TILTIX INDUSTRIAL INCLINOMETER
WITH MODBUS RTU INTERFACE

The TILTIX industrial inclinometers are compact solutions for determining the inclination in both single and dual axes with remarkable precision and at a lower expense. The molded housing provides the mechanical stability and the fully encapsulated sensor has a high environmental protection making it ideal for measuring tilt / slope in industrial environments.

Main Features

- Dual Axis Inclinometer ± 80°
- Single Axis Inclinometer 360°
- High Resolution: 0.01°
- High Accuracy: 0.1°
- Rugged Glass Fiber Reinforced PBT Housing
- High Mechanical Stability
- Active Linearization
- Temperature Compensation
- Interface: Modbus RTU
- Housing Protection Class: IP69K, IP68, IP67

Programmable Parameters

- Resolution
- Preset
- Baud Rate
- Software Filters

Electrical Features

- Highly Integrated Circuit in SMD-Technology
- Polarity Inversion Protection
- Over-Voltage-Peak Protection
- Termination Resistor

Applications

- Measurement of Inclinations and Rotational Movements
- Solar Trackers
- Robotic Arms & Positioning Systems
- Mobile Platforms
- Marine & Offshore Machinery

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MODBUS RTU INTERFACE

Technical Data

Electrical Data

Model	TILTIX-080	TILTIX-360
Measurement Range	± 80°	360°
Number of Axes	2	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	MODBUS RTU Based on EIA/TIA-485	
Baud Rate	Adjustable: Max. 115,200 (Factory Setting : 19,200)	
Max Number of Devices on Bus	32	
Addressing	Programmable Device Address from 1 to 247d (Factory Setting: 127d)	
Supply Voltage	5 to 30 VDC (Absolute Maximum Ratings)	
Current Consumption	T.B.D.	
EMC	Emitted Interference: EN 61000-6-4	
	Noise Immunity: EN 61000-6-2	
Connection	Connector Output, 5 Pin M12 male (A-coded)	

Mechanical Data

Housing Material	Glass Fiber Reinforced PBT (Polybutylene Terephthalate)
Potting Material	Polyurethane
Shock (EN 60068-2-27)*	≤ 100 g (half sine, 6 ms)
Vibration (EN 60068-2-6)*	1.5 mm (10Hz to 58Hz) & ≤ 20 g (58 Hz to 2000 Hz)
Weight	75 gm / 3 oz

Environmental Conditions

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 Counter Connector) , IP68, IP67

*further data available on request

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MTBF Data

Failure Rate [FIT]	759
MTBF [Hours]	1,317,822
MTBF [Years]	150

The above mentioned data were calculated for TILTIX' electronics under the following conditions:
SNA: Non-mobile operation
Tu: 40°C - Mean component of ambient temperature
Zf: Continuous operation for 8760 h per year

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.
Invert Measurement Direction	This flag is used to invert the counting direction.
Moving Average-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.
Termination Resistor	You can activate and deactivate the internal Termination Resistor
Baud Rate	Adjustable - Min.2400 Baud; Max. 115200 Baud Factory Setting : 19200 Baud
Parity	You can set the parity for communication from even, odd or no parity.
Address (Node ID)	Adjustable from 1 to 247 Factory setting: Node ID=127

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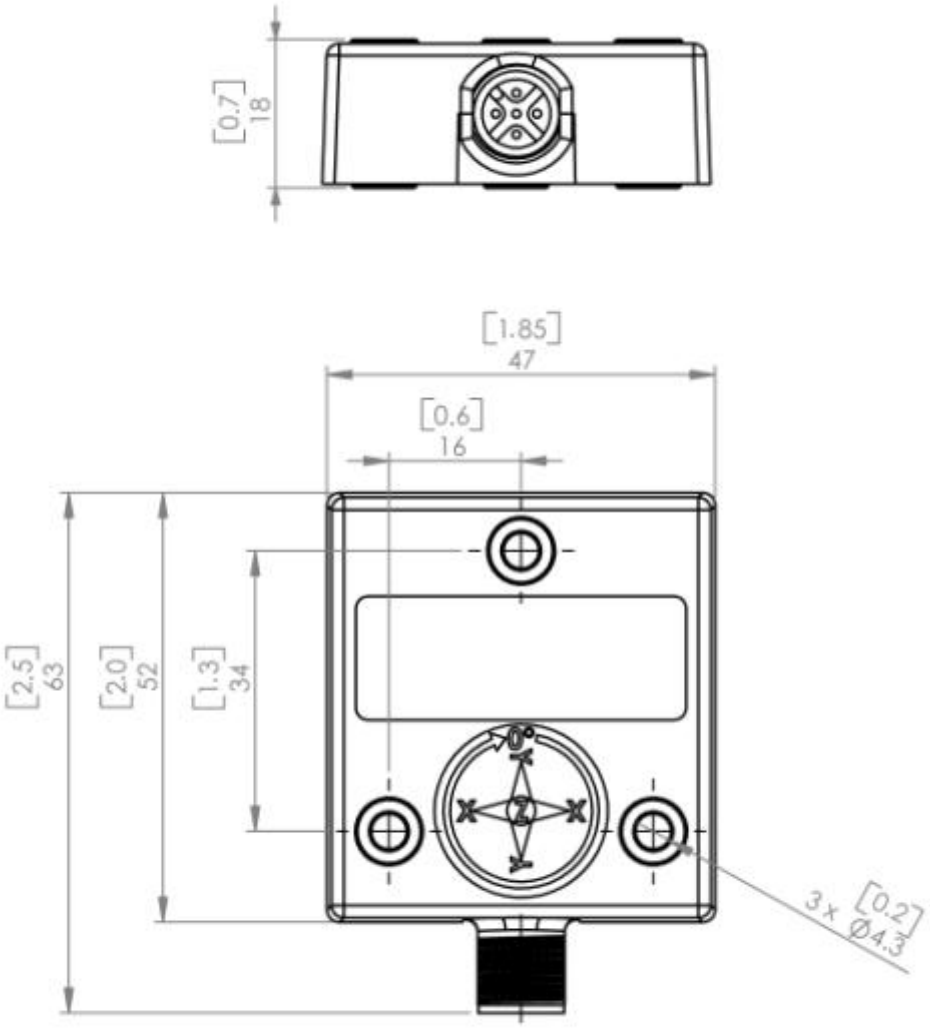
Mechanical Drawing – Industrial Housing

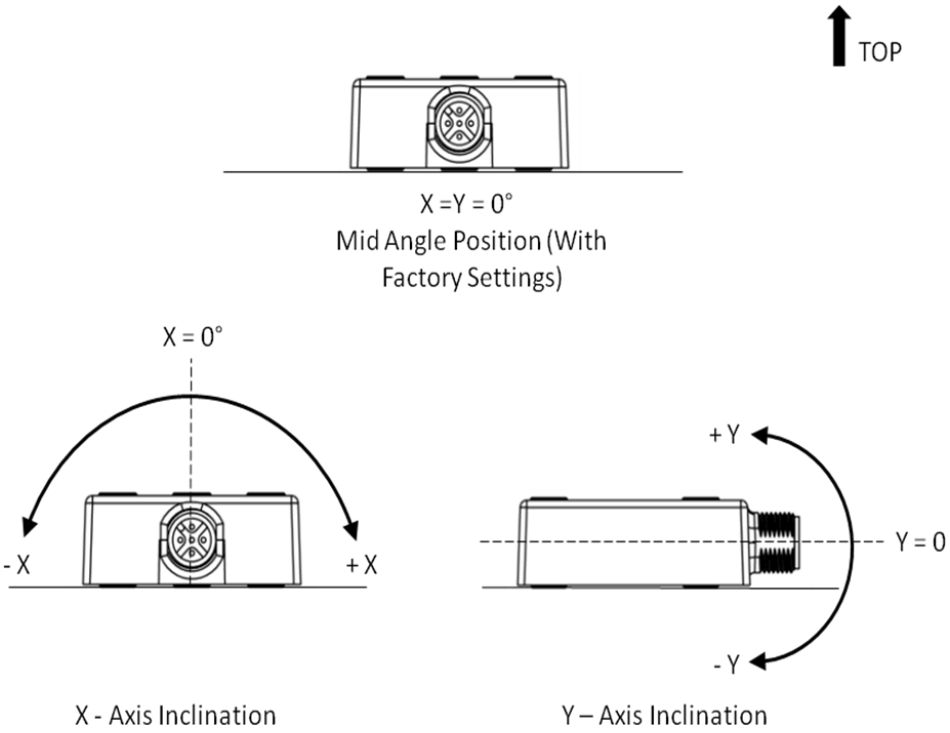


Dimensions in mm and [inches]

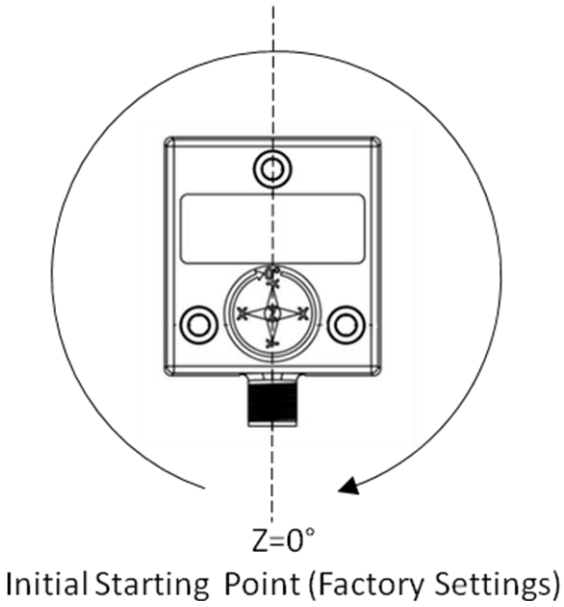
For more detailed drawings please refer website.

Measurement Axes

TILTIX-080 – Dual Axis Inclinometer



TILTIX-360 – Single Axis Inclinometer



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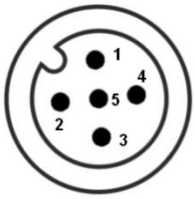
Pin Assignement

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

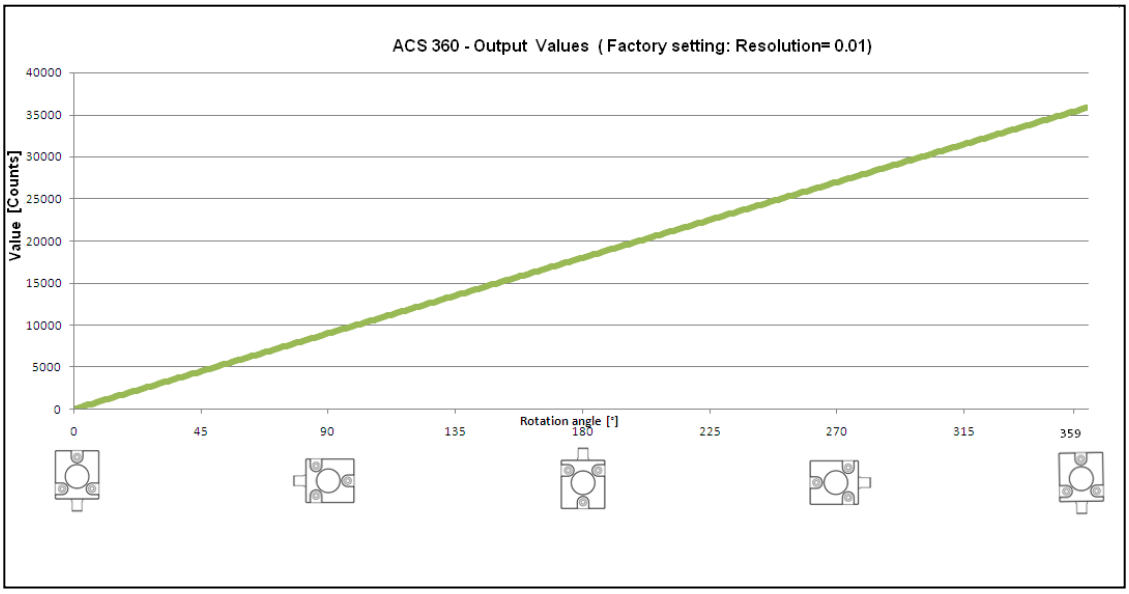
5 pin round connector pin number	Cable exit	Signal
1		N.C.
2	Red	+Vs: Supply Voltage
3	Yellow	0 V Supply voltage
4	White	RS485 A
5	Brown	RS485 B



For more detailed information about setup, measurement axes and programming, refer TILTIX MODBUS RTU Manual

Please read the instruction leaflet carefully prior to installation.

TILTIX – MODBUS RTU Output



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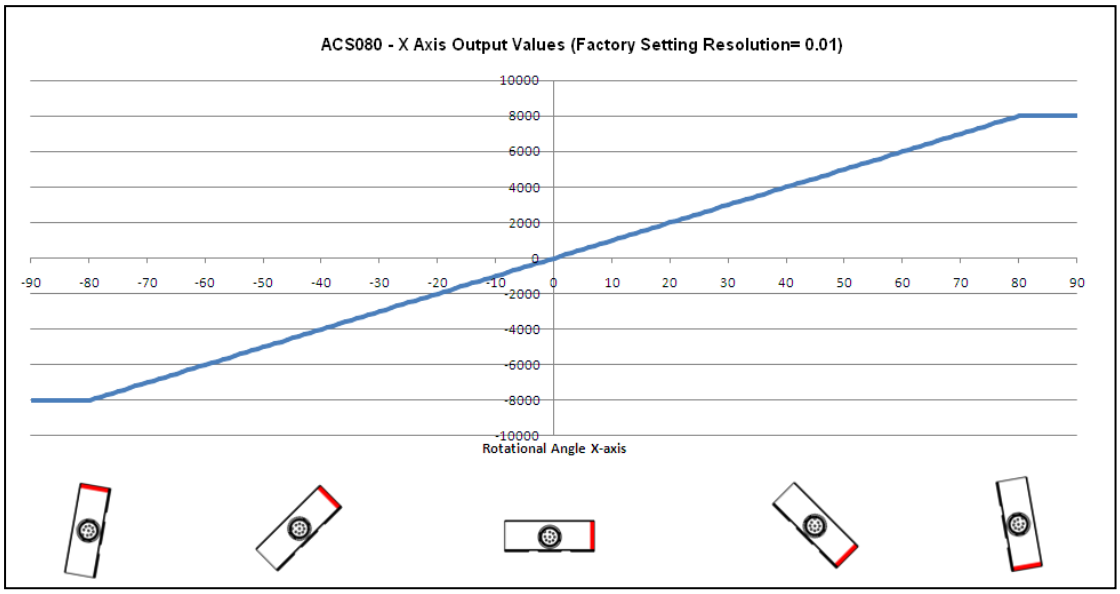

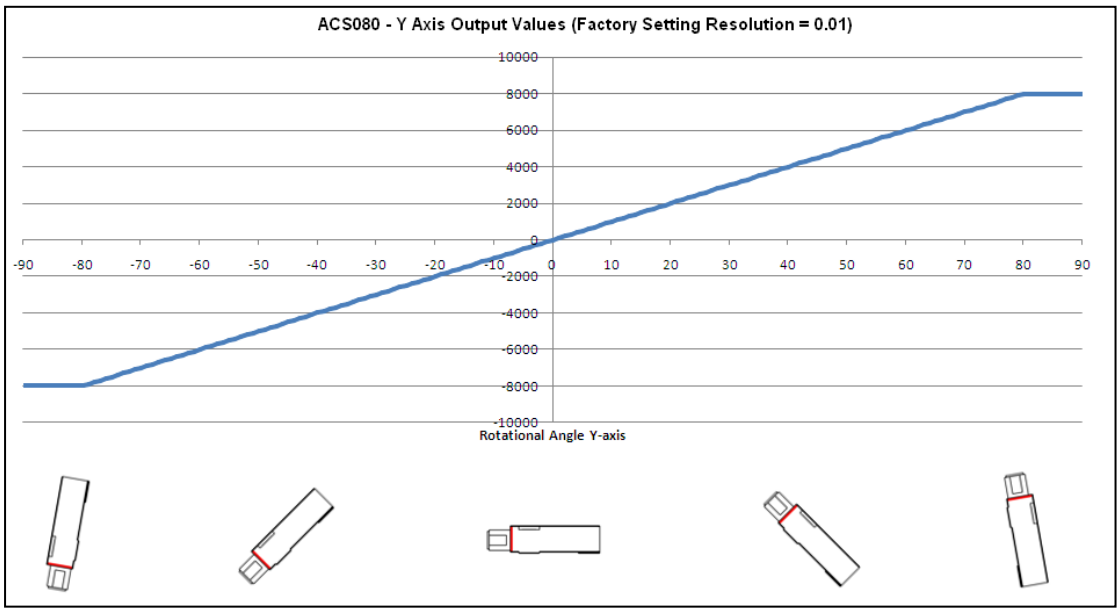

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Models/Ordering Description

Description	Type key								
	ACS-	XXX-	X-	XX	XX-	X	X	X-	XX
Range	360° (1 axis)	360							
	± 80° (2 axis)	080							
Number of axis	One for 360° Version		1						
	Two for ± 80° Version		2						
Interface	Modbus RTU			M1					
Version	Software Version				00				
Mounting	Vertical for 360° Version					V			
	Horizontal for ± 80° Version					H			
Housing Material	Industrial (PBT)						E		
Inclinometer Series	ACS II							2	
Connection	Connector								PM

Accessories

Article No	Description
10001978	Female M12, 5 pin A-coded connector, with 2 m PUR shielded cable
10012182	Female M12, 5 pin A-coded connector, with 5 m PUR shielded cable
10005631	External terminal resistors for higher baud rate transmissions

TILTIX INDUSTRIAL INCLINOMETER
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Check out some of the other POSITAL products

Draw Wire Sensor to Measure Linear Displacements

To measure rotary movements or rotary displacements, an absolute magnetic rotary encoder can be used. The contact-free measuring sensor stage of the IXARC Sensor does not have any abrasion. The Sensor can be connected directly to digital control units via SSI, CANopen or Analog Interface.

More Information

Heavy Duty Magnetic Encoder Line for Thoughest Environments

To measure linear movements or linear displacements, an absolute magnetic rotary encoder can be combined with a draw wire sensor. The contact-free measuring sensor stage of the IXARC Sensor doesn't have any abrasion. The sensor can directly be connected to digital control units via SSI- or CANopen or Analog Interface.

More Information

Tilt Sensors to Measure Inclinations up to 360°

TILTIX is developed on advanced MEMS technology based capacitance measurement. The sensor is a pre-calibrated device which can be put into immediate operation, upon simple and easy installation with a three point mount and setting of preset. Its compact design, installation "anywhere" and other versatile features makes it an ideal choice for very genuine and accurate measurement.

More Information

Typical Type-Keys

ACS-360-1-M100-VE2-PM
ACS-080-2-M100-HE2-PM