

AMERICAN MOTORS AIR GUARD SYSTEM

DESCRIPTION

The Air Guard System is used on all 6-cylinder engines to reduce carbon monoxide and hydrocarbon emissions. The system adds a controlled amount of air to exhaust gases in the exhaust ports, causing oxidation of the gases. The Air Guard System used on all Eagle models consists of a belt driven air pump, diverter valve, air injection manifold and connecting hoses. A dual system input is used on all Federal vehicles which, in addition to the above, includes an air control valve, coolant temperature override (CTO) switch, upstream and downstream air input hoses. California vehicles use the Federal dual system plus an air bypass circuit and an electrically controlled air control circuit.

OPERATION

Fresh air is drawn into the air pump through a filter fan. The air is compressed in the pump and then discharged through the pump to the diverter valve which directs it to the air distribution system or dumps it through a bypass port, depending on engine operating conditions. Air pressure in this system is maintained at approximately 5 psi by a relief valve incorporated in the diverter valve.

Air from the diverter valve is directed through the air injection mounted check valve. At each exhaust port, a hollow fitting carries air into the exhaust manifold. The air mixes with hot exhaust gases and causes a further burning of the mixture, reducing hydrocarbon and carbon monoxide emissions.

Air Pump — Pump is belt driven and mounted on front of the engine with power take-off at crankshaft pulley. Intake air passes through a centrifugal filter at front of pump. Air is delivered to injection manifold(s) by a rubber hose, through a diverter valve and tubing.

NOTE — *The air pump is serviceable only by replacement. Do not remove rear housing cover for any reason. The internal components of the pump are not serviceable.*

Diverter Valve — This valve momentarily diverts air pump output from the exhaust manifold during rapid deceleration; intake manifold vacuum exceeds 20 inches Hg. Diverter also operates when air pump output exceeds 5 psi.

Air Injection Manifold — The air injection manifold distributes air from the pump to each of the injection tubes. A check valve incorporated within the manifold prevents reverse flow of exhaust gases in case of pump or belt failure. Air injection manifold distribution tubes are connected directly to exhaust manifold.

Air Control Valve — This valve is located between the diverter valve and air injection manifold. Vacuum is applied to the air control valve by the coolant temperature override switch (CTO). This valve directs air pressure to the air injection manifold when vacuum is applied or directly to the dual-bed catalytic converter when vacuum is not applied.

Coolant Temperature Override Valve — The CTO valve is located on the left rear corner of the engine block. A manifold vacuum hose is attached to the CTO. Manifold vacuum should be present at the air control valve when coolant temperature is less than 160°F. No vacuum should be present if coolant temperature is above 160°F. The CTO is connected to the air valve by a hose. The CTO used on California vehicles routes all air system pressure to air injection manifold until engine coolant reaches 149°F.

Upstream Air Input Hoses — These hoses direct air up to the air injection manifold.

Downstream Air Input Hoses — These hoses direct air down to the dual-bed catalytic converter.

Air Bypass Circuit — This circuit is used only on California vehicles (except Eagle). In addition to the Federal components, this system consists of an air bypass valve, diverter solenoid, extended idle circuit, two-way and reverse delay valves. This system is controlled and actuated by the Computerized Emission Control (CEC) system.

The air bypass valve releases system air pressure to the atmosphere when the diverter solenoid is energized by the Open Loop 3 switch of the CEC. However, for the first 75 seconds of Open Loop 3 (warm idle) operation, the extended idle relay switch cuts current flow to the bypass valve to prevent dumping of the system air. After 75 seconds, the idle relay switch turns off and the air pressure is dumped to the atmosphere.

The two-way and reverse delay valves are used to prevent loss of vacuum during acceleration. A thermal vacuum switch is located in the air cleaner to block system vacuum below temperatures of 50°F.

Air Control Circuit — This system is used in conjunction with the air bypass circuit and is controlled by an upstream solenoid. The solenoid is grounded through the Open Loop 2 switch. When the circuit is closed, system air pressure is directed to the air injection manifold. When the circuit is open, air system pressure is directed to the catalytic converter.

TESTING

DIVERTER VALVE

1) Start engine and run at idle. Check diverter vents. Little or no air should flow from vents. Accelerate engine to 2000-3000 RPM and rapidly close throttle. A strong flow of air should pass from diverter vents for 5 seconds.

2) Slowly accelerate engine. Between 2500 and 3500 RPM air should begin to flow from diverter vents. Replace diverter valve if defective. Valve is not serviceable and must be replaced as an assembly.

CHECK VALVE

Disconnect air supply hose at check valve. With engine running above idle speed, listen and feel for exhaust leakage at check valve. If check valve leaks excessively, replace as complete assembly.

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AIR CONTROL VALVE

NOTE — Engine must be at normal operating temperature.

1) Disconnect hoses from valve and connect suitable hand vacuum pump (J-23738) to vacuum nipple. Start engine and note output from air control valve. Air pump pressure should be present at "upstream" port ("downstream" port on California). Little or no pressure should be felt at opposite port. If present, replace valve.

2) Apply 10 in. Hg to small nipple on air control valve. Air pressure should be present at "upstream" ("downstream" on California) port. Little or no pressure should be felt at opposite port. If present, replace valve.

AIR BYPASS VALVE

1) With engine at normal operating temperature, disconnect air bypass-to-air control valve hose at bypass valve. Remove vacuum hose. Start engine and check for air pump pressure at vent port. System output should be felt at vent port. No output should be present at disconnected port.

2) Apply 10 in. Hg to vacuum nipple. Air pump pressure should be felt at disconnected port and not at vent port. If valve does not operate as described and air pump and diverter check valve are not defective, replace air bypass valve.

DIVERTE? SOLENOID

1) With engine at normal operating temperature, connect a voltmeter probe to light green wire at rear of solenoid plug (use jumper wire if required). Start engine and idle at 700 RPM. Battery voltage should be indicated during first 75 seconds of operation.

2) After 75 seconds, voltage should drop to about one volt. Accelerate engine. Voltmeter should indicate battery charge and 75-second time delay should begin. If low voltage is indicated before 75-second delay, check for pinched wire in harness or replace extended idle relay.

3) If voltage does not drop after 75-second delay test Open Loop 3 circuit. Refer to *Computerized Emission Control in the AMERICAN MOTORS Section*. Replace open loop if defective. Connect vacuum hose and unplug diverter electrical connection. Connect test lamp to terminal of solenoid and positive post of battery. Lamp should light and vacuum should be present through solenoid. If not, replace solenoid and/or locate air leak. If solenoid operates normally, replace extended idle relay.

UPSTREAM SOLENOID

1) Connect a voltmeter between light blue wire of solenoid and ground (using jumper wire if required). With ignition "ON", battery voltage should be present. If not, check for battery voltage at dark blue wire. If voltage is present at dark blue wire, replace solenoid; if not, check for short in solenoid voltage circuit.

2) Start engine and idle at 700 RPM. One volt should register on voltmeter. Accelerate engine from idle to 3000 RPM for 1-2 seconds. During acceleration period, battery voltage should be indicated. One volt should be indicated at idle. If system does not perform as stated, check Open Loop 2 system and replace if necessary. Refer to *Computerized Emission Control in AMERICAN MOTORS Section*.

3) If vacuum switches and Open Loop 2 operate properly, replace upstream solenoid. If voltmeter indication does not change, locate short between solenoid and Open Loop 2 switch.

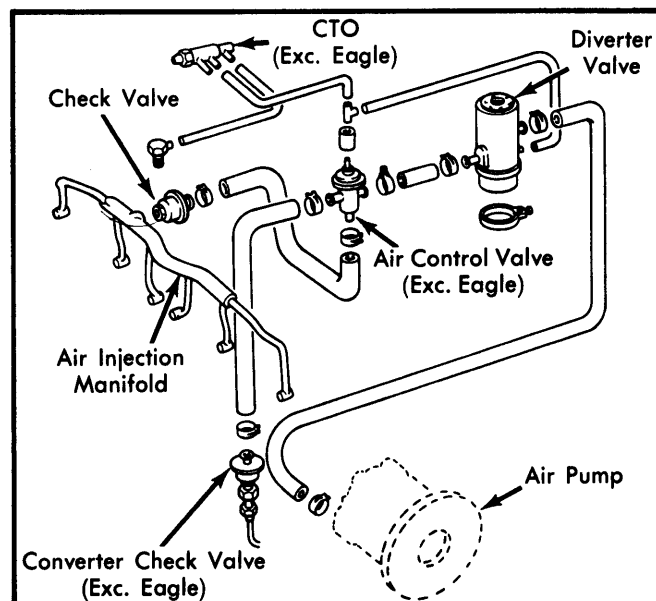


Fig. 1 AMC Air Guard System (Federal Models)

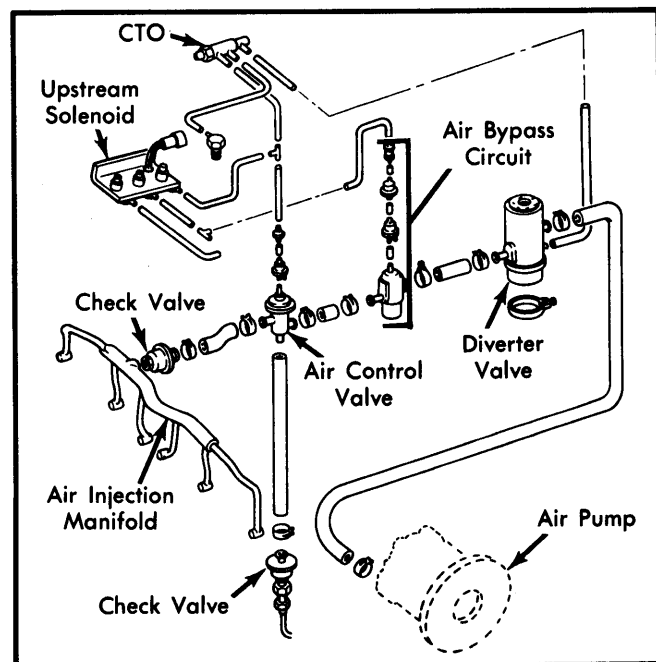


Fig. 2 AMC Air Guard System (California Models)