

Unidirectional DC Motor Drive

CAN networked

P/N: AX100300

Smooth and precise speed control with CAN communications for unidirectional, brushed and other DC motors...

- Compact drive for 12V or 24V unidirectional, brushed and other DC motors designed for highly efficient and reliable power control
- Current output up to 12 Amps
- CAN communications (SAE J1939)
- RS-232 port
- Configurable software provided

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.



*Rugged packaging
for harsh environments*

Features

- Accepts 9...32VDC power supply with reverse polarity protection provided
- Speed command input is universal and user selectable through software configuration.
 - a digital input from a switch or other source;
 - 0-5VDC, potentiometer, 0-10VDC, 0-20 mA or 4-20 mA analog input for machine controls; or
 - PWM signal input (50-10kHz, 0-100%) for interface to a PLC or engine control module (ECM).
- Speed control command input can be transmitted over CAN 2.0B, SAE J1939
- Half H-bridge motor drive technology
- Provides a 24V, 12A output to an 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 connector, IP67 rated
- Control logic is user configurable over the RS-232 interface (Refer to User Manual.)
- Monitors current drawn by the load and transmits info at a constant interval to the CAN bus (option)

Ordering Part Number:

Unidirectional DC Motor Drive - **AX100300**

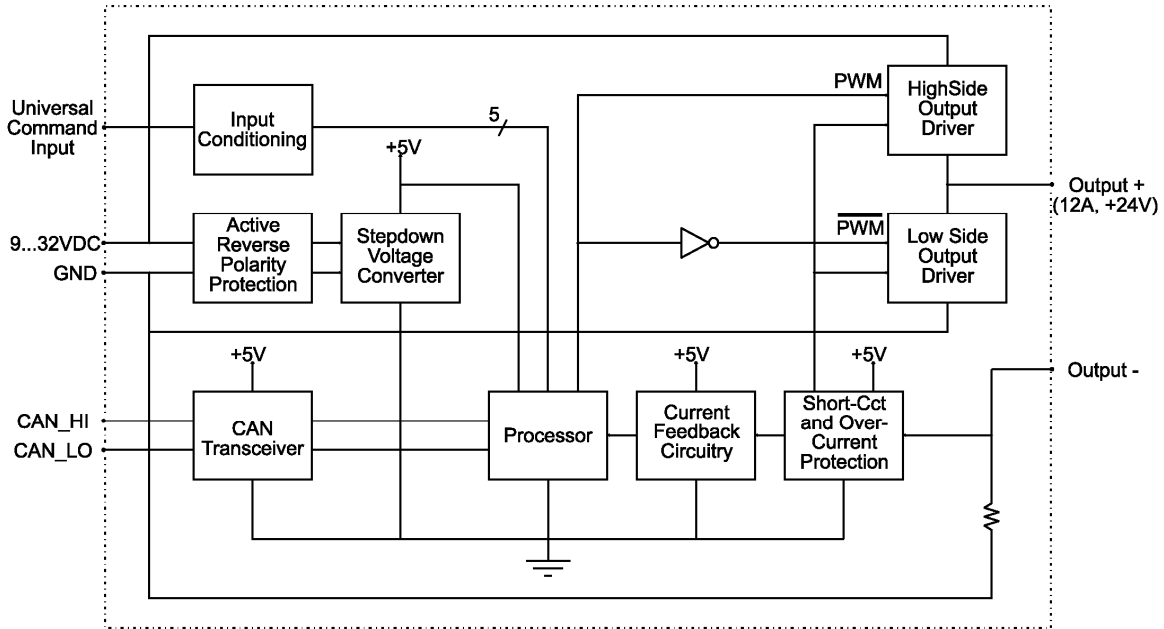
Accessories – Wire Harnesses

RS-232 wire harness assembly with a DB-9 connector, 2m - P/N: **AX070101**

CAN connector wire harness assembly, 2m – P/N: **AX070301**

Power and Output wire harness assembly, 2m – P/N: **AX070109**

BLOCK DIAGRAM



Technical Specifications:

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

Input Specifications

Power Supply Input	9...32 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
CAN Interface CAN_HI CAN_LO	All inputs can be provided over the CAN bus. As per ISO 11898 Standard, CAN 2.0B Protocol SAE J1939 The user can select to control the motor using either a command received from the J1939 bus or a wired command input.
Command Signal Input	Speed command input is universal and user selectable through software configuration. Choose from one of the following signals: <ul style="list-style-type: none"> ▪ a digital input from a switch or other source; ▪ 0-5VDC, potentiometer, 0-10VDC, 0-20 mA or 4-20 mA analog input for machine controls; or ▪ PWM signal input (50-10kHz, 0-100%) for interface to a PLC or engine control module (ECM).

Output Specifications


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

General Specifications

CAN Interface	<p>1 CAN port (SAE J1939)</p> <p>The software was designed to provide flexibility and provides the following.</p> <ul style="list-style-type: none"> • Configurable ECU Instance in the NAME (for multiple ECU's on the network) • Configurable Input Parameters • Configurable Motor Parameters • Configurable PGN and Data Parameters <p><i>Note: Configurable parameters are also called setpoints.</i></p> <p>By default the drive uses a Proprietary B message to send data to the network bus. <i>To use J1939 capabilities, refer to the user manual.</i></p> <p>The Motor Drive, AX100300, is compliant with Bosch CAN protocol specification, Rev.2.0, Part B, and the following J1939 standards.</p> <table border="1" data-bbox="516 531 1295 1318"> <thead> <tr> <th colspan="2">Table 1: J1939 Compliance</th> </tr> <tr> <th>OSI Network Model Layer</th> <th>J1939 Standard</th> </tr> </thead> <tbody> <tr> <td>Physical</td> <td>J1939/11 – Physical Layer, 250K bit/s, Twisted Shielded Pair. J1939/15 - Reduced Physical Layer, 250K bits/sec, Un-Shielded Twisted Pair (UTP).</td> </tr> <tr> <td rowspan="2">Data Link</td> <td>J1939/21 – Data Link Layer</td> </tr> <tr> <td>The motor controller does not support Transport Protocol for either transmitting or receiving multi-packet messages. It supports responses on PGN Requests (PGN 59904) and acknowledgements (PGN 59392). It also supports Proprietary B messaging (PGN 65280 to 65535).</td> </tr> <tr> <td rowspan="2">Network Layer</td> <td>J1939/81 – Network Management J1939, Appendix B – Address and Identity Assignments</td> </tr> <tr> <td>The controller supports: Address Claimed Messages (PGN 60928), Requests for Address Claimed Messages (PGN 59904). This unit is not arbitrary address capable, although the user can change the address using the RS-232 interface. It does not support the Commanded Address (PGN 65240).</td> </tr> <tr> <td rowspan="2">Application Layer</td> <td>J1939/71 – Vehicle Application Layer</td> </tr> <tr> <td>None of the application layer PGN's are supported as part of the default configurations. However, the drive could be configured such that any of the input messages to be sent will use a PGN from this section, or for the outputs to respond to the data in a message with a PGN from this section. The data size, index, resolution and offset can all be configured for the appropriate SPN associated with the PGN. <i>It is the user's responsibility to configure the drive such that it will not violate the J1939 standard.</i></td> </tr> <tr> <td></td> <td>J1939/73 – Application Layer – Diagnostics</td> </tr> </tbody> </table>	Table 1: J1939 Compliance		OSI Network Model Layer	J1939 Standard	Physical	J1939/11 – Physical Layer, 250K bit/s, Twisted Shielded Pair. J1939/15 - Reduced Physical Layer, 250K bits/sec, Un-Shielded Twisted Pair (UTP).	Data Link	J1939/21 – Data Link Layer	The motor controller does not support Transport Protocol for either transmitting or receiving multi-packet messages. It supports responses on PGN Requests (PGN 59904) and acknowledgements (PGN 59392). It also supports Proprietary B messaging (PGN 65280 to 65535).	Network Layer	J1939/81 – Network Management J1939, Appendix B – Address and Identity Assignments	The controller supports: Address Claimed Messages (PGN 60928), Requests for Address Claimed Messages (PGN 59904). This unit is not arbitrary address capable, although the user can change the address using the RS-232 interface. It does not support the Commanded Address (PGN 65240).	Application Layer	J1939/71 – Vehicle Application Layer	None of the application layer PGN's are supported as part of the default configurations. However, the drive could be configured such that any of the input messages to be sent will use a PGN from this section, or for the outputs to respond to the data in a message with a PGN from this section. The data size, index, resolution and offset can all be configured for the appropriate SPN associated with the PGN. <i>It is the user's responsibility to configure the drive such that it will not violate the J1939 standard.</i>		J1939/73 – Application Layer – Diagnostics
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Serial Interface	<p>1 RS-232 port interfaces to a serial port (i.e. COM1) on a PC (115200 Baud Rate, N81, Xon/Xoff Flow Control) Use Tera Term or an equivalent data terminal.</p>																	
Monitoring (options)	<p>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.</p>																	
LED Indication	<p>3.3V, 5V, 7V – red LED's ON Heartbeat – Green LED CAN Transmit & Receive – Red LED's</p>																	
CAN Termination	<p>121Ω should be connected between CAN_HI and CAN_LO in a mating wire harness assembly (not supplied).</p>																	

Electrical Connections	<p>1 6 pin DT15-6P-(G003) connector Mates with wire harness AX070301 comprised of a plug assembly (Deutsch IPD P/N: DT06-6S, W6S wedge, 6 gold-plated sockets 0462-201-1631) and 2 m unterminated 16 AWG wire)</p> <p>1 4 pin DT15-4P-(G003) connector Mates with wire harness AX070109 comprised of a plug assembly (Deutsch IPD P/N: DT06-4S, W4S wedge, 4 gold-plated sockets 0462-201-1631) and 2m unterminated 16 AWG wire</p> <p>1 4 pin M8 P/N: NAN-T-3MR-M8 A 2m mating wire harness assembly, including mating connector P/N: NAN-T-3FP-2M and a DB-9 connector, is available. Ordering P/N: AX070101</p> <p>See pin out below in Table 2.0.</p>
EMC Compatibility	Contact manufacturer.
Packaging and Dimensions	<p>Potted unit packaged in a stainless steel casing with powder coated steel base 3.55 x 5.00 x 1.30 inches or 90.2 x 127.0 x 33.0 mm (W x L x H) <i>Height excludes the height of the connectors and mating plugs.</i> <i>Height with receptacles (connectors) on unit is 1.81 inches or 46.0 mm.</i></p>
Operating Conditions	<p>-40 to +75°C (-40 to 167°F) 0 to 95% relative humidity</p>
Storage Temperature	-40 to 100°C (-40 to 212°F)
Weight	1.75 lbs. (0.79 kg)
Vibration	Vibration compliance is suitable for mobile equipment applications.
Protection	IP67

Table 2.0 Pin out:

Connector	PIN#	Function
Command and CAN DT15-6P-(G003)	1	Input GND
	2	+5V Reference
	3	Input
	4	CAN_H
	5	CAN_L
	6	Shield
Power and Output DT15-4P-(G003)	1	Battery +
	2	Output +
	3	Output -
	4	Battery -
RS-232 NAN-T-3MR-M8		
	1	RS-232 TXD (Brown wire)
	2	Not Used
	3	RS-232 RXD (Blue wire)
	4	RS-232 GND (Black wire)

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.

Form: TDAX100300-07/21/09

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