



Service Repair Manual

Models

329E and 329EL Excavator

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Product: EXCAVATOR

Model: 329E EXCAVATOR PTY

Configuration: 329E & 329E L Excavators PTY00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly

C7.1 Engines for Caterpillar Built Machines

Media Number -KENR8881-05

Publication Date -01/11/2012

Date Updated -10/05/2016

i05909563

Vibration Damper and Pulley - Remove

SMCS - 1205-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M14 x 1.5 by 100 mm	1
B	227-4393	E18 Torx Socket	1

Start By:

- A. Remove the alternator belt. Refer to Disassembly and Assembly, "Alternator Belt - Remove and Install" for the correct procedure.

Note: The weight of the assembly of the crankshaft pulley, the vibration damper, and the crankshaft adapter is approximately 22 kg (48 lb).

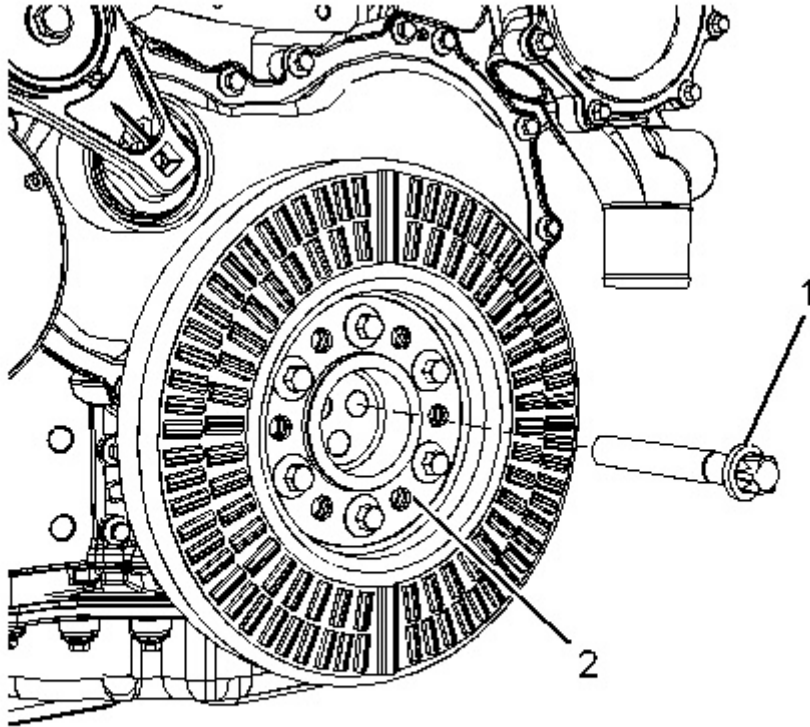


Illustration 1

g02368017

1. Use a suitable tool in order to prevent the crankshaft from rotating. Use Tooling (B) to remove one Torx screws (1) from crankshaft pulley assembly (2) .
 2. Install Tooling (A) into crankshaft pulley assembly (2) .
 3. Remove remaining Torx screws (1) from crankshaft pulley assembly (2) .
 4. Remove crankshaft pulley assembly (2) .
 5. Tooling (A) .
-

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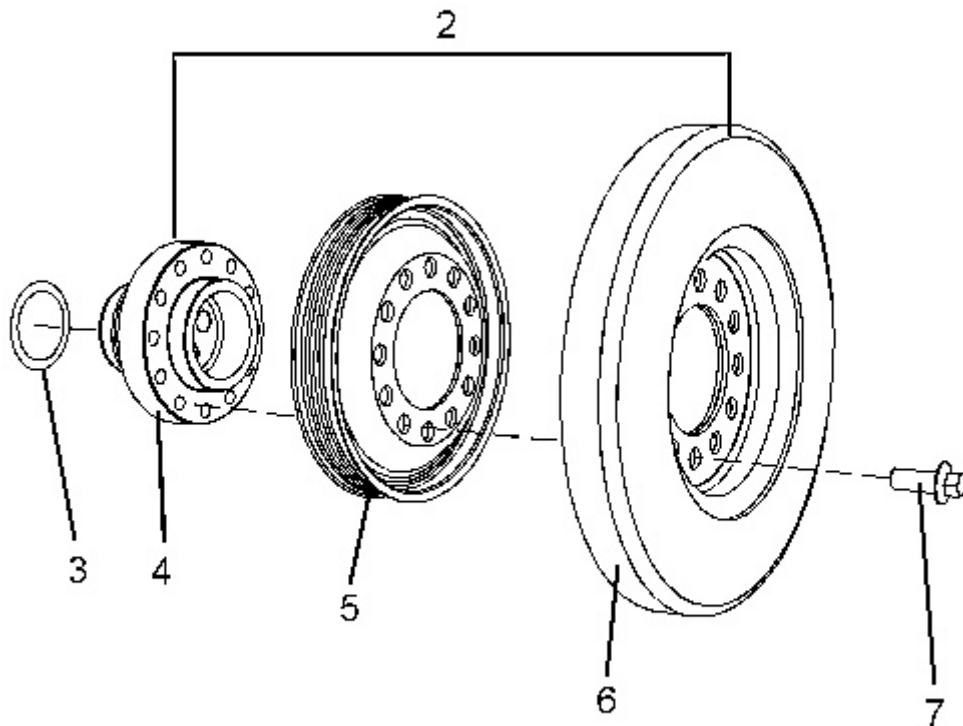


Illustration 2

g02368018

6. If necessary, follow Step 6.a through Step 6.b in order to remove friction shim (3) from the crankshaft.
 - a. Remove the front seal from the front cover. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install" for the correct procedure.
 - b. Remove friction shim (3) .
7. If necessary, follow Step 7.a through Step 7.c in order to disassemble vibration damper, crankshaft pulley from crankshaft adapter.
 - a. Place the crankshaft pulley assembly onto a suitable support.
 - b. Remove bolts (7) from crankshaft pulley assembly (2) .
 - c. Remove vibration damper (6) and crankshaft pulley (5) from adapter (4) .

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Vibration Damper and Pulley - Install

SMCS - 1205-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M14 x1.5 by 100 mm	1
B	227-4393	E18 Torx Socket	1
C	8T-3052	Degree Wheel	1
D	-	Guide Stud M12 x1.75 by 50 mm	2

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

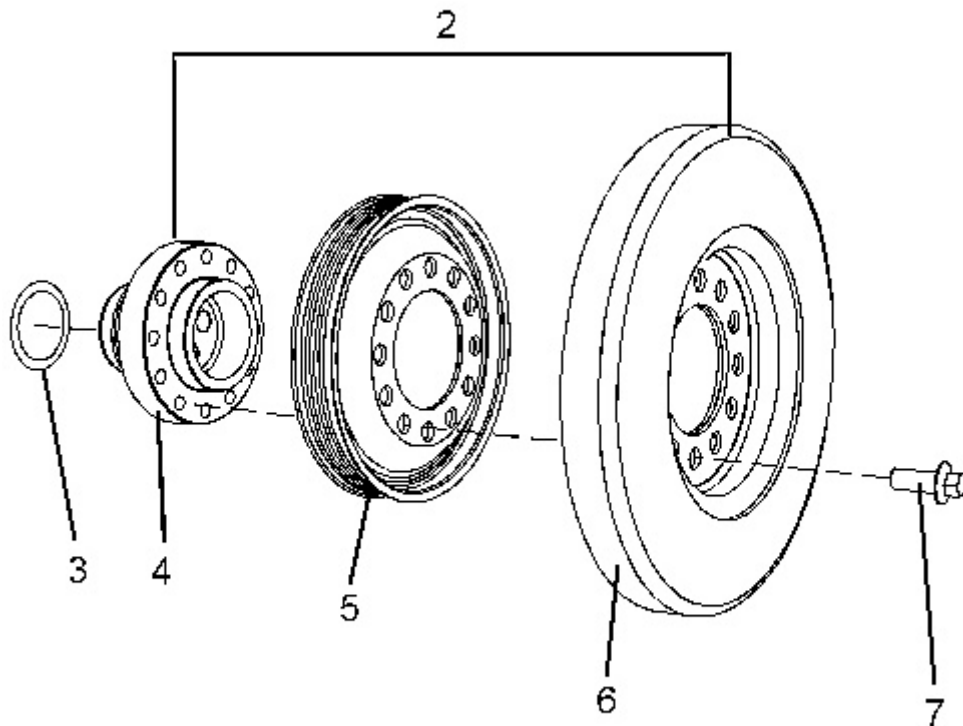


Illustration 1

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1. Ensure that the crankshaft adapter and the front of the crankshaft are clean and free from damage.
2. Inspect vibration damper (6) for damage. If necessary, replace the vibration damper.
3. If necessary, follow Step 3.a through Step 3.e in order to install vibration damper, crankshaft pulley to crankshaft adapter.
 - a. Place crankshaft adapter (4) onto a suitable support.
 - b. Install Tooling (D) crankshaft adapter (4) .
 - c. Install crankshaft pulley (5) and vibration damper (6) over Tooling (D) .
 - d. Install bolts (7) to the crankshaft pulley assembly.
Note: Evenly space bolts (7) around the crankshaft pulley assembly.
 - e. Tighten bolts (7) to a torque of 115 N·m (85 lb ft).
4. If necessary, install friction shim (3) . Follow Step 4.a through Step 4.b in order to install friction shim (3) .
 - a. Install friction shim (3) .

- b. Install a new front seal to the front cover. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install" for the correct procedure.

5. Install Tooling (A) to the crankshaft.

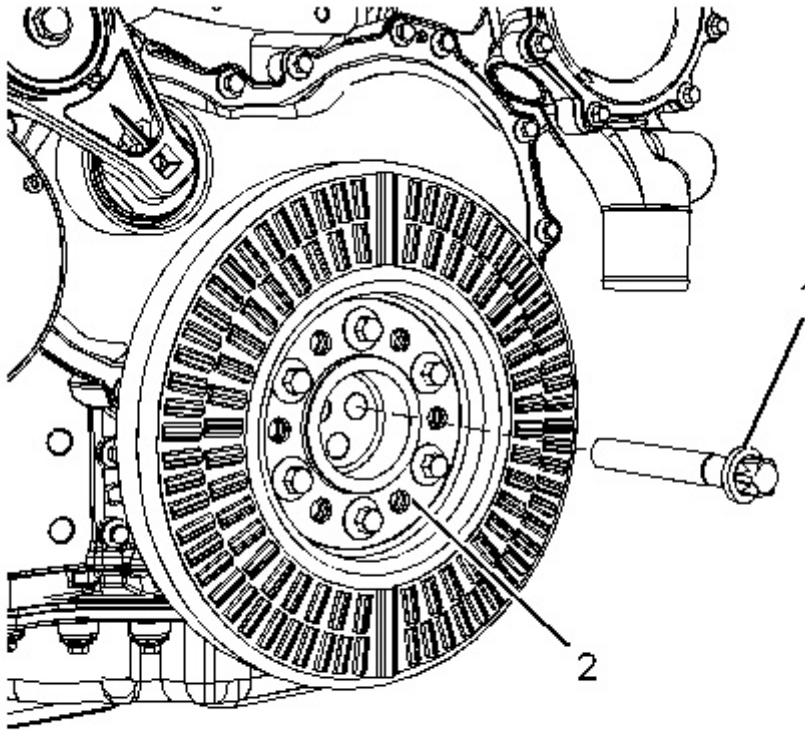


Illustration 2

g02368017

6. Install crankshaft pulley assembly (2) onto the crankshaft.
7. Install one Torx screws (1) to crankshaft pulley assembly (2) hand tighten.
8. Remove Tooling (A) .
9. Install remaining Torx screws (1) to crankshaft pulley assembly (2) .
10. Use a suitable tool in order to prevent the crankshaft from rotating. Tighten Torx screws (1) to a torque of 40 N·m (29 lb ft).
11. Use Tooling (B) and Tooling (C) to turn Torx screws (1) through an additional 120 degrees.

End By: Install the alternator belt. Refer to Disassembly and Assembly, "Alternator Belt - Remove and Install" for the correct procedure.

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Disassembly and Assembly
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Media Number -KENR8881-05

Publication Date -01/11/2012

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i05246993

Crankshaft Front Seal - Remove and Install

SMCS - 1160-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	367-3534	Oil Seal Removal & Installer Tool	1

Start By:

- A. Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove" for the correct procedure.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

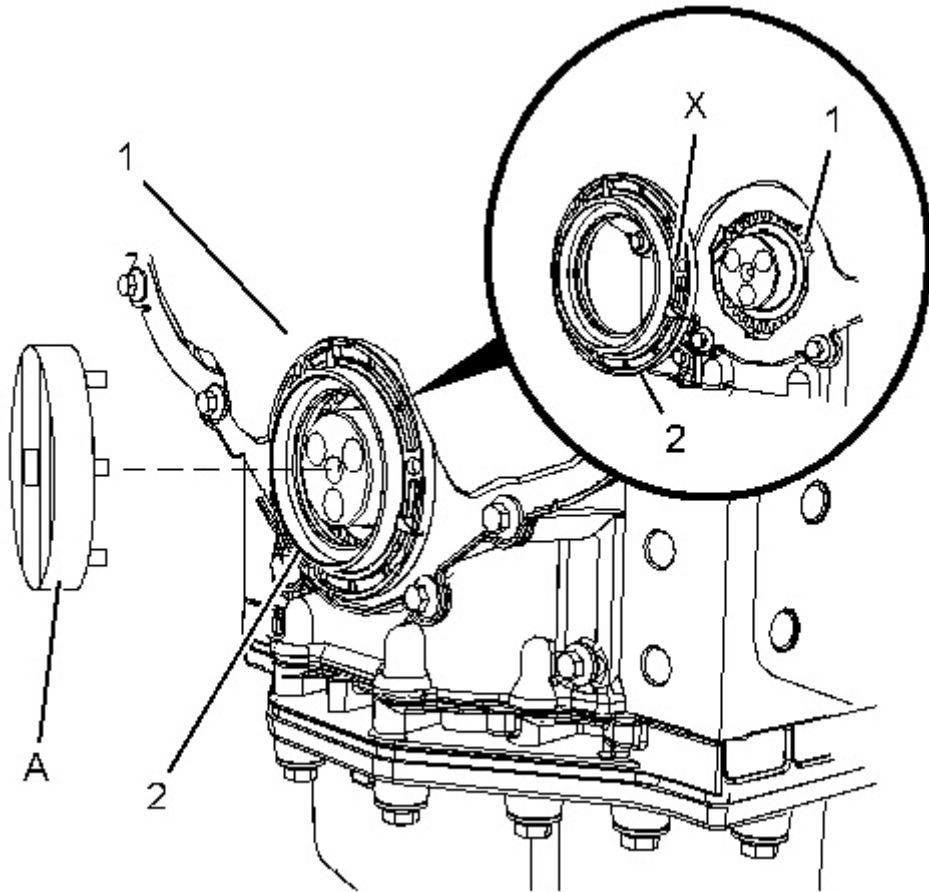


Illustration 1

g03344801

1. Position Tooling (A) onto crankshaft front seal (2) .
2. Turn Tooling (A) in a counterclockwise direction and remove crankshaft front seal (2) from front cover (1) .

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	367-3534	Oil Seal Removal & Installer Tool	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the front cover is clean and free from damage.

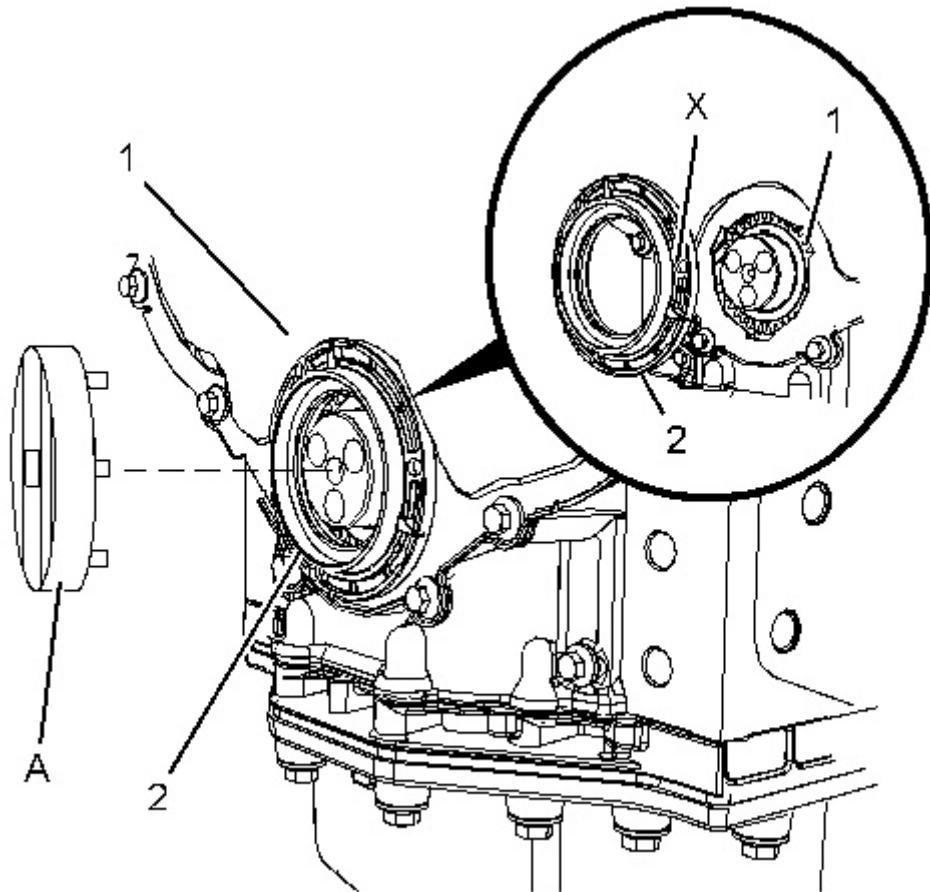


Illustration 2

g03344801

2. Correctly position a new crankshaft front seal (2) in Position (X) onto front cover (1) .
3. Position Tooling (A) onto crankshaft front seal (2) .
4. Use Tooling (A) in order to turn crankshaft front seal (2) in clockwise direction.
5. If a torque greater than 50 N·m (37 lb ft) is necessary, in order to install crankshaft front seal (2) . Remove crankshaft front seal (2) . Inspect the crankshaft front seal and the front cover for faults or damage.
6. If necessary repeat Step 2 through Step 5 in order to install crankshaft front seal (2) .

End By: Install the crankshaft pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Install" for the correct procedure.

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i03934107

Front Cover - Remove and Install - Heavy Duty Front Cover

SMCS - 1166-010

Removal Procedure

Start By:

- a. Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove" for the correct procedure.
 - b. If the engine is equipped with a fan, remove the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install" for the correct procedure.
 - c. Remove the front seal. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install" for the correct procedure.
-

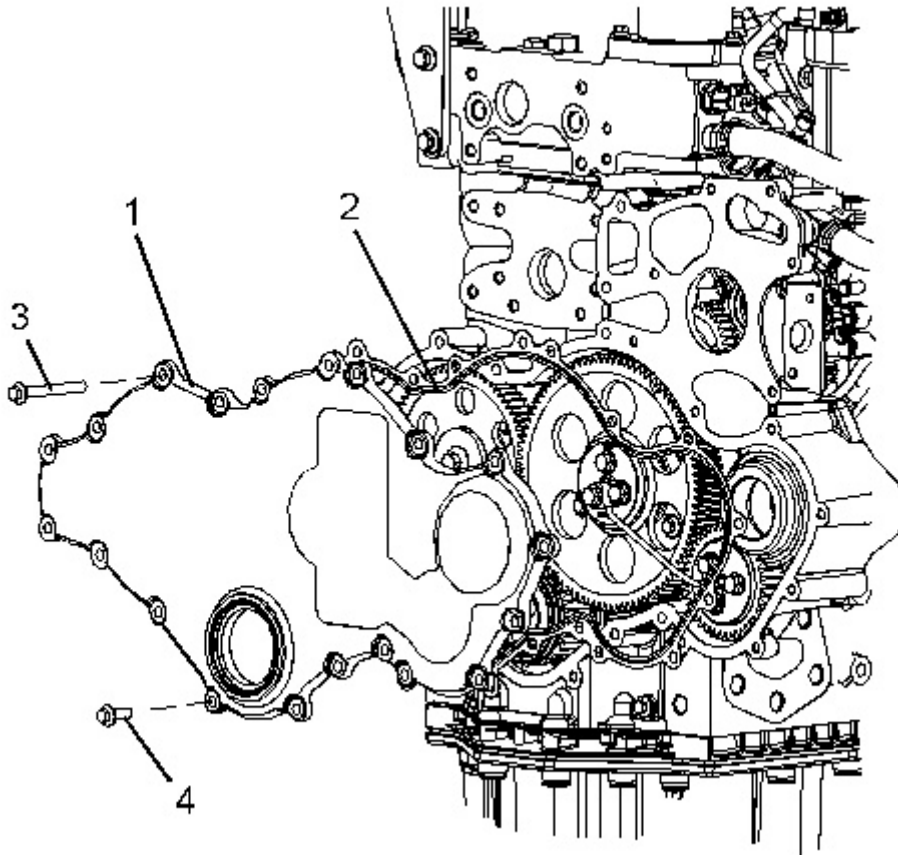


Illustration 1

g02048613

1. Remove bolts (3) and bolts (4). Identify the positions of bolts of different length.
2. Remove front cover (1) from the front housing.
3. Remove gasket (2) from front cover (1).

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M8 by 70 mm	2
B	364-7210	Front Cover Alignment Tool	1

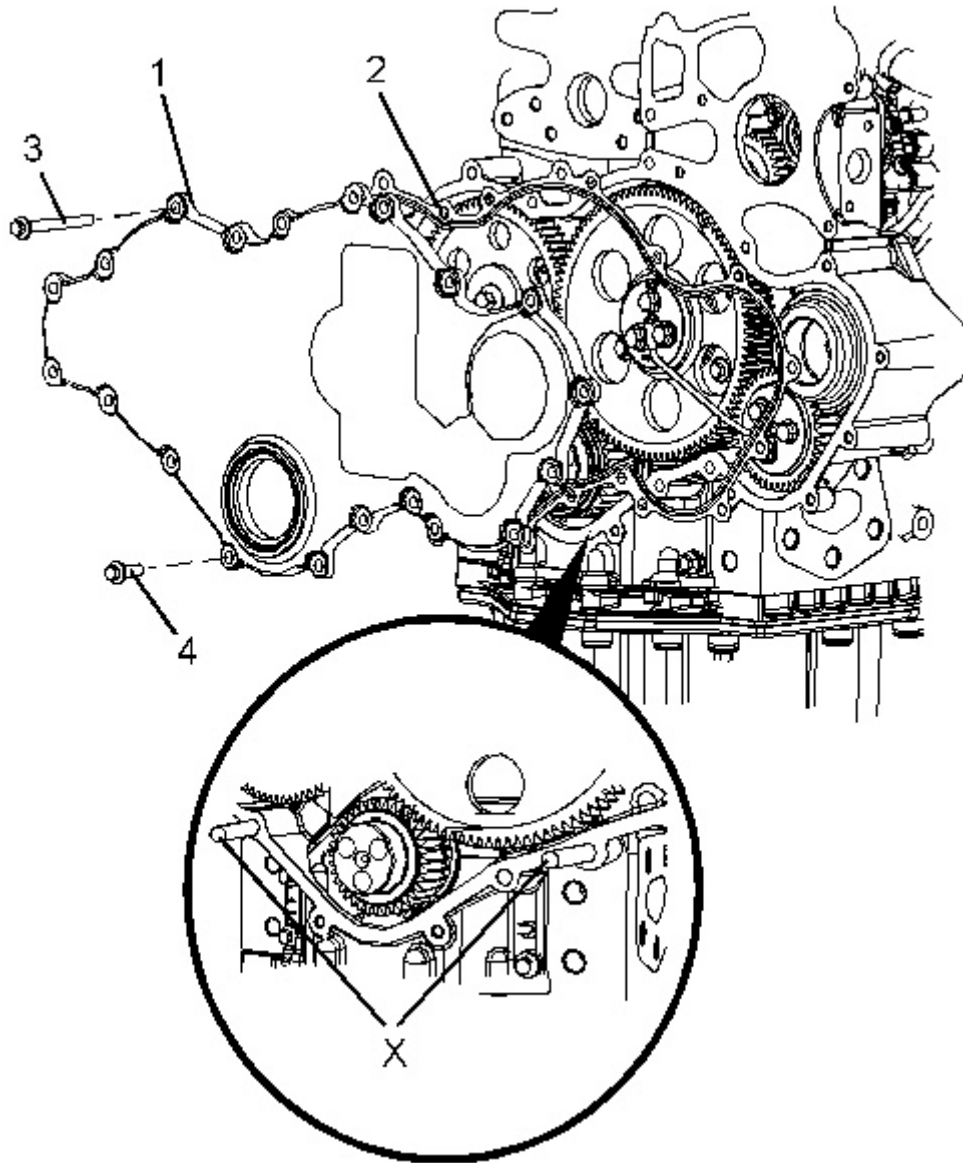


Illustration 2

g02190213

1. Ensure that all components are clean and free from damage. Replace any damaged components.
2. Thoroughly clean the gasket surface of the front housing.
3. Thoroughly clean front cover (1).
4. Install Tooling (A) into Holes (X) in the front housing.
5. Install a new gasket (2) onto Tooling (A).
6. Install front cover (1) onto Tooling (A).
7. Install bolts (3) and bolts (4) finger tight. Ensure that the bolts of different length are installed in the correct positions.
8. Use Tooling (B) to align the front cover assembly.

9. Remove Tooling (A) and install remaining bolts (4).
10. Tighten bolts (3) and bolts (4) to a torque of 22 N·m (195 lb in).
11. Remove Tooling (B).
12. Install a new front seal to the front cover. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install" for the correct procedure.

End By:

- a. Install the crankshaft pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Install" for the correct procedure.
- b. If the engine was equipped with a fan, install the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install" for the correct procedure.

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Disassembly and Assembly

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Date Updated -10/05/2016

i05215788

Front Cover - Remove and Install

SMCS - 1166-010

Removal Procedure

Start By:

- A. Remove the crankshaft pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove" for the correct procedure.
 - B. If the engine is equipped with a fan, remove the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install" for the correct procedure.
-

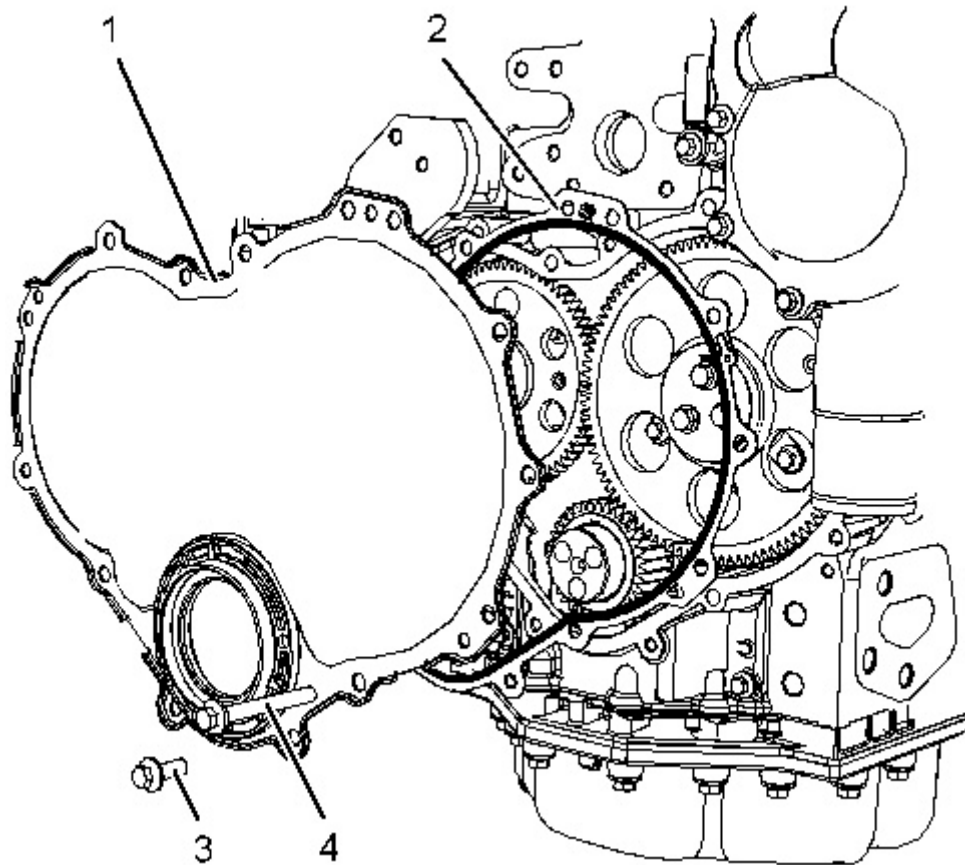


Illustration 1

g01992013

1. Remove the front seal from the front cover. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install" for the correct procedure.
2. Remove bolts (3) and bolts (4) . Identify the positions of bolts of different length.
3. Remove front cover (1) from the front housing.
4. Remove gasket (2) from front cover (1) .

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M8 by 70 mm	2
B	367-3535	Front Cover Alignment Tool	1

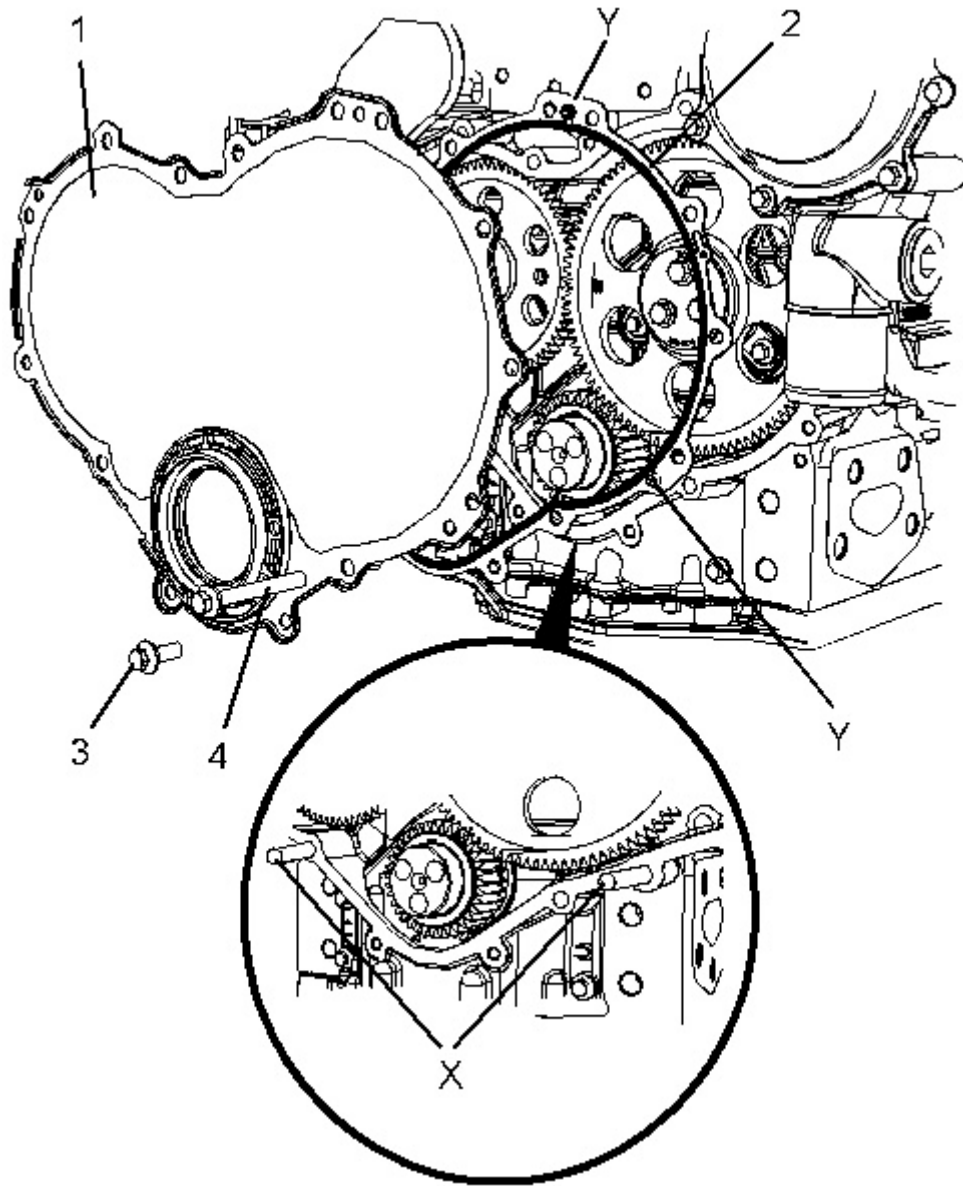


Illustration 2

g02190133

1. Thoroughly clean the gasket surface of the front housing.
2. If the original front cover is installed, follow Step 2.a through Step 2.b.
 - a. Thoroughly clean front cover (1) .
 - b. Install a new gasket (2) to front cover (1) . Engage Locators (Y) into the holes in the front cover.
3. Install Tooling (A) into Holes (X) in the front housing.
4. Use Tooling (A) in order to position the front cover assembly onto the front housing.
5. Install bolts (3) and bolts (4) finger tight. Ensure that the bolts of different length are installed in the correct positions.

6. Install a new front seal to the front cover. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove and Install" for the correct procedure.
7. Use Tooling (B) in order to align the front cover.
8. Remove Tooling (A) and install remaining bolts (4) .
9. Tighten bolts (3) and bolts (4) to a torque of 22 N·m (195 lb in).
10. Remove Tooling (B) from the front cover.

End By:

- a. Install the crankshaft pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Install" for the correct procedure.
- b. If the engine was equipped with a fan, install the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install" for the correct procedure.

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C7.1 Engines for Caterpillar Built Machines

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i03934125

Gear Group (Front) - Remove and Install - Heavy Duty Gear Group (Front)

SMCS - 1206-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	230-6284	Timing Pin (Camshaft)	1
C	364-9107	Fuel Injection Pump Timing Pin	1
D	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

⁽¹⁾ The Crankshaft Turning Tool is used on the front pulley.

⁽²⁾ This Tool is used in the aperture for the electric starting motor.

Start By:

- a. Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove and Install" for the correct procedure.
 - b. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install" for the correct procedure.
-

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

Note: Either Tooling (A) can be used. Use the Tooling that is most suitable. Care must be taken in order to ensure that the fuel injection pump timing is not lost during the removal of the front gear group. Carefully follow the procedure in order to remove the gear group.

1. If the air compressor is equipped with a hydraulic pump, remove the hydraulic pump. Refer to Original Equipment Manufactures (OEM) for the correct procedure.
2. If the engine is equipped, with an air compressor remove the air compressor. Refer to Disassembly and Assembly, "Air Compressor - Remove" for the correct procedure.
3. If the engine is equipped with only a hydraulic pump, remove the hydraulic pump. Refer to the OEM for the correct procedure.
4. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.

Note: Do not use excessive force to install Tooling (D). Do not use Tooling (D) to hold the crankshaft during repairs.

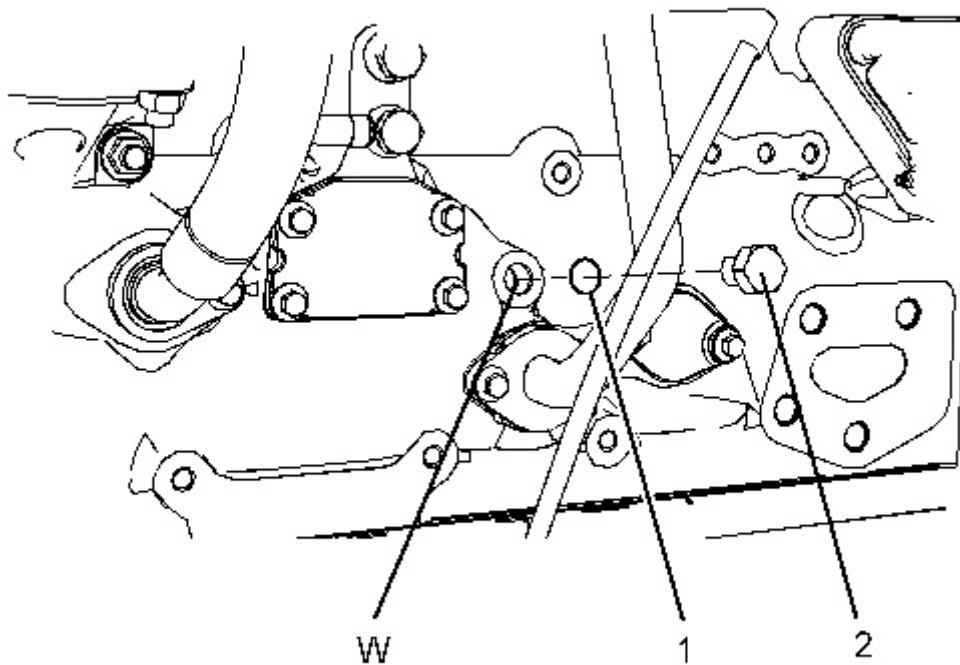


Illustration 1

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5. Remove plug (2) from the cylinder block. Remove O-ring seal (1) from the plug.
 6. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure. Install Tooling (D) through Hole (W) in order to lock the crankshaft.
 7. Remove Tooling (D).
 8. Use Tooling (A) in order to rotate the crankshaft in a clockwise direction and position the crankshaft at 60 degrees after top dead center.
-

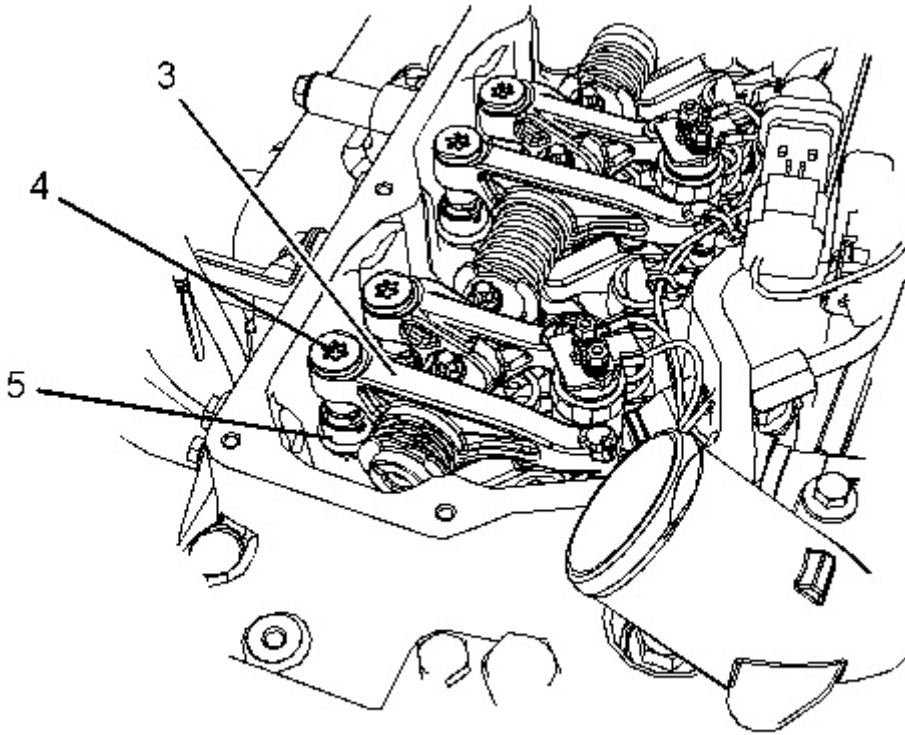


Illustration 2

g02048655

9. Loosen threaded inserts (4) on all rocker arms (3). Unscrew threaded inserts (4) on all rocker arms (3) until all valves are fully closed. Ensure that guides (5) for the pushrods are left in position on threaded inserts (4).

Note: Ensure that ALL threaded inserts are fully unscrewed.

10. Use Tooling (A) in order to rotate the crankshaft so that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure. Install Tooling (D) through Hole (W) in order to lock the crankshaft. Refer to Illustration 1.
-

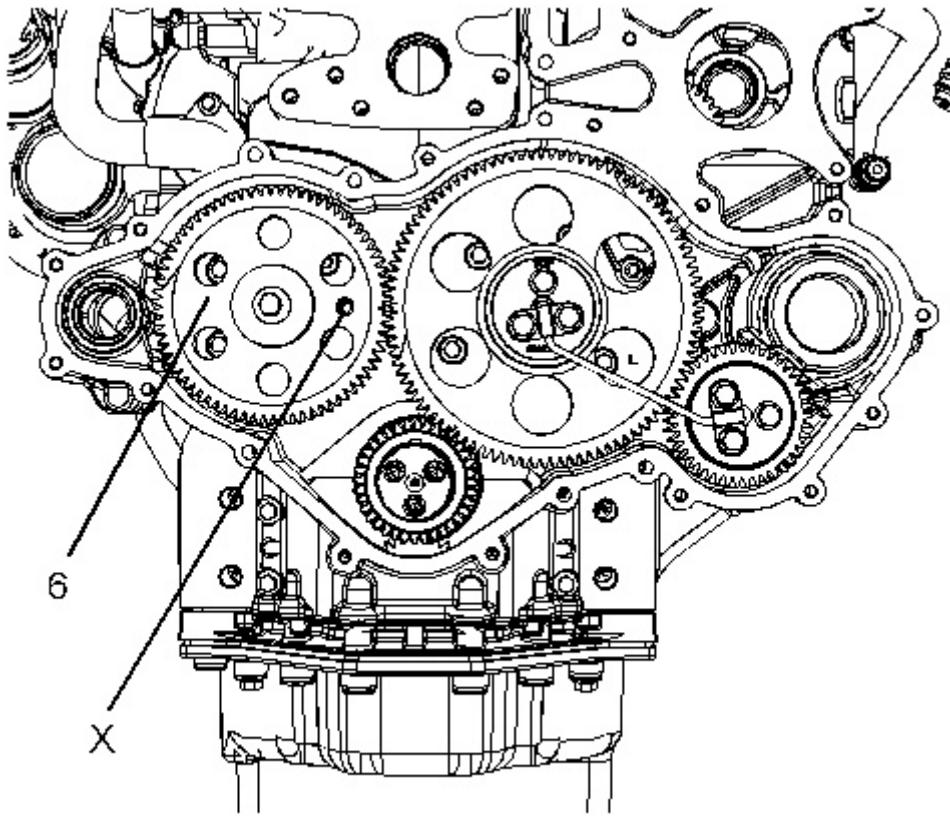


Illustration 3

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11. Install Tooling (B) through Hole (X) in camshaft gear (6) into the front housing. Use Tooling (B) in order to lock the camshaft in the correct position. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
12. Use Tooling (C) in order to lock the fuel injection pump gear in the correct position. Refer to Disassembly and Assembly, "Fuel Injection Pump - Remove" for the correct procedure.

Note: The fuel injection pump must remain locked until the procedure instructs you to unlock the fuel injection pump.

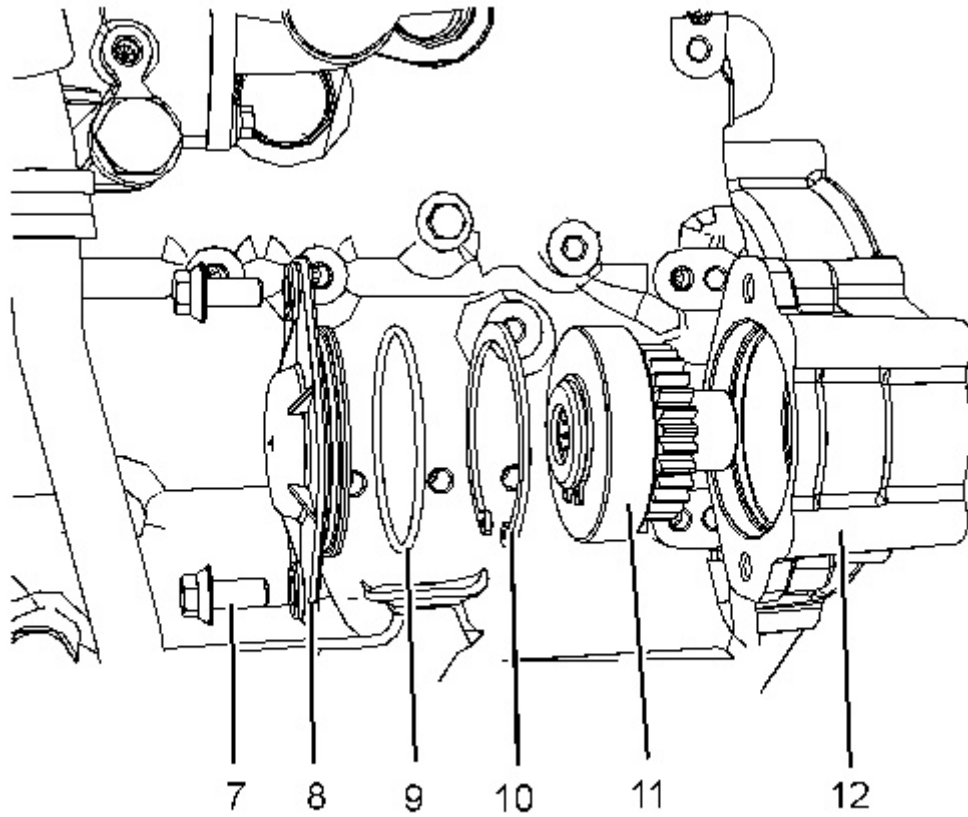


Illustration 4

g02052394

13. If the right-hand side of the engine is equipped, with a hydraulic pump remove the hydraulic pump. Refer to the OEM for the correct procedure.
 14. If necessary, remove bolts (7) from plate (8). Remove plate (8) and remove O-ring seal (9).
 15. Remove circlip (10) and remove gear assembly (11) from front housing (12).
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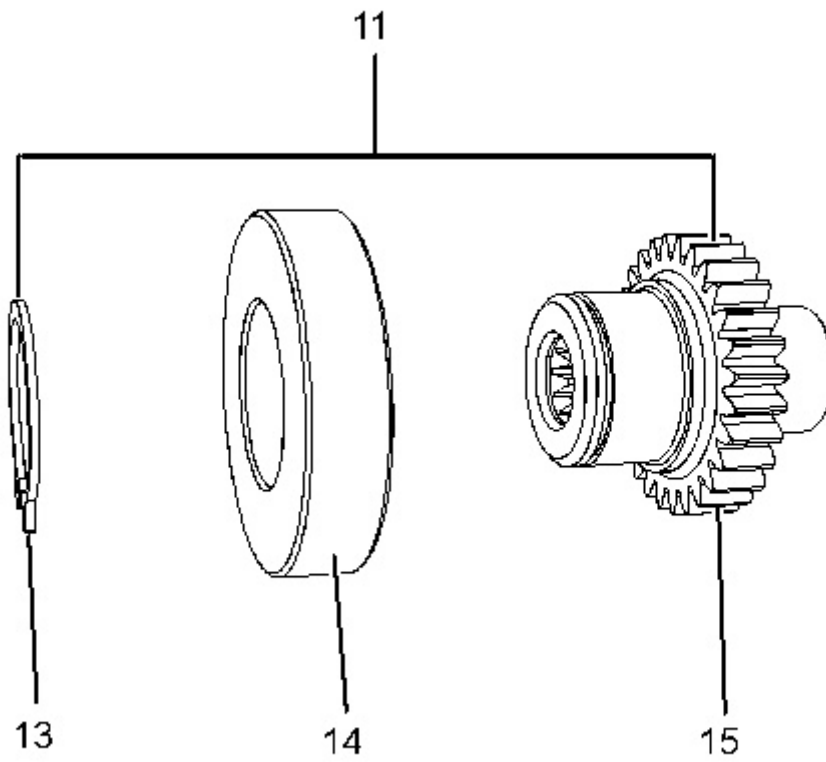


Illustration 5

g02053673

16. If necessary, follow Step 16.a through Step 16.b in order to disassemble gear assembly (11).
 - a. Remove circlip (13) from gear (15).
 - b. Place gear assembly (11) on a suitable support. Press bearing (14) from gear (15).
-

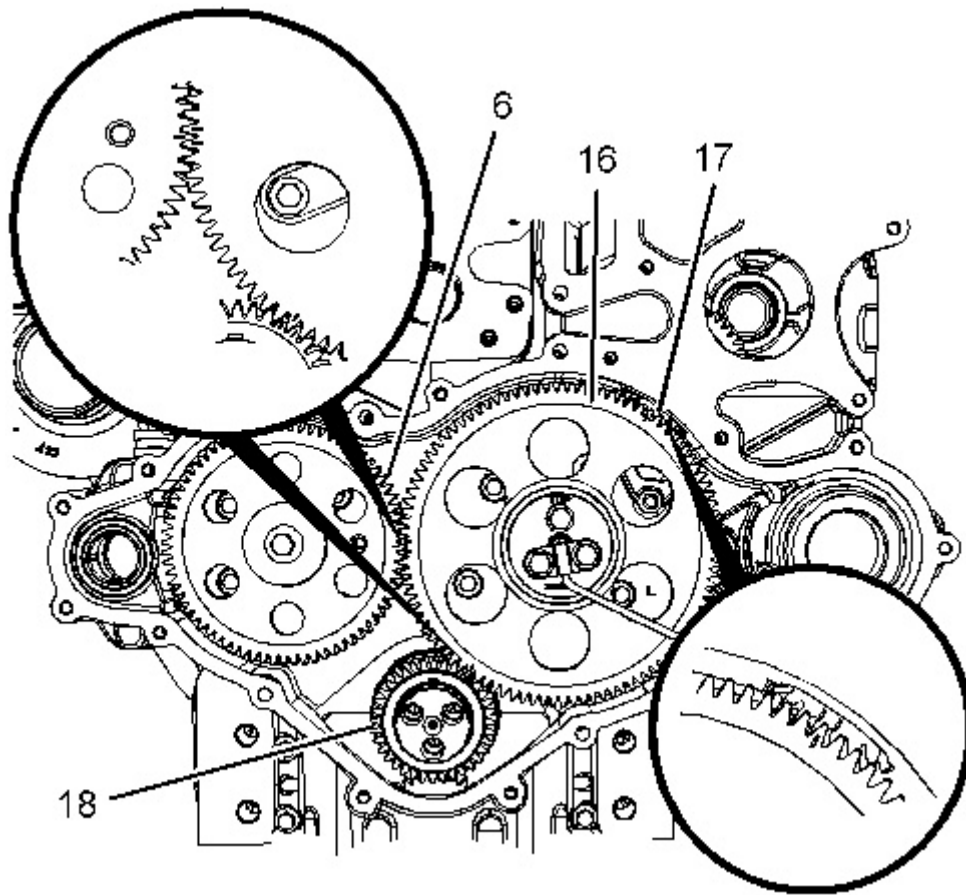


Illustration 6

g02048714

17. Mark gear (6), gear (16), gear (17) and gear (18) in order to show alignment. Refer to Illustration 6.

Note: Identification will ensure that the gears can be installed in the original alignment.

18. Remove camshaft gear (6). Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install" for the correct procedure.
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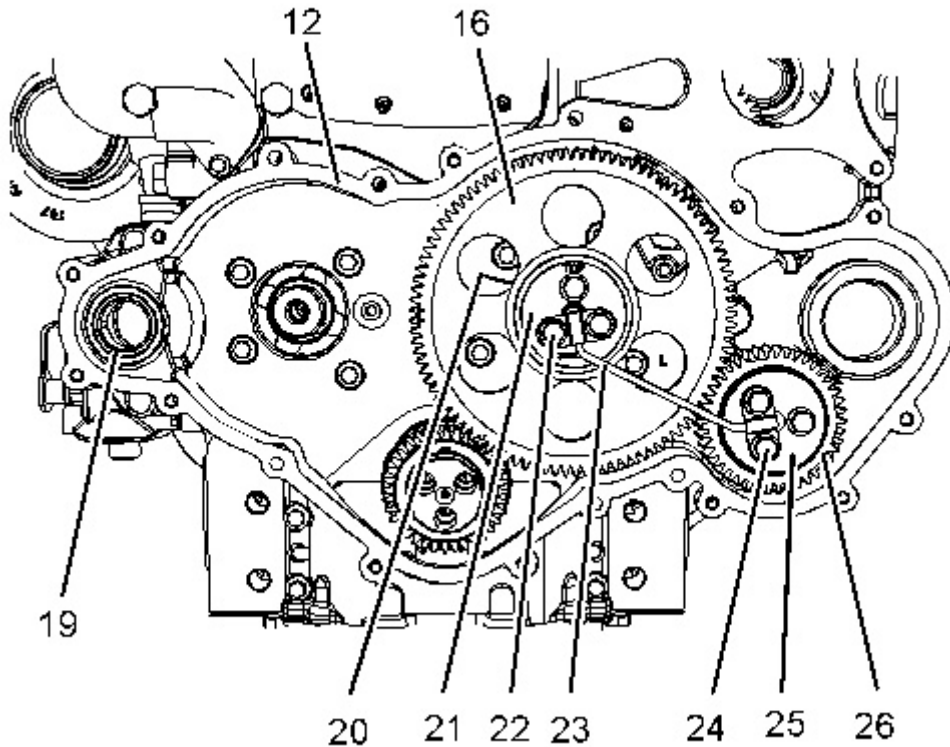


Illustration 7

g02053984

19. Remove bolts (22) and bolts (24).
20. Remove tube assembly (23) from idler gear (16) and idler gear (26).
21. Remove plate (21).
22. Remove idler gear (16) from front housing (12).
23. Remove idler gear (26) and idler gear hub (25) from front housing (12).
24. Remove hub (20) (not shown) from front housing (12).
25. If necessary, remove bearing (19) from front housing (12). Refer to Disassembly and Assembly, "Housing (Front) - Remove" for the correct procedure.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A ⁽¹⁾	9U-6198	Crankshaft Turning Tool	1
A ⁽²⁾	9U-7336	Housing	1

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