

1980 Exhaust Emission Systems

MAZDA PISTON ENGINE AIR PUMP AIR INJECTION

GLC (Calif. w/Auto. Trans.)
626
B2000 (Calif.)

NOTE — All other GLC and B2000 models use a reed valve type air injection system. See appropriate article in this section.

DESCRIPTION

The air pump type air injection system is designed to reduce hydrocarbon (HC) and carbon monoxide (CO) content of exhaust gases by injecting a controlled amount of compressed air into the exhaust manifold.

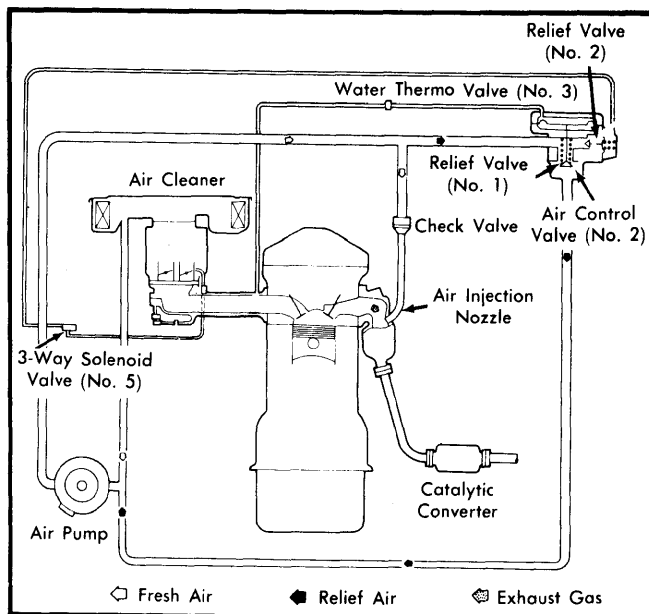


Fig. 1 Schematic of Mazda GLC (Calif. Auto. Trans.) Air Pump Type Air Injection System

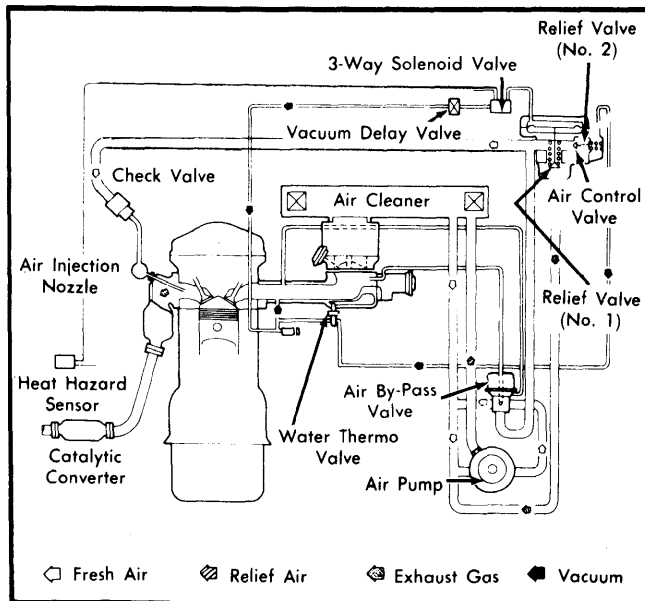


Fig. 2 Schematic of Mazda 626 Air Pump Type Air Injection System

System components and application vary among models. Components of the system are a belt-driven air pump with integral relief valve, air control valve with 2 relief valves, water thermo valve, check valve, air by-pass valve (626 and B2000), air injection nozzle, catalytic converter and various pipes and hoses. A 3-way solenoid valve and heat hazard sensor are installed on GLC and 626 models which reduce catalytic converter overheating.

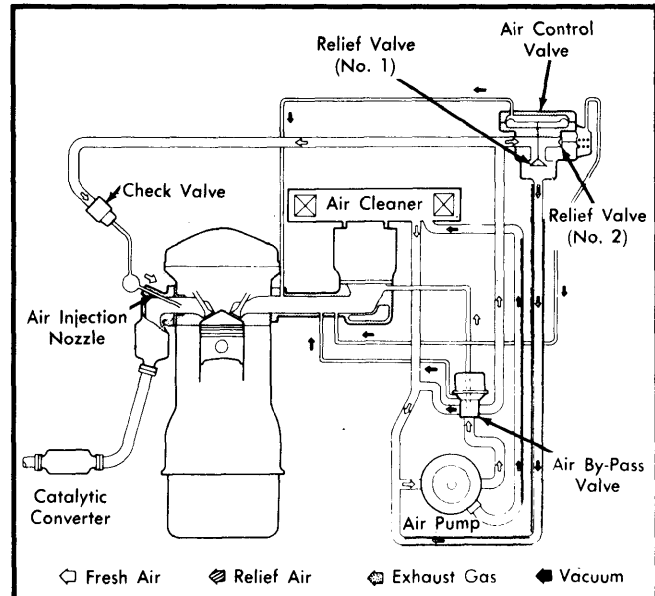


Fig. 3 Schematic of Mazda B2000 (Calif.) Air Pump Type Air Injection System

OPERATION

AIR PUMP

Air pump draws fresh air from air cleaner, pressurizes it and drives it into the system hoses. A built-in relief valve diverts excess air pressure back to the air cleaner should it build up in air pump.

AIR CONTROL VALVE

This valve regulates the supply of compressed air from the air pump according to engine load conditions. The air control valve also aids in the prevention of catalytic converter overheating by venting compressed air to the atmosphere during certain engine operating conditions. The air control valve consists of 2 relief valves:

No. 1 Relief Valve — The No. 1 relief valve is controlled by coolant temperature and intake manifold vacuum. When the engine is operating under heavy load conditions, the valve opens to divert part of compressed air back to air pump.

No. 2 Relief Valve — The No. 2 relief valve is controlled by intake manifold vacuum and coolant temperature. This valve regulates the amount of injected air to increase oxidation of unburned exhaust gas according to engine operating conditions.

MAZDA PISTON ENGINE AIR PUMP AIR INJECTION (Cont.)

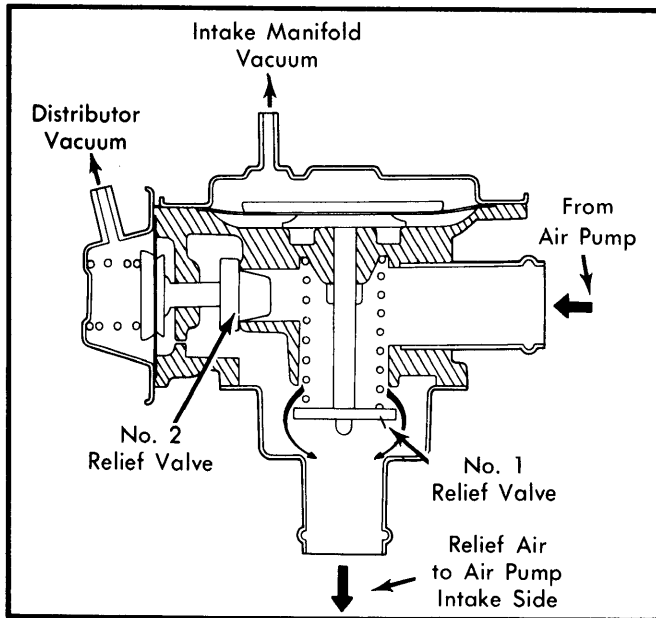


Fig. 4 Sectional View of Air Control Valve

CHECK VALVE

This is a one-way flow control valve. It allows air pump air to enter exhaust manifold, but will not let any exhaust back-pressure be forced into air pump system and ruin components.

WATER THERMO VALVE

The water thermo valve is located in the bottom radiator tank. The valve controls the vacuum signal sent to the air control valve. The valve opens above 64° F (18° C) on GLC and above 122° F (50° C) on all other models. For testing procedure, see *Exhaust Gas Recirculation* article.

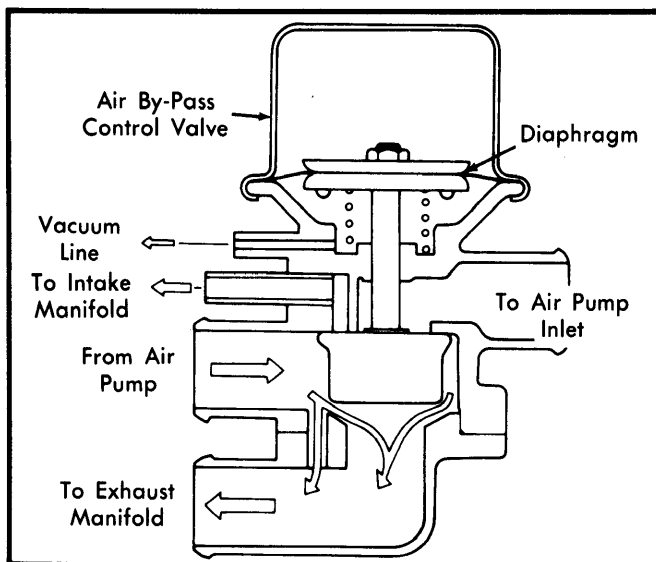


Fig. 5 Sectional View of Mazda Air By-Pass Valve (626 and Calif. B2000 Only)

AIR BY-PASS VALVE (626 AND B2000 ONLY)

The air by-pass valve is located between air pump and check valve. During normal operation, air pump system air passes through by-pass valve to exhaust ports. On deceleration, large amount of unburned air/fuel mixture reaches exhaust port area. Adding fresh air would cause afterburn. When by-pass valve manifold connection senses high vacuum level, by-pass valve momentarily diverts part of air pump air back to inlet side of air pump while part is directed into intake manifold to help balance air/fuel mixture during deceleration.

CATALYTIC CONVERTER

All models are equipped with a catalytic converter which converts unburned hydrocarbons into harmless water and carbon dioxide. The catalytic converter is equipped with a plug which may be removed for visual inspection of converter interior.

TESTING

AIR PUMP

- 1) Start engine and run until normal operating temperature is reached. Check all hoses and connections for possible leaks. Replace as necessary and/or tighten connections.
- 2) Listen for excessive noise at air pump. Replace air pump if noise is excessive. Check drive belt tension. Disconnect hose from air pump outlet and attach a suitable pressure gauge. See Fig. 6.

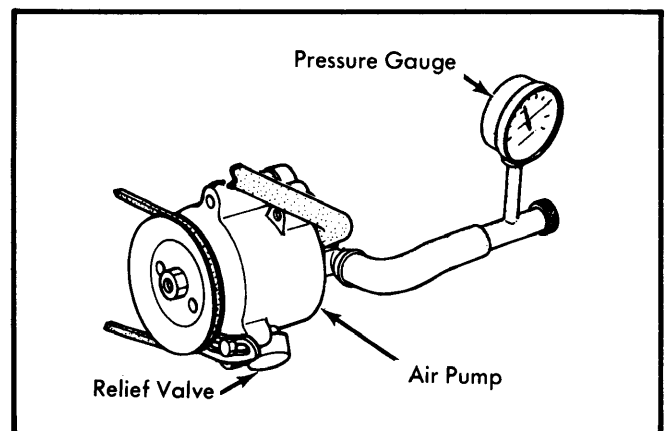


Fig. 6 Checking Air Pump Pressure Output

- 3) Connect a tachometer to engine and run engine at 1500 RPM. Note pressure reading. Pump must show a pressure of at least 1.0 psi (0.68 kg/cm²). If less, replace pump.

RELIEF VALVE

- 1) Run engine at idle speed. Hold hand near relief valve. No air should be felt at idle. Disconnect and plug vacuum sensing tube from No. 2 air control valve (GLC only).
- 2) On all models, increase engine speed to 4000-4500 RPM. Check relief valve. Air should flow from relief valve.

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MAZDA PISTON ENGINE AIR PUMP AIR INJECTION (Cont.)

AIR CONTROL VALVE

1) Warm engine until operating temperature is reached. Stop engine and disconnect outlet hose from bottom of air control valve.

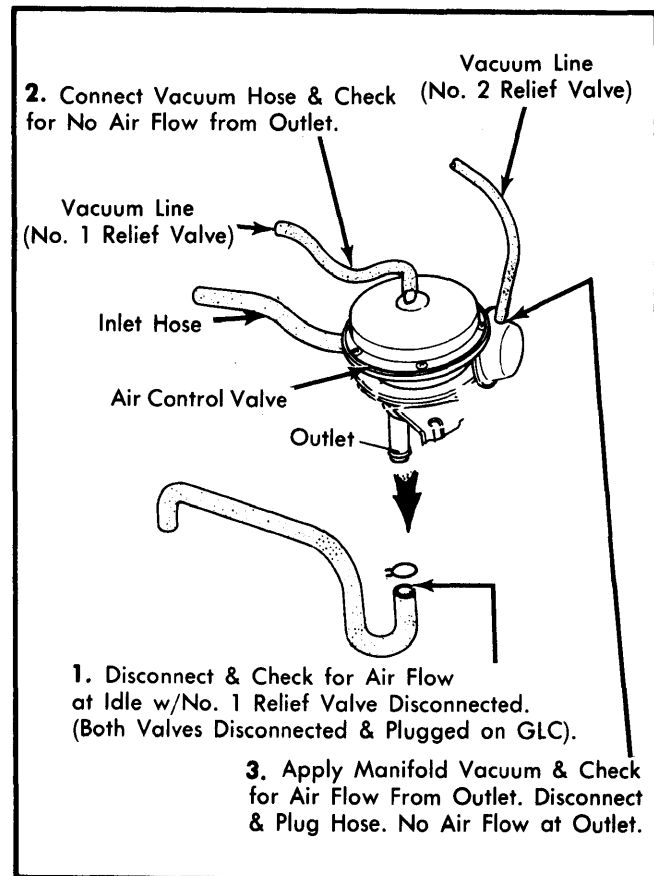


Fig. 7 Testing Air Control Valve

2) On GLC only, disconnect and plug vacuum hose (white) from No. 1 relief valve and vacuum hose (black) from No. 2 relief valve. On all models, start engine and run at idle.

3) On 626 and B2000 models, disconnect vacuum hose from No. 1 relief valve. Air should be discharged from outlet on all models.

4) On all models, reconnect vacuum hose to No. 1 relief valve. Air should not flow from outlet port. Using suitable tubing, connect No. 2 relief valve to vacuum source. Air should flow from outlet port. Disconnect and plug vacuum hose previously connected to No. 2 relief valve. No air should flow from outlet port. If air control valve does not operate as described, replace valve and repeat test.

CHECK VALVE

1) Warm engine until normal operating temperature is reached. Stop engine and disconnect air hose from check valve connector.

2) Slowly increase engine speed to 1500 RPM while holding hand over open connection. Check for exhaust leak from check valve. If exhaust gas escapes, replace check valve.

AIR BY-PASS VALVE

1) Disconnect by-pass valve-to-exhaust manifold hose. Start engine and run at idle. Air should flow from by-pass valve outlet.

2) Increase engine speed and rapidly release throttle. Air flow from by-pass valve outlet should stop for 3 seconds. If air continues to flow or stops for more than 3 seconds, replace air by-pass valve.

3) With engine at idle, disconnect intake manifold hose from by-pass valve. No air should flow from outlet. Increase engine speed and repeat step 2). Replace valve if it does not perform as described.