Thermocouple Module, 2 Channel
P/N: AX188001

Monitors 2 Type J, K, B, E, N, R, S or T Thermocouples
CANopen®

Description:

The Thermocouple Module monitors up to 2 channels of Type J, K, B, E, N, R, S or T thermocouples (others on request). The temperature information is provided to the engine control system over CAN bus. Temperature information can include exhaust temperature, winding temperature, and fluid temperature monitoring. All channels are fully isolated and measure temperatures at the same time. Temperature data is automatically sent over the CAN bus when power is applied. CAN communications are via an isolated CAN interface with CANopen® protocol. Settings are automatically saved to non-volatile memory. The product enclosure is rated as IP67 and has an 8-pin connector which is a TE Deutsch equivalent.

Applications: Applications include power generator sets.

Features:

- Model AX188001: Reads up to 2 Type J, K, B, E, N, R, S or T thermocouple inputs (other thermocouple types on request)
- All channels are measured simultaneously.
- Full channel to channel isolation and isolation from CAN line, other inputs and power supply
- Channels configured for CANopen® to transmit the temperature measured by that input
- Cold junction compensation is provided.
- Thermocouple input resolution is 0.1 °C.
- Accuracy is +/-1 °C throughout the entire range of the thermocouple input.
- 1 CANopen® port
- Robust 9…36Vdc power supply, 12V or 24Vdc nominal, with reverse polarity protection
- Compact size for mounting directly on the power generator set or remotely
- Rugged IP67 rated packaging with plug-in connections
- Operational from -40 to 85°C (-40 to 185°F)
- EDS File

Ordering Part Numbers:

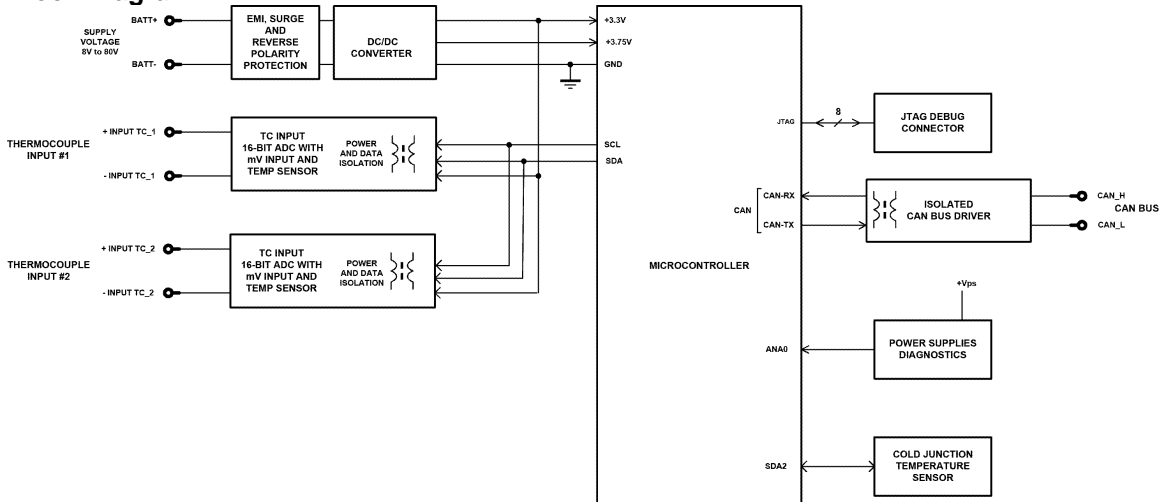Thermocouple Module, 6 Channels reading Type J, K, T or E TC, CANopen®: **AX188001**
Thermocouple Module, 6 Channels reading Type J, K, T or E TC, SAE J1939 (250 kbps): **AX188000**
EDS File

Accessories:

Mating Plug Kit: **AX070112** (1 DT06-08SA, 1 W8S, 8 0462-201-16141, 3 114017)

Block Diagram

Technical Specifications:

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 https://www.axiomatic.com/service/.

Input Specifications

Power Supply Input	12 or 24Vdc nominal (9…36Vdc power supply range) NB. The maximum total power consumption is <1.5 Watts.
Protection	Surge and reverse polarity protection are provided.
Isolation	Full isolation of each channel from the CAN line, other inputs and power supply. Isolation voltage is 1500 Vac (rms) or 2550V for 1 sec. for all channels to power and 50V (rms) for all channels to CAN interface.
All Inputs	In P/N: AX186001, the following Thermocouple (TC) types are supported. 2 Type J, K, B, E, N, R, S or T The device reads mV signals from the supported Thermocouples. B = 0 to 13.82 mV E = -9.835 to 76.373 mV J = -8.095 to 69.553 mV K = -6.458 to 54.886 mV N = -4.345 to 47.513 mV R = -0.226 to 21.101 mV S = -0.236 to 18.693 mV T = -6.258 to 20.872 mV (Other TC types are available on request.)
Resolution	Temperature data is measured with a resolution of 0.1 °C. When sending data to the CAN bus, one-byte parameters have a resolution of 1°C/ bit, an offset of -40°C and a range of -40 °C to 210 °C. Two-byte parameters have resolution of 0.03125 °C / bit and a range of -273 °C to 1735 °C.
Drift	Overall drift with temperature is 50ppm/°C of span (maximum).
Accuracy	+/-1 °C throughout the entire range of the thermocouple input
Input Functionality	All input channels are completely independent of each other and can read the thermocouple temperatures at the same time. Temperature is measured in °C with a 0.1°C resolution. By default, the Thermocouple Scanner transmits the process value (object $7130) according to the device profile in CiA Standard DS-404
Measurement Rate	The measurement rate is 6 scans/Sec. All channels are measured simultaneously. The update rate is 165 mSec.
Common Mode	Common mode rejection is >110 db@ 5V p-p (programmable for either 50 or 60 Hz). Common mode input range is +/- 4 V minimum.
Ground	2 analog ground connections are provided.

General Specifications

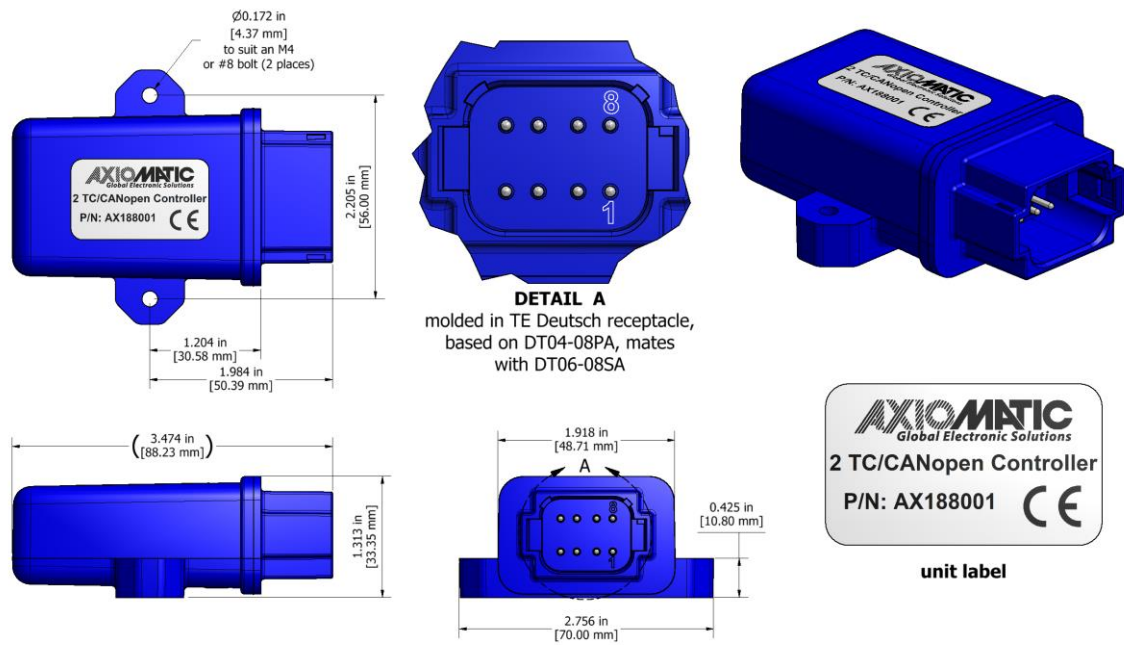|	
Operating Conditions	-40 to 85°C (-40 to 185°F)
Weight	0.147 lb. (0.067 kg)
Protection	IP67; Unit is conformal coated within the housing.
Vibration	MIL-STD-202G, Test 204D and 214A (Sine and Random) 10 g peak (Sine) 7.68 Grms peak (Random)
Shock	MIL-STD-202G, Test 213B 50 g
Microprocessor	STM32F405RG, 32-bit, 1MByte flash memory
Control Logic	Standard embedded software is provided. User programmable functionality using SDO object access, per CiA DS-301. *Refer to the user manual for details.* (Application-specific control logic is available on request.)
User Interface	.EDS provided to interface to standard CANopen® tools
CAN Interface	1 CAN 2.0Bport, protocol CiA CANopen® By default, the Thermocouple Scanner transmits the process value (object $7130) according profile in CiA Standard DS-404 SAE J1939 model is AX188000
Termination	It is necessary to terminate the network with external termination resistors. The resistors are 120 Ohm, 0.25W minimum, metal film or similar type. They could be placed between CAN_H and CAN_L terminals at both ends of the network.
Electrical Connections	8-pin receptacle (equivalent TE Deutsch P/N: DT04-08PA) Mating plugs kit, AX070112, is available on request and includes1 DT06-08SA, 1 W8S, 8 0462-201-16141, and 3 114017. Refer to Table 2.0. *Table 2.0 - Typical Connections, AX188001* Table below
Enclosure and Dimensions	Molded Enclosure, integral connector Nylon 6/6, 30% glass, Ultrasonic welded 3.47 x 2.75 x 1.31 inches (88.2 x 70.0 x 33.3 mm) L x W x H including integral connector Refer to the Dimensional Drawing, Figure 1.0.
Mounting	Mounting holes are sized for #8 or M4 bolts. The bolt length will be determined by the end-user's mounting plate thickness. The mounting flange of the controller is 0.425 inches (10.8 mm) thick. It should be mounted with connectors facing left or right to reduce likelihood of moisture entry. All field wiring should be suitable for the operating temperature range. Install the unit with appropriate space available for servicing and for adequate wire harness access (6 inches or 15 cm) and strain relief (12 inches or 30 cm).

Table 2.0 - Typical Connections, AX188001

Pin #	Function
1	BATT -
2	BATT +
3	CAN_L
4	CAN_H +
5	TC IN 1 -
6	TC IN 1 +
7	TC IN 2 -
8	TC IN 2 +

Ø0.172 in
[4.37 mm]
to suit an M4
or #8 bolt (2 places)

2.205 in
[56.00 mm]

1.204 in
[30.58 mm]
1.984 in
[50.39 mm]

DETAIL A
molded in TE Deutsch receptacle,
based on DT04-08PA, mates
with DT06-08SA

3.474 in
[88.23 mm]

1.313 in
[33.35 mm]

1.918 in
[48.71 mm]

A

0.425 in
[10.80 mm]

2.756 in
[70.00 mm]

AXIOMATIC
Global Electronic Solutions
2 TC/CANopen Controller
P/N: AX188001 C€

unit label

Figure 1.0 - Dimensional Drawing – AX188001

Note: CANopen® is a registered community trademark of CAN in Automation e.V.

Form: TDAX188001-06/19/23