ASM®
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POSIROT®

Magnetic Angle Sensors (Dust-Ex-proof)

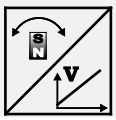
PRAS5EX
Magnetic Angle Sensor

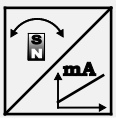
Datasheet

Analog output

Sensor features

- **Measurement range 0 ... 360°**
- **Protection class IP65**
- **Analog output**
- **With 10 mm shaft or non-contact**
- **II 3D Ex tc IIIC T80°C Dc X (X = examined with low impact energy of 4J)**



Specifications

Output	Voltage 0.5 ... 10 V Voltage 0.5 ... 4.5 V, ratiometric Current 4 ... 20 mA, 3 wire
Measurement range	0 ... 15° to 0 ... 360° (in 15° increments)
Resolution	0.03% (60 ... 360°); 0.1% (15 ... 45°)
Repeatability	±0.03% (60 ... 360°); ±0.1% (15 ... 45°)
Linearity	±0.3% f.s. (typical)
Rated distance sensor / magnet	Depending on the position magnet
Protection class	IP65
Housing material	Stainless steel 1.4404
Mounting	Screws M8
Connection	5-pin connector M12 (compatible to 4-pin connector)
Temperature range	-20 ... +40°C
Life cycle of bearings (shaft version)	100 x 10^6 revolutions (<1000 r.p.m.)
Revolutions per minute (shaft version)	1000 r.p.m.
Allowable shaft load	120 N radial / 120 N axial
Shock	DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks
Vibration	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles
Weight	390 g approx., 890 g with shaft
EMC	DIN EN 61326-1:2013
Dust-EX proof	DIN EN 60079-0 (June 2014), DIN EN 60079-31 (December 2014)

Order code

PRAS5EX	–	1	–	2	–	3	–	4	–	5	–	6

1 Mechanical connection

V	= Shaft 10 mm
K	= Non-contact with external magnet

2 Measurement range (0 ... 15° to 0 ... 360°, in 15° increments)

15 / 30 / 45 / ... / 345 / 360

3 Output

U2	= Voltage 0.5 ... 10 V (excitation voltage 18 ... 36 V DC)
U6	= Voltage 0.5 ... 4.5 V ratiometric (excitation voltage 5 V DC)
I1	= Current 4 ... 20 mA, 3 wire (excitation voltage 18 ... 36 V DC)

4 Signal characteristics

CW	= Signal increasing CW, clockwise
CCW	= Signal increasing CCW, counterclockwise

5 Connection

M12A5	= 5-pin connector M12 axial (compatible with 4-pin connector)
M12R5	= 5-pin connector M12 radial (compatible with 4-pin connector)

6 Housing material

VA	= Stainless steel 1.4404

Order example

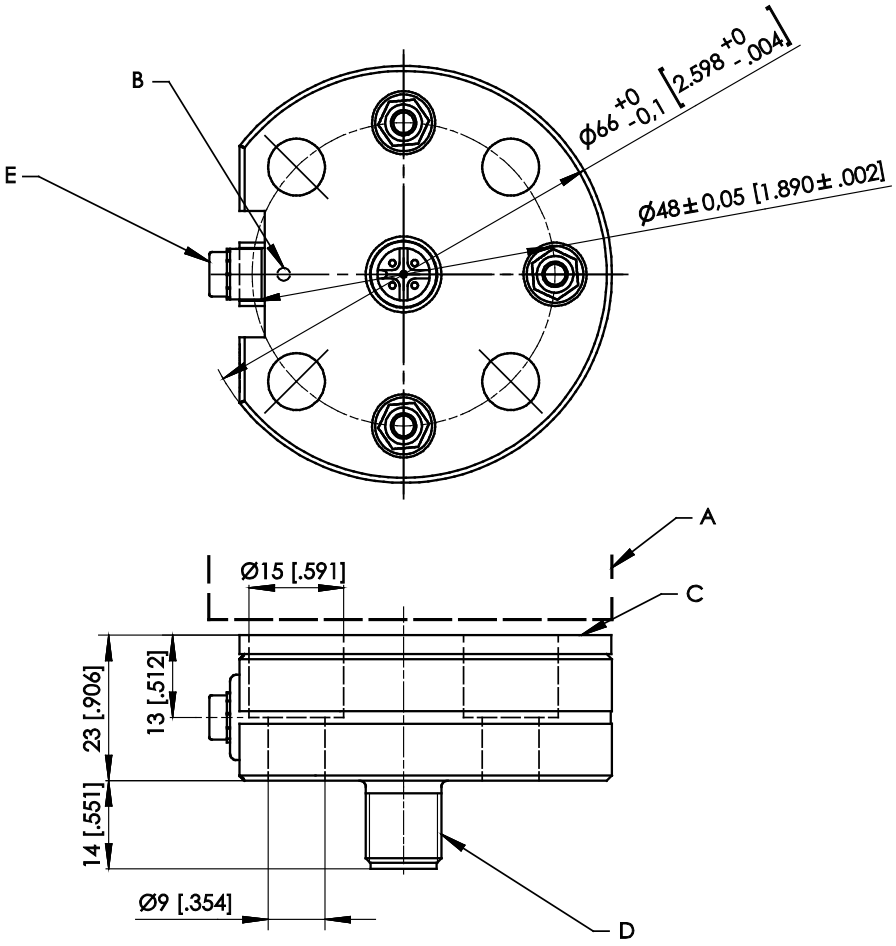
PRAS5EX – V – 360 – I1 – CW – M12A5 – VA

Accessories:

Position magnets (see page 13)

Dimensions

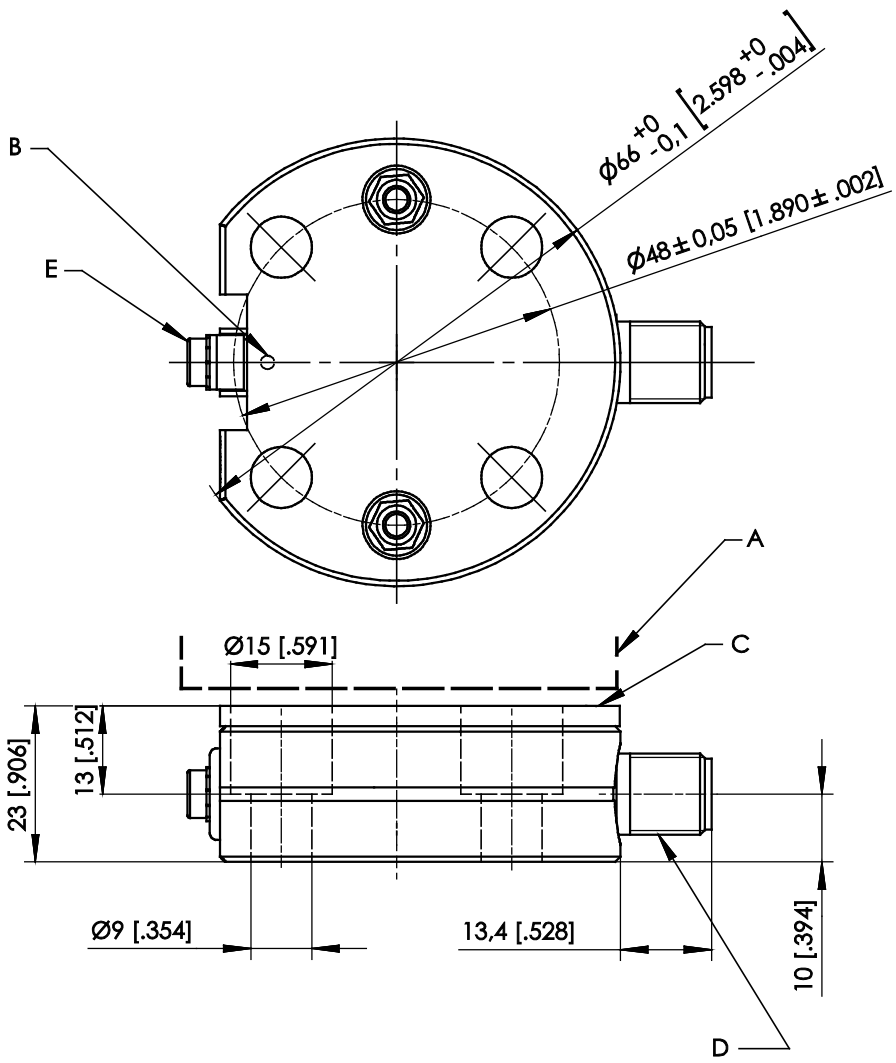
Contactless, connector M12, axial



A – Position magnet
B – Marking
C – Measuring area
D – Connector M12
E – Earthing

Dimensions in mm [inch]. Weight approx. 390 g.
Dimensions informative only.
For guaranteed dimensions consult factory.

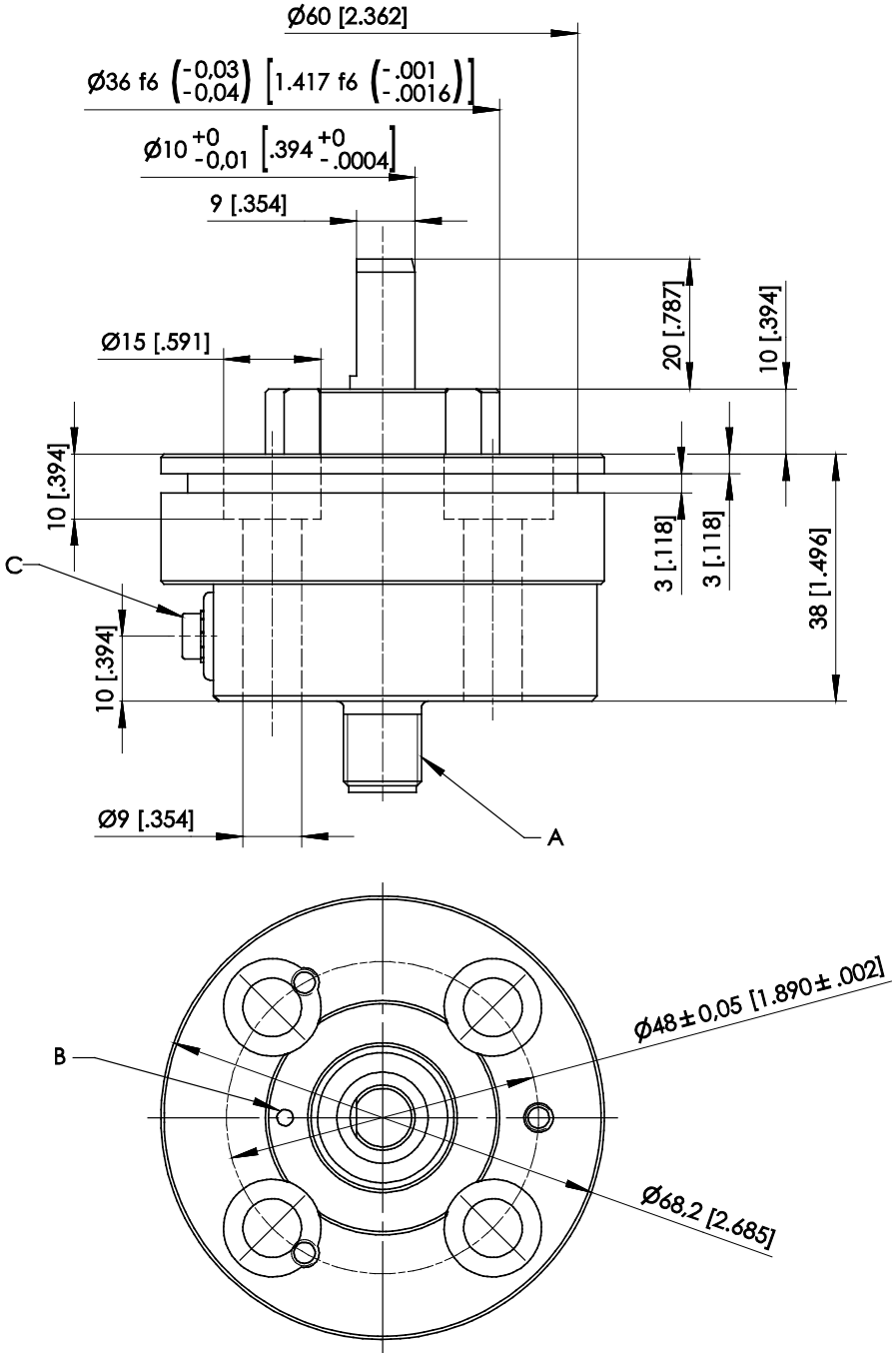
Contactless, connector M12, radial



A – Position magnet
B – Marking
C – Measuring area
D – Connector M12
E – Earthing

Dimensions in mm [inch]. Weight approx. 390 g.
Dimensions informative only.
For guaranteed dimensions consult factory.

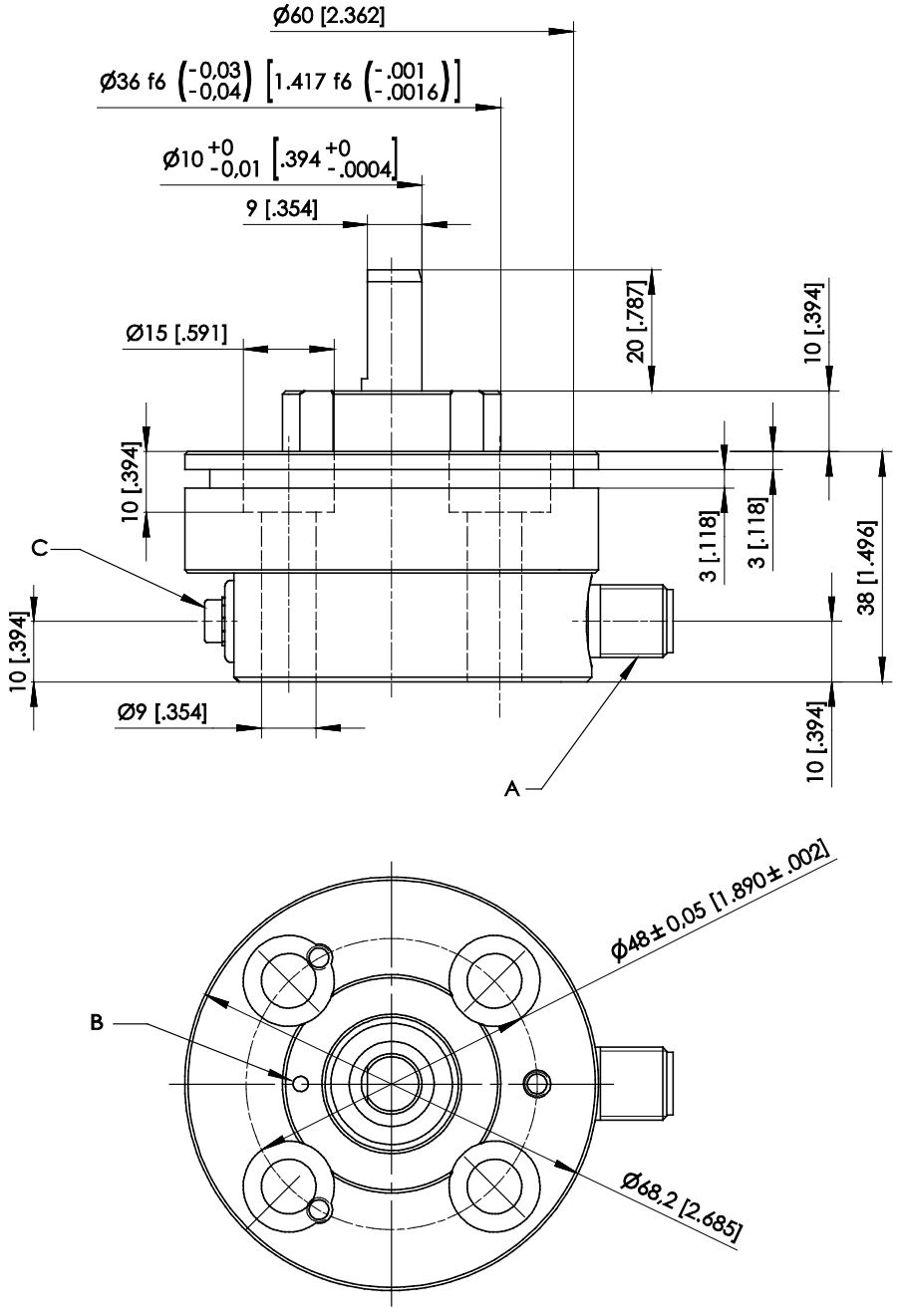
With shaft, connector M12, axial



A – Connector M12
B – Marking
C – Earthing

Dimensions in mm [inch]. Weight approx. 890 g.
Dimensions informative only.
For guaranteed dimensions consult factory.

With shaft, connector M12, radial

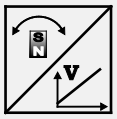
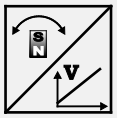
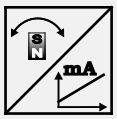


A – Connector M12
B – Marking
C – Earthing

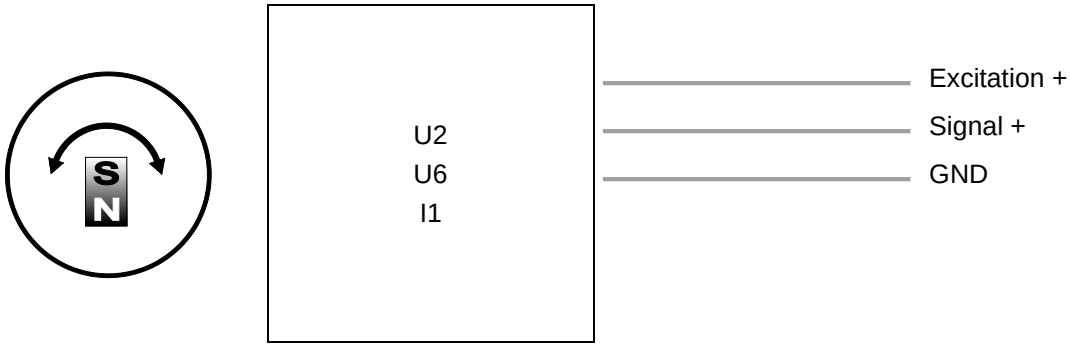
Dimensions in mm [inch]. Weight approx. 890 g.
Dimensions informative only.
For guaranteed dimensions consult factory.

Output specification

Analog output

U2 Voltage output 0.5 ... 10 V 	Excitation voltage	24 V DC (18 … 36 V DC)
	Excitation current	typical 10 mA max. 15 mA
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	±50 x 10^{-6} / °C f.s. (typical for 90° … 360°) ±100 x 10^{-6} / °C f.s. (typical for <90°)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 … +85 °C
	EMC	DIN EN 61326-1:2013
U6 Voltage output 10 … 90 % ratiometric 	Excitation voltage	5 V DC ±10 %
	Excitation current	typical 8 mA max. 12 mA
	Output voltage	10 … 90 % of the excitation voltage
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	±50 x 10^{-6} / °C f.s. (typical for 90° … 360°) ±100 x 10^{-6} / °C f.s. (typical for <90°)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 … +85 °C
	EMC	DIN EN 61326-1:2013
I1 Current output 4 … 20 mA, 3 wires 	Excitation voltage	24 V DC (18 … 36 V DC)
	Excitation current	typical 30 mA max. 35 mA
	Load R_L	500 Ω max.
	Output current	4 … 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	±50 x 10^{-6} / °C f.s. (typical for 90° … 360°) ±100 x 10^{-6} / °C f.s. (typical for <90°)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 … +85 °C
	EMC	DIN EN 61326-1:2013

Signal diagram



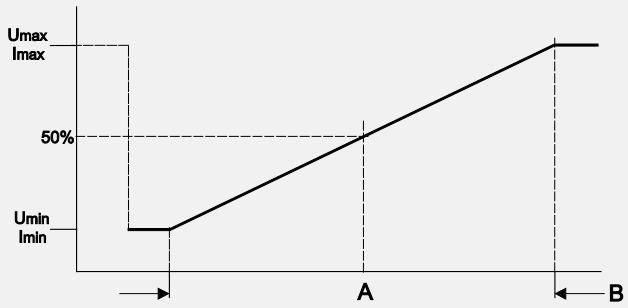
Signal wiring, 1 channel M12, 4/5 pin (connector output)

Signal	PIN	View to the sensor connector
Excitation +	1	
Signal	2	
GND	3	
Do not connect!	4	
Do not connect!	5	

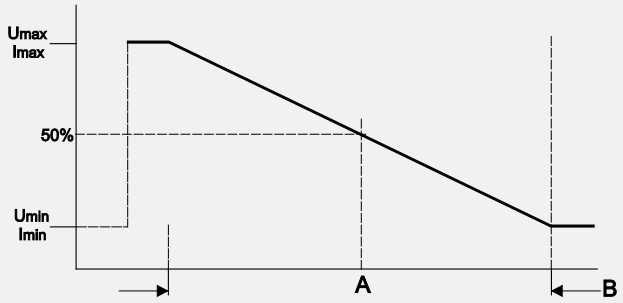
3-wire current 4...20 mA interface: GND has to be connected!

Characteristics for magnetic angle sensors

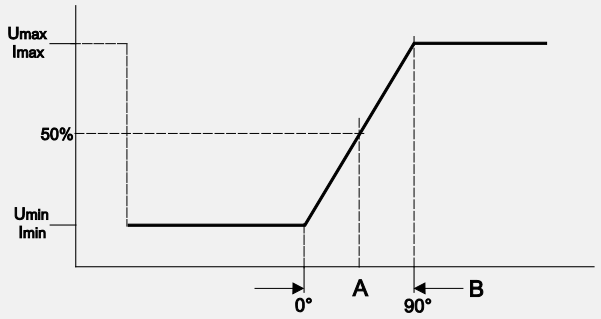
Output signal CW
(clockwise increasing)



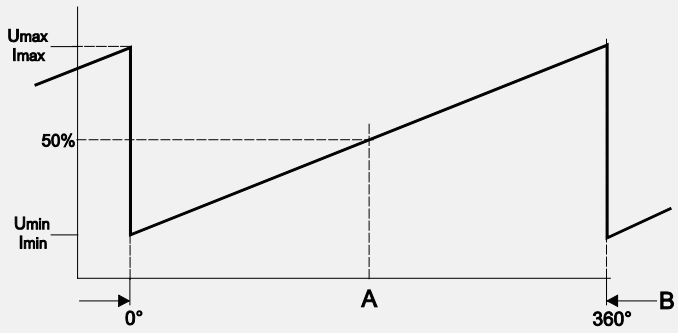
Output signal CCW
(counterclockwise increasing)



Example angular range 90°



Example angular range 360°

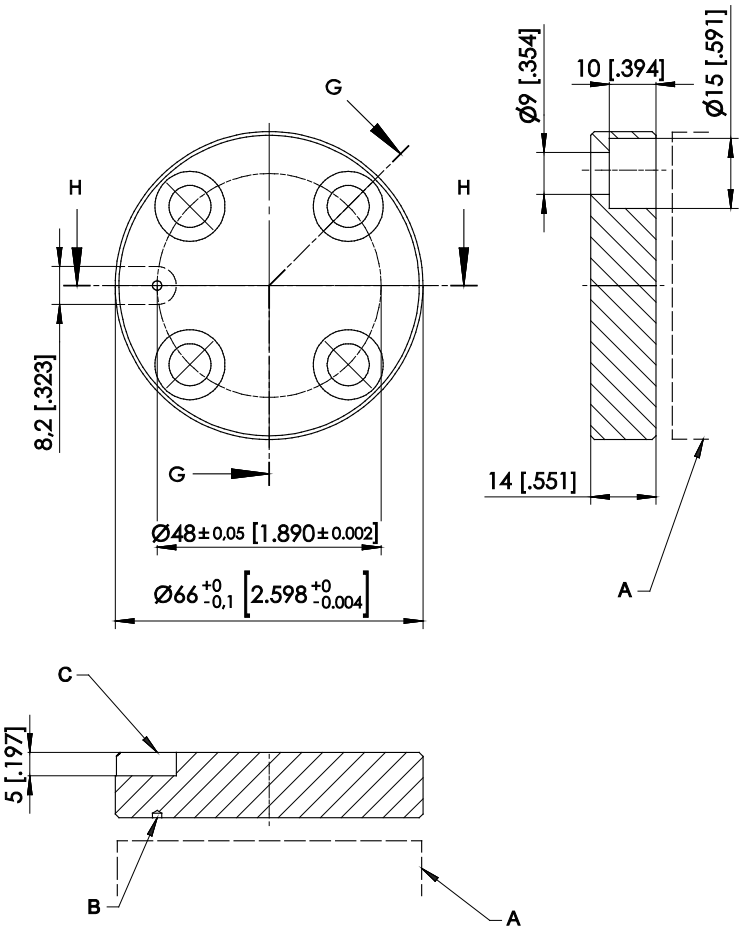


A – Marking
B – Measurement range [°]

Accessories

Position magnets

PRMAG5-Z / PRMAG5-Z-VA



A – Sensor
B – Marking
C – Notch

Order code	Weight	Material	Moment of inertia
PRMAG5-Z	approx. 110 g	AlMgSi1	59,9 kgmm^2
PRMAG5-Z-VA	approx. 275 g	stainless steel 1.4404	149,9 kgmm^2

A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].
Dimensions informative only.
For guaranteed dimensions please consult factory.

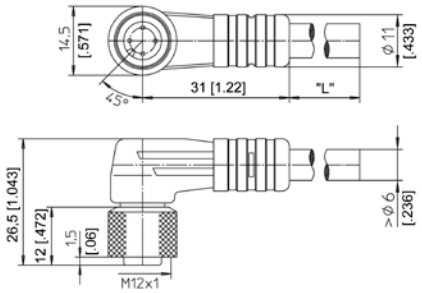
Connector cable M12, 4 pin

(angular coupling)

shielded connector

Suitable for 5-pin sensor connectors

The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end.
Available lengths are 2 m, 5 m and 10 m.
Wire: cross sectional area 0.34 mm^2
Cable diameter: 5.6 ±0.2 mm



Order code

	KAB - xM - M12/4F/W - LITZE
IP69:	**KAB - xM - M12/4F/W/69K - LITZE**

xM = length in m

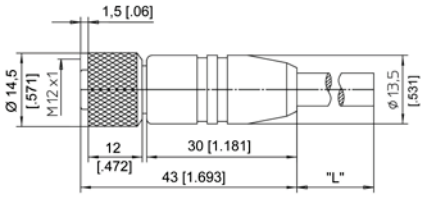
Connector cable M12, 4 pin

(straight coupling)

shielded connector

Suitable for 5-pin sensor connectors

The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end.
Available lengths are 2 m, 5 m and 10 m.
Wire: cross sectional area 0.34 mm^2
Cable diameter: 5.6 ±0.2 mm



Order code

	KAB - xM - M12/4F/G - LITZE
IP69:	**KAB - xM - M12/4F/G/69K - LITZE**

xM = length in m

Signal wiring M12, 4 pin	**Plug connection / cable color**			
	1	2	3	4
	brown	white	blue	black

Applicable for cable carriers

Maximum movement speed	3 m/s
Maximum acceleration	5 m/s^2
Minimum bending radius	10 x cable diameter