

Product: TRACK-TYPE TRACTOR

Model: D3K XL TRACK-TYPE TRACTOR FFF

Configuration: D3K XL & LGP Track Type Tractors FFF00001-UP (MACHINE) POWERED BY C4.4 Engine

Disassembly and Assembly C4.4 Engines for Caterpillar Built Machines

Media Number -KENR6082-19

Publication Date -01/10/2013

Date Updated -21/10/2013

i03683045

Valve Mechanism Cover Base - Remove and Install

SMCS - 1120-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1860	Retaining Ring Pliers	1

Start By:

- A. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".
- B. Remove the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Use a deep socket in order to remove the electrical connections from the electronic unit injectors. Use of incorrect tooling will result in damage to the electronic unit injectors.

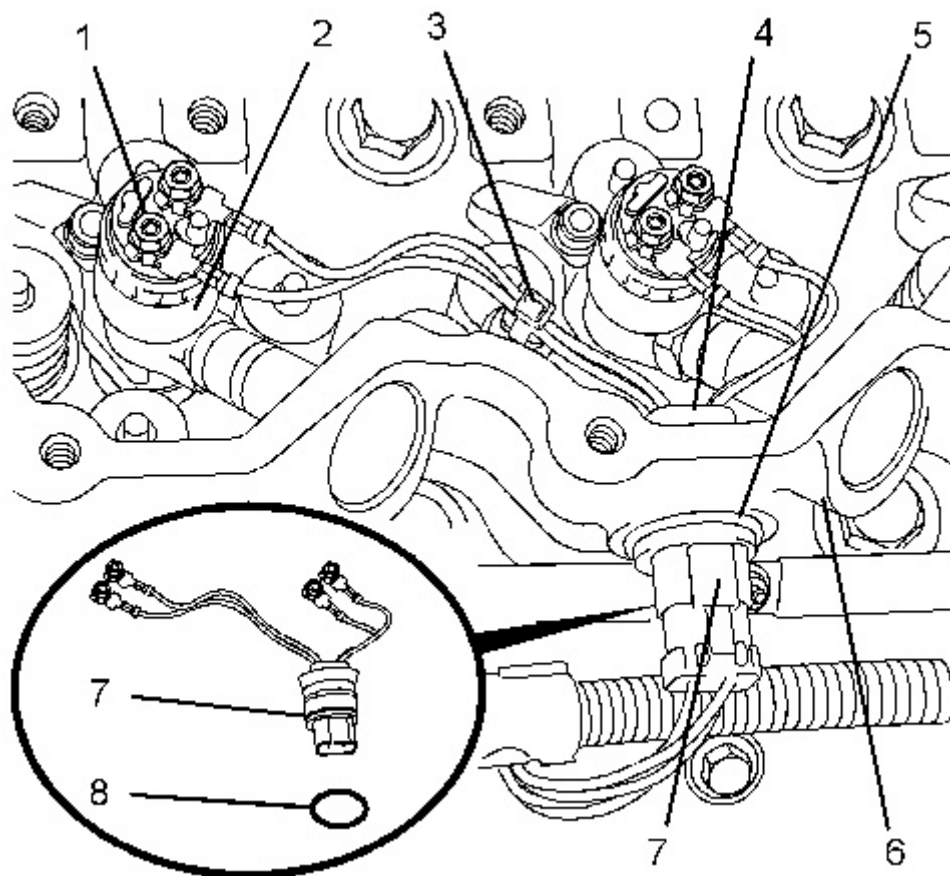


Illustration 1

g01476212

Typical example

1. Make a temporary identification mark on connections (1) .
2. Use a deep socket to remove connections (1) from electronic unit injectors (2) .
3. Disconnect plugs (7) from harness assemblies (4) .
4. If necessary, follow Step 4.a through Step 4.e in order to remove harness assemblies (4) from valve mechanism cover base (6) .
 - a. Cut cable strap (3) .
 - b. Use Tooling (A) to remove circlip (5) .
 - c. From the outside of valve mechanism cover base (6) , push harness assembly (4) inward. Withdraw the harness assembly from valve mechanism cover base (6) .
 - d. Remove O-ring seal (8) from harness assembly (4) .
 - e. Repeat Step 4.a through Step 4.d in order to remove the remaining harness assembly.

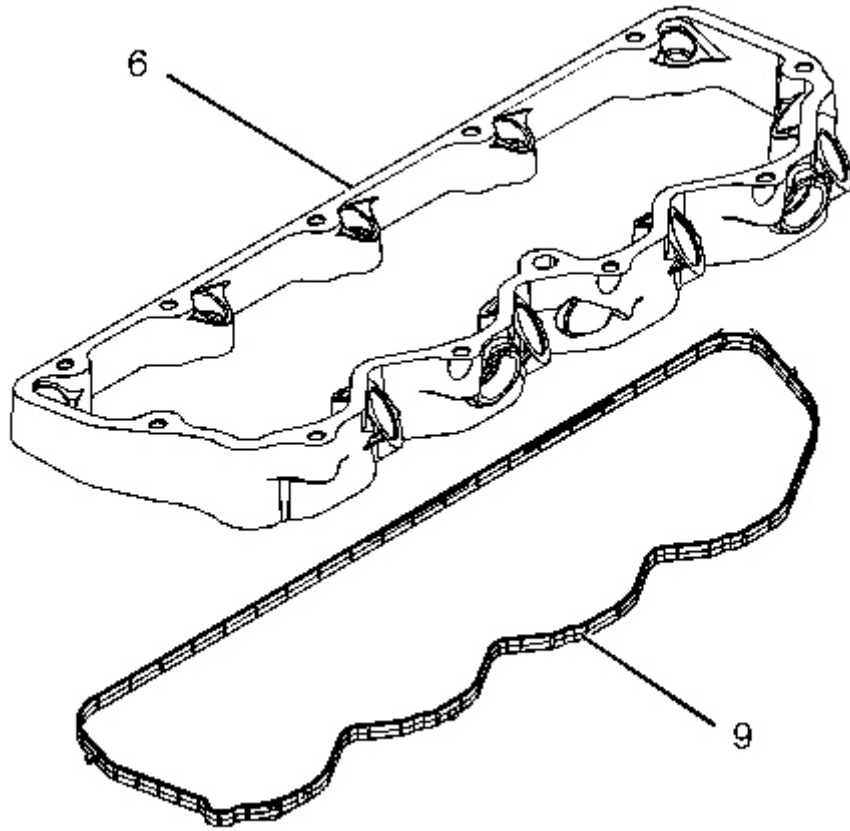
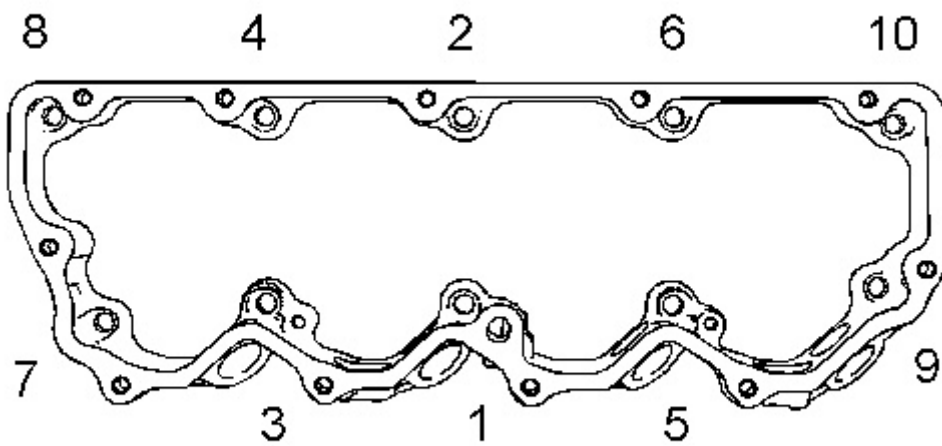


Illustration 2

g01245186

Typical example



Sequence for loosening captive bolts in valve mechanism

5. Progressively loosen the captive bolts that secure the valve mechanism cover base in reverse numerical order. Refer to Illustration 3. This will help prevent distortion of the valve mechanism cover base.

Note: The captive bolts cannot be removed from the valve mechanism cover base.

6. Remove the valve mechanism cover base from the cylinder head.
7. Remove gasket (9) from the valve mechanism cover base .

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1860	Retaining Ring Pliers	1
B	1U-1860	O-Ring Assembly Compound	1
C	247-5377	Torque Wrench	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Use a deep socket in order to remove the electrical connections from the electronic unit injectors. Use of incorrect tooling will result in damage to the electronic unit injectors.

1. Clean the valve mechanism cover base. Ensure that the surfaces are free from damage.
-

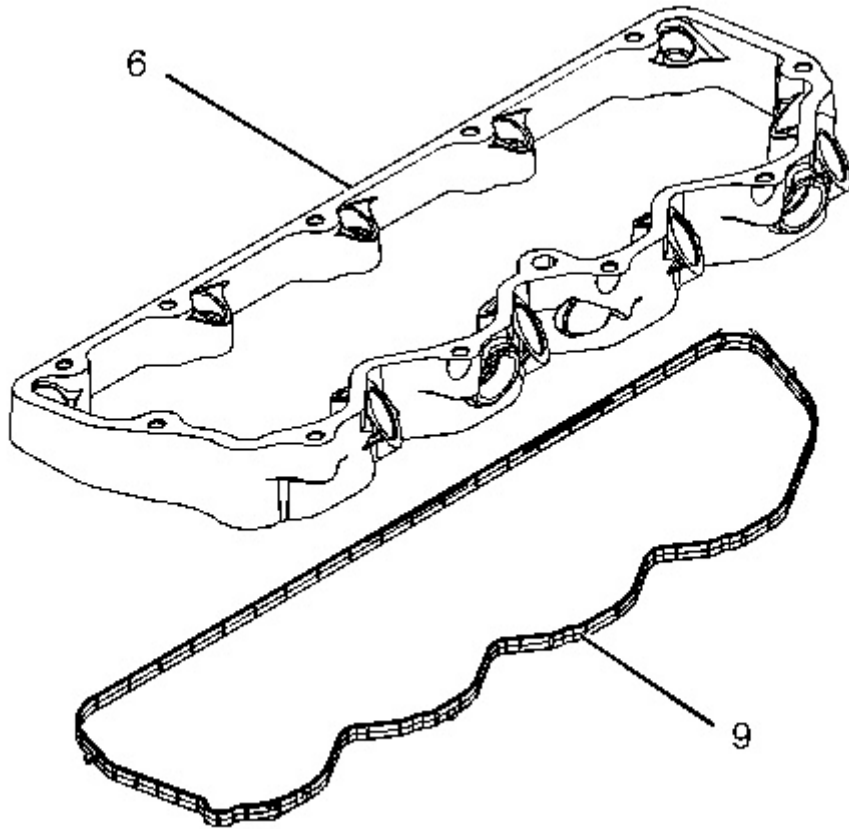


Illustration 4

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Typical example

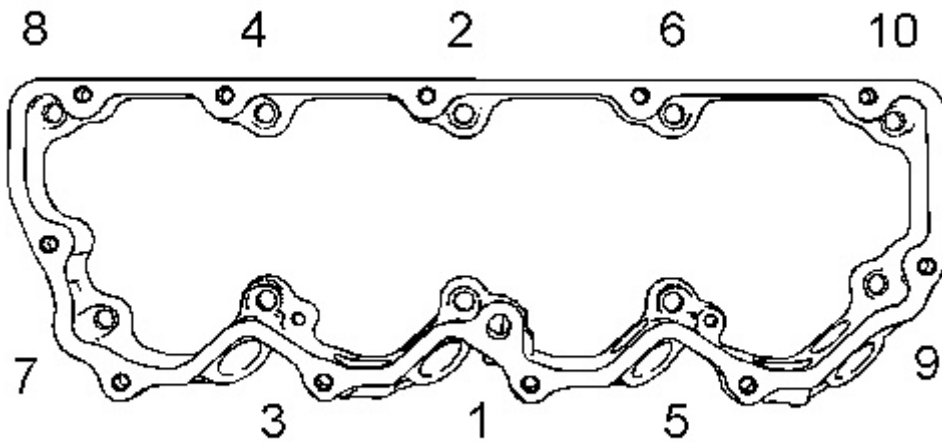


Illustration 5

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Tightening sequence for the valve mechanism cover base

2. Install gasket (9) to valve mechanism cover base (6) . Ensure that the gasket is seated correctly in the groove in the valve mechanism cover base.
3. Position valve mechanism cover base (6) on the cylinder head.
4. Progressively tighten the captive bolts that secure the valve mechanism cover base. Tighten the captive bolts to a torque of 9 N·m (79 lb in) in the sequence that is shown in Illustration 5.

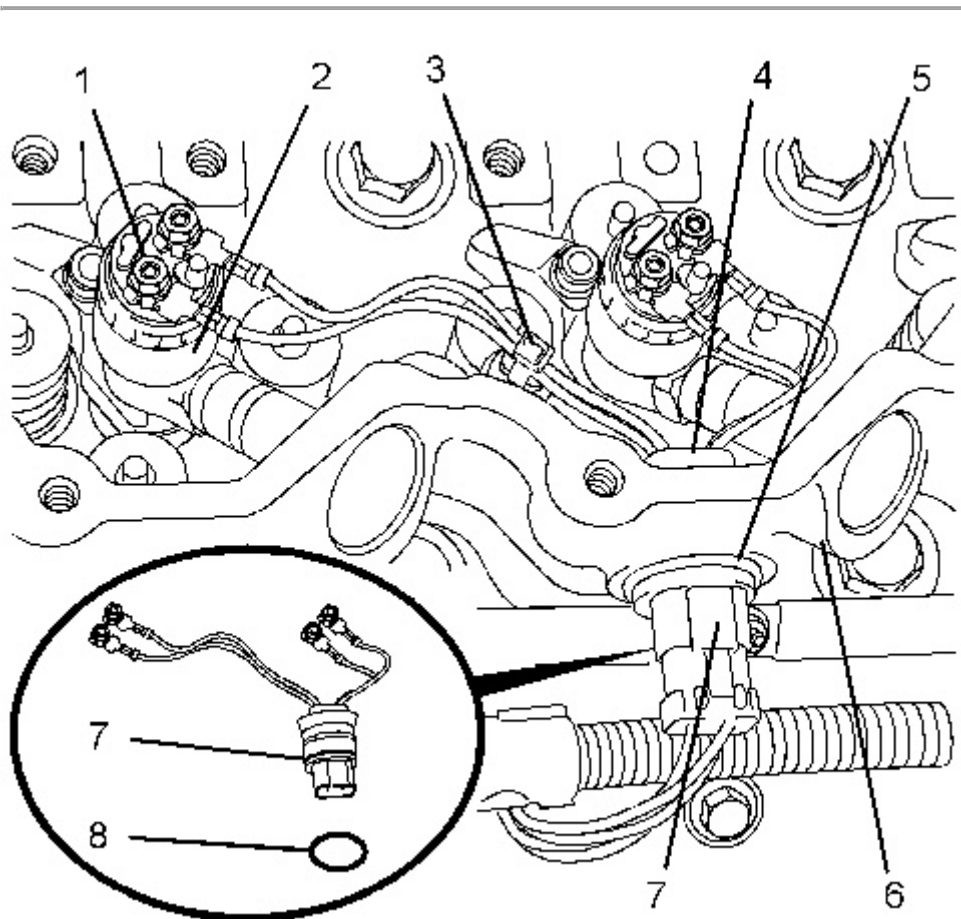


Illustration 6

g01476212

Typical example

5. If necessary, install the harness assemblies for the electronic unit injectors. Follow Step 5.a through Step 5.e in order to install the harness assemblies to the electronic unit injectors.
 - a. Ensure that harness assembly (4) and the bore in valve mechanism cover base (6) are clean and free from damage. Replace any damaged components.
 - b. Use Tooling (B) to lubricate a new O-ring seal (8) . Install O-ring seal (8) onto harness assembly (4) .

- c. From the inside of valve mechanism cover base (6) , push harness assembly (4) into the valve mechanism cover base.
 - d. Use Tooling (A) to install circlip (5) .
 - e. Repeat Step 5.a through Step 5.e for the remaining harness assembly.
6. Use a deep socket to connect harness (4) to electronic unit injectors (2) . Use Tooling (C) to tighten connectors (1) to a torque of 2.4 N·m (21 lb in).
 7. If necessary, install new cable strap (3) to harness assemblies (4) .
Note: Ensure that the cable straps conform to the Caterpillar specification.
 8. Connect plugs (7) to harness assemblies (4) .

End By:

- a. Install new fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Install".
 - b. Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".
-

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i02930035

Rocker Shaft and Pushrod - Remove

SMCS - 1102-011; 1208-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	227-4389	E10 Torx Socket	1

Start By:

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

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

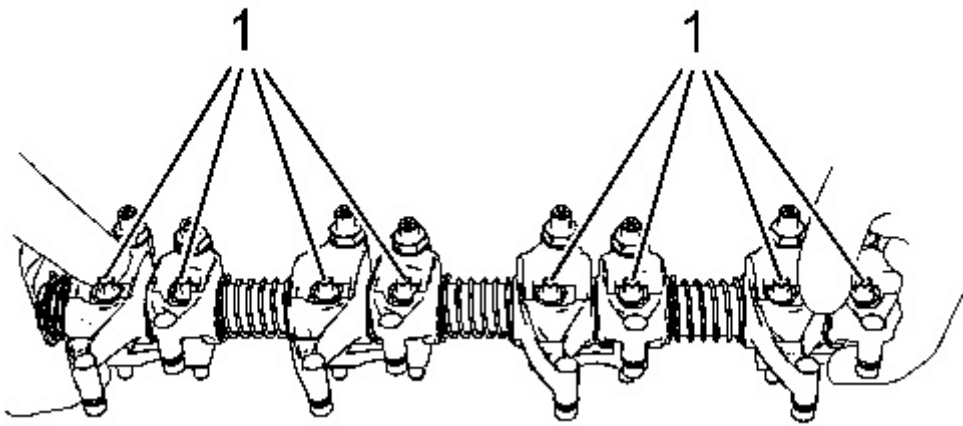


Illustration 1

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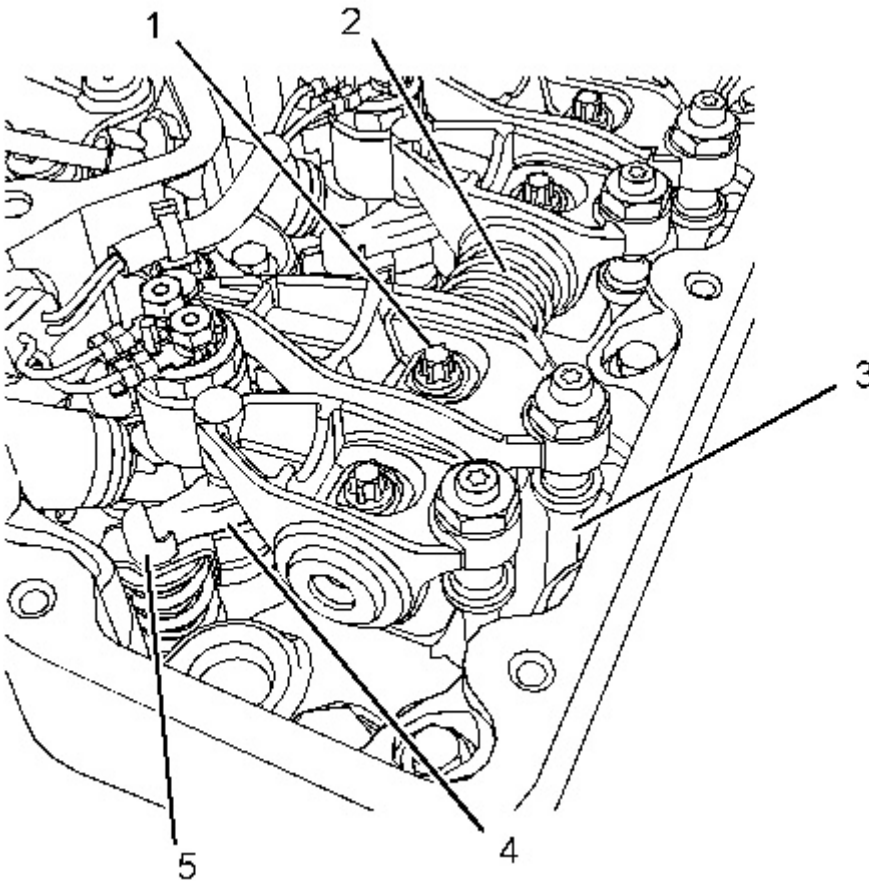


Illustration 2

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Typical example

1. Use Tooling (A) in order to progressively loosen torx screws (1). Begin at the ends of the rocker shaft assembly and work toward the center.

Note: To avoid distortion of the rocker shaft assembly, each torx screw should be loosened by a quarter of a turn at one time. Repeat the procedure until all torx screws are loosened.

2. Remove torx screws (1) from rocker shaft assembly (2).
3. Remove rocker shaft assembly (2) from the cylinder head.
4. Make a temporary mark on pushrods (3) in order to show the location. Remove the pushrods from the cylinder head.

Note: Identification will ensure that the pushrods can be reinstalled in the original positions. Do not interchange the positions of used pushrods.

5. Make a temporary mark on valve bridges (4) in order to show the location and the orientation. Remove the valve bridges from the cylinder head. If the valve bridges are equipped with shrouds (5), ensure that the shrouds are removed from the cylinder head.

Note: Identification will ensure that the valve bridges can be reinstalled in the original location and the original orientation. Do not interchange the location or the orientation of used valve bridges.

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i02930033

Rocker Shaft - Disassemble

SMCS - 1102-015

Disassembly Procedure

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.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Make an identification mark on each rocker arm assembly in order to show the location.

Note: The components must be reinstalled in the original location. Do not interchange components.

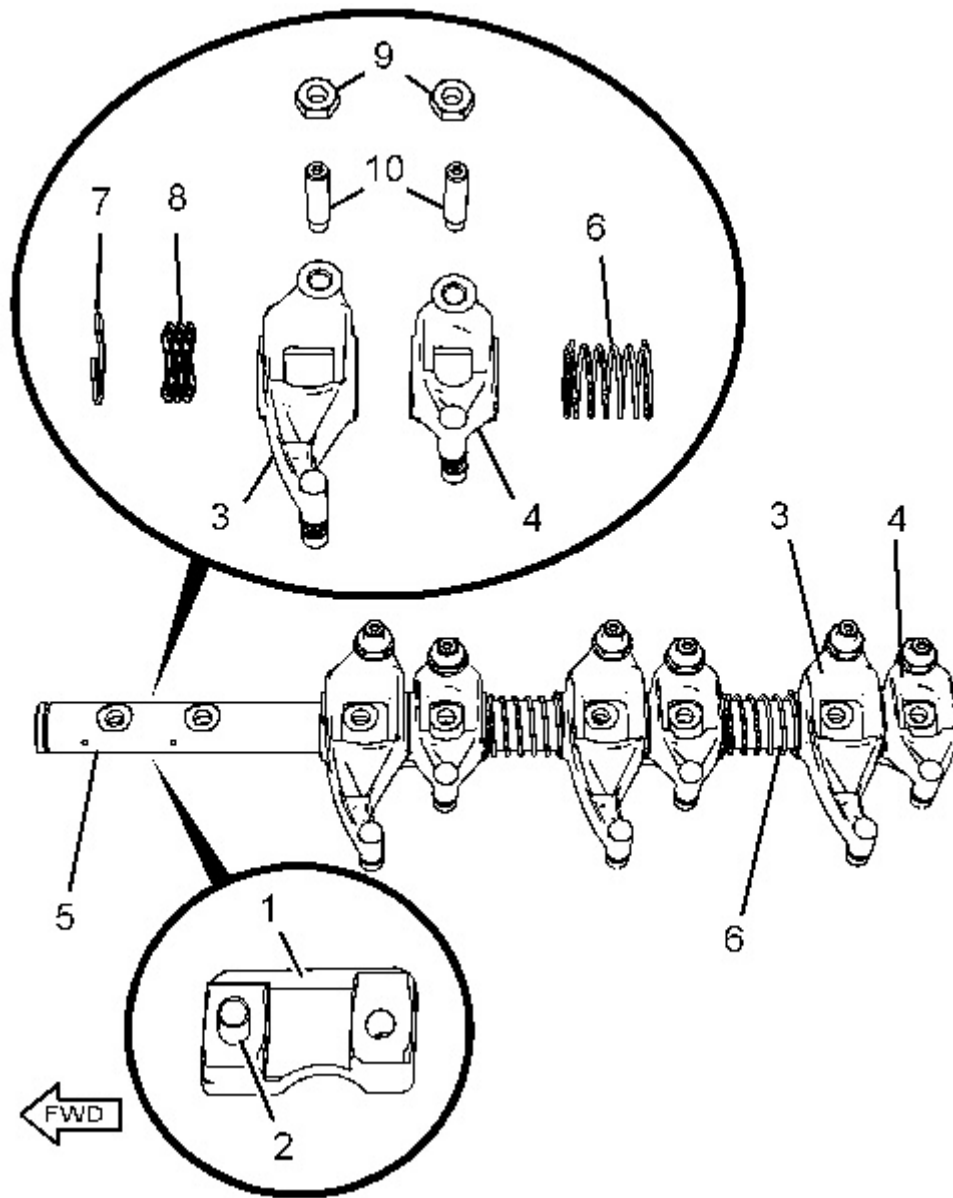


Illustration 1
Typical example

g01476312

2. Remove pedestals (1) from rocker shaft (5). Do not remove dowels (2) from the pedestals.
3. Remove rocker arm assembly (4) for the exhaust valve from rocker shaft (5). Remove rocker arm assembly (3) for the inlet valve from rocker shaft (5). Begin at the rear of the rocker shaft assembly.

Note: The rocker arm assembly for the inlet valve is longer than the rocker arm assembly for the exhaust valve.

4. Remove spring (6) from rocker shaft (5).

- Repeat Step 3 and Step 4 in order to remove the remaining rocker arms from rocker shaft (5).
-

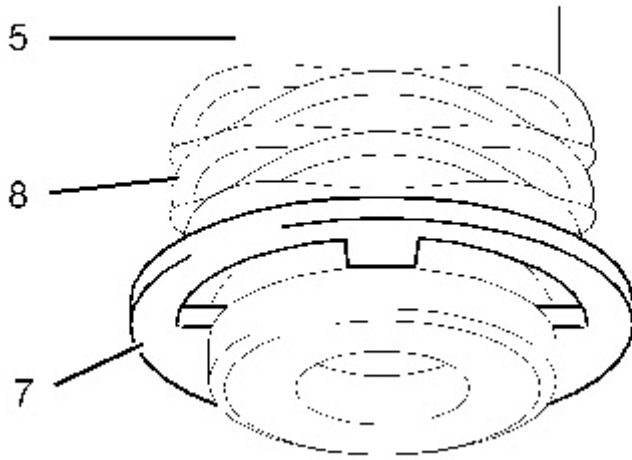


Illustration 2

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- If necessary, remove retaining clip (7) and remove spring (8) from the front end of rocker shaft (5).
- If necessary, remove nuts (9) and adjusters (10) from the rocker arms. Make a temporary identification mark on each adjuster in order to show the location.

Note: The components must be reinstalled in the original location. Do not interchange components.

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i02930032

Rocker Shaft - Assemble

SMCS - 1102-016

Assembly Procedure



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.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

-
1. Ensure that all components are clean and free from wear or damage. Refer to Specifications, "Rocker Shaft" for more information. If necessary, replace any components that are worn or damaged.
-

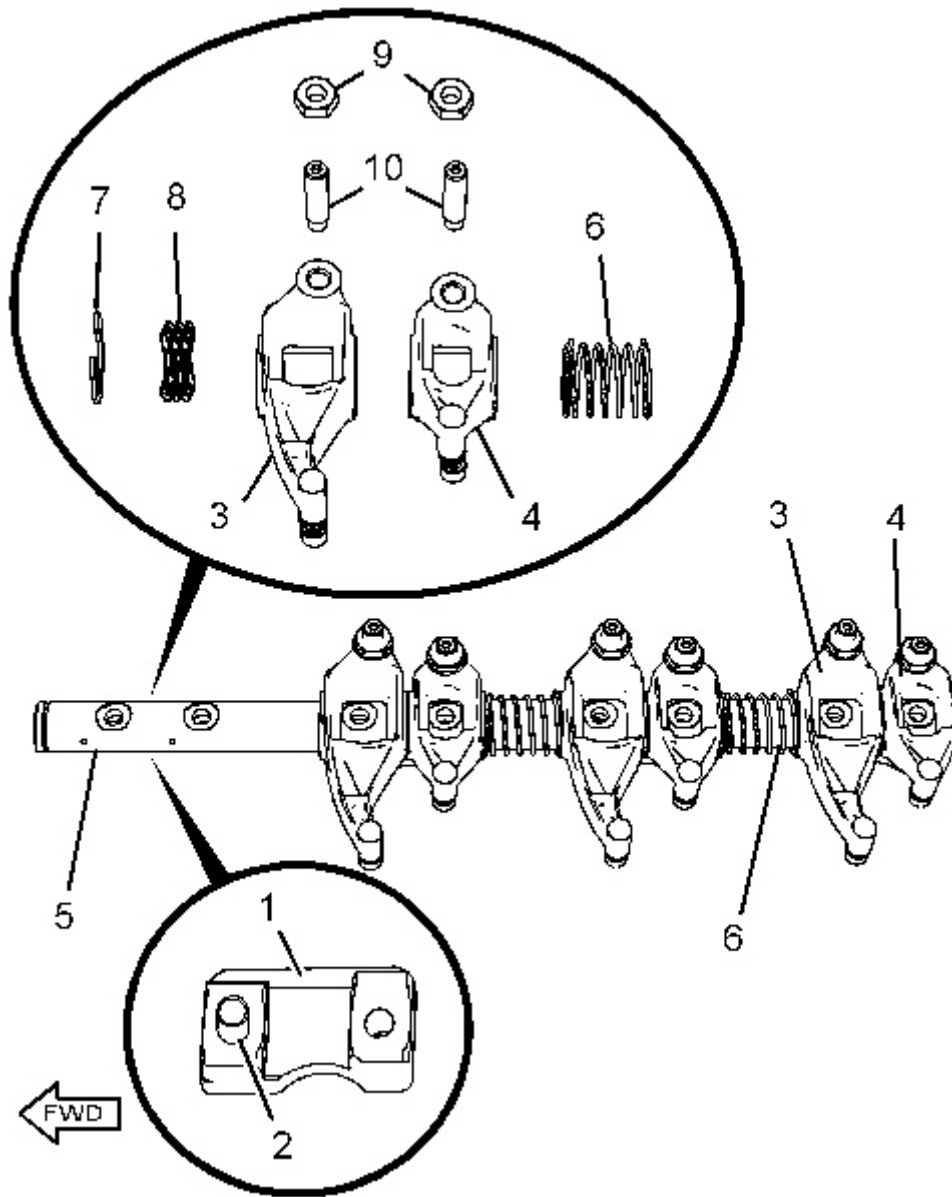


Illustration 1
Typical example

g01476312

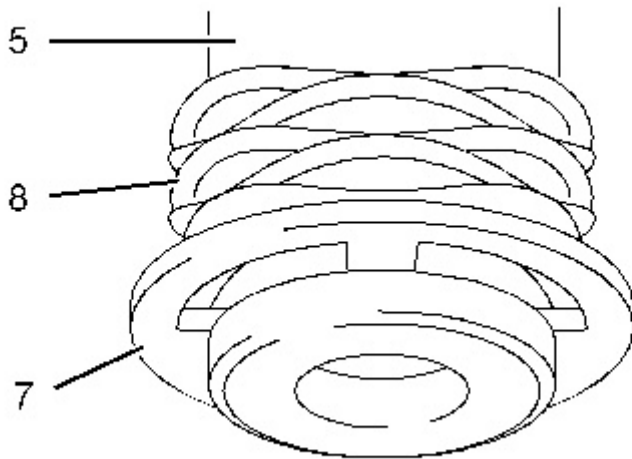


Illustration 2

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2. If necessary, install nuts (9) and adjusters (10) to rocker arm assemblies (3) and (4). If the original adjusters are reused, ensure that the adjusters are installed in the original positions.
3. Install retaining clip (7) and spring (8) to the front end of rocker shaft (5).
4. Lubricate the bores of rocker arm assemblies (3) and (4) and rocker shaft (5) with clean engine oil.
5. Place the rocker shaft in the inverted position with the counterbores for the holes downward. Install rocker arm assembly (3) for number 1 cylinder inlet valves to the rocker shaft. Install rocker arm assembly (4) for number 1 cylinder exhaust valves to rocker shaft (5).

Note: The rocker arms for the inlet valves are longer than the rocker arms for the exhaust valves. Install rocker arms in the inverted position. Used components should be installed in the original location.

6. Ensure that dowel (2) is correctly seated in pedestal (1). Align the dowel with the appropriate hole in rocker shaft (5). Install the pedestal to the rocker shaft.
7. Install spring (6) to rocker shaft (5).
8. Repeat Step 5 through Step 7 in order to assemble the remaining components to rocker shaft (5).

End By:

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

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i02930034

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.
-

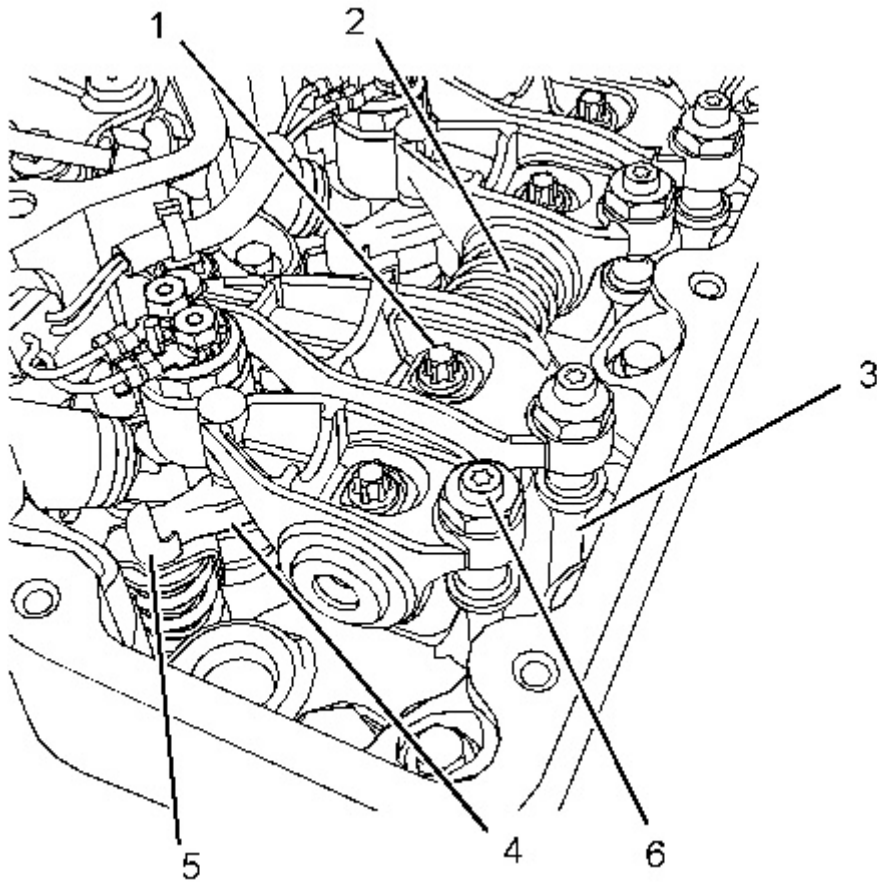


Illustration 1

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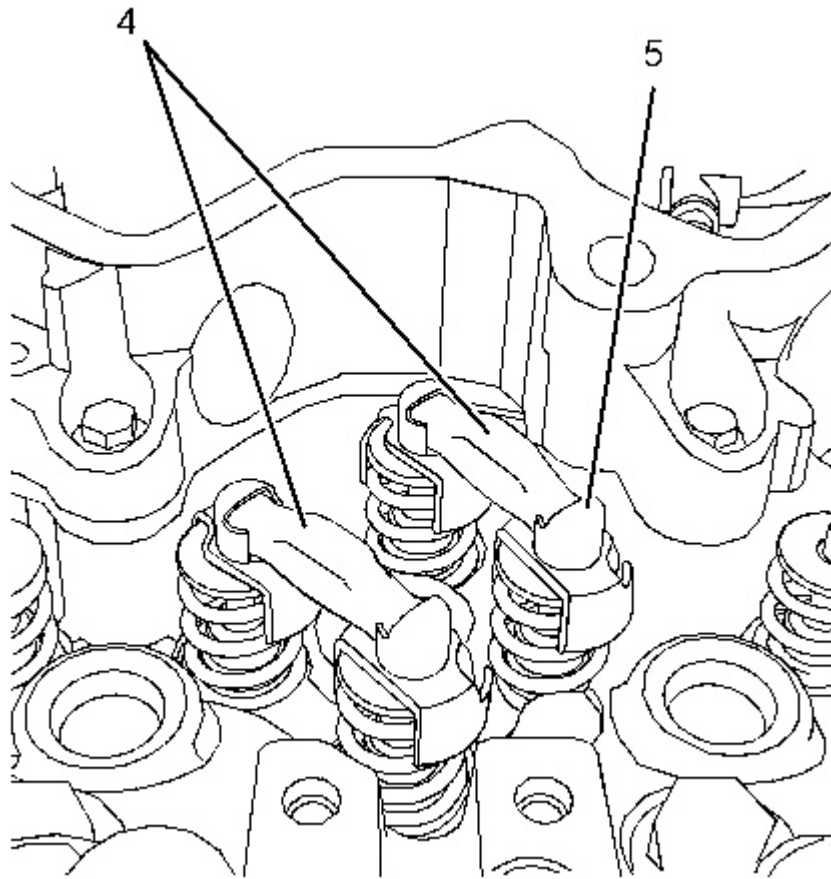


Illustration 2

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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.

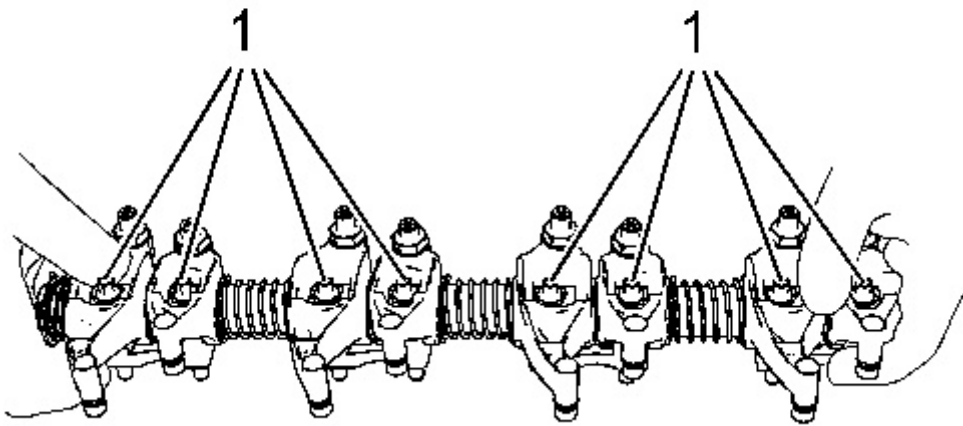


Illustration 3

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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.

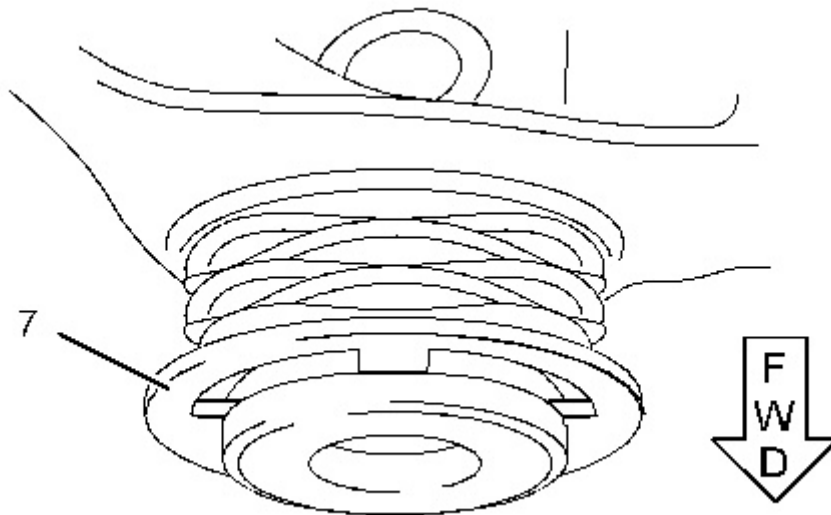


Illustration 4

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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).

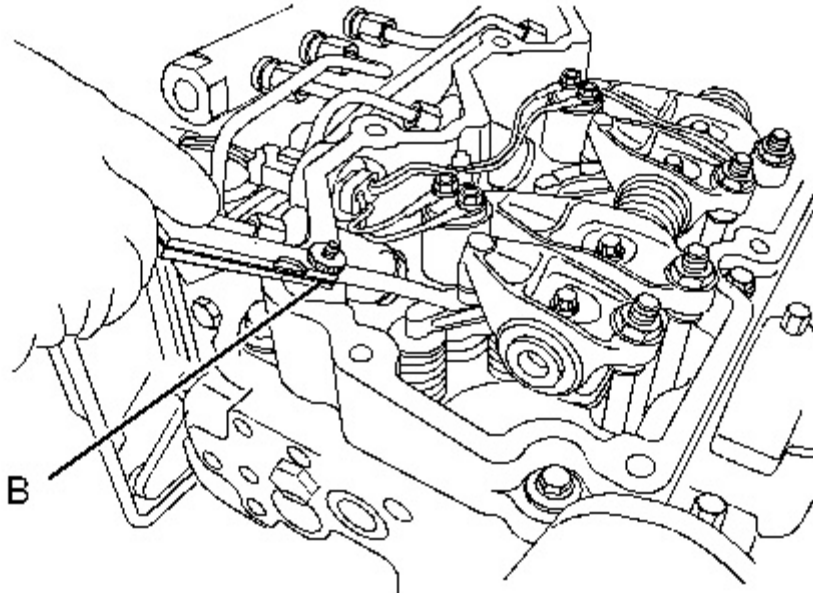


Illustration 5
Typical example

g01259267

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

Media Number -KENR6082-19

Publication Date -01/10/2013

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i02929979

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.

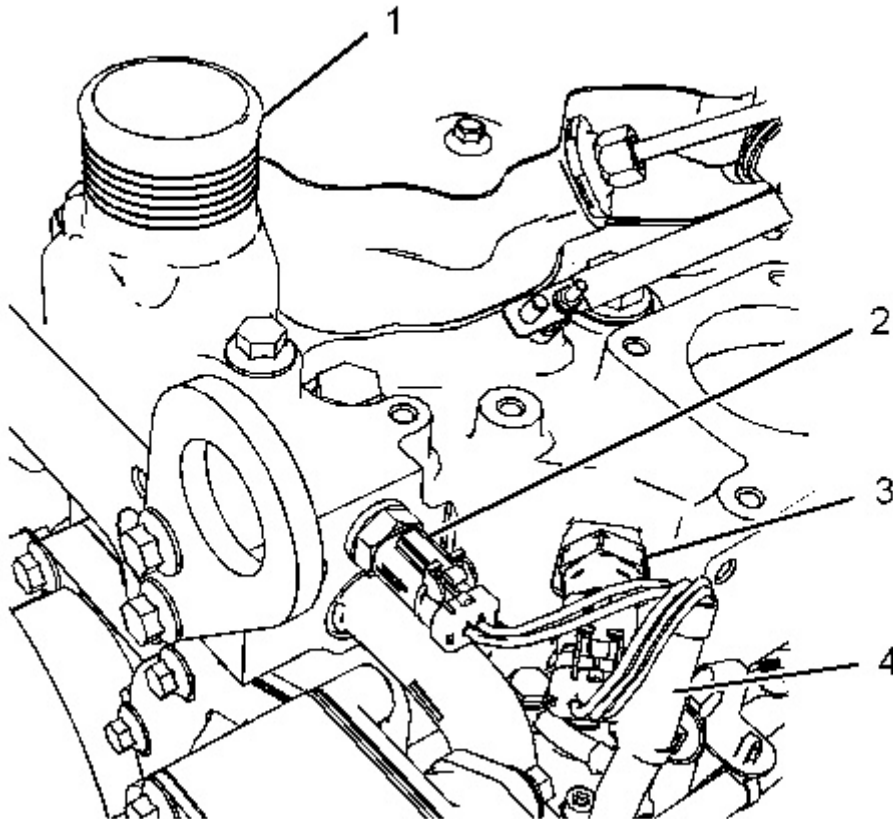
NOTICE

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.

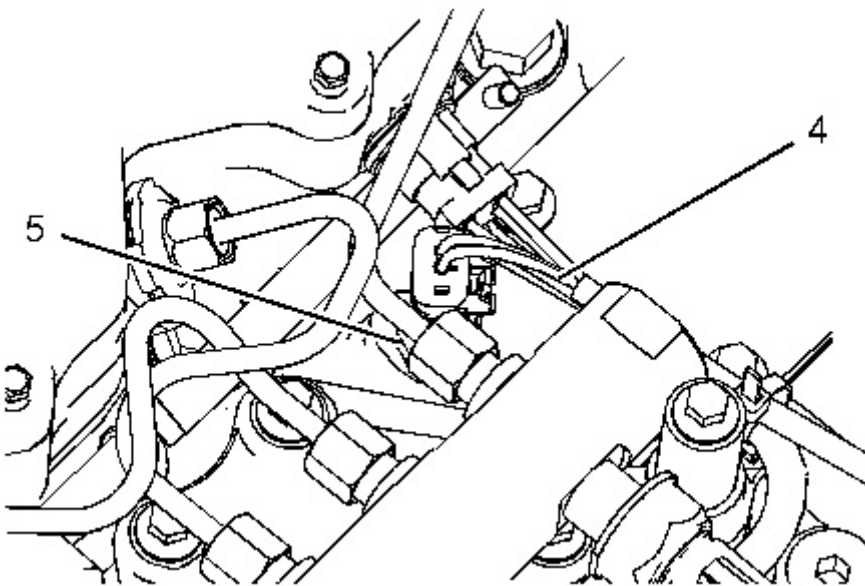
Dispose of all fluids according to local regulations and mandates.

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. This helps to prevent fluid loss and this helps to keep 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.
-



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).
-



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.
-

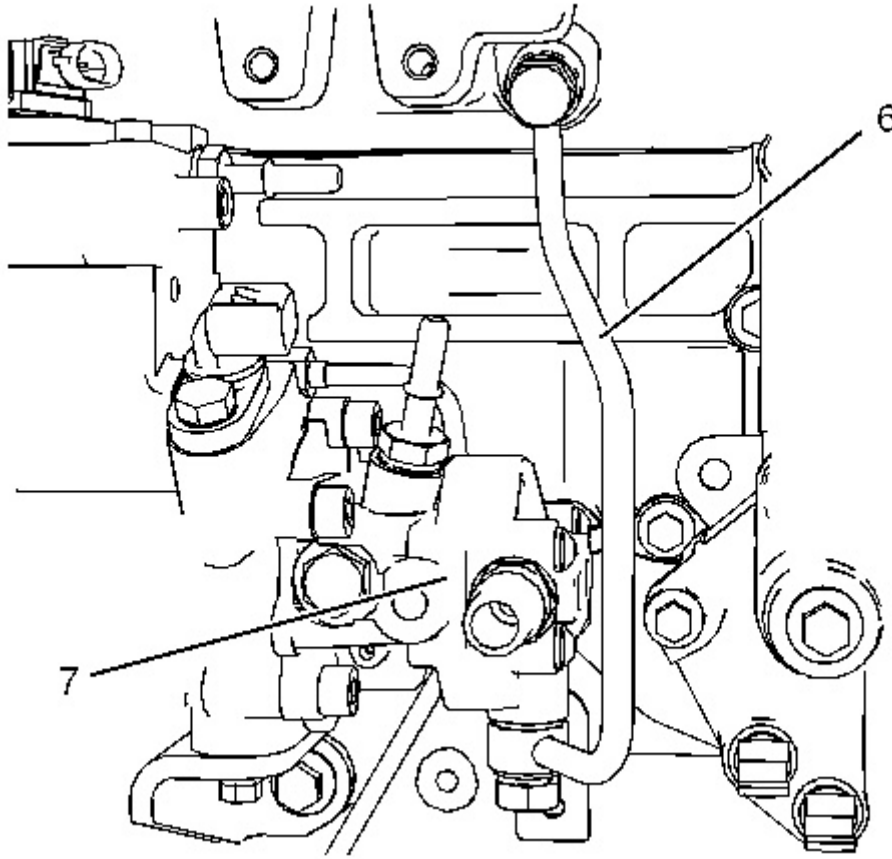


Illustration 3
Typical example

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

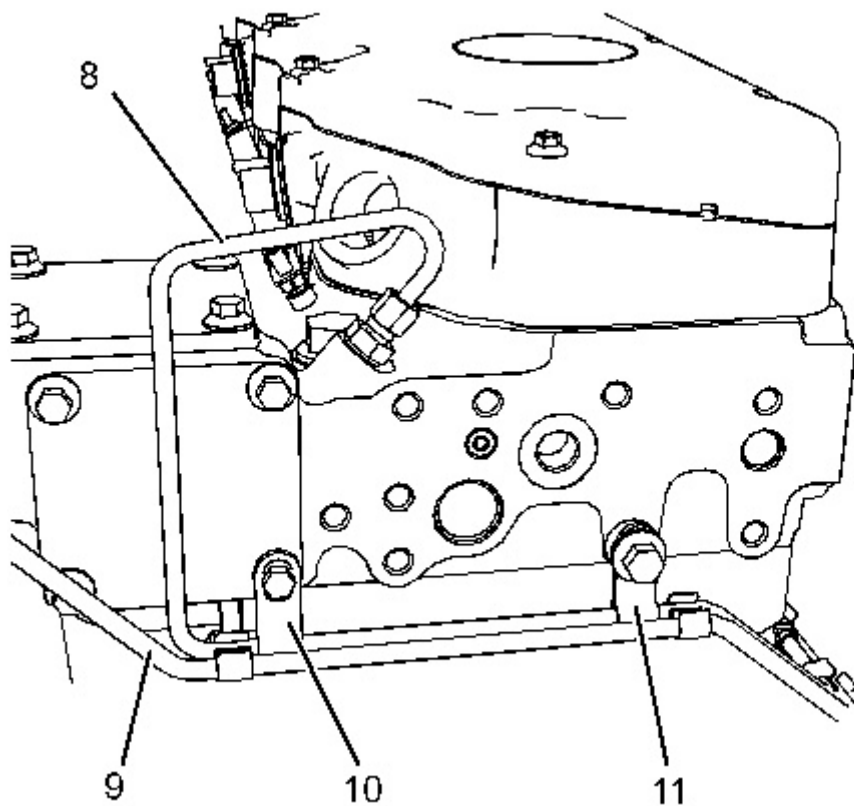


Illustration 4
Typical example

g01249479

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.

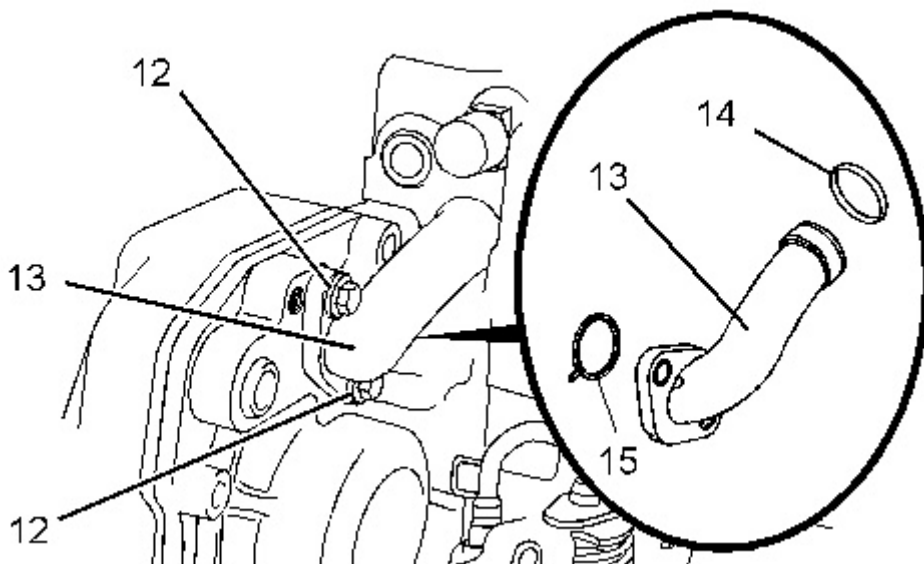


Illustration 5

g01476537

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.

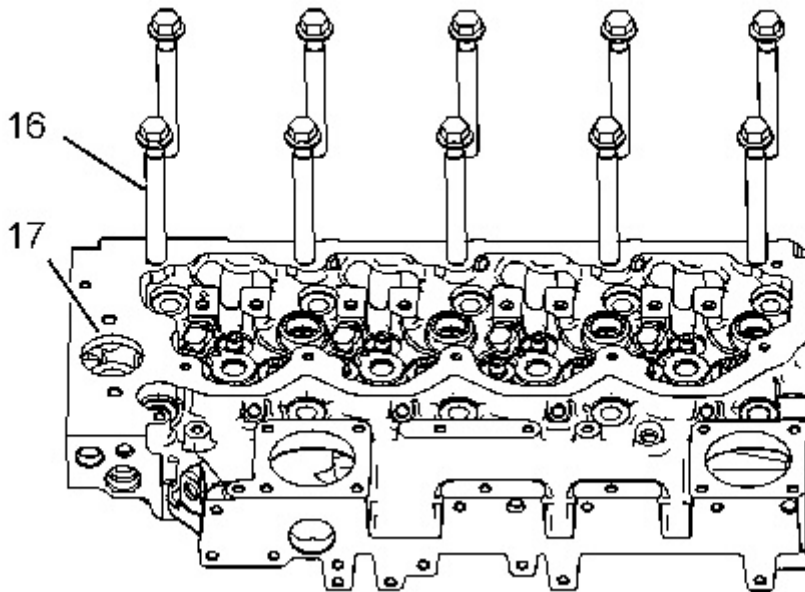


Illustration 6

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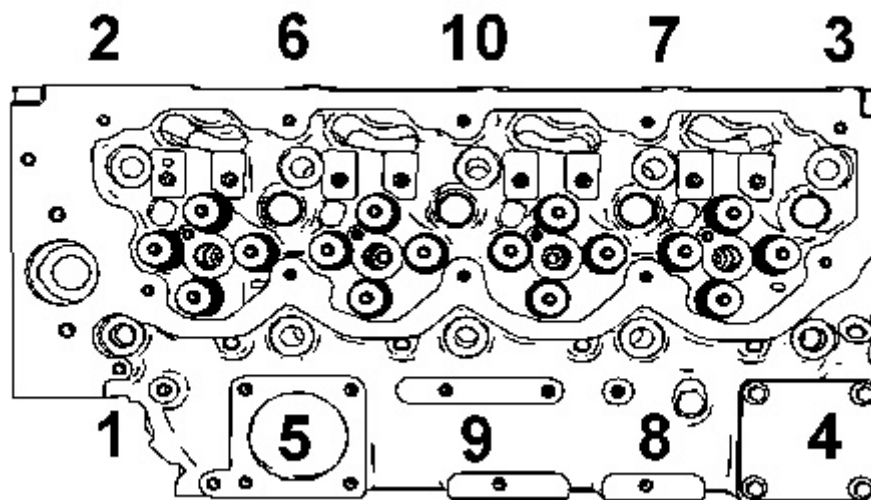


Illustration 7

g01250785

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.

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