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Shop Tips FROM FORD

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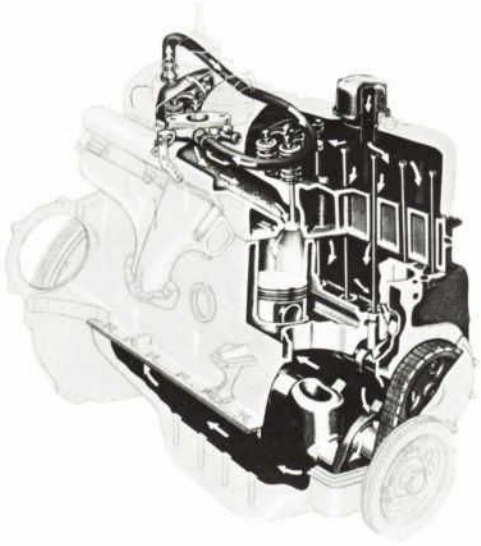
SPECIAL FEATURE!



OPERATION, TESTING AND SERVICING OF THE FORD POSITIVE CRANKCASE VENTILATION SYSTEM

(See page 2)

Be sure to 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: Ford Division of Ford Motor Company, Parts and Service Promotion and Training Dept., P. O. Box 658, Dearborn, Michigan, 48121.

IN THIS ISSUE

From your Ford dealer

1 HEATER CORE—1962-63 Fairlane, 221, 260 and 289 C.I.D. Engines

The 1962 and 1963 Fairlane 8-cylinder 221, 260 and 289 C.I.D. engines have a highly efficient water pump. When the engine is cold and the thermostat closed, it is possible to build up extremely high water pressure at high engine RPM. And in some cases, under these conditions, it is possible for this water pressure to cause leakage at the heater core. If this condition occurs, it can be corrected by installing a new-type Hot Water Heater Connecting Elbow that incorporates a pressure restrictor. The Ford Part Number is C3OZ-18599-A. The elbow is painted a gold color instead of silver which was used on earlier models.

2 IMPROPER SERVICING OF DISTRIBUTOR TO SPARK PLUG WIRES

We occasionally hear reports that spark plug wires are still being used as handles when removing the boot from the spark plugs. This practice of pulling on the cable may result in the separation of the wire from its terminal, and with the radio resistance type wiring may even result in a broken cable. Of more importance is the possibility that the cables might be partially separated from the terminals, or that the radio resistance type cables could be stretched enough to raise their resistance beyond specifications.

To eliminate these undesirable results, it is recommended that spark plug terminals be removed by grasping the terminal boots above the spark plugs. A rotating motion applied to the boot prior to pulling will break the adhesion of the boot to the spark plug porcelain and facilitate removal. When a boot is to be removed with the engine running, use a pair of insulated pliers, by pulling on the boot.

Also, it has been noted that spark plug cables are still being punctured by a probe when performing ignition timing tests. The damaging effects of this practice can cause an arc to ground where the insulation is punctured, and a subsequent ignition miss. The major manufacturers of timing lights include a spark plug adaptor with their kits, and make available insulated pliers for this particular purpose. The use of such tools is considered a mandatory safety precaution.

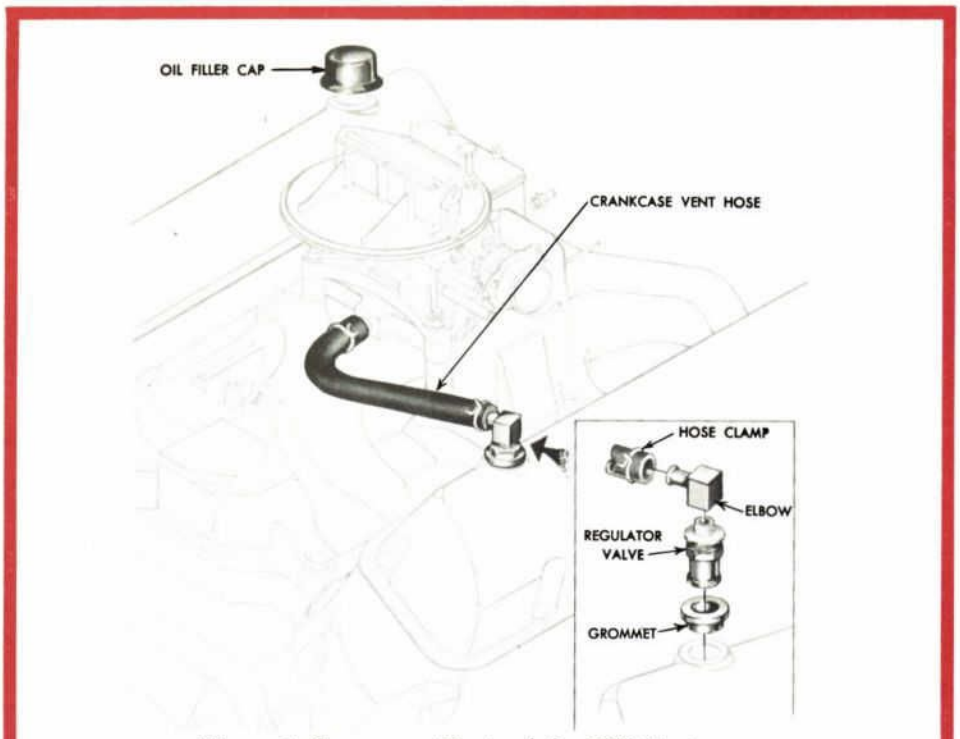


Figure 1—Component Parts of the PCV System

3 SERVICE OPPORTUNITIES WITH THE POSITIVE CRANKCASE VENTILATION SYSTEM

All 1963 Ford car and truck engines, as well as many models dating back to 1961 were equipped with a Positive Crankcase Ventilation System (PCV). The PCV System offers excellent opportunities to provide required maintenance service to your customers. Ford Owners Manuals recommend regular 12,000 mile checkups and service for the PCV System including cleaning of the emission system, tubes, filter and valves. When needed, the oil filter, air filter and crankcase breather cap should also be replaced as part of the PCV service. This service is most important if the system is to keep operating at maximum efficiency.

Signs that the emission system is not operating properly are: excessive vapors coming from the oil filter cap, rough idle, and oily residue covering rocker covers and underhood components. These trouble spots can be sighted whenever performing under-the-hood services.

Operation of the PCV System

The PCV System was designed for all kinds of driving and in particular for slow moving, stop-and-go type driving. Usually below 20 mph and at engine idle, air flow through the engine is insufficient by way of the road draft tube to remove the crankcase emission fumes of engine combustion. These fumes, if allowed to condense, cause oil dilution and the formation of sludge which results in lack of power, poor economy, and eventual premature engine failure.

The air flow in the Positive Crankcase Ventilation System is shown on the front cover. Also see Figure 1 for component parts of the PCV System.

Ventilating air enters the engine through the oil filler cap located on the front of the valve rocker arm cover. The filler cap contains a filtering element which filters the incoming air.

From the oil filler cap, the air flows into the front section of the valve rocker arm shaft chamber. The ventilating air moves down past the push rods and into the crankcase. Air is diverted from the front section of the crankcase through holes in the front of the cylinder block wall to ventilate the timing chain or gear chamber.

The rotating action of the crankshaft causes the air to flow towards the rear of the crankcase and up into the rear section of the valve rocker arm cover. The air then enters a spring-loaded regulator valve that regulates the amount of air to meet changing operating conditions. The air is then directed to the intake manifold through the crankcase vent hose.

The PCV System operates by vac-

uum, drawing crankcase vapors through a valve, then into the intake manifold (usually below the carburetor) to be reburned. The metering valve has two moving parts—a tapered plunger with a center bleed hole and a stainless steel spring.

Vacuum, which is greatest when the engine is idling or at low speed, pulls the tapered plunger forward to seat against the valve housing, restricting the vapor flow to the center bleed hole. (left hand Figure 2.) At highway speed with decreased vacuum, the spring moves the plunger to the fully opened (middle position Figure 2), for maximum flow around the plunger and through the bleed hole. With the ignition off, manifold vacuum drops to zero and the spring moves the plunger to a closed position (right hand Figure 2). In the event of backfire, back pressure will also cause the plunger to close.

Testing Procedure

The PCV System works well only if properly maintained. In order to test its efficiency the AC Tester CT-1 can be used. (Figure 3.) This tester will give an accurate visual indication of the need for service.

The tester will check the PCV System used on all Ford engines as well as other make vehicles. Set the tester to number 2 for all Ford engines, except 144 and 170 engines, which require a number 4 setting. The tester will let the customer see for himself if he needs emission service. With the exception of the tester setting for Ford engines given above, complete operating instructions are provided with the tester.

Replacement Procedure

If replacement is necessary, first disconnect the hose and remove the valve. Replace it with a new one of the correct type for the car. Disconnect the hose from the manifold and blow it out with compressed air. If the hose is in poor condition, replace it with a new one. Reassemble the PCV System. Install the new valve and attach the hose to the valve and to the manifold. After installing a new valve, always retest the system to make sure it is working properly.

If the original reading was yellow and it repeats yellow . . . examine the engine for other leakage points into the crankcase, such as a broken rocker cover gasket, or push rod cover gasket, or any other opening that may prevent the PCV System from doing its job.

If the reading was red, and it repeats red, there is probably excessive blow-by, and a possible need for an engine overhaul.

In disassembling the valve, be careful not to distort the spring. Soak the parts in carburetor solvent for at least 20 minutes. Clean them with a brush and then dry with compressed air. (Figure 4.)

To reassemble the valve, push the tapered end of the plunger into the spring until the end coil is seated against the head of the plunger. (Figure 5.) Again . . . be careful not to distort the spring (Figure 6).

Place the spring and valve plunger into the valve body, and screw the two parts together.

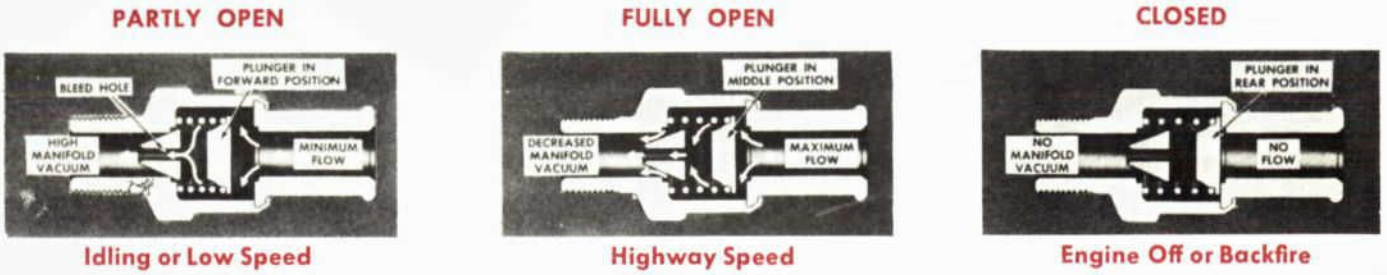


Figure 2—Emission System Valve Operation

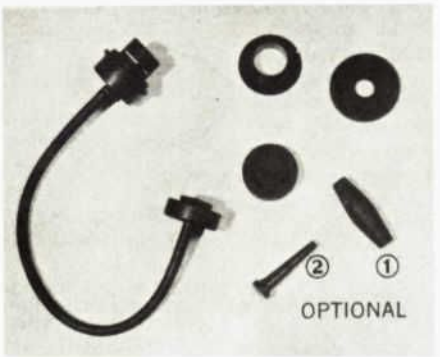


Figure 3—Emission System Tester Components and Adaptors

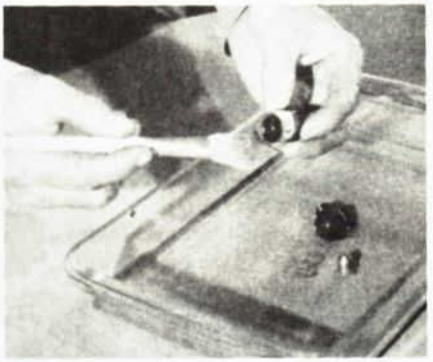


Figure 4—Disassembly and Cleaning Emission Valve

Figure 5—Assemble Plunger and Spring

Figure 6—Assemble Plunger and Spring into Valve

4 COMPOSITE-DESIGN FRONT BRAKE DRUMS — 1963 F-250-350 Series Trucks

Composite-design front brake drums, incorporating a stamped backing plate cast integrally into a cast iron drum, became effective in production on these series of trucks in January, 1963.

These front brake drums are completely interchangeable with the previous "centrifugally cast" drums and are effective in correcting erratic brake action encountered on some 1956-62 model vehicles used in severe stop and go service.

Part Number	Application
C3TZ-1125-C	F-250-350 & P-350-400 with 8 Stud Wheels
C3TZ-1125-L	F-350 & P-400 with 6 Stud Wheels

5 WATER CONTAMINATION OF FRONT WHEEL BEARINGS— 1960-63 Falcon

Inquiries concerning front wheel bearing water contamination have been occasionally received on some 1960-63 Falcons. This contamination may be caused by water seeping through the front brake backing plate where the plate is fastened to the spindle.

If, when inspecting or packing front wheel bearings, it is found that road contaminants have entered through the backing plate, a sealer Ford Part Number 8A-19554-B should be applied around the outer periphery of the spindle flange in the area to which the backing plate is fastened.

6 ROUGH ENGINE IDLE— 1963 THUNDERBIRD 6-VENTURI CARBURETOR

Rough engine idle indicated by fuel fouled spark plugs may be caused by fuel leakage past the metering block gasket into the power valve vacuum cavity of the primary or center carburetor.

Other symptoms may be rough engine idle, no idle mixture control, excessive black smoke on acceleration or black sooty deposits on the spark plugs.

Before attempting any repairs, check the float level on all three carburetors by removing the fuel level sight plug. Fuel level should be at the lower edge of the sight plug hole. Correct the float level, if necessary. If the excessively rich conditions persist after float level correction, remove the malfunctioning carburetor or carburetors and replace the carburetor gaskets. The carburetor gasket kit recommended is Ford Part Number C1AZ-9502-C.

7 REVISED MAIN METERING JET SPECIFICATIONS — 1960-63 352 C.I.D. Engine Two-Barrel Carburetor

To improve fuel economy in 1963 Fords with 352 C.I.D. engines, new carburetors with one size leaner (smaller) main metering jets were introduced in production during the 1963 model year. Carburetors incorporating this change may be identified by the letter B stamped in the carburetor code tag after the prefix and suffix.

When a problem of poor fuel economy persists after all possible contributing factors have been eliminated, it is recommended that the main metering jets be changed to the leaner size as noted above. This recommendation applies to 1960 through 1963 352 C.I.D. engine 2-barrel carburetors.

The part numbers of the leaner main metering jets, their identification number and application are as follows:

Part Number	Jet Size & Identification Number	Application
C1AZ-9533-D	56	0 to 5,000 ft. Std. Trans.
C1AE-9533-A	54	5,000 to 10,000 ft. Std. Trans.
C1AZ-9533-L	52	10,000 to 15,000 ft. Std. Trans.
C1AE-9533-B	55	0 to 5,000 ft. Auto. Trans.
C1AZ-9533-H	53	5,000 to 10,000 ft. Auto. Trans.
C1AZ-9533-M	51	10,000 to 15,000 ft. Auto. Trans.

8 COLD ENGINE HARD STARTING—CHOKE CABLE INTERFERENCE—All 1963 Vehicles with Six Cylinder Engines & Manual Choke

Difficulty in starting 1963 six cylinder engines with a manual choke may be attributed to choke cable interference. This is caused by an excessive length of choke control wire interfering with the pull-down rod or choke shaft lever.

This condition can be corrected by cutting off the excessive length of choke wire as shown in Figure 1. Prior to cutting the choke wire, check the control housing for proper installation in the clamp at the carburetor. The end of the control housing should extend ¼ to ½ inch beyond the clamp.

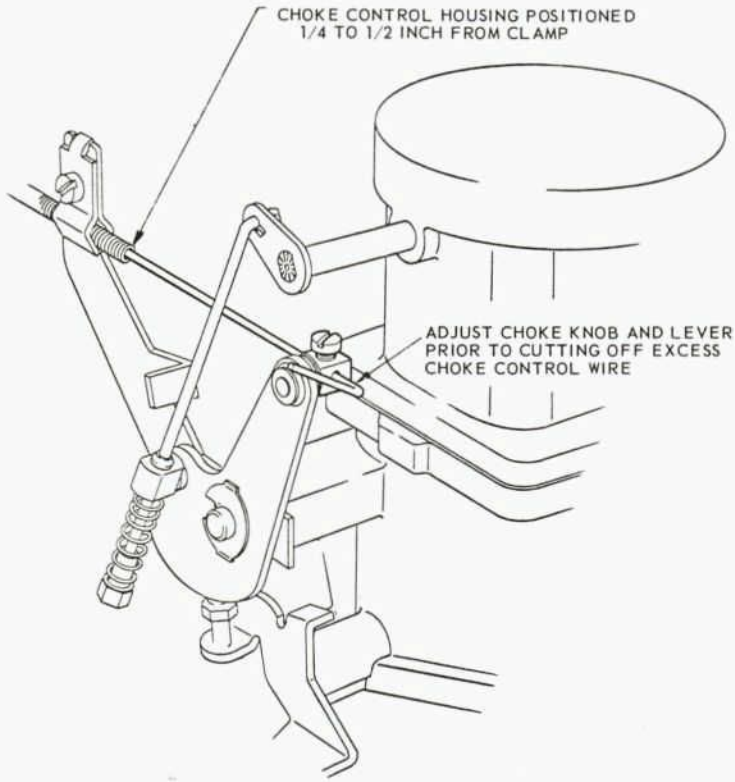


Figure 1—Manual Choke Control Installation

9 STEERING GEAR HOUSING BUSHINGS AND BEARINGS All Car Lines

Whenever a steering gear assembly is being disassembled and/or rebuilt, the bushing or bearing in the housing should be inspected for proper location as well as for wear, nicks, burrs, etc.

When a bushing or bearing has turned or moved out of place within the housing, a new steering gear housing should be installed.

A turned or mislocated bushing indicates that the bearing bore in the housing is oversized. To install a new bushing or bearing in an oversized bore may result in a repeat failure.

10 NEW CAMSHAFT THRUST BUTTON—352, 390 and 406 C.I.D. Eight Cylinder Car Engines

To minimize camshaft thrust button wear and/or noise in the subject engines, a new button made from nylon flock and graphite material is available for service replacement in the above engines under Ford Part Number C2AZ-6295-A.

It is recommended that this new button be installed wherever complaints of camshaft thrust button wear and/or noise are encountered in these engines.

11 NEW CONNECTING ROD—1963 170 C.I.D. Falcon and Fairlane Engines

To provide improved durability, a new connecting rod was incorporated in production during the 1963 model year. This connecting rod has more metal at the squirt hole section and the 5/32" diameter drill squirt hole depth is reduced by 0.15".

This new connecting rod is available for service under Ford Part Number C3OZ-6200-B.

12 NEW VALVE STEM SEALS—1960-63 144 & 170 C.I.D. Falcon, Fairlane & Econoline Engines

To minimize the possibility of cracking, new valve stem oil seals (with a revised radius of .030" to .040" at the top of the inside diameter) became effective in production on the listed engines, early in the 1963 model year.

The new valve stem oil seals are available to service these 1960-63 engines under Ford Part Number C3DZ-6571-A.

13 NEW CYLINDER HEAD GASKETS C3TZ-6051-D—1954-63 239, 256, 272, 292, 312 C.I.D. Passenger Car and Truck Engines

New cylinder head gaskets Ford Part Number C3TZ-6051-D have been released featuring larger diameter coolant holes. This has been done to minimize coolant leaks resulting from misalignment of the coolant transfer holes between the head and cylinder block.

When installing the cylinder head gasket a thin coating of sealer must be applied uniformly to both sides of the gasket. If an excessive amount of sealer is used some of the small coolant holes in the gasket will become restricted—or even closed.

14 CORRECT APPLICATION OF ENGINE TEMPERATURE INDICATOR BULB AND COOLANT THERMOSTAT—1960-62 Passenger Car Engines

Temperature gauges are calibrated to correspond to specific engine temperature indicator bulbs and thermostats. Therefore, where it becomes necessary to replace the indicator bulb or thermostat, or where a higher or lower thermostat is installed, care should be taken to assure that the correct matching part is used.

Where necessary, change as required according to the following chart. When a problem of indicated overheating without water loss is encountered, the indicator bulb and thermostat should be checked to be sure they are matched as specified.

The indicator bulb may be identified by the degrees stamped on the hex head. The thermostat may be identified by the degrees stamped on the outer edge of the thermostat or on the bottom of the sensing unit housing.

15 INTAKE MANIFOLD TO CYLINDER BLOCK SEAL—332, 352, 390, & 406 C.I.D. Engines

New intake manifold to cylinder block gaskets have been released for service to improve sealing in the manifold area. These new seals are made of cork and neoprene rubber compound, which has a controlled swell characteristic when exposed to hot oil. Also, this material has better recovery properties when compressed; therefore, it exerts more constant pressure between the mating surfaces, with resultant better sealing.

These seals are available in separate packages, or as a kit as shown below:

FORD Part Number	Part Name and Application
C3AZ-9A424-A	Seal, Intake Manifold to Cylinder Block—Rear
C3AZ-9A425-A	Seal, Intake Manifold to Cylinder Block—Front
C3AZ-9433-A	Kit, Front & Rear Seals; Right & Left Intake Manifold to Head Gaskets

16 CYLINDER BLOCK REPLACEMENT—1958-62—352-390-406 C.I.D. 8 Cylinder Engines

The 1963 352-390-406 C.I.D. engines utilize a thrust plate to control camshaft end play. The same size engines in 1958-62 models have a spring button to control end play.

When using a 1963 block to service 1958-62 engines, the two tapped holes used for thrust plate retention must be plugged (use (2) 7/16-14 x .62 bolts, lockwashers and flatwashers). The camshaft can be installed in the 1963 block in the same manner as in the 1958-62 block.

Model and Year	Temperature Indicator Bulb Degree Identification Stamp		Coolant Thermostat Degree Identification Stamp
	With Air/Cond.	Without Air/Cond.	
Falcon—1960-61 Falcon—1962-63	240° 250°	240° 250°	178° 188°
Fairlane—1962-63	250°	250°	188°
Ford—1960-61 Ford—1962-63	250° 250°	233° 250°	178° 188°
Thunderbird—1960-61 Thunderbird—1962-63	250° 250°	233° 250°	178° 188°

17 FLEXIBLE FUEL HOSE PREMATURE WEAR AND FUEL STARVATION— 1963 Fairlane and Falcon

If the flexible fuel line between the fuel pump and the fuel tank line is the incorrect length, it can result in a kinked condition causing fuel starvation of the engine, or premature wear with eventual leakage.

If the fuel hose is too long and kinked as shown in Fig. 1-B, the hose should be shortened to about 7¾ inches for a smooth routing. See Fig. 1-A.

If the fuel hose is too short and stretched as in Fig. 1-C, it is necessary to bend the front end of the fuel tank line to obtain a smooth routing without stretching of the flexible fuel line. See Fig. 1-A.

18 STEERING GEAR SHAFT AND COLUMN ALIGNMENT— 1961-63 Econoline Trucks and 1962-63 Falcon Bus

The steering gear shaft must be properly aligned in these vehicles to avoid a binding condition which can cause steering shaft failure.

It is, therefore, important to check this alignment whenever a steering gear assembly is removed and replaced, or when the steering gear housing is loosened or detached from the mounting plate, or when the steering column is loosened or detached from the instrument panel.

Following is the procedure for checking and adjusting steering gear shaft and column alignment:

1. Raise front end of truck and position safety stands.
2. Remove horn ring, steering wheel, spring, and column bearing sleeve.
3. Inspect steering shaft in relation to column for bind. If the shaft does not contact the steering column bearing when it is rotated by moving the front wheels from side to side, no adjustment is required and the parts removed can be re-installed.
4. If the steering shaft contacts the steering column bearing indicating a binding condition exists, correct as outlined below:

A. When the steering shaft contacts the steering column bearing, and records indicate this condition has been present in the vehicle for more than 4,000 miles, attach a pull scale in the undercut below the spline in the shaft and pull the shaft to the center of the column in the direction opposite to the bind. If the effort required to center the shaft is more than 35 lbs., replace the steering shaft and worm assembly.

B. If the steering shaft contacts the steering column bearing, and records indicate the condition has been present in the vehicle for less than 4,000 miles, align as follows:

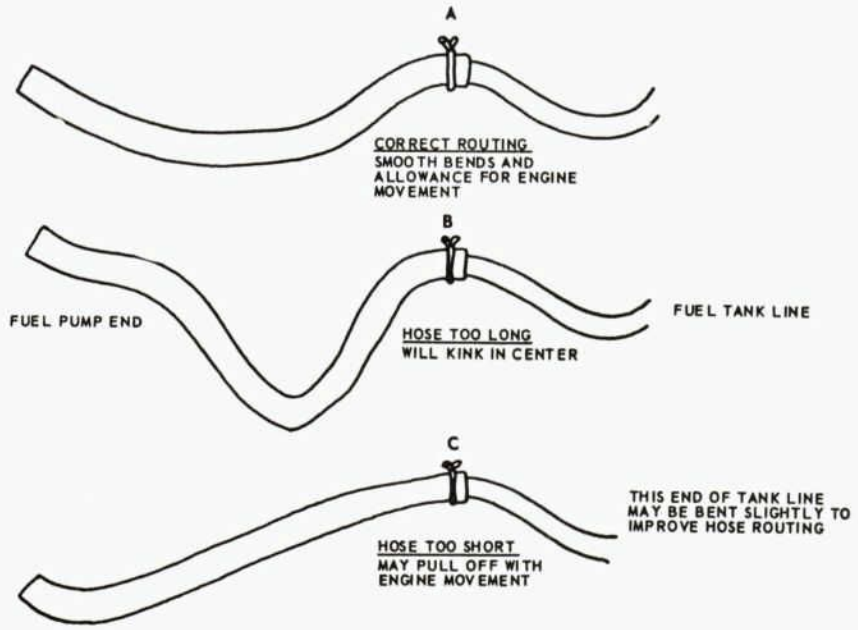


Figure 1—Premature Wear—Flexible Fuel Hose—1963 Fairlane and Falcon

1. Alignment procedure for vehicles built prior to December, 1962.
   (a) Side to Side Adjustment – When the steering shaft contacts the column bearing on the right or left side (3 or 9 o'clock) loosen the three (3) bracket to instrument panel attaching bolts and center the shaft within the column. Then retighten the attaching bolts.
   (b) Fore and Aft Adjustment – When the steering shaft contacts the column bearing at top or bottom (6 or 12 o'clock), loosen the two (2) steering column to instrument panel bracket clamp bolts and the three (3) steering gear housing mounting bolts. Center shaft in column and retighten bolts. (If the shaft cannot be centered in the column with this procedure, loosen the two (2) steering column to steering housing clamp bolts. Adjust column to center the shaft and retighten bolts.)

NOTE: In some cases it may be necessary to make both "side to side" and "fore and aft" adjustments to properly center the shaft. Also, when required, it is permissible to elongate the three (3) holes in the instrument panel to obtain adequate "side to side" adjustment, and to elongate the two (2) top holes in the steering gear housing mounting plate for proper "fore and aft" adjustment.

2. Alignment procedure for vehicles built after December, 1962 (Covers both "side to side" and "fore and aft" adjustments)
   (a) Loosen the steering housing mounting bolts, steering column to instrument panel support nuts, and steering column to instrument panel support clamp nuts.
   (b) Tighten and torque steering gear mounting bolts.
   (c) Tighten steering column support nuts and steering column nuts sufficiently to position steering column but still permit movement for adjustment.
   (d) Adjust column so that the shaft rotates without contacting column upper bearing (with sleeve removed).
   (e) Tighten column support nuts and column bracket clamp nuts.
   (f) Check for free rotation of steering shaft.

NOTE: In some cases it may be necessary to increase the length of the slotted holes in the instrument panel for adjusting the column support to center the steering shaft in the column.

19 AIR BRAKE SLACK ADJUSTER LUBRICATION—1963 Ford Trucks

Air Brake Slack Adjusters on 1963 Ford Trucks that do not have a plug provided in the casting for lubrication purposes were permanently lubricated during manufacture.

Air Brake Slack Adjusters that do have the plug provided for lubrication should be lubricated in the usual manner.

20 ENGINE REAR SUPPORT LEAF SPRING NOISE—1963 Falcon V8 with 4-Speed Transmission

The rear engine support of some early 1963 Falcon V-8 with 4-speed transmissions may create an objectionable noise when traveling over rough roads. This noise is caused by the rear edge of the upper leaf of the engine rear support contacting the rear support bracket. It could be erroneously diagnosed as the exhaust system grounding out.

Vehicles built after March 1, 1963, have an upper leaf that is ⅜ of an inch shorter. If this sound condition is encountered it can be corrected by the replacing of the early spring assembly with an assembly which has the shorter upper leaf Ford Part Number C3DZ-6B056-F.

21 STEERING STOP METALLIC RATTLE OR CRUNCH NOISE—1963-64 All Car Lines

A metallic "rattle" or "crunch" noise emanating from the front suspension when the vehicle is in full right or left turn, may be caused from dry surfaces of the steering spindle arms and the steering stops.

A coat of water resistant lubricant such as Ball Joint Grease, Ford Part Number C1AZ-19590-B applied to these surfaces will eliminate the noise.

22 REAR ENGINE SUPPORT BRACKET—1962-63 Fairlane

Whenever rear engine mounts are removed or replaced on 1962-63 Fairlanes it is recommended that the following bolts, flat washer and slotted nut (which requires the use of a cotter pin) be used for positive locking action when the engine mount is reinstalled.

Part Number	Part Name
376905-S7	Bolt ½"—13 x 1⅜
34398-S7	Nut ½—13 Slotted
44735-S8	Washer—Flat ½ I.D.
72034-S	Cotter Pin

23 RADIO ANTENNA MOUNTING LOCATION—1963-64 Fairlanes

In some cases, radio antennas have been installed incorrectly on the right hand fender of 1963 and 1964 Fairlanes. The correct location is on the left-hand fender.

An improper installation can cause an objectionable vibration to be transmitted through the right hand fresh air vent. In order to prevent complaints of this nature, the left hand fender mounting should be used in all cases.

The 1963-64 Fairlane antenna accessory kits show the proper location in their installation sketches. The template in these kits should be used on the left fender only.

24 VACUUM BRAKE BOOSTER AIR CLEANER MAINTENANCE—"C" Series Trucks

The 1963 C-500 and C-850 through C-1100 Owner's Manuals specify cleaning and lubrication of the vacuum brake booster air cleaner at each 4000 mile service interval.

The proper maintenance of the vacuum brake booster air cleaner will help to eliminate the possibility of booster contamination. In some isolated severe operations, relocation of the air cleaner may be desirable. This can be accomplished by drilling the crossmember and relocating the air cleaner as close to the frame side rail as possible.

25 IMPROVED GEARS FOR FOUR-SPEED TRANSMISSIONS—1963 Ford with 390 High Performance, 406 and 427 Engines

Improved gear train materials are being used in the four-speed transmissions of the above vehicles built after December 21, 1962.

In the event of gear failure on high performance vehicles built prior to December 21, 1962 the following parts should be installed as required:

C3AZ-7113-F	Gear—Transmission Countershaft
C3AZ-7B340-B	Gear—Transmission 3rd Speed
C3AZ-7102-E	Gear—Transmission 2nd Speed
C3AZ-7100-F	Gear—Transmission 1st Speed
C3AZ-7017-G	Shaft—Transmission Input

NOTE: These parts should be used only on vehicles equipped with high performance engines.

26 INSTRUMENT PANEL LIGHT FUSES—1963 Falcon, Fairlane, Ford and Econolines

All 1963 Fords, Falcons, Fairlanes, and Econolines incorporate a 15 amp fuse in the fuse panel on the headlight switch to protect the feed wire for the instrument panel lights, dome lights, parking lights, tail lights and license plate light against excessive current draw and failure.

Another fuse is incorporated in a cartridge in the feed wire between the headlight switch rheostat and the instrument panel lights to protect the rheostat against excessive current draw and possible failure.

When all the instrument panel lights fail to light, check the aforementioned fuses to be sure they have not blown before any attempt is made to replace the headlight switch assembly. Where either fuse is blown, replace it and check the operation of the instrument panel lights again. If either fuse blows again, locate and correct the cause of the condition.

The proper fuses to be installed, their numbers and locations are as follows:

Model Application	Circuit	Rating (Amps)	Fuse Number	Location
Ford, Falcon, Fairlane, and Econoline	Instrument panel, dome, parking, tail, license plate lights	15	3AG-15 or AGC-15	Fuse Panel on light switch
Falcon & Econoline	Headlight switch rheostat to instrument panel lights	1	1AG-1 or AGA-1	Cartridge in feed wire
Fairlane	Headlight switch rheostat to instrument panel lights	2	1AG-2 or AGA-2	Cartridge in feed wire
Ford	Headlight switch rheostat to instrument panel lights	4	SFE-4	Cartridge in feed wire