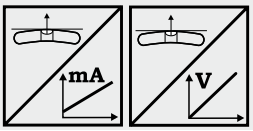
POSITILT®
PTAM27
Universal MEMS Inclination Sensor with Analog Output

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

- **Measurement range ±180° with 1 axis or 2 axes**
- **Protection class IP67**
- **Linear analog ouput**
- **Plastic housing**
- **Wear free, high resolution**
- **High shock resistance**



Specifications

Output /Excitation	U2 U6 U8 I1	Voltage 0.5 ... 10 V Voltage 0.5 ... 4.5 V Voltage 0.5 ... 4.5 V Current 4 ... 20 mA
Measurement range		±15 ... ±180° with 1 axis or 2 axes
Resolution		0.1°
Linearity		1 axis : ±0.5° (≤±75°), ±1° (>±75°) 2 axes : ±1° (≤±75°), ±1.5° (>±75°)
Settling time		0.1 ... 10 s / 90 %, configurable
Protection class		IP67
Material		Plastic
Connection		Cable 5 x 0.25 mm²
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

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Model name

Number of axes

1	= Inclination in X axis (mounting X)
2	= Inclination in X and Y axes (mounting XY)

Measurement range [in °]

15 ... 180	= ±15°... ±180° in 15° increments

Output

U2	= 0.5 ... 10 V
U6	= 0.5 ... 4.5 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

KAB2M	= Cable, standard length 2 m

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

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POSITILT®
PTDM27
Universal MEMS Inclination Sensor with CANopen Output

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**

CAN

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 0.3 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

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Model name

Output

CANOP = CANopen
CANJ1939 = CAN SAE J1939

Connection

KAB0.3M-M12/CAN = Cable (length 0.3 m) with connector M12, 5 pin

Order code connector cable (see page 9) **KAB - XM - M12/5F/G - M12/5M/G - CAN**

Order example: PTDM27 - CANOP - KAB0,3M-M12/CAN

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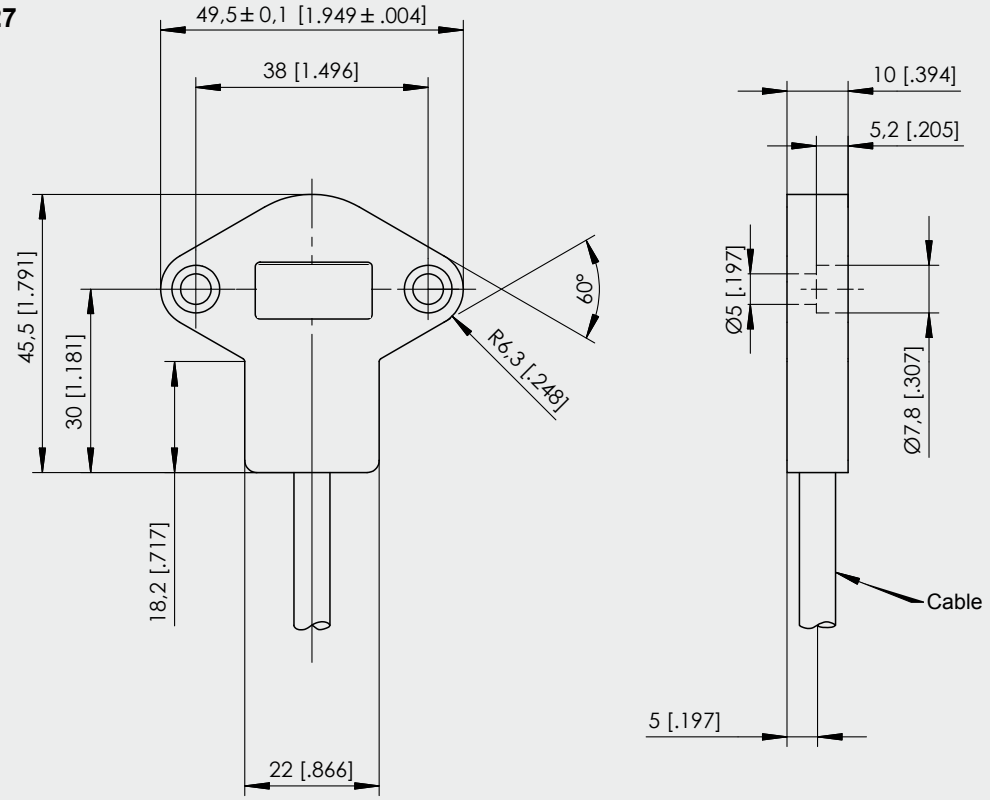
PTAM27/PTDM27
Dimensions

Outline drawing
PTAM27/PTDM27



Dimensions in mm [inch]

Dimensions informative only.
For guaranteed dimensions consult factory.

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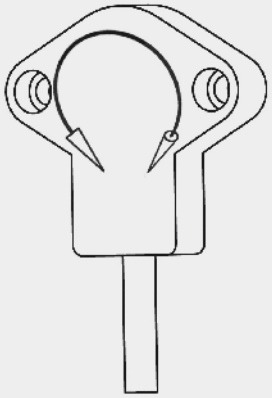
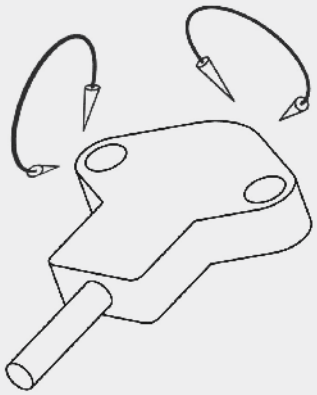
Orientation of the inclination axes



1 axis



2 axes

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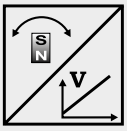
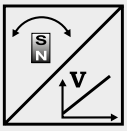
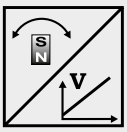
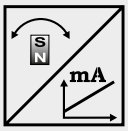
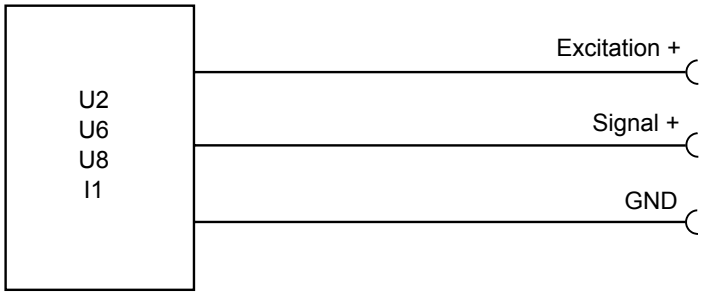
POSITILT®
PTAM
Analog outputs U2, U6, U8 and I1

U2 Voltage Output 0.5 ... 10 V 	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)	±100 x 10^{-6} / °C f.s. (typ.)
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN61326-1:2006
U6 Voltage Output 0.5 ... 4.5 V DC 	Excitation voltage	5V DC ±5 %
	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)	±100 x 10^{-6} / °C f.s. (typ.)
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN61326-1:2006
U8 Voltage output 0.5 ... 4.5 V 	Excitation voltage	18 ... 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)	±100 x 10^{-6} / °C f.s. (typ.)
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN61326-1:2006
I1 Current Output 4 ... 20 mA 	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)	±100 x 10^{-6} / °C f.s. (typ.)
	Operating temperature	-40 ... +85 °C
	Protection	Reverse polarity, short circuit
	EMC	EN61326-1:2006

Other outputs available on request.

Output signals



Signal Wiring	**Output signals**		**Cable color**
	1 axis	**2 axes**	
	Excitation +	Excitation +	brown
	Output X	Output X	white
	GND	GND	blue
	Do not connect!	Output Y	black
	Do not connect!	Do not connect!	gray

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POSITILT®
PTDM
Output CANopen

Description Inclination sensor with CANopen interface according to CiA 410.

CANopen Interface 	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

Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	15/30 mA typical for 24/12 V, 100 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

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POSITILT®
PTDM
Output CAN SAE J1939

Description

Inclination sensor 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
	Transceiver	24V-compliant, not isolated
	Communication profile	SAE J1939
	Baud rate	250 kbit/s
	Internal temination resistor	120 Ω
	Address	Default 247d, configurable

NAME Fields	Arbitrary address capable	1	Yes
	Industry group	0	Global
	Vehicle system	7Fh (127d)	Non specific
	Vehicle system instance	0	
	Function	FFh (255d)	Non specific
	Function instance	0	
	ECU instance	0	
	Manufacturer	145h (325d)	Manufacturer ID
	Identity number	0nnn	Serial number 21 bit

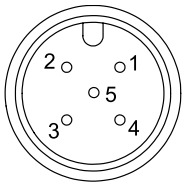
Parameter Group Numbers (PGN)	Configuration data	PGN EF00h	Proprietary-A (PDU1 peer-to-peer)
	Process data	PGN FFnnh	Proprietary-B (PDU2 broadcast); nn Group Extension (PS) configurable

Specifications	Excitation voltage	8 ... 36 V DC
	Excitation current	15/30 mA typical for 24/12 V, 100 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



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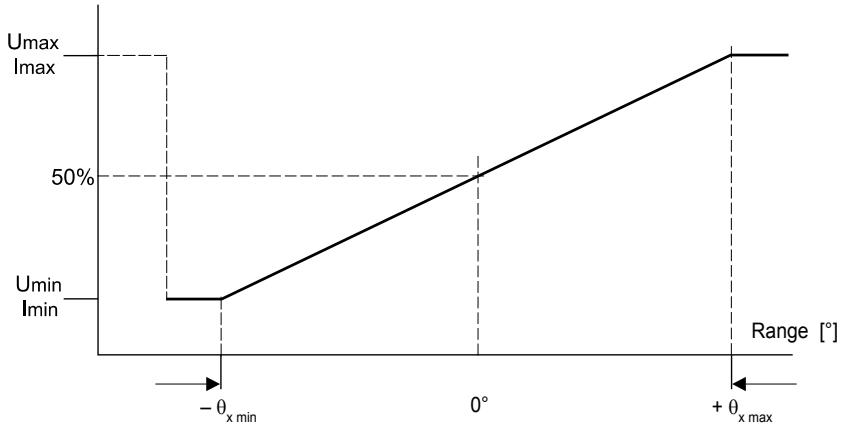
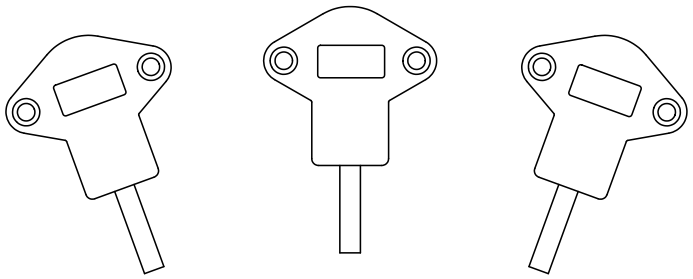
Characteristic of the linear output

Output signal



PTAM27/PTDM27

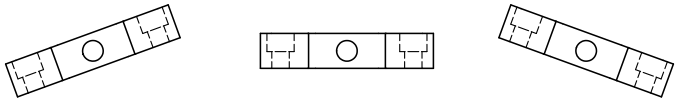
1 axis



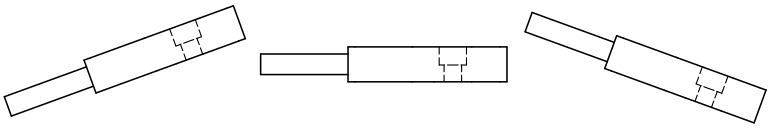
PTAM27/PTDM27

2 axes

X



Y



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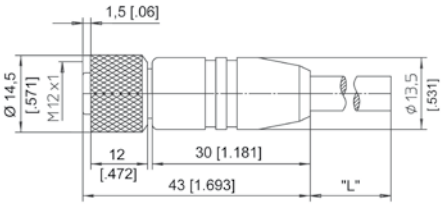
Connector/bus cable for POSIROT®-POSITILT® sensors
5 pin M12
CAN bus

The 5-lead shielded cable is supplied with a female 5-pin M12 connector at one end and a male 5-pin M12 connector at the other end. Available lengths are 2, 5 and 10 m.



Order code:

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

IP69K: **KAB - XM - M12/5F/G/69K - M12/5M/G/69K - CAN**

Length in m

T-piece for bus cable
5 pin M12
CAN bus

Order code:

KAB - TCONN - M12/5M - 2M12/5F - CAN

Terminating resistance
5 pin M12
CAN bus

Order code:

KAB - RTERM - M12/5M/G - CAN

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