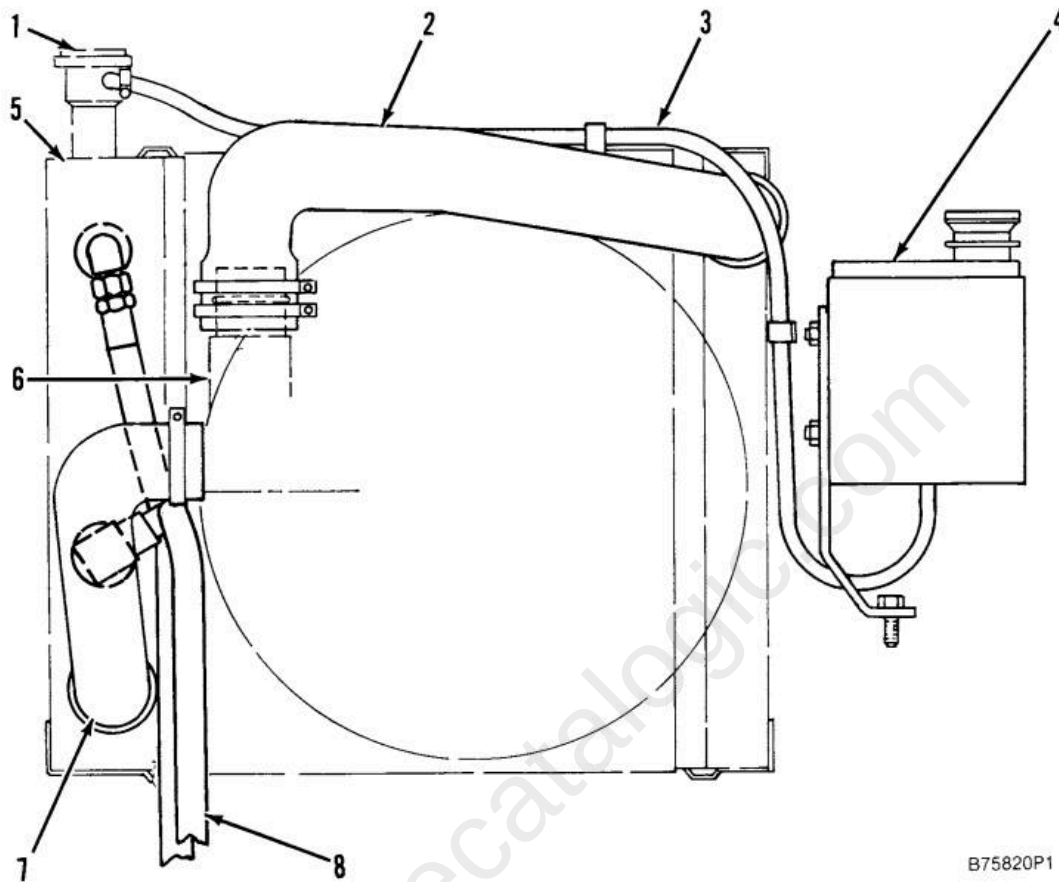


Specifications Systems Operation Testing & Adjusting

2.5 Liter (XD3P) Diesel Engine

machinecatalog.com

Cooling System



B75820P1

Cooling System Schematic

(1) Radiator cap. (2) Upper hose (radiator inlet). (3) Coolant recovery tube. (4) Coolant recovery tank. (5) Radiator. (6) Water pump and water temperature regulator (thermostat) housing. (7) Lower hose (radiator outlet). (8) Torque converter cooler lines.

The cooling system removes excess heat from the engine and torque converter. The coolant in the system is water. Heat is transferred from the metal parts to the water that contacts them. The water pump circulates the coolant through the engine and radiator. The water pump is driven by a Vee-belt from the crankshaft pulley. The coolant leaves the engine through upper hose (2) and flows through radiator (5). The coolant flowing through the radiator transfers heat to the air flowing across the radiator. The air is moved across the radiator by a fan which is driven by the same Vee-belt that drives the water pump. The coolant returns to the engine through lower hose (7).

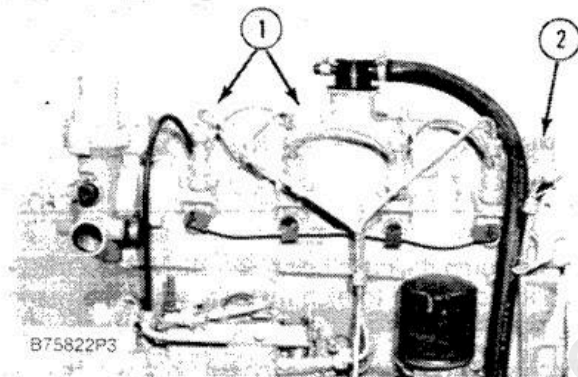
The cross flow radiator keeps positive water pressure on the water pump at all times. The radiator is equipped with a shroud to increase the efficiency of the fan and cause the air to be pushed through the radiator and away from the lift truck.

The coolant system pressure is controlled by radiator cap (1). When the coolant gets hot and the coolant pressure goes above the radiator cap rating, a pressure relief valve in the radiator cap allows some coolant to flow through tube (3) to coolant recovery tank (4) to lower the system pressure. When the coolant becomes cooler and the system pressure decreases below atmospheric pressure, a vacuum relief valve in the radiator cap allows coolant in recovery tank (4) to flow through tube (3) back into the radiator to remove the vacuum. The coolant recovery tank helps to insure that air is removed from the cooling system and that the radiator remains full of coolant.

C DPC Fuel Injection Pump

Tools Needed		
4C6354	Timing Tool Group	1
8T0483	Valve Spring Compressor	1
8T0490	Indicator Screw	1
8T0491	Support	1
8T0492	Support	1
8T0499	Adapter	1
8T0471	Dial Indicator Support	1
8T0501	Dial Indicator	2
1U7562	3 mm (.19 in) Allen Wrench	1

NOTE: The timing chain must be installed correctly for the following procedure to be accurate.

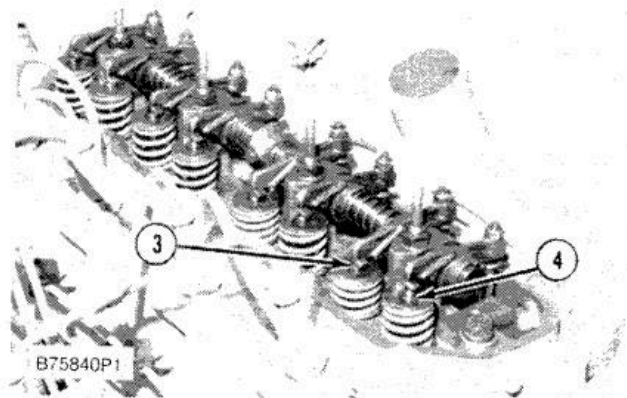


Valve Cover Removal
(1) Nuts. (2) Valve cover.

1. Remove four nuts (1), washers and valve cover (2).

WARNING

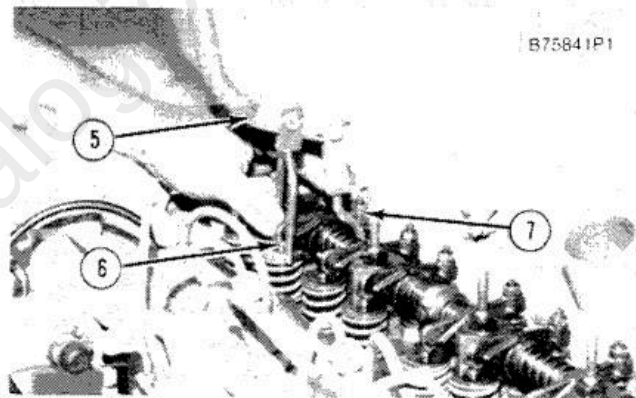
Personal injury could result if the engine should start while this procedure is done. Do not turn the engine with the starting motor. Turn the ignition switch OFF and disconnect the battery. Turn the crankshaft by hand.



Valves

(3) No. 1 cylinder exhaust valve. (4) No. 1 cylinder inlet valve.

2. Turn the crankshaft (by hand, not the starting motor) in the direction of engine rotation (clockwise, when viewed from the front of the engine) until No. 1 cylinder exhaust valve (3) is fully open (at its lowest point).



No. 4 Cylinder

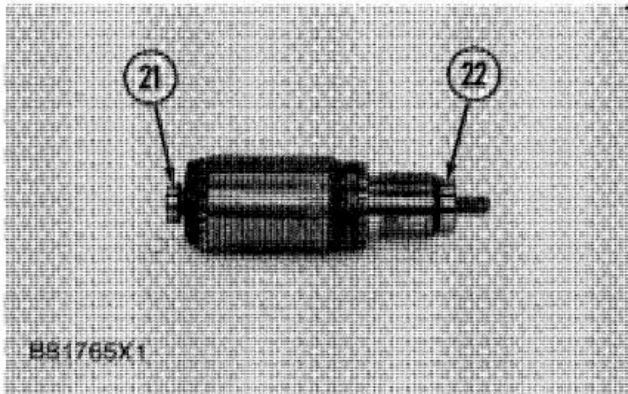
(5) 8T0483 Valve Spring Compressor. (6) No. 4 cylinder exhaust valve. (7) Rocker arm.

3. Make a compression of No. 4 cylinder exhaust valve (6) spring with 8T0483 Valve Spring Compressor (5) and move rocker arm (7) toward the center of the engine and turn the rocker arm counterclockwise when viewed from the front of the engine.

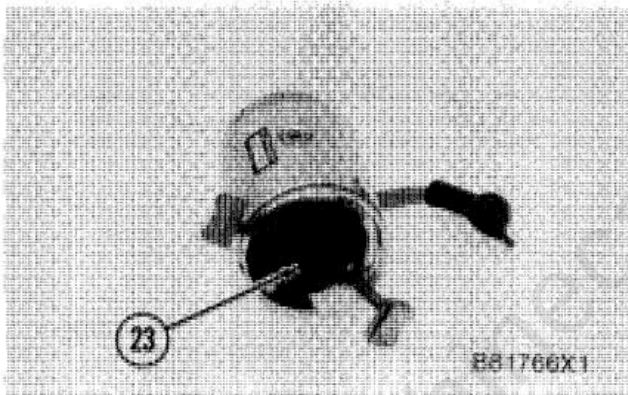
C NOTE: Do not move push rod for the No. 4 cylinder exhaust valve. Attach a piece of wire to the valve's keeper groove to prevent the valve from falling into the cylinder if the piston is not at TC.

4. Turn the crankshaft (by hand, NOT starting motor) in the direction of engine rotation (CW, when viewed from the front of the engine) until No. 1 cylinder exhaust valve (3) just closes and No. 1 cylinder inlet valve (4) just begins to open. At that point, the No. 4 cylinder piston is close to TC (top center) on the compression stroke. When the piston is near the top of its stroke, the valve keepers and spring can be removed without the valve falling into the cylinder.

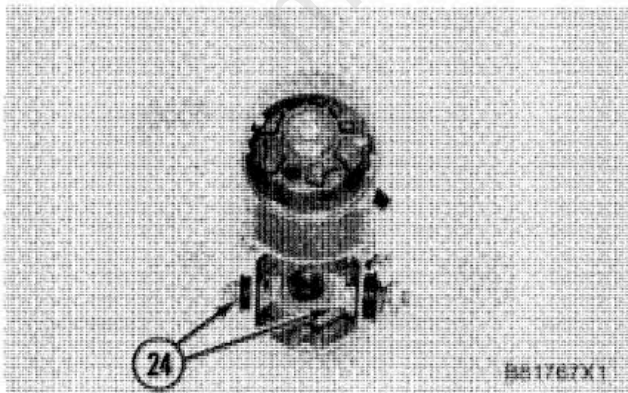
Electric Starting Motor



13. Visually inspect bearings (21) and (22). If necessary, remove the bearings from the armature assembly.



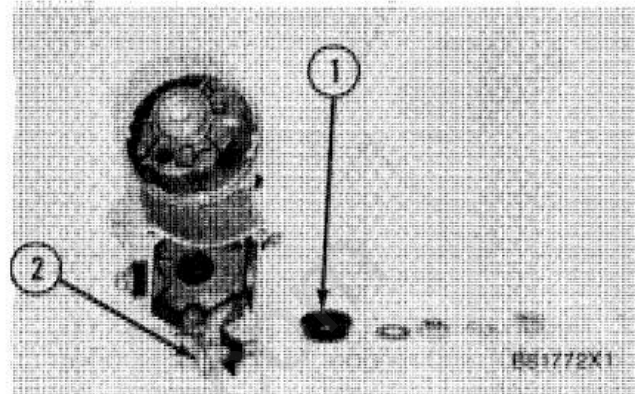
14. Remove brush holder and field (23) from the housing.



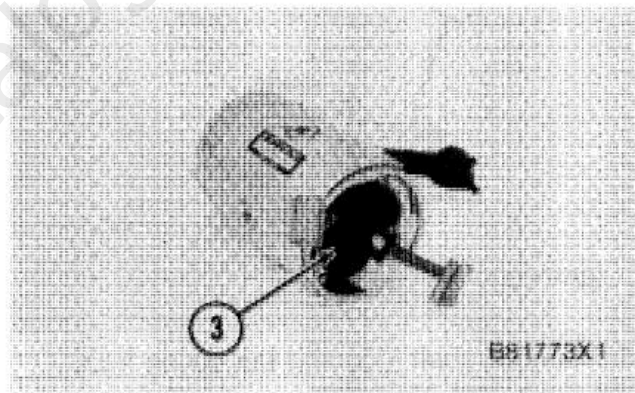
15. Remove contact points (24) from the case.

16. All other housing components are serviceable only as a unit.

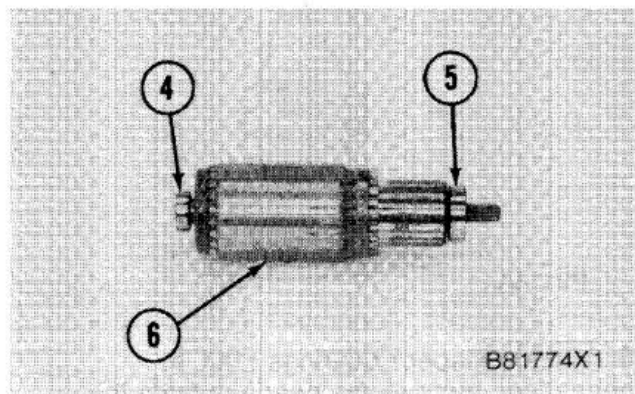
Assemble Electric Starting Motor 1453-16



1. Install the insulator on contact point (2). Install insulator (1) and the washers and nuts.



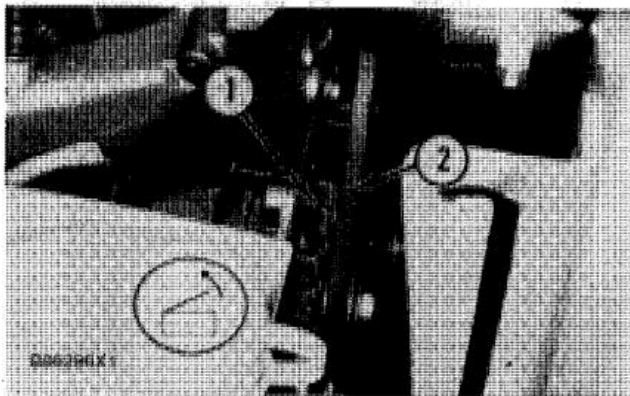
2. Install brush holder and field (3) in the housing.



3. Install bearing (4) and (5) on armature (6) as shown.

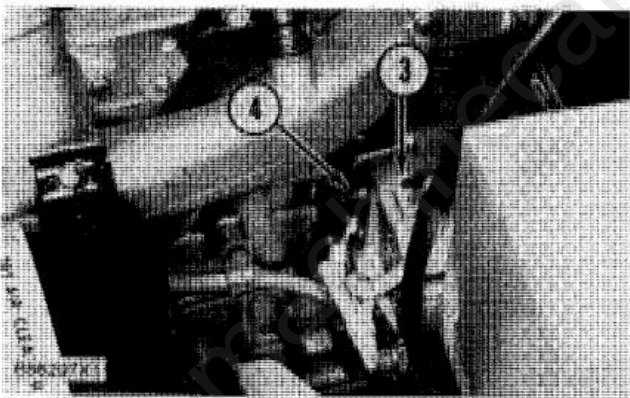
Alternator

Remove And Install Alternator 1405-10

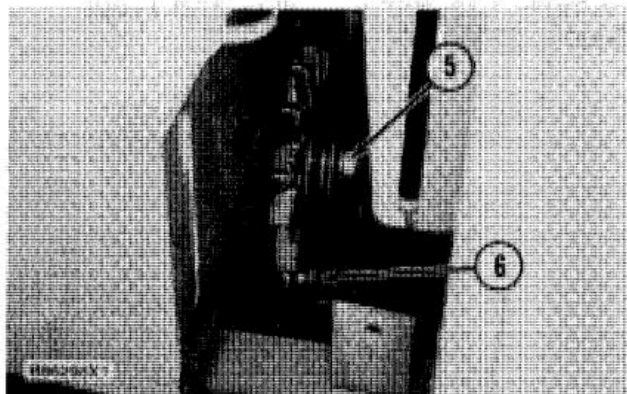


1. Remove bolt (1) from the alternator adjusting bracket.

2. Remove belt (2) from the alternator pulley.



3. Disconnect clip (3) from the top of the alternator. Remove the nut from beneath rubber boot (4). Bend the clip to remove the wiring harness from the back of the alternator.



4. Remove bolt (6) and alternator (5) from its mounting bracket.

5. Put the alternator in position, and install bolt (6). Do not tighten bolt (6) at this time.

6. Connect the wiring harness at the back of the alternator. Tighten the nut to a torque of $3.6 \pm .8$ N·m ($2.7 \pm .6$ lb.ft.). Install the boot over the nut.

7. Put the alternator bracket in position, and loosely install bolt (1).

8. Use a belt tension gauge such as a Borroughs Tool Company Part No. BT-33-95 or an equivalent, and make an adjustment of the fan belt. Tighten the new belt until the gauge indication is 445 ± 22 N (100 ± 5 lb.). Operate the engine at high idle for a minimum of 30 minutes. Make another adjustment of the belt tension. The correct gauge indication for a used belt is 400 ± 22 N (90 ± 5 lb.). Tighten the bolts that hold the alternator in position.

Water Temperature Regulator

5. To check any other cooling system problems, see Cooling System in Testing And Adjusting.

NOTICE

If the water temperature regulator is installed wrong, it will cause the engine to overheat.

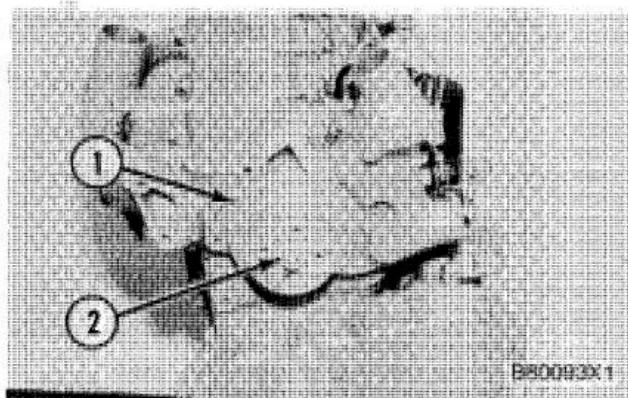
6. Put water temperature regulator (3) in the water pump with the spring down as shown.

7. Install a new gasket and the housing.

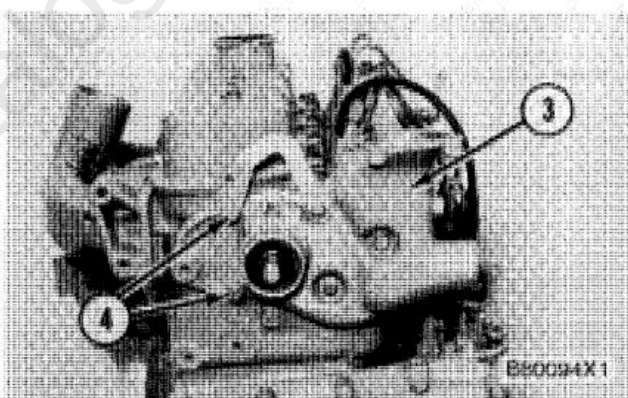
8. Fill the radiator to the correct coolant level. See the Maintenance Guide.

Water Pump

Remove Water Pump 1361-11



1. Remove the fan and the fan belt from pulley (1). Remove nut (2) and pulley (1) from the water pump.



2. Remove five bolts (4) and water pump (3). Remove the water pump gasket.

Radiator

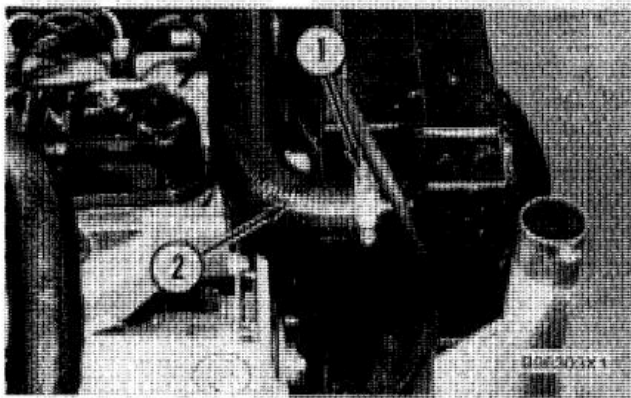
Remove Radiator 1353-11

START BY:

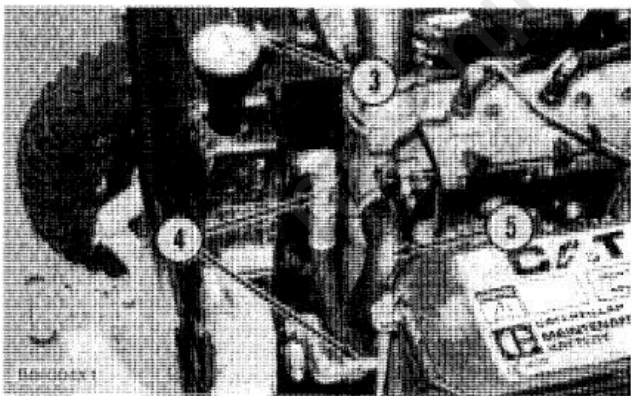
- a. remove counterweight*

*This operation is in the Vehicle Systems Disassembly And Assembly section.

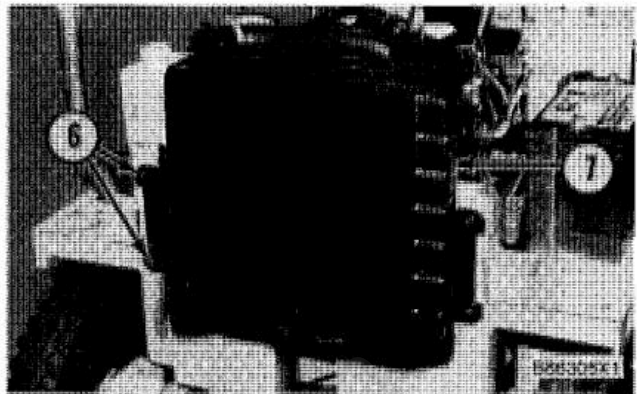
1. Drain the coolant from the radiator.



2. Loosen hose clamp (1), and remove upper radiator hose (2) from the radiator.

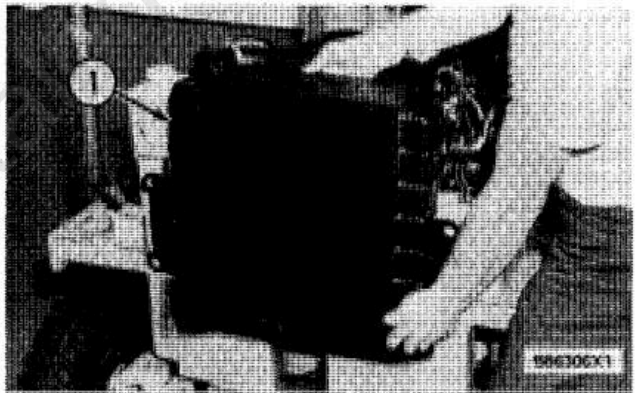


3. Loosen clamp (3), and remove the overflow hose from the radiator. Disconnect lower radiator hose (5) and two hydraulic oil cooler lines (4) from the radiator.

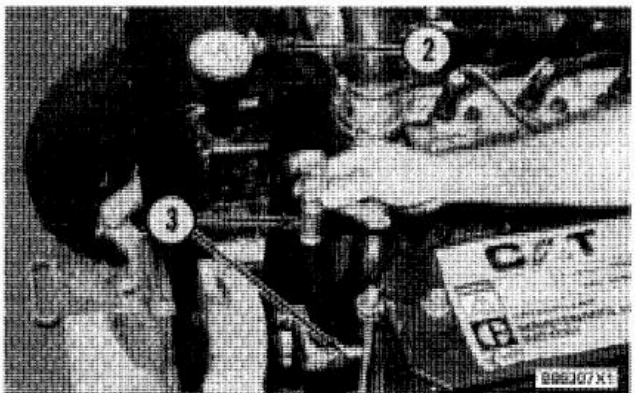


4. Remove four bolts (6) and radiator (7) from the vehicle frame.

Install Radiator 1353-12



1. Install radiator (1) on the vehicle frame.



2. Install the lower radiator hose and two hydraulic hoses (3). Install radiator overflow hose (2).

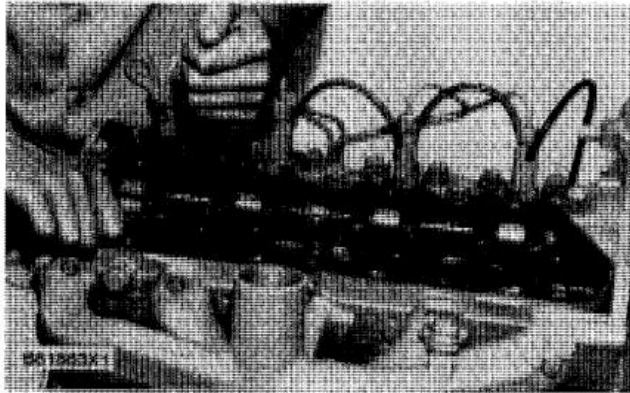
Rocker Shaft Assembly

Disassemble Rocker Shaft Assembly 1102-15

Tools Needed		A
1P1859	Retaining Ring Pliers	1

START BY:

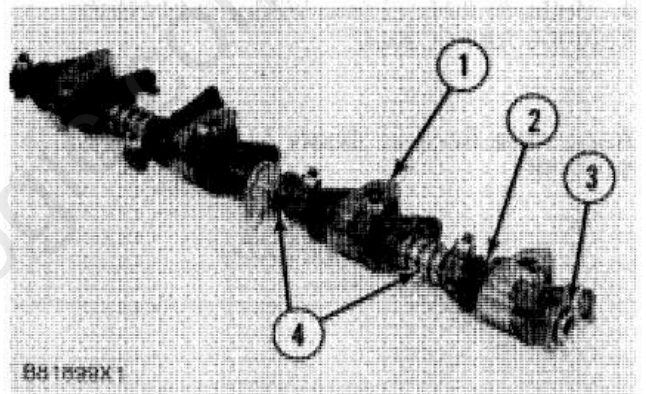
- a. remove rocker shaft assembly and push rods



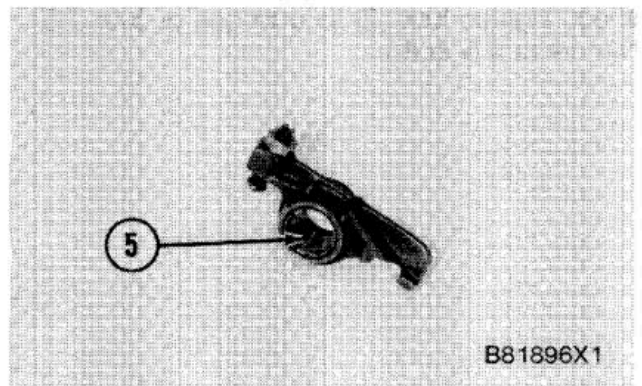
4. The valve clearance for the intake and exhaust valves is 0.30 to 0.35 mm (.012 to .014 in.). For the valve adjusting procedure see Install Cylinder Head Assembly.

END BY:

- a. install valve cover



1. Remove retaining ring (3) with tool (A).
2. Before disassembling the rocker shaft, put identification marks on the rocker arms and springs for installation purposes.
3. Remove the washer, rocker arm assemblies (2), brackets (1), springs (4) and the washer on each side of the center support.



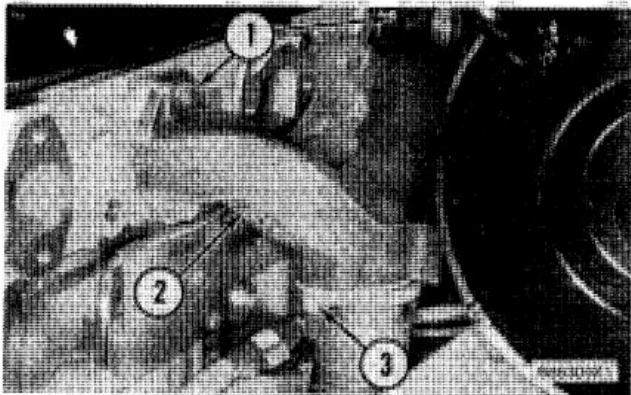
4. Check the condition of the bearings in the rocker arms. Remove bearings (5) from the rocker arms if necessary.

Exhaust Manifold

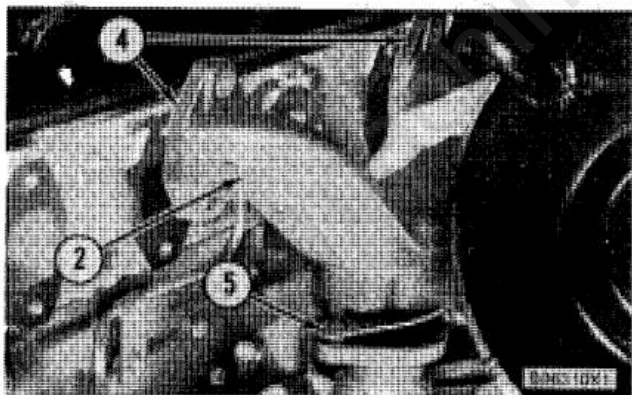
Remove And Install Exhaust Manifold 1059-10

START BY:

- a. remove inlet manifold



1. Remove two nuts (3) that fasten the exhaust pipe to the exhaust manifold. Remove the exhaust pipe gasket.
2. Remove four manifold mounting bolts (1). Remove exhaust manifold (2) and the gaskets.

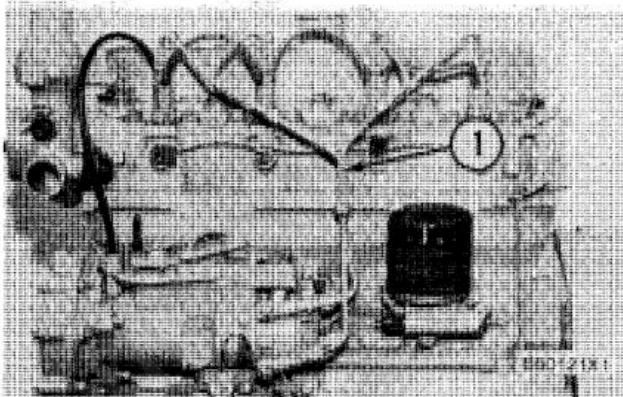


3. Make a replacement of the two exhaust manifold to cylinder head gaskets (4), and install exhaust manifold (2). Tighten the bolts that hold the exhaust manifold to a torque of 20 to 25 N·m (15 to 18 lb.ft.).
4. Install a new exhaust pipe gasket (5). Install two nuts (3), and tighten them to a torque of 45 ± 7 N·m (33 ± 5 lb.ft.).

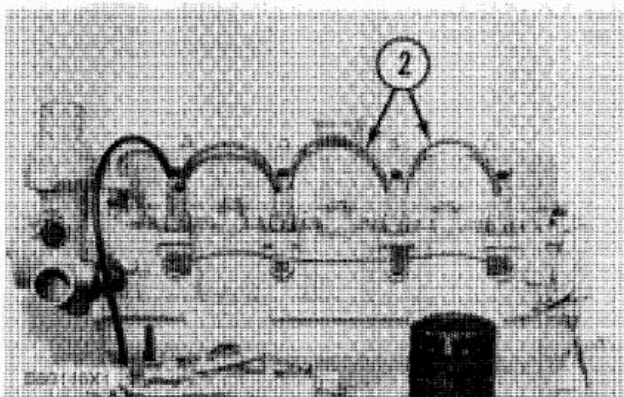
Fuel Injection Nozzles

Remove Fuel Injection Nozzles 1254-11

Tools Needed		A
8T0495	Injector Socket	1



1. Remove fuel injection lines assembly (1) from the fuel injection nozzles and the fuel injection pump.



2. Remove connectors (2) from the fuel injection nozzles.

Full Version Available

Caterpillar VC40D Forklift Engine Service Manual (SENB8238-03)

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