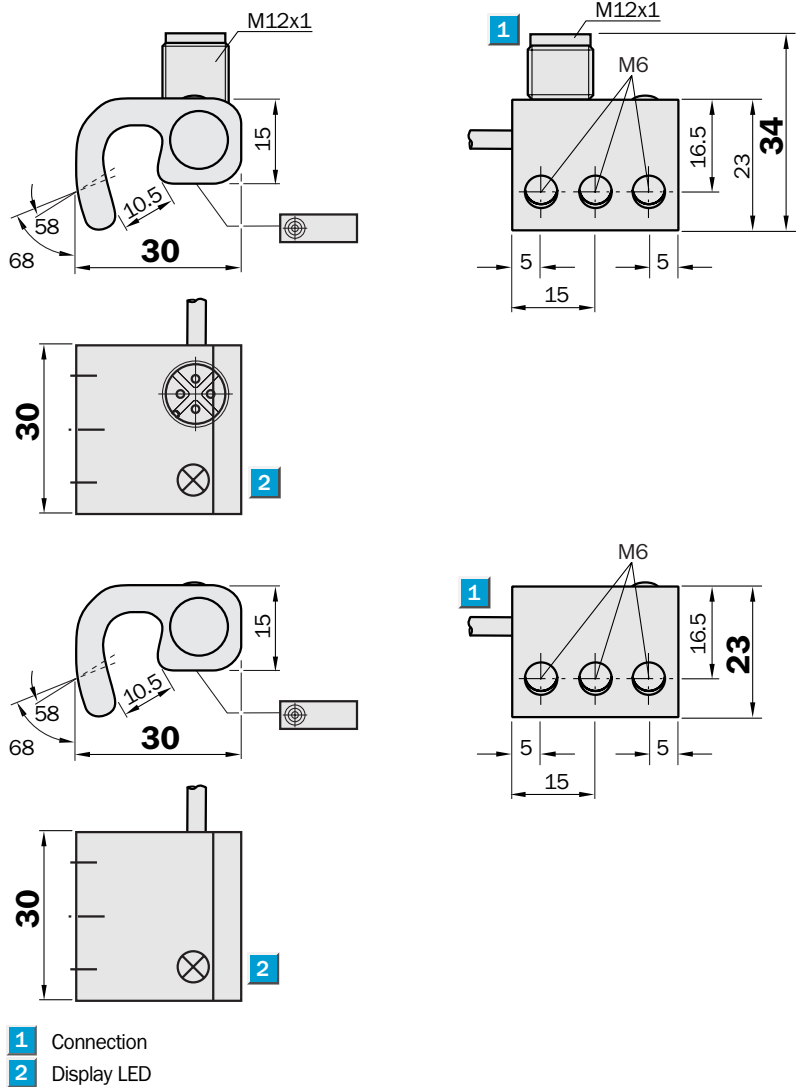
¹⁾ of U_b ²⁾ at I_a max³⁾ without load⁴⁾ according to EN 60529⁵⁾ (pulsed)**Ordering information**

Type	Order no.
MZZ1-03VNS-ACO	7 900 609
MZZ1-03VPS-ACO	7 900 608
MZZ1-03VPS-AUO	7 900 606

for tie-rod cylinders
Magnetic cylinder sensor

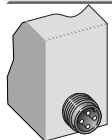
- Mounting of tie-rods with max. rod diameter of 10 mm
- NAMUR to EN 60 947-5-6
- High repeat accuracy
- Solid aluminium construction with integrated mounting claw
- Classification TÜV 99 ATEX 1398
 $\text{Ex II 2G EEx ib IIC T6}$
- LED status indicator

Dimensional drawing

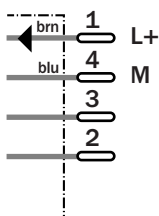


Connection type

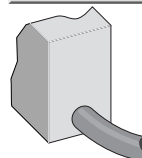
MZZ1-03V-N-ACO



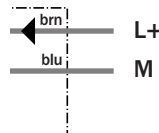
M12, 4-pin



MZZ1-03V-N-AWO



2 x 0.34 mm²



See chapter Accessories

Connector, M12, 4-pin

Switching units

Technical specifications		MZZ1-03V-	N-ACO	N-AWO										
Sensing face	Front													
Electrical configuration	NAMUR 2-wire													
Supply voltage V_s	DC 5 ... 25 V													
Nominal voltage V_n	DC 8.2 V													
Response sensitivity	≤ 3 mT													
Ripple U_{pp}	$\leq 5\%$ ¹⁾													
Power consumption, attenuated	≥ 2.5 mA													
Power consumption, unattenuated	≤ 1 mA													
Internal capacitance	≤ 15 nF													
Internal inductance	≤ 35 μ H													
Cable resistance	≤ 50 Ohm													
Time delay before availability t_v	≤ 2 ms													
Hysteresis H, of s_r	≤ 1 mm													
Repeatability R	≤ 0.1 mm (U_b and T_a constant)													
Temperature drift, of s_r	± 0.005 mm/ $^{\circ}$ C													
EMC	According to EN 60 947-5-6													
Switching output	Control current dependent on switching state ²⁾													
Output function	NAMUR													
Connection type	Connector, M12, 4-pin													
	Cable, PVC, 2 m													
Enclosure rating	IP 67 ³⁾													
Max. switching frequency	5,000 Hz													
short-circuit protected	✓													
Reverse polarity protected	✓													
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm													
Ambient temperature T_a	-25 $^{\circ}$ C ... +70 $^{\circ}$ C													
Housing material	Aluminium, plastic													

¹⁾ of U_b ²⁾ according to NAMUR EN 60947-5-6³⁾ according to EN 60529

Max. data for connecting isolating unit EN 2 Ex

or other approved isolating amplifier:

Short circuit current I_{Kmax}	30 mA
No load voltage U_0	16 V
Power loss P_{max}	75 mW

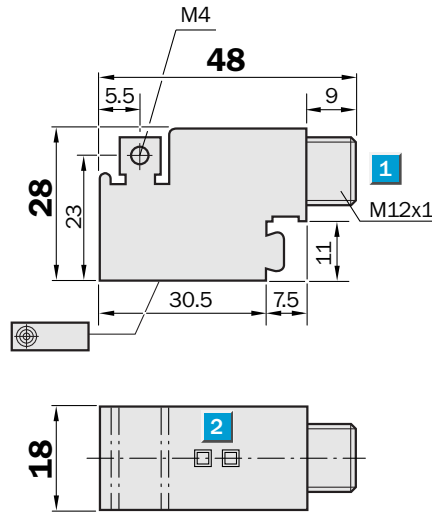
Ordering information

Type	Order no.
MZZ1-03V-N-ACO	7 901 324
MZZ1-03V-N-AWO	7 901 323



- Weld immune in welding applications
- The sensors locks the output during the welding process. When the welding process stops, the sensor updates the output accordingly
- Flexible mounting technique for different cylinder styles
- Housing with teflon coating optional

Dimensional drawing

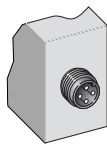


- 1 Connection
- 2 Display LED

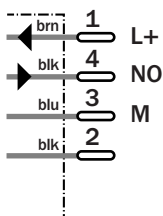


Connection type

- MZU2-03VPS-DCM
- MZU2-03VPS-TCM



M12, 4-pin



See chapter Accessories

- Connector, M12, 4-pin
- Mounting systems

Technical specifications		MZU2-	03VPS -DCM	03VPS -TCM								
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	≤ 3 mT											
Ripple U_{pp}	≤ 10 % ¹⁾											
Voltage drop U_d	≤ 2 V											
Power consumption	≤ 18 mA ²⁾											
Continuous current I_a	≤ 300 mA											
Time delay before availability t_v	≤ 20 ms											
Hysteresis H, of s_r	≤ 1.5 mm											
Repeatability R	≤ 0.1 mm (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	PNP											
Output function	Normally open											
Connection type	Connector, M12, 4-pin											
Enclosure rating	IP 67 ³⁾											
Max. switching frequency	40 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁴⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 C ... +75 °C											
Housing material	Zinc die-cast											
	Zinc die cast/Teflon coated											

¹⁾ of U_b

²⁾ without load

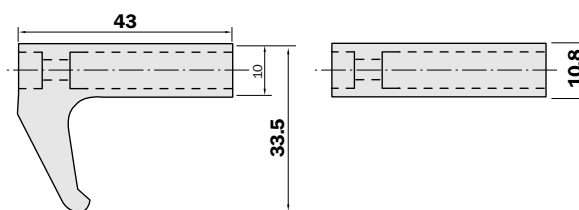
³⁾ according to EN 60529

⁴⁾ (pulsed)

Accessories:

Mounting clamp for pneumatic cylinder sensor MZU2

Mounting clamp:	BEF-KS-U2-S1
Material:	Die-cast zinc
Order-Nr:	4 030 922
Mounting clamp:	BEF-KS-U2-S1T
Material:	Die-cast zinc with teflon coating
Order-No:	4 031 632
Tie-rod cylinder $\varnothing 4$... 20 mm	

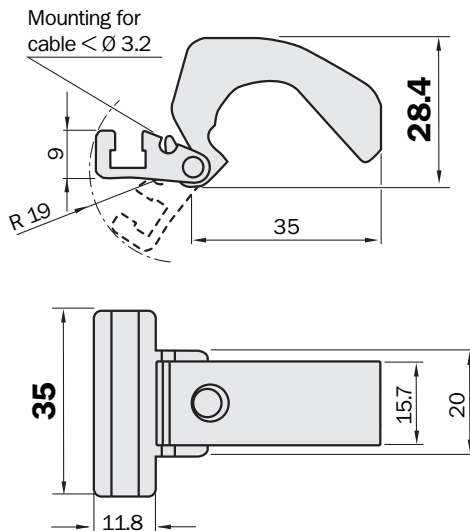


Ordering information

Type	Order no.
MZU2-03VPS-DCM	1 017 450
MZU2-03VPS-TCM	1 017 451

- Adaptable to MZT6 / RZT6 and MZT1 / RZT1 sensors
- Integrated profile cylinder:
 Ø Pistons 32 ... 100 mm
 Ø Profile rods 5 ... 18 mm
- Tie-rod cylinders:
 Ø Pistons 32 ... 160 mm
 Ø Tension rods 5 ... 18 mm
- Fits tightly on profile rods/ tension rod cylinders
- Sensors can be mounted from above onto the mounting rails

Dimensional drawing



Note:

Using the BEF-KHZ-PT1 mounting system together with the MZT1/RZT1 and MZT6/RZT6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZZ1, MZZ2, MZP3 and MZP4.

Technical specifications		BEF-	KHZ-PT1										
Material	Zinc die-cast												



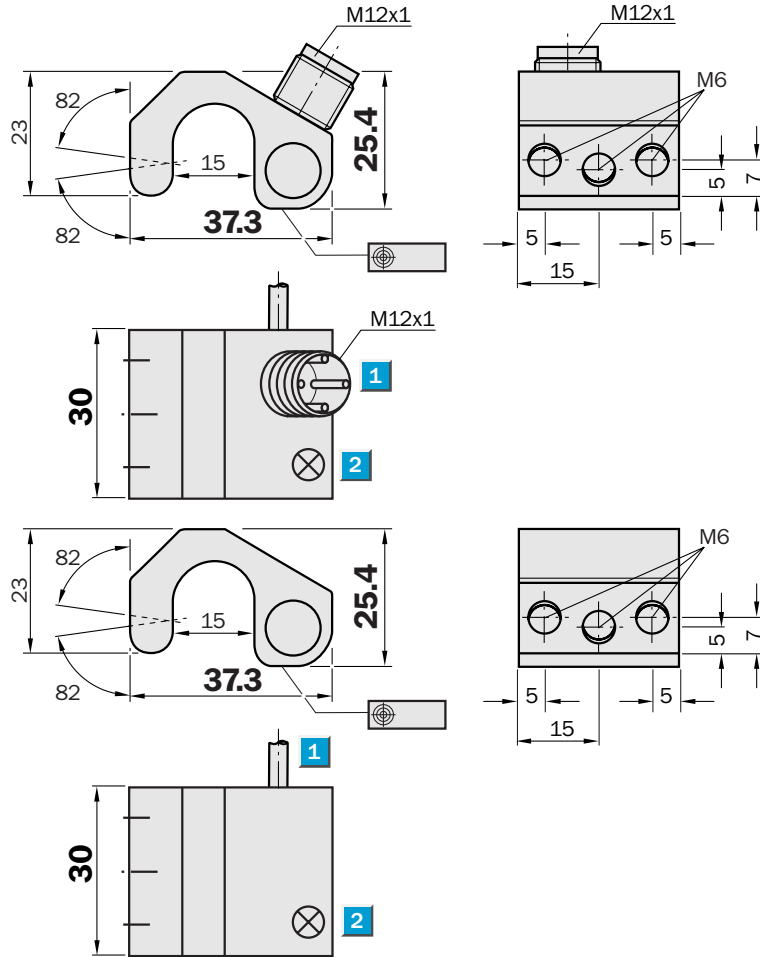
The mounting bracket BEF-KHZ-PT1 makes it possible to mount magnetic cylinder sensors MZT6 / RZT6 and MZT1 / RZT1 series on tie rod and integrated profile bar cylinders.

Ordering information	
Type	Order no.
BEF-KHZ-PT1	2 022 702

for integrated profile cylinders
Magnetic cylinder sensor

- Mounting on integrated profile with max. width of 14 mm
- High repeat accuracy
- Solid aluminium housing with integrated mounting claw
- Cable or connector
- LED status indicator

Dimensional drawing



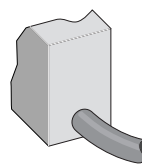
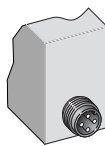
- 1 Connection
- 2 Display LED



Connection type

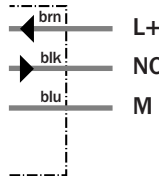
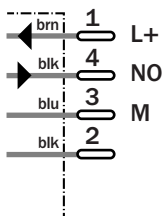
MZP3-03VPS-ACO

MZP3-03VPS-AUO



M12, 4-pin

3 x 0.25 mm²



See chapter Accessories

Connector, M12, 4-pin

Technical specifications		MZIP3-	03VPS -ACO	03VPS -AUO										
Sensing face	Front													
Electrical configuration	DC 3-wire													
Supply voltage V_s	DC 10 ... 30 V													
Response sensitivity	≤ 3 mT													
Ripple U_{pp}	≤ 10 % ¹⁾													
Voltage drop U_d	≤ 1.5 V ²⁾													
Power consumption	10 mA ³⁾													
Continuous current I_a	≤ 300 mA													
Time delay before availability t_v	≤ 2 ms													
Hysteresis H, of s_r	≤ 1 mm													
Repeatability R	≤ 0.1 mm (U_b and T_a constant)													
EMC	According to EN 60947-5-2													
Switching output	PNP													
Output function	Normally open													
Connection type	Connector, M12, 4-pin													
	Cable, PVC/PUR, 2 m													
Enclosure rating	IP 67 ⁴⁾													
Max. switching frequency	5,000 Hz													
Wire-break protection	✓													
Short-circuit protection	✓ ⁵⁾													
Reverse polarity protection	✓													
Power-up pulse suppression	✓													
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm													
Ambient temperature T_a	-25 °C ... +75 °C													
Housing material	Aluminium, plastic													

1) of U_b 2) at I_a max

3) without load

4) according to EN 60529

5) (pulsed)

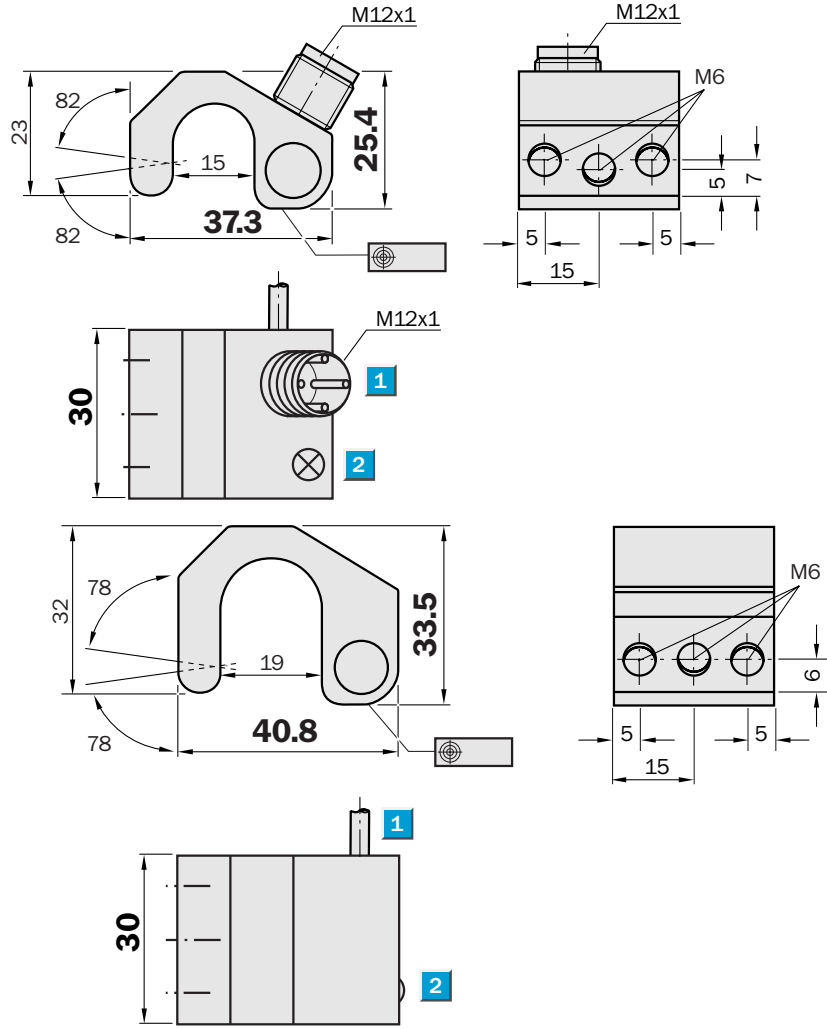
Ordering information

Type	Order no.
MZIP3-03VPS-ACO	7 900 612
MZIP3-03VPS-AUO	7 900 610



- Mounting on integrated profile with max. width of 14 mm
- NAMUR to EN 60 947-5-6
- High repeat accuracy
- Solid aluminium housing with integrated mounting claw
- Classification TÜV 99 ATEX 1398
Ex II EEx ib IIC T6
- LED status indicator

Dimensional drawing



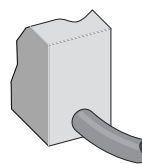
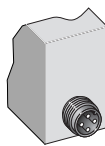
- 1 Connection
- 2 Display LED



Connection type

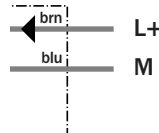
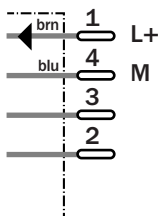
MZP3-03V-N-ACO

MZP3-03V-N-AWO



M12, 4-pin

2 x 0.34 mm²



See chapter Accessories
 Connector, M12, 4-pin
 Switching units

Technical specifications		MZIP3-03V-	N-ACO	N-AWO										
Sensing face	Front													
Electrical configuration	NAMUR 2-wire													
Supply voltage V_s	DC 5 ... 25 V													
Nominal voltage V_n	DC 8.2 V													
Response sensitivity	≤ 3 mT													
Ripple U_{pp}	$\leq 5\%$ ¹⁾													
Power consumption, attenuated	≥ 2.5 mA													
Power consumption, unattenuated	≤ 1 mA													
Internal capacitance	≤ 15 nF													
Internal inductance	≤ 35 μ H													
Cable resistance	≤ 50 Ohm													
Time delay before availability t_v	≤ 2 ms													
Hysteresis H, of s_r	≤ 1 mm													
Repeatability R	≤ 0.1 mm (U_b and T_a constant)													
Temperature drift, of s_r	± 0.005 mm/ $^{\circ}$ C													
EMC	According to EN 60 947-5-6													
Switching output	Control current dependent on switching state ²⁾													
Output function	NAMUR													
Connection type	Connector, M12, 4-pin													
	Cable, PVC, 2 m													
Enclosure rating	IP 67 ³⁾													
Max. switching frequency	5,000 Hz													
short-circuit protected	✓													
Reverse polarity protected	✓													
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm													
Ambient temperature T_a	-25 $^{\circ}$ C ... +70 $^{\circ}$ C													
Housing material	Aluminium, plastic													

¹⁾ of U_b

²⁾ according to NAMUR EN 60947-5-6

³⁾ according to EN 60529

Max. data for connecting isolating unit EN 2 Ex

or other approved isolating amplifier:

Short circuit current I_{Kmax}	30 mA
No load voltage U_0	16 V
Power loss P_{max}	75 mW

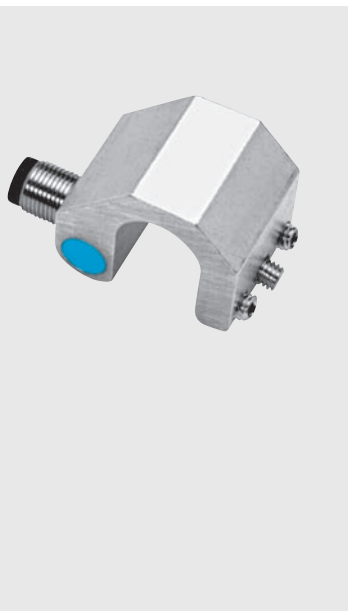
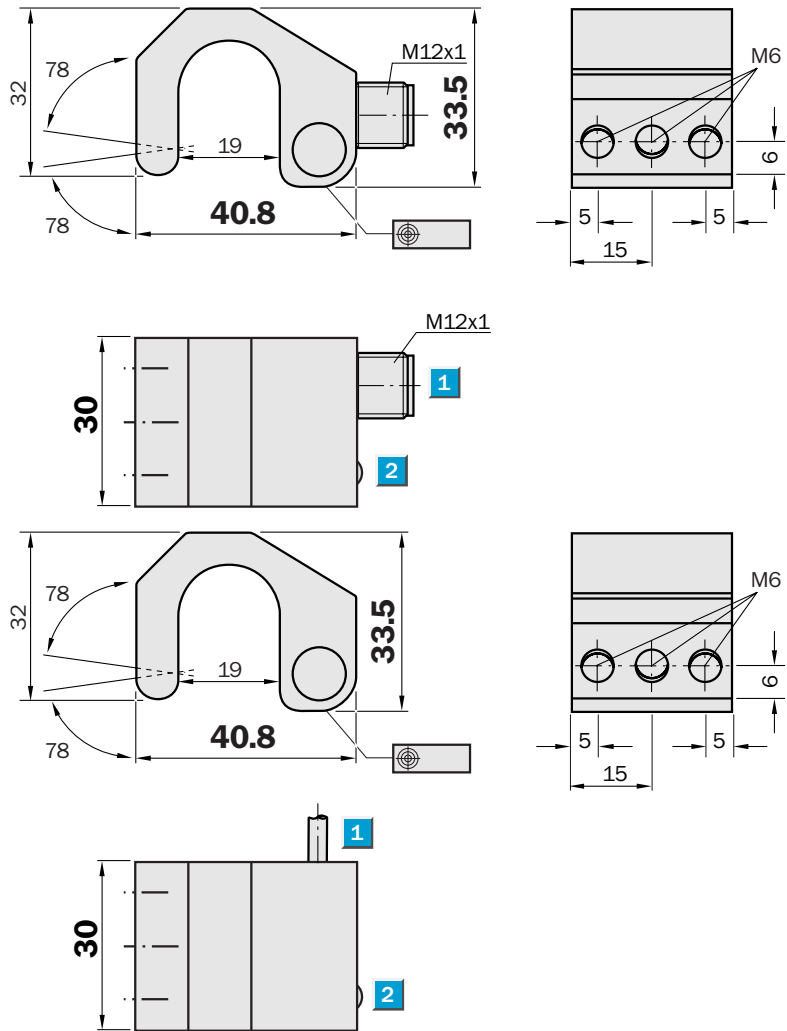
Ordering information

Type	Order no.
MZIP3-03V-N-ACO	7 901 441
MZIP3-03V-N-AWO	7 901 440

for integrated profile cylinders
Magnetic cylinder sensor

- Mounting on integrated profile with max. width of 18 mm
- High repeat accuracy
- Solid aluminium housing with integrated mounting claw
- Cable or connector
- LED status indicator

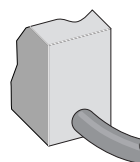
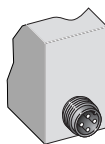
Dimensional drawing



Connection type

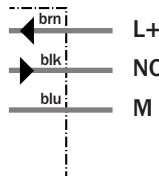
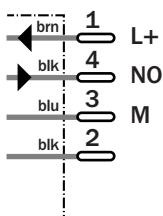
MZP4-03VPS-ACO

MZP4-03VPS-AUO



M12, 4-pin

3 x 0.25 mm²



See chapter Accessories

Connector, M12, 4-pin

Technical specifications		MZP4-	03VPS-ACO	03VPS-AUO									
Sensing face	Front												
Electrical configuration	DC 3-wire												
Supply voltage V_s	DC 10 ... 30 V												
Response sensitivity	3 mT												
Ripple U _{pp}	≤ 10 % ¹⁾												
Voltage drop U _d	≤ 1.5 V ²⁾												
Power consumption	≤ 10 mA ³⁾												
Continuous current I_a	≤ 300 mA												
Time delay before availability t _v	≤ 2 ms												
Hysteresis H, of s _r	≤ 1 mm												
Repeatability R	≤ 0.1 mm (U _b and T _a constant)												
EMC	According to EN 60947-5-2												
Switching output	PNP												
Output function	Normally open												
Connection type	Connector, M12, 4-pin												
	Cable, PVC/PUR, 2 m												
Enclosure rating	IP 67 ⁴⁾												
Max. switching frequency	5,000 Hz												
Wire-break protection	✓												
Short-circuit protection	✓ ⁵⁾												
Reverse polarity protection	✓												
Power-up pulse suppression	✓												
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm												
Ambient temperature T _a	-25 °C ... +75 °C												
Housing material	Aluminium, plastic												

¹⁾ of U_b

²⁾ at I_a max

³⁾ without load

⁴⁾ according to EN 60529
⁵⁾ (pulsed)

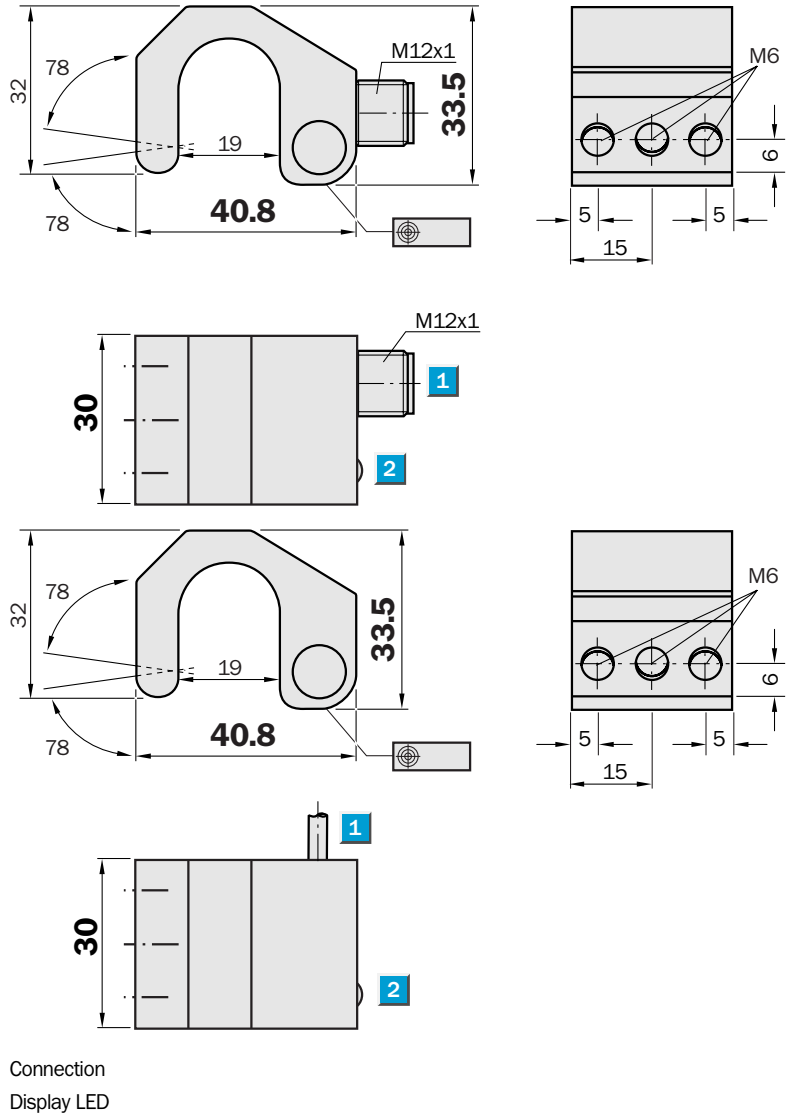
Ordering information

Type	Order no.
MZP4-03VPS-ACO	7 900 616
MZP4-03VPS-AUO	7 900 614

for integrated profile cylinders
Magnetic cylinder sensor

- Mounting on integrated profile with max. width of 18 mm
- NAMUR to EN 60 947-5-6
- High repeat accuracy
- Solid aluminium housing with integrated mounting claw
- Cable or connector
- Classification TÜV 99 ATEX 1398
Ex II 2G EEx ib IIC T6
- LED status indicator

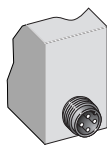
Dimensional drawing



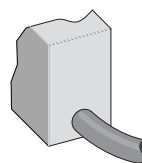
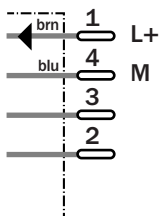
Connection type

MZP4-03V-N-ACO

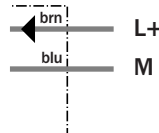
MZP4-03V-N-AWO



M12, 4-pin



2 x 0.34 mm²



See chapter Accessories

Connector, M12, 4-pin

Switching units

Technical specifications		MZIP4-03V-	N-ACO	N-AWO										
Sensing face	Front													
Electrical configuration	NAMUR 2-wire													
Supply voltage V_s	DC 5 ... 25 V													
Nominal voltage V_n	DC 8.2 V													
Response sensitivity	≤ 3 mT													
Ripple U_{pp}	$\leq 5\%$ ¹⁾													
Power consumption, attenuated	≥ 2.5 mA													
Power consumption, unattenuated	≤ 1 mA													
Internal capacitance	≤ 15 nF													
Internal inductance	≤ 35 μ H													
Cable resistance	≤ 50 Ohm													
Time delay before availability t_v	≤ 2 ms													
Hysteresis H, of s_r	≤ 1 mm													
Repeatability R	≤ 0.1 mm (U_b and T_a constant)													
Temperature drift, of s_r	± 0.005 mm/ $^{\circ}$ C													
EMC	According to EN 60 947-5-6													
Switching output	Control current dependent on switching state ²⁾													
Output function	NAMUR													
Connection type	Connector, M12, 4-pin													
	Cable, PVC, 2 m													
Enclosure rating	IP 67 ³⁾													
Max. switching frequency	5,000 Hz													
short-circuit protected	✓													
Reverse polarity protected	✓													
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm													
Ambient temperature T_a	-25 $^{\circ}$ C ... +70 $^{\circ}$ C													
Housing material	Aluminium, plastic													

¹⁾ of U_b ²⁾ according to NAMUR EN 60947-5-6³⁾ according to EN 60529

Max. data for connecting isolating unit EN 2 Ex

or other approved isolating amplifier:

Short circuit current I_{Kmax}	30 mA
No load voltage U_0	16 V
Power loss P_{max}	75 mW

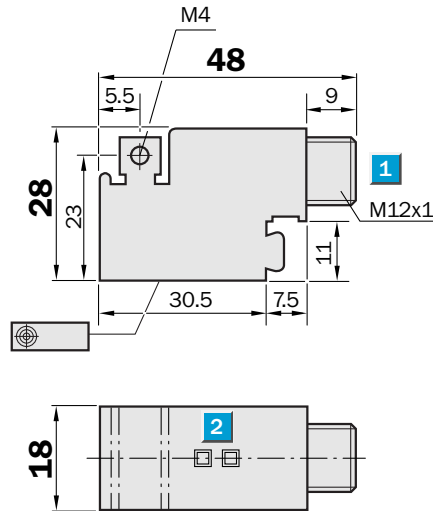
Ordering information

Type	Order no.
MZIP4-03V-N-ACO	7 901 330
MZIP4-03V-N-AWO	7 901 329



- Weld immune in welding applications
- The sensors locks the output during the welding process. When the welding process stops, the sensor updates the output accordingly
- Flexible mounting technique for different cylinder styles
- Housing with teflon coating optional

Dimensional drawing

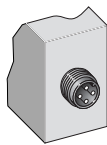


- 1 Connection
- 2 Display LED

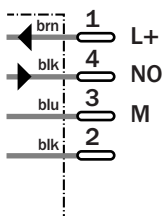


Connection type

- MZU2-03VPS-DCM
- MZU2-03VPS-TCM



M12, 4-pin



See chapter Accessories
Connector, M12, 4-pin
Mounting systems

Technical specifications		MZU2-	03VPS -DCM	03VPS -TCM								
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	≤ 3 mT											
Ripple U_{pp}	≤ 10 % ¹⁾											
Voltage drop U_d	≤ 2 V											
Power consumption	≤ 18 mA ²⁾											
Continuous current I_a	≤ 300 mA											
Time delay before availability t_v	≤ 20 ms											
Hysteresis H, of s_r	≤ 1.5 mm											
Repeatability R	≤ 0.1 mm (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	PNP											
Output function	Normally open											
Connection type	Connector, M12, 4-pin											
Enclosure rating	IP 67 ³⁾											
Max. switching frequency	40 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁴⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 °C ... +75 °C											
Housing material	Zinc die-cast											
	Zinc die cast/Teflon coated											

¹⁾ of U_b

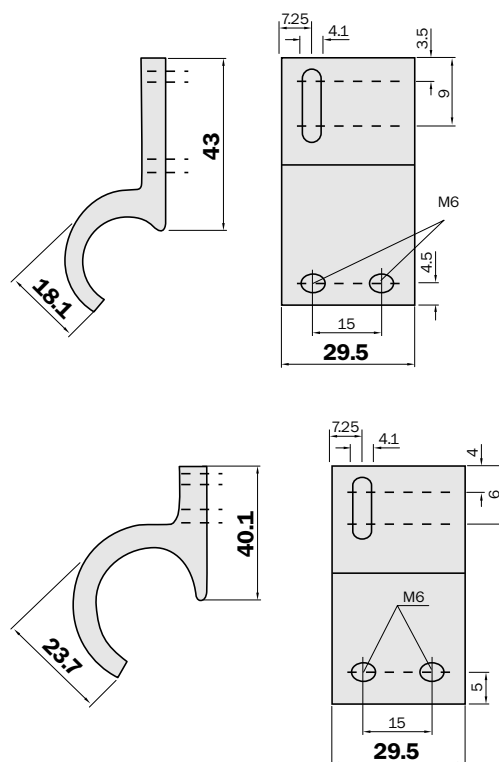
²⁾ without load

³⁾ according to EN 60529

⁴⁾ (pulsed)

Accessories:

Mounting clamp:	BEF-KS-U2-P1
Material:	Aluminium
Order-No:	2 019 824
Integrated profile cylinder with max. rod diameter of 13 mm	
Mounting clamp:	BEF-KS-U2-P2
Material:	Aluminum
Order-No:	2 019 823
Integrated profile cylinder with max. rod diameter of 18 mm	

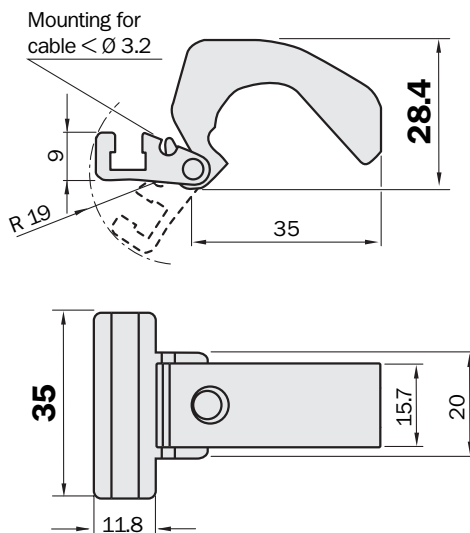


Ordering information

Type	Order no.
MZU2-03VPS-DCM	1 017 450
MZU2-03VPS-TCM	1 017 451

- Adaptable to MZT6 / RZT6 and MZT1 / RZT1 sensors
- Integrated profile cylinder:
 Ø Pistons 32 ... 100 mm
 Ø Profile rods 5 ... 18 mm
- Tie-rod cylinders:
 Ø Pistons 32 ... 160 mm
 Ø Tension rods 5 ... 18 mm
- Fits tightly on profile rods/ tension rod cylinders
- Sensors can be mounted from above onto the mounting rails

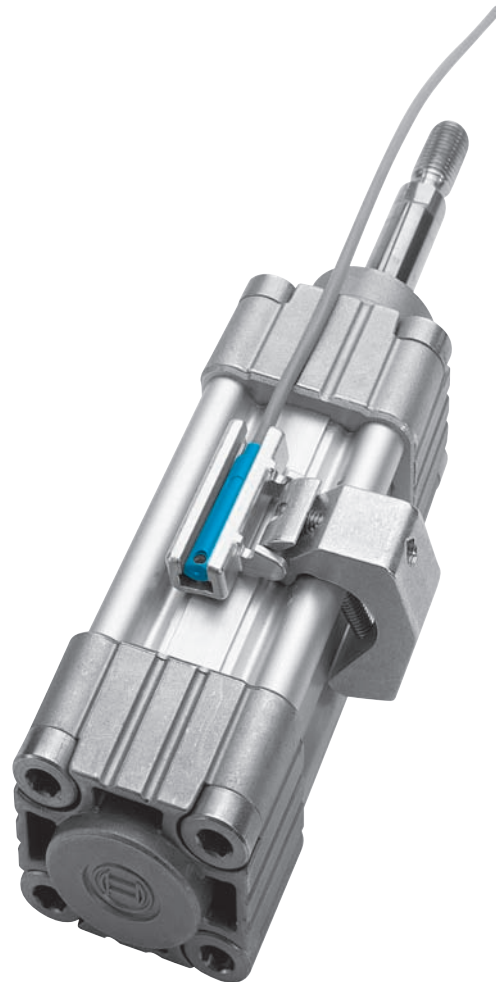
Dimensional drawing



Note:

Using the BEF-KHZ-PT1 mounting system together with the MZT1/RZT1 and MZT6/RZT6 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZZ1, MZZ2, MZP3 and MZP4.

Technical specifications		BEF-	KHZ-PT1										
Material	Zinc die-cast												



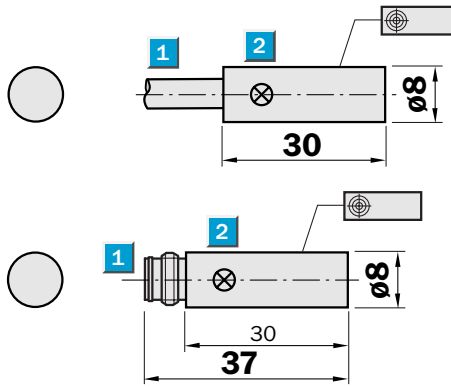
The mounting bracket BEF-KHZ-PT1 makes it possible to mount magnetic cylinder sensors MZT6 / RZT6 and MZT1 / RZT1 series on tie rod and integrated profile bar cylinders.

Ordering information	
Type	Order no.
BEF-KHZ-PT1	2 022 702

for round-body cylinders
Magnetic cylinder sensor

- Mounting on round-body cylinders \varnothing 8 ... 63 mm using R1 mounting clamp
- High repeat accuracy
- Solid aluminium housing
- Cable or connector
- LED status indicator

Dimensional drawing



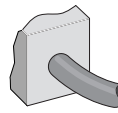
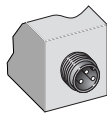
- 1 Connection
- 2 Display LED



Connection type

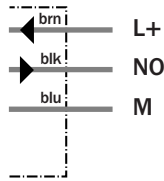
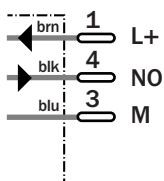
MZR1-03VNS-ATO
MZR1-03VPS-ATO

MZR1-03VNS-AUO
MZR1-03VPS-AUO



M8, 3-pin

3 x 0.25 mm²



See chapter Accessories

Connector, M8, 3-pin
Mounting systems

Technical specifications		MZR1-	03VNS-ATO	03VNS-AUO	03VPS-ATO	03VPS-AUO						
Sensing face	Front											
Electrical configuration	DC 3-wire ¹⁾											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	3 mT											
Ripple U _{pp}	≤ 10 % ²⁾											
Voltage drop U _d	≤ 1.5 V ³⁾											
Power consumption	≤ 10 mA ⁴⁾											
Continuous current I_a	≤ 300 mA											
Time delay before availability t _v	≤ 2 ms											
Hysteresis H, of s _r	≤ 1 mm											
Repeatability R	≤ 0.1 mm (U _b and T _a constant)											
EMC	According to EN 60947-5-2											
Switching output	NPN											
	PNP											
Output function	Normally open											
Connection type	Connector, M8, 3-pin											
	Cable, PVC/PUR, 2 m											
Enclosure rating	IP 67 ⁵⁾											
Max. switching frequency	5,000 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁶⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T _a	-25 °C ... +75 °C											
Housing material	Aluminium, plastic											

¹⁾ Product group available as reed switch on request

²⁾ of U_b
³⁾ at I_a max

⁴⁾ without load
⁵⁾ according to EN 60529

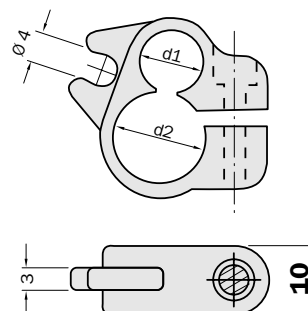
⁶⁾ (pulsed)

Mounting clamp

Plastic,

with d1 Ø 8 mm

For cylinders w/ piston diameter	Clamping range d2 in mm	Type	Order no.
8 mm	9.2 ... 10.0	BEF-S-R1-08	7 902 337
10 mm	10.9 ... 12.0	BEF-S-R1-10	7 901 753
12 mm	12.9 ... 14.0	BEF-S-R1-12	7 901 754
16 mm	16.9 ... 18.0	BEF-S-R1-16	7 901 755
20 mm	21.0 ... 22.0	BEF-S-R1-20	7 901 756
25 mm	26.1 ... 27.2	BEF-S-R1-25	7 901 757
32 mm	33.0 ... 35.0	BEF-S-R1-32	7 901 758
40 mm	41.4 ... 42.5	BEF-S-R1-40	7 901 759
50 mm	52.5 ... 54.0	BEF-S-R1-50	7 901 760
63 mm	66.0 ... 67.0	BEF-S-R1-63	7 901 761



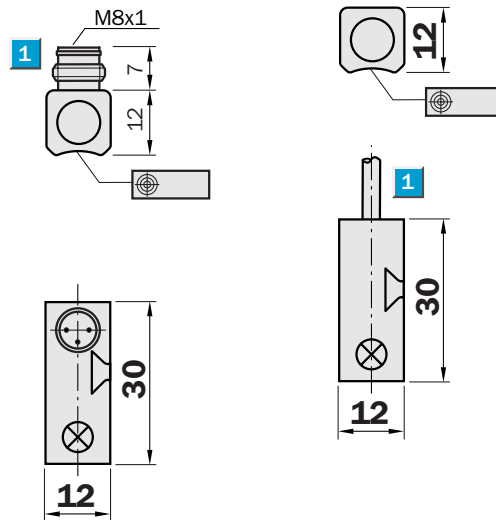
Ordering information

Type	Order no.
MZR1-03VNS-ATO	7 900 595
MZR1-03VNS-AUO	7 900 593
MZR1-03VPS-ATO	7 900 594
MZR1-03VPS-AUO	7 900 592

for round-body cylinders
Magnetic cylinder sensor

- Universal mounting using clamping band for max. cylinder diameter of 100 mm
- High repeat accuracy
- Solid aluminium housing
- Cable or connector
- LED status indicator

Dimensional drawing



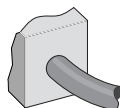
1 Connection



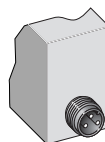
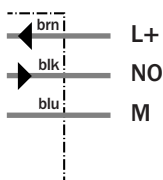
Connection type

MZR2-03VNS-AU0
MZR2-03VPS-AU0

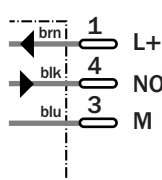
MZR2-03VNS-ATO
MZR2-03VPS-ATO



3 x 0.25 mm²



M8, 3-pin



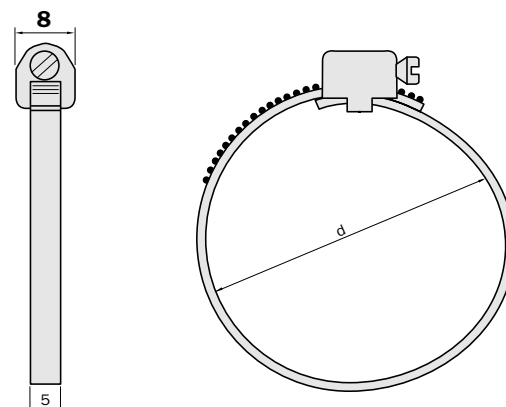
See chapter Accessories

Connector, M8, 3-pin
Mounting systems

Technical specifications		MZR2-	03VNS-ATO	03VNS-AUO	03VPS-ATO	03VPS-AUO						
Sensing face	Front											
Electrical configuration	DC 3-wire											
Supply voltage V_s	DC 10 ... 30 V											
Response sensitivity	≤ 3 mT											
Ripple U_{pp}	≤ 10 % ¹⁾											
Voltage drop U_d	≤ 1.5 V ²⁾											
Power consumption	≤ 10 mA ³⁾											
Continuous current I_a	≤ 300 mA											
Time delay before availability t_v	≤ 2 ms											
Hysteresis H, of s_r	≤ 1 mm											
Repeatability R	≤ 0.1 mm (U_b and T_a constant)											
EMC	According to EN 60947-5-2											
Switching output	NPN											
	PNP											
Output function	Normally open											
Connection type	Connector, M8, 3-pin											
	Cable, PUR-PVC, 2 m											
Enclosure rating	IP 67 ⁴⁾											
Max. switching frequency	5,000 Hz											
Wire-break protection	✓											
Short-circuit protection	✓ ⁵⁾											
Reverse polarity protection	✓											
Power-up pulse suppression	✓											
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm											
Ambient temperature T_a	-25 °C ... +75 °C											
Housing material	Aluminium, plastic											

¹⁾ of U_b ²⁾ at I_a max³⁾ without load⁴⁾ according to EN 60529⁵⁾ (pulsed)**Accessories:****Clamping band,
stainless steel**

For cylinder range with piston diameter	Clamping range d in mm	Type	Order no.
8 ... 16 mm	18 ... 29	BEF-S-R2-16	7 901 762
20 / 25 mm	28 ... 39	BEF-S-R2-25	7 901 763
32 mm	38 ... 49	BEF-S-R2-30	7 901 764
40 mm	48 ... 59	BEF-S-R2-40	7 901 765
50 mm	58 ... 69	BEF-S-R2-50	7 901 766
63 mm	68 ... 79	BEF-S-R2-63	7 901 767
80 mm	88 ... 99	BEF-S-R2-80	7 901 768
100 mm	98 ... 109	BEF-S-R2-100	7 901 769

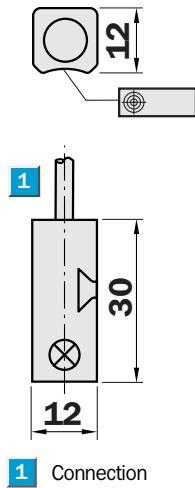
**Ordering information**

Type	Order no.
MZR2-03VNS-ATO	7 900 601
MZR2-03VNS-AUO	7 900 599
MZR2-03VPS-ATO	7 900 600
MZR2-03VPS-AUO	7 900 598



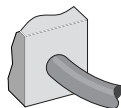
- Universal mounting with clamping band for max. cylinder diameter of 100 mm
- NAMUR to EN 60 947-5-6
- High repeat accuracy
- Solid aluminium housing
- Classification TÜV 99 ATEX 1398
Ex II 2G EEx ib IIC T6
- LED status indicator

Dimensional drawing

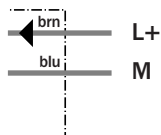


Connection type

MZR2-03V-N-AW0



2 x 0.34 mm²



See chapter Accessories
 Mounting systems
 Switching units

Technical specifications		MZR2-03V-	N-AW0										
Sensing face	Front												
Electrical configuration	NAMUR 2-wire												
Supply voltage V_s	DC 5 ... 25 V												
Nominal voltage V_n	DC 8.2 V												
Response sensitivity	≤ 3 mT												
Ripple U_{pp}	$\leq 5\%$ ¹⁾												
Power consumption, attenuated	≥ 2.5 mA												
Power consumption, unattenuated	≤ 1 mA												
Internal capacitance	≤ 15 nF												
Internal inductance	≤ 35 μ H												
Cable resistance	≤ 50 Ohm												
Time delay before availability t_v	≤ 2 ms												
Hysteresis H, of s_r	≤ 1 mm												
Repeatability R	≤ 0.1 mm (U_b and T_a constant)												
Temperature drift, of s_r	± 0.005 mm/ $^{\circ}$ C												
EMC	According to EN 60 947-5-6												
Switching output	Control current dependent on switching state ²⁾												
Output function	NAMUR												
Connection type	Cable, PVC, 2 m												
Enclosure rating	IP 67 ³⁾												
Max. switching frequency	5,000 Hz												
short-circuit protected	✓												
Reverse polarity protected	✓												
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm												
Ambient temperature T_a	-25 $^{\circ}$ C ... +70 $^{\circ}$ C												
Housing material	Aluminium, plastic												

¹⁾ of U_b ²⁾ according to NAMUR EN 60947-5-6³⁾ according to EN 60529**Accessories:**

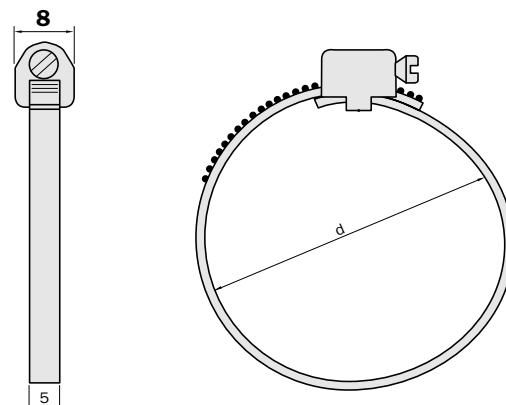
Max. data for connecting isolating unit EN 2 Ex

or other approved isolating amplifier:

Short circuit current 1_{Kmax}	30 mA
No load voltage U_0	16 V
Power loss P_{max}	75 mW

Clamping band, stain-**less steel**

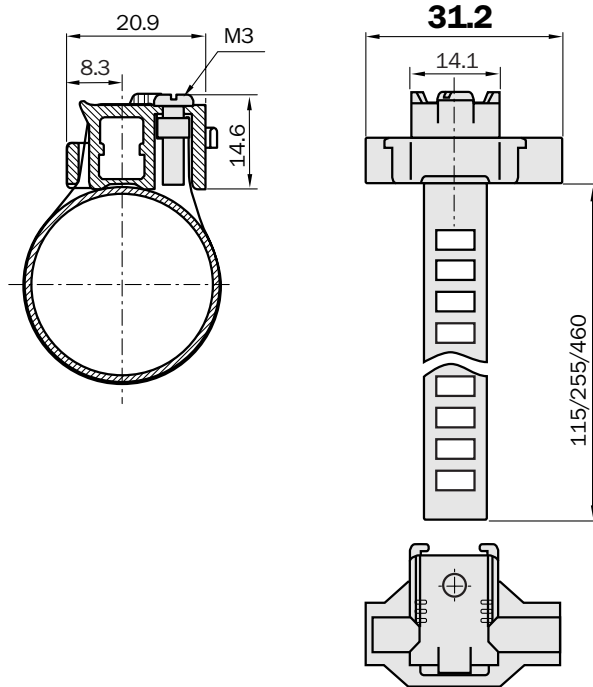
For cylinder range with piston diameter	Clamping range d in mm	Type	Order no.
8 ... 16 mm	18 ... 29	BEF-S-R2-16	7 901 762
20 / 25 mm	28 ... 39	BEF-S-R2-25	7 901 763
32 mm	38 ... 49	BEF-S-R2-30	7 901 764
40 mm	48 ... 59	BEF-S-R2-40	7 901 765
50 mm	58 ... 69	BEF-S-R2-50	7 901 766
63 mm	68 ... 79	BEF-S-R2-63	7 901 767
80 mm	88 ... 99	BEF-S-R2-80	7 901 768
100 mm	98 ... 109	BEF-S-R2-100	7 901 769

**Ordering information**

Type	Order no.
MZR2-03V-N-AW0	7 901 321

Dimensional drawing

- Adaptable to round body cylinders with piston diameters from 8 mm to 130 mm
- Fits tightly on round body cylinders
- Material: plastic / nickel silver



Note:

Using the BEF-KHZ-RT1 mounting system together with the MZT1/RZT1, MZT6/RZT6 and MZF1 magnetic cylinder sensors, the following magnetic cylinder sensors can be replaced for profile rod/tension rod cylinders: MZR1, RZR1, MZR2 and RZR2.

Technical specifications		BEF-KHZ-	RT1-130	RT1-25	RT1-63								
Piston diameter	8 ... 130 mm												
	8 ... 25 mm												
	8 ... 63 mm												
Material	Plastic/nickel silver												



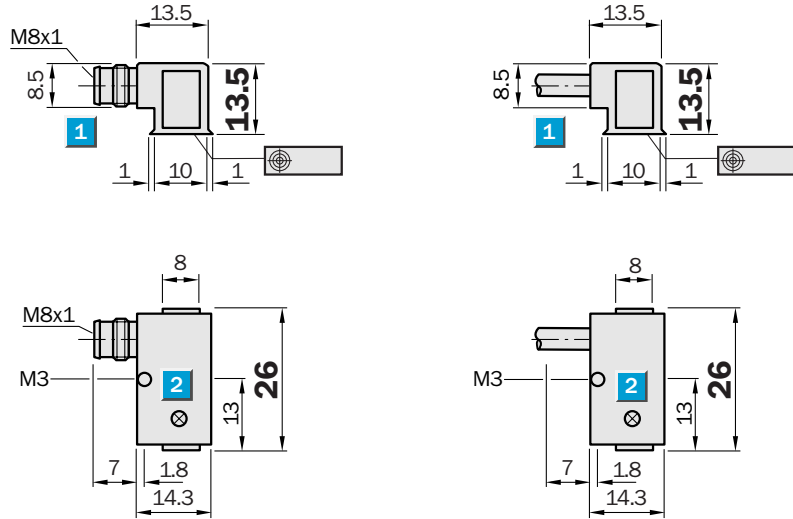
The mounting bracket BEF-KHZ-RT1 makes it possible to mount magnetic cylinder sensors MZT6/RZT6, MZT1/RZT1 and MZF1 series on round-body cylinders.

Ordering information	
Type	Order no.
BEF-KHZ-RT1-130	5 311 506
BEF-KHZ-RT1-25	5 311 171
BEF-KHZ-RT1-63	5 311 172

for short-stroke cylinders
Magnetic cylinder sensor

- Simple mounting on short-stroke cylinders
- High repeat accuracy
- Solid aluminium housing with special profile and clamping screw
- Cable or connector
- LED status indicator

Dimensional drawing



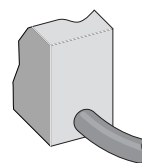
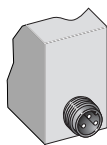
- 1 Connection
- 2 Display LED



Connection type

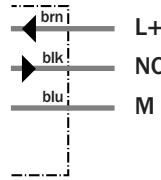
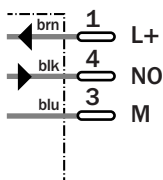
MZK1-02VPS-ATO

MZK1-02VPS-AU0



M8, 3-pin

3 x 0.25 mm²



See chapter Accessories

Connector, M8, 3-pin

Technical specifications		MZK1-	02VPS-ATO	02VPS-AU0									
Sensing face	Front												
Electrical configuration	DC 3-wire												
Supply voltage V_s	DC 10 ... 30 V												
Response sensitivity	2 mT												
Ripple U_{pp}	$\leq 10\%$ ¹⁾												
Voltage drop U_d	$\leq 1.5\text{ V}$ ²⁾												
Power consumption	$\leq 10\text{ mA}$ ³⁾												
Continuous current I_a	$\leq 300\text{ mA}$												
Time delay before availability t_v	$\leq 2\text{ ms}$												
Hysteresis H, of s_r	$\leq 1\text{ mm}$												
Repeatability R	$\leq 0.1\text{ mm}$ (U_b and T_a constant)												
EMC	According to EN 60947-5-2												
Switching output	PNP												
Output function	Normally open												
Connection type	Connector, M8, 3-pin												
	Cable, PVC/PUR, 2 m												
Enclosure rating	IP 67 ⁴⁾												
Max. switching frequency	5,000 Hz												
Wire-break protection	✓												
Short-circuit protection	✓ ⁵⁾												
Reverse polarity protection	✓												
Power-up pulse suppression	✓												
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm												
Ambient temperature T_a	-25 °C ... +75 °C												
Housing material	Aluminium, plastic												

¹⁾ of U_b

²⁾ at I_a max

³⁾ without load

⁴⁾ according to EN 60529
⁵⁾ (pulsed)

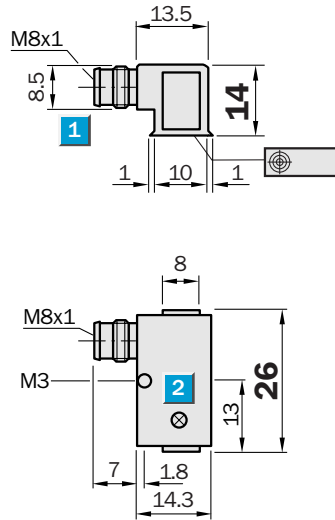
Ordering information

Type	Order no.
MZK1-02VPS-ATO	7 900 604
MZK1-02VPS-AU0	7 900 602

for short-stroke cylinders
Magnetic cylinder sensor

- Mountable from the top
- High repeat accuracy
- Solid aluminium housing with special profile and clamping screw
- Connector
- LED status indicator

Dimensional drawing

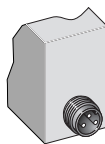


- 1 Connection
- 2 Display LED

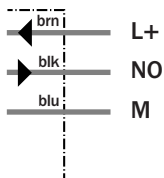


Connection type

MZK3-02VPS-ATO



M8, 3-pin



See chapter Accessories

Connector, M8, 3-pin

Technical specifications		MZK3-	02VPS-ATO										
Sensing face	Front												
Electrical configuration	DC 3-wire												
Supply voltage V_s	DC 10 ... 30 V												
Response sensitivity	2 mT												
Ripple U_{pp}	$\leq 10\%$ ¹⁾												
Voltage drop U_d	$\leq 1.5\text{ V}$ ²⁾												
Power consumption	$\leq 10\text{ mA}$ ³⁾												
Continuous current I_a	$\leq 300\text{ mA}$												
Time delay before availability t_v	$\leq 2\text{ ms}$												
Hysteresis H, of s_r	$\leq 1\text{ mm}$												
Repeatability R	$\leq 0.1\text{ mm}$ (U_b and T_a constant)												
EMC	According to EN 60947-5-2												
Switching output	PNP												
Output function	Normally open												
Connection type	Connector, M8, 3-pin												
Enclosure rating	IP 67 ⁴⁾												
Max. switching frequency	5,000 Hz												
Wire-break protection	✓												
Short-circuit protection	✓ ⁵⁾												
Reverse polarity protection	✓												
Power-up pulse suppression	✓												
Shock/vibration stress	30 g, 11 ms/10 ... 55 Hz, 1 mm												
Ambient temperature T_a	-25 °C ... +75 °C												
Housing material	Aluminium, plastic												

¹⁾ of U_b

²⁾ at I_a max

³⁾ without load

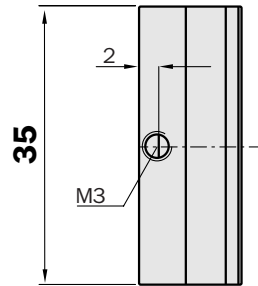
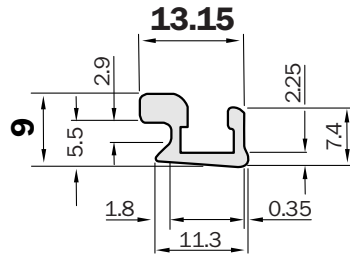
⁴⁾ according to EN 60529
⁵⁾ (pulsed)

Ordering information

Type	Order no.
MZK3-02VPS-ATO	7 901 952

Dimensional drawing

- Mountable from the top
- MZT1/RZT1 sensors can be mounted from above onto mounting rails
- Stable aluminium profile
- Fits tightly on dovetail groove (no slipping)
- Material: Aluminium alloy AlMgSi 0.5



Note:

The profile dimensions of the BEF-KHZ-ST1 mounting system correspond to the groove dimensions of the MZK1, MZK3, RZK1 and RZK3 magnetic cylinder sensors. Compare the dimensions of the groove with the dimensions of the mounting rails.

Technical specifications		BEF-	KHZ-ST1											
Material	Aluminium													



The mounting bracket BEF-KHZ-ST1 makes it possible to mount magnetic cylinder sensors MZT6/RZT6 and MTZ1/RZT1 series on short-stroke cylinders.

Ordering information	
Type	Order no.
BEF-KHZ-ST1	2 022 703