

Product: INDUSTRIAL ENGINE  
Model: 3512B INDUSTRIAL ENGINE BR2  
Configuration: 3512B Industrial Engine BR200001-UP

## Disassembly and Assembly 3500B Engines

Media Number -UENR0181-11

Publication Date -01/09/2018

Date Updated -14/09/2018

i03351722

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

SMCS - 1371-015

## Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-2320	Combination Puller (Two Jaw or Three Jaw)	1
B	193-8094	Spline Socket	1
C	193-8100	Socket (Impeller Nut)	1
D	1P-0510	Driver Gp	1
E	136-1452	Retaining Ring Pliers As	1
F	152-7159	Socket As (Water Pump Shaft)	1
G	1U-7600	Slide Hammer Puller Gp	1
H	1P-0074	Slide Hammer Puller Gp	1
J	-	M10 x 125 Forcing Bolts	2
K	-	M8 x 1.25 Bolts	2

### Start By:

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

## NOTICE

**Keep all parts clean from contaminants.**

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

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## Disassemble the Check Valve

**Note:** If the hose assembly is leaking, the entire hose assembly must be replaced.

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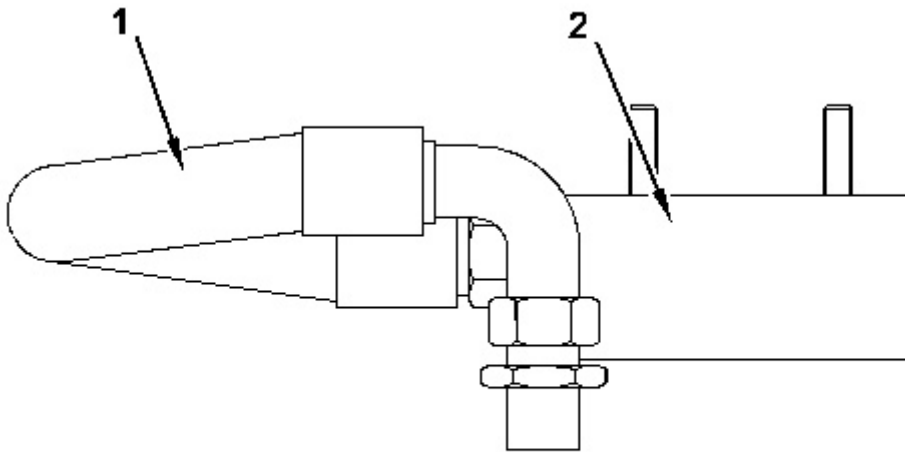


Illustration 1

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1. Remove hose assembly (1) from the body of check valve (2) .
-

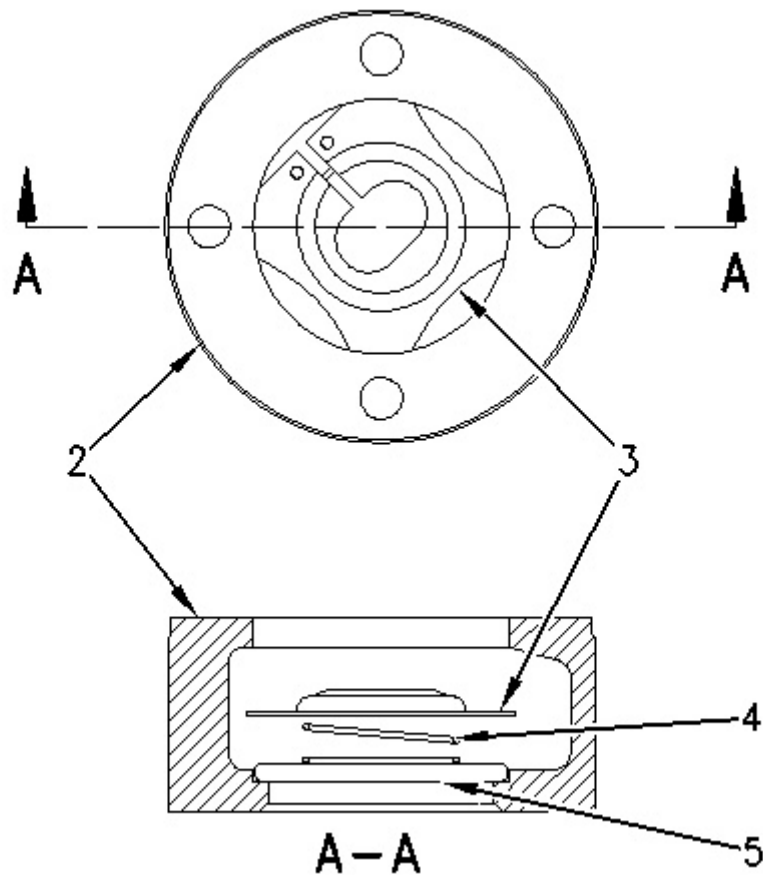


Illustration 2

g00714974

## **WARNING**

**Personal injury can result from parts and/or covers under spring pressure.**

**Spring force will be released when covers are removed.**

**Be prepared to hold spring loaded covers as the bolts are loosened.**

2. Use Tooling (E) in order to remove retainer (3) from the body of check valve (2) .
3. Remove spring (4) and disc (5) from the body of check valve (2) .

## **Disassemble the Pump**

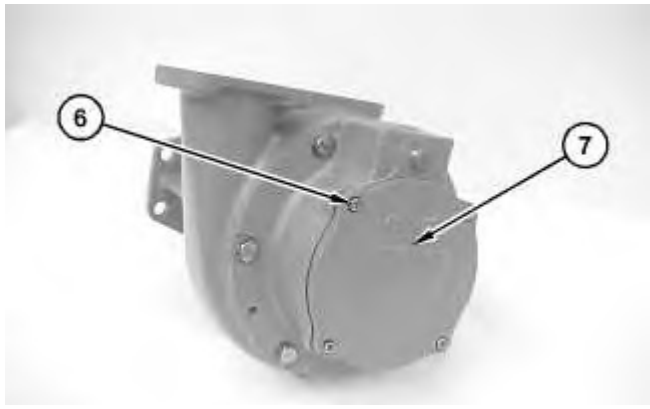


Illustration 3

g01055763

1. Remove bolts (6) in order to remove cover (7) .

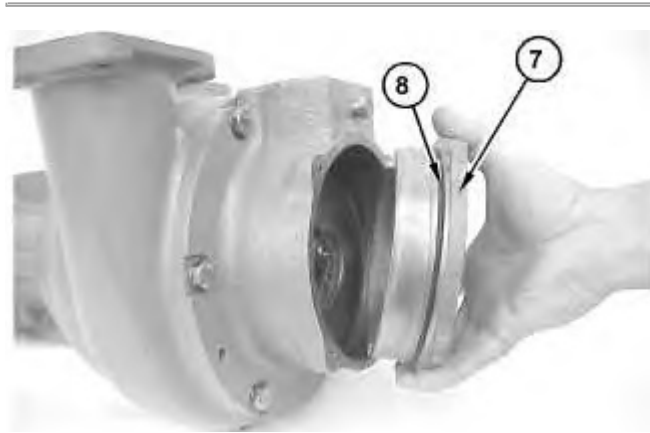


Illustration 4

g01055766

2. Remove O-ring seal (8) from cover (7) .



Illustration 5

g01055768

3. Remove port plate (9) .



Illustration 6

g01055769

4. Remove nut (10) and the washer.

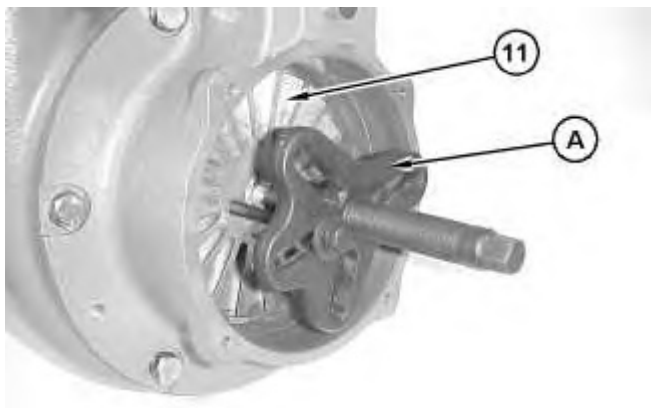
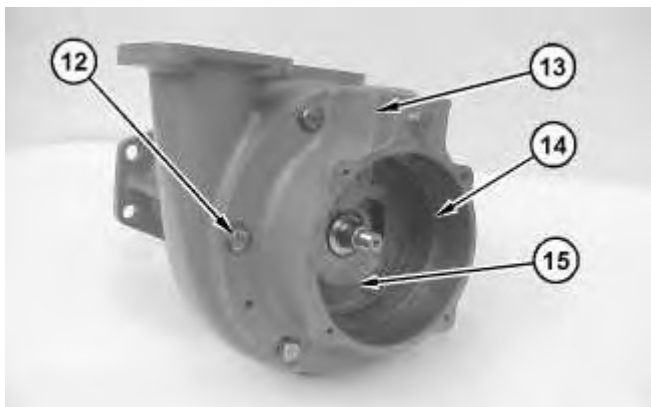


Illustration 7

g01055770

5. Use Tooling (A) in order to remove impeller (11) .



6. Remove bolts (12) from body (13) .

**Note:** Ring (14) and port plate (15) will remain inside when the body is removed.



Illustration 9

7. Use Tooling (J) in order to remove body (13) .



Illustration 10

8. Remove O-ring seal (16) from body (13) .
-

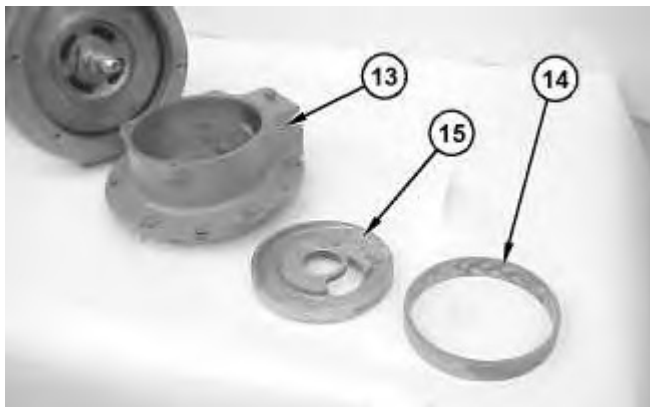


Illustration 11

g01055783

9. Remove ring (14) and port plate (15) from body (13) .

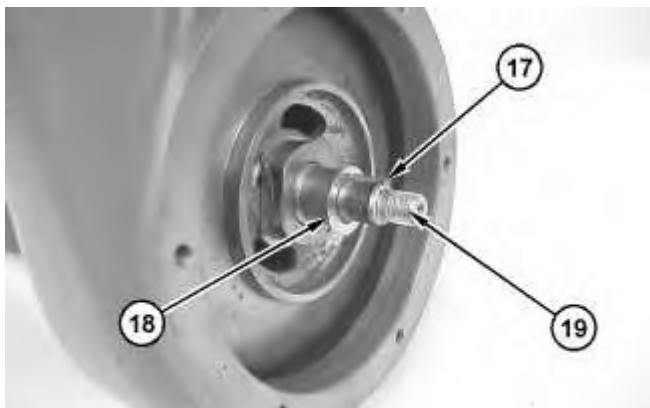


Illustration 12

g01055786

10. Remove key (17) and shim (18) from shaft (19) .

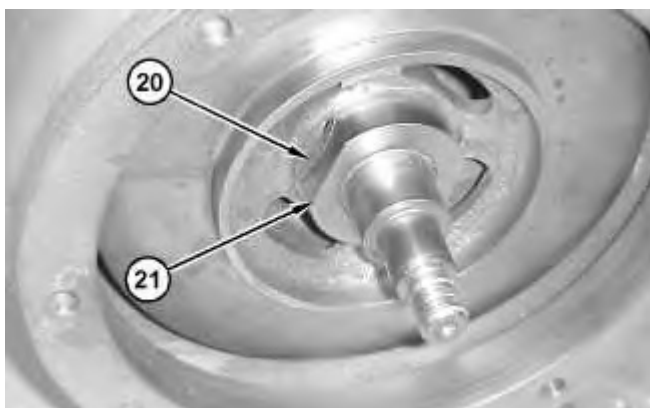


Illustration 13

g01055789

11. Bend the tabs of lockwasher (20) away from the flats of locknut (21) .

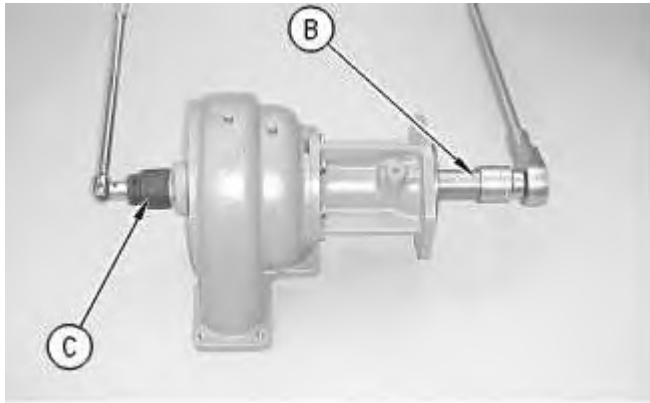


Illustration 14

g00705829

12. Hold the driven end of the shaft with Tooling (B) . Use Tooling (C) in order to loosen the locknut.

Remove the locknut and the lockwasher from the shaft. Use a new lockwasher upon assembly.



Illustration 15

g01055791

13. Use Tooling (A) in order to remove impeller (22) .
-





Illustration 16

g01055793

14. Place body (23) in the downward position. Remove bolts and washers (24) that attach bearing housing (25) to the body.

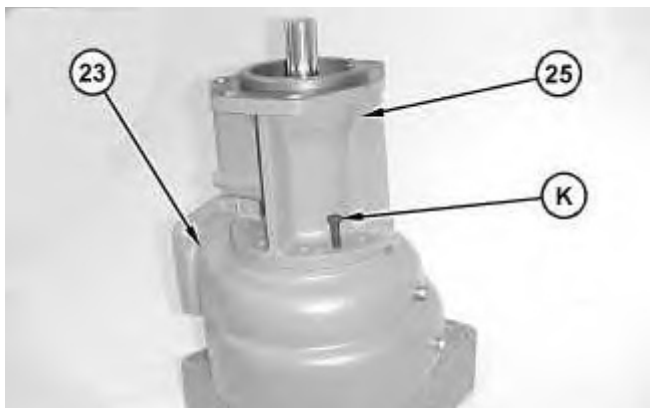


Illustration 17

g01055795

15. Use Tooling (K) in order to force bearing housing (25) from body (23) .



Illustration 18

g01055796

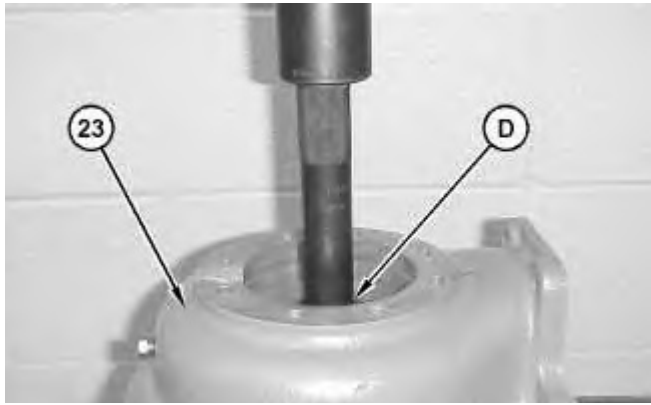


Illustration 19

g01055798

16. Use Tooling (D) and a suitable press in order to remove the stationary segment of ceramic seal (26) from body (23) .



Illustration 20

g01055799

17. Remove ring (27) and the rotating segment of ceramic seal (28) from shaft (19) .



18. Use an allen wrench to loosen the screws that hold ring (29) to shaft (19) . Remove the ring.



Illustration 22

19. Remove O-ring seal (30) from shaft (19) .

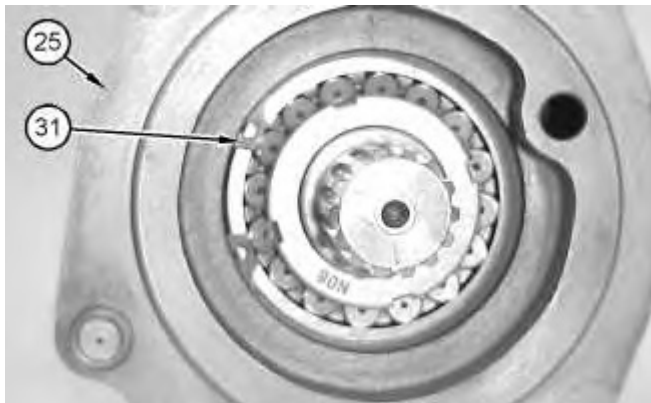


Illustration 23

20. Place bearing housing (25) in a vise with the driven end of the shaft in the upward position. Use Tooling (E) in order to remove retaining ring (31) .

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### NOTICE

**Do not allow the shaft to fall when the shaft is removed from the bearing housing.**

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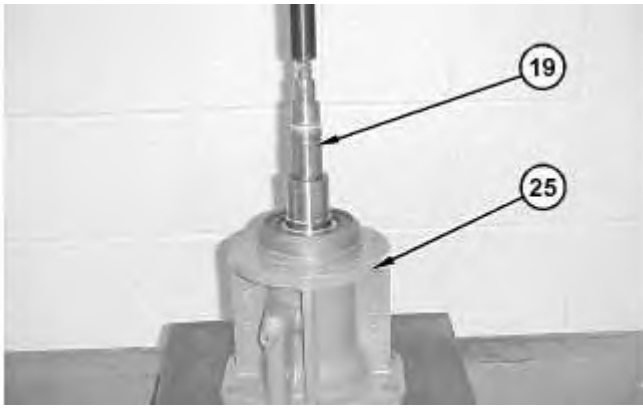


Illustration 24

g01055806

21. Place bearing housing (25) and shaft (19) in a suitable press. Orient the impeller end of the shaft in the upward position. Press the shaft out of the bearing housing.

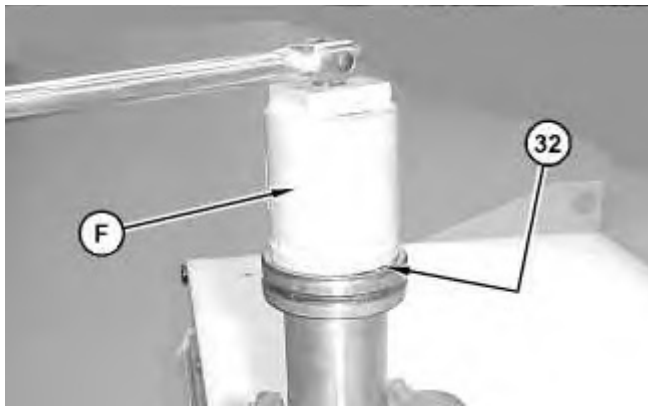


Illustration 25

g01055810

22. Place the shaft in a vise. Orient the driven end of the shaft in the upward position. Use Tooling (F) in order to remove nut (32) (not shown) from the shaft.

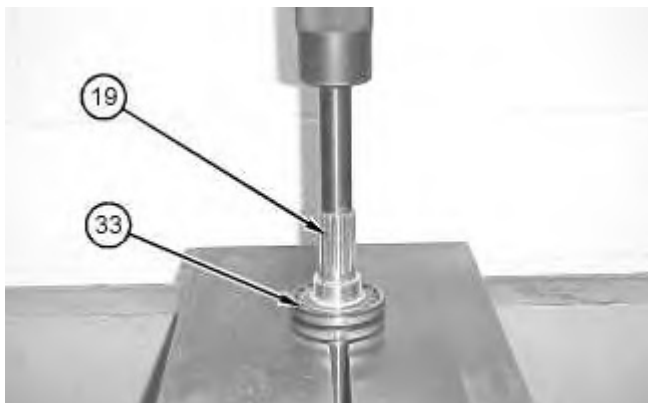


Illustration 26

g01055815

23. Place shaft (19) and bearing (33) in a suitable press. Orient the driven end of the shaft in the upward position. Press the shaft out of the bearing.

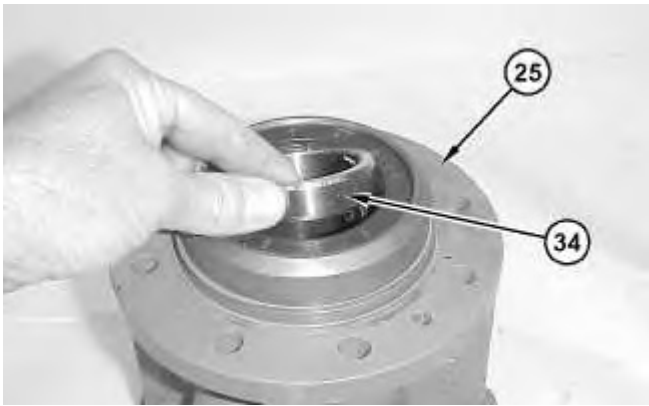


Illustration 27

g01055814

24. Remove collar (34) from bearing housing (25) .

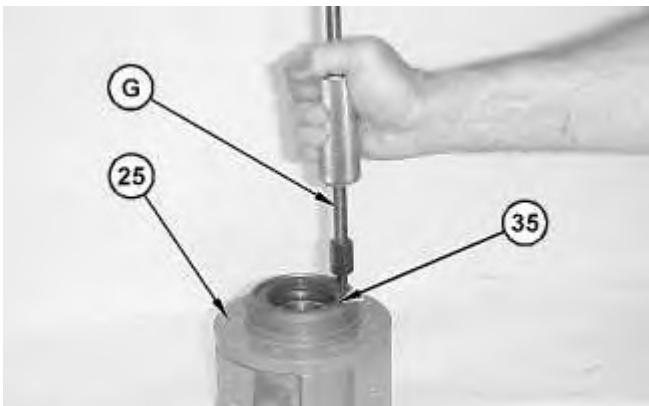
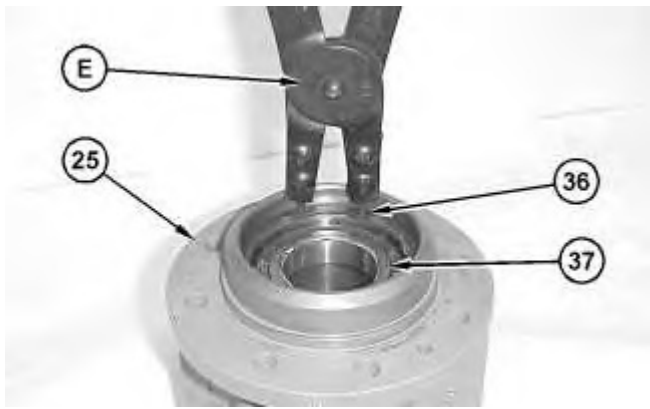


Illustration 28

g01055816

25. Use Tooling (G) in order to remove oil seal (35) from bearing housing (25) .
-



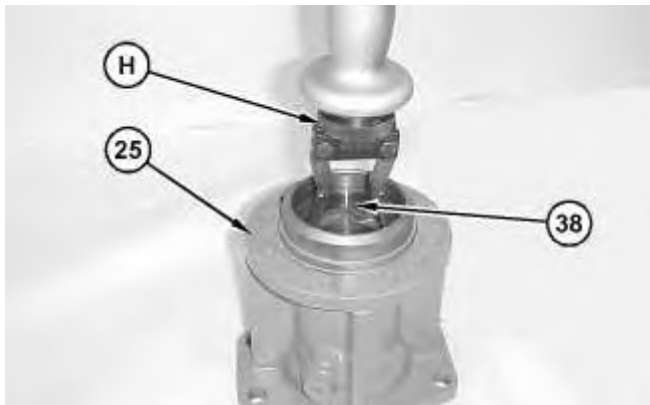
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Illustration 29

g01055817

26. Use Tooling (E) in order to remove retaining ring (36) from bearing housing (25) .

27. Remove bearing (37) from bearing housing (25) .



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Illustration 30

g01055821

28. Use Tooling (H) in order to remove bearing race (38) from bearing housing (25) .

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Configuration: 3512B Industrial Engine BR200001-UP

## Disassembly and Assembly 3500B Engines

Media Number -UENR0181-11

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Date Updated -14/09/2018

i02062541

# Auxiliary Water Pump - Assemble - Auxiliary Sea Water Pump

SMCS - 1371-016

## 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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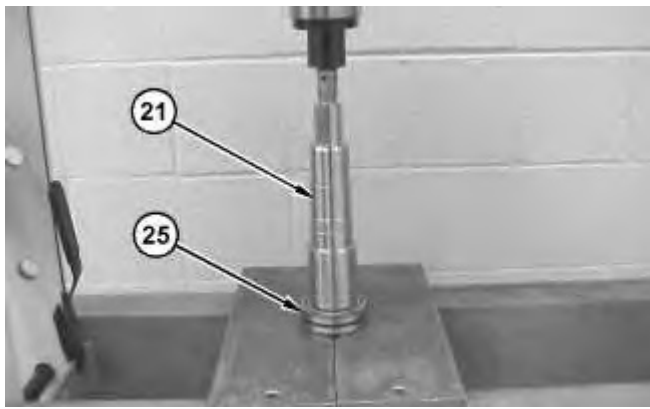


Illustration 1

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.

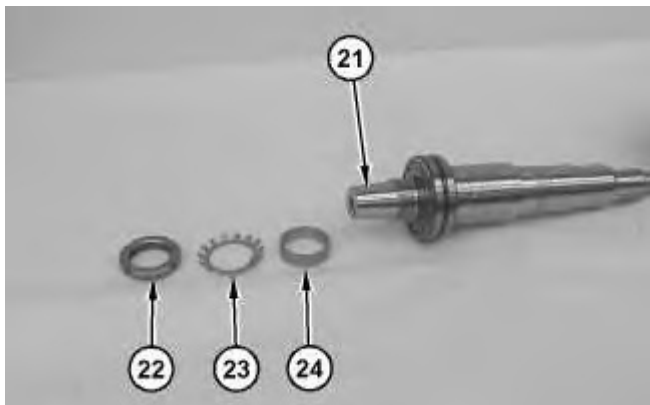


Illustration 2

g01057051

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.

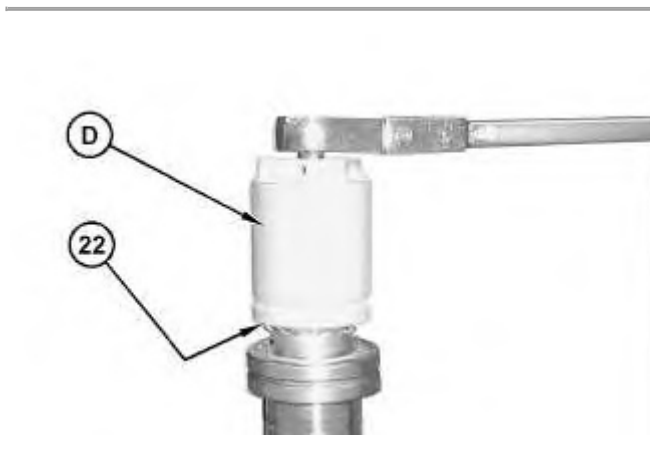


Illustration 3

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).



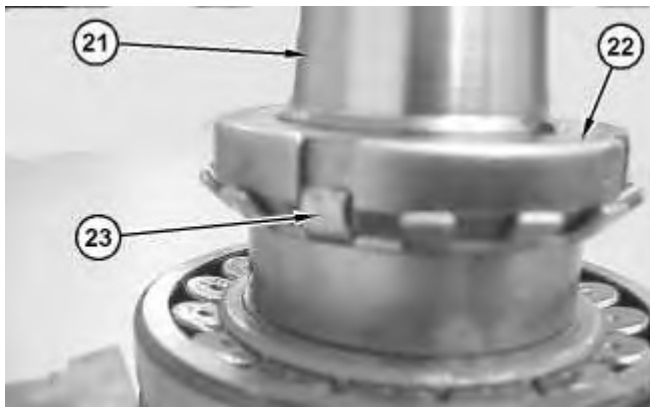


Illustration 4

g01057045

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

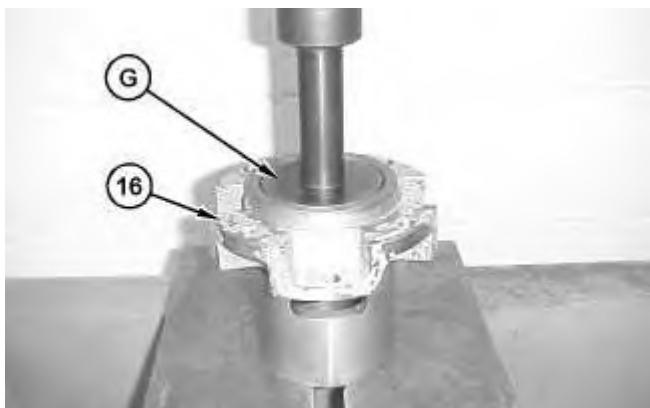


Illustration 5

g01057103



Illustration 6

g01057060

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

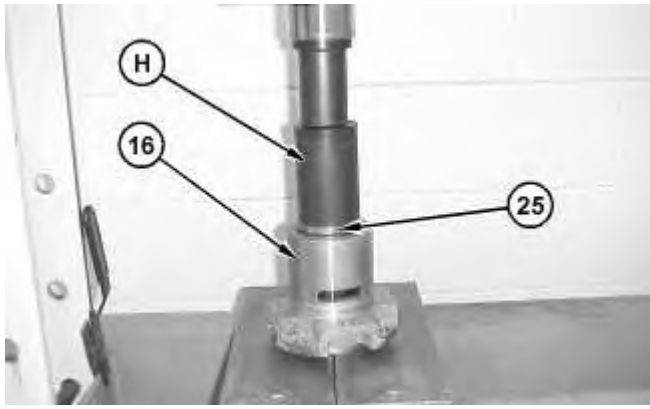


Illustration 7

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.

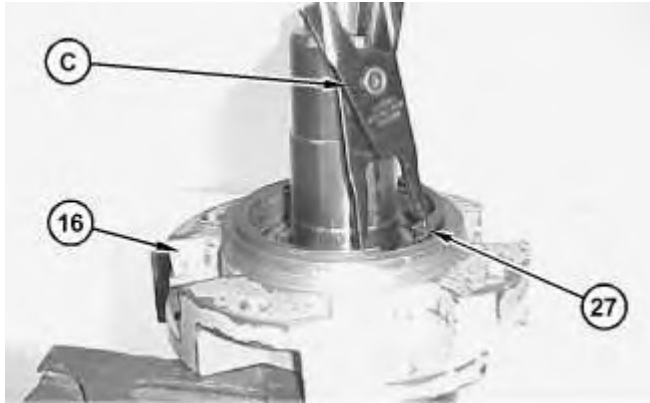


Illustration 10

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.

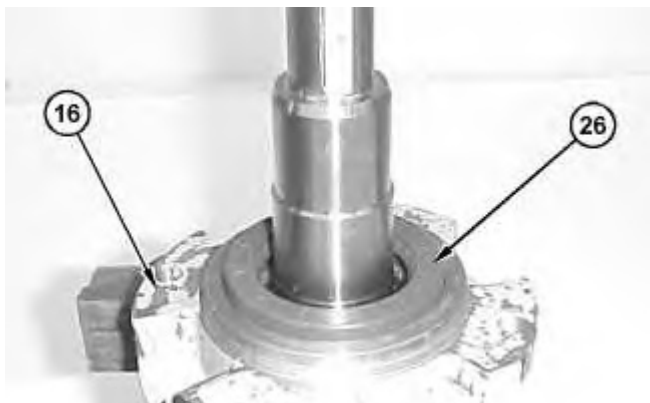


Illustration 11

g01057128

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

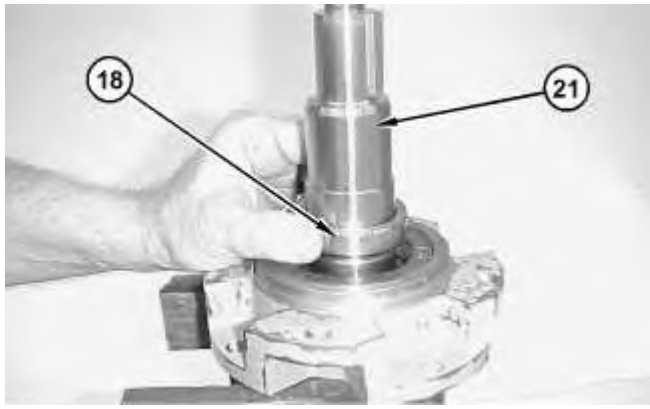


Illustration 12

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.

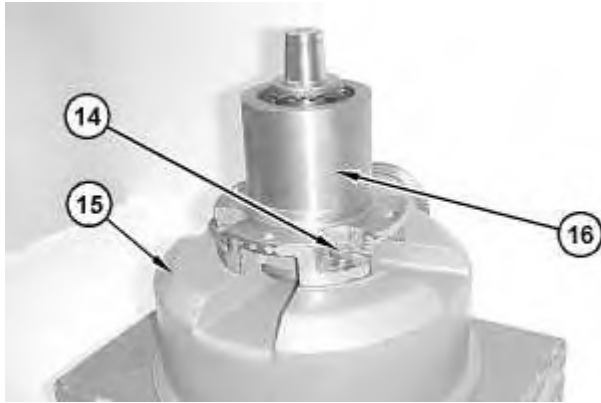


Illustration 15

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).

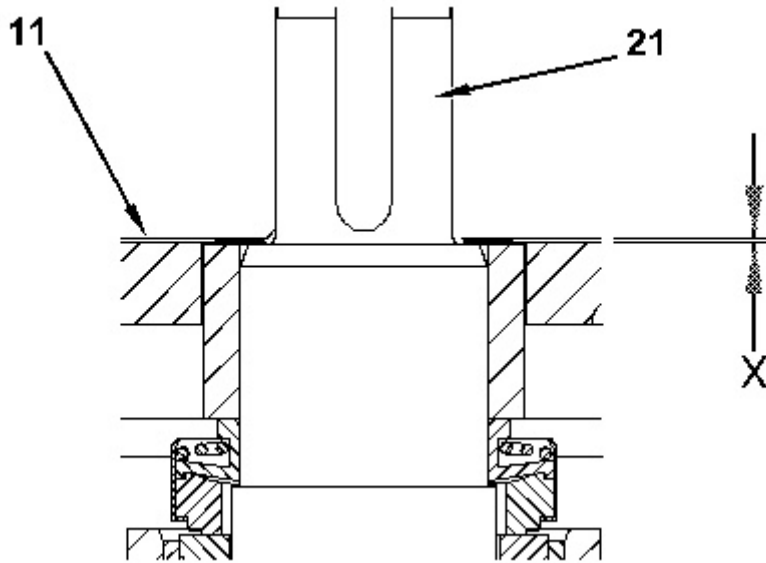


Illustration 19

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 (0.022 inch)	+	0.20 mm (0.008 inch)	=	0.76 mm (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).

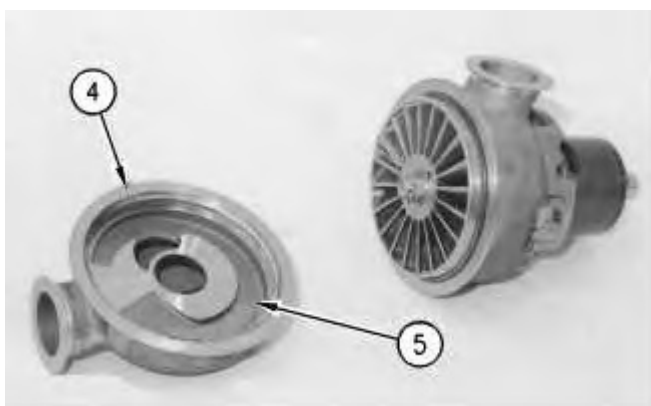


Illustration 24

g00603007

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

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