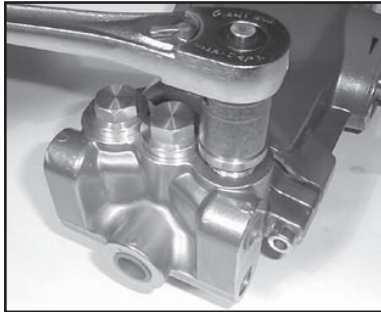


## REPAIR INSTRUCTION - P59W-0021 PUMPS

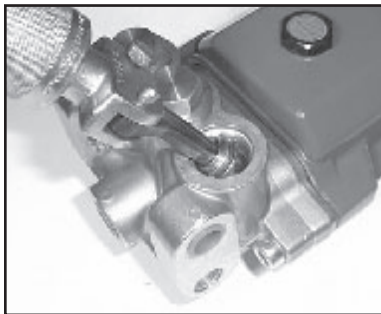
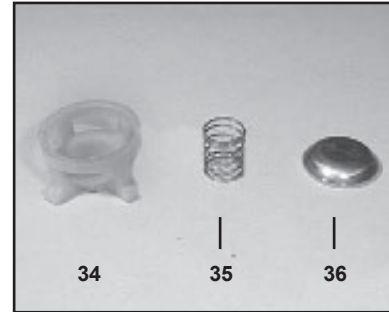
**NOTE:** Always take time to lubricate all metal and nonmetal parts with a light film of oil before reassembly. This step will ensure proper fit, at the same time protecting the pump nonmetal parts (i.e., the elastomers) from cutting and scoring.



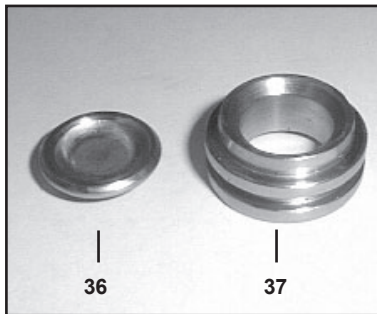
1. With a 22mm socket, remove the three discharge valve plugs (43) from the top of the manifold.



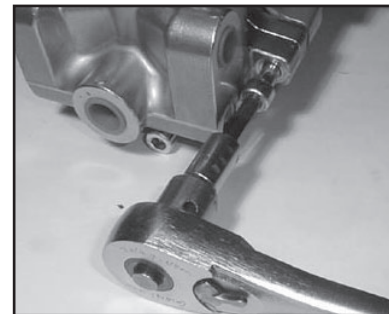
2. With a pair of needle nose pliers, remove the discharge valve cage (34), spring (35) and plate (36).



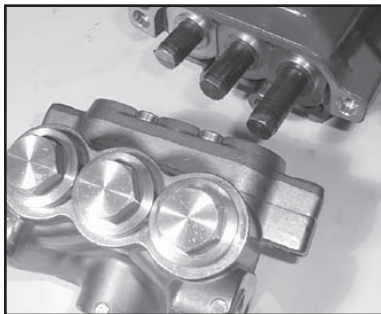
3. Use a slide hammer with a finger attachment to remove the valve seats (37).



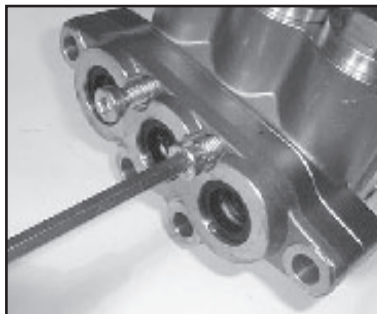
4. Inspect the valve seat (37) and valve plate (36) for signs of wear or cavitation and replace as necessary.



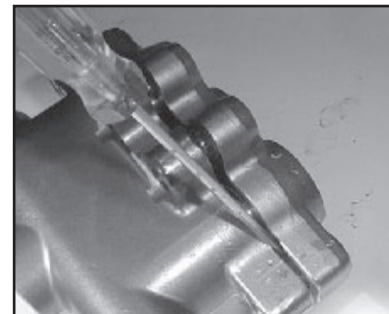
5. Using a 8mm allen wrench, remove the inner hexagon screws (45).



6. With a rubber mallet tap the back of the valve casing (29) and pull the valve casing (29) off the plungers (24A).



7. Using a 6mm allen wrench, remove the two inner hexagon screws (46).

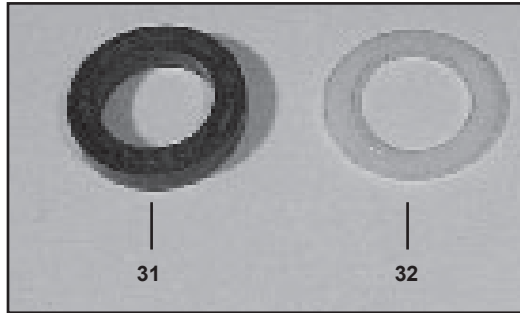


8. Separate the intermediate casing (48) from the valve casing (29)

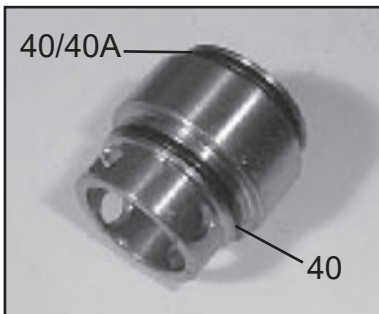
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9. Remove and inspect the weep seal (50) and replace if necessary.



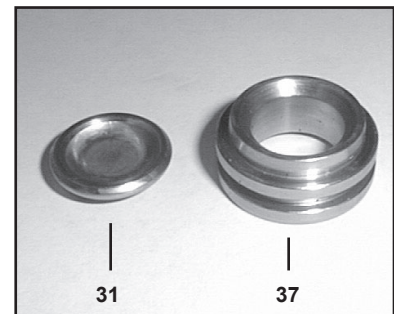
10. Remove and inspect the high pressure seal (31), pressure ring (32). Replace if needed.



11. Remove the seal case (39) from the valve casing (29) and inspect both o-rings (40 and/or 40A) for wear.



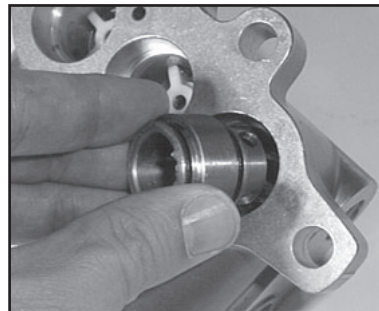
12. Using a needle nose pliers, remove the valve cage (34), spring (35) and valve plate (36) from the valve casing (29). Using a slide hammer with finger attachments, remove the valve seat (37) from the valve casing.



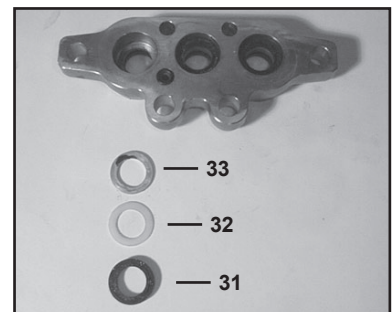
13. Inspect the valve seat (37) and valve plate (36) for wear and cavitation. Replace as needed.



14. Install the inlet valve assembly (34-38) back into the valve casing.



15. Install the seal case (39) with O-rings (40 and/or 40A) into the valve casing (29).



16. Install the high pressure seal (31) and pressure ring (32) into the intermediate casing (48).

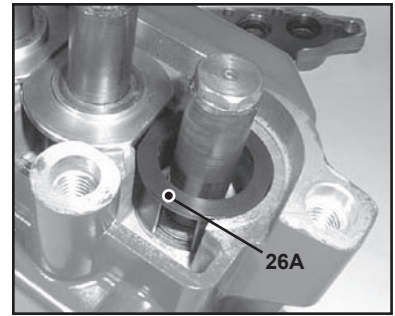
## REPAIR INSTRUCTION - P59W-0021 PUMPS



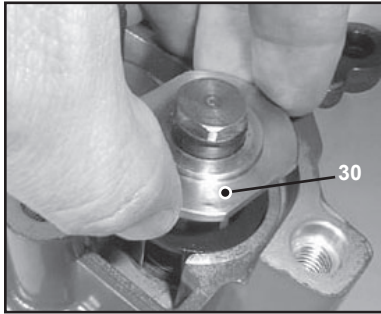
17. Lubricate the weep seal (50) and install into the intermediate casing (48).

18. If plunger pipe (24A) is damaged, remove tension screw (24B) and take pipe off. Thoroughly clean contact surfaces of plunger pipe (24A) and plunger base (22). Coat thread of tension screw (24B) with a thin layer of loctite. Assemble plunger pipe (24A) on to plunger base (22). Replace copper washer (24C) and tighten tension screw to 200 in-lbs (22.5 NM).

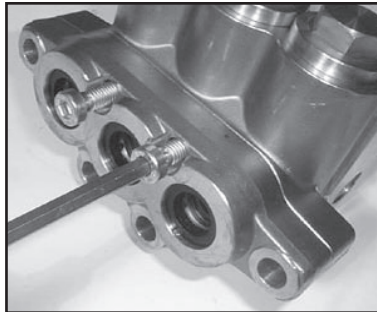
**IMPORTANT:** It is important that no glue gets between the plunger base (22) and plunger pipe (24A). Do not overtighten as damage to the plunger pipe (24A) will occur.



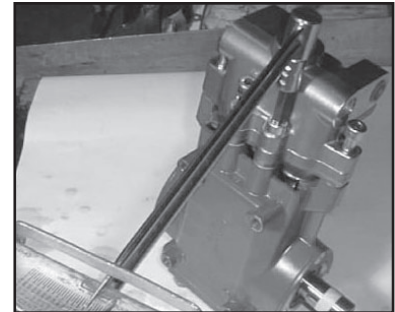
19. Replace the three spacer sleeves (26A) over the plunger with the flanged side toward the valve casing (29).



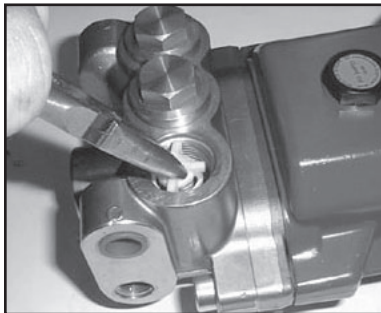
20. Install the pressure rings (30) over the plungers. Make sure that the O-ring (49) is in place.



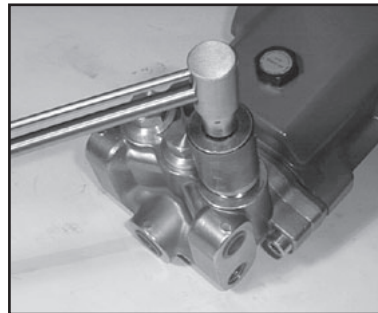
21. Secure the intermediate casing (48) to the valve casing (29) with the inner hexagon screws (46). Torque the screws to 107 in-lbs (12 NM).



22. Place the valve casing (29) over the plungers. Secure the valve casing with the inner hexagon screws (45). Torque the screws to 33 ft.-lbs (45 NM).



23. Install the three discharge valve assemblies with O-rings (34 - 38).



24. Replace the discharge plugs (43) and torque to 52 ft.-lbs (70 NM).

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### Maintenance of the Gear End

24. With the valve casing (29) and intermediate casing (48) off the pump, remove the crankcase cover screws (9). Inspect the crankcase cover (3) and its o-ring(4) for wear. Replace as necessary.
25. Inspect the dipstick (5) vent hole for signs of clogging. Clean as necessary.
26. To remove the crankshaft (18), first remove the bearing cover plates (12). Remove the key (19).
27. Remove the connecting rod caps (20) with a 5 mm allen wrench and push the front half of the connecting rod (20) and plunger rod assembly (22) forward as far as possible into the crankcase (1) housing.
28. 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. This turning ensures that during this sequence the crankshaft does not become wedged against 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 far side crankshaft seal (14) will be removed by this procedure.
29. If necessary, use a bearing puller to remove the crankshaft bearing (15).
30. Remove the connecting rod and plunger rod/crosshead assembly from the rear of the pump by pulling straight out of the crosshead guides.  
**IMPORTANT:** Connecting rods are marked for identification. Do not twist conn-rod halves. Each conn-rod is to be re-instated in the same position on the crankshaft journal.
31. Using a dowel and rubber mallet, tap the oil seals (26) out from the rear of the crankcase (1).
32. To remove the crosshead pin (23) from the crosshead (22), place the assembly on a wooden fixture to avoid damage to the crosshead. Drive out the pin on the opposite side of the mark on the crosshead. On those pumps without a mark on the crosshead, drive out the pin by tapping out the tapered side of the pin.
33. To remove the bearing (15) remaining in the crankcase (1), insert the small end of a bearing tool and tap with a rubber mallet until the bearing and seal (14) are completely removed. The bearing can only be removed from the inside by inserting a bearing tool through the opposite side of the crankcase. The crosshead guide in the crankcase should be inspected for possible damage.
34. To reassemble, place the far bearing (15) in the crankcase bearing housing. With the bearing tool as a driver, tap into the crankcase using a rubber mallet.
35. Before reinserting into the pump, make sure that the crankshaft seal (14) lip does not show signs of wear and that the garter spring is firmly in place on the seal. With the bearing tool, insert the far side seal. Make sure the seal is firmly seated and well oiled. Replace the bearing cover (12) and tighten securely.
36. Replace the connecting rod (20) and plunger rod / crosshead assembly 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 should not extend beyond either side of the crosshead in order to prevent damage to the crosshead bore of the crankcase.
37. Generously lubricate (with oil) the crosshead / plunger assembly into the crankcase. Notice that the connecting rod halves are numbered or colored. Position the connecting rods with their numbers or colors on the upper left-hand side, in the same numerical sequence in which they were removed.

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38. Replace near side bearing (15) on crankshaft (18) by using a bearing tool and mallet to tap into place. Attention must be paid during repair work that the outer bearing ring (15) is placed firmly against the bearing cover (12) on one side. On the opposite side, a correct amount of shims (15A & 15B) are to be inserted between the outer bearing cover (12) and bearing (15) so that the shaft can turn easily with very little clearance.
39. Take the crankshaft end with the bearing and insert the other end through the bearing housing and tap with a rubber mallet until the bearing is seated.
40. When reassembling the connecting rod (20) halves, 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 150 in-lbs (17 NM).
41. Before installation, apply a small amount of locktite to the O.D. of the crankcase oil seal (26). The oil seal should be installed so that the grooved side of the seal will face the crankcase (1). Tap seal in place using a socket and rubber mallet.
42. Lubricate the weep seal (50) and install into the intermediate casing (48).
43. Replace the three spacer sleeves (26A) over the plunger with the flanged side toward the valve casing (29).
44. Install the pressure rings (30) over the plungers. Make sure that the o-ring (49) is in place.
45. Again lubricate the plungers. Reinstall the intermediate casing (48) and valve casing (29) over the plungers with inner hexagon screws (46). Torque the screws to 107 in-lbs (12 NM).
46. Clean the back edge of crankcase (1) and replace the crankcase cover (3). Be careful not to pinch the crankcase cover o-ring (4).
47. Fill the crankcase (1) with 12.5 oz. of Giant oil. Check the oil level with the dipstick (5). The oil level should be between the two lines.

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