Preliminary
TECHNICAL DATASHEET #TDAX030780

# 1x Input, 2x Analog & 2x 5A Proportional Outputs Controller

*1x CAN (SAE J1939) Port*
*1x H-Bridge or 2x 5A Proportional / Digital Outputs*
*2x Analog Voltage or Current Outputs*
*1x Isolated Digital Input*
*Configurable with Axiomatic Electronic Assistant*
**P/N: AX030780**

## Features

- 1x isolated digital input
- 2x outputs (up to ±5 A) selectable as follows.
  - Proportional voltage
  - Proportional current
  - Digital hotshot
  - PWM
  - Digital on/off
  - 1x H-bridge output
- 2x analog voltage or current outputs
- Operational from 7 to 46 VDC (12 or 24 VDC)
- 1x CAN port (SAE J1939) with auto-baud-rate detection
- Compact
- Integrated 12-pin connector
- Sealed enclosure, IP67
- Configure with Axiomatic Electronic Assistant


## Applications

Controls and drives lamps, relays, actuators, valves, and DC motors

## Ordering Part Number

1x Input, 2x Analog & 2x 5A Proportional Outputs Controller, SAE J1939 with auto-baud-rate detection – P/N: **AX130780**

Accessories:
Mating Plug KIT - P/N: **PL-DTM06-12SA**
Axiomatic Electronic Assistant Configuration KIT - P/N: **AX070502** or **AX070506K**

## Description

This AX030780 has one isolated digital input, two analog outputs, and two 2.5 A proportional / digital outputs. The two proportional outputs can be either used together to form one full H-bridge or can be individually configured as proportional voltage, proportional current, digital hotshot, PWM, or digital on/off types. The two analog outputs are programmable as analog voltage or analog current.

Powerful control algorithms allow the user to program the controller for a wide range of applications without the need for custom firmware. It features one CAN (SAE J1939) port with auto-baud-rate detection.

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## Block Diagram

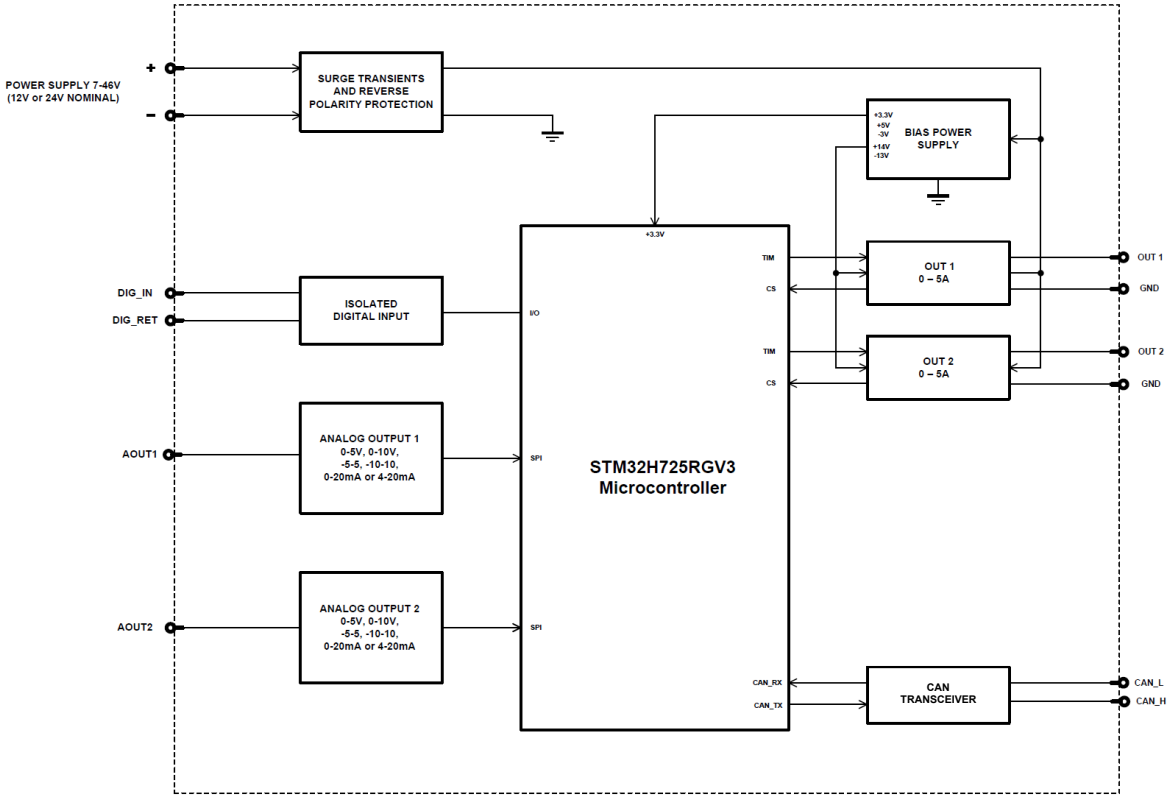


*Figure 1 - Block Diagram*

## Dimensional Drawing

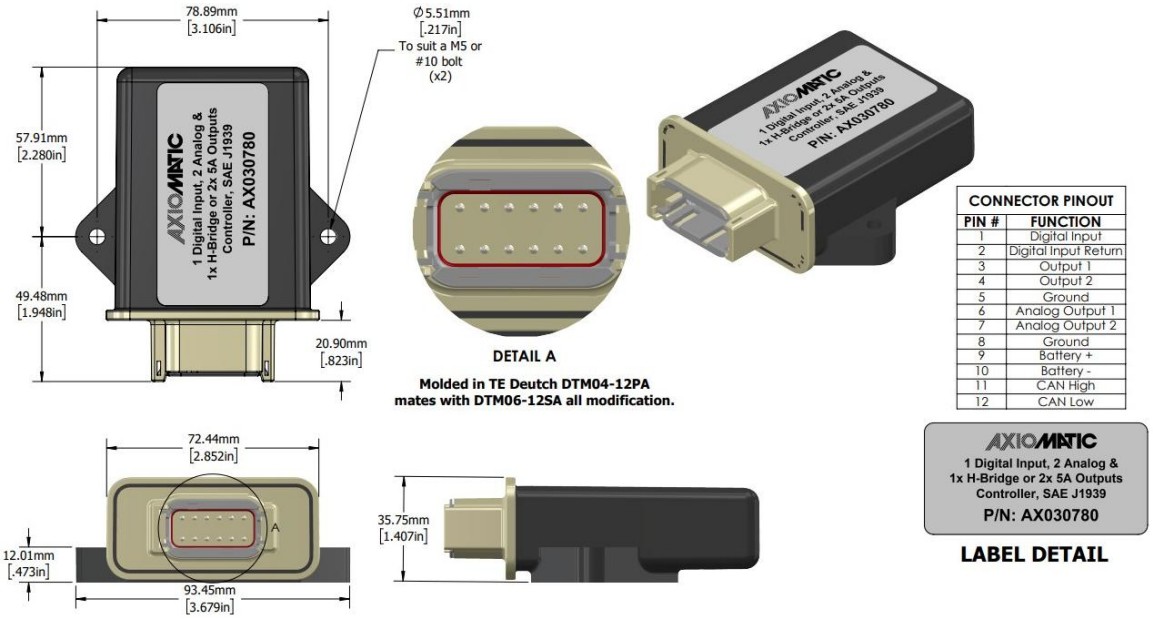


*Figure 2 - Dimensional Drawing*

# 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/.*

## Power

| | |
|---|---|
| Power Input | 12 or 24 VDC (nominal)<br>7 to 46 VDC range |
| Quiescent Current | TBD mA @ 12 VDC; TBD mA @ 24 VDC (typical) |
| Protections | Surge and transient protection is provided.<br>Reverse polarity protection up to -80 VDC is provided.<br>Undervoltage protection is provided. Hardware shutdown at 6 V.<br>Overvoltage protection is provided. Hardware shutdown at 37 V. |

## Input

| | |
|---|---|
| Digital Input | 1 isolated digital input<br>Low: 13.6 V<br>High: 14.3 V<br>Input impedance: 12 KΩ |

## Outputs

<table>
<tr><td>H-Bridge, Proportional, or Digital Outputs</td><td>2x outputs programmable as follows.<br>• 2x proportional / digital outputs<br>• 1x full H-bridge ±5 A output (Load connected between “Proportional / Digital Output 1” and “Proportional / Digital Output 2”)<br><br>The proportional outputs are further configurable as follows.
<table>
<tr><td>Proportional Voltage</td><td>Range: 0 to Vps<br>Resolution: 100 mV<br>Accuracy: ±1 % error</td></tr>
<tr><td>Proportional Current</td><td>Ranges: Up to ±5 A<br>Resolution: 1 mA<br>Accuracy: ±1 % error</td></tr>
<tr><td>Hotshot Digital</td><td>Ranges: Up to ±5 A<br>Resolution: 1 mA<br>Accuracy: ±1 % error<br>See profile diagram below.</td></tr>
<tr><td>PWM</td><td>Range: 1 Hz to 10 kHz<br>Duty Cycle: 0 to 100 %<br>Resolution: 0.1 %<br>Accuracy: ±1 % error<br>Amplitude: Vps ±0.5 %</td></tr>
<tr><td>Digital On/Off</td><td>ON = Vps ±0.5 %<br>OFF = 0 V<br>Load up to 3.5 A is supported.</td></tr>
<tr><td>Disabled Output</td><td>-</td></tr>
</table>
Current sensing is provided.<br>Note: Load at supply voltage must not draw more than TBD.</td></tr>
<tr><td>Analog Outputs</td><td>2 analog outputs configurable as voltage or current type.
<table>
<tr><td>Analog Voltage</td><td>Ranges: 0 to 5 V, 0 to 10 V, -5 to 5 V, or -10 to 10 V<br>Resolution: 0.01 V<br>Accuracy: ±0.5 % error<br>Maximum Load: 30 mA</td></tr>
<tr><td>Analog Current</td><td>Ranges: 0 to 20 mA or 4 to 20 mA<br>Resolution: 0.01 mA<br>Accuracy: ±0.5 % error<br>Maximum Load Resistance: 400 Ω</td></tr>
</table>
12-bit Digital-to-Analog Converter (DAC)</td></tr>
<tr><td>Protection</td><td>Protected against shorts to Ground or Battery +.</td></tr>
</table>

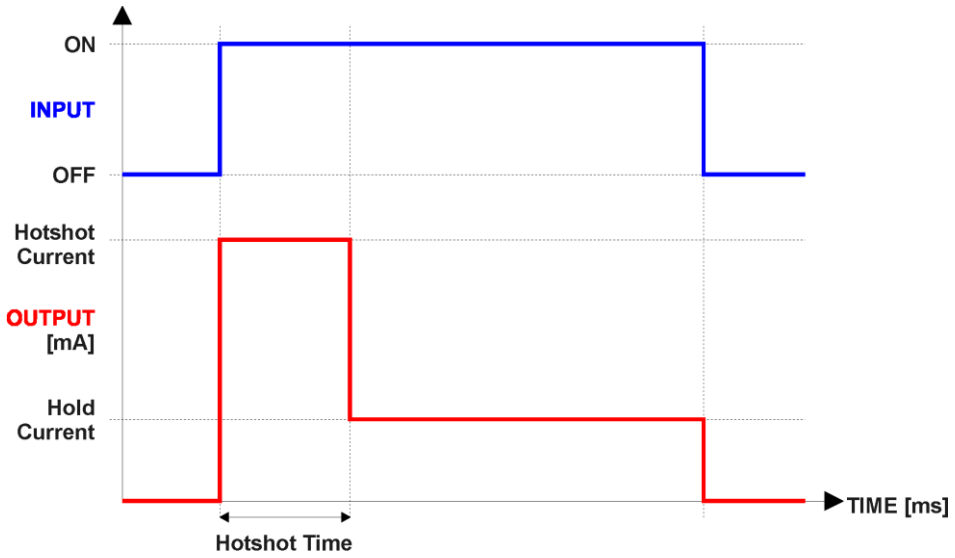


*Figure 3 – Hotshot Digital Profile*

## General Specifications

| | |
|---|---|
| Microcontroller | STM32H725RGV3 |
| Communications | 1 CAN port (SAE J1939)<br>Supported baud-rates: 250 kbit/s, 500 kbit/s, 667 kbit/s, and 1 Mbit/s with auto-baud-rate detection |
| Control Logic | Standard embedded control logic is provided. Refer to the User Manual. |
| User Interface | Axiomatic Electronic Assistant P/N: **AX070502** or **AX070506K** |
| Compliance | RoHS |
| Operating Conditions | -40 to 85 °C (-40 to 185 °F) |
| Storage Temperature | -40 to 105 °C (-40 to 221 °F) |
| Weight | TBD lb. (TBD kg) |
| Protection Rating | IP67 |
| Enclosure | Molded Enclosure, integral connector<br>Nylon 6/6, 30% glass, laser welded<br>Flammability rating: UL 94 HB<br>4.228 in. x 3.679 in. x 1.407 in. (107.39 mm x 93.45 mm x 35.75 mm)<br>Note: L x W x H includes the integral connector<br>Refer to Dimensional Drawing. |
| Electrical Connections | Integral 12-pin receptacle (equivalent to TE Deutsch P/N: **DTM04-12PA**) |

| Pin | Description |
|---|---|
| 1 | Digital Input |
| 2 | Digital Input Return |
| 3 | Proportional / Digital Output 1 |
| 4 | Proportional / Digital Output 2 |
| 5 | Ground |
| 6 | Analog Output 1 |
| 7 | Analog Output 2 |
| 8 | Ground |
| 9 | Battery + |
| 10 | Battery - |
| 11 | CAN High |
| 12 | CAN Low |

| | |
|---|---|
| Mating Connectors | Mating Plug KIT P/N: **PL-DTM06-12SA** (includes 1x DTM06-12SA plug, 1x WM-12S wedgelock, 12x 0462-201-20141 solid contacts, and 6x 0413-204-2005 sealing plugs) |
| Mounting | Mounting holes are sized for #10 or M5 bolts. The bolt length will be determined by the end-user's mounting plate thickness. The mounting flange of the controller is 0.47 in. (12 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 in. or 15 cm) and strain relief (12 in. or 30 cm). |

Form: TDAX030780-01/13/2025