

# 18 Digital Inputs CAN Controller

SAE J1939

Developed with Simulink®

with Electronic Assistant® 

P/N: AX030310

## Features:

- 10 digital inputs are user selectable from the following.
  - Active High/Active Low
  - PWM signal from sensors or diesel engine ECM's
  - Frequency (Hz or RPM)
  - Counter
- 8 digital inputs are user selectable as Active High/Active Low
- 12V, 24VDC input power (nominal) with rugged surge protection
- 1 CAN (SAE J1939)
- CANopen® (P/N: AX030311)
- IP67
- CE mark
- User configurable using Axiomatic Electronic Assistant®
- Developed with Simulink®



## Applications:

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

## Ordering Part Numbers:

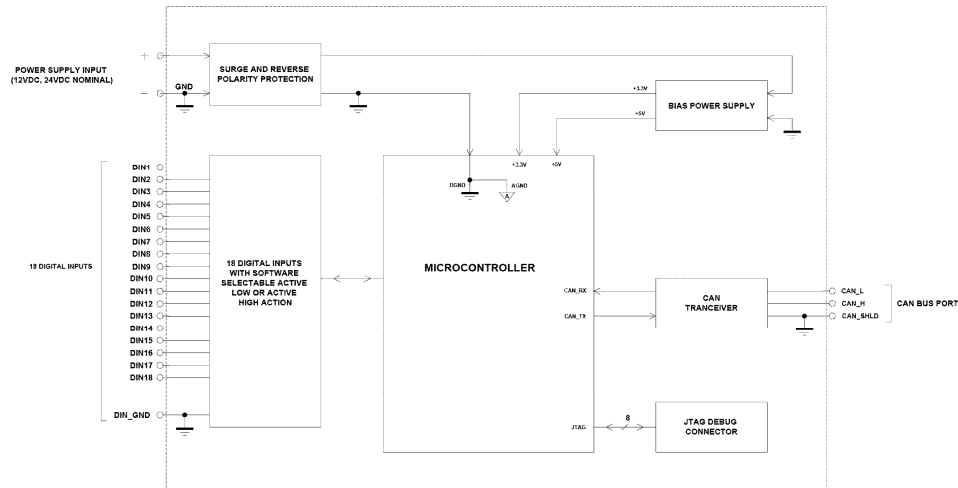
SAE J1939 Controller: For baud rate, refer to the table below for the appropriate P/N.

| Model P/N   | Baud Rate  | Standard Reference     |
|-------------|------------|------------------------|
| AX030310    | 250 kBit/s | J1939/11, J1939/15.    |
| AX030310-01 | 500 kBit/s | J1939/14. New standard |
| AX030310-02 | 1Mbit/s    | Non-standard           |

Electronic Assistant® Configuration KIT: **AX070502**

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

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

### Input Specifications

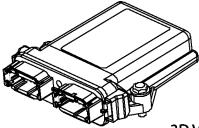
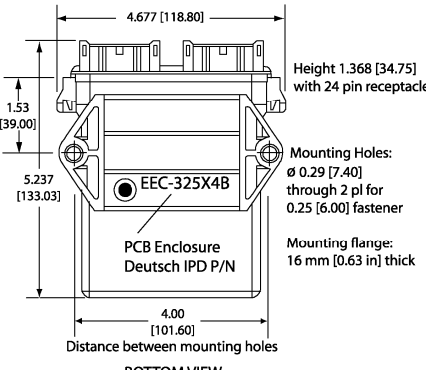
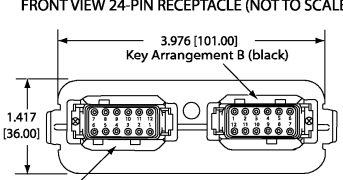
|                              |   |
|------------------------------|---|
| Power Supply Input - Nominal | 12V, 24VDC nominal (8...36VDC power supply range)                               |
| Protection                   | Surge and reverse polarity protection are provided.                             |
| All Inputs                   | Up to 18 digital inputs are selectable by the user. Refer to Table 1.0.         |
| Input Protection             | Full protection to all other physical pins (any other input or power terminal). |
| CAN Commands                 | SAE J1939<br>{CANopen® model AX030311}  |
| Ground Connection            | 1 Digital GND connection is provided.   |

| Table 1.0 - Inputs |   |
|--------------------|---|
| Digital Inputs     | <p>Up to 18 digital inputs are available.</p> <p>The first 10 digital inputs can be configured for any one of the following options.</p> <ul style="list-style-type: none"> <li>• Disable Input</li> <li>• Digital Input</li> <li>• PWM signal input (1-10,000 Hz, 0-100% D.C.)</li> <li>• Frequency Input (Hz or RPM) (50 to 10,000 Hz, 50 mV-3V RMS)*</li> <li>• 16-bit Counter Input</li> </ul> <p>The last 8 digital inputs can be configured for any one of the following options.</p> <ul style="list-style-type: none"> <li>• Disable Input</li> <li>• Digital Input</li> </ul> <p>Threshold 3.5V<br/>Hysteresis 0.4V<br/>Pull up/ Pull down 10 KOhm<br/>Input voltage maximum is 30Vdc.</p> |
| Input Accuracy     | <p>PWM, single channel: +/- 0.05% to +/- 1.25% (over the 500 Hz to 10 kHz range)</p> <p>Frequency/RPM, single channel: +/- 1%</p> <p>16-bit counter, single channel: +/- 3 mSec (@50 Hz)</p>  |
| Input Resolution   | <p>PWM, single channel: +/- 0.05% to +/- 1.25%, 0 decimal place resolution</p> <p>Frequency/RPM (single channel)</p> <p>0.5 Hz to 50 Hz: +/- 0.01Hz, 0 decimal place resolution</p> <p>50 Hz to 10kHz: +/- 1Hz, 0 decimal place resolution</p> <p>16-bit counter, single channel: 1 pulse resolution</p>  |

### Output Specifications

|              |           |
|--------------|-----------|
| CAN Messages | SAE J1939 |
|--------------|-----------|

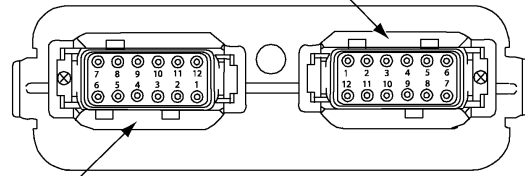
## General Specifications

|                           |  |
|---------------------------|--|
| Microprocessor            | STM32F205RET6  |
| Control Logic             | Standard embedded software ( <i>Application-specific logic is available on request.</i> ) Configurable properties of the Electronic Control Unit (ECU) are divided into function blocks, namely Input Function Block, Diagnostic Function Block, Lookup Table Function Block, Programmable Logic Function Block, Math Function Block, CAN Transmit Message Function Block and CAN Receive Function Block. Refer to the User Manual for details.  |
| User Interface (PC-based) | Electronic Assistant® for <i>Windows</i> operating systems<br>It comes with a royalty-free license for use.<br>The Electronic Assistant® requires an Axiomatic USB-CAN converter to link the device's CAN port to a <i>Windows</i> -based PC. This is included in the Configuration KIT P/N AX070502.  |
| CAN Communications        | 1 CAN port (SAE J1939)<br>For 500 kbps and 1 Mbps baud rates, see Ordering Part Numbers.   |
| Simulink®                 | Model <b>AX030310</b> was developed using Simulink®. <b>Simulink®</b> is a model-based design tool from Mathworks®. Using Simulink®, the OEM machine designer may simulate their control system with the Axiomatic module included. This permits fine tuning of the design parameters and testing of functionality prior to machine prototype installation.  |
| Quiescent Current Draw    | 13.71 mA @ 24V<br>24.15 mA @ 12V<br>31.68 mA @ 9V  |
| Compliance                | CE mark:<br>EMC Directive<br>RoHS Directive<br>Exempt from Low Voltage Directive   |
| Vibration                 | Random Vibration: 7.7 Grms peak<br>Sinusoidal Component: 10 G peak<br>Based on MIL-STD-202G, Methods 204G and 214A   |
| Shock                     | 50 G half sine pulse, 6 x 6ms per axis<br>Based on MIL-STD-202G, Method 213B, Test Condition A   |
| Network Termination       | 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.   |
| Operating Conditions      | -40 to 85 °C (-40 to 185 °F)   |
| Protection                | IP67, PCB is conformal coated and protected by the housing.  |
| Weight                    | 0.50 lbs. (0.23 kg)  |
| Packaging and Dimensions  | <p>High Temperature Nylon housing - Deutsch IPD PCB Enclosure (EEC-325X4B)<br/>4.62 x 5.24 x 1.43 inches 117.42 x 133.09 x 36.36 mm<br/>(W x L x H excluding mating plugs)</p> <div style="text-align: center;">  <p><b>HOUSING DIMENSIONS</b><br/>Housing Material: High Temperature Nylon (Black)</p> <p>3D VIEW<br/>Housing with 24 Pin Receptacle</p> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p><b>BOTTOM VIEW</b></p> <p>4.677 [118.80]<br/>Height 1.368 [34.75] with 24 pin receptacle<br/>Mounting Holes: Ø 0.29 [7.40] through 2 pl for 0.25 [6.00] fastener<br/>Mounting flange: 16 mm [0.63 in] thick<br/>Distance between mounting holes: 4.00 [101.60]</p> </div> <div style="text-align: center;">  <p><b>FRONT VIEW 24-PIN RECEPTACLE (NOT TO SCALE)</b></p> <p>3.976 [101.00]<br/>Key Arrangement B (black)<br/>1.417 [36.00]<br/>Key Arrangement A (grey)</p> <p>Mating Plug Assemblies for 24-pin receptacle:<br/>Deutsch IPD P/N: DTM06-125A and DTM06-125B with wedgelocks WM125 and contacts (Contact factory for contact specification.)</p> <p>Dimensions: inches [mm] excluding mating plug(s)</p> </div> </div> |

Electrical Connections

Deutsch DTM series 24 pin receptacle (DTM13-12PA-12PB-R008)  
 Mating plug: Deutsch 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.

Key Arrangement B (black)



Key Arrangement A (grey)

FRONT VIEW 24 PIN RECEPTACLE

| Grey Connector |                 | Black Connector |                  |
|----------------|-----------------|-----------------|------------------|
| 1              | CAN_H           | 1               | Digital Input 7  |
| 2              | CAN_L           | 2               | Digital Input 8  |
| 3              | CAN_Shield      | 3               | Digital Input 9  |
| 4              | GND             | 4               | Digital Input 10 |
| 5              | Power -         | 5               | Digital Input 11 |
| 6              | Power+          | 6               | Digital Input 12 |
| 7              | Digital Input 6 | 7               | Digital Input 18 |
| 8              | Digital Input 5 | 8               | Digital Input 17 |
| 9              | Digital Input 4 | 9               | Digital Input 16 |
| 10             | Digital Input 3 | 10              | Digital Input 15 |
| 11             | Digital Input 2 | 11              | Digital Input 14 |
| 12             | Digital Input 1 | 12              | Digital Input 13 |

Notes:

Electronic Assistant® is a registered US trademark of Axiomatic Technologies Corporation.  
 CANopen® is a registered community trade mark of CAN in Automation e.V.  
 Simulink® is a registered trademark of The Mathworks, Inc.

Form: TDAX030310-02/25/15