

ENGINE CONTROL SYSTEM

GENERAL INFORMATION

A cable-type accelerator mechanism have been adopted.

A suspended-type accelerator pedal have been adopted.

SERVICE SPECIFICATIONS

Items		Standard value
Accelerator cable play mm		1 – 2
Engine idle speed r/min	MPI	750 ± 50

ON-VEHICLE SERVICE

ACCELERATOR CABLE CHECK AND ADJUSTMENT

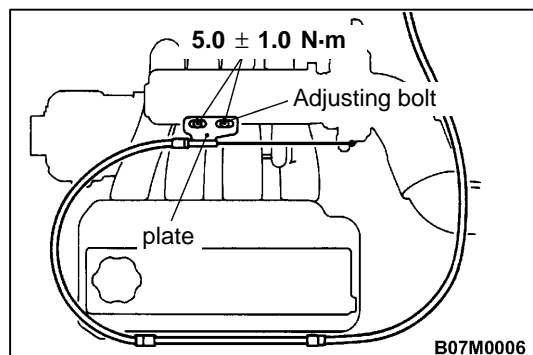
1. Turn A/C and lamps OFF.
Inspect and adjust at no load.
2. Warm engine until stabilized at idle.
3. Confirm idle speed is at prescribed value.

Standard value: 750 ± 50 r/min

4. Stop engine (ignition switch OFF).
5. Confirm there are no sharp bends in accelerator cable.
6. Check inner cable for correct slack.

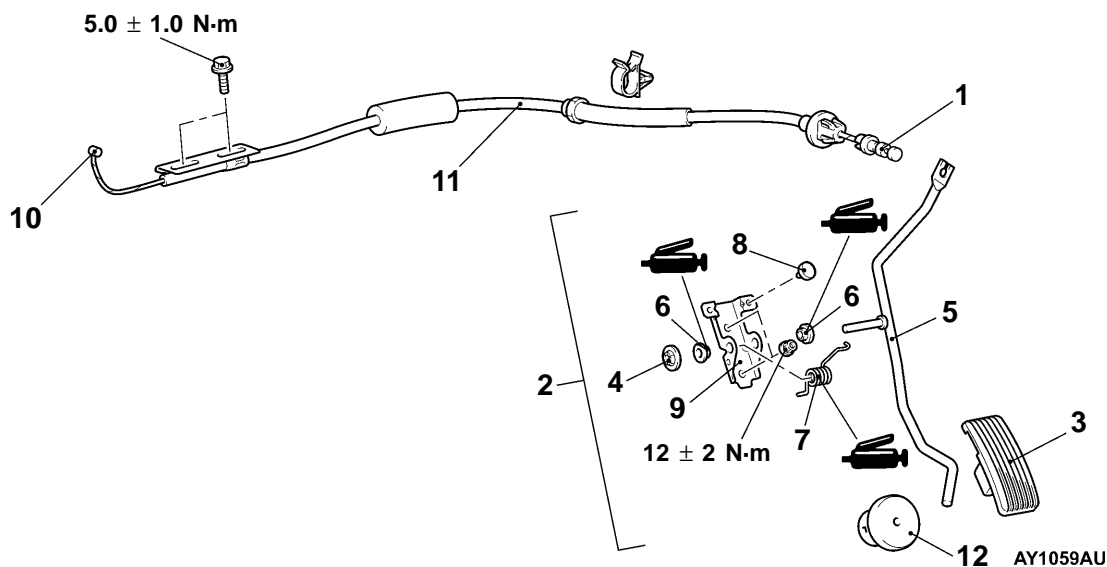
Standard value: 1 – 2 mm

7. If there is too much slack or no slack, adjust play by the following procedures.
 - (1) Loosen the adjusting bolt to release the cable.
 - (2) Move the plate until the inner cable play is at the standard value, and then tighten the adjusting bolt to the specified torque.



ACCELERATOR CABLE AND PEDAL REMOVAL AND INSTALLATION

Post-installation Operation
Accelerator Cable Adjustment



Accelerator pedal removal steps

1. Accelerator cable assembly (Accelerator pedal side)
2. Accelerator pedal assembly
3. Pedal pad
4. Push-on spring nut
5. Accelerator arm assembly
6. Bushing
7. Spring
8. Stopper
9. Accelerator pedal bracket

Accelerator cable removal steps

1. Accelerator cable assembly (Accelerator pedal side)
10. Accelerator cable assembly (Throttle body side)
11. Accelerator cable assembly

Accelerator pedal stopper removal

12. Accelerator pedal stopper

EMISSION CONTROL SYSTEM

GENERAL INFORMATION

The emission control system consists of the following subsystems:

- Crankcase emission control system
- Evaporative emission control system
- Exhaust emission control system

Items	Name	Specification
Crankcase emission control system	Positive crankcase ventilation (PCV) valve	Variable flow type (Purpose: HC reduction)
Evaporative emission control system*	Canister Purge control solenoid valve	Equipped Duty cycle type solenoid valve (Purpose: HC reduction)
Exhaust emission control system	Exhaust gas recirculation system <ul style="list-style-type: none"> • EGR valve • EGR control solenoid valve 	Equipped Single type Duty cycle type solenoid valve (Purpose: NOx reduction)
	Catalytic converter	Monolith type (Purpose: CO, HC, NOx reduction)

EMISSION CONTROL DEVICE REFERENCE TABLE

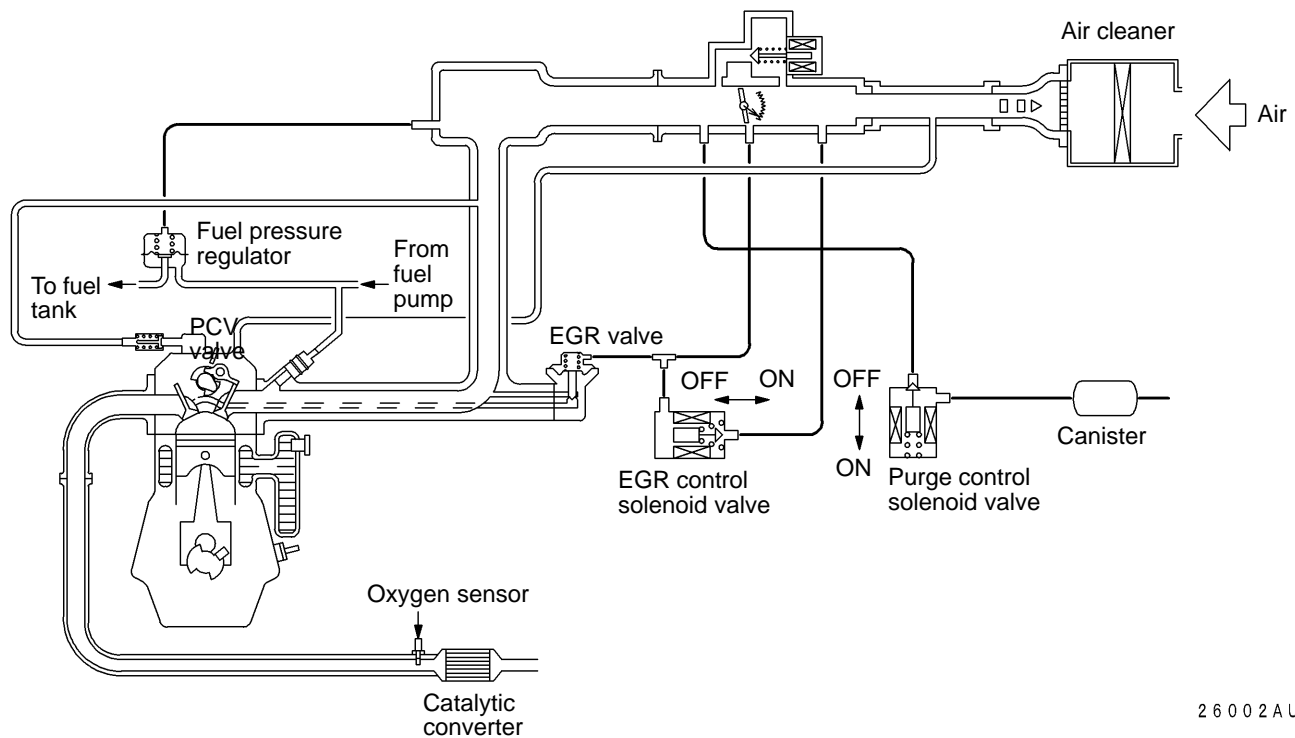
Related parts	Crankcase emission control system	Evaporative emission control system	Air/fuel ratio control system	Catalytic converter	Exhaust gas recirculation system
PCV valve	×				
Purge control solenoid valve		×			
MPI system component		×	×		
Catalytic converter				×	
EGR valve					×
EGR control solenoid valve					×

SERVICE SPECIFICATIONS

Items	Standard value
Purge control solenoid valve coil resistance (at 20°C) Ω	29 – 35
EGR control solenoid valve coil resistance (at 20°C) Ω	29 – 35

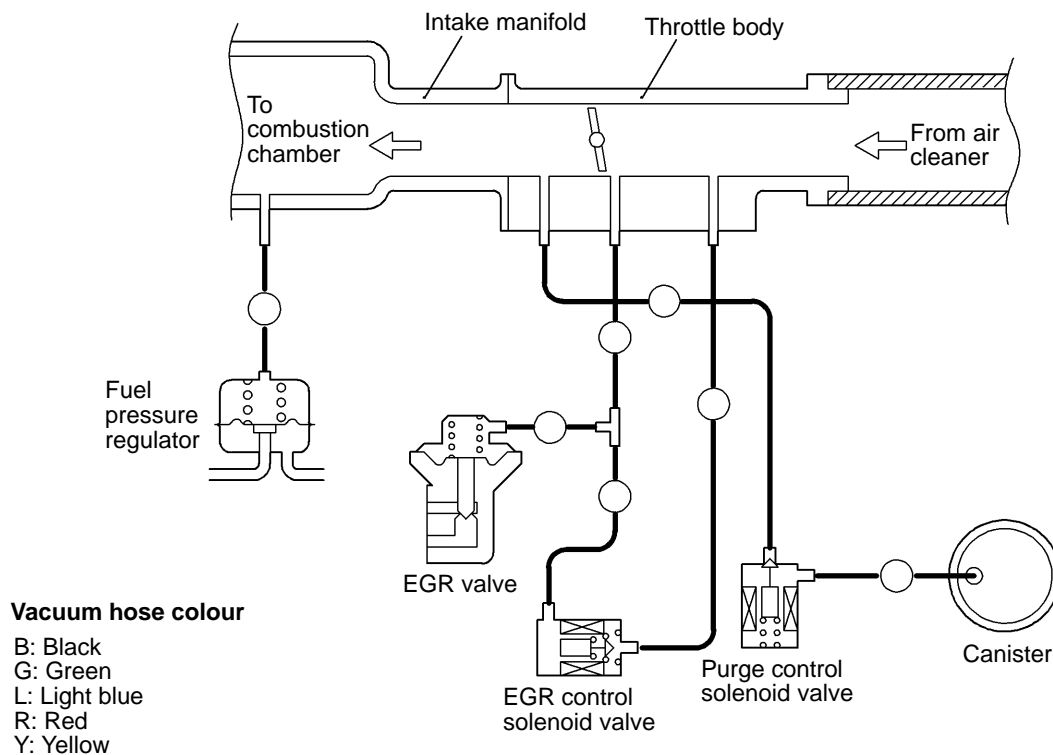
VACUUM HOSE

VACUUM HOSE PIPING DIAGRAM



26002AU

VACUUM CIRCUIT DIAGRAM



26003AU

VACUUM HOSE CHECK

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.

VACUUM HOSE 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

GENERAL INFORMATION

The crankcase emission control system prevents blow-by gases from escaping inside the crankcase into the atmosphere.

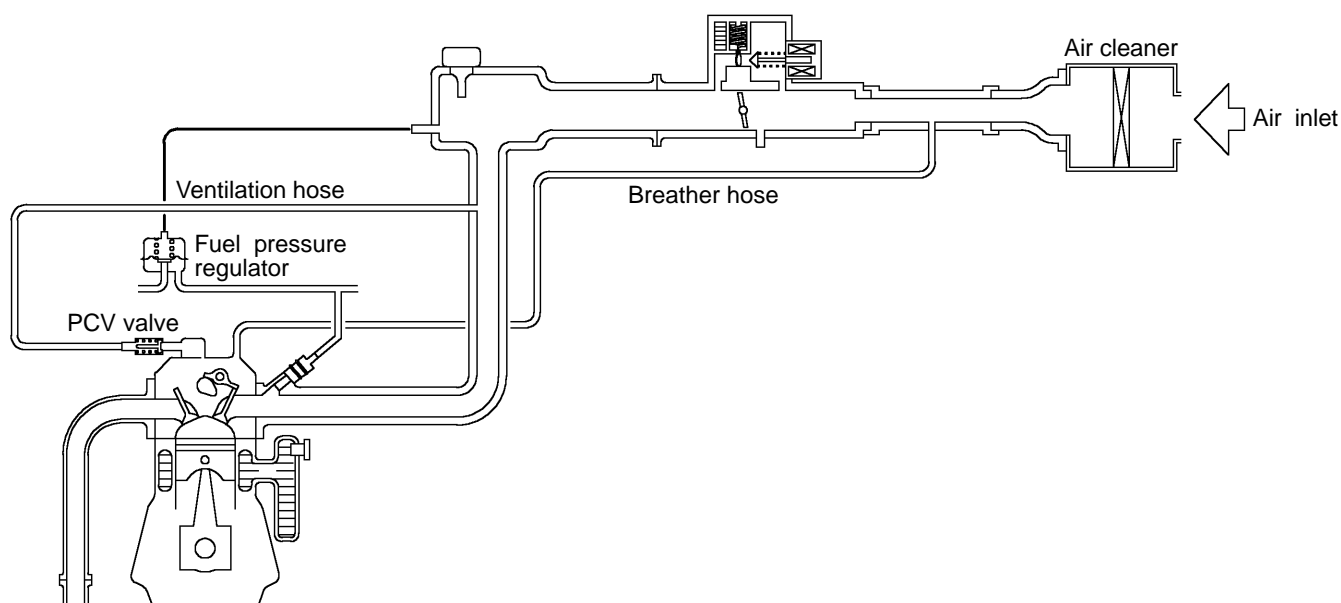
Fresh air is sent from the air cleaner into the crankcase through the breather hose. The air becomes mixed with the blow-by gases inside the crankcase.

The blow-by gas inside the crankcase is drawn into the intake manifold through the positive

crankcase ventilation (PCV) valve.

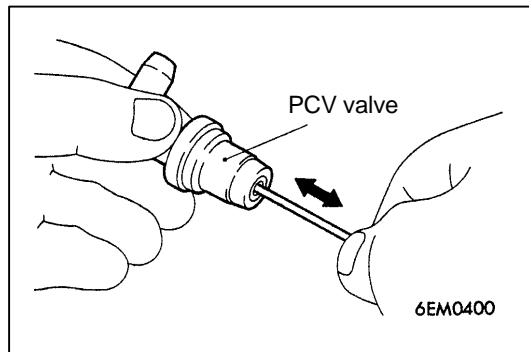
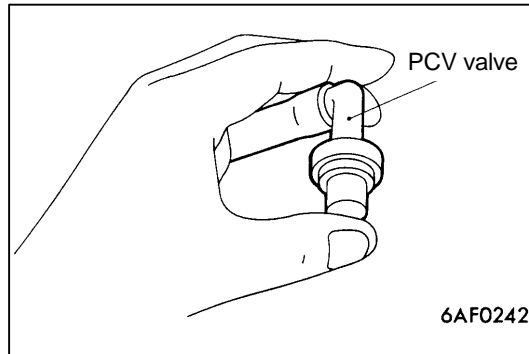
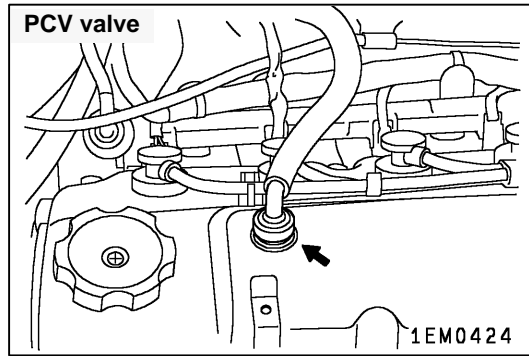
The PCV valve lifts the plunger according to the intake manifold vacuum so as to regulate the flow of blow-by gas properly. In other words, the blow-by gas flow is regulated during low load engine operation to maintain engine stability, while the flow is increased during high load operation to improve the ventilation performance.

SYSTEM DIAGRAM



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COMPONENT LOCATION



POSITIVE CRANKCASE VENTILATION SYSTEM CHECK

1. Remove the ventilation hose from the PCV valve.
2. Remove the PCV valve from the rocker cover.
3. Reinstall the PCV valve at the ventilation hose.
4. Start the engine and run at idle.

5. Place a finger at the opening of the PCV valve and check that vacuum of the intake manifold is felt.

NOTE

At this moment, the plunger in the PCV valve moves back and forth.

6. If vacuum is not felt, clean the PCV valve or replace it.

PCV VALVE CHECK

1. Insert a thin rod into the PCV valve from the side shown in the illustration (rocker cover installation side), and move the rod back and forth to check that the plunger moves.
2. If the plunger does not move, there is a clogging in the PCV valve. In this case, clean or replace the PCV valve.

EVAPORATIVE EMISSION CONTROL SYSTEM

GENERAL INFORMATION

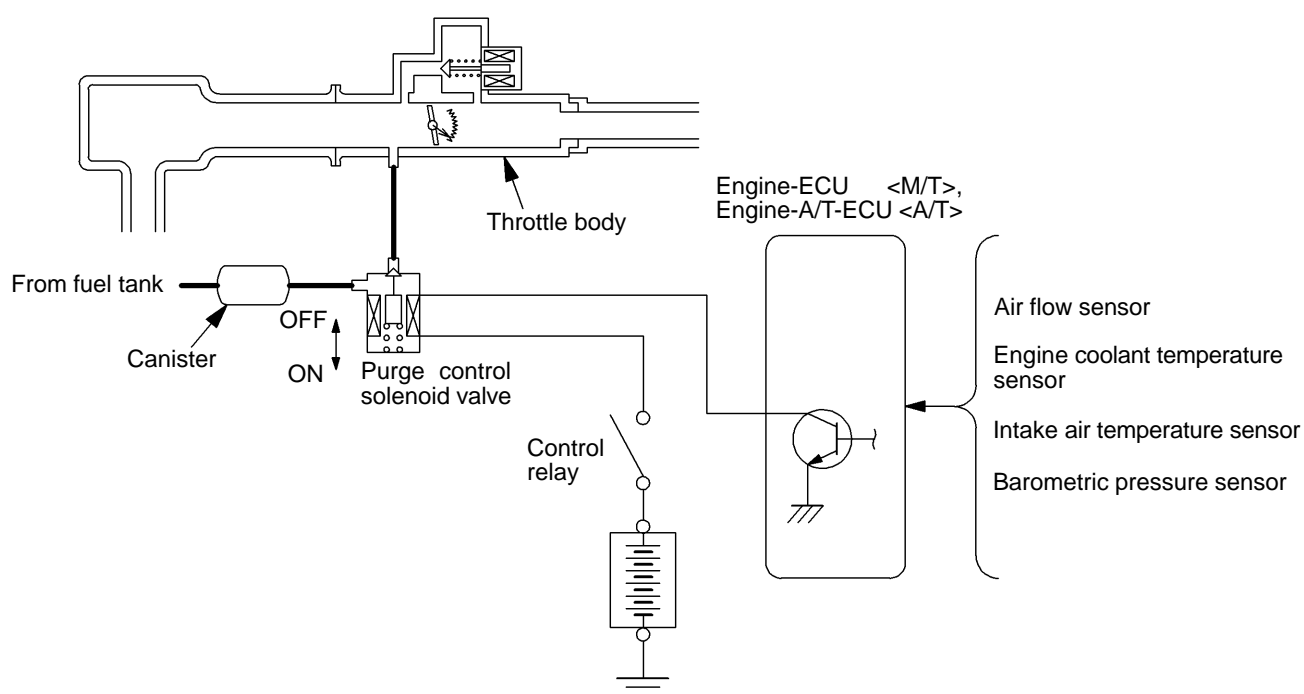
The evaporative emission control system prevents fuel vapours generated in the fuel tank from escaping into the atmosphere.

Fuel vapours from the fuel tank flow through the fuel tank pressure control valve and vapour pipe/hose to be stored temporarily in the canister. When driving the vehicle, fuel vapours stored in the canister flow through the purge solenoid and purge port and go into the intake manifold to be sent to the combustion chamber.

When the engine coolant temperature is low or when the intake air quantity is small (when the engine is at idle, for example), the engine control unit turns the purge solenoid off to shut off the fuel vapour flow to the intake manifold.

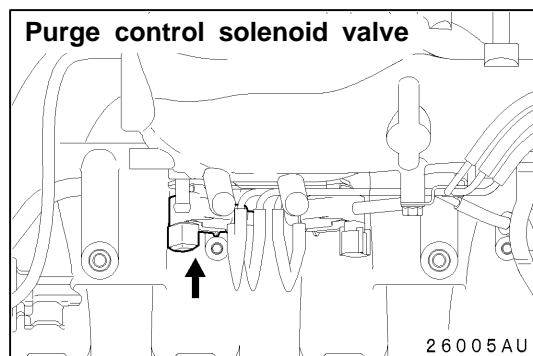
This does not only insure the driveability when the engine is cold or running under low load but also stabilize the emission level.

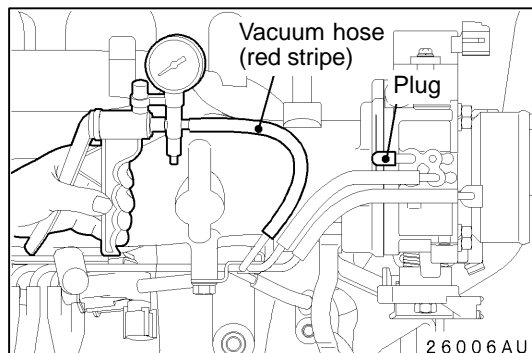
SYSTEM DIAGRAM



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COMPONENT LOCATION





PURGE CONTROL SYSTEM CHECK

1. Disconnect the vacuum hose (red stripe) 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 or hot, apply a vacuum of 53 kPa, and check the condition of the vacuum.

When engine is cold

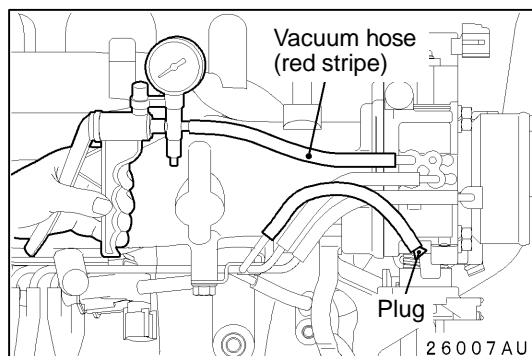
(Engine coolant temperature: 40°C or less)

Engine condition	Normal condition
At idle	Vacuum is maintained
3,000 r/min	

When engine is hot

(Engine coolant temperature: 80°C or higher)

Engine condition	Normal condition
At idle	Vacuum is maintained
3,000 r/min (for approximately 3 minutes after the engine is started.)	Vacuum will leak.



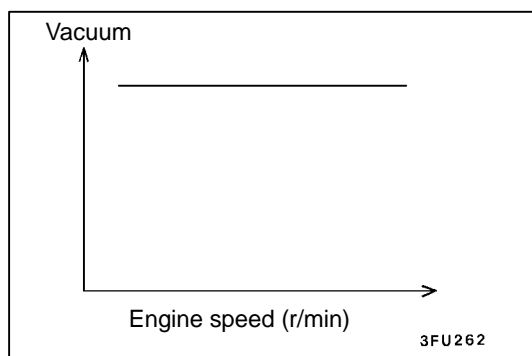
PURGE PORT VACUUM CHECK

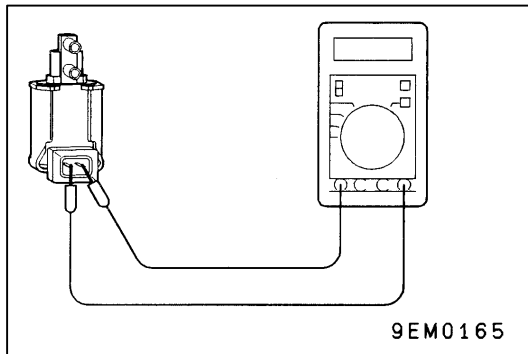
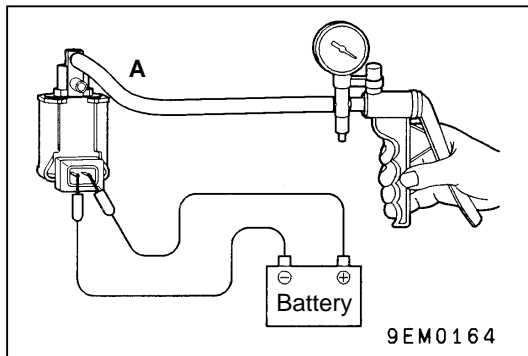
1. Disconnect the vacuum hose (red stripe) from the throttle body purge vacuum nipple and connect a hand vacuum pump to the nipple.

2. Start the engine and check that vacuum remains fairly constant after racing the engine.

NOTE

If vacuum changes, it is possible that the throttle body purge port may be clogged and require cleaning.





PURGE CONTROL SOLENOID VALVE CHECK

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 stripe) from the solenoid valve.
2. Disconnect the harness connector.
3. Connect a hand vacuum pump to nipple (A) of the solenoid valve (refer to the illustration at left).
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: 29 – 35 Ω (at 20°C)

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

GENERAL INFORMATION

The exhaust gas recirculation (EGR) system lowers the nitrogen oxide (NOx) emission level. When the air/fuel mixture combustion temperature is high, a large quantity of nitrogen oxides (NOx) is generated in the combustion chamber. Therefore, this system recirculates part of emission gas from

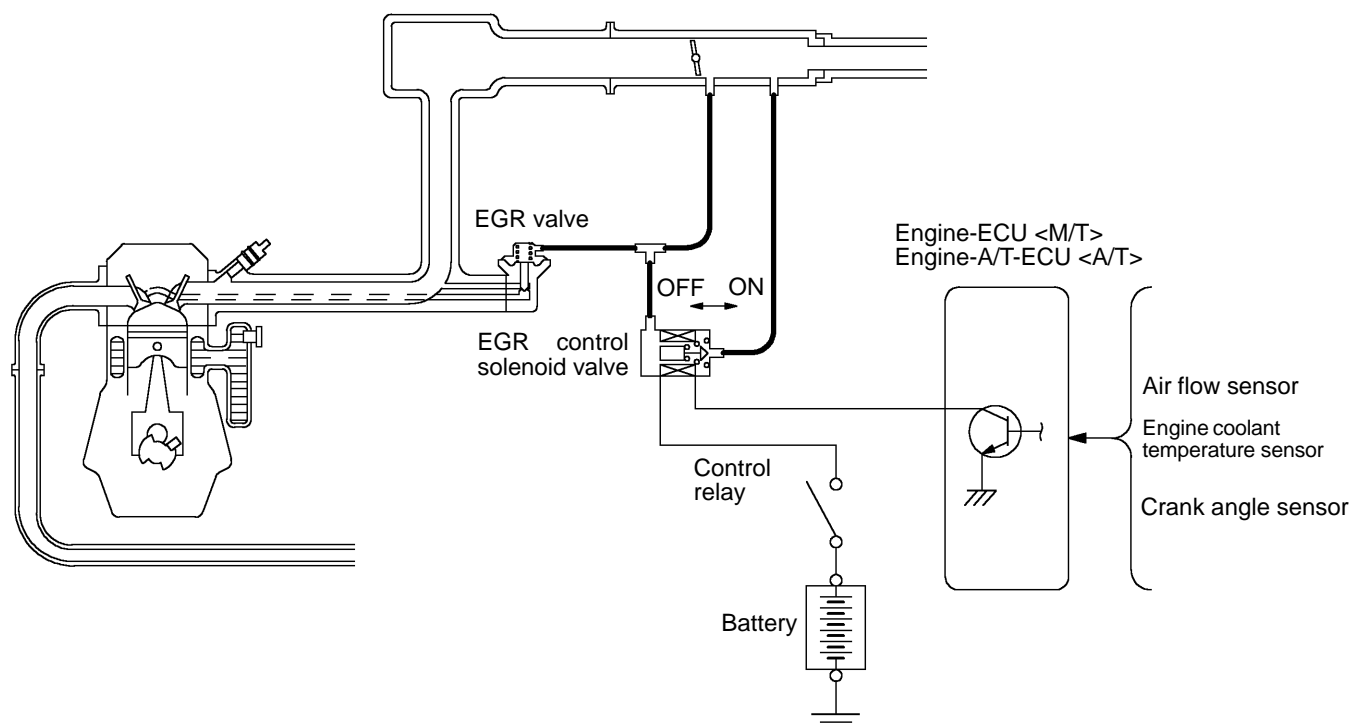
the exhaust port of the cylinder head to the combustion chamber through the intake manifold to decrease the air/fuel mixture combustion temperature, resulting in reduction of NOx. The EGR flow rate is controlled by the EGR valve so as not to decrease the driveability.

OPERATION

The EGR valve is being closed and does not recirculate exhaust gases under one of the following conditions. Otherwise, the EGR valve is opened and recirculates exhaust gases.

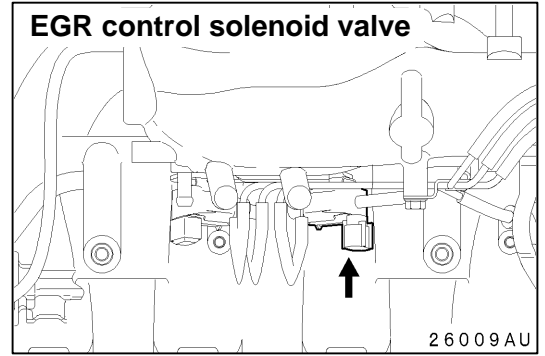
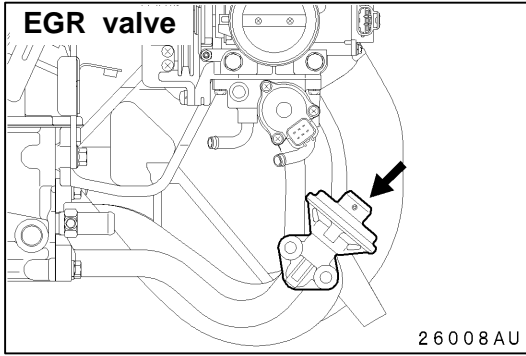
- The engine coolant temperature is low.
- The engine is at idle.
- The throttle valve is widely opened.

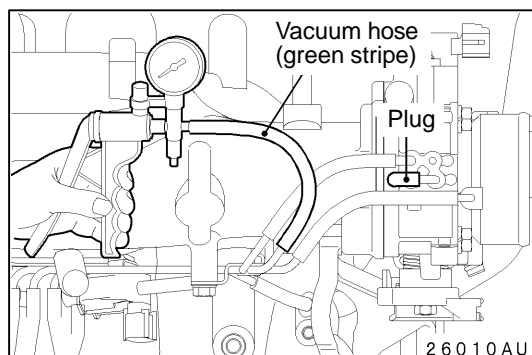
SYSTEM DIAGRAM



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COMPONENT LOCATION





EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM CHECK

1. Disconnect 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 or less)

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

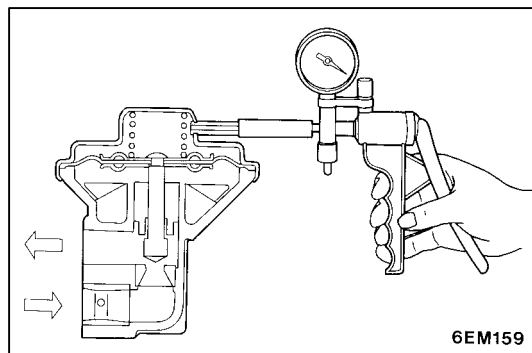
When engine is hot

(Engine coolant temperature: 80°C or less)

Hand vacuum pump	Normal engine condition	Normal vacuum condition
2.7 kPa	No change	Vacuum is maintained
29 kPa	Idling becomes slightly unstable or engine stalls.	Vacuum is maintained

EGR VALVE CHECK

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 of vacuum, and check that the vacuum is maintained.

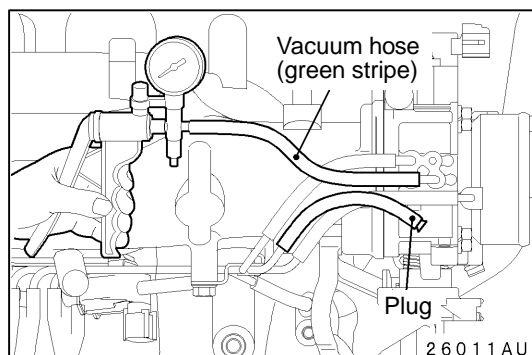


4. Apply a vacuum and check the passage of air by blowing through one side of the EGR passage.

Vacuum	Passage of air
2.7 kPa or less	Air is not blown out
29 kPa or more	Air is blown out

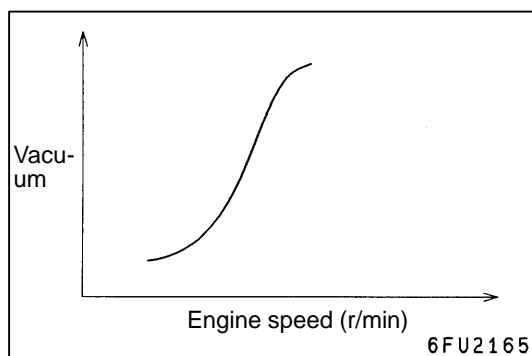
5. Replace the gasket, and tighten to the specified torque.

Tightening torque: 21 ± 4 N·m

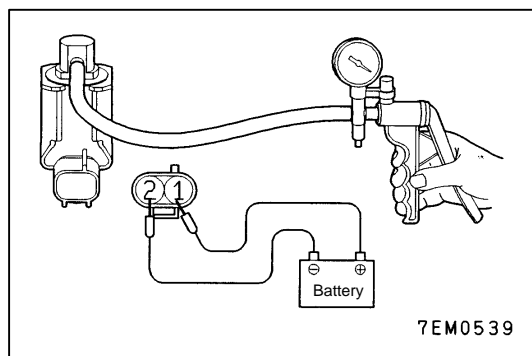


EGR PORT VACUUM CHECK

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



3. Start the engine.
4. When the engine speed increases, the vacuum should increase in proportion to the engine speed.
5. If no, the port may be clogged.



EGR CONTROL SOLENOID VALVE CHECK

NOTE

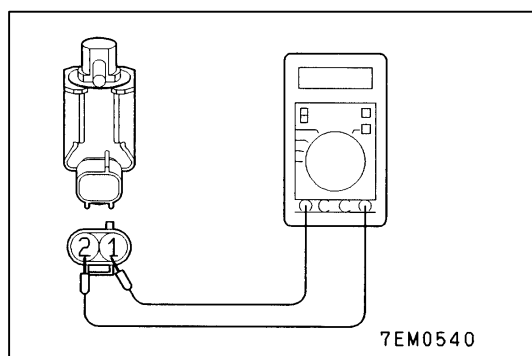
When disconnecting the vacuum hose, always make a mark so that it can be reconnected at original position.

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
Not applied	Vacuum leaks
Applied	Vacuum maintained

5. Measure the resistance between the terminals of the solenoid valve.

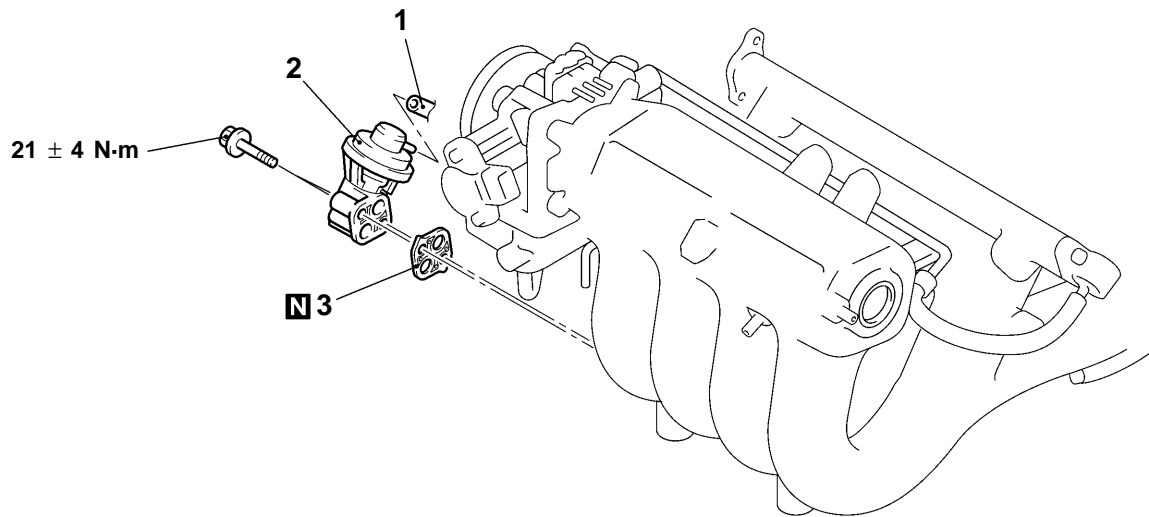
Standard value: 29 – 35 Ω (at 20°C)



EGR VALVE

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
[Air Cleaner Assembly Removal and Installation](#)



AY1302AU

Removal steps

1. Vacuum hose connection
2. EGR valve
3. EGR valve gasket

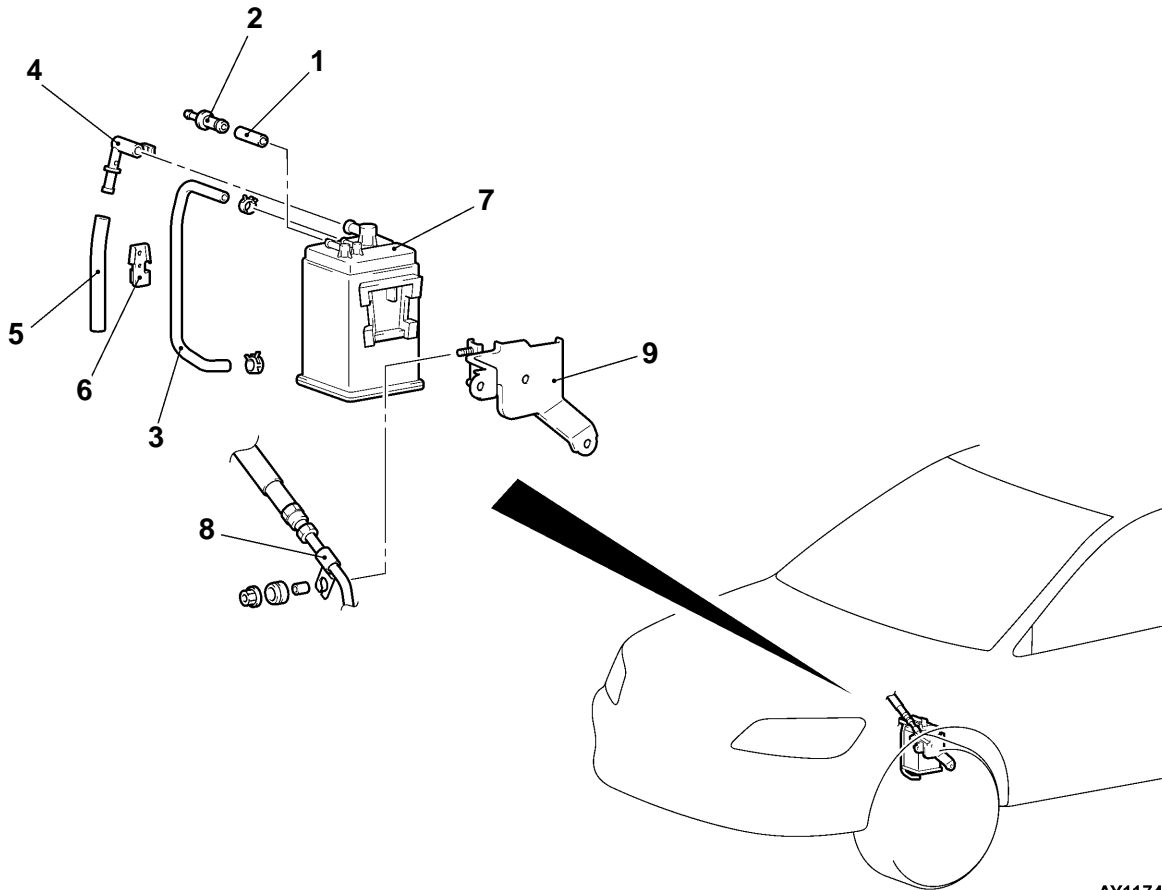
CANISTER

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
Air cleaner assembly removal and installation

MAIN

Group
17



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Canister removal steps

1. Purge hose
2. Connector
3. Vapor hose
4. Vent connector
5. Vapor hose
6. Hose clamp
7. Canister
8. Fuel high pressure hose
9. Canister bracket assembly

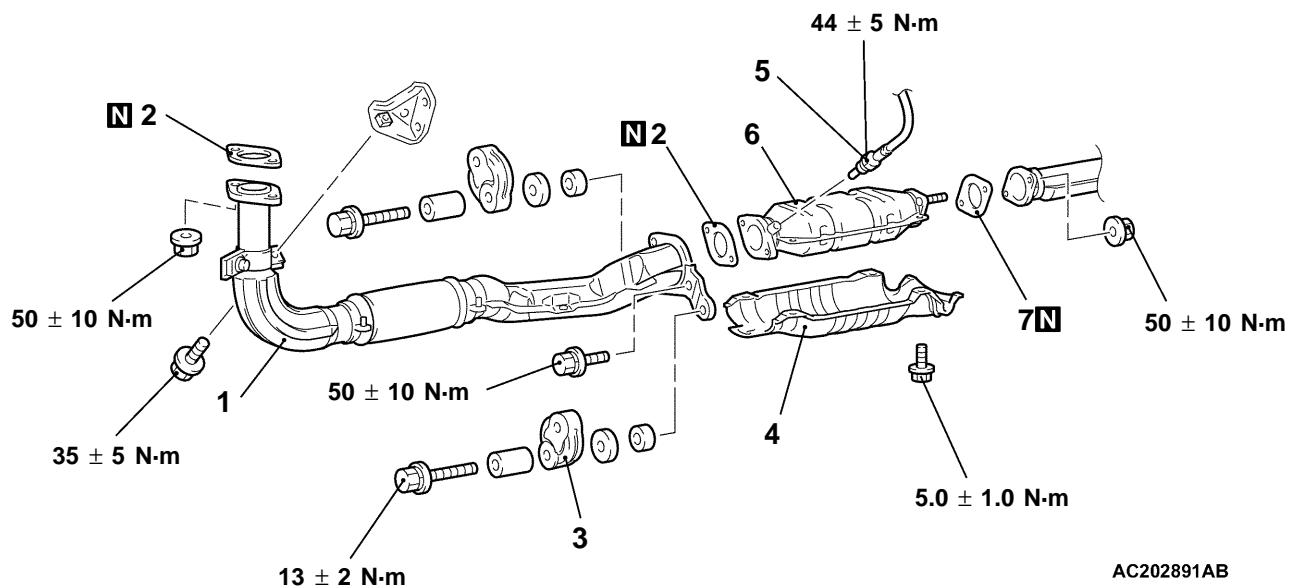
CATALYTIC CONVERTER

GENERAL INFORMATION

The three-way catalytic converter, together with the closed loop air-fuel ratio control based on the oxygen sensor signal, oxidizes carbon monoxides (CO) and hydrocarbons (HC) and reduces nitrogen oxides (NOx).

When the mixture is controlled at stoichiometric air-fuel ratio, the three-way catalytic converter provides the highest purification against the three constituents, namely, CO, HC and NOx.

REMOVAL AND INSTALLATION



Removal steps

1. Front exhaust pipe
2. Gasket
3. Hanger
4. Heat protector

5. Oxygen sensor
6. Catalytic converter
7. Gasket