

## DATSUN EXHAUST GAS RECIRCULATION SYSTEM

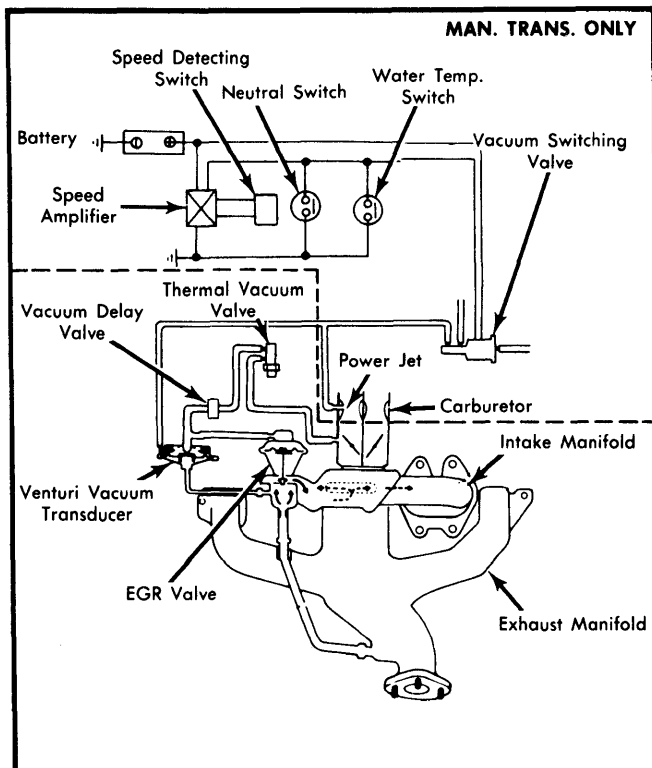
**All Models**  
(Except Calif. 280ZX and 810 Models)

### DESCRIPTION

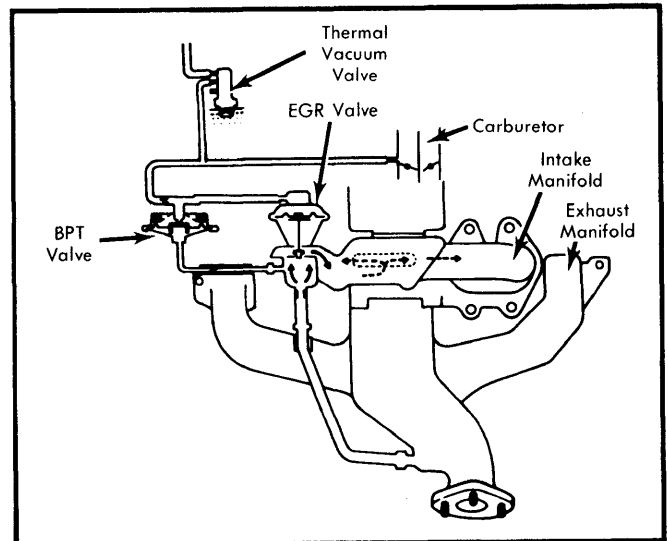
The Exhaust Gas Recirculation System (EGR), recirculates exhaust gases into the combustion chamber to reduce combustion temperature. The reduction in temperature acts to reduce oxides of Nitrogen (NO<sub>x</sub>) emissions. The system consists of an EGR control valve, thermal vacuum valve, back pressure transducer (BPT) valve (all Pickups and Federal 210, 280ZX, 310 and 810 models) and various connecting hoses and tubes. In addition, all 200SX, 510 and Calif. 210 and 310 models are equipped with venturi vacuum transducer (VVT) valves. A mixture ratio rich/lean system is installed on Calif. 210 and 310 models (manual transmissions only). Minor differences exist between application of thermal vacuum valves on all models.

### OPERATION

Exhaust gases are directed from exhaust manifold, through EGR tube and into EGR control valve. The BPT/VVT valve monitors exhaust pressure in order to control intake manifold vacuum applied to EGR control valve. The EGR control valve regulates actual amount of exhaust gas to be recirculated into intake manifold. Open/Close operation of EGR control valve is directed by the thermal vacuum valve which operates on carburetor vacuum and engine coolant temperature. EGR system does not operate at idle or under full throttle (heavy load) conditions, when coolant temperature is low (thermal vacuum valve closed), or when exhaust pressure is low.



**Fig. 1 210 and 310 EGR System – California Models**



**Fig. 2 210 and 310 EGR System – Federal Models**

### MIXTURE RATIO RICH/LEAN SYSTEM (CALIF. 210 AND 310 MODELS ONLY)

This system controls air-fuel mixture ratio and EGR flow on manual transmission models only. The system consists of a solenoid controlled vacuum switching valve, water temperature switch, neutral switch, speedometer mounted speed detector and speed amplifier. The solenoid mounted in the vacuum switching valve, moves the valve to control air-fuel mixture and EGR flow. Below 122°F (50°C), regardless of speed/gear selection, EGR flow is not actuated and mixture is lean. Above 122°F (50°C), EGR flow and mixture ratio are adjusted according to speed/gear selection: Below 40 MPH EGR flow is large and mixture ratio rich, above 40 MPH EGR flow is low and mixture lean.

### TESTING

#### EGR SYSTEM

- 1) With engine stopped, visually inspect entire EGR system and clean as necessary. Replace hoses that are cracked or broken. Inspect EGR valve for signs of binding or sticking by moving valve diaphragm upwards with finger.
- 2) With engine running, check operation of EGR valve and thermal vacuum valve by placing finger on diaphragm of EGR valve and checking diaphragm movement.
- 3) With engine coolant temperature below "Closed" value shown in following table, increase engine speed to 3000-3500 RPM. EGR valve diaphragm should remain closed.
- 4) With engine coolant temperature above "Open" value shown in table, increase engine speed to 3000-3500 RPM. EGR valve diaphragm should open and allow exhaust gas recirculation.
- 5) If EGR valve does not operate as indicated, disconnect EGR valve-to-thermal vacuum valve vacuum hose at EGR valve. Increase engine speed to 3000-3500 RPM and check for vacuum at end of disconnected hose.

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6) If vacuum is present, check EGR, BPT and VVT valves (210 and 310), thermal vacuum valve and vacuum delay valves (280ZX and 810) or replace EGR valve on all other models. If vacuum is weak or not present, check BPT and EGR valves (280ZX and 810) or replace thermal vacuum valve on all other models.

EGR System Test Specifications		
Application	Valve Closed °F (°C)	Valve Open °F (°C)
<b>200SX</b> ①		
Federal	..... ②	140-203 (60-95)
Calif.	..... 59 (15)	140-203 (60-95) ③
<b>210 &amp; 310</b>		
Federal	Above 140 (60)	Below 140 (60)
Calif.	..... ②	140-23 (60-95)
<b>280ZX &amp; 810</b> ..... 131-203 (55-95) ..... ④		
<b>510</b>		
Federal	Above 140 (60)	Below 140 (60)
Calif.	Above 140 (60)	Below 140 (60) ③
Pickup	Below 122 (50)	Above 122 (50)

① - Second valve of all models closes below 203°F (95°C); opens above 203°F (95°C).  
 ② - Closed above and below open temperature.  
 ③ - Slightly open between 59-140°F (15-60°C).  
 ④ - Open above and below closed temperature.

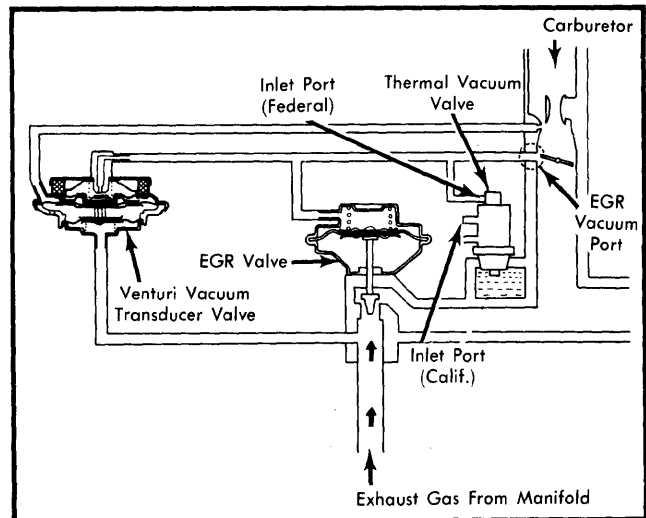


Fig. 5 510 EGR System

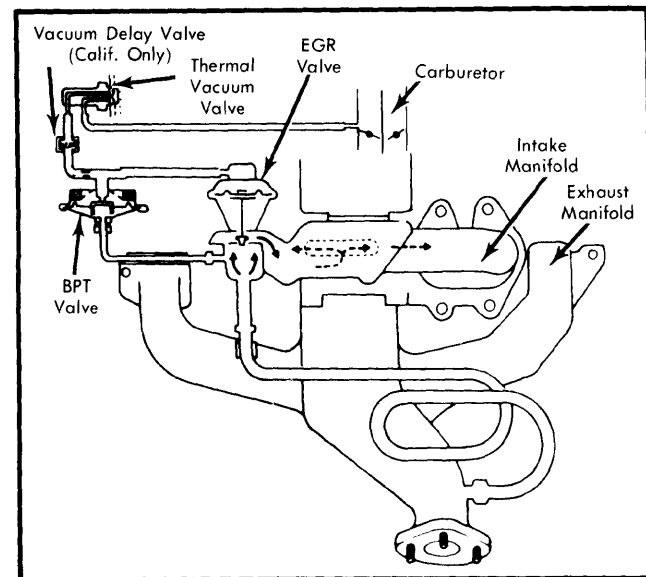


Fig. 6 Pickup EGR System

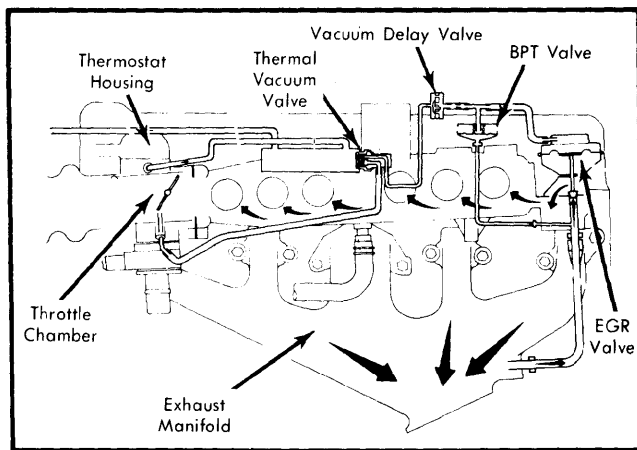


Fig. 3 280ZX and 810 EGR System

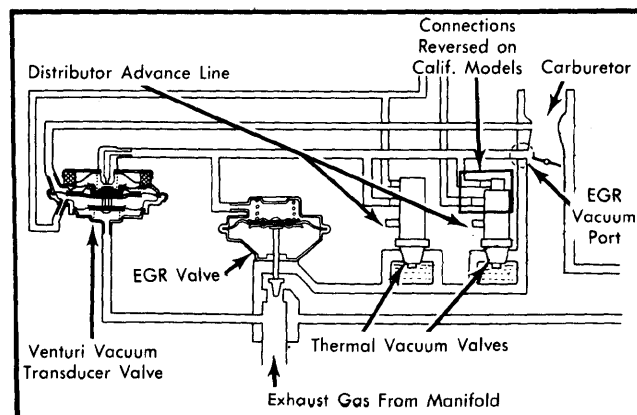


Fig. 4 200SX EGR System (Federal Models Shown)

### MIXTURE RATIO RICH/LEAN SYSTEM (CALIF. 210 AND 310 MODELS ONLY)

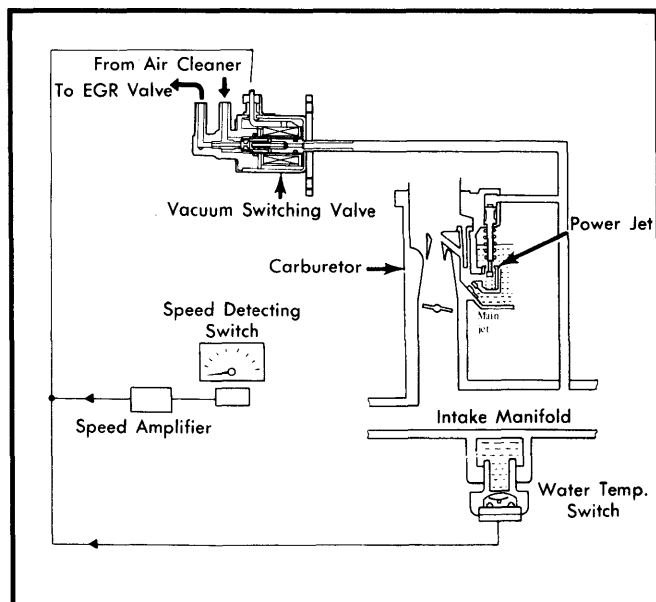
1) With engine at normal operating temperature, block front wheels and raise rear of vehicle. Start engine, place transmission in 4th or 5th gear and operate at 50 MPH. Pinch hose at vacuum switching valve (air cleaner side). Engine speed should decrease and operate erratically.

2) Shift transmission to 3rd and maintain speed below 30 MPH. Disconnect hose between vacuum switching valve and carburetor power jet, at carburetor. Engine should operate erratically.

3) Turn ignition switch "OFF" and connect an ohmmeter to speed amplifier. Continuity should be measured at terminals "LR" and "B".

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4) If engine does not function as described, check vacuum switching valve and water temperature switch. Speed detector switch and speed amplifier condition is determined upon results of testing vacuum switching valve and temperature valve.



**Fig. 7 Mixture Ratio Rich/Lean System (Calif. Manual Trans. 210 and 310 Only)**

### EGR VALVE

1) Remove EGR valve from engine and inspect it for damage. Apply vacuum to EGR valve and watch diaphragm movement. Diaphragm should move to full open position and should remain in this position for at least 30 seconds after vacuum is shut off.

2) Before reinstalling EGR valve, clean mating surface with a wire brush and compressed air, and remove foreign matter from around valve and port.

### THERMAL VACUUM VALVE

**NOTE** — A 3-port thermal vacuum valve is used on all models except California 210, 310 and all Pickups in addition to or in place of a 2-port valve. The bottom port of the 3-port valve is used for distributor advance.

1) Drain engine coolant and remove thermal vacuum valve from engine with vacuum hoses attached.

2) Submerge valve and thermometer in a container of water. Heat water and observe temperature. Apply vacuum to top port of valve and check that valve opens and closes according to water temperature specified in "EGR System Test Specifications" table. If valve does not operate as specified, replace assembly.

**NOTE** — Do not allow water to enter thermal vacuum valve during test.

### BPT/VVT VALVE

Remove BPT/VVT valve from engine. Apply a slight pressure to one port and a slight suction to other port. If any leakage is noted, replace valve.

**NOTE** — BPT/VVT valve must be replaced with identical part. Ensure part numbers match.

### VACUUM DELAY VALVE

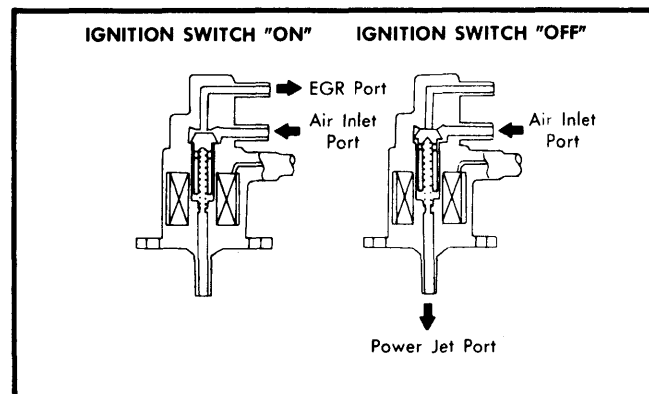
Remove vacuum delay valve. Apply air pressure to EGR valve side of vacuum delay valve. Air should flow through valve. When air pressure is applied to thermal vacuum valve side of delay valve (white side on 280ZX and 810 models — brown side on all other models), resistance should be felt.

**NOTE** — Vacuum delay valve must be installed with brown (white) side toward thermal vacuum valve.

### VACUUM SWITCHING VALVE (CALIF. 210 & 310 MODELS W/MAN. TRANS. ONLY)

1) Remove vacuum hoses from valve and remove valve from engine. With electrical leads connected, turn ignition "ON" and apply slight air pressure to air inlet port. Air should escape through EGR port.

2) Turn ignition switch "OFF" and apply slight air pressure to inlet port. Air should escape through power valve port. If valve does not perform as described, replace vacuum switching valve.



**Fig. 8 Schematic of Vacuum Switching Valve Test**

### WATER TEMPERATURE SWITCH (CALIF. 210 & 310 W/MAN. TRANS. ONLY)

1) Drain engine coolant, remove electrical connections and remove temperature switch.

2) Place switch and thermometer in a container of water. Heat water and observe temperature. Connect ohmmeter to electrical connections. Below 104°F (40°C), continuity should be measured. Above 149°F (65°C), continuity should not be measured. If valve does not function as described, replace assembly.