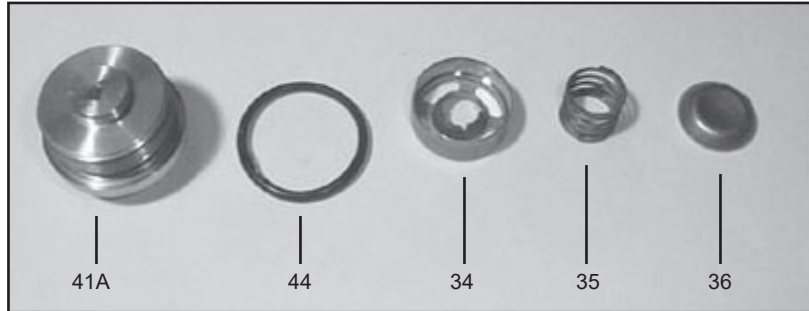


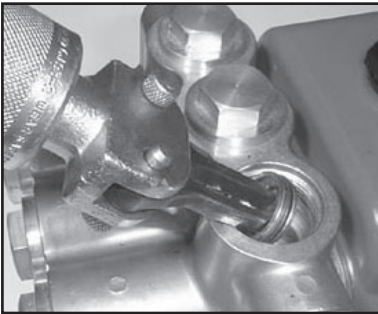
## REPAIR INSTRUCTIONS - SP100HT, SP100HTK and SP200HT PUMPS



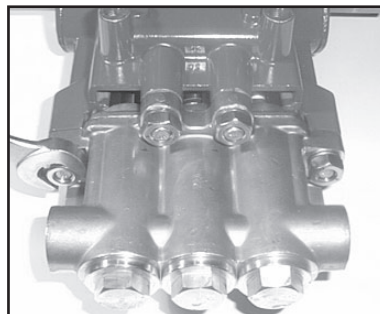
1. With a 22mm socket, remove the three discharge (43) and three inlet (41) manifold plugs.



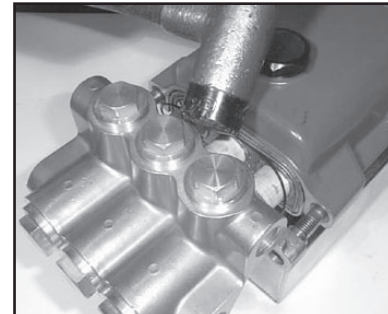
2. Check o-ring (44) for wear and replace as necessary. Remove the discharge spring retainer (34), valve spring (35), and valve plate (36).



3. Use a small slide hammer to remove valve seats (37) from manifold (29). Inspect valve plate (36) and valve seats (37) for wear. If excessive pitting is seen, replace the worn parts. Check valve seat o-ring (38) for wear and replace as necessary.



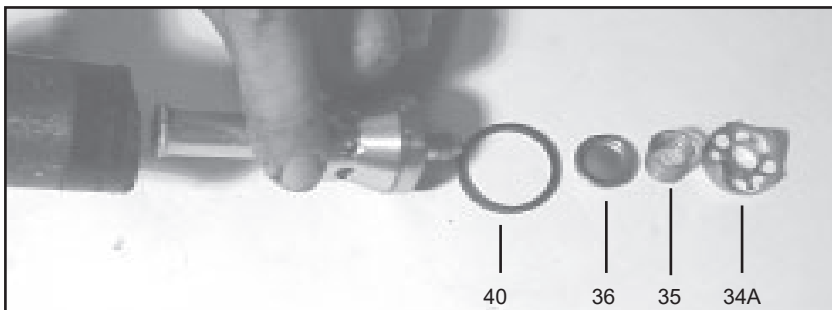
4. Drain the oil from the pump. Turn the pump over to remove the four manifold stud nuts (46) with a 19mm wrench.



5. Tap the back of the valve casing (29) with a rubber mallet.

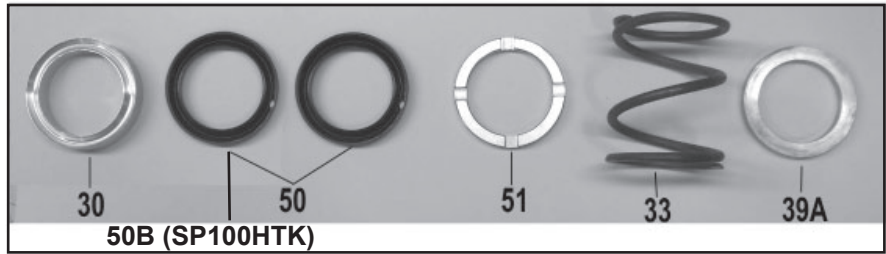
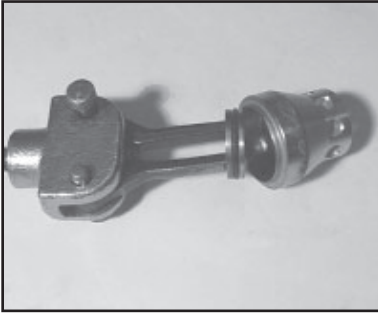


6. Remove the inlet valve retainer assembly (34A-39)



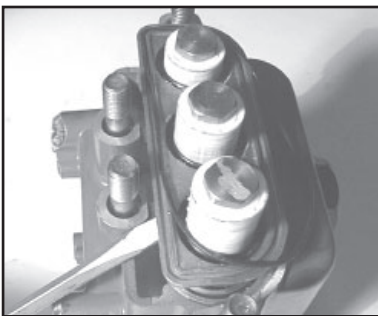
7. Remove the o-ring, (40), valve plate (36), valve spring (35), spring retainer (34A). Check valve retainer o-ring (40) for wear.

## REPAIR INSTRUCTIONS - SP100HT, SP100HTK and SP200HT PUMPS

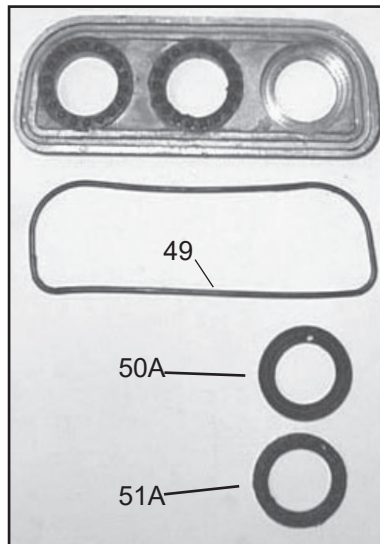


8. With a valve puller remove the valve seat (37) and o-ring (38) replace if worn. If excessive pitting is seen, replace the worn parts. Check valve seat o-ring (38) for wear and replace as necessary.

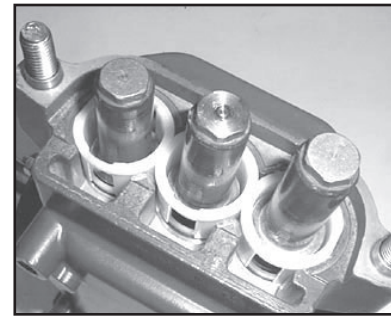
9. Remove the spacer (39A), pressure spring (33), support ring (51), sleeves (50/50B for SP100HTK only), and pressure ring (30), from the manifold (29) and check for wear.



10. With a flat headed screw-driver remove the weep return plate (48). Remove the o-ring (49) and check for wear.

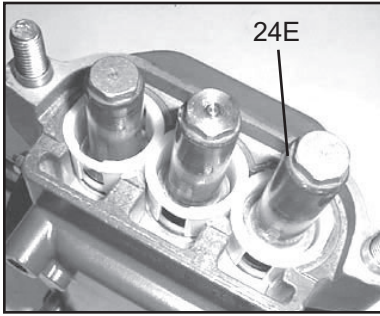


11. Inspect seals (50A), seal support ring (51A) and O-ring (49) and replace as necessary.



12. Inspect ceramic plunger (24A) tips for wear. If necessary, replacement of the ceramic plungers may be accomplished by removing the plunger bolt assemblies (24) with a 13mm wrench. Ceramic plungers should now slide off the stainless steel plunger base (22). Excessive resistance to plunger removal may be overcome by heating the stainless steel plunger base. This will melt any excess loc-tite beneath the ceramic plunger allowing easy removal.

# REPAIR INSTRUCTIONS - SP100HT, SP100HTK and SP200HT PUMPS

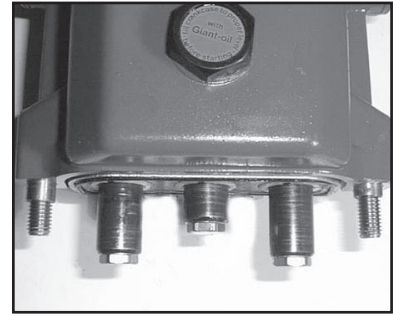


13. Replace copper ring (24E) onto plunger bolt (24B). Slide plunger bolt assembly (24) into ceramic plunger (24A). Apply a light film of loc-tite to plunger bolt threads and place plunger assembly onto stainless steel plunger base (22) and tighten to 247 in.-lbs. (28 Nm).

14. To replace plunger oil seals (26), proceed to “Gear End Disassembly” section below. Otherwise, continue as described below.

15. Before replacing pump manifold (29), first rotate crankshaft (18) until two outside plungers (24A) extend evenly forward. Next lubricate v-sleeves (50) in the rear v-sleeve housing (48) and slide housing over plungers.

**Important!** Do not use grease on the seals. Lubricate ceramic plungers with a light film of oil. Carefully and evenly slide manifold over plungers and press manifold firmly against crankcase (1). Replace manifold stud bolts (45), washers (47) and nut (46) and tighten to 59 ft.-lbs. (80 Nm).



## Gear End Disassembly

16. Remove the crankcase cover screws (9). Inspect the crankcase cover o-ring (4) for wear. Replace if necessary.

17. Inspect the dipstick (5) vent hole for signs of clogging. Clean if necessary.

18. To remove the crankshaft (18), first remove the bearing cover plates (12). Remove the key (19).

19. With a 5 mm allen wrench remove the connecting rod screws (21) and rear portion of connecting rod assemblies (20). Push the connecting rod (20) and plunger rod (22) down as far as possible into the crankcase housing.

20. Hold the pump rear assembly with a wooden fixture, or other suitable device, in order to secure it while removing the crankshaft (18). Using a plastic mallet, tap the crankshaft from one side while turning it from the other side. The turning insures that during this sequence the crankshaft does not become wedged against the front portion of the connecting rods (20). The far side bearing (15) will remain in the crankcase (1). When free, the crankshaft can be removed by hand. The opposite side crankshaft seal (14) will be removed by this procedure. **It is important that you turn the crankshaft (18) constantly while tapping from the opposite end to avoid any binding. The crankshaft bearing (15) remains on the crankshaft as it is removed.** If necessary, use a bearing puller to remove the crankshaft bearing (15).

21. Remove the front portion of the connecting rods (20) and plunger base assembly (22) from the rear of the pump by pulling straight out of the crankcase crosshead guides. **Notice that the connecting rod (20) halves are numbered or colored. Connecting rods must be positioned with their numbers or colors on the upper left-hand side, in the same numerical sequence as when they were removed.**

22. Using a dowel and a rubber mallet, tap the oil seals (26) out from the rear of crankcase (1). The area onto which the oil seal rests should be clean and dry. Put a small drop of loc-tite on the oil seals and place into crankcase with lips facing the rear of the pump.

23. To remove the crosshead pin (23) from the crosshead (22), the assembly should be positioned on a wooden fixture to avoid damage to crosshead. Drive out the pin on opposite side of mark located on the crosshead. On those pumps without mark on crosshead, drive out pin by tapping on tapered side of pin.

## REPAIR INSTRUCTIONS - SP100HT, SP100HTK and SP200HT PUMPS

24. To remove the bearing (15) remaining in the crankcase (1), insert small end of Giant bearing tool and tap with a rubber mallet until bearing and seal (14) are completely removed. **The bearing can only be removed from the inside by inserting the Giant Bearing Tool through the opposite side of the crankcase.** The crosshead guide in the crankcase should be inspected for possible damage.
25. To reassemble, place the far bearing (15) in the crankcase (1) bearing housing and with the Giant Bearing tool as a driver, tap into the crankcase using a rubber mallet.
26. Insert the far side crankshaft oil seal (14) with the Giant Bearing Tool making sure it is firmly seated and well oiled. Always make sure that the crankshaft seal lip does not show signs of wear and that the garter spring is firmly in place on the seal before reinserting into the pump. Replace the bearing cover (12) and o-ring (13) and tighten securely.
27. Replace the front portion of the connecting rod (20) and plunger rod/ crosshead assembly (22) by press-fitting the crosshead pin (23). Make sure to insert the beveled edge of the crosshead pin into crosshead. If the crosshead has a mark, install pin from marked side. **The crosshead pin (23) should not extend beyond either side of the crosshead (22) in order to prevent damage to the crosshead bore of the crankcase (1).**
28. Place each crosshead/ plunger assembly into the pump making sure that all of the parts are well oiled before insertion into the crankcase (1). **Notice that the connecting rod (20) halves are numbered or colored. Connecting rods must be positioned with their numbers or colors on the upper left-hand side, in the same numerical sequence as when they were removed.**
29. Replace near side bearing (15) on crankshaft by using the Giant Bearing Tool and mallet to tap into place. Take the crankshaft (18) end with the bearing (15) and insert the other end through the bearing housing and tap with a rubber mallet until the bearing is seated.
30. When reassembling the connecting rods (20), note that the connecting rod halves are numbered or colored and that the numbers or colors must be matched and aligned. Torque the connecting rod bolts to 106 in.-lbs. (12 Nm).
31. Insert the near side crankshaft oil seal (14) with the Giant Bearing Tool making sure it is firmly seated and well oiled. Replace the bearing cover (12) and o-ring (13) and tighten securely.  
  
**See instructions above for re-installing fluid end onto the gear end.**
32. Fill the pump crankcase (1) with 24 oz. (710 mL) of Giant Industries' oil and check the oil level with the dip-stick (5). Proper level is center of two lines. Reinstall the pump into your system.

**NOTE: Contact Giant Industries for Service School Information. Phone: (419)-531-4600**