

PRAS4

Angle sensor for underwater applications, up to 100 m depth



- **Measurement range 0°... 360°**
- **Protection class IP68 (10 bar), continuous use**
- **Robust stainless steel housing**
- **Diameter 79 mm, overall height 22.5 mm**
- **Contactless with external position magnet, wear-free**

Product versions



Analog output



PRAS4 - Magnetic Angle Sensor Version with Analog output

Specifications

			Order options
Mechanical connection	Contactless with external position magnet	1	K
Measurement range	0 ... 15° to 0 ... 360° (in 15° increments)	2	15 / 30 / 45 / ... / 345 / 360
Output	Voltage 0.5 ... 10 V Voltage 0.5 ... 4.5 V ratiometric Current 4 ... 20 mA, 3 wire	3	U2 U6 I1
Signal characteristics	Signal increasing CW, clockwise Signal increasing CCW, counterclockwise	4	CW CCW
Resolution	0.03% (60 ... 360°); 0.1% (15 ... 45°) f.s.		
Repeatability	±0.03% (60 ... 360°); ±0.1% (15 ... 45°) f.s.		
Linearity	±0.3% f.s. (typical)		
Connection	Cable, standard length 2 m	5	KAB2M
Housing material	Stainless steel EN 1.4404 (AISI 316L)	6	VA
Mounting	Screws M6		
Protection class	IP68 (10 bar), continuous use		
Pressure resistance	10 bar	7	WP
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	-20 ... +85°C (up to +30°C immersed in sea water)		
Weight	1250 g approx. (without cable)		
EMC	DIN EN 61326-1:2013		

Order code

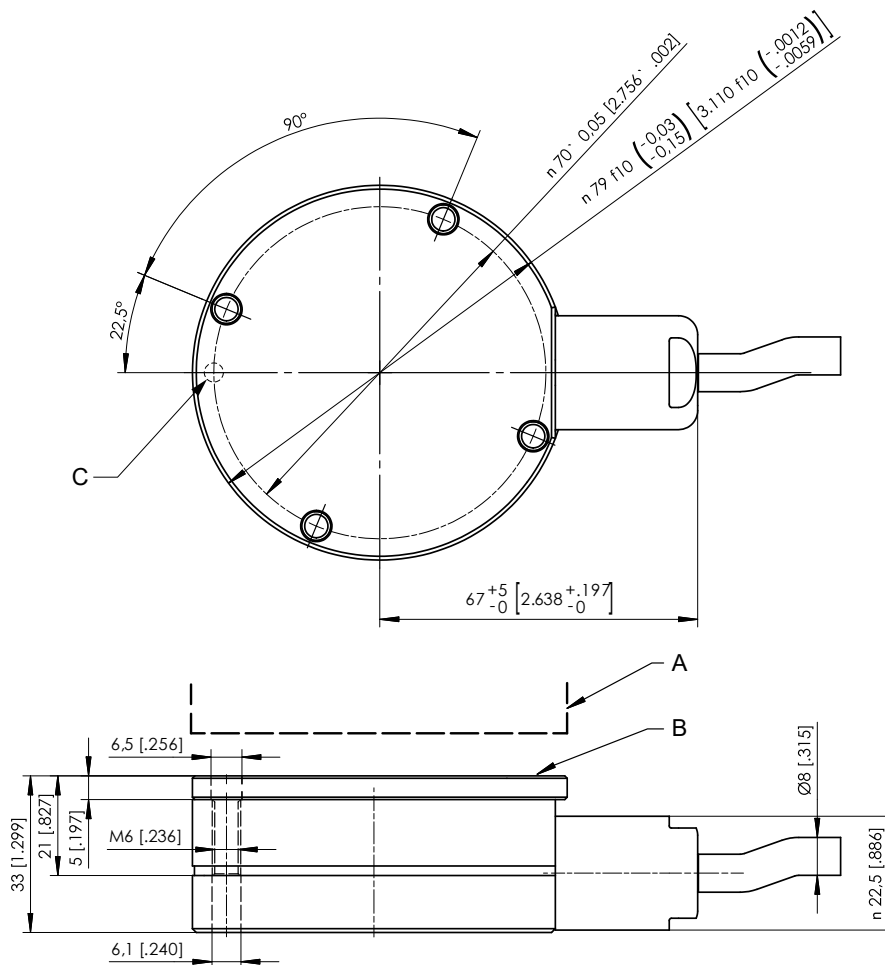
PRAS4 – **1** – **2** – **3** – **4** – **5** – **6** – **7**

Order example: PRAS4 – K – 360 – I1 – CW – KAB2M – VA – WP

Accessories:

Position magnets (see page 4)

Dimensions



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

IP68 / 100 m, continuous use.

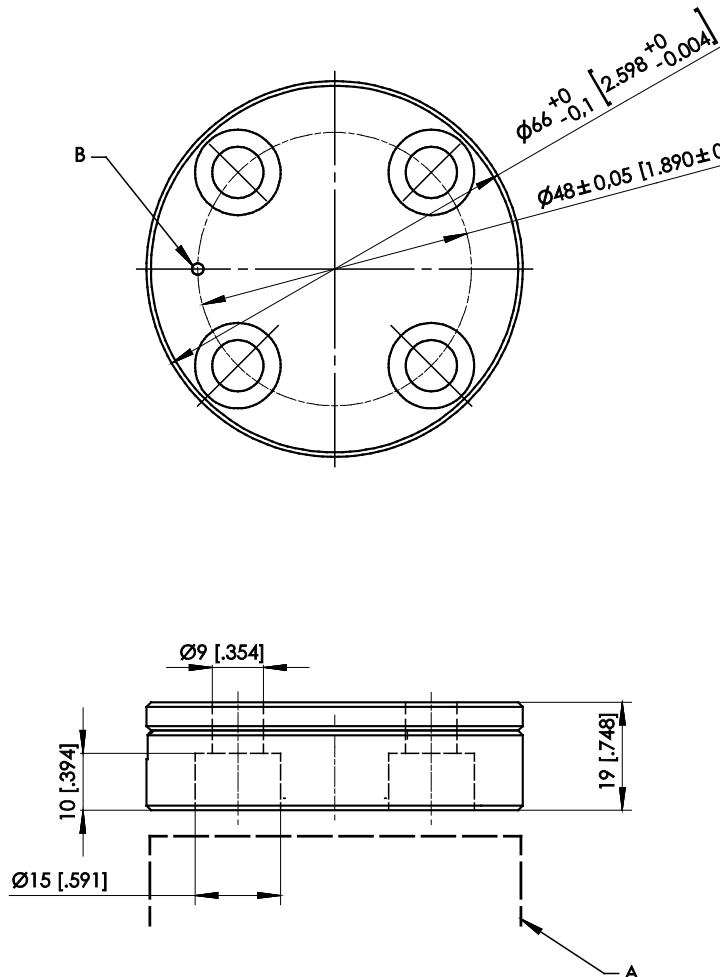
Dimensions in mm [inch]. Weight without cable approx. 1250 g.

Dimensions informative only.

For guaranteed dimensions please consult factory.

Position magnets

PRMAG5-Z-VA-WP



A – Position magnet

B – Marking

Order code	Weight	Material	Moment of inertia
PRMAG5-Z-VA-WP	approx. 292 g	stainless steel EN 1.4404 (AISI 316L)	175 kgmm ²

IP68 / 100 m, continuous use.

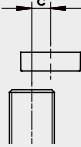
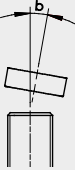
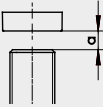
A misalignment of the position magnet has an effect on the linearity.

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
PRAS4	PRMAG5-Z-VA-WP	0 ... 6.5	0 ... 5	0.1	0.2	0.6	1.5	4.5	8.5

Output specification

Analog output

U2 Voltage output 0.5 ... 10 V 	Excitation voltage	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)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical for 90° ... 360°) $\pm 100 \times 10^{-6}$ / °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)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical for 90° ... 360°) $\pm 100 \times 10^{-6}$ / °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	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

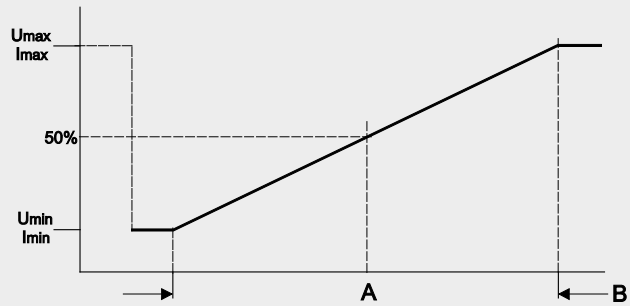
Analog output (cable output, seawater resistant submarine cable)

Signal wiring	Output signals	Cable color
	Excitation +	white
	Signal	green
	GND	brown
	Do not connect!	grey
	Do not connect!	-

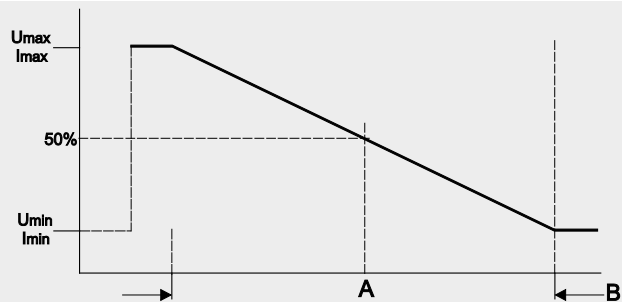
3-wire current 4...20 mA interface: GND has to be connected!

Characteristics for magnetic angle sensors

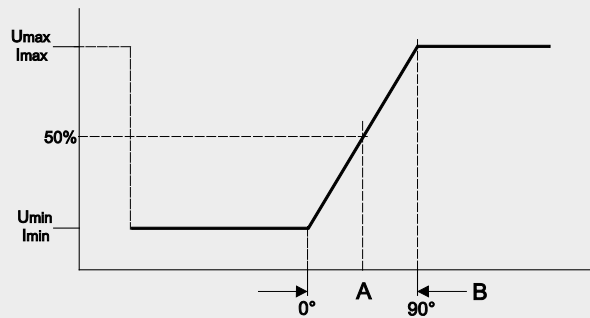
Output signal CW (clockwise increasing)



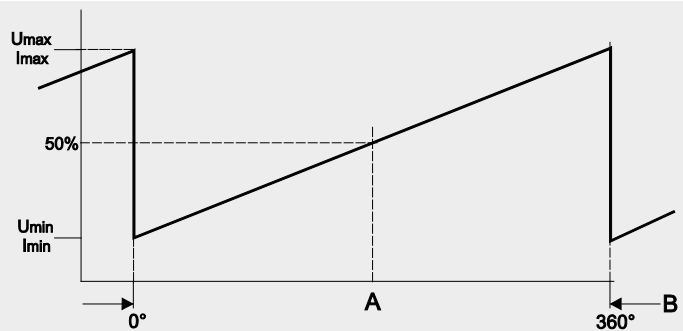
Output signal CCW (counterclockwise increasing)



Example angular range 90°



Example angular range 360°



A – Marking

B – Measurement range [°]

