# SHOP TIPS FROM Autolite Ford

VOL. 6, NO. 9 MAY, 1968

## VACATIONTIME IS SAFETY CHECK TIME

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.

### LEARN ABOUT 12 CHECKS FOR:

- BETTER CUSTOMER RELATIONS AND SAFETY
- INCREASED PARTS AND SERVICE BUSINESS

**PLUS**—OTHER TIMELY SERVICE TOPICS


# VACATION-TIME SAFETY

**CORRECTION: March, 1968 Shop Tips**

Figures 4 and 21 illustrate the 428 Cobra Jet crankshaft with an *optional* oil groove cut in the MAIN bearing journal. The caption and copy incorrectly said the groove was in the CONNECTING ROD journal. All references to this oil groove, which can be cut into the production crankshaft to improve lubrication under the extra high load conditions of strip operation, should be changed to read "main bearing journal."

## IN THIS ISSUE



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

The description and specifications contained in this book were in effect at the time the publication was approved for printing. The Ford Motor Company, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change specifications or design without notice and without incurring obligation.

Autolite Ford



VOL. 68 FPM 80 LITHO IN U.S.A.

## SAFETY CHECKS MAKE MORE THAN JUST GOOD SENSE

Nearly half the states now *require* some type of vehicle safety inspection. The Auto Industries Highway Safety Committee sponsors a yearly nationwide safety check in May and June. You may be taking part in one of these programs. *And, of course, Ford Motor Company pioneering and long-time research into the art of designing and building more sturdy, dependable vehicles, has made it a leader in automotive safety for many years.*

**FORD'S Automotive Safety Center • World's first centralized, fully equipped laboratory for automotive safety research—a "total system's" approach to vehicle safety.**

Safety makes sense to a lot of people. Vehicle safety checks can make more than just good sense to you. Hardly anybody wants to drive an unsafe car, but few have the know-how or inclination to check out and maintain their cars for safety. They depend on service technicians like you to maintain it. That makes safety checks *good business* because they help assure:


- **Customer Safety**
- **Better Customer Relations**
- **Increased Parts and Service Business**

Official figures from 1967 show the leading causes for vehicles failing the safety check were:

- Rear lights (28%)
- Headlights (22%)
- Stoplights (15%)
- Turn Signals (13%)
- Brakes (10%)
- Tires (9%)

Notice you can easily and quickly check these items. In fact, it only takes a short time to perform a complete safety check. It can be well worth your while, for safety checks can lead to increased parts and service sales .

AUTO INDUSTRIES HIGHWAY SAFETY COMMITTEE
Drive for Safety

NOW is the time to become a safety bug! Your customers will soon be coming in to get their cars ready for summer vacation travel. Use this timely article from Ford to help you recommend the services necessary to provide a safe care-free trip . . . beginning with a safety check.

A packet containing complete information on the 1968 Traffic Safety Program can be obtained by writing:

Auto Industries Highway Safety Committee
2000 K Street, Northwest—Washington, D.C. 20006

# CHECKS AND SERVICES


## SAFETY CHECKS

Essentially, the safety checks are an extension of the normal periodic maintenance which every owner has the responsibility of having performed to keep the car in good running order; maintenance some owners may "put off" or not fully understand.

By virtue of your frequent contact, training and experience, probably nobody has a better opportunity to help the average motorist realize that *regular* preventative maintenance not only adds to the service life of the vehicle, but contributes to auto safety by helping the driver, *see, steer,* and *stop* safely.

These checks only pinpoint some of the more serious types of conditions that may develop. Other conditions or symptoms may be discovered during the inspection, and of course, should be checked out. And don't hesitate to question the owner about unusual operating conditions or noises. Many times they are caused by components that do not function "intermittently." Such conditions that might ordinarily pass the safety check can then be corrected before they cause trouble.

## 1. BRAKES

Ford-built brakes are built to provide long, trouble free service. To achieve maximum service life, check the fluid level and the entire brake system every 6,000 miles. Also check the brake lines and the lining of all four wheels at 30,000 miles. During a safety check . . .

### HERE ARE THE THINGS TO LOOK FOR:

- Low or spongy pedal
- Pull to one side
- Excessive pedal effort
- Harshness or noise
- Insufficient braking action
- Parking brake doesn't hold
- Brake warning light operates (Dual Brakes)

### Checking Pedal Travel

Depress the brake pedal (with the engine running for power brakes) and observe the amount of pedal travel. Generally, pedal travel ("B" dimension) should never be more than one-half of pedal height ("A" dimension) as shown in Figure 1. In other words, the brake pedal should never travel more than half way to the floor when the brakes are fully applied. Maximum pedal travel varies from about 2″ to 3″, depending on car model. However, all brakes should start to take hold in the first inch of travel. When fully applied, there should always be an inch or two between the pedal and floor board.

The vacuum booster system of power brakes can be checked by applying the brakes with the engine off. When the engine is started, the pedal should fall away under pressure and less pressure should be required to hold the pedal in the applied position. If no action is felt, the vacuum booster system is not functioning properly.

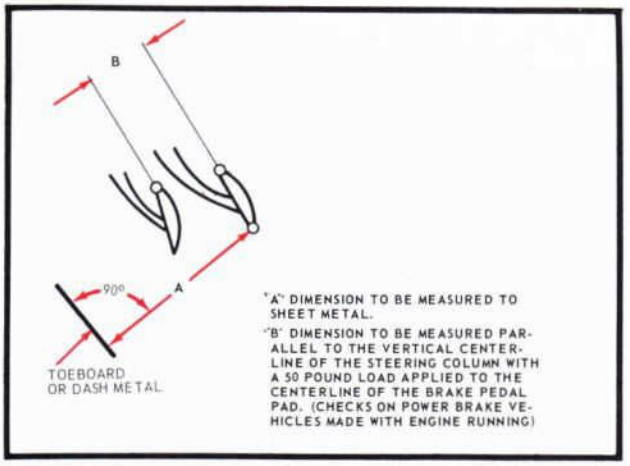



*Figure 1—Pedal Height and Pedal Travel*

## 2. LIGHTS

Statistics show that lights were the leading reason why many vehicles failed the 1967 safety check inspection. Owners tend to put off having light defects corrected. A simple thing like a burned out bulb may seem unimportant. But customers should be reminded that a faulty light can be hazardous on a dark, rainy night or in a panic stop situation. When checking lights . . .

### HERE ARE THE THINGS TO LOOK FOR:

### Front Lights

Check parking lights, turn signals and headlight high and low beam operation. If headlights are part of vacuum operated doors, be sure the doors open and close properly. Also check headlight alignment. If headlights need alignment, it should be made with a half full tank of gas, the car weighted to equal to a driver and one passenger, no loads, and with an empty trunk except for a spare tire and jacking equipment. Level vehicle by jouncing all four corners and be sure tire pressures are at recommended specifications.

### Rear Lights

Check to see that all rear lights operate. This includes license plate light, tail lights, stoplights, turn signal lights and back-up lights.

### Side Marker Lights/Reflectors (If so equipped)

Bulbs should be checked to see that they light up. Reflector should be checked for chipped or broken glass.

### Interior Lights

Check to see that all interior lights are in proper working order. If the car is equipped with emergency warning lights, be sure the warning flasher operates correctly.


# VACATION-TIME SAFETY

## Diagnosis Tips

Diagnosing lighting problems generally is a matter of determining if (1) a bulb is burned out, (2) if a wire is shorted or grounded, (3) if a connection is loose, or (4) if a switch is faulty. Normal trouble-shooting procedures will usually determine which condition exists.

## 3. STEERING

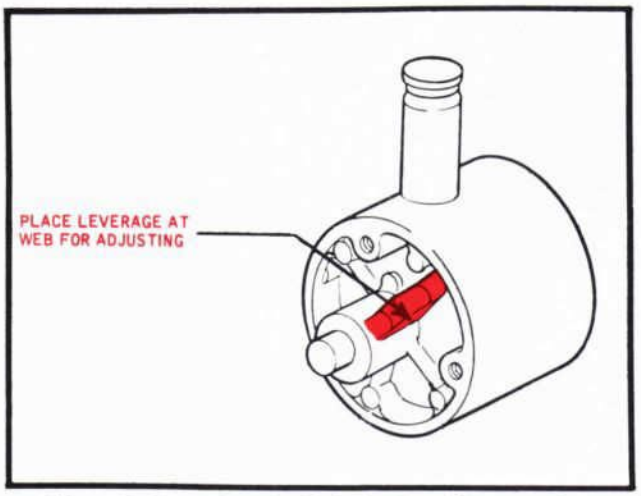



*Figure 2–Power Steering Belt Tension Adjustment Lug*

Steering is an extension of the suspension system. Hence, for a vehicle to steer properly, tire pressure and wheel alignment must be within specifications and ball joints must be in good shape. If the vehicle is equipped with power steering, Ford recommends checking the drive belt and fluid level every 6,000 miles. Steering arm stops should be lubricated every 6,000 miles and the suspension and steering system every 36,000 miles. During a Safety Check . . .

### HERE ARE THE THINGS TO LOOK FOR:

1. Power steering drive belt condition
2. Power steering fluid level
3. Excessive looseness in linkage

### Checking Pump Belt

Check to see if the belt is cracked, glazed or worn. Also check belt tension. Used belts (run for more than 10 minutes) should be adjusted to 110 lbs. New belts, (run for less than 10 minutes) should be adjusted to 140 lbs. Run the engine for 10 minutes, then check belt tension. If necessary, adjust the belt to 110 lbs. to bring the belt tension to the used "reset" specification.

**CAUTION:** When adjusting the power steering belt tension, do not pry against the reservoir. Obtaining belt tension in this manner may damage the reservoir resulting in leaks. Instead, pry upwards on the ½ inch boss (Fig. 2) with an open end wrench.

### Checking Fluid Level

Run the engine long enough to bring the engine to normal operating temperature. After making sure the reservoir is filled to the proper mark, turn the steering wheel several times all the way to the left and then to the right to expel or bleed air out of the system. DO NOT HOLD THE WHEELS AGAINST THEIR STOPS. AS THIS CAN CAUSE SEAL DAMAGE. Check the fluid level again. The fluid should be at the "F" mark on the dip stick, or to the bottom of the filler neck on a pump with a straight filler tube (Fig. 3). If fluid level is low, add Ford automatic transmission fluid. Ford Part No. C1AZ-19582-A or equivalent. DO NOT OVERFILL THE RESERVOIR.

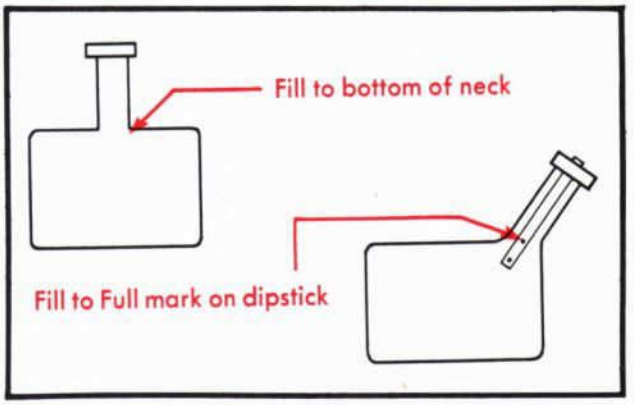



*Figure 3–Full Marks-Power Steering Reservoir*

### Checking for Looseness

Turn the steering wheel back and forth several times to note whether or not the steering has excessive play. If so, check steering tie rod linkage ball joints and suspension ball joints. If the ball joints require lubrication use Ford Multi-Purpose Long-Life Lubricant. Ford Part No. C1AZ-19590-B, or equivalent. Also check the worm and sector for proper adjustment.

## 4. TIRES

Tires are important safety-check items because they greatly affect performance, ride and handling qualities.

### HERE ARE THE THINGS TO LOOK FOR:

1. Exterior cuts, breaks or bruises.
2. Excessive or uneven tread wear.
3. Improper inflation.

### Cuts and Bruises (Exterior)

Check sidewall and tread for cuts, bruises, foreign objects, etc. Repair or replace the tire as required.

# CHECKS AND SERVICES

## Excessive or Uneven Tire Wear

Abnormal tire wear usually is readily noticeable to the eye. Here are some of the common types:

*Figure 4—**Spotty Wear** occurs along the edge of the tire in small circular areas. It's caused by a combination of conditions, including tread design, inflation pressure and misalignment.*

*Figure 5—**Toe-in or Toe-out Wear** produces a feather-like edge along the edges of the tread due to a scrubbing action on the road. Excessive Toe-in produces a feather edge on the inner edge of the tread. Toe-out produces a feather edge on the outer tread edge.*

*Figure 6—**Camber Wear** resulting from out-of-spec camber adjustment, produces excessive wear on the inner or outer shoulder of the tire, usually one side only.*

*Figure 7—**Cornering Wear** also produces excessive wear on the inner and outer shoulder of the tire due to fast driving on curves and around corners, usually on both inner and outer shoulders.*

*Figure 8—**Overinflation Wear** occurs at the center of the tread area. Causes early failure in the center of the ribs or sidewall areas.*

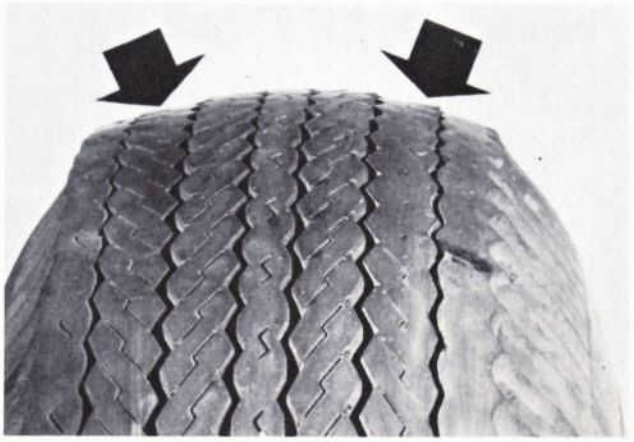


*Figure 9—**Underinflation Wear** occurs at both shoulders of the tire. Car weight usually distorts the normal contour of the tire so that it bellies out. Leads to excessive heat, broken cords, wheel-rim bruises and premature tire failure.*

Photographs Courtesy of Rubber Manufacturers Association


# VACATION-TIME SAFETY

## Inflation Pressures

Tire pressure specifications for 1968 Ford Motor Company cars are on a decal in the glove box, or door pillar. Tire pressures should be checked frequently, and while the tire is "cold" (preferably after the car has been parked at least one hour or not driven more than three miles). Operation at high speeds or heavy loads will increase tire pressure considerably. An increase of 8 psi over "cold" pressures is not unusual. Therefore, never bleed air from a "hot" tire because when the tire cools off, pressures will be less than specified.

Pressures lower than those recommended will reduce the allowable full-rated load carrying capacity and may affect handing. Overinflated tires reduce comfort by magnifying rather than absorbing road shocks. Overinflated tires are also more vulnerable to damage from road suface impacts.

## TIRE INFLATION NOTES

- When towing trailers up to 200 lbs. tongue load, combined weight of driver, passenger, luggage, and trailer tongue load must not exceed the full rated (Max.) load. For heavier tongue loads see your Ford or Lincoln-Mercury Dealer.

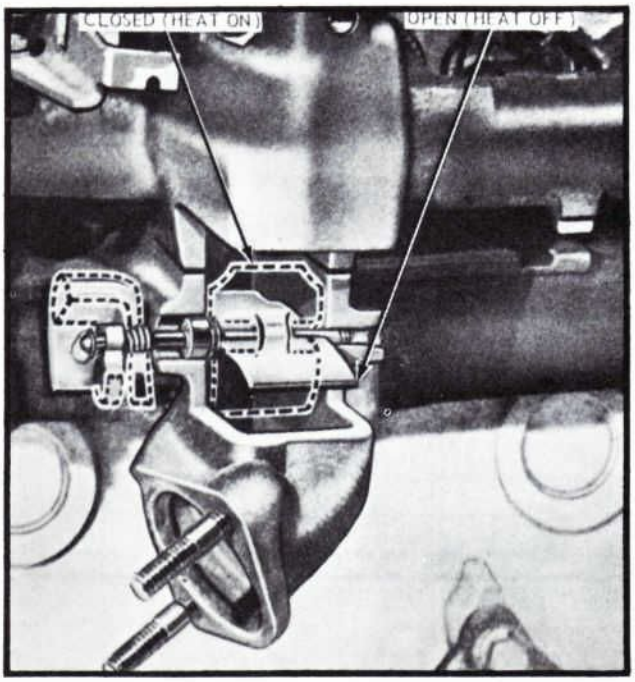



*Figure 10–Exhaust Control Valve*

- For sustained high speed driving (one hour or more) over 75 mph, cold inflation pressure must be increased 4 psi, but not exceed the maximum of 32 psi for 4-ply rating tires, and 40 psi for 8-ply rating tires. If the 4 psi pressure adjustment for sustained high speed driving with maximum vehicle load requires inflation pressures above the maximum allowable, speeds above 75 mph are not recommended.

## 5. EXHAUST

The exhaust system safety-check is vital because a faulty exhaust system may allow carbon monoxide gas to seep into the vehicle causing drowsiness to the driver and a safety hazard. If the engine is so equipped Ford recommends that the exhaust control valve (Fig. 10), which affects engine warm-up, be checked every 6,000 miles and lubricated, if required, for free operation. The complete exhaust system can also be checked at this time.

### HERE ARE THE THINGS TO LOOK FOR:

1. Noise and Leaks
2. Misalignment

### Noise and Leaks

External leaks in the exhaust system are usually accompanied by noises or greyish-white smoke emitted from under the car. Small leaks are most often inaudible and not visible. A visual inspection usually shows the location of the leak. Look for holes, ruptured joints and corroded areas in the muffler, inlet pipe and outlet pipe. Examine joints and connections for greyish-white deposits that could be caused by exhaust gas leakage.

### Misalignment

Misalignment is usually indicated by vibration, grounding, rattling, or binding. These conditions should be corrected since they not only divert driver attention, but usually lead to leakage. If re-alignment is necessary, start at the front and work towards the rear of the vehicle.

## 6. GLASS

The ability to see is, of course, an important factor to safe motoring. Although no periodic maintenance is recommended by Ford, owners should be advised to keep the windshield, rear window and all side glass in good repair.

### HERE ARE THE THINGS TO LOOK FOR:

1. Check all glass for cracks
2. Check all glass for discoloration and cloudiness
3. Check all side windows for easy operation

## 7. WIPERS AND WASHERS

Wiper and washers present no special safety problem . . . until it's time to use them. Then they are vitally important if the driver is to have adequate visibility.

### HERE ARE THE THINGS TO LOOK FOR:

1. Wiper operation
2. Proper wiping action
3. Washer operation

### Wiper Operation

Squirt the windshield with water and operate the wiper for a few cycles. Also check park position which may affect wiper travel.

### Wiping Action

This can be checked while wiper operation is checked. Inspect the rubber blades to see if they are deteriorated. This is usually evident by streaks left on windshield. Check to see that wiper arms hold the blades on the windshield with adequate tension.

### Washer Operation

Inspect during the wiper operation check. If the washer fails to work, the problem in most instances is caused by an accumulation of foreign material on the strainer. Figure 11 illustrates typical strainers and how to clean them. Hoses and jets should also be inspected for clogging materials.

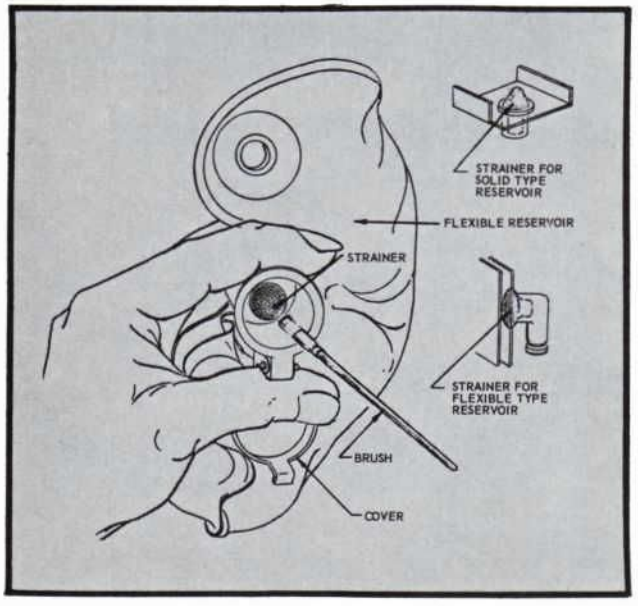



*Figure 11—Windshield Washer Strainers*

## 8. MIRRORS

Mirrors are installed on vehicles for one reason. To enable the driver to see what's behind him. They are considered an important safety item and should be thoroughly inspected.

### HERE ARE THE THINGS TO LOOK FOR:

1. Looseness
2. Cracks or discoloration

### Looseness

Loose mirrors make it difficult if not impossible, to see what's happening behind the vehicle. If they are loose, tighten them. If they can not be tightened, recommend that they be replaced.

### Cracks or Discoloration

Likewise, broken or discolored mirrors impair the driver's rear vision. Broken mirrors should definitely be replaced. Discolored mirrors should be replaced if they can't be cleaned.

## 9. HORN

Horns are something like wipers and washers, they're used sparingly but when you need them it's most important that they work properly. This is especially important with horns, which should be in good working order to warn other motorists, children and pedestrians that danger may exist from an approaching vehicle.

### HERE IS WHAT TO LOOK FOR:

1. Horn operates

### Horn Test

The only test for horns is the current draw. Connect a voltmeter and ammeter to the horn and to a voltage supply as shown in Figure 12. The normal current draw for horns at 12 volts is 4.0 to 5.0 amperes. If not within specifications, turn the self-locking adjusting nut until the current draw is within limits.

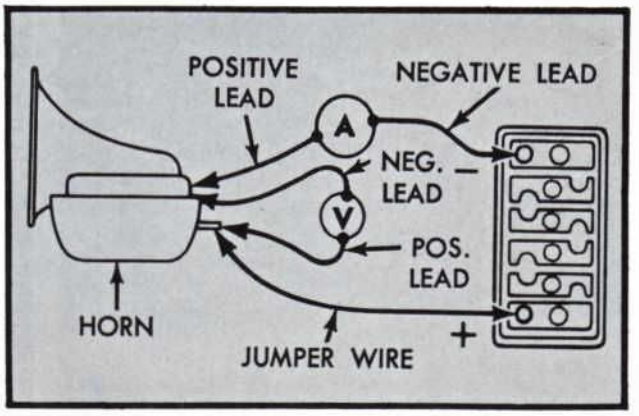



*Figure 12—Horn Current Draw Test*

## 10. SEAT BELTS

This is the one safety-check item that's not necessary for mechanical operation of the vehicle. Seat belts are strictly a protective device for the driver and passengers . . . a safety item that has proved its value at reducing injury in case of an accident.


# VACATION-TIME SAFETY

**HERE ARE THE THINGS TO LOOK FOR:**

1. Buckle operation
2. Frayed or broken belt strands
3. Belt anchorage

### Buckle Operation

Check the belt buckle to see that it fastens easily. Give a quick firm pull on the belt to check its holding power.

### Frayed or Broken Belt Strands

Inspect the entire length of each belt for broken or frayed belt fibre strands. This is the first sign of potential failure. Belts with broken or frayed strands should be replaced.

### Belt Anchorage

Inspect belt anchorage for looseness or defects. If the anchorage bolt is loose, it can be tightened. If there is any doubt about the ability of the anchorage to hold a passenger firmly in his seat during an impact, recommend that the anchorage be repaired or replaced.

## 11. DOOR LOCKS

Door locks not only keep intruders *out* (police reports show that 80% of stolen cars were left unlocked), but passengers *in*. Operate each lock mechanism to see that it functions properly.

**HERE ARE THE THINGS TO LOOK FOR:**

1. Lock mechanism malfunction
2. Broken or missing lock buttons

## 12. DEFROSTER

Defrosters clear the *outside* of ice and snow, and the *inside* of fogging moisture. This is especially important during the first few miles of operation in the morning.

**HERE ARE THE THINGS TO LOOK FOR:**

1. Inoperative switches
2. Disconnected or pinched air ducts
2. Stuck air doors

## SPECIAL VACATION SERVICES

Ford-built vehicles require very little special attention. They are built to operate under a wide range of conditions. Extreme usage situations, however, arise when the owner loads the car with the family and vacation gear, perhaps attaches a trailer, and travels for long periods on turnpikes and thruways or secondary roads and trails. Under these conditions, a few special services and perhaps some optional equipment are adviseable to provide a safe trouble-free trip.

### Tires

Tires probably require more special attention than any other item during vacation travel because of the increased loads carried. Tire load carrying capacity can be increased by using larger tires or increasing tire pressure. Failure to adhere to this important principal can result in steering and stability problems due to weak sidewalls (Figure 13). The tires specified as standard equipment on all Ford-built vehicles can be used under just about any conditions by varying tire pressure. The exception is when extremely heavy loads are carried, in which case oversize tires may be required.

The owner's manual with each car contains complete tire size recommendations, tire pressure and load carrying specifications.

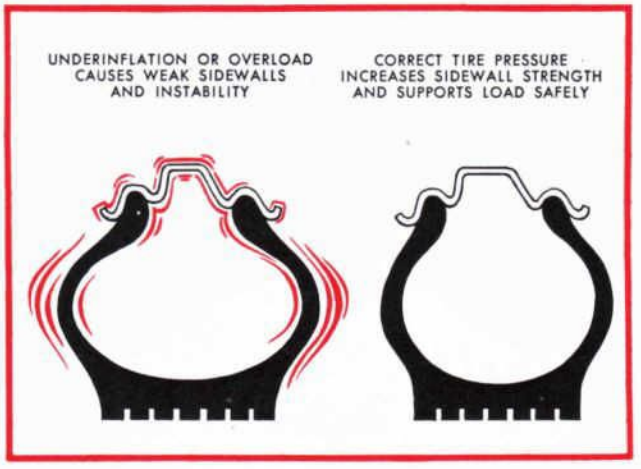



*Figure 13—Tire Pressure vs. Load Carrying Capacity*

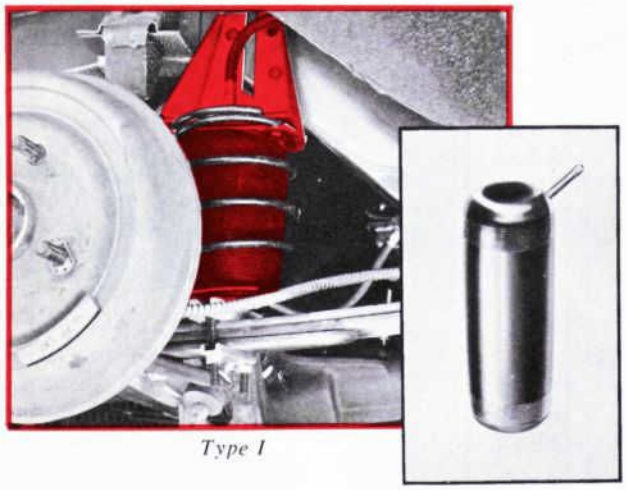
### Towing

Ford Motor Company cars can tow trailers of Class I size (Maximum trailer weight up to 2,000 lbs., static tongue load 200 lbs.) with very little special equipment. In most cases, all that is needed is a Ford Hitch and a Ford Wiring Kit (which includes a 4-wire connector plug and a heavy duty turn signal flasher). Ford and Lincoln-Mercury dealers have information covering detailed towing requirements for each car line. Recommendations for larger trailers include: increased wheel and tire sizes, heavy duty suspension, air lift springs and a load equalizing trailer hitch. Automatic transmissions are preferred over manual transmissions for towing.

# CHECKS AND SERVICES

## Air Lift Kits

Air lift springs (Figure 14) provide extra support for heavy loads and raise the vehicle to correct ride heights. The air cylinders are easily installed and require only a small amount of air from a tire pump or similar air supply. Cars with leaf springs (Falcon, Fairlane, Mustang, Cougar, Comet) use type I kits. They include air bags, auxiliary helper springs and necessary air hoses. Type II air bags are used on vehicles with coil springs.



*Type I* *Type II*

*Figure 14—Air Lift Spring Kits*

## Tips On Trailer Hitches

Although many varieties of coupling devices are available, each with special applications, Ford recommends the use of frame hitches only. Detailed hitch drawings for all Ford vehicles are available at your nearby Ford or Lincoln-Mercury dealer.

For static tongue loads under 200 pounds, the connection can be a simple hitch attached to the frame. With a heavier load, the hitch must spread the load between the trailer and towing vehicle. Then it is necessary to install a load-equalizing hitch that attaches to the frame and distributes part of it back to the trailer wheels. It equalizes the tongue load (weight resting on the car hitch) to both the trailer and car (or truck) wheels. This helps keep the towing vehicle and trailer level for easier handling, more comfortable and safer driving.

Most equalizing frame hitches can be adjusted for height when installed, so that the trailer will ride levelly with the towing vehicle.

**NOTE:** Axle hitches are not recommended in any case.

Safety Chains should always be crossed under the tongue to prevent the tongue from dropping to the ground in the event of a coupling failure. The following coil-steel welded chains are recommended:

CLASS I Trailers.....trade size 3/16 inch
CLASS II Trailers.....trade size 1/4 inch
CLASS III Trailers.....trade size 5/16 inch

## Cooling System

All Ford Motor Company vehicles are filled with Ford Permanent Anti-Freeze at the factory. If any other type has been used since the original fill and has been in the car more than one year, recommend a complete drain and flush. Be sure to add a rust inhibitor. The coolant level should be maintained at about 1" below the bottom of the inlet filler neck ring (Figure 15).

The cooling system should maintain a pressure of 12-15 psi. If the system will not hold 12-15 lbs., or if coolant must be added more than once a month, or more than a quart at one time, check the cap, radiator filler neck, hose connections, and other areas for leakage.

To avoid injury when checking a hot engine, do not immediately remove the radiator cap. Muffle the cap in a thick cloth and turn it counter-clockwise only until the pressure starts to escape. After the pressure has completely dissipated, finish removing the cap. If the coolant is low add coolant gradually, with the engine running.

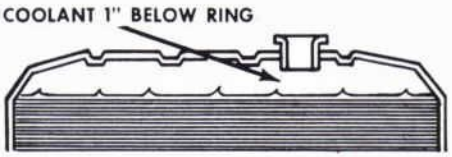



*Figure 15—Coolant Level*

## Electrical System

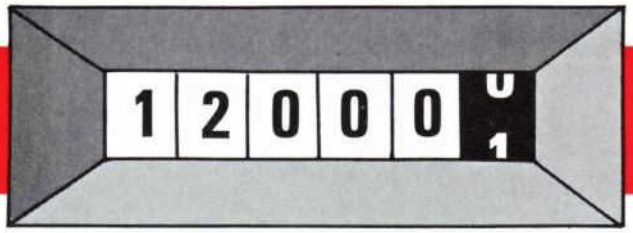
A check of the electrical system is important, because of the extensive use of accessories during vacations. The most important component in the electrical system is the battery. Check for cracks or buckling that can lead to failure. The top should be clean and dry. If wet, dirty, or acid soaked the battery will constantly discharge. Also, check the cables for looseness, corrosion and wear. Last, but most important, check battery capacity.

Capacity is a measure of the battery's ability to furnish current and maintain minimum necessary voltage. If the battery passes the capacity test, it is in satisfactory condition. However, if the specific gravity is below 1.230, it should be recharged to bring the battery to peak performance.

## Engine

To obtain peak performance and top efficiency during the many miles of vacation travel, the engine should be in good running order. If several thousand miles have elapsed since the last tune-up, recommend one.

If the vehicle is near the oil and filter change interval, recommend high quality replacements such as the Autolite 6000-Mile Oil Filter and a motor oil that meets Ford specification M2C101-B. This will continue the high level of protection provided every Ford-built vehicle at the factory.




To keep engine exhaust emission within Federal and/or State regulations, a 12,000 mile performance check of the following ignition, fuel systems components, and engine accessories are recommended:

**NOTE:** These checks are in addition to the recommended periodic services, such as replacing oil, fuel and air filters.

## 1. CLEAN AND ADJUST SPARK PLUGS—REPLACE IF NECESSARY

### A. Cleaning and Inspection

*Remove spark plugs and clean in an air-abrasive spark plug cleaner. Normally a visual inspection is effective in determining malfunctioning spark plugs, therefore, prior to cleaning, inspect the spark plugs carefully and check for cracked insulators, damaged threads, broken insulator tips (firing end), loose insulator within the plug shell and other visual defects. Replace plugs with any of the above noted conditions. Be sure the firing end of the plug has been properly dried prior to cleaning plugs. After the plugs have been cleaned, inspect for small hair line cracks, replace plugs if cracks are noted. Large amounts of lead deposits lodged in the shell bore occasionally cannot be successfully removed and plugs should be replaced when this occurs.*

### B. Filing and Regapping

The side electrode should be opened slightly and both electrode surfaces filed with a distributor point file until the surfaces are flat. The gap surfaces should then be adjusted parallel to each other. When adjusting the gap, do not apply pressure on the center electrode or insulator tip; adjust only the side electrode.

## 2. CHECK AND ADJUST DISTRIBUTOR BREAKER POINTS

### A. Breaker Point Dwell Check

A scope or dwell meter must be used to check the dwell on used breaker points. Because of normal metal transfer on the tungsten contacts, the use of a feeler gauge is not recommended. Replace ignition breaker points as required.*

Adjust dwell to specifications.

**Do not replace ignition condenser unless a known good tester shows it to be defective.*

## 3. CHECK AND ADJUST INITIAL TIMING AND SPARK ADVANCE

### A. Initial Spark Timing Check

1. Attach timing light to engine. Remove both vacuum lines at distributor diaphragm assembly and plug manifold vacuum line (See Fig. 1).
2. Start engine and adjust idle speed screw to specification.
3. Check initial timing. Adjust to specification if required.

### B. Mechanical Advance Check

1. With both vacuum lines still disconnected, accelerate engine from idle to approximately 2,000 RPM. The spark timing on the damper should advance.

### C. Vacuum Advance

1. Adjust idle speed screw to obtain 1500 engine RPM.
2. Observe the spark timing.
3. Connect the carburetor vacuum connection to the distributor diaphragm (See Fig. 2). The spark timing should now advance further.

### D. Vacuum Retard

(Dual Diaphragm Distributors Only)

1. Re-adjust engine idle speed screw to specification.
2. Remove plug from manifold vacuum line and then connect manifold vacuum line to distributor diaphragm assembly (See Fig. 3). The spark timing should then retard.

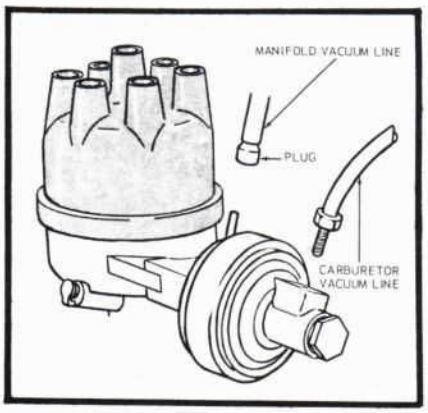



*Figure 1—Disconnect Both Vacuum Connections*

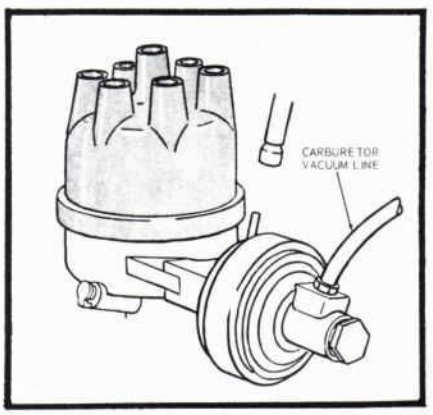



*Figure 2—Connect Carburetor Vacuum Line*

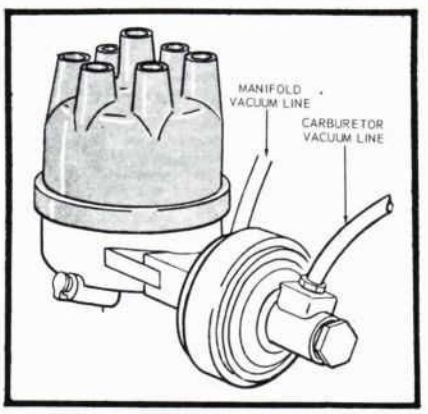



*Figure 3—Connect Both Vacuum Lines*

# PERFORMANCE CHECKS

### 4. VISUALLY INSPECT ALL SECONDARY IGNITION WIRING FOR PROPER INSTALLATION AT THE COIL, DISTRIBUTOR AND SPARK PLUGS AND FOR DETERIORATED INSULATION.

### 5. CHECK EXTERNAL CHOKE MECHANISM AND CLEAN WITH SOLVENT, IF NECESSARY.

Use a carburetor cleaner such as Ford Carburetor and Combustion Chamber Cleaner (Ford Part No. C6AZ-19579-A) or equivalent, to remove any gum formations that may impair the operation of the choke mechanism.

### 6. CHECK ENGINE IDLE SPEED AND FUEL MIXTURE; ADJUST TO SPECIFICATIONS.

Use a tachometer and an exhaust gas analyzer to check the idle speed and the fuel mixture. If necessary to adjust idle mixture beyond the limits of the plastic idle limiter caps, service must be done by a Ford or Lincoln-Mercury dealer.

### 7. CHECK ALL DRIVE BELTS FOR EXCESSIVE WEAR OR DEFECTS. ADJUST TENSION TO SPECIFICATIONS, IF NECESSARY.

A. Inspect all drive belts for evidence of damage and/or excessive wear as indicated by lack of available adjustment when belt is properly tensioned.

B. Install a tension gauge on the longest accessible span of the belt. On dual belt drives only one (1) belt need be checked for tension.

C. If belt tension is less than 70 lbs. as indicated by the gauge, adjust the belt tension to 110 lbs. by loosening the adjusting locknut and moving components outward to increase belt tension.

D. If a new belt is installed tighten to 140 lbs. Run engine for 10 minutes, then check belt tension. If necessary, adjust the belt to 110 lbs. to bring the belt tension to the used "reset" specification.

### 8. TORQUE ALL INTAKE MANIFOLD BOLTS TO SPECIFICATIONS — 8-CYLINDER ENGINES ONLY.

A. Normalize engine temperatures (operate engine at 1200 RPM for thirty (30) minutes).

B. Torque each manifold attaching bolt to specification, starting at the center bolts and progressing in a criss-cross pattern outwardly to the end bolts.

**TORQUE SPECIFICATIONS**

| Engine | Torque |
|---|---|
| 289-302 | 20-22 ft. lbs. |
| 429, 460 | 25-30 ft. lbs. |
| 462 | 20-25 ft. lbs. |
| All Other V-8's | 32-35 ft. lbs. |

### 9. CHECK THE EXHAUST CONTROL VALVE FOR FREEDOM OF OPERATION (IF SO EQUIPPED), FREE WITH SPECIFIED SOLVENT IF NECESSARY.

A. Rotate the control valve balance wheel from the fully closed to the fully open position (when the valve is cold). It should return to the fully closed position immediately upon release with no apparent delay or restriction.

B. If there is any apparent sluggishness in the valve rotation, apply Ford Solvent and Penetrating Fluid (Ford Part No. C0AZ-19A501-A) or equivalent to the valve shaft, between the valve body and counterweight. Rotate shaft repeating the application of solvent until the shaft is free.

### 10. INSPECT COOLING SYSTEM FOR LEAKS AND LOOSE HOSE CLAMPS.

A. Visually inspect each cooling system hose connection for evidence of coolant leakage, as indicated by greenish color of residue from coolant.

B. If any evidence of coolant leakage exists at the connection, check the hose clamp for looseness and tighten if necessary.

C. If the leakage condition cannot be corrected by proper hose clamp tightness, the hose and/or hose clamp(s) should be replaced.

D. Visually inspect the radiator assembly for evidence of coolant leakage. Repair as required.

E. Inspect the water pump housing drain hole area for evidence of coolant leakage. Replace the water pump if leakage is detected.

### 11. INSPECT FUEL LINES AND FUEL FILTER FOR LEAKS.

A. Inspect fuel pump to carburetor fuel line for evidence of fuel leakage. Inspect the junction point of the hose connector at the fuel line and fuel filter for evidence of leakage. Repair as necessary.

B. Inspect the fuel filter to carburetor connection for evidence of fuel leakage. Tighten as required.

C. On divorced-type individually mounted fuel filters, inspect line connections at the fuel filter body for evidence of leakage. Tighten the line connections as required. Inspect filter element retainer can for evidence of fuel leakage at the gasket. Tighten as required.

### 12. INSPECT THERMACTOR EXHAUST EMISSION SYSTEM.

A. Inspect the thermactor exhaust emission system (if so equipped) hoses for leaks or damage. Replace if required.

# BALL JOINT INSPECTION

Ford Motor Company vehicles employ two types of front suspension: (1) A spring on the top arm design, and (2) a spring on the lower arm design. A specific procedure must be followed when inspecting the ball joints of either system, or unnecessary replacement of ball joints can result.

## TYPE I (Spring on Top Arm)

### Upper Ball Joint Inspection

1. Raise the car on a frame contact hoist or by floor jacks placed beneath the underbody until the wheel falls to the full down position as shown in Figure 1. This unloads the upper ball joint.
2. Adjust the wheel bearings.
3. With the dial indicator attached to the upper arm, position the indicator so the plunger rests against the inner side of the wheel rim adjacent to the upper arm ball joint.
4. Grasp the tire at the top and bottom, and slowly move it in and out, (Figure 1). Note the reading (radial play) on the dial indicator. If the reading exceeds 0.250", the upper ball joint should be replaced.

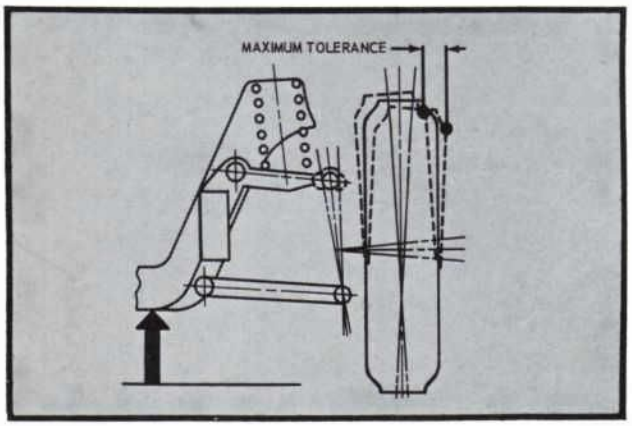



*Figure 1–Measuring Upper Ball Joint Radial Play*

### Lower Ball Joint Inspection

1. Raise the vehicle on a frame contact hoist or with floor jacks placed beneath the underbody until the wheel falls to the full down position.
2. Have an assistant grasp the lower edge of the tire and move the wheel in and out.
3. As the wheel is being moved, observe the lower end of the spindle and lower control arm.
4. *Any* movement between the lower end of the spindle and the lower arm indicates ball joint wear and loss of preload. If any movement is observed, the ball joint should be replaced.

**NOTE:** DURING THE FOREGOING CHECK, THE UPPER BALL JOINT WILL BE UNLOADED AND MAY MOVE. DISREGARD ALL SUCH MOVEMEMT OF THE UPPER BALL JOINT. ALSO, DO NOT MISTAKE LOOSE WHEEL BEARINGS FOR A WORN BALL JOINT.

## TYPE II (Spring on Lower Arm)

### Upper Ball Joint Inspection

1. Raise the car on floor jacks placed beneath the lower control arms.
2. Ask an assistant to grasp the lower edge of the tire and move the wheel in and out.
3. As the wheel is moved in and out, observe the upper end of the spindle and the upper control arm.
4. Any movement between the upper end of the spindle and the upper arm indicates ball joint wear and loss of preload. If any such movement is observed, replace the upper ball joint.

**NOTE:** DURING THE FOREGOING CHECK, THE LOWER BALL JOINT WILL BE UNLOADED AND MAY MOVE. DISREGARD ALL SUCH MOVEMENT OF THE LOWER BALL JOINT. ALSO, DO NOT MISTAKE LOOSE WHEEL BEARINGS FOR A WORN BALL JOINT.

### Lower Ball Joint Inspection

1. Raise the car on jacks placed under the lower control arms as shown in Figure 2. This will unload the ball joint.
2. Adjust the wheel bearings.
3. With the dial indicator attached to the lower arm, position the indicator so that the plunger rests against the inner side of the wheel rim adjacent to the lower ball joint.
4. Grasp the tire at the top and bottom and slowly move the tire in and out. Note the reading (radial play) on the dial indicator. If the reading exceeds 0.250 inches, replace the lower ball joint.

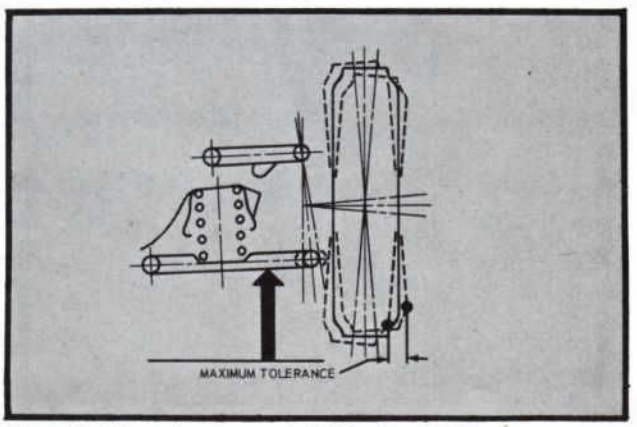



*Figure 2–Measuring Lower Ball Joint Radial Play*

# SERVICING FLOATING CALIPER DISC BRAKES

**Floating caliper** disc brake linings wear differently than previous types of disc brakes. Disc brake linings on 1967 and previous year cars wear *evenly* or straight across the face of the lining. However, the off center anchor plate abutments on floating caliper disc brakes used in 1968 models cause the linings to wear in a *taper* pattern.

The manner in which the caliper housing is retained in the anchor plate allows the caliper to shift within the anchor plate and assume the angular position imposed by the tapered wear pattern of brake linings (Figure 1).

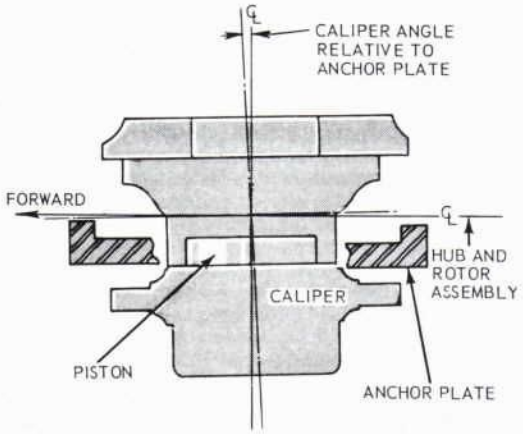



*Figure 1—Caliper Angle Relative To Anchor Plate*

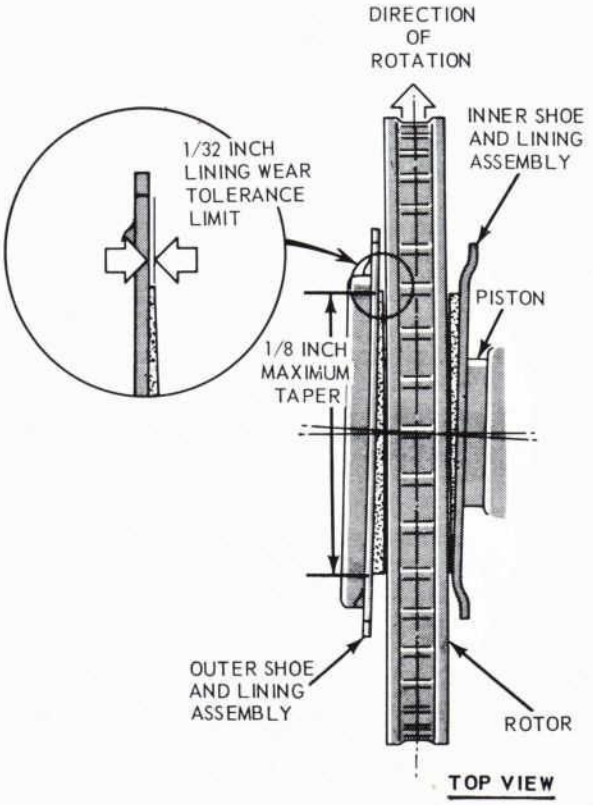



*Figure 2—Taper Wear Pattern Tolerance Specification*

The maximum acceptable taper of the brake linings is ⅛-inch across the face of the linings from front to rear, during the service life of the lining (Figure 2). Floating caliper disc brake linings should be replaced when only 1/32-inch of lining remains on the brake shoe (Figure 2).

Although floating caliper disc brake linings wear in a tapered pattern, their service life should be about the same as other types of brakes.

Excessive lining wear, however, can be caused by the driver "riding the brake pedal" resulting in overheating. The following inspection procedure will confirm this type of abuse, that can cause excessive or abnormal front brake lining wear.

### 1. Power Brake Booster

Verify the power brake booster push rod length adjustment with 19-25 inches of vacuum applied to the booster and with 5 to 6 pounds of force applied to the push rod, to insure that the push rod is firmly seated in the booster assembly.

### 2. Master Cylinder

Inspect the master cylinder to verify that the compensating ports are open. Also check to assure that the front disc brake shoes are completely released.

### 3. Brake Pedal

Inspect and verify that the specified brake pedal is correctly installed and does not bind.

### 4. Brake Pedal Linkage

Inspect the brake system linkage for a binding condition and proper installation.

**NOTE:** If the above brake components are functioning correctly and the rear brakes show normal wear, the excessive and/or abnormal wear condition must be attributed to brake abuse or "riding" the brake pedal.

Customers should be advised that premature replacement of the brake linings can be avoided by not "riding the brake pedal."

## LOOSE INSIDE REAR VIEW MIRROR

### All 1967-68 Cars With Windshield Mounted Mirrors

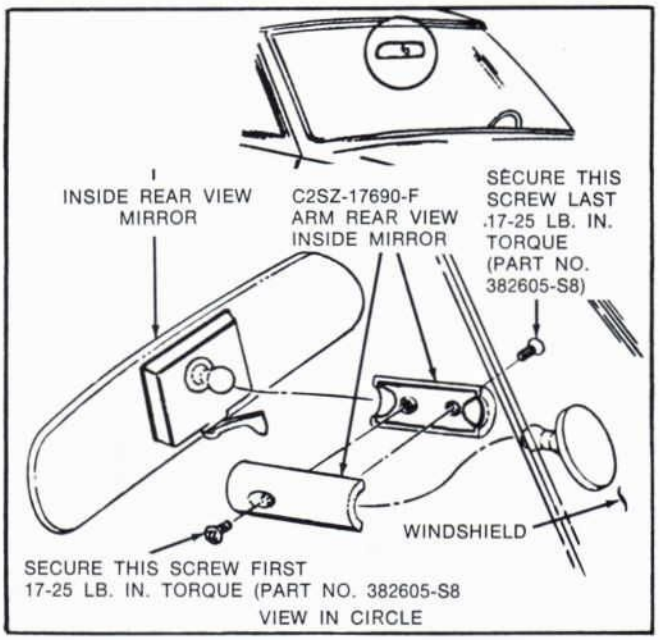



*Figure 1—Loose Mirror Correction*

Insufficient torque on the mirror arm retaining screws can cause the mirror to loosen. Mirrors can be made to hold their adjustment by replacing the existing screws with new, improved screws that permit tightening the screws to the specified torque of 17-25 in. lbs. without stripping or breaking.

Install the new screws (Ford Part No. 382605-S9) in both ends of the arm (Figure 1). Tighten the screw at the mirror end of the arm to 17-25 in. lbs. Then tighten the screw at the windshield end of the arm. Repeat the tightening, using the same sequence.

## IMPROVING IGNITION TIMING POINTER VISIBILITY

### 1968 Thermactor Equipped 390 and 428 CID Engines

To improve visibility when checking ignition timing on the subject engines, it's recommended that the 6° BTDC mark on the vibration damper and the end of the timing pointer be painted white.

Visibility can also be improved by viewing the timing pointer between the dual alternator drive belts. The timing light should be aimed at the pointer from in back of the Thermactor pump adjusting arm. Position the head so as to observe the timing marks directly under the timing pointer as near as possible.

## ALTERNATOR INSULATOR AND WIRE COLOR CHANGES

### All 1968 Models with 42, 55 or 65 Amp Autolite Alternator

The Autolite alternator field circuit wire color code has been changed to orange (from white in past model years). Also, the alternator field terminal insulator on the alternator is orange on some models.

Incorporation of the new molded connector (Figure 2) at the alternator and alternator regulator aids component servicing and prevents improper connection of wiring.

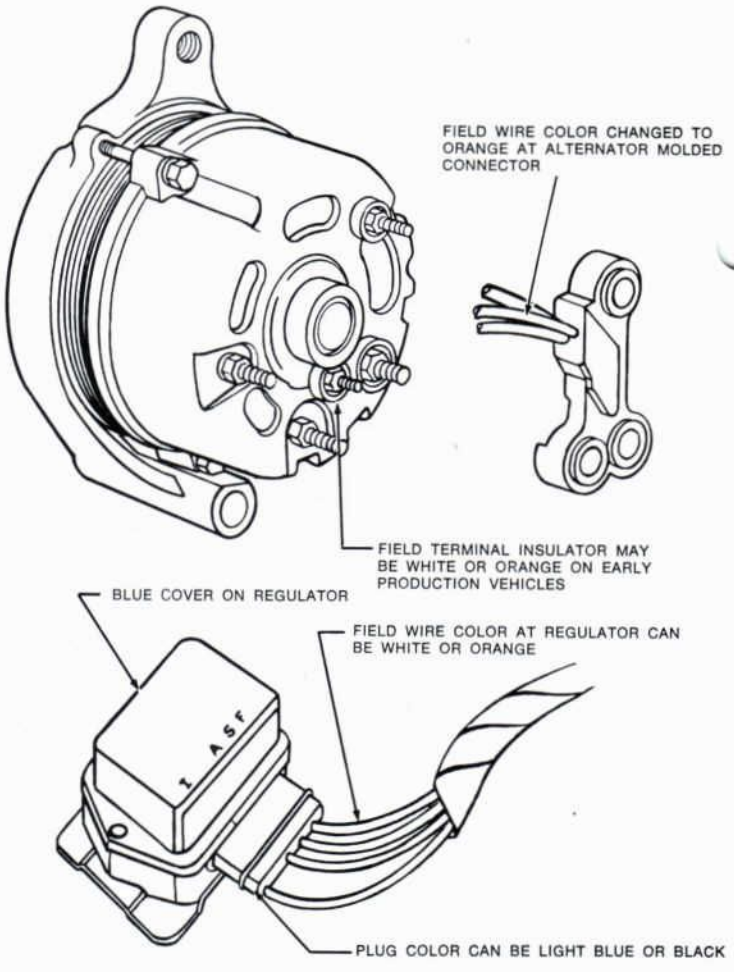



*Figure 2—Alternator Insulator and Wire Color Changes*

# SERVICE BRIEFS

## AUTOMATIC TRANSMISSION OIL COOLER REPAIR

A leak in the oil cooler within the radiator can cause damage to the automatic transmission if proper steps are not taken to preclude such damage during repair of the cooler. This transmission damage is usually caused by:

1. The loss of transmission fluid resulting in damage to the friction elements, which causes a transmission malfunction *after* the cooler is repaired.
2. Contamination of the automatic transmission fluid with water or ethylene glycol. Less than 1/10 of 1% contamination can cause rapid fluid deterioration. Water in lesser amounts, if in a high temperature area such as the converter, can be turned into steam; forcing transmission fluid out of the filler or breather tube, or past seals. ANY CONTAMINATION OF THE TRANSMISSION FLUID BY ETHYLENE GLYCOL IS INTOLERABLE.

For these reasons, whenever a transmission cooler failure occurs, the transmission must be inspected to determine if contamination or damage has occurred, before placing the vehicle back in service.

The following procedure is recommended for an oil cooler failure:

A–Inspect for evidence of fluid contamination.

1. Inspect coolant in radiator for presence of transmission fluid.
2. Remove transmission oil pan and inspect for presence of coolant, fluid deterioration or internal transmission failure.

B–If fluid contamination is found, the transmission and converter assembly must be removed, disassembled and thoroughly cleaned. Cooler lines and cooler must also be flushed, if not replaced, as part of the repair procedure.

## CHANGE IN ENGINE OIL SPECIFICATIONS

### 1967-68 242 and 363 CID Ford Dorset Diesel Engines

Multi-viscosity lubricating oils meeting Ford Specification ESE-M2C101-B may now be used in the above engines. Single viscosity oils, only, were formerly specified. Single viscosity oils may still be used; however, they must meet Ford Specification M2C101-B. The following chart lists the recommended viscosity weights for both types of oil at the temperature ranges indicated.

**Temperature-Viscosity Chart**

| Temperature Range °(F) | Single Viscosity (SAE) | Multi-Viscosity (SAE) |
|---|---|---|
| Below -10 to 32 | | 5W-30 |
| -10 to 90 | | 10W-30 |
| -10 to 10 | 10W | |
| 0 to above 90 | | 10W-40 |
| 10 to 32 | 20 - 20W | |
| 32 to above 90 | | 20W-40 |
| 32 to 90 | 30W | |
| above 90 | 40W | |

## ENGINE WILL NOT START OR WARNING LIGHT PROVE OUT DOES NOT FUNCTION

**All 1968 Cars**

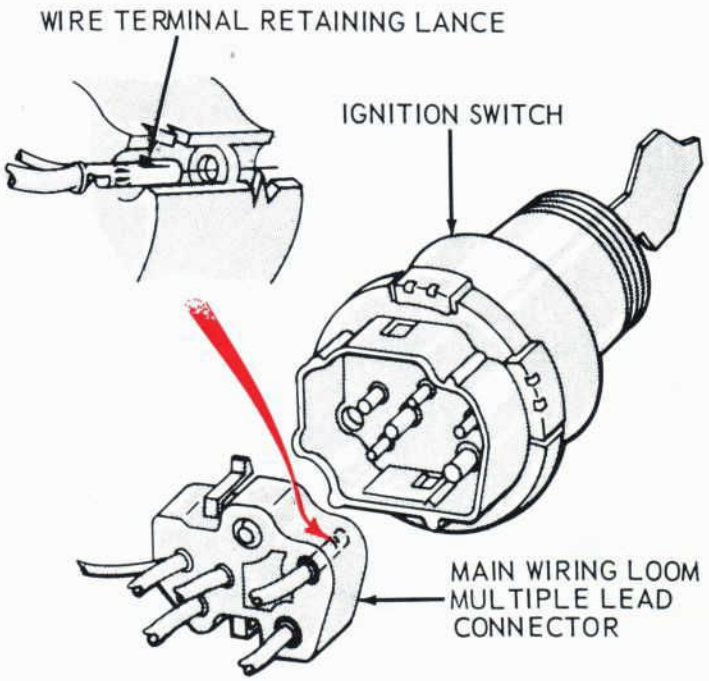



*Figure 3–Ignition Switch and Main Wiring Loom Connector*

If the engine stops running or will not start, or if the warning light prove-out does not function; the cause may be a poor connection between the ignition switch and the main wiring loom multiple connector. It's usually caused by the wire terminals pushing out of the plastic connector block (Figure 3). This condition can also affect operation of accessories like the radio and heater.

To correct this condition, inspect for loose or damaged terminals in the connector. If a loose terminal is located, remove it from the connector and carefully raise the retaining lance on the side of the terminal to 1/16-inch. Re-insert the terminal into the connector being sure that the retaining lance locks into place and that the connector is firmly seated to the ignition switch.

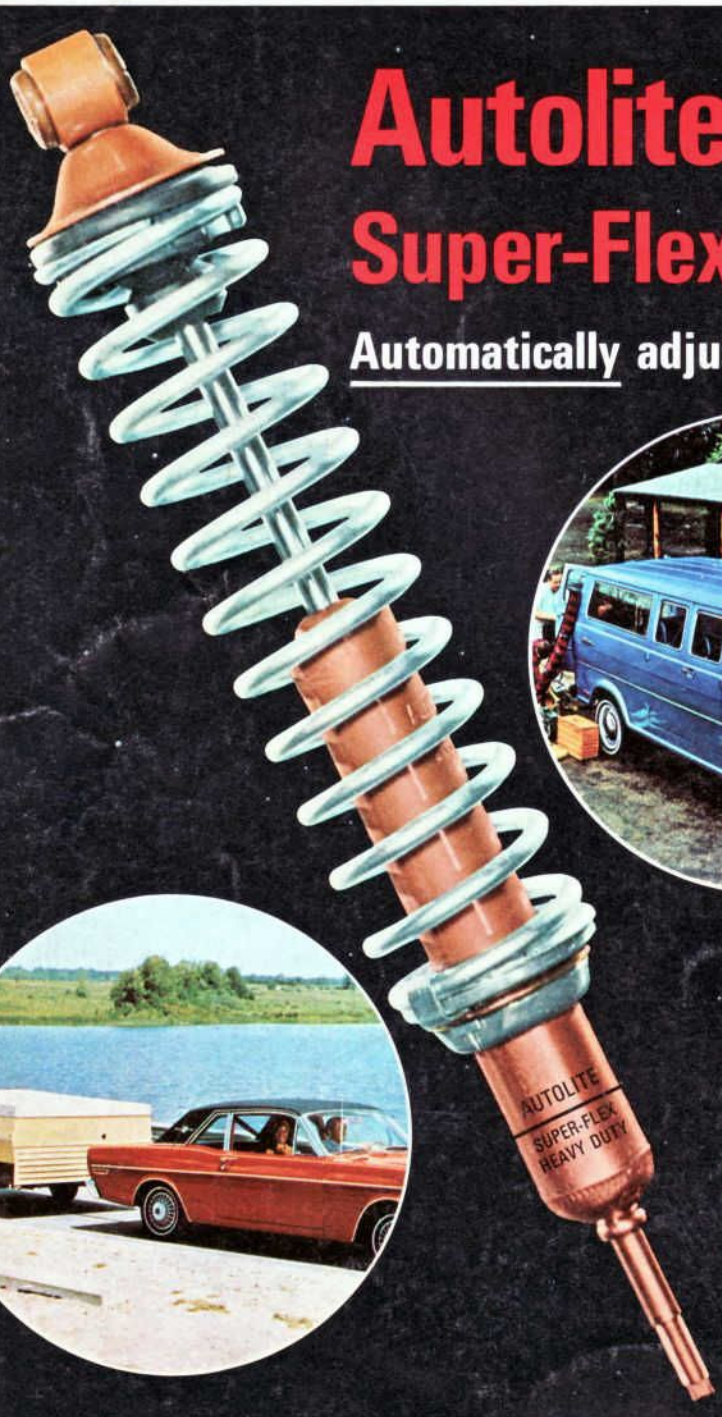
## SERVO COVER-TO-CASE GASKET

### All 1966-68 Cars With C6 Automatic Transmission

Some vehicles have *two* servo cover and transmission gaskets installed to provide positive sealing. If new gaskets are installed on these vehicles, spread a thin layer of petroleum jelly on the gasket surfaces to keep them in place. Place the gaskets on the servo and then install the cover and cover bolts in the usual way.

# Autolite Heavy Duty Super-Flex Shock Absorbers

## Automatically adjusts to all kinds of loads







- Industry's *only* automatic 3-stage shock
- Supports almost half-ton of extra weight
- No need to add or let out air
- Won't bottom out
- No "tail up" look as with other booster shocks
- Easy to install