

Product: TRACK LOADER

Model: 933 TRACK LOADER 8FL

Configuration: 933 & 933 LGP Track Loaders Power Shift 8FL00001-UP (MACHINE) POWERED BY 3046 Engine

Disassembly and Assembly 3046 Engine For Caterpillar Built Machines

Media Number -SEN6458-05

Publication Date -01/04/2004

Date Updated -22/04/2004

i01646292

Gear Group (Front) - Remove - Idler Gear Only

SMCS - 1206-011

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6148	Idler Shaft Puller	1

Start By:

- A. Remove the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Remove".

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.

Note: Before removal, ensure that the marks on the timing gears are in alignment. Align the fuel injection drive gear with the "33" mark with the "3" mark on the idler gear. Make an alignment of the "2" mark on the camshaft gear with the "22" mark on the idler gear. Align the "1" mark on the crankshaft gear with the "11" mark on the idler gear. The No. 1 cylinder is at the top center position when these marks are in alignment.

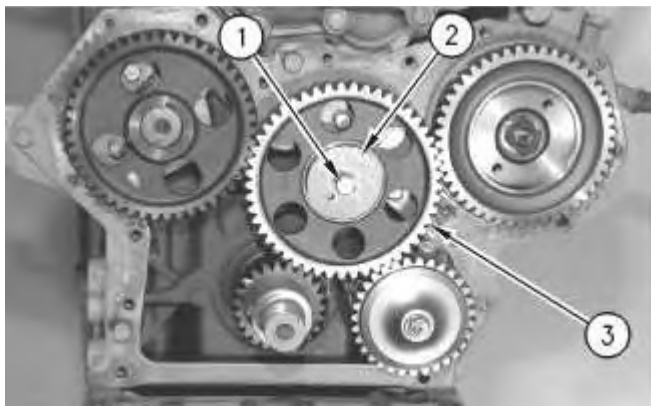


Illustration 1

g00559575

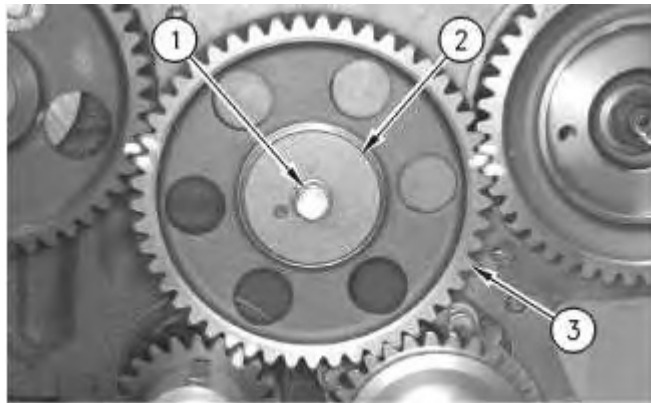


Illustration 2

g00559536

1. Remove idler gear bolt (1) and the washer from the idler gear shaft .
2. Remove thrust plate (2) .
3. Remove idler gear (3) .

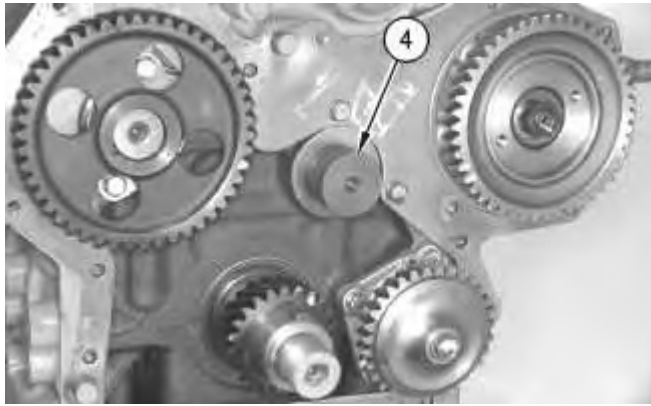


Illustration 3

g00559567

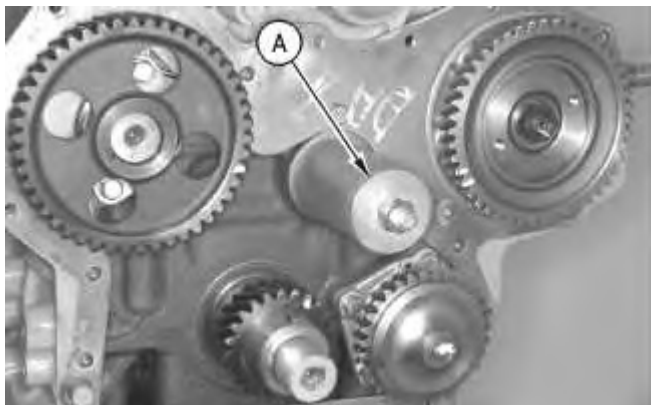


Illustration 4

g00559569

4. Use Tool (A) and remove idler shaft (4) from the cylinder block.



Illustration 5

g00559572

5. If necessary, remove five bolts (5) that hold front plate (6) to the cylinder block.

6. Remove front plate (6) and the gasket.

Note: See the following list for the removal of the other gears in the front gear group.

- In order to remove the camshaft gear, refer to Disassembly and Assembly, "Camshaft - Remove and Install".
 - In order to remove the fuel injection pump gear, refer to Disassembly and Assembly, "Fuel Injection Pump Housing and Governor - Remove".
 - In order to remove the gear to the engine oil pump, refer to Disassembly and Assembly, "Engine Oil Pump - Remove".
 - In order to remove the crankshaft front gear, refer to Disassembly and Assembly, "Crankshaft Gear - Remove and Install".
-

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i01045442

Gear Group (Front) - Install - Idler Gear Only

SMCS - 1206-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

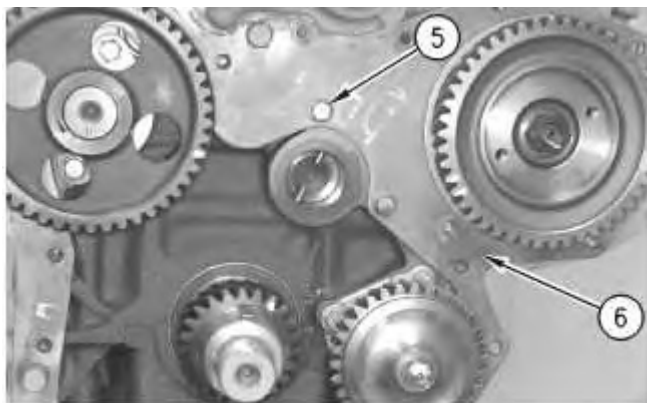


Illustration 1

g00559572

1. Install a new gasket and front plate (6) .

Note: Ensure that all mating surfaces are clean and free of old gasket material.

2. Install five bolts (5) that hold front plate (6) to the cylinder block. Tighten these bolts to a torque of 10 to 13 N·m (7 to 10 lb ft).

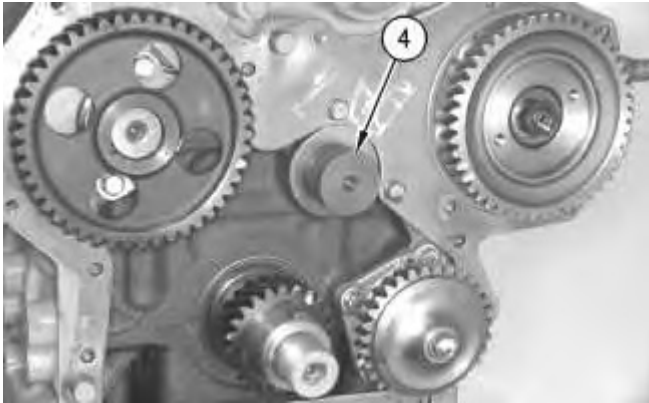


Illustration 2

g00559567

3. Install idler shaft (4) onto the cylinder block.

Note: If necessary, cool the idler shaft to 0 °C (32 °F) before installation.

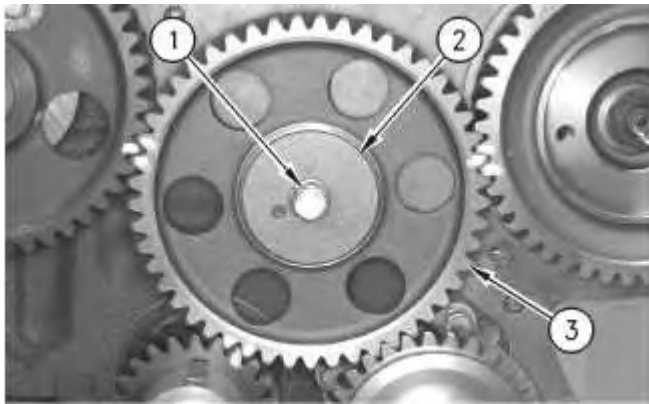


Illustration 3

g00559536

Note: Ensure that the marks on the timing gears are in alignment. Align the fuel injection drive gear with the "33" mark with the "3" mark on the idler gear. Make an alignment of the "2" mark on the camshaft gear with the "22" mark on the idler gear. Align the "1" mark on the crankshaft gear with the "11" mark on the idler gear. The No. 1 cylinder is at the top center position when these marks are in alignment.

4. Install idler gear (3) .
5. Install thrust plate (2) .
6. Install the washer and idler gear bolt (1) onto thrust plate (2). Tighten idler gear bolt (1) to a torque of 34 ± 5 N·m (25 ± 4 lb ft).

Note: For more information, refer to the Specifications Module, "Gear Group (Front)".

Note: See the following list for the installation of the other gears in the front gear group.

- In order to install the camshaft gear, refer to Disassembly and Assembly, "Camshaft - Remove and Install".
- In order to install the fuel injection pump gear, refer to Disassembly and Assembly, "Fuel Injection Pump Housing and Governor - Install".
- In order to install the gear from the engine oil pump, refer to Disassembly and Assembly, "Engine Oil Pump - Install".
- In order to install the crankshaft front gear, refer to Disassembly and Assembly, "Crankshaft Front Gear - Remove and Install".

End By: Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".

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i01646584

Housing (Front) - Remove

SMCS - 1162-011

Removal Procedure

Start By:

- A. Remove the alternator. Refer to Disassembly and Assembly, "Alternator - Remove and Install".
- B. Remove the vibration damper and the pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove and Install".

NOTICE

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NOTICE

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Dispose of all fluids according to local regulations and mandates.

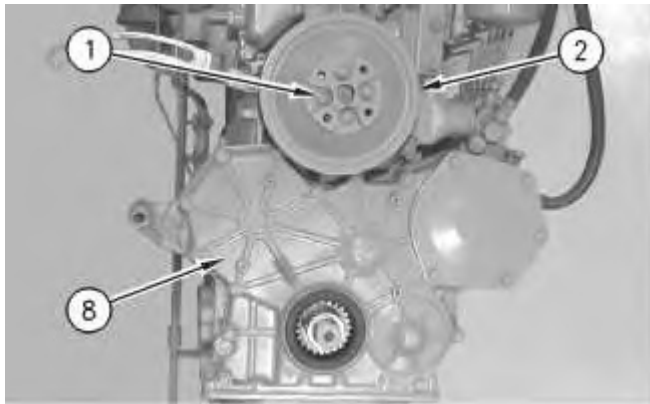


Illustration 1

g00560210

1. Remove four bolts (1) and the washers from fan pulley (2) .
2. Remove fan pulley (2) .

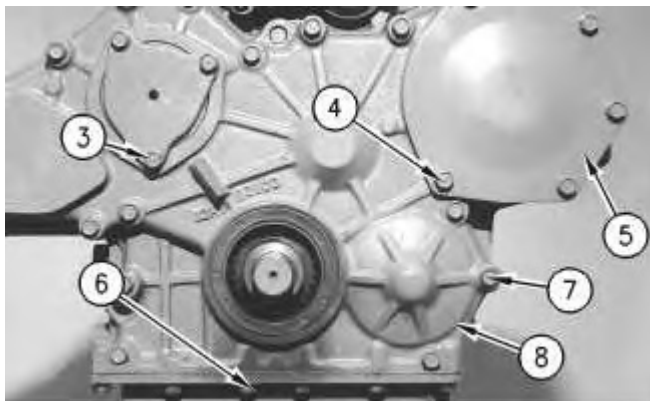


Illustration 2

g00529390

3. If equipped, remove bolts (3) and the washers from front housing (8) .
4. Remove five bolts (4) and the washers from cover (5) for the fuel injection pump gear.
5. Remove cover (5) for the engine oil pump.
6. Remove six bolts (6) and the washers that secure the engine oil pan to the front housing.
7. Remove bolts (7) that secure front housing (8) to the cylinder block.
8. Remove front housing (8) .

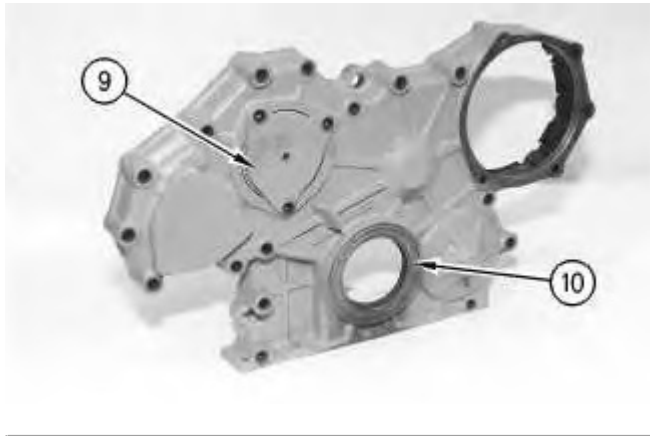


Illustration 3

g00529391

9. If equipped, remove cover (9) for the camshaft gear.
10. Check the condition of crankshaft front seal (10). If the crankshaft front seal is worn or damaged, use a new part for replacement. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Remove" for removal of the crankshaft front seal .

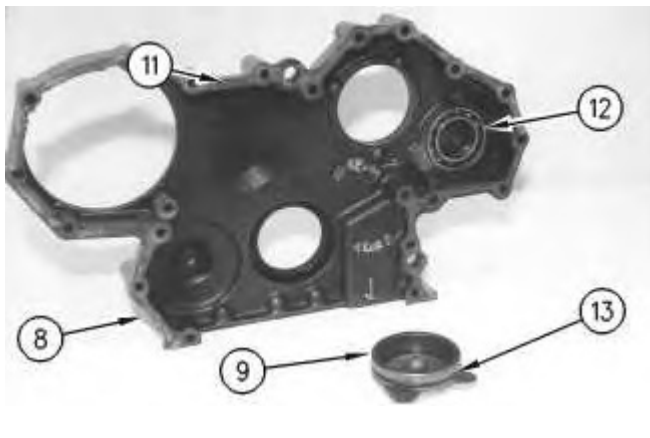


Illustration 4

g00529392

11. Remove bearing (12), if equipped. If the bearing is worn or damaged, use a new part for replacement.
 12. Clean old gasket material (11) from the contact surface of front housing (8) and the timing gear plate.
-

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i01646599

Housing (Front) - Install

SMCS - 1162-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

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

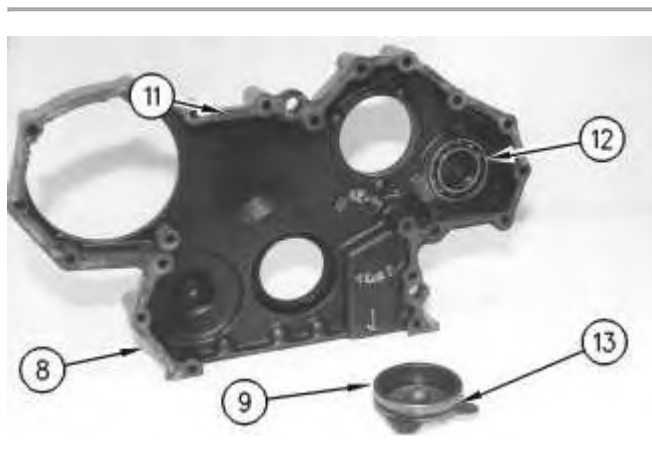


Illustration 1

g00529392

1. Clean old gasket material (11) from the contact surface of front housing (8) and the timing gear plate. Install a new gasket.
2. Install bearing (12), if equipped. If the bearing is worn or damaged, use a new part for replacement.
3. Install O-ring seal (13) onto cover (9), if equipped.

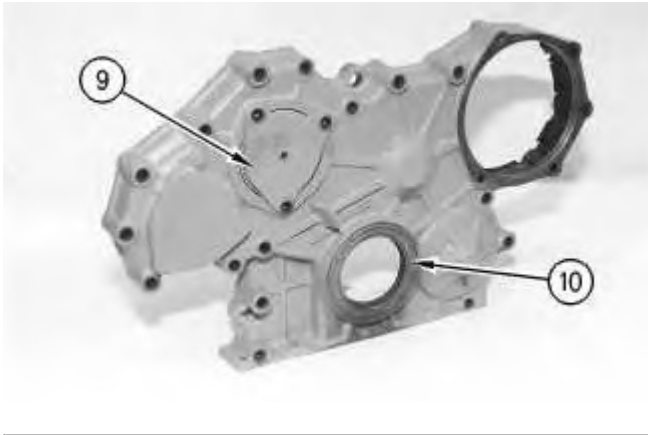


Illustration 2

g00529391

4. Install a new crankshaft front seal (10), if the crankshaft front seal was removed. Refer to Disassembly and Assembly, "Crankshaft Front Seal - Install".
5. If equipped, install camshaft gear cover (9) onto front housing (8) .

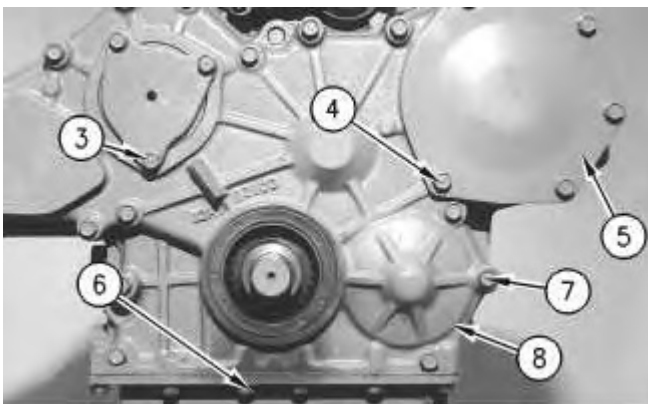


Illustration 3

g00529390

6. Install front housing (8) .
7. Install bolts (7) in order to fasten front housing (8) onto the cylinder block.
8. Install the washers and six bolts (6) in order to secure front housing (8) onto engine oil pan.
9. Install cover (5) for fuel injection pump gear.

10. Install the washers and five bolts (4) in order to secure cover (5) for fuel injection pump gear onto front housing (8) .
11. If equipped, install the washers and bolts (3) in order to secure camshaft gear cover (9) onto front housing (8) .

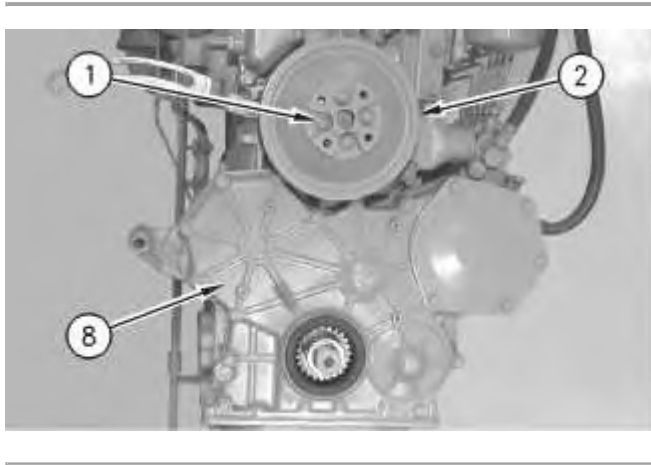


Illustration 4

g00560210

12. Install fan pulley (2) .
13. Install the washers and four bolts (1) in order to secure fan pulley (2) onto the water pump.

End By:

- a. Install the vibration damper and the pulley. Refer to Disassembly and Assembly, "Vibration Damper and Pulley - Remove and Install".
 - b. Install the alternator. Refer to Disassembly and Assembly, "Alternator - Remove and Install".
-

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i01579643

Valve Mechanism Cover - Remove and Install

SMCS - 1107-010

Removal Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

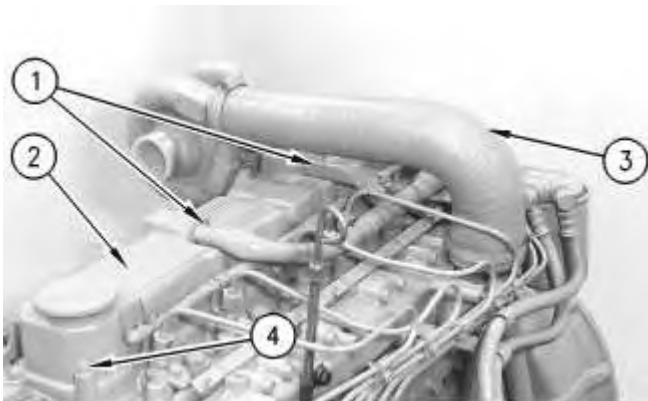


Illustration 1

g00530277

1. Loosen two hose clamps and remove hose (3) from the air inlet manifold and the turbocharger.

2. Loosen the clamps and disconnect two hoses (1) from valve mechanism cover (2) .
3. Remove seven bolts (4) and the washers from valve mechanism cover (2) .
4. Remove valve mechanism cover (2) .



Illustration 2

g00530278

5. Remove gasket (5) from valve mechanism cover (2) .

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



Illustration 3

g00530278

1. Check the condition of gasket (5) on valve mechanism cover (2). If the gasket is worn or damaged, use a new part for replacement.

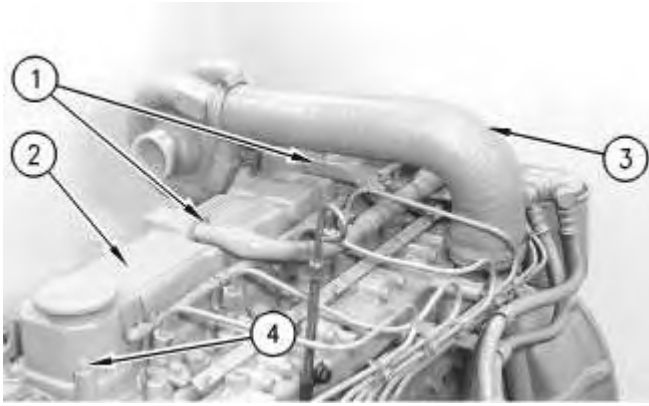


Illustration 4

g00530277

2. Install valve mechanism cover (2) and bolts (4). Torque the bolts to 3 N·m to 5 N·m (26 lb in to 44 lb in).
 3. Install two hoses (1) onto valve mechanism cover (2) and tighten the clamps that secure the hoses.
 4. Install hose (3) and tighten the two clamps that secure the hose.
-

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Publication Date -01/04/2004

Date Updated -22/04/2004

i01030044

Rocker Shaft and Pushrod - Remove

SMCS - 1102-011; 1208-011

Removal Procedure

Start By:

- A. Remove the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

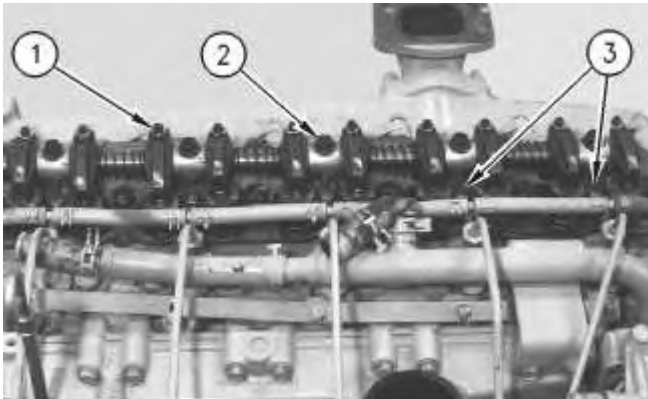


Illustration 1

g00530465

1. Loosen adjusting screws (1) on rocker arms.
2. Loosen six short bolts (3) and the washers on the rocker arm brackets.
3. Loosen six rocker bracket bolts (2) .

Note: Rocker bracket bolts are the longer bolts.

4. Remove six rocker bracket bolts (2) from the rocker arm brackets.
5. Remove six short bolts (3) and the washers from the rocker arm brackets.
6. Remove the rocker shaft assembly.

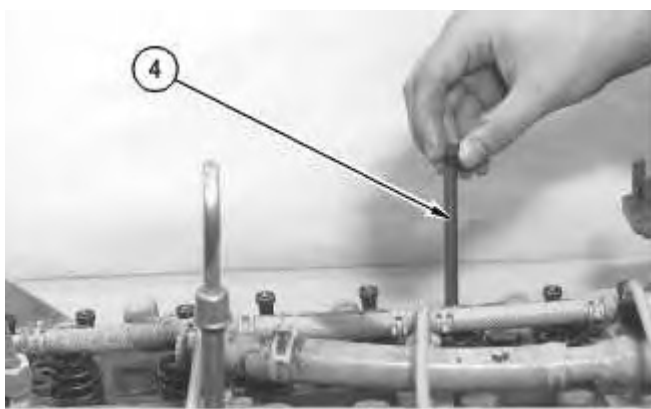


Illustration 2

g00530467

7. Put identification marks on pushrods (4) in order to identify the location of the pushrods in the engine. Remove pushrods (4) .
-

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Publication Date -01/04/2004

Date Updated -22/04/2004

i02063400

Rocker Shaft - Disassemble

SMCS - 1123-015

Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1855	Retaining Ring Pliers	1

Start By:

- A. Remove the rocker shaft and pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



Illustration 1

g00531311

1. Use Tool (A) to remove snap ring (1) on each end of the rocker shaft assembly.

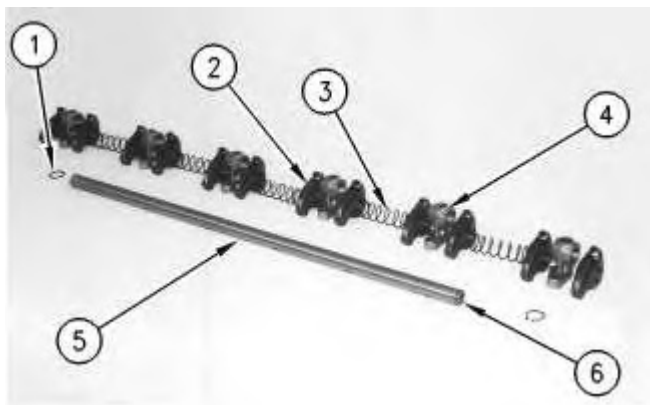


Illustration 2

g00531306

2. Remove twelve rockers (2), six rocker arm shaft brackets (4) and six springs (3) from each end of shaft assembly (5) .

Note: Mark the location and the position of each component for later assembly.

3. Remove plugs (6) from each end of shaft assembly (5) .

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Publication Date -01/04/2004

Date Updated -22/04/2004

i02063398

Rocker Shaft - Assemble

SMCS - 1102-016

Assembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1855	Retaining Ring Pliers	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

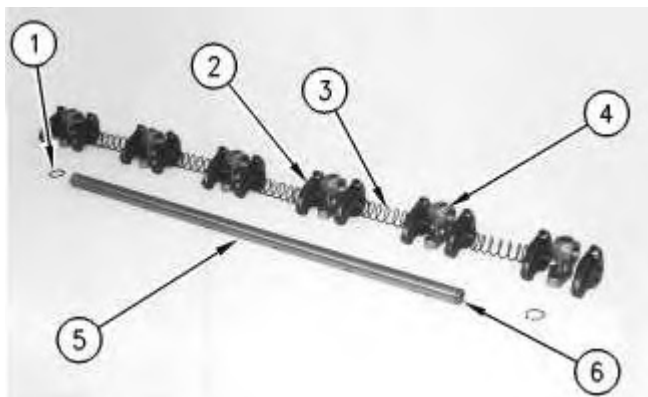


Illustration 1

g00531306

1. Install twelve rockers (2), six rocker arm shaft brackets (4) and six springs (3) onto shaft assembly (5) .
2. Install plugs (6) into each end of shaft assembly (5) .



Illustration 2

g00531311

3. Use Tool (A) to install snap ring (1) on each end of the rocker shaft assembly.

End By: Install the rocker shaft and pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrods - Install".

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i01579663

Rocker Shaft and Pushrod - Install

SMCS - 1102-012; 1208-012

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

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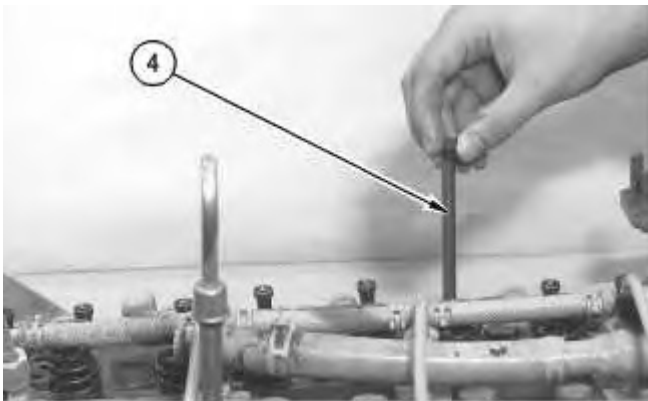


Illustration 1

g00530467

1. Install pushrods (4) .

Note: Ensure that the pushrods are installed in the original location and seated in the valve lifters correctly.

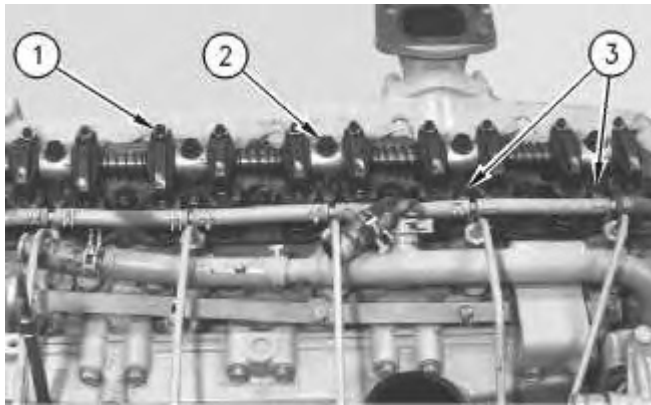


Illustration 2

g00530465

2. Install the rocker shaft assembly.
3. Install six rocker bracket bolts (2) and tighten the rocker bracket bolts to a torque of 15 ± 5 N·m (11 ± 4 lb ft).
Note: Rocker bracket bolts are the longer bolts.
4. Install six short bolts (3) and the washers. Tighten the short bolts to a torque of 15 ± 5 N·m (11 ± 4 lb ft).
5. Adjust the inlet valve lash and the exhaust valve lash to 0.25 mm (0.010 inch). Refer to Testing and Adjusting, "Air Inlet and Exhaust System" for more information on setting the valve lash. Tighten adjusting screws (1) .

End By: Install the valve mechanism cover. Refer to Disassembly and Assembly, "Valve Mechanism Cover - Remove and Install".

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i01032735

Cylinder Head - Remove

SMCS - 1100-011

Removal Procedure

Start By:

- A. Remove the turbocharger. Refer to Disassembly and Assembly, "Turbocharger - Remove".
- B. Remove the rocker shaft and pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrods - Remove".
- C. Remove the fuel injection nozzles in order to protect from damage. Refer to Disassembly and Assembly, "Fuel Injection Nozzles - Remove".
- D. Remove the glow plugs in order to protect from damage. Refer to Disassembly and Assembly, "Glow Plugs - Remove and Install".

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NOTICE

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Dispose of all fluids according to local regulations and mandates.

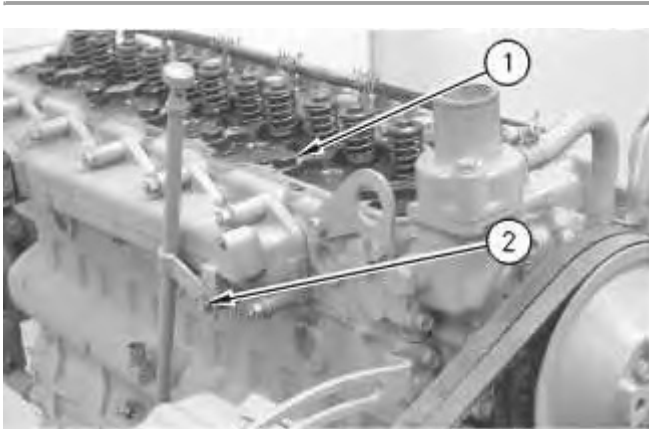


Illustration 1

g00562585

1. If necessary, remove bolt (2) and remove oil tube assembly (dipstick).
-

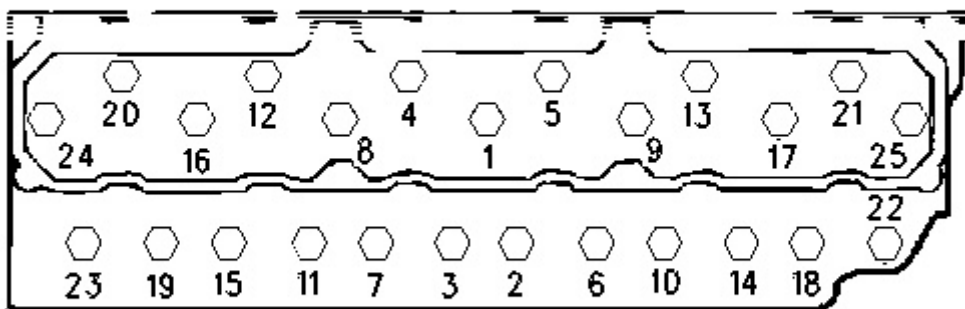


Illustration 2

g00531679

Cylinder Head Tightening Sequence

2. Gradually remove 25 cylinder head bolts (1) in reverse order of the tightening sequence.

Note: Do not use a pry bar to separate the cylinder head from the engine block.

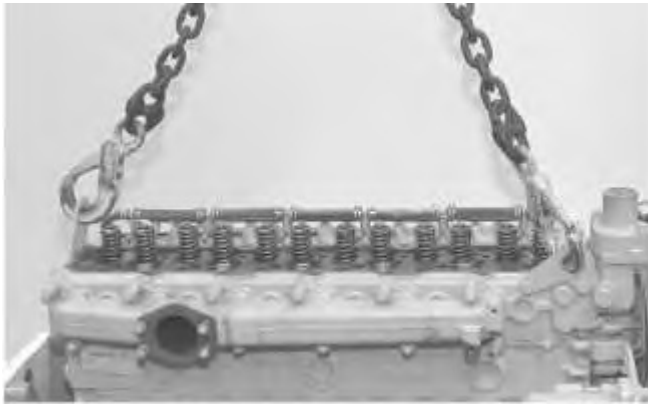


Illustration 3

g00560287

3. Attach a hoist to the cylinder head lifting brackets and remove the cylinder head from the cylinder block. The weight of the cylinder head assembly is 60 kg (132 lb).

Note: Place the cylinder head on a surface that will not damage the face of the cylinder head.

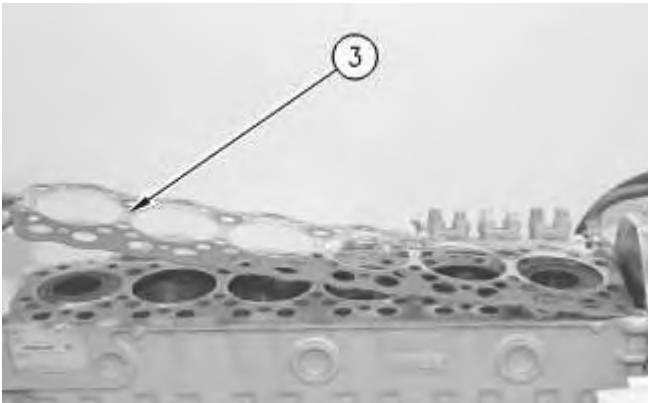


Illustration 4

g00560297

4. Remove the cylinder head gasket (3) .
-

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