

ASM®

perfect in sensors.

POSIROT®

Magnetic Angle Sensors



POSIROT®

Magnetic Angle Encoders



POSITILT®

Magnetic Inclination Sensors



POSIROT® / POSITILT®
Angle Sensors and Encoders
Contents

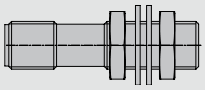
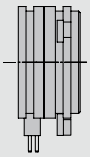
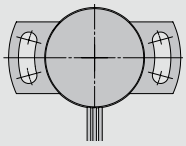
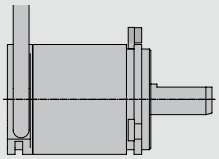
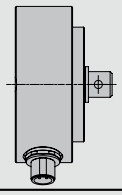
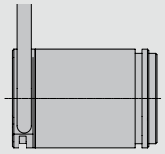
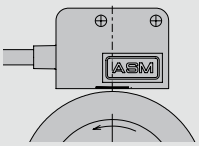
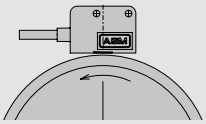
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Applications that are described herein for any of these products are for illustrative purpose only. ASM makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.



Model Selection Guide for POSIROT® and POSITILT®

Model	Outputs					Protection class	Special characteristics
	U2 (0.5...10 V)	U6 (0.5...4.5 V)	I1 (4...20 mA 3w)	Incremental	SSI		• Magnetic non-contact with 360 degree range
PRAS1 / PRDS1 	●	●	●	●	●	IP67/ IP69K	• Non-contact with external position magnet • Wear free • M12 housing
PRAS2 / PRDS2 	●	●	●	●	●	IP67/ IP69K	• Non-contact with external position magnet • Wear free • 36 mm dia. housing • Redundant channel as option
PRAS20 / PRAS21 		●				IP60	• Non-contact with external position magnet • Wear free • Height only 6 mm • OEM version
PRAS3 / PRDS3 	●	●	●	●	●	IP67/ IP69K	• 10 mm shaft or 6 mm hollow shaft • Housing dia. 36 mm • Redundant channel as option
PRAS4 	●	●	●			IP67/ IP69K	• Magnetic measurement principle • 13 mm shaft or non-contact • Housing dia. 79 mm • Double-bearing shaft
PTAS2 	●	●	●			IP67/ IP69K	• Inclinometer • Magnetic measurement principle • Wear-free • Housing dia. 36 mm • Redundant channel as option
PMIS4 / PMIR4 				●		IP67	• Magnetic incremental encoder • Resolution up to 184,320 pulses per revolution • Resistant against shock, vibration, humidity and many liquids
PMIS4 / PMIR5 				●		IP67	• Magnetic incremental encoder • Resolution up to 327,680 pulses per revolution • Resistant against shock, vibration, humidity and many liquids

The Company and the Products

ASM is a leading company in the development and production of linear and angular position sensors. ASM sensors are used in industrial and commercial applications, where angle, inclination, displacement or position measurements are used to automate, test or monitor processes.



Innovative Technologies that Solve Your Measuring Requirements

Our product range consists of various technologies to measure linear and rotative positions. With over 25 years of experience in the position sensor market, ASM offers innovative solutions for the most demanding applications.

ASM Products Represent Quality and Reliability

The quality and precision of our products ensures consistent productivity. Our continuous research and development in our laboratories as well as our DIN EN 9001:2000 certified quality management system guarantees these high standards.





ASM – Global Supplier of Position Sensors

ASM products are sold world-wide through sales offices, subsidiaries and a network of 50 distributors. With this global presence we ensure being close to our customers and provide quick product availability wherever ASM sensors are needed.

The product range

- **POSIROT®** Magnetic Angle Sensors
- **POSITILT®** Magnetic Inclination Sensors
- **POSICHRON®** Magnetostrictive Position Sensors
- **POSIMAG®** Magnetic Scale Position Sensors
- **WS®** Cable Actuated Position Sensors
- **PRODIS®** Digital Process Displays



PRAS/PRDS Series (POSIROT®)

The angle sensors of the **PRAS/PRDS series** are based on a contact-free and absolute measurement principle. The position sensing element is a permanent magnet.

Depending on the permanent magnet type, a tolerance in the air gap and axial offset is allowable within certain limits. The detected magnetic field vectors are transformed by an internal circuit board into standard 4-20 mA, 0.5-10 V and SSI output signals.

PMIS Series (POSIROT®)

The incremental encoder of the **PMIS series** consists of an XMR sensor head and a magnet ring as a magnetic scale. The circumference of the magnet ring contains a series of evenly spaced magnetic north and south poles.

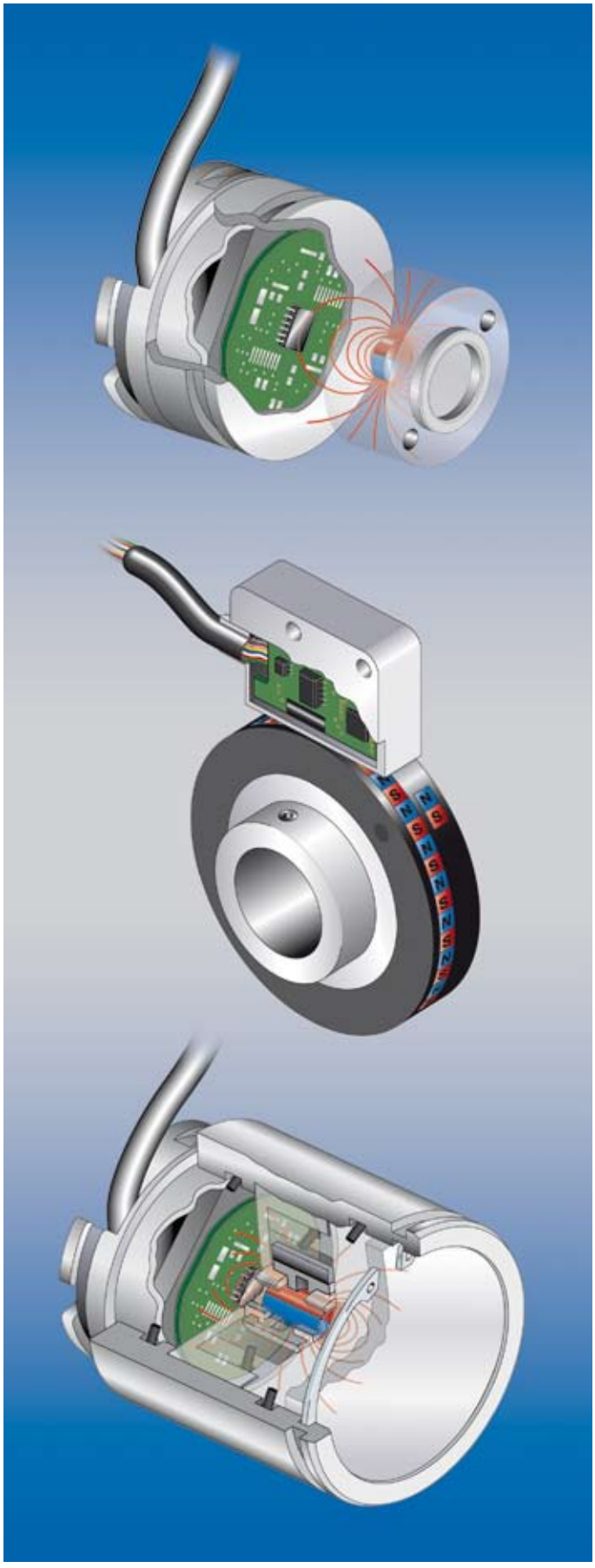
The angular position is determined contact-free and wear-free by the sampling of the sinusoid magnetic field above the surface of the magnet ring by the XMR-sensor head. The air gap between the sensor head and the magnetic ring can be up to 2 mm for a ring with a 5 mm period. The sensor head generates 90° shifted sine/cosine signals, through the integrated signal interpolation circuit, these signals are combined with the reference mark signal and transformed without a time delay into a square-wave output.

PTAS Series (POSITILT®)

The **PTAS series** uses a pendulum with an internal position magnet to provide the inclination angle. The cavity surrounding the pendulum is filled with a specific fluid that can be varied depending upon the amount of motion damping is required.

The established PRAS2 or PRDS2 angle sensor is fitted into the PTAS2 housing. The stainless steel housing is thoroughly sealed and is rated up to IP69K, which makes it suitable for use in extreme environments found on cranes, off-highway construction equipment, ships and off-shore applications.

External magnetic fields due to power cables, magnetized materials or the earth's magnetic field do not influence the accuracy of the inclinometer. The PTAS series is completely encapsulated in a magnetically shielded housing and is immune against magnetic fields as far as possible.

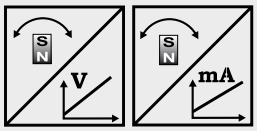


POSIROT®
PRAS1
Magnetic Angle Sensor with Analog Output



Magnetic angle sensor 0 - 360° in M12 housing

- **Protection class IP67/IP69K**
- **Non-contact with external position magnet**
- **Wear free**
- **All metal housing**
- **Outputs:**
  Voltage 0.5 ... 4.5 V, 0.5 ... 10 V
  Current 4 ... 20 mA



Specifications		
	Outputs	Voltage: 0.5 ... 4.5 V; 0.5 ... 10 V Current: 4 ... 20 mA, 3 wire
	Resolution	0.03 % (60 ... 360); 0.1 % (15 ... 45°)
	Repeatability	±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity	±0.3 % f.s. (typ.); a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 15° to 0 ... 360°, standard 360°
	Signal characteristics	CW, CCW
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	M12 x 1
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PRAS1

PRAS1 – □ – □ – □ – □

Model name

Measurement range 15 ... 360° in steps of 15°
15 / 30 / 45 / ... / 345 / 360

Output (see page 26)
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
KAB3M = Cable, standard length 3 m
M12A5 = 5-pin socket M12 (compatible to 4-pin connector)

Order code position magnet (see accessories page 30) **PRMAG ...**

Order code connector cable (see accessories page 32) **KAB-2M-M12/4F/G-LITZE**

Order Example: PRAS1 - 360 - I1 - CW - M12A5

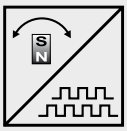
POSIROT®
PRDS1
Magnetic Angle Encoder with Incremental Output

PRELIMINARY



Magnetic angle encoder 0 - 360° in M12 housing

- **Protection class IP67/IP69K**
- **Non-contact with external position magnet**
- **Wear free**
- **All metal housing**
- **Incremental encoder output**



Specifications		
	Output	Incremental encoder outputs A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$, RS422 compatible
	Resolution	128, 256, 512, 1024 pulses per revolution
	Linearity	±1°; a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 360°
	Max. revolutions	30,000 r.p.m.
	Max. output frequency	500 kHz (the quadrature counter of the subsequent circuit must be able to process >500 kHz)
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	M12 x 1
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PRDS1

PRDS1 – □ – □ – □

Model name

Resolution (pulses/revolution)
128 / 256 / 512 / 1024

Output (see page 28)
RS422 = RS422 compatible output with excitation 5 V DC

Connection
KAB3M = Cable, standard length 3 m
M12A8 = 8-pin socket M12

Order code position magnet (see accessories page 30) **PRMAG ...**

Order code connector cable (see accessories page 33) **KAB-2M-M12/8F/G-LITZE**

Order example: PRDS1 - 1024 - RS422 - M12A8

POSIROT®
PRDS1
Magnetic Angle Encoder with SSI Output

PRELIMINARY



Magnetic angle encoder 0 - 360° in M12 housing

- **Protection class IP67/IP69K**
- **Non-contact with external position magnet**
- **Wear free**
- **All metal housing**
- **Synchronous serial output (SSI)**



Specifications		
	Output	Synchronous serial (SSI)
	Resolution	12 bit f.s.
	Repeatability	±0.03 % f.s. (typ.)
	Linearity	±0.3 % f.s. (typ.); a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 360°
	Max. revolutions	30,000 r.p.m.
	Code characteristics	CW, CCW
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	M12 x 1
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PRDS1

PRDS1 – □ – □ – □

Model name

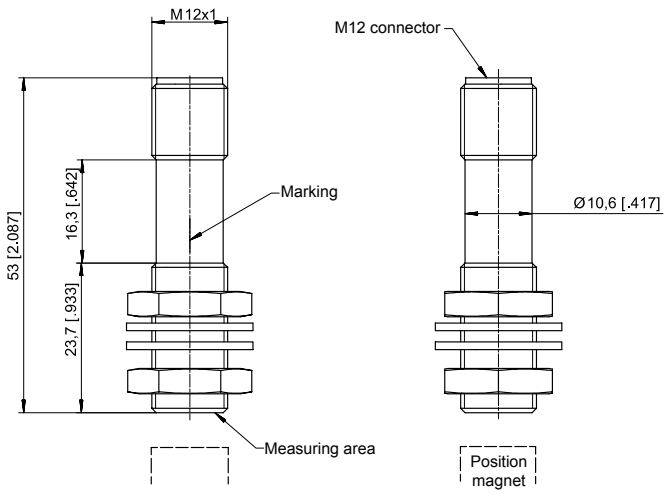
Output (see page 29)
SSI = Synchronous serial
Code characteristics
CW = Code increasing CW
CCW = Code increasing CCW
Connection
KAB3M = Cable, standard length 3 m
M12A8 = 8 pin socket M12

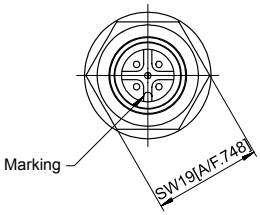
Order code position magnet (see accessories page 30) **PRMAG ...**

Order code connector cable (see accessories page 33) **KAB-2M-M12/8F/G-LITZE**

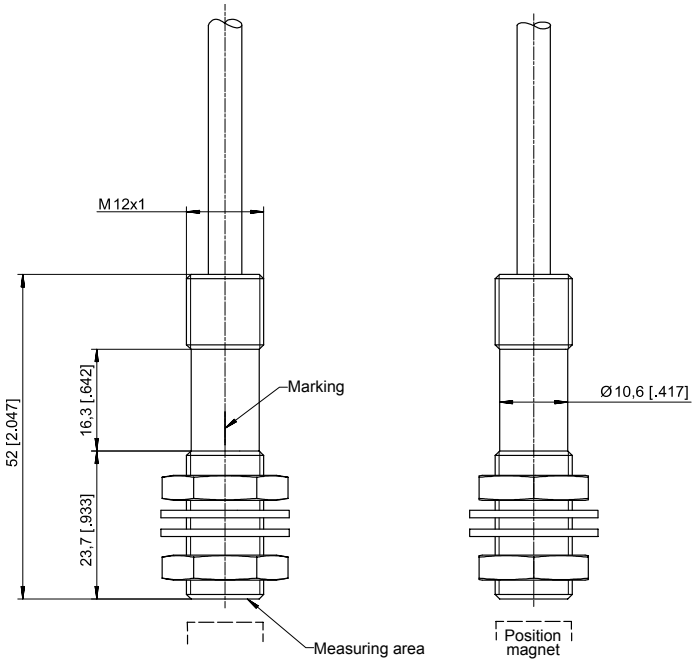
Order example: PRDS1 - SSI - CW - M12A8

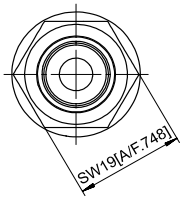
Outline drawing





Dimensions in mm [inch]





Dimensions in mm [inch]

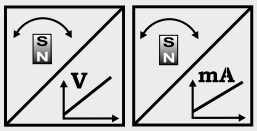
Weight without cable 35 g approx.
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSIROT®
PRAS2
Magnetic Angle Sensor with Analog Output



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

- **Protection class IP67/IP69K**
- **Non-contact with external position magnet**
- **Wear free**
- **Flat housing – 20 mm thickness**
- **Outputs:**
  Voltage 0.5 ... 4.5 V, 0.5 ... 10 V
  Current 4 ... 20 mA
- **Redundant second channel as option**



Specifications		
	Outputs	Voltage: 0.5 ... 4.5 V; 0.5 ... 10 V Current: 4 ... 20 mA, 3 wire
	Resolution	0.03 % (60 ... 360); 0.1 % (15 ... 45°)
	Repeatability	±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity	±0.3 % f.s. (typ.); a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 15° to 0 ... 360°, standard 360°
	Signal characteristics	CW, CCW
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Aluminium / stainless steel / zinc (depends on the model)
	Mounting	Clamps, mounting plate
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output, option IP67/IP69K)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PRAS2

PRAS2 – □ – □ – □ – □

Model name

Measurement range 15 ... 360° in steps of 15°
15 / 30 / 45 / ... / 345 / 360

Output (see page 26)
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
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A5 = 5-pin socket M12 axial (compatible with 4-pin connector)
M12R5 = 5-pin socket M12 radial (compatible with 4-pin connector), (in preparation)

Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code position magnet (see accessories page 30) **PRMAG ...**

Order code connector cable (see accessories page 32) **KAB-2M-M12/4F/G-LITZE**

Order example: PRAS2 - 360 - I1 - CW - KAB3M

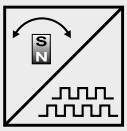
POSIROT®
PRDS2
Magnetic Angle Encoder with Incremental Output

PRELIMINARY



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

- **Protection class IP67/IP69K**
- **Non-contact with external position magnet**
- **Wear free**
- **Flat housing – 20 mm thickness**
- **Incremental encoder output**



Specifications		
	Output	Incremental encoder outputs A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$, RS422 compatible
	Resolution	128, 256, 512, 1024 pulses per revolution
	Linearity	±1°; a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 360°
	Max. revolutions	30,000 per min
	Max. output frequency	500 kHz (the quadrature counter of the subsequent circuit must be able to process >500 kHz)
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Aluminium / stainless steel / zinc (depends on the model)
	Mounting	Clamps, mounting plate
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output, option IP67/IP69K)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PRDS2

PRDS2 – □ – □ – □

Model name

Resolution (pulses/revolution)
128 / 256 / 512 / 1024

Output (see page 28)
RS422 = RS422 compatible output with excitation 5 V DC

Connection
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A8 = 8-pin socket M12 axial
M12R8 = 8-pin socket M12 radial (in preparation)

Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code position magnet (see accessories page 30) **PRMAG ...**

Order code connector cable (see accessories page 33) **KAB-2M-M12/8F/G-LITZE**

Order example: PRDS2 - 1024 - RS422 - KAB3M

POSIROT®
PRDS2
Magnetic Angle Encoder with SSI Output

PRELIMINARY



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

- **Protection class IP67/IP69K**
- **Non-contact with external position magnet**
- **Wear free**
- **Flat housing – 20 mm thickness**
- **Synchronous serial output (SSI)**



Specifications		
	Output	Synchronous serial (SSI)
	Resolution	12 bit f.s.
	Repeatability	±0.03 % f.s. (typ.)
	Linearity	±0.3 % f.s. (typ.); a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 360°
	Max. revolutions	30,000 r.p.m.
	Code characteristics	CW, CCW
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Aluminium / stainless steel / zinc (depends on the model)
	Mounting	Clamps, mounting plate
	Protection class	IP67/IP69K (connector output with IP69K connector cable) IP67 (cable output, option IP67/IP69K)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PRDS2

PRDS2 – □ – □ – □

Model name

Output (see page 29)
SSI = Synchronous serial

Code characteristics
CW = Code increasing CW
CCW = Code increasing CCW

Connection
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A8 = 8-pin socket M12 axial
M12R8 = 8-pin socket M12 radial (in preparation)

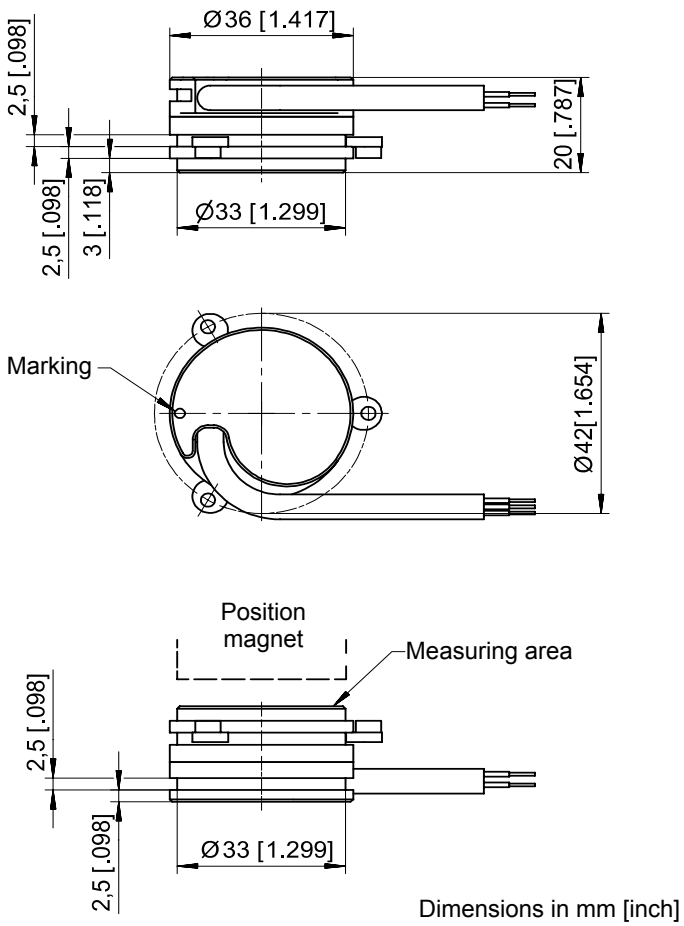
Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code position magnet (see accessories page 30) **PRMAG ...**

Order code connector cable (see accessories page 33) **KAB-2M-M12/8F/G-LITZE**

Order example: PRDS2 - SSI - CW - KAB3M

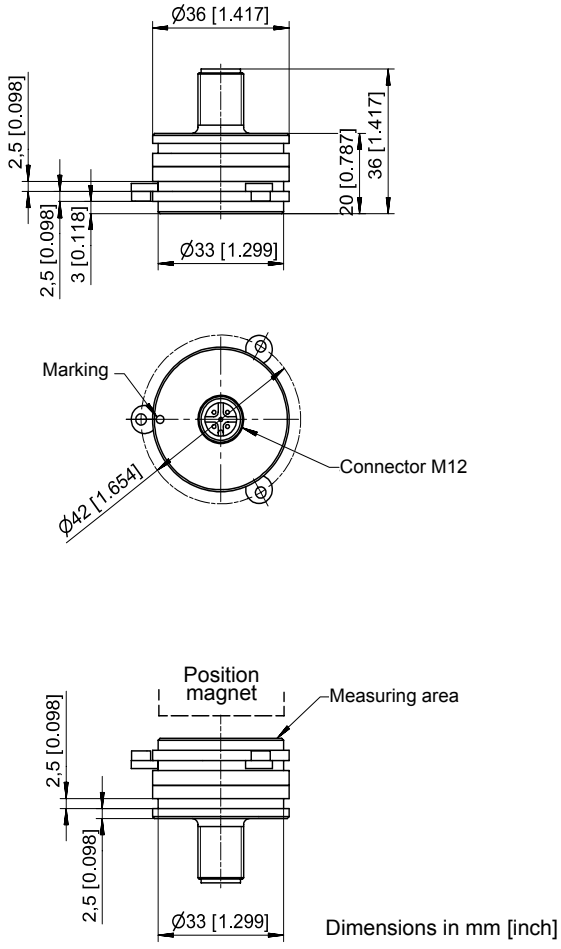
Outline drawing sensor with cable output



Dimensions in mm [inch]

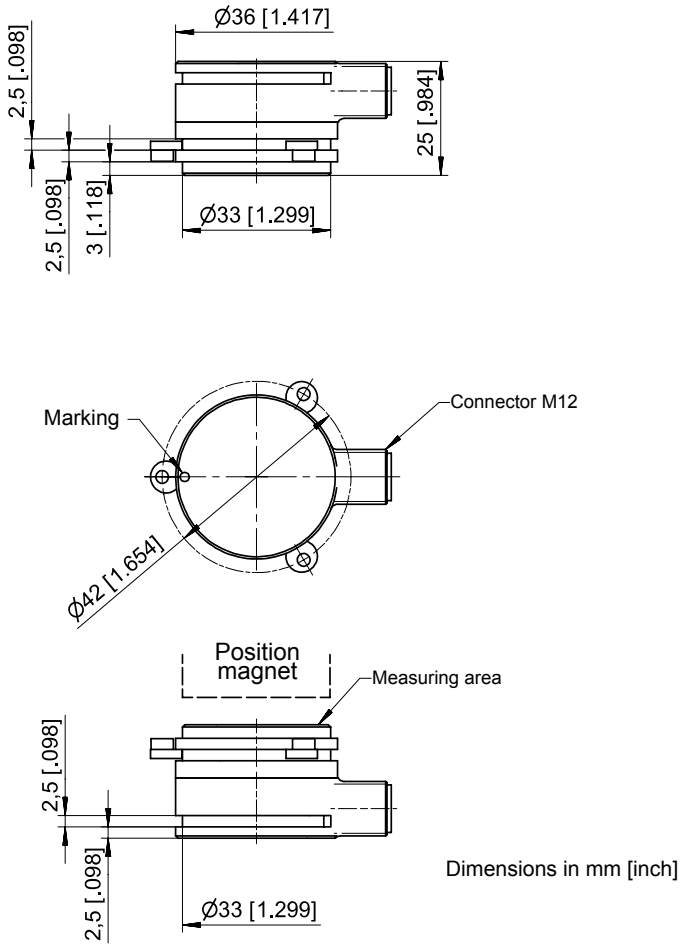
Weight without cable approx. 40 g.
Dimensions informative only.
For guaranteed dimensions please consult factory.

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



Dimensions in mm [inch]

Ask factory for availability

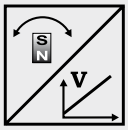
Weight without cable approx. 50 g.
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSIROT®
PRAS20 / 21
Magnetic Angle Sensor with Analog Output



Magnetic angle sensor 0 - 360°

- **Protection class IP60**
- **Non-contact with external position magnet**
- **Wear free**
- **Compact, low profile housing**
- **Output:**
  Voltage 0.5 ... 4.5 V
- **Other outputs available on request**



Specifications		
	Outputs	Voltage: 0.5 ... 4.5 V
	Resolution	0.03 % (60 ... 360); 0.1 % (15 ... 45°)
	Repeatability	±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity	±0.5 % f.s. (typ.); a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 15° to 0 ... 360°, standard 360°
	Signal characteristics	CW, CCW
	Rated distance sensor / magnet	Depending on the position magnet, see page 30
	Material	Epoxy glass fiber, thermoplastic
	Mounting	Screws M3 resp. M4
	Connection	
	Protection class	IP60
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

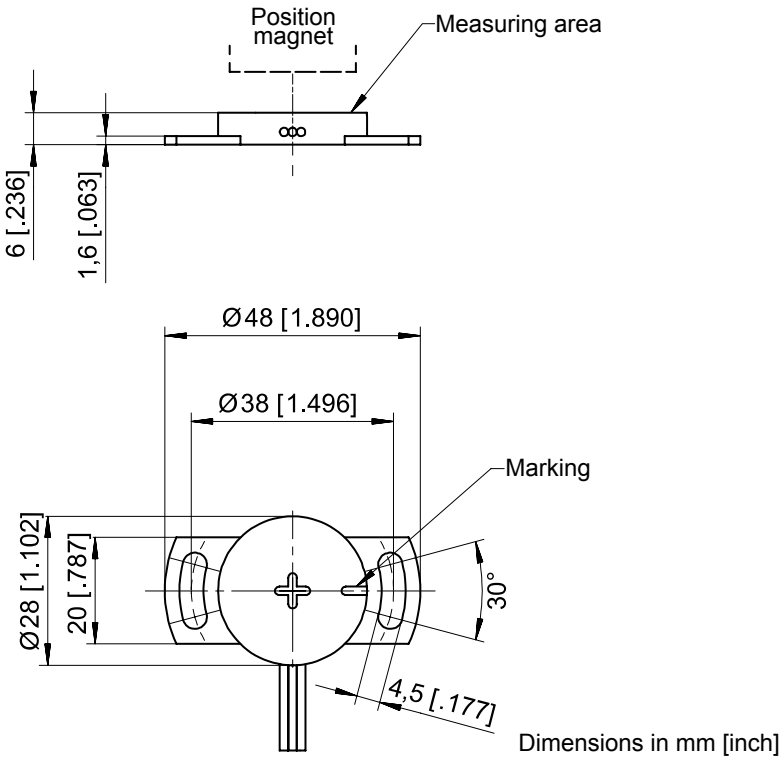
Order Code PRAS20 / 21

PRASXX – □ – □ – □ – □

Model name
PRAS20
PRAS21
Measurement range 15 ... 360° in steps of 15°
15 / 30 / 45 / ... / 345 / 360
Output (see page 26)
U6 = 0.5 ... 4.5 V ratiometric
Signal characteristics
CW = Signal increasing CW
CCW = Signal increasing CCW
Connection
A300 = Single wire ETFE 3 x 0.5 mm², length 300 mm

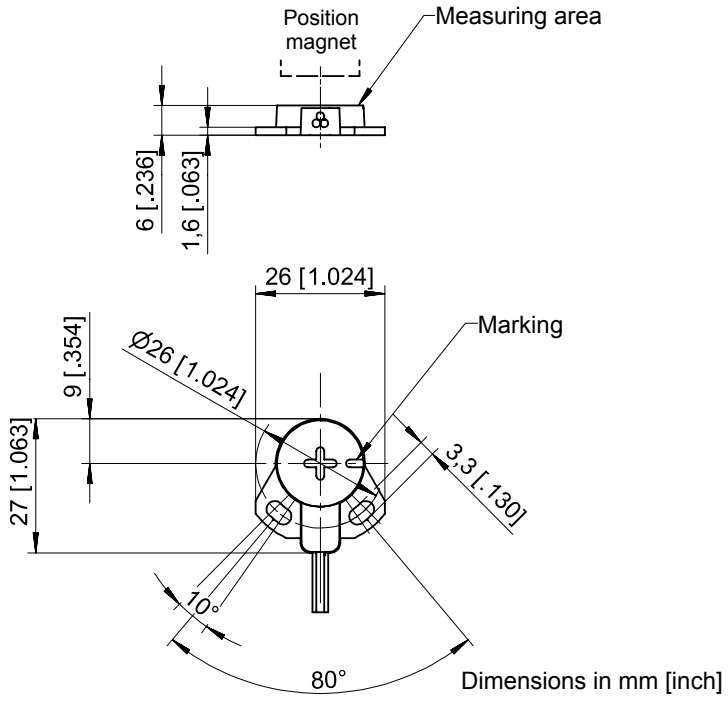
Order example: PRAS20 - 360 - U6 - CW - A300

Outline drawing
PRAS20



Weight without cable approx. 8 g.
Dimensions informative only.
For guaranteed dimensions please consult factory.

Outline drawing
PRAS21



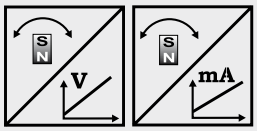
Weight without cable approx. 5 g.
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSIROT®
PRAS3
Magnetic Angle Sensor with Analog Output



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

- **With 10 mm shaft or 6 mm hollow shaft**
- **Protection class IP67/IP69K**
- **Magnetic measurement principle**
- **Outputs:**
  Voltage 0.5 ... 4.5 V, 0.5 ... 10 V
  Current 4 ... 20 mA
- **Redundant second channel as option**



Specifications		
	Outputs	Voltage: 0.5 ... 4.5 V; 0.5 ... 10 V Current: 4 ... 20 mA, 3 wire
	Resolution	0.03 % (60 ... 360); 0.1 % (15 ... 45°)
	Repeatability	±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity	±0.3 % f.s. (typ.)
	Measurement range	0 ... 15° to 0 ... 360°, standard 360°
	Signal characteristics	CW, CCW
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	Clamps, mounting plate
	Protection class	IP67 (IP67/IP69K option, housing)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles
	Life cycle of bearings	100 x 10^6 revolutions (<1500 r.p.m.)
	Revolutions per minute	Max. 10,000 r.p.m.
	Allowable shaft load	100 N radial, 100 N axial

Order Code PRAS3

PRAS3 – □ – □ – □ – □ – □

Model name

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

Measurement range 15 ... 360° in steps of 15°
15 / 30 / 45 / ... / 345 / 360

Output (see page 26)
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
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A5 = 5-pin socket M12 axial (compatible with 4-pin connector)
M12R5 = 5-pin socket M12 radial (compatible with 4-pin connector), (in preparation)

Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code connector cable (see accessories page 32) **KAB-2M-M12/4F/G-LITZE**

Order example: PRAS3 - V - 360 - I1 - CW - KAB3M

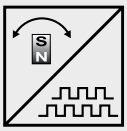
POSIROT®
PRDS3
Magnetic Angle Encoder with Incremental Output

PRELIMINARY



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

- **With 10 mm shaft or 6 mm hollow shaft**
- **Protection class IP67/IP69K**
- **Magnetic measurement principle**
- **Incremental encoder output**



Specifications		
	Output	Incremental encoder outputs A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$, RS422 compatible
	Resolution	128, 256, 512, 1024 pulses per revolution
	Linearity	±1°
	Measurement range	0 ... 360°
	Max. output frequency	500 kHz (the quadrature counter of the subsequent circuit must be able to process >500 kHz)
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	Clamps, mounting plate
	Protection class	IP67 (IP67/IP69K option, housing)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles
	Life cycle of bearings	100 x 10^6 revolutions (<1500 r.p.m.)
	Revolutions per minute	Max. 10,000 r.p.m.
	Allowable shaft load	100 N radial, 100 N axial

Order Code PRDS3

PRDS3 – □ – □ – □ – □

Model name

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

Resolution (pulses/revolution)
128 / 256 / 512 / 1024

Output (see page 28)
RS422 = RS422 compatible output with excitation 5 V DC

Connection
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A8 = 8-pin socket M12 axial
M12R8 = 8-pin socket M12 radial (in preparation)

Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code connector cable (see accessories page 33) **KAB-2M-M12/8F/G-LITZE**

Order example: PRDS3 - V - 1024 - RS422 - KAB3M

POSIROT®
PRDS3
Magnetic Angle Encoder with SSI Output

PRELIMINARY



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

- **With 10 mm shaft or 6 mm hollow shaft**
- **Protection class IP67/IP69K**
- **Magnetic measurement principle**
- **Synchronous serial output (SSI)**



Specifications

Output	Synchronous serial (SSI)
Resolution	12 bit f.s.
Repeatability	±0.03 % f.s. (typ.)
Linearity	±0.3 % f.s. (typ.)
Measurement range	0 ... 360°
Code characteristics	CW, CCW
Material	Stainless steel / aluminium / zinc (depends on the model)
Mounting	Clamps, mounting plate
Protection class	IP67 (IP67/IP69K option, housing)
Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles
Life cycle of bearings	100 x 10^6 revolutions (<1500 r.p.m.)
Revolutions per minute	Max. 10,000 r.p.m.
Allowable shaft load	100 N radial, 100 N axial

Order Code PRDS3

PRDS3 – □ – □ – □ – □

Model name

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

Output (see page 29)
SSI = Synchronous serial

Code characteristics
CW = Code increasing CW
CCW = Code increasing CCW

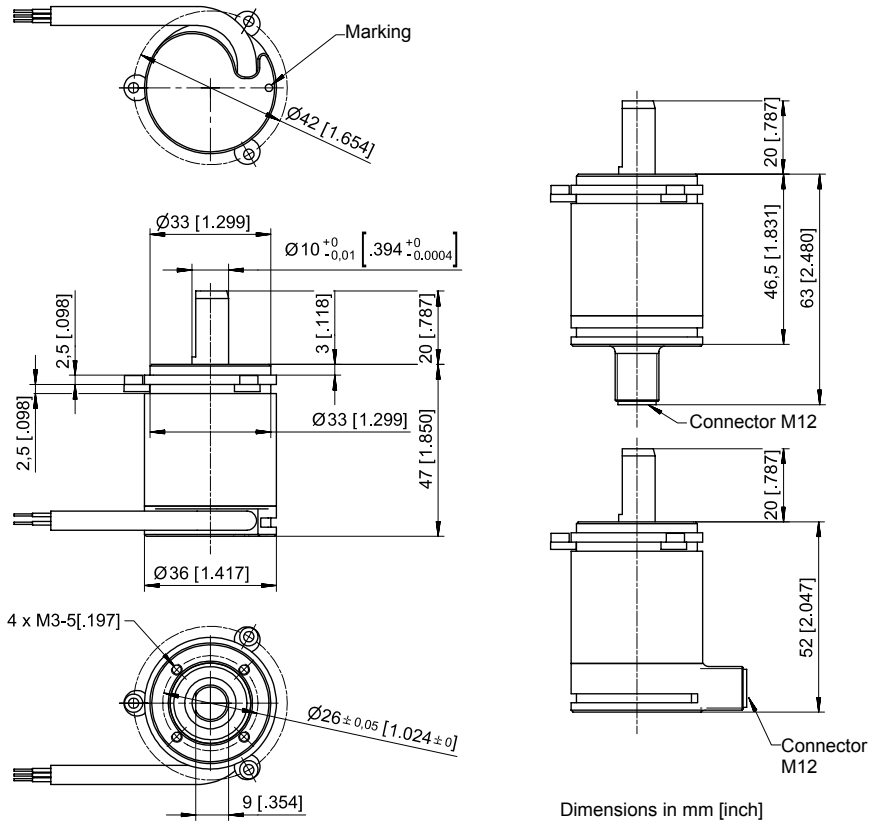
Connection
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A8 = 8-pin socket M12 axial
M12R8 = 8-pin socket M12 radial (in preparation)

Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code connector cable (see accessories page 33) **KAB-2M-M12/8F/G-LITZE**

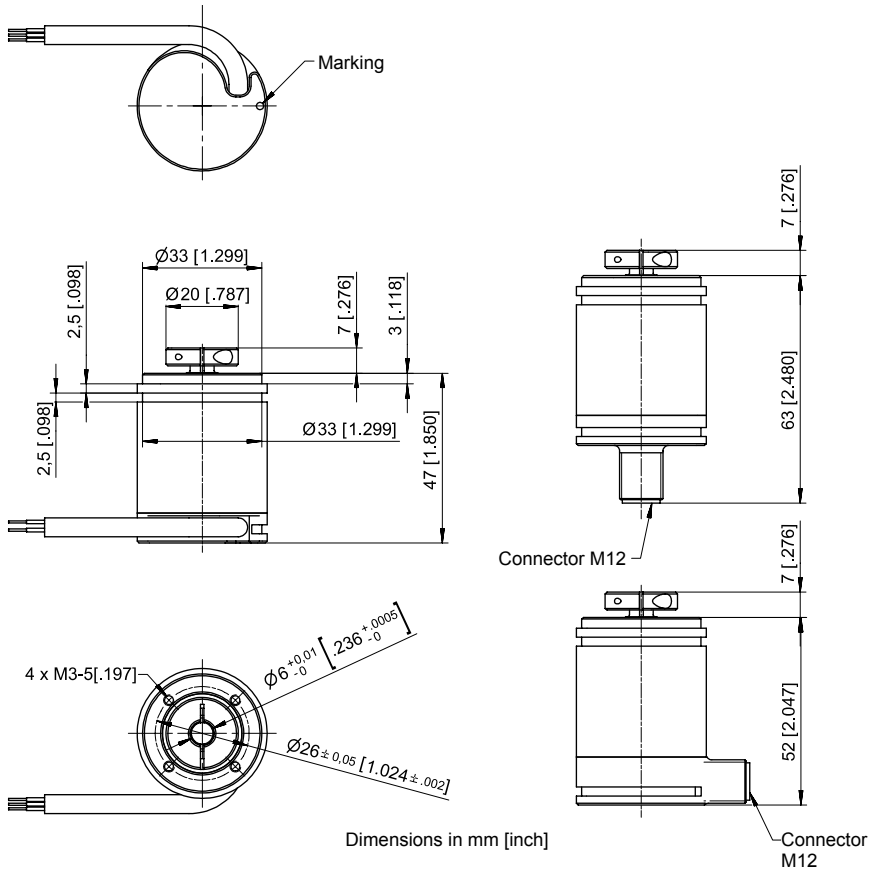
Order example: PRDS3 - V - SSI - CW - KAB3M

Outline drawing sensor with shaft



Dimensions in mm [inch]

Outline drawing sensor with hollow shaft



Dimensions in mm [inch]

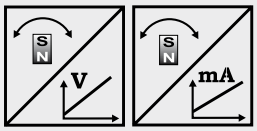
Weight without cable 250 g approx.
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSIROT®
PRAS4
Magnetic angle sensor with analog output



Magnetic angle sensor 0 - 360° in a flat housing with 79 mm diameter

- **With 13 mm shaft or non-contact**
- **Protection class IP67/IP69K**
- **Magnetic measurement principle**
- **Outputs:**
  Voltage 0.5 ... 4.5 V; 0.5 ... 10 V
  Current 4 ... 20 mA
- **Other outputs available on request**



Specifications		
	Outputs	Voltage: 0.5 ... 4.5 V; 0.5 ... 10 V Current: 4 ... 20 mA, 3 wire
	Resolution	0.03 % (60 ... 360); 0.1 % (15 ... 45°)
	Repeatability	±0.03 % (60 ... 360°); ±0.1 % (15 ... 45°)
	Linearity	±0.3 % f.s. (typ.); a misalignment of the position magnet has an effect on the linearity (see page 30)
	Measurement range	0 ... 15° to 0 ... 360°, standard 360°
	Signal characteristics	CW, CCW
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	Screws M6 or M5
	Protection class	IP67/IP69K housing (with IP69K connector cable)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles
	Life cycle of bearings	100 x 10^6 revolutions (<1500 r.p.m.)
	Revolutions per minute	Max. 10,000 r.p.m.
	Allowable shaft load	120 N radial, 120 N axial

Order Code PRAS4

PRAS4 – □ – □ – □ – □ – □

Model name

Mechanical connection
V = Shaft 13 mm
K = Non-contact

Measurement range 15 ... 360° in steps of 15°
15 / 30 / 45 / ... / 345 / 360

Outputs (see page 26)
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

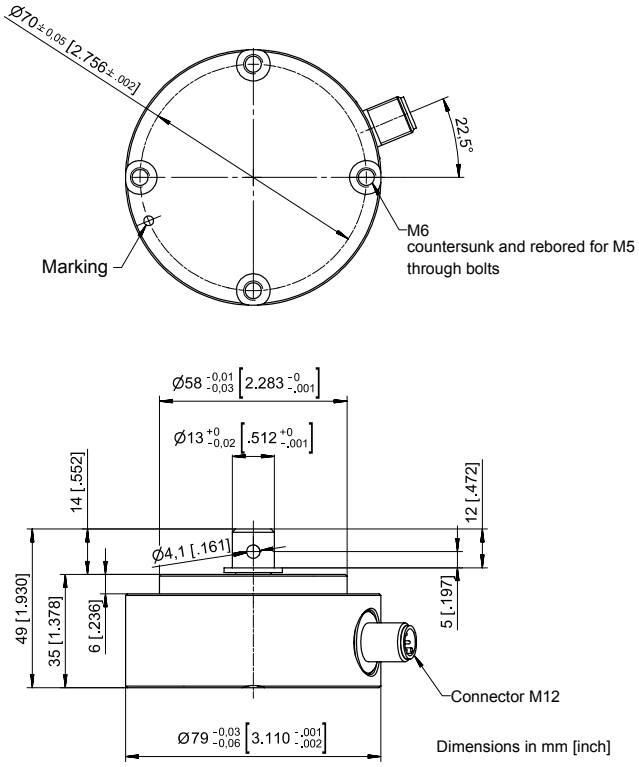
Connection
M12R5 = 5-pin socket M12 (compatible to 4-pin connector)

Order code position magnet (see accessories page 30) **PRMAG2**

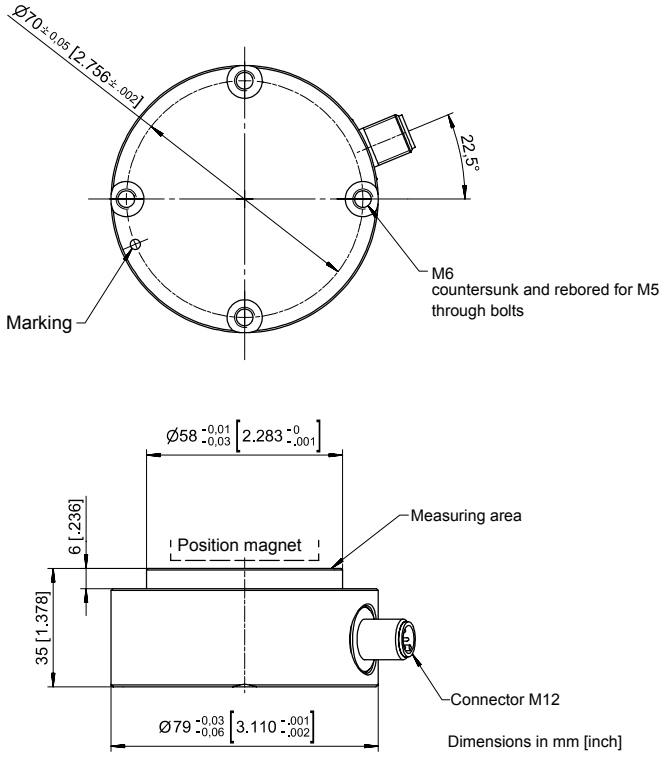
Order code connector cable (see accessories page 32) **KAB-2M-M12/4F/G-LITZE**

Order example: PRAS4 - V - 360 - I1 - CW - M12R5

Outline drawing sensor with shaft



Outline drawing sensor non-contact



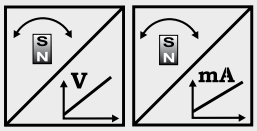
Weight without cable 450 g approx.
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSITILT®
PTAS2
Magnetic inclination sensor with analog output



Magnetic inclination sensor in a 36 mm housing

- **Protection class IP67/IP69K**
- **Magnetic measurement principle**
- **Outputs:**
  Voltage 0.5 ... 4.5 V; 0.5 ... 10 V
  Current 4 ... 20 mA
- **Redundant second channel as option**
- **Other outputs available on request**



Specifications		
	Outputs	Voltage: 0.5 ... 4.5 V; 0.5 ... 10 V Current: 4 ... 20 mA, 3 wire
	Resolution	0.03 % (±30 ... ±180); 0.1 % (±15°)
	Repeatability	±0.03 % (±30 ... ±180°); ±0.1 % (±15)
	Linearity	±0.3 % f.s. (typ.)
	Measurement range	0 ... ±15° to 0 ... ±180°, standard ±180°
	Signal characteristics	CW, CCW
	Material	Stainless steel / aluminium / zinc (depends on the model)
	Mounting	Clamps, mounting plate
	Protection class	IP67 (IP67/IP69K option)
	Shock	EN 60068-2-27:1993, 100 g/11 ms, 100 shocks
	Vibration	EN 60068-2-6:1995, 20 g 10 Hz-2 kHz, 10 cycles

Order Code PTAS2

PTAS2 – □ – □ – □ – □

Model name

Measurement range ±15 ... ±180° in steps of 15°
15 / 30 / 45 / ... / 165 / 180

Output (see page 26)
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

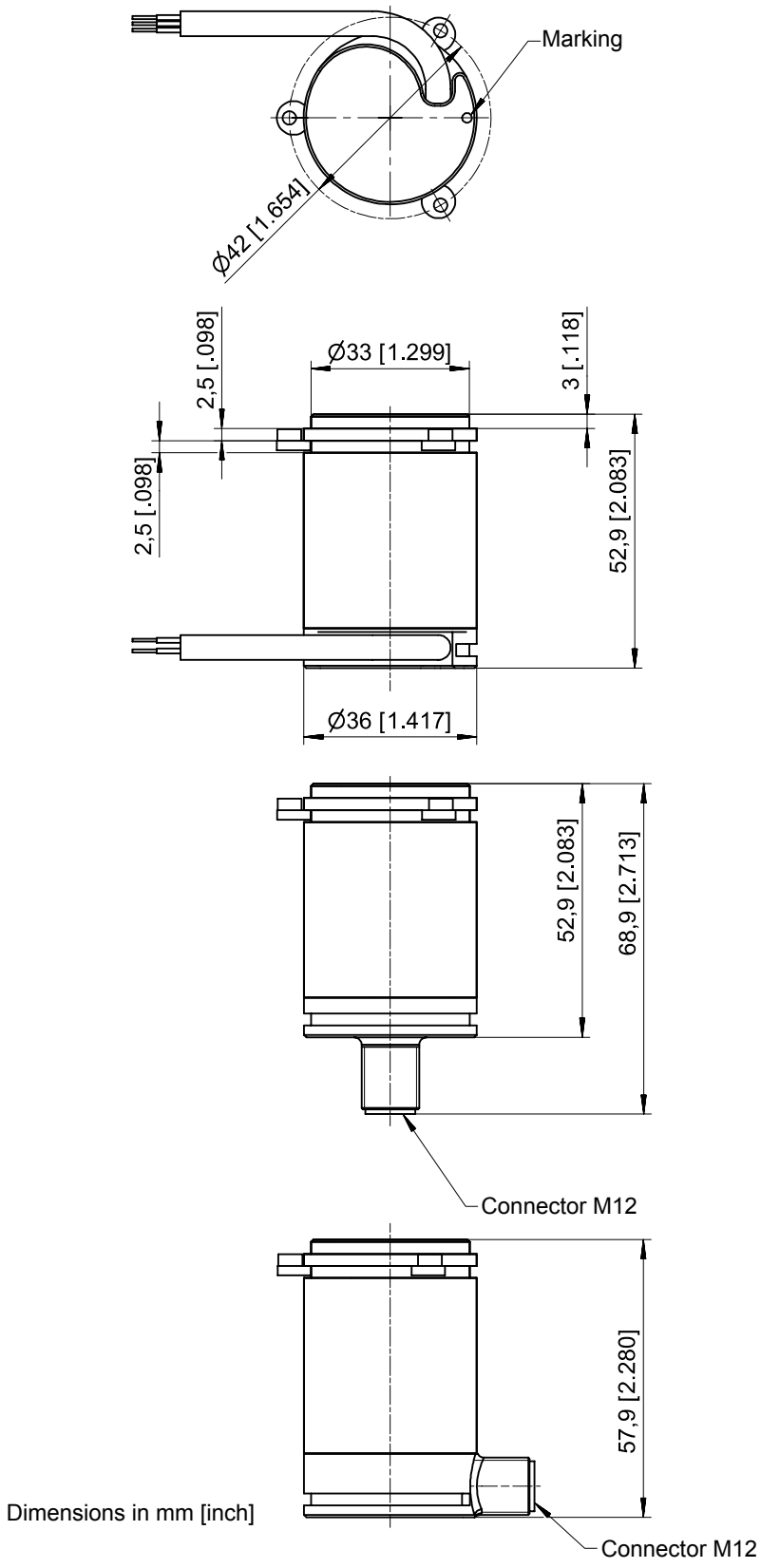
Connection
KAB3M = Cable, standard length 3 m, IP67
KAB3M69K = Cable, standard length 3 m, IP67/IP69K
M12A5 = 5-pin socket M12 axial (compatible with 4-pin connector)
M12R5 = 5-pin socket M12 radial (compatible with 4-pin connector), (in preparation)

Order code mounting clamps (set of 3 pieces) **PRPT-BFS1**

Order code connector cable (see accessories page 32) **KAB-2M-M12/4F/G-LITZE**

Order example: PTAS2 - 180 - I1 - CW - KAB3M

Outline drawing sensor

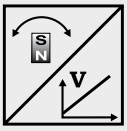


Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions please consult factory.

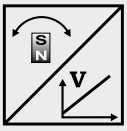
POSIROT® – PRAS, POSITILT® – PTAS
Outputs U2, U6 and I1

U2
Voltage Output
0.5 ... 10 V



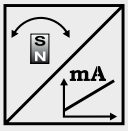
Excitation voltage	+18 ... +27 V DC (+36 V DC as option)
Excitation current	40 mA max.
Output voltage	0.5 ... 10 V DC
Output current	2 mA max.
Output load	> 5 kΩ
Measuring rate	1 kHz standard
Stability (temperature)	±50 x 10^{-6} / °C f.s. (typ.) for 90°...360° ±100 x 10^{-6} / °C f.s. (typ.) for <90°
Operating temperature	-40 ... +85 °C (+105 °C as option, for sensors w/o shaft only)
Protection	Reverse polarity, short circuit
EMC	According to EN 61326:2004

U6 = U6/5 / U6/8,25
Voltage Output
10 ... 90 % ratiometric



Excitation voltage	+5V DC ±10 % / +8.25 V DC ±10 %
Excitation current	40 mA max.
Output voltage	10 ... 90 % of the excitation voltage
Output current	2 mA max.
Output load	> 1 kΩ
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, for sensors w/o shaft only)
Protection	Reverse polarity, short circuit
EMC	According to EN 61326:2004

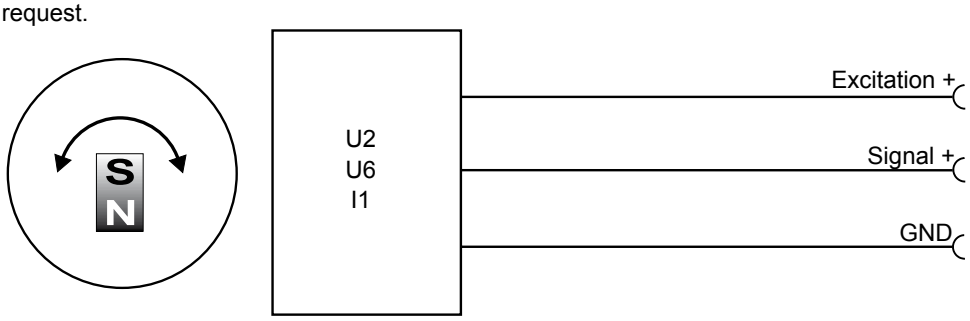
I1
Current Output
4 ... 20 mA



Excitation voltage	+18 ... +27 V DC (+36 V DC as option)
Excitation current	60 mA max.
Load resistor	500 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	According to EN 61326:2004

Other outputs available on request.

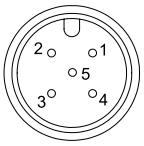
Output signals



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	–

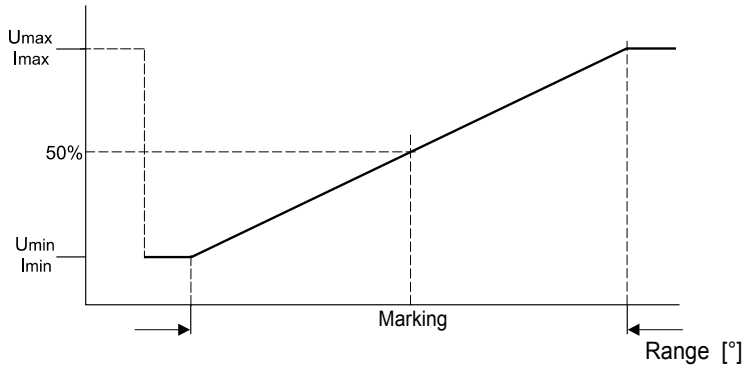
Connection



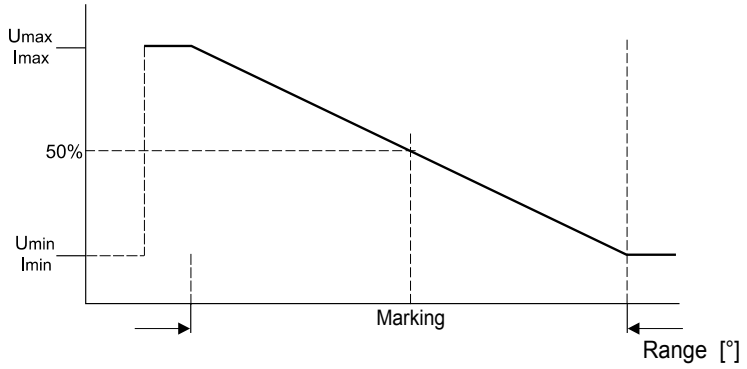
View to sensor connector

M12A5 / M12R5

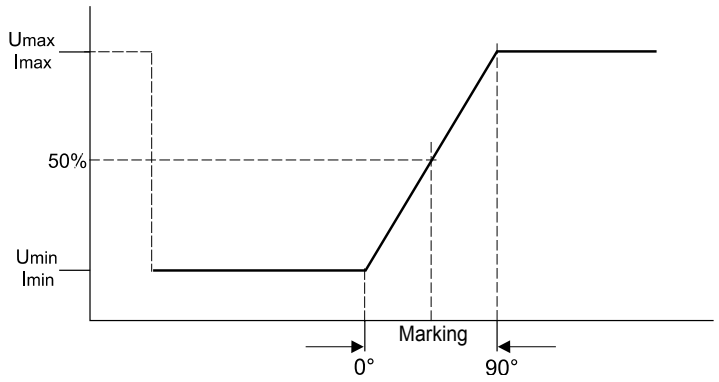
Output signal
(CW increasing)



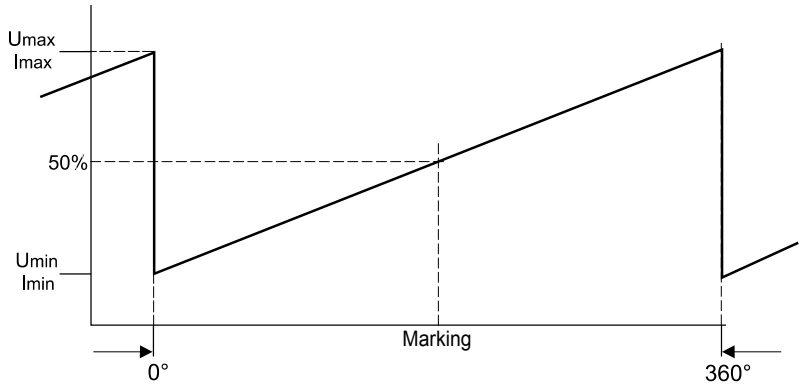
Output signal
(CCW increasing)



Example angular range 90°



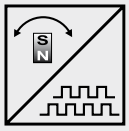
Example angular range 360°



POSIROT® – PRDS
Output RS422

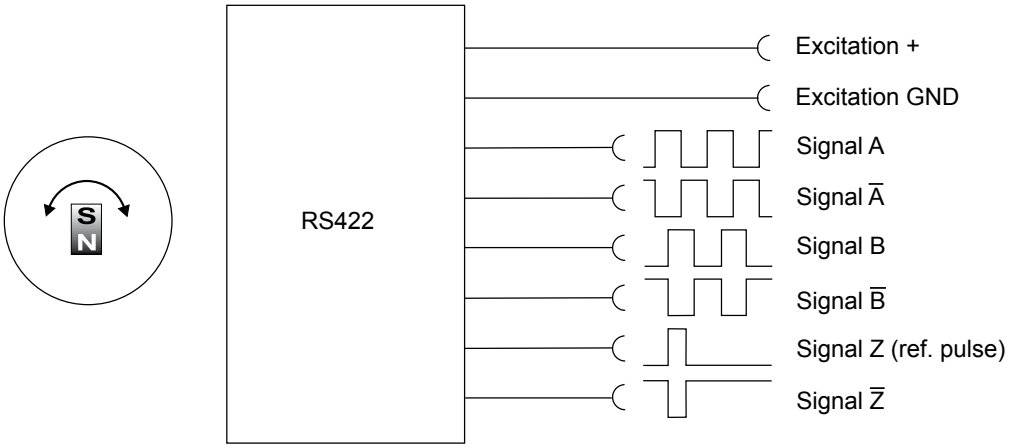
PRELIMINARY

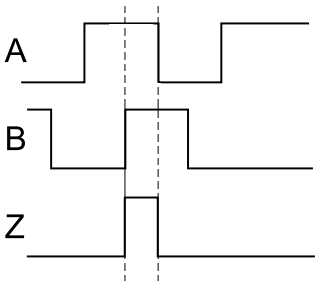
RS422
Incremental



Interface	EIA RS-422
Excitation voltage	5 V DC ±10 %
Excitation current	100 mA max., depending on the load
Pulse frequency	<500 kHz
Output signals	A, $\overline{A}$, B, $\overline{B}$, Z, $\overline{Z}$ Push-Pull
Output current	10 mA max.
Stability (temperature)	±50 x 10^{-6} / °C f.s. (typ.)
Operating temperature	-40 ... +85 °C
Protection	Short circuit
EMC	According to EN 61326:2004

Output signals





Signal wiring

Output signals	Connector pin	Cable color
Excitation +	1	white
GND	2	brown
A	4	green
$\overline{A}$	6	yellow
B	3	grey
$\overline{B}$	5	pink
Z	7	blue
$\overline{Z}$	8	red

Connection



View to sensor connector

M12A8 / M12R8

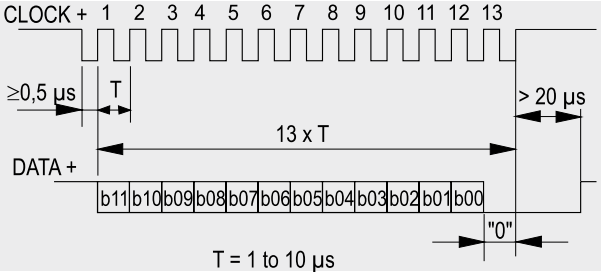
POSIROT® – PRDS
Output SSI

PRELIMINARY

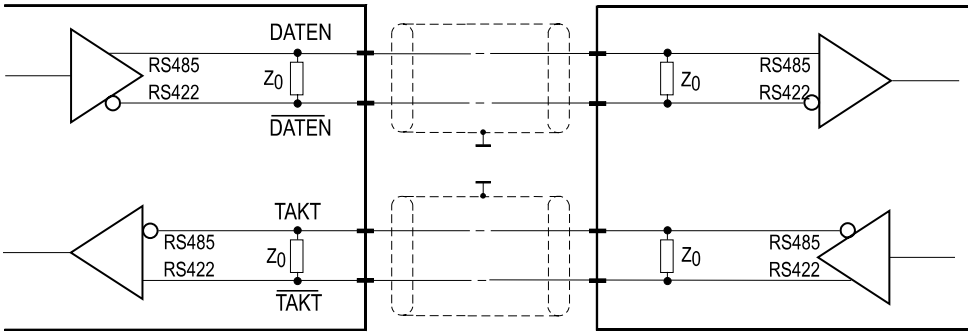
SSI
Synchronous serial

Interface	EIA RS-422
Excitation voltage	5 V DC ±10 %
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 µs min.
Stability (temperature)	±50 x 10^{-6} / °C f.s. (typ.)
Operating temperature	-40 ... +85 °C
Protection	Short circuit
EMC	According to EN 50082-2, EN50081-1

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 /$\overline{\text{CLOCK}}$ and DATA/$\overline{\text{DATA}}$ 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
$\overline{\text{CLOCK}}$	4	yellow
DATA	5	grey
$\overline{\text{DATA}}$	6	pink

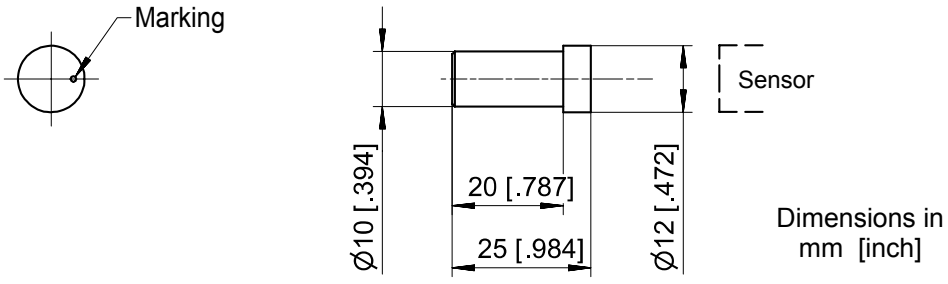
Connection



View to sensor connector

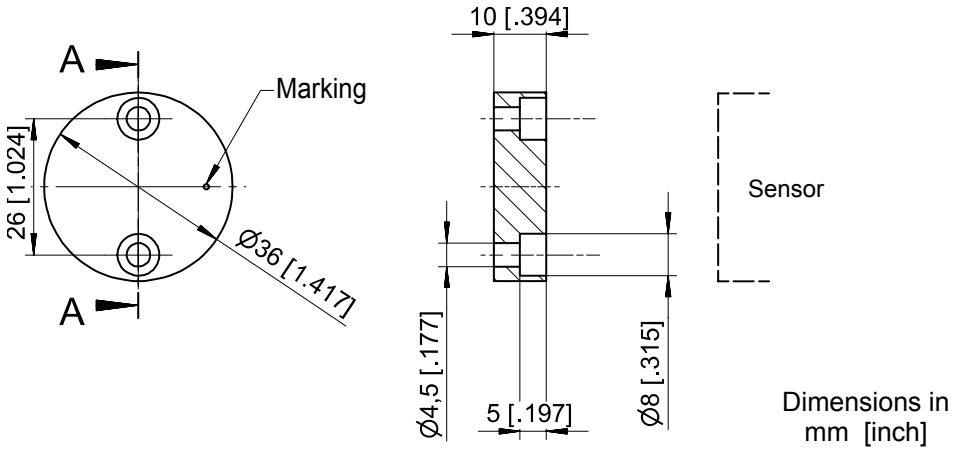
M12A8 / M12R8

PRMAG1



Weight 10 g approx., moment of inertia 0.1 kgmm²

PRMAG2



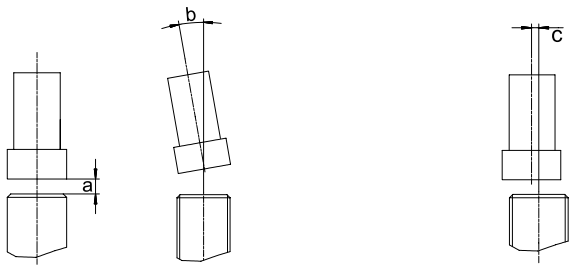
Weight 30 g approx., moment of inertia 4.5 kgmm²

Dimensions informative only
For guaranteed dimensions please consult factory

Note: Sensor and position magnet must be mounted aligned!

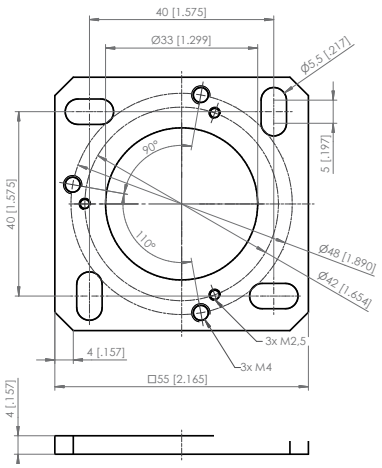
Measuring error by misalignment

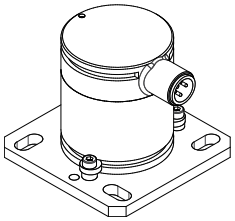
Position magnet	Air gap [mm]	Parallelism [degree]	Error by axial misalignment [% f.s.]			
			0.2 mm	0.5 mm	1 mm	2 mm
PRMAG1	0 ... 1.5	<1	0.1 %	0.3 %	1.1 %	–
PRMAG2	0 ... 4	<1	0.1 %	0.1 %	0.3 %	0.5 %



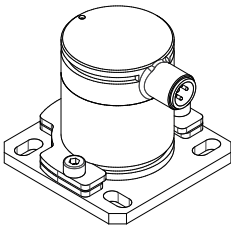
PRPT-BPL1

(screw mounting)
For PRAS2, PRDS2,
PRAS3, PRDS3, PTAS2





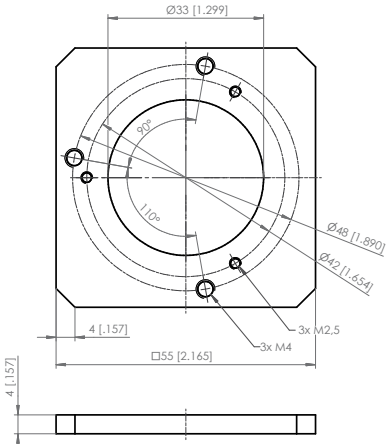
In combination with the mounting clamps PRPT-BFS1.

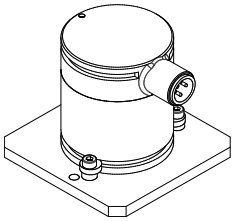


In combination with the mounting brackets PRPT-BFS2.

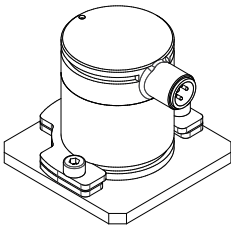
PRPT-BPL2

(welding assembly)
For PRAS2, PRDS2,
PRAS3, PRDS3, PTAS2





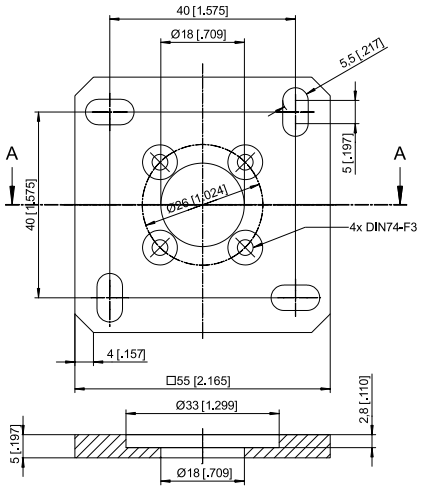
In combination with the mounting clamps PRPT-BFS1.



In combination with the mounting brackets PRPT-BFS2.

PRPT-BPL3

For PRAS3, PRDS3



Dimensions in mm [inch]

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

Connector cable for POSIROT® angle sensors
4 pins M12

Suitable for 5-pin sensor connectors M12A5 and M12R5

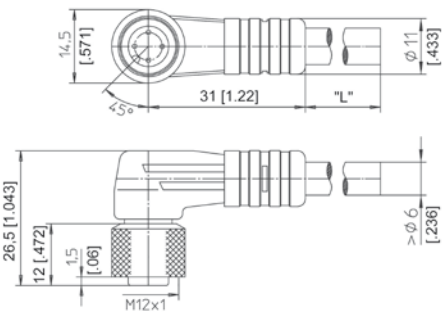
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

Length in m



Connector cable for POSIROT® angle sensors
4 pins M12

Suitable for 5-pin sensor connectors M12A5 and M12R5

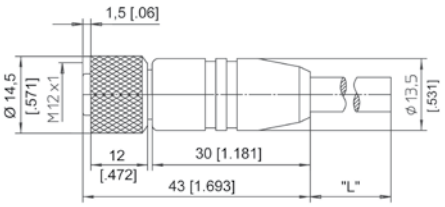
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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® angle sensors
8 pins M12

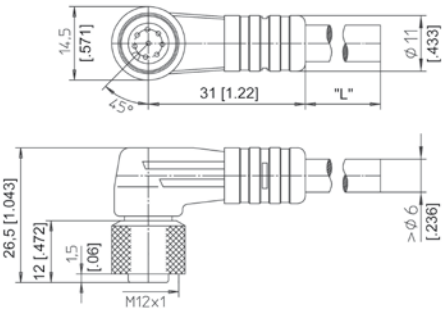
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

Order code:

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

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

Length in m



Connector cable for POSIROT® angle sensors
8 pins M12

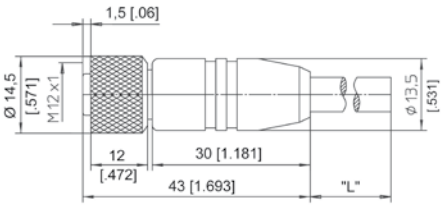
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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®
PMIS4, PMIR4
Magnetic incremental encoder



Magnetic wheels for rotative applications with POSIROT® position sensor PMIS4

- **All metal housing**
- **Protection class IP67**
- **Highest EMC protection**
- **Large guiding distance of ±1 mm**
- **Suitable for harsh environments**
- **Up to 184,320 pulses/360°**

Order Code PMIR4
(magnetic wheel)

PMIR4 – □ – □ – □ – □

Model name

Magnetic period
20 = 2 mm

Number of Poles
50 / 64 / 90 (other pole numbers on request)

Z signal mark
O = without / M = with

Inner diameter
20 = 20H7 (other diameters on request)

Order Code PMIS4
(sensor head)

PMIS4 – □ – □ – □ KHZ – □ – □ – □ M – □

Model name

Magnetic period
20 = 2 mm

Scaling factor
See table page 37

Maximum pulse frequency (in kHz, standard 50 kHz)
50 / 20 / 10 (other frequencies on request, max. 480 kHz)

Output
HTL = HTL output with excitation 24 V DC, output 24 V
TTL = TTL output with excitation 5 V DC, output TTL/RS-422
TTL24V = TTL output with excitation 24 V DC, output TTL/10 mA

Signal Z / status signal
Z0 = A/B w/o signal Z
Z1 = A/B with signal Z
Z3 = A/B with signal Z and status signal, only for non-differential (single-ended) outputs

Cable length (in m, standard 2 m)

Connection
S = Open cable end
P15 = SUB-D connector at the cable end, 15 poles

Order example magnetic wheel: PMIR4 - 20 - 50 - O - 20

Order example sensor: PMIS4 - 20 - 100 - 50KHZ - HTL - Z0 - 2M - S

POSIROT®
PMIS4
Magnetic incremental encoder

Specifications	Output	Incremental encoder output A/B with differential push-pull output, TTL/24 V-, TTL/RS-422- or HTL-compatible	
	Excitation voltage	10 ... 30 V DC or 5 V DC ±5 %	
	Excitation current	50 mA to 300 mA, depending on pulse frequency, cable length and load	
	Magnetic period of the sensor	2 mm	5 mm
	Guided spacing between sensor and wheel x_Z	0,1 ... 0,8 mm	0,1 ... 2 mm
	Side tracking tolerance of the sensor	±1 mm	±1 mm
	Linearity (sensor with magnetic wheel PMIR4)	±0.1°	±0.1°
	Repeatability	±1 digit	±1 digit
	Maximum pulse frequency f_P	50, 20, 10 kHz (standard 50 kHz, max. 480 kHz)	
	Output signals	A, $\overline{A}$, B, $\overline{B}$, signal Z, $\overline{Z}$, status signal $\overline{ERR}$	
	Material of housing	Zinc die casting	
	Connection	Cable 8 wire, dia. 5 mm, open cable end. 15 pin SUB-D conn. at the cable end as option. Max. length of the integrated sensor cable: output TTL: 3 m; HTL/TTL24V: 20 m	
	Weight (w/o cable and connector)	30 ±5 g	
	Protection class (EN 60529)	IP67	
	Environmental		
	EMC	DIN EN 61326	
	Temperature	-40 ... +85 °C (-40 ... +185 °F)	

⚠ The subsequent counting device must be able to process the specified maximum pulse frequency of the sensor.

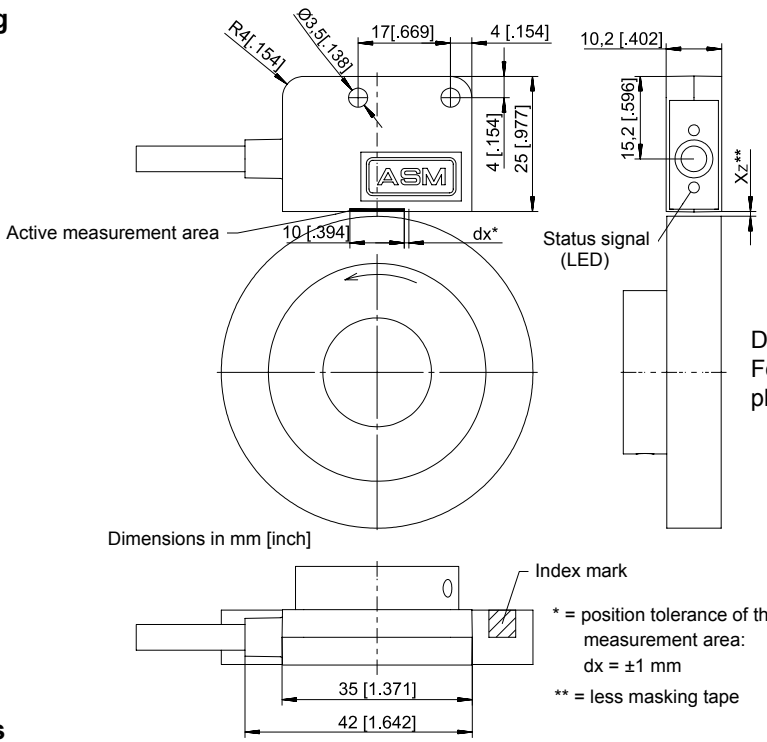
Output signals	Saturation voltage	UH, UL = 0.2 V UH, UL = 0.4 V C_{last} < 10 nF	I_{out} = ±10 mA I_{out} = ±30 mA	(UH = UB - U_{out})
	Short circuit current	ISL, ISH < 800 mA ISL, ISH < 90 mA	(UH, UL = 0 V) (UH, UL = 1.5 V)	
	Rise time	t_r, t_f < 200 ns	with cable length 1 m, 10 % … 90 %	

Pulse frequency in dependence on the cable length

Load/cable length	**Load/pulse frequency fp**		
	HTL single ended UB = 24 V	**TTL/RS422 differential** UB = 5 V *	**TTL/24 V** UB = 24 V
Max. output current	50 mA	50 mA	10 mA
R_{last} min.	500 Ω	100 Ω	500 Ω
C_{last} max.	10 nF	10 nF	1 nF
200 m	15 kHz	—	—
100 m	25 kHz	100 kHz	—
50 m	50 kHz	200 kHz	50 kHz
10 m	100 kHz	300 kHz	100 kHz

* = consider the voltage loss of the cable; the excitation voltage 5 V ± 5% of the sensor must be guaranteed.
Note: For longer distances (see specification above) you must use min. 0.5 mm² wire for „Excitation+“ and „Excitation GND“ (see signal wiring next page), all signal wires must be min. 0.14 mm²!

Outline drawing



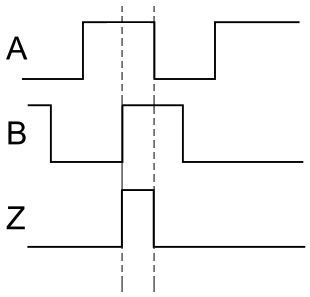
Dimensions informative only.
For guaranteed dimensions
please consult factory.

* = position tolerance of the active measurement area:
dx = ±1 mm

** = less masking tape

Output signals

Option Z1 (signal Z)

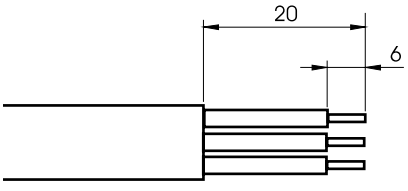


Signal wiring

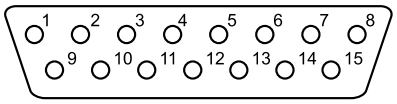
Signal name				Cable with open end, cable color	Connector SUB-D, pin no.
Option	**Z0**	**Z1**	**Z3 ***		**15 poles**
Excitation +				white	1
Excitation GND (0 V)				brown	2
	B	B	B	green	6
	A	A	A	yellow	4
	$\overline{B}$	$\overline{B}$	$\overline{ERR}$	grey	7
	$\overline{A}$	$\overline{A}$	–	pink	5
	–	Z	Z	blue	8
	–	$\overline{Z}$	–	red	9
Shield				black	12

Z = reference pulse
ERR = status signal, periodical approx. 16 Hz, for side tracking and velocity errors
* = status signal ERR available only with HTL (single ended) output

Connection



Cable output dimensions



Connector SUB-D (Pin)
View to connector pins

POSIROT®
PMIR4
Incremental magnetic wheels

Specification	Material	Plastic bonded magnetic material or magnetic scale
	Base material	Aluminium
	Signal periods per revolution	From 50 poles/revolution
	Magnetic period	2 mm
	Temperature range	-40 ...+85°C (-40 ... +185 °F)
	Linearity with sensor PMIS4	Approx. ± 0.1°

Data valid in connection with the sensor PMIS4.

Standard magnetic wheels

Type	Poles	∅	Height	Signal periods/rotation	Inside diameter
PMIR4-20-50	50	31.8	18	decade division (refer to the table below)	20H7
PMIR4-20-64	64	40.7	18	binary division (refer to the table below)	20H7
PMIR4-20-90	90	57.3	18	vernier (refer to the table below)	20H7

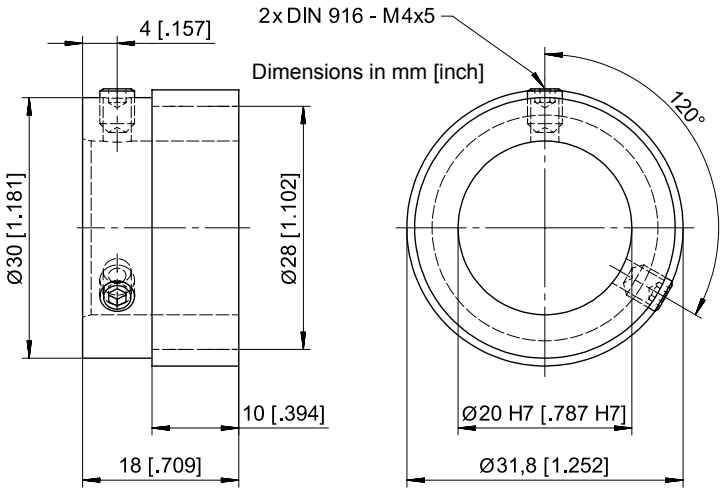
Further pole numbers, diameters and magnetic periods on request.

Scaling factor Sensor PMIS4-20- ...	PMIR4-20-50		PMIR4-20-64		PMIR4-20-90	
	Signal periods	R.p.m.)* (at 480 kHz)	Signal periods	R.p.m.)* (at 480 kHz)	Signal periods	R.p.m.)* (at 480 kHz)
1	50	6000	64	6000	90	6000
2	100	6000	128	6000	180	6000
4	200	6000	256	6000	360	6000
8	400	6000	512	6000	720	6000
10	500	5760	640	4500	900	3200
16	800	6000	1024	6000	1440	6000
20	1000	5760	1280	4500	1800	3200
25	1250	6000	1600	6000	2250	5120
32	1600	6000	2048	6000	2880	6000
40	2000	5760	2560	4500	3600	3200
50	2500	6000	3200	6000	4500	5120
64	3200	6000	4096	5625	5760	4000
80	4000	5760	5120	4500	7200	3200
100	5000	4608	6400	3600	9000	2560
125	6250	3686	8000	2880	11 250	2048
128	6400	3600	8192	2813	11 520	2000
200	10 000	2304	12 800	1800	18 000	1280
250	12 500	1843	16 000	1440	22 500	1024
256	12 800	1800	16 384	1406	23 040	1000
400	20 000	1152	25 600	900	36 000	640
500	25 000	922	32 000	720	45 000	512
512	25 600	900	32 768	703	46 080	500
1024	51 200	450	65 536	352	92 160	250
2048	102 400	225	131 072	176	184 320	125

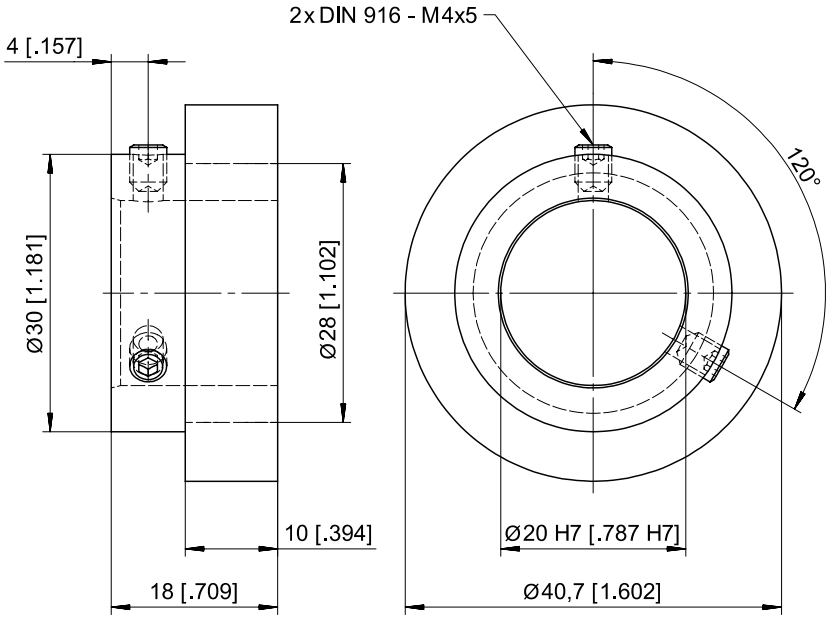
)* Maximum revolution per minute mechanically 6.000 R.p.m.

Outline drawings

PMIR4-20-50



PMIR4-20-64

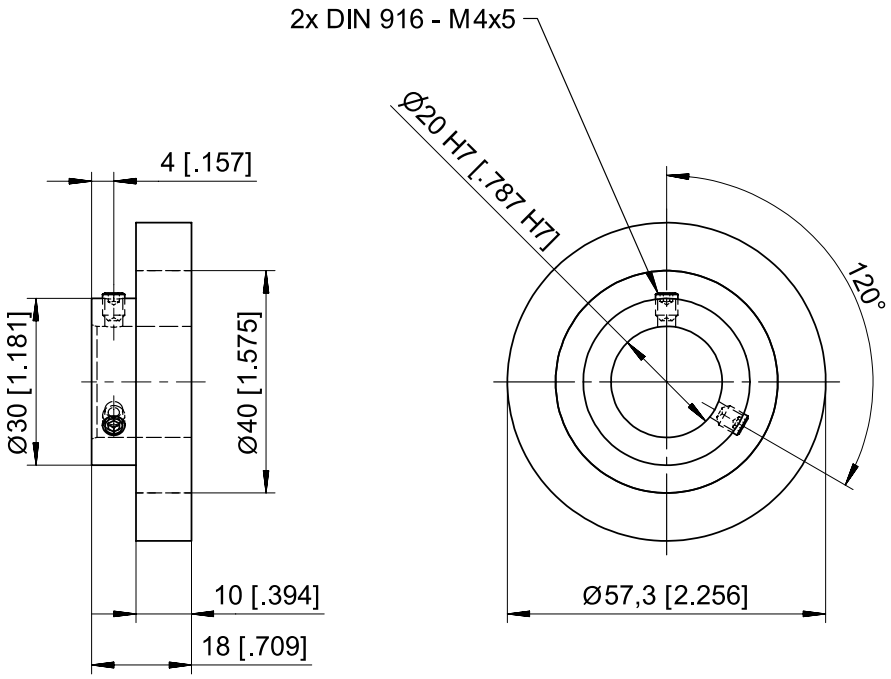


Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions
please consult factory.

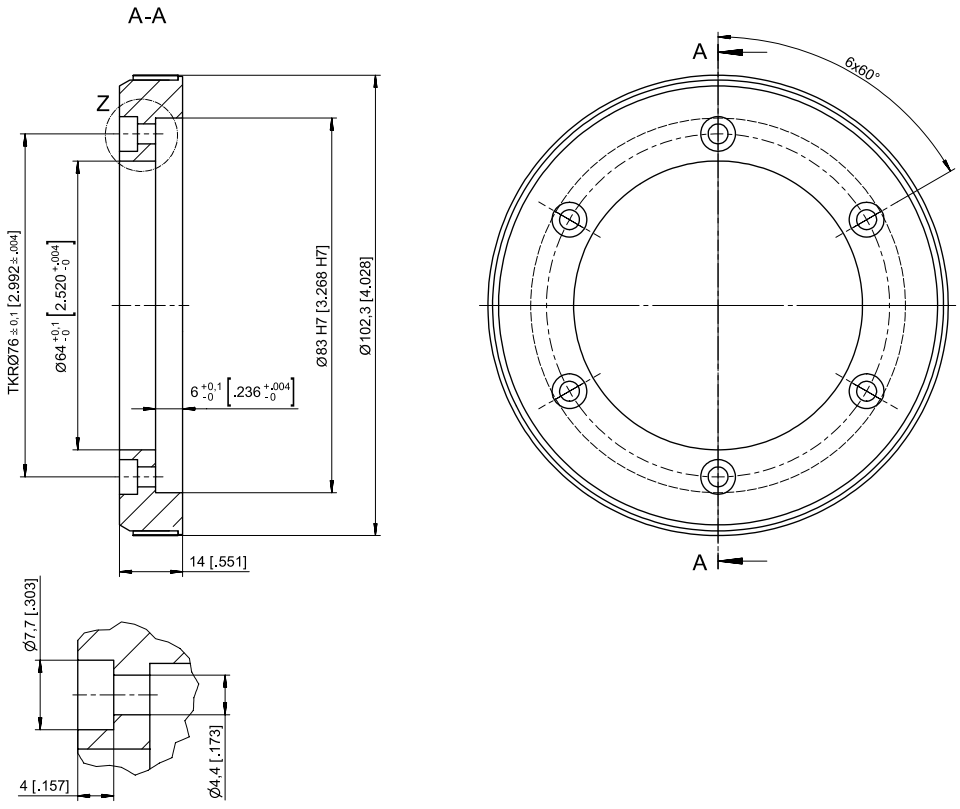
Outline drawings

PMIR4-20-90



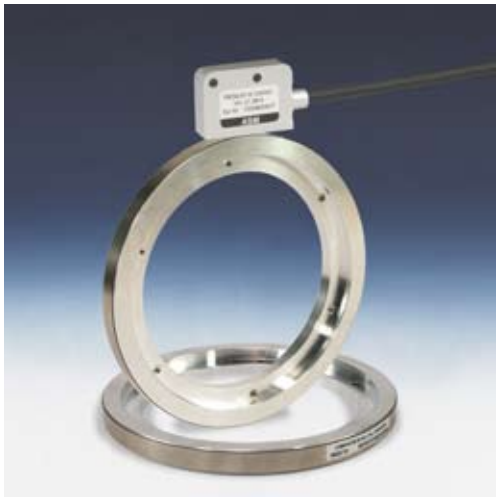
Dimensions in mm [inch]

PMIR5-50-64



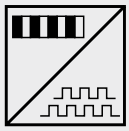
Dimensions informative only.
For guaranteed dimensions please consult factory.

POSIROT®
PMIS4, PMIR5
Magnetic incremental encoder



Magnetic wheels for rotative applications with POSIROT® position sensor PMIS4

- **All metal housing**
- **Protection class IP67**
- **Highest EMC protection**
- **Large guiding distance of ±1 mm**
- **Suitable for harsh environments**
- **Up to 327,680 pulses/360°**



Order Code PMIR5
(magnetic wheel)

PMIR5 – □ – □ – □ – □ – □

Model name

Magnetic period
50 = 5 mm

Number of poles
64 / 96 / 160 (other pole numbers on request)

Z signal mark
O = without / M = with

Inner diameter
Depending on the number of poles (on request)

Option
AB = Masking tape

Oder Code PMIS4
(sensor head)
Specifications see page 35

PMIS4 – □ – □ – □ KHZ – □ – □ – □ M – □

Model name

Magnetic period
50 = 5 mm

Scaling factor
See table page 41

Maximum pulse frequency (in kHz, standard 50 kHz)
50 / 20 / 10 (other frequencies on request, max. 480 kHz)

Output
HTL = HTL output with excitation 24 V DC, output 24 V
TTL = TTL output with excitation 5 V DC, output TTL/RS422
TTL24V = TTL output with excitation 24 V DC, output TTL/10 mA

Signal Z / status signal
Z0 = A/B w/o signal Z
Z1 = A/B with signal Z
Z3 = A/B with signal Z and status signal, only for non-differential (single-ended) outputs

Cable length (in m, standard 2 m)

Connection
S = Open cable end
P15 = SUB-D connector at the cable end,15 poles

Order example position magnet ring: PMIR5 - 50 - 64 - M - 83 - AB

Order example sensor: PMIS4 - 50 - 100 - 50KHZ - HTL - Z0 - 2M - S

POSIROT®
PMIR5
Incremental magnetic wheels

Specifications	Material	Plastic bonded magnetic scale
	Base material	Aluminium
	Signal periods per revolution	64 / 96 / 160 poles per revolution
	Magnetic period	5 mm
	Temperature range	-40 ...+120°C (-40 ... -248 °F)
	Linearity with sensor PMIS4	Approx. ± 0.1°

Data valid in connection with the sensor PMIS4.

Standard magnet rings

Type	Poles	∅	Height	Signal periods/revolution	Inner diameter ∅
PMIR5-50-64	64	102.3	14	Divisions see table below	Ø83 H7
PMIR5-50-96	96	153.2	14	Divisions see table below	On request
PMIR5-50-160	160	255.1	14	Divisions see table below	On request

Positionsmagnet rings with other number of poles, diameters or magnetic periods on request.

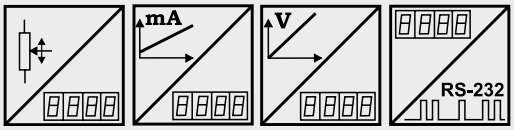
Scaling factor sensor PMIS4-50- ...	PMIR5-50-64		PMIR5-50-96		PMIR5-50-160	
	Signal periods	R.p.m.)* (at 480 kHz)	Signal periods	R.p.m.)* (at 480 kHz)	Signal periods	R.p.m.)* (at 480 kHz)
1	64	3000	96	3000	160	3000
2	128	3000	192	3000	320	3000
4	256	3000	384	3000	640	3000
8	512	3000	768	3000	1280	3000
10	640	3000	960	3000	1600	1800
16	1024	3000	1536	3000	2560	3000
20	1280	3000	1920	3000	3200	1800
25	1600	3000	2400	3000	4000	2880
32	2048	3000	3072	3000	5120	3000
40	2560	3000	3840	3000	6400	1800
50	3200	3000	4800	3000	8000	2880
64	4096	3000	6144	3000	10 240	2250
80	5120	3000	7680	3000	12 800	1800
100	6400	3000	9600	2400	16 000	1440
125	8000	2880	12 000	1920	20 000	1152
128	8192	2813	12 288	1875	20 480	1125
200	12 800	1800	19 200	1200	32 000	720
250	16 000	1440	24 000	960	40 000	576
256	16 384	1406	24 576	938	40 960	563
400	25 600	900	38 400	600	64 000	360
500	32 000	720	48 000	480	80 000	288
512	32 768	703	49 152	469	81 920	281
1024	65 536	352	98 304	234	163 840	141
2048	131 072	176	196 608	117	327 680	70

)* Maximum r.p.m. mechanically 3.000 U/min

PRODIS®
PD-ADC
Digital process meter for analog sensors



- **For POSIROT® and POSITILT® position sensors with analog outputs:**
  Voltage 0 ... 10 V; 0.5 ... 10V; 0.5 ... 4.5 V
  Current 4 ... 20 mA
  Voltage divider
- **Integrated sensor supply (24 V DC)**
- **6-digit LED display**
- **RS-232 interface**
- **Optional 4 comparator outputs**
- **Easy programming**



Description

PRODIS-ADC is designed for use with analog position sensors to display angles and displacements. A high resolution A/D converter processes signals from sensors with voltage output 0 ... 10 V, current output 0/4 ... 20 mA or voltage divider (potentiometer).
The meter is programmable to display values within preset start/end range or values in units as inches, mm or degrees. A tare function or programming lock can be activated with two control terminals.
Sensor excitation is supplied by the meter. With four membrane keys all parameters can be programmed for the special applications. Optional comparator functions with 4 NPN open-collector outputs are available, additional 2 of them have relay output.

Specification

Display		6-digit, 7-segment LED, height 14 mm, decimal point programmable
Counting rate		1 ... 25/s programmable
Measurement accuracy		±0.05 % f.s.
Excitation voltage/current		24 V DC ±10%/150 mA, residual ripple 1%$_{ss}$; 85-250 V AC, 50-60 Hz/180 mA max.
Sensor excitation		24 V DC/300 mA
Input		Two channels, each for: Voltage 0...10V; 0.5 ... 10V; 0.5 ... 4.5 V; max. 24V Current 0/4...20 mA, load 100 Ω, I_{max}<30 mA Voltage divider R_{min}=500 Ω, 0 ... 5 V One input or the difference between both inputs can be chosen by programming
Control input		2 control inputs 24 V, active low
Comparator outputs (option)	Relay NPN	250 V AC/5 A, 30 V DC/5 A 24 V max./50 mA to GND
Connection		Terminal strip 12 pole, excitation 3 pole
Temperature coefficient		±20 x 10^{-6} / °C [±36 x 10^{-6} / °F]
Operating temperature / storage temperature		-10...+40 °C [14...+104 °F] / -20...+85 °C [-4...+185 °F]

Order Code PRODIS-ADC

PD-ADC – □ – □

Model name

Excitation Voltage
24VDC = 24 V DC
230VAC = 85...250 V AC

Options
REL2 = Comparator
DT = Desktop version

Order example: PD - ADC - 24VDC - REL2

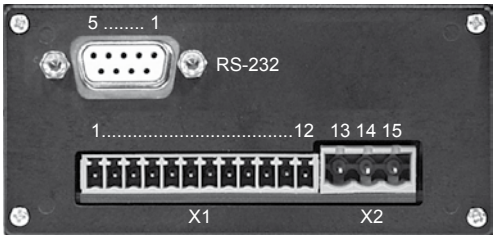
PRODIS®
PD-ADC
Digital process meter for analog sensors

Specifications (Cont´d)	Weight	24 V DC: approx. 250 g; 230 V AC: approx.. 400 g
	Protection class	Front IP60, rear IP40
	Humidity	Max. 80 % R. H., non condensing
	Safety of equipment	Directive 73/23/EWG: DIN EN61010:2002-03
	Electromagnetic compatibility, EMC	Directive 89/336/EWG

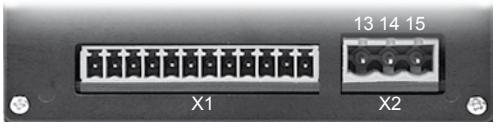
Programmable parameters / value range	Value range offset, limit values	-999999 to +999999
	Divisor, multiplier	0 to 999999
	Other programmable parameters	Decimal point position, display brightness
	Control input terminals	Key lock, display value hold, tare function

Wiring basic unit

Signals	Connector X1 pin no.	Connector X2 pin no.
Sensor excitation +U_B 24 V	1	
Sensor excitation 0 V (GND)	2	
Control input terminal 1	3	
Control input terminal 2	4	
Voltage input terminal 0 ... 10 V, channel 1	5	
Voltage input terminal 0 ... 10 V, channel 2	6	
Current input terminal 0/4 ... 20 mA, channel 1	7	
Current input terminal 0/4 ... 20 mA, channel 2	8	
Voltage divider input terminal R1K, channel 1	9	
Voltage divider input terminal R1K, channel 2	10	
Reference voltage output terminal 5 V for R1K	11	
GND	12	
PD-ADC-24VDC Excitation +24 V Excitation 0 V (GND)		 13 14
PD-ADC-230VAC Excitation Protective ground		 13, 15 14



PD-ADC-24VDC



PD-ADC-230VAC

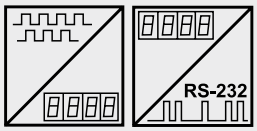
RS-232 interface	Level	RS-232: ±8 V, galvanically isolated	
	Data format	1 start bit, 8 data bits, 1 stop bit, no parity	
	Transmission rate	9600 Baud	
	Signals	**Connector X3 Pin No.**	**SUB-D Pin No.**
	TxD	17	2
	RxD	16	3
	GND	18	5

Rear view with comparator outputs and outline drawings see pages 48 and 49.

PRODIS®
PD-INC
Digital process meter for incremental sensors



- **For POSIROT® position sensors with incremental outputs**
- **Integrated sensor supply**
- **Counting rate up to 250 kHz (<1 MHz edge frequency)**
- **6-digit LED display**
- **RS-232 interface**
- **Optional 4 comparator outputs**
- **Easy programming**



Description

PRODIS-INC is designed for use with incremental position sensors to display angles. The fast counter processes 90° phase shifted A,B signals (quadrature signals) for direction and counting information. Sensor excitation is supplied from the meter. With four membrane keys all parameters can be programmed for the special application. An zero signal and a reference signal can be used for calibration of the measurement system. Optional comparator functions with 4 NPN open-collector outputs are available, additional 2 of them have relay output.

Specifications

Display		6-digit, 7-segment LED, height 14 mm, decimal point programmable
Excitation voltage/current		24 V DC ±10%/150 mA, residual ripple 1%$_{ss}$; 85-250 V AC, 50-60 Hz/180 mA max.
Counting frequency		250 kHz max., 1 MHz edge frequency
Sensor excitation		24 V DC/300 mA or 5V DC/500 mA
Inputs		A, B, Z, T (reference signal)
Connection		Terminal strip 12-pole, excitation 3-pole
Operating temperature		-10 ... +40 °C [14 ... +104 °F]
Storage temperature		-20 ... +85 °C [-4 ... +185 °F]
Weight		24 V DC: approx. 250 g; 230 V AC: approx. 400 g
Protection class		Front IP60, rear IP40
Humidity		Max. 80 % R.H., non condensing
Comparator outputs (option)	Relay NPN	250 V AC/5 A, 30 V DC/5 A 24 V max./50 mA to GND
Safety of equipment		Directive 73/23/EWG: DIN EN61010:2002-03
EMC		Directive 89/336/EWG

Order Code PRODIS-INC

PD-INC – ☐ – ☐ – ☐ – ☐

Model name

Excitation voltage
24VDC = 24 V DC
230VAC = 85...250 V AC

Sensor excitation voltage
G24V = 24 V DC
G5V = 5 V DC

Sensor signal
HTL = HTL level with excitation voltage G24V
TTL = TTL level with excitation voltage G5V or G24V

Options
REL2 = Comparator
DT = Desktop version

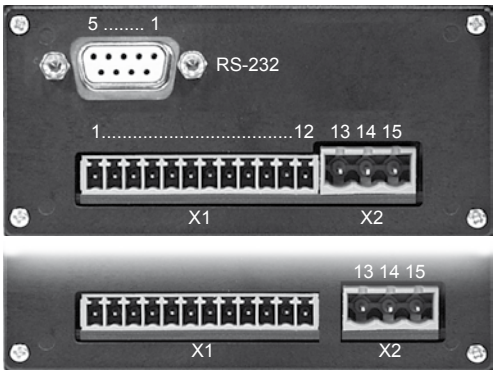
Order example: PD - INC - 24VDC - G24V - HTL - REL2

PRODIS®
PD-INC
Digital process meter for incremental sensors

Programmable parameters / value range	Value range display, offset, limit values	-999999 to +999999
	Divisor, Multiplier	0 to 999999
	Other programmable parameters	Counting direction, decimal point position, last-value memory, Z signal evaluation, display brightness
	Signal T	Manual zero, key lock, display value hold, Z release, relative measurement activation

Wiring basic unit	**Signals**	**Connector X1 pin no.**	**Connector X2 pin no.**
	Sensor $+U_B$	1	
	Sensor 0 V (GND)	2	
	Signal A	4	
	Signal $\overline{A}$	5	
	Signal B	6	
	Signal $\overline{B}$	7	
	Signal Z (zero signal)	8	
	Signal $\overline{Z}$ (zero signal)	9	
	Signal T (reference signal)	10	
	Signal $\overline{T}$ (reference signal)	11	
	GND	12	
	PD-INC-24VDC Excitation +24 V Excitation 0 V (GND)		 13 14
	PD-INC-230VAC Excitation Protective ground		 13, 15 14

Rear view without comparator outputs



PD-INC-24VDC

PD-INC-230VAC

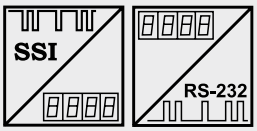
RS-232 interface			
	Level	RS-232: ±8 V, galvanically isolated	
	Data format	1 start bit, 8 data bits, 1 stop bit, no parity	
	Transmission rate	4800 / 9600 / ... / 115200 Baud	
	Signals	**Connector X3 Pin No.**	**SUB-D Pin No.**
	TxD	17	2
	RxD	16	3
	GND	18	5

Rear view with comparator outputs and outline drawings see pages 48 and 49.

PRODIS®
PD-SSI
Digital process meter for sensors with SSI output



- **For POSIROT® position sensors with SSI output**
- **Integrated sensor supply**
- **6-digit LED display**
- **RS-232 interface**
- **Optional 4 comparator outputs**
- **Easy programming**



PRODIS-SSI is designed for use with SSI position sensors to display angle and displacement. Via the CLOCK lines, a sequence of pulses will be transmitted, the input DATA lines will read the sensor´s serial bit sequence. The meter is programmable to display values within preset start/end range or values in units as inches, mm or degrees. A tare function or programming lock can be activated with two control terminals.
Sensor excitation is supplied by the meter. With four membrane keys, all parameters can be programmed for the special applications. Optional comparator functions with 4 NPN open-collector outputs are available, additional 2 of them have relay output.

Specifications

Display		6-digit, 7-segment LED, 14 mm high, decimal point programmable
Sampling rate		100/s
Excitation voltage/current		24 V DC ±10%/150 mA, residual ripple 1%$_{PP}$; 85-250 V AC, 50-60 Hz/180 mA max.
Sensor excitation		24 V DC/200 mA or 5 V DC/200 mA
Inputs		DATA, $\overline{\text{DATA}}$ (RS-422)
Outputs		CLOCK, $\overline{\text{CLOCK}}$ (RS-422)
Control inputs		2 control inputs 24 V, active low
Comparator outputs (option)	Relay NPN	250 V AC/5 A, 30 V DC/5 A 24 V max./50 mA to GND
Connection		Terminal strip 12-pole, excitation 3-pole
Operating temperature		-10 ... +40 °C [14 ... +104 °F]
Storage temperature		-20 ... +85 °C [-4 ... +185 °F]
Weight		24 V DC: approx. 250 g; 230 V AC: approx. 400 g

Order Code PRODIS-SSI

PD-SSI – □ – □ – □

Model name

Excitation Voltage
24VDC = 24 V DC
230VAC = 85...250 V AC

Sensor Excitation
G24V = 24 V DC
G5V = 5 V DC

Options
REL2 = Comparator
DT = Desktop version

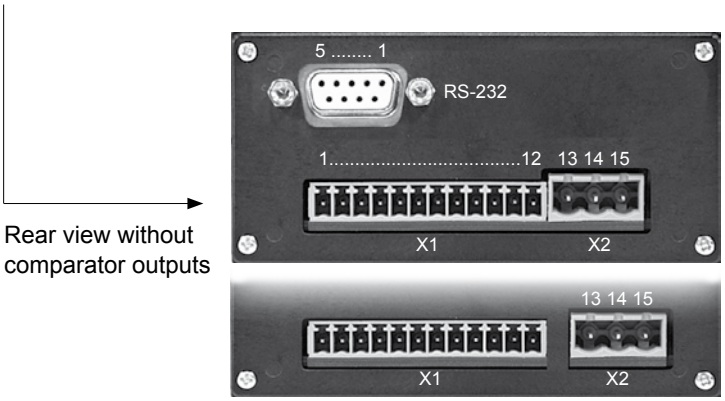
Order example: PD - SSI - 230VAC - G5V

PRODIS®
PD-SSI
Digital process meter for sensors with SSI output

Specifications (continuation)	Protection class	Front IP60, back IP40
	Humidity	Max. 80 % r.h., non condensing
	Safety of equipment	Directive 73/23/EWG: DIN EN61010:2002-03
	Electromagnetic compatibility, EMC	Directive 89/336/EWG

Programmable Parameters / Value range	Value range offset, limit values	-999999 to +999999
	Divisor, multiplier	0 to 999999
	Other programmable parameters	Decimal point position, display brightness
	Programmable SSI parameters	Gray/dual code, sign, sampling rate, data format
	Control inputs	Key lock, display value hold, tare function

	Signals	**Connector X1 pin no.**	**Connector X2 pin no.**
Wiring basic unit	Sensor excitation +U_B (24 V or 5 V)	1	
	Sensor excitation 0 V (GND)	2	
	Control input 1: tare function	3	
	Control input 2: programming lock	4	
	Not used	5 / 6	
	Output CLOCK	7	
	Output $\overline{\text{CLOCK}}$	8	
	Input DATA	9	
	Input $\overline{\text{DATA}}$	10	
	Do not connect!	11	
	GND	12	
	PD-SSI-24VDC Excitation +24 V Excitation 0 V (GND)		 13 14
	PD-SSI-230VAC Excitation Protective ground		 13, 15 14



Rear view without comparator outputs

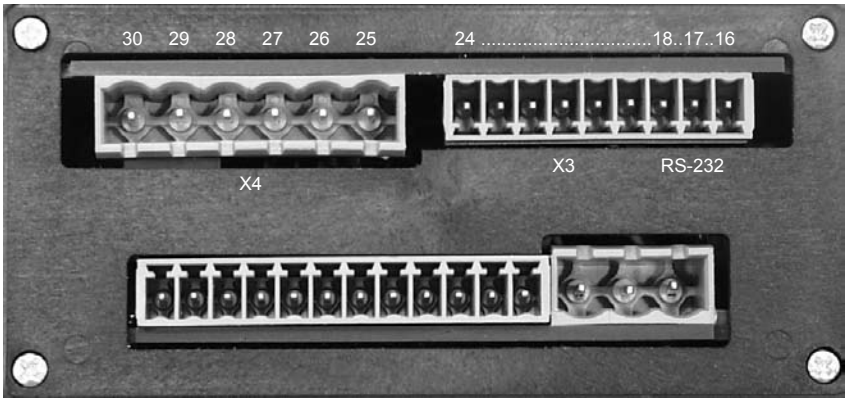
PD-SSI-24VDC

PD-SSI-230VAC

RS-232 interface	Level	RS-232: ±8 V, galvanically isolated	
	Data format	1 start bit, 8 data bits, 1 stop bit, no parity	
	Transmission rate	9600 Baud	
	Signals	**Connector X3 pin no.**	**SUB-D pin no.**
	TxD	17	2
	RxD	16	3
	GND	18	5

Rear view with comparator outputs and outline drawings see the following pages.

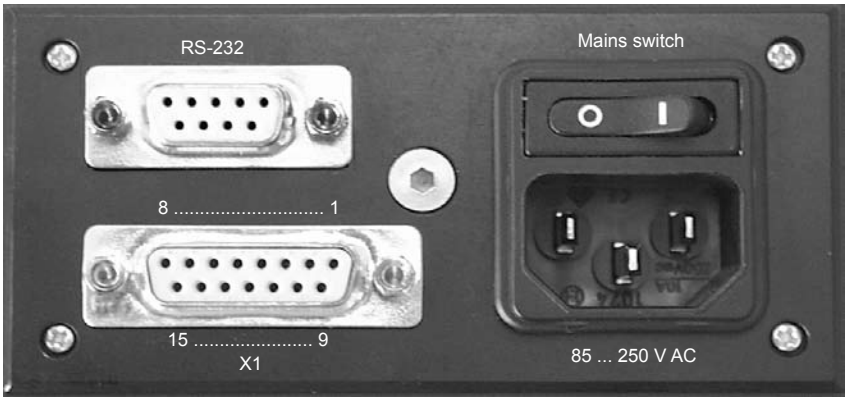
Rear view with comparator outputs



Comparator function (option)

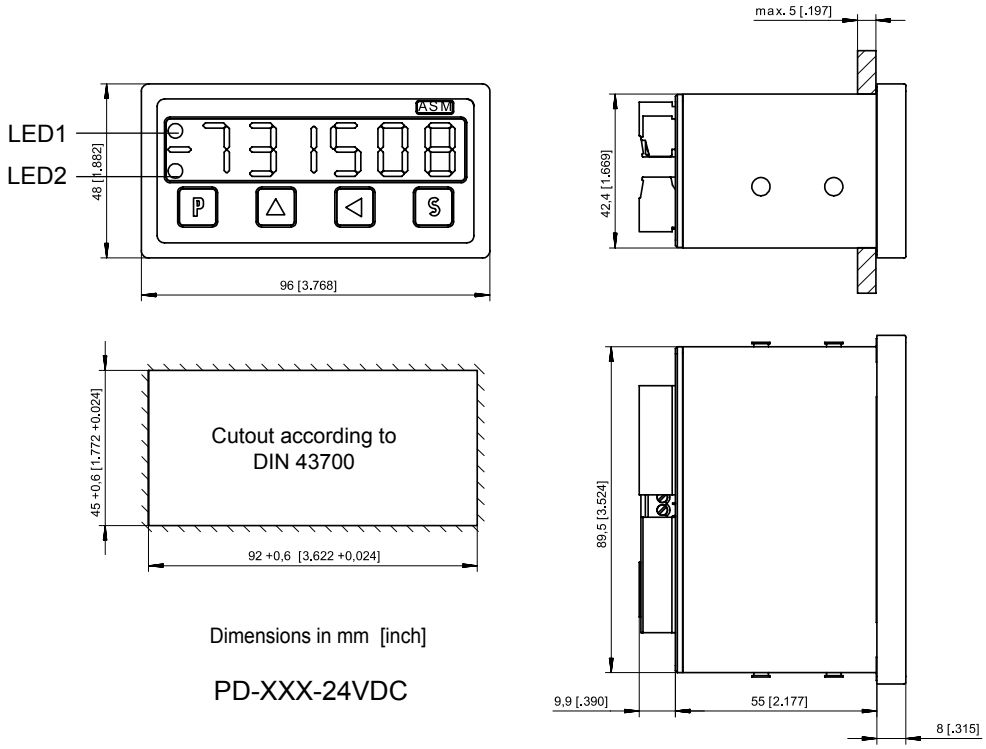
Comparator	Comparator output				
	NPN Collector	Connector X3 pin no.	Relay	Connector X4 pin no.	LED
Comparator 1	NPN1	20	Relay 1 NO NC Common	 25 27 26	LED1
Comparator 2	NPN2	21	Relay 2 NO NC Common	 28 30 29	LED2
Comparator 3	NPN3	22			
Comparator 4	NPN4	23			
	NPN GND NPN U_B (+24V)	24 19			

Desktop version (option)

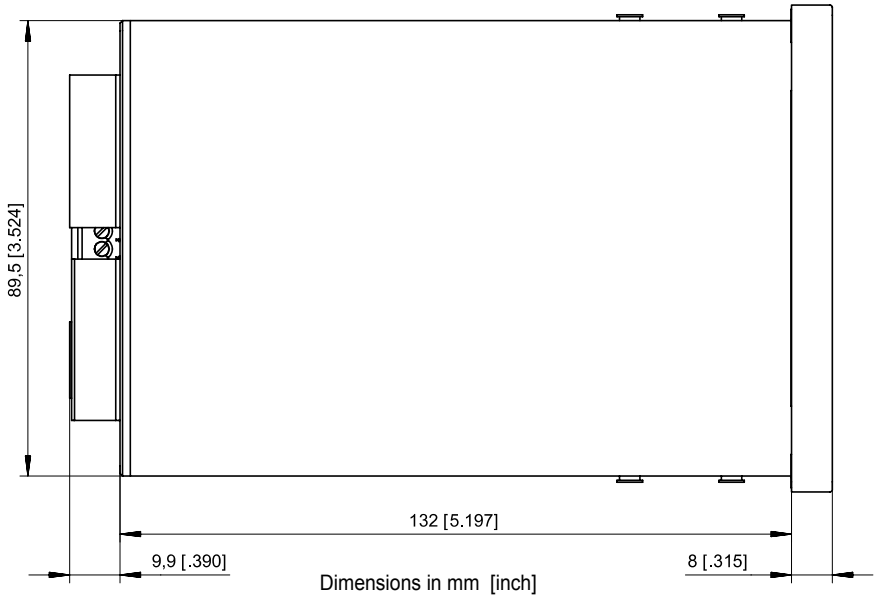


Wiring of connector X1 see table at page 43 (PD-ADC), page 45 (PD-INC) resp. page 47 (PD-SSI).

Outline drawing



PD-XXX-24VDC



PD-XXX-230VAC

Dimensions informative only.
For guaranteed dimensions
please consult factory.

Available Position Sensor Catalogs







Information request

Fax +49-(0)8123-986-500

Company: _____

Mr./Mrs.: _____

Department: _____

Street: _____

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Tel. / Fax: _____

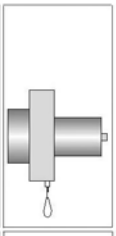
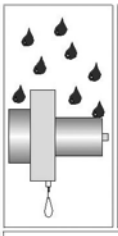
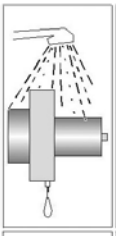
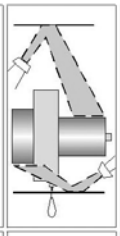
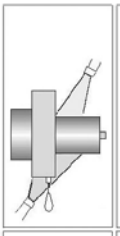
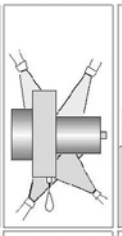
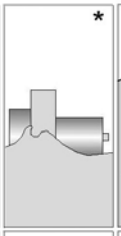
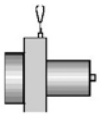
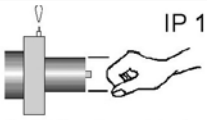
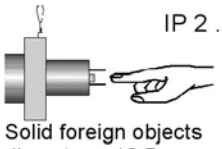
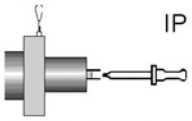
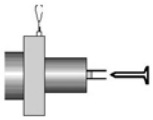
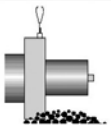
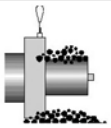
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Website: _____

- Please send me detailed information/catalog on the following products:

☐ WS® Cable actuated Position Sensors
☐ POSICHRON® Magnetostrictive Position Sensors
☐ POSIMAG® Magnetic Scale Position Sensors

Protection classes according to EN 60529

2nd char. numeral: Protection against ingress of water / 1st char.numeral: Protection against solid foreign objects								* 	* 
Protection against ...	Non protected	Falling water drops vertical / 15°		Spraying water	Splashing water	Water jets	Powerful water jets	Temporary immersion	Continuous Immersion
IEC 529 DIN 40050	IP .. 0	IP .. 1	IP .. 2	IP .. 3	IP .. 4	IP .. 5	IP .. 6	IP .. 7	IP .. 8
IP 0 ..  Non protected	IP 00								
IP 1 ..  Solid foreign objects diameter ≥ 50 mm	IP 10	IP 11	IP 12						
IP 2 ..  Solid foreign objects diameter ≥ 12,5 mm	IP 20	IP 21	IP 22	IP 23					
IP 3 ..  Solid foreign objects diameter ≥ 2,5 mm	IP 30	IP 31	IP 32	IP 33	IP 34				
IP 4 ..  Solid foreign objects diameter ≥ 1 mm	IP 40	IP 41	IP 42	IP 43	IP 44				
IP 5 ..  Dust-protected	IP 50		IP 52	IP 53	IP 54	IP 55	IP 56		
IP 6 ..  Dust-tight	IP 60				IP 64	IP 65	IP 66	IP 67	IP 68

* Depth and duration of immersion must be specified!

IP69K - Water at high pressure / steam jet cleaning

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