MOOG

62 Series Installation and Operation Instruction

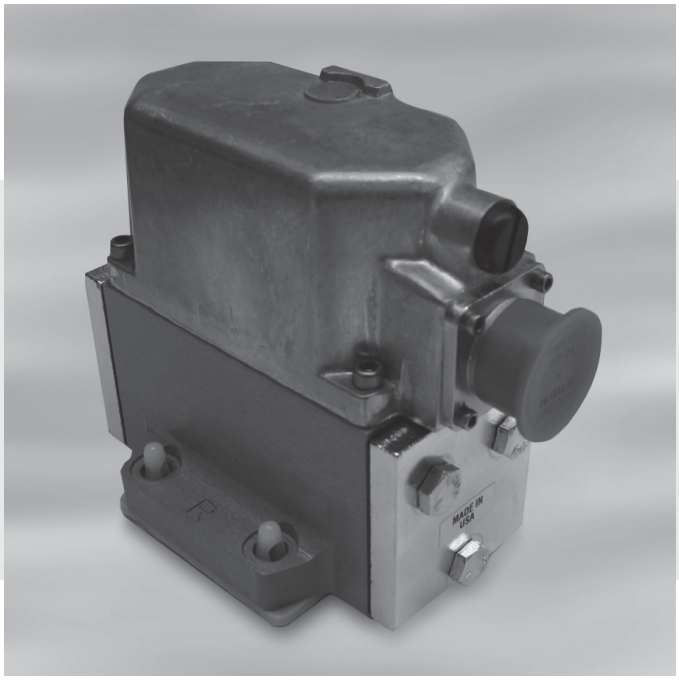
Electrohydraulic Servovalve

1. INTRODUCTION

This manual provides instructions and procedures necessary to install, operate and troubleshoot the Moog Series 62 Electrohydraulic Industrial Servovalve. Troubleshooting instructions are outlined to permit the identification of the specific component(s) suspected of failure.

2. OPERATION

The Moog Series 62 Electrohydraulic Servovalve consists of an electrical torque motor, a nozzle-flapper pilot stage and a sliding spool main stage (see Figure 1). The torque motor includes coils, polepieces, magnets and an armature. The armature is supported for limited movement by a flexure tube. The flexure tube also provides a seal between the hydraulic and electromagnetic portions of the valve.



The flapper attaches to the center of the armature and extends down, inside the flexure tube. A nozzle is located on each side of the flapper so that the flapper motion varies the nozzle openings. Pressurized hydraulic fluid is supplied to each nozzle through a filter and inlet orifice. Differential pressures caused by flapper movement between the nozzle are applied to the ends of the valve spool.

The 4-way valve spool controls flow from the supply to either control port (A or B). The bushing contains flow control ports that are uncovered by spool motion. A feedback wire is deflected by spool movement so that feedback torque is applied to armature/flapper.

Electrical current in the torque motor coils causes either clockwise or counterclockwise torque on the armature. This torque displaces the flapper between the two nozzles. The differential nozzle pressure moves the spool to either the right or left. The spool continues to move until the the feedback torque counteracts the electromagnetic torque. At this point the armature flapper is returned to the center, so the spool stops and remains displaced until the electrical input changes to a new level. The actual flow from the valve to the load will depend upon the load pressure.

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.

ELECTROHYDRAULIC VALVE CUT-AWAY

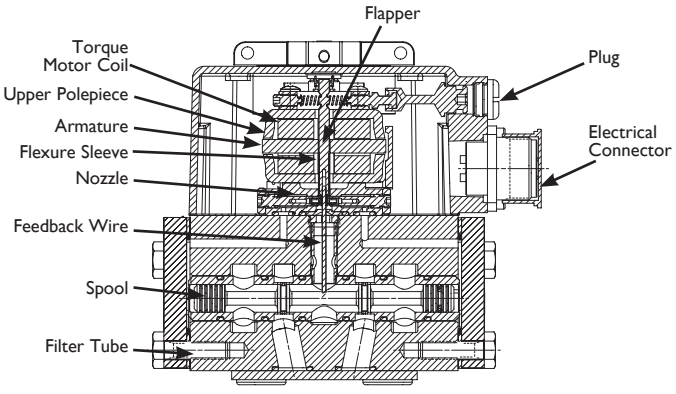


Figure 1

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 Code 16/13 (NAS Class 5) or better. The most effective filtration scheme incorporates the use of kidney loop or "off-line" filtration scheme with $\beta_3 \geq 75$ filters for maximimum effectiveness.

Upon system start-up, the hydraulic system should be purged of built in contamination particles by an adequate flushing of the entire hydraulic circuit prior to mounting the servovalves. The servovalve should be replaced with a flushing manifold and the hydraulic circuit powered up under conditions of fluid temperature and fluid velocity which reasonably simulate normal operating conditions. New system filters are installed during the flushing process whenever the pressure drop across the filter element becomes excessive. The flushing process should turn the fluid in the reservoir over 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 62 Series Industrial Servovalve may be mounted in any position, provided the servovalve pressure, control and return ports match respective manifold ports. The mounting pattern and port location of the servovalve are shown on Page 4. The servovalve should be mounted with 5/16-18 x 1 inch long socket head capscrews. Torque the screws to 96 inch-pounds.

Wire the mating electrical connector for desired coil configuration and polarity (see 62 Series Servovalve catalog, CDL6267). Thread connector to valve.

5. MECHANICAL NULL ADJUSTMENT

It may be desirable to adjust the servovalve for flow null independent of the other system parameters. The mechanical null adjustment permits convenient control function set-ups. The "mechanical null adjustor" is a hex socket set screw located behind the the pan head screw in the motor cap (see Figure 2) which, when adjusted, provides control of the spool position to obtain desired flow null.

NORMAL ADJUSTMENT SHOULD REQUIRE LESS THAN ± ONE TURN.
LIMIT NULL SCREW ADJUSTMENT TO LESS THAN ± TWO TURNS.

Adjustment Procedure

a. Ensure that zero electrical signal is applied to servovalve by disconnecting electrical power to servovalve.
b. Using a blade screwdriver, remove pan head screw to permit adjustment of hex socket set screw.
c. Using a 1/8 inch hex key, adjust set screw to obtain desired flow null. NORMAL ADJUSTMENT SHOULD REQUIRE LESS THAN ± ONE TURN.

Note:

Clockwise orientation of set screw produces flow out control port B on standard models.

d. After desired flow null has been obtained, install pan head screw.
e. Connect electrical power to servovalve.

Tools and Equipment

a. Blade screwdriver
b. Tweezers
c. 1/8 inch Allen wrench
d. 7/16 inch socket

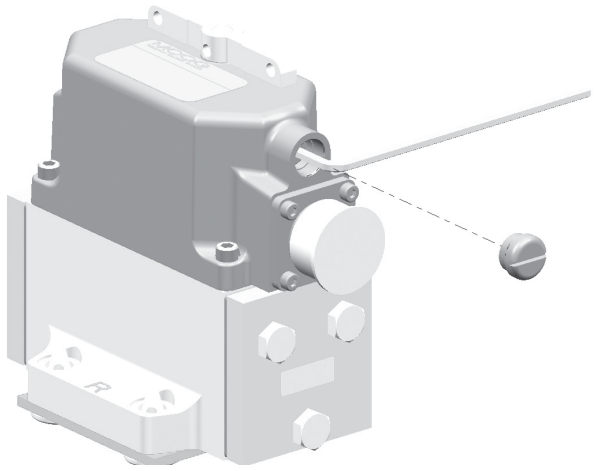


Figure 2
Mechanical Null Adjustment

6. GENERAL SERVICING RECOMMENDATIONS

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

7. TROUBLESHOOTING CHART

The following troubleshooting chart list potential troubles encountered, probable causes, and remedies.

Potential Trouble	Probable Cause	Remedy
Servovalve does not respond to command signal.	1. Controller does not function. 2. Open controller cable. 3. Open coil or open coil lead. 4. Jammed spool.	1. Replace controller. 2. Replace controller cable. 3. Factory repair. 4. Factory repair.
Output flow obtained from one control port only. (Actuator is at limit of stroke or hydraulic motor is rapidly rotating.) Limited or no response to command signal.	1. Controller not functioning properly. 2. Filters silted with contamination. 3. Null adjustor adjusted hardover.	1. Replace controller 2. Replace inlet orifice filter assemblies (Figure 3). 3. Readjust null.
High null bias (actuator drifts or hydraulic motor slowly rotates when controller returns to neutral).	1. Incorrect null adjustment. 2. Filters silted with contamination.	1. Readjust null. 2. Replace inlet orifice filter assemblies (Figure 3).
Poor response (valve delays in returning to neutral each time controller is returned to neutral).	Filters silted with contamination.	Replace inlet orifice filter assemblies (Figure 3).
Non-repeatability (valve fails to return to neutral each time controller is returned to neutral).	Controller not functioning properly.	Replace controller.

Figure 3

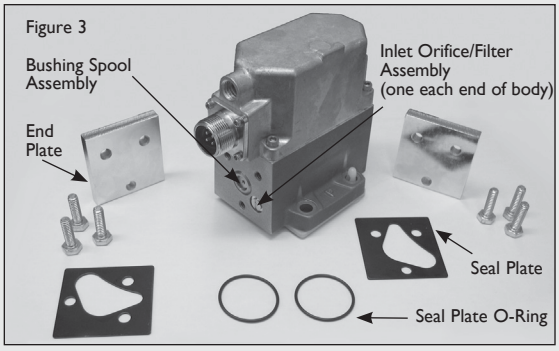


Table 1. Replacement Parts

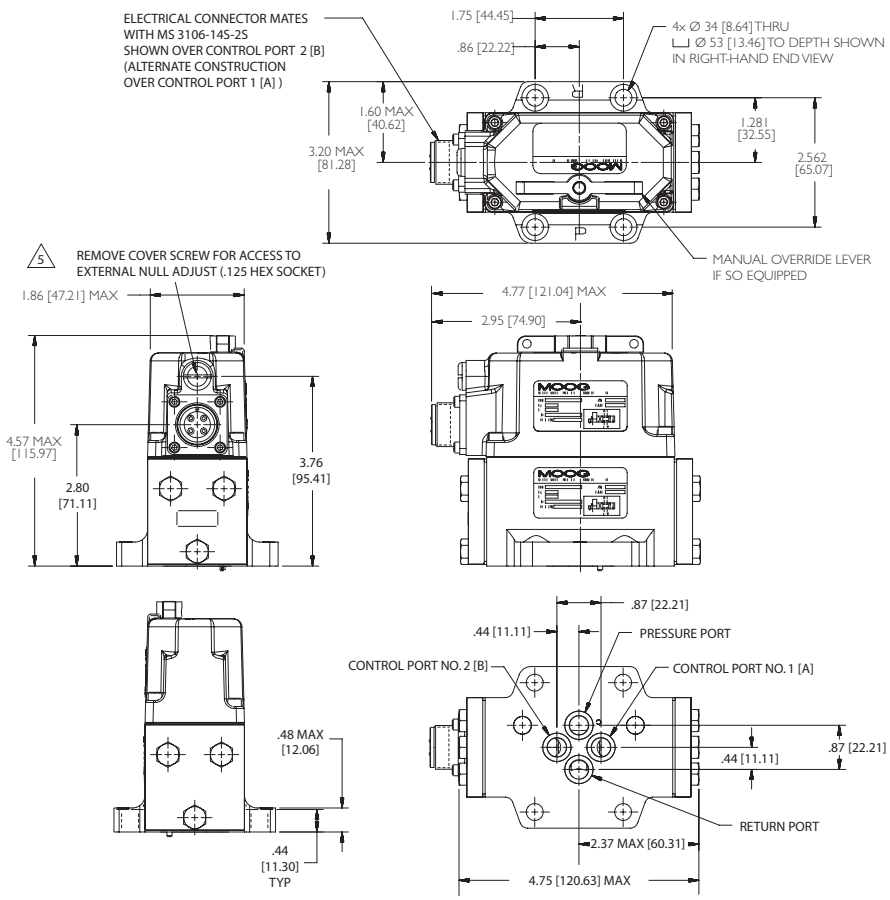
Part Description	Part Number
62 Series Maintenance Kit	B52555RK206K001

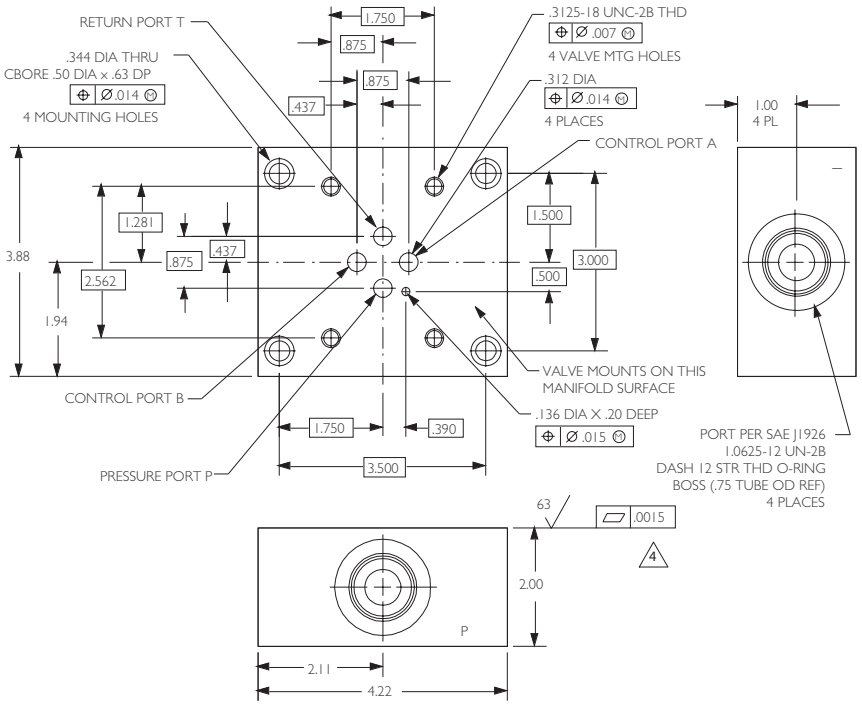
8. FILTER ASSEMBLY REPLACEMENT (one each end of body)

a. Using a 7/16 inch socket, remove the three bolts from end plate. Remove end plate.
b. Remove seal plate and O-Ring (if separate).
c. Locate inlet orifice/filter assembly. Do not touch or attempt to remove bushing spool assembly (see Figure 3).
d. Insert edge of blade screwdriver under lip of inlet orifice/filter and remove inlet orifice/filter assembly and associated O-Ring from body.
e. Visually inspect inlet orifice/filter assembly for damage or foreign matter. (Unless they are new, inlet orifice/filter assemblies should be discarded and replaced each time they are removed).
f. Inspect and replace O-Ring as required.
g. Place seal plate on a flat clean surface. Install O-Ring in seal plate. Because O-Ring is slightly larger than seal plate, it will be necessary for assembler to "lead" O-Ring into seal plate with a finger.
h. Install seal plate containing O-Ring. Install end plate on servovalve body. Install socket head cap screws or bolts and lockwasher. Torque screws to 85 inch pounds.
i. Repeat steps a. through h. for opposite end of servovalve.

9. AUTHORIZED REPAIR FACILITIES

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 or visit www.moog.com/industrial 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.





NOTES

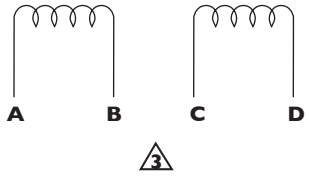
1 Fluid:
Industrial type petroleum base hydraulic fluid, maintained to ISO DIS 4406 Code 14/11 recommended.

2 Operating Temperature Range:
0˚F to 200˚F (-18˚C to 93˚C)

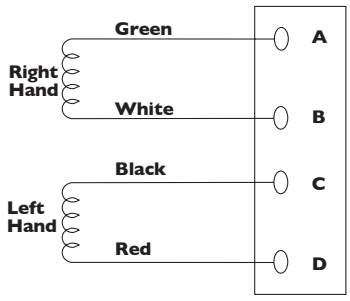
3 Valve Phasing:
Flow out port B results when Series coils: B & C connected, A+, D-

4 Surface:
Surface to which valve is mounted requires finish, flat within .002 [0.05] TIR.

5 Null Adjust:
Flow out port B results with clockwise rotation of null adjust set screw (1/8 hex key).



TYPICAL WIRING SCHEMATIC



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