

## Universal Input, Single Output Valve Controller (3A)

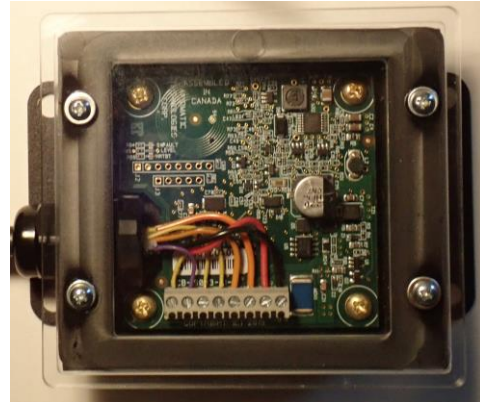
With Near Field Communication (NFC)

Configurable with Android and Apple iOS Devices and Smartphones

P/N: AX020710-PG9

### Features:

- 1 universal signal input, user selectable as:
  - Voltage
  - Current
  - PWM
  - Frequency
  - Digital
- 1 output drives a solenoid, user selectable as:
  - proportional current 0-3 A
  - proportional voltage up to Vps
  - Digital Hotshot
  - PWM signal
  - Digital on/off
- 1 auxiliary 0-5V output feedback
- +5V Reference output;
- 12Vdc, 24Vdc nominal
- PCB assembly with four (4) 2-pin push-in terminal blocks
- Multiple LED indicators
- IP67 for metal box once cable is added
- Smartphone with E-Write NFC Android application configures the controller when placed in proximity. The application is also available for Apple iOS devices like iPhones.
- E-Write NFC provides flexible user configurability for application-specific input-output relationship with slope or time response.
- Protected and secure communication



### Ordering Part Numbers:

**AX020710-PG9** - Universal Input, Single Valve Controller (3A), NFC, 1 8-pin Screw Terminal Block, Metal Box, Strain Relief (1 PG9)

**AX020710-1.5M** - Universal Input, Single Valve Controller (3A), NFC, 1 8-pin Screw Terminal Block, Metal Box, 1.5 M Cable

**AX020710** – Universal Input, Single Valve Controller (3A), NFC, 1 8-pin Screw Terminal Block, PCB

*If custom settings are requested, a unique part number will be assigned before ordering.*

## Description

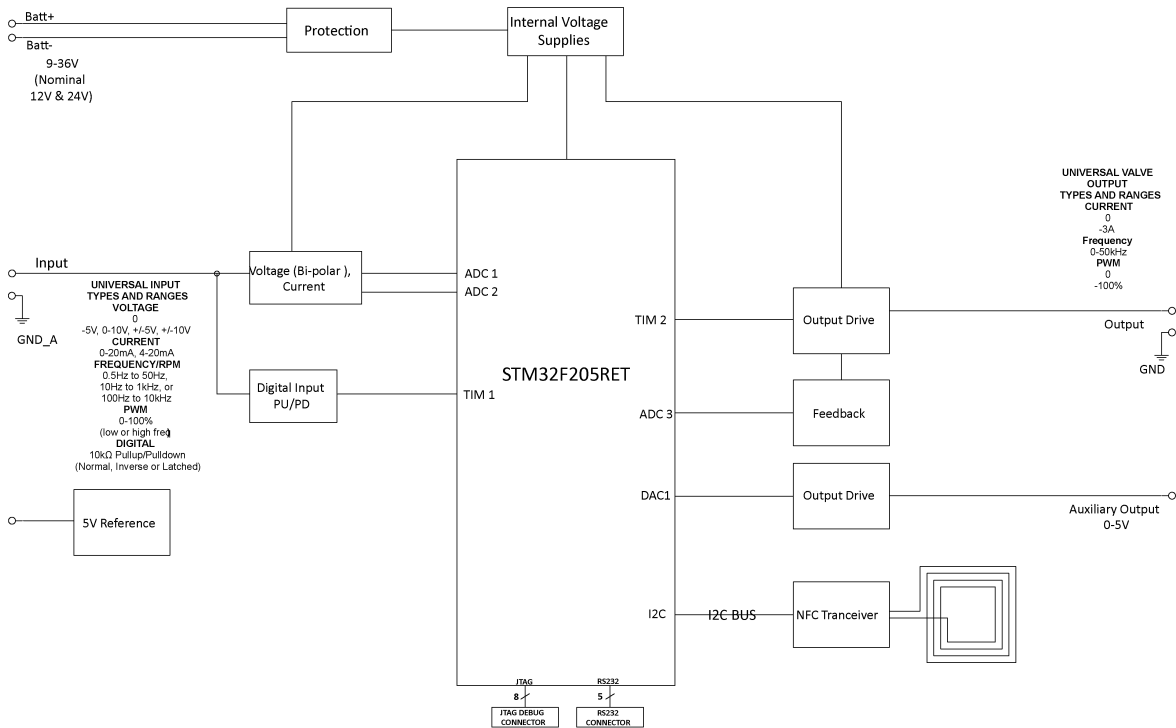
As a highly flexible controller, it accepts one command signal input and drives a solenoid up to 3A. Many control profile parameters are user configurable. A PCB form factor is available. Operation is from -40 to 85 °C. Designed to interface with 12V or 24V battery power, it is suitable for machine and industrial applications.

Using Near Field Communication (NFC), the wireless valve controller is remotely configurable via a smartphone application. Bringing the two devices within 3 cm\* (1 inch) of each other, the NFC technology uses magnetic induction between two loop antennas to communicate within the globally available radio frequency ISM band of 13.56 MHz.

There are 3 models available: PCB installed in a metal box with PG9 strain relief (AX020710-PG9), a PCB installed in a metal box with 1.5 m unterminated cable (AX020710-1.5M), or PCB Assembly (AX020710).

\*The distance will vary with different phones.

## 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 Approvals/Limitations and Return Materials Process as described on <https://www.axiomatic.com/service/>.

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

## Input Specifications

Power Supply Input - Nominal	12Vdc or 24Vdc nominal (9...36 VDC power supply range)
Protection	Reverse polarity protection is provided. Overvoltage protection up to 45V is provided. Overvoltage (undervoltage) shutdown of the output load is provided.
Universal Signal Input	Refer to Table 1.0 All inputs are user selectable.

**Table 1.0 –User Configurable Universal Input**

Analog Input Functions	Voltage Input or Current Input																																								
Voltage Input	0-5 V (Impedance 110 k $\Omega$ ) 0-10 V (Impedance 130 k $\Omega$ ) +/- 5V (Impedance 110 k $\Omega$ ) +/- 10V (Impedance 130 k $\Omega$ )																																								
Current Input	0-20 mA (Impedance 249 $\Omega$ ) 4-20 mA (Impedance 249 $\Omega$ )																																								
Discrete Input Functions	Digital Input, PWM Input or Frequency Input																																								
Input	12-bit ADC																																								
Digital Input Level	Accepts 5V TTL and up to V <sub>PS</sub> Threshold: Low <1 V; High >2.2 V																																								
Digital Input	Active High or Active Low Amplitude: 0 to +V <sub>ps</sub>																																								
Input Impedance	1 M $\Omega$ High impedance, 10K $\Omega$ pull down, 10K $\Omega$ pull up to +6V																																								
PWM Input	Low Frequency (10 Hz to 1 kHz) High Frequency (100 Hz to 10 kHz) 0 to 100% D.C.																																								
Frequency Input	0.5 Hz to 50 Hz; 10 Hz to 1 kHz; or 100 Hz to 10 kHz 1 to 99% D.C.																																								
Input Accuracy	< 1%																																								
Input	16-bit Timer																																								
Maximum and Minimum Ratings	<table border="1"> <thead> <tr> <th>Characteristic</th> <th>Min</th> <th>Max</th> <th>Units</th> </tr> </thead> <tbody> <tr> <td>Power Supply</td> <td>9</td> <td>36</td> <td>V dc</td> </tr> <tr> <td>Voltage Input</td> <td>0</td> <td>36</td> <td>V dc</td> </tr> <tr> <td>Current Input 0(4)-20 mA</td> <td>0</td> <td>12</td> <td>Vdc</td> </tr> <tr> <td>Digital Input</td> <td>0</td> <td>36</td> <td>Vdc</td> </tr> <tr> <td>PWM Duty Cycle</td> <td>0</td> <td>100</td> <td>%</td> </tr> <tr> <td>PWM Low Frequency</td> <td>10</td> <td>1 000</td> <td>Hz</td> </tr> <tr> <td>PWM High Frequency</td> <td>100</td> <td>10 000</td> <td>Hz</td> </tr> <tr> <td>PWM Voltage pk - pk</td> <td>0</td> <td>36</td> <td>V dc</td> </tr> <tr> <td>Frequency</td> <td>0.5</td> <td>10 000</td> <td>Hz</td> </tr> </tbody> </table>	Characteristic	Min	Max	Units	Power Supply	9	36	V dc	Voltage Input	0	36	V dc	Current Input 0(4)-20 mA	0	12	Vdc	Digital Input	0	36	Vdc	PWM Duty Cycle	0	100	%	PWM Low Frequency	10	1 000	Hz	PWM High Frequency	100	10 000	Hz	PWM Voltage pk - pk	0	36	V dc	Frequency	0.5	10 000	Hz
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## Lookup Table Specifications

Lookup Table	Can be used to create different input-to-output responses Ramp or Time Response Up to 5 Slopes/Time slots The user can map the Universal Input as control to the Lookup Table and configure the required slopes for the output
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## Output Specifications

Output	Up to 3A Half-bridge, High Side Sourcing, Current Sensing, Grounded Load High Frequency (25 kHz) The user can select the following options for output using the E-Write NFC. <ul style="list-style-type: none"> <li>Proportional Output Current (with current sensing) (0-3A)</li> <li>Proportional Output Voltage (up to V<sub>ps</sub>)</li> <li>Digital Hotshot</li> <li>Output PWM Duty Cycle (0-100% D.C.)</li> <li>Digital On/Off (Gnd-V<sub>ps</sub>)</li> </ul>
Configurable Parameters	Refer to Table 2.0.

Table 2.0 Configurable Output Parameters		
Parameter	Minimum Range	Maximum Range
Output Current	0A	3A
Ramp Up / Ramp Down	0ms (no ramp)	60,000ms
Dither amplitude (level)	0mA (no dither)	400mA
Current dither frequency	50Hz	500Hz
PWM frequency	1Hz	25kHz

Output Accuracy	Output Current mode $\leq 1\%$ Output Voltage mode $\leq 1\%$ Output PWM Duty Cycle mode $\leq 1\%$
Output Resolution	Output Current mode 1 mA Output Voltage mode 0.1V Output PWM mode 0.1%
Protection	Overcurrent and short circuit protection
Auxiliary Output	0-5V output is proportional to the proportional output range. Short circuit protection is provided.
Auxiliary Output Scale	20% of proportional output range
Voltage Reference	+5V, 50 mA maximum load

### General Specifications

Microcontroller	STM32F205RET6 32-bit, 512 Kbit program flash																		
Quiescent Current	34 mA @ 24Vdc																		
LED Indicator	Power, heartbeat, input fault indication and output fault indication																		
Control Logic	User configurable																		
Communications	Near Field Communication Full-duplex Data rate: 106 kbit/s Complies with ISO1443 (RF protocol), ISO13239, and ISO7816 Protected and secure configuration																		
User Interface	E-WRITE NFC Application is available from Google Play for Android devices. <a href="https://play.google.com/store/apps/details?id=axiomatic.nfcproject">https://play.google.com/store/apps/details?id=axiomatic.nfcproject</a> The application is also available for Apple iOS devices like iPhones.																		
Operating Conditions	-40 to 85 °C (-40 to 185 °F)																		
Dimensions	Metal Box with gasket and PG9 strain relief 114.3 x 27.9 x 79.4 mm 4.50 x 1.01 x 3.13 inches (W x D x H excluding PG9 strain relief) Refer to Figure 1.0.																		
Protection	IP00 for PCB IP67 for Metal Box once cable is added																		
Vibration - Pending	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 - Pending	MIL- STD-202G, Method 213B, test condition A 50g (half sine pulse, 9ms long, 8 per axis)																		
Approvals	CE marking																		
Weight	0.72 lb. (0.327 kg)																		
Electrical Connections	1 8-pin screw terminal block (Wieland P/N: 25.197.0853.0) Use 18-20 AWG wire for connection to power and solenoid. <table border="1" data-bbox="591 1528 1040 1793"> <thead> <tr> <th>PIN #</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>POWER -</td> </tr> <tr> <td>2</td> <td>POWER +</td> </tr> <tr> <td>3</td> <td>SOLENOID -</td> </tr> <tr> <td>4</td> <td>SOLENOID +</td> </tr> <tr> <td>5</td> <td>INPUT +</td> </tr> <tr> <td>6</td> <td>INPUT GND</td> </tr> <tr> <td>7</td> <td>AUXILIARY OUTPUT</td> </tr> <tr> <td>8</td> <td>+5V REFERENCE</td> </tr> </tbody> </table>	PIN #	FUNCTION	1	POWER -	2	POWER +	3	SOLENOID -	4	SOLENOID +	5	INPUT +	6	INPUT GND	7	AUXILIARY OUTPUT	8	+5V REFERENCE
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Mounting	<p>Program the unit before installing in a control panel or metal box.</p> <p>Mounting holes are sized for #6 or M4 bolts on the PCB Assembly P/N: AX020710. The bolt length will be determined by the end-user's mounting plate thickness. The mounting flange of the controller is 0.062 inches (1.5 mm) thick. If the module is mounted without an enclosure, it should be mounted vertically 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.</p>
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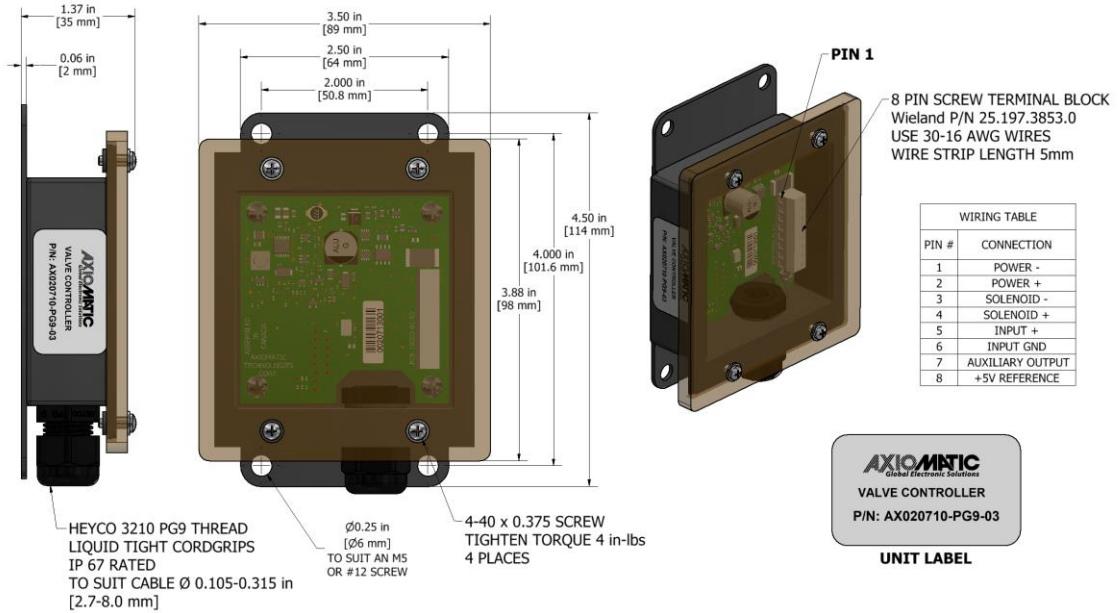


Figure 1.0. – Dimensional Drawing

Form: TDAX020710-PG9-02/27/2024