

EMISSION CONTROL

CONTENTS

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EMISSION CONTROL <4G93>	2	SERVICE ADJUSTMENT PROCEDURES	16-2
SPECIFICATIONS	2	Emission Control Device Reference Table	16-2
General Specifications	2	Component Layout	16-3
Service Specifications	2	Vacuum Hose Piping Diagram	16-5
SERVICE ADJUSTMENT PROCEDURES	3	Vacuum Hose Layout	16-6
Emission Control Device Reference Table ...	3	Crankcase Emission Control System	16-8
Component Layout	4	Evaporative Emission Control System	16-9
Vacuum Hose Piping Diagram	6	Exhaust Gas Recirculation (EGR) System <4G63>	16-9
Vacuum Hose Layout	8	Exhaust Gas Recirculation (EGR) System <4G64>	16-12
Crankcase Emission Control System	10	CATALYTIC CONVERTER	16-15
Evaporative Emission Control System	11	EMISSION CONTROL <DIESEL>	17
Exhaust Gas Recirculation (EGR) System	14	SPECIFICATIONS	17
EMISSION CONTROL <4G63, 4G64>	16-1	General Specifications	17
SPECIFICATIONS	16-1	Service Specifications	17
General Specifications	16-1	SPECIAL TOOLS	17
Service Specifications	16-2	SERVICE ADJUSTMENT PROCEDURES ..	18
		Component Layout	18
		Exhaust Gas Recirculation (EGR) System	19
		Glow & EGR Control Unit <Super Quick Glow System>	23
		Glow & EGR Control Unit <Self-regulating Glow System>	24

EMISSION CONTROL <4G93>**SPECIFICATIONS****GENERAL SPECIFICATIONS****<Vehicles with catalytic converter>**

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system	Canister 2-way valve Purge control solenoid valve	Equipped Equipped ON/OFF type solenoid valve (Purpose: HC reduction)
Exhaust emission control system	Air-fuel ratio control device – MPI system	Oxygen sensor feedback type (Purpose: CO, HC, NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

<Vehicles without catalytic converter>

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system	2-way valve	Equipped
Exhaust emission control system	Exhaust gas recirculation system EGR valve EGR control solenoid valve	Single type ON/OFF type solenoid valve (Purpose: NOx reduction)

SERVICE SPECIFICATIONS

Items	Specification
Purge control solenoid valve coil resistance [at 20°C (68°F)]	Ω 36–44
EGR control solenoid valve coil resistance [at 20°C (68°F)]	Ω 36–44

SERVICE ADJUSTMENT PROCEDURES**EMISSION CONTROL DEVICE REFERENCE TABLE**

Emission control system Related parts	Crankcase emission control system	Evapora- tive emis- sion con- trol sys- tem	Air fuel ratio con- trol sys- tem	Catalytic converter	Exhaust emission control system	Reference page for each part inspection
PCV valve	X					17-10
Purge control solenoid valve *1		X				17-13
2-way valve		X				Fuel (Group 13)
MPI system component		X	X			Fuel (Group 13)
Catalytic converter				X		17-17
EGR valve *2					X	17-15
EGR control solenoid valve *2					X	17-16

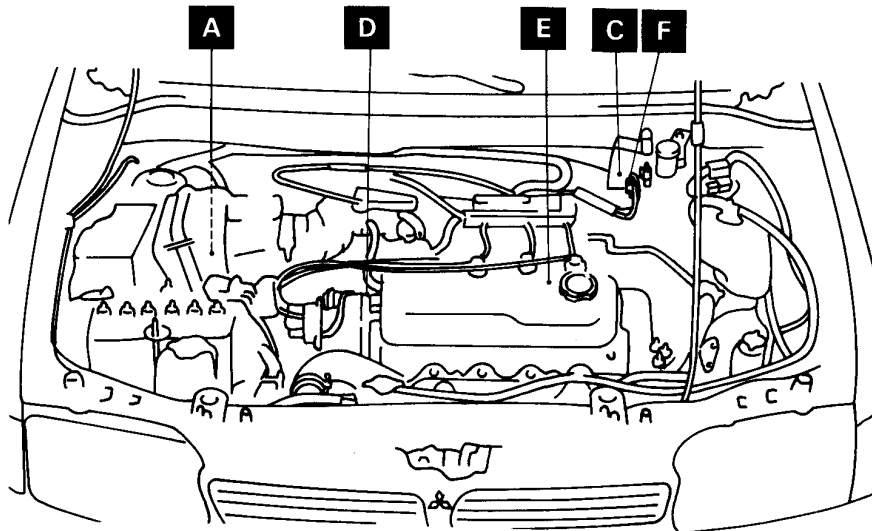
NOTE

*1: Vehicles with catalytic converter

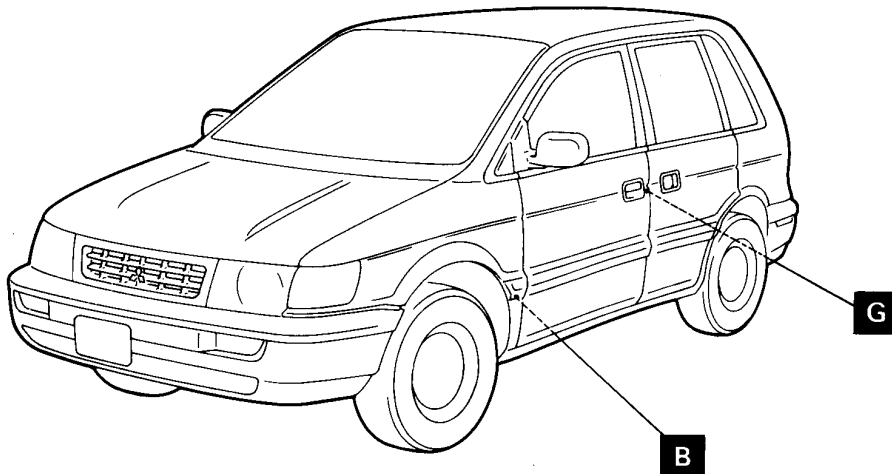
*2: Vehicles without catalytic converter

COMPONENT LAYOUT

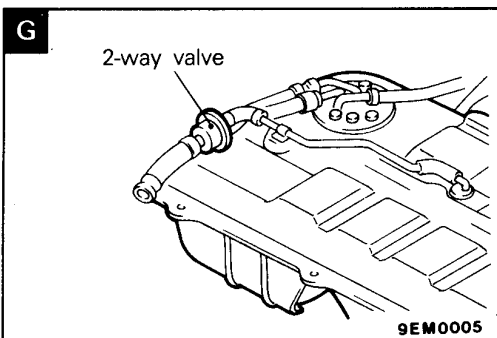
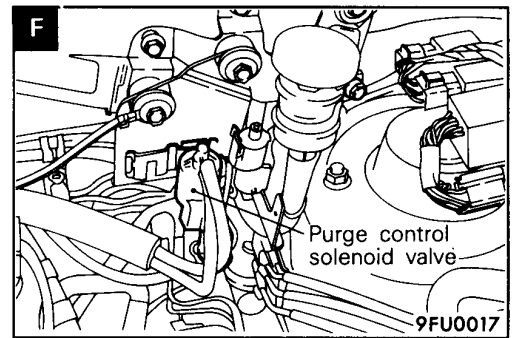
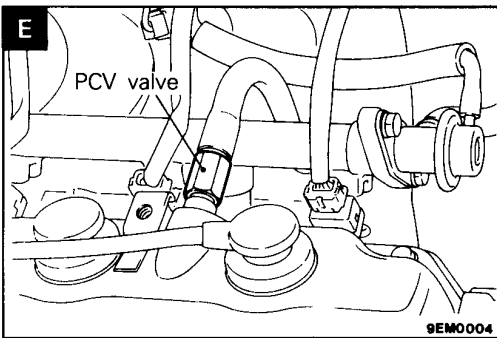
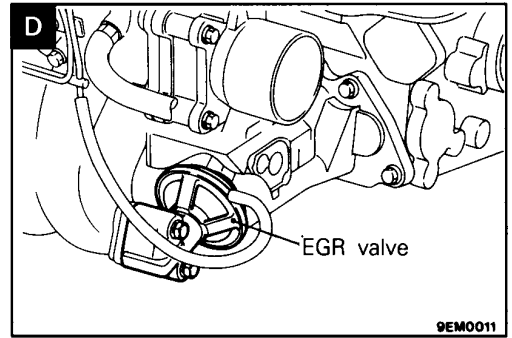
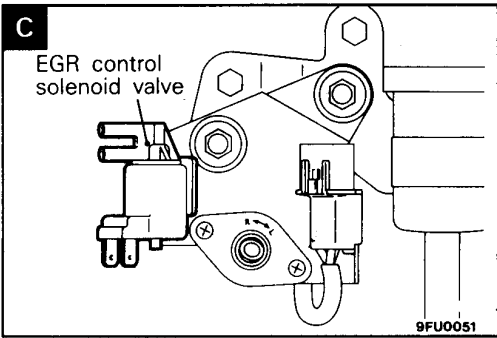
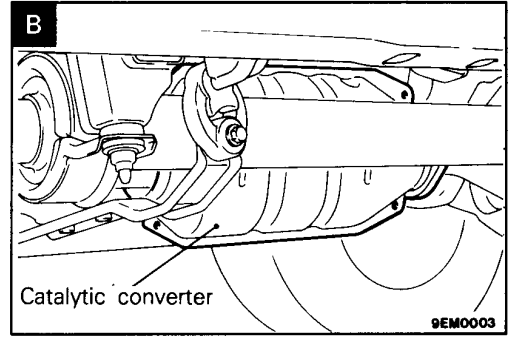
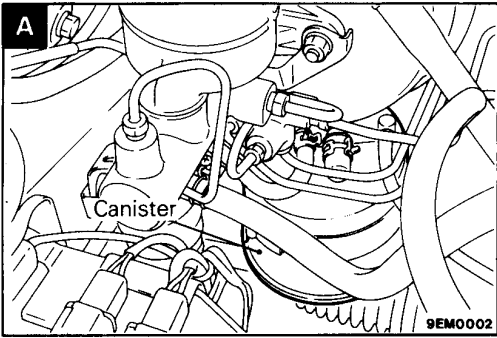
Name	Symbol
Canister	A
Catalytic converter	B
EGR control solenoid valve	C
EGR valve	D
PCV valve	E
Purge control solenoid valve	F
2-way valve	G



9FU0005

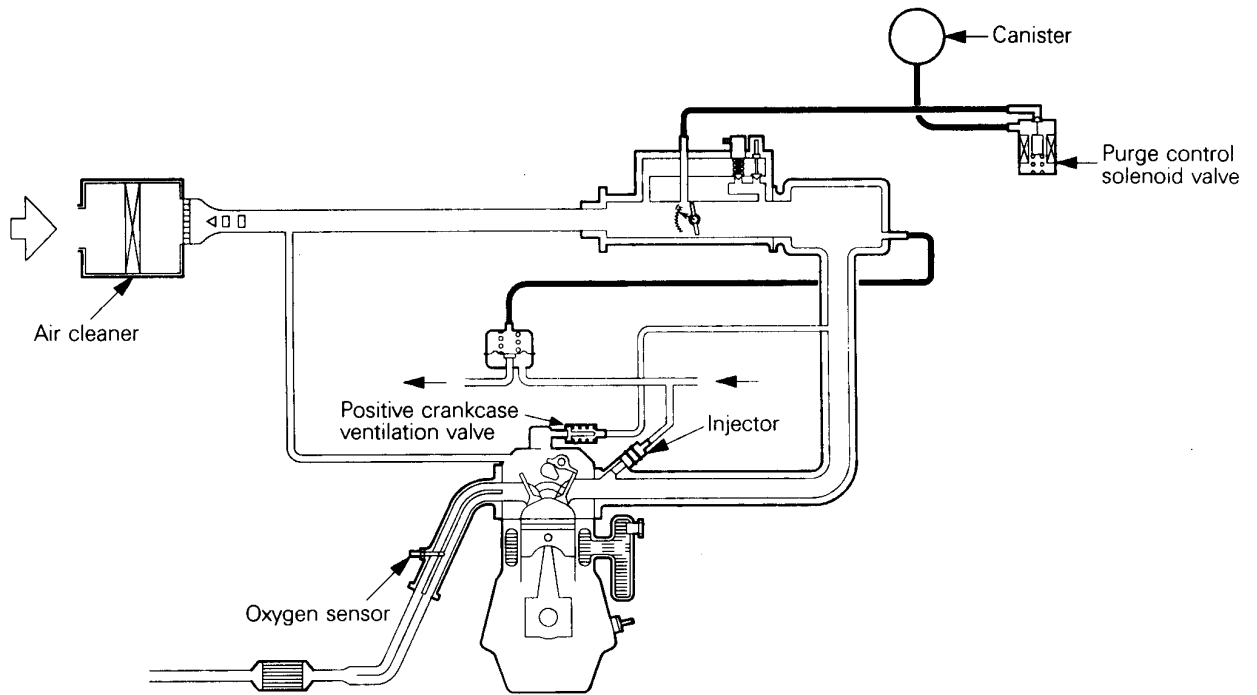


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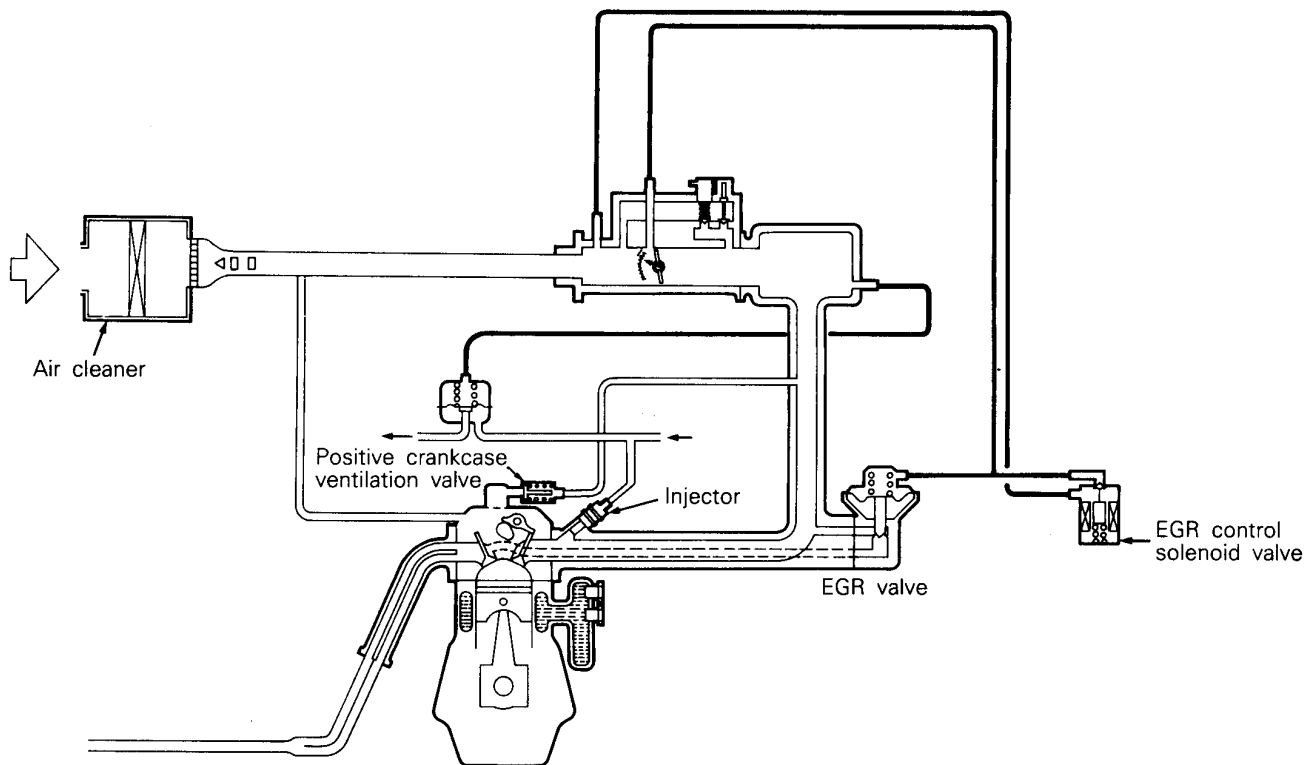
VACUUM HOSE PIPING DIAGRAM

<Vehicles with catalytic converter>



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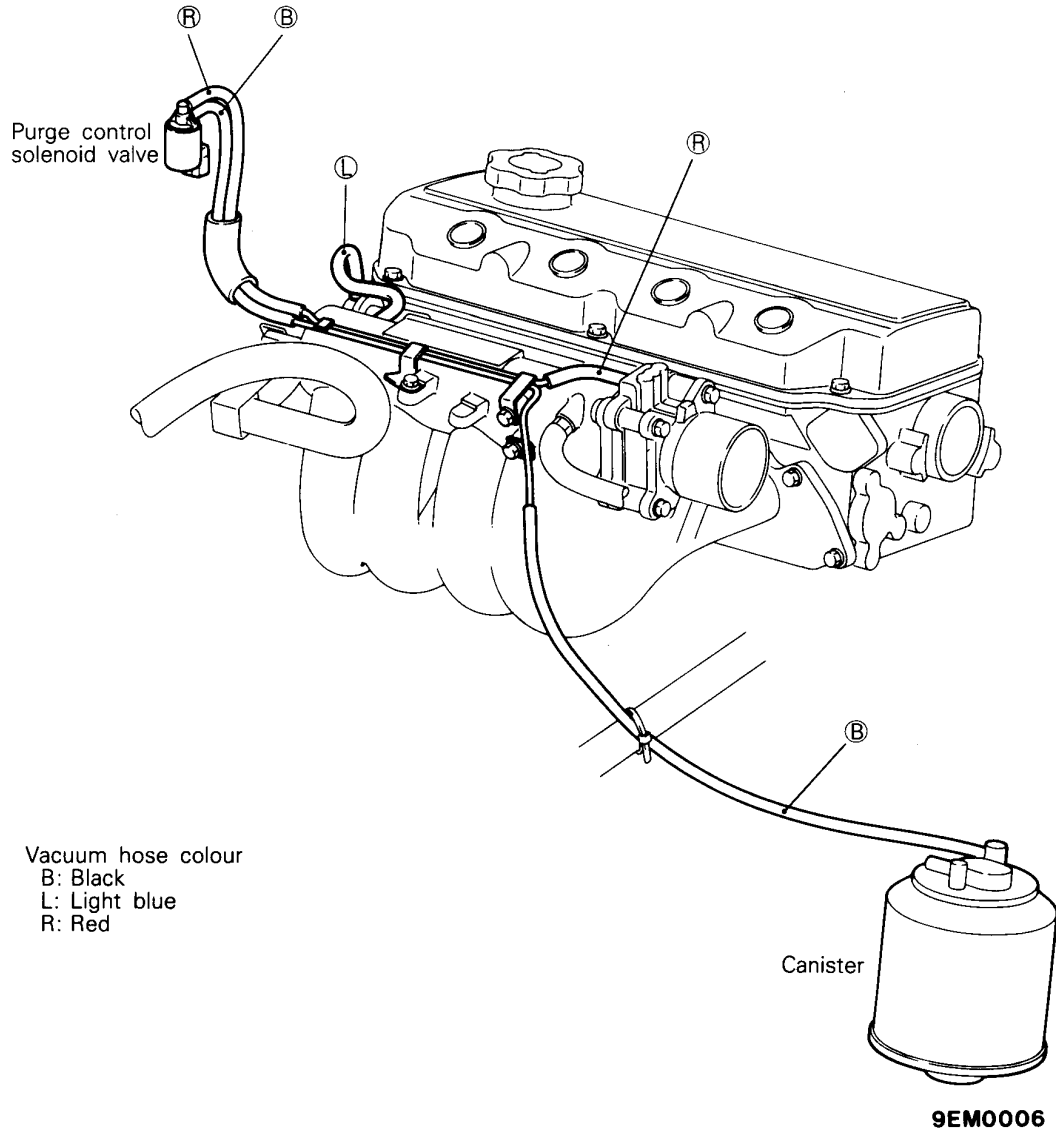
<Vehicles without catalytic converter>



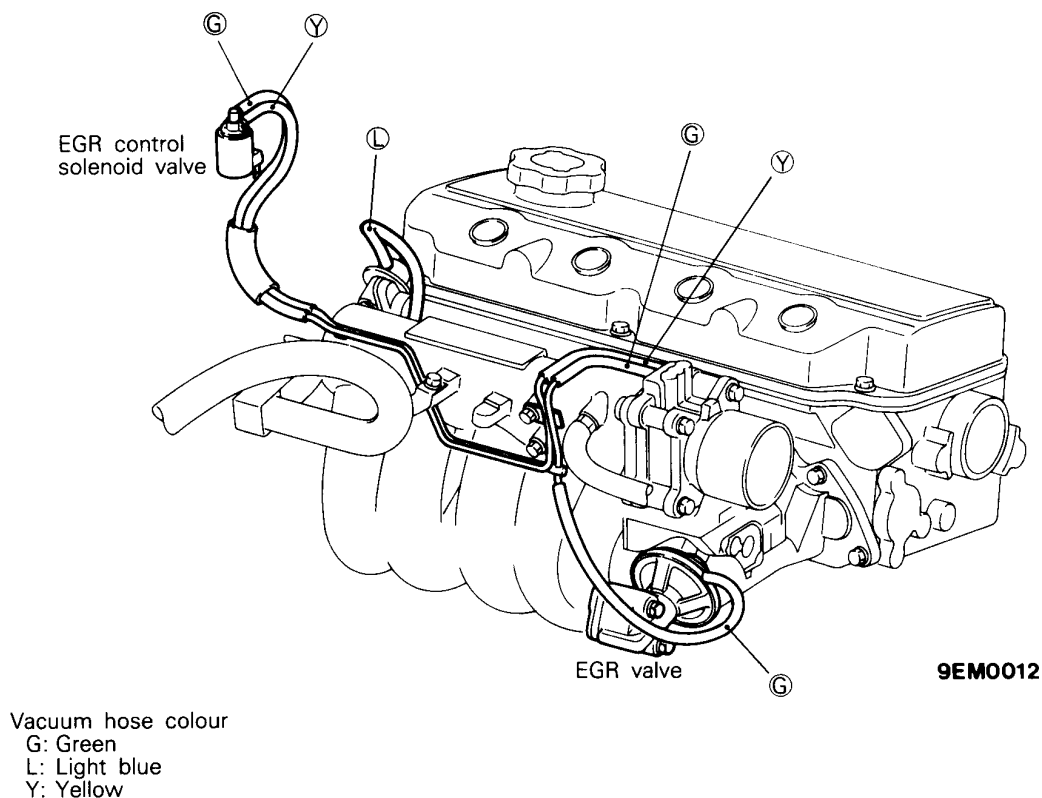
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VACUUM HOSE LAYOUT

<Vehicles with catalytic converter>



<Vehicles without catalytic converter>

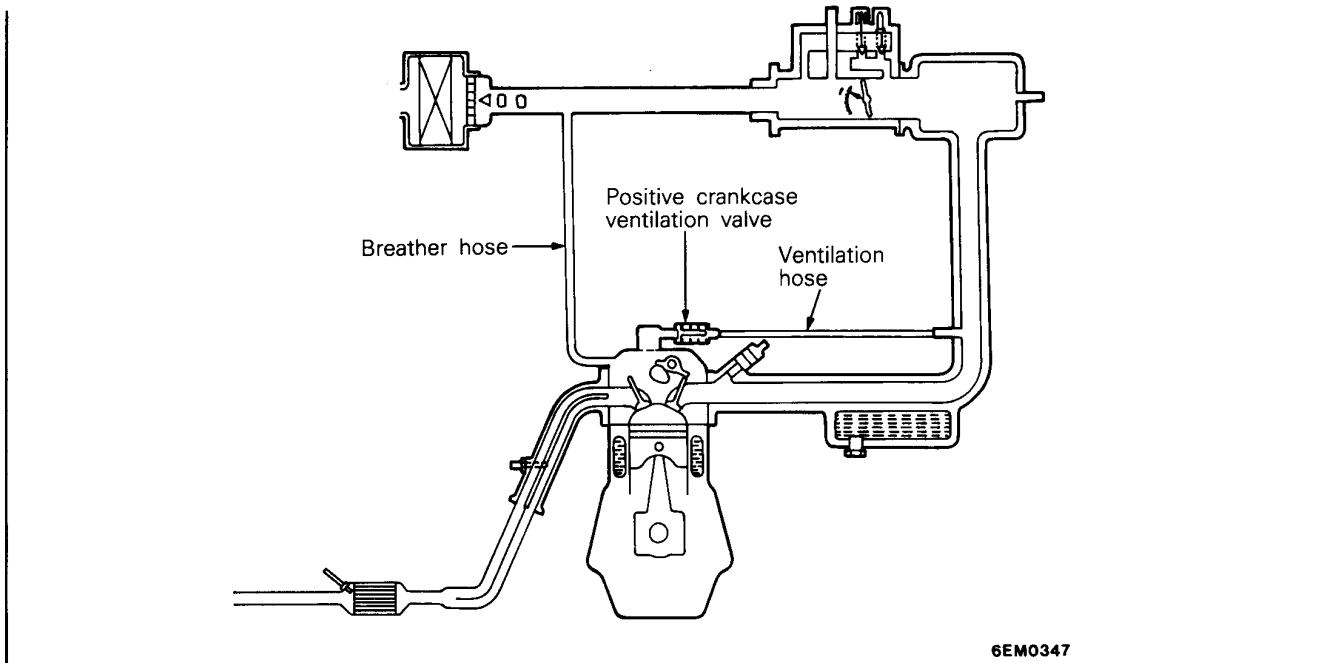
**INSPECTION**

- (1) Using the piping diagram as a guide, check to be sure that the vacuum hoses are correctly connected.
- (2) Check the connection condition of the vacuum hoses, (removed, loose, etc.) and check to be sure that there are no bends or damage.

INSTALLATION

- (1) When connecting the vacuum hoses, they should be securely inserted onto the nipples.
- (2) Connect the hoses correctly, using the vacuum hose piping diagram as a guide.

CRANKCASE EMISSION CONTROL SYSTEM



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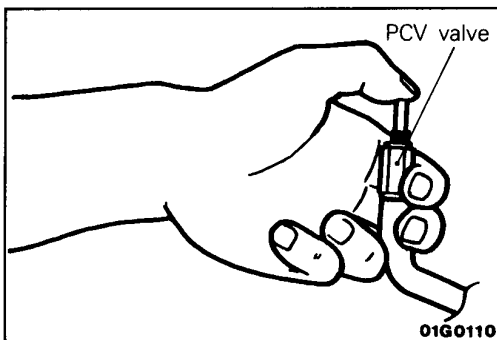
POSITIVE CRANKCASE VENTILATION SYSTEM**System Inspection**

- (1) Remove the ventilation hose from the positive crankcase ventilation valve.
- (2) Remove the positive crankcase ventilation valve from the rocker cover.
- (3) Reinstall the positive crankcase ventilation valve at the ventilation hose.
- (4) Start the engine and run at idle.
- (5) Place a finger at the opening of the positive crankcase ventilation valve and confirm that vacuum of the intake manifold is felt.

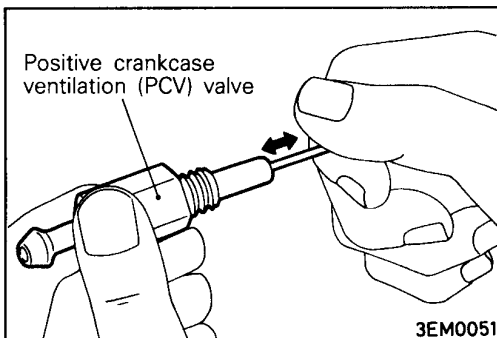
NOTE

At this moment, the plunger in the positive crankcase ventilation valve moves forward and backward.

- (6) If vacuum is not felt, clean the positive crankcase ventilation valve or replace it.



01G0110



3EM0051

Positive Crankcase Ventilation (PCV) Valve Inspection

- (1) Slide in a narrow stick at the threaded side of the positive crankcase ventilation valve and make sure that the plunger moves.
- (2) If the plunger does not move, there is a clogging in the positive crankcase ventilation valve. In this case, clean or replace the valve.

Installation

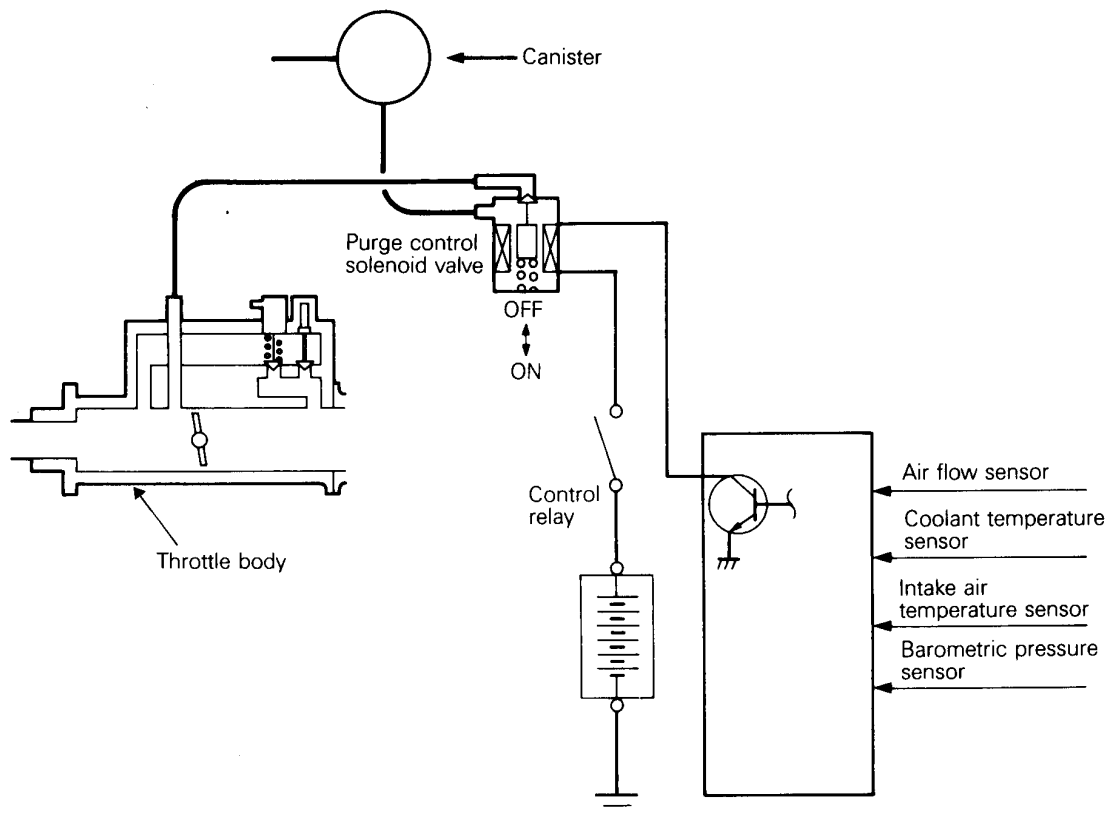
- (1) Install positive crankcase ventilation valve and tighten to specified torque.

Specified torque: 10 Nm (1.0 kgm, 7.2 ft.lbs.)

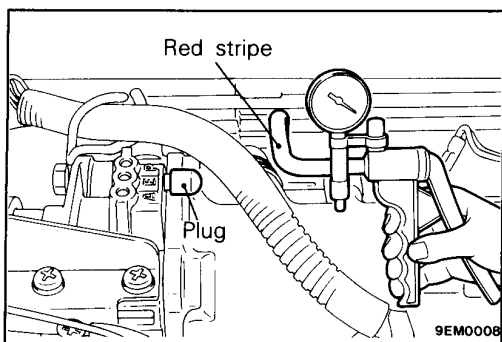
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EVAPORATIVE EMISSION CONTROL SYSTEM <Vehicles with catalytic converter>
PURGE CONTROL SYSTEM

System Inspection



1EM0288



- (1) Disconnect the vacuum hose (red stripes) from the throttle body and connect it to a hand vacuum pump.
- (2) Plug the nipple from which the vacuum hose was removed.
- (3) When the engine is cold and hot, apply a vacuum while the engine is idling, and check the condition of the engine and the vacuum.

When engine is cold

[Engine coolant temperature: 40°C (104°F) or less]

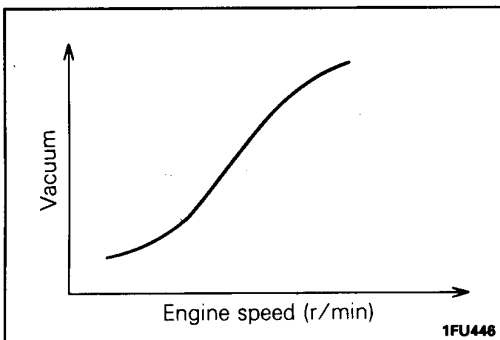
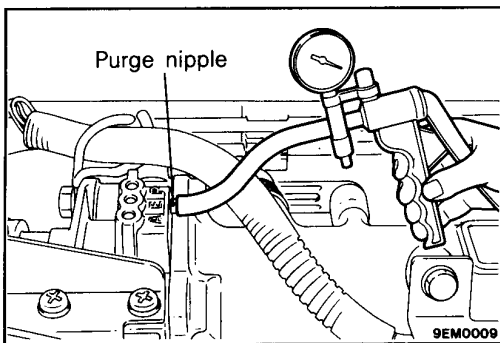
Vacuum	Engine status	Normal condition
53 kPa (400 mmHg, 15.7 in.Hg.)	3,000 r/min	Vacuum is maintained

When engine is hot
[Engine coolant temperature: 80°C (176°F) or higher]

Vacuum	Engine status	Normal condition
53 kPa (400 mmHg, 15.7 in.Hg)	Idling	Vacuum is maintained
	3,000 r/min	Vacuum will leak for approximately 3 minutes after the engine is started. After 3 minutes have elapsed, the vacuum will be maintained momentarily, after which it will again leak.*

NOTE

* The vacuum will leak continuously if the atmospheric pressure is approximately 77 kPa (580 mmHg, 22.8 in.Hg) or less, or the temperature of the intake air is approximately 50°C (122°F) or higher.



Purge Port Vacuum Inspection

Check Condition

Engine coolant temperature: 80–95°C (176–203°F)

- (1) Disconnect the vacuum hose (red stripe) from the throttle body purge hose nipple and connect a hand vacuum pump to the nipple.

- (2) Start the engine and check to see that, after raising the engine speed by racing the engine, purge vacuum raises proportionately with the rise in engine speed.

NOTE

If there is a problem with the change in vacuum, it is possible that the throttle body purge port may be clogged and require cleaning.

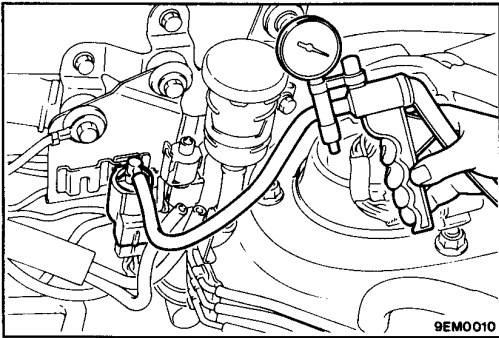
Purge Control Solenoid Valve

Inspection

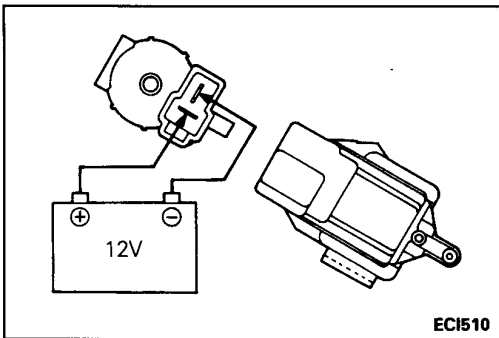
NOTE

When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

- (1) Disconnect the vacuum hose (black, red stripes) from the solenoid valve.
- (2) Disconnect the harness connector.

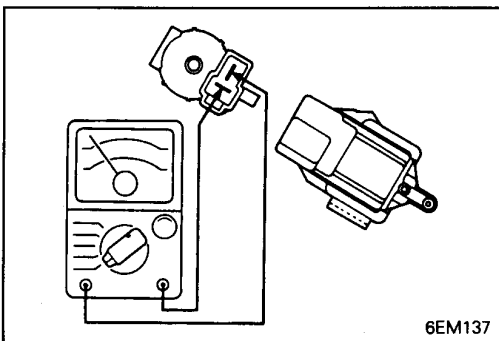


- (3) Connect a hand vacuum pump to the nipple to which the vacuum hose with red-stripes was connected.



- (4) Check airtightness by applying a vacuum with voltage applied directly from the battery to the purge control solenoid valve and without applying voltage.

Battery voltage	Normal condition
Applied	Vacuum leaks .
Not applied	Vacuum maintained

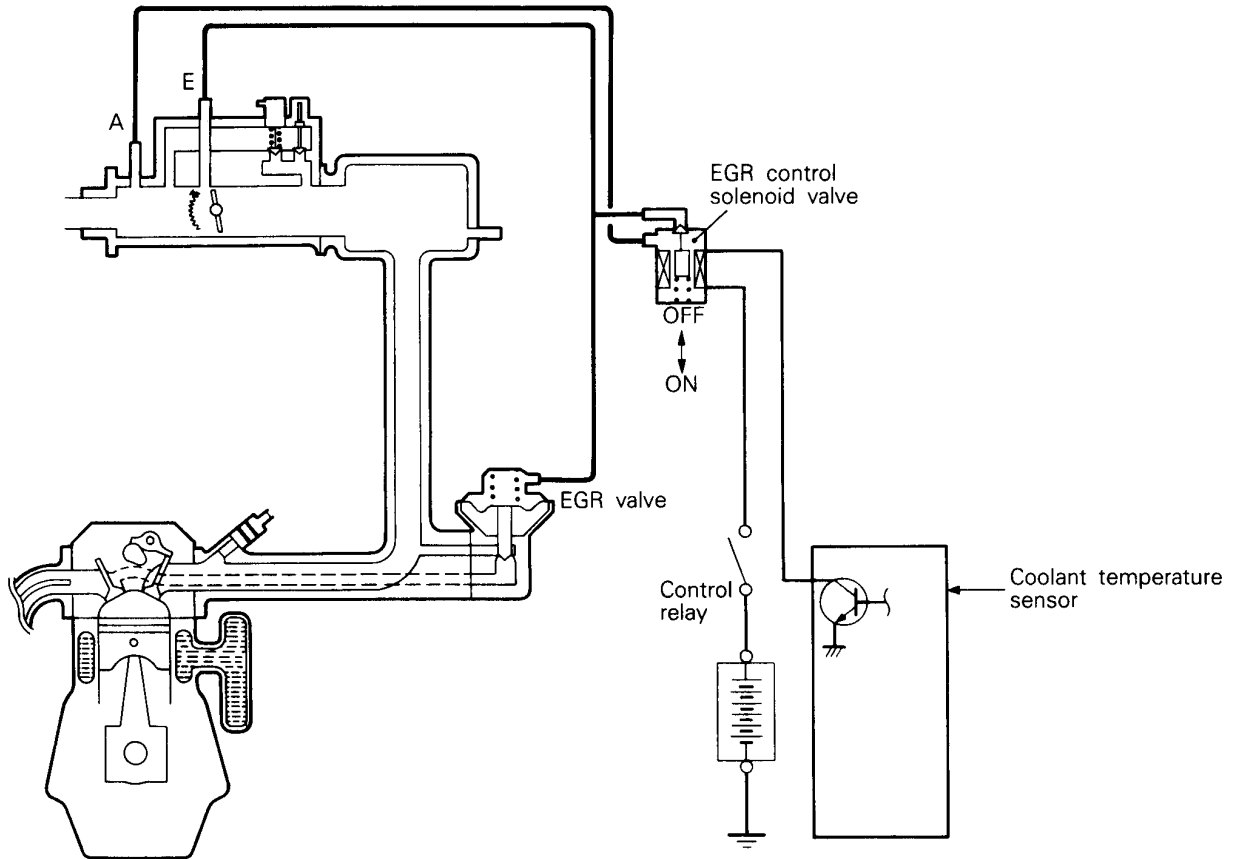


- (5) Measure the resistance between the terminals of the solenoid valve.

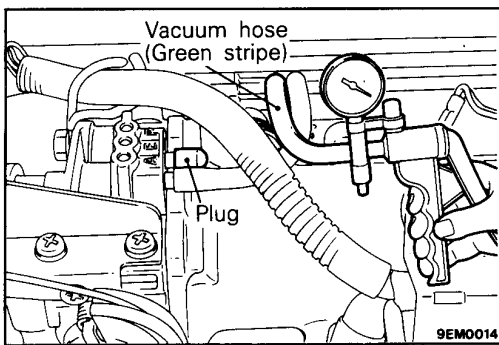
Standard value: 36–44 Ω [at 20°C (68°F)]

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

System Inspection



9EM0013



- (1) Remove the vacuum hose (green stripe) from the throttle body, and connect a hand vacuum pump to the vacuum hose.
- (2) Plug the nipple from which the vacuum hose was removed.
- (3) When the engine is cold and hot, apply a vacuum while the engine is idling, and check the condition of the engine and the vacuum.

When engine is cold

[Engine coolant temperature: 40°C (104°F) or less]

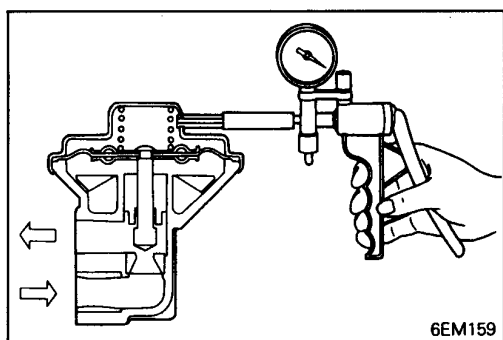
Hand vacuum pump	Normal condition	
	Engine	Vacuum
Vacuum is applied	No change	Vacuum leaks

When engine is hot
[Engine coolant temperature: 80°C (176°F) or higher]

Hand vacuum pump	Normal condition	
	Engine	Vacuum
5.3 kPa (40 mmHg, 1.6 in.Hg) of vacuum is applied	No change	Vacuum is maintained
26 kPa (195 mmHg, 7.7 in.Hg) of vacuum is applied	Idling becomes slightly unstable	

EGR Valve Inspection

(1) Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found, clean with a suitable solvent so that the valve seats' correctly.

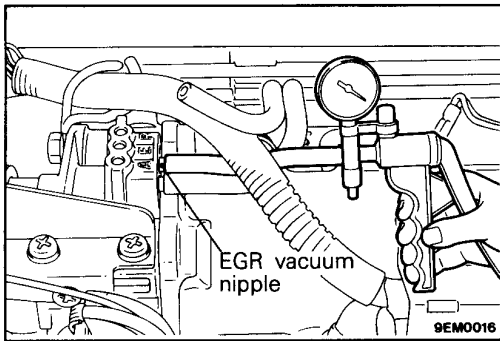


- (2) Connect a hand vacuum pump to the EGR valve.
 (3) Apply 67 kPa (500 mmHg, 20 in.Hg) of vacuum, and check to be sure that the vacuum is maintained.
 (4) Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

Vacuum	Passage of air
5.3 kPa (40 mmHg, 1.6 in.Hg) or less	Air is not blown out
26 kPa (195 mmHg, 7.7 in.Hg) or more	Air is blown out

Installation

- (1) Use a new gasket, and tighten to the specified torque.
Specified torque: 22 Nm (2.2 kgm, 16 ft.lbs.)

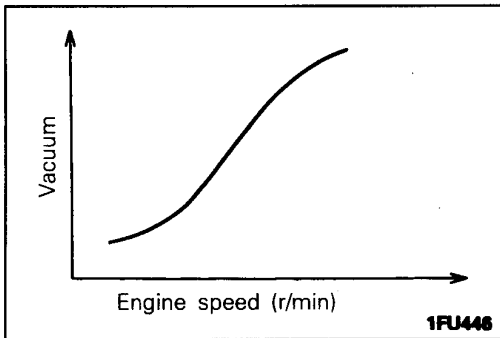


EGR Valve Control Vacuum Inspection

Check Condition

Engine coolant temperature: 80–95°C (176–203°F)

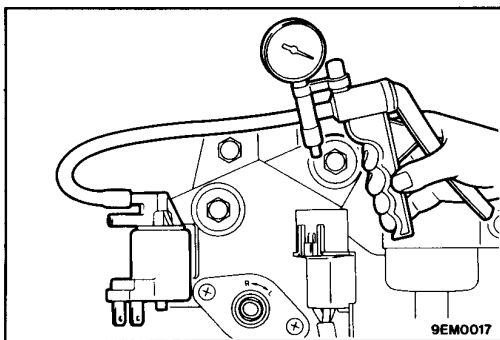
- (1) Disconnect the vacuum hose (green stripe) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.



- (2) Start the engine and check to see that, after raising the engine speed by racing the engine, EGR vacuum raises proportionately with the rise in engine speed.

NOTE

If there is a problem with the change in vacuum, it is possible that the throttle body EGR port may be clogged and require cleaning.



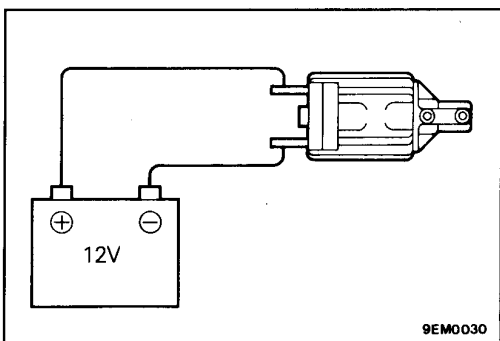
EGR Control Solenoid Valve

Inspection

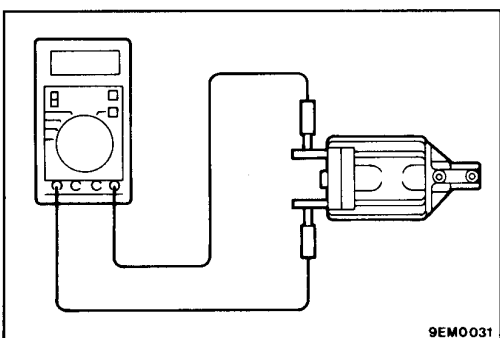
NOTE

When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

- (1) Disconnect the vacuum hose (yellow stripe, green stripe) from the solenoid valve.
- (2) Disconnect the harness connector.
- (3) Connect a hand vacuum pump to the nipple to which the green-striped vacuum hose was connected.
- (4) Check airtightness by applying a vacuum with voltage applied directly from the battery to the EGR control solenoid valve and without applying voltage.



Battery voltage	Normal condition
Applied	Vacuum leaks
Not applied	Vacuum maintained



- (5) Measure the resistance between the terminals of the solenoid valve.

Standard value: 36–44 Ω [at 20°C (68°F)]

EMISSION CONTROL <4G63, 4G64>**SPECIFICATIONS****GENERAL SPECIFICATIONS****<4G63>**

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system	Canister 2-way valve Purge control solenoid valve	Equipped Equipped ON/OFF type solenoid valve (Purpose: HC reduction)
Exhaust emission control system	Air-fuel ratio control device – MPI system	Oxygen sensor feedback type (Purpose: CO, HC, NOx reduction)
	Exhaust gas recirculation system EGR valve Thermo valve	Single type Bimetal type (Purpose: NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

<4G64>

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system	Canister 2-way valve Purge control solenoid valve	Equipped Equipped ON/OFF type solenoid valve (Purpose: HC reduction)
Exhaust emission control system	Air-fuel ratio control device – MPI system	Oxygen sensor feedback type (Purpose: CO, HC, NOx reduction)
	Exhaust gas recirculation system EGR valve EGR control solenoid valve	Single type Duty type solenoid valve (Purpose: NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

17-16-2 EMISSION CONTROL <4G63, 4G64> – Specifications/Service Adjustment Procedures

SERVICE SPECIFICATIONS

Items		Specifications
Purge control solenoid valve coil resistance [at 20°C (68°F)]	Ω	36 – 44
EGR control solenoid valve coil resistance [at 20°C (68°F)]	Ω	36 – 44

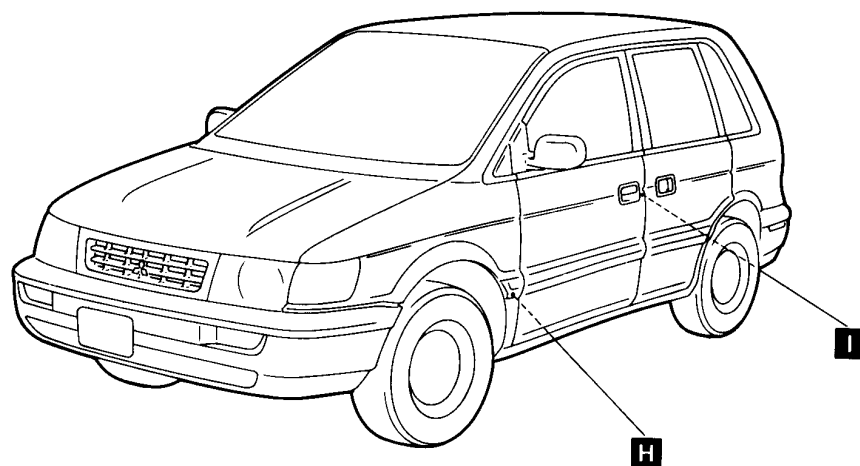
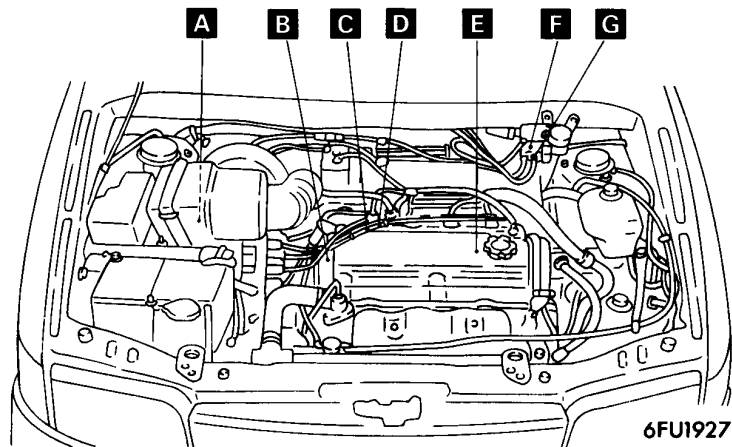
SERVICE ADJUSTMENT PROCEDURES

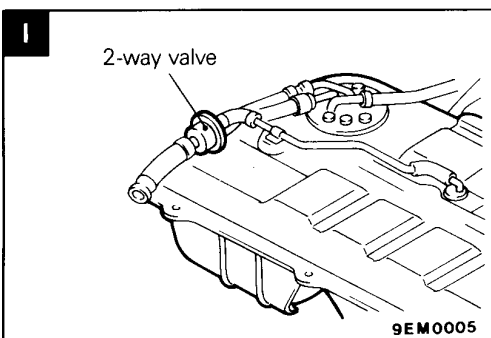
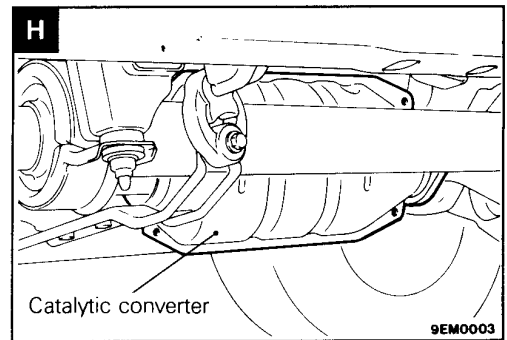
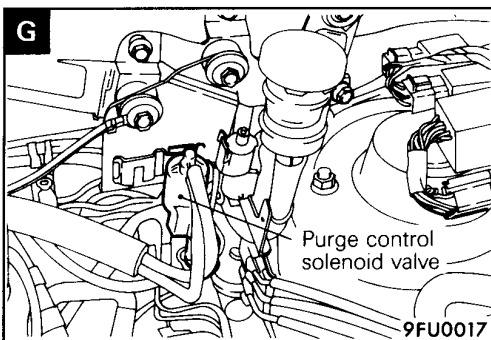
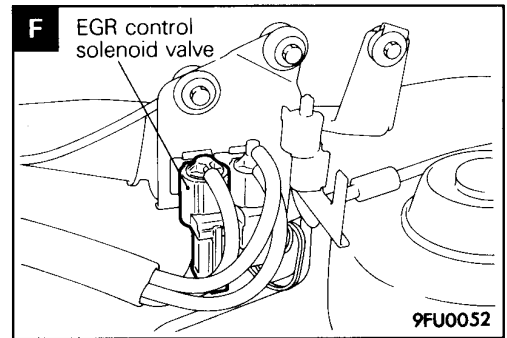
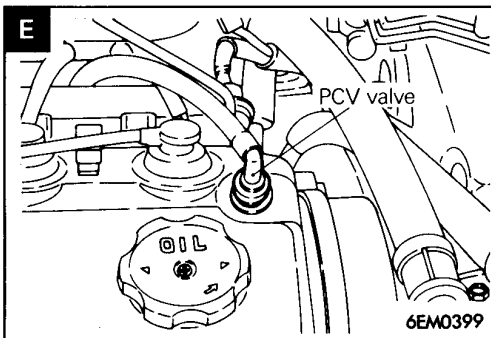
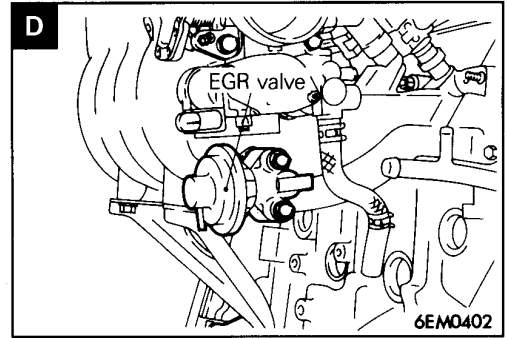
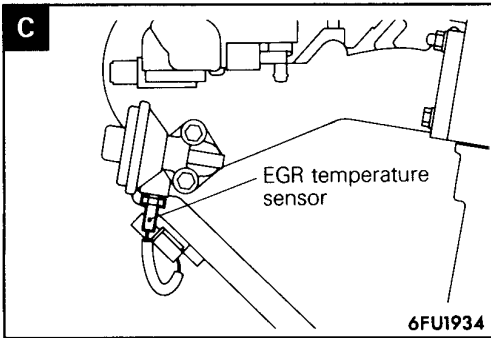
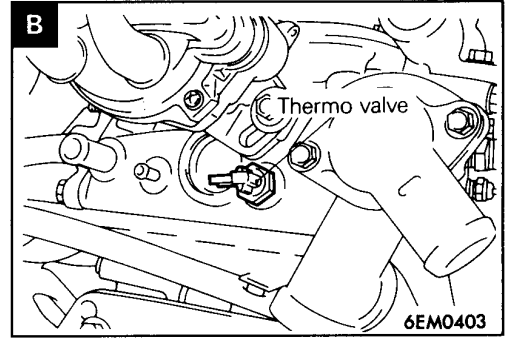
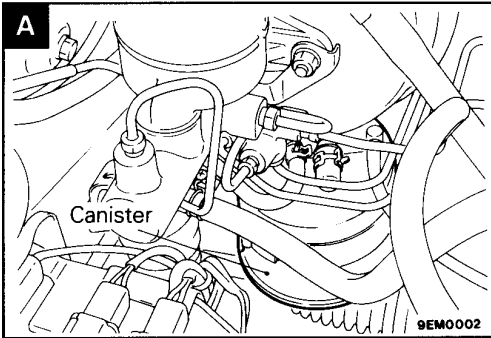
EMISSION CONTROL DEVICE REFERENCE TABLE

Emission control system Related parts	Crankcase emission control system	Evaporative emission control system	Air fuel ratio control system	Catalytic converter	Exhaust emission control system	Reference page for each part inspection
PCV valve	X					17-16-8
Purge control solenoid valve		X				17-11
2-way valve		X				Fuel (Group 13)
MPI system component		X	X			Fuel (Group 13)
Catalytic converter				X		17-17
EGR valve					X	17-16-11<4G63> 17-16-14<4G64>
EGR control solenoid valve <4G64>					X	17-16-13
Thermo valve <4G63>					X	17-16-11
EGR temperature sensor <4G64>					X	17-16-15

COMPONENT LAYOUT

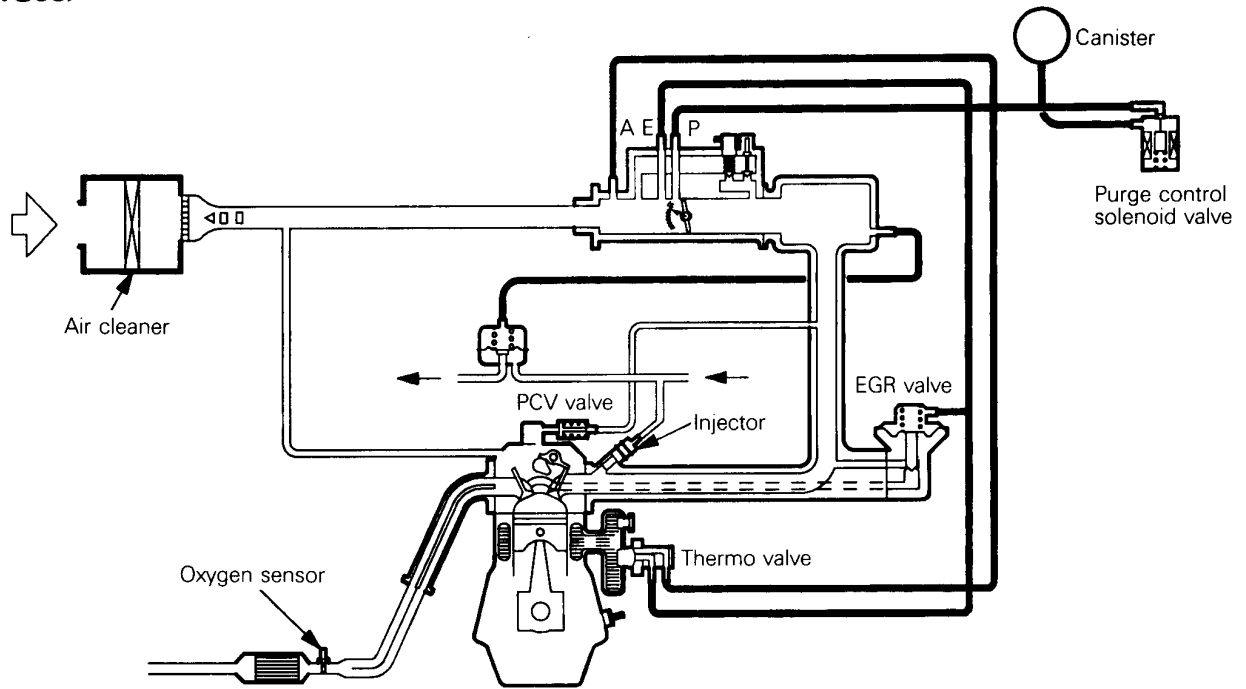
Name	Symbol
Canister	A
Catalytic converter	H
EGR control solenoid valve	F
EGR temperature sensor <4G64>	C
EGR valve	D
PCV valve	E
Purge control solenoid valve <4G64>	G
Thermo valve <4G63>	B
2-way valve	I





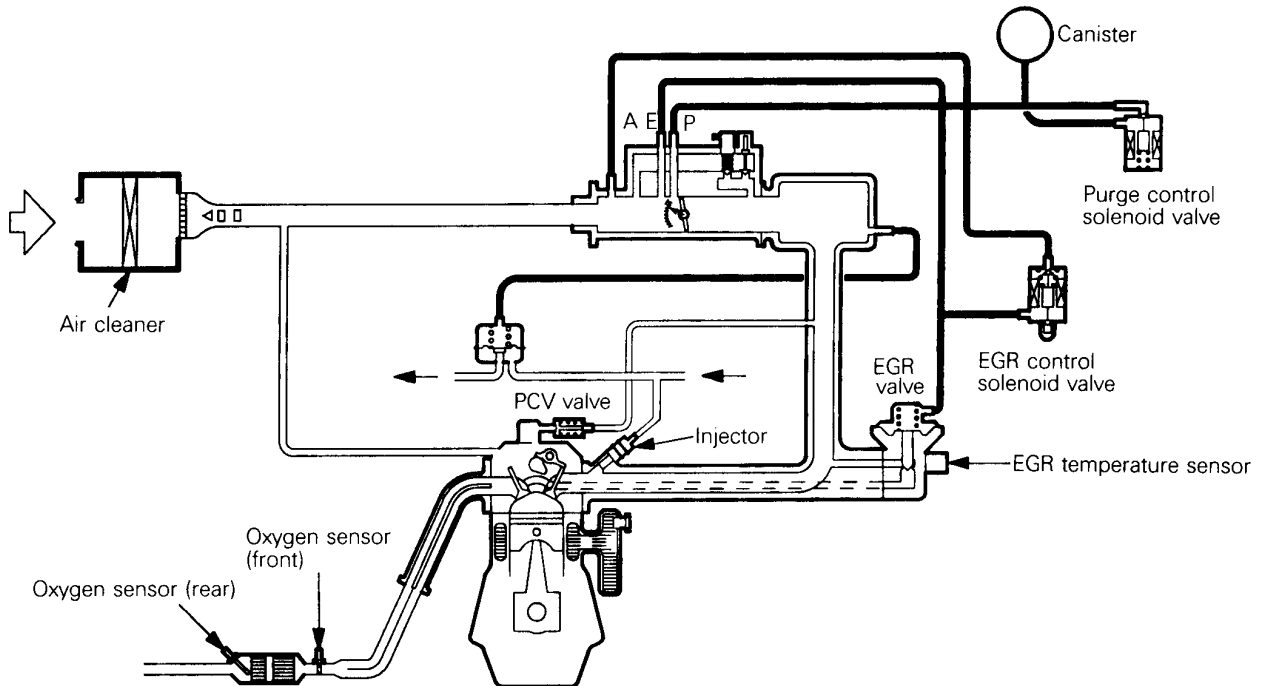
VACUUM HOSE PIPING DIAGRAM

<4G63>



6EM0411

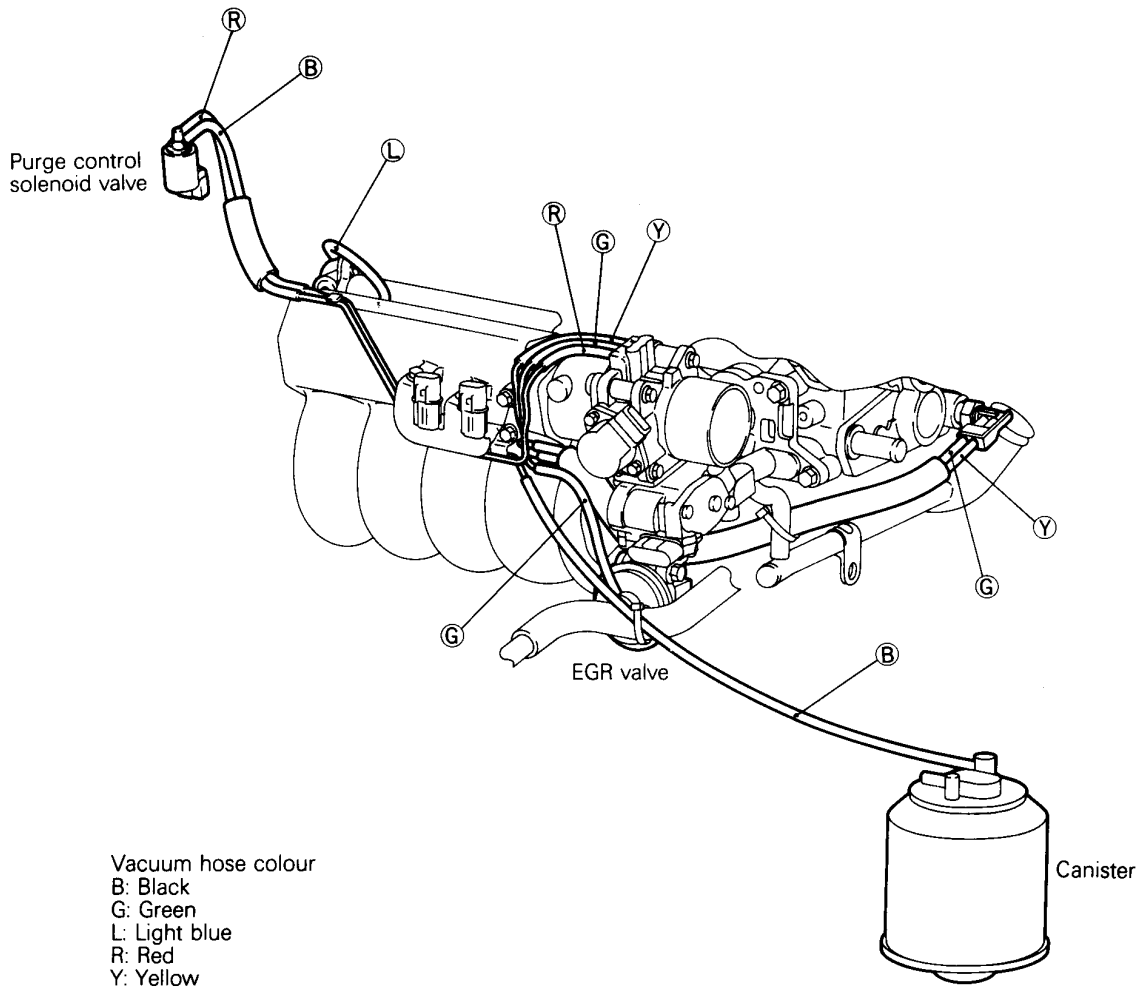
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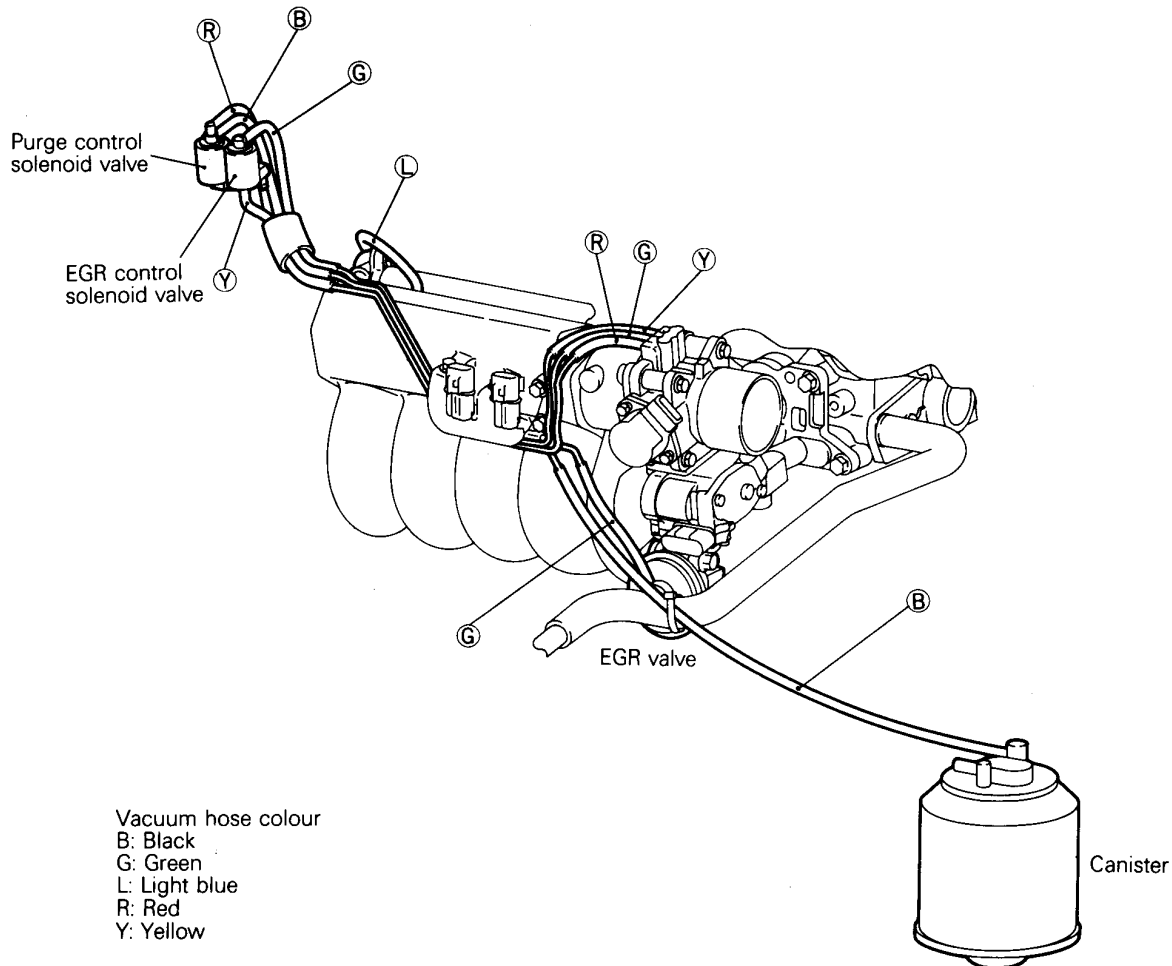
VACUUM HOSE LAYOUT

<4G63>



6EM0413

<4G64>



6EM0414

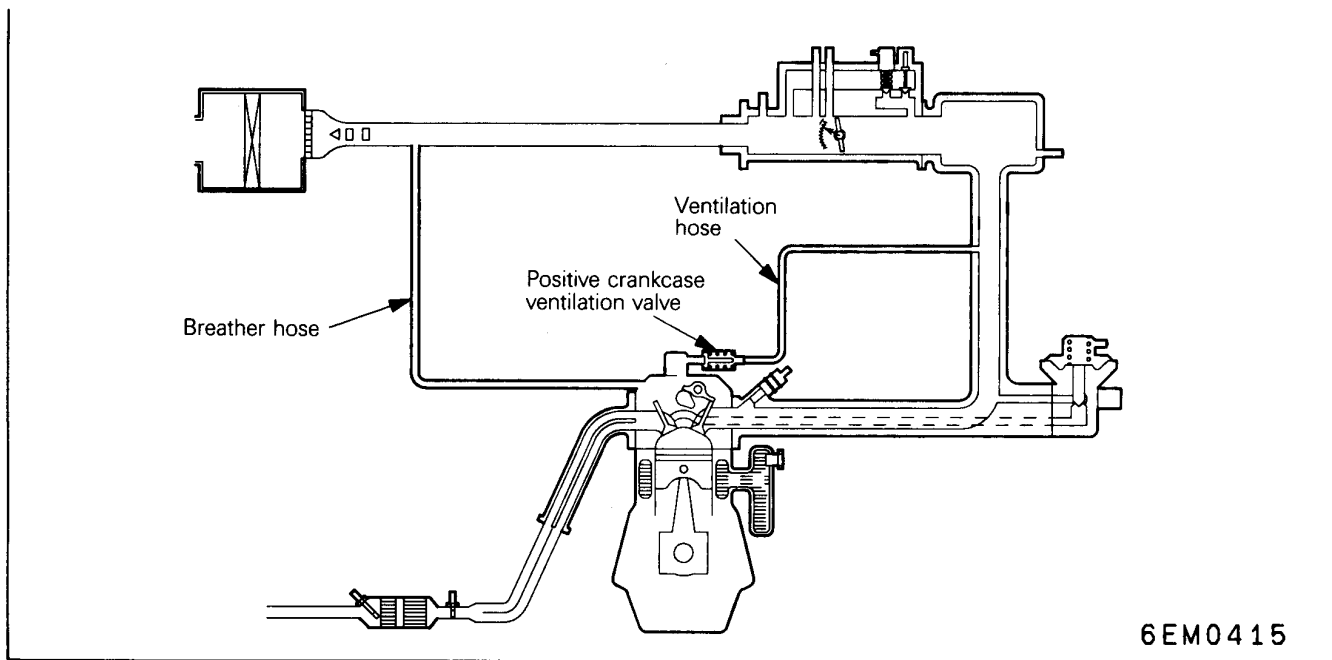
INSPECTION

- (1) Using the piping diagram as a guide, check to be sure that the vacuum hoses are correctly connected.
- (2) Check the connection condition of the vacuum hoses, (removed, loose, etc.) and check to be sure that there are no bends or damage.

INSTALLATION

- (1) When connecting the vacuum hoses, they should be securely inserted onto the nipples.
- (2) Connect the hoses correctly, using the vacuum hose piping diagram as a guide.

CRANKCASE EMISSION CONTROL SYSTEM



POSITIVE CRANKCASE VENTILATION SYSTEM

System Inspection

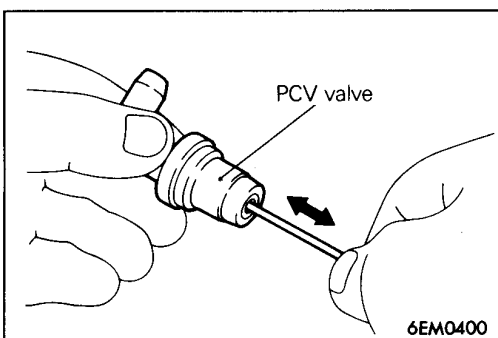
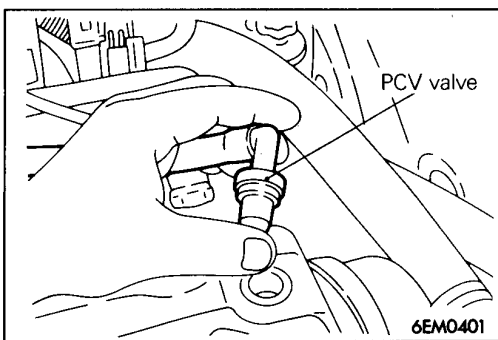
- (1) Remove the ventilation hose from the positive crankcase ventilation valve.
- (2) Remove the positive crankcase ventilation valve from the rocker cover.
- (3) Reinstall the positive crankcase ventilation valve at the ventilation hose.
- (4) Start the engine and run at idle.

- (5) Place a finger at the opening of the positive crankcase ventilation valve and confirm that vacuum of the intake manifold is felt.

NOTE

At this moment, the plunger in the positive crankcase ventilation valve moves forward and backward.

- (6) If vacuum is not felt, clean the positive crankcase ventilation valve or replace it.



Positive Crankcase Ventilation (PCV) Valve Inspection

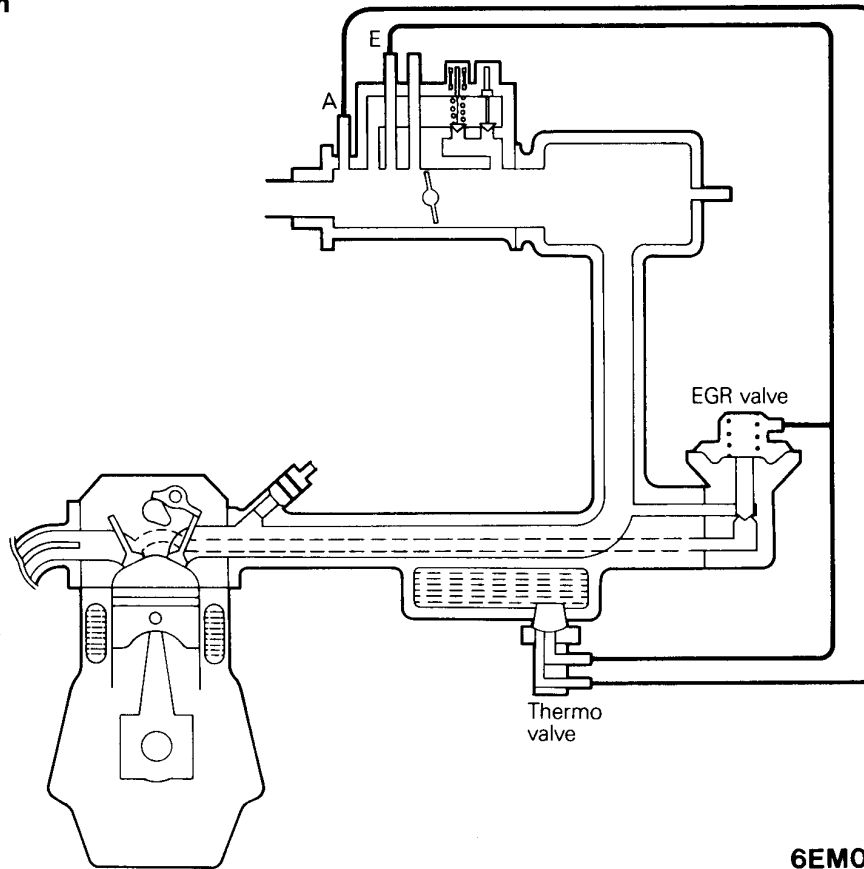
- (1) Slide in a narrow stick at the threaded side of the PCV valve and make sure that the plunger moves.
- (2) If the plunger does not move, there is a clogging in the positive crankcase ventilation valve. In this case, clean or replace the valve.

EVAPORATIVE EMISSION CONTROL SYSTEM

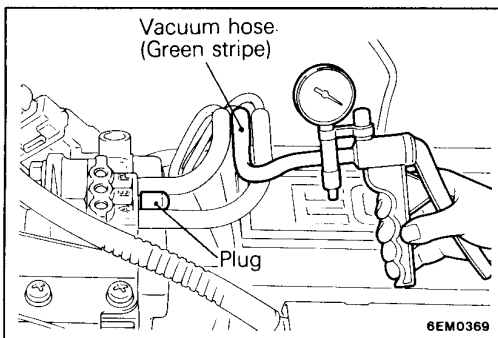
Refer to P.17-11.

EXHAUST GAS RECIRCULATION (EGR) SYSTEM <4G63>

System Inspection



6EM0368



- (1) Remove the vacuum hose (green stripe) from the throttle body, and connect a hand vacuum pump to the vacuum hose.
- (2) Plug the nipple from which the vacuum hose was removed.
- (3) When the engine is cold and hot, apply a vacuum while the engine is idling, and check the condition of the engine and the vacuum.

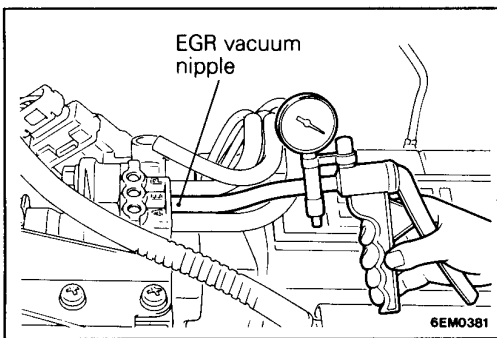
When engine is cold

[Engine coolant temperature: 40°C (104°F) or less]

Hand vacuum pump	Normal condition	
	Engine	Vacuum
Vacuum is applied	No change	Vacuum leaks

When engine is hot
[Engine coolant temperature: 80°C (176°F) or higher]

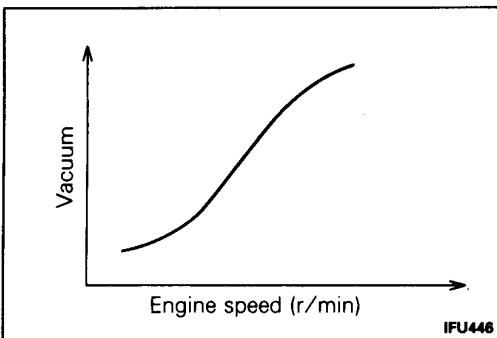
Hand vacuum pump	Normal condition	
	Engine	Vacuum
5.3 kPa (40 mmHg, 1.6 in.Hg) of vacuum is applied	No change	Vacuum is maintained
16 kPa (120 mmHg, 4.7 in.Hg) of vacuum is applied	Idling becomes slightly unstable	



EGR Valve Control Vacuum Inspection
Check Condition

Engine coolant temperature: 80–95°C (176–203°F)

- (1) Disconnect the vacuum hose (green stripe) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.



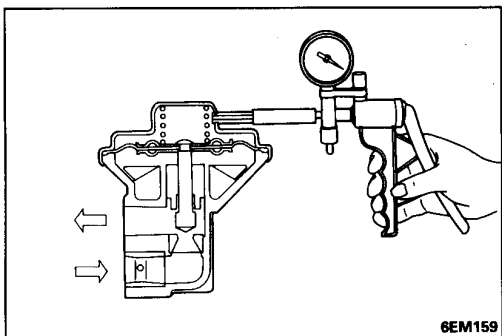
- (2) Start the engine and check to see that, after raising the engine speed by racing the engine, EGR vacuum raises proportionately with the rise in engine speed.

NOTE

If there is a problem with the change in vacuum, it is possible that the throttle body EGR port may be clogged and require cleaning.

EGR Valve Inspection

- (1) Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found, clean with a suitable solvent so that the valve seats correctly.
- (2) Connect a hand vacuum pump to the EGR valve.
- (3) Apply 67 kPa (500 mmHg, 20 in.Hg) of vacuum, and check to be sure that the vacuum is maintained.
- (4) Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.



Vacuum	Passage of air
5.3 kPa (40 mmHg, 1.6 in.Hg) or less	Air is not blown out
16 kPa (120 mmHg, 4.7 in.Hg) or more	Air is blown out

Installation

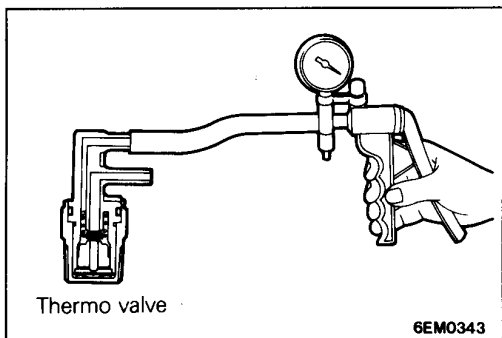
- (1) Use a new gasket, and tighten to the specified torque.

Specified torque: 22 Nm (2.2 kgm, 16 ft.lbs.)

Thermo Valve Inspection

Caution

When removing and installing, do not apply the spanner to the resin section of the thermo valve.



- (1) Disconnect the vacuum hose (yellow stripes, green stripes) and connect a hand vacuum pump to the thermo valve.
- (2) Apply vacuum to check the thermo valve.

Engine coolant temperature	Normal condition
40°C (104°F) or less	Vacuum leaks
80°C (176°F)	Vacuum is maintained.

Installation

- (1) After applying specified sealant to the thread section, tighten to the specified torque.

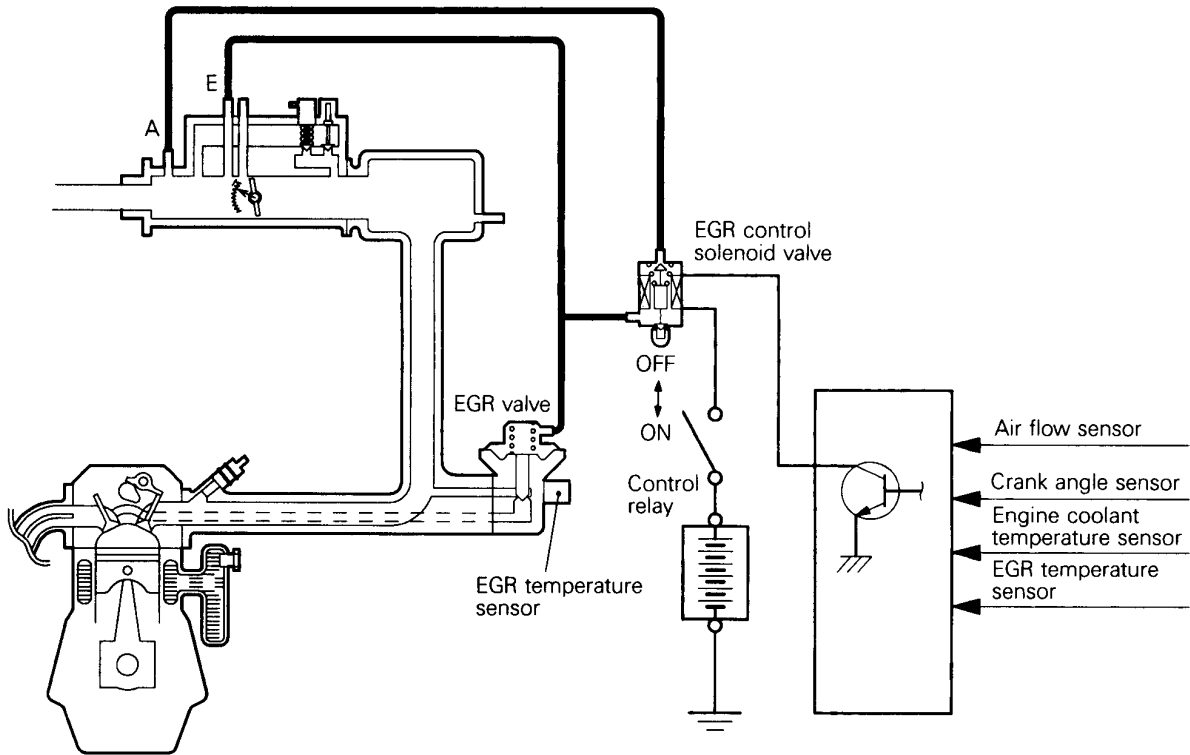
Specified sealant:

3M NUT Locking No. 4171 or equivalent

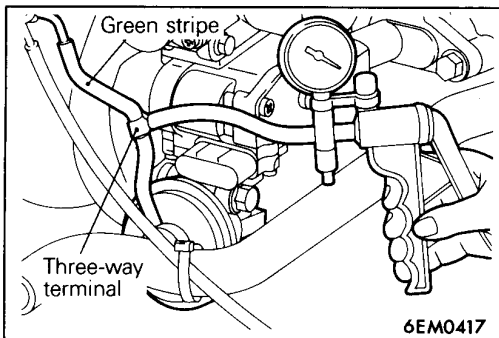
Specified torque: 30 Nm (3 kgm, 22 ft.lbs.)

EXHAUST GAS RECIRCULATION (EGR) SYSTEM <4G64>

System Inspection



6EM0416



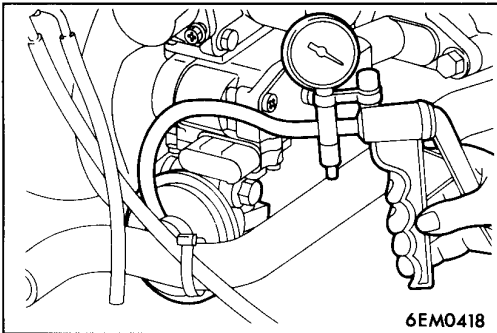
- (1) Disconnect the vacuum hose (green striped hose) from the exhaust gas recirculation (EGR) valve, and then connect a hand vacuum pump via the three-way terminal.
- (2) Regarding the engine in cold and hot conditions, check the condition of vacuum when a rapid racing has been performed by opening the throttle valve quickly.

When engine is cold
[Engine coolant temperature: 20°C (68°F) or less]

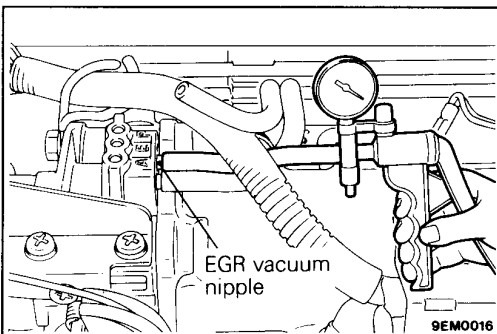
Throttle valve	Normal vacuum condition
Open quickly	No vacuum will generate (remained as barometric pressure).

When engine is hot
[Engine coolant temperature: 70°C (158°F) or higher]

Throttle valve	Normal vacuum condition
Open quickly	It will momentarily rise over 13 kPa (100 mmHg, 3.9 in.Hg).



- (3) Disconnect the three-way terminal.
- (4) Connect the hand vacuum pump directly to the exhaust gas recirculation (EGR) valve.
- (5) Check whether the engine stalls or the idling is unstable when a vacuum of 27 kPa (200 mmHg, 7.9 in.Hg) or higher is applied during idling.

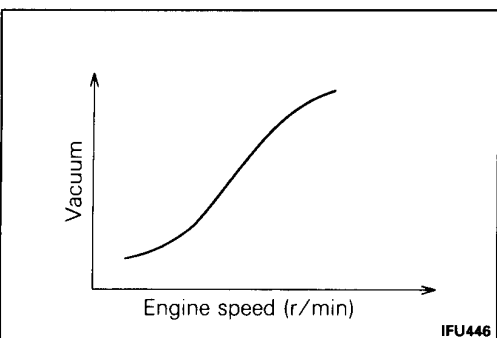


EGR Valve Control Vacuum Inspection

Check Condition

Engine coolant temperature: 80–95°C (176–203°F)

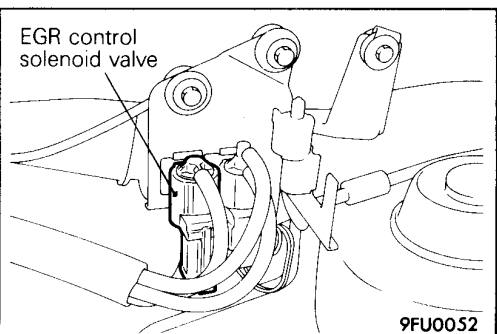
- (1) Disconnect the vacuum hose (green stripe) from the throttle body EGR vacuum nipple and connect a hand vacuum pump to the nipple.



- (2) Start the engine and check to see that, after raising the engine speed by racing the engine, EGR vacuum raises proportionately with the rise in engine speed.

NOTE

If there is a problem with the change in vacuum, it is possible that the throttle body EGR port may be clogged and require cleaning.



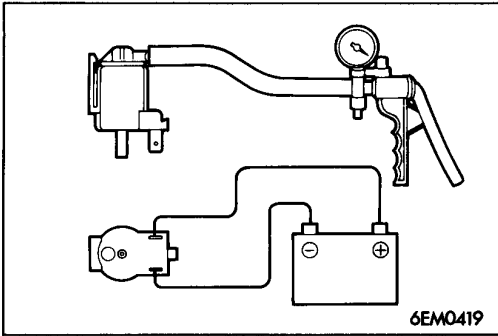
EGR Control Solenoid Valve

Inspection

NOTE

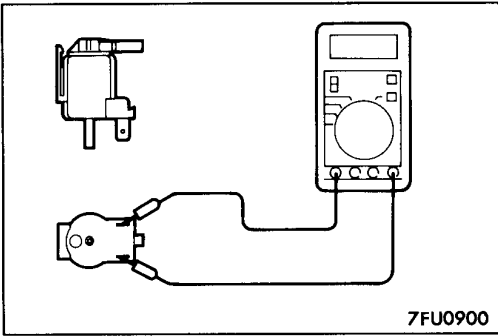
When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

- (1) Disconnect the vacuum hose (yellow stripe, green stripe) from the solenoid valve.
- (2) Disconnect the harness connector.
- (3) Connect a hand vacuum pump to the nipple to which the green-striped vacuum hose was connected.



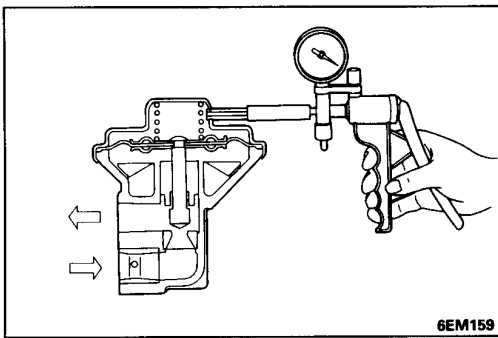
- (4) Check airtightness by applying a vacuum with voltage applied directly from the battery to the EGR control solenoid valve and without applying voltage.

Battery voltage	Normal condition
Applied	Vacuum maintained
Not applied	Vacuum leaks



- (5) Measure the resistance between the terminals of the solenoid valve.

Standard value: 36 – 44 Ω [at 20°C (68°F)]



EGR Valve Inspection

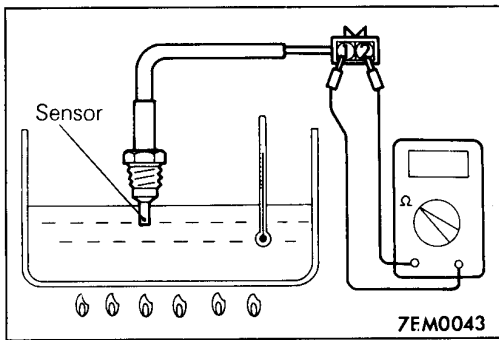
- (1) Remove the EGR valve and inspect for sticking, carbon deposits, etc. If found, clean with a suitable solvent so that the valve seats correctly.
- (2) Connect a hand vacuum pump to the EGR valve.
- (3) Apply 67 kPa (500 mmHg, 20 in.Hg) of vacuum, and check to be sure that the vacuum is maintained.
- (4) Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

Vacuum	Passage of air
5.3 kPa (40 mmHg, 1.6 in.Hg) or less	Air is not blown out
26 kPa (195 mmHg, 7.7 in.Hg) or more	Air is blown out

Installation

- (1) Use a new gasket, and tighten to the specified torque.

Specified torque: 22 Nm (2.2 kgm, 16 ft.lbs.)



EGR Temperature Sensor Inspection

- (1) Remove the EGR temperature sensor.
- (2) Place the EGR temperature sensor in water, and then measure the resistance value between terminals ① and ② while increasing the water's temperature. Replace the EGR temperature sensor if there is a significant deviation from the standard value.

Temperature [°C (°F)]	Resistance (kΩ)
50 (122)	60–83
100 (212)	11–14

Installation

- (1) Install the EGR temperature sensor, tighten to specified torque.

Specified tightening torque:
10–12 Nm (1.0–1.2 kgm, 7.3–8.6 ft.lbs.)

CATALYTIC CONVERTER

REMOVAL AND INSTALLATION

E17YA-

For removal and installation procedures, refer to GROUP 15 – Exhaust Pipes and Main Muffler.

INSPECTION

E17YCAAa

Inspect for damage, cracking or deterioration. Replace if faulty.

Caution

1. **Operation of any type, including idling, should be avoided if engine misfiring occurs. Under this condition the exhaust system will operate at abnormally high temperature, which may cause damage to the catalyst or underbody parts of the vehicle.**
2. **Alteration or deterioration of ignition or fuel system, or any type of operating condition which results in engine misfiring must be corrected to avoid overheating the catalytic converters.**
3. **Proper maintenance and tune up according to manufacturer's specifications should be made to correct the conditions as soon as possible.**

17-16-16

NOTES

EMISSION CONTROL <DIESEL>**SPECIFICATIONS****GENERAL SPECIFICATIONS**

E17CA--

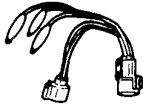
<Vehicles with EGR valve>

Items	Name	Specification
Exhaust emission control system	Exhaust gas recirculation system EGR valve EGR solenoid valve No. 1 EGR solenoid valve No. 2	Single type Duty cycle solenoid valve ON-OFF solenoid valve

SERVICE SPECIFICATIONS

Item		Standard value
EGR solenoid valve No. 1/No. 2 resistance [at 20°C (68°F)]		36 – 44
Lever position sensor output voltage	V	Idle position
		Fully open
Engine speed sensor resistance	kΩ	1.2 – 1.7
Engine coolant temperature sensor resistance	kΩ	At 20°C (68°F)
		At 80°C (176°F)

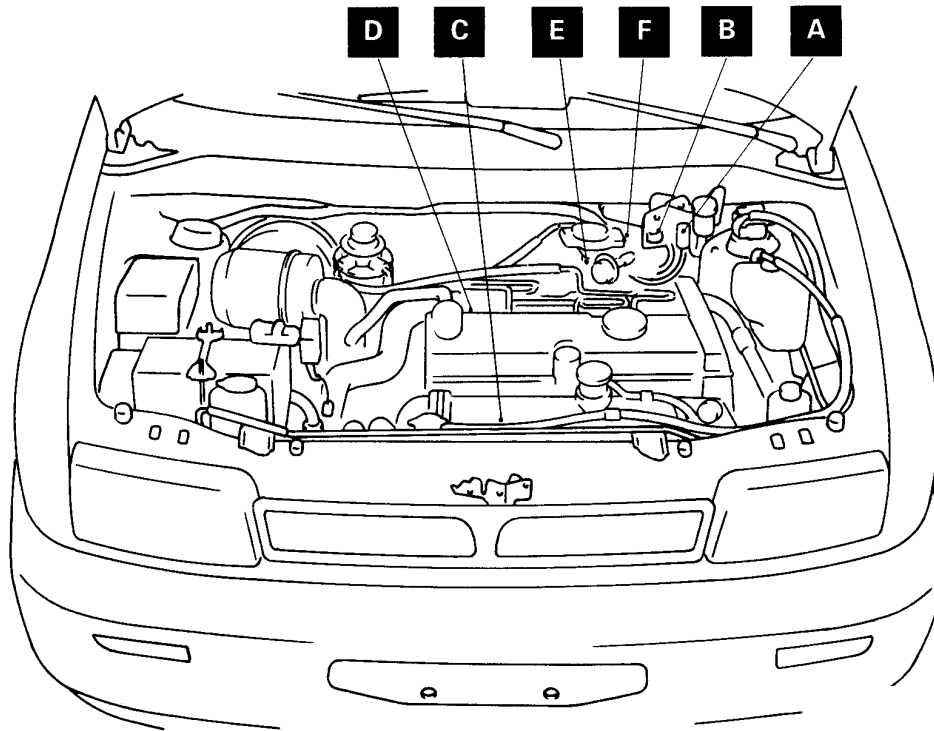
SPECIAL TOOLS

Tool	Number	Name	Use
	MD998478	Test harness (3P, square)	Inspection of lever position sensor

SERVICE ADJUSTMENT PROCEDURES

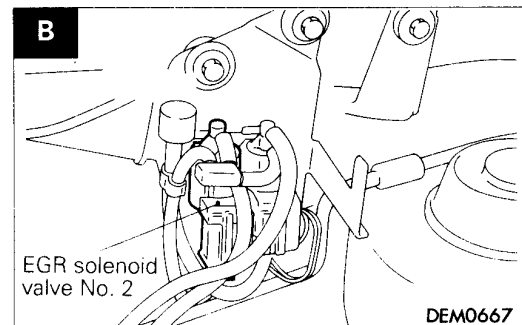
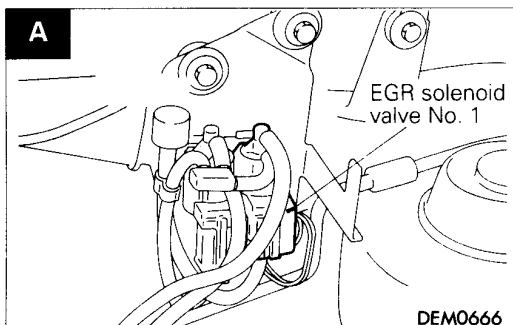
E17FGAA

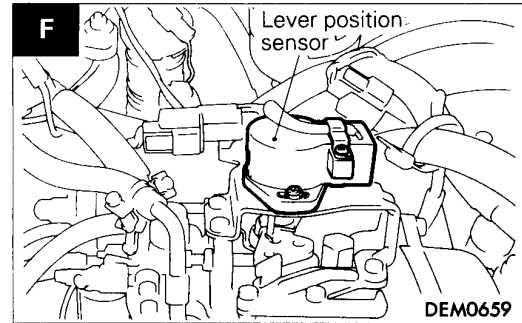
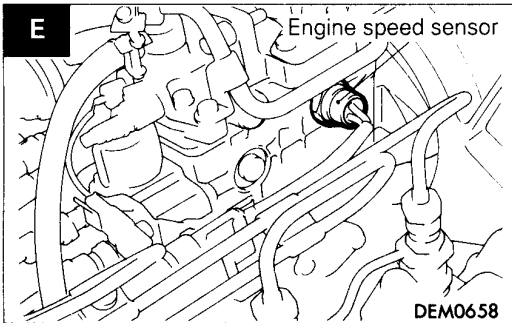
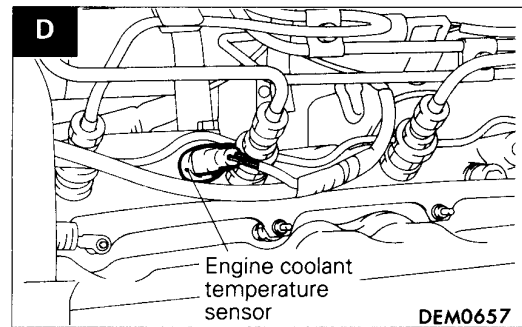
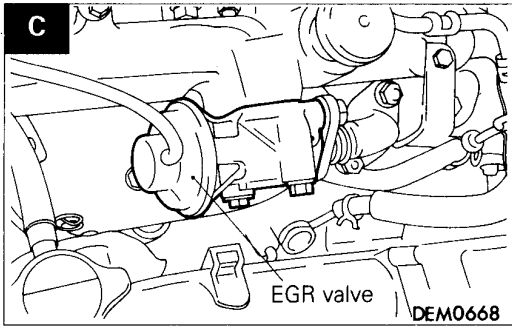
COMPONENT LAYOUT



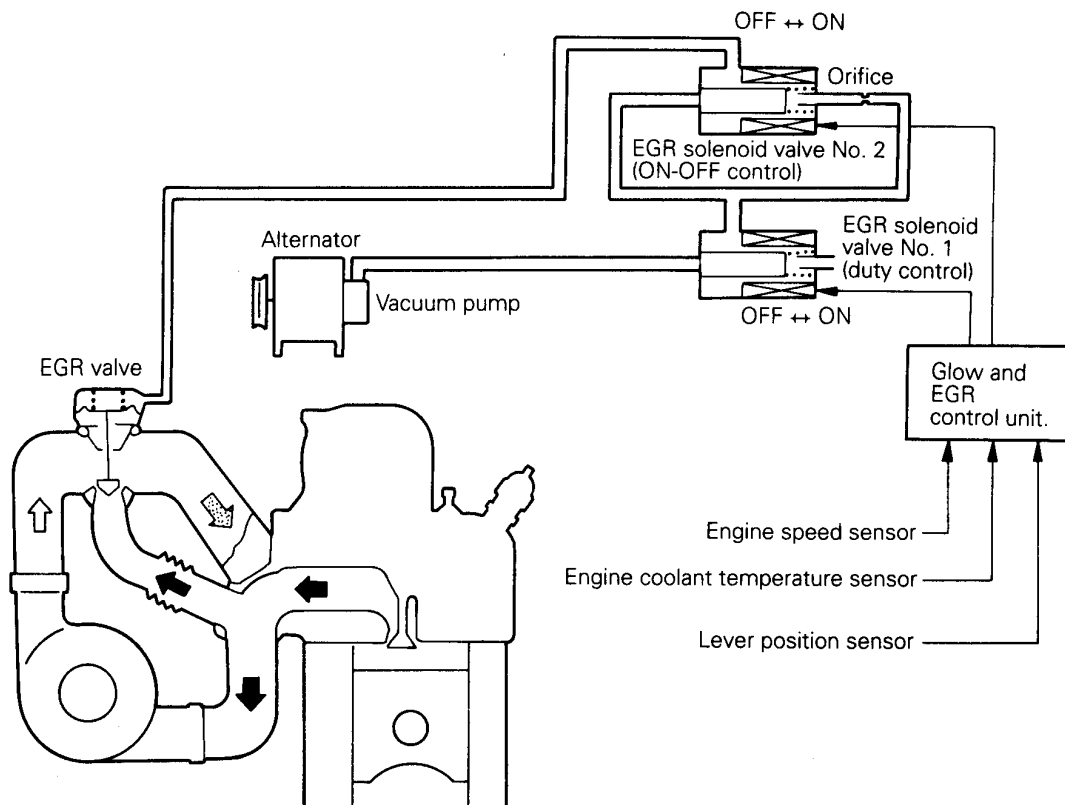
16C0302

Parts name	Symbol	Parts name	Symbol
EGR solenoid valve No. 1	A	Engine coolant temperature sensor	D
EGR solenoid valve No. 2	B	Engine speed sensor	E
EGR valve	C	Lever position sensor	F

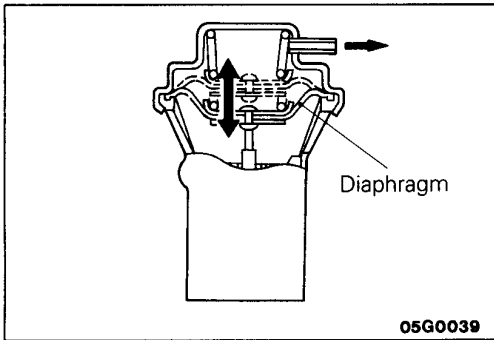




EXHAUST GAS RECIRCULATION (EGR) SYSTEM <VEHICLES WITH EGR>



DEM0603

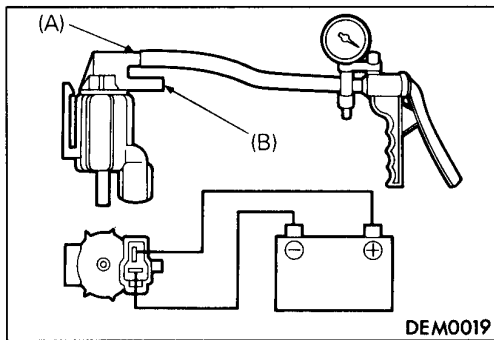


FUNCTION INSPECTION

- (1) Start the engine and let it warm up until the engine coolant temperature is 80°C (176°F) or above.
- (2) When the engine is raced by suddenly depressing the accelerator pedal, check to be sure that the diaphragm of the EGR valve lifts.

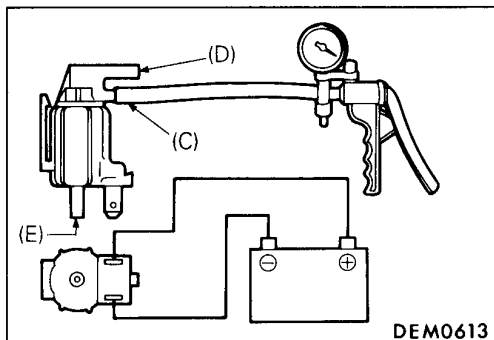
EGR SOLENOID VALVE NO.1/NO.2 OPERATION INSPECTION

- (1) Remove the EGR solenoid valve No.1/No.2 connectors and vacuum hoses.
- (2) Attach a vacuum pump to each nipple of the EGR solenoid valve No.1/No.2 and apply negative pressure. Check that the valves are airtight both when voltage is applied to each terminal of the EGR solenoid valves and when it is not applied.



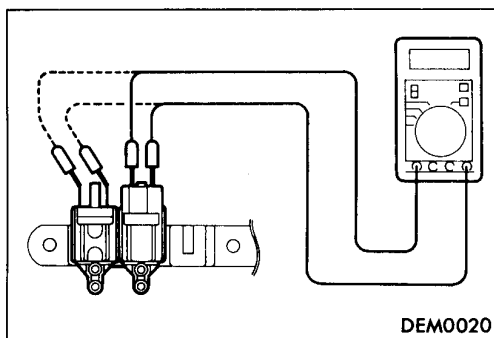
EGR solenoid valve No. 1

Battery voltage	Normal condition
When current is flowing	Vacuum leaks (Vacuum is maintained when nipple (B) is covered)
When current is not flowing	Vacuum is maintained



EGR solenoid valve No. 2

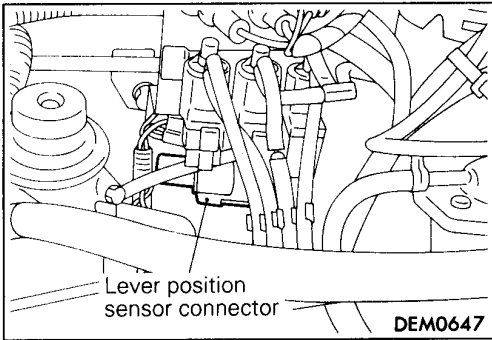
Battery voltage	Normal condition
When current is flowing	Vacuum leaks (Vacuum is maintained when nipple (D) is covered)
When current is not flowing	Vacuum leaks (Vacuum is maintained when nipple (E) is covered)



EGR SOLENOID VALVE NO.1/NO.2 RESISTANCE INSPECTION

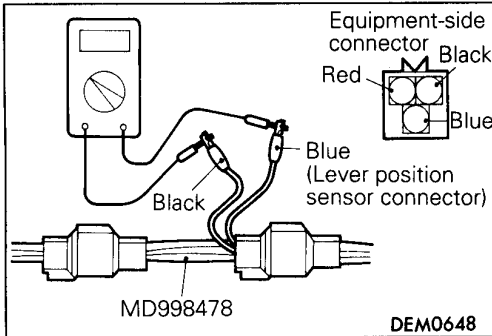
- (1) Measure the coil resistances of the EGR solenoid valve No.1/No.2 with a circuit tester.

	Solenoid valve No.1/No.2 resistance Ω
Standard value [at 20°C (68°F)]	36 – 44



LEVER POSITION SENSOR (LPS) ADJUSTMENT
[Condition before adjustment]

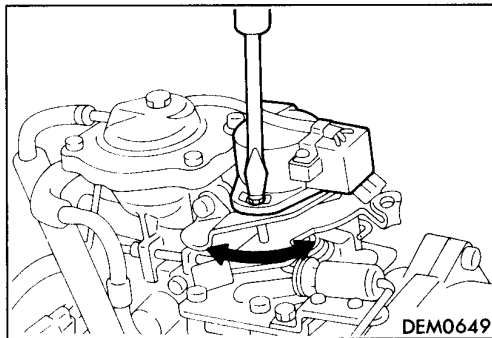
- Engine coolant temperature 80–95°C (176–203°F)
- (1) Loosen the accelerator cable tension sufficiently.
- (2) Connect the special tool (test harness) to the lever position sensor connector shown in the illustration.



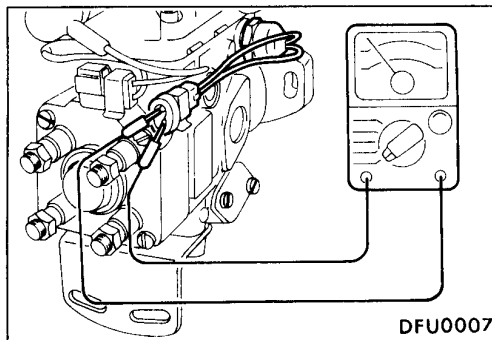
- (3) Connect a digital-type voltmeter between terminal (1) (red clip) and terminal (3) (blue clip) of the LPS.
- (4) Turn the ignition switch to ON. (Do not start the engine.)
- (5) Measure the output voltage of the lever position sensor.

Standard value

Lever condition	Voltage V
Idle position	0.28 – 0.48
Fully open	3.2 – 5.5



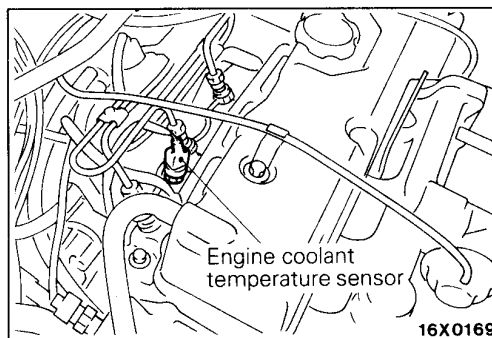
- (6) If the voltage is outside the standard value, adjust by loosening the LPS mounting screw and turning the LPS body. After adjustment, securely tighten the screw.
- (7) Turn the ignition switch to OFF.
- (8) Adjust the accelerator cable play.



ENGINE SPEED SENSOR INSPECTION

- (1) Disconnect the engine speed sensor connector.
- (2) Measure the resistance between the engine speed sensor terminals.

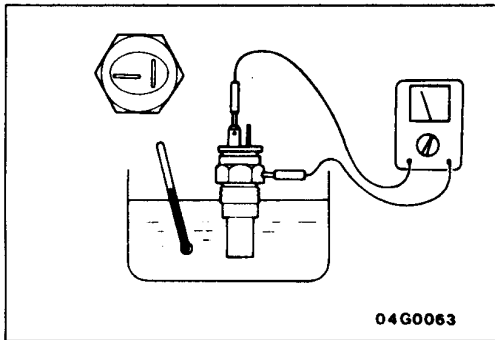
Standard value: 1.2 – 1.7 k Ω



ENGINE COOLANT TEMPERATURE SENSOR INSPECTION

- (1) Remove the engine coolant temperature sensor.

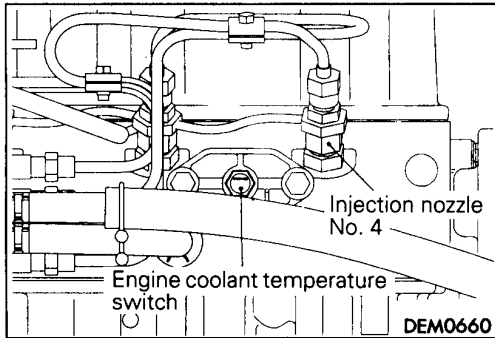
17-22 EMISSION CONTROL <DIESEL> – Service Adjustment Procedures



- (2) Dip the sensing section of the engine coolant temperature sensor, and measure the resistance.

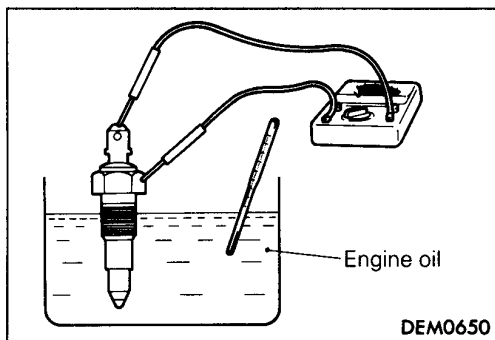
Standard value:

Temperature °C (°F)	Resistance value (k Ω)
0 (0)	8.6
20 (68)	3.3
40 (104)	1.5
80 (176)	0.3



ENGINE COOLANT TEMPERATURE SWITCH INSPECTION

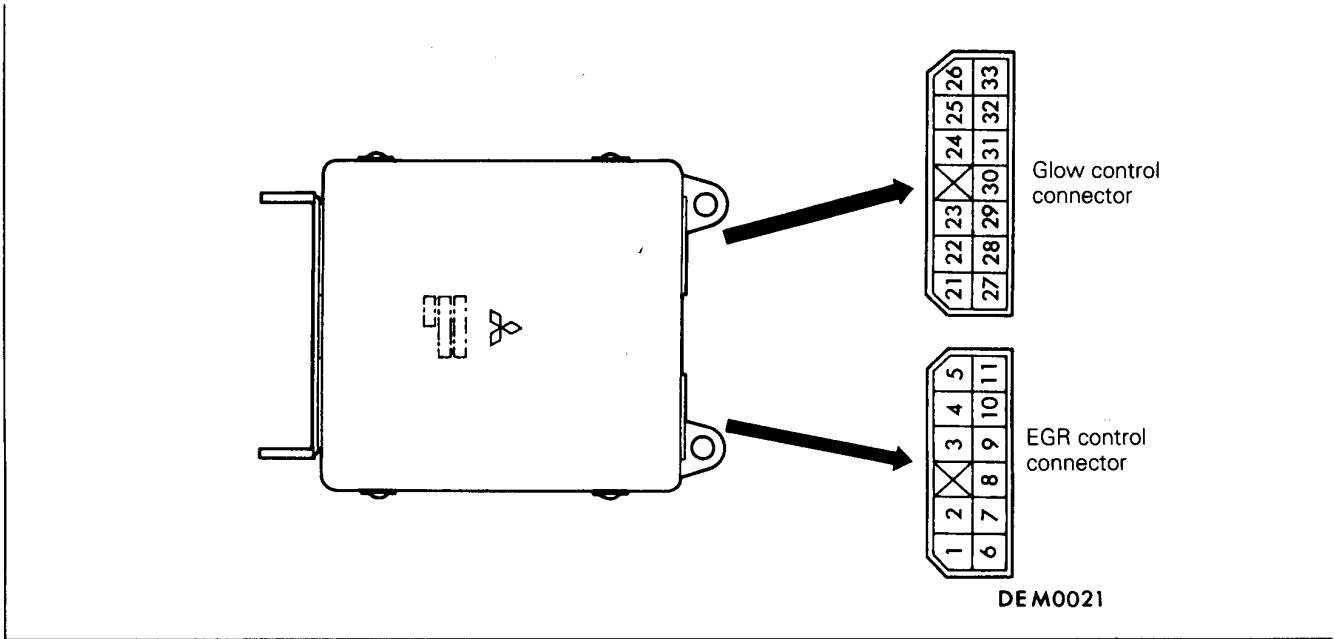
- (1) Remove the switch.



- (2) Immerse the switch in engine oil as shown in the illustration.

Oil temperature	Continuity
100°C (212°F) or low	No continuity
120°C (248°F) or higher	Continuity

GLOW & EGR CONTROL UNIT <SUPER QUICK GLOW SYSTEM>



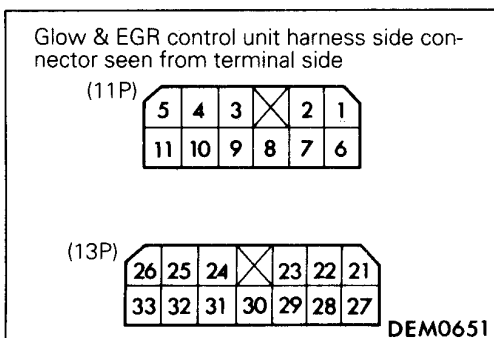
TERMINAL VOLTAGE MEASUREMENT

NOTE

1. Inspect with the glow & EGR control unit connectors still connected.
2. Connect the earth to terminal No.30 of the glow & EGR control unit terminal when measuring the voltage.

Terminal Voltage Table

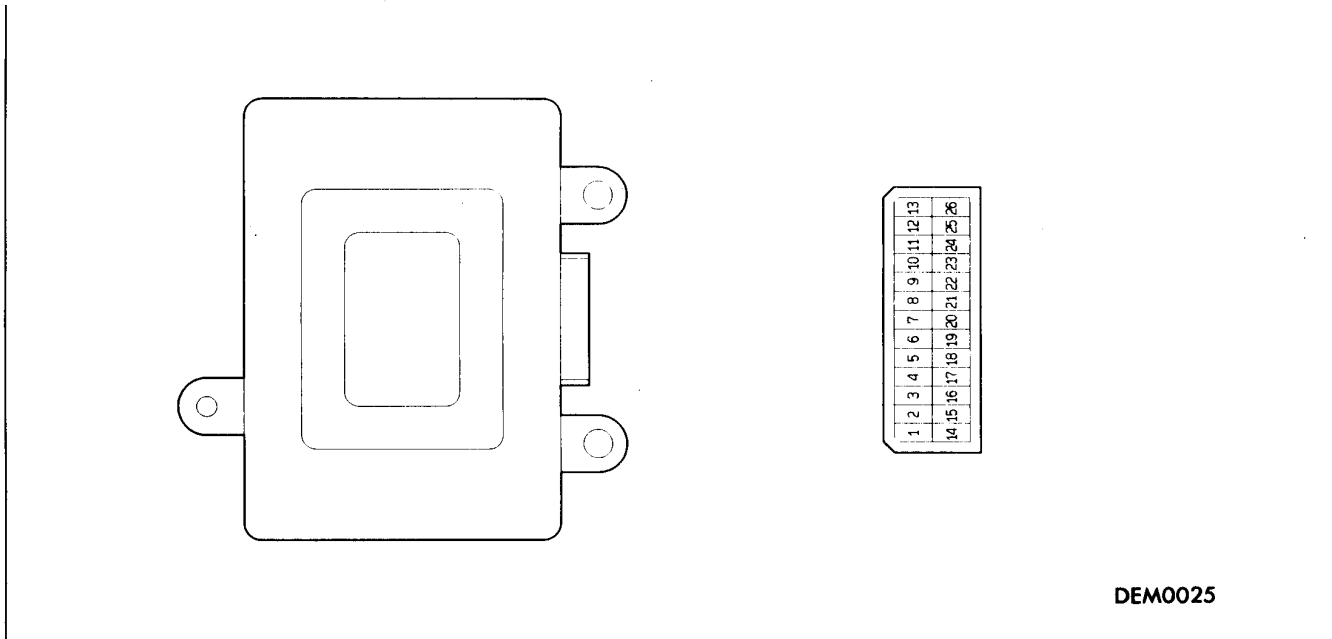
Glow and EGR control unit inspection terminal	Inspection item	Inspection condition		Standard value
2	EGR solenoid valve No. 1	Ignition switch: OFF → ON		Battery voltage
		While engine is idle after having warmed up, suddenly depress the accelerator pedal.		Momentarily increases
3	Lever position sensor	Ignition switch: OFF → ON	Throttle lever: Idle position	0.28 – 0.48 V
			Throttle lever: Fully open position	3.2 – 5.5 V
5	Sensor applied voltage	Ignition switch: OFF → ON		4.5 – 5.5 V
8	EGR solenoid valve No. 2	Ignition switch: OFF → ON		Battery voltage
		While engine is idle after having warmed up, suddenly depress the accelerator pedal.		Momentarily decreases



HARNES CONTINUITY INSPECTION

- (1) Disconnect the glow & EGR control unit connector.
- (2) Check to be sure that there is continuity (1.2–1.7 Ω) between the harness side connector terminals (10)–(30).

GLOW & EGR CONTROL UNIT <SELF-REGULATING GLOW SYSTEM>



DEM0025

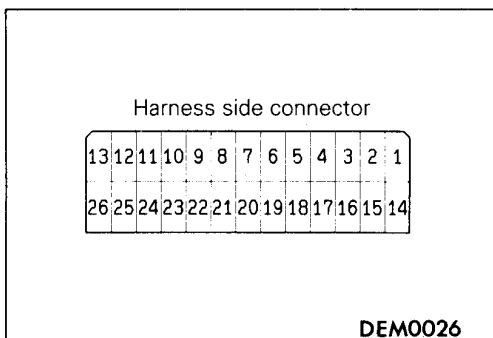
TERMINAL VOLTAGE MEASUREMENT

NOTE

1. Inspect with the glow & EGR control unit connectors still connected.
2. When measuring the voltage, the earth will be the glow & EGR unit terminal No. 13.

Terminal Voltage Reference Table

Glow & EGR control unit inspection terminal	Inspection item	Inspection condition	Standard value
3	EGR solenoid valve No. 1	Ignition switch: OFF → ON	11 – 13 V
		While engine is idling after having warmed up, suddenly race the engine.	Momentarily increases
6	Lever position sensor	Ignition switch: OFF → ON	0.3 – 1.5 V
		Throttle lever fully open position	3.7 – 4.9 V
7	Sensor power supply	Ignition switch: OFF → ON	4.5 – 5.5 V
16	EGR solenoid valve No. 2	Ignition switch: OFF → ON	11 – 13 V
		While engine is idling after having warmed up, suddenly race the engine.	Momentarily decreases



DEM0026

HARNES CONTINUITY INSPECTION

- (1) Disconnect the glow & EGR control unit connector.
- (2) Check to be sure that there is continuity (1.3–1.9 kΩ) between the harness side connector terminals 11–12.