

Product: LOCOMOTIVE ENGINE  
Model: 3512B LOCOMOTIVE ENGINE 3ZW  
Configuration: 3512B Locomotive Engine 3ZW00001-UP

## Disassembly and Assembly 3500B Engines

Media Number -SEN6564-29

Publication Date -01/03/2015

Date Updated -14/09/2018

i02062541

# Auxiliary Water Pump - Assemble - Auxiliary Sea Water Pump

SMCS - 1052-016

## Assembly Procedure

Table 1

| Required Tools |             |                              |     |
|----------------|-------------|------------------------------|-----|
| Tool           | Part Number | Part Description             | Qty |
| C              | 136-1452    | Retaining Ring Pliers As     | 1   |
| D              | 152-7159    | Socket As (Water Pump Shaft) | 1   |
| G              | 1P-0520     | Driver Gp (Bearing and Seal) | 1   |
| H              | 5P-4197     | Spacer                       | 1   |
| J              | 4C-4032     | Bearing Mount Compound       | 1   |

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### NOTICE

**Keep all parts clean from contaminants.**

**Contaminants may cause rapid wear and shortened component life.**

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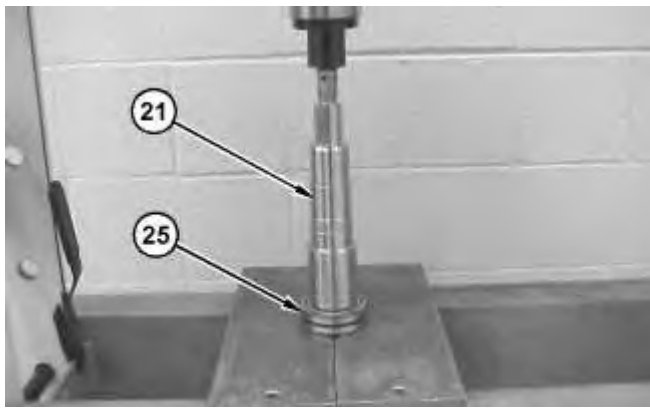


Illustration 1

g01057093

1. Place shaft (21) and bearing (25) in a suitable press. Make sure that the serial number on the bearing is toward the driven end of the shaft. Insert the driven end of the shaft into the bearing. Press the shaft into the bearing until the shoulder of the shaft contacts the bearing.

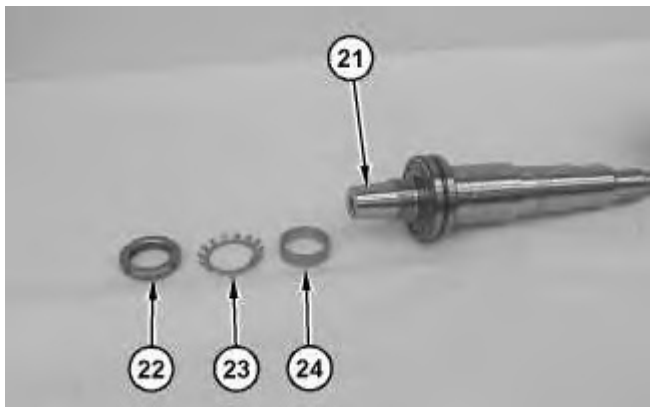


Illustration 2

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2. Install spacer (24), lock ring (23), and nut (22) onto the end of shaft (21). Place the shaft into a vise with the bearing upward.

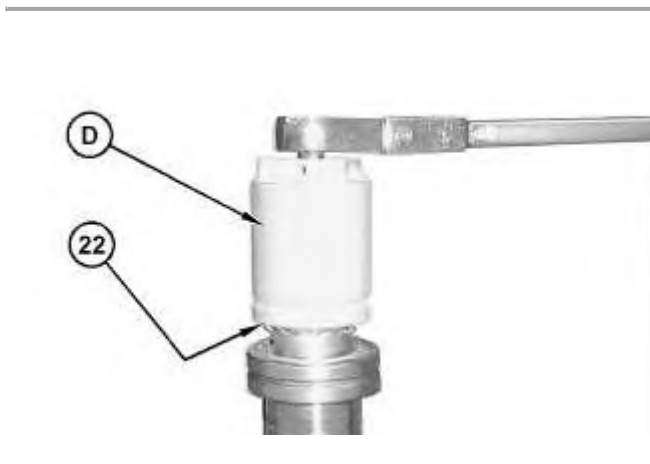


Illustration 3

g01057048

3. Use Tooling (D) in order to tighten nut (22) to a torque of  $167 \pm 33$  N·m ( $125 \pm 25$  lb ft).

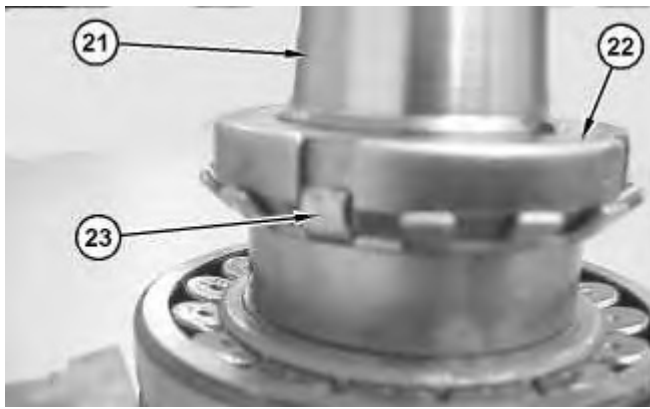


Illustration 4

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4. Place shaft (21) in a vise. Bend a tab of lock ring (23) into a slot of nut (22).

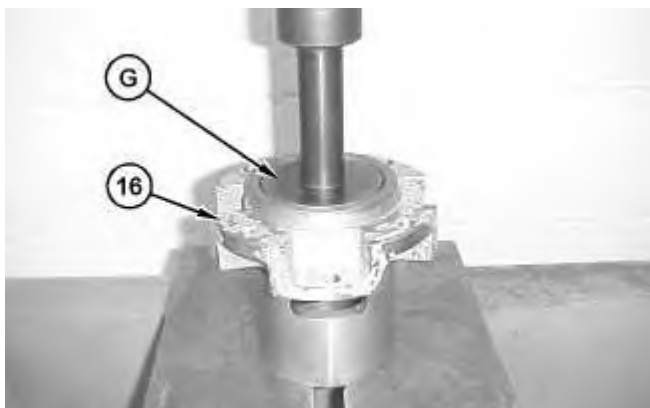


Illustration 5

g01057103



Illustration 6

g01057060

5. Use a suitable press and Tooling (G) in order to install bearing race (29) into bearing housing (16).

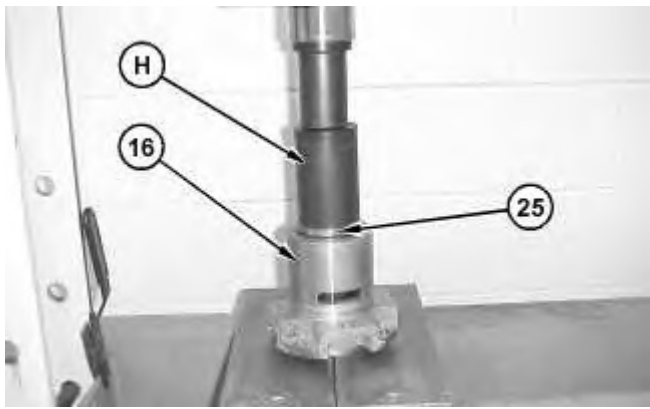


Illustration 7

g01057115

6. Use a suitable press and Tooling (H) in order to install the shaft and bearing (25) into bearing housing (16).

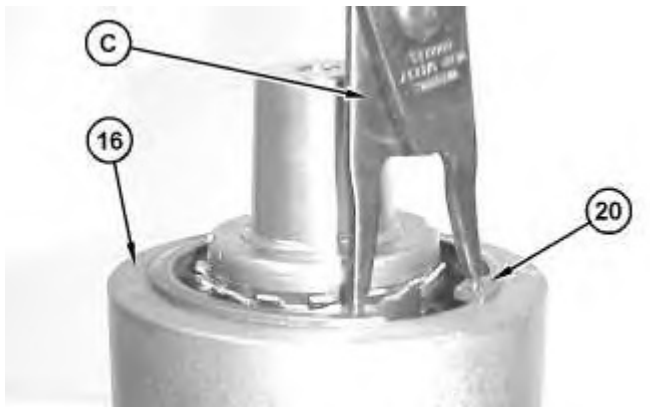


Illustration 8

g01057118

7. Use Tooling (C) in order to install retaining ring (20) into bearing housing (16). Make sure that the side of the ring with the bevel is upward. After the ring is installed, strike the ring with a punch in order to ensure that the ring is properly seated.



Illustration 9

g01057120

- Place bearing housing (16) and shaft (21) into a vise with the impeller end of the shaft in the upward position. Place bearing (28) into position with the serial number in the upward position. Use a hammer and a brass driver to install the bearing into the bearing housing.

Alternatively, use a suitable press with an appropriate sleeve to press the bearing into the housing.

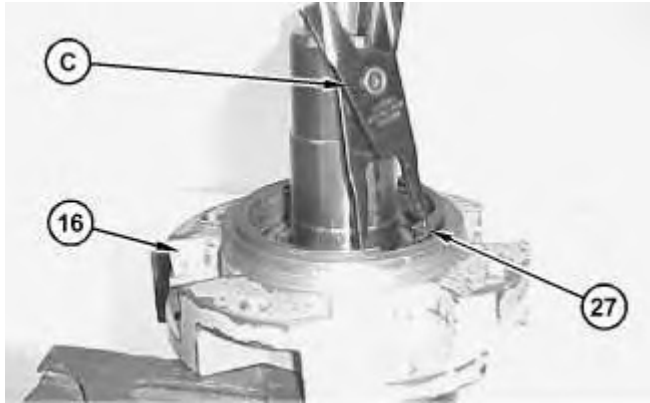


Illustration 10

g01057123

- Use Tooling (C) in order to install retaining ring (27) into bearing housing (16). After the retaining ring is installed, strike the ring with a punch in order to ensure that the ring is properly seated.

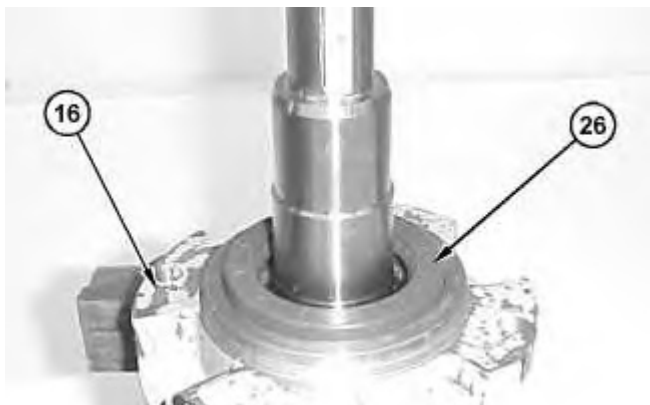


Illustration 11

g01057128

- Lubricate oil seal (26) with a solution of water and five percent soap. Install the oil seal into bearing housing (16).
-



Illustration 12

g01057132

11. Thoroughly clean shaft (21) and collar (18) with solvent. Apply Tooling (J) to the inside diameter of the collar. Install the collar onto the shaft. Rotate the collar for 180 degrees in both directions. Allow the compound to cure for 30 minutes.

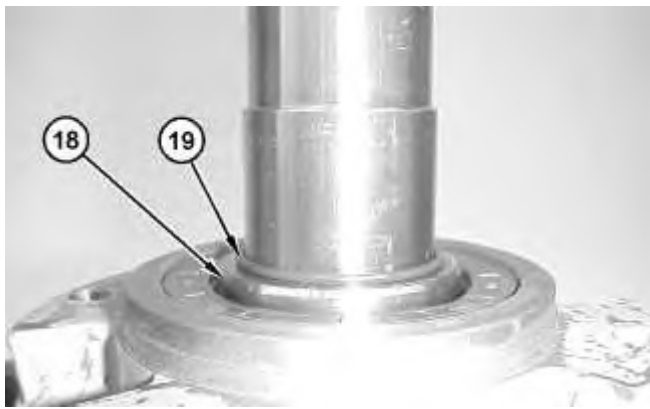


Illustration 13

g01057040

12. Install O-ring seal (19) over collar (18).

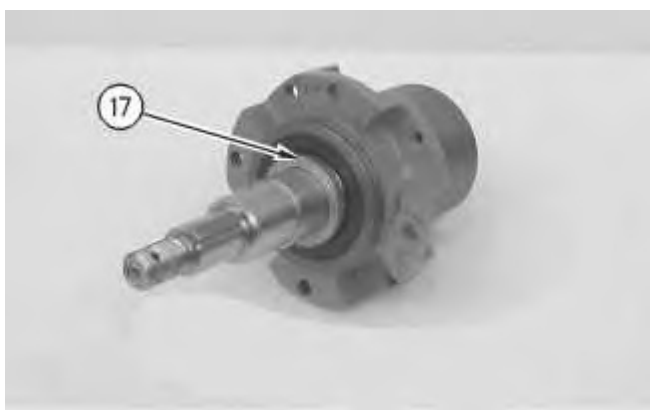


Illustration 14

g00690988

13. Install ring (17) over the O-ring seal. Compress the O-ring seal with ring (17). Maintain approximately  $490 \pm 45$  N ( $110 \pm 10$  lb) of pressure on ring (17) and use an allen wrench in

order to tighten the screws to a torque of  $0.9 \pm 0.1$  N·m ( $7.97 \pm 0.10$  lb in). After the screws are tightened, use a small center punch to peen the threads in the ring.

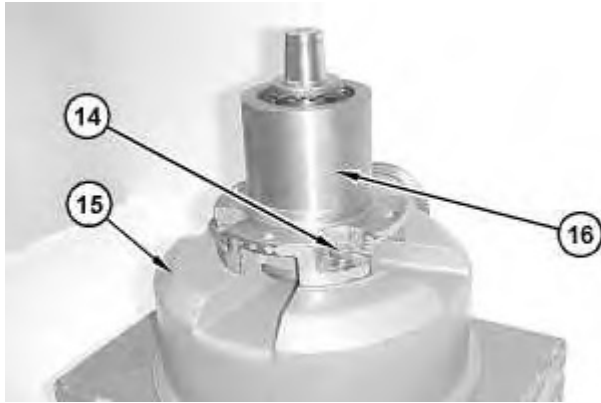


Illustration 15

g01057139

14. Place drive housing (15) on blocks. Install bearing housing (16) onto the body. Attach the bearing housing to the body with washers and bolts (14).

**Note:** Carefully inspect the surface of the ceramic seal. If the surface is cracked or scratched, discard the seal and obtain a new seal for installation. Ensure that the faces of the seal are clean.



Illustration 16

g01057143

15. Orient the impeller end of shaft (21) to the upward position. Lubricate the stationary segment of the ceramic seal with a solution of water and five percent soap. Place the side of the segment with the bevel in the downward position. Use hand pressure in order to install the segment into drive housing (15). After the seal is installed, wipe the surface dry.
-



Illustration 17

g01057146

16. Lubricate the rotating segment of ceramic seal (13) with a solution of water and five percent soap. Orient the side of the segment with the spring to the upward position. Use hand pressure in order to install the rotating segment of ceramic seal (13) onto the stationary segment of the ceramic seal. After the seal is installed, wipe the surface dry.



Illustration 18

g01057149

17. Lubricate port plate (11) with a solution of water and five percent soap. Align the tabs of the port plate with the notches in the body. Install the port plate into drive housing (15).



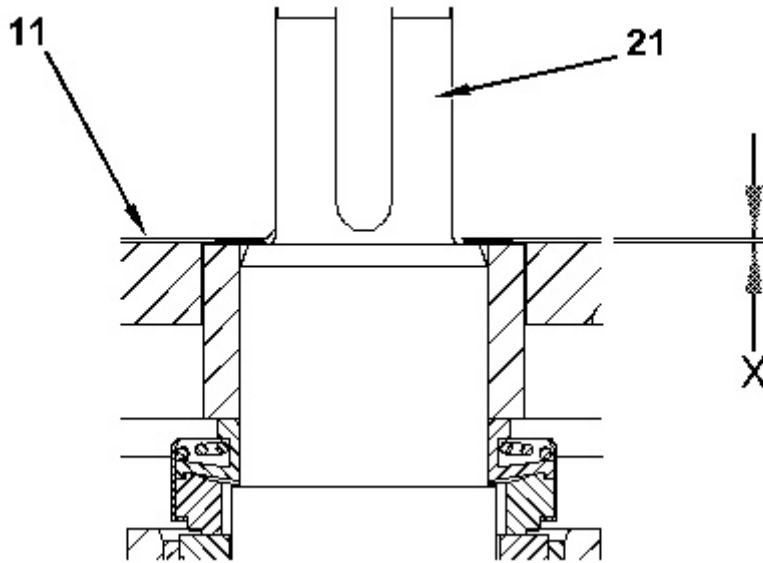


Illustration 19

g01057151

18. Determine the thickness of the shims for the impeller.

The shims will be used in order to obtain a clearance of 0.18 to 0.23 mm (0.007 to 0.009 inch) on each side of the impeller.

Place a straight edge on the face of the port plate (11) across the opening for shaft (21). Use a feeler gauge to measure Dimension (X) between the shoulder of the shaft and the face of the port plate.

The correct thickness of the shims is Dimension (X) plus the specification of the clearance. Table 2 is an example of the calculation.

Table 2

| Example of the Calculation for Determining the Thickness of the Shims |   |                         |   |                        |
|---|---|-------------------------|---|------------------------|
| Dimension (X)   |   | Clearance Specification |   | Thickness of the Shims |
| 0.56 mm<br>(0.022 inch)   | + | 0.20 mm<br>(0.008 inch) | = | 0.76 mm<br>(0.03 inch) |

In the example, the proper thickness for the shims is 0.76 mm (0.030 inch).



Illustration 20

g01057154

19. Install spacer (12) (not shown). Install shims (8). Install key (8A).

**Note:** The spacer and the shims will protrude slightly above the port plate. This is normal. When the impeller is installed, the spring in the ceramic seal will be compressed and the spacer and the shims will be pushed down.

**Note:** The impeller has threaded holes for the puller. Install the impeller with the holes toward the outside.



Illustration 21

g01057157

20. Use a suitable press to install impeller (7) onto the shaft. Be sure to support the shaft with a jack and/or blocks.

After the impeller is installed, rotate the impeller in order to make sure that the impeller does not rub.



Illustration 22

g00690890

21. Install the washer. Thoroughly clean the threads of the shaft and nut (6) with solvent. Apply Tooling (J) to the threads of nut (6). Install the nut. Tighten the nut to a torque of  $155 \pm 20 \text{ N}\cdot\text{m}$  ( $115 \pm 15 \text{ lb ft}$ ). Install the cotter pin in order to secure the nut.



Illustration 23

g01057162

22. Install ring (10). Ensure that O-ring seal (9) is in good condition. Install O-ring seal (9).

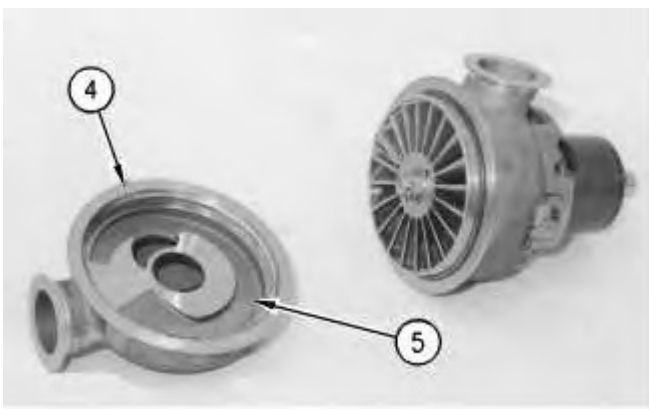


Illustration 24

g00603007

23. Lubricate port plate (5) with a solution of water and five percent soap. Install the port plate into body (4).



Illustration 25

g00690875

24. Install the body onto the auxiliary water pump. Attach the body to the auxiliary water pump with clamp (3). Tap the clamp while you tighten the bolt in order to ensure that the clamp seats properly.



Illustration 26

g01057164

25. Install gear (1) onto the shaft with the washer and bolt (2). Tighten the bolt to a torque of  $55 \pm 7 \text{ N}\cdot\text{m}$  ( $41 \pm 5 \text{ lb ft}$ ). Strike the bolt with a hammer and a punch. Tighten the bolt again to the same torque.

**End By:**

- a. Install the auxiliary water pump. Refer to Disassembly and Assembly, "Auxiliary Water Pump - Install".
-

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Configuration: 3512B Locomotive Engine 3ZW00001-UP

## Disassembly and Assembly 3500B Engines

Media Number -SEN6564-29

Publication Date -01/03/2015

Date Updated -14/09/2018

i03455280

# Auxiliary Water Pump - Assemble - Auxiliary Pump (Type 1)

SMCS - 1052-016

## Assembly Procedure

Table 1

| Required Tools |             |                          |     |
|----------------|-------------|--------------------------|-----|
| Tool           | Part Number | Part Description         | Qty |
| B              | 193-8094    | Spline Socket            | 1   |
| C              | 193-8100    | Socket                   | 1   |
| E              | 136-1452    | Retaining Ring Pliers As | 1   |
| F              | 152-7159    | Socket As                | 1   |
| L              | 1P-0520     | Driver Gp                | 1   |
| M              | 5P-4197     | Spacer                   | 1   |
| N              | 4C-4030     | Thread Lock Compound     | 1   |
| P              | 4C-4032     | Bearing Mount Compound   | 1   |
| Q              | 9S-3263     | Thread Lock Compound     | 1   |

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### NOTICE

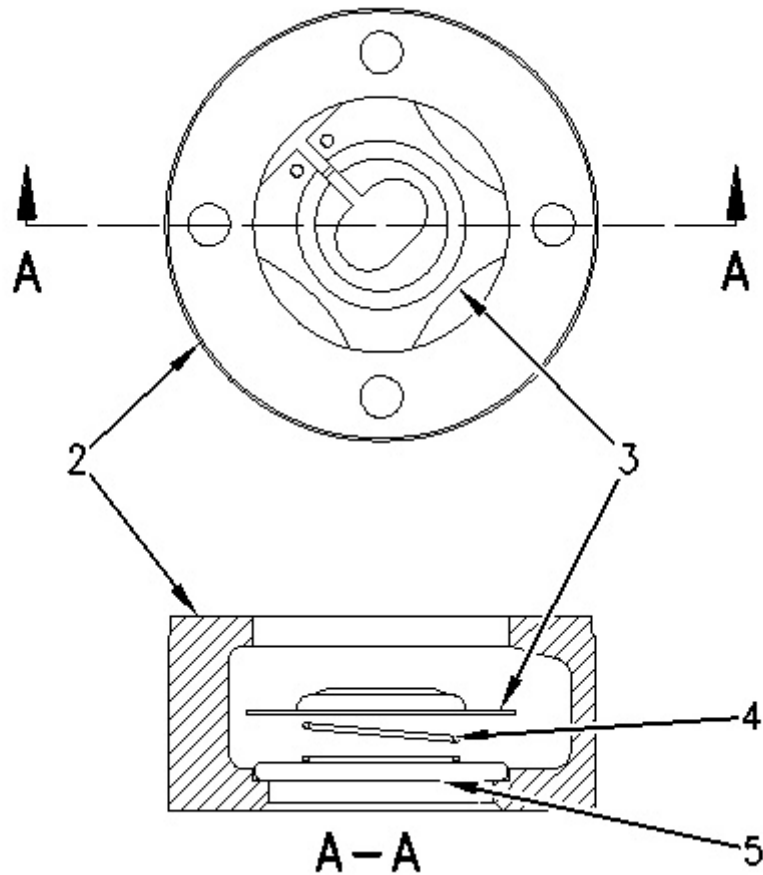
**Keep all parts clean from contaminants.**

**Contaminants may cause rapid wear and shortened component life.**

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## Assemble the Check Valve

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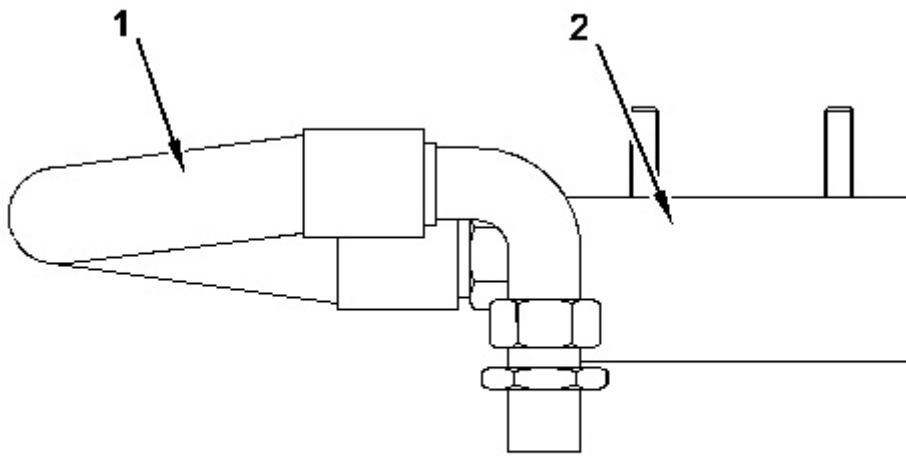


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Illustration 1

g00714974

1. Install disc (5) and spring (4) into the body of check valve (2).
  2. Use Tooling (E) in order to install retainer (3) into the body of check valve (2). After the retainer is installed, strike the retainer in order to ensure that the retainer is properly seated.
-



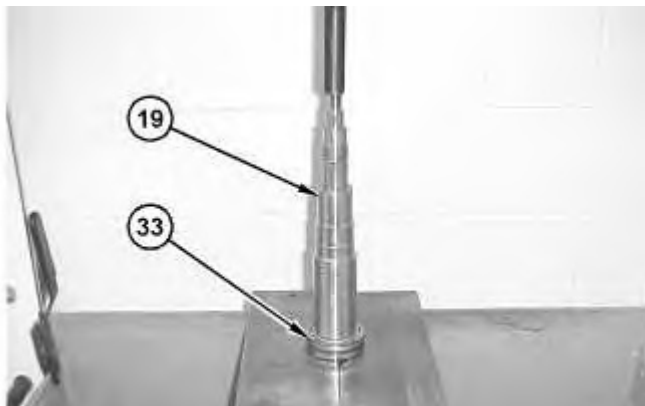
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Illustration 2

g01056041

3. Install hose assembly (1) to the body of check valve (2).

## Assemble the Pump



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Illustration 3

g01056378

1. Place shaft (19) and bearing (33) in a suitable press. Make sure that the serial number on the bearing is toward the driven end of the shaft. Insert the driven end of the shaft into the bearing. Press the shaft into the bearing until the shoulder of the shaft contacts the bearing.
-

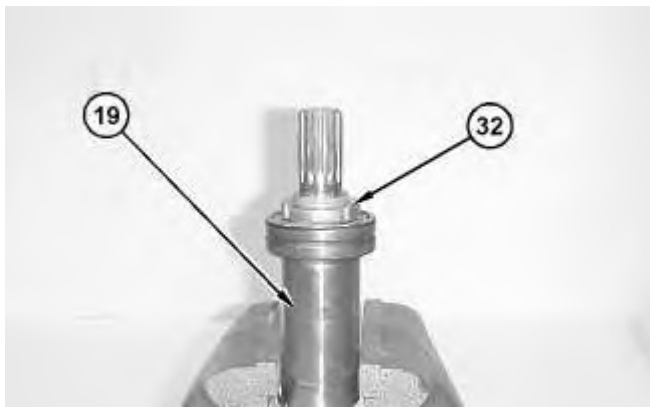


Illustration 4

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**Note:** Thoroughly clean the threads of shaft (19) and nut (32) with solvent before assembly.

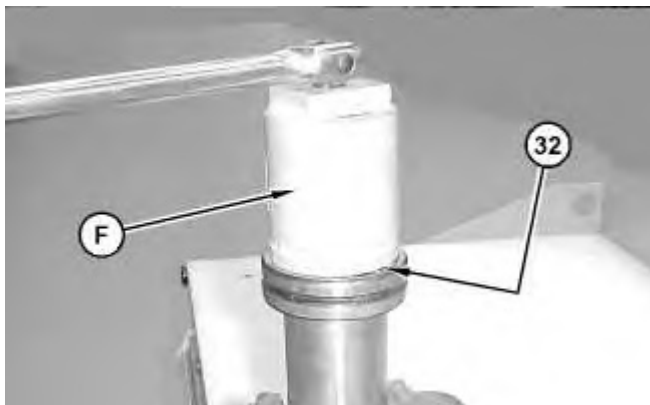


Illustration 5

g01055810

2. Secure the shaft in a vise with the driven end of the shaft in the upward position. Apply Tooling (N) to the threads of the shaft. Orient the tapered end of nut (32) (not shown) toward the bearing. Use Tooling (F) in order to tighten the nut to a torque of  $140 \pm 10 \text{ N}\cdot\text{m}$  ( $103 \pm 7 \text{ lb ft}$ ).

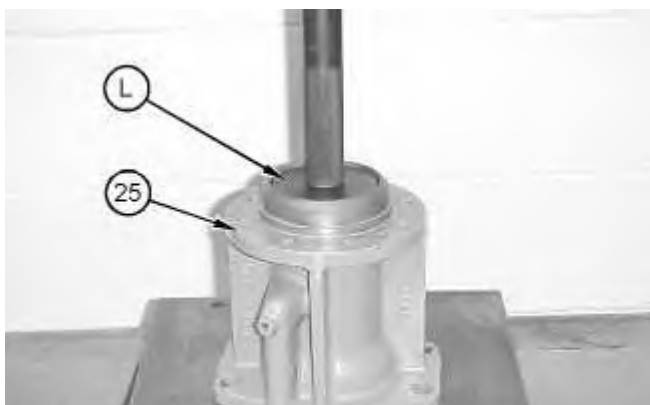


Illustration 6

g01056412



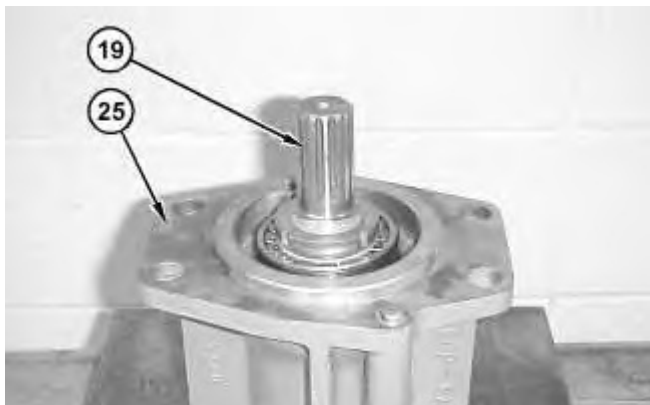


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Illustration 7

g01056415

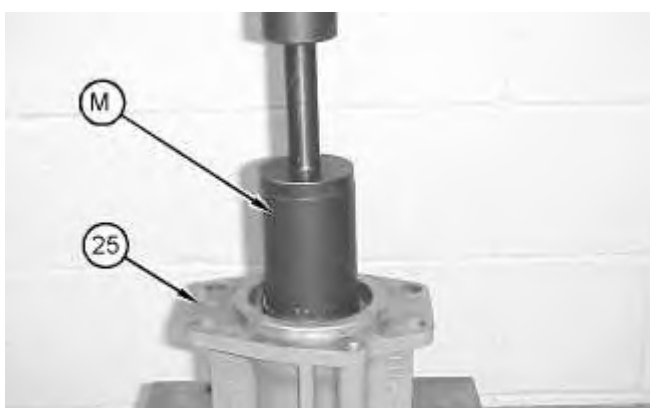
3. Use a suitable press and Tooling (L) in order to install bearing race (38) into bearing housing (25).



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Illustration 8

g01056417



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Illustration 9

g01056418

4. Place shaft (19) into bearing housing (25) with the driven end of the shaft in the upward position. Use a suitable press and Tooling (M) in order to install the shaft into the bearing housing.
-

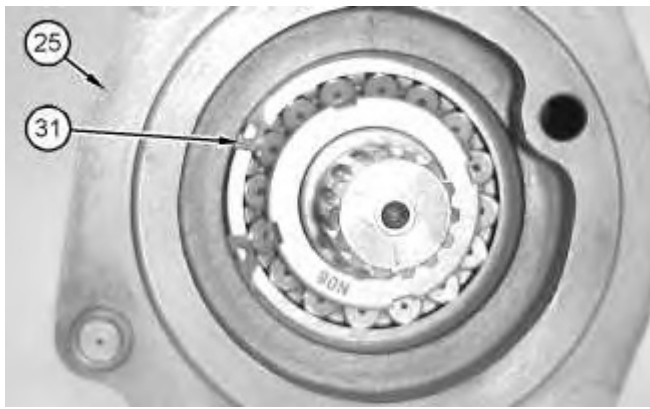


Illustration 10

g01055804

5. Place bearing housing (25) into a vise with the driven end of the shaft in the upward position. Use Tooling (E) in order to install retaining ring (31) into the bearing housing. After the retaining ring is installed, strike the ring with a punch in order to ensure that the ring is properly seated.



Illustration 11

g01055817

6. Place bearing housing (25) into a vise with the impeller end of the shaft in the upward position. Place bearing (37) into position with the serial number in the upward position. Use a hammer and a brass driver to install the bearing into the bearing housing.

Alternatively, use a suitable press with an appropriate sleeve to press the bearing into the housing.

7. Use Tooling (E) in order to install retaining ring (36) into bearing housing (25). Make sure that the side of the retaining ring with the bevel is upward. After the retaining ring is installed, strike the ring with a punch in order to ensure that the ring is properly seated.

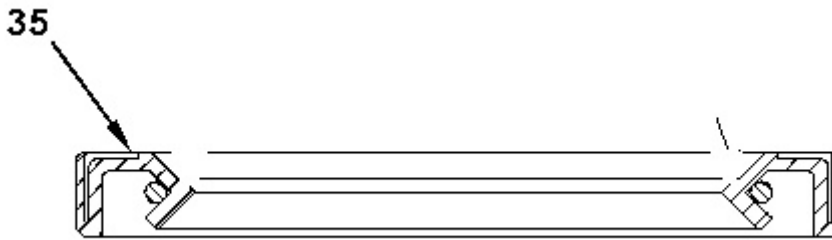


Illustration 12

g01056429

8. Lubricate the inner diameter (lip) of oil seal (35) with clean engine oil.



Illustration 13

g01056434

9. Lubricate the outer diameter of oil seal (35) with a solution of water and five percent soap. Install the oil seal into bearing housing (25).

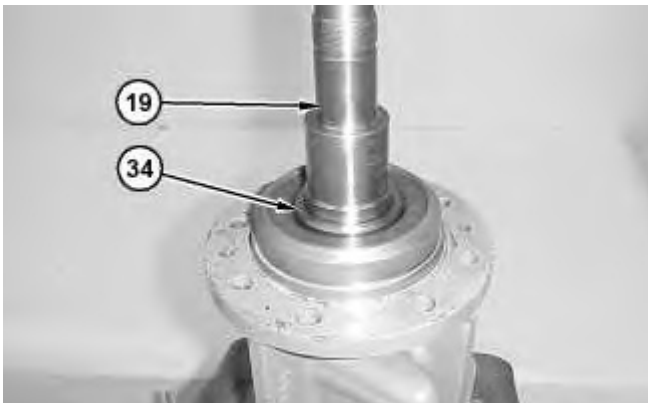


Illustration 14

g01056485

10. Thoroughly clean shaft (19) and collar (34) with solvent. Apply Tooling (P) to the shaft for 15 mm (0.6 inch) from the shoulder of the shaft at the bearing diameter. Install the collar onto the shaft. Rotate the collar for 180 degrees in both directions. Allow the compound to cure for 30 minutes.



Illustration 15

g01055803

11. Install O-ring seal (30) on shaft (19) and install the O-ring seal over the collar.

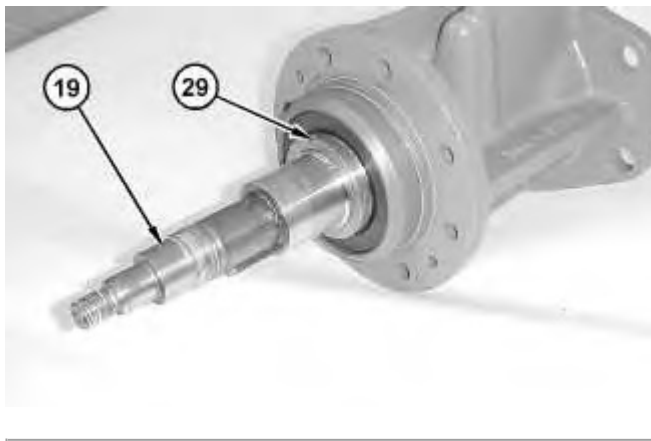


Illustration 16

g01055802

12. Install ring (29) on shaft (19) and install the ring over the O-ring seal. Make sure that the side of the ring with the step is oriented toward the O-ring seal. Maintain approximately  $490 \pm 45$  N ( $110 \pm 10$  lb) of pressure on ring (29) and use an allen wrench to tighten the screws to a torque of  $0.9 \pm 0.1$  N·m ( $7.97 \pm 0.10$  lb in). After the screws are tightened, use a small center punch to peen the threads in the ring.

**Note:** Carefully inspect the surface of the ceramic seal. If the surface is cracked or scratched, discard the seal and obtain a new seal for installation. Ensure that the faces of the seal are clean.

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