TECHNICAL DATASHEET #TDAX020100

VALVE CONTROLLER – 2 I/O

Engine Control Module PWM Signal Interface,
Single Proportional or On/Off Output

P/N: AX020100 SERIES

Features:

- OEM specifications are accommodated with factory programming on request
- Accepts a PWM signal with variable duty cycle from an Engine Control Module
- Provides one DC current output of up to 2 Amps (other current outputs on request)
- Either a proportional or digital output is available (factory programmed)
- Minimum and maximum current output are user configurable within factory set ranges
- Superimposed dither is user configurable
- Ramp time is user configurable
- Powered by a power supply input from 9…32VDC and designed for rugged applications
- RS232 interface to PC or laptop for user configuration and diagnostics
- Compact IP67 rated packaging and plug-in connections
- Operational from -40 to 85°C (-40 to 185°F)
- Alternate hardware configurations on request

Other controllers are available on request, including:

- Open loop, 0…5VDC or 4-20 mA analog inputs
- Multiple temperature sensor inputs
- Multiple digital I/O
- PT input
- Engine RPM sensor input
- Two proportional or on/off outputs to drive hydraulic valves
- CAN bus interface for data exchange with vehicle control systems
- High current electric fan controllers in various configurations

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Applications:

The controller is designed to interface to a variety of Engine Control Modules configured for a PWM output. It provides a singles proportional or on/off output to drive a hydraulic valve. It is suited for a wide variety of applications in mobile equipment, marine and industrial hydraulic circuits. The electronic controllers are factory programmed to meet application-specific requirements and most Engine Control Module PWM signal specifications. A unique part number will be assigned for each application.

The controller can be used as part of a hydraulic fan control system that optimizes fan speed independent of vehicle speed, saving energy and reducing emissions. In fan control applications, the controller can be used with HydraForce TS-08-27, TS-10-27 and TS-12-27 series of Pressure Relieving Electro-Proportional Cartridge Valves or the PV series of Proportional Flow Control Cartridge Valves or equivalent.

The controller can also provide control of an on/off valve such as the HydraForce SV series of valves when used in a hydraulic drive circuit or equivalent hydraulic valves.

Description:

OEM specifications for controls are accommodated with factory programming. Alternate hardware configurations are available upon request.

The controller accepts a broad range of power supply input from 9 to 32 VDC. The power supply section is designed to meet the rugged requirements of mobile equipment.

The controller accepts a PWM signal with variable duty cycle from an Engine Control Module.

Parameters are user configured with a laptop over the RS232 serial communications link.

Parameters	**Default**	**Range**
PWM Frequency	80 Hz	50-500 Hz
Duty Cycle Minimum	0%	0-20%
Duty Cycle Maximum	100%	80-100%
Minimum Current Output	0 mA	0 – 600 mA
Maximum Current Output	1100 mA	800 – 2000 mA
Dither Frequency	200 Hz	70 - 350 Hz
Start up Timer	3 Seconds	2 – 10 Seconds
Dither Amplitude	FIXED at 10% of maximum current	Not adjustable

The controller provides one solenoid output. Either a proportional or on/off output is available to suit the user's application. The DC current output of the controller is designed for the ratings of the HydraForce proportional cartridge valves, up to 2 Amps. Overcurrent protection of 3 Amps on the output is provided. *Maximum current output should be specified at the time of ordering.*

The controller has two modes of operation: calibration and run. The user sets up the mode of operation through the RS232 interface to COM1 of a PC or Laptop (19 200 baud rate, N81). In calibration mode, the user powers the controller and adjusts all the variables. Note that if the user hits any key on the keyboard within 3 seconds after powering up the unit, the controller enters calibration mode. If no key is pressed within the 3 seconds upon start up, the unit enters run mode. To get back to the configuration mode you must power the unit down and then power it back up again. Once the unit is calibrated, the user enters run mode.

In the case of a temporary or intermittent fault, the controller turns the output off for several milliseconds until the situation corrects itself, and then restarts with the same output as before the fault. However, if the overcurrent situation continues, the controller will shut off completely. After a length of time specified by the OEM, the controller will return the output to the same level as before. If the fault is still present, the overcurrent protection process is repeated until the fault is corrected. In the case of loss of input signal, the controller will respond to suit the application (contact the manufacturer for details.) In fan drive applications; the controller and valve circuits are also designed to provide a maximum fan speed in the cooling circuit in the case of a power loss. Errors can be diagnosed using the RS232 interface to a PC or Laptop.

The controller is packaged for the rugged mobile environment, in a remote mount high temperature nylon housing with a watertight 12-pin connector. *Mating plug connectors with wire harnesses are available upon request. OEM specific packaging and connection styles are available.*

SPECIFICATIONS

Power

Type	Description
Power supply	12Vdc or 24Vdc nominal 9-32Vdc

Inputs

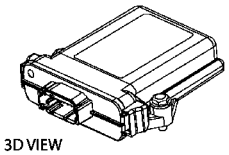
Type	Description	Notes
PWM Input Signal from Engine Control Module	Frequency - Default 80 Hz Adjustable from 50-500 Hz Duty Cycle – Default 0-100% Adjustable from minimum 0-20%, maximum 80-100%	Refer to parameter table.

Output

Type	Description	Notes
Current Output (High Frequency Pulse Width Modulation)	1.1Amps maximum output (adjustable) *Other output currents available up to 3 Amps with factory programming. Contact manufacturer.* Overcurrent protection is provided. No Ramps Superimposed dither frequency and amplitude are provided.	Used to drive a HydraForce proportional pressure control valve or equivalent. I min and I max are adjustable. (Refer to parameter table.) Superimposed dither frequency and amplitude are adjustable. (Refer to parameter table.)

General

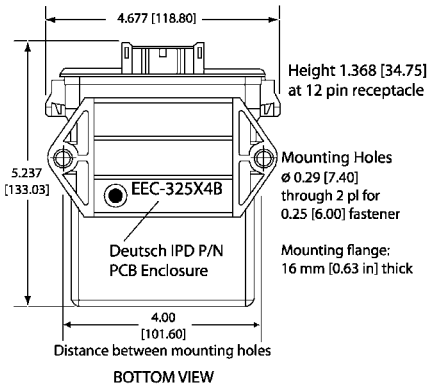
Type	Description
Protection	IP67 for package with connector (Connector itself is rated for IP69)
Operating temperatures	-40 to +85 degrees C (-40 to 185 degrees F)
Microprocessor	AT89S53 in-circuit programmable 12 kBytes NVM
Electrical Connections	<u>12 pin version</u> Deutsch DTM series 12 pin receptacle (DTM13-12PA-R008) *It is recommended to use dielectric grease on the connector pins at installation.* Mating plug and wire harness available on request for prototypes: Plug is Deutsch DTM06-12SA with wedgelock (WM12S) and including 12 contacts (P/N: 0462-201-20141). A Deutsch crimping tool is required to connect wiring to contacts. Wiring of 20 AWG is accepted by the contacts. Wire harness should include a DB9 connector for interface to a PC.
Packaging and Dimensions	High Temperature Nylon housing with 12-pin receptacle Deutsch IPD PCB Enclosure (P/N: EEC-325X4B) 4.62 x 5.24 x 1.43 inches 117.42 x 133.09 x 36.36 mm (WxLxH excluding mating plug)
Vibration	Vibration compliance is suitable for mobile equipment applications.
Interface	RS232 serial communication is available for interface to COM1 on a PC 19200 baud rate, N81 Microsoft HyperTerminal™ or an equivalent data terminal



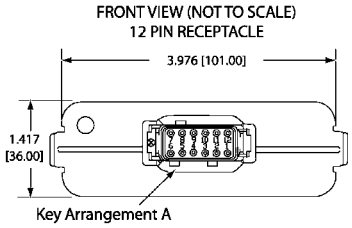
3D VIEW
12 Pin Receptacle

HOUSING DIMENSIONS

Housing Material: High Temperature Nylon (Black)
Protection Rating: IP67



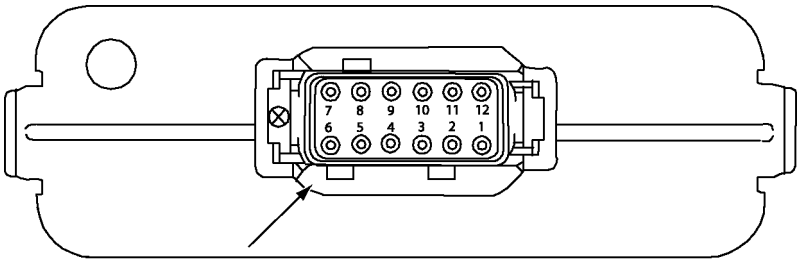
BOTTOM VIEW



Mating Plug Assemblies:
12 pin receptacle - DTM06-12SA
with wedgelock WM12S and contacts
24 pin receptacle - DTM06-12SA and DTM06-12SB
with wedgelocks WM12S and contacts
Contact factory for contact specification.

Dimensions: inches [mm]
excluding mating plug(s)

CONNECTIONS



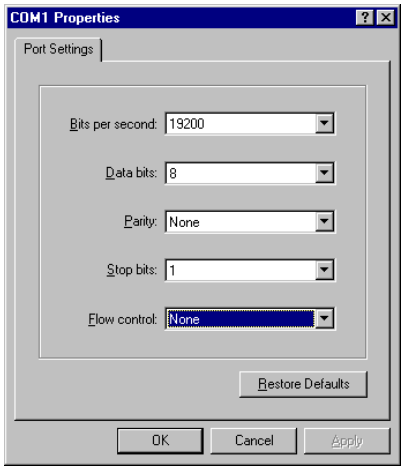
Key Arrangement A

FRONT VIEW 12 PIN RECEPTACLE

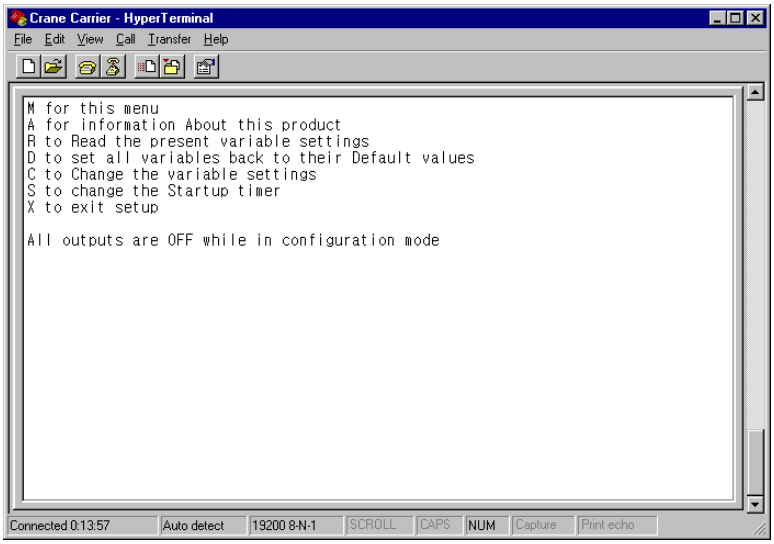
PIN #	FUNCTION
1	Power +
12	Power -
2	Solenoid +
11	Solenoid -
3	Not Used
10	Not Used
4	Not Used
9	RS232_TXD
5	PWM Input
8	RS232_RXD
6	Input GND
7	RS232_GND

Installation Instructions

- Connect the DB9 connector to a PC or laptop computer.
- Navigate to and startup Microsoft HyperTerminal.
- Enter a name for the new connection (your choice).
- Select COM1 serial port.
- Select the following port settings for COM1 (19 200 baud rate, N81).



- With the DB-9 connector from the controller plugged into the computer's COM1 serial port, power the unit. A message stating Axiomatic Technologies Corporation © 2003 appears on the screen.
- Press any key on the keyboard to enter into configuration mode. If a key is not pressed within 3 seconds, the controller will enter its run mode. To get back to the configuration mode you must power the unit down and then power it back up again.
- When a key is pressed within 3 seconds this is the statement received.



- MENU COMMANDS include:

A – information about the product
R – reads current variable settings from controller.
D – sets variables back to default values:
C - changes the variable settings.

- To change a parameter, key in the number and press the Enter key.
  1. PWM Frequency
  2. Min. Duty Cycle
  3. Max. Duty Cycle
  4. Min. Output Current
  5. Max. Output Current
  6. Dither Frequency

Parameters	Default	Range of Adjustment
PWM Frequency	80 Hz	50-500 Hz
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Duty Cycle Maximum	100%	80-100%
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Dither Frequency	200 Hz	70 – 350 Hz
Start up Timer	3 Seconds	2 – 10 Seconds
Dither Amplitude	FIXED at 10% of maximum current	Not adjustable

- Key in the new desired value (without units) and press the Enter key.
  -When finished changing variables key in 7 and press the Enter key.
  -Press M to return to the main menu.

*Be careful not to key in letters when entering a numeric value. In this event, “Invalid Selection, returning to Main Menu” will be displayed. When this occurs, you will not be able to change anymore variables. You must exit to the main menu and restore the default settings before you change variables again.

- To change the start up timer, key in the appropriate menu command.
  S – changes the startup timer.
  -Key in the new desired value (without units) and press the Enter key.
  -Press M to return to the main menu.

*Be careful not to key in letter here also. This will enter into a non-acceptable value loop that can not be stopped. In this event, you’ll have to power down the unit and power it up again.

- To exit setup and enter RUN mode, key in the appropriate menu command.
  X – exits the setup and puts the unit into run mode.

For installation instructions for a specific part number, contact the manufacturer.

Ordering Part Number:

Valve Controller – 2 I/O (ECM interface, Single Proportional or On/Off Output)
AX020100

Specify the PWM frequency and duty cycle generated by the Engine Control Module that is the input to the controller. Specify the type of output required (proportional or on/off) and the valve part number with current ratings.

Form: TDAX020100-11/28/06