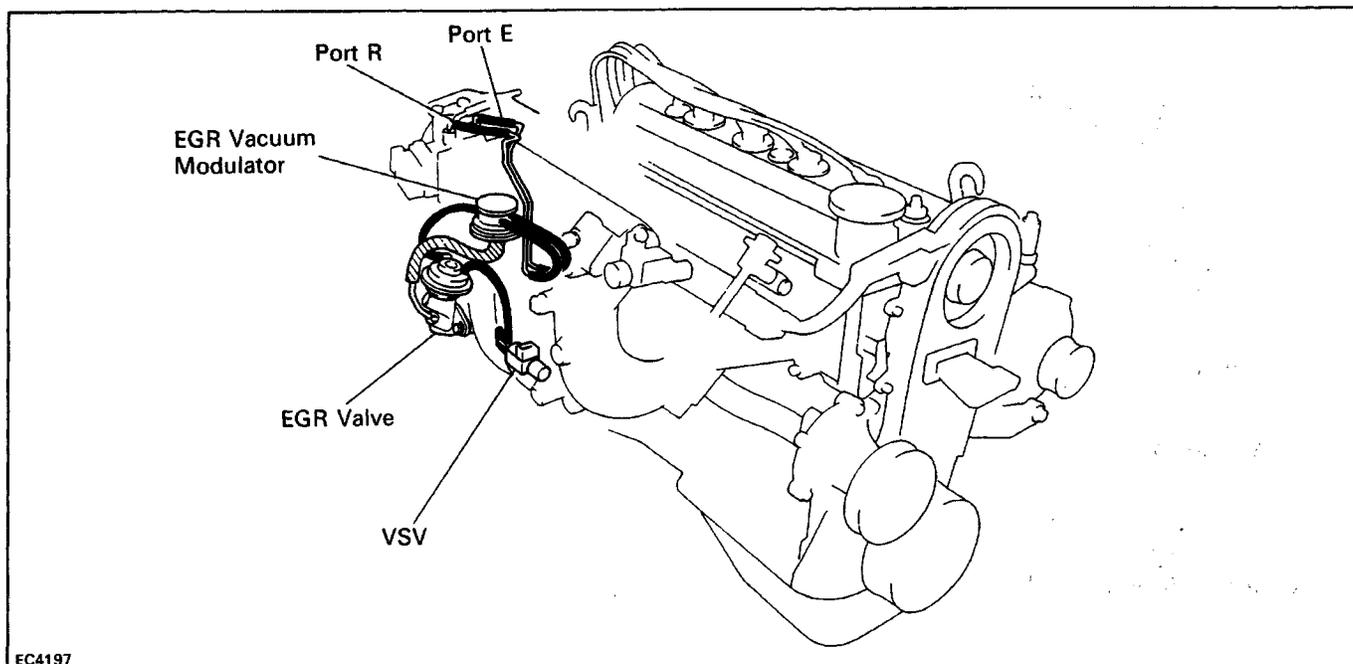
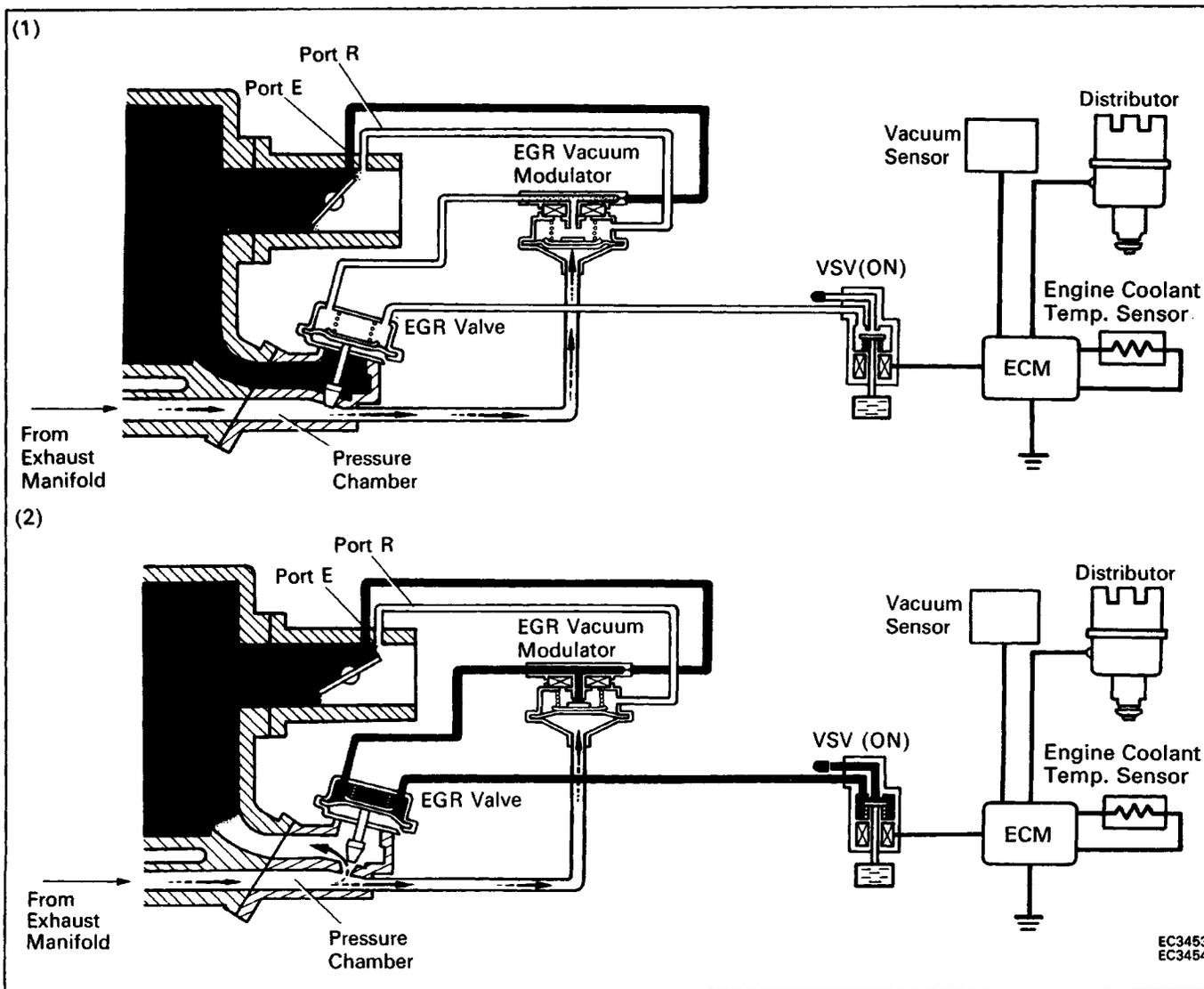
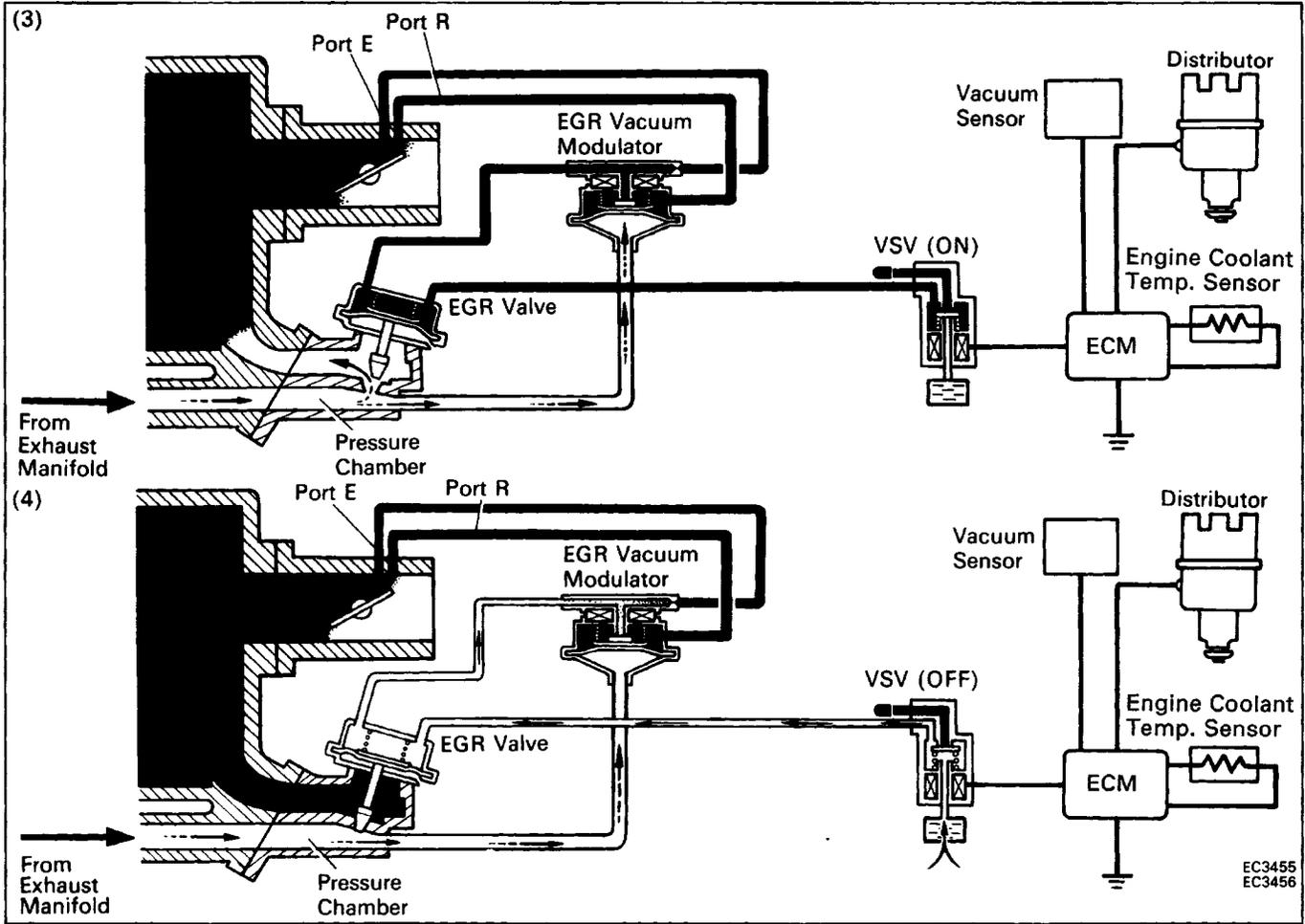


EXHAUST GAS RECIRCULATION (EGR) SYSTEM



EC4197





EC3455
EC3456

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.

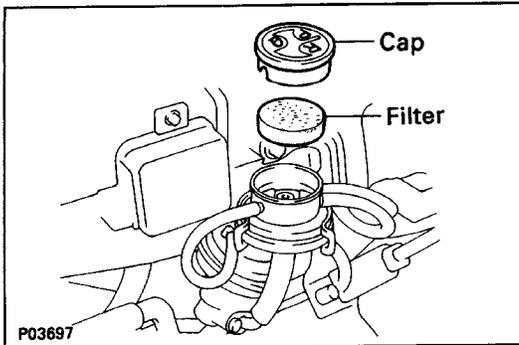
Engine Coolant Temp.	ENGINE rpm	VSV	Throttle Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber	EGR Vacuum Modulator	EGR Valve	Exhaust Gas	
Below 47°C (117°F)	-	**** OFF	-	-	-	CLOSED	Not recirculated	
Above 53°C (127°F)	Above 1,100 rpm (Federal) & Below 4,000 rpm	*** ON	Positioned below port E	-	-	CLOSED	Not recirculated	
			Positioned between port E and and port R	(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 port R	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)		
Below 1,000 rpm (Federal) & Above 4,400 rpm	-	(4) OFF	-	-	-	CLOSED	Not recirculated	

Remarks: * Pressure increase → Modulator closes → EGR valve opens → Pressure drops
 ← EGR valve closes ← Modulator opens ←

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

*** VSV switched ON when product of engine rpm multiplied by vacuum sensor valve exceeds a specified valve.

**** If terminals TE1 and E1 of data link connector 1 are connected, the VSV switches ON.

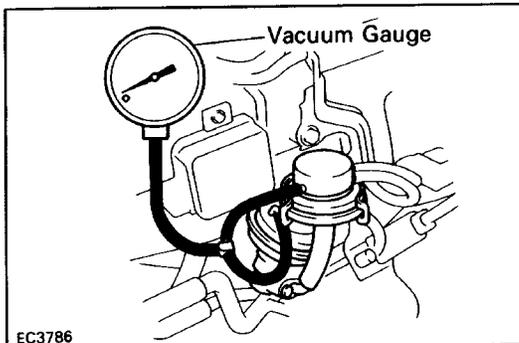


INSPECTION OF EGR SYSTEM

1. INSPECT AND CLEAN FILTERS IN EGR VACUUM MODULATOR

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

HINT: Install the filters with the coarser surface facing the atmospheric side (outward).

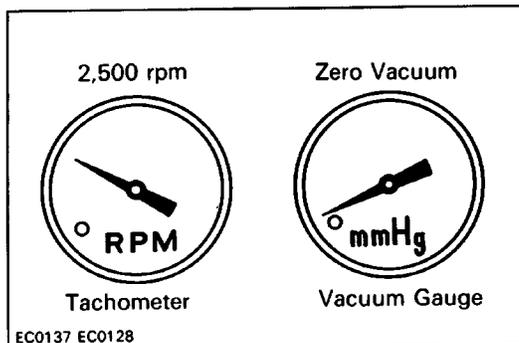


2. INSTALL VACUUM GAUGE

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

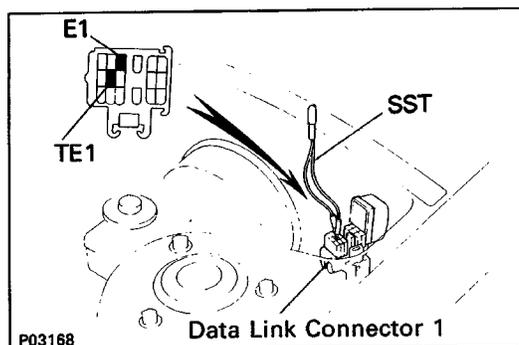
3. INSPECT SEATING OF EGR VALVE

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



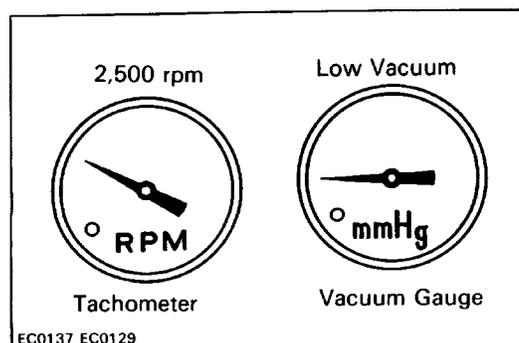
4. INSPECT VSV OPERATION

Check that the vacuum gauge indicates zero at 2,500 rpm.



5. CONNECT TERMINALS TE1 AND E1 OF DATA LINK CONNECTOR 1

Using SST, connect the terminals TE1 and E1 of the data link connector 1.

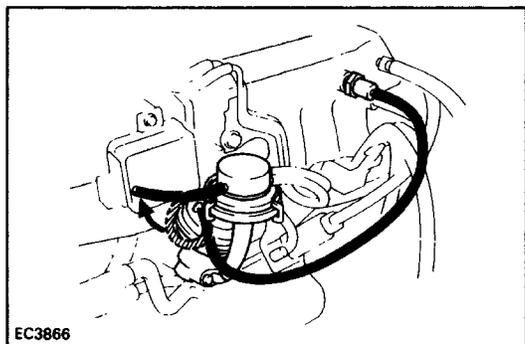


6. INSPECT OPERATION OF VSV AND EGR VACUUM MODULATOR

Check that the vacuum gauge indicates low vacuum at 2,500 rpm.

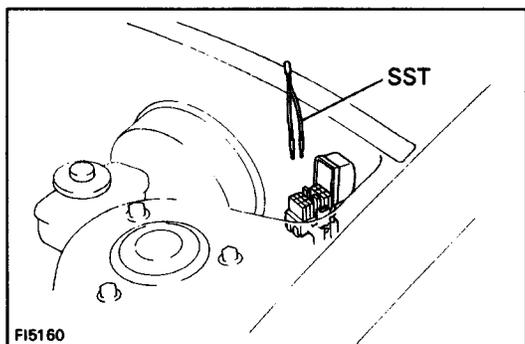
7. REMOVE VACUUM GAUGE

Remove the vacuum gauge, and reconnect the vacuum hoses to the proper locations.



8. INSPECT EGR VALVE OPERATION

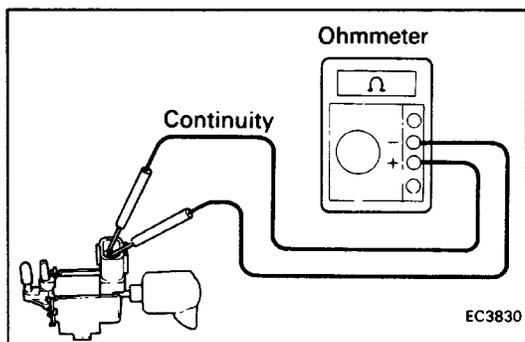
- (a) Apply vacuum directly to the EGR valve with the engine idling.
- (b) Check that the engine runs rough or dies.
- (c) Reconnect the vacuum hoses to the proper locations.



9. REMOVE SST FROM CHECK CONNECTOR

SST 09843-18020

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



INSPECTION OF VSV

1. REMOVE VSV

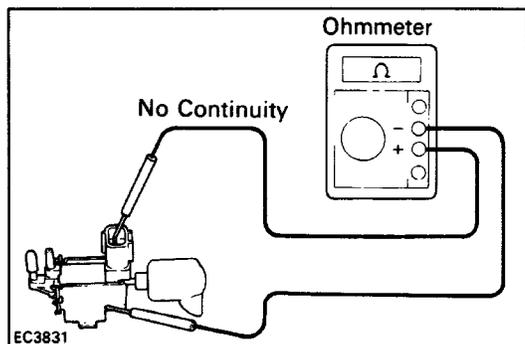
2. INSPECT VSV

A. Inspect VSV for open circuit

Using an ohmmeter, check that there is continuity between the terminals.

Resistance (Cold): 37 – 44Ω

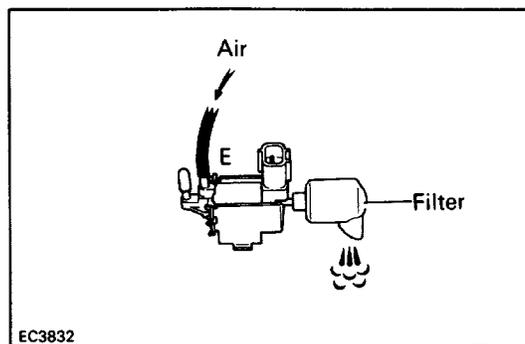
If there is no continuity, replace the VSV.



B. Inspect VSV for ground

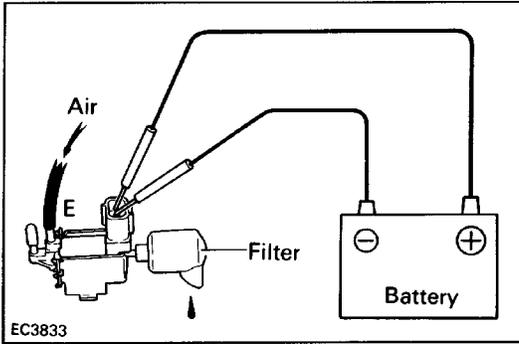
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



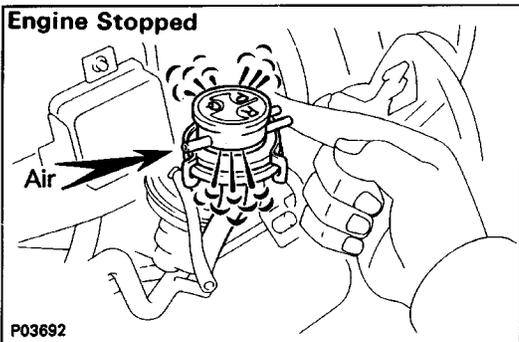
C. Inspect VSV operation

- (a) Check that air flows from port E to the filter.



- (b) Apply battery voltage across the terminals.
- (c) Check that air does not flow from port E to the filter.
If operation is not as specified, replace the VSV.

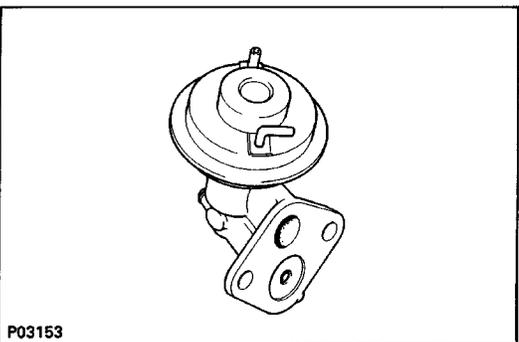
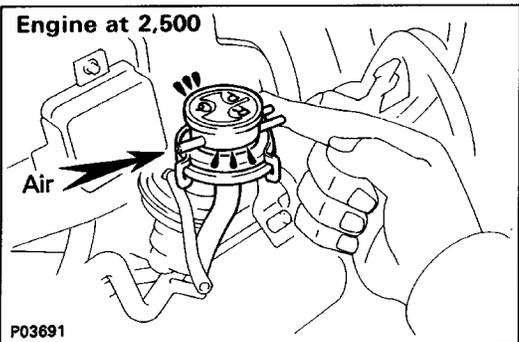
3. REINSTALL VSV



INSPECTION OF EGR VACUUM MODULATOR

INSPECT OPERATION OF EGR VACUUM MODULATOR

- (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, and check that the air passes through to the air filter side freely.
- (d) Start the engine, and maintain speed at 2,500 rpm.
- (e) Repeat the above test. Check that there is a strong resistance to air flow.
- (f) Reconnect the vacuum hoses to the proper locations.



INSPECTION OF EGR VALVE

1. REMOVE EGR VALVE

2. INSPECT EGR VALVE

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

3. REINSTALL EGR VALVE

Install a new gasket.