

# HEM Data Mini INCLN™ Details

## Dual Axis Functionality

There are two identical functional blocks: Sensor X and Sensor Y presenting angular data from two orthogonal sensing directions X and Y of the inclinometer sensor.

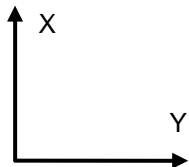


Figure 1.0 Sensing Direction Vectors

The inclinometer measures angles between the sensing directions and the ground plane. Normally, the sensor is mounted horizontally, with the sensing direction vectors being in parallel with the ground plane.

When a sensing direction vector points up, out of the ground plane, the inclination angle is considered to be positive, and when the sensing direction vector points down, into the ground plane, it is negative.

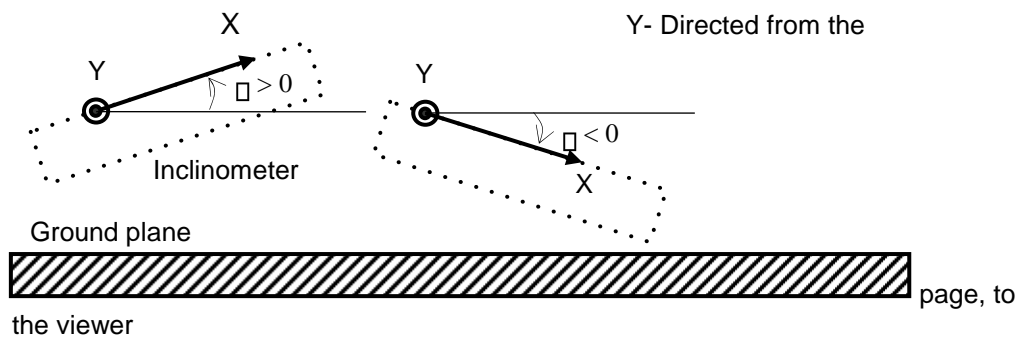


Figure 2: Dual Axis Functionality with the Inclinometer mounted horizontally – Sensor X and Sensor Y Functional Blocks

## Single Axis Functionality

The single axis functionality is provided by the vertically mounted sensor functional block. It is available only when the inclinometer is mounted vertically, orthogonally to the ground plane. In this position, if kept vertically, the inclinometer can measure an inclination angle in one direction in the whole  $\pm 180^\circ$  degree range.

The sensing direction of the vertically mounted sensor is the same as the Y sensing direction of the regularly (horizontally) mounted sensor. When the X sensing direction points up and the Y sensing direction points to the right, and is in parallel with the ground plane, the inclination angle is zero.

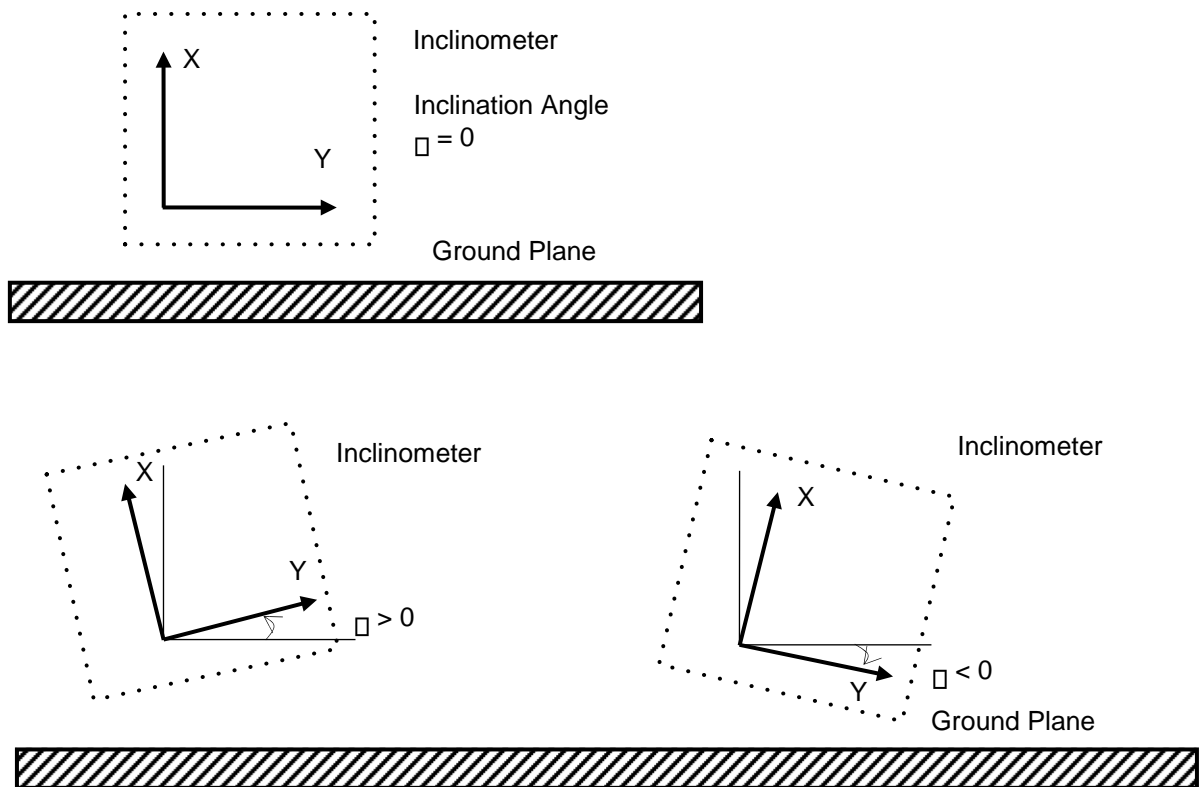


Figure 3: Single Axis Functionality with the Inclinometer mounted vertically – Vertically mounted sensor functional block - The counterclockwise rotation of the sensor produces positive angles and the clockwise, correspondingly, negative.

## Technical Specifications:

### Power Input

Power Supply Input	12V, 24V nominal (9...43 VDC power supply range)
Supply Current	40 mA at 12 V Typical 22 mA at 24 V Typical
Protection	Reverse polarity and transient protection is provided.

### Angle Measurements

Operation Modes	Dual Axis or Single Axis
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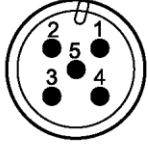
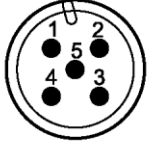
Single Axis – Angle Range	Single Axis: -180°...180° (0...360°)  NB. Vertical position of the inclinometer should be maintained within the maximum displacement angle ( $\pm 20^\circ$ , by default)
Resolution	$\pm 0.05^\circ$ Maximum
Initial Accuracy	$\pm 0.25^\circ$ Maximum, at 25°C
Repeatability	$\pm 0.05^\circ$ Maximum
Nonlinearity	$\pm 0.1^\circ$ Typical

Dual Axis – Angle Range	Dual Axis: -80°...80° (Functional up to $\pm 90^\circ$ )	
	<b>Low-angle range</b>	<b>High-angle range</b>
Dual Axis Measurement Range	-30°...30°	-80°...-30° 30°...80°
Resolution	$\pm 0.05^\circ$ Maximum	$\pm 0.2^\circ$ Maximum
Initial Accuracy	$\pm 0.25^\circ$ Maximum, at 25°C	$\pm 0.5^\circ$ Maximum, at 25°C
Repeatability	$\pm 0.05^\circ$ Maximum	$\pm 0.2^\circ$ Maximum
Temperature Drift	$\pm 0.0015$ %/°C Typical, at 0° over the full temperature range -40...85°C	-
Nonlinearity	$\pm 0.1^\circ$ Typical	$\pm 0.25^\circ$ Typical
Cross-Axis Sensitivity	0.5% Typical	

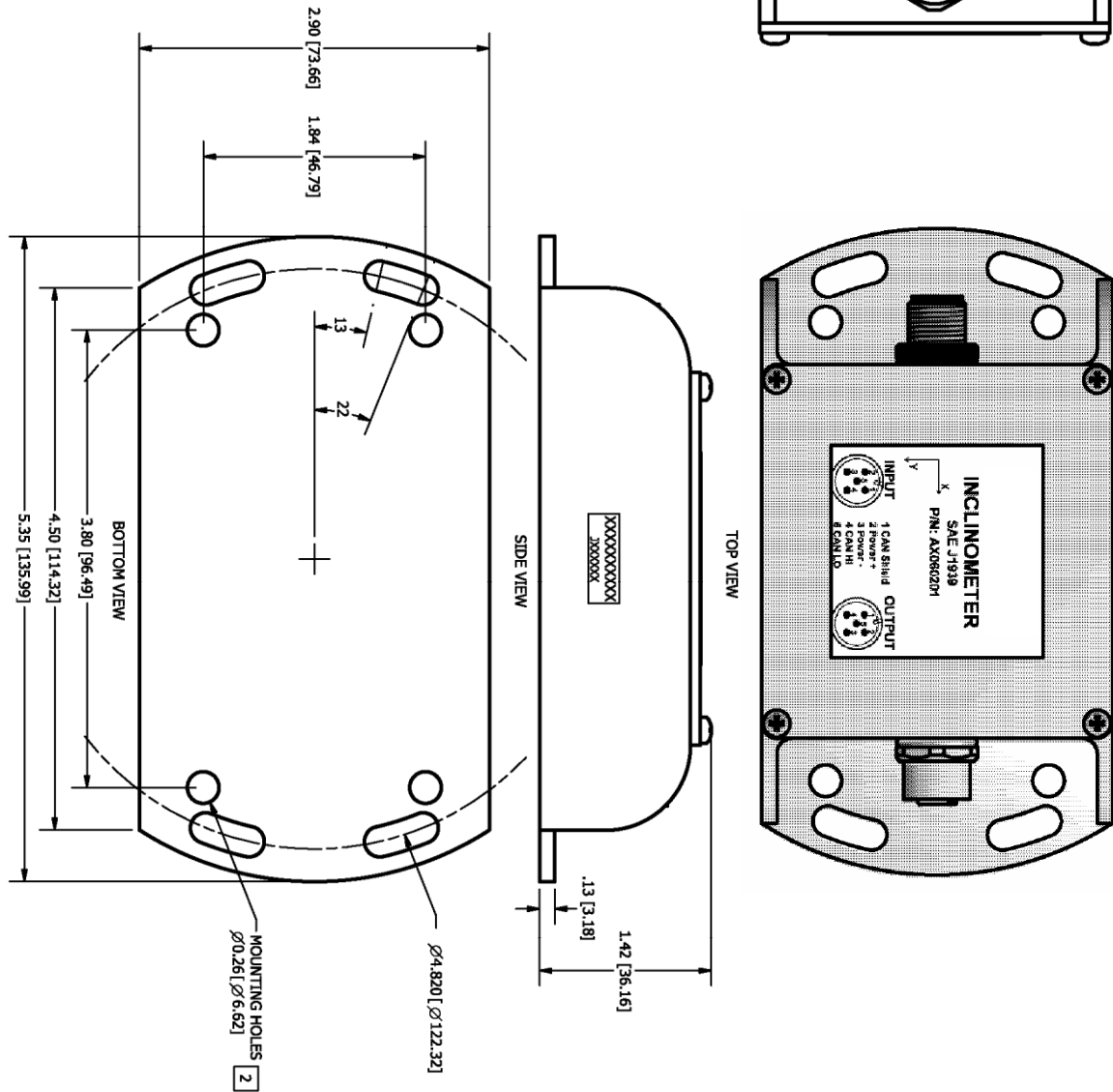
### Outputs

CAN	1 CAN port SAE J1939
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## General Specifications

Cut-off frequency, Fc	5 Hz (default) 1...20 Hz (User configurable)
Settling Time	0.3 sec. Typical at Fc ≥ 5Hz from 0 to 95% of the static output value
Microprocessor	32-bit, 128 Kbyte flash program memory
Sensor	Dual axis MEMS acceleration sensor
Operating Conditions	-40 to 85 °C (-40 to 185 °F)
Packaging and Connectors	Cast Aluminum enclosure 2 Round M12 5-pin A-coded integral connector(s) CONEC P/N: 43-02079 (M12 FEMALE) CONEC P/N: CONEC 43-02080 (M12 MALE) Encapsulated, Lid Gasket Dimensions: 2.90 x 5.35 x 1.42 inches 73.66 x 135.99 x 36.16 mm (L x W x H)
Protection	IP65 (IP67 on request for underwater applications)
Weight	0.85 lbs, 0.39 kg
Electrical Connections	<p><b>P/N: AX060201 (CAN SAE J1939)</b></p> <p><b>INPUT CONNECTOR      OUTPUT CONNECTOR</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><b>M12 Male FRONT VIEW</b></p> <ol style="list-style-type: none"> <li>1. CAN SHIELD</li> <li>2. Power +</li> <li>3. Power -</li> <li>4. CAN HI</li> <li>5. CAN LO</li> </ol> </div> <div style="text-align: center;">  <p><b>M12 female FRONT VIEW</b></p> <ol style="list-style-type: none"> <li>1. CAN SHIELD</li> <li>2. Power +</li> <li>3. Power -</li> <li>4. CAN HI</li> <li>5. CAN LO</li> </ol> </div> </div> <p>A mating plug with CAN termination, P/N: AX070114, can be ordered to plug the 2nd connector for applications requiring only one CAN and Power connection as well as requiring a termination of the CAN network.</p>
Installation	<p>Mounting holes accept #10 or M5 screws. The thickness of the mounting flange is 0.13 inch or 3.18 mm.</p> <p>The CAN wiring is considered intrinsically safe. All field wiring should be suitable for the operating temperature range of the module.</p> <p>All chassis grounding should go to a single ground point designated for the machine and all related equipment.</p>

# Dimensional Drawing



## NOTES

- 1 DIMENSIONS ARE IN INCHES [MILLIMETRES].
- 2 MOUNTING HOLES TO SUIT #10 OR M5 HARDWARE.