

1974-79 EXHAUST EMISSION SYSTEMS

Mazda Air Pump Air Injection System

1979 RX-7

NOTE: For 1974-78 models, see **AIR INJECTION SYSTEMS** article in this section.

DESCRIPTION

This system controls HC and CO emissions by injecting additional air into the exhaust system to cause further burning of exhaust gases. System consists of an air pump, check valve, air control valve (with relief solenoid valve) and thermal reactor.

OPERATION

Pressurized air from the air pump blows secondary air into engine exhaust ports to mix with hot gases being discharged from engine. This allows the mixture to reburn, greatly reducing HC and CO emissions. When excessive air pressure is present, some of the air pump output is released to the thermal reactor cooling jacket to prevent air pump damage and engine power loss. Air is drawn in through air cleaner, compressed by air pump, forced through air control valve and check valve, and fed into exhaust ports.

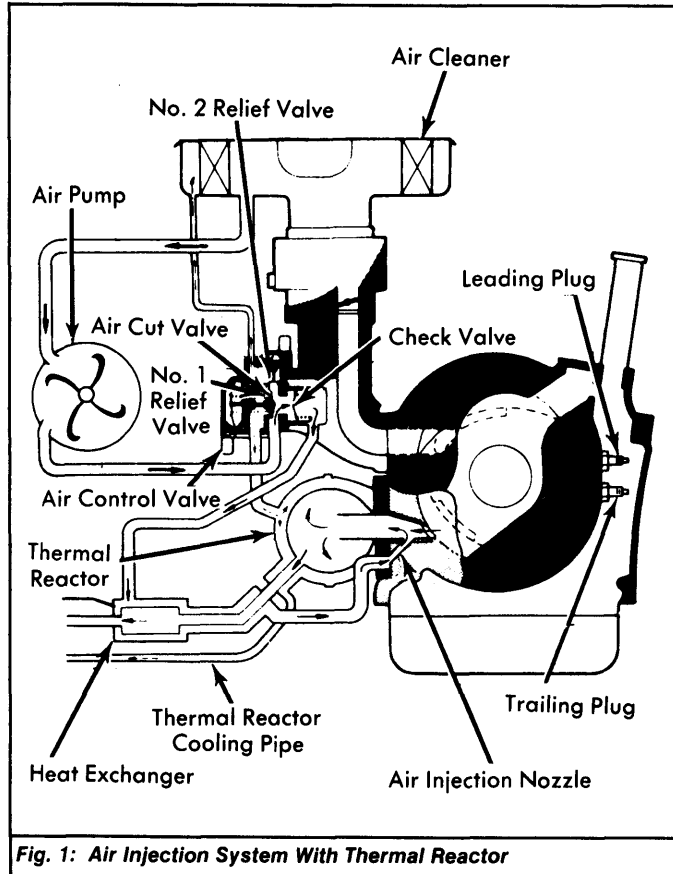


Fig. 1: Air Injection System With Thermal Reactor

TESTING

AIR PUMP

- 1) With engine at normal operating temperature, inspect all hose connections for leaks. Check for pump noise and belt tension. Disconnect air line to air control valve.
- 2) Connect hose to a pressure gauge. Start and run engine at idle speed. Gauge should register more than 1.64 psi (.12 kg/cm²) with engine at 800 RPM. If pump outlet is below specification, replace pump.

CHECK VALVE

With engine at normal operating temperature, connect tachometer. Detach air pump-to-air control valve hose at control valve. Start engine and increase speed to 1500 RPM. Check for exhaust gas leak at air inlet fitting of control valve. If leak exists, replace check valve (it is not blocking reverse flow through system).

THERMAL REACTOR & HEAT EXCHANGER

Inspect for obvious damage, cracks, loose connections and signs of leaks. Repair or replace as required.

AIR CONTROL VALVE

- 1) After ensuring air pump and all hoses are okay, check carburetor and air control valve attaching nuts for tightness. Disconnect vacuum sensing tube from relief solenoid valve. See Fig. 2. Disconnect air control valve hose at air cleaner.
- 2) Start and run engine at idle. Place finger over open end of hose from air control valve. Connect detached end of vacuum sensing tube back onto relief solenoid valve.
- 3) Slowly increase engine speed and check that air starts to flow from air control valve hose when engine speed is about 1300 RPM. Stop engine and remove pipe from air control valve to thermal reactor.
- 4) Start and run engine at idle. Check that air does not flow from air control valve (where pipe has been disconnected). Increase engine speed. Air should flow from valve at about 4500 RPM. If valve does not function as described, replace it.

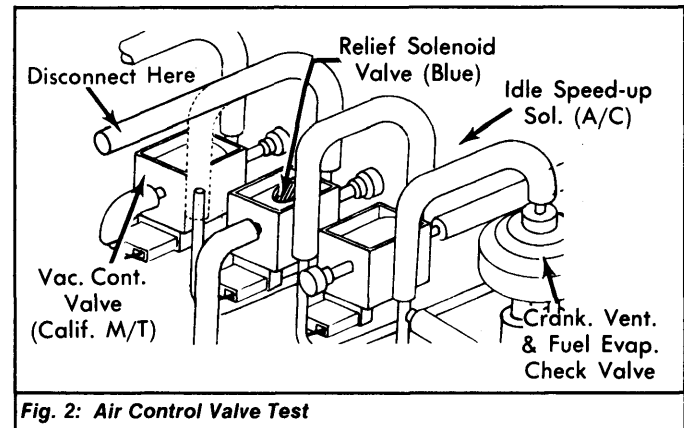


Fig. 2: Air Control Valve Test

RELIEF SOLENOID VALVE

- 1) Disconnect vacuum sensing tubes from relief solenoid valve and vacuum pipe. Blow through solenoid valve from vacuum sensing tube (top hose). Air should pass through valve and come out side fitting.
- 2) Disconnect coupler from relief solenoid valve and connect battery power to terminals on valve. Blow through valve from vacuum sensing tube (top hose). Air should pass through solenoid valve and come out air filter of valve. If valve does not respond as described, replace it.

RELIEF SOLENOID VALVE SIGNAL CHECK

Federal Models - 1) Warm engine to normal operating temperature. Connect tachometer to engine. With voltmeter on good ground, insert other probe into Light Green wire terminal of relief solenoid valve connector (do not detach connector).

2) Start and run engine at idle. Be sure current is reaching terminal. Increase speed to 2000 RPM, current flow should stop. Slowly decrease engine speed and record speed at which current begins flowing to terminal. It should be about 1050-1250 RPM.

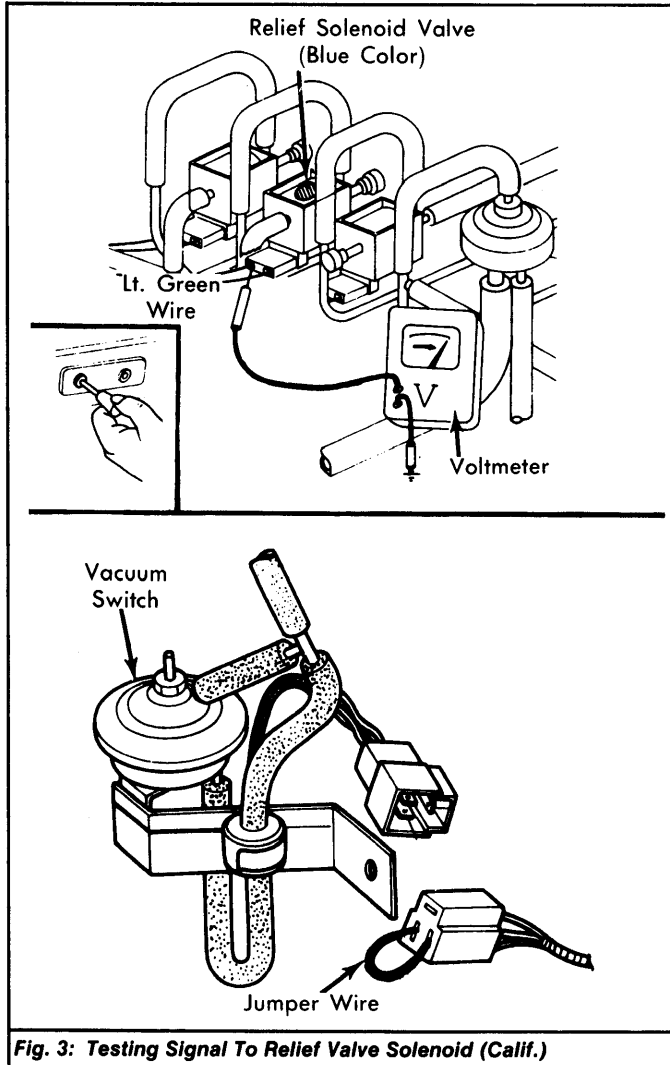
3) Slowly increase engine speed from idle and check speed at which current stops flowing to solenoid. Difference between this speed and speed noted in previous step (1050-1250 RPM), should be 80-220 RPM.

California Models - 1) Warm engine to normal operating temperature. Stop engine and connect tachometer. Attach voltmeter to ground

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Mazda Air Pump Air Injection System (Cont.)

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and to Light Green wire of relief solenoid valve connector (do not detach connector).

2) Disconnect vacuum switch electrical coupler. Start engine with choke knob pulled fully out. Note voltmeter to be sure current is reaching solenoid terminal. Push choke knob all the way in.

3) Place jumper wire on vacuum switch connector. See Fig. 3. Increase engine speed to 3500 RPM, using throttle. Current should stop flowing to terminal after approximately 130 seconds from engine start in step 2).

4) Return to engine to idle, then slowly increase engine speed. Current should stop flowing to terminal when engine is running faster than 3000 RPM.

5) On manual transmission equipped models, set engine speed to 2000 RPM with throttle. Depress clutch pedal and check that current stops flowing when shifting into 4th and/or 5th gear.

6) Remove jumper wire from vacuum switch connector. Using throttle, increase engine speed to 2000 RPM. Slowly decrease engine speed and record speed at which current begins flowing to terminal. Speed should be about 1050-1250 RPM.

7) From idle, slowly increase speed and check speed at which current stops flowing to terminal. Difference between this speed and that recorded in previous step should be 80-220 RPM.