

1980 Exhaust Emission Systems

DATSUN AIR INJECTION SYSTEM

210 (Calif. Only)
310 (Calif. Only)
Pickup (Calif. Only)

DESCRIPTION

The Air Injection System is designed to reduce the hydrocarbon (HC) and carbon monoxide (CO) content of exhaust gases by injecting a controlled amount of compressed air into the exhaust gas stream as it leaves the combustion chamber. The system consists of a belt-driven air pump, air pump air cleaner, check valve, anti-backfire valve, combined air control valve, air gallery and various connecting hoses and pipes. Heavy duty pickup models are also equipped with an air pump relief valve and programmed control system consisting of an electronic control unit, vacuum switching valve and air control switch.

OPERATION

Inlet air to the air pump is drawn through the pump air cleaner. The pump then supplies air under pressure to either the exhaust ports on the cylinder head (210 and 310) or the exhaust manifold (all other models). The oxygen in this fresh air, plus the heat of the exhaust gases, causes further oxidation (burning), which converts the exhaust gases into carbon dioxide and water.

AIR PUMP

The air pump is a belt-driven, rotary vane type pump. The pump receives clean air through a hose connected to the air pump air cleaner. The compressed air from the pump is routed through the check valve to the injection nozzles where it is injected into exhaust ports near the exhaust valves.

ANTI-BACKFIRE VALVE

The anti-backfire valve is used to prevent backfire in the exhaust system during deceleration. At the start of deceleration, the air/fuel mixture in the intake manifold becomes too rich to ignite and burn in the combustion chamber. The anti-backfire valve provides additional air to the intake manifold to make the air/fuel mixture leaner and prevent backfire.

CHECK VALVE

The check valve, located in the pump discharge line, prevents the backflow of exhaust gas into the air pump in the event that

exhaust manifold pressure exceeds air injection pressure, or the air pump fails.

AIR GALLERY

Secondary air from air pump goes through check valve into air gallery where it is distributed to each exhaust port. Air gallery of 210 and 310 models is integral with cylinder head. Pickup models have an external air gallery with injection nozzles located at each exhaust port.

COMBINED AIR CONTROL VALVE

Used on all models, this valve regulates supply of compressed air from the air pump according to engine load condition. The combined air control valve also aids in prevention of catalytic converter overheating by venting compressed air to atmosphere during certain engine operating conditions.

PROGRAMMED CONTROL SYSTEM

Used on heavy duty pickup models, this system electronically controls the operation of the combined air control valve. The electronic control unit is mounted under dash in cab and monitors the operation of air control switch and vacuum switching valve. Electronic unit is not serviceable.

AIR CONTROL SWITCH

Used on heavy duty pickup models, this switch is activated by manifold vacuum and controlled by the electronic control unit. It electrically operates the vacuum switching valve by sensing manifold vacuum.

VACUUM SWITCHING VALVE

Used on heavy duty pickup models, this valve controls the operation of the combined air control valve. The vacuum switching valve is activated by the air control switch and monitored by the electronic control unit.

AIR PUMP RELIEF VALVE

Used on Pickup models, the air pump relief valve controls the injection of secondary air into the exhaust system when the engine is running at high speeds under a heavy load. The relief

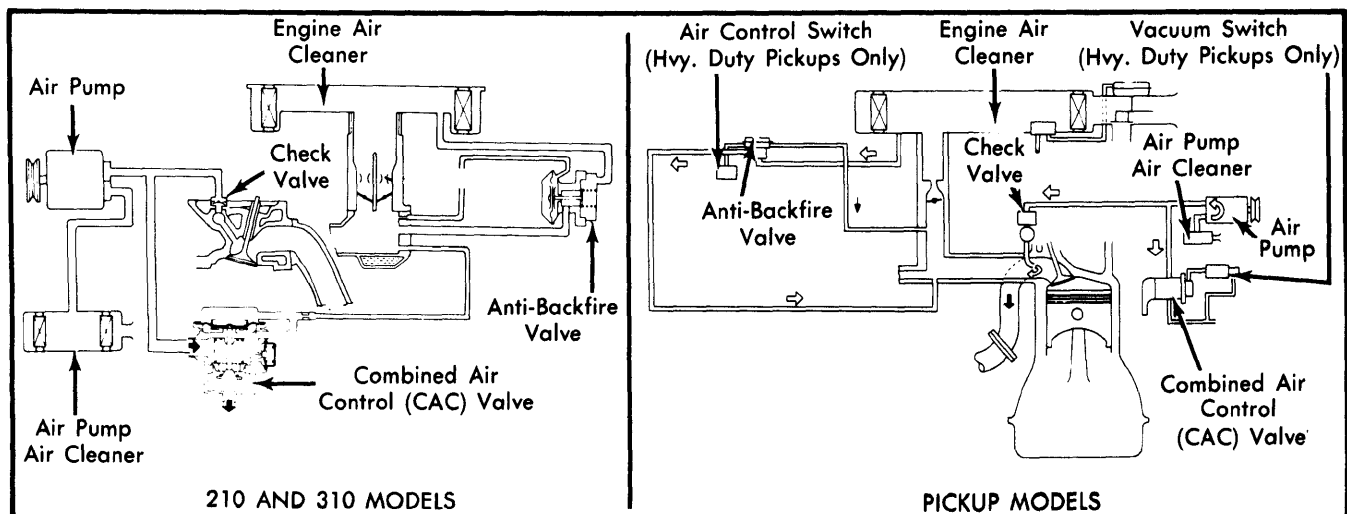


Fig. 1 Schematics of Datsun Air Injection System

DATSUN AIR INJECTION SYSTEM (Cont.)

valve is designed to minimize horsepower loss resulting from air injection into the exhaust system, and to protect the air pump from excessive back pressure.

TESTING

AIR PUMP

1) With engine at normal operating temperature, inspect all air injection system hoses, hose connections and air gallery for leaks and damage. Check air pump drive belt tension and adjust as required.

2) Disconnect and plug air pump discharge hose at combined air control (CAC) valve. Disconnect air supply hose at check valve and connect air pump test gauge and adapter (ST 19870000) to hose. Tighten hose clamp securely.

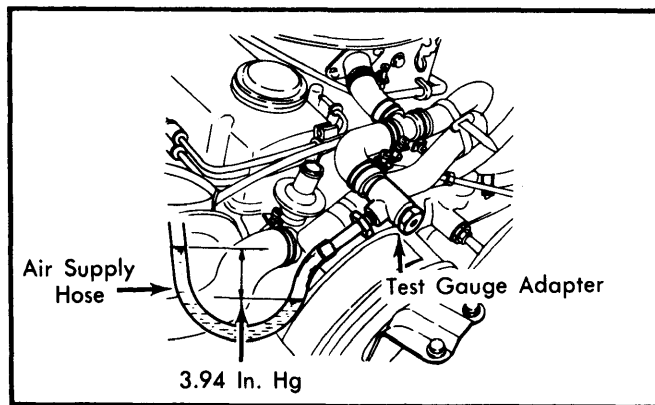


Fig. 2 Connecting Air Pump Gauge and Adapter

3) Position adapter and test gauge so that air emitted through drilled pipe plug will be harmlessly dissipated. Connect a tachometer to engine.

4) Start engine and check air pump pressure with engine at 2600 RPM. Pump pressure should be at least 3.94 in. Hg (100 mm Hg). If air pump pressure is not as specified, repair or replace air pump as necessary.

CHECK VALVE

1) With engine at normal operating temperature, disconnect hose from check valve and check hose opening for any sign of exhaust gas leakage. If leakage is detected, replace check valve.

2) Increase engine speed to 2000 RPM and then return it to idle. Again check hose for any sign of leakage as engine returns to idle. If leakage is detected, replace check valve.

ANTI-BACKFIRE VALVE

1) With engine at normal operating temperature, disconnect anti-backfire valve hose at air cleaner and place finger over end of hose.

2) Increase engine speed to 3000 RPM, then quickly return it to idle. If suction is felt at end of hose, anti-backfire valve is functioning properly. If not, replace valve.

COMBINED AIR CONTROL VALVE

1) With engine at normal operating temperature and idling, place finger over relief air opening in air cleaner and check for presence of air.

2) Disconnect vacuum hose from combined air control (CAC) valve and plug hose to prevent engine from stalling. Air should now be discharged from CAC valve if valve is functioning properly.

3) Next, connect a hand operated vacuum pump to CAC valve as shown in Fig. 3. Apply 7.87-9.84 in. Hg (200-250 mm Hg) to valve. Increase engine speed to 3000 RPM and make sure no air leaks from CAC valve.

4) With vacuum still applied and engine at 3000 RPM, disconnect and plug air hose at check valve. Air should now leak from CAC valve. If not, replace CAC valve.

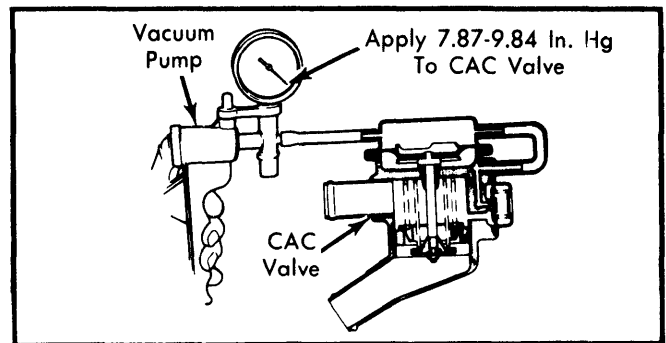


Fig. 3 Checking Combined Air Control Valve

AIR PUMP RELIEF VALVE (PICKUP MODELS ONLY)

1) With engine at normal operating temperature, disconnect hoses to check valve and relief valve from air hose connector and cap off connector.

2) Increase engine speed to 3000 RPM and place hand over air outlet of relief valve to check for discharged air. If no air is felt, replace relief valve.

AIR CONTROL SWITCH (HEAVY DUTY PICKUP MODELS ONLY)

1) With engine idling, disconnect electrical connector at control switch and connect ohmmeter. If continuity exists, control switch is defective and must be replaced.

2) Next, disconnect vacuum hose and check for continuity. If continuity does not exist, switch is defective and must be replaced.

VACUUM SWITCHING VALVE (HEAVY DUTY PICKUP MODELS ONLY)

1) With engine idling, disconnect electrical connector and vacuum hose. If vacuum builds up at vacuum hose; valve is good. If no vacuum is created, valve is defective and must be replaced.

2) Next, apply 12 volts to connector. If no vacuum builds up at hose end, switch is good; if vacuum does build up, replace switching valve.