Preliminary
TECHNICAL DATASHEET #TDAX020720

Universal Input, Single Output Valve Controller (5A)

With Near Field Communication (NFC)
Configurable with Android and Apple iOS Devices and Smartphones

P/N: AX020720

Features:

- 1 universal signal input, user selectable as:
  - Voltage
  - Current
  - PWM
  - Frequency
  - Digital
- 1 output drives a solenoid, user selectable as:
  - Proportional current 0-5A
  - Proportional voltage up to Vps
  - Digital Hotshot
  - PWM signal
  - Digital on/off
- 1 auxiliary 0-5V output feedback
- +5V Reference output
- 12 or 24 VDC nominal
- PCB assembly with 4 2-pin push-in terminal blocks
- Multiple LED indicators
- 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:

AX020720 – Universal Input, Single Valve Controller, NFC, 1 8-pin Screw Terminal Block, PCB

AX020720-PG9 - Universal Input, Single Valve Controller, NFC, 1 8-pin Screw Terminal Block, Metal Box, Strain Relief (1 PG9)

AX020720-1.5M - Universal Input, Single Valve Controller, 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 5 A. Many control profile parameters are user configurable. A PCB form factor is available. Operation is from -40 to 85°C. Designed to interface with 12 or 24 V battery power, it is suitable for machine and industrial applications.

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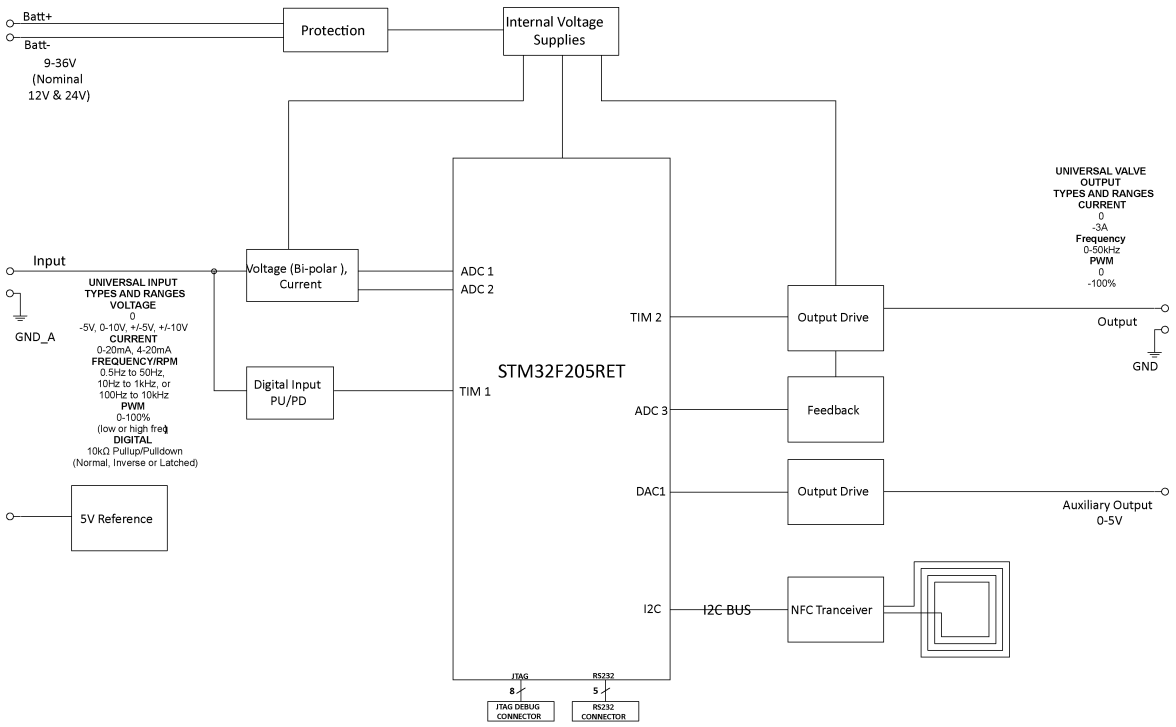
Using Near Field Communication (NFC), the wireless valve controller is remotely configurable via a smartphone application. Bringing the two devices within 3 cm* (1 inch) of each other, the NFC technology uses magnetic induction between two loop antennas to communicate within the globally available radio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

There are 3 models available: PCB Assembly (AX020720), PCB installed in a metal box with PG9 strain relief (AX020720-PG9), or a PCB installed in a metal box with 1.5 m unterminated cable (AX020720-1.5M).

**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 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 V_{PS} 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	

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

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

Output Specifications

Output	Up to 5A 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. • Proportional Output Current (with current sensing) (0-5A) • Proportional Output Voltage (up to Vps) • Digital Hotshot • Output PWM Duty Cycle (0-100% D.C.) • Digital On/Off (Gnd-Vps)
Configurable Parameters	Refer to Table 2.0.

Table 2.0 Configurable Output Parameters

Parameter	Minimum Range	Maximum Range
Output Current	0A	5A
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 ≤1% Output Voltage mode ≤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

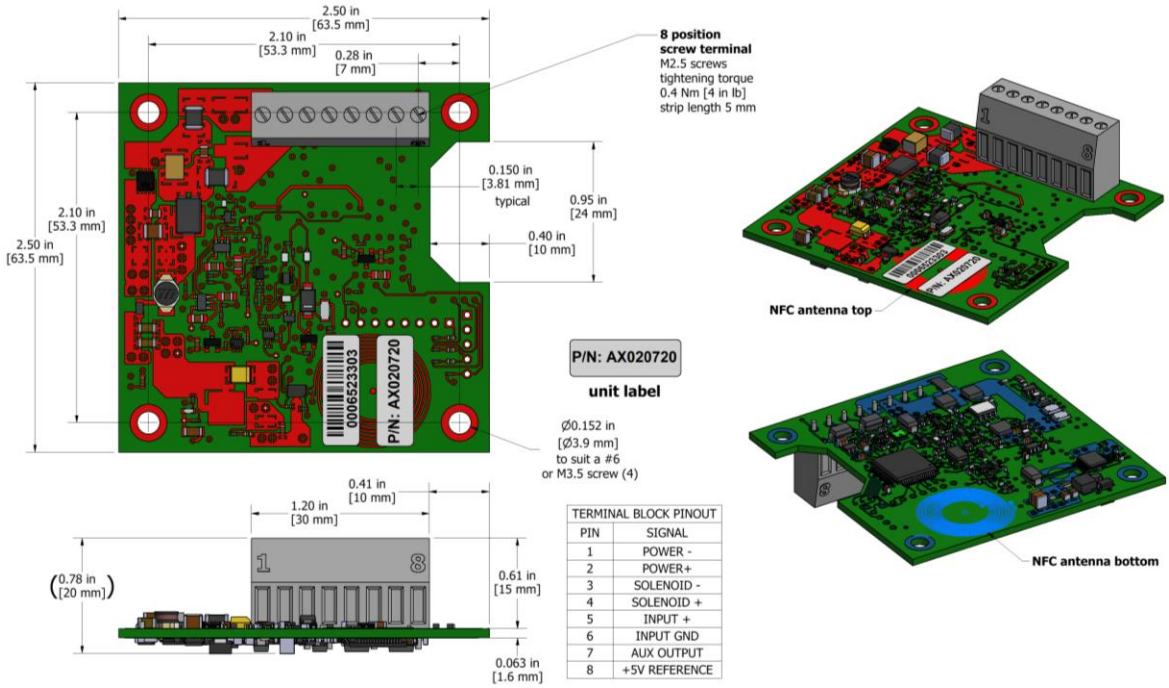
General Specifications

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. https://play.google.com/store/apps/details?id=axiomatic.nfcproject The application is also available for Apple iOS devices like iPhones.
Operating Conditions	-40 to 85 °C (-40 to 185 °F)
Dimensions	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.
Protection	IP00
Vibration	Preliminary values: 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	Preliminary values: MIL- STD-202G, Method 213B, test condition A 50g (half sine pulse, 9ms long, 8 per axis)
Approvals	CE / UKCA marking
Weight	0.05 lb. (0.023 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.

PIN #	FUNCTION
1	POWER -
2	POWER +
3	SOLENOID -
4	SOLENOID +
5	INPUT +
6	INPUT GND
7	AUXILIARY OUTPUT
8	+5V REFERENCE

Mounting	Program the unit before installing it in a control panel or metal box. Mounting holes are sized for #6 or M3.5 bolts on the PCB Assembly P/N: 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 the 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.

Dimensional Drawing



TERMINAL BLOCK PINOUT	
PIN	SIGNAL
1	POWER -
2	POWER+
3	SOLENOID -
4	SOLENOID +
5	INPUT +
6	INPUT GND
7	AUX OUTPUT
8	+5V REFERENCE

Figure 1 – Dimensional Drawing

Form: TDAX020720-03/14/2024