SHOP TIPS

Motorcraft Ford

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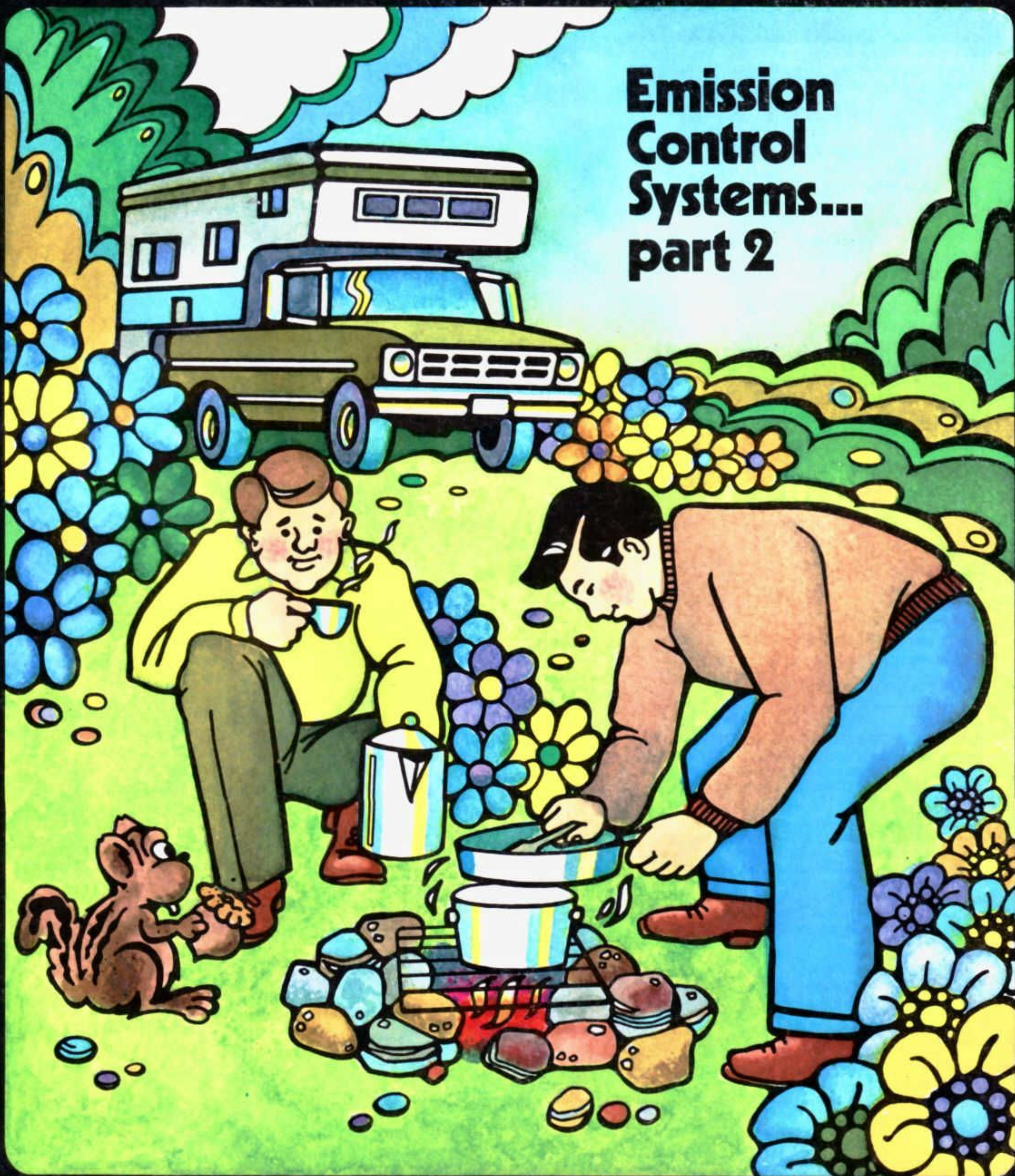

EMISSION CONTROL SYSTEMS, Part 2

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

IN THIS ISSUE

IMPORTANT . . .

CORRECTION TO THE 1972 MOTORCRAFT & AUTOLITE ALL PRODUCTS CATALOG (FORM AP-205-G)

Inadvertently, the incorrect Motorcraft rotor part number for a Chevrolet Vega was printed on page 40 of the subject catalog. The correct part number is DRG-218, *not* DRG-208. Please correct your catalog accordingly.

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: Ford Parts Division, Merchandising Services Dept., P.O. Box 3000, Livonia, Michigan 48151.

The information in this publication was gathered from materials released by the National Service Department of Ford Parts Division and the Ford Customer Service Division of the Ford Marketing Corporation, as well as other vehicle and parts manufacturers. The descriptions and specifications contained in this issue were in effect at the time it was approved for printing. Our policy is one of continuous improvement and we reserve the right to change specifications or design without notice and without incurring obligation.

Motorcraft Ford

VOL. 72 MSD 70

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PART TWO OF A TWO-PART ARTICLE COVERING EMISSION SYSTEMS OPERATION, DIAGNOSIS, AND MAINTENANCE

THIS ARTICLE COMPLETES EXPLANATION OF EMISSION SYSTEMS FOR 1972 FORD-BUILT VEHICLES

Part 1 of this Series (July 1972 *Shop Tips*) described operation, diagnosis and maintenance of the IMCO System (Improved Combustion System), and TRS System (Transmission Regulated Spark System).

Part 2 describes fuel evaporative control systems, positive crankcase ventilation, ESC System (Electronic Spark Control System), and related carburetor adjustments on Ford-built vehicles.

Required maintenance operations on emission systems components and other related engine components are also described and illustrated.

A chart is included for quick reference to the required emission system maintenance schedule. (Page 16.)

Application charts are supplied showing you which emission controls are used on various 1972 Ford-built models, including light trucks. (Pages 17 and 18.)

EMISSION SYSTEMS MAINTENANCE IS IMPORTANT TO YOU AND YOUR CUSTOMERS

Maintenance and service of your customers' emission systems is valuable business for you because it includes labor and sales of related engine parts such as spark plugs, points, condensers and distributor caps as well as sales of emission systems replacement components.

Regular maintenance is important to your customers for two reasons:

1. To help keep the car or truck emission systems operating properly, therefore serving their purpose of reducing undesirable emissions.
2. To help keep the engine operating properly, delivering the performance, easy starting and satisfactory fuel economy which are possible when the emission systems are performing properly.

Help your customers maintain good emission systems performance. The result of such maintenance is cleaner air and greater customer satisfaction with their vehicles. This means greater customer satisfaction with you.

FUEL EVAPORATIVE CONTROL SYSTEMS

It is estimated that 20 percent of the overall vehicle emission problem has been caused by gasoline vapors escaping from openings in the fuel tank and carburetor. These gasoline vapors are known as *evaporative losses* and occur not only when the vehicle is operating, but when it is parked, as well. In fact, most fuel vapors are lost when the vehicle is parked.

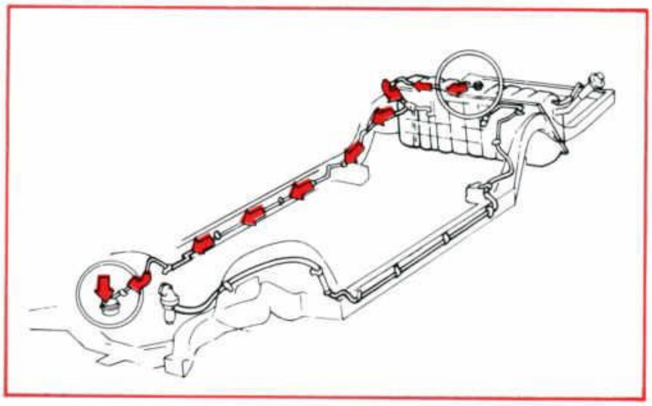

Figure 1

This part of emission control is provided by a sealed fuel system wherein the fuel vapors are trapped and directed to the engine, where they are burned in the normal combustion process.

Three basic sub-systems within the system function to provide fuel evaporative emission control. These systems are the:

- Fill Control Vent
- Pressure and Vacuum Relief
- Vapor Vent and Storage

Fill Control Vent System

The fill control vent system provides positive control of fuel height during fill operations by filler pipe design and by vent lines within the filler neck or fuel tank. Of course, fuel tank design will vary to serve specific needs for the many vehicle applications.

This fill control system is designed so that approximately 10 to 12 percent of the tank is empty when the tank is filled to capacity. This space above the fuel allows for heat expansion of the fuel and temporary storage of fuel vapors.

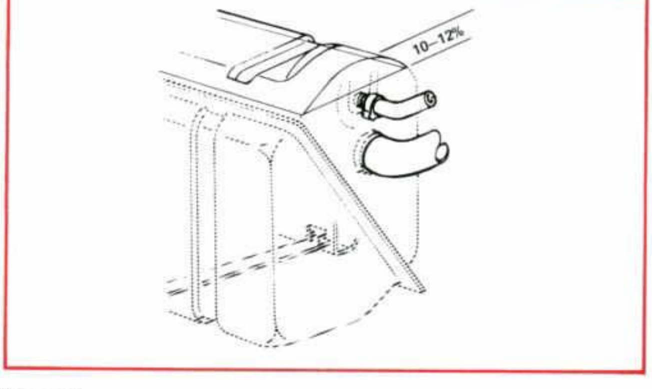

Figure 2

Pressure and Vacuum Relief

The pressure and vacuum relief system functions through a valve in the sealed fill cap. Under normal operating conditions, the fill cap operates as a check valve, allowing air to enter the tank as gasoline is used, while preventing fuel vapors from escaping through the cap.

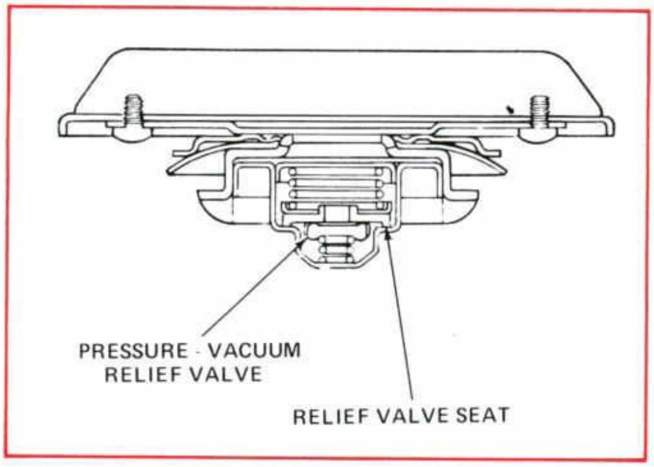

Figure 3

The valve opens to relieve pressure when it exceeds ¾ to 1¼ psi. When vacuum buildup occurs in the tank the valve opens to allow air into the system. Maximum vacuum at which the cap opens is ½ inch of mercury.

Vapor Vent and Storage

The vapor vent system on vertically mounted fuel tanks consists simply of a vapor separator mounted centrally on the uppermost surface of the tank. As mentioned earlier, the 10 to 12 percent space in the tank provides adequate breathing space for the vapor separator.

Horizontally mounted fuel tanks use a raised mounting section for the vapor separator that is centrally located on the upper surface of the tank. This raised section provides additional breathing space for the vapor separator since the space allowed for heat expansion of fuel is not as deep as it is on the vertically mounted tank.

Figure 4

EMISSION CONTROL SYSTEMS, Part 2 Continued

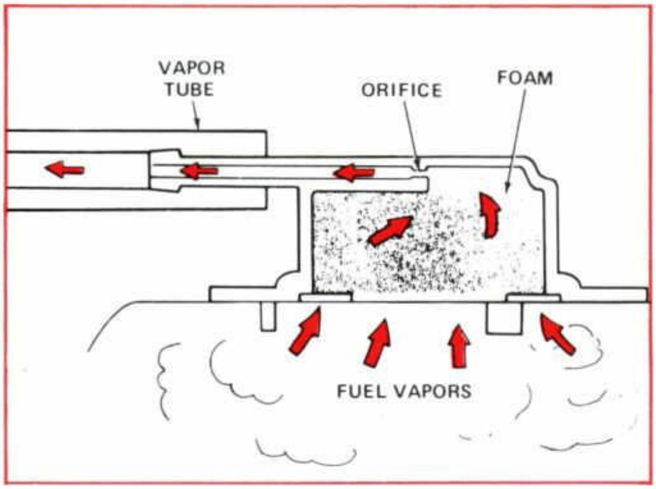

Figure 5

The vapor separator consists of a small hole or opening in the outlet connected to the vapor tube, plus open-cell foam to separate liquid fuel and fuel vapors. It minimizes the possibility of liquid fuel entering the vapor tube.

The fuel vapors that are trapped in the fuel tank have only one place to go and that is through the small opening in the vapor separator and into the vapor tube.

The vapor separator is retained to the fuel tank by the same cam-lock ring used for the fuel tank sending unit. The design shown is the conventional-type vapor separator used for most vehicle applications. Other types are also required because of differences in component usage or vehicle design.

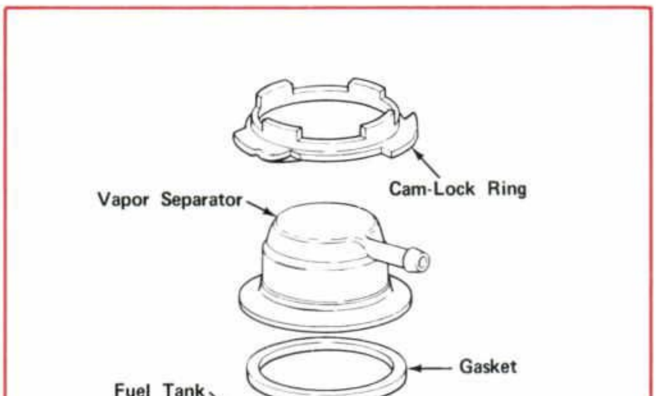

Figure 6

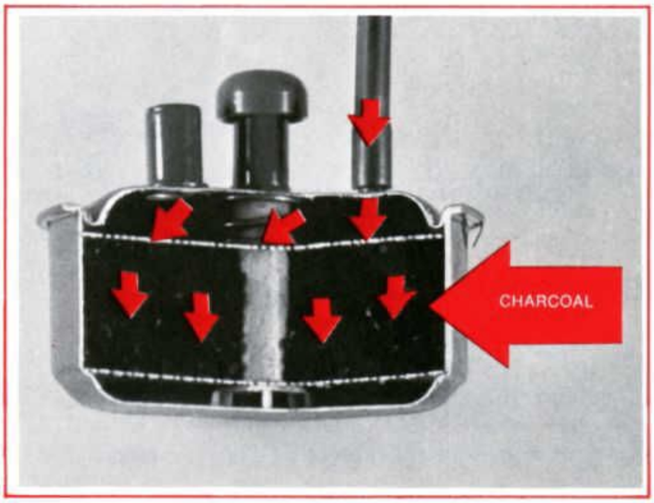

Figure 7

Regardless of the type of vapor separator used, all perform the same function. They serve as a baffle to be sure that only fuel vapors are delivered to the charcoal canister.

If the engine is not operating, the fuel vapors entering the canister are absorbed and stored by the activated charcoal.

On engine start-up, air enters the canister through the center tube that extends to the bottom of the canister. The air circulates through the canister to remove the fuel vapors from the charcoal. This cleansing action is called purging, and it is a good reason for using charcoal, since it is self-cleaning and can be used repeatedly.

From the air cleaner, the fuel vapors are drawn into the carburetor and added to the air-fuel mixture. The air-fuel mixture is then distributed through the intake manifold to each cylinder. The fuel vapors are burned then in the normal combustion process. In this way, fuel evaporative emissions from the fuel tank and carburetor are reduced very substantially.

Another feature of the fuel emission system is that all carburetors are internally vented. The fuel vapors from the carburetor fuel bowl remain within the system until they are drawn into the engine for burning.

Diagnosis and Service

Diagnosis of the system, other than fuel tank or fuel vapor line leaks and damaged parts, is limited to locating kinked lines or fill cap malfunction.

Fill cap damage or contamination causing the pressure-vacuum relief valve to be inoperative may result in deformation of the fuel tank; be sure that the correct fill cap is used and is in working order.

Component parts of the fuel emission system, except for the fuel tanks and lines, are not subject to repair. Malfunctioning or damaged parts must be removed and replaced with new parts.

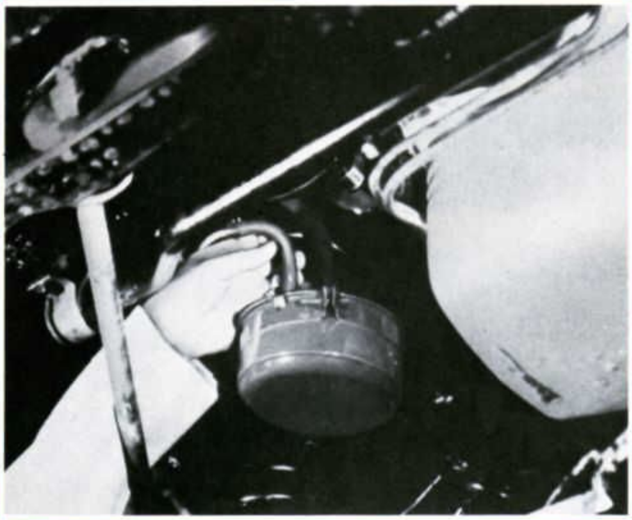

Figure 8

The scheduled maintenance services required are replacement of the charcoal canister and purge tube to the air cleaner every 24,000 miles or 24 months . . . whichever occurs first. Of course, earlier replacement of the canister may be necessary if it is damaged by crushing, oil contamination, or water flooding. See Maintenance Schedule, page 16.

Positive Crankcase Ventilation System

In order to ensure proper vehicle performance, fuel economy, and effective emission control, periodic maintenance on the PCV system is a *must*. The recommended service interval is every 12 months or 12,000 miles, whichever comes first. At that time, the PCV valve must be changed and the emission system hoses should be cleaned or, if necessary, replaced.

The positive crankcase ventilation system is a simple but easy-to-service system. Yet, if properly maintained as recommended, it is very effective in controlling crankcase emissions.

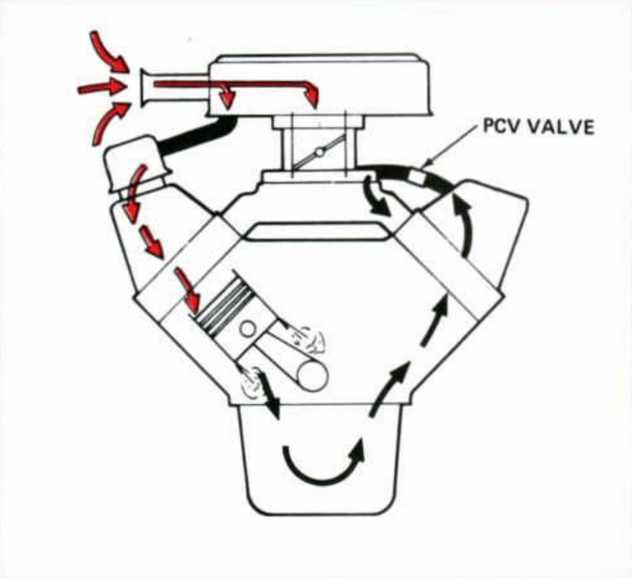

Figure 9

ELECTRONIC SPARK CONTROL SYSTEM

The function of the ESC system is to control vacuum to the vacuum advance diaphragm of the distributor, and retarding the spark for more complete combustion of the fuel when the vehicle is operating below a specified road speed, and the outside air temperature is approximately 65 degrees Fahrenheit or higher.

How the system operates and the procedures necessary for effective testing are most important. A complete operational check is a required part of each 12,000-mile or 12-month maintenance service to be sure that exhaust emission standards are met.

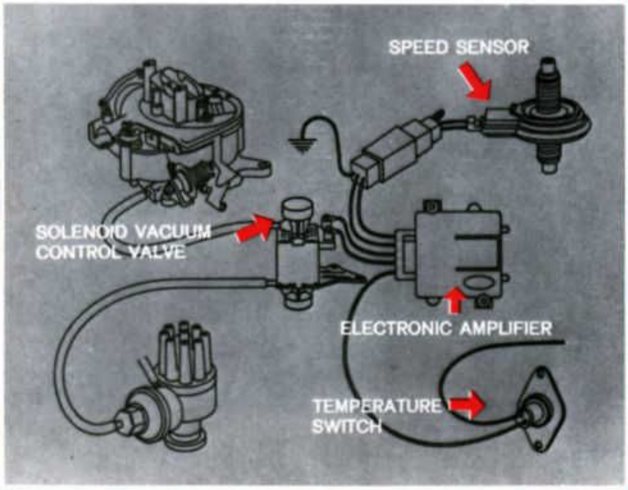

Figure 10

The principal components are the solenoid vacuum control valve, the electronic amplifier, the temperature switch, and the speed sensor.

On some installations, a distributor vacuum control valve, also called Ported Vacuum Switch (PVS), is used as a safety override switch. If engine coolant exceeds 230 degrees Fahrenheit, the PVS valve will function to bypass the ESC system and apply manifold vacuum directly to the distributor to provide vacuum advance.

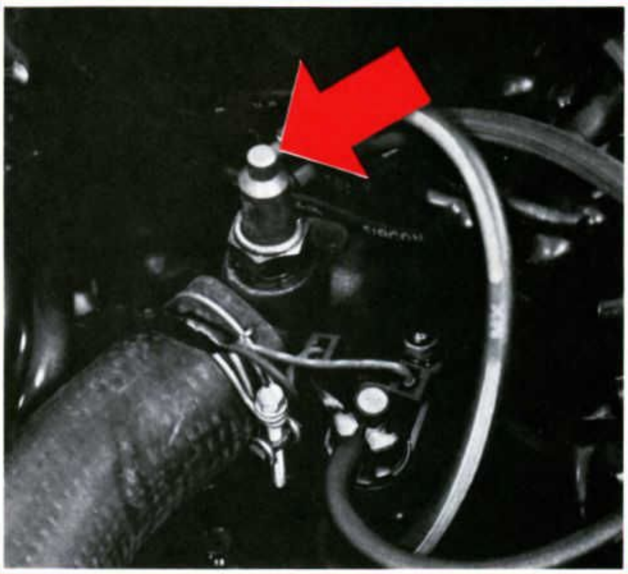

Figure 11

EMISSION CONTROL SYSTEMS, Part 2 Continued

Solenoid Vacuum Control Valve

The spark control device in the ESC system is the solenoid vacuum control valve. It is installed in the vacuum line from the carburetor to the advance diaphragm on the distributor.

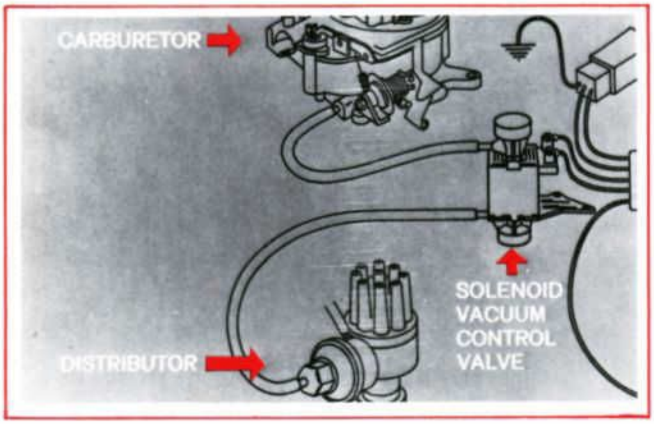

Figure 12

The vacuum valve is normally open. In the open position, it permits the vacuum advance to function normally, not retarding the spark.

While the valve is open, an internal bleed on top of the valve housing purges the vacuum line of any vapor or liquids in the system which might damage the valve plunger.

To close the valve, an electric current must be applied to its two blade contacts, energizing the coil of the solenoid built into the valve assembly.

When the valve is closed by closing its electric circuit, advance vacuum from the carburetor is blocked.

At the same time, vacuum at the distributor advance diaphragm is bled off through a vent at the bottom of the valve housing.

With no vacuum present at the advance diaphragm, the spark is retarded. The fuel burns more completely due to the resultant higher air-fuel mixture temperature and higher exhaust temperatures. And that's really all there is to the vacuum part of the ESC system.

Now, let's look at the electric circuit to the vacuum valve, which determines the conditions in which the spark is to be retarded.

To begin, note that the electronic amplifier is connected to the vacuum valve by two leads. Both have brown insulation.

The lead with orange hash marks is the hot wire and the lead with yellow dots is the ground circuit.

Following the hot circuit past the amplifier, you can see that the circuit is powered from the ignition switch, through the fuse block, and through the temperature switch.

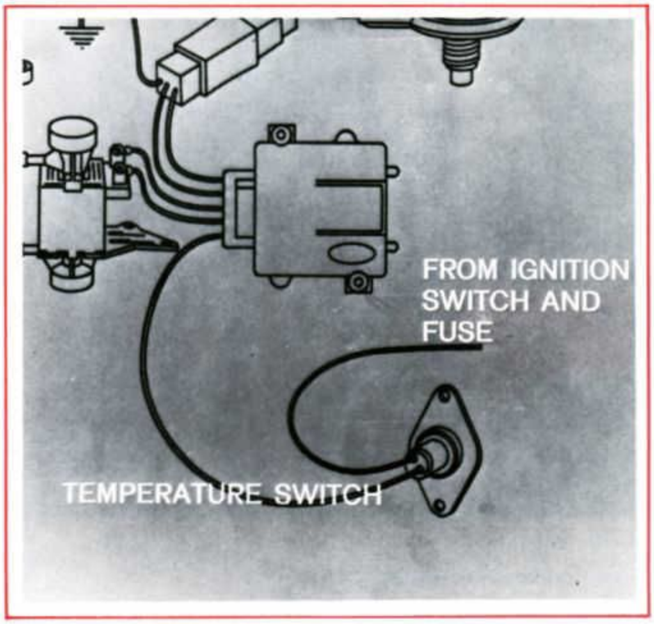

Figure 13

Temperature Switch

The temperature switch contains a bimetal element which senses the ambient or outside air temperature.

The switch is located in the right or left "A" pillar to isolate it from passenger or engine compartment heat.

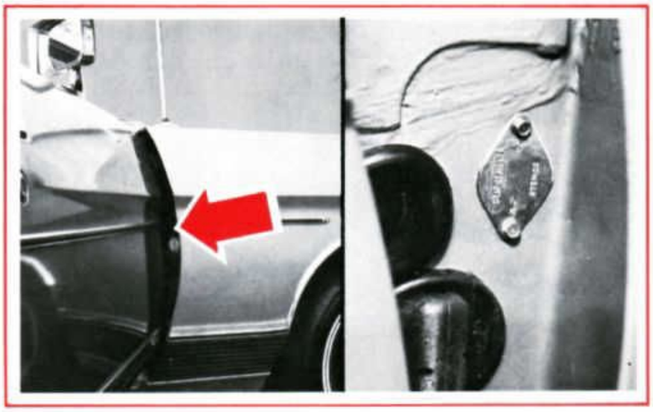

Figure 14

The function of the temperature switch is to close the electrical circuit to the amplifier at temperatures of approximately 65 degrees Fahrenheit or higher and to open the circuit at approximately 49 degrees or less. Therefore, the spark can be retarded only with warm, outside air available.

It is important to note that it is possible for the switch contacts to be either opened or closed within the range of 49 to 65 degrees Fahrenheit. This variance has little effect on the overall function and operation of the system.

Speed Sensor

The speed sensor is in the ground circuit and physically is installed between the two speedometer cable segments.

The speed sensor must be installed with the copper bushing toward the transmission. In this position, the bushing absorbs most of the shock that may occur in the speedometer cable, and prolongs the life of the sensor.

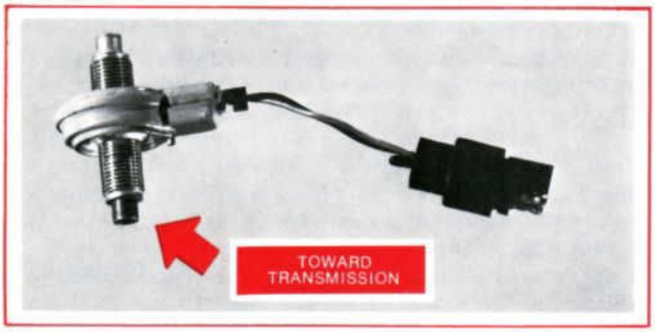

Figure 15

On units equipped with a speed control, a short adapter (coupling) is used to connect the speed control sensor with the ESC speed sensor.

To ensure proper installation, the speed control sensor must be installed to the adapter first. Be sure it is installed in the end of the adapter that contains the shorter end of the core and the brass collar, as shown in the cross section view of the adapter.

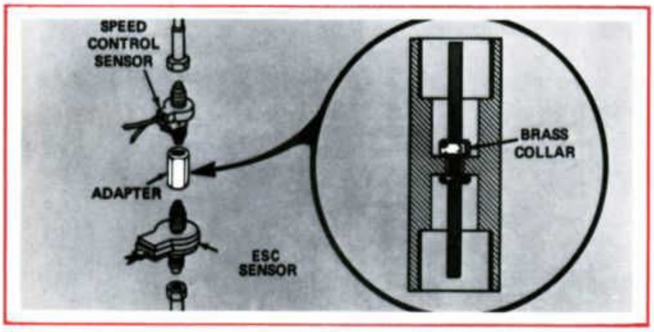

Figure 16

The speed sensor puts out an electric voltage proportional to road speed . . . to signal the amplifier when to energize or de-energize the solenoid vacuum valve coil.

There are two leads to the sensor . . . one for the voltage signal to the amplifier and the other to provide a ground circuit for the vacuum valve.

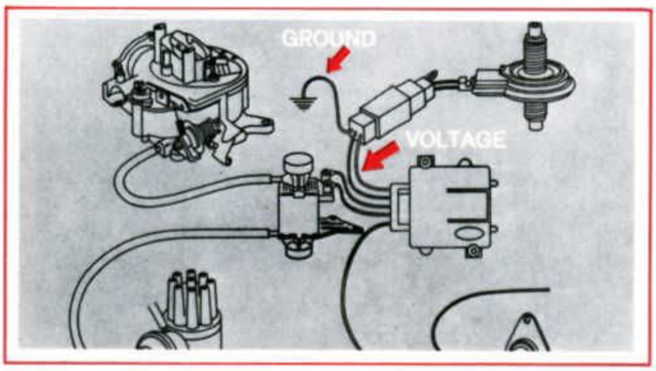

Figure 17

Electronic Amplifier

The electronic amplifier is placed in the circuit in such a way that it opens and closes the ground circuit to the vacuum valve in response to the signal from the speed sensor.

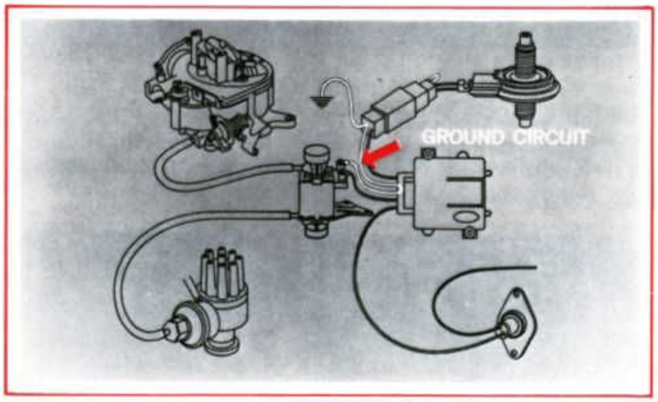

Figure 18

The four different amplifiers available are identical in operation except for their road speed setting. They are identified by the color of the plastic case as follows:

Color	Cut-In Speed
Black	25 MPH
White	31 MPH
Blue	37 MPH
Gray	40 MPH

All four are set to close the circuit at approximately 18 miles per hour.

Physically, the amplifier is located on a printed circuit board in the control module.

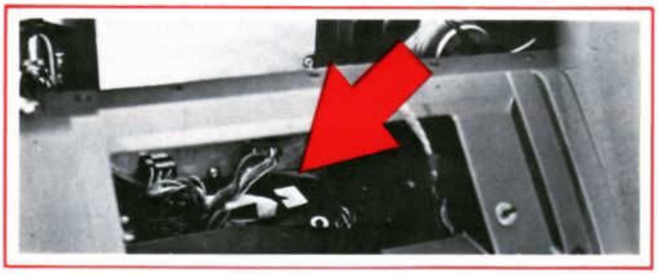

Figure 19

How ESC Operates

A review of the operation of each component within the complete ESC system will provide a better understanding of how it functions to provide exhaust emission control. Let's assume the air temperature outside is above 65 degrees . . . so that the temperature switch is closed.

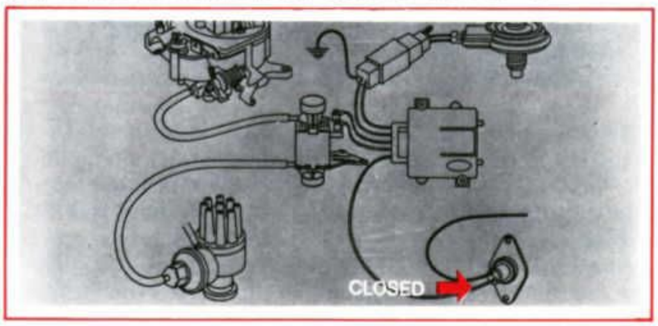

Figure 20

The hot circuit is always complete through the amplifier connector to the ignition switch when the temperature switch is closed. In this way the vacuum valve coil is energized.

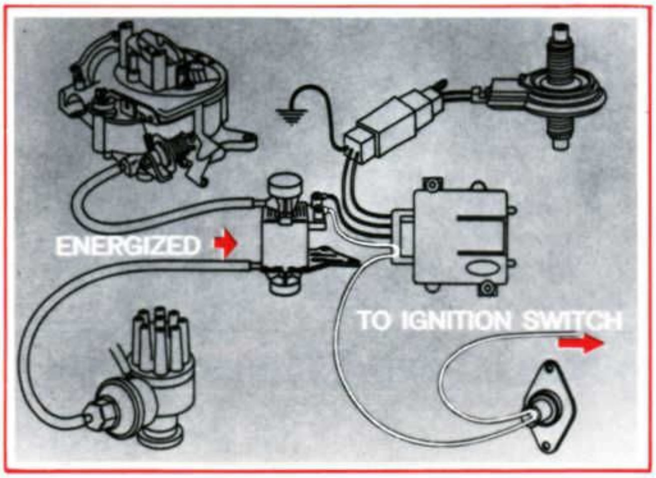

Figure 21

Energizing the vacuum valve coil closes the valve so that it blocks vacuum from the carburetor and bleeds off vacuum from the distributor. Thus, the spark is retarded until the circuit opens again.

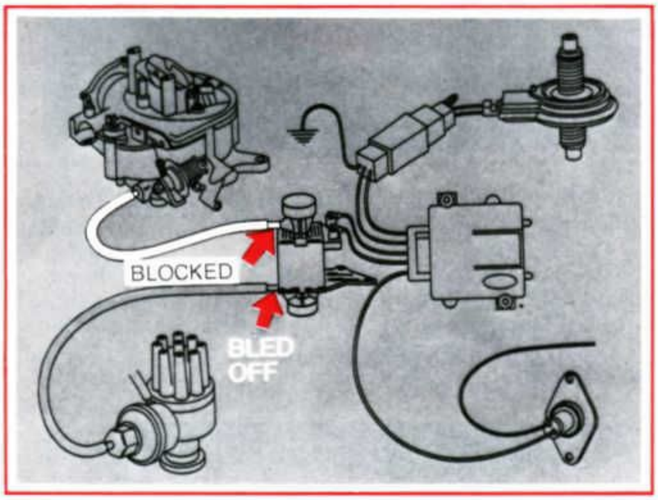

Figure 22

The circuit will open to allow normal advance if the temperature drops to 49 degrees or lower at the temperature switch.

Also . . . the ground circuit will open in the amplifier when the sensor tells the amplifier that the vehicle has reached the cut-in speed: 25, 31, 37 or 40 miles per hour.

It will remain open to advance the spark until the vehicle slows to the cut-out speed of approximately 18 miles per hour. The spark is again retarded at 18 miles per hour or less.

CHECKING OUT ESC SYSTEM

Now, let's turn our attention to the four operational tests for the ESC system. The operational test for the complete system must be performed as part of the 12,000-mile or 12-month maintenance service interval.

In operational testing, you simulate the actual operating conditions on the vehicle . . . using test instruments to be sure that the desired operation actually is occurring.

The first operational test is for the entire ESC system . . . then there are individual test procedures for the speed sensor, the temperature switch, and the vacuum valve.

Operational Test–Entire System

To prepare for the system operational test, install a T-fitting and vacuum gauge with a long hose into the line at the vacuum port on the distributor. Put the gauge where you can see it from the driver's seat.

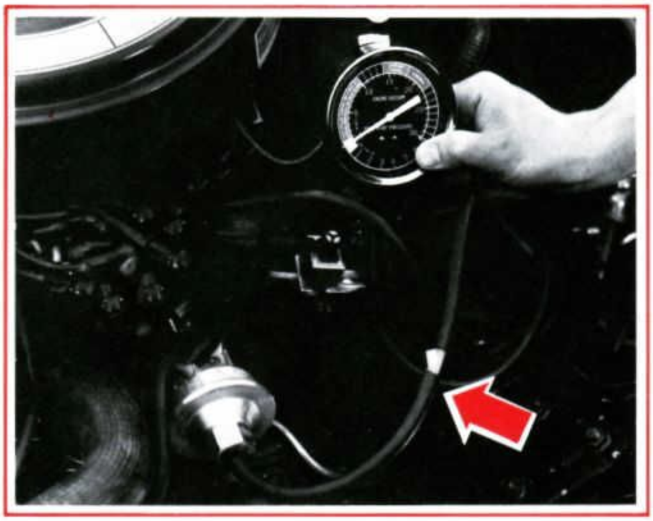

Figure 23

Be sure that the room or air temperature is at 65 degrees or higher, so that the temperature switch is closed.

Raise the rear wheels of the vehicle so that you can operate in gear, up to 40 miles per hour, during the functional test.

With the vacuum gauge in place, the temperature switch warm, and the rear wheels up on jack stands, get behind the wheel to begin the system operational test.

Then, start the engine and shift to Drive range or High gear. No vacuum will be indicated up to the cut-in speed, since the vacuum valve should be closed.

At the cut-in speed of 25, 31, 37 or 40 miles per hour, the circuit should open and the gauge should read at least six inches of vacuum. If these conditions exist, the system is functioning properly. No additional checks are necessary.

Vacuum System Check

If there is no vacuum during the operational test, further diagnosis is necessary to isolate the malfunction as a vacuum problem, or an electrical problem.

In order to isolate a vacuum problem, disconnect the electrical leads at the vacuum valve. Operate the engine in Neutral at about 1500 rpm, and recheck the vacuum gauge. The vacuum valve should be open at this time, and at least six inches of vacuum indicated on the gauge.

In the event that no vacuum is still indicated, check the vacuum hoses to the distributor for proper routing and restrictions. If the vacuum hoses check out okay, it may be that vacuum is not available from the carburetor.

To test for the availability of vacuum, pull the hoses from the vacuum valve and connect them with a nipple to bypass the vacuum valve. Again operate the engine in Neutral at about 1500 rpm to build up spark vacuum; then check the vacuum gauge again.

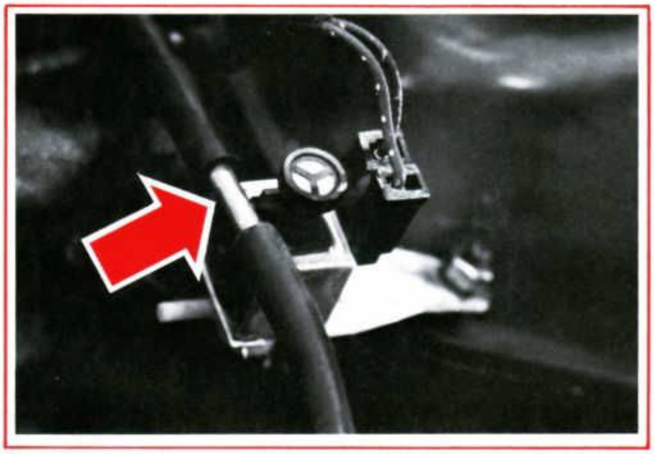

Figure 24

If there's still no vacuum, check out the vacuum system back to the carburetor to correct the problem. But, if there is vacuum, then the vacuum valve itself is probably not functioning properly.

Replace the valve and repeat the system operational test.

Electrical System Check

Now, let's take situations which would point to trouble in the electrical circuit.

Suppose that vacuum occurs before the cut-in speed; or that there is vacuum all the time. These conditions would indicate electrical problems at the vacuum valve, temperature switch, speed sensor, or electronic amplifier.

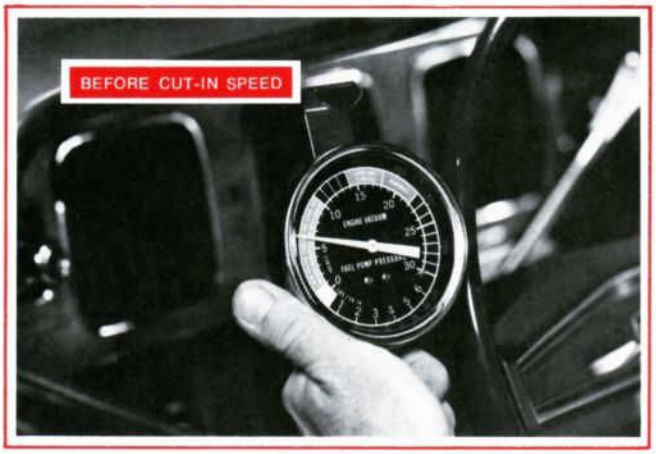

Figure 25

You should begin by testing for power with a test light in the hot circuit, with the ignition switch on, and the temperature switch above 65 degrees.

You can test for power to-and-from the temperature switch where its connector plugs into the instrument panel wiring. Power to the switch is the red wire with yellow hash marks.

If no power is available, continue testing back to the power source. If power is available to-and-from the temperature switch, move to the amplifier connector.

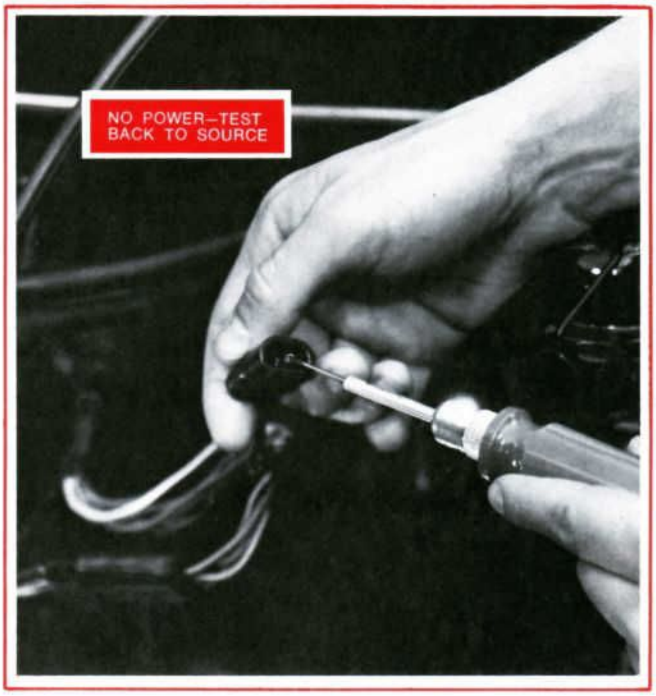

Figure 26

Remove the connector from the amplifier and test for power to the connector. If that's not okay, repair the wiring from the temperature switch.

To test the temperature switch by itself, make a continuity check between the two terminals of the connector. There should be continuity or low resistance when the switch is warming, and no continuity when it is cold.

On the vehicle, the switch can be warmed with a sponge dipped in hot water. It can be cooled with an aerosol spray, such as starter fluid.

Away from its installed place on the car, the switch can be warmed easily in the palm of your hand, and cooled in ice or very cold water.

If you have a good temperature switch, but still are getting vacuum below the cut-in speed, then test the speed sensor.

You test the speed sensor by making a continuity check with an ohmmeter between the leads. The resistance should be from 40 to 60 ohms.

Check to be sure the speed sensor connector is tight. It has a ground interlock loop between the connectors, which will unground the circuit when the connector is opened.

The other test point in the ground circuit is at the amplifier connector. You can test there for continuity to ground.

EMISSION CONTROL SYSTEMS, Part 2 Continued

Now, let's review the procedure for checking electrical trouble at the vacuum valve. Remove the electrical leads from the valve to isolate it from the electronic amplifier.

WARNING: Never connect any test jumper, test light or "hot screwdriver" to the valve, except when it is isolated from the amplifier. To do so can damage the electronic amplifier.

Figure 27

Apply power to the isolated valve by connecting jumper wires from its terminals to the battery and to ground.

Then operate the engine in Neutral at about 1500 rpm. The valve should close when power is applied. If there is a vacuum reading, replace the valve.

If the gauge shows no vacuum with the valve coil energized, the valve is okay. And that leaves only the amplifier.

There is no way to test the amplifier . . . and to attempt to do so would damage it. Therefore . . . replace the amplifier if there is still trouble after okaying all the other parts of the system.

Remember that if any of the ESC system components: solenoid vacuum valve, electronic amplifier, temperature switch, or speed sensor malfunctions, it should be replaced as a unit.

FOR CONVENIENT ESC TROUBLESHOOTING CHART, SEE PAGE 19.

CARBURETOR ADJUSTMENTS

As carburetors are calibrated more closely to reduce emissions by burning the fuel more thoroughly, carburetor adjustments become increasingly critical, for two reasons.

First the engine must operate to meet emission control standards; and second, the vehicle must perform to customer satisfaction.

Linkage

Begin with the preliminary checks of the linkage to be certain everything operates smoothly and to full travel in both directions.

Throttle

Move the throttle linkage to the wide-open position. Check that the linkage from the accelerator permits the throttle lever to go all the way to the wide-open stop.

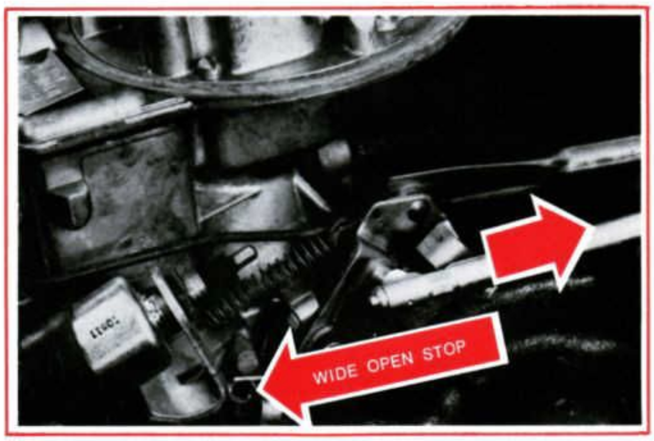

Figure 28

On a cold engine, up to room temperature, observe that the choke closes as the throttle opens; and then opens slightly to de-choke when the throttle lever is at or near the W.O.T. stop.

When you release the throttle with the choke closed, it should return to a fast idle position on the top step of the fast-idle cam. To check for free return to idle, open the choke plate by hand.

Observe that the throttle lever moves back against the anti-diesel set screw from the force of the return spring.

Choke

At the same time, check that the choke linkage is not binding and that the choke plate moves freely on its shaft.

Use a lubricant such as Dri-Slide to assure proper operation. (Do not use lubricating oil.) With all the linkage functioning properly, you can proceed to the choke adjustments. These are all made with the engine shut off.

Choke Pull-Down Adjustment

Choke plate pull-down is a partial opening of the choke plate from engine vacuum acting on a piston or diaphragm as soon as the engine starts. Its purpose is to prevent overrichness while the engine is warming.

All Carburetors Except 2-V

The pull-down adjustment is made to obtain a specified clearance between the choke plate and air horn wall, with the piston or diaphragm held in the pull-down position.


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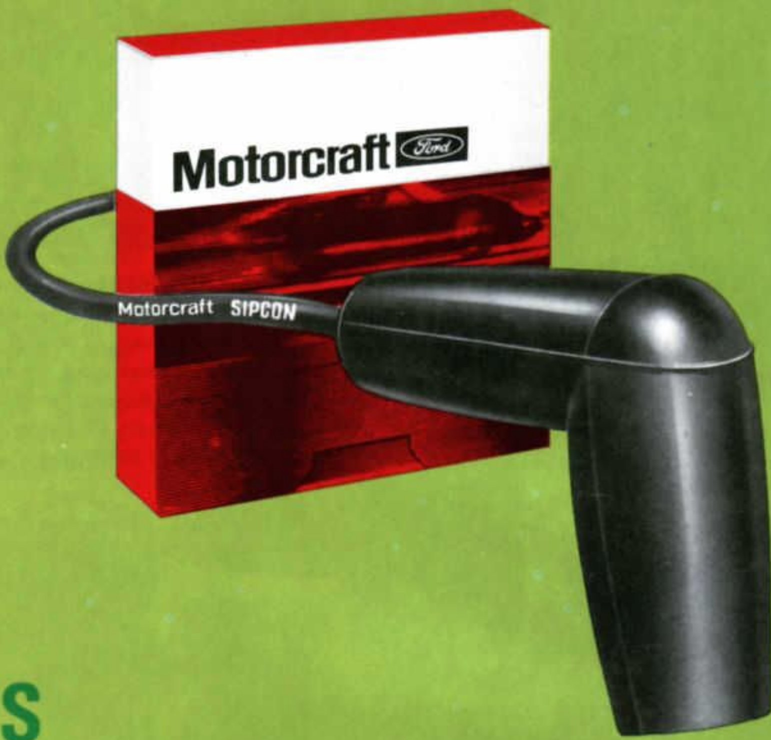

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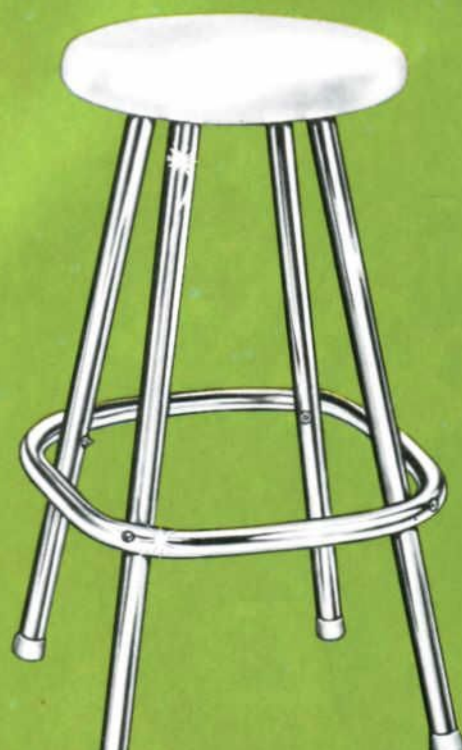

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WR-3802	6	1954-64, 70 Ford, 1966-72 Bronco, 1962-70 Fairlane, 1960-70 Falcon 1970-72 Maverick, 1965-72 Mustang, 1968-72 Torino 1961-62 Mercury, 1960-72 Comet, 1968-72 Montego	–	1	1
WR-3809	8	1963-72 Ford, 1966-72 Bronco, 1962-70 Fairlane, 1963-70 Falcon, 1965-67, 70-72 Mustang 1968-72 Torino, 1963-67, 70-71 Comet, 1968-70 Cougar, 1969-72 Montego	1	1	2
WR-3813	8	1966-69 Fairlane, 1967-69 Mustang, 1968-69 Torino, 1963-69 Comet 1968-69 Montego	1	1	2
WR-3816	8	1969-72 Ford, 1970 Fairlane, 1970-71 Mustang, 1969-72 Torino 1969-72 Lincoln, 1969-72 Mark III, IV, 1968-72 Mercury, 1970-71 Comet, 1971-72 Cougar, 1970-72 Montego, 1958-72 Thunderbird	–	1	1
WR-3819	8	1970-72 Ford, 1970 Mustang, 1969 Torino, 1971 Mercury, 1969 Cougar 1969 Montego	–	1	1
WR-3824	4	1966-72 Volkswagen (Square Back and Fast Back)	1•	1•	1•
WR-3826	6	1968-71 Buick, 1962-72 Chevrolet, 1967-72 Camaro, 1962-72 Chevy II/ Nova, 1964-72 Chevelle/Monte Carlo, 1966-71 Oldsmobile, 1966-71 F-85, 1968-72 Firebird, 1964-72 Tempest/LeMans, 1972 Ventura II	1	1	2
WR-3827	8	1968-71 Buick	–	1	1
WR-3828	8	1971-72 Chrysler, 1963-72 Dodge, 1962-72 Dart, 1965-72 Plymouth, 1965-72 Valiant/Barracuda	1	1	2
WR-3829	8	1957-70 Chevrolet	1	1	3
WR-3830	8	1967-70 Camaro, 1964-70 Chevy II/Nova, 1964-70 Chevelle/Monte Carlo	1	1	1
WR-3831	8	1969-70 Chrysler, 1962-69 Dodge, 1969 Dart, 1967-69 Plymouth, 1968-69 Valiant/Barracuda, 1969-70 Imperial	1	1	1
WR-3832	8	1961-68 Chrysler, 1966-68 Dodge, 1965-67 Plymouth, 1966-68 Imperial	1	1	2
WR-3834	8	1968-72, Pontiac Firebird, Pontiac, LeMans, Tempest, 1972 Ventura II	–	1	1
WR-3835	8	1963-70 Cadillac	–	1	1
WR-3837	8	1962-68 Oldsmobile, 1961-68 F-85/Cutlass	1	1	1
WR-3838	8	1971-72 Chevrolet, Camaro, Chevy/Nova, Chevelle/Monte Carlo	1	1	1
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For the *Model 1250 carburetor,* insert a gauge wire of specified diameter in the slot in the pull-down piston cylinder to lock the piston from moving.

Then use a drill bit of the specified clearance to gauge the distance between the lower edge of the choke plate and air horn wall, while holding a light closing pressure on the plate.

You will be able to move the drill bit with just a slight drag if the adjustment is correct.

If the clearance is not correct, bend the arm of the choke thermostat lever where it contacts the vacuum piston lever to obtain the proper clearance.

To adjust the pull-down clearance on *Carter carburetors,* you must remove the choke piston lever and bend it.

On the *Motorcraft 4-V carburetor,* the pull-down adjustment is made at the choke shaft lever. Loosen the screw, which has a *left-hand thread,* and pry the lever out just enough to loosen it on the shaft.

Then use a drill bit that is ten-thousandths smaller than specs to compensate for play in the linkage while you set the clearance.

When the clearance is set, and the choke shaft screw is tightened, repeat the clearance check with a gauge of the specified diameter.

2-V Carburetors

On 2-V carburetors, pull-down is set permanently during manufacture by the fuel-air ratio method. Adjustment is not normally required. However, if the vehicle has excessive loading, sluggish feel, or emits black smoke, you may try opening the pull-down adjustment .020" greater than the existing setting. If the complaint is excessive stumbles, backfires, or stalls, you may try closing the pull-down adjustment by as much as .020".

On the *Motorcraft 2-V carburetor,* hold the diaphragm piston down against the stop while checking the clearance. Do not press on the L-shaped nylon post.

If an adjustment is needed, turn the diaphragm stop screw under the choke diaphragm housing clockwise to decrease the clearance or counterclockwise to increase it.

The *5200 carburetor* has a very simple adjustment of pull-down. Push the diaphragm stem against its stop and measure the clearance while holding the choke plate closed.

If the clearance is not to specs, just pull the plug from the end of the diaphragm, insert a small screwdriver, and turn the set screw in or out until the clearance is correct.

One final point on the pull-down adjustment: be sure the fast idle linkage isn't preventing the choke from closing. If necessary, block the throttle partly open.

Choke Thermostat Adjustment

Next, let's look at the choke thermostat adjustment. Here it's important to note that too rich a setting will increase exhaust emissions, while too lean a setting will hurt starting and warmup performance.

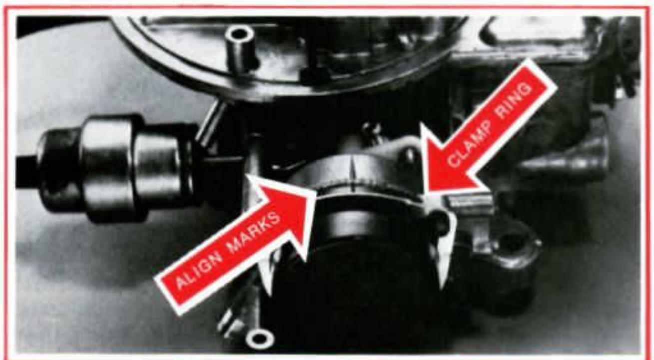


Figure 29

On most chokes, the housing is held by a clamp ring, as shown in Figure 29. With the clamp ring screws loose, rotate the housing until the scribe mark on its rim aligns with the specified mark and tighten the screws.

On *Models 1250* and *5200,* the housing can be rotated slightly with the three retaining screws loose. Align the scribe mark on the rim with the specified index and tighten the screws.

Another important difference between these carburetors and others is the direction of housing rotation to change the richness. On the conventional choke, clockwise is lean; counterclockwise is rich.

The opposite is true on *Models 1250* and *5200:* clockwise is richer and counterclockwise is leaner.

Fast Idle Cam Index

Along with the choke adjustments, it is necessary to index the fast idle cam to the choke plate on some carburetors prior to making the idle speed settings. Now this is very important: on all fast idle cam indexing, you are setting the linkage up for fast idle operation on the kickdown step of the fast idle cam. This is the second step . . . and is usually identified by an arrow or other scribe mark on the cam.

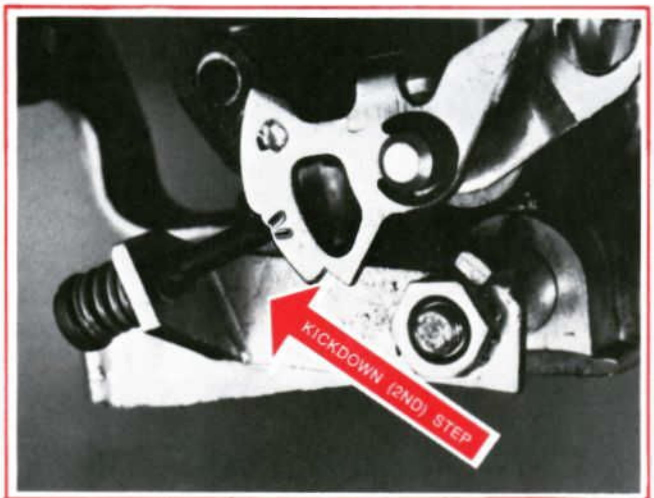


Figure 30

Figure 31

EMISSION CONTROL SYSTEMS, Part 2 Continued

The fast idle cam index is checked on *Model 1250* with the setup for choke pull-down. With the wire in the piston slot and the drill bit in place, check that the fast idle tab of the throttle lever is on the cam step with the stamped arrow. If it is not, bend the fast idle rod to make the adjustment.

On the *Model 5200 carburetor,* begin by holding the lower edge of the choke plate closed against the specified drill bit. Place the fast idle speed adjusting screw firmly on the second step of the fast idle cam. Then measure the clearance between the tang of the choke lever and the arm on the fast idle cam. If the clearance is not within specifications, bend the tang up or down to adjust it.

On *Motorcraft 2-V* and *4-V carburetors,* the fast-idle rpm setting must be made before the fast-idle cam clearance. To prepare for the cam clearance adjustment set the choke housing ninety degrees rich to apply tension to the linkage and close the choke plate. Then hold the fast idle adjusting screw firmly against the cam at the "V" stamped in the cam.

With the two-piece fast idle lever used on some *Motorcraft 2-V Model 2100's,* align the tang on the top lever with the "V" on the cam.

Measure the clearance between the choke plate and the air horn. If it is not to specifications, turn the adjusting screw in to increase the clearance or out to decrease it. Make sure the fast idle cam remains in the position indicated by the "V."

On *Carter carburetors,* hold the fast idle adjusting screw on the kickdown step of the cam, against the shoulder of the high step, and measure the fast idle cam index clearance at the choke plate. If necessary, adjust the clearance by bending the connecting rod from the choke plate to the fast idle cam.

Idle Adjustments

Begin by operating the engine at 1500 rpm for at least fifteen minutes to stabilize operating temperatures.

Also, when checking idle speeds, actuate the throttle several times after speed is obtained to make sure it remains steady.

Unless you're positive the ignition system is up to specifications, check dwell, initial ignition timing and distributor spark advance and retard before making any idle adjustments. Also be sure there are no vacuum leaks.

With an automatic transmission, apply the parking brakes firmly and shift into "Drive" to make the hot idle adjustments. Leave a manual transmission in Neutral, of course.

On cars with a vacuum-release parking brake, you'll have to disconnect and plug the vacuum line to keep the brake from releasing when you shift into "Drive."

On the 1600cc and 2000cc engines, leave the headlights off, but turn the air conditioner on.

On all other vehicles, turn the headlights on high beam to load the alternator. Leave the air conditioner off.

When you hook up the tachometer, make sure the choke is wide open. And if you're working on a four-barrel carburetor with a hot idle compensator make sure it's seated.

Make your idle adjustments with the air cleaner installed, whenever possible. If you can't reach the adjustment with the air cleaner installed, remove it to make the adjustment and then install it before checking the tachometer.

Hot Curb Idle

If the vehicle has no solenoid to position the throttle, set the idle rpm to hot curb idle specifications with the idle speed adjusting screw.

If the carburetor has a solenoid throttle positioner, there will be two idle rpm specifications. The higher rpm with the solenoid on is the normal hot idle speed; the lower rpm with solenoid off and in neutral prevents dieseling when the engine is shut down.

Set the rpm with the solenoid on first. Open the throttle slightly to allow the solenoid to extend. Then release the throttle lever against the tip of the solenoid plunger and check the rpm.

After the solenoid-on rpm setting is complete, open the solenoid connector so that the plunger retracts for the solenoid-off adjustment. Turn the idle screw in the throttle lever to obtain the specified low rpm; then reconnect the electrical circuit.

Fast Idle

The fast idle rpm adjustment is very simple. First place the set screw on the second or kickdown step of the cam. Then turn the screw until you have the specified rpm, with the engine operating in Neutral, engine hot and choke plate at wide open position.

Usually the air cleaner must be removed; but if the adjustment is accessible with the air cleaner on, as with the *Model 5200* installation, then leave it on.

The *Model 1250* has a fast idle tab on the throttle lever instead of a set screw. Check the fast idle rpm with the tab on the kickdown step of the cam, and make the adjustment by bending the tab.

One final point on the fast idle adjustment. Many vehicles now are equipped with a solenoid vacuum control valve to retard the distributor in certain operating conditions, as described on page 6.

If this valve is on the vehicle, be sure to temporarily disconnect one or both leads to be sure of getting the required vacuum to the distributor during the fast idle adjustment.

Staged Choke Pulldown Adjustment

Now, let's look at some special adjustments which are peculiar to certain carburetors or fuel systems.

There is a new staged choke vacuum control on *Motorcraft 2-V* and *4-V carburetors,* which releases the choke faster in moderate weather to cut down emissions during warm-up.

The units for both carburetors are similar, but adjustments are different. The fast idle cam clearance and choke pull-down must be to specifications before adjusting either unit.

On the **2-V carburetor,** for the 351W and all trucks hold

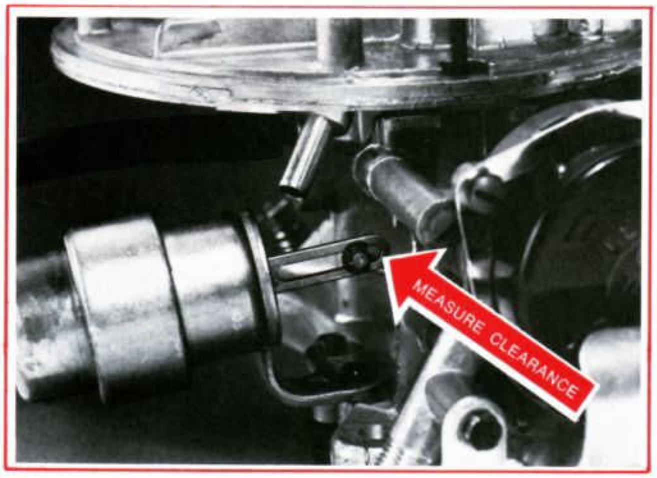


Figure 32

the choke plate fully closed, and measure the clearance between the choke link and the end of the slot in the vacuum unit lever.

If it is not to specifications, hold the link steady with pliers as you turn the adjuster in or out to obtain the specified clearance.

On the *4-V carburetor,* hold the choke plate fully closed, and back off the adjusting sleeve locknut until it's clear of the sleeve.

Then turn the sleeve clockwise until the choke plate just begins to move. Mark the upper flat of the sleeve for reference, and back it off exactly one turn before you tighten the locknut.

MAINTENANCE

The recommended emission maintenance services for both cars and trucks are scheduled to give the best results, with the maximum time allowed between service intervals. These services must be performed in accordance with the manufacturer's specifications and are a very important part of vehicle emission control.

The maintenance services are detailed in the sequence in which the intervals are scheduled. Only those items that may affect emission control are covered. Additional information is available in the Owner's Manual Supplement, that is included in the glove box of each 1972 vehicle. Also a chart of required maintenance services is illustrated on page 16.

6,000 Miles or 6 Months (Cars and Trucks)

Replace the crankcase emission filter element located in the air cleaner.

Figure 33

Change the engine oil and the oil filter. When a car or light truck is operated under any of the following conditions, change engine oil and filter every three months or 3,000 miles, and clean and regap spark plugs every six months or 6,000 miles, whichever comes first.

- Extended periods of idling or low-speed operation such as police, taxi or door-to-door delivery service.
- Towing trailers over 2000 lbs. gross-loaded weight for long distances.
- Outside temperature remains below +10° F. for 60 days or more and most trips are less than 10 miles.

When changing the engine oil, clean the crankcase oil filler breather cap on vehicles so equipped.

Lubricate and check the operation on the exhaust control valve on units equipped with a 240 Six or 300 Six light-duty engine.

To check the valve, simply rotate the valve counterclockwise with light finger pressure. A properly operating valve should open easily. Make certain it rotates freely about 90 degrees, without binding.

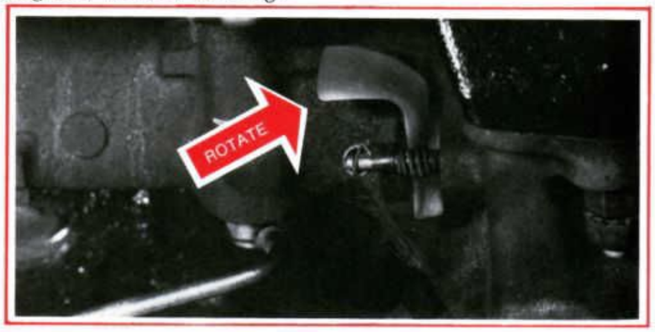


Figure 34

If necessary, free up the valve with approved penetrating fluid, before lubricating the control valve.

Check and adjust Pinto and Capri carburetors for idle speed, fast idle speed and idle fuel mixture. Adjust according to specifications. (See page 10 for carburetor adjustments.)

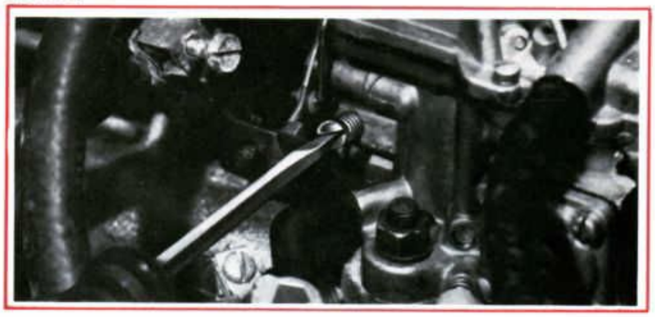


Figure 35

Adjust the valve clearance on Pintos and Capris equipped with a 1600cc engine to follow specifications.

A service for the Pinto and Capri at first 6000 miles or 6 months is to check the decel valve on the intake manifold for vacuum leakage at the bottom of the valve.

Leakage here would indicate the valve diaphragm is leaking, and that the decel valve must be replaced.

Use a vacuum gauge and tachometer to check the decel valve for proper operation. If adjustment is required, perform it with the engine at normal operating temperature (See page 6, July 1972 *Shop Tips*.)

ON LIGHT TRUCKS ONLY, CLEAN AND REFILL THE OIL BATH AIR CLEANER, IF THE VEHICLE IS SO EQUIPPED.

EMISSION CONTROL SYSTEMS, Part 2 Continued

12,000 Miles or 12 Months (Cars and Trucks)

The maintenance services scheduled at the 6,000-mile or 6-month and 12,000-mile or 12-month, intervals are repeated. In addition, the following services must be performed to complete the recommended schedule.

On light trucks, replace the dry-type air cleaner element and on heavier trucks, only if not equipped with a restriction indicator. Earlier replacement may be necessary if the vehicle is driven under severe conditions.

Check the air intake temperature control system to be sure it is properly assembled and that it is operating as it should be. Repair as necessary. (See page 3, July 1972 *Shop Tips*.)

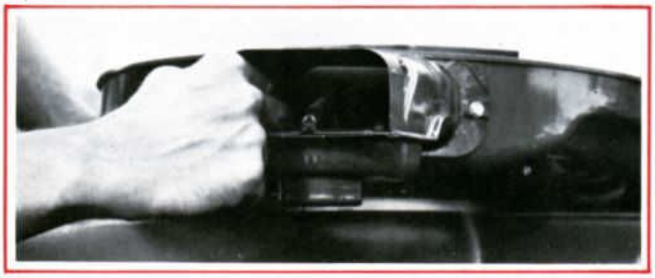


Figure 36

Replace the fuel filter on all cars, Econolines and Broncos. All vehicles require an inspection of the fuel lines and connections for leaks. Tighten or replace the fuel lines as necessary.

On those trucks equipped with an electric fuel pump, install a pressure gauge at the carburetor fuel inlet line. Check the pump pressure and flow, following the procedures in the Truck Shop Manual.

On all vehicles, check the operation of the carburetor throttle linkage for free movement.

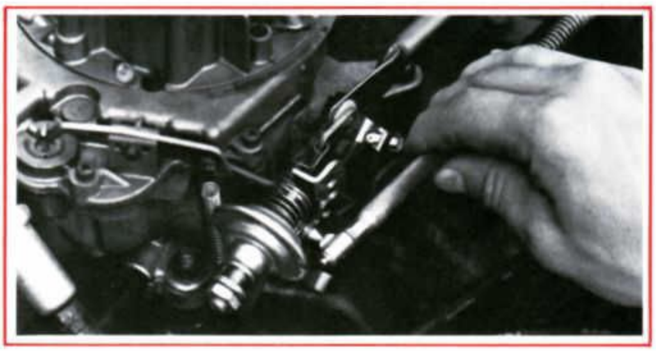


Figure 37

Also, check the operation of the choke linkage for sticking and binding.

Lubricate the accelerator linkage pivots, except ball joints or plastic bushings, on medium and heavy trucks only.

Check the anti-stall dashpot for proper operation, and adjust it as required.

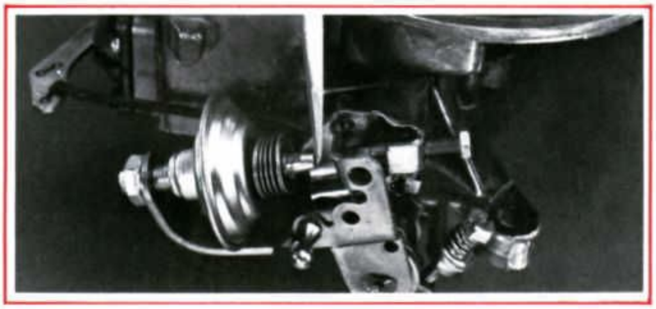


Figure 38

On units equipped with a *4300 4-V carburetor,* move the secondary air valve plate as a check for a binding condition. Correct as necessary.

Check and clean the external choke mechanism on all trucks equipped with a manual choke.

Before installing the new PCV valve, clean the emission hoses and tubes with a damp cloth, or soak and clean with approved solvent if they are restricted.

Replace the PCV valve as recommended. Do not attempt to clean the valve.

Clean the carburetor spacer on medium and heavy trucks. Replace emission hoses and tubes, when required.

For all cars and light trucks, inspect the spark control hoses and electrical leads for damage, deterioration and firm connections. Also, be sure the vacuum hoses are properly routed.

Ignition Timing and Distributor Advance

Check and adjust the initial ignition timing, using an accurate tachometer and timing light. Follow the recommended procedures.

Figure 39

Check for correct spark control advance and retard at the distributor diaphragm, especially on those units equipped with a transmission regulated or electronic spark control system. When testing, use a vacuum gauge and simulate vehicle operating conditions as explained earlier in these articles.

Spark Delay Valve

The spark delay valve, used on some car and light truck applications, must be replaced at 12,000 miles or 12 months. It is located between the carburetor spark port and the distributor diaphragm.

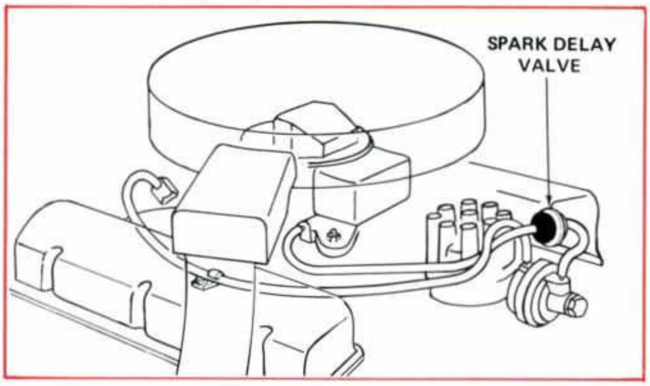


Figure 40

Inspect and clean the distributor cap and rotor. Check for cracks, carbon buildup or erosion.

Replace Points and Plugs

Replace the distributor breaker points and set the dwell or breaker gap to specifications.

Replace the condenser.

Replace the spark plugs and adjust the gaps to specifications. Be sure to torque the plugs to specifications when you install them. In severe vehicle operating conditions the spark plugs should be cleaned and regapped at 6,000-mile or 6-month intervals.

Check the secondary ignition wires for cuts, burns, abrasions or punctures. Also, check the resistance of each wire, which should not exceed 1000 ohms per inch.

Be sure to test the wires connecting the distributor cap and spark plugs, and the wire connecting the center terminal of the distributor cap to the center terminal of the ignition coil. When testing wire resistance, do not puncture the wire with any probe. These are radio-resistant-type wires. A puncture could cause separation in the conductor, leading to ignition noise interference.

Clean the ignition coil tower with a damp cloth or use solvent if grease-encrusted.

Use a coil tester to check for both primary and secondary ohms resistance, and amperage draw with the engine idling and stopped.

Figure 41

Curb Idle Speed

Check and adjust the curb idle speed. Be sure the parking brake is set when making this adjustment.

A satisfactory idle should be obtainable within the range of the idle fuel mixture adjusting limiters, if all other engine systems are operating within specifications.

Torque the intake manifold bolts to specifications. This service applies to 4- and 8-cylinder cars, 8-cylinder light trucks, and to all medium and heavy trucks.

Adjust valve lash clearance specifications on Pinto 2000cc, Capri 2000cc and 2600cc, and Mustang Boss 351.

24,000 Miles or 24 Months
(Cars and Trucks)

Repeat the maintenance services performed under the earlier schedules.

Replace the distributor cap and rotor on all cars and trucks.

On units equipped with a 240 or 300 six-cylinder engine, fill the oil cup on the distributor to provide lubrication for the shaft bushing.

Check and adjust the distributor spark advance.

Replace the fuel evaporative emission control canister and the purge hose on vehicles so equipped.

Replace the fuel system filter on light trucks and the fuel filter element on medium and heavy trucks. More frequent replacement may be required under off-highway or dusty conditions (medium and heavy-duty trucks only).

24,000 Miles and 36,000 Miles
(Cars and Trucks)

Check the compression of all cylinders against specifications at 24,000 miles. Repair or replace parts as required. This service is repeated at 36,000 miles.

48,000 Miles or One Year
(Cars and Trucks)

This service is for cars and light trucks equipped with the fuel evaporative emission control system.

Check the fuel emission control system for restrictions in the purge hose and fuel vapor lines. Make certain the fuel tank filler cap is not damaged in any way to make it non-functional.

NOTE: Symptoms indicating the need for emission control system checking and where to check, are listed in the Owner's Manual Supplement, supplied to each owner of a new Ford-built vehicle. A portion of such a Supplement is reproduced here for your convenience, followed by the included chart of required emission system maintenance services. (These Supplements are revised when necessary and may vary from model to model. Therefore, you should consult the customer's copy to make sure you are using the appropriate version.)

Symptoms Indicating Need For Emission Control Systems Service

Engine runs unusually rough or stalls.

- Ignition system, fuel system, engine ignition timing, crankcase ventilation system, or engine cylinder compression pressure.

Dieseling (engine continues to run after ignition is shut off).

- Engine ignition timing, fuel system, or engine cooling system (too hot).

Blue or black smoke from exhaust pipe.

- Fuel system, ignition system, or engine cylinder compression pressure.

Gasoline odors.

- Fuel system vent, fuel tank cap, or engine flooded.

EMISSION SYSTEMS REQUIRED MAINTENANCE SERVICES

These maintenance services must be performed at the indicated intervals, following the procedures in the 1972 Ford Car Shop Manual. Maintenance service adjustments MUST CONFORM TO SPECIFICATIONS published in the 1972 Ford Car Specifications Manual, or the emission systems may become inoperative.

Each 6,000 Miles or 6 Months (Whichever Occurs First)

- Replace crankcase emission filter element in air cleaner.
- Change engine oil and oil filter (1).
- Check and adjust carburetor idle fuel mixture, idle speed and fast idle speed—4 cylinder.
- Clean crankcase oil filler breather cap, if so equipped.
- Lubricate exhaust control valve and check for free operation, if so equipped.
- Pinto and Capri
  Adjust 1600cc engine valve clearance.
  Check deceleration valve-adjust if necessary (at first 6,000 miles or 6 months).

Each 12,000 Miles or 12 Months (Whichever Occurs First)

- Replace carburetor air cleaner element.
- Replace fuel system filter, check fuel lines and connections for leaks.
- Replace distributor points and set gap. Inspect condenser for loose terminal and ground connections.
- Replace spark plugs and set gap (1). Check resistance of secondary ignition wires. Inspect wires for cuts, abrasions, or punctures.
- Replace PCV valve. Clean emission system hoses, tubes. Replace if deteriorated.
- Replace spark delay valve.
- Adjust engine valve clearance—Pinto 2000cc, Capri 2000cc and 2600cc, and Mustang Boss 351.
- Check operation of carburetor throttle and choke linkage and air valve, dash pot and throttle solenoid. Lubricate, adjust or repair as required.

Each 12,000 Miles or 12 Months (Whichever Occurs First)—Cont'd.

- Torque intake manifold bolts to specification, 4- and 8-cylinder, and Capri V6.
- Inspect all spark control system vacuum hoses and electrical leads for damage, deterioration, and firm connections to proper points.
- Check for correct spark control system advance and retard vacuum cut-in speed, and function of thermal switch. Adjust or repair as required.
- Check for correct component assembly and functioning of air cleaner intake temperature control system, if so equipped.
- Check and adjust initial ignition timing.
- Check and adjust carburetor idle fuel mixture, curb idle speeds, and throttle solenoid-off speed 6- and 8-cylinder.
- Clean ignition coil tower and test voltage output.
- Clean and inspect distributor cap and rotor for cracks, carbon build-up, or erosion.

Each 24,000 Miles or 24 Months (Whichever Occurs First)

- Replace evaporative emission control canister and purge hose.
- Replace distributor cap and rotor.
- Check and adjust distributor spark advance.

At 24,000 Miles and 36,000 Miles

- Test engine compression—all cylinders. Repair any cylinder below specifications.

Each 48,000 Miles or 1 Year (Whichever Occurs First)

- Check fuel emission system.

(1) SEVERE SERVICE OPERATION

- When operating your car under any of the following conditions: change engine oil and filter every 3 months or 3,000 miles and clean and regap spark plugs every 6 months or 6,000 miles, whichever comes first.
- Extended periods of idling or low-speed operation such as police, taxi, or door-to-door delivery service.
- Towing trailers over 2000 lbs. gross loaded weight for long distances.
- Outside temperature remains below +10°F for 60 days or more and most trips are less than 10 miles.

The use of fuels, lubricants, fluids, and parts that do not conform to Ford specifications may result in invalidating the emissions Warranty.

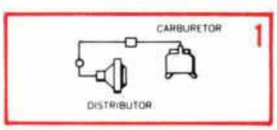
VEHICLE EMISSION CONTROL SYSTEM APPLICATION 1972 ALL CAR LINES AND LIGHT TRUCKS

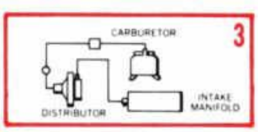
The following Vehicle Emission Control System Application Charts are provided to assist in determining what emission controls are used in each vehicle application. These charts will periodically be updated to reflect any changes that may occur during the model year. Notice that there are two different charts: one for California vehicles, the other for the balance of the United States.

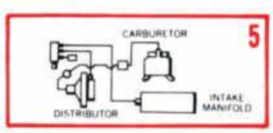
VEHICLE EMISSION CONTROL SYSTEM APPLICATION CHART (49 STATES AND CANADA)

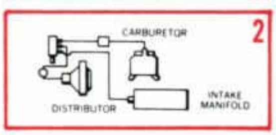
Engine, Transmission, Rear Axle, Vehicle	Distributor Diaphragm	Spark Delay Valve Color and Seconds	Choke Delay Valve Color and Seconds	Decel Valve	Spark Control System	Fresh Air (Zip Tube)	Dashpot		Throttle Solenoid		Distributor Vacuum System Schematic No.	
							W/AC	WO/AC	W/AC	WO/AC	W/AC	WO/AC
CAR												
1.6L—1V Man. Pinto	Dual			•@					•	•	—	3
2.0L—2V Man. Pinto	Single	White—5		•@					•		2	1
2.0L—2V Auto. Pinto	Dual			•@					•		4	3
2.6L—2V Man. Capri	Dual			•@							3	3
2.6L—2V Auto. Capri	Dual			•@	ESC 37						3	3
170—1V Man. Maverick—Comet	Dual				TRS		•	•			3	3
200—1V Man. Maverick—Comet	Dual				TRS			•	•		4	3
200—1V Auto. Maverick—Comet	Dual				ESC 31			•	•		4	3
250—1V Man. Tor.—Mont.—Must.	Dual				TRS				•	•	3	3
250—1V Auto. Tor.—Mont.—Must.—Maverick—Comet	Dual								•	•	4	3
240—1V Auto. Ford	Dual				TRS		•	•			3	3
302—2V Man. Tor.—Mont.	Dual	Yellow—10							•	•	4	3
302—2V Man. Maverick—Comet—Must.	Dual	Yellow—10							•	•	3	3
302—2V Auto. Torino—Mont.— Mav.—Com.—Must.—Ford	Dual	Green—20	Green—20					•	•		4	5
302—2V Auto. Tor.—Mont. Wagon—3.0 Axle	Dual	Red—40						•	•		4	5
351W—2V Auto. Ford—Meteor Wagons & Convert.—3.25 Axle	Dual	Blue—15			TRS			•	•		4	5
351W—2V Auto. Ford—Meteor	Dual	White—5			TRS			•	•		4	5
351C—2V Man. Must.—Cougar	Dual		Green—20						•	•	4	5
351C—2V Auto. Torino	Dual		Green—20						•	•	4	4
351C—2V Auto. Ford—Must.—Coug.— Montego—Merc.—Met.	Dual		Green—20						•	•	4	4
400—2V Auto. Mercury	Dual								•	•	4	4
400—2V Auto. T-Bird—Ford—Torino—Montego	Dual								•	•	4	4
429—4V Auto. Mercury	Single		Green—20						•	•	4	5
429—4V Auto. T-Bird—Torino—Montego—Ford	Single		Green—20						•	•	4	5
429—4V Auto. P.I. Ford—Mercury—P. I. Torino—Montego	Dual				ESC 40	•			•	•	4	5
460—4V Auto. Lincoln-Mark IV	Single					•			•	•	2	2
351C—4V Boss Man. Mustang	Dual								•	•	N.A.	N.A.
351C—4V Boss Man. Cougar	Dual								•	•	N.A.	N.A.
351C—4V CJ Man. Tor.—Must.—Coug.—Mont.	Dual			•					•	•	N.A.	N.A.
351C—4V CJ Auto. Must.—Coug.—Mont.	Dual	Blue—15							•	•	2	2
351C—4V CJ Auto. Torino	Single	Blue—15							•	•	2	2
460—4V Auto. T-Bird—Mercury	Single					•			•	•	1	1
TRUCK												
170—1V Man. Bronco	Dual						•	•			3	3
240—1V Man. Econoline	Dual				TRS				•	•	3	3
240—1V Auto. Econoline	Dual				TRS				•	•	3	3
240—1V Man. F-100	Dual				TRS				•	•	3	3
240—1V Auto. F-100	Dual				TRS				•	•	3	3
302—2V Man. Bronco	Dual			•	TRS				•	•	3	3
302—2V Man. Econoline	Dual			•					•	•	3	3
302—2V Auto. Econoline	Dual				TRS			•	•		3	3
302—2V Man. F-100	Dual			•	TRS				•	•	3	3
302—2V Auto. F-100	Dual	White—5			TRS		•	•			3	3
360—2V Man. F-100	Dual	White—5		•	TRS		•	•			3	3
360—2V Auto. F-100	Single	Green—20		•	TRS		•	•			1	1
390—2V Man. F-100	Dual			•	TRS				•	•	3	3
390—2V Auto. F-100	Dual		Blue—15				•	•			3	3

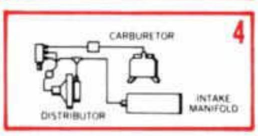
TRS	Transmission Regulated Spark Control System
ESC	Electronic Spark Control System
@	Fuel Enrichment
L	Liter
P.I.	Police Interceptor
ESC 25	Black Amplifier
ESC 31	White Amplifier
ESC 37	Light Blue Amplifier
ESC 40	Gray Amplifier
W/AC	With Air Conditioning
WO/AC	Without Air Conditioning
N.A.	Information Not Available

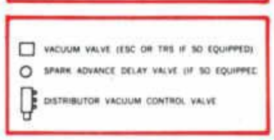










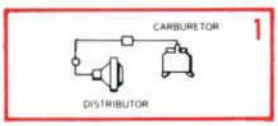


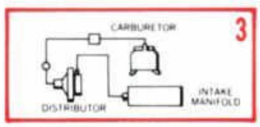
EMISSION CONTROL SYSTEMS, Part 2 Continued

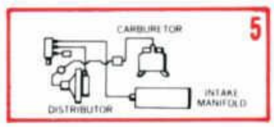
VEHICLE EMISSION CONTROL SYSTEM APPLICATION CHART (CALIFORNIA ONLY)

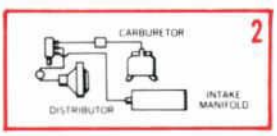
Engine, Transmission, Rear Axle, Vehicle	Distributor Diaphragm	Spark Delay Valve Color and Seconds	Choke Delay Valve Color and Seconds	Decel Valve	Spark Control System	Fresh Air (Zip Tube)	Dashpot		Throttle Solenoid		Distributor Vacuum System Schematic No.	
							W/AC	WO/AC	W/AC	WO/AC	W/AC	WO/AC
CAR												
1.6L—1V Man. Pinto	Dual	Green—20		• @					•	•	—	3
2.0L—2V Man. Pinto	Single	White—5		• @					•		1	1
2.0L—2V Auto. Pinto	Single			• @	ESC 37				•		2	1
2.6L—2V Man. Capri	Dual			• @							3	3
2.6L—2V Auto. Capri	Dual			• @	ESC 37						3	3
170—1V Man. Maverick—Comet	Dual				TRS		•	•			3	3
200—1V Man. Maverick—Comet	Dual				TRS			•	•		4	3
200—1V Auto. Maverick—Comet	Dual				ESC 37			•	•		4	3
250—1V Auto. Tor.—Mont.	Dual	White—5			ESC 31				•	•	4	3
250—1V Auto. Mav.—Comet	Dual	Yellow—10							•	•	4	3
250—1V Auto. Mustang	Dual	White—5			ESC 25						3	3
302—2V Auto. Mav.—Comet—Must.	Dual				ESC 25	•			•	•	4	5
302—2V Auto. Tor.—Montego	Dual	Blue—15			ESC 25	•			•	•	4	5
351C—2V Auto. Torino	Dual				ESC 31	•			•	•	4	4
351C—2V Auto. Ford—Mont.—Must.—Cougar—Mercury	Dual				ESC 31	•			•	•	4	4
400—2V Auto. Mercury	Dual				ESC 37	•			•	•	4	4
400—2V Auto. Ford—Tor.—Mont.	Dual				ESC 37	•			•	•	4	4
429—4V Auto. Mercury	Dual	Blue—15	Green—20			•			•	•	4	5
429—4V Auto. T-Bird—Torino—Montego—Ford	Dual	Blue—15	Green—20			•			•	•	4	5
429—4V Auto. P.I. Ford—Mercury, P.I. Torino—Montego	Dual				ESC 40	•			•	•	4	5
460—4V Auto. Lincoln-Mark IV—T-Bird-Merc.	Single				ESC 40	•			•	•	2	2
351C—4V Boss Man. Must.—Coug.	Dual				TRS				•	•	N.A.	N.A.
351C—4V CJ Man. Torino—Mustang—Cougar—Montego	Dual				TRS				•	•	N.A.	N.A.
351C—4V CJ Auto. Must.—Coug.—Mont.	Single				ESC 37	•			•	•	2	2
351C—4V CJ Auto. Torino—Must. H.O.	Single				ESC 37	•			•	•	2	2
TRUCK												
240—1V Man. Econoline	Dual				TRS				•	•	3	3
240—1V Man. F-100	Dual				TRS				•	•	3	3
302—2V Man. Bronco	Dual			•	TRS				•	•	3	3
302—2V Man. Econoline	Dual			•	TRS				•	•	3	3
302—2V Auto. Econoline	Dual	White—5			TRS			•	•		3	3
302—2V Man. F-100	Dual			•	TRS				•	•	3	3
302—2V Auto. F-100	Dual	White—5			TRS		•	•			3	3
360—2V Man. F-100	Dual	White—5			TRS		•	•			3	3
360—2V Auto. F-100	Single	Green—20			TRS		•	•			1	1
390—2V Auto. F-100	Single	Green—20	Blue—15		TRS		•	•			1	1

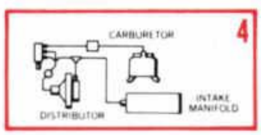
TRS	Transmission Regulated Spark Control System
ESC	Electronic Spark Control System
@	Fuel Enrichment
L	Liter
P.I.	Police Interceptor
ESC 25	Black Amplifier
ESC 31	White Amplifier
ESC 37	Light Blue Amplifier
ESC 40	Gray Amplifier
W/AC	With Air Conditioning
WO/AC	Without Air Conditioning
N.A.	Information Not Available

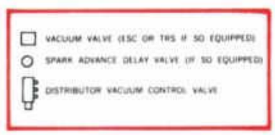




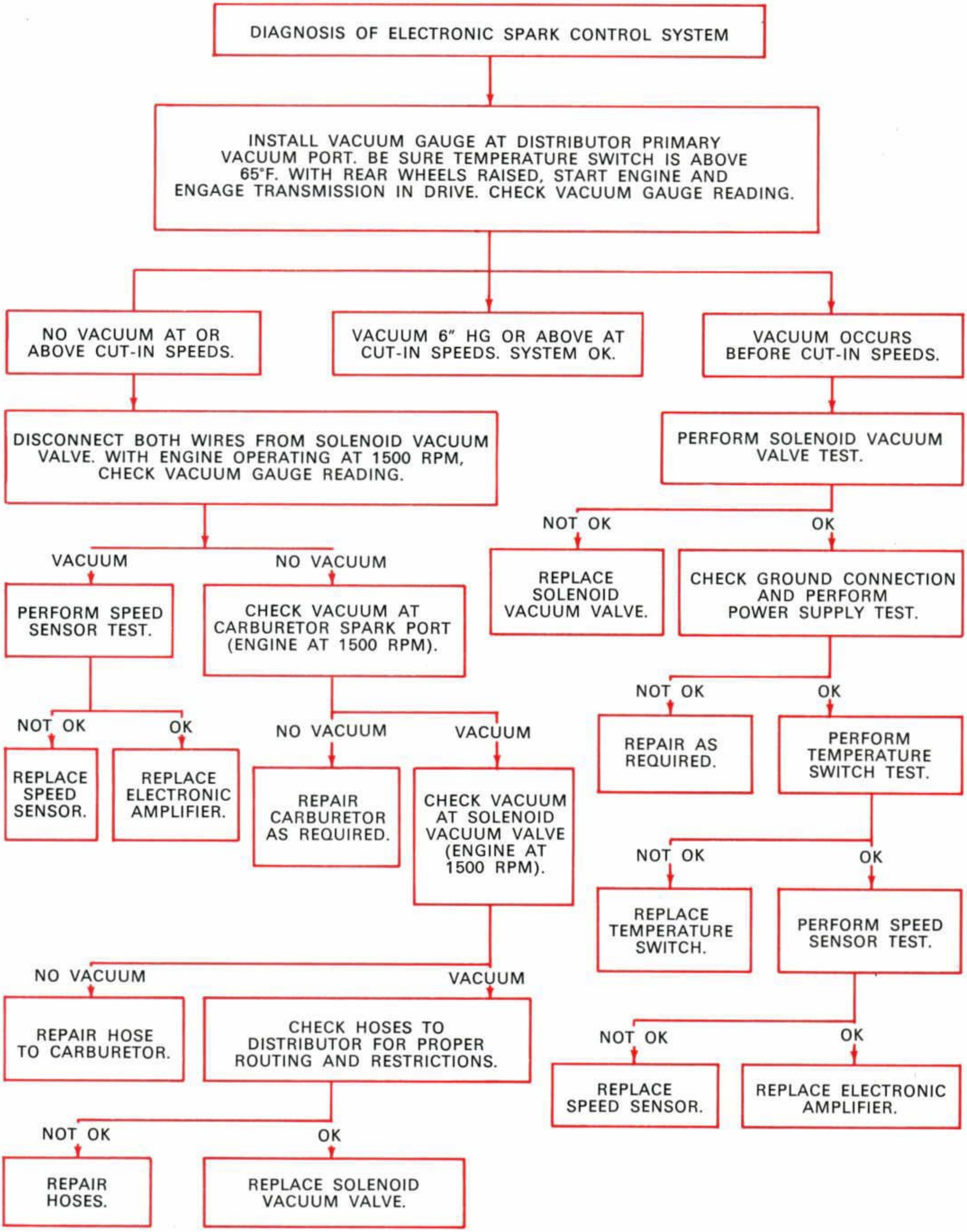








ESC SYSTEM


DIAGNOSIS OF ELECTRONIC SPARK CONTROL SYSTEM
INSTALL VACUUM GAUGE AT DISTRIBUTOR PRIMARY VACUUM PORT. BE SURE TEMPERATURE SWITCH IS ABOVE 65°F. WITH REAR WHEELS RAISED, START ENGINE AND ENGAGE TRANSMISSION IN DRIVE. CHECK VACUUM GAUGE READING.
NO VACUUM AT OR ABOVE CUT-IN SPEEDS.
VACUUM 6" HG OR ABOVE AT CUT-IN SPEEDS. SYSTEM OK.
VACUUM OCCURS BEFORE CUT-IN SPEEDS.
DISCONNECT BOTH WIRES FROM SOLENOID VACUUM VALVE. WITH ENGINE OPERATING AT 1500 RPM, CHECK VACUUM GAUGE READING.
VACUUM
PERFORM SPEED SENSOR TEST.
NOT OK
REPLACE SPEED SENSOR.
OK
REPLACE ELECTRONIC AMPLIFIER.
NO VACUUM
CHECK VACUUM AT CARBURETOR SPARK PORT (ENGINE AT 1500 RPM).
NO VACUUM
REPAIR CARBURETOR AS REQUIRED.
VACUUM
CHECK VACUUM AT SOLENOID VACUUM VALVE (ENGINE AT 1500 RPM).
NO VACUUM
REPAIR HOSE TO CARBURETOR.
VACUUM
CHECK HOSES TO DISTRIBUTOR FOR PROPER ROUTING AND RESTRICTIONS.
NOT OK
REPAIR HOSES.
OK
REPLACE SOLENOID VACUUM VALVE.
PERFORM SOLENOID VACUUM VALVE TEST.
NOT OK
REPLACE SOLENOID VACUUM VALVE.
OK
CHECK GROUND CONNECTION AND PERFORM POWER SUPPLY TEST.
NOT OK
REPAIR AS REQUIRED.
OK
PERFORM TEMPERATURE SWITCH TEST.
NOT OK
REPLACE TEMPERATURE SWITCH.
OK
PERFORM SPEED SENSOR TEST.
NOT OK
REPLACE SPEED SENSOR.
OK
REPLACE ELECTRONIC AMPLIFIER.

SUMMER TRAVEL PUTS COOLING SYSTEM PARTS TO THE TEST!

To be sure your customers don't get stranded . . .

CALL ON US FOR REPLACEMENTS!

Vacation travel can put extra strain on cooling system fluid, belts, hoses, thermostats and water pumps. Your customers' Ford-built vehicles should receive the best in travel assurance when you give them pre-vacation servicing. Check those hard-working cooling system parts that are sure to be put to the test in hot weather. Then whenever needed, install quality-built Ford replacement parts. They meet original equipment standards . . . *exceed* power and operational demands when heat and pressure build up. Give your customers the right-of-way for safer, more enjoyable summertime travel, by using our genuine Ford replacement parts. One stop does it. We have the *right* Ford replacement parts for all Ford, Mercury and Lincoln vehicles.

REMEMBER Ford Means QUALITY!

WE'RE HEADQUARTERS FOR ALL FORD, MOTORCRAFT AND AUTOLITE PARTS!

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