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This section is for the following models:

HR45-25, HR45-27, HR45-31, HR45-40S, HR45-36L, HR45-40LS,
HR45-45LSX [A227, B227, C227]

General

This section has the description and repair procedures for the parts of the steering system.

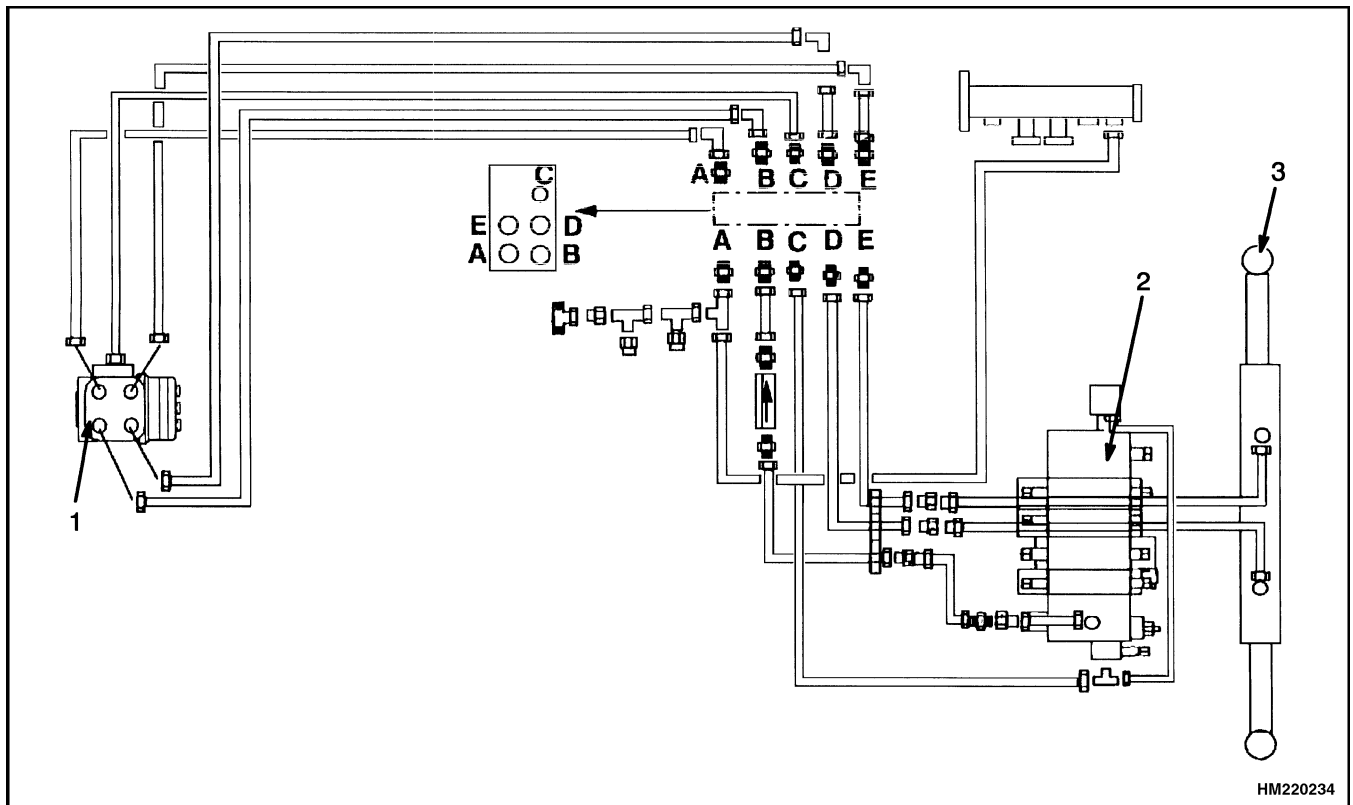
Description

These vehicles use a hydraulic steering system. See Figure 1 and Figure 2. The oil for the steering system is supplied by the main hydraulic pump. Oil from the pump flows to the main control valve, past a relief valve, then to the steering control unit. The relief valve for the steering system is set at 220 bar (3200 psi).

When the engine is not running, a check valve closes and permits the steering control unit to operate as a hydraulic motor. The vehicle is difficult to steer when

the steering pump is not operating, but steering is possible.

When the steering wheel is turned, a pilot line (LS) from the steering control unit shifts a shuttle valve in the main control valve. The shuttle valve moves to send all of the oil from the pump to the steering control unit. The other four lines at the steering control unit connect the supply, return, left, and right steering cylinder ports. Return flow from the steering system is sent to the hydraulic tank.

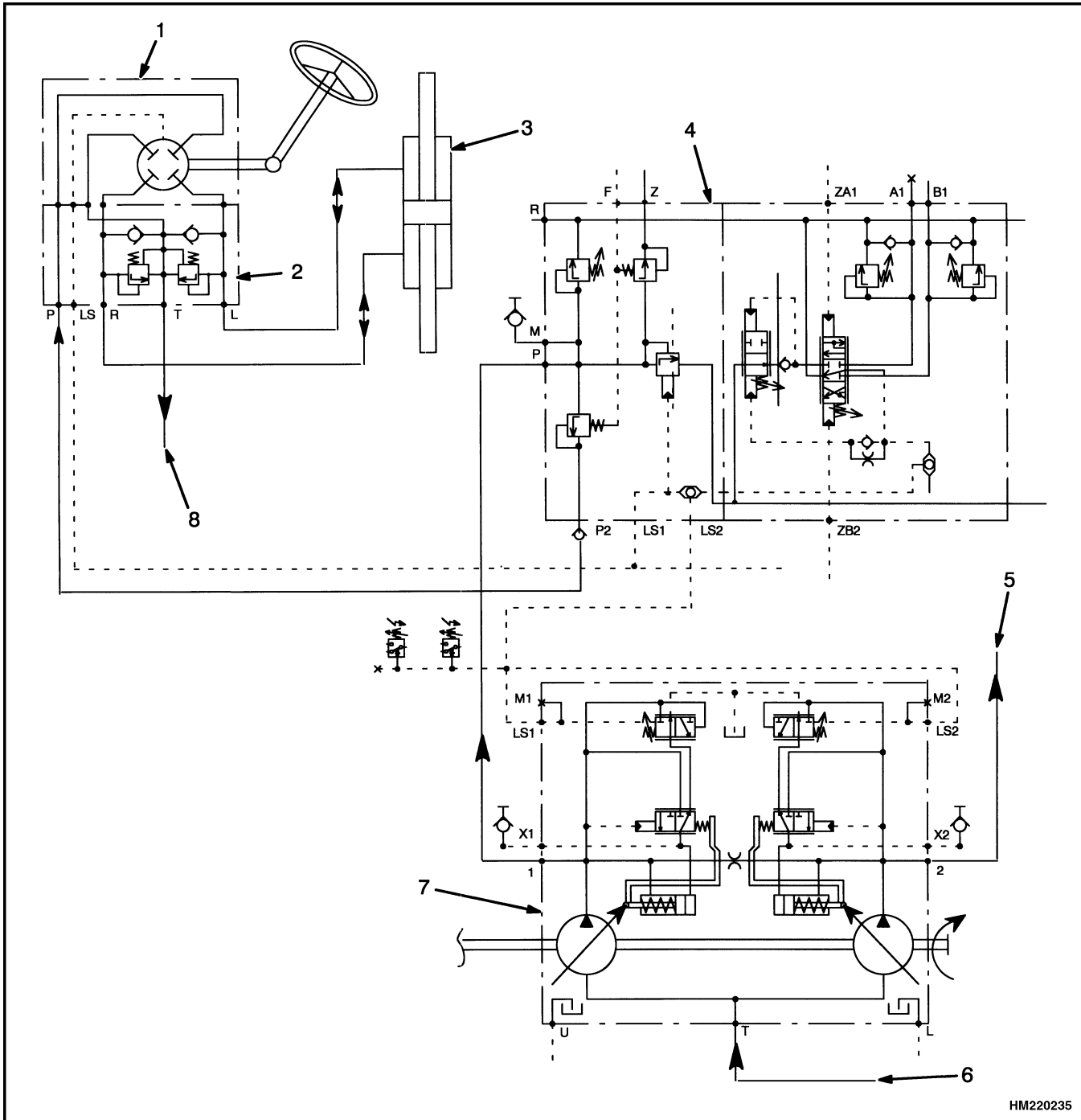


1. STEERING CONTROL UNIT

2. MAIN CONTROL VALVE

3. STEERING CYLINDER

Figure 1. Steering System Diagram



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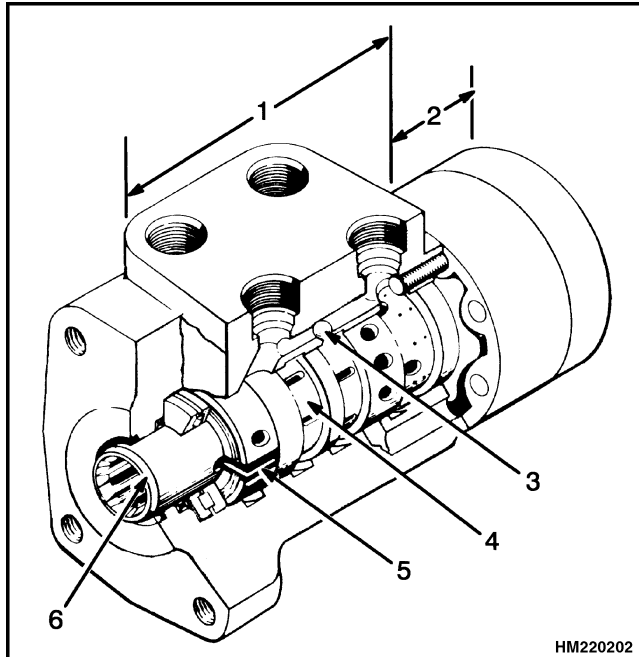
- | | |
|--------------------------|--------------------------|
| 1. STEERING CONTROL UNIT | 5. TO MAIN CONTROL VALVE |
| 2. MANIFOLD BLOCK | 6. FROM HYDRAULIC TANK |
| 3. STEERING CYLINDER | 7. MAIN HYDRAULIC PUMP |
| 4. MAIN CONTROL VALVE | 8. TO HYDRAULIC TANK |

Figure 2. Steering System Schematic Diagram

Steering Control Unit Repair

DESCRIPTION

The steering control unit is a hydrostatic unit controlled by the steering wheel. See Figure 3. It is mounted in the steering housing. The steering control unit has a shaft assembly, control section, and a metering section. The hydraulic hoses for the steering system are fastened to a manifold block.



1. CONTROL SECTION
2. METERING SECTION
3. CHECK BALL (MANUAL OPERATION)
4. SLEEVE
5. NEUTRAL POSITION SPRINGS
6. SPOOL

Figure 3. Steering Control Unit

OPERATION

Turning the steering wheel actuates three main parts of the steering control unit (see Figure 3): (1) the spool for the control section, (2) the sleeve for the control section, and (3) the rotor in the metering section. When the steering wheel is not moving, the spool and sleeve are held in the **NEUTRAL** (center) position by springs. During this time, oil flows freely through the steering control unit. The oil does not flow to the steering cylinder.

As the steering wheel is turned, the spool just begins to rotate. The springs try to move the sleeve to keep the **NEUTRAL** position between the spool and sleeve. However, the force necessary to turn the rotor is greater than the pressure of the springs. The springs begin to bend, letting the spool move a small amount within the sleeve. The spool stops moving when it touches the center pin. In this position, the holes in the sleeve and the spool are aligned. Oil coming into the control unit flows to the metering section.

More rotation of the steering wheel causes the spool to rotate the pin. This action causes the rotation of the sleeve and the rotor in the metering section. The oil then flows to the flow amplifier and then to one side of the steering cylinder. Oil from the other side of the steering cylinder flows back through the flow amplifier and the control section of the steering control unit.

When the steering wheel stops moving, the metering action in the metering section also stops. The **NEUTRAL** position springs return the sleeve to the **NEUTRAL** position. When this action occurs, the pressure stays in the steering cylinder to keep the tires in position. Oil from the pump flows through the steering control unit to the tank or other parts of the system. To return the tires to the straight position, the steering wheel must be rotated in the opposite direction. The steering control unit will operate as described, but all parts will rotate in the opposite direction.

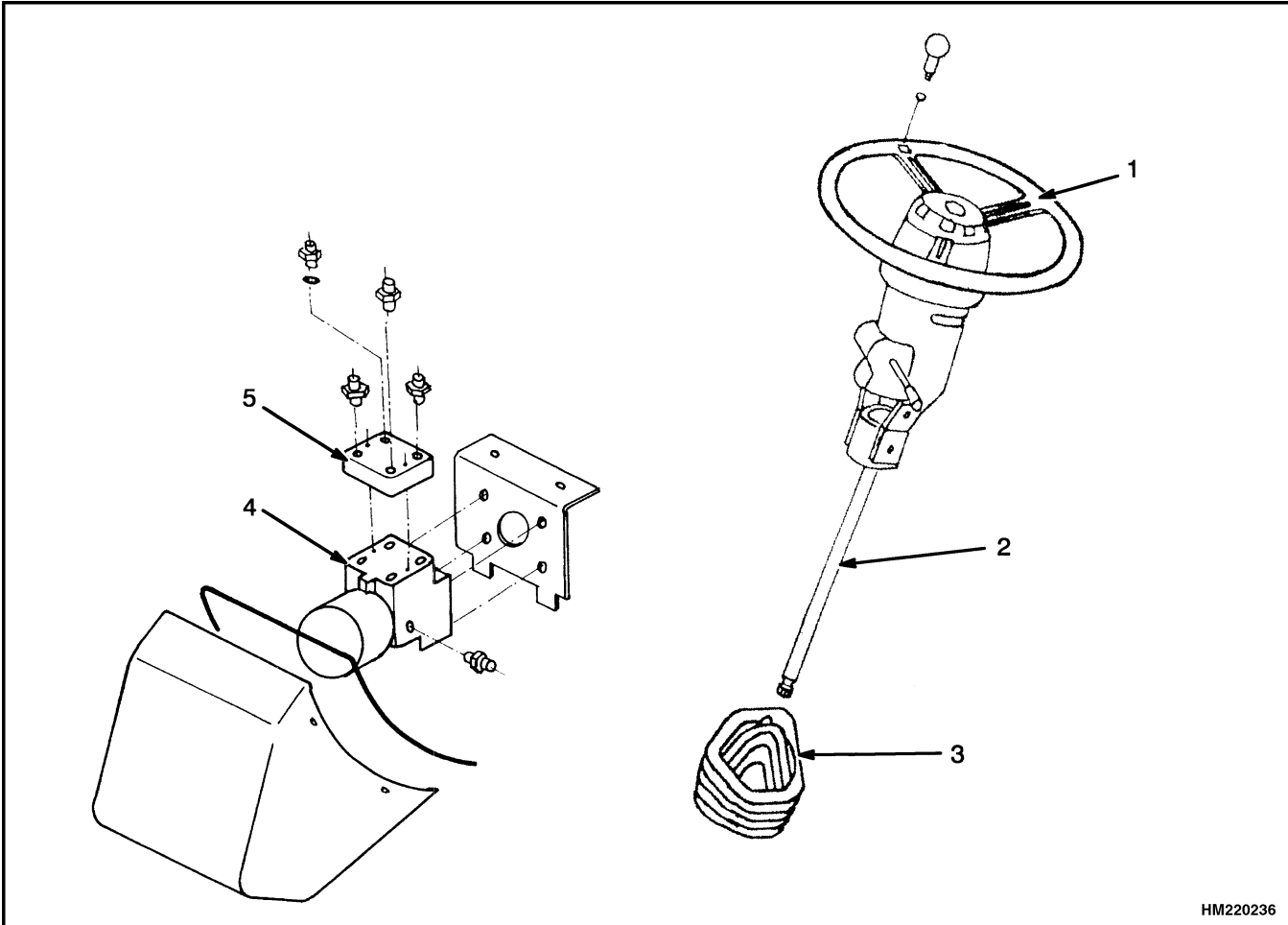
LOAD-SENSING STEERING

The demand for steering is sensed at the load-sensing (LS) port in the steering control unit. The pilot line from the LS port is connected to the priority valve in the main control valve. While steering, a spring and pilot pressure from the LS line hold the regulator spool open for steering. When there is no pressure in the LS line (no steering), pilot pressure from the hydraulic pump shifts the spool. In this position, most of the oil for steering system goes to the hydraulic system.

REMOVE

1. Remove cover from steering housing. Put tags on hydraulic lines at manifold block. Disconnect hydraulic lines and put caps on openings.

2. Remove steering column from steering control unit. See Figure 4. Remove capscrews that fasten steering control unit to bracket and remove steering control unit.



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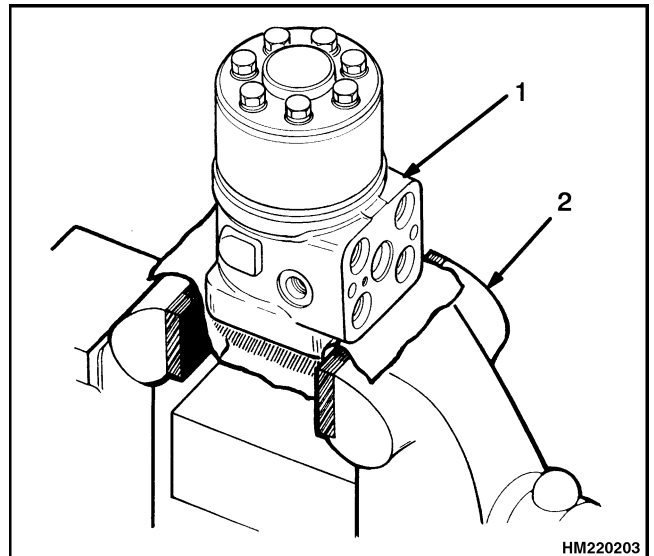
1. STEERING WHEEL
2. STEERING COLUMN
3. RUBBER BOOT

4. STEERING CONTROL UNIT
5. MANIFOLD BLOCK

Figure 4. Steering Column Assembly

DISASSEMBLE**STEP 1.**

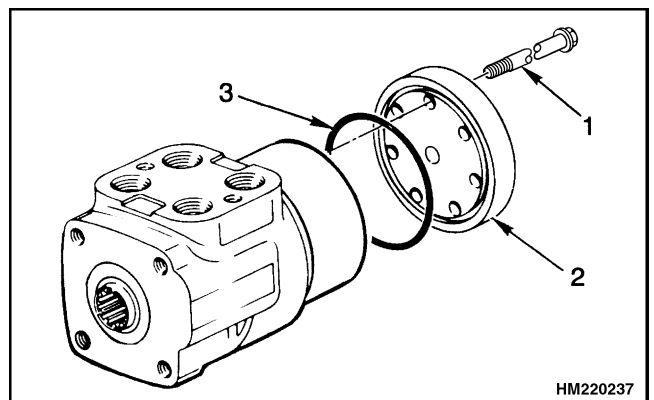
Put the control unit in a vise with soft jaws. Make an identification mark on length of control unit. Remove manifold block.



1. STEERING CONTROL UNIT
2. VISE

STEP 2.

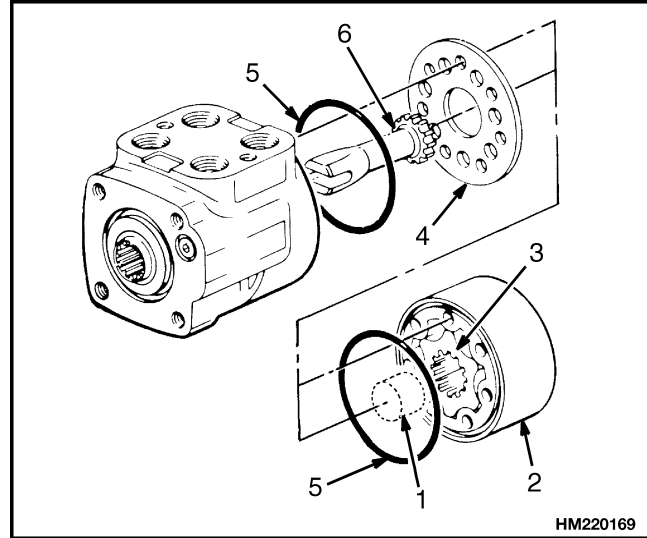
Remove cover on bottom of steering control unit.



1. CAPSCREW
2. COVER
3. O-RING

STEP 3.

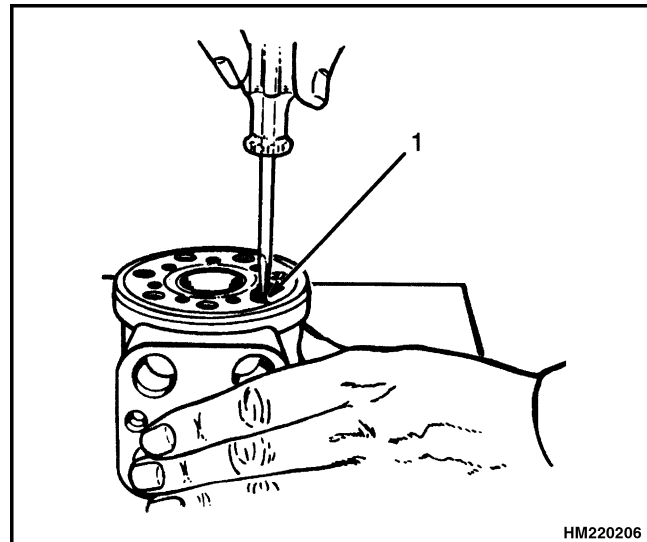
Remove spacer, stator, rotor, and port plate. Put a mark on stator so the same side is toward body of control unit. Remove O-rings. Remove center shaft.



1. SPACER
2. STATOR
3. ROTOR
4. PORT PLATE
5. O-RING
6. CENTER SHAFT

STEP 4.

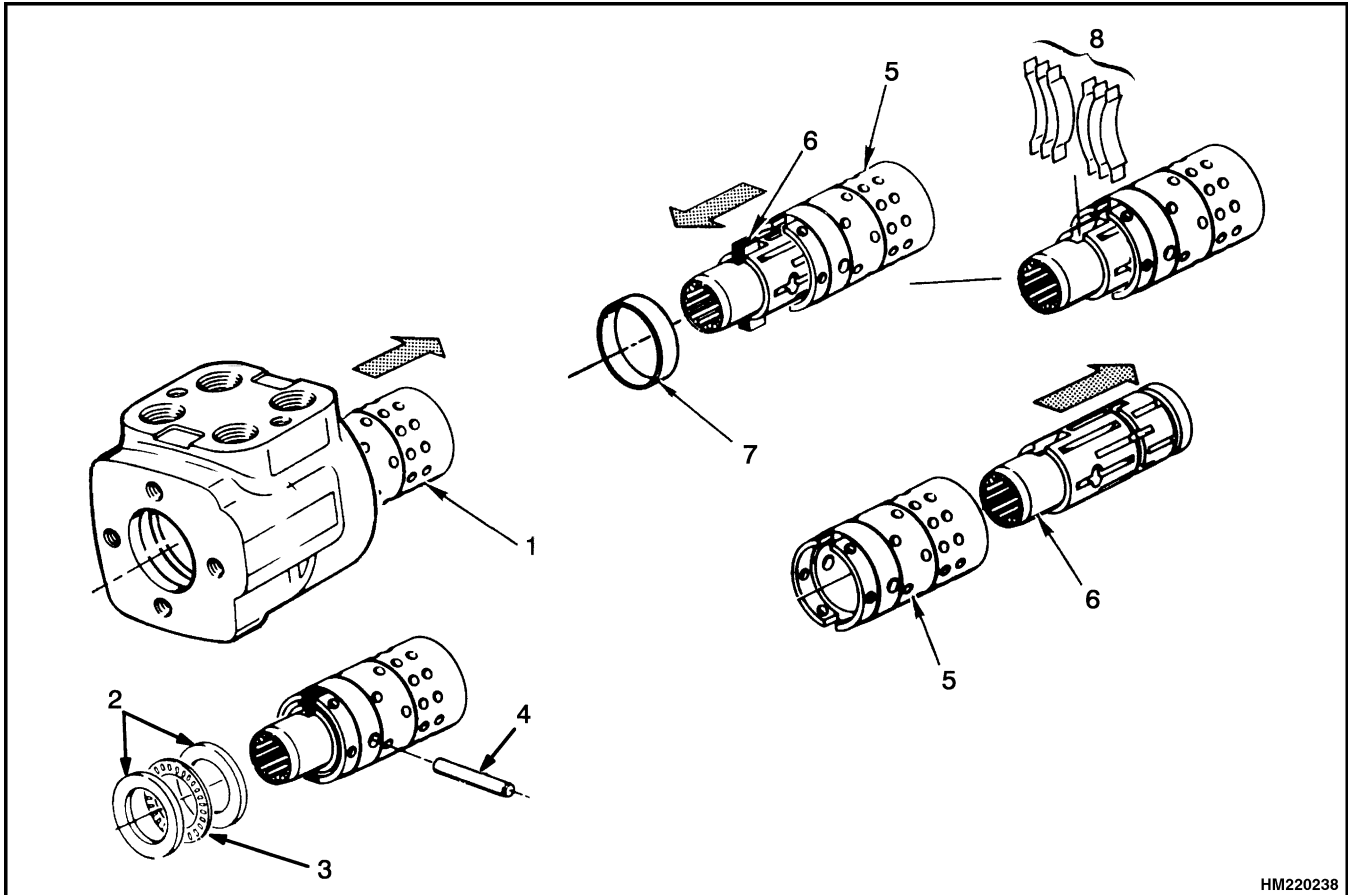
Remove screw for check ball. Remove check ball.



1. SCREW

STEP 5.

Remove spool and sleeve assembly. Remove thrust bearing assembly from spool. Push center pin from sleeve. Carefully remove spool from sleeve. (Rotate spool slowly during removal.) Remove ring from sleeve. Remove **NEUTRAL** position springs from spool. Remove ring from sleeve.



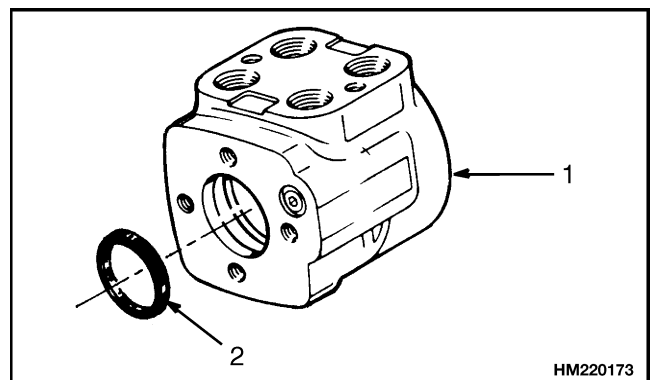
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- 1. SPOOL AND SLEEVE ASSEMBLY
- 2. THRUST WASHER
- 3. THRUST BEARING
- 4. CENTER PIN

- 5. SLEEVE
- 6. SPOOL
- 7. RING
- 8. NEUTRAL POSITION SPRINGS

STEP 6.

Remove dust seal from housing.



HM220173

- 1. HOUSING
- 2. DUST SEAL

(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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