



Instruction

Disassembling and assembling APP S 674 5.1-9.0



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Table of Contents	1.	Introduction	3
	2.	Disassembling the pump	3
	3.	Assembling the pump	8
	4.	Disassembling and assembling of the swash plate	14
	5.	Disassembling and assembling of cylinder barrel and valve plate	15
	6.	Disassembling and assembling of the flushing valve	16
	7.	How to replace the shaft seal	16
	8.	Changing pistons	17
	8.1	Disassembling	17
	8.2	Assembling	19
9.	Exploded view APP S 674 5.1-9.0 pumps	21	
0.	When should the pistons be replaced	22	

**This document covers the instructions for
disassembling and assembling the axial piston
pumps APP S 674 5.1-9.0.**

Instruction
Disassembling and assembling APP S 674 5.1-9.0
1. Introduction

Important: It is essential that the pump is serviced in conditions of absolute cleanliness.

For a better understanding of the pump, please see the exploded view in item 9.

Note:

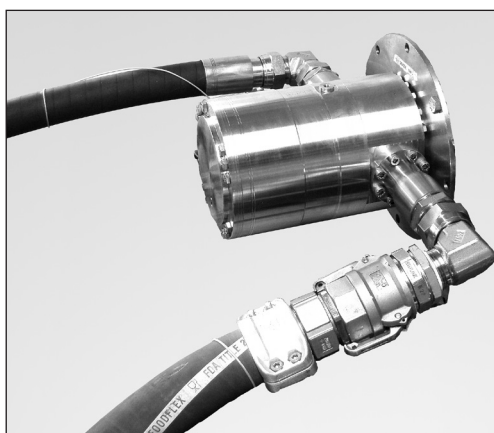
For disassembling and assembling it must be possible to place the pump vertically with the shaft pointing downwards. This can be done using a distance block with a minimum height of 50 mm.

Tools needed:

- 10 mm combination wrench
- 13 mm combination wrench
- Torque wrench
- 2 screwdrivers
- 1 press bush tool (part of Seal kit)
- Adjustable pin wrench
- Distance block

2. Disassembling the pump

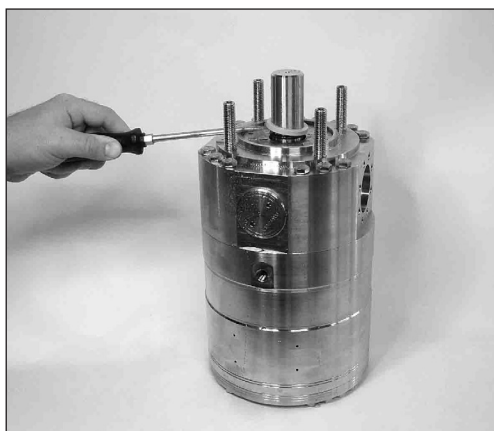
1. Disconnect the pump from the rest of the system.



2. Lubricate shaft with clean filtered water.



3. Carefully remove the stop bush ring and the O-ring with a screw driver.



4. Using a 10 mm combination wrench, unscrew the four bolts from shaft seal cover.

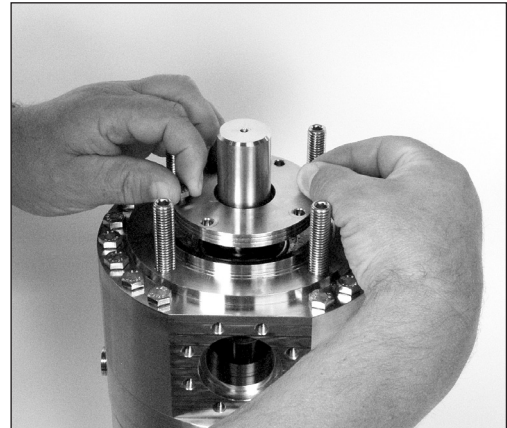
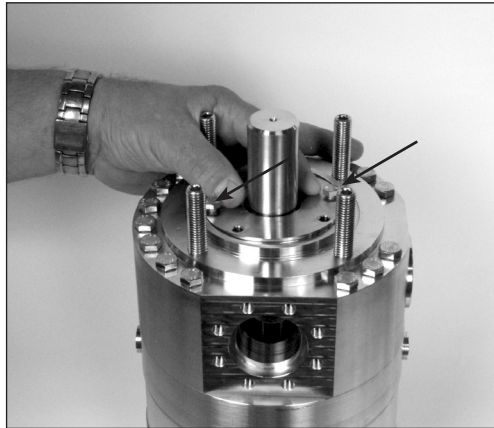
WARNING!

While unscrewing the bolts with one hand hold the shaft seal cover with the other hand. This is done to ensure, the cover does not pop out and damage the ceramic ring.



- 5. Place **two (!)** bolts in threaded holes in the shaft seal cover to remove it without damaging the ceramic ring.

WARNING!
Be careful, the shaft has sharp edges.



- 6. Remove ceramic ring from flange by carefully pushing it from the back of the sealing ring.

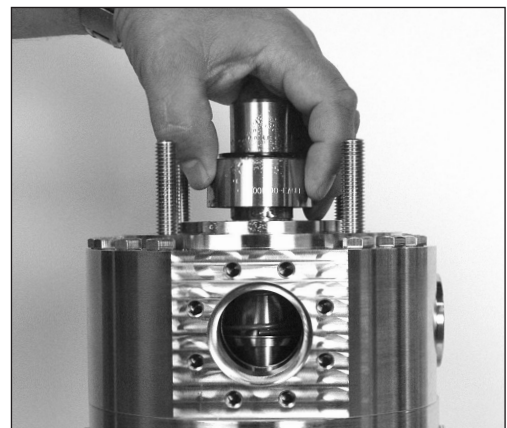
- 7. Wet the shaft with clean water.



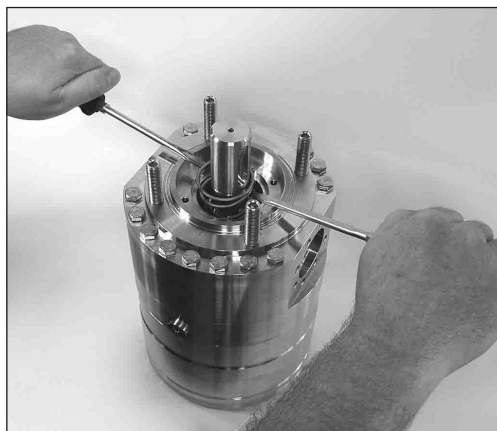
- 8. Through the inlet port lift the shaft seal with a screw driver between shaft seal and spring. Use one hand to pull the shaft seal up.

- 9. Carefully remove the shaft seal and distance ring; the shaft has a sharp edge.

WARNING:
Be careful not to scratch the shaft.



10. Carefully remove the spring by lifting it with two screwdrivers.



11. Turn pump upside down and place pump on a distance block. Make sure there is enough free space for the shaft beneath the housing.



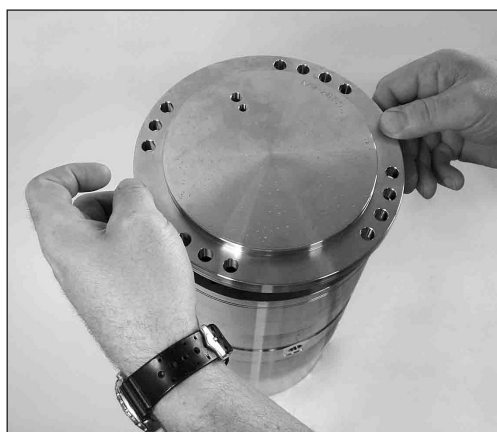
12. Using a 13 mm combination wrench, remove all the bolts on the mounting flange except the two shown in item 13.



13. Unscrew the remaining two bolts. Turn each bolt one round at the time to make sure that the flange is removed as straight upward as possible.



14. Remove end flange.



15. Swash plate must be placed so that its surface is not scratched. For further disassembling of swash plate, see page 14.



16. Remove the pistons one by one.
Be careful not to scratch the pistons.
Tilt the retainer plate to horizontal position
for easy removal of pistons, if required.

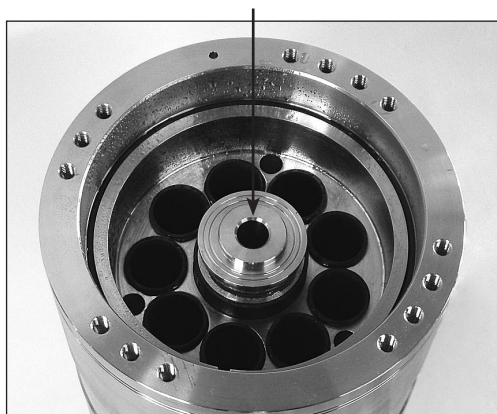
WARNING:
Do not use any tools.



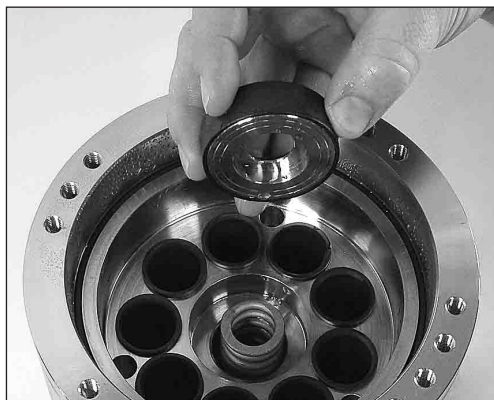
17. Remove the retainer plate.



18. Remove the retainer ball.



19. Remove the retainer guide and the spring.



20. Pull the cylinder barrel straight upwards in
a continuous lift to ensure no damage of
house bearing. This can only be done if the
shaft seal is removed.

WARNING:
If the cylinder barrel is dropped or
lowered too fast into housing, the main
bearing/shaft bearing might be damaged.

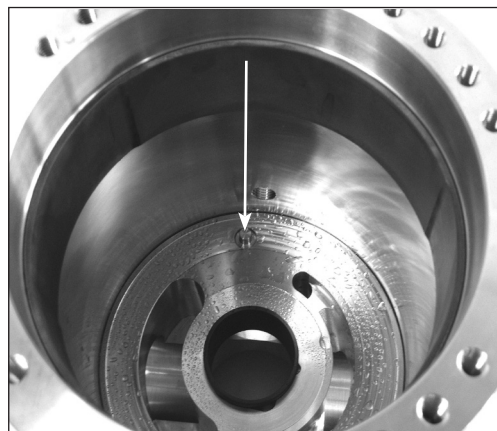
21. Place cylinder barrel upside down. For
further disassembling of cylinder barrel
and valve plate see page 15.



22. Remove the port plate in the housing by hand.



23. Remove, by hand, the guide pin.
Note: The following operation is only necessary if O-ring on port flange is to be changed.



24. Turn the pump upside down.



25. If necessary, remove the remaining screws in port flange by using a 13 mm combination wrench.



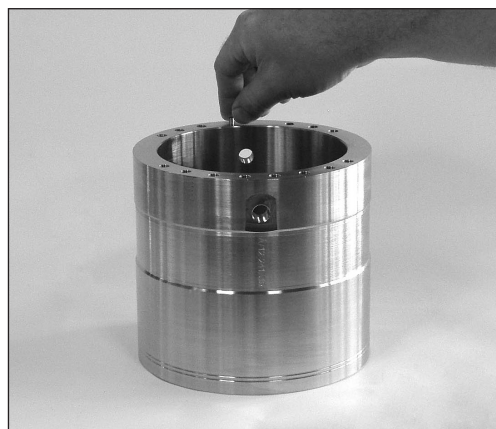
3. Assembling the pump

WARNING:
Do not use silicone when assembling the pump. Do not reuse disassembled O-rings; they might be damaged. Always use new O-rings.

Important:
It is essential that the pump is serviced in conditions of absolute cleanliness. All parts must be absolute clean before mounting.

1. Lubrication:
 - To prevent seizing-up, lubricate all threads with PTFE lubrication type.
 - O-rings inside pump must be lubricated only with clean filtered water.
 - O-rings for port flange, mounting flange and flushing valve must be lubricated.
 - It is important to lubricate ALL parts to be assembled with clean filtered water (Especially all PEEK parts).

2. Place the housing with drain holes pointing upwards and insert guide pin for positioning the port flange on housing.



3. Mount O-ring on port flange and lubricate with water.

4. Position port flange by aligning pin hole over guide pin.

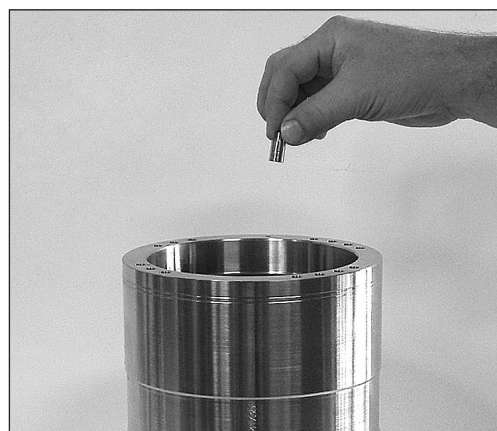
5. Carefully press the port flange downwards. Do not squeeze the O-ring. If the O-ring is damaged, the pump will leak.



6. Lubricate the threads with PTFE lubrication. Insert screws on the port flange. Tighten screws to a torque of 30 ± 3 Nm.

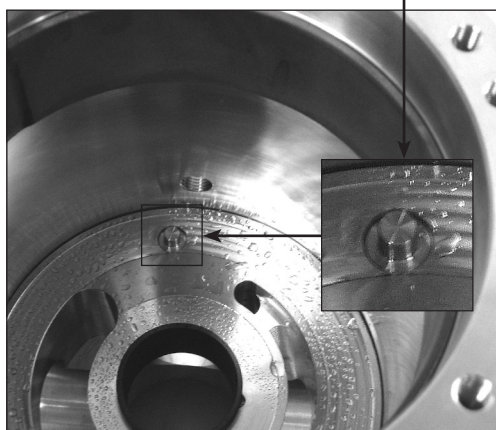


7. Turn pump upside down. Place a 10.5 mm guide pin in port flange.



Guide pin

8. Lubricate and position port plate by using the guide pin. Do not use force for this operation.

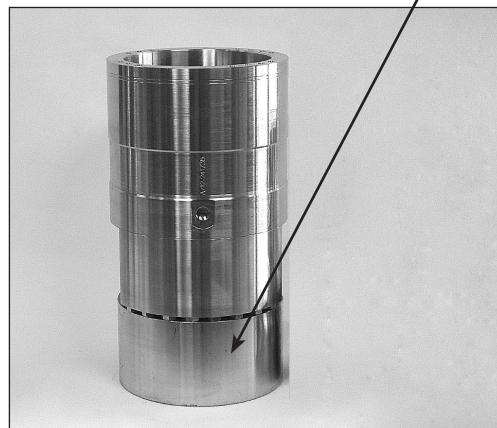


9. Ensure port plate is fitted tightly against the bottom.
Important: If valve plate is disassembled from cylinder barrel, please see page 15 before continuing.



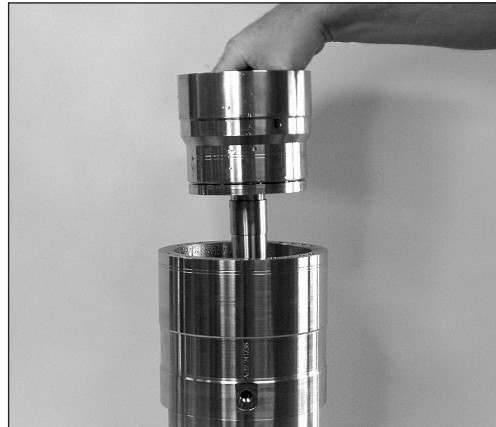
10. Place the pump on a distance block. Make sure, there is enough free space for the shaft beneath the housing.

Distance block



11. Carefully lower cylinder barrel into the housing.

WARNING:
If cylinder barrel is dropped or lowered too fast into housing, main bearing and shaft bearing might be damaged. Replacement can only be done at Danfoss, Nordborg.



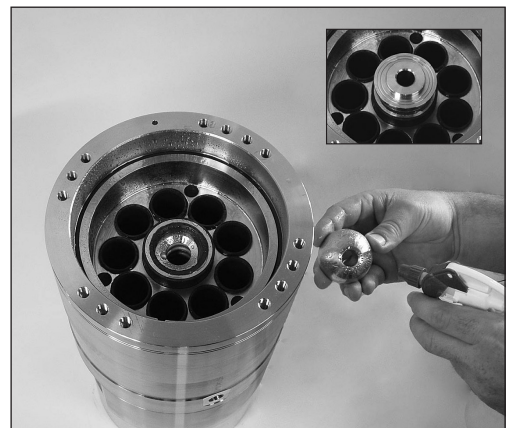
12. Place the spring in cylinder barrel and lubricate liners inside cylinder barrel with water.



13. Lubricate and position the retainer guide.



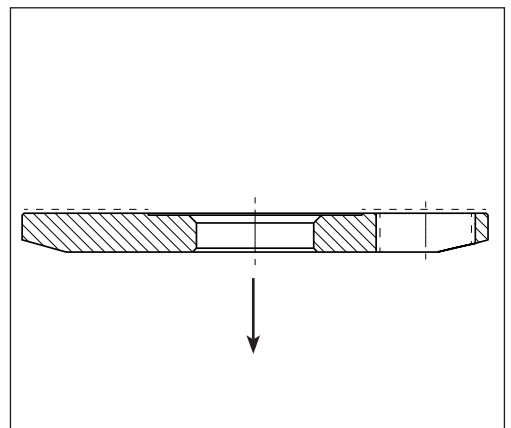
17. Lubricate retainer guide and position the retainer ball.



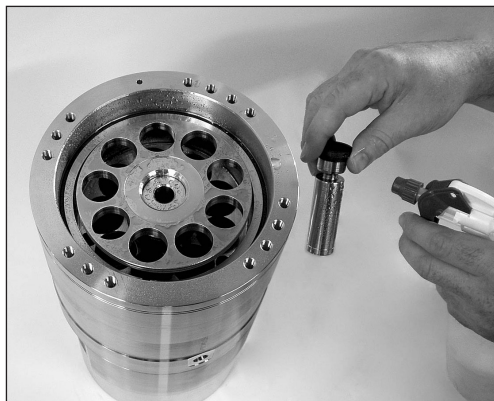
18. Position the retainer plate.



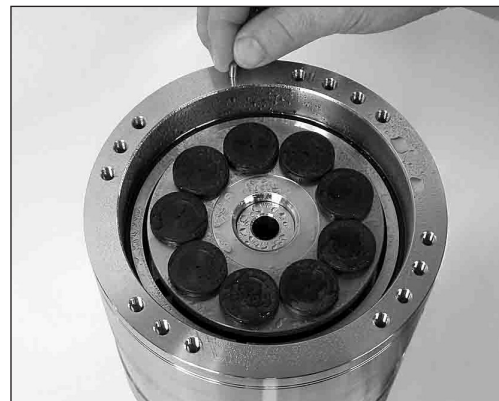
19. Ensure it is oriented correctly.



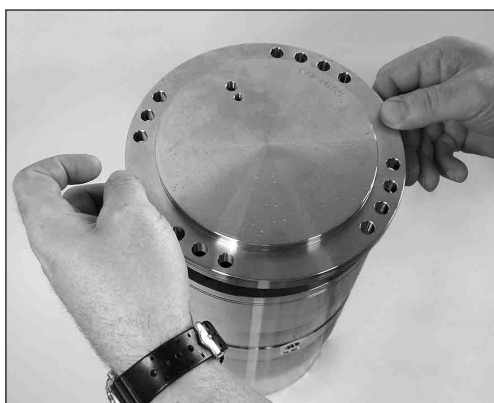
20. Lubricate and position the pistons in the retainer plate and cylinder barrel.



21. Lubricate the piston shoes. Tilt retainer plate for easier placement of swash plate. If the swash plate has been disassembled from end flange, see page 14 for assembling of swash plate. Remember to place the guide pin in the housing.



22. Change and lubricate O-ring in end flange. Position the end flange aligning pin hole over the guide pin.



23. Lubricate and place two bolts in end flange. Turn each bolt one round at a time to ensure mounting flange is mounted as straight downwards as possible. Be careful not to squeeze the O-ring.



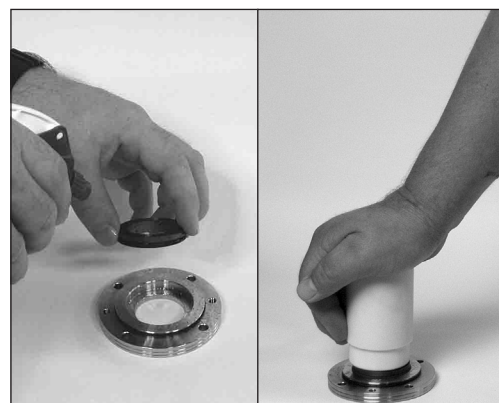
24. Screw in the rest of the bolts and tighten all screws to a torque of 30 +/- 3 Nm.



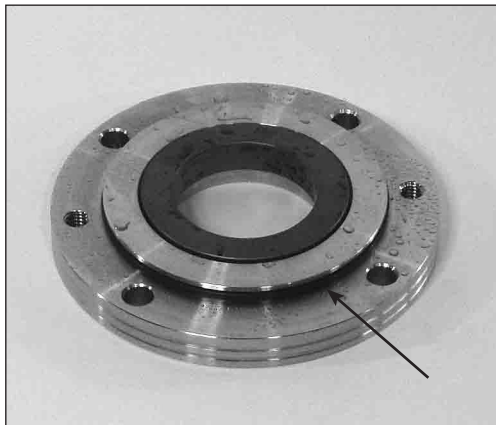
25. Lubricate and press new ceramic ring into the shaft seal cover by using the press bush tool.

WARNING:

Ensure that the face with rubber seal is positioned against shoulder in shaft seal flange.



26. Remove old O-ring and place the new one on shaft seal cover.



27. Place pump upside down to get access to shaft. Position the distance ring.



28. Lubricate shaft with clean filtered water.



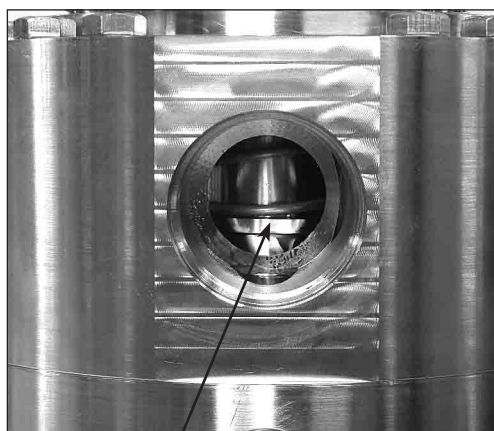
29. Mount new shaft seal with the carbon seal face pointing upwards.



30. Press seal down and at the same time turn the seal clockwise until spring stops at distance ring.



31. Right position of the spring can be inspected through flushing valve hole.



Spring against distance ring

32. Position the shaft seal cover on shaft. Be careful not to damage the ceramic ring.

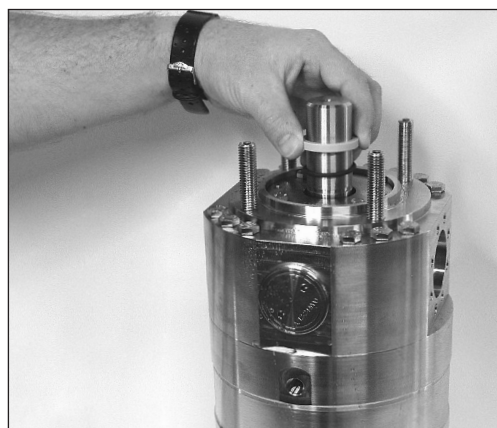
WARNING!
Be careful, the shaft has sharp edges.

33. Hold the cover down with one hand and tighten the bolts with a torque of 10 Nm \pm 2 Nm.

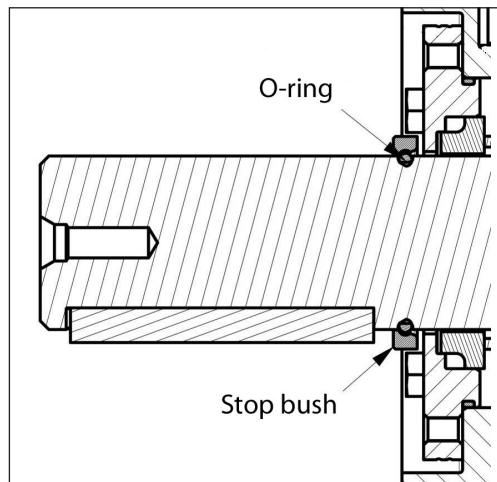


Lubricate the shaft with water before mounting the stop bush.

34. Mount O-ring and stop bush on shaft. Ensure the gap with O-ring groove is pointing in correct direction (towards pump).

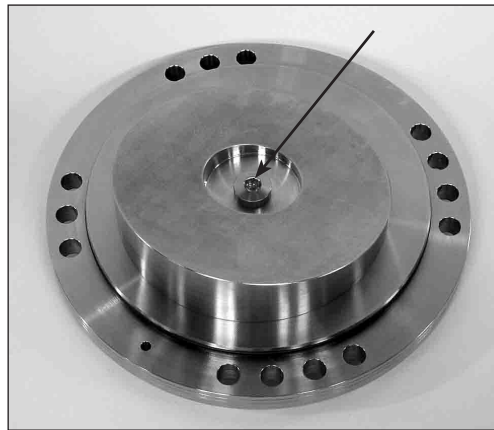


35. Press stop bush in place by using the press bush tool.

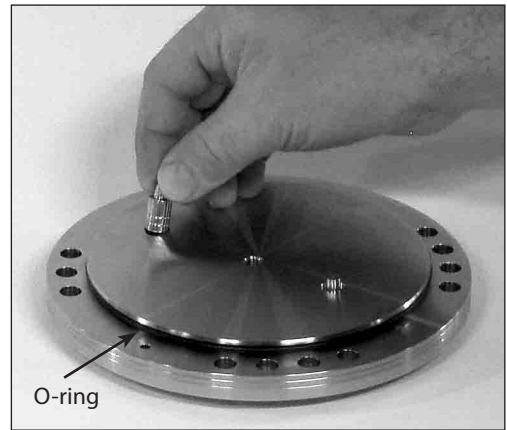


4. Disassembling and assembling of the swash plate

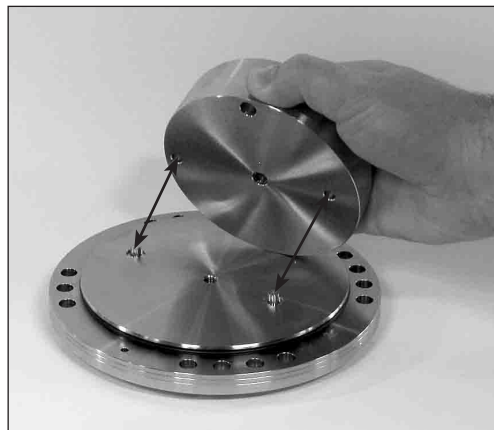
1. Unscrew centre bolt from swash plate and remove the swash plate.



2. Place two new guide pins in the end flange, if needed. Change the O-ring in the end flange. Remember to lubricate.



3. Carefully align swash plate over guide pins.



4. Lubricate centre bolt thread with a PTFE lubricant type.



5. Position centre bolt.



6. Screw centre bolt into centre of swash plate and tighten to 30 ± 3 Nm. Finally check the surface on the swash plate for any marks or foreign particles.



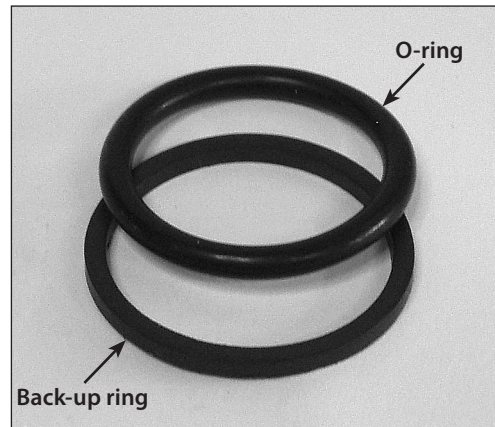
5. Disassembling and assembling of cylinder barrel and valve plate

1. Push a screwdriver into the hole between cylinder barrel and valve plate. Carefully push the screwdriver downward so that it makes a gap between cylinder barrel and valve plate. Use this gap to put in another screwdriver and loosen the valve plate from the cylinder barrel.

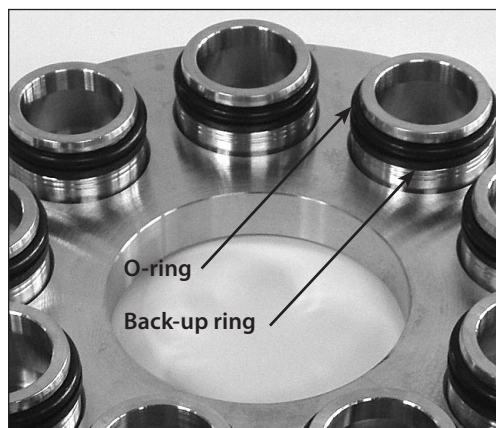


2. Remove the O-rings and backup rings on valve plate.

Important:
If they have been removed they can not be reused.



3. Mount the new back-up rings on the valve plate first and then mount the O-rings.



4. Lubricate the new O-rings/back-up rings and the liners in the cylinder barrel with clean filtered water.



5. Lower the valve plate upside down on the cylinder barrel.



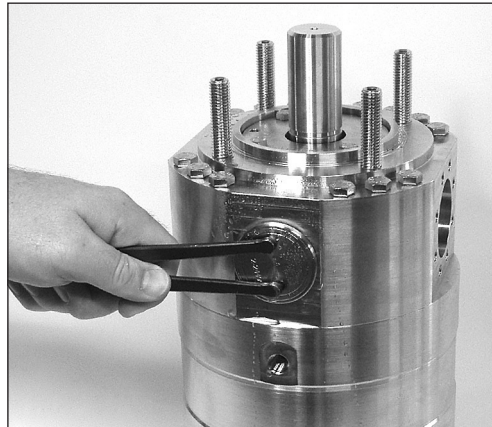
6. Press by hand valve plate into cylinder barrel.



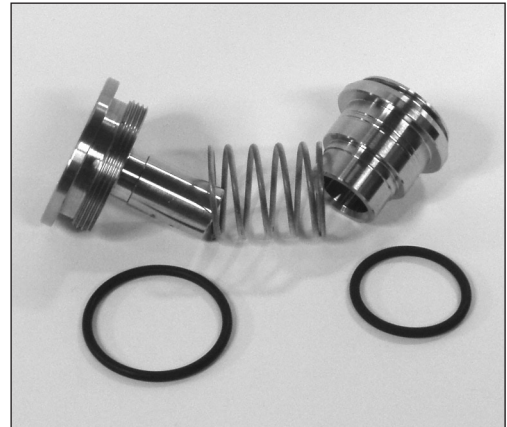
7. Cylinder barrel is now ready for mounting.

6. Disassembling and assembling of the flushing valve

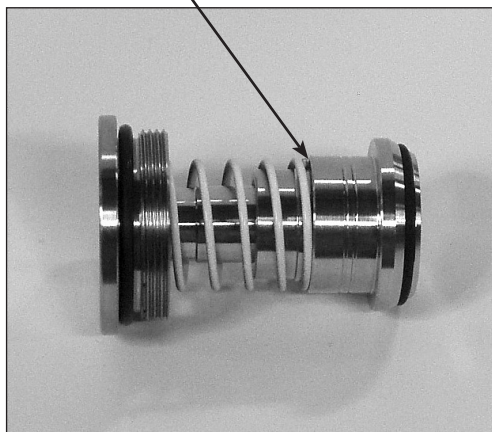
1. Unscrew the flushing valve counter-clockwise by using the pin wrench.



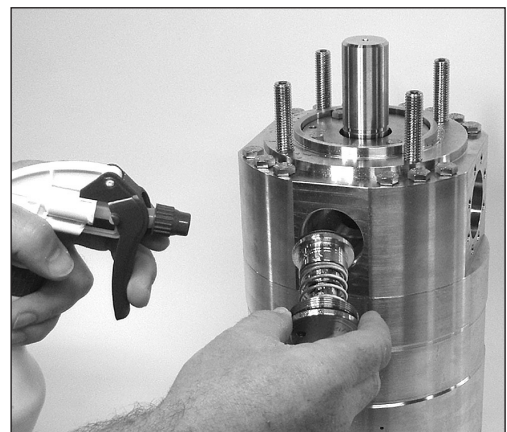
2. Remove the O-rings. If necessary, change the valve cone, spring and plug.



3. It is important that if the spring is changed it is located like on the picture. The end of the spring must be against the shoulder of the valve cone.



4. Lubricate seals with clean filtered water and lubricate thread with PTFE lubrication. Screw it into the port flange. Tighten with a torque of 30 Nm +/- 3 Nm.



7. How to replace the shaft seal

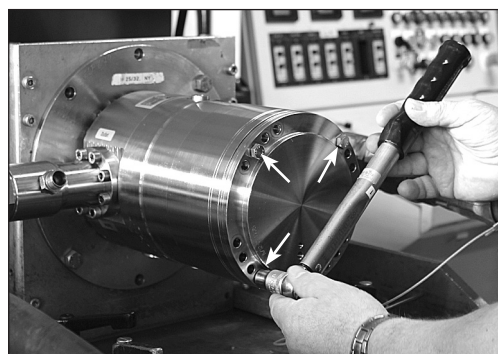
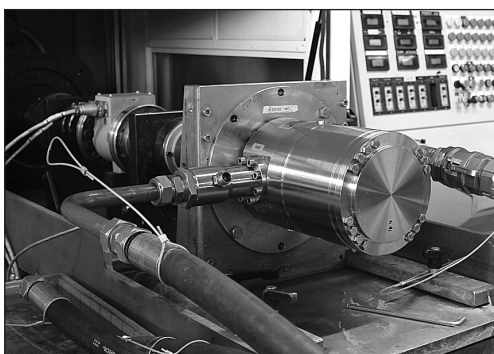
Disassembling, please see	Assembling, please see
Page 3 items 2 to 4	Page 11 item 25
Page 4 items 5 to 9	Page 12 items 26 to 31
	Page 13 items 32 to 35

8. Changing pistons
8.1 Disassembling

To understand the pump design better, please see the exploded view in item 9.

1. Disconnect the pump from the rest of the system or close inlet valve.
2. Loosen all screws on the pump except the three screws as shown in the picture below.

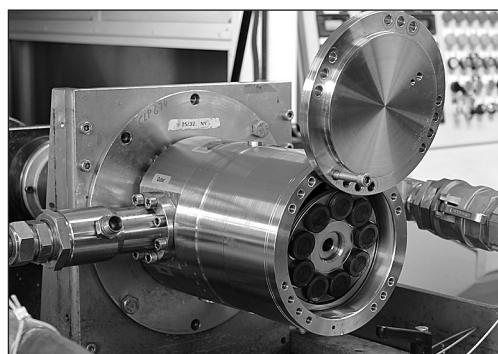
Note: There is still water inside the pump.



3. A long M8 guide bolt can be mounted in the top hole.
4. Unscrew the remaining three screws.



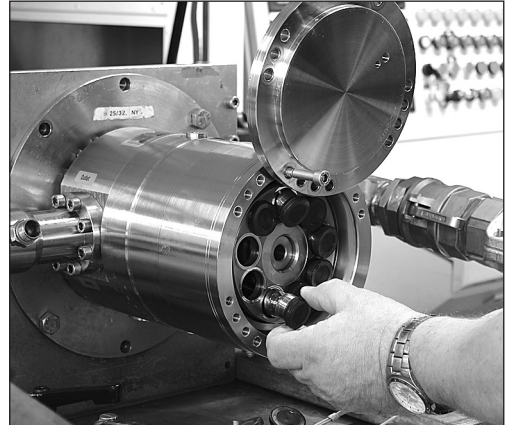
5. Remove the flange. The guide bolt must remain mounted.
6. Carefully turn the flange and push it backwards to make it rest on the housing surface. Ensure not to scratch the swash plate surface. The flange can also be removed.



7. Adjust the retaining plate to be parallel to the end flange.



8. Carefully remove the pistons one by one.



9. **WARNING:**
Ensure that the piston shoes and the piston surfaces are not damaged during removal.

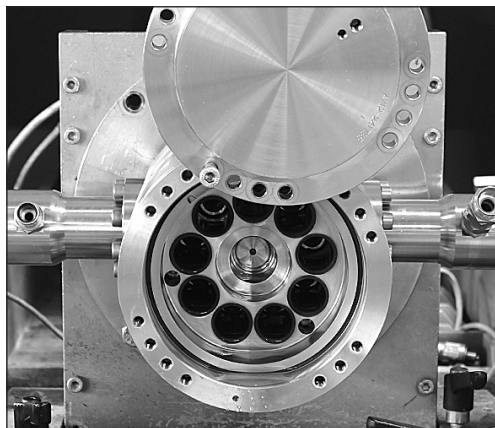
It is recommended to place the pistons upside down on an even and clean base/surface.



10. Remove retainer plate, ball, guide and spring.



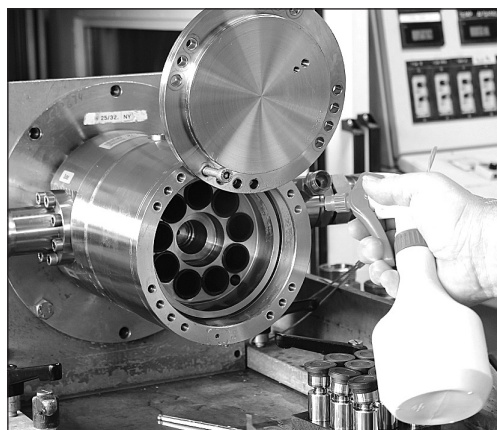
11. Inspect the piston liners.



12. Replace any worn parts.

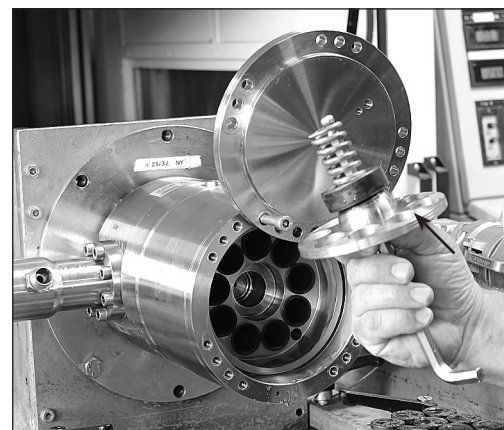
8.2 Assembling

1. Ensure liner and end of cylinder barrel are wetted.



2. Place retainer plate, ball, guide and spring on the allen key.

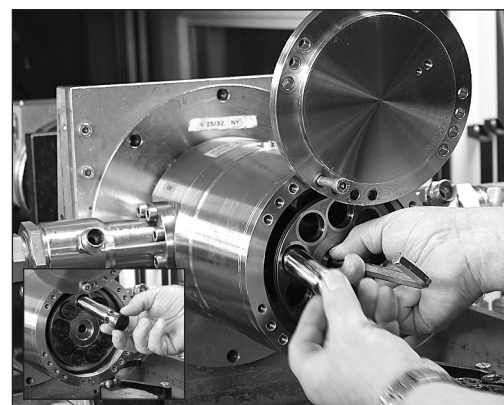
WARNING!
Ensure right assembling and side of retainer plate.



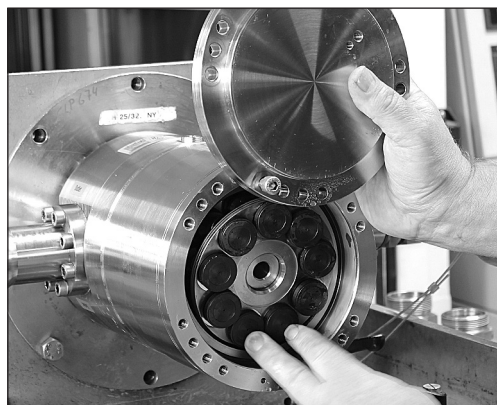
3. Carefully place all parts in the cylinder barrel.



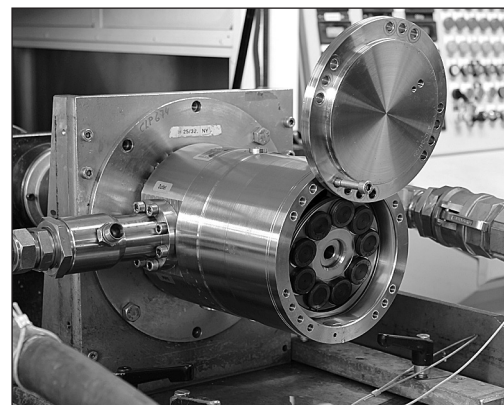
4. Insert the pistons one by one. At the same time keep the retainer plate in place with the other hand.



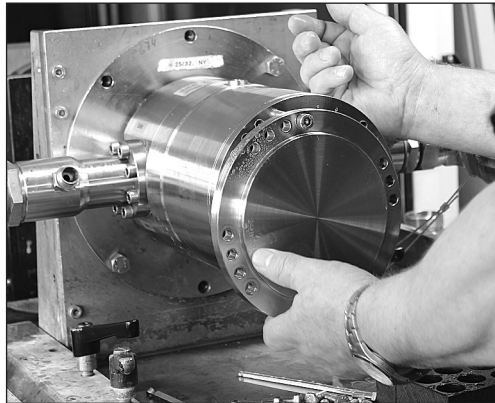
5. Place the retainer plate in an odd angle corresponding to the orientation of the swash plate.



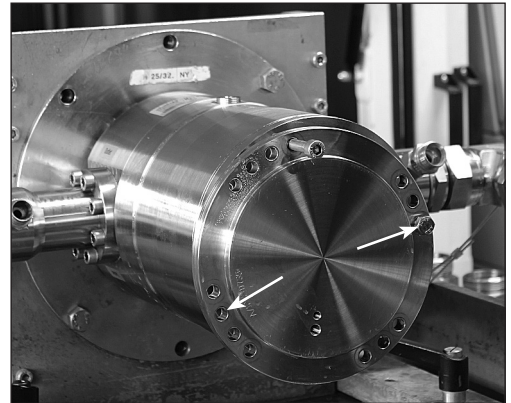
6. Tilt the flange and replace the flange O-ring.



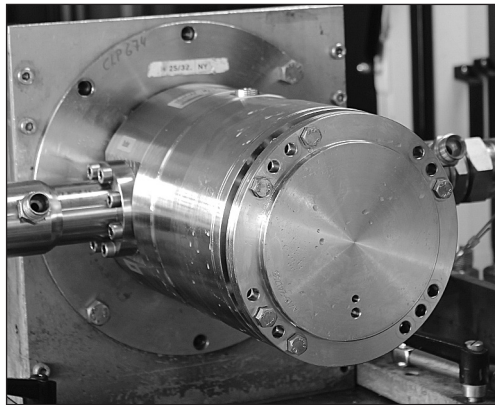
7. Turn the flange and gently push it into the housing.



8. Mount two screws as shown below and tighten them.



9. Remove the guide bolt and mount the remaining bolts.



10. Cross tighten the bolts to a torque of 30 Nm \pm 3 Nm.



11. Connect the pump to the rest of the system.

12. Bleed the pump before starting it up.

10. When should the pistons be replaced

This section provides guidance on, how to determine whether the parts of the pump are worn and should be replaced. In case of doubt - the pistons must be replaced. The pictures below are meant as a guideline for evaluating the wear of the sliding surface.

Note: If the pistons break down, the pump will suffer a disastrous breakdown.

Picture 1:
Cavitation of the piston shoes.
New inspection is required in 3,000-4,000 hours.



Picture 2:
Cavitation of the piston shoes.
All pistons must be replaced within the next 500-1,000 hours.



Picture 3:
Cavitation of the piston shoes.
All pistons must be replaced within the next 100-200 hours.



Picture 4:
Abrasive wear of the piston shoes.
All pistons must be replaced immediately.

