



# **POSIROT® / PRAS**

## **Analog Magnetic Angle Sensors**

### **Instruction Manual**



**Please read carefully before installation and operation!**

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**Safety instructions**

Do not use POSIROT® position sensors in safety critical applications where malfunction or total failure of the sensor may cause danger for man or machine.

For safety related applications additional mechanisms (devices) are necessary to maintain safety and to avoid damage.

Disregard of this advice releases the manufacturer from product liability.

The sensor must be operated only within values specified in the catalog or datasheet.

Connection to power supply must be performed in accordance with safety instructions for electrical facilities and performed only by trained staff.

**Do not connect or disconnect the sensor under tension!**

Disregard of this advice can lead to malfunctions, damage to property or personal injury and releases the manufacturer from product liability.

Explanation of used safety signs and signal words



**WARNING, Risk of Injury:**

Indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or property damage.

**DANGER**

**WARNING, Risk of Personal Injury or Death:**

Indicates a situation that can result in serious personal injury or death if not properly avoided.

**WARNING**

**WARNING, Risk of Personal Injury or Death:**

Indicates a situation that can result in moderate personal injury or death if not properly avoided.

**CAUTION**

**WARNING, Risk of Personal Injury:**

Indicates a situation that can result in minor personal injury if not properly avoided.

**NOTICE**

**WARNING, Risk of Property Damage:**

Indicates a situation that can result in minor to major property damage if not properly avoided.

**Intended use** The angle sensor was intended for angular position measurement, when properly mounted and used in the properly rated ambient atmospheric and technical conditions for which the sensor is designated.


**Unintended use** The unintended use is when the sensor is used outside its specified technical and ambient atmospheric conditions or when improperly mounted.

**Maintenance and service**

- In order to avoid risk of injury and improper handling the customer is not allowed to repair the sensor. No warranty or liability will be granted for opened sensors.
- Damaged sensors must be shut down immediately and sent to the factory for repair.

**Maintenance-interval** Proper maintenance comprises the visual examination of parts (e.g. integrity of housing, connectors and cables). Maintenance intervals depend on the specific application and should be defined by the user in dependance of operating conditions.

The following maintenance steps are recommended:

	Integrity of housing, connector, cable	Mounting elements	Visual check of shaft sealing
PRAS2	X	X	
PRAS3	X	X	X
PRAS5	X	X	
PRAS5-V	X	X	X
PRMAG20		X	
PRMAG21		X	
PRMAG22		X	
PRMAG5Z		X	
<b>Maßnahmen</b>	Damaged parts: Put sensor out of service and replace damaged parts resp. send sensor to ASM for repair	Loose mounting parts: Screw tight mounting parts with recommended torque, if applicable use bolt adhesive	Damaged shaft sealing: Put sensor out of service and send it to ASM for repair

**Deinstallation** Disconnect electrical connections. Loosen fixing screws.

**Disposal** Disposal according to applicable government regulations.

## Description

The angle sensors PRAS of the POSIROT® product family perform touchless or shaft based angle measurement. A position magnet rotates in front of the sensing area of the sensor head. The angular position is converted into a standardized high resolution voltage or current output. Measuring ranges 15° to 360° having rising or falling characteristic are available.

## Mounting

### Placement and alignment of the position magnet



### NOTICE

For non-contact sensor models air gap and alignment of sensor and position magnet has to be observed. The linearity will degrade in case of misalignment.

Adjacent magnetic fields or ferromagnetic materials can influence the measurement results of the PRAS sensors of the POSIROT® product family. Therefore the angle sensors should be mounted solely with nonmagnetic / non magnetisable shields and screws.

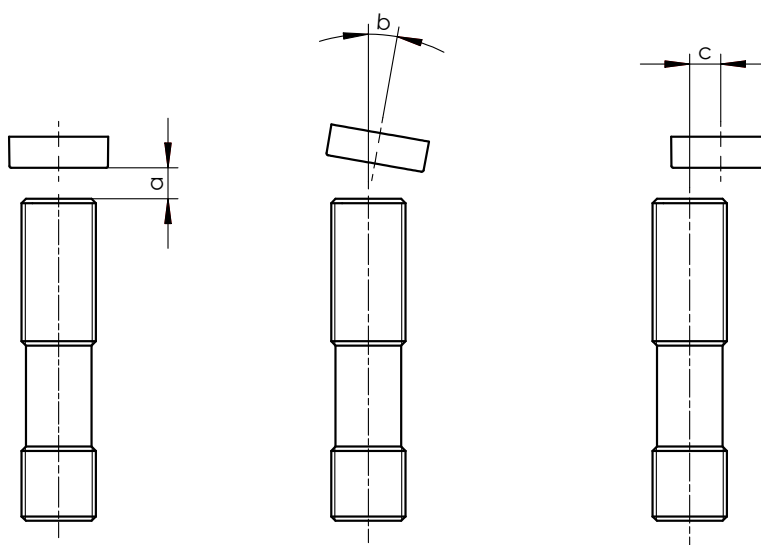
The angle sensors PRAS2, PRAS3 and PRAS5 are equipped with an integrated magnetic shield which minimizes the sensitivity against external magnetic fields.

Optional shield plates are available for the angle sensors PRAS20, PRAS21, PRAS26 and PRAS27. They can reduce the effect of residual magnetizing in case the sensor has to be mounted on a ferromagnetic material (see page 9). It is however not possible to exclude the effect of lateral external magnetic fields.

**Mounting**  
(continued)

Measuring error by misalignment of the position magnet

Sensor	Position magnet	Air gap [mm]	Parallelism [°]	Error by axial misalignment [°]					
		(a)	(b)	(c)	0.2 mm	0.5 mm	1 mm	2 mm	3 mm
PRAS1	PRMAG20	0 ... 6.5	0 ... 5	0.15	0.4	0.8	2.2	5.0	–
	PRMAG21	0 ... 4	0 ... 5	0.2	0.4	1.0	3.8	10	–
	PRMAG22	0 ... 9.5	0 ... 5	0.1	0.4	1.0	2.2	4.5	8.0
PRAS2	PRMAG20	0 ... 6	0 ... 5	0.15	0.4	0.8	2.2	5.0	–
	PRMAG21	0 ... 3.5	0 ... 5	0.2	0.4	1.0	3.8	10	–
	PRMAG22	0 ... 9.0	0 ... 5	0.1	0.4	1.0	2.2	4.5	8.0
PRAS5	PRMAG5-Z	0 ... 7.5	0 ... 5	0.1	0.2	0.6	1.5	4.5	8.5
	PRMAG20	0 ... 5.5	0 ... 5	0.15	0.4	0.8	2.2	5.0	–
	PRMAG21	0 ... 3	0 ... 5	0.2	0.4	1.0	3.8	10	–
	PRMAG22	0 ... 8.5	0 ... 5	0.1	0.4	1.0	2.2	4.5	8.0
PRAS20 PRAS26	PRMAG20	0 ... 7	0 ... 5	0.1	0.3	0.7	2.0	4.6	–
	PRMAG21	0 ... 2	0 ... 5	0.15	0.3	0.9	3.6	9.6	–
	PRMAG22	0 ... 10	0 ... 5	0.0	0.0	0.7	1.5	3.8	7.0
PRAS21	PRMAG20	0 ... 7.0	0 ... 5	0.1	0.3	0.7	2.0	4.6	–
	PRMAG21	0 ... 2	0 ... 5	0.15	0.3	0.9	3.6	9.6	–
	PRMAG22	0 ... 10	0 ... 5	0.0	0.0	0.7	1.5	3.8	7.0
PRAS27	PRMAG20	0 ... 7.5	0 ... 5	0.1	0.3	0.7	2.0	4.6	–
	PRMAG21	0 ... 2.5	0 ... 5	0.15	0.3	0.9	3.6	9.6	–
	PRMAG22	0 ... 10.5	0 ... 5	0.0	0.0	0.7	1.5	3.8	7.0

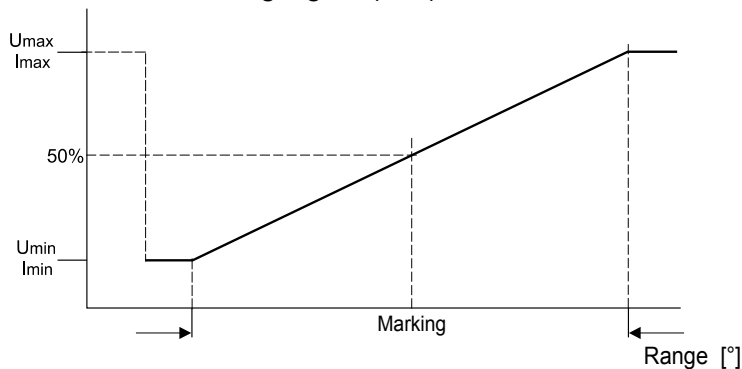


**Mounting**  
 (continued)

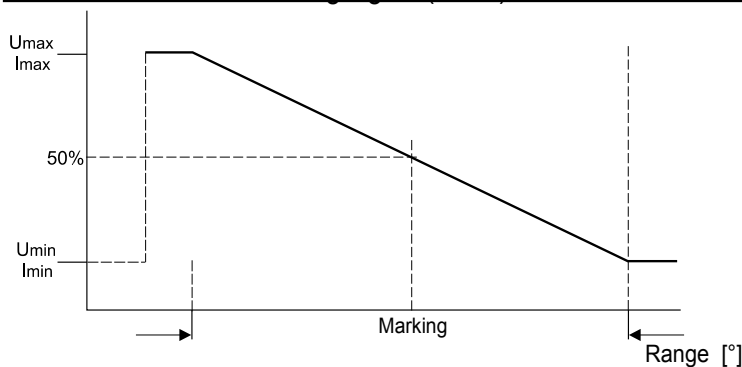
**Reference position**

For ease of mounting there are reference markings at housing, position magnet and near the shaft. If both markings match output will be on the 50% of full scale.

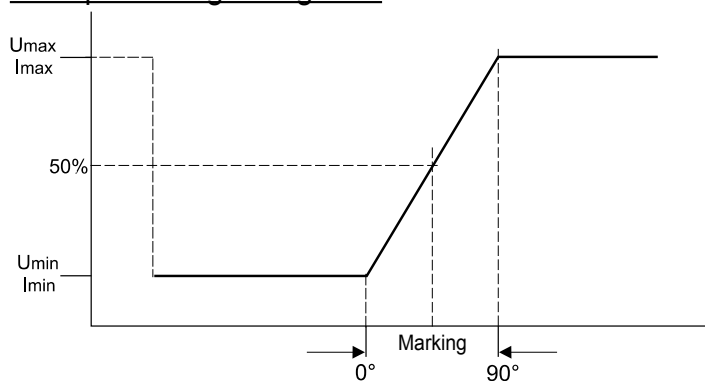
Clockwise increasing signal (CW), view to sensor measuring area/shaft



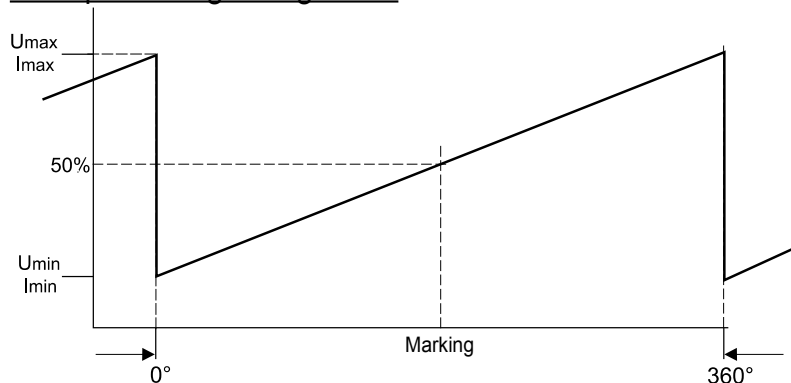
Counterclockwise increasing signal (CCW), view to sensor measuring area/shaft



Example for angle range 90°



Example for angle range 360°



**Mounting**  
(continued)

Output	Value range	50% value of output signal
U2	0.5 ... 10 V	5.25 V
U6	0.5 ... 4.5 V	2.5 V
U8	0.5 ... 4.5 V	2.5 V
I1	4 ... 20 mA	12 mA



**Torque for fixing screws**

The specified torques and mounting methods are general recommendations and can differ according to application and operating conditions.

Torque	Mounting method	Material	Torque [Nm]
	Nuts M12x1 (PRAS1)	–	2.5
	M2,5 screws for mounting brackets (PRAS2, PRAS3)	–	0.8
	M3 screws for mounting flange (PRAS3)	–	1.2
	M3 screws with washer (PRAS21)	A4	<0.8
		Aluminium	–
		Brass	–
		Plastic	–
	M4 screws with washer (PRAS20)	A4	<1.8
		Aluminium	–
		Brass	–
		Plastic	–
	M4 screws (PRAS27)	–	1
	M4 screws with washer (PRAS26)	A2	<1.8
	M8 screws (PRAS5)	–	< 10

**Electrical installation**



**NOTICE**

**Supply voltage, current consumption, wiring**

For wiring of connector or cable outlet as well as supply voltage and current consumption refer to chapter „Specification of the outputs“ at the end of this manual.

Cable screen has to be connected to protective earth.

**Caution:** Observe different color code for pre-assembled accessory cables - refer to accessories pages.

The protection class of sensors with connector output is valid only if the electrical plug is connected!

**Caution:** Do not twist the M12 connector insert.

Cable outputs must be installed in such a way that no moisture can get into the cable.

Crossing the dew point must be avoided.

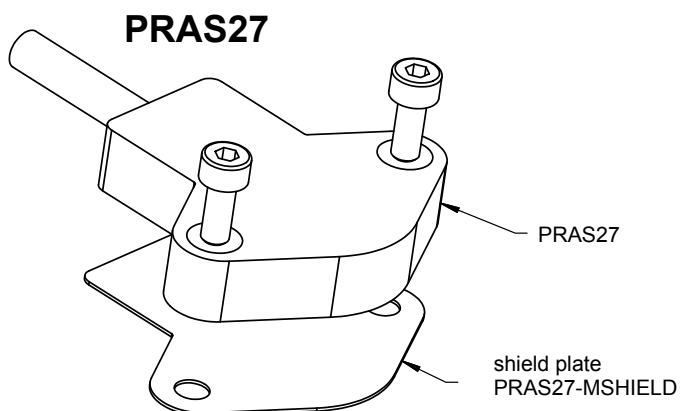
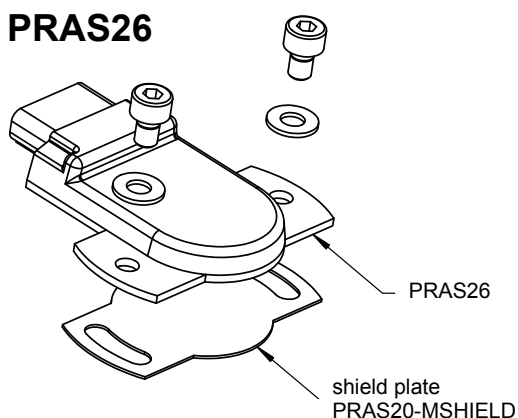
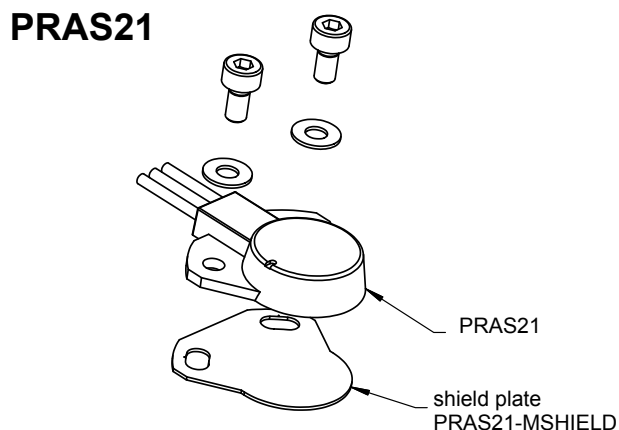
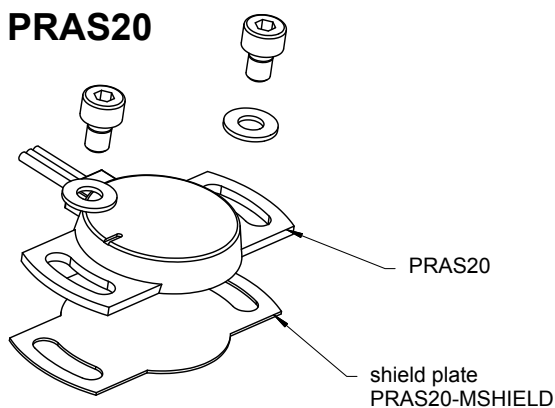
Do not strain the connection cable.

A separate cord grip is recommended.



**Mounting**  
 (continued)

**Sensor fixing with a shield plate (optional)**



**NOTICE**

**Mechanical information PRAS3, PRAS5-V**

- Prevent the sensor shaft from binding.
- Use shaft couplings resp. torque arms (e.g. flexible ones) to avoid misalignment errors.  
 (see chapter „couplings“)

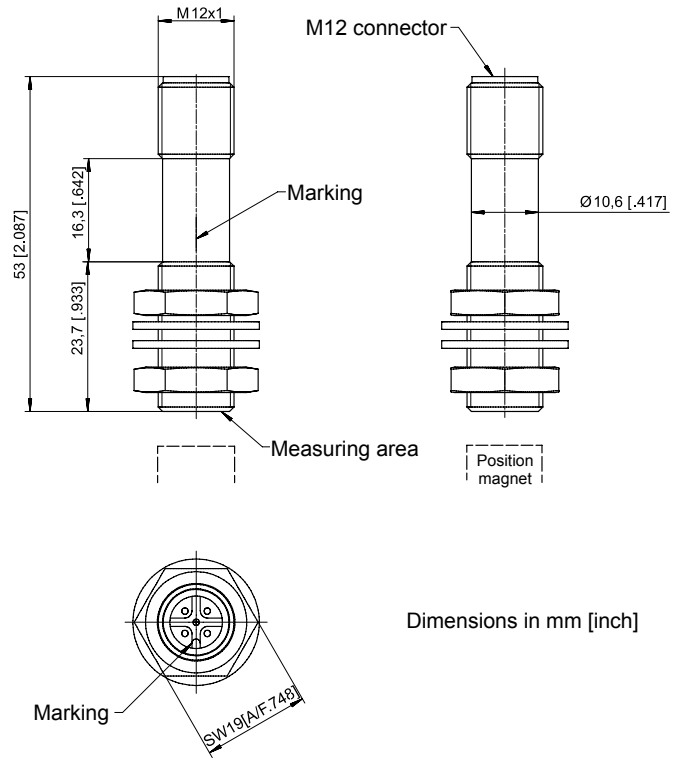


**NOTICE**

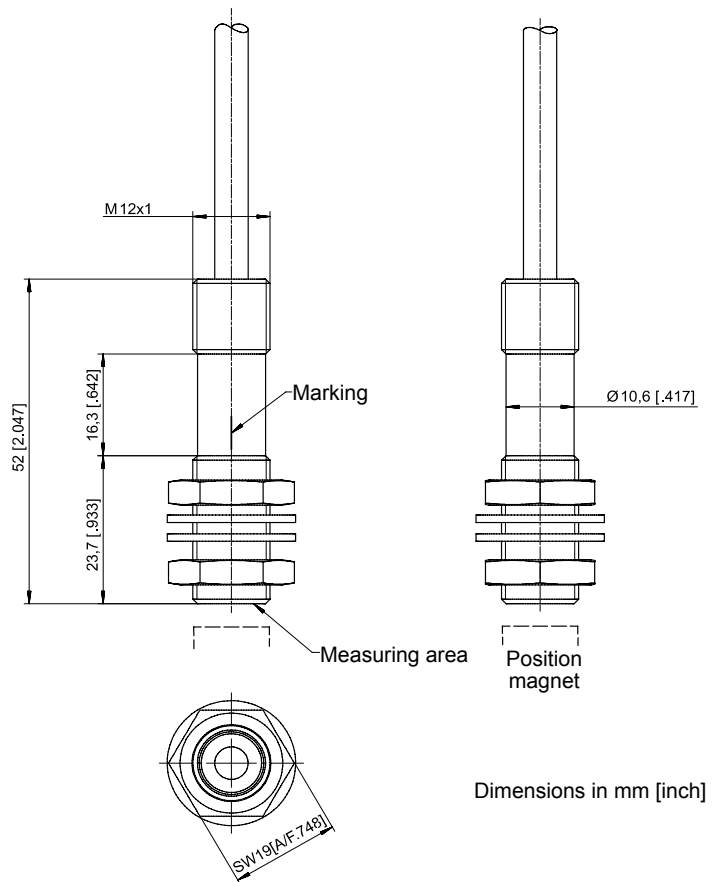
**Mechanical information PRAS20, PRAS21, PRAS26, PRAS27**

- Mount the sensor on a flat surface.
- Do not deform the sensor housing!

**Outline drawing**  
**PRAS1**  
 Connector version

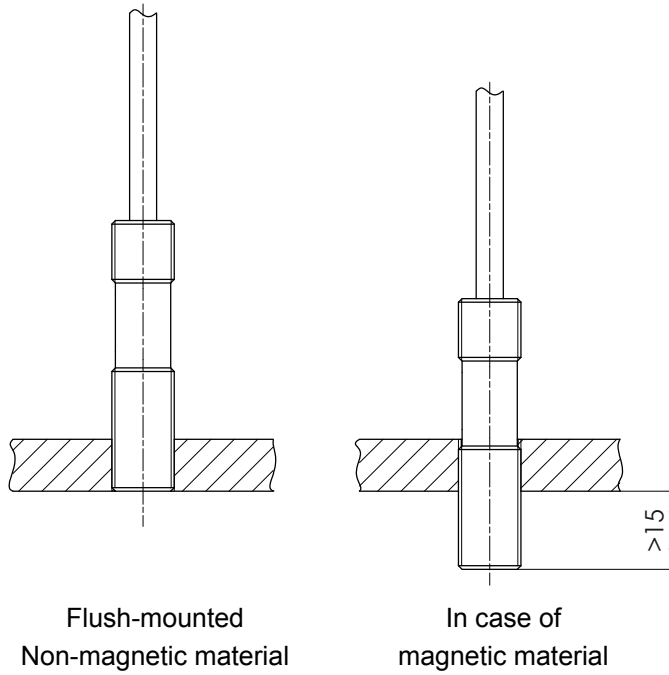


**Outline drawing**  
**PRAS1**  
 Cable version

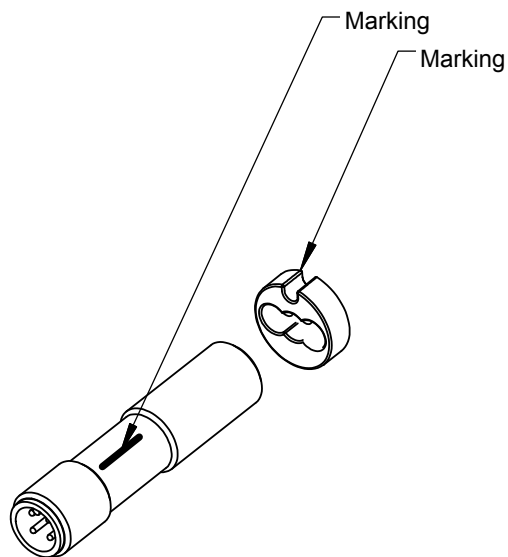


Weight without cable 20 g approx.  
 Dimensions informative only.  
 For guaranteed dimensions consult factory.

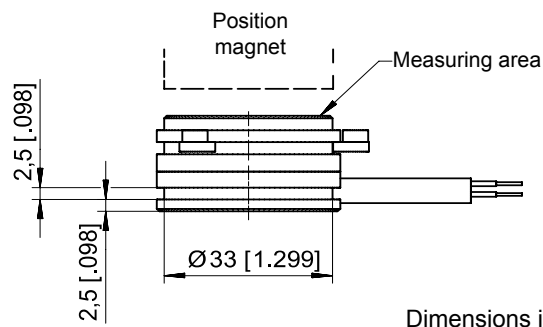
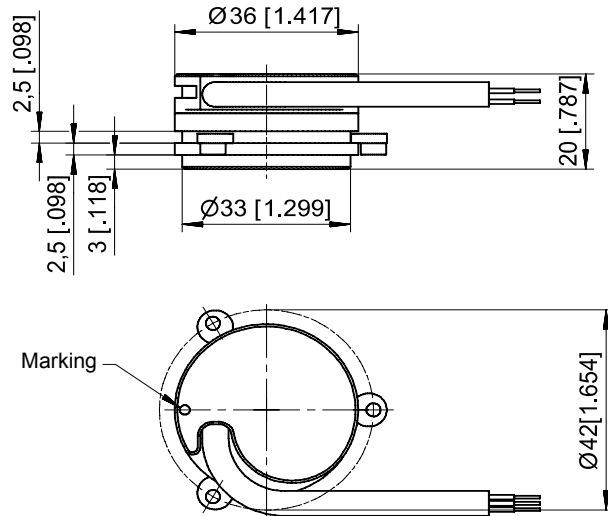
## Mounting PRAS1



## Reference position (see page 7)



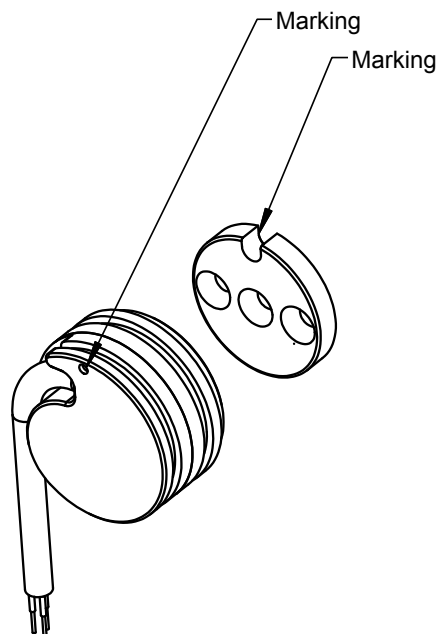
**Outline drawing**  
**PRAS2**  
Cable version



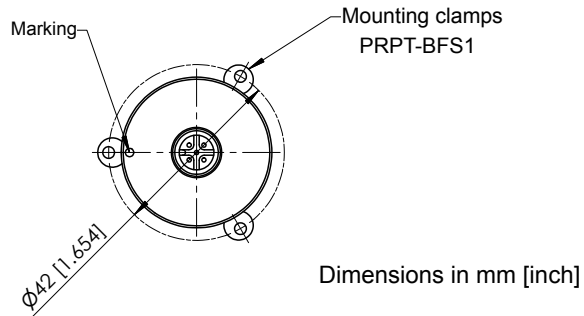
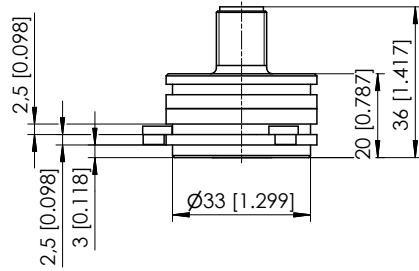
Dimensions in mm [inch]

Weight without cable 40 g approx.  
Dimensions informative only.  
For guaranteed dimensions consult factory.

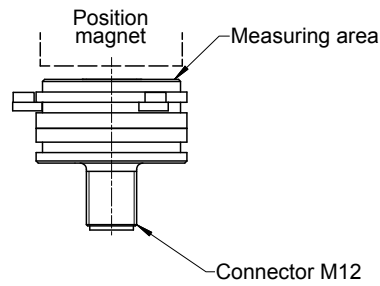
**Reference**  
**position**  
(see page 7)



**Outline drawing**  
**PRAS2**  
 Connector version  
 M12 axial

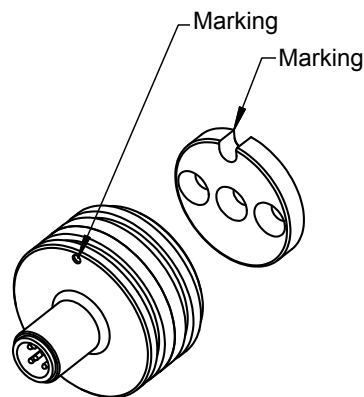


Dimensions in mm [inch]



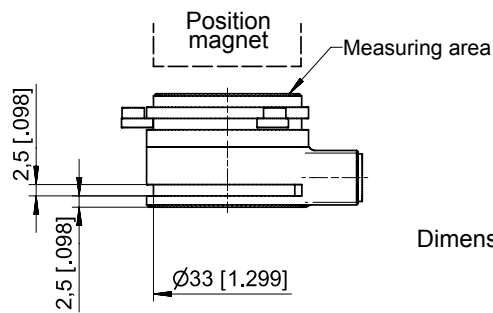
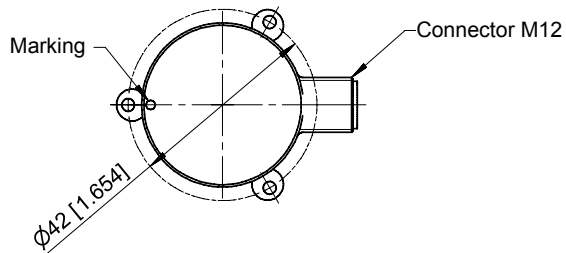
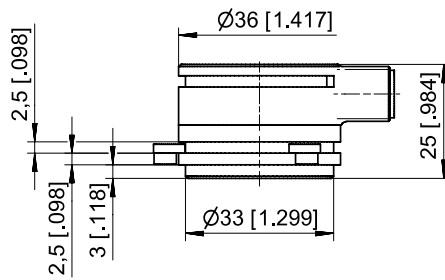
Weight without cable 50 g approx.  
 Dimensions informative only.  
 For guaranteed dimensions consult factory.

**Reference position**  
 (see page 7)



Also for connector version

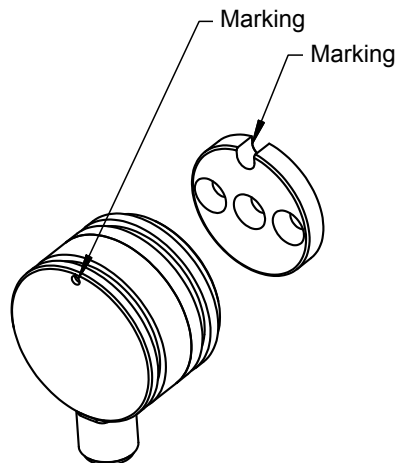
**Outline drawing**  
**PRAS2**  
Connector version  
M12 radial



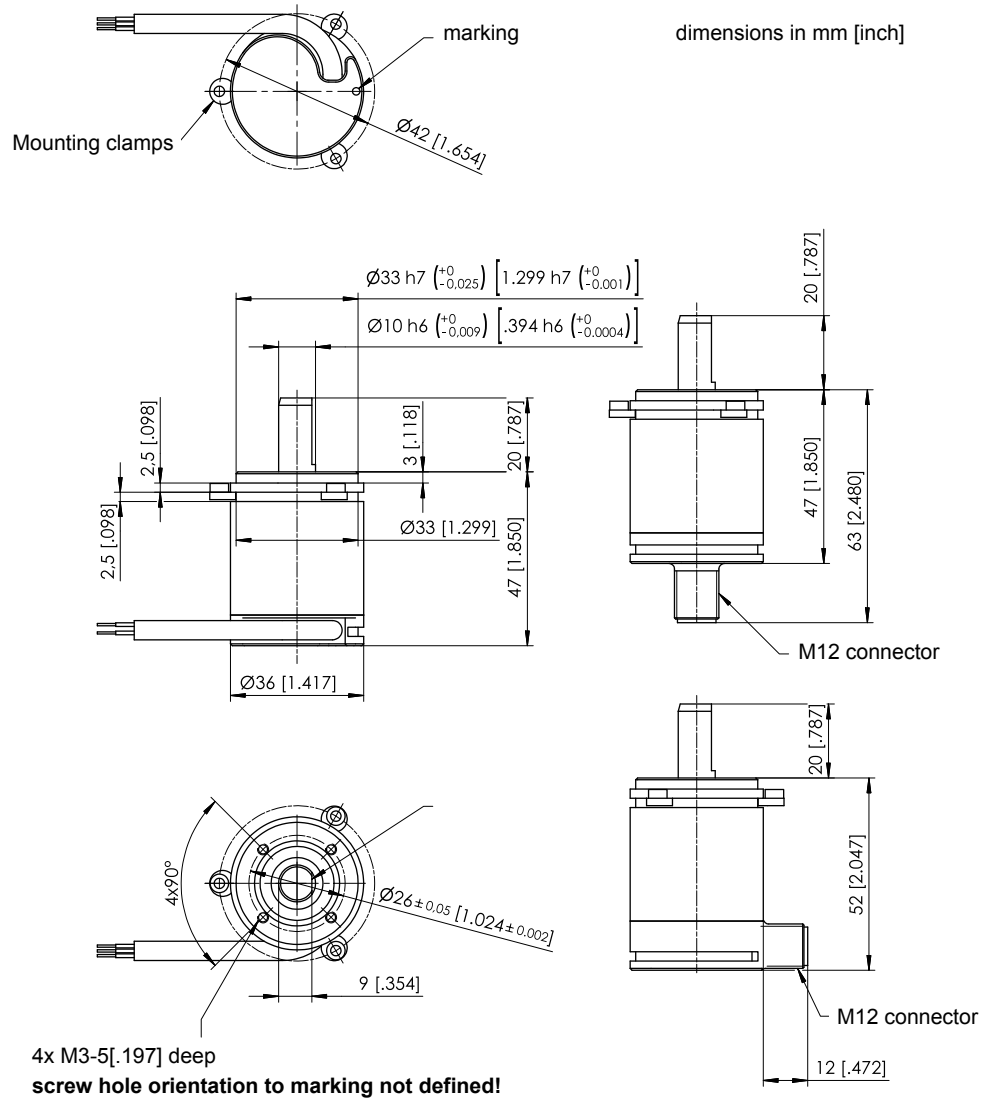
Dimensions in mm [inch]

Weight without cable 50 g approx.  
Dimensions informative only.  
For guaranteed dimensions consult factory.

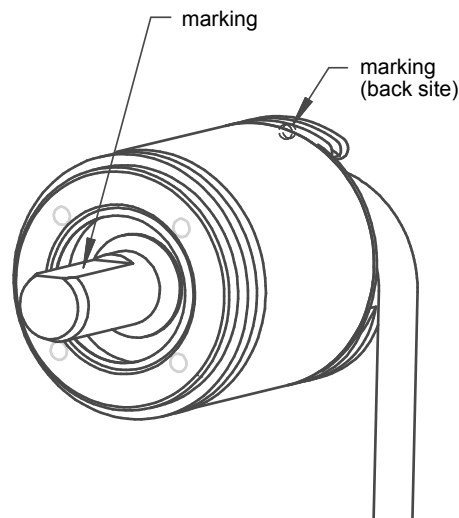
**Reference position**  
(see page 7)



**Outline drawing**  
**PRAS3**  
**Shaft**

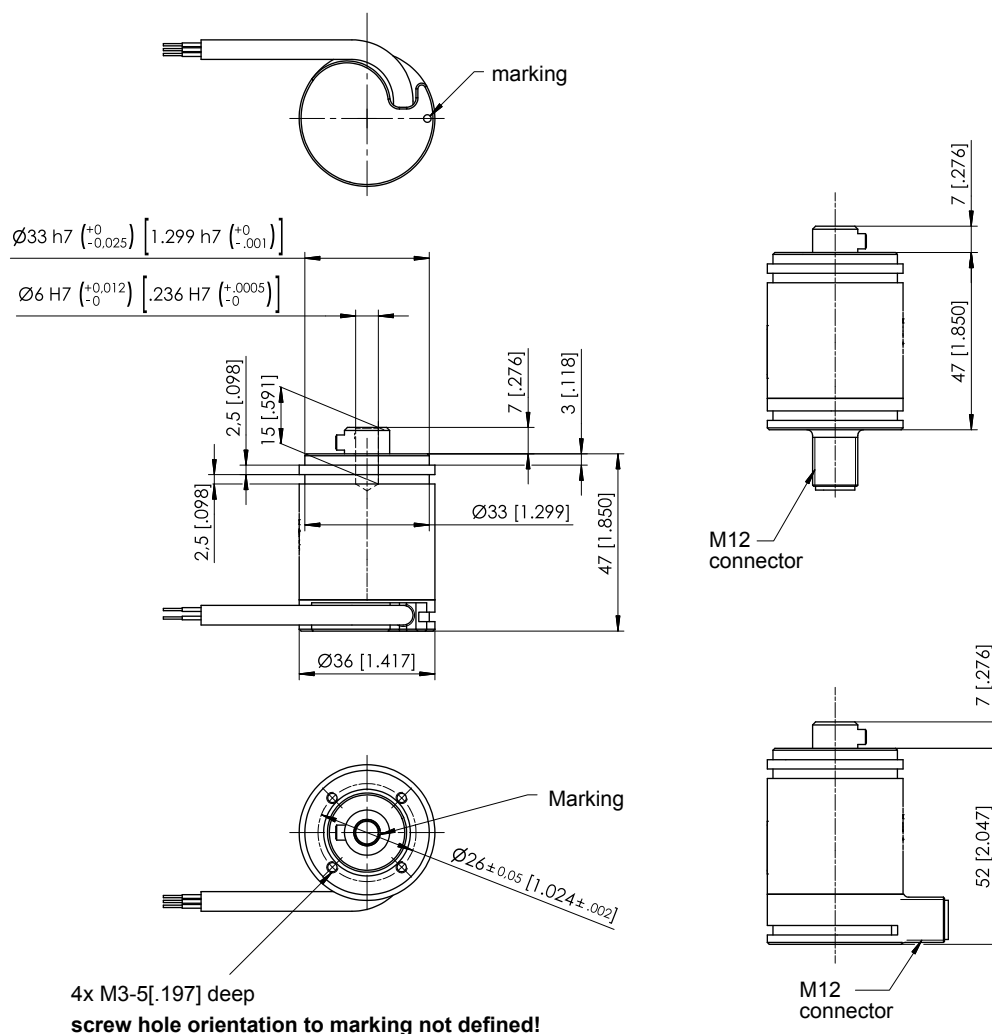


**Reference**  
**position**  
 (see page 7)

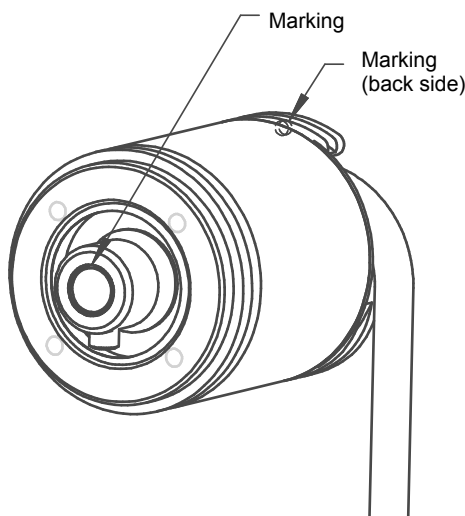


Weight without cable 250 g approx.  
 Dimensions informative only.  
 For guaranteed dimensions consult factory.

**Outline drawing**  
**PRAS3**  
Hollow shaft



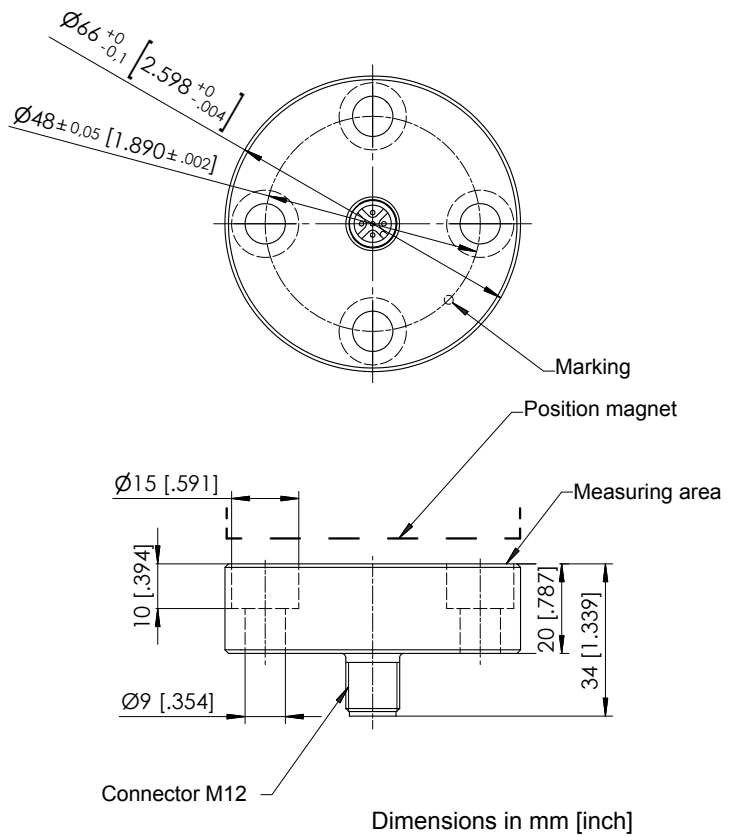
**Reference position**  
(see page 7)



Weight without cable 250 g approx.  
Dimensions informative only.  
For guaranteed dimensions consult factory.

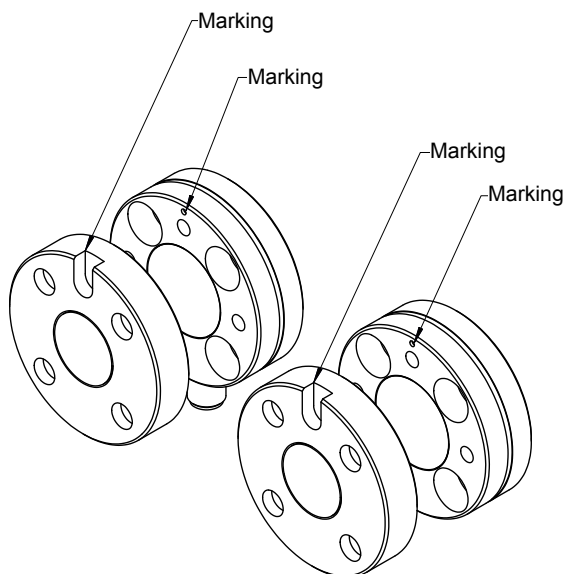


Outline drawing  
PRAS5  
Connector M12  
axial

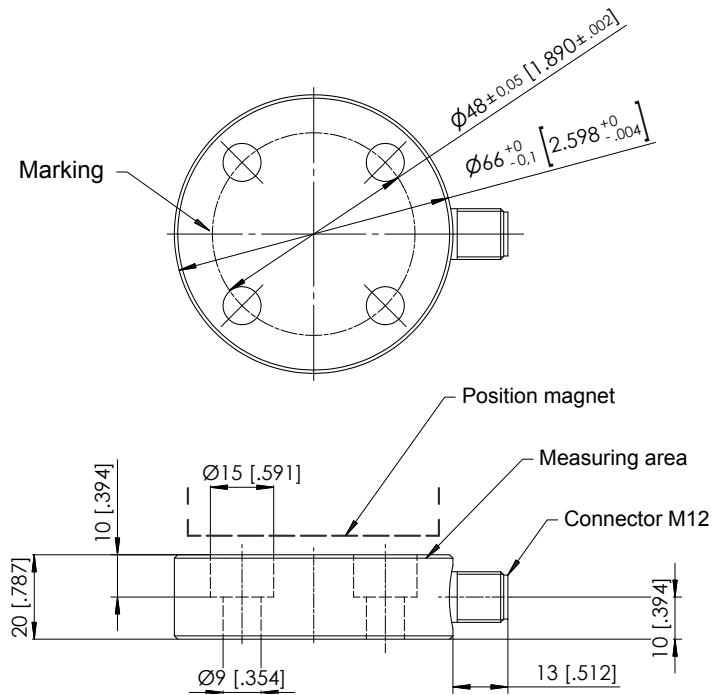


Dimensions informative only.  
For guaranteed dimensions consult factory.

Reference  
position  
(see page 7)



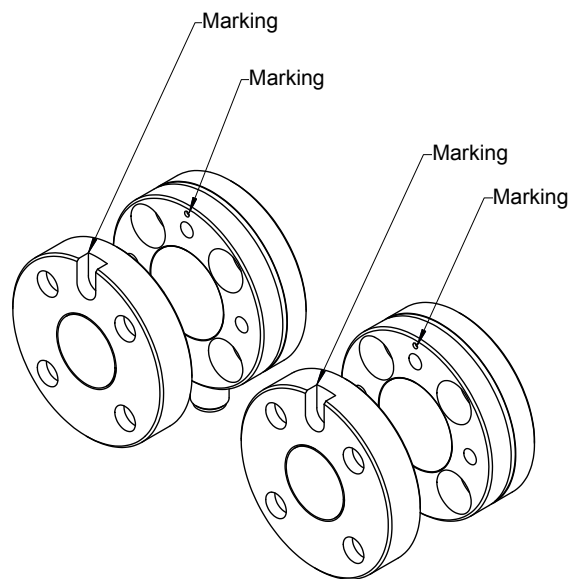
Outline drawing  
PRAS5  
Connector M12  
radial



Dimensions in mm [inch]

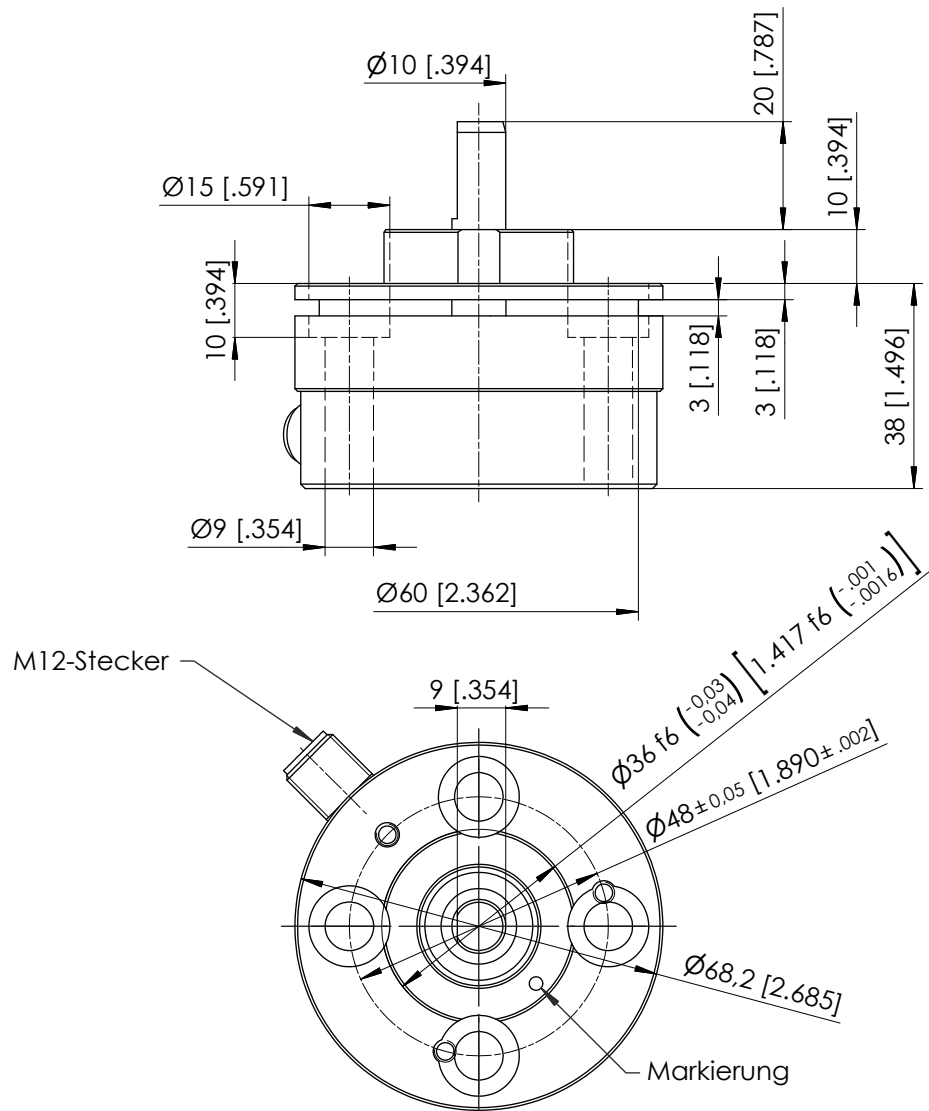
Dimensions informative only.  
For guaranteed dimensions consult factory.

Reference  
position  
(see page 7)





Outline drawing  
PRAS5-V  
Connector M12  
radial



Allowable shaft load  
(10 mm shaft)

100 N radial, 100 N axial

Dimensions in mm [inch]

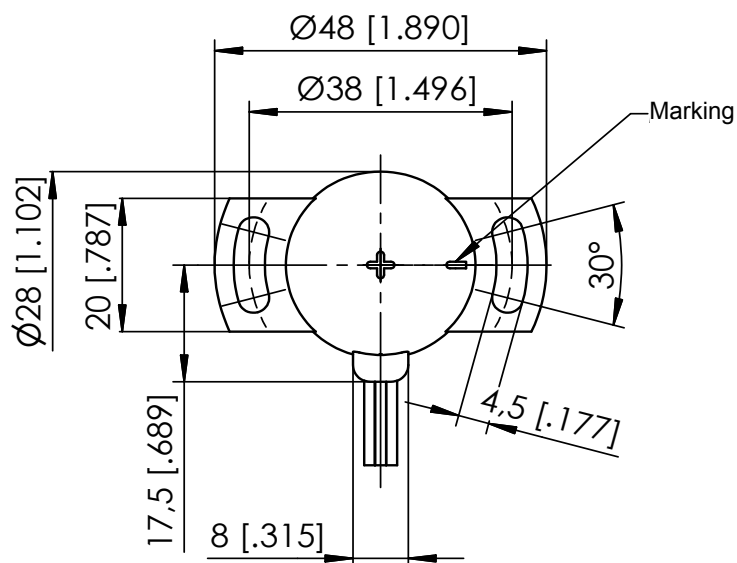
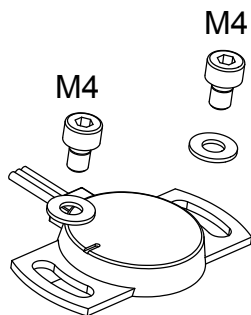
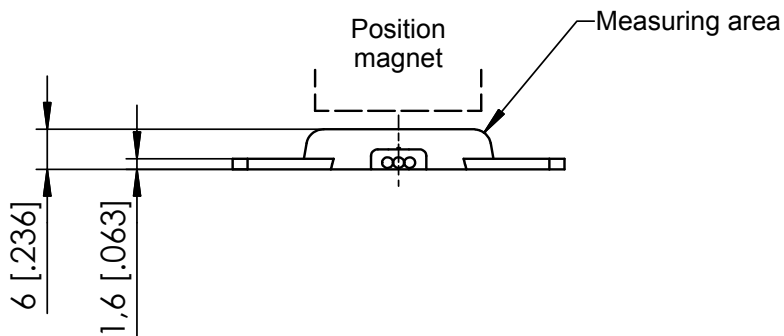
Dimensions informative only.

For guaranteed dimensions consult factory.

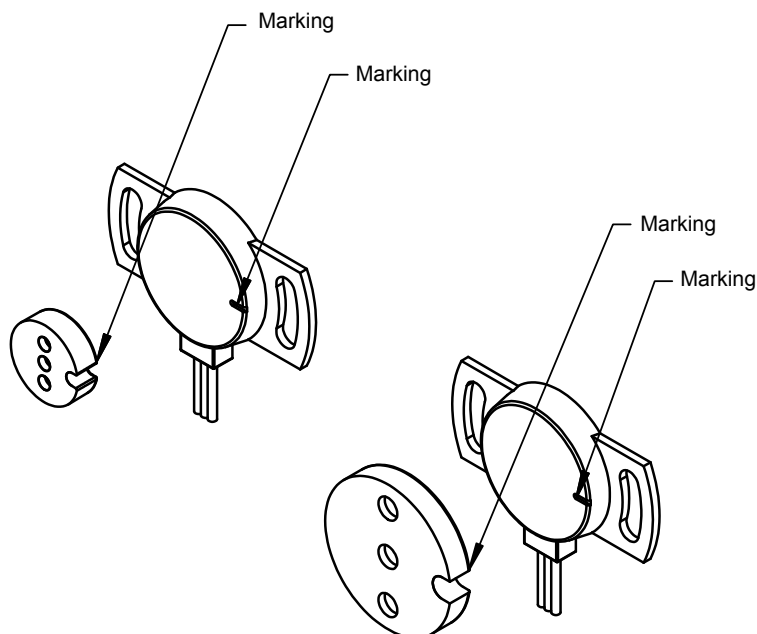
**Outline drawing**  
**PRAS20**

Dimensions in mm [inch]

Dimensions informative only.  
 For guaranteed dimensions  
 consult factory.



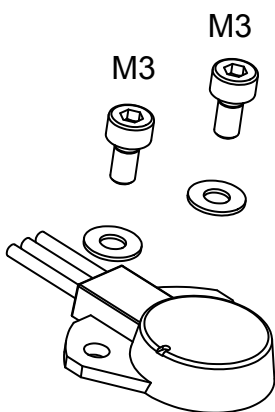
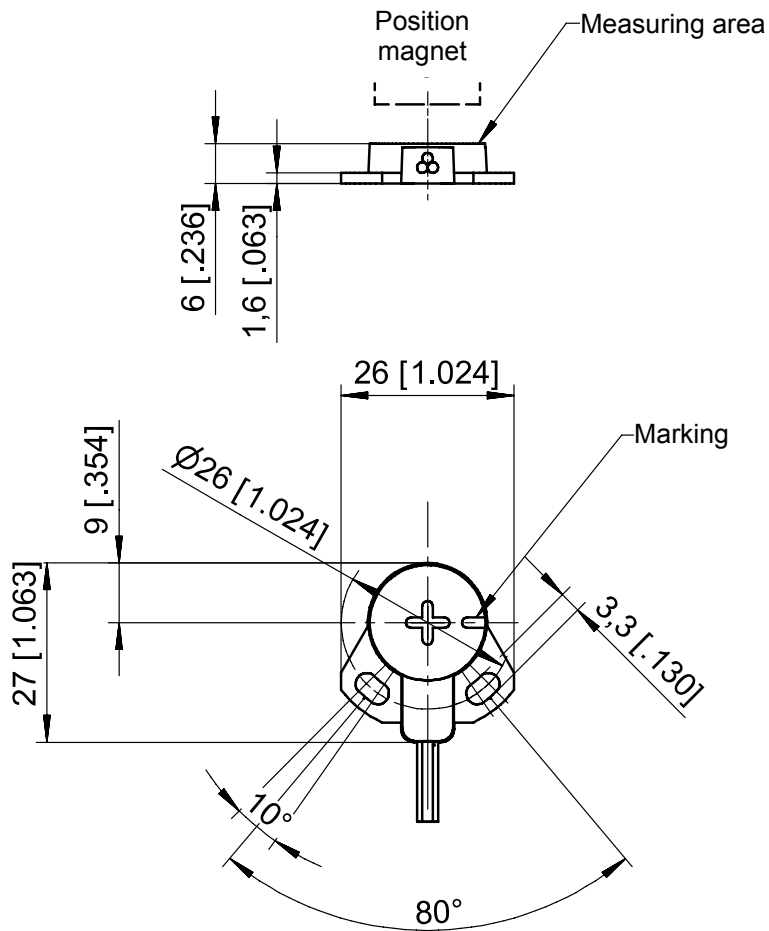
**Reference**  
**position**  
 (see page 7)



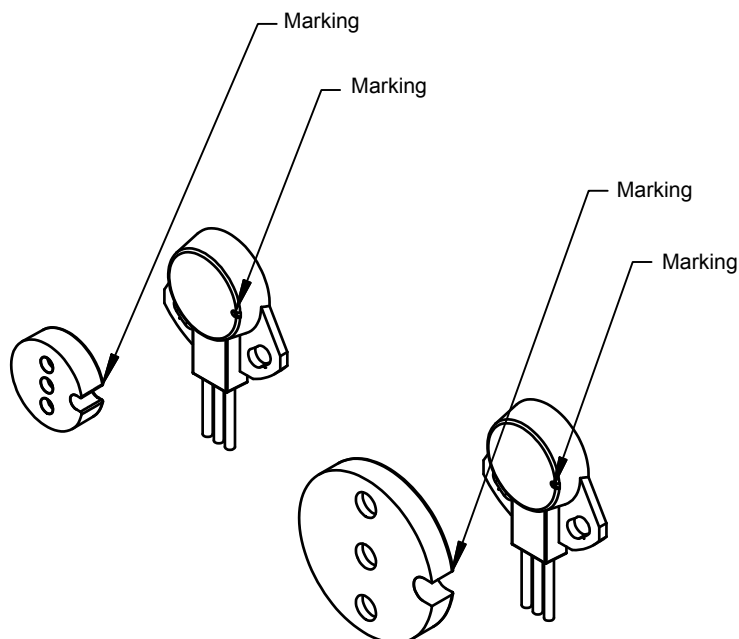
**Outline drawing**  
**PRAS21**

Dimensions in mm [inch]

Dimensions informative only.  
 For guaranteed dimensions  
 consult factory.



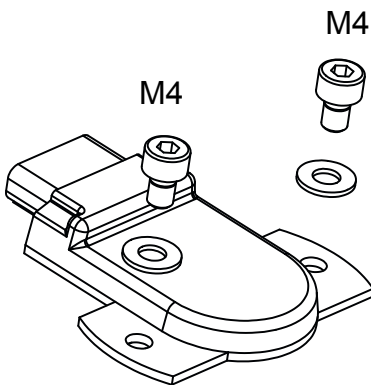
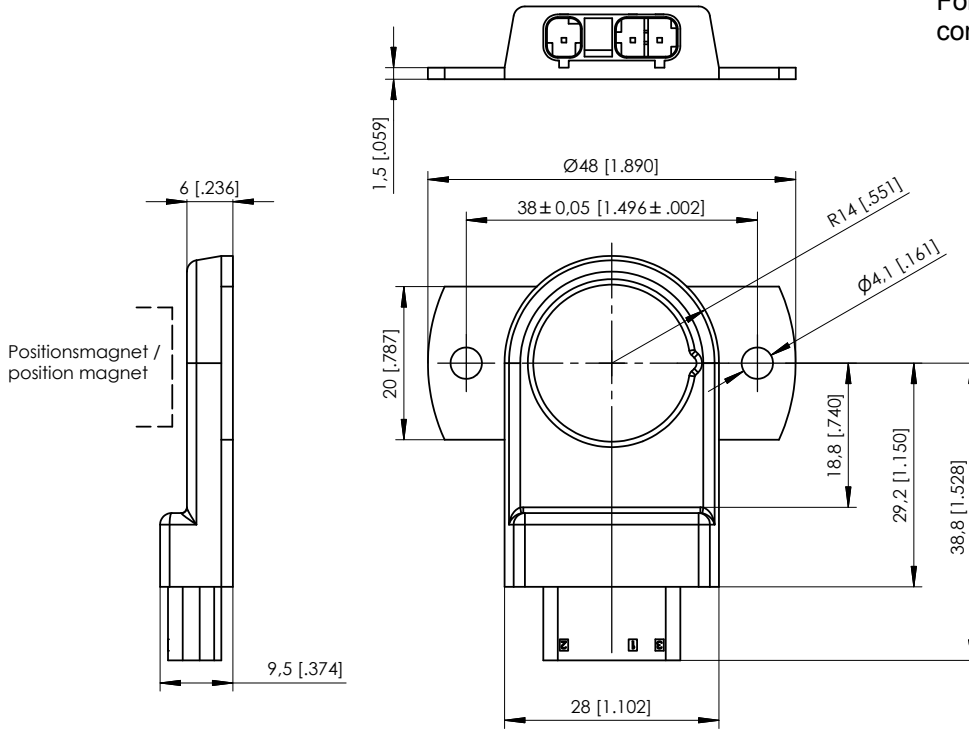
**Reference**  
**position**  
 (see page 7)



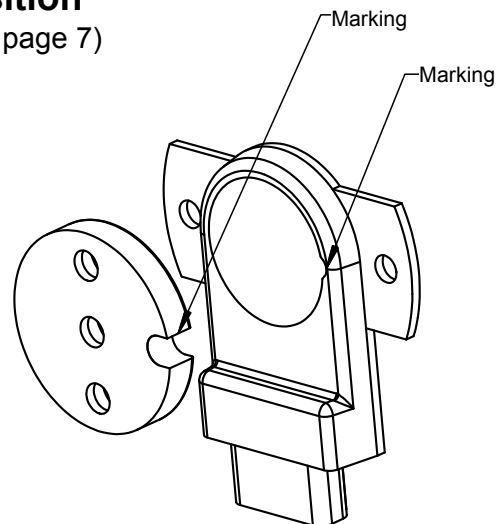
**Outline drawing**  
**PRAS26**

Dimensions in mm [inch]

Dimensions informative only.  
 For guaranteed dimensions  
 consult factory.



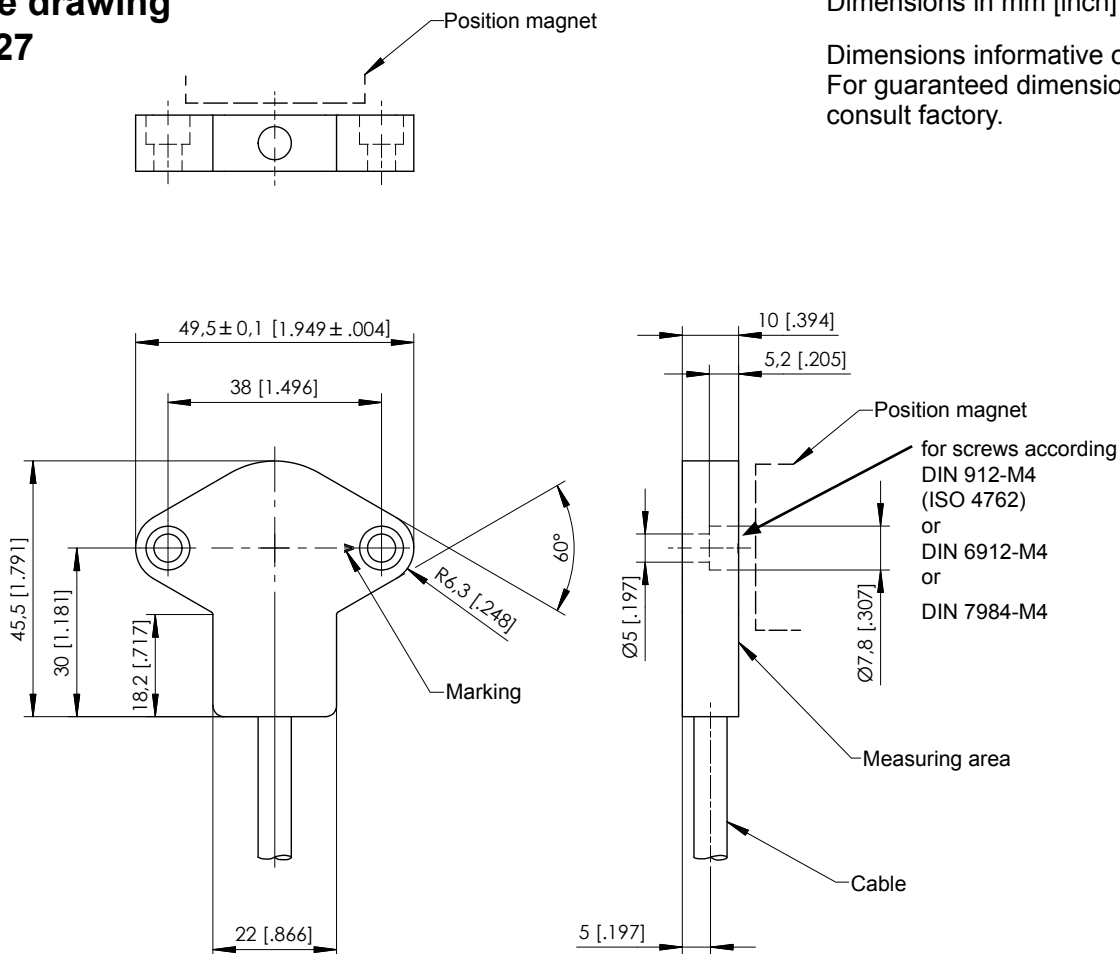
**Reference position**  
 (see page 7)



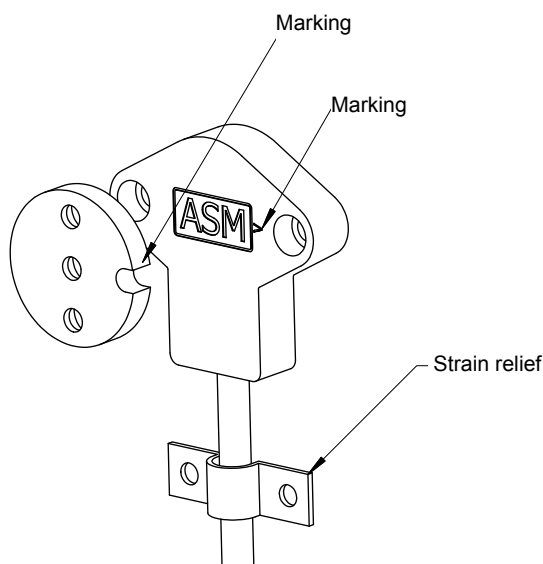
**Outline drawing  
 PRAS27**

Dimensions in mm [inch]

Dimensions informative only.  
 For guaranteed dimensions  
 consult factory.



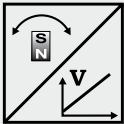
**Reference  
 position**  
 (see page 7)

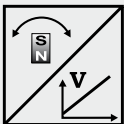


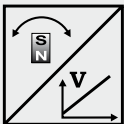
For all sensors with cable:

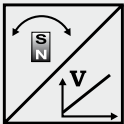
Cable diameter	Ø 5,2 mm	
Min. bending radius	in motion	not in motion
	10 x cable diameter, 10 million cycles	5 x cable diameter

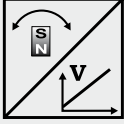


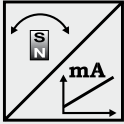
<b>U2</b> Voltage Output 0.5 ... 10 V 	Excitation voltage	18 ... 36 V DC
	Excitation current	10 mA typ., 15 mA max.
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C (+105 °C as option)
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

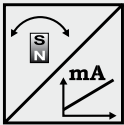
<b>U2B</b> Voltage Output 0.5 ... 10 V 	Excitation voltage	11.5 ... 27 V DC
	Excitation current	12 mA typ., 16 mA max.
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C (+105 °C as option)
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

<b>U6</b> Voltage Output 10 ... 90% ratiometr. 	Excitation voltage	5V DC $\pm 10\%$
	Excitation current	8 mA typ., 12 mA max.
	Output voltage	10 ... 90 % of the excitation voltage
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C (+125 °C as option)
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

<b>U6/8,25</b> Voltage Output 10 ... 90% ratiometr. 	Excitation voltage	8.25 V DC $\pm 10\%$
	Excitation current	8 mA typ., 12 mA max.
	Output voltage	10 ... 90 % of the excitation voltage
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C (+125 °C as option)
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

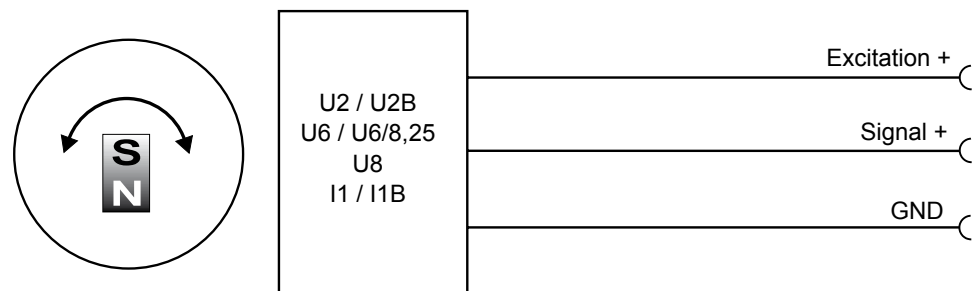
<b>U8</b> Voltage Output 0,5 ... 4,5 V 	Excitation voltage	11 ... 36 V DC
	Excitation current	10 mA, typ. 20 mA max.
	Output voltage	0,5 ... 4,5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

<b>I1</b> Current Output 4 ... 20 mA, 3 wire 	Excitation voltage	18 ... 36 V DC
	Excitation current	30 mA typical, 35 mA max.
	Load resistor	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

<b>I1B</b> Current Output 4 ... 20 mA, 3 wire 	Excitation voltage	10 ... 27 V DC
	Excitation current	32 mA typical, 36 mA max.
	Load resistor	200 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN 61326-1:2013

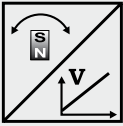
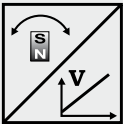
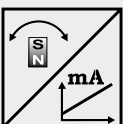
Other outputs on request.

**Output signals**

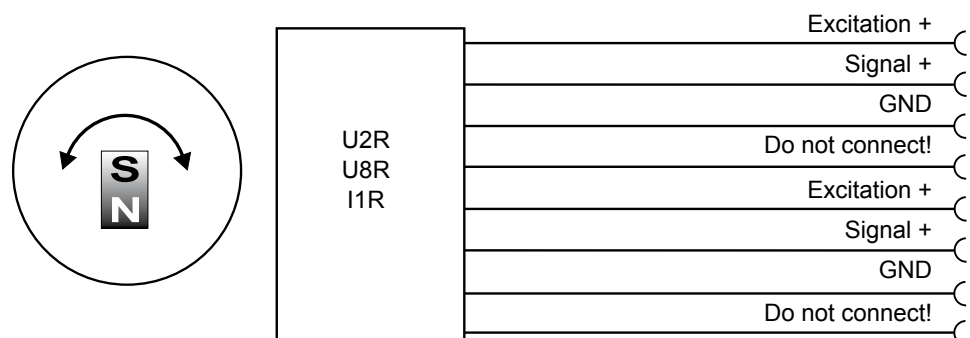


# POSIROT® Instruction Manual Analog output, redundant



<b>U2R</b> Voltage Output 0.5 ... 10 V  	Excitation voltage	18 ... 36 V DC
	Excitation current	10 mA typ., 15 mA max. per channel
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $< 90^\circ$
	Operating temperature	-40 ... +85 °C (+105 °C as option)
	Protection	Reverse polarity, short circuit
EMC	EN 61326-1:2013	
<b>U8R</b> Voltage Output 0,5 ... 4,5 V  	Excitation voltage	11 ... 36 V DC
	Excitation current	10 mA, typ. 20 mA max. per channel
	Output voltage	0,5 ... 4.5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $< 90^\circ$
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
EMC	EN 61326-1:2013	
<b>I1R</b> Current Output 4 ... 20 mA, 3 wire  	Excitation voltage	18 ... 36 V DC
	Excitation current	30 mA typical, 35 mA max. per channel
	Load resistor	500 $\Omega$ max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $< 90^\circ$
	Operating temperature	-40 ... +85 °C (-40 ... +185 °F)
	Protection	Reverse polarity, short circuit
EMC	EN 61326-1:2013	

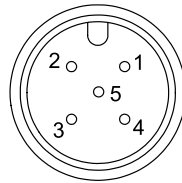
Other outputs available on request.



	Signal	Plug connection	Cable connection
<b>Signal wiring</b> <b>1 channel</b>	Excitation +	1	brown
	Signal	2	white
<b>M12A4/5, M12R4/5</b> <b>4/5 pin</b> <b>Plug and cable connection</b>	GND	3	blue
	Do not connect!	4	black
	Do not connect!	5	grey

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

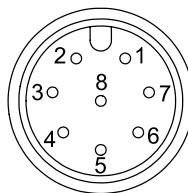
**Connection**



View to sensor connector

	Signal	Plug connection	Cable connection
<b>Signal wiring</b> <b>2 channel</b> <b>redundant version</b>	CH1-Excitation +	1	white
	CH1-Signal	2	brown
	CH1-GND	3	green
<b>M12, 8 pin</b> <b>Plug and cable connection</b>	CH1-Do not connect!	4	yellow
	CH2-Excitation +	5	grey
	CH2-Signal	6	pink
	CH2-GND	7	blue
	CH2-Do not connect!	8	red

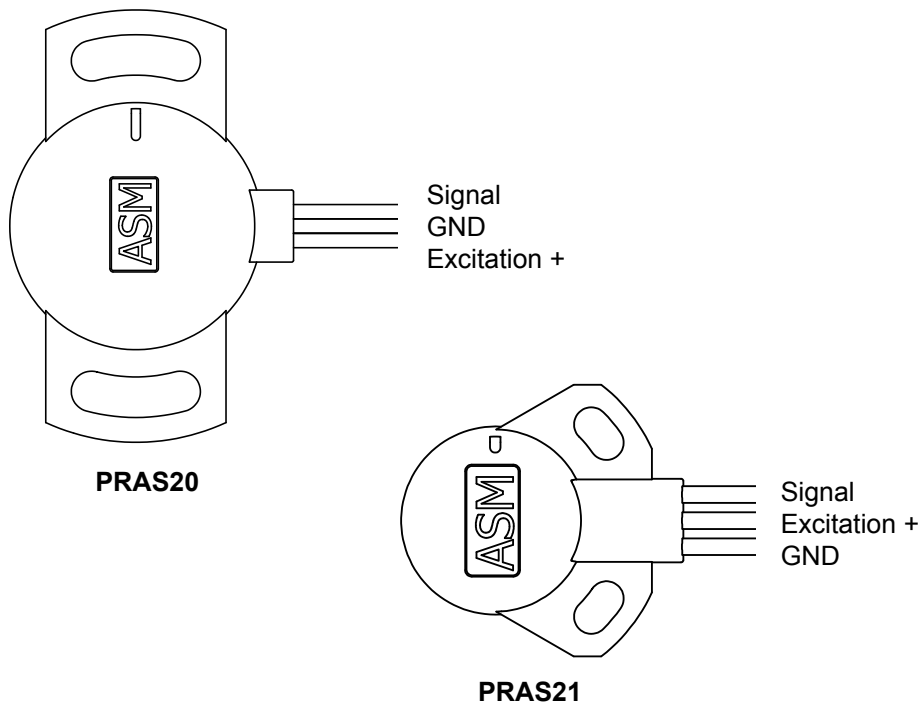
**Connection**



View to sensor connector

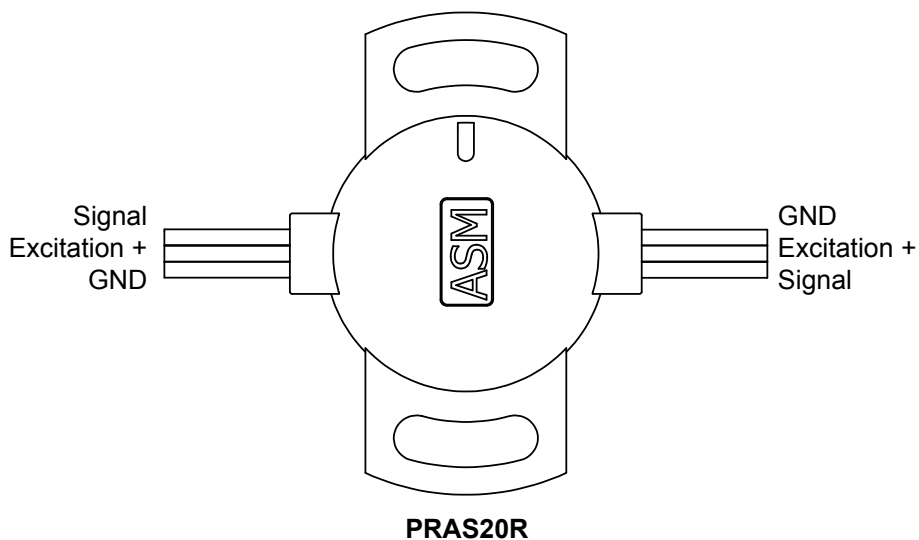
Signal Wiring PRAS20 / PRAS21	Signal	Wires
	Excitation +	brown
	Signal	white
	GND	blue

**Connection**



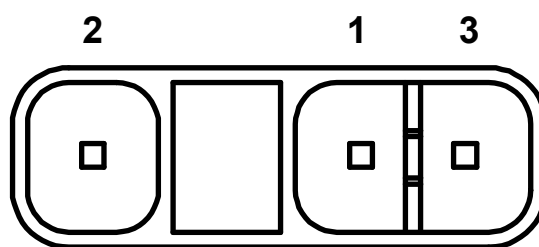
Signal Wiring PRAS20R (redundant version)	Signal	Wires
	Excitation +	brown
	Signal	white
	GND	blue

**Connection**



Signal wiring	Signal	Plug connection
PRAS26	GND	1
	Excitation +	2
TE3, 3 pin	Signal	3

**Connection**



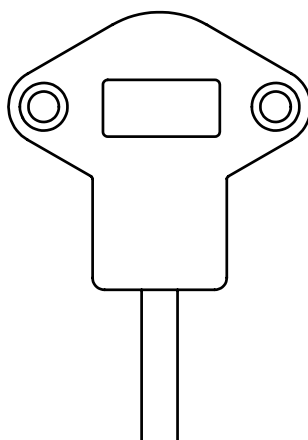
View to sensor  
connector

**Connector TE3**

(Connector cable see page 32)

Signal wiring	Signal	Cable color
PRAS27	Excitation +	brown
	Signal	white
Cable connection	GND	blue
	Do not connect!	black
	Do not connect!	grey

**Connection**



**Connector cable  
M12, 4-pin  
shielded\***

Suitable for 5-pin  
sensor connectors  
M12A5 and M12R5

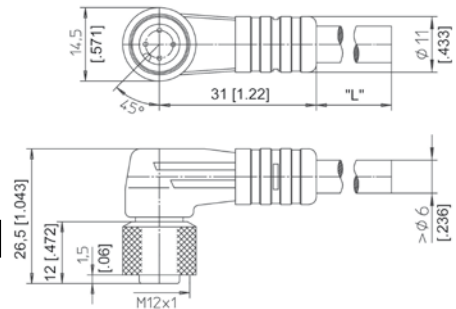
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m. Cross section 0.34 mm<sup>2</sup>

Order code:

**KAB - XM - M12/4F/W - LITZE**

IP69K: **KAB - XM - M12/4F/W/69K - LITZE**

Length in m



**Connector cable  
M12, 4-pin  
shielded\***

Suitable for 5-pin  
sensor connectors  
M12A5 and M12R5

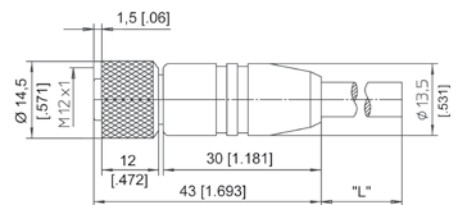
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m. Cross section 0.34 mm<sup>2</sup>

Order code:

**KAB - XM - M12/4F/G - LITZE**

IP69K: **KAB - XM - M12/4F/G/69K - LITZE**

Length in m



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

\* = shielded connector

**Connector cable  
M12, 8-pin  
shielded\***

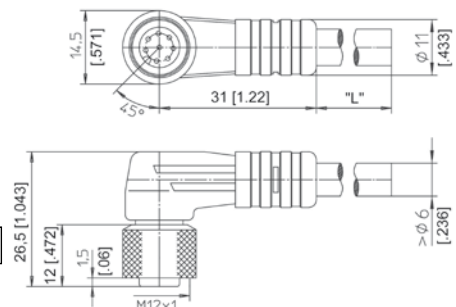
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m. Cross section 0.25 mm<sup>2</sup>

Order code:

**KAB - XM - M12/8F/W - LITZE**

IP69K: **KAB - XM - M12/8F/W/69K - LITZE**

Length in m



**Connector cable  
M12, 8-pin  
shielded\***

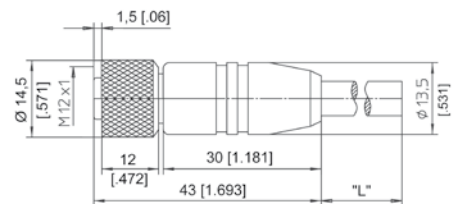
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m. Cross section 0.25 mm<sup>2</sup>

Order code:

**KAB - XM - M12/8F/G - LITZE**

IP69K: **KAB - XM - M12/8F/G/69K - LITZE**

Length in m



Signal wiring M12, 8-pin	Plug connection / Cable connection							
	1	2	3	4	5	6	7	8
	white	brown	green	yellow	grey	pink	blue	red

\* = shielded connector

# POSIROT® Instruction Manual Accessory cables

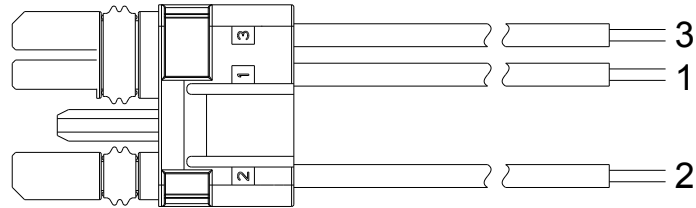


**Connector cable  
PRAS26**  
Connector, 3-pin

This cable is supplied with a male 3-pin connector at one end and 3 wires at the other end. Cross section 0.32 mm<sup>2</sup>. Wire length 0.5 m.

Order code:

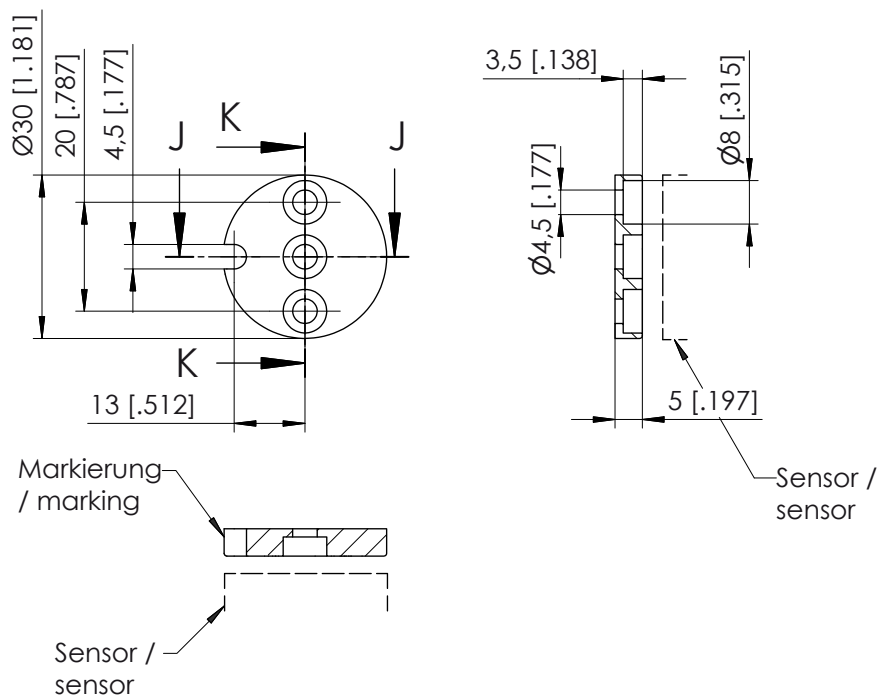
**CONN-TE-3F-G-LITZE-0,5M**



Signal wiring 3-pin connector	Plug connection / Wires		
	1	2	3
	blue	brown	white



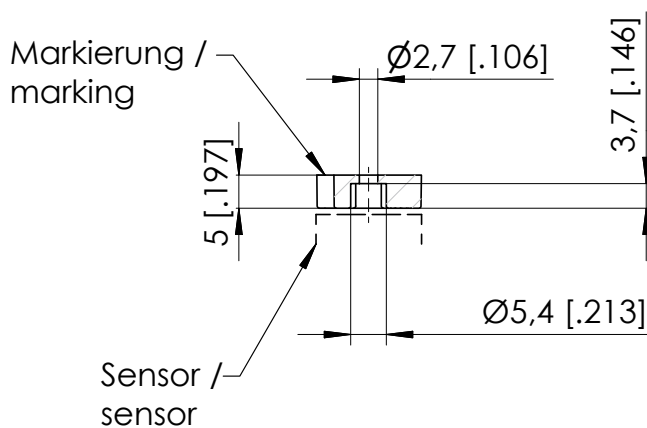
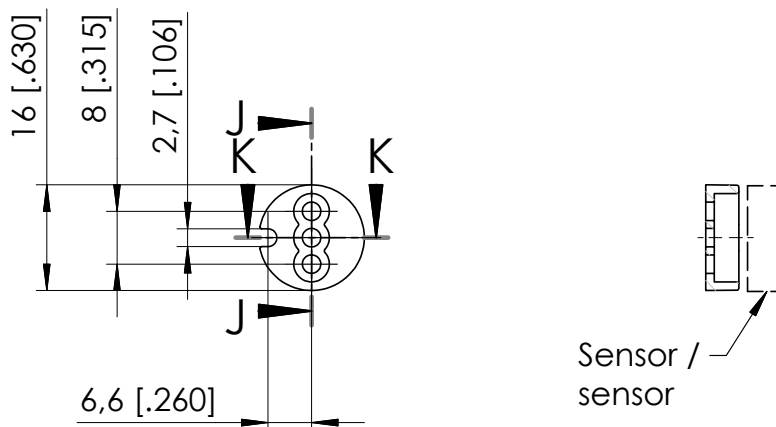
**Position magnet**  
**PRMAG20**



Weight 11 g approx.  
 Moment of inertia 1.2 kgmm<sup>2</sup>

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

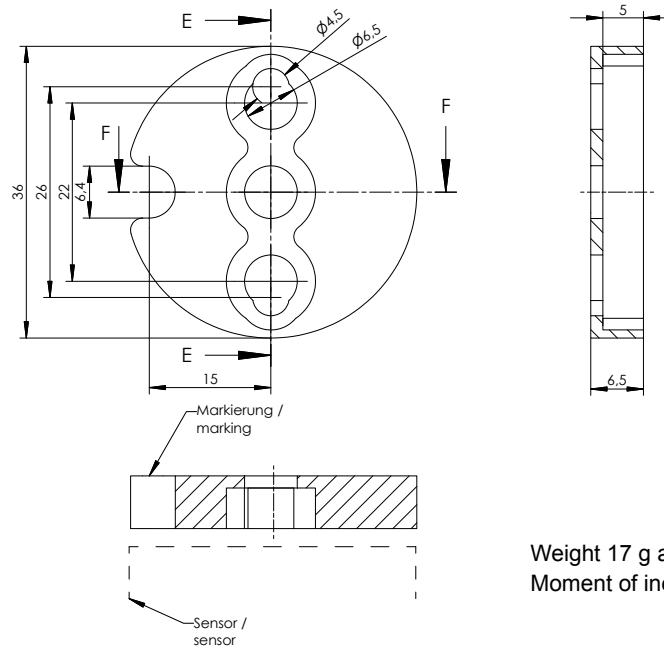
**Position magnet**  
**PRMAG21**



Weight 3 g approx.  
 Moment of inertia 0.1 kgmm<sup>2</sup>

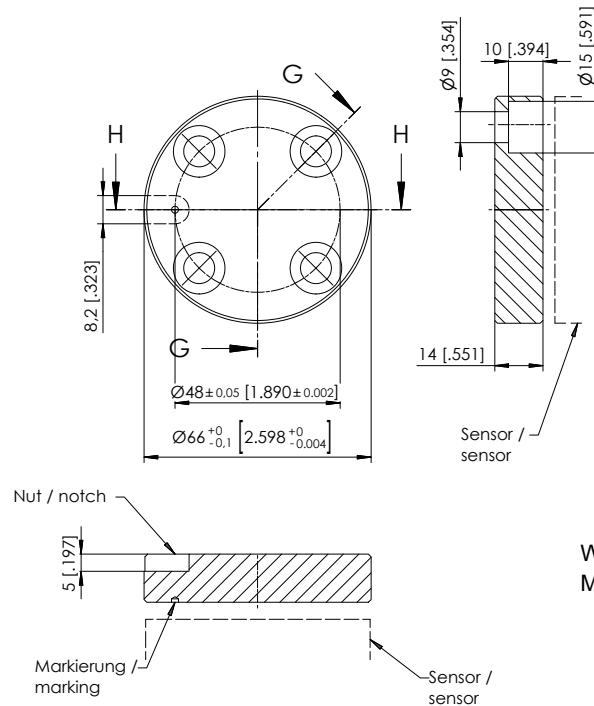
Dimensions in mm [inch]  
 Dimensions informative only.  
 For guaranteed dimensions consult factory.

**Position magnet**  
**PRMAG22**



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

**Position magnet**  
**PRMAG5-Z**



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

**Fixing of the**  
**position**  
**magnets**



**NOTICE**

Adjacent magnetic fields or ferromagnetic materials can influence the measurement results of the PRAS sensors of the POSIROT® product family. Therefore the angle sensors should be mounted solely with nonmagnetic / non magnetisable screws.

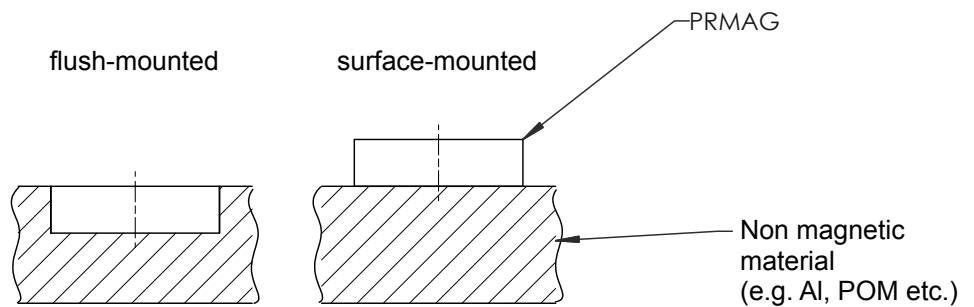
Mounting of the magnets	Magnet	Mounting method	Material
	PRMAG20	Screw(s) M4	A4
	PRMAG21	Screw(s) M2.5	A4
	PRMAG22	Screw(s) M4 or M6	A4
	PRMAG5-Z	Screws M8	A2
	Anti-rotation element	–	A2 or non-magnetic

**Assembly of  
the position  
magnets**

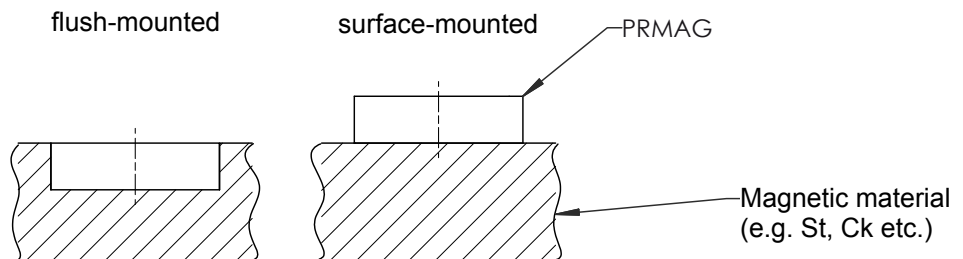


**NOTICE**

Usually it is not admissible to countersink a position magnet into ferromagnetic material, because this would have a negative influence on the performance of the position magnet, and could lead to measurement errors of the PRAS angle sensors.

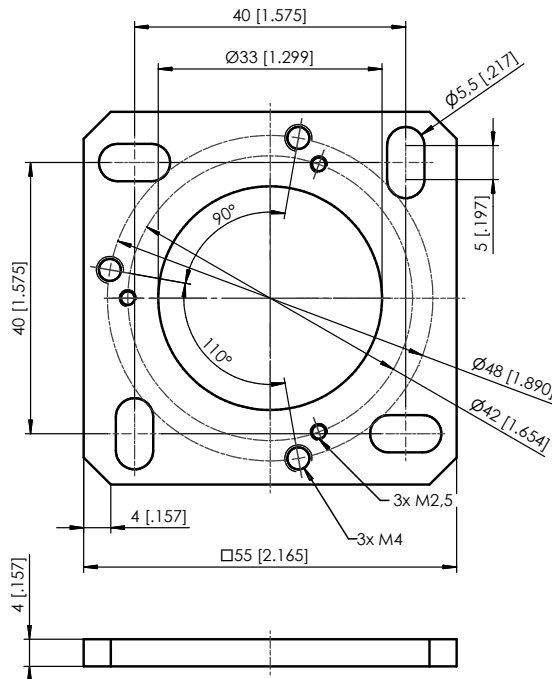


✓	✓	PRMAG5-Z
✓	✓	PRMAG20
✓	✓	PRMAG21/22



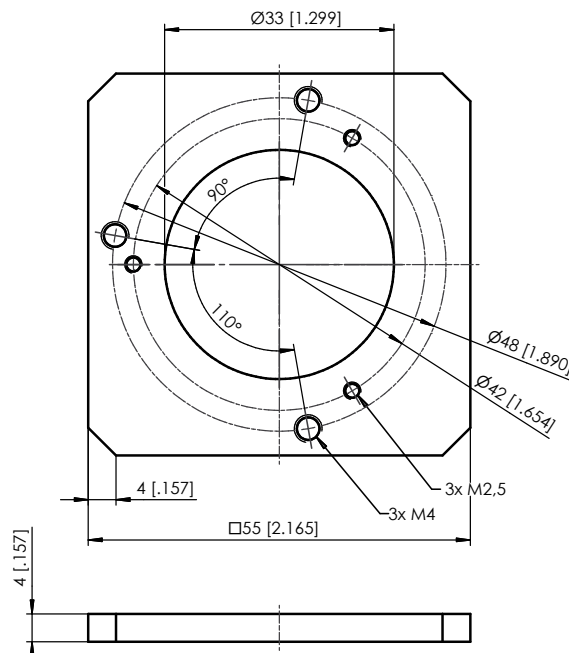
✓	✓	PRMAG5-Z
-	✓	PRMAG20
-	✓	PRMAG21/22

**Mounting plate**  
**PRPT-BPL1**



In combination with the mounting clamps PRPT-BFS1 (3 x M2.5) or in combination with the mounting bracket PRPT-BFS2 (3 x M4).

**Mounting plate**  
**PRPT-BPL2**  
 (welding assembly)

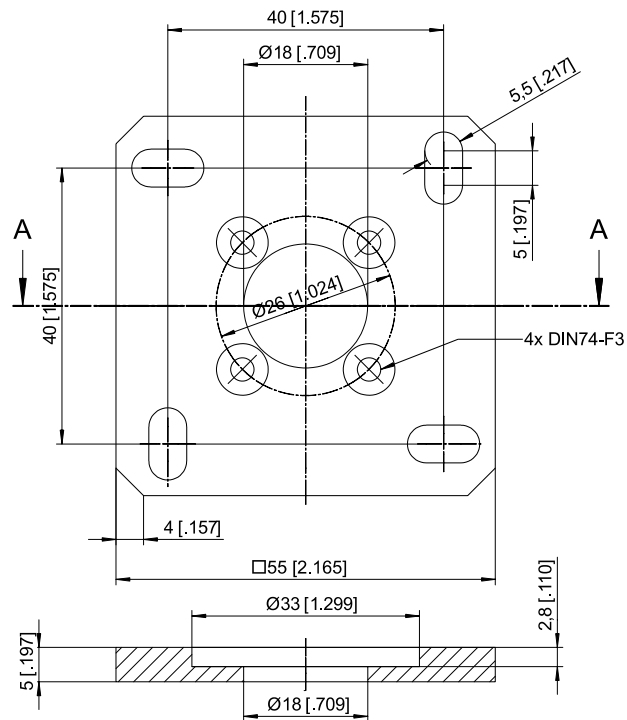


In combination with the mounting clamps PRPT-BFS1 (3 x M2.5) or in combination with the mounting bracket PRPT-BFS2 (3 x M4).

Dimensions in mm [inch]

Dimensions informative only.  
 For guaranteed dimensions consult factory.

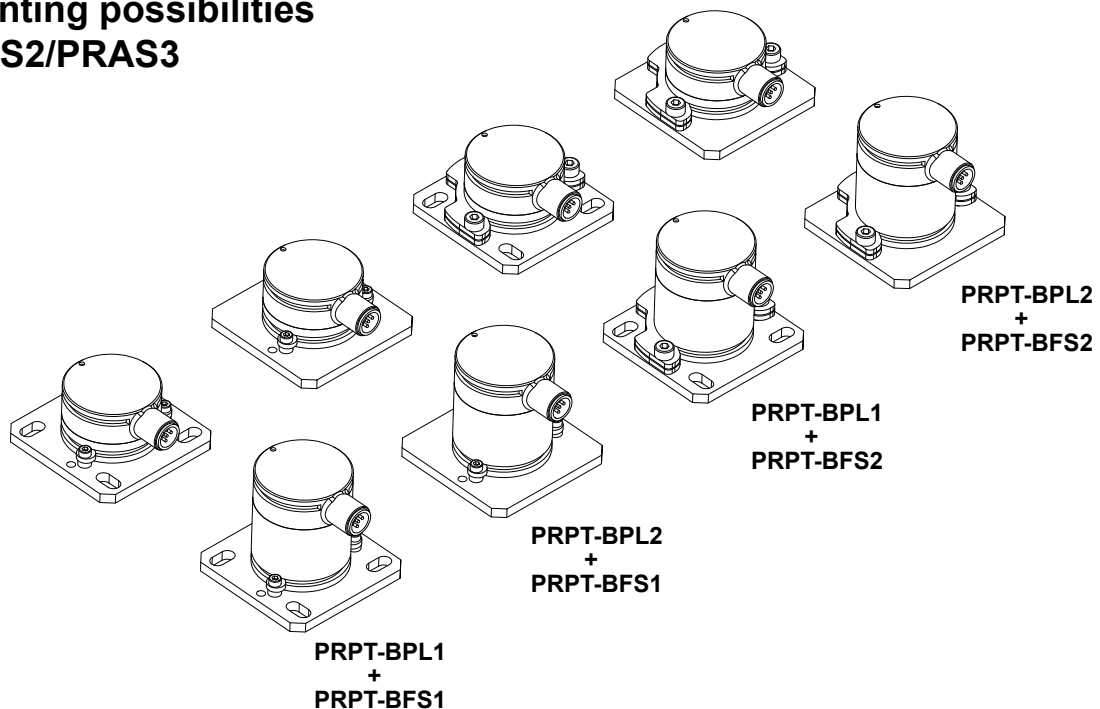
**Mounting plate**  
**PRPT-BPL3**



Dimensions in mm [inch]

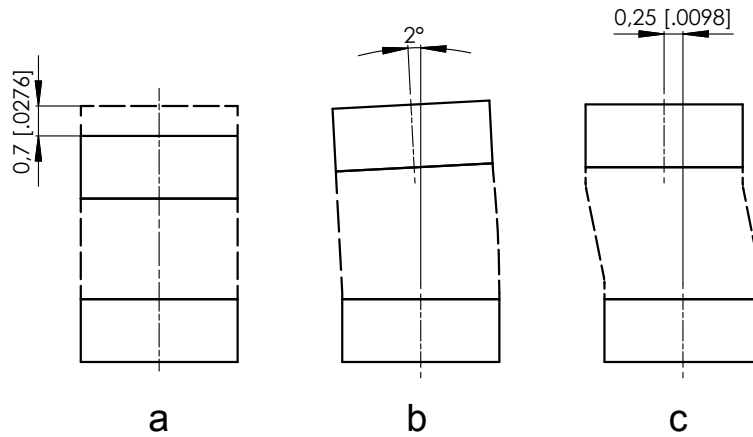
Dimensions informative only.  
 For guaranteed dimensions consult factory.

**Mounting possibilities**  
**PRAS2/PRAS3**



<b>Model MK4</b>	Rated torque	2 Nm
	Total length (inserted)	37 mm
	Axial misalignment (a)	< 0.7 mm
	Angular misalignment (b)	< 2°
	Lateral misalignment (c)	< 0.25 mm

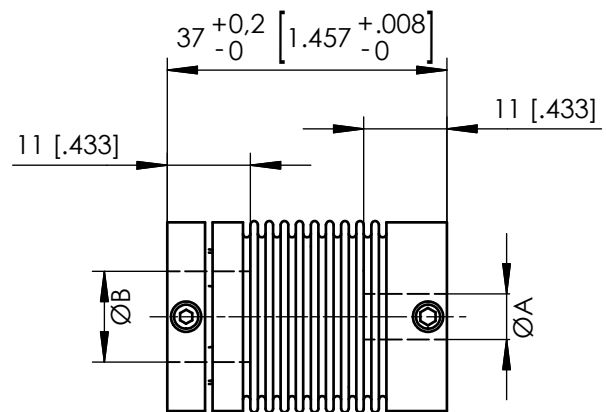
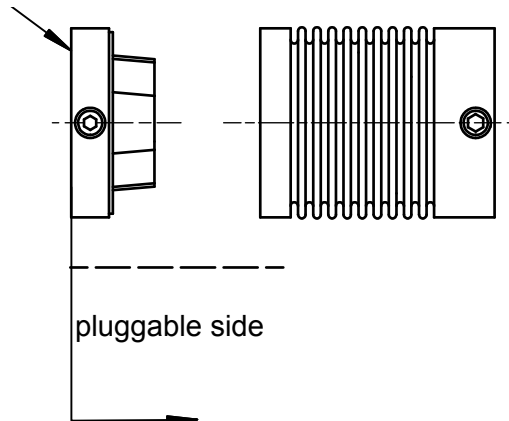
**Maximum misalignment**



Dimensions in mm [inch]

Order code	A	B
<b>MK4-37-6-6</b>	Ø6 [.236 +.0005]	Ø 6 [.236 +.0005]
<b>MK4-37-6-10</b>	Ø6 [.236 +.0005]	Ø10 [.394 +.0006]
<b>MK4-37-6-12</b>	Ø6 [.236 +.0005]	Ø12 [.472 +.0007]

axially pluggable



Screws (ISO4029)	2 x M4
Torque	2,5 Nm

Dimensions in mm [inch]



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**Service**

Sensors and accessories have to be repaired and adjusted at ASM in Moosinning.

In order to avoid risk of injury and improper handling the customer is not allowed to repair the sensor. No warranty or liability will be granted for opened sensors.

Damaged sensors must be shut down immediately and sent to the factory for repair.

**Calibration**

The recommended calibration interval is 1 year.

Test protocol is available on request.

**Disposal**

Disposal according to applicable government regulations.

**Models** PRAS1, PRAS2, PRAS3, PRAS5,  
 PRAS20, PRAS20R, PRAS21, PRAS26, PRAS27

U2	Voltage output 0,5 ... 10 V
U2R	Voltage output 0,5 ... 10 V
U2B	Voltage output 0,5 ... 10 V
U6	Voltage output 0,5 ... 4,5 V
U6/8,25	Voltage output 0,825 ... 7,425 V
U8	Voltage output 0,5 ... 4,5 V
U8R	Voltage output 0,5 ... 4,5 V
I1	Current output 4 ... 20 mA
I1R	Current output 4 ... 20 mA
I1B	Current output 4 ... 20 mA

<b>Characteristics</b>	Device type	B
	Probability of failure PFH ( $\lambda_{DU}$ )	877 Fit
	Life period MTTF <sub>d</sub>	130 years
	Working life	10 years
	Mechanical life period L <sub>10</sub>	100 x 10 <sup>6</sup> revolutions
	Max. revolutions	10.000 1/min
	Allowable shaft load (10 mm solid shaft, 6 mm hollow shaft)	100 N radial, 100 N axial

**Standards** IEC 61508-1, -2, -6, Functional Safety  
 ISO 13849-1, Safety of Machines  
 SN29500 Failure rate electronic components (Siemens)

## EU Declaration of Conformity



We **ASM GmbH**  
Am Bleichbach 18 - 24  
85452 Moosinning  
Germany

declare under our sole responsibility that the product

**Name:** **Angle Sensor**

**Type:** **PRAS1, PRAS2, PRAS3, PRAS5,  
PRAS20, PRAS21, PRAS26, PRAS27**

to which this declaration relates is in conformity with the following standards or other normative documents:

Directives: 2014/30/EU (EMC)

Standards: EN 61326-1:2013 (EMC)

Moosinning, 22<sup>nd</sup> 02.2016

A handwritten signature in black ink, appearing to be 'P. Wirth', is written over a light gray grid background.

p.p. Peter Wirth  
Head of Development

---

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