

Product: WHEEL LOADER

Model: 930M WHEEL LOADER KTG

Configuration: 930M Small Wheel Loader KTG00001-UP (MACHINE) POWERED BY C7.1 Engine

Disassembly and Assembly C7.1 Engines for Caterpillar Built Machines

Media Number -UENR4468-15

Publication Date -01/06/2015

Date Updated -30/10/2018

i05909511

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).

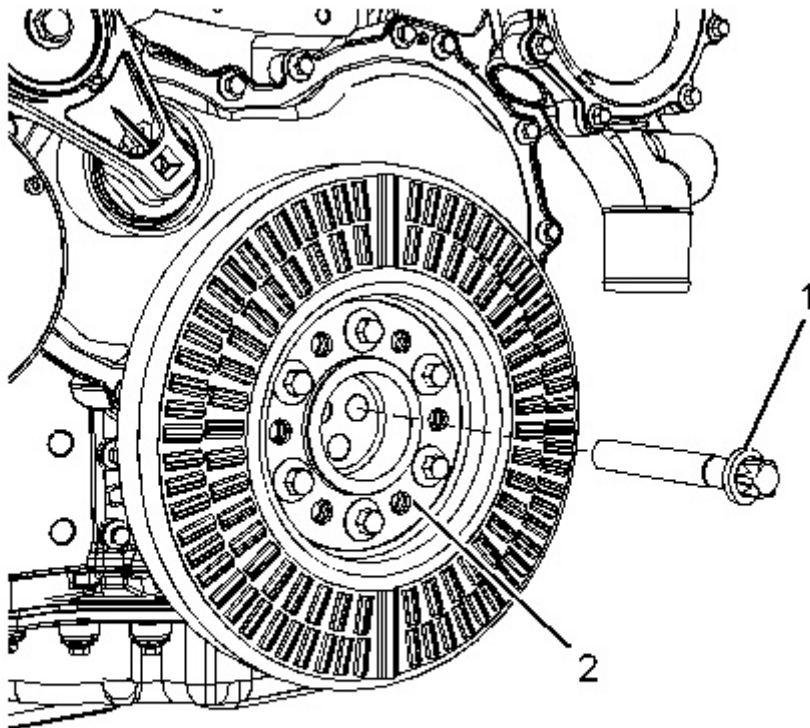


Illustration 1

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. Remove Tooling (A) .
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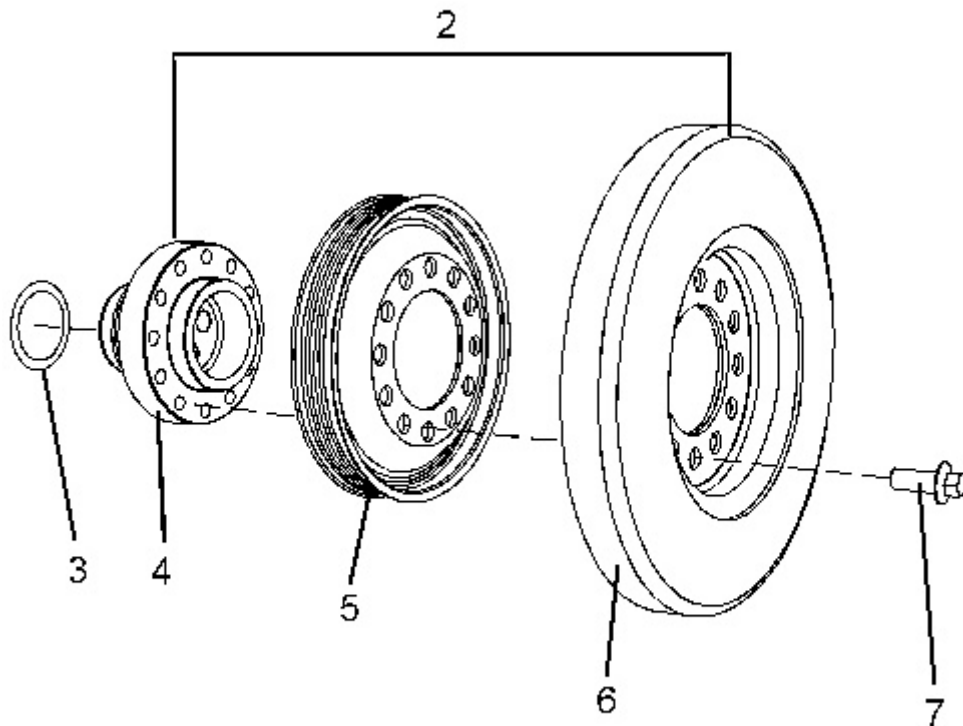


Illustration 2

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 x 1.5 by 100 mm	1
B	227-4393	E18 Torx Socket	1
C	8T-3052	Degree Wheel	1
D	-	Guide Studs M12 x 1.75 by 50 mm	2

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

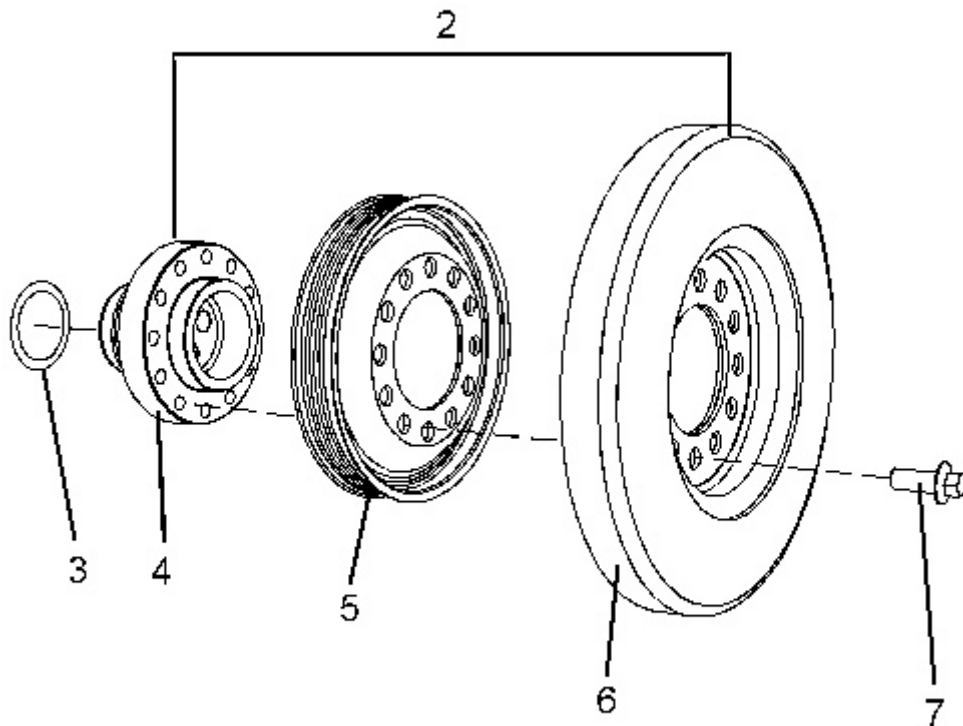


Illustration 1

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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.f 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. Remove Tooling (D) .
 - f. 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.

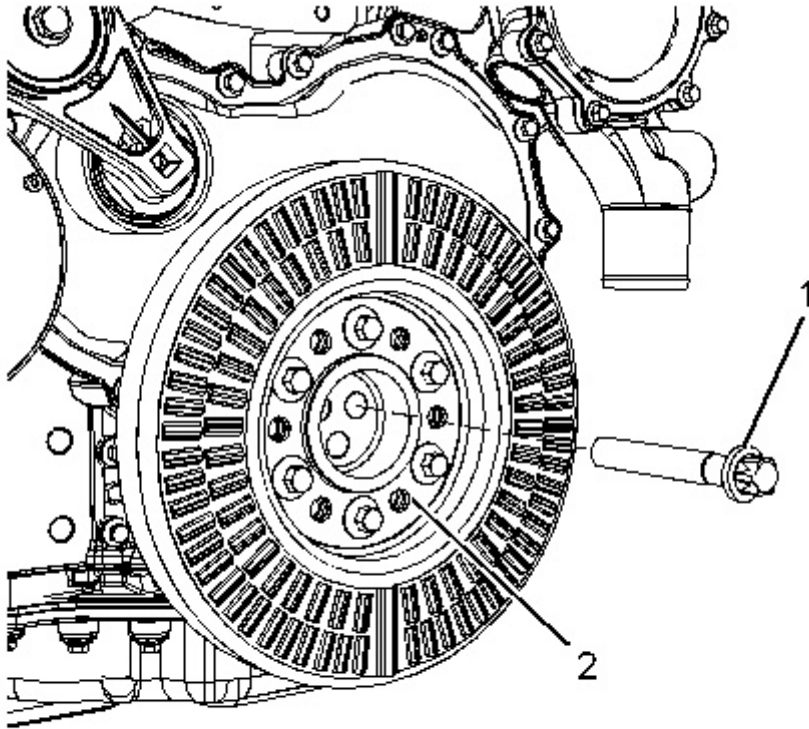


Illustration 2

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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i05018646

Crankshaft Front Seal - Remove and Install - Crankshaft Front Seal for Heavy Duty Front Cover

SMCS - 1160-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	278-2636	Front Oil Seal Removal Tool	1

Start By:

- 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.

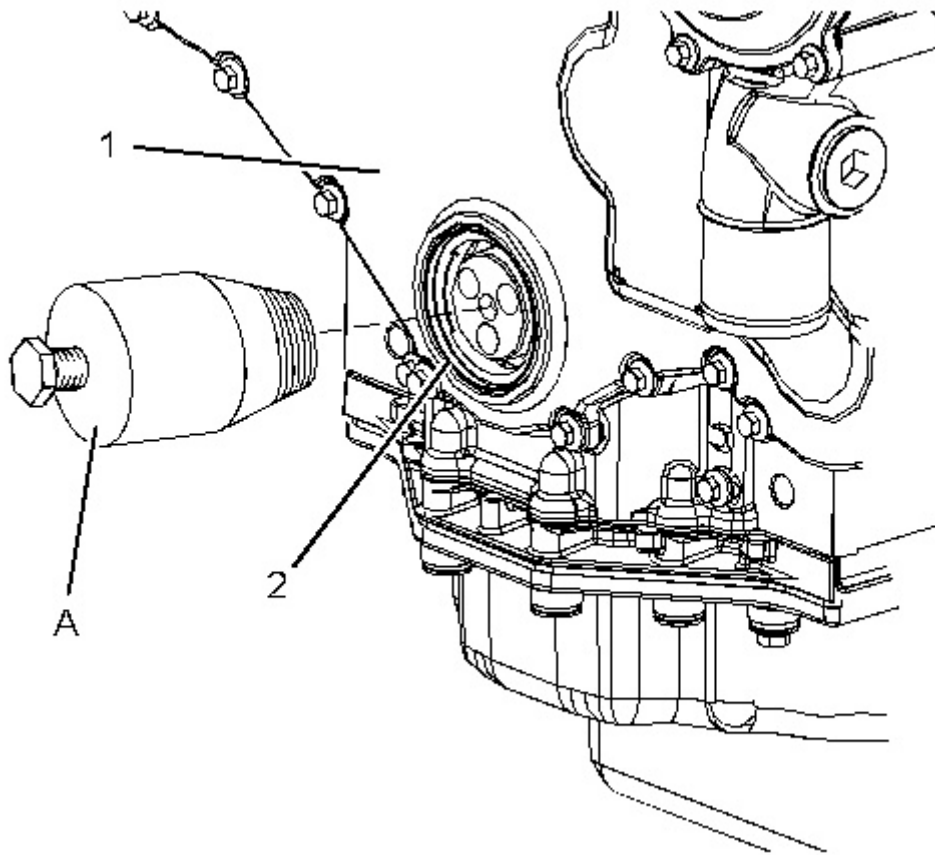


Illustration 1

g02048634

1. Position Tooling (A) on the nose of the crankshaft. Screw Tooling (A) into crankshaft front seal (2).

Note: Do not damage the edge of the front cover for the crankshaft front seal.

2. Screw the bolt into Tooling (A) in order to remove crankshaft front seal (2) from front cover (1).

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
B	9U-6206	Stud Front Seal Installer	1
	9U-6207	Plate	1
	9U-6209	Sleeve Plate	1
	9U-6211	Seal Installer Tool	1
	366-5984	Installer Assembly	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the bore for the crankshaft front oil seal in the front cover is clean and free from damage.
-

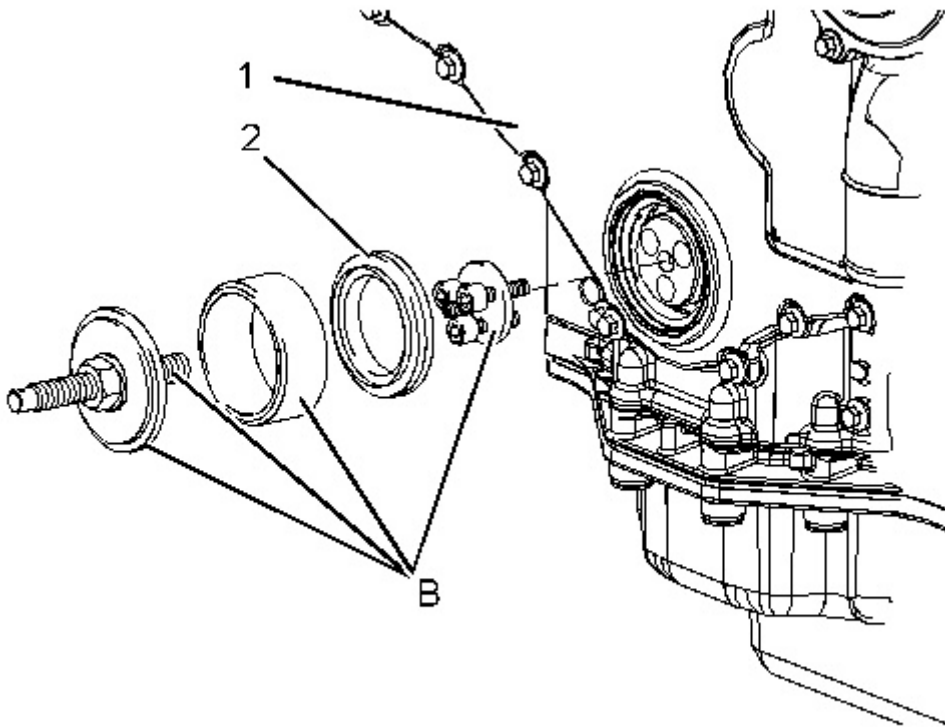


Illustration 2

g03417117

2. Assemble Tooling (B).
3. Correctly position a new crankshaft front seal (2) to front cover (1).

Note: If the crankshaft front seal is supplied with a sleeve, remove the sleeve from the crankshaft front seal before installation.

4. Use Tooling (B) to install crankshaft front seal (2) to front cover (1). Ensure that the front face of the crankshaft front seal is installed to a depth of 6.5 ± 0.2 mm (0.256 ± 0.008 inch).
5. Remove Tooling (B) from the crankshaft.

End By:

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

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i06799526

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
B	207-1601	P-80 Rubber Lubricant	1

Start By:

- a. Remove the crankshaft vibration damper and pulley.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

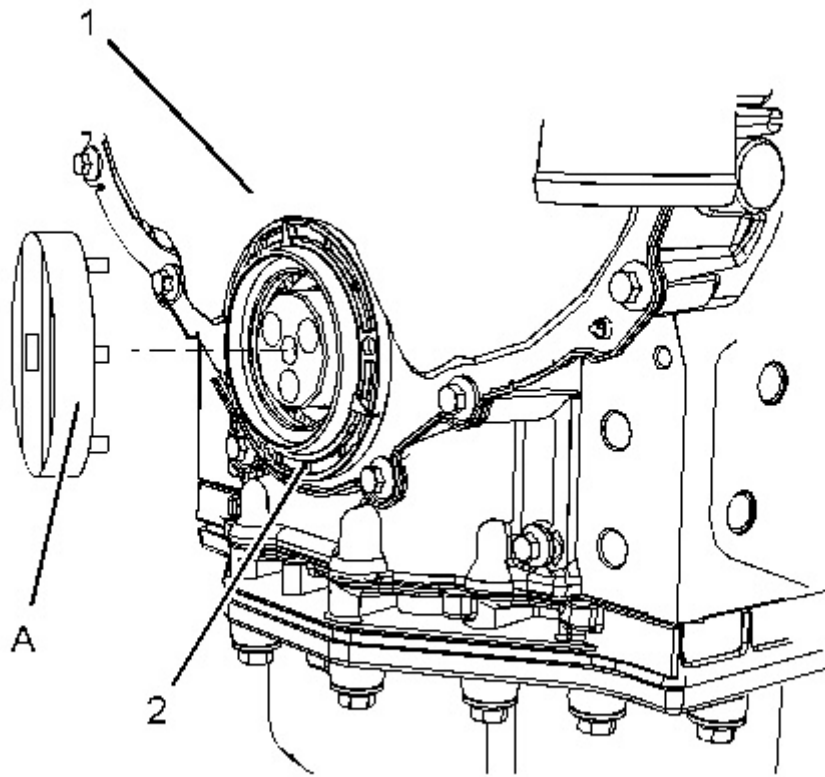


Illustration 1

g03417118

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

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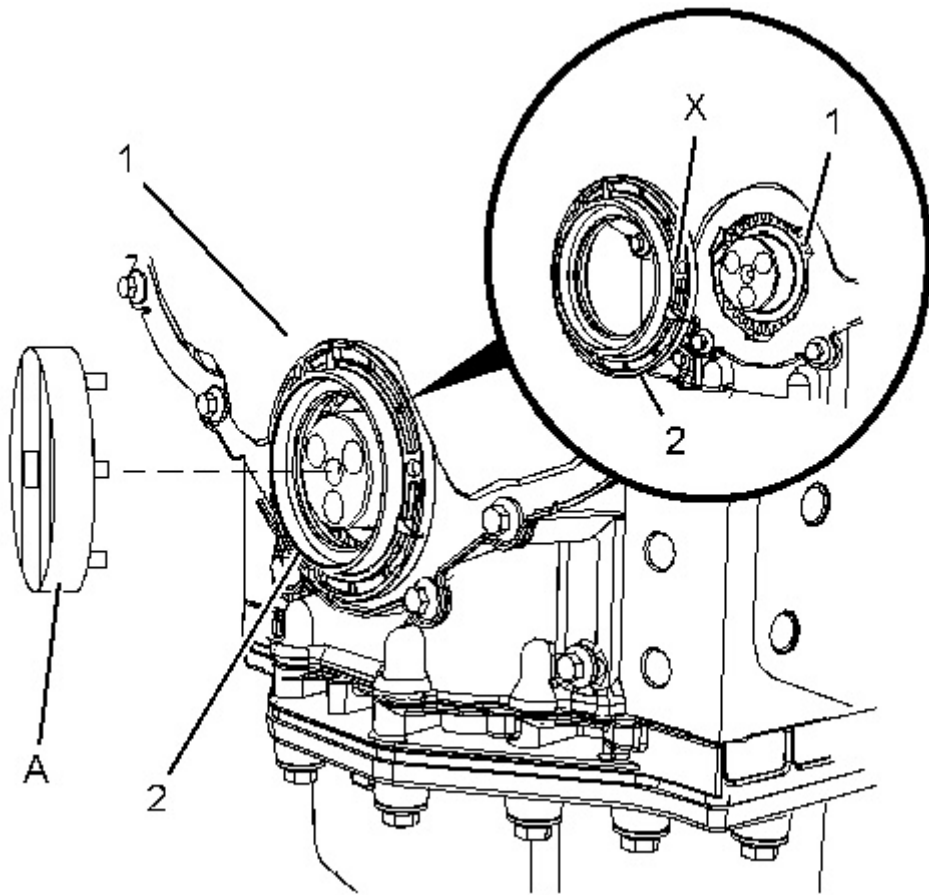


Illustration 2

g03417120

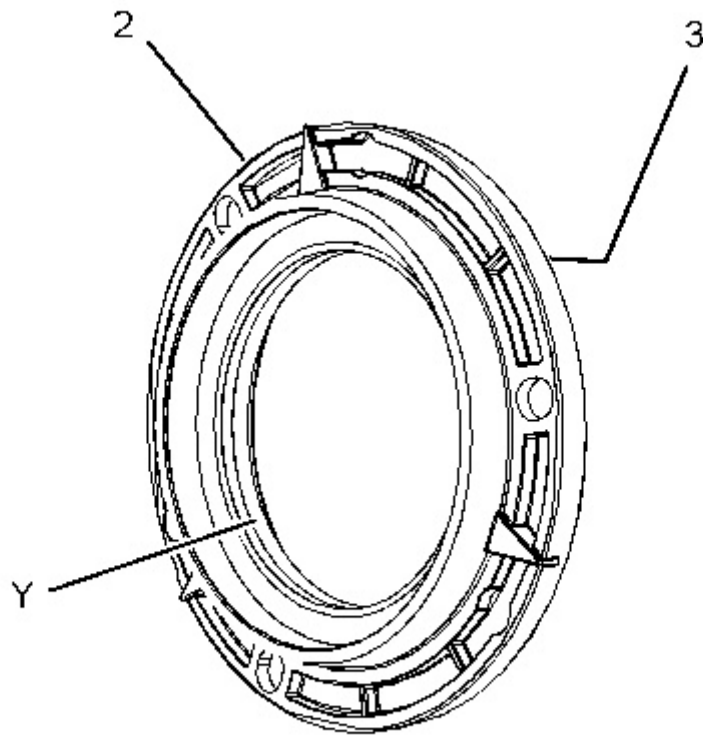


Illustration 3

g03453516

2. Apply Tooling (B) to static twin dead seal (3) (not shown) to a new crankshaft front seal (2). Ensure that none of Tooling (B) contaminates the crankshaft front seal in Position (Y).
3. Correctly position a new crankshaft front seal (2) in Position (X) onto front cover (1).
4. Position Tooling (A) onto crankshaft front seal (2).
5. Use Tooling (A) to turn crankshaft front seal (2) in a clockwise direction.
6. If a torque that is greater than 50 N·m (37 lb ft) is necessary to install crankshaft front seal (2), remove crankshaft front seal (2). Inspect crankshaft front seal (2) and front cover (1) for faults or damage.
7. If necessary, repeat Step 2 through Step 6 to install crankshaft front seal (2).

End By:

- a. Install the crankshaft vibration damper and pulley.
-

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i05018648

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.
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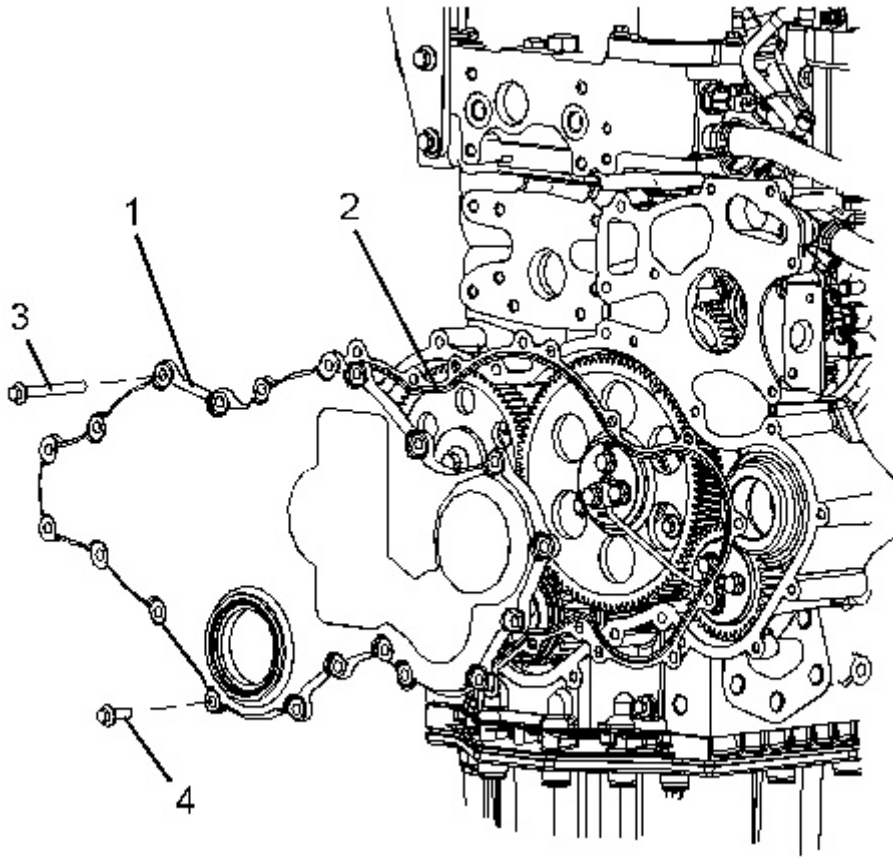


Illustration 1

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 Studs M8 by 70 mm	2
B	364-7210	Front Cover Alignment Tool	1

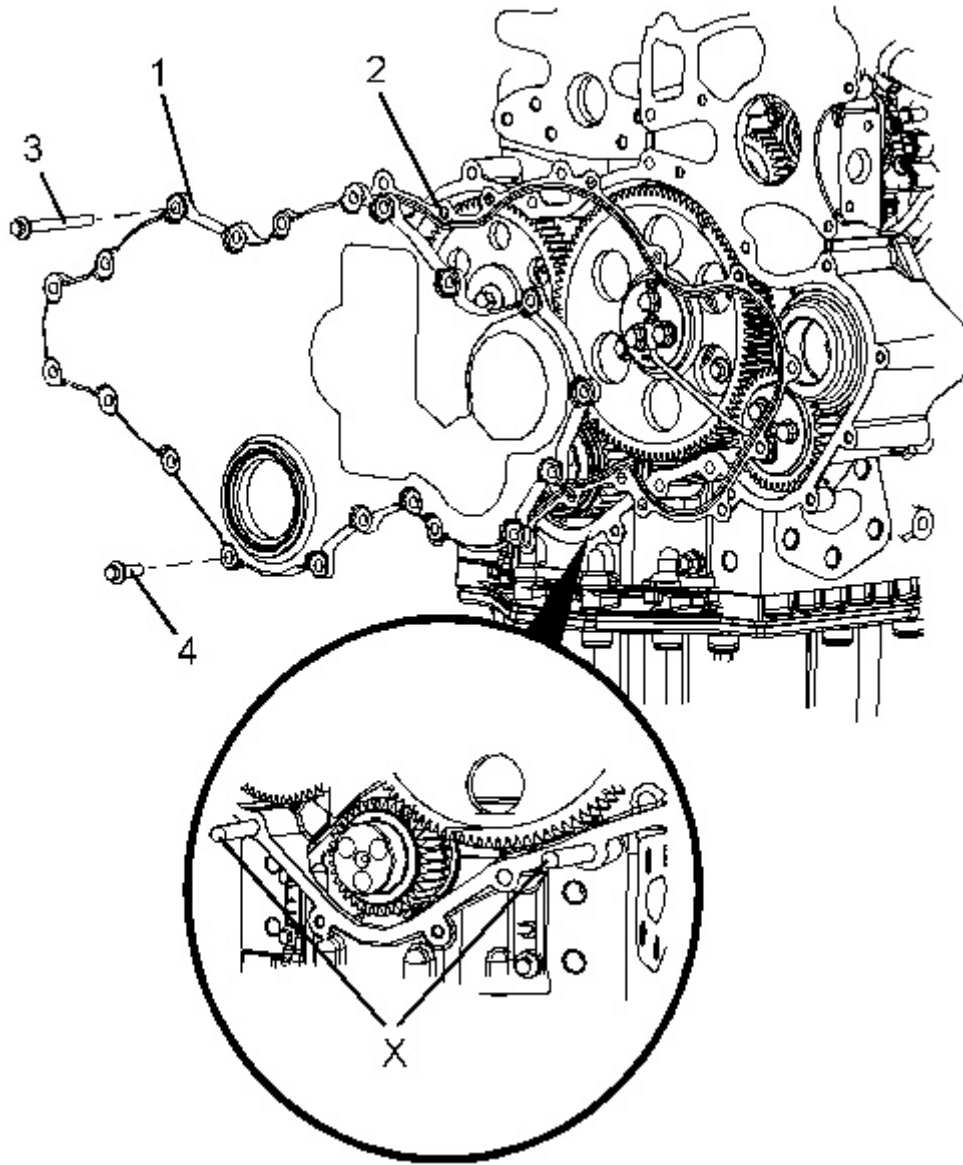


Illustration 2

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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i07167344

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.
-

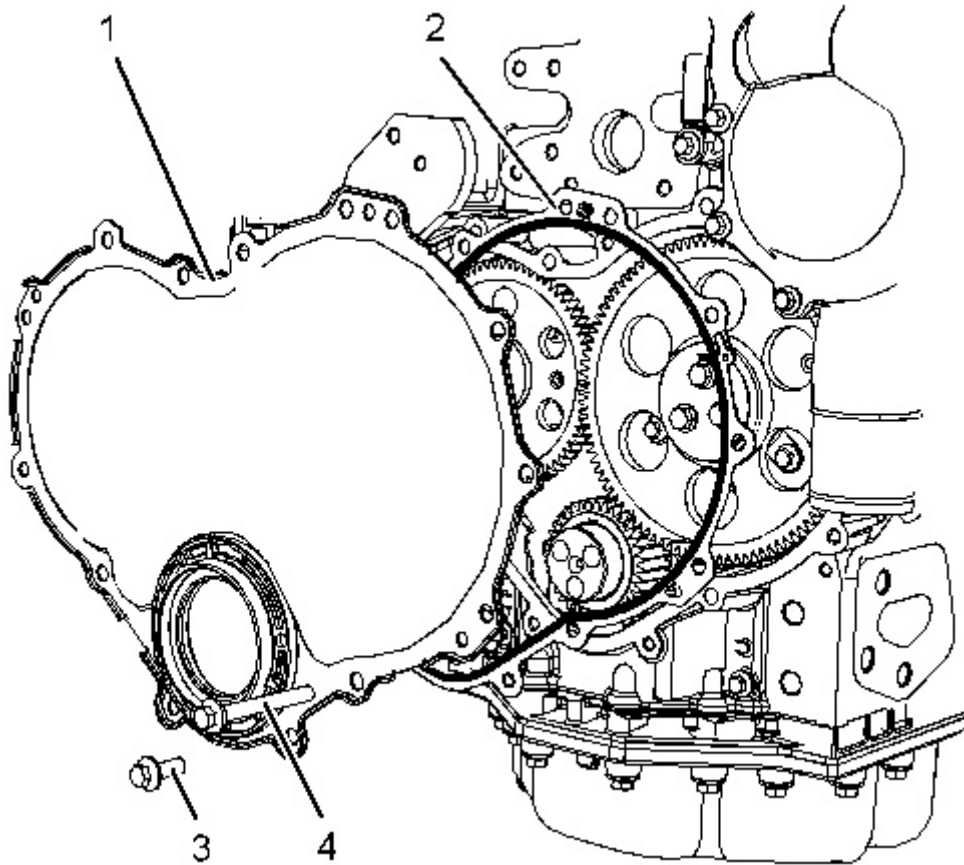


Illustration 1

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

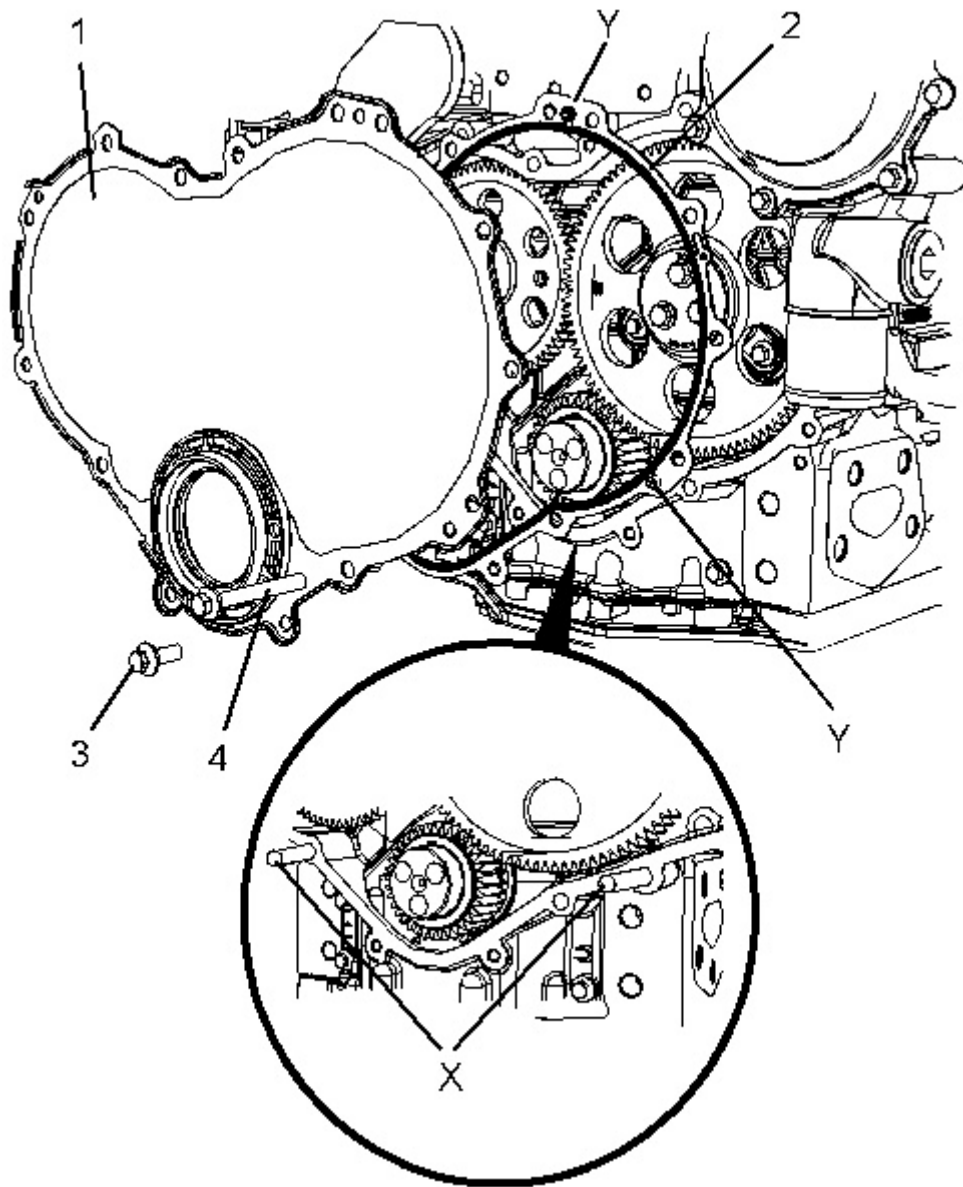


Illustration 2

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) 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) 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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i05018649

Gear Group (Front) - Remove and Install

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
E	298-5564	T40 Torx Socket	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.
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NOTICE

Keep all parts clean from contaminants.

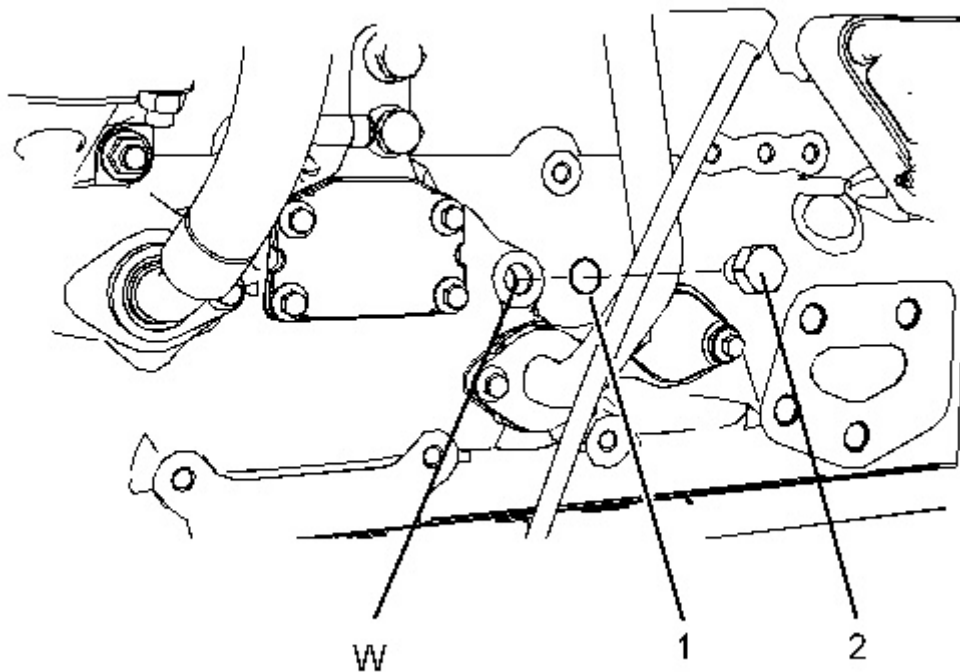
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NOTICE

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.



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