TECHNICAL DATASHEET #TDAX100311

Unidirectional DC Motor Drive

Encoder Input
CANopen® networked
P/N: AX100311

Features

- Two universal signal inputs for a speed command input is user selectable through software configuration from the following.
  - a digital input from a switch or other source;
  - 0-5 VDC, potentiometer, 0-1 V, 0-2.5 V, 0-10 VDC, 0-20 mA or 4-20 mA analog input for machine controls; or
  - PWM signal input (0.5-10 kHz, 0-100%) for interface to a PLC or engine control module (ECM).
- Encoder Input
- CAN bus input (SAE J1939 or CANopen®)
- Speed control command input can be transmitted over CAN bus
- Half H-bridge motor drive technology
- Provides a 12V or 24V, 25A output to a unidirectional brushed or other DC motor used in electric fan drives and many more applications
- NVM memory retains configuration in case of power loss
- Operating temperatures are –40 to 75°C (-40 to 167°F)
- Encapsulated in a rugged metal base with water-tight connectors, IP65 rated
- Monitors current drawn by the load and transmits info at a constant interval to the CAN bus

Applications:

- Electric Vehicles
- On-highway Vehicles
- Off-highway Equipment
- Fuel Cell Stationary Power
- Industrial Cooling

In electric fan drive applications, a loss of CAN bus communications has the controller output operate at a default value that turns on the motor to allow a cooling fan to operate until communications are re-established or a time-out period elapses.

Ordering Part Numbers:

Unidirectional DC Motor Drive with Encoder Input, SAE J1939 (with auto-baud-rate-detect) - **AX100310**

Unidirectional DC Motor Drive with Encoder Input, CANopen® - **AX100311**
EDS File

Accessories – Wire Harnesses

Power and Output wire harness assembly, 2m – P/N: **AX070149**
Mating connector kits for the M12 connectors are not supplied.

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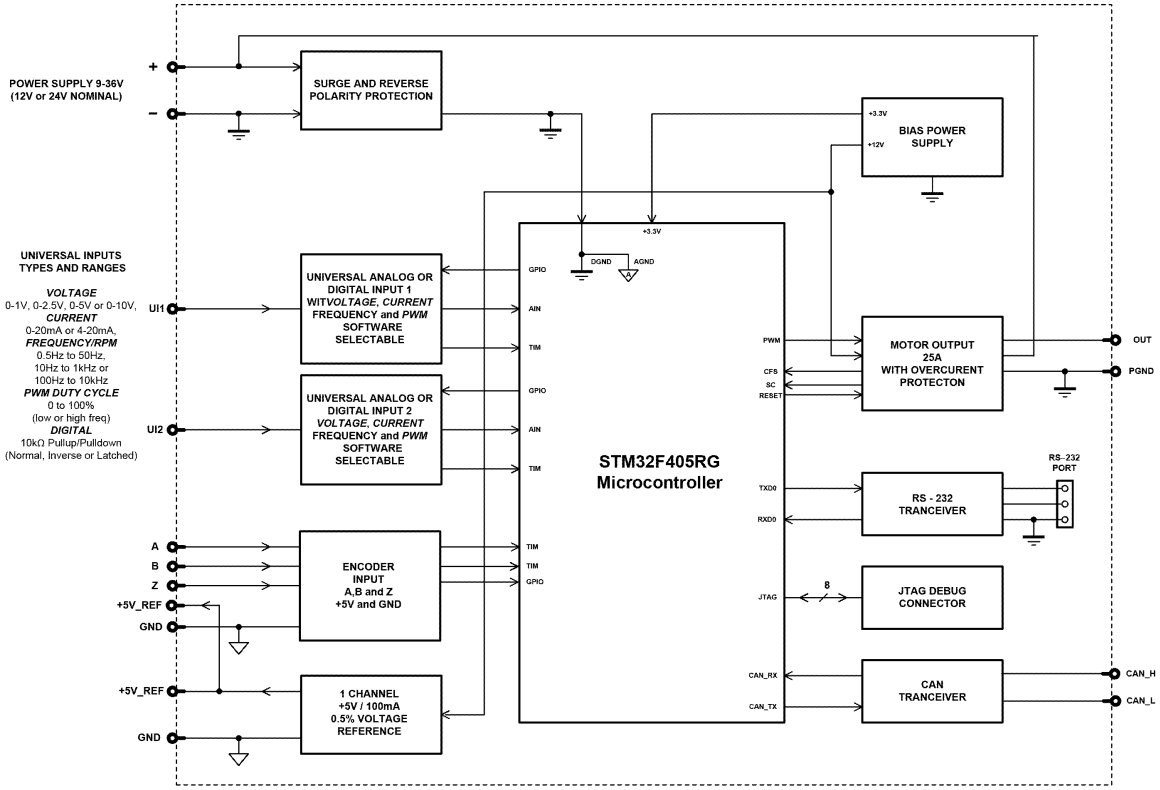
BLOCK DIAGRAM



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 Limitations & Return Materials Process as described on https://www.axiomatic.com/service/.

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

Power Input

Power Supply Input	12V or 24V nominal 9…36 VDC power supply range Transient surge protection is provided. WARNING: This unit is designed for a battery power source. Back EMF from a motor could damage the controller if a bench power supply without voltage regulation is used.
Reverse Polarity Protection	Provided

Input Specifications

CAN Interface CAN_HI CAN_LO	The user can select to control the motor using either a command received from the CAN bus or a wired command input.
Command Signal Input	Two signal inputs Speed command input is universal and user selectable through software configuration. Choose from one of the following signals: ▪ a digital input from a switch or other source (10 kΩ pull-up/pull down – normal, inversed or latched); ▪ potentiometer, 0-1 V; 0-2.5 V; 0-5 V; 0-10 VDC, 0-20 mA or 4-20 mA analog input for machine controls; or ▪ PWM signal input (0.5 Hz to 50 Hz; 10 Hz to 1 kHz; 100 Hz to 10 kHz, 0-100%) for interface to a PLC or engine control module (ECM).
Input GND	Isolated GND connection provided
Quadrature Encoder Input	A, B, Z, +5V and GND connections Maximum Input Frequency 100 kHz *(Input 'Encoder Z", which measures the speed, is not able to measure a frequency higher than 60 KHz.)* Input Amplitude: 0 to Vps. 20kΩ pulldown resistor Rising/Falling edge threshold 4.0V/1.0V +/- 0.1V Number or pulses per revolution are configurable. Custom scaler for encoder steps counter value. There is a configurable polarity of direction of rotation.

Output Specifications

Drive Output	Outputs to a unidirectional, brushed DC motor (other DC motors, contact manufacturer) Half H-Bridge Driver Standard model – 12V or 24V, Up to 25 Amps continuous
Resolution	15-bit PWM
Accuracy	+/- 1% (Duty Cycle)
Protection	Overcurrent and short circuit protection are provided.
+5V Reference	+5V, 100 mA, 0.5%

General Specifications

Microprocessor	STM32F405RG
CAN Interface	Model AX100311: CANopen®
Monitoring (options)	The controller can monitor the current drawn by the motor and transmits this information at a constant interval over the CAN bus. Other monitoring options include input measured and % Duty Cycle applied to the motor.
Quiescent Current	61 mA @ 12 VDC; 31 mA @ 24 VDC typical
LED Indication	POWER – Green LED's ON Heartbeat – Green LED (Flashing) CAN Transmit & Receive – Red LED's
Control Logic	Refer to the user manual for details.
CAN Termination	120Ω should be connected between CAN_HI and CAN_LO in a mating wire harness assembly (not supplied).

Electrical Connections	1 8-pin M12, A coded connector 1 5-pin M12, A coded connector 1 4-pin connector (TE Deutsch P/N: DTP15-4P) See pin out below
Mating Wire Harness	The mating plug kits for the M12 connectors are not supplied. 1 4-pin connector (TE Deutsch P/N: DTP15-4P) mates with wire harness **AX070149** (The mating plug assembly is TE Deutsch P/Ns: DTP06-4S, WP4S and four contact sockets 0462-203-12141 with 2 meters (6.5 ft.) of 12 AWG lead wire, unterminated.) <u>Wire Harness Pin out:</u> 1 Output - Black/White 2 Battery – Black 3 Battery + Red 4 Output + Red/White
Enclosure and Dimensions	Encapsulated unit enclosed in a stainless-steel casing with powder coated steel base *Refer to the dimensional drawing.*
Operating Conditions	-40 to +75°C (-40 to 167°F) 0 to 95% relative humidity
Storage Temperature	-40 to 100°C (-40 to 212°F)
Weight	1.80 lb. (0.816 kg)
Vibration	Vibration compliance is suitable for mobile equipment applications.
Protection	IP65

Connector	**PIN#**	**Function**
Command and CAN 8-pin M12 Female, A coded	1	Input GND
	2	+5V Reference
	3	Input 1
	4	CAN_H
	5	CAN_L
	6	Input 2
	7	Not Used
	8	Not Used
Power and Output (TE Deutsch P/N: DTP15-4P)	1	Output -
	2	Battery -
	3	Battery +
	4	Output +
Encoder Input 5-pin M12, A coded P/N: 09-3442-126-05		
	1	+5V
	2	ENC_A
	3	ENC_B
	4	ENC_Z
	5	GND

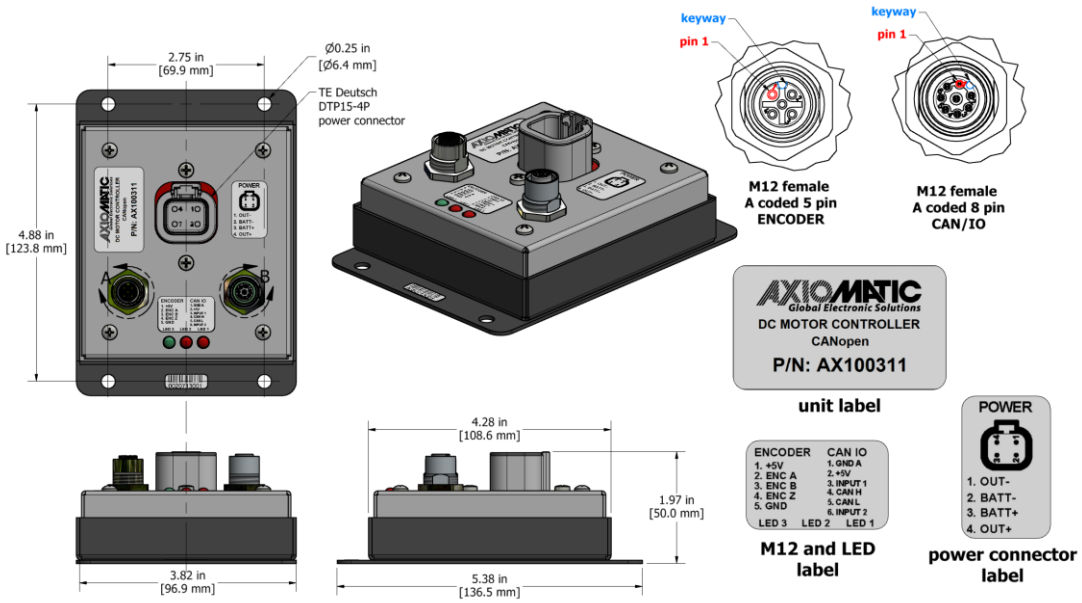


Figure 1.0 – Dimensional Drawing

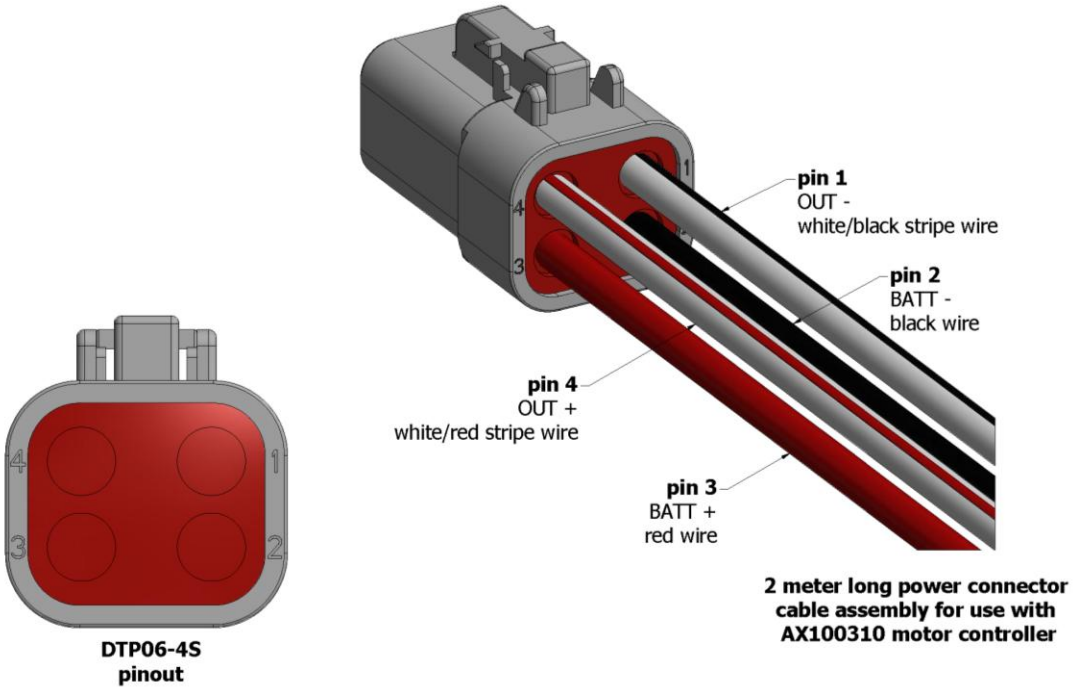


Figure 2.0 – Wire Harness AX070149

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