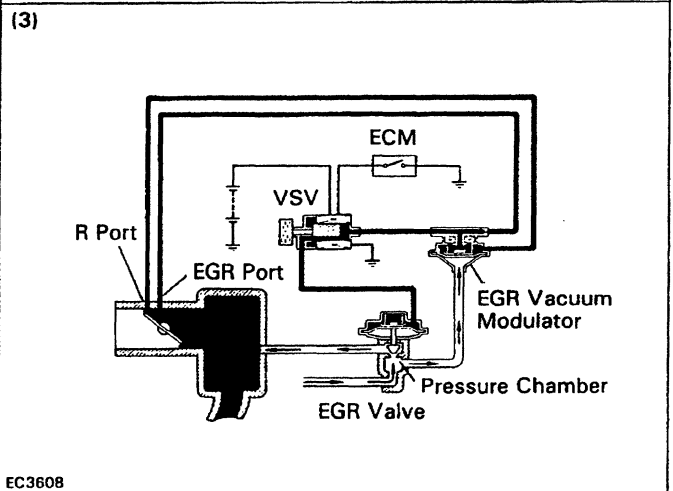
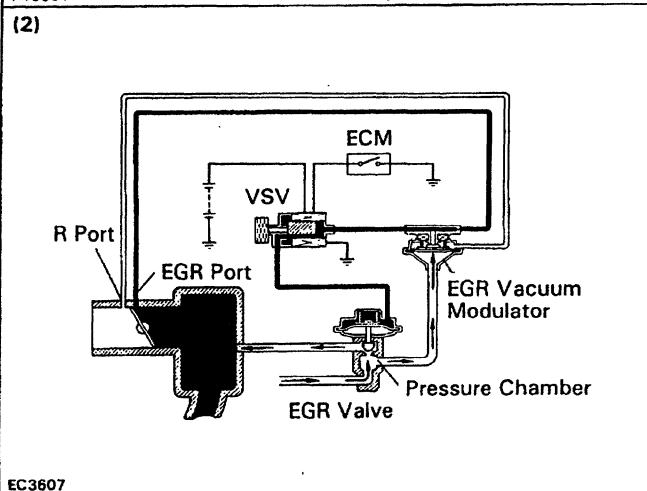
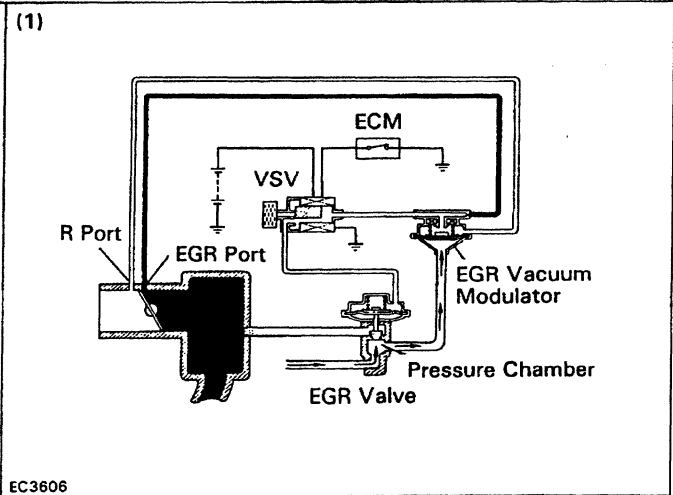
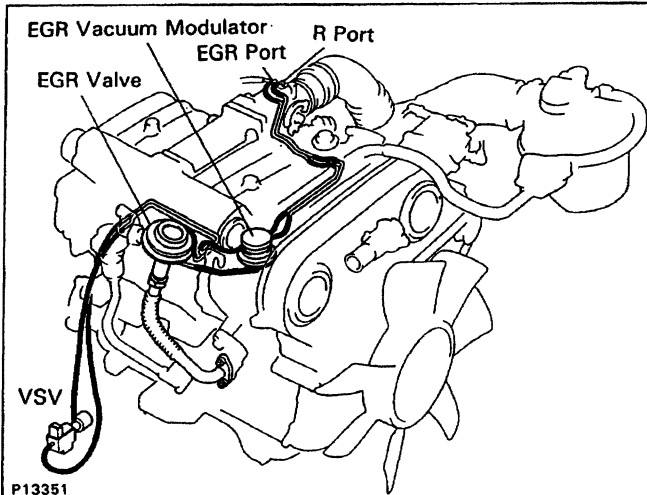


EXHAUST GAS RECIRCULATION (EGR) SYSTEM

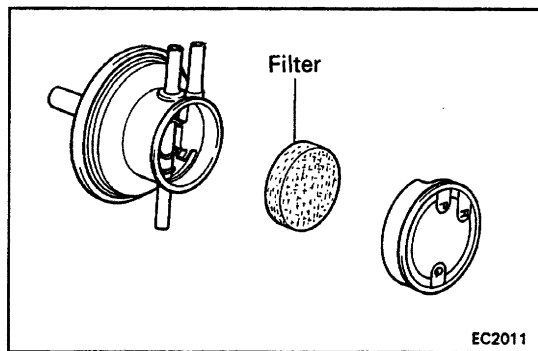


To reduce NOx emissions, part of the exhaust gases are recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Engine Coolant Temp.	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber	EGR Vacuum Modulator	EGR Valve	Exhaust Gas	
Below 48°C (118°F)	CLOSED	—	—	—	CLOSED	Not recirculated	
Above 52°C (126°F)	OPEN	Positioned below EGR port	—	—	CLOSED	Not recirculated	
		Positioned between EGR port and R port	(1) LOW	*Pressure constantly alternating between low and high	OPENS passage to atmosphere	CLOSED	Not recirculated
			(2) HIGH		CLOSED 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 ←

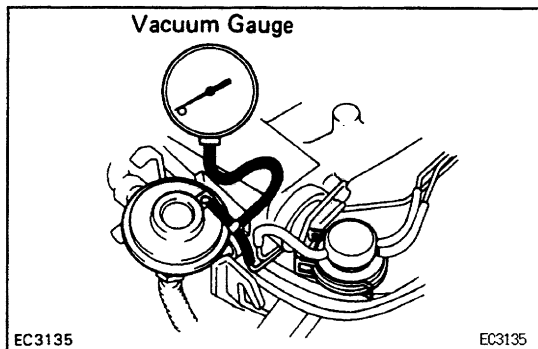
**When the throttle valve is positioned above the R port, the EGR vacuum modulator will close the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.



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.

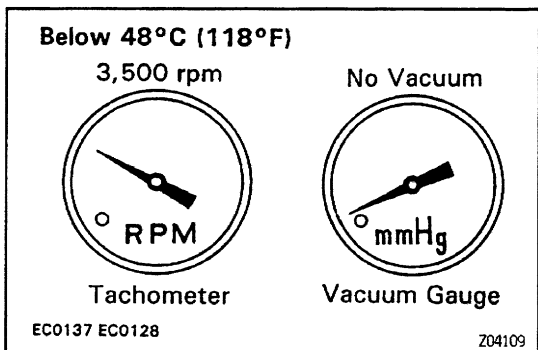


2. PREPARATION

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

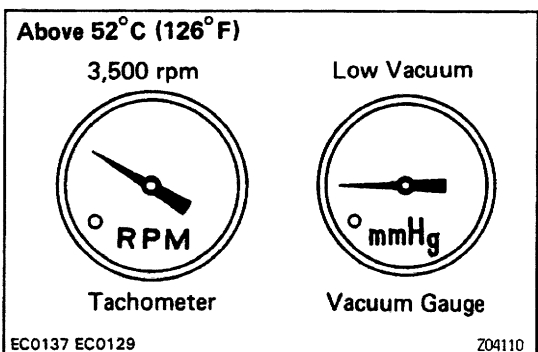
3. CHECK SEATING OF EGR VALVE

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



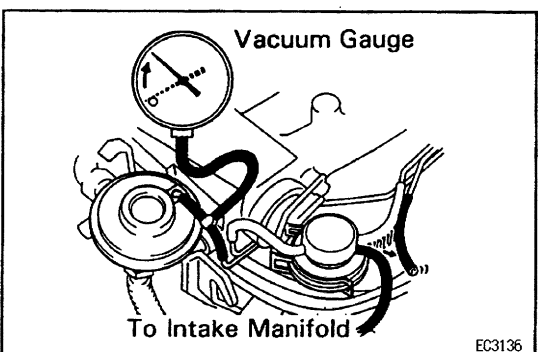
4. CHECK VSV WITH COLD ENGINE

- The engine coolant temperature should be below 48°C (118°F).
- Check that the vacuum gauge indicates zero at 3,500 rpm.



5. CHECK VSV AND EGR VACUUM MODULATOR WITH WARM ENGINE

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

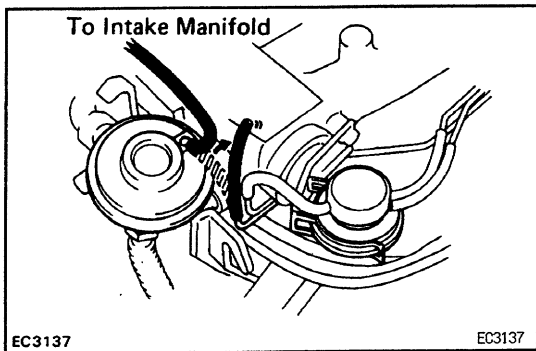


- Disconnect the vacuum hose from R port of the EGR vacuum modulator and connect R port directly to the intake manifold with another hose.

- Check that the vacuum gauge indicates high vacuum at 3,500 rpm.

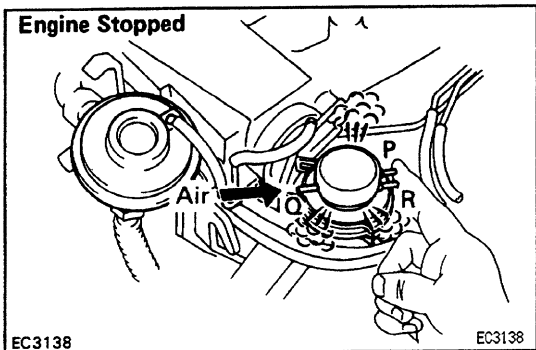
HINT: As a large amount of EGR gas enters, the engine will misfire slightly.

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



6. CHECK EGR VALVE

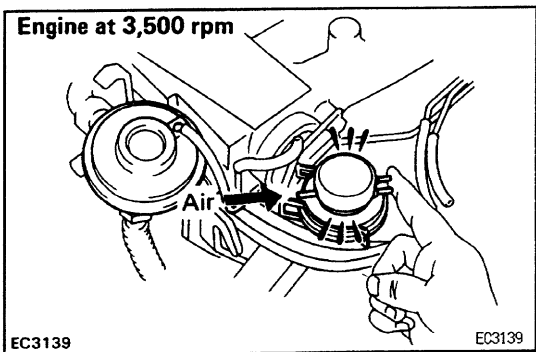
- Apply vacuum directly to the EGR valve with the engine idling.
- Check that the engine runs rough or dies.
- Reconnect the vacuum hoses to the proper locations. If no problem is found with this inspection, the system is okay; otherwise inspect each part.



EGR VACUUM MODULATOR INSPECTION

CHECK EGR VACUUM MODULATOR OPERATION

- Disconnect the 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.



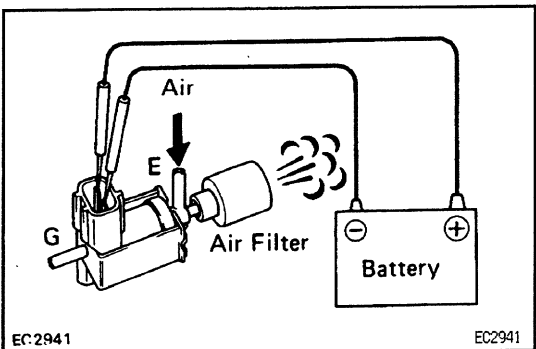
- Start the engine and maintain speed at 3,500rpm.
- Repeat the above test. Check that there is a strong resistance to air flow.
- Reconnect the vacuum hoses to the proper locations. If a problem is found, replace the EGR vacuum modulator.

EGR VALVE INSPECTION

1. REMOVE EGR VALVE

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

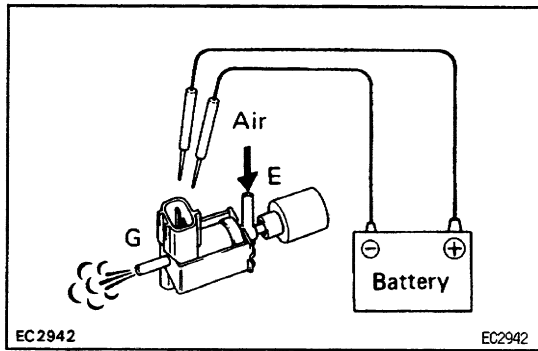
2. INSTALL EGR VALVE WITH NEW GASKET



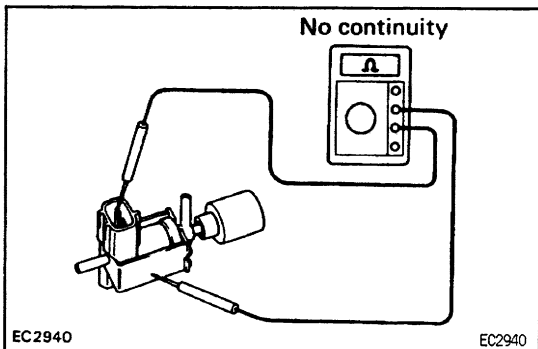
VSV INSPECTION

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

- Connect the VSV terminals to the battery terminals as illustrated.
- Blow air into pipe E and check that air comes out of air filter.

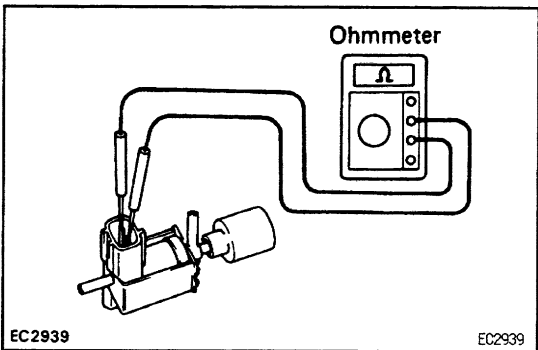


- (c) Disconnect the battery from the VSV.
 (d) Blow air into pipe E and check that air comes out of pipe G.
 If a problem is found, replace the VSV.



2. CHECK FOR SHORT CIRCUIT

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



3. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the terminals.

Specified resistance:

30 – 50 Ω at 20° C (68° F)

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

ENGINE COOLANT TEMP. SENSOR INSPECTION

(See page [EG2-250](#))