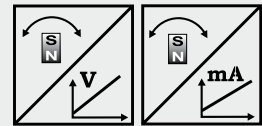


POSIROT®
PRAS2
Magnetic Angle Sensor with Analog Output



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

- Measurement range 0 to 360°
- Protection class IP67 / IP69K
- Analog output
- Flat housing – 20 mm thickness
- Non-contact with external position magnet
- Wear free
- Redundant second channel as option
- SIL in preparation



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 15° increments
	Resolution		0.03 % (60 ... 360°); 0.1 % (15 ... 45°)
	Repeatability		±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity		±0.3 % f.s. (typ.)
	Rated distance sensor / magnet		Depending on the position magnet
	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

Order Code PRAS2

Model name

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

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 position magnet (see accessories page 53/54)

PRMAG ...

Order code connector cable (see accessories page 90)

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

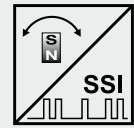
Order example: PRAS2 - 360 - I1 - CW - KAB2M

POSIROT®
PRDS2
Magnetic Angle Encoder with SSI Output



Magnetic angle encoder 0 - 360° in a flat housing with 36 mm dia.

- Measurement range 0 to 360°
- Protection class IP67 / IP69K
- Synchronous serial output (SSI)
- Flat housing – 20 mm thickness
- Non-contact with external position magnet
- Wear free



Specifications		Synchronous serial (SSI)
Output		Synchronous serial (SSI)
Measurement range		0 ... 360°
Resolution		12 bit (4096 steps) per revolution
Repeatability		±0.1° (typ.)
Linearity		±1° (typ.)
Rated distance sensor / magnet		Depending on the position magnet
Max. revolutions		30,000 r.p.m.
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

Order Code PRDS2

Model name

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

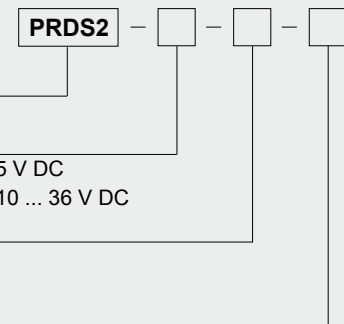
CW = Code increasing CW

CCW = Code increasing CCW

Connection

KAB2M/KAB2M69K = Cable, standard length 2 m (not with RSSI5V), IP67/IP69K

M12A8/M12R8 = 8-pin socket M12 axial/radial



Order code mounting clamps (set of 3 pieces)

PRPT-BFS1

Order code position magnet (see accessories page 53/54)

PRMAG ...

Order code connector cable (see accessories page 90)

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

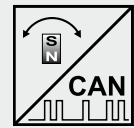
Order example: PRDS2 - RSSI24V - CW - KAB2M

POSIROT®
PRDS2
Magnetic Angle Encoder with CANopen output



Magnetic angle encoder 0 - 360° in a flat housing with 36 mm dia.

- Measurement range 0 to 360°
- Protection class IP67 / IP69K
- CANopen output
- Flat housing – 20 mm thickness
- Non-contact with external position magnet
- Wear free



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
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
EMC, Temperature		Refer to output specification

Order Code PRDS2

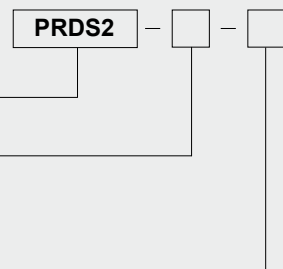
Model name

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 connector cable (see accessories page 91)

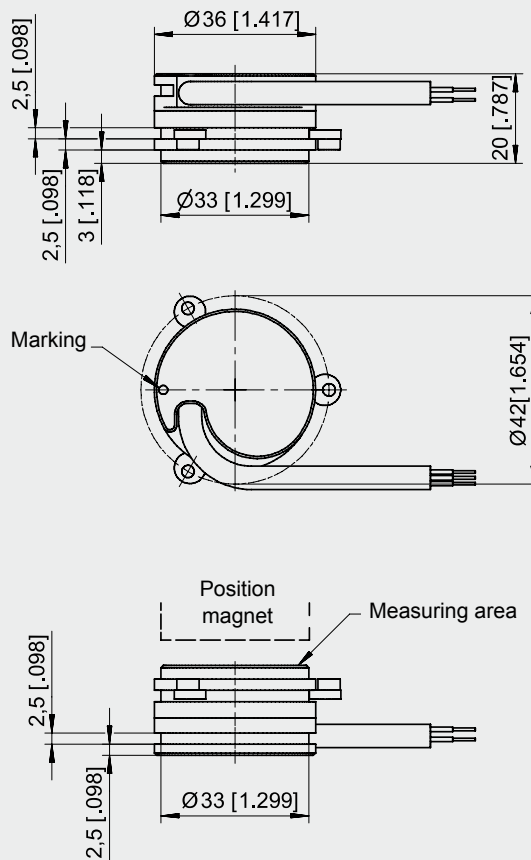
KAB - XM - M12/5F/G - M12/5M/G - CAN

Order example: PRDS2 - CANOP - M12A5/CAN

POSIROT®
PRAS2/PRDS2
Dimensions



**Outline drawing
sensor with cable
output**

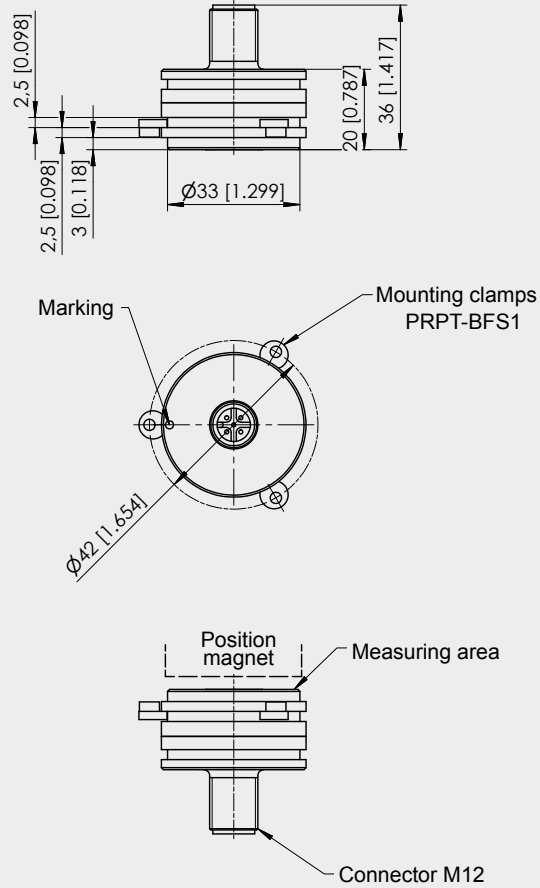


Weight without cable approx. 40 g.
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSIROT®
PRAS2/PRDS2
Dimensions

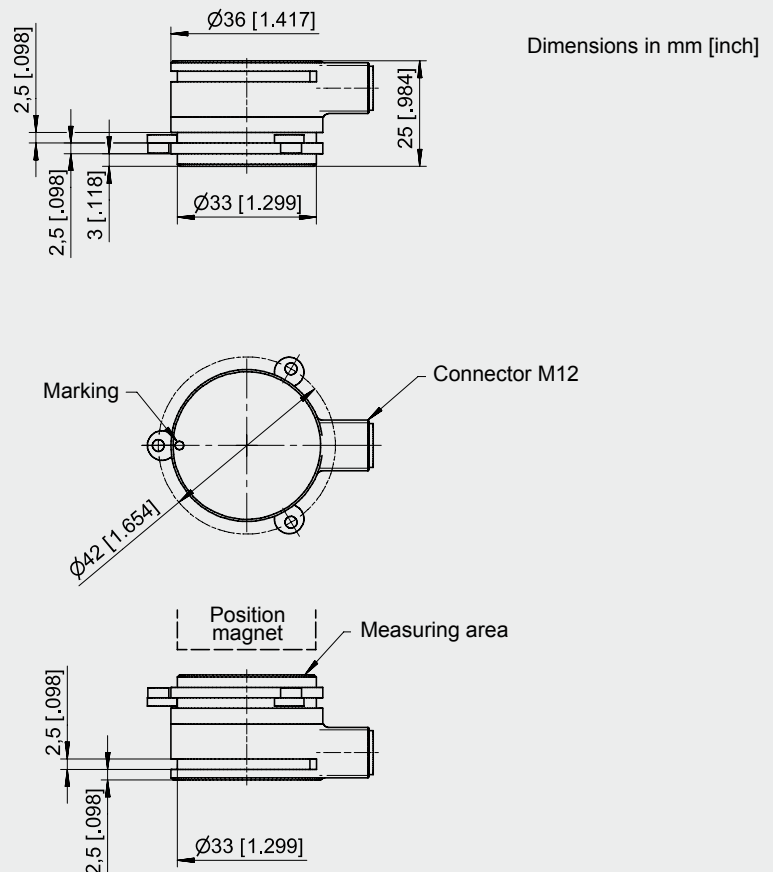


**Outline drawing
 sensor M12 axial**



Weight without cable approx. 50 g.
 Dimensions informative only.
 For guaranteed dimensions please
 consult factory.

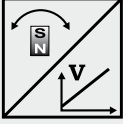
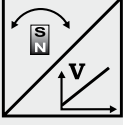
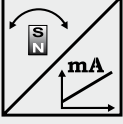
**Outline drawing
 sensor M12 radial**



Weight without cable approx. 50 g.
 Dimensions informative only.
 For guaranteed dimensions please
 consult factory.

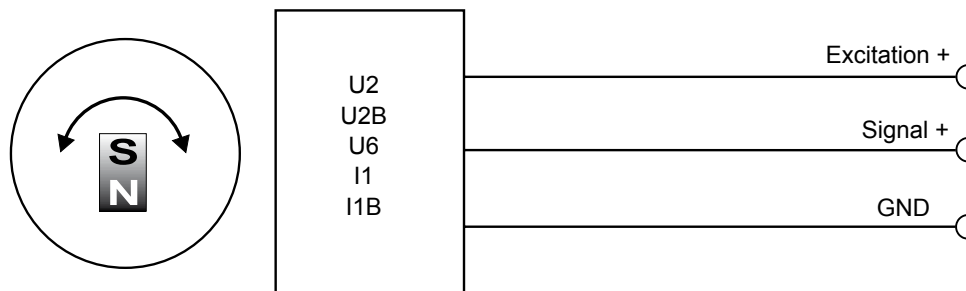
POSIROT®
PRAS
Analog outputs U2(B), U6 and I1(B)



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 (+105 °C as option)
	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 (+125 °C as option)
	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	

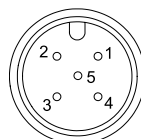
Other outputs available on request.

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



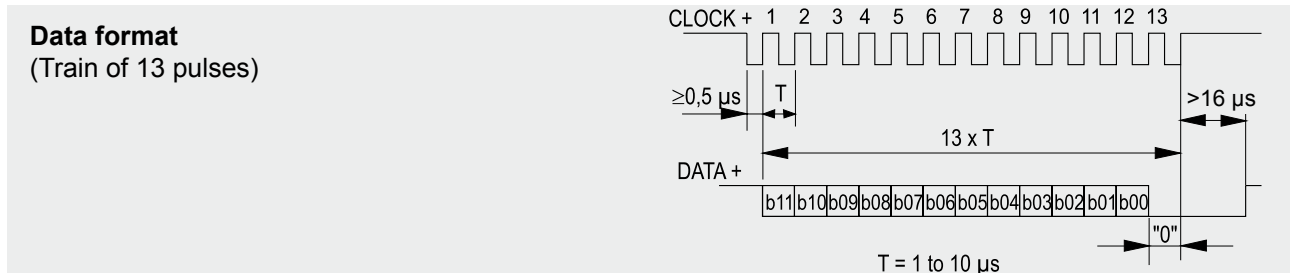
M12A5 / M12R5

View to sensor
connector

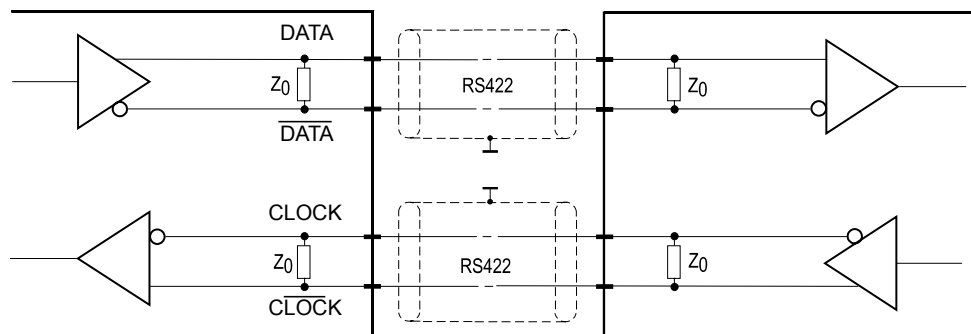
POSIROT®
PRDS
Output RSSI5V / RSSI24V



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

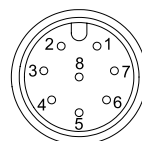


Cable length	Baud rate
50 m	100-1000 kHz
100 m	100-300 kHz

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.

CANopen 	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

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 Automation	EN61326-1:2006

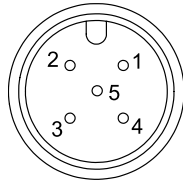
Description Angle encoder according to standard SAE J1939. Customer configuration of operating parameters by Peer-to-Peer. Process data exchange by Broadcast message. Node-Id distribution by address claiming (ACL).

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

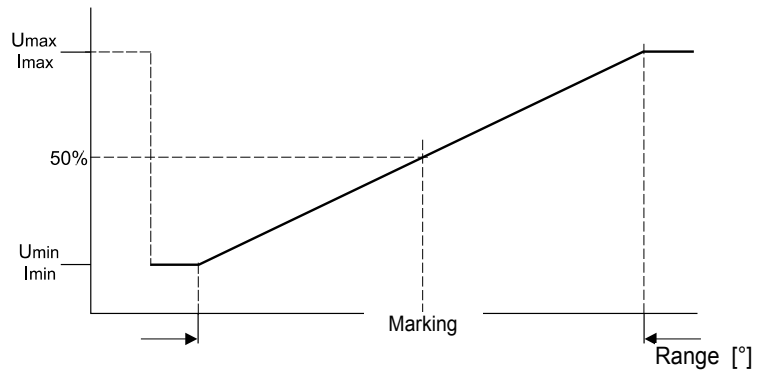
Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	Typ. 15/30 mA for 24/12 V, max. 100 mA
	Measuring rate	1 kHz (asynchronous)
	Stability (temperature)	±50 x 10 ⁻⁶ / °C f.s.
	Repeatability	1 LSB
	Operating temperature	-40 ... +105 °C
	Protection	Reverse polarity, short circuit
	Dielectric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

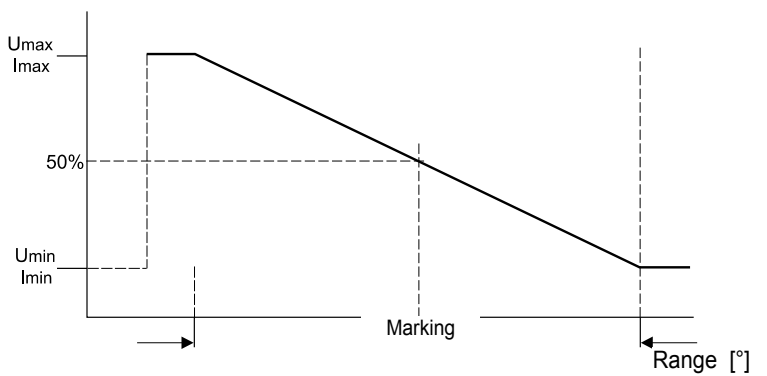
POSIROT[®]
PRAS/PRDS
Characteristics for magnetic angle sensors



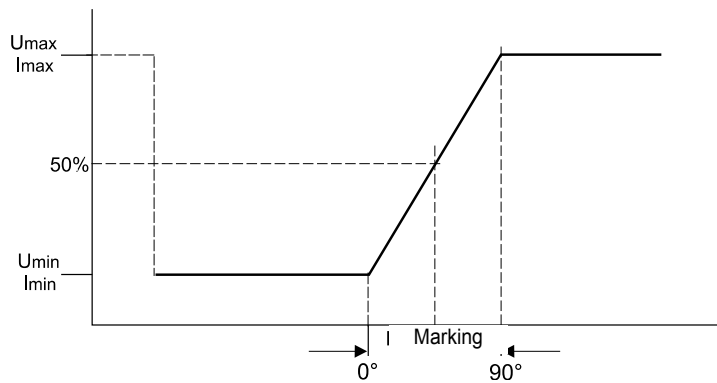
Output signal
 (CW increasing)



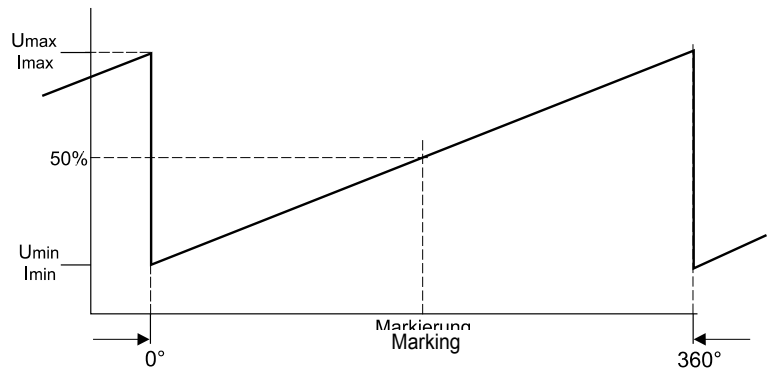
Output signal
 (CCW increasing)



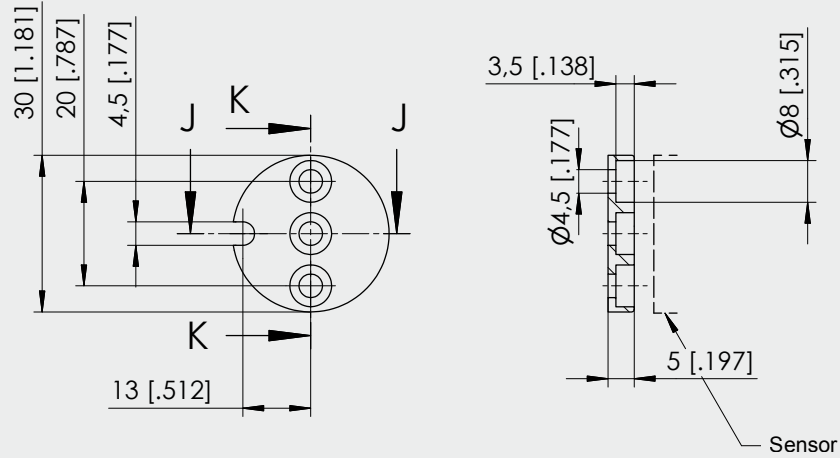
Example angular
range 90°



Example angular
range 360°

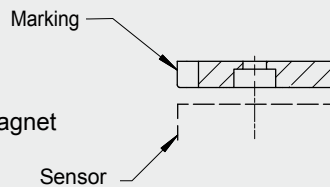


PRMAG20

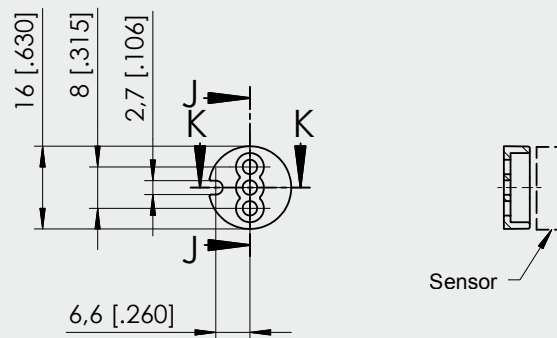


Weight 11 g approx.,
 moment of inertia 1.2 kgmm²

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

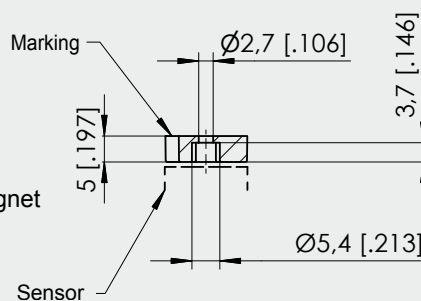


PRMAG21



Weight 3 g approx.,
 moment of inertia 0.1 kgmm²

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



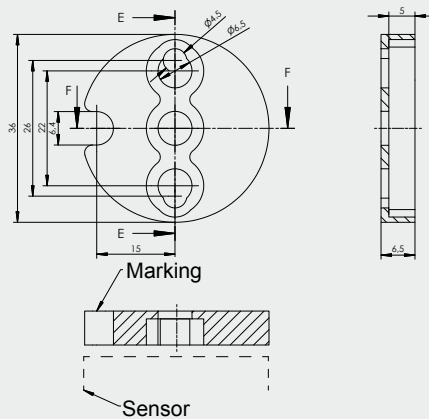
Dimensions in mm [inch]

Dimensions informative only
 For guaranteed dimensions please consult factory

PRMAG22

Weight 17 g approx.,
 moment of inertia 3 kgmm²

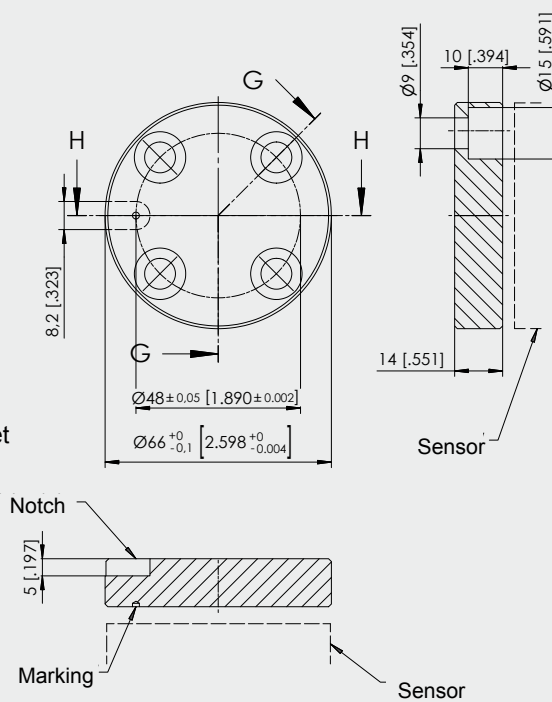
A misalignment of the position magnet
 has an effect on the linearity



PRMAG5Z

Weight 100 g approx.,
 moment of inertia 55 kgmm²

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

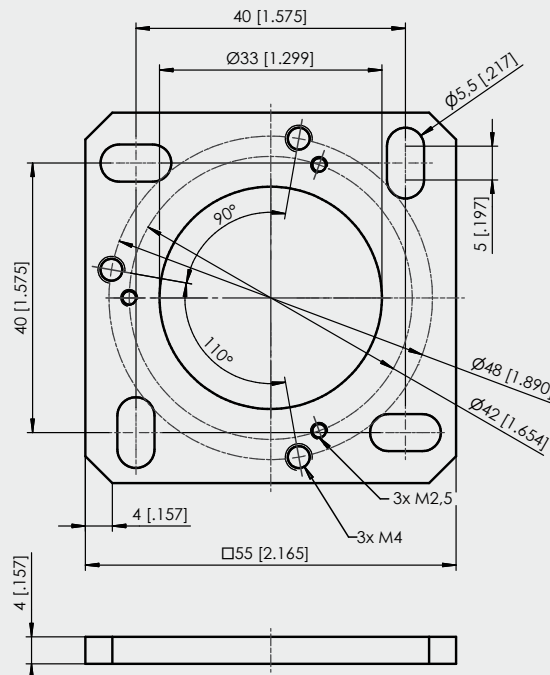


Dimensions in mm [inch]

Dimensions informative only
 For guaranteed dimensions please consult factory

PRPT-BPL1

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



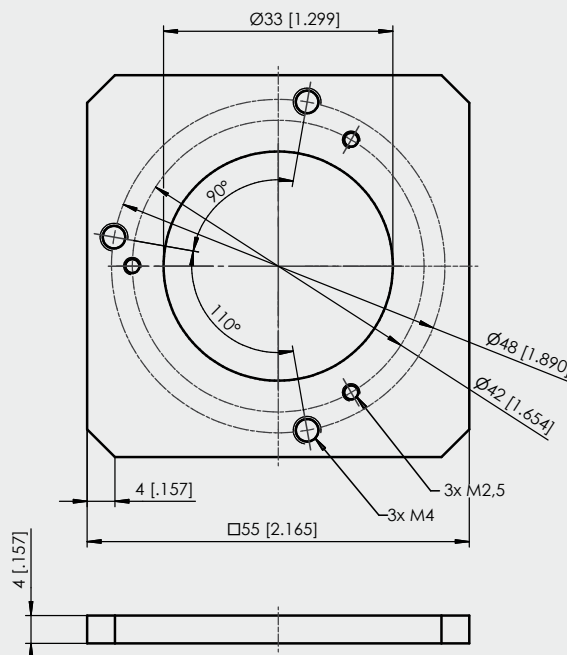
In combination with the
 mounting clamps
 PRPT-BFS1 (3 x M2.5)
 or
 in combination with the
 mounting bracket
 PRPT-BFS2 (3 x M4).

Dimensions in mm [inch]

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

PRPT-BPL2

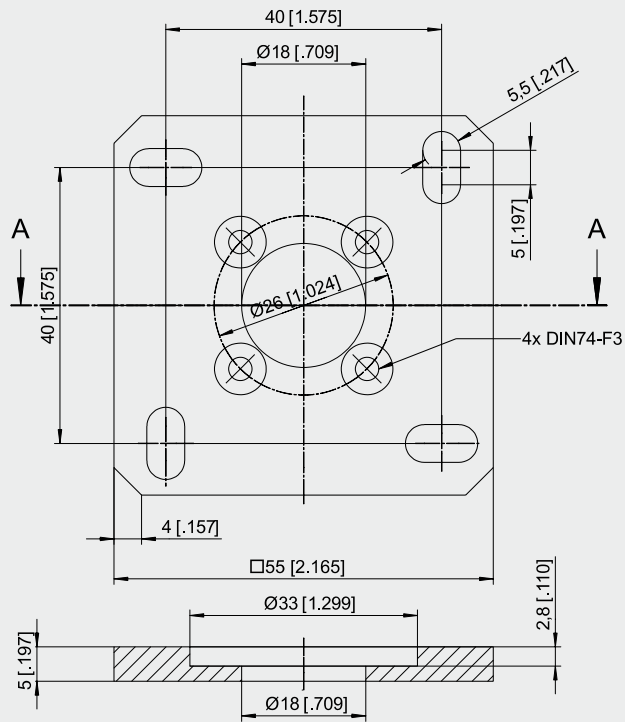
(welding assembly)
 For PRAS2, PRDS2,
 PRAS3, PRDS3



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.

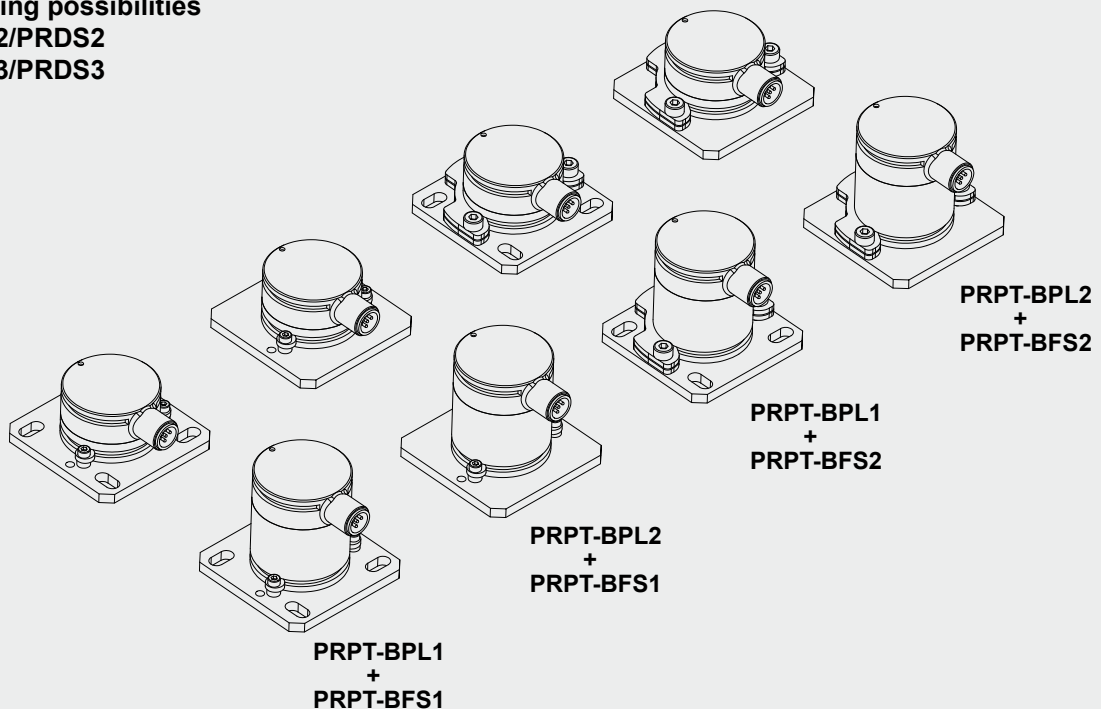
Dimensions informative only.

For guaranteed dimensions please consult factory.

Mounting possibilities

PRAS2/PRDS2

PRAS3/PRDS3



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

Suitable for 5-pin sensor connectors M12A5 and M12R5

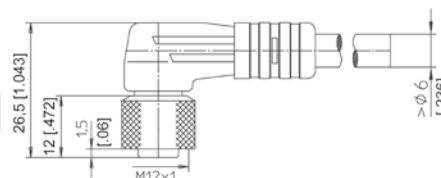
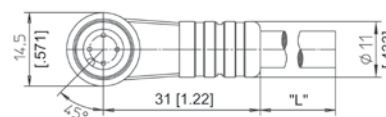
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

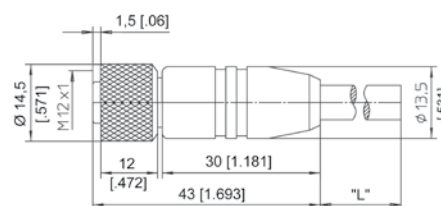
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

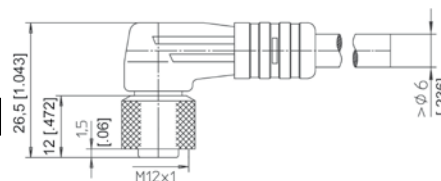
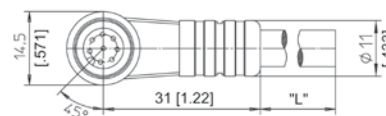
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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

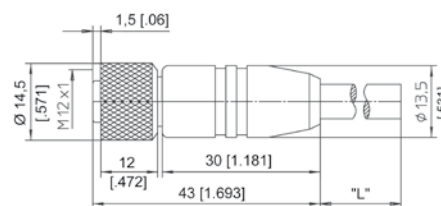
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

Length in m



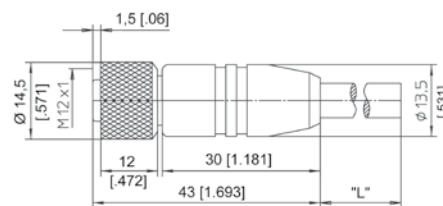
Signal wiring M12, 8 pin

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

