

## Triaxial Inclinometer

CANopen®

2 M12 Connector(s), IP67

P/N: AX060805

### Features:

- Reliable, real-time, accurate and stable slope angle data
- MEMS-based accelerometer measures angle with respect to gravity
- Measures pitch and roll inclination angles in a full  $\pm 180$  degree orientation range
- Outputs gravity angle and accelerations in 3 orthogonal directions
- CANopen®
- 12V, 24Vdc nominal power supply
- Aluminum enclosure, 2 round 5-pin A-coded M12 connectors, gasket
- IP67 protection
- EDS File



### Applications:

- Level, tilt, pitch and acceleration monitoring in agricultural, off-highway and mining equipment
- Platform levelling and stabilization in industrial machines
- Navigation system component

**General Description:** The unit measures pitch and roll inclination angles in a full  $\pm 180$  degree orientation range. The unit can also output: gravity angle and unit accelerations in three orthogonal directions. The inclinometer transmits angular data over CAN bus using a standard CANopen® protocol.

### Ordering Part Number:

#### Inclinometer:

**AX060805** – Triaxial Inclinometer, CAN (CANopen), 2 M12 Connectors

The EDS file is on the website [www.axiomatic.com](http://www.axiomatic.com). Go to the Log-In section and enter the password.

#### Accessories:

**AX070140** - Screw Plug PROT-FB M12 1555538

## Technical Specifications:

### Static Parameters

Parameter	Value	Remarks
Measurement Range	±180° – Pitch & Roll 0...180° – Gravity	
Resolution	0.35°	Maximum Effective Resolution (3.46*NoiseRMS). Maximum at cut-off frequency, Fc=5Hz
Initial Accuracy	±2°	Maximum, at 25°C
Temperature Drift	±3.5°	Maximum, in the full temperature range: -40...85°C
Nonlinearity	±0.7%	Maximum, at 25°C
Cross-Axis Sensitivity	±3.5%	Maximum, at 25°C

### Dynamic Parameters

Parameter	Value	Remarks
Cut-off frequency, Fc	1...50 Hz, 5 Hz default	User selectable
Settling time	≤0.2s	Typical at default Fc. From 0 to 95% of the static output value.

### Inputs

Parameter	Value	Remarks
Supply Voltage	9...36 VDC	12V, 24V – nominal
Supply Current <sup>1</sup>	20 mA 30 mA	Maximum at 24V Maximum at 12V
Protection	Reverse polarity, Transients <sup>2</sup>	

<sup>1</sup> CAN bus is connected.

<sup>2</sup> Withstands 80 VDC @25°C for 2minutes for jump start conditions

### CAN Output

Parameter	Value	Remarks
Number of ports	1 CAN Port	To output data and change the internal configuration of the inclinometer.
Communication standards	CANopen®  ISO 11898  Bosch CAN protocol specification 2.0, Part A, B.	120Ohm terminated twisted pair, baud rate up to 1MBit/s. Termination resistor is not installed.  For the internal CAN controller.
Protection	Short circuit to ground  Connection to the power supply	Only for 12V systems

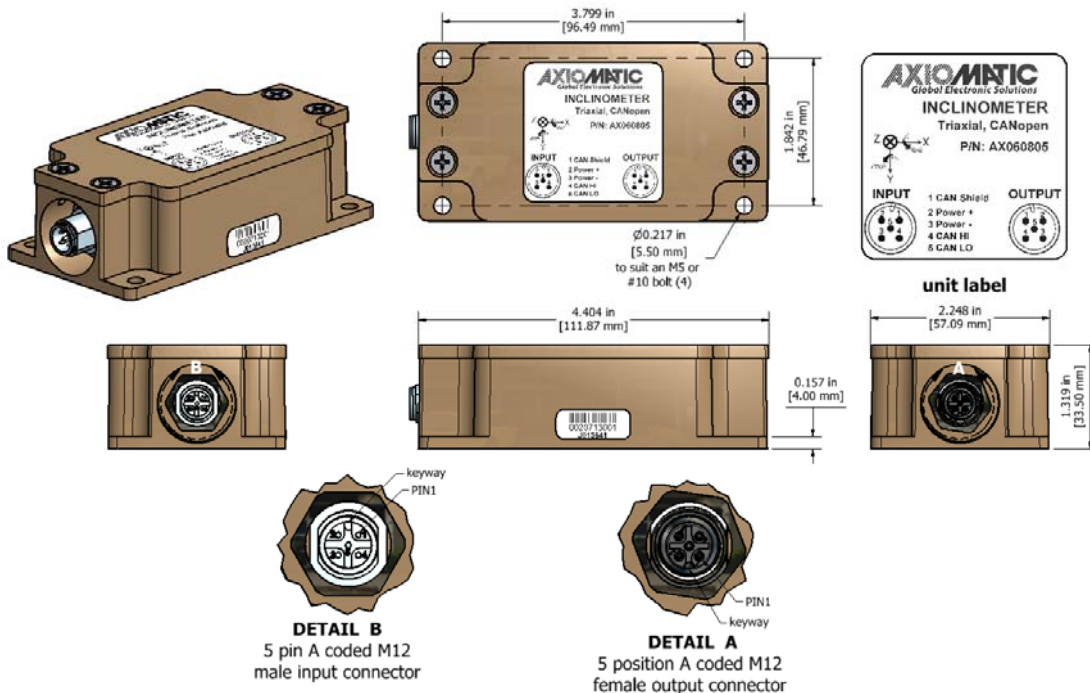
### General Specifications

Parameter	Value
Sensor Type	MEMS
User Interface	EDS provided to interface to standard CANopen ® tools
Operating Temperature	-40...+85 °C
Environmental Protection	IP67

Vibration and Shock <sup>1</sup>	<p>The sinusoidal component of the vibration testing was conducted following MIL-STD-202G, method 204D, test condition C (10g peak). A resonant frequency analysis was performed, no resonances were noted.</p> <p>Sweep Characteristic: 10Hz to 2000Hz to 10Hz  Sweep Period: 20 Minutes  Test Duration: 8hrs/axis  Test Intensity: 10g Peak</p> <p>The random component of the vibration testing was conducted meeting or exceeding the requirements of MIL-STD-202G, method 214A, test condition I/B (7.68 Grms):</p> <p>Frequency Range: 5Hz to 2000Hz  Test Duration: 8hrs/axis  Overall Grms: 7.68 Grms</p> <p>The shock component of the vibration testing is based on MIL-STD-202G, method 213B, test condition A. The pulse duration was shortened to 9 ms from the standard 11 ms due to our vibration system limits. Eight pulses per axis were performed instead of six. The test was conducted as follows:</p> <p>Pulse Type: half sine  Pulse Duration: 9 ms  Peak Value: 50 g  Pulses per axis: 8</p>
Enclosure	Metal enclosure, anodized with two 5-pin M12 A-coded round connectors. Refer to dimensional drawing.
Size	See dimensional drawing.
Weight	0.75 lb. (0.34 kg)

<sup>1</sup>MEMS sensor can withstand 20000 g max.

**Dimensions:**

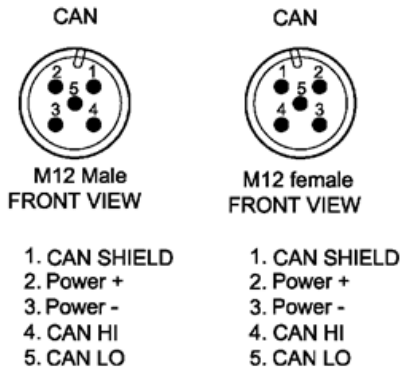


### Electrical Connections:

#### Model: AX060805

There is only one CAN port supported by the unit. Both CAN connectors are physically connected to facilitate cable routing in the user system.

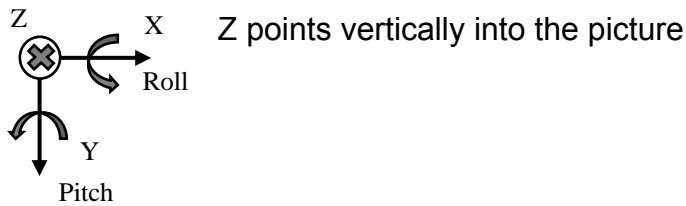
The unit contains two 5-pin M12 A-coded round connectors. Use mating connectors compliant with IEC 61076-2-101:2012.



### Unit Orientation:

#### Model: AX060800

The unit coordinates, together with the Pitch and Roll directions are shown on the inclinometer label.



### Compliance

#### Enclosure Protection

Standard	Description	Conditions
IEC 60529	Degrees of protection provided by enclosures (IP Code).	IP67. Mating connectors compliant with IEC 61076-2-101:2012 should be installed.

Name	Remarks
CE Marking	EMC RoHS

### Installation Instructions:

The CAN wiring is considered intrinsically safe. All field wiring should be suitable for the operating temperature range of the module. CAN wiring may be shielded using a shielded twisted conductor pair and the shield must be connected to the CAN\_SHIELD pin.

### Control Logic:

The inclinometer is internally organized as a set of function blocks, which can be individually configured and arbitrarily connected together to achieve the required unit functionality, see: Figure 1.



**Figure 1. The Inclinometer Logical Block Diagram**

Notes: CANopen® is a registered community trade mark of CAN in Automation e.V.

Specifications are indicative and subject to change. Actual performance will vary depending on the application and operating conditions. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Approvals/Limitations and Return Materials Process as described on [www.axiomatic.com/service.html](http://www.axiomatic.com/service.html).

Form: TDAX060805-09/09/18