

GENERAL MOTORS EARLY FUEL EVAPORATION SYSTEM

DESCRIPTION

The Early Fuel Evaporation (EFE) system is used on many General Motors engines to provide extra heat to the engine induction system during cold driveaway. This extra heat provides quicker fuel evaporation and better fuel distribution. It also helps reduce the choke "on" time by helping warm up the engine faster. System consists of a vacuum-operated heat valve installed in the exhaust pipe, a vacuum actuator, a thermal vacuum switch and, on some engines, a check valve.

Chevette engines use a ceramic heating element under the primary throttle bore instead of a crossover and control valve. A bi-metal switch controls operation of the heater so incoming charge is heated only when engine coolant temperature is low.

OPERATION

EFE VALVE

When engine coolant temperature is low (below a predetermined level), the thermal vacuum switch will send a vacuum signal to the vacuum actuator. This will close the butterfly valve and direct exhaust gases back into a crossover chamber in the floor of the intake manifold, helping to heat up intake system.

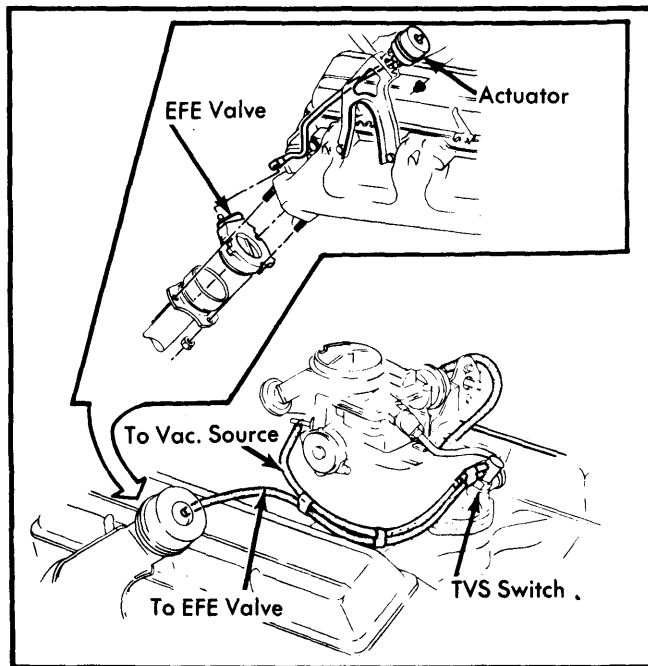


Fig. 1 Typical Early Fuel Evap. System Component Locations (Chevrolet V8 Shown)

THERMAL VACUUM SWITCH

This switch is mounted so it can sense engine coolant temperature. Depending on actual application, the valve directs vacuum from either the intake manifold or ported source on carburetor through the switch, according to coolant temperature. Some applications tie the EFE TVS and EGR TVS together in one unit.

CHECK VALVE

Check valves are used on some applications to assist in vacuum control. These valves help hold a high enough vacuum level to keep the EFE valve closed during cold engine operation when a low vacuum condition occurs.

TESTING

EFE VALVE

- 1) Start cold engine and allow to idle in "Park" or neutral. Observe heat valve and actuator. Valve should move to closed position. If not, disconnect vacuum line and check for vacuum.
- 2) If vacuum is present, check valve for free movement. Lubricate if necessary with manifold heat valve lubricant. If still inoperative, replace actuator.
- 3) If no vacuum is present, trace hose back to TVS and check for vacuum from source at TVS. If vacuum is present from source, replace TVS. If not, replace vacuum source hose(s).
- 4) When coolant is warm, valve should open. If not, disconnect hose at actuator and check for vacuum. If present, replace TVS. If not, replace actuator.
- 5) Apply and hold 8-10 in. Hg with vacuum pump. Actuator should close valve and remain closed without leaking down for at least one minute. If not, replace actuator.

CHECK VALVE

Remove check valve and attach vacuum gauge to white side of check valve. Attach hand vacuum pump to other side and apply vacuum. With pump removed, vacuum should not leak down in less than one minute. If vacuum leaks, replace valve.

CHEVETTE ELECTRICAL HEATER

- 1) Disconnect electrical connector at EFE heater switch. Connect 12V test lamp across terminals in connector and turn ignition "On". If lamp glows with ignition "On" and engine not running, heater is good.
- 2) If lamp does not glow, reconnect connector and measure voltage across EFE heater by inserting probes into back of EFE heater connector (Black is negative). Battery voltage should be present with engine temperature below 140°F, and no voltage when coolant temperature is above 140°F.
- 3) If no voltage is present, check connector terminals for good contact and black wire for continuity with ground. If heater still does not operate properly, replace switch.

TROUBLE SHOOTING

POOR ENGINE OPERATION DURING WARM-UP

Check for vacuum at EFE valve and check valve operation. Check hose routing. Lubricate, connect, or repair EFE valve linkage. Replace actuator or valve if seized.

POOR OPERATION AFTER WARM-UP

Check EFE actuator and thermal vacuum switch, replace as necessary. Check actuator linkage for damage or seizure.

NOISY EFE VALVE ACTUATOR

Linkage stop may have failed; repair if necessary. If valve or shaft are loose, replace actuator or valve.

NOTE — For complete vacuum hose routings of EFE system on all General Motors vehicles, see *General Motors Vacuum Diagrams* in this section.