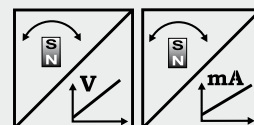


POSIROT® PRAS2 Magnetic Angle Sensor with Analog Output



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 U2 I1	Voltage 0.5 ... 4.5 V ratiometric Voltage 0.5 ... 10 V 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®

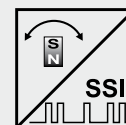
PRDS2

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

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

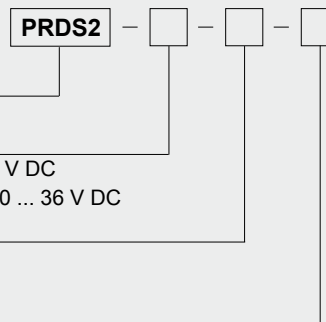
CW = Code increasing CW

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

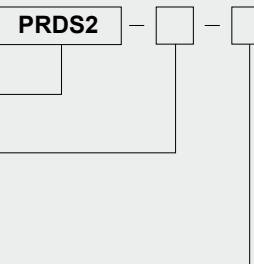
Model name

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)

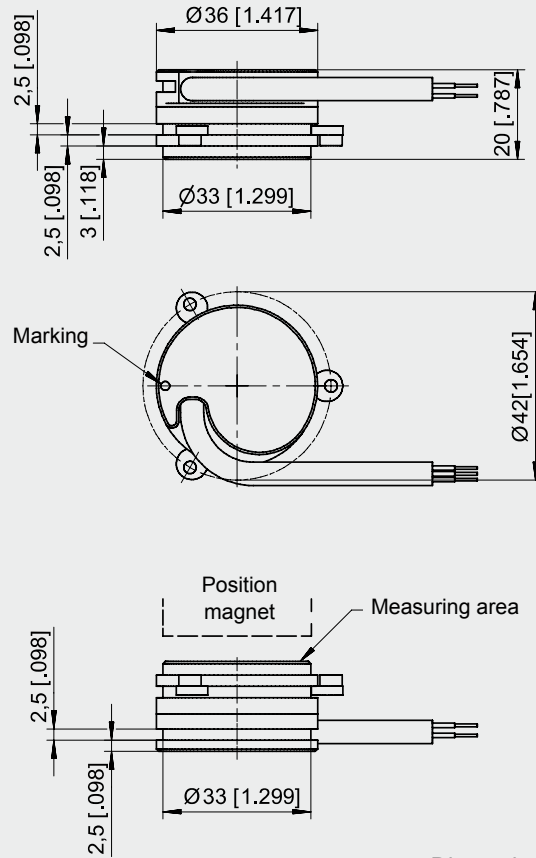
KAB - XM - M12/5F/G - M12/5M/G - CAN

Order example: PRDS2 - CANOP - M12A5/CAN

POSIROT® PRAS2/PRDS2 Dimensions



Outline drawing
sensor with cable
output



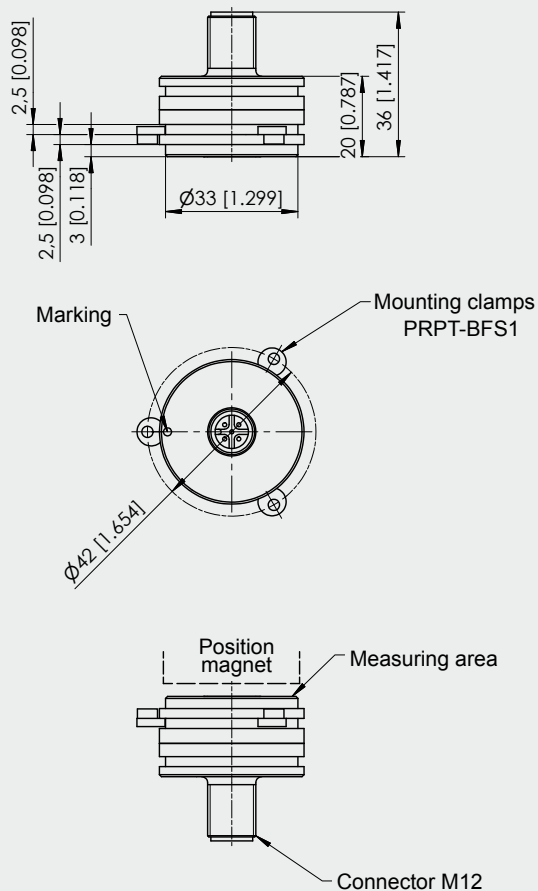
Dimensions in mm [inch]

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

POSIROT® PRAS2/PRDS2 Dimensions

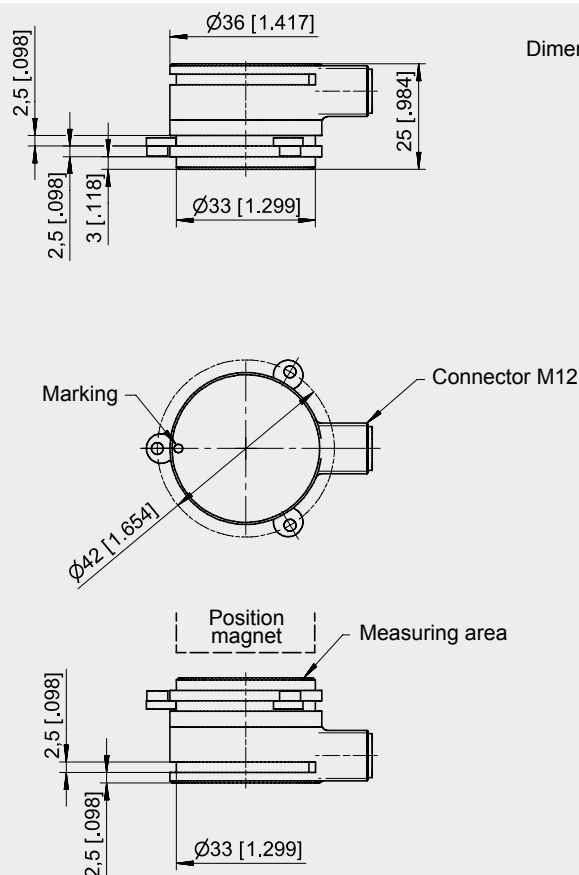


Outline drawing sensor M12 axial



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

Outline drawing sensor M12 radial

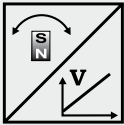
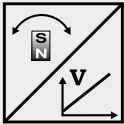
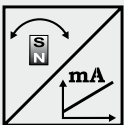


Weight without cable approx. 50 g.
Dimensions informative only.
For guaranteed dimensions please
consult factory.

POSIROT® PRAS

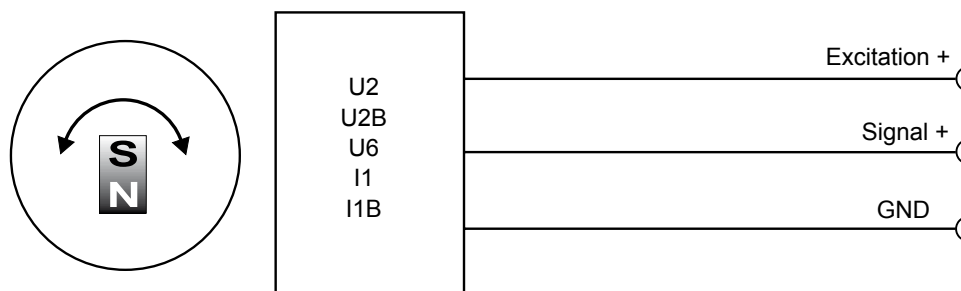
Analog outputs U2(B), U6 and I1(B)



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)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C
U6/5; U6/8,25 Voltage Output 10 ... 90% ratiometr. 	Excitation voltage	5V DC $\pm 10\%$ / 8.25 V DC $\pm 10\%$
	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)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C
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)	$\pm 50 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $90^\circ \dots 360^\circ$ $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) for $<90^\circ$
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN61326-1:2006

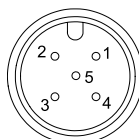
Other outputs available on request.

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



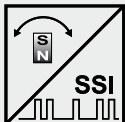
M12A5 / M12R5

View to sensor
connector

POSIROT® PRDS Output RSSI5V / RSSI24V

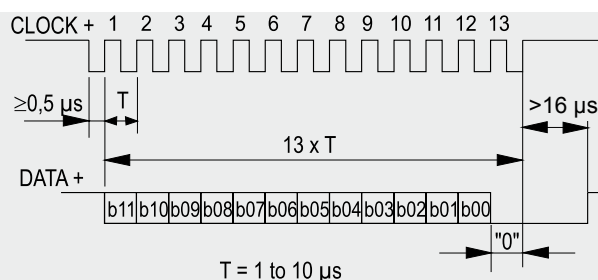


RSSI5V / RSSI24V Synchronous serial

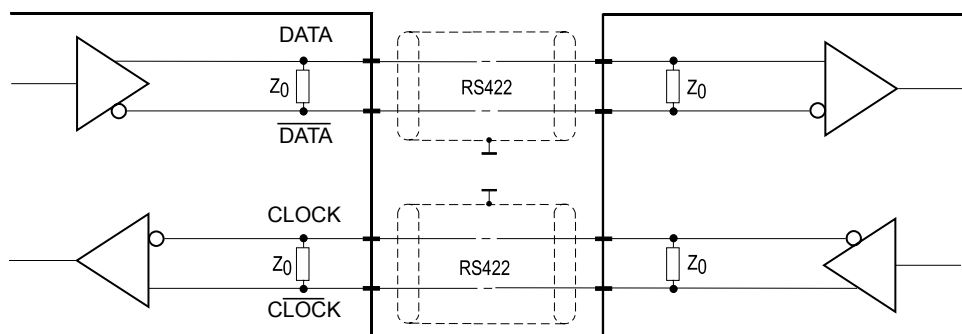


Interface	EIA RS-422
Excitation voltage	RSSI5V: 5 V DC $\pm 10\%$; RSSI24V: 10 ... 36 V DC
Excitation current	100 mA max. without load
Clock frequency	100 kHz ... 1 MHz
Code	Single step Gray code 12 Bit
Resolution	12 Bit
Delay between pulse trains	20 μ s min.
Stability (temperature)	$\pm 50 \times 10^{-6}$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

Data format (Train of 13 pulses)



Recommended processing input circuit

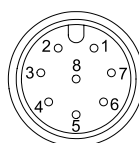


Cable length	Baud rate
50 m	100-1000 kHz
100 m	100-300 kHz

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



M12A8 / M12R8

View to sensor
connector

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 pin
	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)	$\pm 50 \times 10^{-6}$ / °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

POSIROT®

PRDS

Output CAN SAE J1939



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

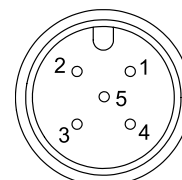
Specifications

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
Shield	1	Black+grey
Excitation +	2	White
GND	3	Brown
CAN-H	4	Green
CAN-L	5	Yellow

View to sensor connector

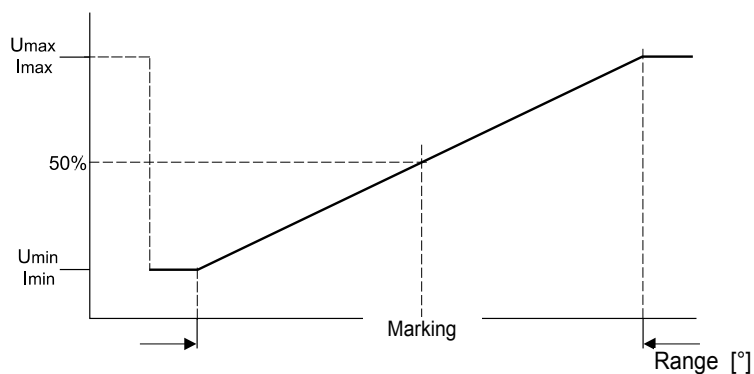


POSIROT® PRAS/PRDS

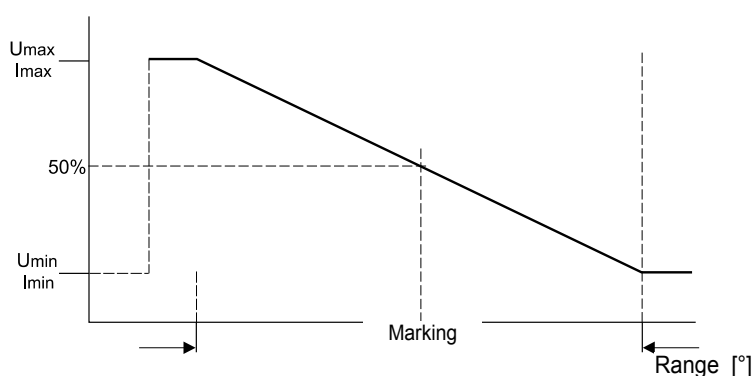
Characteristics for magnetic angle sensors



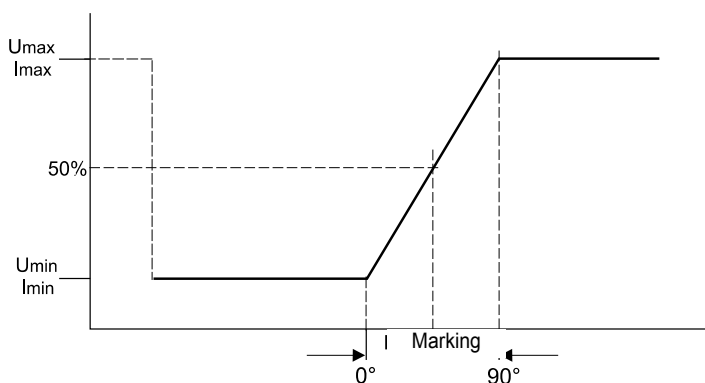
Output signal
(CW increasing)



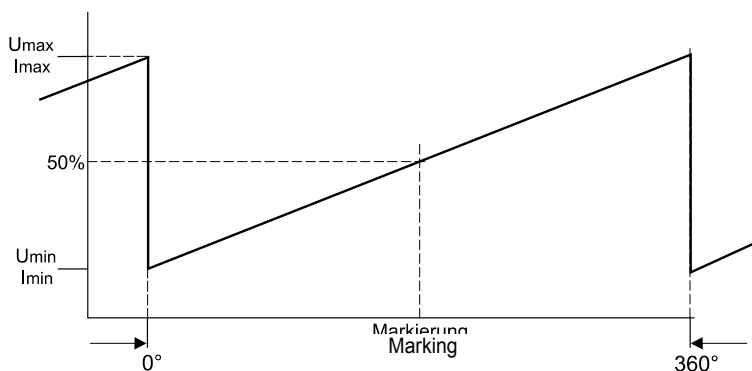
Output signal
(CCW increasing)



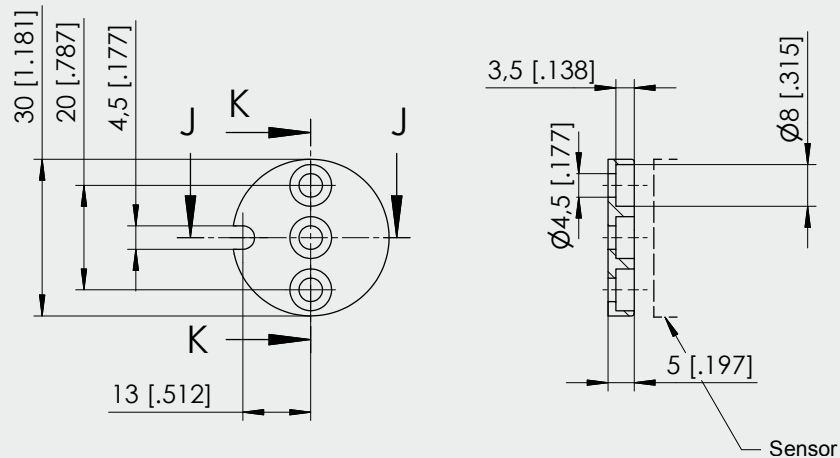
**Example angular
range 90°**



**Example angular
range 360°**

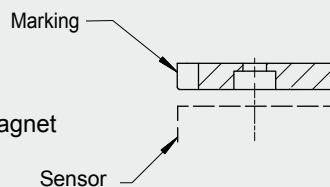


PRMAG20

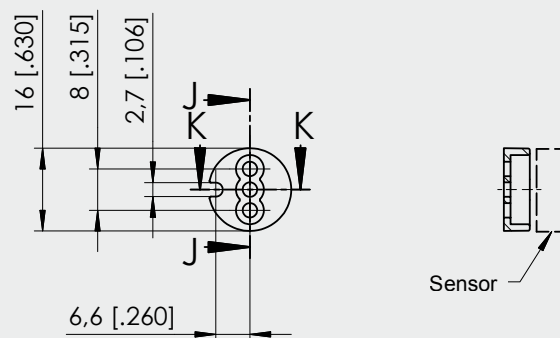


Weight 11 g approx.,
moment of inertia 1.2 kgmm²

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

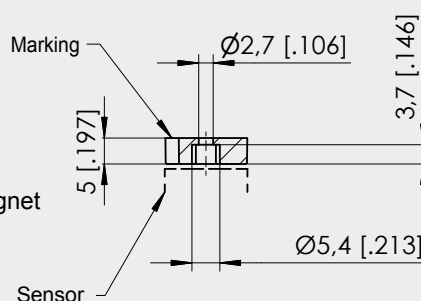


PRMAG21



Weight 3 g approx.,
moment of inertia 0.1 kgmm²

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



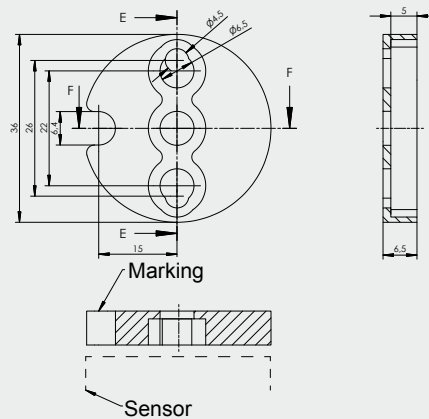
Dimensions in mm [inch]

Dimensions informative only
For guaranteed dimensions please consult factory

PRMAG22

Weight 17 g approx.,
moment of inertia 3 kgmm²

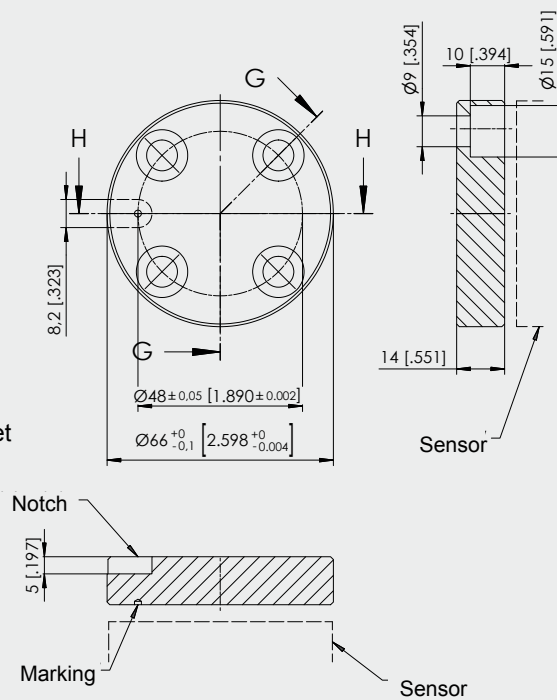
A misalignment of the position magnet
has an effect on the linearity



PRMAG5Z

Weight 100 g approx.,
moment of inertia 55 kgmm²

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

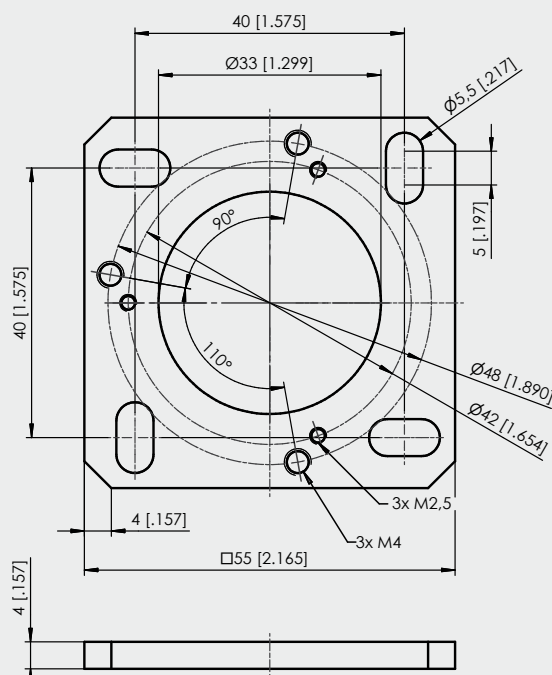


Dimensions in mm [inch]

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]

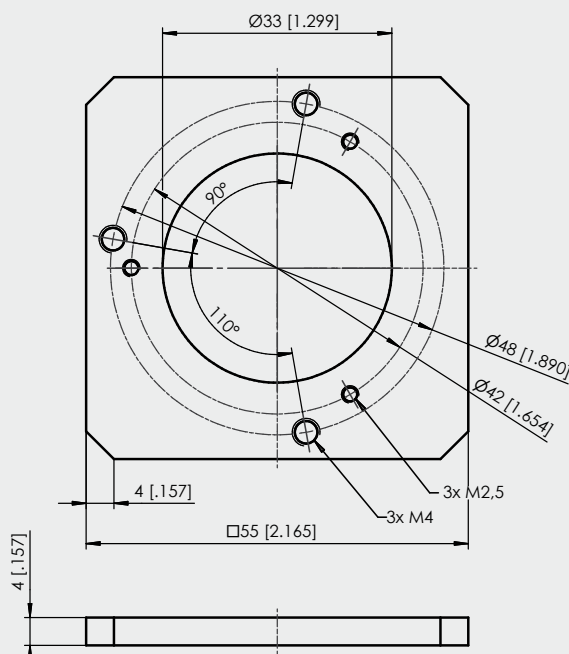
Weight 30 g approx.

Dimensions informative only.

For guaranteed dimensions please consult factory.

PRPT-BPL2

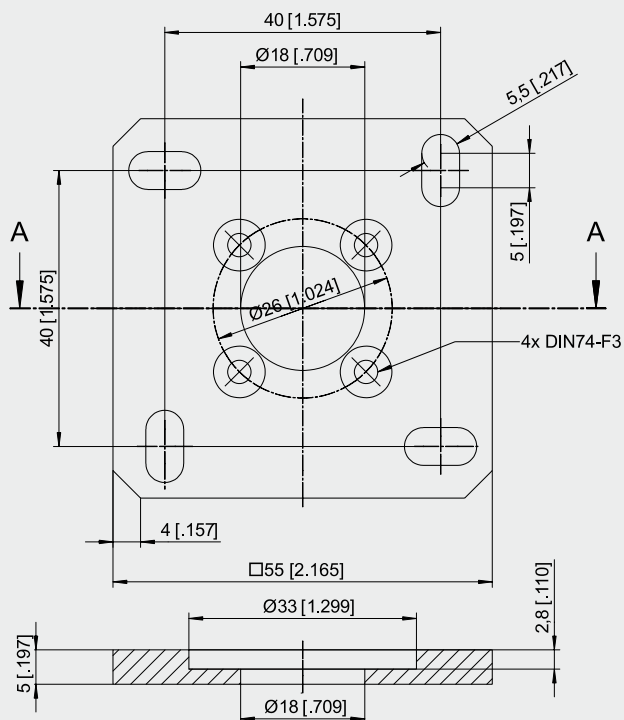
(welding assembly)
 For PRAS2, PRDS2,
 PRAS3, PRDS3



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.

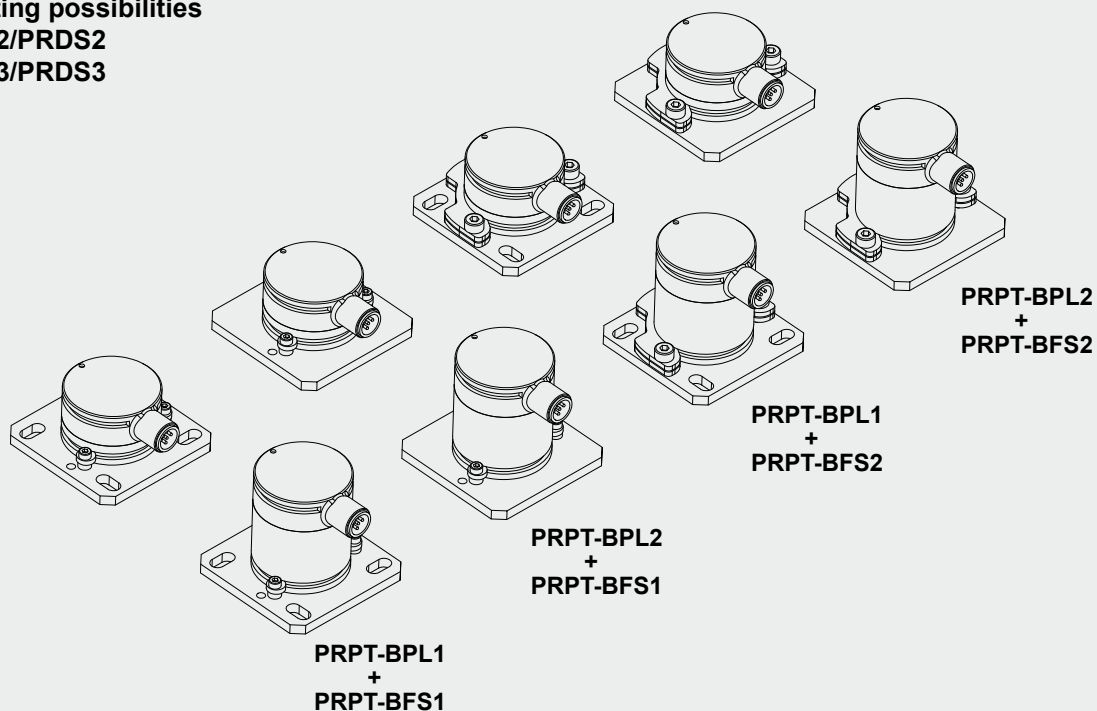
Dimensions informative only.

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

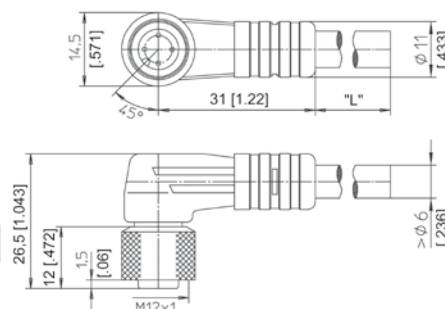
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

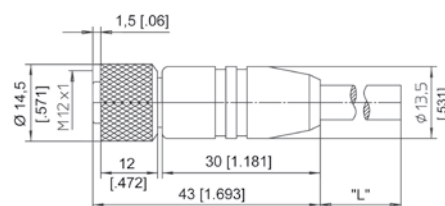
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

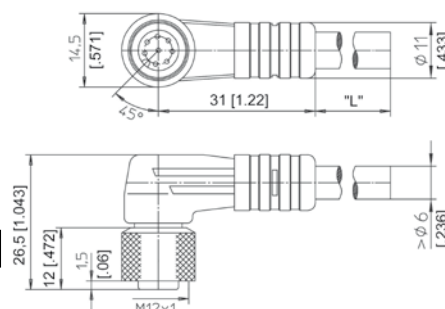
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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

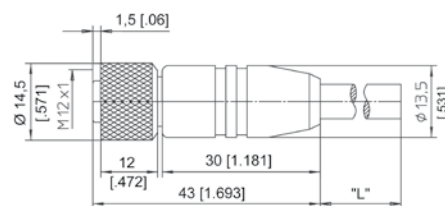
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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

POSIROT® / POSITILT®

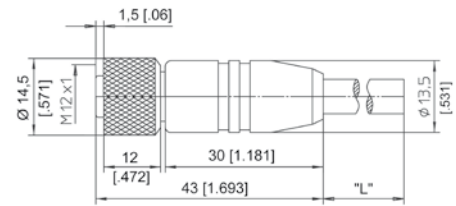
Accessories

Connector Cables



**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

