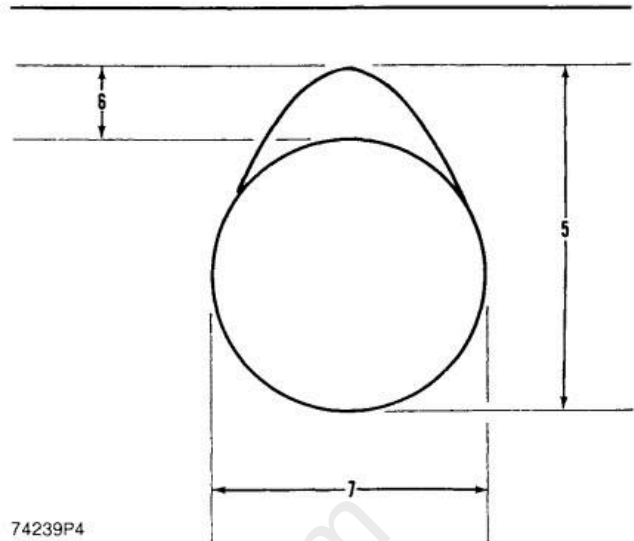
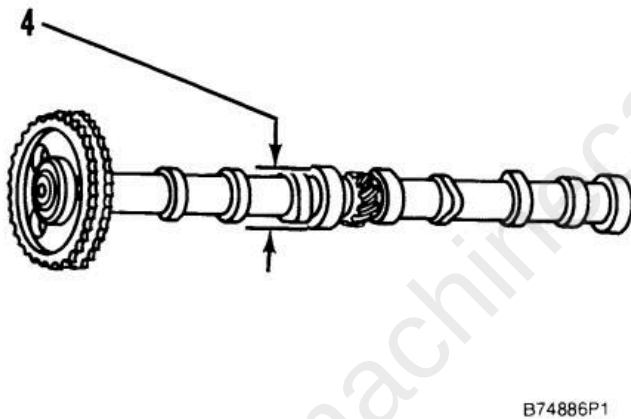
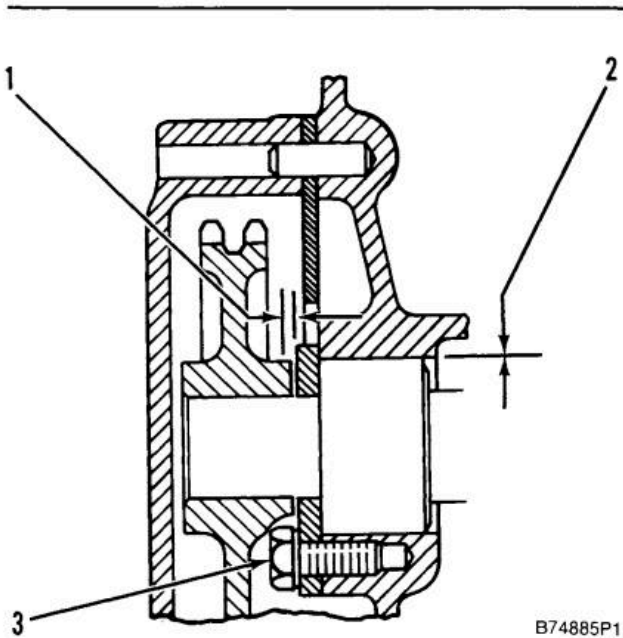


Specifications Systems Operation Testing & Adjusting

2.5 Liter (XD3P) Diesel Engine

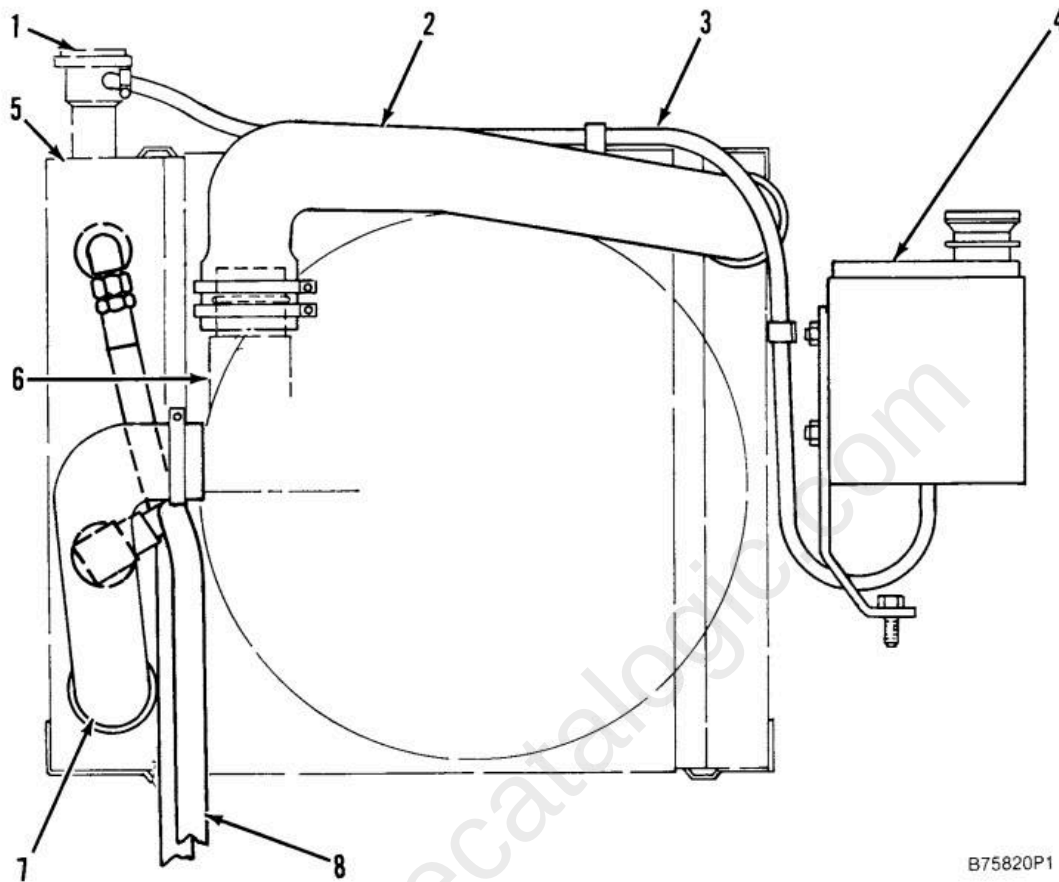
machinecatalog.com

Camshaft



- (1) Camshaft radial clearance (end play) 0.05 to 0.15 mm (.002 to .006 in)
- (2) Camshaft axial clearance (clearance between camshaft bearing surface and block) 0.05 to 0.15 mm (.002 to .006 in)
- (3) Torque for bolts fastening timing gear case back plate (camshaft retainer) 7.5 to 12.5 N•m (67 to 111 lb in)
- (4) Camshaft bearing surface diameter 41.925 to 41.950 mm (1.6502 to 1.6516 in)
- (5) Height of camshaft lobes.
To find lobe height, use the following procedure:
 - a. Measure camshaft lobe height (5).
 - b. Measure base circle (7).
 - c. Subtract base circle (Step B) from lobe height (Step A). The difference is actual lobe lift.
 - d. Specified camshaft lobe lift (6) is:
 1. Exhaust lobe 6.173 mm (.243 in)
 2. Intake lobe 6.172 mm (.243 in)

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).

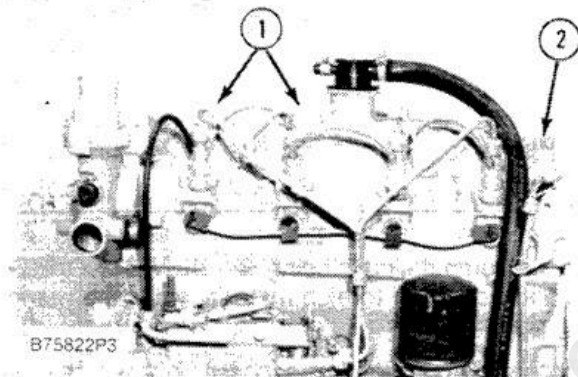
The cross flow radiator keeps positive water pressure on the water pump at all times. The radiator is equipped with a shroud to increase the efficiency of the fan and cause the air to be pushed through the radiator and away from the lift truck.

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.

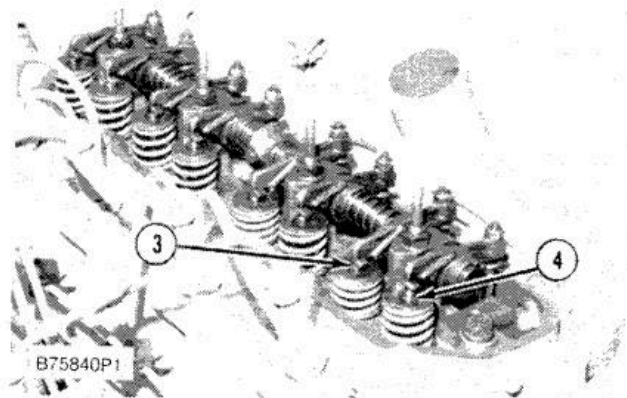


Valve Cover Removal
(1) Nuts. (2) Valve cover.

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

WARNING

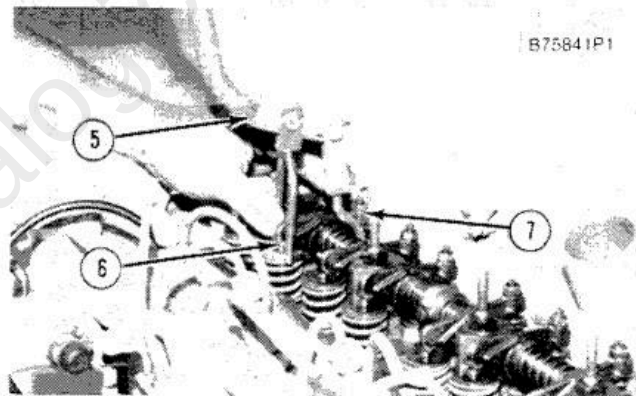
Personal injury could result if the engine should start while this procedure is done. Do not turn the engine with the starting motor. Turn the ignition switch OFF and disconnect the battery. Turn the crankshaft by hand.



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.

 WARNING

10. To avoid burns, be alert for hot parts on machines which have just been stopped and hot fluids in lines, tubes and compartments.

11. Be careful when removing cover plates. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device and pry cover loose to relieve any spring or other pressure, before removing them completely.

12. Be careful when removing filler caps, breathers and plugs on the machines. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.

13. Use only the recommended tools which are listed for a specific procedure. Be sure the tools are in good condition and that you fully understand how to use them before performing any service work. Failure to use the listed tools can cause damage to components or serious personal injury or death.

14. Reinstall all fasteners with same part number. Do not use a lesser quality fastener if replacements are necessary. Do not mix metric fasteners with standard nuts and bolts.

15. Repairs, which require welding, should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Make reference to "Techniques of Structural Repair Course" form number JEG03719. Determine type of metal being welded and select correct welding procedure and electrodes, rods or wire to provide a weld metal strength equivalent at least to that of parent metal.

16. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.

17. Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.

18. Always support the mast and carriage to keep carriage or attachments raised when maintenance or repair work is performed, which requires the mast in the raised position.

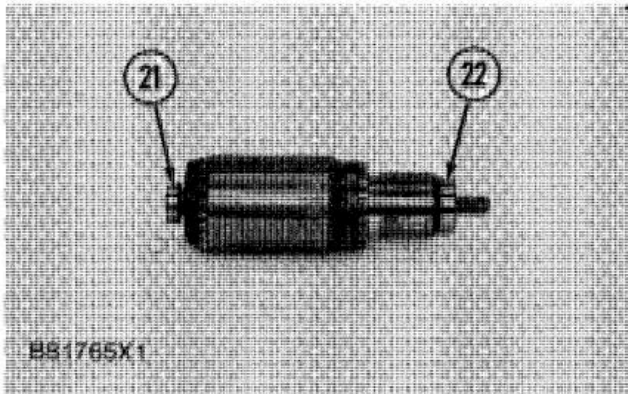
19. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Do not check for leaks with your hands. Pin hole (very small) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.

20. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.

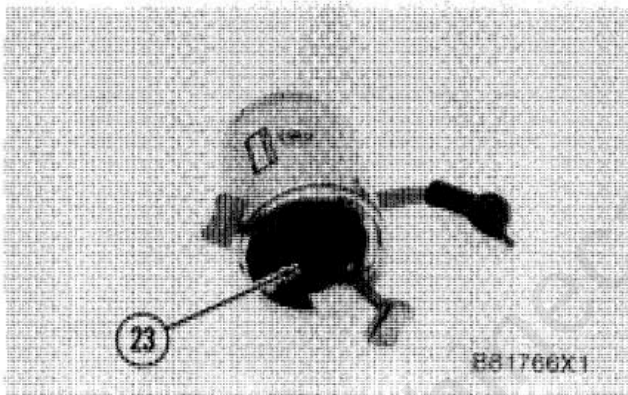
21. Do not operate a machine if any rotating part is damaged or contacts any other part during operation. Any high speed rotating component that has been damaged or altered should be checked for balance before reusing.

22. On LP equipped lift trucks, be sure to close the valve on the LP tank before service work is performed. Always close the valve on the LP tank when the lift truck is being stored. Do not check for LP leaks with an open flame.

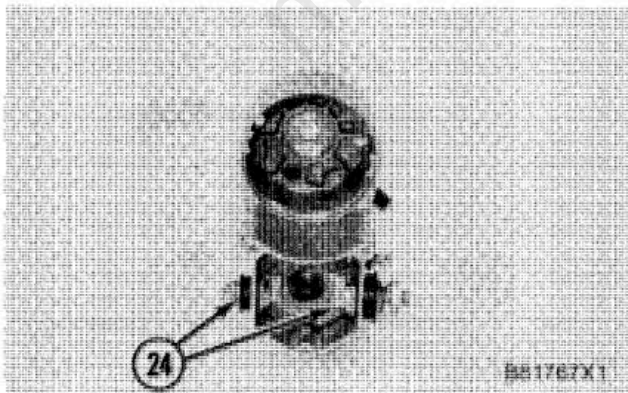
Electric Starting Motor



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



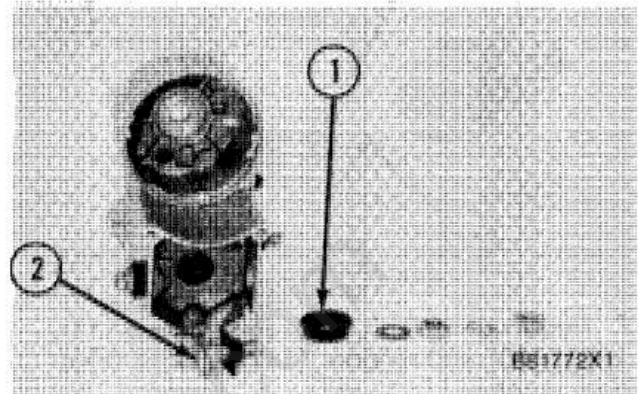
14. Remove brush holder and field (23) from the housing.



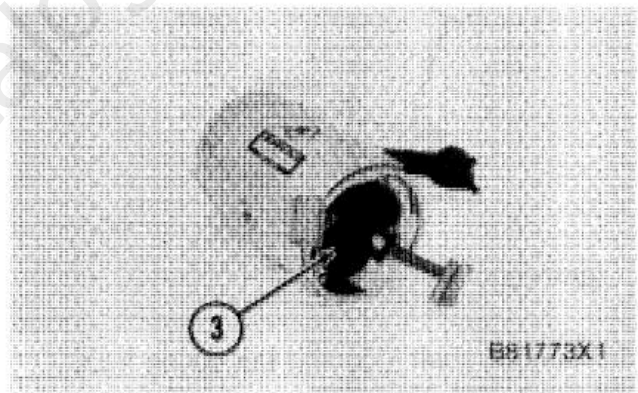
15. Remove contact points (24) from the case.

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

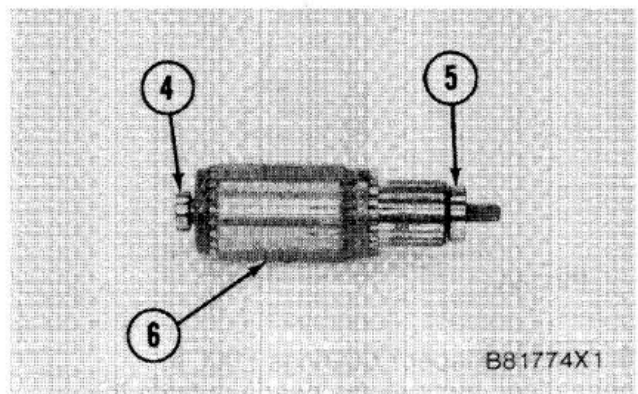
Assemble Electric Starting Motor 1453-16



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



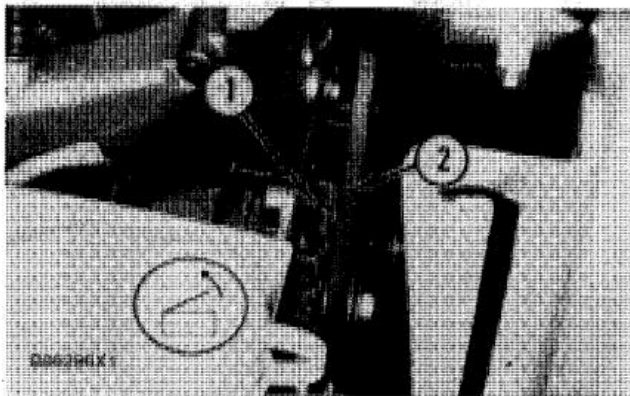
2. Install brush holder and field (3) in the housing.



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

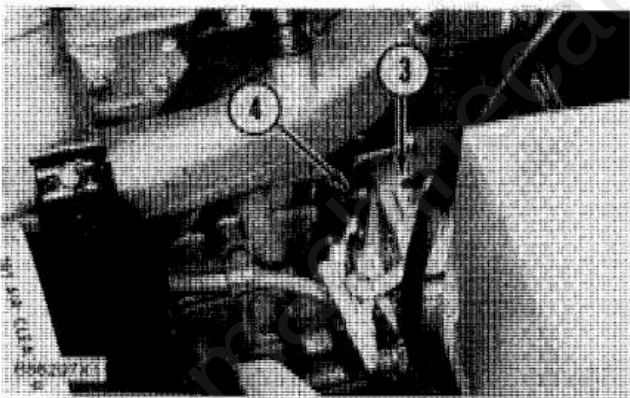
Alternator

Remove And Install Alternator 1405-10

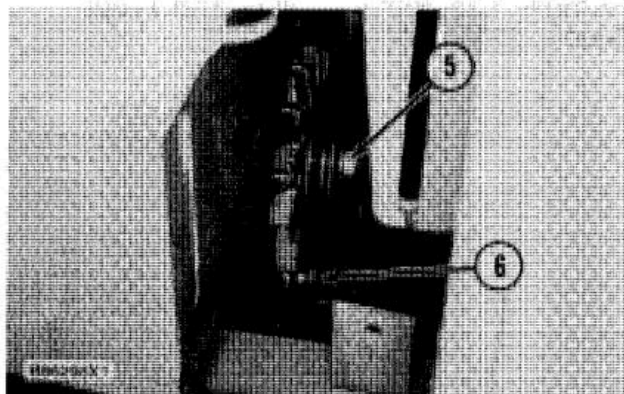


1. Remove bolt (1) from the alternator adjusting bracket.

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.

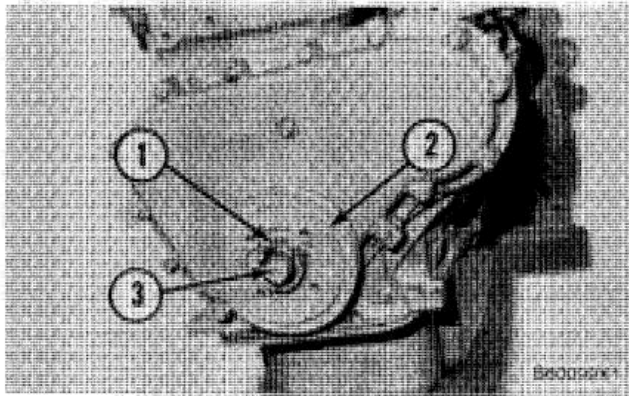
6. Connect the wiring harness at the back of the alternator. Tighten the nut to a torque of $3.6 \pm .8$ N·m ($2.7 \pm .6$ lb.ft.). Install the boot over the nut.

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

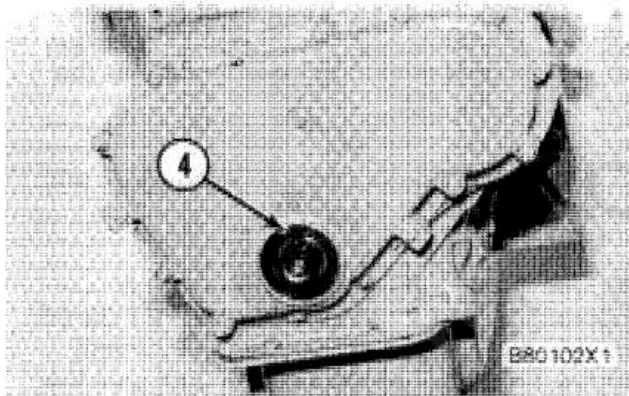
8. Use a belt tension gauge such as a Borroughs Tool Company Part No. BT-33-95 or an equivalent, and make an adjustment of the fan belt. Tighten the new belt until the gauge indication is 445 ± 22 N (100 ± 5 lb.). Operate the engine at high idle for a minimum of 30 minutes. Make another adjustment of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

Crankshaft Pulley And Front Seal

Remove Crankshaft Pulley And Front Seal 1205, 1160-11



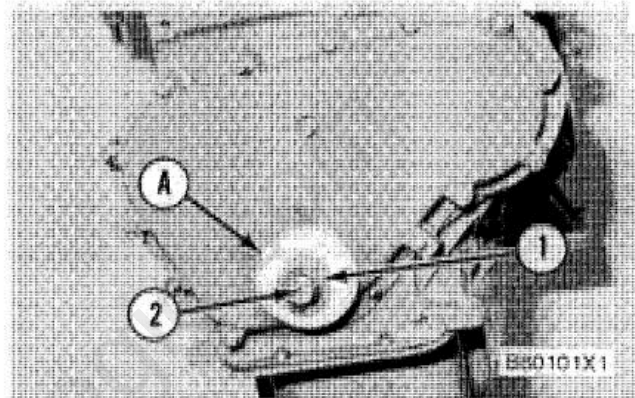
1. Remove bolt (3), spacer (1) and pulley (2).



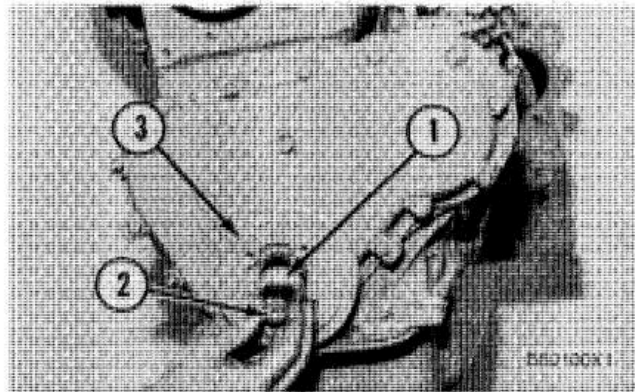
2. Remove crankshaft front seal (4) from the timing gear cover.

Install Crankshaft Pulley And Front Seal 1205, 1160-12

Tools Needed		A
8T0817	Seal Installer	1



1. Install the crankshaft front seal in the timing gear cover with tool (A), spacer (1) and bolt (2). The lip of the seal must be toward the inside of the crankcase. Remove spacer (1), bolt (2) and tool (A).

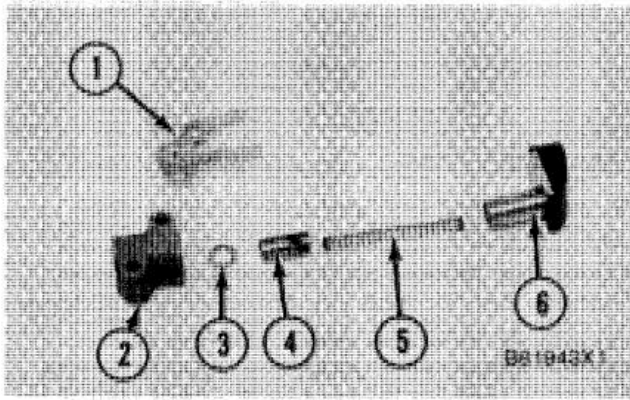


2. Install pulley (3), spacer (1) and bolt (2). Put 9S3263 Thread Lock on the threads of bolt (2). Tighten bolt (2) to a torque of 50 N·m (36 lb.ft.); then tighten the bolt an additional 62°.

Timing Chain Tightener

Install Timing Chain Tightener

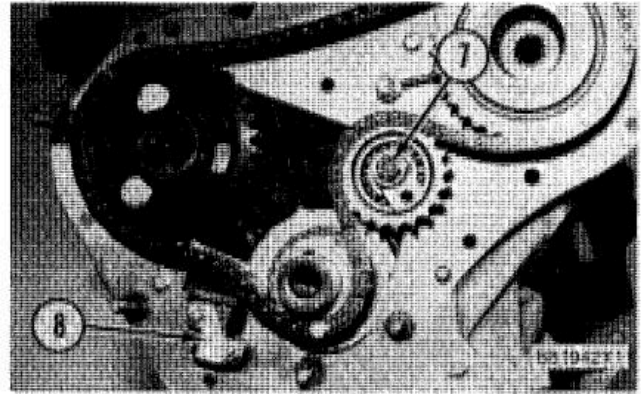
1. Clean the components, and make a replacement as needed. The timing chain tightener is serviced as a unit.



2. There is a pin on the inside diameter of plunger (6). When assembled, the pin in the plunger fits inside the slot in piston (4). The piston slot has steps in which the plunger pin engages.

3. Install shim (3) in housing (2).

4. When installing spring (5) and the piston-plunger assembly, it will be necessary to compress spring (5). This is done by rotating the piston as it is installed inside the plunger following the spiral shape of the piston slot. There is a step in the end of the piston slot that allows the piston to be held inside the plunger with the spring compressed.



5. Install mounting plate (1) (see illustration B81943X1) and timing chain tightener (8). Tighten the bolt and nut that hold the timing chain tightener to a torque of 5 to 7.5 N·m (4 to 5.3 lb.ft.).

6. Be sure the paint marks or scribe marks on the timing chain are in alignment with the timing marks on the gears. Put 9S3262 Thread Lock on idler gear bolt (7). Compress the timing chain tightener a small amount to allow the plunger to move against the timing chain.

Full Version Available

Caterpillar V50D Forklift Engine Service Manual (SENB8238-03)

Caterpillar V50D forklift service manual, covers engine repair, testing, teardown, and assembly. Fast PDF access.

VIEW THE FULL MANUAL

<https://machinecatalogic.com/caterpillar-v50d-forklift-engine-service-manual-senb8238-03/>