

FORD

Service Manual



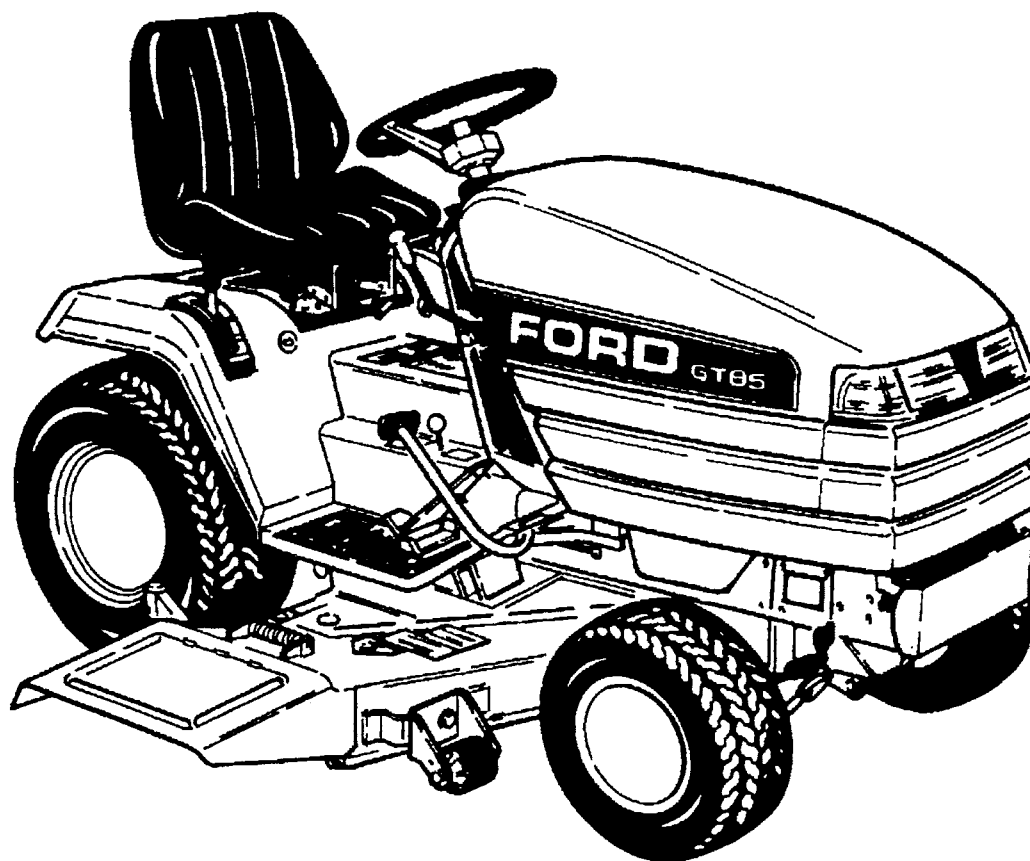
Lawn and Garden Tractor
GT65 and GT75 Diesel
GT85 and GT95 Gasoline

Section 1 – Engine Systems
 – Kohler Engine Service Manual

Section 2 – Fuel Systems

Vol. 1

40006540



FOREWORD

This manual provides information for the proper servicing and overhaul of the Ford GT tractor models and is an essential publication for all service personnel carrying out repairs and maintenance procedures.

The Manual is divided into ten Sections, each sub-divided into Chapters. Each Chapter contains information on general operating principles, detailed inspection and overhaul and, where applicable, troubleshooting, special tools and specifications.

The material contained in this Manual was correct at the time of going to print but Ford New Holland, Inc. Policy is one of continuous improvement and the right to change prices, specifications, equipment or design at anytime without notice is reserved. All data in this Manual is subject to production variations, so overall dimensions should be considered as approximate only and the illustrations do not necessarily depict the unit to standard build specification.

FORD NEW HOLLAND, INC.

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SECTION 1

ENGINE SYSTEMS

DIESEL ENGINE (GT65 AND GT75)

ENGINE AND LUBRICATION SYSTEM

DESCRIPTION AND OPERATION



FIGURE 1-1

GT Diesel Tractor (Ford GT65 Shown)

This chapter describes the overhaul and repair of the Ford GT65 and GT75 diesel engine.

The Ford GT65 and GT75 tractors, Figure 1-1, are equipped with a 3-cylinder in-line, four cycle, liquid cooled, overhead valve engine. The GT65 and GT75 engines are identified by code number E643 (GT65) and E673 (GT75). The code number is cast into the left side of the block and readily accessible for reference.

The GT65 engine has a 37.6 cu. in. (617 cc) displacement with a compression ratio of 23:1.

The GT75 engine has a 41.2 cu. in. (676 cc) displacement with a compression ratio of 24:1.

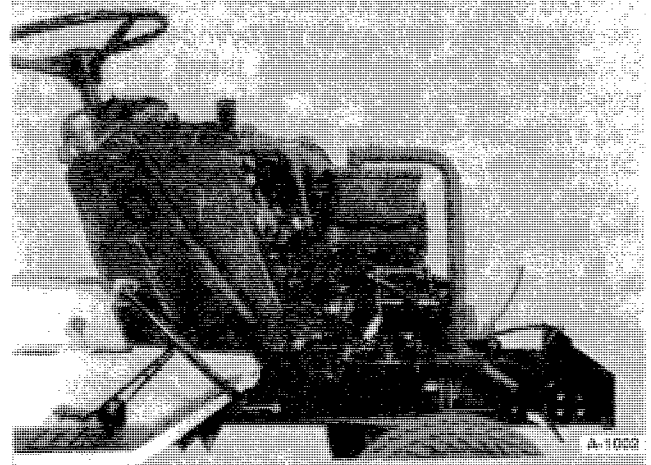


FIGURE 1-2

GT Diesel Engine

The engine is positioned in the tractor chassis in reverse position, i.e., with the engine (fan, radiator, water pump, etc.) facing the rear of the tractor as shown, Figure 1-2.

All reference to left, right, front and rear in this repair manual is made as follows:

WHOLE TRACTOR: All reference to the tractor are as viewed by the operator traveling in the forward direction.

ENGINE ONLY (Removed From Tractor): All reference to the engine when removed from the chassis is consistent with normal engine repair procedures. That is, with the water pump at the front and the flywheel at the rear of the engine.

CYLINDER HEAD AND VALVE TRAIN COMPONENTS

The cylinder head assembly includes the intake and exhaust valve assemblies, rocker shaft assembly and the pre-combustion chambers.

The intake manifold is incorporated into the valve cover assembly.

The exhaust manifold is an integral part of the muffler assembly.

The pre-combustion chamber is located between the injector assembly and the cylinder combustion chamber. Initial combustion takes place in the pre-combustion chamber. The expanding gases pass through drilled ports leading into the cylinder combustion area forming a swirl pattern of burning gases for a more complete and efficient burning of the air fuel mixture.

A glow plug located inside of the cylinder head extends into the pre-combustion area. When energized, the glow plug heats the incoming air/fuel mixture which provides improved starting for cold weather conditions.

CYLINDER BLOCK ASSEMBLY

The cylinder block assembly contains the pistons, connecting rods, crankshaft, timing gears and engine oil pump.

The crankshaft is supported by four main bearings. The front bearing is a full circle bearing located in the front casting wall of the engine block.

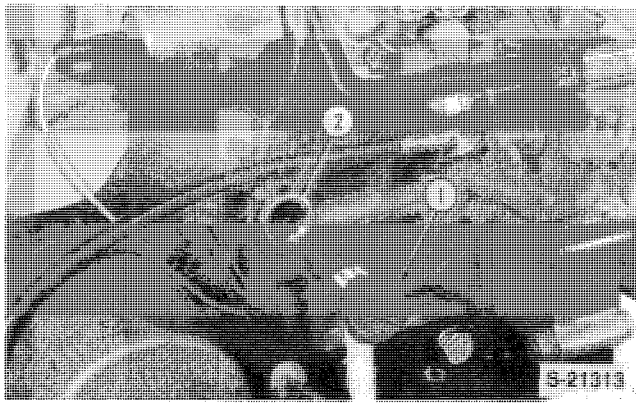
The second, third and fourth main bearings are split liners located in bearing holders bolted to the engine block.

The fourth main bearing holder is made of cast aluminum and has thrust bearing surfaces for controlling the crankshaft end play.

The camshaft assembly is supported on one roller bearing located at the center and two ball bearings located one on each end of the engine block.

The pistons are of three ring design consisting of two compression and one oil control ring.

The oil control ring uses a coil spring type expander.

**FIGURE 1-3****Engine Oil Relief Valve Location**

- 1 Relief Valve
- 2 Main Oil Gallery

LUBRICATION SYSTEM

The gerotor type oil pump is an integral part of the idler timing gear and is driven by the crankshaft gear. It is located in the front of the engine block and to the left of the crankshaft as viewed from the front of the engine.

OIL FLOW

Engine lubrication oil is picked up from the crankcase sump through a screen by the pump intake tube and drawn into a lower side drilling in the engine block to the oil pump. Oil pressurized by the pump then flows through passages in the block, past the relief valve, through the oil filter and returns to the main oil gallery in the block in the area of the drilled bolt located on the side of the block. Oil flow in the main oil gallery extends to the

four main bearing journals through passages in the crankshaft to the three connecting rod bearing journals. The remaining portion of the oil flow is directed through the external tube to the cylinder head. Oil flows from the external tube into a passage in the cylinder head to the front rocker shaft pedestal. The oil flows upward into the pedestal, through a roll pin that extends into the rocker shaft.

The roll pin serves to hold the rocker shaft in a fixed position and it also acts as a restrictor to maintain adequate oil pressure in the main oil gallery.

Oil seepage through the clearance between the rocker arms and the shaft overflows into the valve cover area and lubricates the valve stems, push rods and tappets. The relief valve, 1, Figure 1-3, is mounted in the side of the engine block and intersects the main oil gallery. When the oil pressure exceeds the rated pressure, oil is by-passed through the relief valve directly to sump through a passage in the engine block.

The cylinder walls, pistons and piston pins are splash lubricated by the crankshaft.

ENGINE OIL FILTER

Because engine oil becomes contaminated with dust, carbon particles, metal and sludge it is first directed through a filter before entering the lubrication system. The filter is a full flow type, whereby all the oil from the pump is routed through the filter. To protect the engine from loss of lubrication in the event of a plugged or restricted filter, a relief valve in the filter opens and permits unfiltered oil to flow through the system to maintain engine lubrication.

ENGINE OVERHAUL

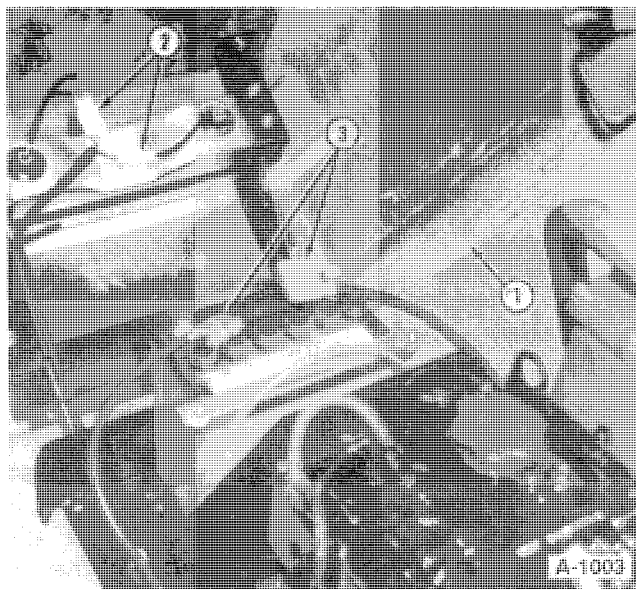


FIGURE 1-4

Engine Hood Removal

- 1 Hood
- 2 Headlight Connectors
- 3 Battery Cables

ENGINE REMOVAL

1. Raise the hood, 1, and disconnect the headlight wiring connector, Figure 1-4.
2. Remove the two bolts of hood pivot pins R.H. and L.H. and remove the hood from the tractor.
3. Drain the coolant from the radiator and engine block, Figure 1-5.
4. Disconnect the battery cables, 3, Figure 1-4 from the battery terminal posts.



WARNING: DISCONNECT THE NEGATIVE CABLE AT THE BEGINNING.

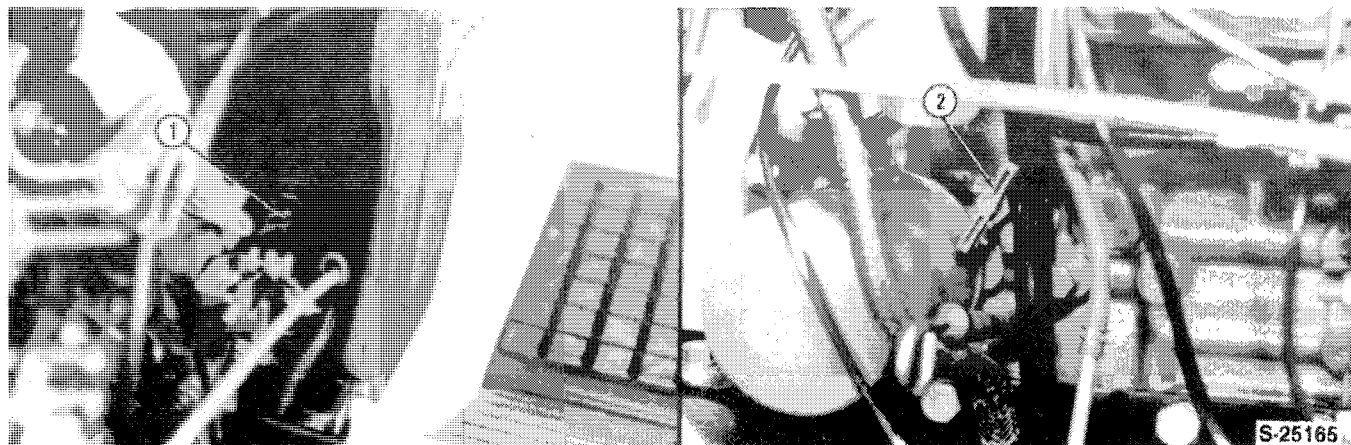


FIGURE 1-5

Coolant Drainage Locations

- 1 Radiator Drain Cock
- 2 Engine Block Drain Cock

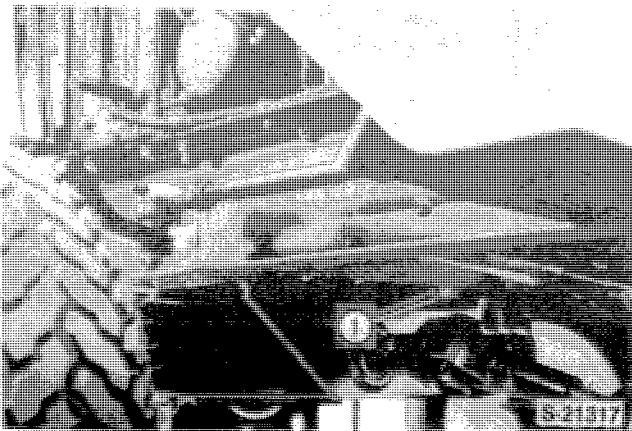


FIGURE 1-6

Crankcase Oil Drain

1 Drain Plug

5. Drain the engine crankcase oil, Figure 1-6.
6. Loosen the exhaust pipe clamp, 1, and fixed bolts, 3, and remove the exhaust pipe, 2, Figure 1-7.
7. Remove the air cleaner as follows:

Reference Figure 1-8.

- Loosen the intake tube clamps, 3, and remove the intake tube, 2,
 - Loosen the air cleaner hose clamps, 5, and remove the hose, 4,
 - Loosen the air cleaner canister retaining clamps, 6, and remove the air cleaner assembly from the mounting bracket.
 - Remove the mounting bracket bolts and spacers and remove the bracket, 1, from the cylinder head, Figure 1-9.
8. Remove the upper radiator hose, 7, Figure 1-8.
 9. Remove the injector fuel leak-off tube, 8, Figure 1-8.

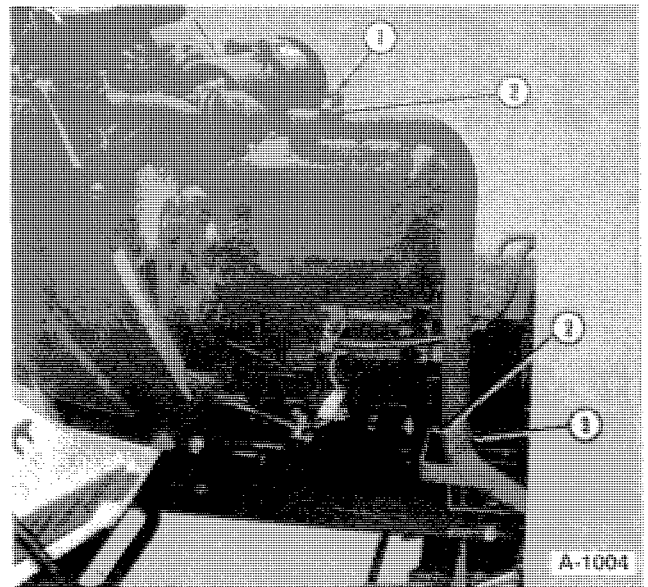


FIGURE 1-7

Exhaust Pipe Removal

- 1 Clamp
- 2 Exhaust Pipe
- 3 Bolt

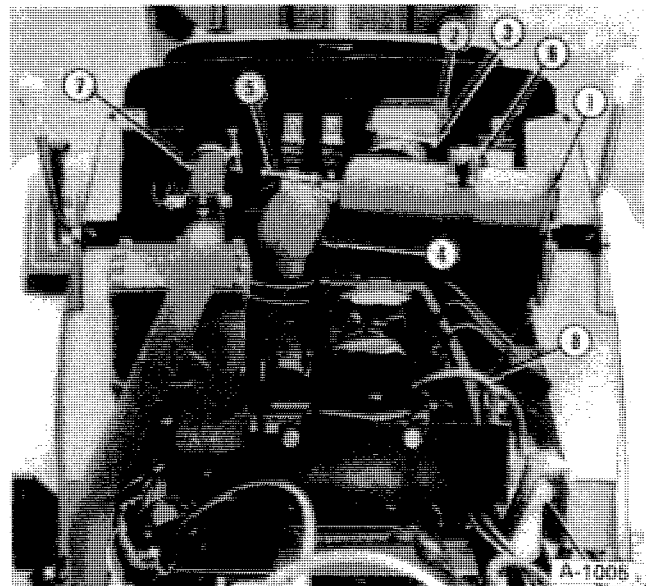


FIGURE 1-8

Air Cleaner Removal

- | | |
|------------------------|-------------------------------|
| 1 Air Cleaner Assembly | 6 Air Cleaner Retaining Strap |
| 2 Intake Tube | 7 Upper Radiator Hose |
| 3 Intake Tube Clamp | 8 Injector Leak-Off Tube |
| 4 Air Cleaner Hose | |
| 5 Air Cleaner Hose | |

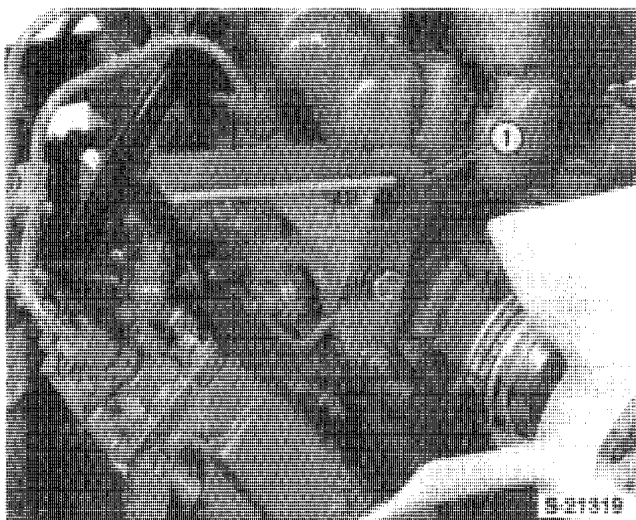


FIGURE 1-9

Air Cleaner Support Removal

- 1 Support Bracket

10. Disconnect the flexible fuel line hose, 1, from the fuel filter, Figure 1-10.

NOTE: If the fuel has not been drained from the fuel tank, pinch the flexible hose closed to prevent fuel leakage.

11. Disconnect the glow plug terminal wire, 1, Figure 1-11.
12. Disconnect the engine oil pressure sensor switch wire, 2, Figure 1-11.

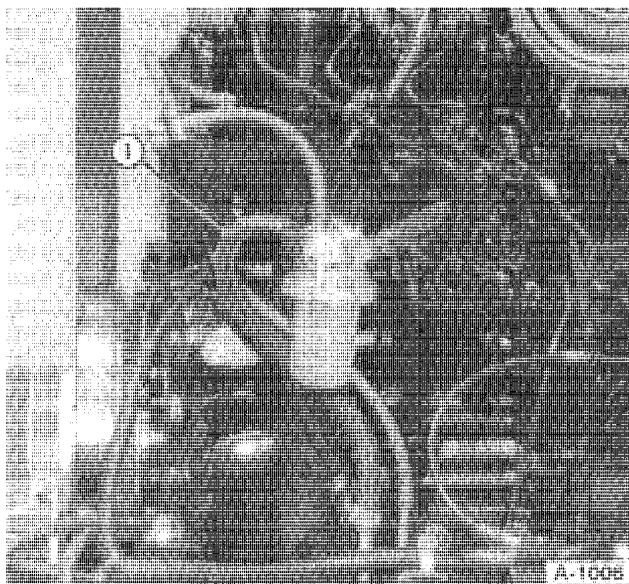


FIGURE 1-10

Fuel Line

- 1 Flexible Fuel Line

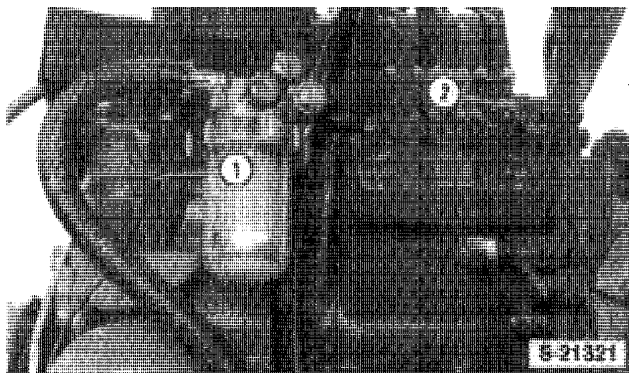


FIGURE 1-11

Glow Plug and Oil Pressure Wire Location

- 1 Glow Plug Terminal Wire
- 2 Oil Pressure Sensor and Wire

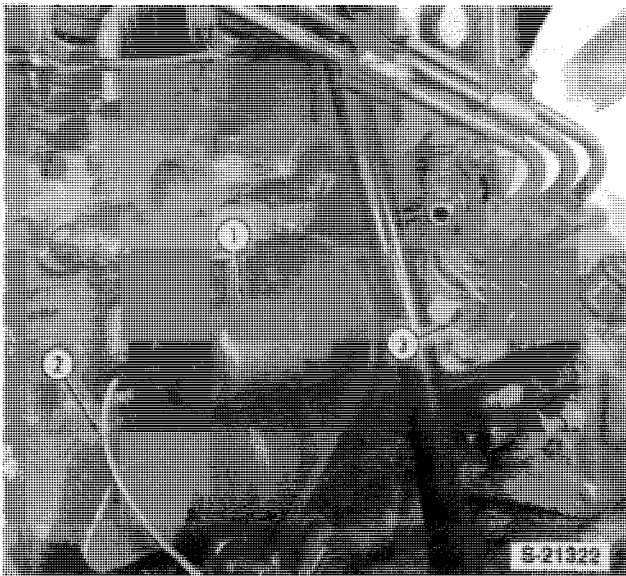


FIGURE 1-12

Engine Stop Solenoid

- 1 Solenoid
- 2 Solenoid Wire
- 3 Injection Pump

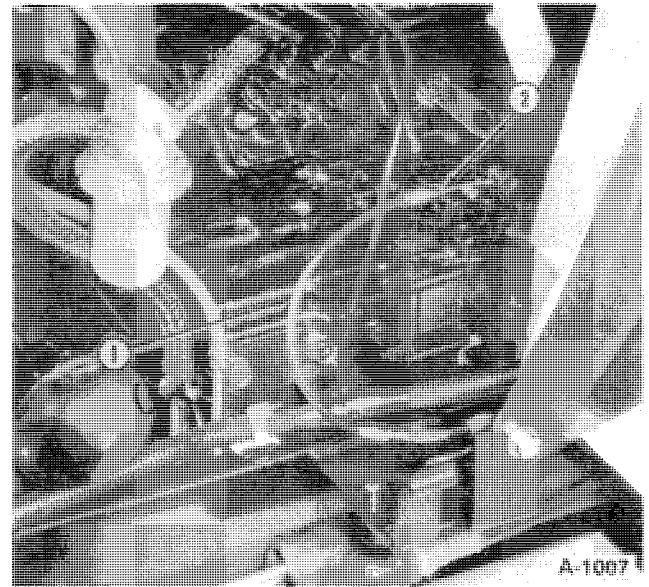


FIGURE 1-13

Throttle Cable Removal

- 1 Throttle Cable
- 2 "E"-Ring

13. Disconnect the wire, 2, from the injection pump solenoid stop control, Figure 1-12.
14. Remove the "E"-ring, 2, and remove the throttle control cable, 1, from the injection pump, Figure 1-13.
15. Disconnect the coolant temperature sensor wire, 1, from the sensor switch, Figure 1-14.
16. Remove the wires, 2, from the alternator assembly, Figure 1-14.
17. Remove the battery cable and wires, 3, from the starter motor, Figure 1-14.

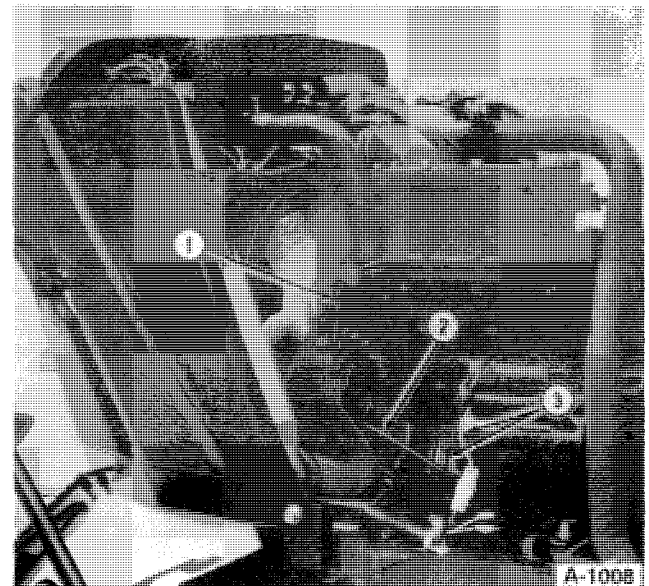


FIGURE 1-14

Engine Removal

- 1 Coolant Temperature Sensor Wire
- 2 Alternator Wires
- 3 Starter Motor Cable and Solenoid Wires

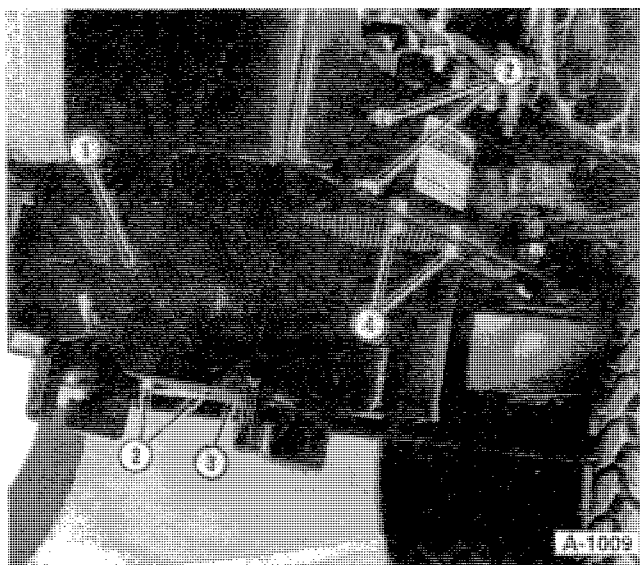


FIGURE 1-15

PTO Drive Shield Removal

- 1 Front Shield
- 2 Front Shield Mounting Bolts (6)
- 3 Lower Shield
- 4 Lower Shield Mounting Bolts (4)

18. Remove the PTO drive belts as follows:

Reference Figures 1-15 and 1-16.

- Remove the upper and lower shields, 1 and 3, Figure 1-15.
- Remove the cover.
- Loosen the belt guide bolts and slide the guides, 1, away from the belts, 3, Figure 1-16.
- Loosen the PTO control cable locknut, 4, Figure 1-16, and unscrew the locknut to allow maximum slack in the cable and conduit assembly.
- Remove the PTO tightener lower spring, 5,
- Disconnect the PTO cable from the tension spring, 6, Figure 1-16.
- Remove the drive belts, 2, from the pulleys.

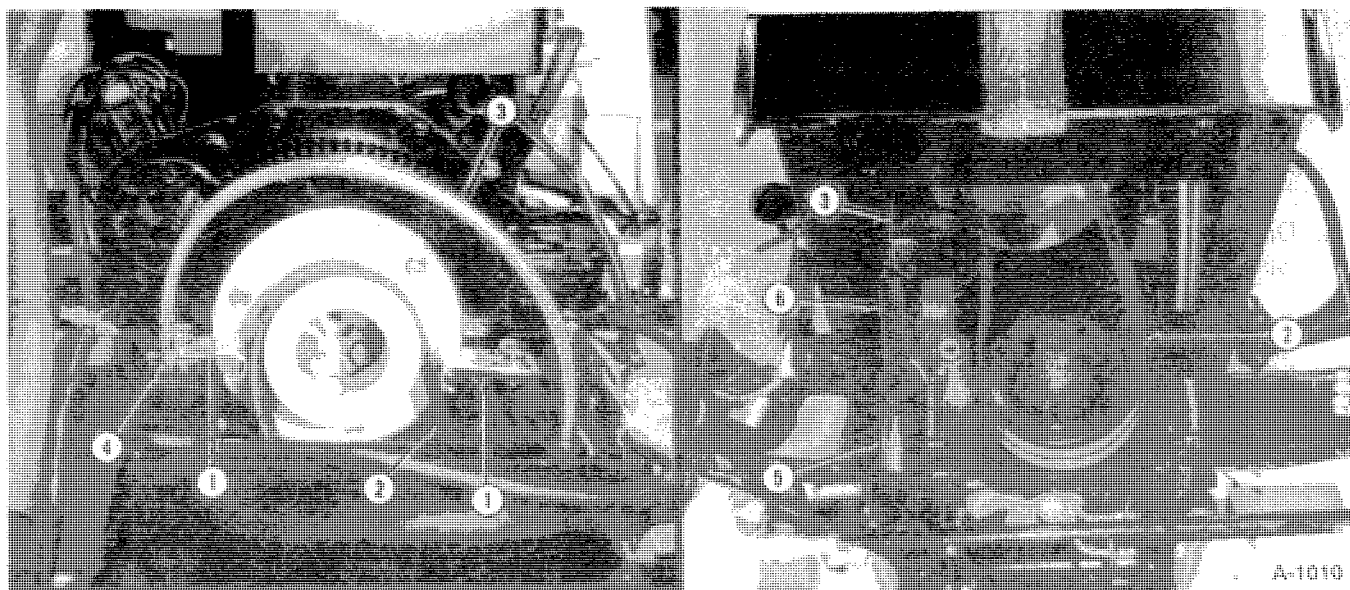


FIGURE 1-16

PTO Drive

- | | |
|---------------------|------------------------|
| 1 Belt Guide, 2, | 4 Locknut |
| 2 Belts (2) | 5 Lower Tension Spring |
| 3 PTO Control Cable | 6 Upper Tension Spring |

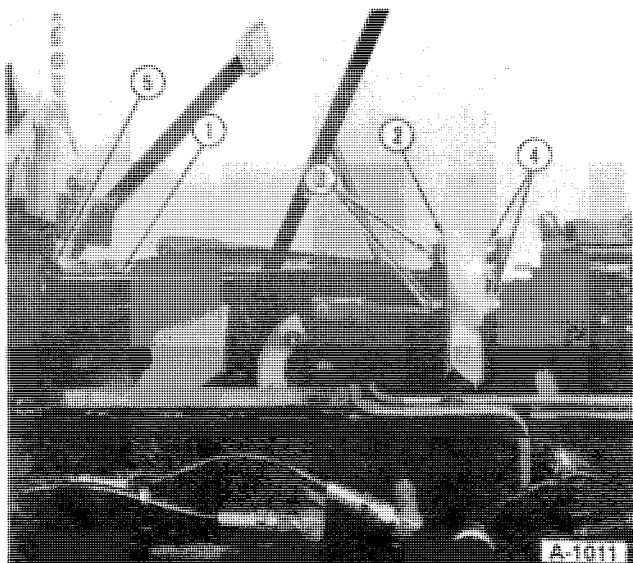


FIGURE 1-17

Transmission Drive and Coupling

- | | |
|---------------|--------------|
| 1 Drive Shaft | 4 Spacers |
| 2 Plate | 5 Pulley Hub |
| 3 Bolts | |

19. From under the tractor, remove the two transmission drive shaft coupling bolts, 3, and spacers, 4, Figure 1-17.
20. Remove the transmission drive shaft by sliding the shaft rearward to disengage the spline drive to the crankshaft pulley coupling, 5,
21. Remove the three air flow baffle mounting screws, and remove the baffle, 1, Figure 1-18.
22. Remove the two fan shroud mounting screws, 3, Figure 1-18.
23. Reposition the fan shroud so as to be clear of the radiator and side screens.

NOTE: Shown with sheet metal removed for clarity.

24. Attach an overhead hoist to the engine lifting brackets and take up the chain slack.
25. Remove the four engine base mounting nuts, 1, Figure 1-19.
26. Remove the ground cable from the frame mounting bolt.

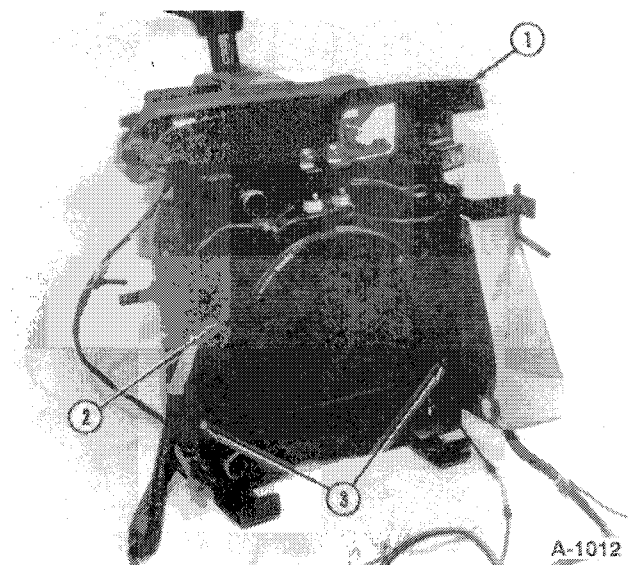


FIGURE 1-18

Fan Shroud and Air Baffle Removal

- | |
|-------------------------------|
| 1 Air Baffle |
| 2 Fan Shroud |
| 3 Fan Shroud Retaining Screws |

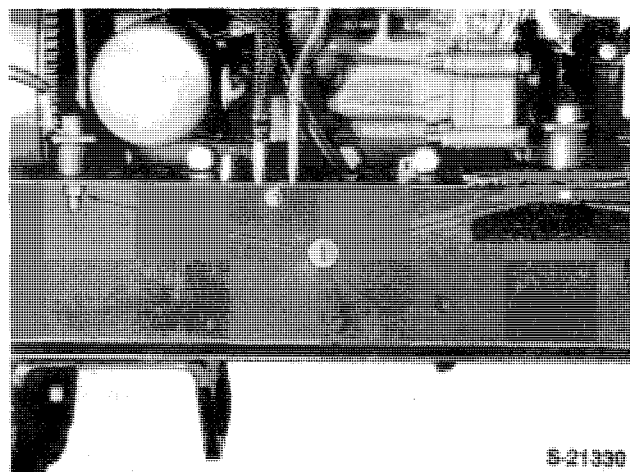


FIGURE 1-19

Engine removal

- | |
|-------------------------|
| 1 Engine Mounting Bolts |
|-------------------------|
27. Carefully lift the engine out of the tractor.

NOTE: Use care not to damage the engine fan or fan shroud due to the small amount of clearance available.

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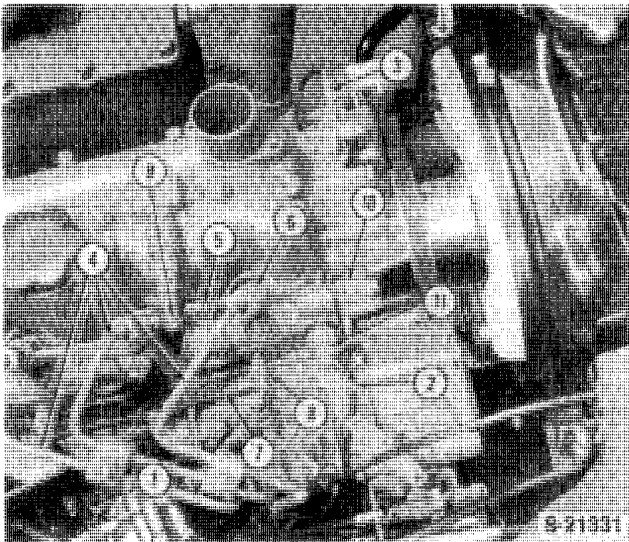


FIGURE 1-20

Engine Disassembly

- | | |
|-----------------------------------|---------------------------------|
| 1 Glow Plug Wire | 7 Glow Plug Connector Strap |
| 2 Oil Pressure Sensor Wire | 8 Glow Plugs |
| 3 Coolant Temperature Sensor Wire | 9 Vapor Vent Tube |
| 4 Injector Lines (3) | 10 External Oil Tube Banjo Bolt |
| 5 Fuel Leak-Off Line | 11 Oil Pressure Sensor Switch |
| 6 Injectors (3) | |

ENGINE DISASSEMBLY

NOTE: The cylinder head and related components can be serviced with the engine in place in the tractor.

1. Perform steps 1-5 and 7-10 under "Engine Removal" as described.
2. Disconnect the glow plug terminal wire, 1, Figure 1-20.
3. Disconnect the engine oil pressure sensor wire, 2, Figure 1-20.

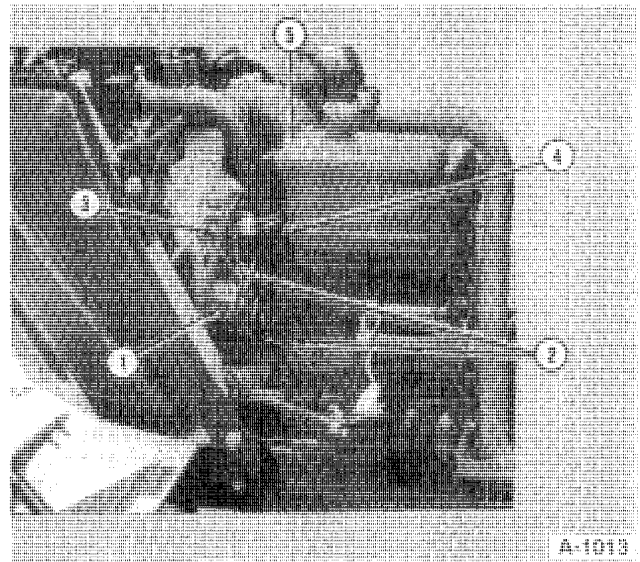


FIGURE 1-21

Engine Disassembly

- | |
|----------------------------|
| 1 Alternator Assembly |
| 2 Alternator Mounting Bolt |
| 3 Belt |
| 4 Thermostat Housing |
| 5 Muffler Assembly |

4. Disconnect the coolant temperature sensor wire, 3, from the temperature sensor, Figure 1-20.
5. Remove the injector lines, 4, and cap all openings.
6. Remove the vapor vent tube, 9,
7. Remove the external oil tube banjo bolt, 10, from the front of the head.
8. Loosen the alternator bracket bolt, 2, Figure 1-21. Then remove the belt from the alternator and fan pulley.