



PRAS29

Angle sensor for standard industrial applications



- Protection class up to IP69
- Measurement range 0°... 360°
- Stainless steel housing
- Overall height 10 mm
- Contactless with external position magnet, wear-free

Product versions



Analog output



Analog output, redundant



PRAS29 - 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 ... 10 V Voltage 0.5 ... 4.5 V ratiometric Voltage 0.5 ... 4.5 V Current 4 ... 20 mA, 3 wire	2	U2 / U2B U6 U8 I1 / I1B
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	Stainless steel EN 1.4404 (AISI 316L)		
Mounting	Screws M4: DIN 912, DIN 6912, DIN 7984		
Protection class	up to IP69		
Connection	Cable, standard length 2 m Deutsch connector, not shielded	4	KAB2M
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	80 g approx. (without cable)		
EMC	DIN EN 61326-1:2013		

Order code

PRAS29 – **1** – **2** – **3** – **4**

Order example: PRAS29 – 360 – U6 – CW – KAB2M



PRAS29 - Magnetic Angle Sensor

Version with Analog output, redundant

Specifications

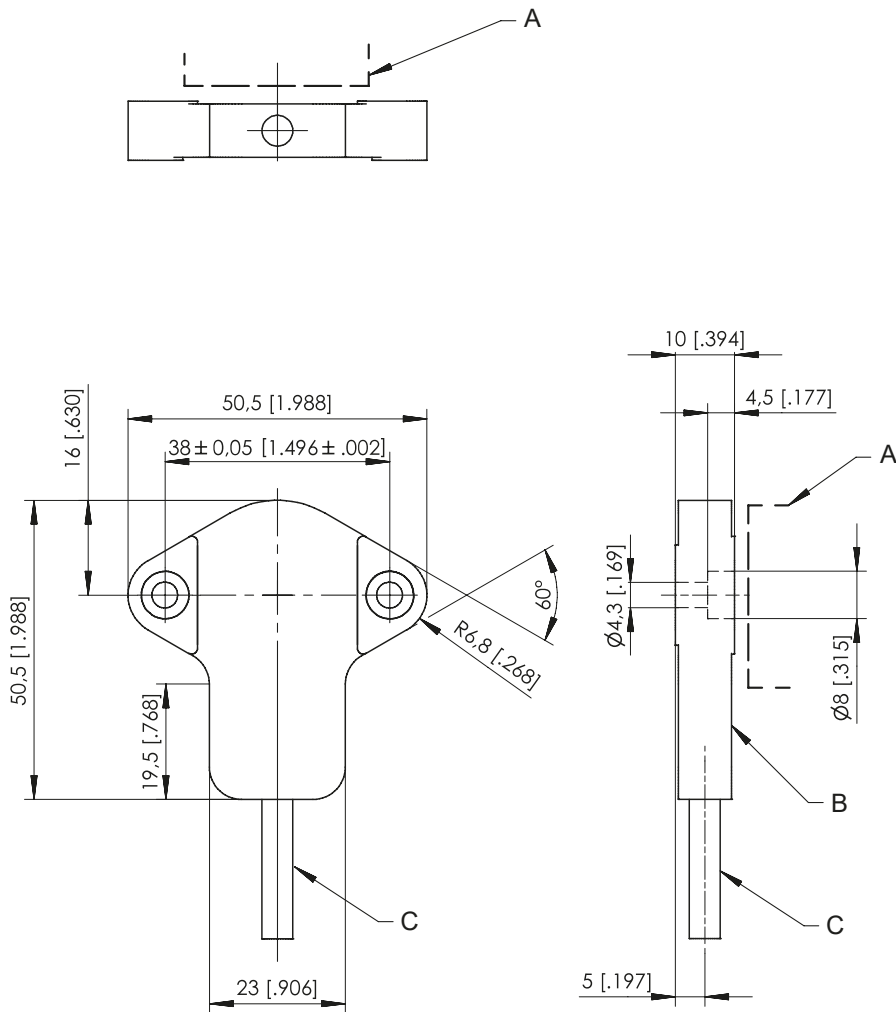
		Order options	
Measurement range	0 ... 15° to 0 ... 360° (in 15° increments)	1	15 / 30 / 45 / ... / 345 / 360
Output	Voltage 0.5 ... 10 V, redundant Voltage 0.5 ... 4.5 V, ratiometric, redundant Voltage 0.5 ... 4.5 V, redundant Current 4... 20 mA, 3 wire, redundant	2	U2R U6R U8R I1R
Signal characteristics	Signal 1 increasing clockwise, signal 2 increasing counterclockwise Signal 1 and signal 2 increasing clockwise* Signal 1 and signal 2 increasing counterclockwise* * not available with output I1R	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	Stainless steel EN 1.4404 (AISI 316L)		
Mounting	Screws M4: DIN 912, DIN 6912, DIN 7984		
Protection class	up to IP69		
Connection	Cable, standard length 2 m Deutsch connector, not shielded	4	KAB2M
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	80 g approx. (without cable)		
EMC	DIN EN 61326-1:2013		

Order code

PRAS29 – **1** – **2** – **3** – **4**

Order example: PRAS29 – 360 – U2R – CW/CCW – KAB2M

Dimensions

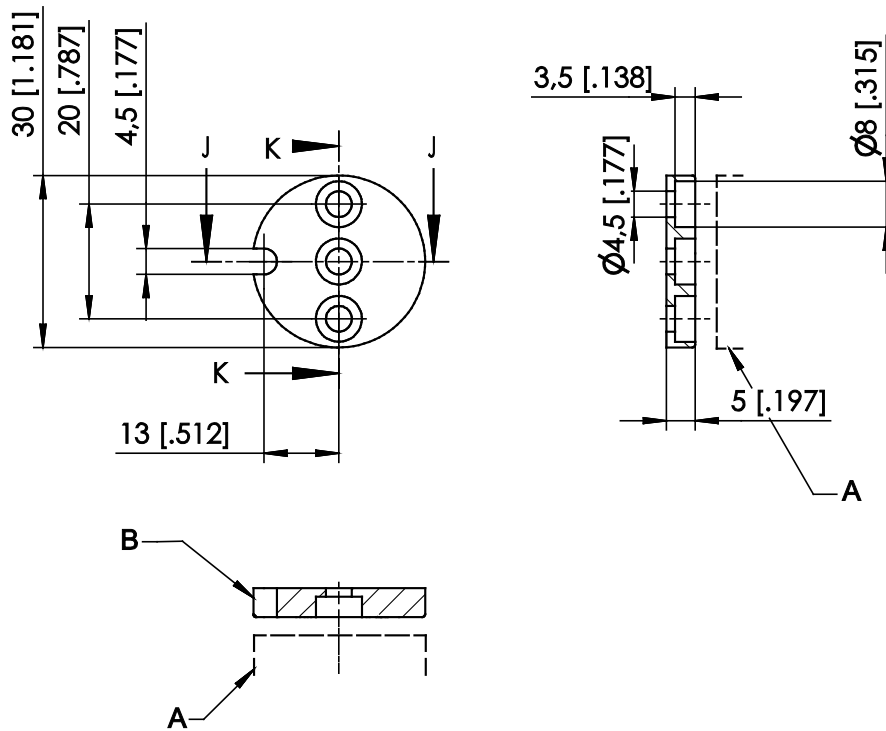


- A – Position magnet
- B – Measuring area
- C – Cable

Dimensions in mm [inch].
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

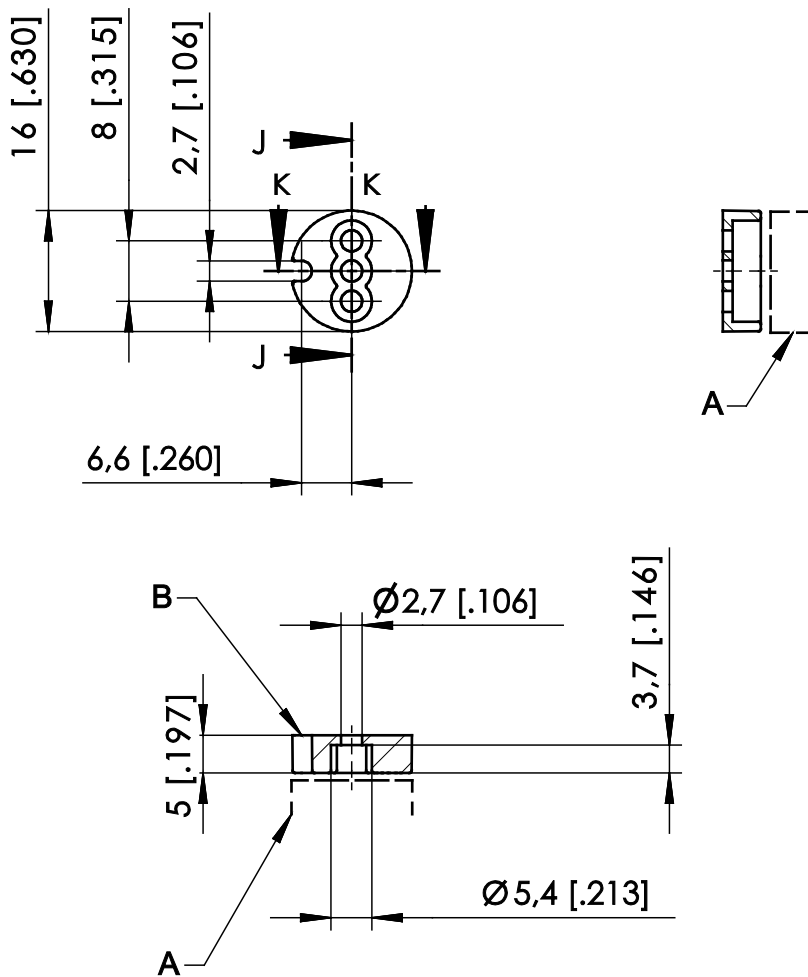
A misalignment of the position magnet has an effect on the linearity.

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

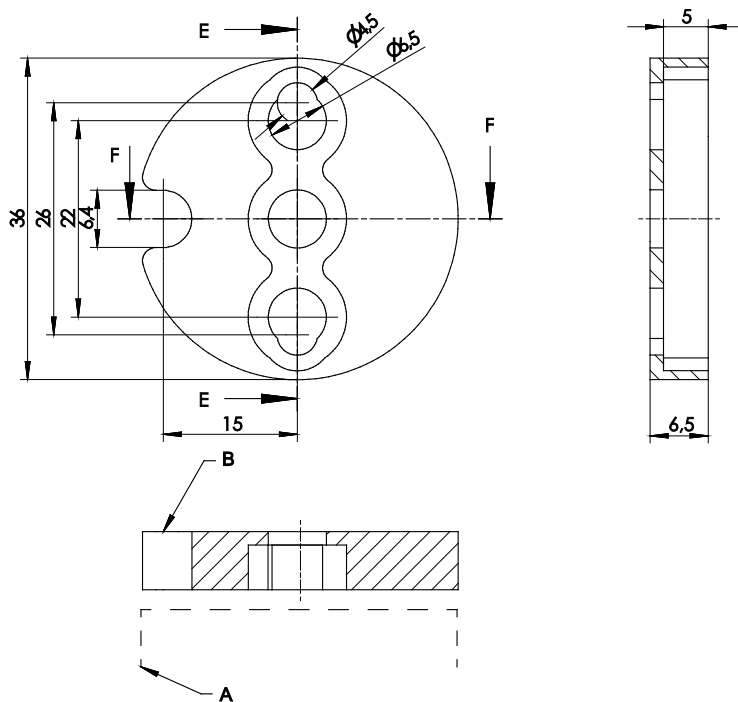
A misalignment of the position magnet has an effect on the linearity.

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

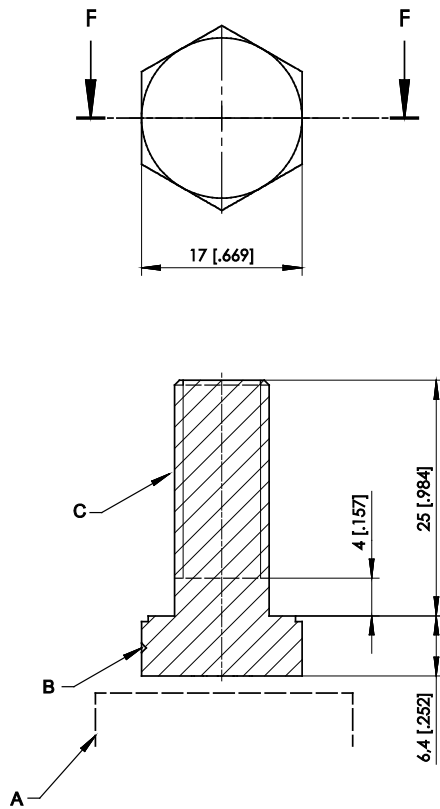
A misalignment of the position magnet has an effect on the linearity.

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

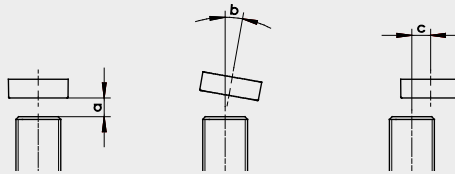
A misalignment of the position magnet has an effect on the linearity.

Dimensions in mm [inch].

Dimensions informative only.

For guaranteed dimensions please consult factory.

Measuring error by misalignment of the position magnet



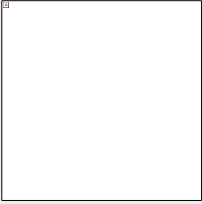
Air gap (a)
Parallelism (b)
Lateral offset (c)

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
PRAS29 PRDS29	PRMAG20	0 ... 7.5	0 ... 5	0.1	0.3	0.7	2	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	0.7	1.5	3.8	7
	PRMAG-M10	0 ... 3.5	0 ... 5	0.1	0.1	0.5	2	7	–

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

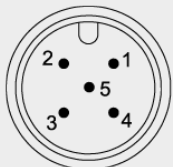
U2B Voltage output 0.5 ... 10 V 	Excitation voltage	11.5 ... 27 V DC
	Excitation current	typical 12 mA max. 16 mA
	Output voltage	0,5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical for 90° ... 360°) $\pm 100 \times 10^{-6}$ / °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)	±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
U8 Voltage output 0.5 ... 4.5 V 	Excitation voltage	11 ... 36 V DC
	Excitation current	typical 10 mA max. 20 mA
	Output voltage	0.5 ... 4.5 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

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

I1B Current output 4 ... 20 mA, 3 wires 	Excitation voltage	10 ... 27 V DC
	Excitation current	typical 32 mA max. 36 mA
	Load R _L	250 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, 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

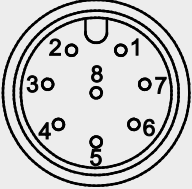
3-wire current 4...20 mA interface: GND has to be connected!

Analog output, redundant

U2R Voltage output 0.5 ... 10 V 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 10 mA max. 15 mA per channel
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz Standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °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
U6R Voltage output 10 ... 90 % ratiometric 	Excitation voltage	5 V DC ± 10 %
	Excitation current	typical 8 mA max. 12 mA per channel
	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	EN 61326-1:2013
U8R Voltage output 0.5 ... 4.5 V 	Excitation voltage	11 ... 36 V DC
	Excitation current	typical 10 mA max. 20 mA per channel
	Output voltage	0.5 ... 4,5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °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

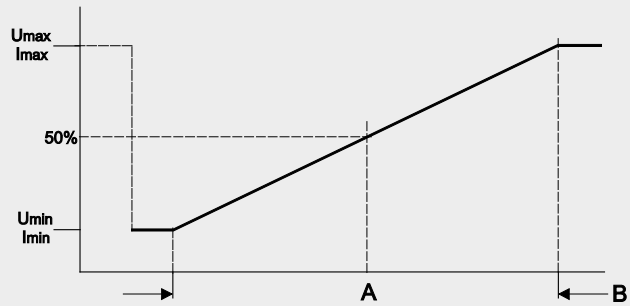
I1R Current output 4 ... 20 mA, 3 wires 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 30 mA max. 35 mA per channel
	Load R_L	500 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typical for 90° ... 360°) $\pm 100 \times 10^{-6}$ / °C f.s. (typical for <90°)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013

Analog output, 2 channels, redundant (connector and cable output)

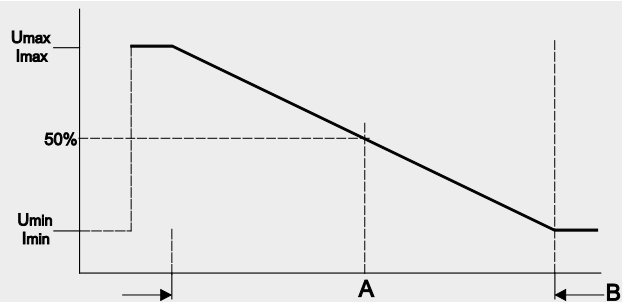
Signal wiring	Channel	Output signals	Connector pin no.	Cable color
Connector M12, 8 pin  View to the sensor connector	1	Excitation +	1	white
		Signal	2	brown
		GND	3	green
		Do not connect!	4	yellow
	2	Excitation +	5	grey
		Signal	6	pink
		GND	7	blue
		Do not connect!	8	red

Characteristics for magnetic angle sensors

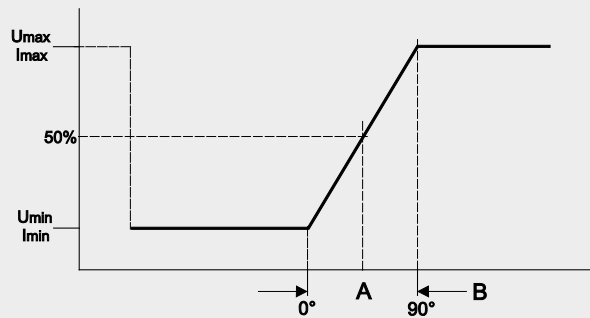
Output signal CW (clockwise increasing)



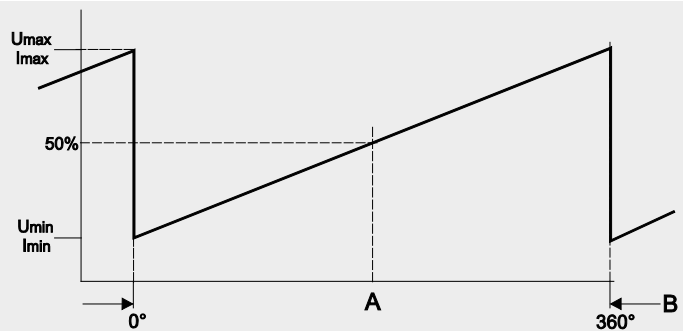
Output signal CCW (counterclockwise increasing)



Example angular range 90°



Example angular range 360°



A – Marking

B – Measurement range [°]

