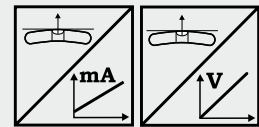




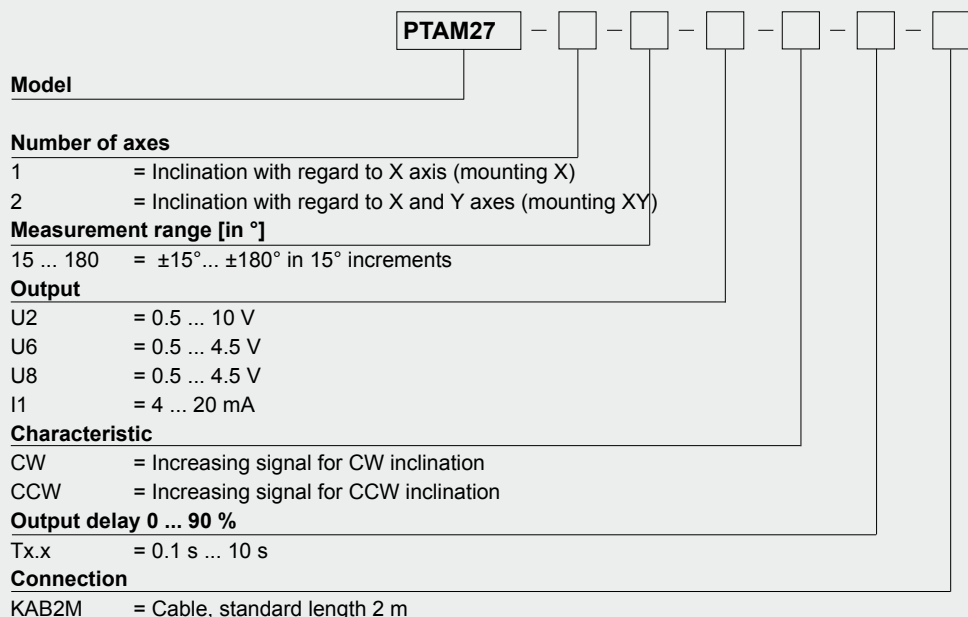
Analog Inclination Sensor with 1 axis or 2 axes in MEMS technology

- Measurement range $\pm 180^\circ$ with 1 axis or 2 axes
- Protection class IP67
- Linear analog output
- Plastic housing
- Wear free, high resolution
- High shock resistance
- OEM version



| Specifications | Output /Excitation | U2 | Voltage 0.5 ... 10 V / $U_B = 18 \dots 36$ V |
|----------------|-----------------------------|--|---|
| | | | U6 |
| | | U8 | Voltage 0.5 ... 4.5 V / $U_B = 10 \dots 36$ V |
| | | I1 | Current 4 ... 20 mA / $U_B = 18 \dots 36$ V |
| | Measurement range | $\pm 180^\circ$ with 1 axe or 2 axes | |
| | Resolution | 0.1° | |
| | Linearity | 1 axis : $\pm 0.5^\circ$ ($\leq 75^\circ$), 1° ($> 75^\circ$) 2 axes : $\pm 1^\circ$ ($\leq 75^\circ$), 1.5° ($> 75^\circ$) | |
| | Settling time | 0.1 ... 10 s / 90 %, configurable | |
| | Protection class | IP67 | |
| | Material | Plastic | |
| | Connection | Cable 5 x 0.25 mm ² | |
| | Shock (non-operational) | EN60068-2-27:1993, 100 g/11 ms, 100 shocks | |
| | Vibration (non-operational) | EN60068-2-6:1995, 20 g/10 Hz-2 kHz, 10 cycles | |
| | EMC, temperature | Refer to output specification | |

Order code PTAM27

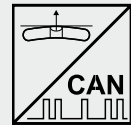


Order example: PTAM27 - 1 - 90 - U6 - CCW - T1.0 - KAB2M



Digital Inclination Sensor with 1 axis or 2 axes in MEMS technology

- Measurement range ±180° with 1 axis or ±60° with 2 axes
- Protection class IP67
- CANopen output
- Plastic housing
- Wear free, high resolution
- High shock resistance
- OEM version



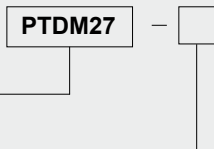
| Specifications | | |
|----------------|-----------------------------|--|
| | Output | CANopen (profile „Inclination Sensor“) |
| | Measurement range | ±180° with 1 axis or ±60° with 2 axes |
| | Resolution | 0.05 ° |
| | Linearity | ±0.5° |
| | Settling time | 0.1 s ... 10 s / 90%, configurable |
| | Protection class | IP67 |
| | Material | Plastic |
| | Connection | 5 pin connector M12 with cable, fixed length 0.5 m |
| | Shock (non-operational) | EN60068-2-27:1993, 100 g/11 ms, 100 shocks |
| | Vibration (non-operational) | EN60068-2-6:1995, 20 g/10 Hz-2 kHz, 10 cycles |
| | EMC, temperature | Refer to output specification |

Order code PTDM27

Model

Output

- CANOP = CANopen
- CANJ1939 = CAN SAE J1939

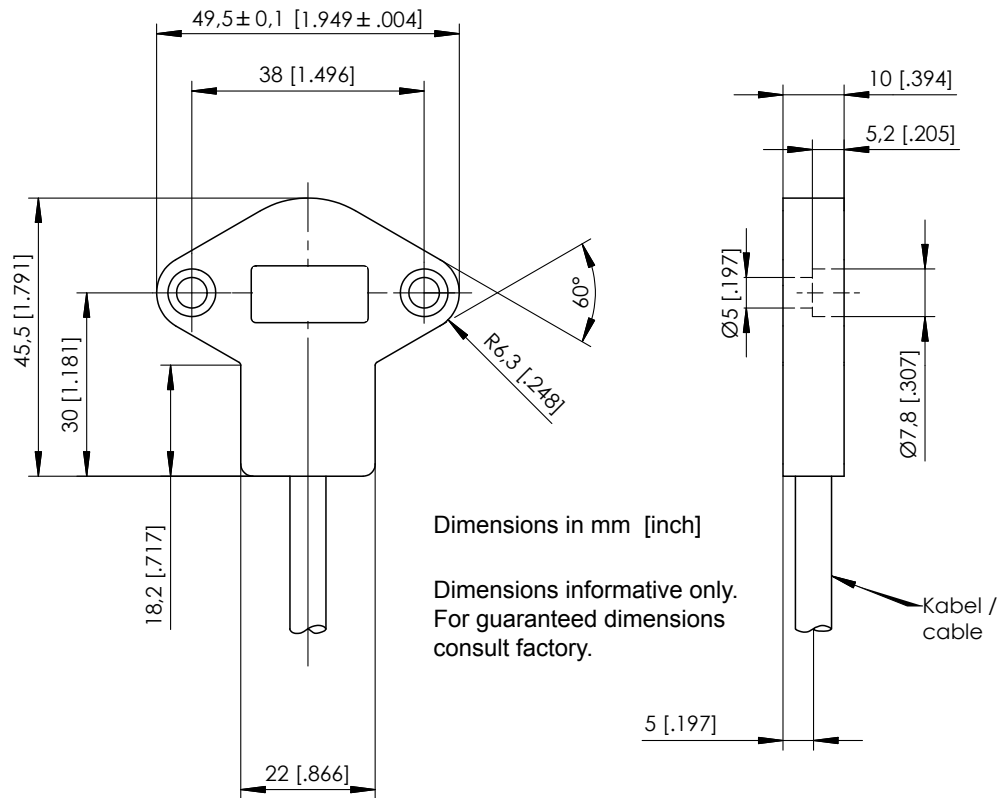


Order example: PTDM27 - CANOP

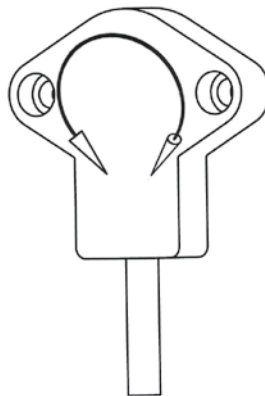
POSITILT®
PTAM27/PTDM27
MEMS Inclination Sensor



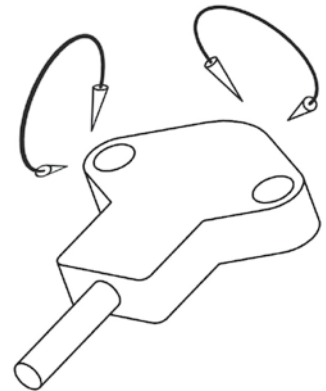
Outline drawing
PTAM27



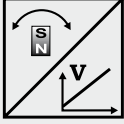
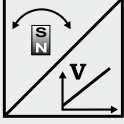
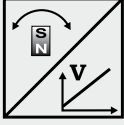
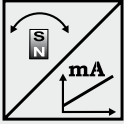
Orientation of the
inclination axis



1 axis



2 axes

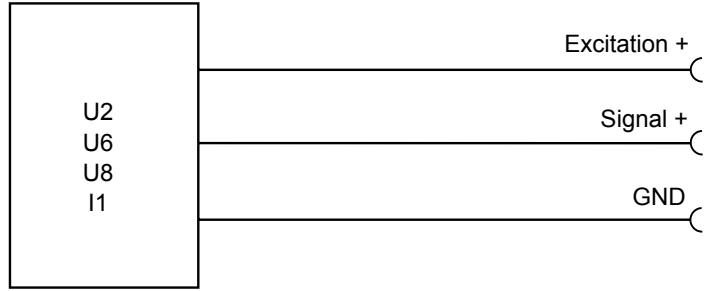
| | | |
|--|-------------------------|---|
| <p>U2 Voltage Output 0.5 ... 10 V</p>  | Excitation voltage | 18 ... 36 V DC |
| | Excitation current | 12 mA typ., 16 mA max. |
| | Output voltage | 0.5 ... 10 V DC |
| | Output current | 2 mA max. |
| | Measuring rate | 1 kHz standard |
| | Stability (temperature) | $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) |
| | Operating temperature | -40 ... +85 °C |
| | Protection | Reverse polarity, short circuit |
| | EMC | EN61326-1:2006 |
| <p>U6 Voltage Output 0.5 ... 4.5 V DC</p>  | Excitation voltage | 5V DC ± 10 % |
| | Excitation current | 16 mA typ., 20 mA max. |
| | Output voltage | 0.5 ... 4.5 V DC |
| | Output current | 2 mA max. |
| | Measuring rate | 1 kHz standard |
| | Stability (temperature) | $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) |
| | Operating temperature | -40 ... +85 °C |
| | Protection | Reverse polarity, short circuit |
| | EMC | EN61326-1:2006 |
| <p>U8 Voltage output 0.5 ... 4.5 V</p>  | Excitation voltage | 10 ... 36 V DC |
| | Excitation current | 12 mA typ., 16 mA max. |
| | Output voltage | 0.5 ... 4.5 V DC |
| | Output current | 2 mA max. |
| | Measuring rate | 1 kHz standard |
| | Stability (temperature) | $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) |
| | Protection | Reverse polarity, short circuit |
| | Operating temperature | -40 ... +85 °C |
| | EMC | EN61326-1:2006 |
| <p>I1 Current Output 4 ... 20 mA</p>  | Excitation voltage | 18 ... 36 V DC |
| | Excitation current | 32 mA typ., 36 mA max.. |
| | Load resistor | 500 Ω max. |
| | Output current | 4 ... 20 mA |
| | Measuring rate | 1 kHz standard |
| | Stability (temperature) | $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.) |
| | Operating temperature | -40 ... +85 °C |
| | Protection | Reverse polarity, short circuit |
| | EMC | EN61326-1:2006 |

Other outputs available on request.

POSITILT[®]
PTAM
Analog outputs U2, U6, U8 and I1

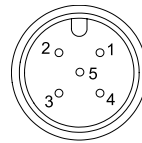


Output signals



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


Connection




View to sensor connector

M12A5 / M12R5

Description Inclination sensor with CANopen interface according to CiA 410.

| | | |
|---|-------------------------------------|--|
| <p>CANopen Interface</p>  | Communication profile | CANopen CiA 301 V 4.02, Slave |
| | Device profile | Encoder CiA 410 V 1.2 |
| | Configuration services | LSS, CiA Draft Standard 305 (transmission rate, node ID) |
| | Error Control | Node Guarding, Heartbeat, Emergency Message |
| | Node ID | Adjustable via LSS or via object dictionary, default: 127 |
| | PDO | 1 TxPDO, 0 RxPDO, static mapping |
| | PDO Modes | Event-/Time triggered, Remote-request, Sync cyclic/acyclic |
| | SDO | 1 Server, 0 Client |
| | Certified | Yes |
| | Transmission rate | 50 kBaud to 1 MBaud, adjustable via LSS or via object dictionary, default: 125 kBaud |
| | Bus connection | M12 connector, 5 pin |
| | Integrated bus terminating resistor | optional |
| | Bus, galvanic isolation | No |
| | <p>Specifications</p> | Excitation voltage |
| Excitation current | | 16 mA typical, 50 mA max. |
| Measuring rate | | 1 kHz standard |
| Stability (temperature) | | $\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. |
| Repeatability | | 1 LSB |
| Operating temperature | | -40 ... +85 °C |
| Protection | | Reverse polarity, short circuit |
| EMC | | EN61326-1:2006 |

Description Inclinometer according to standard SAE J1939. Configuration of operating parameters by proprietary-A-Message (peer-to-peer connection). Process data exchange by proprietary-B-Message (broadcast).

| | | |
|---|-------------------------------|---|
| Interface J1939  | CAN specification | ISO 11898, Basic and Full CAN 2.0 B |
| | Communication profile | SAE J1939 |
| | Baud Rate | 250 kBit/s |
| | Internal termination resistor | 120 Ω, configurable |
| | Address | Address claiming (ACL), default 251d or commanded address |

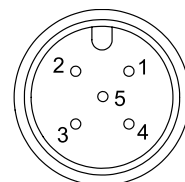
| | | | |
|--------------------|---------------------------|-------------|-----------------|
| NAME Fields | Arbitrary address capable | 1 | Yes |
| | Industry group | 0x0 | Global |
| | System | 0x0 | Non specific |
| | System instance | 0x0 | Non specific |
| | Function | 0xFFh | |
| | Function instance | 0x0 | Non specific |
| | ECU instance | 0x0 | |
| | Manufacturer | 0xD6 (214d) | Manufacturer ID |
| | Identity number | 0XXX | Serial number |

| | | | |
|--------------------------------------|--------------------|--------------|---|
| Parameter Group Numbers (PGN) | Configuration data | PGN 0x00EF00 | Proprietary-A-Message (peer-to-peer) |
| | Process data | PGN FFnnh | Proprietary-B-Message (broadcast); xx (low byte) customer configurable |

| | | |
|-----------------------|-------------------------|-----------------------------------|
| Specifications | Excitation voltage | 11 ... 36 V DC |
| | Excitation current | 16 mA typical, 50 mA max. |
| | Measuring rate | 1 kHz standard |
| | Stability (temperature) | ±100 x 10 ⁻⁶ / °C f.s. |
| | Repeatability | 1 LSB |
| | Operating temperature | -40 ... +85 °C |
| | Protection | Reverse polarity, short circuit |
| | EMC | EN61326-1:2006 |

| Signal wiring / connection | Signal name | Connector pin |
|-----------------------------------|--------------------|----------------------|
| | Shield | 1 |
| | Excitation + | 2 |
| | GND | 3 |
| | CAN-H | 4 |
| | CAN-L | 5 |

View to sensor connector



Connector cable for POSIROT® angle sensors
4 pins M12

Suitable for 5-pin sensor connectors M12A5 and M12R5

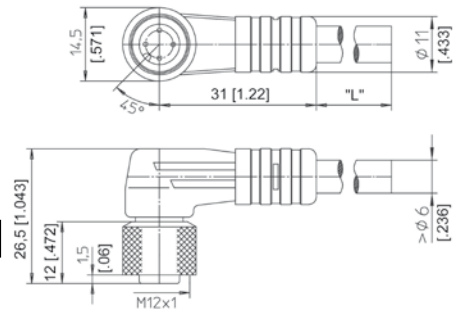
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

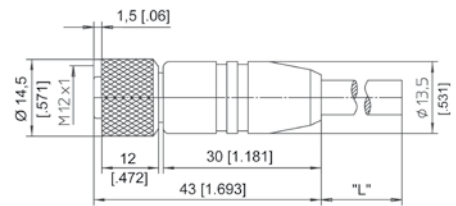
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

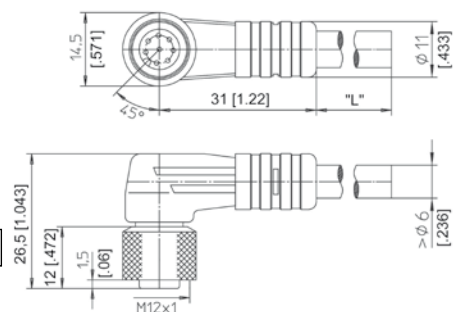
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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

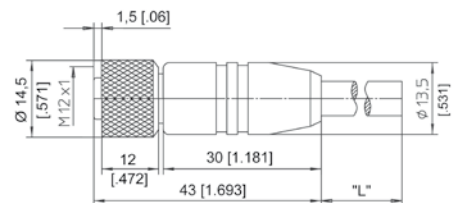
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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 |