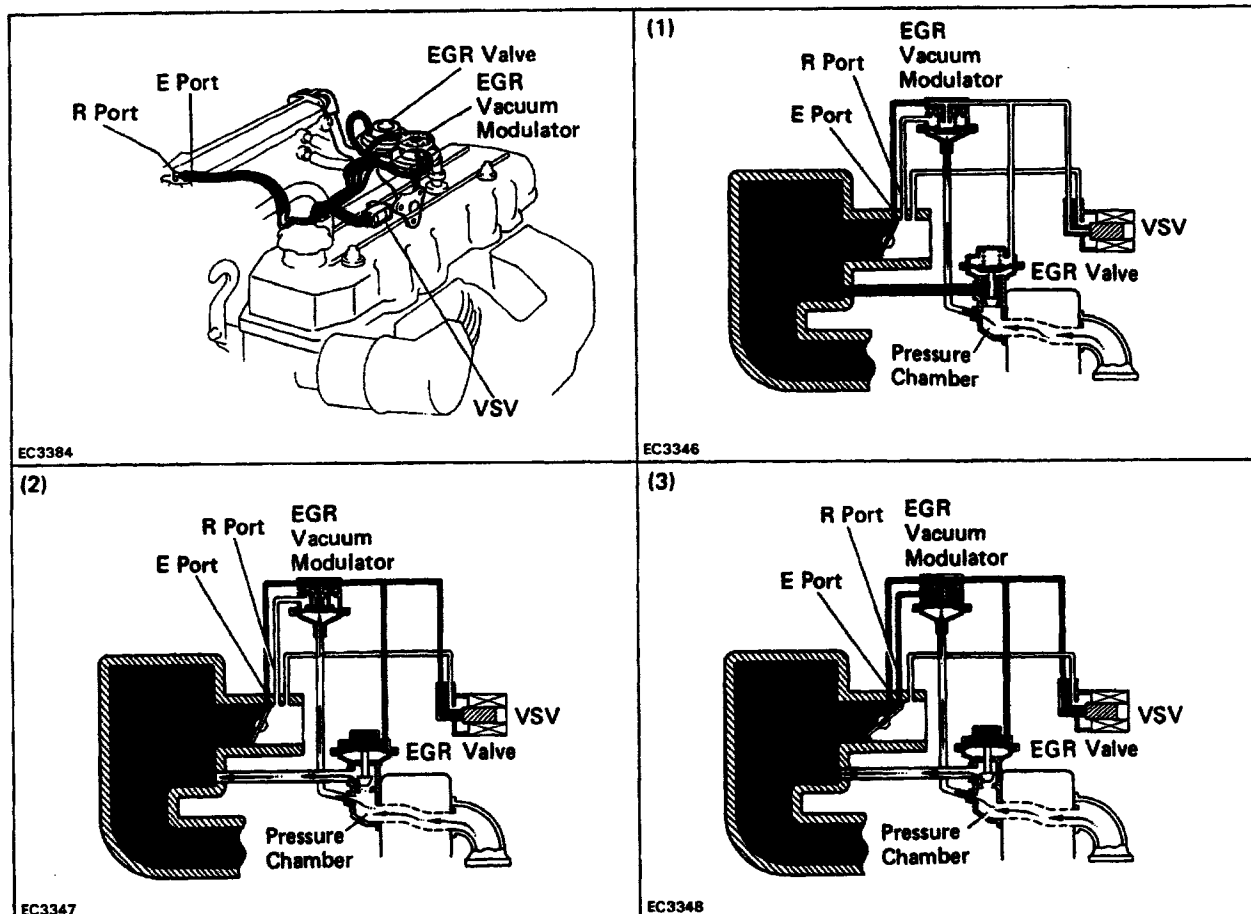


EXHAUST GAS RECIRCULATION (EGR) SYSTEM (California)



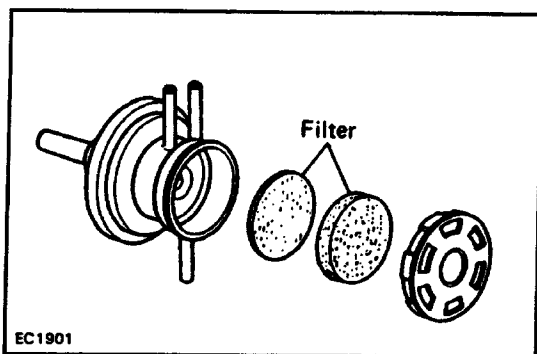
To reduce NO_x emission, part of the exhaust gases are recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Coolant Temp.	Driving Condition	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 34°C (93°F)	—	ON	—	—		—	CLOSED	Not recirculated
Above 40°C (104°F)	Low load	ON	—	—		—	CLOSED	Not recirculated
	Heavy load, etc.	OFF	Positioned below E port	—		—	CLOSED	Not recirculated
			Positioned between E port and R port	(1) LOW	*Pressure constantly alternating between low and high	OPENS passage to atmosphere	CLOSED	Not recirculated
				(2) HIGH		CLOSES passage to atmosphere	OPEN	Recirculated
			Positioned above R port	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)

Remarks: * Pressure increases → Modulator closes → EGR valve opens → Pressure drops

← EGR valve closes ← Modulator opens ←

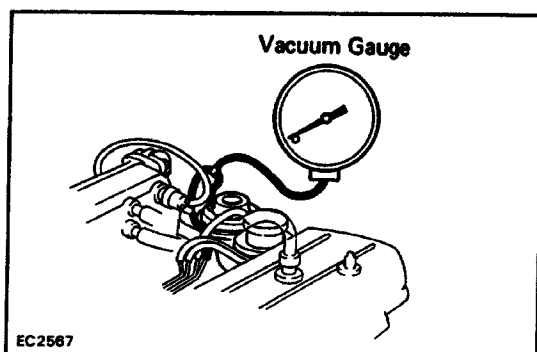
**When the throttle valve is positioned above the R port, the EGR vacuum modulator will close the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.



EGR SYSTEM INSPECTION

1. CHECK AND CLEAN FILTER IN EGR VACUUM MODULATOR

- Check the filter for contamination or damage.
- Using compressed air, clean the filter.

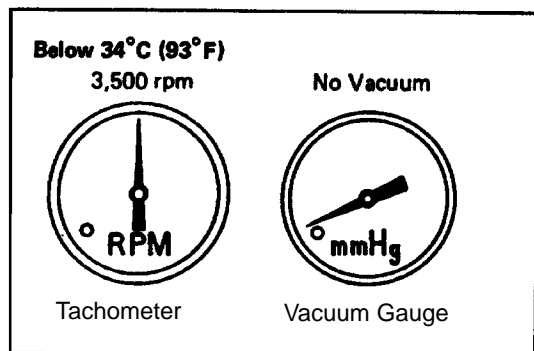


2. PREPARATION

Disconnect the vacuum hose from the EGR valve, and using a three way union, connect a vacuum gauge to it.

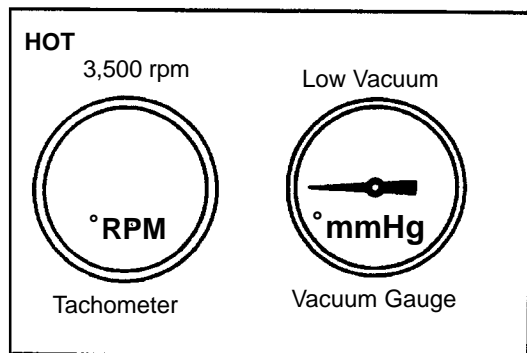
3. CHECK SEATING OF EGR VALVE

Start the engine and check that the engine starts and runs at idle.



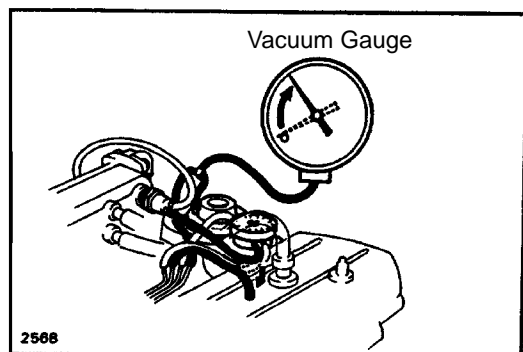
4. CHECK VSV WITH COLD ENGINE

- The coolant temperature should be below 34°C (93°F).
- Check that the vacuum gauge indicates zero at 3,500 rpm.



5. CHECK VSV AND EGR VACUUM MODULATOR WITH HOT ENGINE

- Warm up the engine.
- Check that the vacuum gauge indicates low vacuum at 3,500 rpm.

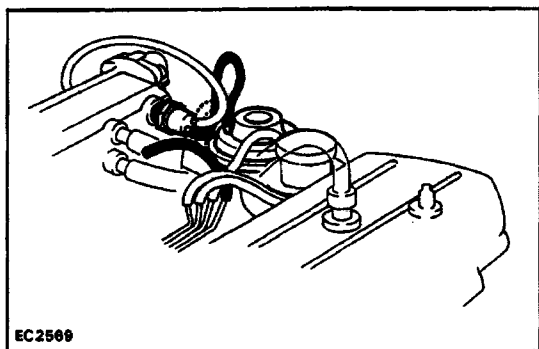


- Disconnect the vacuum hose from port R of the EGR vacuum modulator and connect port R directly to the intake manifold with another hose.

- Check that the vacuum gauge indicates high vacuum at 3,000 rpm.

HINT: As exhaust gas is increasingly recirculated the engine will start to misfire.

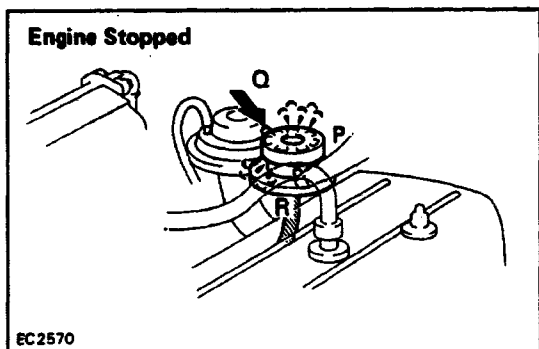
- Disconnect the vacuum gauge and reconnect the vacuum hoses to the proper locations.



6. CHECK EGR VALVE

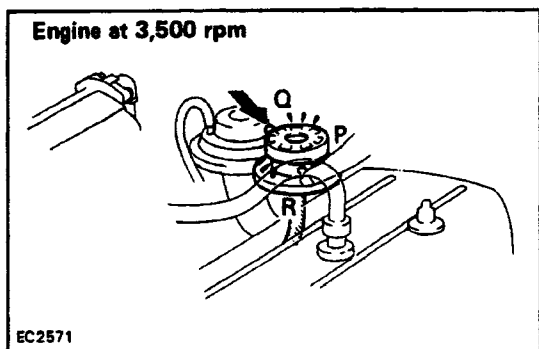
- Apply vacuum directly to the EGR valve with the engine idling.
- Check that the engine runs rough or dies.
- Reconnect the vacuum hoses to the proper locations.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

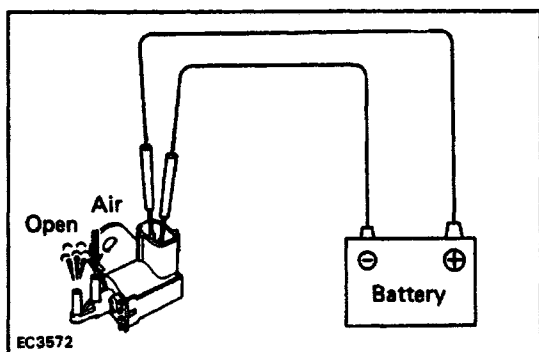


EGR VACUUM MODULATOR INSPECTION CHECK EGR VACUUM MODULATOR OPERATION

- Disconnect the 2 vacuum hoses from ports P, Q and R of the EGR vacuum modulator.
- Plug ports P and R with your finger.
- Blow air into port Q. Check that the air passes through to the air filter side freely.



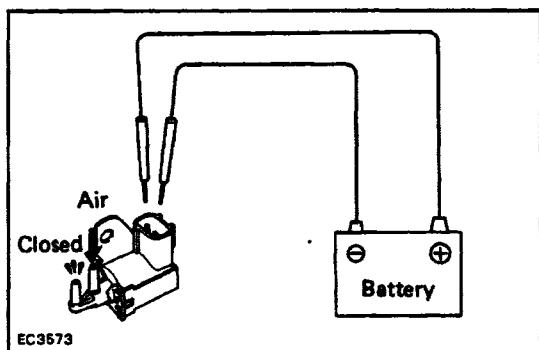
- Start the engine and maintain the speed at 3,500 rpm.
- Repeat the above test. Check that there is a strong resistance to air flow.
- Reconnect the vacuum hoses to the proper locations.



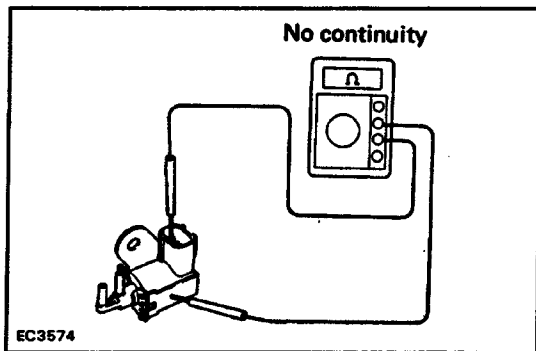
VSV INSPECTION

1. CHECK VACUUM CIRCUIT CONTINUITY IN THE VSV BY BLOWING AIR INTO PIPE

- Connect the VSV terminals to the battery terminals as illustrated.
- Blow air into a pipe and check that the VSV is open.

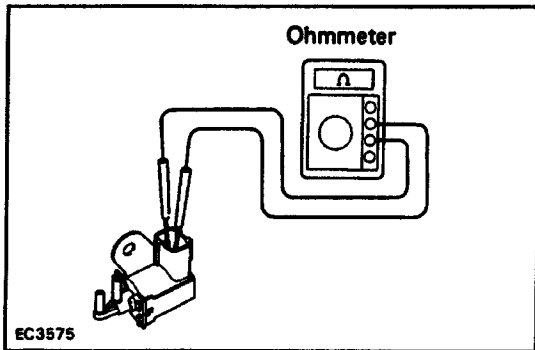


- Disconnect the battery from the VSV.
 - Blow air into a pipe and check that VSV is closed.
- If a problem is found, replace the VSV.



2. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between the terminals and the VSV body.



3. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the terminals.

Specified resistance:

At 20-C (68-F): 30 – 50 Ω

If the resistance is not within specification, replace the VSV.

EGR VALVE INSPECTION

1. REMOVE EGR VALVE

Check the valve for sticking and heavy carbon deposits. If a problem is found, replace it.

2. INSTALL EGR VALVE WITH NEW GASKET