
FARMALL 55, FARMALL 60 SERVICE MANUAL COMPLETE CONTENTS

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The following pages are the collation of the contents pages from each section and chapter of the Farmall 55, Farmall 60 Service manual. Complete Service part # 84257441.

The sections used through out all Case IH product Service manuals may not be used for each product. Each Service manual will be made up of one or several books. Each book will be labeled as to which sections are in the overall Service manual and which sections are in each book.

The sections listed above are the sections utilized for the Farmall 55, Farmall 60 Tractors.

SAFETY

PRECAUTIONARY STATEMENTS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read the following precautions before operating this equipment. Equipment should be operated only by those who are responsible and instructed to do so.

Carefully review the procedures given in this manual with all operators. It is important that all operators be familiar with and follow safety precautions.

THE TRACTOR

1. Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Use an approved roll bar and seat belt for safe operation. Overturning a tractor without a roll bar can result in death or injury. If your tractor is not equipped with a roll bar and seat belt, see your Case IH Dealer.
3. Always use the seat belt. The only instance when the seat belt should not be used is if the roll bar has been removed from the tractor or folding ROPS is in down position.
4. If a front end loader is to be installed, always use a FOPS (Falling Object Protective Structure) canopy to avoid injury from falling objects.
5. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep steps and platform cleared of mud and debris.
6. Do not permit anyone but the operator to ride on the tractor. There is no safe place for extra riders.
7. Keep all safety decals clean of dirt and grime, and replace all missing, illegible, or damaged safety decals. See the list of decals in the Decal section of this manual.
3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
4. Keep open flame or cold weather starting aids away from the battery to prevent fires or explosions. Use jumper cables according to instructions to prevent sparks which could cause explosion. Do not use chemical starting aids on glow plug equipped tractors.
5. Stop the engine before performing any service on the tractor.
6. Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: relieve all pressure, before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
7. Do not modify or permit anyone else to modify or alter this tractor or any of its components or functions without first consulting a Case IH Dealer.

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow pressure to escape before removing the cap entirely.
2. Keep any type of open flame away from the tractor and do not smoke while refueling. Wait for the engine to cool before refueling.
8. The fuel oil in the injection system is under high pressure and can penetrate the skin. Unqualified persons should not remove or attempt to adjust a pump, injector, nozzle, or any other part of the fuel injection system. Failure to follow these instructions can result in serious injury.
9. Continuous long-term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.

SECTION 00 - GENERAL INFORMATION - CHAPTER 1

10. Some components of your tractor, such as gaskets and friction surfaces (brake linings, clutch linings, etc.) may contain asbestos. Breathing asbestos dust is dangerous to your health. You are advised to have any maintenance or repair on such components carried out by an authorized Case IH Dealer. However, if service operations are to be undertaken on parts that contain asbestos, the essential precautions listed below must be observed:
 - Work out of doors or in a well ventilated area.
 - Dust found on the tractor or produced during work on the tractor should be removed by extraction, not by blowing.
 - Dust waste should be dampened, placed in a sealed container, and marked to ensure safe disposal.
 - If any cutting, drilling, etc. is attempted on materials containing asbestos, the item should be dampened and only hand tools or low speed power tools used.
11. Install new decals if the old decals are destroyed, lost, painted over or cannot be read. When parts are replaced that have decals make sure you install a new decal with each new part.
8. If the power steering or engine ceases operating, stop the tractor immediately.
9. Pull only from the drawbar or the lower link drawbar in the down position. Use only a drawbar pin that locks in place. Pulling from the tractor rear axle or any point above the axle may cause the tractor to upset.
10. If the front end of the tractor tends to rise when heavy implements are attached to the three-point hitch, install front end weights. Do not operate the tractor with a light front end.
11. Always set the hydraulic selector lever in position control when attaching or transporting equipment. Ensure hydraulic couplers are properly mounted and will disconnect safely in case of accidental detachment of implement.
12. Do not leave equipment in the raised position.
13. Use the flasher/turn signal lights and SMV signs when traveling on public roads both day and night (unless prohibited by law).
14. When operating at night, adjust lights to prevent blinding oncoming drivers.

OPERATING THE TRACTOR

1. Before starting the tractor, apply the parking brake, place the PTO lever in the "OFF" position, the lift control lever in the down position, the remote control valve levers in the neutral position, and the transmission in neutral.
2. Always sit in the tractor seat when starting the engine or operating controls. Do not start the engine or operate controls while standing beside the tractor.
3. Do not bypass the neutral start switches. Consult your Case IH Dealer if your neutral start controls malfunction. Use jumper cables only in the recommended manner. Improper use can result in tractor runaway.
4. Avoid accidental contact with the gear shift lever while the engine is running, as this can cause unexpected tractor movement.
5. Before getting off the tractor, disengage the PTO, turn the engine off, and apply the parking brake. Never get off the tractor while it is in motion.
6. Do not park the tractor on a steep incline.
7. Do not operate the tractor engine in an enclosed building without adequate ventilation. Exhaust fumes can cause death or illness.
1. Watch where you are going, especially at row ends, on roads, around trees and low hanging obstacles.
2. To avoid upsets, drive the tractor with care and at a safe speed. Use extra caution when operating over rough ground, when crossing ditches or slopes, and when turning corners.
3. To provide two-wheel braking, lock tractor brake pedals together when transporting on roads.
4. Do not coast or free wheel down hills. Use the same gear when going downhill as is used when going uphill.
5. Any towed vehicle with a total weight exceeding that of the towing tractor should be equipped with brakes for safe operation.
6. If the tractor becomes stuck or the tires become frozen to the ground, back up the tractor to prevent upset.
7. Always check overhead clearance, especially when transporting the tractor.
8. When operating at night, adjust lights to prevent blinding oncoming drivers.

DRIVING THE TRACTOR

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Hello dear friend!

Thank you very much for reading.

Enter the link into your browser.

The full manual is available for immediate download.

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OPERATING THE PTO

1. When operating PTO driven equipment, shut off the engine and wait until the PTO stops before getting off the tractor and disconnecting the equipment.
2. Do not wear loose clothing when operating the power take-off or when near rotating equipment.
3. When operating stationary PTO driven equipment, always place range gear shift lever in neutral, apply the tractor parking brake, and block the rear wheels front and back.
4. To avoid injury, do not clean, adjust, unclog, or service PTO driven equipment when the tractor engine is running.
5. Ensure the PTO master shield is installed at all times. Always replace the PTO shield cap when the PTO is not in use.

DIESEL FUEL

1. UNDER NO CIRCUMSTANCES should gasoline, alcohol, or blended fuels be added to diesel fuel. These combinations can create an increased fire or explosive hazard. Such blends are more explosive than pure gasoline in a closed container such as a fuel tank. **DO NOT USE THESE BLENDS.**
2. Never remove the fuel cap or refuel with the engine running or hot.
3. Do not smoke while refueling or when standing near fuel.
4. Maintain control of the fuel filler pipe nozzle when filling the tank.
5. Do not fill the fuel tank to capacity. Allow room for expansion.

6. Wipe up spilled fuel immediately.
7. Always tighten the fuel tank cap securely.
8. If the original fuel tank cap is lost, replace it with a Case IH approved cap. A non-approved, proprietary cap may not be safe.
9. Keep equipment clean and properly maintained.
10. Do not drive equipment near open fires.
11. Never use fuel for cleaning purposes.
12. Arrange fuel purchases so that winter grade fuels are not held over and used in the spring.

SAFETY FRAME (ROPS)

Your Case IH tractor is equipped with a safety frame. It must be maintained in a serviceable condition. Be careful when driving through doorways or working in confined spaces with low headroom.

UNDER NO CIRCUMSTANCES should you:

- modify, drill, or alter the safety frame in any way. Doing so may render you liable to legal prosecution.
- attempt to straighten or weld any part of the main frame or retaining brackets which have suffered damage. Doing so may weaken the structure and endanger your safety.
- secure any parts on the main frame or attach your safety frame with anything other than the special high tensile bolts and nuts specified.
- attach chains or ropes to the main frame for pulling purposes.
- take unnecessary risks even though your safety frame affords you the maximum protection possible.

ECOLOGY AND THE ENVIRONMENT

Soil, air, and water are vital factors of agriculture and life in general. When legislation does not yet rule the treatment of some of the substances which are required by advanced technology, common sense should govern the use and disposal of products of a chemical and petrochemical nature.

The following are recommendations which may be of assistance:

- Become acquainted with and ensure that you understand the relative legislation applicable to your country.
- Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, antifreeze, cleaning agents, etc., with regard to their effect on man and nature and how to safely store, use and dispose of these substances. Agricultural consultants will, in many cases, be able to help you as well.

HELPFUL HINTS

1. Avoid filling tanks using cans or inappropriate pressurized fuel delivery systems which may cause considerable spillage.
2. In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
3. Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
4. Avoid spillage when draining off used engine coolant mixtures, engine, gearbox and hydraulic oils, brake fluids, etc. Do not mix drained brake fluids or fuels with lubricants. Store them safely until they can be disposed of in a proper way to comply with local legislation and available resources.
5. Modern coolant mixtures, i.e. antifreeze and other additives, should be replaced every two years. They should not be allowed to get into the soil but should be collected and disposed of safely.
6. Do not open the air-conditioning system yourself. It contains gases which should not be released into the atmosphere. Your dealer or air conditioning specialist has a special extractor for this purpose and will have to recharge the system properly.
7. Repair any leaks or defects in the engine cooling or hydraulic system immediately.
8. Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
9. Protect hoses during welding as penetrating weld splatter may burn a hole or weaken them, allowing the loss of oils, coolant, etc.

GENERAL INFORMATION

PLEASE READ CAREFULLY:

For a complete list of the pre-delivery service checks performed by your dealer, refer to the PRE-DELIVERY SERVICE checklist found at the back of this manual. Keep one copy as your record of the service performed. The other copy should be removed from the manual and kept by your dealer. **MAKE SURE THAT BOTH COPIES ARE COMPLETED AND THAT YOU AND THE DEALER SIGN BOTH COPIES.**

A PRODUCT IDENTIFICATION PLATE, 1, is located on the right-hand side of the tractor front end. The numbers on the plate are important in the event your tractor should require future service. For your convenience, have your dealer record these numbers in the appropriate spaces below.

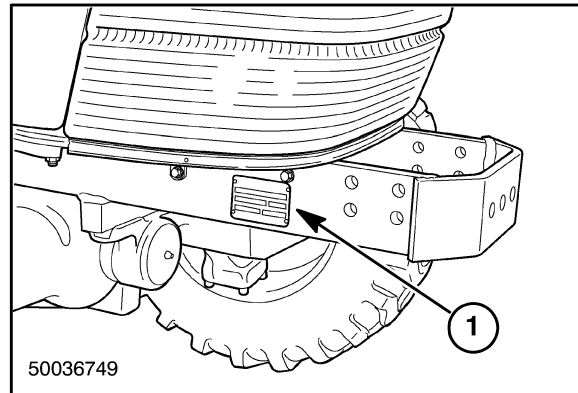
CNH America LLC is continually striving to improve its products. We reserve the right to change prices, specification, or equipment at any time without notice.

All data given in this book is subject to production variations. Dimensions and weights are approximate only, and the illustrations do not necessarily depict tractors in standard condition. For exact information about any particular tractor, please consult your Case IH dealer.

This tractor has been designed for doing light work, such as mowing, light tilling, blowing snow, and light loader work. Do not attempt to use implements that were not designed for this tractor, as they may cause damage to the tractor.

The image shows a rectangular product identification plate. At the top left is the 'CASE IH' logo. At the top right, it says 'CNH America LLC' and 'Racine, WI 53404 U.S.A.'. Below the logo, it says 'Made In Japan'. The main body of the plate contains five fields for recording information: 'Product Identification Number' (a long horizontal box), 'Engine' (a horizontal box), 'Unit' (a smaller horizontal box), 'Transmission' (a horizontal box), and 'Model' (a smaller horizontal box). The number '20070967' is printed at the bottom left of the plate.

1



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SECTION 10 - ENGINE

Chapter 1 - Engine Components

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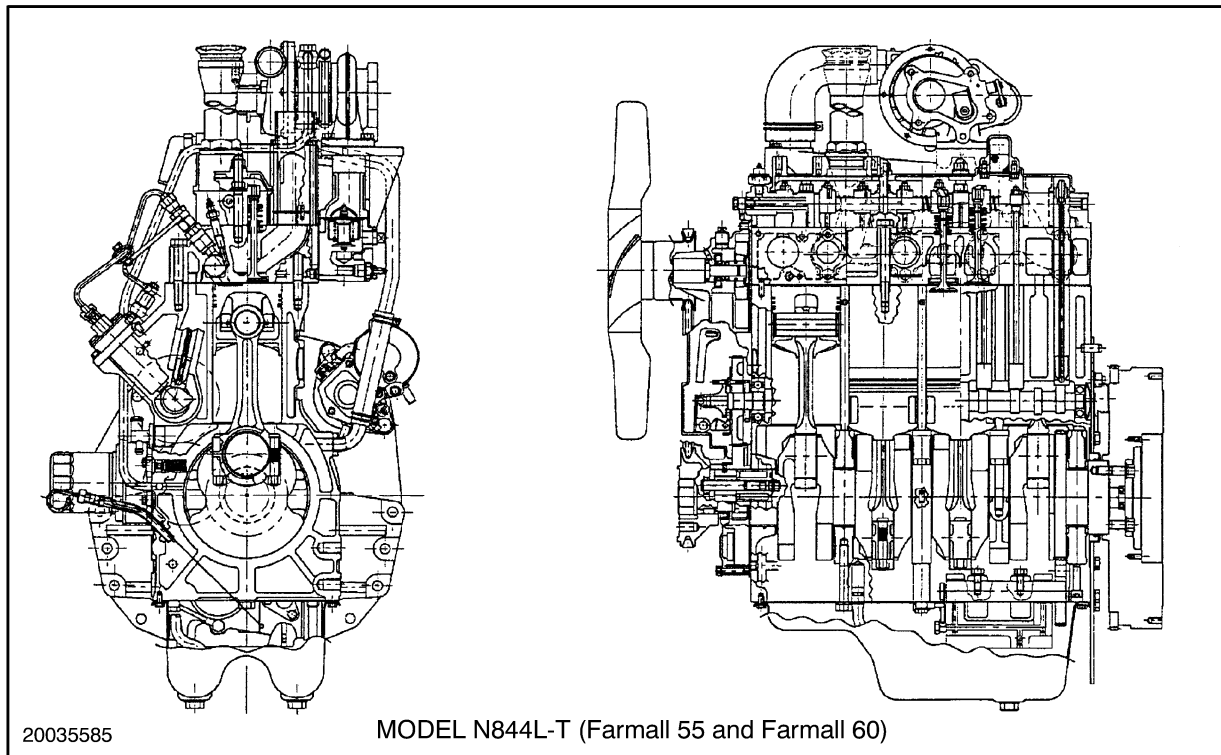
CYLINDER HEAD AND VALVE TRAIN COMPONENTS

The cylinder head incorporates the valve assemblies, rocker arms, rocker shaft, push rods, and lifters. A swirl chamber located between the injector assembly and the main combustion chamber of the cylinders provides improved starting and greater fuel efficiency. Initial combustion starts in the precombustion chamber and as the expansion occurs a strong swirl pattern is created in the main combustion chamber for more complete combustion of the air-fuel mixture. The air intake manifold is separate from the cast aluminum valve cover on all these engines. The exhaust manifold is bolted on the left-hand side of the cylinder head on each of the models. Cylinder heads have integral valve guides. Standard size valves only are used.

CYLINDER BLOCK ASSEMBLY

N844L-T

The cylinder block assembly contains the pistons, connecting rods, crankshaft, timing gears, and engine oil pump. The crankshaft is supported on five main bearings. The front bearing is positioned in a bore in front of the block. The other bearings are split liners located in holders bolted to the block. The camshaft is supported on four ball bearings located in the block.

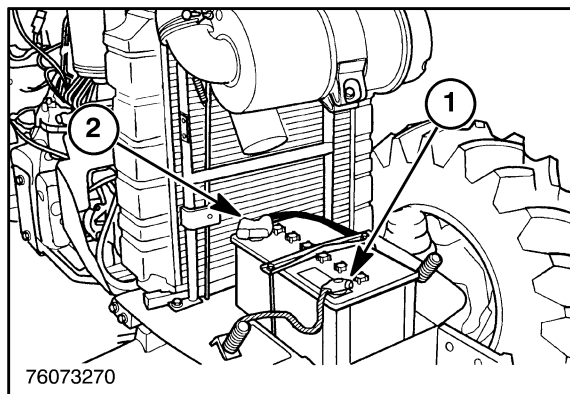


OVERHAUL

ENGINE

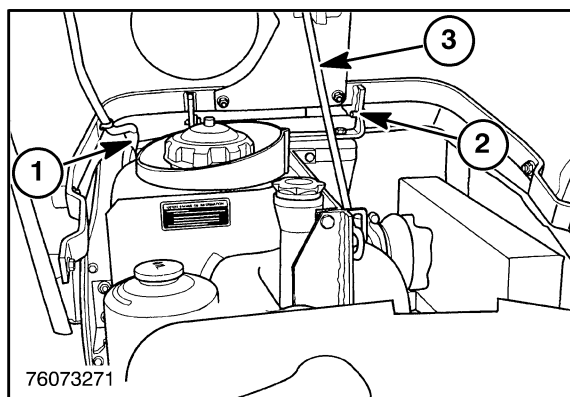
Removal

1. Disconnect the negative (-) battery cable, 1, and positive (+) battery cable, 2, from the battery.



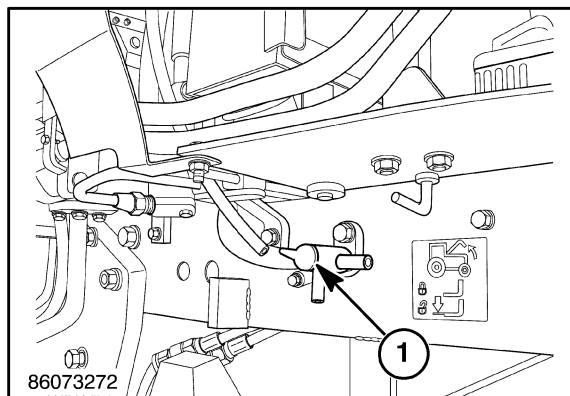
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2. Disconnect the headlight wire harness plug, 1.
3. Remove the clips and pins, 2, from each side of the hood bracket.
4. Remove the support rod, 3, and remove the hood from the tractor.



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5. Drain the coolant from radiator, and engine using the petcock valve, 1. Remove radiator cap to assist draining.
6. Remove the radiator, refer to "Radiator Removal" found later in this section.

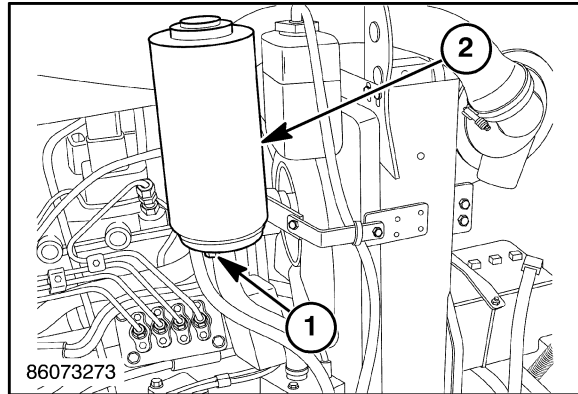


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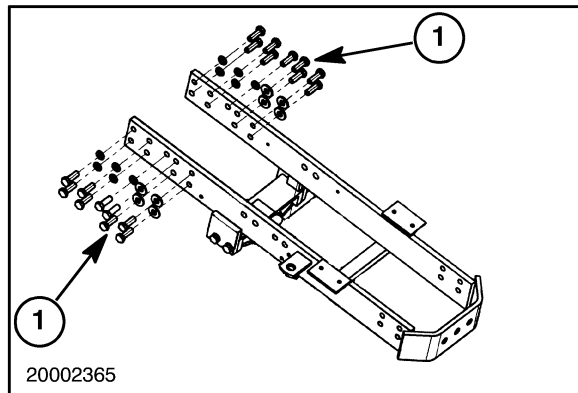
7. Loosen and remove the drain plug, 1, from the power steering reservoir, 2, and drain into a suitable container.

NOTICE: See “Separating the Tractor at the Clutch Housing/Engine” in Section 21 to separate the tractor.



8

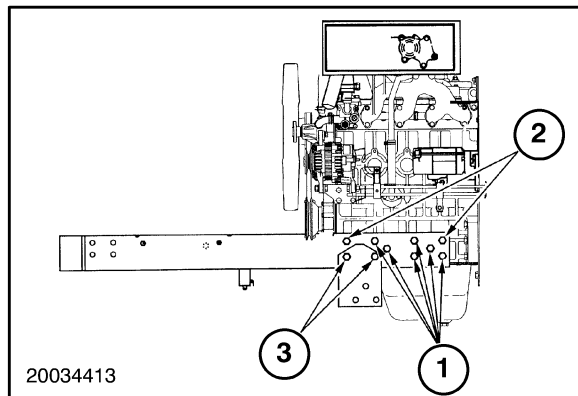
8. After the tractor has been successfully separated, support the front axle and the front support frame with jack stands.
9. Remove the firewall from the engine.
10. Remove the muffler and exhaust pipe from the tractor.
11. With the chain and hoist still attached to the engine, remove the cap screws, 1, from each side of the frame rails.
12. Carefully remove the engine.



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Installation

1. Attach a hoist to the engine, and position it onto the frame.
2. Install the engine mounting cap screws on both sides of the frame. Apply Loctite® thread locker 242 to the thread of the cap screws. Tighten cap screws to the following torques:
 - torques #1 - 80 N·m (60 lb ft)
 - torques #2 - 80 N·m (60 lb ft)
 - torques #3 - 175 N·m (130 lb ft)
3. Install the muffler and exhaust pipe onto the tractor.
4. Install the firewall onto the engine.



10

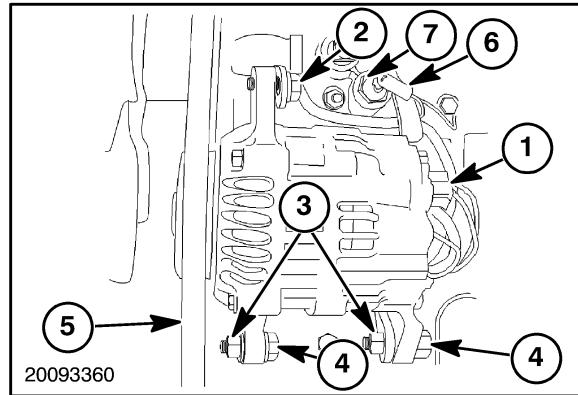
NOTICE: See “Attaching the Tractor at the Clutch Housing/Engine” in Section 21 to attach the engine to the transmission.

NOTICE: Some procedures discussed in this chapter are shown with the engine in the tractor. Many of the procedures can be done with the engine in or out of the tractor.

ALTERNATOR AND TEMPERATURE SENDING SWITCH

Removal

1. Disconnect the alternator wire harness and wires, 1.
2. Loosen the M8x25 cap screw with washer, 2, two M10 nuts, two M10 lock washers, 3, and two M10x35 bolts, 4, on the alternator mount and adjusting bracket.
3. Remove the drive belt, 5, from the pulley.
4. Remove the wire, 6, from the temperature sending switch, 7, and remove the switch.

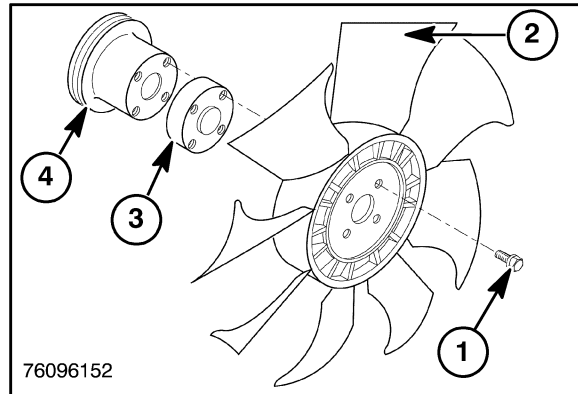


11

COOLING FAN AND PULLEY

Removal

1. Remove the four M6x35 cap screws, 1, and remove the fan, 2, from the fan holder, 3, and pulley, 4.

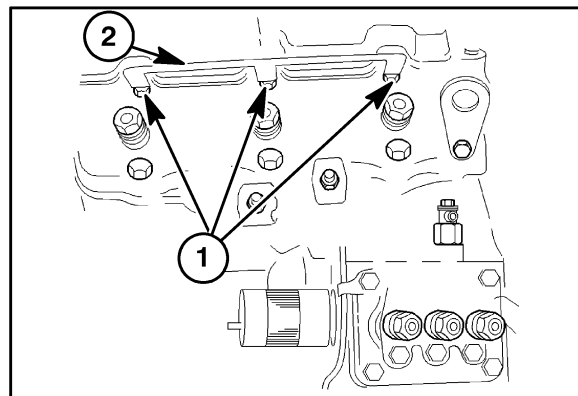


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GLOW PLUG AND CONNECTOR

Removal

1. Remove the glow plugs, 1, and glow plug connectors, 2.

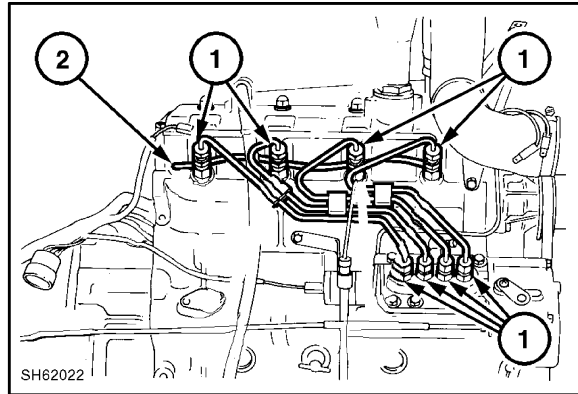


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FUEL INJECTION TUBING

Removal

1. Loosen the fuel tube nuts from the fuel injection pump and injectors, 1. Remove the tubing as an assembly.
2. Remove the spring clamp and fuel return hose, 2.

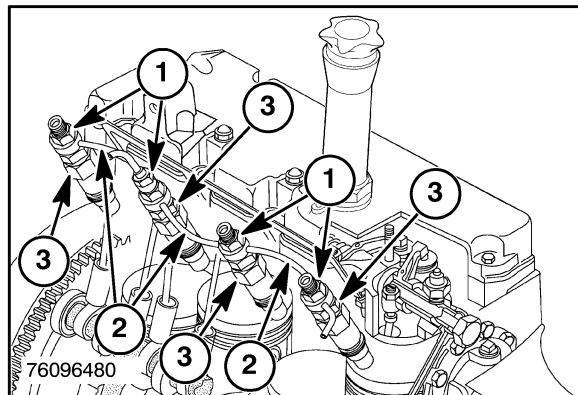


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FUEL INJECTOR

Removal

1. Loosen and remove the securing nuts, 1. Remove the fuel return tubing, 2. Remove the aluminum washers and discard. Remove the fuel injectors, 3.

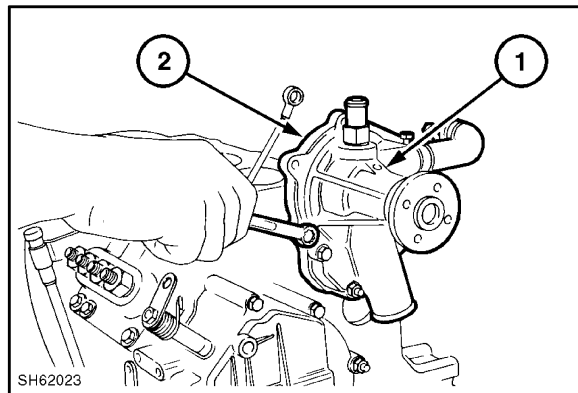


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WATER PUMP

Removal

1. Remove the five M6 nuts and remove the water pump assembly, 1, and set plate, 2.



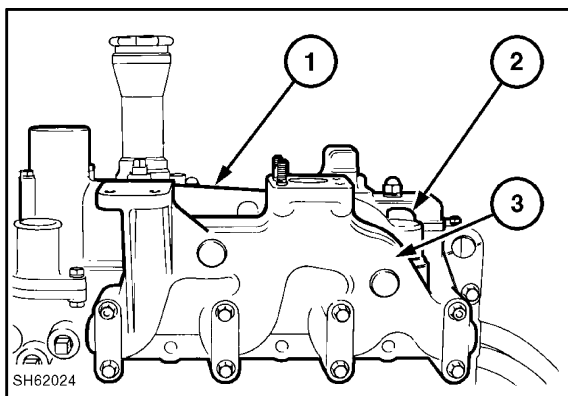
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COVER/INTAKE MANIFOLD/EXHAUST MANIFOLD

Removal

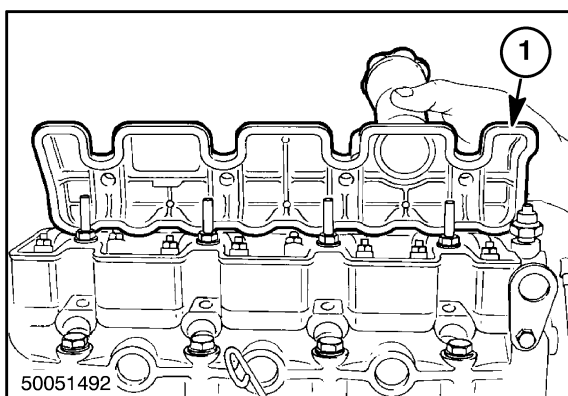
1. Remove the intake manifold, 1, spacer, 2, by removing the eight M6 cap screws. Remove the exhaust manifold, 3, by removing the six M8x75 cap screws and two M8 nuts.

NOTICE: For the N844L-T turbocharged engine, refer to the turbocharger section of the manual for removal and replacement.



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2. Loosen and remove four M10 cap nuts with washers. Remove the head cover assembly, 1.



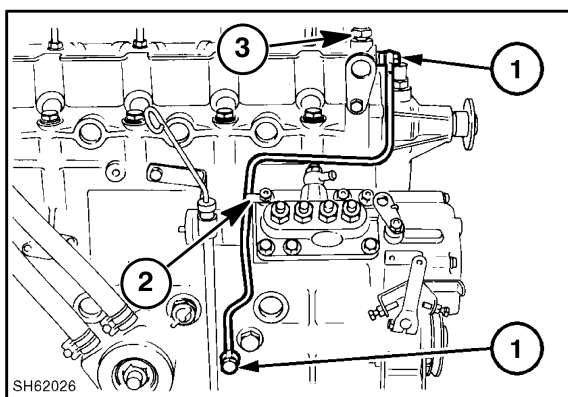
18

EXTERNAL OIL TUBE

Removal

1. Loosen and remove the two banjo bolts, 1, at the cylinder block main oil gallery and cylinder head assembly.
2. Remove the clamp, 2, from the fuel injection pump.

NOTICE: Remove the wire from the oil pressure switch and remove the switch, 3.

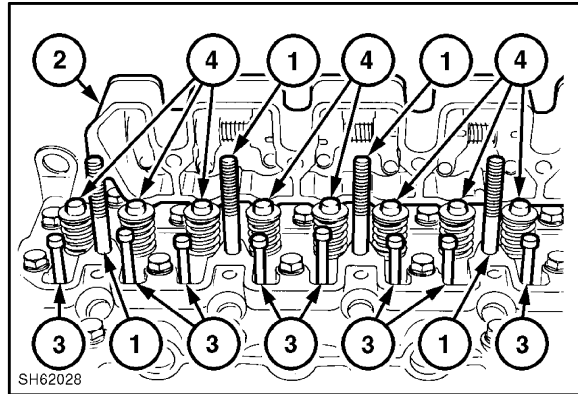


19

ROCKER ASSEMBLY

Removal

1. Loosen and remove nuts, lock washers, and flat washers from the rocker pillar stud, 1. Lift the rocker assembly, 2.
2. Remove the push rods, 3, and valve stem caps, 4.

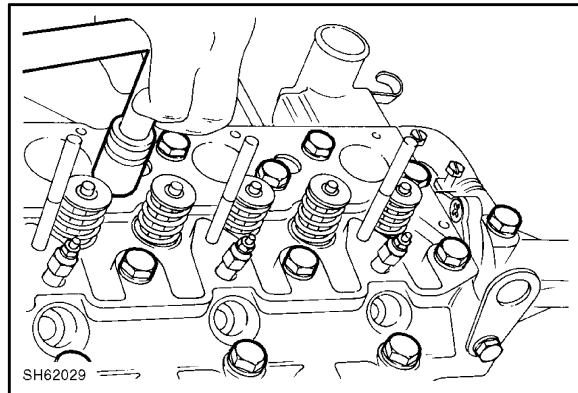


20

CYLINDER HEAD

Removal

1. Loosen the cylinder head cap screws, starting from the center, in a circular pattern, using several steps of equal torque. Remove the head.

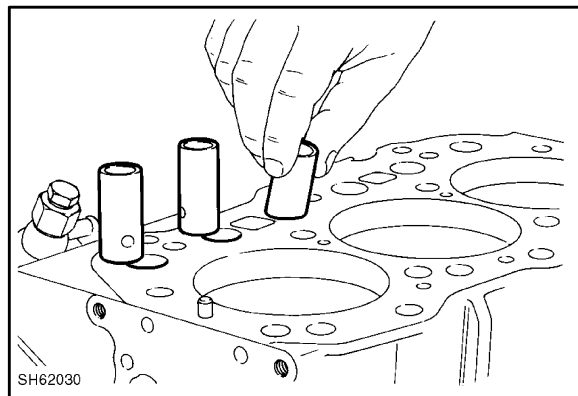


21

TAPPETS

Removal

1. Pull the tappets from the machined bore in the cylinder block.

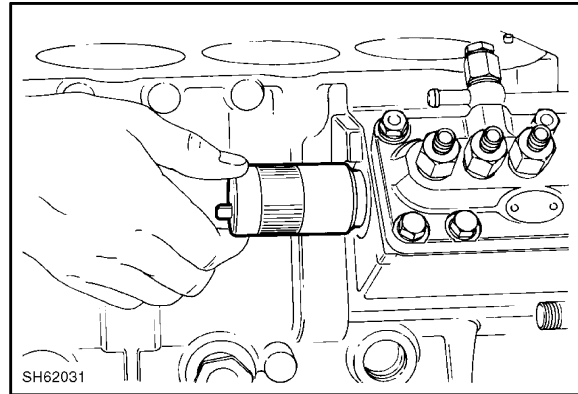


22

FUEL STOP SOLENOID

Removal

1. Unscrew the stop solenoid, and remove from the engine block.

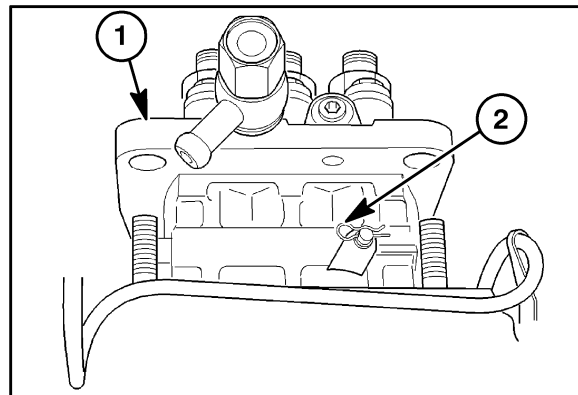


23

TIMING GEAR COVER

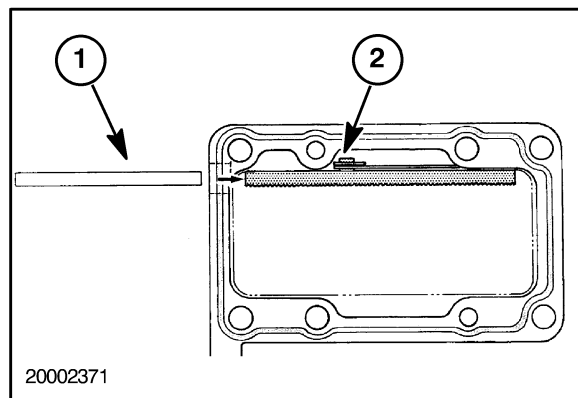
Removal

1. Drain the engine crankcase oil.
2. Remove the three M8 nuts, three M8x20 cap screws and three M8 flat washers from the injection pump and raise the injection pump, 1, enough to remove the hair pin cotter pin, 2, and separate the governor link from the control rack. Remove the injection pump.



24

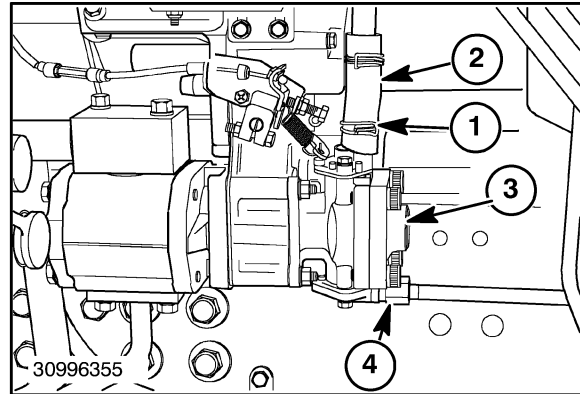
NOTICE: Insert a small dowel, 1, through the fuel shut-off solenoid hole and slide the control rack, 2, in to allow enough clearance to the cylinder block, for the pump to be removed.



25

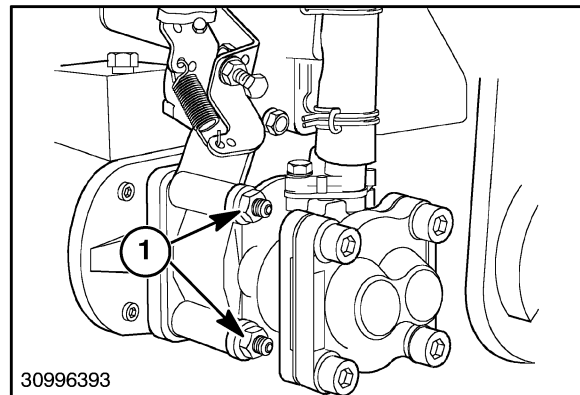
SECTION 10 - ENGINE - CHAPTER 1

3. Loosen the hose clamp, 1, on the suction hose, 2, and remove the suction hose from the steering pump, 3.
4. Remove the pressure tube, 4, from the bottom of the steering pump.



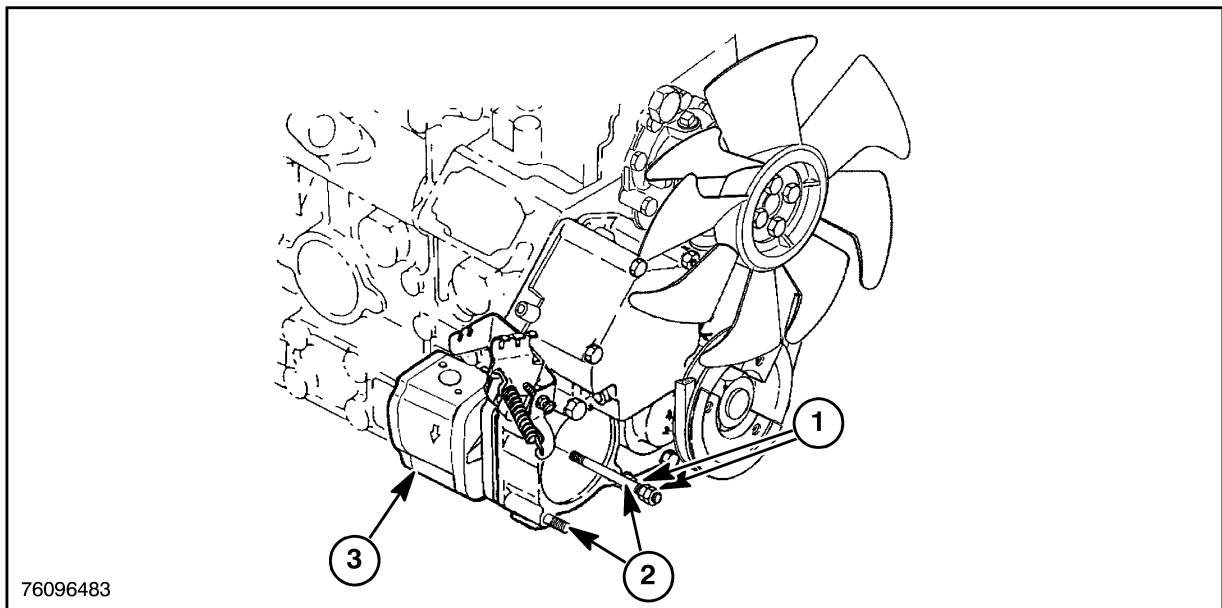
26

5. Remove the two M8x70 cap screws (not shown) and two M8 nuts, 1, and remove the steering pump from the front cover. Cap the lines and pump openings.



27

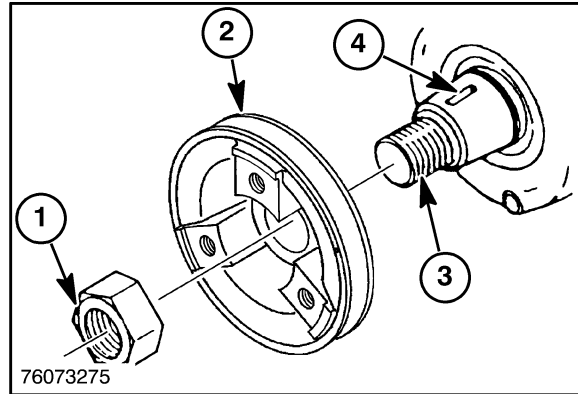
6. Install and tighten two nuts, 1, against each other, onto the retaining studs, 2. Remove the studs, 2, and the hydraulic pump, 3.



28

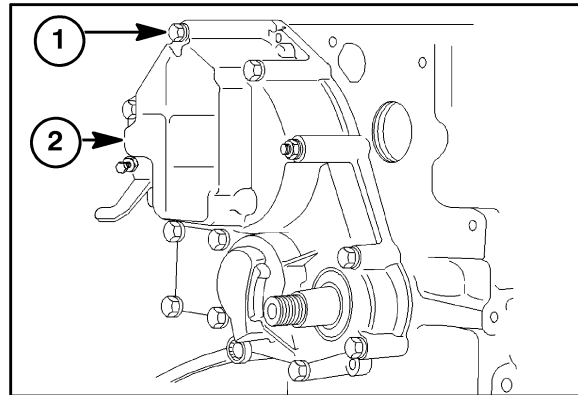
SECTION 10 - ENGINE - CHAPTER 1

7. Remove the retaining nut, 1. Pull crankshaft pulley, 2, off of crankshaft, 3. Remove key, 4, from crankshaft.



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8. Remove the cap screws and nut, 1, and lift the cover, 2, off the locating dowels.

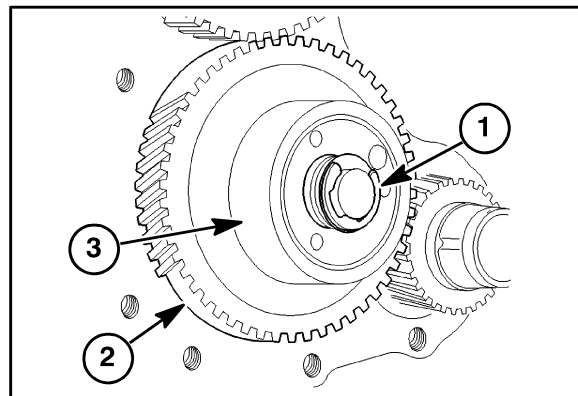


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TIMING GEARS AND CAMSHAFT

Removal

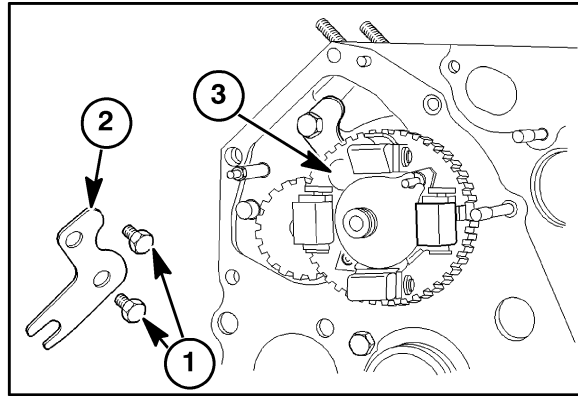
1. Remove E-ring, 1, and remove the idler gear, 2, and oil pump assembly, 3.



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SECTION 10 - ENGINE - CHAPTER 1

2. Remove the two M6x12 cap screws, 1, securing the keeper plate, 2. One must be accessed using the access hole, 3, in the cam gear.
3. Slide the camshaft and gear out of the camshaft bore.

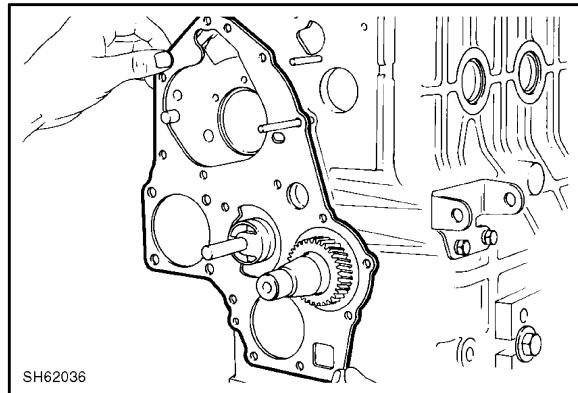


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FRONT END PLATE

Removal

1. Remove the M6x12 cap screws and lift the front plate off its locating dowels. Remove the gasket and discard.

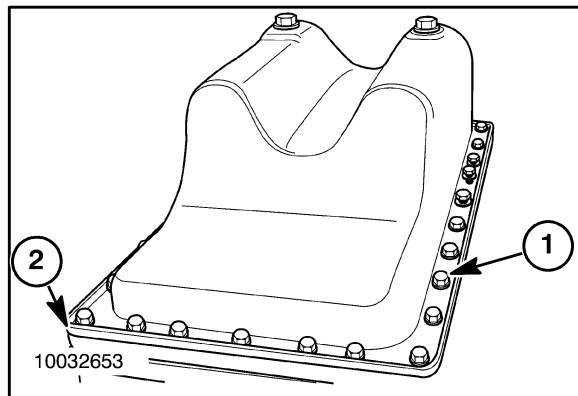


33

OIL SUMP

Removal

1. Remove the oil sump cap screws, 1.
2. Remove the oil sump and discard gasket.
3. Remove steel spacer, 2, from the block.

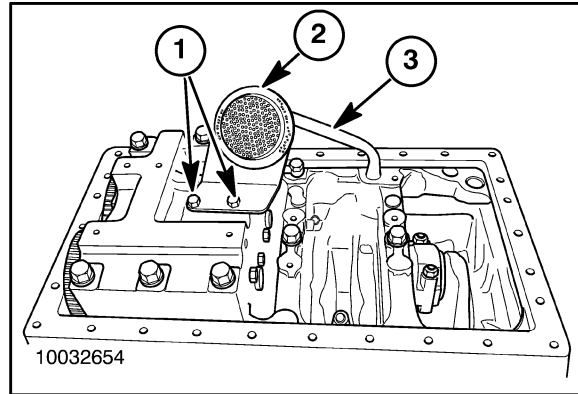


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OIL SUCTION TUBE AND STRAINER

Removal

1. Remove the two M6x12 cap screws, 1.
2. Remove the oil strainer, 2, and rotate the oil suction tube, 3, out of its bore.



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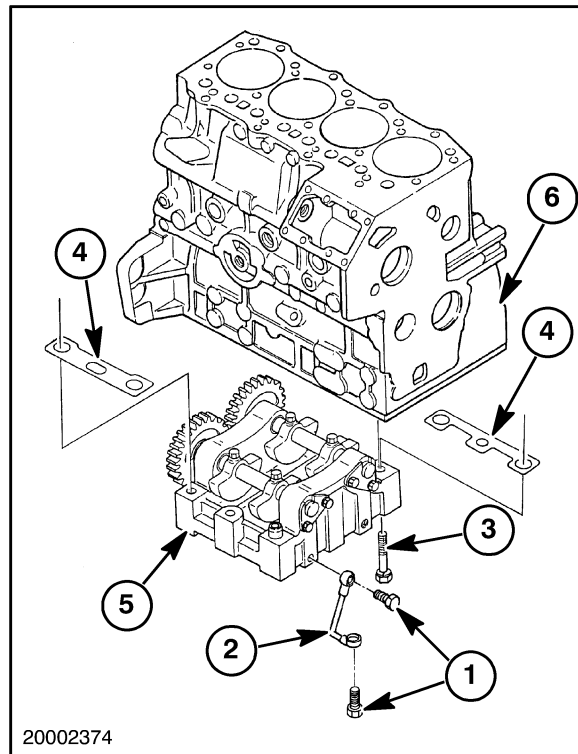
BALANCER ASSEMBLY

Removal

1. Remove the banjo bolts, 1, and the oil transfer tube, 2.
2. Loosen and remove the balancer retaining M10x70 cap screws, 3.

NOTICE: Observe the quantity and thickness of the shims, 4, (if used) for re-installation upon assembly.

3. Remove the balancer assembly, 5, from the engine block, 6.

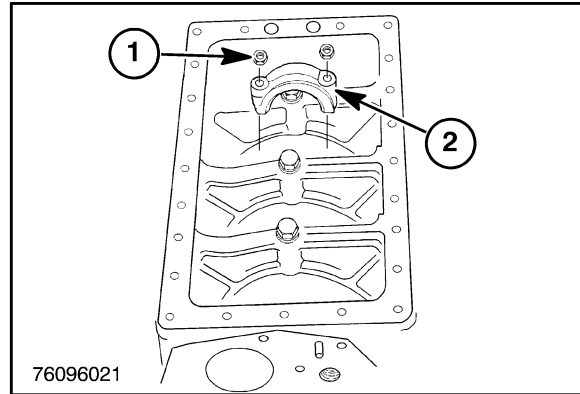


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CONNECTING RODS, BEARINGS AND PISTONS, RINGS

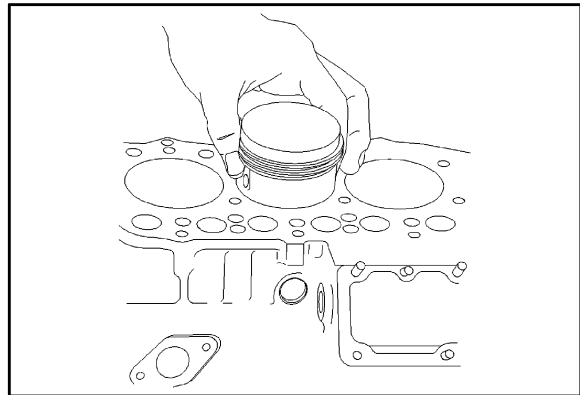
Removal

1. Remove the two nuts, 1, retaining the connecting rod caps, 2.
2. Remove the connecting rod caps and lower half of connecting rod bearing.
3. If necessary, remove any ridge from the top of the cylinder bores using a suitable ridge reamer.



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4. Push the piston and connecting rod out of the cylinder block.
5. Replace the connecting rod cap to the piston assembly it was removed from. Keep together in cylinder sequence.

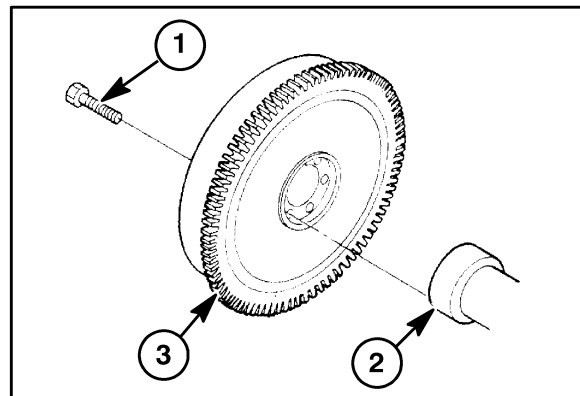


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FLYWHEEL

Removal

1. Loosen the flywheel cap screws, 1.
2. Using a brass drift and hammer, tap the end of the crankshaft, 2, to loosen the flywheel, 3, from the shaft.

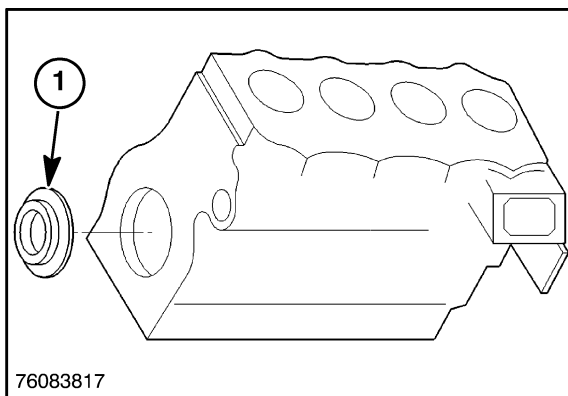


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BACKPLATE AND OIL SEAL

Removal

1. Remove the ten M8x20 backplate cap screws and remove the backplate.
2. Remove the rear oil seal, 1.

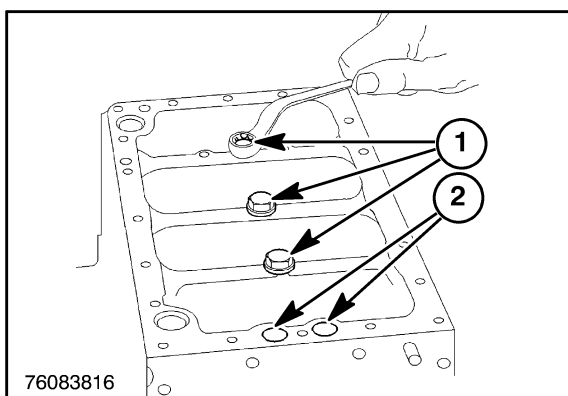


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CRANKSHAFT AND MAIN BEARINGS

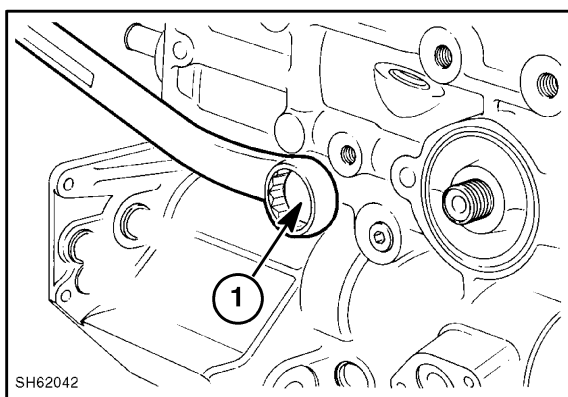
Removal

1. Remove the three M10x70 cap screws, 1, and two M8x60 socket head cap screws, 2, securing the crankshaft bearing holders.



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2. Remove the relief valve assembly, 1.
3. Slide the crankshaft and main bearing assembly through the rear of the engine.



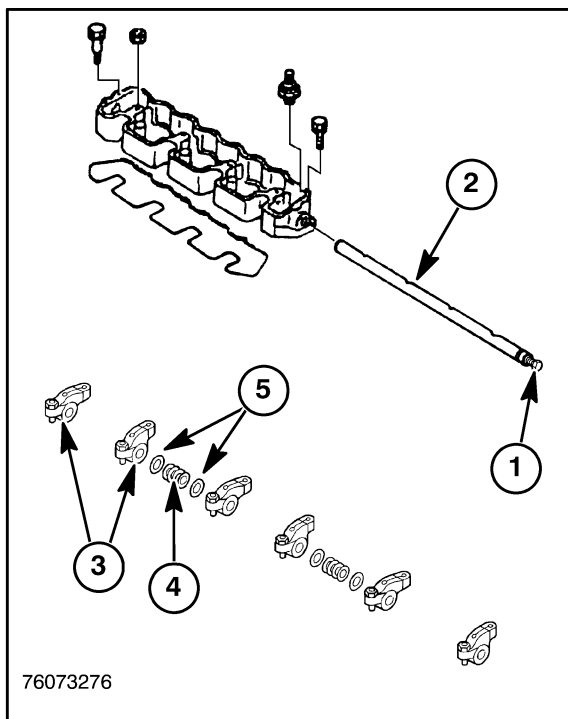
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ROCKER ARM ASSEMBLY

Disassembly

1. Thread a 8 mm cap screw, 1, into the rear end of the rocker shaft and slowly withdraw the rocker shaft, 2, while at the same time removing the rocker arms, 3, springs, 4, and shims, 5.

NOTICE: The rocker shaft housing must be removed from the cylinder head, before rocker shaft can be removed from housing. Housing cap screws retain the rocker shaft.



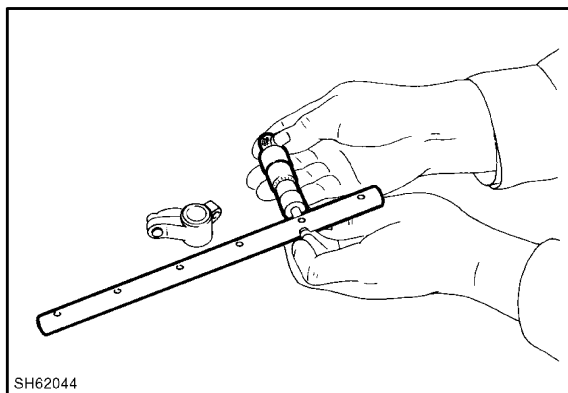
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Inspection and Repair

1. Wear of Rocker Arm Shaft

Using a micrometer, check the outside diameter of the rocker arm shaft. If the rocker arm shaft is worn beyond the allowable limit, replace.

Standard dimension	Allowable Limit
14.95 - 14.97 mm (0.588 - 0.589 in)	14.87 mm (0.585 in)



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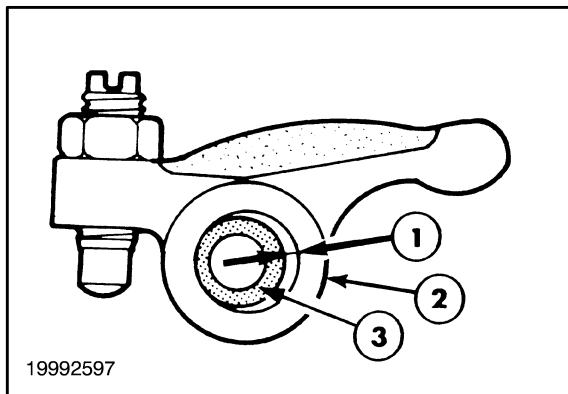
2. Rocker Arm-to-Shaft Clearance

Measure the inside diameter of the rocker arm. Calculate the clearance at, 1, between the rocker arm, 2, and the rocker arm shaft, 3. If the clearance is excessive, replace.

Standard Clearance	Allowable Limit
0.030 - 0.093 mm (0.0012 - .0037 in)	0.2 mm (0.008 in)

3. Wear on valve stem contacts face of the rocker arm.

Check the face for step wear or score. Slight wear may be corrected using an oil stone.



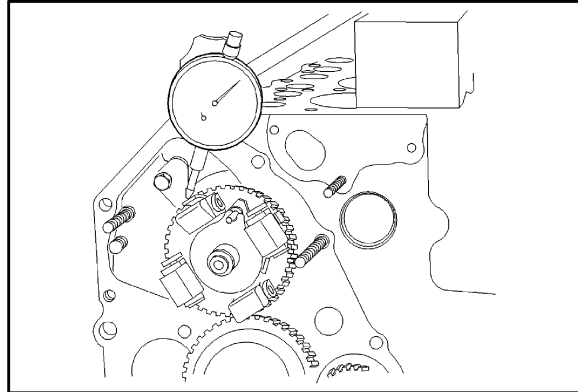
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TIMING GEAR

Inspection

1. Check the timing gears for wear and damage on the contact area. Replace if any defect is found.
2. Measure the backlash of gears with a feeler gauge or dial indicator. If the allowable limit is exceeded, replace all timing gears.

Standard	Allowable Limit
0.08 mm (0.003 in)	0.25 mm (0.010 in)

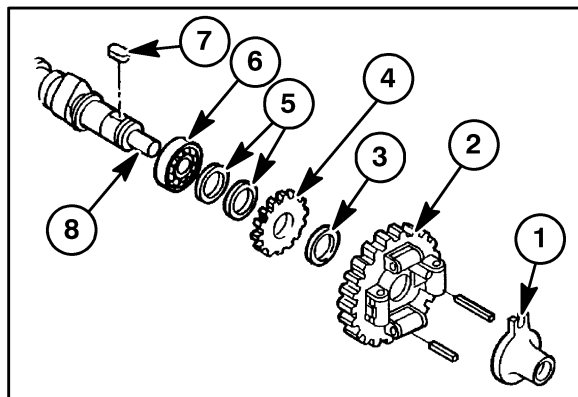


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CAMSHAFT

Disassembly

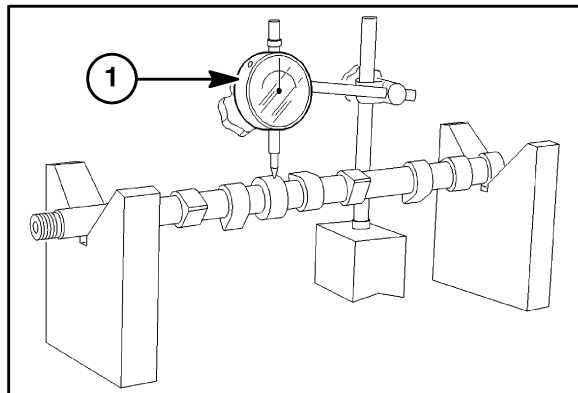
1. Remove the slider, 1, from the camshaft gear.
2. Using a gear puller, remove the gear assembly, 2, spacer, 3, tachometer gear, 4, spacers, 5, bearing, 6, and key, 7, from the camshaft, 8.



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Inspection

1. Place the camshaft in a set of V-blocks and check the runout using a dial indicator, 1.
2. Replace or straighten the camshaft if the runout is greater than 0.1 mm (0.004 in).
3. Using a micrometer, measure the height of the camshaft lobes.
4. Replace the camshaft if any of the cam lobes are worn to less than the following dimensions:
 Valve Lobe: 34.1 mm (1.3425 in)
 Injection Pump Lobe: 42.8 mm (1.685 in)

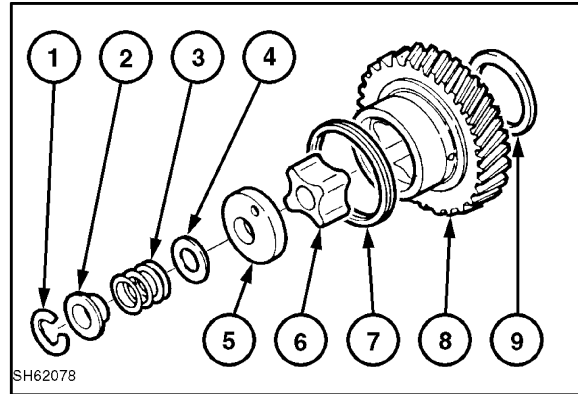


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OIL PUMP

Disassembly

1. Remove the E-ring, 1.
2. Take out the collar, 2, spring, 3, and shim, 4.
3. Remove the oil pump cover, 5.
4. Remove the rotor, 6, and spring, 7, from idler gear, 8.
5. Remove the thrust washer, 9, from the idler gear.



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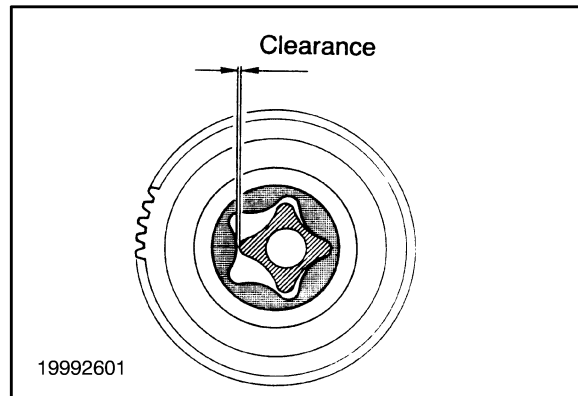
1. E-ring
2. Collar
3. Spring
4. Shim
5. Oil pump cover
6. Rotor
7. Spring
8. Idler gear
9. Thrust washer

Inspection

1. Check the oil pump cover, rotor, and vane for wear. If excessively worn or damaged, replace.
2. Check the clearance between the rotor and the vane.

Assembly (see Idler Gear)

1. Reassemble the oil pump in the reverse order of disassembly.
2. Align the set marks on the crankshaft gear and idler gear to reassemble.
3. Make sure the tip clearance between the rotor and the vane is 0.01 mm to 0.15 mm (0.0004 to 0.006 in). Allowable limit is 0.25 mm (0.010 in).



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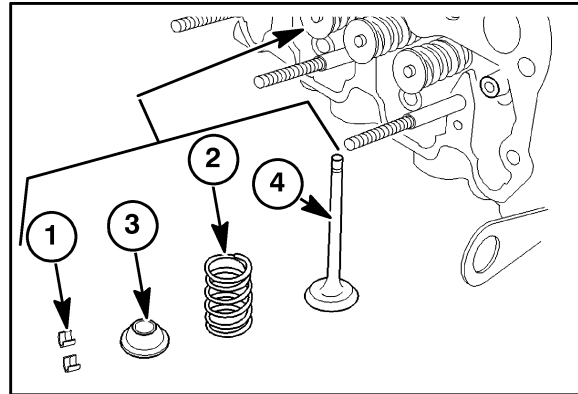
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CYLINDER HEAD

Disassembly

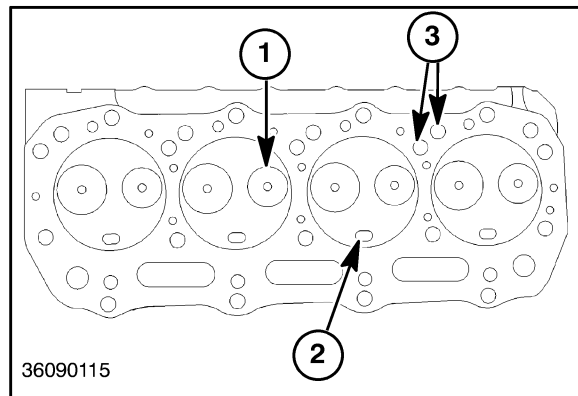
1. Clean the cylinder head and remove any carbon deposits from around the valve heads.
2. Use a valve spring compressor and remove the valve spring retainer locks, 1, spring, 2, and spring retainer, 3, from each valve, 4.
3. Remove the valves and place the valve components together in separately marked containers for reassembly in their original position.



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Inspection and Repair

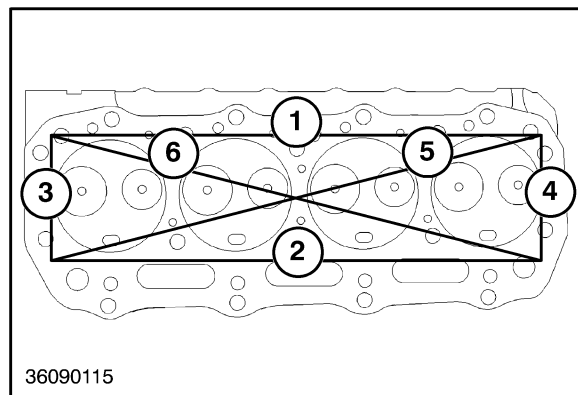
1. Clean all carbon deposits from the combustion chamber and valve ports using a wire brush and scraper.
2. Clean all dirt and residue from the gasket surface using care not to scratch or nick the machined surface.
3. Clean the cylinder head in solvent and air dry.
4. Inspect the head for cracks or damage in the following areas:
 - Valve ports
 - Valve seats, 1
 - Prechamber, 2
 - External cracks in the water jackets, 3
5. Inspect the gasket surfaces for scratches or nicks, which could cause leakage.
6. Examine the core hole plugs for rust or signs of leakage. If a plug shows signs of damaging rust or leakage, replace all plugs in the head.
7. Inspect the prechamber for carbon deposits and looseness. Remove any carbon deposits found. If prechamber is found to be loose, cylinder head may be warped.
8. Check six positions (1 to 6 lines, as shown) for warping. If found to be warped excessively, correct with a surface grinder.



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Standard Value	Allowable Limit
0.05 mm or less (0.002 in)	0.12 mm (0.005 in)



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