TECHNICAL DATASHEET #TDAX020200

CAN SAE J1939, Dual Output Valve Controller

***with* Electronic Assistant®**

P/N: AX020200

Features:

- Two independent, software controlled outputs selectable as: Proportional Current (up to 2.5A); Hotshot Digital; PWM Duty Cycle; Proportional Voltage; or On/Off Digital types (2.5A)
- 12Vdc or 24Vdc nominal input power
- 1 CAN (SAE J1939) port
- Compact plastic enclosure with integral 8-pin connector
- LED status indication
- IP67
- **Electronic Assistant®** for user programmability
- CE marking

Applications: The controller is designed to meet the rugged demands of mobile equipment and heavy duty industrial machine control applications. These applications include, but are not limited to the following.

- PID Closed Loop Valve Control
- Hydraulic Valve Control

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*
AX020200	250 kBit/s	J1939/11, J1939/15.
AX020200-01	500 kBit/s	J1939/14. New standard
AX020200-02	1Mbit/s	Non-standard

Accessories:
Mating Plug Kit: **AX070112** (comprised of DT06-08SA, W8S, 0462-201-16141, 114017)
Electronic Assistant®: **AX070502**

Description: The CAN to Dual Output Valve Controller is a highly programmable controller, allowing the user to configure it for their application. It must be integrated into a CAN J1939 network of controllers. Its sophisticated control algorithms allow for open or closed loop drive of the proportional outputs. All logical function blocks on the unit are inherently independent from one another, but can be programmed to interact in a large number of ways. While Figure 1A shows the hardware features, Figure 1B shows the logical function blocks (software) available on the CAN-2O. All setpoints are user configurable using the Electronic Assistant®.

The CAN-2O has several built-in protections that can shut off the outputs in adverse conditions. These features include hardware shutoffs to protect the circuits from being damaged as well as software shutdown features that can be enabled in safety critical systems.

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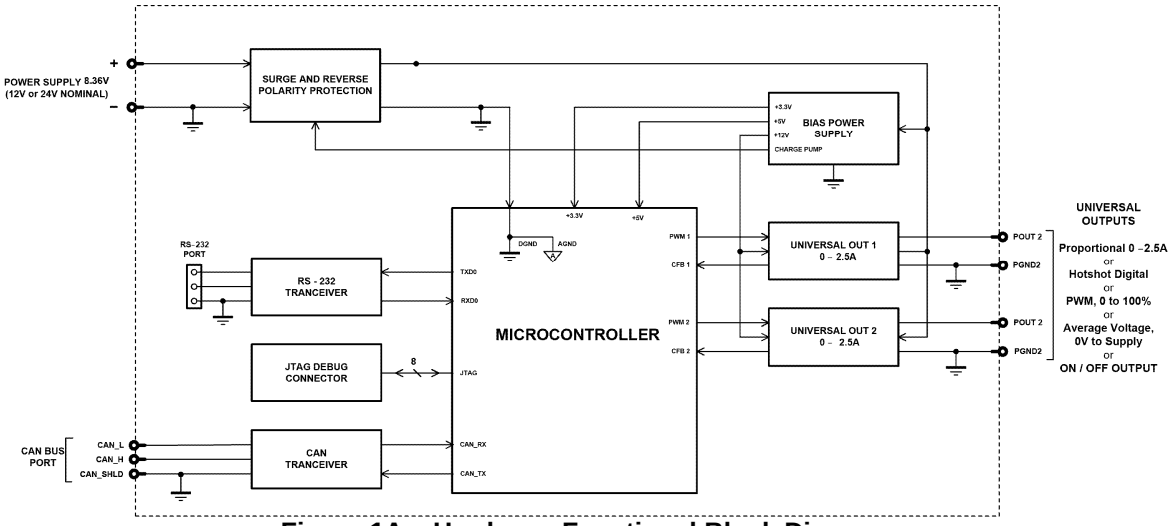

Figure 1A – Hardware Functional Block Diagram

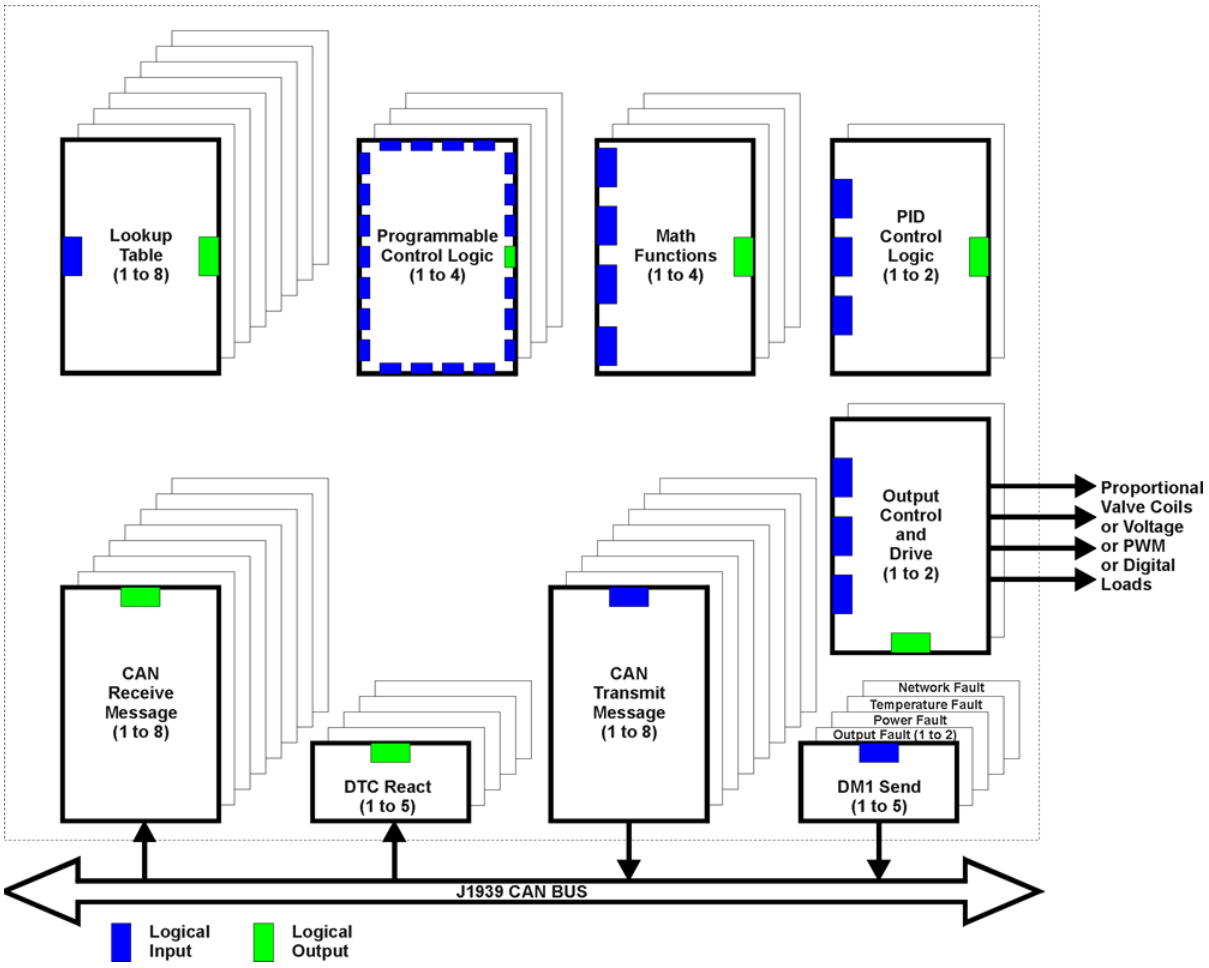

Figure 1B – Software

Technical Specifications:

Inputs

Power Supply Input	12Vdc or 24Vdc nominal (9…36 Vdc power supply range) The design is suitable for engine cranking and load dump conditions.
Protection	Reverse polarity protection is provided. Surge protection up to 150V is provided. Under-voltage protection (software, hardware shutdown at 2.5V) is provided. Over-voltage shutdown of the output load is provided.
CAN	SAE J1939 Command

Outputs

CAN	SAE J1939 Messages
Output	Two independent, software controlled outputs selectable as: Proportional Current; Hotshot Digital; PWM Duty Cycle; Proportional Voltage; or On/Off Digital types Half-bridge outputs, current sensing, grounded load. High side sourcing up to 2.5A Current Outputs: 1mA resolution, accuracy +/- 2% error Software controlled PID current Fully configurable dither from 50 to 400Hz. High frequency drive at 25kHz Voltage Outputs: 0.1V resolution, accuracy +/- 3% error Average output based on unit power supply High frequency drive at 25kHz PWM Outputs: 0.1% resolution, accuracy +/- 1% error Output Frequency: 1Hz to 25kHz Configurable frequency ONLY if no current output types are used, otherwise default 25kHz is used Digital On/Off: Load at supply voltage must not draw more than 2.5A. Note: When both outputs are on from 2A to 2.5A, the device is derated to operate at -40 to 70°C (-40 to 158°F).
Power GND Reference	One provided
Protection for Output + Terminal	Fully protected against short circuit to ground or +Vcc Grounded short circuit protection will engage at 2.5A +/- 0.5A Unit will fail safe in the case of a short-circuit condition, and is self-recovering when the short is removed.

General Specifications

Microprocessor	STM32F103CBT7 32-bit, 128 KByte flash program memory
Control Logic	User programmable functionality using Electronic Assistant® Refer to UMAX07050X for details. (Application-specific control logic or factory programmed setpoints are available on request.)
Quiescent Current	<40 mA @ 12Vdc; <30 mA @ 24Vdc
LED Indicator	User configurable to react to different events or faults
Diagnostics	Each input and output channel can be configured to send diagnostic messages to the J1939 CAN network if the I/O goes out of range. Diagnostic data is stored in a non-volatile log.
Additional Fault Feedback	There are several types of faults that the controller will detect and provide a response: unit power supply under-voltage and over-voltage, microprocessor over temperature and lost communication. They can be sent to the J1939 CAN bus.
Communications	1 CAN port (SAE J1939), CANopen® model p/n is AX020201. Refer to ordering part numbers for a list of models with different baud rates.
Reflashing over CAN	Yes, per J1939 standard using Electronic Assistant® 29-bit IDs, 250 kbps baud rate
User Interface	Electronic Assistant® for *Windows* operating systems, P/N: AX070502 It comes with a royalty-free license for use on multiple computers.
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 Temperature	Operating: -40 to 85°C (-40 to 185°F) Storage: -50 to 105°C (-58 to 221°F)

Enclosure	Molded Enclosure, integral connector Nylon 6/6, 30% glass Ultrasonically welded 3.47 x 2.75 x 1.31 inches (88.2 x 70.0 x 33.3 mm) L x W x H including integral connector *Refer to the dimensional drawing, Figure 2.0.*
Protection	IP67 rating for the product assembly
Approvals	CE marking
Safety Directive	If you have specific safety or certification requirements, please contact us.
Vibration	Suitable for high shock and vibrating environments
Shock	Suitable for high shock and vibrating environments
Weight	0.156 lb. (0.071 kg)

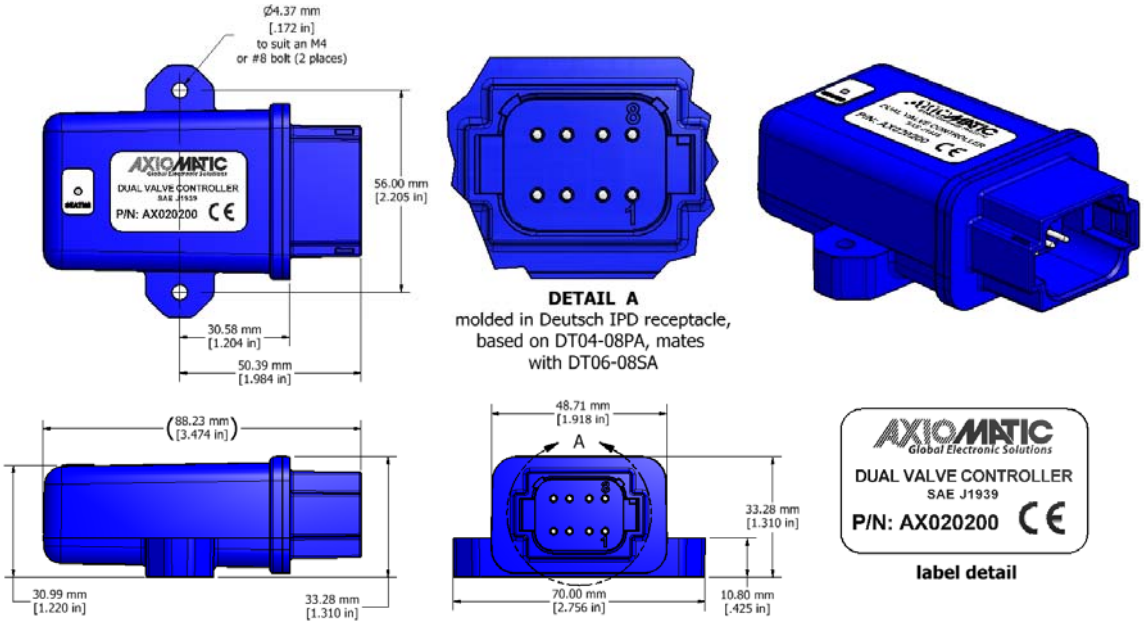

Figure 2.0. – Dimensional Drawing

Electrical Connections	Integral TE Deutsch 8 pin receptacle (P/N: DT04-08PA) 18 AWG wire is recommended for use with contacts 0462-201-16141. A mating plug kit is available. Ordering P/N: **AX070112 i**s comprised of 1 DT06-08SA, 1 W8S, 8 0462-201-16141, and 3 114017.

CAN and I/O Connector

Pin #	Function
1	CAN_L
2	CAN_H
3	Output 2 GND
4	Output 2
5	Output 1
6	Output 1 GND
7	Batt-
8	Batt+

Installation	Mounting holes are sized for #8 or M4 bolts. The bolt length will be determined by the end-user's mounting plate thickness. The mounting flange of the controller is 0.425 inches (10.8 mm) thick. If the module is mounted without an enclosure, it should be mounted vertically with connectors facing left or right to reduce likelihood of moisture entry. 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. No wire or cable harness should exceed 30 meters in length. The power input wiring should be limited to 10 meters. All field wiring should be suitable for the operating temperature range. 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).

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.

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