



## PTAM7

Inclination sensor with robust stainless steel housing, also for hygienic applications



- Measurement range up to  $\pm 180^\circ$
- Single or dual axis measurement
- Protection class IP67/IP69
- Hermetically sealed stainless steel housing
- Potted electronics
- Wear-free MEMS technology, shock resistant

### Product versions



Analog output



Analog output, tare function



PTAM7 - Inclination sensor in MEMS technology  
Version with analog output

Specifications

		Order options	
<b>Number of axes of inclination</b>	1 axis: Inclination in X axis 2 axes: Inclination in X and Y axes	<b>1</b>	1 2
<b>Measurement range</b>	1 axis: ±15 ... 180° (selectable in 15° increments) 2 axes: ±15 ... 60° (selectable in 15° increments)	<b>2</b>	15 ... 180 15 ... 60
<b>Output</b>	Voltage 0.5 ... 10 V Voltage 0.5 ... 4.5 V Current 4 ... 20 mA, 3 wire	<b>3</b>	U2 U8 I1
<b>Resolution</b>	0.05°		
<b>Linearity</b>	±0.5°		
<b>Mounting</b>	Screws M6		
<b>Protection class</b>	IP67/IP69 (connector output with IP69 connector)		
<b>Signal characteristics</b>	Signal increasing CW Signal increasing CCW	<b>4</b>	CW CCW
<b>Output delay</b>	0.1 s ... 10 s / 90%	<b>5</b>	Tx.x
<b>Connection</b>	Connector M12 axial, 5 pin Connector M12 radial, 5 pin	<b>6</b>	M12A5 M12R5
<b>Housing material</b>	Stainless steel EN 1.4404 (AISI 316L)	<b>7</b>	VA
<b>Shock</b>	DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks		
<b>Vibration</b>	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
<b>Temperature range</b>	-40° ... +85°C		
<b>Weight</b>	approx. 390 g		
<b>EMC</b>	DIN EN 61326-1:2013		

Order code

PTAM7	-	<b>1</b>	-	<b>2</b>	-	<b>3</b>	-	<b>4</b>	-	<b>5</b>	-	<b>6</b>	-	<b>7</b>
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Order example: PTAM7 – 1 – 60 – I1 – CW – T1.0 – M12A5 – VA

Accessories:

Connector cable (see page 11)



PTAM7 - Inclination sensor in MEMS technology  
Version with analog output, tare function

Specifications

		Order options	
<b>Number of axes of inclination</b>	1 axis: Inclination in X axis 2 axes: Inclination in X and Y axes	<b>1</b>	1 2
<b>Measurement range</b>	1 axis: ±15 ... 180° (selectable in 15° increments) 2 axes: ±15 ... 60° (selectable in 15° increments)	<b>2</b>	15 ... 180 15 ... 60
<b>Output</b>	Voltage 0.5 ... 10 V, tare function Voltage 0.5 ... 4.5 V, tare function Current 4 ... 20 mA, 3 wire, tare function	<b>3</b>	U2/PMZ U8/PMZ I1/PMZ
<b>Resolution</b>	0.05°		
<b>Linearity</b>	±0.5°		
<b>Mounting</b>	Screws M6		
<b>Protection class</b>	IP67/IP69 (connector output with IP69 connector)		
<b>Signal characteristics</b>	Signal increasing CW Signal increasing CCW	<b>4</b>	CW CCW
<b>Output delay</b>	0.1 s ... 10 s / 90%	<b>5</b>	Tx.x
<b>Connection</b>	Connector M12 axial, 5 pin Connector M12 radial, 5 pin	<b>6</b>	M12A5 M12R5
<b>Housing material</b>	Stainless steel EN 1.4404 (AISI 316L)	<b>7</b>	VA
<b>Shock</b>	DIN EN 60068-2-27:2010, 100 g/11 ms, 100 shocks		
<b>Vibration</b>	DIN EN 60068-2-6:2008, 20 g 10 Hz-2 kHz, 10 cycles		
<b>Temperature range</b>	-40° ... +85°C		
<b>Weight</b>	approx. 390 g		
<b>EMC</b>	DIN EN 61326-1:2013		

Order code



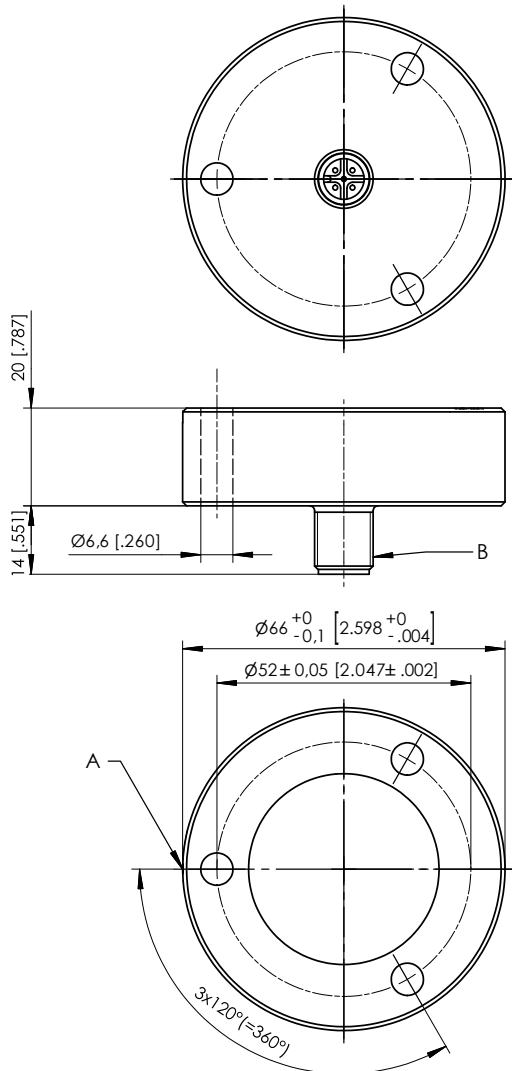
Order example: PTAM7 – 1 – 60 – I1/PMZ – CW – T1.0 – M12A5 – VA

Accessories:

Connector cable (see page 12)

## Dimensions

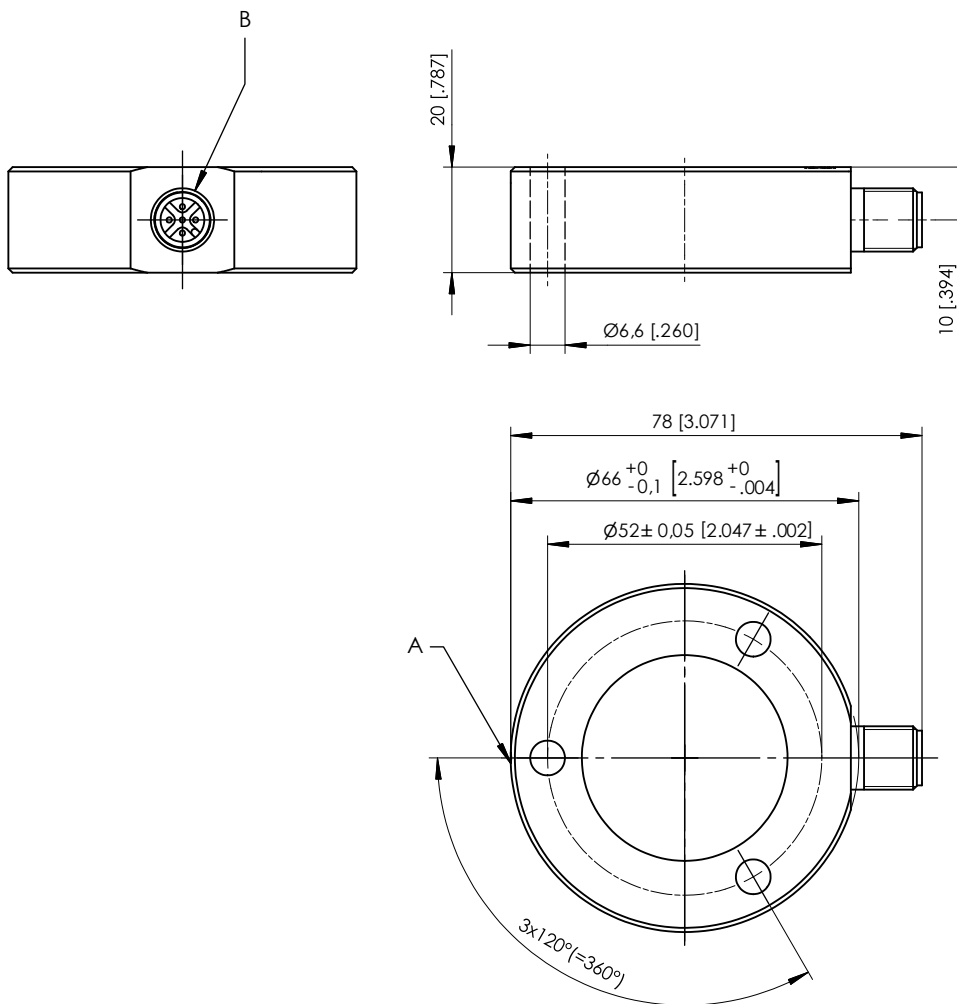
### Connector M12, axial



A – Marking  
B – Connector M12

Dimensions in mm [inch].  
Dimensions informative only.  
For guaranteed dimensions consult factory.

Connector M12, radial





A – Marking  
B – Connector M12


Dimensions in mm [inch].  
Dimensions informative only.  
For guaranteed dimensions consult factory.

## Output specification

### Analog output

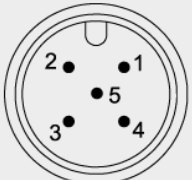
<b>U2</b> Voltage output 0.5 ... 10 V 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 12 mA max. 16 mA
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013

<b>U8</b> Voltage output 0.5 ... 4,5 V 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 12 mA max. 16 mA
	Output voltage	0.5 ... 4,5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013


<b>I1</b> Current output 4 ... 20 mA, 3 wires 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 32 mA max. 36 mA
	Load $R_L$	500 $\Omega$ max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6}$ / °C f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013


**Analog output (connector output)**


Signal wiring	Signal	Connector pin no.
<b>1 axis</b> <b>Connector M12, 5 pin</b> 	+U <sub>B</sub> (excitation voltage)	1
	Analog output X axis	2
	GND	3
	Do not connect!	4
	Do not connect!	5

Signal wiring	Signal	Connector pin no.
<b>2 axes</b> <b>Connector M12, 5 pin</b>  View to the sensor connector	+U <sub>B</sub> (excitation voltage)	1
	Analog output X axis	2
	GND	3
	Analog output Y axis	4
	Do not connect!	5

### Analog output, tare function

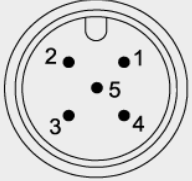
<b>U2/PMZ</b> Voltage output 0.5 ... 10 V 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 12 mA max. 16 mA
	Output voltage	0.5 ... 10 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013

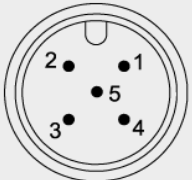
<b>U8/PMZ</b> Voltage output 0.5 ... 4,5 V 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 12 mA max. 16 mA
	Output voltage	0.5 ... 4,5 V DC
	Output current	2 mA max.
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013

<b>I1/PMZ</b> Current output 4 ... 20 mA, 3 wires 	Excitation voltage	18 ... 36 V DC
	Excitation current	typical 32 mA max. 36 mA
	Load $R_L$	500 $\Omega$ max.
	Output current	4 ... 20 mA
	Measuring rate	1 kHz standard
	Stability (temperature)	$\pm 100 \times 10^{-6} / ^\circ\text{C}$ f.s. (typical)
	Protection	Reverse polarity, short circuit
	Operating temperature	-40 ... +85 °C
	EMC	DIN EN 61326-1:2013



### Analog output, tare function (connector output)

Signal wiring	Output signals	Connector pin no.
<b>1 axis</b> <b>Connector M12, 5 pin</b>  View to the sensor connector	+U <sub>B</sub> (excitation voltage)	1
	Analog output X axis	2
	GND	3
	Do not connect!	4
	ZERO	5

Signal wiring	Output signals	Connector pin no.
<b>2 axes</b> <b>Connector M12, 5 pin</b>  View to the sensor connector	+U <sub>B</sub> (excitation voltage)	1
	Analog output X axis	2
	GND	3
	Analog output Y axis	4
	ZERO	5

### Tare function ZERO (PMZ)

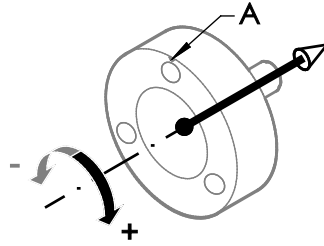
Programming the zero point by the customer:

The tare function "ZERO" allows to program the zero point of the output range by using a signal ZERO available at the connector. This Signal ZERO must be connected with GND via a push button. At first the sensor must be brought into the zero position. Pushing the button for 2 seconds sets the actual position as the zero point. The values are available as well after switching off the sensor.

**Position of the inclination axis and characteristic of the linear output PTxM7**

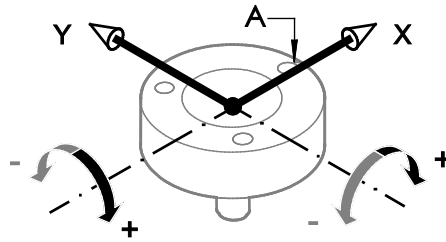
**PTxM7 axial**

Connector M12, 1 axis



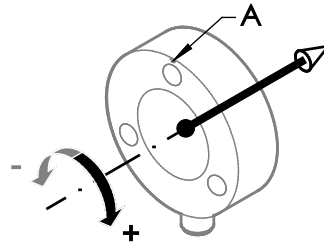
**PTxM7 axial**

Connector M12, 2 axes



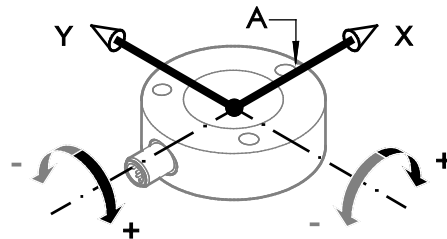
**PTxM7 radial**

Connector M12, 1 axis



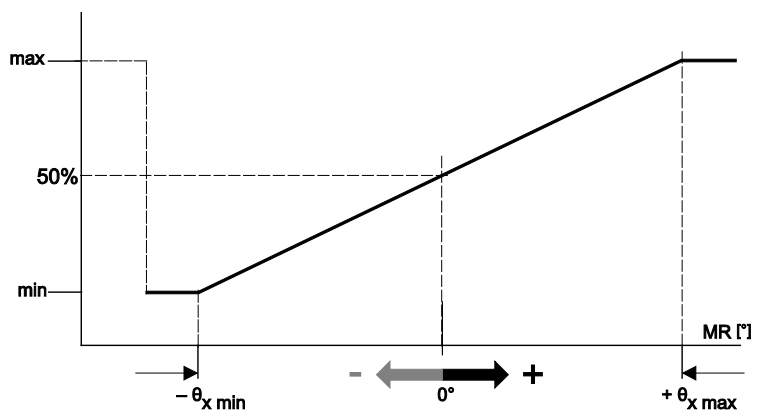
**PTxM7 radial**

Connector M12, 2 axes



A – Marking

**Output signal**

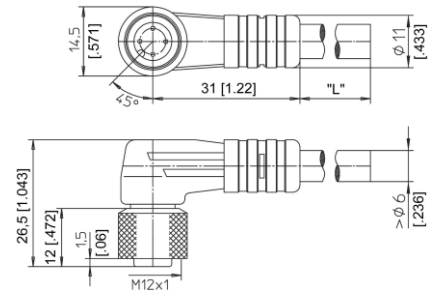


## Accessories

### Connector cable M12, 4 pin (angular coupling)

shielded connector  
Suitable for 5-pin  
sensor connectors

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 m, 5 m and 10 m.  
Wire: cross sectional area 0.34 mm<sup>2</sup>  
Cable diameter: 5.6 ±0.2 mm



#### Order code

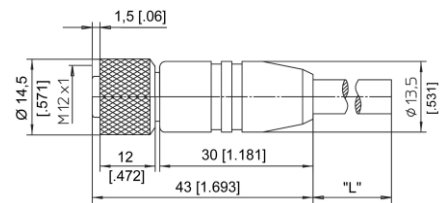
	<b>KAB - xM - M12/4F/W - LITZE</b>
IP69:	<b>KAB - xM - M12/4F/W/69K - LITZE</b>

xM = length in m

### Connector cable M12, 4 pin (straight coupling)

shielded connector  
Suitable for 5-pin  
sensor connectors

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 m, 5 m and 10 m.  
Wire: cross sectional area 0.34 mm<sup>2</sup>  
Cable diameter: 5.6 ±0.2 mm



#### Order code

	<b>KAB - xM - M12/4F/G - LITZE</b>
IP69:	<b>KAB - xM - M12/4F/G/69K - LITZE</b>

xM = length in m

Signal wiring M12, 4 pin	Plug connection / cable color			
	1	2	3	4
	brown	white	blue	black

### Applicable for cable carriers

Maximum movement speed	3 m/s
Maximum acceleration	5 m/s <sup>2</sup>
Minimum bending radius	10 x cable diameter

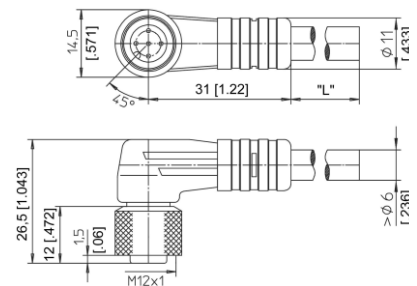
## Connector cable M12, 5 pin (angular coupling)

shielded connector

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

Wire: cross sectional area 0.34 mm<sup>2</sup>

Cable diameter: 5.6 ±0.2 mm



### Order code

**KAB - xM - M12/5F/W - LITZE**

IP69: **KAB - xM - M12/5F/W/69K - LITZE**

xM = length in m

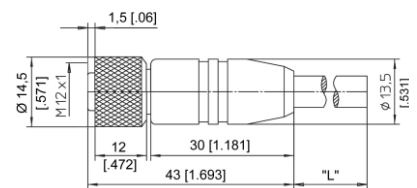
## Connector cable M12, 5 pin (straight coupling)

shielded connector

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

Wire: cross sectional area 0.34 mm<sup>2</sup>

Cable diameter: 5.6 ±0.2 mm



### Order code

**KAB - xM - M12/5F/G - LITZE**

IP69: **KAB - xM - M12/5F/G/69K - LITZE**

xM = length in m

Signal wiring M12, 5 pin	Plug connection / Cable color				
	1	2	3	4	5
	brown	white	blue	black	grey

### Applicable for cable carriers

Maximum movement speed	3 m/s
Maximum acceleration	5 m/s <sup>2</sup>
Minimum bending radius	10 x cable diameter