EMISSION CONTROL SYSTEMS

ALL SERIES

CONTENTS

DESCRIPTION AND OPERATION

CLOSED POSITIVE CRANKCASE VENTILATOR SYSTEM

All cars have a closed Positive Crankcase Ventilating System to provide more complete scavenging of crankcase vapors. Ventilation air is drawn through a filter assembly located in the air cleaner, through a hose, into the left rocker arm cover, down into the crankcase, across and up into the rear of the intake manifold, up through the ventilator valve, through a hose and into the intake manifold. Intake manifold vacuum draws any fumes from the crankcase to be burned in the engine.

When air flow through the carburetor is high, added air from the Positive Crankcase Ventilating System has no noticeable effect on engine operation; however, at idle speed, air flow through the carburetor is so low that any large amount added by the ventilating system would upset the air-fuel mixture, causing rough idle. For this reason, a flow control valve is used which restricts the ventilating system flow whenever intake manifold vacuum is high. See Figure 6F-1.

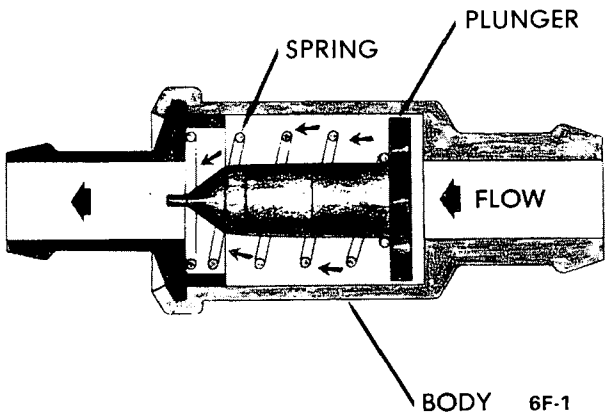


Figure 6F-1 Positive Crankcase Ventilator Valve

An engine which is operated without any crankcase ventilation can be damaged seriously. Therefore, it is important to replace the ventilator valve periodically.

> **CAUTION:** *If an engine is idling too slow or rough, this may be caused by a clogged ventilator valve or plugged hose; therefore, never adjust the carburetor idle without first checking the crankcase ventilator check valve and hose.*

After installing a new ventilator valve, readjust engine idle if necessary.

All cars have a closed P.C.V. System. With this system, any blow-by in excess of the system capacity (from a badly-worn engine, sustained heavy load, etc.) is exhausted into the air cleaner and is drawn into the engine.

THERMOSTATICALLY CONTROLLED AIR CLEANER

Since past model carburetion was as lean as possible consistent with good driveability with inlet air temperatures as low as minus 20 degrees, this still leaner carburetion is only possible because of the heated air system. With the heated air system operating, inlet air temperature is around 115 degrees after the first few minutes of operation; this makes use of leaner (hot weather) calibration possible, and the car still responds and drives well in cold weather.

The thermal air cleaner system consists of a heat stove, a heated-air pipe, a nylon adapter elbow, where necessary, and an air cleaner containing a temperature controlled door operated by vacuum through a temperature sensor (located on the bottom side of the air cleaner).

The heat stove is a sheet metal cover, shaped to and bolted on the exhaust manifold. Air drawn in along the lower edge of the stove passes across the manifold surface, picking-up heat. The heated air is drawn out from the upper center of the manifold, through the heated air pipe into the storkel of the air cleaner.

The temperature control air cleaner is designed to mix this heated air with cold outside air so that carburetor inlet air temperature averages about 115 degrees. This mixing is done by a damper door.

The damper door is moved by a diaphragm type vacuum motor. When there is no vacuum present in the motor, the diaphragm spring forces the damper door downward, opening the snorkel passage. Whenever the engine is running, the amount of vacuum present in the vacuum motor depends on the temperature sensor in the air cleaner which is located in the vacuum line between the intake manifold and the vacuum motor. In the sensor, a bi-metal temperature sensing spring starts to open a valve to bleed more air into the vacuum line whenever the temperature in the air cleaner rises above about 115°. Whenever the temperature falls below about 115° the sensing spring starts to close the air bleed into the vacuum line, allowing more manifold vacuum to reach the vacuum motor. Whenever there is 6 inches or more of vacuum in the vacuum motor, the diaphragm spring is compressed, raising the damper door to close snorkel passage.

When the engine is not running, the diaphragm spring will always hold the damper door to wide open snorkel passage position. However, when the engine is running, the position of the damper door depends on the air temperature in the air cleaner.

When starting a cold engine (air cleaner temperature under 85°), the damper door will close off snorkel passage. As soon as the air cleaner starts receiving hot air from the heat stove, the sensor will cause the damper door to partially open snorkel passage, mixing cold air with hot air as necessary to regulate air cleaner temperature within 20° of the ideal 115° air inlet temperature.

If outside air temperature rises to 135°, the air bleed valve in the sensor will be wide open so that vacuum to the vacuum motor approaches zero. The diaphragm spring in the vacuum motor will hold the damper door to wide open snorkel position. If outside temperature rises above 135°, carburetor inlet air temperature will also rise above 135°.

While air cleaner temperature is being regulated, accelerating the engine hard will cause the vacuum level in the intake manifold and in the vacuum motor to drop. Whenever vacuum drops below 4 inches, the diaphragm spring will move the damper door downward opening the

snorkel passage in order to get the maximum air flow required for maximum acceleration.

Since failure of the thermo air cleaner will generally result in damper door staying in the downward position (snorkel passage open) failure will probably go unnoticed in warm weather. In cold weather, however, owners will complain of leanness, hesitation, sag, surge or stalling. When any type of lean operation complaint is received, always test the thermo air cleaner for proper functioning before doing any work on the carburetor.

AIR INJECTION REACTOR SYSTEM (A.I.R.)

General

The A.I.R. System reduces the hydrocarbon and carbon monoxide content of the exhaust gases by injecting air into the exhaust port of each cylinder. The oxygen in the air reacts with the hot exhaust gas, causing further combustion in the exhaust manifold before the gas enters the exhaust pipe.

The A.I.R. System is used on some 1975 Buicks.

The system consists of a belt-driven air pump, diverter valve, check valve, special intake manifold and cylinder head assemblies and hoses connecting the various components.

Air Pump

The air injection pump is a positive displacement vane type which is permanently lubricated and requires no periodic maintenance.

The pump mounting bracket is attached to the front of the engine. Power take-off for the pump is at the water pump pulley. Intake air passes through a centrifugal fan at the front of the pump, where foreign materials are separated from the air by centrifugal force. Air is delivered to the intake manifold galleries by a formed flexible hose of 3/4" inside diameter fitted to a 3/4" exhaust tube on the diverter valve at the back of the pump.

The only serviceable component of the pump is the centrifugal filter fan. Do not assume pump is malfunctioning if it squeaks when turned by hand. Do not lubricate the pump in any way.

If engine or underhood compartment is to be cleaned with steam or high pressure detergent, the centrifugal filter fan should be masked off to prevent liquids from entering the pump.

Do not attempt to operate vehicle with the drive belt disconnected.

Diverter Valve and Silencer Assembly

The diverter valve is attached to the back of the pump. It senses manifold vacuum through a 3/16" fitting at the carburetor. During sudden deceleration, vacuum increases cause the valve to open, allowing air from the air-injection pump to pass through the valve and silencer to the atmosphere. Approximate duration of the valve opening is five seconds. This valve also controls pressure within the system by diverting excessive pump output to the atmosphere through an internal muffler.

Check Valve

The check valve has a one-way diaphragm which prevents hot exhaust gases from backing up into the hose and pump and causing damage. This will protect the system in the event of pump belt failure, abnormally high exhaust system pressure or air delivery hose ruptures.

CATALYTIC CONVERTER

The catalytic converter is an emission control device added to the exhaust system to reduce hydrocarbon and carbon monoxide pollutants from the exhaust gas stream. The converter contains beads which are coated with a catalytic material containing platinum and palladium. Use of the catalytic converter has allowed the engine to be designed for improved fuel economy and driveability.

THE CATALYTIC CONVERTER REQUIRES THE USE OF UNLEADED FUEL ONLY.

Periodic maintenance of the exhaust system is not required however, if the vehicle is raised for other service, it is advisable to check the general condition of the catalytic converter, exhaust pipes and mufflers.

CHOKE AIR MODULATOR

All 231, 350, and 455 engine air cleaners will have a choke air modulator located in the bottom of the air cleaner to provide heated, filtered air entering the choke thermostatic coil housing. When the air cleaner temperature is below a specified temperature the modulator is closed to slow down the rate of heating of the choke thermostatic coil for improved driveability. As temperatures rise above the specified temperature the modulator will open allowing normal circulation of heated filtered air to the choke housing, heating the thermostatic coil and thus opening the choke valve.

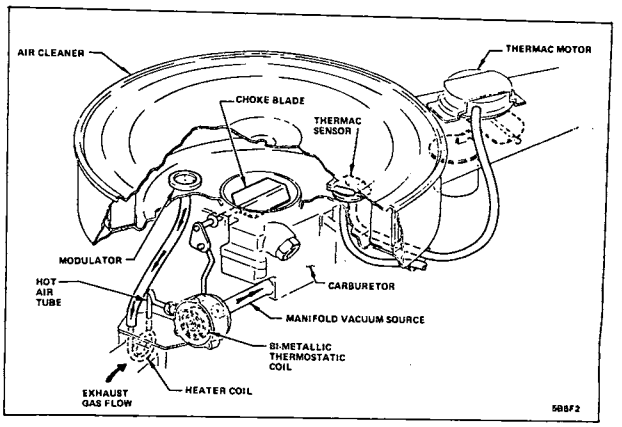


Figure 6F-2 - Choke Air Modulator System (Typical)

EXHAUST GAS RECIRCULATION SYSTEM (E.G.R.)

The Exhaust Gas Recirculation System is used on all 1975 Buicks.

The Exhaust Gas Recirculation System is used to reduce oxides of nitrogen emissions from the engine exhaust. During the combustion process, nitrogen which makes up

80 percent of the air will tend to mix with oxygen at temperatures above 2500° F. During the combustion process, temperatures in the engine's cylinders will go well above 2500° F. which forms nitrogen oxides.

To lower the formations of nitrogen oxides, it is necessary to reduce combustion temperatures. This is accomplished by introducing exhaust gases into the engine intake manifold, which will enter the engine cylinders with the air fuel mixture for combustion.

The E.G.R. valve remains closed during periods of engine idle and deceleration to prevent rough idle from excessive exhaust gas contamination in the idle air/fuel mixtures.

All exhaust gas recirculation systems perform the same function, however differences in operation of the system will be covered in the Diagnosis Section.

EARLY FUEL EVAPORATION SYSTEM (EFE)

An early fuel evaporation valve (EFE) has been added to the exhaust system on most cars for 1975. the EFEvalve promotes quick heating of the incoming fuel by directing exhaust gas flow through the intake manifold crossover passage directly beneath the carburetor whenever engine coolant temperatures are below a specified temperature. The EFE valve operation is the same for all engines however, temperature control and methods of sensing temperature are different, and are covered in the Diagnosis Section.

DISTRIBUTOR VACUUM ADVANCE SPARK DELAY SYSTEM 231 CU. IN. ENGINE

The distributor vacuum advance spark delay valve is used on all 231 cu. in. engines for California located in-line between the T.V.S. and the carburetor ported spark port on early production models. (On after jobs the T.V.S. switch is discontinued and the delay valve is located between the carburetor ported spark port and the distributor vacuum advance unit.)

Ported spark to the distributor is metered through an orifice in the delay valve, anytime distributor ported vacuum has been dropped to zero it will then take about 25 seconds to reach full vacuum advance.

DISTRIBUTOR VACUUM ADVANCE RETARD DELAY VALVE 400 CU. IN. ENGINE

1. Four second retard delay cold.

a. These engines contain a parallel system of hose plumbing in which one branch contains a spark retard delay valve and the other branch a thermal vacuum valve sensing engine coolant temperature.

b. At cold engine coolant temperatures the TVV is closed, and the only vacuum path to the distributor is through the spark retard delay valve. At this condition, loss of vacuum advance when the throttle is opened will be gradual during a 4 second time period rather than immediately. This feature is to improve cold driveability.

c. At warm engine coolant temperatures the TVV opens, and both vacuum paths to the distributor are available. Under these circumstances, the loss of vacuum advance with throttle opening will be instantaneous rather than delayed because vacuum will follow the path of least resistance. Spark retard delay with a warm engine is not desirable because of the possibility of spark knock.

DIAGNOSIS

PCV SYSTEM

CONDITION	POSSIBLE CAUSE	CORRECTION
Slow, unstable idle, frequent stalling.	1. Valve completely plugged or stuck.	1. Replace valve.
	2. Restricted filter	1. Replace filter, clean system.
Oil in air cleaner.	1. PCV system plugged.	1. Replace valve.
	2. Leak in closed ventilation system.	1. Clean system as required. 2. Inspect for leaks to atmosphere and correct as necessary.

CONDITION	POSSIBLE CAUSE	CORRECTION
Hesitation, sag and stalling during cold start.	1. Thermac damper door in full open snorkel position.	1. Perform functional tests on Thermac system as described.
Poor fuel economy.	1. Thermac damper door in closed snorkel position.	1. Perform diagnostic tests on thermac system as described.

TESTING THERMO AIR CLEANER OPERATION

Since failure of the thermo air cleaner will generally result in the damper door staying in the full open snorkel position, failure will probably go unnoticed in warm or hot weather. In cold weather, however, owners will complain of leaness, hesitation, sag, surge or stalling. When any type of lean operation complaint is received, always test the thermo air cleaner for proper functioning before doing any work on the carburetor.

Always perform checks in the same order as listed below.

Vacuum Motor Check

1. Check all hoses for proper hook-up. Check for kinked, plugged or damaged hoses.

2. With the engine "OFF", observe damper door position through snorkel opening. If position of snorkel makes observation difficult use the aid of a mirror. At this point damper door should be in such a position that the heat stove passage is covered (snorkel passage open). If not, check for binds in linkage.

3. Apply at least 7 in. Hg. of vacuum to the diaphragm assembly through hose disconnected at sensor unit. Damper door should completely close snorkel passage when vacuum is applied. If not check to see if linkage is hooked up correctly and for a vacuum leak.

4. With vacuum applied, bend or clamp hose to trap vacuum in diaphragm assembly. Damper door should remain in position (closed snorkel passage). If it does not, there is a vacuum leak in diaphragm assembly. Replace diaphragm assembly.

Sensor Check (Quick Check of System)

1. Start test with engine cold, air cleaner at a temperature below 85 degrees. If the engine has been in recent use, allow it to cool. (Removing the air cleaner from the engine and placing it on the bench will aid in quickly cooling the sensor).

2. Observe the damper door before starting the engine: it should be in the open snorkel position.

3. Start the engine and allow it to idle. Immediately after starting the engine, the damper door should be in the closed snorkel passage position.

4. As the engine warms up, the damper door should start to allow outside air and heated air to enter the carburetor inlet.

5. The system is operating normally as described above. If the air cleaner fails to operate as above or if correct operation of the air cleaner is still in doubt, proceed to the thermometer check (of sensor).

Thermometer Check of Sensor:

1. Start test with air cleaner temperature below 85 degrees. If engine has been run recently, remove air cleaner and place on bench (this will help quickly cool the air cleaner). Remove air cleaner cover and place Tool J-22973 (Thermac Thermometer) as close as possible to the sensor. Let air cleaner cool until thermometer reads below 85°F. about 5 to 10 minutes. Reinstall air cleaner on engine and continue to step 2 below.

2. Start and idle engine. Damper door should move to close the snorkel passage immediately if engine is cool enough. When damper door starts to open the snorkel passage (in a few minutes), remove air cleaner cover and read temperature gage. It must read 115 degrees plus or minus 20 degrees.

3. If the damper door does not start to open up the snorkel passage at temperature indicated, temperature sensor is malfunctioning and must be replaced.

A.I.R. PUMP DIAGNOSIS CHART ALL

Condition	Possible Cause	Correction
Excessive Belt Noise	1. Loose belt.	1. Tighten belt.
	2. Seized pump.	1. Replace pump.

Excessive Pump Noise, Chirping, Rumbling Or Knocking	1. Leak in hose.	1. Locate source of leak and correct.
	2. Loose hose.	1. Reassemble and replace or tighten hose clamp.
	3. Hose touching other engine parts.	1. Adjust hose position.
	4. Malfunctioning diverter valve.	1. Replace valve.
	5. Malfunctioning check valve.	1. Replace valve.
	6. Pump mounting fasteners loose.	1. Re-torque all mounting screws.
	7. Centrifugal filter fan damaged.	1. Replace centrifugal filter fan.
	8. Malfunctioning pump.	1. Replace pump.
No Air Supply	1. Loose belt.	1. Tighten belt.
	2. Leak in hose.	1. Locate source of leak and correct.
	3. Leak at hose fitting.	1. Reassemble and replace or tighten hose clamps.
	4. Malfunctioning diverter valve.	1. Replace valve.
	5. Malfunctioning check valve.	1. Replace valve.
	6. Malfunctioning pump.	1. Replace pump.

CATALYTIC CONVERTER ALL

Condition	Possible Cause	Correction
Exhaust system noisy.	1. Exhaust pipe joints loose at catalytic converter.	1. Tighten clamps at joint.
	2. Catalytic converter ruptured.	1. Replace catalytic converter.
	3. Loose or missing catalyst replacement plug.	1. Tighten or replace (Recharge catalyst as necessary).

Poor car performance.	1. Failed catalytic converter.	1. Replace catalytic converter. Ignition system and AIR system should also be diagnosed and repairs made if necessary.
B-B size particles coming out of tailpipe.	1. Failed catalytic converter.	1. Replace catalytic converter. Ignition system and AIR system should also be diagnosed and repairs made if necessary.

CHOKE AIR MODULATOR SYSTEM 231, 350, AND 455 ENGINES

Condition	Possible Cause	Correction
Poor driveability after warm-up (choke not releasing).	1. Choke air modulator system plugged.	1. Locate restriction and correct as necessary.
Poor driveability during warm-up (choke releasing to soon).	1. Modulator valve stuck in open position.	1. Replace valve.

EVAPORATIVE EMISSION SYSTEM

Condition	Possible Cause	Correction
Fuel Odor.	1. Vapor leak from evap. system.	1. Inspect and correct as necessary fuel and evaporation hoses and pipes, fuel sender sealing gasket, and fuel cap.

EGR SYSTEM - 231-350-455 ENGINES

Condition	Possible Cause	Correction
Engine idles abnormally rough and/or stalls.	1. EGR valve vacuum hoses misrouted.	1. Check EGR valve vacuum hose routing. Correct as required.
	2. Leaking EGR valve.	1. Check EGR valve for corcect operation.
	3. Idle speed misadjusted.	1. Set idle RPM per engine label specification. Remove EGR vacuum hose from valve and observe effect on engine. Replace valve if speed is affected, reset RPM to specification and reconnect hose.

	4. Improper carburetor signal to EGR valve at idle.	1. Check vacuum signal from carburetor EGR port with engine at stabilized operating temperature and at curb idle speed. If signal is more than 2.0 in hg. vacuum, proceed to carburetor idle diagnosis.
	5. Failed EFE-EGR thermal vacuum switch.	1. Check vacuum signal into switch from carburetor EGR port with engine at normal operating temperature and at curb idle speed. Then check vacuum signal out of switch to EGR valve. If the two vacuum signals are not equal with $\pm$1/2 in. hg., them proceed to EFE-EGR thermal vacuum switch diagnosis. Replace switch as required.
	6. EGR valve gasket failed or loose EGR attaching bolts.	1. Check EGR attaching bolts for tightness. Tighten as required. If not loose, remove EGR valve and inspect gasket. Replace as required.
Engine runs rough on light throttle acceleration, poor part load performance and poor fuel economy.	1. EGR valve vacuum hose misrouted.	1. Check EGR valve vacuum hose routing. Correct as required.
	2. Failed EFE-EGR thermal vacuum switch.	1. Same as Step 5 above under "Engine Idles Abnormally Rough" and/or stalls.
	3. EGR flow unbalanced due to deposit accumulation in EGR passages or under carburetor.	1. Clean EGR passages of all deposits.
	4. Sticky or binding EGR valve.	1. Remove EGR valve and inspect for proper operation. Clean or repair as required.
Engine stalls on decelerations.	1. Restriction in EGR vacuum line.	1. Check EGR vacuum lines for kinks, bends, etc. Remove or replace hoses as required. Check EGR thermal vacuum switch for excessive restriction. Replace as required. Check EGR valve for excessive deposits causing sticky or binding operation. Clean or repair as required.

Part throttle engine detonation.	1. Insufficient exhaust gas recirculation flow during part throttle accelerations.	1. Check EGR valve hose routing. Check EGR valve operation. Repair or replace as required. Check EGR thermal vacuum switch as listed under "Engine Idles Abnormally Rough and/or Stalls". Replace switch as required. Check EGR passages and valve for excessive deposits. Clean as required.
(NOTE: Detonation can be caused by several other engine variables. Perform ignition and carburetor related diagnosis		
Engine starts but immediately stalls when cold.	1. EGR valve hoses misrouted.	1. Check EGR valve hose routings.
	2. EGR system malfunctioning when engine is cold.	1. Perform check to determine if EFE-EGR thermal vacuum switch is operational. Replace as required.
(NOTE: Stalls after start can also be caused by carburetor problems. Refer to carburetor diagnosis section.)		

EFE-EGR THERMO VACUUM SWITCH 231-350-455 ENGINES (AND 260 ENGINE CALIFORNIA ONLY)

Condition	Possible Causes	Correction
Rough idle or stall during warm-up.	1. No vacuum to EFE vacuum actuator with engine coolant temperature below 120°F. ±3°F.	1. Check vacuum source for vacuum of 8" hg. or above. 2. Correct improper vacuum hose routing, leak in connecting system, or EFE vacuum actuator diaphragm. Replace. 3. Failed EFE-EGR thermo vacuum switch. Replace.
	2. Vacuum to EGR valve below 120° ±3°F.	1. Correct improper vacuum hose routing if necessary. 2. Failed EFE-EGR thermo vacuum switch. Replace.
Rough idle, lack of performance, surge after warm-up period.	1. Vacuum to EFE vacuum actuator with engine coolant temperature above 120°F. ±3°F.	1. Correct improper vacuum hose routing. 2. Failed EFE-EGR thermo vacuum switch. Replace.
Improper EGR operation.	1. Vacuum to EGR valve with engine coolant temperature below 120°F. ±3°F.	1. Correct improper vacuum hose routing if necessary. 2. Failed EFE-EGR thermo vacuum switch. Replace.

EFE SYSTEM 231-350-455 ENGINES

Condition	Possible Cause	Correction
Poor Operation during warm-up such as—rough idle, stumble, etc.	1. No vacuum to vacuum actuator during warm-up period for cold start.	1. Check vacuum source for vacuum of 8″ hg. or above. Repair improper vacuum hose routing, leak in connecting system, diaphragm, or EFE-EGR TVS. Failed EFE-EGR TVS. Replace.
	2. EFE valve linkage bent or binding.	1. Repair EFE valve linkage.
	3. EFE valve linkage disconnected.	1. Reconnect linkage.
	4. EFE valve shaft frozen in bearing.	1. Replace EFE valve.
	5. EFE valve loose on shaft.	1. Replace EFE valve.

CLOSED EFE VALVE

Condition	Possible Cause	Correction
Poor Operation after warm-up rough idle -lack of high speed performance -surge, misses at all speeds	1. Failed EFE-EGR TVS -vacuum present at vacuum actuator.	1. Replace EFE-EGR TVS.
	2. EFE valve asm. shaft frozen in bearing.	1. Replace EFE valve.
	3. EFE valve to housing interference.	1. Repair EFE valve.
	4. Vacuum actuator linkage bent or binding.	1. Repair EFE valve linkage.
	5. EFE valve separated from shaft.	1. Repair EFE valve linkage.
Noisy EFE valve asm.	1. Linkage stop failed.	1. Repair linkage stop tab.
	2. No vacuum actuator linkage over travel.	1. Replace vacuum actuator.
	3. Valve loose on shaft.	1. Replace EFE valve.
	4. Shaft loose in bushing, or bushing loose in housing.	1. Replace EFE valve.

1. Connect a vacuum gauge to the "T.V.S." side of the valve and the Hand Operated Vacuum Pump (with a vacuum gauge) to the carburetor side of the valve.)

2. Draw a vacuum, there should be a slight hesitation on the gauge reading at the "T.V.S." side. The Hand Operated vacuum pump gauge should drop slightly and balance with the gauge reading at the "T.V.S." side. This should take 3 to 4 seconds to balance the readings.

3. If there is not a slight hesitation in readings the valve should be replaced.

4. Remove the gauge hose from the "T.V.S." side of the valve. Cover the port with a finger, draw a vacuum, .5". The hand operated vacuum gauge pump reading should hold steady. If the vacuum reading should show a leak, replace the valve.

5. Remove the finger and the gauge reading should drop slowly, if the reading drops quickly to zero, replace the valve.

EARLY FUEL EVAPORATION SYSTEM (EFE) - 260 CU. IN. ENGINE

Operation

At engine temperatures less than the switching temperature of the TVS switch, manifold vacuum is directed to the EFE actuator which closes the EFE heat valve and increases the exhaust flow through the intake manifold crossover. The added heat from the exhause gas improves cold start performance. The valve starts to close at 5-7" of vacuum and is fully closed by 10 to 12" of vacuum. Above the temperature of temperature of the controlling valve switching point, the EFE valve remains open, since no vacuum is available. The gases will now leave through the exhaust crossover pipe.

Functional Check

Check valve for proper operation. A binding condition must be corrected. Check switch for proper operation. Check hoses for cracking, abrasion or deterioration. Replace parts as necessary.

EARLY FUEL EVAPORATION THERMAL VACUUM SWITCH (EFE-TVS)

Operation

At engine temperatures less than 120° manifold vacuum is directed from port "D" or "2" on the TVS to the EFE actuator which closes the heat valve and increases the exhaust flow through the intake manifold cross-over. The added heat from the exhause gas improves cold start performance. Above the switching point of the valve the valve closes, and the spring loaded EFE valve is held open since there is no vacuum available. The exhaust gas will now exit through the crossover pipe.

Functional Check

1. COLD ENGINE (less than 120° coolant temperature) disconnect hose from port "D" or "2" on the TVS and connect vacuum gauge to port. Start engine. If hoses are connected to the proper ports, full manifold vacuum should be present at port "D" or "2". If not, make sure manifold vacuum is present in hose connected to "C" or "3". If vacuum is present, replace switch using a soft setting sealant.

2. WARM ENGINE (over 120° coolant temperature) disconnect hose from port "D" or "2" on EFE-TVS and connect vacuum gauge to the port. Start engine. If hoses are connected to proper ports, less than 5" of vacuum should be present at port "D" or "2", if more than 5" of vacuum is present, replace switch using a soft setting sealant.

EARLY FUEL EVAPORATION CHECK VALVE (EFE-CV) - 260 CU. IN, ENGINE

Operation

A check valve is used in the vacuum line from the intake manifold to the EFE-TVS switch or the EFE-DTVS.

The valve holds the highest vacuum reached to keep the EFE heat valve closed until the TVS switches modes. The EFE heat valve could rattle without this valve under certain low vacuum conditions as during heavy acceleration.

BACK PRESSURE TRANSDUCER VALVE (BPV) - 260 CU. IN. ENGINE

Some V-8 engines use the BPV with the EGR valve to modulate Exhaust Gas Recirculation to engine load.

Exhaust pressure in the exhaust pressure prove of the BPV moves a diaphragm against spring pressure to seal the air bleed when engine load is high allowing maximum EGR.

When engine load decreases, exhause pressure decreases in the exhaust pressure probe. The spring then pushes the diaphragm down. Vacuum to the EGR valve is than bled through the air bleed reducing vacuum to the EGR valve and Exhaust Gas Recirculation.

EGR vacuum is ported to assure no EGR at idle and wide open throttle conditions.

Functional Check—(BPV)

1. Remove air cleaner assembly and plug manifold vacuum fitting.

2. With A/C "OFF", drive wheels blocked, transmission in park, start engine and bring to operating temperature. Put cam follower on high step of fast idle cam.

3. Check vacuum on source (control valve) side of BPV valve, record reading.

4. "T" a vacuum gauge to the EGR control valve side of BPV valve. Vacuum should be 1.7 to 2.7 HG. Replace BPV valve is not within specifications. Leave vacuum gauge at this location.

Remove hose from EGR valve and plug hose. Read vacuum gauge—should be the same as source vacuum, Step 3. If not within 2 inches of source vacuum, replace BPV valve.

5. Remove vacuum gauge and install air cleaner assembly.

EGR THERMAL CONTROL VALVE (EGR-TCV) - 260 CU. IN. ENGINE

All 260 engines use a temperature sensitive control valve in the vacuum line to the EGR valve.

The valve is closed below 61° temperature blocking vacuum to the EGR valve giving better driveaway when the engine is cold.

The EGR control valve is open above 76° engine temperature allowing EGR ported vacuum to be directed to the EGR valve. If vacuum is present at EGR valve below 61°F, or no vacuum is present above 76°F, valve must be replaced.

EGR CHECK VALVE (EGR-CV) 260 CU. IN. CALIFORNIA ONLY

A check valve is used in the vacuum line from the carburetor ported spark port to the #1 port of the EFE/EGR-TVS switch.

The valve holds the highest ported vacuum reached to keep the E.G.R. valve open during hard acceleration. (Note: The back pressure transducer valve - B.P.V. bleed valve is closed during hard acceleration.)

During deceleration or light engine loads the vacuum is modulated through the B.P.V. reducing vacuum to the E.G.R. valve thus reducing exhaust gas recirculation.

EXHAUST GAS RECIRCULATION SYSTEM (EGR) - 400 CU. IN. ENGINE

Function test the EGR valve as outlined under Checking EGR Valve Operation - All Engines.

Functional Test of EGR Thermal VAcuum Valve - 400 Cu. In. Engine

1. Valve is closed below 70°F and open above 70° F.

2. Warm check, above 70°F. (valve left on engine):

a. Apply a vacuum source to hose connected to lower fitting.

b. A vacuum gauge attached to upper fitting should show a reading within 1 inch of the source vacuum. Replace valve if it does not conform.

3. Cold check, below 70°F. (remove from engine):

a. Cool valve to below 70°F.

b. Apply a vacuum source to lower fitting.

c. A vacuum gauge attached to upper fitting should not show a reading. Replace valve if a reading is obtained.

Function Test of EFE System - 400 Cu. In. Engine

Before starting test, the car should be cooled down so that the engine coolant temperature is below 120°F. Before starting engine to make system check, an extra person is required to start the engine while the testor observes the EFE valve for opening.

1. Locate EFE valve and not position of the actuator arm.

2. One man observes EFE valve when engine is started.

Valve should close when engine is started cold. The actuator link will be pulled into the diaphragm housing.

3. If valve does not close, remove hose from EFE valve and apply in external vacuum source in excess of 8 inches. *Valve should close.*

a. If valve still does not close, replace the EFE valve.

b. If valve closes, the problem is not the EFE valve. See function test failure diagnosis guide for possible causes and repair the condition. Then proceed with function test.

4. Warm up engine until coolant exceeds 120°F.

5. Observe EFE valve to see if it has opened. *Valve should open.*

6. If valve does not open, remove hose from EFE valve to see if it will open. *Valve should open.* If valve opens, there is no air bleed for the diaphragm or the TVV plunger is stuck in the cold mode. Replace TVV.

Function Test Failure Diagnosis Guide

Failure	Possible Cause	Repair
EFE valve does not close.	1. Coolant not below 120°F.	1. Remove TVV from engine for more rapid cooling.
	2. Malfunctioning TVV	2. Replace part.
	3. Loose, kinked, pinched or plugged hoses, or cracked "T".	3. Check hoses and connections and correct.
	4. Malfunctioning EFE valve diaphragm or external damage to link or arm, etc.	4. Replace part.
	5. Check valve installed incorrectly.	5. Install with tapered end toward vacuum source.

EFE valve does not open.	1. Plugged vent in TVV.	1. Replace part.
	2. Malfunctioning or stuck plunger in TVV.	2. Replace part.
	3. Damaged EFE valve linkage parts.	3. Replace part.

Function Test of Individual Component Parts

Check valve.

a. Apply an external vacuum source to the tapered end of check valve.

b. When vacuum source is sealed off leaving vacuum applied to valve, there should be no vacuum loss in 1 minute. Replace check valve if it loses more than .5 inch.

EFE Distributor Spark TVV In Intake Manifold Water Crossover

- 4-Port Type (400 Cu. In. Engine Non-California) The vertical port and the upper horizontal port marked "HV" are a of the EFE system. These ports are open below 120°F. and closed above 120°F. The lower portion of the TVV is a part of the EGR system on some engines, and part of the distributor spark advance system on other engines.

a. Warm check, above 120°F. (valve left on engine).

- Apply a vacuum source to the vertical port.
- A vacuum gauge attached to the port marked "HV" should not show a reading. Replace valve if it does not conform.
- NOTE: In this mode the "HV" port is vented to atmosphere.

b. Cold check, below 120°F. (remove from engine or cool car overnight).

- Cool valve to below 120°F.
- Apply a vacuum source to the vertical port.
- A vacuum gauge attached to the port marked "HV" should show a reading within 1 inch of the source vacuum. Replace valve if it does not conform.

EFE Valve

a. Apply a vacuum source in excess of 8 inches and observe for valve movement.

Valve should close. The actuator link will be pulled inward toward the diaphragm.

b. Remove vacuum supply and observe for valve movement.

Valve should open.

c. To check diaphragm, apply vacuum and seal off source.

Diaphragm should hold actuator link retracted for 1 minute.

d. Replace diaphragm or valve parts as required if all the above checks are not met.

Full Vacuum Advance System - 400 Engine

Condition	Possible Cause	Repair
No advance at idle.	1. Distributor advance unit not operating.	1. Replace part.
	2. Plugged vacuum source.	2. Correct or replace part.
	3. Vacuum hose off, pinched or plugged, or a "T" or "F" connector cracked or broken.	3. Check hoses, connectors and routing and correct.
Do not loose advance when removing hose at idle.	Damaged distributor advance unit.	Replace part.
No retard delay.	1. Malfunctioning spark retard delay valve.	1. Replace part.
	2. Malfunctioning TVV in manifold.	2. Replace part.

Functional Test for Vacuum Advance Systems

Full Vacuum Advance Systems

400 Cu. In. Engine (California)

1. Warm up engine to normal operating temperature.

2. Hook up a timing light and observe for vacuum advance.

Timing should be advanced beyond the initial setting.

3. Remove vacuum hose from distributor and observe for loss of vacuum advance.

Engine should return to specified initial timing setting.

4. On engines equipped with a spark retard delay valve:

a. Verify correct installation. Side marked "DIST" should be connected toward the distributor. Correct if needed.

b. Locate hose connected to port marked "1" on TVV in manifold water crossover. Remove hose from vacuum source. Plug hose and cap the vacuum source.

c. "T" a vacuum gauge into hose between distributor and the spark retard delay valve. Place gauge so it can be observed from the driver's seat.

d. Turn off the ignition and observe the vacuum gauge.

Vacuum reading should not drop immediately, but should drop slowly (taking about 2 to 5 seconds to go from 15 to 5 inches).

e. If the vacuum drops too fast, the TVV is leaking or the spark retard delay valve is malfunctioning. Then . . . .

- Remove hose from TVV port marked "2" and plug hose. Repeat step d.
- If vacuum drops slowly, replace the TVV.
- If vacuum still drops too fast, replace the spark retard delay valve.

EXHAUST GAS RECIRCULATION SYSTEM - 250 CU. IN. ENGINE

Funtion test the EGR valve as outlined under Checking EGR Valve Operation - All Engines.

Testing EGR Thermal Vacuum Switch - 250 Cu. In. Engine

1. Coolant temperatures above 100°F.

a. Connect a vacuum gauge to the EGR port of the switch.

b. Connect a hand operated vacuum pump to carburetor port and draw a vacuum. There must be a vacuum reading on the vacuum gauge. If not, replace the valve.

2. Engine coolant temperatures below 100°F. remove switch from engine and cool if necessary.

a. Connect vacuum gauge and pump to switch as in steps 1A and 1B above.

Draw a vacuum. There should be no vacuum reaping on the gauge, if there is replace the valve.

EARLY FUEL EVAPORATION SYSTEM (EFE) - 250 CU. IN. ENGINE

Early Fuel Evaporation (EFE) System Check

Check valve for proper operation. A binding condition must be corrected. Check solenoid for proper operation. Check hoses for cracking, abrasion or deterioration. Replace parts as necessary.

TO CHECK E.F.E. VALVE FOR PROPER OPERATION

1. Visually inspect manifold heat valve for damaged valve or linkage, disconnected linkage, and cracked or deteriorated vacuum line.

2. Apply at least 10 inches of vacuum from an external vacuum source to EFE vacuum diaphragm.

3. Valve should move freely. Vacuum diaphragm must hold plunger in retracted position for one minute without applying additional vacuum.

TO CHECK E.F.E. SOLENOID FOR PROPER OPERATION

Visually inspect hoses, wires, and fuses for proper connections, cracking, abrasion, pinching or deterioration. Repair or replace as necessary.

1. Connect a vacuum gage to the hose at the EFE valve actuator.

2. Disconnect the lead from the engine oil temperature switch. With the engine running, ground the lead to the engine. The vacuum gage should indicate idle vacuum. If idle vacuum is indicated, go to Step 3. If idle vacuum is not indicated, go to Step 2a.

2a. Stop engine, and then turn ignition switch to the "Run" position. Using a voltmeter, check for battery voltage at the solenoid (tan wire). If battery voltage is not indicated, check the power circuit and repair as necessary. If battery voltage is indicated, check the continuity of the ground circuit with an ohmmeter and repair if necessary. If the ground circuit is good, replace the solenoid.

3. With the engine running and the engine oil at normal operating temperature, disconnect the temperature switch lead from ground. The vacuum gage should read zero. If vacuum is indicated, replace the solenoid. Reconnect the lead to the engine oil temperature switch. The vacuum gage should read zero. If vacuum is indicated, replace the engine oil temperature switch.

CHECKING E.G.R. VALVE OPERATION - ALL ENGINES

Checking E.G.R. Valve (Engine at Operating Temperature)

The E.G.R. valve cannot be disassembled and no actual service is required, except that it should be checked for proper operation.

WARNING: IF ENGINE HAS BEEN OPERATED, CAUTION SHOULD BE USED WHEN CHECKING MOVEMENT OF VALVE STEM AS VALVE WILL BE HOT.

NOTE: *A cold override or thermal delay system is used on all models. Disconnect the system prior to performing the on-the-car check of the EGR valve.*

An outside vacuum source can be applied to the vacuum supply tube at the top of the vacuum diaphragm. The diaphragm should not leak down and can be checked for freedom of movement by applying a 5" vacuum signal to the diaphragm and observing shaft movement.

MAINTENANCE AND ADJUSTMENTS

P.C.V. FILTER AND VALVE

Replace positive crankcase ventilator valve every 24 months or 30,000 miles. Replace PCV filter in the air cleaner every 30,000 miles more frequent under dusty conditions.

MAJOR REPAIR

REMOVAL AND REPLACEMENT OF C.C.S. UNITS

The damper door is not serviceable. The air cleaner assembly must be replaced if the damper door is malfunctioning.

R and R Vacuum Motor

1. Drill center of two spot welds using a 1/16 inch drill. Do not center punch.

2. Enlarge two holes using a 5/32 inch drill.

Use extreme care not to damage the air cleaner snorkel.

3. Remove vacuum motor retainer strap. See Figure 6F-3.

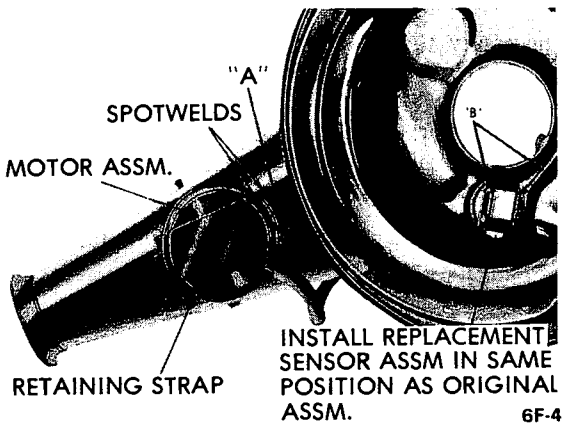


Figure 6F-3 - Replacing Vacuum Motor Assembly

4. Lift vacuum motor, cocking it to one side to unhook motor linkage at the control door.

5. Drill a 7/64" hole in snorkel tube at point "A" as shown in Figure 6F-3.

6. Use the motor strap retainer and the sheet metal screw provided in the motor service package to secure the retainer and motor to the snorkel tube.

7. Make sure the screw does not interfere with the operation of the damper assembly. Shorten screw if required.

R and R Air Cleaner Sensor

1. Remove two sensor retaining clips by prying. See Figure 6F-4.

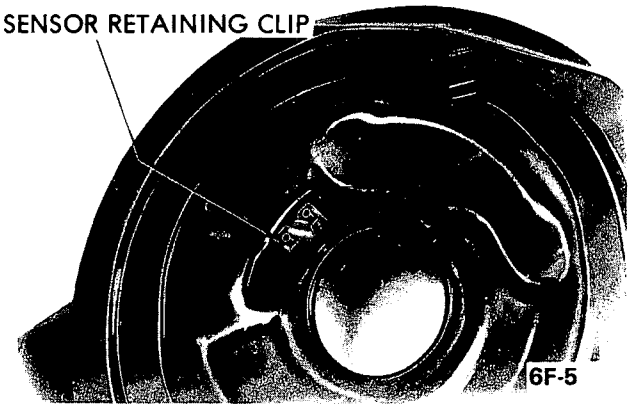


Figure 6F-4 - Replacing Sensor Assembly

2. Pull vacuum hoses from sensor.

3. Note carefully the installed position of the sensor so that you can install new sensor in same position. Then remove sensor.

4. Install sensor and gasket assembly in air cleaner in same position as noted in Step 3. This is to eliminate the possibility of interference with the air filter element. See Figure 6F-4.

5. Install sensor retaining clip. Meanwhile supporting sensor at "B" around the outside rim to prevent damage to the temperature sensing spring. See Figure 6F-3.

6. Reinstall vacuum hoses.

AIR PUMP

Removal

1. Disconnect hoses from pump and valve.

2. Loosen bracket to pump mounting bolts.

3. Remove pump belt.

4. Remove pulley to hub bolts and remove pulley.

5. Remove pump.

6. Remove valve from pump if pump is to be replaced.

Installation

1. Replace valve on back of pump.

2. Position pump assembly on mounting bracket with holes lined up and install bolts loosely.

3. Place pulley on hub and tighten pulley to hub bolts to 72-108 lb.in.

4. Install pump belt over pulley.

5. Move pump until belt is tightened to 60-85 lbs. and tighten bracket bolts.

6. Connect all hoses to valve and pump.

CENTRIFUGAL FILTER FAN

Removal

1. Remove pump.

2. Insert needle nose pliers and pull fan from hub, as shown in Figure 6F-5. It is seldom possible to remove fan without damaging it. Care should be taken to prevent fragments from entering the air intake hole.

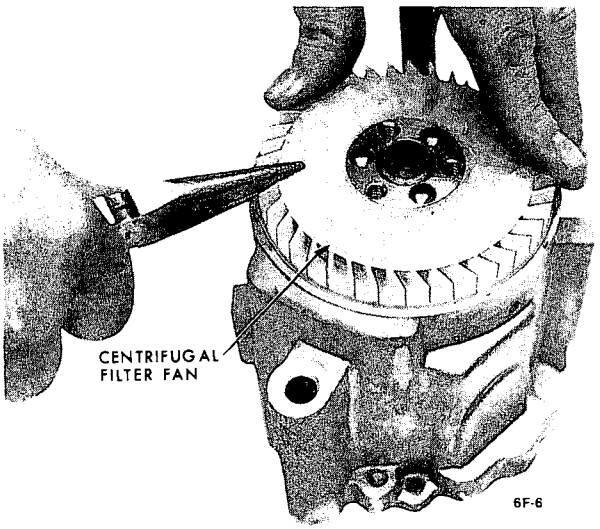


Figure 6F-5 Removing Centrifugal Fan From Hub

Installation

1. Install filter fan by drawing it into position, using pulley and bolts as tools. Draw the fan down evenly by alternately torquing the bolts, making certain that the outer edge of the fan slips into the housing.

2. Install pump.

A new fan may be noisy for about 20-30 miles of operation, until the outer diameter sealing lip has worn in.

DIVERTER VALVE

Removal

1. Remove hoses on valve.

2. Remove two screws holding valve to pump and remove valve.

3. Remove gasket material from valve and pump.

Installation

1. Do not use a gasket when replacing the diverter valve.

2. Install valve and secure with two screws. Torque to 120-160 lb.in.

3. Connect hoses to valve assembly.

CHECK VALVE

Removal

1. Release clamp and disconnect air hose from check valve.

2. Unscrew check valve.

Installation

1. Reinstall check valve.

2. Install air hose to check valve.

A.I.R. INJECTION TUBES REPLACEMENT (L6-only)

There is no periodic service or inspection for the air injection tubes, yet, whenever the cylinder head is removed inspect the air injection tubes for carbon build up and warped or burned tubes.

Remove any carbon build up with a wire brush.

Warped or burned tubes must be replaced.

Replacement

On in-line engines, remove carbon from tubes and using penetrating oil, work tubes out of cylinder head.

E.G.R. VALVE REMOVAL AND INSTALLATION

Removal

1. Disconnect vacuum hose from valve.

2. Remove bolt or bolts holding valve to manifold and remove valve.

Installation

1. Install gasket and valve in manifold and tighten bolts.

2. Connect vacuum hose to valve.

CATALYTIC CONVERTER

Catalyst Removal and Replacement

Removal

If necessary, the catalyst in the converter can be replaced on the car with Tool J-25077.

(NOTE: Separate hoses should be attached to the aspirator and the vibrator with maximum available pressure. (Minimum of 60 psi in each hose.)

If the car has dual tailpipes, attach the aspirator to one pipe and place a plug in the other pipe.

1. Install aspirator. See Figure 6F-6.

2. Connect air supply line to aspirator to create a vacuum in the converter to hold beads in place when fill plug is removed.

3. Remove converter fill plug with 3/4" hex wrench. See Figure 6F-7.

4. Clamp on vibrator. See Figure 6F-8.

5. Install empty catalyst container to vibrator (do not install fill tube extension at this time.) See Figure 6F-8.

6. Disconnect air supply to aspirator and connect air supply to vibrator. Catalyst will now drain from the converter into the empty container.

7. When all the catalyst has been removed from the converter, disconnect air supply to vibrator and remove container from the converter.

8. Discard used catalyst.

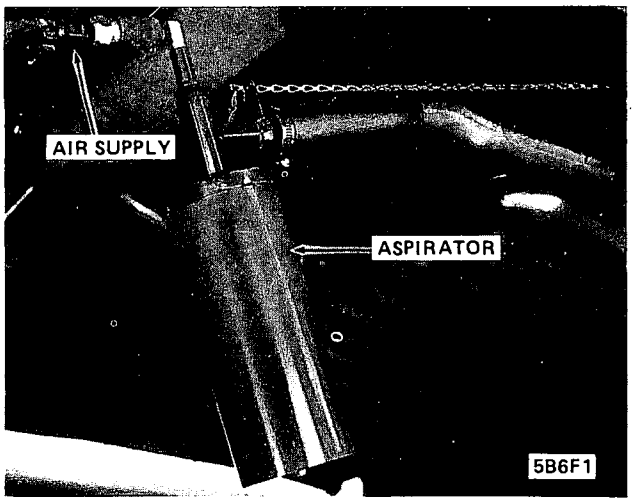


Figure 6F-6 - Aspirator Installed

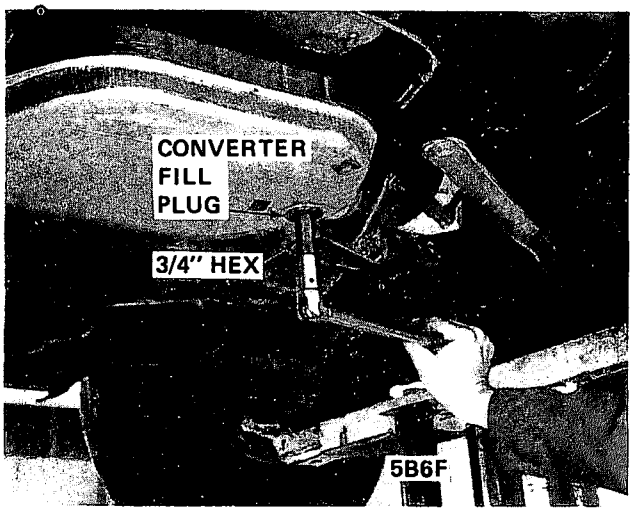


Figure 6F-7 - Removing Converter Fill Plug

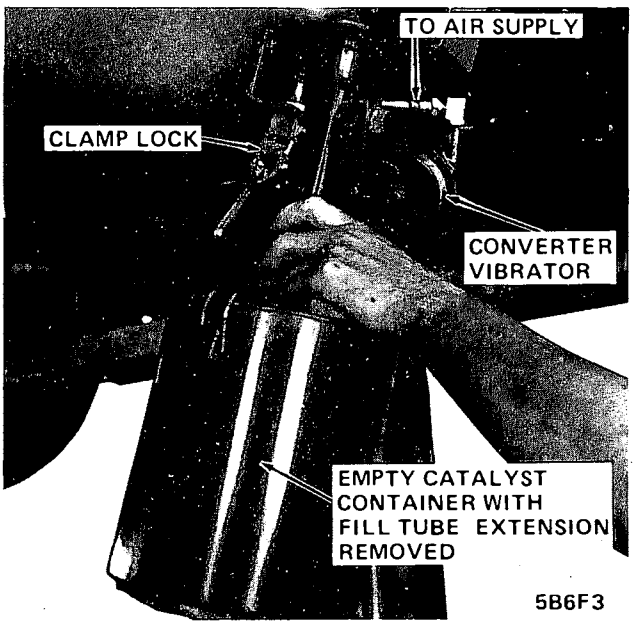


Figure 6F-8 - Clamping on Vibrator and Empty Catalyst Container

Replacement

1. Fill container with approved replacement catalyst.

2. Install fill tube extension to the fixture. See Figure 6F-9.

3. Connect air supply to aspirator and vibrator.

4. Attach catalyst container to the fixture.

5. After the catalyst stops flowing, disconnect air supply to the vibrator.

6. Remove vibrator and check that catalyst has filled converter flush with fill plug hole. Add catalyst if required.

7. Apply an anti-seize compound to the fill plug; install and tighten to 50 lb. ft.

8. Disconnect air supply to aspirator and remove.

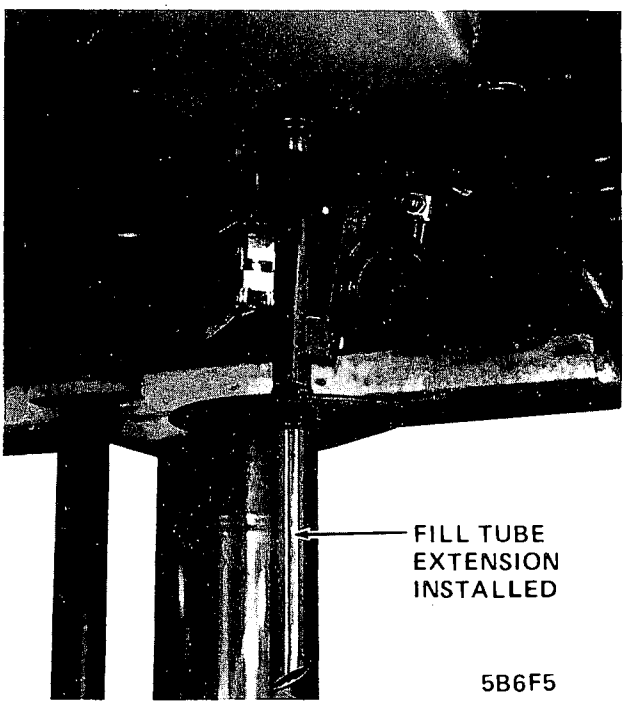


Figure 6F-9 - Fill Tube Extension Installed

Catalytic Converter Bottom Cover Replacement

If, for any reason, the bottom cover of the converter is torn or severely damaged, it can be replaced with a repair kit.

1. Remove bottom cover by cutting close to the bottom outside edge. See Figures 6F-10 and 6F-11. Do not remove the fill plug. The depth of the cut must be very shallow to prevent damage to the inner shell of the converter.

2. Remove insulation. See Figure 6F-12.

3. Inspect inner shell of the converter for damage. If there is damage in the inner shell, the converter assembly must be replaced.

4. Place new insulation in the replacement cover. Apply sealing compound, all around the cover after the insulation is in position. Apply extra sealer at the front and rear opening for the pipes. See Figure 6F-13.

5. Install replacement cover on converter. See Figure 6F-14.

6. Install cover retaining channels on both sides of the converter. See Figure 6F-15.

7. Attach 2 clamps over retaining channels at each end of the converter. See Figure 6F-16.

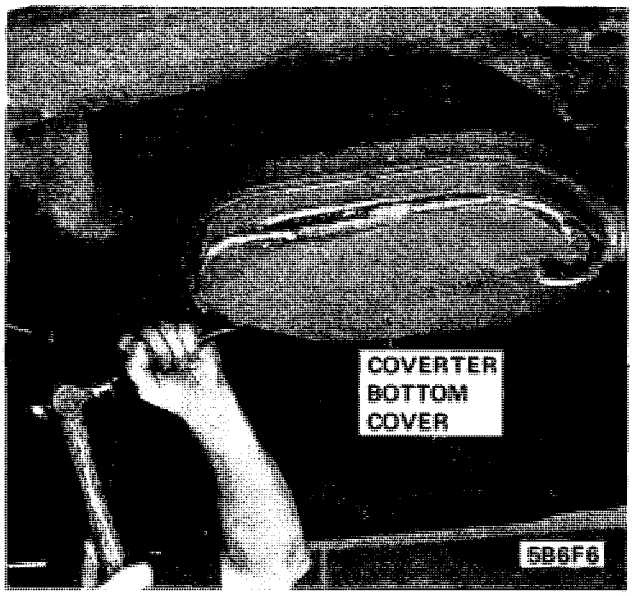


Figure 6F-10 - Cutting Off Bottom Cover

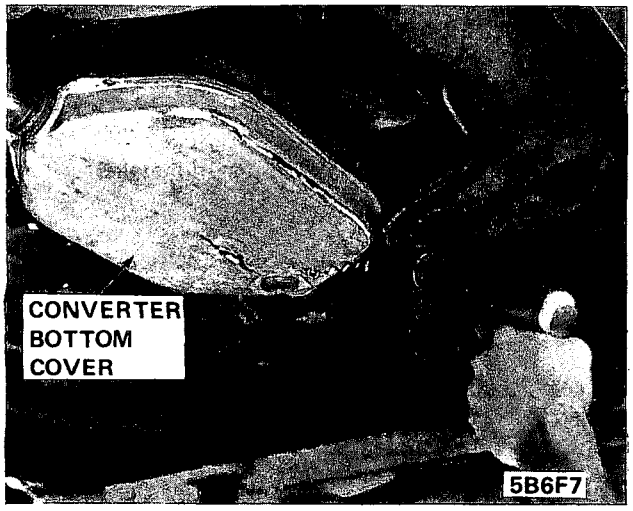


Figure 6F-11 - Cutting Off Bottom Cover

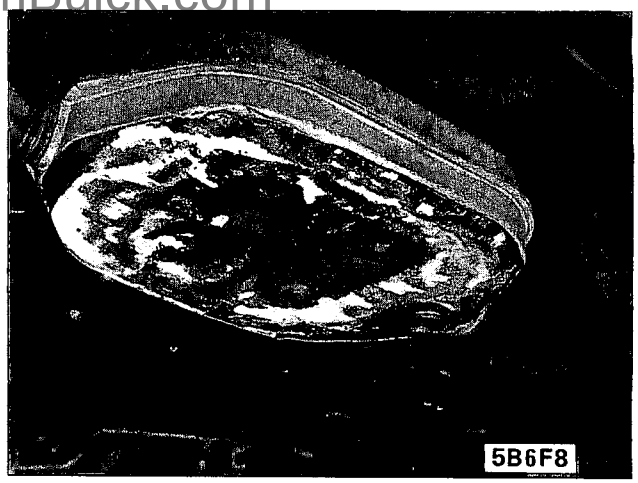


Figure 6F-12 - Insulation Removed

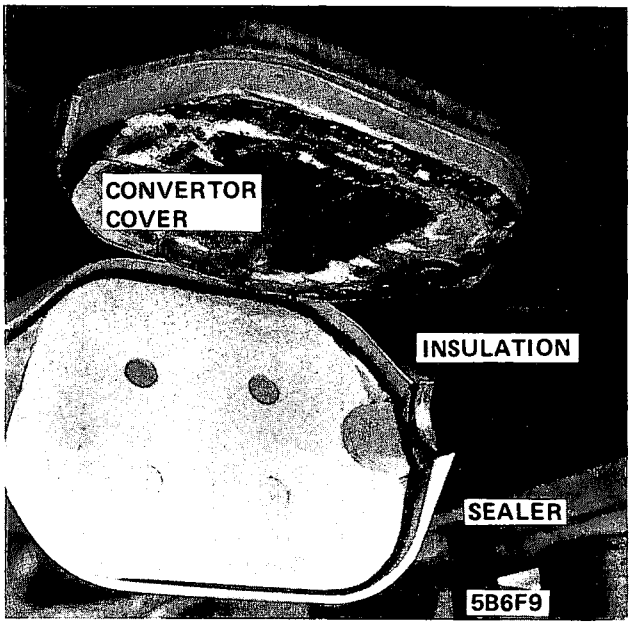


Figure 6F-13 - Insulation and Sealer Applied to Cover

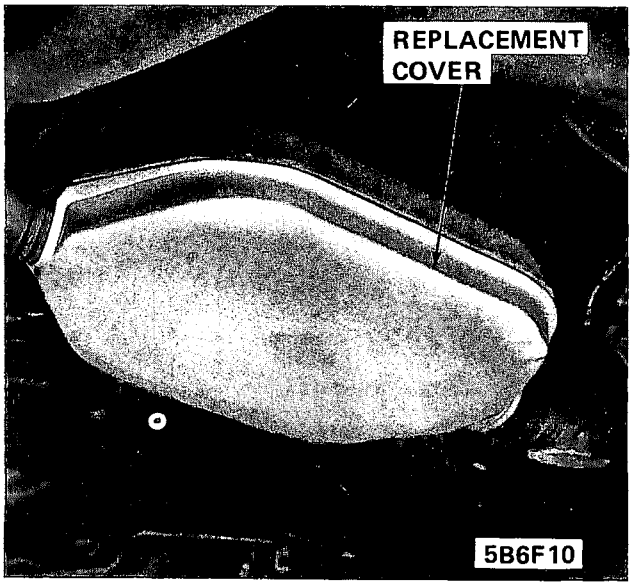


Figure 6F-14 - Installing Replacement Cover

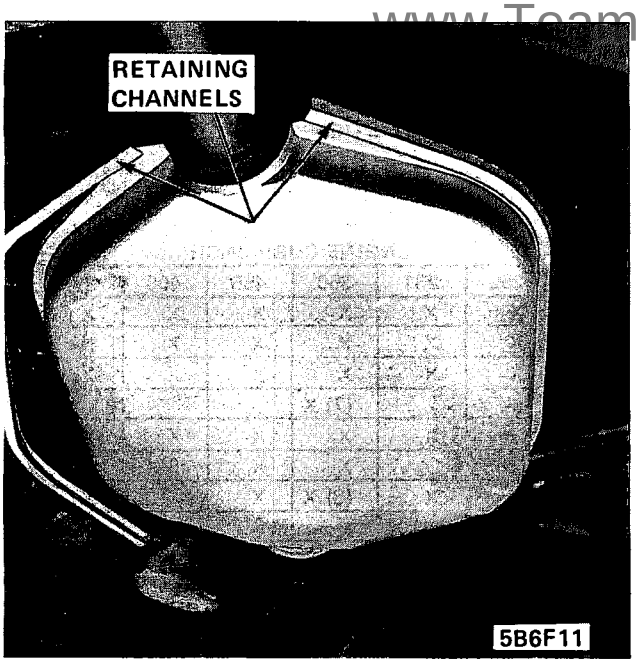


Figure 6F-15 - Installing Retaining Channels

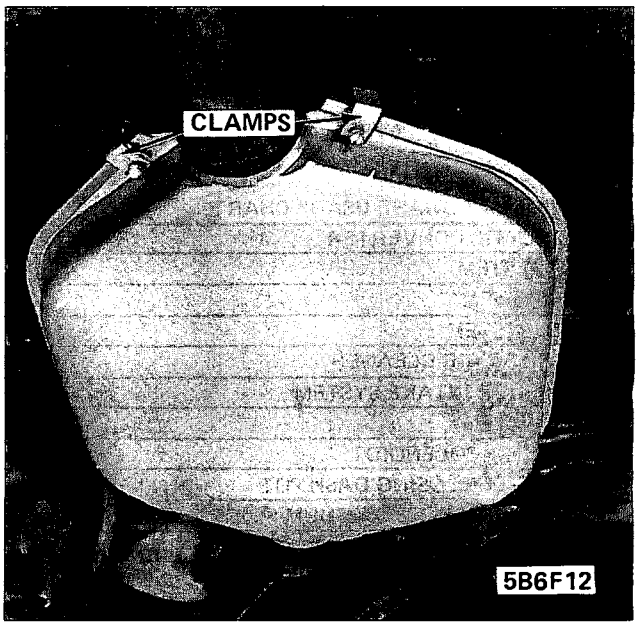


Figure 6F-16 - Retaining Channel Clamps Installed

EGR-EFE Thermal Vacuum Switch Removal and Replacement

231-260-350-400-455 Engines

Removal

1. Disconnect all vacuum hoses from switch. NOTE: This procedure cannot be used on an all metal switch.
2. Top (plastic) part of switch may have to be indexed to line up with a wrench flat of metal part of switch. Using a suitable size wrench turn top (plastic) part of switch so as Tool J-25254-2 can be set down over top part of switch and turn lower metal part of switch.

Replacement

1. Reverse removal procedure.

SPECIFICATIONS

EMISSION CONTROL SYSTEM SPECIFICATIONS

Positive Crankcase Ventilator Valve Type	
231	CV768C
250	CV781C
260	CV679C
350	CV768C
400	CV679C
455	CV768C
PCV Valve Location	Intake Manifold
Carburetor Inlet Air Regulated Temperature	115° ± 20°
Air Injection Pump Belt Tension	See Cooling System Specifications

ENGINE HARDWARE USAGE CHART	ENGINE CUBIC INCH					
	250	231	350	455	400	260
CATALYTIC CONVERTER	X	X	X	X	X	X
EGR SYSTEM	X	X	X	X	X	X
PCV SYSTEM	X	X	X	X	X	X
A.I.R. SYSTEM	(1) X		(7) X			
THERMAC AIR CLEANER	X	X	X	X	X	X
FRESH AIR INTAKE SYSTEM			X	X	(8) X	X
EFE SYSTEM	X	X	(3) X	X	X	X
IDLE STOP SOLENOID	X	(1) X				
THROTTLE CLOSING DASH POT			(4) X	(5) X		
EGR-EFE THERMAL VACUUM SWITCH		X	X	X		(1) X
EGR THERMAL VACUUM SWITCH					X	X
EFE THERMAL VACUUM SWITCH						(8) X
EFE OIL TEMPERATURE SWITCH	X					
EFE VACUUM SOLENOID SWITCH	X					
TVS SWITCH		X	X	X		
BACK PRESSURE TRANSDUCER VALVE						X
EFE CHECK VALVE						X
EGR CHECK VALVE						(1) X
EVAPORATIVE EMISSION CONTROL SYSTEM	X	X	X	X	X	X
DISTRIBUTOR VACUUM ADVANCE SPARK DELAY VALVE		(1) X				
CHOKE AIR MODULATOR SWITCH (IN AIR CLEANER)		X	X	X		
THERMAC AIR CLEANER THERMAL CONTROL VALVE						X
EFE-DISTRIBUTOR VACUUM ADVANCE THERMAL VACUUM SWITCH					X	
IDLE SPEED-UP SOLENOID						X
TAIL PIPE DIFFUSER (6)			(6)	(6)		
DISTRIBUTOR VACUUM ADVANCE RETARD DELAY VALVE					X	
REAR VACUUM BREAK THERMAL VACUUM SWITCH					X	

(1) CALIFORNIA ONLY

(2) ALL-EXCEPT "H" SERIES 231

(3) ALL-EXCEPT 350-4BBL WITH A.I.R.

(4) 350-4BBL "A" AND "B" SERIES CALIFORNIA ONLY

(5) 455-4BBL "B" SERIES SEDAN AND COUPE CALIFORNIA ONLY FOR START OF PRODUCTION AND ALL "B-C-E" SERIES AFTER START OF PRODUCTION.

(6) ALL 350-4BBL "B" SEDANS AND COUPES FOR CALIFORNIA-ALL "A" WAGONS-AND ALL "B" SEDANS WITH A 3.23 REAR AXLE WILL HAVE TAIL PIPE DIFFUSERS.

(7) ALL 350-4BBL "A" WAGON FOR CALIFORNIA AND ALL 350-4BBL "B" SEDANS AND COUPES FOR CALIFORNIA.

(8) NON CALIFORNIA ONLY.

5B6F30

Figure 6F-17A - Engine Hardware Usage Chart

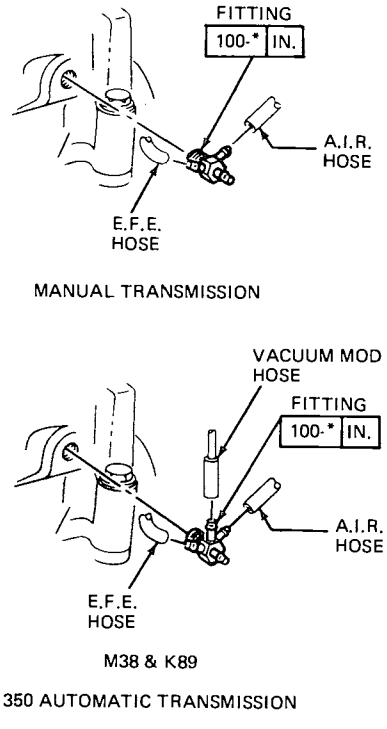


Figure 6F-17 - 250 Engine Vacuum Fittings less A/C

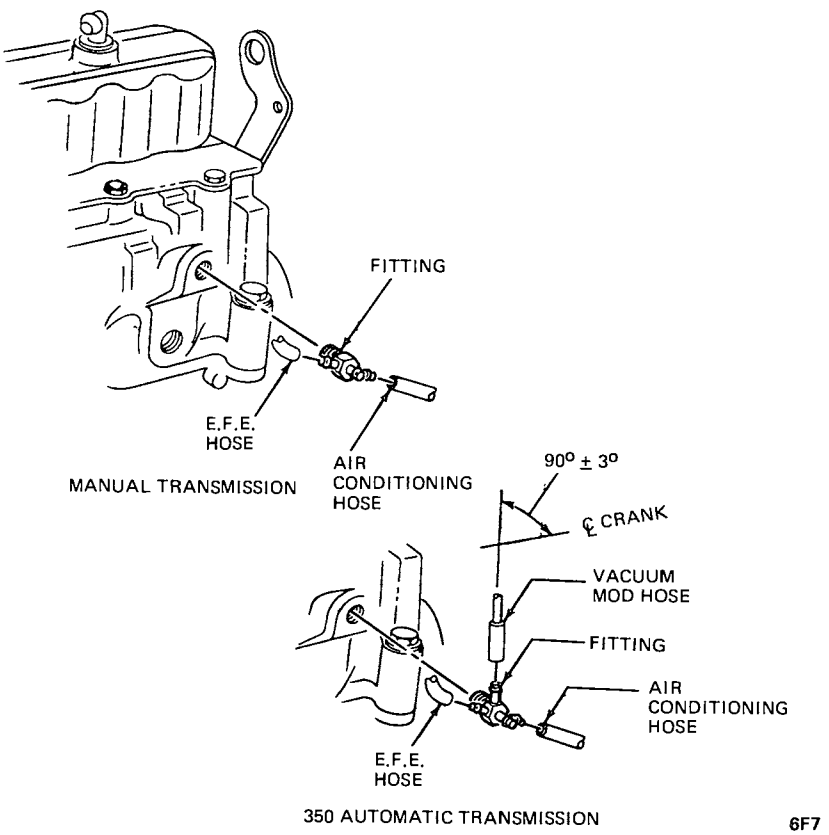


Figure 6F-18 - 250 Engine Vacuum Fittings with A/C

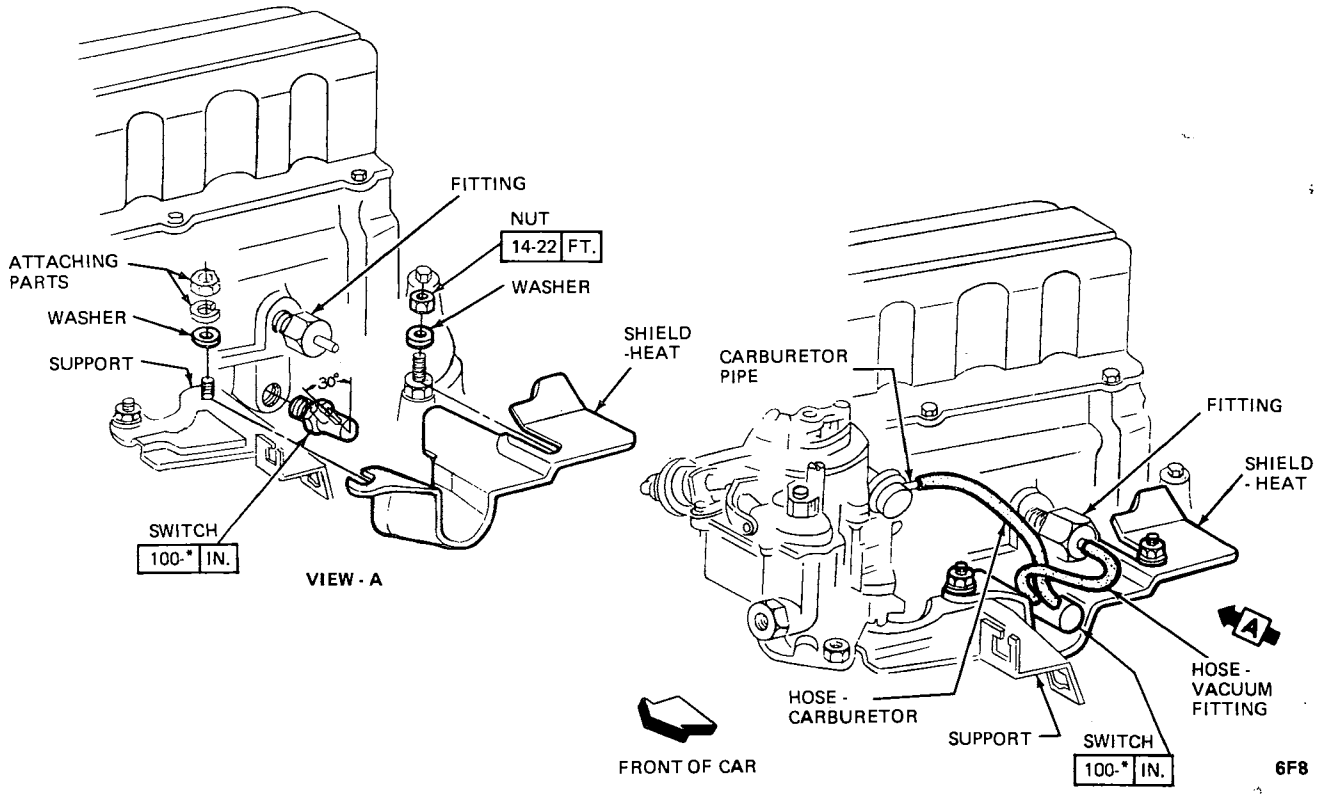


Figure 6F-19 - 250 Engine Idle Switch and Shield

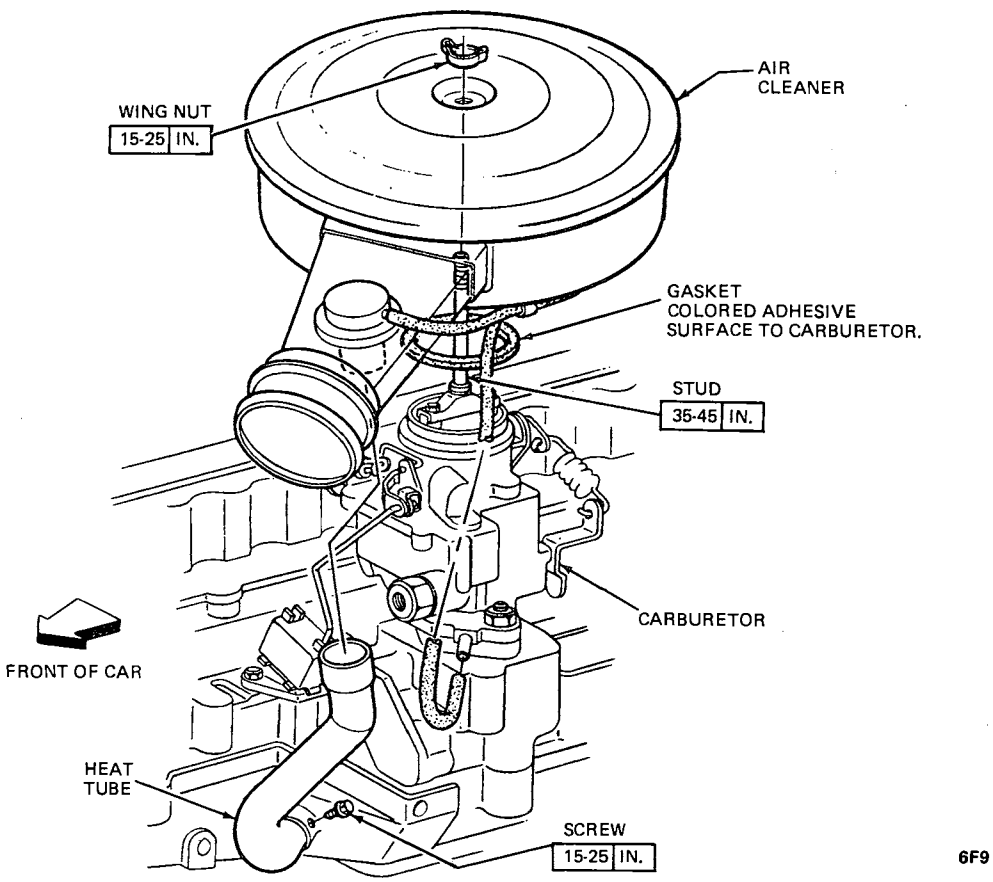


Figure 6F-20 - 250 Engine Air Cleaner

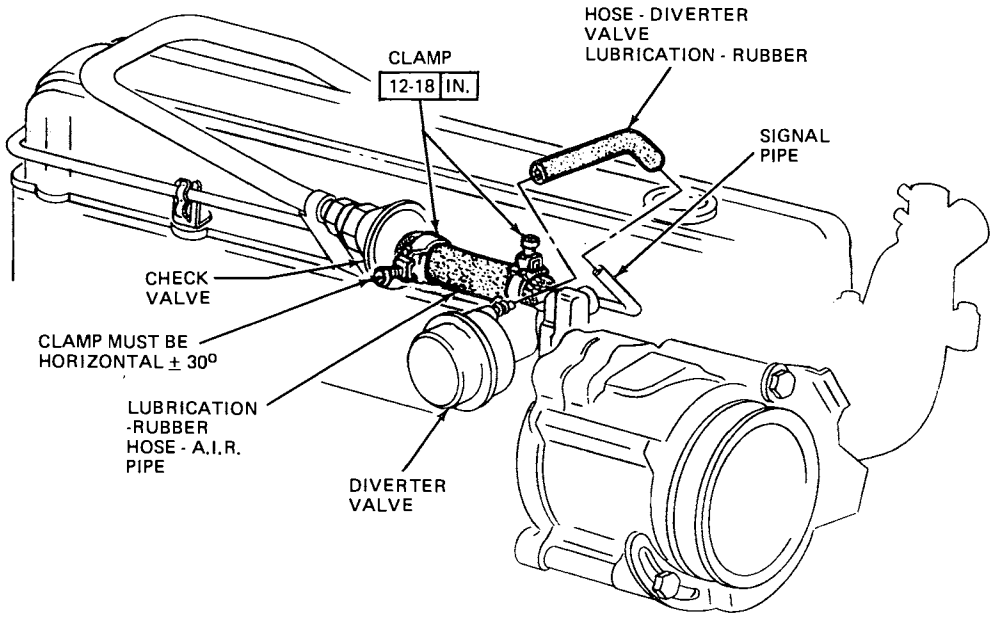


Figure 6F-21 - 250 Engine A.I.R. System Hoses

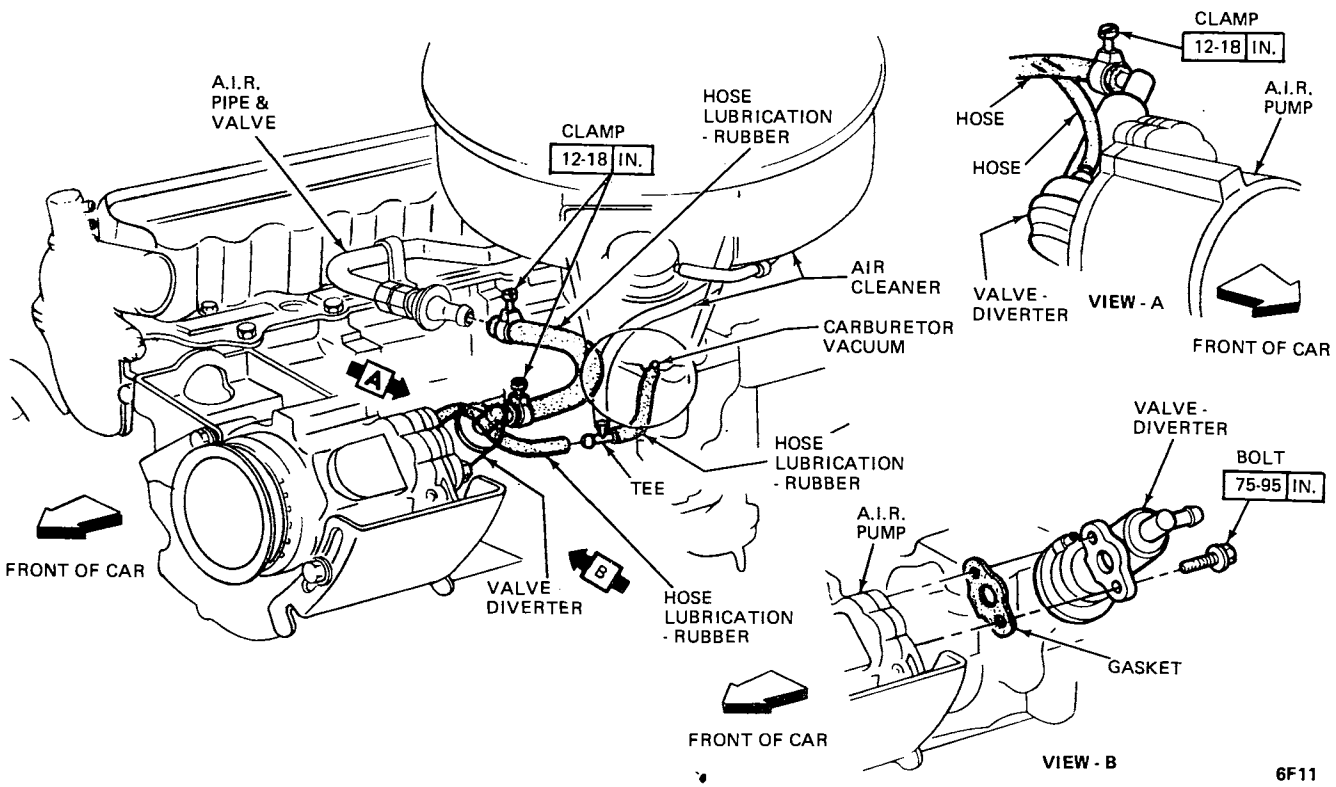


Figure 6F-22 - 250 Engine A.I.R. Hoses and Diverter Valve

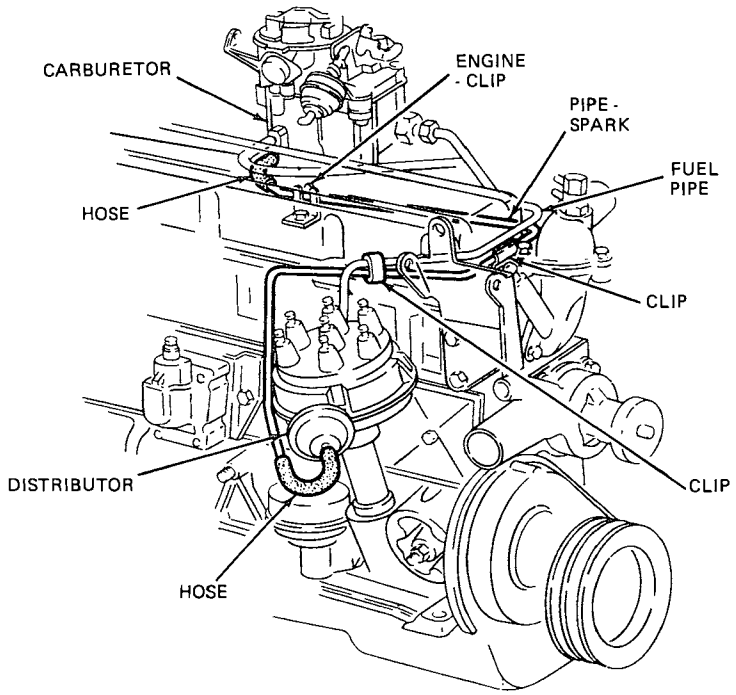


Figure 6F-23 - 250 Engine Distributor Vacuum Advance Hoses

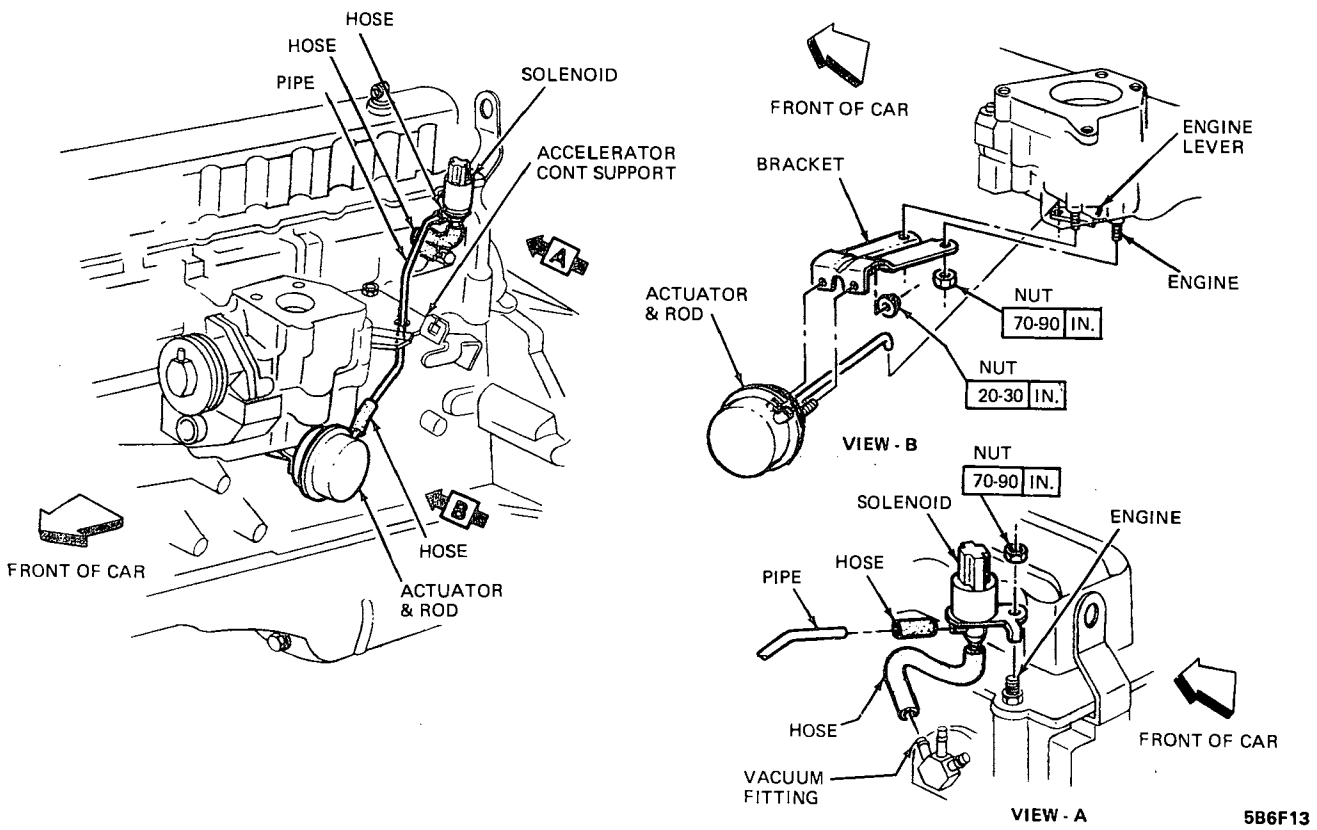


Figure 6F-24 - 250 Engine EFE Valve

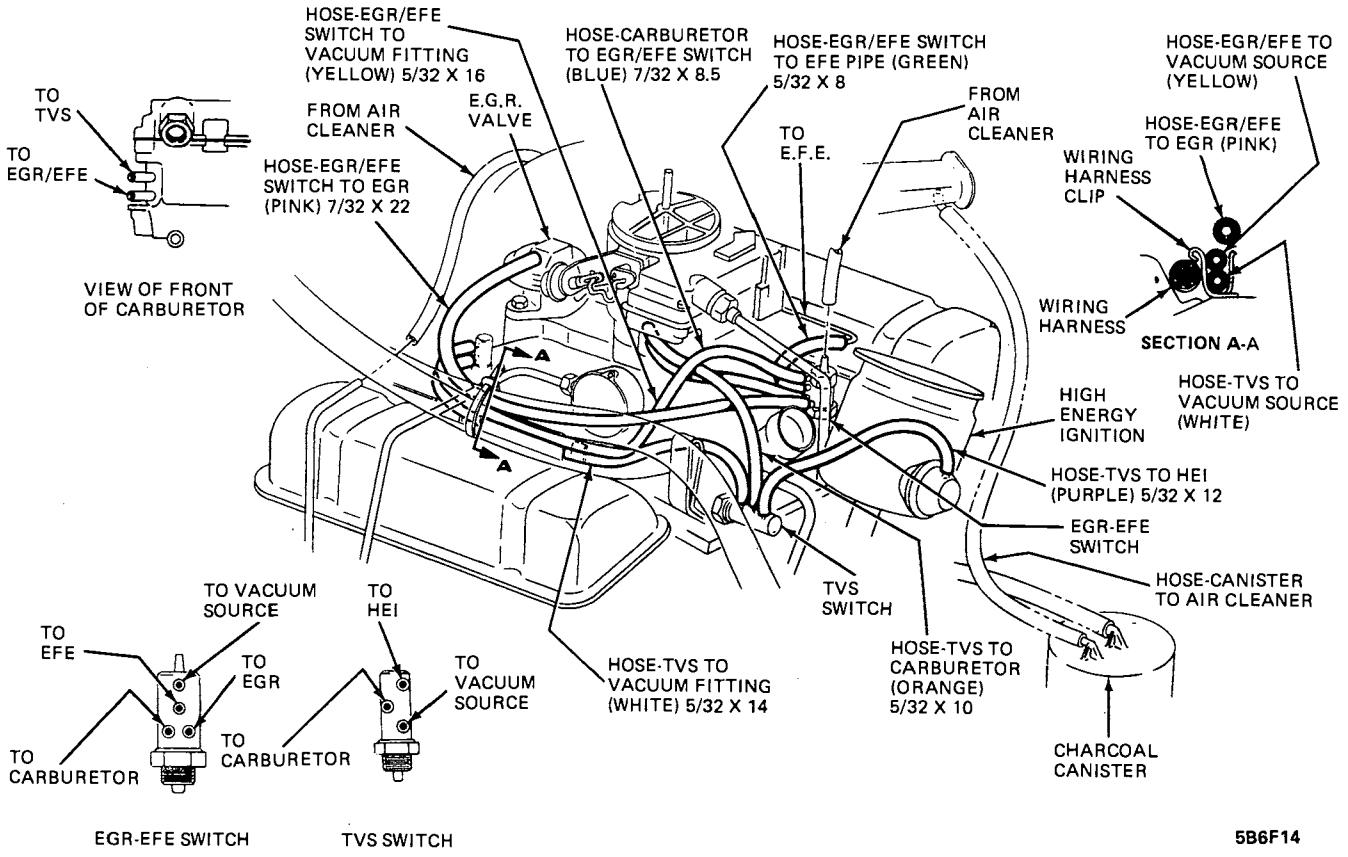


Figure 6F-25 - 231 Engine Vacuum Hose Routing less California

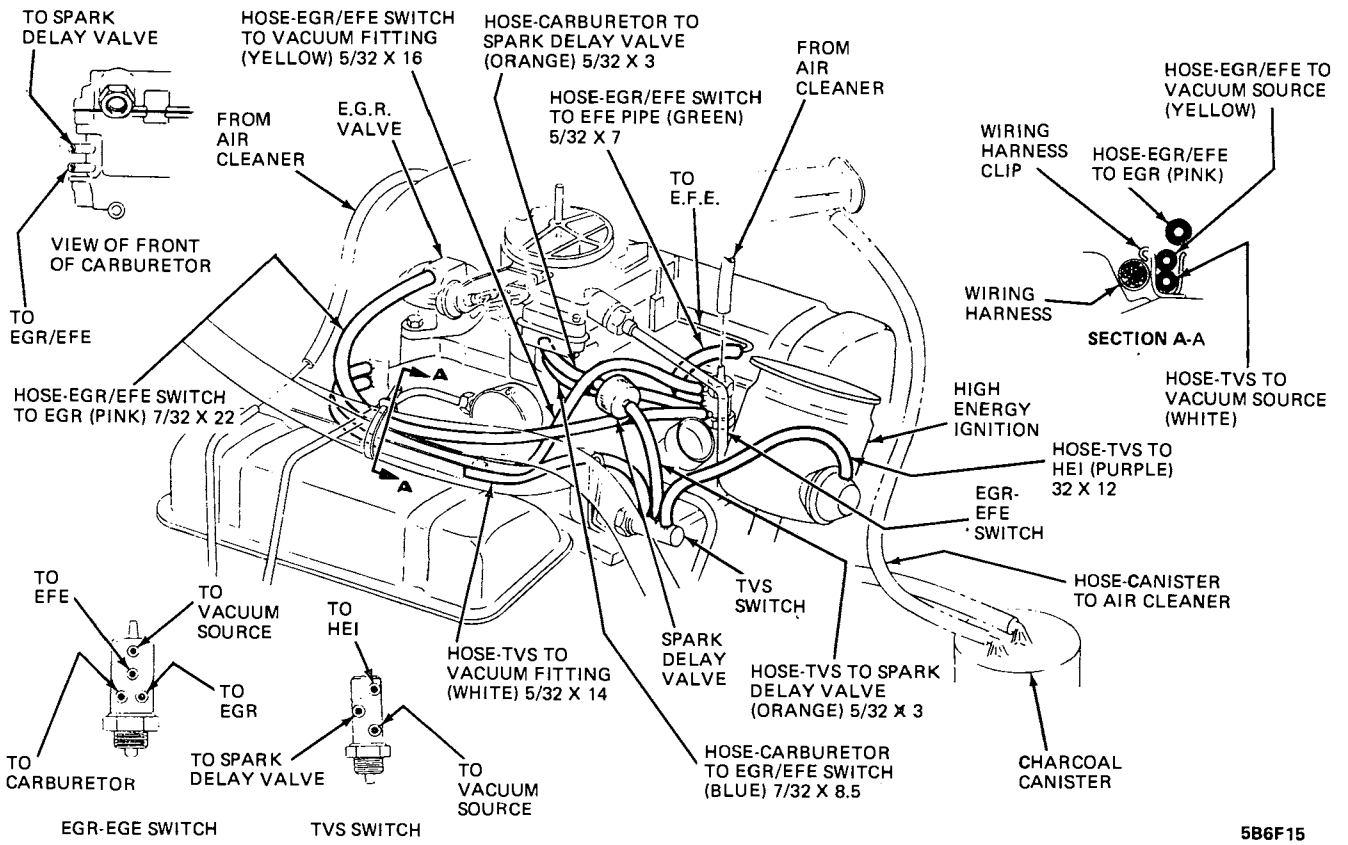


Figure 6F-26 - 231 Engine Vacuum Hose Routing California

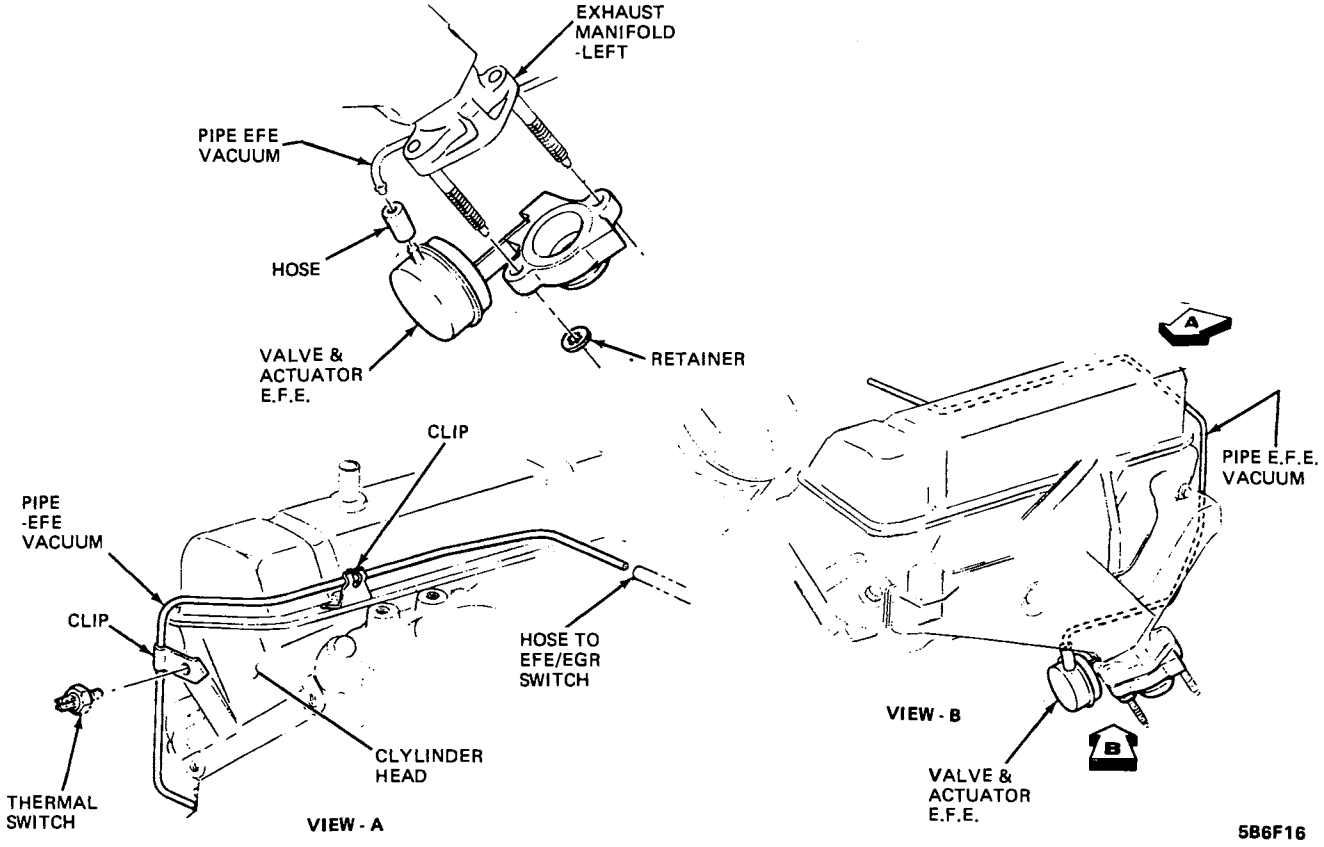


Figure 6F-27 - 231 Engine EFE Valve

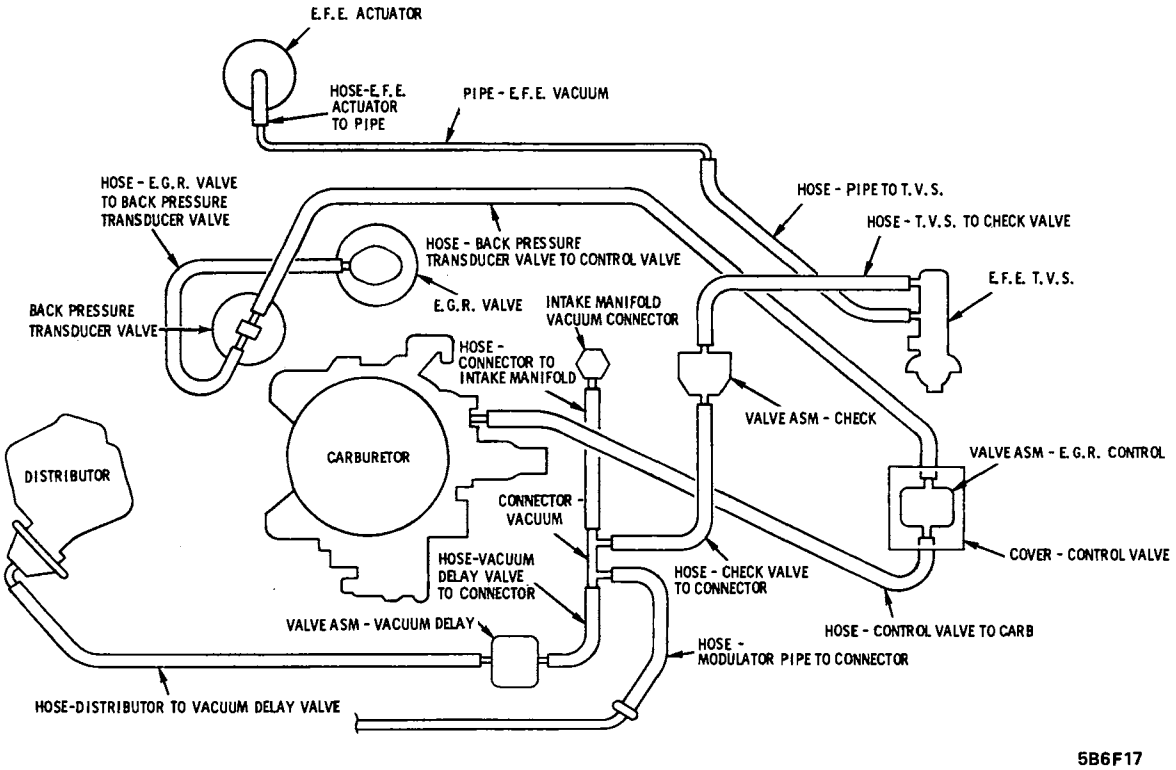
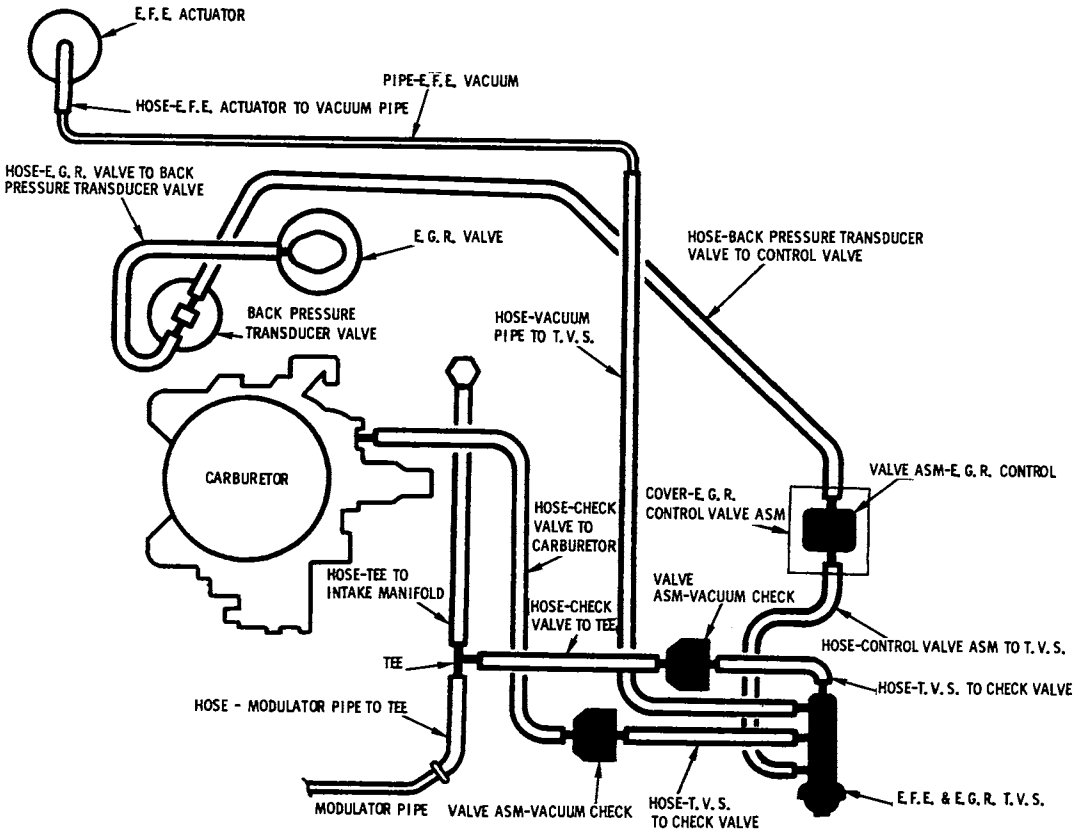
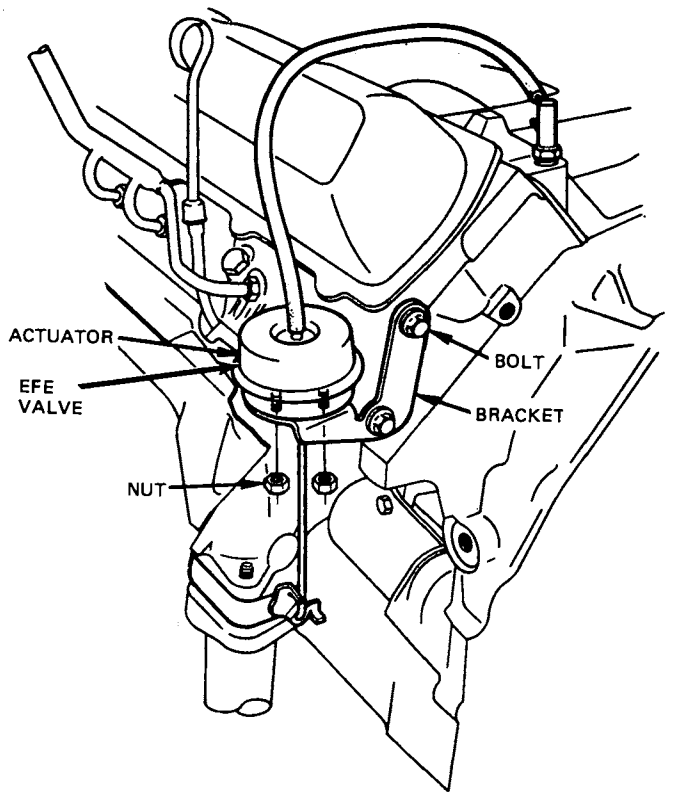


Figure 6F-28 - 260 Engine Vacuum Hose Routing less California



6F18

Figure 6F-29 - 260 Engine Vacuum Hose Routing California



6F17

Figure 6F-30 - 260 Engine EFE Valve

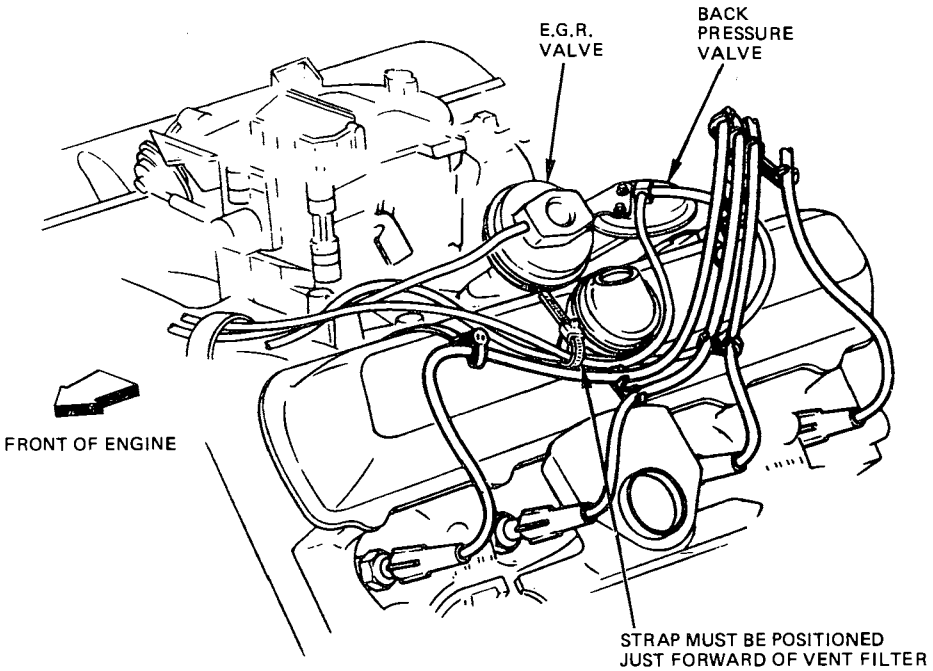


Figure 6F-31 - 260 Engine EGR Valve Strap

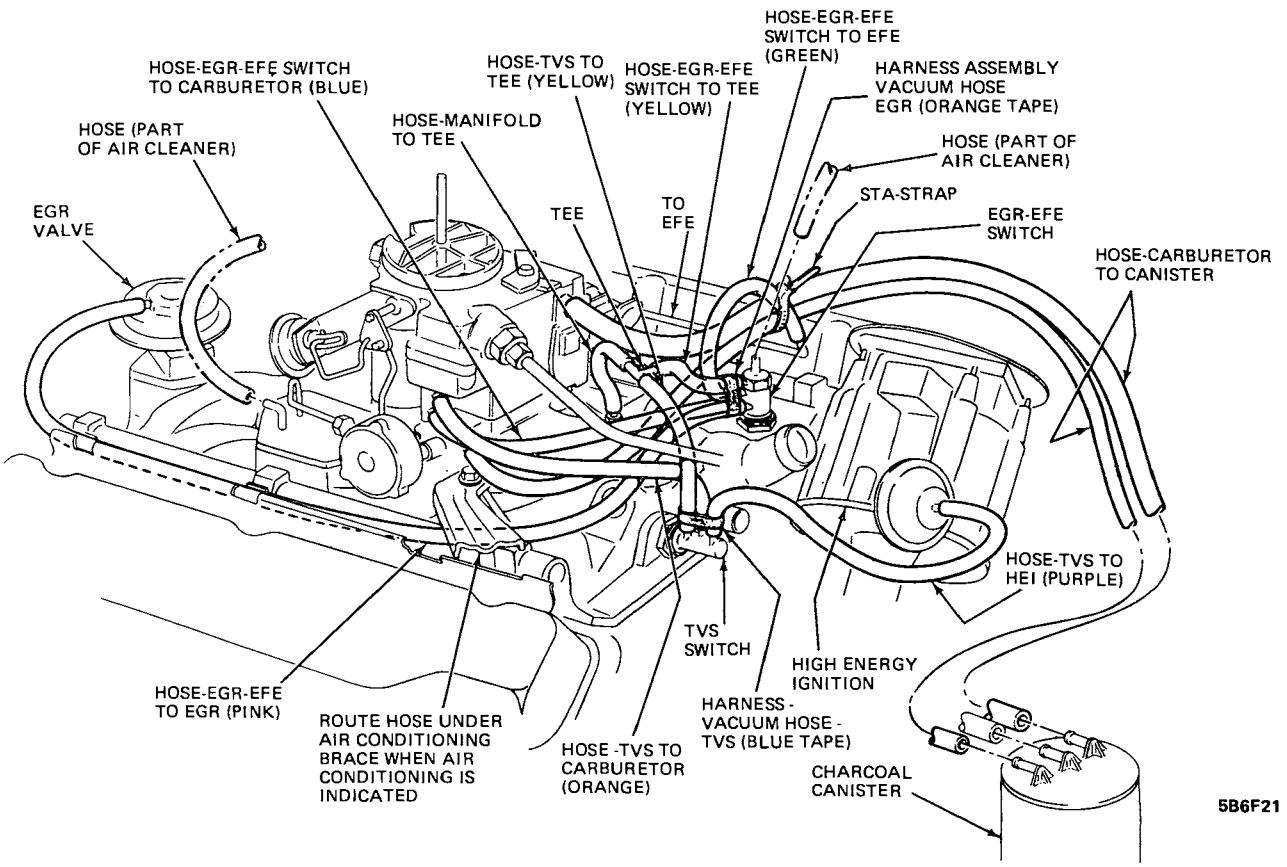


Figure 6F-32 - 350 2 Bbl. Engine Vacuum Hose Routing

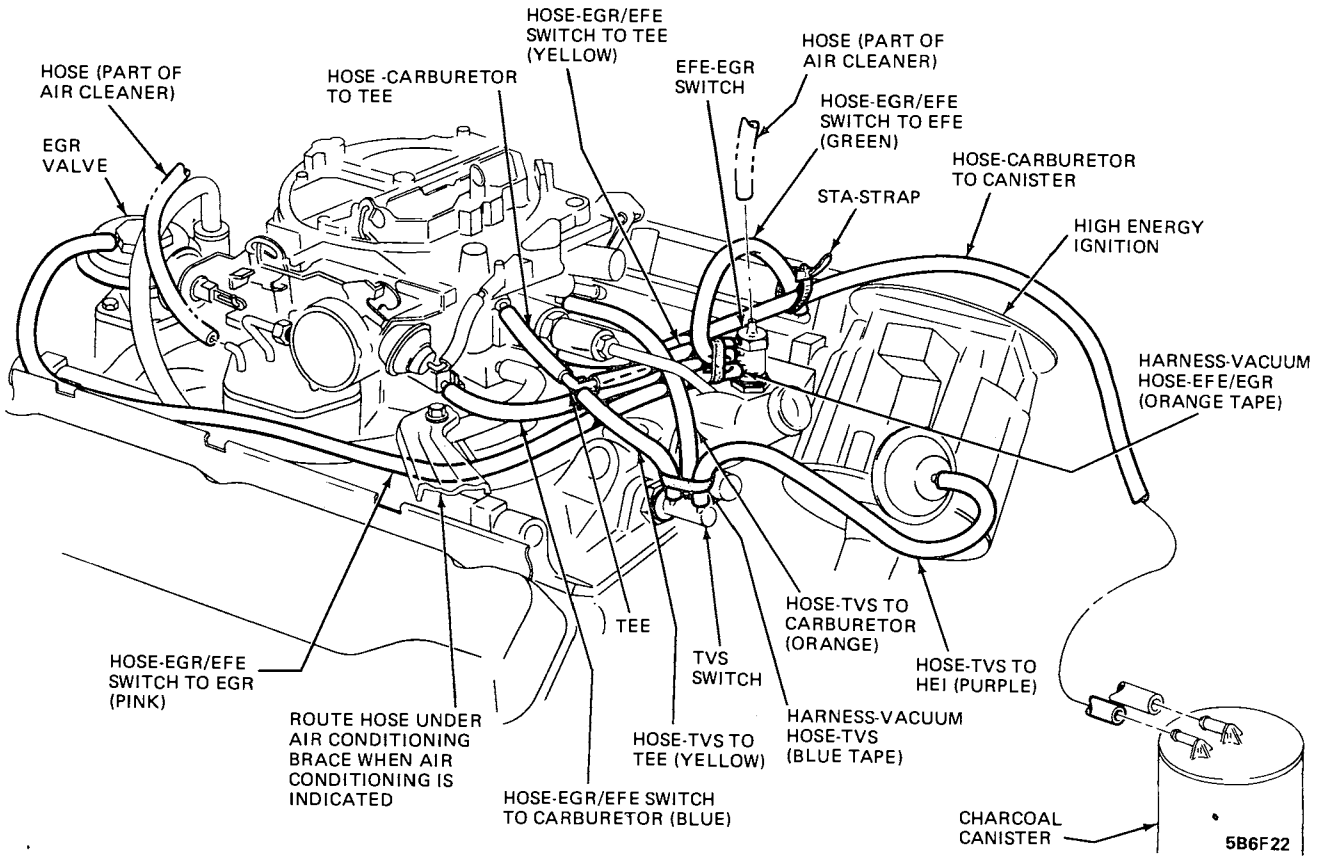


Figure 6F-33 - 350 4 Bbl. Engine Vacuum Hose Routing less A.I.R.

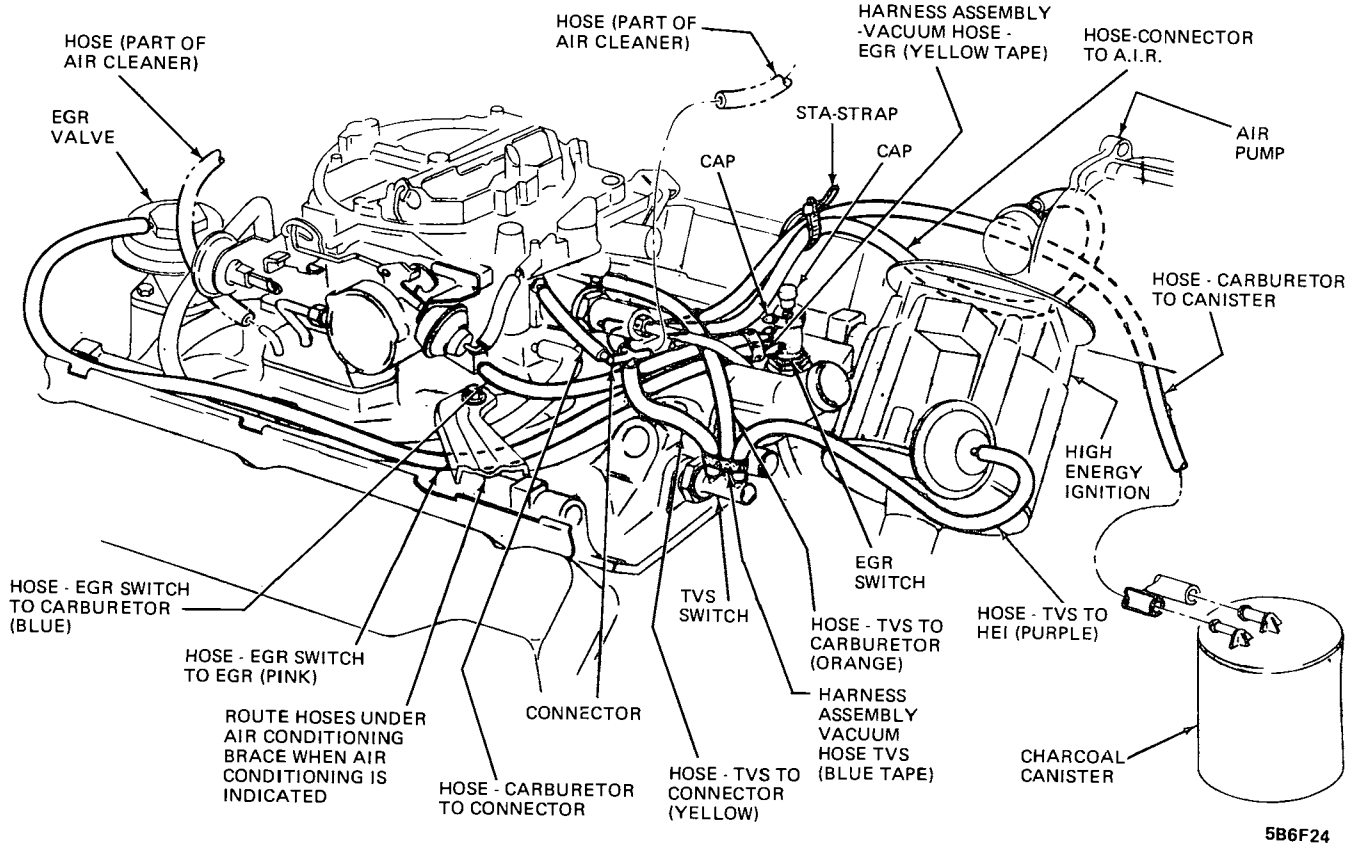


Figure 6F-34 - 350 4 Bbl. Engine with A.I.R. less EFE Valve

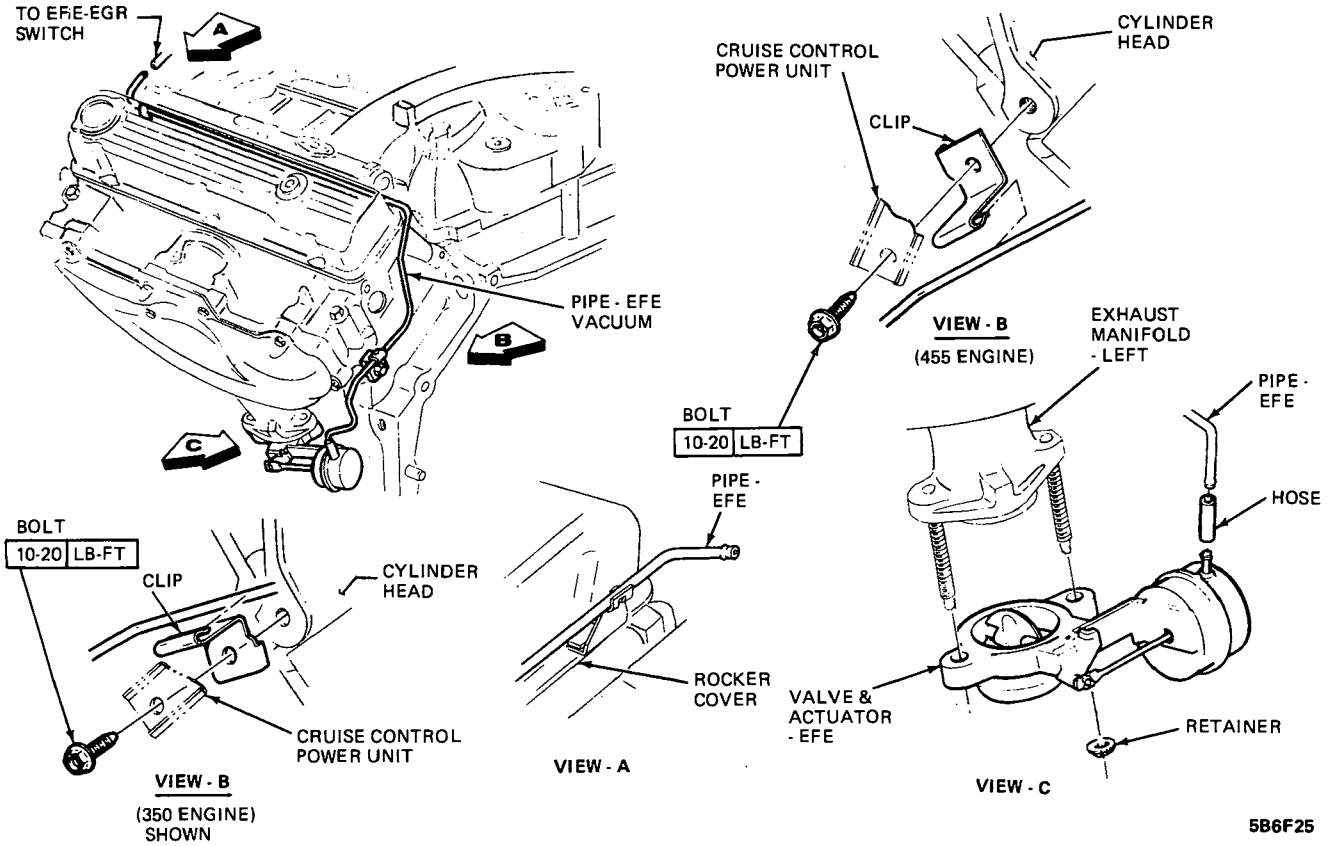


Figure 6F-35 - 350 and 455 Engines EFE Valve

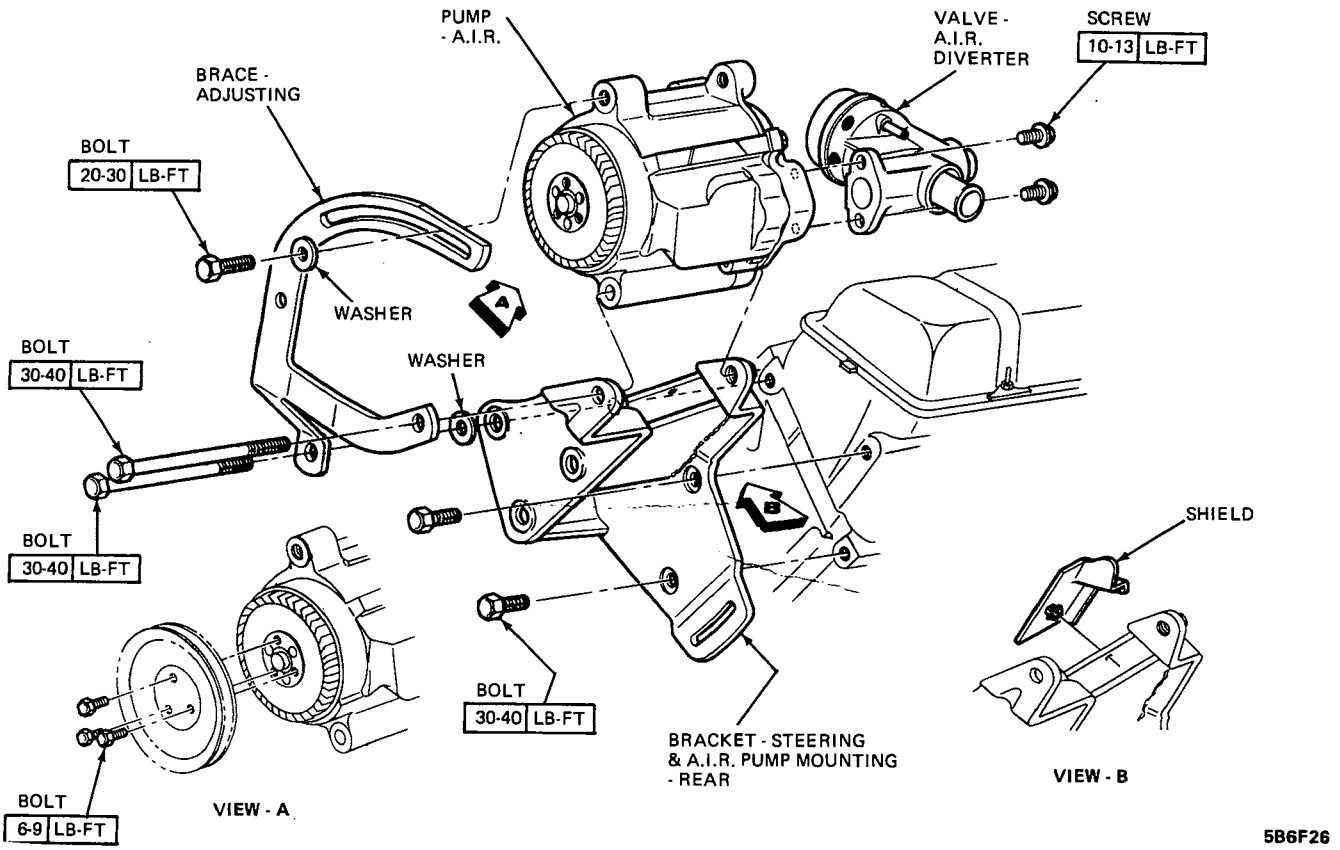


Figure 6F-36 - 350 Engine A.I.R. Pump Mounting

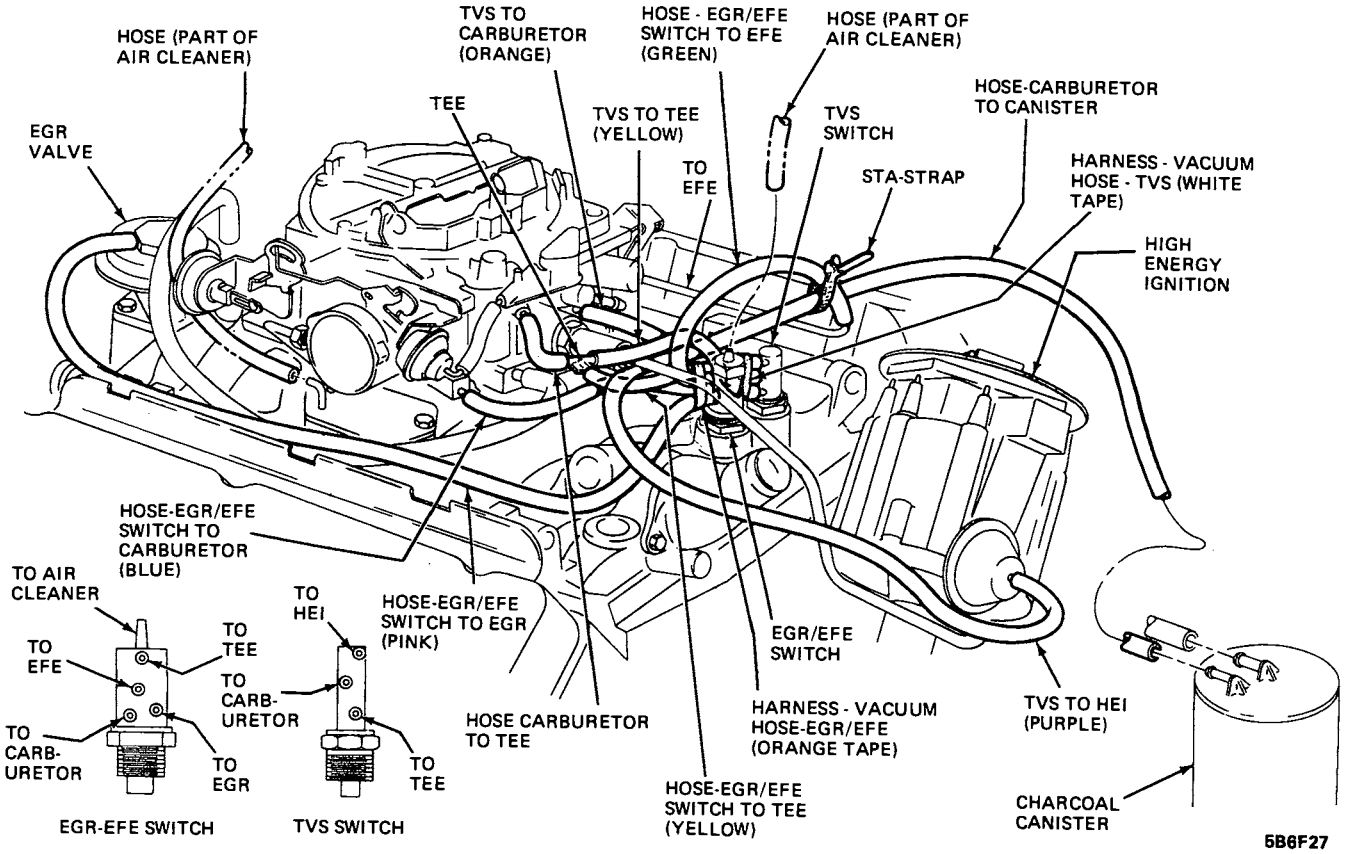


Figure 6F-37 - 455 Engine Vacuum Hose Routing

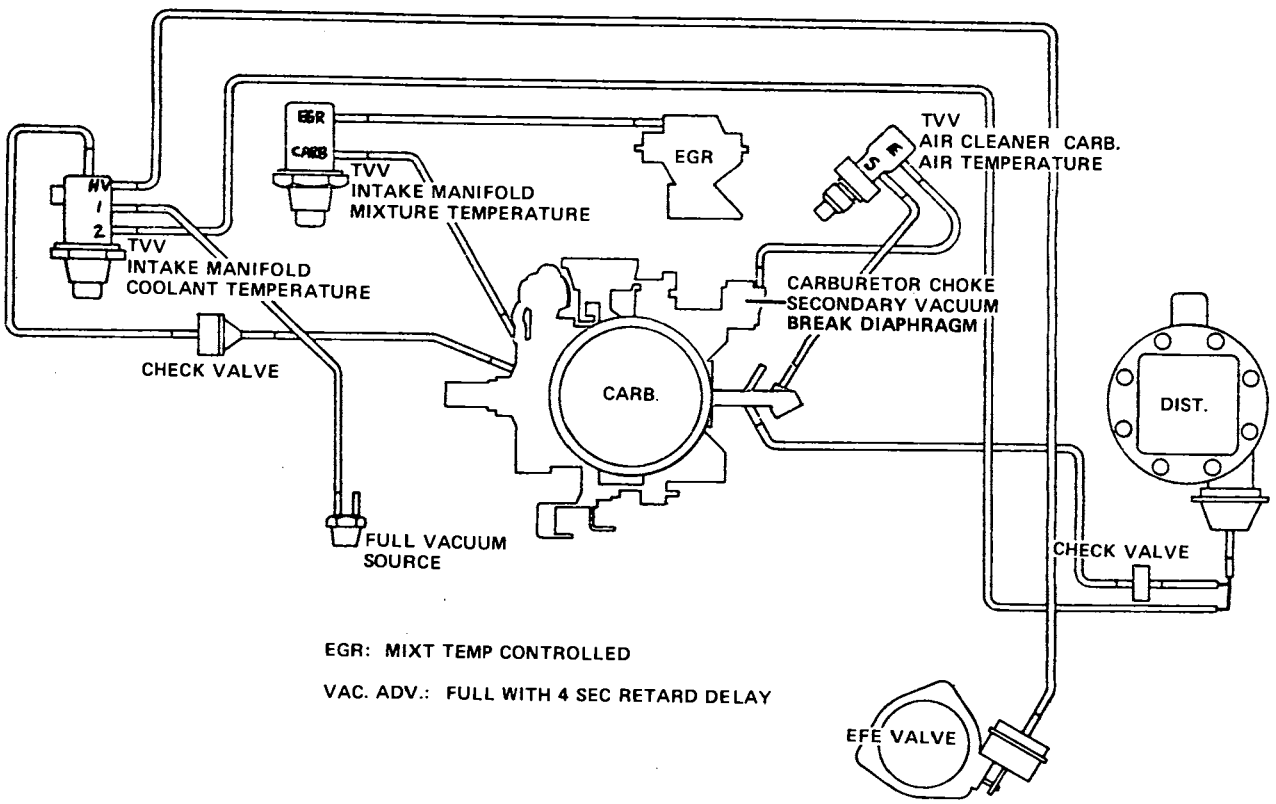


Figure 6F-38 - 400 Engine Vacuum Hose Routing less California

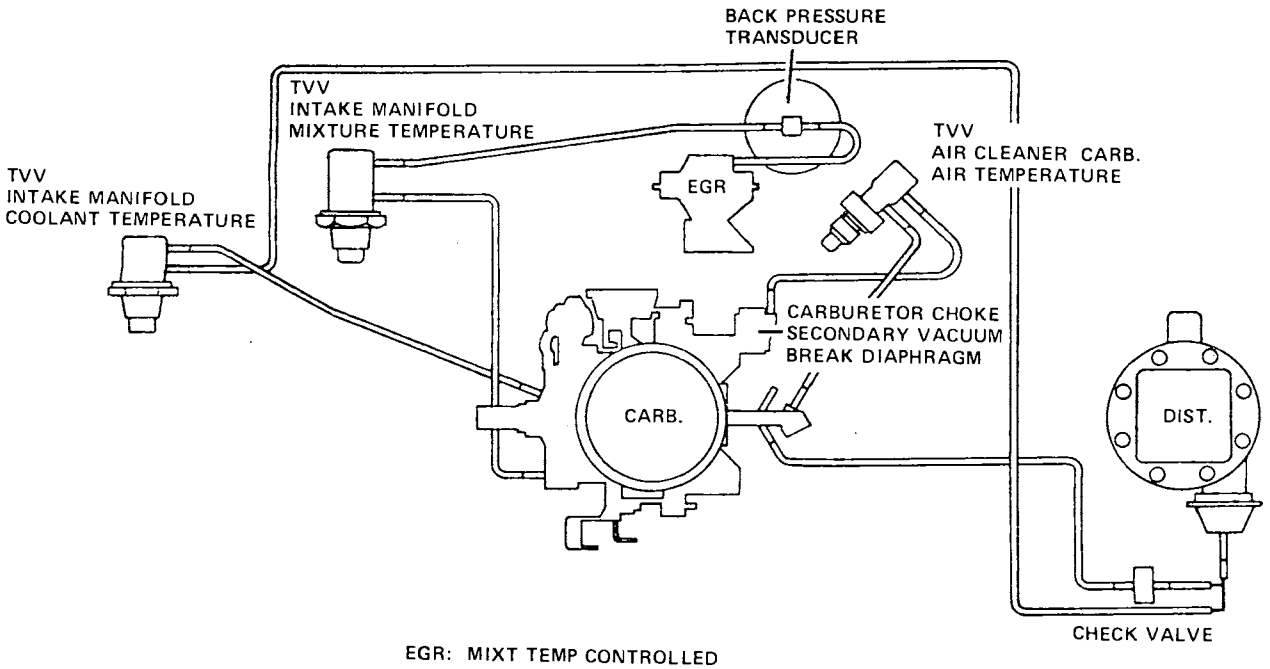


Figure 6F-39 - 400 Engine Vacuum Hose Routing California