Power Steering
Steering Control Unit (SCU)
Parts and Repair Information

Square Housing with Side Ports

Round Housing with Side Ports

Round Housing with End Ports
Introduction

This manual provides service information for Char-Lynn® Series 5 Steering Control Units. Step by step instructions for complete disassembly, inspection and reassembly of the control unit are given.

The following recommendations should be followed to insure successful repairs.

- Most repairs require the removal of the control unit from the vehicle.
- Cleanliness is extremely important.
- Clean the port areas thoroughly before disconnecting the hydraulic lines.
- Plug the control unit ports and cover open hydraulic lines immediately after they have been disconnected.
- Drain the oil and clean the exterior of the control unit before making repairs.
- Wash all metal parts in clean solvent.
- Use filtered, moisturefree compressed air to dry the parts. Do not wipe them dry with paper towels or cloth – lint in a hydraulic system will cause damage.
- Always use new seals when reassembling hydraulic control units.
- Lubricate new rubber seals with a petroleum jelly before installation.
- Torque all bolts over gasketed joints, then repeat the torquing sequence to make up for gasket compression.

After all repairs are complete it is essential to verify the accuracy of control unit repairs on an authorized test stand.
General Information

Ordering Parts

How to Order Replacement Parts

Each order must include the following:
1. Product Number
2. Date Code
3. Part Name
4. Part Number
5. Quantity of Parts

Refer to specific part listings for your Char-Lynn® Steering Control Unit when ordering replacement parts. Listings are available from Eaton. Sample tag shows identification.

For additional literature contact Eaton Hydraulics at:
14615 Lone Oak Road
Eden Prairie, MN 55344
http://hydraulics.eaton.com

Tools

Tools Required:
• 10 mm Socket (13 mm Socket for End-Ported Units)
• 7/8 in. Socket
• Torque Wrench (31 Nm [275 lb-in] Capacity)
• Small Blade Screwdriver

Special Tools:
• Plunger and Sleeve Tool (two-piece seal) No. 600801-001*

* Tools available—by special order—through our service department.
Round and Square Housing with Side Ports
Exploded View

*Round housing shown, but applies to square housing also.
Table 1.0
Round and Square Housing with Side Ports

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
<th>REFERENCE PAGE</th>
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<tr>
<td>1</td>
<td>See Table 2.0</td>
<td>7</td>
<td>Cap Screw, Hex Head</td>
<td>6</td>
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<tr>
<td>2</td>
<td>22994-000</td>
<td>1</td>
<td>Cap, End</td>
<td>6</td>
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<td>4</td>
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<td>4994693-001</td>
<td>1</td>
<td>Drive</td>
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<td>4996933-001</td>
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<td>Bearing, Needle Thrust</td>
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<tr>
<td>16</td>
<td>4997708-001</td>
<td>1</td>
<td>Dust Seal</td>
<td>6</td>
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</tbody>
</table>

REPLACEMENT PART NO. | DESCRIPTION
64456-00 | Centering Spring Kit - Standard Torque (contains parts with *)
990170-000 | Centering Spring Kit - Low Torque (contains parts with **)
990252-000 | Seal Kit - Standard Back Pressure (contains parts with **)  
9900256-000 | Seal Kit - High Back Pressure (contains parts with **)
9900321-000 | Seal Kit - Viton, PM Gerotor (contains parts with **)
9900323-000 | Seal Kit - Viton, Steel Gerotor (contains parts with **)  

Table 2.0
Gerotor

<table>
<thead>
<tr>
<th>ACTUAL DISPLAY</th>
<th>REFERENCE NO. 4 GEROTOR</th>
<th>REFERENCE NO. 29 CAP SCREW</th>
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<td>cm³/r [in³/r]</td>
<td>Part No.</td>
<td>Width mm [in]</td>
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<td>31.5 [1.92]</td>
<td>4996815-001</td>
<td>7.45 [0.290]</td>
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<td>39.5 [2.41]</td>
<td>4996815-002</td>
<td>9.3 [0.366]</td>
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<td>50.8 [3.10]</td>
<td>4996815-003</td>
<td>8.3 [0.326]</td>
</tr>
<tr>
<td>63.1 [3.85]</td>
<td>4996815-004</td>
<td>10.2 [0.400]</td>
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<td>73.8 [4.50]</td>
<td>4996815-005</td>
<td>12.1 [0.476]</td>
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<td>4996815-006</td>
<td>16.3 [0.642]</td>
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<tr>
<td>120 [7.33]</td>
<td>4996815-007</td>
<td>19.5 [0.768]</td>
</tr>
</tbody>
</table>
Cleanliness is extremely important when repairing hydraulic Steering Control Units (SCU). Work in a clean area. Before disconnecting the hydraulic lines, clean the port area of the SCU. Before disassembly, drain the oil, then plug the ports and thoroughly clean the exterior of the SCU. During repairs, always protect machined surfaces.

1. Remove the seven cap screws and disassemble the SCU as shown in figure 1.
2. Remove the plug and manual steering check as shown in figure 1.
   **Note:** The manual steering check may be a check ball or a check/relief valve.
3. Slide the spool and sleeve from the housing, see figure 2.
4. Remove the thrust bearing and bearing races.
5. Remove the quad seal.
6. Using a small blade screwdriver, carefully pry the dust seal from the housing.
   **Important:** Do not damage the dust seal seat.
7. Remove the pin that holds the spool and sleeve together, see figure 3.
8. Carefully slide the spool out of the sleeve. The springs and retaining ring will stay with the spool as it's removed.
9. Remove the retaining ring and springs.
   **Caution:** The centering springs are under tension; remove the retaining ring carefully.

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**Figure 1**

**Figure 2**
Reassembly

Check all mating surfaces. Replace any parts with scratches or burrs that could cause leakage. Wash all metal parts in clean solvent. Blow them dry with pressurized air. Do not wipe parts dry with paper towels or cloth as lint in a hydraulic system will cause damage.

Note: Always use new seals when reassembling hydraulic steering control units. Refer to page 5 for seal kit part numbers.

Important: During reassembly lubricate the new seals with a petroleum jelly such as Vaseline®. Also lubricate machined surfaces and bearings with clean hydraulic fluid.

10. Install the quad seal (see page 12 for 2-piece seal installations):
   • Put one of the bearing races and sleeve into the housing.
   • Together, the housing and bearing race create a groove into which the quad seal will be installed.
   • Hold the bearing race tightly against the input end of the housing by pushing on the gerotor end of the sleeve.
   • Fit the quad seal into its seat through the input end of the housing. Be sure the seal is not twisted.
   • Remove the sleeve and bearing race.

11. Lubricate and install the dust seal (see Figure 4 for correct seal orientation).

12. Install the centering springs in the spool. It is best to install the two flat pieces first. Next, install the curved pieces, three at a time.

13. Fit the retaining ring over the centering springs.

14. Apply a light coating of clean hydraulic fluid to the spool and slide it into the housing. Be sure the centering springs fit into the notches in the sleeve.

15. Install the drive, be sure the slot in the drive engages the pin.

16. Install the pin (see Figure 3).

17. Apply a light coating of petroleum jelly to the inner edge of the dust and quad seals.

18. Put the thrust bearing and races into the housing. The thrust bearing goes between the two races (see Figure 2).

19. Apply a light coating of clean hydraulic fluid to the spool and sleeve assembly and slide it into the housing.

   Important: Do not damage the dust or quad seals.

20. Clamp the housing in a vise as shown in Figure 5. Use just enough clamping force to hold the housing securely.

21. Lubricate and install a new o-ring seal in the groove in the housing.

22. Install the wear plate and align the holes in the wear plate with threaded holes in the housing.

   Note: The holes in the wear plate are symmetrical.

23. Lubricate and install a new o-ring seal in the groove in the wear plate.

24. Install the gerotor and align the screw holes.

25. Lubricate and install a new o-ring seal in the groove in the gerotor ring.

26. Lubricate and install a new o-ring and seal ring in the groove in the gerotor star.

27. Install end cap and seven cap screws. Tighten cap screws, in a crisscross pattern, to 16 -18 Nm [140 -160 lb-in].

28. Remove the SCU from the vise.

29. Install the relief valve/check or check ball and plug. Use a new o-ring and tighten the plug to 17 Nm [150 lb-in].
Round Housing with End Ports
Exploded View
### Table 3.0
**Round Housing with End Ports**

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NO.</th>
<th>QTY.</th>
<th>DESCRIPTION</th>
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<tr>
<td>1</td>
<td>See Table 4.0</td>
<td>4</td>
<td>Cap Screw, Hex Head</td>
<td>10</td>
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<td>Cap, End (Non-load sense, non-STC only)</td>
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<td>4</td>
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<td>5</td>
<td>4993805-001</td>
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**Gerotor**

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<td>31.5 [1.92]</td>
<td>4998582-001 7.4 [0.290]</td>
<td>4994536-045 44.9 [1.77]</td>
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<td>4998582-002 9.3 [0.366]</td>
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<td>4998582-007 19.5 [0.768]</td>
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Round Housing with End Ports - Disassembly

Disassembly

Cleanliness is extremely important when repairing hydraulic Steering Control Units (SCU). Work in a clean area. Before disconnecting the hydraulic lines, clean the port area of the SCU. Before disassembly, drain the oil, then plug the ports and thoroughly clean the exterior of the SCU. During repairs, always protect machined surfaces.

1. Remove the plug and inlet relief as shown in figure 1. **Note:** The manual steering check is part of the inlet relief valve. If inlet relief valve is not present, the manual steering check is located in the housing.

2. Remove the four cap screws and disassemble the SCU as shown in figure 1.

3. Slide the spool and sleeve from the housing, see figure 2.

4. Remove the thrust bearing and bearing races.

5. Remove the seal.

6. Using a small blade screwdriver, carefully pry the dust seal from the housing. **Important:** Do not damage the dust seal seat.

7. Remove the pin that holds the spool and sleeve together, see figure 3.

8. Carefully slide the spool out of the sleeve. The springs and retaining ring will stay with the spool as it’s removed.

9. Remove the retaining ring and springs. **Caution:** The centering springs are under tension; remove the retaining ring carefully.

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**Figure 1**

**Figure 2**
**Round Housing with End Ports - Reassembly**

**Reassembly**

Check all mating surfaces. Replace any parts with scratches or burrs that could cause leakage. Wash all metal parts in clean solvent. Blow them dry with pressurized air. Do not wipe parts dry with paper towels or cloth as lint in a hydraulic system will cause damage.

**Note:** Always use new seals when reassembling hydraulic steering control units. Refer to seal kit part numbers on page 6.

**Important:** During reassembly lubricate the new seals with a petroleum jelly such as Vaseline®. Also lubricate machined surfaces and bearings with clean hydraulic fluid.

10. Install the quad seal:

   (see page 12 for 2-piece seal installations):

   - Put one of the bearing races and sleeve into the housing.
   - Together, the housing and bearing race create a groove into which the quad seal will be installed.
   - Hold the bearing race tightly against the input end of the housing by pushing on the gerotor end of the sleeve.
   - Fit the quad seal into its seat through the input end of the housing. Be sure the seal is not twisted.
   - Remove the sleeve and bearing race.

11. Lubricate and install the dust seal (see Figure 4 for correct seal orientation).

12. Install the centering springs in the spool. It is best to install the two flat pieces first. Next, install the curved pieces, three at a time.

13. Fit the retaining ring over the centering springs.

14. Apply a light coating of clean hydraulic fluid to the spool and slide it into the sleeve. Be sure the centering springs fit into the notches in the sleeve.

15. Install the pin (see Figure 3).

16. Apply a light coating of petroleum jelly to the inner edge of the dust and quad seals.

17. Put the thrust bearing and races into the housing. The thrust bearing goes between the two races (see Figure 2).

18. Apply a light coating of clean hydraulic fluid to the spool and sleeve assembly and slide it into the housing.

**Important:** Do not damage the dust or quad seals.

19. Clamp the housing in a vise as shown in Figure 5. Use just enough clamping force to hold the housing securely.

20. Install manual steering check ball and pin into housing, if no relief valve is present.

21. Lubricate and install a new o-ring seal in the groove in the housing.

22. Install the wear plate and align the timing groove on plate with the timing groove on the housing.

**Note:** The holes in the wear plate are not symmetrical.

23. Install the drive, be sure the slot in the drive engages the pin.

24. Lubricate and install a new o-ring seal in the groove in the wear plate.

25. Install the gerotor and align the timing groove with the timing groove in the wear plate.

26. Lubricate and install a new o-ring seal in the groove in the gerotor ring.

27. Lubricate and install a new o-ring and seal ring in the groove in the gerotor star.

28. Install the spacer.

29. Install end cap and four cap screws. Align timing groove on endcap with timing groove on gerotor. Tighten cap screws, in a crisscross pattern, to 25 -31 Nm [225-275 lb-in].

30. Install the relief valve/check if present. Use a new o-ring and tighten the plug to 17 Nm [150 lb-in].

31. Remove the SCU from the vise.

32. Check SCU and confirm all timing grooves are in line.

**Note:** If timing grooves are not aligned properly, SCU will not function.
2-Piece Shaft Seal
Assembly
Installation

2-Piece Shaft Seal Installation
For installation of
O-Ring 4999650-001 and
Seal 4998312-001

1. Place housing on a flat work
area as shown in figure 13.

2. Lubricate seal and o-ring with
hydraulic oil before installa-
tion.

3. Align sleeve with housing
bore (figure 13).

4. Insert sleeve into housing
bore (figure 14).

5. Place o-ring on plunger (fig-
ure 15).

6. Align seal with plunger cross
section “L” shape of seal
should be upside down (fig-
ure 16).

7. Push seal onto plunger. Lip of
seal should be between o-
ring and plunger. No gap
should exist between o-ring
and seal (figure 17).

8. Align plunger into sleeve
until it bottoms out, rotate
1/4 turn (figure 19).

9. While holding sleeve in
housing, withdraw plunger.

10. Withdraw sleeve.

11. Inspect seal installation.
Seal and o-ring must both
be within shaft seal
counter bore of housing.
How to Order Replacement Parts

Each Order Must Include the Following:

1. Product Number
2. Date Code
3. Part Name
4. Part Number
5. Quantity of Parts

For more detailed Information, contact:
Eaton Corp.
Hydraulics Division
14615 Lone Oak Road
Eden Prairie, MN 55344
www.hydraulics.eaton.com

• Specifications and performance data, Catalog No. C-STOV-MC001-E1