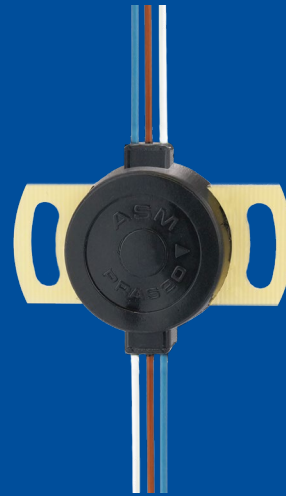




PRAS20R

Angle sensor for indoor applications



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

Product versions



Analog output, redundant



PRAS20R - Magnetic Angle Sensor
Version with analog output, redundant

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, redundant | 2 | U6R |
| Signal characteristics | Signal 1 increasing clockwise, signal 2 increasing counterclockwise Signal 1 and signal 2 increasing clockwise Signal 1 and signal 2 increasing counterclockwise | 3 | CW/CCW CW/CW CCW/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 M4 | | |
| Protection class | IP60 | | |
| Connection | Single wire ETFE 6 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 | 8 g approx. (without cable) | | |
| EMC | DIN EN 61326-1:2013 | | |

Order code

PRAS20R – **1** – **2** – **3** – **4**

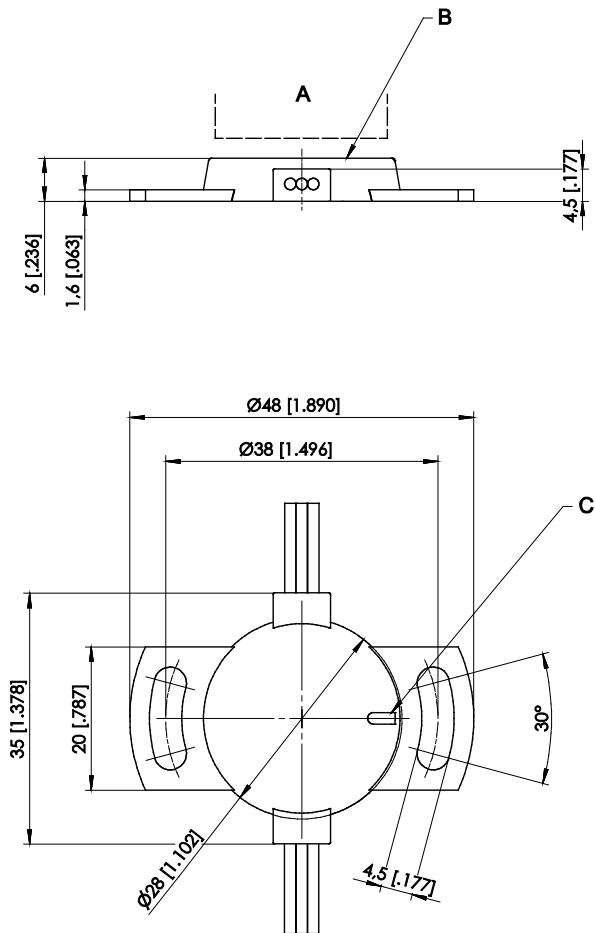
Order example: PRAS20R – 360 – U6R – CW/CCW – A300

Accessories:

Position magnets (see from page 4)

Magnetic shield (see page 11)

Dimensions

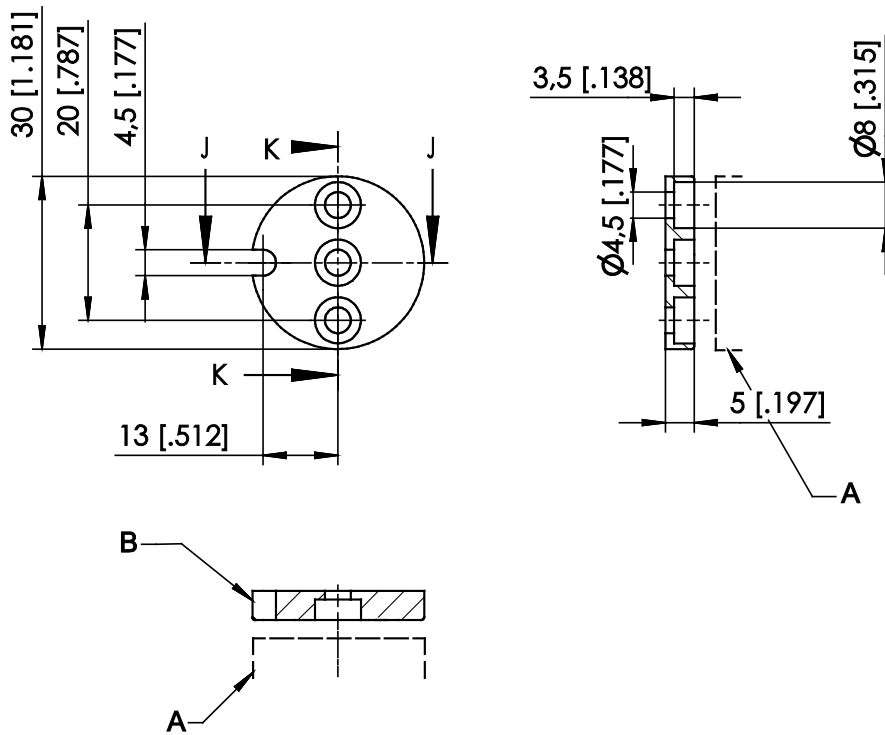


- A – Position magnet
- B – Measuring area
- C – Marking

Dimensions in mm [inch]. Weight without cable approx. 8 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 |

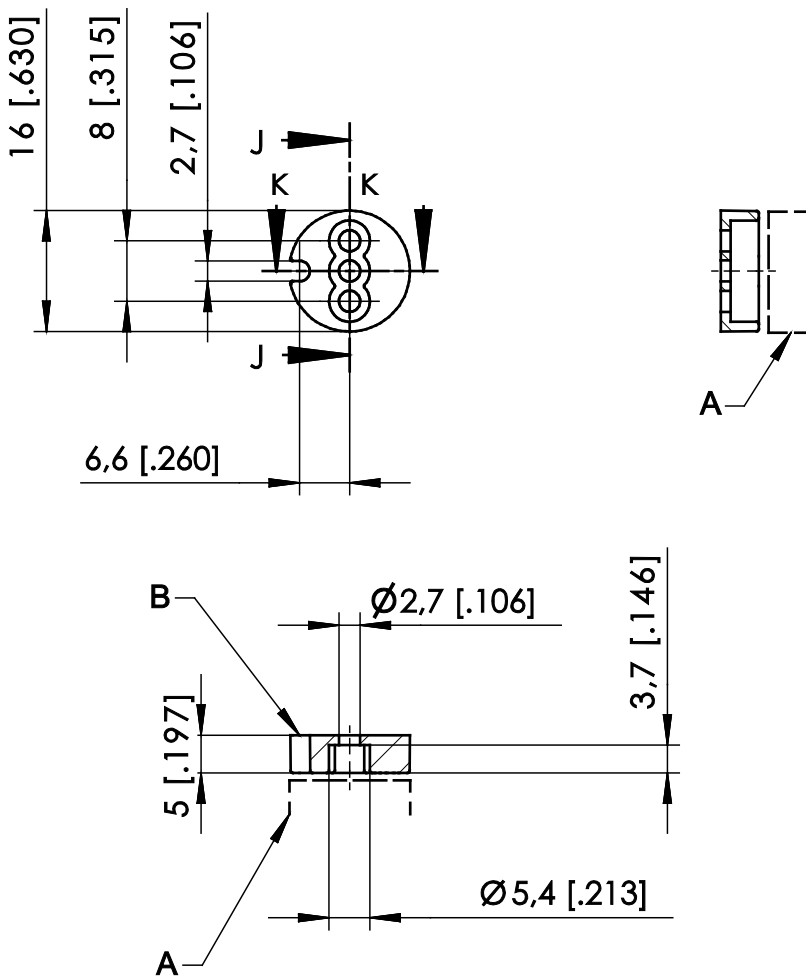
A misalignment of the position magnet has an effect on the linearity.

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 |

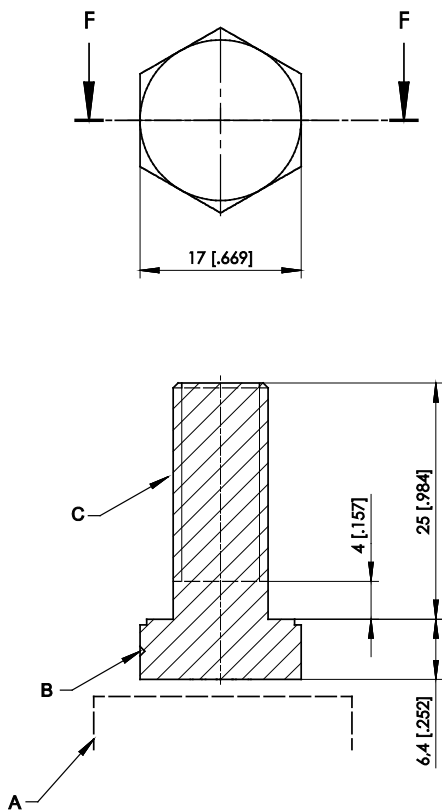
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch]

Dimensions informative only.

For guaranteed dimensions please consult factory.

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 |

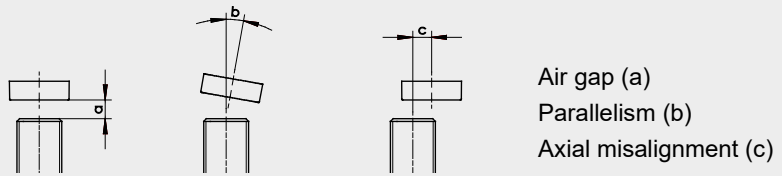
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only.

For guaranteed dimensions please consult factory.


Measuring error by misalignment of the position magnet



| Sensor | Position magnet | Air gap [mm] | Parallelism [°] | Error by axial misalignment [°] | | | | | |
|---------|-----------------|--------------|-----------------|---------------------------------|--------|------|------|------|------|
| | | | | 0.2 mm | 0.5 mm | 1 mm | 2 mm | 3 mm | 4 mm |
| PRAS20 | PRMAG20 | 0 ... 7 | 0 ... 5 | 0.1 | 0.3 | 0.7 | 2 | 4.6 | – |
| PRAS20R | 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 |

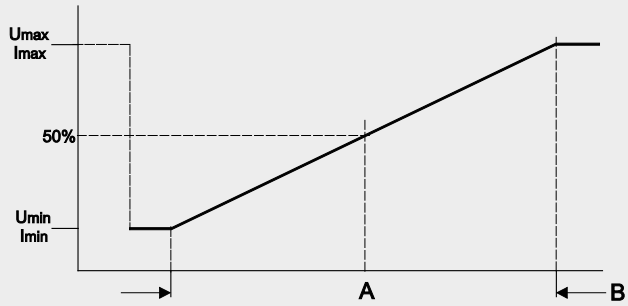
PRAS20 / PRAS20R / PRAS21

| Signal wiring | Output signals | Cable color |
|---------------|----------------|-------------|
| Single wires | Excitation + | brown |
| | Signal | white |
| | GND | blue |

Characteristics for magnetic angle sensors

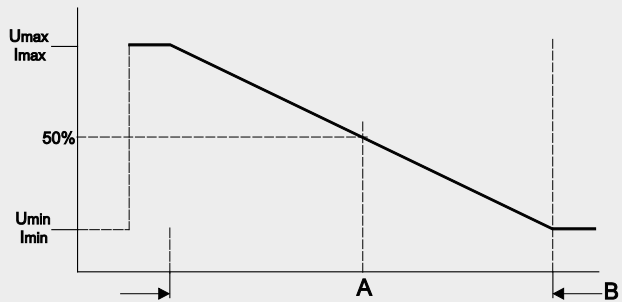
Output signal CW

(clockwise increasing)

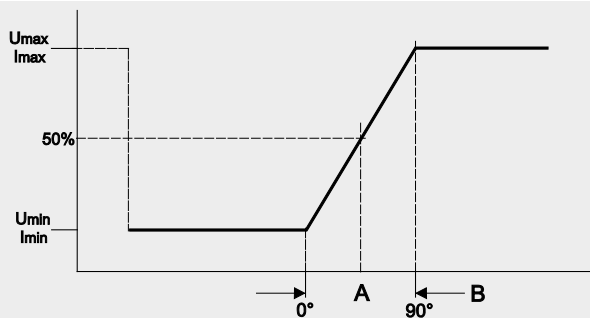


Output signal CCW

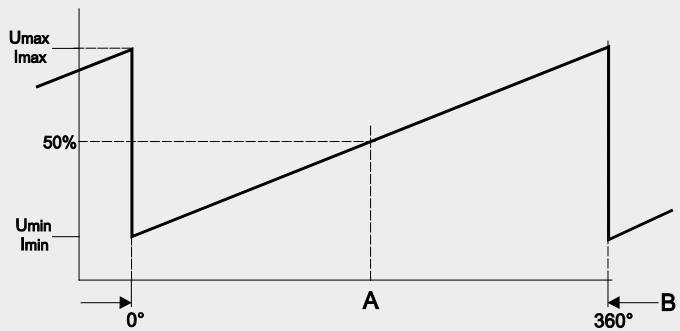
(counterclockwise increasing)



Example angular range 90°



Example angular range 360°



A – Marking

B – Measurement range [°]

Accessories PRAS20 / PRAS20R Magnetic shield

An optional shield plate is available for the angle sensors PRAS20 and PRAS20R. It can reduce the effect of residual magnetizing in case the sensor has to be mounted on a ferromagnetic material.

Order code magnetic shield:

PRAS20/26-MSHIELD

