Preliminary
TECHNICAL DATASHEET #TDAX021601

Single Channel

Valve Controller

Universal Input, 2A Output
CAN (SAE J1939)
Metal Box

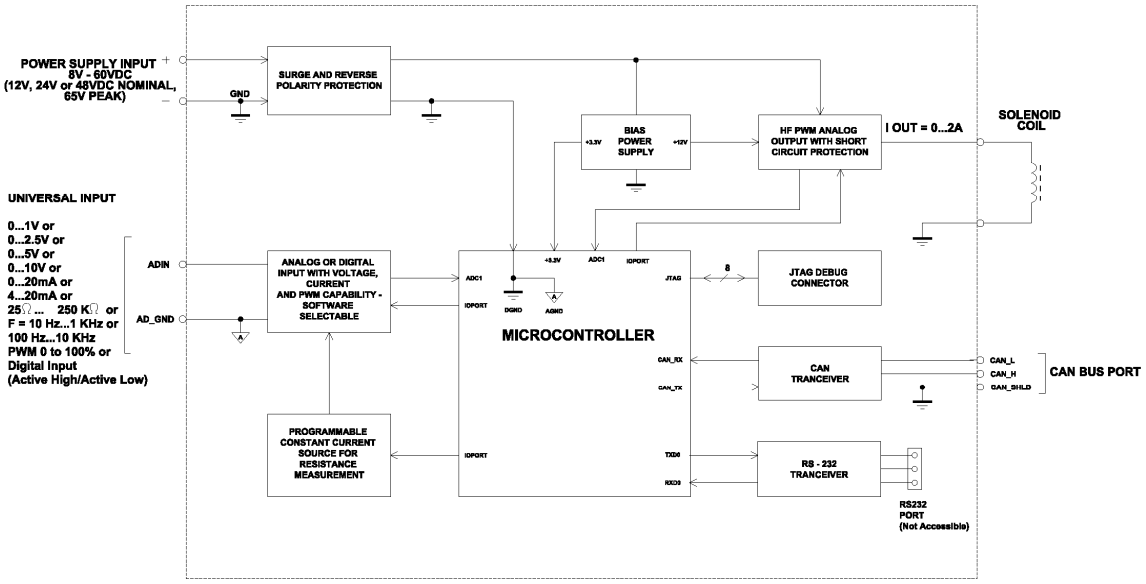
***with* Electronic Assistant®**

P/N: AX021601

Features:

- 1 universal signal input
- 1 output up to 2 A
- User programmable functionality
- Wide power supply range (8…60VDC), 12V, 24V or 48VDC nominal
- 1 CAN (SAE J1939) port
- IP67 aluminum packaging with integral Deutsch IPD connector
- **Electronic Assistant®** together with an Axiomatic USB-CAN converter links a PC to the CAN bus for user configuration.
- Flexible user programming for application-specific control logic via the CAN based Electronic Assistant®.

BLOCK DIAGRAM



In Europe:
Axiomatic Technologies Oy
Höytämöntie 6
33880 LEMPÄÄLÄ - Finland
Tel. +358 3 3595 600
Fax. +358 3 3595 660
www.axiomatic.fi

In North America:
Axiomatic Technologies Corporation
5915 Wallace Street
Mississauga, ON Canada L4Z 1Z8
Tel. 1 905 602 9270
Fax. 1 905 602 9279
www.axiomatic.com

Ordering Part Numbers:

SAE J1939 version
Controller (Aluminum enclosure with integral connector - IP67): **AX021601**
AX070502 Configuration KIT includes the following. USB-CAN Converter P/N: AX070501 1 ft. (0.3 m) USB Cable P/N: CBL-USB-AB-MM-1.5 12 in. (30 cm)CAN Cable with female DB-9 P/N: CAB-AX070501 AX070502IN CD P/N: CD-AX070502, includes: **Electronic Assistant®** software; EA & USB-CAN User Manual UMAX07050X; USB-CAN drivers & documentation; CAN Assistant (Scope and Visual) software & documentation; and the SDK Software Development Kit. **NOTE: To order this kit, you need only to specify P/N: AX070502.**

Technical Specifications:

Inputs

Power Supply Input - Nominal	12V, 24V or 48VDC nominal (8…60 VDC power supply range)
Protection	Reverse polarity protection is provided. Overvoltage protection up to 65V is provided. Overvoltage (undervoltage) shutdown of the output load is provided.
CAN	SAE J1939 Commands
Universal Signal Input	Refer to Table 1.0 All inputs are user selectable.

Table 1.0 – **Input – User Selectable Options**

Analog Input Functions	Voltage Input, Current Input or Resistive Input
Voltage Input	0-1V (Impedance 1 MOhm) 0-2.5V (Impedance 1 MOhm) 0-5V (Impedance 200 KOhm) 0-10V (Impedance 133 KOhm for 0-5V, 133 to 20 KOhm for 5-10V))
Current Input	0-20 mA (Impedance 124 Ohm) 4-20 mA (Impedance 124 Ohm)
Resistive Input	25Ω to 250 kΩ
Digital Input Functions	Discrete Input, PWM Input, Frequency Input
Digital Input Level	5V CMOS
PWM Input	0 to 100% 10 Hz to 1kHz 100 Hz to 10 kHz
Frequency Input	10 Hz to 1kHz 100 Hz to 10 kHz
Digital Input	Active High, Active Low
Input Impedance	1 MOhm high impedance, 10KOhm pull down, 10KOhm pull up to +5V
Input Accuracy	≤ 1%
Input Resolution	12-bit

Outputs

CAN	SAE J1939 Messages
Output	Up to 2A High Side Switch, Current Sensing, Grounded Load The user can select the following options for output using the EA. • Output Disable • Discrete Output • Output Current (PID loop*, with current sensing) • Output Voltage • Output PWM Duty Cycle *Parameters are password protected. Refer to the user manual for details.
Output Accuracy	Output Current mode <2% Output Voltage mode <3% Output PWM Duty Cycle mode <3%

General Specifications

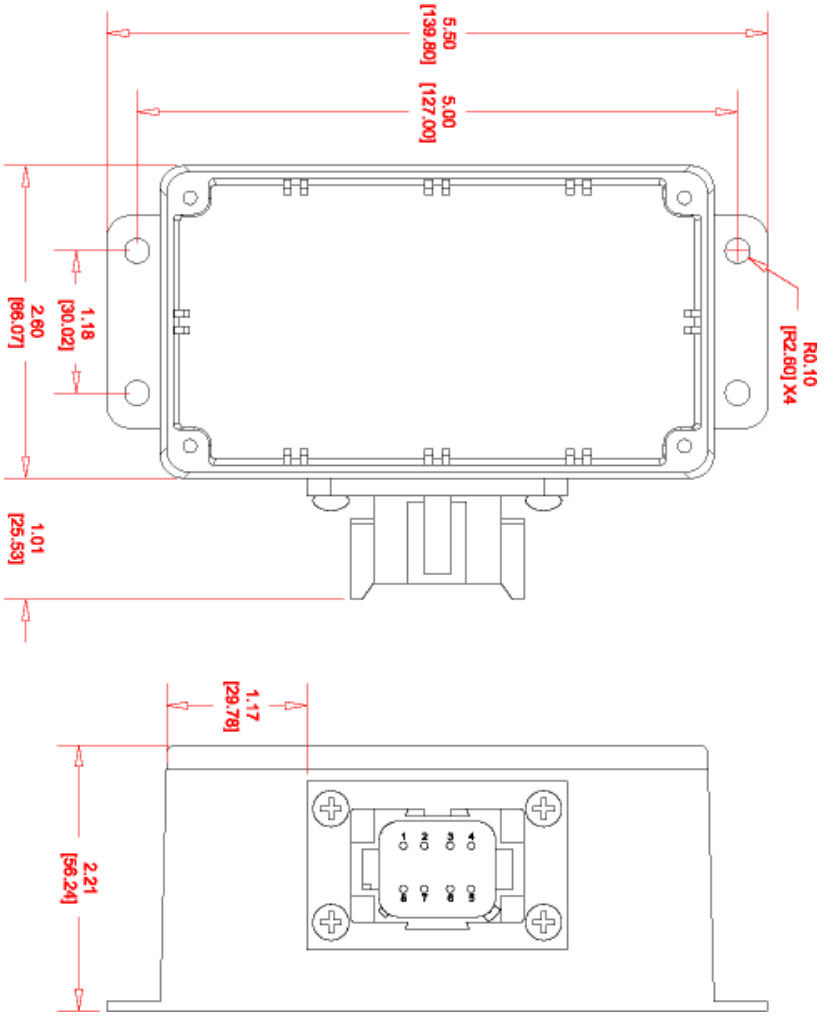
Microprocessor	32-bit, 128 KByte program memory
Control Logic	User programmable functionality using Electronic Assistant® Refer to the user manual for details.
Communications	1 CAN port (SAE J1939) CANopen® is available on request.
User Interface	Electronic Assistant® for *Windows* operating systems It comes with a royalty-free license for use. The Electronic Assistant® requires an USB-CAN converter to link the device's CAN port to a *Windows*-based PC. An Axiomatic USB-CAN Converter AX070501 is available as part of the Axiomatic Configuration KIT. **P/N: AX070502**, the Axiomatic Configuration KIT includes the following. USB-CAN Converter P/N: AX070501 1 ft. (0.3 m) USB Cable P/N: CBL-USB-AB-MM-1.5 12 in. (30 cm)CAN Cable with female DB-9 P/N: CAB-AX070501 AX070502IN CD P/N: CD-AX070502, includes: Electronic Assistant® software; EA & USB-CAN User Manual UMAX07050X; USB-CAN drivers & documentation; CAN Assistant (Scope and Visual) software & documentation; and the SDK Software Development Kit.

The network part of the controller is compliant with Bosch CAN protocol specification, Rev.2.0, Part B, and the following J1939 standards:

ISO/OSI Network Model Layer	J1939 Standard
Physical	J1939/11 – Physical Layer, 250K bit/s, Twisted Shielded Pair. Rev. SEP 2006. J1939/15 - Reduced Physical Layer, 250K bits/sec, Un-Shielded Twisted Pair (UTP). Issued NOV 2003.
Data Link	J1939/21 – Data Link Layer. Rev. APR 2001.
	The controller supports Transport Protocol for Commanded Address messages (PGN 65240) and software identification -SOFT messages (PGN 65242). It also supports responses on PGN Requests (PGN 59904).
Network	J1939, Appendix B – Address and Identity Assignments. Rev. 2005-01. J1939/81 – Network Management. Rev. 2003-05.
	The controller is an Arbitrary Address Capable ECU. It can dynamically change its network address in real time. The controller supports: Address Claimed Messages (PGN 60928), Requests for Address Claimed Messages (PGN 59904) and Commanded Address Messages (PGN 65240).
Transport	N/A in J1939.
Session	N/A in J1939.
Presentation	N/A in J1939.
Application	J1939/71 – Vehicle Application Layer. Rev. NOV 2006
	The controller can receive an application specific PGN with an input signal and transmit an application specific PGN with up to five output signals. Both PGNs are user programmable.
	J1939/73 – Application Layer – Diagnostics. Rev. SEP 2006
	Memory access protocol (MAP) support: DM14, DM15, DM16 messages.

Operating Conditions	-40 to 85 °C (-40 to 185 °F)
Electrical Connections	**P/N: AX021601** 8-pin Deutsch Connector p/n: DT04-8PA-L012 Pin 1: Solenoid + Pin 2: Solenoid – Pin 3: Power Input Pin 4: Power GND Pin 5: Signal Input Pin 6: Signal GND Pin 7: CAN_H Pin 8: CAN_L
Packaging	P/N: AX021601 Aluminum Enclosure with integral Deutsch IPD connector Encapsulated Refer to dimensional drawing below.
Protection	P/N : AX021601 IP67 rating for the product assembly (Aluminum enclosure, integral connector) NOTE : Deutsch IPD connectors are rated at IP67 for submersion (3 ft., 0.9 m) and IP69K for high pressure, high temperature wash down applications.
Weight	P/N: AX021601 1.40 lbs. (0.63 kg)

P/N: AX021601 IP67 Rated Housing with integral Deutsch IPD connector



Control Logic

The controller consists of a set of internal functional blocks, which can be arbitrarily connected together to form an application-specific control structure. See Figure 1.

Each functional block is absolutely independent and has its own set of parameters, or setpoints, used to control its functionality. The setpoints are accessible through CAN using Axiomatic Electronic Assistant® (EA) software.

There are two types of the controller functional blocks. One type represents the controller hardware resources, for example: universal input or PWM output. The other type is purely logical – these functional blocks are included to program the user defined functionality of the controller.

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

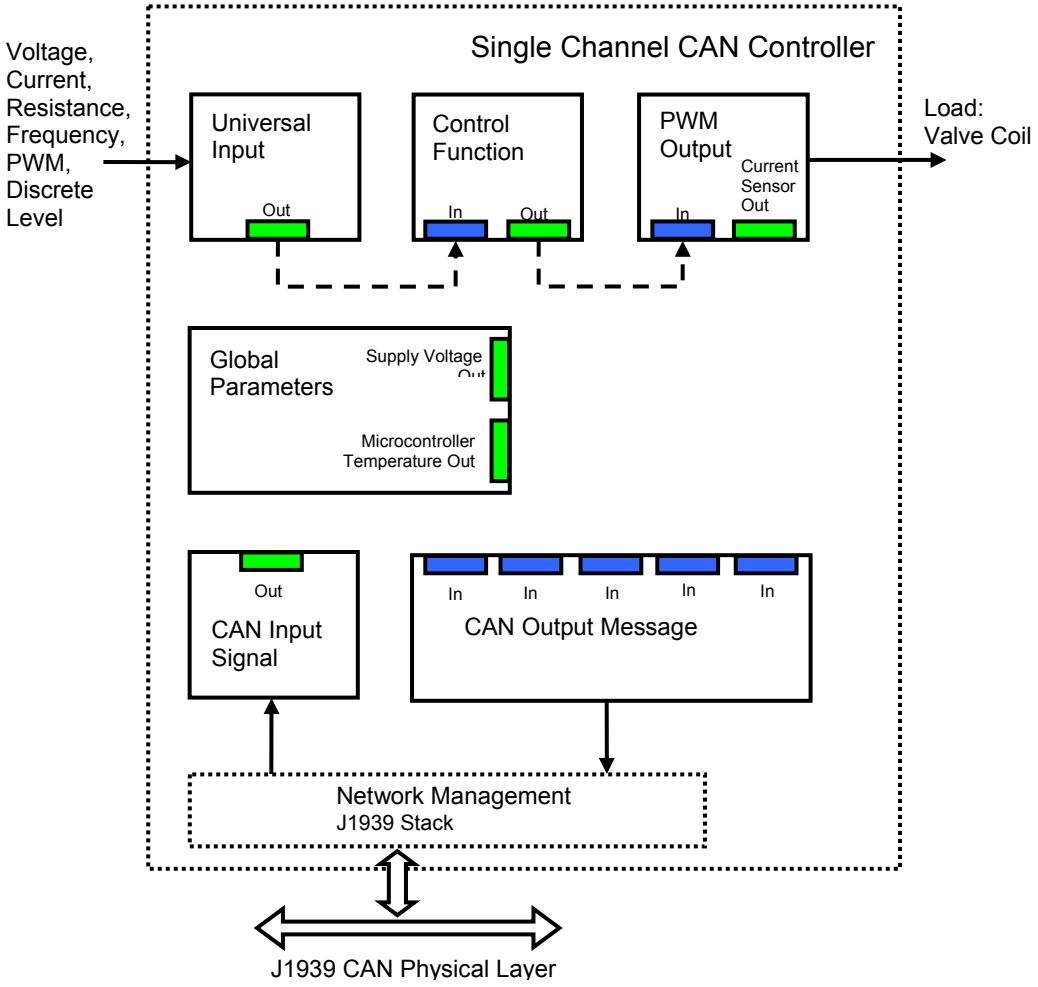


Figure 1.0 - The AX02160X is user programmable for functionality using the Electronic Assistant®. As an example, Universal Input is connected to the Conversion Function and the Conversion Function to the PWM Output, providing a path for the signal from input to output through the Conversion Function. CAN input and outputs are not used in this example.

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

Form: TDAX021601-07/23/09