

Product: EXCAVATOR

Model: 235 EXCAVATOR 83X

Configuration: 235 EXCAVATOR 83X00444-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

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.

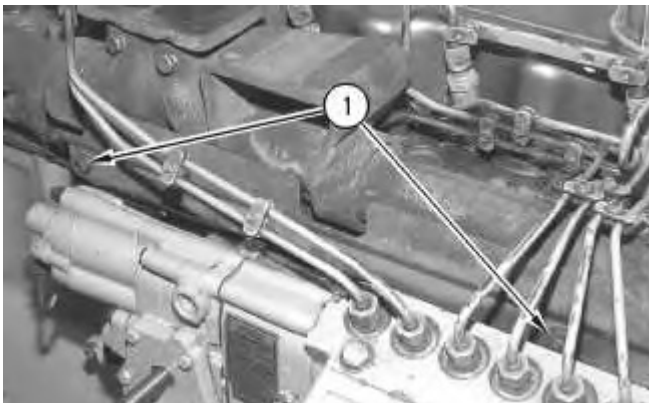


Illustration 1

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

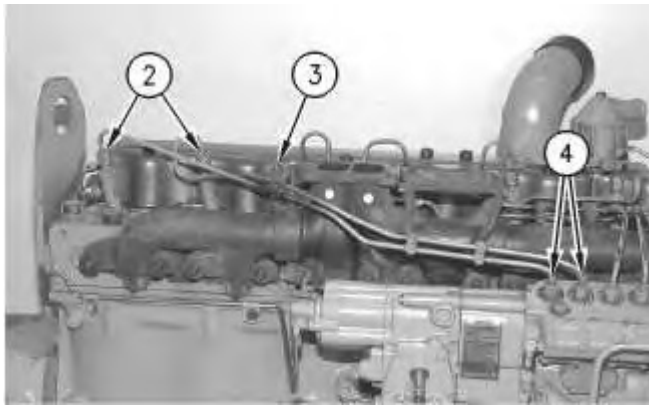


Illustration 2

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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.

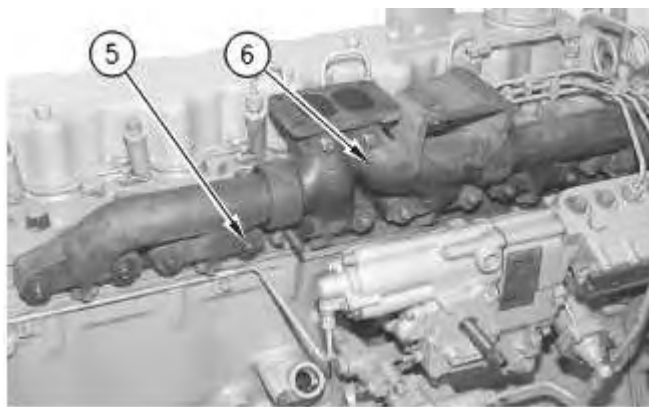


Illustration 3

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

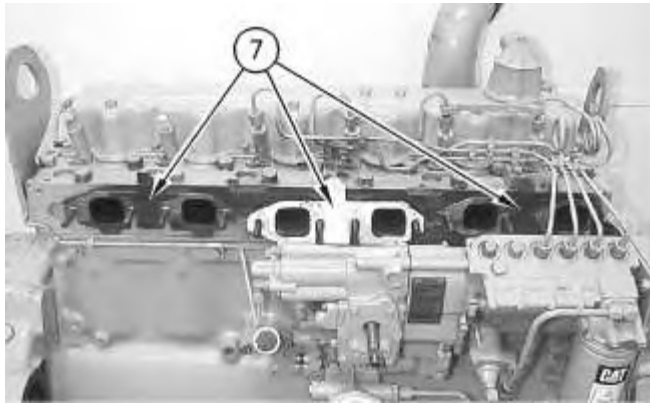


Illustration 4

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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).
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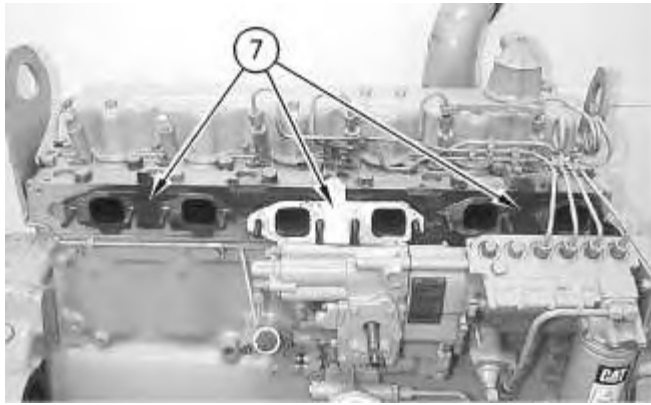


Illustration 5

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

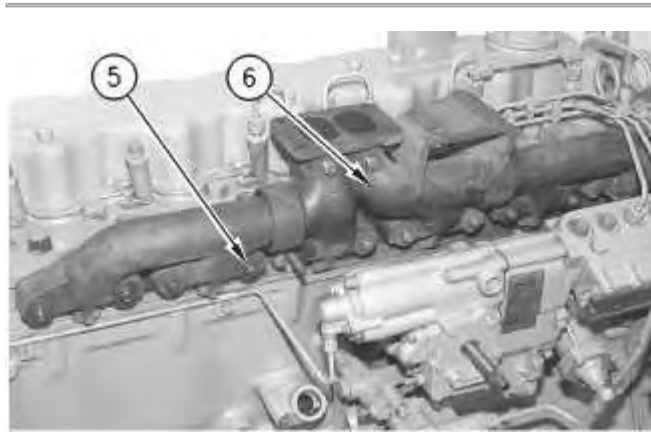


Illustration 6

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- 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).

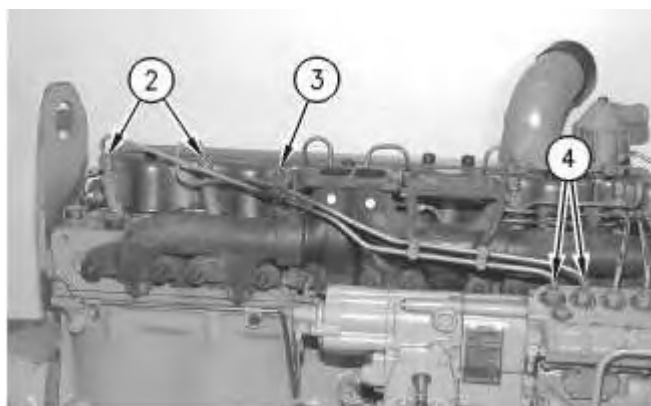


Illustration 7

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4. 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 $40 \pm 7 \text{ N}\cdot\text{m}$ ($30 \pm 5 \text{ lb ft}$).

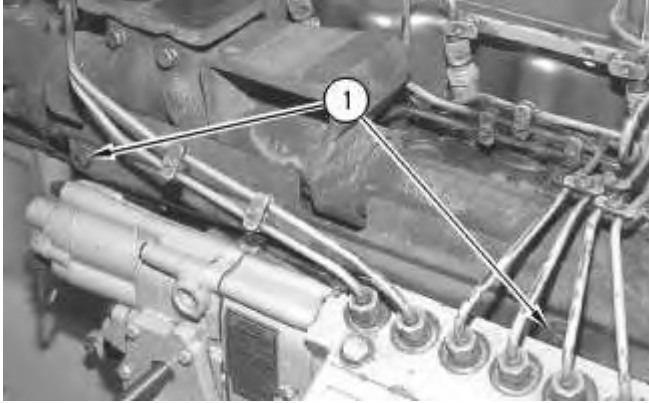


Illustration 8

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5. 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 $47 \pm 4 \text{ N}\cdot\text{m}$ ($35 \pm 3 \text{ lb ft}$).
6. 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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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.

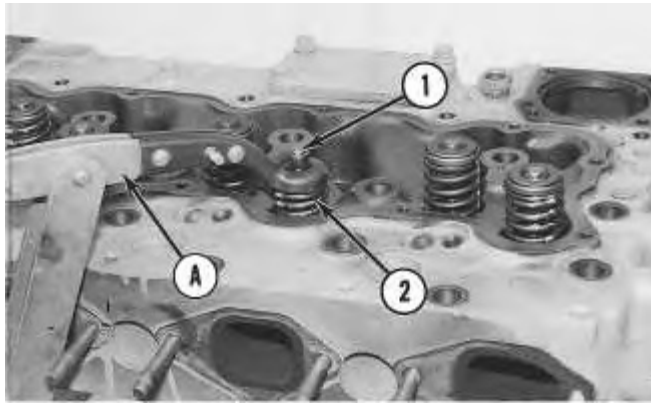


Illustration 1

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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.

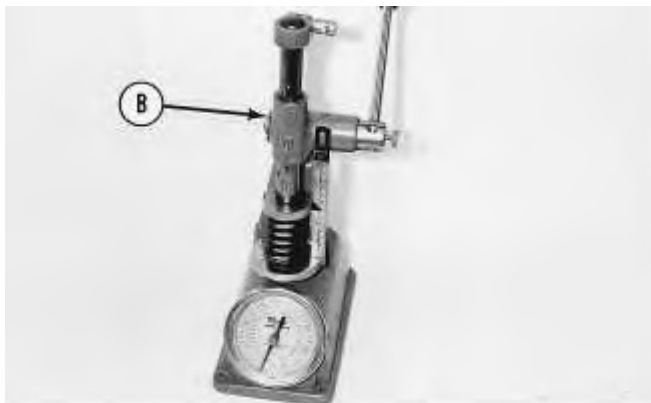


Illustration 2

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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.

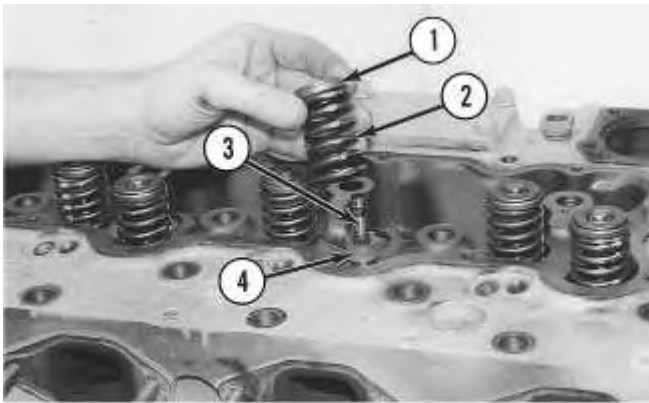


Illustration 3

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

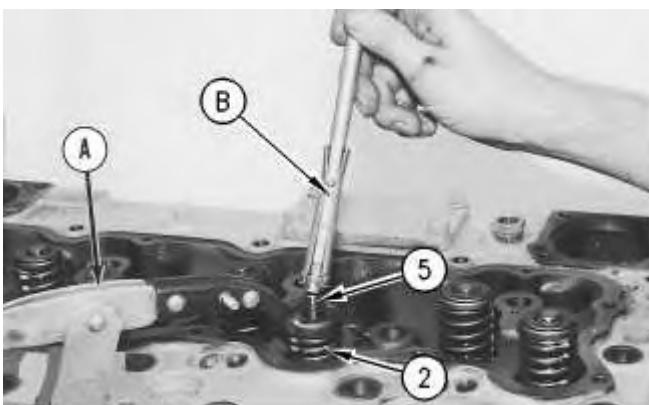


Illustration 4

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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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