

Preliminary
TECHNICAL DATASHEET #TDAX024010
4 INPUTS, 2 BIDIRECTIONAL 10 - 400 mA OUTPUTS
VALVE CONTROLLER, DIN rail mount

Four Signal Inputs
Two Bi-directional 10-400 mA Outputs
One Reference Voltage
Isolated CAN (SAE J1939)
with Electronic Assistant®
Developed with Simulink®
NFC

P/N: AX024010

Features:

- Two bidirectional outputs from -400mA to +400 mA
- Isolated SAE J1939 CAN port
- Two analog signal inputs are selectable as the following voltage or current signals (Inputs 1 & 2).
 - 0-5V, 0-10V, 0 to +/- 5V, 0 to +/- 10V
 - 4-20mA, or 0-20mA
- Two analog/digital inputs are available as the following signals (Inputs 3 & 4).
 - 0-5V, 0-10V,
 - 4-20 mA, 0-20 mA,
 - PWM,
 - Frequency,
 - or Digital (Active High or Active Low).
- 12Vdc or 24Vdc nominal
- One reference voltage (+5V) is available to power sensors.
- Operates from -40 to 85°C (-40 to 185°F).
- Two LED indicators
- IP20
- DIN rail mount
- CE marking
- Configurable via Electronic Assistant®
- The firmware was developed using Simulink®.
- A Near Field Communications Antenna is provided for configuration using an Android Smartphone:
 - Place the phone next to the antenna and configure while unpowered.
 - The E-Write NFC Android Application provides flexible user configurability for application-specific input-output relationship with slope or time response.
 - Protected and secure communications



Applications:

- servo valve control in motion control, industrial automation

Ordering Part Numbers:

Valve Controller, SAE J1939 (250 kbps): **AX024010**

Electronic Assistant®: **AX070502**

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.

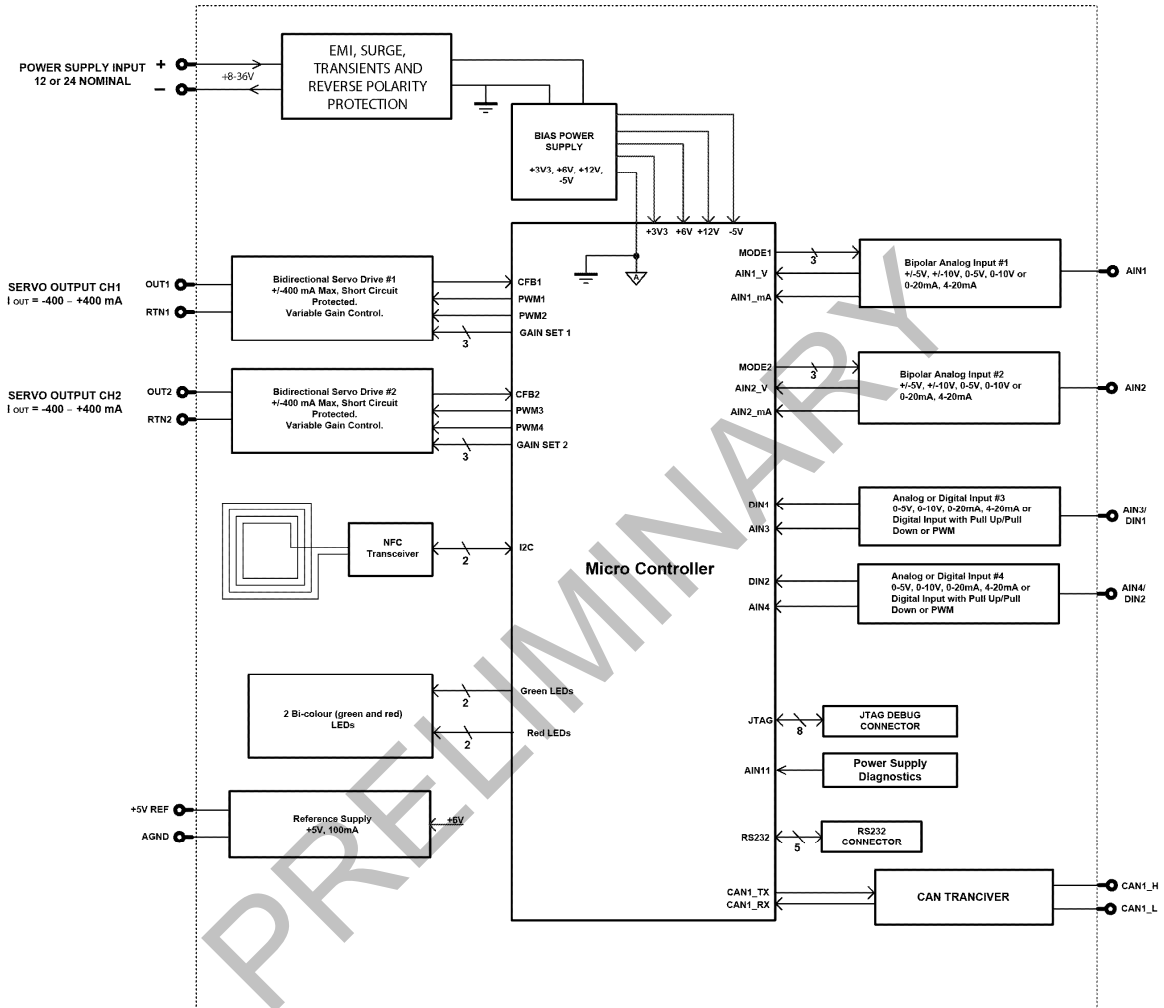


Figure 1.0 - Block Diagram

Inputs

| | |
|--------------------|----------------------------------------------------------------------------------------------------|
| Power Supply Input | 12V or 24Vdc nominal (9...36Vdc power supply range) |
| Protection | Reverse polarity protection Overvoltage protection up to 38V Under voltage shutdown at 7.5V. |
| Input Grounds | Three common input GND connections are provided. |

| Bipolar Analog Inputs | <p>Two inputs (Input 1 and 2 in Table 2.0.) User selectable as Bipolar or Unipolar Voltage or Current</p> <p>12-bit Analog to Digital Protected against shorts to GND or +Vsupply</p> <p>Voltage Types: 1mV resolution, accuracy +/- 1% error Ranges: +/-5V or +/-10V or 0-5V or 0-10V</p> <p>Current Types: 1uA resolution, accuracy +/- 1% error Ranges: 0-20mA or 4-20mA</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|--------------|--|--|-----------------------|------------|------------|--------------|--------------|---|----|------|---------------|---|----|------|---------------|---|----|----|-------------------------------|---|----|-----|------------------------------------|---|----|-----|----------------|---|-----|---|---------------|----|--------|----|---------------------|---|----|------|---------------|----|--------|----|
| Analog or Digital Inputs (Voltage, Current or PWM) | <p>Two inputs (Inputs 3 and 4 in Table 2.0.) User selectable as: Voltage, Current, PWM or Digital</p> <p>12-bit Analog to Digital (voltage, current) Protected against shorts to GND or +Vsupply</p> <p>Voltage Types: 1mV resolution, accuracy +/- 1% error Ranges: 0-5V, 0-10V</p> <p>Current Types: 1uA resolution, accuracy +/- 1% error Ranges: 0-20mA or 4-20mA</p> <p>PWM Signal Frequency: 1 – 10,000 Hz PWM Duty Cycle: 0 to 100% PWM Input: 0.01% resolution, accuracy +/- 1% error</p> <p>Digital Input: Active High or Active Low, Amplitude: 3.3V to +Vsupply</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Minimum and Maximum Ratings | <table border="1" data-bbox="565 1047 1167 1394"> <thead> <tr> <th colspan="4">Table 1.0. 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>9</td> <td>36</td> <td>V dc</td> </tr> <tr> <td>Voltage Input</td> <td>0</td> <td>36</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>36</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>36</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 1.0. Absolute Maximum and Minimum Ratings | | | | Characteristic | Min | Max | Units | Power Supply | 9 | 36 | V dc | Voltage Input | 0 | 36 | V dc | Current Input | 0 | 21 | mA | Current Input – Voltage Level | 0 | 12 | Vdc | Digital Type Input – Voltage Level | 0 | 36 | Vdc | PWM Duty Cycle | 0 | 100 | % | PWM Frequency | 50 | 10 000 | Hz | PWM Voltage pk - pk | 0 | 36 | V dc | RPM Frequency | 50 | 10 000 | Hz |
| Table 1.0. Absolute Maximum and Minimum Ratings | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Characteristic | Min | Max | Units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Power Supply | 9 | 36 | V dc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Voltage Input | 0 | 36 | V dc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Current Input | 0 | 21 | mA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Current Input – Voltage Level | 0 | 12 | Vdc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Digital Type Input – Voltage Level | 0 | 36 | Vdc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PWM Duty Cycle | 0 | 100 | % | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PWM Frequency | 50 | 10 000 | Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PWM Voltage pk - pk | 0 | 36 | V dc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RPM Frequency | 50 | 10 000 | Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Outputs

| | |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs | <p>Two +/- 400 mA bidirectional outputs, independent User selectable as: Servo Valve Control or Proportional Current Selectable current ranges from +/- 10mA to +/-400 mA Accuracy: +/- 1%</p> <p>Full bridge output Current sensing resistor</p> <p>Overcurrent protection is provided. Short circuit protection is provided.</p> |
| Reference Voltages | One 5V, 100mA, 1% reference voltage |
| Protection for Output Terminals | Fully protected against short circuit to ground and short circuit to power supply rail. Unit will fail safe in the case of a short circuit condition, self-recovering when the short is removed. |

General Specifications

| | |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Microprocessor | STM32F205VGT7 32-bit, 1MByte flash memory |
| Typical Quiescent Current | 60mA @ 12Vdc; 35mA @ 24Vdc |
| Response Time | 70 ms for 0 to 400 mA current change. |
| LED Indicators | 2 bicolour LED's (Red and Green) Power, heartbeat, input fault indication and output fault indication |
| Control Logic | Standard embedded software is provided. Setpoints are user configurable. (Application-specific control logic or factory programmed setpoints on request) Refer to the User Manual for details. |
| Communications | Near Field Communication Full-duplex Data rate: 106 kbit/s Complies with ISO1443 (RF protocol), ISO13239, and ISO7816 Protected and secure configuration |
| User Interface | E-WRITE NFC Application is available from Google Play. https://play.google.com/store?hl=en |
| Software Reflashing | Electronic Assistant® P/N: AX070502 |
| Simulink® | Model AX024010 was developed using Simulink®. Simulink® is a model-based design tool from Mathworks®. |
| CAN bus | 1 Isolated CAN port (SAE J1939) Model AX024010 250 kbps baud rate Other baud rates are available on request. |
| 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 Conditions | -40 to 85 °C (-40 to 185 °F) |
| Enclosure and Dimensions | Phoenix Contact: ME MAX 22,5 G 2-2 KMGY – 2713638 or PHO ME MAX 22.5 2-2 KMGY – 2713625 (vented) Polyamide, UL94V0, cULus recognized, China RoHS DIN rail TH 35-7.5 99 x 114.5 x 22.5 x 99 mm (L x H x W x D) Refer to Figure 2.0. |
| Protection | IP20 |
| Electrical Connections | 4 Phoenix Contact PSPT 2,5/ 4-ST KMGY spring clamp connectors Accepts 24-14 AWG wire. Refer to Table 2.0 and Figure 2.0. for pin out. |
| Compliance | CE marking |
| Weight | 0.30 lb. (0.136 kg) |
| Installation | DIN rail mount TH 35-7.5 |

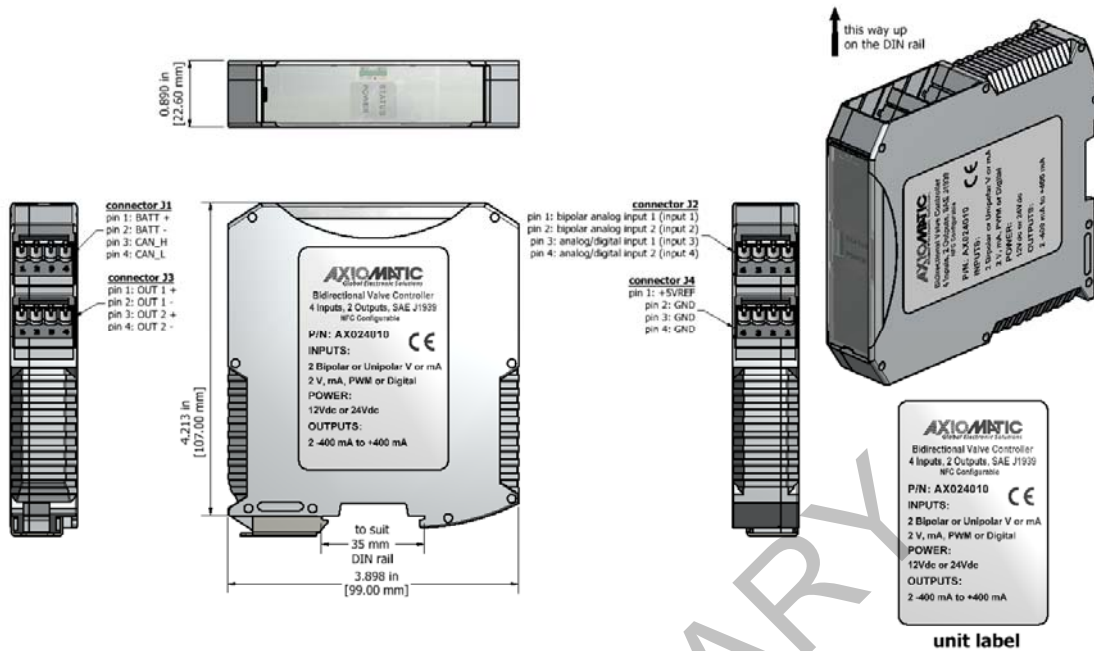


Figure 2.0 – Dimensions

Table 2.0 – Pin out: AX024010

| Power and CAN (J1) | | Outputs (J3) | | Inputs (J2) | | Reference and GNDs (J4) | |
|--------------------|----------|--------------|-----------|-------------|----------------------------------|-------------------------|-------------------|
| PIN # | Function | PIN # | Function | PIN # | Function | PIN # | |
| 1 | BATT + | 1 | Output 1+ | 1 | Bipolar Analog Input 1 (Input 1) | 1 | +5V Reference |
| 2 | BATT – | 2 | Output 1- | 2 | Bipolar Analog Input 2 (Input 2) | 2 | Common Analog GND |
| 3 | CAN_H | 3 | Output 2+ | 3 | Analog/Digital Input 1 (Input 3) | 3 | Common Analog GND |
| 4 | CAN_L | 4 | Output 2- | 4 | Analog/Digital Input 2 (Input 4) | 4 | Common Analog GND |

Note: CANopen® is a registered community trade mark of CAN in Automation e.V.
 Electronic Assistant® is a registered trademark of Axiomatic Technologies Corporation.
 Simulink® is a registered trademark of The Mathworks, Inc.

Form: TDAX024010-04/12/17