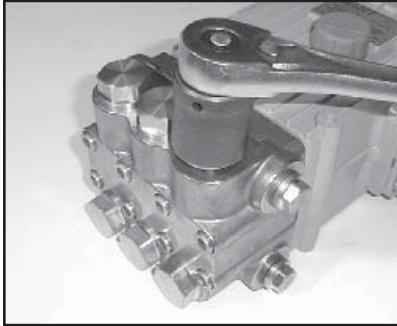
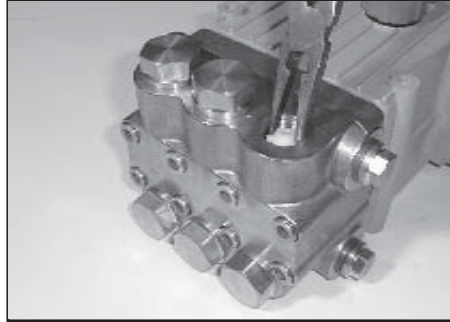


REPAIR INSTRUCTIONS - P450/P451/P452/P456

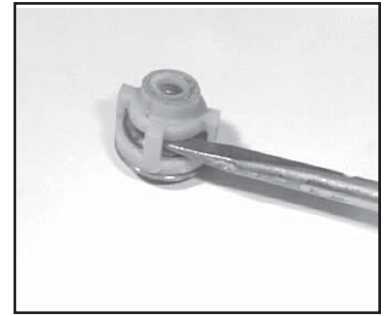
Note: Always take time to lubricate all metal and nonmetal parts with a light film of oil before reassembly. This step will ensure proper fit, at the same time protecting the pump nonmetal parts (i.e., the elastomers) from cutting and scoring.



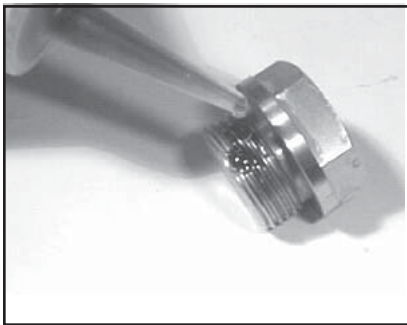
- 1) With a socket wrench, remove the three discharge valve plugs and three inlet valve plugs (32). Inspect the o-ring (33) for wear and replace if damaged.



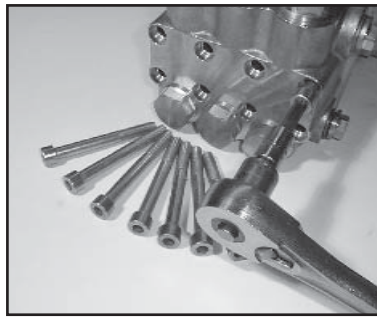
- 2) Using needle nose pliers, remove the inlet and discharge valve assemblies (27A). Note: It may become necessary to remove the valve seat (27) from the valve casing using a slidehammer.



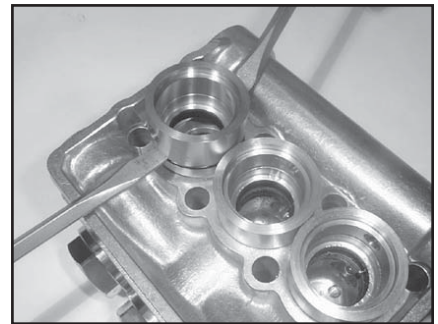
- 3) By inserting a small screwdriver between the valve seat (27) and the valve spring retainer (30), the valve assembly can be separated.



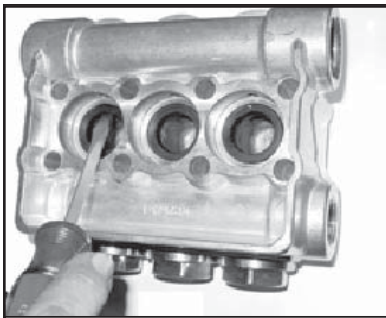
- 4) Remove the o-ring (31). Inspect all parts for wear and replace as necessary. Apply one drop of loctite 243 to the valve plugs (32) and tighten to 107 ft. lbs. (145 Nm).



- 5) Use a 8mm allen wrench to remove the 8 socket head cap screws (34). Carefully slide the valve casing (26) out over the plungers.



- 6) Remove seal adaptors (20) and weep return rings (25) from the valve casing.



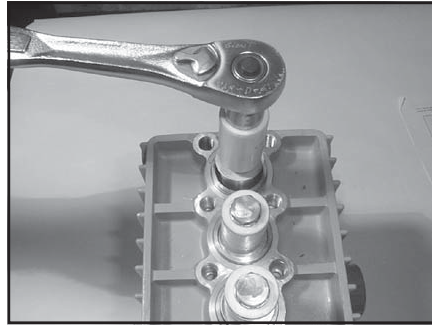
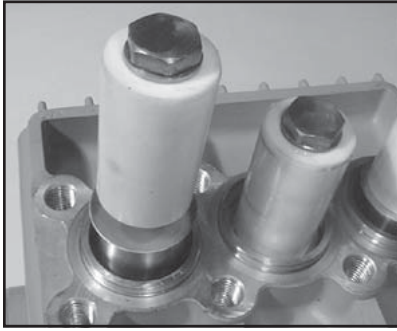
- 7) Remove the pressure rings (24) and v-sleeves (23) from the valve casing (26).



- 8) Remove the weep grooved seal (23) out of the seal adaptor (20). Check O-rings (21).

IMPORTANT! The grooved seal (23) on the high-pressure side is to be fitted carefully into the valve casing (26) using a screwdriver. Under no circumstances must the seal surface in the valve casing or the seal lip be damaged.

REPAIR INSTRUCTIONS - P450/P451/P452/P456



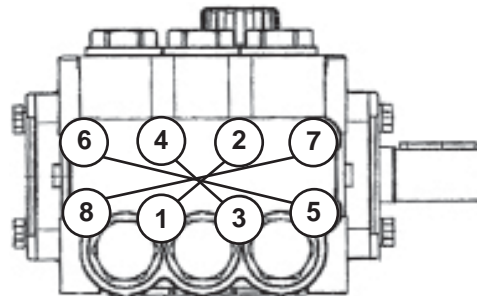
IMPORTANT! Care must be taken that glue does not get between the plunger pipe (16B) and centring sleeve (16C). The plunger pipe should not be strained by eccentric tightening of the tension screw or through damage to front surface of plunger, otherwise it is liable to fracture.

- 9) Check surfaces of plunger (16). Damaged surfaces cause accelerated seal wear. Deposits of all kinds must be removed from the plungers.

IMPORTANT! Plunger surfaces are not to be damaged. If there are lime deposits in the pump, care must be taken that the drip-return bore in parts (25) and (26) ensure trouble-free drip-return.

- 10) If the plunger pipe (16B) is worn, remove tension screw (16D) and remove along with plunger pipe (16B). Check and clean plunger surface (16A), check oil scraper (16H). Cover thread of tension screw (16D) with a thin film of Loctite and tighten carefully to 21 ft.-lbs. (28 Nm).

- 11) After installation of high pressure seals (23), place seal adaptor (20) with weep seals & pressure ring installed, weep return ring (25) and high pressure weep return ring (24) over plungers. Slide valve casing over plungers and seat firmly. Replace the 8 socket head cap screws (34) and tighten to 30 ft.-lbs. (40 Nm) in a crossing pattern (as shown to the right).



TORQUE SPECIFICATIONS - P450/P451/P452/P456

<u>Position</u>	<u>Item#</u>	<u>Description</u>	<u>U.S</u>	<u>Metric</u>
15	08390	Screw with Washer	97 in.-lbs.	11 Nm
16D	08399	Tension Screw	248 in.-lbs.	28 Nm
32	05544/08406	Plug	125 ft.-lbs.	170 Nm
34	08484	Hexagon Screw	30 ft.-lbs.	40 Nm

Gear End

If oil leaks where the plunger (16) extends from the crankcase (1), the oil seals (19) and plungers (16) must be examined and replaced if necessary. Remove oil plug (5) and drain oil; remove crankcase cover (3). Remove valve casing (26), and seal case (20). Then remove plunger pipes (16B) and oil scrapers (16H) as described above.

IMPORTANT! Before removing connecting rods be aware of their position on the crankshaft so as to return them to the same location and orientation when re-assembling.

Remove screws from connecting rods (15), separate the back connecting rod half from the crankshaft and the front connecting rod half. The connecting rod halves must be kept as pairs - do not mix them up. Push connecting rod shaft as far as possible into the crosshead guide. Remove screws (10) and pry bearing covers (7,8) off gently with a screwdriver.

Carefully remove crankshaft (13) by threading it through the connecting rods (15), making sure not to bend the connecting rods. Remove and disassemble connecting rods and plungers (16) paying close attention not to damage the plungers. Pry out oil seal (19) using a screwdriver. Examine plunger surfaces (16A) and replace if necessary.

To re-assemble, first press the oil seal (19) into the crankcase. Then insert connecting rods with plungers remembering their original location. Thread in the crankshaft (13). Replace bearing cover (7) and o-ring (9) together with the radial shaft seal (11) and roller bearing (12) and fix in place with screws (10). Replace roller bearing (12), bearing cover (8) and o-ring (9). Adjust the clearance by fitting shims (8A) under the bearing cover as required to ensure that the crankshaft (13) turns easily without play being felt. Finally, mount connecting rod halves on crankshaft matching them with other half and tighten screws (15) to 97 in-lb (11 Nm). Replace crankcase cover (3) and o-ring (4). When remounting the valve casing (26), tighten hexagon socket screws (34) to 30 ft.-lb (40 Nm).

To Move Crankshaft to Opposite Side

Remove the valve casing (26) and seal case (20). Then rotate the crankcase 180°. Interchange the oil plug ((5B) with oil dipstick (2). Rotate the crankcase cover (3) 180°. Remount the valve casing together with the seal casing and the seal adapters (20). **Make sure that the seal adapters are rotated in order that the bores face downwards.**

Contact Giant Industries for service school information.

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