Table of Contents

Table of Revisions

<table>
<thead>
<tr>
<th>Date</th>
<th>Page</th>
<th>Changed</th>
<th>Rev</th>
</tr>
</thead>
<tbody>
<tr>
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<td>BC</td>
</tr>
</tbody>
</table>

Table of contents ................................................................. 2
Exploded view OSPB ................................................................. 3
Exploded view OSPC / OSPF ......................................................... 4
Tools .................................................................
Dismantling .................................................................
Dismantling the pressure relief valve for OSPC ...................... 12
Assembling .................................................................
Assembly pattern for standard bearing .................................. 18
Installation instruction for O-ring / roto Glyd ..................... 19
Assembly of the pressure relief valve for OSPC ..................... 26
Assembly of the shock valves for OSPC/OSPC LS/OSPC LSR ....... 27
Maximum tightening torque and hydraulic connections ............ 29
Hydrostatic Steering Unit OSPB, OSPC and OSPF
Service Manual
Exploded View OSPB

1 Dust seal ring
2 Housing + spool + sleeve
3 Ball 8.5 mm [0.33 in]
4 Thread bushing
5 O-ring with kin-ring or Roto Glyd
7 Bearing assembly
10 Ring for springs
11 Cross pin 6 • 41 mm [0.24 • 1.61 in]
12 Neutral position springs
13 Cardan shaft
14 Spacer
15 O-ring 80,5 • 1,5 mm [3.17 • 0.06 in]
16 Distributor plate
17 Gearwheel
18 O-ring 75.92 • 1,78 mm [2.99 • 0.07 in]
19 End cover
20 Washer 8.2 • 11,9 • 1.0 mm [0.32 • 0.47 • 0.04 in]
22 Special screw
23 Screw
24 Name label
26 Spacer
Hydrostatic Steering Unit OSPB, OSPC and OSPF
Service Manual
Exploded View OSPC / OSPF

1. Dust seal ring
2. Housing, spool and sleeve.
   Check valve and the seats for relief
   and shock valves are locktited.
3. Ball 8.5 mm (0.33 in)
4. Thread bushing
5. O-ring used with kin-ring (item 6)
6. Kin-ring
7. Bearing assembly
10. Ring
11. Cross pin
14. Spacer
13. Cardan shaft
12. Set of springs
15. O-ring
16. Distributor plate
17. Gearwheel set
18. O-ring
19. End cover
20. Washer
22. Special screw
23. Screw
24. Name plate
30. Complete relief valve
31. Spring wire
32. Complete shock valve
33. Ball 7/16 in
36. Bushing
35. Ball
39. Kin ring
40. O-ring
Hydrostatic Steering Unit OSPB, OSPC and OSPF Service Manual

Tools

Holding tool
Code number: SJ 150-9000-2

Guide ring
Code number: SJ 150-9000-16

Assembly tool for O-ring and kin-ring / Roto Glyd
Code number: SJ 150-9000-11
Code number: SJ 150N4014-1

Assembly tool for lip seal
Code number: SJ 150-9000-17
Tools

Assembly tool for cardan shaft.
Code number: SJ 150-9000-3

Assembly tool for dust seal.
Code number: SJ 150-9000-22

Torque wrench 0 - 70 N.m.
13 mm socket spanner.
6.8 and 12 mm sockets.
12 mm screwdriver.
2 mm [0.08 in] screwdriver.
13 mm ring spanner.
6.8 and 12 mm socket spanners.
Plastic hammer.
Tweezers.

The tools are not available from Sauer-Danfoss
Dismantling

Dismantle steering column from steering unit and place the steering unit in the holding tool. Screw out the screws in the end cover (6-off plus one special screw).

Remove the end cover, sideways.

Lift the gearwheel set (with spacer if fitted) off the unit. Take out the two O-rings.

Remove the cardan shaft.
Hydrostatic Steering Unit OSPB, OSPC and OSPF
Service Manual
Dismantling

Dismantling

Remove distributor plate.

Screw out the threaded bush over the check valve.

Remove O-ring

OSP B, OSP B LS, OSP BX LS:
Shake out the check valve ball (Ø 8 mm)

OSPC LS, OSPC LSR:
Shake out the check valve ball and suction valve pins and balls.

On some pins in the OSPC there are two springs (see page 4, pos. 3B).
Replace this pins prior to the reassembly!
Dismantling

Take care to keep the cross pin in the sleeve and spool horizontal. The pin can be seen through the open end of the spool. Press the spool inwards and the sleeve, ring, bearing races and needle bearing will be pushed out of the housing together.

Take ring, bearing races and needle bearing from sleeve and spool. The outer (thin) bearing race can sometimes “stick” in the housing, therefore check that it has come out.

Press out the cross pin. Use the special screw from the end cover.
Note next point/paragraph!

OSPB CN and OSPC CN
A small mark has been made with a pumice stone on both spool and sleeve close to one of the slots for the neutral position springs (see drawing).

If the mark is not visible, remember to leave a mark of your own on sleeve and spool before the neutral position springs are dismantled.

For OSPF both marks should be placed opposite each other!
Dismantling

Carefully press the spool out of the sleeve.

Press the neutral position springs out of their slots in the spool.

Remove dust seal and O-ring / Kin-ring / Roto Glyd.

Remove plugs from shock valves using a 6 mm hexagon socket spanner.
Dismantling

Remove seal washers (2-off).

Unscrew the setting screws using a 6 mm hexagon socket spanner.

Shake out the two springs and two valve balls into your hand. The valve seats are bonded into the housing and cannot be removed.

The shock valves are now dismantled.
Hydrostatic Steering Unit OSPB, OSPC and OSPF
Service Manual
Dismantling the Pressure Relief Valve for OSPC

**Dismantling**

Screw out the plug using and 8 mm hexagon socket spanner. Remove seal washers.

Unscrew the setting screw using an 8 mm hexagon socket spanner.

Shake out spring and piston. The valve seat is bonded into the housing and cannot be removed.

The pressure relief valve is now dismantled.
Screw out the pressure relief valve using and 8 mm hexagon socket spanner. Remove the seal ring. If the valve is defective it must be replaced.

The pressure relief valve is now dismantled.

The steering unit OSPB is now completely dismantled.

The steering unit OSPB LS is now completely dismantled.
Dismantling the Pressure Relief Valve (Cartridge) for OSPC LS / OSPC LSR

The steering unit OSPC is now completely dismantled. Replace this pins prior to the reassembly!

The steering unit OSPC LS is now completely dismantled. Replace this pins prior to the reassembly!

Cleaning
Clean all parts carefully in Shellsol K or the like.

Inspection and replacement
Replace all seals and washers. Check all parts carefully and make any replacements necessary.

Lubrication
Before assembly, lubricate all parts with hydraulic oil.
Assembling

Place the two flat neutral position springs in the slot. Place the curved springs between the flat ones and press them into place.

Line up the spring set.

Guide the spool into the sleeve. Make sure that spool and sleeve for OSPB LS, OSPBX LS, OSPC LS, OSPC LSR and OSPF are placed correctly in relation to each other (see page 10).
Assemble spool and sleeve.

**OSPB LS, OSPBX LS, OSPC LS, OSPC LSR and OSPF**

When assembling spool and sleeve only one of two possible ways of positioning the spring slots is correct. There are three slots in the spool and three holes in the sleeve in the end of the spool/sleeve opposite to the end with spring slots. Place the slots and holes opposite each other so that parts of the holes in the sleeve are visible through the slots in the spool.

**OSPB CN and OSPC CN**

Assemble the spool/sleeve and make sure the marks on spool and sleeve are opposite each other (see drawing page 10).

Press the springs together and push the neutral position springs into place in the slave.

Line up the springs and centre them.
Assembling

Guide the ring down over the sleeve.

The ring should be able to move - free of springs.

Fit the cross pin into the spool/sleeve.

Fit bearing races and needle bearings as shown on the drawing next page.
Assembling for Standard Bearing

Assembly pattern for standard bearing

1. Outer bearing race
2. Needle bearing
3. Inner bearing race
4. Spool
5. Sleeve

Assembly pattern for double bearing

1. Washer for axial bearing
2. Outer needle bearing
3. Outer bearing race
4. Spool
5. Sleeve
6. Inner needle bearing
7. Inner bearing race

The inside chamfer on the inner bearing race must face the inner spool.
Turn the steering unit until the bore is horizontal. Guide the outer part of the assembly tool into the bore for the spool/sleeve.

Grease o-ring and king-ring/roto Glyd with hydraulic oil and place them on the tool.

Hold the outer part of the assembly tool in the bottom of the steering unit housing and guide the inner part of the tool right to the bottom.

Press and turn the o-ring/kin-ring into position in the housing.
Installation Instructions for O-ring / Kin-ring / Roto Glyd

Draw the inner and outer parts of the assembly tool out of the steering unit bore, leaving the guide from the inner part in the bore.
Lubricate the lip seal with hydraulic oil and place it on the assembly tool.

Guide the assembly tool right to the bottom.

Press and turn the lip seal into place in the housing.

With a light turning movement, guide the spool and sleeve into the bore.

Fit the spool set holding the cross pin horizontal.
Installation Instructions for Lip Seal

The spool set will push out the assembly tool guide. The o-ring and kin-ring/roto Glyd are now in position.

Turn the steering unit until the bore is vertical again. Put the check valve ball into the hole indicated by the arrow.

Screw the threaded bush lightly into the check valve bore. The top of the bush must lie just below the surface of the housing.

Place a ball in the two holes indicated by the arrows.
Place a new pin in the same two holes.

In some cases a spring has to be fitted (see page 4 pos. 38) on the pin before it is placed in the housing.

Grease the o-ring with mineral oil approx. viscosity 500 mm²/s [SUS] at 20°C [68 °F].

Place the distributor plate so that the channel holes match the holes in the housing.
Installation Instructions for Lip Seal

Guide the cardan shaft down into the bore so that the slot is parallel with the connection flange.

Place the cardan shaft as shown - so that it is held in position by the mounting fork.

Grease the two o-rings with mineral oil approx. viscosity 500 mm²/s [SUS] at 20°C [°F] and place them in the two grooves in the gear rim. Fit the gearwheel and rim on the cardan shaft.

⚠️ Caution

Fit the gearwheel (rotor) and cardan shaft so that a tooth base in the rotor is positioned in relation to the shaft slot as shown. Turn the gear rim so that the seven trough holes match the holes in the housing.
Fit the spacer, if any.

Place the end cover in position.

Fit the special screw with washer and place it in the hole shown.

Fit the six screws with washers and insert them. Cross-tighten all the screws and the rolled pin with a torque of $30 \pm 6$ N·m [265.5 ± 53 lbf·in]. The OSPB, OSPB LS and OSPBX LS can now be function tested.
Assembly of the Pressure Relief Valve for OSPC

Fit the piston.

Fit the spring

Screw in the setting screw with an 8 mm hexagon socket spanner. Make the pressure setting on a panel or the vehicle.

Screw plug with dust seal into the housing using an 8 mm hexagon socket spanner. Tightening torque: 65 +/- 5 N-m. [575.3 +/- 44.2 lbf-in]
Assembly of the Shock Valves for OSPC/OSPC LS/OSPC LSR

Put a ball in the two holes indicated by the arrows.

Place springs and valve cones over the two balls.

The blue spring applies to setting range 90-180 bar \([1305-2610 \text{ psi}]\). The untreated spring applies to setting range 170-260 bar \([2465-3770 \text{ psi}]\).

Screw in the two setting screws using a \(6 \text{ mm}\) hexagon socket spanner. Make the pressure setting on a panel or the vehicle.

Screw plug with seal ring into the two shock valves and tighten them with a torque of: \(30 + 10 \text{ Nm} \ [265.5 + 88.5 \text{ lbf-in}]\) using a \(6 \text{ mm}\) hexagon socket spanner. Steering unit type OSPC, OSPC LS or OSPC LSR is now assembled.
Assemble the Shock Valves for OSPC/OSPC LS/OSPC LSR

Place the dust seal ring in the housing. With the OSPC, OSPC LS and OSPC LSR the dust seal ring must be placed only after the pressure relief valve and shock valves have been fitted.

Fit the dust seal ring in the housing using special tool SJ 150-9000-22 (see page 5) and a plastic hammer.

Press the plastic plugs into the connection ports. Do not use a hammer!
### Maximum Tightening Torque and Hydraulic Connections

**T:** Tank  
**L:** Left port  
**P:** Pump  
**R:** Right port

#### Screwed connection | Maximum tightening torque N·m [lbf·in] | With cutting edge | With cooper washer | With aluminium washer | With O-ring
--- | --- | --- | --- | --- | ---
G 1/4 | 35 [309] | 35 [309] | 35 [309] | - | -
G 3/8 | 70 [619] | 45 [398] | 50 [442] | - | -
G 1/2 | 100 [885] | 55 [486] | 80 [708] | - | -
7/16-20 UNF | - | - | - | - | 20 [177]
3/4-16 UNF | - | - | - | - | 60 [531]
M 12 • 1.5 | 30 [265] | 20 [177] | 30 [265] | 25 [221] | -
M18 • 1.5 | 80 [708] | 55 [486] | 70 [619] | 50 [442] | -
M22 • 1.5 | 100 [885] | 65 [575] | 80 [708] | 60 [531] | -
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