

SHOP TIPS

Motorcraft



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Emergency Towing and Starting Tips





EMERGENCY TOWING

Technical parts and service information published by the Autolite-Ford Parts Division and distributed by Ford and Lincoln-Mercury Dealers to assist servicemen in Service Stations, Independent Garages and Fleets.

IN THIS ISSUE

	Page
EMERGENCY TOWING AND HARD STARTING TIPS	
SERVICE CALLS ARE BIG BUSINESS	2
SPECIAL TOWING TIPS—	
1971-1972 FORD-BUILT CARS	3-5
TOWING THE 1971-72 CAPRI SAFELY	6
PRECAUTIONS WHEN TROUBLESHOOTING HARD STARTERS	7
STARTING SYSTEM TESTING TIP	8
V-8 DISTRIBUTOR SERVICE INFORMATION TIP—1972 FORD-BUILT ENGINES	8
COLD WEATHER STARTING TIPS	9
IMPORTANT TIP DURING COLD WEATHER	9
TECHNICAL SERVICE BRIEFS	10
1971 SHOP TIPS YEARLY INDEX	11

Be sure to file this and future issues for ready reference. If you have any suggestions for articles that you would like to see included in this publication, please write to: Autolite-Ford Parts Division, Merchandising Services Dept., P.O. Box 3000, Livonia, Michigan 48151.

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SERVICE CALLS ARE BIG BUSINESS

Recent figures show there are 108,300,000 licensed drivers in the U.S.; a little over 62 million are male while 46 million are females. And, because there are a greater number of drivers and cars on the highways (and the number is increasing each year), the number of service calls is also increasing. But even more significant is the fact that a great proportion of owners FAIL TO MAINTAIN THEIR CARS PROPERLY! They often fail or overlook or even ignore getting their engines tuned, batteries checked and tested, cooling systems inspected, or other such simple maintenance needs as fluid level checks.

As a result, service calls are big business!

Is your service outlet prepared to handle just about any kind of an emergency situation? For one thing, you should have a good Towing Rig; one that is equipped with a Towing Dolly, Scotch Blocks, Tow Bar and Sling, and where necessary, wood block adapters (made in advance) for pulling in vehicles with special towing problems.

Some of the more aggressive service outlets even equip their tow trucks with a two-way radio plus a car starter. These car starters are generators powered by a small gasoline engine. Advances made in these gas-engine/generators have almost obsoleted a booster battery and cables. Some of these car starters are also designed to charge a battery and to provide alternating current power for lights and electrically operated tools and other equipment that may be needed on the roadside.

Why not make it a point to review your own service outlet towing equipment and make plans for bringing it up-to-date with more modern methods of handling all types of road emergency calls.

HANDLING THE EMERGENCY CALL

Owners who experience a breakdown on the road, regardless of their car problem, generally tend to be irritable and visibly upset.

Therefore, when a call is received at your service outlet, your main problem at that moment is to attempt to handle the situation as courteously as possible. Treating him (or her) with a calm but firm approach will often turn the owner into a loyal customer who will come in for all his service needs.

Getting off on the right foot is extremely important. Ask for all the necessary information on the nature of the emergency. Simple breakdowns such as a flat tire or "out-of-gas" naturally pose no difficulty. More serious breakdowns require you to ask searching questions. Find out if the owner heard any unusual noises prior to the breakdown. Ask if the engine will "crank over" but will not start. Ask the owner if he noticed any unusual odors such as spilled gasoline (carburetor flooding, fuel line ruptured, etc.).

Often your questioning will reveal if the breakdown is too serious for a roadside repair . . . and the car will have to be towed in to your shop . . . or if it is only a minor problem that can be corrected at the scene. Armed with this information you can decide the best possible method for getting the owner back on "wheels" again. Generally you can also determine the amount of time it will take. Nothing gets an owner "up-tight" faster than a promise to get to his car at a certain time . . . then show up an hour later than agreed upon. It is much better to give yourself some leeway in your emergency scheduling. Showing up earlier makes you look more professional.

& HARD STARTING TIPS

SPECIAL TOWING TIPS • 1971-72 FORD-BUILT CARS

When you are called upon to tow a Ford-built passenger car, make sure the parking brakes are released and the transmission gears are in neutral. It is also important to know that the transmission and rear axle are in proper working order before towing. To move a vehicle with damaged or failed rear axle, it is necessary to raise the rear wheels. If the transmission has failed, the driveshaft must be removed or the rear wheels raised, whichever is more convenient.

CAUTION

To tow a vehicle with steering column and transmission locked and no ignition key available, lift vehicle from rear with wheels locked straight. If wheels are locked in a turned position, they **MUST BE SUPPORTED** with a DOLLY suitable for towing.

If the vehicle is being towed with the rear wheels on the ground, do not exceed 30 mph, or a distance of 15 miles. If this is not possible, it is advisable to tow the vehicle with the rear wheels raised off the ground . . . or with the driveshaft

disconnected from the rear axle.

TOWING SLINGS

To avoid metal to metal contact and possible damage to chrome or lower body panels, a special wide-belt sling, similar to that shown in the illustrations below, should be used to lift and tow ALL cars.

The 1971 Maverick and Cougar (also Comet), require one or more 4 x 4 wood block spacers to insure that there is no lifting stress on the lower body panels. The suggested lifting and towing hook-ups and placement of spacers for the above vehicles is illustrated in Figures 2, 3, 4 and 5.

NOTE:

On vehicles equipped with a front end spoiler, the spoiler must be removed when the vehicle is towed from either the front or rear.

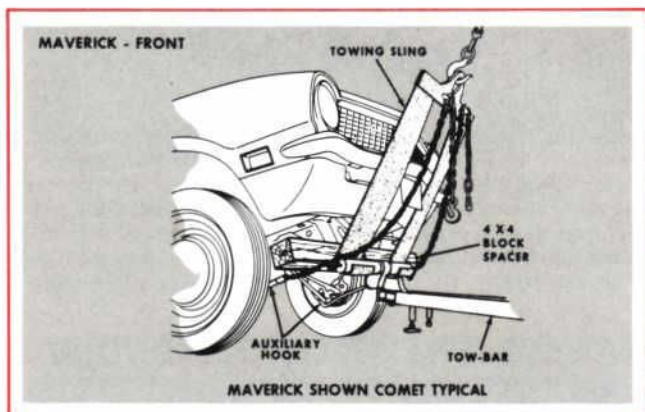


Figure 2—Note the position of the 4" x 4" wood block spacer when towing a 1971-72 Maverick from the front of the vehicle.

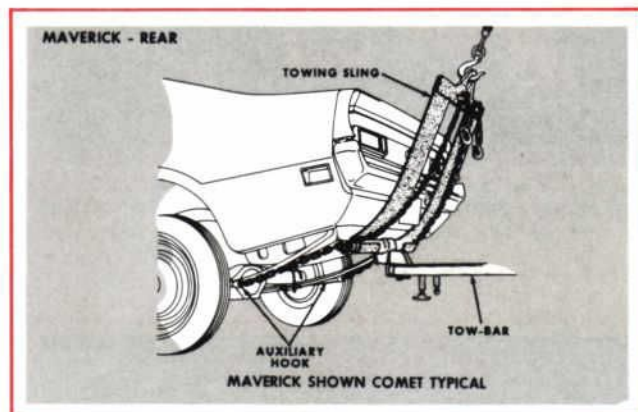


Figure 3—You do not require a wood spacer block when towing a 1971-72 Maverick from the rear of the vehicle.

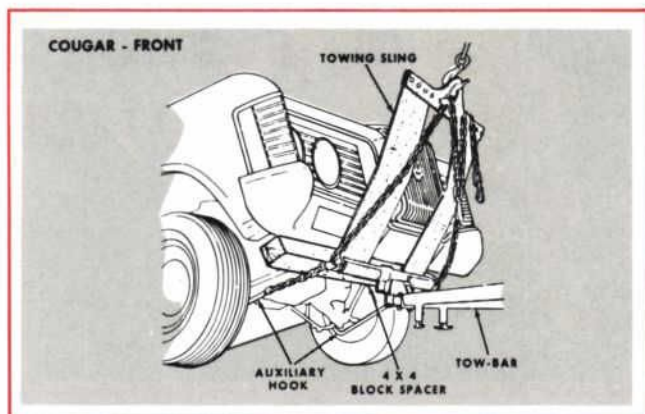


Figure 4—Note the position of the 4" x 4" wood block spacer when towing a 1971-72 Cougar from the front of the vehicle.

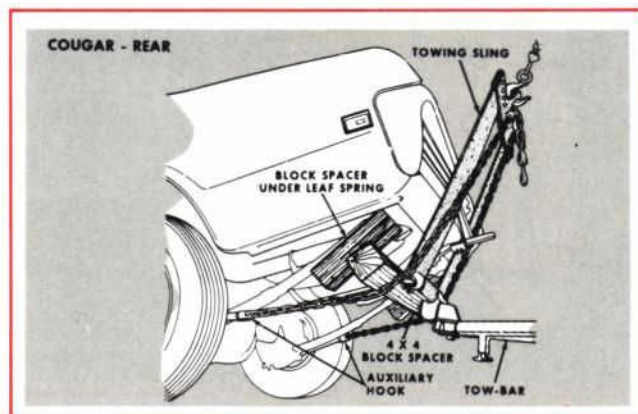


Figure 5—Note that when you are required to tow a 1971-72 Cougar from the rear, you will need three (3) 4" x 4" wood block spacers positioned as shown.



EMERGENCY TOWING

SPECIAL TOWING TIPS • 1971-72 FORD-BUILT CARS

To avoid metal to metal contact and possible damage to chrome or lower body panels, a special wide-belt sling, similar to the ones shown in figures 6 thru 10 should be used to lift and tow ALL cars.

The 1971-72 Mustang and the 1971 Torino require one or more 4" x 4" wood block spacers to insure there is no lifting

stress on the lower body panels. The suggested lifting and towing hookups and the placement of spacers for these two vehicles is illustrated in Figures 6 thru 10.

Vehicles that are equipped with a front end spoiler must have the spoiler removed whenever the vehicle is towed from either the front or rear.

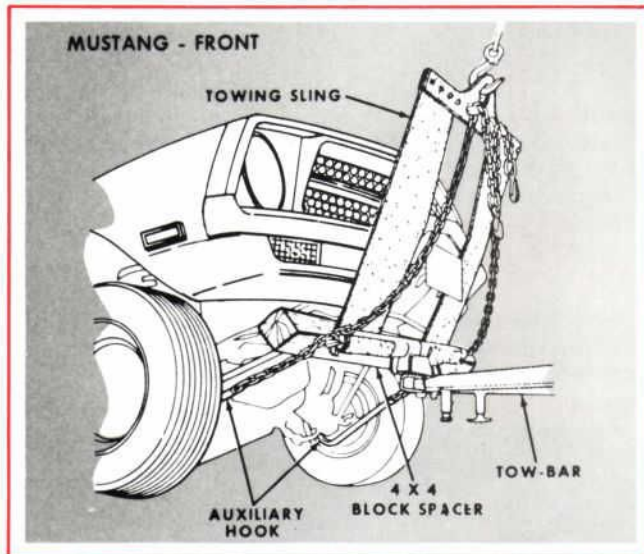


Figure 6—Note the position of the 4" x 4" wood block spacer when towing a 1971-72 Mustang.

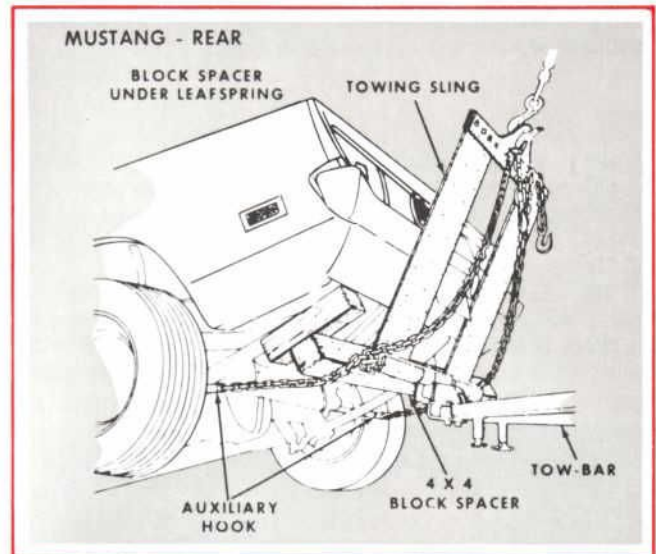


Figure 7—Note that three (3) wood block spacers are required when towing a 1971-72 Mustang from the rear end. The short wood spacers must be positioned under the rear leaf springs with the larger cross-car spacer distributing the towing load at about the midway portion of the shorter spacers.

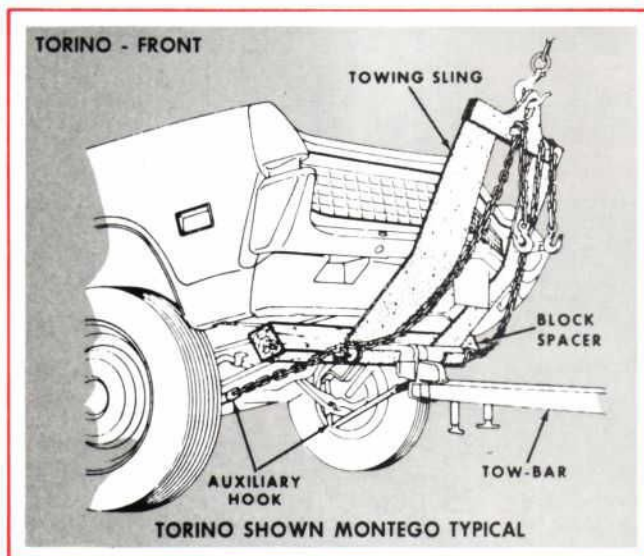


Figure 8—Note the position of the 4" x 4" wood block spacer under the front end of a 1971 Torino. (This is also typical on Montego models).

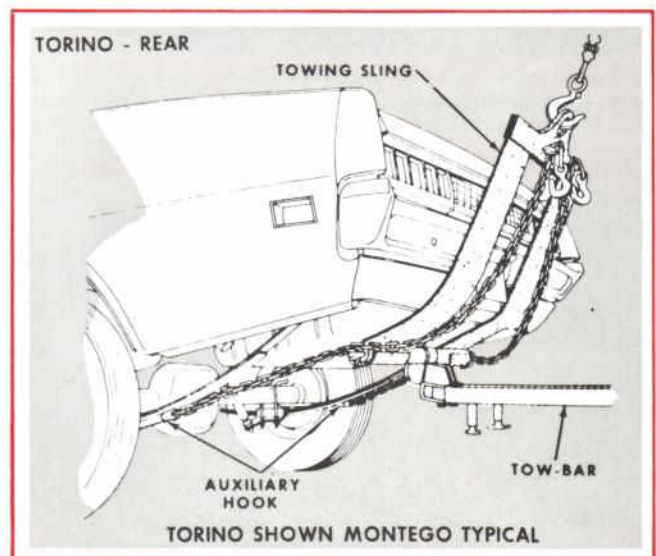


Figure 9—Note that the 1971 Torino (also typical for Montego models), does not need a wood block spacer when towing from the rear end.

& HARD STARTING TIPS

Continued

SPECIAL TOWING TIPS • 1972 FORD-BUILT CARS

To avoid possible damage to chrome parts or lower body panel, a special wide-belt sling should be used as shown in Figures 10 thru 13.

The 1972 Torino and Montego require a special wood block spacer for front end towing. See Figure 10 for dimensions. On Ford, Mercury, Lincoln, Mark IV and Thunderbird, use an

ordinary 4" x 4" wood block spacer adapter for rear end towing as shown in Figure 13.

When towing a Ford or Mercury from the front, it is necessary to remove the license plate and bracket to prevent bending and scratching the bumper.

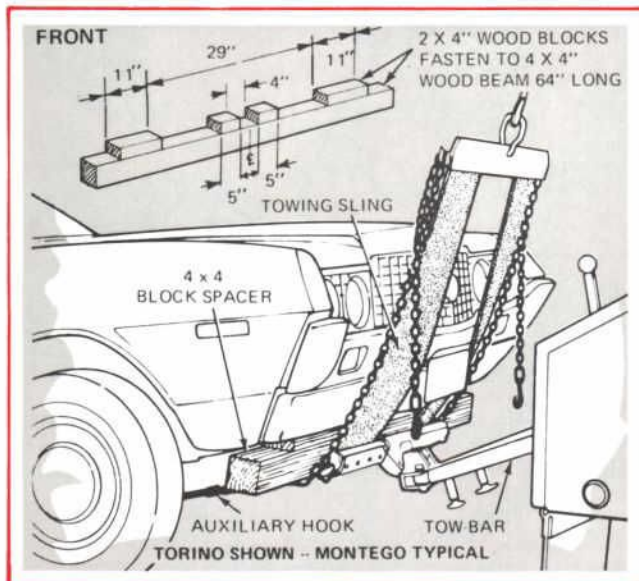


Figure 10—Note that a special wood block spacer is needed when towing a 1972 Torino (Montego typical) from the front end. This can be made locally in a few minutes and will prevent front end damage during the towing process.

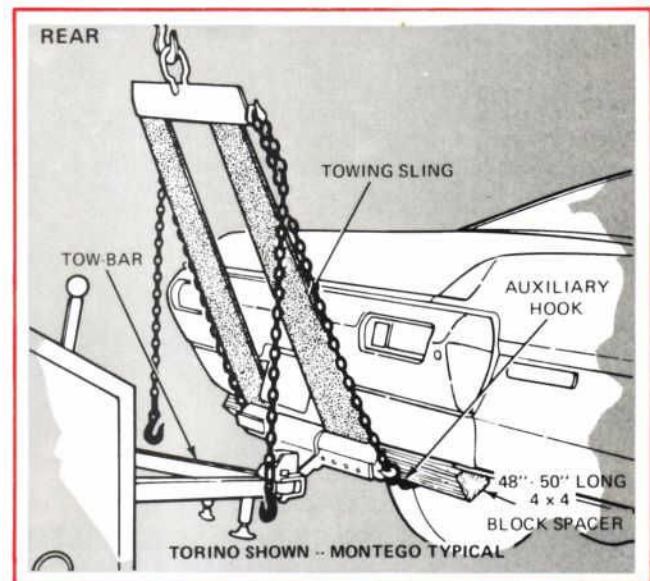


Figure 11—Note that a large 4" x 4" wood block spacer is required when towing 1972 Torino (Montego typical) from the rear end.

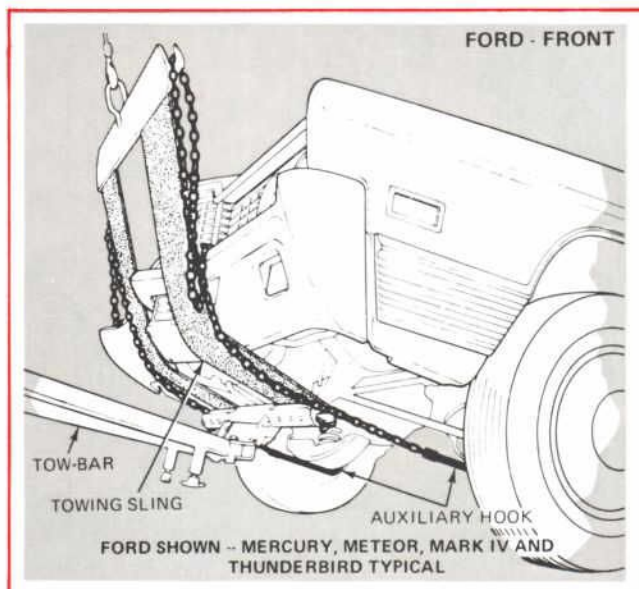


Figure 12—As you can see, the 1972 Ford (Mercury, Mark IV and Thunderbird typical) does not require a wood block spacer when towing from the front end.

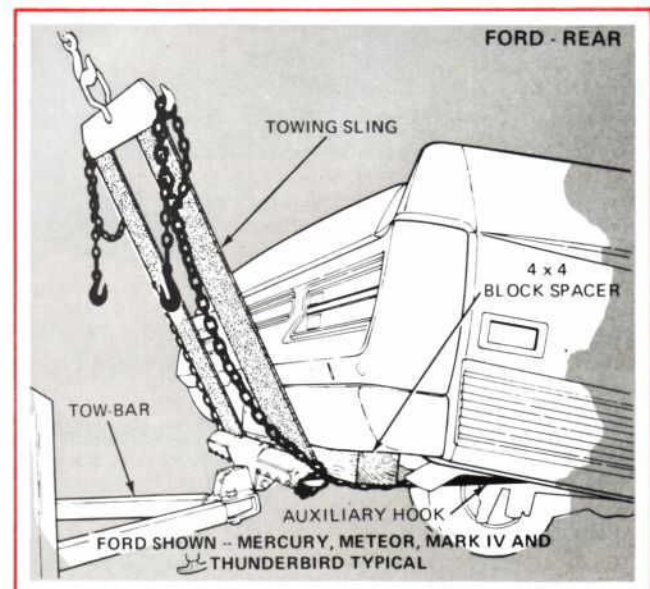


Figure 13—When towing a 1972 Ford from the rear end, (Mercury, Mark IV and Thunderbird typical) a wood block 4" x 4" spacer is needed to prevent damage.

Note: Not necessary to use wood block spacer between belt slings and bumper on Thunderbird and Mark IV models.



EMERGENCY TOWING & HARD STARTING TIPS *Continued*

TOWING THE 1971-72 CAPRI SAFELY

The Capri should be towed with rear wheels raised and with a special wood device required (locally made) to prevent vehicle damage.

NOTE:

The following procedure **MUST** be followed when towing a Capri:

1. Obtain two pieces of 2" x 4" wood and construct an adapter device using the dimensions shown in Figure 14. Join the two pieces of wood together using nails or screws, and install protective covering on the back side of the device to cushion the block against sheet metal and to prevent paint damage.

NOTE: Before towing the Capri, the ignition key should be removed from the switch so that the front wheels are locked in straight forward position. Make sure the parking brake is released and the transmission gears are in neutral position. Removing the ignition key from the switch on Capri models, locks **ONLY** the steering column.

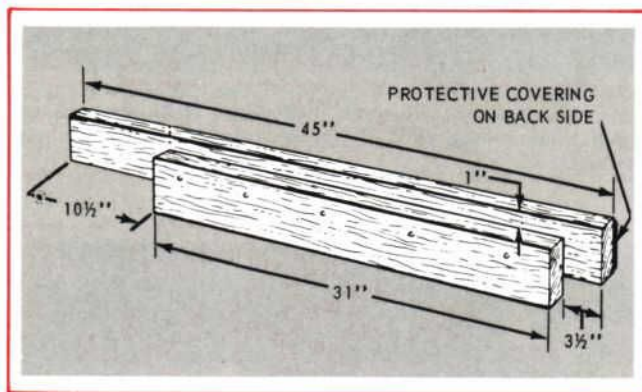


Figure 14—Here are the dimensions of the wood adapter device required for towing the 1971-72 Capri safely and without damaging sheet metal or painted surfaces.

2. Install the tow truck sling hooks over the rear axle and position the wood adapter device flush against the lower back panel and under the rear bumper as shown in Figure 15.
3. Raise the sling until the rear tires are approximately 14" off the ground. This will assure that the sling does not bear against or contact the rear bumper face bar. See Figure 16.

CAUTION: If the front end of the Capri is damaged extensively, or the front wheels are locked in a turned position, tires are flat, or for any other unsafe towing condition, it will be necessary to place a *dolly* under the front wheels.

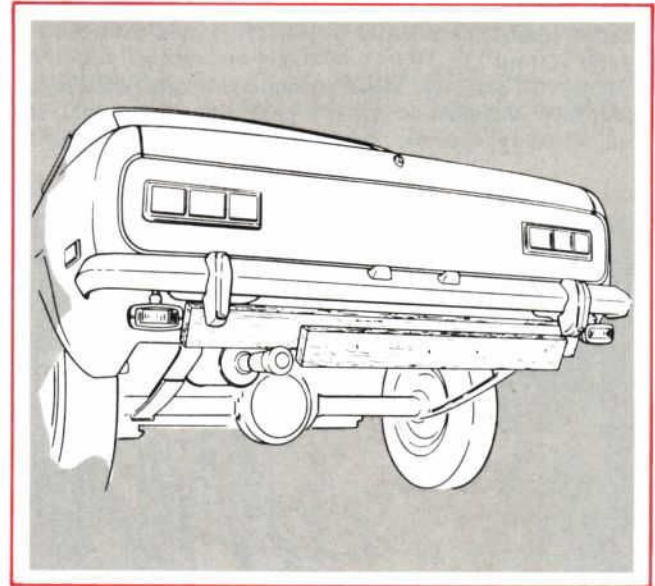


Figure 15—Note that the wood adapter device needed for 1971-72 Capri models is located against the rear lower panel and underneath the lower section of the bumper guards. Any other position will damage sheet metal.

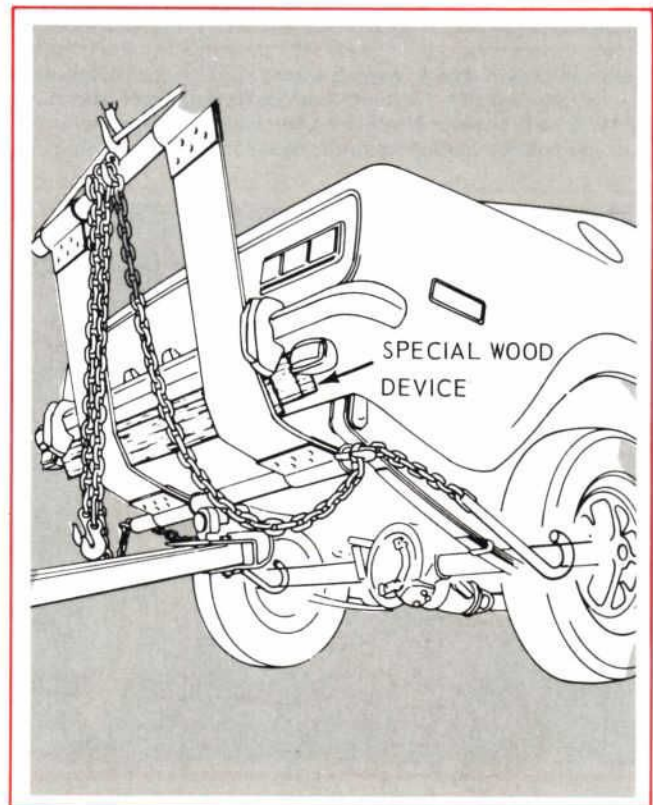


Figure 16—Note the position of the hooks, adapter and sling when the Capri is properly raised and prepared for towing safely.

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...here's hoping your holidays are the merriest ever!
And, our best wishes for a profitable and enjoyable 1972.

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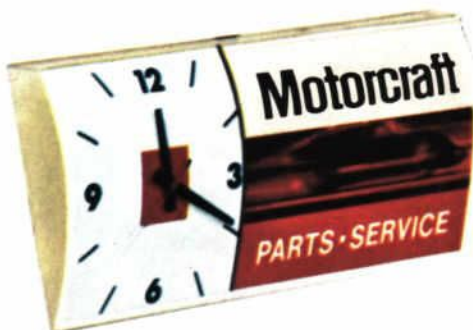
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EMERGENCY TOWING & HARD STARTING TIPS *Continued*

PRECAUTIONS WHEN TROUBLESHOOTING HARD STARTERS

Whenever you troubleshoot a hard starting engine, keep in mind that the alternator and regulator are designed with a specific polarity system. Therefore, the following service precautions must be observed. If you fail to follow these precautions, the result will be serious damage to the electrical equipment:

CAUTION 1.

When installing a battery, always make absolutely sure the ground polarity of the battery and the ground polarity of the alternator are the same. If the battery polarity is reversed when installing it, the battery is directly shorted through the diodes. As a result, the diodes and vehicle wiring will be damaged by high current flow. Burned wiring harness, burned "open" diodes, or both, will occur.

CAUTION 2.

When connecting a booster or "slave" battery into the charging system, make certain to connect the negative battery terminals together. Failure to observe this precaution will result in the same damage as noted.

CAUTION 3.

When connecting a charger to the battery, connect the charger positive lead to the battery positive terminal and the

charger negative lead to the battery negative terminal. Failure to follow this procedure will result in the same damage as described in Caution 1.

CAUTION 4.

Never short across or ground any of the terminals on the alternator or regulator. Any artificial circuit set up by purposely grounding or shorting any of the alternator or regulator terminals can cause serious damage to one or more of the electrical units in the charging system.

CAUTION 5.

Never operate an alternator on *open circuit*. With no battery or electrical load in the circuit (open circuit), the alternator can build up high voltage which could damage the diodes. Before making "on-the-vehicle" tests or checks, make sure that all connections in the circuit and any test equipment leads are tight and secure.

CAUTION 6.

DO NOT attempt to polarize an alternator. Polarizing the direct current type of generator is necessary to insure that both generator and battery polarity are the same. Polarizing the alternator is not necessary since the voltage development within the alternator is of both polarities and the diodes automatically control the direction of current flow.

ALWAYS KEEP IN MIND . . .

1. When installing a battery, make sure battery and alternator polarities are the same.
2. Booster batteries must be paralleled.
3. Battery-Charger and battery polarities must agree.
4. Never short across or ground any of the alternator or regulator terminals.
5. Never operate an alternator on an open circuit.
6. Never polarize an alternator.

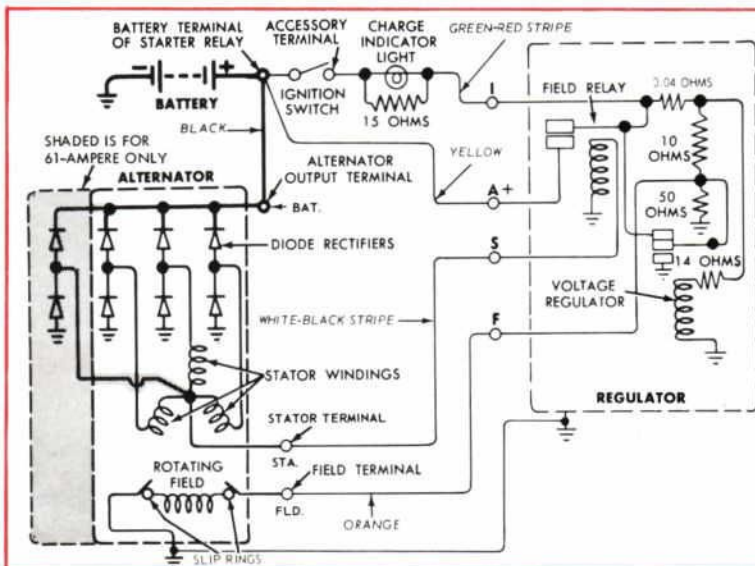


Figure 17—A typical Motorcraft Alternator System with an indicator light in the circuit. This is a negative ground system and consists of an alternator, a regulator, a charge indicator, a storage battery and the associated wiring. The alternating current is rectified from alternating current to direct current by six (6) diodes (eight [8] diodes in the 61 ampere models) for use in charging the battery and supplying power to the electrical system.



EMERGENCY TOWING

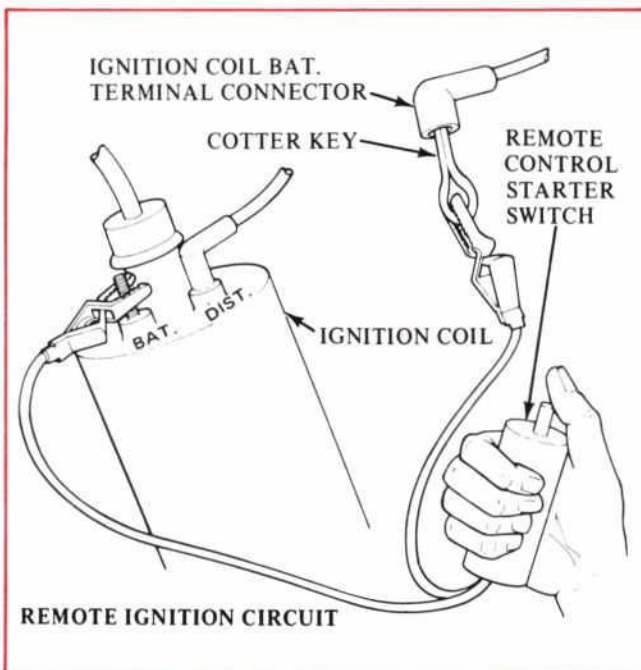
STARTING SYSTEM TESTING TIP

Intermittent Starter Drive Slipping Test

The purpose of this test is to provide a procedure for the diagnosis of intermittent starter drive slipping problems before you remove the starter from the engine.

If the complaint is of an intermittent "Engine Will Not Crank—Starter Spins" condition, check re clutch action of the starter drive as follows:

1. Start engine and set engine idle at between 900 and 1000 rpm with the hot idle adjusting screw.
2. Shut the engine off and connect a remote control starter switch in the primary ignition circuit as shown in the illustration below.
3. Depress the remote control starter switch and hold it in that position. Then, turn the ignition key to the START position. As soon as the engine begins to run, let up on remote-control starter switch while holding the ignition key in the START position. *Do not depress accelerator pedal during this procedure.* Letting up on remote control starter switch "kills" the ignition and the "dead" engine should now be cranked by the starter.
4. Observe to see if the starter begins to crank the dead engine and continues to crank engine until ignition key is released from the START position. If the starter spins and does not crank the dead engine, the drive assembly is slipping.
5. Repeat the test at least five times in succession to detect an intermittent starter drive slipping condition. If an intermittent condition is noticed it indicates that a new drive assembly is needed.



Note the simple hook-up into the primary side of the ignition coil and wiring for performing a starter drive slipping test.

V-8 DISTRIBUTOR SERVICE INFORMATION TIP—1972 FORD-BUILT ENGINES

There are 3 Delrin (plastic) buttons (Numbers 1, 2, & 3 in the drawing) that separate the upper, movable plate from the lower fixed plate in the distributor.

Buttons #2 & #3 serve as 2 points on an imaginary line about which the upper plate can be tilted when the ground screw "A" is being tightened. (Side View.)

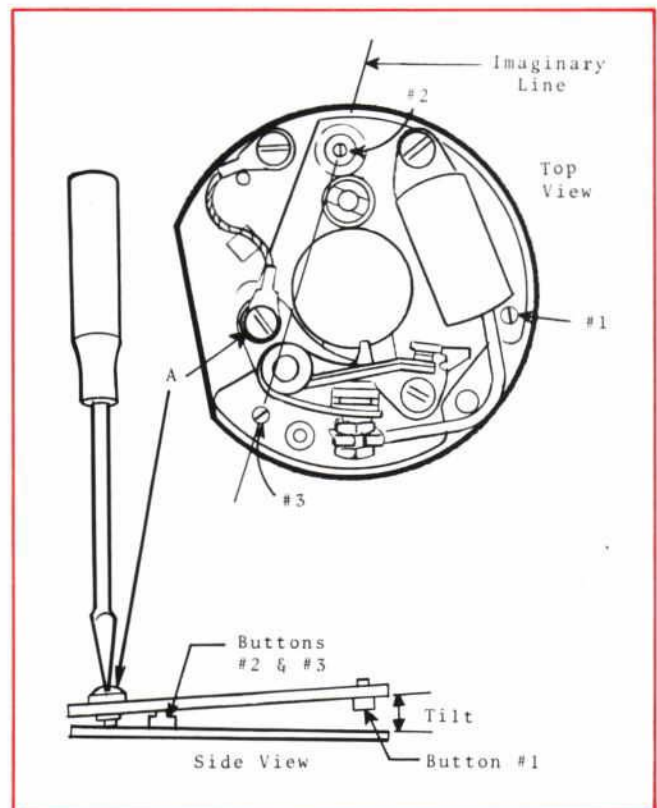
This allows button #1 to fall out of its hole. It then becomes trapped out of position between the two plates when pressure is released, leaving the two plates misaligned.

Point sets adjusted to specifications while the plates are in this position will lose their gap when button #1 is eventually dislodged during vehicle operation.

IMPORTANT NOTE:

As of November 15, 1971 these distributors have had a flange added to the upper distributor plate to prevent the excessive tilt that permits the condition described above.

Meanwhile (and whenever checking an engine for hard starting, poor performance or sluggishness), make sure the #1 button is in its hole. When you replace the distributor point set, make sure you press down on the condenser when tightening screw "A."



Note how the plastic button #1 can fall out of its location in the movable plate if finger pressure is not used on the condenser when tightening screw "A."

COLD WEATHER STARTING TIPS

Experience shows that most often one of the following problems usually causes the starting difficulty. They are relatively simple and generally occur during extremely cold weather in vehicles that operate satisfactorily in warmer weather. For instance, temperatures below zero drastically reduce available battery power and greatly increase the difficulty of igniting the air/fuel mixture. In other words, these conditions are specifically caused by COLD weather.

ENGINE CRANKS (SLOW) . . . DOESN'T START

1. **Weak Battery or Corroded Cables**—If engine turns over slowly, a discharged battery or excessive resistance due to bad cables or corroded or loose connections is most likely the cause. Outside chance of starter malfunction.
2. **Oil Viscosity**—The lower the temperature, the more sticky and molasses-like the crankcase oil becomes which takes more power to turn the crankshaft. 10W-30 or 10W-40 multi-viscosity oils are okay down to -10° F, if battery is in good shape. 5W-30 may be required at lower temperatures. The following oil viscosity selection chart applies to 1971-72 Ford-built passenger cars.

ENGINE CRANKS (FAST) . . . DOESN'T START

1. **Ignition**—Remove plug wire and hold $\frac{1}{4}$ -inch from ground while cranking engine. No spark indicates problem up the line, probably points or condenser. If weather is also damp, check inside distributor cap for moisture and carbon tracking. If spark occurs trouble can be isolated as spark plugs or fuel. Also check the distributor on 1972 Ford-built V-8 engine vehicles (manufactured prior to November 15, 1971) as described on page 8 of this issue.
2. **Fuel**—To assure against fuel-line "freeze-up" check for flow by pumping the accelerator rod and observing main venturi nozzles. Carbon deposits tend to cause sticky automatic choke operations. Choke (butterfly) plate should be completely closed after depressing accelerator.
3. **Starting Procedure**—Excessive pumping of accelerator floods engine.

ENGINE WILL NOT CRANK

1. **Discharged Battery or Loose or Corroded Cables**—If starter relay doesn't click when ignition is turned to START, a dead battery or bad cables are indicated. If relay clicks, the battery still may not be strong enough to turn engine, or cables may be too loose or too corroded at the battery posts to pass significant current. However, most likely the starter, or starter circuit is defective. Also, make a starter drive slipping test as described on page 8 of this issue.

OIL VISCOSITY, 1971-72 FORD-BUILT CARS

When you are changing or adding oil in Ford-built passenger car engines, you should also recommend oil with the proper viscosity, selected from the accompanying table which most closely matches the temperature range you expect the customer to encounter for the next 6 months or 6000 miles.

WHEN OUTSIDE TEMPERATURE IS CONSISTENTLY	USE SAE VISCOSITY NUMBER
MULTI-VISCOSITY OILS Below $+32^{\circ}$ F -10° F to $+90^{\circ}$ F -10° F to $+90^{\circ}$ F & above Above $+10^{\circ}$ F	5W-30* 10W-30 or 10W-40 10W-40 20W-40
SINGLE VISCOSITY OILS -10° F to $+32^{\circ}$ F $+10^{\circ}$ F to $+60^{\circ}$ F $+32^{\circ}$ F to $+90^{\circ}$ F Above $+60^{\circ}$ F	10W* 20W-30 30 40

*When continuous operation is anticipated which will impose maximum loads on the engine or when driving at sustained high speeds above 60 mph, use the next heavier viscosity oil.

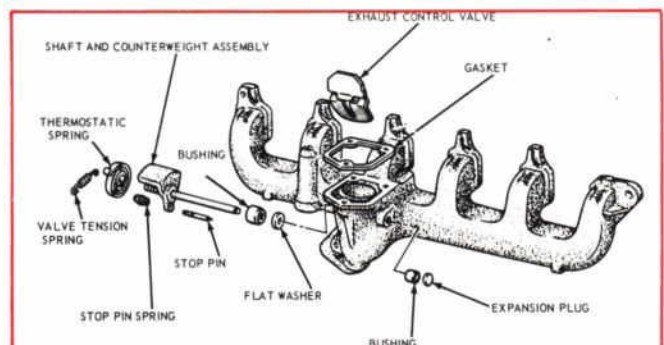
IMPORTANT TIP DURING COLD WEATHER

A small, and very often neglected part of some automobile engines can be the basis for serious operating problems. It's called the Heat Riser Valve, located in the exhaust manifold. Its purpose is to divert part of the hot exhaust gases through passages in the intake manifold just after the engine is started and during the warm-up period. If it sticks in the closed position, there will be a lot of back-pressure on the engine valves after warm-up, and eventually cause burned exhaust valves. If stuck in the open position, it will not function at all, resulting in slow warm-up and reduced gas mileage and often engine stalling, because the automatic choke will remain closed too long. Also, when this condition occurs, the heat passing through the intake manifold heat riser passages is insufficient for proper fuel vaporization.

WHAT DO WE DO?

First of all, understand that there is a counterweight and a thermostatic spring built into the valve. The valve is closed when the engine is cold. The weight tends to open the valve, and the spring serves to close it, until the engine gets warm enough to relax the spring tension. To check the action, the engine must be cold. Simply flip the counterweight and see if the springs brings the valve back to the closed position. If the

valve doesn't move at all, try squirting some solvent on the shaft using Ford Carburetor & Combustion Chamber Cleaner (Part No. B7AZ-19579). If that doesn't free it, then replacement is in order. Above all, NEVER put engine oil on the heat riser shaft. Oil will get gummy, and eventually become a carbon deposit when it gets hot. When that happens, reach for the wrenches.



Typical heat riser valve—6 cylinder, 240 CID, Ford engine.

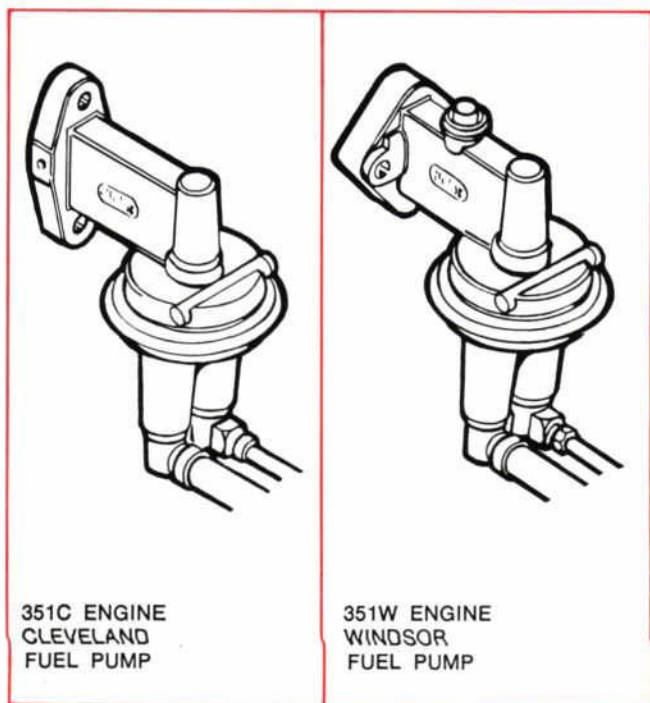
TECHNICAL SERVICE BRIEFS

IDENTIFICATION OF FORD'S 351W AND 351C ENGINES: WINDSOR AND CLEVELAND V8 POWER PLANTS

Because of differences in specifications, it is very important that you be able to identify the 351 CID engines as to whether they were built in Windsor or in Cleveland. One key to the correct identification can be found at the fuel pump. On the Windsor engines, the mounting flange is square-shaped. The flange on Cleveland-built engines is oval-shaped.

If the car is equipped with Air Conditioning, it is difficult to see the fuel pump. Other means of identification are then needed. For example:

- The Cleveland engine *does not* have the thermostat housing as part of the intake manifold
- Valve covers on the Cleveland engine are wider
- Cleveland 351C engine uses 14mm spark plugs. Windsor 351W engine uses 18mm spark plugs



351 CID fuel pumps. Note the differences in design between the Cleveland 351C engine and the Windsor 351W engine fuel pumps.

FLUID LOSS FROM SPARK SWITCH—1972 FORD-BUILT FMX AUTOMATIC TRANSMISSIONS

To avoid loss of transmission fluid when removing the Transmission Regulated Spark Switch or Plug, place the selector lever in REVERSE position. The manual valve will then be positioned in the fluid circuit of the main control valve body and reduce fluid loss to a minimum.

IMPORTANT INFORMATION ... NEW API ENGINE OIL SERVICE CLASSIFICATIONS

The latest revised American Petroleum Institute Engine Service Classification System presently includes nine classes of service; five for service stations and four for commercial applications. This article will cover only the classifications for new car dealers, garages and service stations.

NEW API ENGINE SERVICE CLASSIFICATIONS	PREVIOUS API ENGINE SERVICE CLASSIFICATIONS	RELATED DESIGNATIONS MILITARY & INDUSTRY
NEW CAR DEALERS, GARAGES AND SERVICE STATION ENGINE SERVICES		
SA	ML	Straight mineral oil
SB	MM	Inhibited oil
SC	MS (1964)	1964 MS Warranty Approved, M2C101-A
SD	MS (1968)	1968 MS Warranty Approved, M2C101-B 6041-M (Prior to July, 1970)
SE	None	1972 Warranty Approved, M2C101-C, 6041-M (July, 1970)

The following descriptions of the API Engine Service classifications are intended as guides to aid in the selection of proper engine oils for significantly different engine service conditions.

"S"—SERVICE (Service Stations, Garages, New Car Dealers, etc.)

SA (for Utility Gasoline & Diesel Engine Service) Service typical of engines operated under such mild conditions that the protection afforded by compounded oils is not required. This classification has no performance requirements.

SB (for Minimum Duty Gasoline Engine Service) Service typical of gasoline engines operated under such mild conditions that only minimum protection afforded by compounding is desired. Oils designed for this service have been used since the 1930's and provide only antiscuff capability, and resistance to oil oxidation and bearing corrosion.

SC (for 1964 Gasoline Engine Warranty Maintenance Service) Service typical of gasoline engines in 1964 through 1967 models of passenger cars and some trucks operating under engine manufacturers' warranties in effect during those model years. Oils designed for this service provide control of high and low temperature deposits, wear, rust and corrosion in gasoline engines.

SD (for 1968 Gasoline Engine Warranty Maintenance Service) Service typical of gasoline engines in 1968 through 1970 models of passenger cars and some trucks operating under engine manufacturers' warranties in effect during those model years. Also may apply to certain 1971 and/or later models as specified (or recommended) in the Owner's Manuals. Oils designed for this service provide more protection against high and low temperature engine deposits, wear, rust and corrosion in gasoline engines than oils which are satisfactory for API Engine Service Classification SC and may be used when API Engine Service Classification SC is recommended.

SE (for 1972 Gasoline Engine Warranty Maintenance Service) Service typical of gasoline engines in passenger cars and some trucks beginning with 1972 and certain 1971 models operating under engine manufacturers' warranties. Oils designed for this service provide more protection against oil oxidation, high temperature engine deposits, rust and corrosion in gasoline engines than oils which are satisfactory for API Engine Service Classifications SD or SC and may be used when either of these classifications is recommended.

1971 SHOP TIPS

YEARLY INDEX TO MAGAZINE ARTICLES

ARTICLE	ISSUE	PAGE	ARTICLE	ISSUE	PAGE
Air Cleaner—Element Replacement Interval Ford 4 and 6 Cylinder Engines	April	15	Motorcraft Part Number Application Chart—1972 Vehicles	September	44-47
Air Conditioning—Functioning of Refrigeration Cycle; Testing the System; Analysis Chart; Servicing; Important Tips; Safety Information; Glossary of Terms; '71 Model Specifications	May	2-11	Motorcraft Parts Lineup	September	4-5
Autolite Part Number Application Chart—1972 Vehicles	September	44-47	Oil Filter Removal—Econoline with 302 CID and Power Steering	May	12
Autolite Parts Released (New)	June July	14-15 15	Owner's Manuals—Ford Passenger Car and Truck thru 1971	April	13
Automatic Transmission—Ford-Built; Dry Refill Instructions	April	15	Paint—Ford Touch-Up	January	16
Battery Ground Cable—'71 Pinto 2000 cc Engine; Proper Positioning	May	12	Passenger Cars—1972 Features	September	2-3
Battery Power Requirements	May	15	Pinto—All 1971 Engines—Carburetion Deceleration Valve Operation and Service; Troubleshooting Chart	July	14
Camshaft—Timing, '71 Pinto; Improper Engine Performance	May	15	Pinto Maintenance Check List—Revised	June	13
Capri, 1970-'71 Autolite Parts Availability	January	15	Pinto—New Point Gap Adjusting Sleeve, 1600 cc and 2000 cc Engines	October	14
Carburetor—Autolite Model 1-V, Pinto 1600 cc Engine	June	12	Pinto—Rear Axle Ratios; Superseding Data	April	15
Carburetor—Diagnosis Guide '71 Pinto, 1600 cc Engine	June	12	Pinto—Removing and Installing C4 Automatic Transmission	October	10-11
Carburetor—'71 Pinto with 2000 cc Engine; Rough Idle Complaints (Weber Model 5200 C)	May	14	Pinto—'71, Air Cleaner Damage During Removal	April	15
Carburetor—Weber Model 5200, 2000 cc Engine; Lubrication Guide and Service Interval	August	12	Pinto—'71 Carburetor—Weber Model 5200 C Lubrication Guide and Service Interval	August	12
Car Towing—Ford and L-M Passenger	December	2-6	Pollution Control—Causes; Emission Control System Types (open and closed)	February	2-15
Circuit Breaker—New 1972 Models	October	14	Pollution Control—Service Procedures; Ignition, Combustion and Air Injection System Tests; Carburetor Adjustments; Air Intake System Service; Emission System Service Procedures and '71 Refinements; Glossary of Terms	March	2-14
Cooling System—Purpose and Function; Maintaining Efficiency; Effects of Poor Operation; 20 Steps to System Tune-Up; Specifications for '71 Passenger Cars	April	2-9	Power Brake Booster—Ford-Built Passenger Cars Diagnosis Information	May	13
Crankcase Breather Element—Service Interval—'71 Ford and L-M Cars	January	15	Safety in Service Shop—Hand Tools, Power Tools/ Equipment/Air; Personal Safety; Shopkeeping Safety; Handling Cars; During Fires; Fire Classification Chart	August	2-11
Distributor—On-The-Car Services—Basics of Ignition/ Distributor Operation; Testing Circuit; Adjustments; Ignition Timing; Distributor Vacuum Control and Advance Control Valve Hose Installations; Engine Timing and Cylinder Firing Order '71 Ford-Built Engines; Operation and Testing of Dual-Diaphragm Distributor; '71 Ford-Built Distributor Applications and Engine Ignition Specifications	July	2-11	Service Publications—1968 and Earlier Ford and L-M Vehicles	April	14
Distributor—'71 Ford 400-2V (D00F-12127-U)	May	15	Shop Manuals—'71 Ford and L-M Vehicles	April	10-13
Engine Identification—351C and 351W	December	10	Spark Plug Thread Design—AE-42 Application	May	12
Engine Oil—New API Service Classifications	December	10	Spark Plug Wire Routing—'71 Econoline, 302 CID Engine	April	15
Engine Timing—Ford 302 and 401 CID Revised Specifications	April	15	Specifications, 1972 Ford and L-M Vehicles	September	12-43
Frame Horns—Crash Repairs	October	12-13	Starter, Solenoid Actuated—Use of Connector Link	January	15
Hard Starting Tips	December	7-9	Trailer, Light Connections—All Ford-Built Car Lines	June	11
Identification—1963-72 Ford-Built Vehicles	November	3-15	Trailer Towing—Safe Equipment; Servicing Suggestions; Ford and L-M Car Towing Recommendations	June	2-9
Ignition Sets—Autolite SIPCON for All Ford Vehicles and GM and Chrysler Applications	July	12-13	Transmission, Automatic—Erratic, No Upshifts, No Reverse or Cracked Main Control	January	14
Lighting System—Facts and Figures; Circuits; Fuses; Troubleshooting	October	2-9	Transmission, Automatic—On-The-Car Services—FMX, C4, C6 Design Features and Applications; Checking; Partial Refill; Adjusting Bands and Throttle Linkage; Troubleshooting Charts	January	2-13
Loctite Minute-Bond (Ford D0AZ-19554-A)	January	15	Transmission Oil Cooling—When Required, Typical Installation	June	10
Lucas Alternator—'71 Capri; Diode and Output Tests	May	14	Truck Information, Engine and Transmission Codes	November	12-15
Maintenance Schedules—1972 Ford Division Models	September	10	Water Pump Gaskets—Applications, Ford CID Engines (1968-71)	May	13
Maintenance Schedules—1972 Lincoln-Mercury Division Models	September	11	Weld Studs—Replacing (Trim Clip Rivet 383229-S)	January	14

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