

TOYOTA AIR INJECTION

Celica
Corolla (Calif. Only)
Corona
Land Cruiser
Pickup

DESCRIPTION

Air injection is used on these models to reduce hydrocarbon (HC) and carbon monoxide (CO) emissions. Fresh air is injected at the exhaust ports, allowing the gases to continue burning as they exit through the exhaust system. An air pump provides fresh air under pressure to be injected in the exhaust ports. A control system determines when the air should be injected.

The control system varies with each model. Major components include air switching valve (ASV), check valve, vacuum transmitting valve (VTV), bimetal vacuum switching valve (BVS), vacuum switching valve (VSV) and a catalytic converter temperature sensor.

OPERATION

The air injection control systems determine when fresh air is added to the exhaust ports. The switching points will vary with each engine, but the following conditions apply to all systems. Air is not injected when the engine is cold, when coolant temperature is above 230° F (110° C), or during deceleration. Air is injected under most driving conditions. On vehicles with a catalytic converter temperature probe, air injection is switched off by the computer when converter temperature is over 1445° F (785° C).

TESTING

SYSTEM CHECK

1) Check all hoses and connections. With engine coolant below 45° F (8° C), remove air by-pass hose from air cleaner housing. Start engine. Air should be discharged from air by-pass hose. As engine warms up, air by-pass should stop.

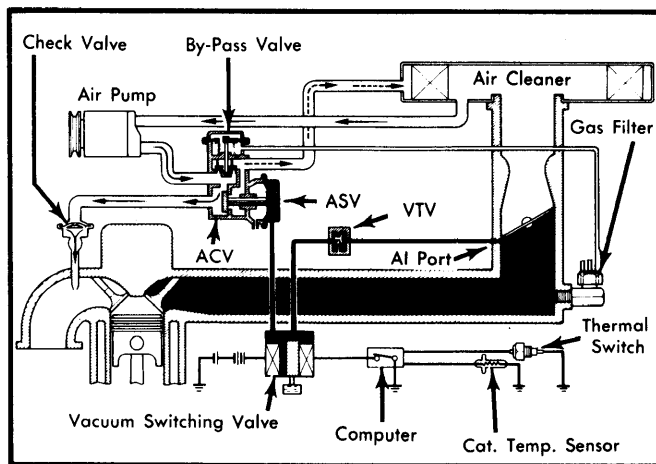


Fig. 1 Air Injection System
(Celica, Corona, Pickup)

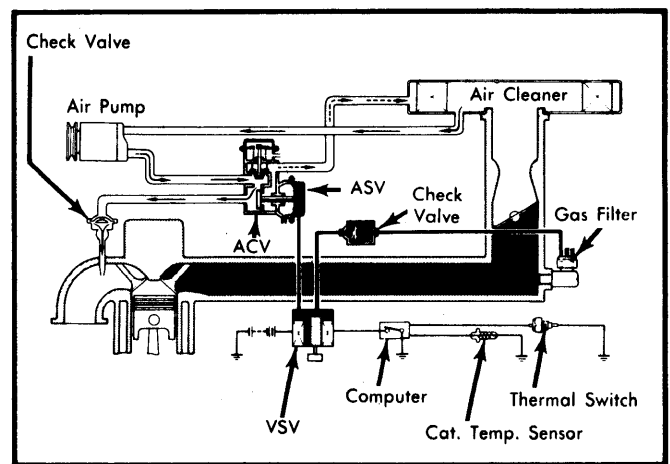


Fig. 3 Air Injection System
(Pickup Cab & Chassis)

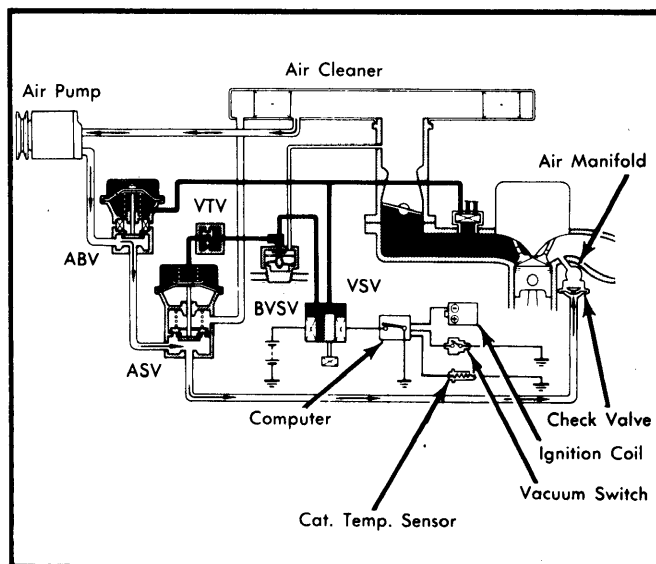


Fig. 2 Air Injection System
(Corolla)

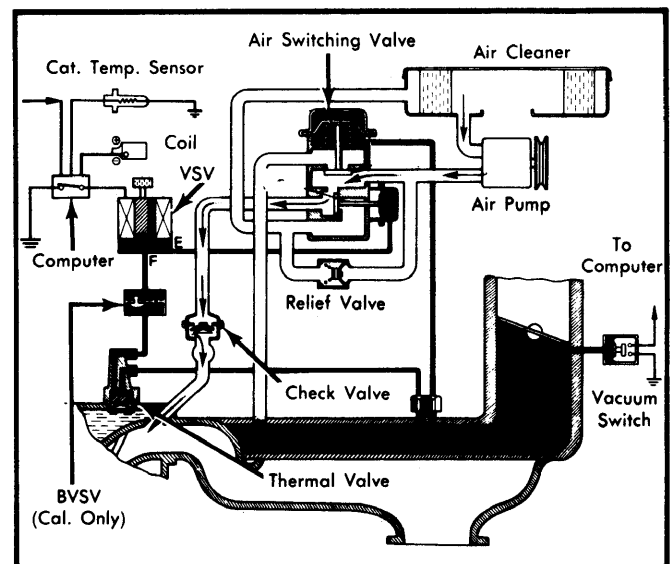


Fig. 4 Land Cruiser Air Injection System

TOYOTA AIR INJECTION (Cont.)

2) On Land Cruiser, disconnect hose from air switching valve to intake manifold and plug hose. On all models, race engine and quickly close throttle. Air should be discharged briefly from ASV on Land Cruiser, ABV on Corolla, and from by-pass hose on all other models.

3) On all models, disconnect VTV hose as shown. Air should be discharged from air by-pass hose within 10-20 seconds on Corolla and Land Cruiser, and within 15-30 seconds on all other models. Reconnect hose. See Fig. 5.

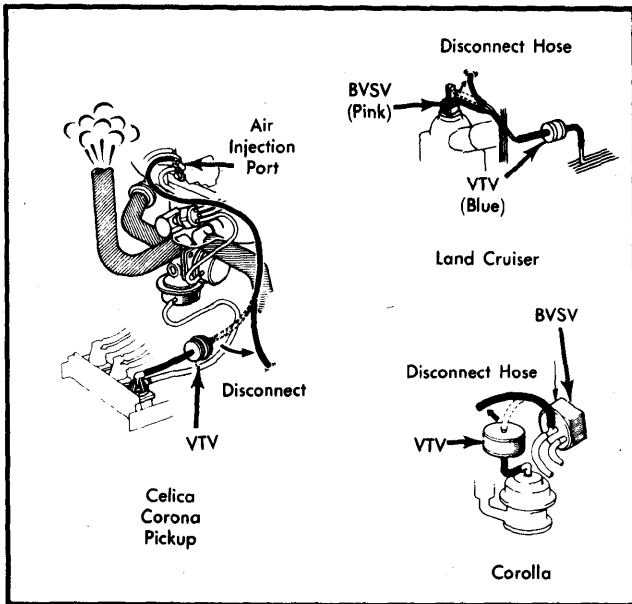


Fig. 5 VTV Hose Locations for System Check

4) Raise engine speed to 3000 RPM. Air should be discharged from by-pass hose. Stop engine and reconnect all hoses. If system performed correctly, testing is complete. If not, check individual components as necessary, using testing procedures that follow.

CHECK VALVE

Remove check valve and blow through both sides. Air should pass to manifold side, but should not pass from manifold side to pump side. Replace if defective.

PUMP AND RELIEF VALVE

1) Check air pump belt for condition and tension. Belt tension should be 60-100 lbs. with a used belt and 100-150 lbs. with a new belt. Do not pry on pump housing when tightening belt.

Air Pump Relief Valve Pressure

| Application | Pressure Psi (kg/cm ²) |
|------------------------------|---------------------------------------|
| Celica, Corona, Pickup | 3.3-5.5 (.23-.39) |
| Corolla | 4.0-4.9 (.28-.35) |
| Land Cruiser | |
| Federal | 3.9-6.1 (.28-.43) |
| Calif. | 5.7-8.5 (.40-.60) |

2) Disconnect air outlet hose at check valve and install pressure gauge. Start engine, warm to operating temperature, and raise engine speed until relief valve operates. Check that pressure is correct.

VACUUM TRANSMITTING VALVE (VTV)

Remove valve and blow through both sides. On Corolla, air should flow with resistance in both directions. On all other models, air should flow easily from side B to A, but with resistance from side A to B.

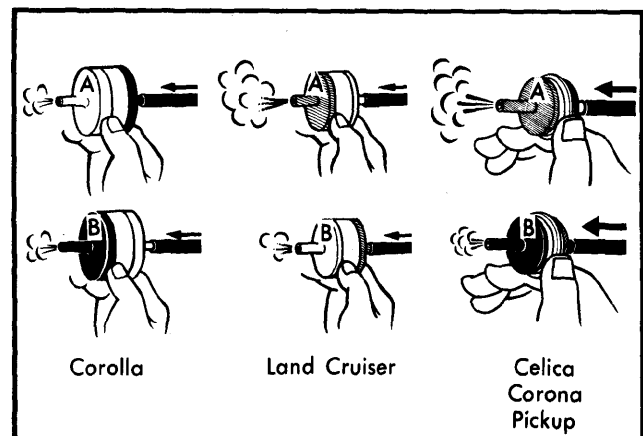


Fig. 6 Testing Vacuum Transmitting Valve

BIMETAL VACUUM SWITCHING VALVE (BVSV)

Land Cruiser — Drain coolant and remove BVSV. Cool in ice water and see that no air passes through (valve closed) below 41° F (° C). Heat water and check that air passes (valve open) above 66° F (19° C).

Corolla — Drain coolant and remove BVSV. Cool in ice water to below 46° F (8° C). Plug top port and blow through other ports. Air should pass freely. Heat valve in water and check that air will not flow through (with top port plugged) when valve is above 66° F (19° C).

VACUUM SWITCHING VALVE (VSV)

1) Connect battery to VSV terminals as shown. Blow into lower port of VSV — air should come out top port. Disconnect battery and blow into lower port — air should come out filter at bottom of VSV.

2) Use an ohmmeter to measure resistance between terminals where voltage was applied. Resistance should measure 38-43 ohms (48-60 ohms on Land Cruiser) at room temperature. There should be no continuity between positive terminal and body of VSV.

TOYOTA AIR INJECTION (Cont.)

3) Connect vacuum gauge to lower port of VSV. Start warm engine. Vacuum should read high. Locate catalytic converter temperature probe connector under driver's seat. Connect a jumper wire across connector terminals without unplugging connector. Vacuum should read zero or low.

CATALYTIC CONVERTER TEMPERATURE PROBE

Unplug temperature probe connector under driver's seat. With engine warm and idling, measure resistance across probe terminals. Resistance should measure 2,000 – 200,000 ohms.

NOTE — Insert ohmmeter probes into rear of connector to avoid damaging contacts.

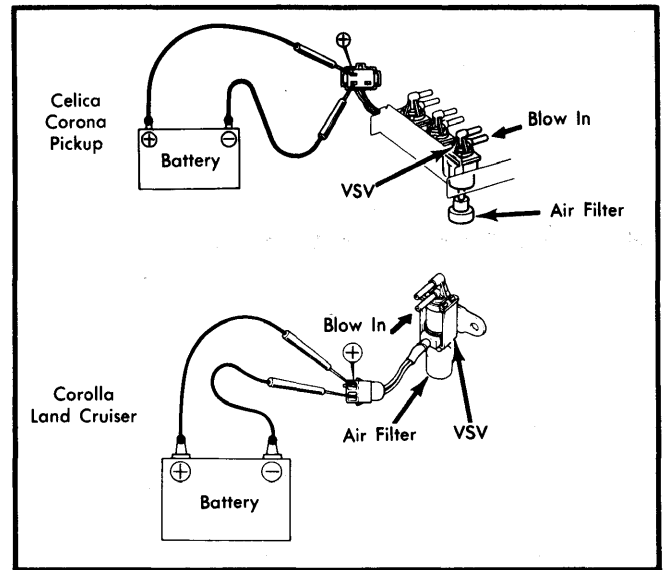


Fig. 7 Vacuum Switching Valve Test Connections