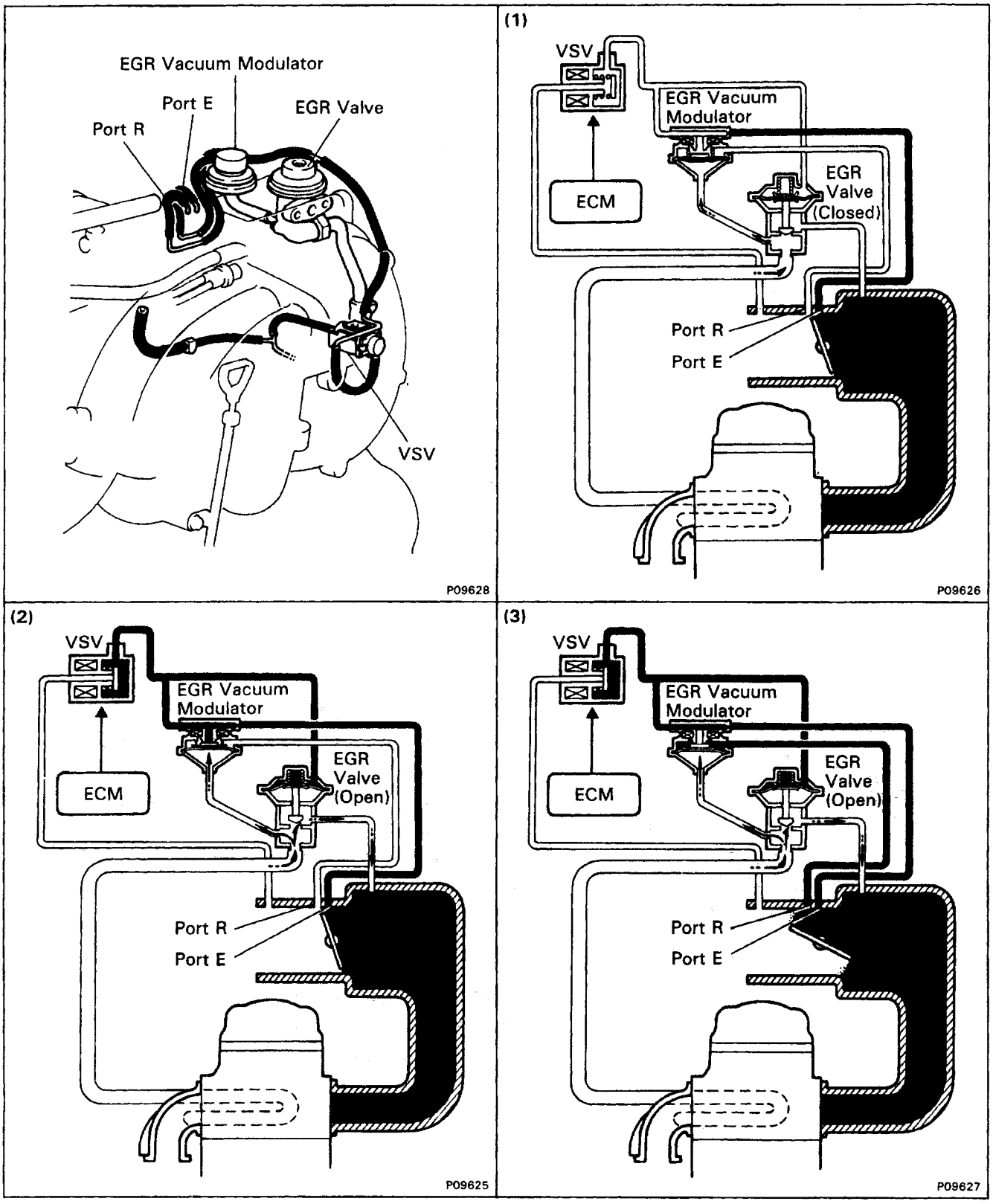
EXHAUST GAS RECIRCULATION (EGR) SYSTEM

EG19W–02



V02040

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.

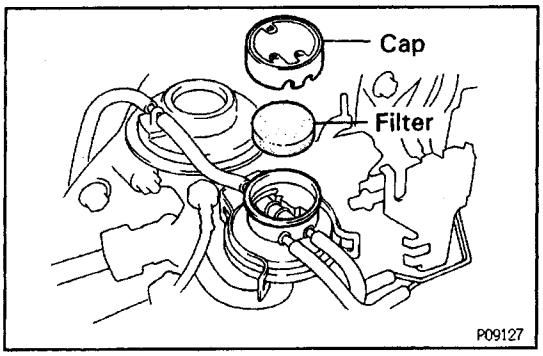
ECT	RPM	Driving Condition	Intake Air Volume	VSV	Throttle Position	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 47°C (117°F)	—	—	—	OFF	—	—		—	CLOSED	Not recirculated
Above 53°C (127°F)	Above 3,500 rpm	—	—	OFF	—	—		—	CLOSED	Not recirculated
	Below 3,500 rpm	Deceleration	—	OFF	—	—		—	CLOSED	Not recirculated
		Ex. deceleration	LOW	OFF	—	—		—	CLOSED	Not recirculated
			HIGH	OFF	—	—		—	CLOSED	Not recirculated
				ON	Below port E	—		—	CLOSED	Not recirculated
					Between port E 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
					Above port R	(3) HIGH	**	CLOSES passage to atmosphere	OPEN	Recirculated (increase)

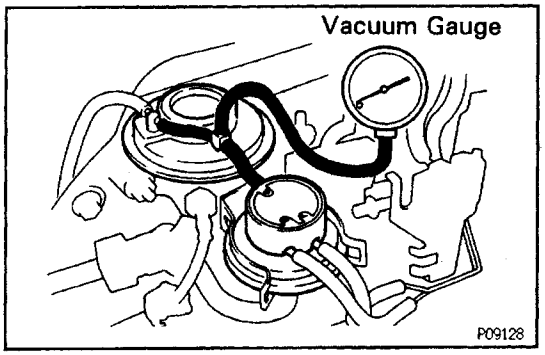
* Pressure increase → Modulator closes → EGR valve opens → Pressure drops → EGR valve closes ← Modulator opens ←

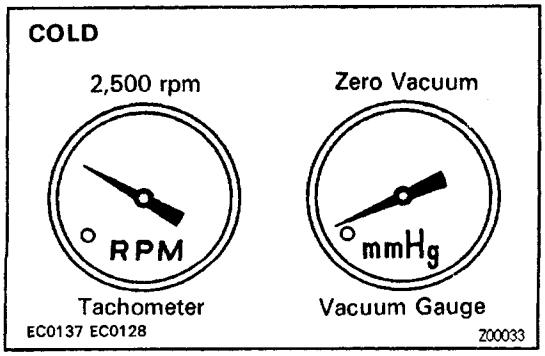
** When the throttle valve is positioned above the R port, the EGR vacuum modulator will close the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.

V01994

EG128-01







EGR SYSTEM INSPECTION

1. INSPECT AND CLEAN FILTER IN EGR VACUUM MODULATOR

(a) Remove the cap and filter.
(b) Check the filter for contamination or damage.
(c) Using compressed air, clean the filter.
(d) Reinstall the filter and cap.
HINT: Install the filter with the coarser surface facing the atmospheric side (outward).

2. INSTALL VACUUM GAUGE

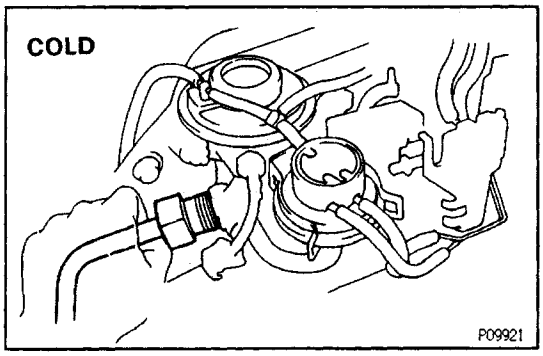
Using a 3-way connector, connect a vacuum gauge to the hose between the EGR valve and EGR vacuum modulator.

3. INSPECT SEATING OF EGR VALVE

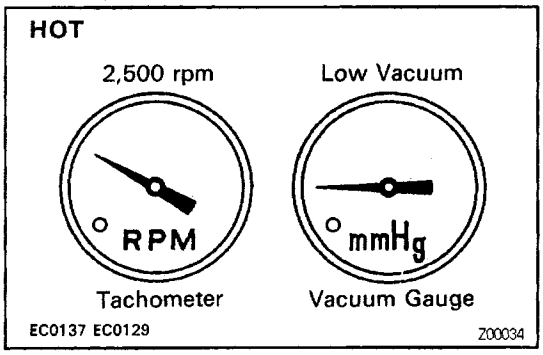
Start the engine and check that the engine starts and runs at idle.

4. INSPECT VSV OPERATION WITH COLD ENGINE

(a) The engine coolant temperature should be below 47° C (117°F).
(b) Check that the vacuum gauge indicates zero at 2,500 rpm.

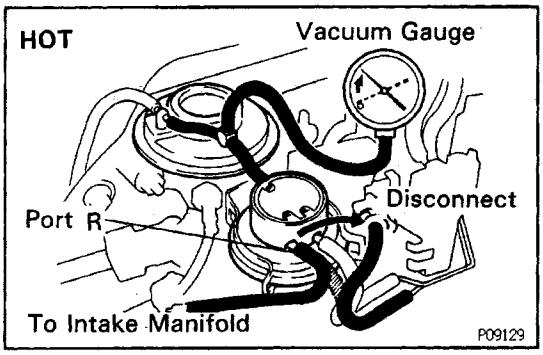


(c) Check that the EGR pipe is not hot.

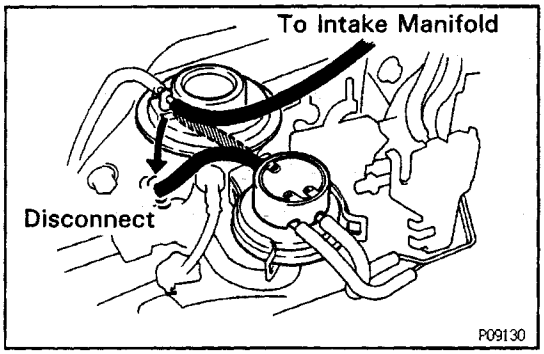


5. INSPECT OPERATION OF VSV AND EGR VACUUM MODULATOR WITH HOT ENGINE

(a) Warm up the engine to above 53°C (1270 F).
(b) Check that the vacuum gauge indicates low vacuum at 2,500 rpm.



(c) Disconnect the vacuum hose port R of the EGR vacuum modulator and connect port R directly to the intake manifold with another hose.
(d) Check that the vacuum gauge indicates high vacuum at 2,500 rpm.
HINT: As a large amount of exhaust gas enters, the engine will misfire slightly.



6. REMOVE VACUUM GAUGE

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

7. INSPECT EGR VALVE

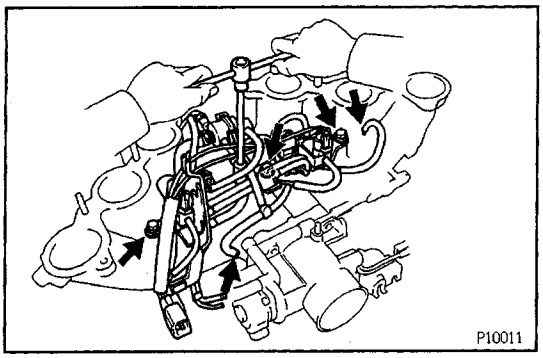
(a) Apply vacuum directly to the EGR valve with the engine idling.
(b) Check that the engine runs rough or dies.

(c) Reconnect the vacuum hoses to the proper locations.

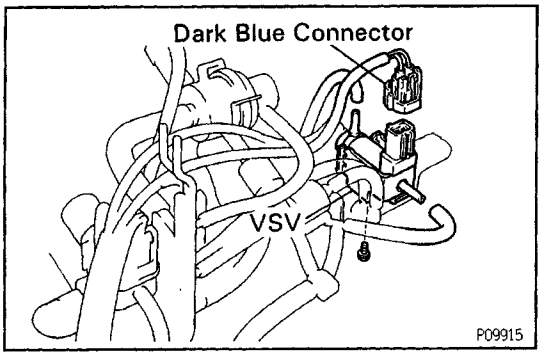
IF NO PROBLEM IS FOUND WITH THIS INSPECTION, SYSTEM IS NORMAL; OTHERWISE INSPECT EACH PART

VSV INSPECTION

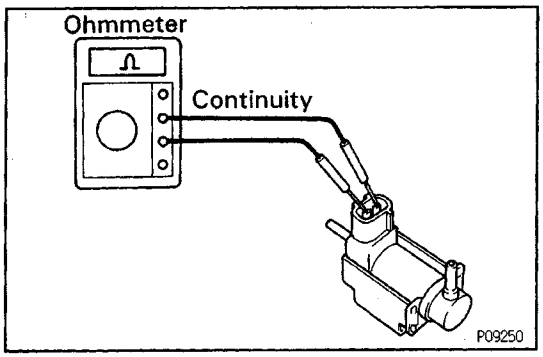
EG1S9-02



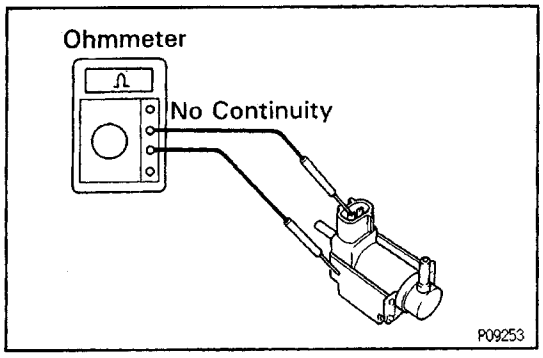
1. REMOVE AIR INTAKE CHAMBER
(SEE PAGES EG-269 AND 270)
2. REMOVE VSV
(a) Disconnect the air hose and vacuum hose from the air intake chamber.
(b) Remove the 4 bolts and emission control valve set assembly.



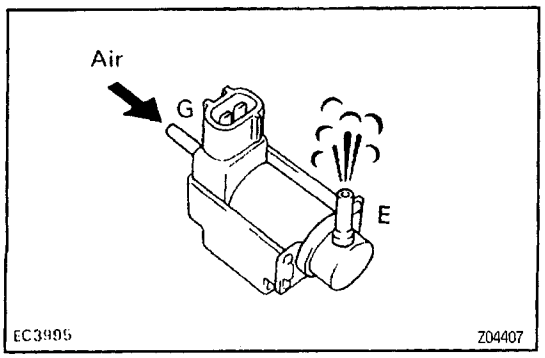
(c) Disconnect the connector and 2 vacuum hoses, and remove the screw and VSV.



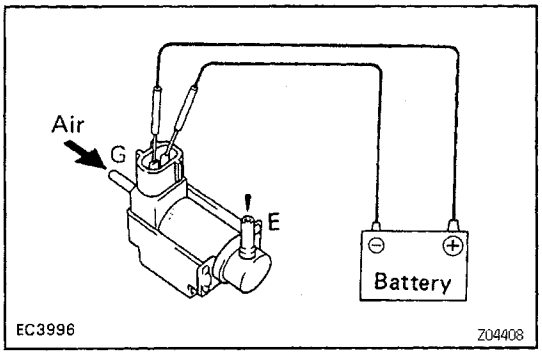
3. INSPECT VSV
A. Inspect VSV for open circuit
Using an ohmmeter, check that there is continuity between the terminals.
Resistance:
30 - 34 Ω at 20˚C (68˚F)
If there is no continuity, replace the VSV.



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.

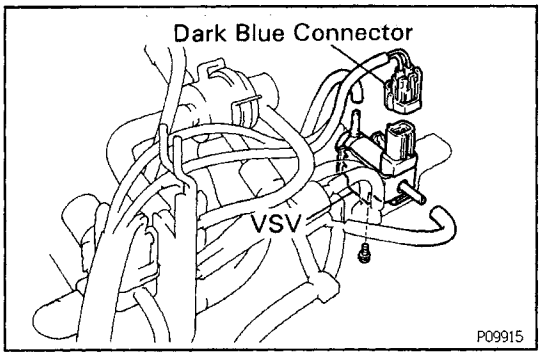


C. Inspect VSV operation
(a) Check that the air flows from pipe G to pipe E.

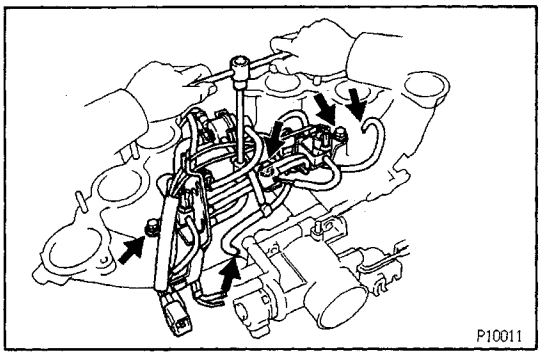


(b) Apply battery voltage across the terminals.

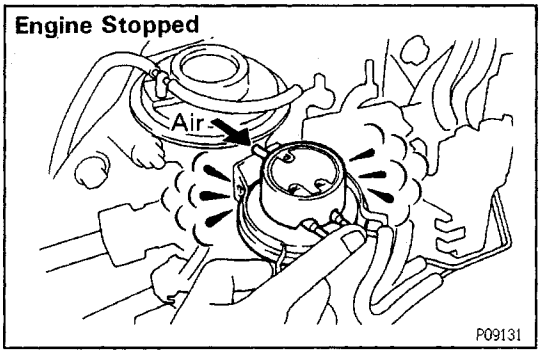
(c) Check that the air does not flows from pipe G to pipe E.
If operation is not as specified, replace the VSV.



4. REINSTALL VSV
(a) Install the VSV with the screws.
(b) Connect the connector and 2 vacuum hoses to the VSV.



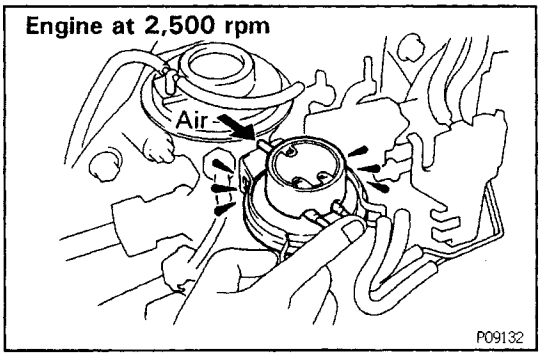
(c) Install the emission control valve set assembly with the 4 bolts.
Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)
(d) Connect the air hose and vacuum hose to the air intake chamber.
5. REINSTALL AIR INTAKE CHAMBER
(See pages EG-276 **and 277)**



EGOE^-06

EGR VACUUM MODULATOR INSPECTION

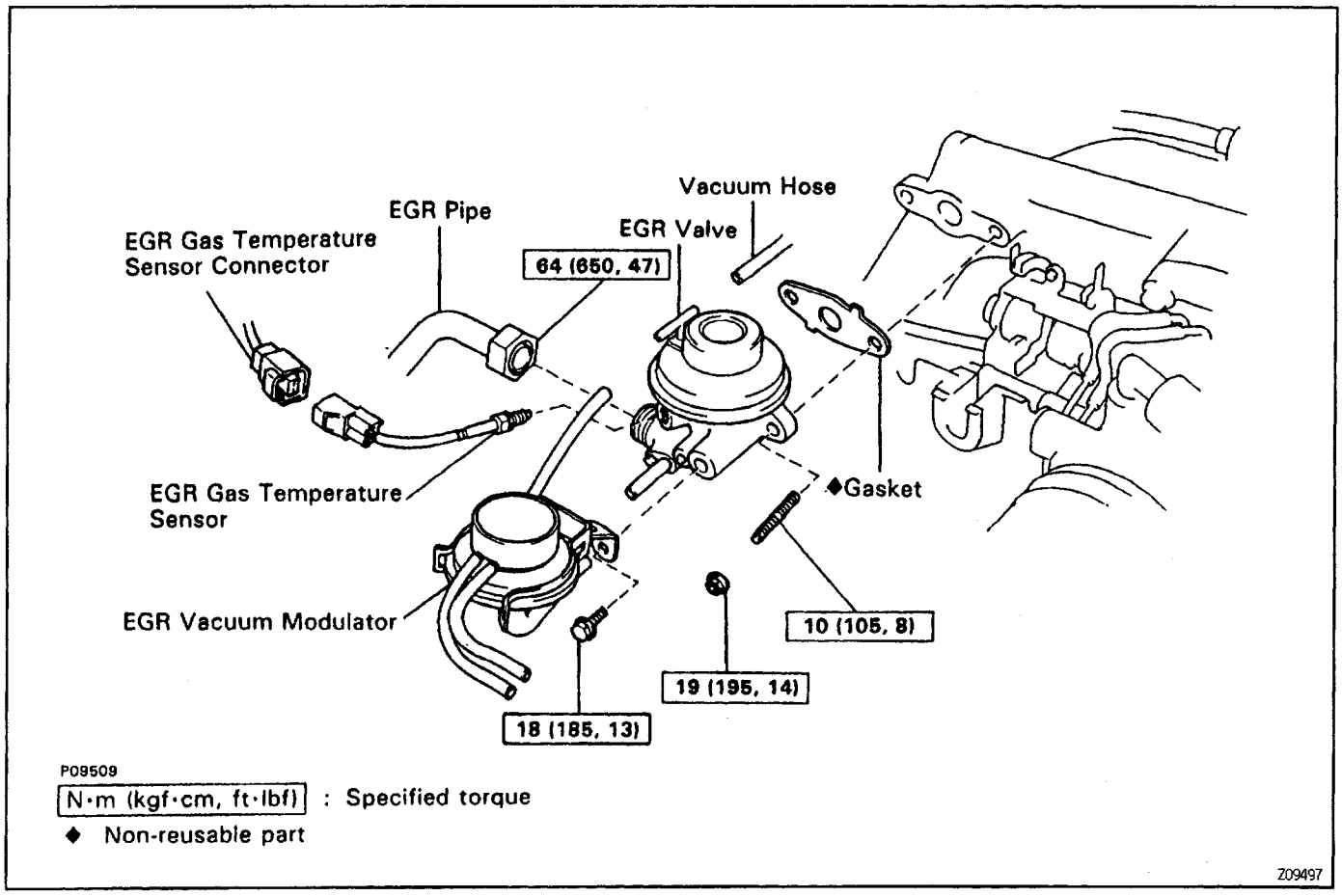
INSPECT EGR VACUUM MODULATOR OPERATION
(a) Disconnect the vacuum hoses from ports P, Q and R of the EGR vacuum modulator.
(b) Block ports P and R with your finger.
(c) Blow air into port Q, and check that the air passes through to the air filter side freely.



(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.
If operation is not as specified, replace the EGR vacuum modulator.
(f) Reconnect the vacuum hoses to the proper locations.

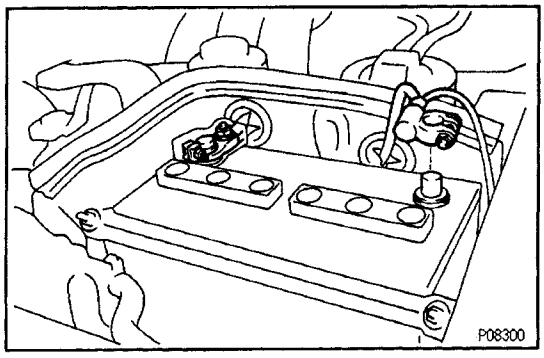
EG19Y-03

COMPONENTS FOR EGR VALVE REMOVAL AND INSTALLATION

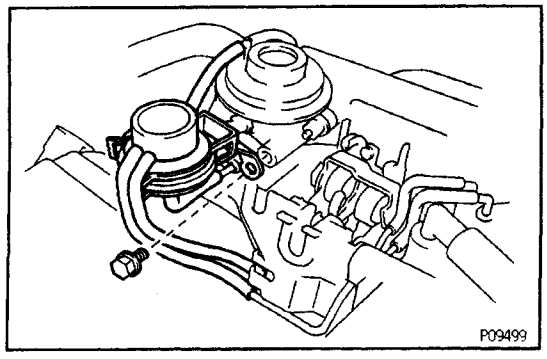


EG18A-02

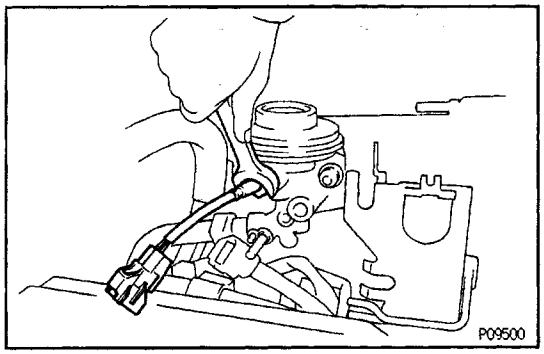
EGR VALVE INSPECTION



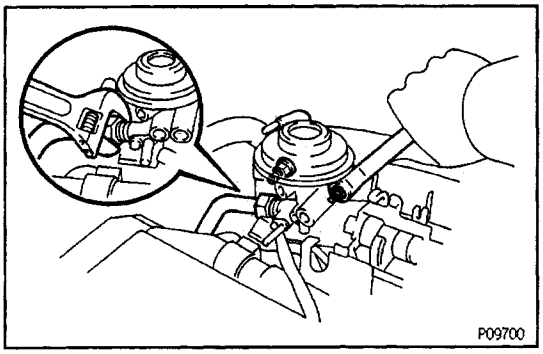
1. DISCONNECT NEGATIVE TERMINAL CABLE FROM BATTERY



2. REMOVE EGR VACUUM MODULATOR

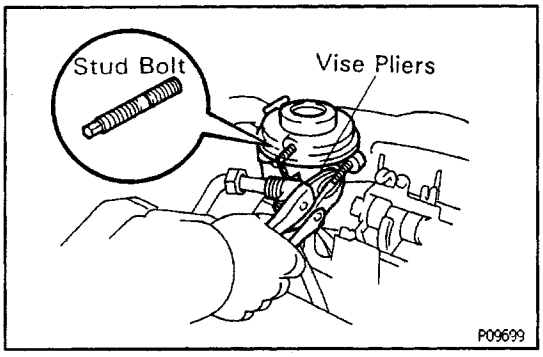


3. REMOVE EGR GAS TEMP. SENSOR

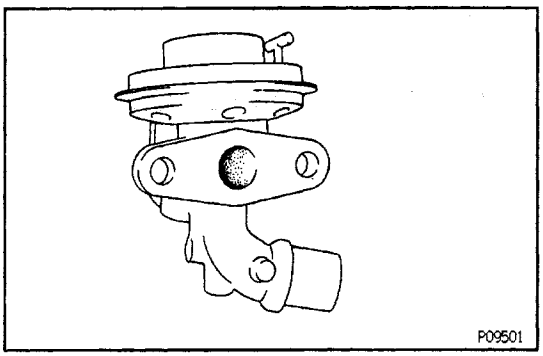


4. REMOVE EGR VALVE

(a) Loosen the EGR pipe union nut.
(b) Remove the 2 nuts holding the EGR valve to the air intake chamber.
(c) Disconnect the vacuum hose from the EGR valve.

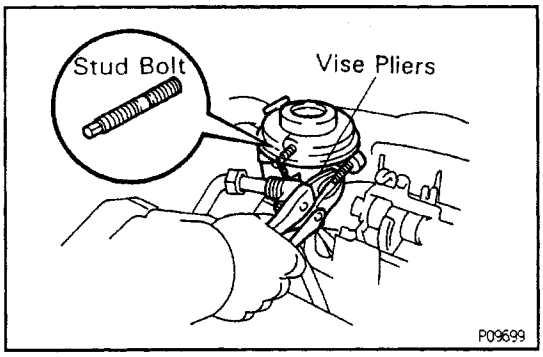


(d) Using vise pliers, remove the 2 stud bolts, EGR valve and gasket.



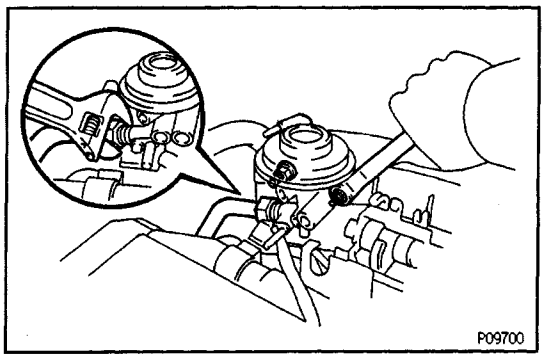
5. INSPECT EGR VALVE

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

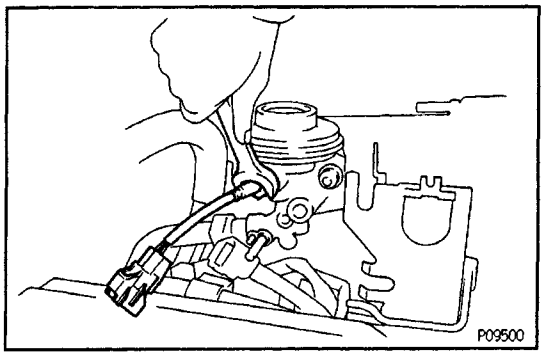


6. REINSTALL EGR VALVE

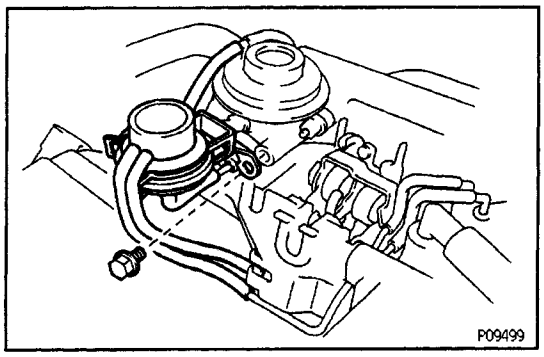
(a) Using vise pliers, temporarily install a new gasket, and EGR valve with the 2 stud bolts.
Torque: 10 N-m (105 kgf-cm, 8 ft-fbf)



(b) Connect the vacuum hose to the EGR valve.
(c) Install the 2 nuts holding the EGR valve to the air intake chamber.
Torque: 18 N-m (195 kgf cm. 14 ft-lbf)
(d) Tighten the union nut of the EGR pipe.
Torque: 64 N-m (650 kgf-cm, 47 ft-lbf)



7. REINSTALL EGR GAS TEMP. SENSOR
Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)



8. REINSTALL EGR VACUUM MODULATOR
Torque: 18 N-m (185 kgf-cm, 13 ft-lbf)

9. RECONNECT NEGATIVE TERMINAL CABLE TO BATTERY