

Product: TELEHANDLER

Model: TH210 TELEHANDLER MHT

Configuration: TH210 Telehandler MHT00001-UP (MACHINE) POWERED BY 3054C Engine

Disassembly and Assembly 3054C Engines for Caterpillar Built Machines

Media Number -SEN5069-18

Publication Date -01/05/2015

Date Updated -19/09/2018

i02298106

Rocker Shaft and Pushrod - Install

SMCS - 1102-012; 1208-012

Installation Procedure

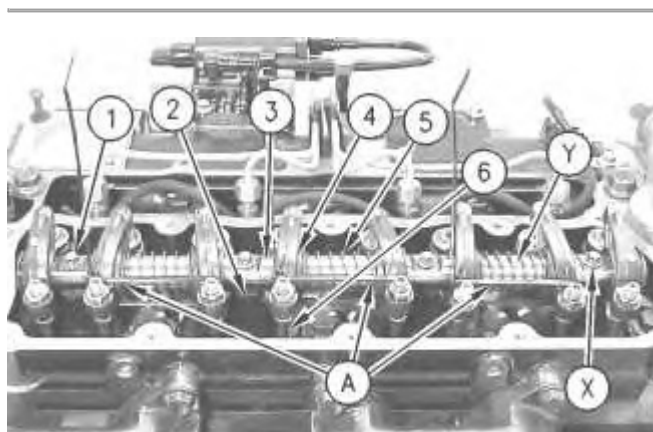
Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	6K-0806	Cable Strap	3

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.



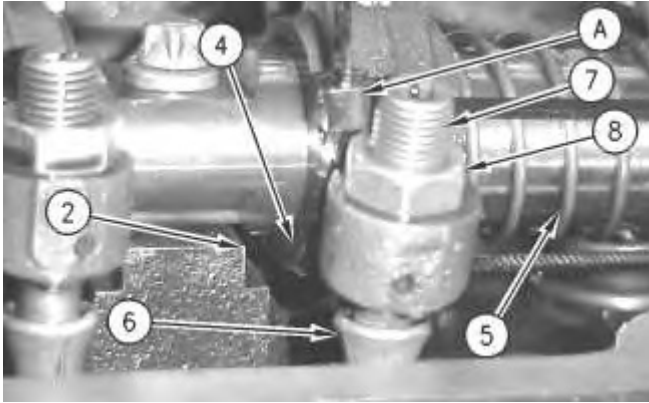


Illustration 2

1. Apply clean engine lubricating oil to both ends of the pushrods (6). Install the pushrods (6).

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

2. If the rocker shaft was disassembled, install the Tooling (A) around the rocker arms (4) in order to slightly compress spring (5). The rocker arms must be held away from the machined face of the cylinder head (2) during reassembly.
3. Loosen the nut (8) and the adjustment screw (7) on each rocker arm. This will help prevent a bent valve or a bent pushrod during the installation of the rocker shaft.
4. Position the rocker shaft assembly on the cylinder head.

Note: The rocker shaft (3) of the rocker shaft assembly is not symmetrical. The rocker shaft (3) has a machined flat at the front end of the shaft. Ensure that the machined flat is toward the top and toward the front end of the engine.

5. Install the Torx screws (1) in the rocker shaft (3).

Note: The longest Torx screw must be installed at the front of the cylinder head in the hole (X).

6. Ensure that the adjustment screws (7) are properly seated in the ends of the pushrods (6).
7. Alternately tighten the Torx screws (1). Start from the center and work toward the outside. Tighten the Torx screws (1) to a torque of 35 N·m (26 lb ft).
8. Cut and remove the Tooling (A) from the rocker shaft assembly.
9. Adjust the inlet valve lash to 0.20 mm (0.008 inch) and adjust the exhaust valve lash to 0.45 mm (0.018 inch). Refer to Testing and Adjusting, "Engine Valve Lash - Inspect/Adjust" for more information on adjusting the valve lash.

End By:

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

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i02298184

Cylinder Head - Remove

SMCS - 1100-011

Removal Procedure

Start By:

- a. Drain the coolant from the engine oil cooler into a suitable container for storage or disposal. Drain the engine oil from the engine oil cooler into a suitable container. Refer to Operation and Maintenance Manual for the procedure on draining the engine coolant and the engine oil.
- b. Remove the hose from the air filter to the integral air inlet. Refer to the OEM information for further details.
- c. Remove the fuel priming pump. Refer to this Disassembly and Assembly Manual, "Fuel Priming Pump and Fuel Filter Base - Remove and Install".
- d. Remove the pipe for the boost control.
- e. Remove the fuel injectors. Refer to this Disassembly and Assembly Manual, "Fuel Injection Nozzles - Remove".
- f. Remove the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
- g. Remove the rocker shaft assembly and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Remove".
- h. Remove the glow plugs. Refer to this Disassembly and Assembly Manual, "Glow Plugs - Remove and Install".

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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

Note: Refer to Operation and Maintenance Manual, "Refill Capacities" for the coolant capacity and the engine oil capacity of the engine.

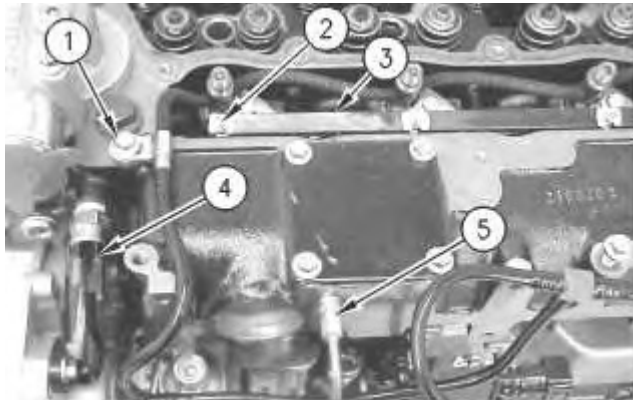


Illustration 1

g00951472

1. Remove the setscrew (1) and the fuel line from the cylinder head.
 2. Disconnect the harness assembly (4) from the coolant temperature sensor.
 3. Disconnect tube assembly (5) from the cylinder head.
-

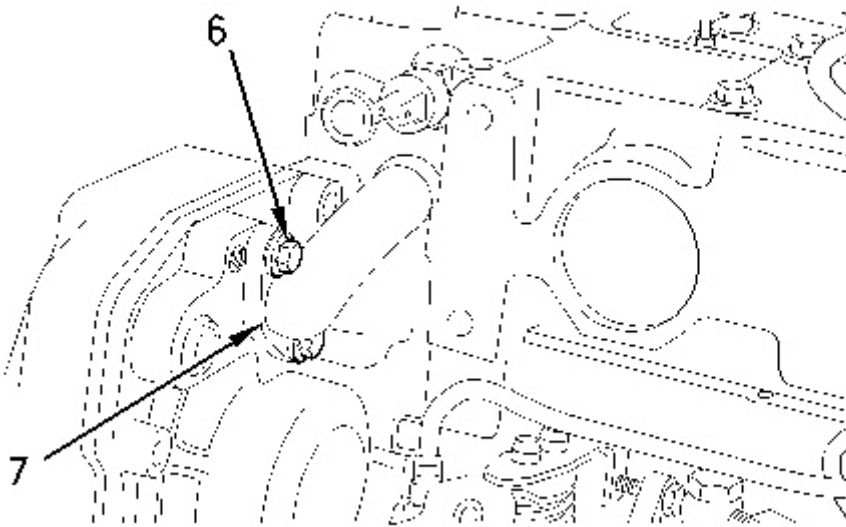


Illustration 2

g00954953

4. Remove the setscrews (6). Remove the bypass tube (7) from the cylinder head. Remove the O-ring seals from the bypass tube. Discard the O-ring seals.

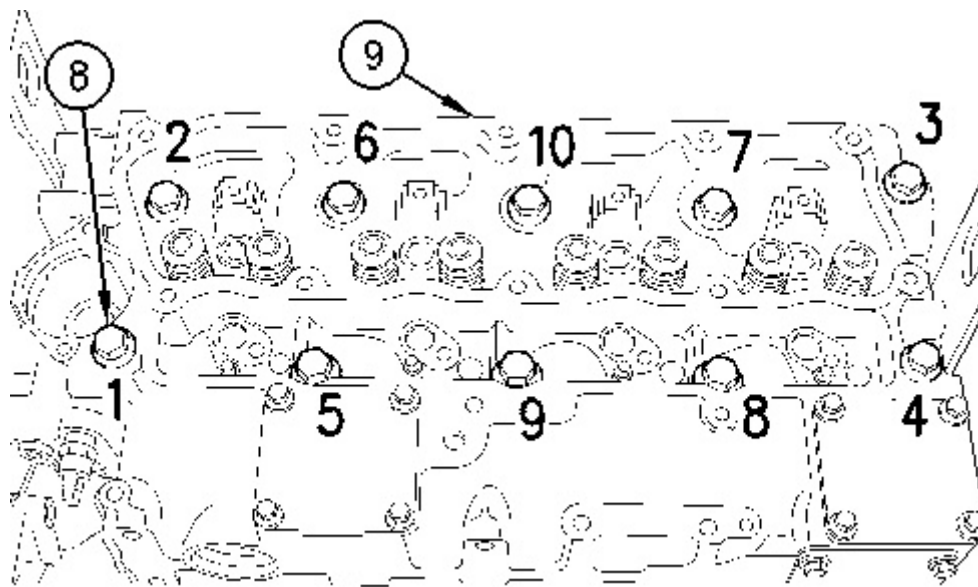


Illustration 3

g00951484

5. Gradually loosen the setscrews (8) in reverse numerical order. Refer to Illustration 3. This will help prevent distortion of the cylinder head.
6. Remove the setscrews (8) from the cylinder head (9).
7. Use a suitable lifting device and carefully lift the cylinder head off the cylinder block. The weight of the cylinder head is approximately 57 kg (126 lb).

Note: Take care not to damage the machined surfaces of the cylinder head (9) during removal.

Note: Do not use a lever to separate the cylinder head from the cylinder block.

NOTICE

Place the cylinder head on a surface that will not scratch the face of the cylinder head.

8. Remove the cylinder head gasket. Discard the cylinder head gasket.

Note: Note the location of the dowels on the cylinder block.

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i02298802

Cylinder Head - Install

SMCS - 1100-012

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	9U-6238	Guide Bolt	2
B	8T-3052	Degree Wheel	1
C	-	Red Rubber Grease	-

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Thoroughly clean the top of the cylinder block and the bottom of the cylinder head. Ensure that there is no debris in the cylinder bores, the coolant passages, and the lubricant passages.

Note: Thoroughly clean the hole in the cylinder head for the gas that is ventilated from the crankcase. Ensure that the hole is not restricted by debris and/or oil deposits.

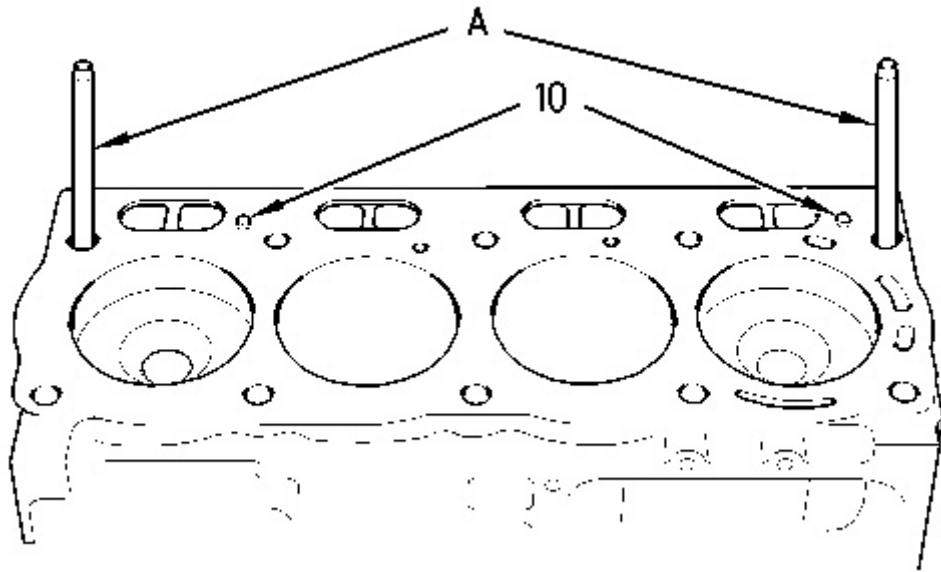


Illustration 1

g00951564

1. Install the cylinder head gasket on the dowels (10) on top of the cylinder block.

Note: Do not use any sealant or compound on the cylinder head gasket.

2. Install the Tooling (A) in the cylinder block.

3. Use a suitable lifting device to install the cylinder head. The weight of the cylinder head is approximately 57 kg (126 lb).

Note: Ensure that the cylinder head is positioned on dowels (10). Take care not to damage the machined surfaces of the cylinder head during installation.

4. Remove the Tooling (A).

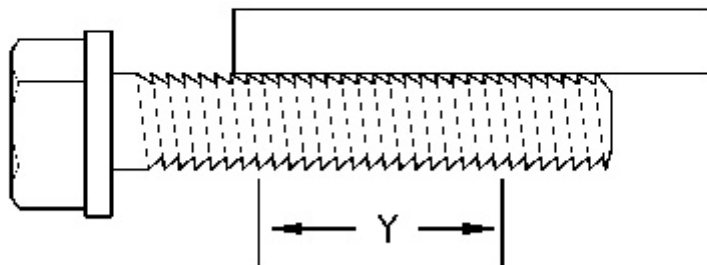


Illustration 2

g00951563

5. Clean the threads of the setscrews that secure the cylinder head. Inspect the threads of the setscrews that secure the cylinder head.

Note: Do not use the setscrews if there is any visual reduction in the diameter of the threads (Y) that has not been engaged with the cylinder block. Use a straight edge to check the bolts.

6. Apply clean engine oil to the threads and the shoulder of the setscrews that secure the cylinder head before installation.

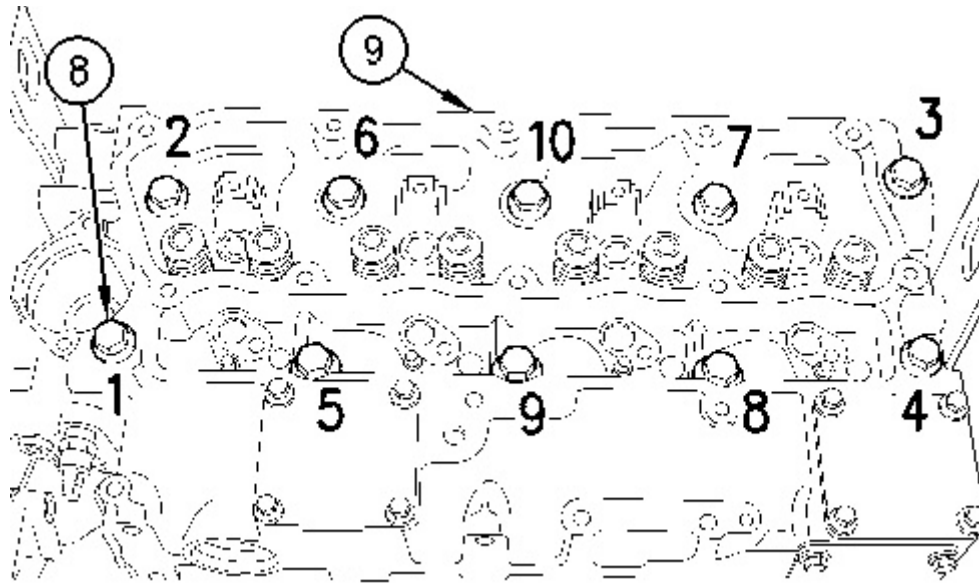


Illustration 3

g00951484

7. Install the setscrews (8) in cylinder head (9).

Note: The short setscrews are installed in holes that are marked 2, 5, 6, 7, 8, 9, and 10.

Note: The long setscrews are installed in holes that are marked 1, 3, and 4.

8. Tighten the setscrews in numerical order to a torque of 50 N·m (37 lb ft). Refer to Illustration 3.
 9. Tighten the setscrews in numerical order to a torque of 100 N·m (74 lb ft). Refer to Illustration 3.
-

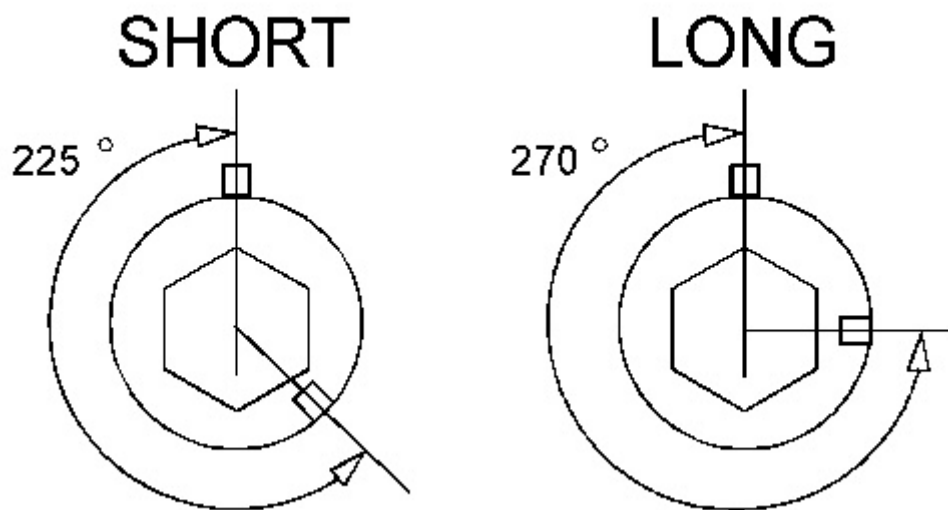


Illustration 4

g01151296

10. Use the Tooling (B) to achieve the correct final torque.

Note: If the Tooling (B) is not available, place an index mark on each setscrew.

11. Tighten the setscrews in numerical order. Refer to Illustration 3.

- a. Turn the short setscrews (2, 5, 6, 7, 8, 9, and 10) for an additional 225 degrees.
- b. Turn the long setscrews (1, 3, and 4) for an additional 270 degrees.

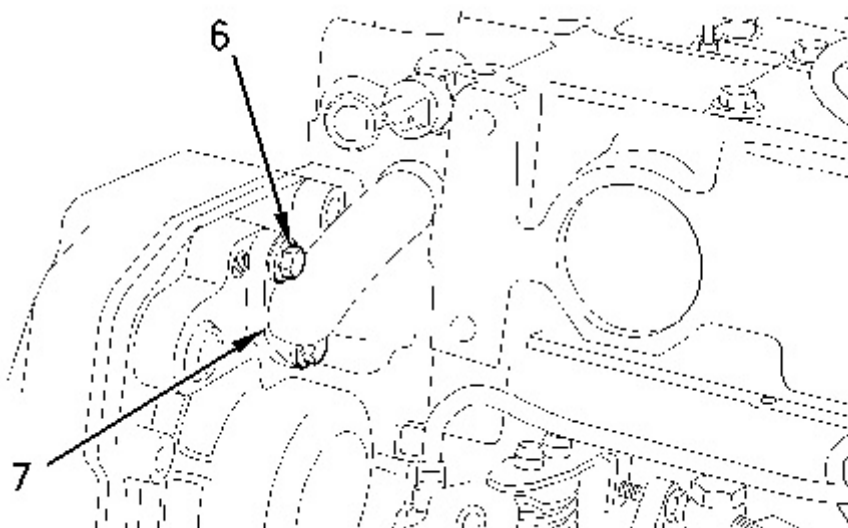


Illustration 5

g00954953

12. Install new O-ring seals on the bypass tube (7). Apply Tooling (C) to the O-ring seals. Install the bypass tube in the cylinder head. Install the setscrews (6).

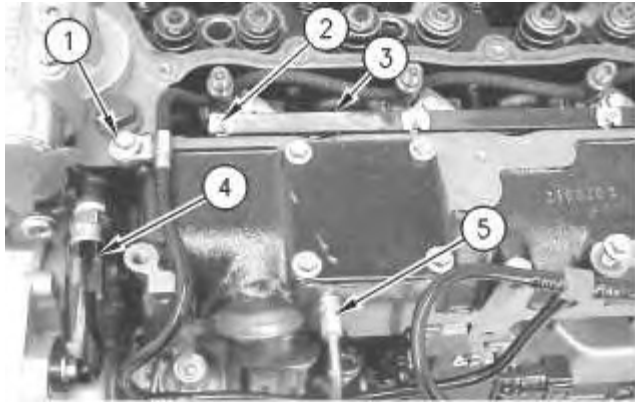


Illustration 6

g00951472

13. Connect the tube assembly (5) to the cylinder head.
14. Connect the harness assembly (4) to the coolant temperature sensor.
15. Install bolt (1) and the fuel line to the cylinder head.
16. Fill the cooling system with coolant. Fill the lubrication system with engine oil.

Note: Refer to Operation and Maintenance Manual, "Refill Capacities" for the cooling system capacity and the lubrication system capacity of the engine.

End By:

- a. Install the glow plugs. Refer to Disassembly and Assembly Manual, "Glow Plugs - Remove and Install".
 - b. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".
 - c. Install the exhaust manifold. Refer to Disassembly and Assembly, "Exhaust Manifold - Remove and Install".
 - d. Install the fuel injection Nozzles. Refer to Disassembly and Assembly Manual, "Fuel Injection Nozzles - Install".
 - e. Install the pipe for the boost control.
 - f. Install the fuel priming pump. Refer to Disassembly and Assembly Manual, "Fuel Priming Pump and Fuel Filter Base - Remove and Install".
 - g. Install the hose from the integral air inlet to the air filter. Refer to the OEM information for further details.
 - h. Refill the engine with coolant and engine oil. Refer to the Operation and Maintenance Manual for the correct procedure, the quantities, the coolant specification, and the specification for the engine oil.
-

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i02333592

Lifter Group - Remove and Install

SMCS - 1209-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7262	Telescoping Magnet	1

Start By:

- Remove the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

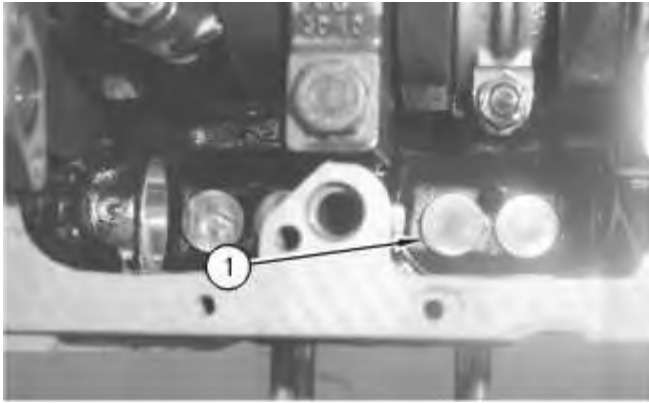


Illustration 1

g00540954

1. Use Tooling (A) to remove lifters (1).

Note: Place an identification mark on the lifters for installation purposes.

Installation Procedure

Table 2

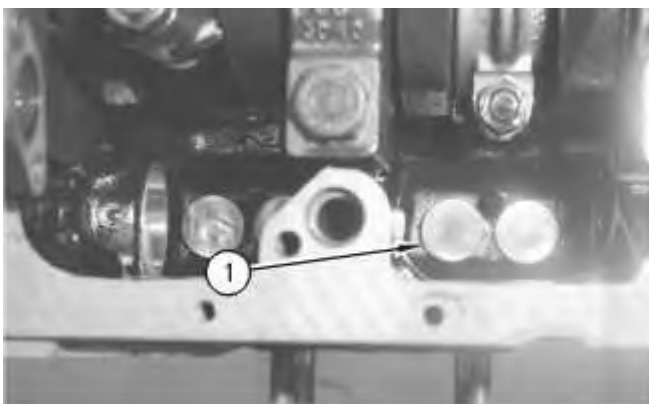
Required Tools			
Tool	Part Number	Part Description	Qty
A	1U-7262	Telescoping Magnet	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Lubricate the lifters with clean oil before installing the lifters in the cylinder block.



2. Use Tooling (A) to install lifters (1).

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

End By:

- a. Install the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install".
-

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i02299051

Camshaft - Remove and Install

SMCS - 1210-010

Removal Procedure

Start By:

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

1. Turn the engine upside-down so the valve lifters are held in a position away from the camshaft.
-

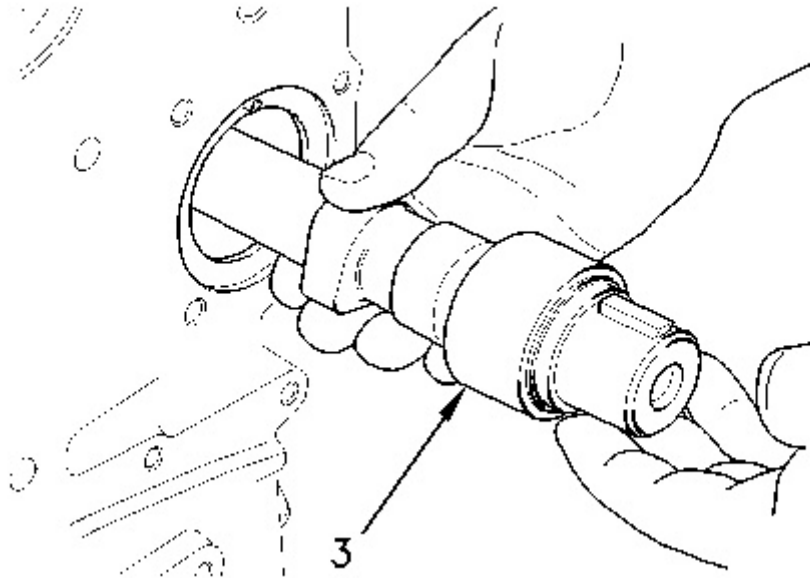


Illustration 1

g00951934

NOTICE

Do not damage the lobes or the bearings when the camshaft is removed or installed.

2. Carefully remove camshaft (3) from the cylinder block.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Ensure that the camshaft is clean. Lubricate the camshaft with clean engine oil prior to installation.

NOTICE

Do not damage the lobes or the bearings when the camshaft is removed or installed.

1. Carefully install camshaft (3) in the cylinder block.

End By:

- a. Install the front housing. Refer to Disassembly and Assembly, "Housing (Front) - Install".
 - b. Install the rocker shaft and the pushrods. Refer to Disassembly and Assembly, "Rocker Shaft and Pushrod - Install".
-

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i02299758

Camshaft Bearings - Remove and Install

SMCS - 1211-010

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2241	Camshaft Bearing Tool Group	1
	8H-0684	Ratchet Wrench	1

Start By:

- Remove the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

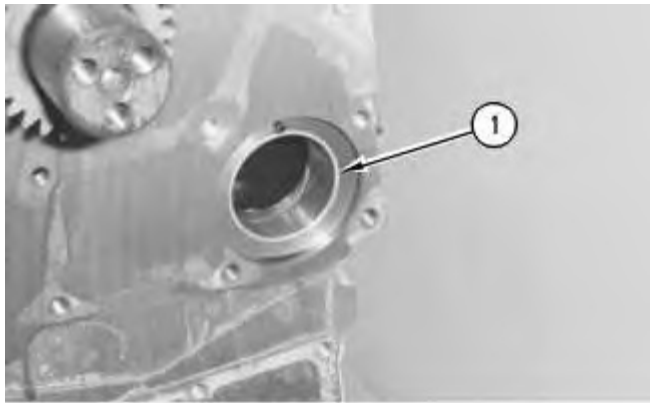


Illustration 1

g00546333

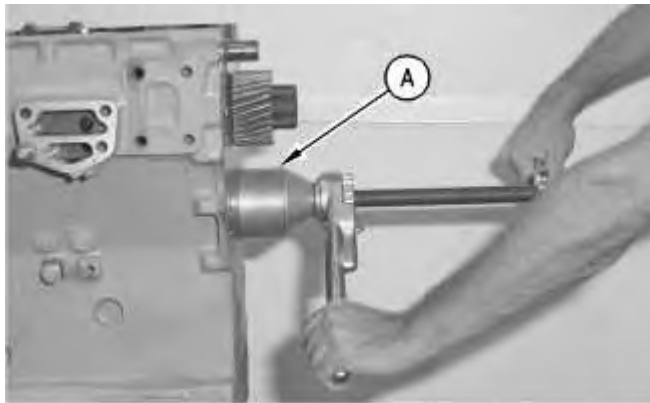


Illustration 2

g00546238

1. Use the Tooling (A) in order to remove the camshaft bearing (1) from the cylinder block.

Installation Procedure

Table 2

Required Tools			
Tool	Part Number	Part Description	Qty
A	8S-2241	Camshaft Bearing Tool Group	1
	8H-0684	Ratchet Wrench	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

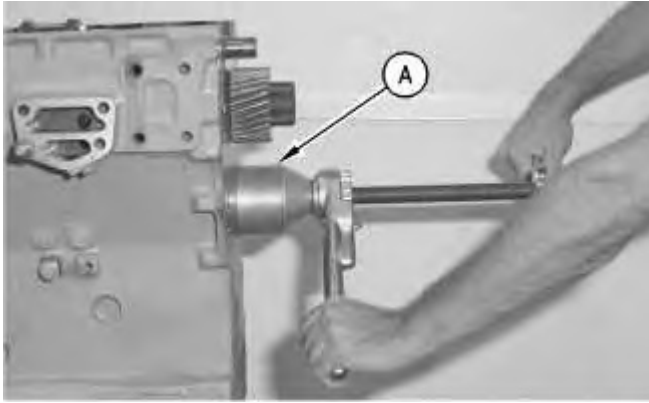


Illustration 3

g00546238

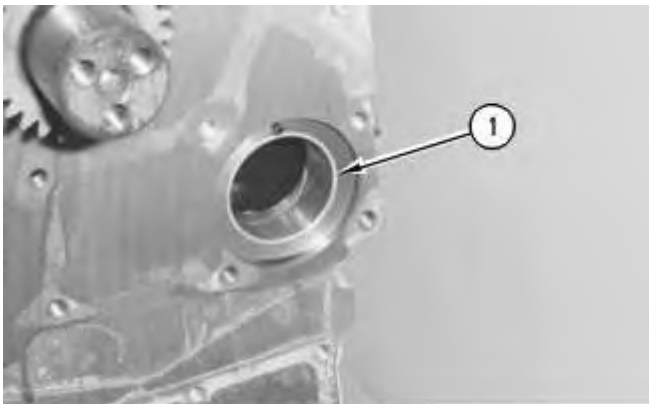


Illustration 4

g00546333

1. Use the Tooling (A) in order to install the camshaft bearing (1) into the bore in the cylinder block.

Note: Align the oil hole in camshaft bearing (1) with the oil hole in the bore in the cylinder block.

Note: The camshaft bearing must be inserted until the front edge of the bearing is flush with the face of the recess in the cylinder block.

End By:

- a. Install the camshaft. Refer to Disassembly and Assembly, "Camshaft - Remove and Install".
-

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i05003149

Engine Oil Pan - Remove and Install

SMCS - 1302-010

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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

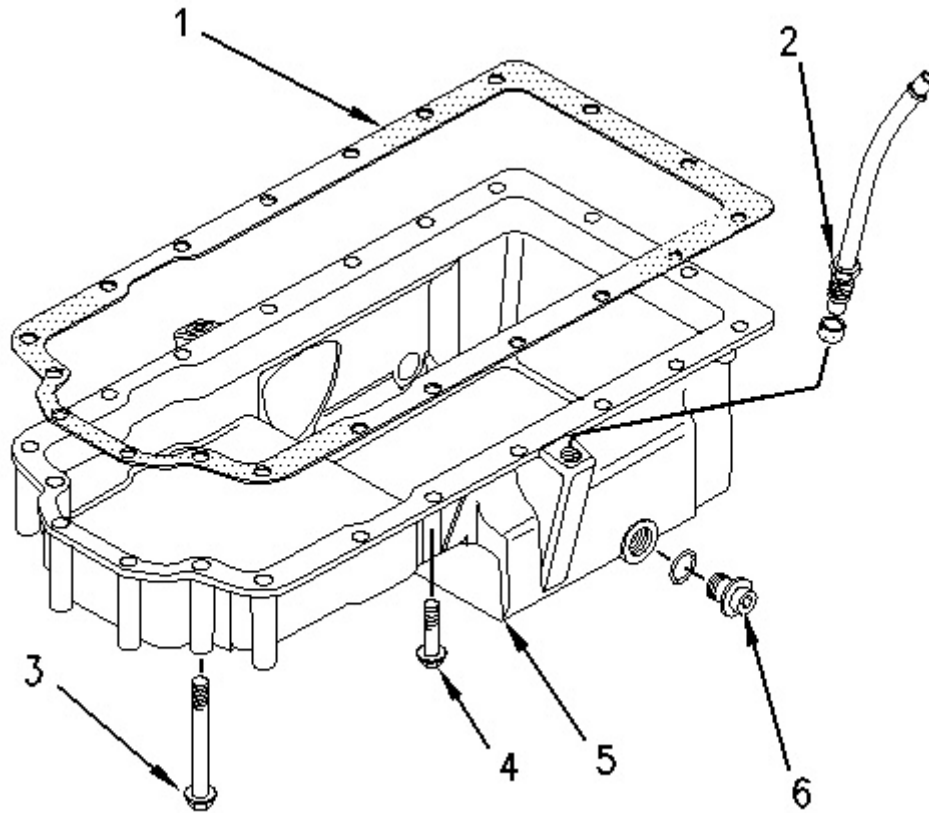


Illustration 1

g00956531

1. Remove all dirt, oil, and grease from the exterior surfaces of the oil pan (5).
2. Operate the engine until the engine is warm. Stop the engine.
3. Remove the oil drain plug (6) and the O-ring seal. Drain the engine oil into a suitable container for storage or disposal.

Note: Refer to the Operation and Maintenance Manual, "Refill Capacities" for information on the capacity of the lubrication system.

Note: Ensure that the engine oil pan is fully supported before the oil pan is removed. Particular care must be taken with the cast iron version of the engine oil sump as this version is heavy.

4. Remove the setscrews (3) and the setscrews (4) from the engine oil pan (5).
5. Remove the engine oil pan (5) and remove the gasket (1) from the cylinder block. Discard the gasket (1).
6. If necessary, remove the nut (2), the seal, and the tube assembly from the engine oil pan.
7. Clean the engine oil pan (5) with a suitable cleaning fluid. Ensure that all of the cleaning fluid is removed.

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	-	Guide Bolt (M8 x 1.25 x 70 mm)	4
B	-	Loctite 5900	-
C	-	Loctite 243	-

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

1. Clean the flange face of the engine oil pan (5) and the flange face of the cylinder block.
-

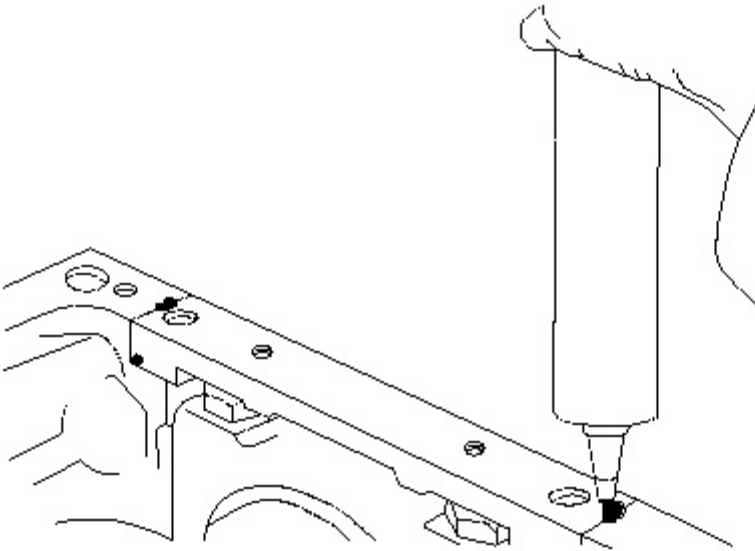


Illustration 2

g00541498

2. When the gasket for the oil pan is removed, damage may occur to the existing seal in the groove of the bridge. If the seal is damaged, apply a sufficient amount of Tooling (B) in order to fill the groove. The groove must be completely filled.
 3. Apply Tooling (B) to the joint between the cylinder block and the front housing.
-

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