

Product: VIBRATORY COMPACTOR

Model: CS-64B VIBRATORY COMPACTOR C64

Configuration: CS64B Compactor C6400001-UP (MACHINE) POWERED BY C4.4 Engine

## **Disassembly and Assembly**

### **C4.4 Engines for Caterpillar Built Machines**

Media Number -UENR0602-11

Publication Date -01/08/2013

Date Updated -25/10/2017

i04047734

## **Camshaft - Remove and Install**

SMCS - 1210-010

### **Removal Procedure**

#### **Start By:**

- a. Remove the rockershaft and pushrods. Refer to Disassembly and Assembly, "Rocker shaft and Pushrod - Remove" for the correct procedure.
- b. Remove the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove" for the correct procedure.

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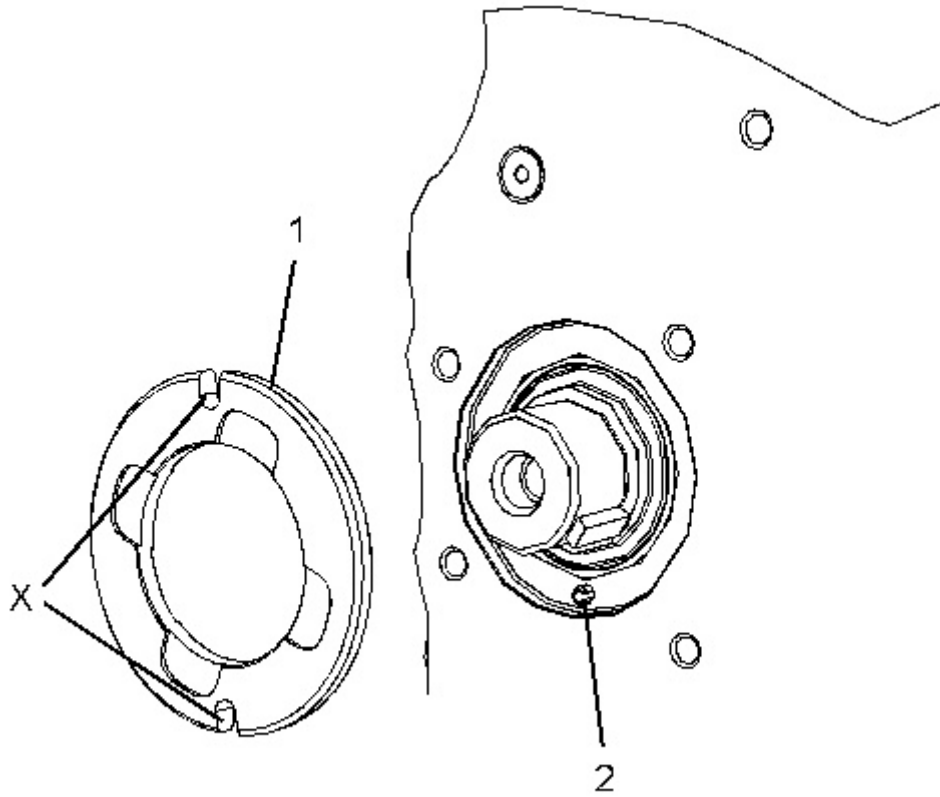
#### **NOTICE**

**Keep all parts clean from contaminants.**

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

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1. The engine should be mounted on a suitable stand and placed in the inverted position.
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Illustration 1

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2. Remove thrust washer (1) from the cylinder block. Do not remove dowel (2) from the cylinder block unless the dowel is damaged.

**Note:** The thrust washer can have one or two Slots (X).

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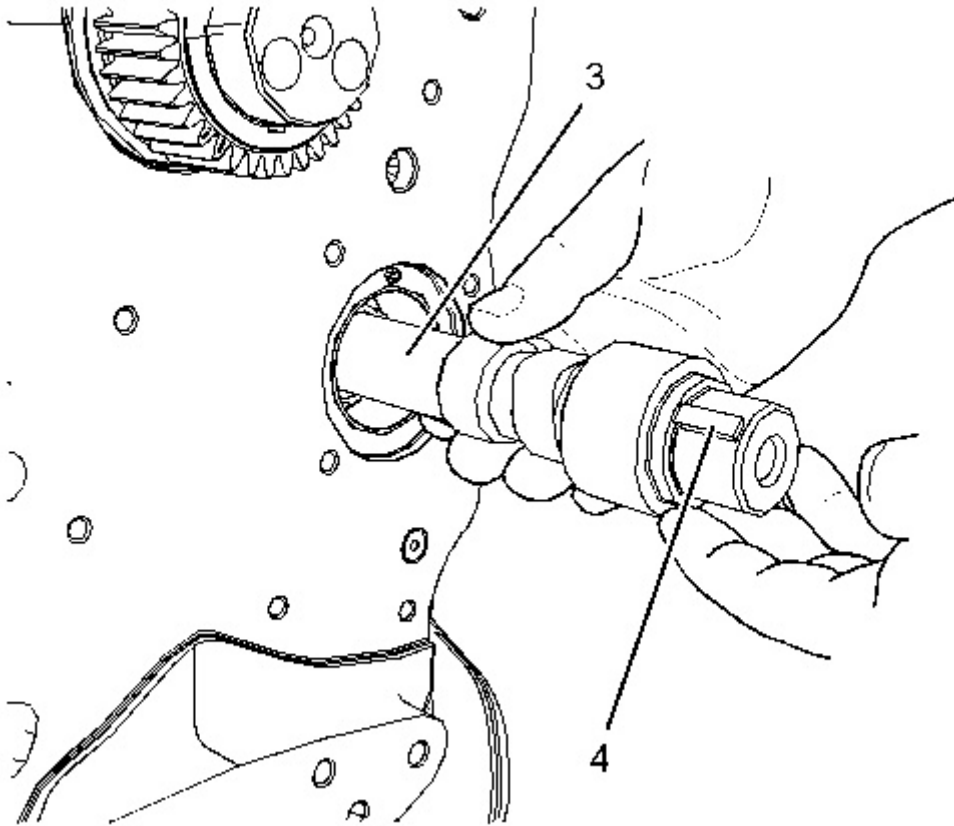


Illustration 2

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### NOTICE

**Do not damage the lobes or the bearings when the camshaft is removed or installed.**

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3. Carefully remove camshaft (3) from the cylinder block.
4. If necessary, remove key (4) from camshaft (3).

## Installation Procedure

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### NOTICE

**Keep all parts clean from contaminants.**

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

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1. Clean the camshaft and the thrust washer. Inspect the camshaft and the thrust washer for wear and for damage. Refer to Specifications, "Camshaft" for more information. Replace any worn components or any damaged components.
2. Clean the camshaft bearing in the cylinder block. Inspect the camshaft bearing for wear and for damage. Refer to Specifications, "Camshaft Bearings" for more information. If necessary, replace the camshaft bearing. Refer to Disassembly and Assembly, "Camshaft Bearing - Remove and Install" for the correct procedure.

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### NOTICE

**It is strongly recommended that all lifters should be replaced when a new camshaft is installed.**

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3. Inspect the lifters for wear and for damage. Refer to Specifications, "Lifter Group" for more information. Replace any worn lifters or any damaged lifters. Refer to Disassembly and Assembly, "Lifter Group - Remove and install" for the correct procedure.

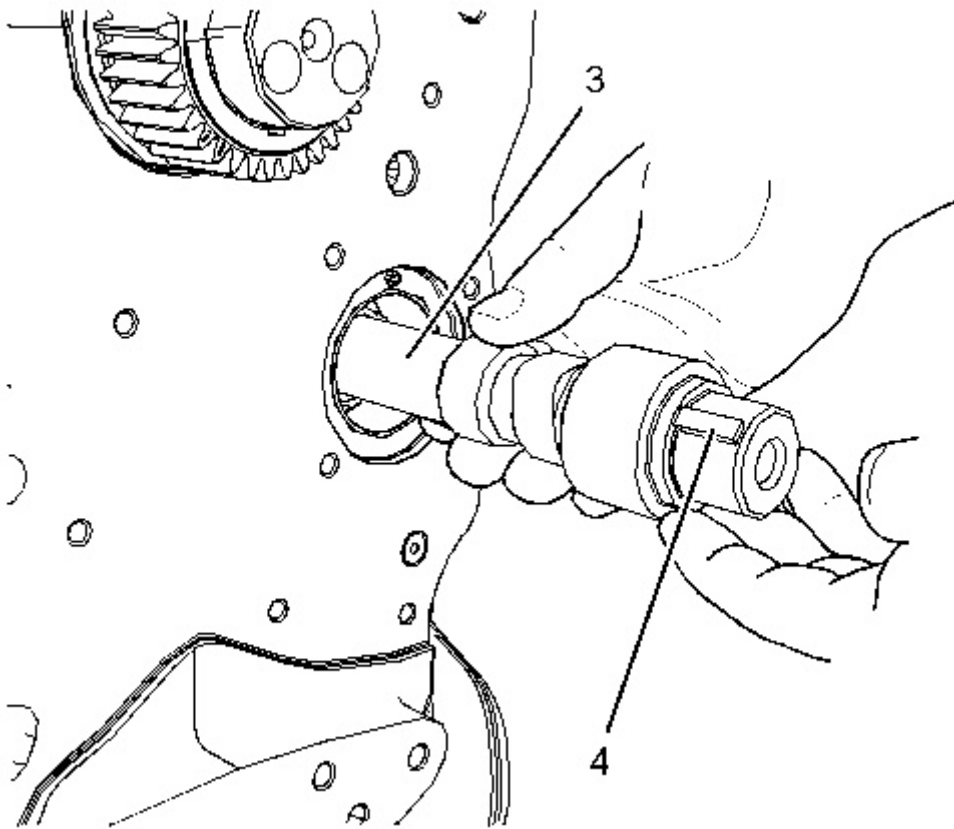


Illustration 3

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4. If necessary, install a new key (4) into camshaft (3).

- Lubricate the bearing surfaces of camshaft (3) and lubricate the lobes of the camshaft with clean engine oil.

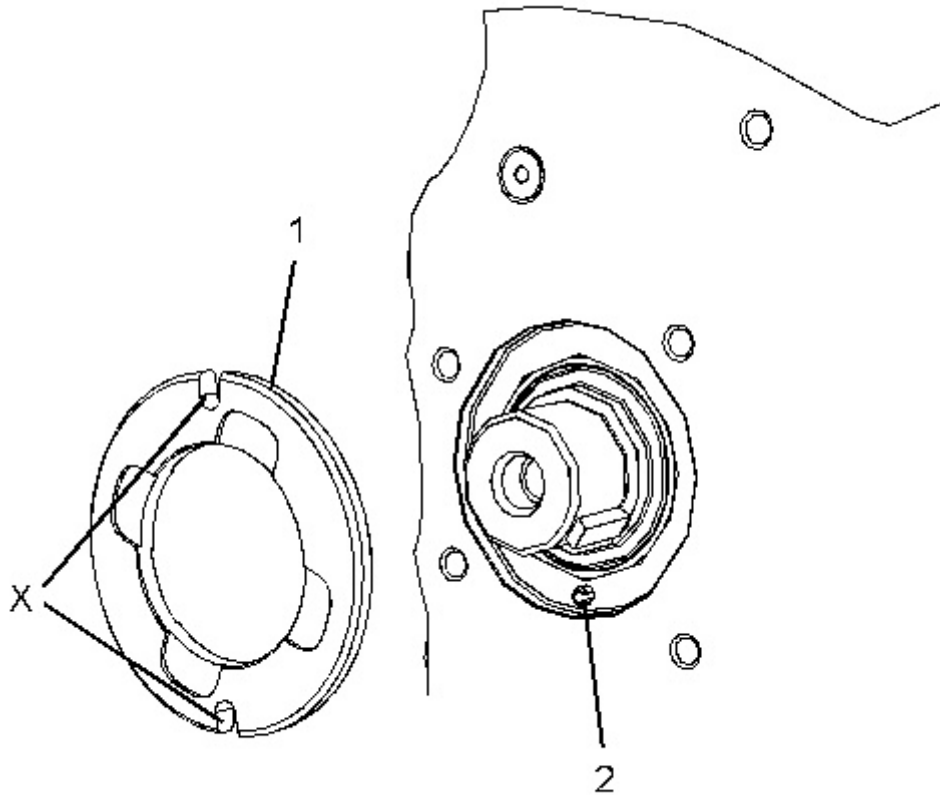
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### NOTICE

**Do not damage the lobes or the bearings when the camshaft is removed or installed.**

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- Carefully install camshaft (3) into the cylinder block.



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Illustration 4

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- Lubricate the thrust washer with clean engine oil. Align Slot (X) in thrust washer (1) with dowel (2) in the cylinder block. Install thrust washer (1) into the recess in the cylinder block.

**Note:** The thrust washer can have one or two Slots (X).

#### End By:

- Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install" for the correct procedure.

- b. Install the rockershaft and pushrods. Refer to Disassembly and Assembly, "Rocker shaft and Pushrod - Install" for the correct procedure.
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## Disassembly and Assembly

### C4.4 Engines for Caterpillar Built Machines

Media Number -UENR0602-11

Publication Date -01/08/2013

Date Updated -25/10/2017

i04047736

## Camshaft Gear - Remove and Install

SMCS - 1210-010-GE

### Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A <sup>(1)</sup>	9U-6198	Crankshaft Turning Tool	1
A <sup>(2)</sup>	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	298-5564	T40 Torx Socket	1
C	230-6284	Timing Pin (Camshaft)	1
D	364-9107	Timing Pin (Fuel Injection Pump)	1
E	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1

<sup>(1)</sup> The Crankshaft Turning Tool is used on the front pulley.

<sup>(2)</sup> This Tool is used in the aperture for the electric starting motor.

#### Start By:

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

**Note:** Either Tooling (A) can be used. Use the Tooling that is most suitable.

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### **NOTICE**

**Keep all parts clean from contaminants.**

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

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### **NOTICE**

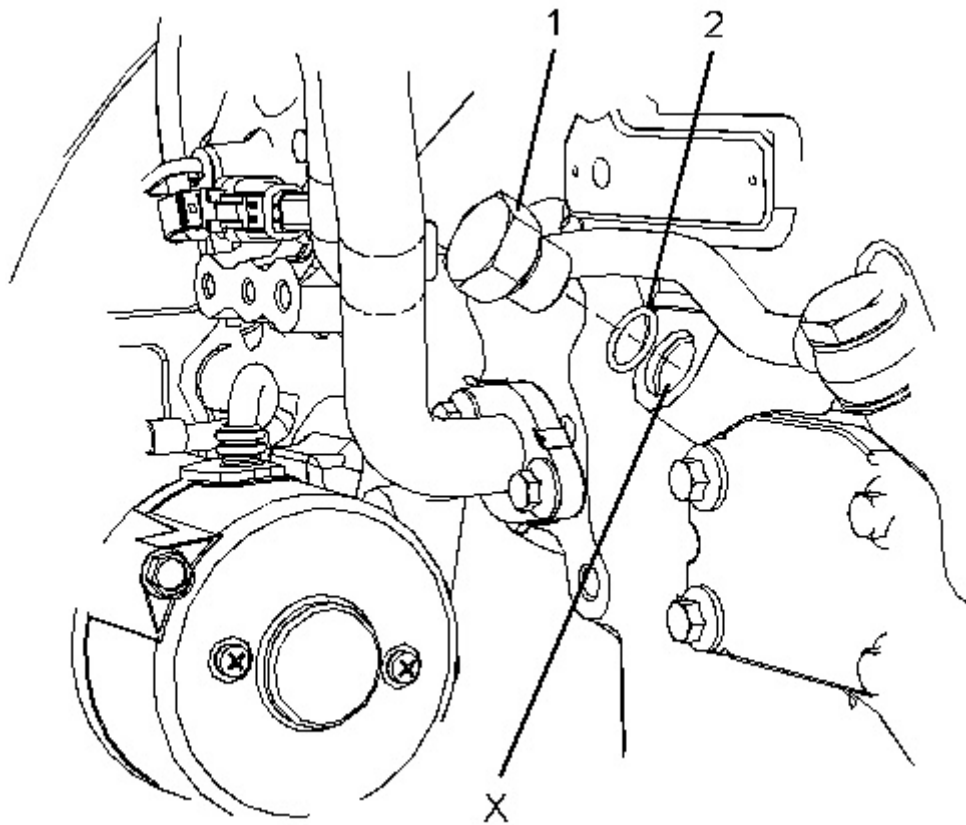
**Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.**

**Dispose of all fluids according to local regulations and mandates.**

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1. 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.
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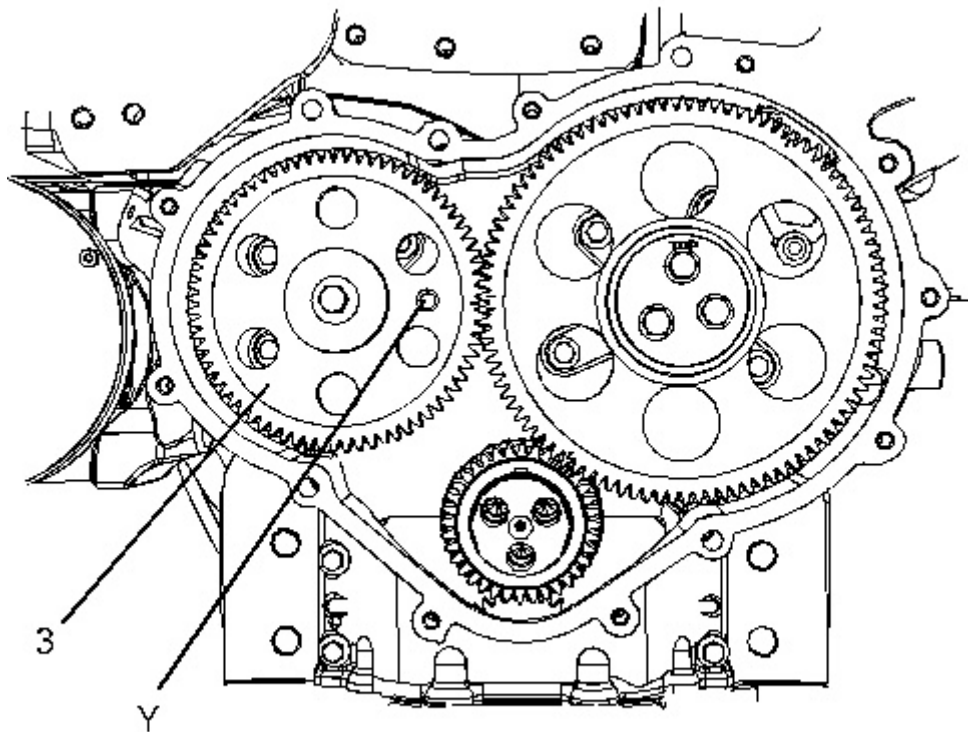
Illustration 1

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2. Remove plug (1) from the cylinder block. Remove O-ring seal (2) from the plug.
3. Install Tooling (E) into Hole (X) in the cylinder block. Use Tooling (E) in order to lock the crankshaft in the correct position.

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

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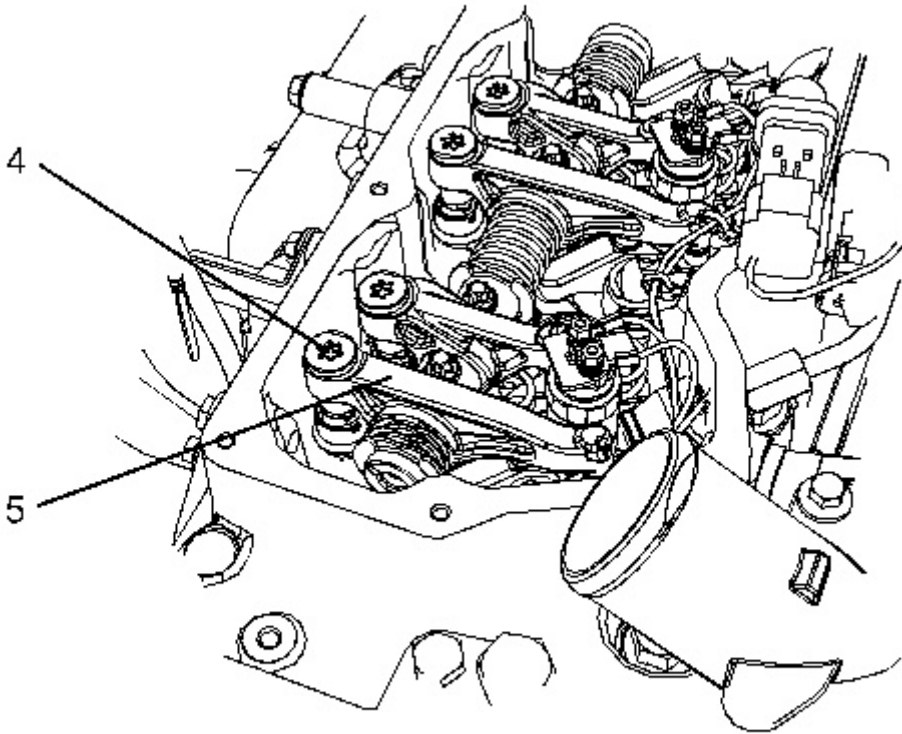


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Illustration 2

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4. Install Tooling (C) through Hole (Y) in camshaft gear (3) into the front housing. Use Tooling (C) in order to lock the camshaft in the correct position.
  5. Use Tooling (D) 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.
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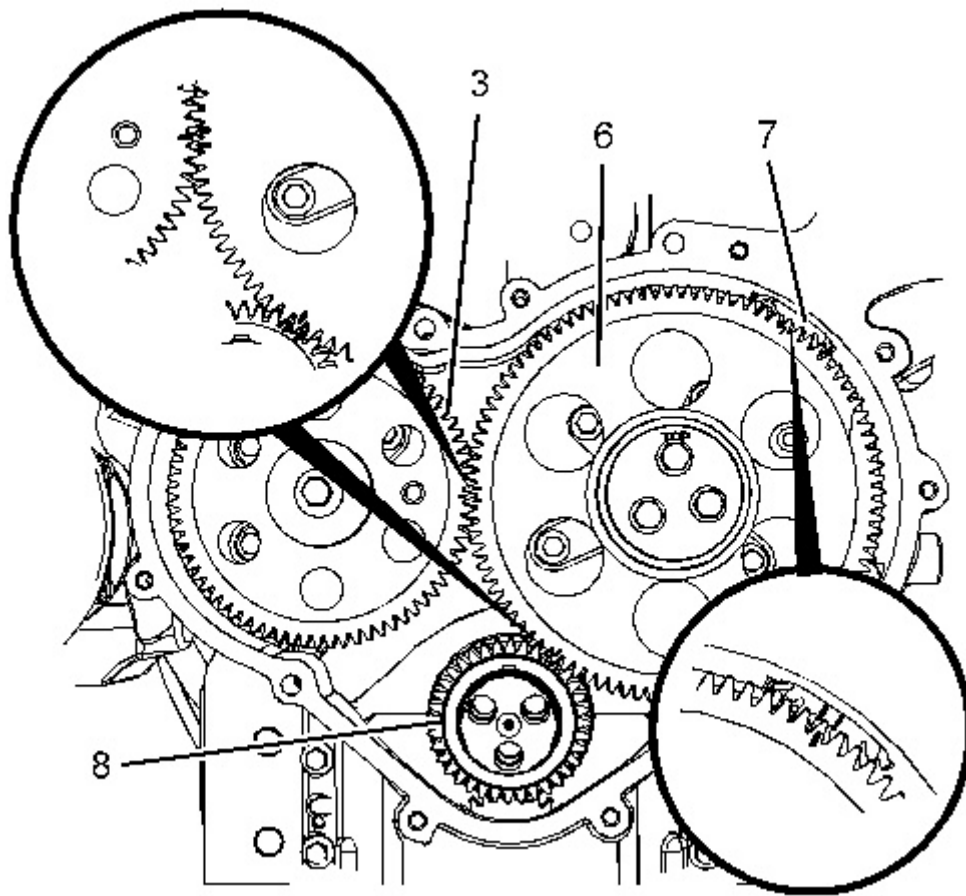
Illustration 3

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6. Use Tooling (B) in order to loosen threaded inserts (4) on all rocker arms (5). Unscrew threaded inserts (4) on all rocker arms (5) until all valves are fully closed.

**Note:** Ensure that all threaded inserts are fully unscrewed.

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Illustration 4

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Alignment of timing marks

7. Mark gear (3), gear (6), gear (7) and gear (8) in order to show alignment. Refer to Illustration 4.

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

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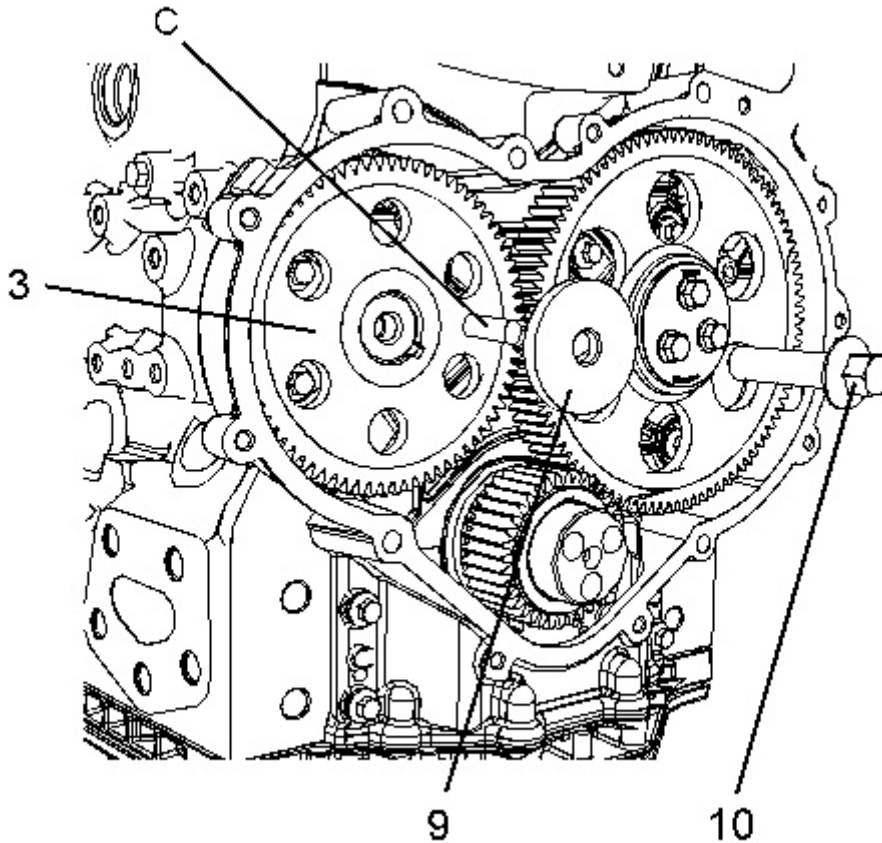


Illustration 5

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8. Remove Tooling (C). Remove bolt (10) and washer (9) from camshaft gear (3).
9. Remove camshaft gear (3) from the camshaft.

**Note:** If the camshaft gear is a tight fit on the nose of the camshaft, use a prybar in order to remove the camshaft gear.

10. If necessary, remove the key from the nose of the camshaft.

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A <sup>(1)</sup>	9U-6198	Crankshaft Turning Tool	1
A <sup>(2)</sup>	9U-7336	Housing	1
	5P-7305	Engine Turning Tool	1
B	298-5564	T40 Torx Socket	1
C	230-6284	Timing Pin (Camshaft)	1

D	364-9107	Timing Pin (Fuel Injection Pump)	1
E	136-4632	Timing Pin (Crankshaft)	1
	268-1966	Adapter	1
F	9U-7324	Indicator Bracket	1
	7H-1942	Dial Indicator	1
	3S-3268	Indicator Contact Point	1
	7H-1940	Universal Attachment	1

<sup>(1)</sup> The Crankshaft Turning Tool is used on the front pulley.

<sup>(2)</sup> This Tool is used in the aperture for the electric starting motor.

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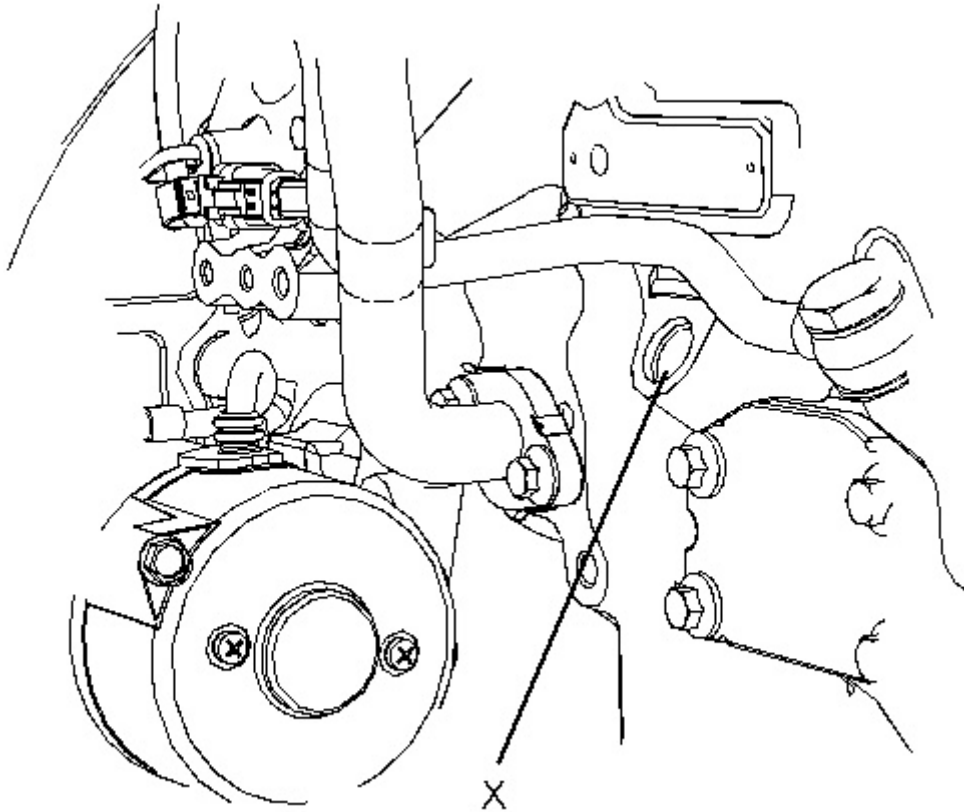
## NOTICE

**Keep all parts clean from contaminants.**

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

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1. Ensure that number one piston is at top dead center on the compression stroke. Refer to System Operation, Testing and Adjusting, "Finding Top Center for No.1 Piston" for the correct procedure.
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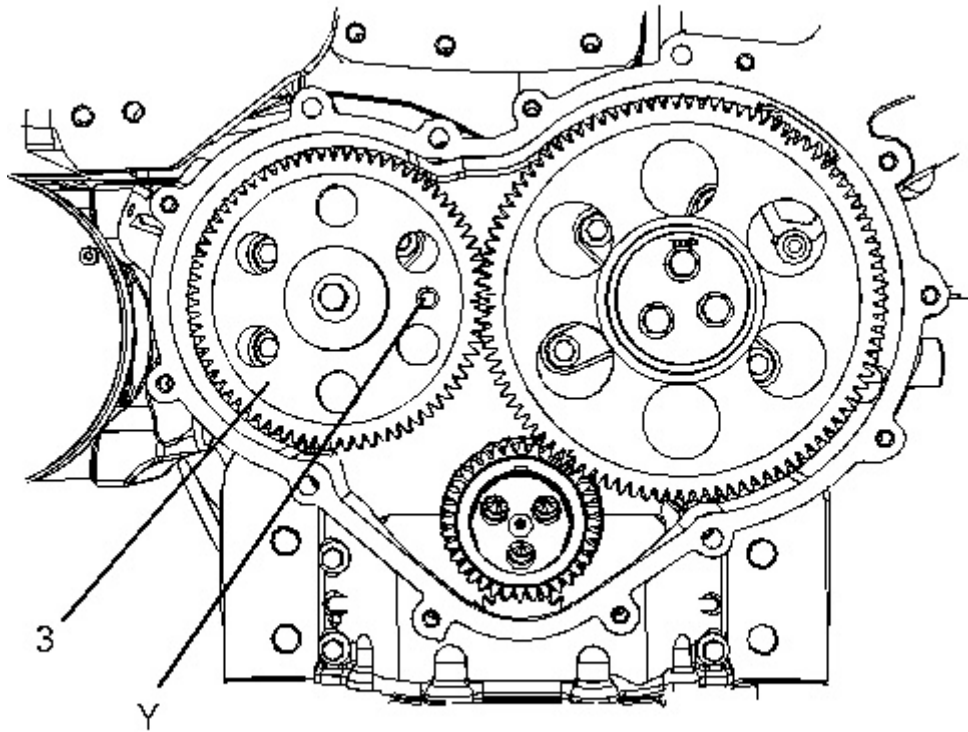
Illustration 6

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2. Ensure that Tooling (E) is installed in Hole (X) in the cylinder block. Use Tooling (E) in order to lock the crankshaft in the correct position. Refer to System Operation, Testing and Adjusting, "Finding Top Center Position for No.1 Piston" for the correct procedure.
3. Ensure that the camshaft gear and the key are clean and free from wear and damage.
4. If necessary, install the key into the nose of the camshaft.

**Note:** Ensure that the key is squarely seated.

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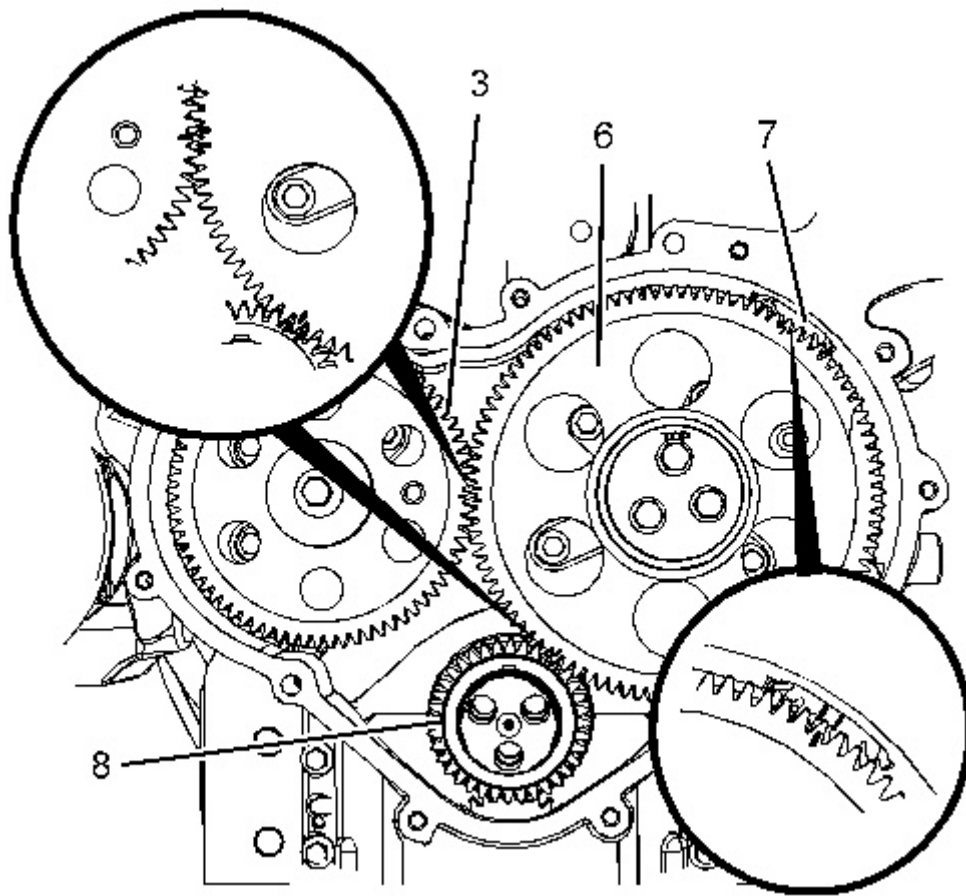
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Illustration 7

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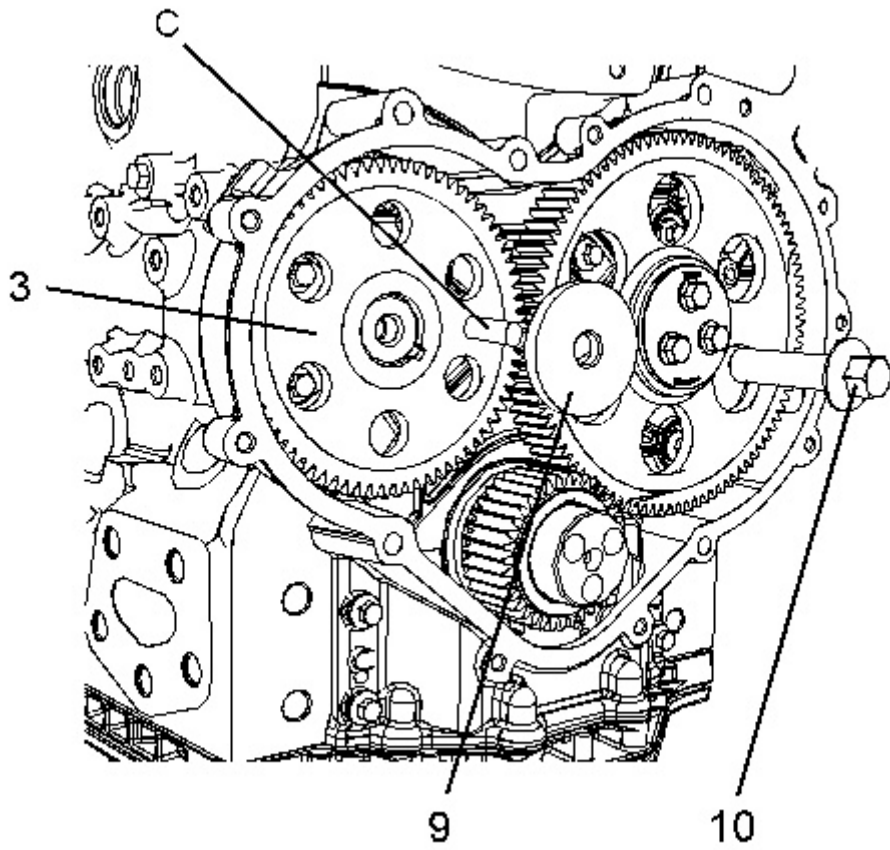
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Illustration 8

g02437701

Alignment of timing marks

5. Align the keyway in camshaft gear (3) with the key in the camshaft. Install camshaft gear onto the camshaft. Ensure that the timing marks on gear (3), gear (6), gear (7) and gear (8) are in alignment and that the mesh of the gears is correct. Refer to Illustration 8.
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Illustration 9

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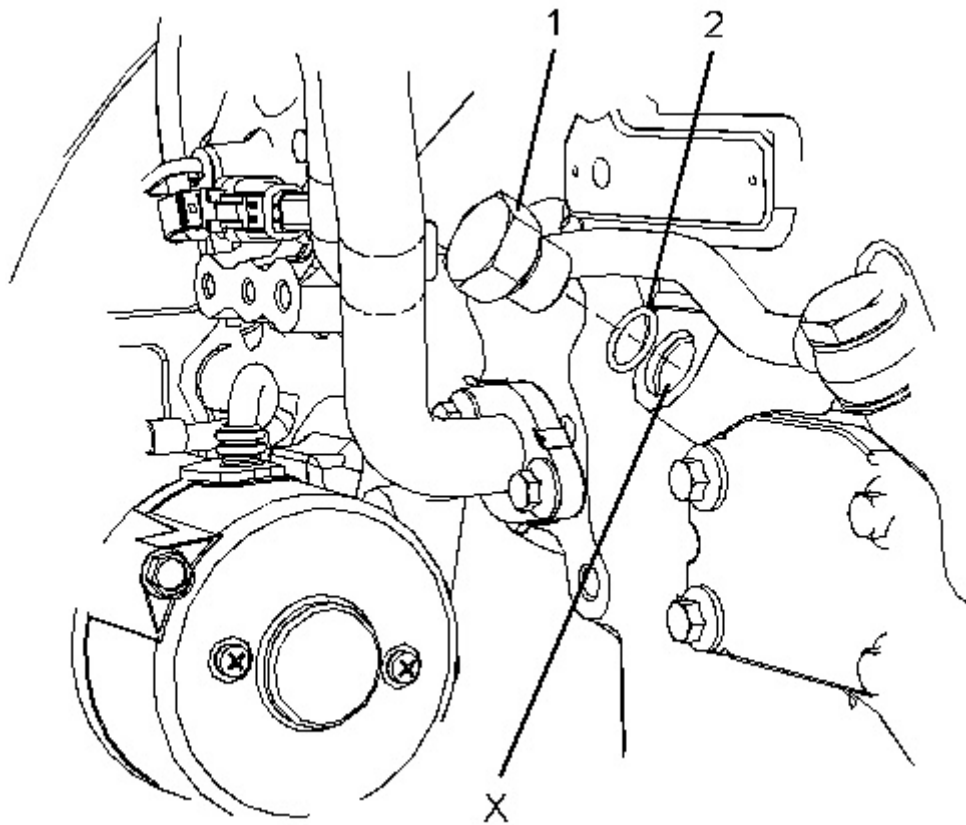


Illustration 10

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6. Install Tooling (C) through Hole (X) in the camshaft gear into the front housing. Install washer (9) and bolt (10) to camshaft gear (3).
7. Remove Tooling (E) and Tooling (C).
8. Install a new O-ring seal (2) to plug (1). Install the plug into Hole (Y) in the cylinder block. Refer to Illustration 10. Tighten plug (1) to a torque of 21 N·m (186 lb in).
9. When bolt (10) is a 8.8 Grade. Tighten bolt (10) to a torque of 95 N·m (70 lb ft).  
When bolt (10) is a 10.9 Grade. Tighten bolt (10) to a torque of 120 N·m (89 lb ft).
10. Use Tooling (F) in order to measure the backlash for gear (3), gear (6), gear (7) and gear (8). Refer to Specifications, "Gear Group (Front)" for further information.
11. Use Tooling (F) in order to measure the end play of camshaft gear (1). Refer to Specifications, "Camshaft" for further information.
12. Lubricate the teeth of the gears with clean engine oil.

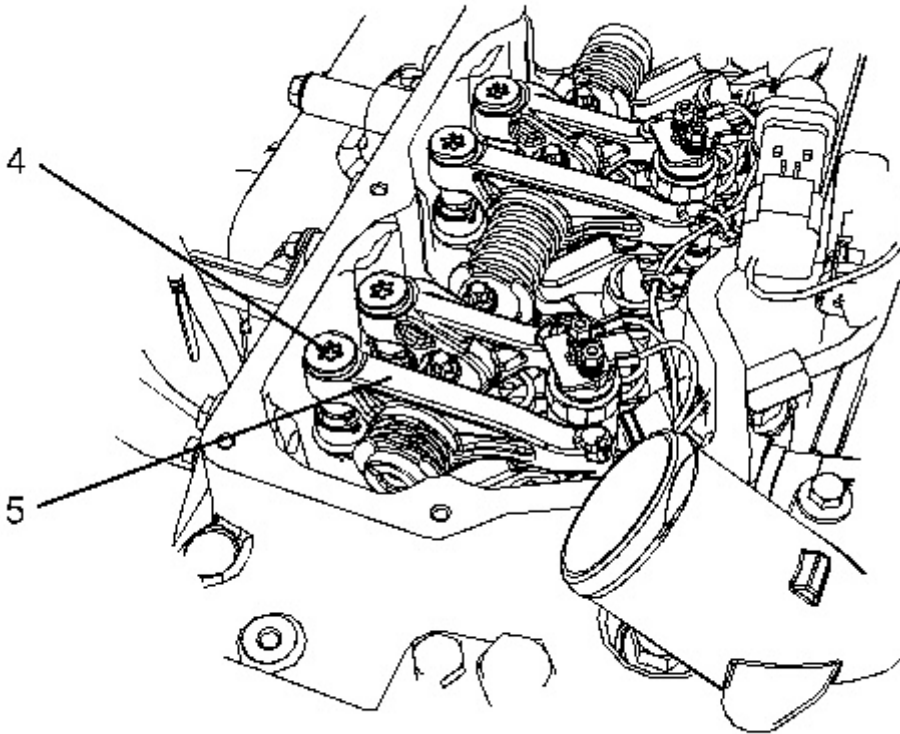
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**NOTICE**

**Failure to ensure that the crankshaft is set in the safe position will result in interference between the pistons and the valves. Interference between the pistons and the valves will result in damage to the engine.**

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13. Use Tooling (A) in order to rotate the crankshaft in a clockwise direction and position the crankshaft at the safe position. Refer to System Operation, Testing and Adjusting, "Position the Valve Mechanism Before Maintenance Procedures" for the correct procedure.
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Illustration 11

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14. Ensure that the guides for the pushrods are correctly positioned on the threaded inserts (4). Use Tooling (B) in order to tighten threaded inserts (4) on all rocker arms (5). Tighten the threaded inserts to a torque of 30 N·m (266 lb in).

**Note:** When the threaded insert is tightened, the threaded insert must be correctly seated into the cup for the pushrod.

15. The engine should not be operated for a period 30 minutes after the threaded inserts on all the rocker arms have been tightened. This period will allow the force of the valve springs to purge off excessive engine oil from the hydraulic lifters.

**End By:**

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

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

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## Disassembly and Assembly C4.4 Engines for Caterpillar Built Machines

Media Number -UENR0602-11

Publication Date -01/08/2013

Date Updated -25/10/2017

i04047735

# Camshaft Bearings - Remove and Install

SMCS - 1211-010

## Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2241	Camshaft Bearing Tool Group	1
	8H-0684	Ratchet Wrench	1

### Start By:

- If the engine is equipped with a balancer, remove the balancer. Refer to Disassembly and Assembly, "Balancer - Remove" for the correct procedure.
- If the engine is not equipped with a balancer, remove the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Remove" for the correct procedure.
- Remove the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install" for the correct procedure.

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### NOTICE

**Keep all parts clean from contaminants.**

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

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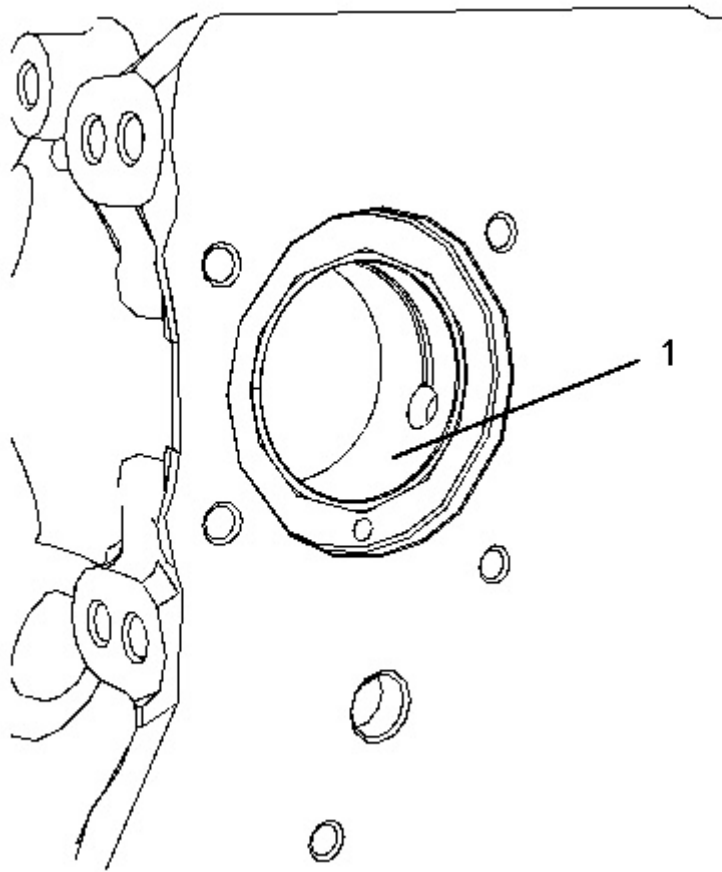


Illustration 1

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1. Inspect camshaft bearing (1). Refer to Specifications, "Camshaft Bearings" for more information.
2. If camshaft bearing (1) is worn or damaged, use Tooling (A) in order to remove the camshaft bearing from the cylinder block.

**Note:** Remove the camshaft bearing from the front of the cylinder block.

## Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2241	Camshaft Bearing Tool Group	1
	8H-0684	Ratchet Wrench	1

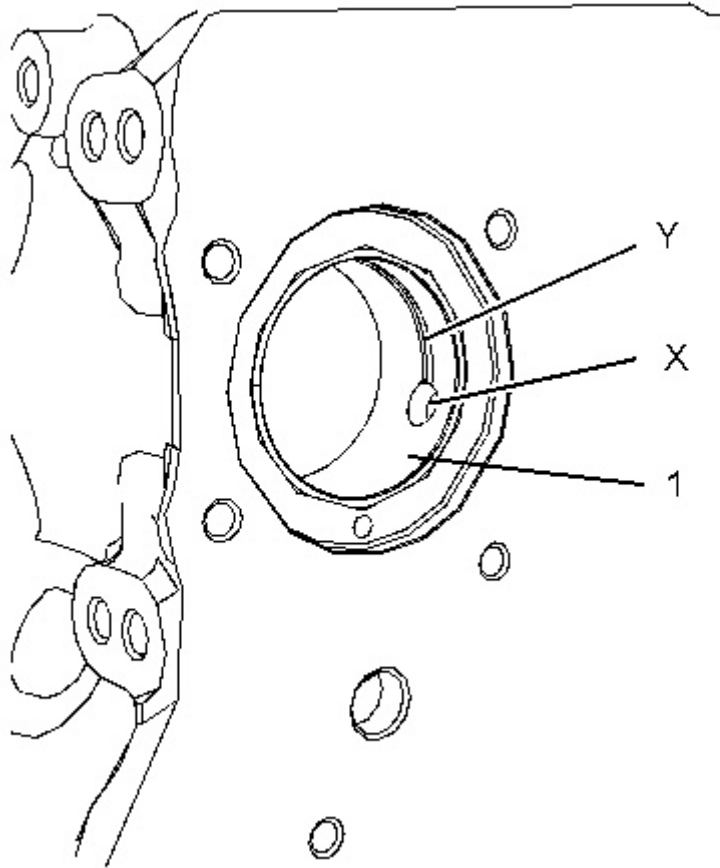
### NOTICE

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1. Clean the bearing housing in the cylinder block. Ensure that the oil hole in the bearing housing is free from debris.
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Illustration 2

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2. Lubricate the bearing housing in the cylinder block with clean engine oil.
3. Accurately align large oil Hole (X) in camshaft bearing (1) with the oil hole in the cylinder block.

**Note:** The Groove (Y) in the camshaft bearing must be to the top of the cylinder block.

4. Use Tooling (A) in order to install camshaft bearing (1) into the cylinder block. Install the camshaft bearing so that the front edge of the bearing is flush with the face of the recess in the cylinder block.

**Note:** Ensure that the oil holes are correctly aligned. If the oil is not correctly aligned, the camshaft bearing should be removed.

**End By:**

- a. Install the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install" for the correct procedure.



- b. If the engine was equipped with a balancer, install the balancer. Refer to Disassembly and Assembly, "Balancer - Install" for the correct procedure. If the engine was not equipped with a balancer, install the engine oil pump. Refer to Disassembly and Assembly, "Engine Oil Pump - Install" for the correct procedure.
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