



Service Repair Manual

Models

330-A L, 330, 330L Excavator

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Product: EXCAVATOR

Model: 330-A L EXCAVATOR 9ML

Configuration: 330, 330L TRACK-TYPE EXCAVATORS 9ML00001-UP (MACHINE) POWERED BY 3306 ENGINE

Disassembly and Assembly 3304B and 3306B Engines for Caterpillar Built Machines

Media Number -SEN5598-09

Publication Date -01/01/2013

Date Updated -25/01/2013

i00894497

Fuel Injection Pump - Install

SMCS - 1251-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2244	Pump Extractor	1
B	6V-4186	Fuel Pump Timing Pin	1
C	8T-5287	Wrench	1
D	6V-9128	Rack Position Tool Group	1
	3S-3270	Indicator Contact Point	1
	C-clamp		1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

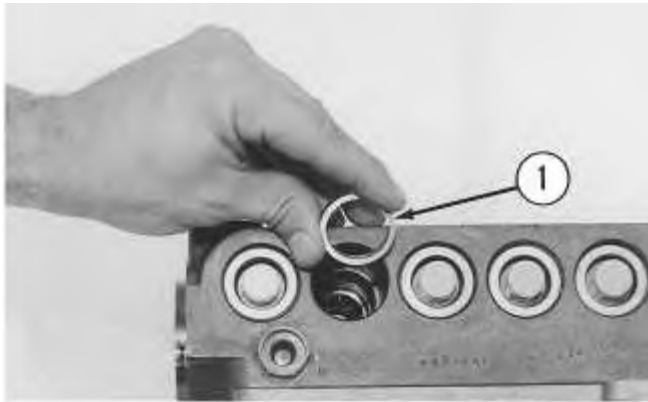


Illustration 1

g00507964

1. Install spacer (1) in the fuel injection pump housing.

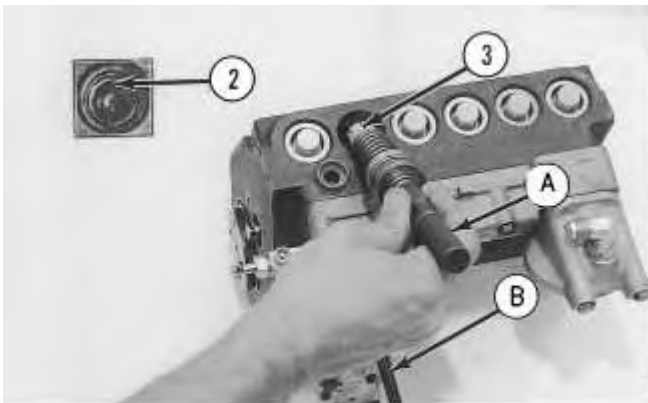


Illustration 2

g00507989

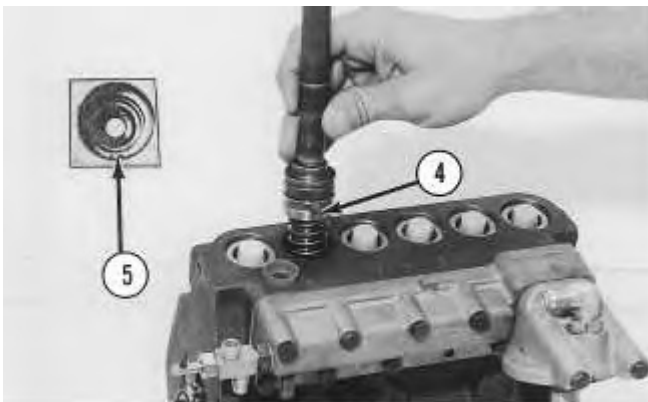


Illustration 3

g00508002

2. Install Tool (B) in the fuel injection pump housing. Move the rack until Tool (B) can be installed in order to hold the rack in the center position. The rack must be in the center position in order to install the fuel injection pumps.

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3. Turn the camshaft until the lobe of the camshaft is downward so that the fuel injection pump can be installed.
4. Install Tool (A) on the bonnet of the fuel injection pump.
5. Install the fuel injection pump in the fuel injection pump housing. Ensure that slot (3) that is cut in the gear is aligned with the small pin (2) and groove (4) in the barrel. The small pin (2) and groove (4) in the barrel are aligned with dowel (5) in the fuel injection pump housing.

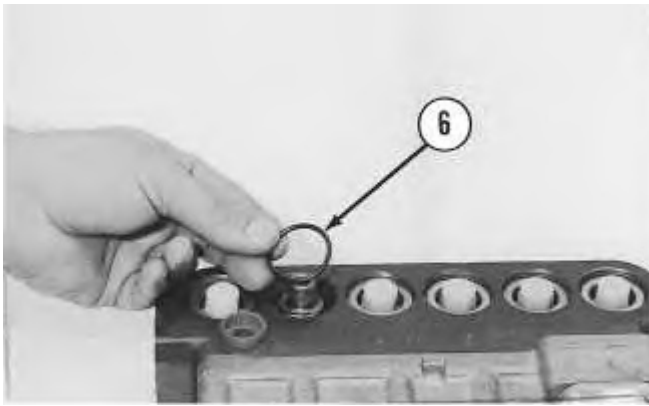


Illustration 4

g00508005

6. Put clean engine oil on O-ring seal (6) and install the O-ring seal in the fuel injection pump housing.

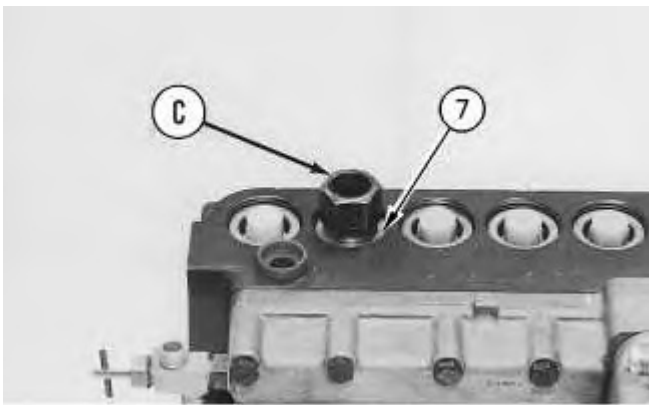


Illustration 5

g00508057

7. Install bushing (7) by hand until the bushing is even with the top of the fuel injection pump housing. If bushing (7) cannot be installed by hand, remove bushing (7). Remove the fuel injection pump. Put the pump in alignment and reinstall bushing (7) .
8. Install Tool (C) on bushing (7) and tighten the bushing to a torque of 163 ± 14 N·m (120 ± 10 lb ft).

9. Install Tool (D) in order to measure the total travel of the rack. The correct travel for the rack is 15.70 mm (.618 inch). A smaller measurement is an indication of improper fuel injection pump installation.
10. Repeat Steps 1 through 9 in order to install the remaining fuel injection pumps.
11. Install the cover and the gasket on the fuel injection pump housing.

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Disassembly and Assembly 3304B and 3306B Engines for Caterpillar Built Machines

Media Number -SEN5598-09

Publication Date -01/01/2013

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i01117604

Turbocharger - Remove

SMCS - 1052-011

Removal Procedure

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, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

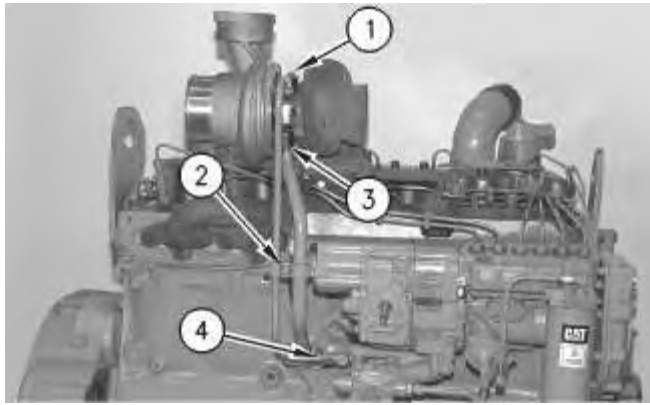


Illustration 1

g00537468

1. Remove bolt (2) and the clamp that holds the oil supply tube and the oil drain tube in position.
2. Remove two bolts (1) that hold the oil supply tube to the turbocharger. Remove two bolts (3) that hold the oil drain tube to the turbocharger.
3. On the 3304B, loosen the two hose clamps and remove the hose from the turbocharger. Slide the hose onto the pipe that goes to the cylinder head.
4. Loosen nut (4) and remove the oil supply tube from the engine.

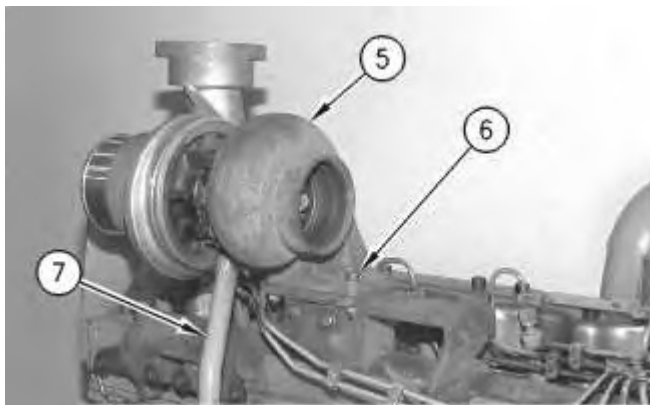


Illustration 2

g00537495

5. Loosen four bolts (6) and the nuts that hold turbocharger (5) to the exhaust manifold. Remove turbocharger (5) and the gasket from the exhaust manifold. Remove oil drain tube (7) from the engine and check the O-ring seal for damage. If the O-ring seal is worn or damaged, use a new part for replacement.

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Disassembly and Assembly 3304B and 3306B Engines for Caterpillar Built Machines

Media Number -SEN5598-09

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i01009195

Turbocharger - Disassemble

SMCS - 1052-015

Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9S-6363	Turbocharger Fixture Group	1

Start By:

- A. Remove the turbocharger. Refer to Disassembly and Assembly, "Turbocharger - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

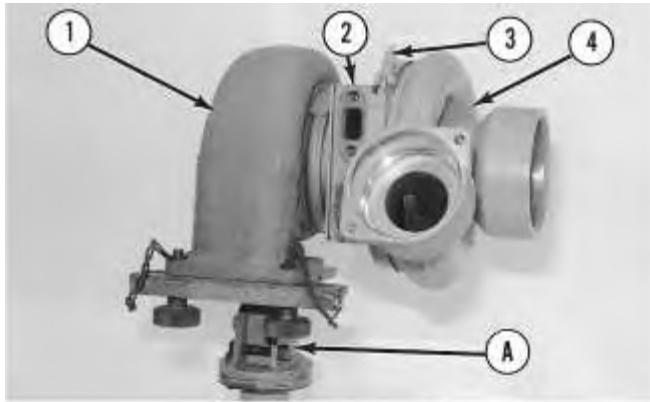


Illustration 1

g00517570

1. Install the turbocharger onto Tool (A) .
2. Apply alignment marks to the two housings and the cartridge assembly for correct alignment during assembly.
3. Loosen clamp (3) and remove compressor housing (4) from cartridge assembly (2) .
4. Loosen the remaining clamp on turbine housing (1) and remove cartridge assembly (2) from the turbine housing.

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3304B and 3306B Engines for Caterpillar Built Machines**

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Publication Date -01/01/2013

Date Updated -25/01/2013

i01009564

Turbocharger - Assemble

SMCS - 1052-016

Assembly Procedure

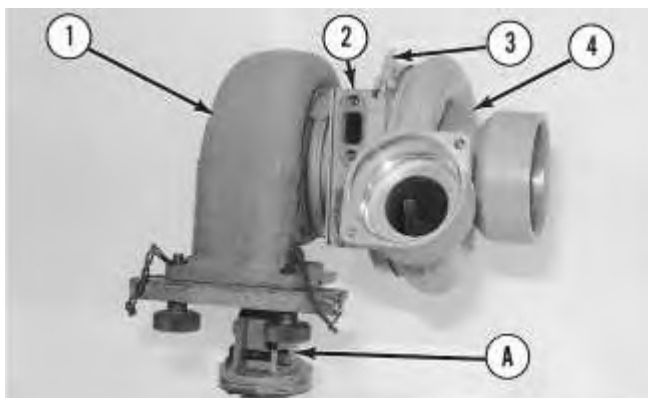
Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9S-6363	Turbocharger Fixture Group	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



1. Put cartridge assembly (2) in position on turbine housing (1). Make sure that the identification marks are in alignment. Tighten the clamp that secures cartridge assembly (2) to turbine assembly (1) to a torque of 14 ± 1.1 N·m (125 ± 10 lb in).
2. Put compressor housing (4) in position on cartridge assembly (2). Make sure that the identification marks are in alignment. Tighten clamp (3) that secures compressor housing (4) to cartridge assembly (2) to a torque of 14 ± 1.1 N·m (125 ± 10 lb in).
3. Remove the turbocharger from Tool (A) .

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Publication Date -01/01/2013

Date Updated -25/01/2013

i01117656

Turbocharger - Install

SMCS - 1052-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

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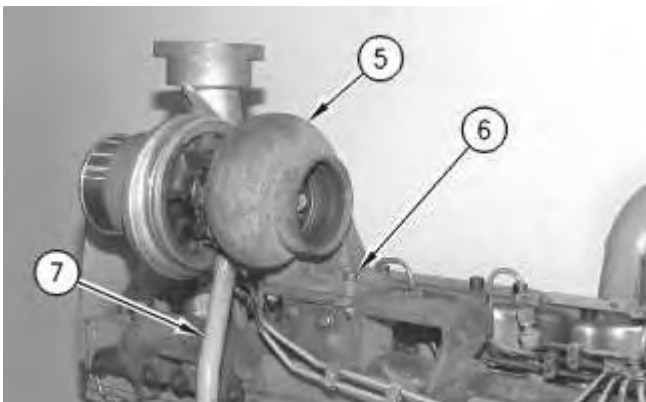


Illustration 1

g00537495

Note: Check the condition of the gaskets and the O-ring seals. If the gaskets or the O-ring seals are worn or damaged, use new parts for replacement.

1. Install oil drain tube (7) on the engine. Position the gasket and turbocharger (5) on top of the exhaust manifold and install four bolts (6) and the nuts.

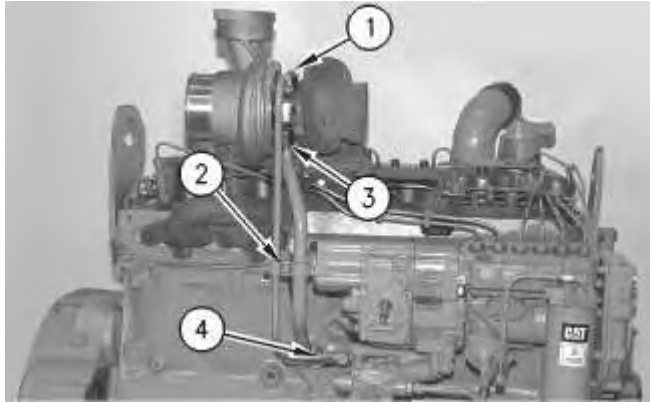


Illustration 2

g00537468

2. Install the gasket and two bolts (3) that hold the oil drain tube to the turbocharger. Put the oil supply tube in position and install the gasket and two bolts (1) that hold the oil supply tube to the turbocharger. Tighten nut (4) .
3. On the 3304B, slide the hose into position on the turbocharger and the pipe that goes to the cylinder head. Tighten the hose clamp.
4. Install the clamp that holds the oil supply tube and the oil drain tube in position and install bolt (2) .

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Disassembly and Assembly 3304B and 3306B Engines for Caterpillar Built Machines

Media Number -SEN5598-09

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i01041426

Exhaust Manifold - Remove and Install

SMCS - 1059-010

Removal Procedure

Start By:

- A. Remove the turbocharger. Refer to Disassembly and Assembly, "Turbocharger - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

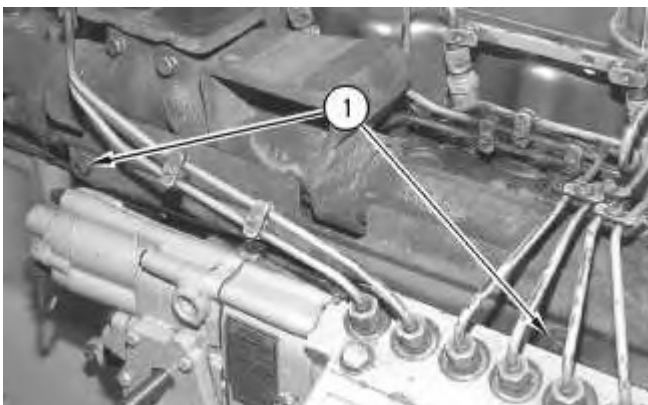


Illustration 1

g00537836

1. Remove two nuts (1), the washers and the heat shield from the exhaust manifold.

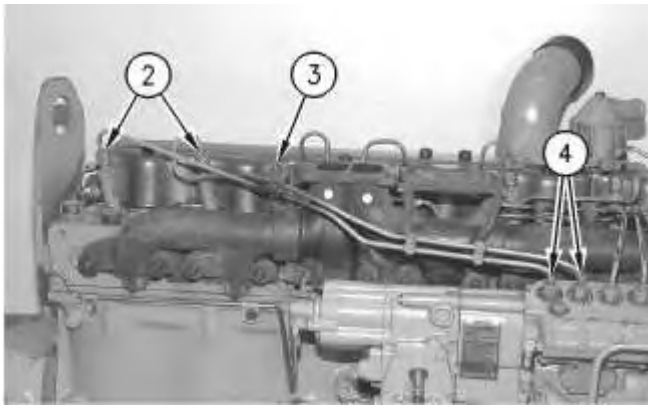


Illustration 2

g00537855

2. Remove bolt (3) from the bracket that holds two of the fuel injection lines in position. Loosen nuts (2) and (4) and remove the two fuel injection lines from the engine. Put protective caps on the fuel injectors and put protective caps on the fuel injection pump in order to prevent contamination.

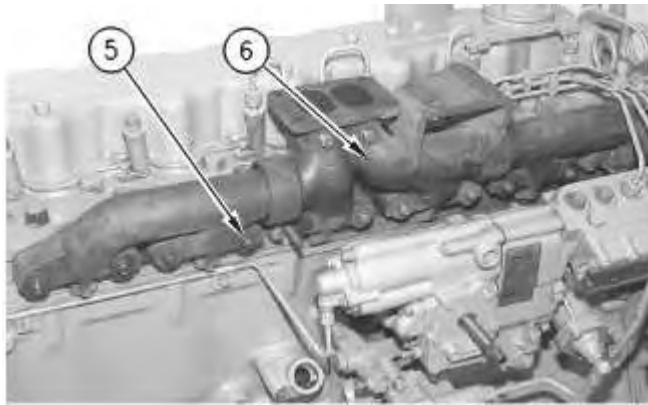


Illustration 3

g00537885

3. Remove the remaining ten exhaust manifold nuts (5) and the large washers. Remove exhaust manifold (6).
-

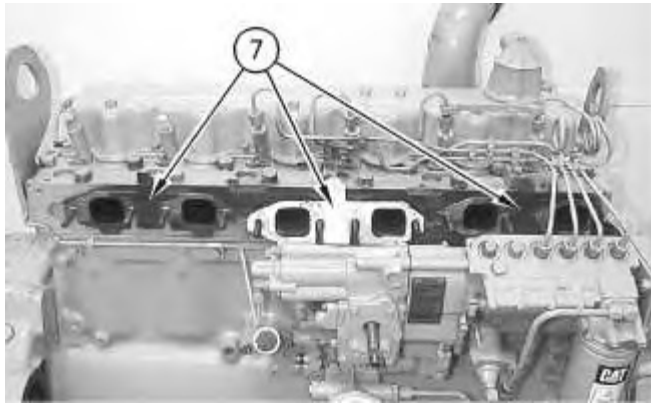


Illustration 4

g00541058

4. Remove three exhaust manifold gaskets (7) from the cylinder head and the twelve exhaust manifold studs, if necessary. Make sure that the position of the two longer studs are marked for proper installation.

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Description	Qty
A	5P-0144	Fuel Line Socket	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. If the twelve exhaust manifold studs were removed, apply **5P-3931** Anti-Seize Compound to both ends of the exhaust manifold studs and install the studs in the cylinder head. Make sure that the two longer studs are installed in the correct position. Tighten the studs to a torque of 27 ± 4 N·m (20 ± 3 lb ft).
-

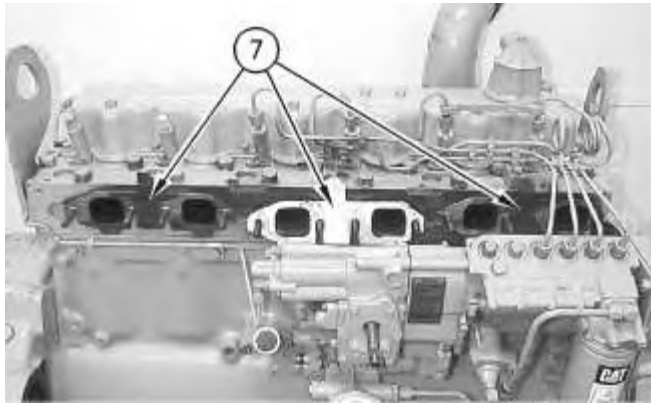


Illustration 5

g00541058

- Put three exhaust manifold gaskets (7) in position on the cylinder head.

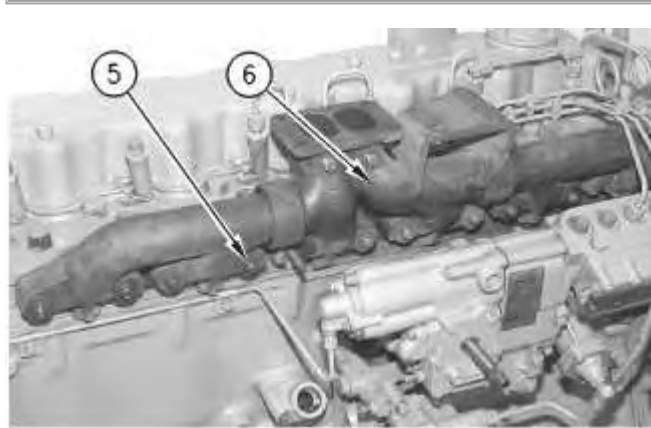


Illustration 6

g00537885

- Install exhaust manifold (6). Install ten washers and nuts (5). The two longer studs are for the installation of the heat shield. Tighten exhaust manifold nuts (5) to a torque of 47 ± 4 N·m (35 ± 3 lb ft).

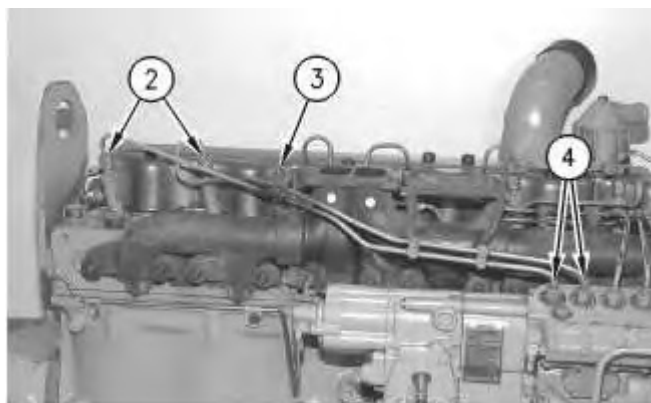


Illustration 7

g00537855

- Remove the protective caps from the fuel injectors and the fuel injection pump. Put the fuel injection lines in position and tighten nuts (2) and (4) finger tight. Install bolt (3) in the bracket that holds the fuel injection lines in position. Tighten nuts (3) and (4) with Tool (A) to a torque of $40 \pm 7 \text{ N}\cdot\text{m}$ ($30 \pm 5 \text{ lb ft}$).

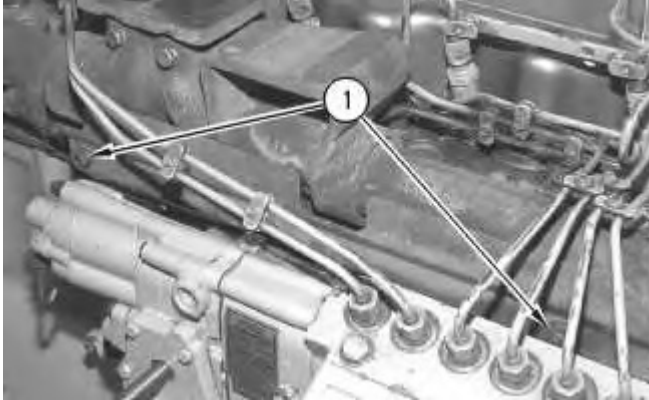


Illustration 8

g00537836

- Install the two large washers and the spacers on the two remaining exhaust manifold studs. Install heat shield (1) and the remaining two washers and exhaust manifold nuts that fasten heat shield (1) to the exhaust manifold. Tighten the two nuts to a torque of $47 \pm 4 \text{ N}\cdot\text{m}$ ($35 \pm 3 \text{ lb ft}$).
- Prime the fuel system. Refer to the Operation and Maintenance Manual, "Fuel system - Prime" topic (Maintenance Section).

End By: Install the turbocharger. Refer to Disassembly and Assembly, "Turbocharger - Install".

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**Disassembly and Assembly
3304B and 3306B Engines for Caterpillar Built Machines**

Media Number -SEN5598-09

Publication Date -01/01/2013

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i00962627

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
B	8S-2263	Valve Spring Tester	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.

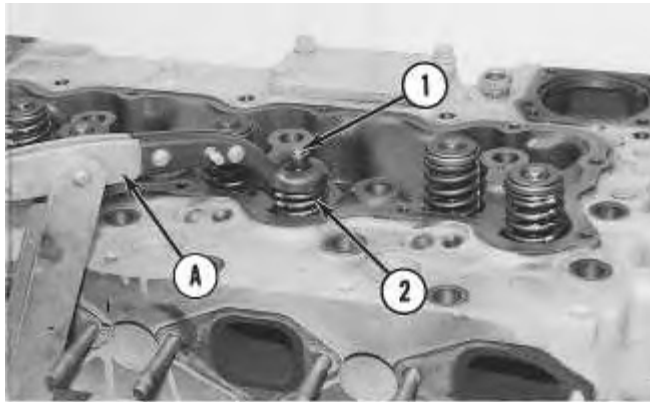


Illustration 1

g00490614

1. Use Tool (A) to compress valve spring (2) and remove valve keepers (1) .
2. Remove Tool (A), the rotocoil, the valve spring and the valve stem oil shield. Remove the valve from the cylinder head. Put identification marks on the valves for installation purposes.

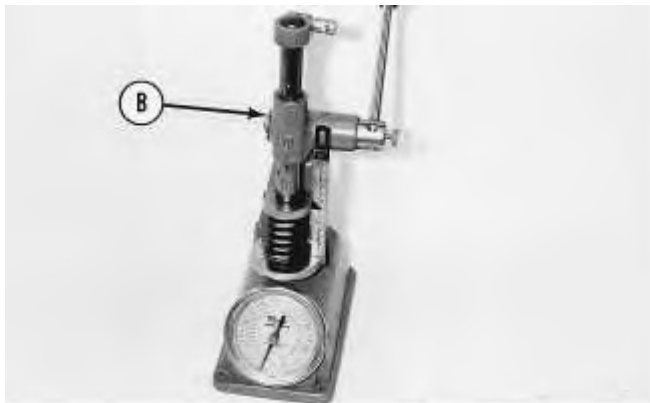


Illustration 2

g00490682

3. Check the valve spring force with Tool (B). Refer to Specifications, "Cylinder Head Valves" for information on the valve springs.
4. Perform Steps 1 through 3 for the remaining inlet and exhaust valves.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	5S-1330	Valve Spring Compressor	1
B	5S-1322	Valve Keeper Inserter	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Lubricate the inlet and exhaust valves with clean engine oil. Install the inlet and exhaust valves in the original location in the cylinder head.

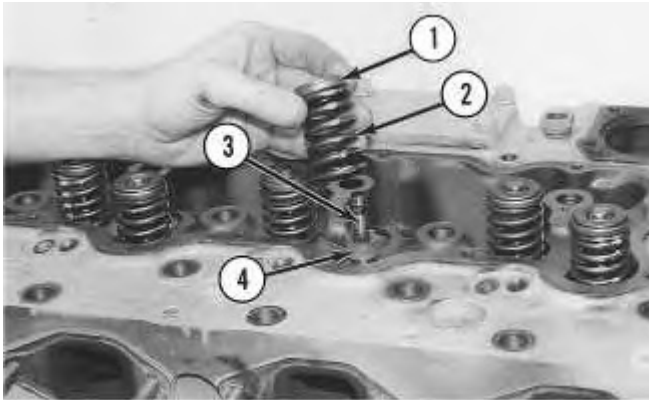


Illustration 3

g00508681

2. Install valves (3), oil shield (4), valve spring (2) and rotocoil (1) in the cylinder head.

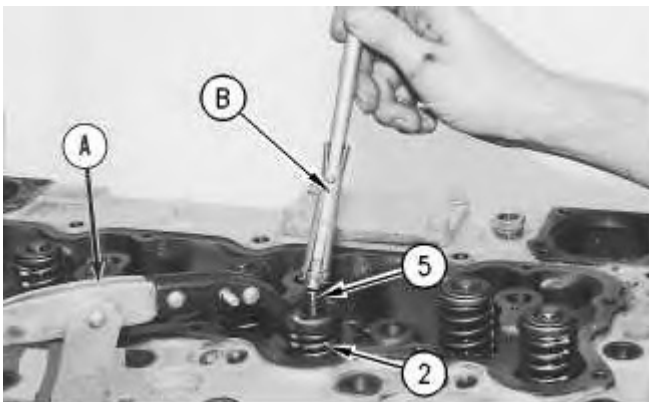


Illustration 4

g00490777

3. Use Tool (A) to compress valve spring (2). Install valve keeper (5) on the valve stem with Tool (B) .



WARNING

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

4. Carefully remove Tool (A). Strike the top of the valve with a soft faced hammer in order to ensure that the valve keepers are properly installed.
5. Repeat Steps 3 through 4 for the remaining inlet and exhaust valves.

End By: Install the cylinder head. Refer to Disassembly and Assembly, "Cylinder Head - Remove and Install".

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**Disassembly and Assembly
3304B and 3306B Engines for Caterpillar Built Machines**

Media Number -SEN5598-09

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i00962891

Inlet and Exhaust Valve Guides - Remove and Install

SMCS - 1104-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-7349	Valve Guide Driver	1

Start By:

- A. Remove the inlet and exhaust valves. Refer to Disassembly and Assembly, "Inlet and Exhaust Valves - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

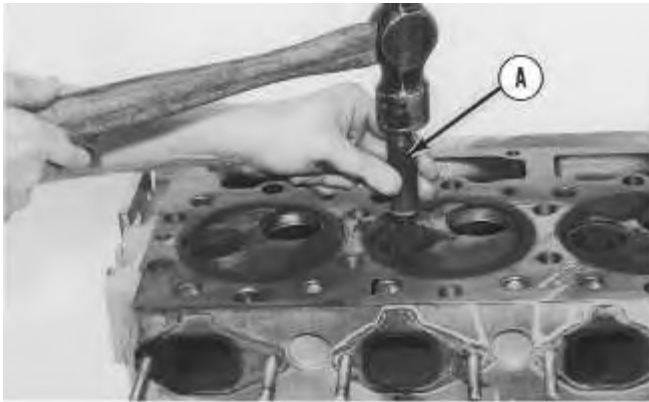


Illustration 1

g00490787

1. Use Tool (A) to remove the inlet and exhaust valve guides from the cylinder head.
2. Repeat Step 1 for the remaining inlet and exhaust valve guides.

Installation Procedure

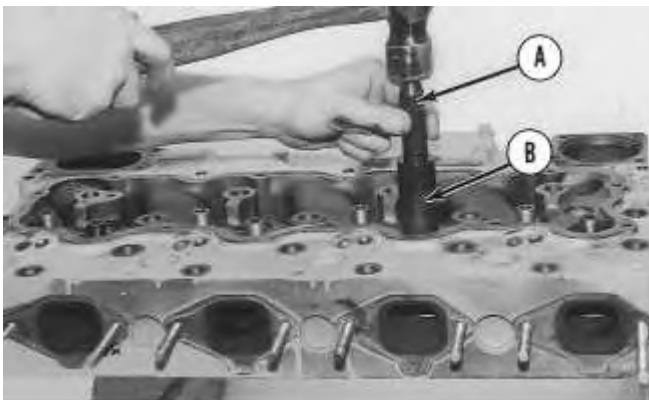
Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-7349	Valve Guide Driver	1
B	9U-6954	Valve Guide Collar	1

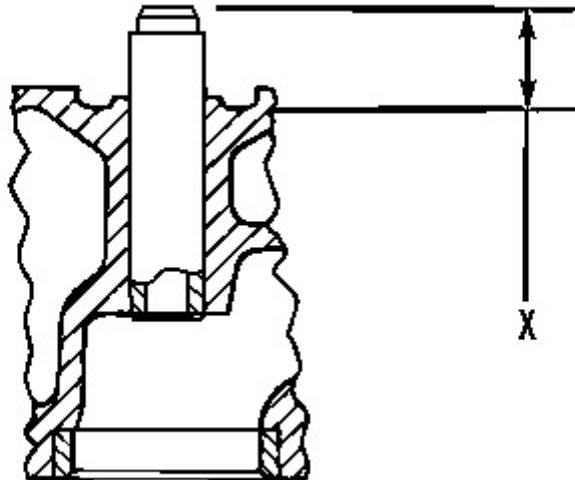
NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



1. Put clean engine oil on the outside diameter of the valve guide. Install the valve guide with Tool (A) and Tool (B), as shown.



2. Dimension (X) from the top of the valve guide to the cylinder head must be 22.23 ± 0.25 mm (0.875 ± 0.010 inch). For more information on the inlet and exhaust valve guides, refer to Specifications, "Cylinder Head Valves".

Note: In order to help prevent damage to the valve guides, Tool (B) must be used during installation.

3. Repeat Steps 1 and 2 for the remaining inlet and exhaust valve guides.

End By: Install the inlet and exhaust valves. Refer to Disassembly and Assembly, "Inlet and Exhaust Valves - Remove and Install".

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**Disassembly and Assembly
3304B and 3306B Engines for Caterpillar Built Machines**

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i02107684

Inlet and Exhaust Valve Seat Inserts - Remove and Install

SMCS - 1103-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	6V-4805	Valve Seat Extractor Tool Group	1

Start By:

- A. Remove the inlet and exhaust valves. Refer to Disassembly and Assembly, "Inlet and Exhaust Valves - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



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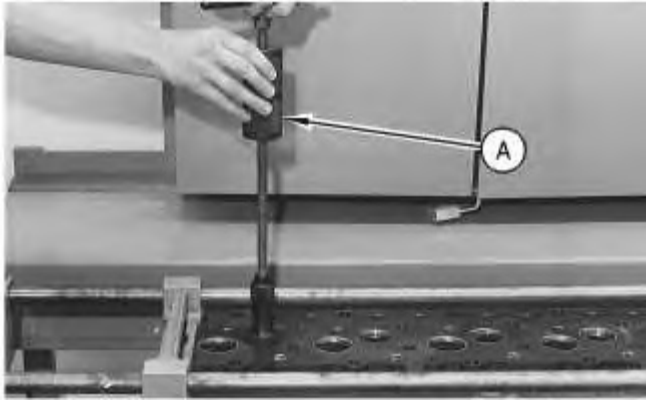


Illustration 1

g00490857

1. Use Tooling (A) in order to remove the valve seat insert from the cylinder head.
2. Clean the valve seat in the cylinder head. Remove any rough areas from the valve seat in the cylinder head.
3. Repeat Steps 1 and 2 for the remaining inlet valve seat inserts and exhaust valve seat inserts.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	6V-4805	Valve Seat Extractor Tool Group	1

NOTICE

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