TECHNICAL DATASHEET #TDAX060900

Triaxial Gyro Inclinometer

SAE J1939
2 M12 Connectors
with Electronic Assistant®

P/N: AX060900

Features:

- Reliable, real-time, accurate and stable slope angle as well as pitch, roll and yaw
- MEMS-based accelerometer data measures angle with respect to gravity
- MEMS gyro and MEMS accelerometer sensor data is fused to lead to an effective measuring unit under most operating conditions
- Measures pitch and roll inclination angles in a full ±180 degree orientation range
- Outputs gravity angle, pitch, roll and yaw angular rates and accelerations in 3 orthogonal directions
- SAE J1939
- 12V, 24Vdc nominal power supply
- Aluminum enclosure, 2 round 5-pin A-coded M12 connectors, gasket, encapsulation (Option: 1 5-pin M12 connector)
- IP67 protection
- Configurable using the **Electronic Assistant®**

Applications:

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

General Description:

The unit measures pitch and roll inclination angles in a full ±180 degree orientation range. The angles can be compensated by a 3D gyroscope to minimize the influence of dynamic linear accelerations caused by vibrations and machine operational movements.

The unit can also output: gravity angle; pitch, roll and yaw angular rates; and unit accelerations in three orthogonal directions. The inclinometer transmits angular data over CAN bus using a standard J1939 protocol. The unit original configuration can be changed using Axiomatic Electronic Assistant® PC-based configuration tool.

Ordering Part Numbers:

Inclinometers:
AX060900 – Triaxial Inclinometer, CAN (SAE J1939), 2 M12 Connectors

Accessories:
Electronic Assistant® over CAN (SAE J1939): **P/N: AX070502**

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Technical Specifications:

Static Parameters

Parameter	Angular Measurements	Angular Rate Measurements	Remarks
Measurement Range	Inclinometer ±180° – Pitch & Roll 0…180° – Gravity	Gyro ±125°/s	±90° default for Pitch & Roll
Resolution	0.07° All angles 0.05° All angles with gyro compensation	0.08°/s	Maximum Effective Resolution (3.46*NoiseRMS) typical at cut-off frequency, Fc=5Hz
Offset Error	N/a	± 1%	Maximum
Offset Temperature Drift	N/a	± 0.8%	Maximum, in the full temperature range: -40…85°C
Sensitivity Error	N/a	± 2.5%	Maximum, in the full temperature range: -40…85°C
Initial Accuracy	±1.5°	N/a	Maximum
Temperature Drift	±1.3°	N/a	Maximum, in the full temperature range: -40…85°C
Nonlinearity	±0.15%	±0.5%	Typical
Cross-Axis Sensitivity	±0.5%	±1.5%	Maximum

Dynamic Parameters

Parameter	Angular Measurements	Angular Rate Measurements	Remarks
Cut-off frequency, Fc	Inclinometer 1…35 Hz, 5 Hz default 8 Hz with gyro compensation	Gyro 1….35 Hz, 5 Hz default	User selectable
Settling time	≤ 0.2 s ≤ 0.1 s – with gyro compensation	N/a	Typical at default Fc (except for the gyro compensation). From 0 to 95% of the static output value.

Inputs

Parameter	Value	Remarks
Supply Voltage	9…36 VDC	12V, 24V – nominal
Supply Current[1]	40 mA 75 mA	Maximum at 24V Maximum at 12V
Protection	Reverse polarity, Transients	
Jump Start Protection	Can withstand 80Vdc @ 25 °C for 2 minutes	Will restart once voltage drops back to the device's operating range.

[1] CAN bus is connected.

CAN Output

Parameter	Value	Remarks
Number of ports	1 CAN Port	To output data and change the internal configuration of the inclinometer.
Communication standards	SAE J1939	Full support for a J1939 ECU is provided. By default, the inclinometer transmits angular information on the CAN network in PGN 61459, Slope Sensor Information. User configurable PGNs are also available.
	ISO 11898	120Ohm terminated twisted pair, baud rate up to 1MBit/s. Termination resistor is not installed.
	Bosch CAN protocol specification 2.0, Part A, B.	For the internal CAN controller.
Protection	Short circuit to ground	
	Connection to the power supply	Only for 12V systems. 24V max

General Specifications

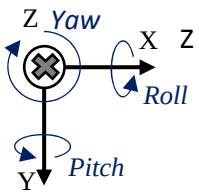
Parameter	Value
Sensor Type	MEMS gyro and MEMS accelerometer
Internal Logic	User Configurable with Electronic Assistant (EA), AX070502
Operating Temperature	-40…+85 ºC
Environmental Protection	IP67
Vibration and Shock	Pending
Size	See dimensional drawing.
Weight	0.80 lb. (0.36 kg)

Compliance

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.
CE Marking	EMC Directive RoHS Directive	

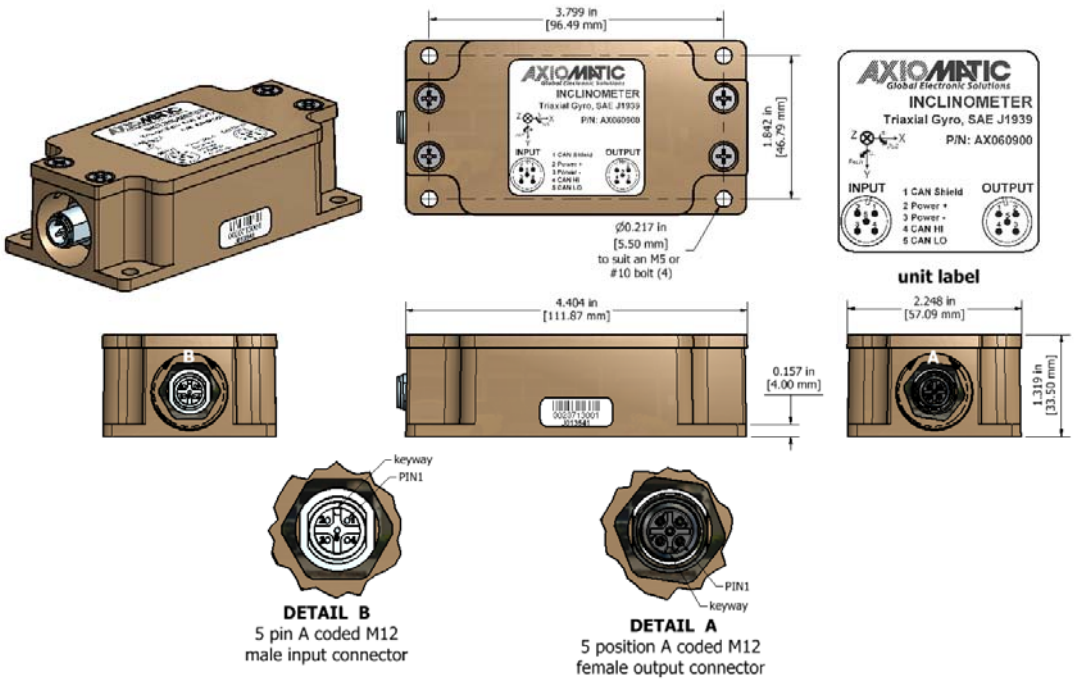
Installation Instructions:
The CAN wiring is considered intrinsically safe. All field wiring should be suitable for the operating temperature range of the module. CAN wiring may be shielded using a shielded twisted conductor pair and the shield must be connected to the CAN_SHIELD pin.

Unit Orientation: The unit coordinates, together with the Pitch, Roll and Yaw directions are shown on the inclinometer label:



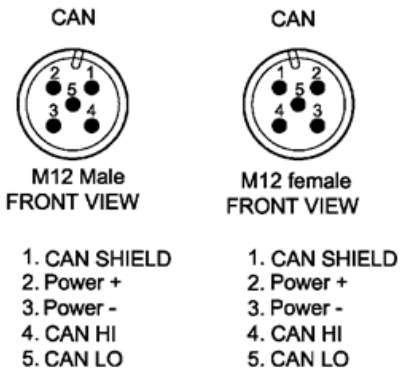
Z points vertically into the picture

Dimensions:



Electrical Connections:
Model: AX060900
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 with CiA-303-1 pinout. Use mating connectors compliant with IEC 61076-2-101:2012.



Form: TDAX060900-11/01/18