1982 Exhaust Emission Systems

COURIER AIR INJECTION SYSTEMS

DESCRIPTION

Courier models use 2 types of air injection systems. On California models with 2.0L engines, the system consists of an air pump, check valve, air control valve and air injection manifold with 4 injection nozzles. California models with 2.3L engines use the same components except that the air manifold/injection nozzles are replaced with a single air injection pipe.

On Federal models, a special reed valve takes the place of the air pump. It reacts to exhaust system pulsations to draw fresh air into the system. This system consists only of the reed valve (which also acts as a check valve) and injection nozzle.

OPERATION

AIR PUMP SYSTEM (Calif. Models Only)

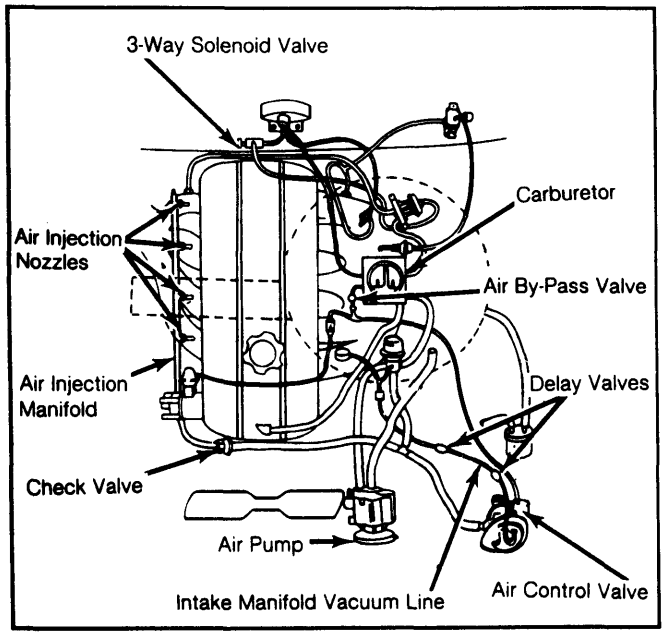
Air Pump

Air is directed from this belt driven pump through the system and into exhaust ports, where it oxidizes exhaust emissions.

Relief Valve

Integral with the air pump, this valve will protect the pump and system against pressure build-up by automatically opening to bleed off excess pressure.

Fig. 1: Air Pump Type Air Injection System Used on 2.0L California Engines



Uses 4 injection nozzles and air injection manifold.

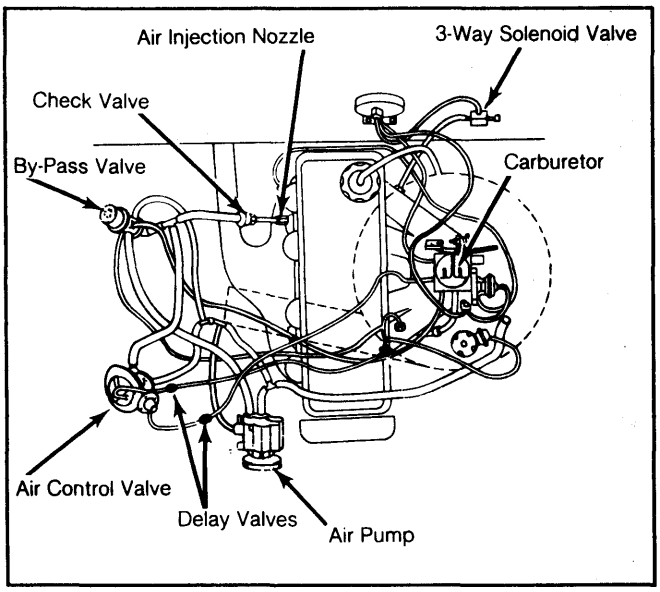
Check Valve

A one-way flow control valve located near injection manifold allows air pump air into the manifold. Should exhaust pressure become higher than air pump pressure, check valve closes to prevent hot exhaust gases from going into system and damaging components.

By-Pass Valve

This valve is connected into the system and reacts to air pressure levels and vacuum levels to direct air pump air through the air control valve or directly to injection manifold.

Fig. 2: Air Pump Type Air Injection System Used on 2.3L California Engines



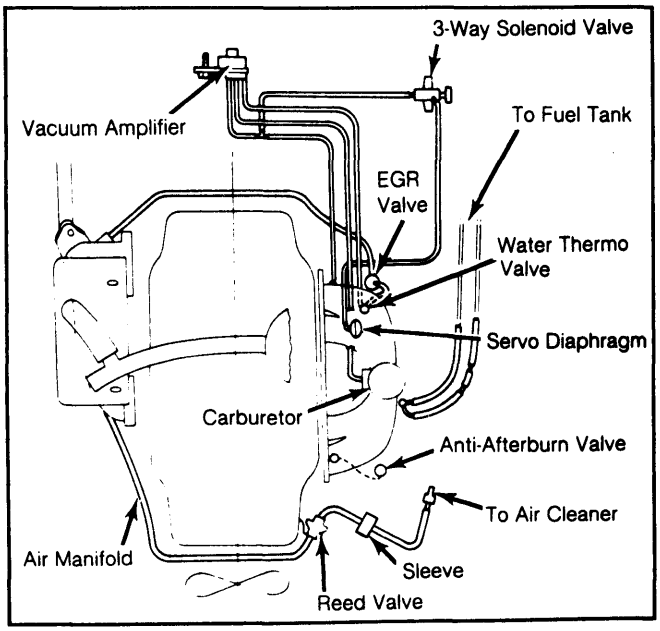
Uses single air injection pipe.

Air Control Valve

Air control valve reacts to vacuum levels (which indicate engine loads) to direct air pump air either into injection manifold or back to the inlet side of air pump. On vehicles with automatic transmissions, air control valve contains 1 relief valve.

Vehicles equipped with manual transmissions use an air control valve with 2 relief valves. One relief valve is closed during low engine load conditions to direct normal air flow into exhaust system. Under high load conditions, it opens to return air flow to the air pump. The second relief valve modulates amount of air reaching exhaust system according to engine loads.

Fig. 3: Reed Valve Type Air Injection System Used on 2.0L Federal Engines



Uses reed valve, air manifold and sleeve.

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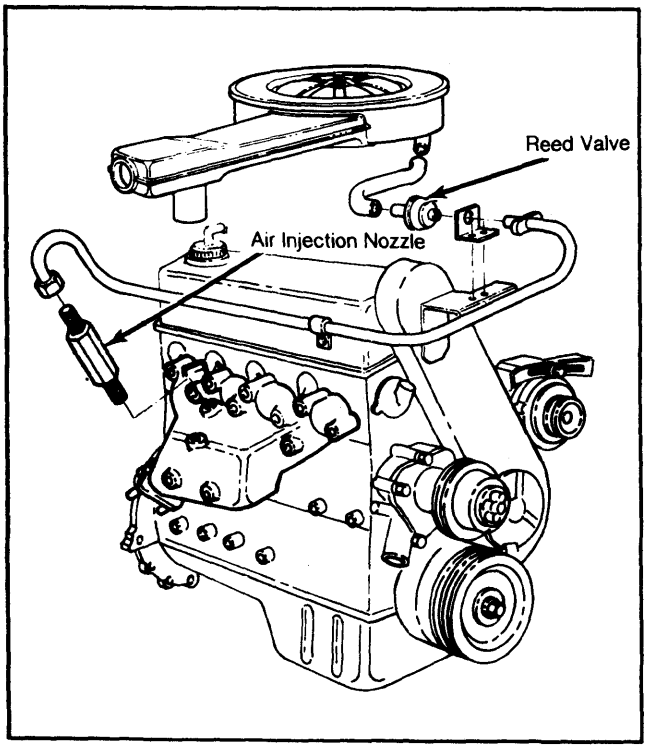
COURIER AIR INJECTION SYSTEMS (Cont.)

REED VALVE SYSTEM (Federal Models Only)

Reed valve is a special, one-way flow control valve. Reed assembly opens and closes with exhaust system pressure pulsations (which are normal action of engine combustion cycle).

When atmospheric pressure of intake fresh air is higher than exhaust pressure (negative pulse), reed valve is open to allow fresh air into system. When exhaust system pulse is higher than intake air pressure (positive pulse), reed valve is closed so exhaust gases cannot back into intake air source at air cleaner.

Fig. 4: Reed Valve Type Air Injection System Used on 2.3L Federal Engines



Uses reed valve and injection nozzle.

TESTING

AIR PUMP TEST

1) Detach air pump outlet hose from by-pass valve. Insert "T" fitting and connect pressure gauge. Plug other opening in fitting.

2) Be sure air pump belt tension is correct (deflection is about ¾" when depressed midway on longest run). Start engine and run at 1500 RPM. Be sure choke is pushed fully in.

3) Check pressure gauge. If reading is below 1.0 psi, replace air pump.

AIR MANIFOLD CHECK VALVE

Remove check valve from injection manifold. Blow through each side of valve. Air should pass through the valve when blowing from air pump side. If air passes through the valve from air manifold side, replace check valve.

AIR PUMP RELIEF VALVE TEST

1) Remove relief valve air hose. Start engine and run at idle. Check relief valve for air flow by placing finger near outlet. If air flow is detected, replace pump and relief valve assembly.

2) Increase engine speed to 4500 RPM. If no air flow is present and/or valve is excessively noisy, replace pump and valve assembly.

AIR CONTROL VALVE TEST

Auto. Trans. Equipped Vehicles Only

1) Detach air hose at bottom of air control valve. Start engine and run at idle. Check that no air comes from outlet port.

2) Detach intake manifold vacuum line from top of air control valve. Air should now come from bottom outlet port. If valve does not respond as described, check vacuum line. If okay, replace air control valve.

Man. Trans. Equipped Vehicles Only

1) Warm engine to normal operating temperature and stop engine. Detach air hose at bottom of air control valve. Start engine and run at idle.

2) Remove vacuum line from No. 1 relief valve at top of control valve. Air should come from outlet port at bottom of air control valve.

3) Reconnect vacuum line to No. 1 relief valve. No air should flow from outlet port.

4) Disconnect vacuum line from No. 2 relief valve on side of control valve. Remove vacuum line from air by-pass valve (2.3L) or evap shutter valve (2.0L) and connect at No. 2 relief valve.

5) This leads intake manifold vacuum directly to the No. 2 relief valve. Air should be discharged from the outlet port of the air control valve.

6) Disconnect vacuum line from No. 2 relief valve and reconnect to air by-pass valve (2.3L) or evap shutter valve (2.0L). Check that air is not discharged from outlet port. If air flow from outlet port is not correct in any of the above tests, replace the air control valve.

REED VALVE TEST

1) Warm engine to normal operating temperature. Detach air hose from reed valve. Start engine and run at idle speed.

2) Place finger over reed valve inlet and check that air is being drawn into valve. If no intake air is evident, replace reed valve.

3) Raise engine speed to 1500 RPM. Check for exhaust gas leaks at reed valve inlet fitting. If exhaust is leaking, replace reed valve.