

**Heavy Duty Standard Manual  
Displacement Control Shaft and Seal  
Installation Instructions**

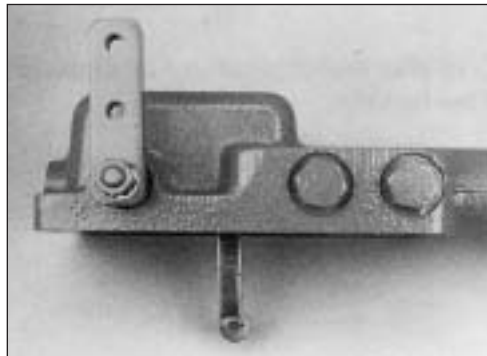
Models 33 thru 76

**Repair & Service**

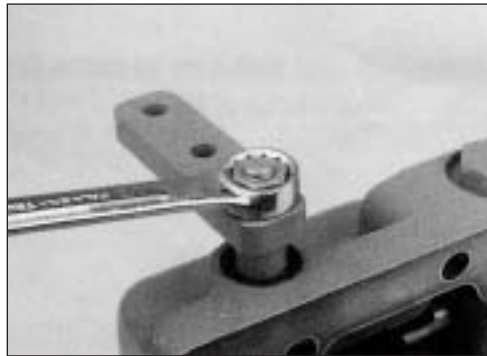
**Note:** The following procedure will not disturb the control valve's neutral adjustment.

**Step 1**

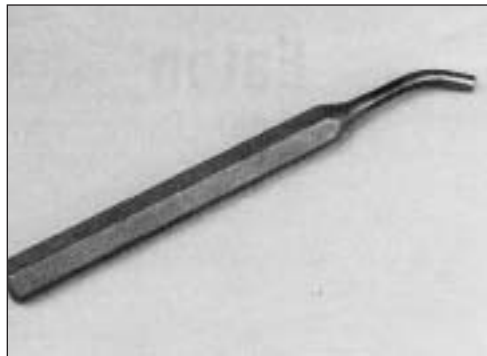
Remove the control valve assembly from the pump or motor (Figure 1).

**Figure 1****Step 2**

Observe and mark the location of the control handle for proper reassembly. Use a 1/2" wrench to remove the retaining nut from the control shaft, then remove the star washer and handle from the control shaft (Figure 2).

**Figure 2****Step 3**

To remove the control shaft without disconnecting the feedback linkage, it will be necessary to make a special tool from a 1/4" punch (Figure 3). Bend the tip of the punch down approximately 34°, leaving a 3/4" straight section after the bend. This tool is necessary to drive the roll pin through the control connector and shaft.

**Figure 3**

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### Step 4

Clamp the control assembly in a protected jaw vise in the position shown (Figure 4). Rotate the control connector until the end of the roll pin is exposed. Use the bent punch to drive the roll pin through the control connector and shaft. It is not necessary to drive the roll pin out completely, only far enough to get it through the shaft.

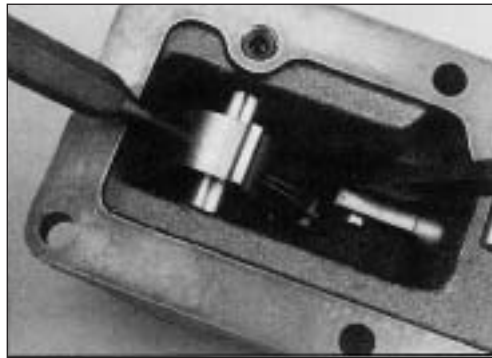


Figure 4

### Step 5

Use a 3/16" allen wrench to back out the control shaft set screw at least two full turns (Figure 5).

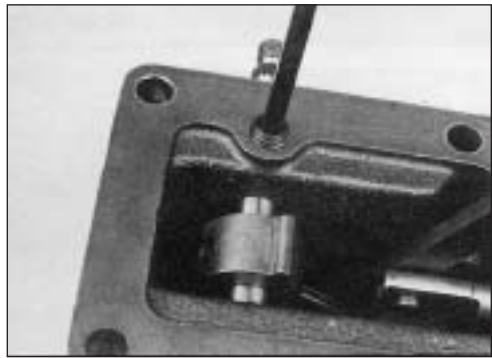


Figure 5

### Step 6

Remove the control shaft from the control housing as shown (Figure 6).

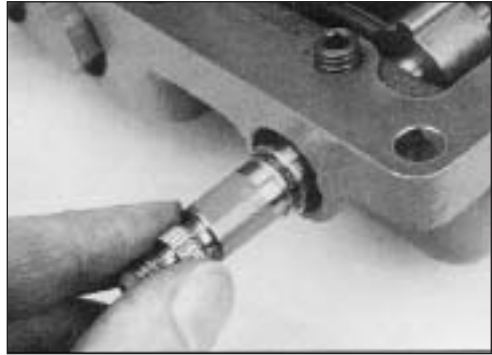


Figure 6

DUST SEAL

PART NO. 4994571-001

### Step 7

Remove the control assembly from the vise, then use a small screw driver to pry out the old shaft seal. Be careful not to damage the surface of the housing (Figure 7).

**Note:** This seal is used only on control valve assemblies manufactured after January 1987.

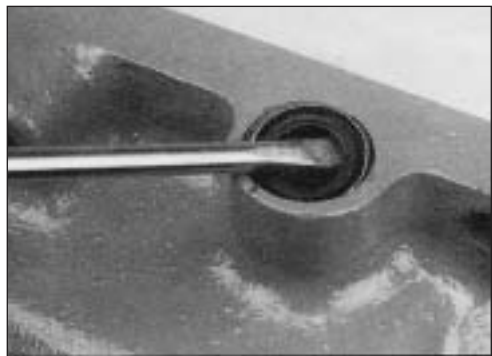


Figure 7

## Repair & Service

### NEW SHAFT AND O-RING SUB. ASSY

**PART NO. 104306-000**

### SHAFT

**PART NO. 104040-000**

### O-RINGS

**A. PART NO. 95953**

**B. PART NO. 8761-011**

**C. PART NO. 8761-012**

### Step 8

Two styles of control shafts have been used, the old style used both an o-ring and teflon seal arrangement. The latest style uses only an o-ring shaft seal. This procedure recommends the replacement of the shaft with the latest o-ring only seal design. (Figure 8).

**Note:** The single o-ring seal must not be used on the shaft designed for the two piece o-ring and teflon seal arrangement.

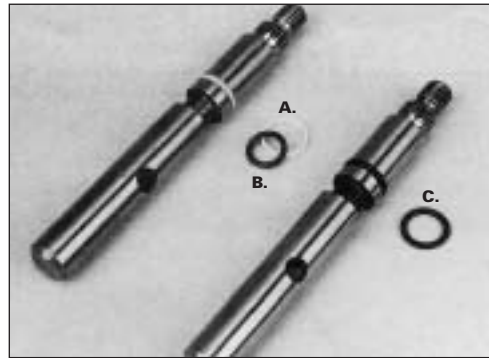


Figure 8

### Step 9

Install new o-ring into the o-ring groove in the control shaft. Lubricate o-ring with petroleum jelly and carefully slide shaft through the housing and control connector (Figure 9).

**Note:** The control shaft bore in the housing must be clean of any corrosion or rust before installing the control shaft.



Figure 9

### Step 10

Align the roll pin with cross hole in shaft (Figure 10).

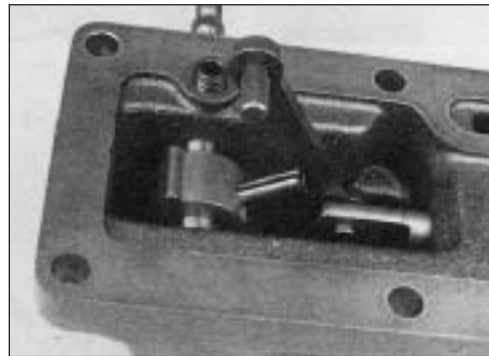


Figure 10

### Step 11

Use a straight punch to drive the roll pin back into the control connector until the pin is centered in the connector (Figure 11).

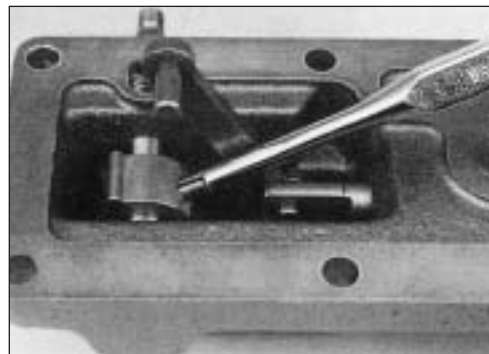


Figure 11

## Repair & Service

### Step 12

Center the control shaft and align the set screw with the groove in the control shaft. Screw the set screw in until it bottoms out, then back out 1/4 turn (Figure 12).

**Note:** If the set screw is turned too tight against the shaft, it can override the centering spring force. This would cause the control shaft to remain in the stroked position after it has once been stroked.

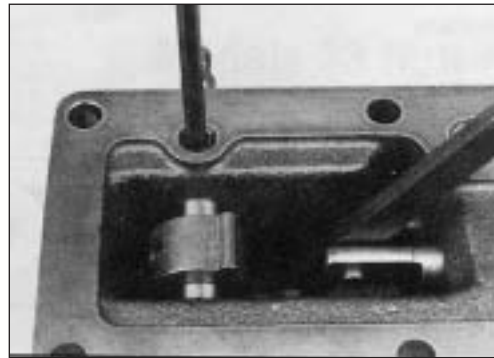


Figure 12

### Step 13

Lubricate the I.D. of the shaft and carefully install over the control shaft with the tip of the seal facing outward (Figure 13).



Figure 13

### Step 14

Use a deep well socket or seal installation tool with the same O.D. as the shaft seal and carefully drive the shaft seal in until it contacts the bottom of the counterbore (Figure 14).

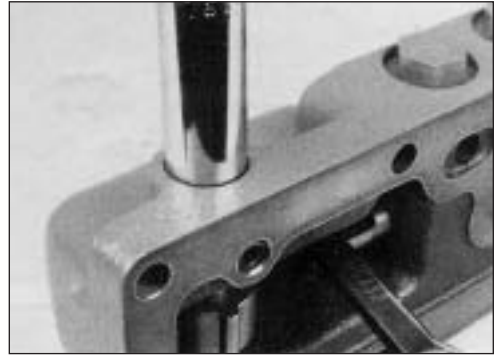


Figure 14

### Step 15

Place the control handle on the control shaft in the same position it was before removal. Install the washer and nut, tighten the nut to 16–19 ft. lbs. torque (Figure 15).

**Note:** When connecting the control linkage to the control handle, always adjust the linkage to the handle and not the handle to the linkage.



Figure 15

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