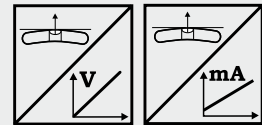




Analog Inclination Sensor with 1 or 2 axes in MEMS technology

- Measurement range $\pm 180^\circ$ for 1 axis or $\pm 60^\circ$ for 2 axes
- Protection class IP67 / IP69K, optional IP68 (bar)
- Analog output linear
- Stainless steel housing
- Wear free, high resolution
- High shock resistance
- Seawater proof
- Suitable for use on ocean-going vessels



Specifications	Output	U2	Voltage 0.5 ... 10 V / $U_B = 18 \dots 36$ V
			U8
		I1	Current 4 ... 20 mA / $U_B = 18 \dots 36$ V
	Measurement range		$\pm 180^\circ$ for 1 axis or $\pm 60^\circ$ for 2 axes
	Resolution		0.05°
	Linearity		$\pm 0.5^\circ$
	Settling time		0.1 s ... 10 s / 90 %, configurable
	Protection class		IP67 / IP69K, optional IP68 (bar)
	Material		Stainless steel
	Connection		5 pin connector M12 axial or radial
	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 PTAM5



Model name

Axis of inclination

- 1 = Inclination with regard to X axis (mounting X) $< 180^\circ$
- 2 = Inclination with regard to X and Y axis (mounting XY) $< 60^\circ$

Measuring range [in °]

- 15 ... 180 = $\pm 15^\circ \dots \pm 180^\circ$ in 15° increments

Output

- U2 = 0.5 ... 10 V
- U8 = 0,5 ... 4,5 V
- I1 = 4 ... 20 mA

Characteristic

- CW = Increasing signal for CW inclination
- CCW = Increasing signal for CCW inclination

Output delay 0 ... 90 %

- Tx.x = 0.1 s ... 10 s

Connection

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

Order code connector cable

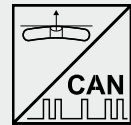
KAB-...M-M12/4F/G-LITZE

Order example: PTAM5 - 1 - 180 - I1 - CW - T1.0 - M12R5



Digital Inclination Sensor with 1 or 2 axes in MEMS technology

- Measurement range $\pm 180^\circ$ for 1 axis or $\pm 60^\circ$ for 2 axes
- Protection class IP67 / IP69K, optional IP68 (bar)
- CANopen output
- Stainless steel housing
- Wear free, high resolution
- High shock resistance
- Seawaterproof
- Suitable for use on ocean-going vessels



Specifications		
	Output	CANopen (profile „Inclination Sensor“)
	Measurement range	$\pm 180^\circ$ for 1 axis or $\pm 60^\circ$ for 2 axes
	Resolution	0.05 °
	Linearity	$\pm 0.5^\circ$
	Settling time	0.1 s ... 10 s / 90% configurable
	Protection class	IP67 / IP69K, optional IP68 (bar)
	Material	Stainless steel
	Connection	5 pin connector M12 axial or radial
	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
	EMV, temperature	Refer to output specification

Order code PTDM5

Model name

Output

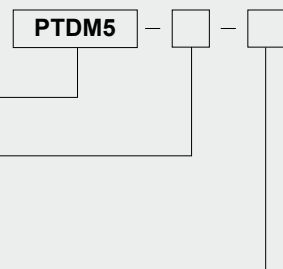
CANOP = CANopen

CANJ1939 = CAN SAE J1939

Connection

M12R5 = 5 pin socket M12, radial (compatible with 4 pin mating connector)

M12A5 = 5 pin socket M12, axial (compatible with 4 pin mating connector)



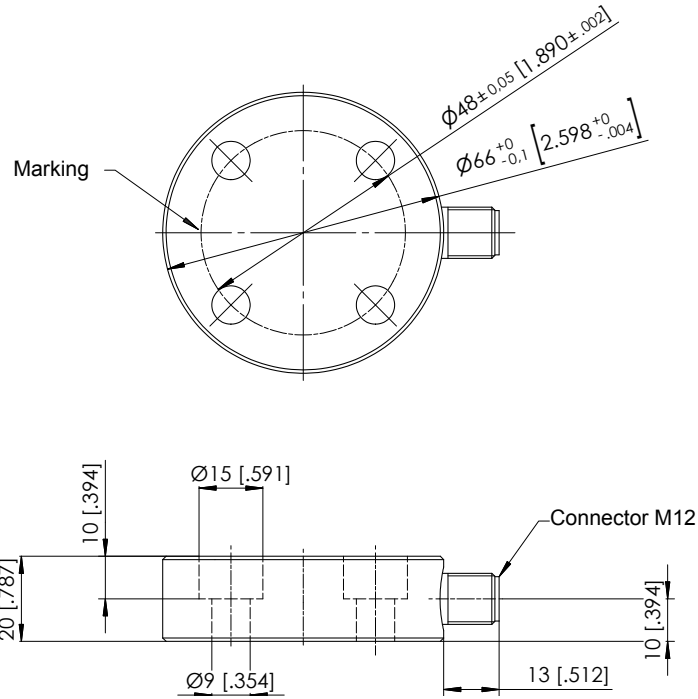
KAB-...M-M12/5F/G-M12/5M/G

Order example: PTDM5 - CANOP - M12R5

POSITILT®
PTAM5/PTDM5
Inclination Sensor



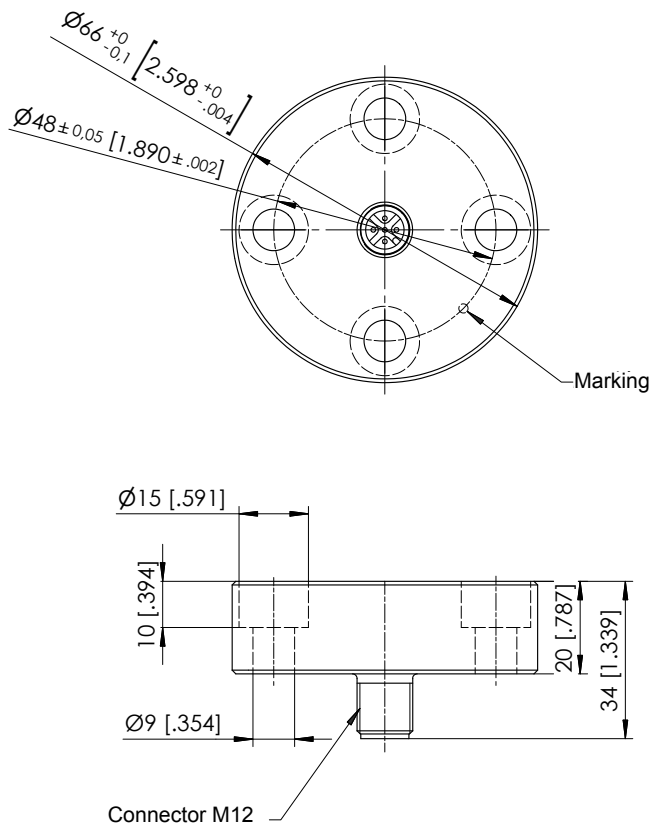
Outline drawing
M12 radial



Dimensions in mm [inch]

Dimensions informative only.
 For guaranteed dimensions consult factory.

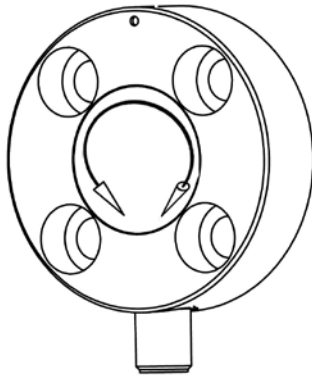
Outline drawing
M12 axial



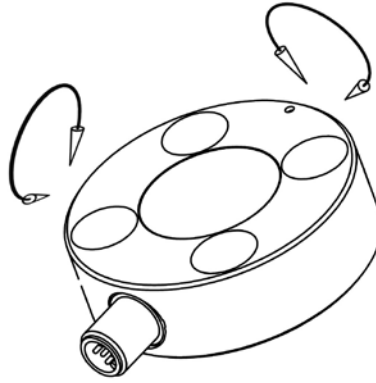
POSITILT®
PTAM5/PTDM5
Inclination Sensor



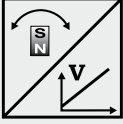
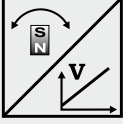
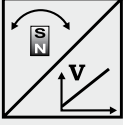
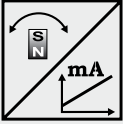
Orientation of the
inclination axis



1 axis



2 axes

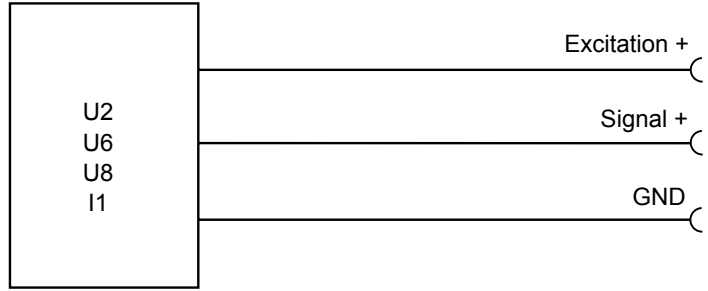
<p>U2 Voltage Output 0.5 ... 10 V</p> 	Excitation voltage	18 ... 36 V DC
	Excitation current	12 mA typ., 16 mA max.
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typ.)
	Operating temperature	-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 $\pm 10\%$
	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.)
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	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

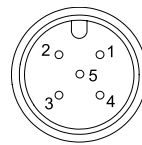


Output signals



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

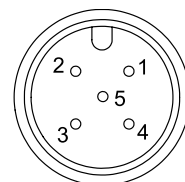
NAME Fields	Arbitrary address capable	1	Yes
	Industry group	0x0	Global
	System	0x0	Non specific
	System instance	0x0	Non specific
	Function	0xFFh	
	Function instance	0x0	Non specific
	ECU instance	0x0	
	Manufacturer	0xD6 (214d)	Manufacturer ID
	Identity number	0XXX	Serial number

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

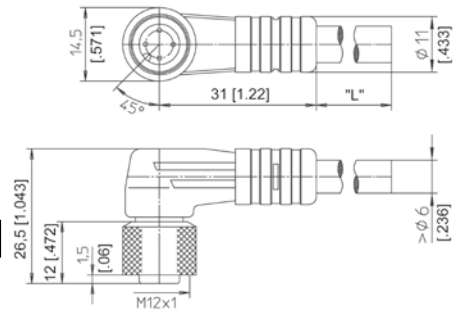
The 4-core screened cable is supplied with a mating 4-pin 90° M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

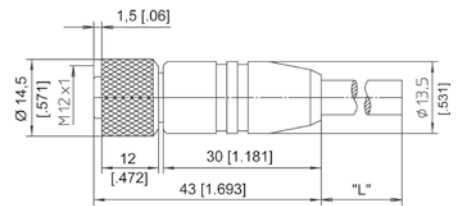
The 4-core screened cable is supplied with a mating 4-pin M12 connector at one end and 4 wires at the other end. Available lengths are 2, 5 and 10 m.

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

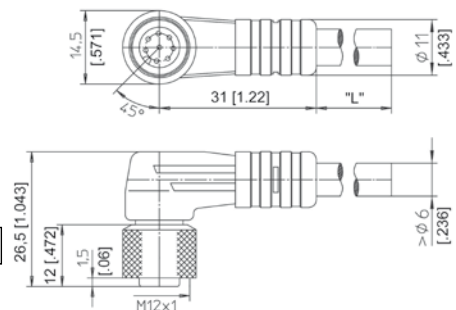
The 8-core screened cable is supplied with a mating 8-pin 90° M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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

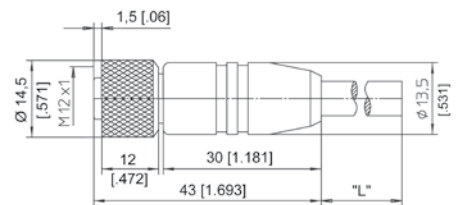
The 8-core screened cable is supplied with a mating 8-pin M12 connector at one end and 8 wires at the other end. Available lengths are 2, 5 and 10 m.

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