

Product: TRACK-TYPE TRACTOR

Model: D4K2 XL TRACK-TYPE TRACTOR MT3

Configuration: D4K2 XL & D4K2 LGP Small Track Type Tractor MT300001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly C4.4 Engines for Caterpillar Built Machines

Media Number -UENR4525-09

Publication Date -01/06/2015

Date Updated -22/05/2018

i05818226

Rocker Shaft and Pushrod - Install

SMCS - 1102-012; 1208-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	227-4389	E10 Torx Socket	1
B	235-0032	Feeler Gauge	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Clean the valve bridges. Inspect the valve bridges for wear or damage. Replace any valve bridges that are worn or damaged.
-

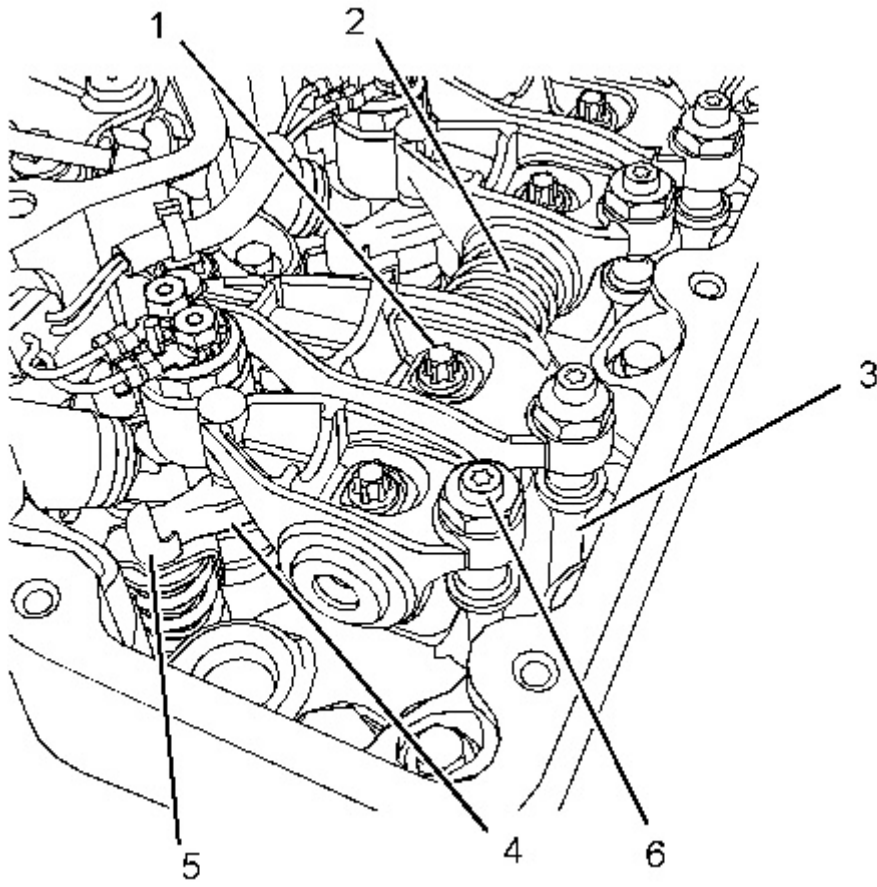


Illustration 1

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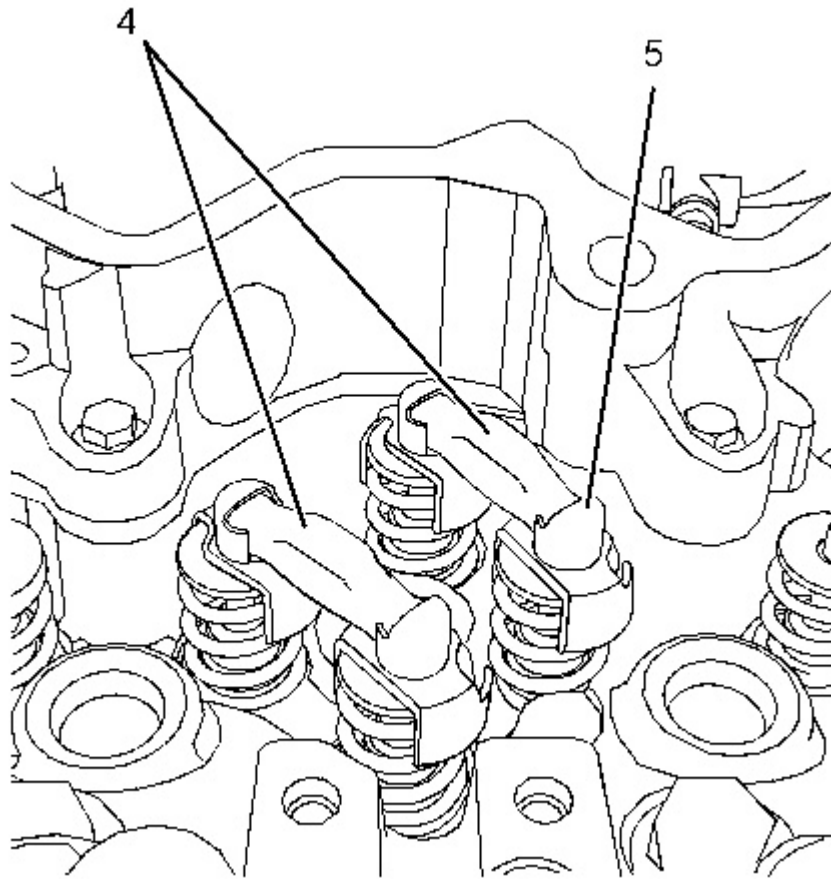


Illustration 2

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The correct location of valve bridges on valve stems is shown. The electronic unit injector is not shown for clarity.

NOTICE

Failure to ensure that ALL valve bridges are correctly seated onto the valve stems will cause interference between the pistons and the valves, resulting in damage to the engine.

2. Lubricate valve bridges (4) with clean engine oil. Install the valve bridges to the cylinder head.
3. Install valve bridges (4) to the cylinder head. If the valve bridges are equipped with shrouds (5), ensure that the shrouds are located correctly.

Note: Install used valve bridges in the original location and in the original orientation. Ensure that the valve bridges are correctly seated on the valves. New valve bridges may be installed in either orientation.

4. Clean pushrods (3). Inspect the pushrods for wear or damage. Replace any pushrods that are worn or damaged.

5. Apply clean engine lubricating oil to both ends of pushrods (3). Install the pushrods to the engine with the cup upward.

Note: Ensure that the pushrods are installed in the original location and that the ball end of each pushrod is correctly seated in the valve lifters.

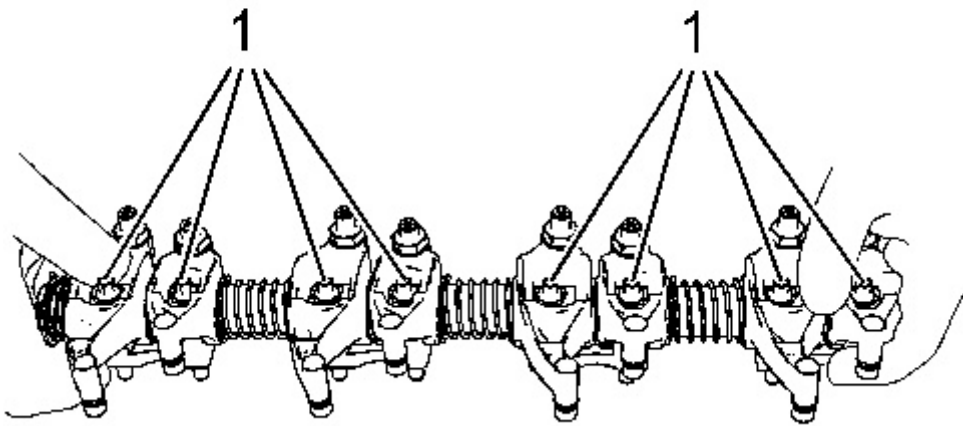


Illustration 3

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6. Ensure that the rocker shaft assembly is clean and free from wear or damage. Install torx screws (1) in the rocker shaft.

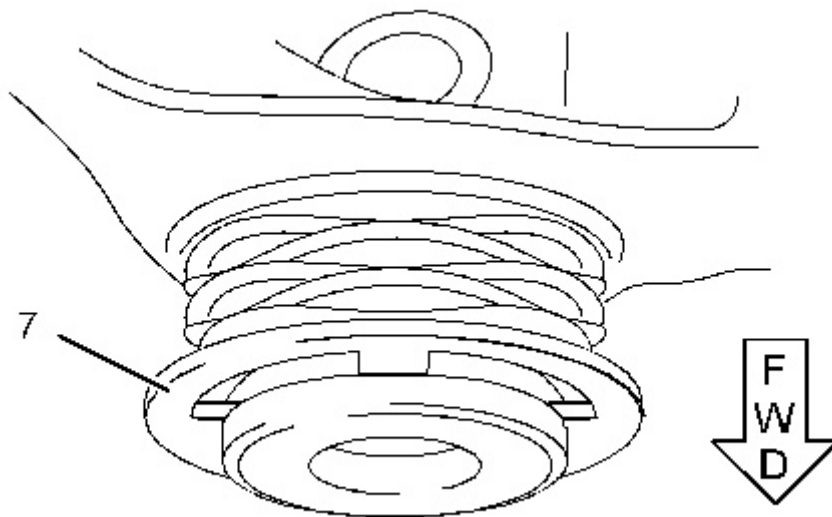


Illustration 4

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7. Position rocker shaft assembly (2) onto the cylinder head. Retaining clip (7) should face the front of the engine.

Note: Ensure that adjustment screws (6) are properly seated in the ends of pushrods (3).

8. Use Tooling (A) to gradually tighten torx screws (1).

Note: To avoid distortion of rocker shaft assembly (2), tighten the torx screws in the center first. Work toward the outside of the rocker shaft assembly.

Tighten the torx screws to a torque of 35 N·m (26 lb ft).

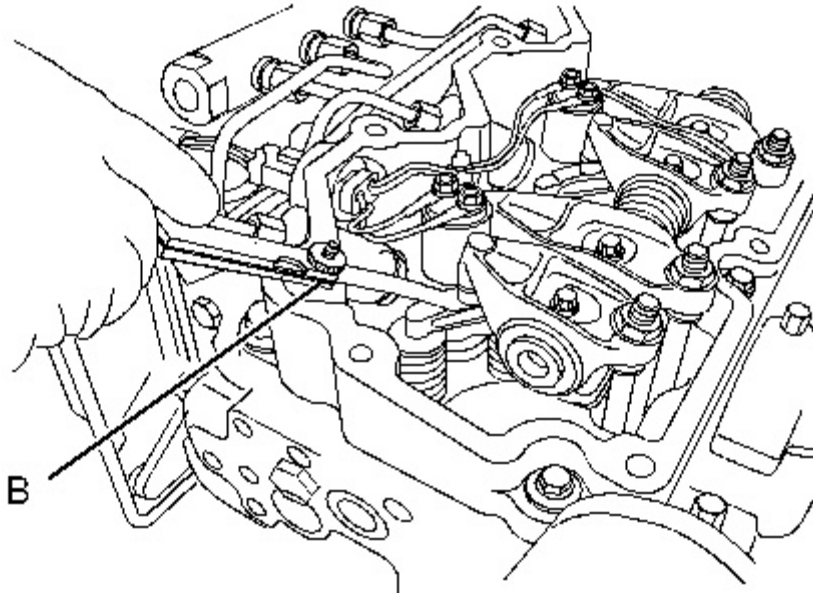


Illustration 5
Typical example

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9. Use Tooling (B) in order to check the valve lash. If necessary, adjust the valve lash. Refer to Systems Operation, Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust" for the correct procedure.

End By:

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

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Disassembly and Assembly

C4.4 Engines for Caterpillar Built Machines

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i05820364

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 fuel manifold. Refer to Disassembly and Assembly, "Fuel Manifold (Rail) - Remove and Install".
- c. Remove the mounting bracket for the electronic control module. Refer to Disassembly and Assembly, "ECM Mounting Bracket- Remove and Install".
- d. Remove the electronic unit injectors. Refer to Disassembly and Assembly, "Electronic Unit Injector - Remove".
- e. Remove the valve mechanism cover base. Refer to Disassembly and Assembly, "Valve Mechanism Cover Base - Remove and Install".
- f. Remove the glow plugs. Refer to Disassembly and Assembly, "Glow Plugs - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

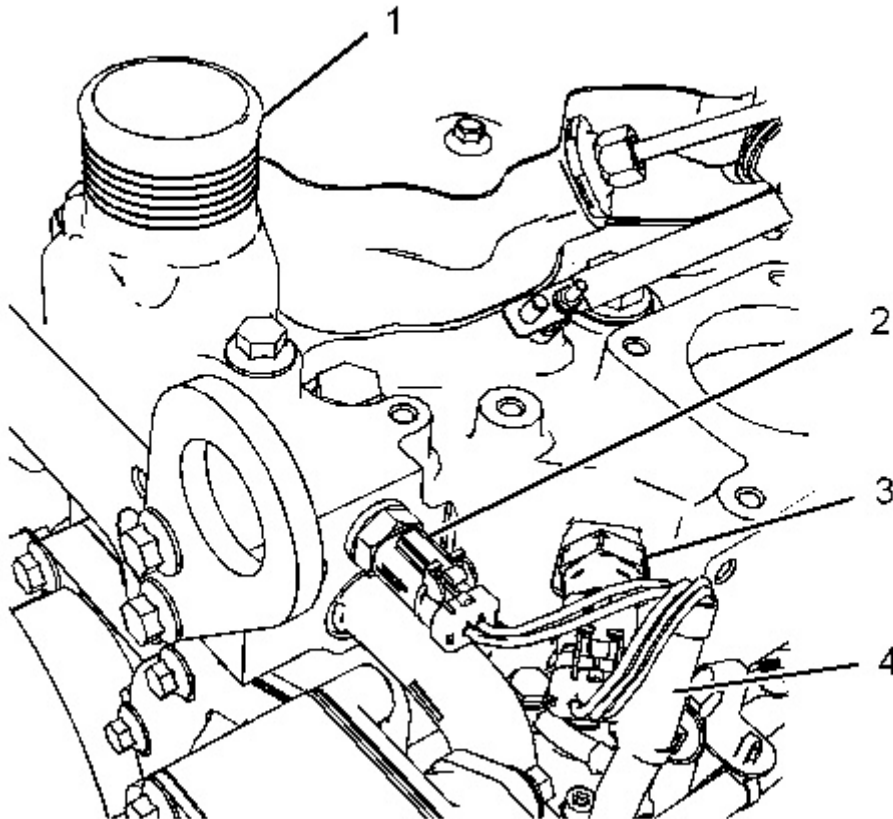
NOTICE

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.

Dispose of all fluids according to local regulations and mandates.

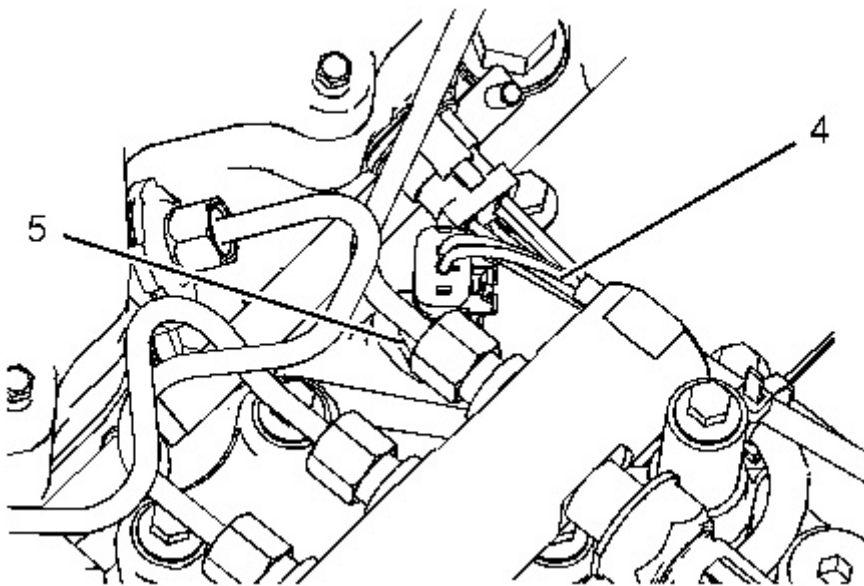
Note: Put identification marks on all hoses, on all hose assemblies, on wires and on all tube assemblies for installation purposes. Plug all hose assemblies and tube assemblies. Plugging the hoses helps to prevent fluid loss and prevents contaminants from entering the system.

1. If the alternator bracket is mounted on the cylinder head, remove the alternator. Refer to Disassembly and Assembly, "Alternator - Remove".
 2. If the fuel priming pump and the primary fuel filter are mounted on the cylinder head, remove the fuel priming pump and the primary fuel filter. Refer to Disassembly and Assembly, "Fuel Priming Pump - Remove and Install".
 3. Drain the coolant from the cooling system into a suitable container for storage or for disposal. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct draining procedure.
-



Typical example

4. Disconnect the upper radiator hose from water temperature regulator housing (1).
 5. If necessary, remove the air hose from the inlet connection.
 6. Follow Step 6.a and Step 6.b in order to disconnect harness assembly (4) from coolant temperature sensor (2).
 - a. Slide the locking tab into the unlocked position.
 - b. Disconnect harness assembly (4) from coolant temperature sensor (2).
 7. If necessary, follow Step 7.a and Step 7.b in order to disconnect harness assembly (4) from boost pressure sensor (3).
 - a. Slide the locking tab into the unlocked position.
 - b. Disconnect harness assembly (4) from boost pressure sensor (3).
-



Typical example

8. Follow Step 8.a and Step 8.b in order to disconnect harness assembly (4) from inlet air temperature sensor (5).
 - a. Slide the locking tab into the unlocked position.
 - b. Disconnect harness assembly (4) from inlet air temperature sensor (5).
 9. Remove all cable straps that secure harness assembly (4) to the cylinder head. The harness assembly should be positioned in order to avoid causing an obstruction during the removal of the cylinder head.
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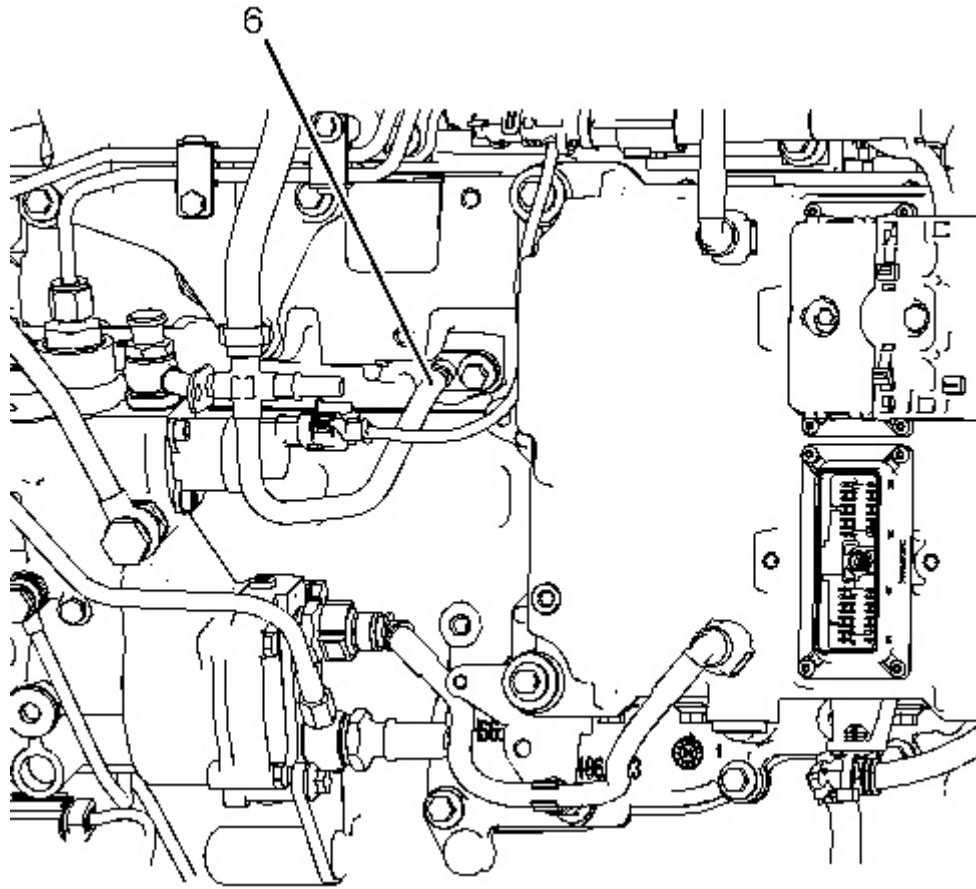


Illustration 3
Typical example

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10. Remove tube assembly (6) from the cylinder head and from transfer pump (7).
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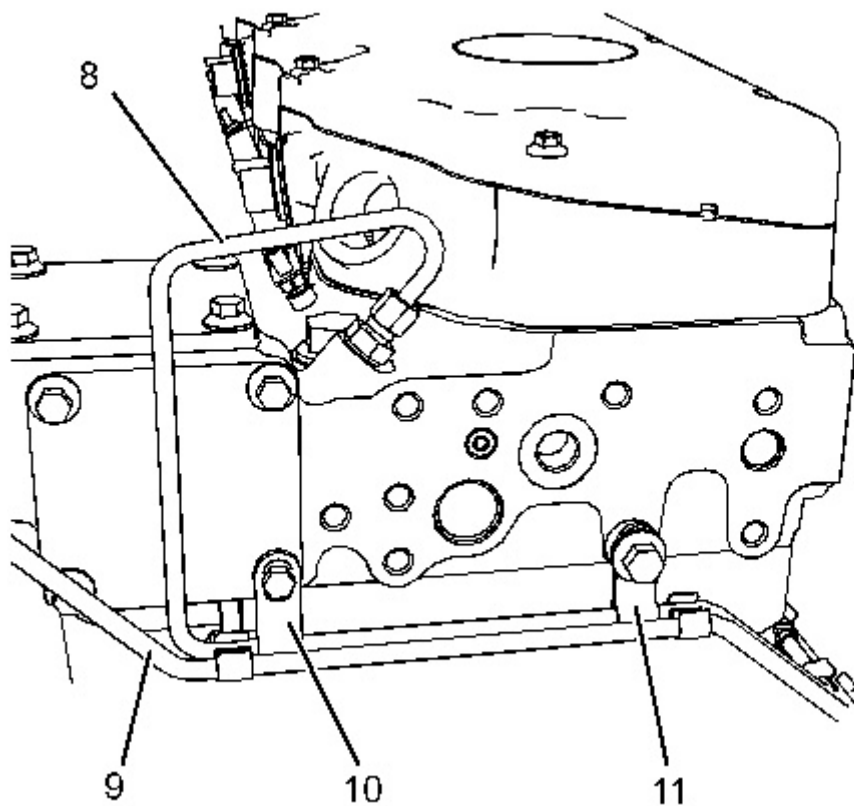


Illustration 4
Typical example

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11. If the engine is equipped with a wastegate solenoid, remove harness assembly (9) from tube assembly (8). Remove the bolts for tube clip (10) and tube clip (11). Remove tube assembly (8) from the wastegate solenoid and from the cylinder head.

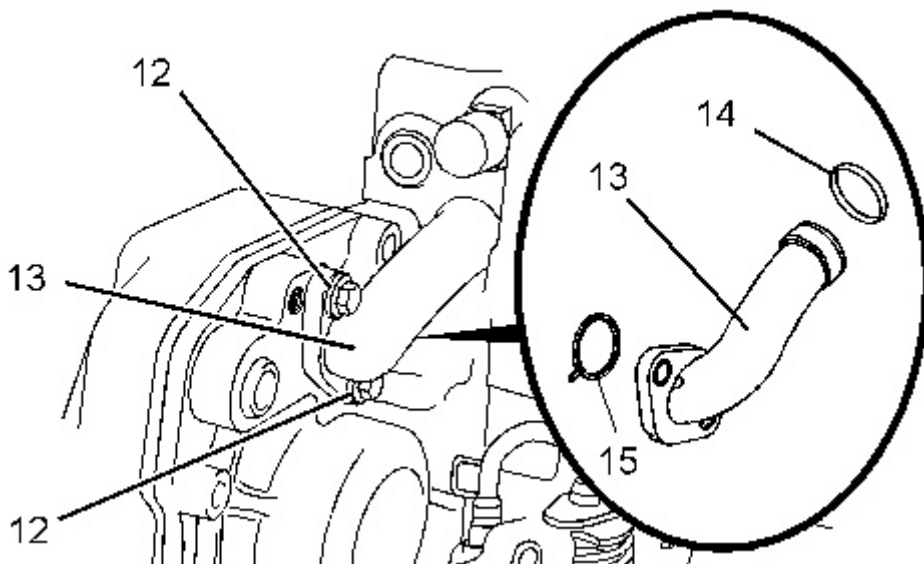


Illustration 5

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Typical example

12. Remove bolts (12). Note the position of any brackets that are secured by the bolts. Remove bypass tube (13) from the cylinder head. Remove O-ring seals (14) and (15) from the bypass tube.

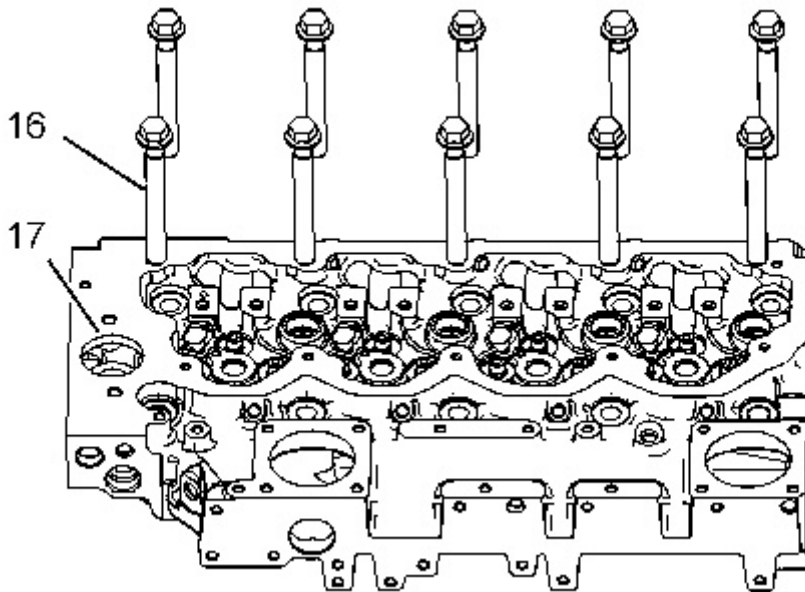


Illustration 6

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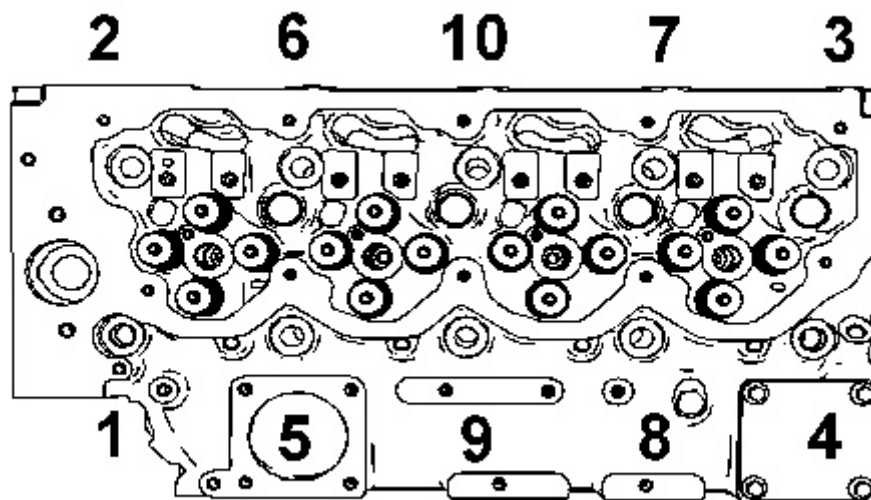


Illustration 7

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Sequence for loosening the bolts for the cylinder head

13. Gradually loosen bolts (16) in the reverse numerical order to the sequence that is shown in Illustration 7.

Note: Follow the correct sequence in order to help prevent distortion of the cylinder head.

14. Remove bolts (16) from cylinder head (17).
15. Attach a suitable lifting device to cylinder head (17). Support the weight of the cylinder head. The weight of the cylinder head is approximately 56 kg (124 lb).
16. Use the suitable lifting device to carefully lift cylinder head (17) off the cylinder block.

Note: Do not use a lever to separate the cylinder head from the cylinder block. Take care not to damage the machined surfaces of the cylinder head during the removal procedure.

NOTICE

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

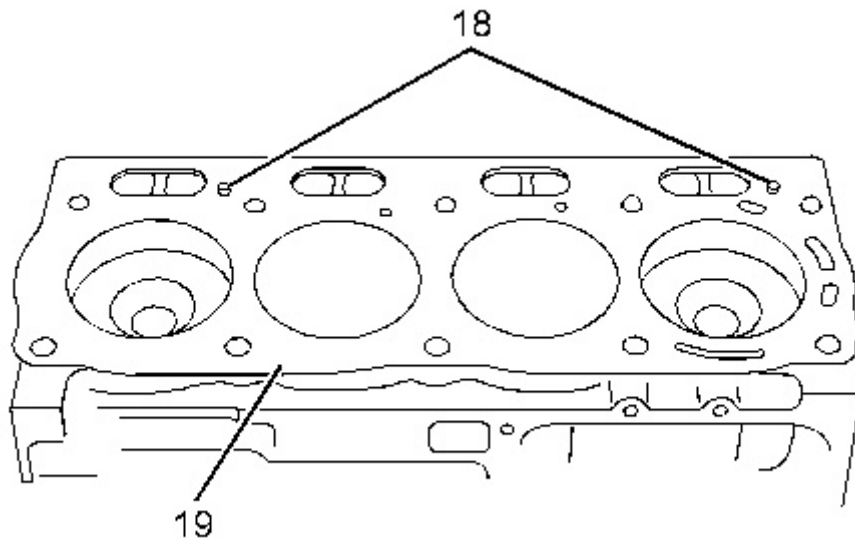


Illustration 8
Typical example

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17. Remove cylinder head gasket (19).
 18. Note the position of dowels (18) in the cylinder block. Do not remove the dowels unless the dowels are damaged.
 19. If necessary, remove the water temperature regulator from the cylinder head. Refer to Disassembly and Assembly, "Water Temperature Regulator - Remove and Install".
 20. If necessary, remove the electronic sensors from the cylinder head. Refer to Disassembly and Assembly, "Coolant Temperature Sensor - Remove and Install". Refer to Disassembly and Assembly, "Air Temperature Sensor - Remove and Install". Refer to Disassembly and Assembly, "Boost Pressure Sensor - Remove and Install".
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Disassembly and Assembly

C4.4 Engines for Caterpillar Built Machines

Media Number -UENR4525-09

Publication Date -01/06/2015

Date Updated -22/05/2018

i05820444

Cylinder Head - Install

SMCS - 1100-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Bolt M16 by 115mm	2
B	-	Straight Edge	1
C	8T-3052	Degree Wheel	1
D	1U-6396	O-ring Assembly Compound	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Thoroughly clean the faces of the cylinder head and the cylinder block. Do not damage the faces of the cylinder head or the cylinder block. Ensure that no debris enters the cylinder bores, the coolant passages, or the lubricant passages.
2. Inspect the face of the cylinder head for distortion. Refer to Specifications, "Cylinder Head" for more information. If the face of the cylinder head is distorted beyond maximum permitted limits, replace the cylinder head.

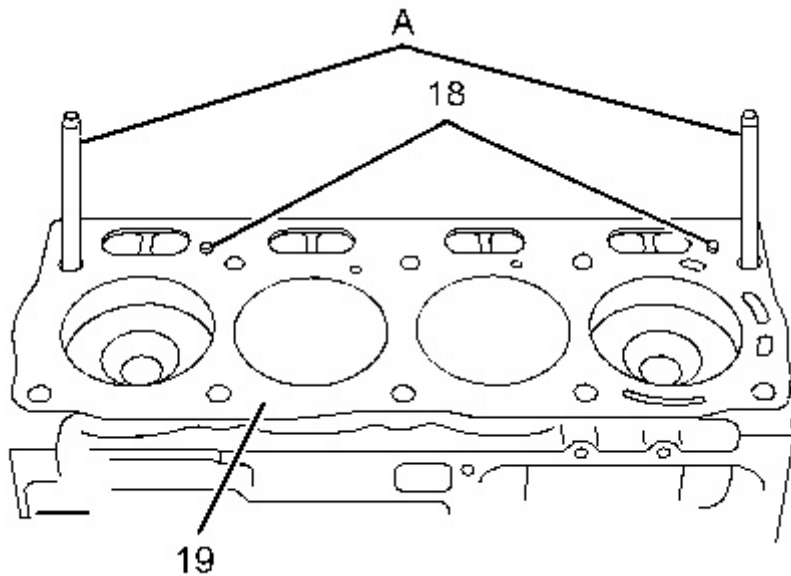
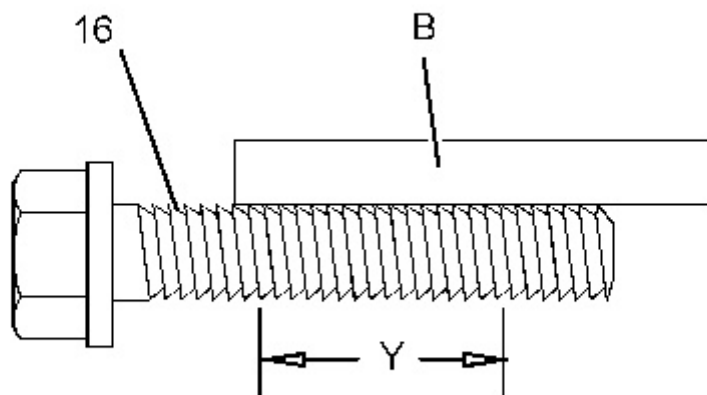


Illustration 1

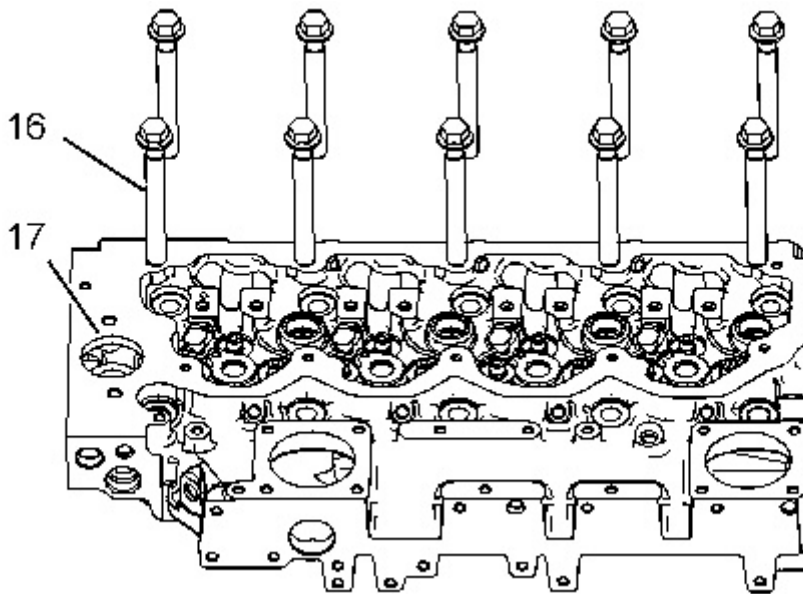
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3. Inspect dowels (18) for damage. If necessary, replace the dowels in the cylinder block.
4. Install Tooling (A) to the cylinder block. Refer to Illustration 1.
5. Align cylinder head gasket (19) with Tooling (A) and with dowels (18). Install the cylinder head gasket onto the cylinder block.
6. Use a suitable lifting device to lift the cylinder head. The weight of the cylinder head is approximately 56 kg (124 lb).
7. Use Tooling (A) to align cylinder head (17) with the cylinder block. Install the cylinder head to the cylinder block.

Note: Ensure that the cylinder head is correctly positioned onto dowels (18).



8. Clean bolts (16). Follow Step 8.a and Step 8.b for the procedure to inspect the bolts.
 - a. Check the length of the bolts.
 - b. Use Tooling (B) in order to check the threads of the bolts. Refer to Illustration 2. Replace any bolts that show visual reduction in the diameter of the thread over length (Y).
9. Lubricate the threads and the shoulder of bolts (16) with clean engine oil.
10. Remove Tooling (A).



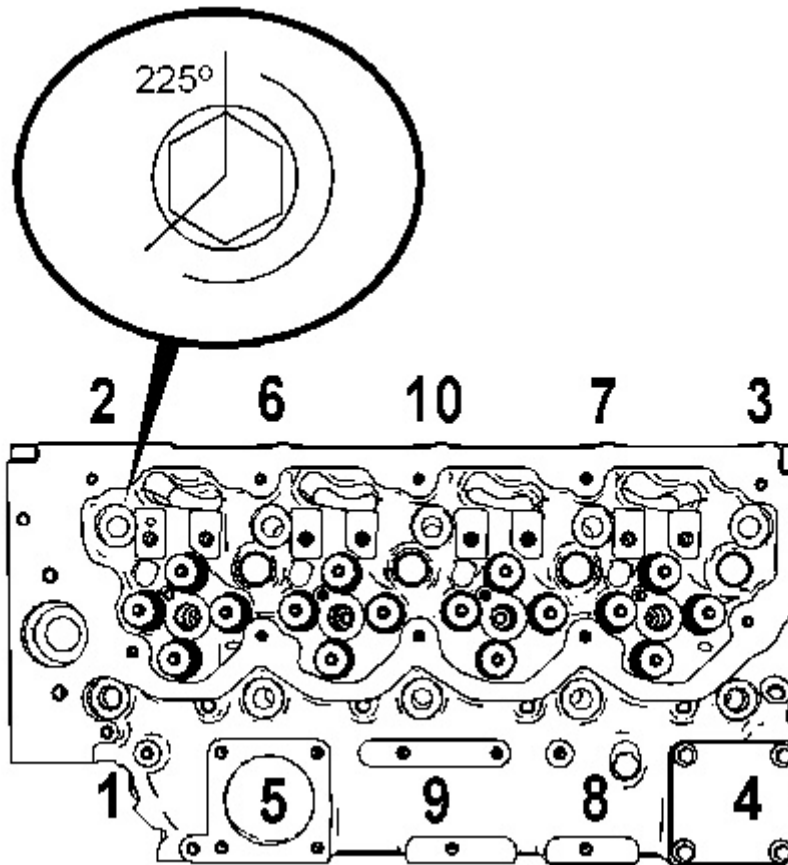


Illustration 4

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Sequence for tightening the bolts for the cylinder head

11. Install bolts (16) to cylinder head (17).
 12. Tighten bolts (16) to a torque of 50 N·m (37 lb ft) in the sequence that is shown in Illustration 4.
 13. Tighten bolts (16) to a torque of 100 N·m (74 lb ft) in the sequence that is shown in Illustration 4.
 14. Use Tooling (C) to turn bolts (16) through an additional 225 degrees. Turn bolts (16) in the sequence that is shown in Illustration 4.
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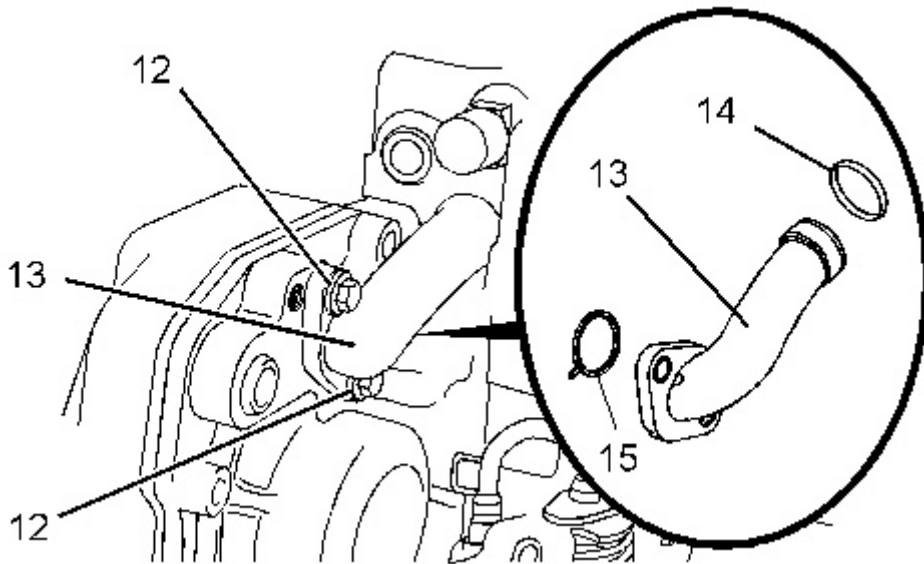


Illustration 5

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Typical example

15. Install new O-ring seal (14) and O-ring seal (15) to bypass tube (13). Use Tooling (D) in order to lubricate O-ring seal (14). Install the bypass tube to the cylinder head. Install bolts (12). Tighten the bolts to a torque of 22 N·m (16 lb ft).

Note: Ensure that any brackets that are secured by the bolts are installed in the correct position.

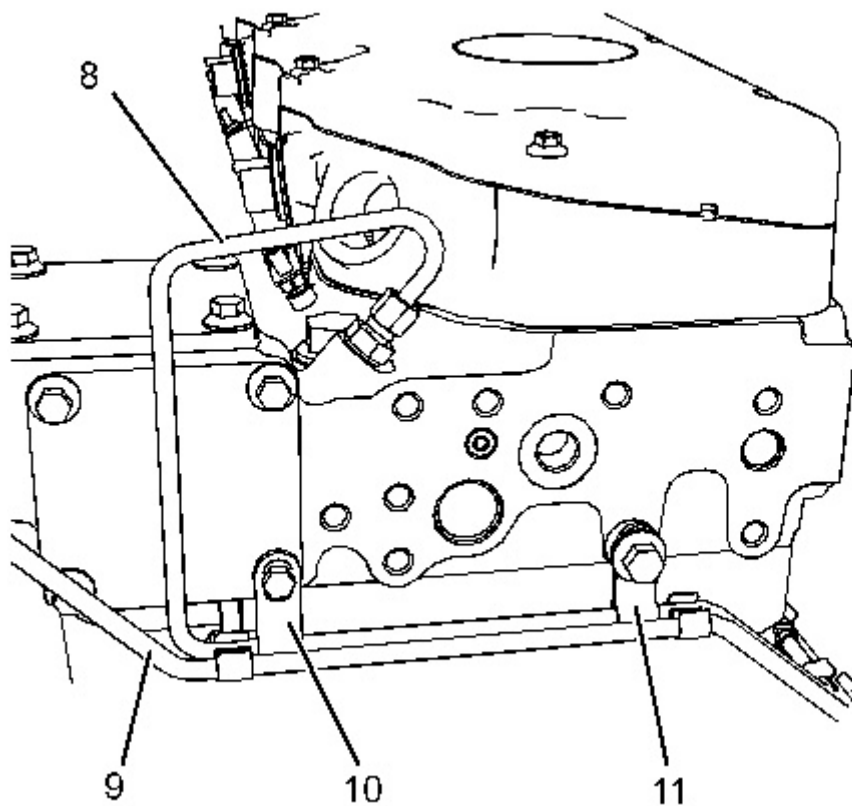


Illustration 6
Typical example

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16. If the engine is equipped with a wastegate solenoid, install tube assembly (9) to the wastegate solenoid and to the cylinder head. Install the bolts for tube clip (10) and tube clip (11). Tighten M8 bolts to a torque of 22 N·m (16 lb ft). Tighten M10 bolts to a torque of 44 N·m (32 lb ft). Secure harness assembly (9) to tube assembly (8).
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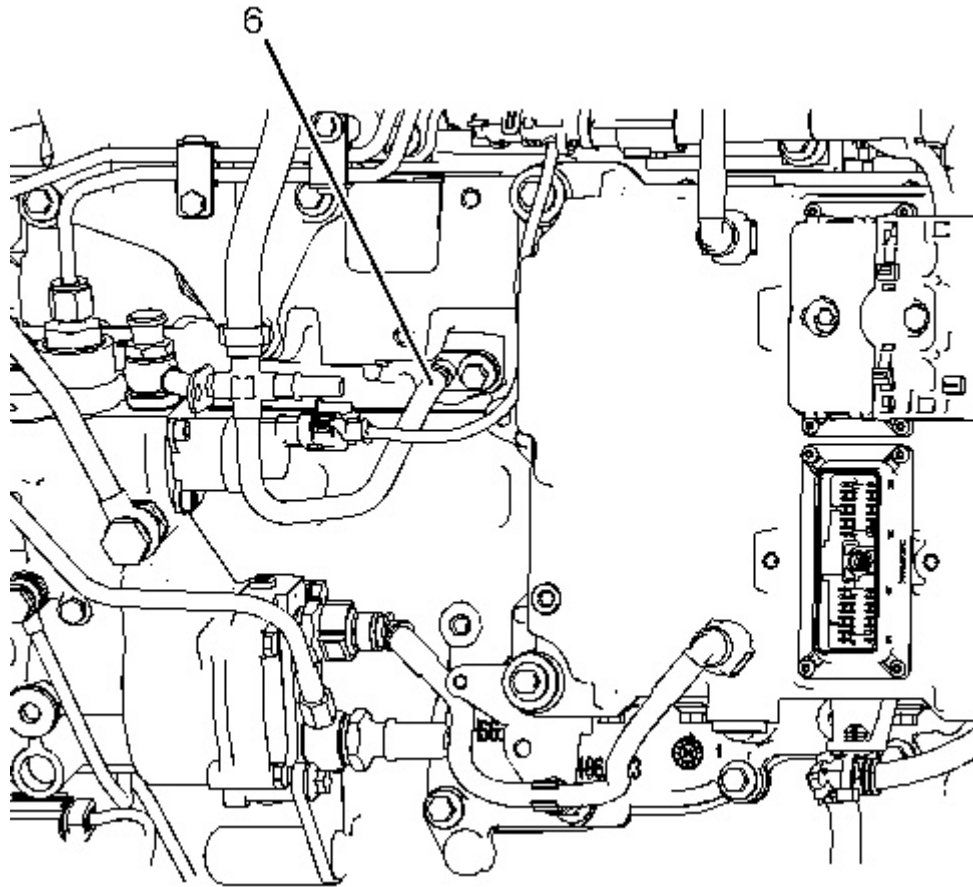


Illustration 7
Typical example

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17. Follow Step 17.a through Step 17.c in order to install tube assembly (6) for the fuel return.
 - a. Install the bolt and new sealing washer to tube assembly (6).
 - b. Install tube assembly (6) to the cylinder head.
 - c. Tighten the bolt to a torque of 22 N·m (195 lb in).
 18. If necessary, install the electronic sensors to the cylinder head. Refer to Disassembly and Assembly, "Coolant Temperature Sensor - Remove and Install". Refer to Disassembly and Assembly, "Air Temperature Sensor - Remove and Install". Refer to Disassembly and Assembly, "Boost Pressure Sensor - Remove and Install".
-

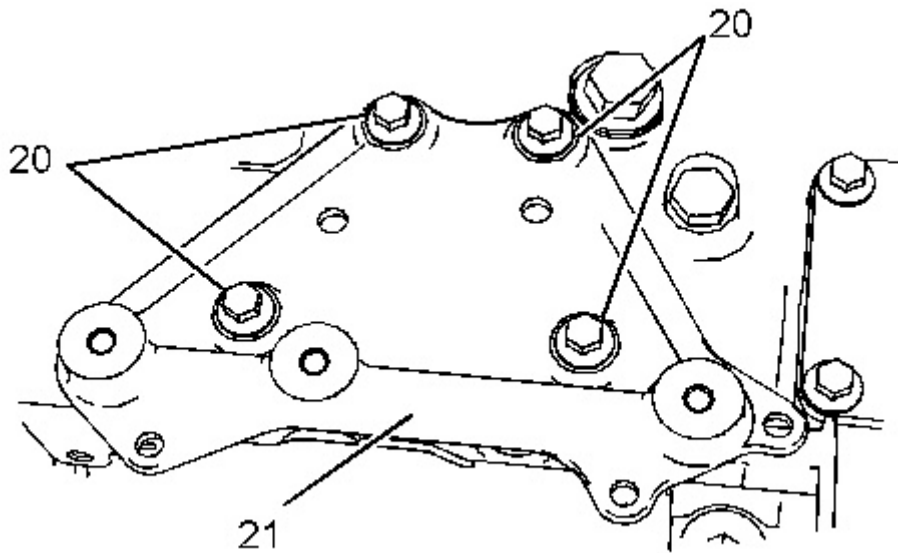


Illustration 8

g01763173

Typical example

19. If necessary, install mounting bracket (21) and install screws (20) to the cylinder head. Tighten the screws to a torque of 22 N·m (16 lb ft).

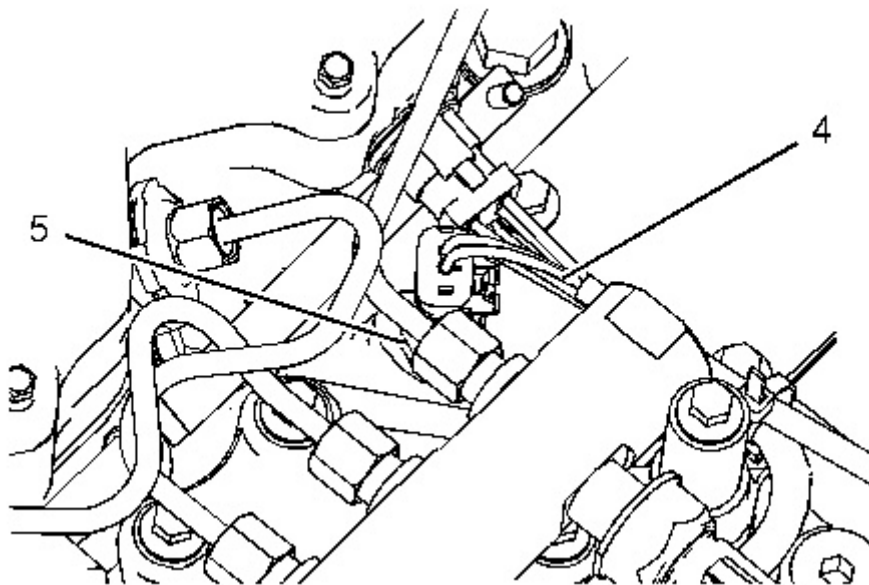


Illustration 9

g01249835

Typical example

20. Follow Step 20.a and Step 20.b in order to connect harness assembly (4) to inlet air temperature sensor (5).
 - a. Connect harness assembly (4) to inlet air temperature sensor (5).
 - b. Slide the locking tab into the locked position.

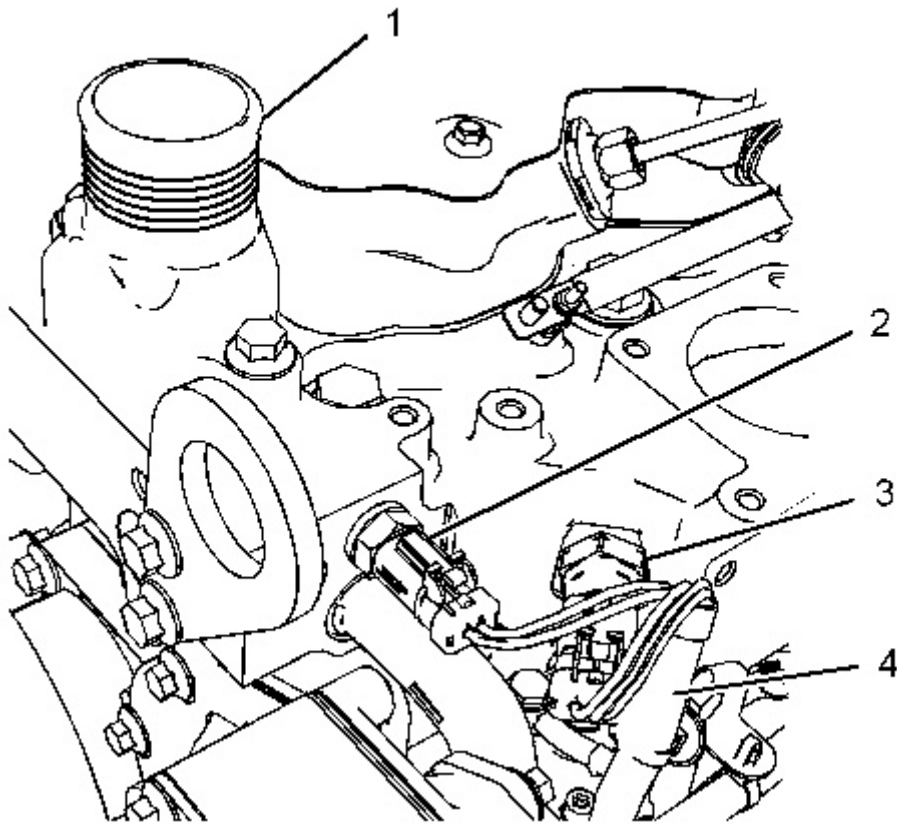


Illustration 10
Typical example

g01245537

21. If necessary, install water temperature regulator housing (1) to the cylinder head. Refer to Disassembly and Assembly, "Water Temperature Regulator Housing - Remove and Install".
22. Connect the upper radiator hose to water temperature regulator housing (1). Tighten the hose clip securely.
23. Follow Step 23.a and Step 23.b in order to connect harness assembly (4) to boost pressure sensor (3).
 - a. Connect harness assembly (4) to boost pressure sensor (3).
 - b. Slide the locking tab into the locked position.
24. Follow Step 24.a and Step 24.b in order to connect harness assembly (4) to coolant temperature sensor (2).
 - a. Connect harness assembly (4) to coolant temperature sensor (2).
 - b. Slide the locking tab into the locked position.
25. Use new cable straps in order to secure the harness assembly to the cylinder head. Ensure that the harness assembly is not strained.

Note: Ensure that the harness assembly is clear of other engine components.

26. Install the mounting bracket for the electronic control module. Refer to Disassembly and Assembly, "ECM Mounting Bracket - Remove and Install".
 27. Install the glow plugs. Refer to Disassembly and Assembly, "Glow Plugs - Remove and Install".
 28. Install the valve mechanism cover base. Refer to Disassembly and Assembly, "Valve Mechanism Cover Base - Remove and Install".
 29. Install the electronic unit injectors. Refer to Disassembly and Assembly, "Electronic Unit Injector - Install".
 30. Install the fuel manifold. Refer to Disassembly and Assembly, "Fuel Manifold (Rail) - Remove and Install".
 31. Install the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
 32. If necessary, install the fuel filter base and the secondary fuel filter. Refer to Disassembly and Assembly, "Fuel Filter Base - Remove and Install".
 33. If necessary, install the fuel priming pump and the primary fuel filter. Refer to Disassembly and Assembly, "Fuel Priming Pump - Remove and Install".
 34. If the alternator bracket is mounted on the cylinder head, install the alternator. Refer to Disassembly and Assembly, " Alternator - Install".
 35. If necessary, install the air hose to the inlet connection.
 36. Fill the cooling system with coolant. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct filling procedure.
 37. If necessary, fill the engine oil pan to the correct level that is indicated on the engine oil level gauge. Refer to Operation and Maintenance Manual, "Engine Oil Level - Check".
-

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Disassembly and Assembly

C4.4 Engines for Caterpillar Built Machines

Media Number -UENR4525-09

Publication Date -01/06/2015

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i05820992

Lifter Group - Remove and Install

SMCS - 1209-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6198	Crankshaft Turning Tool	1
B	1U-7262	Telescoping Magnet	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 and Install".
- b. 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.

1. If the crankshaft is installed, use Tooling (A) to rotate the crankshaft in order to gain access to the lifters.

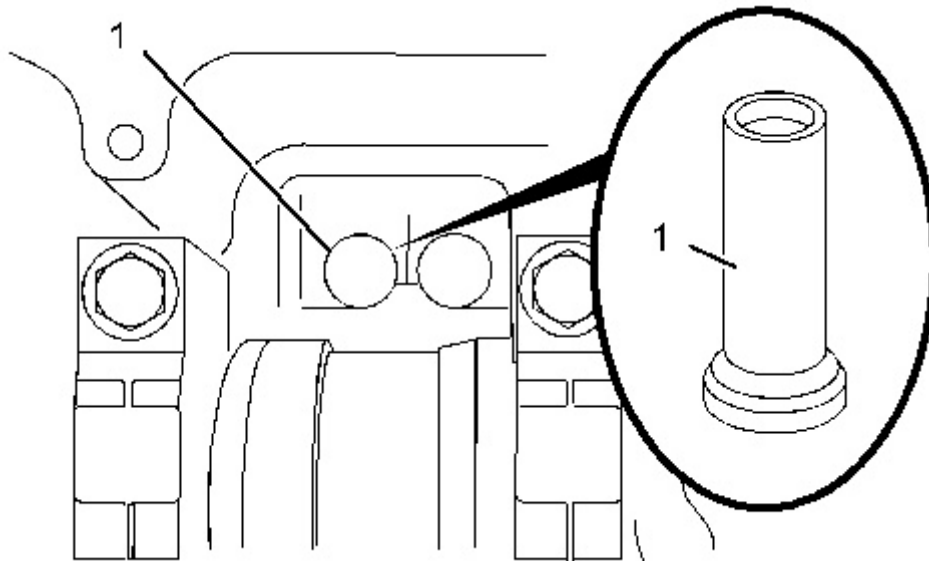


Illustration 1
Typical example

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2. Use Tooling (B) in order to remove lifters (1).

Note: Place a temporary identification mark on each lifter in order to identify the correct location.

3. Repeat Step 1 through Step 2 in order to remove the remaining lifters.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6198	Crankshaft Turning Tool	1
B	1U-7262	Telescoping Magnet	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

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

1. Clean the lifters. Follow Step 1.a through Step 1.c in order to inspect the lifters. Replace lifters that are worn or damaged.
 - a. Inspect the seat of the pushrod in the lifter for visual wear or damage.
 - b. Inspect the shank of the lifter for wear or damage. Refer to Specifications, "Lifter Group" for more information.
 - c. Inspect the face of the lifter that runs on the camshaft for visual wear or damage.
 2. If the crankshaft is installed, use Tooling (A) to rotate the crankshaft. Rotate the crankshaft to access to the cylinder block in order to install lifters (1).
 3. Lubricate lifters (1) with clean engine oil.
-

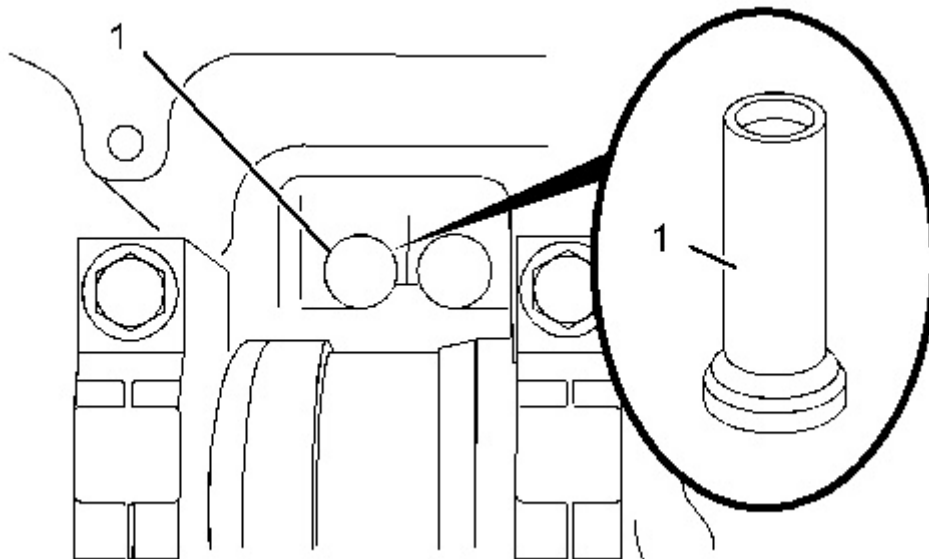


Illustration 2

g01476632

Typical example

4. Use Tooling (B) to install lifters (1) to the cylinder block. Ensure that used lifters are installed in the correct location.

Note: The lifters should be free to rotate.

5. Repeat Step 1 through Step 4 in order to install the remaining lifters.

End By:

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

- 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 - Remove and Install".
-

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