

Operating Manual

Altronic Gas Control Valve, 690210

altronic
HOERBIGER Engine Solutions



1.0 Overview

1.1 This manual provides installation instructions and maintenance information for the Altronic Gas Control Valve, model 690210-1 (1" NPT). It is recommended that the user read this manual 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 Altronic Gas Control Valve 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.

1.2 Altronic Gas Control Valves are normally used with natural gas. Natural gas and air, when combined, become very combustible and, when contained within an enclosure such as a gas engine or its exhaust system, can explode in a violent manner when ignited. It is necessary to always use extreme caution when working with any fuel system. The control systems used with gas engines or other similar machines should always be designed to be "fail-safe".

1.3 The Gas Control Valve is **NOT** a shutoff valve. Shutoff valves must be used in addition to the control valve. The fuel system should be designed in such a way that:

- no failure of a single component will cause the fuel system to admit fuel to the engine when the engine has been shutdown, and
- no single failure can result in grossly over-fueling the engine when attempting to start.

WARNING: Failure to follow the above rules may lead to serious damage to equipment or to personnel.

1.4 Maximum gas working pressure is **50 psig**. Gas pressure at the valve must **NOT** exceed this rating at any time.

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

2.0 Installation

2.1 The Gas Control 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 valve, contact the distributor or Altronic, Inc.

2.2 The Gas Control Valve is designed to be installed on natural gas fired, reciprocating engines. It is a flow-control device that responds directly to the control output of the Altronic EPC series of products. Additionally, by the use of a special adaptor device, Altronic P/N 691156-1, the valve can be made to control based upon a 4–20mA signal from a general purpose controlling device such as a PLC. In all cases the valve is installed between the fuel supply pressure regulator and the carburetor and is used to throttle the fuel available to the engine. When considering where to place the Gas Control Valve, choose a location away from any extreme sources of heat. Operating ambient temperature is -40°F to +176°F (-40°C to +80°C). Do not expose the valve to temperatures higher than indicated in this manual.

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 Mounting the Gas Control Valve

- 3.1 In order to control the air/fuel ratio, the electronically-controlled valve is connected in series between the regulator and carburetor or mixer. The valve should be installed as close to the fuel inlet of each carburetor or mixer as possible. The distance from the valve to the carburetor inlet should not exceed 12 pipe diameters in length. The preferred mounting of the valve is in the vertical position, with the flow direction being up or down. Horizontal mounting of the valve is acceptable as long as the valve is **NOT** installed with the control cable connector facing downward. This is necessary to avoid the collection of condensation in the electronics housing. **See FIG. 1 for dimensional details.** Four 5/16-18 tapped holes on the machined flat of the port housing are provided for mounting purposes.
- 3.2 If possible, gas connection piping should be of the same diameter as that currently in use. The 690210-1 valve has 1-inch NPT threads. In some applications, the threaded connection to the valve body may require the use of thread adapters. If adapters are used, proper plumbing procedures must be followed.
- 3.3 Each control valve is connected to the EPC Series using 693005-x or 693013-x cable. The 693005-x cable has connectors on both ends and in unshielded installations these connectors are simply plugged into the valve and the EPC unit. In applications where the cable will be enclosed in conduit, use 693013-1 cable, which is 30' long with a connector at one end only. The cable is color-coded and must be connected inside a junction box with each wire color matching. This cable must not be run in the same conduit as the ignition primary or other wires. A distance of 4" to 6" should be maintained between EPC Series wiring and other engine wiring. Note that the upper connector on the EPC Series controls the stepper valve for single control channel applications and the left bank valve on V-engines.

4.0 Power Supply

- 4.1 The circuitry of the valve is powered directly by the EPC Series or the output of the Stepper Motor Controller 691156-1. No additional external power source should ever be connected to the valve.

5.0 Flow Characteristics

- 5.1 *See the flow capacity curve, FIG. 4, in the drawings section.*

6.0 Gas Valve Service and Repair Overview

- 6.1 The Gas Control Valve has been designed to provide reliable operation with a minimum amount of maintenance. To ensure optimum performance, periodic inspection and cleaning is necessary. Preventative maintenance issues can be integrated into the current maintenance schedule of the engine. Most maintenance requires little effort and minimal downtime of the valve. Corrective maintenance is to be done when the Gas Control Valve begins to behave erratically. Procedures have been generated to cover most minor issues.
- **External Visual Inspection** – Inspect the exterior of the Gas Control Valve for loose connections, frayed wires or structural damage.
 - **Cleaning** – Exterior cleaning will aid in the visual inspection of the external casing and ensure good connections. Mild soapy water can be used as a cleaning agent.
 - **Maintenance Log** – To facilitate troubleshooting and to establish service schedules, a maintenance log should be kept on the Gas Control Valve. Throughout this manual, service parts will be identified by the figure number and item number assigned in the parts list. Items will be referred to by the figure number followed by a hyphen and the item number that it refers to. For example, (2-5) and its position on the Gas Control Valve can be found by locating item 5 on FIG. 2 and looking for its description and part number as identified in the table.

7.0 SERVICING THE GAS CONTROL VALVE

7.1 The Altronic Gas Control Valve is set from the factory and generally does not need adjustment, however periodic maintenance may be needed depending on the service application and quality of the fuel passing through the valve. By following the recommended mounting positions and supplying clean gas this valve will provide excellent service.

7.2 The service kit for the Gas Control Valve includes:

- Stepper Motor Assembly Kit P/N 620008
- Throttle Plate Housing Kit P/N 670054-1
- O-Ring Kit P/N 620019-1
- Control/Throttle Housing Kit P/N 680013-1

Other parts may be available as individual items.

8.0 Disassembly of Gas Control Valve

8.1 This section covers the disassembly of the Gas Control Valve for purposes of field service or maintenance. This valve was designed to be serviceable while connected to the gas pipeline **providing that the gas flow has been shut off to the valve. Failure to shut off the gas flow can cause a very dangerous situation.** If servicing is to be done with the valve removed from the gas pipeline, then it is recommended that a clean flat work surface be prepared and the proper tools be made available. NOTE: Most of the screws and threads below the cover have a service removable thread locker (Loctite 222) on them which may make them more difficult than usual to remove.

8.2 Recommended tool list to disassemble the 690210-x series Gas Control Valves:

- 3/16" to 1/4" wide slotted screwdriver
- #2 Phillips-head screwdriver
- 11/32" open-box end wrench
- 1/16" short arm hex wrench (Allen wrench)
- 9/64" short arm hex wrench (Allen wrench)
- 5/32" T-handle hex wrench (Allen wrench)
- 3/32" T-handle hex wrench (Allen wrench)
- 3/16" diameter straight punch

8.3 With the stepper motor in its fully retracted position (valve fully open), remove the four 8-32 seal screws (2-14) that secure the connector to the cover. Next remove the eight 10-32 cap screws (2-13) that fasten the cover (2-3) to the Control/Throttle Housing (2-1). Note gasket (2-12) between connector and cover. There is also a gasket (2-11) between the cover and the Control housing.

8.4 With the cover (2-3) removed, the inner workings of the valve are now exposed. Keep this area free from contaminants such as excessive dirt and moisture. Remove the four 10-32 socket head cap screws (2-13) and washers (2-16). Separate the Control/Throttle Housing Assembly (2-1) from the Port Housing (2-2). Having available a spare Control/Throttle Housing Assembly (2-1) will minimize downtime due to the ease of exchanging one larger assembly versus a number of smaller ones. If you are exchanging the Control/Throttle Housing Assembly, refer to section 9.4 for reassembly instructions, then skip to section 9.10. If you are not exchanging the Control/Throttle Housing Assembly, it is recommended that you leave the screws in place and do not remove it from the Port Housing at this time as this will make further disassembly easier by allowing the Port Housing to hold the Control/Throttle Housing Assembly.

8.5 To disassemble the Control/Throttle assembly refer to FIG. 3. With the stepper motor in its fully retracted position, remove the four Phillips-head screws (3-3B) from the bracket. Lift stepper motor assembly taking care not to bend the slider (3-3A3) from tilting it against the pin on the shaft lever assembly (3-8). Once the slider is clear of the pin, remove the stepper motor assembly from the Control Housing (3-2).

- 8.6 Remove magnet** (3-10) from magnet holder (3-9) using the straight punch to carefully push the magnet from the magnet holder taking precautions not to damage magnet or exert excessive perpendicular force on the end of the throttle plate shaft (3-1B). Magnet is retained in the magnet holder using silicone rubber adhesive (RTV). Removing any excess amounts of RTV first may make this step easier.
- **NOTE: Mark magnet and holder and note orientation to be sure of correct pole alignment on re-installation.**
- 8.7 Using 3/32" T-handle hex wrench, remove cap screw (3-12) that secures the magnet holder (3-9) to the throttle plate shaft (3-1B) and remove magnet holder.
- 8.8 Loosen (unscrew by at least 1/16") or remove the set screw (3-13) in the shaft lever assembly (3-8) using 1/16" short arm hex wrench. Slide shaft lever assembly up and off of the shaft.
- 8.9 **Note position of throttle stop screw!** Measure or mark the position of the screw (3-6) in the throttle stop bracket (3-4) to ensure correct repositioning during reassembly. Loosen nut (3-7) on throttle stop bracket (3-4) using 11/32" open-box end wrench. Remove 8-32 cap screw (3-6) from bracket using 9/64" short arm hex wrench if necessary. Remove the two 8-32 flat head screws (3-5) using a #2 Phillips screwdriver and lift bracket (3-4) out of housing.
- 8.10 Lift control housing (3-2) off the port housing (2-2) and note if any o-rings are stuck to the bottom of the control housing. Remove the five o-rings, one (2-9) on the top outside of the throttle plate housing, and four (2-10) on each screw that attaches the control housing to the throttle plate housing.
- 8.11 Remove the throttle plate housing assembly by gripping the shaft and pulling up.

9.0 Reassembly of Gas Control Valve

- 9.1 To reassemble the valve, follow the instructions given. The use of a service removal thread locker (Loctite 222) is recommended on all fasteners. RTV will be used to secure the magnet in the magnet holder.
- 9.2 Replace the throttle plate housing (3-1) into the port housing (2-2), aligning the opening of the throttle plate housing with the hole through the port housing.
- 9.3 Replace the five o-rings, one (2-9) on the outside top of the throttle plate housing and four (2-10) for the screws that attach the throttle plate housing to the control housing (3-2).
- 9.4 Attach the control housing (3-2) to the port housing (2-2) and throttle plate assembly using the screws (3-11), (2-13) and washers (2-16).
- 9.5 Slide the shaft lever assembly (3-8) onto the shaft (3-1B). Align the set screw (3-13) to the flat on the shaft approximately halfway up the flattened area on the shaft and tighten using 1/16" Allen wrench.
- 9.6 Replace the magnet holder (3-9) onto the throttle plate shaft (3-1B) and secure it using the cap screw (3-12).
- 9.7 Replace the magnet (3-10) into the magnet holder (3-9) by pressing it in using your thumb. **Be sure to observe the previously marked polarity. Use a dab of RTV to help secure the magnet.**
- 9.8 With the stepper motor in its fully retracted position, carefully insert the pin of the shaft lever assembly (3-8) into the slot on the slider (3-3A3). Secure the stepper motor assembly with the four Phillips head screws (3-3B).
- 9.9 Replace throttle stop bracket (3-4) using two 8-32 x 1/2" flat head Phillips screws (3-5). Insert 8-32 screw (3-6) and nut (3-7) into bracket and lock screw into original position by tightening nut against bracket. Do not use Loctite on screw or nut. Verify that the throttle stop is in the correct position; the centerline axis of the magnet should be perpendicular to the flow of gas when the stepper motor is in the fully extended position (against the stop).

- 9.10 Replace the four 8-32 seal screws (2-14) which secure the stepper motor connector to the cover (2-3) taking care to properly mount the connector gasket (2-12) between the connector and the cover. Replace the cover using the eight 10-32 cap screws (2-13) being careful to properly mount the gasket (2-11) between the cover and the control housing. NOTE: The indicating arrow on the cover should now be in the open position.
- 9.11 Before returning the valve to service, the valve should be thoroughly leak tested using a soapy water solution. Brush a small amount of this solution onto the area to be tested. A constant bubbling of the liquid indicates a leak. Do not submerge the valve in the test solution. Carefully check the area around the cover gasket and around the connector. Also check the interface between the port housing and the control assembly for leaks.

FIG. 1 Fuel Control Valve Detail

MEDIA COMPATIBILITY	- 6061 ALUMINUM BLACK ANODIZED BODY WITH STAINLESS STEEL BUTTERFLY AND SHAFT. CORROSION RESISTANT STEPPER MOTOR
ELECTRICAL SPECIFICATION	- 12/24 VOLTS @ 5 WATTS MAX.
MAX. WORKING PRESSURE	- 50 PSIG
MAX. OPERATING TEMPERATURE	- -40°F TO 176°F
APPROXIMATE WEIGHT	- 10lbs.

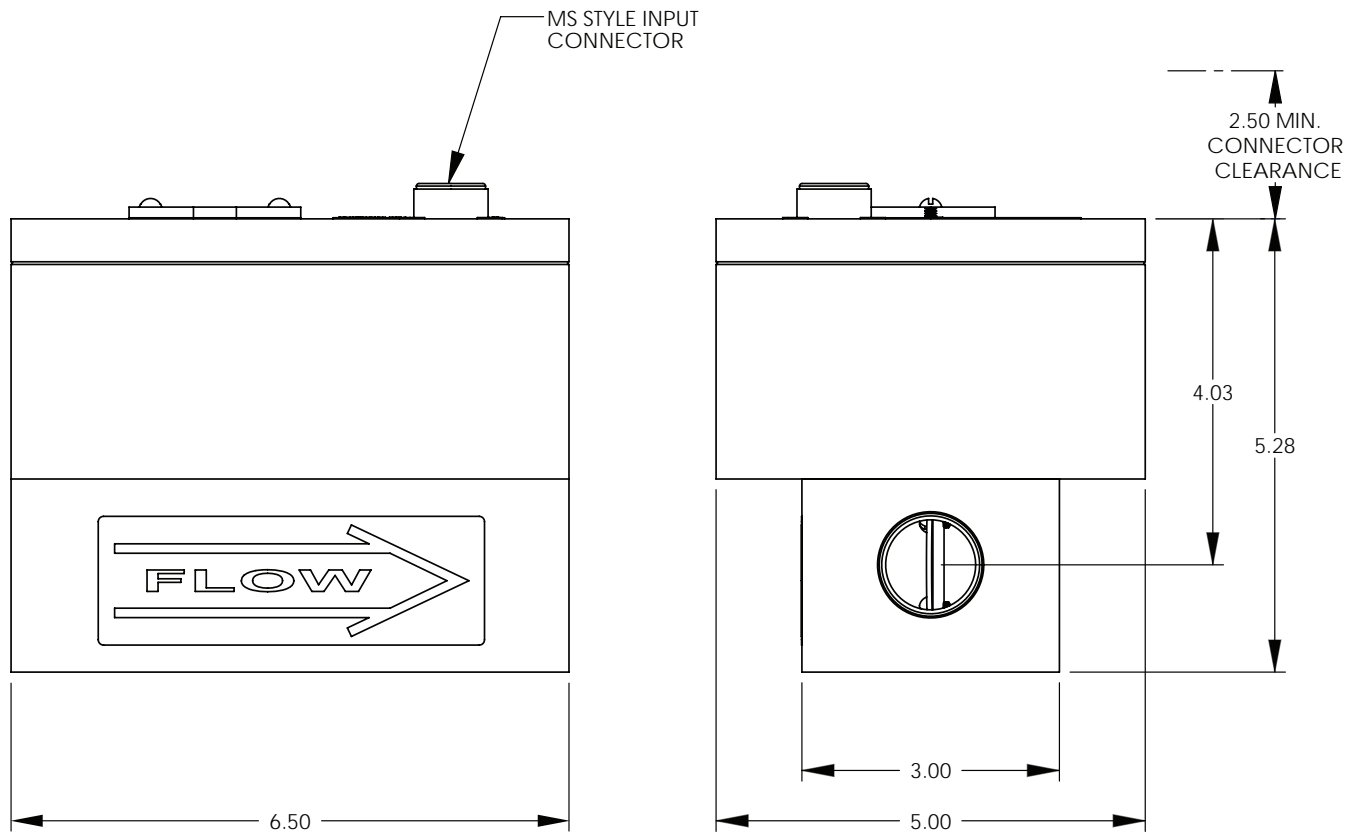


FIG. 2 Part Breakdown and Identification – 1" Fuel Control Valve

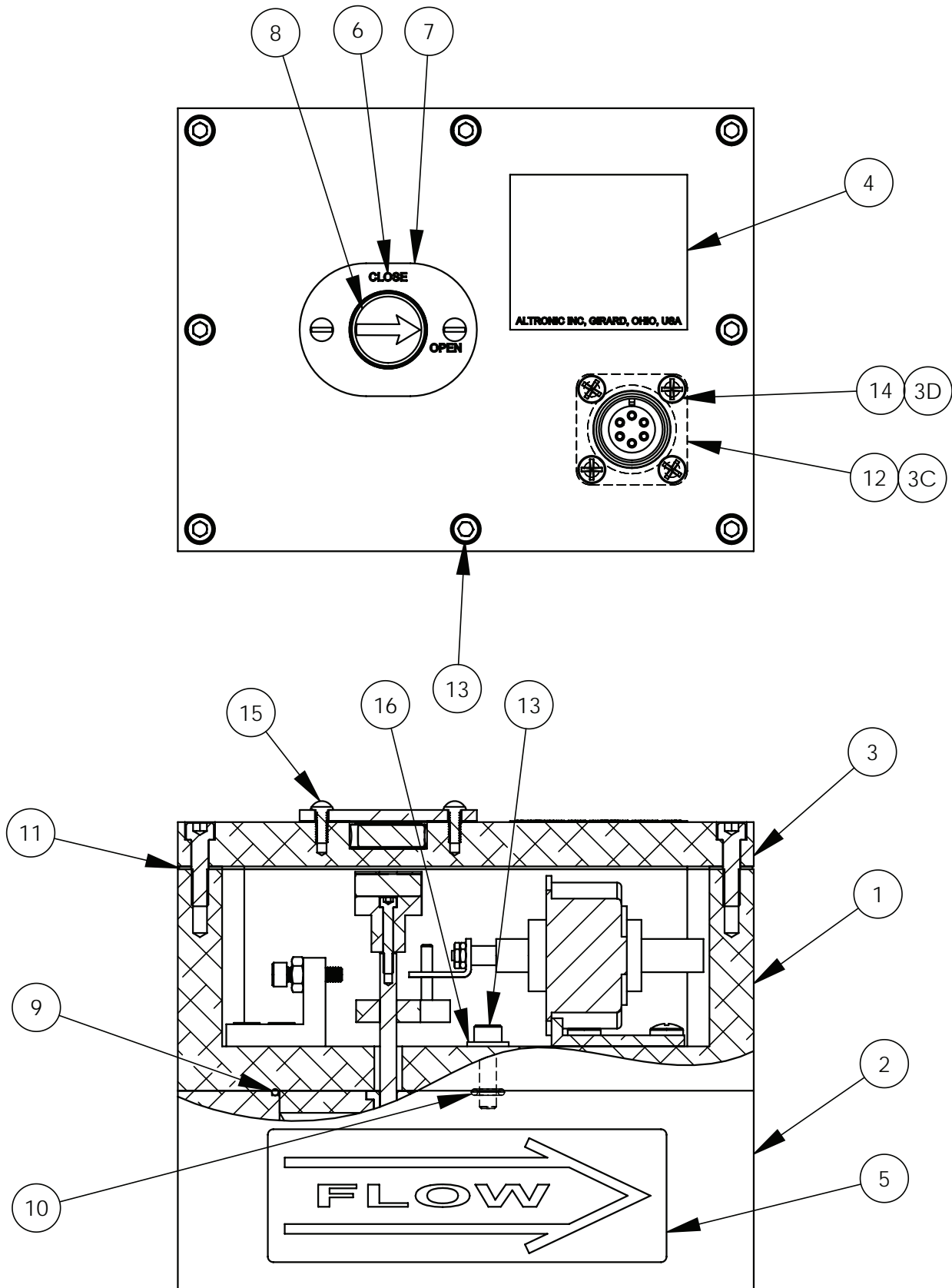


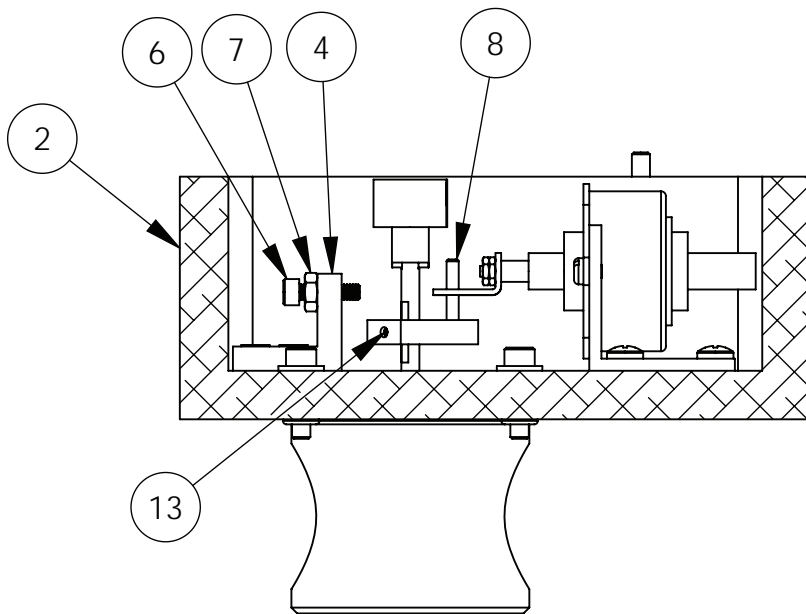
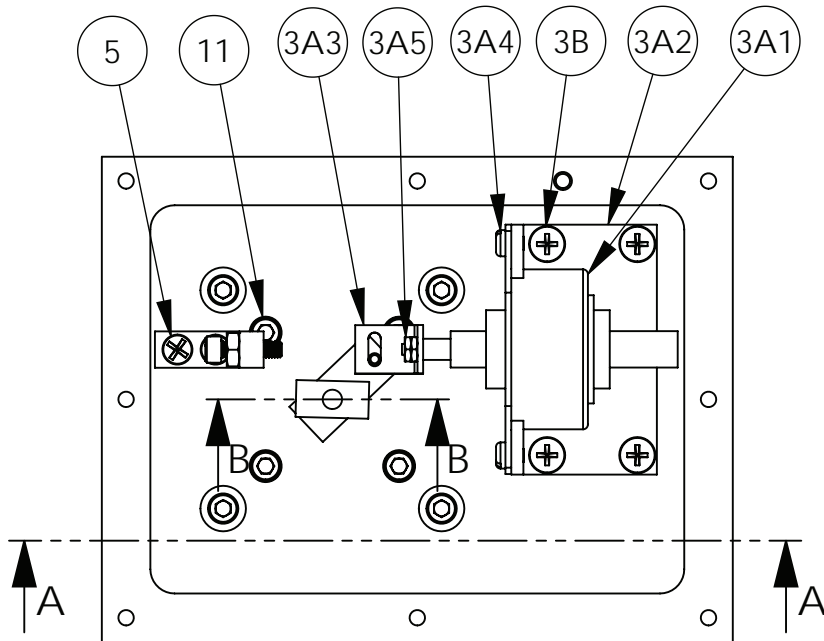
FIG. 2 Part Breakdown and Identification – 1" Fuel Control Valve

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	680013	Control / Throttle Housing Assembly
2	1	615137	Port Housing
3	1	610910	Cover
4	1	602586	Label, P/N
5	1	802005	Label, Flow
6	1	602587	Label, Open / Close
7	1	310365	Cover, Valve Position Indicator
8	1	680009	Valve Position Indicator Assembly
9	1	210464	O'ring
10	4	810049	O'ring
11	1	610923	Gasket, Cover
* 12 (3C)	1	501335	Gasket, Connector
13	12	801033	Screw, 10-32 x 3/4" Cap
* 14 (3D)	4	902641	Screw, 8-32 x 3/8, Ft Hd Seal
15	2	902064	Screw, 6-32 x 3/8, Rd Hd
16	4	902731	Washer, #10 Flat

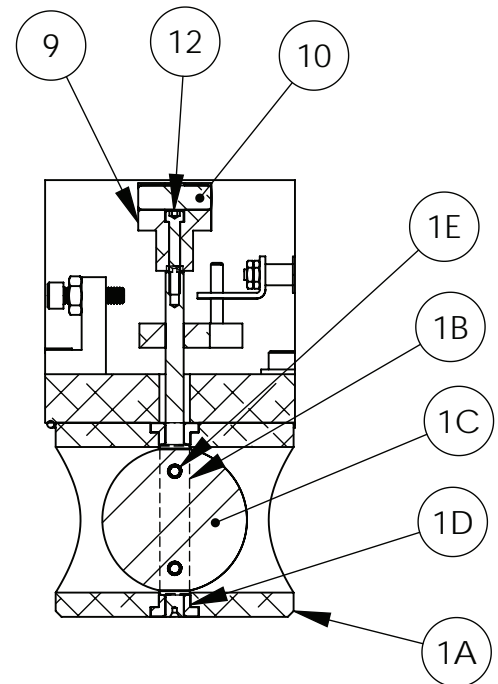
NOTE: 620019-1 O'ring kit consists of qty. 1 of item 9 and qty. 4 of item 10.

* Also IT.3C and IT.3D in Stepper Motor Kit 620008 from FIG.3 PART I.D.

FIG. 3 Part Breakdown and Identification – 1" Fuel Control Valve



SECTION A-A
SCALE 1 : 2



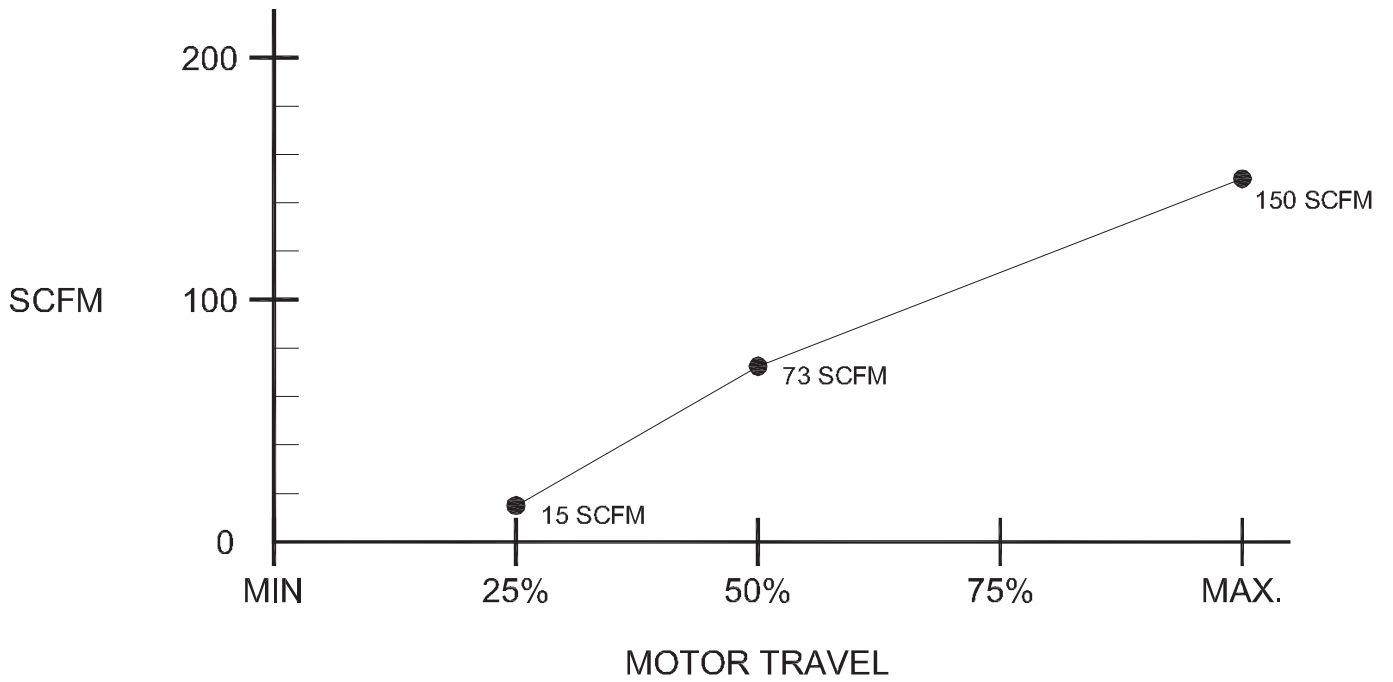
SECTION B-B
SCALE 1 : 2

FIG. 3 Part Breakdown and Identification – 1" Fuel Control Valve

ITEM NO.	QUANTITY	PART NO.	DESCRIPTION
1	1	670054	Throttle Plate Housing Kit
1A	1	615139	Housing, Throttle Plate
1B	1	615140	Shaft, Throttle Plate
1C	1	615141	Throttle Plate
1D	2	615142	Bushing, Shaft
1E	2	902560	Screw, 6-32 x 1/4
2	1	615138	Control Housing
3	1	620008	Stepper Motor Kit
3A	1	660008	Stepper Motor / Bracket Assembly
3A1	1	620001-3	Stepper Motor / Connector Assembly
3A2	1	610917	Bracket
3A3	1	610918	Slider
3A4	2	902598	Screw, 6-32 x 3/16 Pan Hd
3A5	2	902582	Nut, 4-40 Hex
3B	4	902642	Screw, 10-32 x 3/8 Pan Hd Ph
* 3C	1	501335	Gasket, Connector
* 3D	4	902641	Screw, 8-32 x 3/8, Ft Hd Seal
4	1	610921	Throttle Stop
5	2	902687	Screw, 8-32 x 1/2 Ft Hd Ph
6	1	801001	Screw, 8-32 x 5/8 Cap
7	1	901679	Nut, 8-32 hex
8	1	670055	Shaft Lever Assembly
9	1	615143	Magnet Holder
10	1	801085	Magnet
11	4	902729	Screw, 10-32 x 1/2 Cap
12	1	902730	Screw, 4-40 x 3/4 Cap
13	1	902685	Screw, 6-32 x 1/4 Set, Ft PT

* IT.3C and IT.3D are shown in FIG.2.

FIG. 4 Flow Curve for 690210-1



DATA TAKEN @ 1 PSIG AIR INLET PRESSURE AND 68°F