

Product: VIBRATORY COMPACTOR

Model: CB-335D VIBRATORY COMPACTOR 5PZ

Configuration: CB-335D Vibratory Compactor 5PZ00001-UP (MACHINE) POWERED BY 3013 Engine

Disassembly and Assembly 3003, 3013, 3014 and 3024 Engines for Caterpillar Built Machines

Media Number -SEN5027-05

Publication Date -01/05/2005

Date Updated -16/05/2005

i01480631

Cylinder Head - Install

SMCS - 1100-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Thoroughly clean the top of the cylinder block and the bottom of the cylinder head. Ensure that there is no debris in the cylinder bores.

Note: A number with four digits is stamped on the gasket in order to ensure the correct positioning of the gasket. This number faces the cylinder head. Make sure that the cylinder head is the correct thickness before installation.

2. Place the cylinder head gasket on the dowels on the top of the cylinder block. Do not use any gasket sealant or compound on the cylinder head gasket.
-

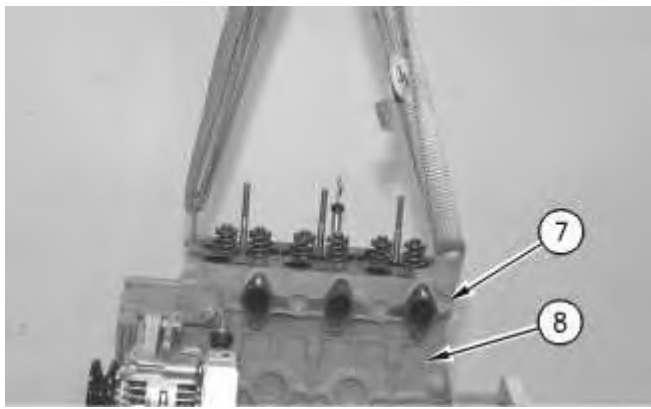


Illustration 1

g00597552

3. Attach a suitable lifting device to cylinder head (7) .
4. Place cylinder head (7) on the cylinder block. Ensure that the cylinder head is positioned on the dowels and that the cylinder head gasket is positioned correctly.
5. Lubricate the cylinder head bolts with clean engine oil.

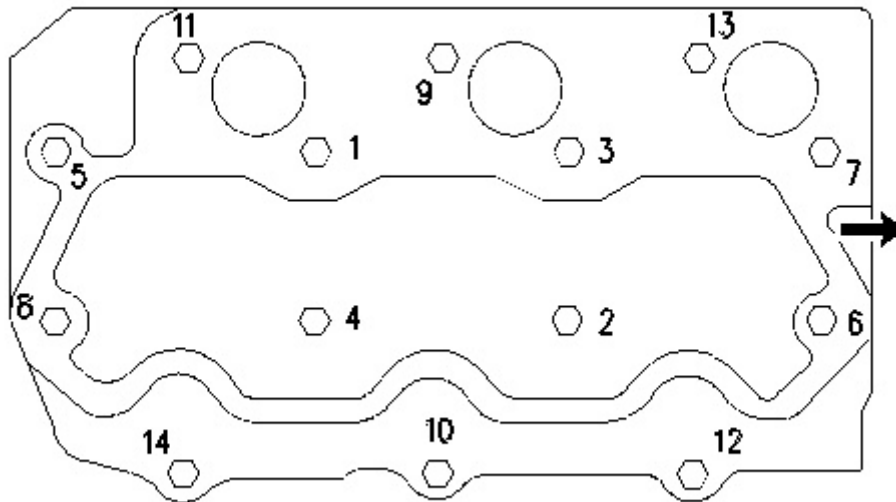


Illustration 2

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Bolt tightening sequence for 3 cylinder engines

The arrow points toward the front of the engine.

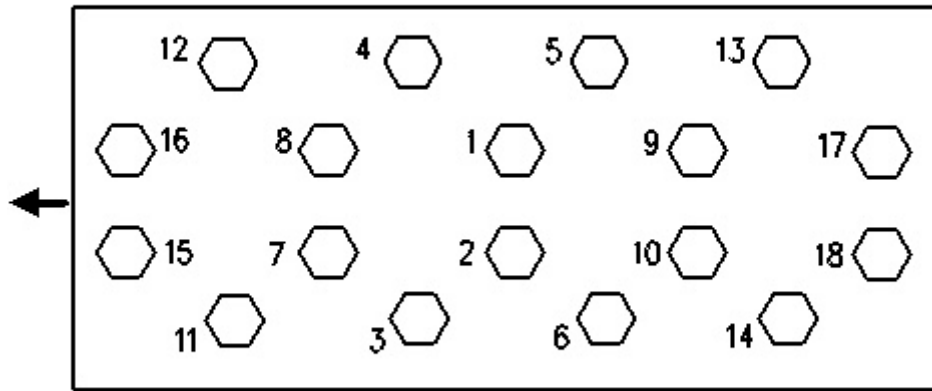


Illustration 3

g00597449

Bolt tightening sequence for 4 cylinder engines

The arrow points toward the front of the engine.

6. Install the cylinder head bolts and gradually tighten the cylinder head bolts in a numerical sequence. The numerical sequence is shown in Illustration 2 and in Illustration 3. Tighten the cylinder head bolts to the following torque:

3003 Engine ... 51 N·m (38 lb ft)

3013, 3014, and 3024 Engines ... 100 N·m (74 lb ft)

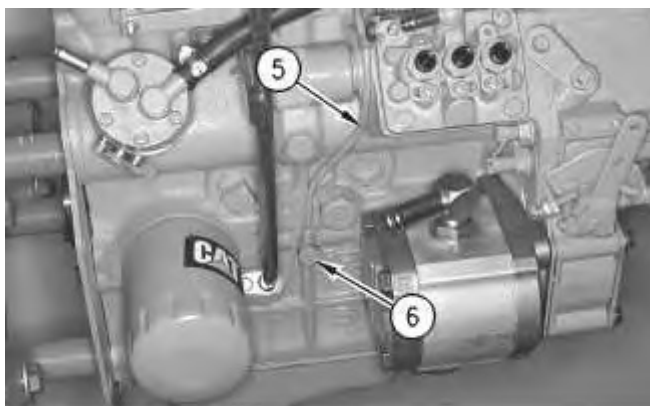


Illustration 4

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7. Position external oil line (5) on the side of the engine and install bolt (6) .

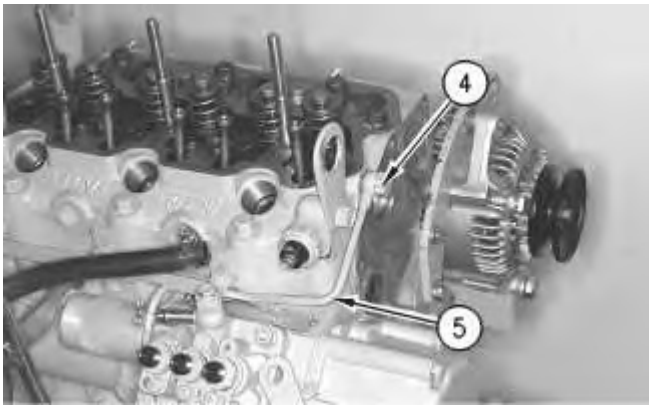


Illustration 5

g00597210

8. Install bolt (4) and the two washers that fasten external oil line (5) to the front of the cylinder head.

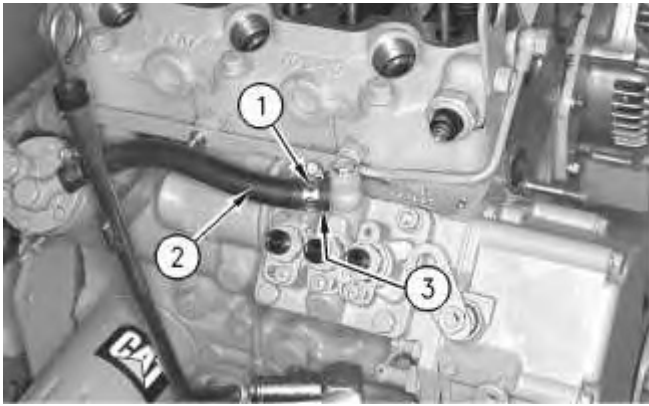


Illustration 6

g00597200

9. Install nut (3) (not shown) that connects the external oil line to the fuel injection pump.
10. Install fuel hose (2) on the fuel injection pump and tighten hose clamp (1) .

End By:

- a. On 3013, 3014, and 3024 engines, install the inlet manifold. Refer to Disassembly and Assembly, "Inlet Manifold - Install".
- b. On 3013 engines, install the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove and Install".
- c. On 3003 engines, install the fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Install".
- d. On 3003 engines, install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".
- e. Install the fuel injection nozzles. Refer to Disassembly and Assembly, "Fuel Injection Nozzles - Install".
- f. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".

- g. Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".
 - h. Install the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
 - i. Install the water pump. Refer to Disassembly and Assembly, "Water Pump - Install".
-

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i02405583

Lifter Group - Remove and Install

SMCS - 1209-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7262	Telescoping Magnet	1

Start By:

- A. Remove the cylinder head. Refer to Disassembly and Assembly, "Cylinder Head - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Mark the original location of the lifters for later installation.

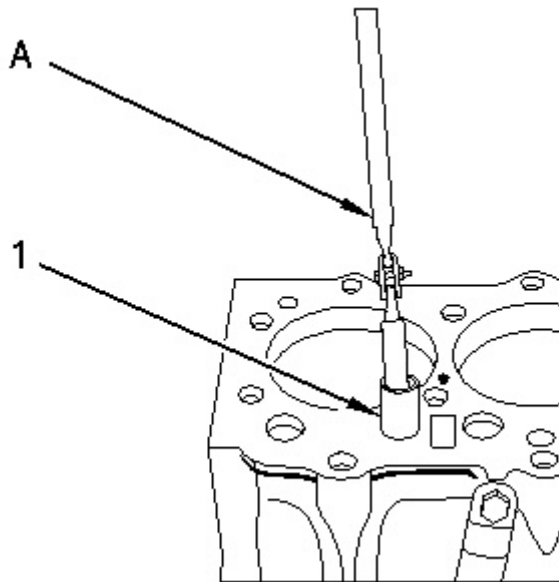


Illustration 1

g00828101

1. Use Tooling (A) to remove lifter (1) from the cylinder block.
2. Inspect lifter (1) for wear or damage. If the lifters are worn or damaged, use new parts for replacement.
3. Repeat Steps 1 and 2 for the remaining lifters.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

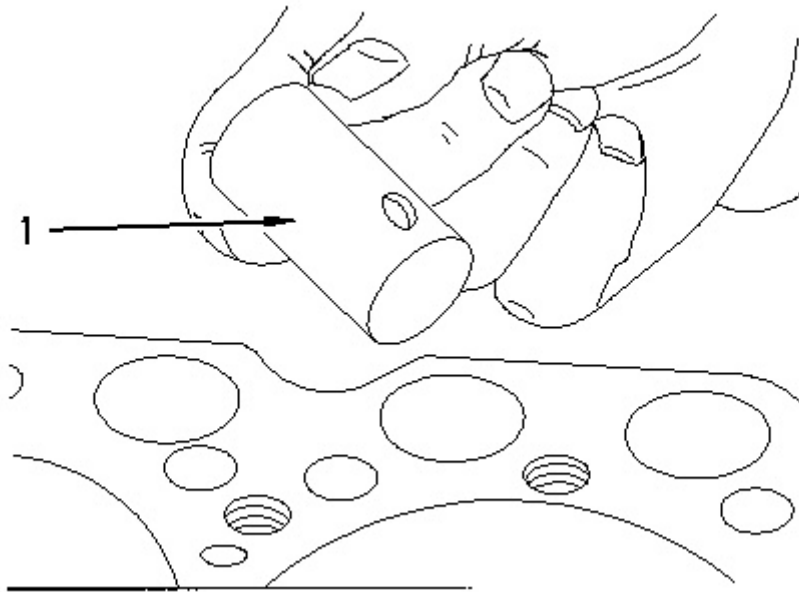


Illustration 2

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1. Ensure that lifter (1) is clean and that the oil hole in the lifter is not restricted. Lubricate the lifter with clean engine oil and install the lifter in the cylinder block.

Note: Ensure that the lifters are installed in the original location.

2. Repeat Step 1 for the remaining lifters.

End By: Install the cylinder head. Refer to Disassembly and Assembly, "Cylinder Head - Install".

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i01908247

Camshaft - Remove

SMCS - 1210-011

Removal Procedure

Start By:

- A. Remove the lifters. Refer to Disassembly and Assembly, "Lifter Group - Remove and Install".
- B. Remove the fuel injection pump. Refer to Disassembly and Assembly, "Fuel Injection Pump - Remove".
- C. Remove the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Remove".
- D. Remove the engine front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove".

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.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

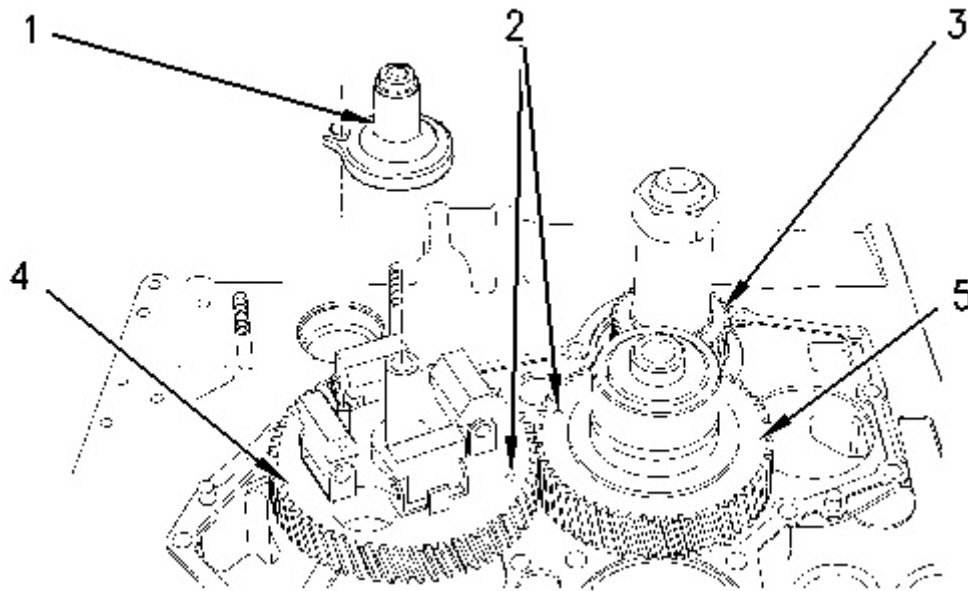


Illustration 1

g00828467

1. Remove slider (1) from camshaft gear (4) .
2. Rotate the crankshaft until timing marks (2) on the following components are aligned.

Note: The No. 1 cylinder is at the top center position when these marks are in alignment. Refer to Illustration 1.

- Camshaft gear (4)
- Idler gear (5)
- Crankshaft gear (3)

3. Remove idler gear (5). Refer to Disassembly and Assembly, "Engine Oil Pump - Remove".
-

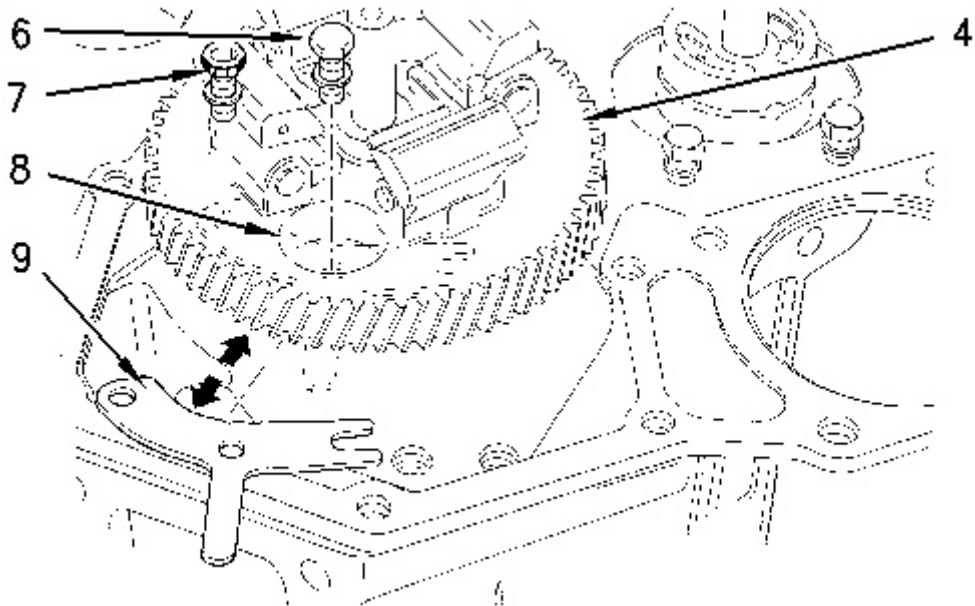


Illustration 2

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4. Rotate camshaft gear (4) in order to align access hole (8) in the camshaft gear with bolt (6). Remove bolt (6) and remove bolt (7) from camshaft retainer (9) .

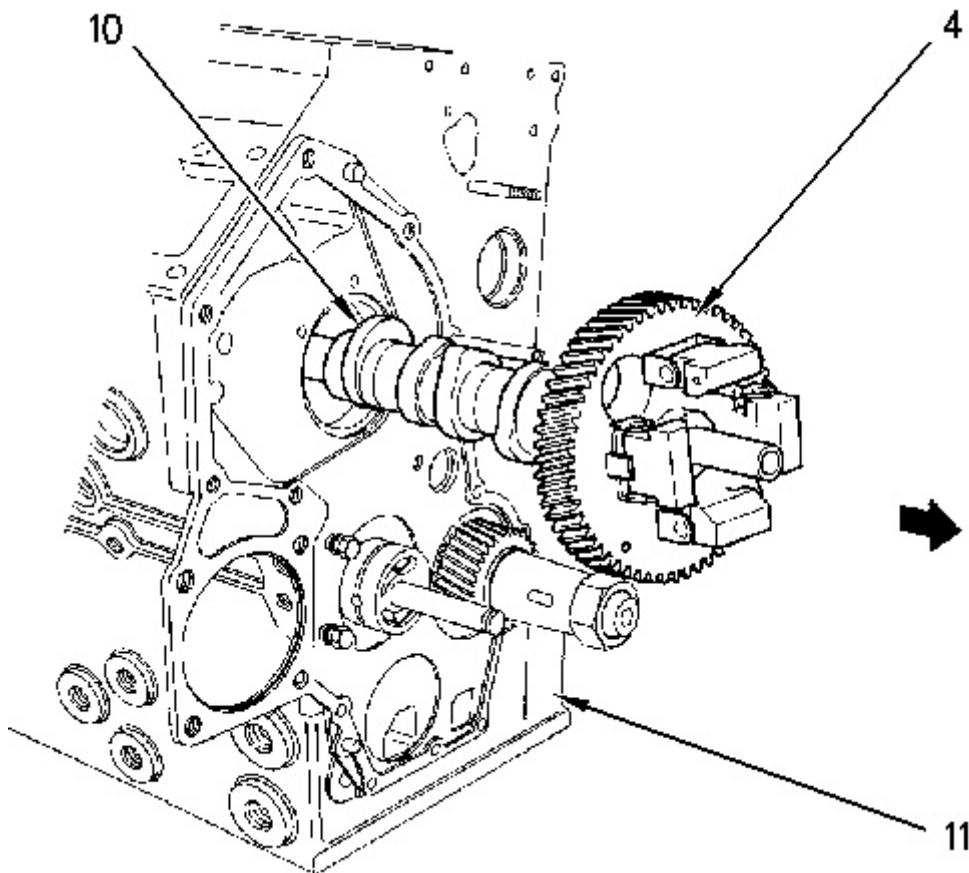


Illustration 3

g01003180

5. Carefully remove camshaft gear (4) and camshaft (10) from cylinder block (11). Be careful not to damage the lobes of the camshaft or the camshaft bearings.
 6. Inspect the components for wear or damage. Replace the components that are worn or damaged.
-

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i02005467

Camshaft - Install

SMCS - 1210-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Ensure that the camshaft is clean. Lubricate the camshaft with clean engine oil.
-

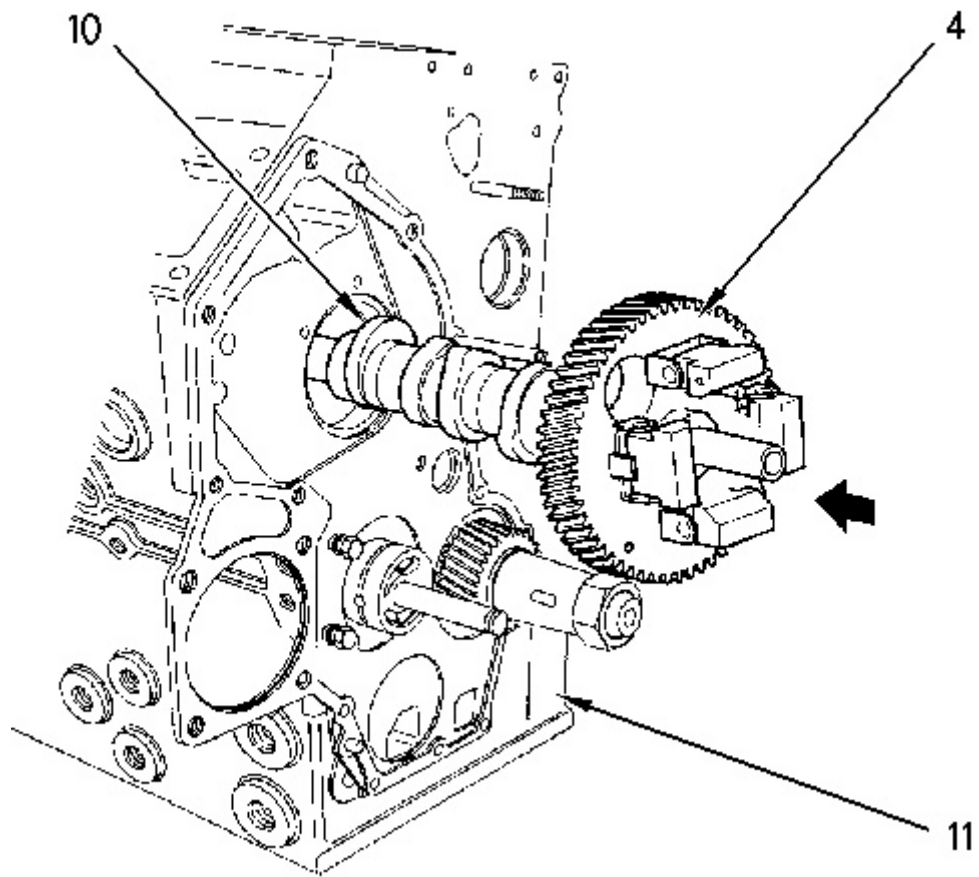


Illustration 1

g01003212

2. Carefully install camshaft (10) and camshaft gear (4) in cylinder block (11). Be careful not to damage the lobes of the camshaft or the camshaft bearings.

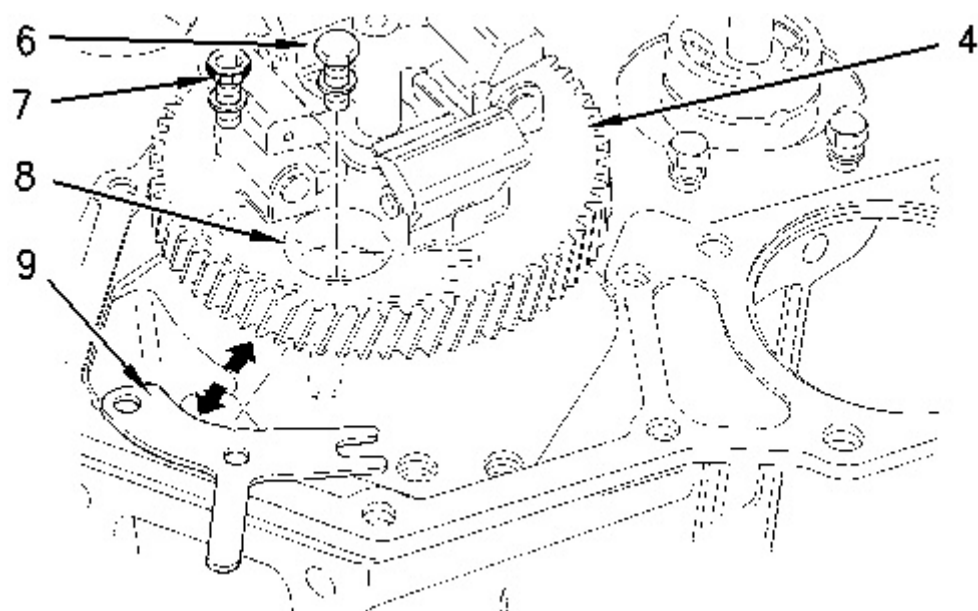


Illustration 2

g00828468

3. Align the bolt holes in camshaft retainer (9) with the bolt holes in cylinder block (11). Rotate camshaft gear (4) in order to align access hole (8) in the camshaft gear with the hole for bolt (6). Install bolt (6) and bolt (7) that secures camshaft retainer (9) in position on cylinder block (11). Tighten bolt (6) and bolt (7) to a torque of 11 N·m (95 lb in).

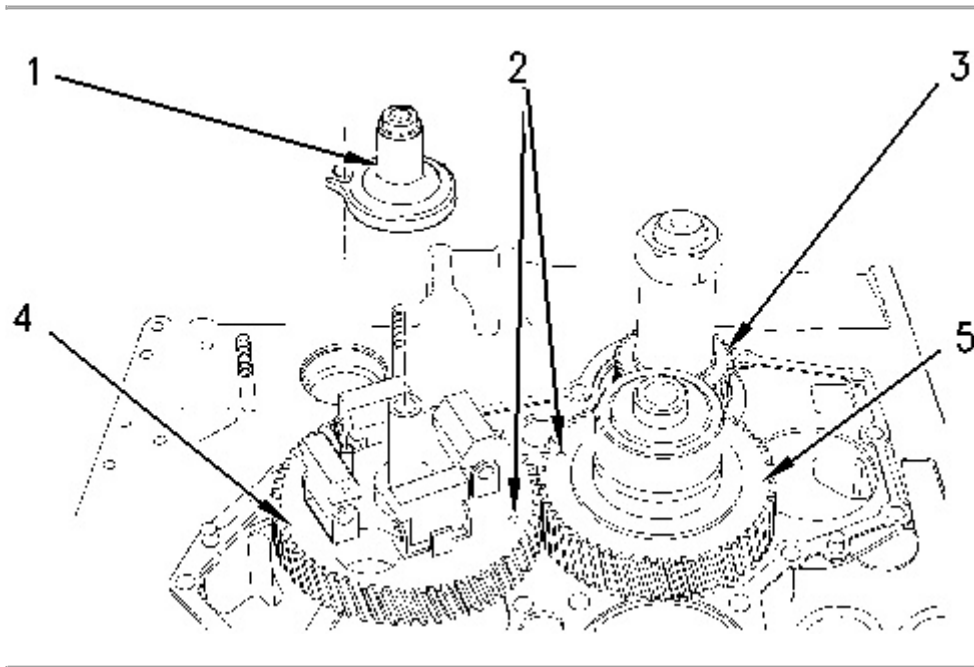


Illustration 3

g00828467

4. Install idler gear (5). Refer to Disassembly and Assembly, "Engine Oil Pump - Install".

Note: When you install the idler gear, ensure that timing marks (2) are aligned on the following components.

- Camshaft gear (4)
 - Idler gear (5)
 - Crankshaft gear (3)
5. Install slider (1) to camshaft gear (4) .

End By:

- a. Install the engine front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".
 - b. Install the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Install".
 - c. Install the fuel injection pump. Refer to Disassembly and assembly, "Fuel Injection Pump - Install".
 - d. Install the lifters. Refer to Disassembly and Assembly, "Lifter Group - Remove and Install".
-

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i01896056

Engine Oil Pan - Remove and Install

SMCS - 1302-010

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.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

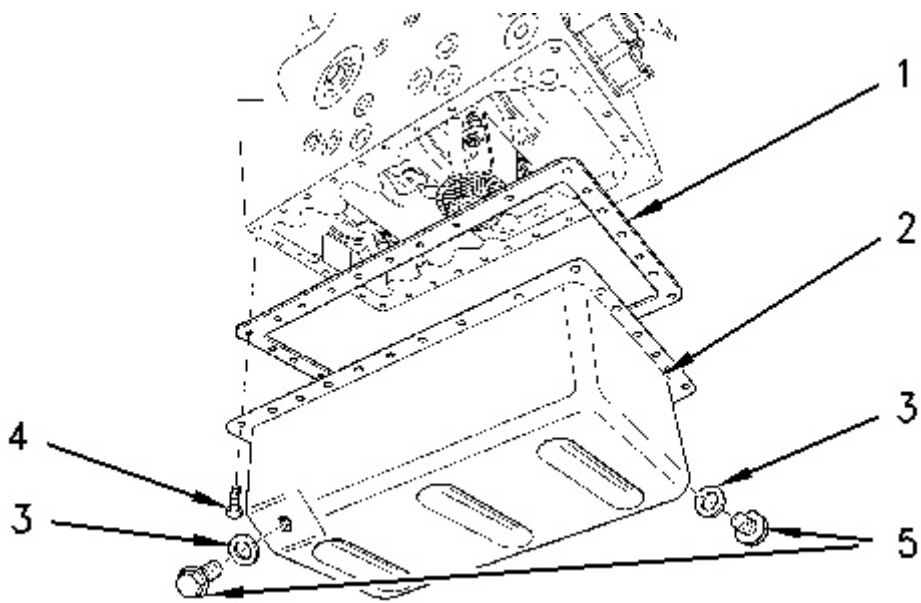


Illustration 1

g00820013

1. Remove drain plugs (5) and washers (3) from engine oil pan (2). Drain the engine oil into a suitable container for storage or disposal.
2. Remove bolts (4) for engine oil pan (2) .
3. Remove engine oil pan (2) from the engine.
4. Remove the remaining gasket material (1) from engine oil pan (2) and the cylinder block.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

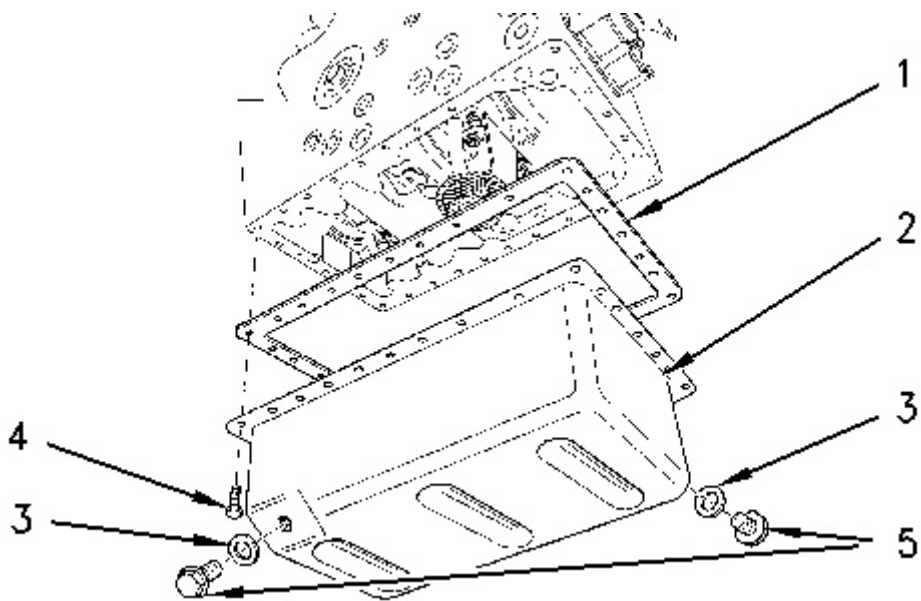


Illustration 2

g00820013

1. Clean all surfaces thoroughly. Inspect the condition of gasket (1). Replace the gasket, if necessary.
2. Position gasket (1) and engine oil pan (2) on the engine.
3. Install bolts (4) for engine oil pan (2) .

For 3011C Engines, tighten the bolts for the engine oil pan to a torque of 6 N·m (53 lb in).

For 3013C Engines and 3024C Engines, tighten the bolts for the engine oil pan to a torque of 11 N·m (97 lb in).

4. Install drain plugs (5) and washers (3) to oil pan (2). Tighten the drain plugs for the engine oil pan to a torque of 35 N·m (26 lb ft).

Note: When a drain plug is removed, install a new O-ring.

5. Fill the engine oil pan to the correct level that is indicated on the engine oil level gauge. Refer to Operation and Maintenance Manual, "Refill Capacities" for more information.

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i02037025

Pistons and Connecting Rods - Remove

SMCS - 1225-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2269	Ridge Reamer	1

Start By:

- A. Remove the cylinder head. Refer to Disassembly and Assembly, "Cylinder Head - Remove".
- B. Remove the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove and Install".
- C. Remove the oil suction tube. Refer to Disassembly and Assembly, "Engine Oil Pump - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Use Tooling (A) to remove the wear ridge from the inner surface of the cylinder bore.
-

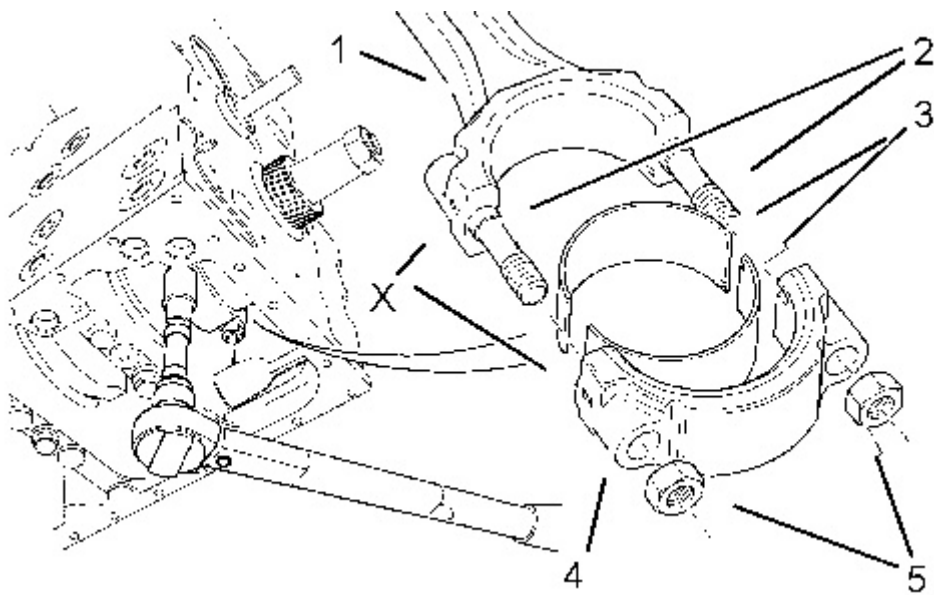


Illustration 1

g01047932

2. Rotate the crankshaft until the piston is at the bottom center. Remove connecting rod nuts (5) from the connecting rod. Remove connecting rod cap (4).

Note: Identification marks (X) are on the connecting rod and the connecting rod cap. The identification marks ensure that the pistons are installed into the correct cylinder in the cylinder block.

Note: Use tape or rubber tubing on connecting rod bolts (2) to protect the crankshaft journals. The sharp edges of the connecting rod bolts could damage the crankshaft journals.

3. Push the piston and connecting rod (1) away from the crankshaft until the piston rings are out of the cylinder bore. Remove the piston from the cylinder block.
4. Remove connecting rod bearings (3) from connecting rod (1) and connecting rod cap (4) .
5. Keep connecting rods (1) and connecting rod caps (4) together. Ensure that the identification marks are on the connecting rod and on the connecting rod cap. This will ensure that the piston is installed into the correct cylinder in the cylinder block.
6. Repeat Steps 1 through 5 for removing the remaining pistons and connecting rods.

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i01480856

Pistons and Connecting Rods - Disassemble

SMCS - 1225-015

Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1857	Retaining Ring Pliers	1
B	1U-6683	Ring Expander	1
C	1P-0510	Driver Group	1

Start By:

- Remove the pistons and connecting rods. Refer to Disassembly and Assembly, "Pistons and Connecting Rods - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

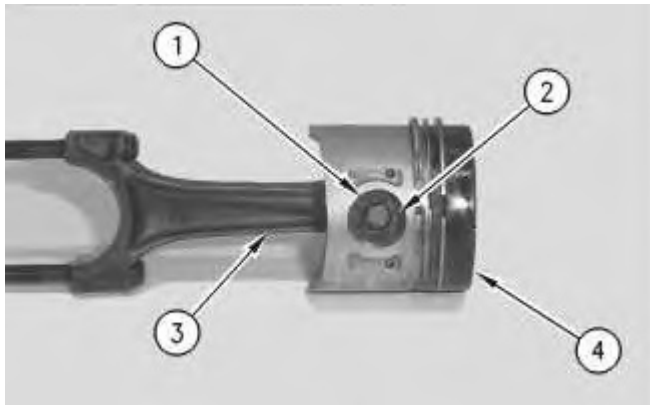


Illustration 1

g00535802

1. Use Tool (A) to remove two retaining rings (1) from piston (4).
2. Remove piston pin (2) and connecting rod (3) from piston (4).

Note: Check the condition of the following parts: retaining rings (1), piston pin (2) and piston (4). If these items are worn or damaged, use new parts for replacement.



Illustration 2

g00535803



Illustration 3

g00535398

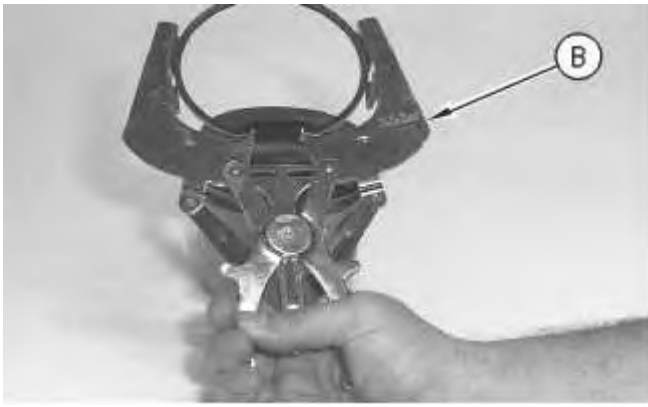


Illustration 4

g00535400

3. Remove piston rings (5) from pistons (4) with tool (B).

Note: Check the condition of the piston rings. If the piston rings are worn or damaged, use new parts for replacement.



Illustration 5

g00770925

4. Remove connecting rod bearing (6) and two bolts (7) from connecting rod (3).

Note: Check the condition of the following items: connecting rod bearing (6), connecting rod bolt (7), piston pin bushing (8) and connecting rod (3). If the items are worn or damaged, use new parts for replacement.

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