1982 Fuel Evaporation Systems

TOYOTA

All Gasoline Models

DESCRIPTION

Toyota fuel evaporation control system is designed to prevent the escape of raw fuel vapors to the atmosphere. This is accomplished through a combination of special fuel tank, filler cap, charcoal fuel vapor storage canister and various vacuum or fuel control valves (depending on vehicle application).

OPERATION

CELICA, CORONA & PICKUP

Fuel evaporation system is controlled by a thermal vacuum switching valve (TVSV), vacuum switching valve (VSV) and a speed-controlled computer. When coolant temperatures are low, no vacuum is present at the VSV. When engine warms up, TVSV opens and vacuum is present at VSV.

When vehicle is stopped or running at low speed, computer interprets signals from the speed sensor and acts on the VSV, closing passage to intake manifold. This routes fuel vapors into the charcoal canister to be stored.

When vehicle reaches 16 MPH, computer signals the VSV to open. This allows accumulated fuel vapors from the charcoal canister and fuel tank to be drawn into the intake manifold and burned in the combustion chamber.

A check valve in the charcoal canister is used to balance fuel tank pressure and prevent tank collapse. The outer vent control valve allows float bowl vapors to the canister when ignition is "OFF".

Fig. 1: Celica, Corona & Pickup Fuel Evaporation System (with High Altitude Compensation (HAC) System.)

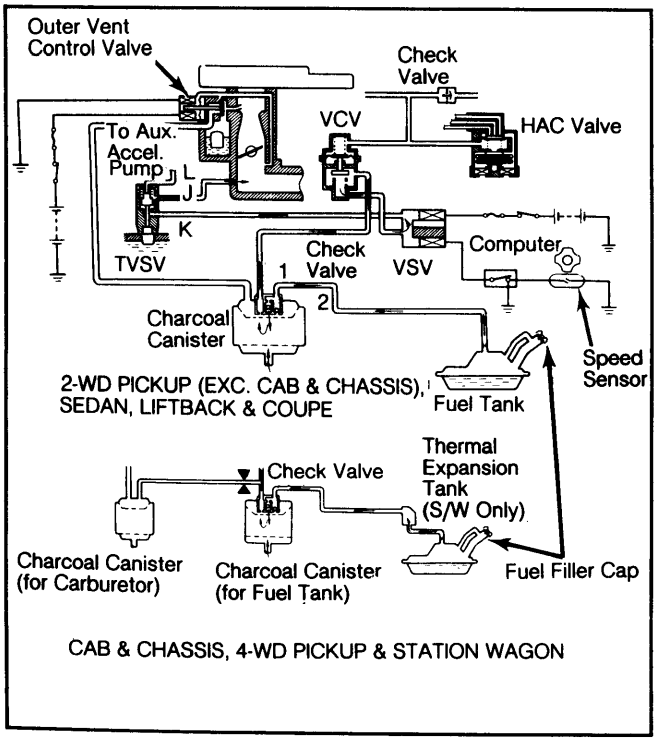
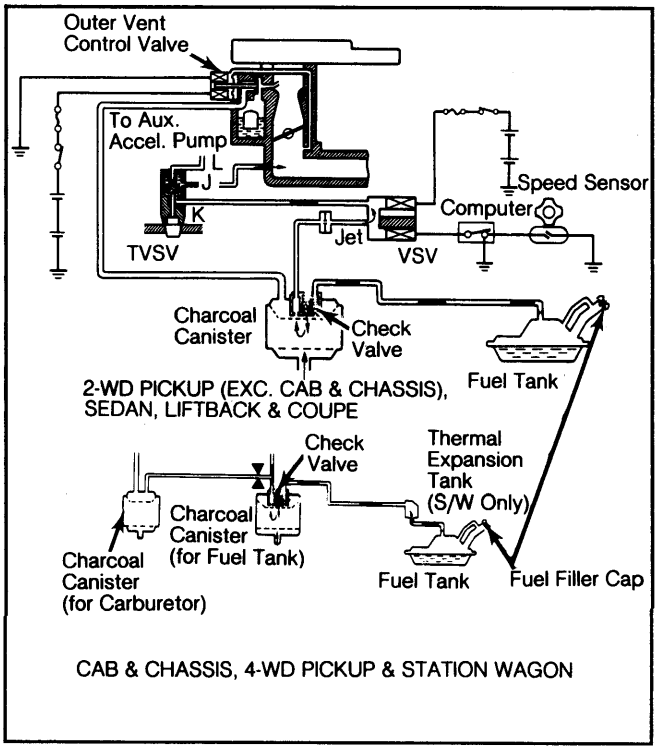


Fig. 2: Celica, Corona & Pickup Fuel Evaporation System (without High Altitude Compensation (HAC) System

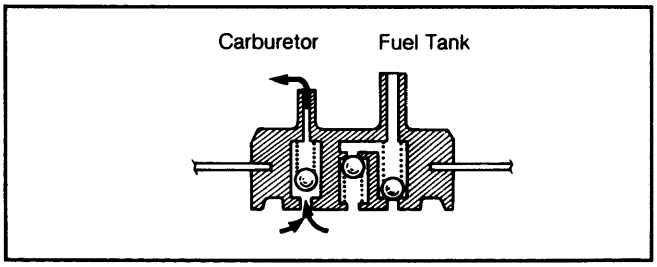


COROLLA, LAND CRUISER & STARLET

The fuel evaporation system is controlled by a bimetal vacuum switching valve (BVSV) and a vacuum control valve (VCV). At low temperature, all vacuum to the VCV is cut off and no fuel vapors are drawn into intake manifold. Once engine coolant warms up, the BVSV opens on Corolla and Land Cruiser (closes on Starlet) to allow vacuum to reach the VCV and draw fuel vapors from charcoal canister to intake manifold.

When the engine is stopped or at idle, a spring loaded ball in the check valve causes check valve to close, routing fuel vapors from fuel tank to the charcoal canister where they are adsorbed.

Fig. 3: Check Valves in Charcoal Canister



When engine speed increases, the spring loaded ball opens and allows intake manifold vacuum to draw accumulated vapors from the charcoal canister and the fuel tank into the carburetor.

The check valve also functions along with the fuel tank safety cap, to balance fuel tank pressure and prevent fuel tank collapse. The outer vent control valve is a solenoid which opens a passage from the carburetor float bowl to the carbon canister when the ignition is "OFF". It closes when the engine is running.

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Fig. 4: Corolla Fuel Evaporation System

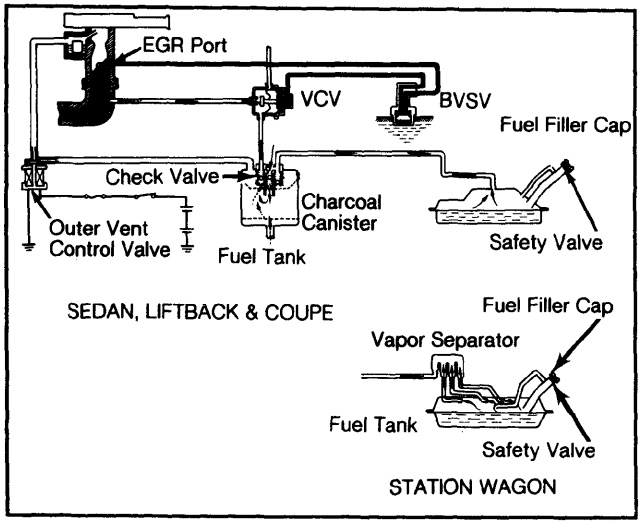


Fig. 5: Land Cruiser Fuel Evaporation System

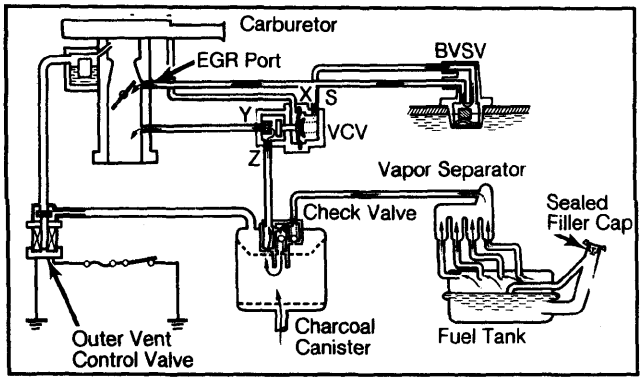
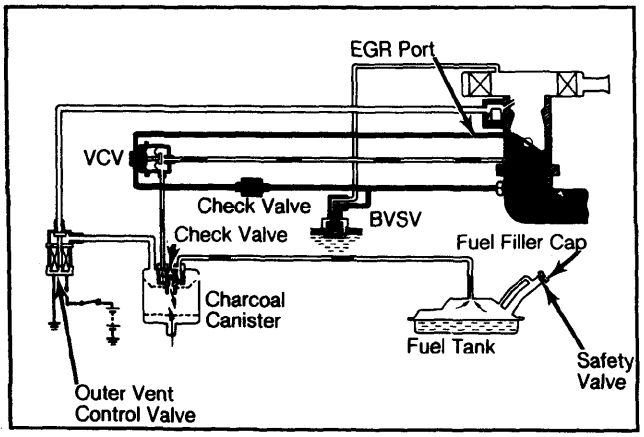


Fig. 6: Starlet Fuel Evaporation System

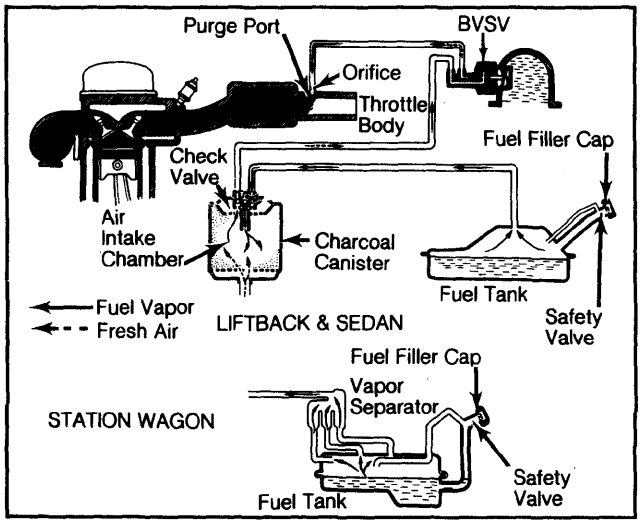


CRESSIDA & SUPRA

The fuel evaporation system is controlled by a bimetal vacuum switching valve (BVSV) and check valves. When the engine is stopped, coolant temperatures are low. When engine is idling, fuel vapors from tank are routed to charcoal canister and stored.

When engine is accelerating or running at road speed, BVSV opens, allowing fuel vapors from canister to be drawn into intake manifold. The system also uses 3 check valves in the charcoal canister. These control fuel tank pressure and vent excess vacuum from tank.

Fig. 7: Cressida & Supra Fuel Evaporation System

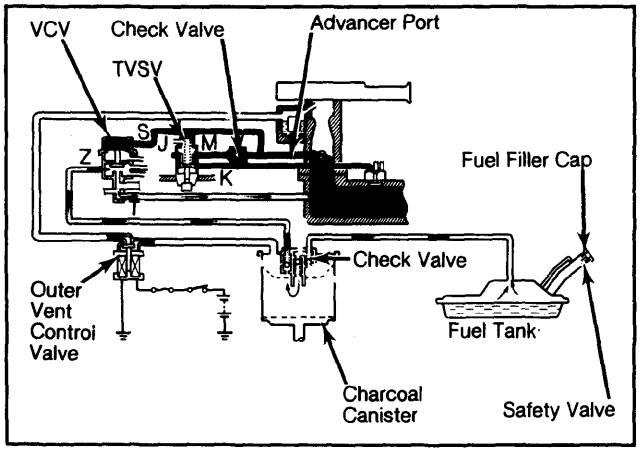


TERCEL

The fuel evaporation system is controlled by a thermal vacuum switching valve (TVSV), outer vent control valve and a vacuum control valve (VCV). When engine is not running, outer vent control valve is open. This allows fuel vapors from carburetor float chamber to be adsorbed in the charcoal canister.

When engine is running, the TVSV opens and causes vacuum to build at the VCV. When engine warms up, the VCV opens and allows purging of stored fuel vapors in charcoal canister to the intake manifold. The system also uses 3 check valves in the charcoal canister. These control fuel tank pressure and vent excess vacuum from tank.

Fig. 8: Tercel Fuel Evaporation System



TROUBLE SHOOTING

FUEL ODOR OR GAS LEAKS

Disconnect or cracked fuel vapor line or defective components in system. Check all lines and fittings and check operation of system.

TOYOTA (Cont.)

FUEL TANK OR EXPANSION TANK DEFORMED

Canister clogged, fuel filler cap defective (valve in cap inoperative), hoses clogged or kinked.

ROUGH ENGINE OPERATION

Check vacuum hose between vacuum solenoid valve and intake manifold for damage and proper connections. Check for malfunctions in other valve and be sure all vacuum hoses are tight and in good condition.

TESTING

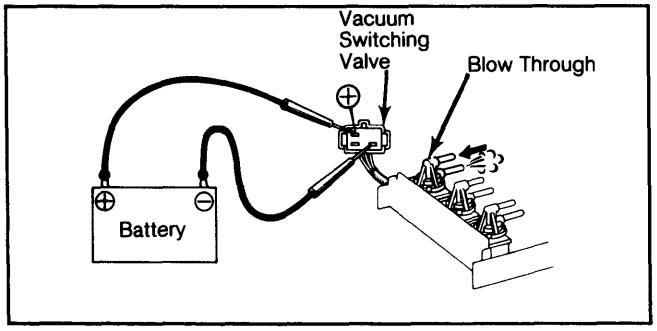
VACUUM SWITCHING VALVE

Celica, Corona & Pickup

1) Connect battery voltage and ground to VSV terminals. *See Fig. 9.* Air should pass through valve with power applied. No air should pass without power.

2) Use an ohmmeter to check resistance between terminals where power was applied. Resistance should be 51-57 ohms. There should be no continuity between case of valve and positive terminal.

Fig. 9: Vacuum Switching Valve Test



Celica, Corona and Pickup models.

BIMETAL VACUUM SWITCHING VALVE (BVSV)

Corolla, Cressida, Land Cruiser, Starlet & Supra

1) With engine coolant below specified level, blow air into front pipe on valve. Valve should be closed and no air should come out rear pipe.

2) Warm engine to normal operating temperature. Again blow air into front pipe. Valve should now be open and air should come out rear pipe. Replace valve if necessary.

BVSV SWITCHING TEMPERATURE

Application	Closing Temp. °F (°C)
Corolla	104 (40)
Cressida & Supra	95 (35)
Land Cruiser & Starlet	86 (30)

THERMAL VACUUM SWITCHING VALVE (TVSV)

Celica, Corona & Pickup

1) With engine coolant below 140°F (60°C), blow air into pipe "J" and check that air comes out pipe "L".

2) Warm engine to normal operating temperature. Blow air into pipe "J" and check that air comes out pipe "K". Replace valve if necessary.

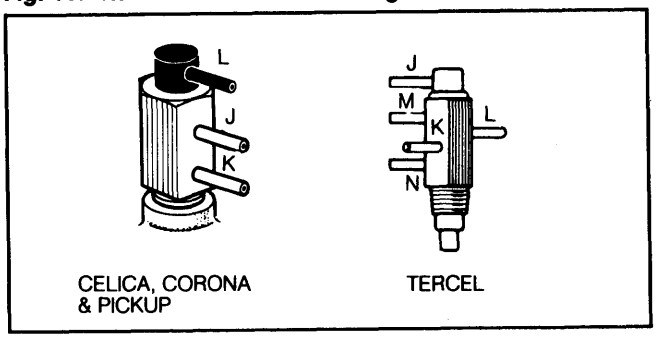
Tercel

1) Remove valve from engine. Dip sensing portion of valve into water below 45°F (7°C). By blowing air into pipes, check that air flows from pipe "J" to pipes "M" and "L" and from pipe "K" to pipe "N".

2) Heat valve to 63-122°F (17-50°C). Check that air flows from pipe "K" to pipes "N" and "L" and from pipe "J" to pipe "M".

3) Heat valve to 154°F (68°C). Check that air flows from pipe "K" to pipes "M" and "L" and does not flow from pipe "J" to any other pipe. Replace valve if necessary.

Fig. 10: Thermal Vacuum Switching Valve Test



Celica, Corona, Pickup and Tercel models.

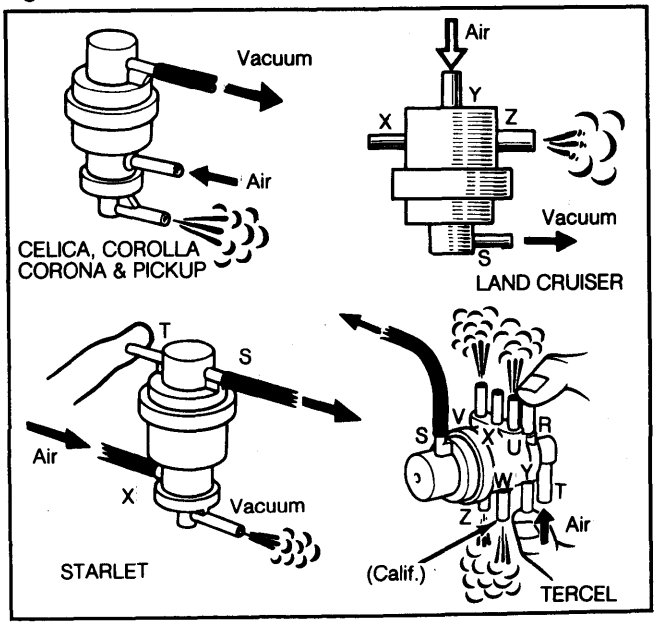
VACUUM CONTROL VALVE (VCV)

Celica, Corolla, Corona, Land Cruiser, Pickup, Starlet & Tercel

1) Remove valve from engine. Connect a hand vacuum pump to pipe "S". Plug pipe "T" on Starlet valve and open pipes "R" and "Y" on Tercel valve.

2) With specified vacuum applied, blow into middle pipe on Celica, Corolla, Corona and Pickup valve, pipe "Y" on Land Cruiser valve, pipe "X" on Starlet valve, and pipe "T" on Tercel valve. *See Fig. 11.*

Fig. 11: Vacuum Control Valve Test



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3) Air should come out specified pipes. Disconnect vacuum and blow into respective pipes described in step **1)**. Valve should now be closed and no air should come out. Replace valve if necessary.

VACUUM CONTROL VALVE TESTING

Application	Vacuum In. (Hg)	Open Pipes
Celica, Corona & Pickup	9.85	Bottom
Corolla	2.95	Bottom
Land Cruiser	2.75	Z
Starlet	5.30	Bottom
Tercel	3.55	U,V,Z,W

OUTER VENT CONTROL VALVE

Celica, Corona & Pickup

1) Disconnect outer vent hose from carburetor. Blow air into outer vent port. Air should pass through.

2) Start engine and run at idle speed. Repeat air application. Air should not pass through valve.

Corolla, Land Cruiser, Starlet & Tercel

1) With valve installed, remove hoses. Turn ignition switch off. Blow air through one side of valve. Air should pass through.

2) Turn ignition switch to "ON". Repeat air application. Air should not pass through valve. Visually check wiring and fuse connections.

SPEED SENSOR

Celica, Corona & Pickup

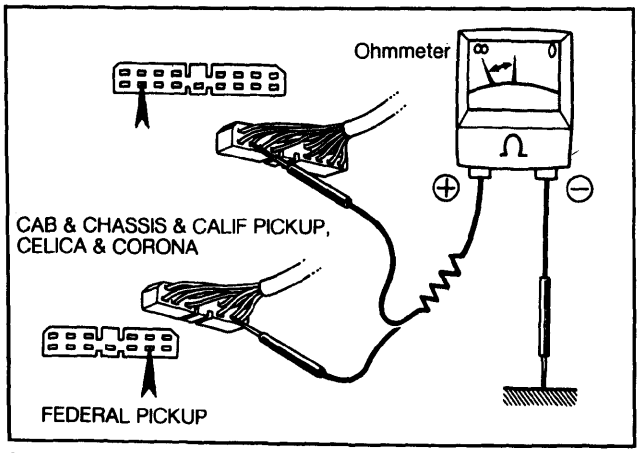
1) Jack up and support one rear wheel. Release parking brake. Place shift lever in "N" position.

2) Unplug wiring connector from computer. Computer is located on upper glove compartment on Celica, right side of cowl on Corona, or left side of cowl on Pickup.

3) Test "ON-OFF" cycles of speed sensor by connecting positive terminal of ohmmeter to back side of wiring connector terminal and connecting negative terminal to ground.

4) Turn wheel slowly, checking to see that ohmmeter needle deflects consistently. Plug wiring connector back into computer.

Fig. 12: Speed Sensor Test



Insert ohmmeter probe from back side of connector.