

**WARNING: DEVIATION FROM THESE INSTALLATION INSTRUCTIONS MAY LEAD TO IMPROPER ENGINE OPERATION WHICH COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.**

## **1.0 OVERVIEW**

- 1.1 This manual provides installation and operating instructions for the Stepper Motor Controller (SMC) Altronic part number 691156-1. The Stepper Motor Controller can be used to interface the Altronic line of gas flow control valves to general purpose control systems with 4-20 ma outputs. The Altronic gas flow control valves which can be used with the SMC are the stainless steel body, piston type valves of the 690154-x series and the aluminum body, butterfly type valves 690220-1, 690225-1, 690230-1. It is recommended that the user read this operating instruction in its entirety before commencing operations.

It is not our intention to instruct others on how to design control systems, nor can we assume responsibility for their safe operation. This advice is intended to help the end user install the SMC in such a manner to reduce the risk of accident to personnel or to equipment.

**Do NOT attempt to operate, maintain, or repair the fuel control valve until the contents of this document have been read and are thoroughly understood.**

## **2.0 INSTALLATION**

- 2.1 The SMC unit and the gas valve should be inspected immediately after unpacking. Check for any damage that may have occurred during shipping. If there are any questions regarding the physical integrity of the SMC unit or the valve, contact the distributor or Altronic, Inc.  
NOTE: If possible, keep the original shipping container. If future transportation or storage of the valve is necessary, this container will provide the optimum protection.

## **3.0 ELECTRICAL CONNECTIONS**

- 3.1 Refer to FIG. 1 for electrical hookup details. The SMC is CSA approved for Class I, Division 2, Group C & D locations. The installation must conform to the applicable electrical code concerning hazardous environment installations. The SMC connects to the Gas Control Valves using harness 693013-1.

**WARNING:** DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

**WARNING:** SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.

## 4.0 POWER SUPPLY

- 4.1 The SMC requires a nominal +24 Vdc supply (+20 to +32 Vdc) with maximum peak current capability of approximately 3 amps. The minimum wire size to the SMC unit must be 20 AWG. If long distances between the control device and the SMC are expected, the wire size used for the power wiring may have to be increased to compensate for the associated voltage drop.

## 5.0 CONTROL SIGNALS

- 5.1 The SMC input signal which would be typically used is an analog 4 to 20 milliamp signal. The input signal represents the desired valve position in % open from 0 to 100%. This means that with an input of 4 milliamps the valve is closed, and with an input of 20 milliamps the valve is 100% open. The input signals to the SMC are not isolated from its power supply. Current to the SMC analog position input should never exceed the maximum value of the calibrated range, 20 milliamps.
- 5.2 The SMC can also control the valves by using the "OPEN" and "CLOSE" discrete inputs. Whenever the "CLOSE" input is connected to ground the valve will move in the close direction at a steady speed of 100 steps/second. Whenever the "OPEN" input is connected to ground the valve opens at the same speed. If both inputs are open, then the valve will remain exactly where it is at that time.

## 6.0 CALIBRATION

- 6.1 The maximum travel range of the valves is 1700 steps of 0.0005" per step, this range is divided evenly across the 4 to 20 milliamp range of the input. While the change in valve position is linear with respect to the input current, the actual flow of gas thru the valve will not be linear.

## 7.0 PLC CONFIGURATION

- 7.1 The SMC is designed to be the interface between the Altronic flow control valves and any industrial controller or PLC (Programmable Logic Controller) with 4 to 20 milliamp output. The appropriate analog input, and discrete inputs must be configured and wired before the SMC will operate. The SMC may be controlled by analog input or the discrete "open" and "close" inputs. The analog input must be above 3 milliamps for the SMC to begin control of the stepper motor. The "MISC" LED will light indicating analog control. An analog signal of less than 3 milliamps enables discrete input control of the stepper motor.
- 7.2 The SMC is factory configured for use with the Altronic stepper valves. In this configuration, **4ma** moves the valve to the most **closed** position. Inversely, **20ma** moves the valve to the most **open** position.

- 7.3 The discrete inputs are internally pulled-up to +5V. The controlling device must pull-down the input to 0V to actuate the input. A “dry contact” switch, closing to ground to activate, is normally used for these inputs.
- 7.4 Activating both the “OPEN” and “CLOSE” discrete inputs together for more than 1 second causes the SMC to “reset” the valve position by driving the valve to its most open position.

## **8.0 DIAGNOSTICS**

- 8.1 The SMC includes a few simple diagnostic features.
- 8.2 When the SMC is being commanded to “OPEN”, the “OPEN” LED will light to indicate this operation. Conversely, a “CLOSE” command will light the “CLOSE” LED. These LEDs are located next to their corresponding discrete input terminal. When the SMC is under analog control, the corresponding “OPEN” or “CLOSE” LED will light to indicate the SMC is changing the position in the commanded direction.
- 8.3 The SMC “POWER” LED indicates that the onboard +5V supply is functional.
- 8.4 The SMC “DIAG” LED will be OFF during normal operation. This LED is used to indicate fault conditions (if any) that exist on the SMC. The LED will emit a series of flashes followed by a 2 second pause to indicate a single trouble code. There are six trouble codes the SMC displays:
- 1 flash = supply voltage less than 11.5V.
  - 2 flashes = supply voltage greater than 32V.
  - 3 flashes = stepper motor coil fault on TB2-1.
  - 4 flashes = stepper motor coil fault on TB2-4.
  - 5 flashes = stepper motor coil fault on TB2-2.
  - 6 flashes = stepper motor coil fault on TB2-5.

# FIG.1 WIRING DIAGRAM - CUSTOMER CONNECTIONS, SMC

