

## Diesel Engine Temperature Monitoring Controls Thermocouple Module P/N: TC20

The Thermocouple Module monitors up to 20 channels of Type J or K thermocouples. The temperature information is provided to the engine control system over SAE J1939 CAN bus. 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 and thermocouple inputs are isolated from each other. CAN communications are via an isolated CAN interface with SAE J1939 protocol. A RS-232 interface allows for quick user adjustments using Windows HyperTerminal or other similar terminal software. Settings are saved to non-volatile memory upon command. The Thermocouple module features rugged packaging and watertight Deutsch IPD connectors. It is UL and cUL recognized to UL508 and C22.2 No. 142-M1987. For hazardous location certifications, contact Axiomatic. Applications include power generator sets.



### General Specifications

- Reads up to 20 Type J or K thermocouple inputs
- Burden is limited to less than 200 mA. Inrush does not exceed 800 mA.
- Temperatures are configured to indicate the SAE J1939 SPN to be transmitted by that temperature input. Suspect Parameter Numbers (SPNs) for configuration of temperature inputs are customer specific. One byte parameters have a resolution of 1 °C / bit 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. (as per SAE J1939 Standard)
- Common mode rejection is -80 db@ 5V p-p (50-60 Hz)
- Common mode input range is +/- 4 V minimum
- Isolation voltage is 1500 Vac (rms) or 2550V for 1 sec.
- System throughput has all 20 channels scanned in 2 seconds (100 mSec./channel).
- Overall drift with temperature is 150ppm/°C of span (maximum)
- Cold junction compensation is provided
- Thermocouple input resolution is 1 °C
- Accuracy is +/-1 °C throughout the entire range of the thermocouple input
- Three way isolation is provided for the CAN line, inputs and power supply.
- Monitored parameters and diagnostics as well as setpoints are supplied by customer specification
- UL recognized component

### Power Supply Input

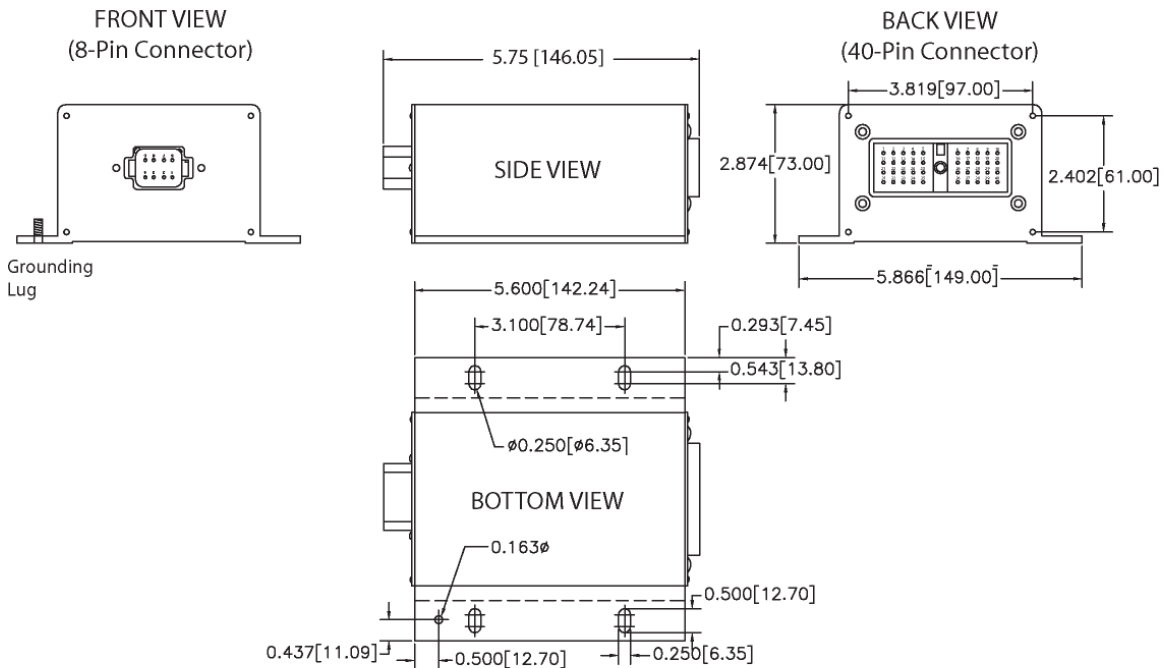
- Accepts 5...32VDC power (12 or 24VDC nominal)
- Overvoltage capability is 32VDC for 1 hour @ 85°C
- Power supply input section protects against transient surges and short circuits and is isolated from thermocouple inputs

### Ordering Part Numbers:

SAE J1939 version
Thermocouple Module P/N: <b>TC20</b>
Mating Plug Kit: <b>AX070200</b> (8 pin socket, wedge, 8 contacts + 40 pin unkeyed socket, 40 contacts)

## Packaging and Dimensions

- Can be mounted directly on the power generator set or remotely
- Compact size (see mechanical drawing)
- Encapsulated in a rugged aluminum housing with watertight Deutsch connectors (IP65 rating for non hazardous locations)
- Suitable for moist, high shock and vibration environments
- Designed to be mounted directly on an engine without vibration isolators
- -40 to 85 deg C (-40 to 185 deg F) operating temperature range (For ambient temperatures exceeding 85°C, the temperature scanner may deviate in accuracy an additional  $\pm 1^\circ\text{C}$ . Note also if the ambient temperature were to exceed 120°C, the device would NOT be expected to return to proper operation.)
- The ambient storage temperature range is -50°C to +120°C.
- It is protected against 95% humidity non-condensing, 30°C to 60°C.



Dimensions: inches [mm]

## Regulatory Compliance

- UL and cUL recognized to UL508 and C22.2 No. 142-M1987
- Certified as a component for use in other equipment
- Designed to be suitable for use in hazardous locations but does not currently carry the certification (Contact Axiomatic for details.)
- Suitable for use in non-hazardous locations
- Suitable field wiring for the rated voltage and current must be used.
- Must meet applicable electrical codes suitable for the jurisdiction and for hazardous locations. This device does not provide energy-limited circuits.
- For hazardous locations, the unit must be installed in a suitable enclosure rated to at least IP54 as defined in EN60529 and IEC 60529 and used within their rated electrical and environmental ratings. (The unit carries an IP65 rating without an enclosure for non-hazardous locations.)
- $-40^\circ\text{C} \leq T_{\text{amb}} \leq 85^\circ\text{C}$
- Must be installed with Deutsch IPD mating plugs, DT06-8S and DRC16-40S or DRC18-40S for the supply receptacle and the thermocouple interface receptacle, respectively.
- Rating of connection cables must be at least 85°C
- For ambient temperatures below  $-10^\circ\text{C}$  and above  $+70^\circ\text{C}$  use field wiring suitable for both minimum and maximum ambient temperature.
- The end user must provide an overcurrent protection device rated at a minimum 32VDC, maximum 3A.

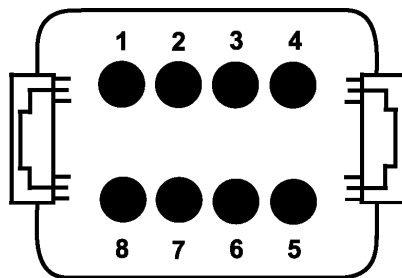
## Network Communications Interface

- Incorporates an SAE J1939 communications port with software selectable slew rate on the transceiver
- Has two configurable “slew rates” to accommodate different CAN (SAE J1939) connections (capable of working both on the standard J1939 link between an engine controller and a generator controller, and on an J1939 accessory module link from a generator controller in power generation applications).
- Other communication protocols are available on request.
- Node address is auto configurable as per J1939-81 and/or via customer configuration.
- Optical isolation is provided for the CAN line
- Retains current date and time relative to synchronization every 24 hours (or upon boot up) with equipment system time via an explicit command from the master I/O (provided by others) or service tool when master I/O is not available – synchronization time is accurate to within 1 sec.
- Includes a watchdog timer to require a reboot when the microprocessor locks
- Monitored parameters and diagnostics as well as setpoints are supplied by customer specification
- Monitored parameters and diagnostics are read-only over the network
- 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.
- Configuration is accomplished using RS-232. A customer’s proprietary service tool, using the J1939 network, can be accommodated.

## SAE J1939 Profile

- For J1939 compliance, all modules comply with the applicable portions of the following:  
SAE J1939-21, April 2001, Data Link Layer  
SAE J1939-71, December 2003, Application Layer  
SAE J1939-73, June 2001, Application Layer – Diagnostic  
SAE J1939-81, May 2003, Network Management
- Customer specific proprietary extensions can also be included in the SAE J1939 profile.
- All module functionality can be divided into three distinctive parts: basic functionality, extended functionality and auxiliary functionality.
- Contact the manufacturer for further details on the communications.

## Typical Connections – Power and CAN bus:



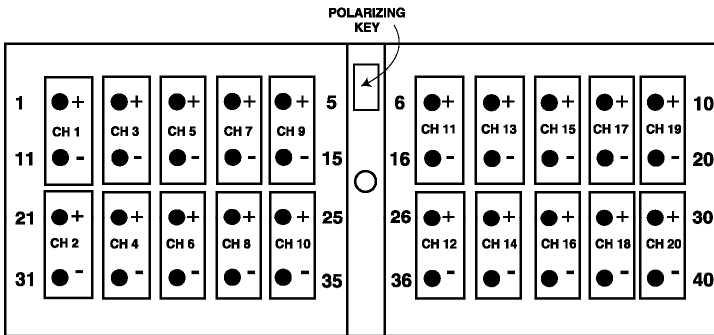
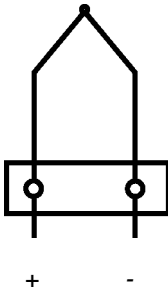
- |           |                |
|-----------|----------------|
| 1 = PWR+  | 5 = SHIELD     |
| 2 = CAN-H | 6 = RS-232 GND |
| 3 = CAN-L | 7 = RS-232 TXD |
| 4 = PWR-  | 8 = RS-232 RXD |

**FRONT VIEW  
MODULE MOUNTED CONNECTOR  
DEUTSCH P/N: DT13-08PA**

(Mating plug is DT06-08SA with wedge W8S and sockets 0462-201-16141)

**Typical Connections – Thermocouple:**

Type J or K



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

**Mating Connector Part Number:** Deutsch IPD p/n DRC16-40SA with sockets 0462-201-16141

*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 [www.axiomatic.com/service.html](http://www.axiomatic.com/service.html).*

Form: TD5103AX-03/01/10