

# BEI SENSORS

## T-SERIES INDUSTRIAL INCLINOMETER ANALOG INTERFACE



T-Series industrial inclinometers are compact high performance sensors used to determine inclination in roll and pitch axes with excellent precision and at a high value. Whether using a molded plastic housing or an AW6082-T6 aluminum alloy housing, both versions offer mechanical stability and an encapsulated sensor. Both have a high environmental protection rating making them ideal for measuring tilt in harsh industrial environments.

### Main Features

- Dual Axis Measurement Range up to  $\pm 60^\circ$
- Option for a Single Axis Measurement Range of  $360^\circ$
- High Resolution: 0.01°
- High Accuracy: 0.1°
- Glass Fiber Reinforced Plastic Housing available
- Factory Calibrated Linearity
- Temperature Compensated for Bias and Sensitivity
- Analog Interface: Voltage, Current
- Highest Protection Class: IP69K, IP68

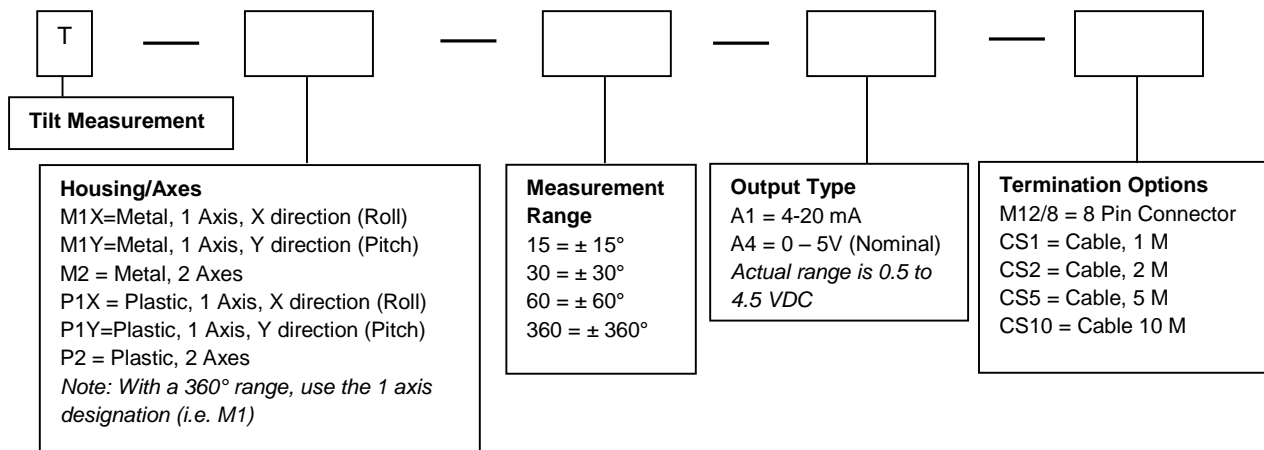
### Electrical Features

- Highly Integrated Circuit in SMD-Technology
- Reverse Polarity Protection
- Over Voltage Peak Protection

### Applications

- Measurement of Inclination (pitch and roll) and Rotational Movements
- Cranes and Construction Machines
- Robotic Arms & Positioning Systems
- Mobile Platform stabilization
- Marine & Offshore Machinery

### Model Ordering Options



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## Electrical Data

Model		T- M2 (or P2)- (Range)			T-M1 (or P1) - 360
		15	30	60	
<b>Measurement Range</b>		± 15°	± 30°	± 60	360°
<b>Number of Axes</b>		2 (Standard), 1 optional			1
<b>Analog Interface</b>	<b>Voltage</b>	0.5 to 4.5 V, 0° = 2.5 V Load ≥ 10 KΩ with 12 V DC			0.5 to 4.5 V, 0° = 0.5 V Load ≥ 10 KΩ with 12 V DC
	<b>Current</b>	4 mA to 20 mA, 0° = 12 mA Load ≤ 270 Ω <sup>1</sup>			4 mA to 20 mA, 0° = 4 mA Load ≤ 270 Ω <sup>1</sup>
<b>Resolution</b>		0.01°			
<b>Accuracy (T = -10 °C to +40 °C)<sup>2</sup></b>		0.1°			
<b>Sensor Response Time</b>		10 ms (Without Filter)			
<b>Recommended Measurement Rate</b>		Up to 10 Hz			
<b>Supply Voltage<sup>3</sup></b>		10 to 30 V DC (Absolute Maximum Ratings) for Voltage Analog Interface 15 to 30 V DC (Absolute Maximum Ratings) for Current Analog Interface			
<b>Power Consumption</b>		≤ 0.7 W			
<b>EMC</b>		Emitted Interference: EN 61000-6-4			
		Noise Immunity: EN 61000-6-2			
<b>Connection</b>		Connector Output, 8 Pin M12 male (A-coded)			

## Mechanical Data

<b>Housing Material (Plastic)</b>	Glass Fiber Reinforced PBT (Polybutylene Terephthalate)
<b>Housing Material (Metal)</b>	AW6082 Corrosion resistant Aluminum alloy, passivated
<b>Potting Material</b>	PUR (Polyurethane)
<b>Shock (EN 60068-2-27)<sup>2</sup></b>	≤ 100 g (half sine, 6 ms)
<b>Vibration (EN 60068-2-6)<sup>2</sup></b>	1.5mm (10 to 58 Hz) & ≤ 20 g (58 to 2000 Hz)

<sup>1</sup> R<sub>L</sub> < 500Ω with 15 V DC

<sup>2</sup> Further data available on request

<sup>3</sup> Inclometers should be connected only to subsequent electronics whose power supplies comply with EN 50178 (Protective Low Voltage)

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**Weight** | 75 gm / 3 oz

## Environmental Conditions

<b>Operating Temperature</b>	-40 °C to +85 °C / -40 °F to 185 °F
<b>Humidity</b>	98 % Relative Humidity, Non-Condensing
<b>Protection Class (EN 60529)</b>	IP 69K (With Appropriate Mating Connector and mounting), IP68

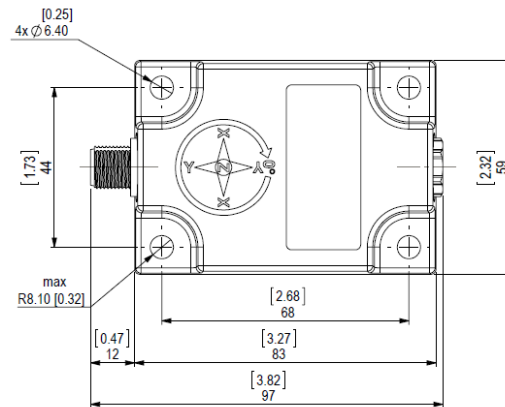
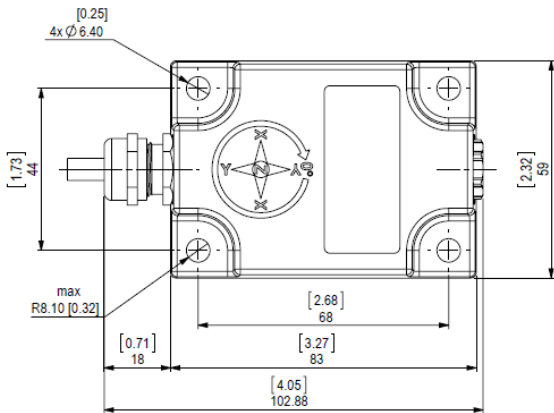
## Mechanical Drawings

### Metal Housing Option

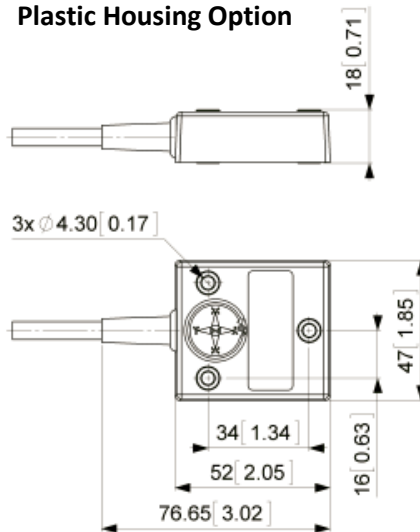
Cable Termination



Connector Termination



### Plastic Housing Option



*Dimensions in mm and [inches]*

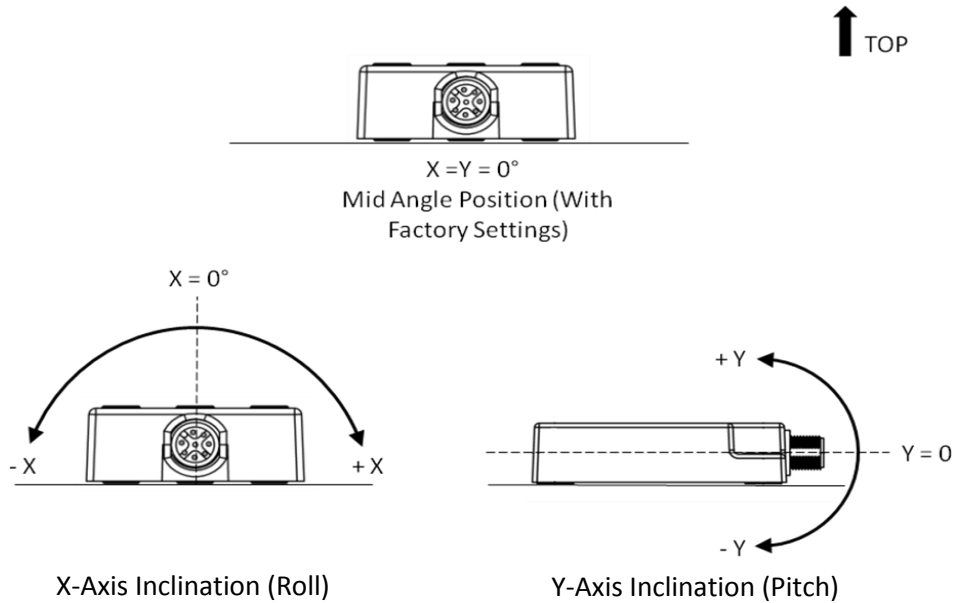
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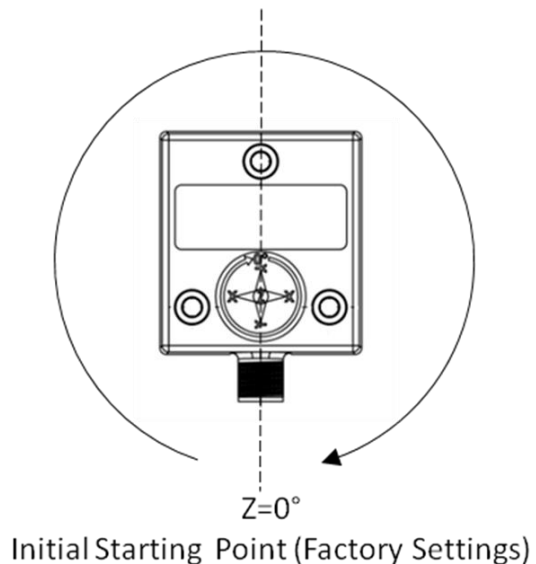
Specification No. 02139-001 REV E

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## Measurement Axes (Two Axis Units)



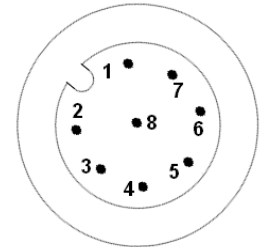
## Measurement Axis - 360 (Single Axis Inclinometer)



## Pin Assignment

The inclinometer is connected via an 8 pin M12 A-coded round connector.  
(Standard M12, Male side at sensor, Female at mating connector).

Pin	Cable Color	Dual-Axis Units	Single Axis, 360° Units
1	Red	V <sub>s</sub> Supply Voltage	V <sub>s</sub> Supply Voltage
2	Gray	Spare (N/C) <sup>1</sup>	Spare (N/C)
3	Pink	Spare (N/C)	Spare (N/C)
4	Yellow	Ground (Signal Common)	Ground (Signal Common)
5	Green	X-axis Analog Output <sup>2</sup>	Z -Axis Analog Output <sup>2</sup>
6	Brown	Spare (N/C)	Spare (N/C)
7	Blue	Y-axis Output Analog <sup>2</sup>	Spare (N/C)
8	White	Spare (N/C)	Spare (N/C)



<sup>1</sup> Items marked Spare (N/C) should not be connected

<sup>2</sup> For single axis units, either the X-axis or the Y-axis is active as specified in the model. If not active, treat the axis as a Spare (N/C)

## Voltage Output

