D25, DX25, D29, DX29, D33, DX33
CONTENTS

SECTION 00 - GENERAL INFORMATION

Chapter 1 - General Information

CONTENTS

INTRODUCTION

This repair manual provides the technical information needed to properly service the Case IH D25, DX25, D29, DX29, D33 and DX33 tractors. 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.

PRECAUTIONARY STATEMENTS

PERSONAL SAFETY

Throughout this manual and on machine decals, you will find precautionary statements ("**DANGER**", "**WARNING**", and "**CAUTION**") followed by specific instructions. These precautions are intended for the personal safety of you and those working with you. Please take the time to read them.

⚠ DANGER ⚠

This word "DANGER" indicates an immediate hazardous situation that, if not avoided, will result in death or serious injury. The color associated with Danger is RED.

⚠ WARNING ⚠

This word "WARNING" indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. The color associated with Warning is ORANGE.

⚠ CAUTION ⚠

This word "CAUTION" indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also used to alert against unsafe practices. The color associated with Caution is YELLOW.

FAILURE TO FOLLOW THE "DANGER", "WARNING", AND "CAUTION" INSTRUCTIONS MAY RESULT IN SERIOUS BODILY INJURY OR DEATH.

MACHINE SAFETY

The precautionary statement ("**IMPORTANT**") is followed by specific instructions. This statement is intended for machine safety.

IMPORTANT: *The word "IMPORTANT" is used to inform the reader of something he needs to know to prevent minor machine damage if a certain procedure is not followed.*

INFORMATION

NOTE: *Instructions used to identify and present supplementary information.*

TECHNICAL INFORMATION

HARDWARE

GENERAL
The D25, DX25, D29, DX29, D33 and DX33 tractors have been built using metric hardware.

NOTE: *Be sure to use the hardware specified when using tapped holes, as trying to install a metric bolt in an inch thread, or an inch bolt in a metric thread, will damage the thread.*

Certain hardware must be tightened to specific torque specifications. If specific torque specifications are not noted, tighten the hardware to the standard torque chart specification listed in this manual.

PLATING
Hardware used on balers is plated with zinc chromate (gold color). Gold colored hardware has different torquing requirements from unplated or zinc plated (silver color) hardware because of the difference in the coefficient of friction of the plating material. The torque charts in this manual list the correct specifications for gold, silver, and unplated bolts.

NUT TIGHTENING
Whenever possible, the nut should be tightened, not the head of the bolt. When tightening using the bolt head, the clamp load can be lost because some of the torque applied twists the bolt instead of tensioning (stretching) it. The tension on the bolt is what holds the joint together.

Approximately 90% of the torque applied during assembly goes to overcoming friction between the parts. The other 10% is used to tension (stretch) the bolt. After assembly, the frictional forces disappear, which is the basis for the saying “If it does not fail during assembly, it will not fail in service.” The bolt may later fail due to other factors, but not from being over tightened.

LOCKNUTS
Most locknuts are coated with a special lubricant that is dry to the touch. Anytime a locknut is used, a lower than normal torque is required. Refer to the torque charts in this manual for specific values.

JAM NUTS
When using a jam nut to lock a regular nut, the jam nut should be installed first and tightened to one half the recommended torque, then held in place while installing a regular nut to the recommended torque.

THREAD LUBRICATION
The addition of antiseize compound, Molykote, oil, graphite, or any other lubricant to a bolt decreases the friction between it and a nut. This makes it necessary to reduce the recommended torque to prevent over tensioning of the bolt. When using the torque charts in this manual, decrease the value by 20% whenever a lubricant is used.

SAFETY PRECAUTIONS

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 Dealer for needed installation.
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.
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 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.
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 Dealer. However, if service operations are to be undertaken on parts that contain asbestos, the essential precautions listed below must be observed:

- 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.

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 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.
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).
14. When operating at night, adjust lights to prevent blinding oncoming drivers.

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.

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 both gear shift levers 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 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. Doing so may weaken the structure and endanger your safety.
- 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.

WHEN YOU SEE THIS SYMBOL

IT MEANS:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

SECTION 10 – ENGINE

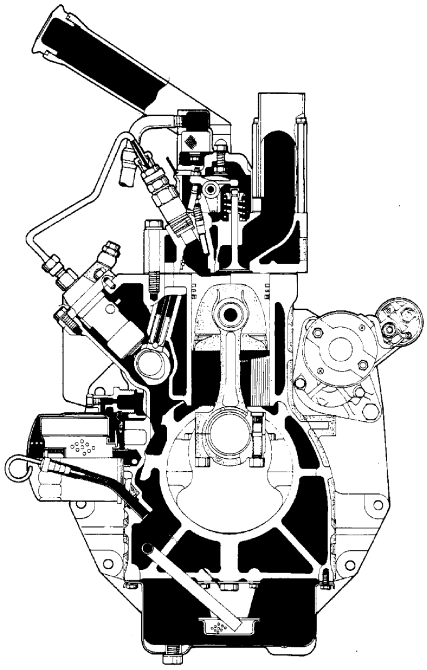
Chapter 1 – Engine

CONTENTS

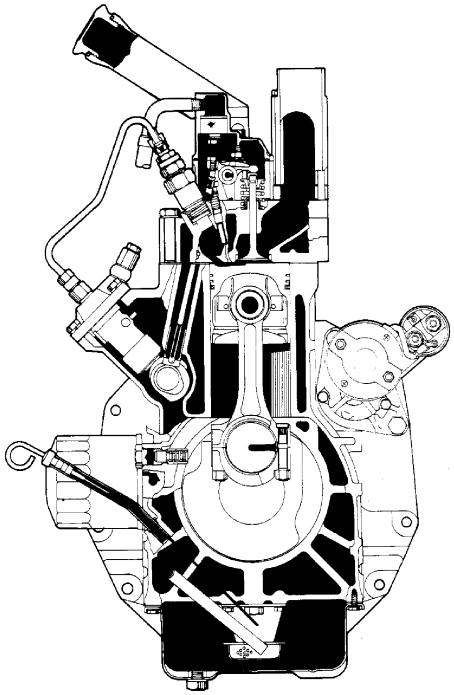
SPECIFICATIONS

GENERAL	D25 / DX25	D29 / DX29D	D33 / DX33D
Net Engine DIN in Kw (Hp)	18.3 (24.5)	21.3 (28.6)	24.0 (32.3)
Gross Engine in Kw (Hp)	18.7 (25.0)	21.6 (29.0)	24.6 (33.0)
PTO in Kw (Hp) w/9 x 3 w/HST	 16.2 (21.7) 15.1 (20.3)	 18.7 (25.1) 17.6 (23.6)	 21.7 (29.1) 20.1 (26.9)
Engine Model	J843	J843	N843
Number of Cylinders	3	3	3
Bore x Stroke in mm (in.)	84 x 80 (3.31 x 3.15)	84 x 80 (3.31 x 3.15)	84 x 90 (3.31 x 3.54)
Displacement in L(in.^{3})	1.33 (81.2)	1.33 (81.2)	1.50 (91.3)
Compression Ratio	23:1	23:1	22.5:1
Rated Speed in rpm	2600	2800	2800
Muffler Location	Under Hood	Under Hood	Under Hood
Firing Order	1-2-3	1-2-3	1-2-3
Low Idle Speed rpm	1000	1000	1000
High Idle Speed rpm	2840	3040	3040
Cylinder Arrangement	In-line Vertical	In-line Vertical	In-line Vertical
Valve Arrangement	Overhead	Overhead	Overhead
CYLINDER BLOCK	**D25 / DX25D**	**D29 / DX29D**	**D33 / DX33D**
Bore Standard in mm (in.)	84 - 84.019 (3.307 - 3.308)	84 - 84.019 (3.307 - 3.308)	84 - 84.019 (3.307 - 3.308)
Bore Maximum in mm (in.)	85.2 (3.354)	85.2 (3.354)	85.2 (3.354)
Head Surface Warp Standard in mm (in.)	0.05 (0.002)	0.05 (0.002)	0.05 (0.002)
Head Surface Warp Maximum in mm (in.)	0.12 (0.005)	0.12 (0.005)	0.12 (0.005)
Re-Bore Size mm (in.) Oversize 0.5 mm (0.02 in) 1.0 mm (0.04 in)	 84.2 - 84.7 (3.315 - 3.334) 82.7 - 83.2 (3.334 - 3.354)	 84.2 - 84.7 (3.315 - 3.334) 82.7 - 83.2 (3.334 - 3.354)	 84.5 - 84.519 (3.327 - 3.328) 85.0 - 85.019 (3.346 - 3.347)

CYLINDER HEAD	D25 / DX25	D29 / DX29	D33 / DX33
Head Ward in mm (in.) Standard Maximum	0.05 (0.002) 0.12 (0.005)	0.05 (0.002) 0.12 (0.005)	0.05 (0.002) 0.12 (0.005)
Valve Seat Width in mm (in.) Standard Maximum	1.2 - 1.8 (0.063 - 0.071) 2.5 (0.098)	1.2 - 1.8 (0.063 - 0.071) 2.5 (0.098)	1.2 - 1.8 (0.063 - 0.071) 2.5 (0.098)
PISTON	**D25 / DX25**	**D29 / DX29**	**D33 / DX33**
Valve Seat Sink in mm (in.) Standard Maximum	0.85 - 1.15 (0.0334 - 0.0453) 1.8 (0.071)	0.85 - 1.15 (0.0334 - 0.0453) 1.8 (0.071)	0.85 - 1.15 (0.0334 - 0.0453) 1.8 (0.071)
Valve Angle	45_	45_	45_
Diameter in mm (in.) Standard Minimum	83.913 - 83.928 (3.303 - 3.304) 83.7 (3.295)	83.948 - 83.963 (3.3050 - 3.3056) 83.7 (3.2593)	83.948 - 83.963 (3.3050 - 3.3056) 83.7 (3.2593)
Bore Clearance in mm (in.) Standard Maximum	0.088 - 0.106 (0.0034 - 0.0041) 0.3 (0.0118)	0.088 - 0.106 (0.0034 - 0.0041) 0.3 (0.0118)	0.088 - 0.106 (0.0034 - 0.0041) 0.3 (0.0118)
Piston Pin Bore in mm (in.) Standard Maximum	24.999 - 25.003 (0.984 - 0.9843) 25.0 (0.0985)	24.999 - 25.003 (0.984 - 0.9843) 25.0 (0.0985)	27.999 - 28.003 (1.10231 - 1.1025) 28.02 (1.1031)
Piston Pin Clearances in mm (in.) Standard Maximum	− 0.001 +0.007 (0 - 0.0002) 0.02 (0.0008)	−0.001 +0.007 (0 - 0.0002) 0.02 (0.0008)	−0.002 +0.008 (−0.00008 +0.0003) 0.02 (0.0008)
Available Oversized in mm (in.) 0.5 and 1.0 (0.20 and 0.40)			



MODEL J843



MODEL N843

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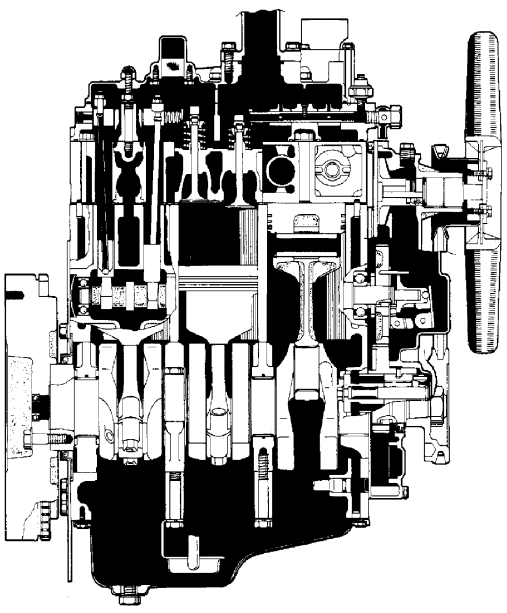

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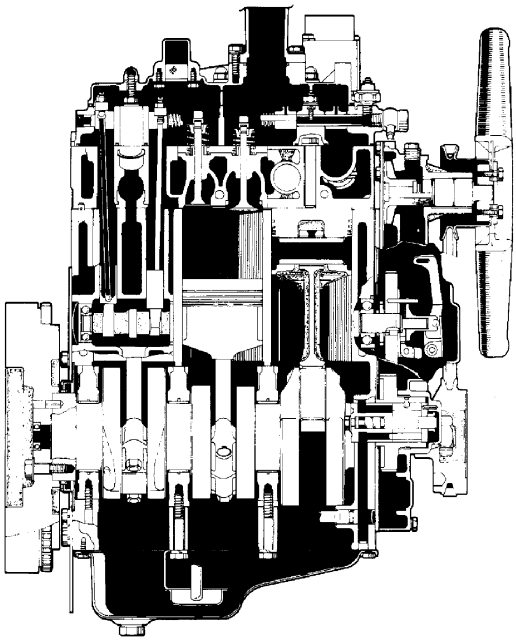

MODEL N843

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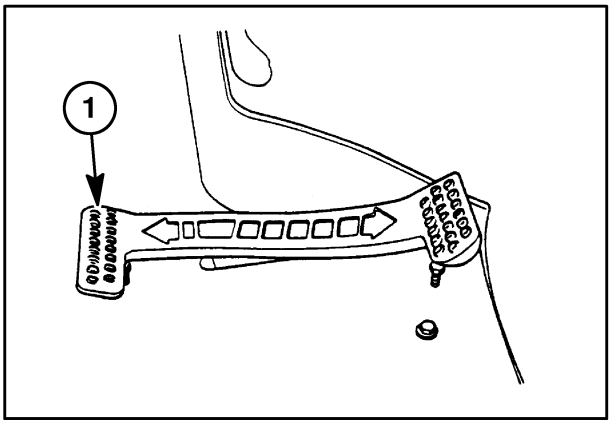
SEPARATING THE TRACTOR BETWEEN THE ENGINE AND CLUTCH HOUSING

REMOVAL

NOTE: *Place jack stands as support under clutch housing.*

1. Open the hood and remove the side panels.
2. Disconnect the battery ground cable.
3. With hydrostatic transmission, remove the HST pedal, 1.



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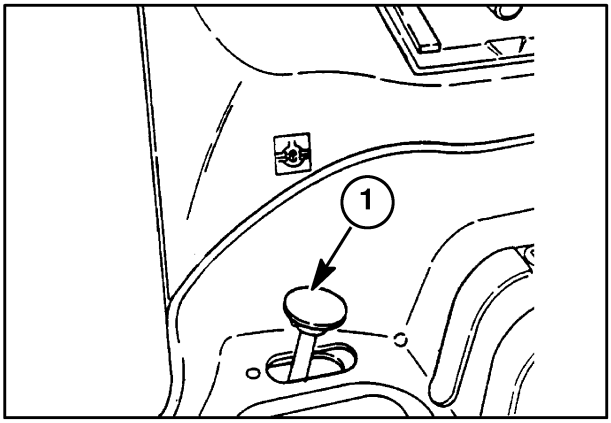
4. Remove the differential lock pedal, 1.



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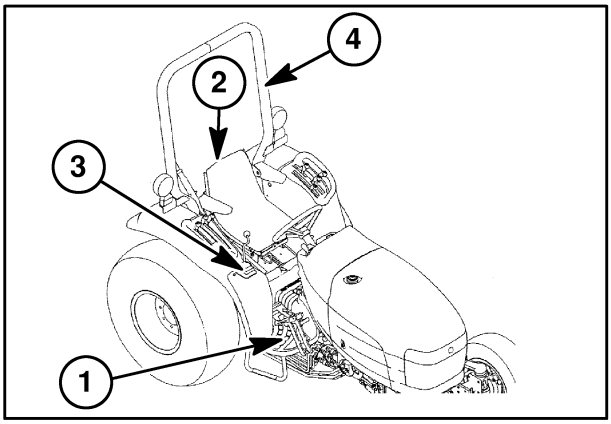
5. Remove the floor mat, 1.
6. Remove the seat, 2.
7. If equipped, remove the loader control valve mounts, and the valve, 3.
8. Remove the knobs from the controls on both fenders.
9. Remove the roll bar, 4.



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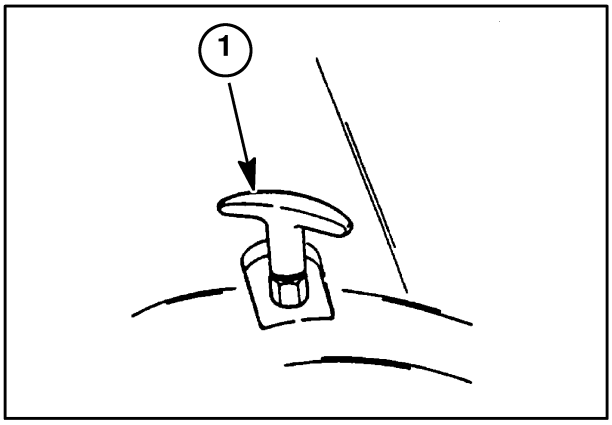
10. Remove the parking brake handle, 1.



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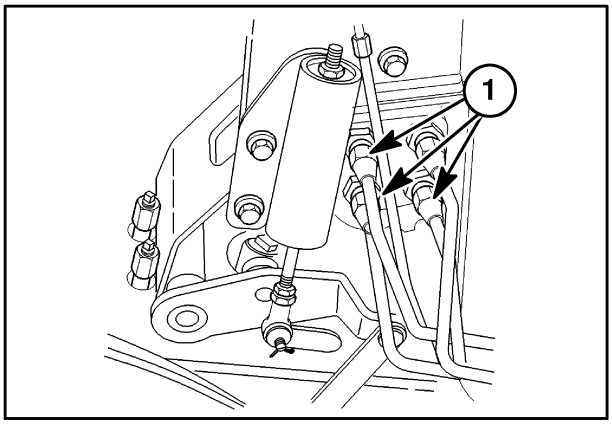
11. Disconnect the power steering tubing, 1, from the steering motor. Cap and plug all openings.



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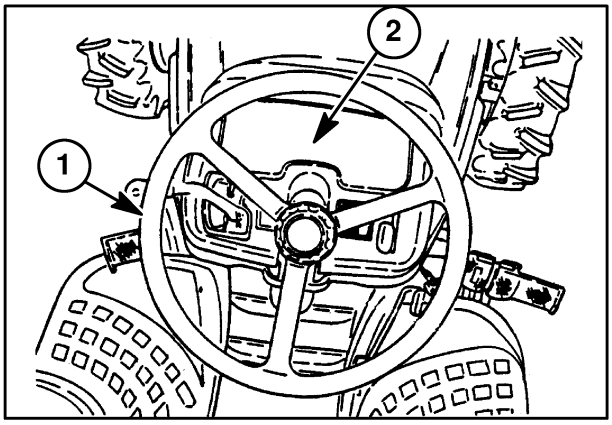
12. Remove the steering wheel, 1.
13. Remove the instrument panel, 2, and unplug the wire harness.



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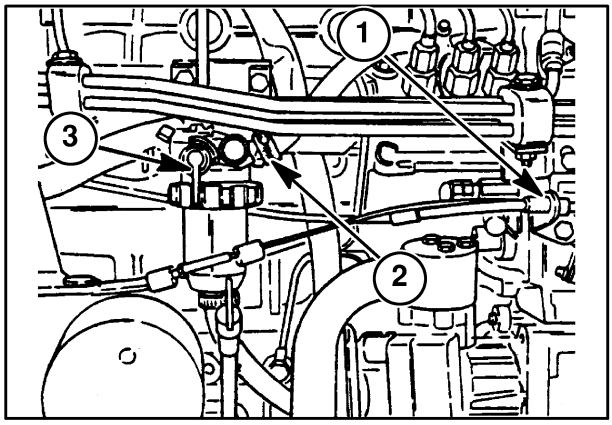
14. Disconnect the throttle control cable, 1, from the injection pump.
15. Remove the fuel hose, 2, from the fuel shutoff valve, 3, and filter and drain the fuel into a clean container. Cap and plug all openings.
16. Remove the fuel tank bracket and remove the fuel tank.
17. Remove the right and left fender attaching hardware and remove the fenders.
18. Remove the step plate.
19. Drain the transmission fluid into a clean container.
20. Remove the hydraulic suction tube, system pressure tube, and fluid return line from the tractor.
21. With hydrostatic transmission, remove the hydraulic lines at the filter and cooler.
22. With FWD, remove the FWD drive shaft, discussed in “Driveline” - Section 23.
23. Drain the engine oil in a clean container and remove the oil filter.



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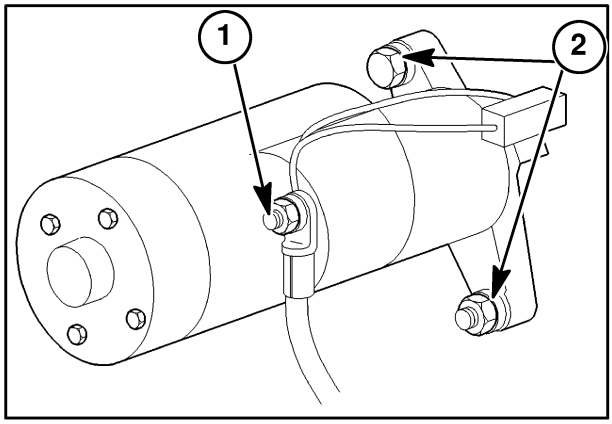
24. Disconnect the starter wiring harness, 1, and remove the starter attaching hardware, 2, and remove the starter.



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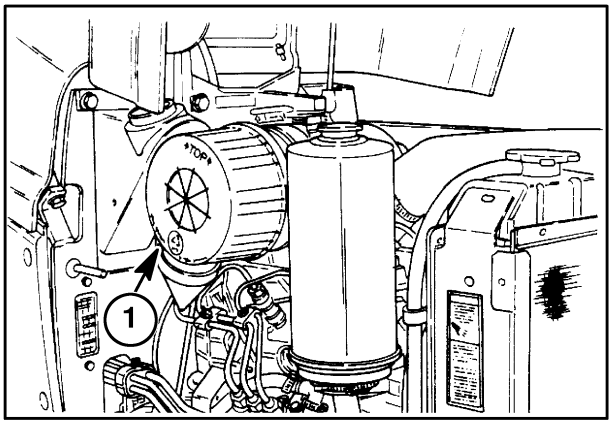
25. Remove the air cleaner, 1.
26. Attach a hoist chain to the engine lift hook, located on the left rear of the engine.
27. Remove the engine to clutch housing buckle up bolts and carefully separate the engine from the clutch housing.



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INSTALLATION

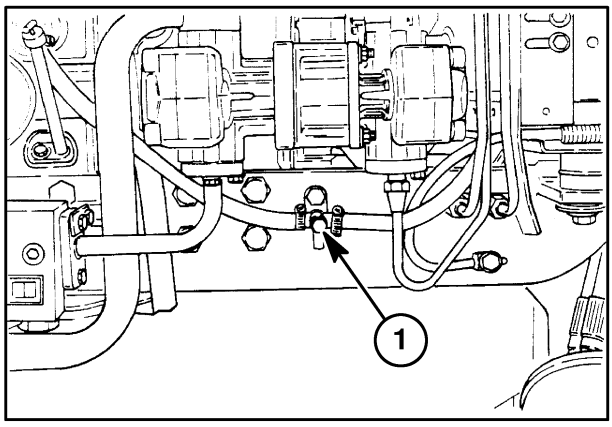
Installation generally follows the removal procedures in reverse order.

During installation coat the engine and clutch housing mating surfaces with liquid sealer. Use caution to prevent excess sealer from entering the inside of the housing and contaminating the hydraulic fluid supply.

ENGINE OVERHAUL

ENGINE DISASSEMBLY

1. Turn coolant tap bolt, 1, counterclockwise to drain fluid. Remove the radiator assembly. See “Radiator Removal”, discussed later in this section.



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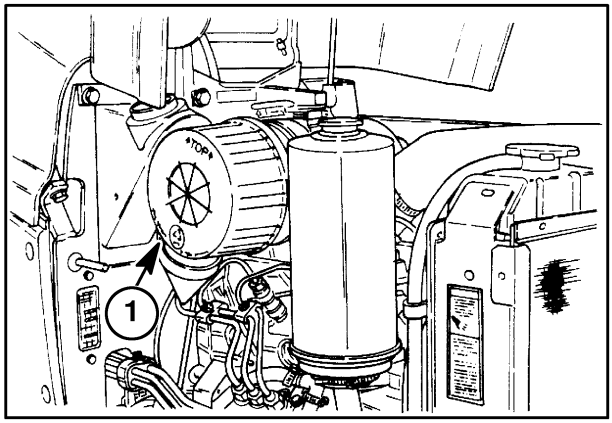
2. Remove the air cleaner assembly, 1, along with the air cleaner hoses. Push in on assembly, 1, and turn counterclockwise to remove.



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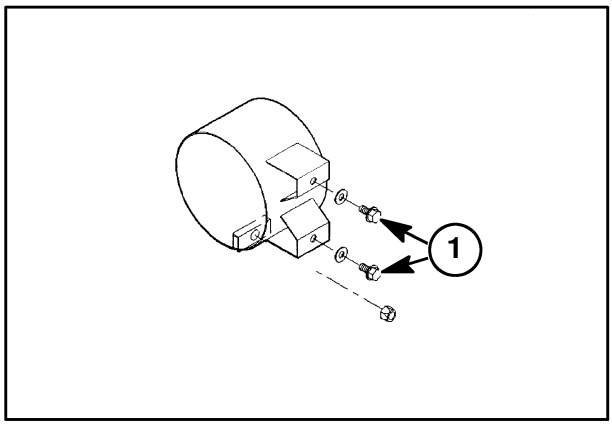
3. Remove bolts, 1, for final removal of air cleaner assembly.



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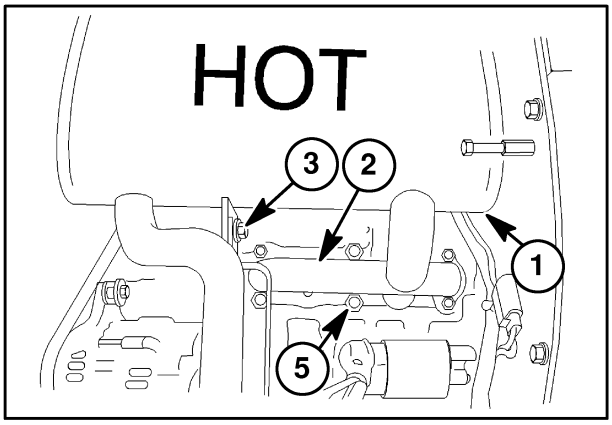
4. Remove the exhaust muffler, 1, and manifold assembly, 2. Loosen bolt, 3, and bolt, 4, Figure 19, to remove exhaust muffler. Loosen six bolts, 5, to remove exhaust manifold.



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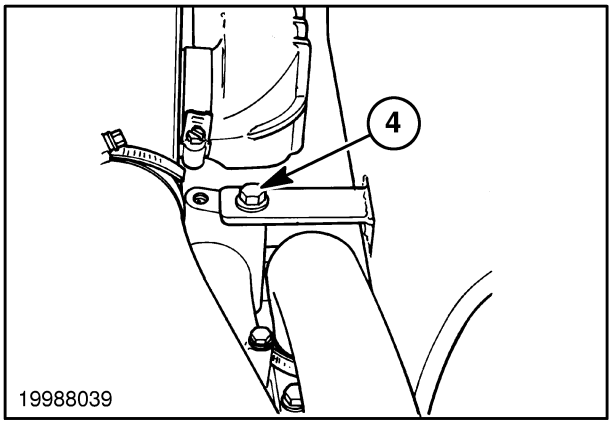

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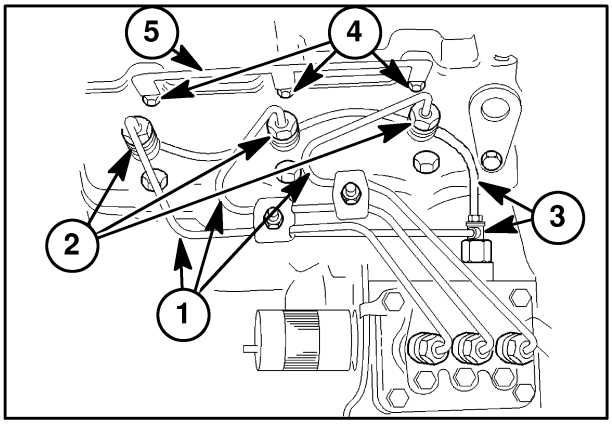
FUEL INJECTOR AND GLOW PLUG REMOVAL

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, 3.
4. Remove the injector assemblies, 2.
5. Remove the glow plug bus connector, 5, and remove the glow plugs, 4.



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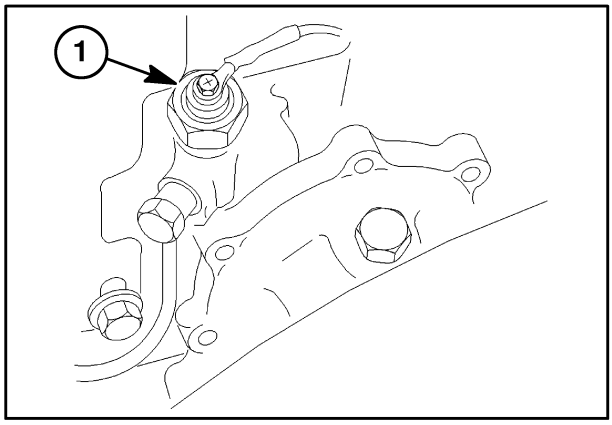
OIL PRESSURE SWITCH

Remove the oil pressure switch, 1.



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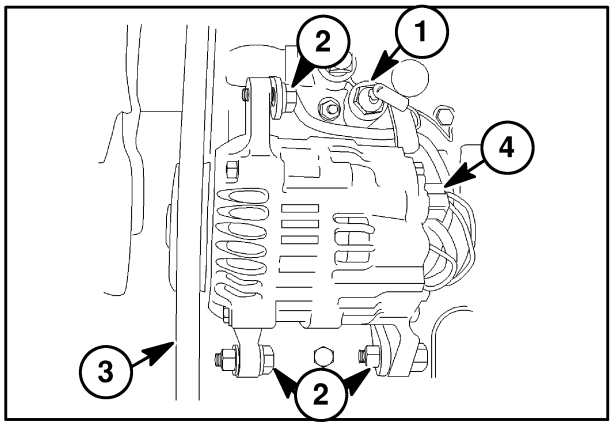
TEMPERATURE SENDING SWITCH AND ALTERNATOR REMOVAL

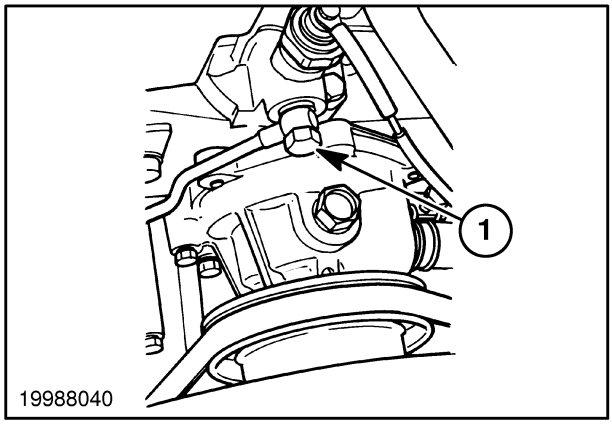
1. Remove the temperature sending switch, 1, from the front of the cylinder head.
2. Loosen the alternator mounting bolts, 2, and remove the V-belt, 3, from the drive pulley.
3. Disconnect the alternator wires from the back of alternator, 4.
4. Remove the alternator mounting bolts, 2, and remove the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



22

FAN, WATER PUMP, AND EXTERNAL OIL TUBE REMOVAL

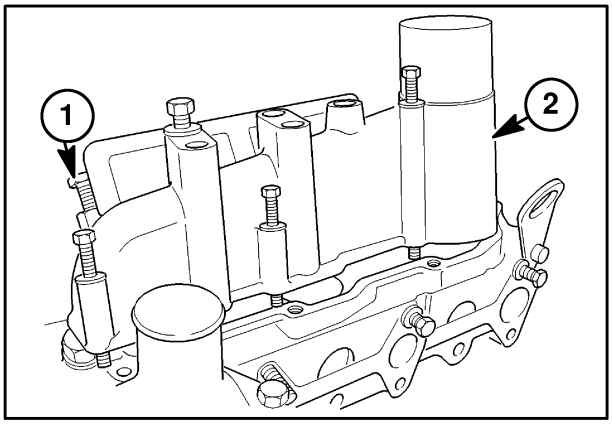
1. Remove the fan and water pump assembly. See “Fan Removal” and “Water Pump Removal” discussed later in this section.
2. Remove the external oil transfer tube banjo bolt, 1, from the front of the cylinder head.



23

AIR INLET MANIFOLD REMOVAL

Remove the six retaining bolts, 1, and remove the air inlet manifold assembly, 2.



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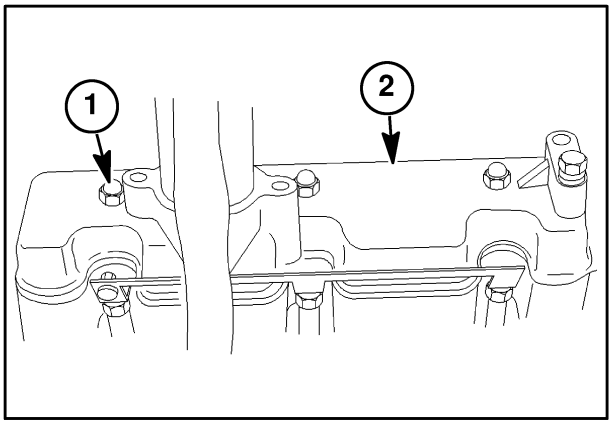
VALVE COVER REMOVAL

Loosen the three bolts, 1, to remove the valve cover, 2.

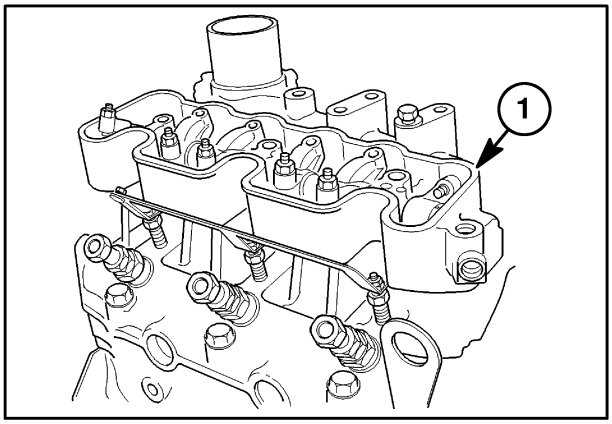


25

ROCKER ARM SHAFT AND SUPPORT BRACKET REMOVAL

Remove the rocker arm shaft and support bracket as an assembly, 1.

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



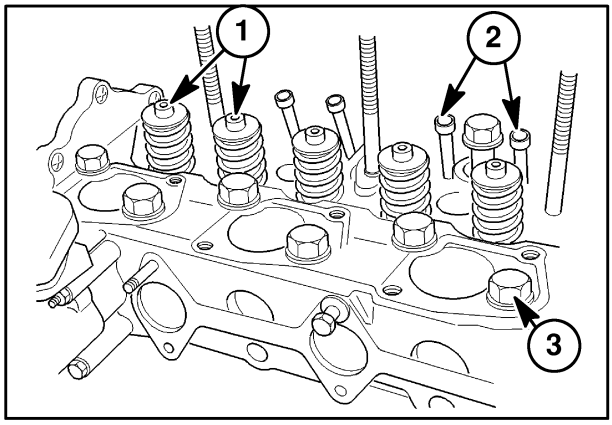
26

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.*

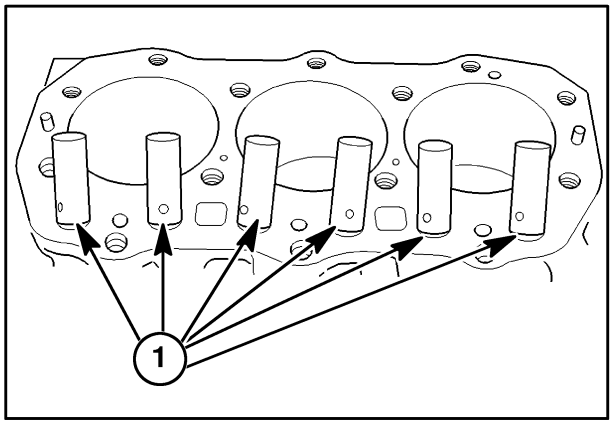
2. To remove the cylinder head, remove the cylinder head bolts, 3, by alternately loosening a half turn at a time to prevent warping the head.



27

VALVE TAPPET REMOVAL

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



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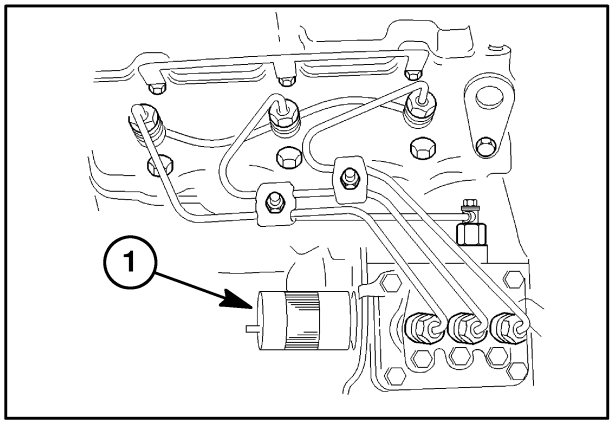
FUEL SHUTOFF SOLENOID REMOVAL

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



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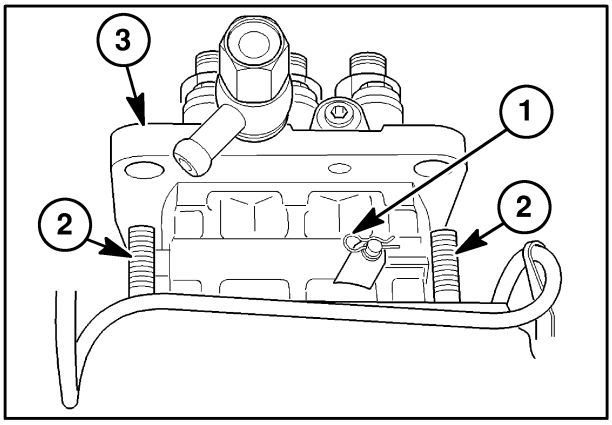
ENGINE TIMING GEAR COVER, TIMING GEARS, AND CAM SHAFT

Timing Gear Cover Removal

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



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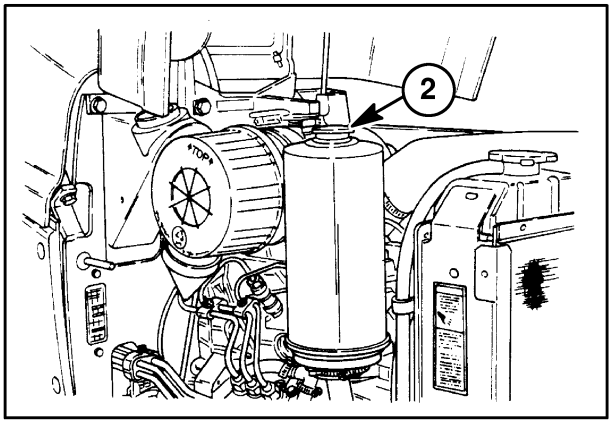
5. Remove the power steering pump reservoir tank dipstick-filler cap, 2.



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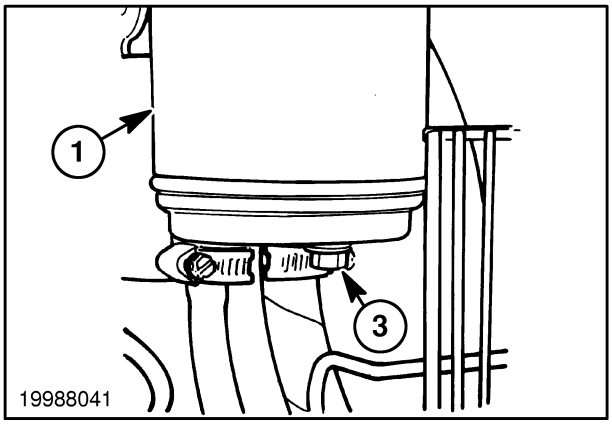
6. Remove the reservoir drain plug, 3, and drain the hydraulic fluid out of the reservoir tank, 1, into a suitable container.



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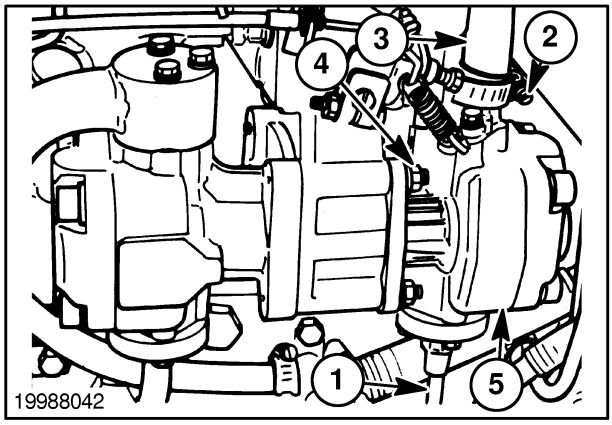
7. Loosen the hose clamp, 2, on the suction tube, 3, and remove the suction hose from the steering pump, 5.
8. Remove the pressure tube, 1, from the bottom of the steering pump.
9. Remove the through bolts, 4, and remove the steering pump from the front cover. Cap the lines and pump openings.



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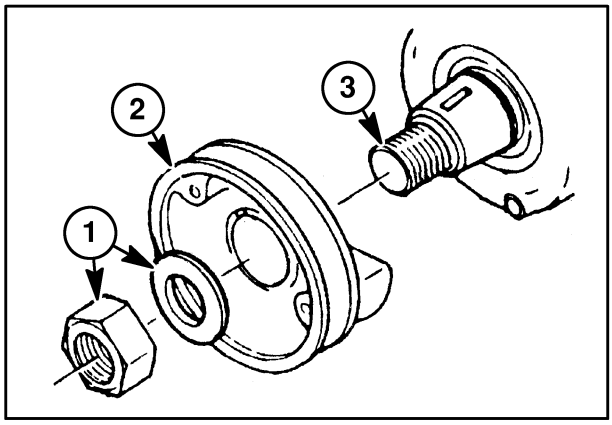
10. Remove retaining nut and washer, 1. Pull crankshaft pulley, 2, off of crankshaft, 3.



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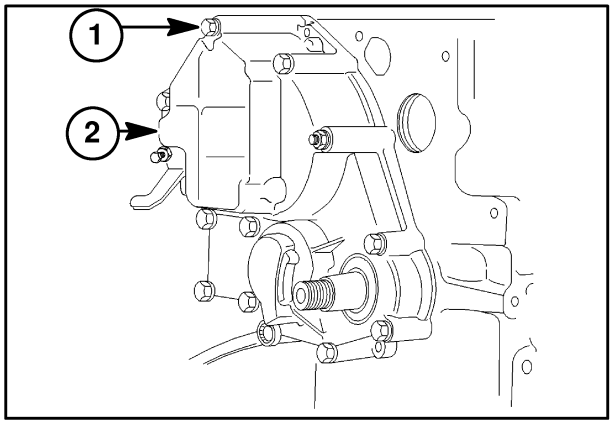
11. Remove the retaining bolts, 1, and lift the cover, 2, off the locating dowels.



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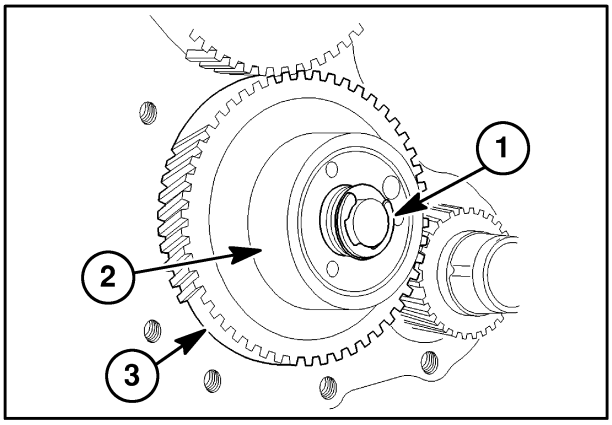
Timing Gears and Camshaft Removal

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



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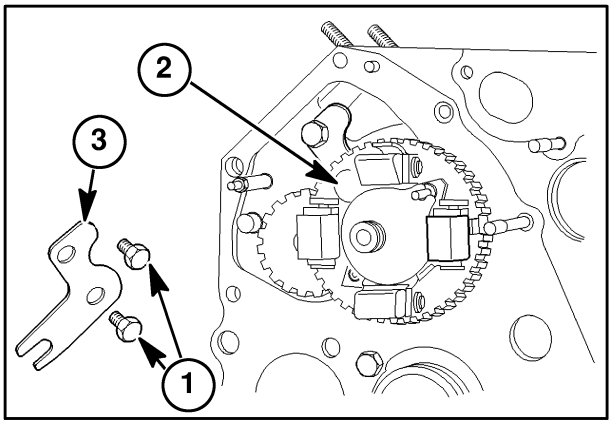
2. Remove the two bolts, 1, securing the keeper plate, 3. One must be accessed using the access hole, 2, in the cam gear.
3. Slide the camshaft and gear out of the camshaft bore.



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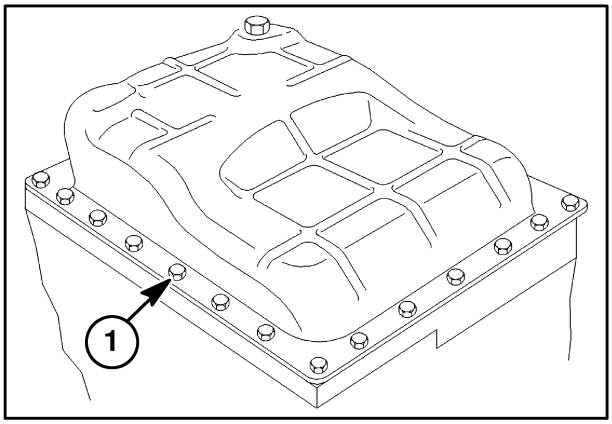
Oil Sump Removal

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



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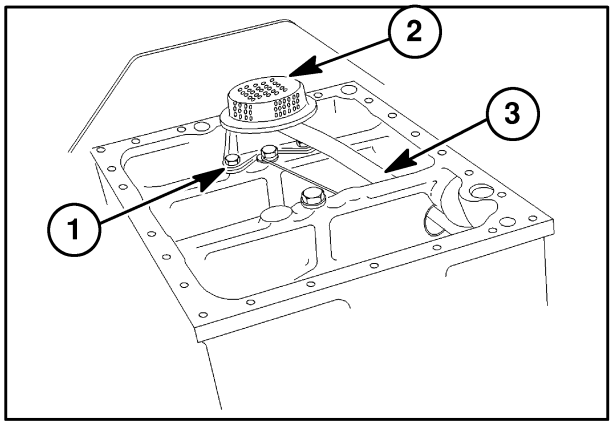
Oil Suction Pipe and Strainer Removal

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



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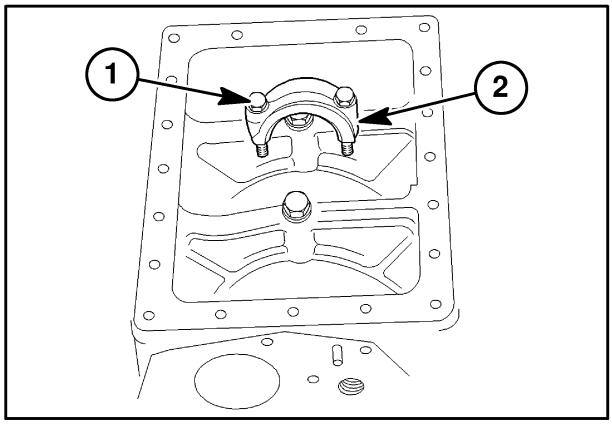
Connecting Rods, Bearings, and Pistons, Rings Removal

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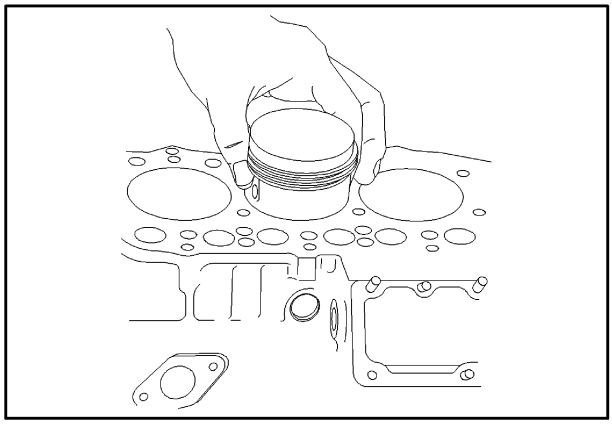
4. Push the piston and connecting rod out of the cylinder block.
5. Replace the connecting rod cap to the piston assembly it was removed from. Keep together in cylinder sequence.



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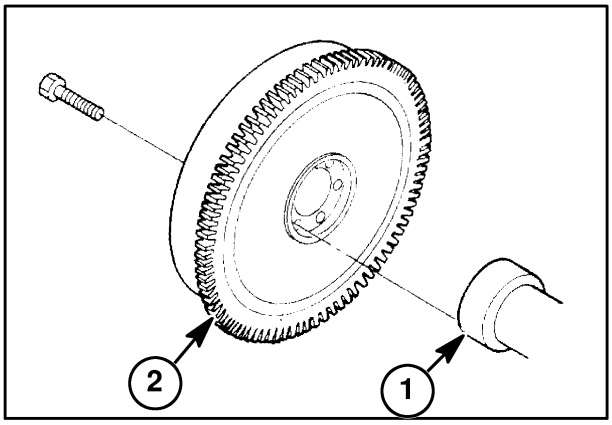
Flywheel Removal

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



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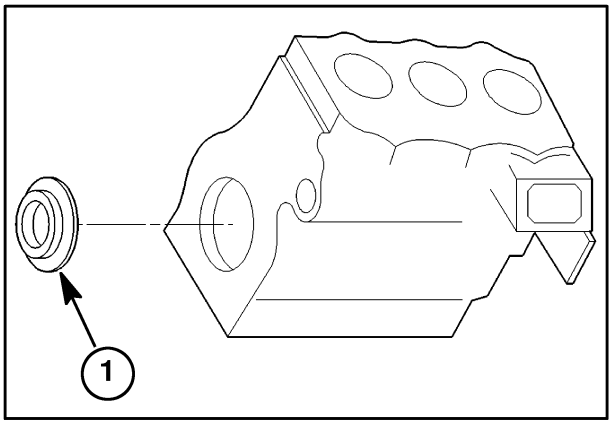
Backplate and Oil Seal

1. Remove the backplate retaining bolts and remove the backplate.
2. Remove the rear oil seal, 1.



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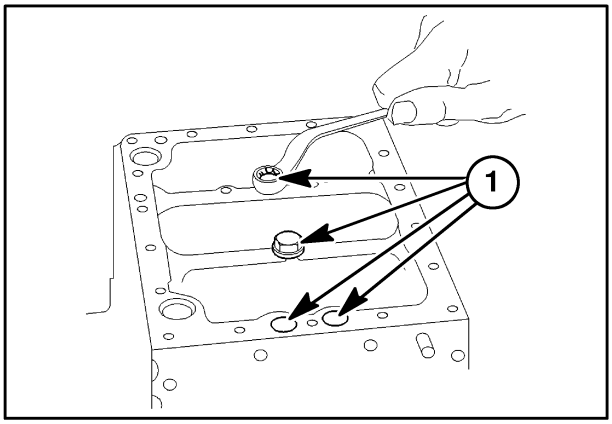
Crankshaft and Main Bearings Removal

1. Remove the crankshaft bearing holder retaining bolts, 1.
2. Slide the crankshaft and main bearing assembly through the rear of the engine.



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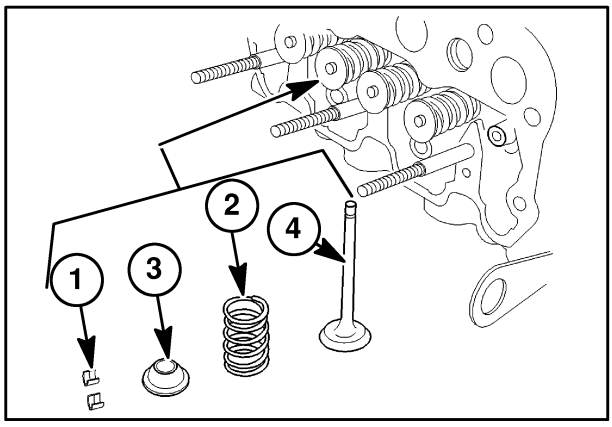
DISASSEMBLY, INSPECTION, FITS, CLEARANCES, AND ASSEMBLY OF COMPONENT ASSEMBLIES

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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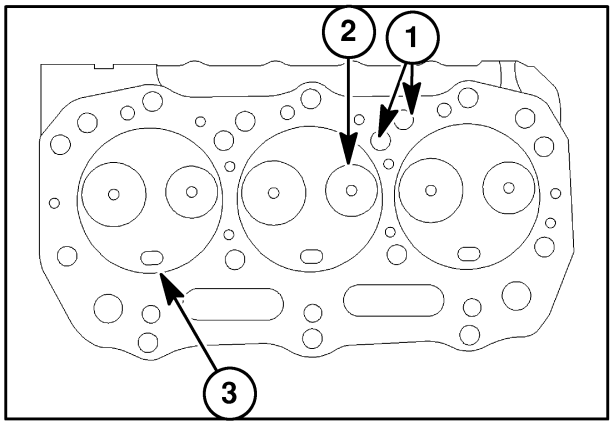
CYLINDER HEAD INSPECTION AND REPAIR

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, 2
   - Prechamber, 3
   - External cracks in the water jackets, 1
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.



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