TECHNICAL DATASHEET #TDAX185000-10

Thermocouple Scanner

20 Thermocouple Channels
CAN 2.0B (250 kbps)
Interfaces with ComAp controllers
Can be used in place of ComAp CA171000

P/N: AX185000-10

Description:

The Thermocouple Scanner monitors up to 20 thermocouples and provides the temperature information to the engine control system over SAE J1939 CAN bus. The controller has a baud-rate of 250 kbps for CAN communication. The input channels are independently configurable as Type J, K, B, E, N, R, S, or T thermocouples. Temperature information can include exhaust 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 via the Axiomatic Electronic Assistant 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)
- Interfaces with ComAp controllers (It can be used in place of the discontinued CA171000. See user manual UMAX185000-10 for details.)

Ordering Part Number:

20-Channel Thermocouple Module, SAE J1939, 250 kbps, P/N: **AX185000-10**

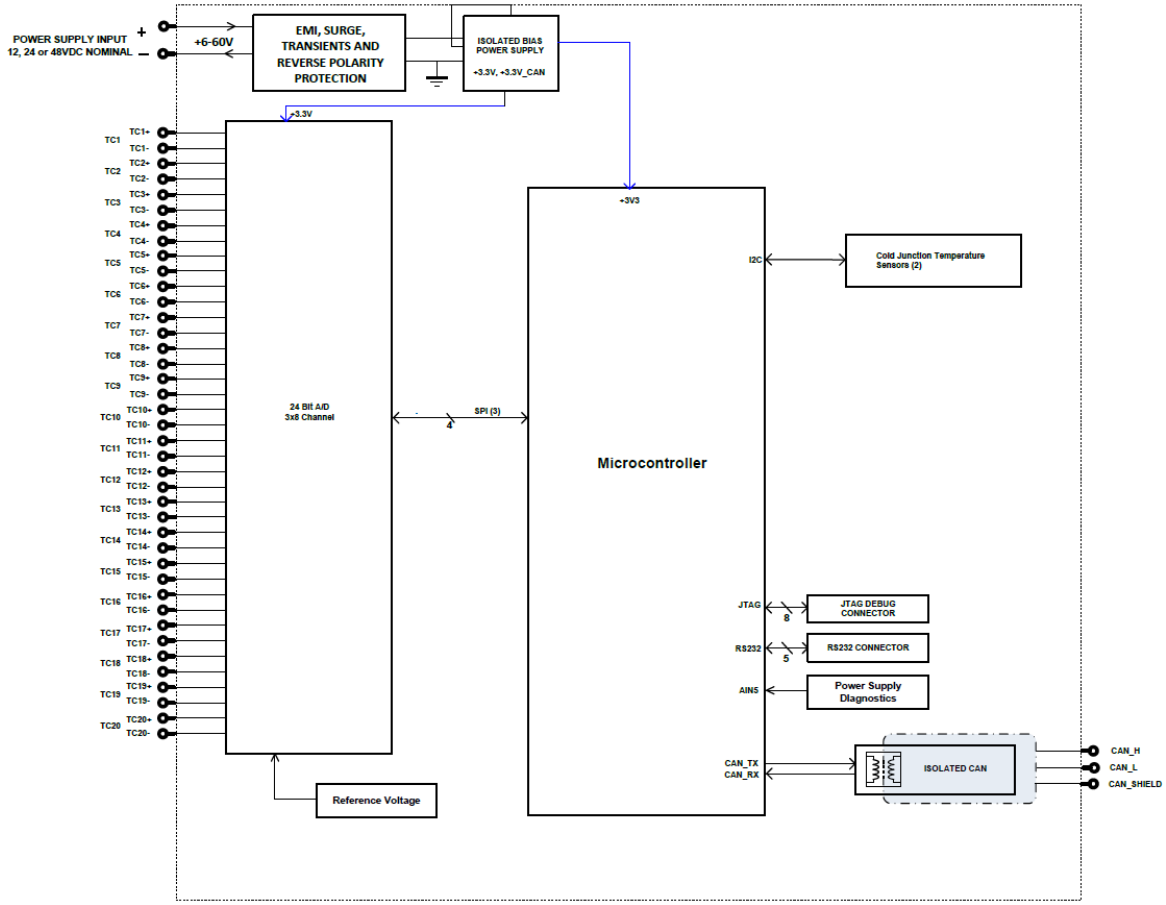
Accessories:
Mating Plug KIT P/N: **AX070200**

Axiomatic Electronic Assistant Configuration KIT, P/Ns: **AX070502** or **AX070506K**

Axiomatic Technologies Oy
Höytämöntie 6
33880 LEMPÄÄLÄ, Finland
Tel. +358 103 375 750
salesfinland@axiomatic.com
www.axiomatic.fi

Axiomatic Technologies Corporation
1445 Courtneypark Dr. E.
Mississauga, ON Canada L5T 2E3
Tel. 1 905 602 9270
sales@axiomatic.com
www.axiomatic.com

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 Temperatures are configured to indicate the SAE J1939 SPN to be transmitted by that temperature input. 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	The average temperature of all the active channels can be sent on a data message.
Protection	Open circuit detection Frozen data detection

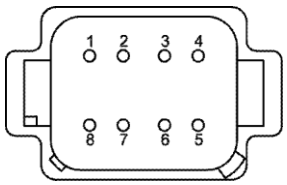
Communication

CAN	1 CAN port (2.0B, SAE J1939) 250 kbit/s baud-rate Digital isolation is provided for the CAN line.
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

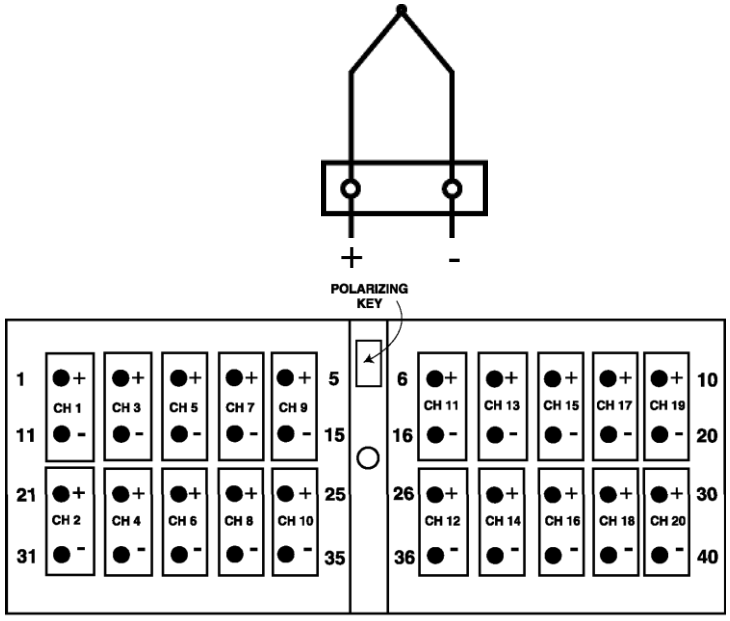
Microcontroller	STM32F205VG, 32-bit, 1 MB flash memory
Control Logic	User programmable functionality with the Axiomatic Electronic Assistant (EA) • Node address is auto configurable as per J1939-81 and/or via customer configuration. • Monitored parameters and diagnostics are user selectable from a drop-down list in the EA. • Monitored parameters and diagnostics are read-only over the network. • Units are pre-configured with default values at the factory. Refer to the user manual. • All parameter locations have default values that do not conflict. • Module is fully functional during configuration and communications. • Parameter values and diagnostic error codes are retained when the modules are de-energized. • Configurable ECU Instance in the NAME to allow for multiple ECU's on the same network

<table>
<tr><td>SAE J1939 Profile</td><td>For J1939 compliance (SAE, Recommended Practice for a Serial Control and Communications Vehicle Network, October 2007), all modules comply with the applicable portions of the following.
SAE J1939-21, Dec 2006, Data Link Layer
SAE J1939-71, Sep 2013, Application Layer
SAE J1939-73, Feb 2010, Application Layer – Diagnostic
SAE J1939-81, March 2017, Network Management
Customer specific proprietary extensions can also be included in the SAE J1939 profile on request.</td></tr>
<tr><td>User Interface</td><td>Axiomatic Electronic Assistant, P/Ns: AX070502 or AX070506K
Updates for the EA are found on www.axiomatic.com</td></tr>
<tr><td>UL and cUL Compliance</td><td>Standard for Controllers for Use in Power Production, CAN/ULC 6200, 1st edition</td></tr>
<tr><td>CE/ UKCA Compliance</td><td>CE/ UKCA marking
2004/108/EC (EMC Directive)
2011/65/EU (RoHS Directive)</td></tr>
<tr><td>Vibration</td><td>7.32 Grms (random)</td></tr>
<tr><td>Operating Temperature</td><td>-40°C to 85ºC (-40ºF to 185ºF)</td></tr>
<tr><td>Storage Temperature</td><td>-50°C to 120°C (-58°F to 248°F)</td></tr>
<tr><td>Humidity</td><td>Protected against 95% humidity non-condensing, 30ºC to 60ºC</td></tr>
<tr><td>Weight</td><td>2.2 lb. (1 kg)</td></tr>
<tr><td>Protection</td><td>IP67</td></tr>
<tr><td>Enclosure and Dimensions</td><td>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)
Refer to Figure 1.0.</td></tr>
<tr><td>Mating Connectors</td><td>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).

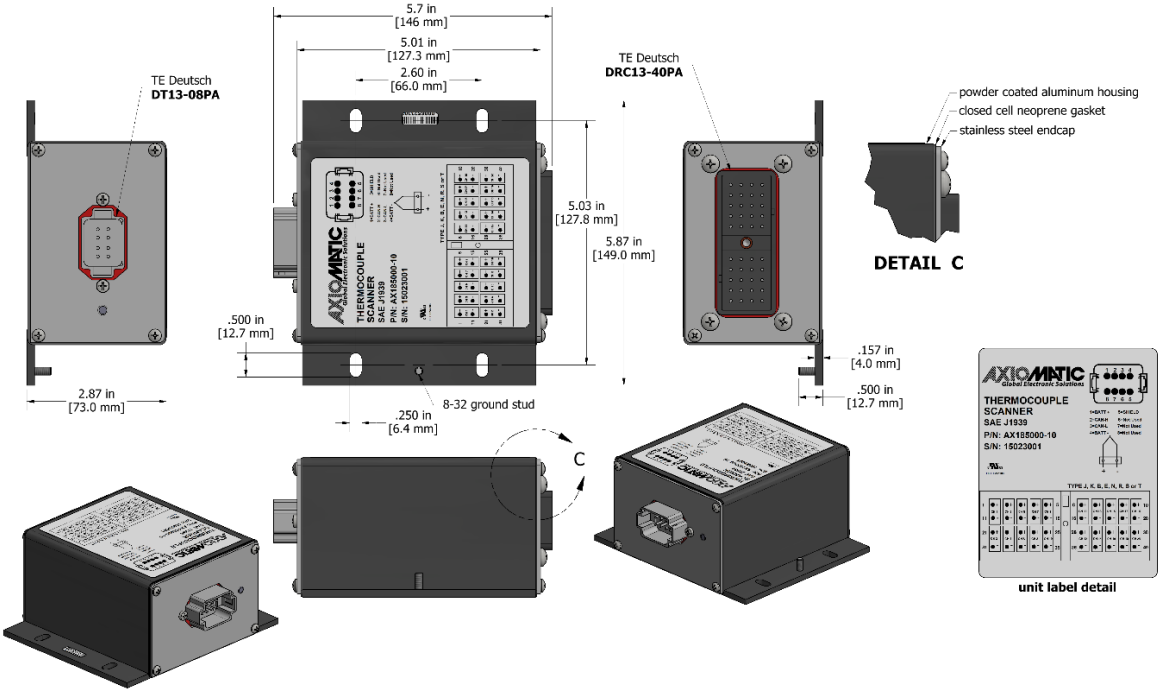
<u>Power and CAN:</u>
TE Deutsch equivalent connector, P/N: DT06-08SA, wedgelock W8S and sockets 0462-201-16141
<u>Thermocouples:</u>
TE Deutsch equivalent connector, P/N: DRC16-40SE-A, or DRC18-40SA, or DRC16-40S with sockets 0462-201-16141</td></tr>
<tr><td>Mounting</td><td>It can be mounted directly on the power generator set or remotely.</td></tr>
<tr><td>Electrical Connections – Power and CAN</td><td><u>Power and CAN:</u>
1 8-pin TE Deutsch connector, P/N: DT13-08PA
 

<table>
<tr><th>Pin #</th><th>Function</th></tr>
<tr><td>1</td><td>Power+</td></tr>
<tr><td>2</td><td>CAN_H</td></tr>
<tr><td>3</td><td>CAN_L</td></tr>
<tr><td>4</td><td>Power -</td></tr>
<tr><td>5</td><td>SHIELD</td></tr>
<tr><td>6</td><td>Not Used</td></tr>
<tr><td>7</td><td>Not Used</td></tr>
<tr><td>8</td><td>Not Used</td></tr>
</table></td></tr>
</table>

Electrical Connections – Thermocouple Inputs	Thermocouple Inputs: Type J, K, B, E, N, R, S, or T 1 40-pin TE Deutsch connector, P/N: DRC13-40PA



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



unit label detail

Figure 1.0 – Dimensional Drawing