

# MOOG

## 743 Series Installation and Operation Instruction

### Electrohydraulic Servovalve

#### 1. INTRODUCTION

This manual provides instructions and procedures necessary to install, operate and troubleshoot the Moog 743 Series industrial servovalve. Troubleshooting instructions are outlined so that only the specific component(s) suspected of failure may be identified.

#### 2. OPERATION

The Moog 743 Series Industrial Servovalve consists of a polarized electrical torque motor and two stages of hydraulic power amplification. The motor armature extends into the air gaps of the magnetic flux circuit and is supported in this position by a flexure tube member. The flexure tube acts as a seal between the electromagnetic and hydraulic sections of the valve. The two motor coils surround the armature, one on each side of the flexure tube.

The flapper of the first stage hydraulic amplifier is rigidly attached to the midpoint of the armature. The flapper extends through the flexure tube and passes between two nozzles, creating two variable orifices between the nozzle tips and the flapper. The pressure controlled by the flapper and nozzle variable orifice is fed to the end areas of the second stage spool.

The second stage is a conventional 4-way spool design in which output flow from the valve, at a fixed valve pressure drop, is proportional to spool displacement from the null position. A cantilever feedback spring is fixed to the flapper and engages a slot at the center of the spool. Displacement of the spool deflects the feedback spring which creates a force on the armature/flapper assembly.

Input signal induces a magnetic charge in the armature and causes a deflection of the armature and flapper. This assembly pivots about the flexure tube and increases the size of one nozzle orifice and decreases the size of the other.

This action creates a differential pressure from one end of the spool to the other and results in spool displacement. The spool displacement transmits a force in the feedback wire which opposes the original input signal torque. Spool movement continues until the feedback wire force equals the input signal force.



ELECTROHYDRAULIC VALVE CUT-AWAY

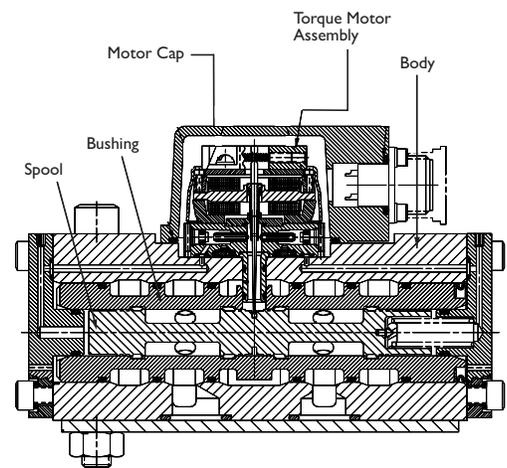


Figure 1 Moog Series 743 Electrohydraulic Servovalve Cut-Away

#### CAUTION

DISASSEMBLY, MAINTENANCE, OR REPAIR OTHER THAN IN ACCORDANCE WITH THE INSTRUCTIONS HEREIN OR OTHER SPECIFIC WRITTEN DIRECTIONS FROM MOOG, WILL INVALIDATE MOOG'S OBLIGATIONS UNDER ITS WARRANTY

### 3. HYDRAULIC SYSTEM PREPARATION

To prolong servovalve operational life and to reduce hydraulic system maintenance, it is recommended that the hydraulic fluid be kept at a cleanliness level of ISO DIS 4406 Code 16/13 maximum, 14/11 recommended. The most effective filtration scheme incorporates the use of a kidney loop or "off-line" filtration as one of the major filtration components. The filter for the "off-line" filtration scheme should be a  $\beta_3 \geq 75$  filter for maximum effectiveness.

Upon system startup and prior to mounting the servovalve, the entire hydraulic system should be purged of built-in contaminating particles by an adequate flushing. The servovalve should be replaced by a flushing manifold and the hydraulic circuit powered up under conditions of fluid temperature and fluid velocity, reasonably simulating normal operating conditions. New system filters are installed during the flushing process whenever the pressure drop across the filter element becomes excessive. The flushing processes should turn over the fluid in the reservoir between fifty to one hundred times.

To maintain a clean hydraulic system, the filters must be replaced on a periodic basis. It is best to monitor the pressure drop across the filter assembly and replace the filter element when the pressure drop becomes excessive. In addition to other filters that are installed in the hydraulic circuit, it is recommended that a large capacity, low pressure  $\beta_3 \geq 75$  filter be installed in the return line. This filter will increase the interval between filter element replacement and greatly reduce the system contamination level.

### 4. INSTALLATION

The Moog 743 series industrial servovalve may be mounted in any position, provided the servovalve pressure, piston and return ports match respective manifold ports.

The mounting pattern and port location of the servovalve is shown on Figure 4. The servovalve should be mounted with 5/16-18 x 2.50 inch long, socket head cap screws. Apply a light film of oil to the screw threads and torque to 96 inch pounds.

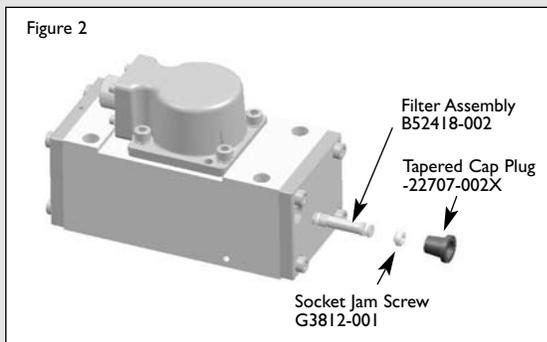
Wire mating connector for desired coil configuration and polarity. Thread connector to valve.

### 5. GENERAL SERVICING RECOMMENDATIONS

- a. Disconnect the electrical lead to the servovalve.
- b. Relieve the hydraulic system of residual pressure.
- c. Remove the servovalve.

## 6. TROUBLESHOOTING CHART

Potential Trouble	Probable Cause	Remedy
Servovalve does not follow input command signal (actuator or components are stationary or creeping slowly).	I. Plugged inlet filter element.	I. Replace filter element.
High threshold (jerky, possible oscillatory or "hunting" motion in closed loop system).	I. Plugged filter element.	I. Replace filter element.
Poor response (servovalve output lags electrical command signal).	I. Partially plugged filter element.	I. Replace filter element. Check for dirty hydraulic fluid in system.
High Null Bias (high input current required to maintain hydraulic cylinder or motor stationary).	I. Partially plugged filter element.	I. Replace filter element and check for dirty hydraulic fluid in system.



**Table I. Replacement Parts**

Part Description	Qty.	Part Number
743 Series Filter Replacement Kit	1	G3194-001
Filter Assembly (I)	1	B52418-002
Base O-Rings	4	-42082-011
	1	-42082-012
Socket Jam Screw (I)	1	G3812-001
Tapered Cap Plug (I)	1	-22707-002X
Filter Removal Tool (I)	1	G3212-001
Allen Wrench Assy. (I)	1	G3814-001

(I) Included in Filter Replacement Kit

## 7. FILTER ASSEMBLY REPLACEMENT

### Tools and Equipment

- a. 1/4" Allen wrench
  - b. 1/8" Allen wrench (included)
  - c. Torque wrench
  - d. Small flat blade screwdriver
- a. Remove the tapered plastic cap plug from the left end cap (view from "P" side body).
  - b. Remove the left rear mounting screw to access the filter cavity.
  - c. Remove the socket jam screw that retains the filter.
  - d. Remove the filter assembly using the filter removal tool, or a long #1-72 UNF-2B screw, and discard the old filter assembly.
  - e. Lubricate the o-rings on the new filter assembly and install it in the filter cavity.
  - f. Install the socket jam screw. Torque to 20± in-lbs.
  - g. Install tapered plastic cap plug and servovalve mounting screw.

## 8. FUNCTIONAL CHECKOUT AND CENTERING

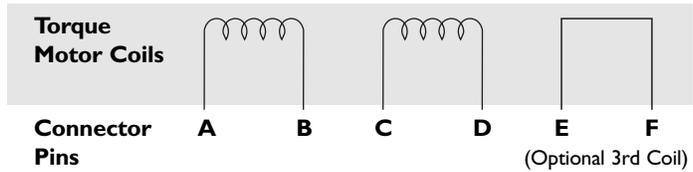
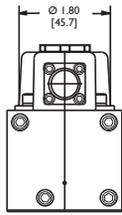
- a. Install servovalve on hydraulic system or test fixture, but do not connect electrical lead.

- b. Apply required system pressure to servovalve and visually examine for evidence of external leakage. If leakage is present and cannot be rectified by replacing o-rings, remove the discrepant component and return for repair or replacement.
- c. Connect electrical lead to servovalve and check phasing in accordance with system requirements.

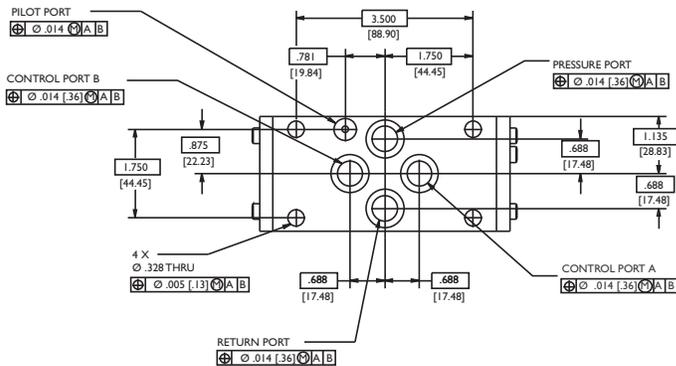
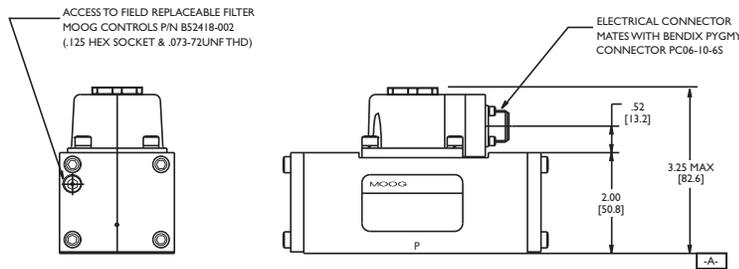
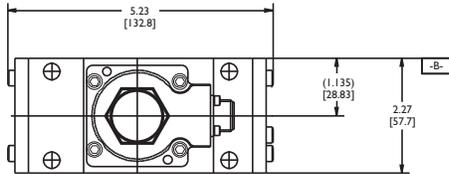
## 9. AUTHORIZED REPAIR FACILITIES

If servovalve continues to malfunction after all recommended corrective action procedures are performed, defective valve should be returned to Moog for repair. Moog does not authorize any facilities other than Moog or Moog subsidiaries to repair its servovalves. It is recommended you contact Moog at (716) 652-2000 to locate your closest Moog repair facility. Repair by an independent (unauthorized) repair house will result in voiding the Moog warranty and could lead to performance degradation or safety problems.

STANDARD ELECTRICAL CONFIGURATION



External connections and electrical polarity for flow out control port A are:  
 Single Coil: A+, B-; or C+, D-  
 Series Coils: tie B to C; A+, D-  
 Parallel Coils: tie A to C and B to D; A & C+, B & D-



ACCESSORIES

**Mating Electrical Connector:**  
 P/N -78068-008 or P/N -78068-009  
 (PC06E-10-6S(SR))

**Suggested Mounting Bolts:**  
 P/N C66391-240B  
 5/16 – 18 NC x 2.50 long  
 Socket Head Cap Screw

NOTES

**Valve Weight:** 3.40 lb (1.54 kg)

**Base O-Ring Size:**  
 0.070 [1.78] sect. x .614 [15.59] I.D.  
 (universal size -016) Compatible with hydraulic fluid being used.

**Aux. Pilot Pressure Port O-Ring Size:**  
 0.070 [1.78] sect. x .301 [7.65]  
 (universal size -011) Compatible with hydraulic fluid being used.

**Aux. Pilot Pressure Port:**  
 Standard on all models.

**Null Adjust:**  
 Internal (factory adjusted).  
 Standard configuration is pressure to control port B.

**Surface Finish:**  
 Surface to which valve is mounted requires  $\sqrt{63}$  finish, flat within 0.0015 [0.04] TIR.

The products described herein are subject to change at any time without notice, including, but not limited to, product features, specifications, and designs.