

# EMISSION CONTROL SYSTEMS

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## GENERAL INFORMATION

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### SERVICE REMINDER INDICATOR (SRI) LAMP

The instrument panel mounted SRI lamp was formerly referred to as the emission maintenance reminder (EMR) lamp. It is **not used** on any Jeep model for the 1994 model year.

### VEHICLE EMISSION CONTROL INFORMATION (VECI) LABEL

All vehicles are equipped with a combined VECI label. The label is located in the engine compartment (Figs. 1 or 2). The label contains the following:

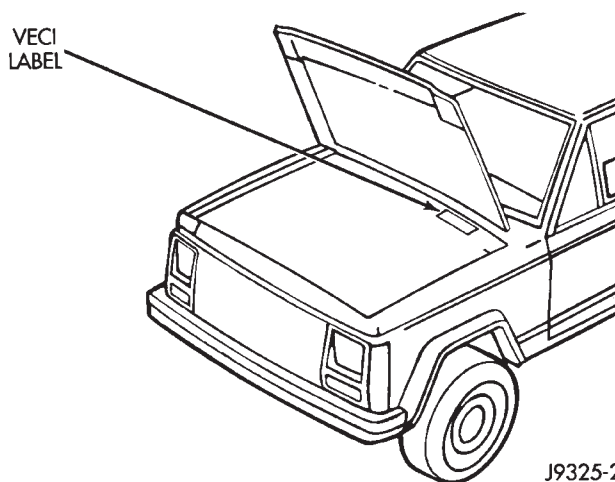
- Engine family and displacement
- Evaporative family
- Emission control system schematic
- Certification application
- Engine timing specifications (if adjustable)
- Idle speeds (if adjustable)
- Spark plug and plug gap

The label also contains an engine vacuum schematic. There are unique labels for vehicles built for sale in the state of California and the country of Canada. Canadian labels are written in both the English and French languages. These labels are permanently attached and cannot be removed without defacing information and destroying it.

**The VECI label illustration (Fig. 3) is used as an example only.** Refer to the VECI label located in the engine compartment (Figs. 1 or 2) for actual emission information.

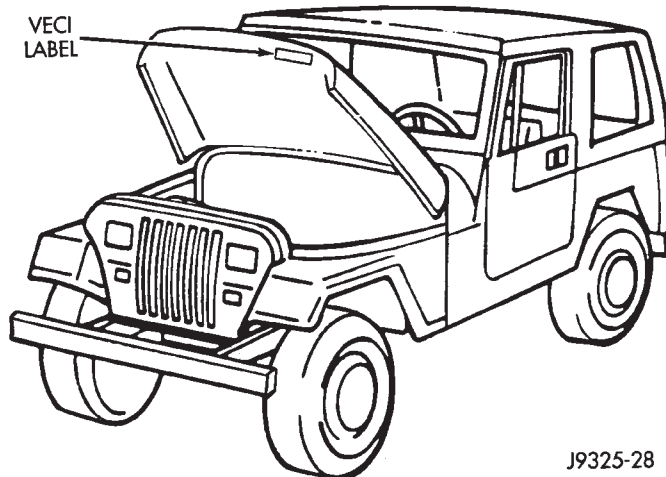
### VACUUM HOSE ROUTING SCHEMATICS

**The vacuum hose routing schematics are used as examples only.** If there are any differences between these schematics and the Vehicle Emission




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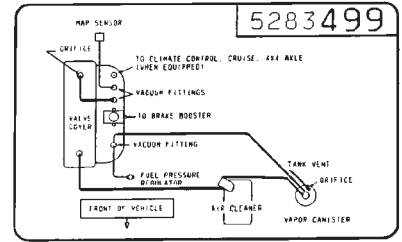
*Fig. 1 VECI Label Location—XJ Models*



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*Fig. 2 VECI Label Location—YJ Models*

53007529	 <b>CHRYSLER CORPORATION</b> IMPORTANT VEHICLE INFORMATION	<b>CATALYST</b>	ENGINE DISPLACEMENT 4.0L ENGINE FAMILY PCR4 OT5FGAS EVAPORATIVE FAMILY FTAPR
	THIS VEHICLE CONFORMS TO U.S. EPA REGULATIONS APPLICABLE TO 1993 MODEL YEAR NEW LIGHT-DUTY TRUCKS AT ALL ALTITUDES		FAMILY NO <sub>x</sub> SYSTEM LIMIT - 1.2
• BASIC IGNITION TIMING AND IDLE FUEL/AIR MIXTURE HAVE BEEN PRESET AT THE FACTORY. SEE THE SERVICE MANUAL FOR PROPER PROCEDURES AND OTHER ADDITIONAL INFORMATION.  • ADJUSTMENTS MADE BY OTHER THAN APPROVED SERVICE MANUAL PROCEDURES MAY VIOLATE FEDERAL AND STATE LAWS. CAUTION: APPLY PARKING BRAKE WHEN SERVICING VEHICLE.		SPECIFICATIONS +	AUTO    MAN
		SPARK PLUG GAP	.25 to .28-10/32
		IGNITION TIMING	NO ADJUSTMENTS NEEDED
		CURB IDLE SPEED (RPM)	NO ADJUSTMENTS NEEDED
		FAST IDLE SPEED	NO ADJUSTMENTS NEEDED
		IDLE CO	



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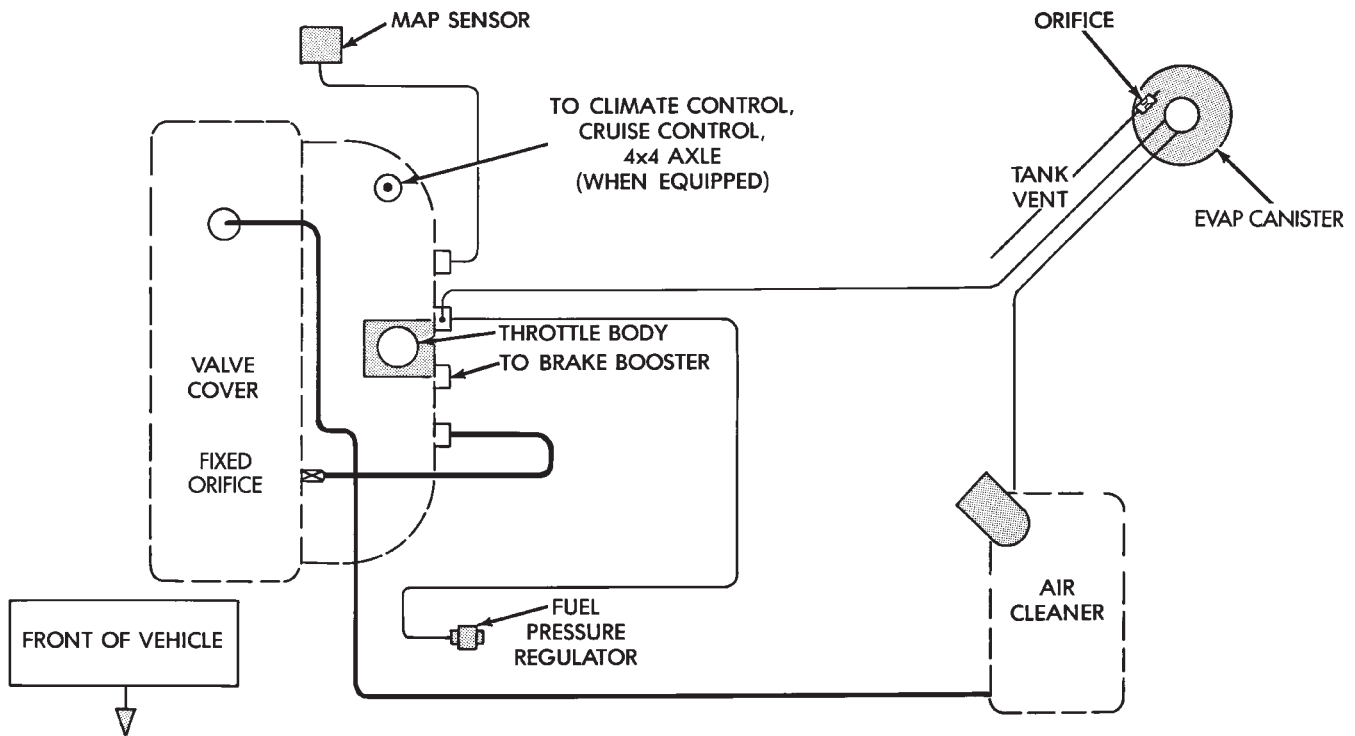
**Fig. 3 VECI Label—Typical**

Control Information (VECI) label schematics, those shown on the VECI label should be used.

**DRB SCAN TOOL**

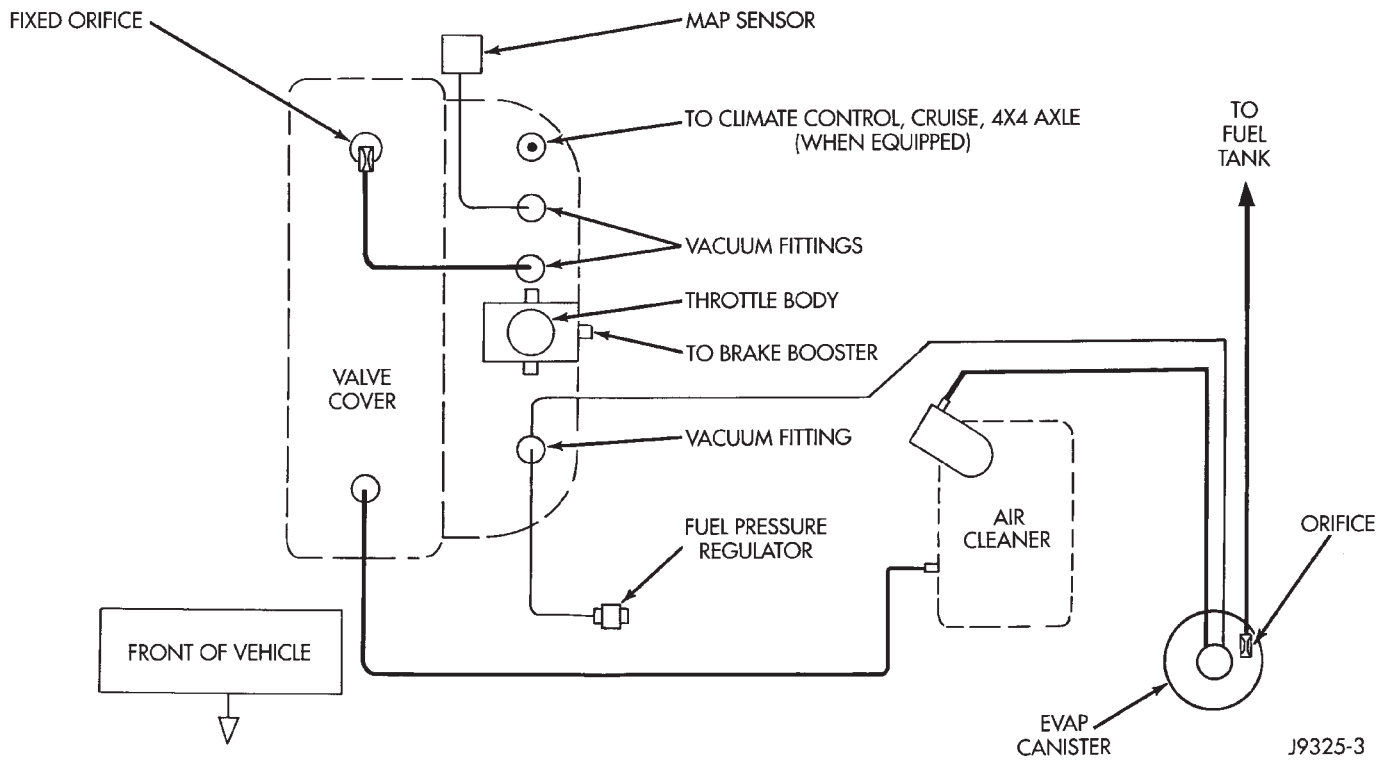
For operation of the DRB scan tool, refer to the appropriate Powertrain Diagnostic Procedures service manual.

**VACUUM ROUTING SCHEMATIC—2.5L 4 CYLINDER ENGINE**



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VACUUM ROUTING SCHEMATIC—4.0L 6 CYLINDER ENGINE



EVAPORATIVE EMISSION CONTROLS

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EVAP (EVAPORATION) CONTROL SYSTEM

GENERAL INFORMATION

The function of the EVAP control system is to prevent the emissions of gasoline vapors from the fuel tank into the atmosphere. When fuel evaporates in the fuel tank, the vapors pass through vent hoses or tubes to a carbon filled EVAP canister. They are temporarily held in the canister until they can be drawn into the intake manifold when the engine is running.

The EVAP canister is a feature on all models for the storage of fuel vapors from the fuel tank.

**The hoses used in this system are specially manufactured. If replacement becomes necessary, it is important to use only fuel resistant hose.**

EVAP CANISTER

A sealed, maintenance free, EVAP canister is used on all vehicles. On XJ models, the EVAP canister is located in the engine compartment on the passenger side frame rail (Fig. 4). On YJ models, the EVAP canister is located in the engine compartment on the dash panel and below the brake master cylinder (Fig. 5). The EVAP canister is filled with granules of an activated carbon mixture. Fuel vapors entering the EVAP canister are absorbed by the charcoal granules.

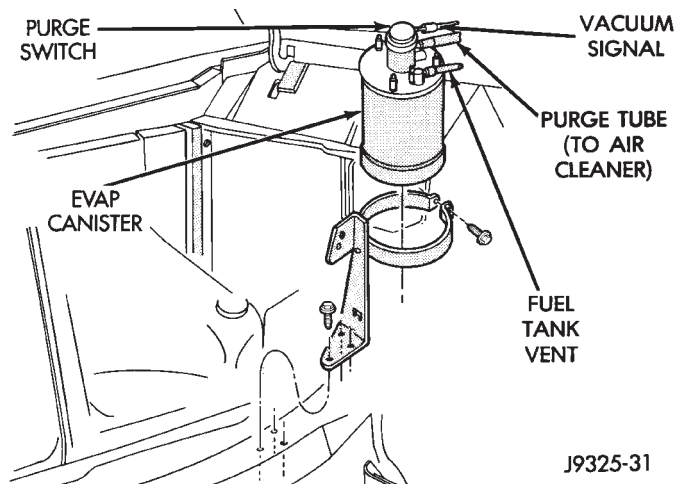


Fig. 4 EVAP Canister Location—XJ Models

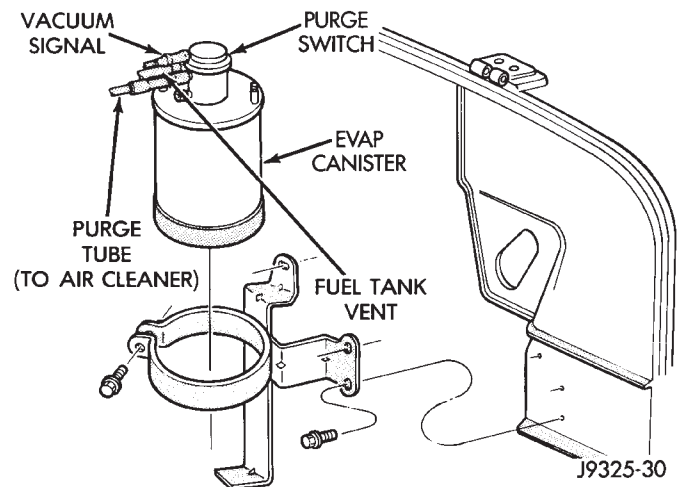


Fig. 5 EVAP Canister Location—YJ Models

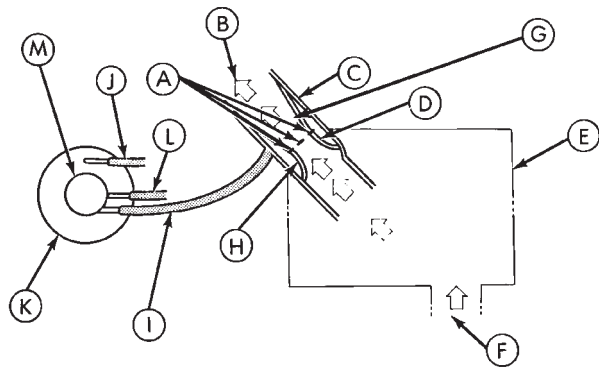
CANISTER OPERATION

The EVAP canister is equipped with a vacuum controlled purge shutoff switch (orifice) (Figs. 4 or 5) that controls canister purge operation. The switch is open when manifold vacuum is applied to it. When the engine is operating, the EVAP canister purge function draws fresh air through the top of the canister. This causes the stored vapors to be drawn out of the canister and into the airstream in the air cleaner snorkel (Fig. 6).

The air cleaner contains a venturi in the air cleaner cover used as a purge line vacuum source (Fig. 6). The venturi effect increases the speed of the intake air flowing by the slots in the venturi wall. This creates a low pressure area around the slots. When the purge shutoff switch is open, vapors from the canister are drawn through slots and into the airstream flowing through the venturi (Fig. 7). The vapors pass through the intake manifold into the engine combustion chambers where they are consumed during engine combustion.

FUEL TANK FILLER TUBE CAP

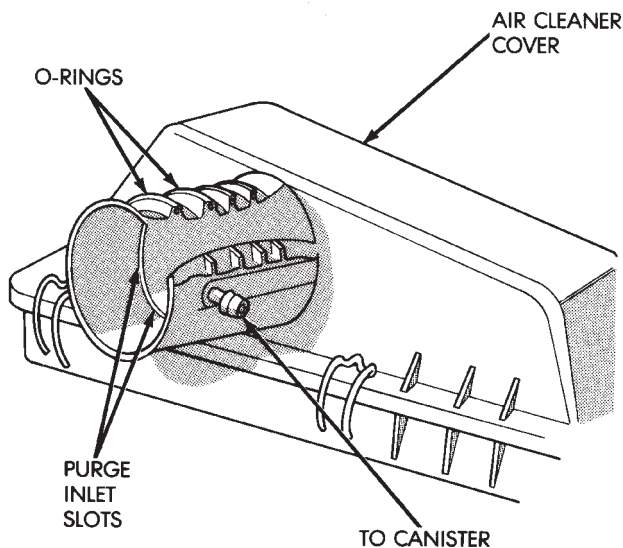
The fuel tank filler tube cap incorporates a two-way relief valve that is closed to atmosphere during normal operating conditions. The relief valve used in fuel filler caps of all models is calibrated at a pressure of 10 kPa (1.5 psi) or a vacuum of 6 kPa (1.8 in. Hg). When the pressure or vacuum is relieved, the valve returns to the normally closed position.



- |                                      |                                    |
|--------------------------------------|------------------------------------|
| A. PURGE INLET SLOTS                 | H. VENTURI                         |
| B. TO THROTTLE BODY                  | I. CANISTER PURGE LINE             |
| C. OUTER WALL                        | J. TO FUEL TANK                    |
| D. INNER WALL                        | K. EVAP CANISTER                   |
| E. REMOTE AIR CLEANER                | L. VACUUM SIGNAL (MANIFOLD VACUUM) |
| F. INLET AIR                         | M. PURGE SHUTOFF                   |
| G. INTAKE AIR ACCELERATED BY VENTURI |                                    |

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**Fig. 6 EVAP System—Typical**



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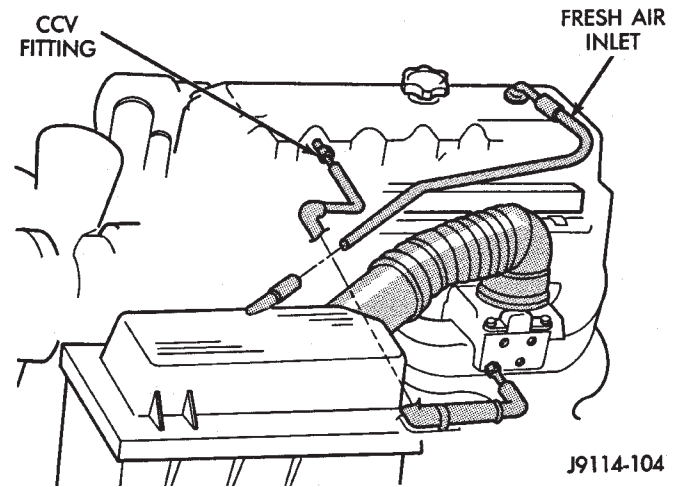
**Fig. 7 Air Cleaner Venturi—Typical**

**CAUTION:** The fuel filler cap must be removed prior to disconnecting any fuel system component.

### CRANKCASE VENTILATION SYSTEM

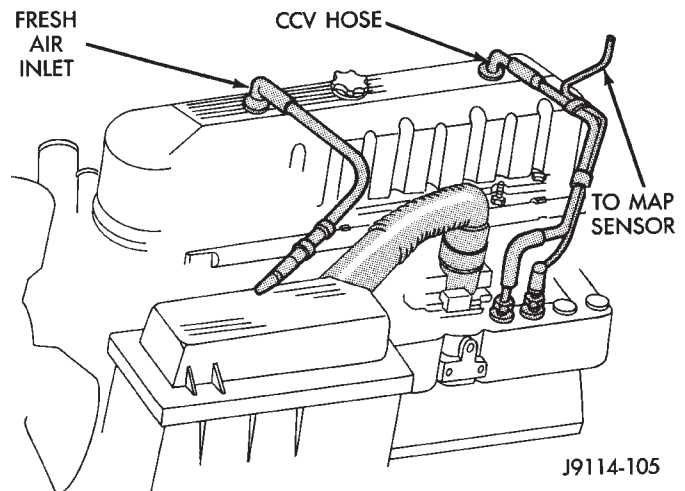
All 2.5L 4 cylinder and 4.0L 6 cylinder engines are equipped with a Crankcase Ventilation (CCV) system (Figs. 8 or 9). The CCV system performs the same function as a conventional PCV system, but does not use a vacuum controlled valve.

On 4.0L engines, a molded vacuum tube connects manifold vacuum to top of cylinder head (valve) cover at dash panel end. The vacuum tube contains a



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**Fig. 8 CCV System—2.5L Engine—Typical**



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**Fig. 9 CCV System—4.0L Engine—Typical**

fixed orifice of a calibrated size. It meters the amount of crankcase vapors drawn out of the engine.

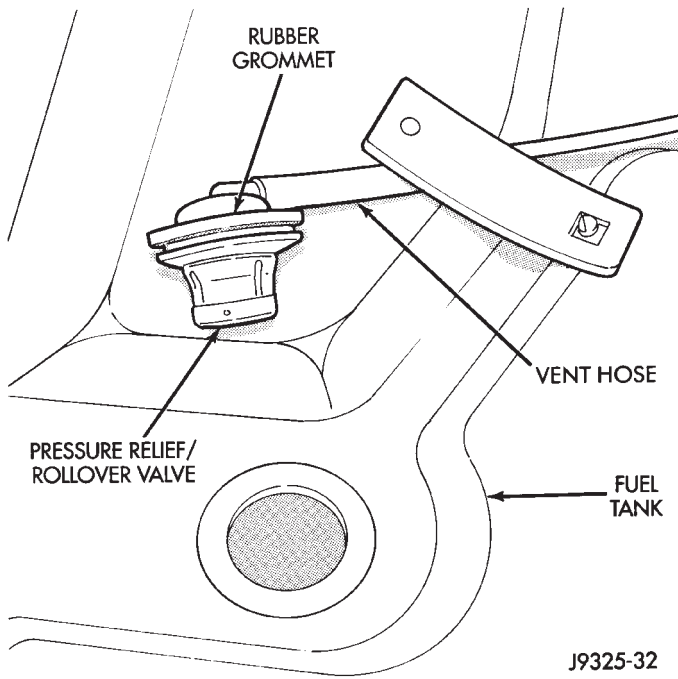
On 2.5L engines, a fitting on drivers side of cylinder head (valve) cover contains the metered orifice. It is connected to manifold vacuum.

A fresh air supply hose from the air cleaner is connected to front of cylinder head cover on 4.0L engines. It is connected to rear of cover on 2.5L engines.

When the engine is operating, fresh air enters the engine and mixes with crankcase vapors. Manifold vacuum draws the vapor/air mixture through the fixed orifice and into the intake manifold. The vapors are then consumed during combustion.

### PRESSURE RELIEF/ROLLOVER VALVE

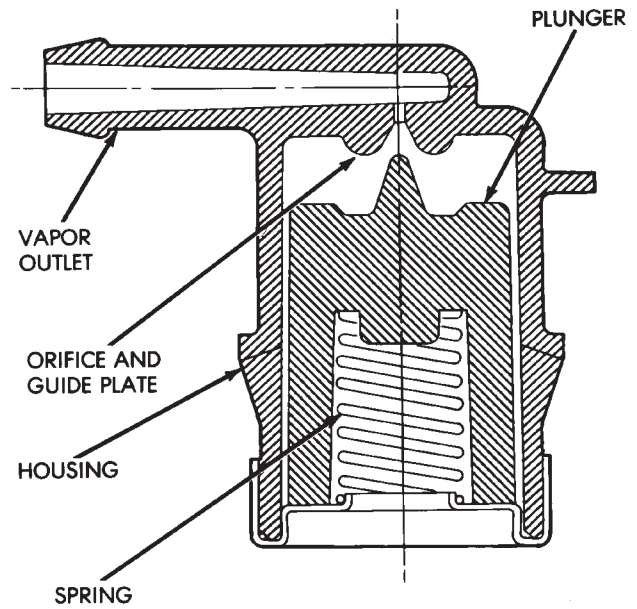
All vehicles are equipped with a combination fuel tank pressure relief and rollover valve (Fig. 10). This dual function valve will relieve fuel tank pressure and also prevent fuel flow through the fuel tank vent hoses in the event of an accidental vehicle rollover.



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**Fig. 10 Pressure Relief/Rollover Valve Location—Typical**

The valve incorporates a pressure relief mechanism (Fig. 11) that releases fuel tank pressure when the pressure increases above the calibrated sealing value. Refer to the Fuel Tank section of Group 14, Fuel Systems for removal and installation procedures.



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**Fig. 11 Pressure Relief/Rollover Valve Operation**

EXHAUST EMISSION CONTROLS

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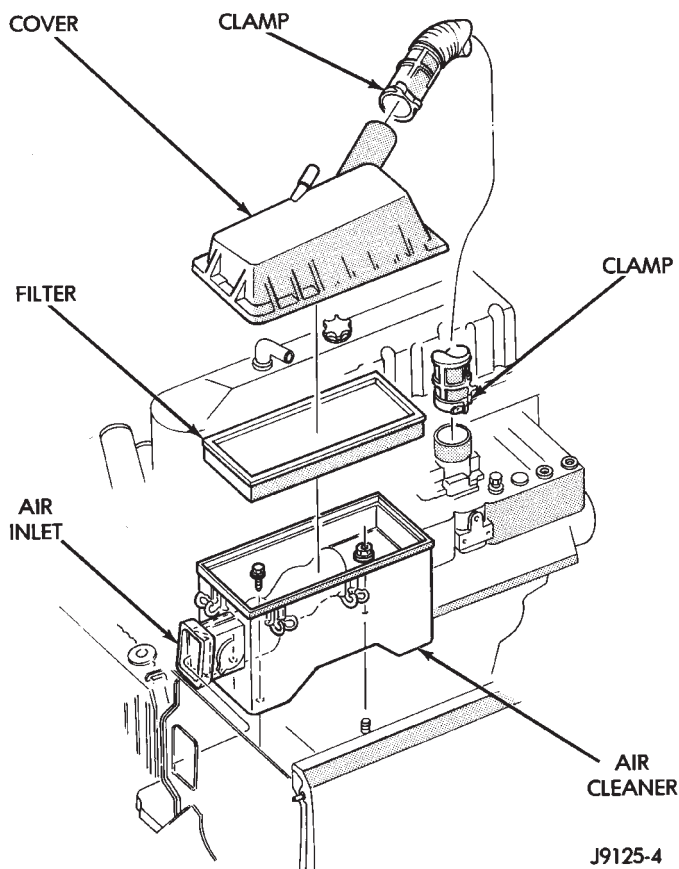
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**AIR CLEANER**

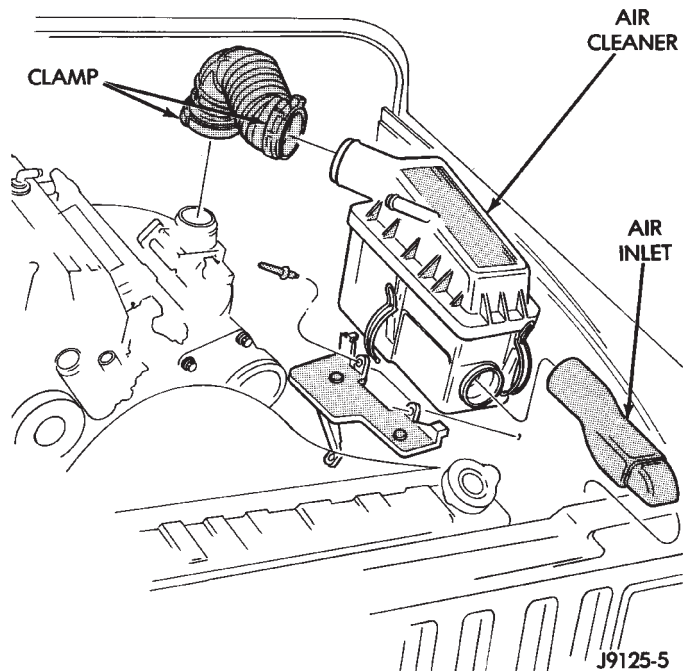
The air cleaner used on all models (Figs. 1 or 2) is open to ambient air. The blend air door and vacuum motor that was used on engines of previous model years to supply heated air, is no longer used. The air cleaner housing assembly contains the engine air filter.

The Powertrain Control Module (PCM) monitors air temperature in the intake manifold through the Intake Manifold Air Temperature sensor. The PCM adjusts injector pulse width and ignition timing to compensate for intake air temperature. Refer to Powertrain Control Module (PCM) in Group 14, Fuel System for more information.

Refer to the Component Removal/Installation section of this group for removal and installation procedures.



**Fig. 1 Air Cleaner—XJ Models—Typical**



**Fig. 2 Air Cleaner—YJ Models—Typical**

**OXYGEN (O<sub>2</sub>S) SENSOR**

For description, operation, diagnosis and removal/installation procedures of the O<sub>2</sub>S sensor, refer to Group 14, Fuel Systems.

COMPONENT REMOVAL/INSTALLATION

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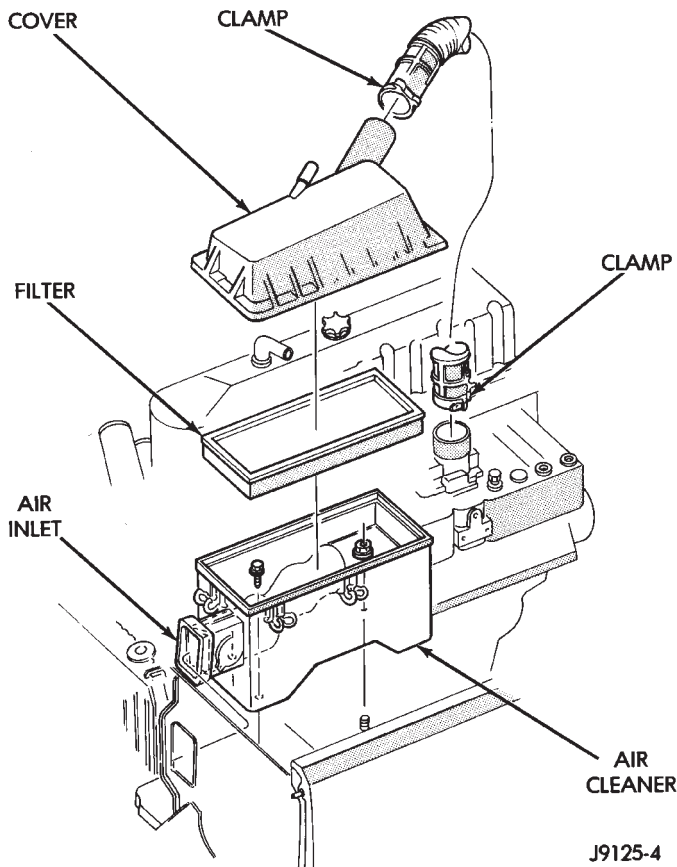
**AIR CLEANER HOUSING**

**REMOVAL**

(1) Unlock clean air hose clamp (Figs. 3 or 4) at air cleaner cover. To unlock the clamp, attach adjustable pliers to clamp and rotate pliers as shown in figure 3. Remove clean air hose at cover.

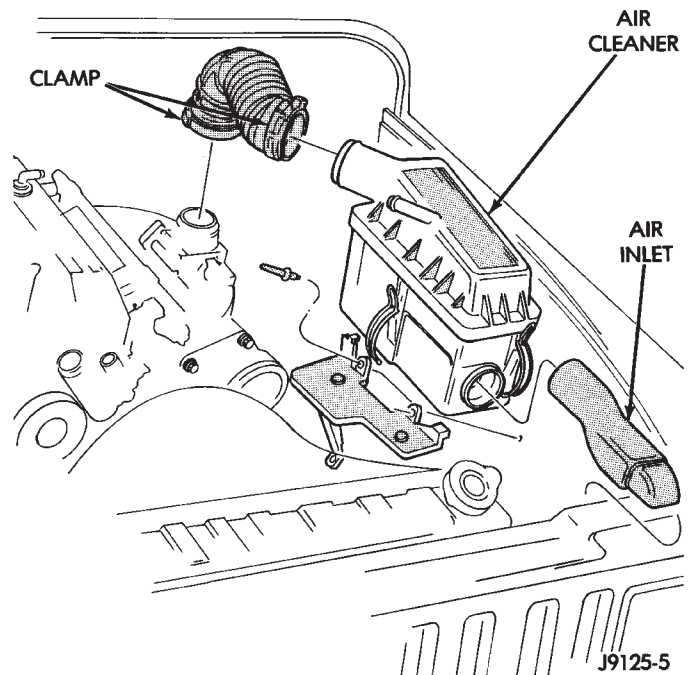
(2) Disconnect vacuum lines at air cleaner housing.

(3) YJ Models: Release the three over-center type clamps securing the housing to the housing bracket. XJ Models: Remove the housing cover and remove air filter. Remove two bolts and one nut.

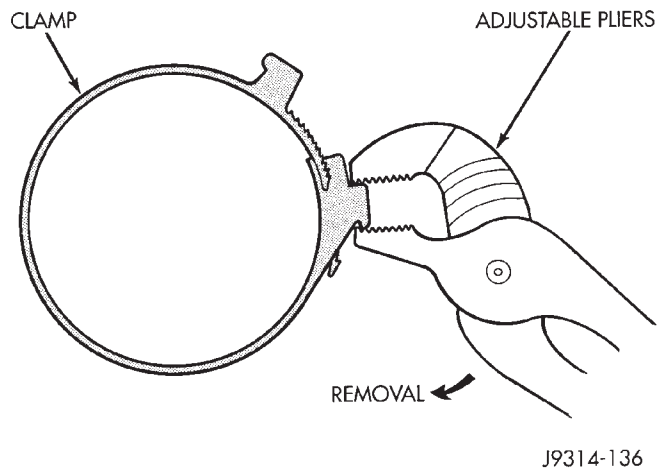


**Fig. 3 Air Cleaner—XJ Models—Typical**

(4) Release the air cleaner housing from the ambient air inlet and remove housing from vehicle.



**Fig. 4 Air Cleaner—YJ Models—Typical**



**Fig. 5 Clamp Removal**

**INSTALLATION**

(1) Position air cleaner housing to body and ambient air inlet.

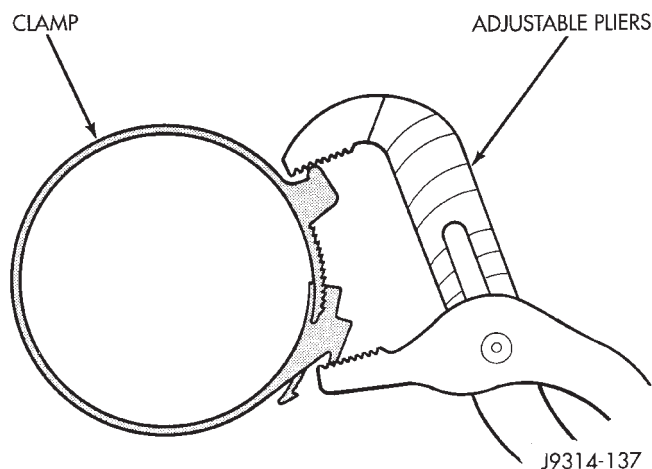
(2) YJ Models: Lock the three over-center type clamps securing the housing to the housing bracket. XJ Models: Install two bolts and one nut to housing.



Install air filter and cover.

(3) Install vacuum lines to housing.

(4) Install clean air hose and clamp to cover. Compress the clamp snugly with adjustable pliers as shown in figure 6.



**Fig. 6 Clamp Installation**

## AIR FILTER

### REMOVAL/INSTALLATION

(1) Pry back the six clips (YJ Models) or three clips (XJ Models) retaining the air cleaner cover to the air cleaner housing.

(2) Lift the cover up and position to the side.

(3) Remove air filter.

(4) Clean the inside of air cleaner housing before installing new filter.

(5) Reverse the preceding operation for installation. Be sure the air cleaner cover is properly seated to air cleaner housing.

## COOLANT TEMPERATURE SENSOR

For description, operation, diagnosis and removal/installation procedures of the engine coolant temperature sensor, refer to Group 14, Fuel Systems.

## EVAP CANISTER

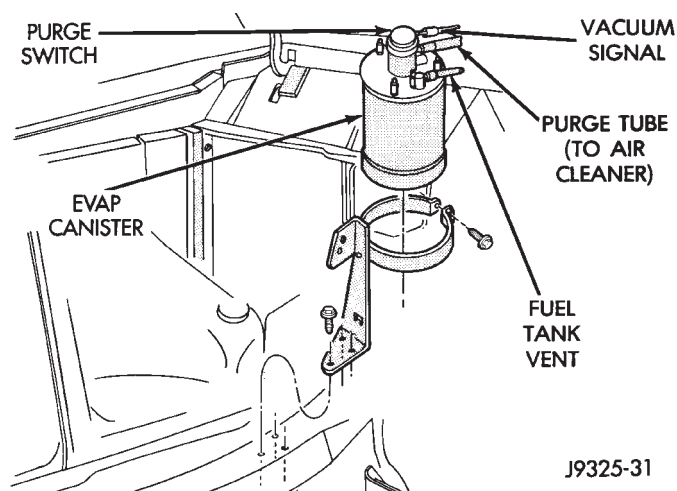
On XJ models, the EVAP canister is located in the engine compartment on the passenger side frame rail (Fig. 7). On YJ models, the EVAP canister is located in the engine compartment on the dash panel and below the brake master cylinder (Fig. 8).

### REMOVAL/INSTALLATION

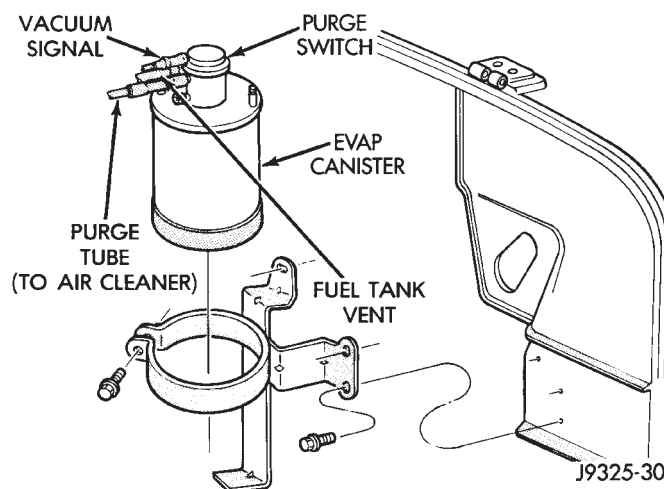
(1) Disconnect the vacuum lines at the EVAP canister. Note location of lines before removal.

(2) Remove canister retaining strap bolt.

(3) Remove canister from vehicle.



**Fig. 7 EVAP Canister—XJ Models**



**Fig. 8 EVAP Canister—YJ Models**

Reverse the procedure for installation.

## FUEL TANK FILLER TUBE CAP

If replacement of the fuel filler tube cap is necessary, it must be replaced with an identical cap to be sure of correct system operation.

## OXYGEN (O2S) SENSOR

For description, operation, diagnosis and removal/installation procedures of the O2S sensor, refer to Group 14, Fuel Systems.

## POWERTRAIN CONTROL MODULE (PCM)

For removal and installation procedures, refer to Group 14, Fuel Systems.

## PRESSURE RELIEF/ROLLOVER VALVE

For removal and installation procedures, refer to the Fuel Tank section of Group 14, Fuel Systems.

