TECHNICAL DATASHEET #TDAX130511A

Isolated Dual Universal Signal Converter CANopen®

1x Isolated CAN
2x Isolated Universal Signal Inputs
2x Isolated Universal Signal Outputs
5 V reference (50 mA)
4-way Isolation
EDS File

P/N: AX130511A

Features

- 2x isolated universal signal inputs selectable as: Voltage, Current, Resistive, Timer (Frequency, PWM), or Digital (Active High/Active Low)
- 2x isolated signal outputs programmable as: Analog Voltage, Analog Current, Frequency, PWM, or Digital (On/ Off)
- 5 V (50 mA) reference to power a sensor input
- 1x isolated CAN port (CANopen®)
- 12 or 24 VDC nominal power input (9 to 36 VDC range)
- 4-way isolation between power, inputs, outputs, and CAN
- Operates from -40 to 85 °C (-40 to 185 °F)
- Compact IP67-rated TE Deutsch enclosure with a 12-pin connector
- EMC compliance as per ISO 13766-1:2018 (CE / UKCA marking) and UR E10 Rev. 10
- Configurable using the Axiomatic Electronic Assistant

Applications

- Power gen set engine control systems
- Oil and gas equipment automation
- Off-highway machine automation

Ordering Part Numbers

Isolated Dual Universal Signal Converter, CANopen® – P/N: **AX130511A**

SAE J1939 version – P/N: **AX130510A**

Accessories:
EDS File
Mating Plug KIT - P/N: **PL-DTM06-12SA**
(For details, refer to the General Specifications below or TDPL-DTM06-12SA.)

Description

The AX130511A signal converter accepts two voltage, current, resistive, frequency, PWM, or digital (active high or active low) signal inputs and converts them into two signal outputs (analog voltage, analog current, frequency, PWM, or digital). A 5 V, 50 mA reference is available to power a sensor input. The device can be connected to a CANopen® networked engine control system. The unit has 4-way isolation between power, inputs, outputs, and CAN.

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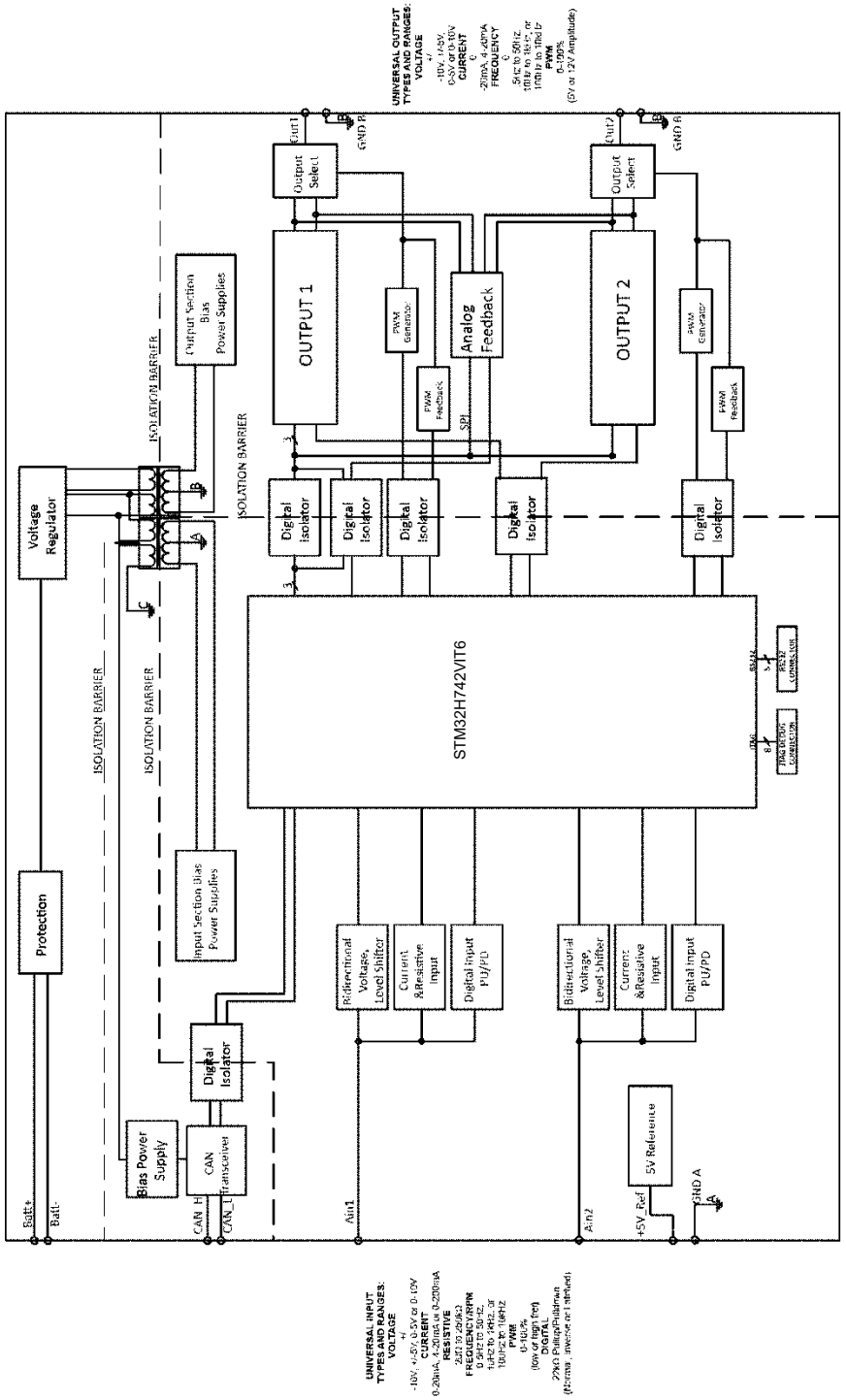
A rugged power supply interface accepts 12 or 24 VDC nominal for battery powered machine applications. The unit carries an IP67 rating. The rugged enclosure with an integrated TE Deutsch 12-pin connector is suitable for harsh environments. It operates from -40 to 85 °C (-40 to 185 °F). The powerful control algorithms allow the user to program the controller for a wide range of applications without the need for customer software.

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 Limitations & Return Materials Process as described on https://www.axiomatic.com/service/.

Power Supply

Power Supply Input	12 or 24 VDC nominal 9 to 36 VDC power supply range
Quiescent Current	165.7 mA @ 12 VDC; 86.5 mA @ 24 VDC typical
Protection	Reverse polarity protection provided Undervoltage protection provided. Shutdown at 5.5 V. Overvoltage protection provided. Shutdown up to 44.25 V.

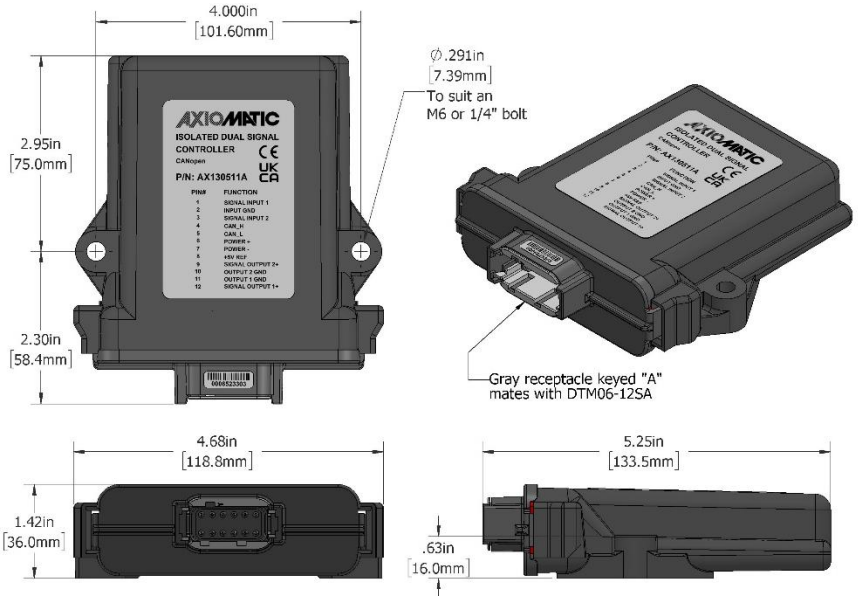
Inputs

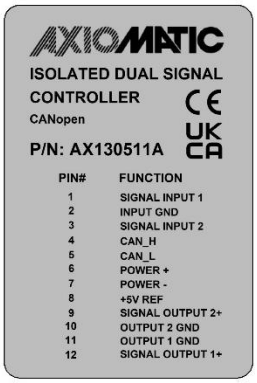
<table>
<tr><td>Inputs</td><td>2 isolated universal signal inputs user programmable as Voltage, Current, Resistive, Timer (Frequency, PWM), or Digital signal input types
Refer to the table below.</td></tr>
<tr><td>Voltage Input</td><td>0-5 V (Impedance 110 kΩ)
±5 V (Impedance 110 kΩ)
0-10 V (Impedance 130 kΩ)
±10 V (Impedance 130 kΩ)</td></tr>
<tr><td>Current Input</td><td>0-20 mA (Impedance 249 Ω)
4-20 mA (Impedance 249 Ω)
0-200 mA (Impedance 5 Ω)
12 V max.</td></tr>
<tr><td>Resistive Input</td><td>20 Ω to 250 kΩ
Self-calibrating</td></tr>
<tr><td>Frequency Input</td><td>0.8 Hz to 10 kHz</td></tr>
<tr><td>PWM Input</td><td>0.8 Hz to 10 kHz
0 to 100 % D.C.</td></tr>
<tr><td>Digital Input</td><td>Accepts 5 V TTL
Accepts up to Vps
Threshold: Low <1 V
High >2 V
Active High or Active Low with 10 kΩ pull-up or pull-down</td></tr>
<tr><td>Maximum and Minimum Ratings</td><td>
<table>
<tr><th>Characteristic</th><th>Min.</th><th>Max.</th><th>Units</th></tr>
<tr><td>Voltage Input</td><td>0</td><td>36</td><td>VDC</td></tr>
<tr><td>Current Input (0-20 mA or 4-20 mA)</td><td>0</td><td>12</td><td>VDC</td></tr>
<tr><td>Current Input (0-200 mA)</td><td>0</td><td>1</td><td>VDC</td></tr>
<tr><td>Frequency</td><td>0.8</td><td>10 000</td><td>Hz</td></tr>
<tr><td>PWM Voltage (peak to peak)</td><td>0</td><td>36</td><td>VDC</td></tr>
<tr><td>Digital Input</td><td>0</td><td>36</td><td>VDC</td></tr>
</table>
</td></tr>
<tr><td>Accuracy and Resolution</td><td>
<table>
<tr><th>Input Type</th><th>Accuracy</th><th>Resolution</th></tr>
<tr><td>Voltage</td><td>±0.5 %</td><td>0.1 V</td></tr>
<tr><td>Current</td><td>±1 %</td><td>1 mA</td></tr>
<tr><td>Resistive</td><td>±2 %</td><td>10 Ω</td></tr>
<tr><td>Frequency</td><td>±0.3 %</td><td>0.1 Hz</td></tr>
<tr><td>PWM</td><td>±0.1 %</td><td>1 %</td></tr>
</table>
</td></tr>
<tr><td>Input Ground</td><td>1 provided</td></tr>
<tr><td>Protection</td><td>All inputs are protected against short to Ground.
All inputs, except current inputs, are protected against shorts to nominal Vps (36 VDC).</td></tr>
</table>

Outputs

Outputs	2 isolated signal outputs programmable as Voltage, Current, Frequency, PWM, or Digital types.
Analog Outputs	Voltage Output: 0-5 VDC, 0-10 VDC, ±5 VDC, or ±10 VDC Maximum load is 50 mA. Current Output: 0-20 mA or 4-20 mA Maximum load resistance is < 500 Ω. Compliance voltage is 10V.
PWM, Frequency or Mixed PWM/Frequency Outputs	0 Hz to 50 kHz 0 to 100 % D.C. 5 or 12 V Amplitude Push pull output Maximum load is 50 mA. Over-current protection (50 mA)
Digital Output	Digital Level Digital ON/OFF 5 V or 12 V Amplitude Maximum load is 50 mA.
Accuracy and Resolution	**Output Type** / **Accuracy** / **Resolution** / **Feedback Accuracy** Voltage / ±0.1 % / 1 mV / ±1 % Current / ±0.5 % / 1 mA / ±2 % Frequency / ±0.1 % / 0.05 Hz / ±0.5 % PWM / ±0.5 % / 0.01% / ±0.8 %
Voltage Reference	5 V (50 mA)
Output Ground	Shared with Input Ground
Protection	Fully protected against short circuit to output ground Unit will fail-safe in the case of a short circuit condition, self-recovering when the short is removed.

Dimensional Drawing





Unit Label

General Specifications

<table>
<tr><td>Microcontroller</td><td>STM32H742VIT6</td></tr>
<tr><td>Isolation</td><td>300 Vrms 4-way isolation (Power, Inputs, Outputs and CAN are isolated from each other.)</td></tr>
<tr><td>Response Time</td><td>30 ms</td></tr>
<tr><td>Control Logic</td><td>Standard embedded software is provided. The configurable properties of the controller are divided into function blocks, namely Input Function Block, Output Function Block, PID Control Function Block, Lookup Table Function Block, Programmable Logic Function Block, Math Function Block, and Inching Control Block. Function blocks can be modified through the CANopen® Object Dictionary to fit the specific application. Data can be sent and received over the CAN bus using the CANopen® RPDO and TPDO objects. Refer to the User Manual for details. (Request application-specific control logic or a factory programmed Object Dictionary configuration.)</td></tr>
<tr><td>Communications</td><td>1 isolated CAN port (CANopen®)
Baud rates: 10, 20, 50, 125, 250, 50, and 800 kbit/s and 1 Mbit/s</td></tr>
<tr><td>Network Termination</td><td>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 High and CAN Low terminals at both ends of the network.</td></tr>
<tr><td>User Interface</td><td>An EDS file is provided to interface with the device using CANopen® tools.</td></tr>
<tr><td>Compliance</td><td>ISO 13766-1:2018 (CE / UKCA marking)
UR E10 Rev. 10
RoHS</td></tr>
<tr><td>Operating Conditions</td><td>-40 to 85 °C (-40 to 185 °F)</td></tr>
<tr><td>Storage Temperature</td><td>-55 to 125 °C (-67 to 257 °F)</td></tr>
<tr><td>Vibration</td><td>MIL-STD-202G, Test 204D and 214A
10 g peak (Sine)
7.86 Grms peak (Random)</td></tr>
<tr><td>Shock</td><td>MIL-STD-202G, Test 213B (50 g)</td></tr>
<tr><td>Protection</td><td>IP67</td></tr>
<tr><td>Enclosure</td><td>High Temperature Nylon enclosure – TE Deutsch P/N: EEC-325X4B
Flammability Rating: UL 94V-0
4.64 in. x 5.23 in. x 1.41 in. (118 mm x 133 mm x 36 mm)
W x L x H excluding mating plugs. Refer to the dimensional drawing.</td></tr>
<tr><td>Weight</td><td>0.55 lb. (0.249 kg)</td></tr>
<tr><td>Electrical Connections</td><td>12-pin receptacle (TE Deutsch P/N: DTM13-12PA-R008)
<table>
<tr><th>Pin</th><th>Description</th></tr>
<tr><td>1</td><td>Analog / Digital Input 1</td></tr>
<tr><td>2</td><td>Input Ground</td></tr>
<tr><td>3</td><td>Analog / Digital Input 2</td></tr>
<tr><td>4</td><td>CAN High</td></tr>
<tr><td>5</td><td>CAN Low</td></tr>
<tr><td>6</td><td>Power +</td></tr>
<tr><td>7</td><td>Power -</td></tr>
<tr><td>8</td><td>5 V Reference</td></tr>
<tr><td>9</td><td>Analog / Digital Output 2 +</td></tr>
<tr><td>10</td><td>Output Ground 2</td></tr>
<tr><td>11</td><td>Output Ground 1</td></tr>
<tr><td>12</td><td>Analog / Digital Output 1 +</td></tr>
</table></td></tr>
<tr><td>Mating Plug Kit</td><td>Available from Axiomatic as P/N PL-DTM06-12SA. It comprises the following TE Deutsch parts: 1x plug (DTM06-12SA), 1x wedgelock (WM12S), 12x contacts (0462-201-20141) and 6x sealing plugs (0413-204-2005). For details, refer to TDPL-DTM06-12SA.
20 AWG wire is recommended for use with contacts 0462-201-20141.</td></tr>
<tr><td>Installation</td><td>For mounting information, refer to the dimensional drawing. Mounting holes sized for ¼ in. 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 in. (16 mm) thick. If the module is mounted without an enclosure, it should be mounted vertically with connectors facing left and right to reduce the likelihood of moisture entry. 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. No wire or cable harness should exceed 30 m in length. The power input wiring should be limited to 10 m. 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 in. or 15 cm) and strain relief (12 in. or 30 cm).</td></tr>
</table>

Form: TDAX130511A-08/18/2025