

## Universal Input, Single Output Valve Controller

With Near Field Communication (NFC)

Configurable with E-WRITE NFC Application from Google Play

P/N: AX020710, AX020720

### Features:

- 1 universal signal input, user selectable as:
  - Voltage;
  - Current;
  - PWM;
  - Frequency;
  - or Digital.
- 1 output drives a solenoid, user selectable as:
  - proportional current 0-3 A (AX020710) or 0-5A (AX020720)
  - proportional voltage up to Vps;
  - PWM signal;
  - or 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
- IP00
- Smartphone running E-Write NFC Android application configures the controller when placed in close proximity.
- E-Write NFC provides flexible user configurability for application-specific input-output relationship with slope or time response.
- Protected and secure communication



P/N: AX020710, PCB Assembly



P/N: AX020710-1.5M

### Ordering Part Numbers:

**AX020710** – Universal Input, Single Valve Controller, 3A, NFC, 1 8-pin Screw Terminal Block, PCB  
**AX020720** – Universal Input, Single Valve Controller, 5A, NFC, 1 8-pin Screw Terminal Block, PCB

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

**AX020720-PG9** – Universal Input, Single Valve Controller, 5A, 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

**AX020720-1.5M** – Universal Input, Single Valve Controller, 5A, NFC, 1 8-pin Screw Terminal Block, Metal Box, 1.5 M Cable

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

**Description:**

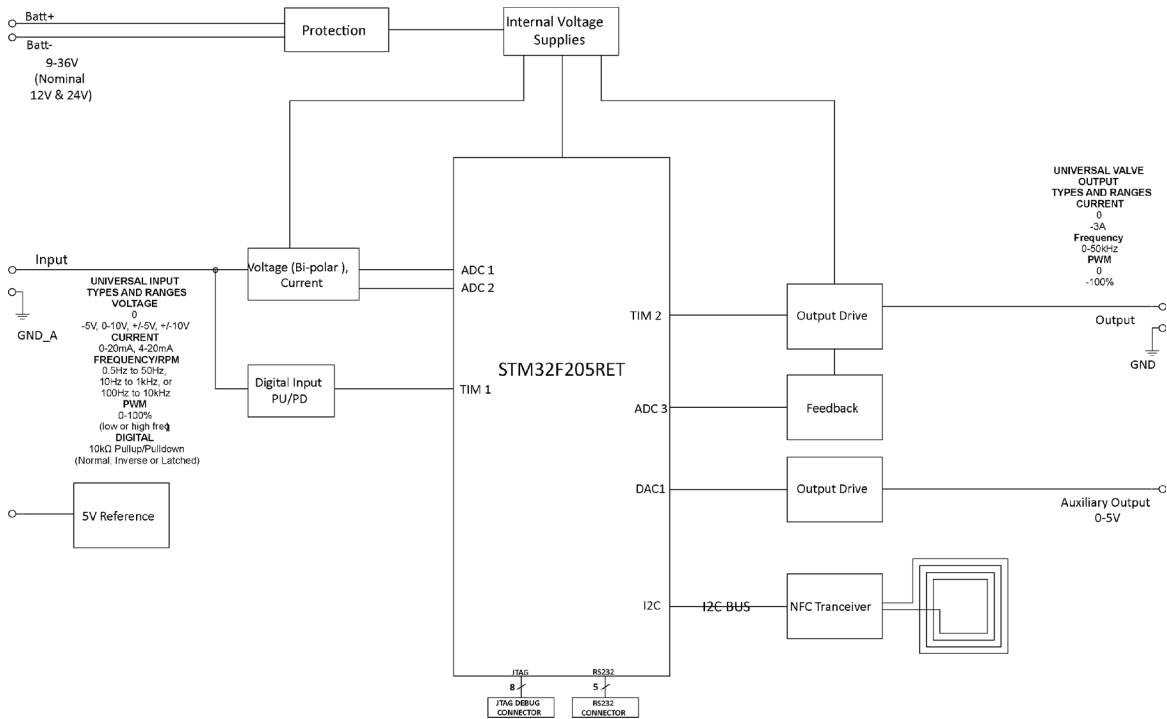
As a highly flexible controller, it accepts one command signal input and drives a solenoid up to 3A (AX020710) or 5A (AX020720). Many control profile parameters are user configurable. A PCB form factor is available. Operation is from -40 to 85 °C. Designed to interface with 12V or 24V battery power, 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 Assembly (AX020710, AX020720); PCB installed in a metal box with PG9 strain relief (AX020710-PG9, AX020720-PG9); or a PCB installed in a metal box with 1.5 m unterminated cable (AX020710-1.5M, AX020720-1.5M).

\*The distance will vary with different phones.

**BLOCK DIAGRAM**



**Technical Specifications:** All specifications typical at nominal input voltage and 25°C unless otherwise specified. 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/>.

**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.

<b>Table 1.0 –User Configurable Universal Input</b>																																									
Analog Input Functions	Voltage Input or Current Input																																								
Voltage Input	0-5 V (Impedance 110 kΩ) 0-10 V (Impedance 130 kΩ) +/- 5V (Impedance 110 kΩ) +/- 10V (Impedance 130 kΩ)																																								
Current Input	0-20 mA (Impedance 249 Ω) 4-20 mA (Impedance 249 Ω)																																								
Discrete Input Functions	Digital Input, PWM Input or Frequency Input																																								
Input	12-bit ADC																																								
Digital Input Level	Accepts 5V TTL and up to Vps Threshold: Low <1 V; High >2.2 V																																								
Digital Input	Active High or Active Low Amplitude: 0 to +Vps																																								
Input Impedance	1 MOhm High impedance, 10KOhm pull down, 10KOhm 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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Frequency	0.5	10 000	Hz																																						

**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 (AX020710) or 5A (AX020720) 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 Vps)</li> <li>Output PWM Duty Cycle (0-100% D.C.)</li> <li>Digital On/Off (Gnd-Vps)</li> </ul>																					
Configurable Parameters	Refer to Table 2.0.																					
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Output Accuracy	Output Current mode $\leq 1\%$ Output Voltage mode $\leq 1\%$ Output PWM Duty Cycle mode $< 1\%$																					
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

Microprocessor	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. <a href="https://play.google.com/store?hl=en">https://play.google.com/store?hl=en</a>
Operating Conditions	-40 to 85 °C (-40 to 185 °F)
Dimensions	Model AX020710, AX020720: 2.50 x 2.50 x 0.77 inches (63.50 x 63.50 x 19.74 mm) (L x W x H) Refer to the dimensional drawing in Figure 1.
Dimensions – In Metal Box with strain relief	Model AX020710-PG9, AX020720-PG9: 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 2.0.  Model AX020710-1.5M, AX020720-1.5M: The dimensions of the metal box are the same as above. The cable is 1.5M in length and is unterminated. Refer to Figure 3.0.
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	AX020710, AX020720: 0.05 lb. (0.023 kg)

	AX020710-PG9, AX020720-PG9: 0.75 lb. (0.350 kg) (Preliminary) AX020710-1.5M, AX020720-1.5M: 1.0 lb. (0.453 kg)																		
Electrical Connections	Model AX020710, AX020720: 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"> <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	Program the unit before installing in a control panel or metal box.  Mounting holes are sized for #6 or M4 bolts on the PCB Assembly P/N: AX020710, AX020720. 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.																		

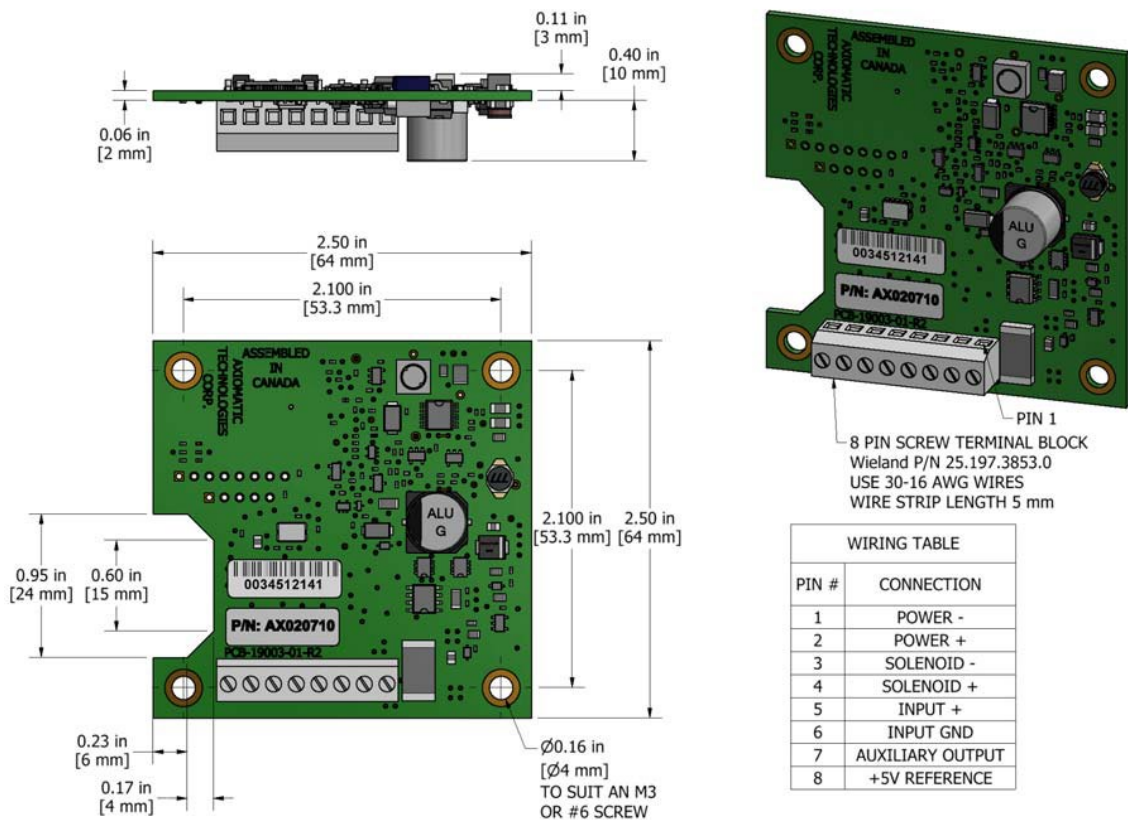


Figure 1.0. – Dimensional Drawing of AX0207X0

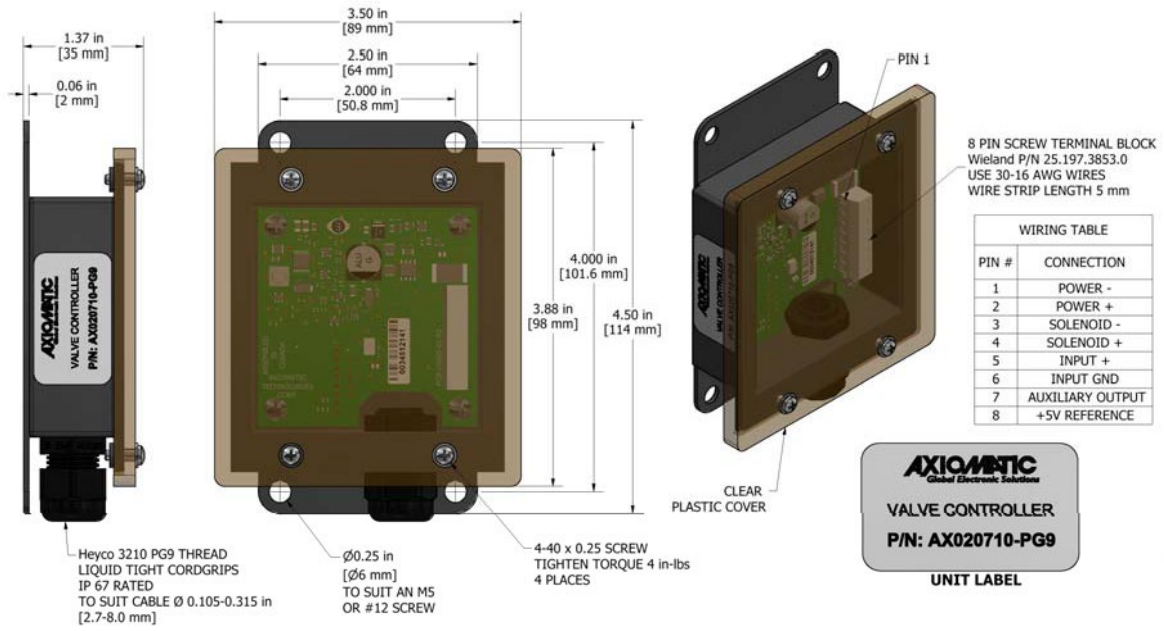


Figure 2.0 – Dimensional Drawing of AX0207X0-PG9

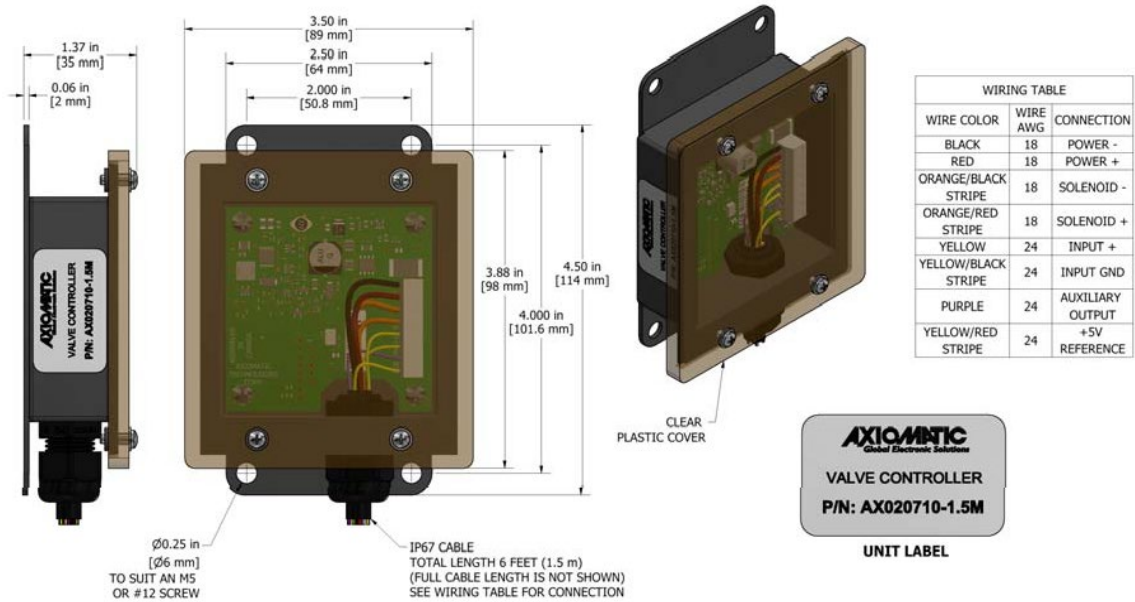


Figure 3.0 – Dimensional Drawing of AX0207X0-1.5M

Form: TDAX0207X0-06/22/22