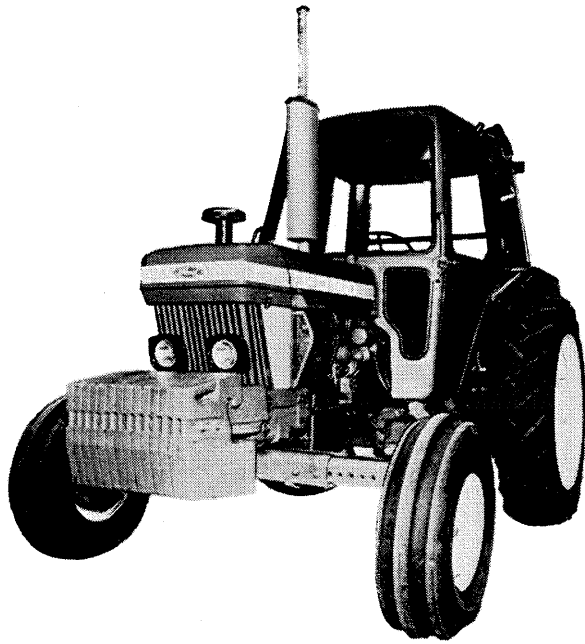


FORD

TRACTOR REPAIR MANUAL VOLUME 1



Tractor Operations
FORD MOTOR CO.

PART 1 ENGINE SYSTEMS

Chapter 1 DIESEL ENGINES

Section	Page
A. DIESEL ENGINE—DESCRIPTION AND OPERATION	1
B. DIESEL ENGINE—OVERHAUL	4

A. DIESEL ENGINE—DESCRIPTION AND OPERATION

This Chapter describes the overhaul and repair of the Ford Tractor direct injection diesel engines. The Chapter covers the 3 and 4-cylinder engines, the latter in both the normally aspirated and turbocharged forms, Figures 1, 2, 3 and 4.

All the engines are of similar design and hence service procedures are basically common throughout the range. The major difference between the engines is that the 4-cylinder units are fitted with a dynamic engine balancer and the Ford 7610 and 7710 engines are turbocharged.

The engines feature cross flow cylinder heads with the inlet and exhaust manifolds on opposite sides of the head. The combustion chamber is formed in the crown of the piston which has three compression and one oil control ring, all located above the piston pin.

The cylinder head assembly incorporates the valves, valve springs and spring retainers. Valve guides are an integral part of the cylinder head with replaceable valve seats pressed into the valve ports.

The following chart shows the 3 and 4-cylinder diesel engine options available.

Model	Ford 2610	Ford 3610	Ford 4110	Ford 4610	Ford 5610	Ford 6610 & 6710	Ford 7610 & 7710 (Turbo-charged)
No. of Cylinders	3	3	3	3	4	4	4
Bore	4.2 in. (106.7 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)
Stroke	4.2 in. (106.7 mm)	4.2 in. (106.7 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)	4.2 in. (106.7 mm)	4.4 in. (111.8 mm)	4.4 in. (111.8 mm)
Displacement	175 in ³ (2868 cm ³)	192 in ³ (3147 cm ³)	201 in ³ (3294 cm ³)	201 in ³ (3294 cm ³)	256 in ³ (4195 cm ³)	268 in ³ (4393 cm ³)	268 in ³ (4393 cm ³)

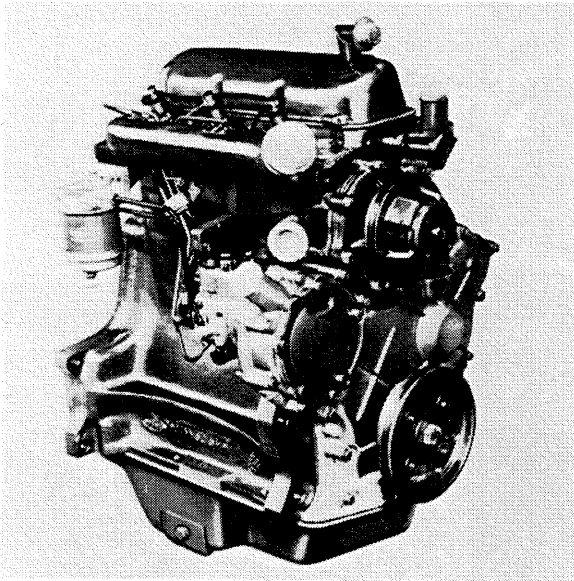


Figure 1

3-Cylinder Diesel Engine with Distributor Type Fuel Injection Pump

The crankshaft is supported in the cylinder block by four main bearings for the 3-cylinder engine and five main bearings for the 4-cylinder engine. Crankshaft end thrust is suppressed by a thrust bearing located on the second main bearing of the 3-cylinder engine and the centre (third) main bearing of the 4-cylinder engine.

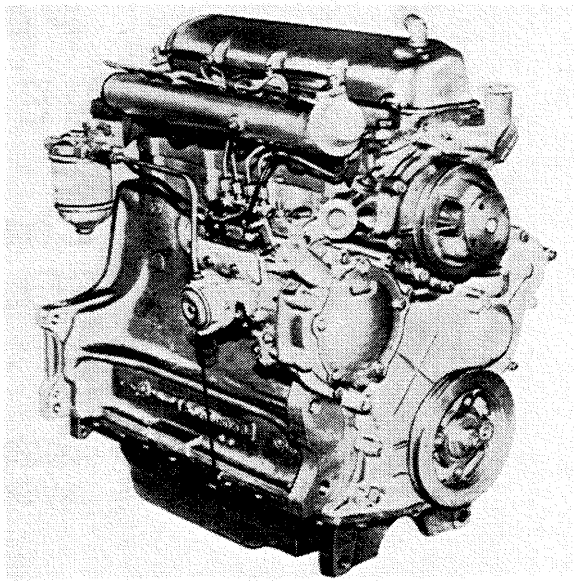


Figure 3

4-Cylinder Diesel Engine with In-Line Type Fuel Injection Pump

Front and rear crankshaft oil sealing is effected by one piece, single lip type seals.

The crankshaft rear main bearing carrier block is sealed by two composition type side seals and a gasket positioned between the block and the engine rear adaptor plate.

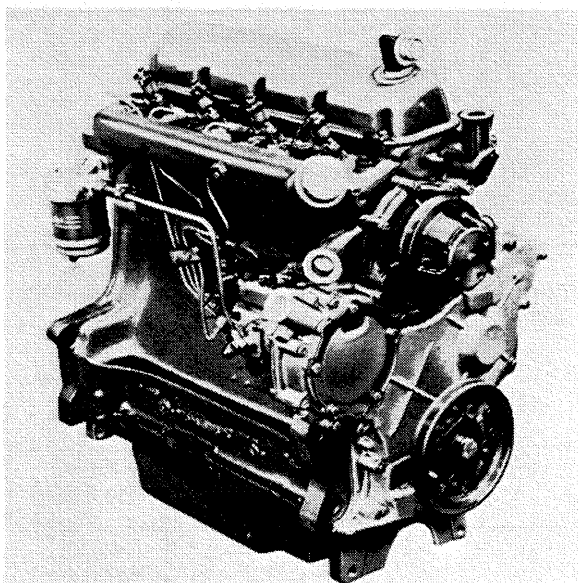


Figure 2

4-Cylinder Diesel Engine with Distributor Type Fuel Injection Pump

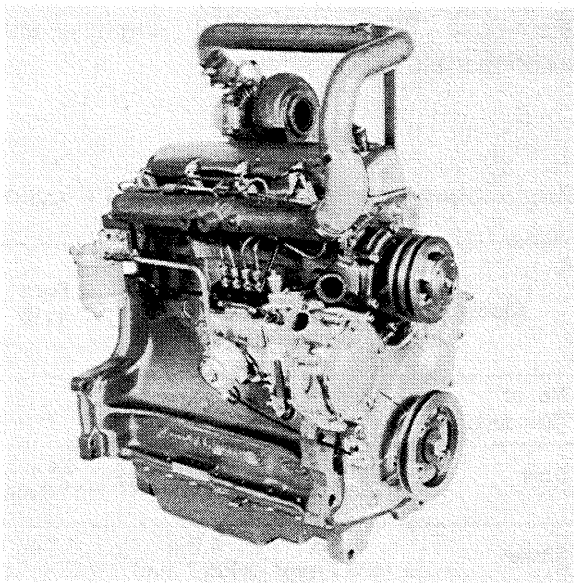


Figure 4

4-Cylinder Turbocharged Diesel Engine with In-Line Type Fuel Injection Pump

A crankshaft driven dynamic balancer, installed on the 4-cylinder engines, counteracts out-of-balance forces and thereby reduces engine vibration. The balancer housing is bolted to the bottom of the cylinder block and contains two meshing gears which are driven and timed from a gear machined on the crankshaft.

The piston connecting rods are of 'I' section and for the turbocharged engines a centrally drilled hole facilitates both pressure lubrication of the piston pin bushing and cooling of the piston crown.

The fully floating piston pin is retained in the piston by two snap rings.

LUBRICATION SYSTEM

Lubrication of the engine is maintained by a rotor type oil pump mounted at the base of the engine block. The oil pump is driven from the camshaft and draws oil from the engine sump through a wire mesh screen.

A spring loaded relief valve in the pump body limits the pressure in the system by directing excess oil back to the intake side of the pump.

Oil passes from the pump to an external, throw-away, spin on type filter incorporating a relief valve which permits oil to be bypassed, if filter blockage occurs, and so ensures engine lubrication at all times.

Oil flows from the filter to the main oil gallery which runs the length of the cylinder block and intersects the camshaft follower chambers.

The main gallery also supplies oil to the crankshaft main bearings and to the connecting rod journals via drillings in the crankshaft. Drilled passages from each main bearing direct oil to the camshaft bearings.

The camshaft drive gear bushing is pressure lubricated through a drilled passage from the front main bearing. The gear has small oil passages machined on both sides which allow the oil to escape.

The timing gears are lubricated by oil from the cam follower chamber and the pressure lubricated camshaft drive gear bushing.

On the 4-cylinder engines, the dynamic balancer is lubricated through a drilled passage from the cylinder block intermediate thrust bearing web to the balancer housing. Oil flows through the balancer housing to the drilled balancer gear shafts and onto the bushings in the balancer gears.

Cylinder walls, pistons and piston pins are splash lubricated by the connecting rods and rotating crankshaft.

An intermittent flow of oil is directed to the valve rocker arm shaft assembly via a drilled passage in the cylinder block located vertically above the No. 1 camshaft bearing. This drilling aligns with a corresponding hole in the cylinder head. As the camshaft turns, holes in the camshaft and camshaft bearing align and a regulated stream of oil is directed to the cylinder head and on up the rocker arm shaft support bolt to the rocker shaft. The oil flows from the shaft through drilled holes in each rocker arm bushing to lubricate both ends of the arms. Excess oil flows down the push rods and assists in lubricating the cam followers before draining back into the sump through cored openings in the block.

For the Ford 6610, 6710, 7610 and 7710 engines, a water-to-oil type oil cooler, located in the base of the radiator is connected into the lubrication system main oil gallery and cools a proportion of the circulating oil. A restrictor at the oil outlet limits the flow to the cooler and maintains internal lubrication at low engine speeds. Return oil from the cooler is fed back to the engine sump via a pipe tapped into the skirt of the cylinder block.

B. ENGINE—OVERHAUL

CYLINDER HEAD, VALVES AND RELATED PARTS

REMOVAL

NOTE: *The cylinder head can be removed with the engine installed in the tractor.*

1. Disconnect the battery.

Ford 2610, 3610, 4110, 4610, 5610, 6610 and 7610:

- Remove the battery and battery tray.
- Remove the vertical muffler (where fitted).

2. Drain the radiator and cylinder block.

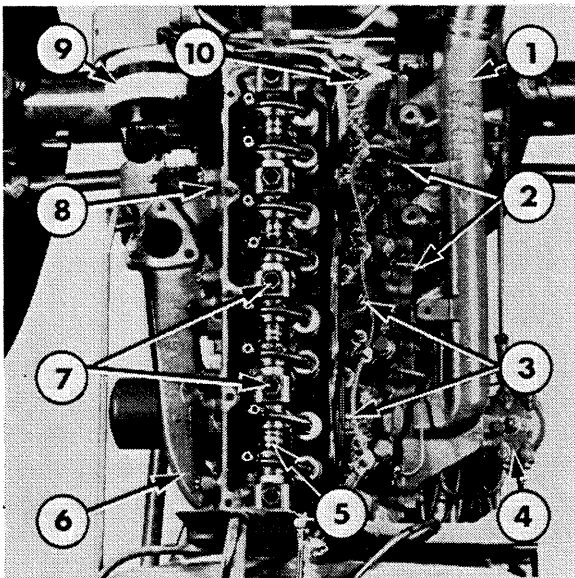


Figure 5

4-Cylinder Engine with Rocker Arm Cover Removed

1. Intake Manifold
2. Injection Tubes
3. Leak-Off Tubes
4. Fuel Filter
5. Rocker Shaft Assembly
6. Exhaust Manifold
7. Rocker Shaft Retaining Bolts
8. Tab Washer
9. Alternator
10. Cold Start Tube

3. Shut off the heater hose taps then disconnect and plug the heater hoses.
4. Remove the radiator top hose.
5. Shut off the main fuel tank tap.

Ford 2610, 3610, 4110, 4610, 5610, 6610 and 7610:

- Remove the hood panel assembly.
- Remove the radiator shell support.
- Remove the two bolts securing the fuel tank to the hood rear support.
- Disconnect the horizontal type exhaust pipe (where fitted) from the exhaust manifold.
- Disconnect the air inlet hose at the clamp at the intake manifold.

Ford 6710 and 7710:

- Remove the main fuel tank. See "FUEL SYSTEMS"—Part 2.
6. Disconnect and remove the rocker cover ventilation tube.

Ford 7610 and 7710:

- Remove the turbocharger assembly. See "FUEL SYSTEMS"—Part 2.
7. Disconnect the alternator, oil pressure, temperature sender, air cleaner restriction indicator and cold start wiring harness connections (where fitted).

8. Remove the alternator and guard (where fitted), Figure 5.

Ford 2610, 3610, 4110, 4610, 5610, 6610 and 6710:

- Remove the vertical type exhaust pipe and bracket (where fitted).

9. Bend the lock tabs back, withdraw the attaching bolts and remove the exhaust manifold and gasket.
10. Disconnect the cold start equipment (where fitted).
11. Remove the injector lines from the fuel injection pump and the injectors. Cap the exposed openings in the pump, injectors and tube ends.
12. Disconnect the fuel lines and remove the fuel filter(s) from the inlet manifold.
13. Withdraw the retaining bolts and lock-washers and remove the inlet manifold and gasket.

Ford 6710 and 7710:

- Place a block under the hood frame rear support and remove the four bolts attaching the support to the rear of the cylinder head.
14. Withdraw the securing bolts and remove the rocker arm cover and gasket from the cylinder head.
 15. Hold the leak-off pipe at each injector and carefully disconnect the fuel injector leak-off pipes. Clean the area surrounding the fuel injectors then remove the bolts and carefully withdraw the fuel injectors and washers, Figure 6.
 16. Check the push rods for straightness by rotating the rods with the valve closed and identify any bent rods.

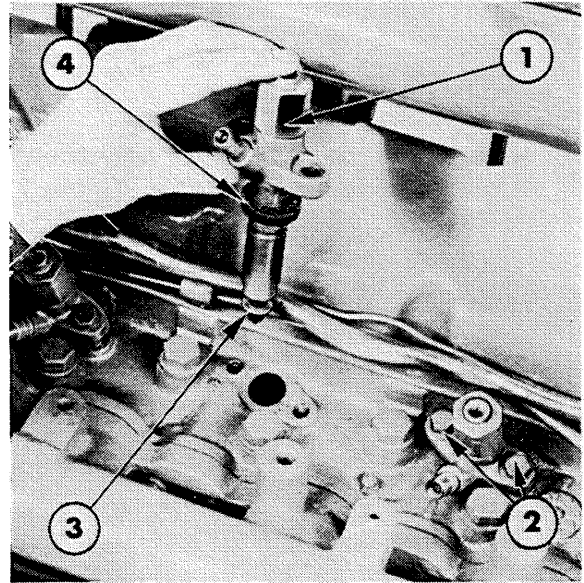


Figure 6

Fuel Injector Removed

1. Fuel Injector Assembly
2. Fuel Injector Mounting Bolts
3. Copper Washer
4. Cork Washer

17. Loosen the rocker shaft retaining bolts, which also serve as cylinder head bolts, evenly and alternately. Remove the rocker shaft assembly.

NOTE: Leave the bolts in the rocker shaft supports during removal as they retain the supports on the shaft.

18. Remove the push rods and place in a numbered rack.
19. Remove the remaining cylinder head bolts and washers working inwards from the ends to the centre of the head.
20. Lift the cylinder head from the block. If necessary lever the head off on the pads provided, taking care not to damage the cylinder head or block faces.

Thank you so much for reading.
Please click the “Buy Now!”
button below to download the
complete manual.



After you pay.

You can download the most
perfect and complete manual in
the world immediately.

Our support email:

ebooklibonline@outlook.com