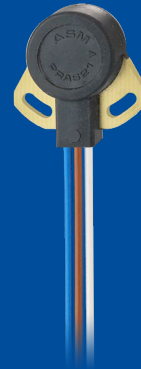




PRAS21

Angle sensor for indoor applications



- **Protection class IP60**
- **Measurement range 0°... 360°**
- **Overall height 6 mm**
- **Contactless with external position magnet, wear-free**
-
-

Product versions



Analog output



PRAS21 - Magnetic Angle Sensor Version with Analog output

Specifications

		Order options	
Measurement range	0 ... 15° to 0 ... 360° (in 15° increments)	1	15 / 30 / 45 / ... / 345 / 360
Output	Voltage 0.5 ... 4.5 V, ratiometric	2	U6
Signal characteristics	Signal increasing CW, clockwise Signal increasing CCW, counterclockwise	3	CW CCW
Resolution	0.03% (60 ... 360°); 0.1% (15 ... 45°)		
Repeatability	±0.03% (60 ... 360°); ±0.1% (15 ... 45°)		
Linearity	±0.5% f.s. (typical)		
Rated distance sensor / magnet	Depending on the position magnet		
Housing material	Epoxy glass fibre, thermoplastic		
Mounting	Screws M3		
Protection class	IP60		
Connection	Single wire ETFE 3 x 0.5 mm ² , length 300 mm	4	A300
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		
Temperature range	-40 ... +85°C		
Weight	5 g approx. (without cable)		
EMC	DIN EN 61326-1:2013		

Order code

PRAS21 – **1** – **2** – **3** – **4**

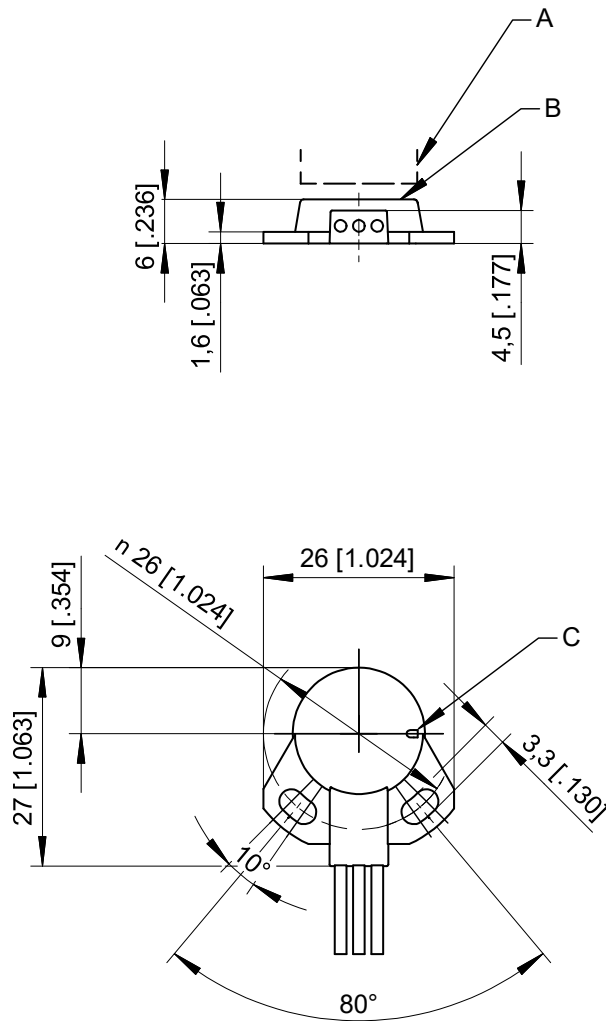
Order example: PRAS21 – 360 – U6 – CW – A300

Accessories:

Position magnets (see from page 4)

Magnetic shield (see page 11)

Dimensions



- A – Position magnet
- B – Measuring area
- C – Marking

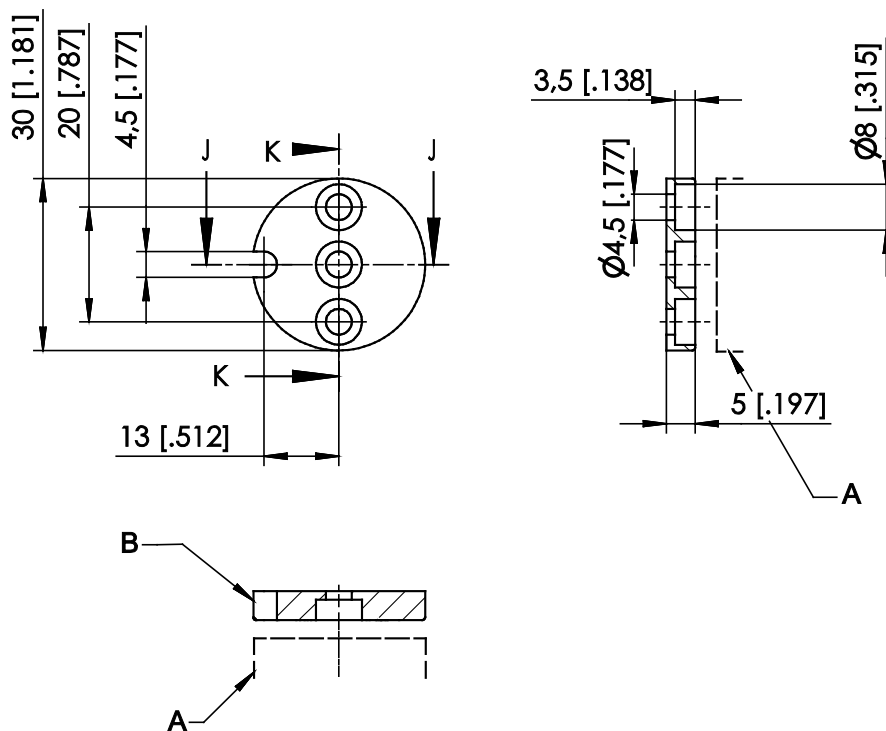
Dimensions in mm [inch]. Weight without cable approx. 5 g.

Dimensions informative only.

For guaranteed dimensions consult factory.

Position magnets

PRMAG20



A – Sensor
B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG20	approx. 12 g	zinc coated steel, plastic	1.3 kgmm ²

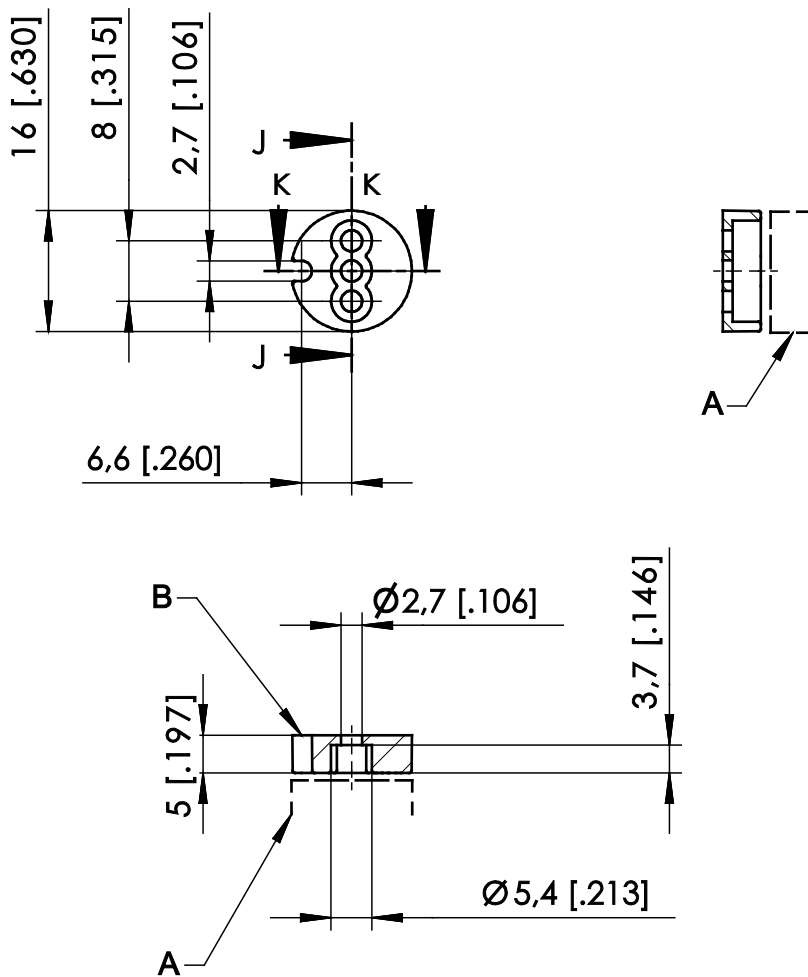
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only.

For guaranteed dimensions please consult factory.

PRMAG21



A – Sensor
B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG21	approx. 3 g	zinc coated steel; plastic	0.1 kgmm ²

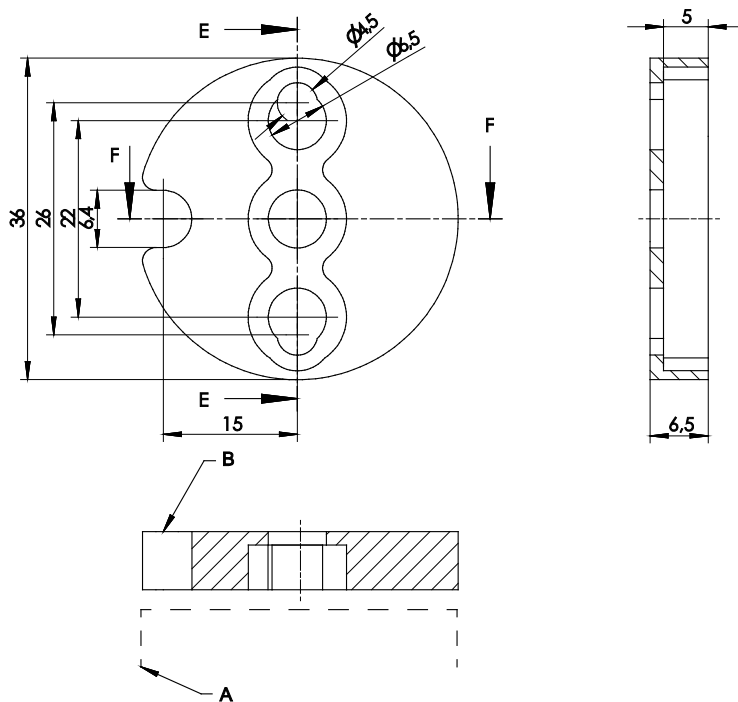
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch]

Dimensions informative only.

For guaranteed dimensions please consult factory.

PRMAG22



A – Sensor

B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG22	approx. 19 g	zinc coated steel, plastic	3 kgmm ²

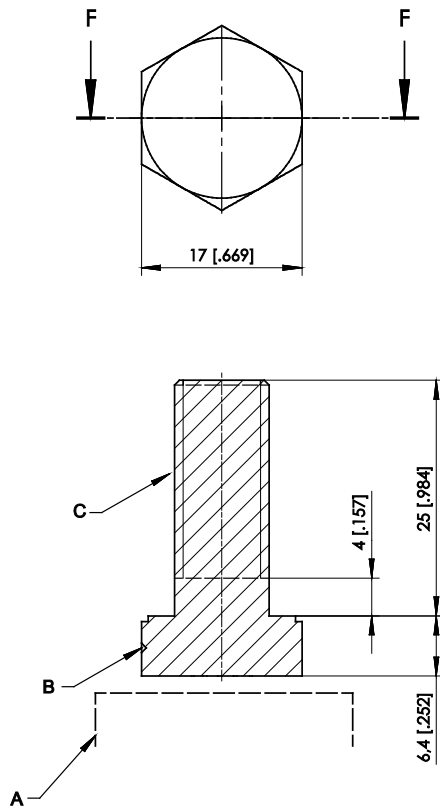
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only

For guaranteed dimensions please consult factory.

PRMAG-M10



- A – Sensor
B – Marking
C – Thread M10

Order code	Weight	Material	Moment of inertia
PRMAG-M10	approx. 30 g	stainless steel A2	1.3 kgmm ²

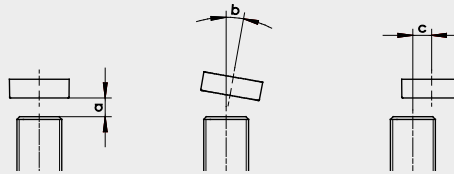
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only.

For guaranteed dimensions please consult factory.

Measuring error by misalignment of the position magnet



Air gap (a)
Parallelism (b)
Lateral offset (c)

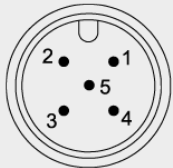
Sensor	Position magnet	Air gap [mm]	Parallelism [°]	Error by lateral offset [°]					
				0.2 mm	0.5 mm	1 mm	2 mm	3 mm	4 mm
PRAS21	PRMAG20	0 ... 7	0 ... 5	0.1	0.3	0.7	2	4.6	–
	PRMAG21	0 ... 2	0 ... 5	0.15	0.3	0.9	3.6	9.6	–
	PRMAG22	0 ... 10	0 ... 5	0	0	0.7	1.5	3.8	7
	PRMAG-M10	0 ... 3	0 ... 5	0.1	0.1	0.5	2	7	–

Output specification

Analog output

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

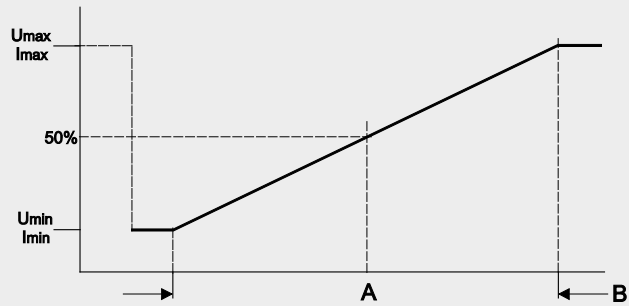
Analog output, 1 channel (connector and cable output)

Signal wiring	Output signals	Connector pin no.	Cable color
Connector M12, 5 pin  View to the sensor connector	Excitation +	1	brown
	Signal	2	white
	GND	3	blue
	Do not connect!	4	black
	Do not connect!	5	grey

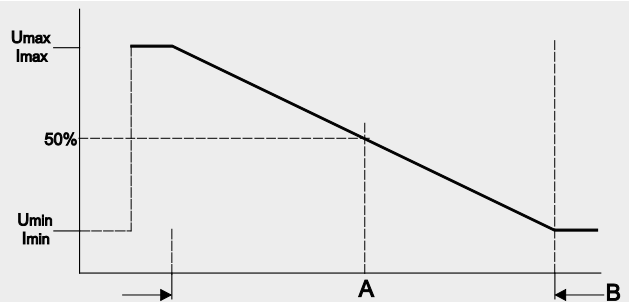
3-wire current 4...20 mA interface: GND has to be connected!

Characteristics for magnetic angle sensors

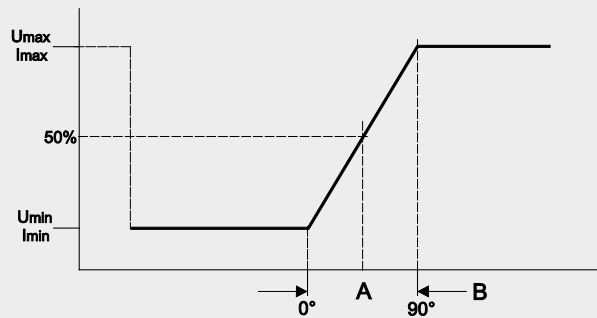
Output signal CW (clockwise increasing)



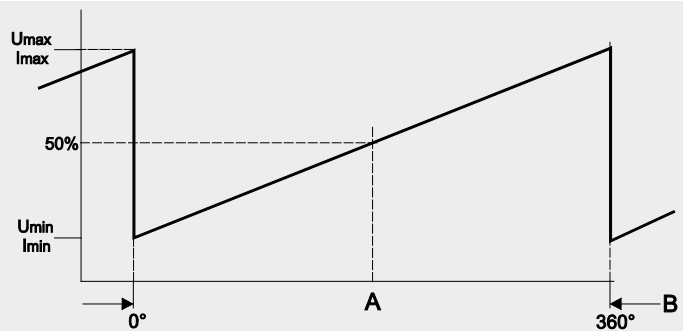
Output signal CCW (counterclockwise increasing)



Example angular range 90°



Example angular range 360°



A – Marking

B – Measurement range [°]

Accessories

PRAS21 Magnetic Shield

An optional shield plate is available for the angle sensor PRAS21. It can reduce the effect of residual magnetizing in case the sensor has to be mounted on a ferromagnetic material.

Order code magnetic shield:

PRAS21-MSHIELD

