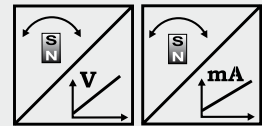


POSIROT® PRAS3 Magnetic Angle Sensor with Analog Output



Magnetic angle sensor 0 - 360° in a 36 mm dia. housing

- Measurement range 0 - 360°+
- Protection class IP67 / IP69K
- Analog output
- With 10 mm shaft or 6 mm hollow shaft
- Magnetic measurement principle
- Redundant second channel as option



Specifications	Outputs	U6	Voltage 0.5 ... 4.5 V ratiometric
		U2	
	I1		Current 4 ... 20 mA, 3 wire
	Measurement range		0 ... 15° to 0 ... 360° in increments of 15°
	Resolution		0.03 % (60 ... 360); 0.1 % (15 ... 45°)
	Repeatability		±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity		±0.3 % f.s. (typ.)
	Protection class		IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output, option IP67/IP69K)
	Signal characteristics		CW, CCW
	Material		Aluminium
	Mounting		Clamps, mounting plate
	Shock		EN60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration		EN60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles
	Life cycle of bearings		100 x 10 ⁶ revolutions (<1500 r.p.m.)
	Revolutions per minute (mech.)		Max. 10,000 r.p.m.
	Allowable shaft load		100 N radial, 100 N axial

Order Code PRAS3

Model name

Shaft

V = 10 mm shaft

H = 6 mm hollow shaft

Measurement range 15 ... 360° in increments of 15°

15 / 30 / 45 / ... / 345 / 360

Output (see page 46)

U6 = 0.5 ... 4.5 V ratiometric

U2 = 0.5 ... 10 V

I1 = 4 ... 20 mA, 3 wire

Signal characteristics

CW = Signal increasing CW

CCW = Signal increasing CCW

Connection

KAB2M/KAB2M69K = Cable, standard length 2 m, IP67/IP69K

M12A5/M12R5 = 5-pin socket M12 axial/radial (compatible with 4-pin connector)

Order code mounting clamps (set of 3 pieces)

PRPT-BFS1

Order code connector cable (see accessories page 90)

KAB-2M-M12/4F/G-LITZE

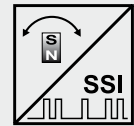
Order example: PRAS3 - V - 360 - I1 - CW - KAB2M

POSIROT®
PRDS3
Magnetic Angle Encoder with SSI Output



Magnetic angle encoder 0 - 360 degrees in a 36 mm dia. housing

- Measurement range 0 - 360°
- Protection class IP67 / IP69K
- Synchronous serial output (SSI)
- With 10 mm shaft or 6 mm hollow shaft
- Magnetic measurement principle



Specifications	Output	Synchronous serial (SSI)
	Measurement range	0 ... 360°
	Resolution	12 bit (4096 steps) per revolution
	Repeatability	±0.1° (typ.)
	Linearity	±1° (typ.)
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output, option IP67/IP69K)
	Code characteristics	CW, CCW
	Material	Aluminium
	Mounting	Clamps, mounting plate
	Shock	EN60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles
	Life cycle of bearings	100 x 10 ⁶ revolutions (<1500 r.p.m.)
	Revolutions per minute (mech.)	Max. 10,000 r.p.m.
	Allowable shaft load	100 N radial, 100 N axial

Order Code PRDS3



Model name

Shaft

- V = 10 mm shaft
- H = 6 mm hollow shaft

Output (see page 49)

- RSSI5V = Synchronous serial output with excitation 5 V DC
- RSSI24V = Synchronous serial output with excitation 10 ... 36 V DC

Code characteristics

- CW = Code increasing CW
- CCW = Code increasing CCW

Connection

- KAB2M/KAB2M69K = Cable, standard length 2 m (not with RSSI5V), IP67/IP69K
- M12A8/M12RR8 = 8-pin socket M12 axial/radial

Order code mounting clamps (set of 3 pieces)

PRPT-BFS1

Order code connector cable (see accessories page 90)

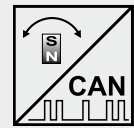
KAB-2M-M12/8F/G-LITZE

Order example: PRDS3 - V - RSSI24V - CW - KAB2M



Magnetic angle encoder 0 - 360 degrees in a 36 mm dia. housing

- Measurement range 0 - 360°
- Protection class IP67 / IP69K
- CANopen output
- With 10 mm shaft or 6 mm hollow shaft
- Magnetic measurement principle



Specifications		
Output	CANopen-Bus (Encoder CiA 406 V 3.2)	
Measurement range	0 to 360°	
Resolution	0.05° max.	
Linearity	±1° (typ.)	
Protection class	IP67/IP69K (connector output with IP69K connector cable); IP67 (cable output, option IP67/IP69K)	
Material	Aluminium	
Mounting	Clamps, mounting plate	
Connection	5-pin socket M12 radial or axial	
Shock	EN60068-2-27:1993, 100 g/11 ms, 100 shocks	
Vibration	EN60068-2-6:1995, 20 g/10 Hz-2 kHz, 10 cycles	
Life cycle of bearings	100 x 10 ⁶ revolutions (<1500 r.p.m.)	
Revolutions per minute (mech.)	Max. 10,000 r.p.m.	
Allowable shaft load	100 N radial, 100 N axial	
EMC, Temperature	Refer to output specification	

Order Code PRDS3

Model name

Shaft

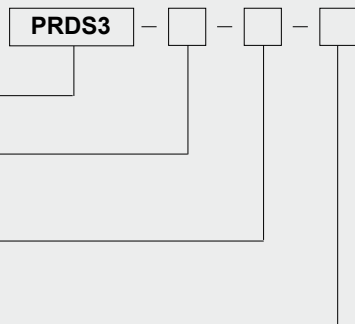
- V = 10 mm shaft
- H = 6 mm hollow shaft

Output (see page 50/51)

- CANOP = CANopen
- CANJ1939 = CAN SAE J1939

Connection

- M12R5/CAN = 5-pin socket M12 radial
- M12A5/CAN = 5-pin socket M12 axial



Order code mounting clamps (set of 3 pieces)

PRPT-BFS1

Order code connector cable (see accessories page 91)

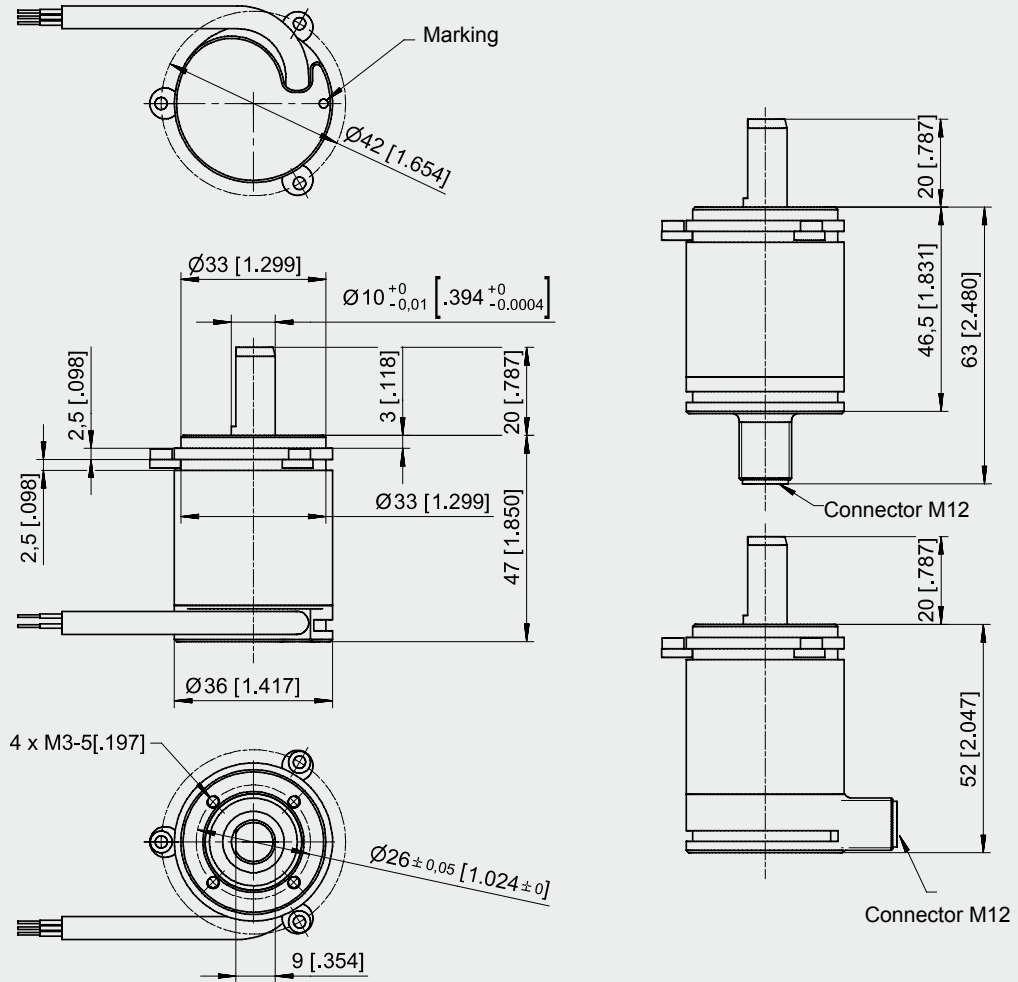
KAB - XM - M12/5F/G - M12/5M/G - CAN

Order example: PRDS3 - V - CANOP - M12A5/CAN

POSIROT®
PRAS3/PRDS3
Dimensions



**Outline drawing
 sensor with shaft**



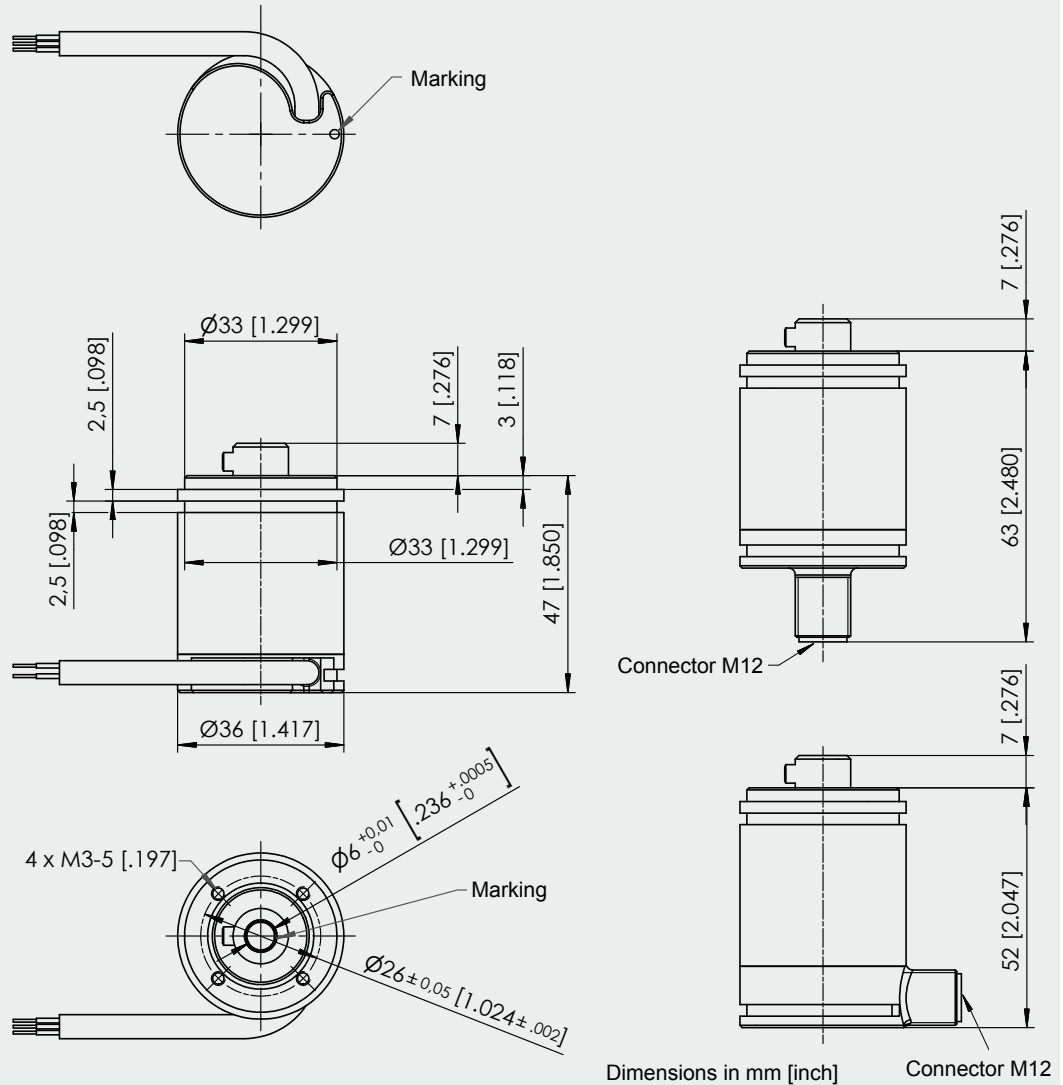
Dimensions in mm [inch]

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

POSIROT®
PRAS3/PRDS3
Dimensions



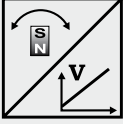
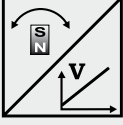
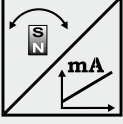
**Outline drawing
 sensor with hollow shaft**



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

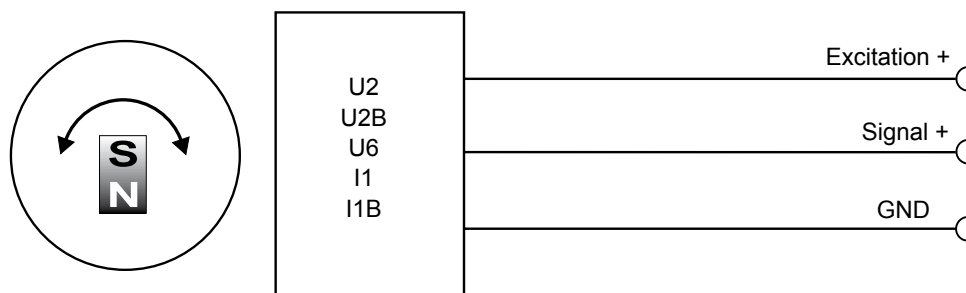
POSIROT®
PRAS
Analog outputs U2(B), U6 and I1(B)



U2; U2B Voltage Output 0.5 ... 10 V 	Excitation voltage	U2: 18 ... 36 V DC; U2B: 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)	±50 x 10 ⁻⁶ / °C f.s. (typ.) for 90°...360° ±100 x 10 ⁻⁶ / °C f.s. (typ.) for <90°
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
EMC	EN61326-1:2006	
U6/5; U6/8,25 Voltage Output 10 ... 90% ratiometr. 	Excitation voltage	5V DC ±10 % / 8.25 V DC ±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)	±50 x 10 ⁻⁶ / °C f.s. (typ.) for 90°...360° ±100 x 10 ⁻⁶ / °C f.s. (typ.) for <90°
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
EMC	EN61326-1:2006	
I1; I1B Current Output 4 ... 20 mA, 3 wire 	Excitation voltage	I1: 18 ... 36 V DC; I1B: 10 ... 18 V DC
	Excitation current	32 mA typ., 36 mA max.
	Load resistor	I1: 500 Ω max.; I1B: 250 Ω max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	±50 x 10 ⁻⁶ / °C f.s. (typ.) for 90°...360° ±100 x 10 ⁻⁶ / °C f.s. (typ.) for <90°
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
EMC	EN61326-1:2006	

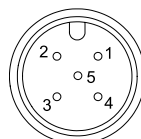
Other outputs available on request.

Output signals



Signal Wiring	Output signals	Connector pin	Cable color
	Excitation +	1	brown
	Signal	2	white
	GND	3	blue
	Do not connect!	4	black
	Do not connect!	5	-

Connection



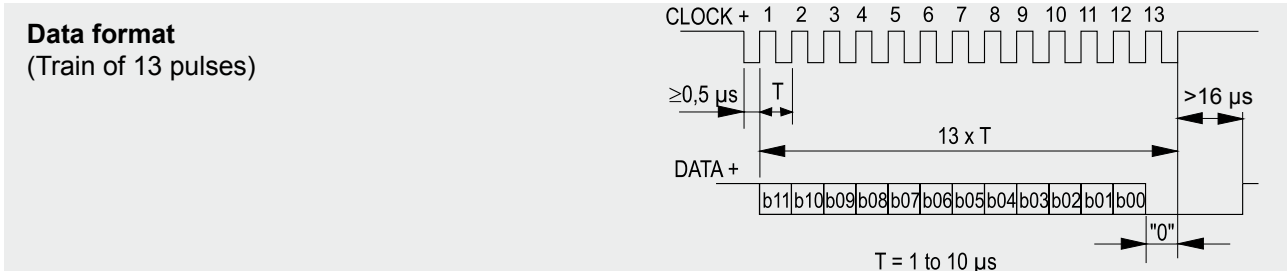
M12A5 / M12R5

View to sensor connector

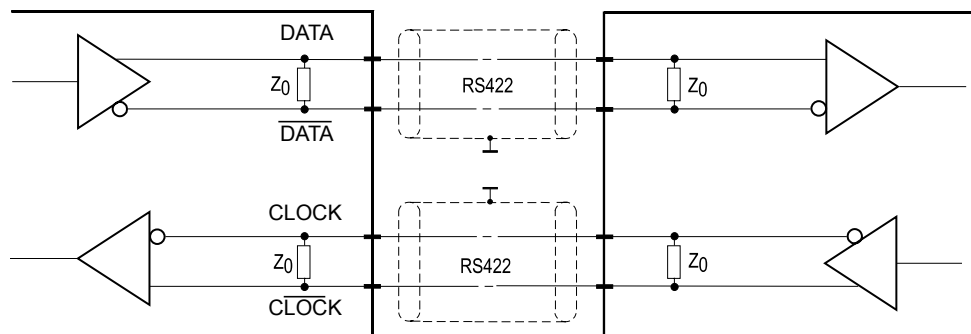
POSIROT®
PRDS
Output RSSI5V / RSSI24V



RSSI5V / RSSI24V Synchronous serial 	Interface	EIA RS-422
	Excitation voltage	RSSI5V: 5 V DC $\pm 10\%$; RSSI24V: 10 ... 36 V DC
	Excitation current	100 mA max. without load
	Clock frequency	100 kHz ... 1 MHz
	Code	Single step Gray code 12 Bit
	Resolution	12 Bit
	Delay between pulse trains	20 μ s min.
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s. (typ.)
	Operating temperature	-40 ... +85 °C
	Protection	Short circuit
EMC	EN61326-1:2006	



Recommended processing input circuit

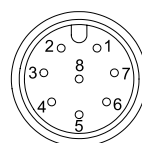


Cable length	Baud rate
50 m	100-1000 kHz
100 m	100-300 kHz

Note:
 Extension of the cable length will reduce the maximum transmission rate. The signals CLOCK /CLOCK and DATA/DATA must be connected in a twisted pair cable, shielded per pair and common.

Signal wiring	Signal name	Connector pin no.	Cable color
	Excitation +	1	white
	Excitation GND	2	brown
	CLOCK	3	green
	CLOCK	4	yellow
	DATA	5	grey
	DATA	6	pink


Connection



View to sensor connector

M12A8 / M12R8

Description Magnetic angle encoder with CANopen interface according to CiA 406.

<p>CANopen</p> 	Communication profile	CANopen CiA 301 V 4.02, Slave
	Device profile	Encoder CiA 406 V 3.2
	Configuration services	Layer Setting Service (LSS), CiA Draft Standard 305 (transmission rate, node id)
	Error Control	Node Guarding, Heartbeat, Emergency Message
	Node ID	Default: 127; programmable via LSS or SDO
	PDO	3 TxPDO, 0 RxPDO, static mapping
	PDO Modes	Event-/Time triggered, Remote-request, Sync cyclic/acyclic
	SDO	1 server, 0 Client
	CAM	8 cams
	Certified	Yes
	Transmission rates	50 kBaud to 1 MBaud, default: 125 kBaud; programmable via LSS or SDO
	Bus connection	M12 connector, 5 ping
	Integrated bus terminating resistor	Optional
	Bus, galvanic isolated	No

<p>Specifications</p>	Excitation voltage	8 ... 36 V DC
	Excitation current	Typ. 15/30 mA for 24/12 V, max. 100 mA
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	$\pm 50 \times 10^{-6}$ / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-40 ... +105 °C
	Protection	Reverse polarity, short circuit
	Dielectric strength	1 kV (V AC, 50 Hz, 1 min.)
	EMC Automation	EN61326-1:2006

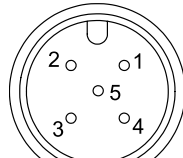
Description Angle encoder according to standard SAE J1939. Customer configuration of operating parameters by Peer-to-Peer. Process data exchange by Broadcast message. Node-Id distribution by address claiming (ACL).

Interface J1939 	CAN specification	ISO 11898, Basic and Full CAN 2.0 B
	Transceiver	24V-compliant, not isolated
	Communication profile	SAE J1939
	Baud rate	250 kbit/s
	Internal termination resistor	120 Ω
	Address	Default 247d, configurable

NAME Fields	Arbitrary address capable	1	Yes
	Industry group	0	Global
	Vehicle system	7Fh (127d)	Non specific
	Vehicle system instance	0	
	Function	FFh (255d)	Non specific
	Function instance	0	
	ECU instance	0	
	Manufacturer	145h (325d)	Manufacturer ID
	Identity number	0nnn	Serial number 21 bit

Parameter Group Numbers (PGN)	Configuration data	PGN EF00h	Proprietary-A (PDU1 peer-to-peer)
	Process data	PGN FFnnh	Proprietary-B (PDU2 broadcast); nn Group Extension (PS) configurable

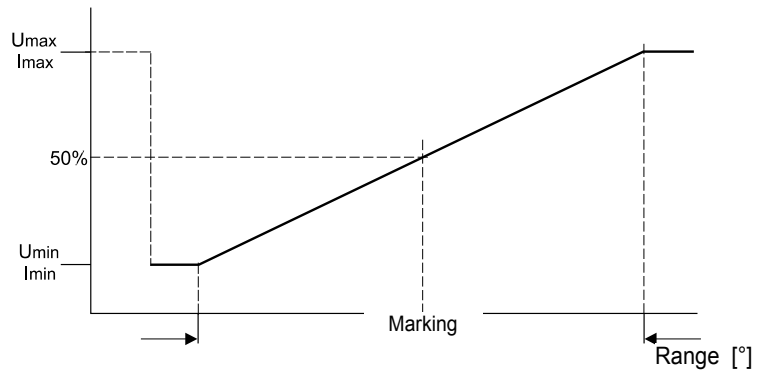
Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	Typ. 15/30 mA for 24/12 V, max. 100 mA
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 ⁻⁶ / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-40 ... +105 °C
	Protection	Reverse polarity, short circuit
	Dielectric strength	1 kV (V AC, 50 Hz, 1 min.)
	EMC	EN61326-1:2006

Signal wiring / connection	Signal name	Connector pin	Wire color	View to sensor connector 
	Shield	1	Black+grey	
	Excitation +	2	White	
	GND	3	Brown	
	CAN-H	4	Green	
	CAN-L	5	Yellow	

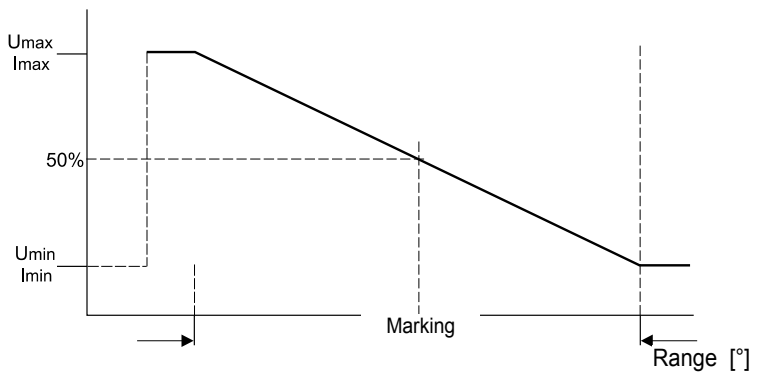
POSIROT[®]
PRAS/PRDS
Characteristics for magnetic angle sensors



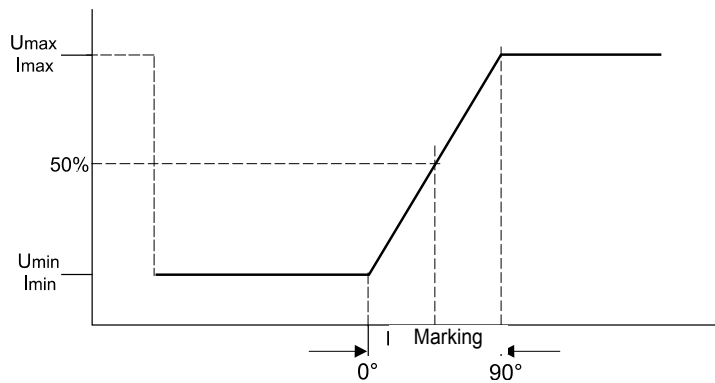
Output signal
 (CW increasing)



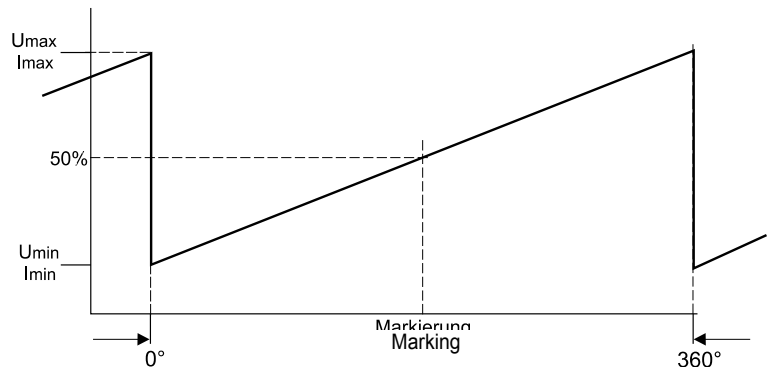
Output signal
 (CCW increasing)



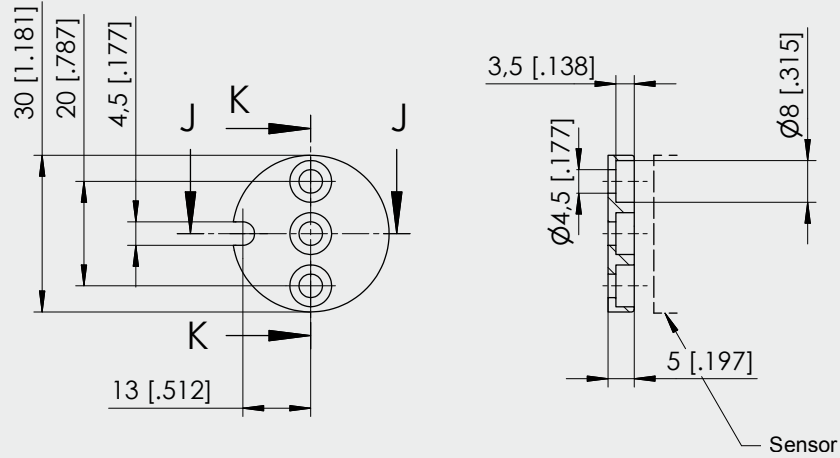
Example angular
range 90°



Example angular
range 360°

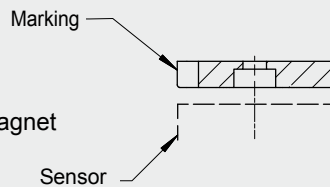


PRMAG20

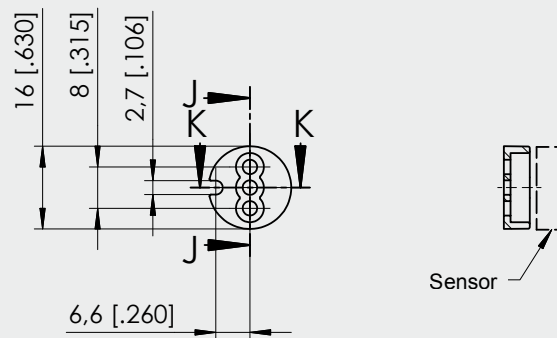


Weight 11 g approx.,
 moment of inertia 1.2 kgmm²

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

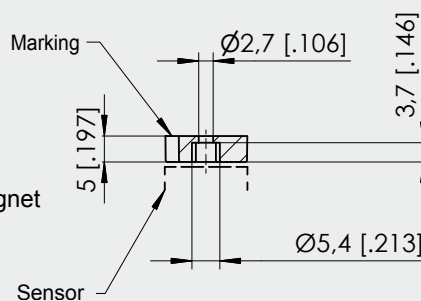


PRMAG21



Weight 3 g approx.,
 moment of inertia 0.1 kgmm²

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



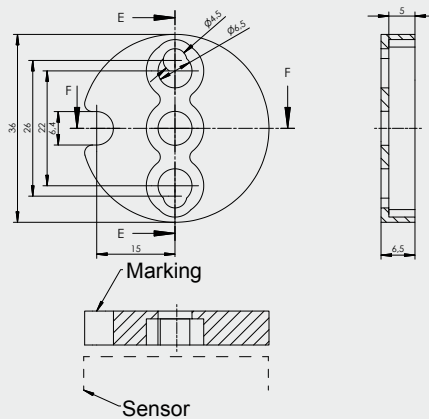
Dimensions in mm [inch]

Dimensions informative only
 For guaranteed dimensions please consult factory

PRMAG22

Weight 17 g approx.,
 moment of inertia 3 kgmm²

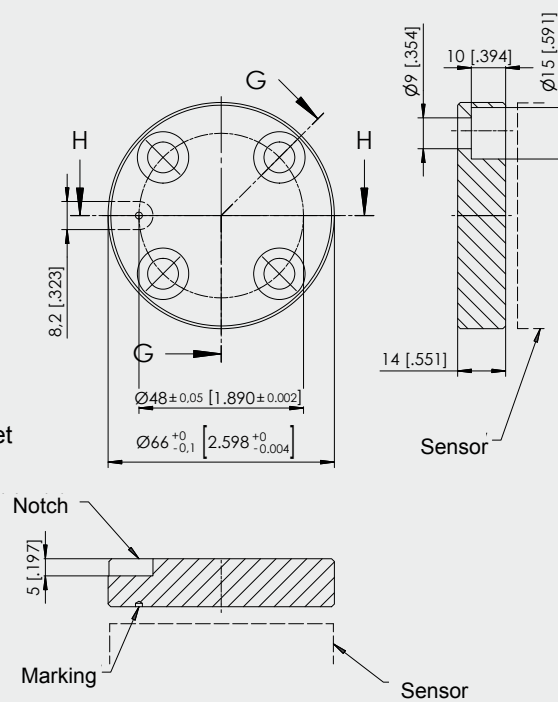
A misalignment of the position magnet
 has an effect on the linearity



PRMAG5Z

Weight 100 g approx.,
 moment of inertia 55 kgmm²

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

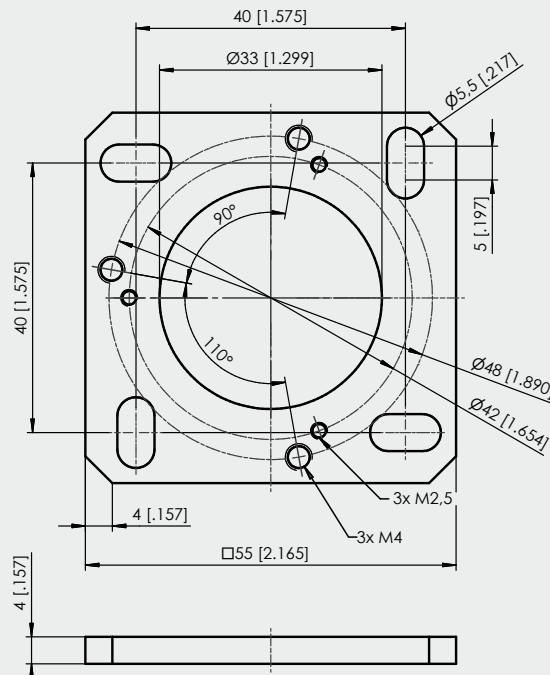


Dimensions in mm [inch]

Dimensions informative only
 For guaranteed dimensions please consult factory

PRPT-BPL1

(screw mounting)
 For PRAS2, PRDS2,
 PRAS3, PRDS3



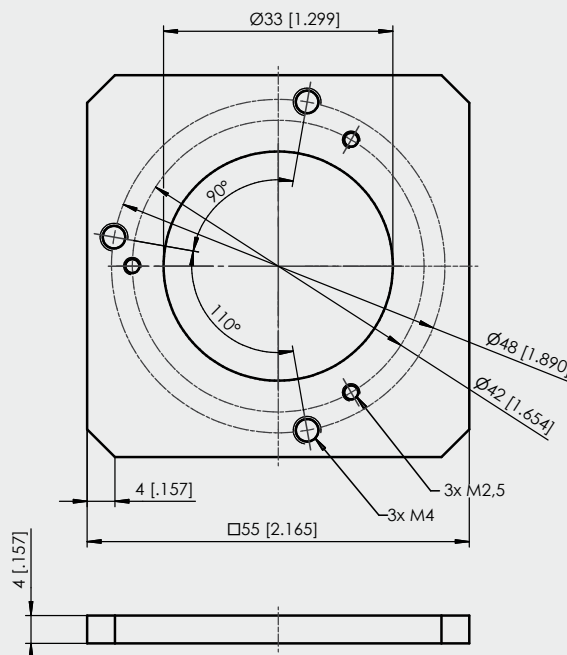
In combination with the
 mounting clamps
 PRPT-BFS1 (3 x M2.5)
 or
 in combination with the
 mounting bracket
 PRPT-BFS2 (3 x M4).

Dimensions in mm [inch]

Weight 30 g approx.
 Dimensions informative only.
 For guaranteed dimensions please consult factory.

PRPT-BPL2

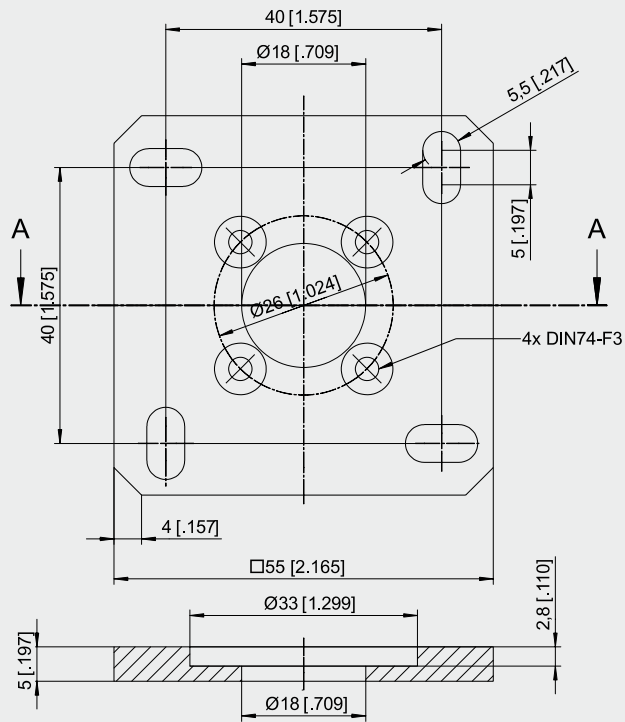
(welding assembly)
 For PRAS2, PRDS2,
 PRAS3, PRDS3



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

PRPT-BPL3

For PRAS3, PRDS3



Dimensions in mm [inch]

Weight 30 g approx.

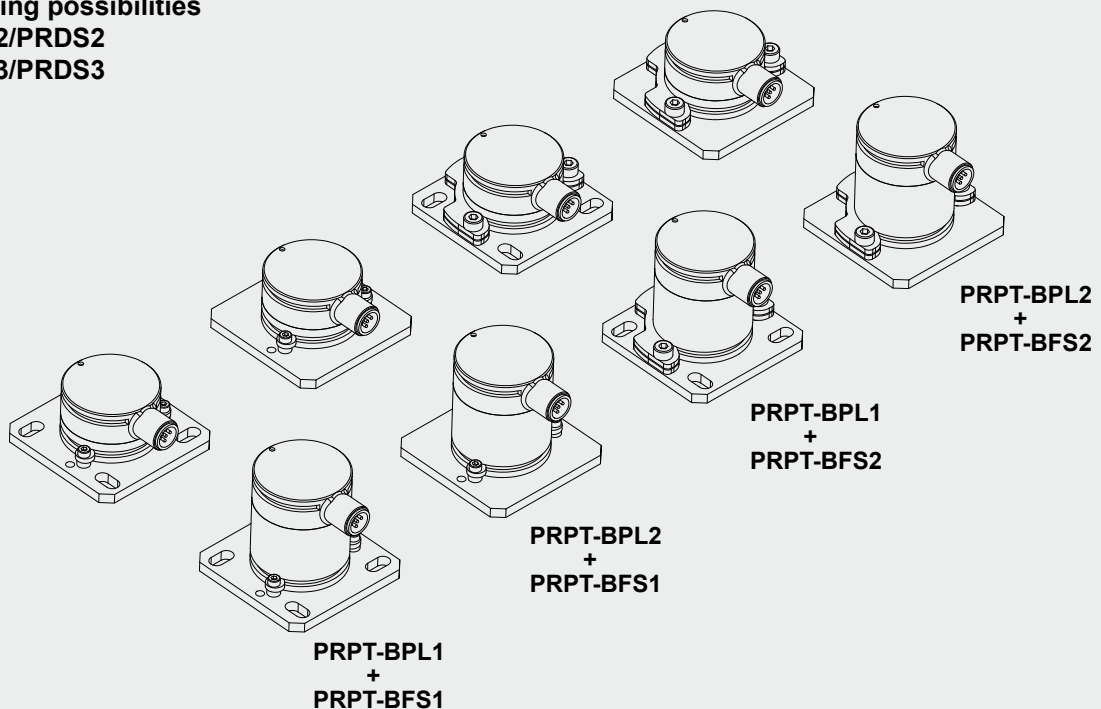
Dimensions informative only.

For guaranteed dimensions please consult factory.

Mounting possibilities

PRAS2/PRDS2

PRAS3/PRDS3



POSIROT® / POSITILT®

Accessories

Connector Cables



Connector cable for POSIROT®-POSITILT® sensors
4 pins M12

Suitable for 5-pin sensor connectors M12A5 and M12R5

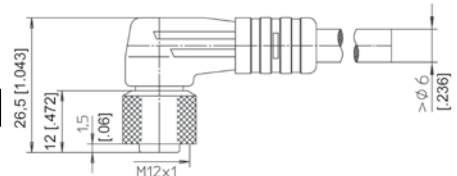
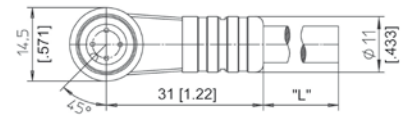
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

Length in m



Connector cable for POSIROT®-POSITILT® sensors
4 pins M12

Suitable for 5-pin sensor connectors M12A5 and M12R5

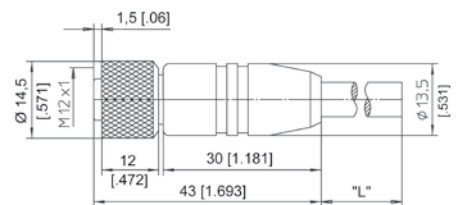
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

Length in m



Signal wiring M12, 4 pin	Connector pin / cable color			
	1	2	3	4
	Brown	White	Blue	Black

Connector cable for POSIROT®-POSITILT® sensors
8 pins M12

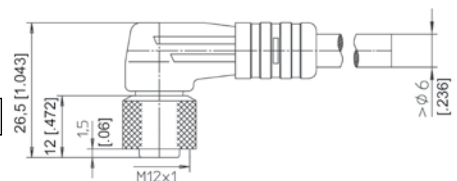
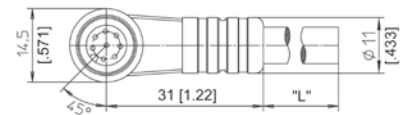
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

Length in m



Connector cable for POSIROT®-POSITILT® sensors
8 pins M12

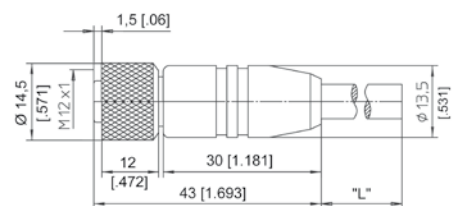
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

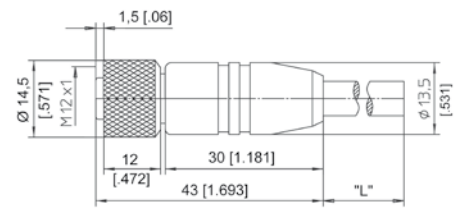
Length in m



Signal wiring M12, 8 pin	Connector pin / cable color							
	1	2	3	4	5	6	7	8
	White	Brown	Green	Yellow	Grey	Pink	Blue	Red

**Connector/bus cable
for POSIROT®-
POSITILT® sensors**
5 pin M12
CAN bus

The 5-lead shielded cable is supplied with a female 5-pin M12 connector at one end and a male 5-pin M12 connector at the other end. Available lengths are 2, 5 and 10 m.



Order code:

KAB - XM - M12/5F/G - M12/5M/G - CAN

IP69K: KAB - XM - M12/5F/G/69K - M12/5M/G/69K - CAN

Length in m

T-piece for bus cable
5 pin M12
CAN bus

Order code:

KAB - TCONN - M12/5M - 2M12/5F - CAN



**Terminating
resistance**
5 pin M12
CAN bus

Order code:

KAB - RTERM - M12/5M/G - CAN

