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# FARMALL 40, 45, 50 CVT 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 40, 45, 50 CVT Service manual. Complete Service part # 84234514.

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 40, 45, 50 CVT Tractors.

**SECTION 00 - GENERAL INFORMATION**

**Chapter 1 - General Information**

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## **INTRODUCTION**

This service manual provides the technical information needed to properly service the Case IH Farmall 40, 45, and 50 CVT transmission. Use this manual in conjunction with the operator's manual for complete operation, adjustment, and maintenance information.

On Case IH equipment, left and right are determined by standing behind the unit, looking in the direction of travel.

# SAFETY

## PRECAUTIONARY STATEMENTS

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

### 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.

### 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.

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.
5. Stop the engine before performing any service on the tractor.
6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury. If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.
  - DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
  - Stop the engine and relieve pressure before connecting or disconnecting lines.
  - Tighten all connections before starting the engine or pressurizing lines.
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.
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

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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.
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 or front wheel 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).

### 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.

### DRIVING THE TRACTOR

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.

## SECTION 10 - ENGINE

### Chapter 1 - Engine

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**SPECIFICATIONS**

<b>GENERAL</b>	<b>40</b>	<b>45</b>	<b>50</b>
Engine Model	N844	N844L	N844L
Number of Cylinders	4	4	4
Bore x Stroke	84 x 90 mm (3.31 x 3.54 in.)	84 x 100 mm (3.31 x 3.94 in.)	84 x 100 mm (3.31 x 3.94 in.)
Displacement	2.0 L (121.7 cu. in.)	2.2 L (135.2 cu. in.)	2.2 L (135.2 cu. in.)
Compression Ratio	22.5:1	22.5:1	22.5:1
Rated Speed (rpm)	2600	2600	2800
Firing Order	1-3-4-2	1-3-4-2	1-3-4-2
Low Idle Speed	1025 rpm	1025 rpm	1050 rpm
Maximum No-Load Speed	2850 rpm	2850 rpm	3050 rpm
Cylinder Arrangement	In-Line Vertical	In-Line Vertical	In-Line Vertical
Valve Arrangement	Overhead	Overhead	Overhead
Compression Pressure at 200 rpm (cylinder speed)	29.4 ± 1.8 bar (427 ± 50 psi)	29.4 ± 1.8 bar (427 ± 50 psi)	29.4 ± 1.8 bar (427 ± 50 psi)
<b>CYLINDER BLOCK</b>	<b>N844</b>	<b>N844L</b>	<b>N844L</b>
<b>Bore</b>			
Standard	84.0 mm (3.3071-3.3078 in.)	84.0 mm (3.3071-3.3078 in.)	84.0 mm (3.3071-3.3078 in.)
Maximum	84.2 mm (3.3150 in.)	84.2 mm (3.3150 in.)	84.2 mm (3.3150 in.)
<b>Head Surface Warp</b>			
Standard	0.05 mm (0.002 in.)	0.05 mm (0.002 in.)	0.05 mm (0.002 in.)
Maximum	0.12 mm (0.005 in.)	0.12 mm (0.005 in.)	0.12 mm (0.005 in.)

\* If bore size exceeds 84.2 mm (3.3150 in.) replace with long block.

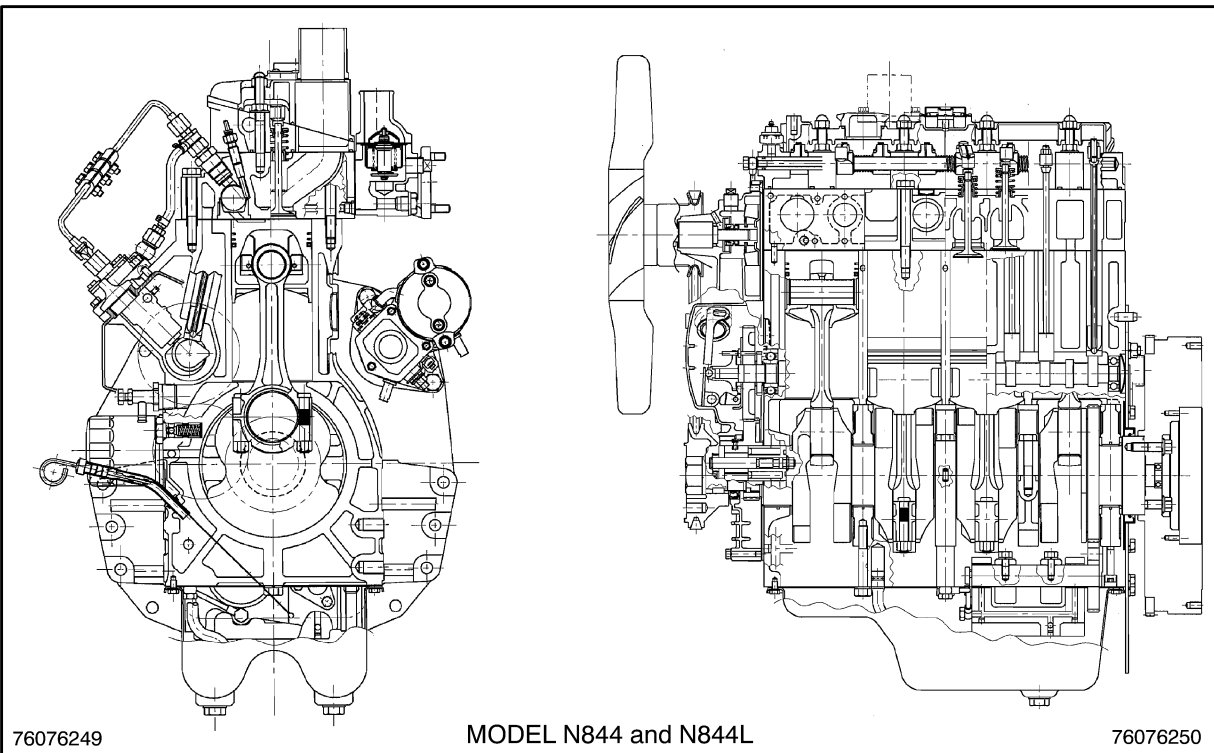
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	<b>40</b>	<b>45</b>	<b>50</b>
<b>CYLINDER HEAD</b>	<b>N844</b>	<b>N844L</b>	<b>N844L</b>
<b>Head Warp</b>			
Standard	0.05 mm (0.002 in.)	0.05 mm (0.002 in.)	0.05 mm (0.002 in. less than)
Maximum	0.12 mm (0.005 in.)	0.12 mm (0.005 in.)	0.12 mm (0.005 in.)
<b>Valve Seat Width</b>			
Standard	1.7-2.1 mm (0.067-0.082 in.)	1.7-2.1 mm (0.067-0.082 in.)	1.7-2.1 mm (0.067-0.082 in.)
Maximum	2.5 mm (0.098 in.)	2.5 mm (0.098 in.)	2.5 mm (0.098 in.)
<b>Valve Seat Sink</b>			
Standard (Recess)	0.85-1.15 mm (0.0334-0.0453 in.)	0.85-1.15 mm (0.0334-0.0453 in.)	0.85-1.15 mm (0.0334-0.0453 in.)
Maximum	1.8 mm (0.071 in.)	1.8 mm (0.071 in.)	1.8 mm (0.071 in.)
<b>Valve Angle</b>	45°	45°	45°
<b>PISTON</b>	<b>N844</b>	<b>N844L</b>	<b>N844L</b>
<b>Diameter</b>			
Standard	83.948-83.963 mm 3.30503-3.30562 in.)	83.948-83.963 mm 3.30503-3.30562 in.)	83.948-83.963 mm 3.30503-3.30562 in.)
Minimum	83.7 mm (3.2953 in.)	83.7 mm (3.2953 in.)	83.7 mm (3.2953 in.)
<b>Bore Clearance</b>			
Standard	0.038-0.072 mm (0.0014-0.0028 in.)	0.038-0.072 mm (0.0014-0.0028 in.)	0.038-0.072 mm (0.0014-0.0028 in.)
Maximum	0.25 mm (0.010 in.)	0.25 mm (0.010 in.)	0.25 mm (0.010 in.)
<b>Piston Pin Bore</b>			
Standard	27.996-28.000 mm (1.102-1.1023 in.)	27.996-28.000 mm (1.102-1.1023 in.)	27.996-28.000 mm (1.102-1.1023 in.)
Maximum	28.04 mm (1.103 in.)	28.04 mm (1.103 in.)	28.04 mm (1.103 in.)
<b>Piston Pin Clearance</b>			
Standard	-0.001 + 0.007 mm (-0.000393 + 0.0002 in.)	-0.001 + 0.007 mm (-0.000393 + 0.0002 in.)	-0.001 + 0.007 mm (-0.000393 + 0.0002 in.)
Maximum	0.02 mm (0.0008 in.)	0.02 mm (0.0008 in.)	0.02 mm (0.0008 in.)

## 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.

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.

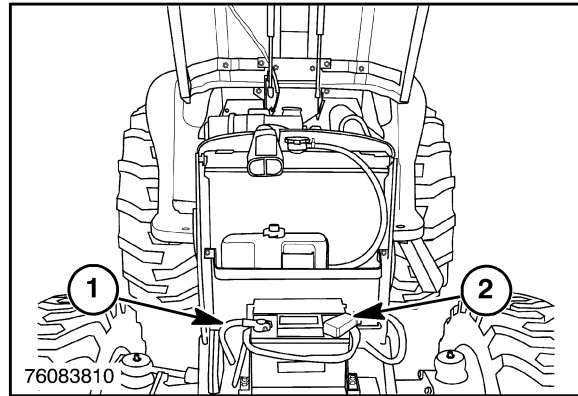


**SEPARATING THE TRACTOR AT THE ENGINE - FRONT TRANSMISSION BOX**

**NOTE:** To separate the tractor between the engine and the front transmission box, the hood and cab must be removed. To accomplish this, see "Platform" Section 90, for removal procedures.

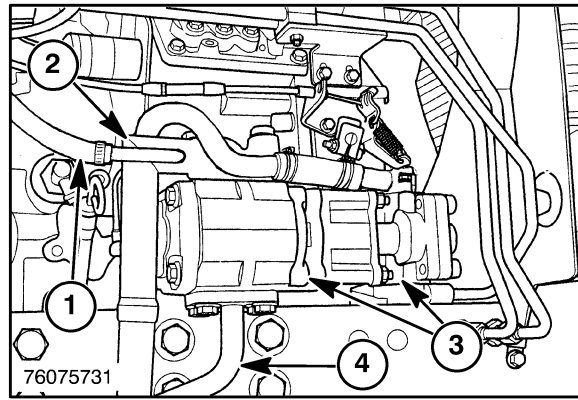
**Removal**

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



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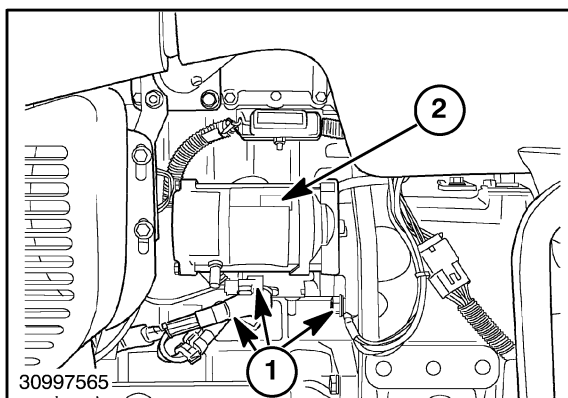
2. Disconnect the power steering return hose, 1, from the hydraulic system inlet tube, 2. Remove the hydraulic system inlet tube, 2, from the hydraulic pump, 3.
3. Remove the hydraulic system pressure tube, 4, from the hydraulic pump, 3, and the diverter valve.



6

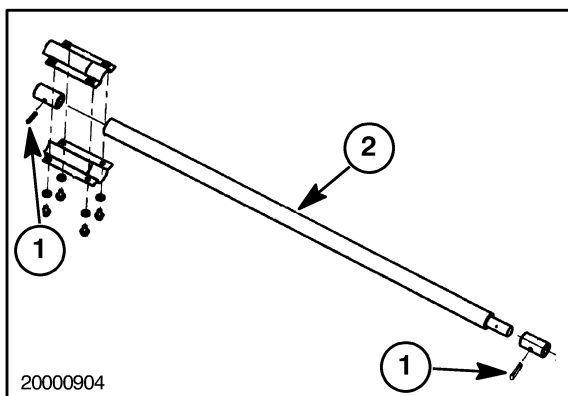
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4. Disconnect the wires, 1, on the starter, 2, and remove the starter from the tractor.



7

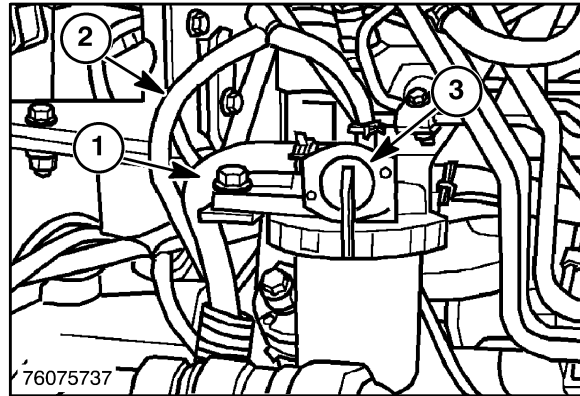
5. If equipped with FWD, remove the roll pins, 1, from the front and rear of the FWD driveshaft, 2, and remove the driveshaft from the tractor.
6. Drain the engine oil into a suitable container and remove the oil filter.



8

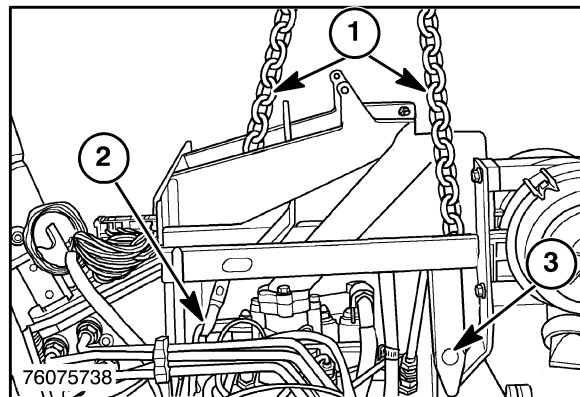
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7. Remove the fuel supply, 1, and return, 2, lines from the fuel filter, 3.
8. Drain the fuel tank into a suitable container.



9

9. Attach a chain sling, 1, to the two hoist eyes, 2 and 3, on the engine.

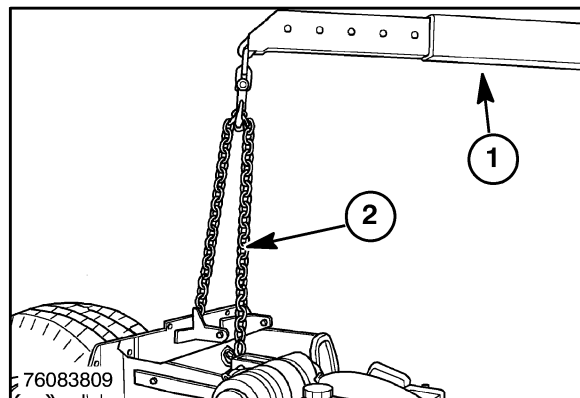


10

10. Attach a suitable hoist, 1, to the chain sling, 2.

**NOTE:** The hoist is used for supporting the engine and axle assembly, not for lifting.

11. Roll a floor jack under the tractor from the rear of the tractor, and place under the front transmission box. Raise the jack enough to support the drive train.

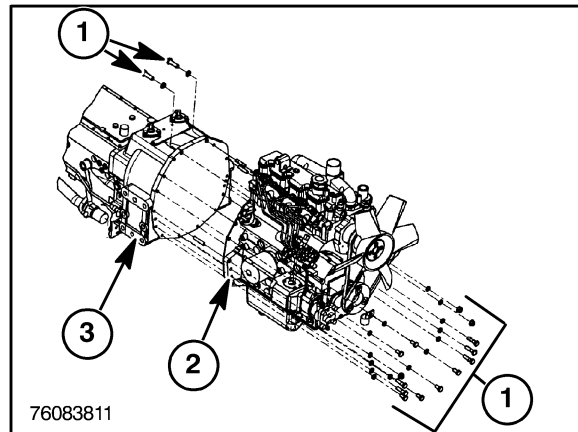


11

- Remove the buckle-up bolts, 1, that secure the engine, 2, to the front transmission box, 3.

**NOTE:** The hoist and/or the floor jack may need to be raised or lowered to allow the separation of the engine from the front transmission box.

- Carefully roll the drive train away from the engine, using the floor jack for support.



12

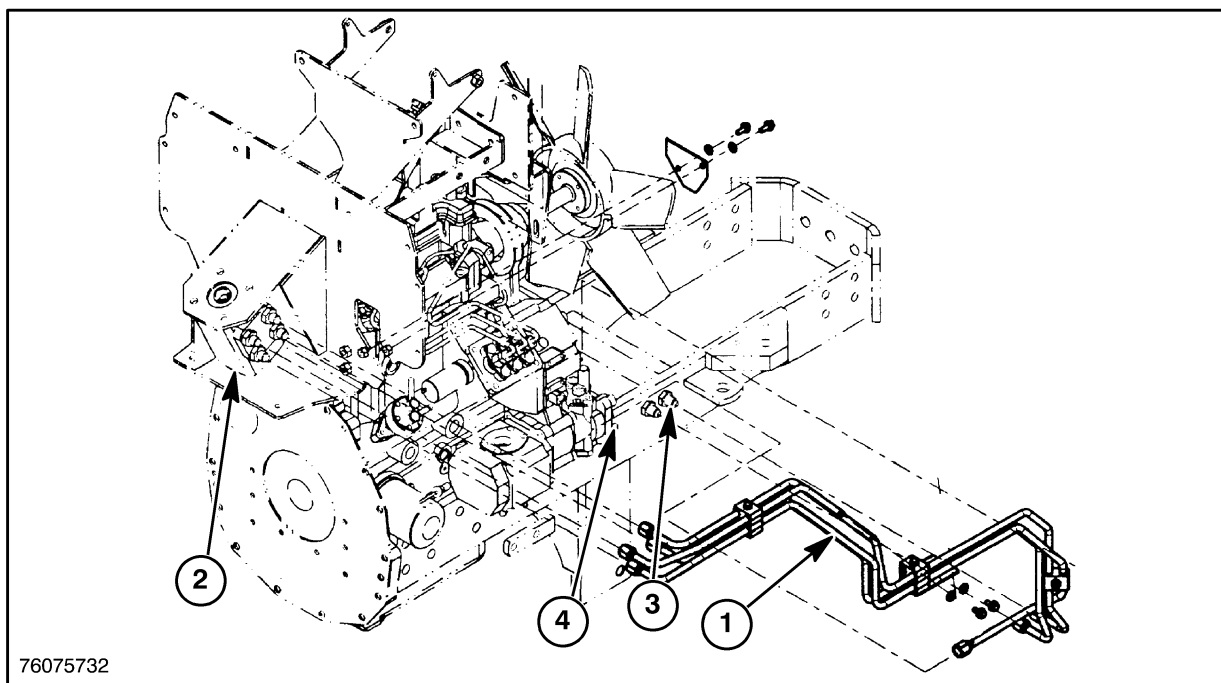
### SEPARATING THE TRACTOR AT THE ENGINE/FRAME

- Use jack stands under the frame rails to support the front frame/engine assembly.

**⚠ WARNING ⚠**

**Make sure the front frame/engine assembly is securely supported before removing the chain sling from the engine. Failure to comply could result in death or serious injury.**

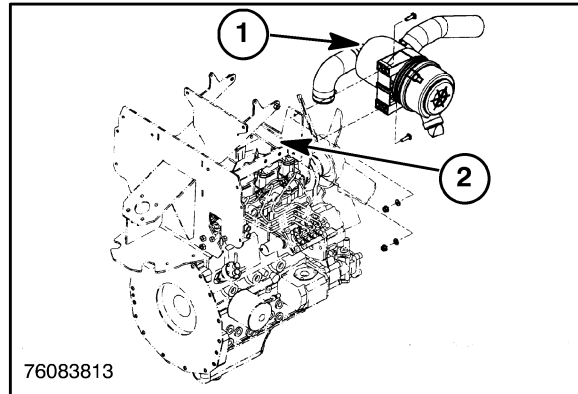
- Remove the chain sling from the two hoist eyes on the engine.
- Remove the power steering lines, 1, from the power steering control motor, 2, the frame, 3, and the power steering pump, 4.



13

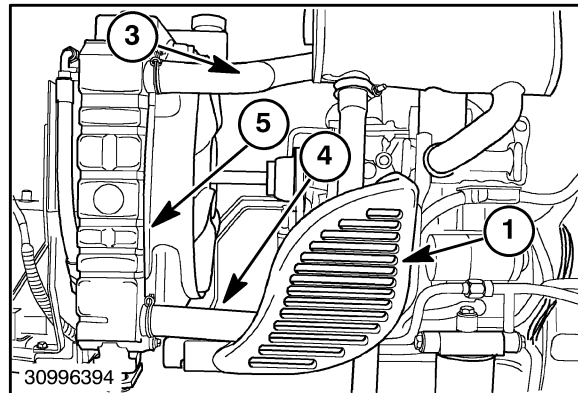
## SECTION 10 - ENGINE - CHAPTER 1

4. Remove the air cleaner assembly, 1, from the firewall, 2.



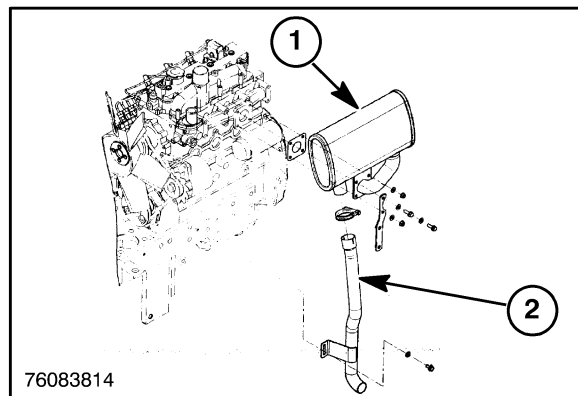
14

5. Remove the muffler guard, 1, from the tractor.



15

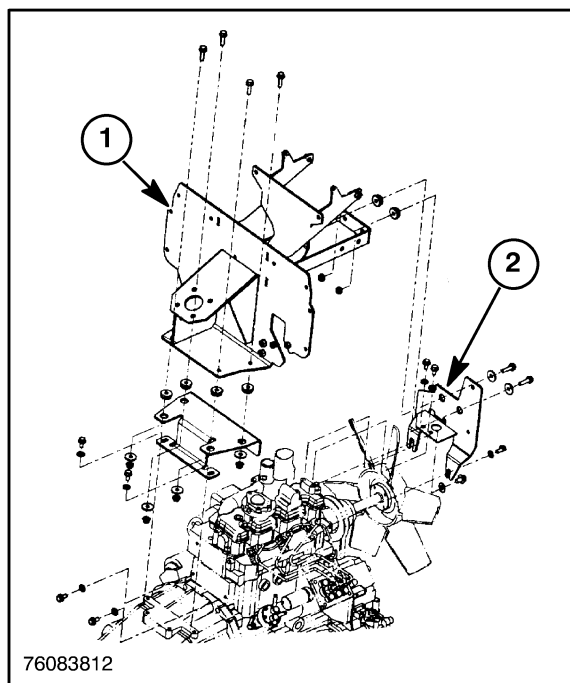
6. Remove the muffler, 1, and the exhaust pipe, 2, from the tractor.
7. Drain the coolant from the radiator into a suitable container.
8. Remove the top, 3, and the bottom, 4, radiator hoses.
9. Remove the radiator, 5, and the oil cooler (if equipped) from the tractor.



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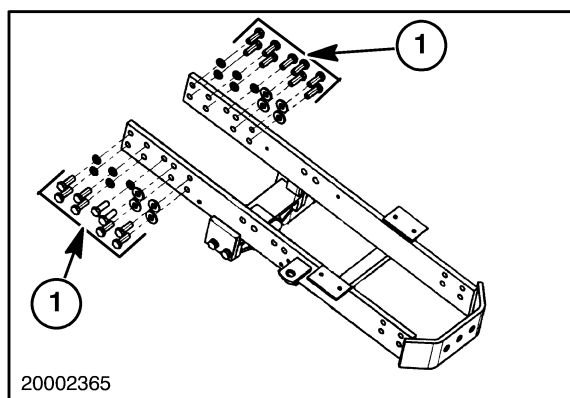
## SECTION 10 - ENGINE - CHAPTER 1

10. Remove the firewall, 1, and the air cleaner mounting bracket, 2, from the engine.
11. Attach a chain sling to the two hoist eyes on the engine.
12. Attach a suitable hoist to the chain sling, and raise the hoist enough to support the engine.



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13. Loosen and remove the engine mounting bolts, 1, on both sides of the frame.
14. Carefully lift the engine from the frame.
15. Attach the engine to a suitable engine stand.
16. With the engine securely attached to the engine stand, remove the chain sling from the two engine hoist eyes.



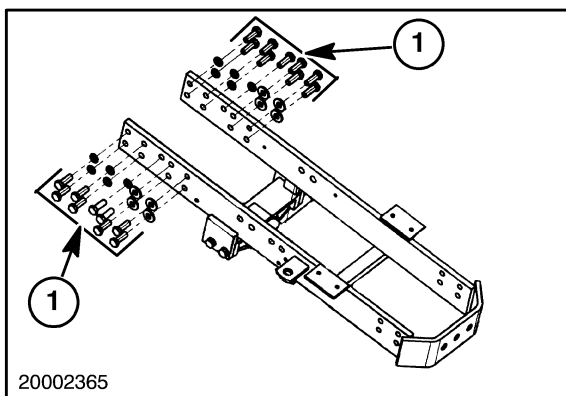
18

### Installation

1. Attach a chain sling to the two hoist eyes on the engine.
2. Attach a suitable hoist to the chain sling and raise the hoist enough to support the engine.
3. Remove the engine from the engine stand.
4. Using the hoist, position the engine in the frame, aligning the mounting holes in the frame with the mounting holes in the engine.

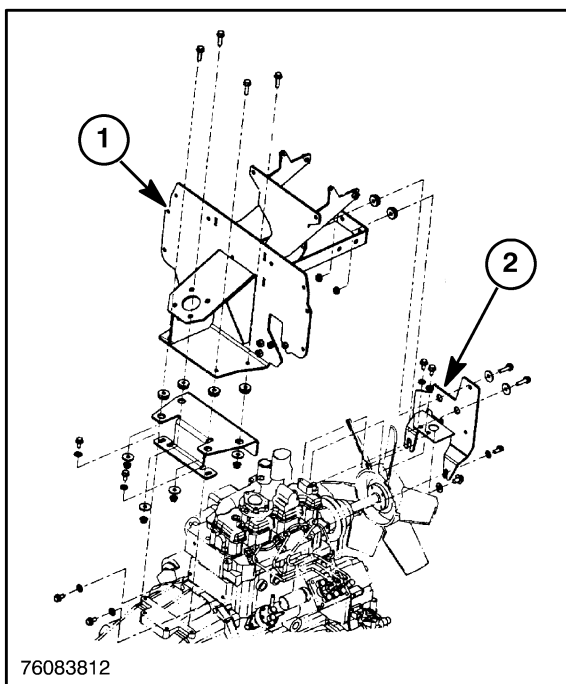
## SECTION 10 - ENGINE - CHAPTER 1

5. Install the engine mounting bolts, 1, on both sides of the frame. Tighten the mounting bolts to 139-175 N·m (102-129 ft-lbs).
6. With the engine securely installed into the frame, remove the chain sling from the two engine hoist eyes.



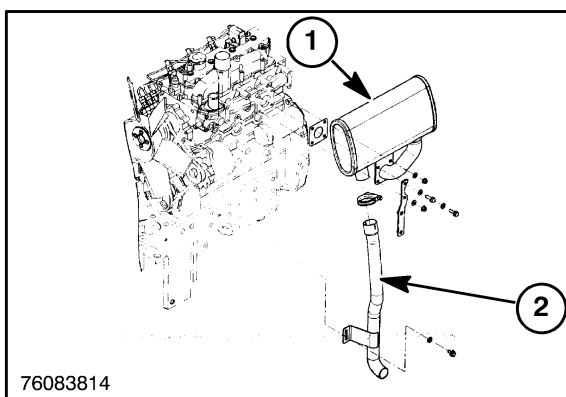
19

7. Install the firewall, 1, and the air cleaner mounting bracket, 2, onto the engine.



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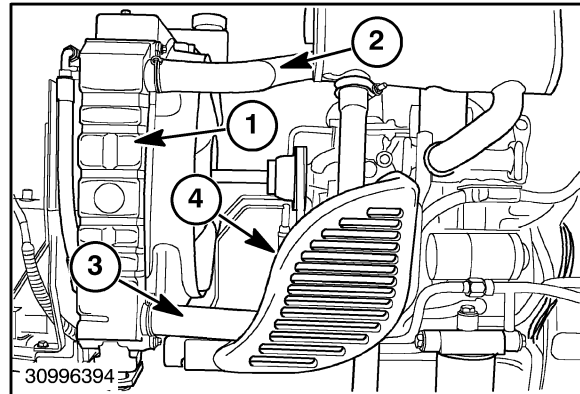
8. Install the muffler, 1, onto the exhaust manifold, and attach the exhaust pipe, 2, onto the muffler.



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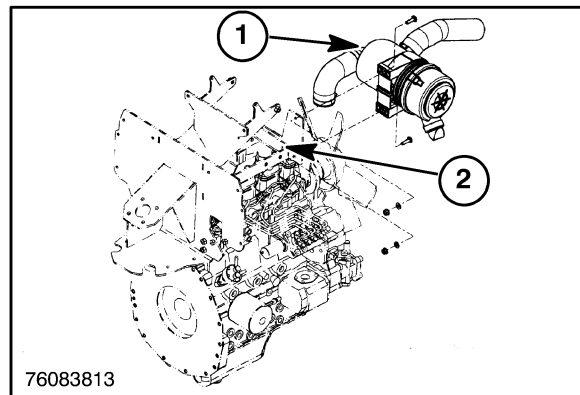
**SECTION 10 - ENGINE - CHAPTER 1**

9. Install the radiator, 1, and the oil cooler (if equipped) onto the tractor frame.
10. Install the top, 2, and bottom, 3, radiator hoses.
11. Fill the radiator with new coolant to the proper level.
12. Install the muffler guard, 4, on the tractor.



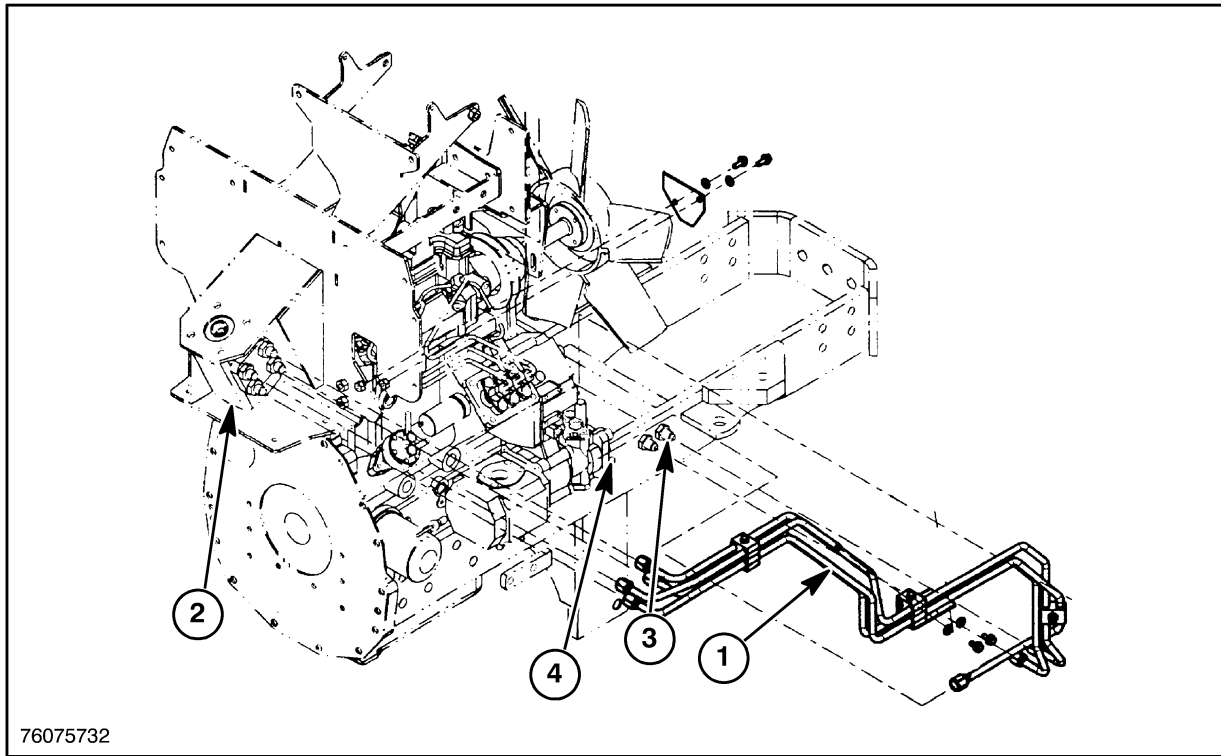
22

13. Install the air cleaner assembly, 1, on the firewall, 2, and connect the air inlet hose to the air inlet manifold pipe.



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14. Connect the power steering tubes, 1, to the power steering control motor, 2, the frame, 3, and the power steering pump, 4.

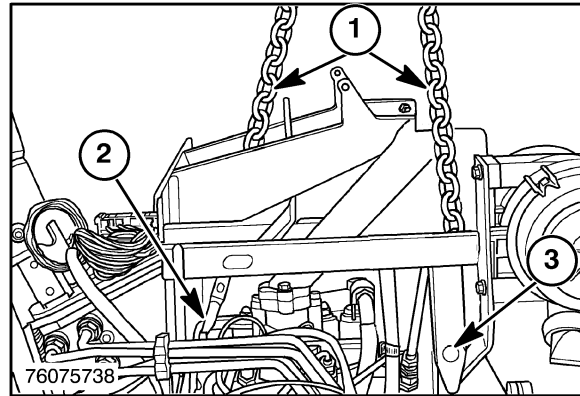


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**ATTACHING THE FRONT TRANSMISSION BOX TO THE ENGINE**

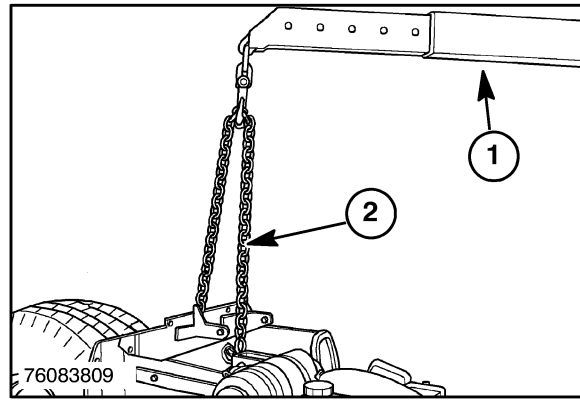
**IMPORTANT:** Do not use the buckle-up bolts to draw the drive train together with the engine. Severe damage to the drive train may result.

1. Attach a chain sling, 1, to the two hoist eyes, 2 and 3, on the engine.



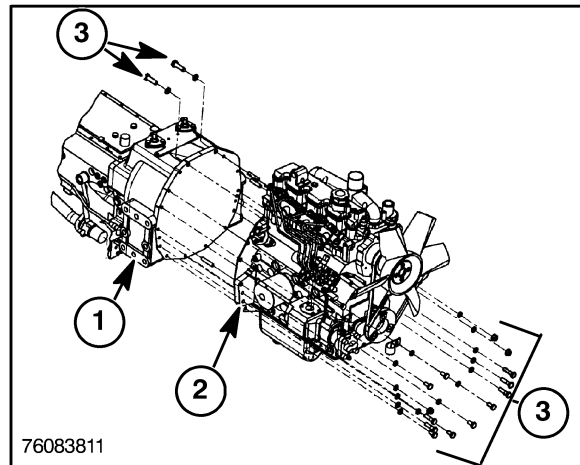
25

2. Attach a suitable hoist, 1, to the chain sling, 2.
3. Carefully roll the drive train into alignment with the engine. Align the splines on the front transmission box input shaft with the engine flywheel. Rotate the engine fan to align the input shaft and the flywheel. The floor jack or the hoist may need to be raised or lowered to make alignment possible.



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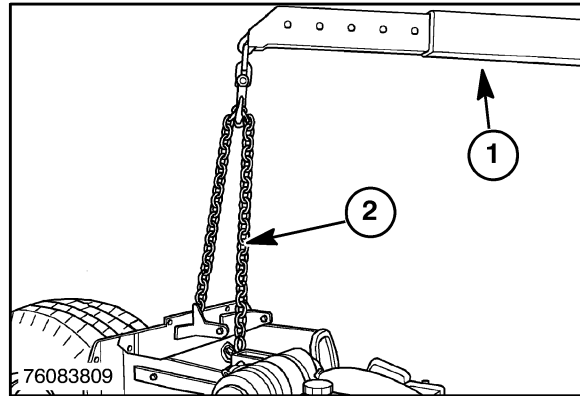
4. Connect the drive train, 1, to the engine, 2, and install the buckle-up bolts, 3. Tighten the buckle-up bolts in a criss-cross pattern. Torque the M10 bolts and nuts to 43-55 Nm (32-41 ft-lbs). Torque the two M12 bolts to 81 Nm (60 ft-lbs).



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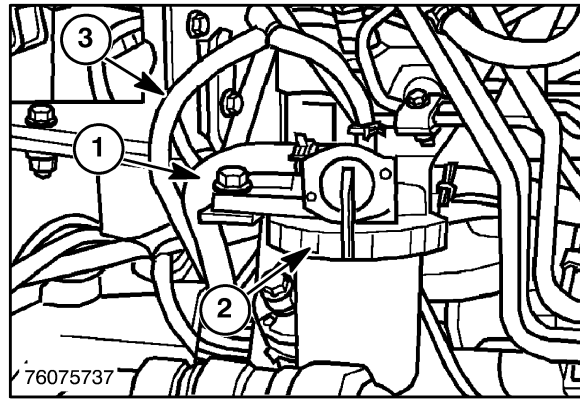
SECTION 10 - ENGINE - CHAPTER 1

5. Remove the chain hoist, 1, and the sling, 2, from the engine hoist eyes. Remove the floor jack from the tractor.



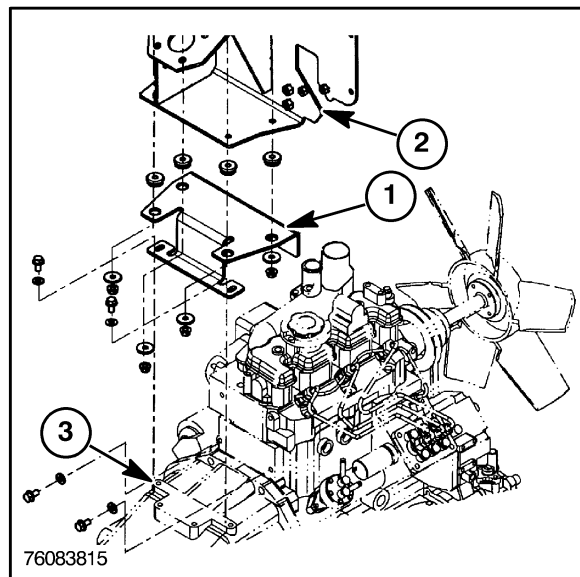
28

6. Connect the fuel supply line, 1, to the fuel shutoff/filter, 2, and connect the fuel tank vent line, 3, to the tee fitting.



29

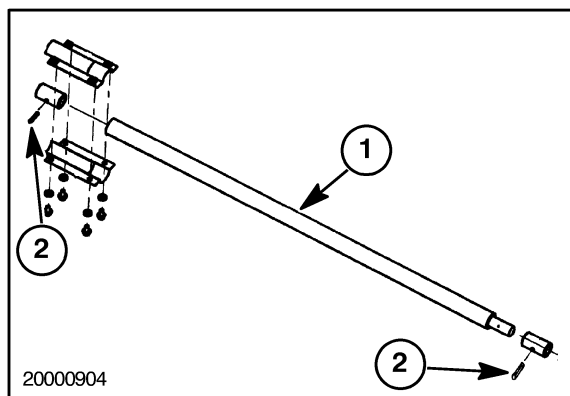
7. Attach the firewall support, 1, to the firewall, 2, and the front transmission box, 3. Secure with the retaining bolts.



30

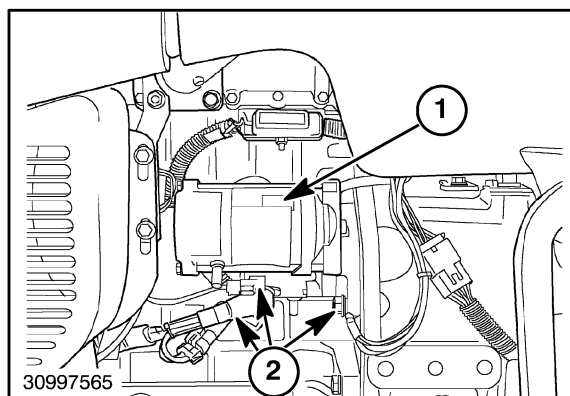
SECTION 10 - ENGINE - CHAPTER 1

8. If equipped, Install the FWD driveshaft, 1, and secure with the two roll pins, 2.



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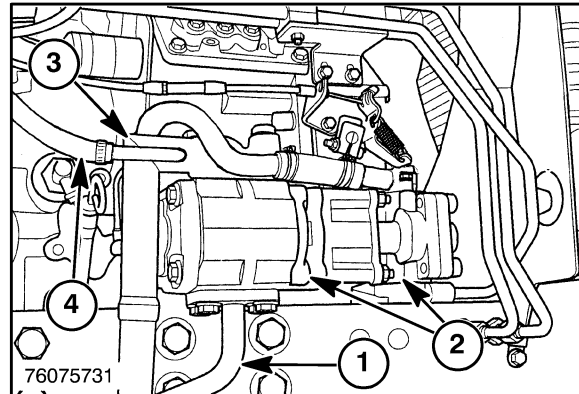
9. Install the starter, 1, onto the engine, and secure with the retaining nuts. Connect the wires, 2, to the starter, 1.



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## SECTION 10 - ENGINE - CHAPTER 1

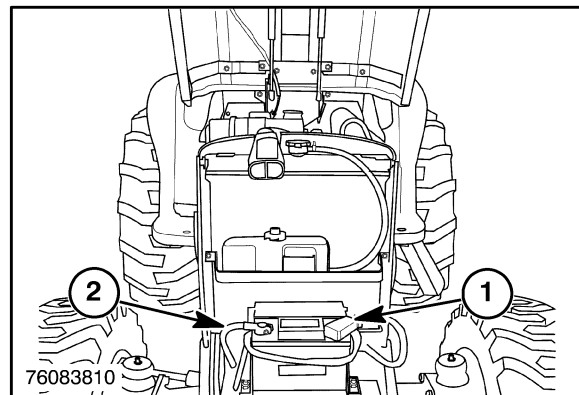
10. Install the hydraulic system pressure tube, 1, on the hydraulic pump, 2, and the diverter valve.
11. Install the hydraulic system inlet tube, 3, onto the hydraulic pump, 2, and connect the power steering return hose, 4, to the inlet tube, 3.



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**NOTE:** Reattach the tractor cab and hood at this time. To accomplish this, see "Platform" Section 90, for installation procedure.

12. If the engine oil was drained, and the oil filter was removed during disassembly, install a new oil filter on the engine, and fill the engine with the recommended oil to the proper level.
13. Connect the positive (+), 1, and the negative (-), 2, battery cables to the battery.
14. Check the fluid levels and start the tractor. Check for leaks and proper operation of all systems.
15. Make any adjustments necessary for proper operation of the tractor.



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OVERHAUL

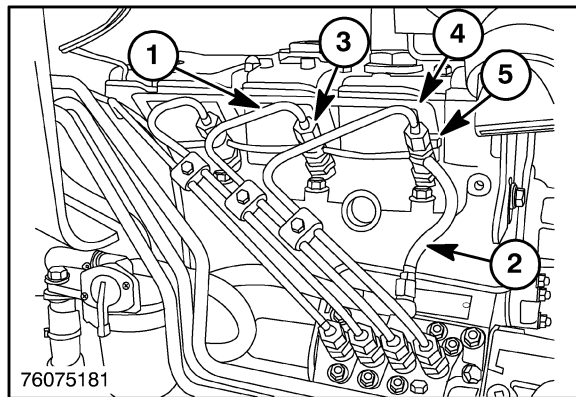
ENGINE

**NOTE:** 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.

FUEL INJECTOR AND GLOW PLUG

Removal

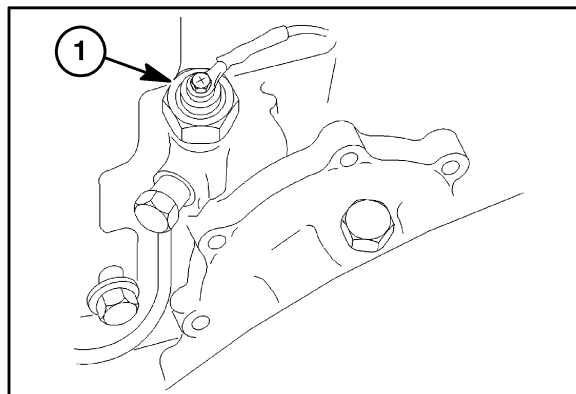
1. Clean all dirt and oil from the injectors and surrounding areas.
2. Disconnect the fuel lines, 1, from the injectors and cap all openings.
3. Remove the injector fuel leak-off line, 2.
4. Remove the injector assemblies, 3.
5. Remove the glow plug bus connector, 4, and remove the glow plugs, 5.



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OIL PRESSURE SWITCH

Remove the oil pressure switch, 1.

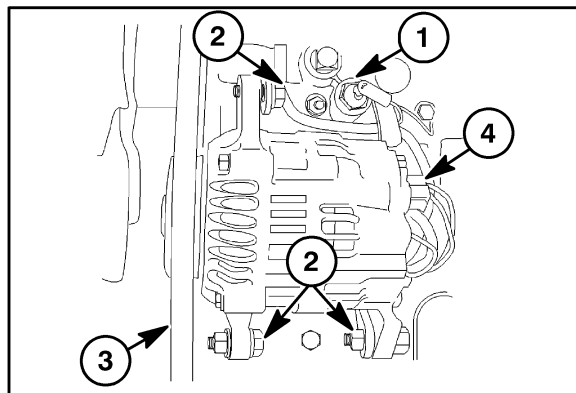


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TEMPERATURE SENDING SWITCH AND ALTERNATOR

Removal

1. Remove the temperature sending switch, 1, from the front of the cylinder head.
2. Loosen the alternator mounting bolts, 2, and remove the V-belt, 3, from the drive pulley.
3. Disconnect the alternator wires from the back of alternator, 4.
4. Remove the alternator mounting bolts, 2, and remove the alternator.

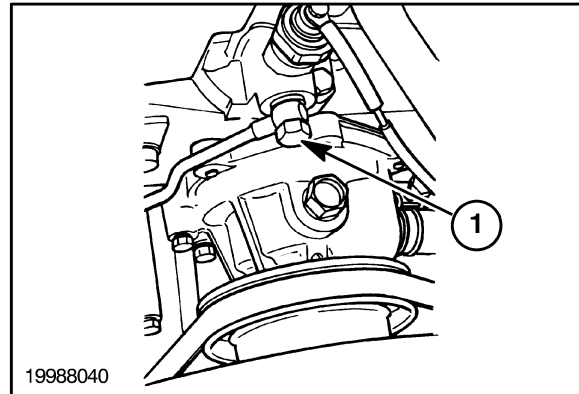


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### FAN, WATER PUMP, AND EXTERNAL OIL TUBE

#### Removal

1. Remove the fan and water pump assembly. See "Fan Removal" and "Water Pump Removal" discussed later in this section.
2. Remove the external oil transfer tube banjo bolt, 1, from the front of the cylinder head.

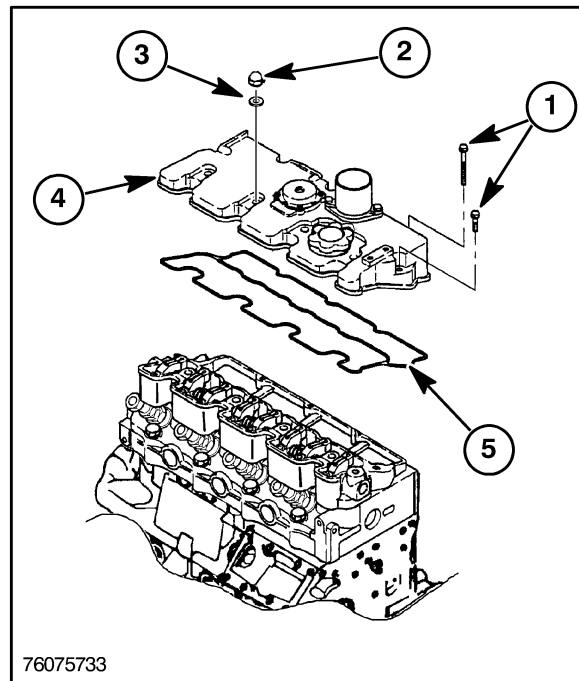


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### AIR INLET MANIFOLD

#### Removal

1. Remove the retaining bolts, 1, cap nuts, 2, and seal washers, 3.
2. Remove the air inlet manifold, 4, and gasket, 5.



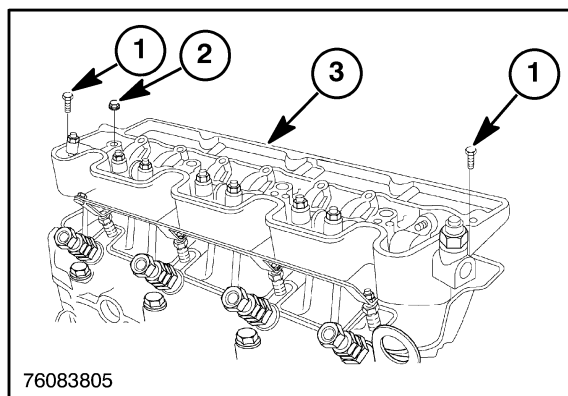
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### ROCKER ARM SHAFT AND SUPPORT BRACKET

#### Removal

1. Remove the bolts, 1, and nuts, 2.
2. Remove the rocker arm shaft and support bracket as an assembly, 3.

**NOTE:** Alternately loosen the rocker support bolts a turn at a time to prevent distorting the rocker shaft.



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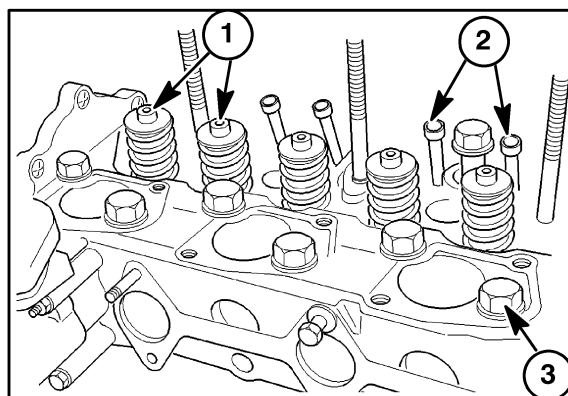
### CYLINDER HEAD

#### Removal

1. Remove the valve stem caps, 1, and push rods, 2.

**NOTE:** Keep all valve components in separately marked containers for re-assembly in their original location.

2. To remove the cylinder head, remove the cylinder head bolts, 3, by alternately loosening a half turn at a time to prevent warping the head.

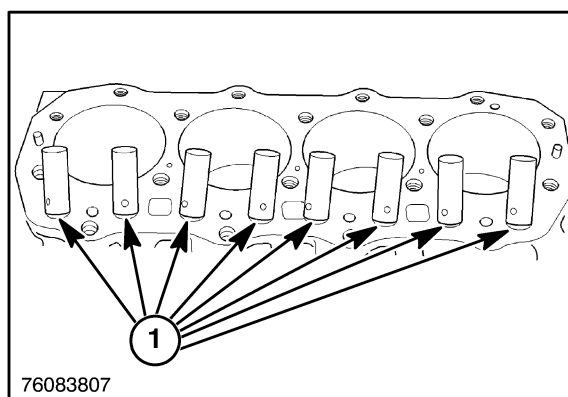


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### VALVE TAPPET

#### Removal

Remove the valve tappets, 1, from the machined bore in the cylinder block.



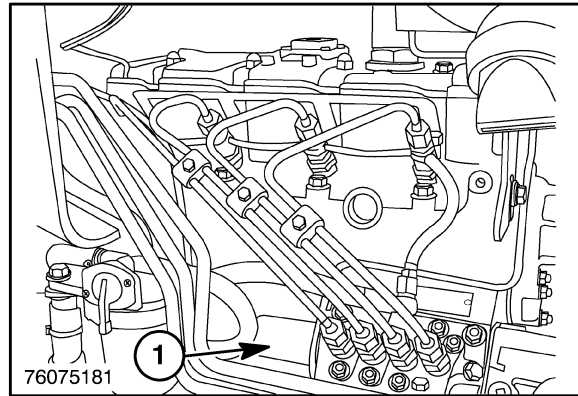
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**FUEL SHUTOFF SOLENOID**

**Removal**

Remove the wire connector and unscrew the fuel shutoff solenoid, 1.

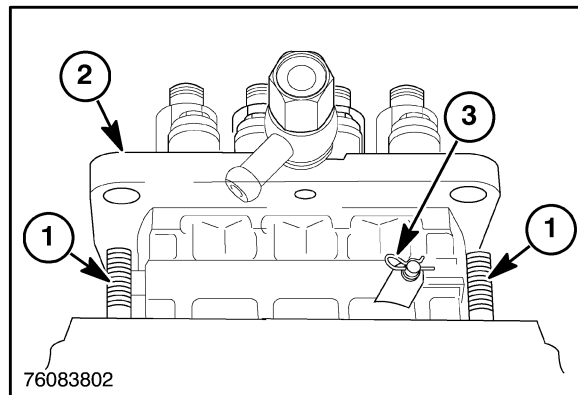


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**ENGINE TIMING GEAR COVER, TIMING GEARS, AND CAM SHAFT**

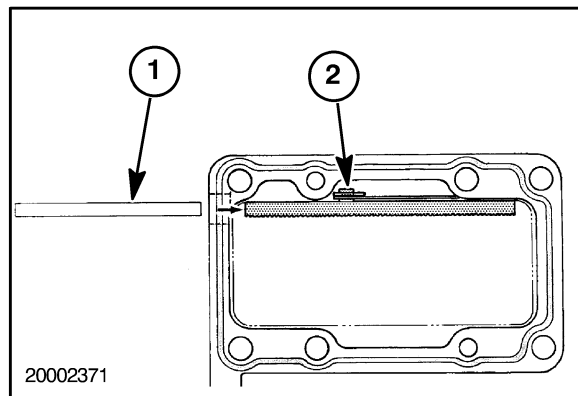
**Timing Gear Cover Removal**

1. Drain the engine crankcase oil.
2. Remove the crankshaft pulley.
3. Loosen the injection pump mounting bolts, 1, and raise the injection pump, 2, enough to remove the spring pin, 3, and separate the governor link from the control rack. Remove the injection pump.



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

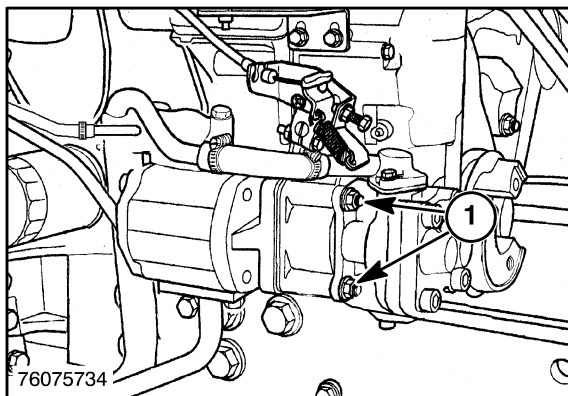


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## SECTION 10 - ENGINE - CHAPTER 1

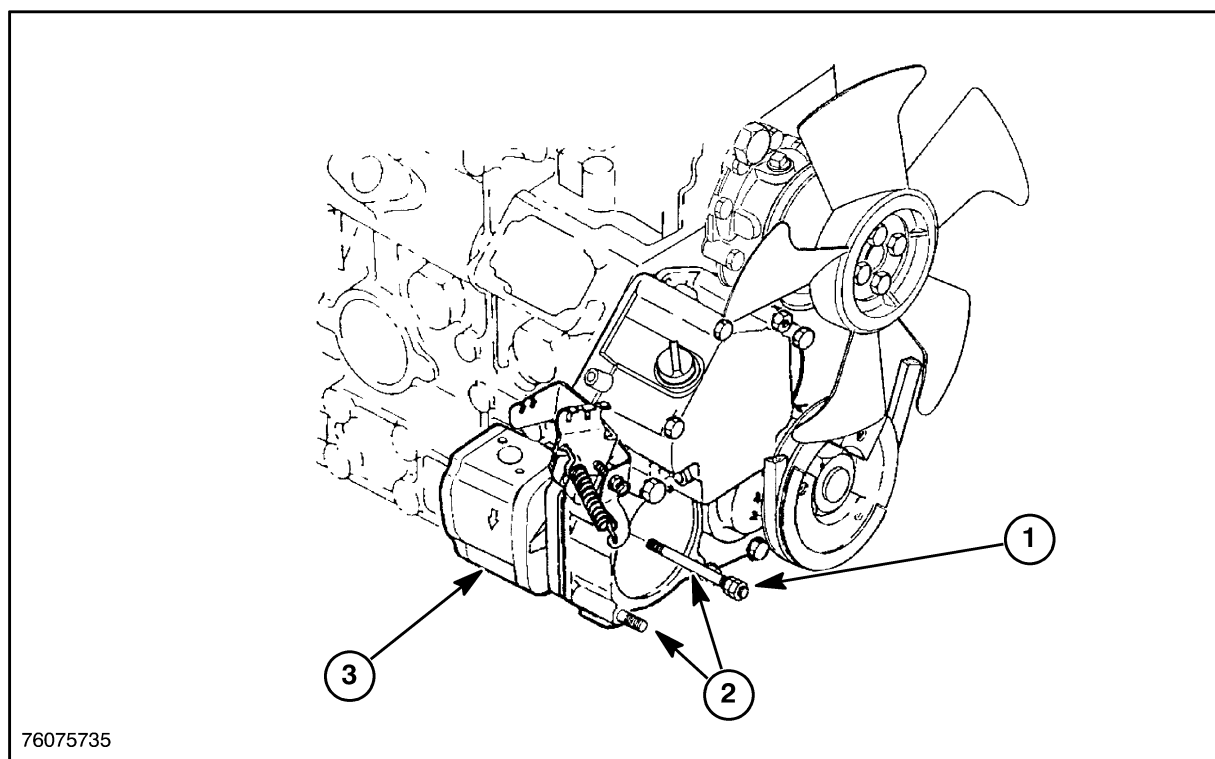
4. Remove the through bolts and nuts, 1, and remove the steering pump from the front cover. Cap the lines and pump openings.

**NOTE:** Two of the power steering pump retaining bolts are not shown.



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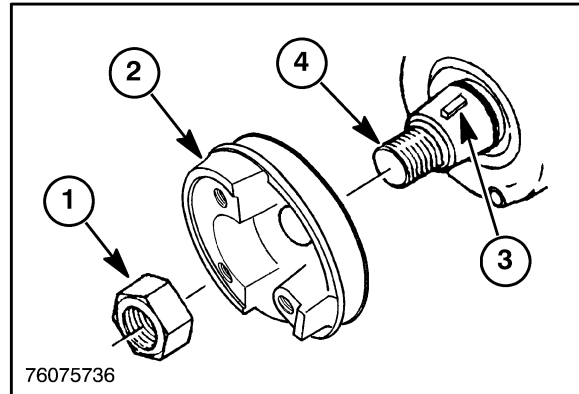
5. Install and tighten two nuts, 1, against each other, onto the retaining studs, 2. Remove the studs, 2, and the hydraulic pump, 3.



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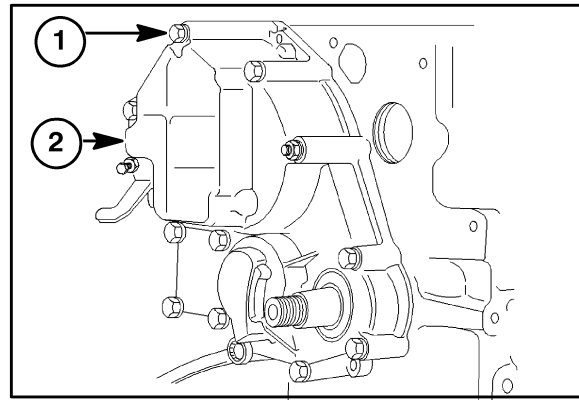
## SECTION 10 - ENGINE - CHAPTER 1

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



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7. Remove the retaining bolts, 1, and lift the cover, 2, off the locating dowels.

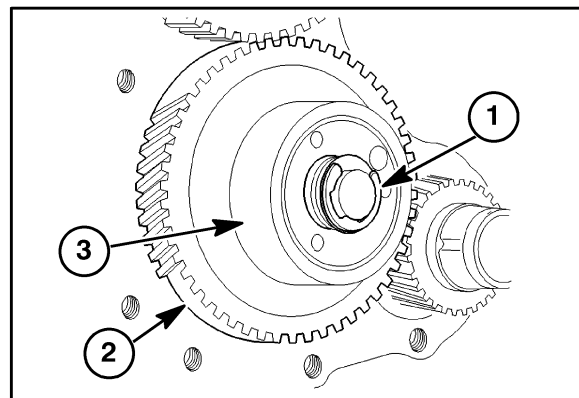


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### TIMING GEARS AND CAMSHAFT

#### Removal

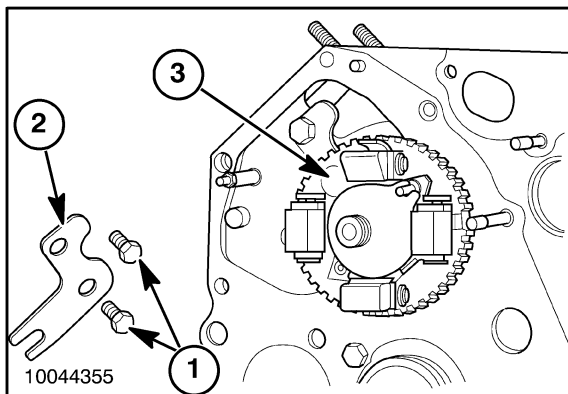
1. Remove retaining ring, 1, and remove the idler gear, 2, and oil pump assembly, 3, with shims and spring.



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## SECTION 10 - ENGINE - CHAPTER 1

2. Remove the two bolts, 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.

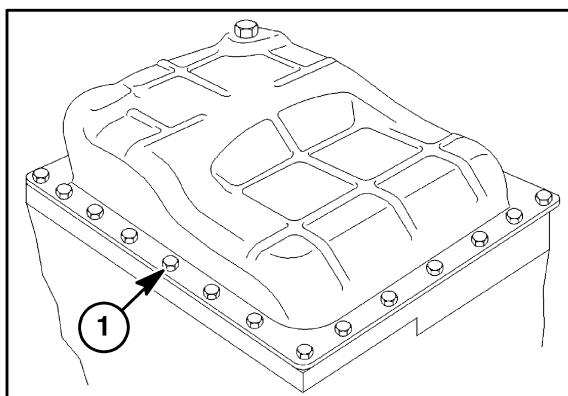


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### OIL SUMP

#### Removal

1. Remove the oil sump retainer bolts, 1.
2. Remove the oil sump and discard gasket.

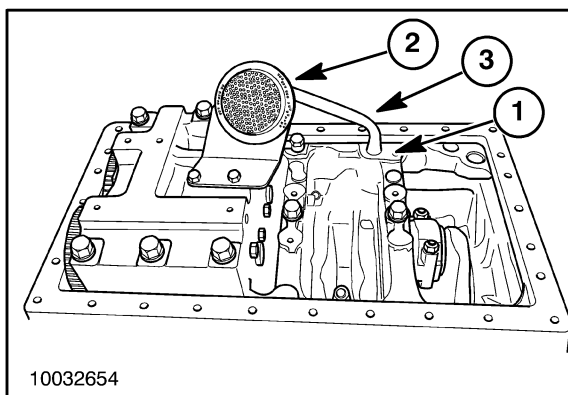


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### OIL SUCTION PIPE AND STRAINER

#### Removal

1. Remove the two retaining bolts, 1.
2. Remove the oil strainer, 2, and rotate the oil suction pipe, 3, out of its bore.



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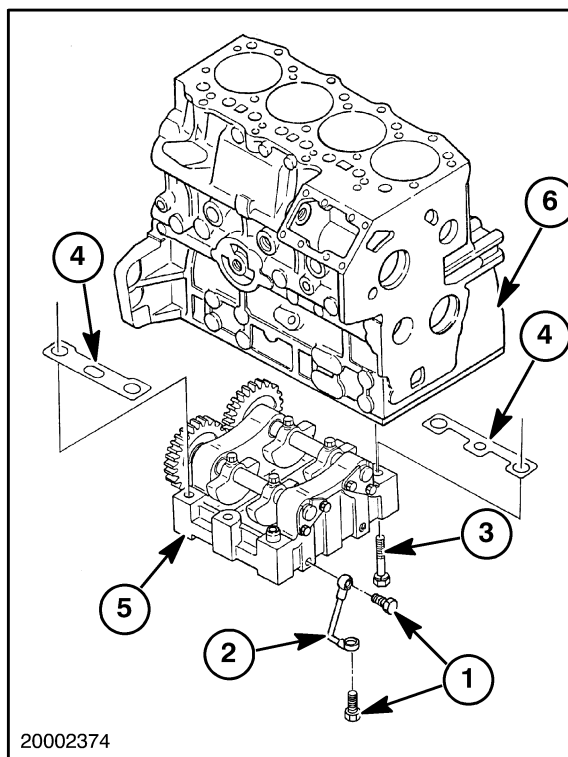
### BALANCER ASSEMBLY

#### Removal

1. Remove the banjo bolts, 1, and the oil transfer pipe, 2.
2. Loosen and remove the balancer retaining bolts, 3.

**NOTE:** 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.



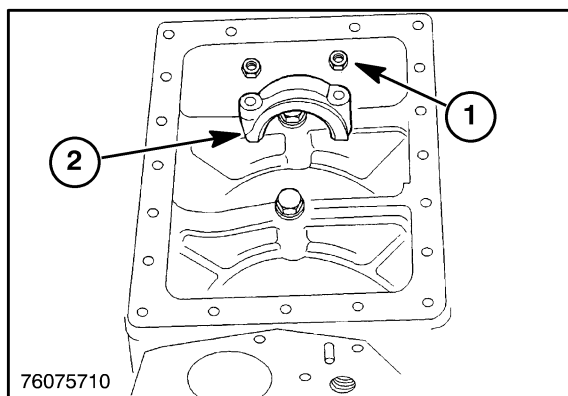
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### CONNECTING RODS, BEARINGS, AND PISTONS, RINGS

#### Removal

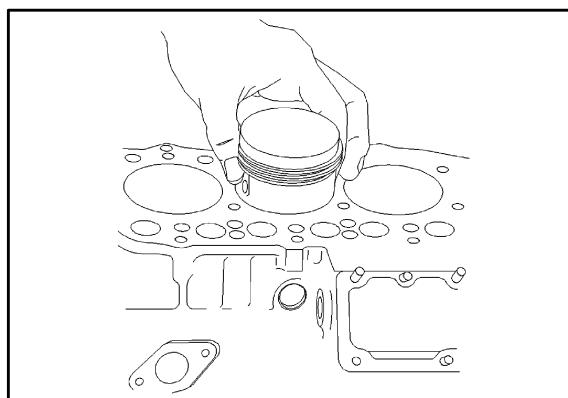
1. Remove the two nuts, 1, retaining the connecting rod caps, 2.
2. Remove the connecting rod caps and lower half of connecting rod bearing.
3. If necessary, remove any ridge from the top of the cylinder bores using a suitable ridge reamer.



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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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