| T-SERIES INDUSTRIAL INCLINOMETER
CANopen 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 ±60°
- Option for a Single Axis Measurement Range of 360°
- High Resolution: 0.01°
- High Accuracy: 0.1°
- Glass Fiber Reinforced Plastic Housing available
- Factory Calibrated Linearity
- Temperature Compensated for Bias and Sensitivity
- Interface: CANopen
- Highest Protection Class: IP69K, IP68

Applications

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

Programmable Parameters

- Resolution, Preset, Baud Rate, Software Filters

Electrical Features

- Latest MEMS Technology for High Precision and Dynamics
- Reverse Polarity Protection
- Over Voltage Peak Protection
- Termination Resistor

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⬤ SPECIFICATIONS

Electrical

Model	T- M2 (or P2)- (Range)			T-M1 (or P1) - 360
	15	30	60	
Measurement Range	± 15°	± 30°	± 60	360°
Number of Axes	2 (Standard), 1 optional			1
Resolution	0.01°			
Accuracy (T = -10 °C to +40 °C)	0.1°			
Sensor Response Time	10 ms (Without Filter)			
Recommended Measurement Rate	Up to 10 Hz			
Interface	CANopen (In Conformance to DS410) Transceiver According ISO 11898, Galvanically Isolated by Opto-Couplers			
Transmission Rate	Adjustable: Max. 1 MBaud (Factory Setting : 125 kBaud)			
Addressing	Programmable Node-id from 1 to 127 (Factory Setting: 1)			
Supply Voltage	10 to 30 V DC (Absolute Maximum Ratings)			
Current Consumption	Max. 57 mA at 10 V DC; Max. 53 mA at 24 V DC			
EMC	Emitted Interference: EN 61000-6-4			
Current Consumption	Noise Immunity: EN 61000-6-2			
Connector Cable	5 Pin M5 male (A-coded)			
	Ø 7.1 mm [0.28 in] Polyurethane: 4 x 2 x 0.34 mm² [AWG 22]			

Mechanical

Housing Material (Plastic)	Glass Fiber Reinforced PBT (Polybutylene Terephthalate)
Housing Material (Metal)	AW6082 Corrosion resistant Aluminum alloy, passivated
Potting Material	PUR (Polyurethane)
Shock (EN 60068-2-27)	≤ 100 g (half sine, 6 ms)
Vibration (EN 60068-2-6)	1.5mm (10 to 58 Hz) & ≤ 20 g (58 to 2000 Hz)
Weight	170 gm / 6 oz

Environmental

Operating Temperature	-40 °C to +85 °C / -40 °F to 185 °F
Humidity	98 % Relative Humidity, Non-Condensing
Protection Class (EN 60529)	IP 69K (With Appropriate Mating Connector and mounting), IP68, IP67

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PROGRAMMABLE PARAMETERS

Resolution per 1°	The resolution parameter per 1° is used to program the desired number (1°, 0.1° and 0.01°) of steps per 1°.
Preset Value	The Preset value is the desired position value, which should be reached at a certain physical position of the axis. The position value is set to the desired process value by the preset parameter.
Moving Avarage-Filter	This filter can be used to adjust the bandwidth of measuring values to minimize the influence of vibration. Factory Setting: Moving average filter activated for 20 subsequent readouts.
Digital Recursive Filter	This filter can be used for weighting the last measured value with the last previous value. This is useful to suppress sudden peaks in the angle measurement.
Transmission Rate	Adjustable - Min. 20 kBaud; Max. 1 MBaud Factory Setting : 125 kBaud
Address (Node ID)	Adjustable from 1 to 127 Factory setting: Node ID=1

PROGRAMMABLE CAN TRANSMISSION MODES

Polled Mode	By a remote-transmission-request telegram, the connected host calls for the current process value. The inclinometer reads the current position value, calculates set parameters and sends back the calculated process value by the same identifier.
Cyclic Mode	The inclinometer transmits cyclically the current process value, without being called by the host. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms.
Sync Mode	The inclinometer answers with current process value after receiving a sync telegram. The parameter sync counter can be programmed to skip a certain number of sync telegrams before answering again.
Heartbeat Function	A node signals its communication status by cyclically transmitting a heartbeat message. This message is received by one or any number of members (Heartbeat Consumers) in the bus and so they can control the dedicated node (Heartbeat Producer).

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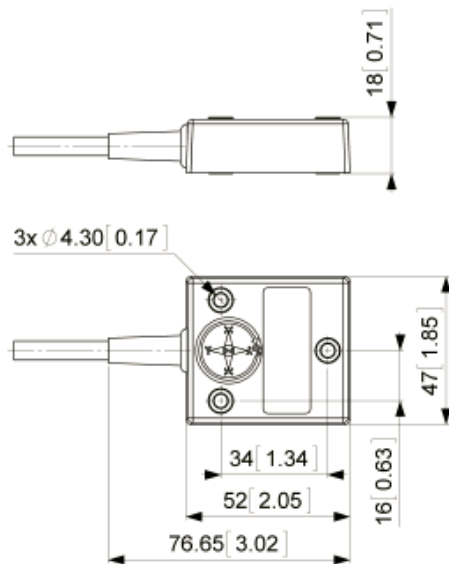
⊙ DIMENSIONS

Metal Housing Option

Cable Termination
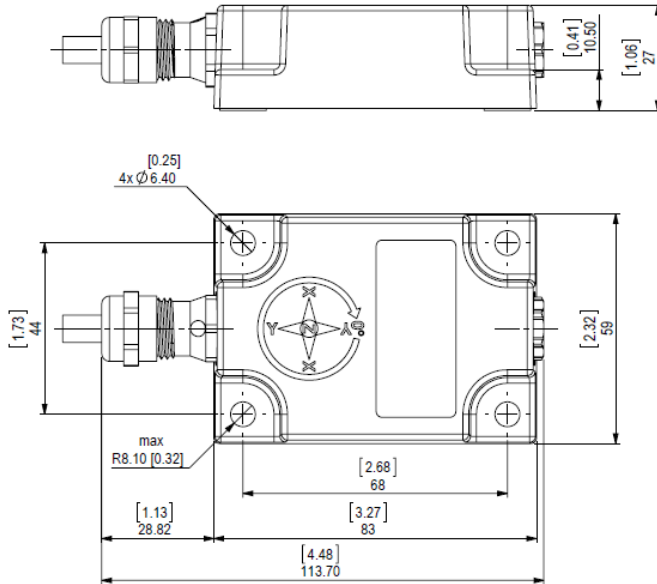
Connector Termination

Plastic Housing Option

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MEASUREMENT AXES (TWO AXIS UNITS)

↑ TOP

X = Y = 0°
Mid Angle Position (With Factory Settings)

X = 0°

- X   + X

X - Axis Inclination

+ Y
Y = 0
- Y
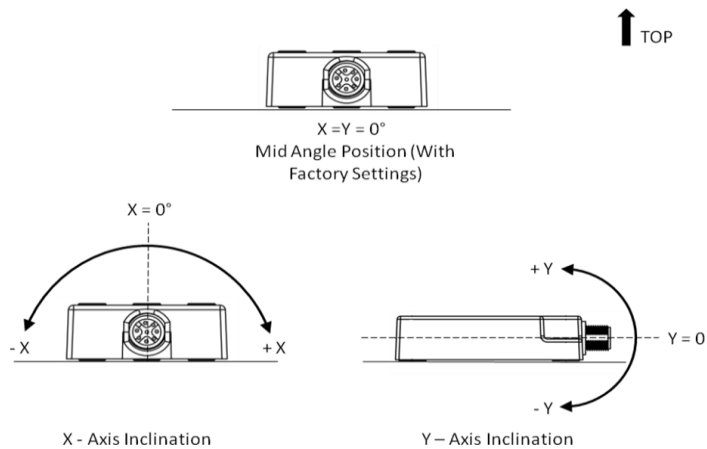
Y – Axis Inclination

MEASUREMENT AXIS - 360 (SINGLE AXIS INCLINOMETER)

Z=0°
Initial Starting Point (Factory Settings)
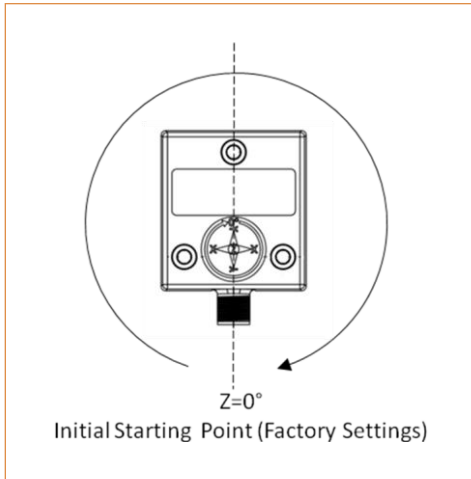
PIN ASSIGNMENT

The inclinometer is connected via a 5 pin M12 A-coded round connector or cable exit. (Standard M12, Male side at sensor, Female at connector counterpart or connection cable)

Signal	5 pin M12 connector	Cable Exit
CAN Ground	1	Green
+Vs Supply Voltage	2	Red
0 V Supply voltage	3	Yellow
CAN High	4	White
CAN Low	5	Brown

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T 360° - Z Axis Output Values (Factory setting: Resolution = 0.01)
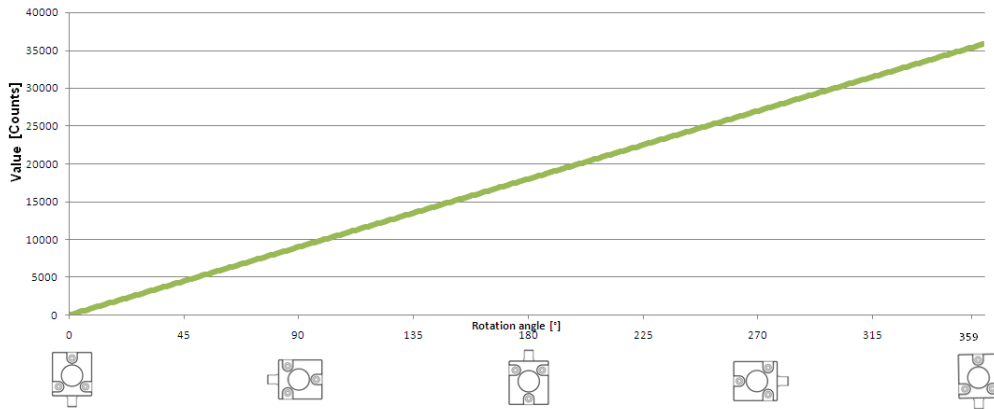
T 80° - X Axis Output Values (Factory setting: Resolution = 0.01)
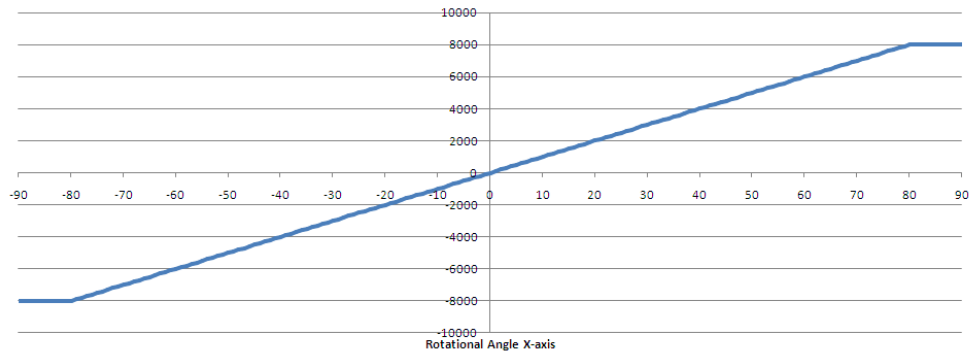
T 80° - Y Axis Output Values (Factory setting: Resolution = 0.01)

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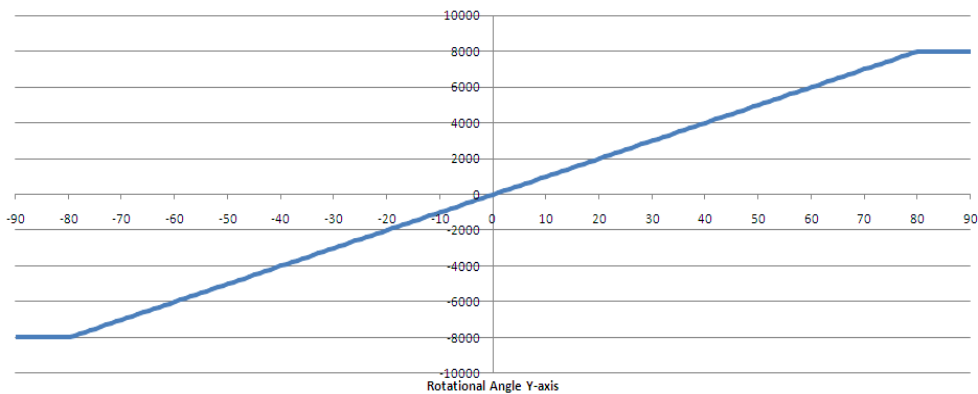
Contact the factory for special versions, ex: special flanges, electronics, connections…

T — **M1X** — **15** — **CAN** — **CS2**

Family

T = Tilt Measurement

Housing/Axes

M1X = Metal, 1 Axis, X direction (Roll)
M1Y = Metal, 1 Axis, Y direction (Pitch)
M2 = Metal, 2 Axes
P1X = Plastic, 1 Axis, X direction (Roll)
P1Y = Plastic, 1 Axis, Y direction (Pitch)
P2 = Plastic, 2 Axes
Note: With a 360° range, use the 1 axis designation (i.e. M1)

Measurement Range

15 = ± 15°
30 = ± 30°
60 = ± 60°
360 = ± 360°

Output Type

CAN = CANopen

Termination Options

M12/5 = 5 Pin Connector
CS1 = Cable, 1 M
CS2 = Cable, 2 M
CS5 = Cable, 5 M
CS10 = Cable 10 M

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