GENERAL MOTORS EVAPORATIVE CONTROL SYSTEM

DESCRIPTION

An evaporative control system (E.C.S.) is used on all General Motors vehicles to reduce gasoline vapor emissions. Vapors are stored in a canister for burning during combustion rather than being vented to the atmosphere.

The fuel tank and usually the carburetor fuel bowl are vented through a hose into a canister containing activated charcoal. The canister absorbs these vapors when the vehicle is parked, and retains them until purged by air drawn through a filter at the bottom of the canister. Purging of the charcoal takes place when the engine is running.

OPERATION

SINGLE STAGE CANISTER

The single stage canister has inlet tubes to permit vapors from carburetor float bowl and from fuel tank to enter. A third tube is connected to engine vacuum and draws vapors out of the charcoal canister when the engine is running.

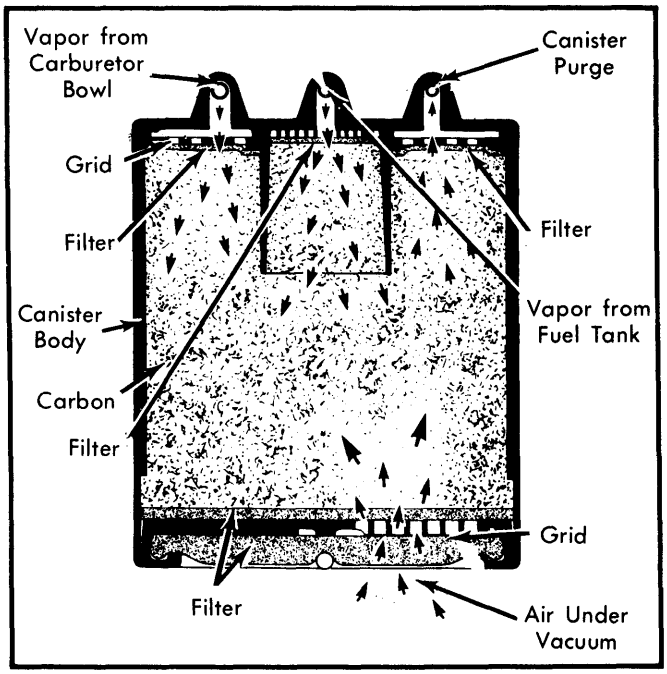

Fig. 1 Cutaway View of Single Stage Carbon Canister

CANISTER WITH VAPOR VENT VALVE

This canister has a vent valve that is part of the vapor canister. Canister collects vapor from carburetor float bowl and delivers it through vapor vent valve. Vacuum signal from engine when running closes the valve, shutting off vapor flow. Purging is controlled by a thermal vacuum switch or an electrical purge solenoid which delays purging until a specified engine coolant temperature is reached. Clean air is supplied to canister from air cleaner.

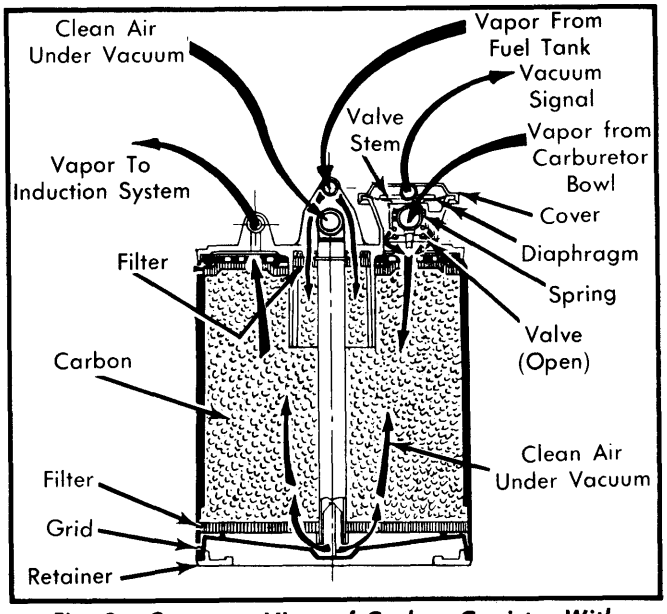

Fig. 2 Cutaway View of Carbon Canister With Vapor Vent Valve

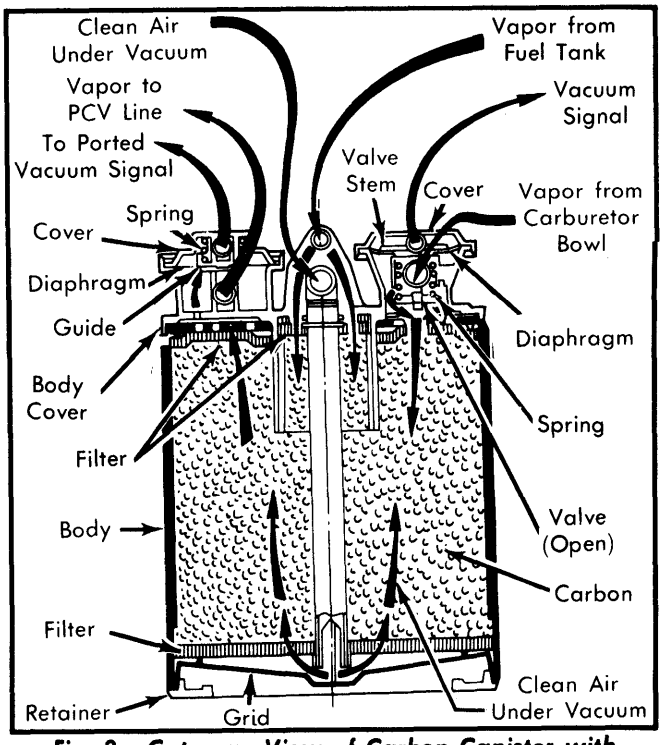

Fig. 3 Cutaway View of Carbon Canister with Purge Control Valve & Vapor Vent Valve

CANISTER WITH PURGE VALVE & VAPOR VENT VALVE

This canister uses a vapor vent valve and purge control valve both mounted on canister body. Canister collects vapor from carburetor float bowl and delivers it through vapor vent valve. Vacuum signal from engine when running closes the valve, shutting off vapor flow. The purge control valve controls the

GENERAL MOTORS EVAPORATIVE CONTROL SYSTEM (Cont.)

rate at which fuel vapor enters engine. A ported vacuum signal is controlled by a thermal vacuum switch which delays canister purging until a specified engine coolant temperature is reached. When carburetor throttle blades are closed, (idle condition) the purge control valve seals the canister and no purging occurs. When throttle blades are open, the signal port located above the throttle blades is uncovered and vacuum signal opens purge valve, allowing vapor to be drawn from canister. Clean air is supplied to canister from air cleaner.

ELECTRONIC CONTROL MODULE

On some engines, the Electronic Control Module controls vacuum to the purge valve with a solenoid valve. When the system is in the open loop, solenoid is energized and blocks vacuum to purge valve. When system is in closed loop, above a specified RPM, solenoid is de-energized and vacuum can be applied to purge valve, releasing accumulated vapors from canister to induction system.

MAINTENANCE

Check all fuel and vapor lines and hose for proper connections and correct routing as well as condition. Remove canister and check for cracks or damage. Replace damaged or deteriorated parts as necessary. Replace filter in canister bottom if dirty or plugged. Filter will require more frequent replacement if vehicle is operated in extremely dusty conditions.

CHECKING CANISTER PURGE VALVE

1) Remove purge valve control vacuum line. Check for a vacuum signal with engine operating above idle (1500 RPM). If no vacuum signal, perform EGR System Function Check. See *General Motor EGR System article in Exhaust Emission Systems section.*

2) Apply an external vacuum source to the purge valve control diaphragm. A good valve will hold vacuum. If valve will not hold vacuum, replace canister.

3) If valve holds vacuum, remove purge line and check for vacuum. If no vacuum, check PCV hoses and system. Repair or replace as necessary.

CHECKING CANISTER VAPOR VENT VALVE

1) Remove bowl vent vapor hose from carburetor. Check the open condition of the valve by connecting to a manual vacuum pump. It should not be possible to obtain .5 inch Hg if valve is open.

2) If a high resistance or plugged system is found, check for a plugged or restricted hose. Hose may be cleared with compressed air. If the hose is clear, remove canister filter. If the restriction persists, replace the canister.

3) The valve closed condition can be checked using the same procedure, but with engine operating at normal temperature. Manifold vacuum will be applied to valve through the control line. The bowl vent line should exhibit a plugged condition.

4) If the valve is not closed, remove control vacuum line and check for vacuum. If no vacuum is present, check hose for restriction or vacuum leak. Repair or replace as required. If vacuum is present, replace canister.