

## **REPAIR INSTRUCTIONS**

**FOR LEDUC TXV UP TO 120 AND DELTA PUMP SERIES**



## 2: Disassembly / Assembly:

### Disassembly process:

- 1 - Clean the pump and Mark the rear cover **4** and the housing (**Pay attention: the cover has to be reassembled in the same position**).
- 2 - Put the pump in a bench clamp and then loosen the four screws holding the LS control (Allen key 4). Look at Fig.1.
- 3 - Remove the vent tube and the lead inside a screw head located on the front cover. Fig.2.
- 4 - Loosen the four screws (Allen key 12). Look at Fig.3.
- 5 - Remove slowly the front cover. Look at Fig.4.  
**Pay attention: when you pull out the front housing to hold in the same the cylinder barrel.**



Fig.1



Fig.2.



Fig.3



Fig.4

- 6 - Put the pump on a multipurpose workbench with a hole to pass through the drive shaft end. Fig.5.
- 7 - Remove the plate and check it to ensure no mark of cavitation or scratches. Fig.6.
- 8 - Remove the retainer ring from the drive shaft and then the bearing inner ring. If the bearing inner ring cannot be removed, warm it and push out in the same time with a screwdriver. Fig.7.
- 9 - Remove the cylinder barrel equipped with the pistons and its retainer plate. Then remove swash plate. Fig.8.



Fig.5.



Fig.6.



Fig.7.



Fig.8.



- 10 - Pull out the Viton lip seal with a screwdriver. Fig.9.  
(after disassembling this seal cannot be reused).
- 11 - Remove the plastic shim between the two lip seals. Fig.10.
- 12 - Pull out the Nitrile lip seal by perforating it with a screwdriver and making lever. Fig.11.  
(after disassembling this seal cannot be reused).
- 13 - Pull out the circlips which holding the drive shaft. Fig.12. Then remove the shaft from the front housing.



Fig.9.



Fig.10.



Fig.11.



Fig.12.

- 14 - Pull out the roller bearing and the lip seal bracket from the front housing, by slightly heating the lip seal bracket and pushing them with a hydraulic press. Fig.13.

**If you have to replace drive shaft, bushing or the roller bearing, follow the disassembling procedure below:**

- 15 - Pull out the bushing for the lip seals from the drive shaft. Apply a hammer blow on the bushing to break it and pull it out easily. Fig.14.
- 16 - Pull out the internal ring of the roller bearing from the drive shaft. Use a hydraulic press to push it. Fig.15.



Fig.13.



Fig.14.

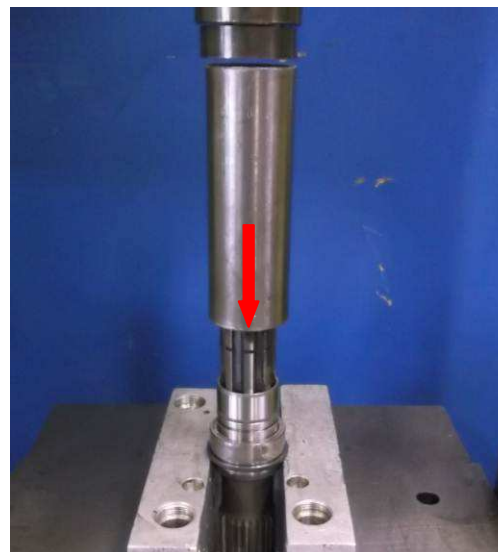


Fig.15.

## Reassembly process:

- 1 - Clean carefully all the spare parts, excluding the seals (with cleaner HAKUPUR 1025 for example). Then check carefully every spare parts.  
If you need to replace the drive shaft, roller bearing or bushing look at the page N°10.
- 2 - Install the O-ring **56** on the lip seal bracket and apply some grease on it. See Fig.1.
- 3 - Heat the front housing at 80-90°C Fig.2. and assemble first the roller bearing **30** with glue LOCTITE 630 or equivalent, then the lip seal bracket into the front housing with LOCTITE® 641 (**Pay attention of the O-ring during assembling**). See Fig.3.



Grease

Fig.1.



Fig.2.



Fig.3.



- 4 - Apply LOCTITE 641® on the drive shaft (red surface on Fig.4.). Heat the bushing **65** at 110°C and assemble it without shock.
- 5 - Put the drive shaft (splines to the top) and install the internal ring of the roller bearing **30** as Fig.5.
- 6 - Install the front cover onto the drive shaft and then mount the bearing inner ring and the bushing, as Fig.6.
- 7 - Assemble the circlips into its groove. Fig.7.  
**Pay attention: do not scratch the bushing during assembly.**



Fig.4.

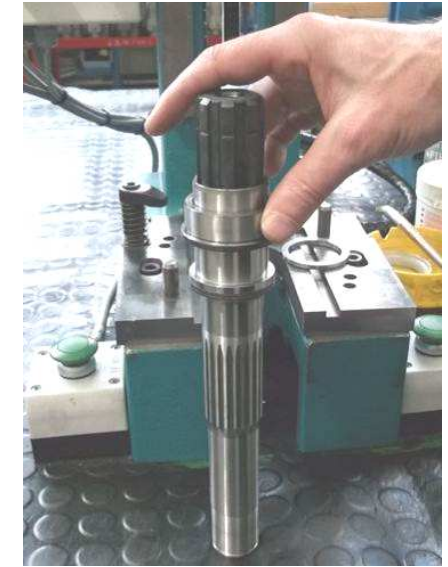


Fig.5.



Fig.6.

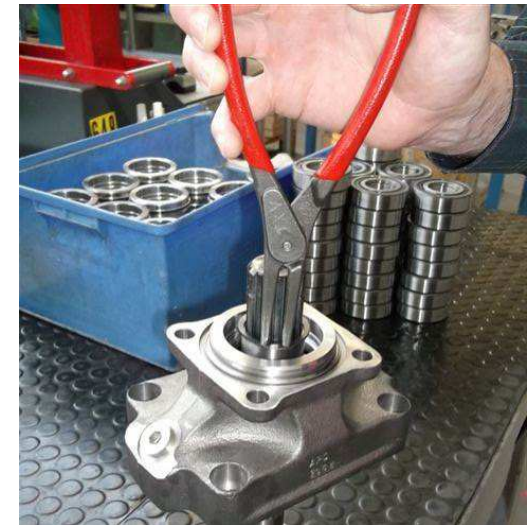


Fig.7.

- 8 - Apply grease on the lip and assemble the Nitrile lip seal **32** (spring toward inside). Fig.8.
- 9 - Assemble the plastic washer into its groove. Pay attention the open of the washer is in front of the vent hole and apply white grease on it. Fig.9.
- 10 - Apply grease on the lip and assemble the Viton lip seal **68** (spring toward outside). Fig.10.
- 11 - Assemble the bearing shells **77** onto the front housing, apply glue on the screws (LOCTITE® 270 or equivalent) and tighten at 3 Nm. Fig.11.  
**Pay attention: the extremity of the bearing shells have to be in contact.**



Fig.8.



Fig.9.



Fig.10.



Fig.11.



- 12 - Assemble the O-ring **96** with grease. Fig.12.  
**Pay attention:** the O-ring is mounted properly inside its groove.
- 13 - Apply grease or oil on the bearing shells and then install the swash plate onto the front housing with the small driver on the stop side. Fig.13.
- 14 - The cylinder barrel is equipped with the spring. Apply grease to the internal splines and then install the six pins **10** and the ball bearing. Fig.14.
- 15 - Apply oil inside the cylinder barrel bores and then assemble the pistons with the retainer plate onto the cylinder barrel, as Fig.15.

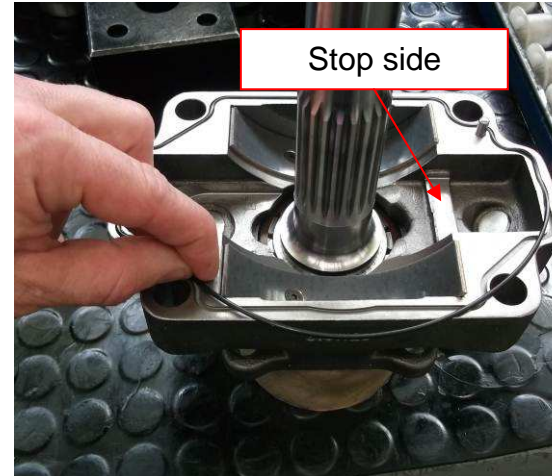


Fig.12.

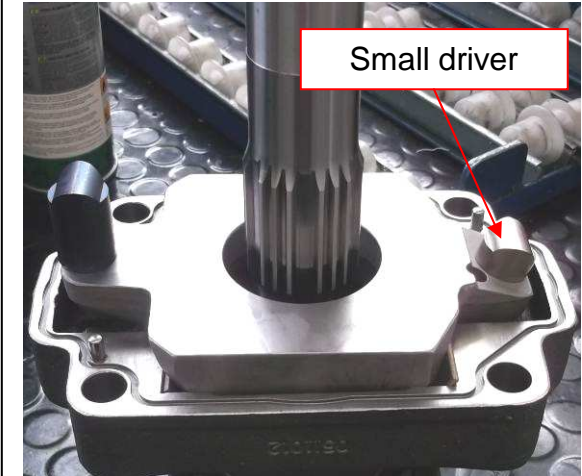


Fig.13.



Fig.14.



Fig.15.

- 16 - Apply grease on the spring guide **21** and mount the spring guide with the 2 springs **86** and **21** into the bore for the position "full flow". Fig.16.
- 17 - Screw in the plugs **85** and **105** (**85** tightened at 15 daNm and **105** tightened at 3 daNm). Fig.17.
- 18 - Apply some grease on valve plate seat inside the rear cover and install the valve plate **14** . Fig.18.  
**Pay attention: to mount the good valve plate following the good housing (CW or CCW).**
- 19 - Assemble the actuating cylinders (**7** and **25**), check if they slide properly in their bores. Fig.19.

For the TXV  $\leq 75$ cc, mount the appropriate shim **97** before mounting the actuating cylinder **7**.



Fig.16.



Fig.17.



Fig.18.



Fig.19.



- 20 - Install the cylinder barrel equipped onto the front cover. Fig.20.
- 21 - Install the needle bearing inner ring and the retainer spring. Fig.21.  
**Pay attention:** the retainer spring is mounted properly into its groove.
- 22 - Move into position the housing on the front cover with the small actuating cylinder on the big driver. Fig.22.  
**Pay attention:** Hold the 2 actuating cylinders until they come in contact with the swash plate.
- 23 - Apply some glue (LOCTITE® 2701 or equivalent) on the four screws **34**. Tighten the screws in cross with pre-torque at 6 daNm and final tightening torque at 23 daNm. Fig.23.  
**Between the pre-torque and the final tightening torque, we advise to turn the drive shaft on few turns with the appropriate rotation direction (CW or CCW according to the pump).**



Fig.20.



Fig.21.

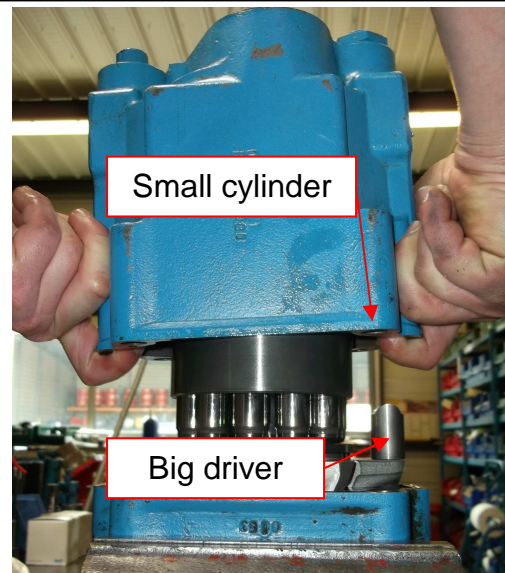


Fig.22.



Fig.23.



- 24 - Replace the 3 O-rings **26** on the LS control and apply some grease on them. Fig.24.
- 25 - Assemble the LS control onto the pump and tighten the four screws at 0,85 daNm. Fig.25.
- 26 - Install a new vent tube. Fig.26.
- 27 - Install a lead inside 1 screw head.

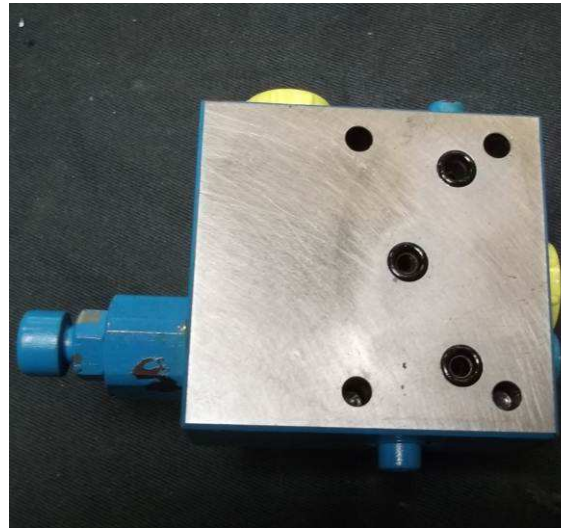


Fig.24.

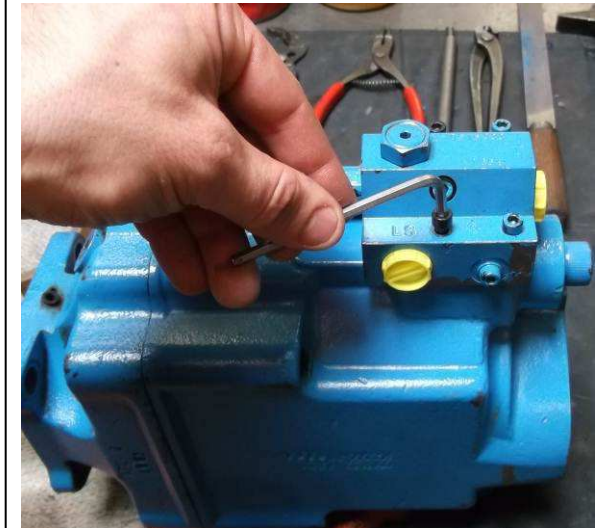


Fig.25.

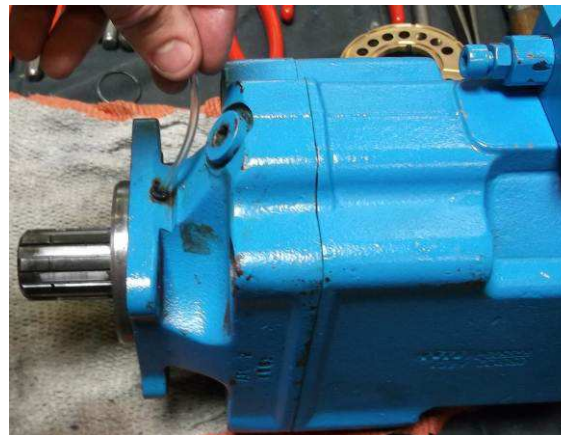


Fig.26.

## 5: Checking procedure for test stand:

- 1 - Connect the inlet and outlet line to the pump.
- 2 - Fill it the pump with hydraulic oil.
- 3 - Ensure the pump is setting for the right direction of rotation (CW or CCW).
- 4 - Run the pump at N=1500rpm, this is the speed at which we take all measurements.
- 5 - Check the stand-by pressure and set it if necessary (the stand-by pressure setting has to be between 25 and 40 bar for satisfactory operation).
- 6 - Check the cancellation pressure and set it if necessary, maximum setting pressure is:
  - 400 bar for TXV40/60/75
  - 380 bar for TXV92
  - 360 bar for TXV120
- 7 - Check the volumetric efficiency at 250 bar. It has to be superior at 95 percents.

$$(Q \text{ at } 250 \text{ bar}) / (Q \text{ at } 0 \text{ bar}) \geq 95\%$$

An example of a test stand schematic to check the pump:

