

Product: COMPACT WHEEL LOADER

Model: 908M COMPACT WHEEL LOADER H88

Configuration: 908M Compact Wheel Loader H8800001-UP (MACHINE) POWERED BY C3.3B Engine

Disassembly and Assembly

C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07

Publication Date -01/09/2014

Date Updated -11/07/2016

i05224034

Inlet and Exhaust Valve Springs - Remove and Install

SMCS - 1108-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	7F-4292	Valve Spring Compressor	1
	9U-6144	Adapter	1

Start By:

- a. Remove the rocker shaft and push rod.

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

Note: The following procedure should be adopted in order to remove the valve springs when the cylinder head is installed to the engine. Refer to Disassembly and Assembly, "Inlet and Exhaust Valves - Remove and Install" for the procedure to remove the valve springs from a cylinder head that has been removed from the engine.

Note: Ensure that the appropriate piston is at top dead center before the valve spring is removed. Failure to ensure that the piston is at top dead center may allow the valve to drop into the cylinder bore.

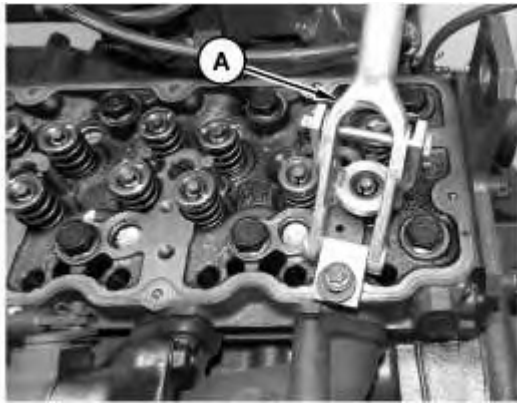


Illustration 1

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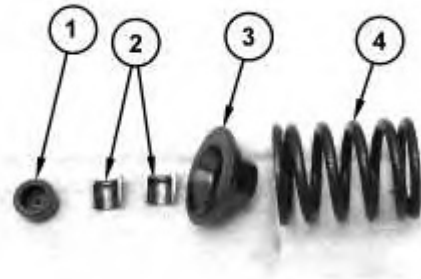


Illustration 2

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 **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

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

1. Follow Step 1.a through Step 1.d in order to position the appropriate piston at top dead center.

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

b. Use Tooling (A) in order to compress valve spring (4) and open the valve slightly.

Note: Do not compress the spring so that valve spring retainer (3) touches the valve stem seal.

c. Rotate the crankshaft carefully, until the piston touches the valve.

Note: Do not use excessive force to turn the crankshaft. The use of force can result in bent valve stems.

d. Continue to rotate the crankshaft and gradually release the pressure on Tooling (A) until the piston is at the top dead center position. The valve is now held in a position that allows the valve spring to be safely removed.

Note: If all valve springs require replacement, the procedure can be carried out on two cylinders at the same time. The procedure can be carried out on the following pairs of cylinders. 1 with 4 and 2 with 3. Ensure that all of the valve springs are installed before changing from one pair of cylinders to another pair of cylinders.

NOTICE

Do not turn the crankshaft while the valve springs are removed.

2. Remove valve cap (1). Apply sufficient pressure to Tooling (A) in order to allow removal of valve keepers (2).

Note: Do not compress the spring so that valve spring retainer (3) touches the valve stem seal.

3. Slowly release pressure on Tooling (A).

4. Remove valve spring retainer (3) and remove valve spring (4).



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5. Remove Tooling (A).
6. Remove valve stem seals (5).
7. Repeat Step 2 through Step 5 in order to remove the remaining valve springs from the appropriate cylinder.

Installation Procedure

1. Install the inlet and exhaust valve springs in the reverse order of removal.

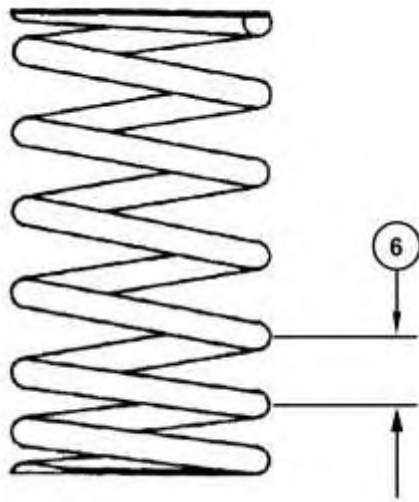


Illustration 4

- a. Install valve springs with the smaller pitch end (6) downward on cylinder head side.
 - b. Inspect valve springs (4) for damage and for the correct length. Refer to Specifications, "Cylinder Head Valves " for further information.
-

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Disassembly and Assembly

C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07

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i05224035

Inlet and Exhaust Valves - Remove and Install

SMCS - 1105-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	5S-1330	Valve Spring Compressor	1

Start By:

- a. Remove cylinder head.

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

1. Clean the bottom mating 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.
 3. Use a suitable lifting device to position the cylinder head with the valve springs upward. The weight of the cylinder head is approximately 23 kg (51 lb).
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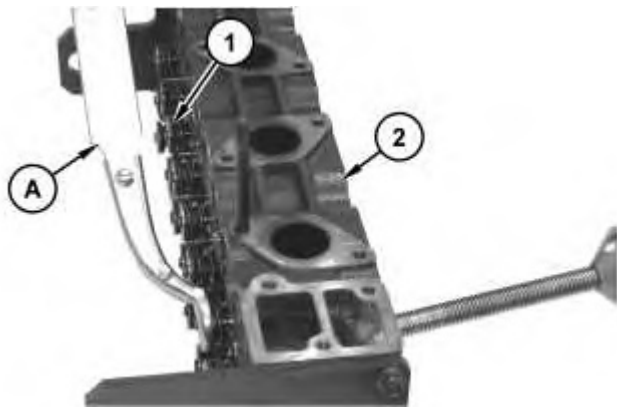


Illustration 1

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4. Install Tooling (A) in position on cylinder head (2) and compress the valve spring in order to remove inlet and exhaust valves (1).

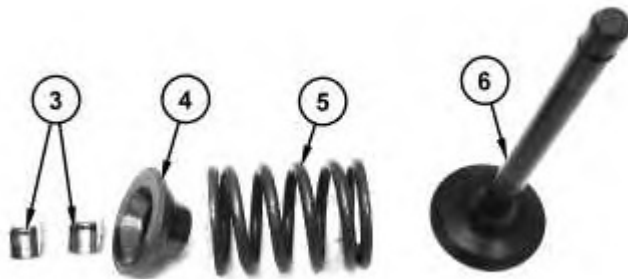


Illustration 2

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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

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

-
5. Apply sufficient pressure to Tooling (A) in order to remove valve keepers (3).
 6. Slowly release pressure on Tooling (A).
 7. Place a temporary identification mark on valve spring (5) in order to identify the correct position.
 8. Remove valve spring retainer (4). Remove valve spring (5) and inlet and exhaust valves (6).
 9. Repeat Step 4 through Step 8 for the remaining valves.
 10. Remove Tooling (A).

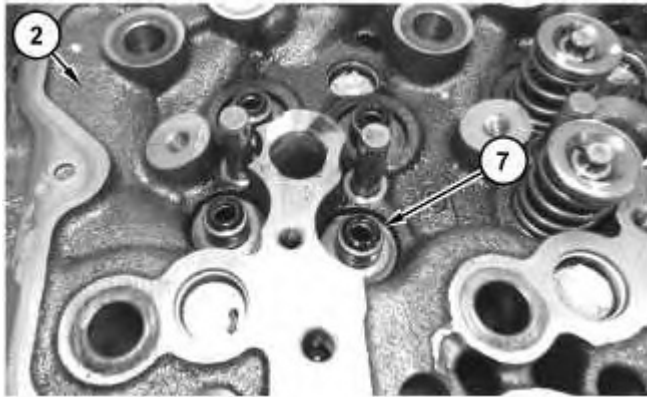


Illustration 3

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11. Remove valve stem seals (7) from cylinder head (2).
12. Use a suitable lifting device in order to turn over cylinder head (2).
13. Remove the inlet and exhaust valves.

Installation Procedure

1. Install inlet and exhaust valves (6) in the reverse order of removal.
 - a. 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. Replace any components that are worn or damaged.
 - b. Lubricate the stems of inlet and exhaust valves (6) with clean engine oil. Install inlet and exhaust valves (6) in the appropriate positions in the cylinder head. Check the depth of the valves below the face of the cylinder head. Refer to System Operation, Testing and Adjusting, "Valve Depth - Inspect" for more information.
-

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Disassembly and Assembly

C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

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i05305972

Inlet and Exhaust Valve Guides - Remove and Install

SMCS - 1104-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	390-1136	Valve Guide Driver Kit	1
B	385-8470	Valve Guide Reamer	1

Start By:

- a. Remove the inlet and exhaust valves.

Note: Refer to Specifications, "Engine Design" for non-specified engine torque values.

NOTICE

Removal and installation of the valve guide and valve seat must be carried out by personnel with the correct training. Also special machinery is required. For more information, refer to your authorized Caterpillar dealer.

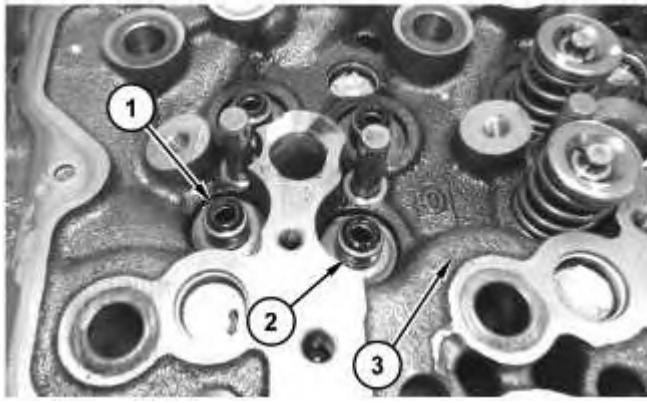


Illustration 1

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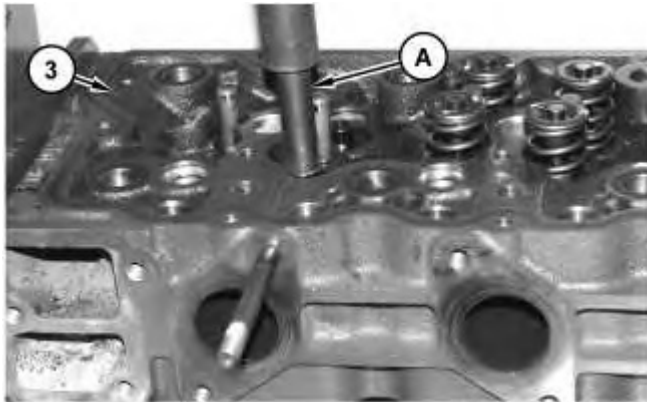


Illustration 2

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1. Remove inlet and exhaust valve seals (1). Use Tooling (A) in order to remove valve guides (2) from cylinder head (3).
2. Repeat the Step 1 for the remaining inlet and exhaust valve guides.

Installation Procedure

Note: Ensure that the cylinder head is clean and free from machining debris. Clean the parent bores in the cylinder head and lubricate the new valve guides.

1. Install inlet and exhaust valve guides (2) in the reverse order of removal.
 - a. Use Tooling (A) to install inlet and exhaust valve guides (2).

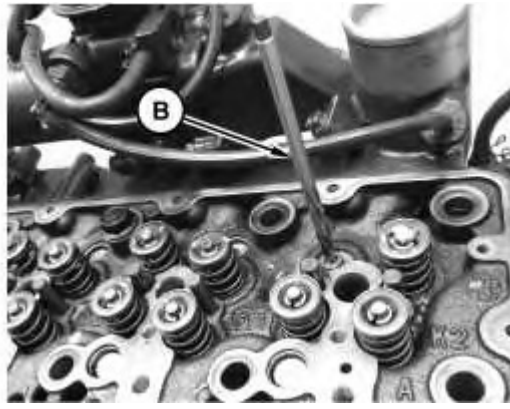


Illustration 3

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- b. Use Tooling (B) to resize the new inlet and exhaust valve guides. Refer to Specifications, "Cylinder Head Valves" for the allowable clearance between the valve stem and valve guide.
-

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Disassembly and Assembly

C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07

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i05223991

Engine Oil Cooler - Remove and Install

SMCS - 1378-010

Removal Procedure

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

1. Refer to Operation and Maintenance Manual, "Cooling System Coolant (ELC) - Change" for the correct draining and filling procedures.

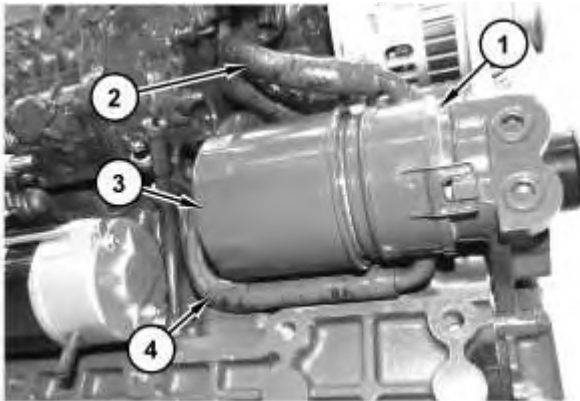


Illustration 1

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2. Remove engine oil filter (3) from engine oil cooler (1).
 3. Disconnect hose assemblies (2) and (4).
-



Illustration 2

g02788221

4. Remove center stud (5) and remove engine oil cooler (1) from the locator.
5. Remove the O-ring seal from engine oil cooler (1).

Installation Procedure

1. Install engine oil cooler (1) in the reverse order of removal.
 - a. Install the O-ring seal. Position engine oil cooler (1) on the locator on the front housing. Install center stud (5). Tighten center stud (5) to a torque of 40 to 44 N·m (29 to 33 lb ft).
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Disassembly and Assembly

C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07

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i05224010

Engine Oil Relief Valve - Remove and Install

SMCS - 1315-010

Removal Procedure

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

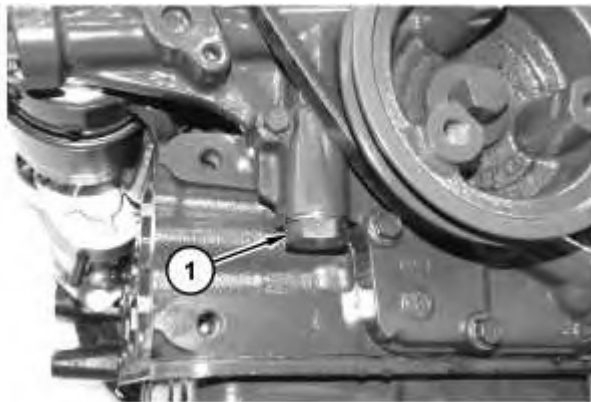


Illustration 1

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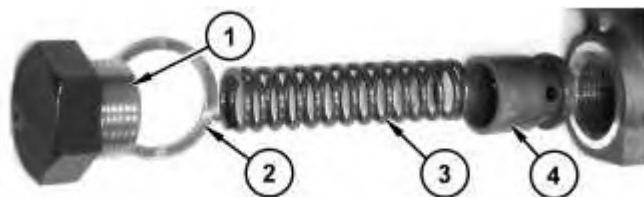


Illustration 2

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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 plug (1). Carefully remove plug (1) from the front housing cover.

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

2. Remove plug (1), washer (2), spring (3), and plunger (4) from the bore for the relief valve in the front housing cover.

Installation Procedure

1. Install engine oil relief valve in the reverse order of removal.

- a. Install plug (1) and tighten plug (1) to a torque of 69 to 78 N·m (51 to 57 lb ft).

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

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Disassembly and Assembly

C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07

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i05306471

Engine Oil Pump - Remove and Install

SMCS - 1304-010

Removal Procedure

Start By:

- a. Remove the front housing.

Note: Refer to Specifications, "Engine Design" for non-specified engine torque values.

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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1. Remove screws (2) and cover (1).



Illustration 2

g02788689

2. Remove inner rotor (4) from outer rotor (3).

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	129-1967	White Grease	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



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NOTICE

If any part of the engine oil pump is worn or damaged, the complete assembly of the engine oil pump must be replaced.

1. Ensure that all components of the engine oil pump are clean and free from wear and damage.
2. Refer to Specifications, "Engine Oil Pump" for all the engine oil pump allowable clearances.

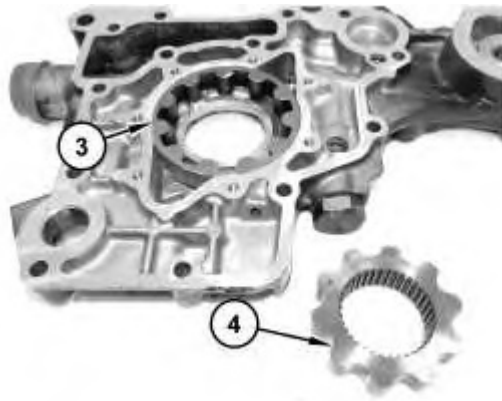


Illustration 3

g02788689

3. Position outer rotor (3) into the pump body. Check the clearance between outer rotor (3) and the pump body.
4. Install inner rotor (4) into outer rotor (3). Check the clearance between the lobes of outer rotor (3) and inner rotor (4).



Illustration 4

g02788686

5. Position a strip of Plastigage onto the outer rotor face with Tooling (A). Position cover (1) and install screws (2) and torque. Remove cover (1) and check clearance between the rotor and cover (1).

6. Position cover (1) and install screws (2). Tighten screws (2) to a torque of 8 to 9 N·m (70 to 83 lb in).

End By:

- a. Install the front housing.
-

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