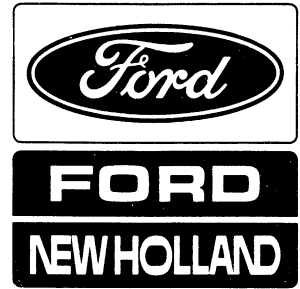
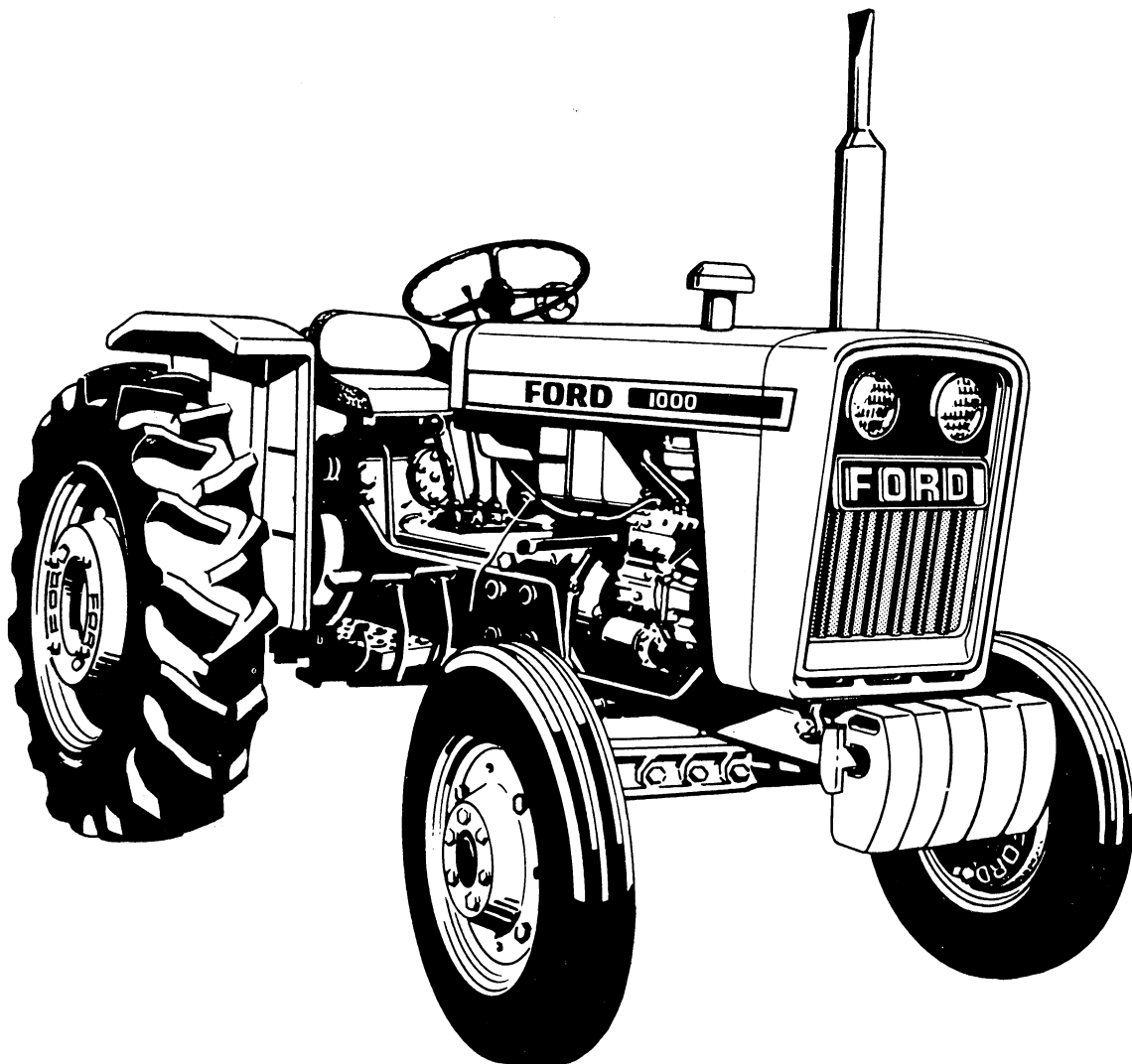


FORD

Service Manual



Tractors
1000, 1600



40100020

Reprinted

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Part 1

ENGINE

Chapter 1

ENGINE AND LUBRICATION SYSTEM

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1. DESCRIPTION AND OPERATION

The Ford 1000 engine is a two cylinder four cycle diesel engine. This part of the manual deals with the removal, disassembly, inspection and repair, and assembly of the engine and the lubrication system, plus the cooling system.

CYLINDER HEAD AND ROCKER ARMS

The cylinder head assembly incorporates the valves, valve springs, and rocker arm assembly. The cylinder head is retained to the block by six studs. This provides a four bolt circle for each cylinder.

There is one complete rocker arm and support assembly for each cylinder. The rocker arms are retained to the rocker shaft by snap rings. The rocker arm support is located on a stud in the cylinder head and is aligned by means of a roll pin in the head which protrudes into a counter bore in the base of the rocker arm support.

The cylinder head incorporates a pre-combustion chamber. The injectors are located in the cylinder head and spray fuel into the pre-combustion chamber.

CYLINDER BLOCK ASSEMBLY

The crankshaft is supported by two main bearings. The main bearings are full circle bearings and are press fit

bearings. The front bearing is located in a bore in the front of the block and the rear bearing is located in the flywheel cover. For proper alignment, the cover is dowelled to the block assembly.

There are also two thrust bearings controlling end movement of the crankshaft, one is on the flywheel cover and the other on the inside face of the front of the block. The thrust bearings are held in position by a roll pin.

The camshaft is mounted on the right side of the block assembly as viewed from the front of the engine. The camshaft is supported by ball bearings at each end. The rear of the camshaft is sealed with an O-ring which fits in a counterbore in the block and is held in position by the flywheel cover.

LUBRICATION SYSTEM

The oil pump assembly consists of a body, gear set, cover and drive gear. The oil pick up tube attaches to the rear of the body and extends into the sump. The body is located in a bore in the front of the block assembly below and to the left of the crankshaft location as viewed from the front. The gear set is positioned in the body and retained in position by the cover. The front cover is bolted to the oil pump body and to the block assembly. The oil pump drive gear is driven by the crankshaft gear.

Oil is picked up from the sump by the intake tube and drawn into the lower side of the oil pump body. Oil from the pump flows through passages in the block, past the relief valve, through the oil filter and returns to the area of the drilled bolt located directly above the oil pump. (The relief valve is mounted in the front of the block and intersects the main oil passage. When the oil pressure becomes higher than the rated value, page 30, oil is discharged through the relief valve and into the crankcase.) At this point, part of the oil is directed to the crankshaft front main bearing and passes through a drilling in the crankshaft to the No. 1 cylinder rod bearing. The remaining portion of the oil is directed through the external tube to the idler gear shaft. Inter connecting drilled passages in the idler gear shaft provide lubrication to the idler gear and connect with the external tube located between the idler gear shaft and the drilled bolt located above the camshaft. Oil flows from the tube and bolt to the main oil gallery. The main oil gallery flows the full length of the block assembly to the rear main bearing and

to the No. 2 cylinder rod bearing by way of the crankshaft. The crankshaft and rod bearings are lubricated by means of oil passages through the block to the main bearings. The crankshaft is drilled from the main bearing journals to the rod bearing journals for lubrication of the rod bearings.

The tappet bores are also located within the main oil gallery. Oil flows around the tappets for lubrication and into a cross drilling in the tappet. From here it flows through the center of the tappet and up the hollow push rod to the rocker arm assembly.

The adjusting screw and the rocker arm have drilled passages which provide pressurized lubrication to the rocker arm shaft. Controlled oil leakage at this point lubricates the valve stems. Oil flows from the top of the head back to the sump in the same manner as other Ford Tractor engines. Cylinder walls, pistons, and piston pins are splash-lubricated by the crankshaft.

2. ENGINE REMOVAL AND DISASSEMBLY

A. REMOVAL

1. Disconnect and remove the battery cables, the starter relay terminals, the headlight terminals, the oil pressure sensor terminals, glow plug terminals and the water temperature gauge, then remove the battery.
2. Remove the nuts, the wiring harness, the air cleaner cap, and unlatch the back of the hood panel and remove the panel.
3. Remove the cotter pin, washer, and accelerator rod.
4. Close the fuel tank valve, loosen the clamps, and remove the fuel pipe and return pipe. Then remove the fuel tank and base.
5. Loosen the hose clamps, nuts and bolts, and remove the radiator and hose.
6. Remove the hydraulic pump suction and delivery tubes.
7. Remove the cotter pin, nut and steering drag link from the pitman arm.
8. Support the tractor by placing a suitable jack under the clutch housing.

9. Install a chain hoist to the engine and raise the hoist until the chain is taut.
10. Remove the six bolts on each side of the front axle support and remove the entire front axle assembly.
11. Loosen the bolts and clamps and remove the muffler and air cleaner.
12. Remove the bolts retaining the cylinder block to the clutch housing and remove the engine.
13. Loosen the bolts and remove the pressure plate and clutch disc from the flywheel.

B. DISASSEMBLY

1. To remove the flywheel nut, raise the lock washer and remove the nut.
2. Remove the oil pressure sensor, Figure 1.
3. Pull out the oil level dipstick.
4. Remove the three bolts and the air cleaner flange.
5. Remove the injection pipes from the injectors.
6. Loosen the four nuts and remove the fan.

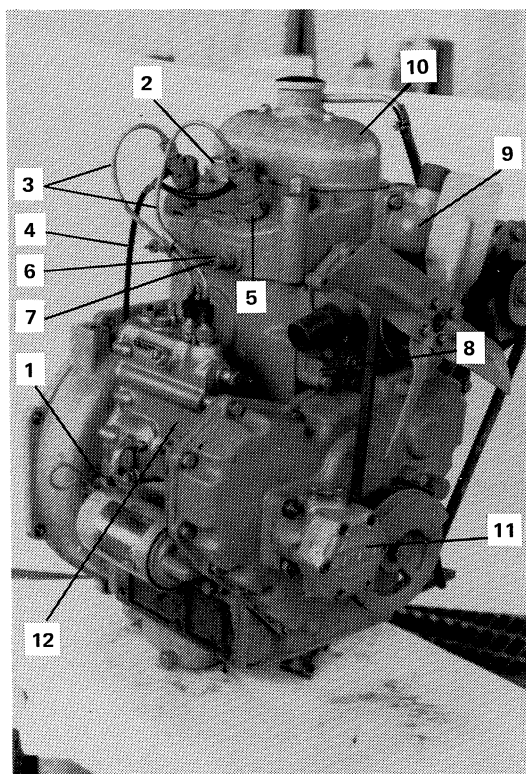


Figure 1
Engine External Components

- | | |
|------------------------|----------------------|
| 1. Oil Pressure Sensor | 7. Glow Plug |
| 2. Air Cleaner Flange | 8. Water Pump |
| 3. Injection Pipes | 9. Thermostat Cover |
| 4. Return Pipe | 10. Rocker Arm Cover |
| 5. Nozzle Holder | 11. Hydraulic Pump |
| 6. Glow Plug Connector | 12. Injection Pump |
7. To remove the alternator assembly, remove the adjusting plate holder nuts and take out the alternator assembly and V-belt.
 8. Remove the return pipe.
 9. Remove the nozzle holder.
 10. Disconnect and remove the glow plug assembly from the cylinder head.
 11. Remove the starting motor.
 12. Remove the six bolts and the water pump.
 13. Remove the thermostat cover.
 14. Remove the nuts and the rocker arm cover assembly.
 15. Loosen the center nut and remove the rocker arm assembly and push rods, Figure 2.

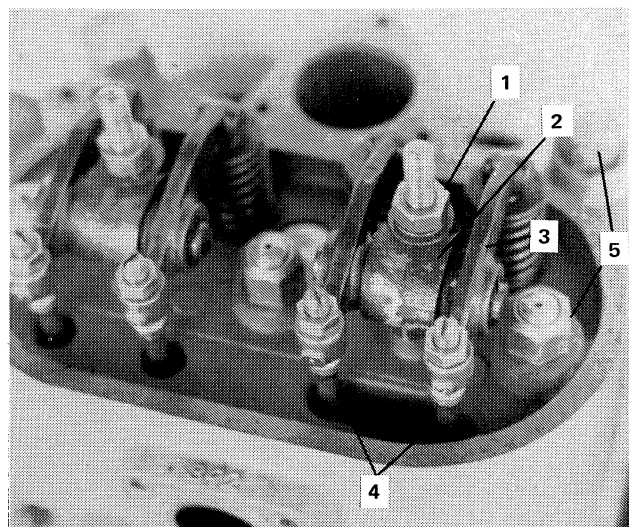


Figure2
Rocker Arm Assembly

- | | |
|-----------------------------|-----------------------|
| 1. Center Nut | 4. Push Rods |
| 2. Rocker Arm Shaft Support | 5. Cylinder Head Nuts |
| 3. Rocker Arm | |
16. Loosen the nuts evenly and remove the cylinder head and gasket from the cylinder block.
 17. Remove the oil filter.
 18. Remove the bolts and the crankshaft pulley and key.
 19. Loosen the nuts and lockwashers and remove the hydraulic pump.
 20. Remove the bolts and timing gear cover.
 21. Remove the nut and the oil pump gear and key, Figure 3.
 22. Loosen the nut and remove the injector coupling.
 23. Remove the three bolts and the injection pump gear.
 24. Remove the nuts and camshaft gear.
 25. After removing the camshaft gear remove the bolt and tachometer assembly.
- NOTE:** The relief valve should be removed only when servicing of the valve is necessary.
26. Remove the bolts and idler gear, idler gear shaft and oil pipe.
 27. Remove the bolts and injection pump from the front plate.

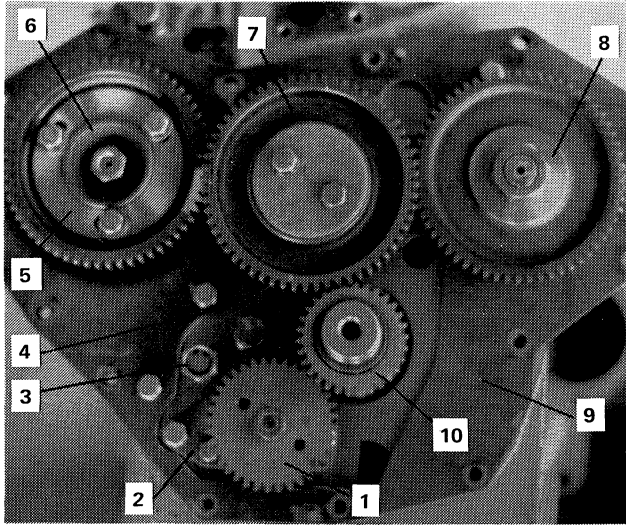


Figure 3
Timing Gears

- | | |
|------------------------|----------------------------|
| 1. Oil Pump Gear | 6. Injection Pump Coupling |
| 2. Oil Pump Assembly | 7. Idler Gear |
| 3. Relief Valve | 8. Camshaft Gear |
| 4. Oil Pipe | 9. Front Plate |
| 5. Injection Pump Gear | 10. Crankshaft Gear |

28. Loosen the bolts and remove the front plate.
29. To remove the flywheel, place a block of wood on the end of the crankshaft and tap with a hammer.
30. Turn the cylinder block upside down and remove the bolts and oil pan.
31. Remove the capscrews and oil suction filter, Figure 4.
32. Remove the two bolts and oil pump assembly.
33. Remove the bolts and bearing caps from the connecting rods. Then remove the piston and connecting rod assembly by tapping the assembly out towards the top of the cylinder block with a hammer handle, Figure 5.

NOTE: Before removing the piston assembly, it may be necessary to use a cylinder ridge reamer to remove any ridge or carbon from the top of each cylinder.

34. Remove the bolts and flywheel cover. Take care not to damage the thrust bearing or oil seal.

35. Remove the crankshaft from the rear of the block.
36. Remove the rear camshaft bearing and the camshaft.
37. Pull out the tappets from the bottom of the cylinder block.

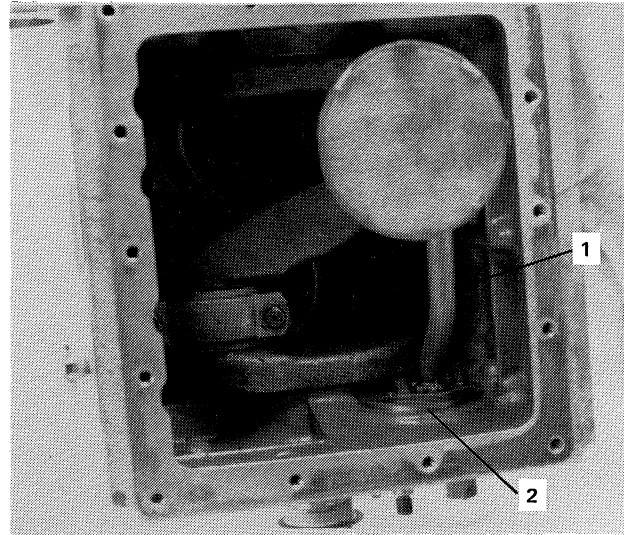


Figure 4
Oil Pump and Suction Filter

1. Oil Suction Filter

2. Oil Pump

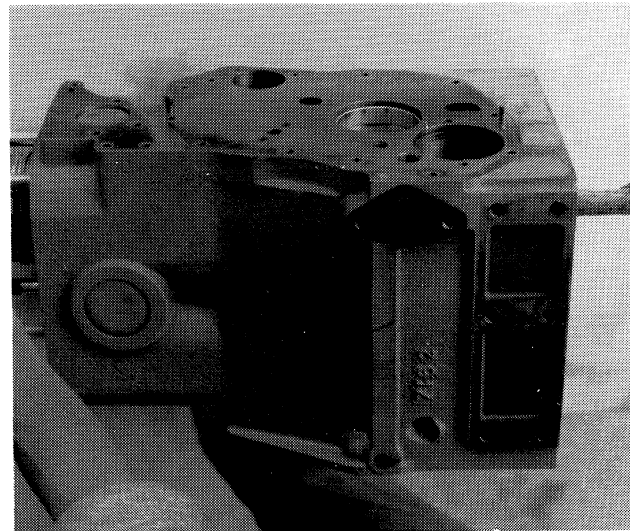


Figure 5
Piston and Connecting Rod Removal

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