Thermocouple Module, 6 Channel
P/N: AX186001

Monitors 6 Type J, K, B, E, N, R, S or T Thermocouples
CANopen®

Description:

The Thermocouple Module monitors up to 6 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 CANopen® 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. Integral diagnostics can flag open wire fault detection. CAN communications are via an isolated CAN interface. Settings are automatically saved to non-volatile memory. Parameters can be configured using standard CANopen® tools.

Applications: Applications include power generator sets.

Features:

- Model AX186001: Reads up to 6 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
- Cold junction compensation is provided.
- Thermocouple input resolution is 0.1 °C.
- Accuracy is +/-1 °C throughout the entire range of the thermocouple input.
- Robust 9…36Vdc power supply, 12V or 24Vdc nominal, with reverse polarity protection
- CANopen®
- 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
- Configuration files can be saved and written to other same devices during setup.
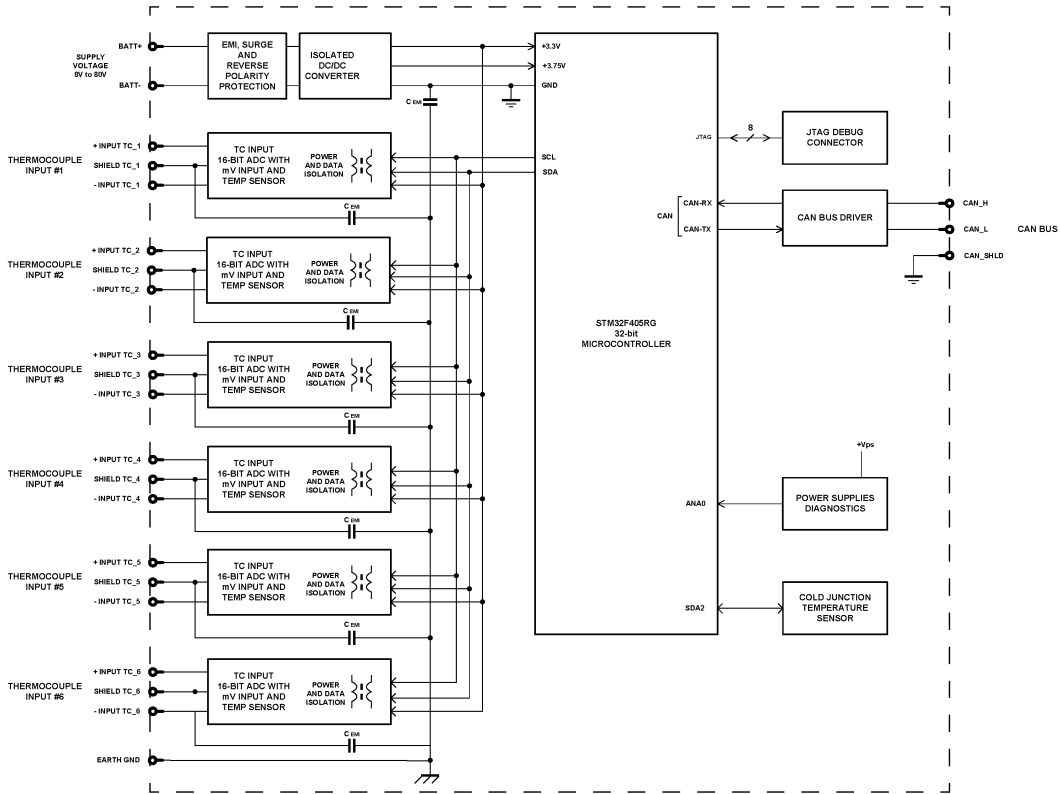
Ordering Part Numbers:

Thermocouple Module, 6 Channels reading Type J, K, B, E, N, R, S or T TC, CANopen®: **AX186001**
Thermocouple Module, 6 Channels reading Type J, K, B, E, N, R, S or T TC, SAE J1939: **AX186000**

EDS File

Accessories:
Mating Plug Kit: **PL-DTM06-12SA-12SB**

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. 6 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 J1939 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
Measurement Rate	The measurement rate is 5 scans/Sec. All channels are measured simultaneously. The update rate is 200 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.
Shield	Four shield connections are provided.
Ground	Four analog ground connections are provided.

General Specifications

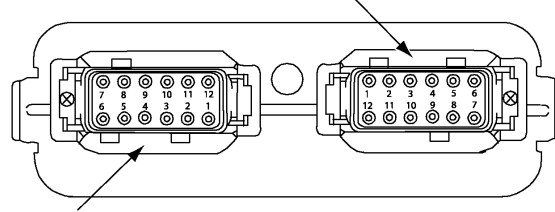| Operating Conditions	-40 to 85°C (-40 to 185°F)
Weight	0.55 lb. (0.25 kg)
Protection	IP67; Unit is conformal coated within the housing.
Vibration	MIL-STD-202G, Test 204D and 214A (Sine and Random) 10 g peak (Sine) 7.68 Grms peak (Random)
Shock	MIL-STD-202G, Test 213B 50 g
Microprocessor	STM32F405RG, 32-bit, 1MByte flash memory
Control Logic	Standard embedded software is provided. *Refer to the user manual for details.* (Application-specific control logic is available on request.)
User Interface	EDS File Standard CANopen® tools
CAN Interface	1 CAN port (CANopen®)
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.
FMI	There are four FMIs associated with each thermocouple channel and include the following functions: High Temperature Shutdown; High Temperature Warning; Low Temperature Warning; and Thermocouple Open Circuit.
Diagnostics	The controller stores diagnostic data in a non-volatile log. There are four diagnostic log entries associated with each input channel. Each entry is a record of the SPN, FMI and OC for any fault that has occurred. There are eight setpoints associated with if and how the ECU will send diagnostic messages for each channel. For more details refer to the user manual.
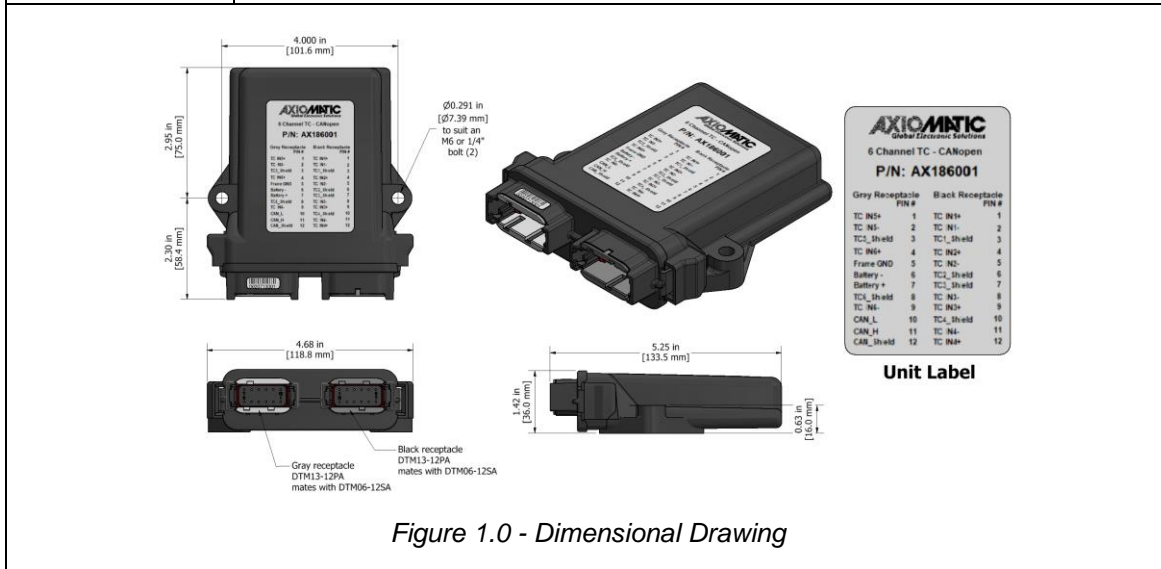
Figure 1.0 - Dimensional Drawing

Electrical Connections	Refer to Table 2.0.

Key Arrangement B (black)

Key Arrangement A (grey)

FRONT VIEW 24 PIN RECEPTACLE

24-pin receptacle (equivalent TE Deutsch P/N: DTM13-12PA-12PB-R008)
Mating plugs kits are available on request, and include equivalents to the TE Deutsch P/Ns:
DTM06-12SA and DTM06-12SB with 2 wedgelocks (WM12S) and 24 contacts (0462-201-20141).
20 AWG wire is recommended for use with contacts 0462-201-20141.

Table2.0 - Typical Connections, AX186001

Grey Connector		Black Connector	
Pin #	Function	Pin #	Function
1	TC IN5+	1	TC IN1+
2	TC IN5-	2	TC IN1-
3	TC 5_Shield	3	TC1_Shield
4	TC IN6+	4	TC IN2+
5	Frame GND	5	TC IN2-
6	Battery -	6	TC2_Shield
7	Battery +	7	TC3_Shield
8	TC 6_Shield	8	TC IN3-
9	TC IN6-	9	TC IN3+
10	CAN_L	10	TC4_Shield
11	CAN_H	11	TC IN4-
12	CAN_Shield	12	TC IN4+

Enclosure and Dimensions	High Temperature Nylon PCB Enclosure - (equivalent TE Deutsch P/N: EEC-325X4B) 4.677 x 5.254 x 1.42 inches 118.80 x 133.45 x 36.00 mm (W x L x H excluding mating plug) Refer to the Dimensional Drawing, Figure 1.0.

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

Form: TDAX186001-06/19/23