Thermocouple Scanner
20 Thermocouple Channels
CANopen®
P/N: AX185001

Description:

The Thermocouple Scanner monitors up to 20 thermocouples and provides the temperature information to the engine control system over CANopen® CAN bus. The channels are independently configurable as Type J, K, B, E, N, R, S or T thermocouples. Temperature information can include exhaust temperature, winding temperature, and fluid temperature monitoring. All 20 channels of temperature data are automatically sent over the CAN bus when power is applied with no additional programming or configuration required. Integral diagnostics determine thermocouple integrity. All inputs are fully isolated from the CAN line, and from the power supply. During set-up, using a USB-CAN converter and a PC, the operator can configure the controller using standard CANopen® tools to suit a wide variety of applications. Settings are saved to non-volatile memory upon command.

The Thermocouple Scanner features rugged packaging and connectors, which are TE Deutsch equivalents, for an IP67 rating.

Applications:

Control systems for industrial and marine power generator sets (stationary or portable)

Ordering Part Number:
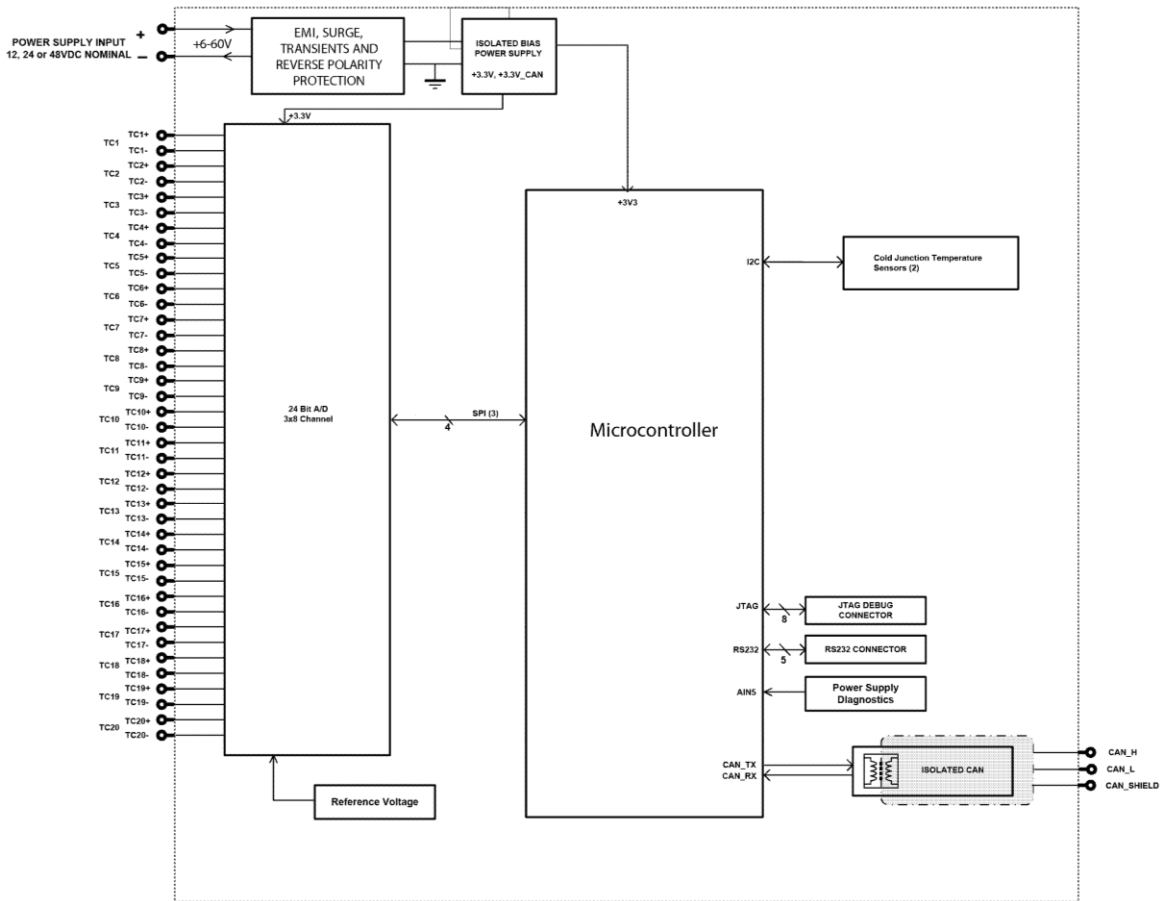
20 Channel Thermocouple Module, CANopen® P/N: **AX185001**
20 Channel Thermocouple Module, SAE J1939 with auto-baud-rate detection P/N: **AX185000**

Accessories:
Mating Plug KIT P/N: **AX070200**
EDS File

Functional 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

Power Supply Input	12 or 24 VDC nominal (9 to 60 VDC power supply range)
Quiescent Current	40 mA @ 12 VDC; 20 mA @ 24 VDC typical
Protection	Reverse polarity protection is provided. Power supply input section protects against transient surges and short circuits and is isolated from thermocouple inputs
Thermocouple Types	Up to 20 channels, independently configurable for B, E, J, K, N, R, S, or T

Thermocouple Inputs	The device reads voltage (mV) signals from the supported Thermocouple types. 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 Resolution: 0.001°C Accuracy: • ±1°C typical with cold junction compensation at ambient temperature (except types J, E, K, N) • Type J: ±1°C up to 600°C and ±3°C beyond 600°C (typical with cold junction compensation) • Type E: ±1°C up to 450°C and ±3°C beyond 450°C (typical with cold junction compensation) • Type K: ±1°C up to 850°C and ±3°C beyond 850°C (typical with cold junction compensation) • Type N: ±1°C up to 950°C and ±3°C beyond 950°C (typical with cold junction compensation)
Scan Rate	Maximum sweep time: 1.5 seconds
Common Mode Readings	Input range: ±2.5 V maximum Rejection: 120 db (maximum) at 2.5 Vp-p (50-60 Hz)
Thermal Drift	4 ppm/°C of span (maximum)
Isolation	Digital isolation is 500 VDC from input to ground. Three-way isolation is provided for the CAN line, inputs, and power supply.
Averaging	Available on Bank 1 (TC1 to TC10), Bank 2 (TC11 to TC20) and Total (All)
Protection	Open circuit detection Frozen data detection Over or under temperature detection High temperature shutdown detection

Communication

| CAN	1 CAN 2.0B port, protocol CANopen® Digital isolation is provided for the CAN line. By default, the Thermocouple Scanner transmits the process value (object $7130) according to the device profile in CiA Standard DS-404.
Network Termination	According to the CAN standard, it is necessary to terminate the network with external termination resistors. The resistors are 120 Ω, 0.25 W minimum, metal film or similar type. They should be placed between CAN_H and CAN_L terminals at both ends of the network.

General Specifications

Microcontroller	STM32F205VG, 32-bit, 1 MB flash memory
Control Logic	User programmable functionality using SDO object access, per CiA DS-301
User Interface	EDS File Standard CANopen® tools (not supplied)
UL and cUL Compliance	Standard for Controllers for Use in Power Production, CAN/ULC 6200, 1st edition
CE/ UKCA Compliance	CE/ UKCA marking 2004/108/EC (EMC Directive) 2011/65/EU (RoHS Directive)
Vibration	7.32 Grms (random)
Operating Temperature	-40°C to 85ºC (-40ºF to 185ºF)
Storage Temperature	-50°C to 120°C (-58°F to 248°F)
Humidity	Protected against 95% humidity non-condensing, 30ºC to 60ºC
Weight	2.2 lbs. (1 kg)
Protection	IP67.
Enclosure and Dimensions	Rugged aluminum housing, stainless steel end plates, neoprene gaskets 5.87 in x 5.7 in x 2.87 in (149 mm x 146 mm x 73 mm)

Electrical Connections	Power and CAN:
	1 8-pin TE Deutsch equivalent connector, P/N: DT13-08PA

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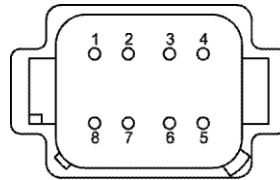
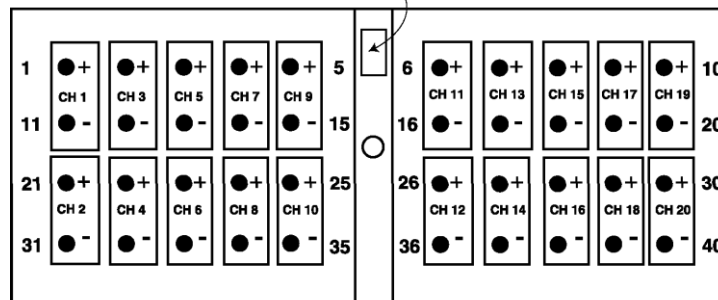| Pin #	Function
1	Power+
2	CAN_H
3	CAN_L
4	Power -
5	SHIELD
6	Not Used
7	Not Used
8	Not Used

Thermocouples:
Type J, K, B, E, N, R, S, or T
1 40-pin TE Deutsch equivalent connector, P/N: DRC13-40PA
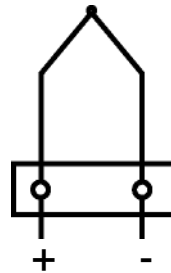
POLARIZING KEY

FRONT VIEW OF
MODULE MOUNTED CONNECTOR
DEUTSCH P/N: DRC13-40PA

Mating Connectors	Mating Plug KIT P/N: AX070200 (This kit includes 1 plug DT06-08SA, 1 plug DRC16-40S, 1 wedgelock W8S, 48 contact sockets 0462-201-16141, and 24 sealing plugs 114017.) These items are also available from a local TE Deutsch distributor. A crimping tool from TE Deutsch is required to connect wiring to the sockets, P/N: HDT 48-00 or equivalent (not supplied). Power and CAN: TE Deutsch equivalent connector, P/N: DT06-08SA, wedgelock W8S and sockets 0462-201-16141 Thermocouples: TE Deutsch equivalent connector, P/N: DRC16-40SE-A, or DRC18-40SA, or DRC16-40S with sockets 0462-201-16141
Mounting	It can be mounted directly on the power generator set or remotely.

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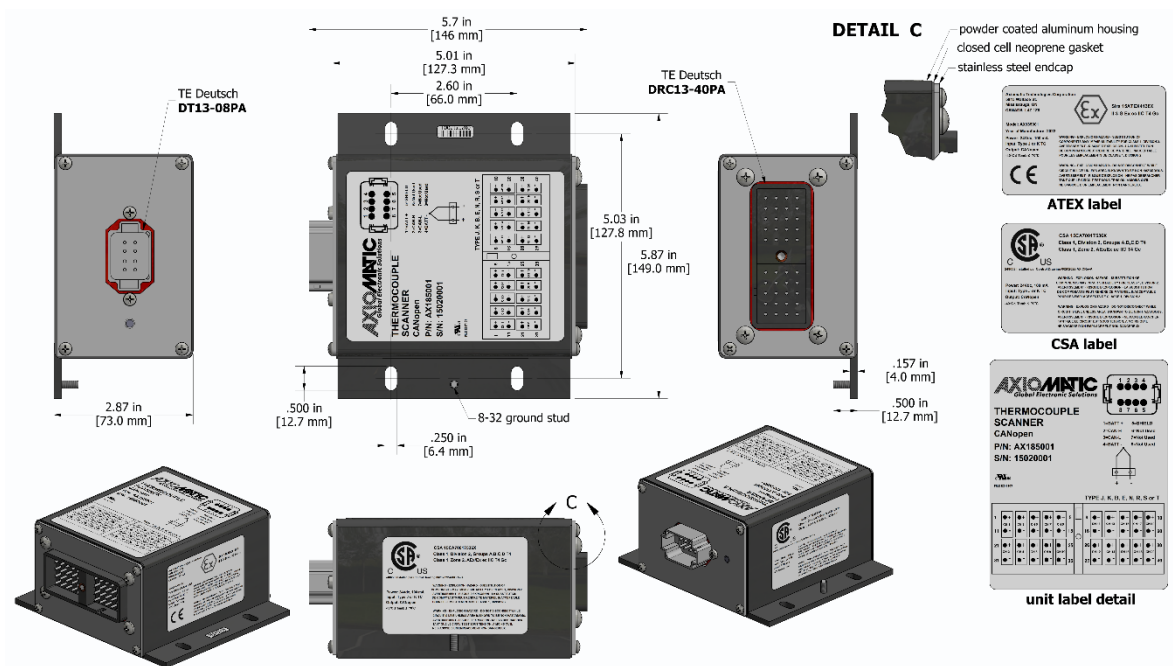
Note: CANopen® is a registered community trademark of CAN in Automation e.V.

Form: TDAX185001-07/21/23