

FOREWORD

This publication describes the servicing of two Ford Remote Control Valves; the Single Spool Valve, Part No. 290207, and the Double Spool Valve, Part No. 290124.

The manual includes recommendations for disassembly, inspection, and reassembly. General operating and adjustment information is included, as required. Since the valves are similar, several service procedures have been combined. Other information is divided and deals with each valve separately.

Keep this manual in a convenient location for future reference.

SERVICE DEPARTMENT
TRACTOR AND IMPLEMENT OPERATIONS (U. S.)
FORD TRACTOR DIVISION
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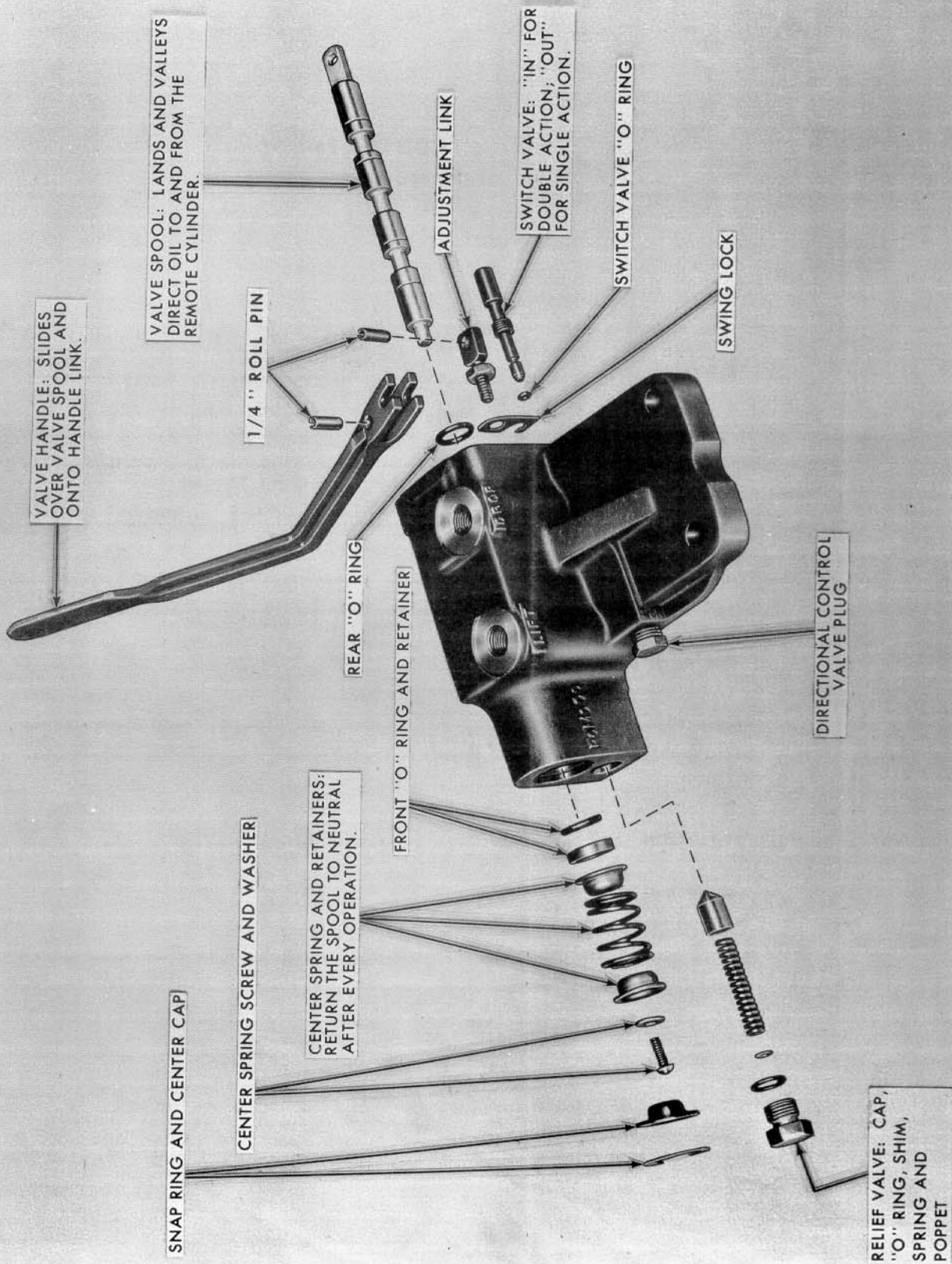


Figure 1
 Single Spool Valve Exploded
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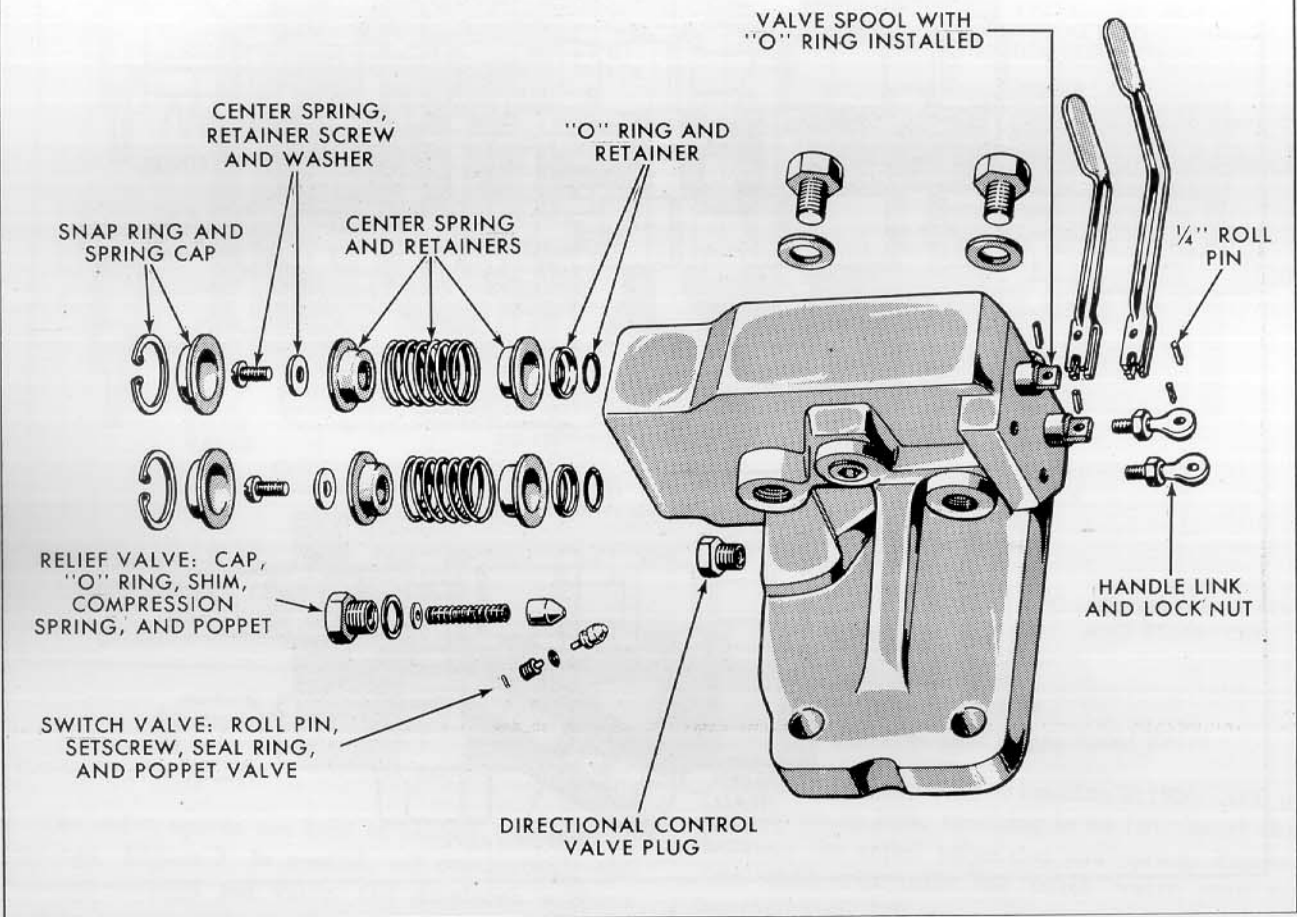


Figure 2
Double Spool Valve Exploded

DESCRIPTION

Both the single and the double spool valve assemblies bolt to the accessory pad of the tractor lift cover, and use oil from the tractor hydraulic system.

The single and double spool valve components are shown in Figures 1 and 2. Reference to side, top, or bottom should be interpreted in relation to the valve installed on the tractor, viewed from the tractor seat.

Only the parts shown in Figures 1 and 2 are serviceable. Defects in spools or internal parts require replacing the entire valve assembly.

SINGLE SPOOL CONTROL VALVE

The Ford Single Spool Remote Control Valve, Part No. 290207, is designed for all Ford Tractors since the NAA, except the Series 6000. This valve can also be installed on the F.S.M. (5000 Series) and the Super Dexta (2100 Series) tractors. The valve can be used with either a double or single acting cylinder.

DOUBLE SPOOL CONTROL VALVE

The Ford Double Spool Remote Control Valve, Part No. 290124, is designed for all Ford Tractors since the NAA, excluding the 6000 Series, and can operate single or double acting cylinders in various combinations.

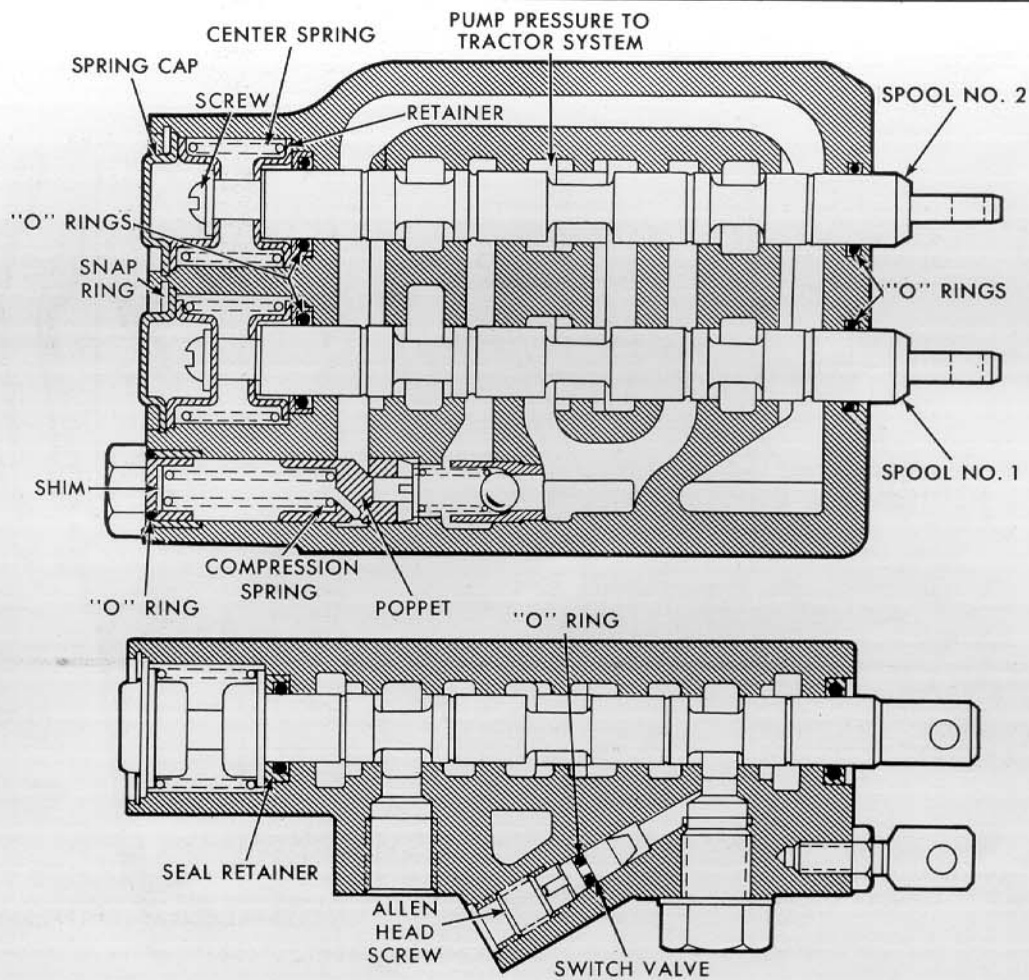


Figure 3
Sectional View – Double Spool Valve

OPERATION

DOUBLE SPOOL CONTROL VALVE

By adjusting the switch valve, Figure 3, the double spool valve can be used with four combinations of remote cylinders.

Cylinder Combinations

One Single Acting Cylinder: Turn the switch valve out with a 3/8" Allen wrench and attach the connecting hose to the left front valve port.

One Double Acting Cylinder: Attach both connecting hoses to the right side valve ports. These ports are controlled by the No. 2 valve spool and are double acting regardless of the switch valve setting.

One Double and One Single Acting Cylinder: Turn the switch valve out, and attach the single acting cylinder hose to the left front port. Connect the double acting cylinder hoses to the right side ports.

Two Double Acting Cylinders: Turn the switch valve in. Attach the hoses from one cylinder to the right side ports and the hoses from the other cylinder to the left side ports.

NOTE: When turning the switch valve in, be sure it seats. Two or three back turns are sufficient to reset the valve to the "out" position.

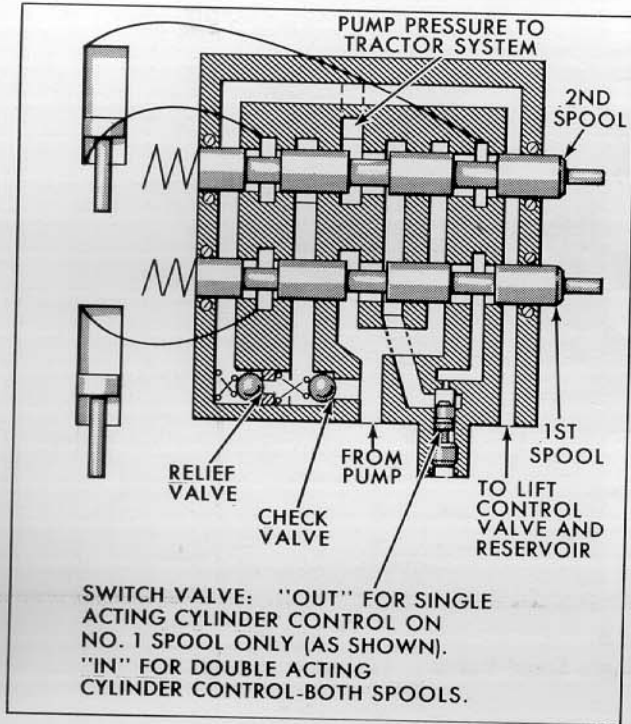


Figure 4

Schematic - Double Spool Valve

Control Valve Spools

The valve spools are held in neutral by centering springs, Figure 3. In neutral, oil continuously circulates through the valve. Oil displaces a check valve, passes between the spool lands, and flows into sump return passages. Movement of the spools allows oil to flow along the spool valleys to or from passages leading to remote cylinders, Figure 4.

Turning the switch valve "in" and activating the spool permits pressurized oil to be diverted out of the No. 1 "drop" port and exert a pressure on a double acting cylinder piston. With the switch valve "out", pressurized oil is unable to enter the "drop" port. When the spool is activated the remote cylinder piston must return to its retracted position by force of gravity.

Relief Valve

The relief valve permits oil to return to sump after 1900 psi is reached in the valve pressure passage. At this point, pressure will displace the relief valve poppet, Figure 3. Holding the control handle back with the remote cylinder fully extended will result in relief valve popping, and should be avoided.

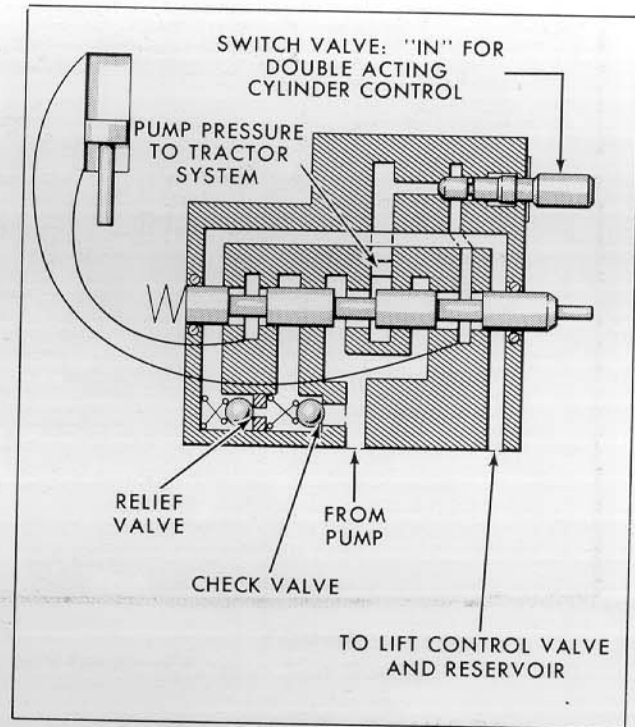


Figure 5

Schematic - Single Spool Valve

The relief valve is set to function at 1900-2000 psi. If pressure is less, resulting in no lift, insert shims between the relief valve cap and spring, Figure 3. One shim will raise the relief valve resistance approximately 150 psi.

SINGLE SPOOL CONTROL VALVE

The single spool valve can be used with a single or double acting cylinder, Figure 5. The switch valve must be "in" for use with a double acting cylinder, and "out" when used with a single acting cylinder. Attaching the hose to the "drop" port when the switch valve is "out" should be avoided, as it will blow the tractor relief valve.

Control Valve Spool

The control valve spool is shown in Figures 1 and 6. The instructions for the operation of the double spool valve applies to the operation of the single spool valve.

Relief Valve

The relief valve is shown in Figures 1 and 6. The single and double spool control valves have similar relief valves.

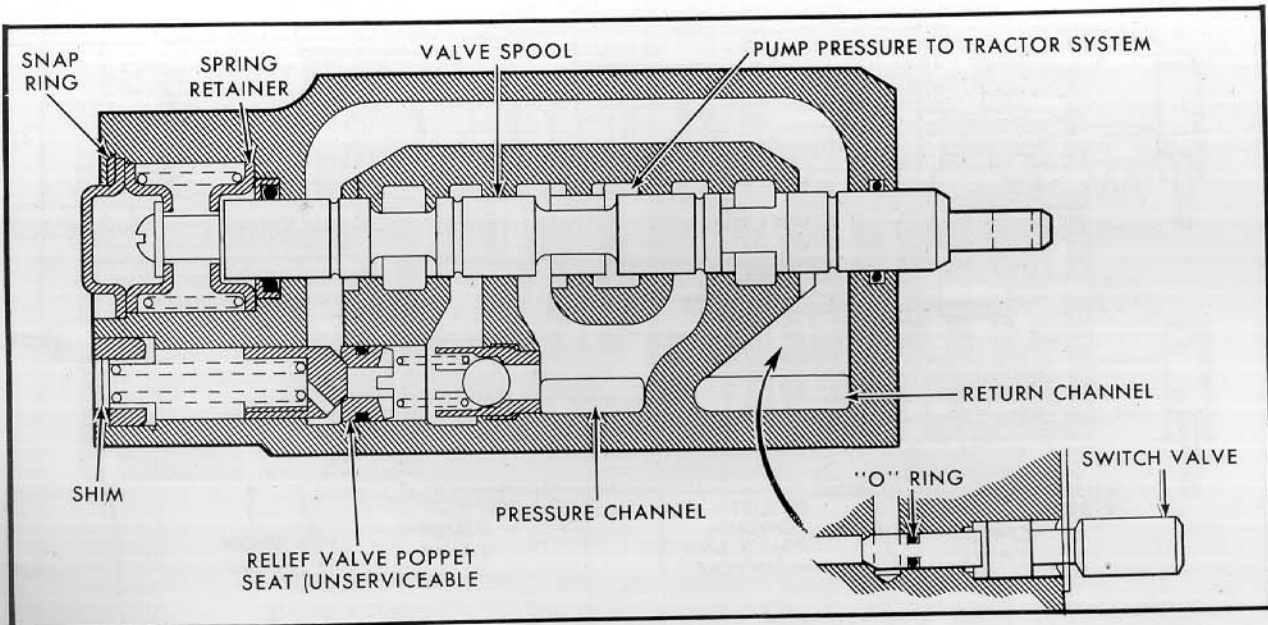


Figure 6
Sectional View - Single Spool Valve

SERVICE PROCEDURES

Valve Spool

REMOVAL

The procedure for removing the valve assembly applies to both the single and double spool valve.

1. Clean the valve hose(s) and the area around the valve thoroughly.
2. Release the pressure in the remote control valve by manipulating the valve handle(s), and disconnect the hose(s) at the valve.
3. Remove the four valve-to-cover retaining bolts and lock washers. Place them aside for reuse.
4. Lift the valve assembly from the tractor and dispose of the valve-to-cover sealing "O" rings.
5. After removal from the tractor, complete cleaning at the valve exterior. Use a clean surface to perform the service operation. Handle parts carefully to avoid nicks or scratches on machined surfaces.

DISASSEMBLY, INSPECTION, AND REPAIR

Before starting to disassemble the valve, study the exploded views on pages 4 and 5. Familiarity with the parts and their location will simplify servicing the valves.

1. Place the control valve face down on a clean work area.
2. Insert a wooden block between the valve spools (and/or spool and surface) and carefully drive out the spool handle roll pin(s), Figure 7. Remove the handle(s).
3. Place the valve assembly in a soft-jawed vise and remove the spool retaining snap ring(s) and centering spring cap(s).
4. Gently tap the spool(s) on the handle end and remove through the front of the valve body. Tag each spool for its correct bore since each is of selected fit.
5. Withdraw the metal seal retainer(s) from the spool bore(s) with a 7600-E Remover, Figure 8. Remove and discard the front and rear valve-to-spool sealing "O" rings. Use a needle to remove the rear "O" ring(s).
6. Remove the centering spring retainer screw(s) and separate the washers, retainers, and spring from the spool(s).
7. Clean the spool(s) and attaching parts thoroughly.

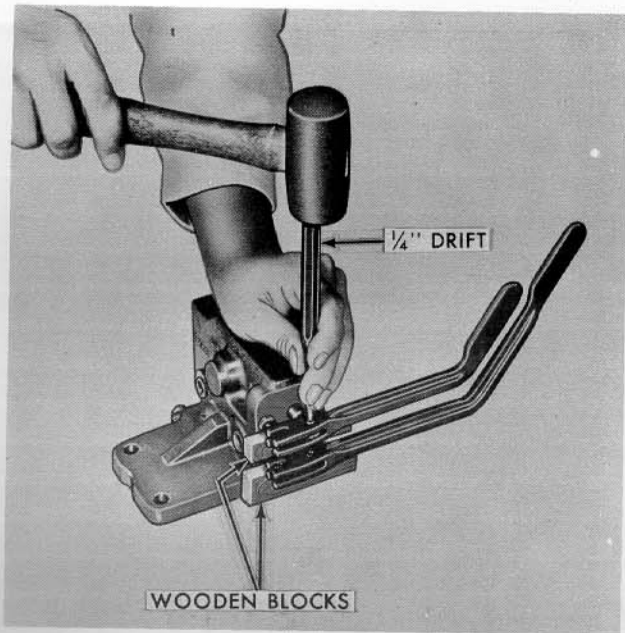


Figure 7
Handle Removal

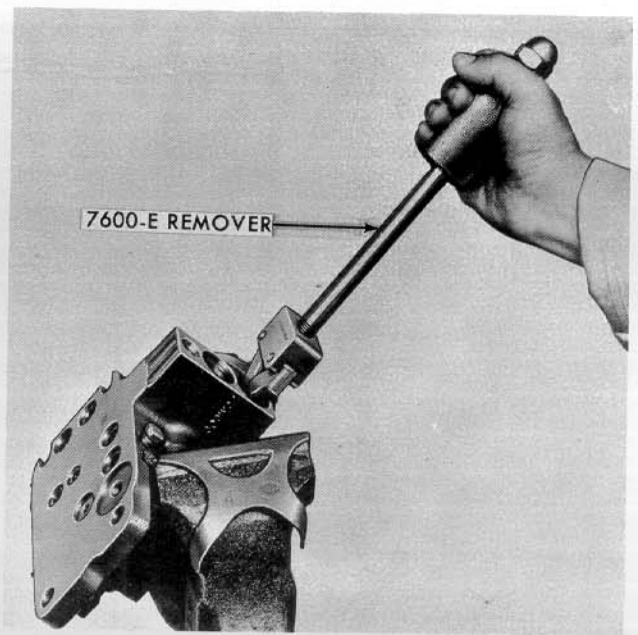


Figure 8
Retainer Seal Removal

8. Inspect the spool(s) and spool bore(s) for pits and deep scoring. If inspection discloses severe defects, the entire control valve assembly should be replaced.
9. Check the centering spring(s), retainers, and washer(s) for cracks and distortion. The centering spring(s) normally has a 1.103" free length and should be replaced if it materially varies from this dimension.

Relief Valve

1. Remove the relief valve cap, shim(s), compression spring, and piston from the valve bore. Clean the parts.
2. Inspect the spring for cracks and distortion and, if necessary, replace it. The normal free length of the spring is 1.731"
3. Check the piston for pits and deep scoring. Replace if necessary.
4. With a light, check the piston seat in the body bore for pits and deep scoring. Since the pressed-in seat cannot be removed, the control valve assembly must be replaced if the seat is damaged.

Switch Valve

Double Spool Valve:

1. Drive the set screw retaining roll pin into the body bore. Remove the pin.
2. Remove the switch valve set screw from the body bore.
3. Remove the poppet valve by tilting and tapping the assembly. Discard the sealing "O" ring.
4. Clean and examine the valve, and replace it if there is pitting or distortion.

Single Spool Valve:

1. Detach the control valve handle. Remove the adjustment link and swing lock from the control valve.
2. Turn the one-piece switch valve entirely out with a 3/8" Allen wrench. Remove and discard the sealing "O" ring.
3. Clean and examine the valve. Replace it if there is excessive pitting or distortion.

SPOOL WITHIN VALVE BORE



Figure 9

Rear "O" Ring Installation

ASSEMBLY

Valve Spool

1. Insert lubricated spool(s) part way into the matching valve bore(s) from the front.

NOTE: Do not attempt to interchange the spools in the double spool valve, as they are of select fit.

2. Continue to push the spool(s) until the spool end(s) align(s) with the "O" ring retainer groove, Figure 9. Be sure all other internal orifices are blocked by the spool(s).

3. Dip new "O" ring(s) in hydraulic oil and install in the retainer groove(s), Figure 9.

IMPORTANT: Follow Step 2 closely to prevent the "O" ring(s) from accidentally falling into an internal valve passage during the "O" ring installation. It is possible, but extremely difficult, to recover "O" rings from internal passages, by using air pressure and/or a thin wire.

4. Push the spool(s) approximately 3/4" out the rear of the valve body to permit the installation of the front spool "O" ring(s) and retainer(s), Figure 10.

5. Lubricate and install the front "O" ring(s) and metal seal retainer(s) with an N-651 Retainer Seal Driver, Figure 11.



Figure 10

Front "O" Ring Installation

6. Reattach the centering spring(s) and retainer(s) to the spool(s) with the retainer screw(s) and washer(s). Reinstall the centering spring cap(s) and snap ring(s).
7. Reinstall the handle(s) in reverse of removal.

Relief Valve

1. Lubricate a new sealing "O" ring and place it on the relief valve cap.
2. Slide the valve poppet and compression spring into the valve bore.
3. Position the shims in the recessed valve cap and reinstall the valve cap.

Switch Valve

Double Spool Valve:

1. Lubricate and install a new sealing "O" ring on the valve and insert the valve into the body bore.
2. Reinstall the valve set screw.
3. Adjust the valve to the desired setting, and drive the retaining roll pin into place.

Single Spool Valve:

1. Install a new lubricated "O" ring on the valve.

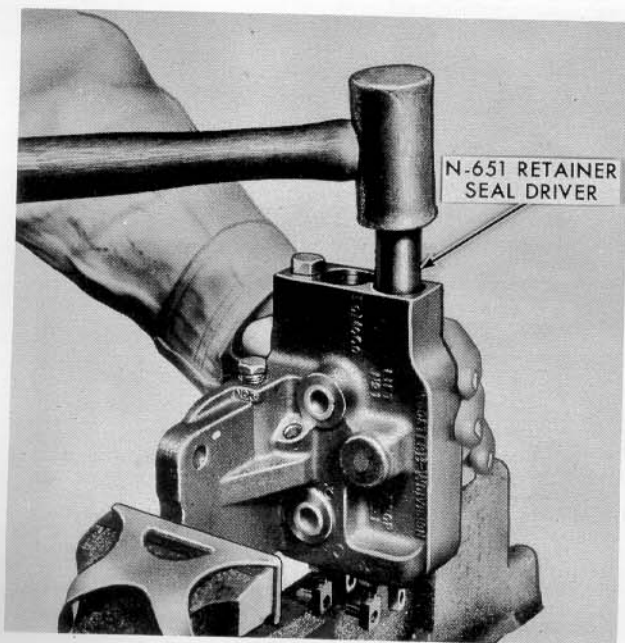


Figure 11
"O" Ring Installation Tool

2. Turn the switch valve assembly into the body bore until the desired setting is reached.
3. Reposition the swing lock over the switch valve and reinstall the adjustment link and valve handle.

INSTALLATION

1. Thoroughly clean the underside of the valve to make certain it is free from all foreign matter.
2. Install new lubricated sealing "O" rings.
3. Apply a suitable lubricant to the valve under surface and install the valve on the tractor lift cover.

NOTE: Set the switch valve to the desired position before installing the valve on the tractor. Although the adjustment can be made with the valve installed, it is easier to accomplish with the valve removed.

4. Check the oil level in the tractor hydraulic system. Add oil as required.

PRESSURE TEST

All test procedures require the Ford Hydraulic Test Kit. In some instances, it may be necessary to use

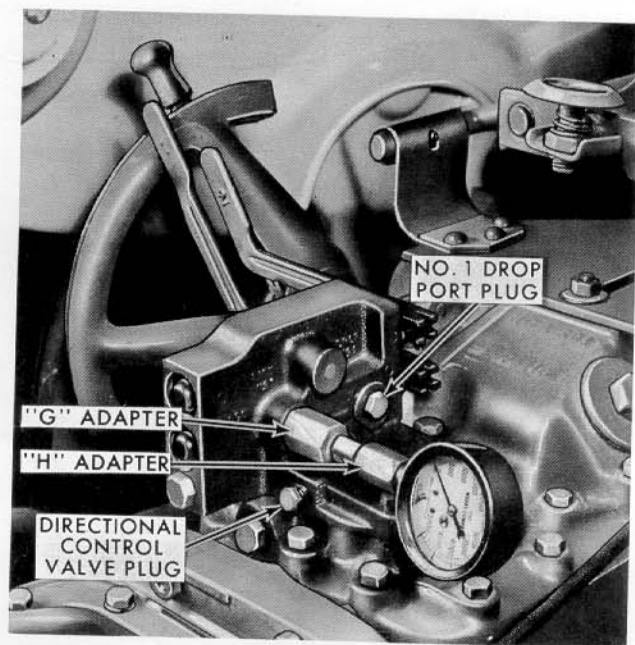


Figure 12
Pressure Test - Double Spool Valve

optional test kit parts. Refer to your Ford Hydraulic Test Kit Instructions, Form No. SE 8182-A, to identify any components not contained in your test kit. Test instructions for the double and single spool valves are listed below.

Double Spool Valve

1. Place a plug in the No. 1 "drop" port, located on the left rear of the control valve, Figure 12.
2. Attach the "H" adapter to the pressure gauge.
3. Connect the control valve "G" adapter to the "H" pressure gauge adapter and thread the entire assembly into the No. 1 "lift" port, Figure 12. Tighten all connections.
4. After the hydraulic oil has warmed in the tractor system, pull the No. 1 control valve handle back and observe the pressure gauge reading. A pressure of 1900-2000 psi should be attained. For accuracy, repeat the procedure. Add shims between the relief valve cap and compression spring to increase pressure. The addition of one shim will increase the pressure approximately 150 psi.
5. After completing the test, remove the pressure gauge, adapters, and plug in the reverse order of installation.

Single Spool Valve

1. Place a plug in the rear, or "drop" port.
2. Attach the "H" adapter to the pressure gauge.
3. Turn the "L" adapter into the "lift" port. Cap the orifice on the "L" adapter and attach the pressure gauge assembly, Figure 13. (The optional "G" fitting can be used in place of the "L" adapter.)
4. After the hydraulic oil has warmed in the tractor system, pull the valve handle and observe the gauge reading. The reading should register within a range of 1900–2000 psi. Repeat the test for accuracy. Higher pressure can be attained by adding shims between the relief valve cap and spring. The addition of one shim will increase the pressure approximately 150 psi.
5. After completing the test, remove the pressure gauge, adapter, and plug in the reverse order of installation.

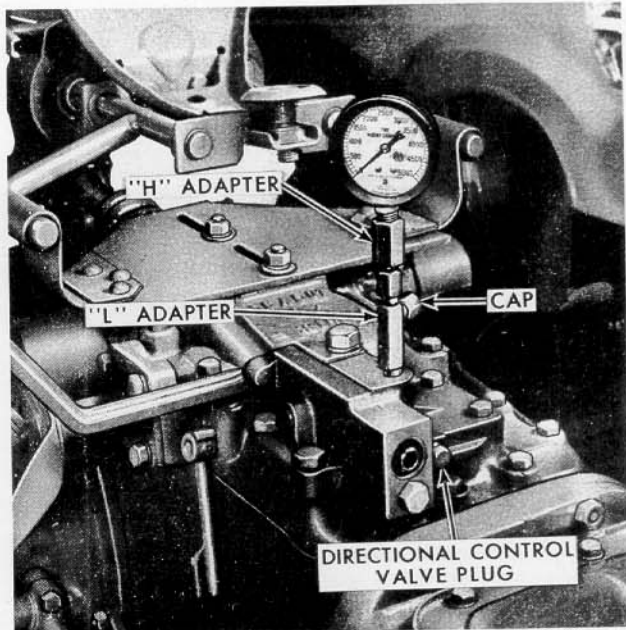


Figure 13
Pressure Test – Single Spool Valve

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