

# REPAIR INSTRUCTIONS - Model LP650

## VALVE REPLACEMENT

- 1) **Discharge Valves:** Screw out tension plugs (50). take the spring tension cap (44A) out of the exposed discharge valve with flat nose pliers. Remove the valve seat (44D), if necessary with an M12 screw (screwing it into the M12 thread).
  - 2) If the valve is extracted as a complete unit, position a screwdriver through the recess in the spring tension cap and press down on the valve plate to gently lever the valve apart.
  - 3) Check parts and replace if worn. Tighten plugs (50) at 107 ft.-lbs. (145 Nm).
  - 4) **Suction Valves:** Unscrew 8 nuts (47), remove valve casing (45) from seal sleeves (35). Using two screwdrivers, pry out seal case (42) from valve casing. Remove spring tension cap (44A) with flat nose pliers. Remove the valve seat (44D), if necessary with an M12 screw (screwing it into the M12 thread). Check parts, and replace if worn.
- NOTE:** The leakage seal (39) with its 3mm bores must be positioned on to the notched pins (35A) situated on the seal sleeve. Make sure the cutouts in the leakage seal are placed exactly over the bores of the seal sleeve (35) and that the drip return bores in the valve casing are also free, to ensure trouble-free drip return.
- 6) Secure valve casing by tightening nuts (47) evenly to 59 ft.-lbs. (80 Nm).

## SEAL AND PLUNGER REPLACEMENT

- 7) Unscrew the 8 x nuts (47), remove valve casing (45) by pulling it out to the front. Remove seal sleeves (35) from the crankcase (1) guides. Remove seal case (42), tension spring (38A) and seal parts (36-38) from seal sleeve. Check plunger surface (29B) and seals (37/37A) and remove pressure ring (36). Replace worn parts.
  - 8) After removing clipring (32) and support ring (33), check weep seal and support ring (33A/33B); replace if necessary.
  - 9) If the surface of the plunger is worn, remove tension screw (29C) and pull out the plunger (29B). Carefully clean front surface of crosshead with plunger base (25).
  - 10) Working from the pump drive side, carefully place the new plunger pipe (29B) through lubricated seals in the seal sleeve (35). Using a properly sized tool, hold the seal sleeve in place.
  - 11) Then insert seal sleeve (35) with plunger pipe (29B) into crankcase (1) guide. Turn crankshaft (22) until plunger with crosshead (25) pushes against plunger (29B). Use new copper gasket (29D) and lightly coat threads of tension screw (29C); attach to plunger base (25) and tighten to 26 ft.-lbs. (35 Nm).
- IMPORTANT!** Glue must never come between the plunger pipe (29B) and the centring sleeve (29A). Deformation of the plunger pipe due to eccentric tightening of the tension screw or dirt or damage on the front surface can cause the plunger pipe to fracture.
- IMPORTANT!** The leakage seal (39) with its  $\varnothing$ 3mm bores must be positioned onto the notched pins (35A) situated on the seal sleeve (35). Make sure the cut-outs in the leakage seal are placed exactly over the bores of the seal sleeve (35) and that the drip return bores in the valve casing (45) are also free to thus ensure trouble-free drip return.
- 12) Evenly tighten nuts (47) evenly at 59 ft.-lbs. (80 Nm) to fix the valve casing (45).

## DISASSEMBLY OF CRANKCASE

- 13) Remove valve casing (43) and plunger pipe (28B); drain oil.
  - 14) Remove gear cover (4) and bearing cover (14).
  - 15) Remove connecting rod screws (24A) and push the front of connecting rod forward as far as possible.
- IMPORTANT!** The connecting rods are marked for identification. Do not twist connecting rod halves. The connecting rods must be remounted on to the shaft journals in their exact original position.
- 16) Turning the crankshaft (22) slightly, carefully hit on side of crankshaft with a rubber mallet until crankshaft is loose.
- IMPORTANT!** Do not bend the connecting rod shanks. Check the crankshaft and connecting rod mounting surfaces as well as the shaft seal rings and roller bearings. Check crankshaft and bearing for damage, replace if needed.

## REASSEMBLY

- 17) Using a soft tool, press in the outer bearing ring (20) until the outer edge lines up with the outer edge of crankcase (1). Attach bearing cover (14) with shaft seal (15) and o-ring (16) in place. Fit crankshaft (22) through bearing hole on the opposite side. Press in bearing with bearing cover, keeping the shaft in a horizontal position and turning it slowly so that taper rollers touch the edge of outer bearing ring.
  - 18) Adjust axial bearing clearance to at least .004" (0.1mm) and maximum at .006" (0.15mm) by placing fitting discs (20A & 20B) under the bearing cover (14).
- IMPORTANT!** After assembly, the shaft should turn easily with very little clearance.
- 19) Bolt connecting rod (24) halves together making sure they are replaced in the same position from which they came from. Tighten connecting rod screws to 22 ft.-lbs. (30 Nm).