

CK25-CK28 Crawler Excavators

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Section 1001

SAFETY INSTRUCTIONS, GENERAL INFORMATION AND TORQUE SPECIFICATIONS

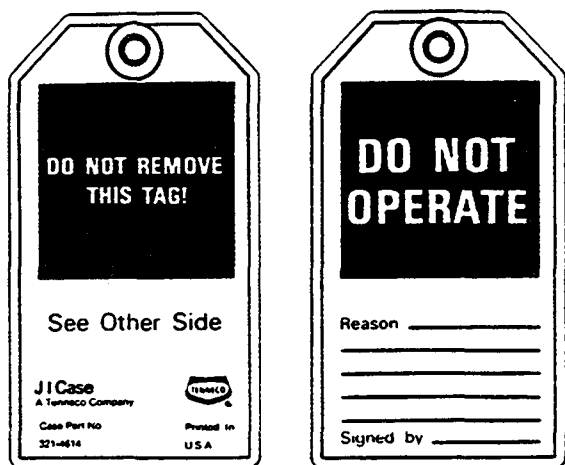
SAFETY



This symbol means ATTENTION ! BECOME ALERT ! YOUR SAFETY IS INVOLVED. The message that follows the symbol contains important information about safety. Carefully read the message, Make sure you fully understand the causes of possible injury or death.

To prevent injury always follow the Warning, Caution and Danger notes in this section and throughout the manual.

Put the warning tag shown below on the key for the keyswitch when servicing or repairing the machine. One warning tag is supplied with each machine. Additional tags Part Number 331-4614 are available from your service parts supplier.



B004



Read the operator's manual to familiarize yourself with the correct control functions.



Operate the machine and equipment controls from the seat position only. Any other method could result in serious injury.



This is a one man machine, no riders allowed.



Before starting engine, study Operator's Manual safety messages. Read all safety signs on machine. Clear the area of other persons. Learn and practise safe use of controls before operating.

It is your responsibility to understand and follow manufacturers instructions on machine operation, service, and to observe pertinent laws and regulations. Operator's and Service Manuals may be obtained from your J.I. CASE dealer.



If you wear clothing that is too loose or do not use the correct safety equipment for your job, you can be injured. Always wear clothing that will not catch on objects. Extra safety equipment that can be required includes hard hat, safety shoes, ear protection, eye or face protection, heavy gloves and reflector clothing.



When working in the area of the fan belt with the engine running, avoid loose clothing if possible, and use extreme caution.



When doing checks and tests on the equipment hydraulics, follow the procedures as they are written. DO NOT change the procedure.



When putting the hydraulic cylinders on this machine through the necessary cycles to check operation or to remove air from a circuit, make sure all people are out of the way.

<https://www.ebooklibonline.com>

Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

<https://www.ebooklibonline.com>



Use insulated gloves or mittens when working with hot parts.



Lower all attachments to the ground or use stands to safely support the attachments before you do any maintenance or service.



Pin sized and smaller streams of hydraulic oil under pressure can penetrate the skin and result in serious infection. If hydraulic oil under pressure does penetrate the skin, seek medical treatment immediately. Maintain all hoses and tubes in good condition. Make sure all connections are tight. Make a replacement of any tube or hose that is damaged or thought to be damaged. DO NOT use your hand to check for leaks, use a piece of cardboard or wood.



When removing hardened pins such as a pivot pin, or a hardened shaft, use a soft head (brass or bronze) hammer or use a driver made from brass or bronze and a steel head hammer.



When using a hammer to remove and install pivot pins or separate parts using compressed air or using a grinder, wear eye protection that completely encloses the eyes (approved goggles or other approved eye protectors).



Use suitable floor (service) jacks or chain hoist to raise wheels or tracks off the floor. Always block machine in place with suitable safety stands.



When servicing or repairing the machine. Keep the shop floor and operator's compartment and steps free of oil, water, grease, tools, etc. Use an oil absorbing material and or shop cloths as required. Use safe practices at all times.



Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in this Service Manual.



Engine exhaust fumes can cause death. If it is necessary to start the engine in a closed place, remove the exhaust fumes from the area with an exhaust pipe extension. Open the doors and get outside air into the area.



When the battery electrolyte is frozen, the battery can explode if (1), you try to charge the battery, or (2), you try to jump start and run the engine. To prevent the battery electrolyte from freezing, try to keep the battery at full charge. If you do not follow these instructions, you or others in the area can be injured.



Batteries contain acid and explosive gas. Explosions can result from sparks, flames or wrong cable connections. To connect the jumper cables correctly to the battery of this machine see the Operator's Manual. Failure to follow these instructions can cause serious injury or death.

GENERAL INFORMATION

CLEANING

Clean all metal components, except bearings, with steam or white spirit. Do not use caustic soda when steam-cleaning. After cleaning, dry and oil the components. Clean oil lines with compressed air. Clean bearings in kerosene, dry them completely and oil them.

INSPECTIONS

Carefully examine all disassembled components. Replace all parts showing signs of wear or damage. Light scores and scratches can be removed by honing or with a buffing compound. Fast, abnormal wear of components can be avoided by careful examination and early detection of wear and pitting.

BEARINGS

Check that bearings run freely. Replace bearings that show signs of too much play or seizing. Clean bearings in a good solvent or kerosene and allow them to dry naturally. **DO NOT DRY BEARINGS WITH COMPRESSED AIR.**

NEEDLE BEARINGS

Before installing needle bearings in their housing, remove any metal edges inside or around the housing. When installing bearings with a hydraulic press, grease the inside and the outside of the bearing with petroleum jelly.

GEARS

Check all gears for signs of damage or wear. Replace damaged or worn gears.

SEAL RINGS, O RINGS AND FLAT SEALS

Always install new seal rings, O-rings and flat seals, if removed. Lubricate seal rings and O-rings with petroleum jelly.

SHAFTS

Check all shafts showing signs of damage or wear. Check particularly to make sure that any surface of the shaft in contact with bearings or seal rings is not damaged.

SERVICE PARTS

Always use genuine CASE service parts. To order service parts, see the Spare Parts Catalog and remember to give the correct reference of the necessary CASE part. No warranty claims will be considered for failures involving parts which are not of CASE origin.

LUBRICATION

Never use oil or grease which is different from that specified in the Operator's Manual or the Service Manual. No warranty claims will be considered for failures due to the use of wrong oil or grease.

Section 2002

ENGINE REMOVAL AND INSTALLATION

2002

Removal and Installation

STEP 1

Park the machine on hard level ground. Lower the attachment to the ground. Release pressure in the hydraulic circuits and stop the engine.

STEP 2

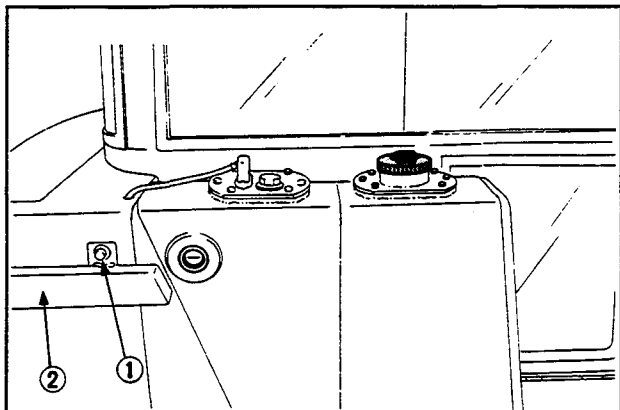
Disconnect the battery, positive (+) terminal first.

NOTE: For Installation, install and tighten the negative (-) terminal first.

STEP 3

Remove the Cab or Canopy, refer to Section 9004.

STEP 4



Remove the bolts (1) and the protector (2).

NOTE: For Installation, apply Loctite 271 to the bolts and tighten to a torque of:

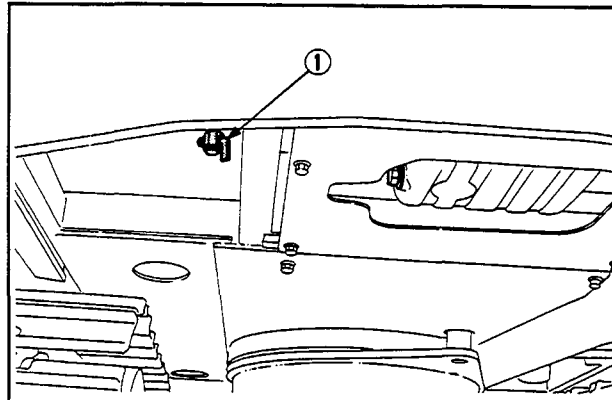
M12 - 77 to 90 Nm

M16 - 166 to 197 Nm

STEP 5

Remove the Hydraulic Oil Reservoir, refer to Section 8010.

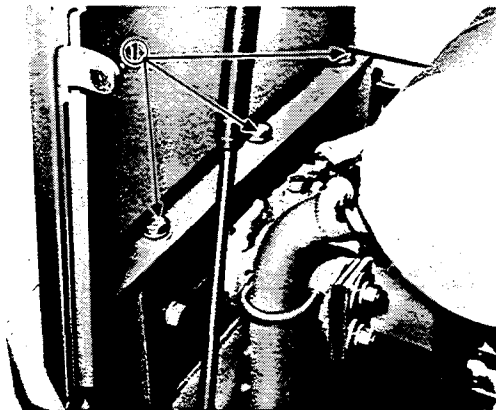
STEP 6



Put a container with a capacity of at least 5 Litres under the radiator drain valve and drain the coolant.

NOTE: For Installation, install coolant to the correct level.

STEP 7



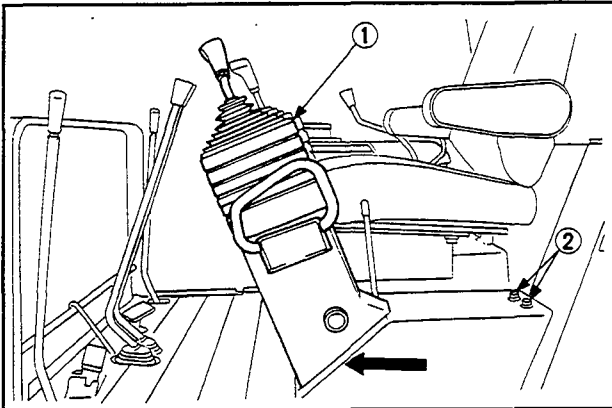
Remove the hood mounting bolts (1) from the inside of the engine compartment.

NOTE: For Installation, apply Loctite 271 to the bolts (1) and tighten to a torque of:

M10 - 48 to 56 Nm

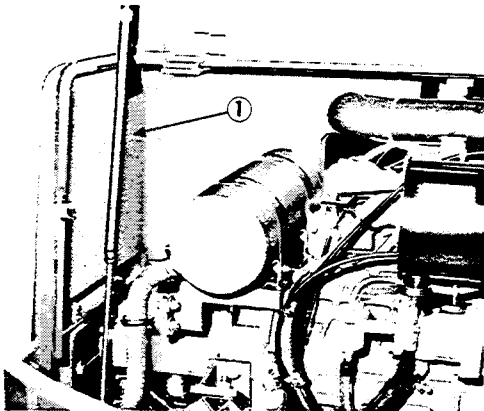
M12 - 77 to 90 Nm

STEP 8

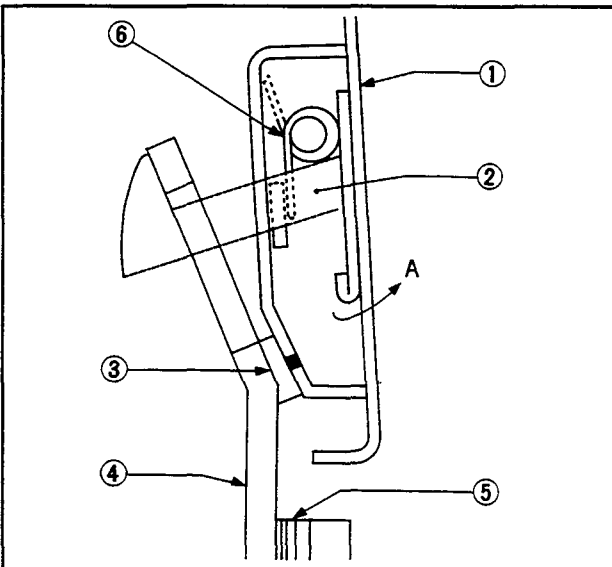


Remove the bolts (2) and slide the control box (1) forwards.

STEP 9



Disconnect and remove the gas strut (1) on the hood. Support the hood on suitable lifting equipment. Remove the hood.



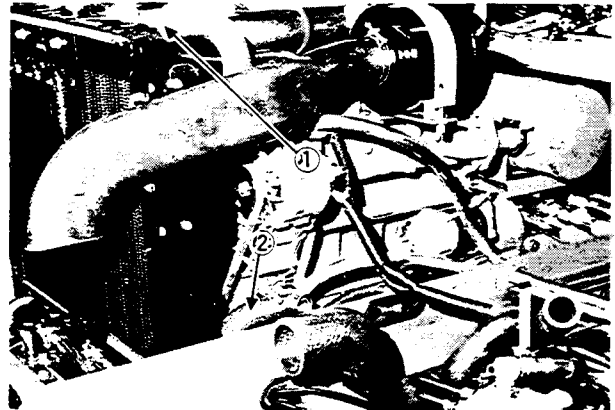
NOTE: When the hood (1) is closed make sure the catch (2) comes in close contact with the bracket (4). When opening the hood (1) make sure the catch (2) easily comes off the bracket (4), if necessary adjust with shims (5).

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STEP 10

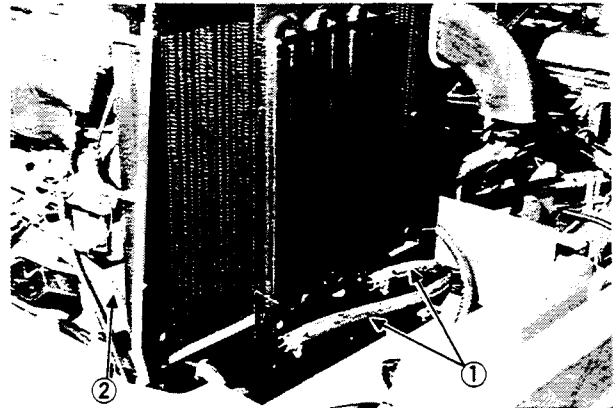
Remove the battery and the fluid level sensor.

STEP 11



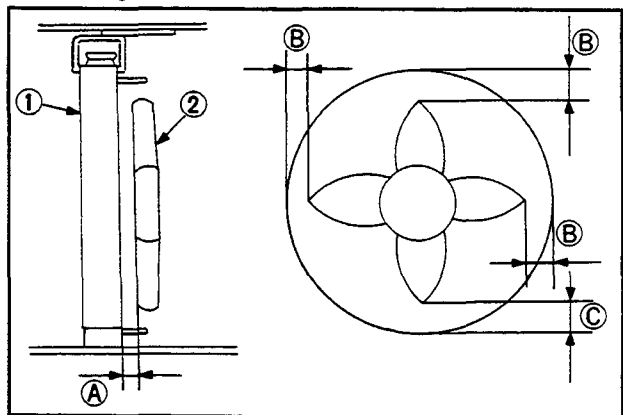
Disconnect and cap the radiator hoses (1) and (2).

STEP 12



Disconnect and cap the oil cooler hoses (1) and radiator return hose (2).

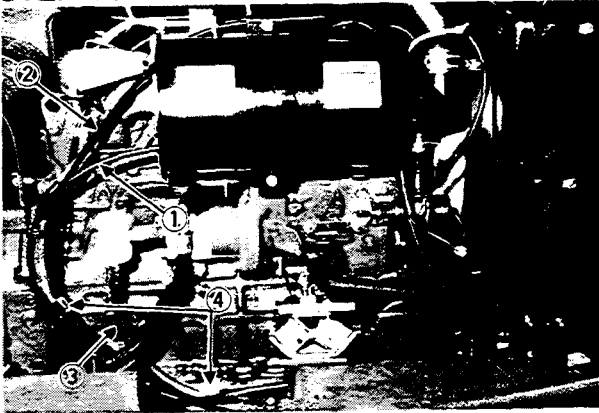
STEP 13



Remove the radiator/oil cooler assembly.

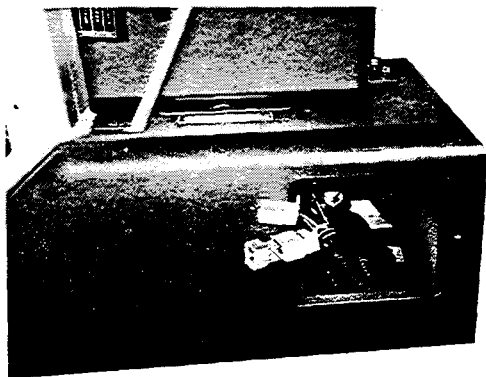
NOTE: For Installation, make sure the radiator (1) and fan (2) have the following clearances:

- A = 30 mm or more
- B = 15 mm or more
- C = 20 mm or more

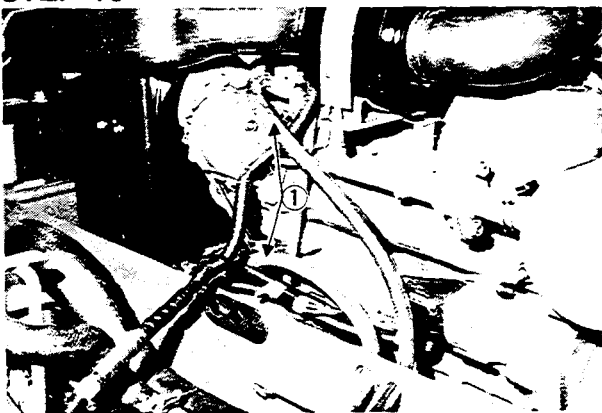
STEP 14

Disconnect the throttle cable (1), tachometer cable (2), fuel hose (3) and clamp (4).

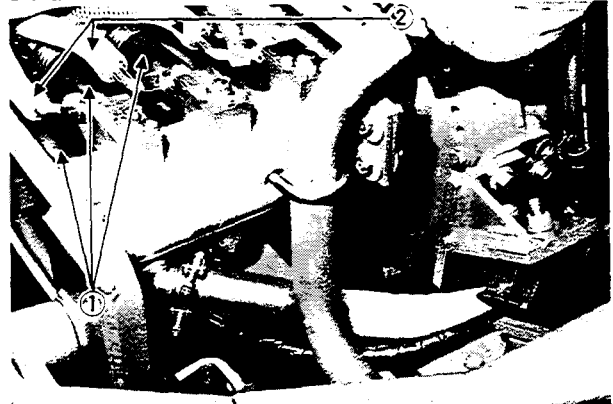
NOTE: For Installation, refer to Section 9003 for throttle cable adjustment.

STEP 15

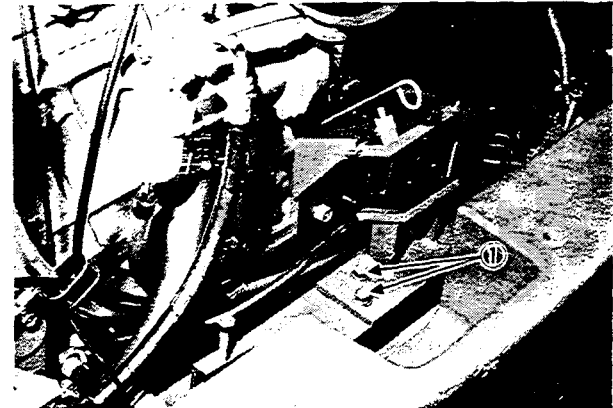
Remove the cover next to the right control lever stand. Disconnect the main electrical harness from the engine.

STEP 16

Disconnect and cap the heater hoses, (if equipped).

STEP 17

Disconnect and cap the hoses (1) and (2) from the hydraulic pump.

STEP 18

Support the engine on suitable lifting equipment. Remove the engine mounting bolts (1).

NOTE: For Installation, apply Loctite 271 to the engine mounting bolts and tighten to a torque of:

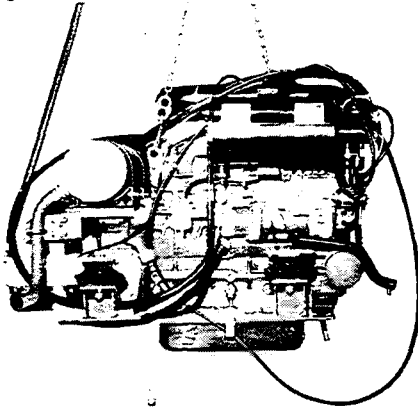
M10 - 48 to 56 Nm

M12 - 77 to 90 Nm

M14 - 124 to 147 Nm.

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STEP 19



Carefully remove the engine from the machine.

NOTE: *For Installation, follow the same procedure in reverse order. Open the heater valve, situated on top of the engine, to allow the coolant to circulate. Start and run the engine for approximately 5 minutes. Stop the engine and check the coolant level, engine oil level and hydraulic oil level. Add coolant or oil if necessary.*

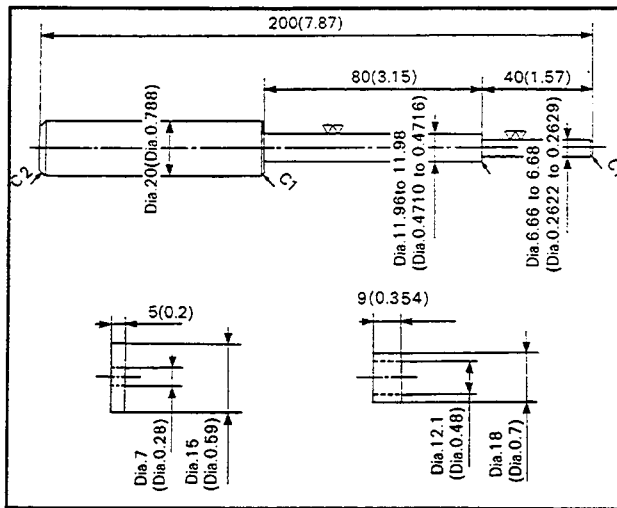


WARNING: *Never run an engine in an closed building. Proper ventilation is required under all circumstances.*

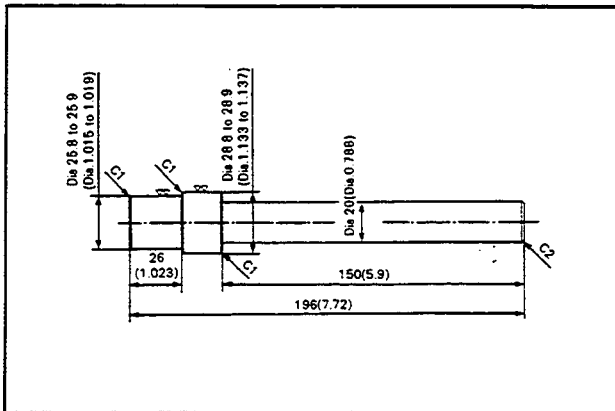
SHOP EQUIPMENT TOOLS

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. TORQUE WRENCH, OEM 6474 AND OEM 6477 2. VALVE SPRING COMPRESSOR, OEM 6414 3. PISTON RING EXPANDER, OEM 6266 4. SPRING TESTER, OEM 1282 5. PISTON RING COMPRESSOR, OEM 6269 6. PULLER, OEM 4212 7. COOLING SYSTEM PRESSURE TESTER, OEM 1347 8. DEPTH MICROMETER, CAS10064-1M 9. MICROMETER (0 to 25 mm), OEM 10057M | <ol style="list-style-type: none"> 10. MICROMETER (25 to 50 mm), OEM 10058M 11. SMALL HOLE GAUGE SET, OEM 1023 12. DIAL GAUGE, CAS 10066-1A
AND MAGNETIC BASE, CAS 10149 13. TELESCOPING GAUGE, OEM 1015 14. TELESCOPING GAUGE, OEM 1017 15. TELESCOPING GAUGE, OEM 1018 16. TELESCOPING GAUGE, OEM 1019 17. CYLINDER BORE GAUGE, OEM 10340 |
|---|---|

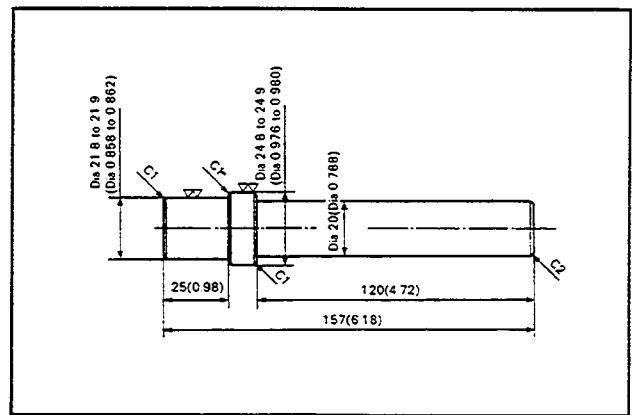
TOOLS TO BE MADE



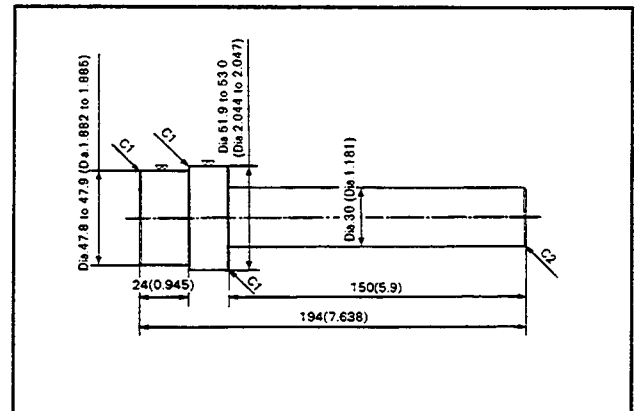
1. VALVE GUIDE DRIVER



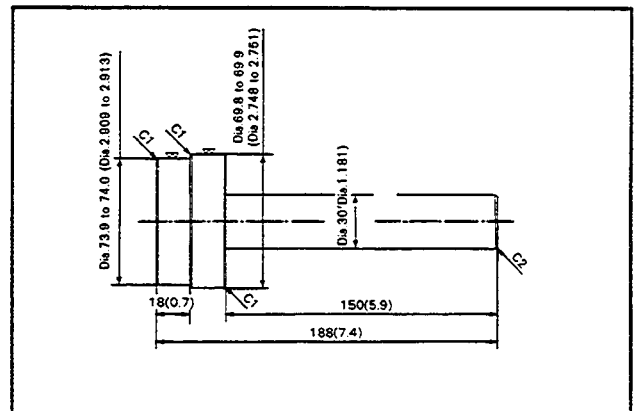
2. IDLER GEAR BUSHING DRIVER



3. SMALL END BUSHING DRIVER



4. CRANKSHAFT BEARING 1 DRIVER



5. GOVERNOR GEAR HOLDER BUSHING DRIVER

CYLINDER HEAD

Removal and Installation

STEP 1

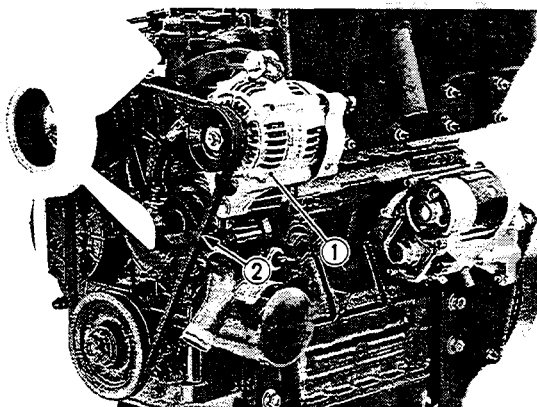
Remove the drain plug and drain the engine oil. Drain the coolant from the cylinder block.

STEP 2

Remove the air filter assembly and muffler.

NOTE: For Installation, install the muffler gasket with the steel side facing the muffler.

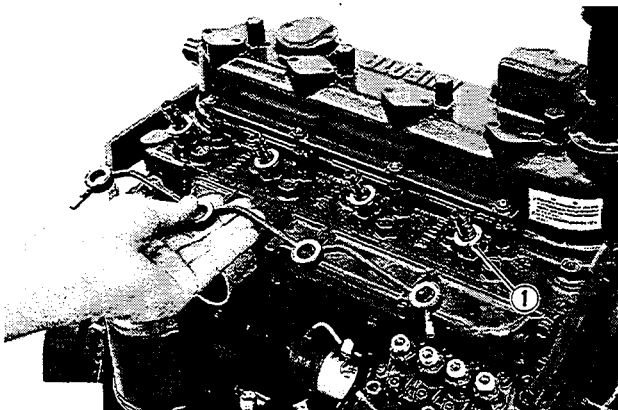
STEP 3



Remove the alternator (1), fan belt (2) and fan.

NOTE: For Installation, tighten the fan belt to 7 to 9 mm deflection at 98 N.

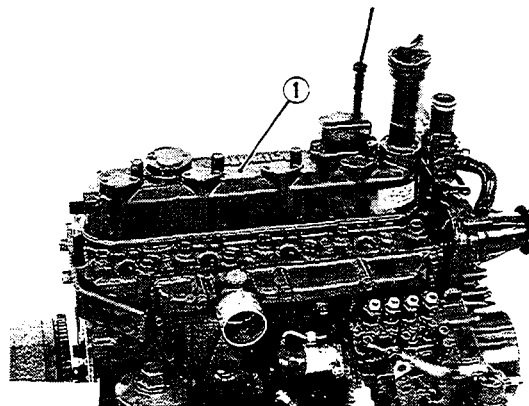
STEP 4



Remove and cap the fuel injection pipes. Remove the fuel overflow pipes.
Remove the nozzle holder assemblies (1).

NOTE: For Installation, tighten the nozzle holder assemblies to a torque of 49 to 68.6 Nm (36 to 50.6 lb ft) and the fuel injection pipe nuts to a torque of 24.5 to 34.3 Nm (18 to 25 lb ft)

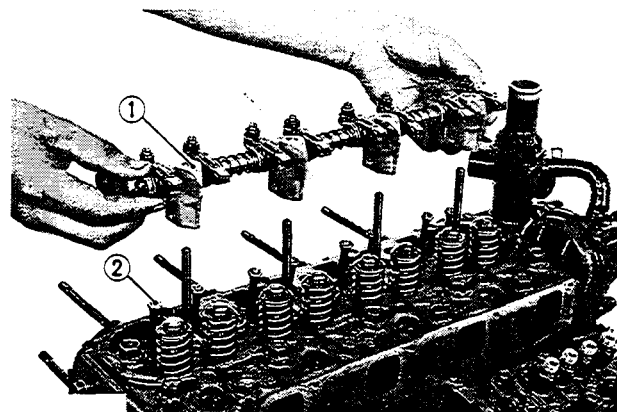
STEP 5



Remove the rocker cover retaining nuts. Remove the rocker cover (1) and discard the gasket.

NOTE: For Installation, install a new rocker cover gasket and tighten the retaining nuts to a torque of 6.9 to 8.8 Nm (5 to 6.5 lb ft)

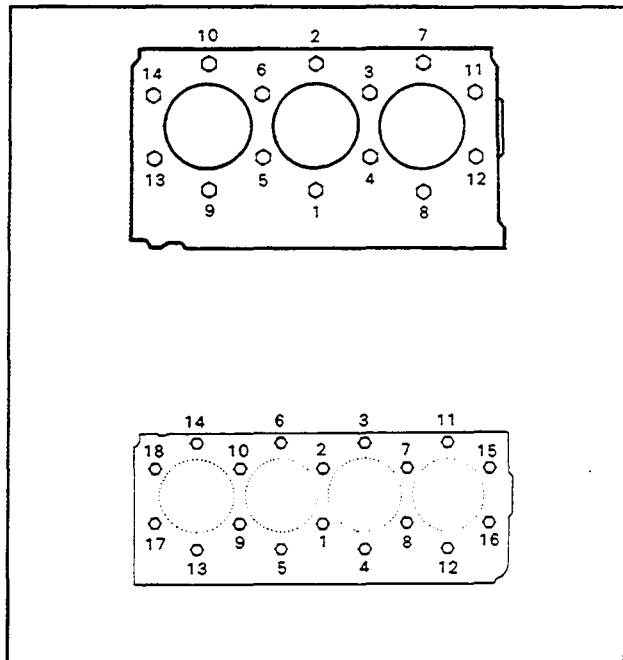
STEP 6



Remove the rocker shaft retaining nuts and remove the rocker shaft assembly. Remove the push rods.

NOTE: For Installation, tighten the rocker shaft retaining nuts to a torque of 21.6 to 26.5 Nm (16 to 19.5 lb ft)

STEP 7

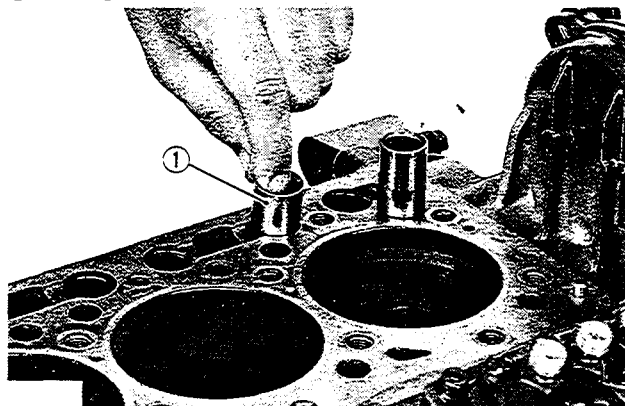


Loosen the clamp and remove the coolant return pipe. Remove the cylinder head retaining bolts (14 to 1 for 3 cylinder engines) or (18 to 1 for 4 cylinder engines) and remove the cylinder head. Remove and discard the gasket.

NOTE: For Installation, install a new cylinder head gasket. Install and tighten the cylinder head bolts (1 to 14 for 3 cylinder engines) or (1 to 18 for 4 cylinder engines) to a torque of 63.7 to 68.6 Nm (47 to 51 lb ft).

NOTE: Check the torque of the cylinder head bolts after approximately 30 minutes running.

STEP 8



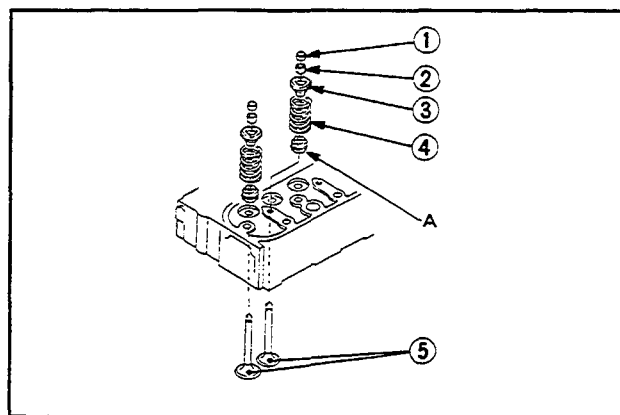
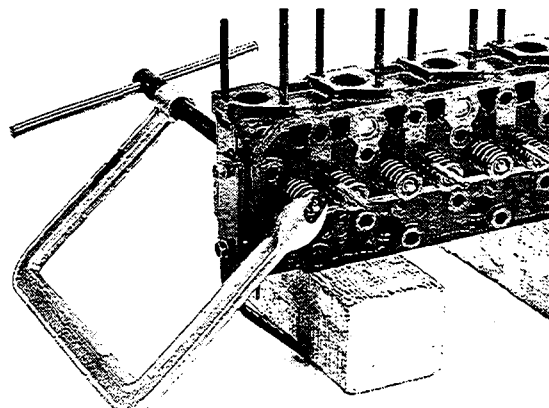
Remove the tappets (1) from the crankcase. Put identification marks on the tappets (1) for installation.

NOTE: Coat the tappets (1) with clean engine oil before installation.

NOTE: For Installation, follow the same procedure in reverse order.

Disassembly and Assembly

STEP 9



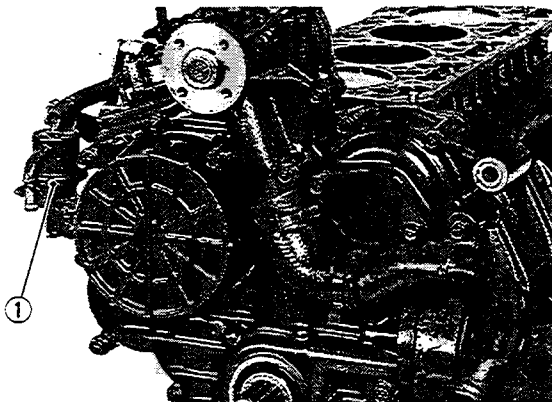
Remove the valve cap (1). Use a valve spring compressor to compress the valve spring, remove the collet (2), retainer (3), valve spring (4) and valve (5). Remove and discard the seal (A).

NOTE: For Assembly, install a new seal (A).

CRANKCASE

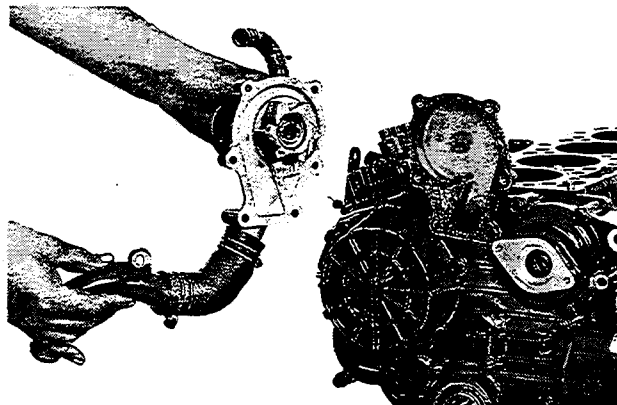
Disassembly and Assembly

STEP 1



Remove the fuel feed pump (1) and tachometer drive housing plate.

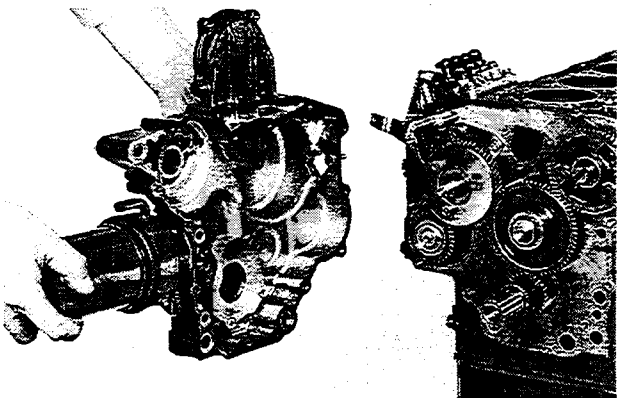
STEP 2



Remove the water pump assembly. Remove and discard the gasket.

NOTE: For Assembly, install a new water pump gasket.

STEP 3

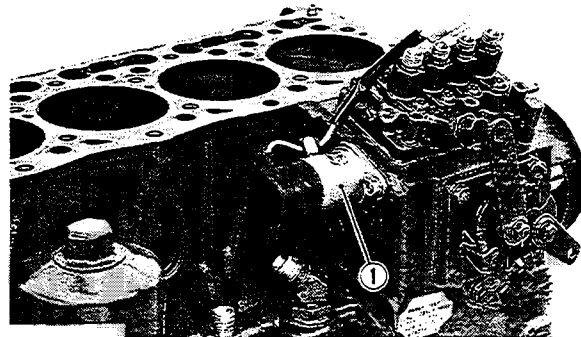


Remove the front gear cover. Remove and discard the gasket.

NOTE: For Assembly, install a new front cover gasket.

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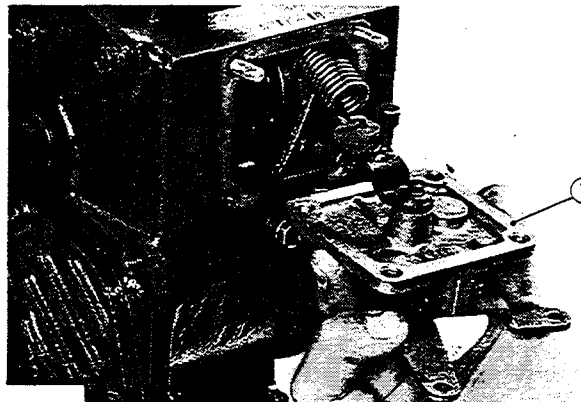
STEP 4



Remove the engine stop solenoid (1). Remove and discard the gasket.

NOTE: For Assembly, install a new engine stop solenoid gasket.

STEP 5

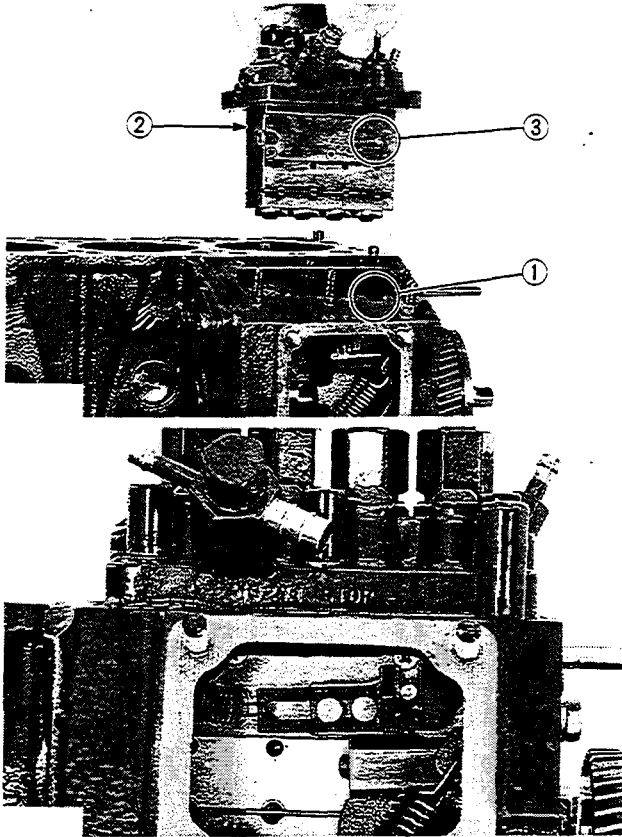


Remove the speed control plate (1) and governor springs.

NOTE: Take care not to drop the governor springs into the crankcase.

NOTE: For Assembly, install a new speed control plate gasket.

STEP 6

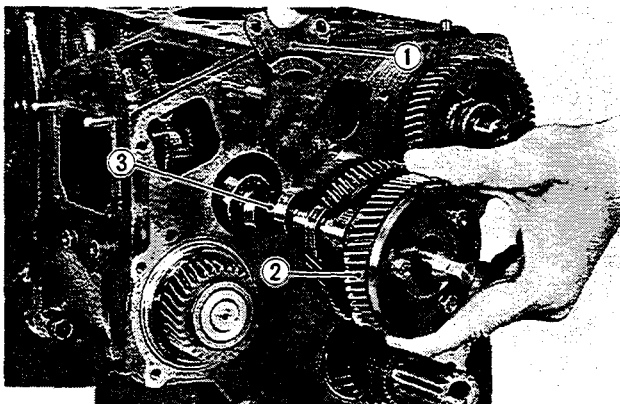


Align the control rack pin (3) with the notch (1) in the crankcase and remove the injection pump (2). Remove the injection pump shims, make a note of the number of shims removed.

NOTE: For Assembly, make sure the control rack pin (3) is located in the groove of the fork and thrust lever.

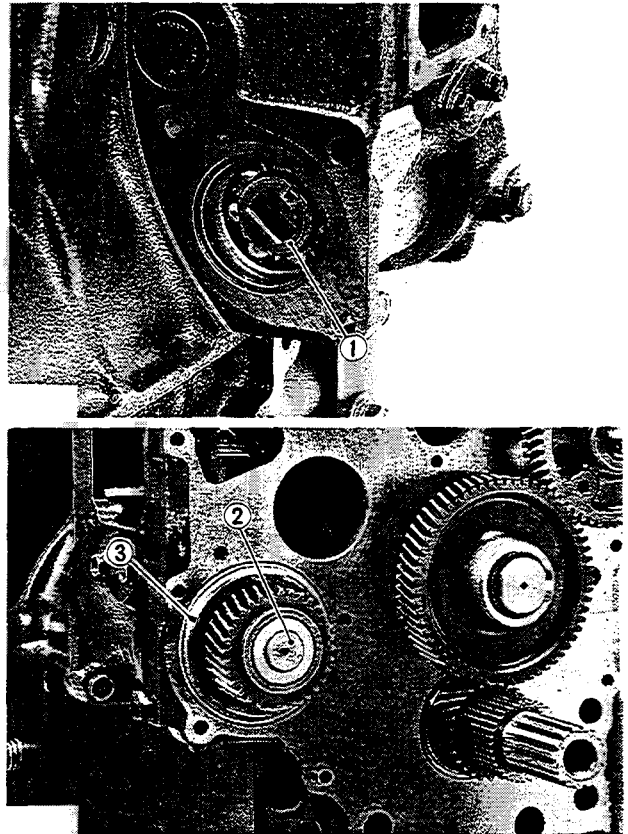
IMPORTANT: Install the same amount of shims between the crankcase and injection pump, as removed in Step 6. Check the injection timing, adding or removing one shim retards or advances the injection timing by 1.5 degrees.

STEP 7

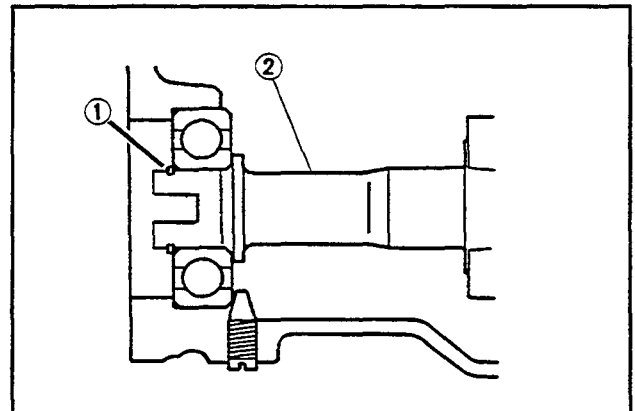


Remove the fuel camshaft retaining bracket (1). Remove the fuel camshaft (3) and timing gear (2).

STEP 8



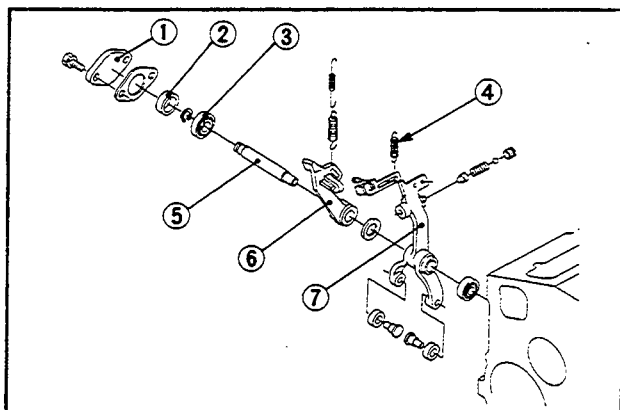
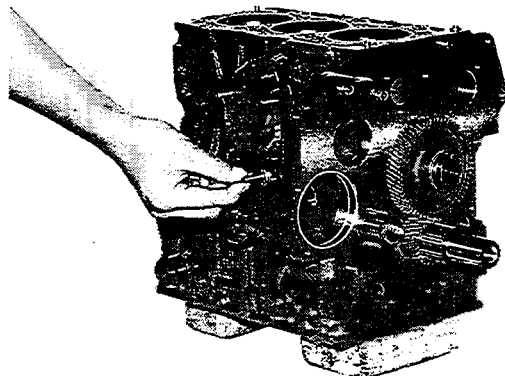
Remove the oil pressure pump. Remove the snap ring (1) from the governor shaft. Remove the governor shaft assembly (2).



- 1. SNAP RING
- 2. GOVERNOR SHAFT
- 3. GOVERNOR SHAFT BUSHING

Before installing the governor shaft (2) into the crankcase, install a new bushing (3) using the Bushing Installation Driver, refer to Tools to be Made, Page 8. Install the shaft (2) and snap ring (1), check the shaft (2) rotates freely.

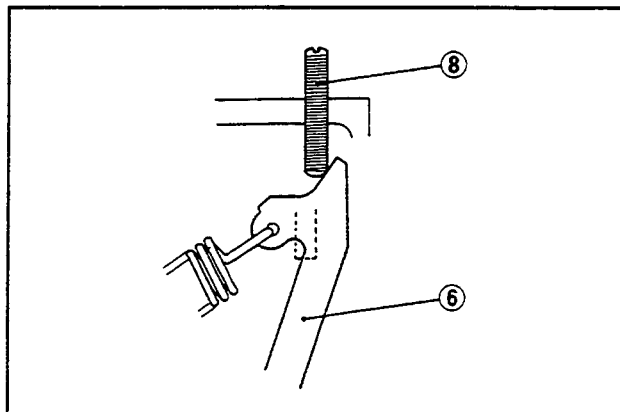
STEP 9



Remove the cover (1), spring (4) and shaft (5). Remove the spacer (2) and bearing (3). Remove the levers (6) and (7).

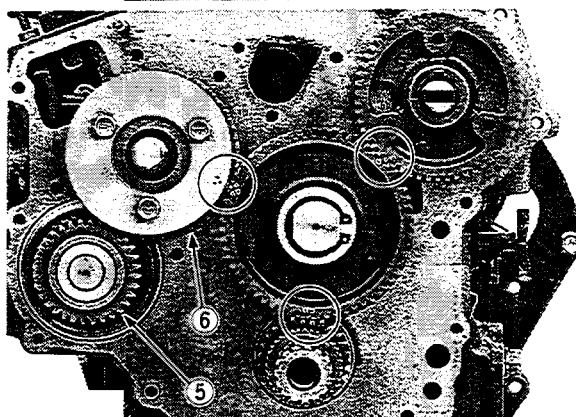
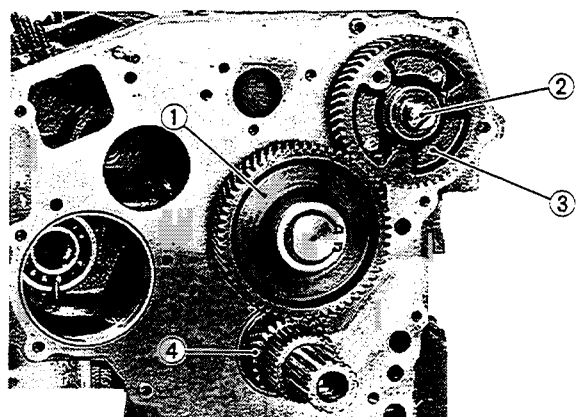
NOTE: For Assembly, install a new gasket onto the cover (1).

STEP 10



Install the lever (6) to the RH side of the fuel limit bolt (8), as shown.

STEP 11



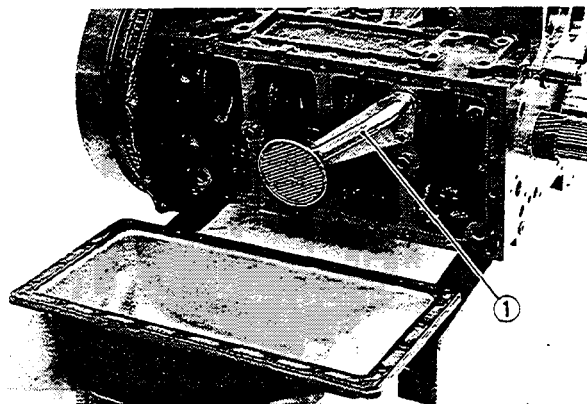
Remove the snap ring (A) and idler gear (1). Remove the camshaft retaining bolts (8) and carefully remove the camshaft gear (3) and camshaft (2).

NOTE: For Assembly, make sure the timing marks are aligned, as shown.

PISTON AND CONNECTING RODS

Removal and Installation

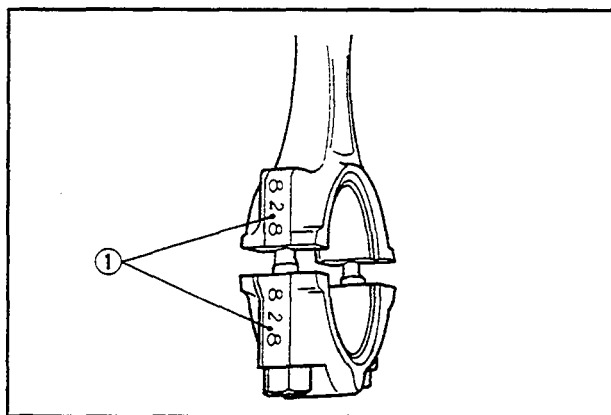
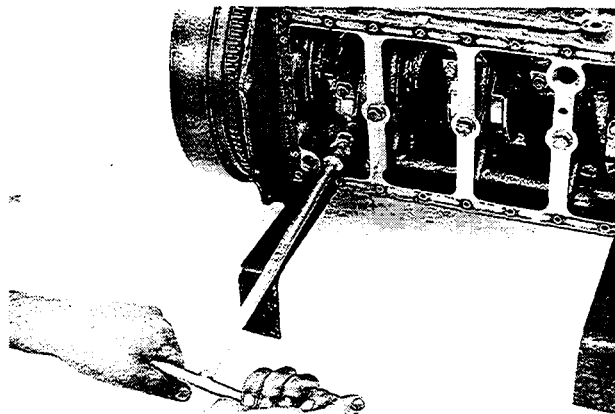
STEP 1



Remove the oil pan retaining screws. Remove the oil pan, remove and discard the gasket. Remove the oil strainer (1), remove and discard the o-ring.

NOTE: For Installation, install a new o-ring onto the oil strainer, install the oil strainer. Install a new oil pan gasket and install the oil pan. When tightening the oil pan retaining bolts, tighten diagonally from the center.

STEP 2

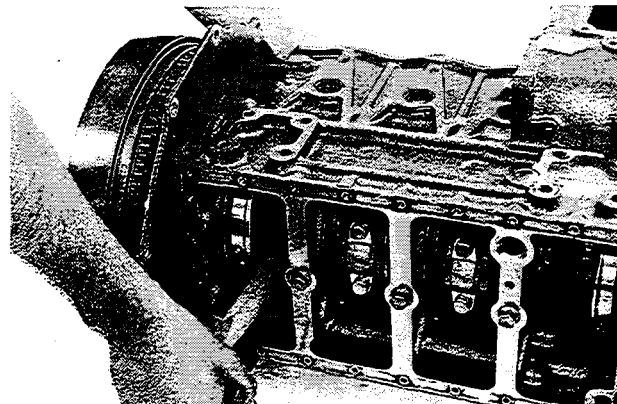


Remove the connecting rod cap retaining screws. Remove the connecting rod cap.

NOTE: For Installation, coat the retaining screws lightly with clean engine oil. Tighten to a torque of 41.2 to 46.1 Nm (30.4 to 34 lb ft).

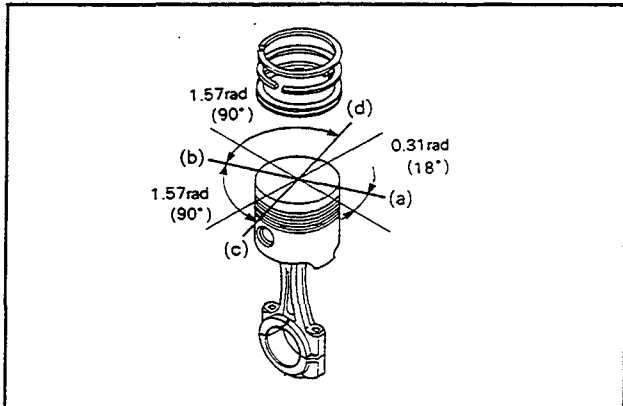
NOTE: For Installation, align the identification marks on the connecting rod and cap.

STEP 3



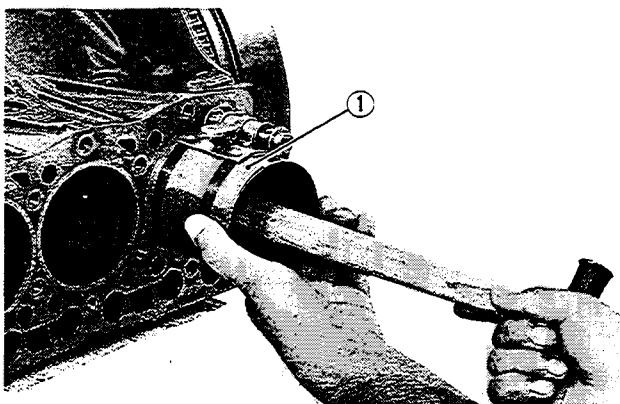
Turn the flywheel until the No. 1 piston is at top dead center. Remove the piston and connecting rod.

STEP 4



Position the piston rings on the piston, as shown.

STEP 5



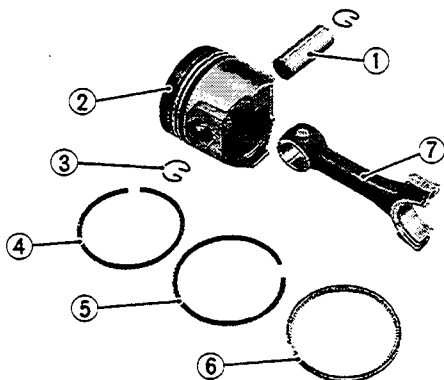
Use a ring compressor (1) and install the piston and connecting rod using a hammer shaft, as shown.

NOTE: Make sure the identification marks on the connecting rod and cap are facing the injection pump.

IMPORTANT: DO NOT interchange the pistons and liners.

Disassembly and Assembly

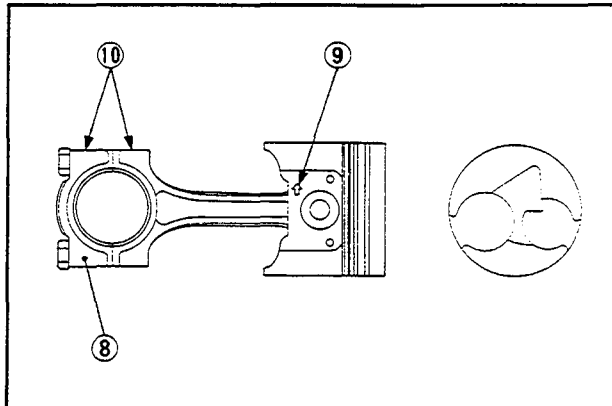
STEP 6



Remove the piston rings (4, 5 and 6). Remove the snap ring (3) and piston pin (1). Remove the connecting rod (7) from the piston (2).

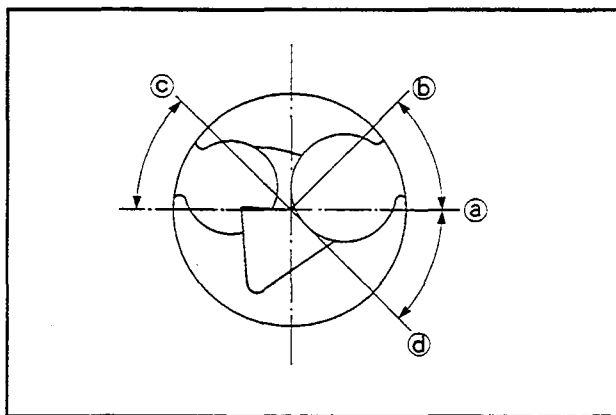
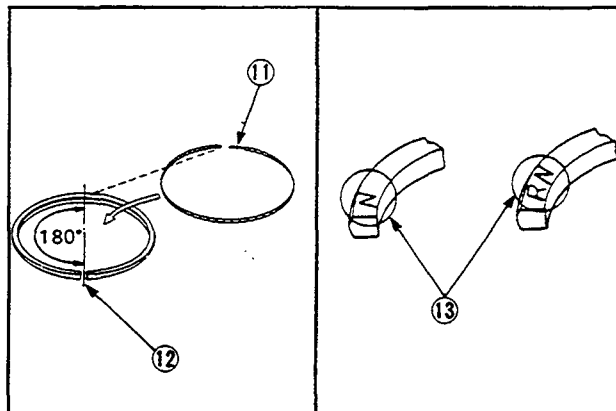
Don 7-37950

STEP 7



Install the connecting rod (7) into the piston (2) with the casting mark (9) and identification numbers (10) in the same direction.

STEP 8



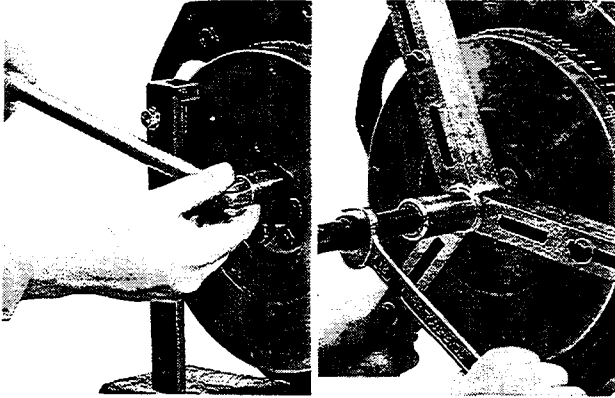
a. PISTON PIN HOLE c. SECOND RING GAP
b. TOP RING GAP d. OIL RING GAP

Install the oil ring onto the piston with the expander joint (11) on the opposite side to the gap (12). Install the remaining piston rings with the manufacturers marks (13) facing the top of the piston.

CRANKSHAFT

Removal and Installation

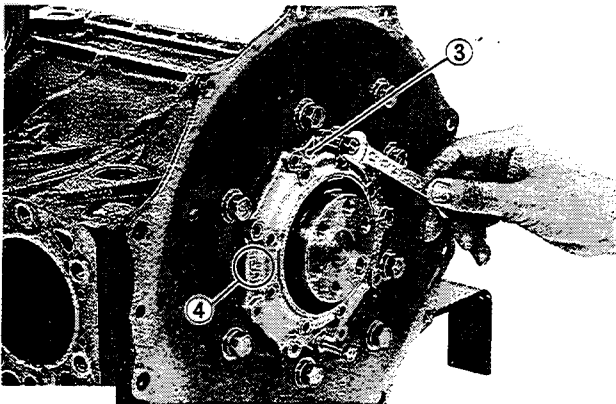
STEP 1



Lock the flywheel and remove the retaining bolts. Use a suitable extractor to remove the flywheel.

NOTE: For Installation, tighten the retaining bolts to a torque of 53.9 to 58.8 Nm (39.8 to 43.4 lb ft).

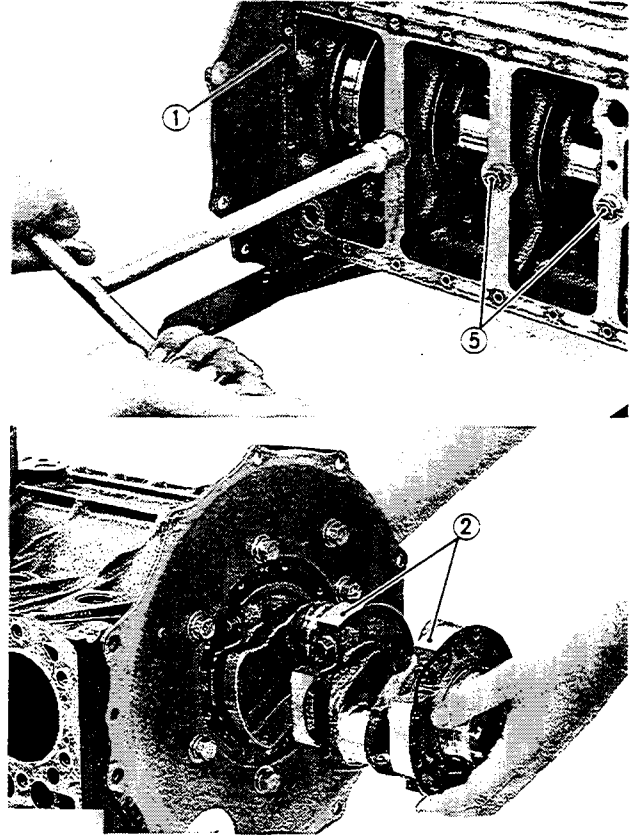
STEP 2



Check the side clearance of the crankshaft, refer to Specifications, Page 4. Remove the bearing case retaining screws and remove the bearing case (3). Remove and discard the oil seal.

NOTE: For Assembly, install a new oil seal. Install a new gasket onto the bearing case. Install the bearing case (3) with the mark "UP" (4), in the position shown. Tighten the retaining screws diagonally to a torque of 29.4 to 34.3 Nm (21.7 to 25.3 lb ft).

STEP 3

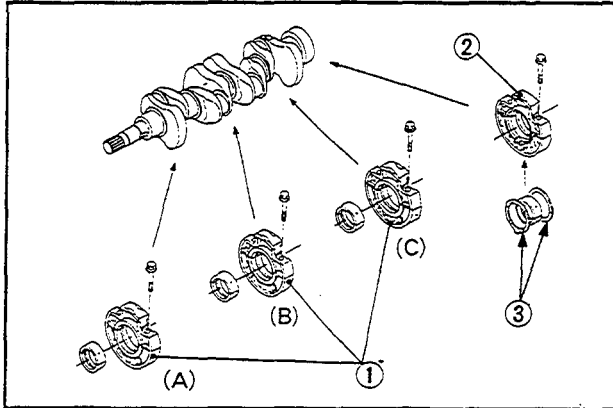


Remove the crankshaft bearing retaining screws (5) and carefully remove the crankshaft.

NOTE: For Installation, install the crankshaft with the holes in the bearing case (2) aligned with the cylinder block (1). Install and tighten the retaining screws (5) to a torque of 49 to 53.9 Nm (36.2 to 39.8 lb ft).

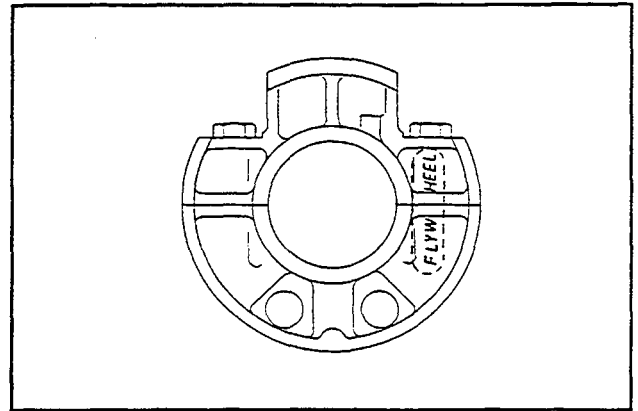
Disassembly and Assembly

STEP 4



Remove the two screws from the bearing case (1). Remove the bearing case (1) from the crankshaft. Remove the thrust bearing (3) and bearing from the bearing case. Repeat procedure for the remaining bearing cases.

STEP 5



Clean the oil passage in the bearing case. Apply clean engine oil on the thrust bearings and bearings. Make sure the bearing cases are installed on the crankshaft in the same position as removed.

NOTE: For Assembly, make sure the face of the bearing case marked "FLYWHEEL" is facing towards the flywheel and the oil grooves in the thrust bearings face outwards from the bearing cases.



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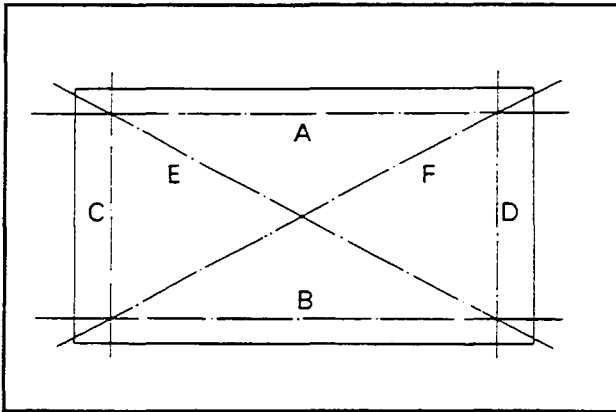
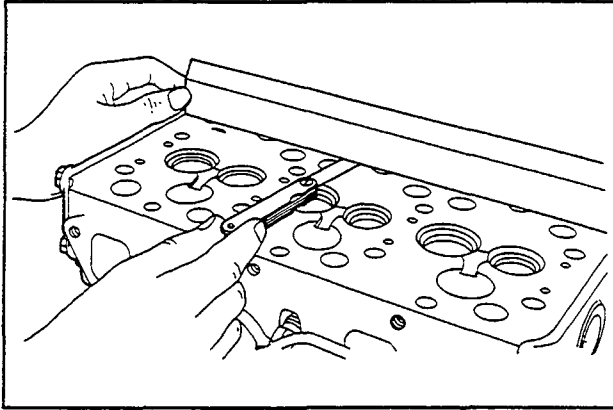
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CYLINDER HEAD

Inspection

STEP 1

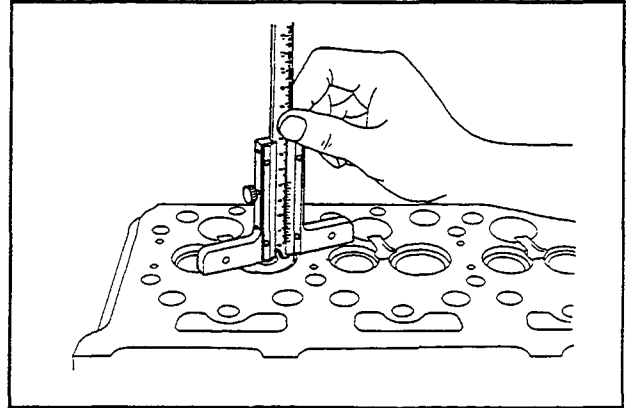


Thoroughly clean the surface of the cylinder head. Check the cylinder surface for warpage, using a straight edge and feeler gauge in the positions shown.

NOTE: If the measurement is more than 0.05 mm the cylinder head must be machined or replaced.

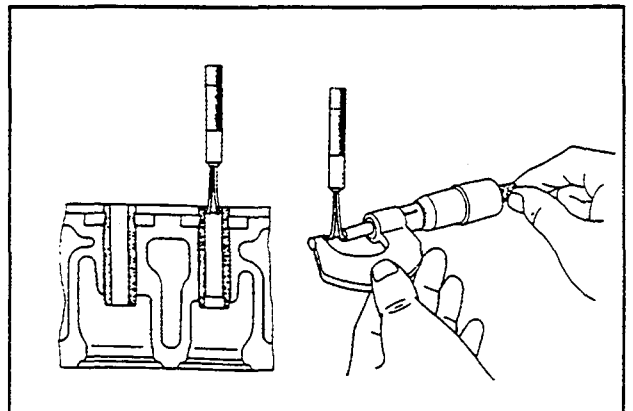
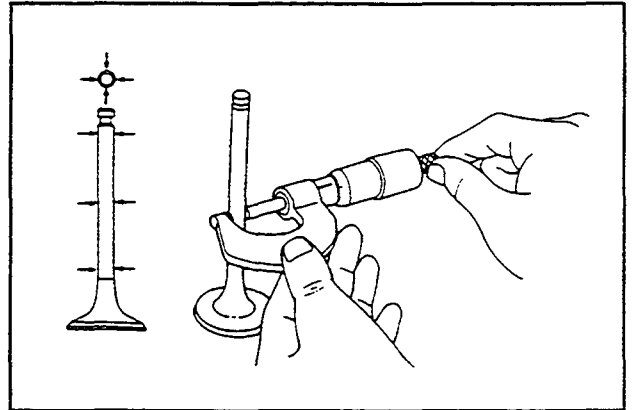
IMPORTANT: If the cylinder head has been machined, refer to Step 2 to check the valve recess.

STEP 2



Install the valve into the cylinder head and using a depth micrometer measure the distance between surface of the valve and cylinder head. If the measurement is not within specification, replace the valve. If the measurement is still greater than specification check the valve seat face and correct if necessary. Valve recess – 0.05 to 0.15 mm (0.4 mm maximum)

STEP 3 Valve and Valve Guide



Measure the outside diameter of the valve stem and the inside diameter of the valve guide. If the clearance is greater than 0.10 mm, replace the valve guide or valve. Refer to Specifications, Page 4, for the O.D. of the valve stem and I.D. of the valve guide.

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