COURIER AIR INJECTION SYSTEMS

All Models

DESCRIPTION

Courier models use two types of air injection systems. On California models, an air pump, by-pass valve, check valve, air control valve and injection manifold are used. 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.)

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 excess pressure by automatically opening to bleed off any excess pressure buildup.

Check Valve – This a one-way flow control valve. It is located near injection manifold and 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.

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 Auto. Trans. vehicles, air control valve contains one relief valve. Man. Trans. vehicles have an air control valve with two relief valves. One relief valve is closed at low speeds to direct normal air flow into exhaust system. At high speeds 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.

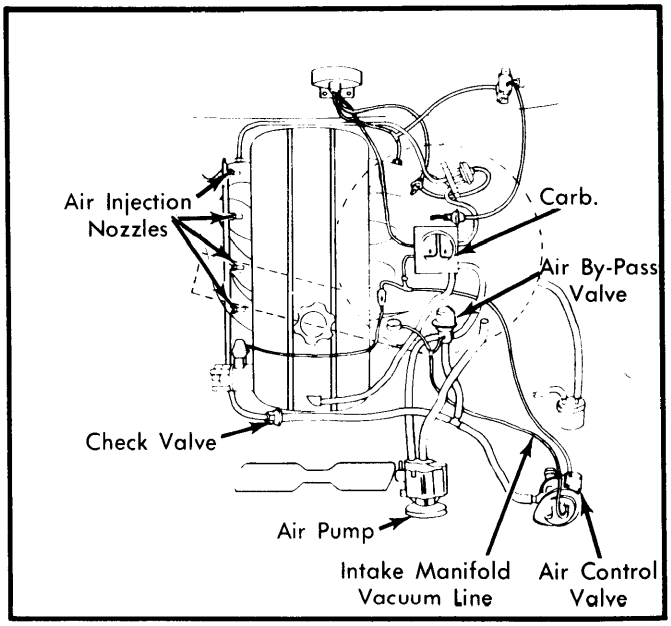

Fig. 1 Air Pump Type Air Injection System for 2.0L California Engines

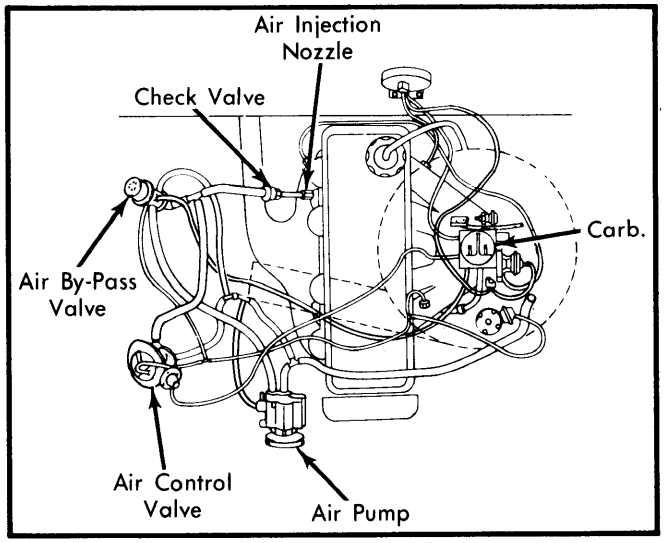

Fig. 2 Air Pump Type Air Injection System for 2.3L California Engines

REED VALVE SYSTEM (FEDERAL)

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.

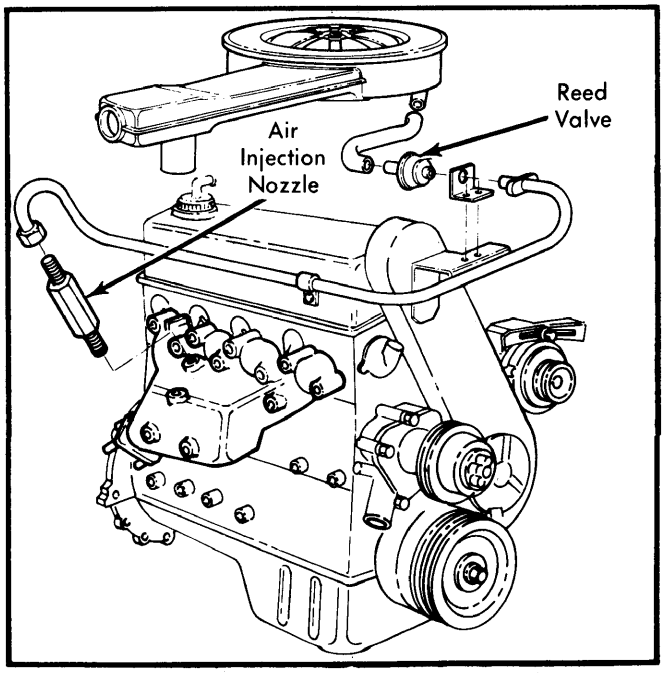

Fig. 3 Reed Valve Type Air Injection System for 2.3L Federal Engines

COURIER AIR INJECTION SYSTEMS (Cont.)

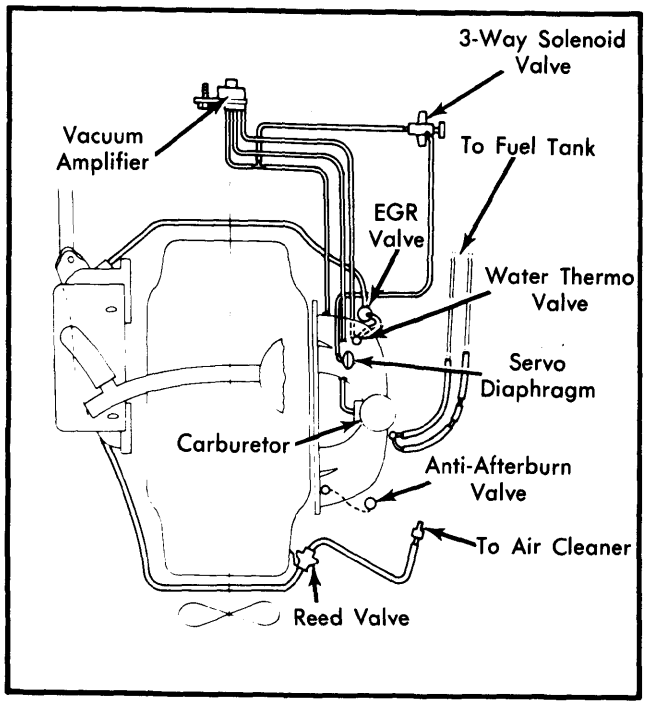

Fig. 4 Reed Valve Type Air Injection System for 2.0L Federal Engines

TESTING

AIR PUMP TEST

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

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 occurs, replace pump and relief valve assembly.

2) Increase engine speed to 4500 RPM. If no air flows out and excessive noise is present, replace pump and valve assembly.

AIR CONTROL VALVE TEST

Auto. Trans. 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. 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. Remove intake manifold vacuum line at air by-pass valve. Air should come from bottom outlet of air control valve.

2) Plug disconnected vacuum line. No air should flow from bottom outlet of valve.

3) Remove intake manifold vacuum line from relief valve on side of air control valve. Unplug by-pass valve vacuum line and connect this line to nipple on side of relief valve from which intake manifold vacuum line was removed.

4) Air should flow from bottom outlet of air control valve. Disconnect vacuum line at nipple on side of air control valve. Air should not flow from bottom of valve. If valve does not respond as indicated, check vacuum lines. If okay, replace 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. Place finger over reed valve inlet to check for air being drawn into valve. If no intake air is evident, replace reed valve.

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