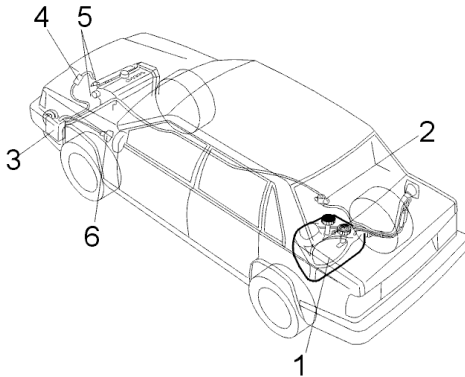


## Evaporative emission (EVAP) system control



EVAP stands for Evaporative Control System.

Vapor which evaporates from the fuel in the fuel tank is routed to and stored in the EVAP canister from where it is introduced, at a convenient time, into the combustion process by way of the canister purge (CP) valve using the negative pressure in the intake manifold.

### The system consists of:

#### Fuel tank (1)

To avoid the fuel tank deforming due to negative pressure it has a reinforcement plate screwed to its underside.

#### Roll-over valve (2)

The roll-over valve is a safety valve which closes if the car tilts sideways by more than 45°, preventing fuel leaking in the event of an accident.

#### EVAP canister (3)

Fuel vapor from the fuel tank passes a bed of activated charcoal in the EVAP canister. The activated charcoal binds the fuel and pure air flows out into the atmosphere through the vent at the top of the EVAP canister. 80-140 g fuel can be absorbed by the EVAP canister, depending on the volume of charcoal.

#### Canister purge (CP) valve (4)

The canister purge (CP) valve is located between the EVAP canister and engine intake manifold and fresh air intake. The valve is used to control the flow of fuel vapor from the EVAP canister to the engine. It is connected to a 12 V supply from the main relay and to the engine control module (ECM). The engine control module (ECM) opens the valve by grounding the cable.

#### Check valves (5)

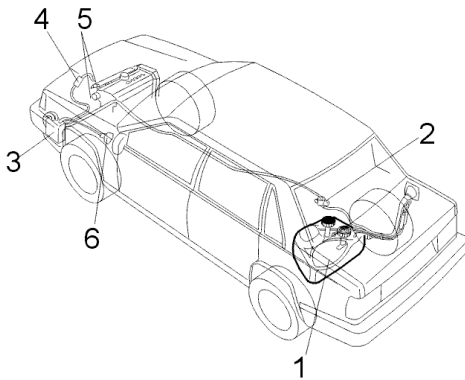
There are check valves in the hoses between the canister purge (CP) valve and intake manifold and fresh air intake respectively. The check valve in the intake manifold hose prevents air flowing from the engine to the EVAP canister when the turbocharger is operating.

The check valve in the cable to the fresh air intake closes if there is a negative pressure in the intake manifold preventing air flowing from the fresh air intake to the intake manifold.

#### **EVAP canister shut-off valve (6)**

Certain markets require the engine control module (ECM) to detect leakages in the tank system, in these markets a leakage diagnostic has been introduced.

In order to check the fuel tank system, cars in these markets have an EVAP canister shut-off valve. This is mounted in front of the left A-pillar, inside the front fender and is connected to the EVAP canister vent. The valve is connected to a 12 V supply from the main relay and can be grounded by the engine control module (ECM). The engine control module (ECM) can close the valve by grounding the cable. The EVAP canister shut-off valve is normally open, it is only closed when the engine control module (ECM) is checking the system. See separate section for information about the leakage diagnostic.



#### **Control**

Normally the canister purge (CP) valve is closed and only opens when the engine control module (ECM) is emptying the canister. When the EVAP canister is emptied the valve is first pulsed, this pulsing increases to bring the mixture from the canister up to a value which varies according to engine load and speed. Because of the pressure in the inlet manifold, fresh air is sucked into the engine through the EVAP canister opening or through the EVAP canister shut-off valve. As the air passes through the EVAP canister, fuel stored in the activated charcoal is drawn into the engine and burned.

When the turbocharger is operating there is a negative pressure in the fresh air intake, this can be used to empty the EVAP canister even when there is an overpressure in the intake manifold.