

Section 5-3

# Service Manual Steering Unit Type OSPB, OSPC, and OSPF



# Hydrostatic Steering Unit Type OSPB, OSPC and OSPF

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# Exploded View and Seal Kit

## Exploded View OSPB



#### Exploded View OSPB Callouts

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

# Exploded View and Seal Kit

# Exploded View OSPC / OSPF



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## Exploded View OSPC / OSPF Callouts

Callout	Description	Callout	Description
1	Dust seal ring	19	End cover
2	Housing, spool and sleeve. Check valve and the seats for relief and shock valves are locktited.	20	Washer
3	Ball 8.5 mm [0.33 in]	22	Special screw
4	Thread bushing	23	Screw
5	O-ring used with kin-ring (item 6)	24	Name plate
6	Kin-ring	30	Complete relief valve
7	Bearing assembly	31	Spring wire
10	Ring	32	Complete shock valve
11	Cross pin	33	Ball 3/16 in
14	Spacer	38	Spring
13	Cardan shaft	34	Rolled pin

Exploded View and Seal Kit

## Exploded View OSPC / OSPF Callouts (continued)

Callout	Description	Callout	Description
12	Set of springs	36	Bushing
15	O-ring	35	Ball
16	Distributor plate	39	Kin ring
17	Gearwheel set	40	O-ring
18	O-ring		

Tools

Tools

Holding tool Allied Part Number 234915



F300 937

Guide ring Allied Part Number 261673



F301 015

Assembly tool for O-ring and kin-ring / Roto Glyd Allied Part Numbers 234916, 261672



F300 940

Tools

Assembly tool for lip seal Allied Part Number 234917



F300 944

Assembly tool for cardan shaft. Allied Part Number 234918



Assembly tool for dust seal. Allied Part Number 234919



## Tools

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 mmring spanner. 6.8 and 12 mm socket spanners. Plastic hammer. Tweezers.



F300 939

The tools are not available from Allied Systems.

## Dismantling

#### 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).



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Remove the end cover, sideways.

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



F300 949

# Dismantling

Remove the cardan shaft







Remove distributor plate.

Screw out the threaded bush over the check valve.

#### Dismantling

#### **Remove O-ring**



OSPB, OSPB LS, OSPBX LS:

Shake out the check valve ball ( $\emptyset$ 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. 38). Replace this pins prior to the reassembly!



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.



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#### Dismantling

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

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!



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# Dismantling



OSPF

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Carefully press the spool out of the sleeve.



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



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# Dismantling

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



F300 960



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

Remove seal washers (2-off).



## Dismantling

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



F300 963

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.





#### Dismantling the pressure relief valve for OSPC

Dismantling

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 6 mm hexagon socket spanner.



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



#### Dismantling

The pressure relief valve is now dismantled.



Dismantling the pressure relief valve Dismantling OSPC

The steering unit OSPC is now completely dismantled.

Replace this pins prior to the reassembly!



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

Lubrication Before assembly, lubricate all parts with hydraulic oil.

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

## Assembly

## Assembling

Place the two flat neutral position springs in the slot.



1 500 575

Place the curved springs between the flat ones and press them into place.



Line up the spring set.



#### Assembly

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).



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Assemble spool and sleeve

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

When assembling spool and sleeveonly 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.



F300 978

#### OSPB CN and OSPC CN

Assemble the spool/sleeve and make sure the marks on spool and sleeve are opposite each other Dismantlingfor more information.



## Assembly

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

Line up the springs and centre them.



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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.



## Hydrostatic Steering Unit Type OSPB, OSPC and OSPF

#### Assembly

Fit bearing races and needle bearings as shown on the drawing next page.



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#### **Assembly Pattern for Bearings**

Assembling Pattern for Standard Bearing



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

Assembly Pattern for Double Bearing



- 1. Washer for axial bearing
- 2. Outer needlebearing

#### Assembly

- 3. Outer bearing race
- 4. Spool
- 5. Sleeve
- 6. Inner needlebearing
- 7. Inner bearing race

The inside chamfer on the inner bearing race must face the inner spool.

## Installation Instructions for O-ring / Kin-ring / Roto glyd

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.



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## Hydrostatic Steering Unit Type OSPB, OSPC and OSPF

#### Assembly

Press and turn the o-ring/kin-ring into position in the housing.



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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.



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#### Installation Instructions for Lip Seal

Lubricate the lip seal with hydraulic oil and place it on the assembly tool.



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## Assembly

Guide the assembly tool right to the bottom.

Press and turn the lip seal into place in the

housing.





F301 991

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

Fit the spool set holding the cross pin horizontal.



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#### Assembly

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



Turn the stearing 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.



## Assembly

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



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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.

## Assembly

Grease the o-ring with mineral oil approx. viscosity 500  $mm^2/s$  [SUS] at 20°C [68 °F].





Place the distributor plate so that the channel holes match the holes in the housing.

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



#### Assembly

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 mm<sup>2</sup>/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

C

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.



# Assembly

Fit the spacer, if any.

Place the end cover in position.

hole shown.





Fit the special screw with washer and place it in the

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## Hydrostatic Steering Unit Type OSPB, OSPC and OSPF

#### Assembly

Fit the six screws with washers and insert them.

Cross-tighten all the screws and the rolled pin with a torque of 30 + -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



## Hydrostatic Steering Unit Type OSPB, OSPC and OSPF

#### Assembly

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]



F300 941

#### Assambly of the Shock Valves for OSPC/OSPC LS/OSPC LSR

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



#### Assembly

Place springs and valve cones over the two balls.

The blue spring applies to setting range 90-180 bar [1305-2610 psi]. The untreated spring applies to setting range 170-260 bar [2465-3770 psi]







Screw plug with seal ring into the two shock valves and tighten them with a torque of : 30 +10 N.m [265.5 + 88.5 lbf.in] using a 6 mm lhexagon socket spanner.

Steering unit type OSPC, OSPC LS or OSPC LSR is now assembled.



#### Assembly

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 234919 and a plastic hammer.



Press the plastic plugs into the connection ports. Do not use a hammer!



# Service Manual Hydrostatic Steering Unit Type OSPB, OSPC and OSPF

Maximum Tightening Torque and Hydraulic Connections

## Maximum Tightening Torque and Hydraulic Connections

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]