

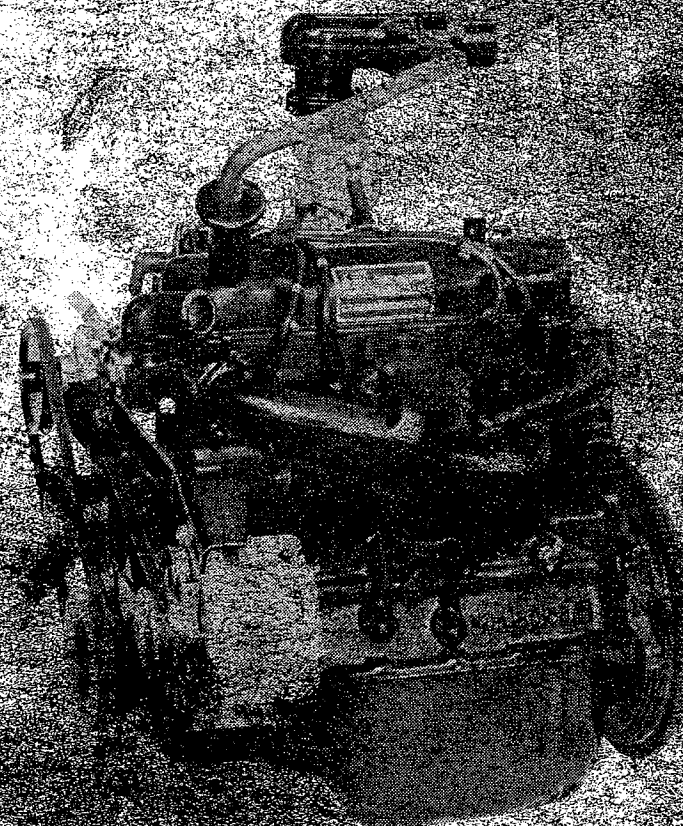


2274E

67 CID — 1100 C.C.

98 CID — 1600 C.C.

ENGINE SERVICE MANUAL



# Introduction

This Shop Manual provides the Service Technician with information for the proper servicing of the Ford 67 and 98 CID Industrial Engines.

In general, this manual covers the servicing of the engine and associated standard equipment. In many cases, engines are supplied with accessories and equipment that are unique to the application. If service information is ever required on such unique accessories or equipment, it is suggested that the Industrial Engine Operations of Ford Motor Company be contacted. The proper information will either be forwarded or the Service Technician will be advised where it can be obtained.

The information in this manual is grouped in sections according to the type of work being performed. The various sections are indicated in the Index. In addition, each section is subdivided to include topics such as diagnosis and testing, cleaning and inspection, overhaul, removal and installation procedures, disassembly and assembly procedures, and service specifications.

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*The descriptions and specifications contained in this manual were in effect at the time the book was released for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation.*

# 67 AND 98 CID GASOLINE ENGINES

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## PART 1 Basic Engine

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## IDENTIFICATION

An Identification Decal (Fig. 1) is affixed to the left side of the rocker cover of the engine. The decal contains the engine serial number which identifies this unit from all others. Next is the engine displacement which determines the engine specifications, then the model number and S.O. or special options which determines the parts or components required on this unit. Use all the numbers when seeking information or ordering replacement parts for this engine.

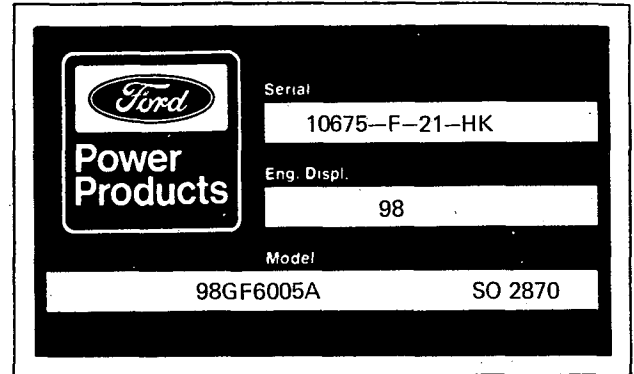


FIG. 1 Identification Decal

## DESCRIPTION

The 67 and 98 CID engines (Fig. 2) are a four cylinder, in-line, overhead valve unit operating on the four stroke cycle with cross-flow cylinder head and bowl-in-piston combustion chambers.

The cylinder bores are machined directly in the cast iron cylinder block, which is cast integral with the upper half of the crankcase, and are provided with full length water jacketing.

The cast iron crankshaft runs in five large diameter main bearings fitted with steel-backed copper/lead or lead/bronze bearing liners.

End-play and thrust are controlled by half-thrust washers located in the cylinder block on either side of the center main bearing.

Seals pressed in the front cover and the rear oil seal carrier prevent oil leaks from the front and rear of the crankshaft. The front seal runs on the pulley hub while the rear seal runs on the crankshaft flange itself.

The connecting rods are H section forgings having separate rod caps attached by two bolts and located by hollow dowel pins. Connecting rod bearing liners are steel-backed copper/lead or aluminum/tin. The piston pin ends have steel-backed bronze bushings.

Solid skirt aluminum alloy pistons with two compression and one oil control ring situated above the piston pin bore are used. The combustion chamber is machined in the piston crown. The piston pins are fully floating and are retained in position by eyelet type snap rings installed in grooves at each end of the piston pin bore.

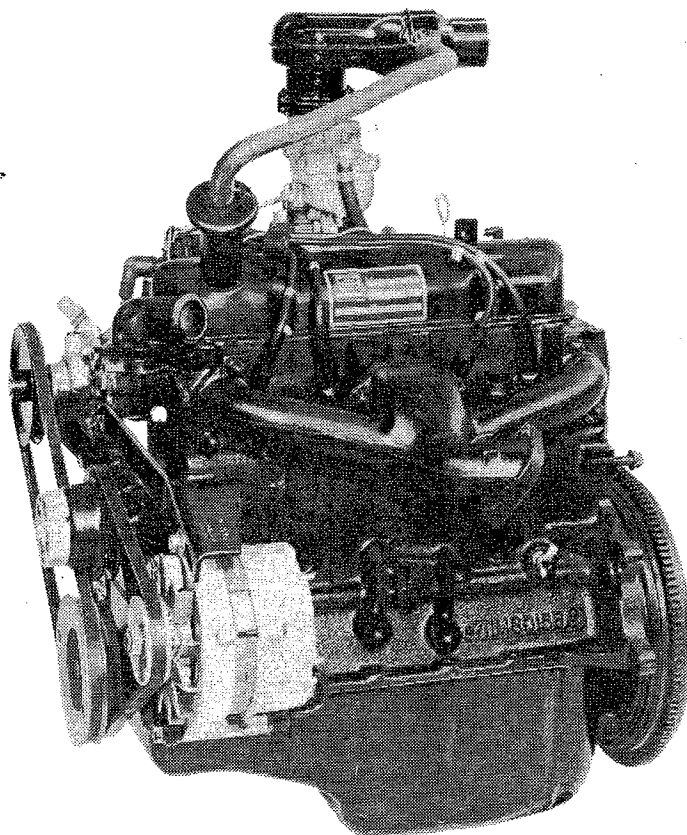
The camshaft is driven at half engine speed by a single row chain and sprockets from the crankshaft. This timing chain is automatically tensioned by a snail cam, bearing against a pivoted tensioner arm. A gear and an eccentric, machined integral with the camshaft, drive the distributor, oil pump and the fuel pump. A thrust plate is bolted to the cylinder block front face and located between the front bearing journal and the sprocket flange that retains the camshaft.

Overhead valves are mounted perpendicular to the cast iron cylinder head in integral valve guides and are operated by rocker arms, push rods and tappets from the camshaft. The rocker arms are mounted on a shaft supported by four mounting posts bolted to the cylinder head. Valve clearances are adjusted by means of self-locking screws provided in the rocker arms.

A cast iron flywheel is mounted on the crankshaft flange. The drive for the starter motor is provided by a steel ring gear shrunk onto the flywheel.

The oil pan is a steel stamping and has a sump for the lubricating oil. The engine lubrication system is the force feed type incorporating a full flow oil filter. The oil pump, which is mounted externally on the engine, is an eccentric bi-rotor type. The pump incorporates a non-adjustable plunger type relief valve.

An oil filler cap is located in the rocker cover. Crankcase ventilation is controlled by a positive-type closed system.



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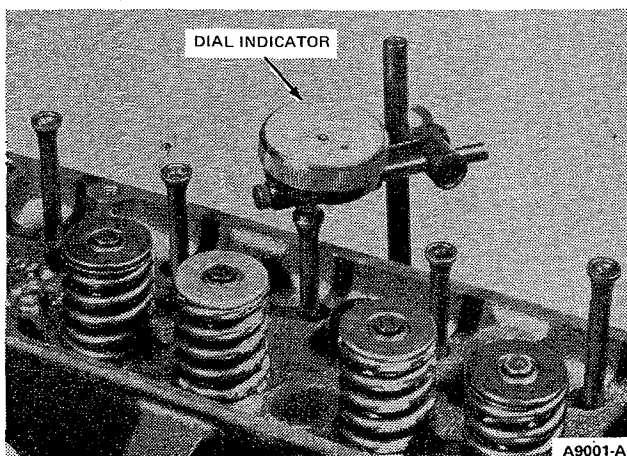
FIG. 2 98 CID (1600cc) Engine

## DIAGNOSIS AND TESTING

### CAMSHAFT LOBE LIFT

Check the lift of each lobe in consecutive order and make a note of the readings.

1. Remove the air cleaner and the valve rocker arm cover.
2. Remove the valve rocker arm shaft assembly as detailed in the pertinent section.
3. Make sure the push rod is in the valve lifter socket. Install a dial indicator in such a manner as to have the ball socket adapter of the indicator on the end of the push rod and in the same plane as the push rod movement (Figure 3).



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FIG. 3 Testing Camshaft Lobe Lift

4. Connect an auxiliary starter switch in the starting circuit. Crank the engine with the ignition switch OFF. Bump the crankshaft over until the tappet or lifter is on the base circle of the camshaft lobe. At this point, the push rod will be in its lowest position.
5. Zero the dial indicator. Continue to rotate the crankshaft slowly until the push rod is in the fully raised position (highest indicator reading).
6. Compare the total lift recorded on the indicator with specifications.
7. To check the accuracy of the original indicator reading, continue to rotate the crankshaft until the indicator reads zero. **If the lift on any lobe is below specified wear limits, the camshaft and the valve lifters operating on the worn lobe(s) must be replaced.**
8. Remove the dial indicator and auxiliary starter switch.
9. Install the rocker arm shaft assembly as detailed under Removal and Installation.
10. Install the valve rocker arm cover and the air cleaner.

## COMPRESSION TEST

### COMPRESSION GAUGE CHECK

1. Be sure the crankcase is at the proper level and the battery is properly charged. Operate the engine for a minimum of 30 minutes at 1200 rpm or until the engine is at normal operating temperature. Turn the ignition switch off; then remove all the spark plugs.
2. Set the carburetor throttle plates and choke plate in the wide open position.
3. Install a compression gauge in No. 1 cylinder.