1982 Exhaust Emission Systems

DATSUN DIESEL EXHAUST GAS RECIRCULATION

Maxima, Pickup

DESCRIPTION

The Exhaust Gas Recirculation (EGR) system is designed to control the formation of NOx emission by recirculating the exhaust gas into the intake manifold passage through the control valve. On Maxima models, the system consists of an EGR control valve, throttle body, solenoid valves and EGR control unit. On Pickup models, the system consists of an EGR control valve, thermal vacuum valve, venturi vacuum transducer (VVT) valve, check valve and vacuum amplifier.

OPERATION

MAXIMA

The EGR flow is determined by position of throttle and EGR valves. Information is signaled to EGR control unit by potentiometer (engine load), revolution sensor (RPM) and water temperature sensor (engine coolant).

The control unit signals the solenoid valves to open or close, determining vacuum levels at EGR control valve and throttle diaphragm. To assure good driveability and safe operation, the EGR system is deactivated when coolant temperature is either low or extremely high.

DATSUN MAXIMA EGR SYSTEM OPERATION

Throttle Valve	EGR Valve	EGR Flow Rate
Closed	Open	High
Open	Open	Low
Open	Closed	Zero

PICKUP

The EGR flow is determined by vacuum amplifier, which functions in response to engine load and engine speed. Under light engine loads, flow rate increases. Under heavy engine loads, flow rate decreases.

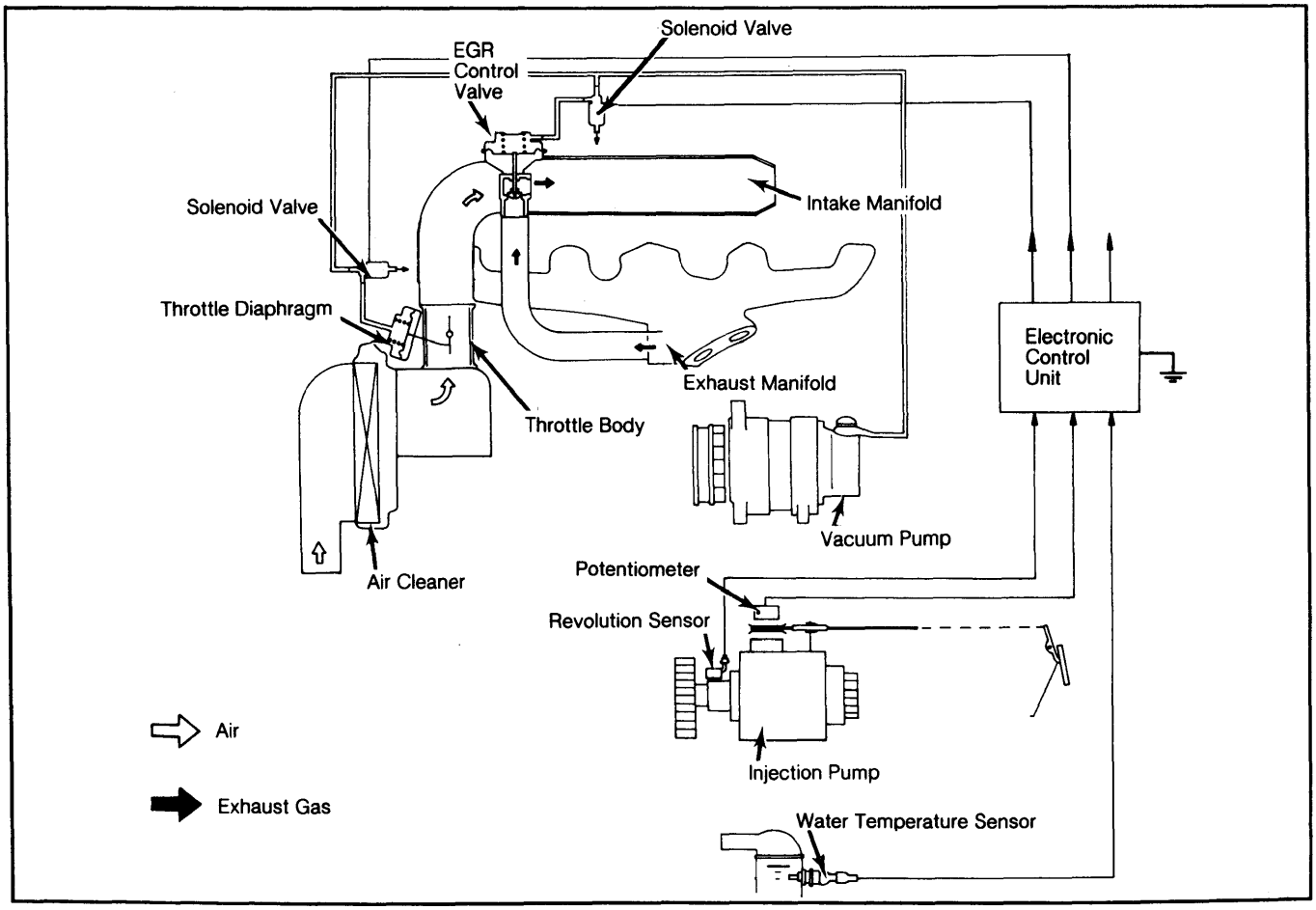
The EGR control valve (connected to diaphragm) is designed to move vertically to control amount of exhaust gas admitted to intake manifold. Diaphragm is activated by vacuum created in response to a sub-venturi vacuum signal that is amplified by vacuum amplifier.

The thermal vacuum valve (attached to oil cooler housing) monitors engine cooling temperature. This wax controlled valve opens (in response to thermal expansion) to activate the vacuum amplifier and VVT valve, which causes the EGR system to operate.

The VVT valve monitors pressure of sub-venturi vacuum and is actuated when sub-venturi vacuum and venturi-ported vacuum are equal. This valve controls vacuum signal which operates EGR control valve.

The vacuum amplifier, which receives a weak vacuum signal produced in sub-venturi, activates venturi

Fig. 1: Datsun Maxima Diesel EGR Control System



DATSUN DIESEL EXHAUST GAS RECIRCULATION (Cont.)

diaphragm and vacuum regulator diaphragm. This valve controls output vacuum admitted to EGR control valve.

The check valve is located on VVT valve bracket in the venturi ported vacuum line. This valve prevents the vacuum, acting on VVT valve, from increasing excessively and activates EGR system properly.

TESTING

SYSTEM CHECK

Maxima

1) Check vacuum hoses and electrical harness connectors. With engine off, check EGR control valve and throttle body diaphragm/rod for binding or sticking.

2) With engine cold, the EGR control valve should not operate and the throttle valve should be open when engine is accelerated. If the control valve operates or the throttle valve is closed, check water temperature sensor. If sensor is functioning properly, replace faulty EGR control unit.

3) With engine idling at normal operating temperature, EGR control valve should open and throttle valve should be closed. While gradually increasing engine speed, the throttle valve should open and the control valve should close. If not, check each valve individually.

4) Disconnect harness connector at each solenoid valve and, with engine idling, apply battery voltage to the terminals in one connector. Repeat test with other solenoid valve

5) When voltage is applied, the EGR valve should operate and the throttle valve should close. If EGR and throttle valves are operating properly, check revolution sensor, potentiometer and electrical connections.

6) If these systems are okay, replace EGR control unit. If the EGR and throttle valves do not operate as described, check solenoid valves, EGR control valve and throttle diaphragm.

Pickup

1) Check vacuum hoses and electrical harness connectors. With engine off, check EGR control valve for binding or sticking by using vacuum gauge.

2) With engine running and coolant temperature below 86°F (30°C), place mirror under EGR control valve diaphragm. Accelerate engine. EGR valve should not operate.

3) Warm engine to normal operating temperature. Check that EGR valve operates when engine is accelerated. If not, disconnect EGR control valve side of vacuum amplifier vacuum hose.

4) Check that thermal vacuum valve is open. Using vacuum gauge, check that sub-venturi vacuum is present at end (vacuum amplifier side) of vacuum hose.

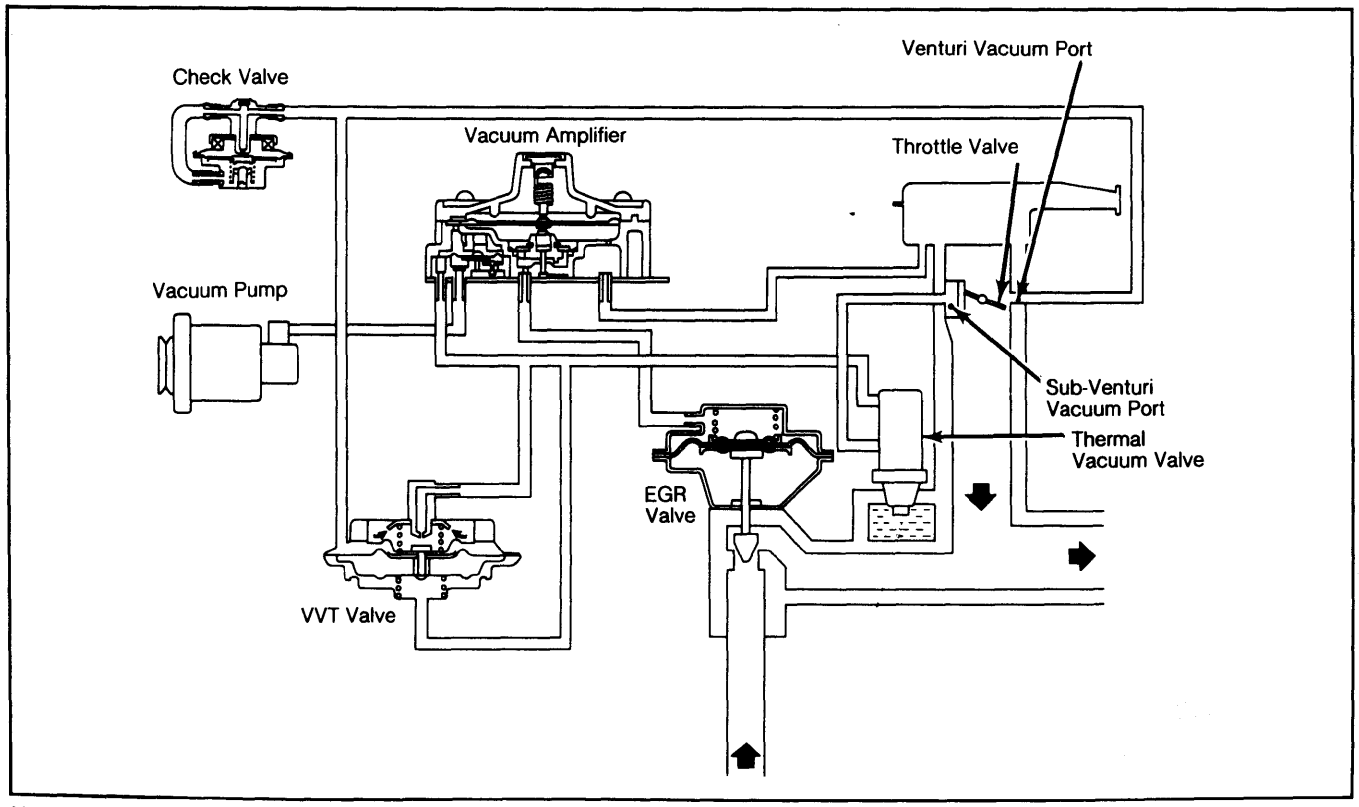
5) If pressure exists, replace thermal vacuum valve. If not, replace vacuum amplifier. If EGR system still does not operate as described, check individual components.

EGR CONTROL VALVE

1) Remove EGR control valve. Visually inspect for wrinkles or other damage to valve body.

2) Using a vacuum pump, apply vacuum to control valve. Valve should move to full open position and remain there for at least 30 seconds after vacuum is cut off.

Fig. 2: Datsun Pickup Diesel EGR Control System



Used on California Man. Trans. Pickups only.

DATSUN DIESEL EXHAUST GAS RECIRCULATION (Cont.)

THROTTLE BODY

Maxima

1) Remove throttle body. Visually inspect for damage. Using vacuum pump, apply vacuum to throttle diaphragm.

2) Throttle valve should move to a fully closed position and remain there for at least 30 seconds after vacuum is cut off.

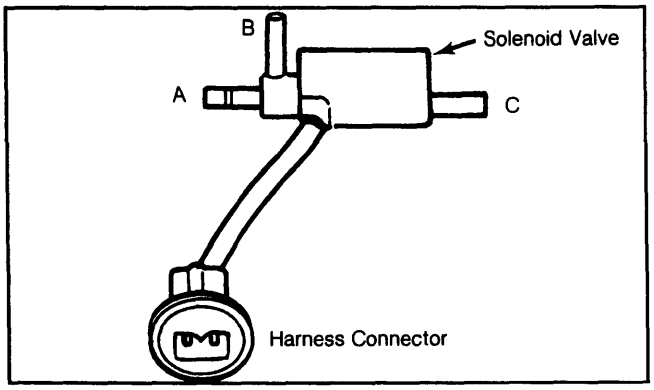
SOLENOID VALVES

Maxima

1) Remove solenoid valves. Check air passages by drawing air and blowing through valve at designated points. Air flow should exist from B to C, and should be blocked from A to B and C to A.

2) Apply battery voltage at harness connectors and check air flow again. Flow should now exist from A to B, but not from B to C or C to A. *See Fig. 3.*

Fig. 3: Maxima Solenoid Valve Testing Connections



REVOLUTION SENSOR

Maxima

Disconnect revolution sensor wiring harness at connector and attach ohmmeter. If ohmmeter shows no resistance, replace sensor.

POTENTIOMETER

Maxima

1) Disconnect potentiometer wiring harness and check resistance between terminals in connector. Connect ohmmeter between Black terminal and Blue/Yellow terminal.

2) Resistance reading should change when the opening angle of the control lever on the fuel injection pump is changed. With ohmmeter between Black terminal and Blue/Red terminal, test results should be the same as previous test.

WATER TEMPERATURE SENSOR

Maxima

Remove sensor from engine. Attach ohmmeter and place sensor tip in water. When water temperature is 66-70°F (19-21°C), resistance should be 2100 to 2900 ohms.

THERMAL VACUUM VALVE

Pickup

1) Drain engine coolant until level is lower than oil cooler. Remove valve from engine. Immerse valve in container of water with thermometer.

2) Using vacuum gauge, apply vacuum to upper port on valve. Check that valve is closed below 77-86°F (25-30°C) and open above those temperatures.

VVT VALVE

Pickup

Remove valve from engine. Draw air from sub-vacuum port side of valve. There should be some leakage, but it should disappear. If not, replace valve.

VACUUM AMPLIFIER

Pickup

1) Disconnect vacuum amplifier-to-EGR valve hose. Connect "T" connector and vacuum gauge to hose end. Start engine and run at idle speed.

2) Check that vacuum gauge reading is 5.3-6.5 in. Hg. Increase engine speed to 2000 RPM. Check that vacuum gauge now reads 11.2-12.8 in. Hg. If EGR vacuum is excessively outside specifications, replace vacuum amplifier.

REMOVAL & INSTALLATION

EGR CONTROL VALVE

Maxima

Remove retaining nut securing EGR tube to control valve. Disconnect tube. Disconnect vacuum hose and remove control valve-to-intake manifold retaining nuts. Remove valve. To install, reverse removal procedure. Ensure that guide tube, which fits over EGR valve, is installed correctly. Notch on mounting flange end of tube must be installed towards rear of vehicle.

Pickup

Remove EGR duct and pipe bolts at EGR control valve side. Disconnect vacuum hose. Remove valve. To install, reverse removal procedure.