

12 Input, 12 Output Valve Controller, Multi-Functional

+5V Reference Voltage

CAN (SAE J1939)

with Axiomatic Electronic Assistant

P/N: AX020420

Features

- All 12 universal signal inputs user configurable as:
 - 0-5 V, or 0-10 V
 - 4-20 mA, or 0-20 mA
 - 1 Hz to 10 kHz PWM/ frequency
 - Digital
- 6 inputs user configurable as 30 Ω to 250 k Ω
- All 12 outputs (0 to 2.5 A) user selectable as:
 - Proportional voltage
 - Proportional current
 - PWM
 - On/Off digital
 - Hotshot digital
- 1 SAE J1939 CAN bus port with auto-baud-rate detection
- Standard control logic permits configuration of complex algorithms for control profiles
- Operates at 12 or 24 VDC nominal power (8 to 36 VDC range)
- Protected against input surge, transient, reverse polarity, and undervoltage and output overcurrent, and short circuit
- 48-pin TE Deutsch equivalent enclosure and connectors
- -40°C to 85°C (-40°F to 185°F) operating temperature
- Designed for EMC compliance
- IP67 rating
- Configurable with Axiomatic Electronic Assistant



Applications

- Suitable for vibration and harsh environments of mobile equipment
- Oil and gas equipment automation
- Off-highway machine automation
- Agricultural equipment
- Drive proportional poppet or spool or On/Off hydraulic valves

Ordering Part Number

12 Input, 12 Output Valve Controller, Multi-Functional, CAN SAE J1939 Auto-Baud-Rate Detection, P/N: **AX020420**

Accessories:

Mating Plug KIT P/N: **AX070123**

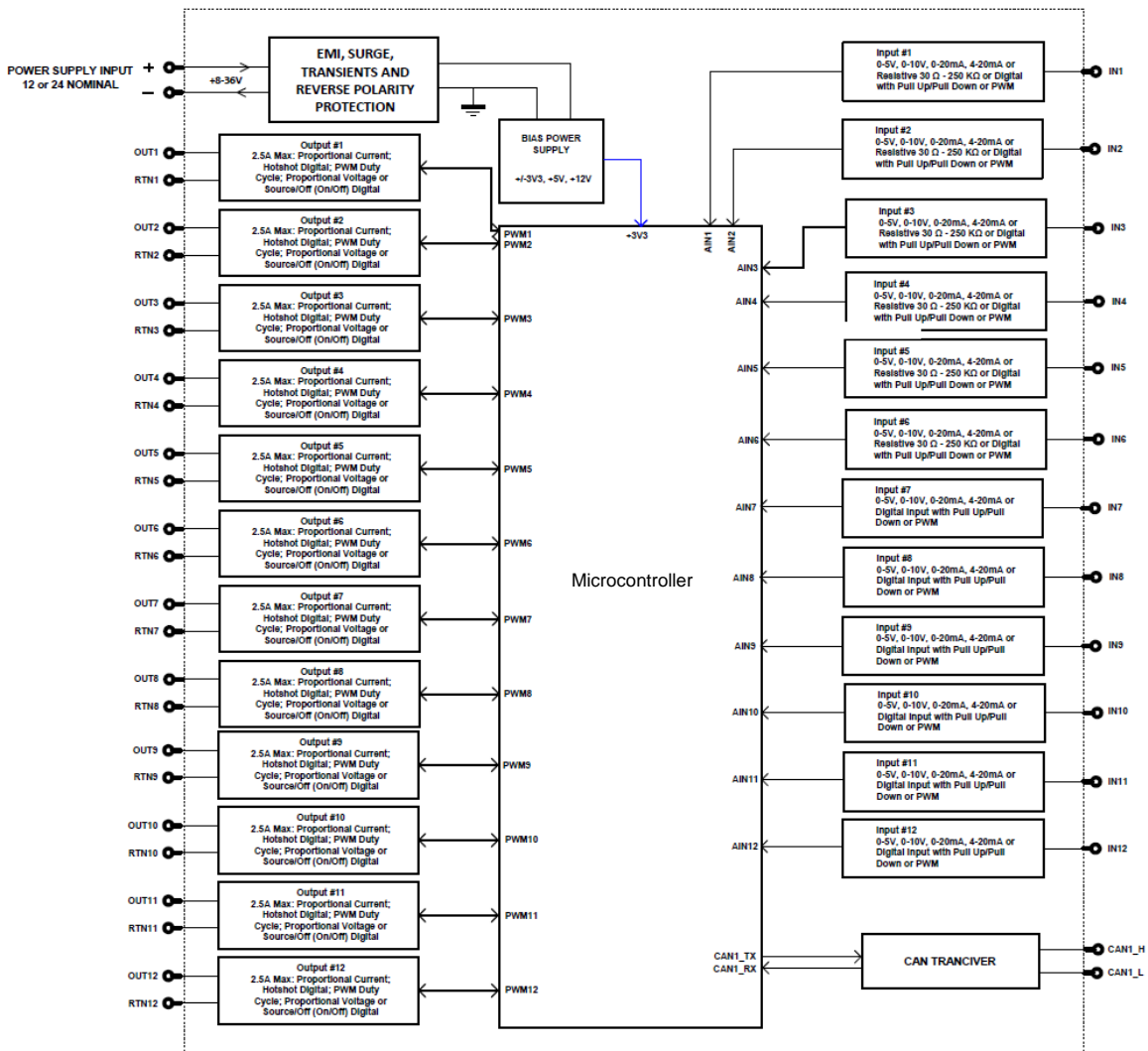
Axiomatic Electronic Assistant Configuration KIT P/N: **AX070502** or **AX070506K**

Description

The 12 Input, 12 Output CAN Valve Controller is a device that measures numerous types of input signals as well as drives different outputs. It features 12 universal inputs and has 12 proportional outputs that can provide a current of up to 2.5 A. Flexible circuit design gives the user a wide range of configurable input and output types. Its powerful control algorithms allow the user to program the controller for a wide range of applications without the need for custom software.

AX020420 has an auto-baud-rate detection feature for CAN SAE J1939 networks. The Axiomatic Electronic Assistant is used to configure it. Setpoint configuration can be saved in a file which can then be utilized to program the same configuration to another AX020420 device.

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/>.

Input

Power Supply Input	12 or 24 VDC nominal (8 to 36 VDC power supply range) The maximum total current draw permitted on the power supply input pins at any given time is 30 A @ 24 VDC.																					
Quiescent Current	140 mA @ 12 VDC; 80 mA @ 24 VDC																					
Protection	Surge and transient protection provided Reverse polarity protection up to 60 VDC Undervoltage hardware shutdown at 4 VDC																					
Universal Inputs	<p>All 12 inputs are selectable by the user as:</p> <ul style="list-style-type: none"> • Voltage type • Current type • PWM type • Frequency type • Digital type <p><u>Voltage Type:</u> Ranges: 0-5V or 0-10V Resolution: 1 mV Accuracy: +/- 0.2%</p> <table border="1"> <thead> <tr> <th colspan="3">Input Impedance</th> </tr> <tr> <th>Range</th> <th>Inputs 1 to 6</th> <th>Inputs 7 to 12</th> </tr> </thead> <tbody> <tr> <td>0-5V</td> <td>>1 GΩ or 10 kΩ pull-down</td> <td rowspan="2">1 MΩ or 10 kΩ pull-down</td> </tr> <tr> <td>0-10V</td> <td>204 kΩ pull-down</td> </tr> </tbody> </table> <p><u>Current Type:</u> Ranges: 0-20mA or 4-20mA Resolution: 1μA Accuracy: +/- 0.2%</p> <table border="1"> <thead> <tr> <th colspan="2">Input Impedance</th> </tr> <tr> <th>Inputs 1 to 6</th> <th>Inputs 7 to 12</th> </tr> </thead> <tbody> <tr> <td>249 Ω</td> <td>124 Ω</td> </tr> </tbody> </table> <p><u>PWM Type:</u> Signal Frequency: 1 Hz to 10 kHz Duty Cycle: 0 to 100% Resolution: 0.01% Accuracy: +/- 1%</p> <p><u>Frequency Type:</u> Range: 1 Hz to 10 kHz Resolution: 0.01% Accuracy: +/-0.1%</p> <p><u>Digital Type:</u> Amplitude: Up to +Vsupply</p> <table border="1"> <thead> <tr> <th>Inputs 1 to 6</th> <th>Inputs 7 to 12</th> </tr> </thead> <tbody> <tr> <td>Active High or Active Low with 10 kΩ pull-up or pull-down</td> <td>1 MΩ impedance or Active High or Active Low with 10 kΩ pull-up or pull-down</td> </tr> </tbody> </table>	Input Impedance			Range	Inputs 1 to 6	Inputs 7 to 12	0-5V	>1 GΩ or 10 kΩ pull-down	1 MΩ or 10 kΩ pull-down	0-10V	204 kΩ pull-down	Input Impedance		Inputs 1 to 6	Inputs 7 to 12	249 Ω	124 Ω	Inputs 1 to 6	Inputs 7 to 12	Active High or Active Low with 10 kΩ pull-up or pull-down	1 MΩ impedance or Active High or Active Low with 10 kΩ pull-up or pull-down
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Resistive Inputs	Inputs 1 to 6 are selectable by the user as Resistive type. Resolution: 1 Ω Accuracy: +/- 2% Range: 30 Ω to 250 kΩ																					

All Inputs	12-bit Analog to Digital Protected against shorts to GND or +Vsupply All inputs are sampled every 1 ms.
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Output

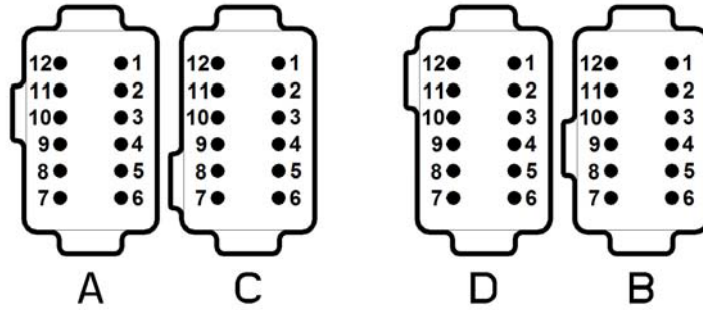
All Outputs	<p>12 independent outputs are user selectable as:</p> <ul style="list-style-type: none"> • Proportional voltage • Proportional current • PWM • On/off digital • Hotshot digital <p>Half-bridge output, current sensing, grounded load High side sourcing up to 2.5 A High frequency drive</p> <p><u>Proportional Voltage:</u> Resolution: 100 mV Accuracy: +/- 5%</p> <p><u>Current Type:</u> Resolution: 1 mA Accuracy: +/- 1%</p> <p><u>PWM:</u> Resolution: 0.1% Accuracy: +/- 0.1%</p> <p><u>On/Off Digital:</u> Sourcing from power supply or output off Load at supply voltage must not draw more than 2.5A.</p> <p><u>Hotshot Digital:</u> Resolution: 1 mA Accuracy: +/- 1%</p>
Protection	Overcurrent protection provided Short circuit protection in hardware

General Specifications

Microcontroller	STM32H747BIT6, 32-bit, 2 MB flash memory, 1 MB RAM
Communication	1 CAN SAE J1939-compliant port 250 kbit/s, 500 kbit/s, 667 kbit/s, 1 Mbit/s auto-baud-rate detection
Control Logic	Standard embedded software is provided and is configurable using the Axiomatic Electronic Assistant. (Application-specific control logic is available on request.)
User Interface	User configuration and diagnostics are provided with the Axiomatic Electronic Assistant, P/N AX070502 or AX070506K . The Axiomatic Service Tool is a <i>Windows</i> -based graphical user interface that allows easy configuration of the controller setpoints.
Diagnostics	Diagnostics messages are provided over the CAN network for the status of inputs or outputs.
Compliance	RoHS
Vibration	Pending
Shock	Pending
Operating Conditions	-40°C to 85°C (-40°F to 185°F)
Storage Temperature	-50°C to +125°C (-58°F to 257°F)
Weight	1.27 lb. (0.58 kg)
Protection	IP67, Unit is conformal coated and protected by the enclosure.

Enclosure and Dimensions High Temperature Nylon housing, TE Deutsch equivalent P/N: EEC-5X650B
 4.03 in x 4.25 in x 1.68 in (102.44 mm x 107.96 mm x 42.67 mm)
 L x W x H including integral connector
 Refer to the dimensional drawing.

Electrical Connections 48-pin TE Deutsch equivalent connector (P/N: DT13-48PABCD-R015) or Amphenol face plate connector (P/N: ATM13-12PA-12PB-BM03), based on availability.

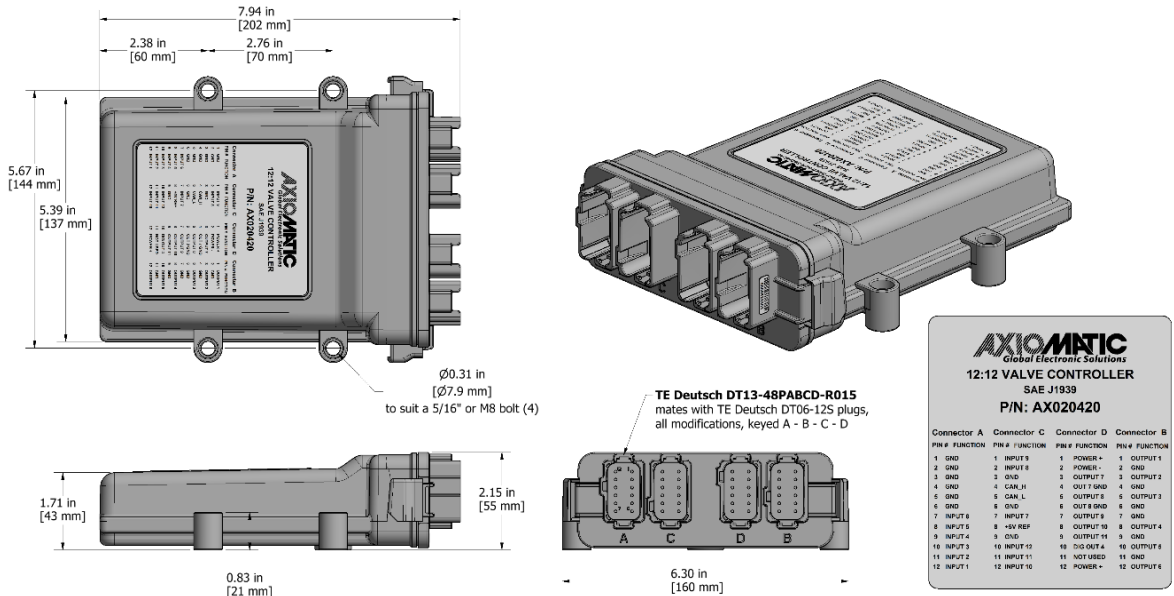


Connector A		Connector C	
Pin	Function	Pin	Function
1	Ground	1	Input 9
2	Ground	2	Input 8
3	Ground	3	Ground
4	Ground	4	CAN_H
5	Ground	5	CAN_L
6	Ground	6	Ground
7	Input 6	7	Input 7
8	Input 5	8	+5V Reference
9	Input 4	9	Ground
10	Input 3	10	Input 12
11	Input 2	11	Input 11
12	Input 1	12	Input 10

Connector D		Connector B	
Pin	Function	Pin	Function
1	Power +	1	Output 1
2	Power -	2	Ground
3	Output 7	3	Output 2
4	Ground	4	Ground
5	Output 8	5	Output 3
6	Ground	6	Ground
7	Output 9	7	Ground
8	Output 10	8	Output 4
9	Output 11	9	Ground
10	Output 12	10	Output 5
11	Not Used	11	Ground
12	Power +	12	Output 6

<p>Mating Connectors</p>	<p>Mates with the following TE Deutsch equivalent P/Ns. DT06-12SA Plug, DT 12 Way A Key DT06-12SB Plug, DT 12 Way B Key DT06-12SC Plug, DT 12 Way C Key DT06-12SD Plug, DT 12 Way D Key</p> <p>A set of these mating plugs is available, ordering P/N: AX070123 (includes 1 plug DT06-12SA, 1 plug DT06-12SB, 1 plug DT06-12SC, 1 plug DT06-12SD, 4 wedgelocks W12S-P012, 48 contact sockets 0462-201-16141, 15 sealing plugs 114017)</p>
<p>Mounting</p>	<p>For mounting information, refer to the dimensional drawing.</p> <p>Mounting holes sized for 5/16 inch or M8 bolts. The bolt length will be determined by the end-user's mounting plate thickness. The mounting flange of the controller is 0.83 inches (21 mm) thick. If the module is mounted without an enclosure, it should be mounted to reduce the likelihood of moisture entry. 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). Wires should be of the appropriate gauge to meet requirements of applicable electrical codes and suit the specifications of the connector.</p> <p>The module must be mounted in an enclosure in hazardous locations. All field wiring should be suitable for the operating temperature range of the module. All chassis grounding should go to a single ground point designated for the machine and all related equipment.</p>

Dimensional Drawing



Form: TDAX020420-03/11/2024