

1975-79 EXHAUST EMISSION SYSTEMS

General Motors Early Fuel Evaporation System

3-289

NOTE: This article also contains information which is applicable to 1980 Buick Skylark, Chevrolet Citation, Oldsmobile Omega and Pontiac Phoenix.

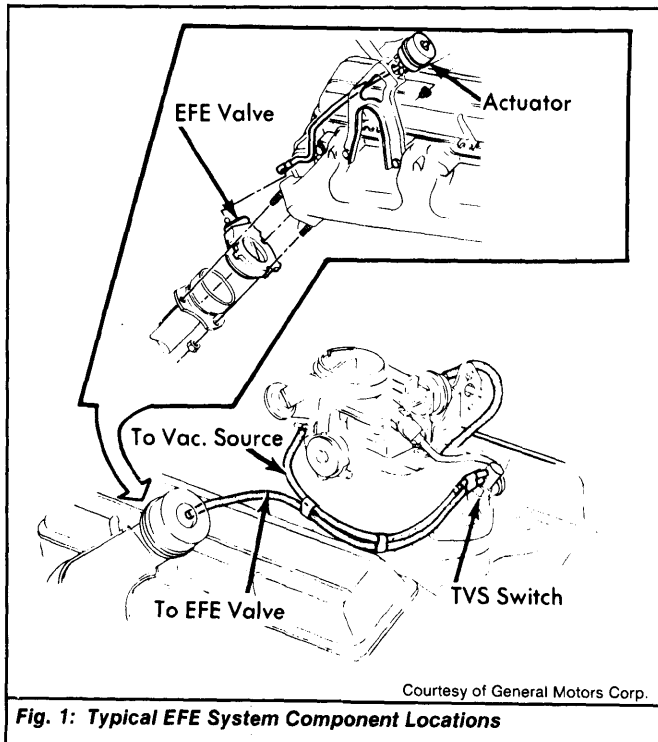
DESCRIPTION

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.

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.



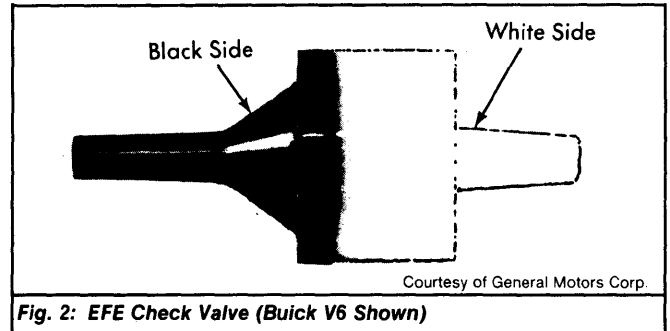
THERMAL VACUUM SWITCH (TVS)

This switch is mounted so it can sense engine coolant temperature. TVS disengages EFE when coolant temperature is above 180°F on small block Chevrolet engines or 120-150°F on all other engines. 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. Refer to appropriate model vacuum diagram in GENERAL MOTORS VACUUM DIAGRAMS in this section.

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. Refer to appropriate model vacuum diagram in GENERAL MOTORS VACUUM DIAGRAMS at end of this section.



TESTING

EFE VALVE

- 1) Visually inspect valve for obvious cracks or hose disconnects.
- 2) Manually apply 8-10 in. Hg vacuum to EFE valve. Actuator link should pull inward. Remove vacuum supply and observe link. It should move outward (valve opening).
- 3) Reapply 8 in. Hg vacuum and seal. Diaphragm should hold this level for at least one minute. If not, replace diaphragm or valve components.

CHECK VALVE

Remove check valve and attach vacuum gauge to White side (EFE side) of valve. Attach vacuum pump to other side and draw vacuum. With pump removed there should be no leakdown. If so, replace valve.

TROUBLE SHOOTING

Poor Engine Operation During Warmup - Check for vacuum at EFE valve by applying 8 in. Hg vacuum or more. Check for proper hose routing. Check for binding linkage at EFE valve and lubricate or repair. Check for disconnected EFE linkage. If linkage seized, replace EFE valve.

Poor Operation After Warmup - Check for failed EFE and/or thermal vacuum switch. If necessary, replace EFE valve or TVS. If EFE linkage seized, replace EFE valve. Repair any EFE valve-to-housing interference.

Noisy EFE Valve Assembly - Check for failed linkage stop. See if vacuum actuator linkage does not over-travel. If so, replace vacuum actuator. Check for valve loose on shaft or bushing. If so, replace EFE valve.

NOTE: For complete vacuum hose routings of EFE system on all General Motors vehicles, see GENERAL MOTORS VACUUM DIAGRAMS in this section.