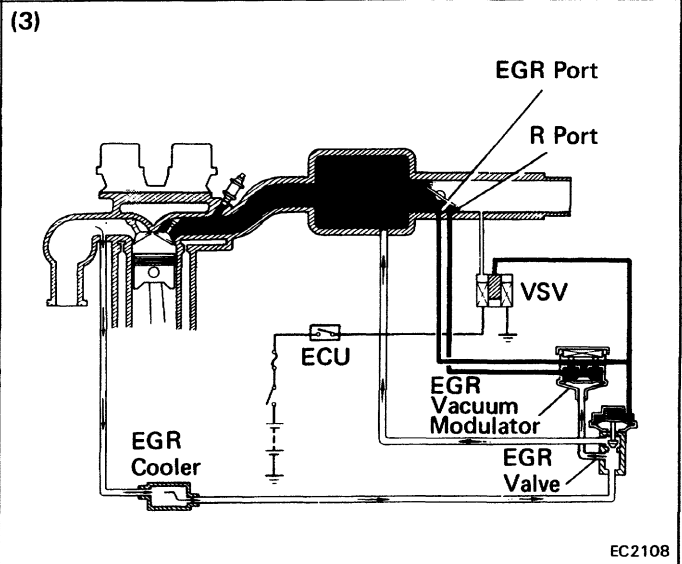
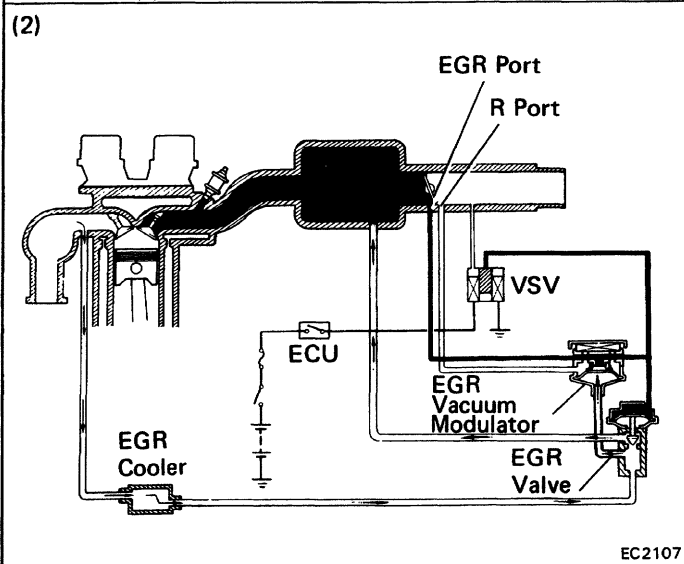
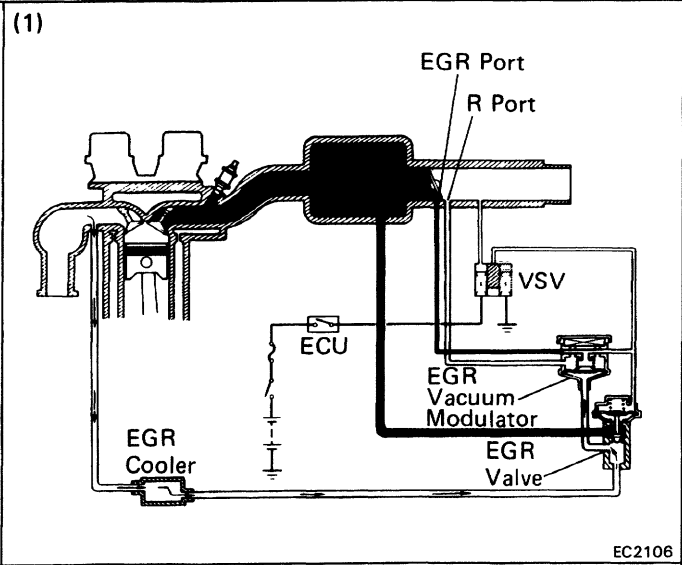
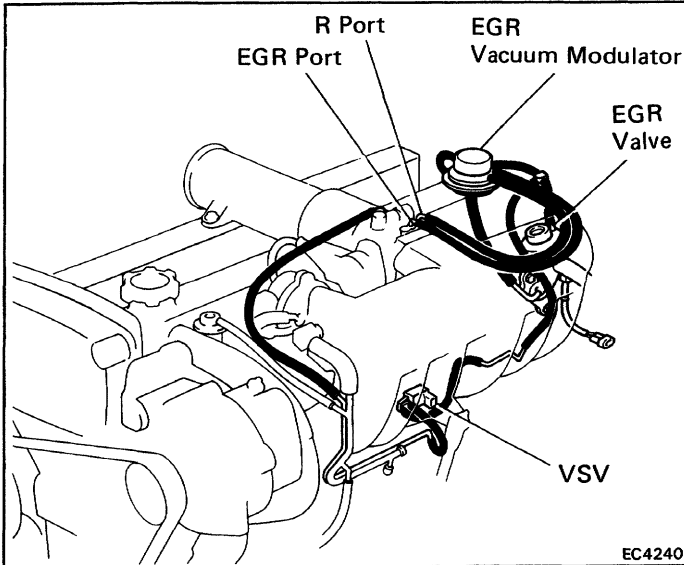


EXHAUST GAS RECIRCULATION (EGR) SYSTEM

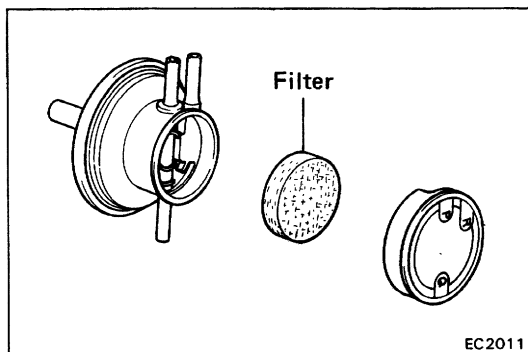


To reduce NOx emission, part of the exhaust gases are recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Coolant Temp.	VSV	Throttle Valve Opening	Pressure in the EGR Valve Pressure Chamber	EGR Vacuum Modulator	EGR Valve	Exhaust Gas	
Below 57°C (135°F)	OPEN	—	—	—	CLOSED	Not recirculated	
Above 63°C (145°F)	CLOSED	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		CLOSES passage to atmosphere	OPEN	Recirculated
Positioned above R port	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)		

* Pressure increases - Modulator closes - EGR valve opens - Pressure drops
 EGR valve closes - Modulator opens

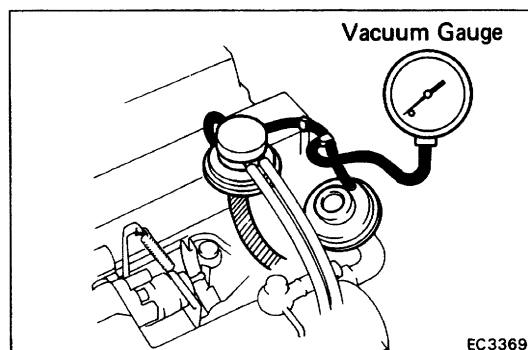
** When the throttle valve is positioned above the R port, the EGR vacuum modulator will close the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.



INSPECTION OF EGR SYSTEM

1. CHECK AND CLEAN FILTER IN EGR VACUUM MODULATOR

- (a) Check the filter for contamination or damage.
- (b) Using compressed air, clean the filter.

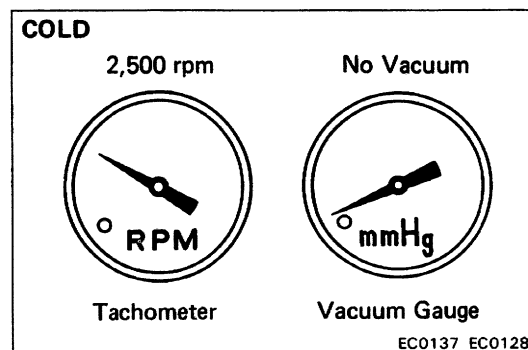


2. PREPARATION

Using a 3-way connector, connect a vacuum gauge to the hose between the EGR valve and EGR vacuum modulator.

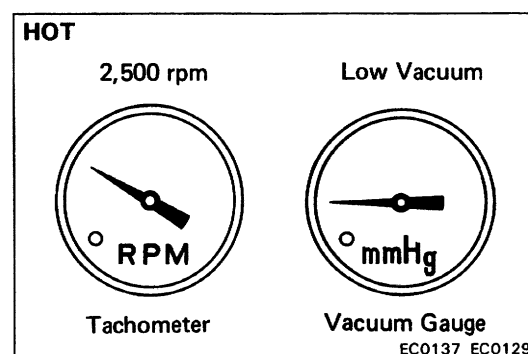
3. CHECK SEATING OF EGR VALVE

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



4. CHECK VSV WITH COLD ENGINE

- (a) The coolant temperature should be below 57°C (135°F).
- (b) Check that the vacuum gauge indicates zero at 2,500 rpm.

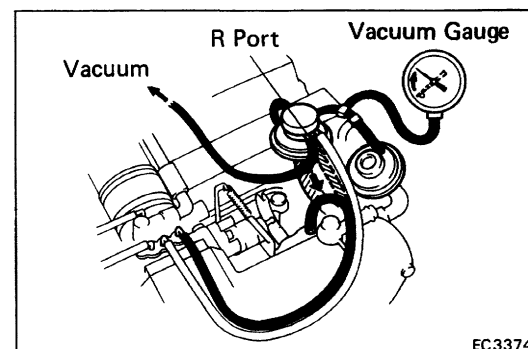


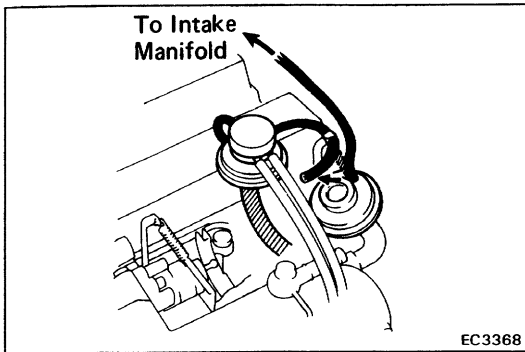
5. CHECK VSV AND EGR VACUUM MODULATOR WITH WARM ENGINE

- (a) Warm up the engine.
- (b) Check that the vacuum gauge indication is approx. 70 mmHg (2.76 in. Hg, 9.3 kPa) at 2,500 rpm.
- (c) Check that the vacuum gauge indicates zero at idle.
- (d) Disconnect the vacuum hose from R port of the EGR vacuum modulator and connect R port directly to the intake manifold with another hose.
- (e) Check that the vacuum gauge indicates high vacuum at 2,500 rpm.

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

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

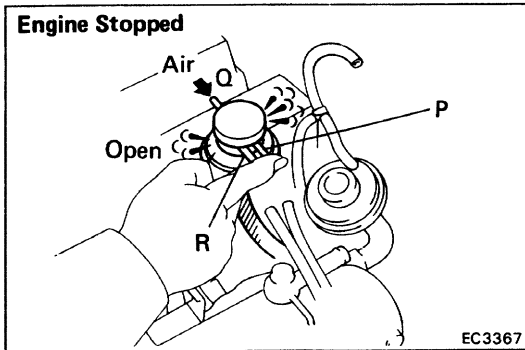




6. CHECK EGR VALVE

- (a) Apply vacuum directly to the EGR valve with the engine idling.
- (b) Check that the engine runs rough or stops.
- (c) Reconnect the vacuum hoses to the proper locations.

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



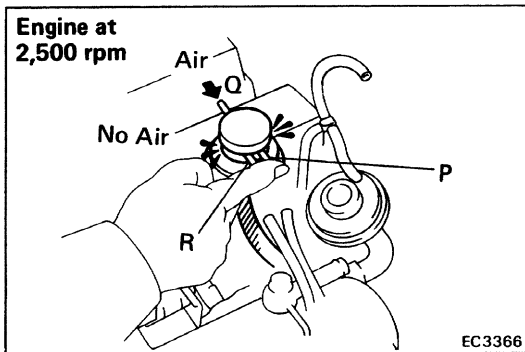
INSPECTION OF EGR VACUUM MODULATOR

CHECK EGR VACUUM MODULATOR OPERATION

- (a) Disconnect the vacuum hoses from ports P, Q and R of the EGR vacuum modulator.
- (b) Block ports P and R with your finger.
- (c) Blow air into port Q. Check that the air passes through to the air filter side freely.
- (d) Start the engine and maintain speed at 2,500rpm.
- (e) Repeat the above test. Check that there is a strong resistance to air flow.

If a problem is found, replace the EGR vacuum modulator.

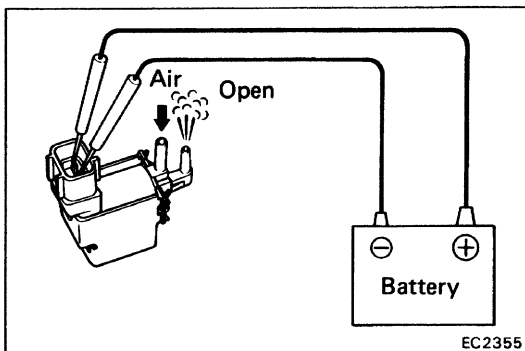
- (f) Reconnect the vacuum hoses to the proper locations.



INSPECTION OF VSV

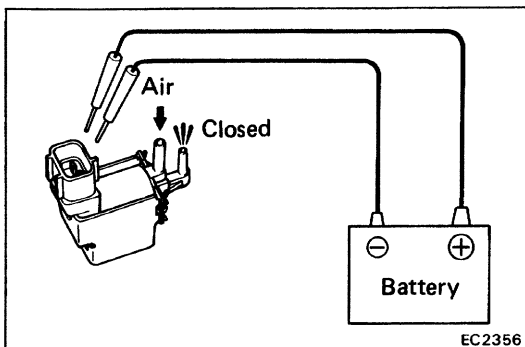
1. CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR INTO PIPE

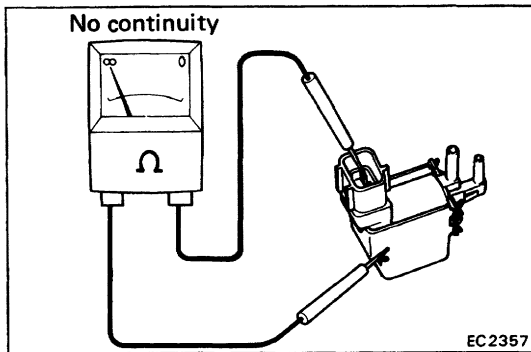
- (a) Connect the VSV terminals to the battery terminals as illustrated.
- (b) Blow air into a pipe and check that the VSV is open.



- (c) Disconnect the battery.
- (d) Blow air into a pipe and check that the VSV is closed.

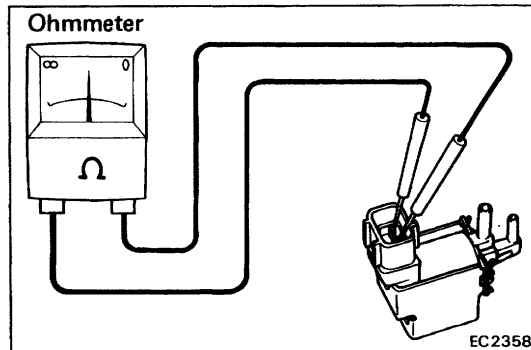
If a problem is found, replace the VSV.





2. CHECK FOR SHORT CIRCUIT

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



3. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the terminals. **Specified resistance: 38 – 44Ω at 20°C (68°F)** If the resistance is not within specification, replace the VSV.

INSPECTION OF EGR VALVE

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

INSPECTION OF WATER TEMP. SENSOR

(See page [FI-79](#))