

1 Universal Signal Input CAN Controller (SAE J1939)

*Distributed I/O for Engine Control Systems
with Axiomatic Electronic Assistant*

P/N: AX030530

Features

- 1 universal signal input selectable as Voltage, Current, Resistive, Digital, Frequency, or PWM types
- User selectable input range from: 0-1V; 0-2.5V; 0-5V; 0-10V; 0-20mA; 4-20mA; 20Ω to 250kΩ (Auto Range or User Selectable Ranges); 10Hz-1kHz; or 100Hz-10kHz.
- 12VDC / 24VDC input power (nominal) with transient and reverse polarity protection
- 1 CAN (SAE J1939), CANopen® on request
- Rugged enclosure and connectors
- CE / UKCA marking
- Axiomatic Electronic Assistant for user configuration and programming



Applications

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

Ordering Part Numbers

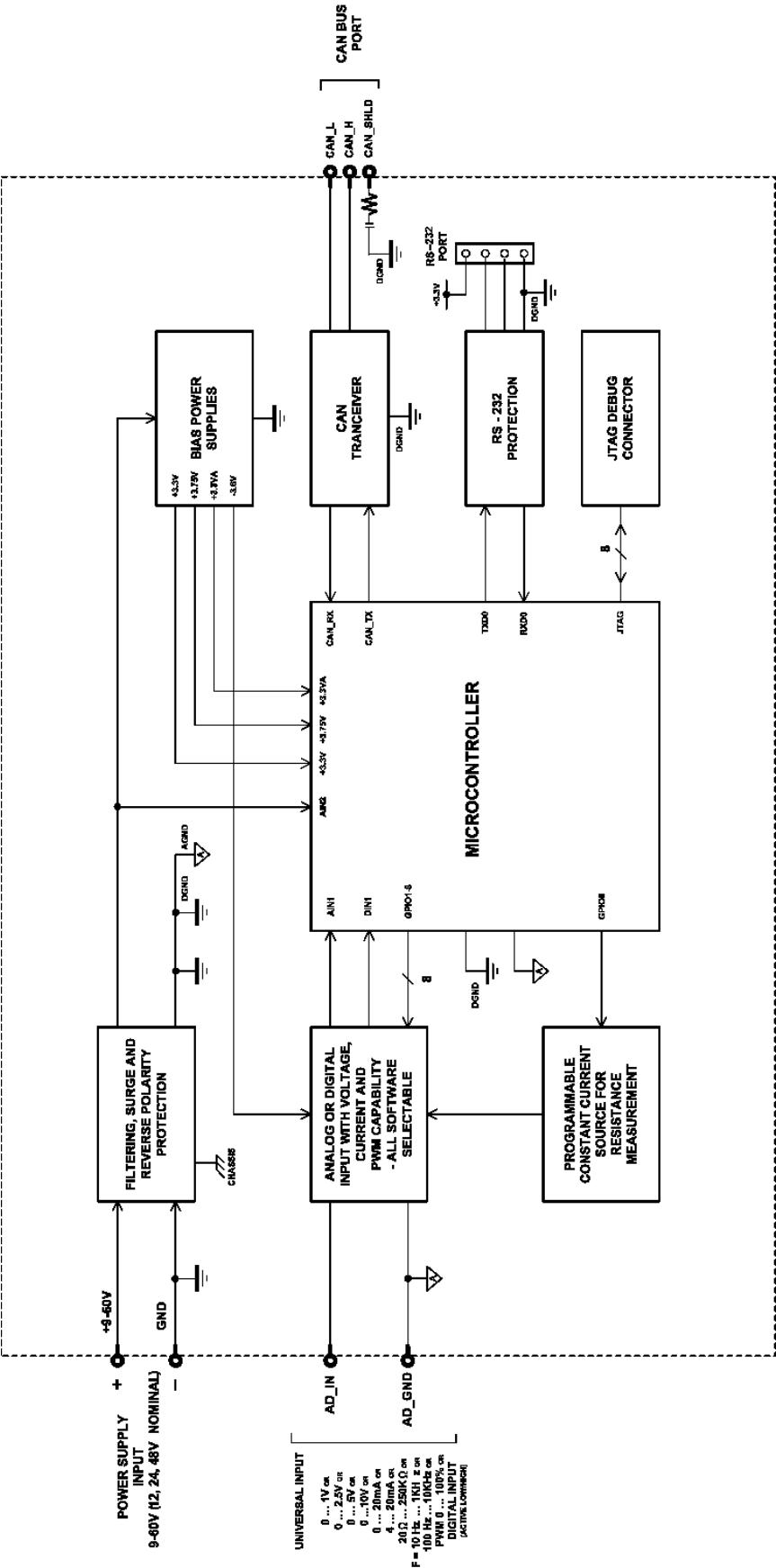
1 Universal Signal Output CAN Controller (SAE J1939), P/N: **AX030530**

Accessories:

Mating Plug KIT, P/N: **AX070112**

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

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 - Nominal	12V or 24VDC nominal (9 to 60 VDC power supply range)
Protection	Transient and reverse polarity protection is provided.
Universal Signal Input	1 universal signal input user selectable as Voltage, Current, Resistive, Digital, Frequency, or PWM types Refer to Table 1.0.
Ground Connection	1 Analog GND connection is provided.

Table 1.0 – Input – User Selectable Options	
Analog Input Functions	Voltage Input, Current Input, or Resistive Input
Voltage Input	0-1V (Impedance 1 M Ω) 0-2.5V (Impedance 1 M Ω) 0-5V (Impedance 204 k Ω) 0-10V (Impedance 136 k Ω)
Current Input	0-20 mA (Impedance 124 Ω) 4-20 mA (Impedance 124 Ω)
Resistive Input	Range: 20 Ω to 250 k Ω (Auto Range) User-selectable ranges: 0-150 Ω 0-800 Ω 0-2.5 k Ω 0-8 k Ω 0-25 k Ω 0-80 k Ω 0-250 k Ω
Digital Input Functions	Discrete Input, PWM Input, Frequency Input
Digital Input Level	5V CMOS compatible
PWM Input	0 to 100% 10 Hz to 1 kHz 100 Hz to 10 kHz
Frequency Input	10 Hz to 1 kHz 100 Hz to 10 kHz
Digital Input	Active High, Active Low
Input Impedance	1 M Ω high impedance, 10 k Ω pull down, 10 k Ω pull up to +5V
Input Accuracy	$\leq 1\%$
Input Resolution	12-bit

Output

Output	CAN Messages, SAE J1939 (CANopen® available on request) Refer to Control Logic and Figure 1.0 as well as the user manual for details. The Axiomatic Electronic Assistant (EA) is used to set up CAN signal acquisition and processing algorithms.
CAN	The controller can send a single frame application specific CAN message to the network continuously or on request. Using the Axiomatic EA, the user can configure this feature.

Control Logic

From the software perspective, the controller consists of a set of internal functional blocks, which can be individually programmed and arbitrarily connected together to achieve the required system functionality. See Figure 1.

Each functional block is independent and has its own set of programmable parameters, or setpoints. The setpoints can be viewed and changed through CAN using the Axiomatic Electronic Assistant.

There are two types of controller functional blocks. One type represents the controller hardware resources, for example the analog signal input block. The other type is purely logical – these functional blocks are included to program the user defined functionality of the controller. The number and functional diversity of

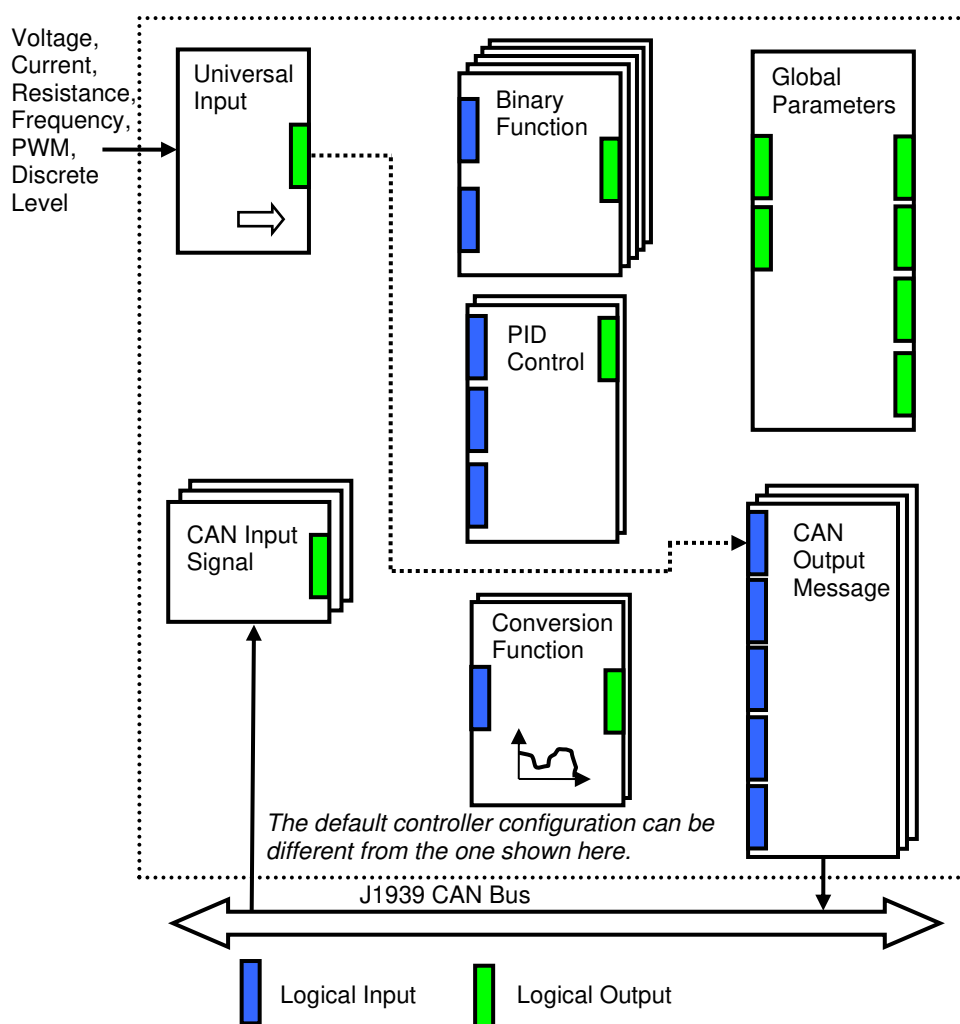
these functional blocks are only limited by the system resources of the internal microcontroller. They can be added or modified on the customer's request to accommodate user-specific requirements.

The user can build virtually any type of custom control by logically connecting inputs and outputs of the functional blocks. This approach gives the user absolute freedom of customization and an ability to fully utilize the controller hardware resources in a user's application.

Each functional block of the controller is presented by its own folder in the Setpoint File root folder in the Axiomatic Electronic Assistant.

By default, the output of the Universal Input functional block is connected to the first logical input of the CAN Output Message functional block, as shown in Figure 1. It provides the simplest controller configuration, when the signal from the input is directly routed to the CAN output.

When additional processing of the input signal is required, the user can use logical functional blocks provided with the controller. There are five Binary Function, two Conversion Function, and two PID Control functional blocks available for this purpose in the current version of the embedded software. A detailed description of the functionality of these functional blocks can be found in the user manual.



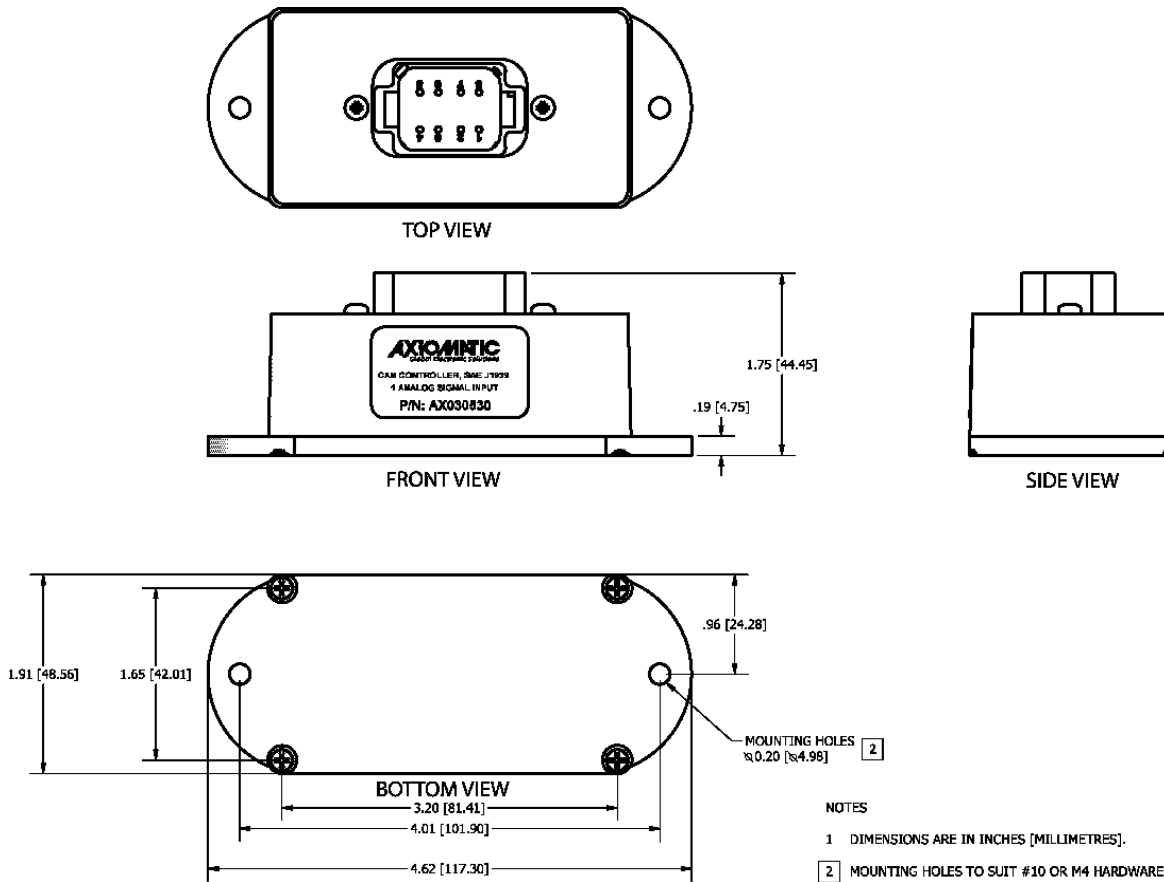
As an example, the logical output of the Universal Input functional block is connected to the logical input of the CAN Output Message functional block, providing a direct path for the input signal to the controller CAN output.

Figure 1. The Controller Internal Structure

General Specifications

Microcontroller	32-bit, 128 KByte flash program memory
Control Logic	Standard embedded software is provided. Refer to Figure 1.0. (Application-specific control logic or factory programmed setpoints are available on request.)
CAN	1 CAN port (SAE J1939) (CANopen® on request)
Slew Rate	To adjust the controller to the CAN physical network, the slew rate can be configured as fast or slow. Refer to the User Manual for details.
User Interface	Axiomatic Electronic Assistant KIT, P/Ns: AX070502 or AX070506K Updates for the Axiomatic EA are found on www.axiomatic.com under the log-in tab.
Typical Current Draw	25 mA @ 12V 14 mA @ 24V 8.5 mA @ 48V Conditions: Resistance Input, 0-150Ω, CAN output transmission every 100ms.
Weight	0.65 lbs. (0.29 kg)
Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-50 to 125 °C (-58 to 257 °F)
Protection	IP67 PCB is conformally coated and protected by the enclosure.
Enclosure and Dimensions	Encapsulated Cast Aluminum enclosure with mounting holes 4.62 x 1.91 x 1.76 inches (117.30 x 48.56 x 44.73 mm) L x W x H including integral connector

Dimensional Drawing



Mounting	<p>Mounting holes – The controller accepts 2 #10 or M4 screws.</p> <p>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.</p> <p>All field wiring should be suitable for the operating temperature range.</p> <p>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).</p>																		
Network Termination	<p>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.</p>																		
Electrical Connections	<p>8-pin plug (TE Deutsch P/N: DT15-08PA)</p> <p>Mating plug KIT: Axiomatic P/N AX070112 (includes TE Deutsch P/Ns: DT06-08SA socket, wedge W8S, 7 solid contact sockets 0462-201-16141 and 1 sealing plug 114017)</p> <p>16-18 AWG wire is recommended for use with sockets 0462-201-16141.</p> <p>Use dielectric grease on the pins when installing the controller.</p> <p>Wiring to these mating plugs must be in accordance with all applicable local codes. Suitable field wiring for the rated voltage and current must be used. The rating of the connecting cables must be at least 70°C. Use field wiring suitable for both minimum and maximum ambient temperature.</p> <table border="1"> <thead> <tr> <th>PIN #</th><th>FUNCTION</th></tr> </thead> <tbody> <tr> <td>1</td><td>POWER +</td></tr> <tr> <td>8</td><td>POWER -</td></tr> <tr> <td>2</td><td>CAN Shield</td></tr> <tr> <td>7</td><td>NOT USED</td></tr> <tr> <td>3</td><td>CAN_H</td></tr> <tr> <td>6</td><td>GROUND</td></tr> <tr> <td>4</td><td>CAN_L</td></tr> <tr> <td>5</td><td>SIGNAL INPUT</td></tr> </tbody> </table>	PIN #	FUNCTION	1	POWER +	8	POWER -	2	CAN Shield	7	NOT USED	3	CAN_H	6	GROUND	4	CAN_L	5	SIGNAL INPUT
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