

Product: ENGINE - MACHINE
Model: C4.4 ENGINE - MACHINE 448
Configuration: C4.4 Industrial Engine 44800001-UP

Disassembly and Assembly C4.4 Industrial Engine

Media Number -KENR9120-01

Publication Date -01/07/2011

Date Updated -03/07/2017

i04047799

Engine Oil Pump - Remove

SMCS - 1304-011

Removal Procedure

Start By:

- a. Remove the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove" 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.

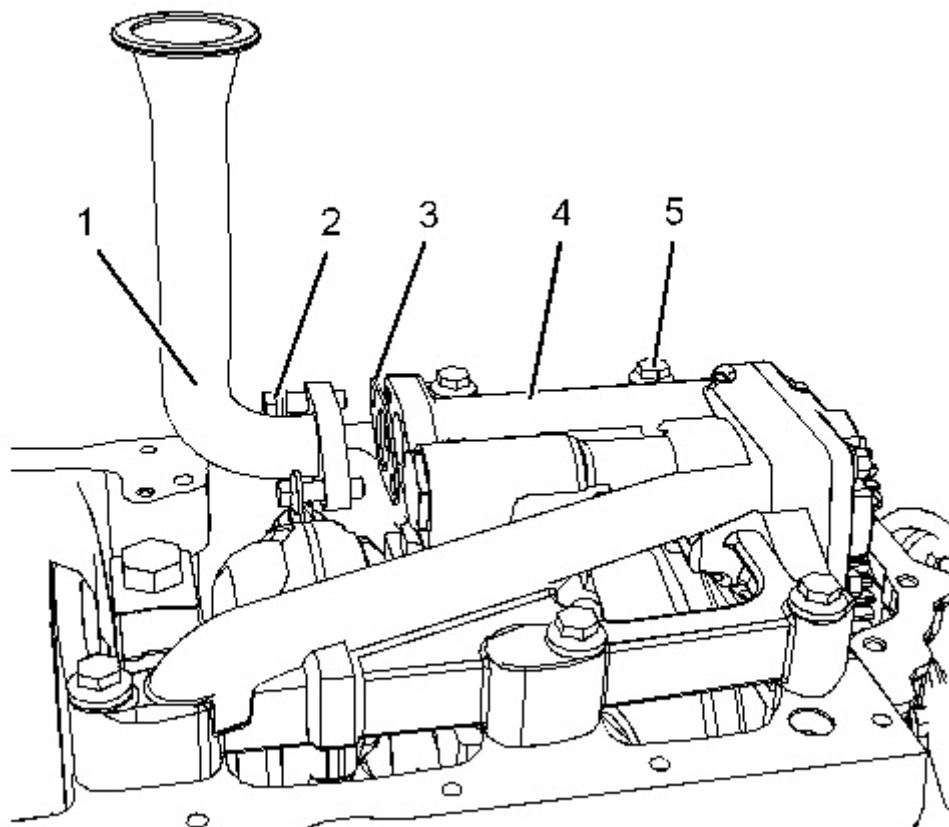


Illustration 1

g02476517

1. Remove bolts (2). Remove suction pipe (1) from engine oil pump (4).
 2. Remove gasket (3).
 3. Remove bolts (5) and remove the assembly of engine oil pump (4) from the cylinder block.
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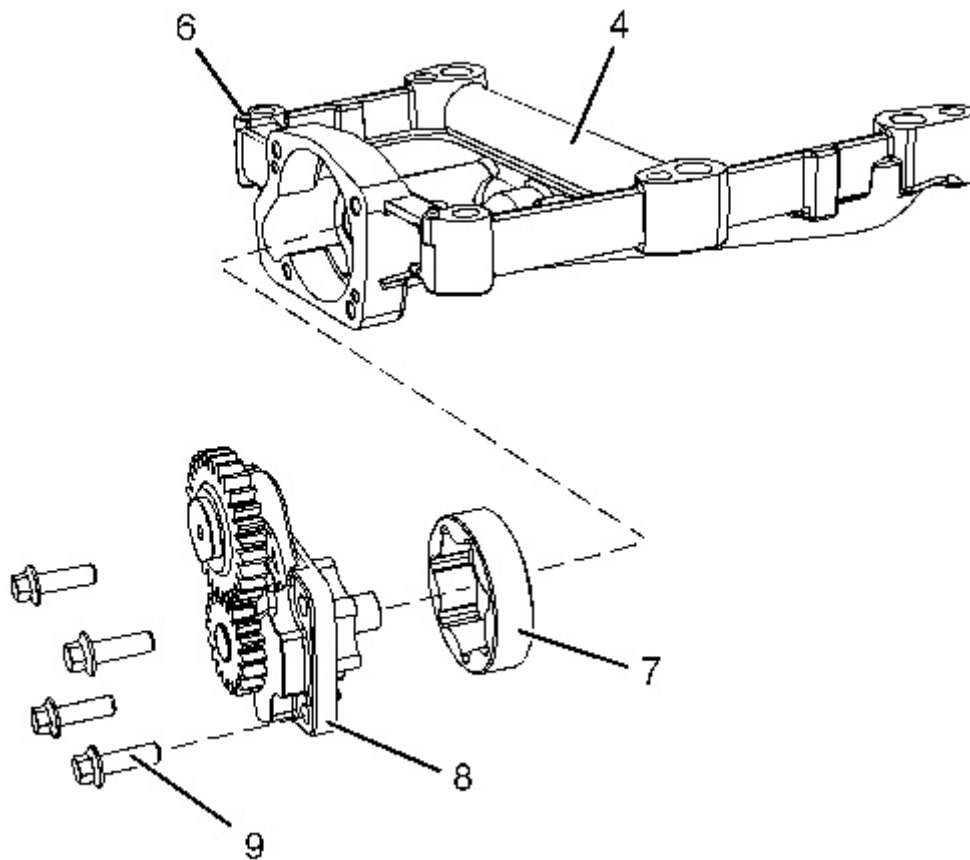


Illustration 2

g02476518

4. If necessary, follow Step 4.a through Step 4.d in order to disassembly engine oil pump (4).
 - a. Remove bolts (9) from front cover assembly (8).
 - b. Remove front cover assembly (8) from the housing of the engine oil pump (4).
 - c. Remove outer rotor (7) from the housing of engine oil pump (4).
 - d. Do not remove dowel (6) from the housing of engine oil pump (4) unless the dowels are damaged.
-

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i04047798

Engine Oil Pump - Install

SMCS - 1304-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

If any part of the engine oil pump is worn or damaged, the complete assembly of the engine oil pump must be replaced.

1. Ensure that all components of the engine oil pump are clean and free from wear and damage. Refer to System Operation, Testing and Adjusting, "Engine Oil Pump - Inspect" for more information. Replace the complete assembly of the engine oil pump if any of the components are worn or damaged.
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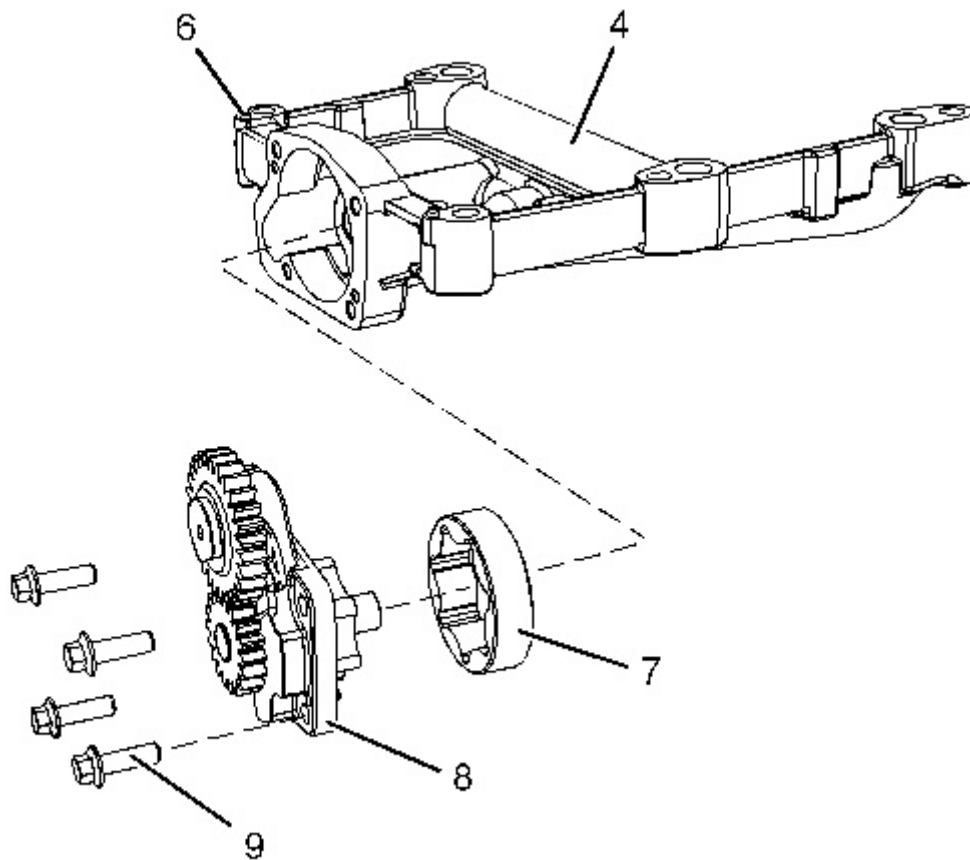


Illustration 1

g02476518

2. If necessary, follow Step 2.a through Step 2.f in order to assembly engine oil pump (4).
 - a. Lubricate the internal components for the assembly of engine oil pump (4) with clean engine oil.
 - b. Install outer rotor (7) to the housing of engine oil pump (4).
 - c. Install front cover assembly (8) to the housing of the engine oil pump (4).
 - d. Install bolts (9) to front cover assembly (8). Tighten the bolts finger tight.
 - e. Tighten bolts (8) to a torque of 24 N·m (212 lb in).
 - f. Ensure that dowels (6) are correctly located in the housing of engine oil pump (4).
-

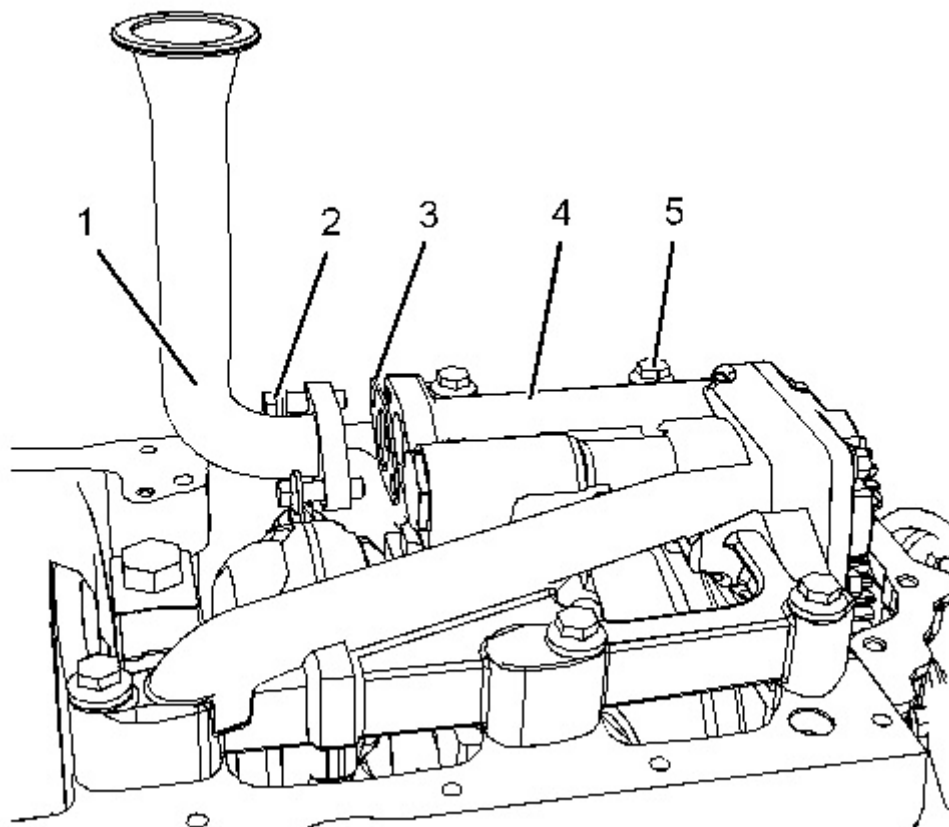


Illustration 2

g02476517

3. Position the assembly of engine oil pump (4) onto the cylinder block.

Note: Ensure that the dowels in the housing of the engine oil pump are aligned with the holes in the cylinder block.

4. Install bolts (5). Tighten the bolts to a torque of 44 N·m (32 lb ft).
5. Check the backlash between idler gear and the crankshaft gear. Refer to Specifications, "Gear Group (Front)" for further information.
6. Position a new gasket (3) onto suction pipe (1). Install the assembly of suction pipe (1) onto the assembly of engine oil pump (4).
7. Install bolts (2) finger tight. Tighten the bolts to a torque to 22 N·m (195 lb in).

End By:

- a. Install the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Install" for the correct procedure.
-

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i04048844

Water Pump - Remove

SMCS - 1361-011

Removal Procedure

Start By:

- a. Remove the fan and the fan pulley. Refer to Disassembly and Assembly, "Fan - 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.

1. Drain the coolant from the cooling system into a suitable container for storage or disposal. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct procedure.
 2. Loosen the hose clamps and remove the hose from the water pump inlet.
-

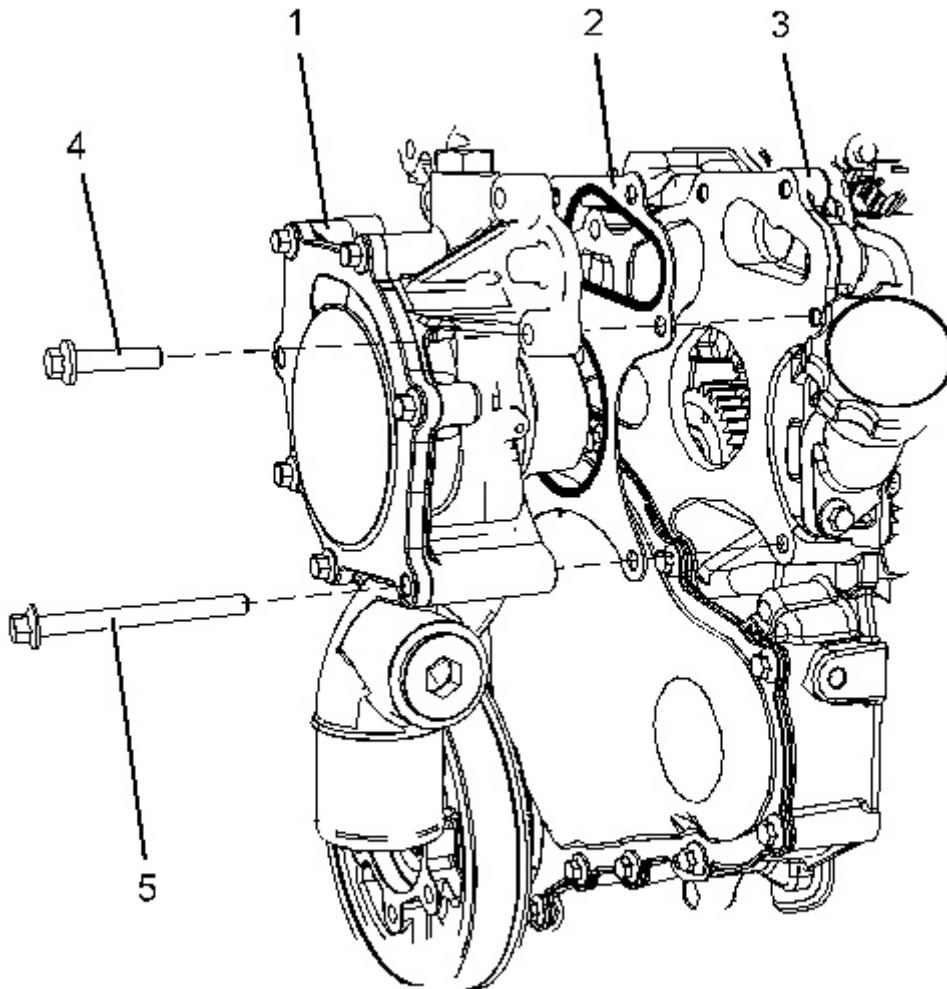


Illustration 1

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3. Remove bolts (4) and bolts (5).
4. Remove water pump (1) from housing (3).

Note: If necessary, tap the water pump with a soft faced hammer in order to loosen the water pump.

5. Remove gasket (2).
-

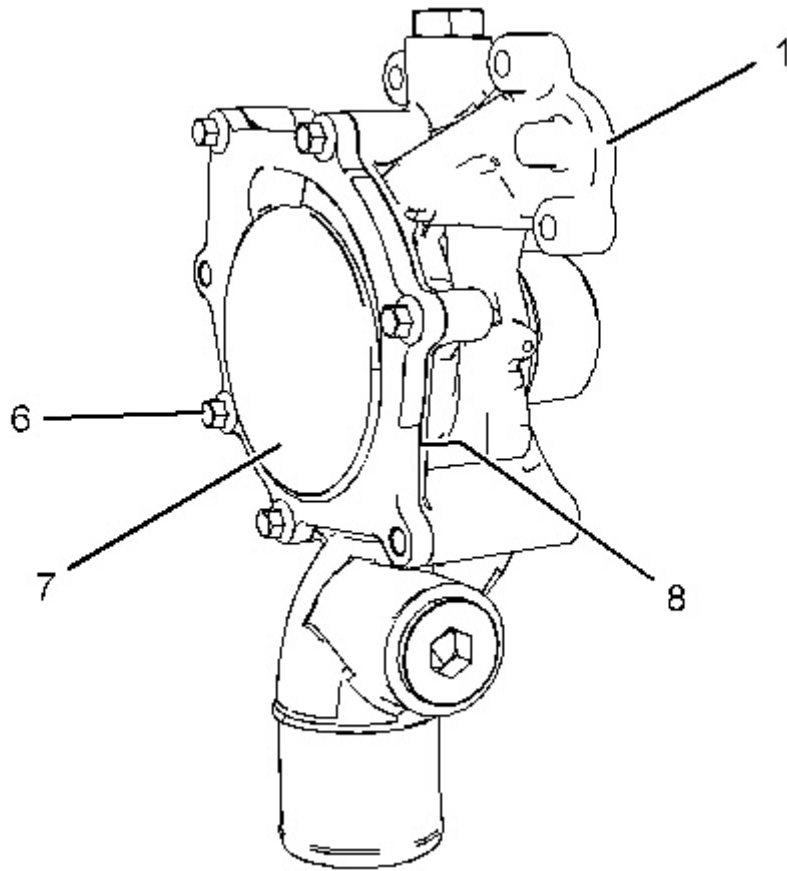


Illustration 2

g02524477

6. If necessary, remove cover (7) from the water pump. Follow Step 6.a through Step 6.c in order to remove the cover.
 - a. Remove bolts (6).
 - b. Remove cover (7).
 - c. Remove O-ring seal (8) (not shown).
-

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i04048838

Water Pump - Install

SMCS - 1361-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud M8 by 90 mm	2

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.

1. Ensure that the water pump is clean and free from wear and damage. If necessary, replace the water pump.
-

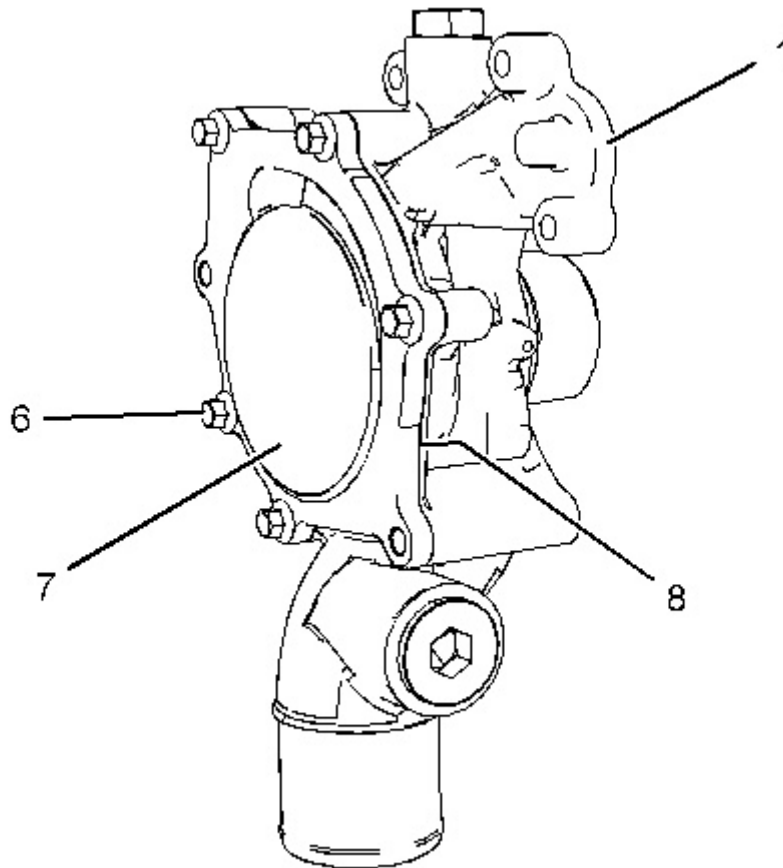


Illustration 1

g02524477

2. If necessary, install cover (7) to water pump (1). Follow Step 2.a through Step 2.d in order to install the cover.
 - a. Clean the gasket surface of cover (7).
 - b. Position a new O-ring seal (8) (not shown) onto water pump (1).
 - c. Install cover (7) to water pump (1).
 - d. Install bolts (6) to cover (7). Tighten the bolts to a torque of 22 N·m (195 lb in).
-

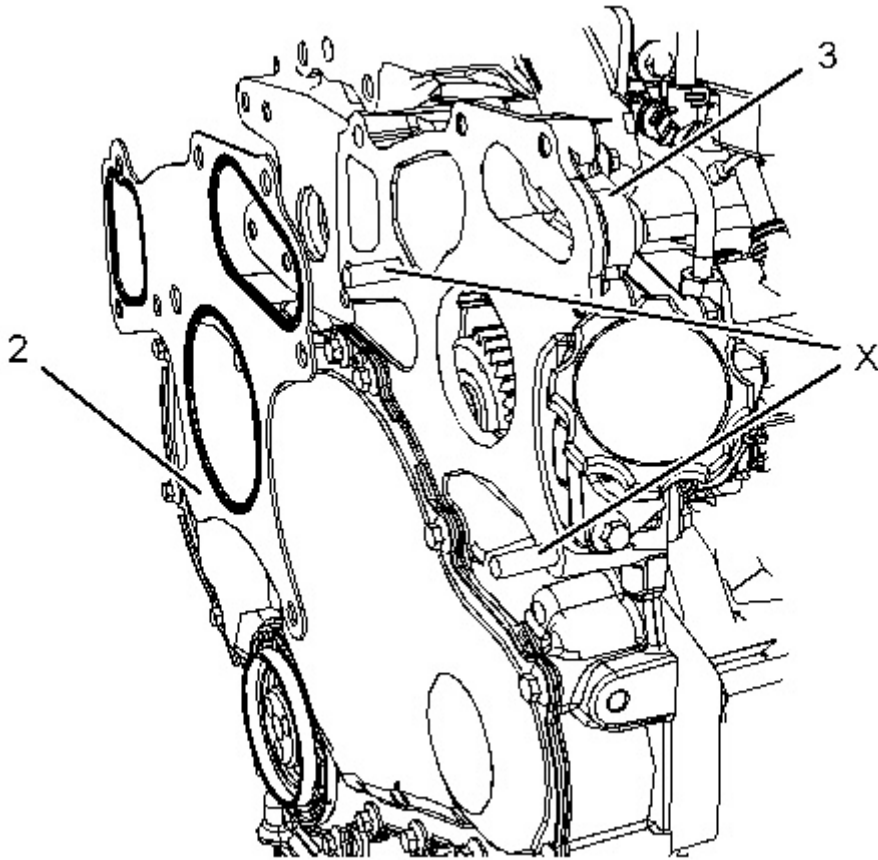


Illustration 2

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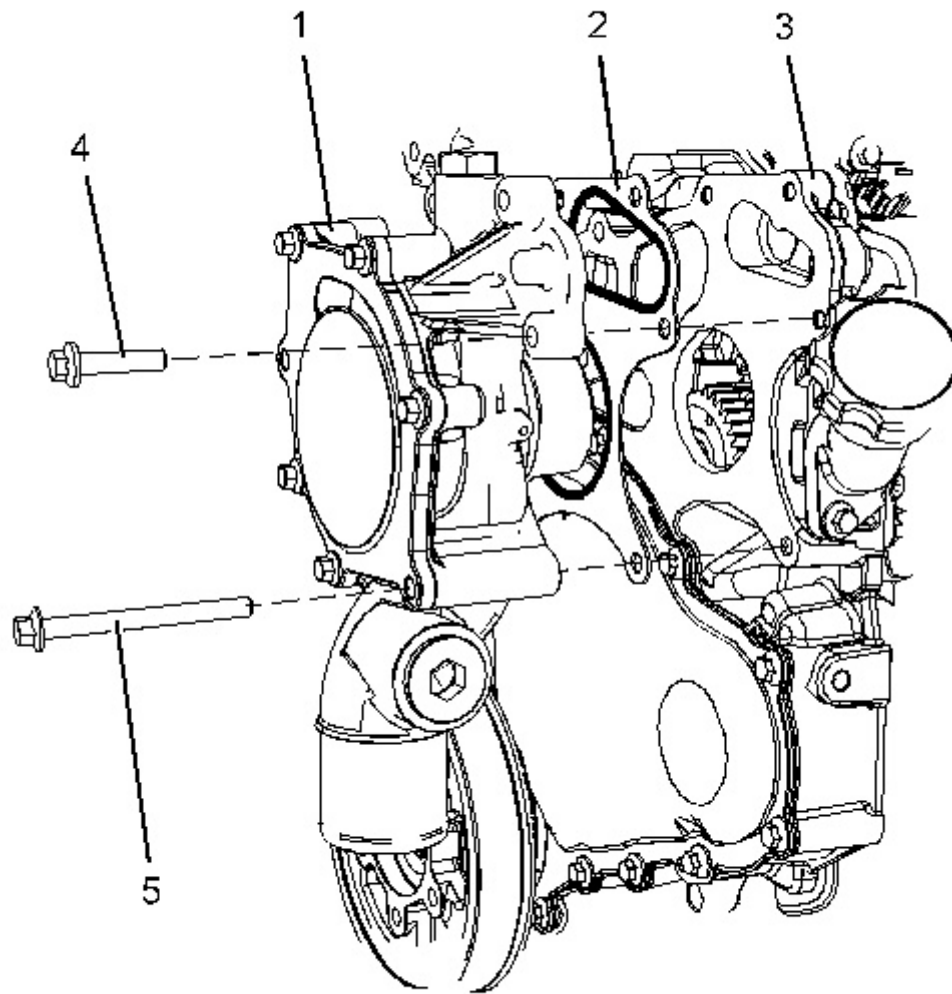


Illustration 3

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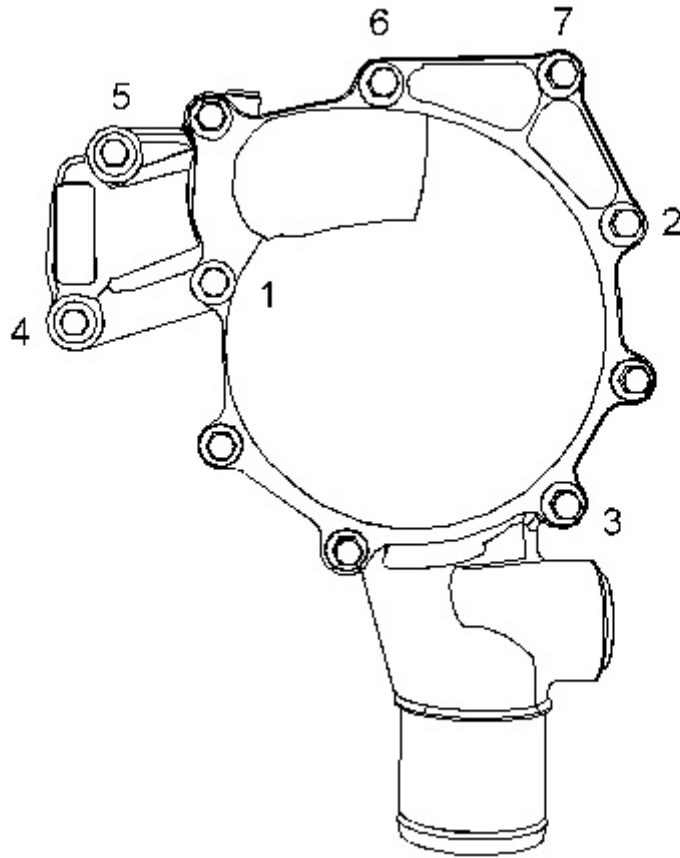


Illustration 4

g01985813

3. Clean the gasket surface of housing (3).
4. Install Tooling (A) in Position (X).
5. Use Tooling (A) in order to align new gasket (2) to housing (3). Install the gasket onto the housing.
6. Align water pump (1) to Tooling (A). Install the water pump to housing (1).

Note: Ensure that the gear of the water pump and the gear of the fuel injection pump mesh.

7. Install bolts (4) and bolts (5). Refer to Illustration 3. Tighten the bolts finger tight.
8. Remove Tooling (A) and install remaining bolts (4) and bolts (5).
9. Tighten bolts (4) and bolts (5) in the sequence that is shown in Illustration 4 to a torque of 22 N·m (195 lb in).
10. Install the hose to the water pump inlet. Tighten the hose clamps.
11. Fill the cooling system with coolant. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct procedure.

End By:

- a. Install the fan and the fan pulley. Refer to Disassembly and Assembly, "Fan - Remove and Install" for the correct procedure.
-

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i04048855

Water Temperature Regulator - Remove and Install

SMCS - 1355-010

Removal 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.

1. Drain the coolant from the cooling system to a level below the water temperature regulator, into a suitable container for storage or for disposal. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct draining procedure.
-

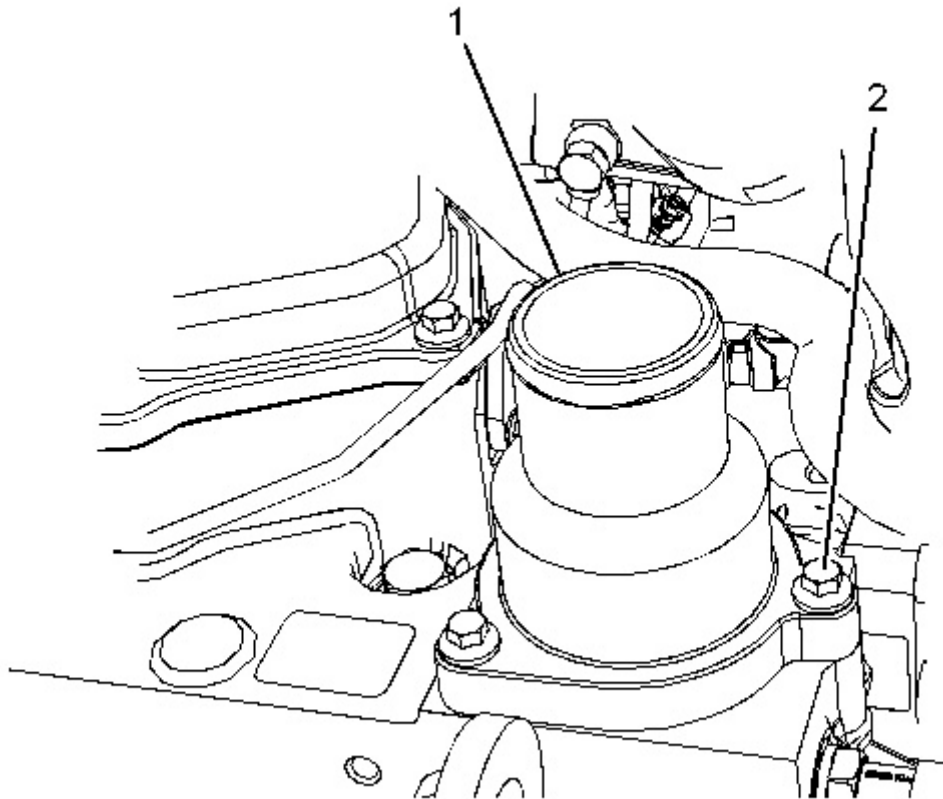


Illustration 1

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2. Loosen the hose clamps from the upper radiator hose and disconnect the upper radiator hose from water temperature regulator housing (1).
3. Remove bolts (2) from water temperature regulator housing (1).
4. Remove water temperature regulator housing (1) from the cylinder head.

Note: Note the orientation of the water temperature regulator housing.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that all components of water temperature regulator housing (2) are clean and free of wear and damage. Check the water temperature regulator for correct operation. Refer to System Operation, Testing and Adjusting, "Water Temperature Regulator - Test" for the correct procedure to test the water temperature regulator. If any components of the water

temperature regulator housing are worn or damaged, the complete assembly must be replaced.

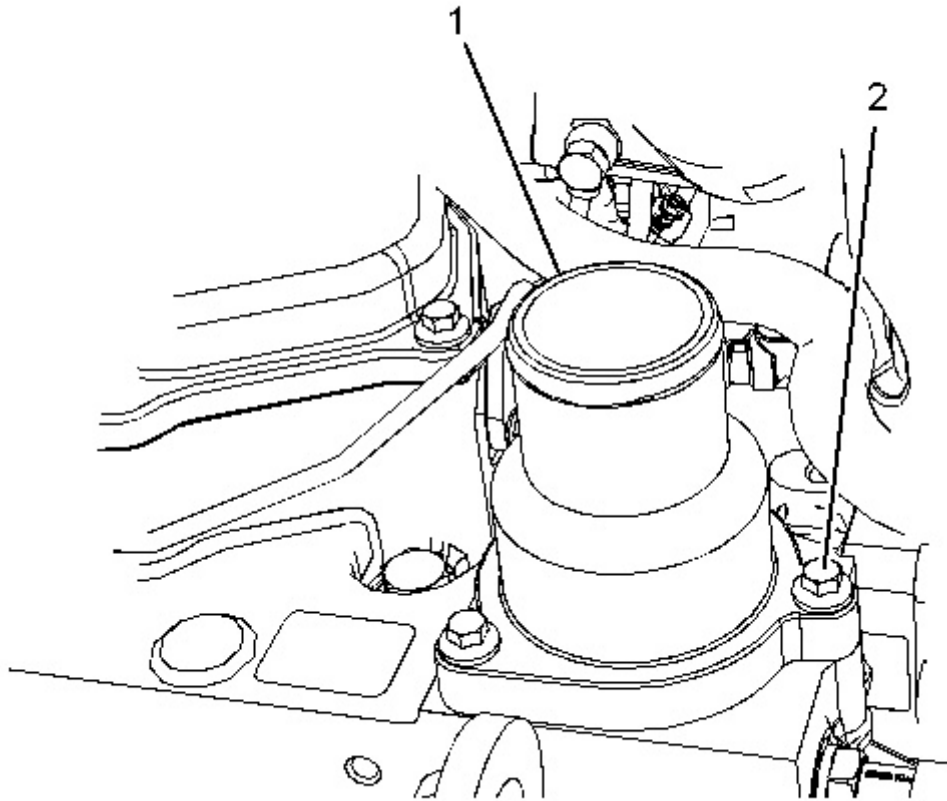


Illustration 2

g02524799

Typical example

2. If the original water temperature regulator (1) is to be installed. Ensure that the seal is not damaged and is correctly positioned in water temperature regulator housing (2).
 3. Install water temperature regulator housing (1) to the cylinder head.
Note: Ensure the correct orientation of the water temperature regulator housing.
 4. Install bolts (2). Tighten the bolts to a torque of 22 N·m (195 lb in).
 5. Connect the upper radiator hose and tighten the hose clamps.
 6. Fill the cooling system to the correct level. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Check" and Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct filling procedure.
-

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i04047808

Flywheel - Remove

SMCS - 1156-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud 1/2 inch - UNF by 4 inch	2

Start By:

- Remove the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install" for the correct procedure.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

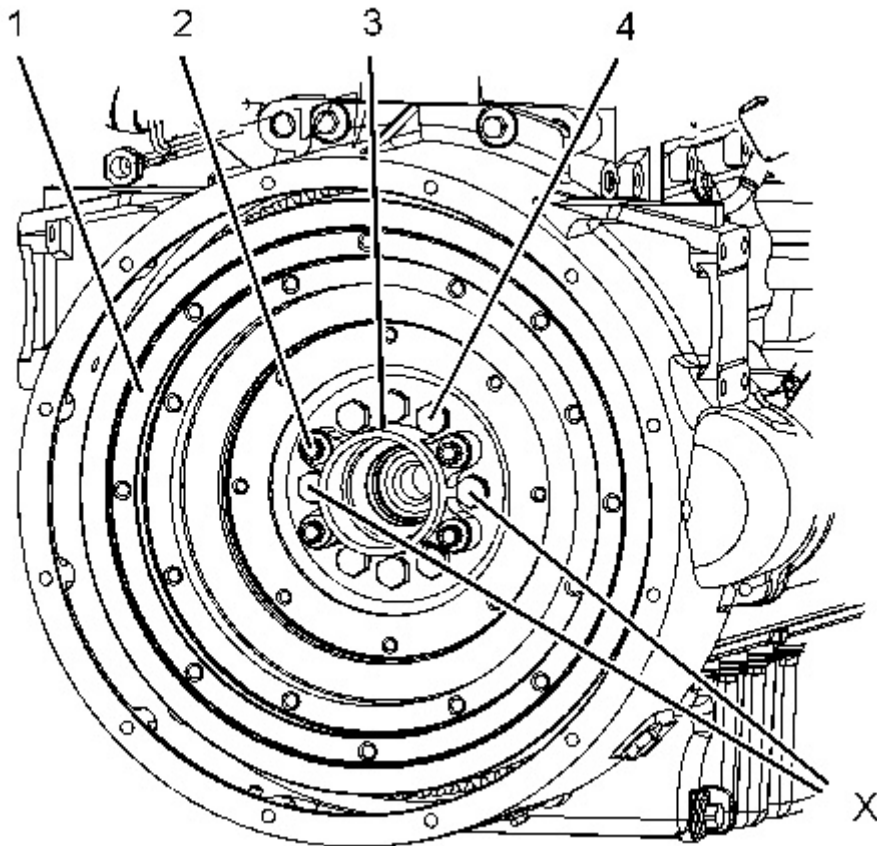


Illustration 1
Typical example

g01336668

1. Remove bolts from Position (X) on flywheel (1).
 2. Install Tooling (A) in Position (X) on flywheel (1).
 3. Install a suitable lifting device on flywheel (1). Support the weight of the flywheel. The flywheel can weigh 71 kg (156 lb).
 4. If necessary, remove bolts (2) that secure the housing for pilot bearing (3) to flywheel (1). Remove the housing for pilot bearing (3).
 5. Remove remaining bolts (4).
 6. Use the lifting device to remove the flywheel from the engine.
-

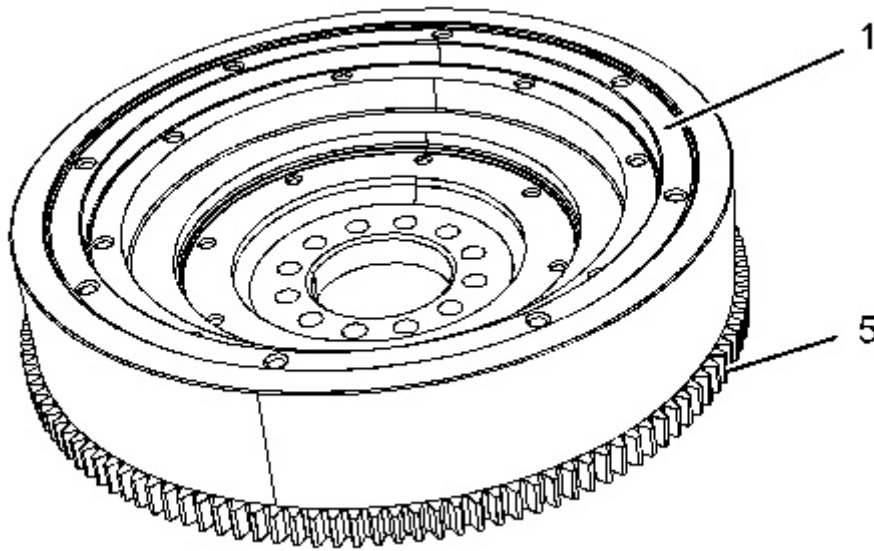


Illustration 2
Typical example

g01336669

7. Inspect flywheel (1) and ring gear (5) for wear and damage. Replace any worn components or damaged components.
8. To remove flywheel ring gear (5), follow Step 8.a through Step 8.b.
 - a. Place the flywheel assembly on a suitable support.
 - b. Use a hammer and a punch in order to remove ring gear (5) from flywheel (1).

Note: Identify the orientation of the teeth on the flywheel ring gear.

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i04047807

Flywheel - Install

SMCS - 1156-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Stud 1/2 inch - UNF by 4 inch	2

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

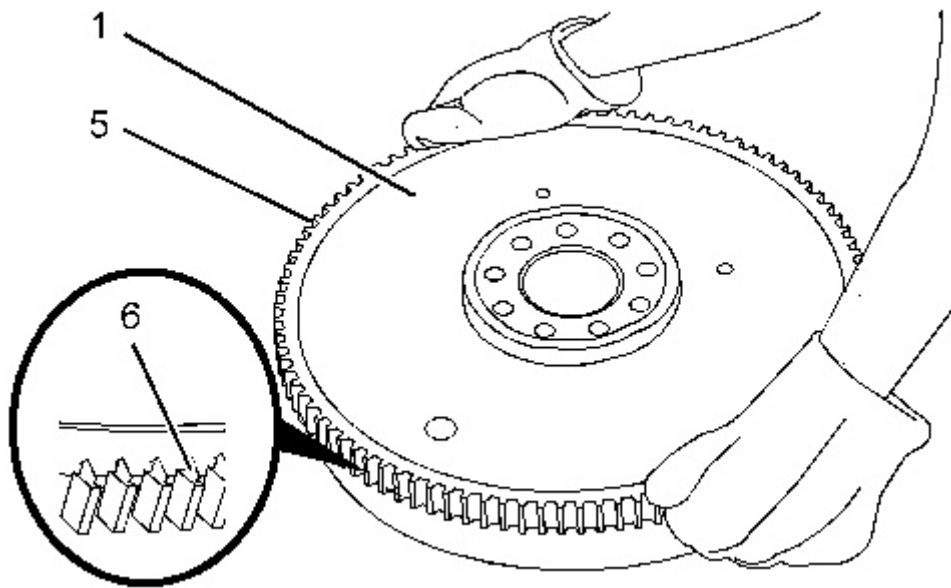


Illustration 1
Typical example

g01336671

! WARNING

Always wear protective gloves when handling parts that have been heated.

1. If the flywheel ring gear was removed, follow Step 1.a through Step 1.c in order to install ring gear (5) to flywheel (1).
 - a. Identify the orientation of teeth (6) on new ring gear (5).

Note: The chamfered side of ring gear teeth (6) must face toward the starting motor when the flywheel is installed. This will ensure the correct engagement of the starting motor.
 - b. Heat flywheel ring gear (5) in an oven to a maximum temperature of 250 °C (482 °F) prior to installation.

Note: Do not use a torch to heat the ring gear.
 - c. Ensure that the orientation of ring gear (5) is correct and quickly install the ring gear onto flywheel (1).
2. Inspect the crankshaft rear seal for leaks. If there are any oil leaks, replace the crankshaft rear seal. Refer to Disassembly and Assembly, "Crankshaft Rear Seal - Remove" for the correct procedure.

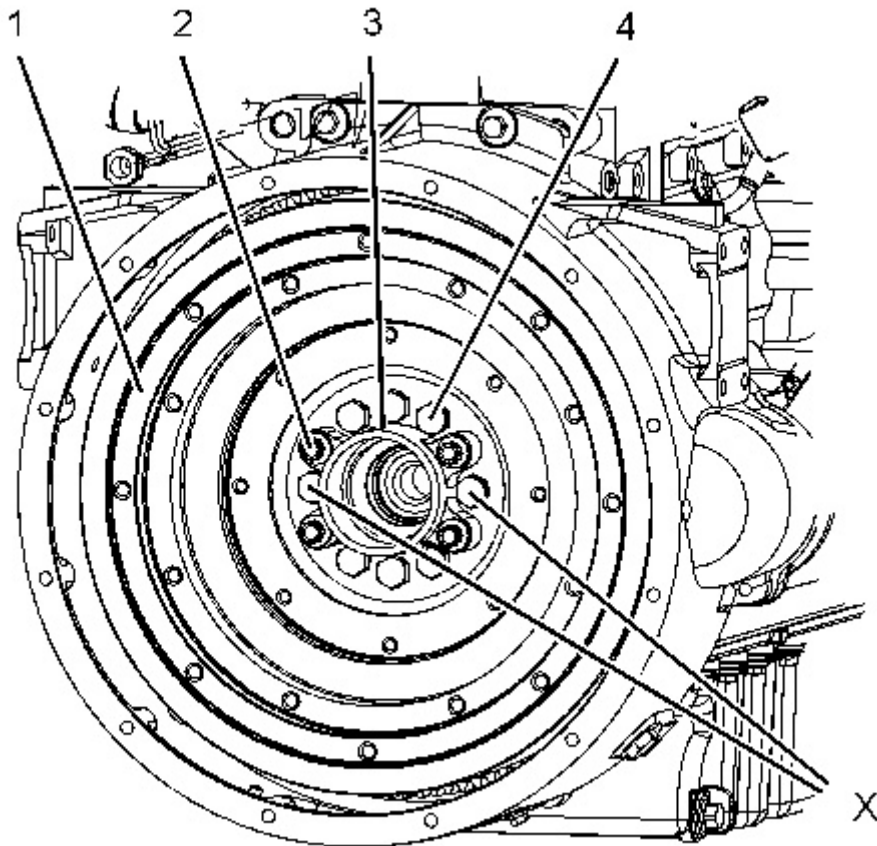


Illustration 2
Typical example

g01336668

3. Install a suitable lifting device on flywheel (1). The flywheel can weigh 71 kg (156 lb).
4. Install Tooling (A) in Position (X) on the crankshaft.
5. Use the lifting device to position flywheel (1) onto Tooling (A).
6. If necessary, install pilot bearing (3) and bolts (2) to flywheel (1).
7. Install bolts (4) to flywheel (1).
8. Remove Tooling (A) and install remaining bolts (4) to flywheel (1).
9. Use a suitable tool to prevent the flywheel from rotating. Tighten bolts (2) and (4) to a torque of 140 N·m (103 lb ft).
10. Remove the lifting device from flywheel (1).
11. Check the run out of the flywheel. Refer to Specifications, "Flywheel" for further information.

End By:

- a. Install the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install" for the correct procedure.
-

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