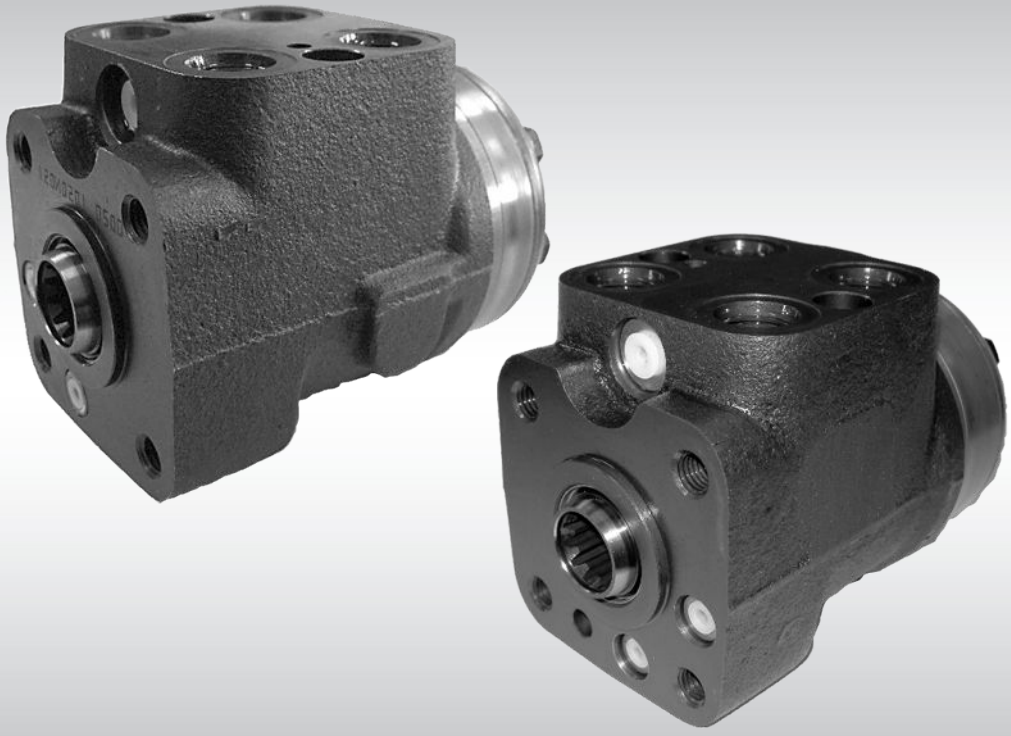
MAKING MODERN LIVING POSSIBLE

Service Manual

Steering Unit

Type OSPB and OSPC Type ON and CN



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Revision History

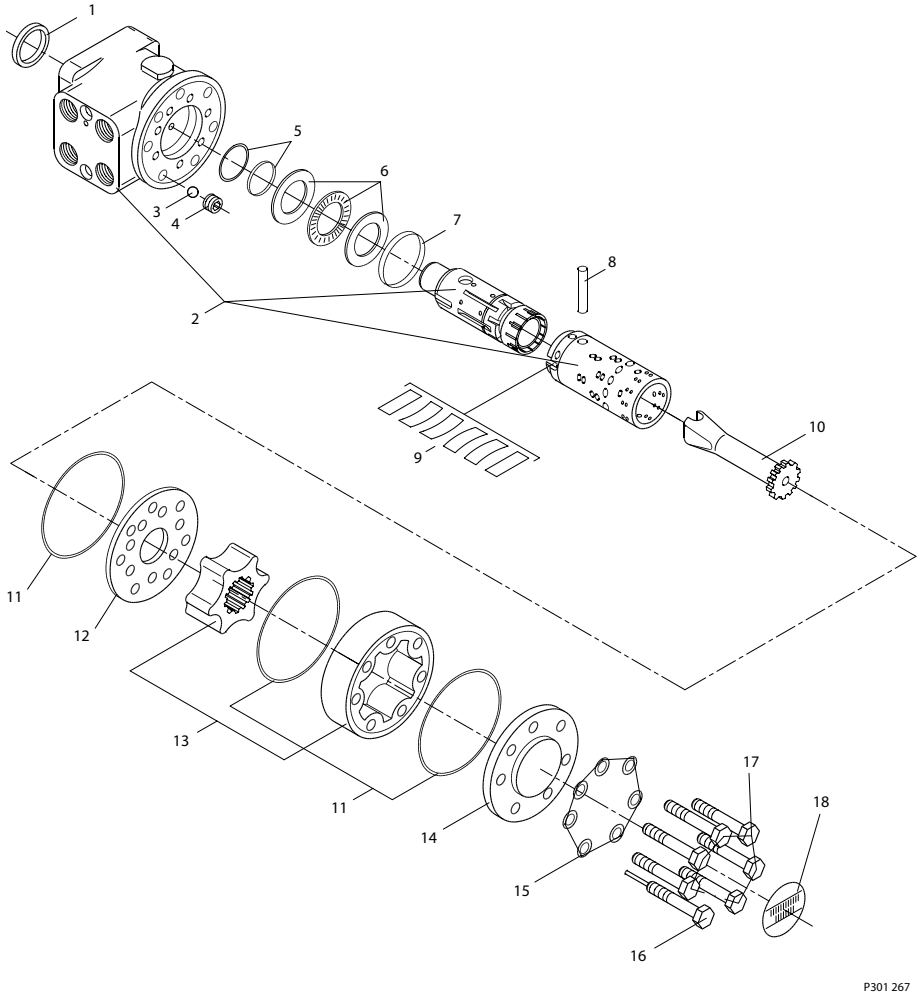
Table of Revisions

Date	Changed	Rev
Mar 2014	Converted to Danfoss layout - DITA CMS	BA
May 2011	Drawing	AC
Sep 2010	New back cover	AB
May 2010	First edition	AA

Contents

Exploded view

Exploded view OSPB

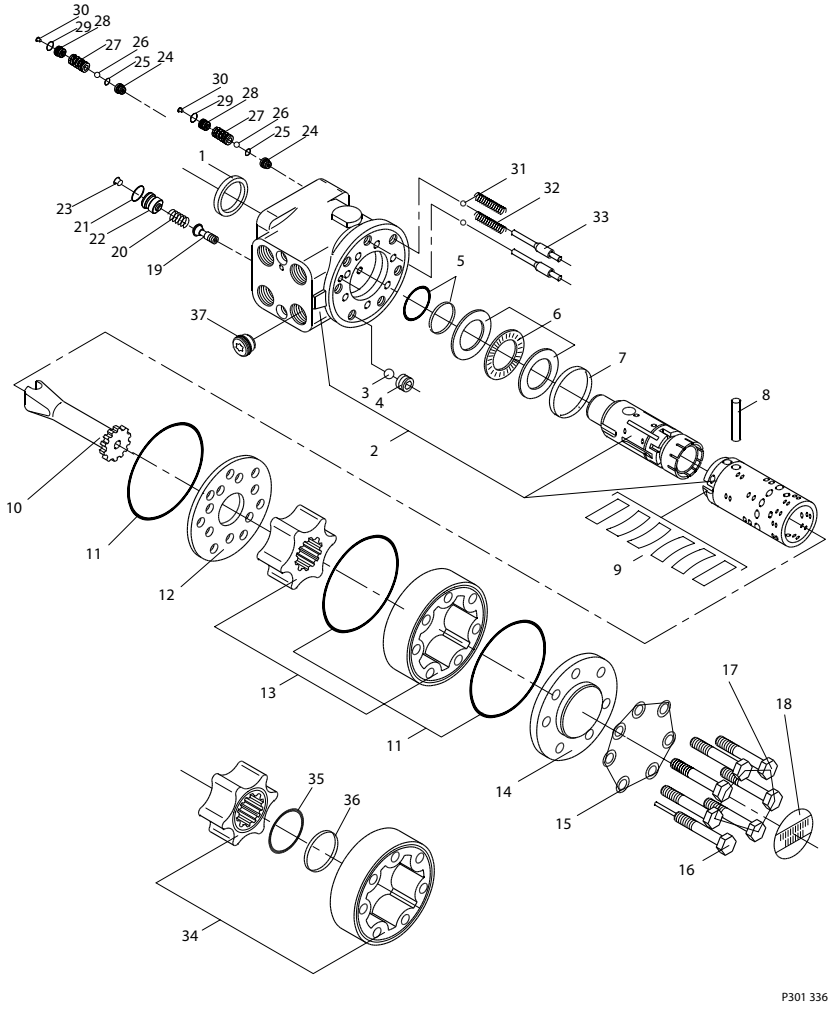


Exploded view OSPB callouts

Callout	Description	Callout	Description
1	Dust Seal Ring	10	Cardan Shaft
2	Housing + Spool + Sleeve	11	O-ring Seal (3 pcs., 79.4 x 2 mm)
3	Check Valve Ball (∅8.5 mm)	12	Distributor plate
4	Threaded Bushing	13	Gear Wheel Set
5	Roto-glyd Shaft Seal	14	End Cover Plate
6	Thrust Bearing Assembly (3 pcs.)	15	Sealing Washer (7 pcs., 8.2 x 15.2 x 1.0)
7	Retainer Ring	16	Pin Bolt Screw
8	Cross Pin (∅ 6 x 41 mm)	17	Screw (6 pcs.)
9	Neutral Spring Kit (4, 6 or 8 pcs.)	18	Model/Code Label

Exploded view

Exploded view OSPC



Exploded view OSPC callouts

Callout	Description	Callout	Description
1	Dust Seal Ring	20	Relief Valve Spring
2	Housing + Spool + Sleeve	21	O-ring seal (1 pc. ∅14.3 x 2.4mm)
3	Check Valve Ball (∅8.5 mm)	22	Relief Valve Adjustment Screw
4	Threaded Bushing	23	Plastic Plug
5	Roto-glyd Shaft Seal	24	Shock Valve Seat (2 pcs.)
6	Thrust Bearing Assembly (3 pcs.)	25	O-ring (2 pcs. ∅6 x 1.5mm)
7	Retainer Ring	26	Shock Valve Ball (2 pcs. ∅3/16″)
8	Cross Pin (∅ 6 x 41 mm)	27	Shock Valve Spring (2 pcs.)
9	Neutral Spring Kit (4, 6 or 8 pcs.)	28	Shock Valve Adjustment Screw (2 pcs.)
10	Cardan Shaft	29	O-ring (2 pcs. ∅9 x 1.5mm)
11	O-ring Seal (3 pcs. ∅79.4 x 2 mm)	30	Plastic Plug
12	Distributor plate	31	Suction Valve Ball (2 pcs. ∅3/16″)
13	Gear Wheel Set	32	Suction Valve Spring (2 pcs.)

Exploded view

Exploded view OSPC callouts (continued)

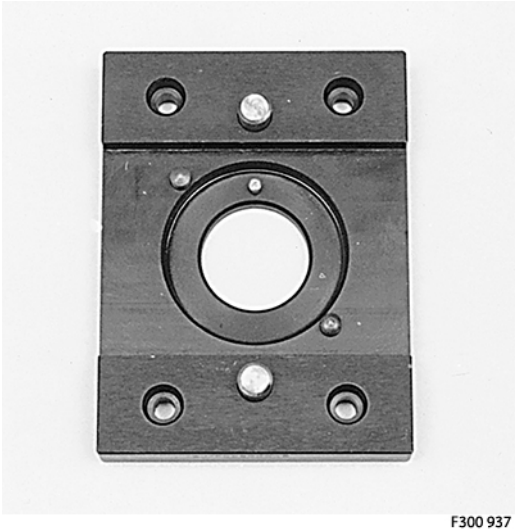
Callout	Description	Callout	Description
14	End Cover Plate	33	Suction Valve Retainer Pin
15	Sealing Washer (7 pcs. ∅8.2 x 2 x 1.0mm)	34	Gear Wheel Set with Seal Star
16	Pin Bolt Screw	35	Seal Star O-ring (1 pc.)
17	Screw (6 pcs.)	36	Seal Star PTFE Ring (1 pc.)
18	Model/Code Label	37	Check Valve in the P port
19	Relief Valve Piston		

Dismantling

Tools

Holding tool.

Code number: SJ 150-9000-2



F300 937

Assembly tool for O-ring and kin-ring / Roto Glyd.

Code number: SJ 150-9000-11.

Code number: SJ: SJ 150N4014-1

F301 732

Assembly tool for dust seal.

Code number: SJ 150-9000-22

F300 946

Dismantling

Torque wrench 0 - 70 Nm.

13 mm socket spanner.

2.75 - 5, 6 and 8 mm Allan key.

12 mm screwdriver.

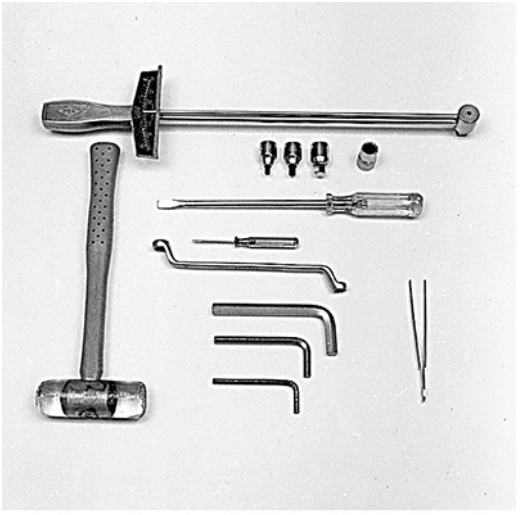
2 mm [0.08 in] screwdriver.

13 mm ring spanner.

Plastic hammer.

Tweezers.

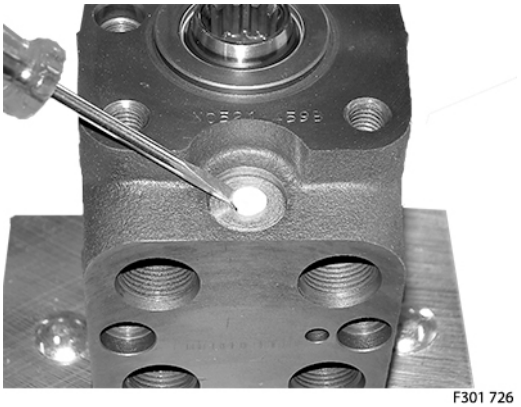
The tools are not available from Danfoss.



F300 939

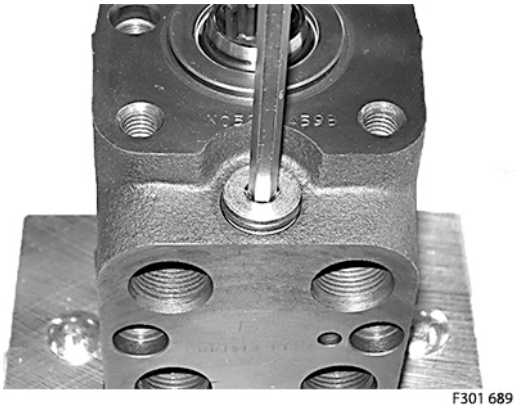
Dismantling the pressure relief valve for OSPC

First remove plastic plug (23).



F301 726

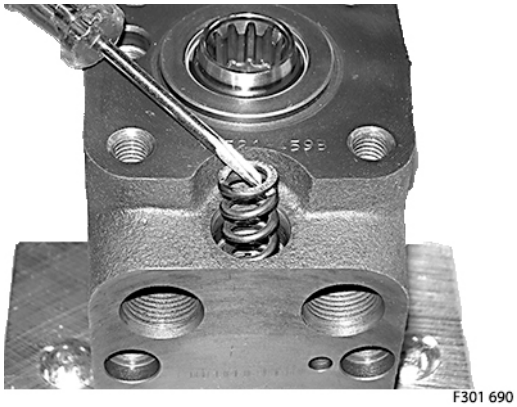
Screw out the adjustment screw (22) using an 8 mm hexagon socket spanner.



F301 689

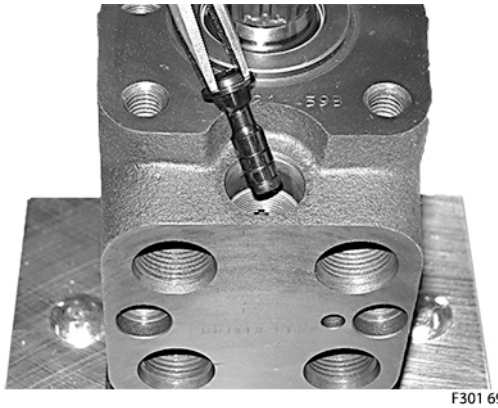
Dismantling

Remove the relief valve spring (20).



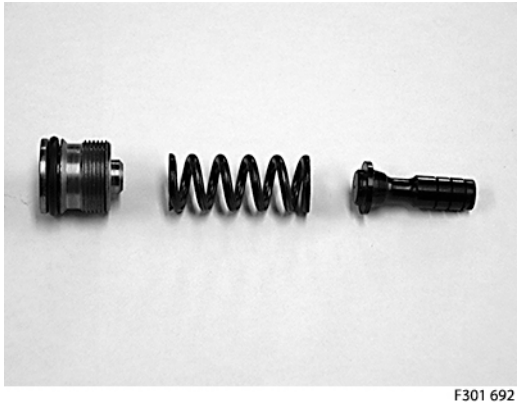
F301 690

Remove the piston as shown (19).



F301 691

The pressure relief valve is now dismantled.

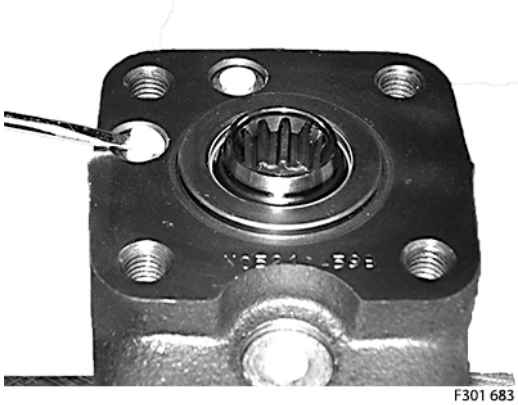


F301 692

Dismantling

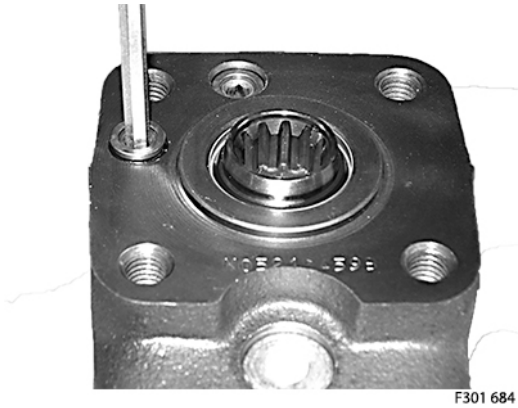
Dismantling the shock valve for OSPC

Prise off the plastic protection plugs (30) from the two shock valves.



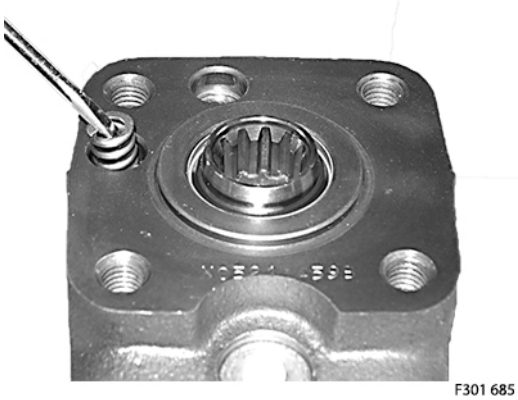
F301 683

Remove pressure adjustment screws (29) using a 5 mm hexagon socket spanner.



F301 684

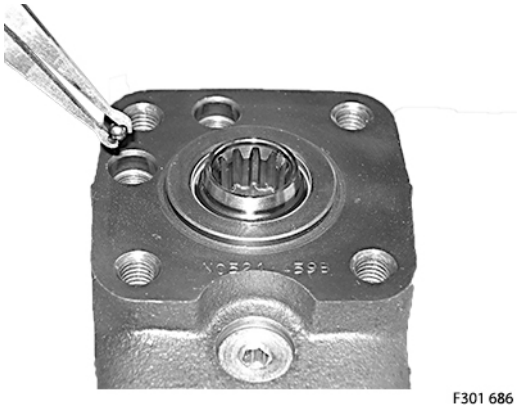
Remove the two shock valve springs (27).



F301 685

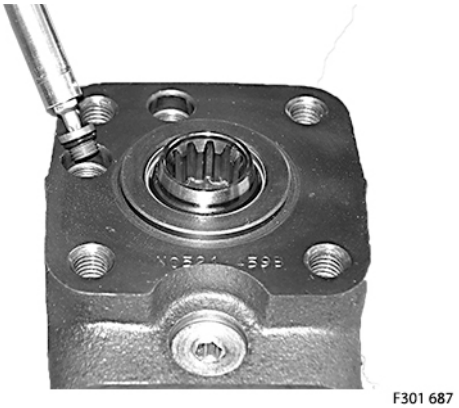
Dismantling

Remove the shock valve balls (26).



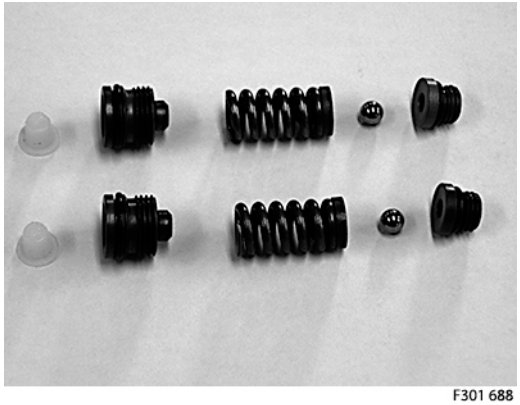
F301 686

Removed the shock valve seats with 2.75 mm Allan key (25).



F301 687

The shock valves are now dismantled.



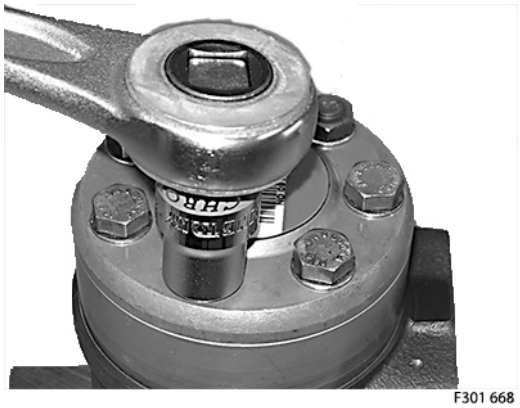
F301 688

Dismantling

Dismantling

Place the steering unit in the holding tool.

Remove the 6 screws (17) and the special pin bolt (16) from the end cover plate.



F301 668

Remove the end cover (14), sideways.

F301 669

Lift the gearwheel set (13) off the unit.

Remove the two O-rings (11).

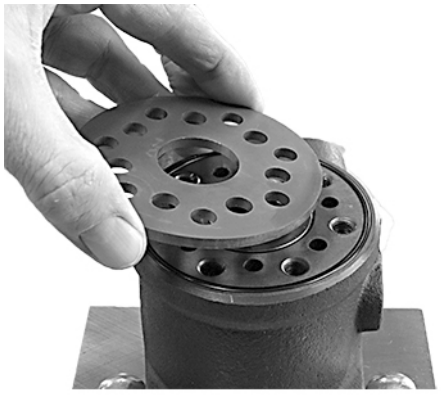
F301 670

Dismantling

Remove the cardan shaft (10).

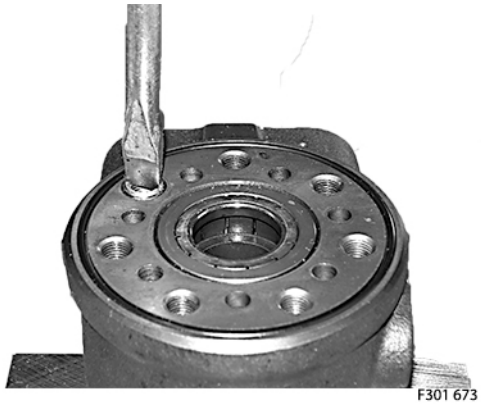
F301 671

Remove distributor plate (12).



F301 672

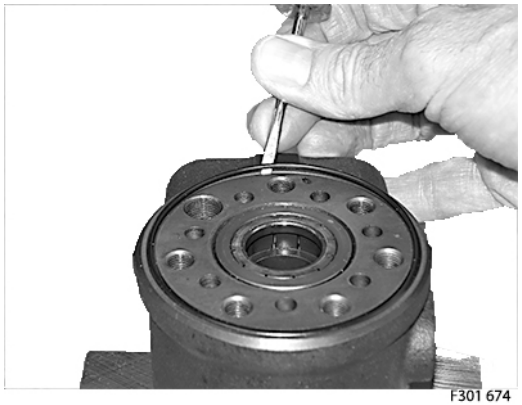
Screw out the threaded bush (4) retaining the check valve ball (3).



F301 673

Dismantling

Remove O-rings (11).


F301 674

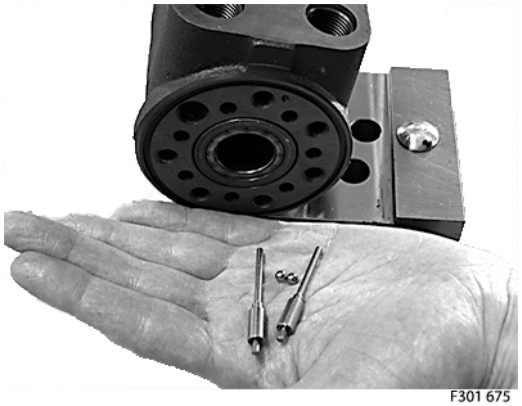
OSPB:

Shake out the check valve ball (3) (∅8.5 mm)

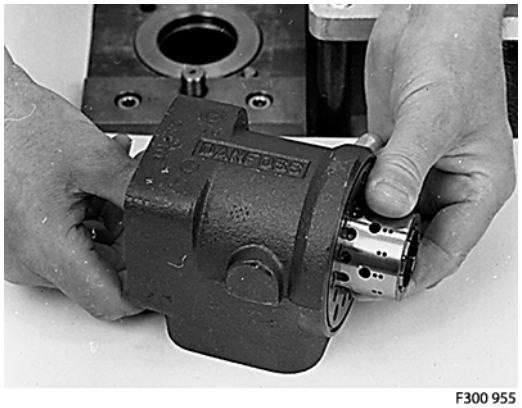
OSPC:

Shake out the check valve ball (3) and suction valve pins (33) and balls (31).

On some pins in the OSPC there are two springs (see page 4, pos. 32).


F301 675

Place the housing with the ports facing down on the work bench. Ensure that the cross pin (8) in the spool and sleeve set (2) is in the horizontal position. The pin (8) can be observed through the open end of the spool. Press the spool (2) inwards (from the housing mounting face end) and the sleeve (2), ring (7) and bearing assembly (6) will be pushed out of the housing together.


F300 955

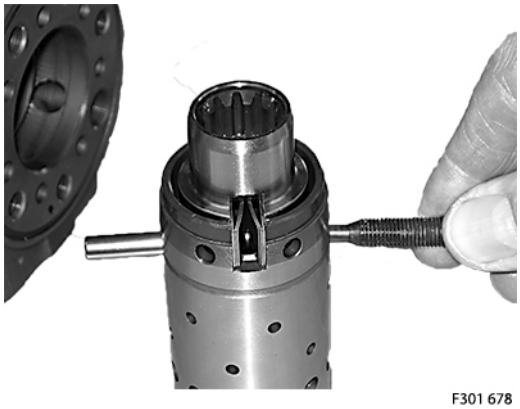
Dismantling

Take the ring (7), bearing races and needle bearing (6) from the spool and sleeve set (2). The outer bearing (6) race can sometimes “stick” in the housing, therefore check that it has come out.

F301 677

Press out the cross pin (8). Use the special screw from the end cover (16).

Note next point/paragraph!



F301 678

OSPB CN and OSPC CN

A small mark has been made on both spool and sleeve close to one of the slots for the neutral position springs.

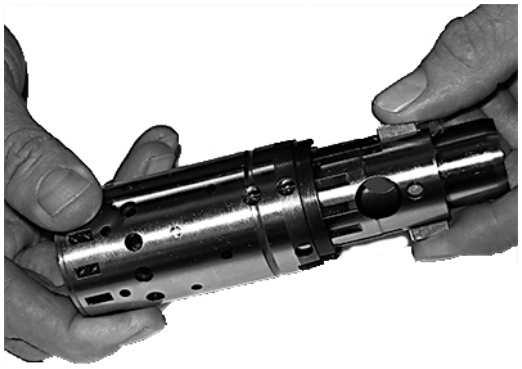
Caution

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.

F301 679

Dismantling

Carefully press the spool out of the sleeve.

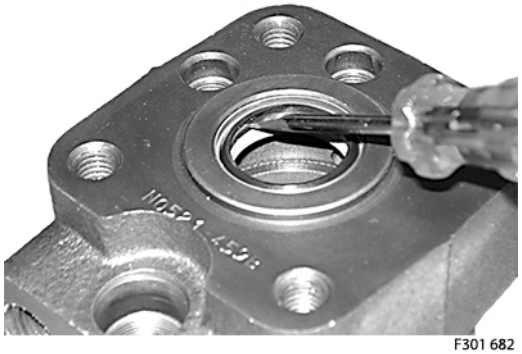


F301 680

Press the neutral position springs (9) out of the slot in the spool.

F301 681

Remove dust seal (1) and Roto Glyd Seal (5) carefully with a screw driver or similar tool.



F301 682

Dismantling

The steering unit OSPB and OSPC is now completely dismantled.

F301 693

Cleaning

Clean all parts carefully in Shellsol K or similar cleaner fluid.

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 as is necessary.

Assembling

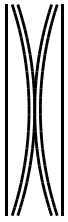
Assembling of spool and sleeve set

Place the two flat neutral position springs in the slot.

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

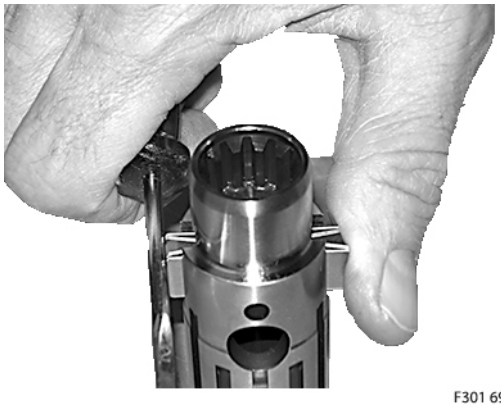
F301 694

Configuration of spring set (9).



150-386.10

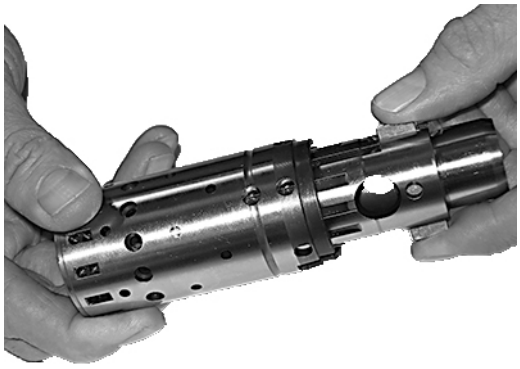
Line up the spring set (9).



F301 695

Assembling

Guide the spool into the sleeve (2), and making sure the centering springs (9) are placed into the slot.



F301 696

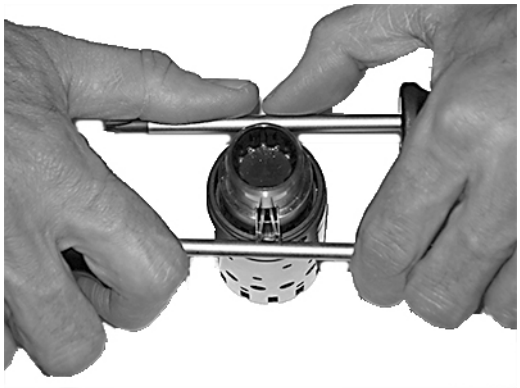
Caution

OSPB CN and OSPC CN

Assemble the spool/sleeve (2) and make sure the marks on spool and sleeve (2) aligne with each other

F301 697

Line up the springs (9) and centre them.



F301 699

Assembling

Guide the ring (7) down over the sleeve.

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

F301 700

Fit the cross pin (8) into the spool/sleeve.

F301 701

Fit bearing races and needle bearing (6)as shown on the drawing below.

F301 702

Caution

Assembly pattern for standard bearing

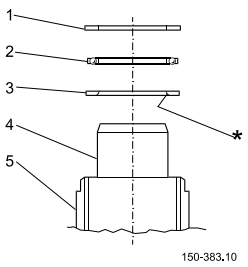
1 Outer bearing race

2 Needlebearing

3 Inner bearing race

4 Spool

5 Sleeve



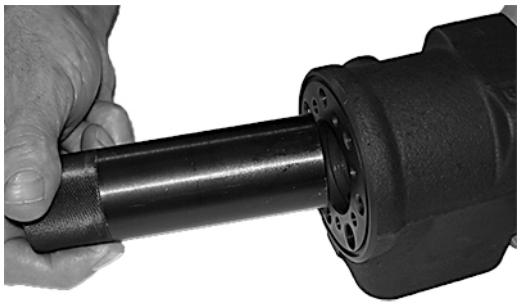
150-383.10

Assembling

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

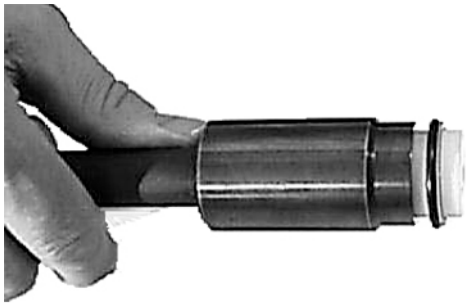
Installation instruction for Roto Glyd Seal

Place the steering unit housing with the port face down on the work bench. Guide the outer part of the assembly tool into the bore for the spool/sleeve set (2).



F301 703

Grease Roto Glyd (5) with hydraulic oil and place them on the tool. Ensure that the Roto Glyd seal is placed on the insertion tool as per the photograph.



F300 985

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.

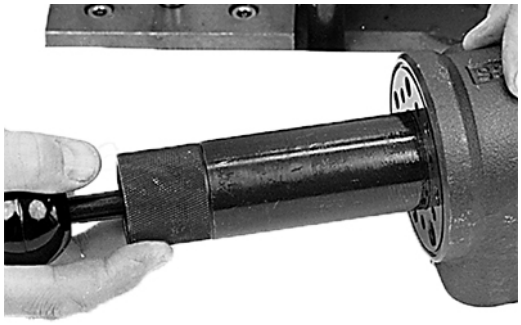
F301 986

Assembling

Press and turn the Roro Glyd seal (5) into position in the housing.

F301 987

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.



F301 988

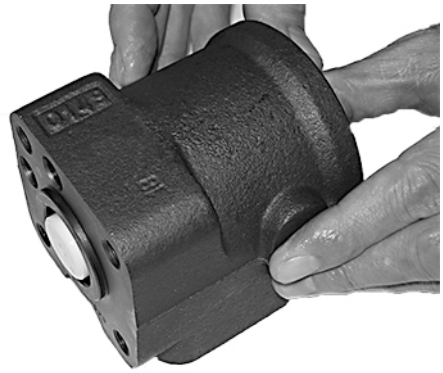
With a light turning movement, guide the spool and sleeve into the bore.

Fit the spool set holding the cross pin (8) horizontal.

F301 708

Assembling

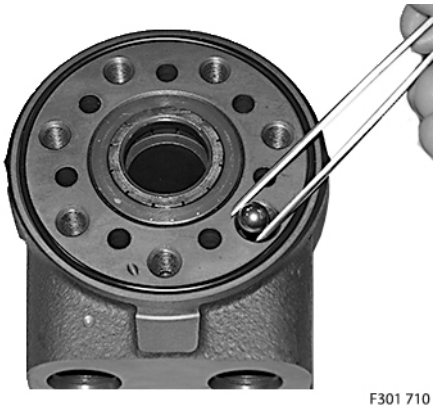
The spool set will push out the assembly tool guide. The Roto Glyd Seals (5) are now installed.



F301 709

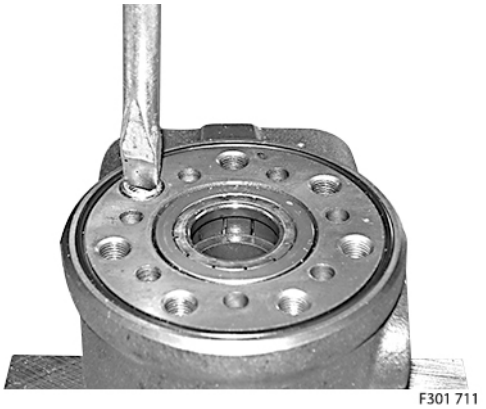
Assembling

Turn the stearing unit until the bore is vertical again. Put the check valve ball (3)into the hole indicated by the arrow.



F301 710

Screw the threaded bush (4) lightly into the check valve bore. The top of the bush must lie just below the surface of the housing.



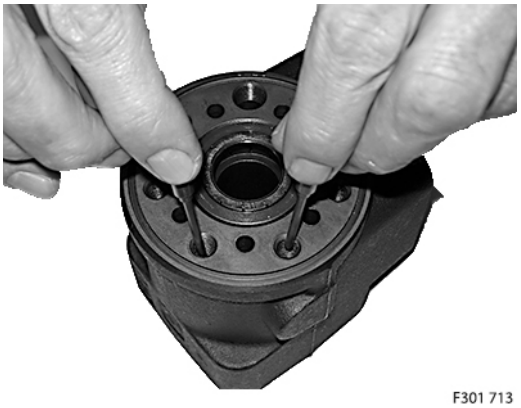
F301 711

Assembling

Place a ball (31) in the two bolt holes indicated by the arrows

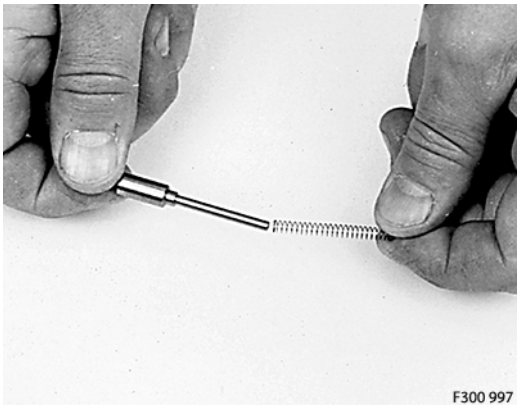
F301 712

Place the pins (33) in the same two bolt holes.



F301 713

In some cases a spring (32) has to be fitted on the pin before it is placed in the housing.

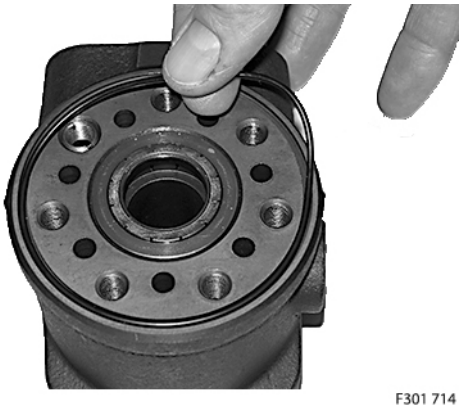


F300 997

Assembling

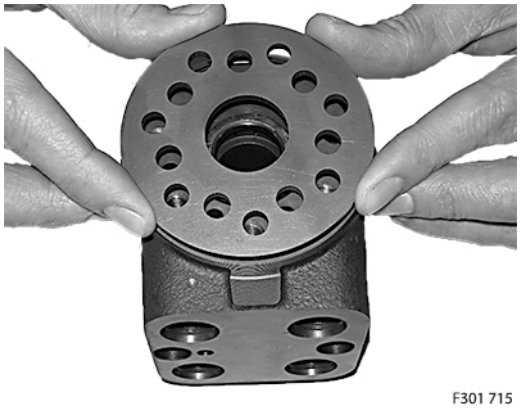
Grease the o-ring (11) with mineral oil approx. viscosity 500 mm² [SUS] at 20°C [68 °F].

Insert the o-ring in the grove on the housing.



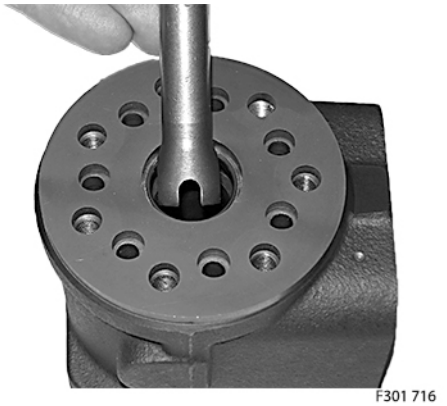
F301 714

Place the distributor plate (12) so that the channel holes match the holes in the housing.



F301 715

Guide the cardan shaft (10) down into the bore so that the slot is parallel with the connection flange ports and lines up with the cross pin (8).



F301 716

Assembling

Grease the two o-rings with mineral oil approx. viscosity 500 mm^2 [SUS] at 20°C [°F] and place them in the two groves in the gear rim. Fit the gearwheel and rim (13) on the cardan shaft (10).

F301 717

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 through holes match the holes in the housing.

F301 718

Place the end cover (14) in position. Ensure that the bar codes and writing are parallel with port face.

F301 719

Assembling

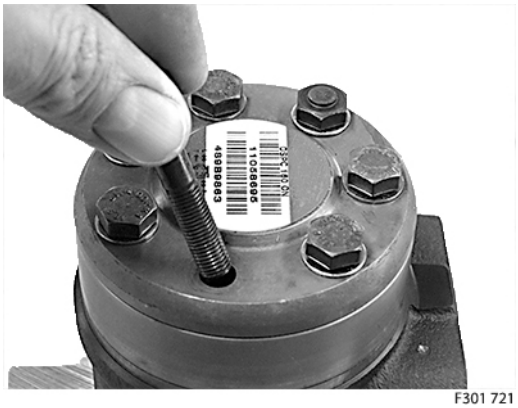
Fit the special screw (16) with washer (15) and place it in the hole shown.

F301 720

Fit the six screws (17) with new washers (15) and insert them.

Cross-tighten all the screws (17) and the rolled pin (16) with a torque of 30 +/-6 N.m [265.5 +/- 53 lbf.in].

The OSPB/C can now be function tested manually.



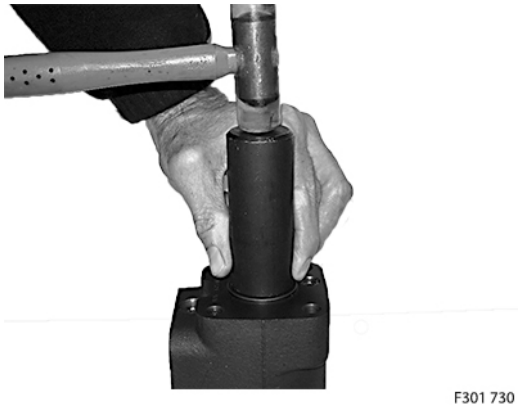
F301 721

Place the dust seal ring in the housing.

F301 729

Assembling

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



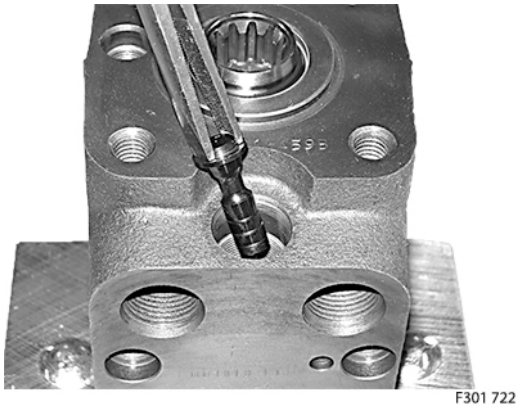
F301 730

Screw the plastic plugs into the connection ports.

F301 731

Assembly of the pressure relief valve for OSPC

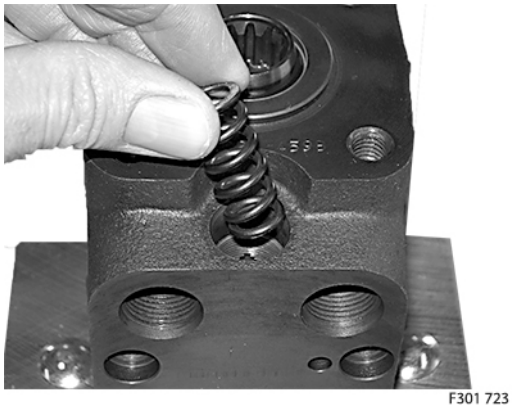
Install the piston (19) to housing.



F301 722

Assembling

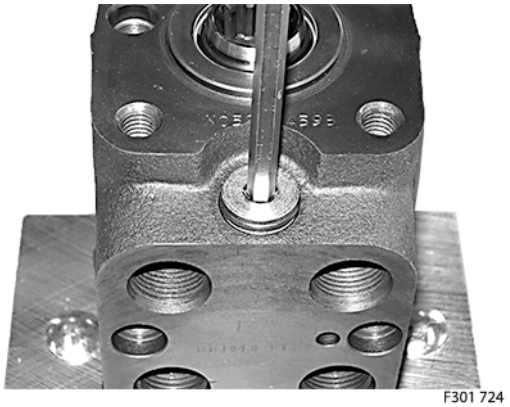
Install the spring (20) on top of the piston (19).


F301 723

Screw in the adjustment screw (21) with an 8 mm hexagon socket spanner.

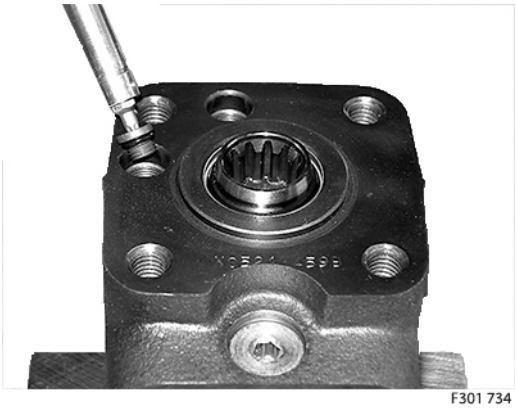
Make the pressure setting on a test panel or the vehicle as required.

Reinsert plastic protection plug (23) to the adjustment screw (21).


F301 724

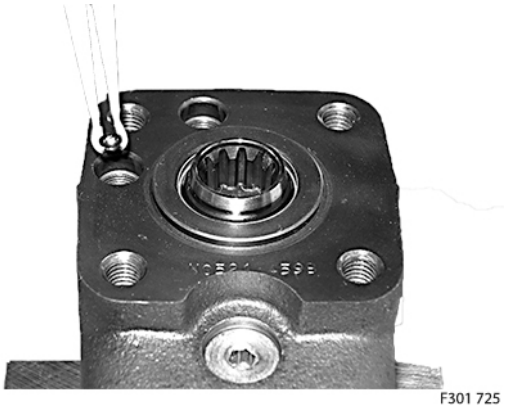
Assembly of the shock valves for OSPC

Screw the shock valve seats (24) with a 2.75 mm Allan key into the cavities indicated by the arrows. Torque to 1.5 Nm.


F301 734

Assembling

Place one ball (26) in each of the shock valve cavities.



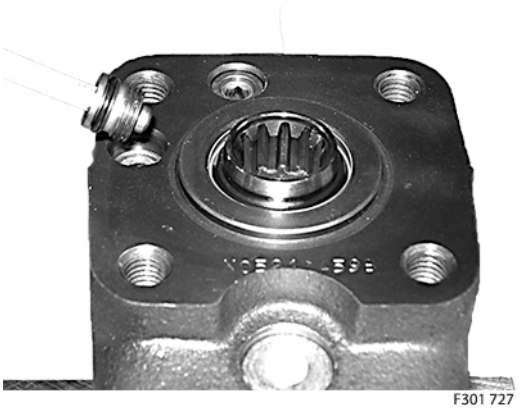
F301 725

Place springs valve cones (27) over the two balls.

The copper coated spring applies to a setting range 90-190 bar [1305-2755 psi]. The black spring applies to a setting range 180-240 bar [2610-3480 psi].

F301 766

Screw in the two setting screws (28) using a 5 mm Allan key. Make the pressure setting on a panel description.



F301 727

Assembling

Insert plastic plug (30) into the 5 mm internal hex.

F301 728

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