EMISSION CONTROLS

Positive Crankcase Ventilation System

The Positive Crankcase Ventilation (PCV) system is used on all vehicles covered by this manual. The PCV system vents harmful combustion blow-by fumes from the engine crankcase into the engine air intake for burning with the fuel and air mixture. The PCV system maximizes oil cleanliness by venting moisture and corrosive fumes from the crankcase.

OPERATION

See Figure 1

Your car is equipped with a closed Positive Crankcase Ventilation (PCV) system. The PCV system vents crankcase gases into the engine air intake where they are burned with the air/fuel mixture. The PCV system keeps pollutants from being released into the atmosphere, and also helps to keep the engine oil clean, by ridding the crankcase of moisture and corrosive fumes. The PCV system consists of the PCV valve, a closed oil fill cap and the various connecting hoses.

The PCV system recycles crankcase gases as follows: When the engine is running, clean filtered air is drawn into the crankcase through the intake air filter. As the air passes through the crankcase, it picks up the combustion gases and carries them out of the crankcase, up through the PCV valve and into the intake manifold. After they enter the intake manifold, they are drawn into the combustion chamber and burned.

The most critical component of the PCV system is the PCV valve. The PCV valve regulates the amount of ventilating air and blow-by gas to the intake manifold and also prevents backfire from traveling into the crankcase, avoiding the explosion of crankcase gases. At low engine speeds, the PCV valve is partially closed, limiting the flow of gases into the intake manifold. As engine speed increases, the valve opens to admit greater quantities of gases into the intake manifold.

If the PCV valve becomes blocked or plugged, crankcase gases will not be able to escape by the normal route. Since these gases are under pressure, they will seek an alternate route, which is usually an oil seal or gasket. As the gases escape, an oil leak will be created.

Besides causing oil leaks, a clogged PCV valve will also allow gases to remain in the crankcase for an extended period, promoting the formation of sludge in the engine.

TESTING

1. Visually inspect the PCV valve hose and the fresh air supply hose and their attaching nipples or grommets for splits, cuts, damage, clogging, or restrictions. Repair or replace, as necessary.
2. If the hoses pass inspection, remove the PCV valve from its mounting grommet. Shake the PCV valve and listen or feel for the rattle of the valve plunger within the valve body. If the valve plunger does not rattle, the PCV valve must be cleaned or replaced. If the valve plunger rattles, the PCV valve is okay; reinstall it.
3. Start the engine and bring it to normal operating temperature. Remove the fresh air supply hose from the air cleaner or air outlet tube. Place a stiff piece of paper over the hose end and wait 1 minute. If vacuum holds the paper in place, the system is okay.
4. On the 4.6L engine, the PCV system is connected with the evaporative emission system. If the paper is not held in place, disconnect the evaporative hose, cap the connector and retest. If vacuum now holds the paper in place, the problem is in the evaporative emission system.
5. If the paper is not held by vacuum, check the fresh air and PCV hoses for leaks or loose connections. Also, check for a loose fitting oil fill cap or loose dipstick. Correct as required until vacuum can be felt at the end of the supply hose.

➡If air pressure and oil or sludge is present at the end of the fresh air supply hose, the engine has excessive blow-by and cylinder bore or piston ring wear.

REMOVAL & INSTALLATION

Refer to Section 1 for removal and installation of the PCV valve.

Evaporative Emission Controls

OPERATION

The evaporative emission control system prevents the escape of fuel vapors to the atmosphere under hot soak and engine off conditions by storing the vapors in a carbon canister. Then, with the engine warm and running, the system controls the purging of stored vapors from the canister to the engine, where they are efficiently burned.

Evaporative emission control components consist of the carbon canister, purge valve(s), vapor valve, rollover vent valve, check valve and the necessary lines. All vehicles may not share all components.

OBD-II EVAP System Monitor

Some of the models covered in this manual have added system components due to the EVAP system monitor incorporated in the OBD-II engine control system. A pressure sensor is mounted on the fuel tank which measures pressure inside the tank, and a purge flow sensor measures the flow of the gases from the canister into the engine. The purge valve is now called the Vapor Management Valve (VMV). It performs the same functions as the purge valve, however it looks slightly different. A canister vent solenoid is mounted on the canister, taking the place of the vent cap, providing a source of fresh air to the canister.

The PCM can store trouble codes for EVAP system performance, a list of the codes is provided later in this section. Normal testing procedure can be used, see EVAP System Component Testing in this Section.

Carbon Canister

See Figure 2

The carbon canister contains vapor absorbent material to facilitate the storage of fuel vapors. Fuel vapors flow from the fuel tank to the canister, where they are stored until purged to the engine for burning.

Purge Control Valve

See Figure 3

The purge valves control the flow of fuel vapor from the carbon canister to the engine. Purge

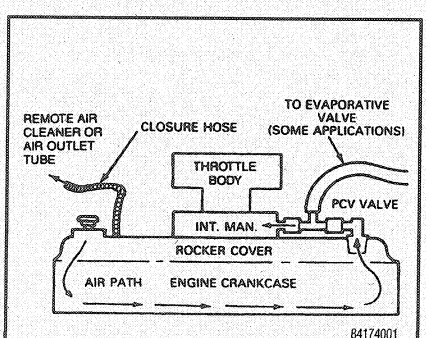

Fig. 1 PCV system functional diagram

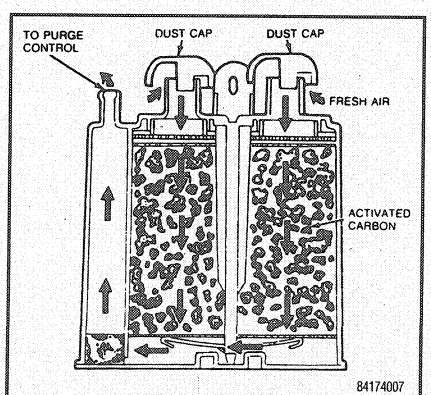

Fig. 2 Cross-section of a carbon canister

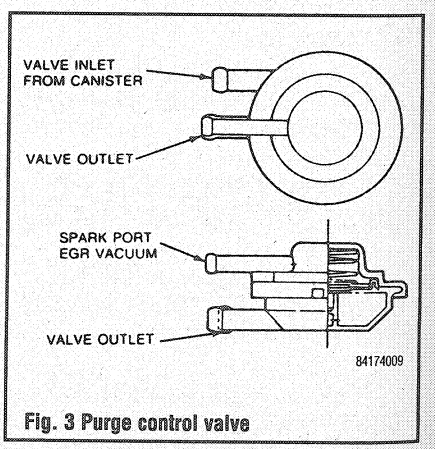

Fig. 3 Purge control valve