

Product: VIBRATORY COMPACTOR

Model: CS-44 VIBRATORY COMPACTOR M4S

Configuration: CS44 CP44 Vibratory Soil Compactor M4S00001-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

i02930024

Inlet and Exhaust Valves - Remove and Install

SMCS - 1105-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6195	Valve Spring Compressor	1
	268-1969	Adapter	1
	276-1221	Head	1

Start By:

- a. Remove the cylinder head. Refer to Disassembly and Assembly, "Cylinder Head - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Clean the bottom gasket surface of the cylinder head. Check the depth of the valves below the face of the cylinder head before the valve springs are removed. Refer to Specifications, "Cylinder Head Valves" for the correct dimensions.

2. Place a temporary identification mark on the heads of the valves in order to identify the correct position. Inlet valves have a recess in the center of the head.

Note: Do not stamp the heads of the valve. Stamping or punching the heads of the valves could cause the valves to fracture.

3. Use a suitable lifting device to position the cylinder head with the valve springs upward. The weight of the cylinder head is approximately 56 kg (125 lb).

Note: Ensure that the cylinder head is kept on a clean, soft surface in order to prevent damage to the machined face.

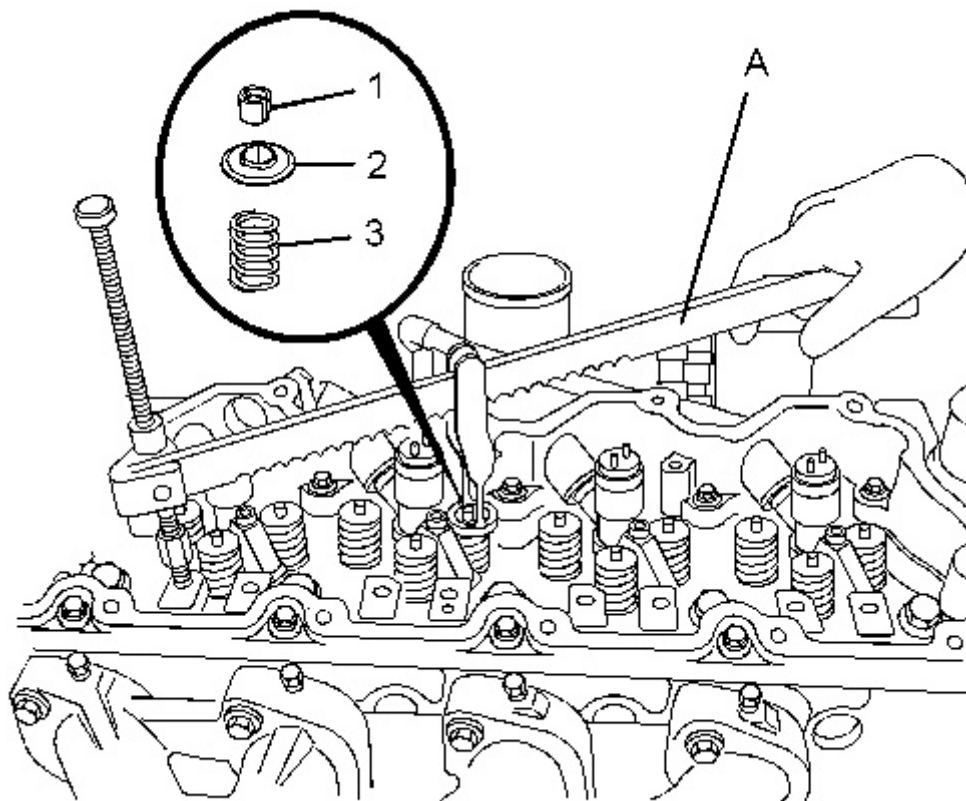


Illustration 1
Typical example

g01469809

! 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.

-
4. Install Tooling (A) in position on the cylinder head in order to compress the appropriate valve spring.
-

NOTICE

Ensure that the valve spring is compressed squarely or damage to the valve stem may occur.

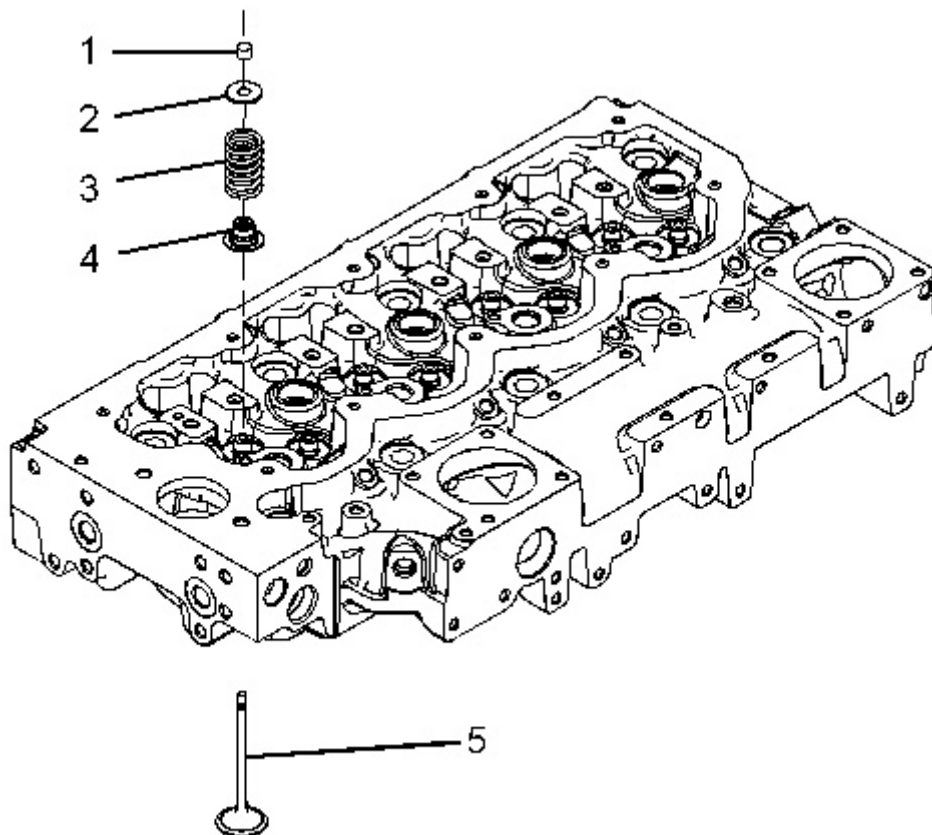


Illustration 2

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5. Apply sufficient pressure to Tooling (A) in order to remove valve keepers (1).

Note: Do not compress the spring so that valve spring retainer (2) touches valve stem seal (4).

6. Slowly release the pressure on Tooling (A).
7. Remove valve spring retainer (2). Remove valve spring (3).
8. Repeat Step 4 through Step 7 for the remaining valves.

9. Remove Tooling (A).
10. Remove valve stem seals (4).
11. Use a suitable lifting device to carefully turn over the cylinder head.
12. Remove valves (5).

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6195	Valve Spring Compressor	1
	268-1969	Adapter	1
	276-1221	Head	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Clean all components of the cylinder head assembly. Ensure that all ports, all coolant passages and all lubrication passages in the cylinder head are free from debris. Follow Step 1.a through Step 1.e in order to inspect the components of the cylinder head assembly. Replace any components that are worn or damaged.
 - a. Inspect the cylinder head for wear and for damage. Refer to Systems Operation, Testing and Adjusting, "Cylinder Head Inspect".
 - b. Inspect the valve seats for wear and for damage. Refer to Specifications, "Cylinder Head Valves" for further information.
 - c. Inspect the valve guides for wear and for damage. Refer to Specifications, "Cylinder Head Valves" and Systems Operation, Testing and Adjusting, "Valve Guide - Inspect" for further information.
 - d. Inspect the valves for wear and for damage. Refer to Specifications, "Cylinder Head Valves".
 - e. Inspect the valve springs for damage and for the correct length. Refer to Specifications, "Cylinder Head Valves".
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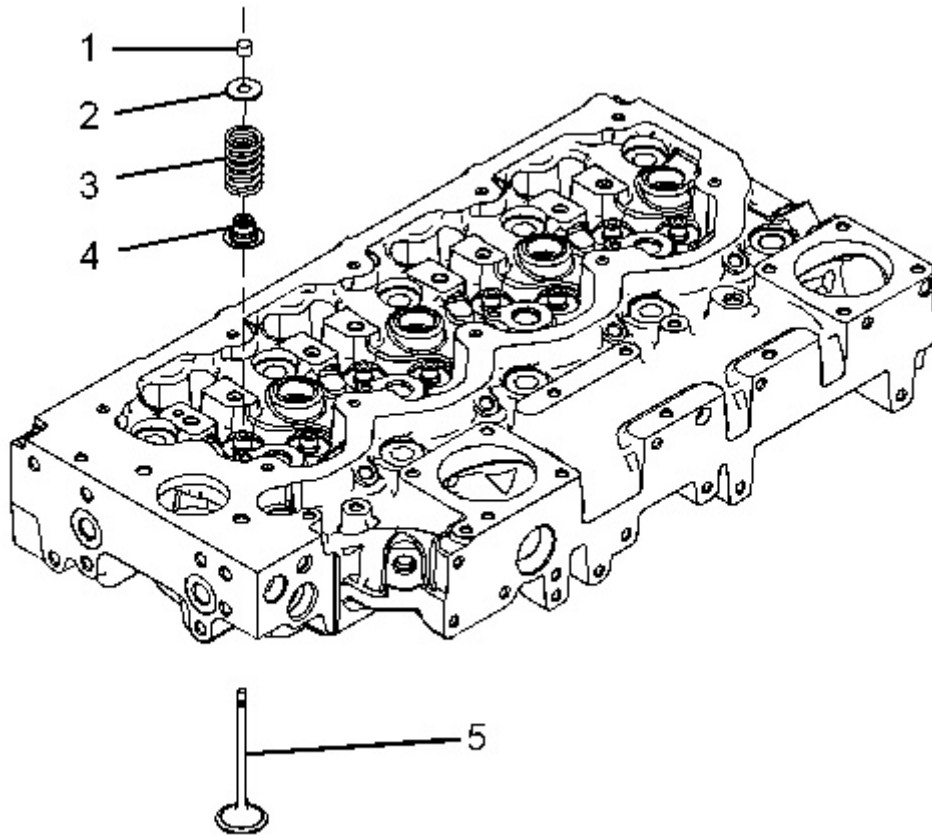


Illustration 3

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2. Lubricate the stems of valves (5) with clean engine oil. Install valves (5) in the appropriate positions in the cylinder head. Check the depth of the valves below the face of the cylinder head. Refer to Systems Operation, Testing and Adjusting, "Valve Depth - Inspect" for more information.
3. Use a suitable lifting device to carefully turn over the cylinder head. The weight of the cylinder head is approximately 56 kg (125 lb).

Note: Ensure that all of the valves remain in place.

4. Install new valve stem seals (4) onto each of the valve guides.

Note: The outer face of the valve guides must be clean and dry before installing the valve stem seals.

5. Install valve spring (3) onto the cylinder head. Position valve spring retainer (2) onto valve spring (3).
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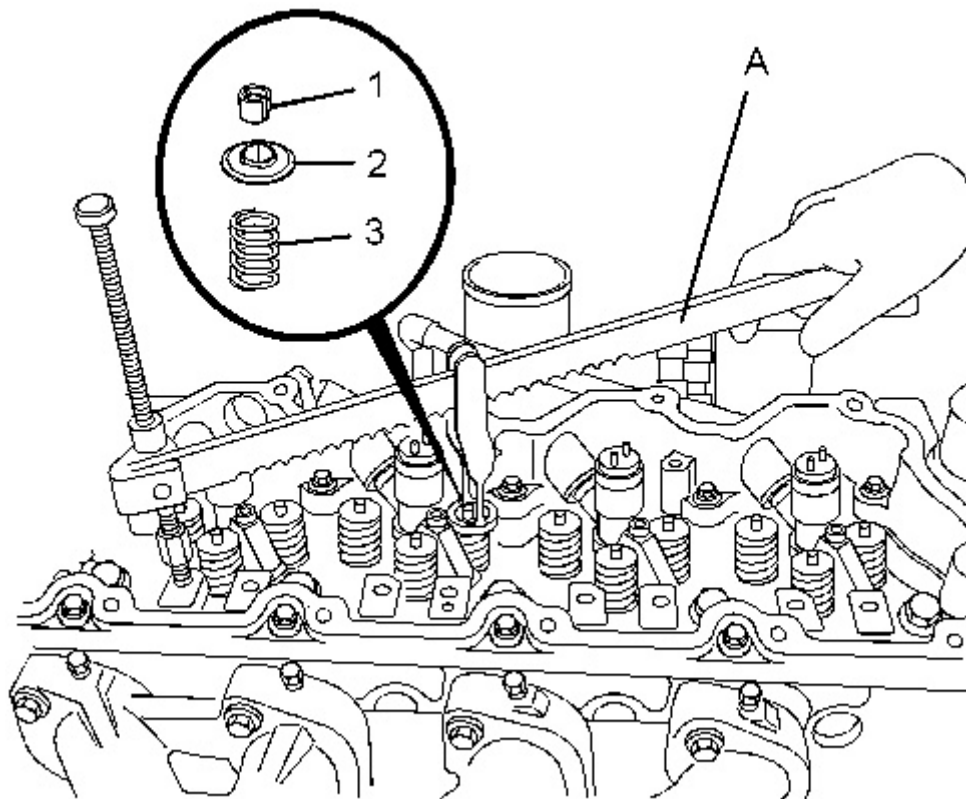


Illustration 4
Typical example

g01469809

! 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.

-
6. Install Tooling (A) in the appropriate position on the cylinder head in order to compress valve spring (3).

NOTICE

Ensure that the valve spring is compressed squarely or damage to the valve stem may occur.

7. Apply sufficient pressure to Tooling (A) in order to install valve keepers (1).

Note: Do not compress the spring so that valve spring retainer (2) touches valve stem seal (4).



The valve spring keepers can be thrown from the valve when the valve spring compressor is released. Ensure that the valve spring keepers are properly installed on the valve stem. To help prevent personal injury, keep away from the front of the valve spring keepers and valve springs during the installation of the valves.

8. Carefully release the pressure on Tooling (A).

9. Repeat Step 5 through Step 8 for the remaining valves.

10. Remove Tooling (A) from the cylinder head.

11. Use a suitable lifting device to position the cylinder head on a support. Ensure that the heads of the valves are not obstructed.

End By:

a. Install the cylinder head. Refer to Disassembly and Assembly, "Cylinder Head - 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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i02929987

Engine Oil Filter Base - Remove and Install

SMCS - 1306-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	185-3630	Strap Wrench As	1

Note: The oil filter may be installed vertically or the oil filter may be installed horizontally.

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.

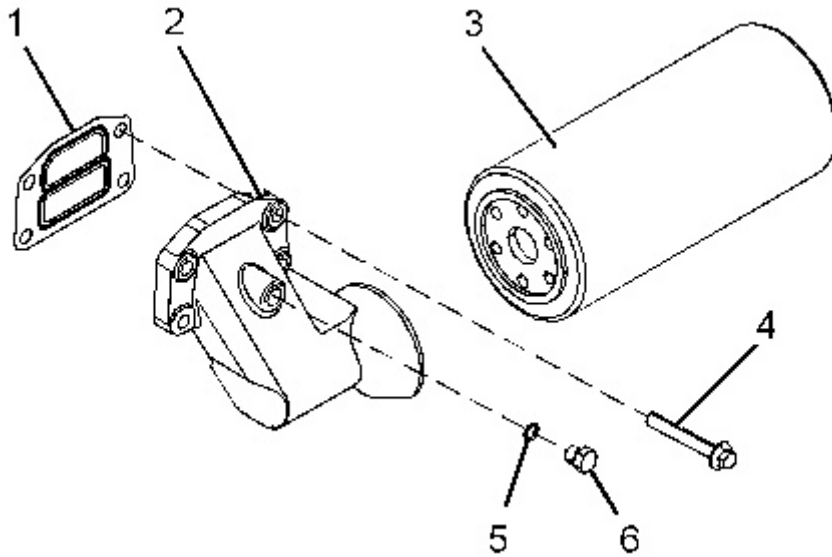


Illustration 1

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Typical example

1. Use Tooling (A) to remove engine oil filter (3). Refer to Operation and Maintenance Manual, "Engine Oil and Filter - Change".
2. If the engine oil pressure sensor is located in the engine oil filter base, remove the engine oil pressure sensor. Refer to Disassembly and Assembly, "Engine Oil Pressure Sensor - Remove and Install".
3. Remove bolts (4) and remove engine oil filter base (2).
4. Remove gasket (1).
5. If the engine oil filter base has a spacer plate, remove the spacer plate and remove the gasket.

Note: mark the orientation of the spacer plate.

6. If necessary, remove plug (6) from engine oil filter base (2). Remove O-ring seal (5) from the plug.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
B	4C-4030	Thread Lock Compound	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

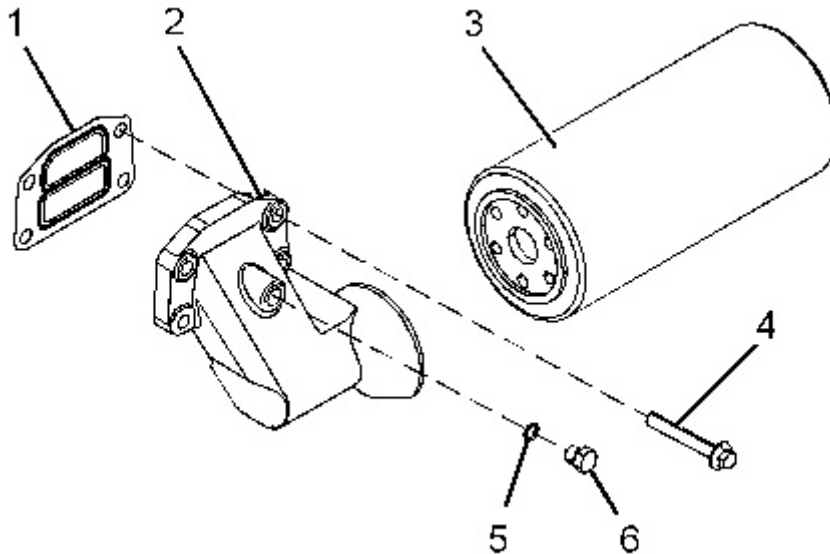


Illustration 2

g01254186

Typical example

1. Ensure that the engine oil filter base is clean. Clean the faces of the cylinder block.
 2. If necessary, install a new O-ring seal (5) to plug (6). Install plug (6) to engine oil filter base (2). Tighten the plug to a torque of 12 N·m (106 lb in).
 3. Install bolts (4) to engine oil filter base (2).
 4. Install a new gasket (1) onto bolts (4). If the engine oil filter base has a spacer plate, install the spacer plate and a new gasket onto the bolts.
- Note:** Ensure the correct orientation of spacer plate.
5. Apply Tooling (B) to the threads of the bolts. Install the assembly of the engine oil filter base to the cylinder block.
 6. Tighten bolts (4) to a torque of 22 N·m (16 lb ft).
 7. If the engine oil pressure sensor is located in the engine oil filter base, Install the engine oil pressure sensor. Refer to Disassembly and Assembly, "Engine Oil Pressure Sensor - Remove and Install".

8. Install a new engine oil filter (3). If necessary, fill the engine oil pan to the correct level that is indicated on the oil level gauge. Refer to Operation and Maintenance Manual, "Engine Oil and Filter - Change".
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Disassembly and Assembly

C4.4 Engines for Caterpillar Built Machines

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Publication Date -01/10/2013

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i02929986

Engine Oil Cooler - Remove

SMCS - 1378-011

Removal Procedure

Start By:

- a. Remove the bracket for the Electronic Control Module. Refer to Disassembly and Assembly, "ECM Mounting Bracket - Remove and Install".

NOTICE

Ensure that all adjustments and repairs that are carried out to the fuel system are performed by authorized personnel that have the correct training.

Before beginning ANY work on the fuel system, refer to Operation and Maintenance Manual, "General Hazard Information and High Pressure Fuel Lines" for safety information.

Refer to Systems Operation, Testing and Adjusting Manual, "Cleanliness of Fuel System Components" for detailed information on the standards of cleanliness that must be observed during ALL work on the fuel system.

NOTICE

Keep all parts clean from contaminants.

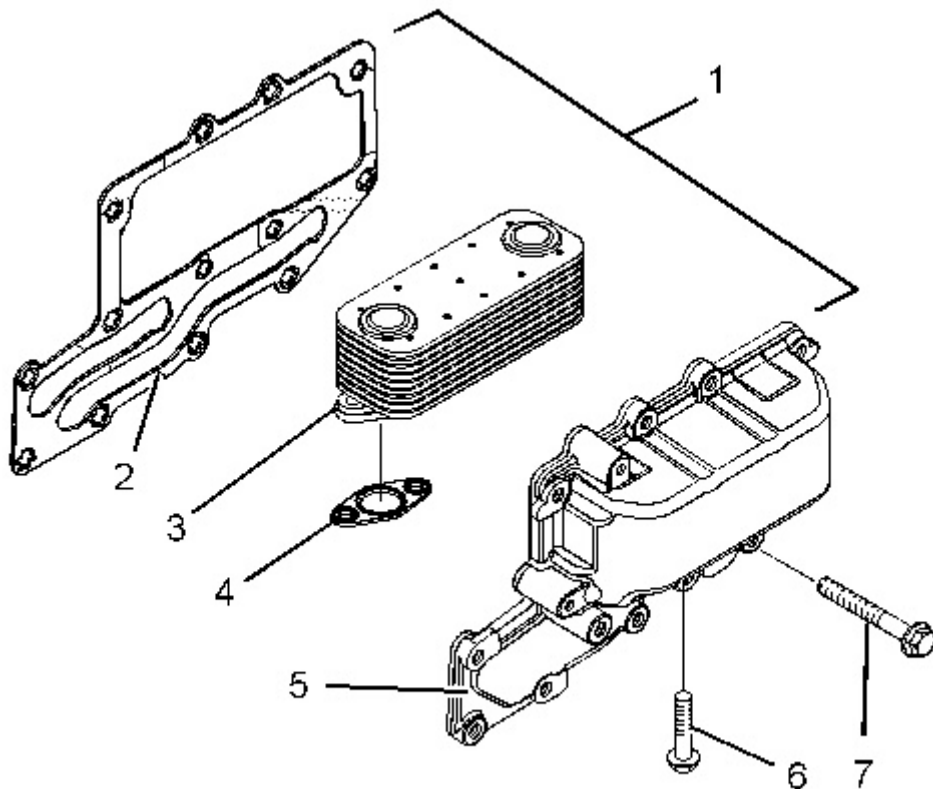
Contaminants may cause rapid wear and shortened component life.

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.

1. Drain the coolant from the cooling system into a suitable container. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct procedure.
 2. Drain the engine lubricating oil into a suitable container. Refer to Operation and Maintenance Manual, "Engine Oil and Filter - Change" for the correct procedure.
 3. If necessary, remove the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install".
 4. Position the engine wiring harness away from the assembly of oil cooler (1). If necessary, cut the cable strap.
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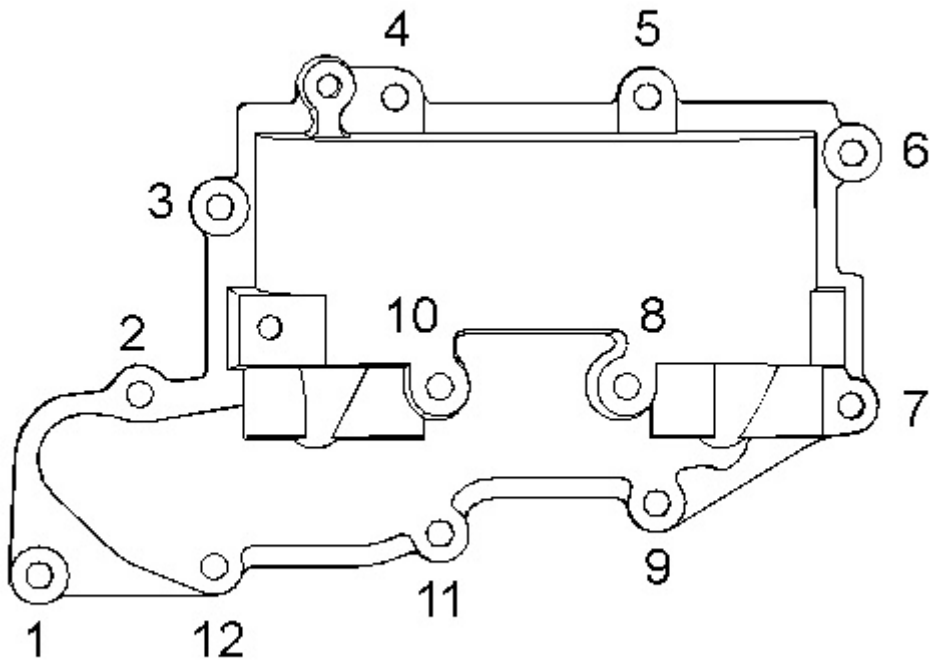


Illustration 2
Tightening sequence for the engine oil cooler

5. Loosen bolts (7) in reverse numerical order to the sequence that is shown in Illustration 2. Remove bolts (7). Support the assembly of engine oil cooler (1) as the bolts are removed.

Note: Bolts of different lengths are installed. Note the correct position of the bolts. Note the position of any brackets that are secured by the bolts. Do not remove bolts (6) at this time.

6. Remove the assembly of oil cooler (1) from the cylinder block.
7. Remove gasket (2).
8. Follow Step 8.a through Step 8.c in order to disassemble the engine oil cooler.
 - a. Remove bolts (6).
 - b. Remove cooler matrix (3) from housing (5).
 - c. Remove gaskets (4).

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Publication Date -01/10/2013

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i02929985

Engine Oil Cooler - Install

SMCS - 1378-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

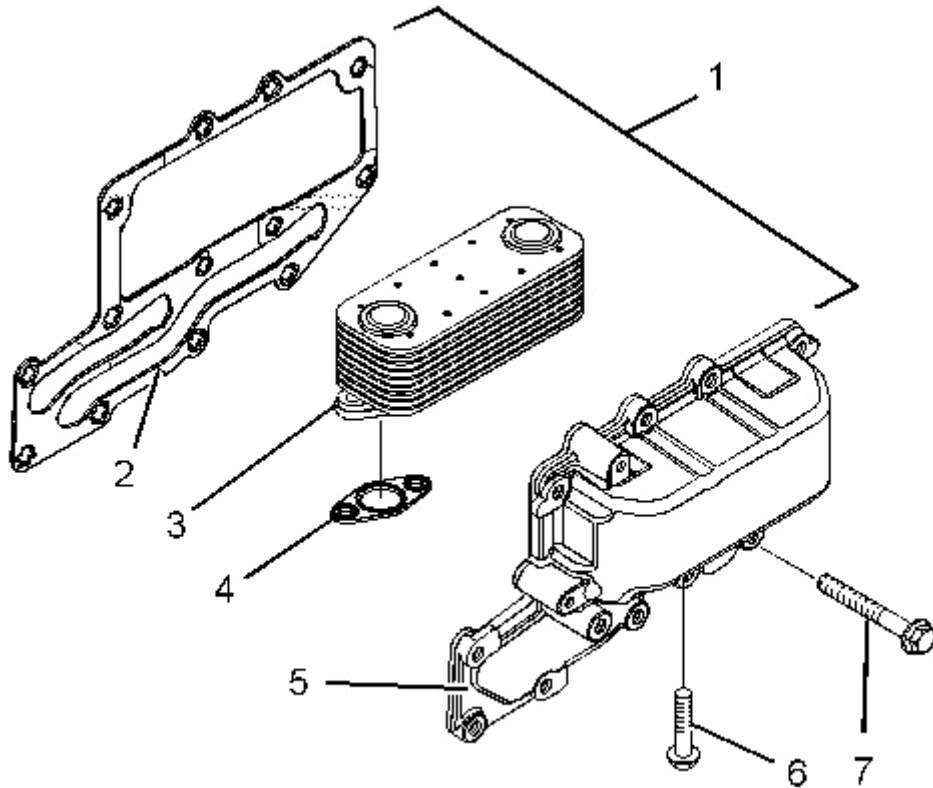


Illustration 1
Typical example

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1. Follow Step 1.a through Step 1.c in order to assemble the engine oil cooler.
 - a. Ensure that cooler matrix (3) is clean and free from damage. Ensure that housing (5) is clean and free from damage. Replace any damaged components.
 - b. Position new gasket (4) onto housing (5). Install cooler matrix (3).
 - c. Install bolts (6) finger tight.
 2. Clean the face of the cylinder block.
 3. Install bolts (7) to the engine oil cooler.
- Note:** The bolts are different lengths. Ensure that the different bolts are installed in the correct location. Ensure that any brackets that are secured by the bolts are installed in the correct location.
4. Install a new gasket (2) to the assembly of oil cooler (1). Push bolts (7) through the holes in the gasket.

Note: The holes in the gasket have serrations that hold the bolts captive.

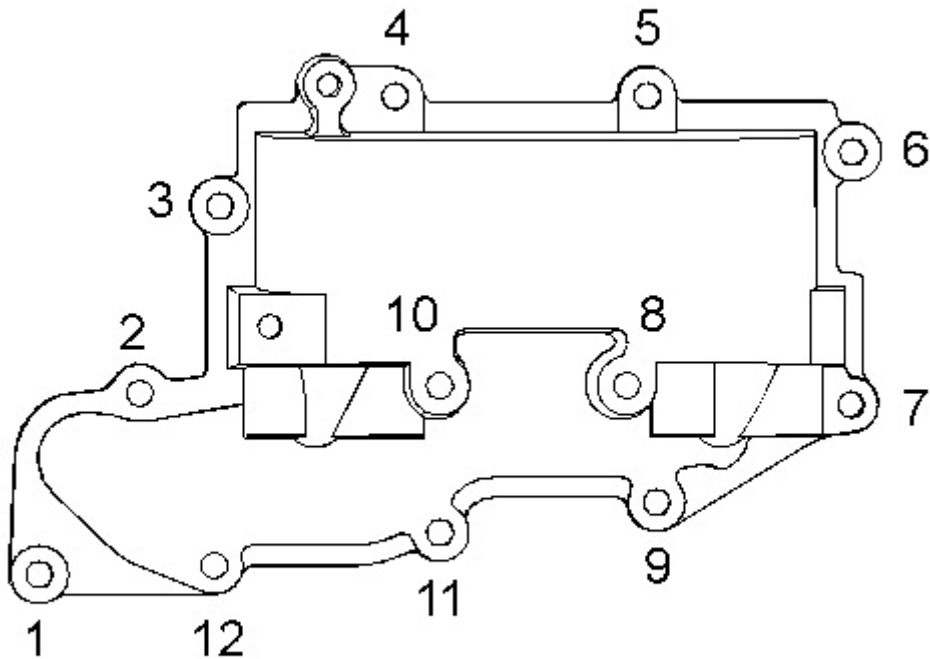


Illustration 2

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Tightening sequence for the engine oil cooler

5. Install the assembly of oil cooler (1) to the cylinder block. Tighten bolts (7) to a torque of 22 N·m (16 lb ft). Tighten the bolts in the sequence that is shown in Illustration 2.

Tighten bolts (6) to a torque of 22 N·m (16 lb ft). Refer to Illustration 1.

6. Place the engine wiring harness in the correct position. If necessary, install a new cable strap.
7. If necessary, Install the electric starting motor. Refer to Disassembly and Assembly, "Electric Starting Motor - Remove and Install".
8. Fill the cooling system to the correct level. Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct procedure.
9. Fill the engine oil pan to the correct level. Refer to Operation and Maintenance Manual, "Engine Oil and Filter - Change" for the correct procedure.

End By:

- a. Install the bracket for the Electronic Control Module. Refer to Disassembly and Assembly, "ECM Bracket - Remove and Install".
-

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Disassembly and Assembly C4.4 Engines for Caterpillar Built Machines

Media Number -KENR6082-19

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i02929993

Engine Oil Relief Valve - Remove and Install - Engines Without a Balancer Unit

SMCS - 1315-010

Removal Procedure

Table 1

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

Start By:

- Remove the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

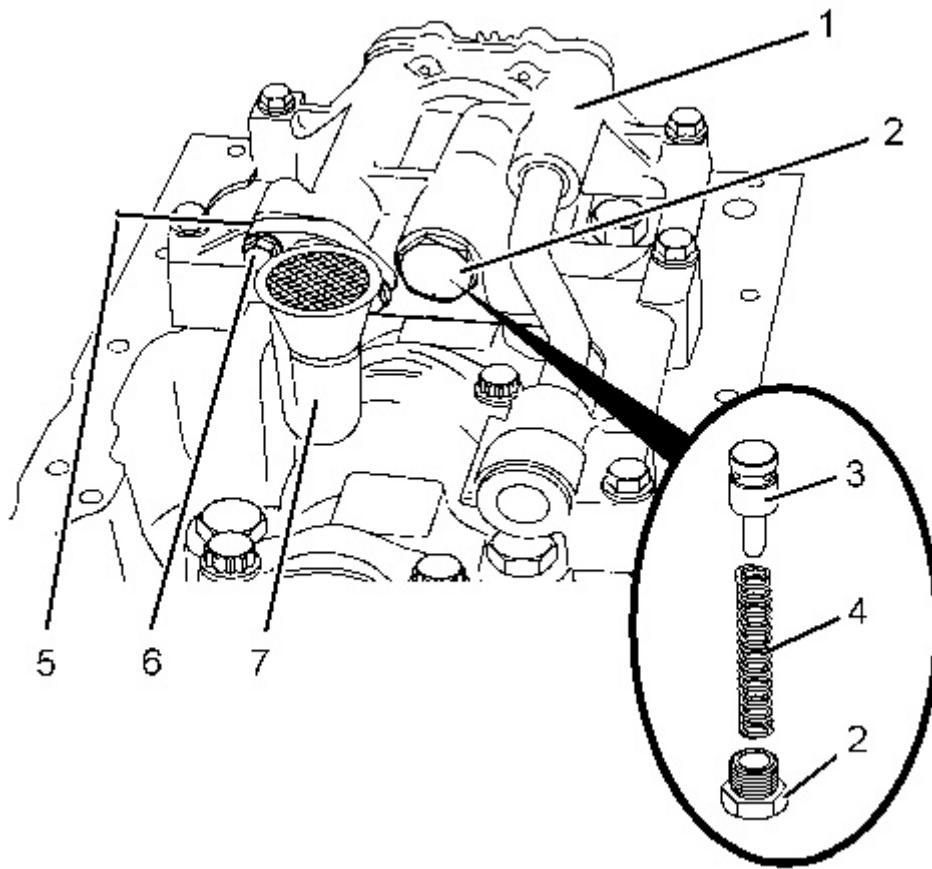


Illustration 1
Typical example

g01470289

 **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.

1. Remove bolts (6) and suction pipe (7).
2. Remove gasket (5) (not shown) from the suction pipe .
3. Loosen cap (2). Carefully remove cap (2) from the housing of engine oil pump (1).

Note: The spring force will be released when the cap is removed.

4. Remove spring (4) from the bore for the relief valve in the housing of engine oil pump (1).

5. Use Tooling (A) to remove plunger (3) from the bore for the relief valve in the housing of engine oil pump (1).

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

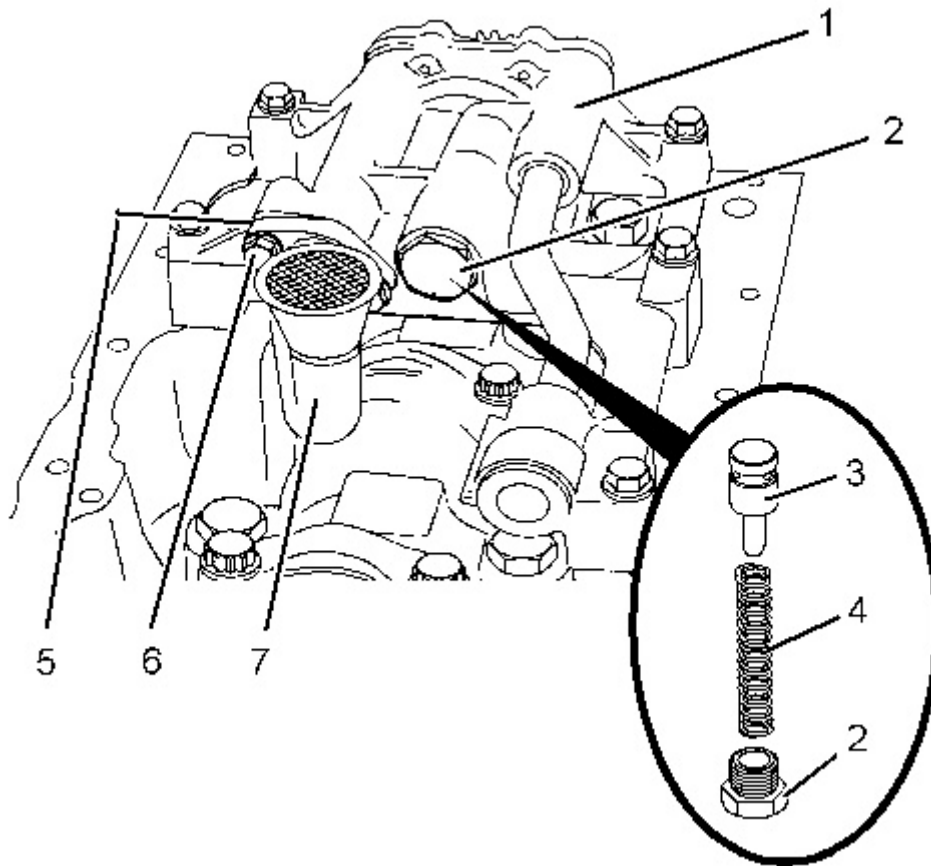


Illustration 2

g01470289

Typical example

 **WARNING**

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.

1. Ensure that all components are clean and free from wear or damage. If necessary, replace any components that are worn or damaged. If the bore for the relief valve in the housing of engine oil pump (1) is worn or damaged, the complete assembly of the engine oil pump must be replaced.
2. Lubricate plunger (3) with clean engine oil. Use long nose pliers to install plunger (3) and spring (4) into the bore for the relief valve in the housing of engine oil pump (1).

Note: The plunger must slide freely in the bore for the relief valve.

3. Install cap (2) to engine oil pump (1). Tighten the cap to a torque of 45 N·m (33 lb ft).

Note: Ensure that the spring is properly located inside the plunger and the cap.

4. Install suction pipe (7) and a new gasket (5) (not shown) to the assembly of the engine oil pump.
5. Install bolts (6). Tighten the bolts to a torque to 22 N·m (16 lb ft).

End By:

- a. Install the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - 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

Date Updated -21/10/2013

i02929992

Engine Oil Relief Valve - Remove and Install - Engines with a Balancer Unit

SMCS - 1315-010

Removal Procedure

Table 1

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

Start By:

- Remove the engine oil pan. Refer to Disassembly and Assembly , "Engine Oil Pan - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

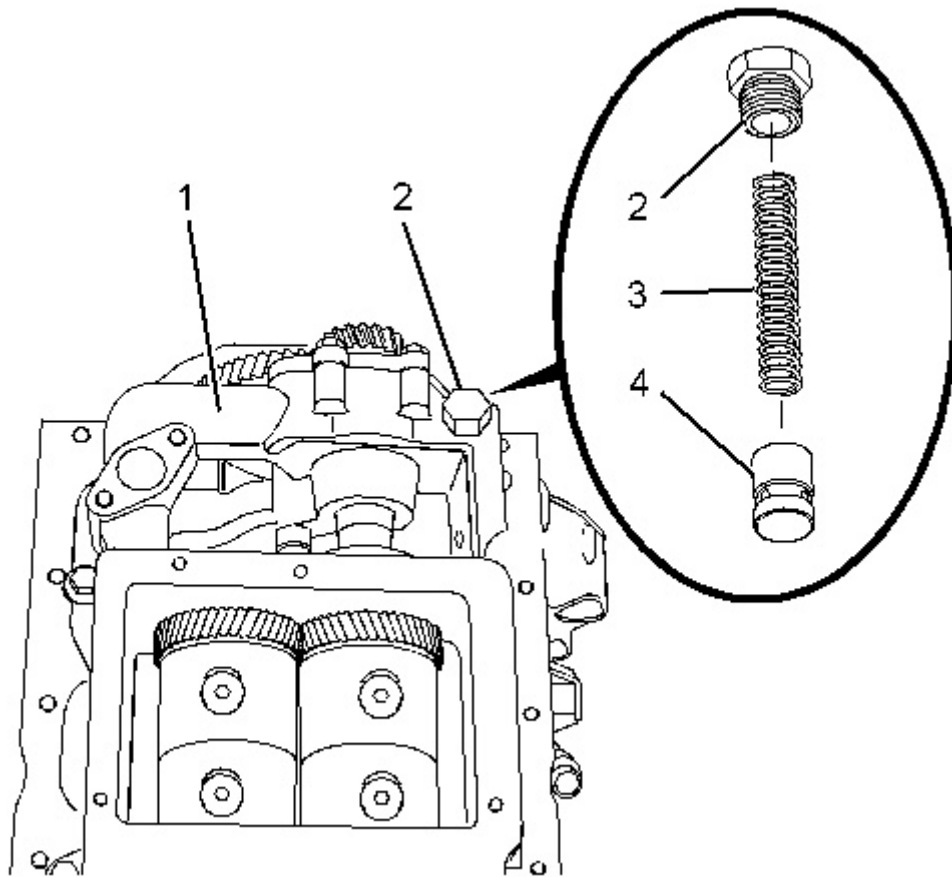


Illustration 1
Typical example

g01470291

! 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.

1. Loosen cap (2). Carefully remove the cap from balancer (1).

Note: The spring force will be released when the cap is removed.

2. Remove spring (3) from the bore for the relief valve in balancer (1).
3. Use Tooling (A) in order to remove plunger (4) from the bore for the relief valve in balancer (1).

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7262	Telescopic Magnet	1
B	4C-4030	Thread Lock Compound	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

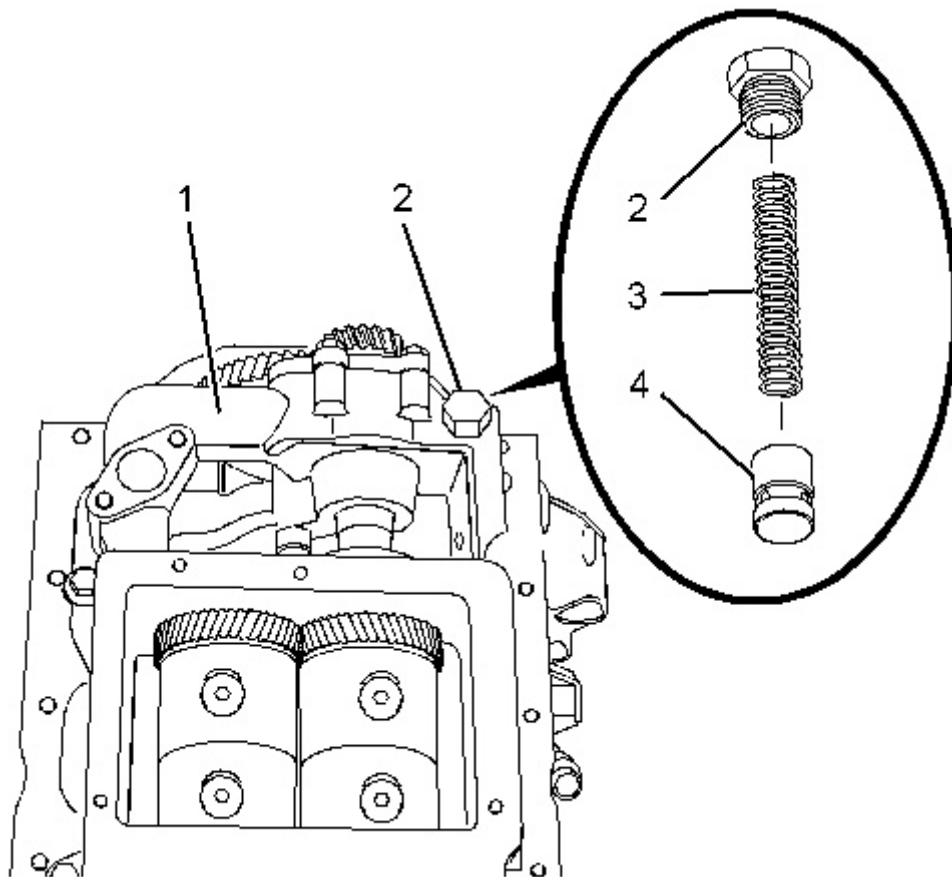


Illustration 2
Typical example

g01470291



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.

1. Ensure that all components are clean and free from wear or damage. If necessary, replace any components that are worn or damaged. If the bore for the relief valve in balancer (1) is worn or damaged, the complete assembly of the balancer must be replaced.
2. Lubricate plunger (4) with clean engine oil. Install plunger (4) and spring (3) into the bore for the relief valve in balancer (1).

Note: The plunger must slide freely in the bore for the relief valve.

3. Apply Tooling (B) to the threads of cap (2). Install cap (2) to balancer (1). Tighten the cap to a torque of 21 N·m (15.5 lb ft).

Note: Ensure that the spring is properly located inside the plunger and the cap. Ensure that Tooling (B) does not contaminate the bore for the relief valve in balancer (1).

End By:

- a. Install the engine oil pan. Refer to Disassembly and Assembly, "Engine Oil Pan - Remove and Install".
-

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