



Service Repair Manual

Model

320, 320L TRACK EXCAVATOR

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Product: EXCAVATOR

Model: 320-A EXCAVATOR 8LK

Configuration: 320, 320L TRACK-TYPE EXCAVATORS 8LK00001-UP (MACHINE) POWERED BY 3066 ENGINE

Disassembly and Assembly 3064 and 3066 Engines for Caterpillar Built Machines

Media Number -SEN5553-10

Publication Date -01/05/2012

Date Updated -15/05/2012

i01564587

Turbocharger - Install

SMCS - 1052-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Inspect the condition of all gaskets. Replace the gaskets, if necessary.

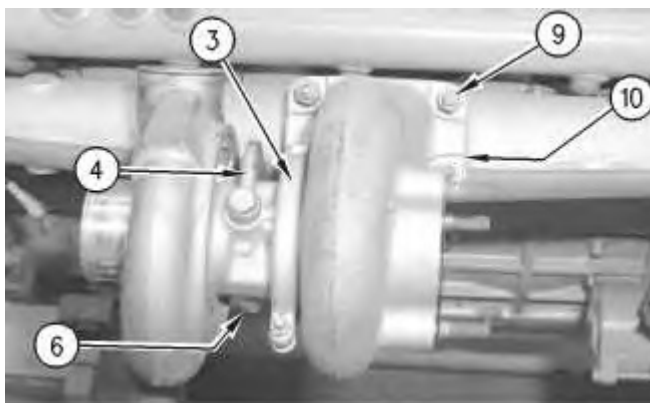


Illustration 1

g00608177

2. Install metal gasket (10) (not shown). Install turbocharger (3), oil supply line (4) and oil return line (6) (not shown) as a unit.
3. Install eight nuts (9). Tighten the nuts to a torque of 41 N·m (30 lb ft).

Note: Two nuts are installed on each turbocharger mounting stud.

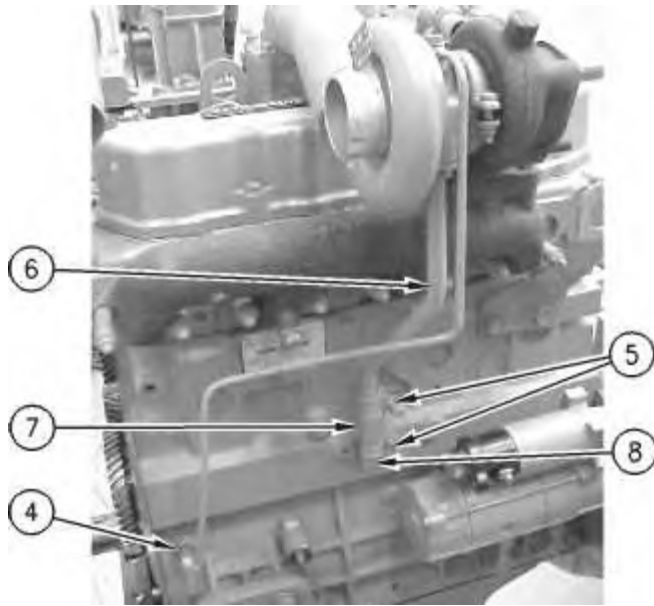


Illustration 2

g00812846

4. Slide hose (7) down the oil return line (6) onto fitting (8) .
5. Tighten two clamps (5) on hose (7) .
6. Connect oil supply line (4) to the cylinder block.

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Media Number -SEN5553-10

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i01565722

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.

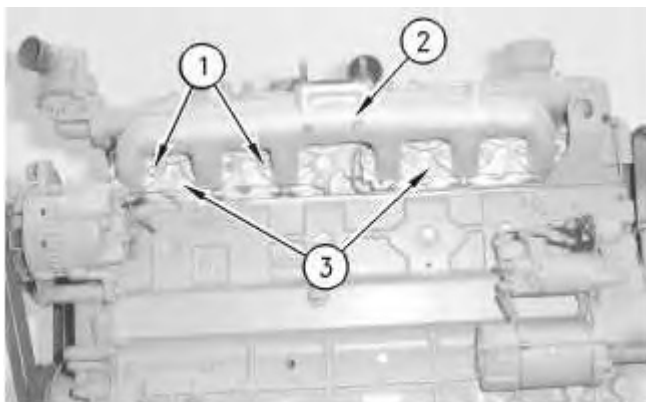


Illustration 1

g00605454

1. Remove the nuts (1) and washers that secure the exhaust manifold to the cylinder head assembly. The 3066 Engine has twelve nuts and washers while the 3064 Engine has eight nuts and washers.
2. Remove exhaust manifold (2) from the cylinder head assembly.
3. Remove exhaust manifold gasket (3) that is located between exhaust manifold (2) and the cylinder head assembly.

Note: The 3066 Engine has two exhaust manifold gaskets, while the 3064 Engine has one exhaust manifold gasket.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

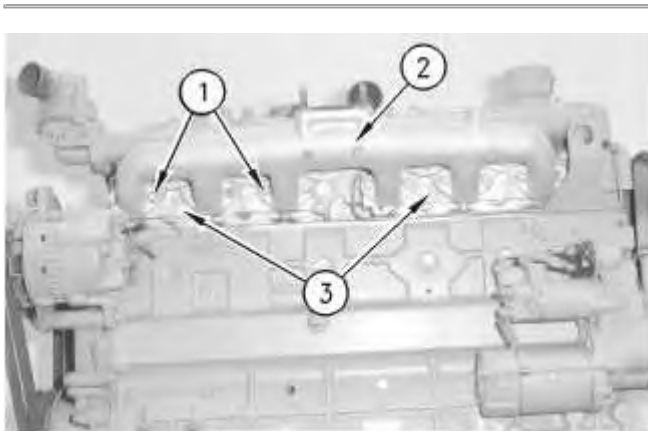


Illustration 2

g00605454

1. Install exhaust manifold gasket (3) between exhaust manifold (2) and the cylinder head assembly.

Note: The 3066 Engine has two exhaust manifold gaskets, while the 3064 Engine has one exhaust manifold gasket.

2. Place exhaust manifold (2) in position on the cylinder head.
3. Install the nuts (1) and the washers that secure the exhaust manifold to the cylinder head assembly. The 3066 Engine has twelve nuts and washers while the 3064 Engine has eight nuts and washers.

4. Tighten exhaust manifold nuts (1) to a torque of 18 ± 4 N·m (13 ± 3 lb ft).

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

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Media Number -SEN5553-10

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i01615211

Air Inlet Heater - Remove and Install

SMCS - 1090-010

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

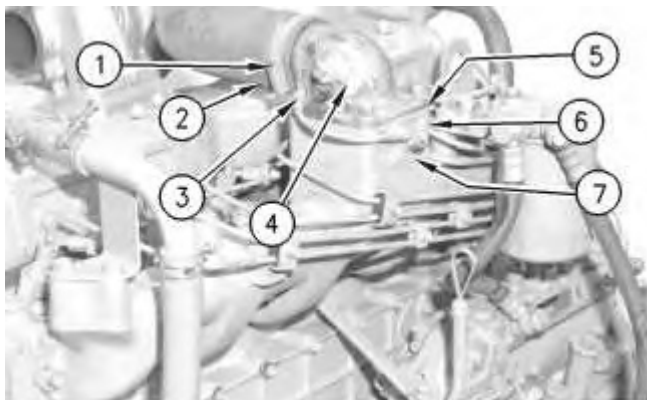


Illustration 1

g00611147

1. Loosen hose clamp (1) that secures air inlet hose (2) to air inlet elbow (4) .
2. Disconnect air inlet hose (2) from air inlet elbow (4) .

3. Remove four bolts (3) and washers that secure the following items to the air inlet manifold: air inlet elbow (4), gasket (5), air inlet heater (6) and gasket (7) .

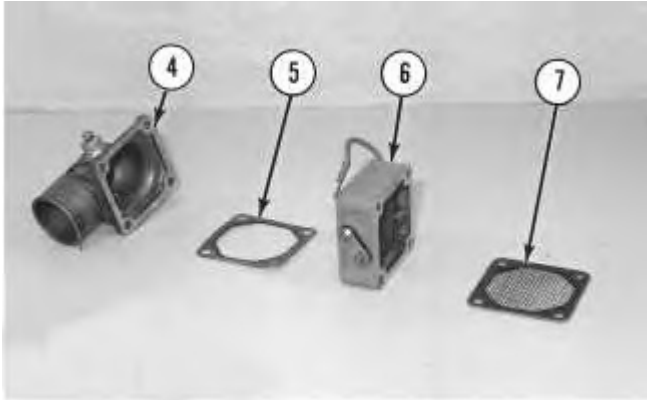


Illustration 2

g00611165

4. Remove the following items from the air inlet manifold: air inlet elbow (4), gasket (5), air inlet heater (6) and gasket (7) .

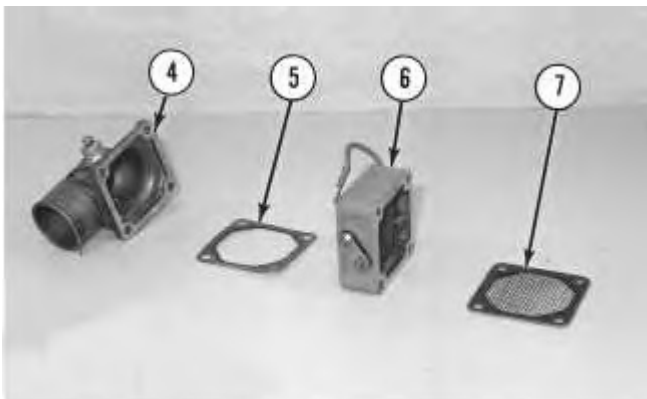
Note: Check the condition of the gaskets that are used between the elbow and the air inlet heater. Check the gaskets between the air inlet heater and the air inlet manifold. If the gaskets are damaged in any way, replace the gaskets.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



Note: Check condition of the gaskets for the air inlet elbow and the air inlet heater. If the gaskets are damaged, use a new part for replacement. The wire mesh gasket (7) is installed between the air inlet manifold and the air inlet heater.

1. Place the following items in position on the air inlet manifold: gasket (7), the air inlet heater (6), gasket (5) and the air inlet elbow (4) .

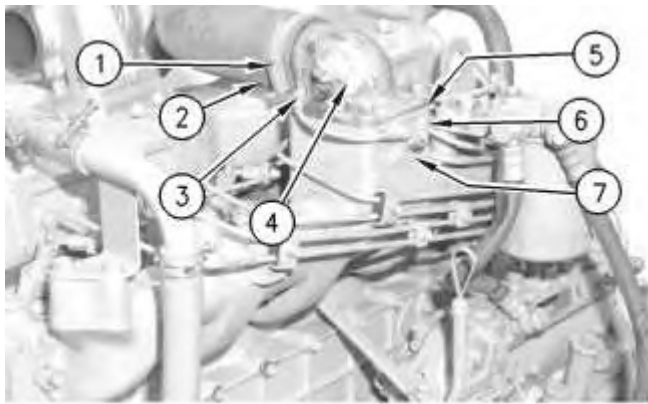


Illustration 4

2. Install four bolts (3) that secure the following items to the air inlet manifold: gasket (7), the air inlet heater (6), gasket (5) and the air inlet elbow (4)

Tighten bolts (3) to a torque of $28 \pm 7 \text{ N}\cdot\text{m}$ ($21 \pm 5 \text{ lb ft}$).

3. Connect air inlet hose (2) to air inlet elbow (4) .
4. Tighten hose clamp (1) that secures the air inlet hose to the air inlet elbow.

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Media Number -SEN5553-10

Publication Date -01/05/2012

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i01575215

Inlet Manifold - Remove

SMCS - 1058-011

Removal Procedure

Start By:

- A. Remove fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Remove and Install".
- B. Remove fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove and Install".
- C. Remove the air inlet heater. Refer to Disassembly and Assembly, "Air Inlet Heater - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

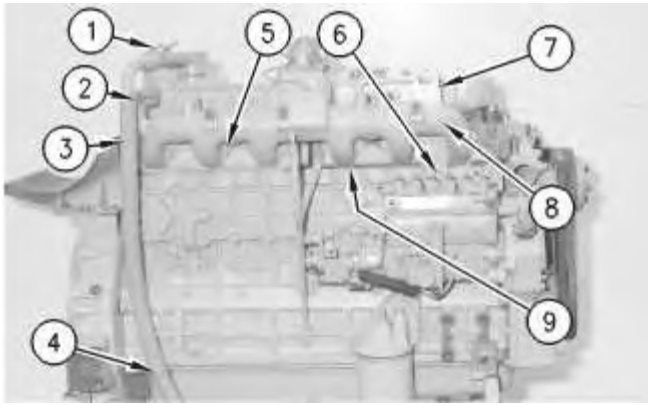


Illustration 1

g00604352

1. Loosen clamp (1) on hose assembly (3) .
2. Remove two bolts (2) that secure the hose assembly to the engine.
3. Slide the hose assembly (3) from the retaining ring (4) .
4. Remove the bolts and washers (5) that secure the air inlet manifold to the cylinder heads. The 3066 Engine has eleven bolts and washers while the 3064 Engine has eight bolts and washers.

Note: One bolt has previously been removed in order to remove the fuel return line.

5. Remove one bolt (6) and the washer that secures the lifting bracket (7) to the cylinder block.
6. Remove inlet manifold (8) and remove the lifting bracket (7) .
7. Remove gaskets (9) (not shown). Check the gaskets for wear or damage. Replace the gaskets, if the gasket is worn or damaged.

Note: The 3064 Engine has one gasket, while the 3066 Engine has two gaskets.

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i01575229

Inlet Manifold - Install

SMCS - 1058-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

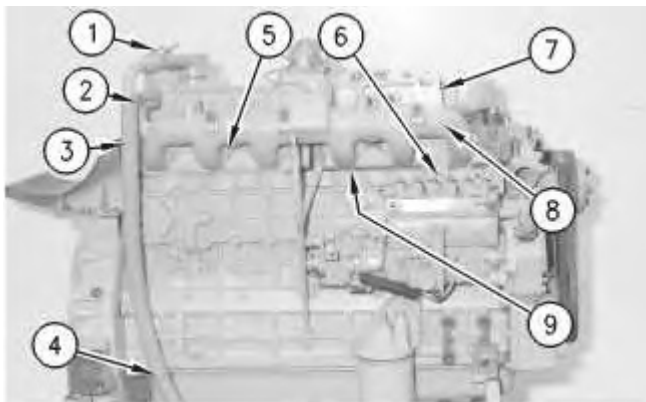


Illustration 1

g00604352

Note: Check condition of the inlet manifold gasket. If the gasket is damaged, use a new part for replacement.

1. Place the following items in position on the engine: gasket (9) (not shown), air inlet manifold (8) and lifting bracket (7) .
2. Install the washer and one bolt (6) onto lifting bracket (7) .
3. Install the washers and bolts (5) that secure the inlet manifold to the cylinder head. The 3066 Engine has eleven washers and bolts while the 3064 Engine has eight washers and bolts.
4. Slide the hose assembly (3) through the retaining ring (4) .
5. Install washers and two bolts (2) that secure the hose assembly to the engine.
6. Tighten the hose clamps (1) on the hose assembly (3) .

End By:

- a. Install the air inlet heater. Refer to Disassembly and Assembly, "Air Inlet Heater - Remove and Install".
- b. Install the fuel injection lines. Refer to Disassembly and Assembly, "Fuel Injection Lines - Remove and Install".
- c. Install the fuel filter base. Refer to Disassembly and Assembly, "Fuel Filter Base - Remove and Install".

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i01615235

Inlet and Exhaust Valve Springs - Remove and Install

SMCS - 1108-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	5S-1322	Valve Keeper Installer	1
B	9U-6145	Air Connector ⁽¹⁾	1
C	9U-6144	Adapter	1
	7F-4292	Valve Spring Compressor	1
	6V-5223	Bolt	1
	8T-4121	Washer	1
	6V-5218	Bolt	1
D	8S-2263	Spring Tester	1

⁽¹⁾ The 9U-6145 Air Connector is part of the 9U-6274 Compression Test Kit. The 9U-6145 Air Connector can be ordered separately.

Start By:

- A. Remove the rocker shaft assembly and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".
- B. Remove the fuel injection nozzles. Refer to Disassembly and Assembly, "Fuel Injection Nozzles - Remove".

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.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: The following procedure is for the removal of the inlet valve springs and the exhaust valve springs without removing the cylinder head.

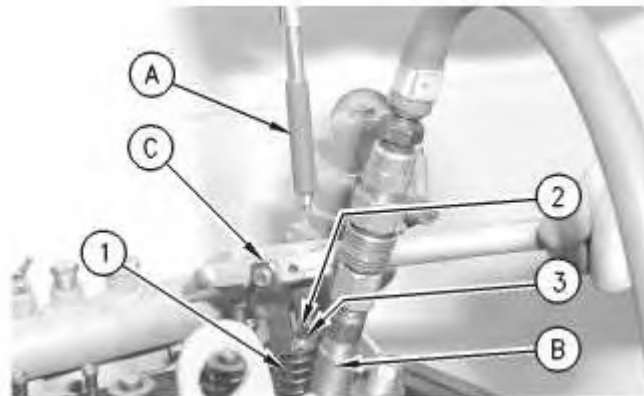


Illustration 1

g00609904

1. Install Tool (B). Attach an air hose to Tool (B) in order to force air pressure into the cylinder. This will hold the valves in position while the inlet and exhaust valve springs are removed and installed.

Note: Maintain air pressure in each cylinder until both of the valve springs are removed and installed.

2. Use Tool (C) to compress the valve spring (1) .

Note: Compress the valve spring evenly in order to avoid damage to the valve stem.

3. Use the magnetic end of Tool (A) to remove cap (2) (not shown) and valve keepers (3) (not shown) from the inlet and exhaust valves.
4. Slowly release the tension on Tool (C) .
5. Remove the retainer and spring (1) from the cylinder head assembly.

Note: Repeat Steps 1 through 5 in order to remove the remaining valve spring of the same cylinder.



Illustration 2

g00525271

6. Check the valve spring force with Tool (D). Refer to Specifications, "Valve Mechanism" for information on the valve springs.
7. Install the valve springs. Refer to the following installation procedure.
8. Perform Steps 1 through 7 for the removal and installation of the remaining inlet and exhaust valve springs.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	5S-1322	Valve Keeper Installer	1
B	9U-6145	Air Connector	1
C	9U-6144	Adapter	1
	7F-4292	Valve Spring Compressor	1
	6V-5223	Bolt	1
	8T-4121	Washer	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

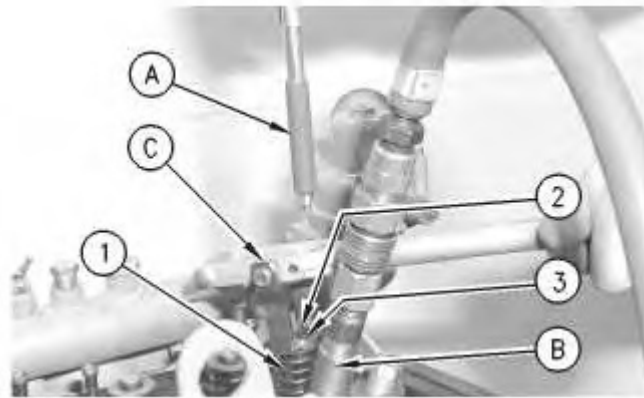


Illustration 3

g00609904

1. Keep an air hose connected to Tool (B) in order to force air pressure into the cylinder. This will hold the valves in position while the inlet and exhaust valve springs are removed and installed.
2. Position valve spring (1) and the retainer over the valve stem.
3. Use Tool (C) to compress valve spring (1) .


Note: Compress the valve spring evenly in order to avoid damage to the valve stem.

4. Place the valve keepers (3) (not shown) in position on the inlet and exhaust valves.

Note: Tool (A) may be used to install valve keepers.

! 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.

- 
5. Install cap (2) (not shown) on the inlet and exhaust valves and slowly release the tension on Tool (C). Tap the top of valve with a soft faced hammer in order to ensure that the valve keepers are properly installed.

Note: Repeat Steps 1 through 5 in order to install the remaining valve spring of the same cylinder.

6. Remove air hose and Tool (B) .
7. Perform Steps 1 through 6 for the installation of the remaining inlet and exhaust valve springs.

End By:

- a. Install the fuel injection nozzles. Refer to Disassembly and Assembly, "Fuel Injection Nozzles - Install".
- b. Install the rocker shaft assembly and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".

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Media Number -SEN5553-10

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i01615246

Inlet and Exhaust Valves - Remove and Install

SMCS - 1105-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-6691	Cylinder Head Repair Stand	1
B	1P-3527	Valve Spring Compressor	1
C	5S-1322	Valve Keeper Installer	1
D	8S-2263	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.

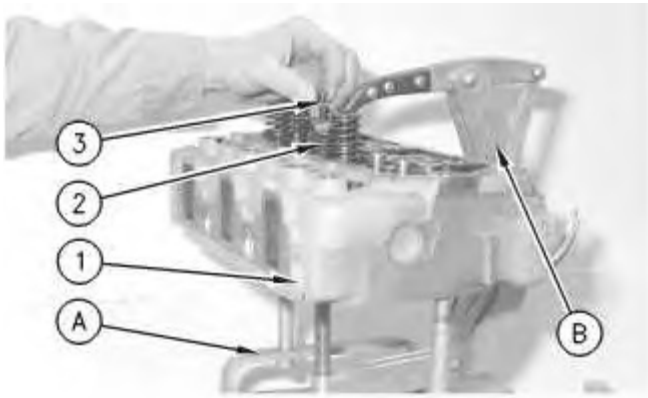


Illustration 1

g00610449

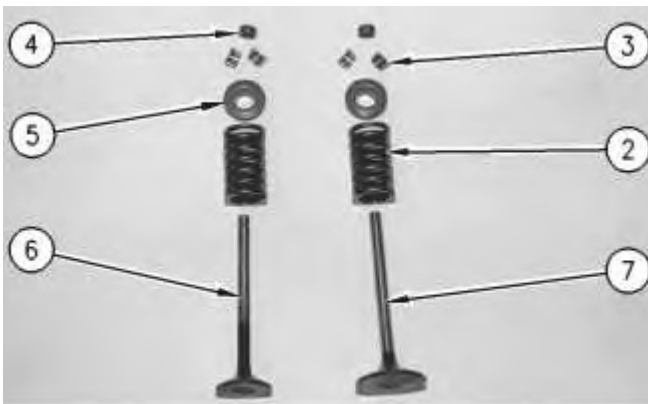


Illustration 2

g00610469

1. Support cylinder head assembly (1) on Tool (A) .
2. Use tool (B) to compress valve spring (2) .
3. Use the magnetic end of tool (C) (not shown) to remove cap (4) and valve keepers (3).
Slowly release the pressure on tool (B) and remove tool (B) .
4. Remove retainer (5) and remove spring (2) .



5. Check the valve spring force with Tool (D). Refer to Specifications, "Valve Mechanism" for information on the valve springs.
6. Remove exhaust valve (6) and inlet valve (7) through the bottom of the cylinder head assembly (1). Put identification marks on the valves for installation purposes.
7. Perform the following procedure, if the valves need to be refaced:
 - a. Set the machine that will reface the valves at an angle of 30 degrees.
 - b. The valve has a stellite facing. This facing will be gone, if the margin of the valve exceeds the service limit.
 - c. Replace the valve, if the margin exceeds the service limit after refacing.
 - d. Grind the valve seat in order to reface the valve seat, if necessary.
 - e. Replace the valve seat, if the width exceeds the repair limit as a result of wear or grinding.
8. Perform Steps 2 through 7 for the remaining inlet valves and exhaust valves in the cylinder head assembly.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-6691	Cylinder Head Repair Stand	1
B	1P-3527	Valve Spring Compressor	1
C	5S-1322	Valve Keeper Installer	1

NOTICE

Keep all parts clean from contaminants.

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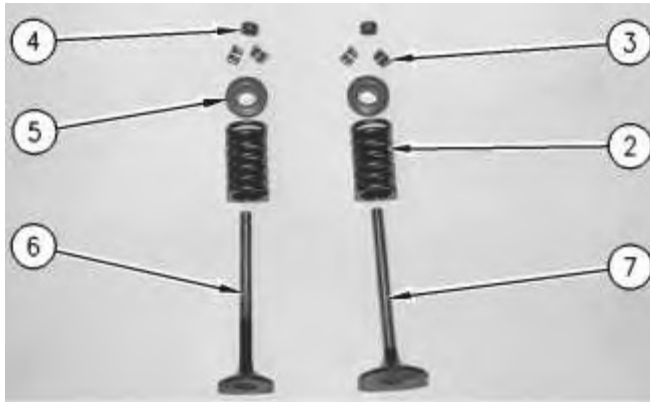


Illustration 4

g00610469

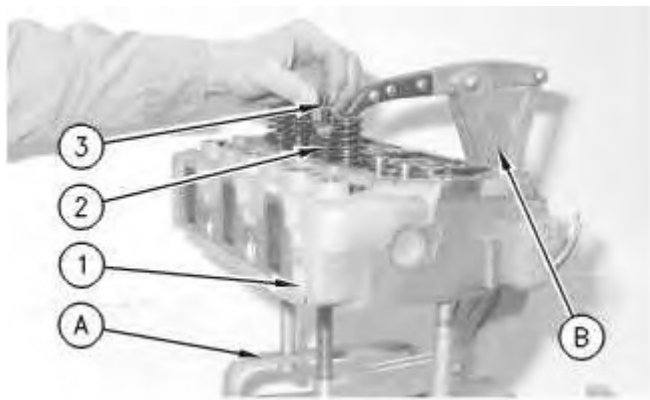


Illustration 5

g00610449

1. Support cylinder head assembly on Tool (A). Lubricate the inlet and exhaust valves with clean engine oil. Install the inlet and exhaust valves through the bottom of the cylinder head.
Note: Ensure that the inlet and exhaust valves are installed in the original location in the cylinder head.
2. Install spring (2) and retainer (5) .
3. Use Tool (B) to compress spring (2). Install valve keepers (3) and cap (4) on the valve stem with Tool (C) .

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 (B). Tap the top of exhaust valve (6) or inlet valve (7) with a soft faced hammer in order to ensure that the valve keepers are properly installed.
5. Repeat Steps 2 through 4 for the installation of the remaining inlet and exhaust valves.

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

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3064 and 3066 Engines for Caterpillar Built Machines**

Media Number -SEN5553-10

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i01650677

Inlet and Exhaust Valve Guides - Remove and Install

SMCS - 1104-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	4C-6366	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.

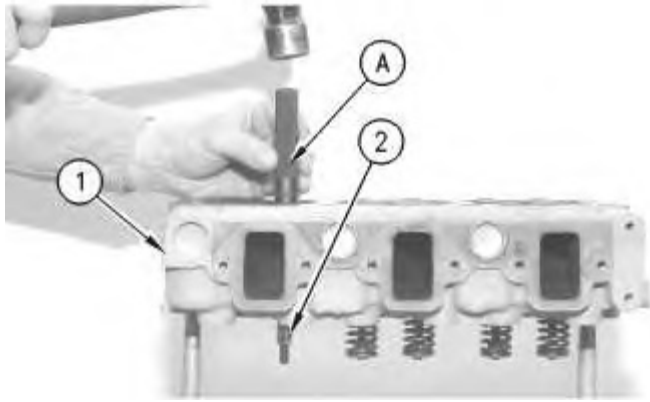


Illustration 1

g00610512

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

Installation Procedure

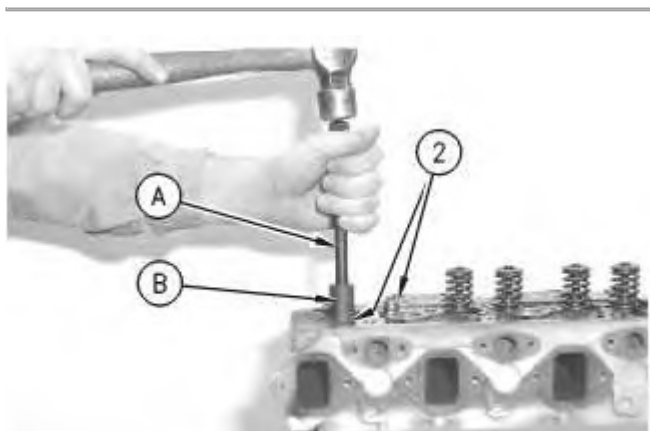
Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	4C-6366	Valve Guide Driver	1
B	4C-6370	Valve Guide Collar	1

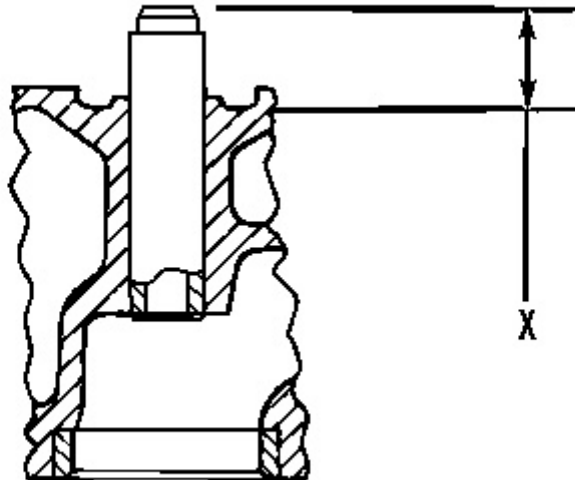
NOTICE

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 valve guide (2) with Tool (A) and Tool (B). The valve guide is driven from the top of the cylinder head.



Typical Example

2. The counterbore in Tool (B) installs the valve guide to the correct height. Height (X) from the top of the valve guide to the cylinder head must be 17.00 ± 0.30 mm (0.699 ± 0.012 inch). For more information on the inlet and exhaust valve guides, refer to Specifications, "Valve Mechanism".

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

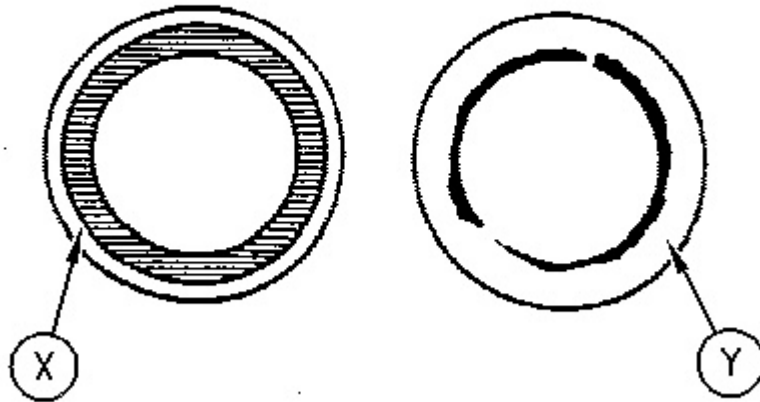


Illustration 4

g00613475

View (X) shows that the contact between the valve and the valve seat is good. View (Y) shows that the contact between the valve and the valve seat is poor.

3. Perform the following procedure after the valve guide has been inspected or the valve guide has been replaced:
 - a. Check the valve face.
 - b. Press the valve that is coated with red lead against the seat without rotating the valve.
 - c. After refacing or replacement of the valve or valve seat, be sure to lap the valve into the valve seat.
4. Repeat Steps 1 through 3 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
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Media Number -SEN5553-10

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i01565864

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	166-7441	Valve Seat Extractor Tool Group	1
	6V-4194	Valve Seat Extractor ⁽¹⁾	1
	6V-4196	Valve Seat Extractor ⁽¹⁾	1

⁽¹⁾ This is a component of the Valve Seat Extractor Tool Group.

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

g00524540

A 3066 cylinder head is shown.

1. Use the valve seat grinder of Tool (A) in order to notch the valve seat.

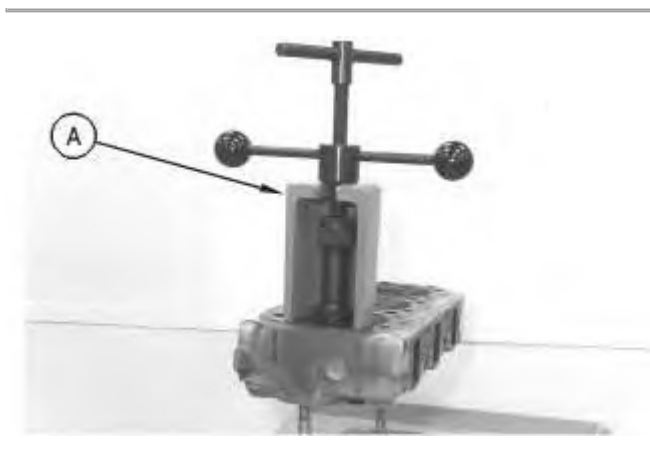


Illustration 2

g00524545

A 3066 cylinder head is shown.

2. Use the valve seat extractor of Tool (A) to remove the inlet and exhaust valve seats.
3. Clean the valve seat in the cylinder head. Remove any rough areas from the valve seat in the cylinder head.
4. Repeat Steps 1 through 3 for the remaining inlet valve seat inserts and exhaust valve seat inserts.

Installation Procedure

Table 2

Required Tools			

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