



Service Repair Manual

Models

315C and 315C L Excavator

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Product: EXCAVATOR

Model: 315C EXCAVATOR ANF

Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054E Engine for Caterpillar Built Machines

Media Number -REN2411-03

Publication Date -01/05/2017

Date Updated -03/05/2017

i02298103

Rocker Shaft - Disassemble

SMCS - 1102-015

Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1855	Retaining Ring Pliers	1

Start By:

- a. Remove the rocker shaft assembly. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".



WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

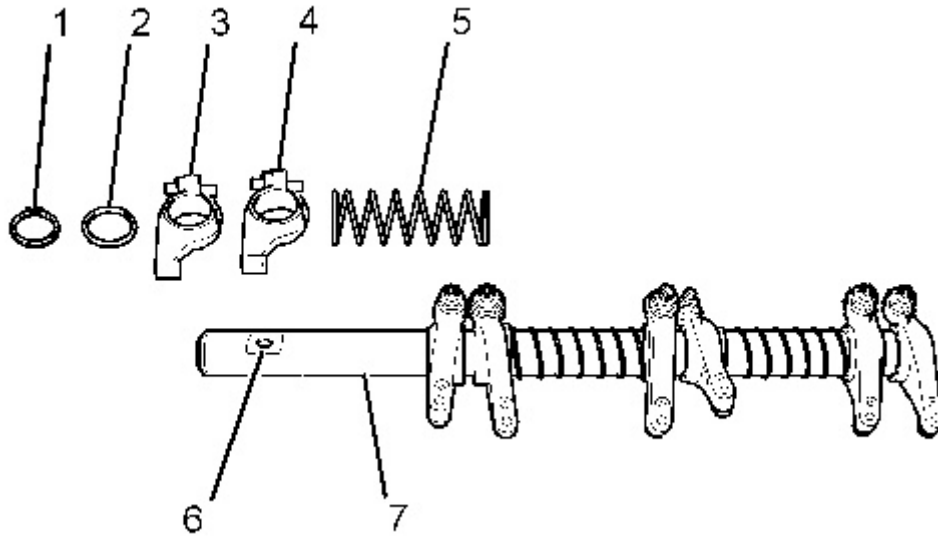


Illustration 1

g01150908

1. Remove the retaining ring (1) and remove the washer (2) from both ends of the rocker shaft assembly.

Note: The rocker shaft (7) is not symmetrical as there is a machined flat (6) toward one end of the shaft.

2. Place an identification mark on each of the components for installation. Ensure that you note the component's relationship to the machined flat (6).
3. Remove the rocker arm assembly (3) for the inlet valve from the rocker shaft (7). Remove the rocker arm assembly (4) for the exhaust valve from the rocker shaft (7).
4. Remove the spring (5) from the rocker shaft assembly.
5. Repeat Step 3 and Step 4 in order to completely disassemble the rocker shaft assembly.

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Product: EXCAVATOR

Model: 315C EXCAVATOR ANF

Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

**Disassembly and Assembly
3054E Engine for Caterpillar Built Machines**

Media Number -REN2411-03

Publication Date -01/05/2017

Date Updated -03/05/2017

i02298104

Rocker Shaft - Assemble

SMCS - 1102-016

Assembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1855	Retaining Ring Pliers	1

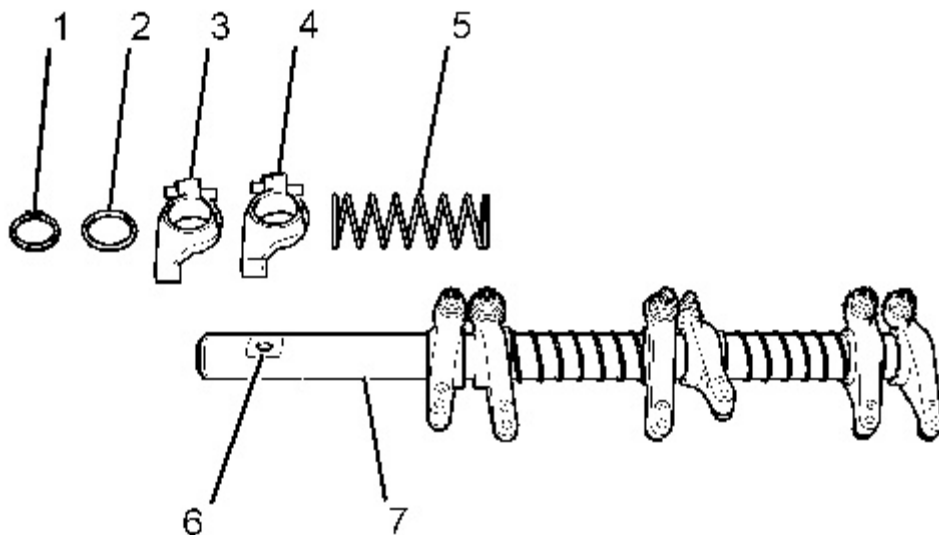


Illustration 1
Typical example

g01150908

1. Clean all of the components and inspect all of the components. Inspect the grooves for the circlips (1) and ensure that all of the oil holes in the rocker shaft (7) and in the rocker arms (3 and 4) are not plugged before you begin the assembly procedure. If necessary, replace any worn components and any damaged components.
2. Check the clearance between the rocker shaft (7) and the bushing of every rocker arm (3 and 4). Refer to the Specifications Manual, "Rocker Shaft" or further information. If necessary, replace any worn components.
3. Lubricate all of the components with clean engine oil before assembly.
Note: Ensure that the machined flat (6) on the rocker shaft (7) is facing upward.
4. Install a circlip (1) onto the end of the rocker shaft (7) that is closest to the machined flat (6). Install a washer (2) onto the rocker shaft (7).
5. Install the rocker arm assembly (3) for the inlet valve onto the rocker shaft (7). Install the rocker arm assembly (4) for the exhaust valve onto the rocker shaft (7).
6. Install the spring (5) onto the rocker shaft (7).
7. Repeat Step 5 and Step 6 in order to assemble the rocker shaft assembly.



Improper assembly of parts that are spring loaded can cause bodily injury.

To prevent possible injury, follow the established assembly procedure and wear protective equipment.

8. Install the remaining washer (2) and the remaining circlip (1) onto the rocker shaft (7).

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Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054E Engine for Caterpillar Built Machines

Media Number -REN2411-03

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i02298106

Rocker Shaft and Pushrod - Install

SMCS - 1102-012; 1208-012

Installation Procedure

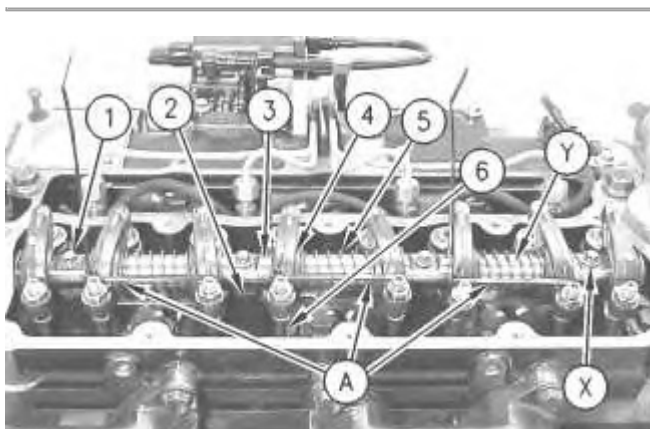
Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	6K-0806	Cable Strap	3

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



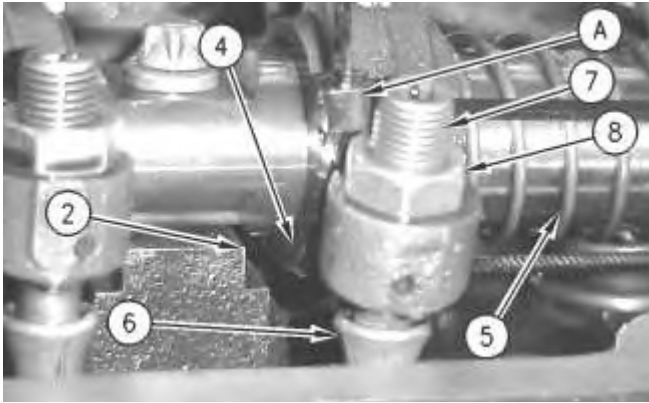


Illustration 2

1. Apply clean engine lubricating oil to both ends of the pushrods (6). Install the pushrods (6).

Note: Ensure that the pushrods are installed in the original location and that the pushrods are seated in the valve lifters correctly.

2. If the rocker shaft was disassembled, install the Tooling (A) around the rocker arms (4) in order to slightly compress spring (5). The rocker arms must be held away from the machined face of the cylinder head (2) during reassembly.
3. Loosen the nut (8) and the adjustment screw (7) on each rocker arm. This will help prevent a bent valve or a bent pushrod during the installation of the rocker shaft.
4. Position the rocker shaft assembly on the cylinder head.

Note: The rocker shaft (3) of the rocker shaft assembly is not symmetrical. The rocker shaft (3) has a machined flat at the front end of the shaft. Ensure that the machined flat is toward the top and toward the front end of the engine.

5. Install the Torx screws (1) in the rocker shaft (3).

Note: The longest Torx screw must be installed at the front of the cylinder head in the hole (X).

6. Ensure that the adjustment screws (7) are properly seated in the ends of the pushrods (6).
7. Alternately tighten the Torx screws (1). Start from the center and work toward the outside. Tighten the Torx screws (1) to a torque of 35 N·m (26 lb ft).
8. Cut and remove the Tooling (A) from the rocker shaft assembly.
9. Adjust the inlet valve lash to 0.20 mm (0.008 inch) and adjust the exhaust valve lash to 0.45 mm (0.018 inch). Refer to Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust" for more information on adjusting the valve lash.

End By:

- a. Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".

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Product: EXCAVATOR

Model: 315C EXCAVATOR ANF

Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054E Engine for Caterpillar Built Machines

Media Number -REN2411-03

Publication Date -01/05/2017

Date Updated -03/05/2017

i01923525

Cylinder Head - Remove

SMCS - 1100-011

Removal Procedure

Start By:

- a. Remove the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
- b. Remove the rocker shaft assembly and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".
- c. Remove the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - 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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

1. Drain the coolant from the engine oil cooler into a suitable container for storage or disposal. Drain the engine oil from the engine oil cooler into a suitable container. Refer to Operation and Maintenance Manual for the procedure on draining the engine coolant and the engine oil.

Note: Refer to Operation and Maintenance Manual, "Refill Capacities" for the coolant capacity and the engine oil capacity of the engine.

2. Loosen the hose clamp from the upper radiator hose and remove the upper radiator hose from the water temperature regulator housing.
 3. Disconnect the harness assembly from the bus bar for the glow plugs.
-

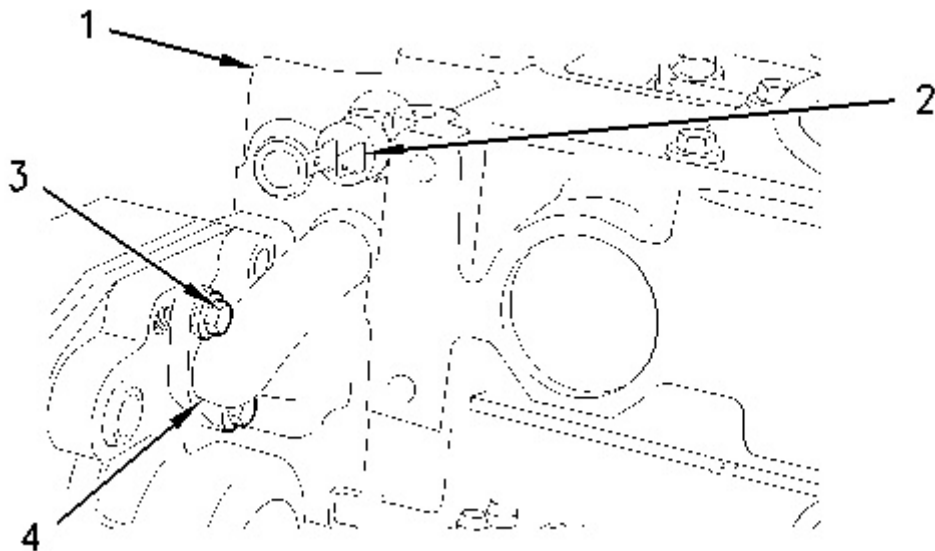


Illustration 1

g01001037

4. Disconnect the harness assembly from coolant temperature sensor (2).
 5. Remove bolts (3). Remove bypass tube (4) from cylinder head (1). Remove the O-ring seals from the bypass tube.
-

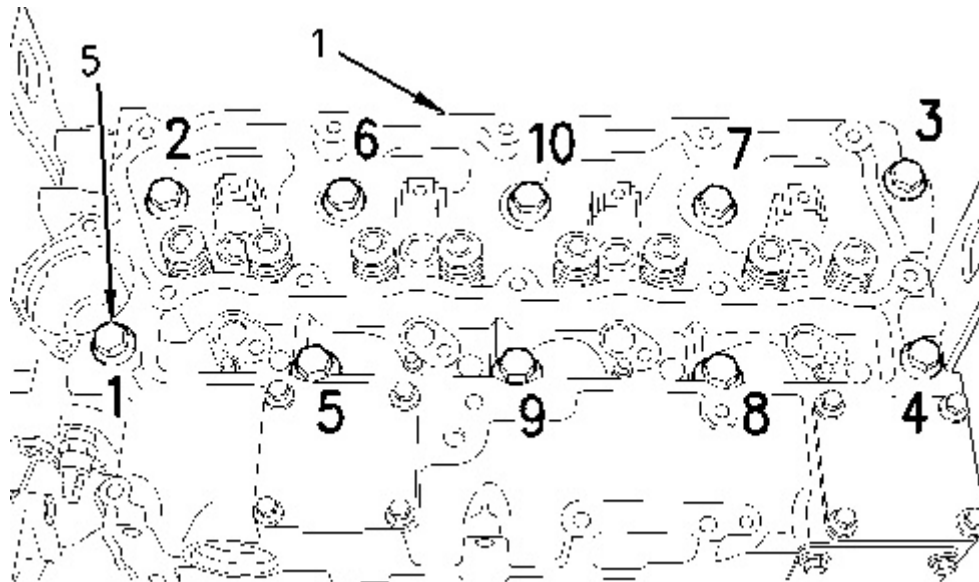


Illustration 2

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6. Gradually loosen cylinder head bolts (5) in reverse numerical order. Refer to Illustration 2. This will help prevent distortion of the cylinder head.
7. Remove bolts (5) from cylinder head (1).
8. Use a suitable lifting device and carefully lift the cylinder head off the cylinder block. The weight of the cylinder head is approximately 57 kg (126 lb).

Note: Do not use a lever to separate the cylinder head from the cylinder block.

NOTICE

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

9. Remove the cylinder head gasket.

Note: Note the location of the dowels on the cylinder block.

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Product: EXCAVATOR

Model: 315C EXCAVATOR ANF

Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054E Engine for Caterpillar Built Machines

Media Number -REN2411-03

Publication Date -01/05/2017

Date Updated -03/05/2017

i05969946

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
C	5P-3975	Rubber Lubricant	-

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: 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.

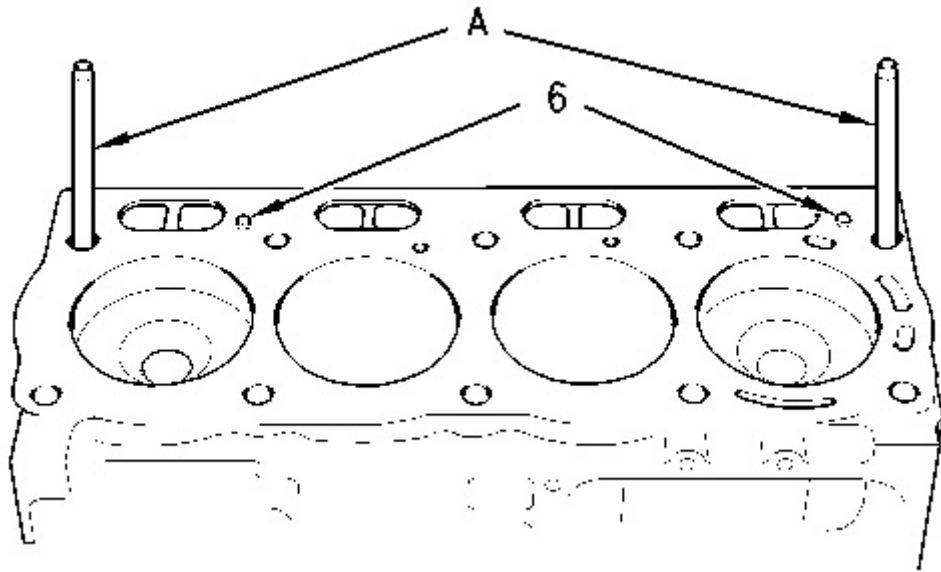
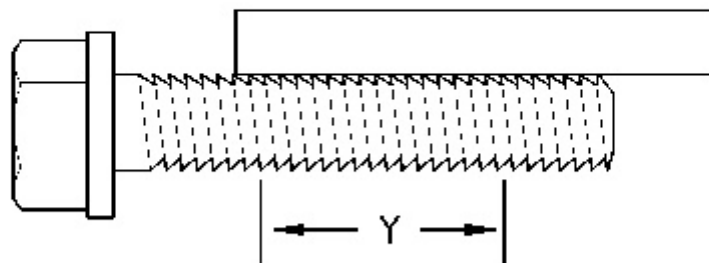


Illustration 1

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1. Install the cylinder head gasket on dowels (6) on top of the cylinder block.
Note: Do Not use any sealant or compound on the cylinder head gasket.
2. Install Tooling (A) in the cylinder block.
3. Use a suitable lifting device to install the cylinder head. The weight of the cylinder head is approximately 57 kg (126 lb).
Note: Ensure that the cylinder head is positioned on dowels (6) .
4. Remove Tooling (A) .



- Clean the threads of the cylinder head bolts. Inspect the cylinder head bolts.

Note: Do Not use bolts if there is any visual reduction in the diameter of the Threads (Y) that has not been engaged with the cylinder block. Use a straight edge to check the bolts.

- Lubricate the threads and the shoulder of the cylinder head bolts with clean engine oil before installation.

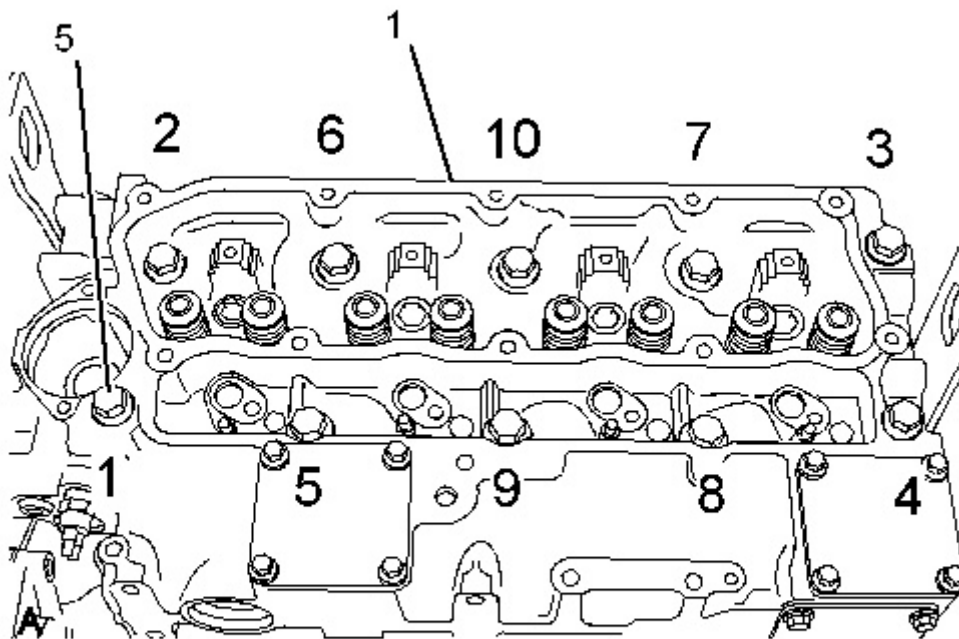


Illustration 3

- Install bolts (5) on cylinder head (1) .

Note: The short bolts are installed in holes that are marked 1, 2, 3, 4, 5, 6, and 9.

Note: The long bolts are installed in holes that are marked 7, 8, and 10.

- Tighten the cylinder head bolts in numerical order to a torque of 50 N·m (37 lb ft).
 - Tighten the cylinder head bolts in numerical order to a torque of 100 N·m (74 lb ft).
-

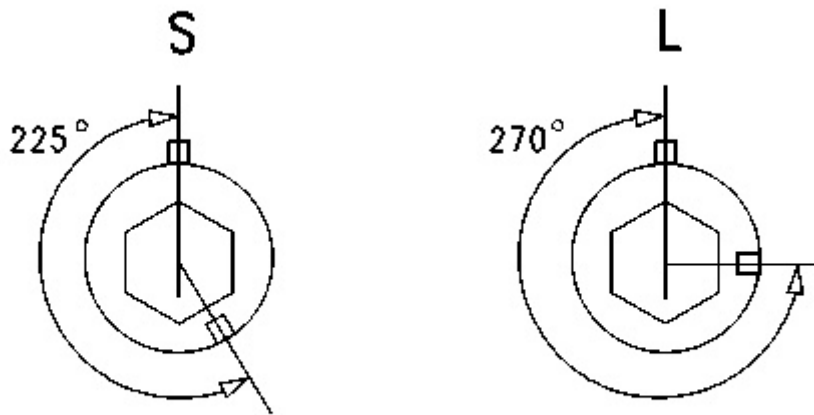


Illustration 4

g00951562

10. Use Tooling (B) to achieve the correct final torque.

Note: If Tooling (B) is not used, place an index mark on each bolt.

11. Tighten the cylinder head bolts in numerical order.

- a. Turn the short bolts (2, 5, 6, 7, 8, 9, and 10) for an additional 225 degrees.
- b. Turn the long bolts (1, 3, and 4) for an additional 270 degrees.

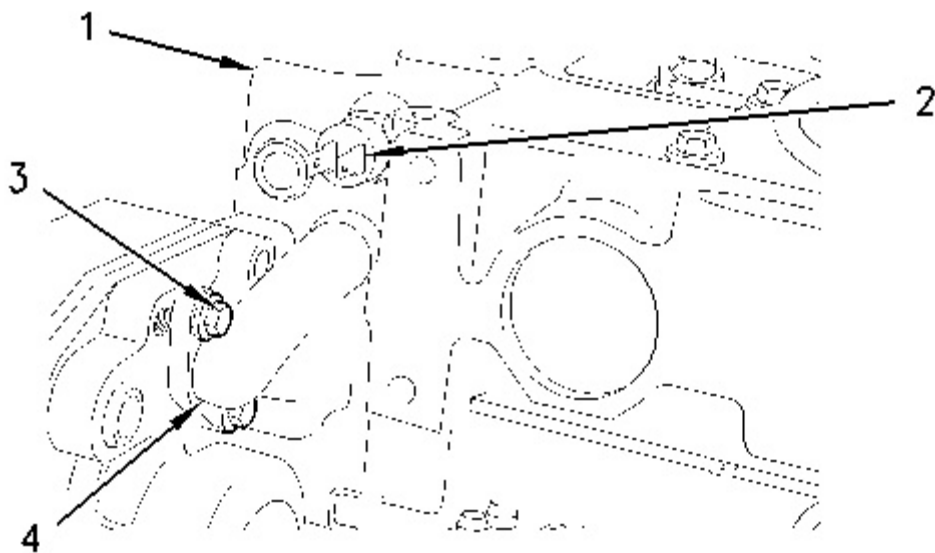


Illustration 5

g01001037

12. Install new O-ring seals on bypass tube (4) . Apply Tooling (C) to the O-ring seals. Install the bypass tube in cylinder head (1) . Install bolts (3) .
13. Connect the harness assembly to coolant temperature sensor (2) .
14. Connect the harness assembly to the bus bar for the glow plugs.
15. Install the upper radiator hose to the water temperature regulator housing.
16. Fill the cooling system with coolant. Fill the lubrication system with engine oil.

Note: Refer to Operation and Maintenance Manual, "Refill Capacities" for the cooling system capacity and the lubrication system capacity of the engine.

End By:

- a. Install the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove and Install".
- b. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".
- c. Install the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".

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Product: EXCAVATOR

Model: 315C EXCAVATOR ANF

Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054E Engine for Caterpillar Built Machines

Media Number -REN2411-03

Publication Date -01/05/2017

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i02333592

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 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.

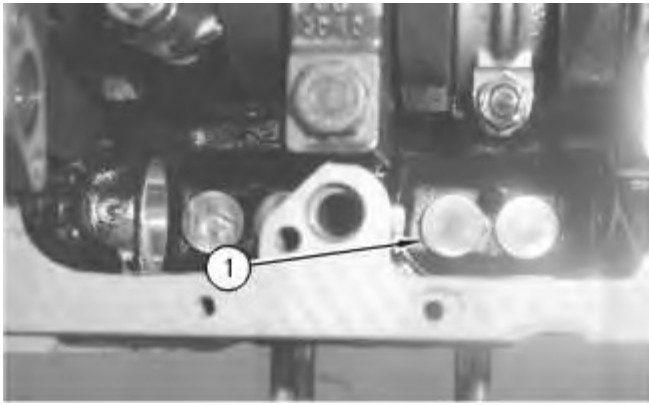


Illustration 1

g00540954

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

Note: Place an identification mark on the lifters for installation purposes.

Installation Procedure

Table 2

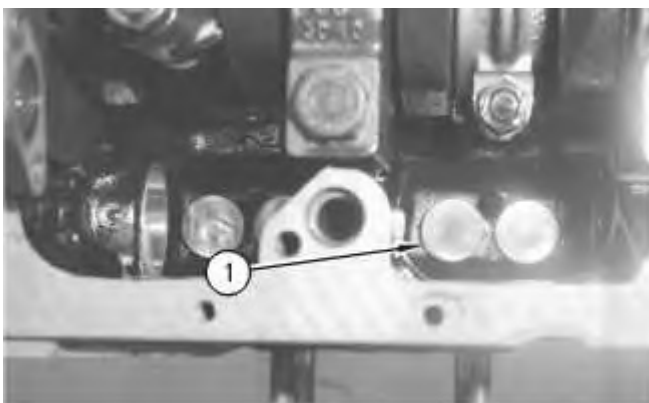
Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7262	Telescoping Magnet	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Lubricate the lifters with clean oil before installing the lifters in the cylinder block.



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

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

End By:

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

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Product: EXCAVATOR

Model: 315C EXCAVATOR ANF

Configuration: 315C L Excavator ANF00001-UP (MACHINE) POWERED BY 3054 Engine

Disassembly and Assembly 3054E Engine for Caterpillar Built Machines

Media Number -REN2411-03

Publication Date -01/05/2017

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i02299051

Camshaft - Remove and Install

SMCS - 1210-010

Removal Procedure

Start By:

- a. Remove the rocker shaft assembly and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".
- b. Remove the 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.

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

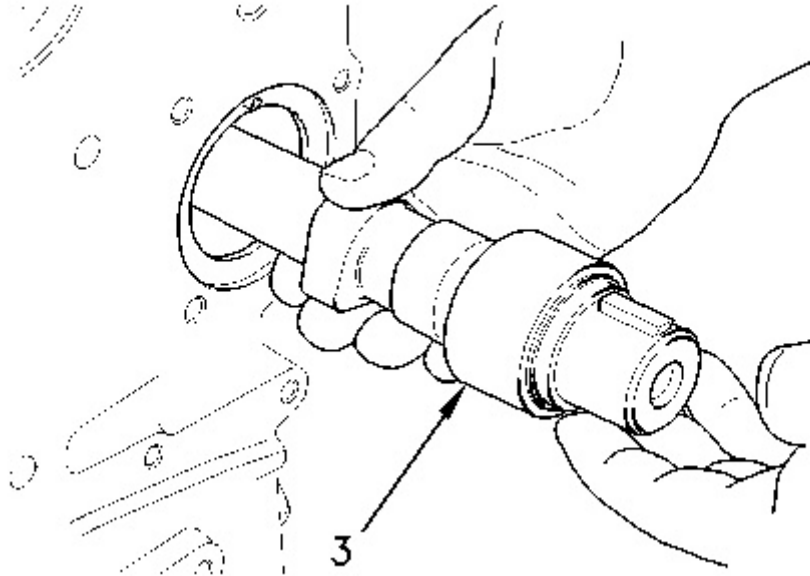


Illustration 1

g00951934

NOTICE

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

2. Carefully remove camshaft (3) from the cylinder block.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Ensure that the camshaft is clean. Lubricate the camshaft with clean engine oil prior to installation.

NOTICE

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

1. Carefully install camshaft (3) in the cylinder block.

End By:

- a. Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".
- b. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".

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Product: EXCAVATOR

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**Disassembly and Assembly
3054E Engine for Caterpillar Built Machines**

Media Number -REN2411-03

Publication Date -01/05/2017

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i02299077

Camshaft Gear - Remove and Install

SMCS - 1210-010-GE

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Name	Qty
A	230-6284	Timing Pin (Camshaft)	1
B	230-6283	Timing Pin (Crankshaft)	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 and Install".
- c. Remove the idler gear. Refer to Disassembly and Assembly, "Idler Gear - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



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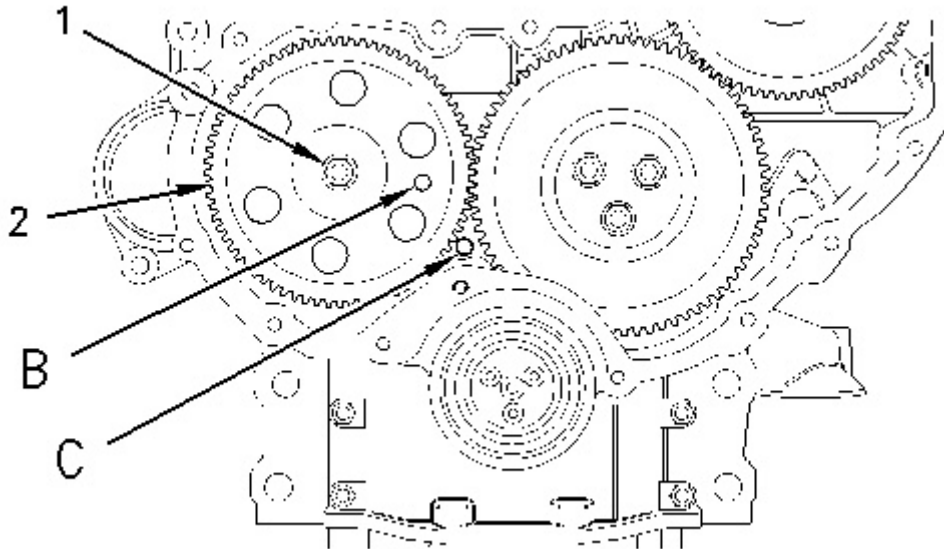


Illustration 1

g01001848

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

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

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Make sure that the No. 1 cylinder is at the top center compression stroke. Refer to Testing and Adjusting, "Finding Top Center Position for No. 1 Piston".
 2. Inspect the camshaft gear and the key for wear or damage.
 3. Install the Tooling (A) through the camshaft gear. Install the Tooling (B) into the crankshaft web.
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