1971-72 GENERAL MOTORS EVAPORATION CONTROL SYSTEM (ECS)

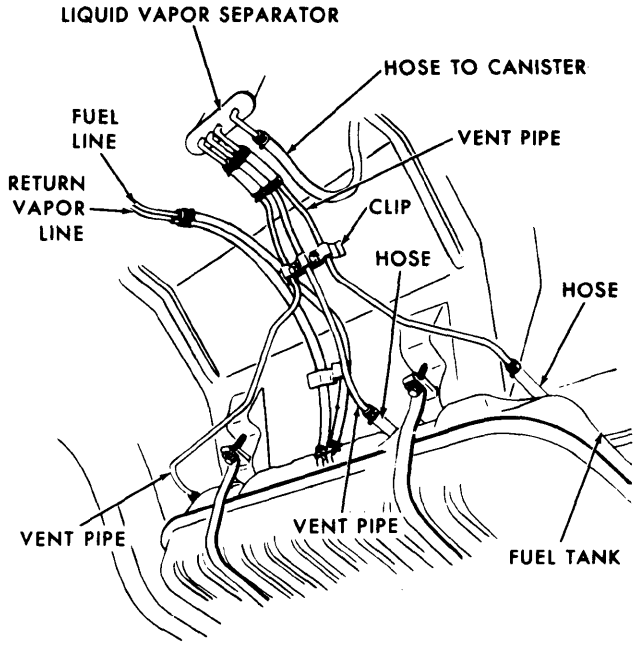
DESCRIPTION & OPERATION

The Evaporation Control System (ECS) is designed to prevent fuel vapors from vehicles fuel system from entering into the atmosphere. Same basic system is used on all cars with design differences detailed below. Fuel system is closed with a normally sealed fuel tank filler cap and a vent system is provided through which fuel vapors are conducted through a vent line to engine compartment where they are burned in the engine. System incorporates the following components:

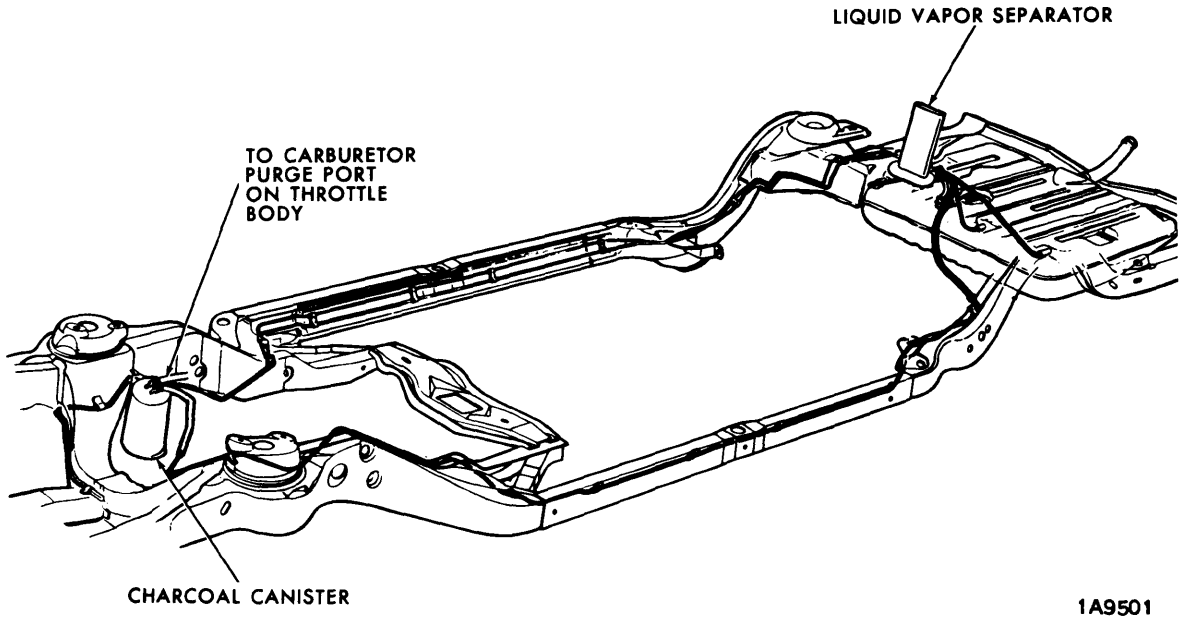
Fuel Tank – Fuel tank is designed with an air chamber allowing for fuel expansion. Tank venting is accomplished by three vent lines which lead to a liquid-vapor separator. Fuel tank vent lines are located at the front (two) and rear (one) so that during any inclination of the vehicle, at least one line will be open to vent at all times. A single vent line leads from liquid-vapor separator to an activated charcoal collection canister where raw fuel vapors are stored until they can be drawn into the engine and burned.

Fuel Tank Filler Cap – Filler cap is not vented and normally seals the fuel tank. A pressure-vacuum relief valve is incorporated to vent fuel tank under conditions of excessive pressure or vacuum (preventing tank damage). *NOTE – When replacing filler caps, same type must be used on each car model as originally installed.*

Liquid-Vapor Separator – Liquid-vapor separator (standpipe design) is located in an area behind rear seat above fuel tank. Three vent lines from fuel tank lead into separator and one line leads from separator to charcoal canister (in engine compartment). These lines are different heights (inside separator) so that tank will always be vented regardless of vehicle attitude. Separator catches liquid fuel and returns it to main fuel tank while allowing vapors to pass through into the line connected to charcoal canister.



LIQUID-VAPOR SEPARATOR CONNECTIONS (TYPICAL)

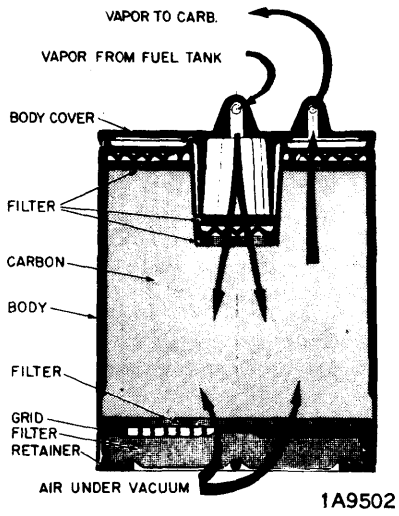


GENERAL MOTORS EVAPORATION CONTROL SYSTEM (TYPICAL)

1971-72 GENERAL MOTORS EVAPORATION CONTROL SYSTEM (ECS) (Cont.)

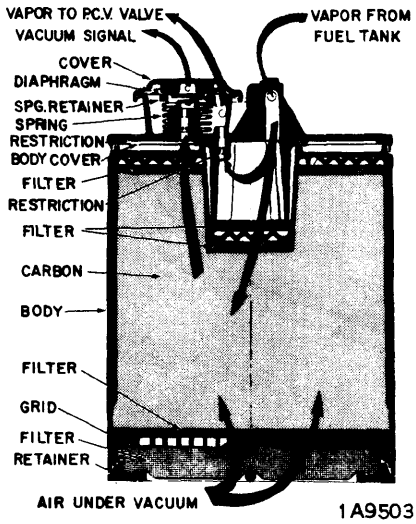
Charcoal Canister – Canister is filled with activated charcoal which adsorbs and stores fuel vapors when engine is not running. Three different versions of charcoal canisters are used, applications and descriptions are as follows:

1) Two Tube Type – Used on all General Motors V8 engine applications (except Chevrolet). Canister has two hose connections on its top. Center connection is vent line from fuel tank. Outer connection is connected to carburetor throttle body. When engine is running, air is drawn in through bottom of canister. This air picks up vapors which are being held by the charcoal and carries them through the carburetor into the engine where they are burned. This action purges and renews the adsorbtion quality of the charcoal.



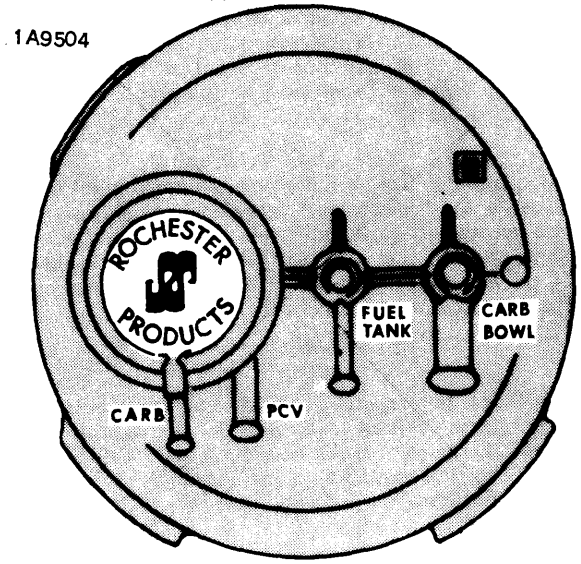
TWO TUBE CANISTER

2) Three Tube Purge Valve Type – Used on all General Motors 6 cylinder engines and on all Chevrolet engine applications (except Vega). Three tube type canister provides a two stage purge system. The three tube type operates basically the same as the two tube type, however a purge valve is added which is an integral part of the canister. Purge valve controls flow of vapor from canister to carburetor intake manifold. Purge valve consists of a body, a spring loaded diaphragm, a diaphragm cover and metered purge restrictions. Purge valve limits flow of vapor to carburetor or manifold at idle but allows maximum vapor purge during higher carburetor air flows. This is accomplished through use of a vacuum signal from carburetor spark port which unseats the diaphragm. A minimum amount of canister purge can be maintained at idle because of the smaller constant bleed restriction. At higher air flows where more fuel vapors can be tolerated, spark port in carburetor is uncovered and vacuum is applied to purge valve diaphragm. This lifts diaphragm off its seat and allows additional vapors to be pulled through the larger restriction, thereby, completely purging vapor canister.



THREE TUBE PURGE VALVE CANISTER

3) Four Tube Purge Valve Type – Used on Chevrolet Vega models only. Operation of four tube type canister is identical to three tube type except that an extra vent tube connects to carburetor float bowl vent valve located on air horn. This vent tube will be connected only on those models that are shipped vertically. On all other models, connection will be capped at the canister.



FOUR TUBE PURGE VALVE CANISTER

MAINTENANCE

Replace charcoal canister filter at 12,000 mile or 12 month intervals (more often for operation in dusty areas). This is the only regular maintenance service required.

Canister Filter Replacement – Disconnect hoses from top of canister, remove canister from mounting bracket. Remove cover from bottom of canister by pulling it down to disengage clips. Remove and discard filter element (squeeze element out from under retainer bar). Install new filter by squeezing element under retainer bar and positioning it evenly around entire bottom of canister with edges tucked under canister lip, snap bottom cover in place, reinstall canister on bracket and reconnect hoses.

►*HOSE REPLACEMENT CAUTION: Hoses are special type and only hose marked "EVAP" should be used for replacement.*

Crankcase Ventilation System – On some models, evaporation control system is interconnected with crankcase ventilation system. See *"Crankcase Ventilation – Domestic"* for individual ventilation systems.