

## 10 Universal Signal Inputs CAN Controller

V, mA, Digital, PWM, Hz/RPM, Counter Inputs  
CANopen®

P/N: AX030121

### Features:

- 10 user selectable signal inputs:
  - 0-5 V
  - 0-10 V
  - 0-20 mA
  - 4-20 mA
  - PWM (low or high frequency)
  - Frequency/RPM
  - Counter
  - Digital
- 12V, 24Vdc (nominal) power input
- 1 CAN port (CANopen®) (SAE J1939 in P/N AX030120)
- CE mark (EMC Compliance)
- Rugged packaging and connectors (Deutsch IPD)
- Standard control logic
- .EDS provided to interface to standard CANopen® tools



**Description:** The 10 Universal Signal Inputs Controller accepts up to 10 analog or digital type inputs (0-5V, 0-10V, 0-20 mA, 4-20 mA, Digital, PWM, Frequency/RPM or Counter). The modules can be connected to a variety of analog machine sensors or levers, PLC's, switches, PWM signals, etc. It interfaces with the machine's CAN network (SAE J1939). Standard embedded software is provided. Rugged IP67 rated packaging in addition to a wide-ranging power supply input section for 12V or 24Vdc power suits applications in the harsh environment of mobile equipment with on-board battery power. All setpoints are user configurable using commercially available CANopen® tools.

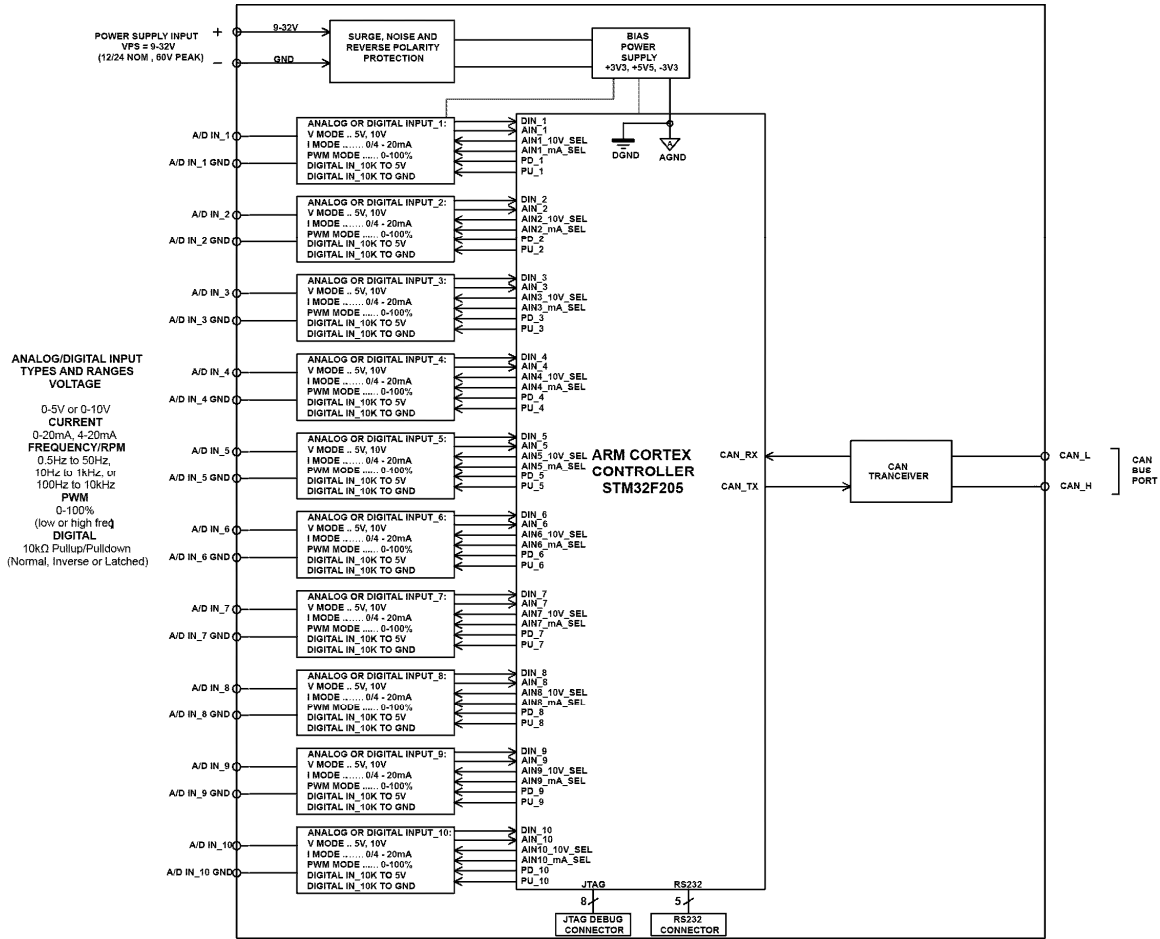
### Applications:

The controller is designed to meet the rugged demands of construction equipment, power generator sets and heavy duty industrial machine control applications.

### Ordering Part Numbers:

<i>CANopen® version</i>
Controller: <b>AX030121</b> EDS File: <b>EDS-AX030121</b>
Accessories: <b>PL-DTM06-12SA-12SB</b> Mating Plug Kit (1 DTM06-12S, DTM06-12SB, 2 W12S, 24 contacts)

# 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).

### Power Input Specifications

Power Supply Input - Nominal	12 or 24Vdc nominal operating voltage 8...60 Vdc power supply range for voltage transients
Surge Protection	Provided
Reverse Polarity Protection	Provided
Quiescent Current	< 25mA @ Vin = 24V

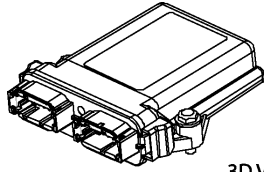
### Signal Input Specifications

Inputs	<p>10 user selectable inputs</p> <ul style="list-style-type: none"> <li>• Analog 12-bit (0-5V, 0-10V, 0-20 mA, 4-20 mA)</li> <li>• PWM 12-bit (low or high frequency)</li> <li>• Frequency/RPM</li> <li>• Counter input 16-bit</li> <li>• Digital (active high/active low) [ON when input <math>\geq</math> 1.5V]</li> </ul> <p>All inputs with the exception of 16-Bit Counter are sampled every 1ms. Analog Input types have a 12-bit resolution.</p> <p>With current inputs, short circuit protection is provided.</p>																																												
Minimum and Maximum Ratings	<table border="1"> <thead> <tr> <th colspan="4">Table 2.0. Absolute Maximum and Minimum Ratings</th> </tr> <tr> <th>Characteristic</th> <th>Min</th> <th>Max</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Power Supply</td> <td>8</td> <td>60</td> <td>V dc</td> </tr> <tr> <td>Voltage Input</td> <td>0</td> <td>43</td> <td>V dc</td> </tr> <tr> <td>Current Input</td> <td>0</td> <td>21</td> <td>mA</td> </tr> <tr> <td>Current Input – Voltage Level</td> <td>0</td> <td>12</td> <td>Vdc</td> </tr> <tr> <td>Digital Type Input – Voltage Level</td> <td>0</td> <td>43</td> <td>Vdc</td> </tr> <tr> <td>PWM Duty Cycle</td> <td>0</td> <td>100</td> <td>%</td> </tr> <tr> <td>PWM Frequency</td> <td>50</td> <td>10 000</td> <td>Hz</td> </tr> <tr> <td>PWM Voltage pk - pk</td> <td>0</td> <td>43</td> <td>V dc</td> </tr> <tr> <td>RPM Frequency</td> <td>50</td> <td>10 000</td> <td>Hz</td> </tr> </tbody> </table>	Table 2.0. Absolute Maximum and Minimum Ratings				Characteristic	Min	Max	Units	Power Supply	8	60	V dc	Voltage Input	0	43	V dc	Current Input	0	21	mA	Current Input – Voltage Level	0	12	Vdc	Digital Type Input – Voltage Level	0	43	Vdc	PWM Duty Cycle	0	100	%	PWM Frequency	50	10 000	Hz	PWM Voltage pk - pk	0	43	V dc	RPM Frequency	50	10 000	Hz
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Input Impedance	<p>0-5V: 1 MOhm 0-10V: 170 kOhm 0(4)-20mA: 249 Ohm Frequency/Digital Input: Pull Up/Pull Down 22 KOhm</p>																																												
Analog GND	<p>10 Analog GND connections are provided. Grounds are connected internally.</p>																																												

## General Specifications

Microprocessor	STM32F205VGT6						
EMC Compliance	CE mark						
Communications	<p>1 CAN 2.0B port, protocol CiA CANopen®            By default, the 10 Universal Signal Inputs Controller transmits measured input (FV object 7100h) TPDO1, TPDO2, and TPDO3.            A SAE J1939 model is available (P/N AX030120).            An on-board RS-232 port is used for factory programming only.</p> <p>The controller's object dictionary is compatible with the CiA DS-404 device profile (Device profile for measurement devices and closed-loop controllers). In addition to the standard objects for this device profile, the controller also includes a number of manufacturer specific objects to extend the functionality beyond that of the basic profile. Refer to the user manual for details.</p> <p>The Axiomatic AX030121 is compliant with the following CAN in Automation (CiA) standards.</p> <table border="1"> <tr> <td>[DS-301]</td> <td>CiA DS-301 V4.1 – CANopen® Application Layer and Communication Profile. CAN in Automation 2005</td> </tr> <tr> <td>[DS-404]</td> <td>CiA DS-404 V1.2 – Device Profile for Measurement Devices and Closed-Loop Controllers. CAN in Automation 2002</td> </tr> <tr> <td>[DS-305]</td> <td>CiA DS-305 V2.0 – Layer Setting Service (LSS) and Protocols. CAN in Automation 2006</td> </tr> </table>	[DS-301]	CiA DS-301 V4.1 – CANopen® Application Layer and Communication Profile. CAN in Automation 2005	[DS-404]	CiA DS-404 V1.2 – Device Profile for Measurement Devices and Closed-Loop Controllers. CAN in Automation 2002	[DS-305]	CiA DS-305 V2.0 – Layer Setting Service (LSS) and Protocols. CAN in Automation 2006
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[DS-305]	CiA DS-305 V2.0 – Layer Setting Service (LSS) and Protocols. CAN in Automation 2006						
CAN Response Time	The maximum recommended transmit rate for any TPDO is 10ms. Response time of feedback on the CAN to changes at the I/O will be a combination of the I/O type's response time and the configurable software filtering, delays, etc.						
Node-ID and Baud Rate	Configurable using Layer Setting Services Default Node-ID = 127 and Baud Rate = 125 kbps.						
User Interface	EDS File is provided. The controller architecture consists of a set of internal functional blocks, which can be individually programmed and arbitrarily connected together to achieve the required system functionality for a specific application. All objects are user configurable using standard commercially available tools that can interact with a CANopen® Object Dictionary via an .EDS file.						
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.						
Control Logic	Refer to User Manual UMAX030121 for details. <i>For application-specific control logic, contact Axiomatic.</i>						
Diagnostics	The module can detect the following. <ul style="list-style-type: none"> <li>• Module Over-Temperature</li> <li>• Power Supply Over Voltage</li> <li>• Power Supply Under Voltage</li> </ul>						
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.						
Enclosure and Dimensions	High Temperature Nylon housing - Deutsch IPD PCB Enclosure (EEC-325X4B) 4.62 x 5.24 x 1.43 inches 117.42 x 133.09 x 36.36 mm (W x L x H excluding mating plugs)						
Operating Conditions	-40 to 85°C (-40 to 185°F)						
Weight	0.55 lb. (0.25 kg)						
Protection	IP67, Unit is conformal coated in the housing.						
Vibration	MIL-STD-202G, Method 204D, test condition A – 10 g peak (Sine) MIL-STD-202G, Method 214A, test condition B – 7.68 Grms (Random)						
Shock	MIL-STD-202G, Method 213B, test condition A 50 g half sine pulse, 6 ms, 6 pulses per axis						

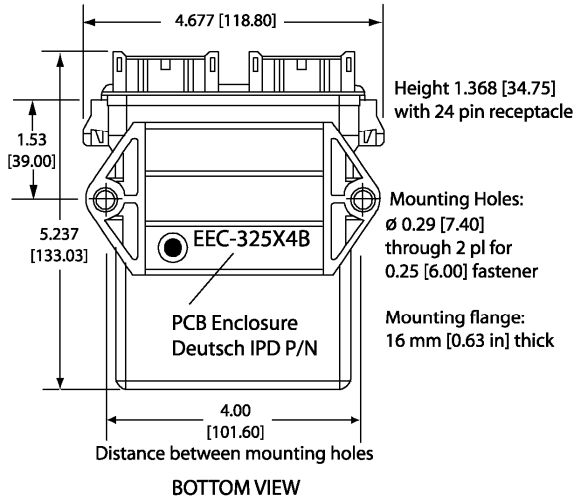
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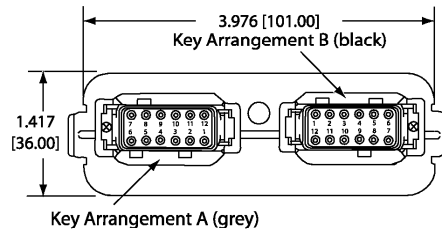
3D VIEW  
Housing with 24 Pin Receptacle

## HOUSING DIMENSIONS

Housing Material: High Temperature Nylon (Black)



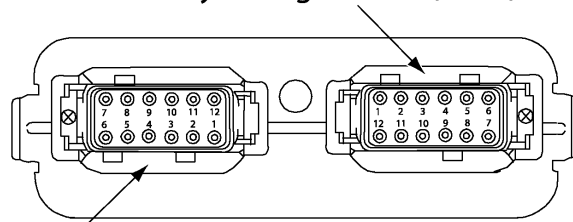
FRONT VIEW 24-PIN RECEPTACLE (NOT TO SCALE)



Mating Plug Assemblies for 24-pin receptacle:  
Deutsch IPD P/N: DTM06-12SA and DTM06-12SB  
with wedgelocks WM12S and contacts  
(Contact factory for contact specification.)

Dimensions: inches [mm]  
excluding mating plug(s)

Key Arrangement B (black)



Key Arrangement A (grey)

FRONT VIEW 24 PIN RECEPTACLE

Table 5.0. Electrical Pin Out			
Grey Connector		Black Connector	
Pin #	Function	Pin #	Function
1	Analog GND 5	1	Input 6
2	Analog GND 4	2	Input 7
3	Analog GND 3	3	Input 8
4	Analog GND 2	4	Input 9
5	Analog GND 1	5	Input 10
6	Batt -	6	CAN_H
7	Batt +	7	CAN_L
8	Input 1	8	Analog GND 10
9	Input 2	9	Analog GND 9
10	Input 3	10	Analog GND 8
11	Input 4	11	Analog GND 7
12	Input 5	12	Analog GND 6

Notes:

CANopen® is a registered community trade mark of CAN in Automation e.V.

Form: TDAX030121-05/17/17