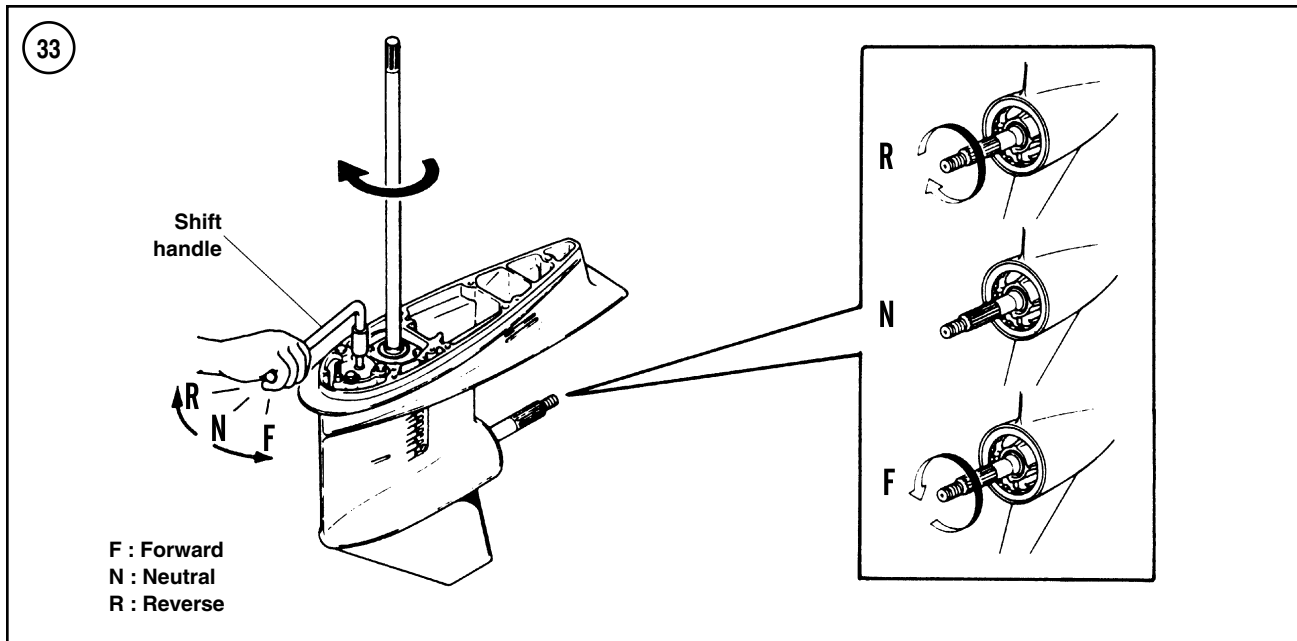




proper alignment of the water tube to the water pump opening during each installation attempt. Make sure the locating pins enter the openings in the drive shaft housing.

7. Apply Loctite 572 to the threads of the gearcase mounting bolts. Have an assistant hold the gearcase in position and install the bolts. Tighten the bolts evenly to the specification in **Table 1**.

8. Heat the end of the speedometer hose with a portable hair dryer and quickly slip it fully over the connector (1, **Figure 25**). Secure the hose to the connector with a plastic locking type clamp.

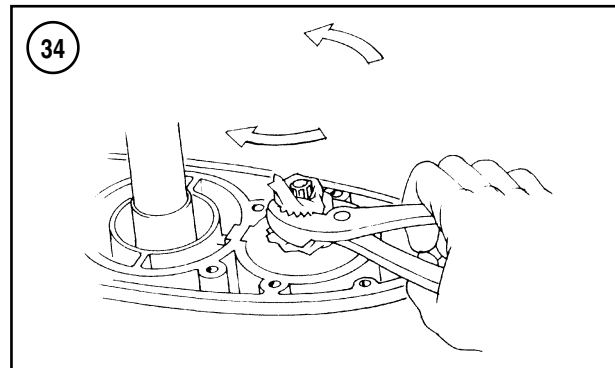
9. Install the trim tab onto the gearcase and hold it in position. Align the reference mark (**Figure 31**) made before removal.

- a. On 40 and 50 hp models, securely tighten the trim tab bolt (**Figure 24**).
- b. On 60-90 hp models, use a socket and extension to install and securely tighten the trim tab bolt (**Figure 32**). Install the bolt access cover into the opening in the drive shaft housing.

10. Adjust the shift linkages and cables as described in Chapter Four. Connect the spark plug leads.

11. On electric start models, connect the cables to the battery.

12. Run the engine to check for proper shifting and cooling system operation. If water does not exit the tell-tale opening, remove the gearcase and check for a dislodged water tube or grommet. Check and correct the linkage adjustment if it does not shift correctly.

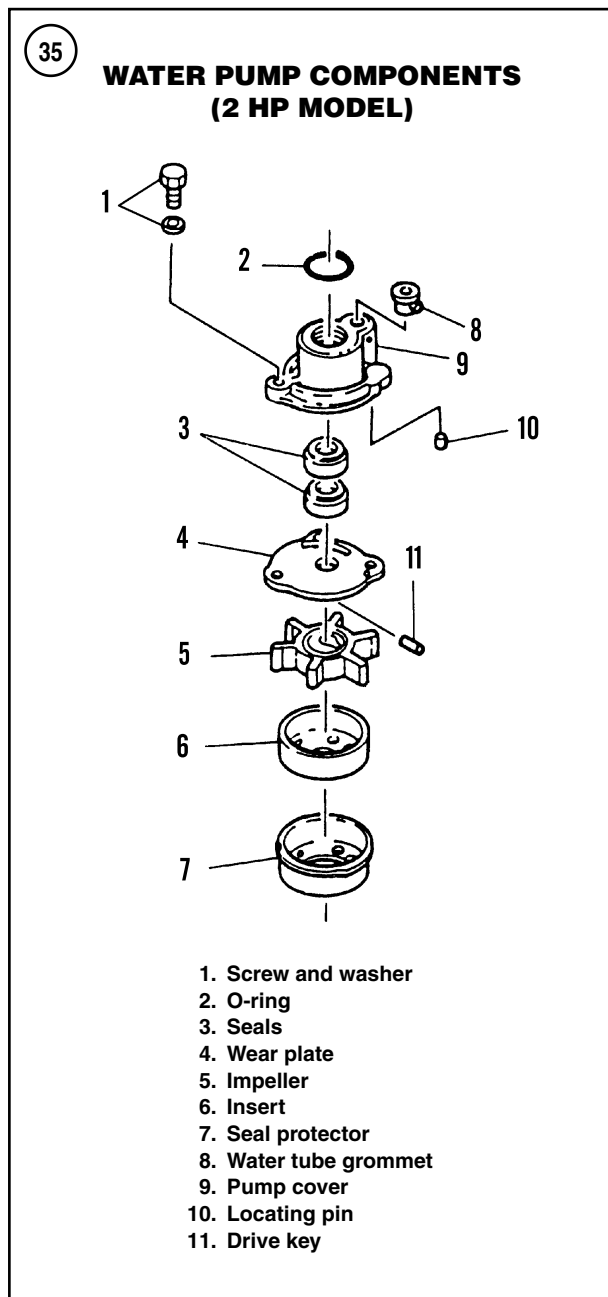


WATER PUMP

Service the water pump when the engine is running warmer than normal and at the service intervals listed in Chapter Three.

Always replace the impeller, seals, O-rings and all gaskets when servicing the water pump. Never compromise the operation of the water pump. Overheating and extensive power head damage can result from operation with faulty water pump components.

Component appearances and mounting arrangements vary by model. To assist with component identification and orientation, refer to the illustration that applies to the selected model. The appearance of the components may differ slightly from the illustration. Four different water pumps are used on the models covered in this manual. Refer to the procedures for the engine model.



Disassembly (2 hp Models)

Refer to **Figure 35** for this procedure.

1. Remove the gearcase as described in this chapter. To ease impeller removal and reduce the chance of contaminating the gearcase, clean all corrosion and debris from the exposed surfaces of the drive shaft.
2. Carefully pry the water tube grommet (8, **Figure 35**) from the pump cover (9). Slide the O-ring (2, **Figure 35**) over the drive shaft. Discard the O-ring.

3. Remove both screws and washers (1, **Figure 35**), then lift the pump cover (9) from the gearcase. If necessary, pry the cover from the gearcase with two small screwdrivers. Work carefully to avoid damaging the cover mating surfaces. Remove the wear plate (4, **Figure 35**) from the cover or gearcase.

4. Mark the UP side of the impeller if it must be reused. Carefully pry the impeller (5, **Figure 35**) from the insert. Remove the impeller by sliding it up and over the drive shaft.

5. Remove the water pump insert and protector only if they must be replaced. Refer to *Component Inspection* in this chapter to determine the need for replacement. Use two screwdrivers to carefully pry the insert (6, **Figure 35**) from the gearcase. Use the same method to remove the seal protector (7, **Figure 35**).

6. Remove the seals (3, **Figure 35**) from the pump cover only if they must be replaced. Refer to *Component Inspection* in this chapter to determine the need for replacement. Remove the seals as follows:

- a. Place the pump cover on a flat work surface with the impeller side facing down.
- b. Use a small punch to carefully drive the lower seal from the bore.
- c. Place the pump cover on a flat work surface with the impeller side facing up.
- d. Use a small screwdriver to carefully pry the upper seal from the bore. Work carefully to avoid damaging the seal bore.

7. Clean all corrosion and contaminants from the water pump cover, wear plate and seal protector bore in the gearcase.

8. Inspect all water pump components as described in *Component Inspection* in this chapter.

Assembly (2 hp Models)

Refer to **Figure 35** for this procedure.

1. Install the seal protector and insert into the gearcase, if they were removed, as follows:
 - a. Insert the seal protector into the gearcase. Align the protrusion on the seal protector lip with the notch in the protector bore.
 - b. Press down on the protector until it fully seats in the gearcase.
 - c. Align the protrusion on the insert with the notch in the seal protector. Then press the insert into the seal protector until it is fully seated.
2. Apply a light coat of Yamaha All-Purpose Grease or its equivalent to the inner bore of the insert. Install the drive key (11, **Figure 35**) into its slot in the drive shaft.

3. Slide the new impeller over the drive shaft until it contacts the insert. Rotate the drive shaft clockwise as viewed from the top while pushing down lightly on the impeller. Continue rotating the drive shaft until the impeller engages the drive key and completely enters the insert.
4. Apply a light coat of Yamaha All-Purpose Grease or its equivalent to the impeller contact surfaces of the wear plate. Slide the wear plate over the drive shaft and seat it against the insert.
5. Install the seals (3, **Figure 35**) into the water pump cover (9), if they were removed, as follows:
 - a. Select a section of tubing or a socket to use as a seal installation tool. The tool must contact the seal casing, but not contact the seal bore in the pump cover.
 - b. Apply a light coat of Loctite 271 to the seal bore and outer diameter of the seals.
 - c. Place the pump cover on a flat work surface with the impeller side facing up. Install the upper seal into the bore with the lip side toward the impeller side of the cover.
 - d. Use the installation tool to seat the seal fully into the bore.
 - e. Press the lower seal into the bore using the same method. The lower seal lip must face the impeller.
6. Apply a light coat of Loctite Gasket Maker to the mating surface of the water pump cover.
7. Apply a bead of Yamaha All-Purpose Grease or equivalent to the lips of the seals in the pump cover. Slide the pump cover over the drive shaft. Rotate the pump cover to align the locating pin (10, **Figure 35**) with the opening in the cover. Then seat the cover onto the insert.
8. Apply a light coat of Loctite 572 to the screw threads. Install both screws and washers (1, **Figure 35**), and evenly tighten them to the general torque specification in Chapter One.
9. Apply Yamaha All-Purpose Grease or equivalent to the contact surfaces. Then slide the O-ring (2, **Figure 35**) over the drive shaft. Seat the O-ring against the pump cover.
10. Apply Yamaha All-Purpose Grease or equivalent to the surfaces, then insert the water tube grommet (8, **Figure 35**) into the pump cover. Install the protrusion on the grommet into the corresponding opening in the cover.
11. Install the gearcase as described in this chapter. Run the engine to check for proper cooling system operation. If water does not exit the tell-tale opening, remove the gearcase and check for a dislodged water tube or grommet. If no fault is found with the tube or grommet, disassemble the water pump and check for improperly assembled or damaged components.

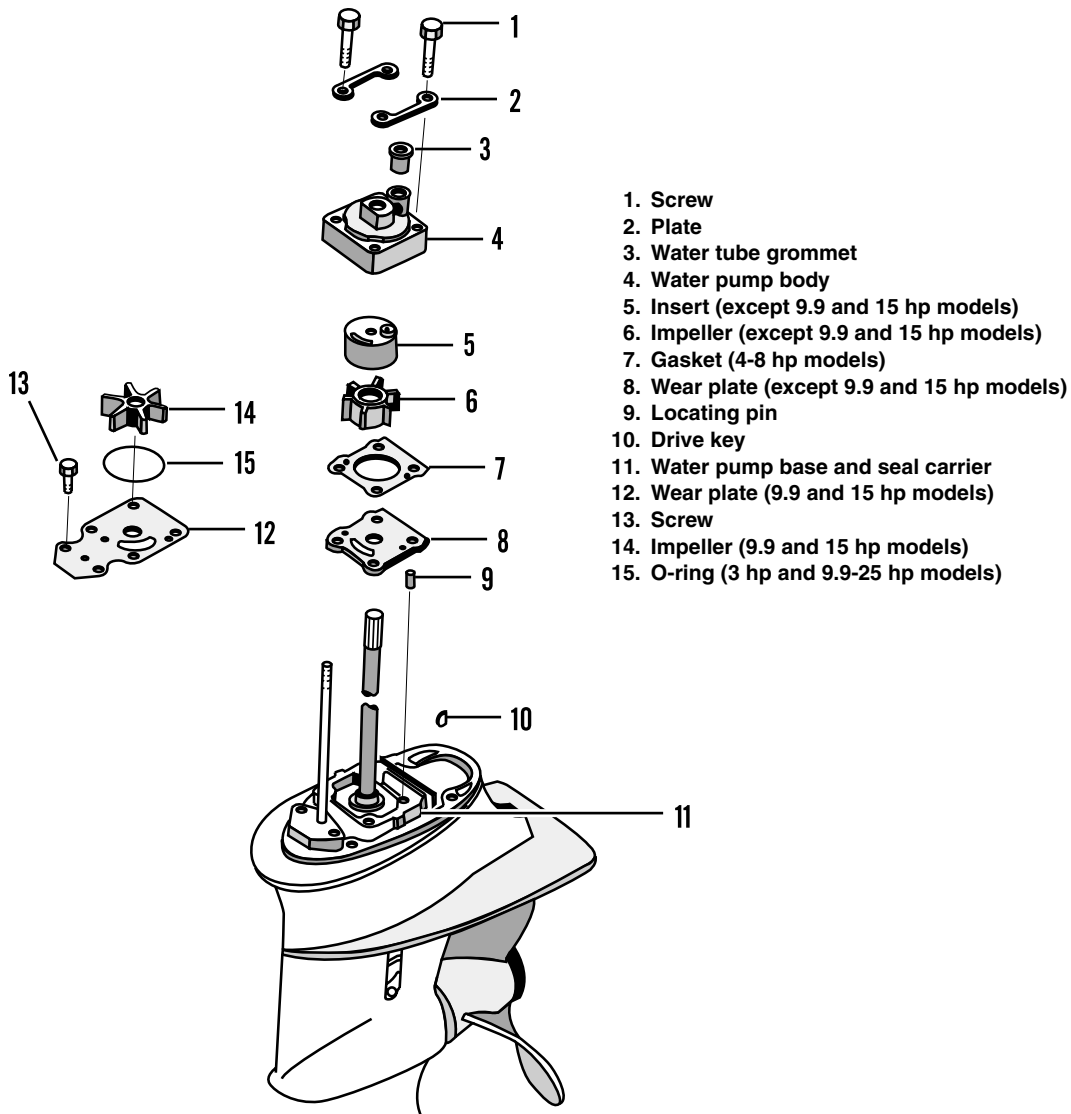
Disassembly (3-5 hp and 6-25 hp Two-Cylinder Models)

Refer to **Figure 36** for this procedure.

1. Remove the gearcase as described in this chapter. To ease impeller removal and reduce the chance of contaminating the gearcase, clean all corrosion and debris from the exposed surfaces of the drive shaft.
2. Carefully pry the water tube grommet (3, **Figure 36**) from the water pump body (4).
3. Remove the four screws (1, **Figure 36**) and two plates (2) from the pump body. Use two screwdrivers to carefully pry the water pump body from the base (11, **Figure 36**). Work carefully to avoid damaging mating surfaces. Slide the body up and over the drive shaft.
- 4A. On 3 hp and 9.9-25 hp models, remove the O-ring (15, **Figure 36**) from the water pump body. Discard the O-ring.
- 4B. On 4-8 hp models, remove the gasket (7, **Figure 36**) from the pump body or pump base. Discard the gasket.
5. Mark the UP side of the impeller (6 or 14, **Figure 36**) if it must be reused.
 - a. If the impeller remains in the pump body, carefully pry the impeller from the insert. Do not damage the insert.
 - b. If the impeller remains on the drive shaft, carefully pry the impeller away from the wear plate using a blunt tip pry bar. Work carefully to avoid damaging the wear plate. Remove the impeller by sliding it up and over the drive shaft. Carefully split the inner hub of the impeller with a sharp chisel if the impeller is seized on the drive shaft. Work carefully to avoid damaging the drive shaft surfaces. To help prevent drive shaft damage, cut the impeller hub at the drive key slot.
6. Remove the drive key (10, **Figure 36**) from the slot in the drive shaft.
7. Only remove the water pump insert (5, **Figure 36**) if it must be replaced. The removal process damages the insert. Refer to *Component Inspection* in this chapter to determine the need for replacement. Use a punch to drive the insert from the water pump body through the drive shaft bore. Discard the insert after removal.
8. Remove the wear plate as follows:
 - a. If the wear plate must be reused, mark the impeller side of the wear plate with a permanent marker. Do not scratch the plate.
 - b. On 9.9 and 15 hp models, remove the two screws (13, **Figure 36**) from the wear plate and shift shaft retainer. Do not disturb the shift shaft while removing the screws.
 - c. Carefully pry the wear plate (8 or 12, **Figure 36**) loose from the pump base. Work carefully to avoid

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WATER PUMP COMPONENTS (3-5 HP AND 6-25 HP TWO-CYLINDER MODELS)



8

damaging the pump base. Slide the wear plate up and over the drive shaft.

9. If the locating pin (9, **Figure 36**) was dislodged, insert it into its respective opening in the water pump base.

10. Clean all corrosion and contaminants from the water pump cover, wear plate and water pump base.

11. Inspect the water pump base (11, **Figure 36**) for cracked, damaged or melted surfaces. Replace the pump base if there are any defects. Damaged surfaces on the

base prevent efficient operation of the water pump. Refer to *Gearcase Repair* in this chapter for replacement procedures.

12. Inspect all water pump components as described in *Component Inspection* in this chapter.

Assembly (3-5 hp and 6-25 hp Two-Cylinder Models)

Refer to **Figure 36** for this procedure.

1. Install a new water pump insert, if it was removed, as follows:

- Apply a very light coat of Yamaha All-Purpose Grease or equivalent to the insert bore in the pump body.
- Slide the insert slightly into the water pump body. The open side must face out.
- Rotate the insert to align the tab or protrusion on the insert with its respective opening in the pump body.
- Guide the tab or protrusion into the pump body opening while seating the insert in the bore.

2. Slide the wear plate (8 or 12, **Figure 36**) over the drive shaft. Rotate the plate to align the screw holes and rest it on the water pump base. The opening in the wear plate must fit over the locating pin (9, **Figure 36**). When reusing the wear plate, make sure the UP mark made before removal faces up. On 9.9 and 15 hp models, apply Loctite 572 to the threads, then install both screws (13, **Figure 36**) into the wear plate and shift shaft retainer. Tighten the screws to the general torque specification in Chapter One.

3. Apply a light coat of Yamaha All-Purpose Grease or equivalent to the drive key (10, **Figure 36**) and the drive key slot in the drive shaft. Install the drive key into the slot. The curved side of the drive key must fit into the drive shaft slot. Apply a light coat of grease to the impeller contact surfaces of the wear plate.

4. On 4-8 hp models, slide a new gasket (7, **Figure 36**) over the drive shaft and rest it on the wear plate. Rotate the gasket to align the screw and locating pin openings, then seat the gasket on the wear plate.

5. Slide the new impeller over the drive shaft. When reusing the impeller, make sure the UP mark made before removal faces up. Align the impeller key slot with the drive key, then push the impeller down until it is seated against the wear plate. Rotate the drive shaft clockwise to verify correct drive key engagement.

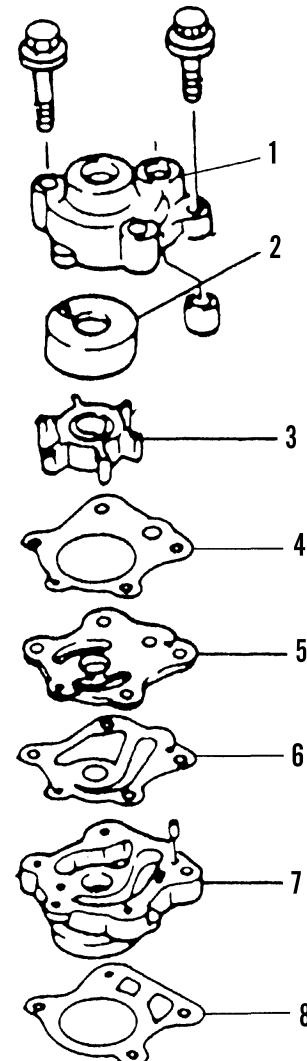
6. Apply a light coat of Yamaha All-Purpose Grease or equivalent to the impeller contact surfaces in the water pump insert.

7. On 3 hp and 9.9-25 hp models, apply a light coat of 3M Weather-strip Adhesive to the O-ring (15, **Figure 36**). Install the O-ring into its groove in the water pump body (4). Allow the O-ring to firmly adhere to the water pump body before proceeding.

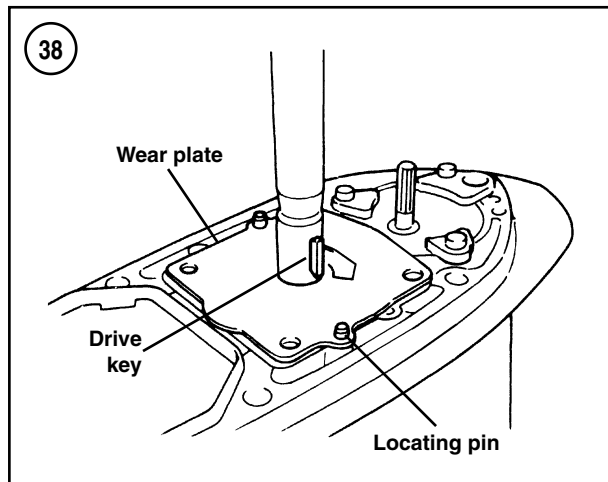
8. Slide the water pump body over the drive shaft and rest it on the impeller. Rotate the pump body to align the screw and locating pin opening. Press down lightly on the pump body while rotating the drive shaft clockwise as viewed from the top. Maintain the screw and pin opening alignment. Continue until the impeller enters the water pump body and the body seats on the wear plate.

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WATER PUMP COMPONENTS (25 HP THREE-CYLINDER, 30 HP AND 60-90 HP MODELS)



1. Water pump body
2. Insert
3. Impeller
4. Upper gasket
5. Wear plate
6. Lower gasket
7. Pump base
8. Base gasket



9. Pull up on the water pump body just enough to inspect the gaskets and O-rings. Do not allow the impeller to exit the pump body. Replace any damaged or dislodged gaskets or O-rings.

10. Apply Loctite 572 to the threads of the four screws (1, **Figure 36**). Install both plates (2, **Figure 36**) and the four screws (1). On 20 and 25 hp models, washers are used on the screws. Tighten the screws to the specification in **Table 1** or Chapter One.

11. Apply Yamaha All-Purpose Grease to the surfaces, then insert the water tube grommet (3, **Figure 36**) into the pump cover. Install the protrusion on the grommet into its corresponding opening in the cover.

12. Install the gearcase as described in this chapter. Run the engine to check for proper cooling system operation. If water does not exit the tell-tale opening, remove the gearcase and check for a dislodged water tube or grommet. If no fault is found with the tube or grommet, disassemble the water pump and check for improperly assembled or damaged components.

Disassembly (25 hp Three-Cylinder, 30 hp and 60-90 hp Models)

Refer to **Figure 37** for this procedure.

1. Remove the gearcase as described in this chapter. To ease impeller removal and reduce the chance of contaminating the gearcase, clean all corrosion and debris from the exposed surfaces of the drive shaft.

2. Remove the two screws and retainer, then carefully pry the water tube grommet from the water pump body (1, **Figure 37**).

3. Remove the four screws and washers from the pump body. Use two screwdrivers to carefully pry the water pump body from the base (7, **Figure 37**). Work carefully

to avoid damaging mating surfaces. Slide the body up and over the drive shaft.

4. Remove the upper gasket (4, **Figure 37**) from the pump body or wear plate (5). Discard the gasket.

5. Mark the UP side of the impeller (3, **Figure 37**) if it must be reused.

- a. If the impeller remains in the pump body, carefully pry the impeller from the insert. Do not damage the insert.
- b. If the impeller remains on the drive shaft, carefully pry the impeller away from the wear plate using a blunt tip pry bar. Work carefully to avoid damaging the wear plate (**Figure 38**). Remove the impeller by sliding it up and over the drive shaft. Carefully split the inner hub of the impeller with a sharp chisel if the impeller is seized on the drive shaft. Work carefully to avoid damaging the drive shaft surfaces. To help prevent drive shaft damage, cut the impeller hub at the drive key slot.

6. Remove the drive key (**Figure 38**) from the slot in the drive shaft.

7. Only remove the water pump insert (2, **Figure 37**) if it must be replaced. The removal process damages the insert. Refer to *Component Inspection* in this chapter to determine the need for replacement. Use a punch to drive the insert from the water pump body through the drive shaft bore. Discard the insert after removal.

8. If the wear plate must be reused, mark the impeller side of the wear plate with a permanent marker. Do not scratch the plate. Carefully pry the wear plate (5, **Figure 37**) loose from the pump base. Work carefully to avoid damaging the pump base or dislodging the locating pin(s) (**Figure 38**). Slide the wear plate up and over the drive shaft. Remove the gasket (6, **Figure 37**) from the wear plate or pump base (7). Discard the gasket.

9. If the locating pin(s) (**Figure 38**) were dislodged, insert them into their respective opening(s) in the water pump base.

10. Clean all corrosion and contaminants from the water pump body, wear plate and pump base.

11. Inspect the water pump base (7, **Figure 37**) for cracked, damaged or melted surfaces. Replace the pump base if there are any defects. Damaged surfaces on the base prevent efficient operation of the water pump. Refer to *Gearcase Repair* in this chapter for replacement procedures.

12. Inspect all water pump components as described in *Component Inspection* in this chapter.

Assembly (25 hp Three-Cylinder, 30 hp and 60-90 hp Models)

Refer to **Figure 37** for this procedure.

1. Install a new water pump insert, if it was removed, as follows:
 - a. Apply a very light coat of Yamaha All-Purpose Grease or equivalent to the insert bore in the pump body.
 - b. Slide the insert slightly into the water pump body. The open side must face out.
 - c. Rotate the insert to align the tab or protrusion on the insert with its respective opening in the pump body.
 - d. Guide the tab or protrusion into the pump body opening while seating the insert in the bore.
2. Slide a new lower gasket (6, **Figure 37**) over the drive shaft. Rotate the gasket to align the screw holes and rest it on the water pump base. The opening(s) in the lower gasket must fit over the locating pin(s) (**Figure 38**).
3. Slide the wear plate (5, **Figure 37**) over the drive shaft. Rotate the plate to align the screw holes and rest it on the water pump base. The opening in the wear plate must fit over the locating pin (**Figure 38**). When reusing the wear plate, make sure the up mark made prior to removal faces up.
4. Apply a light coat of Yamaha All-Purpose Grease or equivalent to the drive key and the drive key slot in the drive shaft. Install the drive key into the slot as indicated in **Figure 38**. The curved side of the drive key must fit into the drive shaft slot. Apply a light coat of grease to the impeller contact surfaces of the wear plate.
5. Slide a new upper gasket (4, **Figure 37**) over the drive shaft and rest it on the wear plate. Rotate the gasket to align the screw and locating pin opening(s), then seat the gasket on the wear plate.
6. Slide the new impeller over the drive shaft. When reusing the impeller, make sure the up mark made prior to removal faces up. Align the impeller key slot with the drive key, then push the impeller down until it is seated against the wear plate. Rotate the drive shaft clockwise to verify correct drive key engagement.
7. Apply a light coat of Yamaha All-Purpose Grease or equivalent to the impeller contact surfaces in the water pump insert.
8. Slide the water pump body over the drive shaft and rest it on the impeller. Rotate the pump body to align the screw and locating pin opening(s). Press down lightly on the pump body while rotating the drive shaft clockwise as viewed from the top. Maintain the screw and pin opening alignment. Continue until the impeller enters the water pump body and the body seats on the wear plate.

9. Pull up on the water pump body just enough to inspect the gaskets. Do not allow the impeller to exit the pump body. Replace any damaged or dislodged gaskets.

10. Apply Loctite 572 to the threads of the four screws and washers. Install the screws and washers, and tighten them to the general torque specification in Chapter One.

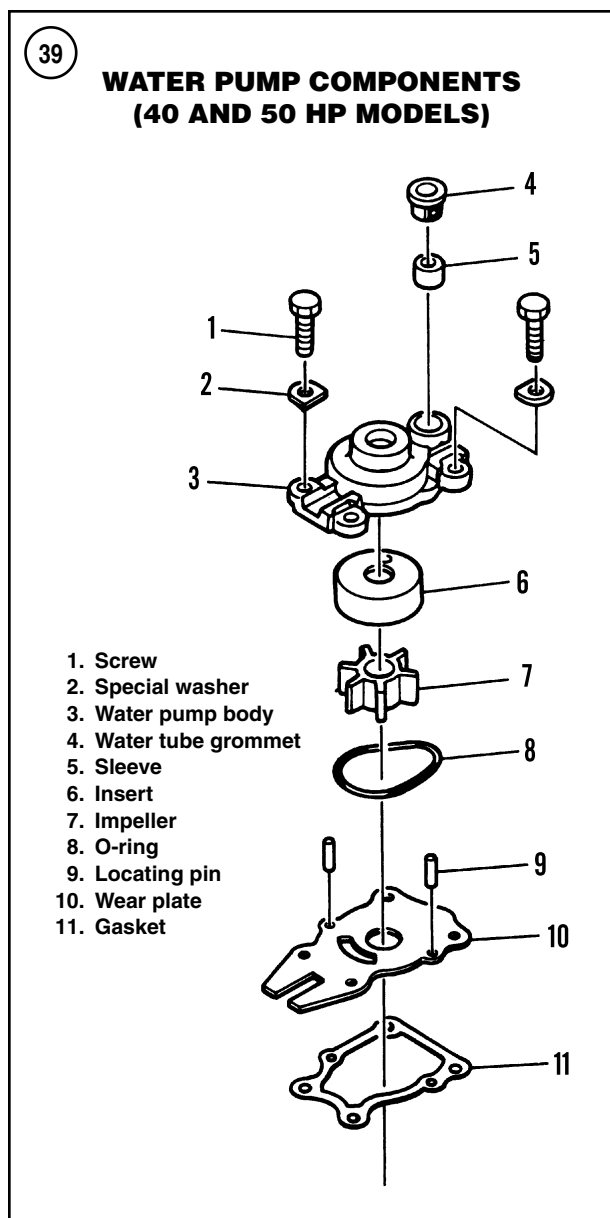
11. Apply Yamaha All-Purpose Grease or equivalent to the surfaces, then insert the water tube grommet into the pump cover. The larger tapered opening must face out. Secure the grommet with the plate and two screws.

12. Install the gearcase as described in this chapter. Run the engine to check for proper cooling system operation. If water does not exit the tell-tale opening, remove the gearcase and check for a dislodged water tube or grommet. If no fault is found with the tube or grommet, disassemble the water pump and check for improperly assembled or damaged components.

Disassembly (40 and 50 hp Models)

Refer to **Figure 39** for this procedure.

1. Remove the gearcase as described in this chapter. To ease impeller removal and reduce the chance of contaminating the gearcase, clean all corrosion and debris from the exposed surfaces of the drive shaft.
2. Carefully pry the water tube grommet (4, **Figure 39**) and sleeve (5) from the water pump body (3).
3. Remove the four screws (1, **Figure 39**) and special washers (2) from the pump body. Use two screwdrivers to carefully pry the water pump body from the wear plate (10, **Figure 39**). Work carefully to avoid damaging mating surfaces. Slide the body up and over the drive shaft.
4. Remove the O-ring (8, **Figure 39**) from the water pump body. Discard the O-ring.
5. Mark the UP side of the impeller (7, **Figure 39**) if it must be reused.
 - a. If the impeller remains in the pump body, carefully pry the impeller from the insert. Do not damage the insert.
 - b. If the impeller remains on the drive shaft, carefully pry the impeller away from the wear plate using a blunt tip pry bar. Work carefully to avoid damaging the wear plate. Remove the impeller by sliding it up and over the drive shaft. Carefully split the inner hub of the impeller with a sharp chisel if the impeller is seized on the drive shaft. Work carefully to avoid damaging the drive shaft surfaces. To help prevent drive shaft damage, cut the impeller hub at the drive key slot.
6. Remove the drive key (**Figure 38**) from the slot in the drive shaft.



7. Only remove the water pump insert (6, **Figure 39**) if it must be replaced. The removal process damages the insert. Refer to *Component Inspection* in this chapter to determine the need for replacement. Use a punch to drive the insert from the water pump body through the drive shaft bore. Discard the insert after removal.

8. If the wear plate must be reused, mark the impeller side of the wear plate with a permanent marker. Do not scratch the plate. Carefully pry the wear plate (10, **Figure 39**) loose from the pump base. Work carefully to avoid damaging the gearcase housing. Slide the wear plate up and over the drive shaft.

9. Remove the gasket (11, **Figure 39**) from the wear plate or gearcase housing. Discard the gasket.

10. If the locating pins (9, **Figure 36**) were dislodged, insert them into the respective openings in the gearcase housing.

11. Clean all corrosion and contaminants from the water pump cover, wear plate and gearcase. Clean all old adhesive from the O-ring groove in the pump body.

12. Inspect all water pump components as described in *Component Inspection* in this chapter.

Assembly (40 and 50 hp Models)

Refer to **Figure 39** for this procedure.

1. Install a new water pump insert, if it was removed, as follows:

- Apply a very light coat of Yamaha All-Purpose Grease or equivalent to the insert bore in the pump body.
- Slide the insert slightly into the water pump body. The open side must face out.
- Rotate the insert to align the tab or protrusion on the insert with its respective opening in the pump body.
- Guide the tab or protrusion into the pump body opening while seating the insert in the bore.

2. Slide a new gasket (11, **Figure 39**) over the drive shaft. Rotate the gasket to align the screw holes and rest it on the gearcase housing. The openings in the gasket must fit over the locating pins (9, **Figure 39**).

3. Slide the wear plate (10, **Figure 39**) over the drive shaft. The slot in the wear plate must straddle the shift shaft retainer. Rotate the plate to align the screw holes and rest it on the gasket. The openings in the wear plate must fit over the locating pins (**Figure 38**). When reusing the wear plate, make sure the UP mark made prior to removal faces up.

4. Apply a light coat of Yamaha All-Purpose Grease or equivalent to the drive key and the drive key slot in the drive shaft. Install the drive key into the slot as indicated in **Figure 38**. The curved side of the drive key must fit into the drive shaft slot. Apply a light coat of grease to the impeller contact surfaces of the wear plate.

5. Slide the new impeller over the drive shaft. When reusing the impeller, make sure the UP mark made prior to removal faces up. Align the impeller key slot with the drive key, then push the impeller down until it is seated against the wear plate. Rotate the drive shaft clockwise to verify correct drive key engagement.

6. Apply a light coat of Yamaha All-Purpose Grease or equivalent to the impeller contact surfaces in the water pump insert.

7. Apply a light coat of 3M Weather-strip Adhesive to the O-ring (8, **Figure 39**). Install the O-ring into its groove in the water pump body (3, **Figure 39**). Allow the O-ring to firmly adhere to the water pump before proceeding.
8. Slide the water pump body over the drive shaft and rest it on the impeller. Rotate the pump body to align the screw and locating pin opening. Press down lightly on the pump body while rotating the drive shaft clockwise as viewed from the top. Maintain the screw and pin opening alignment. Continue until the impeller enters the water pump body and the body seats on the wear plate.
9. Pull up on the water pump body just enough to inspect the gasket and O-ring. Do not allow the impeller to exit the pump body. Replace the O-ring or gasket if it is damaged or dislodged.
10. Apply Loctite 572 to the threads of the four screws (1, **Figure 39**). Install the screws and special washers (2, **Figure 39**). Rotate the washers to match the contour of the water pump body. Tighten the screws to the general torque specification in Chapter One.
11. Apply Yamaha All-Purpose Grease or equivalent to the surfaces, then insert the sleeve (5, **Figure 39**) and water tube grommet (4) into the pump cover.
12. Install the gearcase as described in this chapter. Run the engine to check for proper cooling system operation. If water does not exit the tell-tale opening, remove the gearcase and check for a dislodged water tube or grommet. If no fault is found with the tube or grommet, disassemble the water pump and check for improperly assembled or damaged components.

GEARCASE DISASSEMBLY/ASSEMBLY

This section covers complete gearcase disassembly, inspection and reassembly for each engine covered in this manual. Once the gearcase is disassembled, refer to *Component Inspection* in this chapter to determine the need to replace gearcase components.

On larger models, shim the gears and verify the gear lash between the forward gear and the pinion gear before continuing with assembly. The assembly procedures describe the shimming operation.

Special gauging fixtures and precision measuring instruments are required to shim the gearcase. Have the shimming operation performed by a qualified technician if you do not have access to the special tools or are unfamiliar with their use. The cost of the special tools is far greater than the cost of having a professional perform the procedure.

Many of the disassembly and assembly operations require special service tools. The Yamaha part numbers of required tools are listed in the model specific disassem-

bly/assembly procedures. Purchase or rent any required special tool from a Yamaha outboard dealership.

Note the mounting location and orientation of all components before removing them from the gearcase. Mark components that can be installed in different directions accordingly. Perform the following before gearcase disassembly:

Remove the propeller, then the gearcase, as described in this chapter.

Remove all water pump components as described in this chapter. Do not remove the water pump base, if so equipped, until instructed to do so in the disassembly procedures.

After disassembly, clean and inspect all gearcase components as described in *Component Inspection* in this chapter.

After assembly, perform the following:

Pressure test the gearcase as described in this chapter.

Fill the gearcase with lubricant as described in Chapter Three.

Install the gearcase, then the propeller, as described in this chapter.

Service Precautions

When working on a gearcase, there are several procedures to keep in mind that make the work easier, faster and more accurate.

1. Never use elastic locknuts more than twice. Replace elastic nuts each time they are removed. Never use an elastic locknut that can be turned by hand without the aid of a wrench.
2. Use special tools where noted. Makeshift tools can damage components and cause serious personal injury. The expense to replace damaged components can easily exceed the cost of the special tool.
3. Use appropriate fixtures to hold the gearcase housing when possible. Use a vise with protective jaws to hold smaller housings or individual components. If protective jaws are not available, insert blocks of wood or similar padding on each side of the housing or component before clamping.
4. Remove and install pressed-on parts with an appropriate mandrel, support and arbor or hydraulic press. Do not attempt to pry or hammer components on or off unless otherwise specified in the procedure.
5. Proper torque is essential to ensure long life and satisfactory service from gearcase components. Use the general torque specifications in Chapter One for fasteners not listed in **Table 1**.
6. To help reduce corrosion, especially in saltwater areas, apply Yamaha Marine Grease or its equivalent to all exter-