

TOYOTA

All Gasoline Models

DESCRIPTION

The fuel evaporation control system used on Toyota models 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

The 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 VSV. When the engine warms up, the TVSV opens and vacuum is present at VSV.

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

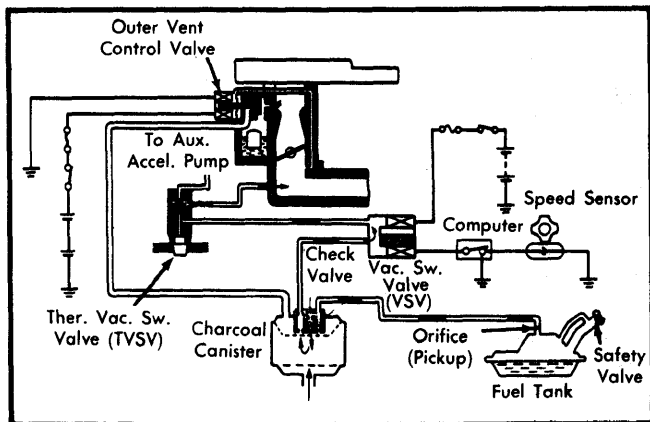


Fig. 1 Fuel Evaporation System (Celica, Corona Exc. Wagon, 2-WD Pickup)

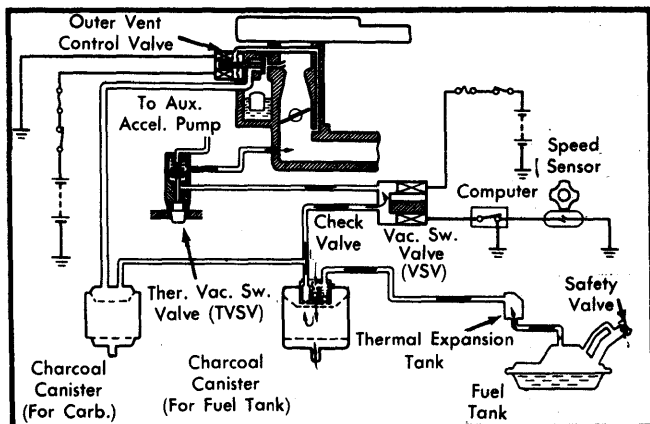


Fig. 2 Fuel Evaporation System (Corona Wagon, 4-WD Pickup)

When the vehicle reaches the road speed specified, the 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 the ignition is "OFF".

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 the 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 check valve) causes check valve to close, routing fuel vapors from fuel tank to charcoal canister where they are absorbed.

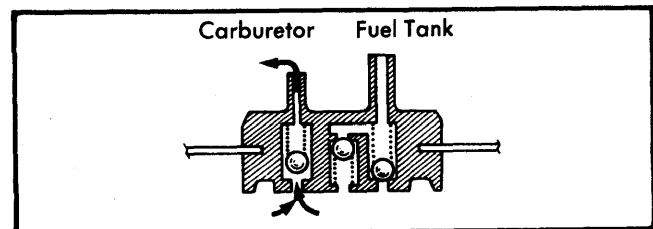


Fig. 3 Check Valves in Charcoal Canister

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.

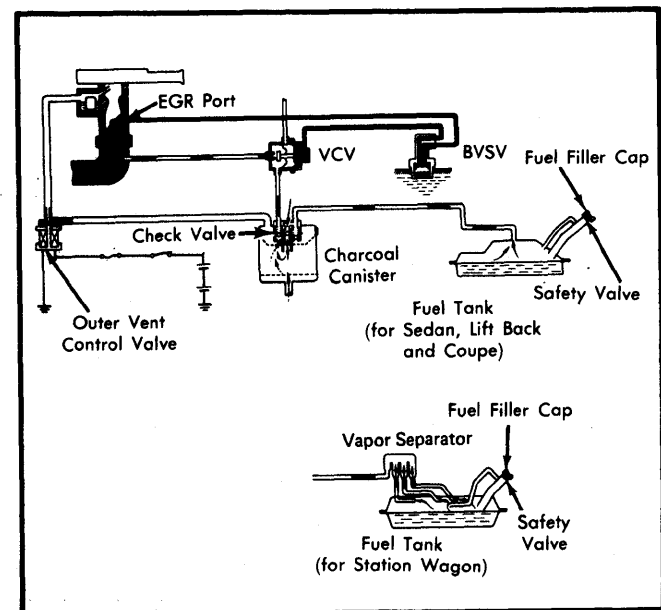


Fig. 4 Fuel Evaporation System (Corolla)

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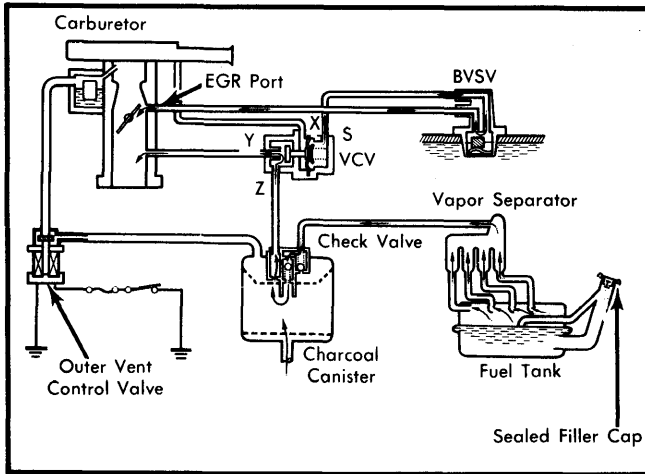


Fig. 5 Fuel Evaporation System (Land Cruiser)

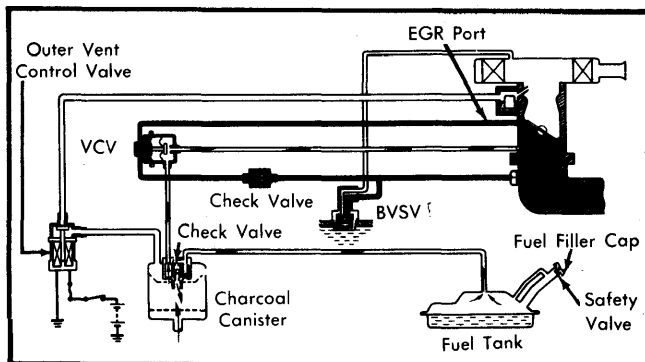


Fig. 6 Fuel Evaporation System (Starlet)

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 or 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.

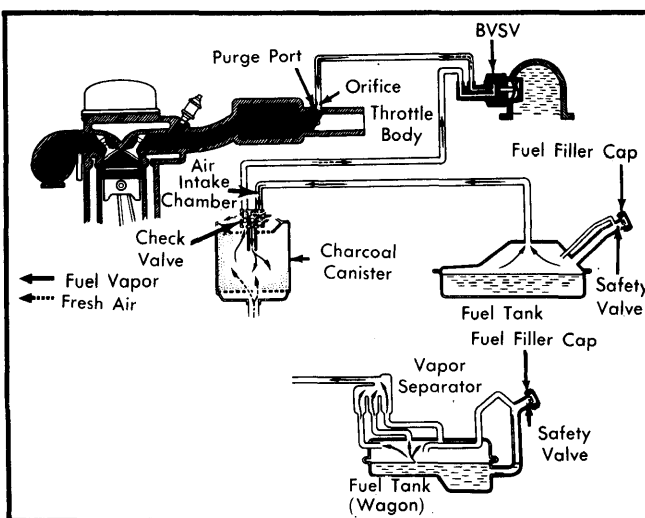


Fig. 7 Fuel Evaporation System (Cressida & Supra)

The system also uses 3 check valves in charcoal canister. These control fuel tank pressure and vent excess vacuum from tank.

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 absorbed in 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 intake manifold.

The system also uses 3 check valves in charcoal canister. These control fuel tank pressure and vent excess vacuum from tank.

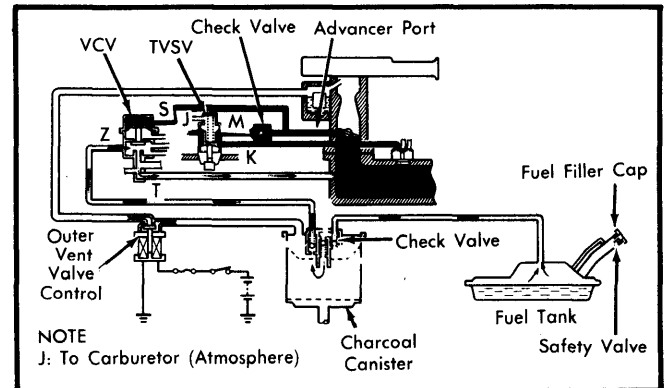


Fig. 8 Fuel Evaporation System (Tercel)

TROUBLE SHOOTING

Fuel Odor or Gas Leaks – Disconnected or cracked fuel vapor line or defective components in system. Check all lines and fittings and check operation of system.

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 valves and be sure all vacuum hoses are tight and in good condition.

TESTING

VACUUM SWITCHING VALVE (VSV)

1) Connect battery voltage and ground to VSV terminals as shown. 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 18-23 ohms on Calif. 4-WD Pickups and 38-43 ohms on all other models. There should be no continuity between case of valve and positive terminal.

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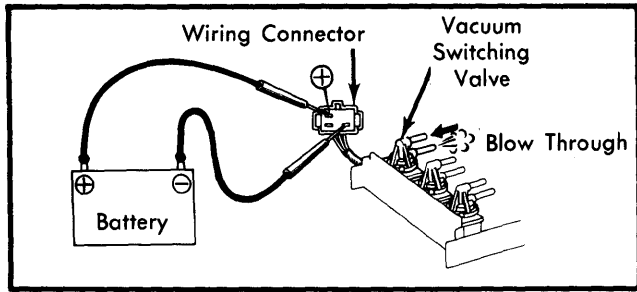


Fig. 9 Testing Vacuum Switching Valve

BIMETAL VACUUM SWITCHING VALVE (BVSV)

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 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 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". 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.

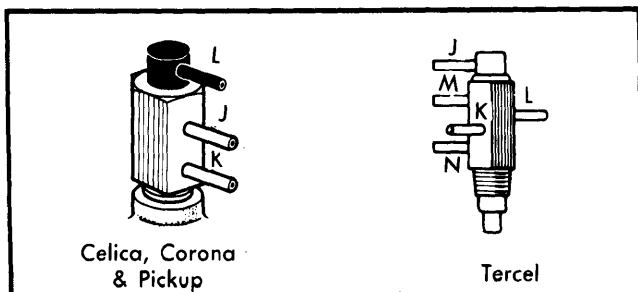


Fig. 10 Testing Thermal Vacuum Switching Valve

VACUUM CONTROL VALVE (VCV)

1) Remove valve from engine. Connect a hand vacuum pump to pipe "S". Plug pipe "T" on Starlet valve and pipes "R" and "Y" on Tercel valve. With specified vacuum applied, blow into middle pipe on Corolla valve, pipe "Y" on Land Cruiser valve, pipe "X" on Starlet valve, and pipe "T" on Tercel valve.

2) Air should come out specified pipes. See *Vacuum Control Valve Testing table*. Stop vacuum application 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
Corolla	2.95	Bottom
Land Cruiser	2.75	Z
Starlet	5.30	Bottom
Tercel	3.55	U, V, Z, W

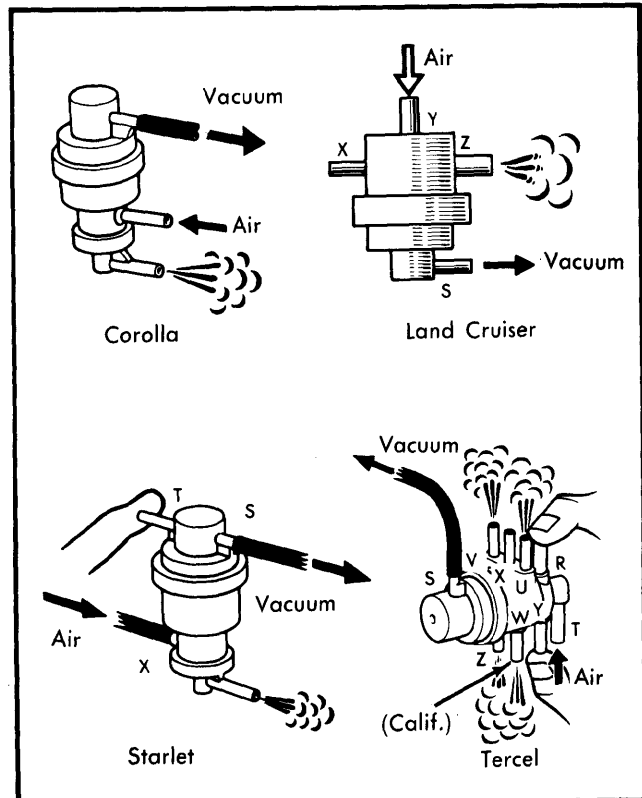


Fig. 11 Testing Vacuum Control Valve

OUTER VENT CONTROL VALVE

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.

3) Visually check wiring and fuse condition.

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SPEED SENSOR

- 1) Jack up one rear wheel and support off ground.
- 2) Release parking brake. Place shift lever in "N" position. Unplug wiring connector from computer. Computer is located on right side of cowl on Celica and Corona or left of cowl side on Pickup.
- 3) Test "ON-OFF" cycles of speed sensor by connecting positive terminal of ohmmeter to 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.

CAUTION — Insert ohmmeter probe from back side of connector.

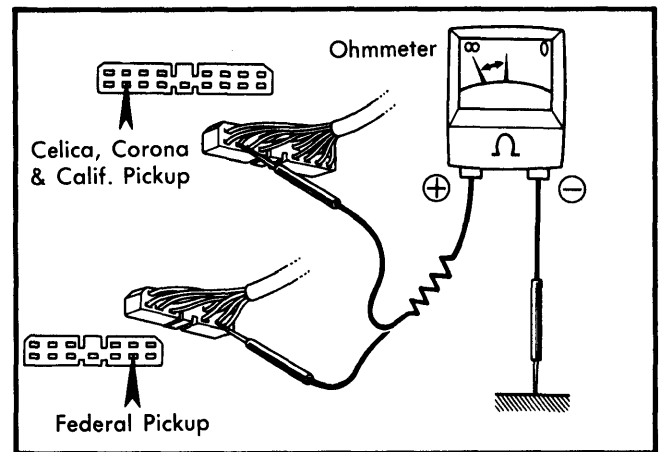


Fig. 12 Speed Sensor Test