

# INTRODUCTION

## GENERAL

This section has a description and the service procedures for the tilt control valve.

## DESCRIPTION AND OPERATION

The tilt control valve is used in the hydraulic circuit for tilt operations. The valve is installed between the main control valve and the tilt cylinders. The tilt control valve prevents cavitation in the tilt cylinders when the mast is tilted forward with a load.

**NOTE:** The H700-920B lift trucks use two tilt control valves. One valve is used when tilting forward and one valve is used when tilting backward.

## Tilt Forward (See FIGURE 1.)

When the mast is tilted forward, the hydraulic oil enters the tilt control valve at port "A". The oil then enters the base of the tilt cylinders. At the same time, pressure is put against the spool in the tilt control valve. The spool moves as long as the pressure at the inlet is more than the tension of the spring. The oil in front of the pistons in the tilt cylinders returns to the main control valve. But, because of a load on the mast, the oil in front of the pistons can return too fast. When this happens, the spool in the tilt control valve moves toward the inlet. This movement causes a restriction in the drain circuit. The spool permits the cylinders to move forward only as fast as oil fills the base of the cylinders. This action prevents cavitation.

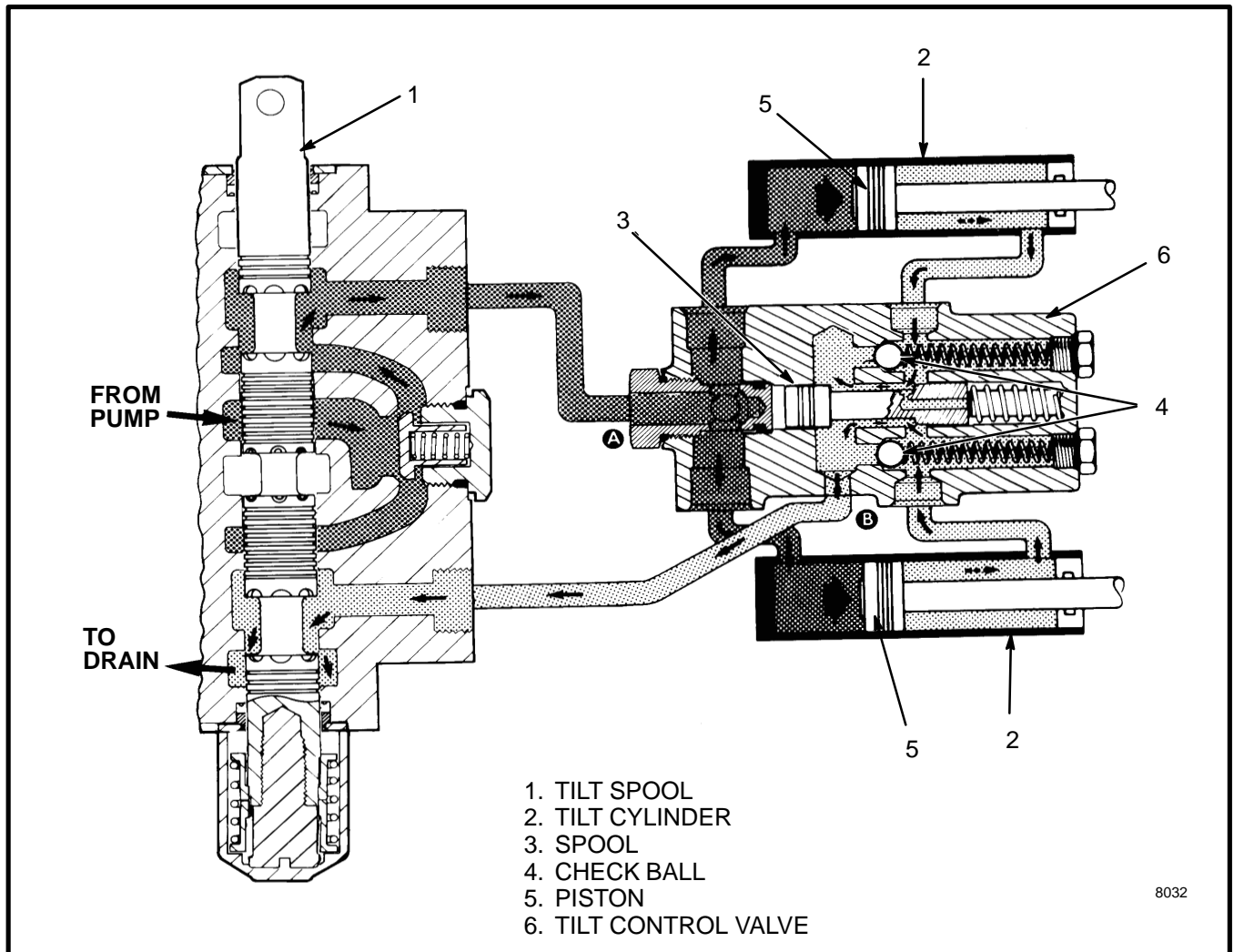


FIGURE 1. TILT FORWARD

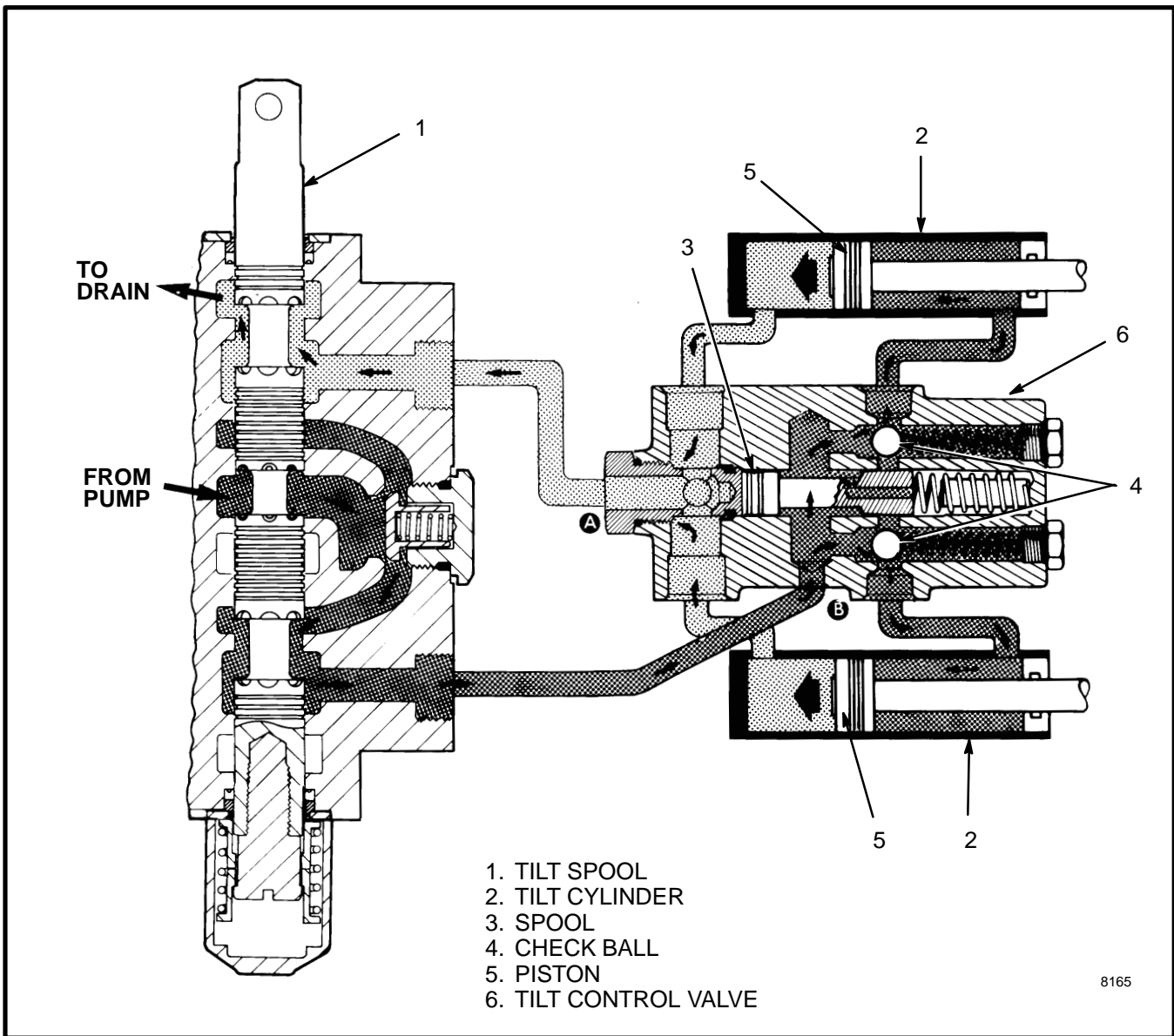


FIGURE 2. TILT BACKWARD

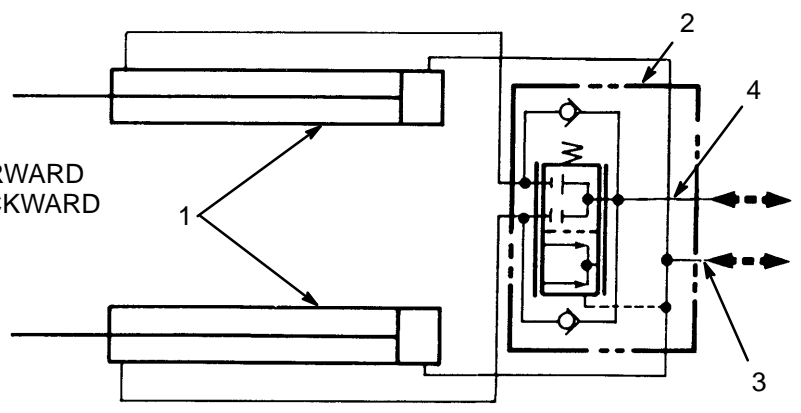
**Tilt Backward (See FIGURE 2. and FIGURE 3.)**

When the mast is tilted backward, the hydraulic oil enters the tilt control valve at port "B". Oil then enters the two chambers with check balls. The check balls move off of their seats when the pressure of the oil exceeds the tension of the springs. This action permits oil to flow

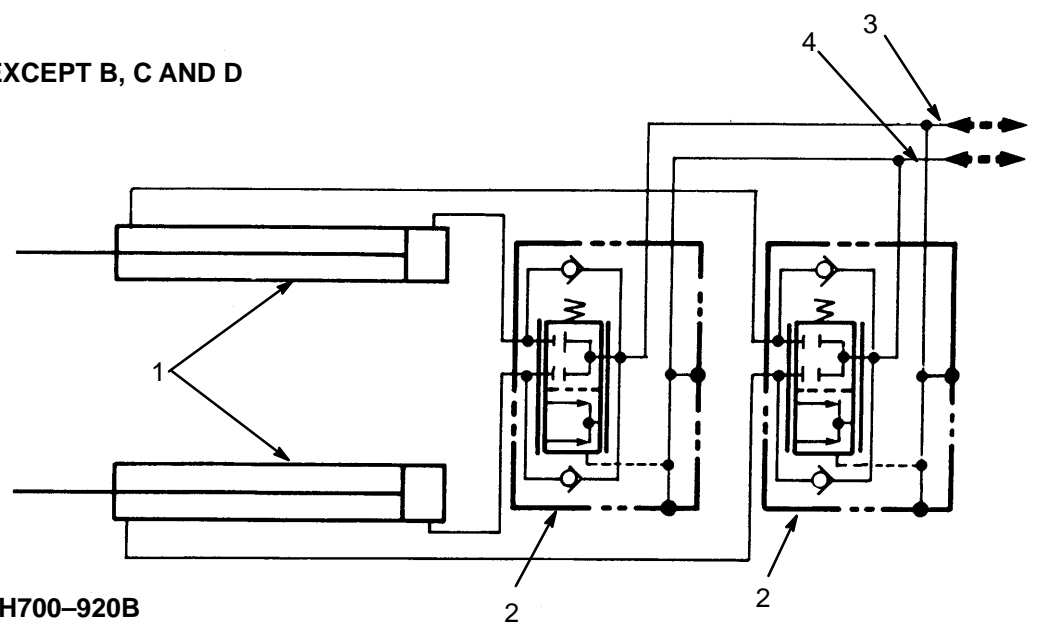
into the cylinders in front of the pistons. The spool in the tilt control valve prevents oil from flowing from one cylinder to the other. Oil in the base of the cylinders flows through the tilt control valve to the drain circuit.

2. Remove the valve from the frame.

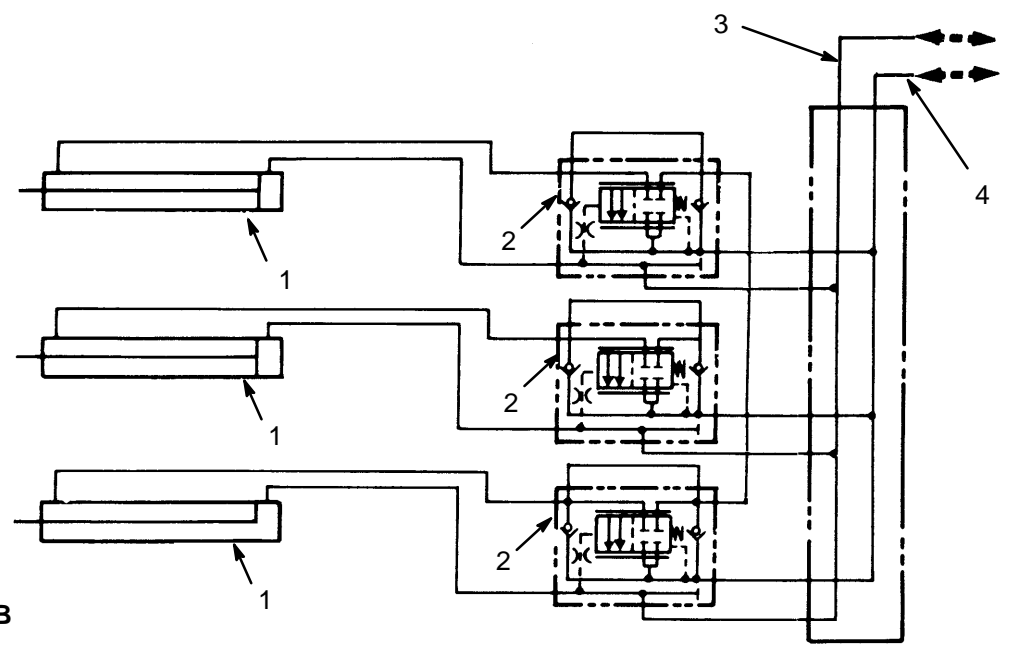
- 1. TILT CYLINDER
- 2. TILT CONTROL VALVE
- 3. PRESSURE FOR TILTING FORWARD
- 4. PRESSURE FOR TILTING BACKWARD



A - ALL UNITS EXCEPT B, C AND D



B - H360-650C, H700-920B



C - H32.00-44.00B

11094

FIGURE 3. SCHEMATIC, TILT CIRCUIT (1 of 2)

(More Content includes: Brake system, Capacities, and specifications, Frame, Hydraulic, System, Industrial battery, Main control, Valve, Mast repair, Fasteners, Schematics diagrams, Steering axle, Steering system, Wire harness repair And more)

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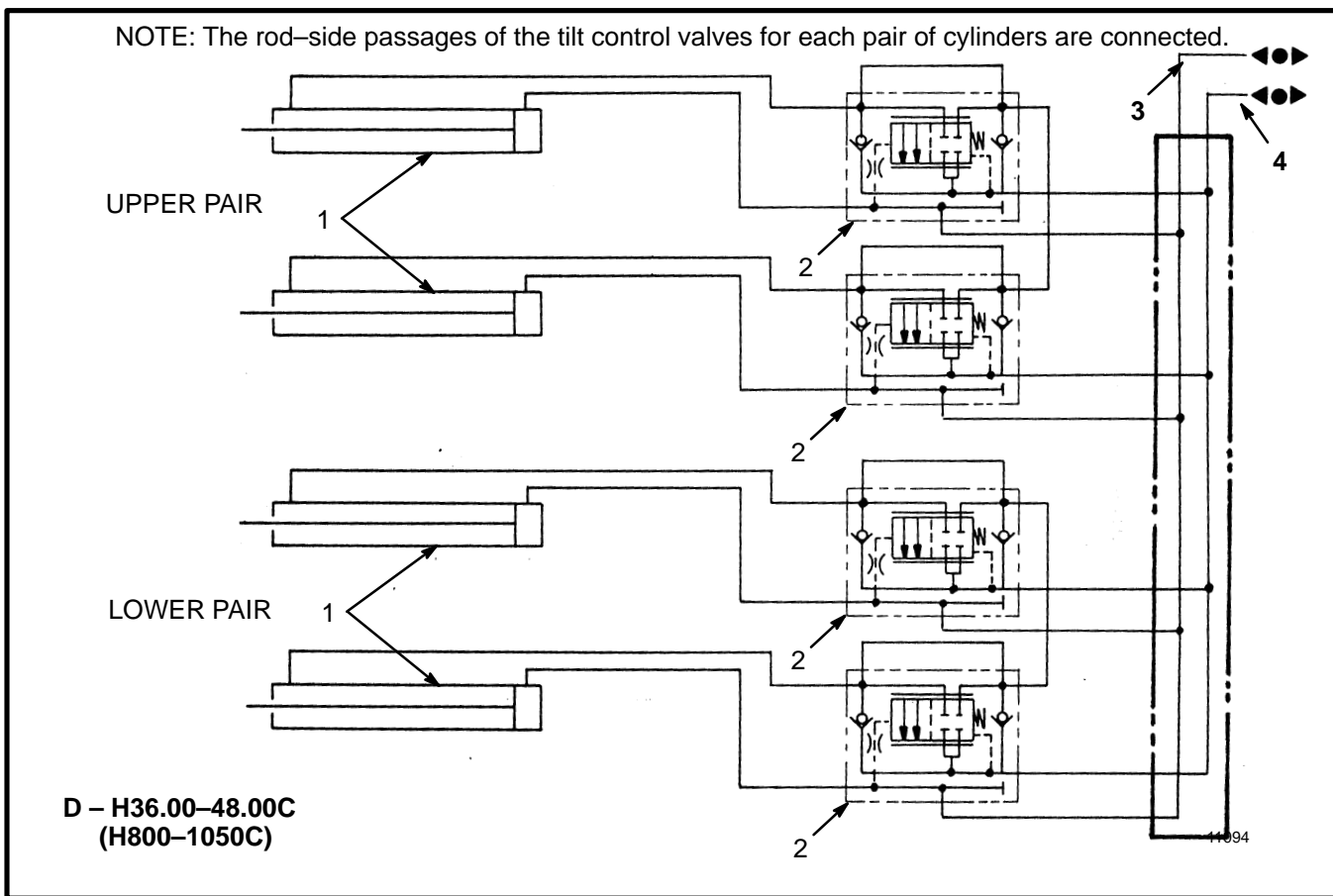


FIGURE 3. SCHEMATIC, TILT CIRCUIT (2 of 2)

## REPAIRS

### REMOVAL

1. Put tags on the hydraulic lines at the valve. Disconnect the lines and put caps on the open lines.

### DISASSEMBLY (See FIGURE 4.)

#### **⚠ WARNING**

The spool has spring tension. Do not look into the valve when the damper fitting and spool are removed.

1. Remove the plugs, springs and check balls.
2. Remove the damper fitting, spool, spring and spool stop.
3. If necessary, remove the other fittings.

### CLEANING

#### **⚠ WARNING**

Cleaning solvents can be flammable and toxic, and can cause skin irritation. When using cleaning sol-

vents, always follow the solvent manufacturer's recommended safety precautions.

#### **⚠ WARNING**

Compressed air can move particles so that they cause injury to the user or to other personnel. Make sure that the compressed air path is away from all personnel. Wear protective goggles or a face shield to prevent eye injuries.

Clean all the parts in solvent. Carefully dry the parts with compressed air. Make sure that the seats for the check balls are clean.

### ASSEMBLY (See FIGURE 4.)

1. Lubricate all parts with clean hydraulic oil. Use new O-rings on all fittings.
2. Install the check balls as follows:
  - a. Put each ball on a seat.
  - b. Hold the ball in position with a soft drift.
  - c. Hit the drift with a hammer. This will make sure that the ball correctly fits the seat.

3. Install the springs and plugs for the check balls.
4. Install the spool stop, spring, spool, washer, snap ring, O-ring and damper fitting.
5. Install the other fittings in the body.

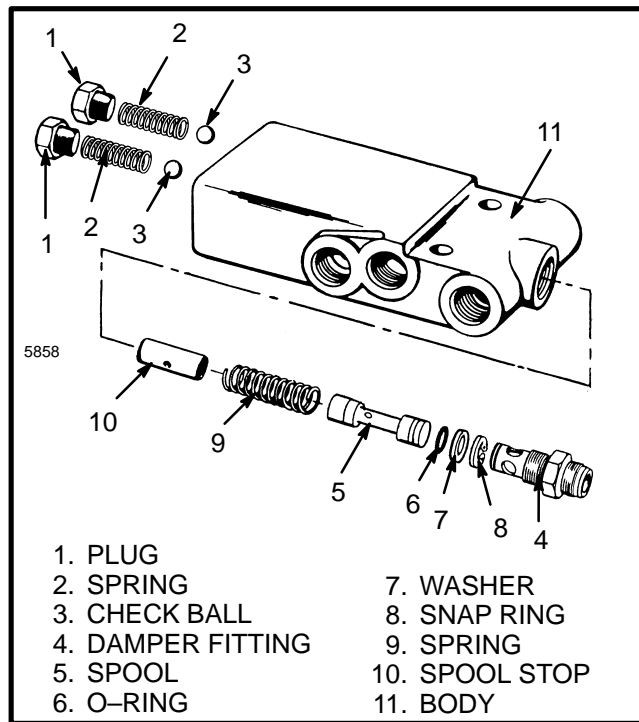


FIGURE 4. TILT CONTROL VALVE

## INSTALLATION (See FIGURE 5.)

1. Install the valve on the truck.
2. Connect the lines to the fittings on the valve. Make sure that the connections are correct.
3. Operate the system. Check for leaks and correct operation.

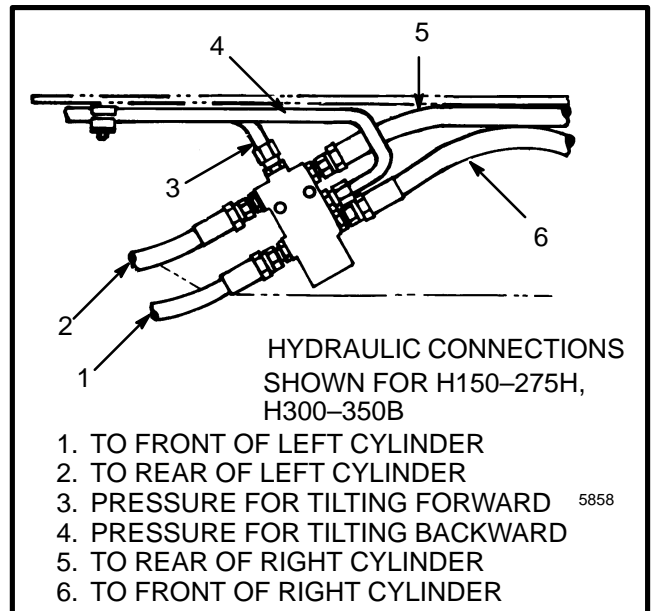


FIGURE 5. INSTALLATION, TILT CONTROL VALVE

## TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	PROCEDURE OR ACTION
Tilt cylinder movement is slow or not smooth.	<ol style="list-style-type: none"> <li>1. Air is in the hydraulic system.</li> <li>2. The hydraulic pump is worn or damaged.</li> <li>3. Restriction in the hydraulic lines.</li> <li>4. Seals in tilt cylinder are damaged.</li> <li>5. Tilt cylinders have internal damage.</li> <li>6. Load is greater than capacity.</li> <li>7. Pressure relief valve(s) is not adjusted correctly or is damaged.</li> <li>8. Large leaks between spool and bore.</li> <li>9. Spool is not fully extended or retracted.</li> <li>10. Tilt control spool is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove air from hydraulic system.</li> <li>2. Repair or replace hydraulic pump.</li> <li>3. Repair hydraulic lines.</li> <li>4. Repair cylinder.</li> <li>5. Repair cylinder.</li> <li>6. Reduce load.</li> <li>7. Repair or adjust relief valve(s).</li> <li>8. Replace valve section.</li> <li>9. Adjust linkage to spool.</li> <li>10. Repair control valve.</li> </ol>
The tilt cylinders permit the mast to move when the Tilt control lever is in the Neutral position.	<ol style="list-style-type: none"> <li>1. There are leaks in the hydraulic lines.</li> <li>2. Seals in tilt cylinder are damaged.</li> <li>3. Tilt cylinders have internal damage.</li> <li>4. Tilt control spool is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten fittings or repair leaks.</li> <li>2. Repair cylinder.</li> <li>3. Repair cylinder.</li> <li>4. Repair control valve.</li> </ol>