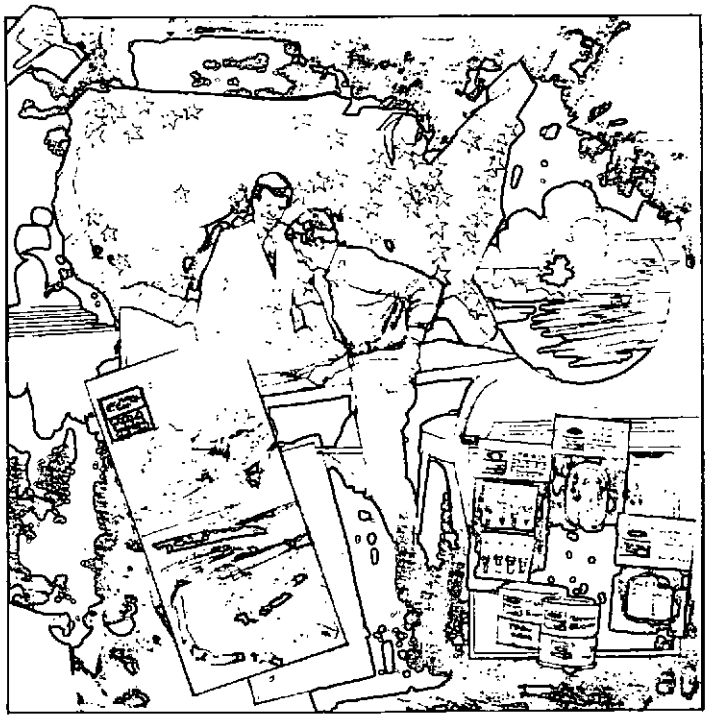
Ford Power Products

MAINTENANCE AND OPERATOR'S MANUAL



V-8 GASOLINE ENGINE
LSG-875

CONTENTS

INTRODUCTION

We are highly pleased that you have selected a Ford unit for your engine requirements. The Ford Motor Company takes great pride in the long tradition of quality products and great values that the Ford name represents.

Ford Industrial Engines are tested and inspected before leaving the factory. However, certain checks should be made before putting them into regular operation. Read the Initial Start-up requirements in the *Maintenance Instructions*.

HOW TO USE THIS MANUAL

We wrote this manual especially for you. We hope you use it to get to know your engine and how to get the most out of it. That is why we urge you to read this manual from cover to cover. First, you'll become familiar with the various controls and instruments. As you read further, we tell you how to maintain your engine and what services need to be performed to keep it in excellent running condition.

The Subject Index on the title page permits you to quickly open the manual to any section. The Alphabetical Index at the back of the manual provides a page reference to a particular item or procedure.

Ford Industrial Engines are built with a variety of standard and/or optional components to suit a wide range of customer requirements. This manual does **not** identify equipment as standard or optional. All the equipment described in this manual may not be found on your engine or power unit.

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

Ford Power Products

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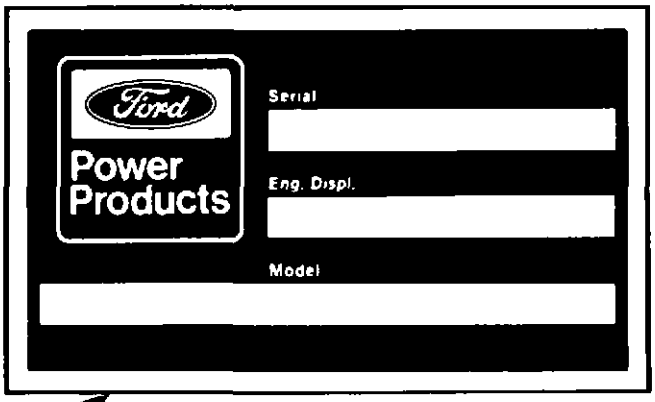
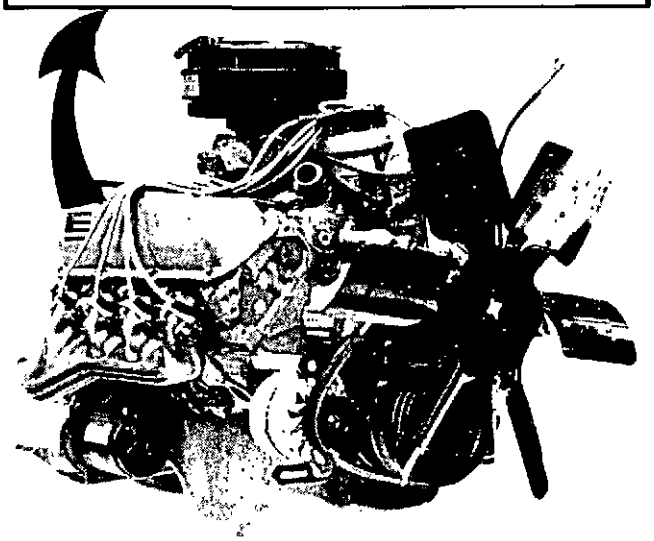
ENGINE IDENTIFICATION

An Identification Decal is affixed to the rocker cover of each 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 determine the parts or components required on this unit. Use all numbers when seeking information or ordering replacement parts for this engine. For a handy reference, record the information on the decal below.





PARTS AND SERVICE

Replacement parts can be obtained through your local Ford Power Products Distributors and Dealers. They are listed in the accompanying directory or can be found in the *Yellow Pages* under "Engines."

Ford Power Products Distributors and Dealers are equipped to perform major and minor repairs. They are anxious to see that all of your maintenance and service needs are quickly and courteously completed.

SERVICE LITERATURE

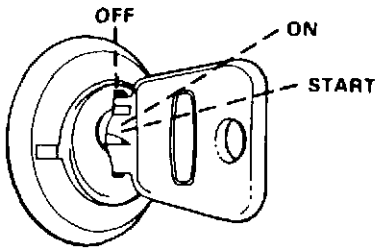
A service manual can be purchased from your distributor or dealer. This publication will provide the necessary servicing and overhaul information for your Ford Industrial Engine.

Service Manual IEO 194-208

CONTROLS

Ignition Switch

This three-position switch is located on the control panel. In the OFF position, the switch disconnects the electrical system from the battery. The key can be removed from the switch when it is in this position. In the ON position, the electrical system is activated. Engage the starter by turning the key to the START position. Release the key when the engine starts and it will return to the ON position.



Choke Control

The choke control is connected to the carburetor and operates the choke butterfly to enrich the fuel mixture on cold starts. Pulling the control out closes the choke and pushing it in opens the choke.

Throttle Control

The throttle control is connected to the carburetor throttle shaft. Initial engine speed adjustment is obtained by pressing the throttle control release button while pulling the throttle knob out to increase the engine speed or pushing it in to decrease the engine speed.

A final fine speed adjustment is obtained by turning the throttle control counterclockwise to increase engine speed or clockwise to decrease engine speed.

Overspeed Control

The overspeed control is an electronic device in the primary circuit of the ignition system. This unit will shut down the engine when engine rpm exceeds the preset nonadjustable limit (3200 or 3800 rpm).

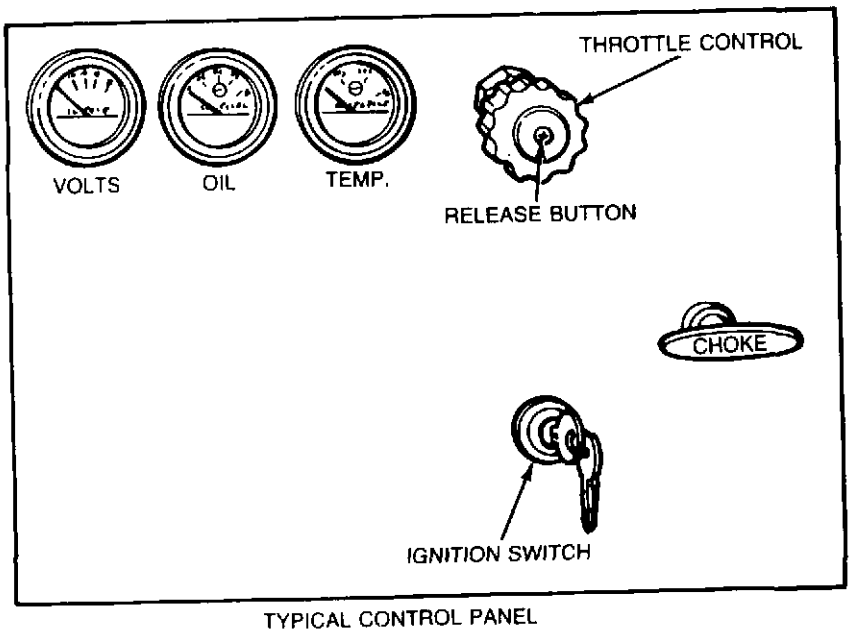
After an automatic shutdown, the ignition switch must be turned to the OFF position before attempting to restart the engine. This will recycle the overspeed control and allow the engine to operate within the specified rpm limit.

Power Takeoff

The power takeoff control handle allows engagement and disengagement of the power takeoff clutch.

Moving the lever towards the engine engages the clutch, and pulling the lever away from the engine disengages the clutch.

When moving the handle to engage the clutch and pick up the load, do so in a smooth manner. Moving the clutch handle too slowly will cause slippage and wear, while moving it too fast will cause quick engagement and possible damage to the power takeoff, engine or driven equipment. The normal force required to engage the clutch is 65-80 pounds.



TYPICAL CONTROL PANEL

INSTRUMENTS

Oil Pressure Gauge

The oil pressure gauge registers the lubricating system pressure in pounds-per-square-inch and should be frequently checked to ensure that the system is functioning correctly. Normally the pressure registered by the gauge should remain constant for a given engine speed (see Specifications).

Should the pressure fluctuate or drop, stop the engine and find the cause. Do not operate the engine at lower than normal oil pressures.

Voltmeter

The voltmeter measures the battery charging voltage. If the meter consistently indicates less than 13 volts or more than 15.5 volts under normal operation, have your engine's electrical system checked.

Temperature Gauge

The temperature gauge registers the coolant temperature and will indicate overheating which may arise from low coolant level, clogged radiator, loose fan belt or faulty thermostat.

By operating the engine at the correct temperature, maximum power, longer life and better fuel economy will be ensured.

Tachometer

The tachometer (optional) indicates the engine speed in hundreds of revolutions per minute. It serves as a guide to maintain engine speed in the most desirable operating ranges.

Hourmeter

This instrument (optional) records the hours of operation and is used to determine when periodic maintenance is required.

STARTING THE ENGINE

Release the load on the power takeoff, or if the engine is equipped with a transmission, disengage the clutch. If the engine is started with the load engaged, it imposes an unnecessary strain on the starter and battery.

CAUTION — All internal combustion engines give off various fumes and gases while running. Do not start or run the engine in a closed or poorly ventilated building where the exhaust gases can accumulate. Avoid breathing these gases as they may contain poisonous carbon monoxide which can endanger your health or life if inhaled steadily for even a few minutes.

Normal Starts

Pull the throttle out about 1/2 inch and the choke out about halfway. Turn the ignition switch to the START position. After the engine starts, release the key, decrease the throttle setting and adjust the choke for fast idle warmup. When the engine is at normal operating temperature, push the choke in all the way.

CAUTION — If the engine stalls or falters in starting, wait three or four seconds before re-engaging starter. This will prevent possible damage to the starter or engine.

The starter should not be operated for periods longer than 30 seconds at a time. An interval of at least two minutes should be observed between such cranking periods to protect the starter from overheating.

Engine Cold

Pull the throttle out about 1/2 inch and the choke all the way out. Turn the ignition switch to the START position. When the engine starts, release the key and adjust the choke setting to keep the engine running smoothly. When the engine is at normal operating temperature, push the choke in all the way.

To assure satisfactory operation in cold weather, allow approximately five minutes for engine warmup before engaging load.

CAUTION — If the engine stalls or falters in starting, wait three or four seconds before re-engaging starter. This will prevent possible damage to the starter or engine.

The starter should not be operated for periods longer than 30 seconds at a time. An interval of at least two minutes should be observed between such cranking periods to protect the starter from overheating.

Engine Flooded

To start a "flooded" engine, press the throttle control release button and pull the throttle out all the way and push the choke in all the way. Turn the ignition switch to the START position until the engine starts. Release the key. Push the throttle in gradually as engine speed increases.

CAUTION — If the engine stalls or falters in starting, wait three or four seconds before re-engaging the starter. This will prevent possible damage to the starter or engine.

The starter should not be operated for periods longer than 30 seconds at a time. An interval of at least two minutes should be observed between such cranking periods to protect the starter from overheating.

Engine Shutdown

After an automatic shutdown, the ignition switch must be turned to the OFF position before attempting to restart the engine.

STOPPING THE ENGINE

Normal Conditions

Following normal operating conditions, lower the engine speed to idle, disengage the clutch, and then turn the ignition switch to the OFF position. If the engine has been running under high power, let it run at fast idle speed a few minutes to cool the engine down.

Never turn off the ignition, then suddenly pull the choke out, with the thought in mind that this will "prime" the system for the next start. This is poor practice because the large quantity of raw gasoline entering the combustion chambers will wash all the oil off the cylinder walls. When started again, the engine will operate for a few moments without any lubrication on the cylinder walls, which may result in scuffing of the pistons, rings and cylinder walls. At best, engine life will be shortened considerably.

Abnormal Conditions

Under abnormally overheated conditions, the engine may continue to run after the ignition switch is turned off. If this case is ever encountered, turn on the ignition switch immediately and allow the engine to idle until it has cooled enough to stop. If the engine is overheated due to loss of coolant, it is best to stop the engine immediately, if necessary by applying the load. Add engine oil if necessary, then, after the engine has returned to a normal temperature, add coolant slowly until the radiator is full.

> **CAUTION** — Avoid injury when checking a hot engine. Cover the radiator cap in a thick cloth and turn it slowly counterclockwise to the first stop. After the pressure has been completely released, press the cap downward and finish removing the cap.

The above instructions also apply to engines that stop due to operation of the low oil pressure/high water temperature safety switch. However, if the engine stops due to low oil pressure, do not restart until the cause has been determined.

SPECIAL SITUATIONS

Problem Diagnosis

Most operating troubles that might be encountered with a new or well-maintained unit will be of a minor nature. Therefore, if you have trouble starting or operating your engine, look for some simple cause rather than failure of a major component. For instance, loose or corroded battery connections are much more likely than battery failure.

A loose ignition wire is much more likely than distributor, coil or ignition system failure.

In many cases, engine operating troubles are coupled with outside factors, such as climatic conditions, operating conditions, change of servicing or fueling source, or change of operator.

Engine troubles that occur as a result of normal use and wear usually give plenty of advance warning. These troubles usually result from *overlooking the Scheduled Preventive Maintenance Services.*

Whenever engine performance seems less than normal in any category, it is best to consult with your dealer at the first symptom rather than wait until a serious problem develops. One of the aims of regular maintenance is to help you in just these circumstances.

Engine Won't Crank

1. Turn the key to the START position. If nothing happens, an electrical lead(s) may be loose or disconnected, the battery cables may be loose, disconnected or corroded or the battery discharged.
2. Another indication of loose battery connections or low battery condition is a stuttering noise from the starter relay when the ignition switch is turned to the START position. Check the connections to the starter motor and the solenoid switch in addition to the battery and ground connections.
3. Try operating the start switch several times. Should the switch be corroded, this operation may clean the contacts enough to make the switch temporarily operable until you can reach your dealer.
4. If all the electrical connections are tight and you need assistance to start, read the instructions under Emergency Starting.

Engine Cranks But Won't Start

1. Check the fuel tank. You may be out of fuel. If there is fuel in the tank, the trouble may be in either the ignition system or in the fuel system.
2. Check the ignition system. Remove the wire from one of the spark plugs by grasping the moulded boot of the wire only, and insert a short piece of bare wire or other metal in the terminal of the wire.

NOTE — Spark plug wires carry high-tension electrical current capable of giving a shock. Be sure to grasp the moulded boot well back from the open end.

Hold the boot so that the inserted bare wire is about 1/4 inch from the engine block and crank the engine (with the ignition switch on) for at least three seconds. If there is no spark between the wire and the metal, the trouble may be in the distributor or coil. If you see a spark, then check the fuel system for trouble.

3. The fuel system may have a restricted fuel line, plugged fuel filter, air leaks in the fuel line or a faulty fuel pump.
4. Check the manual choke. The choke linkage may be binding or damaged so that the choke plate in the carburetor is not opening and closing properly.

Engine Runs Hot

Listed below are items which could cause an engine to overheat.

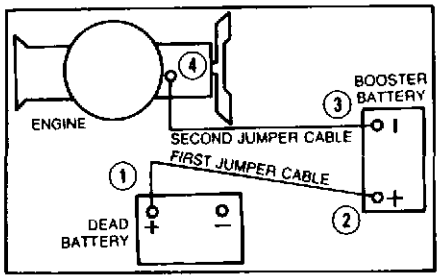
1. Low coolant level
2. Loose or broken fan belt(s)
3. Inoperative thermostat
4. Dirty cooling system
5. Radiator fins restricted with leaves, dirt, etc.
6. Prolonged idling
7. Running engine with frozen coolant
8. Leaky head gasket
9. Overloading, especially during hot weather

EMERGENCY STARTING

Use of booster battery and jumper cables — particular care should be used when connecting to a booster battery in order to prevent sparks. To jump start (negative grounded battery):

- Shield eyes.
- Connect end of one cable to positive (+) terminals of each battery.
- Connect one end of other cable to negative (−) terminal of "good" battery.
- Connect other end of cable to engine block of unit being started (NOT TO NEGATIVE (−) TERMINAL OF BATTERY).

To prevent damage to other electrical components on unit being started, make certain that engine is at idle speed before disconnecting jumper cables.



WARNING — Batteries contain SULFURIC ACID. In case of acid contact with skin, eyes, or clothing, FLUSH IMMEDIATELY WITH WATER FOR A MINIMUM OF FIVE MINUTES. Get "on-the-spot" medical attention immediately.

Hydrogen and oxygen gases are produced during normal battery operation. This gas mixture can explode if flames or sparks are brought near the battery. When charging or using battery in an enclosed space always provide ventilation.

Keep fire away from the top of open battery cells. Combustible gas is always present.

CAUTION — Avoid the use of a 24-volt battery and jumper cable hookup to start an engine with a dead battery, as this will damage the unit's electrical system.

MAINTENANCE SCHEDULE

Initial Start-up Sequence	Operation	100 Hrs.	200 Hrs.	300 Hrs.	400 Hrs.	500 Hrs.	600 Hrs.	700 Hrs.	800 Hrs.	900 Hrs.	1000 Hrs.
1	Oil, Engine, Check Level	Daily									
2	Coolant, Check Level in Radiator	Daily									
3	Fuel, Oil and Coolant Leaks, Check	Daily									
	PTO Release Bearing, Lubricate	Daily									
4	Governor, Check Oil Level (2)	X	X	X	X	X	X	X	X	X	X
	Oil, Engine, Change (1)	X	X	X	X	X	X	X	X	X	X
	Oil Filter, Change (1)	X	X	X	X	X	X	X	X	X	X
5	Air Cleaner, Clean or Replace Element (1)	X	X	X	X	X	X	X	X	X	X
6	Battery, Check Charge and Level	X	X	X	X	X	X	X	X	X	X
7	PTO Bearings, Lubricate	X	X	X	X	X	X	X	X	X	X
	Radiator, Inspect and Clean Exterior		X		X		X		X		X
	Battery Cables, Clean		X		X		X		X		X
9	Fan, Alternator & Governor Belts, Check and Adjust		X		X		X		X		X
	Throttle, Governor and Choke Linkage, Lubricate		X		X		X		X		X
	Fuel Filter, Replace (1)				X				X		
	Cooling System, Check or Refill				X				X		
12	Idle Speed, Check and Adjust				X				X		
13	Idle Mixture, Check and Adjust				X				X		
	Spark Plugs, Clean, Adjust and Test or Replace				X				X		
10	Ignition Timing, Check and Adjust (Check Advance)				X				X		
	PCV Valve, Replace				X				X		
14	Throttle and Governor, Adjust								X		
	Coolant, Replace								X		
11	All Bolts and Nuts, Check for Tightness (3)										
8	PTO Clutch Release and Shaft Bearings, Adjust (3)										

(1) More frequent intervals may be required in dusty areas.
(2) Mechanical governor (belt driven).
(3) Seasonal or as required.
NOTE: Scheduled Maintenance beyond 1000 hours should be continued at the same intervals as before.

MAINTENANCE INSTRUCTIONS

INITIAL START-UP

Your Ford Industrial Engine was inspected before leaving the factory. However, the initial start-up checks must be made before putting the unit into operation. The Preventive Maintenance Schedule (page 13) provides a handy check-off list. Perform the initial start-up operations in the sequence listed in the left-hand column.

ROUTINE SERVICE

Make sure your unit is ready to go whenever you need it. There are some things that you can do or have done, to be sure it is well cared for:

- Keep the fuel tank filled. A full tank reduces the possibility of condensation forming in the tank and moisture entering the fuel lines.
- Make frequent check of the engine oil and coolant levels.
- Keep engine air filter clean.
- Watch the engine temperature.
- Watch the engine oil pressure.
- Watch the voltmeter.
- Lube power takeoff regularly.

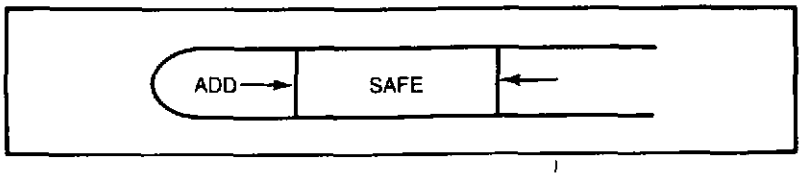
SCHEDULED PREVENTIVE MAINTENANCE

The operations listed in the maintenance schedule are covered in detail on the following pages. Whenever your engine requires maintenance of any kind, your Ford Power Products distributor or dealer has skilled technicians who will do an expert job of keeping your engine in its prime condition.

Engine Oil

Check Oil Level

The oil level should be checked frequently, at least daily, and maintained within the SAFE range or above the ADD mark on the dipstick by adding oil as required. Do not overfill.



MAINTENANCE INSTRUCTIONS

Adding Oil

It is normal to add some oil between oil changes. The amount will vary with the severity of operations. When adding or replacing engine oil be sure oils meet the specifications listed.

Changing Oil and Filter

For most operations, the engine oil and filter must be changed every 100 hours or seasonally. Under normal operating conditions, you do not need to change more often if you use oil and filters of the recommended quality.

The oil and filter should be changed more often if the engine is operating in dusty areas, for extended idling or low-speed operation, or frequent stops during cold weather. No break-in oil change is required.

Oil Quality

To help achieve proper engine performance and durability, it is important that you use only engine lubricating oils of the proper quality in your engine. Proper quality oils also provide maximum efficiency for the crankcase ventilation system which reduces pollution.

Use Ford or Motorcraft oil or equivalent that meets Ford Specification ESE-M2C153-B and API categories SF, SF/CC or SF/CD.

It is best not to mix different brands of lubricants and oils, because sometimes they are not compatible and deteriorate when mixed. Stay with one brand to assure compatibility.

Oil Identification Logo

A logo has been developed to help you select the proper quality oil. It will be included on the oil can you purchase. The top section of the logo shows the oil quality by the API designation. The center section will show the S.A.E. viscosity grade. The lower section will "state energy conserving" if the oil has proven fuel-saving capabilities.

Oil Viscosity

When you change or add oil, you should select oil with the proper specifications and with the viscosity, (selected from the following table), which most closely matches the temperature range you expect to encounter for the next 100 hours of operation.

SINGLE-VISCOSITY OILS

When Outside Temperature Is Consistently	Use SAE Viscosity Number
−10°F to +60°F	*10W
+10°F to +90°F	20W-20
Above +32°F	30
Above +50°F	40

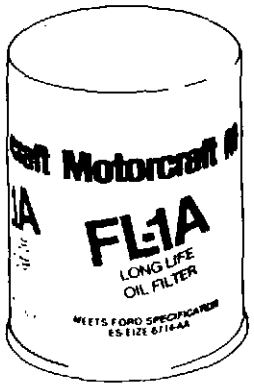
MULTI-VISCOSITY OILS

When Outside Temperature Is Consistently	Use SAE Viscosity Number
Below +10°F	*5W-20
Below +60°F	5W-30
−10°F to 90°F	10W-30
Above −10°F	10W-40 or 10W-50
Above +20°F	20W-40 or 20W-50

*Not recommended for severe service — including high RPM operation.

Oil Filter

Use a Motorcraft FL-1A Long-Life Oil Filter or equivalent which meets Ford specification ES-E1ZE-6714-AA.



These filters protect your engine by filtering harmful, abrasive, or sludgy particles without blocking the flow of oil to vital engine parts.

To replace, use a filter wrench to *remove filter.*

WARNING — Do not handle a hot oil filter with bare hands.

Clean the filter mounting base on the engine block, lightly coat the gasket surface of the new filter with engine oil and hand-tighten until the gasket contacts the base, then tighten another half turn. Fill the crankcase and run the engine to check for leaks.

Air Cleaner

Your air cleaner filters air entering the engine induction system and acts as a silencer. Air that contains dirt and grit produces an abrasive fuel mixture and can cause severe damage to the cylinder walls and piston rings. Damage to the cylinder walls and piston rings will cause high oil consumption and short engine life. A restricted or dirty air cleaner will also cause a rich fuel mixture. Thus, it is extremely important that the air cleaner be serviced at recommended intervals.

CAUTION — Service the air cleaner more frequently under severe dust conditions.

Clean or replace the air cleaner paper filter element.

Remove the paper filter element from the air cleaner. Inspect the element for mud caking or signs of excessive wear or damage. Replace as necessary.

Remove all dust and foreign matter from the air cleaner housing.

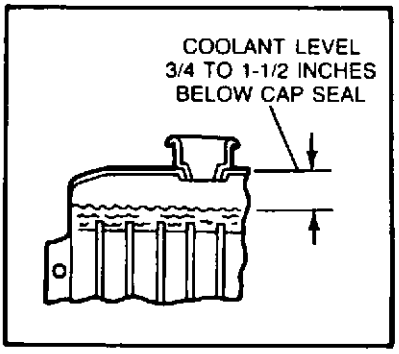
Make sure that the air cleaner is seated properly on the carburetor with the seal installed.

Cooling System

Coolant Level

Check the coolant level in the radiator daily, only when the engine is cool.

Maintain the coolant level at approximately 3/4 to 1-1/2 inches (19-38 mm) below the filler neck seat on the radiator when the coolant is cold.



Whenever coolant level checks are made check condition of radiator cap rubber seal. Make sure it is clean and free of any dirt particles. Rinse off with clean water if necessary. When replacing cap on radiator, also make sure radiator filler neck is clean.

WARNING — Never remove the radiator cap under any conditions while the engine is operating. Failure to follow these instructions *could result in damage to the cooling system or engine and/or* personal injury. To avoid having scalding hot coolant or steam blow out of the radiator, use extreme care when removing the cap from a hot radiator. If possible, wait until the engine has cooled, then wrap a thick cloth around the radiator cap and turn it slowly to the first stop. Step back while the pressure is released from the cooling system. When you are sure all the pressure has been released, press down on the cap (still with a cloth), turn and remove it.

Do not add coolant to an engine that has become overheated until the engine cools. Adding coolant to an extremely hot engine can result in a cracked block or cylinder head.

Use only a permanent-type coolant that meets Ford Specification ESE-M97B44-A such as Ford Cooling System Fluid. Refer to the coolant mixture chart on the container for additional antifreeze protection information. Do not use alcohol or methanol antifreeze, or mix them with the specified coolant.

Plain water may be used in an emergency, but replace it with the specified coolant as quickly as possible to avoid damage to the system. With only water in the system, do not let engine run hot.

Radiator

Inspect the exterior of the radiator for obstructions. Remove all bugs, dirt or foreign material with a soft brush or cloth. Use care to avoid damaging the fins. If available, use compressed air or a stream of water in the opposite direction to normal airflow.

Check all hoses and connections for leaks. If any of the hoses are cracked, frayed, or feel spongy, they should be replaced.

Drive Belts

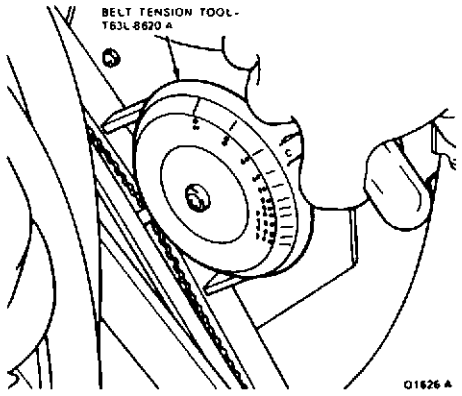
The water pump is belt driven. This same belt may also drive the fan and/or alternator. The drive belt(s) should be properly adjusted at all times. A loose drive belt causes improper alternator, fan and water pump operation, in addition to overheating. Overtightening the belt may result in excessive wear on the alternator and water pump bearings, as well as premature wear on the belt itself. Therefore, it is recommended that a

belt tension gauge be used to check and adjust the belt tension. **Any belt that has operated for a minimum of 10 minutes is considered a used belt,** and when adjusted, it must be adjusted to the reset tension shown in the specifications.

Belt Tension

Install the belt tension tool on the drive belt and check the tension following the instructions of the tool manufacturer.

If the tension is not to specification, loosen the alternator mounting and adjusting arm bolts. Move the alternator away from the engine until the correct tension is obtained. Remove the gauge. Tighten the alternator adjusting arm and mounting bolts. Install the tension gauge and recheck the belt tension.



Battery

If there is any corrosion on the cables and terminals, remove it with a wire brush and neutralize the acid with a solution of baking soda or ammonia with water. After cleaning, flush the top of the battery with clean water, install the terminal clamps on the battery posts, and coat the parts with grease to retard further corrosion.

Fluid Level (Non-Maintenance Free Battery)

Because the battery is the "heart" of your unit's electrical system, periodic checks are necessary to keep it functioning properly. Keep the battery level in each cell up to the level indicator.

Ordinary tap water may be used except in areas where the water is known to be exceptionally hard or to have a high mineral or alkali content. In such areas, use distilled water. If water is added during freezing weather, run the engine 20 to 30 minutes before shutting it off. This mixes the added water with the electrolyte and will prevent it from freezing and damaging the battery. Have the battery charge checked regularly during extreme cold weather. When the specific gravity falls below 1.230 (corrected to 80°F), recharge the battery. Make sure the cables are clean and tightly clamped to the battery terminals. Keep the top of the battery clean and dry.

WARNING — Batteries normally produce explosive gases which can cause personal injury. Therefore, do not allow flames, sparks or any ignited object to come near the battery. When charging or working near a battery, always shield your eyes. Always provide ventilation.

When lifting a plastic-cased battery, excessive pressure on the end walls could cause acid to spew through the vent caps, resulting in personal injury. Lift with a battery carrier or with your hands on opposite corners.

CRANKCASE VENTILATION SYSTEM

All engines are equipped with a positive crankcase ventilation system.

Clean air is supplied from the air cleaner by a tube to the oil filler cap on the left rocker cover. The fumes are vented out through a regulator valve on the right rocker cover and into the intake manifold. The P.C.V. valve (regulator valve) must be replaced and the hoses, tubes and fittings of this system must be cleaned at the recommended intervals.

FUEL FILTER

Disposable Filter

The fuel filter is part of the fuel pump. Remove the filter by unscrewing the canister. Remove the filter element and gasket. Place a new filter element in the canister. Coat a new gasket with light engine oil and position the gasket on the canister. Screw the canister onto the filter body. Hand tighten the filter until the gasket contacts the body and then advance it 1/8 turn. Start the engine and check for leaks.

CARBURETOR ADJUSTMENTS

Idle Speed and Idle Mixture Adjustment

The idle speed adjustment screw, and the idle fuel mixture adjustment needle(s) are accessible on the exterior of the carburetor. Actually, there are three factors that control the conversion of the fuel and mixture into engine power. These factors are engine compression, ignition and correct carburetor adjustment. Correct carburetor adjustment cannot be obtained, however, unless engine compression and ignition meet specifications.

To make the adjustments, start the engine and operate it until it has reached normal operating temperature. Be sure the choke and throttle controls are pushed all the way in.

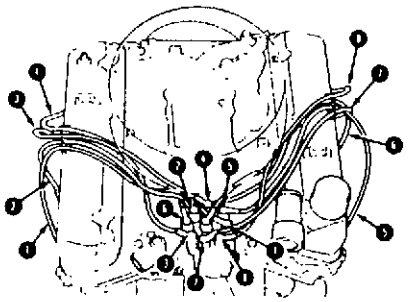
Start the adjustments by setting the idle speed screw to obtain an engine speed of 600 rpm. Then turn idle fuel mixture adjustment needle(s) in (clockwise) until the engine begins to roll. Then, back it out slowly until the engine is running smoothly. Reset the idle speed to 600 rpm.

IGNITION SYSTEM

A dual advance distributor, with a centrifugal and vacuum spark advance system, is used with this engine.

The direction of distributor rotation is counterclockwise as viewed from the top of the distributor.

The spark plug wires are inserted in the distributor cap in the firing order of the engine 1-5-4-2-6-3-7-8. The number one socket is identified by the number one on the cap. The cylinders are numbered from front to rear—1-2-3-4 right side, and 5-6-7-8 left side, as viewed from the rear of the engine.



ENGINE IGNITION WIRING

Solid-State Ignition

The Solid-State Ignition system has a larger rotor, distributor cap and adapter ignition secondary wires and wide gap spark plugs to take advantage of the higher energy produced.

No adjustments are made to the ignition system except initial timing and spark plug gap.

When installing a new distributor cap or rotor, coat the brass rotor electrode surfaces on all side outboard of the plastic, including the outer edge, with D7AZ-19A331-A silicone dielectric compound, or equivalent to approximately 1/32 inch thickness. Do not reapply or attempt to remove any silicone coating from the distributor cap electrodes. As this compound ages, it has the appearance of being a contaminant of the cap and rotor electrode. This condition is normal and causes no performance loss.

Coat the inside of each spark plug boot with silicone dielectric compound D7AZ-19A331-A or equivalent, using a small screwdriver blade. Connect each spark plug wire to the plug from which it was removed. Be sure each wire is fully depressed on each plug and molded boot is firmly in place.

Ignition Timing

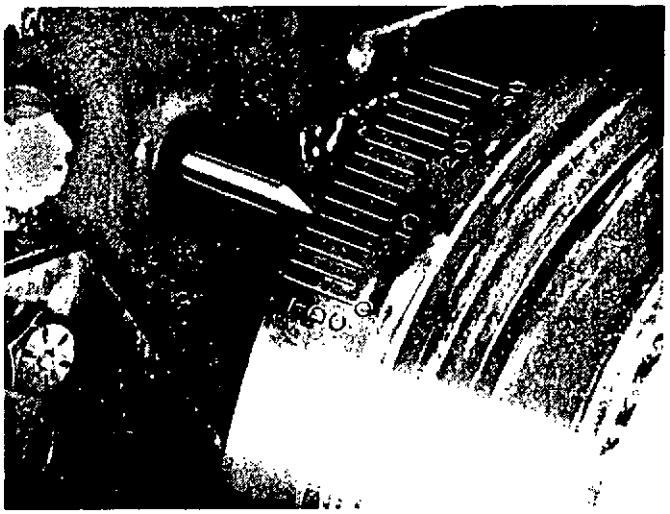
Proper adjustment of ignition timing must be maintained to provide maximum engine power output and best possible fuel economy.

The timing marks are located on the crankshaft damper and can be seen from the right side. These marks and a pointer on the engine front cover are used to time the engine. The recommended timing setting is 10° B.T.D.C. Adjust the ignition timing as follows:

Disconnect and plug the distributor vacuum line. Connect the timing light high tension lead to the No. 1 spark plug (right front cylinder), and the other two leads to the proper battery terminals. Clean and chalk the timing marks to improve legibility.

Operate the engine at a maximum of 600 rpm, and direct the timing light at the pointer. The light should flash just as the 10° mark on the damper lines up with the pointer.

If the 10° mark and the pointer do not line up, loosen the distributor retaining bolt, and rotate the distributor until the mark and notch are in line.



IGNITION TIMING MARKS

NOTE — Ignition timing is advanced by clockwise rotation of the distributor body — retarded by counterclockwise rotation.

When the proper timing is obtained, tighten the distributor retaining bolt and unplug and connect the distributor vacuum line, then accelerate the engine while watching the timing mark with the timing light to determine if the advance mechanism is functioning. The marks on the crankshaft damper should advance as engine rpm increases. This check will confirm whether or not the advance mechanism is functioning.

SPARK PLUGS

The spark plugs should be replaced at the recommended intervals.

Remove the wires from each spark plug by grasping, twisting and then pulling the moulded boot of the wire only. Do not pull directly on the wire because the wire connection inside the cap may become separated.

After loosening each spark plug one or two turns, clean the area around each spark plug port with compressed air, then remove the spark plugs.

Set the spark plug gap to specifications by bending the ground electrode. All spark plugs new or used should have the gap checked.

Install the spark plugs and torque each plug to specifications.

NOTE — Do not overtighten spark plugs. The gap may change considerably due to distortion of the plug outer shell.

Coat the inside of each spark plug boot with silicone dielectric compound D7AZ-19A331-A or equivalent, using a small screwdriver blade. Connect each spark plug wire to the plug from which it was removed. Be sure each wire is fully depressed on each plug and molded boat is firmly in place.

MECHANICAL GOVERNOR

Oil Level

Clean the body of the governor in the area of the fill plug.

Check the oil level by slowly removing the oil level plug. If oil drips out, the oil level is full. If oil doesn't drip out, slowly add engine oil into the oil fill hole. As soon as it begins dripping out the oil level hole, insert the plug.

Adjustment

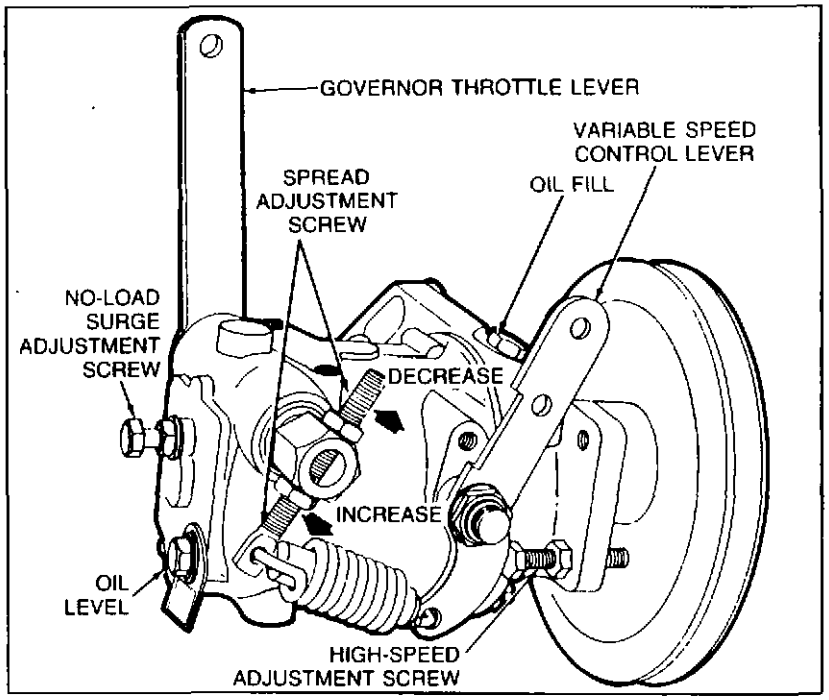
Before making any governor adjustments, check the governor drive belt tension with a belt tension gauge. Set the belt to the tension listed in the Specification Section.

The first adjustment is the governor-to-carburetor control rod adjustment. With the control rod connected, manually move the governor throttle lever to the maximum open throttle position. Check that the carburetor throttle shaft lever is set from 1/32 to 1/16 of an inch from its maximum open position stop. If necessary adjust length of the control rod to obtain the setting.

To perform a high-speed adjustment, attach a tachometer to the engine, then run the engine until it reaches normal operating temperature.

- Loosen the locknut on the high speed stop screw.
- Disengage engine load.
- Slowly pull the throttle control to desired maximum engine speed.
- Adjust the high speed stop screw on the governor to attain the desired maximum engine speed — do not exceed the recommended maximum rpm.
- Tighten the locknut.

The next adjustment is for spread. Proper governor operation requires a difference between full-load and no-load governor speed. Too small an rpm spread between the two speeds will cause governor hunting and surging. Too large a spread will cause the low response. For this governor, normal rpm spread is approximately 250 rpm within the full load speed range of 2000-2800 rpm.



To increase the rpm spread, adjust the screw to move the spring away from the lever hub.

To decrease the rpm spread, adjust the screw to move the spring closer to the lever hub.

The no-load surge adjustment is set at the factory and rarely requires adjustment. If necessary, this adjustment can be used to prevent **hunting and surging at no-load speeds only, provided the rpm spread adjustment is set properly.** Make the adjustment with the tachometer installed. Increase the engine speed with the hand throttle control to 75 rpm lower than the maximum no-load desired control rpm. (NOTE: At

this point if the engine continues to surge, light pressure applied to governor throttle lever will dampen surges). Then loosen the no-load surge adjustment screw locknut and turn the screw inward until the rpm increases to the desired control rpm. Reset high speed adjustment screw and tignten lock-nuts.

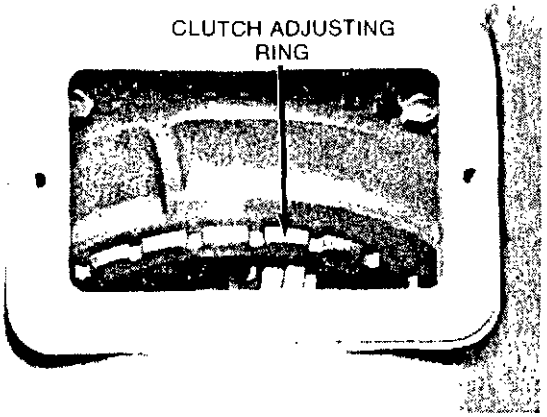
CAUTION — Do not turn the screw in all the way. It will interfere with proper governor operation and prevent the governor from returning the engine to idle speed.

POWER TAKE-OFF

Clutch

A new clutch generally requires several adjustments until the friction surfaces are worn in. Do not let a clutch slip as this will glaze the friction plates and may ruin them.

To adjust the clutch, place the shifter lever in the released position, then remove the patent plate on the top of the housing. Rotate the clutch until the adjusting lock and lock screw can be reached. Remove or disengage the adjustment ring lock. Then turn the adjusting ring. Counterclockwise rotation tightens the adjustment. Turn the adjusting ring until a pressure of 65-80 lbs. is required to engage the clutch. Reinstall the adjustment lock. Lubricate the friction points on the levers and linkage inside the housing with SAE 30 engine oil.



POWER TAKE-OFF ADJUSTING RING

Shaft Bearings

To adjust the shaft bearings, place the shifter lever in the release position, then remove the patent plate on the top of the housing. Loosen the lock plate bolt to free the bearing retainer. Place the end of a long bar into a notch on the bearing retainer and turn it clockwise (facing engine *from rear) to remove play from bearings.* The bearing retainer should be just tight enough to remove any play from the shaft, yet not so tight as to impose any pre-load on the bearing. Pre-loading the bearing will prevent free turning of the shaft and shorten bearing life. Tighten the lock plate bolt.

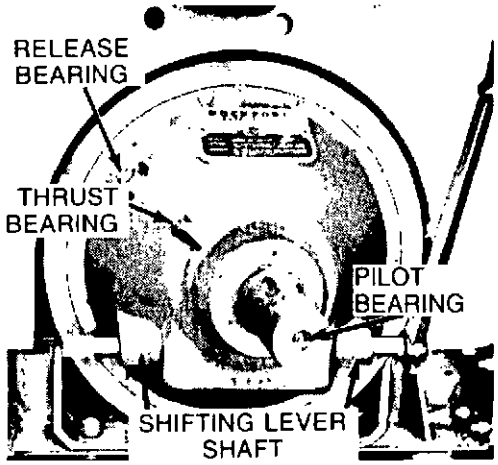
Lubrication

Lubricate the release bearing, thrust bearing, shifting lever bearings, and the pilot bearing. Use a high grade, Lithium Base #2, short fiber grease. Clean the fittings before and after greasing.

The release bearing must be lubricated daily.

> **CAUTION** — Do not use excessive force when greasing, and do not over-grease. Use grease sparingly. Excessive grease can coat the clutch plates and cause slippage.

If your engine is equipped with a truck-type clutch, lubricate the clutch linkage.



LUBRICATION FITTINGS

STORAGE

Less Than 120 Days

While engine is running, treat upper cylinders by spraying one to two ounces of recommended engine oil (S.A.E. 10), or equivalent into carburetor air intake for about 10 to 15 seconds. Open throttle for short burst of speed, shut off ignition and allow engine to come to a stop while continuing to spray recommended engine oil into air intake.

Leave spark plugs in holes or seal spark plug holes with suitable threaded metal plugs and cover all openings into engine with suitable non-hygroscopic material.

If engine is less transmission, spray flywheel and ring gear with mixture of one part recommended engine oil, and one part Stoddard Solvent, or equivalents.

Check coolant protection. Store indoors in dry area.

For Indefinite Period

Drain crankcase completely and refill with recommended engine oil (S.A.E. 10), or equivalent.

Run engine until completely out of gasoline, then restart and run on unleaded, undyed gasoline for at least 10 minutes.

While engine is still running and at completion of above run, treat upper cylinders by spraying one to two ounces of recommended engine oil in to carburetor air intake for about 10 to 15 seconds. Open throttle for short burst of speed, shut off ignition and allow engine to come to a stop while continuing to spray recommended engine oil into air intake.

Check coolant protection.

Disconnect and remove battery.

Clean exterior surface of engine.

Leave spark plugs in holes or seal spark plug holes with suitable threaded metal plugs.

Seal all openings in engine and accessories with non-hygroscopic material. Mask off all areas to be used for electrical contact.

Make sure all surfaces are dry, then spray all taped openings, all engine accessories including ignition wiring, and all exterior surfaces of engine with Insulation Compound.

If engines are equipped with automotive type clutch, block clutch in slightly disengaged position so that lining and pressure plate are not in contact.

SPECIFICATIONS

General Specifications

LSG-875	8 Cyl. 7.5 Liter (460 cubic in.)
Bore and Stroke	111.0 x 97.8 mm. (4.36 x 3.85 in.)
Firing Order	1-5-4-2-6-3-7-8
Lubrication Pressure (Hot @ 2000 RPM)	40-65 psi

Belt Tension

(All belts including governor)

New	120-150 lbs.
Used-Reset	90-120 lbs.
Minimum	75 lbs.

A used belt is one that has been in operation for 10 minutes or more. Reset belt tension when it meets minimum specification.

Capacities

Cooling System (Power Unit)	20.8L (22 qts.)
Lubrication System — with Filter Change	7.5L (9 qts.)

Ignition System

Initial Spark Advance — BTDC	10°
Spark Plug - GAP	1.27 mm (.050 in.)

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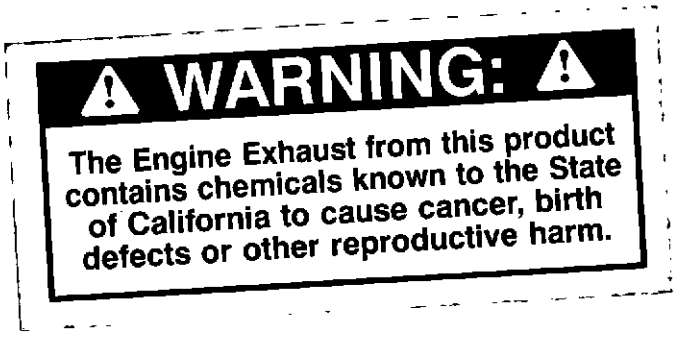
⚠ WARNING: ⚠
The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.