

Product: TELEHANDLER

Model: TH210 TELEHANDLER CEC

Configuration: TH210 Telehandler CEC00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054B Engine for Caterpillar Built Machines

Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i01461576

Cylinder Head - Remove

SMCS - 1100-011

Removal Procedure

Start By:

- A. Remove the fuel injection nozzles. Refer to Disassembly and Assembly, "Fuel Injection Nozzles - Remove".
- B. Remove the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
- C. Remove the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove".
- D. Remove the rocker shaft assembly and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove and Install".

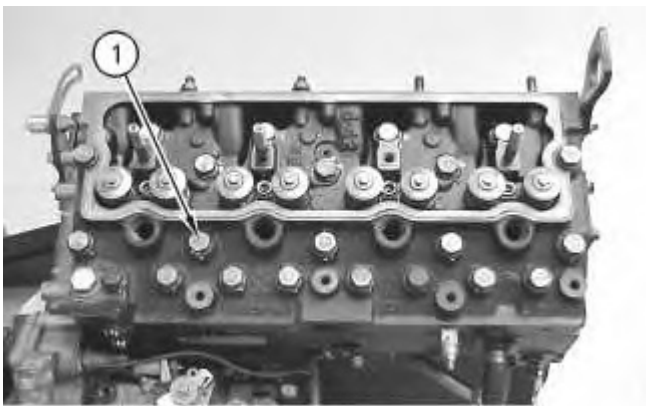


Illustration 1

g00646441

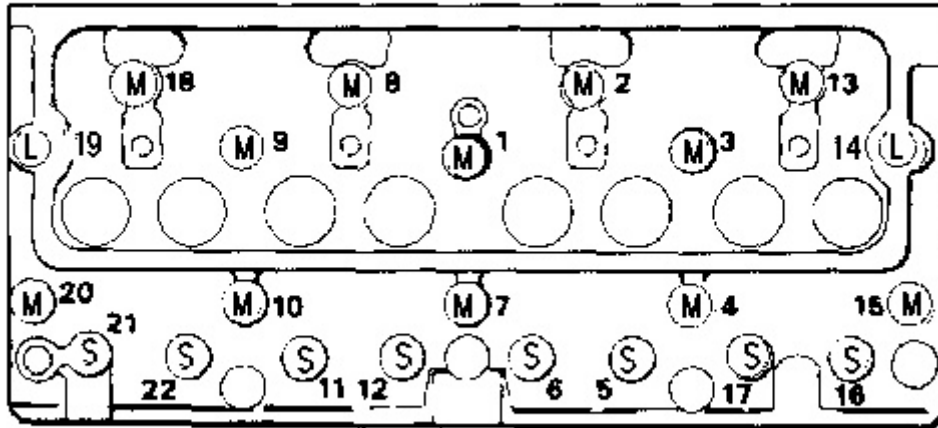


Illustration 2

g00550162

1. Gradually loosen 22 cylinder head bolts (1) in the reverse order that is shown above. This will help prevent possible distortion of the cylinder head during removal.

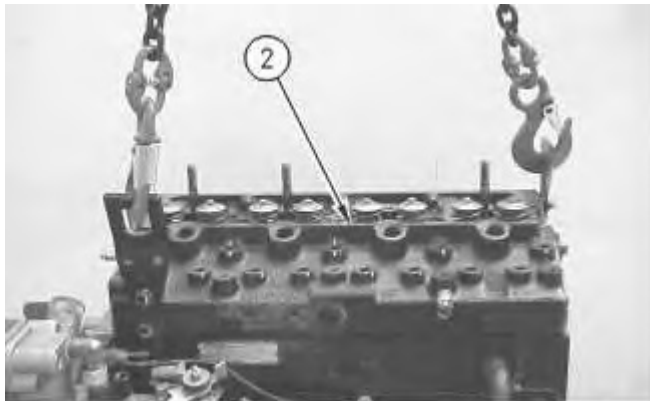


Illustration 3

g00646445

2. Attach a suitable lifting device to cylinder head (2). Carefully lift cylinder head (2) off the cylinder block. The weight of the cylinder head is 36 kg (80 lb).

NOTICE

Place the cylinder head on a surface that will not scratch the face of the cylinder head.

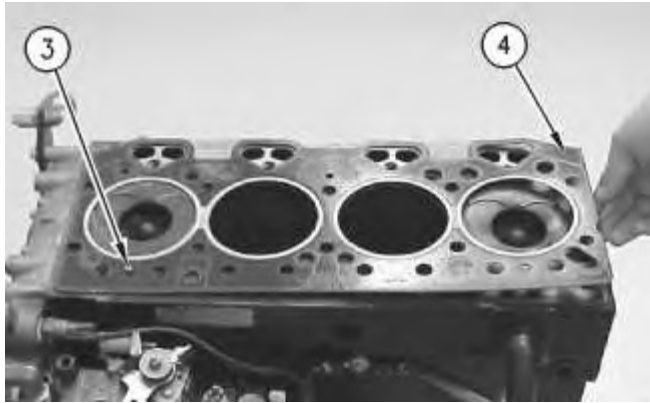


Illustration 4

g00646475

3. Remove cylinder head gasket (4) from the top of the cylinder block.
 4. Note the location of dowels (3) on each end of the cylinder block. Dowels (3) hold cylinder head gasket (4) in place while the cylinder head is installed. Inspect the condition of dowels (3). If the dowels are damaged, use new parts for replacement.
-

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i01421358

Cylinder Head - Install

SMCS - 1100-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6238	Guide Bolt	2
B	8T-3052	Degree Wheel	1

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: The cylinder block has two locating pins that are pressed into the cylinder block. The locating pins hold the cylinder head gasket and the cylinder head in position when the cylinder head is installed.



2. Place a new cylinder head gasket (4) on dowels (3) on top of the cylinder block. Cylinder head gasket (4) is stamped "FRONT TOP". Do not use any sealant or compound on the cylinder head gasket.
3. Install Tool (A) in positions 13 and 18 in the cylinder block. Refer to Illustration 4.

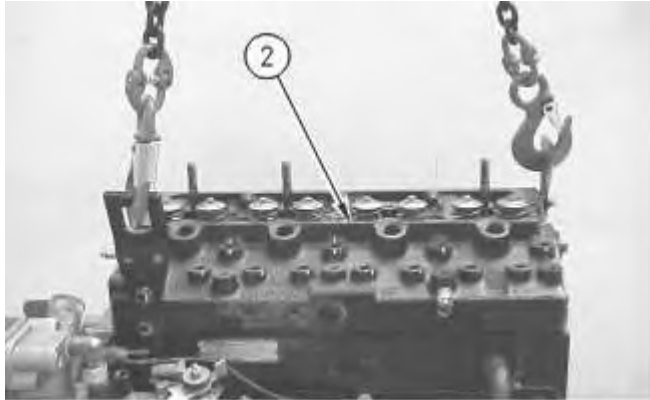


Illustration 2

g00646445

4. Attach a suitable lifting device to cylinder head (2) .
5. Place cylinder head (2) on the cylinder block. Ensure that the cylinder head is positioned on dowels (3) and that cylinder head gasket (4) is positioned correctly.



Illustration 3

g00646441

6. Lightly lubricate cylinder head bolts (1) with clean engine oil. Install bolts (1) finger tight. Remove Tool (A) .
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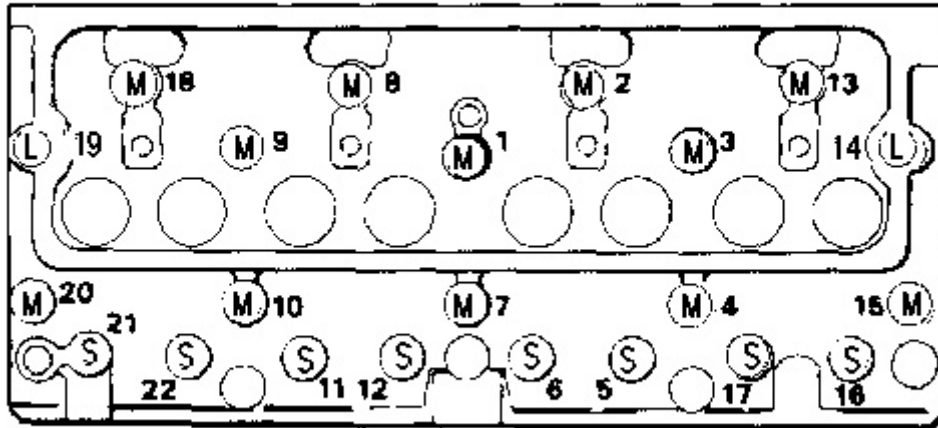


Illustration 4

g00550162

7. Gradually tighten all of the bolts (1 through 22) in a numerical sequence to a torque of 45 N·m (33 lb ft).
8. Gradually tighten bolts (2), (8), (13) and (18) in a numerical sequence to a torque of 110 N·m (80 lb ft).
9. Tighten all of the bolts again except bolts (2), (8), (13) and (18) in a numerical sequence to a torque of 45 N·m (33 lb ft).
10. Tighten bolts (2), (8), (13) and (18) again in a numerical sequence to a torque of 110 N·m (81 lb ft).
11. Place an index mark on the bolts and use Tool (B) in order to further tighten the bolts.
 - a. Turn the short bolts that are marked with an "S" for an additional 120 degrees (2 flats).
 - b. Turn the medium length bolts that are marked with an "M" for an additional 120 degrees (2 flats).
 - c. Turn the long bolts that are marked with an "L" for an additional 150 degrees (2.5 flats).
 - d. Turn bolts (2), (8), (13) and (18) an additional 180 degrees (3 flats).

Note: Refer to the Systems Operation, Testing and Adjusting Module, "Cylinder Head - Inspect" for the correct procedure to inspect the cylinder head.

End By:

- a. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".
- b. Install the water temperature regulator housing. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove and Install".

- c. Install the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
 - d. Install the fuel injection nozzles. Refer to Disassembly and Assembly, "Fuel Injection Nozzles - Install".
-

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Disassembly and Assembly 3054B Engine for Caterpillar Built Machines

Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i01745933

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:

- Remove the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

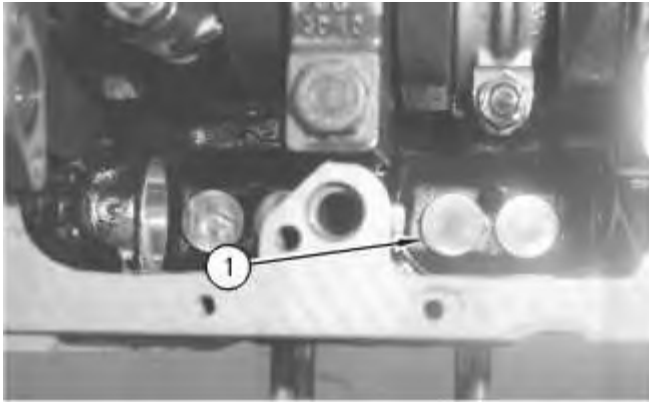


Illustration 1

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1. Use Tooling (A) to remove lifters (1).

Note: Ensure that the lifters are marked with the appropriate cylinder number for installation purposes.

Installation Procedure

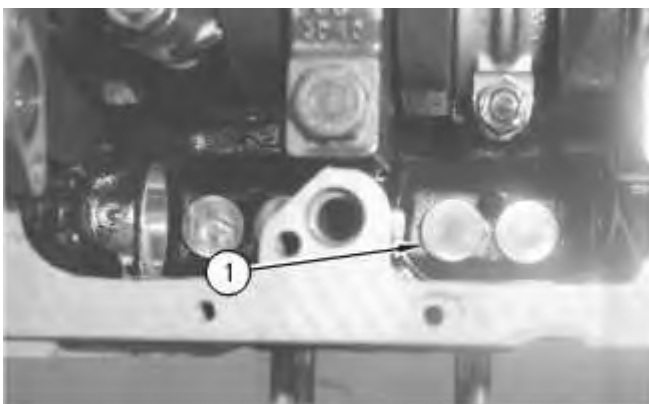
Table 2

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

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



1. Use Tooling (A) to install lifters (1).

Note: Ensure that the lifters are seated correctly and that the lifters are in the correct cylinders.

End By:

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

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Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i01389647

Camshaft - Remove

SMCS - 1210-011

Removal Procedure

Start By:

- A. Remove the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrods - Remove".
- B. Remove the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Remove".
- C. Remove the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove".
- D. Remove the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".

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.

1. Turn the engine upside-down so the valve lifters are held in a position away from the camshaft.

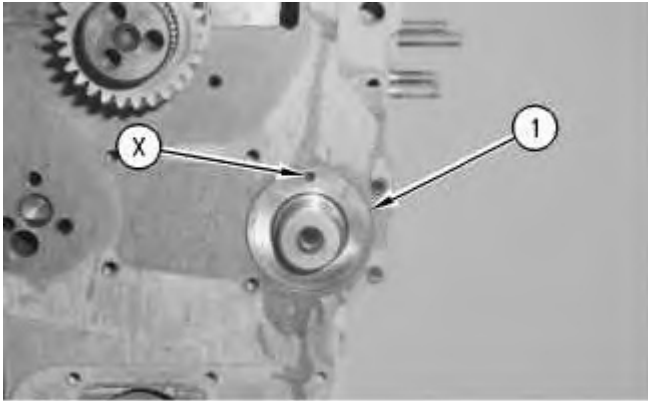


Illustration 1

g00546803

2. Remove thrust washer (1). Make a note of the location of the hollow dowel (X) for installation purposes.

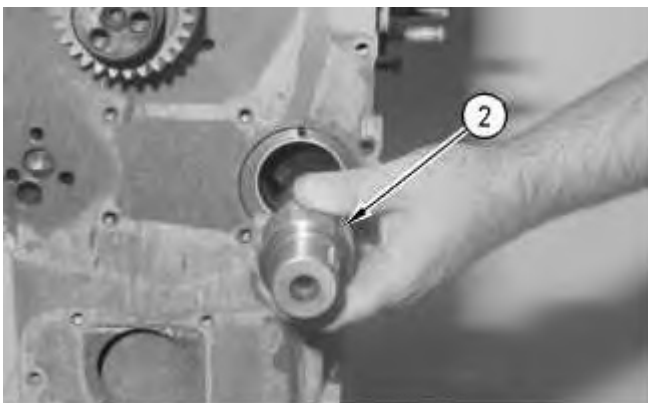


Illustration 2

g00546869

NOTICE

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

3. Carefully remove camshaft (2) from the engine.

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Disassembly and Assembly 3054B Engine for Caterpillar Built Machines

Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i01389653

Camshaft - Install

SMCS - 1210-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

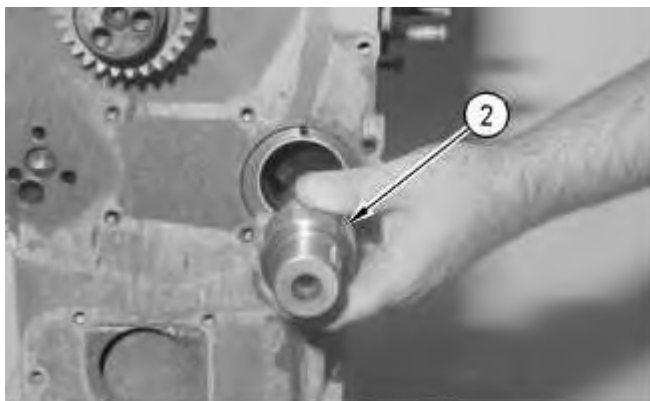


Illustration 1

g00546869

NOTICE

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

Note: Ensure that camshaft (2) is clean. Lubricate camshaft (2) with clean engine oil prior to installation.

1. Carefully install camshaft (2) in the engine.

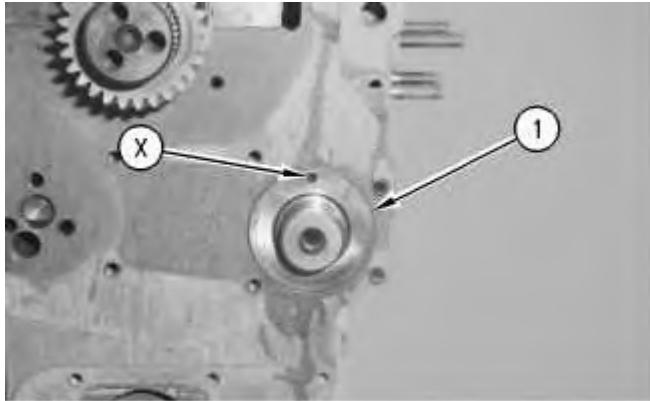


Illustration 2

g00546803

2. Put thrust washer (1) in position. Make sure that thrust washer (1) is aligned with hollow dowel (X) .

End By:

- a. Install the camshaft gear. Refer to Disassembly and Assembly, "Camshaft Gear - Remove and Install".
 - b. Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".
 - c. Install the fuel transfer pump. Refer to Disassembly and Assembly, "Fuel Transfer Pump - Install".
 - d. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrods - Install".
-

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Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i03140046

Camshaft Gear - Remove and Install

SMCS - 1210-010-GE

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Name	Qty
A	1U-6671	Puller Gp	1
	8S-4712	Bolt	2
	1P-0510	Driver Group	1

Start By:

- a. Remove the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install".
 - b. Remove the front cover. Refer to Disassembly and Assembly, "Front Cover - Remove".
-

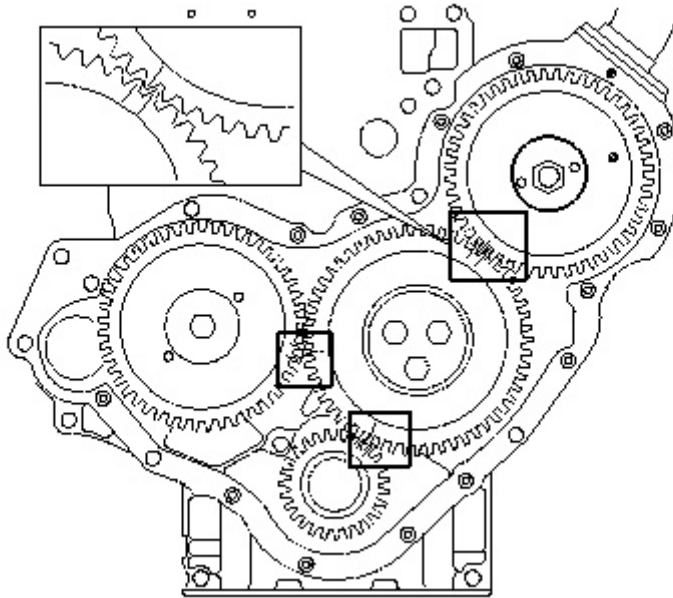


Illustration 1

g00541128

1. Rotate the crankshaft until the timing marks on the crankshaft gear, the camshaft gear, and the fuel injection pump gear are aligned, as shown.

Note: The timing marks on the idler gear may not be aligned. This is caused by the difference in the speed of the rotation of the idler gear.

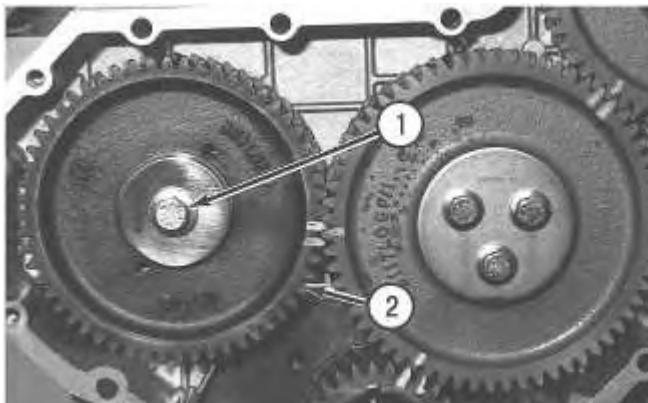


Illustration 2

g00541130

2. Remove bolt (1) and the washer from the camshaft gear (2).



Illustration 3

g00541131

3. Install Tooling (A) and remove camshaft gear.

Note: Do not lose the key from the camshaft gear.

4. Inspect the camshaft gear for wear and damage. Replace the gear, if necessary.

Installation Procedure

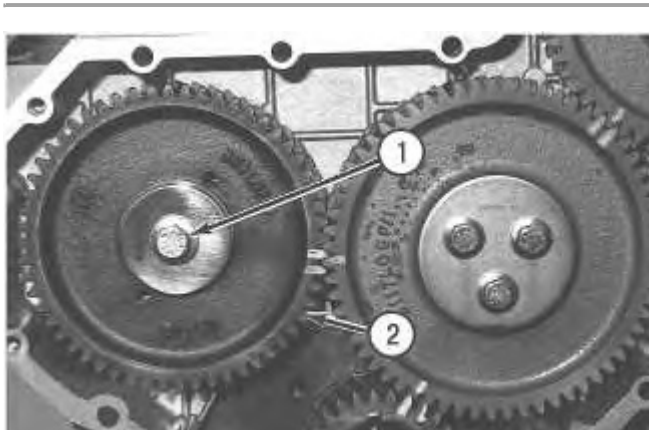


Illustration 4

g00541130

1. Install camshaft gear (2) in the front housing.

Note: When you install the camshaft gear, ensure that the teeth that have the timing marks are facing toward the front. Also, ensure that the key is aligned properly in the keyway. If necessary, tap the gear with a soft hammer in order to seat the key in the keyway.

2. If necessary, remove the idler gear in order to align the gear teeth correctly.
3. Install the washer and bolt (1) on the camshaft gear. Tighten bolt (1) to a torque of 95 N·m (70 lb ft).

Note: Ensure that the timing marks on the camshaft gear, the crankshaft gear, and the fuel injection pump gear are aligned.

4. If a new camshaft gear is used, check the backlash of the camshaft gear. The minimum backlash for a new gear is 0.08 mm (0.003 inch).

End By:

- a. Install the front cover. Refer to Disassembly and Assembly, "Front Cover - Install".
 - b. Install the fan. Refer to Disassembly and Assembly, "Fan - Remove and Install".
-

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Disassembly and Assembly 3054B Engine for Caterpillar Built Machines

Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i06043534

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:

- A. If the engine is equipped with a balancer, remove the balancer. Refer to Disassembly and Assembly, "Balancer - Remove". 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.
- B. Remove the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install" for the correct procedure.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

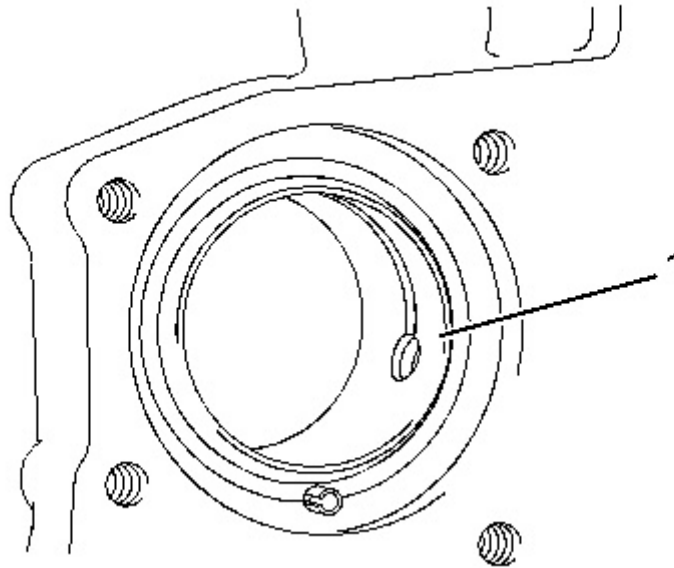


Illustration 1

g01270437

1. Inspect camshaft bearing (1) . Refer to Specifications, "Camshaft Bearings" for more information.
2. For worn or damaged camshaft bearing (1) 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

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Clean the bearing housing in the cylinder block. Ensure that the oil holes in the bearing housing are free from debris.

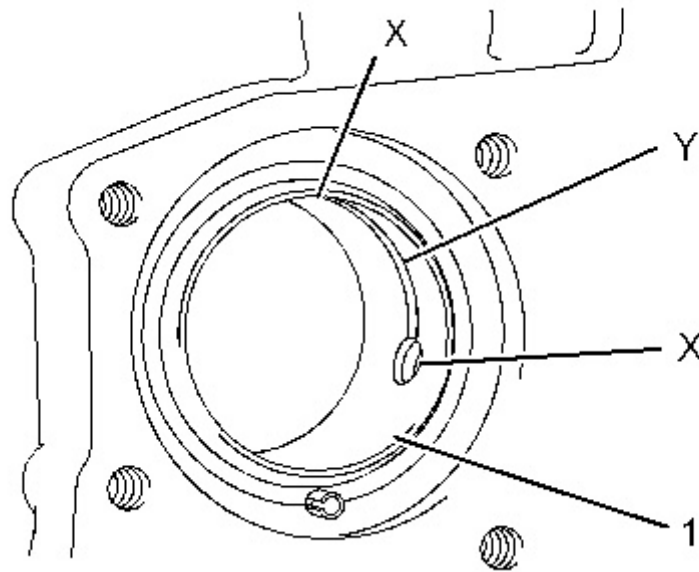


Illustration 2

g01266512

2. Lubricate the bearing housing in the cylinder block with clean engine oil.
3. Accurately align two Oil Holes (X) in camshaft bearing (1) with the two oil holes in the cylinder block.

Note: 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 all oil holes are correctly aligned. If the oils are 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 is equipped with a balancer, install the balancer. Refer to Disassembly and Assembly, "Balancer - Install". If the engine is 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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Disassembly and Assembly 3054B Engine for Caterpillar Built Machines

Media Number -SEN5011-04

Publication Date -01/11/2005

Date Updated -15/11/2005

i02974660

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 Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

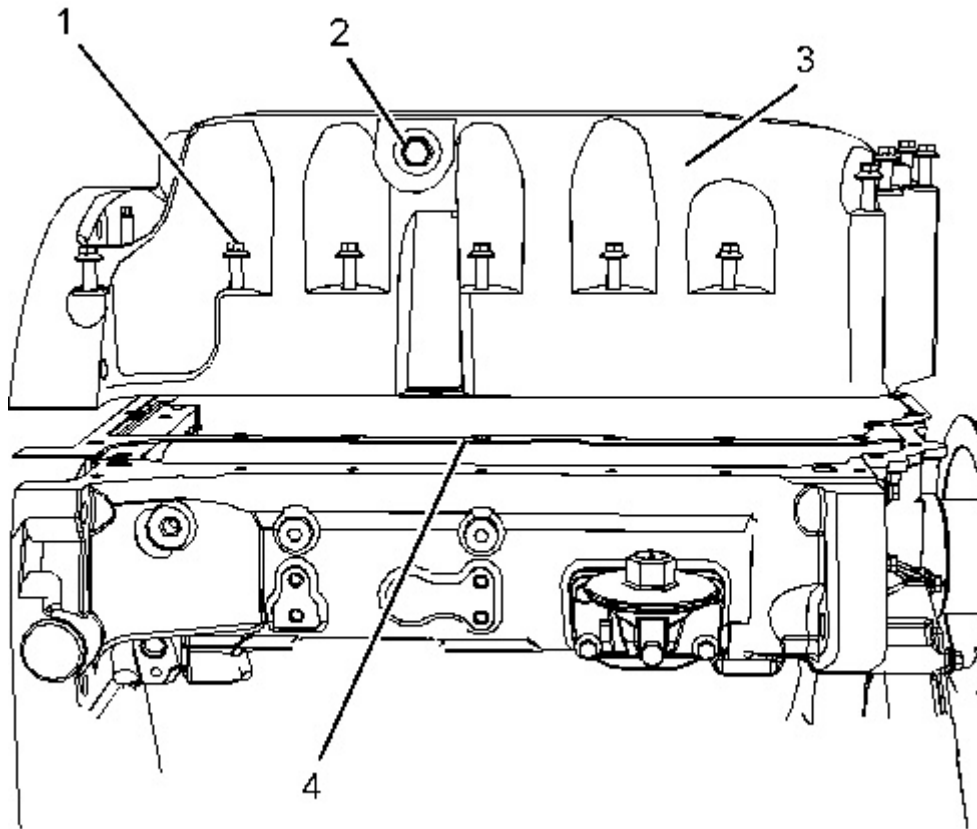


Illustration 1

g01870497

Typical Example

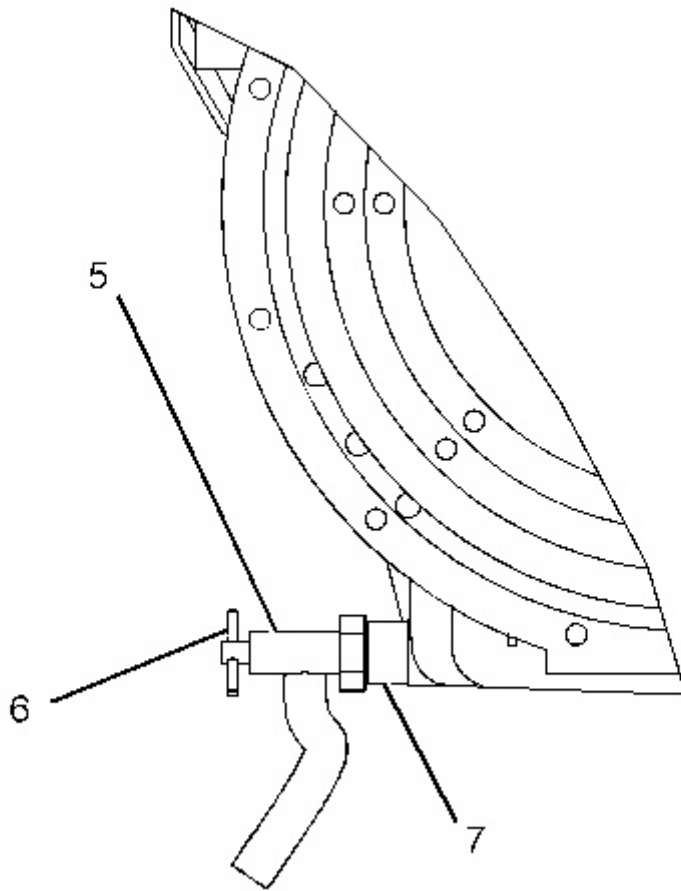


Illustration 2

g01871553

Note: The engine may be equipped with an oil drain plug or the engine may be equipped with a drain valve.

1. If equipped, remove drain plug (2) and the O-ring seal. If equipped, open drain valve (5) by turning handle (6) counterclockwise. Drain the engine oil into a suitable container for storage or disposal.
2. If necessary, remove drain valve (5) from adapter (7) . If necessary, remove adapter (7) from engine oil pan (3) .

Note: In order to remove a oil pan, the engine must be removed from the machine.

3. Remove bolts (1) from engine oil pan (3) .
4. Remove engine oil pan (3) and gasket (4) .

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

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