BLDC MOTOR CONTROLLER
P/N: AX100240

Features:

- Unidirectional or bi-directional BLDC motor control, sensorless operation
- Unidirectional or bi-directional DC (brushed) motor control
- Up to 50W nominal continuous output power to the motor
- Speed control for BLDC motor only and current limiting for both BLDC and DC motors
- Speed control and current limiting
- Ignition Switch input turns power ON to unit.
- Highly efficient and robust design
- Operational from 8 - 90Vdc (12 or 24V or 48Vdc nominal)
- 1 CAN port (SAE J1939) (CANopen® available)
- Continuous operation if CAN signal is lost
- User configurable with the **Axiomatic Electronic Assistant.**
- Compact size for easy mounting, 8-pin connector (the connector is a TE Deutsch P/N equivalent)
- Suitable for moist, high shock and vibration environments
- Designed for EMI/EMC compliance
- Fully sealed with a rugged IP67 enclosure
- Operational up to 125ºC temperature

Applications:

- control of small motors on heavy duty vehicles or trucks
- pump and cooling fan operations requiring speed control and current limiting
- control of small brushless and brushed motors

Ordering Part Numbers:

BLDC Motor Controller, 50W, SAE J1939 P/N: **AX100240**
BLDC Motor Controller, 50W, CANopen® P/N: **AX100241**

Axiomatic Electronic Assistant Configuration KIT, P/Ns: **AX070502, AX070505K,** or **AX070506K**

Accessories: Mating Plug Kit P/N: **AX070112**

Description: The BLDC Motor Controller has an ignition key input to turn it on. The controller can drive brushless and brushed DC motors up to 50W nominal. In the case of a brushed motor drive, only Phase A and Phase B connections are used. Refer to Figure 1.0.

Measured input data can be sent to a SAE J1939 CAN Network.

A *Windows*-based Axiomatic Electronic Assistant (EA) is used to configure the controller via the USB-CAN device.

A rugged enclosure, IP67 rating and high temperature operation up to 125ºC ensure that the controller is suitable for mounting in harsh equipment environments.
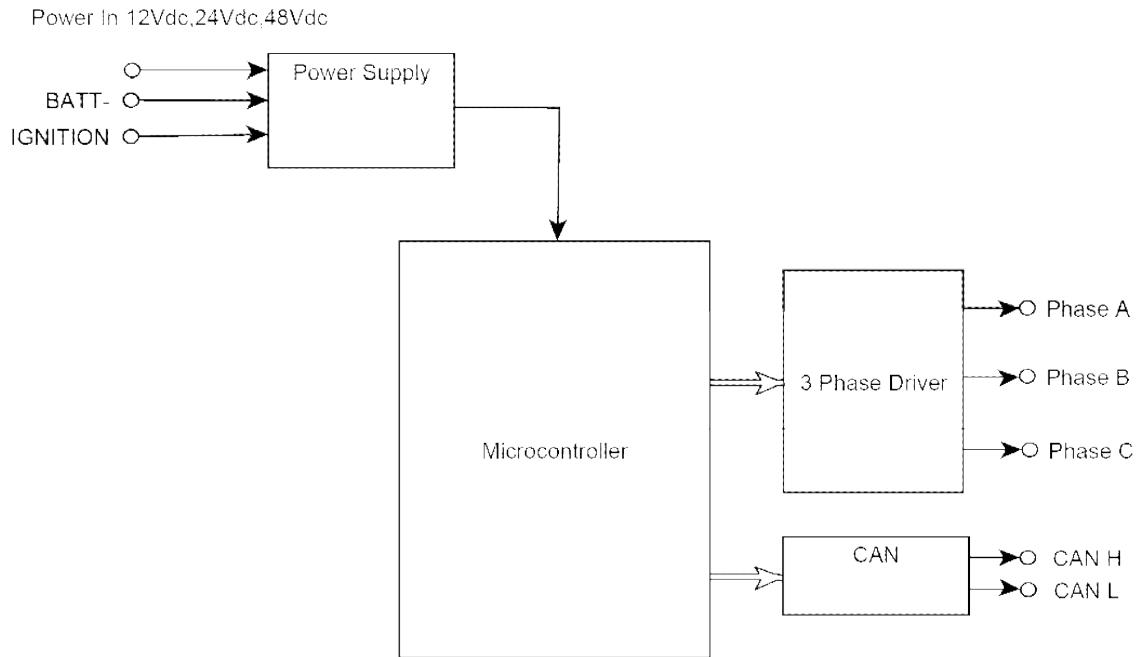
Figure 1 - Block Diagram

Technical Specifications:
All specifications are typical at nominal input voltage and 25 degrees C unless otherwise specified.

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 Specifications

Power Supply Input - Nominal	12, 24 or 48Vdc nominal (8…90Vdc)
Reverse Polarity Protection	Provided up to -150Vdc
Surge Protection	Provided
Under-voltage Protection	Built-in
Ignition Switch Input	The ignition key input turns the unit power ON. Minimum 2.5V, maximum +Vps

Output Specifications

Output to Motor	3 phase, H-bridge output 2.5A per each phase *Ratings are preliminary and subject to validation.* 2.5A @ 48Vdc nominal continuous 2.5A @ 24Vdc nominal continuous 2.5A @ 12Vdc nominal continuous 50W nominal power rating Sensorless operation Overcurrent protection is provided at 5A. Short circuit protection is provided. The maximum rated speed and the motor rated current are configurable to suit individual motor specifications.
Motor Stop	Shut off with or without ramping
Motor Direction	Motor direction command can come from the CAN bus.
Motor Control Mode	Flexible control is provided by user configurable parameters for ➤ Speed control (BLDC motors only) ➤ Current control The control input to drive the motor responds to messages from the CAN bus. It features continuous operation if the CAN signal is lost.
Thermal Protection	Thermal protection is built-in and configurable.

General Specifications

Microprocessor	TI TMS320F280048, 32-bit, 256 KB flash program memory, 100 KB RAM
Motor Control	Custom embedded software is provided. Refer to the user manual.
Quiescent Current	12µA@24Vdc
User Interface	Axiomatic Electronic Assistant KIT, P/Ns: AX070502, AX070505K, or AX070506K
Flashing over CAN	The controller software can be reflashed over the CAN connection using the Axiomatic EA.
CAN port	1 CAN port (SAE J1939) 250 kbps baud rate (CANopen® is available.)
Weight	0.16 lb. (0.073 kg)
Operating Conditions	-40ºC to +125ºC (-40ºF to 257ºF)
Protection Rating	IP67
Vibration	MIL-STD-202G, Method 204D test condition C (Sine) and Method 214A, test condition B (Random) 10 g peak (Sine); 7.68 Grms peak (Random)
Shock	MIL- STD-202G, Method 213B, test condition A 50g (half sine pulse, 9ms long, 8 per axis)
Enclosure and Dimensions	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.
Electrical Connections	Integral 8-pin receptacle (equivalent TE Deutsch 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. <table><tr><th>PIN #</th><th>FUNCTION</th></tr><tr><td>1</td><td>BATT+</td></tr><tr><td>2</td><td>BATT-</td></tr><tr><td>3</td><td>IGNITION</td></tr><tr><td>4</td><td>CAN_L</td></tr><tr><td>5</td><td>CAN_H</td></tr><tr><td>6</td><td>MOTOR_A</td></tr><tr><td>7</td><td>MOTOR_B</td></tr><tr><td>8</td><td>MOTOR_C</td></tr></table>

Mounting	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. It should be mounted with connectors facing left or right to reduce likelihood of moisture entry. 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).

Ø0.172 in [Ø4.37 mm] To suit an M4 or #8 bolt (2)

2.205 in [56.00 mm]

1.204 in [30.58 mm]

1.984 in [50.39 mm]

3.47 in [88.1 mm]

1.21 in [30.6 mm]

DETAIL A

Molded in Deutsch IPD receptacle, based on DT04-08PA, mates with DT06-08SA

CONNECTOR PIN ASSIGNMENT

PIN	FUNCTION	PIN	FUNCTION
1	BATT +	5	CAN_H
2	BATT -	6	PHASE A
3	IGNITION	7	PHASE B
4	CAN_L	8	PHASE C

1.91 in [48.6 mm]

1.31 in [33.3 mm]

0.43 in [10.8 mm]

2.76 in [70.0 mm]

A

AXIOMATIC
Global Electronic Solutions

BLDC MOTOR CONTROLLER
50W, SAE J1939
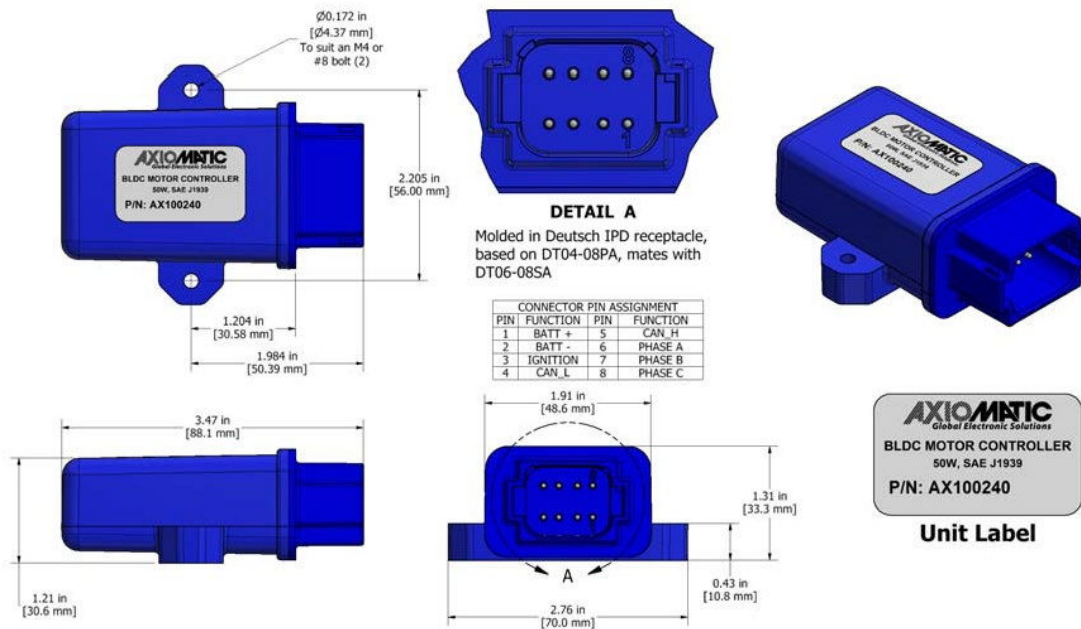
P/N: AX100240

Unit Label

Figure 2.0 - Dimensional Drawing

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

Form: TDAX100240-06/26/23