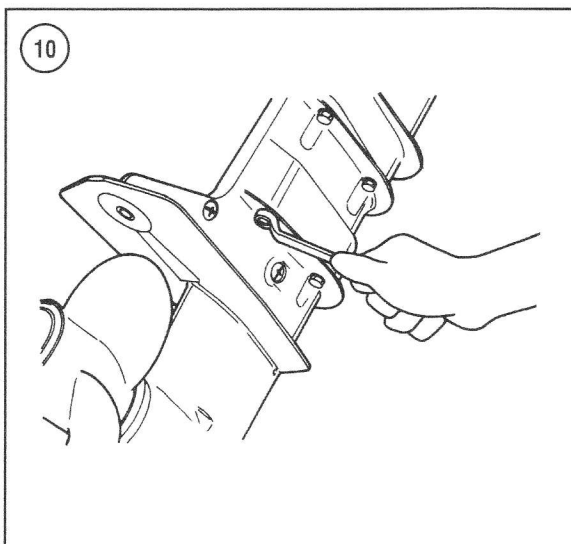
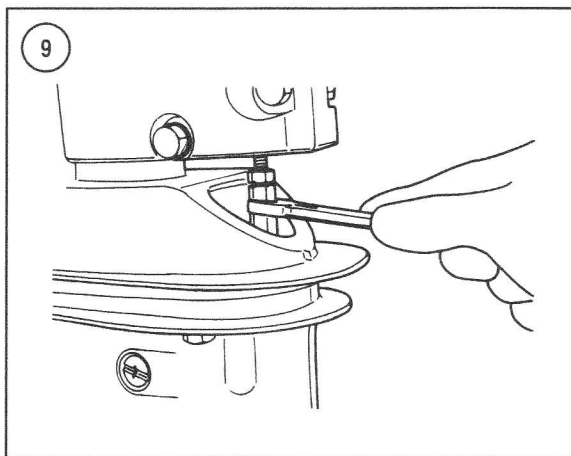
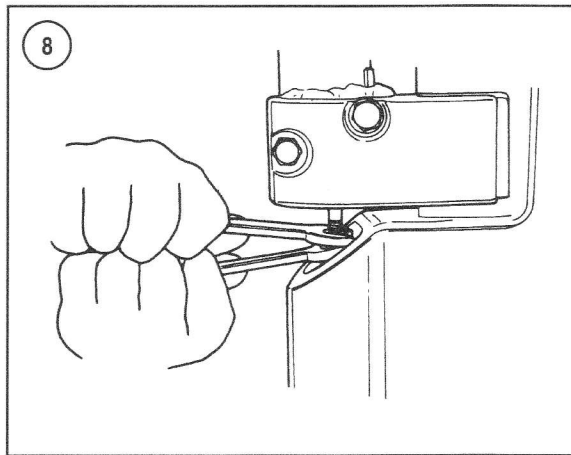


**CAUTION**

Work carefully when installing the upper end of the drive shaft into the crankshaft. The lower seal on the crankshaft may be dislodged or damaged by the drive shaft. Never force the drive shaft into the crankshaft. Rotate the drive shaft clockwise as viewed from the top to align the drive shaft and crankshaft splines.

NOTE

Use caution if using a pry bar to separate the gearcase from the drive shaft housing. Ensure all fasteners are removed before attempting to pry the gearcase from the drive shaft housing. Use a blunt tip pry bar and locate a pry point near the front and rear mating surfaces. Apply moderate heat to the gearcase and drive shaft housing mating surfaces if corrosion prevents easy removal.

Removal (DF9,9-DF50 models)

Four bolts retain the gearcase to the drive shaft housing. Six bolts are used on DF25, DF30, DF40 and DF50 models.

1. Remove the propeller as described in this chapter. Place the shift selector into neutral gear.
2. Locate the shift shaft connector on the forward side of the drive shaft housing. Mark the connector position on the threaded portion of the upper and lower shift shafts. This step saves a great deal of time when adjusting the shift linkage.
3. Using a wrench, hold the lower connector (**Figure 8**) and loosen the locknut above the connector.
4. Rotate the lower shift shaft connector (**Figure 9**) and disconnect it from the upper shift shaft.
5. Support the gearcase and remove the bolts that attach the gearcase to the drive shaft housing (**Figure 10**).
6. Carefully pull or pry the gearcase from the drive shaft housing.

CAUTION

Never rotate the propeller shaft to align the drive shaft to the crankshaft. The water pump impeller can suffer damage that leads to engine overheating.

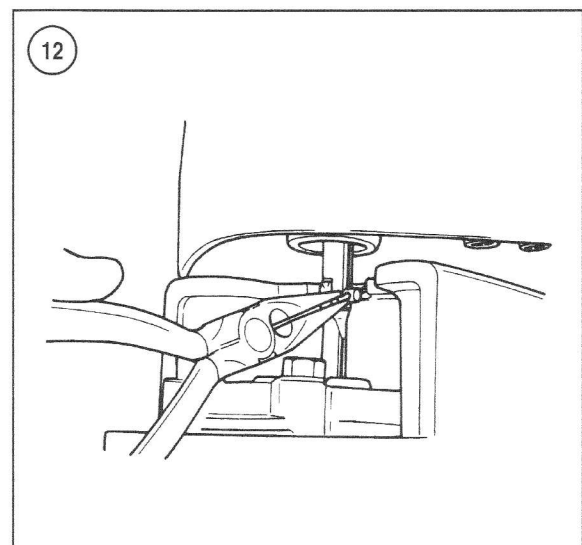
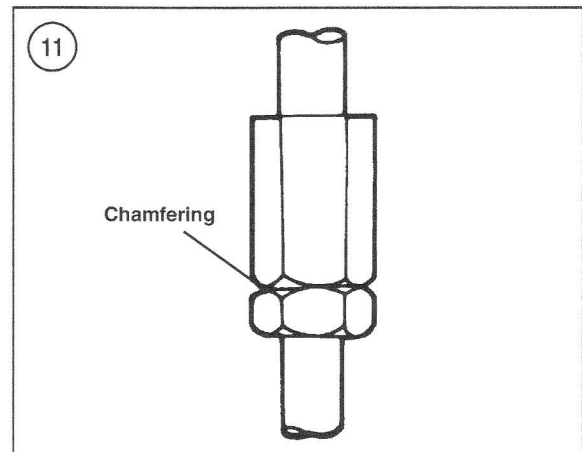
Installation**(DF9.9-DF50 models)**

1. Apply a thin coat of Suzuki silicone seal (part No. 99000-31120) to the mating surfaces of the gearcase and drive shaft housing.
2. Apply Suzuki water-resistant grease (part No. 99000-25160) to the water tube sealing grommet on the water pump body.
3. Place the shift selector on the engine in the neutral position.
4. Apply Suzuki silicone seal (part No. 99000-31120) to the threaded section of the gearcase mounting bolts.
5. Carefully slide the drive shaft into its opening in the drive shaft housing. Keep the gearcase and drive shaft housing mating surfaces parallel and align the mounting bolt holes in the gearcase with their respective holes in the drive shaft housing. Also note the following:
 - a. Ensure the water tube in the drive shaft housing aligns with the water tube sealing grommet on the water pump.
 - b. Align the lower shift shaft and the upper shift shaft while installing the gearcase. Do not thread the connector onto the shift shafts at this time.
6. The gearcase mates to the drive shaft housing if the drive shaft and crankshaft splines align. If the housings do not mate, lower the gearcase slightly. Rotate the drive shaft clockwise, as viewed from the top, until the drive shaft splines engage the crankshaft splines. When properly aligned, the gearcase slips into position.
7. Hold the gearcase in position and thread the mounting bolts into the gearcase and drive shaft housing. Tighten the bolts to the specification in **Table 1**.
8. Thread the connector onto the lower shift shaft until the reference marks align.
9. Thread the locknut upward until it contacts the connector. Ensure the chamfered side of the locknut faces the chamfered side of the connector (**Figure 11**).
10. Refer to Chapter Five to adjust the shift linkage. Refer to Chapter Four on filling the gearcase with the required lubricant. Check for proper cooling system operation *immediately* after starting the engine.

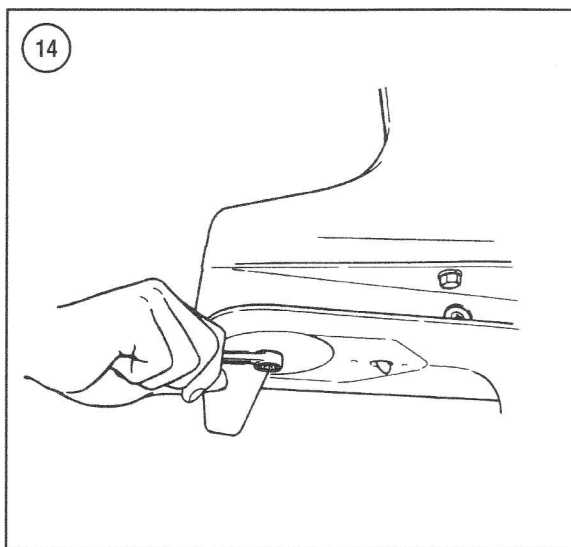
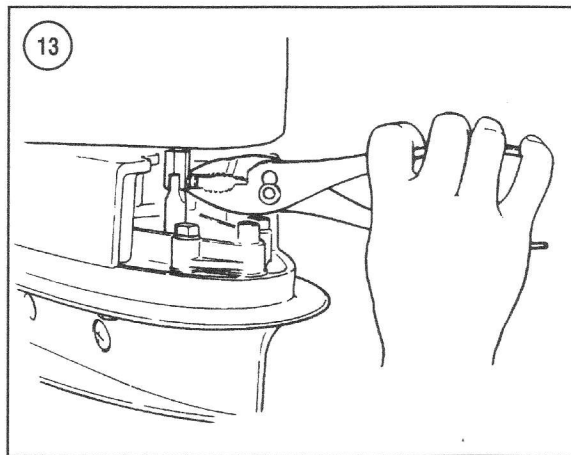
Removal**(DF60 and DF70 models)**

Seven bolts retain the gearcase to the drive shaft housing. One bolt is located within the trim tab mounting cavity.

1. Remove the propeller as described in this chapter. Place the shift selector into neutral gear.



2. Locate the shift shaft connector on the forward side of the drive shaft housing. Use needle nose pliers to remove the cotter pin from the connector (**Figure 12**). Pull the connector from the upper and lower shift shaft (**Figure 13**).
3. Use a felt tip marker and mark the trim tab position relative to the gearcase. Remove the bolt (**Figure 14**) and trim tab from the gearcase. Locate the gearcase mounting bolt within the trim tab mounting cavity.
4. Support the gearcase and remove the seven bolts that attach the gearcase to the drive shaft housing (**Figure 10**).
5. Carefully tug or pry the gearcase loose from the drive shaft housing. Lower the gearcase enough to cut the plastic locking type clamp, and remove the speedometer hose from its fitting on the gearcase. Lower the gearcase from the drive shaft housing.



Installation (DF60 and DF70 models)

1. Apply a thin coat of Suzuki silicone seal (part No. 99000-31120) to the mating surfaces of the gearcase and drive shaft housing.
2. Apply Suzuki water-resistant grease (part No. 99000-25160) to the water tube sealing grommet on the water pump body.
3. Place the shift selector on the engine in the neutral position.
4. Apply Suzuki silicone seal (part No. 99000-31120) to the threaded section of the gearcase mounting bolts.
5. Carefully slide the drive shaft into its opening in the drive shaft housing. Keep the gearcase and drive shaft

housing mating surfaces parallel and align the mounting bolt holes in the gearcase with their respective holes in the drive shaft housing. Also note the following:

- a. Ensure the water tube in the drive shaft housing aligns with the water tube sealing grommet on the water pump.
 - b. Align the lower shift shaft and the upper shift shaft while installing the gearcase. Do not install the connector pin at this time.
 - c. Slide the speedometer hose onto the gearcase fitting and secure with a plastic locking type clamp.
6. The gearcase mates to the drive shaft housing if the drive shaft and crankshaft splines align. If the housings do not mate, lower the gearcase slightly. Rotate the drive shaft clockwise, as viewed from the top, until the drive shaft splines engage the crankshaft splines. When properly aligned, the gearcase slips into position.
 7. Hold the gearcase in position and thread the mounting bolts into the gearcase and drive shaft housing. Tighten the bolts to the specification in **Table 1**.
 8. Install the connector pin into its openings in the upper and lower shift shaft. Install a new cotter pin into the hole in the connector pin. Bend over the ends of the cotter pin.
 9. Align the marks and install the trim tab to the gearcase. Install and securely tighten the trim tab bolt.
 10. Refer to Chapter Five to adjust the shift linkage. Refer to Chapter Four on filling the gearcase with the required lubricant. Check for proper cooling system operation *immediately* after starting the engine.

9

Water Pump Service

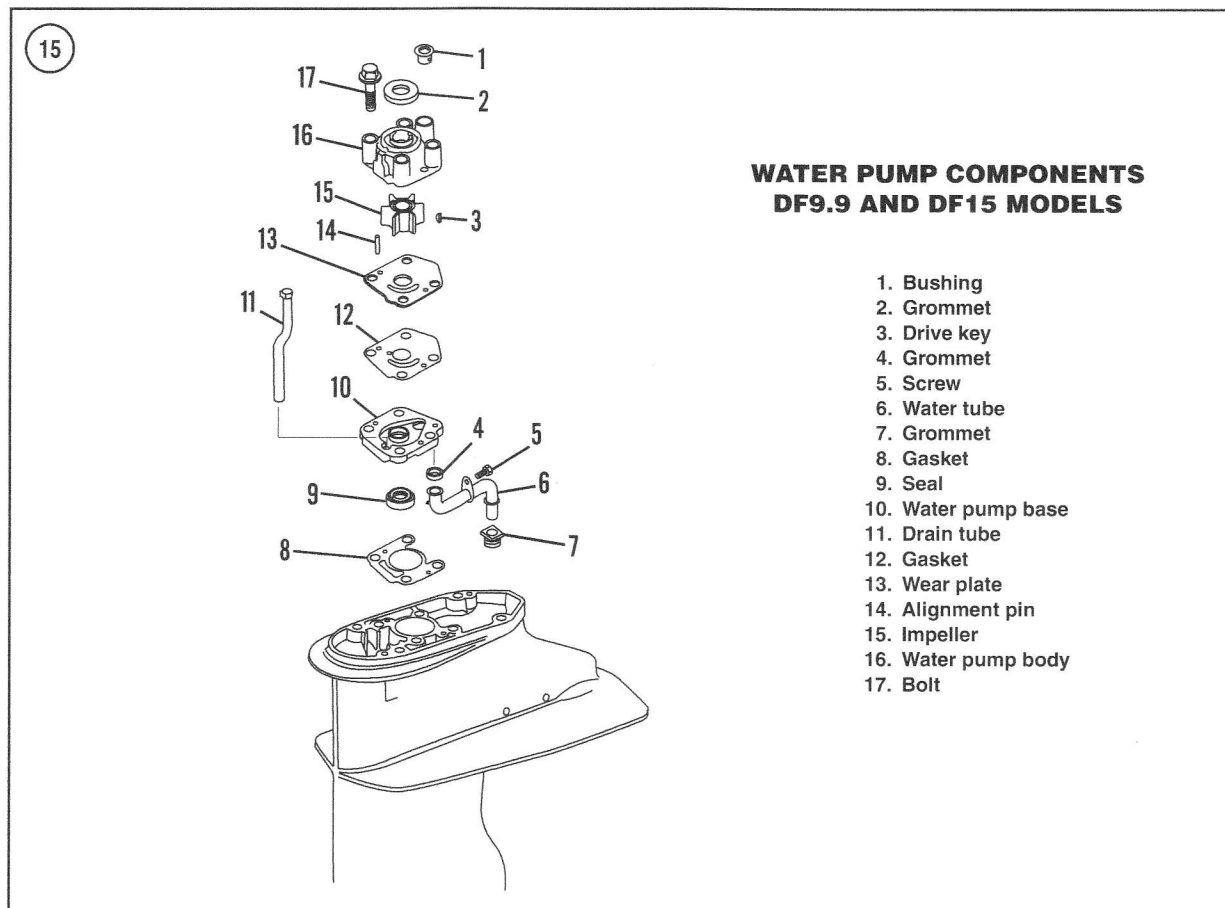
This section provides water pump disassembly and assembly instructions. See *Water Pump Inspection* for further procedures.

Replace the impeller, seals, O-rings and gaskets anytime the water pump is serviced. Never use questionable parts. Doing so may compromise the reliability of this vital component. Water pump components are inexpensive compared to damage caused from their failure. Refer to the instructions for the selected model.

DF9.9 and DF15 models

Refer to **Figure 15**.

1. Refer to *Gearcase* in this chapter and remove the gearcase from the engine.
2. Carefully pry the bushing (1, **Figure 15**) and sealing grommet (2) from the water pump body (16).
3. Remove the four bolts from the water pump body (**Figure 16**). Carefully pry the water pump body free from the



water pump base (10, **Figure 15**). Slip the body over the drive shaft and remove it from the gearcase (**Figure 17**).

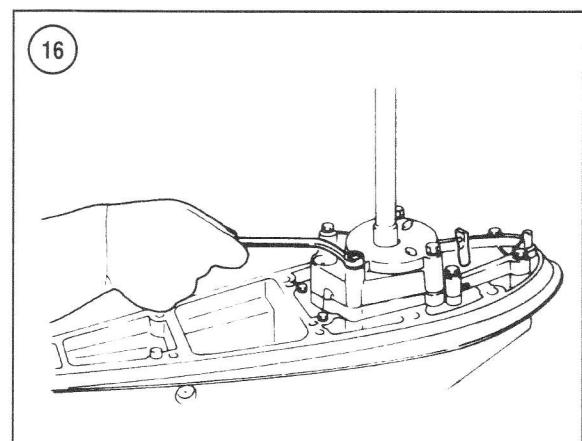
4A. If the impeller remains in the water pump body (**Figure 18**), pry it out with a blunt tip pry bar.

4B. If the impeller remains on the drive shaft, gently pry it up with a blunt tip pry bar. Lift the impeller up and over the drive shaft (**Figure 19**).

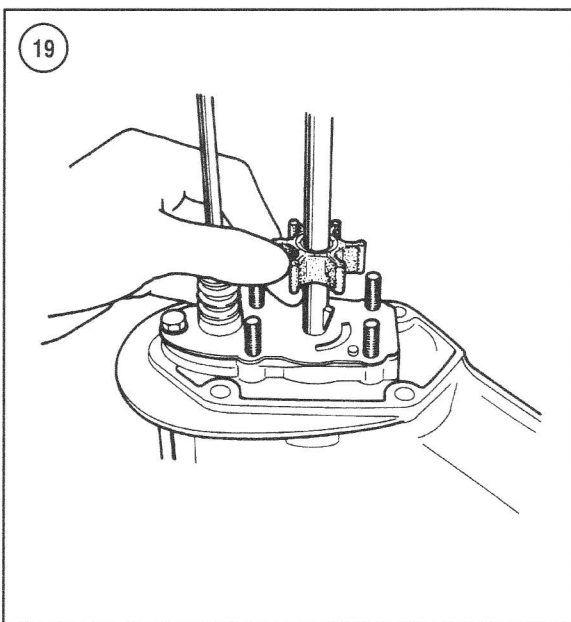
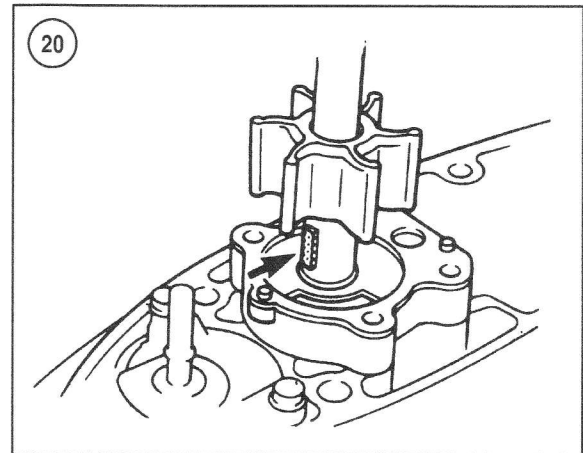
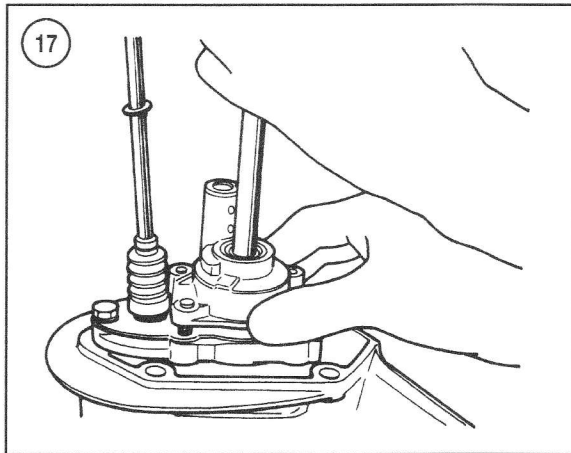
5. Remove the drive key (**Figure 20**) from the drive shaft. Use an aerosol parts cleaner to thoroughly clean the exposed section of the drive shaft. Remove the gasket and wear plate (12 and 13, **Figure 15**) from the water pump base.

6. Remove the water pump base if it must be removed for further gearcase disassembly or seal replacement as follows:

- a. Use two pry bars to carefully pry the water pump base (10, **Figure 15**) from the gearcase. Remove the gasket (8, **Figure 15**). Remove the alignment pin (14, **Figure 15**) from the base.



- b. Remove the screw (5, **Figure 15**) and lift the water tube and grommets from the gearcase.
- c. Note the direction of the seal lip (9, **Figure 15**) relative to the water pump base. Use a blunt tip pry bar



to carefully pry the seal from the base. Do not allow the pry bar tip to contact the seal bore.

- d. Clean the water pump base, tube and grommets in solvent.

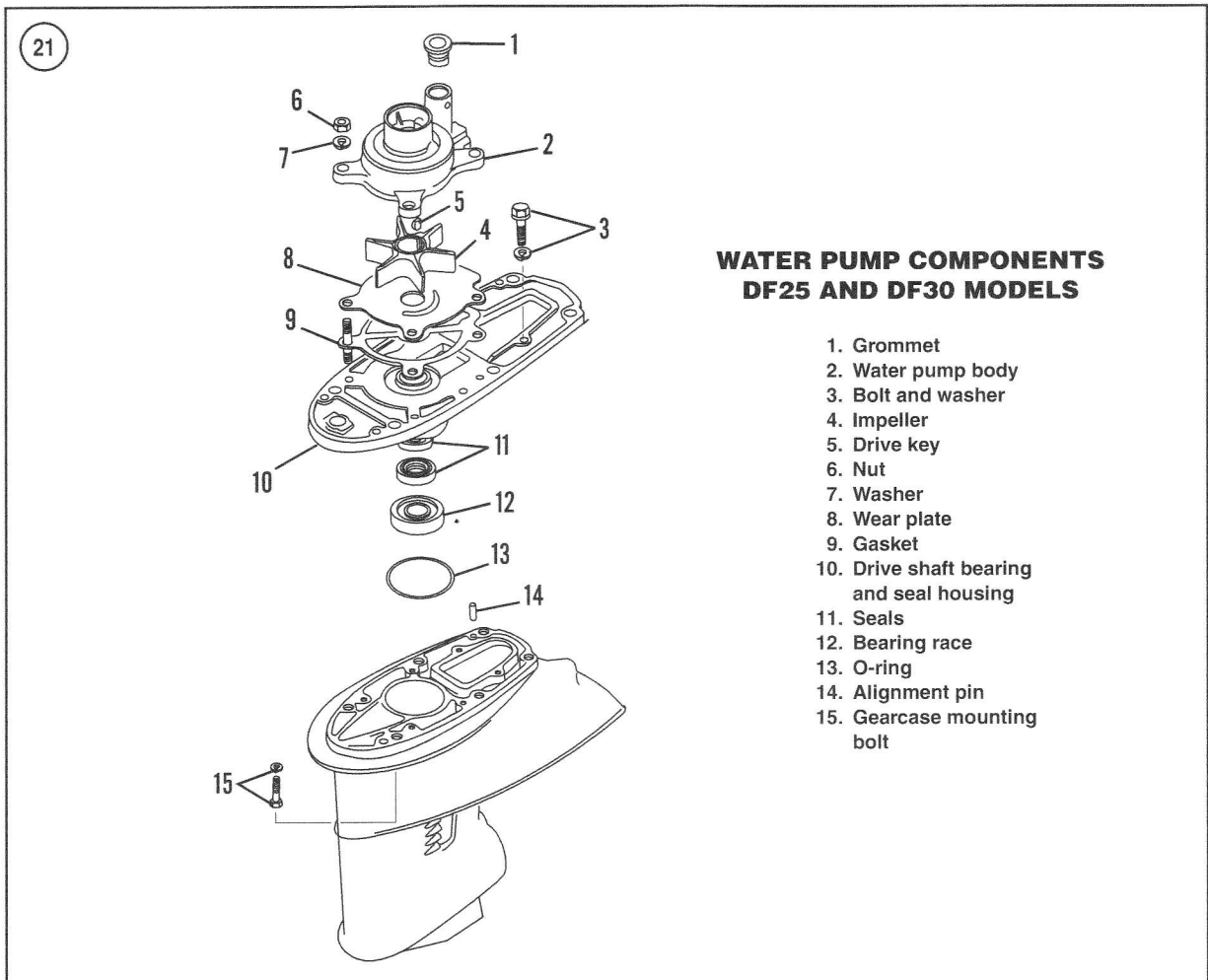
7. Inspect the water pump components as described in this section.

8. Assemble and install the water pump base as follows:

- a. Position the *new* seal (9, **Figure 15**) into the water pump base (10) with the seal lip facing out. Use an appropriately sized socket or section of tubing to carefully push the seal fully into the bore.
- b. Lubricate the grommet (4 and 7, **Figure 15**) surfaces with Suzuki water resistant grease (part No. 99000-25160) and carefully position them onto the water tube (6).
- c. Attach the water tube and grommets to the water pump base. Install and securely tighten the screw (5, **Figure 15**).
- d. Position a *new* gasket (8, **Figure 15**) onto the water pump base. Apply a generous bead of grease to the seal (9, **Figure 15**).
- e. Slide the water pump base over the drive shaft. Align the water tube and grommet (6 and 7, **Figure 15**) while seating the base against the gearcase. Push the alignment pin (14, **Figure 15**) into the opening in the base.

9. Align the gasket and wear plate (12 and 13, **Figure 15**) with the alignment pin (14) while seating them on the water pump base.

10. Apply grease to the drive key surface and install it into the drive shaft slot (**Figure 20**). Lubricate the bore of the impeller with grease and slide it onto the drive shaft. Align the impeller with the drive key and seat it against the wear plate.

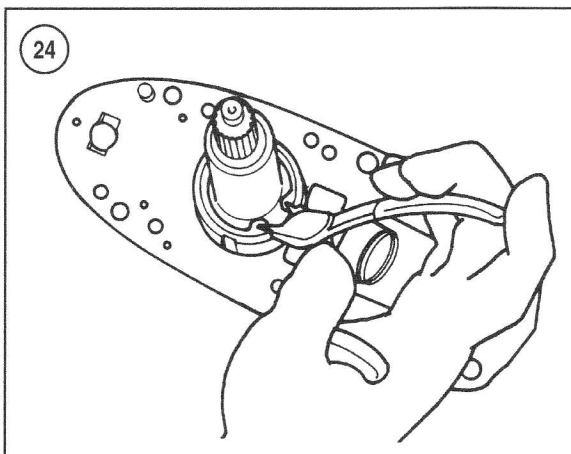
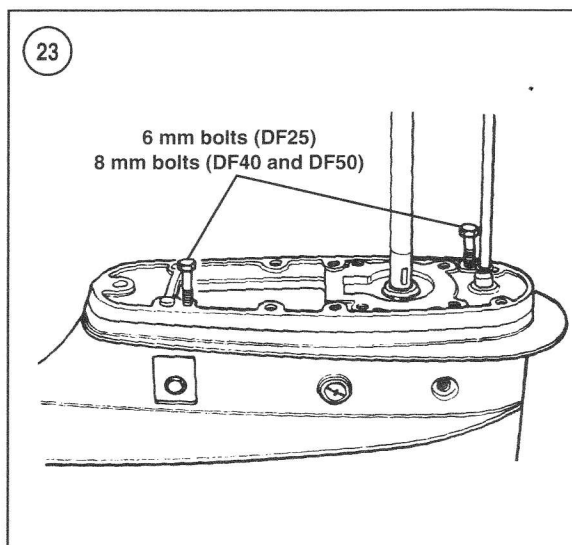
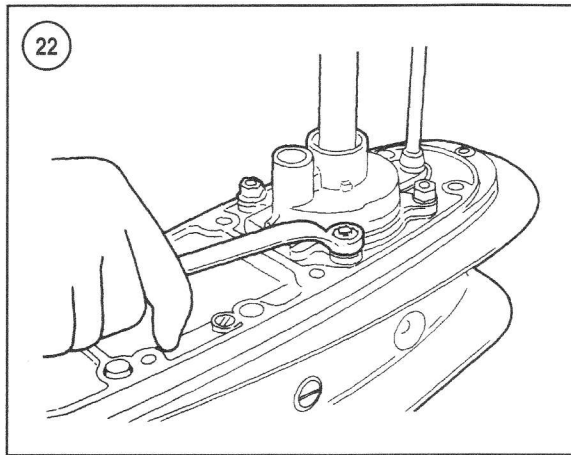


11. Apply a coat of grease to the inner surfaces of the water pump body (16, **Figure 15**) and slide it onto the drive shaft until it just contacts the water pump impeller (15).
12. Align the water pump body with the base. Lightly push down on the water pump body while rotating the drive shaft clockwise as viewed from the top. Continue until the impeller fully enters the water pump body.
13. Install the four water pump bolts (17, **Figure 15**). Tighten the bolts evenly to the specification in **Table 1**.
14. Apply grease to the surfaces and install the bushing and grommet (1 and 2, **Figure 15**) onto the water pump body.
15. Install the gearcase as described in this chapter.

DF25 and DF30 models

Refer to **Figure 21**.

1. Refer to *Gearcase* in this chapter and remove the gearcase from the engine.
2. Carefully pry the sealing grommet (1, **Figure 21**) from the water pump body (2).
3. Remove the four nuts and washers from the water pump body (**Figure 22**). Use two pry bars to carefully pry the water pump body free from the drive shaft bearing and seal housing. (10, **Figure 21**). Slip the body over the drive shaft and remove it from the gearcase (**Figure 17**).
- 4A. If the impeller remains in the water pump body (**Figure 18**), pry it out with a blunt tip pry bar.
- 4B. If the impeller remains on the drive shaft, gently pry it up with a blunt tip pry bar. Lift the impeller up and over the drive shaft (**Figure 19**).
5. Remove the drive key (**Figure 20**) from the drive shaft. Lift the wear plate and gasket (8 and 9, **Figure 21**) from the seal and bearing housing (10). Thoroughly clean the



exposed section of the drive shaft with an aerosol parts cleaner.

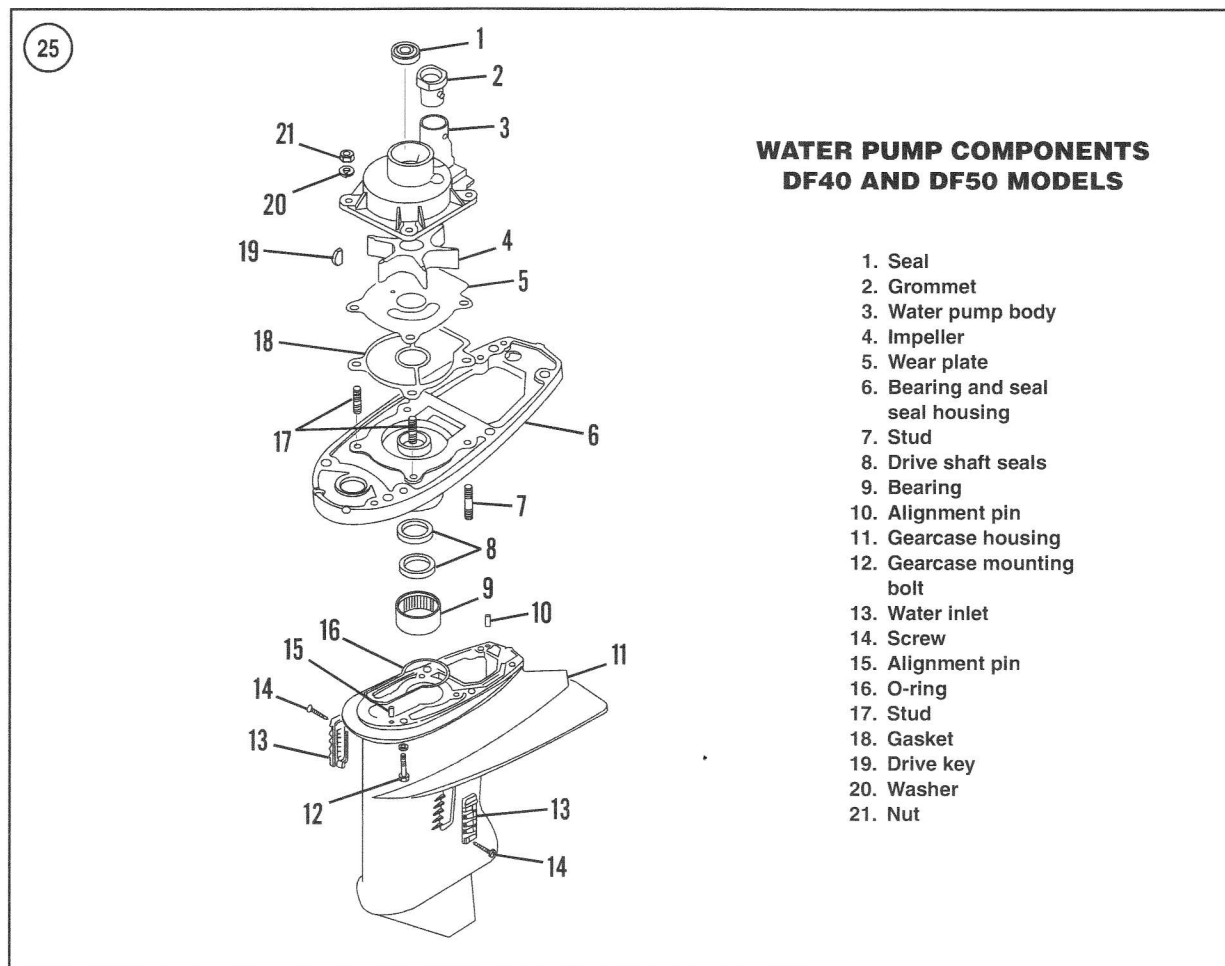
6. Remove the bearing and seal housing if it must be removed for further gearcase disassembly or seal replacement as follows:

- a. Remove the bearing carrier and propeller shaft as describe in this chapter.
- b. Remove the pinion nut as described in *Drive Shaft Removal and Disassembly*.
- c. Remove the two bolts and washers (3, **Figure 21**). Thread two 6 mm bolts into the bearing and seal housing as indicated in **Figure 23**. Evenly tighten the bolts to push the housing away from the gearcase.
- d. Slide the housing over the drive shaft and shift shaft while removing it from the gearcase.
- e. Remove the snap ring (**Figure 24**) and slide the drive shaft from the housing.
- f. Remove the O-ring (13, **Figure 21**) from the housing (10).
- g. Use a blunt tip pry bar to carefully pry the seals (11, **Figure 21**) from the housings. Do not allow the pry bar tip to contact the seal bore.

7. Inspect the water pump components as described in this section.

8. Assemble and install the bearing and seal housing as follows:

- a. Position the new seal (11, **Figure 21**) into the housing (10) with the lip facing in. Use an appropriately sized socket or section of tubing to carefully push the seal fully into the bore.
 - b. Position the second seal into the bore with lip facing in. Carefully push the seal into the bore until it contacts the first seal.
 - c. Lubricate the drive shaft bearing (12, **Figure 21**) with gearcase lubricant. Install the snap ring (**Figure 24**) to retain the drive shaft to the housing. Install a new O-ring (13, **Figure 21**) onto the housing (10).
 - d. Guide the housing over the shift shaft while lowering the drive shaft into the gearcase. Rotate the drive shaft to align the drive shaft splines with the pinion gear. When the splines align, seat the housing (10, **Figure 21**) against the gearcase.
 - e. Install the two bolts and washers (3, **Figure 21**). Tighten the bolts to the specification in **Table 1**.
 - f. Install the pinion nut as described in *Drive Shaft Assembly and Installation*.
 - g. Install the bearing carrier and propeller as described in this chapter.
9. Install the gasket and wear plate (9 and 8, **Figure 21**) onto the housing (10).



10. Apply grease to the drive key surfaces and install it into the drive shaft slot (**Figure 20**). Lubricate the bore of the impeller with grease and slide it onto the drive shaft. Align the impeller with the drive key and seat it against the wear plate.

11. Apply a coat of grease to the inner surfaces of the water pump body (2, **Figure 21**) and slide it onto the drive shaft until it just contacts the water pump impeller (4).

12. Align the water pump body with the base. Lightly push down on the water pump body while rotating the drive shaft clockwise as viewed from the top. Continue until the impeller fully enters the water pump body.

13. Install the four nuts and washers (6 and 7, **Figure 21**). Tighten the nuts evenly to the specification listed in **Table 1**.

14. Apply grease to the surfaces and install the grommet (1, **Figure 21**) onto the water pump body.

15. Install the gearcase as described in this chapter.

DF40 and DF50 models

Refer to **Figure 25**.

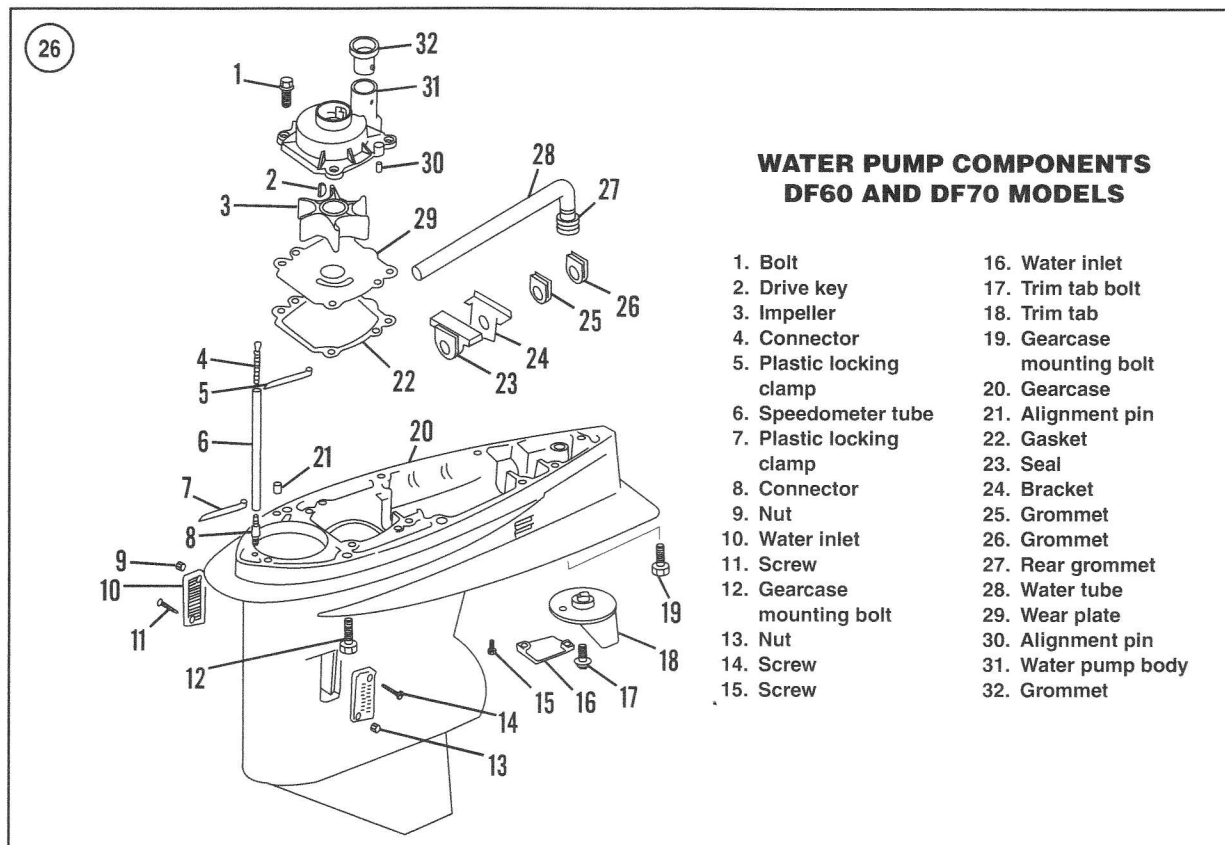
1. Refer to *Gearcase* in this chapter and remove the gearcase from the engine.

2. Carefully pry the sealing grommet (2, **Figure 25**) and seal (1) from the water pump body (3).

3. Remove the four nuts and washers from the water pump body (**Figure 22**). Use two pry bars to carefully pry the water pump body free from the drive shaft bearing and seal housing. (6, **Figure 25**). Slip the body over the drive shaft and remove it from the gearcase (**Figure 17**).

4A. If the impeller remains in the water pump body (**Figure 18**), pry it out with a blunt tip pry bar.

4B. If the impeller remains on the drive shaft, gently pry it up with a blunt tip pry bar. Lift the impeller up and over the drive shaft (**Figure 19**).



5. Remove the drive key (**Figure 20**) from the drive shaft. Lift the wear plate and gasket (5 and 18, **Figure 25**) from the seal and bearing housing (6). Thoroughly clean the exposed section of the drive shaft with an aerosol parts cleaner.

6. Remove the bearing and seal housing if it must be removed for further gearcase disassembly or seal replacement. All shafts, gears and bearings must be removed to remove the bearing and seal housing. Refer to *Gearcase Repair* in this chapter for procedures.

7. Inspect the water pump components as described in this section.

8. Install the gasket and wear plate (18 and 5, **Figure 25**) onto the housing (6).

9. Apply grease to the drive key surfaces and install it into the drive shaft slot (**Figure 20**). Lubricate the bore of the impeller with grease and slide it onto the drive shaft. Align the impeller with the drive key and seat it against the wear plate.

10. Install the new seal (1, **Figure 25**) into the drive shaft bore of the water pump body with the seal lip facing out. Use an appropriately sized socket or section of tubing to

seat the seal in the bore. Apply water resistant grease to the lip surfaces of the seal.

11. Apply a coat of grease to the inner surfaces of the water pump body (3, **Figure 25**) and slide it onto the drive shaft until it just contacts the water pump impeller (4).

12. Align the water pump body with the base. Lightly push down on the water pump body while rotating the drive shaft clockwise as viewed from the top. Continue until the impeller fully enters the water pump body.

13. Install the four nuts and washers (20 and 21, **Figure 25**). Tighten the nuts evenly to the specification in **Table 1**.

14. Apply grease to the surfaces and install the grommet (2, **Figure 25**) onto the water pump body.

15. Install the gearcase as described in this chapter.

DF60 and DF70 models

Refer to **Figure 26**.

1. Refer to *Gearcase* in this chapter and remove the gearcase from the engine.

2. Carefully pry the sealing grommet (32, **Figure 26**) from the water pump body (31).
3. Remove the four bolts from the water pump body (**Figure 16**). Use two pry bars to carefully pry the water pump body free from the gearcase (20). Slip the body over the drive shaft and remove it from the gearcase (**Figure 17**).
- 4A If the impeller remains in the water pump body (**Figure 18**), pry it out with a blunt tip pry bar.
- 4B If the impeller remains on the drive shaft, gently pry it up with a blunt tip pry bar. Lift the impeller up and over the drive shaft (**Figure 19**).
5. Remove the drive key (**Figure 20**) from the drive shaft. Thoroughly clean the exposed section of the drive shaft with an aerosol parts cleaner. Remove the gasket and wear plate (22 and 29, **Figure 26**) from the gearcase.
6. Carefully pull the water tube (28, **Figure 26**) from the bracket and seal (24 and 23, **Figure 26**). Lift the tube out of the rear grommet (27, **Figure 26**).
7. Inspect the water pump components as described in this section.
8. Slip the water tube through the grommets and position it into the bracket and seal (24 and 23, **Figure 26**). Ensure the tube fits securely into the rear grommet (27, **Figure 26**).
9. Align the gasket and wear plate (22 and 29, **Figure 26**) with the alignment pin (30) while seating them on the gearcase.
10. Apply grease to the drive key surfaces and install it into the drive shaft slot (**Figure 20**). Lubricate the bore of the impeller with grease and slide it onto the drive shaft. Align the impeller with the drive key and seat it against the wear plate.
11. Apply a coat of grease to the inner surfaces of the water pump body (31, **Figure 26**) and slide it onto the drive shaft until it just contacts the water pump impeller (3).
12. Align the water pump body with the base. Lightly push down on the water pump body while rotating the drive shaft clockwise as viewed from the top. Continue until the impeller fully enters the water pump body.
13. Install the four water pump bolts (1, **Figure 26**). Tighten the bolts evenly to the specification listed in **Table 1**.
14. Apply grease to the surfaces and install the grommet (32, **Figure 26**) onto the water pump body.
15. Install the gearcase as described in this chapter.

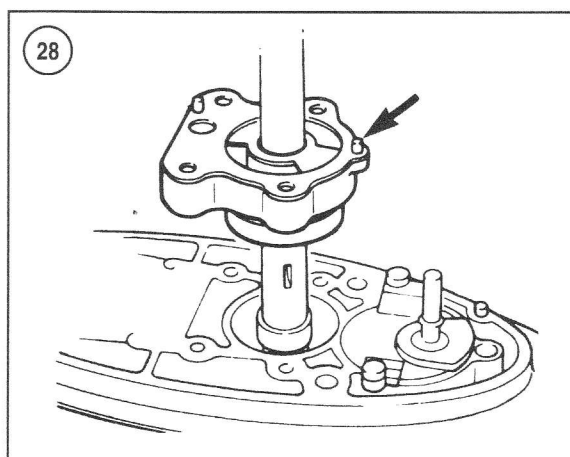
Water Pump Inspection

1. Inspect the impeller (**Figure 27**) for brittle, missing or burned vanes. Squeeze the vanes toward the hub and release them. The vanes should spring back to the extended position. Replace the impeller if damaged, burned, brittle

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or stiff vanes are noted. Replace the impeller if the vanes are set in a curled position.

2. Inspect the water pump insert inside the water pump base for burned, worn or damaged surfaces. Replace the water pump body if any defects are noted.
3. Inspect the water pump body for melted plastic or other indications of overheating. Replace the body and the bearing and seal housing (**Figure 28**) if any defects are noted. Refer to *Gearcase Repair* in this chapter for water pump base/seal carrier replacement instructions.
4. Inspect the water tube, grommets and seals for a burned appearance, cracked surfaces or brittle material. Replace the water tube, grommets and seals if any of these defects are noted.
5. Inspect the wear plate (**Figure 29**) for a warped surface, wear grooves, melted plastic or other damaged areas. Replace the wear plate if a groove is worn in the plate or any other defects are noted.