

Eaton eVaptive™ Electronic Venting System

What is eVaptive™?

eVaptive is an electronically controlled vapor venting system that transmits fuel vapors to a charcoal canister while keeping liquid fuel confined to the fuel tank. For any given fuel tank application the system can be optimized for all driving situations as well as stationary and refueling modes. The hardware is a “one-size-fits-all” unit that can be programmed to fit any vehicle platform, eliminating the need for OEM’s to design unique venting systems for different vehicles.

How it Works

In a traditional fuel tank design, and according to OEM requirements, optimal vapor venting positions are determined in the vapor space at the top of the tank. Once these vent points are determined, **Eaton’s eVaptive™ Electronic Venting System** vent tubes can be located there. They can then be opened and closed as needed via an actuator system for optimized venting. Any liquid fuel that enters the vent tubes is routed to a central liquid trap, where it is pumped back into the fuel tank. Once the vapor and the errant fuel are separated in the liquid trap, the vapor is routed to the charcoal canister for adsorption.

The actuator system is controlled by a computer algorithm that minimizes fuel carryover to the interior liquid trap in all situations and controls the fuel level during refueling. It also is used to mitigate the spit-back that sometimes occurs when filling a tank to full volume.

Eaton’s **eVaptive™ Electronic Venting System** offers numerous benefits over traditional systems, including:

Reduced Complexity/Cost

Reduced complexity/cost for complex fuel tanks

- Fewer vent points
- No longer impacted by the open and closed positions of traditional vent valve float mechanism
- The liquid trap may be mounted on the top or bottom of a fuel tank

One set of hardware across vehicle lines and tank variants

- Reduces development time
- Economies of scale realized
- Reduces validation cycles

Liquid/Vapor Separation

Eliminates liquid carryover from the fuel tank

- System includes a liquid trap depository and optimized vent algorithm
- System includes mechanical safety valve that will not allow liquid to enter the vapor outlet line in a power-off or emergency situation
- Vent algorithm controls grade venting

Superior dynamic vent performance control

- Adaptive learning optimizes the open and closed vent line positions
- Overall tank pressures are lower in dynamic situations and at high-fuel levels



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For further information or to contact a sales representative, please visit: www.eaton.com/evaptive

OBDDII Leak Detection

- System has ability to segregate fuel tank and vent lines to help pinpoint leak
- System can enable the use of more accurate fuel level sensing

Vapor Vent Control

Tank / canister isolation

- Controlled venting assists highly boosted engines, as the natural vacuum used to purge the charcoal canister, present in a traditional internal combustion engine, may no longer be available
- Controller may enable vapor concentration measurement

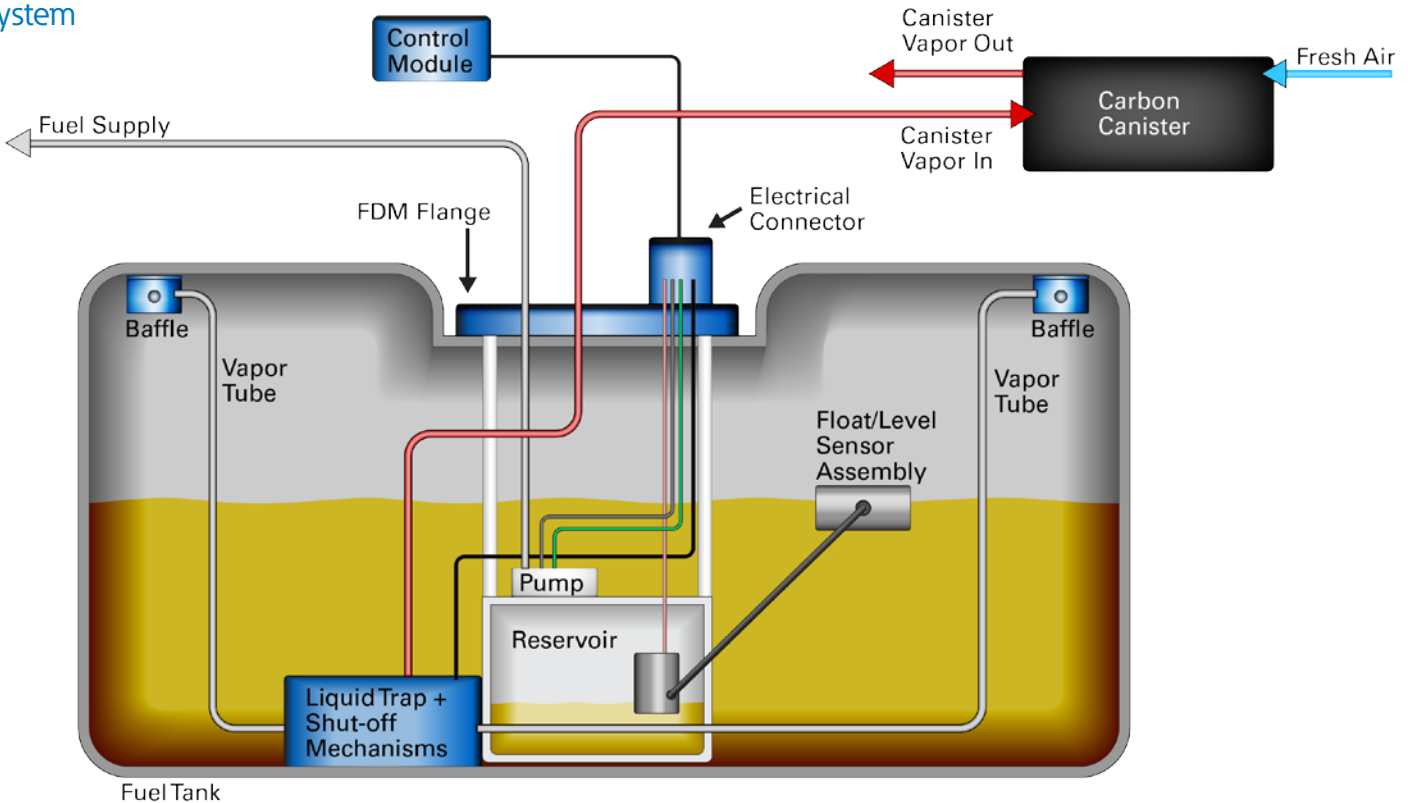
Pressurized tank management

- System can replace current FTIV (Fuel Tank Isolation Valve), which is used to plug the fuel tank on hybrid vehicles when the electric motor is operating, thereby reducing cost and complexity
- eVaptive™ system has the ability to control the bleed down pressure needed in hybrid vehicle fuel tanks prior to refueling, for better vapor management

Refueling control

- Reduces development time with ease of parameter change via software
- Not impacted by shut-off height of mechanical valves
- Not affected by frequent refueling, such as occurs with rental cars. With many conventional systems, the float mechanism can't be closed and reopened again when only a small amount of fuel is used from a full tank of gasoline

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