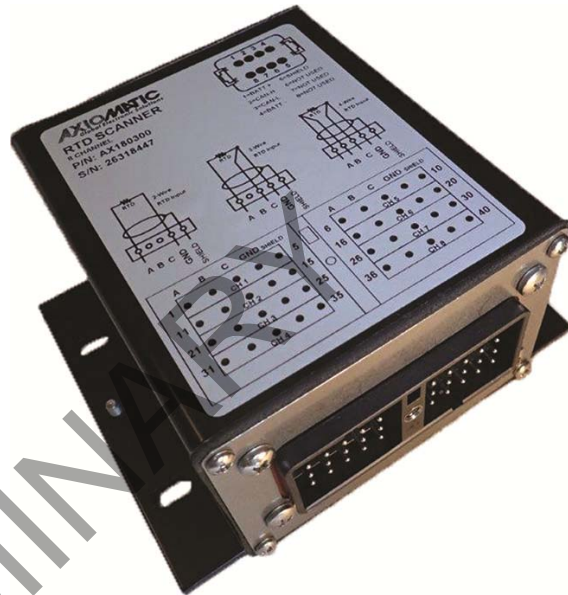


**Preliminary**  
**Technical Datasheet #TDAX180300**  
**RTD Scanner**  
**8 RTD Channels**  
**CAN, SAE J1939**  
**with Electronic Assistant**  
**P/N: AX180300**

**Description:** The RTD Scanner monitors 8 RTD inputs (PT100) from a diesel engine and the temperature information is provided to the engine control system over a SAE J1939 CAN bus. Temperature information can include exhaust temperature, winding temperature, and fluid temperature monitoring. All 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 RTD integrity. RTD inputs are isolated from the CAN communication and power supply. During set-up, using an USB-CAN converter and a PC, the operator can configure the controller via the Electronic Assistant to suit a wide variety of applications.



The RTD Scanner features rugged packaging and watertight TE Deutsch connectors for an IP67 rating. *The control carries a CE mark for the EMC and RoHS Directives. The AX180300 meets the environmental, EMC and vibration requirements of generator set applications in marine installations. (pending)*

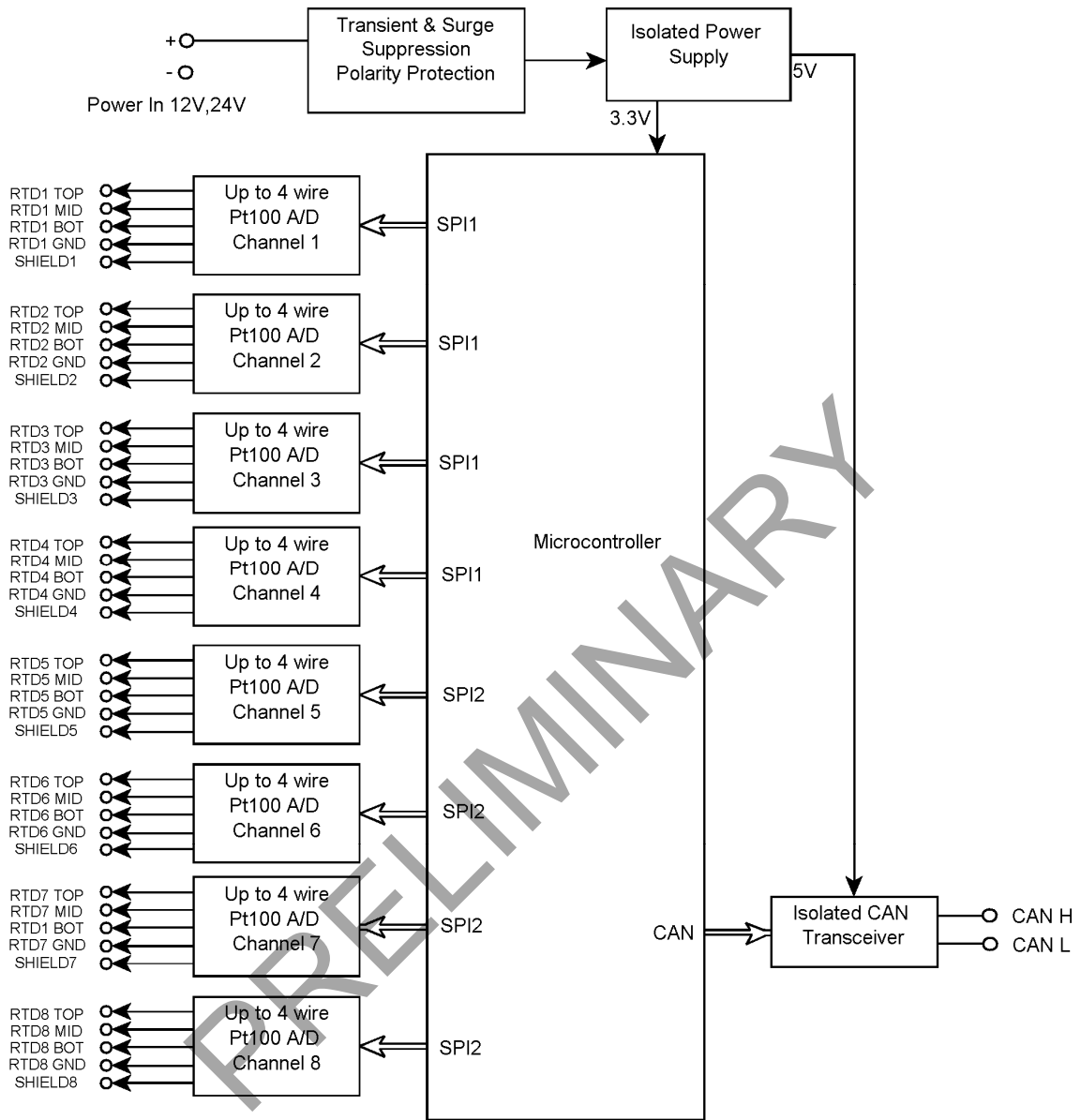
**Applications:**

- Stationary, portable power generator sets
- Genset control systems

**Ordering Part Numbers:**

RTD Module, SAE J1939 P/N: <b>AX180300</b> <i>A CANopen® model is available under ordering P/N: AX180301.</i>
Electronic Assistant – P/N: <b>AX070502</b>
Mating Plug Kit P/N: <b>AX070200</b>

## Block Diagram



## Technical Specifications

### Inputs

Power Supply Input	12V or 24Vdc or 48 Vdc nominal (8...65 Vdc power supply range) 50 or 60 Hz is user selectable.
Supply Current	200 mA at 12 V Typical 100 mA at 24 V Typical Inrush does not exceed 800 mA.
Protection	Reverse polarity protection is provided. Power supply input section protects against transient surges and short circuits and is isolated from RTD inputs
RTD Types	Up to 8 channels, independently configurable for 2 or 3 wire RTDs.
RTD Inputs	Each channel independently supports specific sensors IEC 0.00385, JIS 0.003916, US 0.003902, Legacy 0.003920, SAMA 0.003923. A user defined coefficient would enable custom Callendar-Van Dusen constants to be set for sensors not listed above. The device accepts inputs within the following range of 20 - 400 Ohms.  Accuracy: +/- 0.4°C typical at ambient temperature Resolution: 0.001°C Isolation voltage is 1500 Vac (rms) or 2550V for 1 sec.
Scan Rate	100ms per channel, total sweep time maximum 900 ms.
Common Mode Readings	Input range +/- 4V maximum Rejection is 100db at 5Vp-p (50-60Hz)
Thermal Drift	150 ppm/°C of span (maximum)
Isolation	Digital isolation is 400VDC from input to ground. Three way isolation is provided for the CAN line, inputs and power supply
SPNs and PGNs	The SPN drop list includes all temperature SPNs from the J1939-71 standard published up to January of 2009. If an SPN is not supported by the drop list, the user can select a zero SPN, which then allows them to define the SPN and PGN per the application requirements.  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 (per SAE J1939).  The Parameter Group Number (PGN) that will be used to send a temperature to the J1939 network will be entirely dependent on the Suspect Parameter Number (SPN) that was selected for that channel. In all cases, the PGN is a PDU2 type. Each PGN has a predefined priority and repetition rate associate with it.
Averaging	The average temperature of all the active channels can be broadcasted to the network using the default "Engine Average Information" PGN, or on a Proprietary B message.
Protection	Open circuit detection Frozen data detection Over or under temperature detection High temperature shutdown detection

### Communication

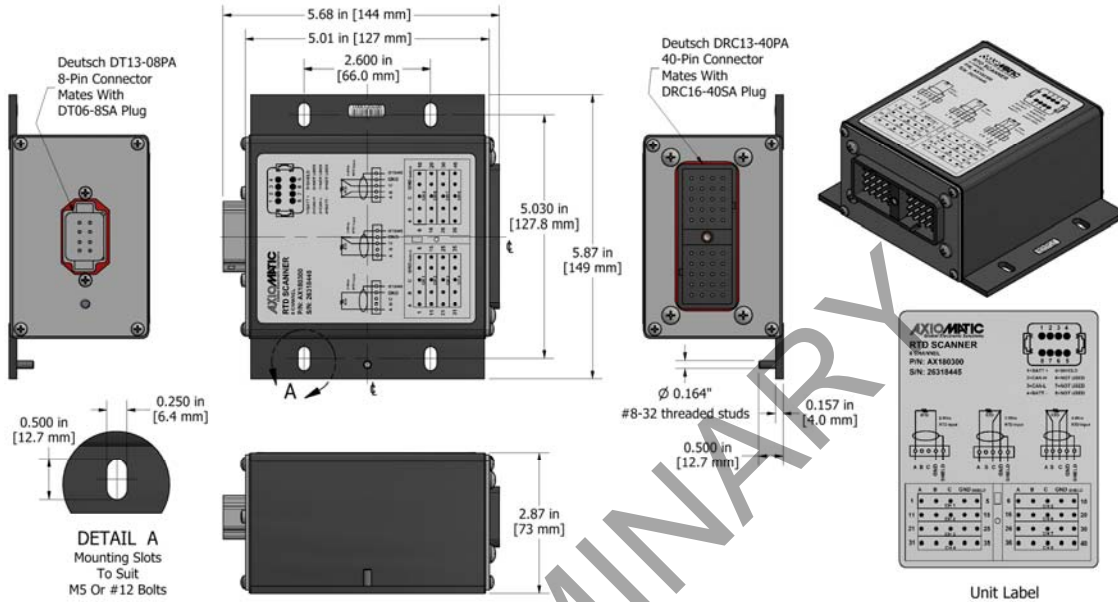
CAN	1 CAN 2.0B port, protocol SAE J1939 Digital isolation is provided for the CAN line.
Network Termination	According to the CAN standard, it is necessary to terminate the network with external termination resistors. The resistors are 120 Ohm, 0.25W minimum, metal film or similar type. They should be placed between CAN_H and CAN_L terminals at both ends of the network.

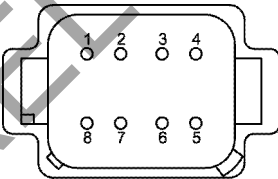
## General Specifications

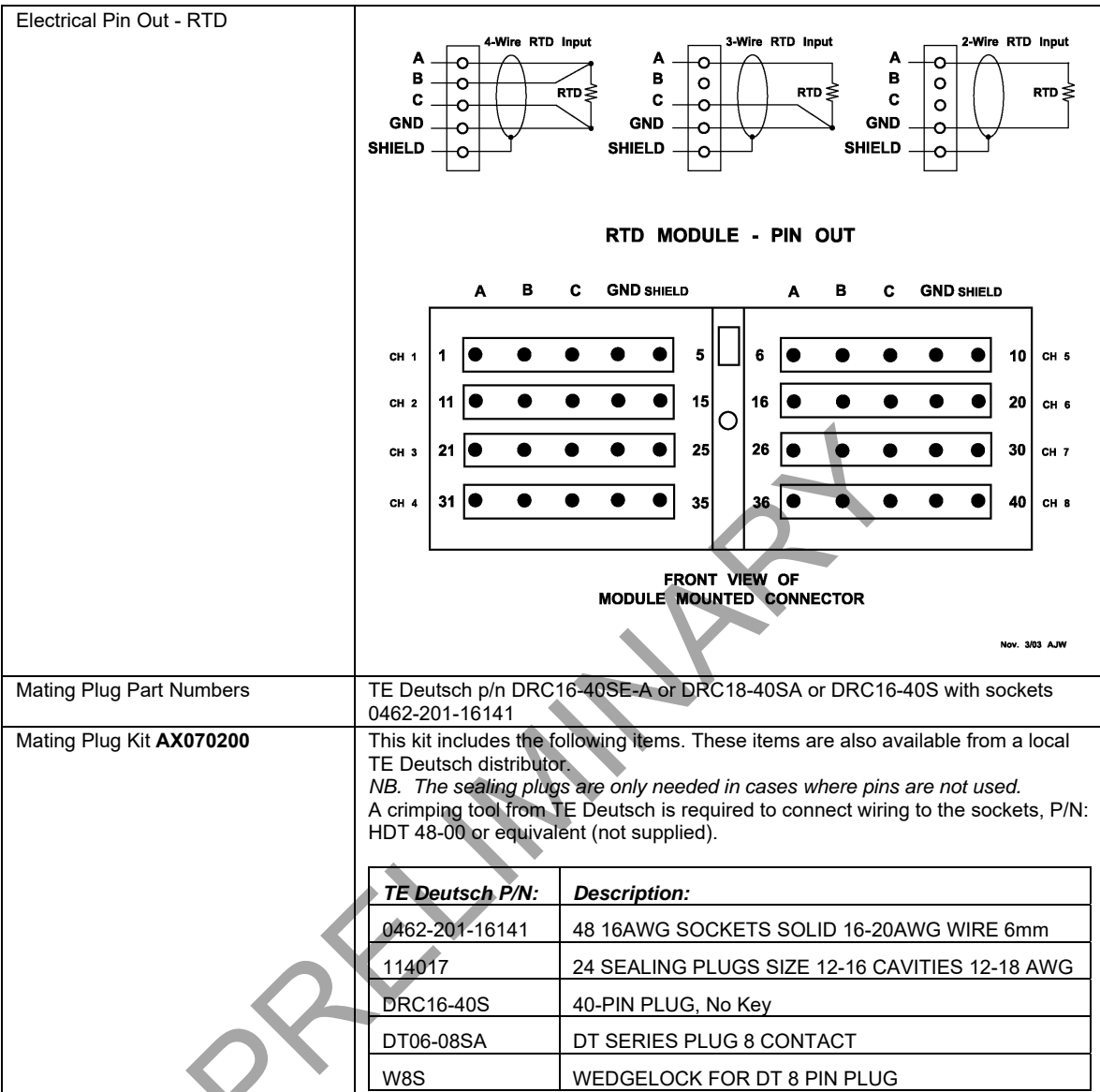
Microprocessor	STM32F413CGU6, 1.5MB Flash, 320KB RAM
Control Logic	<p>User programmable functionality with the Electronic Assistant:</p> <ul style="list-style-type: none"> <li>• Node address is auto configurable as per J1939-81 and/or via customer configuration.</li> <li>• Monitored parameters and diagnostics are user selectable from a drop down list in the EA. Monitored parameters and diagnostics are read-only over the network</li> <li>• All parameter locations have default values that do not conflict. Units are pre-configured with default values at the factory. Refer to the user manual.</li> <li>• Parameter values and diagnostic error codes are retained when the modules are de-energized.</li> <li>• Easily selectable SPNs from a drop down list of the temperature SPNs supported by SAE J1939.</li> <li>• User defined SPN and PGN's configurable with Electronic Assistant® to suit the application.</li> <li>• Configurable ECU Instance in the NAME to allow for multiple ECU's on the same network</li> <li>• The bit-rate is 250 kbit/s. Other bit-rates (125 kbit/s, 500 kbit/s or 1 Mbit/s) can be factory programmed on request. Contact Axiomatic for an ordering p/n.</li> <li>• Module is fully functional during configuration and communications.</li> </ul>
SAE J1939 Profile	<p>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:</p> <p>SAE J1939-21, December 2006, Data Link Layer  SAE J1939-71, January 2009, Vehicle Application Layer  SAE J1939-73, September 2006, Application Layer – Diagnostics  SAE J1939-81, May 2003, Network Management</p> <p><i>Customer specific proprietary extensions can also be included in the SAE J1939 profile on request.</i></p>
Diagnostics	<p>Configurable Diagnostic Messaging parameters</p> <p>Diagnostic Log is maintained in non-volatile memory.</p> <p>Each RTD channel can be configured to send diagnostic messages to the network if the temperature goes out of range.</p> <p>When sending an "Active Diagnostic Trouble Code" (DM1) or a "Previously Active Diagnostic Trouble Codes" (DM2) message, the controller will use the appropriate Diagnostic Trouble Code (DTC). As defined by the standard, this is a combination of the Suspect Parameter Number (SPN), the Failure Mode Indicator (FMI), Occurrence Count (OC) and the SPN Conversion Method (CM).</p>
User Interface	<p>Electronic Assistant, P/N: AX070502</p> <p>Updates for the EA are found on <a href="http://www.axiomatic.com">www.axiomatic.com</a> under the log-in tab.</p>
UL and cUL Compliance	<p>pending</p> <p>UL508 (April 2010) (FTPM2) – Controls for Stationary Engine Driven Assemblies  cUL C22.2 No. 14-10 (2010)</p>
CE Compliance	<p>Pending</p> <p>2004/108/EC (EMC Directive)  2011/65/EU (RoHS Directive)</p>
Vibration	<p>Pending</p> <p>11.48 G for a device rigidly mounted to a generator housing  <i>The marine type approval process tested to 4,0 G per IEC 60068-2-6, Test Fc.</i></p>
Marine Type Approval	Pending
Operating Temperature Range	-40 to 85 °C (-40 to 185 °F)
Storage Temperature Range	-50 to 120 °C (-58 to 248 °F)
Humidity	Protected against 95% humidity non-condensing, 30 °C to 60 °C
Protection	<p>IP67, Pollution Degree 3 per UL508</p> <p><i>The marine type approval process tests to IP56.</i></p>
Weight	2.2 lbs. (1.00 kg) (preliminary)

Enclosure	Rugged aluminum housing, stainless steel end plates, neoprene gaskets 145.30 x 149.00 x 73.00 mm (5.72 x 5.86 x 2.87") L x W x H Connectors, TE Deutsch P/N: 1 8-pin DT13-08PA, 1 40-pin DRC13-40PA Can be mounted directly on the power generator set or remotely Suitable for moist, high shock, vibrating and non-hazardous environments
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**Dimensional Drawing**



Electrical Pin Out – Power and CAN	<p>1 TE Deutsch DT13-08PA connector</p>  <table border="1" data-bbox="714 1365 1071 1596"> <thead> <tr> <th>PIN</th> <th>Function</th> </tr> </thead> <tbody> <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>Not Used</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> </tbody> </table>	PIN	Function	1	Power +	2	CAN H	3	CAN L	4	Power -	5	Not Used	6	Not Used	7	Not Used	8	Not Used
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Mating Plug Part Numbers	TE Deutsch DT06-08SA, Wedglock W8S, 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).

TDAX180300-11/25/20