P/N 009-68962
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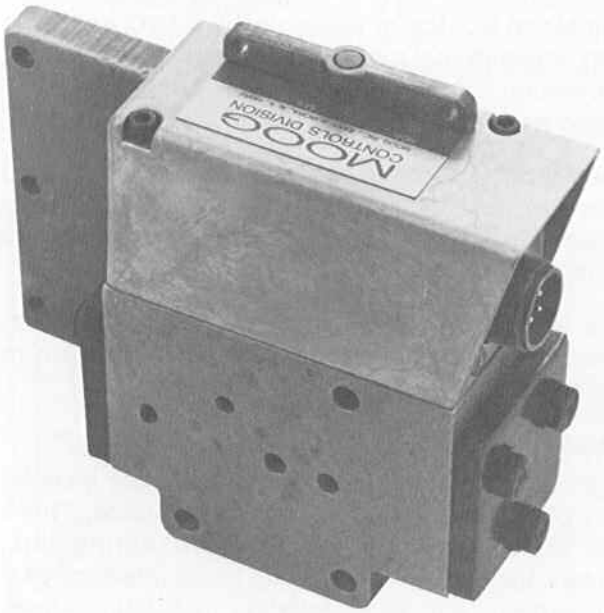
MOOG
INDUSTRIAL DIVISION

MOOG® Series 62-500B Electrohydraulic Controller Service Manual

Effective for Standard 62-500B Series Model Numbers

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. REFER TO MOOG WARRANTY FOR COMPLETE PROVISIONS THEREOF.



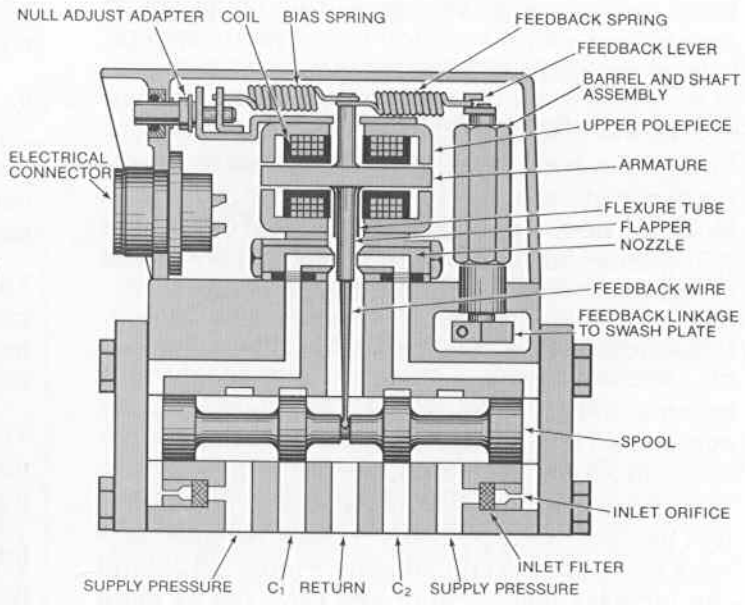


Figure 1. Moog Series 62-500B Electrohydraulic Controller Schematic

1. Description

This manual provides instructions and procedures necessary for field troubleshooting and servicing the Moog Series 62-500B Electrohydraulic Controller. Troubleshooting instructions are outlined to permit the disassembly of only the specific component(s) suspected of failure.

NOTE

Photographs of a Model 62-504B Controller are used in this manual for illustration only. Service instructions equally apply to other 62-500B series models.

2. Operation

The Moog Electrohydraulic Controller functions basically the same as a manual pump/motor controller. The Moog control valve provides flow to the swashplate control pistons, and responds to displacement of the swashplate through a linkage and spring followup.

Input to the controller is electrical current in the coils of the torque motor. This current produces a torque on the armature/flapper that is ultimately balanced out by deflection of the feedback spring due to swashplate movement.

The controller works as follows. When the electrical input current changes, the torque balance at the armature/flapper is upset. This causes the flapper to move toward one nozzle. The fluid flowing to this nozzle through the upstream orifice is then diverted and moves the spool. As the spool moves, the cantilever spring wire that engages the center of the spool is deflected. This creates a feedback torque on the flapper that causes spool displacement to be proportional to the magnitude of torque unbalance at the input.

When the valve spool is displaced out of the null region, flow is ported to the control pistons. These pistons move to change the angle of the swash plate, and so change the displacement of the pump/motor. As the swashplate moves, the feedback lever pulls on a tension spring connected to the torque motor.

The swashplate continues to move until the feed back spring balances-out the torque caused by the electrical signal. At this point the control valve is back near null and the flapper is repositioned between the nozzles.

The overall result is that the position of the swash plate (hence, the displacement of the pump or motor) is proportional in both magnitude and polarity to the electrical input. The valve spool in the controller is underlapped to drain, just as in conventional pump/motor controllers. This under lap, in conjunction with the control piston return springs, gives a positive neutral deadzone.

3. Hydraulic System Preparation

To prolong controller life and to reduce hydraulic system maintenance, it is recommended that a Moog full flow, non-bypass type filter of twenty-five (25) micron absolute rating or better be installed immediately upstream of the charge pump

It is also recommended that a Moog return line filter be installed having a three (3) micron absolute rating or better to remove silt. The return line filter contains an integral bypass valve and can be supplied with an electrical dirt alarm for remote indication of the need for filter replacement. Ninety-five (95) percent of the particles in most hydraulic systems are below ten (10) microns. Proper silt control can increase pump, motor and valve life by more than one-hundred fold.

The pressure line filter is a protective device, trapping system contamination between the fluid reservoir and the controller.The return line filter will police the hydraulic system by removing contaminants which are circulating in the fluid system.

Standard practice has been to operate a new hydraulic system for four or more hours by flushing charge pump supply fluid to return, bypassing the transmission before the controller is installed. However, the period of flushing prior to controller installation varies considerably with the complexity and condition of the system. The flushing is done under conditions of temperature, flow rates, etc. which reasonably simulate operating conditions.

New system filter elements are installed during the flushing process whenever the pressure drop across the filter indicates that the element(s) need changing. When a filter will operate for a period of two hours with no perceptible increase in pressure drop, most of the harmful system contamination has been removed. To maintain a clean system, filters must be replaced whenever the pressure drop indicates a need for changing. Pressure drop can be observed with the installation of hydraulic pressure gauges or with mechanical and electrical dirt alarms available from Moog.

Change filter elements a minimum of once a year.

Size the filters for one-third reservoir size or flow rate, whichever is larger. Increased filter size results in long-term savings for the user.

Request Moog Bulletin TB 114 for a discussion of controlling contamination in hydraulic systems, Moog Bulletin TB 115 for fluid contamination effects on controller performance and Catalog No. 605 Hydraulic System Filters.

4. Installation

The Moog Controller is physically interchangeable with conventional manual pump/motor controllers, depending only upon the availablity of proper interfacing hardware.

The Moog Controller operates from charge pump pressure, just as conventional pump/motor controllers do. The hydraulic port configurations are identical.

The feedback lever on the Moog Controller connects to the same swashplate drag link as conventional manual controllers.

Installation Kit

Kits containing all necessary hardware for installation of the Moog Controller, are available. These kits contain the appropriate connecting link, screws, lockwashers, mounting bolts, interface gasket, o-rings, and an installation instruction sheet. Mating electrical connectors are also available from Moog, Inc.

When ordering complete installation kits or individual replacement parts for installation kits, please provide: (A) the manufacturer's model pump or motor in use, **and** (B) the model number of your Moog Controller.

5. Adjustment and Repair

NOTE

Field maintenance procedures described herein do not require specialized tooling or training. The step-by-step maintenance procedures enable any qualified mechanic to successfully complete all maintenance tasks.

Adjustments/repairs other than those specifically set forth in this manual are not recommended. Service requirements beyond the scope of this service manual should be performed by factory trained personnel at the Moog facilities.

Tools and Equipment

a. Allen wrenches (5/64, 3/32, 1/8 and 9/64)
b. Blade screwdriver

c. Dowel, nylon, 1/2-inch dia. x 6-inch long
d. Locking compound
e. Lubricant - Dow Corning DC-4 (or equiv.)
f. Pin extractor (P/N - AT24321)
g. Pliers, snap-ring, internal
h. Solder, rosin core (60/40)
i. Soldering iron (25-50 watt)
j. Tool, bushing alignment (P/N - T-24448)
k. Torque wrenches (10, 20 & 42 in. lbs.)
l. Tweezers
m. Volt-ohm-milliammeter
n. Wrench, open-end (7/16)

6. Mechanical Null Adjustment

The flow null adjustment of a proportional control valve should be performed independent of other system parameters. Corrections to the mechanical

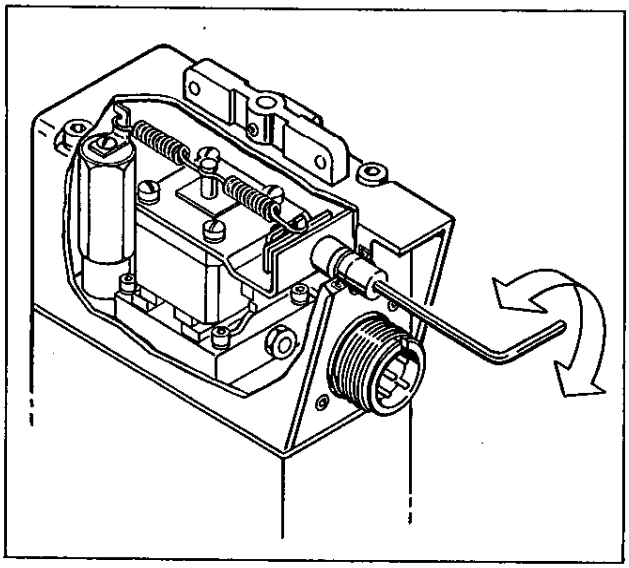


Figure 2. Mechanical Null Adjustment

null adjustment are accomplished by rotating the null adjust adapter that engages the null adjustment screw of the torque motor assembly, Figure 2. Proper positioning of the null adjustment provides zero swashplate rotation with zero current.

Null Adjustment Procedure

a. Disconnect electrical lead from connector (6) on controller motor cap asssembly.
b. With pump running, use a 1/8-inch Allen wrench to rotate the null adjust adapter (30) in each direction (clockwise and counterclockwise), in turn. When rotating adapter, exert slight pushing force to ensure adapter has engaged null adjustment screw on torque motor assembly (11). For each direction of rotation, note relative position of adapter and the instant transmission output shaft rotation begins.
c. Position adapter (30) at point centered within "dead band" between actuation points noted in step b. Normal adjustment should require less than one-half turn in either direction.
d. Reconnect electrical lead to connector (6) on controller.

General Servicing Recommendations

a. Disconnect electrical lead to controller.
b. Relieve hydraulic system of residual pressure.
c. Remove controller from motor/pump.

Thorough review of this service manual is required prior to attempting servicing. Proper servicing requires a good understanding of the overall controller assembly.

7. Troubleshooting Chart

The following Troubleshooting Chart lists potential troubles encountered, probable causes, and remedies. All troubleshooting should be performed only after general servicing recommendations (a), (b), and (c) are completed.

NOTE

Fault isolation is, for the purpose of this manual, solely restricted to possible malfunction of a Moog Controller. A defective motor or pump may cause certain malfunctions described herein. Should a problem persist after suggested service procedures have been performed, a fault isolation checkout of the motor or pump itself should be performed, as specified by the manufacturer.

8. Electrical Checkout

a. Disconnect electrical cable from controller.
b. Using an ohmmeter, measure resistance across electrical connector pins. Resistance values must be in accordance with Figure 7.
c. If an open circuit (infinite ohms) or short circuit (0 ohms) exists, proceed as follows:
    1. Using a 5/64 inch Allen wrench, remove two flat head screws (2, Figure 8).
    2. Using a 9/64 inch Allen wrench, remove two socket head cap screws (3) and lockwashers (4).
    3. Slide motor cap (5) toward electrical connector end of controller until motor cap bottoms (See Figure 3).
    4. CAREFULLY push electrical connector (6) into motor cap (5).
    5. Lift motor cap (5, Figure 8) and gasket (8) from controller body (27). Remove electrical connector gasket (7).

TROUBLESHOOTING CHART

Potential Trouble	Probable Cause	Remedy	Rework in Accordance With Para.	Steps
Contoller does not respond to command signal.	1. Electronic control station does not function.	1. Replace electronic control station	Refer to Para. 8 in this manual.	
	2. Open electronic control station cable.	2. Replace electronic control station cable.	Refer to Para. 8 in this manual.	
	3. Open coil or open coil lead.	3. Replace hydraulic amplifier assembly (11)	9 16	a thru f n thru aa
	4. Contamination wedged in air gap.	4. Clean air gaps.	10	b
	5. Jammed spool	5. Clean valve bushing (25) and spool (24).	10	a
Transmission output flow or motor output in one direction only. Limited or no response to command signal.	1. Electronic control station not functioning properly.	1. Replace electronic control station.	Refer to Para. 8 in this manual.	
	2. Filters silted with contamination.	2. Replace inlet orifice assembly (22).	9 16	i thru k d thru f
	3. Plugged inlet orifices.	3. Replace inlet orifice assembly (22).	10	c
	4. Plugged hydraulic amplifier assembly.	4A. Replace hydraulic amplifier screens (14). 4B. Replace hydraulic amplifier assembly (11).	9 16	a thru f n thru aa
	5. Contamination wedged in air gap.	5. Clean air gaps.	10	b
	6. Jammed spool.	6. Clean valve bushing (25) and spool (24).	10	a
	7. Null adjustor incorrectly adjusted hardover.	7. Readjust null.	6	a thru d
High null bias (actuator drifts or hydraulic motor slowly rotates when electronic control station returns to neutral).	1. Incorrect null adjustment.	1. Readjust null.	6	a thru d
	2. Filters silted with contamination.	2. Replace inlet orifice assembly (22).	9 16	i thru k d thru f
	3. Partially plugged inlet orifice.	3. Replace inlet orifice assembly (22).	10	c
	4. Partially plugged hydraulic amplifier assembly.	4A. Replace hydraulic amplifier screens (14). 4B. Replace hydraulic amplifier assembly (11).	9 16	a thru f n thru aa
	5. Contamination wedged in air gap.	5. Clean air gaps.	10	b
Poor response (valve delays in returning to neutral after electronic control station is returned to neutral).	1. Filters silted with contamination.	1. Replace inlet orifice assembly (22).	9 16	i thru k d thru f
Non-repeatability (valve fails to return to neutral each time electronic control station is returned to neutral).	1. Electronic control station not functioning properly.	1. Replace electronic control station.	Refer to Para. 8 in this manual.	
	2. "Sticky" spool.	2. Clean valve bushing (25) and spool (24).	10	a
	3. Partially plugged hydraulic amplifier assembly.	3A. Replace hydraulic amplifier screens (14). 3B. Replace hydraulic amplifier assembly (11).	9 16	a thru f n thru aa

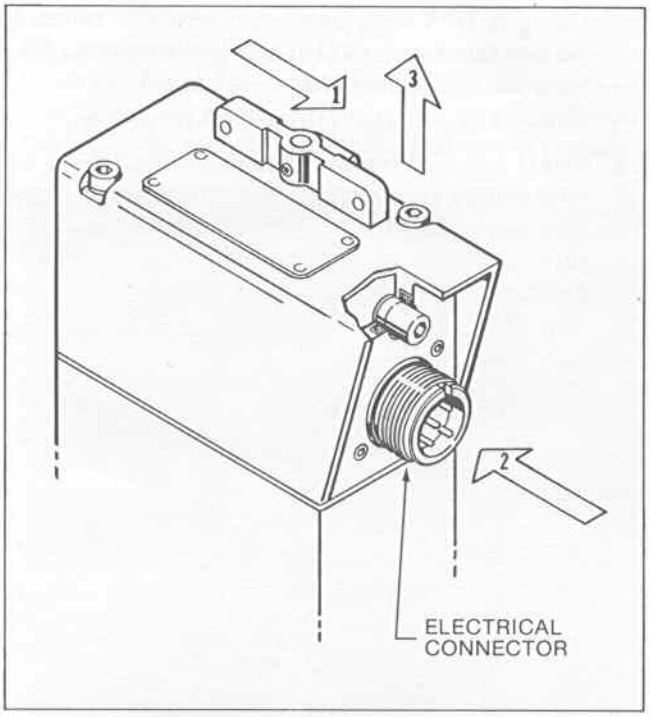


Figure 3. Motor Cap Removal

d. Examine electrical connector (6) for proper solder connections. If a defective connection exists, resolder coil leadwire to connector terminal and remeasure resistance per step (b).

e. If a short or open circuit still exists, replace hydraulic amplifier assembly (11).

9. Disassembly

CAUTION

Controller disassembly should be performed in a clean environment to prevent contamination of disassembled components.

a. Place controller, motor cap up, on a clean, flat surface, with mounting face *away from* assembler.

b. Remove motor cap as described in paragraph 8, steps c-1 thru c-5.

NOTE

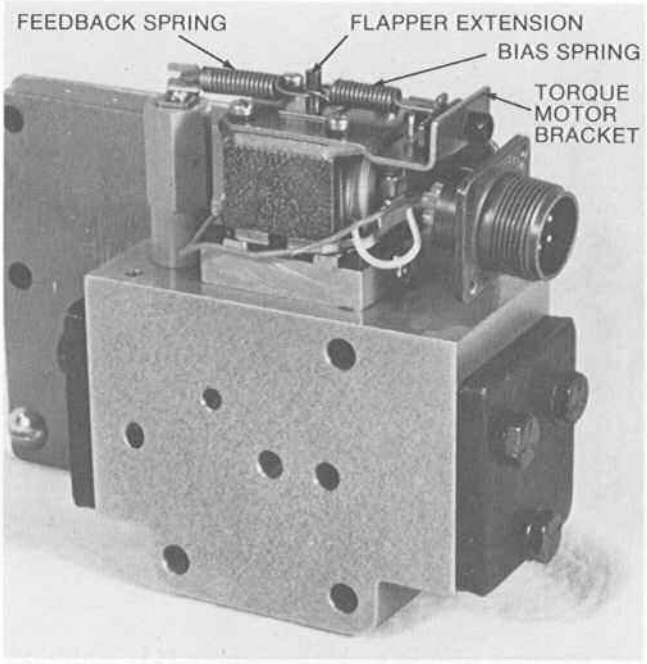
Observe coil leadwire orientation for similar orientation during reassembly.

c. Slide teflon sleeves away from electrical connector (6) to expose soldered connections. Unsolder coil lead wires; remove electrical connector and four teflon sleeves.

d. Remove bias spring and feedback spring. See View 1.

CAUTION

DO NOT attempt to adjust torque motor nozzles. All amplifier adjustments must be made using only the null adjustment screw (see paragraph 6).



View 1

e. Using a 3/32 Allen wrench, remove four socket head cap screws (9) and lockwashers (10) that secure torque motor assembly (11) to controller body (27). Do not permit screws to rub against torque motor magnets during removal (see Figure 4).

CAUTION

The torque motor assembly is a precision built component and must be handled with care. Avoid any contact of objects with the feedback wire protruding from the base of the assembly. Do not let metal particles or objects come in contact with the magnets.

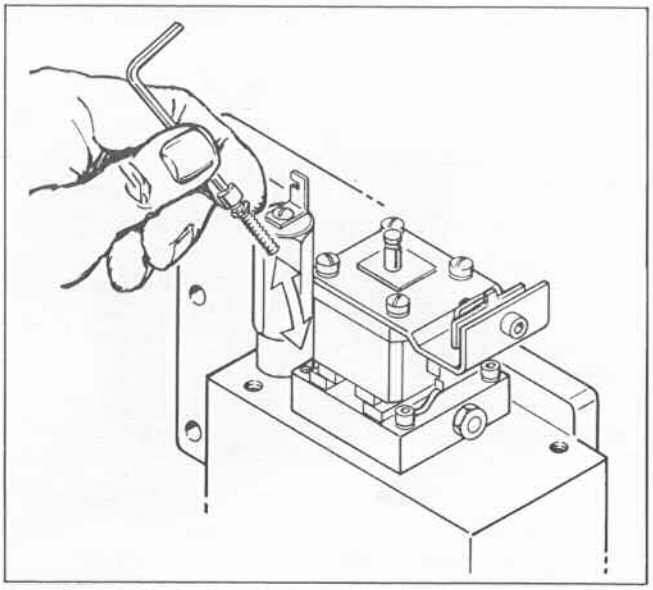
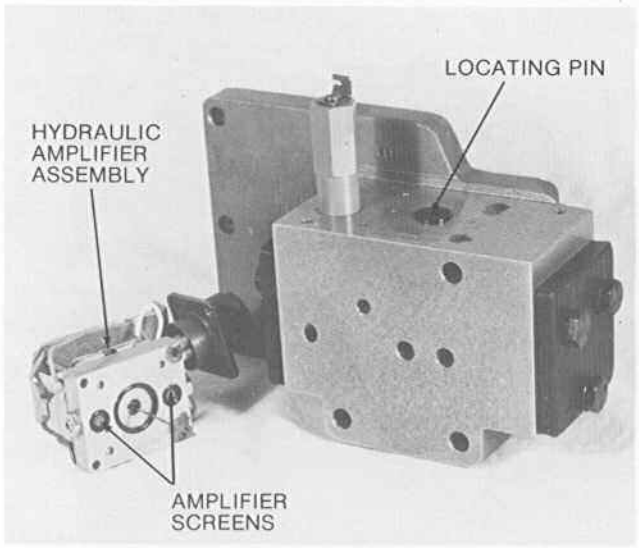


Figure 4. Hydraulic Amplifier Screw Removal

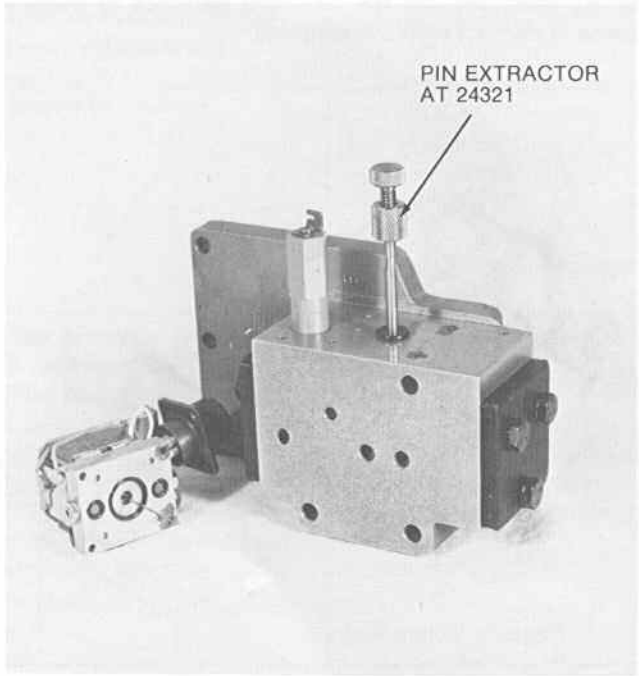


View 2

f. Remove torque motor assembly (11) by lifting base of assembly straight up. DO NOT remove the two O-ring/amplifier screen (13/14) arrangements or O-ring (12) from underside of torque motor unless they are to be replaced with new items. See View 2.

g. Insert pin extractor AT 24321 into bushing locating pin (15). Tighten pin extractor thumbscrew to grip inside diameter of locating pin. See View 3.

h. Withdraw bushing locating pin (15) from valve body (27). See View 4.

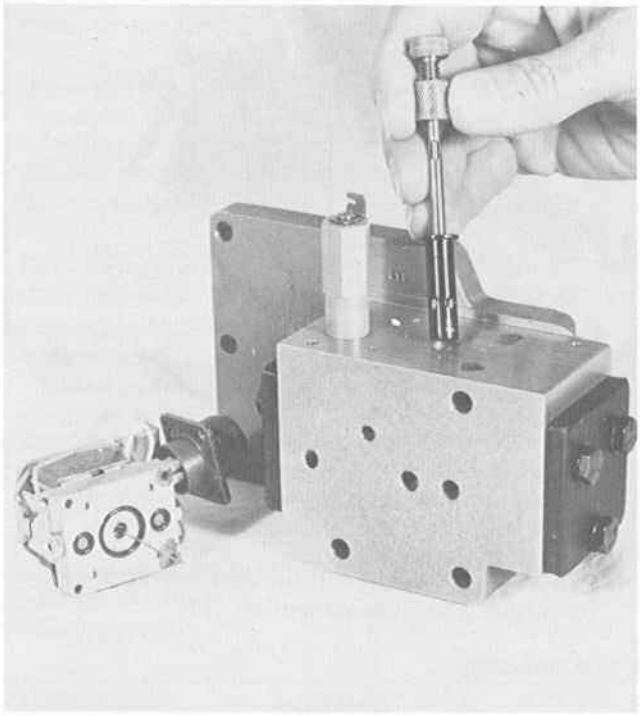


View 3

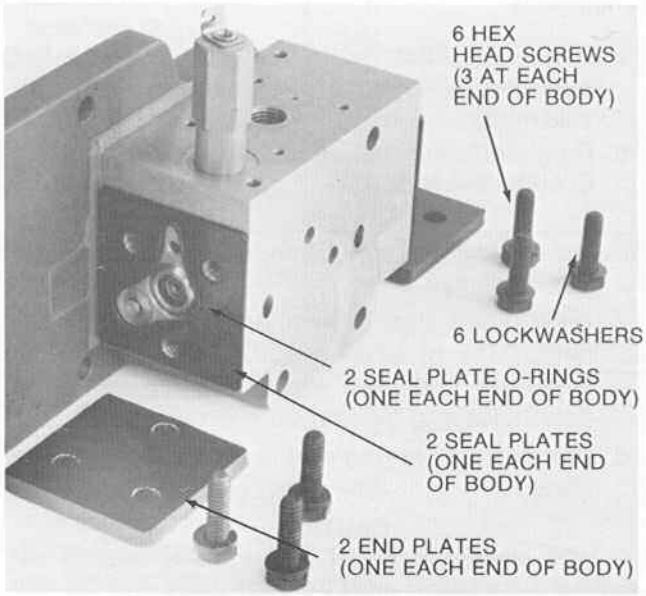
i. Using a 7/16 inch open-end wrench, remove six hex head screws (16) and lockwashers (17). Remove end plates (18). See View 5.

j. Remove seal plates (19) and O-rings (20).

k. Insert edge of blade screwdriver under lip of inlet orifice and remove inlet orifice assemblies (22) and associated O-rings (23) from body (27). Unless they are new, inlet orifice assemblies shall be discarded and replaced each time they are removed.



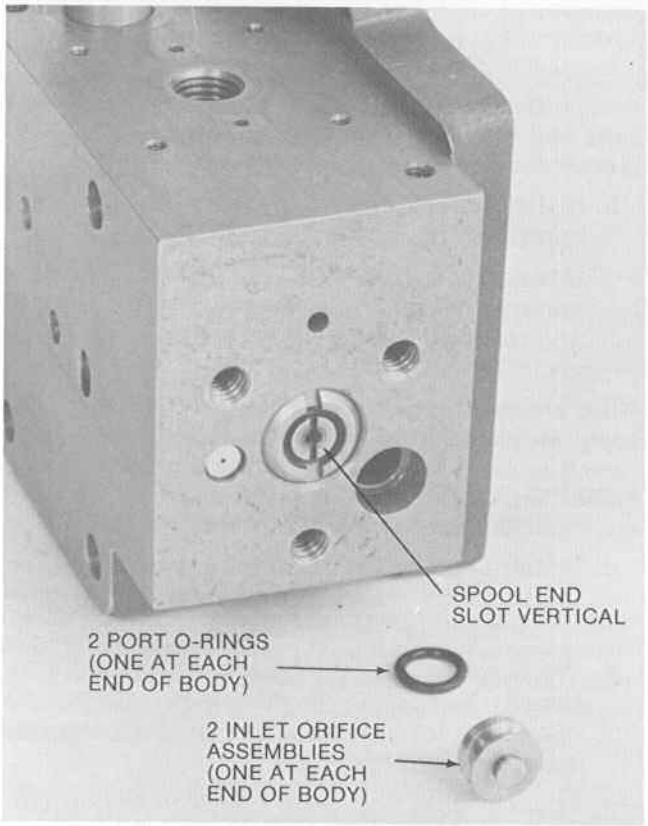
View 4



View 5

NOTE

When overhauling some older models of the controller, be certain to replace separate (2-piece) inlet orifice and filter with newer single unit inlet orifice assembly. Discard the additional port O-ring, which is no longer needed.



View 6

l. Check that spool (24, Figure 8) moves freely within bushing (25). If spool does not move freely, completely remove bushing from servo-valve body (27). Using a 1/2 inch diameter nylon dowel and a small hammer, tap bushing (25) out of body (27) Gently shake bushing and spool or alternately push on ends of spool to loosen spool and allow material causing spool binding to fall free. Remove spool (24). Exercise care when handling bushing and spool to prevent damaging parts.

m. Remove six O-rings (26) from bushing (25).

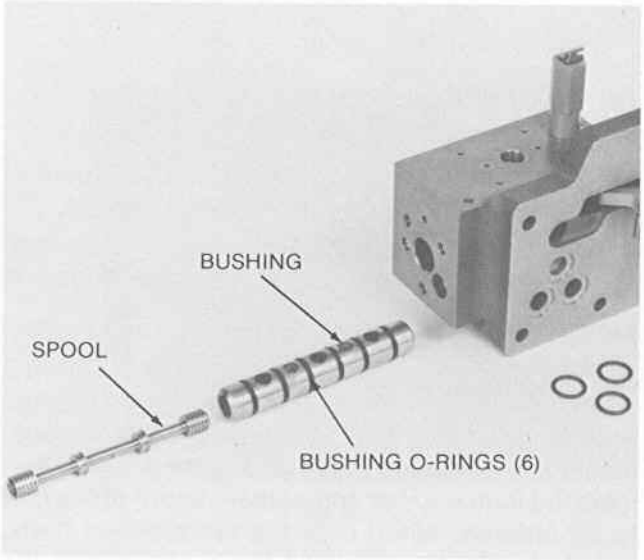
n. Remove hollow hex plugs (28) from bottom of controller, only when plugs are damaged or defective.

10. Cleaning

a. Clean bushing (25, Figure 8) and spool (24) by immersing in a CLEAN commercial solvent.

CAUTION

Many solvents react with O-ring compounds. Remove all O-rings from parts before cleaning.



View 7

b. Clean air gaps of hydraulic amplifier assembly (11) by blowing clean dry air through air gaps (see Figure 5).

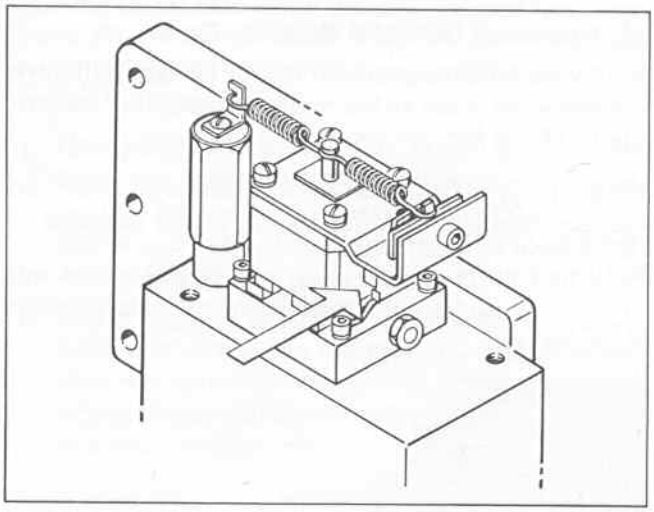


Figure 5. Air Gap Cleaning

c. Clean all remaining parts in a CLEAN commercial solvent. Permit parts to air dry or dry parts using an air hose.

11. Lubrication

a. Lubricate all O-rings with clean filtered hydraulic fluid prior to installing them on parts, and when installing parts containing O-rings.

12. Inspection

a. Visually inspect inlet orifice assemblies (22, Figure 8) for damage or foreign matter.

b. Inspect hydraulic amplifier assembly (11) for damaged coil leads and bent, broken, or otherwise damaged feedback wire.

c. Inspect all O-ring sealing surfaces for scratches, scoring, or other damage.

13. Repair or Replacement

a. Inspect and replace O-rings as required.

b. Replace inlet orifice assemblies (22, Figure 8) if damaged or if foreign matter is present.

c. Replace all parts that have scratched, damaged or broken surfaces which contact O-rings.

14. Ordering Replacement Parts

Replacement parts for all items shown in Figure 8 are available from Moog Inc., Industrial Division, East Aurora, New York 14052. To order a replacement part, locate the part(s) in Figure 8; and determine the item number and nomenclature of the part to be ordered. When ordering replacement parts, specify Model Number and Serial Number of the controller, and the nomenclature of the desired part(s).

NOTE

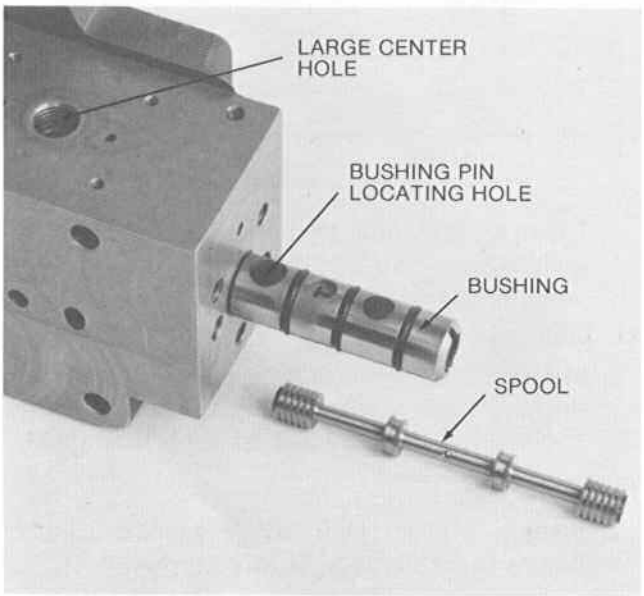
When procuring O-rings for replacement, obtain O-rings compounded to be compatible with system hydraulic fluid being used, or deterioration may result.

15. Returning Defective Parts for Repair

It may be advantageous to return certain defective components, such as the hydraulic amplifier assembly to Moog Inc. for repair.

When returning components, package them so "rough" handling will not cause further damage.

Returned parts will be analyzed. Rework cost will be advised, and authorization awaited before repair is performed.



View 8

16. Reassembly

a. Prior to reassembly, it is recommended that all steps of paragraphs 10 through 12 (cleaning, lubrication, and inspection) be performed.

NOTE

Assembly of controller should be performed in a clean environment to prevent system contamination.

CAUTION

Avoid cutting or nicking O-rings, when installing them on parts and when installing parts containing O-rings, to prevent subsequent leakage problems.

b. Install hollow hex plugs (28) in bottom of controller, as required.

c. Position controller on a clean, flat surface with controller mounting face away from technician, and resting on the right end of body (27).

CAUTION

When pressing the orifice assembly (22) into body (27), apply peripheral force on orifice assembly. Applying central pushing force on the orifice assembly, during installation, may damage the orifice assembly filter and may result in a controller malfunction.

d. Install O-ring (23) on orifice assembly (22). CAREFULLY insert orifice assembly in controller body (27) and press into position.

e. Place seal plate (19) on a flat clean surface. Install O-ring (20) in seal plate. It may be necessary for assembler to "lead" O-ring into seal plate with his finger.

f. Position both seal plate (19) with O-ring (20) and end plate (18) on left end (closest to barrel and shaft assembly) of controller body (27). Secure plate to body with three hex head screws (16) and lockwashers (17). Torque screws to **80-90 in. lbs.**

g. Install six O-rings (26) on bushing (25).

h. Insert bushing (25) into controller body (27) with bushing pin locating hole pointed upward. See View 8.

i. Look into large center hole (View 8) of controller body (27) and align large center hole of bushing (25). Use bushing alignment tool T-24448 for final alignment.

j. Lubricate spool (24) with clean filtered hydraulic fluid. Install spool in bushing (25) with spool slot end oriented toward right side of controller body (27). *This operation must be performed with care.* Misalignment will cause spool to "hang up" and not slide fully or easily into bushing.

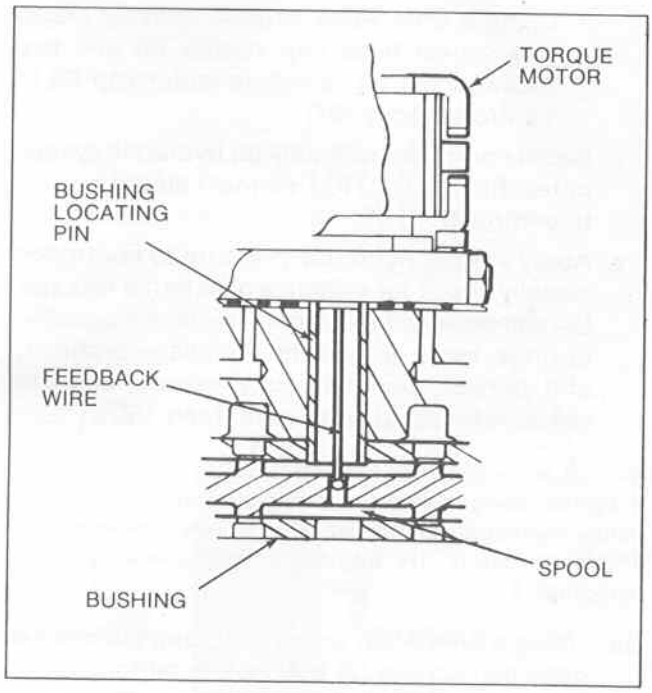


Figure 6. Feedback Wire Ball/Spool Enlargement

CAUTION

Failure to insert bushing locating pin (15) to SUFFICIENT DEPTH in controller body (27) will prevent proper installation of hydraulic amplifier assembly (11) and will result in external leakage and probable damage to hydraulic amplifier assembly.

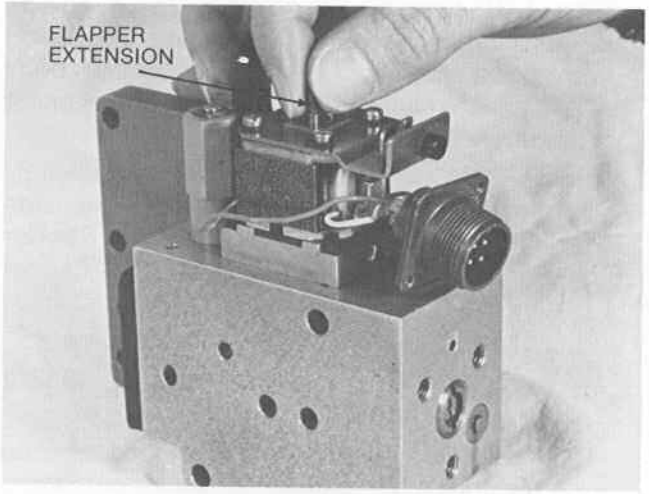
k. Using pin extractor AT 24321, install bushing locating pin (15) into controller body (27) making sure bushing locating pin has engaged large center hole of bushing (25); loosen knurled pin extractor thumbscrew and remove tool.

l. Using a blade screwdriver, position end slot of spool in vertical position (see View 6). Hole in spool shaft (24) must be centered when viewed through bushing locating pin (15).

m. Install O-rings (12) and (13), as required, on underside of torque motor assembly (11). Install amplifier screens (14), coarse side first, by pressing into inside diameter of O-ring (13) as required.

n. Orient torque motor assembly (11) with coil lead wires extending to the right. CAREFULLY insert feedback wire of torque motor assembly into bushing locating pin (15); engage ball at end of feedback wire with hole in spool (24). See Figure 6.

o. Using flapper extension (see View 9), move feedback wire along longitudinal axis of spool (24). When longitudinal motion of spool is observed, engagement of feedback wire and spool is complete.



View 9

NOTE

Engagement of feedback wire and spool must be complete before proceeding with further assembly of the controller. CAREFULLY repeat steps (n) and (o) to achieve spool motion.

NOTE

When the four torque motor mounting, socket head cap screws (9) are being reused, it is recommended that locking compound be applied to screw threads prior to installation.

p. Using a 3/32 Allen wrench, install four socket head cap screws (9) and lockwashers (10) that secure torque motor assembly (11) to controller body (27). Torque cap screws to **10 ±1/2 in. lbs.**

q. Using flapper extension (see View 9), move feedback wire along longitudinal axis of spool (24). Longitudinal motion of spool confirms engagement between feedback wire and spool has been maintained.

NOTE

Should feedback wire and spool (25) become disengaged, remove torque motor assembly (11) and repeat steps (n) thru (q) before proceeding with controller assembly.

r. Position controller on a clean, flat surface, and resting on installed end plate (18).

s. Repeat steps (d), (e) and (f) for installation of orifice assembly (22), O-ring (23), seal plate arrangement (19/20) and end plate (18) on right end of controller body (27).

t. Apply a small amount of lubricant to feedback spring attachment point on barrel and shaft assembly (32).

u. Install feedback spring (end loops approximately same size) between barrel and shaft assembly (32), of the controller body (27), and the flapper extension of the torque motor assembly (11). See View 1.

v. Install bias spring between retainer assembly of the null adjustment and the flapper extension of the torque motor assembly (11). Shorter loop of bias spring should engage flapper extension. See View 1.

w. Install electrical connector (6) as follows:

1. Install teflon sleeves over ends of the four torque motor coil lead wires.
2. Solder four torque motor coil lead wires to electrical connector (6) terminals per Figure 7.
3. Slide teflon sleeves over soldered connections on electrical connector (6).

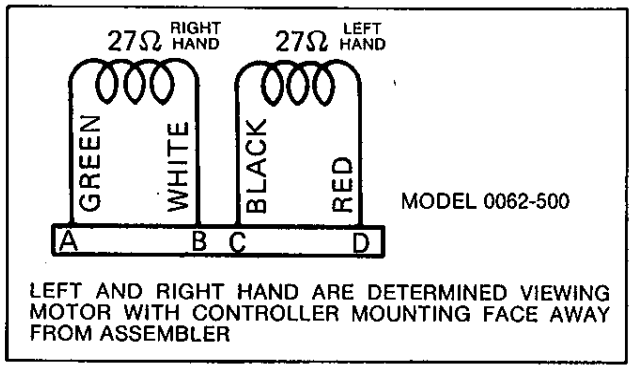


Figure 7. Wiring Schematic

4. Install gasket (7) on face of connector (6) and install connector thru connector mounting hole from inside of motor cap (5). Secure connector to motor cap with two screws (2) installed from outside of cover. Torque to **10 ± 1 in. lbs.**

x. Install motor cap assembly (5) on controller body (27) as follows:

1. With rear of motor cap (end opposite elec-connector) tipped slightly upward and with a 1/8 Allen wrench inserted in the null adjustment transition piece, maneuver motor cap (5) and Allen wrench until transition piece (30) engages null adjustment screw on torque motor assembly (11).
2. Pivot rear of motor cap downward to seat while continually checking to be sure engagement between motor cap transition piece and null adjustment screw is maintained.
3. Using a 9/64 Allen wrench, loosely install two socket head cap screws (3) and two lockwashers (4) to secure motor cap (5) to controller body (27).

y. Install controller assembly on hydraulic system or test fixture. DO NOT connect electrical lead to controller.

z. Apply system hydraulic pressure to controller; visually check for evidence of external leakage. Should leakage be detected, replace suspected O-rings, seals or gaskets. If leakage problems still persist, remove faulty component and return it for repair (see paragraph 15).

NOTE

If system components are drifting or "hardover," first, gently reposition motor cap (5) in finite increments. If error still exists, try adjusting mechanical null per paragraph 6.

aa. Using a 9/64 Allen wrench, tighten two socket head cap screws (3) that secure motor cap (5) to controller body (27). Torque cap screws to **42 ± 4 in. lbs.**

17. Functional Checkout and Centering of Motor Cap Assembly (Models 62-502B and 62-504B Only

a. Rotate manual override handle, on motor cap assembly, fully to both extreme positions. Observe flow rate of hydraulic fluid flowing from respective control ports. Flow rate from control ports should be equal when manual override handle is hardover in either direction. If control port flow rates differ, proceed as follows:

1. Loosen two socket head cap screws (3) that secure motor cap (5) to contrtoller body (27).
2. Slightly reposition motor cap (5) toward or away from electrical connector end of motor cap.
3. Lightly snug socket head cap screws (3) and repeat paragraph 17a. thru 17a.2 until satisfactory control port flow rates are established.
4. Retorque two socket head cap screws (3) per paragraph 16aa.

b. Fine tune control port flow rates using null adjustment procedures in paragraph 6.

Item No.	Description	No. Req'd.
1	ELECTROHYDRAULIC SERVOVALVE ASSEMBLY	REF.
2	SCREW, FLAT HEAD	2
3	SCREW, CAP - SOCKET HEAD	2
4	LOCKWASHER	2
5	MOTOR CAP	1
6	CONNECTOR, ELECTRICAL	1
7	GASKET	1
8	GASKET	1
9	SCREW, CAP - SOCKET HEAD	4
10	LOCKWASHER	4
11	TORQUE MOTOR ASSEMBLY	1
12	O-RING	1
13	O-RING	2
14	SCREEN, AMPLIFIER	2
15	PIN, LOCATING - BUSHING	1
16	SCREW, HEX HEAD	6
17	LOCKWASHER	6
18	PLATE, END	2
19	PLATE, SEAL	2
20	O-RING	2
*21	O-RING	1
22	ORIFICE ASSEMBLY - INLET	2
23	O-RING	2
24	SPOOL	1
25	BUSHING	1
26	O-RING	6
27	BODY, CONTROLLER	1
28	PLUG	2
29	NAMEPLATE	1
30	ADAPTER - NULL ADJUST	1
31	SEAL, OIL	1
**32	BARREL AND SHAFT ASSEMBLY	1

* Used on Series 62-501B and 62-504B ONLY

** Component is NOT a field serviceable item. Removal, installation and/or adjustment to be performed only by factory trained personnel at Moog facilities.

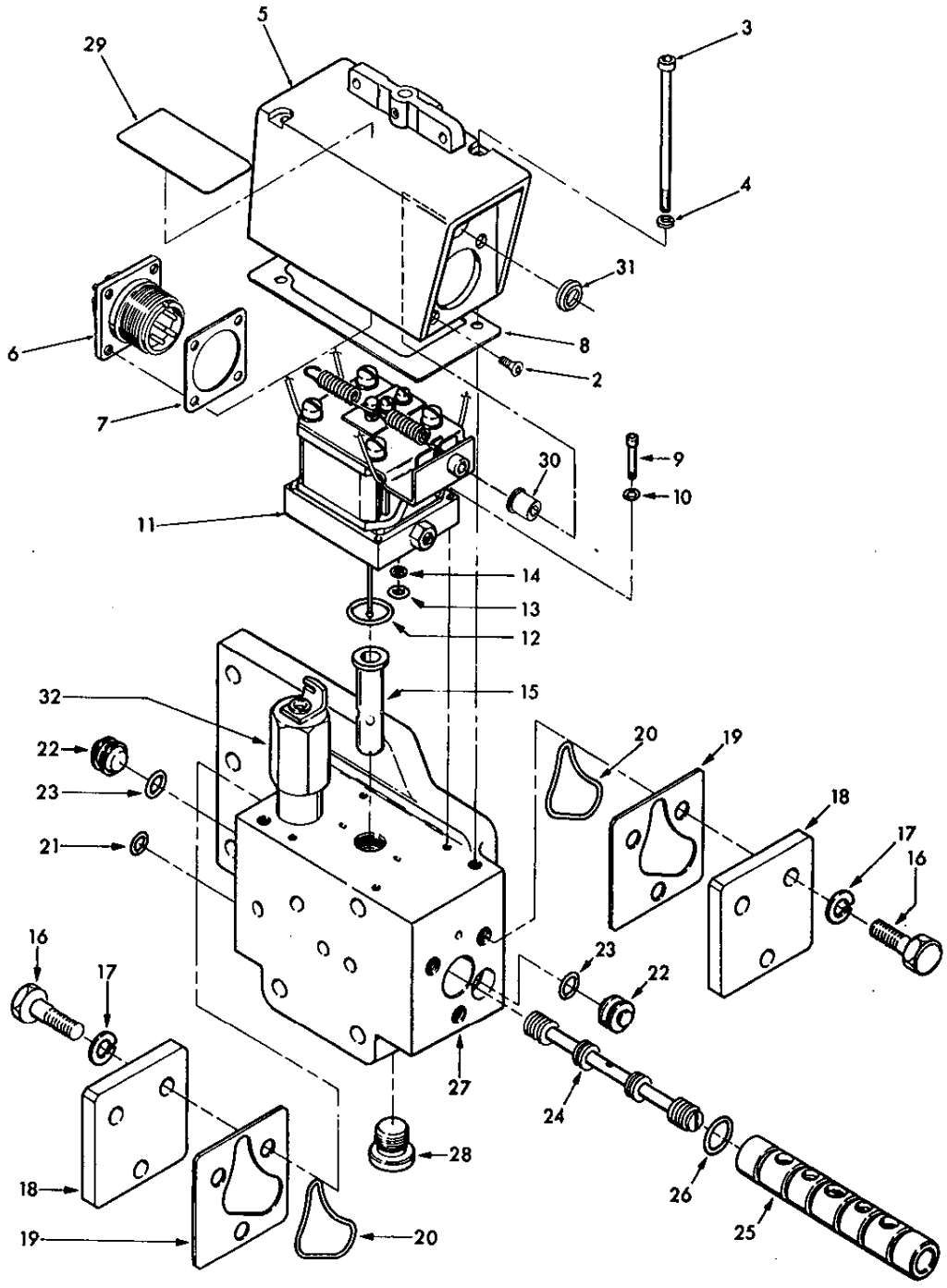
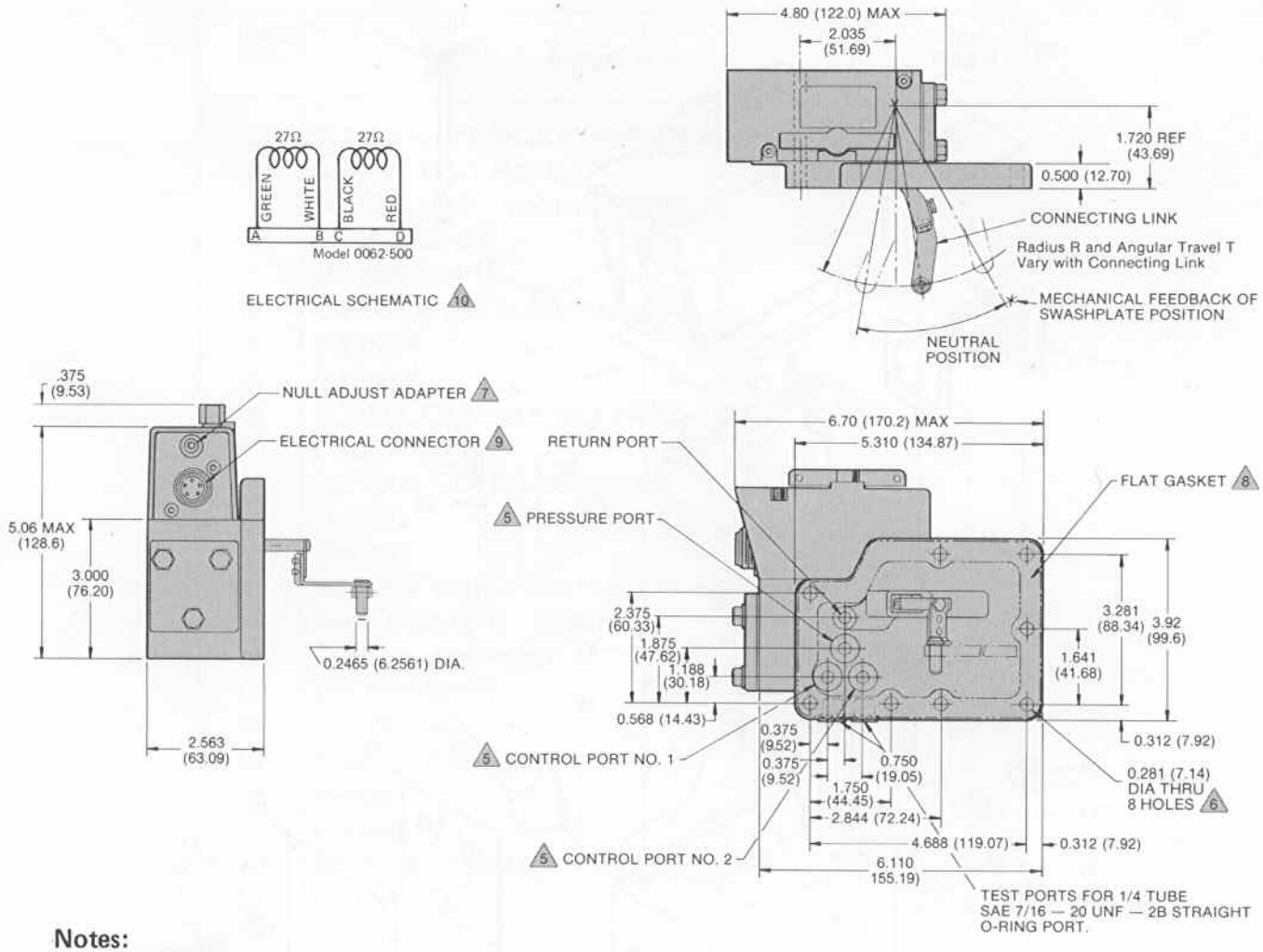


Figure 8. Electrohydraulic Controller, Series 62-500B, 62-501B, 62-502B, 62-504B - Exploded View



Notes:

1 Exterior Materials: Aluminum alloy, zinc alloy and steel

2 Recommended fluids: Petroleum base. Supply filtration 10μ or better required.

3 Surface to which controller is mounted requires $\frac{125}{\surd}$ finish and must be flat within 0.003 (0.08) t.i.r.

4 Ports are 0.365 (9.27) nominal diameter, counterbored 0.625 (15.88) OD x 0.040 (1.02) deep

*5 Recommended seals: Buna N (90 durometer) O-rings 0.070 (0.18) section x 0.489 (12.42) ID

*6 Mounting bolts: (3) ¼ x 20 x 3.00 and (5) ¼ x 20 x 1.00. Torque to 100-120 in. lbs. (11-13 Newton-meters)

7 Null adjustment: Remove access screw; use 9/64 hex socket wrench; 62-500: increase flow out port No. 2 with clockwise rotation; ±2-1/2 turns max. For 62-600 *counterclockwise* rotation will increase flow out port No. 2

*8 Flat Gasket

9 Mating Electrical Connector (environmental capability)

(a) Model 62-500, 62-501, 62-502, 62-504
(b) Model 62-600, 62-601

10 Electrical Polarity; increase flow out port No. 2 with:

Model 62-500, 62-501, 62-502, 62-504
(a) Series coils: B & C tied; A+, D–
(b) Parallel coils: A & C, B & D tied; A+, D–

Model 62-600, 62-601
Internally tied series coils; A+, D–

*Included in installation kit.
See paragraph 4, "Installation".

Dimensions in parentheses are in millimeters

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(b) Unless otherwise specified, Moog's obligation under this warranty is limited to replacing or repairing any item which within twelve months from date of shipment is proven by Moog inspection to have been defective at the time of shipment. As a condition of this warranty, purchaser shall notify Moog in writing of any claimed defect immediately upon discovery and shall return the item to Moog for inspection. Unless specifically approved in writing, Moog shall not provide uncompensated field service under this warranty. No allowance will be made for repairs or alterations unless Moog has previously agreed in writing to such allowance. Moog shall not be responsible for any work done or repairs made by others and disassembly by anyone other than authorized Moog personnel may void the terms of this warranty.

(c) Unless Moog is specifically requested to provide installation assistance under the terms of this quotation, proper installation and checkout shall be the sole responsibility of the customer.

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