TECHNICAL DATASHEET #TDAX030341

12 Digital Signal, 1 TC Inputs CAN Controller

12 Digital Signal Inputs
3 Universal Signal Inputs
1 TC Input
+5V Reference
CANopen®

P/N: AX030341

Features:

- 12 digital inputs are user selectable from the following.
  - 9 Digital Inputs
  - 3 Digital/PWM Inputs
- 3 universal signal inputs are selectable as: Voltage, Current, Resistance, Frequency, PWM or Digital.
- +5 V Reference to power sensors
- 1 TC input
- 12V, 24V or 48Vdc input power (nominal) with rugged surge protection
- 1 CAN CANopen® port
- IP67
- CE/UKCA marking

Applications:

- Engine controls for power generation, co-generation, stationary power
- Engine controls for commercial vehicles, off-highway equipment, etc.

Ordering Part Numbers:

12 Digital Signal Inputs, 1 TC Input Controller, CANopen®: **AX030341**
EDS File

12 Digital Signal Inputs, 1 TC Input Controller, SAE J1939, Auto-baud-rate Detect: **AX030340**

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

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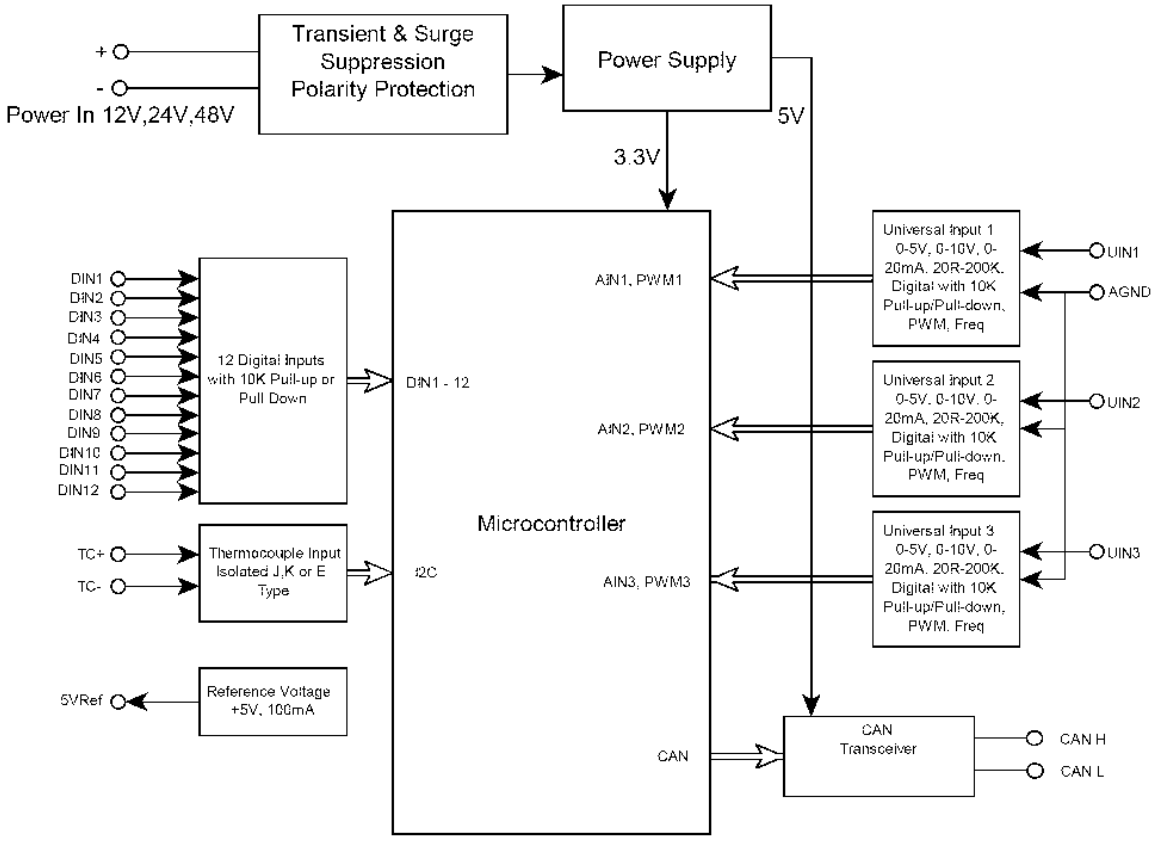
BLOCK DIAGRAM



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/.

Power:

Power Supply Input	12V, 24V, 48Vdc nominal (8…80Vdc power supply range)
Surge and Transients	Surge and transient protection up to 120 V is provided.
Reverse Polarity	Reverse polarity protection is provided up to -80V.
Under-voltage	Under-voltage protection is provided. Hardware shuts down at 6V.
Over-voltage	Over-voltage protection is provided. Hardware shuts down at 85 V.
Quiescent Current	69mA@12V, 36mA@24V
+5V Reference	One +5VDC, +/- 0.5%, 100mA maximum

Inputs:

Digital Inputs	9 Digital Signal Inputs 3 Digital/PWM Inputs Refer to Table 1.0.
Universal Inputs	3 Universal Signal Inputs selectable as Voltage, Current, Resistance, Frequency, PWM or Digital Refer to Table 2.0.

TC Input	One (1) Type B, E, J, K, N, R, S and T The device reads mV signals from the supported Thermocouples. B = 0 to13.82mV E = -9.835 to 76.373 mV J = -8.095 to 69.553 mV K = -6.458 to 54.886 mV N = -4.345 to47.513mV R = -0.226 to 21.101mV S = -0.236 to 18.693mV T = -6.258 to 20.872mV (Other TC types are available on request.)
Resolution	Temperature data is measured with a resolution of 0.1 °C.
Drift	Overall drift with temperature is 50ppm/°C of span (maximum).
Accuracy	+/-1 °C throughout the entire range of the thermocouple input
Input Functionality	Temperature is measured in °C. The input sends a message to the CAN bus.
Measurement Rate	The measurement rate is 5 scans/Sec. 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.
Ground	2 signal ground connections are provided.

Table 1.0 – Digital Inputs	
Digital Inputs	Up to 12 digital inputs are selectable by the user from the following. • 9 Digital Inputs • 3 PWM/Digital Inputs The digital inputs can be configured for any one of the following options. • Disable Input • Digital Input In addition, Digital Input 5, 7 and 8 are configurable as the following. • PWM Signal (Frequency: 1-10,000Hz, 0-100% D.C.) • Frequency • Pulse Counter Pull up/ Pull down 10 KOhm Input voltage maximum is +Vps.
Protection	Protected against shorts to GND or +Vsupply

Table 2.0: Universal Inputs

<table>
<tr><td>Parameter</td><td>Value</td></tr>
<tr><td>Universal Inputs</td><td>Three (3) Universal Signal Inputs are provided.</td></tr>
<tr><td>Analog Input Modes</td><td>Voltage, Current, Resistance</td></tr>
<tr><td>Voltage Input</td><td>
<table>
<tr><th>Input Range</th><th>Input Impedance</th><th>Resolution</th><th>Accuracy</th></tr>
<tr><td>0…5V</td><td>204 kOhm</td><td>12-bit</td><td>+/- 0.1%</td></tr>
<tr><td>0…10V</td><td>153 kOhm</td><td>12-bit</td><td>+/- 1%</td></tr>
</table>
</td></tr>
<tr><td>Current Input</td><td>
<table>
<tr><th>Input Range</th><th>Input Impedance</th><th>Resolution</th><th>Accuracy</th></tr>
<tr><td>0…20mA</td><td rowspan="2">124Ohm</td><td rowspan="2">12-bit</td><td rowspan="2">+/- 0.01%</td></tr>
<tr><td>4…20mA</td></tr>
</table>
</td></tr>
<tr><td>Resistive Input</td><td>
<table>
<tr><th>Input Range</th><th>Resolution</th><th>Accuracy</th></tr>
<tr><td>Auto Range
20…250kOhm[1]</td><td>12-bit</td><td>-</td></tr>
</table>
[1] Resistance <20 Ohm is measured as 0.
</td></tr>
<tr><td>Analog Update Rate</td><td>1ms minimum[1].
[1] Depends on the analog filter settings. In resistive mode also depends on the number of resistive inputs.</td></tr>
<tr><td>Digital Input Modes</td><td>Discrete Voltage Level, Frequency, PWM Duty Cycle</td></tr>
<tr><td>Input Polarity</td><td>Active High, Active Low</td></tr>
<tr><td>Input Impedance</td><td>>1MOhm, High Z, 10kOhm pull down, 10kOhm pull-up to +6V</td></tr>
<tr><td>Amplitude</td><td>Amplitude: 3.3V to +Vsupply</td></tr>
<tr><td>Input Level</td><td>5V CMOS Compatible. A direct connection to the power supply is acceptable.</td></tr>
<tr><td>Discrete Voltage Level Input</td><td>1ms sampling rate. Configurable debouncing</td></tr>
</table>

<table>
<tr><td>Parameter</td><td>Value</td></tr>
<tr><td>Frequency Input</td><td>
<table>
<tr><th>Input Number</th><th>Counter Resolution</th><th>Frequency Range</th><th>Resolution</th><th>Accuracy</th></tr>
<tr><td>Universal Input #1…3</td><td>16-bit</td><td>0.5Hz…50kHz</td><td>0.0001%...1%</td><td><0.5%</td></tr>
</table>
</td></tr>
<tr><td>PWM Duty Cycle Input</td><td>
<table>
<tr><th>Input Number</th><th>Counter Resolution</th><th>Frequency Range</th><th>Resolution</th><th>Accuracy</th></tr>
<tr><td>Universal Input #1…3</td><td>16-bit</td><td>1Hz…10kHz</td><td>0.0001%...1%</td><td>+/- 1%</td></tr>
</table>
0…100% Duty Cycle Range. DC is included.
1 MOhm impedance
</td></tr>
<tr><td>Protection</td><td>+36V maximum. Positive voltage only. No reverse polarity protection.</td></tr>
</table>

Control Logic:

Software Platform	Pre-programmed with standard logic. Refer to the user manual. (Application-specific control logic is available on request.)

General Specifications

Microcontroller	STM32F427VI, 32-bit, 2MByte flash memory
Isolation	Full isolation of TC input channel from the CAN line, other inputs and power supply. 200Vrms
CAN Interface	1 CAN port (CANopen®)
Protection for CAN port	Short circuit to ground
User Interface	EDS File Download from axiomatic.com log-in page. Contact sales@axiomatic.com for the password.
Compliance	CE/UKCA marking: EMC Directive RoHS Directive Exempt from Low Voltage Directive
Vibration	Random Vibration: 7.65 Grms peak Sinusoidal Component: 10 g peak Based on MIL-STD-202G, Methods 204G and 214A
Shock	50 g half sine pulse, 6 x 6ms per axis Based on MIL-STD-202G, Method 213B, Test Condition A
ISO 11898	120Ohm terminated twisted pair, baud rate up to 1Mbit/s. External 120Ohm termination is required.
Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-50 to 125 °C (-58 to 257 °F)
Protection	IP67, PCB is conformal coated and protected by the enclosure.
Weight	0.55 lb. (0.23 kg) preliminary
Enclosure and Dimensions	High Temperature Nylon Enclosure– (equivalent TE Deutsch P/N: EEC-325X4B) Flammability Rating: UL 94V-0 Refer to dimensional drawing.

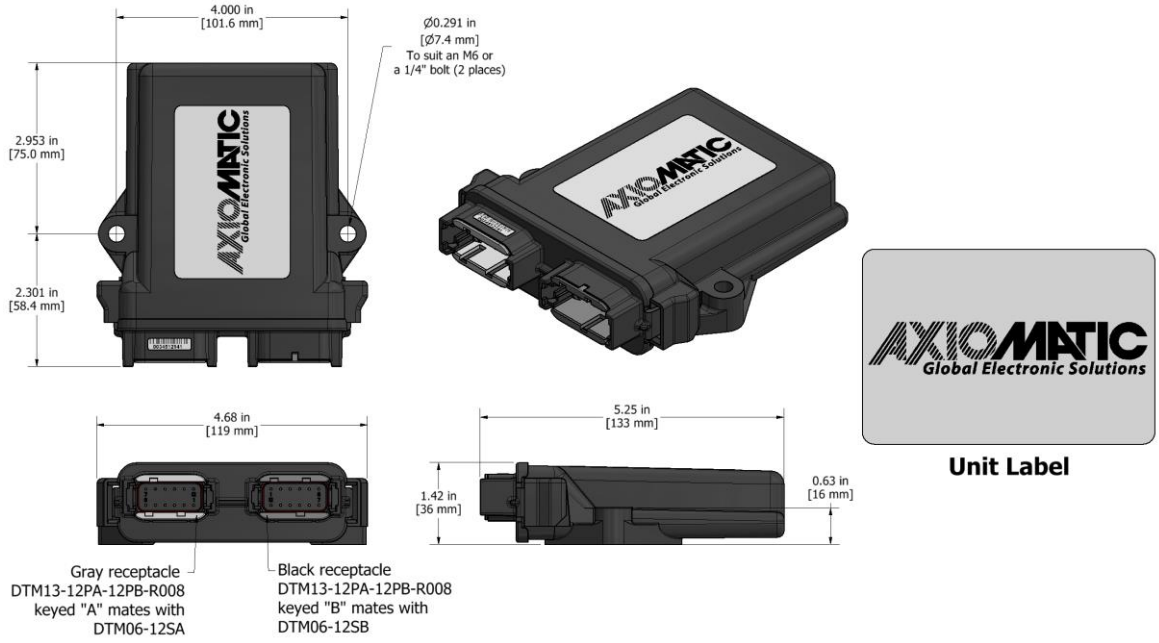
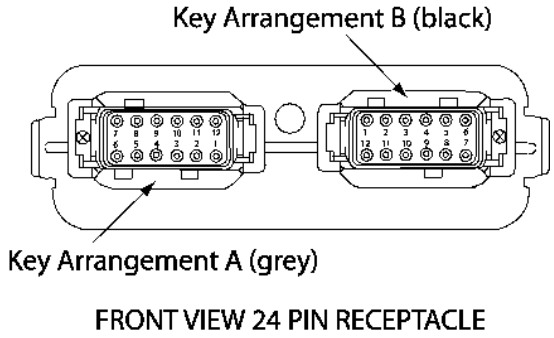


Figure 1.0 – Dimensional Drawing

Electrical Connections	24-pin receptacle (equivalent TE Deutsch P/N: DTM13-12PA-12PB-R008) Mating plug: equivalent 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.



FRONT VIEW 24 PIN RECEPTACLE

Grey Connector		Black Connector	
1	Digital Input 10	1	CAN_H
2	Digital Input 9	2	CAN_L
3	Digital Input 8	3	Universal Input 1
4	Digital Input 7	4	Universal Input 2
5	Digital Input 6	5	Universal Input 3
6	Power+	6	+5V Reference
7	Power -	7	Universal Input_GND
8	Digital Input 5	8	TC_Input -
9	Digital Input 4	9	TC Input +
10	Digital Input 3	10	Input GND
11	Digital Input 2	11	Digital Input 11
12	Digital Input 1	12	Digital Input 12

Mounting	Mounting holes sized for ¼ inch or M6 bolts. The bolt length will be determined by the end-user's mounting plate thickness. The mounting flange of the controller is 0.63 inches (16 mm) thick. If the module is mounted without an enclosure, it should be mounted vertically with connectors facing left and right to reduce likelihood of moisture entry. The CAN wiring is considered intrinsically safe. The power wires are not considered intrinsically safe and so in hazardous locations, they need to be located in conduit or conduit trays at all times. The module must be mounted in an enclosure in hazardous locations for this purpose. All field wiring should be suitable for the operating temperature range. Install the unit with appropriate space available for servicing and for adequate wire harness access (6 inches or 15 cm) and strain relief (12 inches or 30 cm).

Form: TDAX030341-05/31/23