
FARMALL 40, FARMALL 45, FARMALL 50 REPAIR 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, Farmall 45, Farmall 50 Repair manual. Complete Repair part # 87473193.

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

The sections listed above are the sections utilized for the Farmall 40, Farmall 45, Farmall 50 Tractors.

SECTION 00 - GENERAL INFORMATION

Chapter 1 - General Information

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INTRODUCTION

This repair manual provides the technical information needed to properly service the Case IH Farmall 40, 45, 50 gear transmission, and Farmall 40, 45 HST model 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.

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.
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.

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.

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.
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.

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.
8. If the power steering or engine ceases operating, stop the tractor immediately.

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 all gear shift levers in neutral position.

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.



WHEN YOU SEE THIS SYMBOL

IT MEANS:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

SECTION 10 - ENGINE

Chapter 1 - Engine

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SPECIFICATIONS

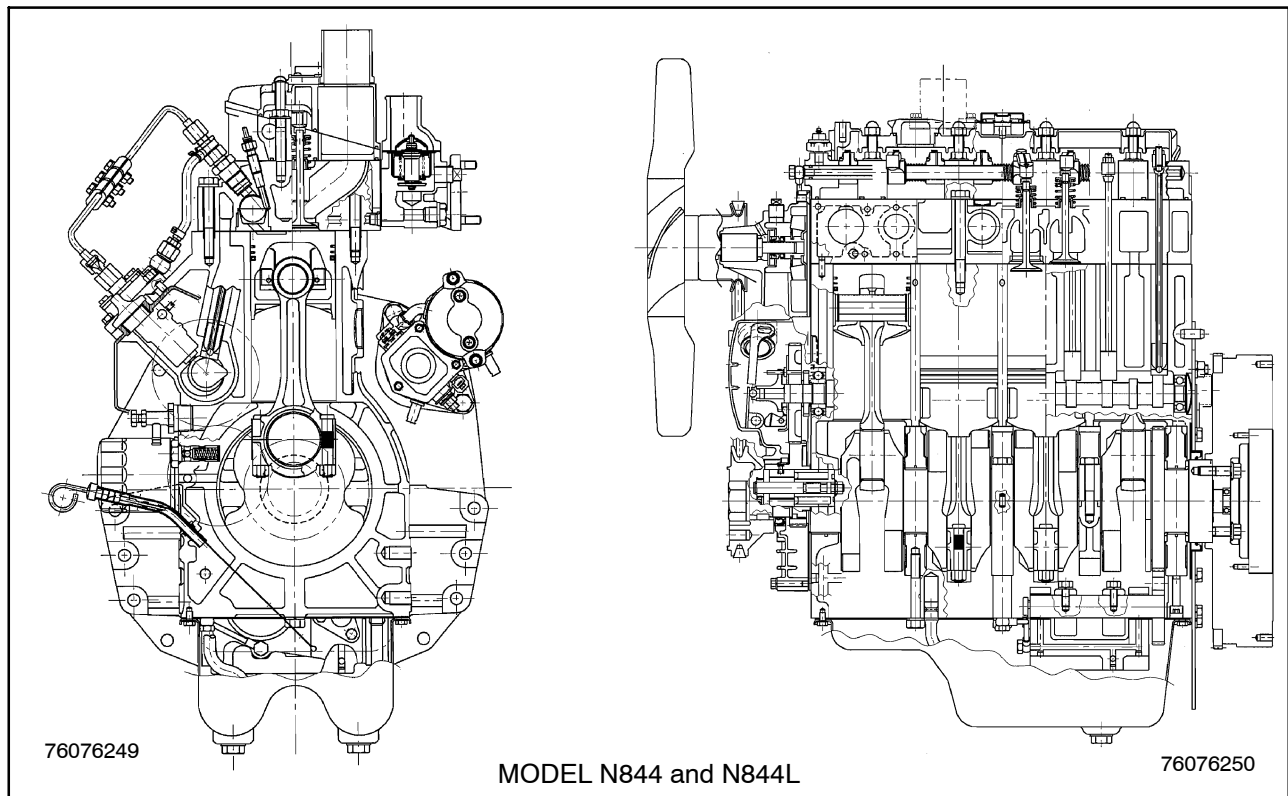
GENERAL	Farmall 40	Farmall 45	Farmall 50
Engine Model	N844	N844L	N844L
Number of Cylinders	4	4	4
Bore x Stroke	84 x 90 mm (3.31 x 3.54 in.)	84 x 100 mm (3.31 x 3.94 in.)	84 x 100 mm (3.31 x 3.94 in.)
Displacement	1995 cc (121.7 cu. in.)	2216 cc (135.2 cu. in.)	2216 cc (135.2 cu. in.)
Compression Ratio	22.5:1	22.5:1	22.5:1
Rated Speed (rpm)	2600	2600	2800
Muffler			Horizontal
Firing Order	1-3-4-2	1-3-4-2	1-3-4-2
Low Idle Speed	1050 rpm	1050 rpm	1050 rpm
Maximum No-Load Speed	2825 rpm	2825 rpm	3025 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)
Variation between cylinders			
CYLINDER BLOCK	N844	N844L	N844L
Bore			
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.)
Head Surface Warp			
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.

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.

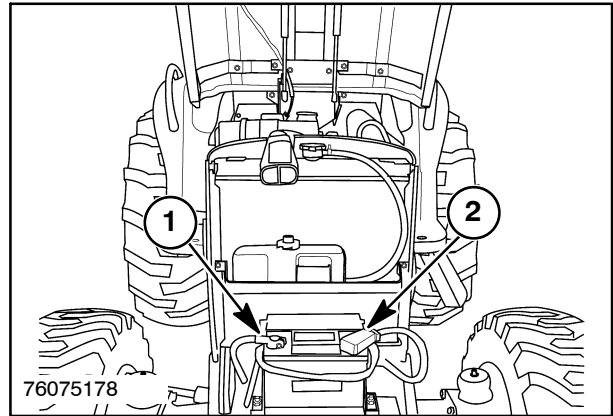
The cylinder block assembly contains the pistons, connecting rods, crankshaft, timing gears, and engine oil pump. The crankshaft is supported on five main bearings. The front bearing is positioned in a bore in front of the block. The other bearings are split liners located in holders bolted to the block.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



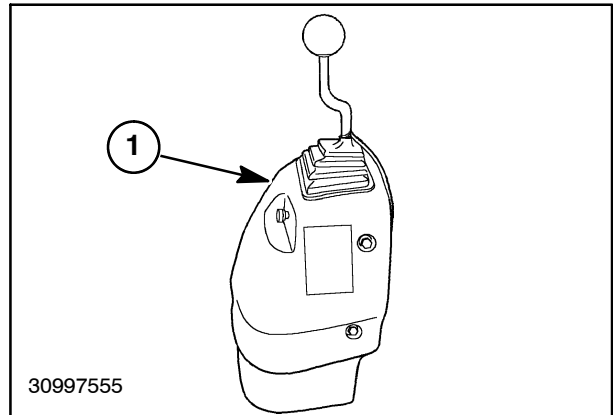
SEPARATING THE TRACTOR AT THE CLUTCH HOUSING/ENGINE - 12X12 TRANSMISSION

Removal

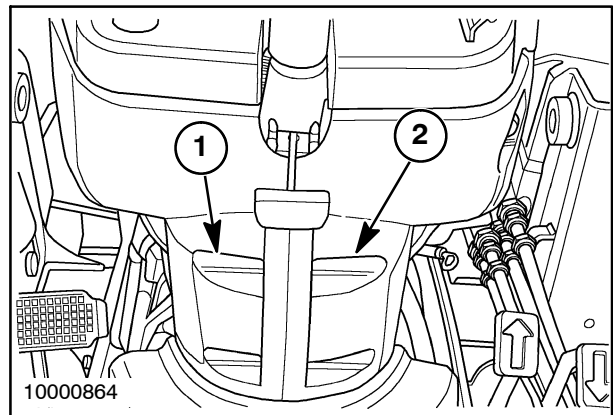
1. Remove the negative (-) battery cable, 1, and the positive (+) battery cable, 2, from the battery.
2. Drain all of the hydraulic fluid from the transmission and the differential into a suitable container.
3. Disconnect the headlight wire harness plug and remove the hood from the tractor.
4. Remove the seat, and the seat base assembly from the tractor.
5. Remove the light bars from the fenders and the ROPS.
6. If equipped, remove the remote loader control valve, 1, and the connecting hydraulic tubes from the right fender.
7. Remove the left and right fenders from the tractor.
8. Remove the left, 1, and right, 2, rear hood side panels.
9. Disconnect and remove the throttle cable from the foot throttle control pedal, located on the right deck.
10. Remove the left and the right deck from the tractor.
11. Disconnect the throttle cable from the dash mounted throttle control lever.



5

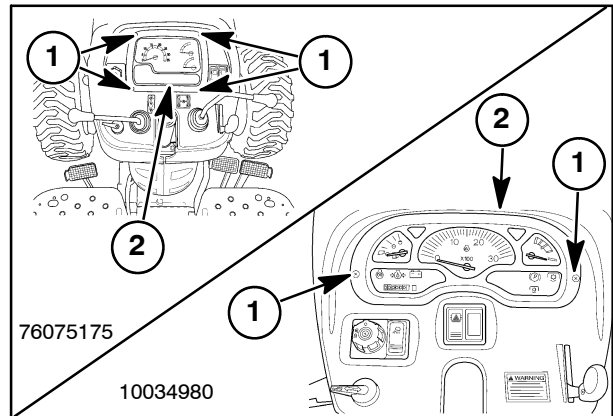


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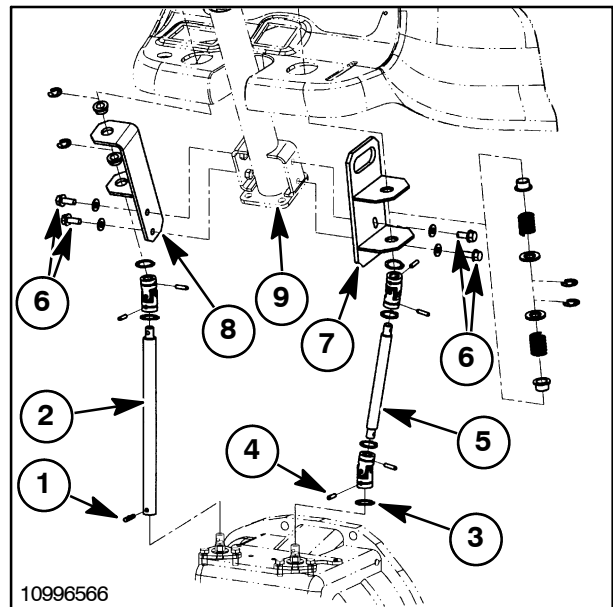
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12. Loosen and remove the two or four instrument panel retaining screws, 1. Remove the instrument panel, 2, from the dash housing. Disconnect the wiring connector from the instrument panel.



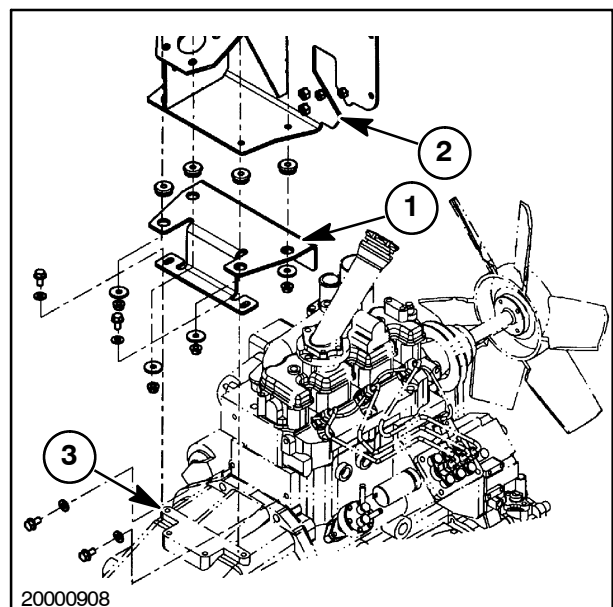
8

13. Drive the roll pin, 1, from the lower shuttle shift shaft, 2. Remove the retaining ring, 3, and the roll pin, 4, from the lower main shift shaft, 5. Loosen and remove the retaining bolts, 6, securing the main shift bracket, 7, and the shuttle shift bracket, 8, to the steering column, 9. Remove the shift shaft assemblies by feeding the control levers down through the dash housing.
14. Remove the dash housing from the firewall. Disconnect the wiring connectors from the dash switches.
15. Disconnect the main wiring harness connector.



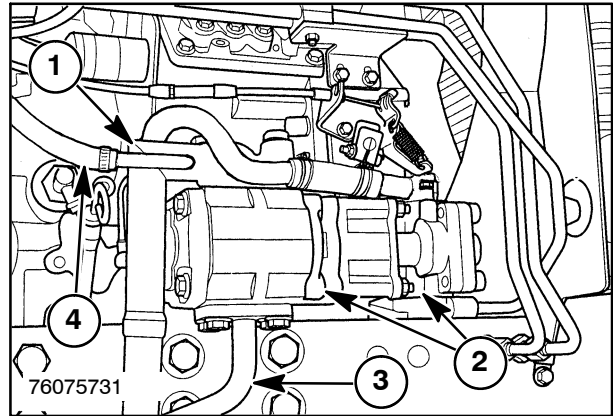
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16. Remove the firewall support bracket, 1, from the firewall, 2, and the clutch housing, 3.



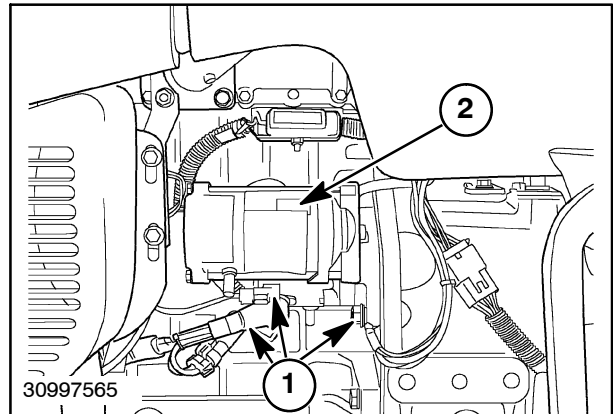
10

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



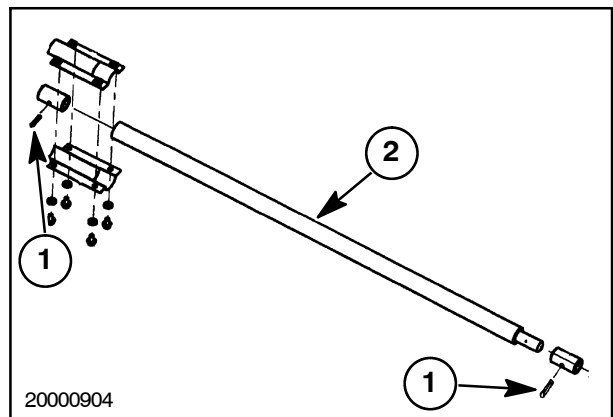
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19. Disconnect the wires, 1, on the starter, 2, and remove the starter from the tractor.



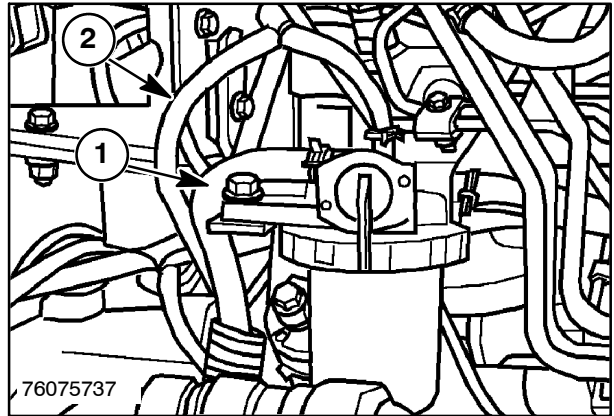
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20. If equipped with FWD, remove the roll pins, 1, from the front and rear of the FWD driveshaft, 2, and remove the driveshaft from the tractor.
21. Drain the engine oil into a suitable container and remove the oil filter.



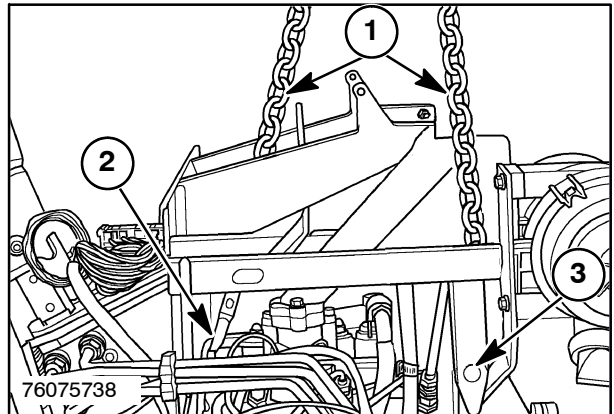
13

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



14

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

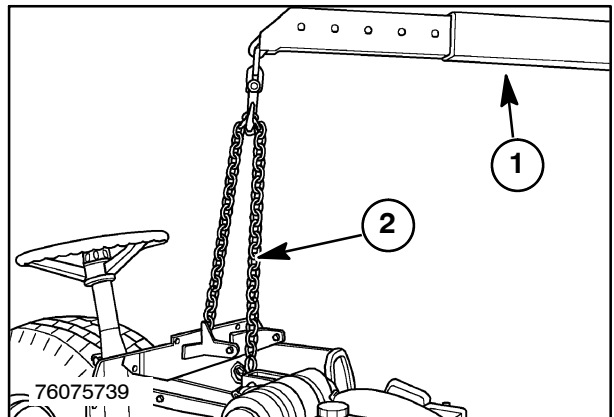


15

25. 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.

26. Roll a floor jack under the tractor from the rear of the tractor, and place under the clutch housing. Raise the jack enough to support the drive train.

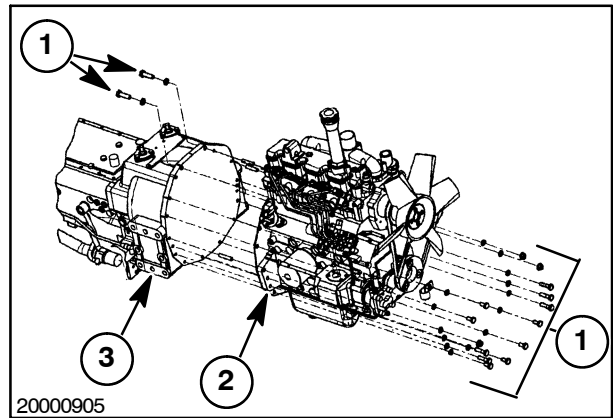


16

27. Remove the buckle-up bolts, 1, that secure the engine, 2, to the clutch housing, 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 clutch housing.

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



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SEPARATING THE TRACTOR AT THE ENGINE/FRAME

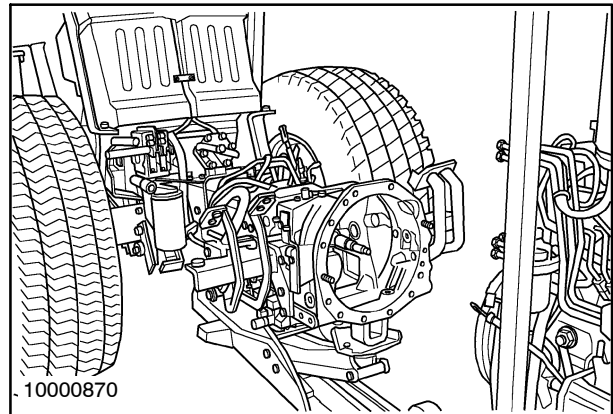
1. Use jack stands under the frame rails to support the front frame/engine assembly.



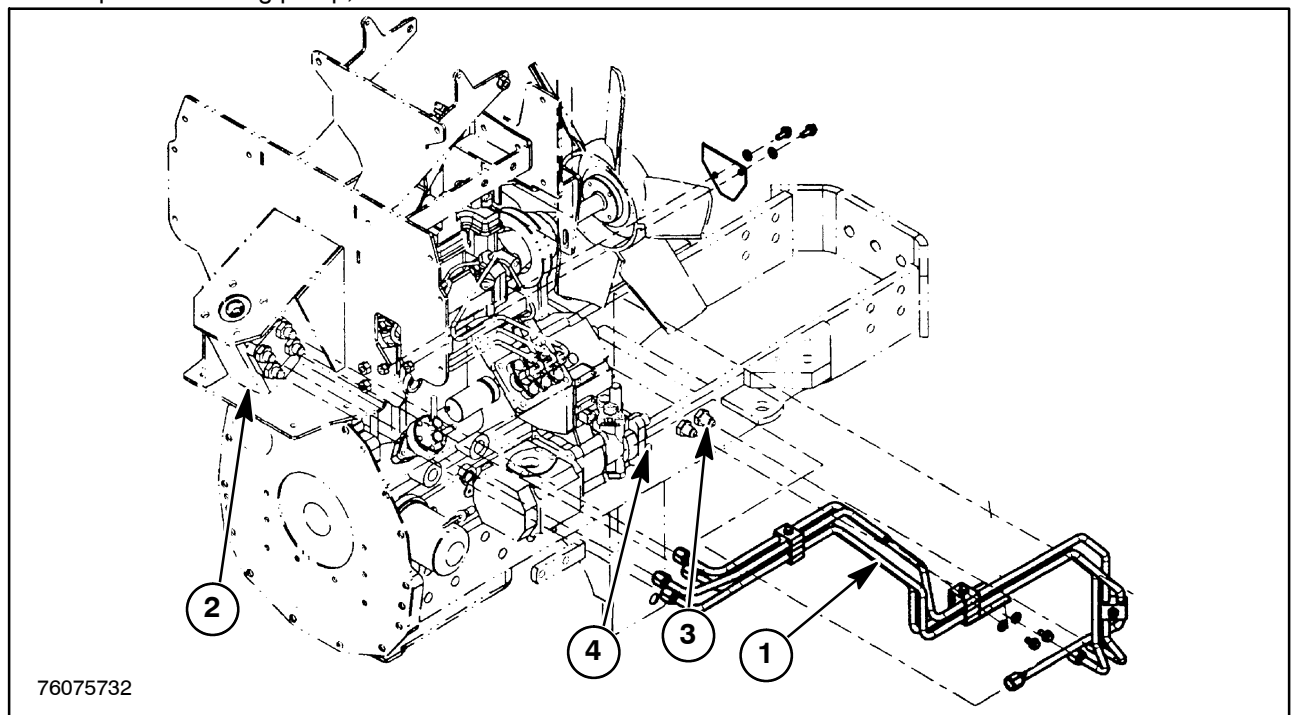
WARNING

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.

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

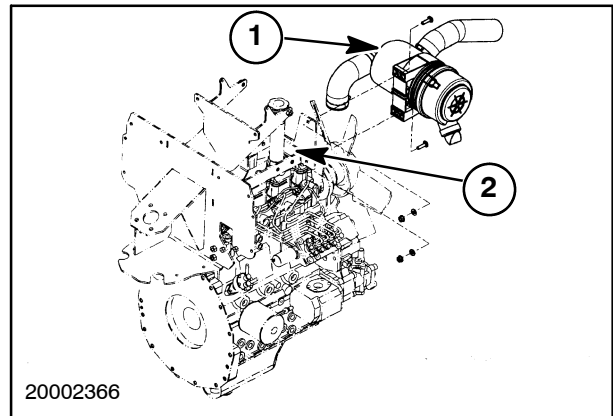


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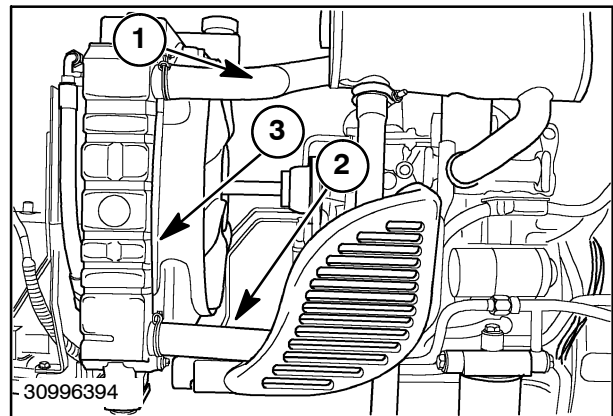
19

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



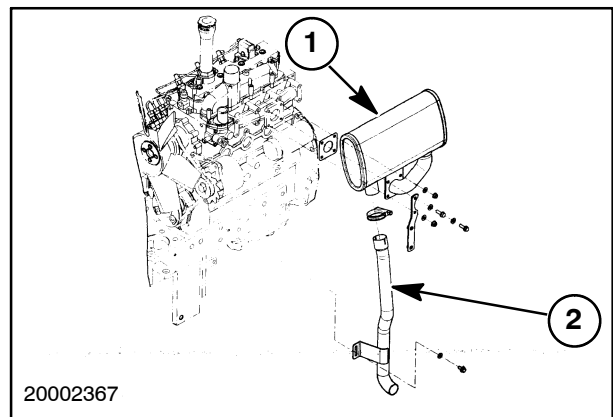
20

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



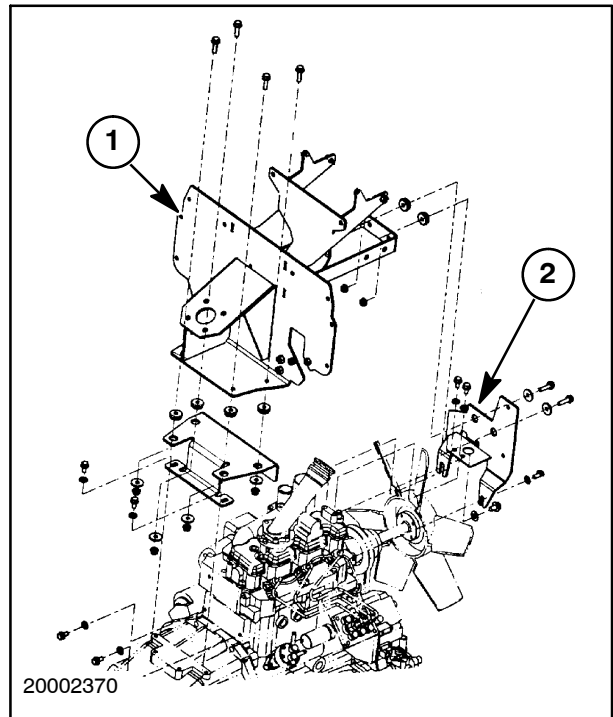
21

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 and the bottom radiator hoses.
9. Remove the radiator and the oil cooler (if equipped) from the tractor.



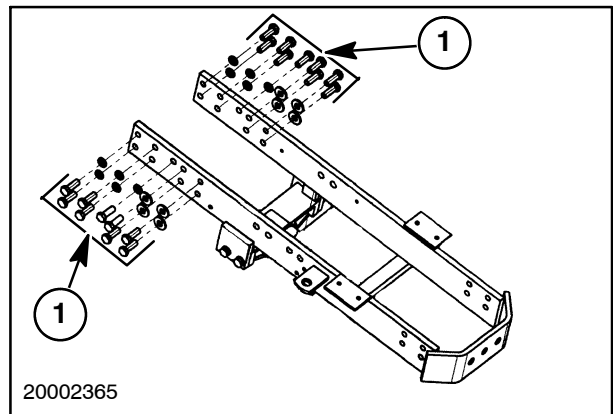
22

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.

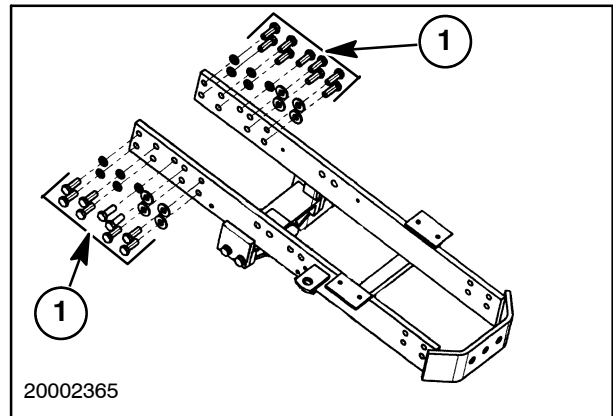


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Installation

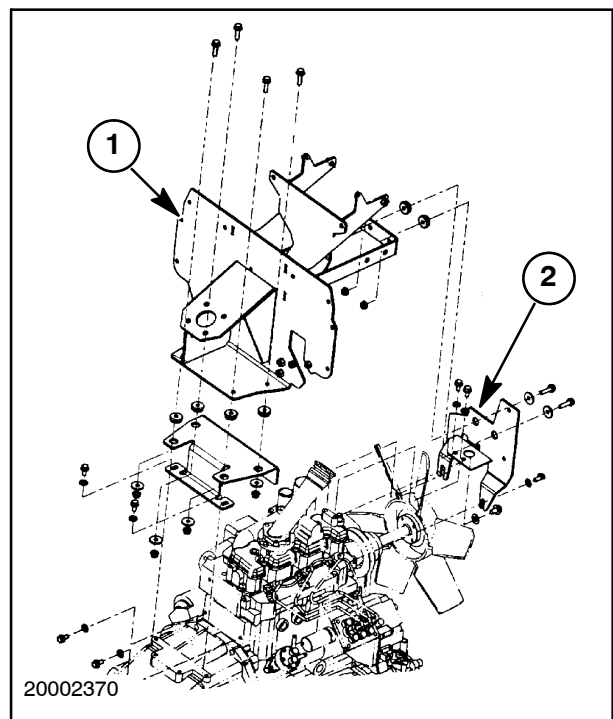
1. Attach a chain sling to the two hoist eyes on the engine.
2. Attach a suitable hoist to the chain sling and raise the hoist enough to support the engine.
3. Remove the engine from the engine stand.
4. Using the hoist, position the engine in the frame, aligning the mounting holes in the frame with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

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.



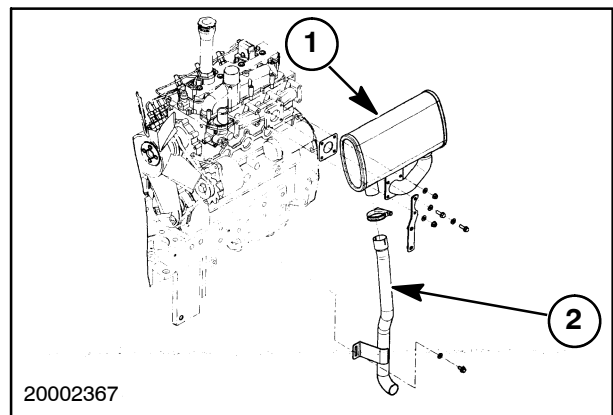
25

7. Install the firewall, 1, and the air cleaner mounting bracket, 2, onto the engine.
8. Install the radiator and the oil cooler (if equipped) onto the tractor frame.
9. Install the top and bottom radiator hoses.
10. Fill the radiator with new coolant to the proper level.



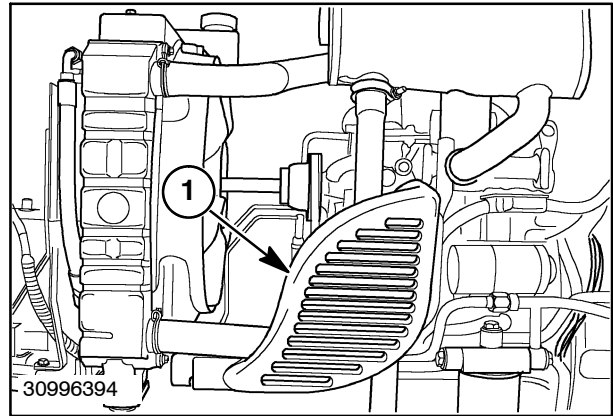
26

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



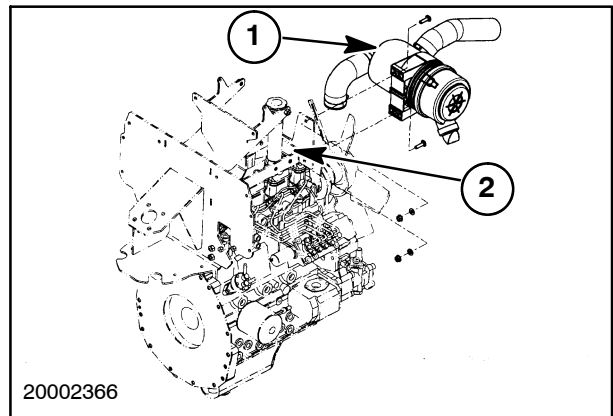
27

12. Install the muffler guard, 1, on the tractor.



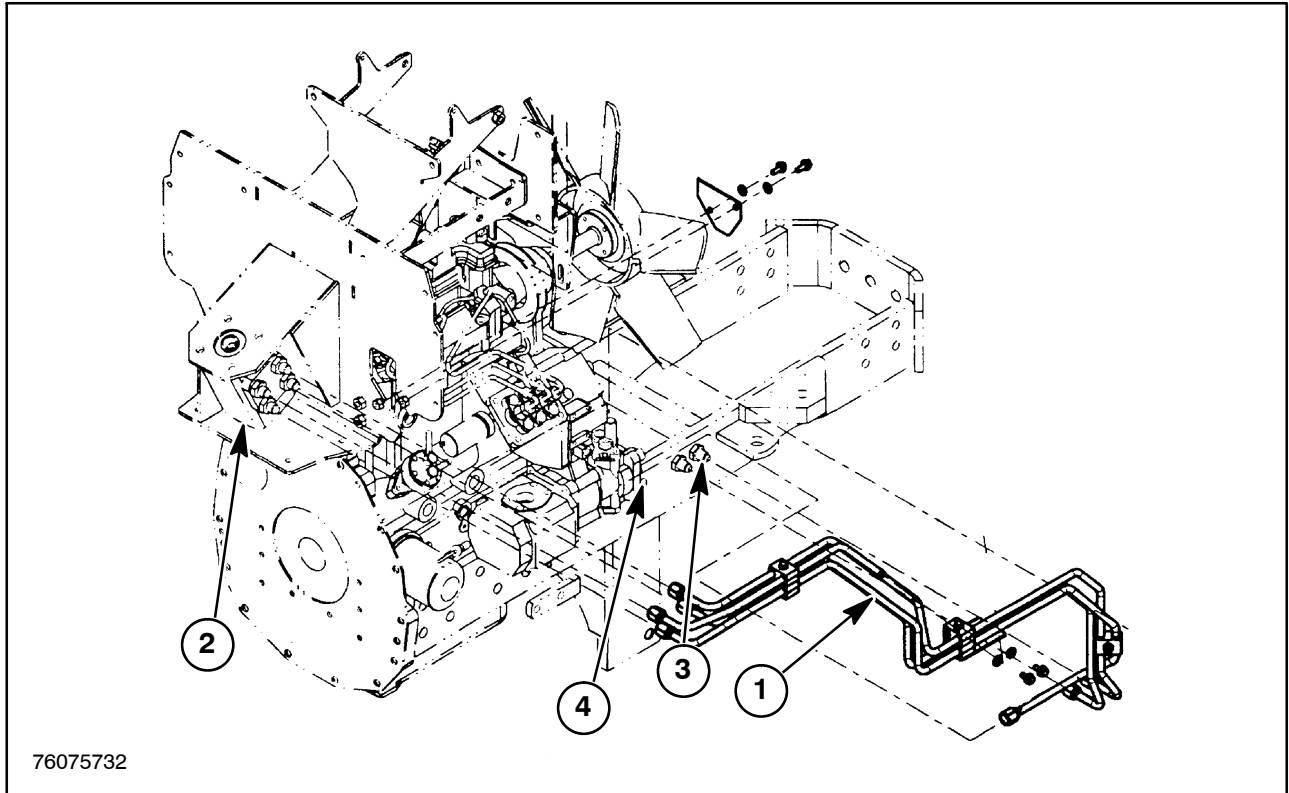
28

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.

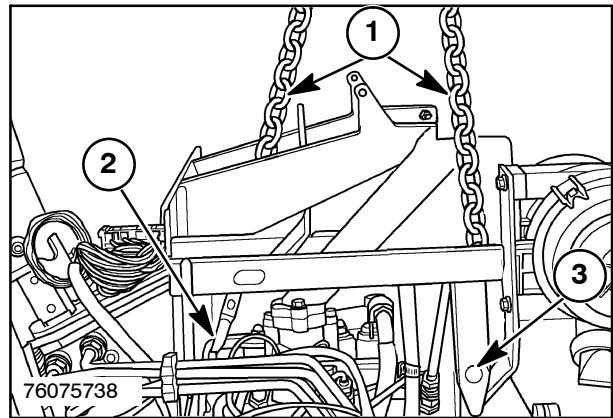


ATTACHING THE 12X12 TRANSMISSION TO THE ENGINE



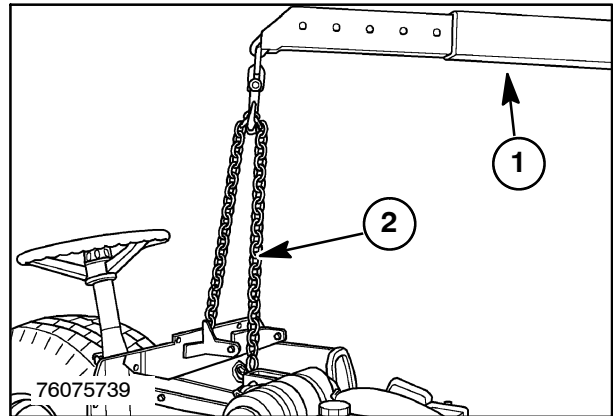
Do not use the buckle-up bolts to draw the drive train together with the engine. Severe damage to the drive train may result.

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



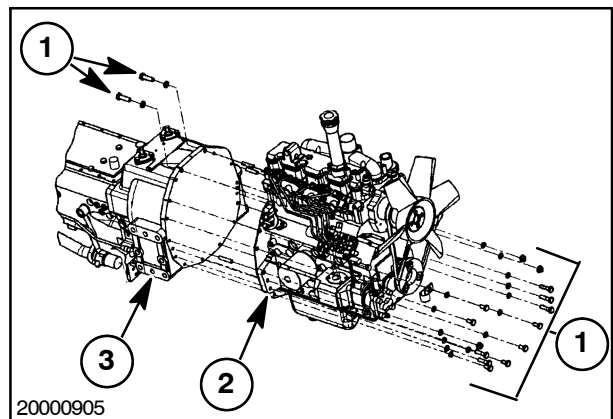
31

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 12x12 input shaft with the clutch and the engine flywheel. Rotate the engine fan to align the input shaft and the clutch/flywheel. The floor jack or the hoist may need to be raised or lowered to make alignment possible.



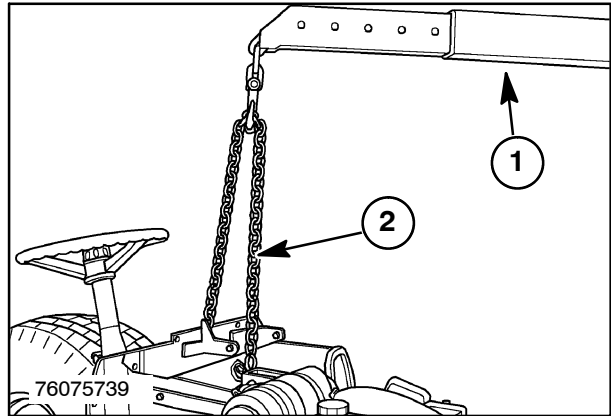
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4. Connect the clutch housing, 3, to the engine, 2, and install the buckle-up bolts, 1. Tighten the buckle-up bolts in a criss-cross pattern. Torque the M10 bolts and nuts to 32-41 ft-lbs Torque the two M12 bolts to 60 ft-lbs



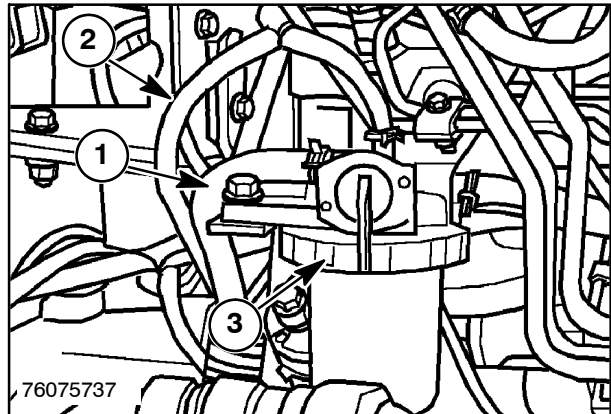
33

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



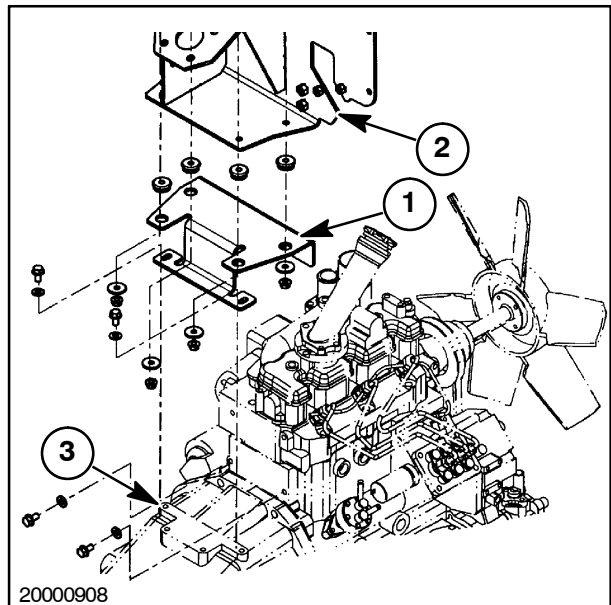
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6. Connect the fuel supply line, 1, to the fuel shutoff/filter, 3, and connect the fuel tank vent line, 2, to the tee fitting.



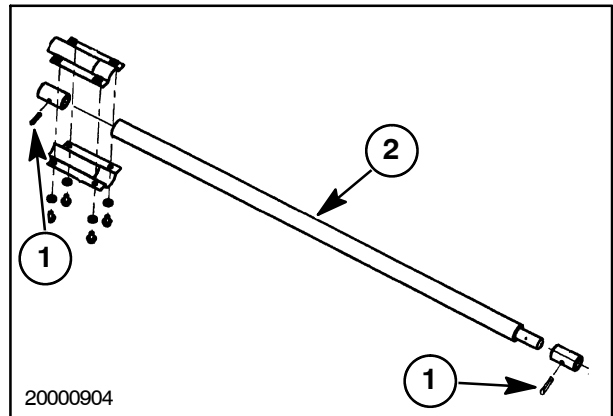
35

7. Attach the firewall support, 1, to the firewall, 2, and the clutch housing, 3. Secure with the retaining bolts.



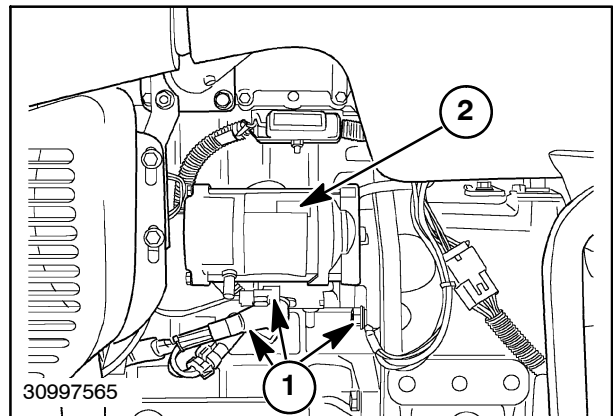
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8. If equipped, Install the FWD driveshaft, 2, and secure with the two roll pins, 1.



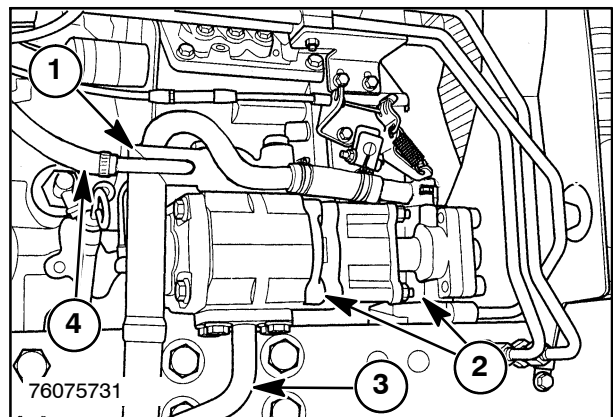
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9. Install the starter, 2, onto the engine, and secure with the retaining nuts. Connect the wires, 1, to the starter, 2.



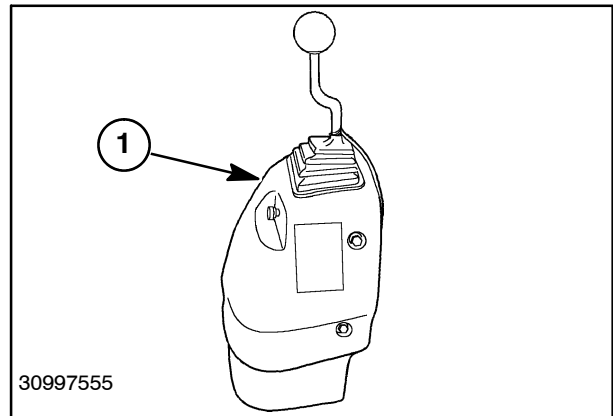
38

10. Install the hydraulic system pressure tube, 3, on the hydraulic pump, 2, and the diverter valve.
11. Install the hydraulic system inlet tube, 1, onto the hydraulic pump, 2, and connect the power steering return hose, 4, to the inlet tube, 1.
12. Connect the main wiring harness connector.
13. Install the left and right deck onto the tractor.
14. Connect the throttle cable to the foot throttle control lever located on the right deck.
15. Install the left and right fenders on the tractor.
16. Install the seat and the seat base on the tractor. Connect the seat safety start switch.
17. Install the light bars onto the fenders and the ROPS.



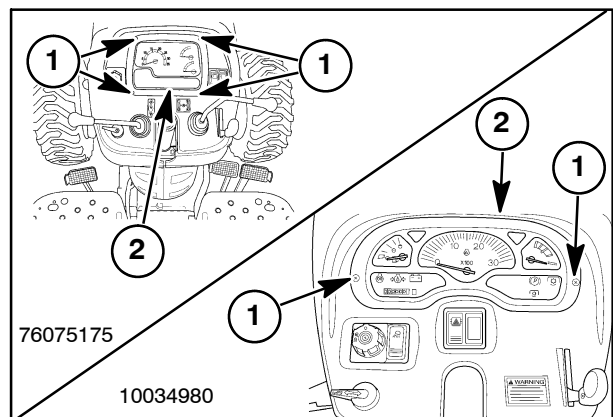
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18. If equipped, install the remote loader control valve, 1, on the right fender. Connect the hydraulic tubes.
19. Install the dash housing onto the tractor.
20. Connect the wiring connectors to the dash housing switches.
21. Connect the throttle cable to the dash mounted throttle control lever.



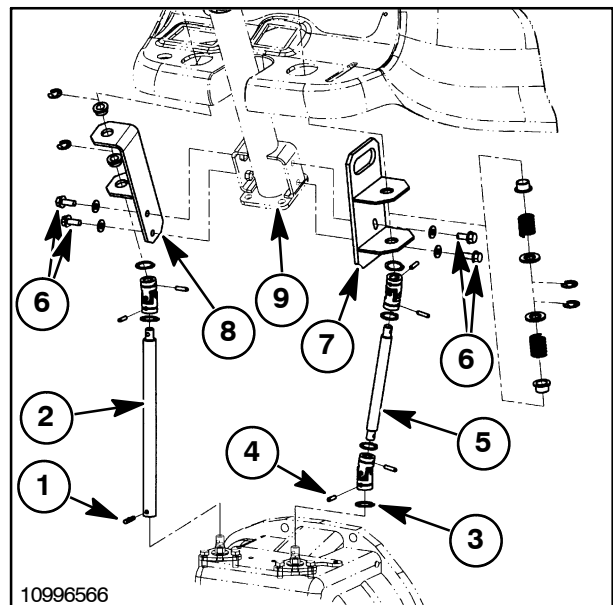
40

22. Connect the instrument panel wiring plug to the instrument panel. Install the instrument panel, 2, into the dash housing and secure with two or four screws, 1.



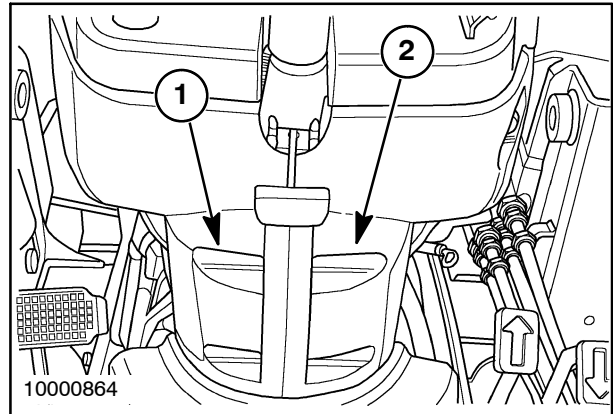
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23. Install the main shift and the shuttle shift control levers through the dash housing, and connect the main shift bracket, 7, and the shuttle shift bracket, 8, to the steering column, 9, with the retaining bolts, 6. Connect the lower main shift shaft, 5, and shuttle shift shaft, 2 to the transmission shafts with the roll pins, 4 and 1, and retaining ring, 3.
24. Install the hood on the tractor and connect the headlight wiring connector.



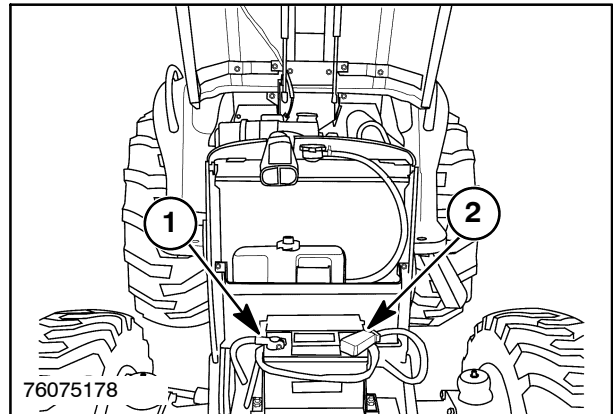
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25. Install the left, 1, and right, 2, rear hood side panels.
26. Fill the hydraulic reservoir with Hy-tran Ultra Hydraulic Fluid, to the proper level.
27. If the engine oil was drained, and the oil filter was removed during disassembly, install a new oil filter on the engine, and fill the engine with the recommended oil to the proper level.



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28. Connect the positive (+), 2, and the negative (-), 1, battery cables to the battery.
29. Check the fluid levels and start the tractor. Check for leaks and proper operation of all systems.
30. Make any adjustments necessary for proper operation of the tractor.



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OVERHAUL

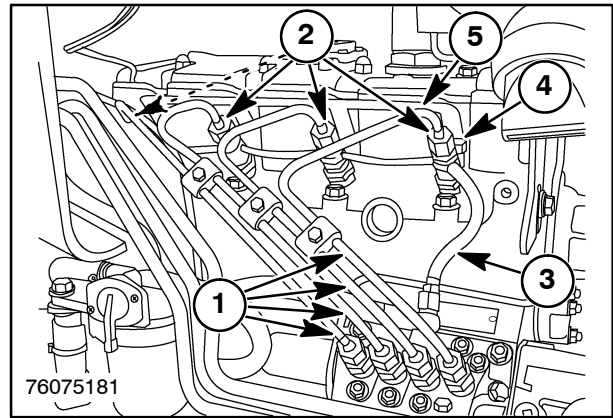
ENGINE

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

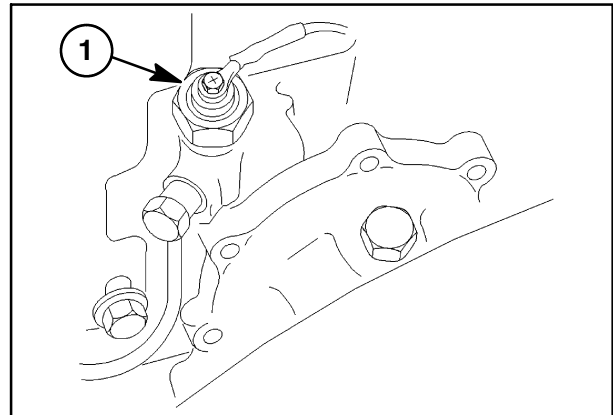
1. Clean all dirt and oil from the injectors and surrounding areas.
2. Disconnect the fuel lines, 1, from the injectors and cap all openings.
3. Remove the injector fuel leak-off line, 3.
4. Remove the injector assemblies, 2.
5. Remove the glow plug bus connector, 5, and remove the glow plugs, 4.



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OIL PRESSURE SWITCH

Remove the oil pressure switch, 1.

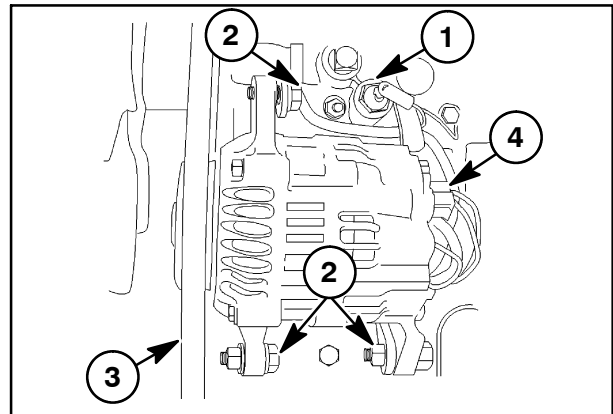


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TEMPERATURE SENDING SWITCH AND ALTERNATOR

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.



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