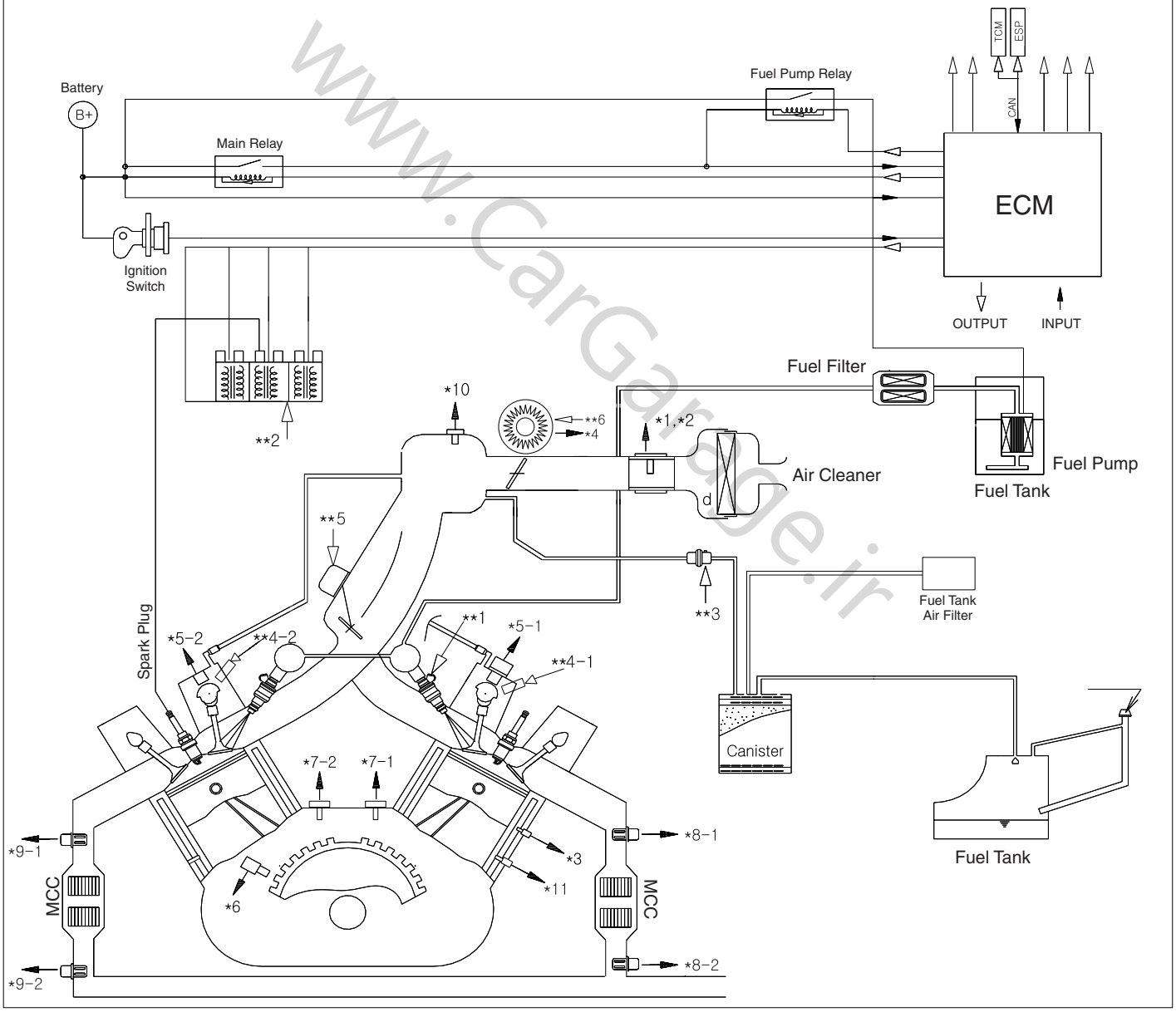
SCHEMATIC DIAGRAM E346F9E1

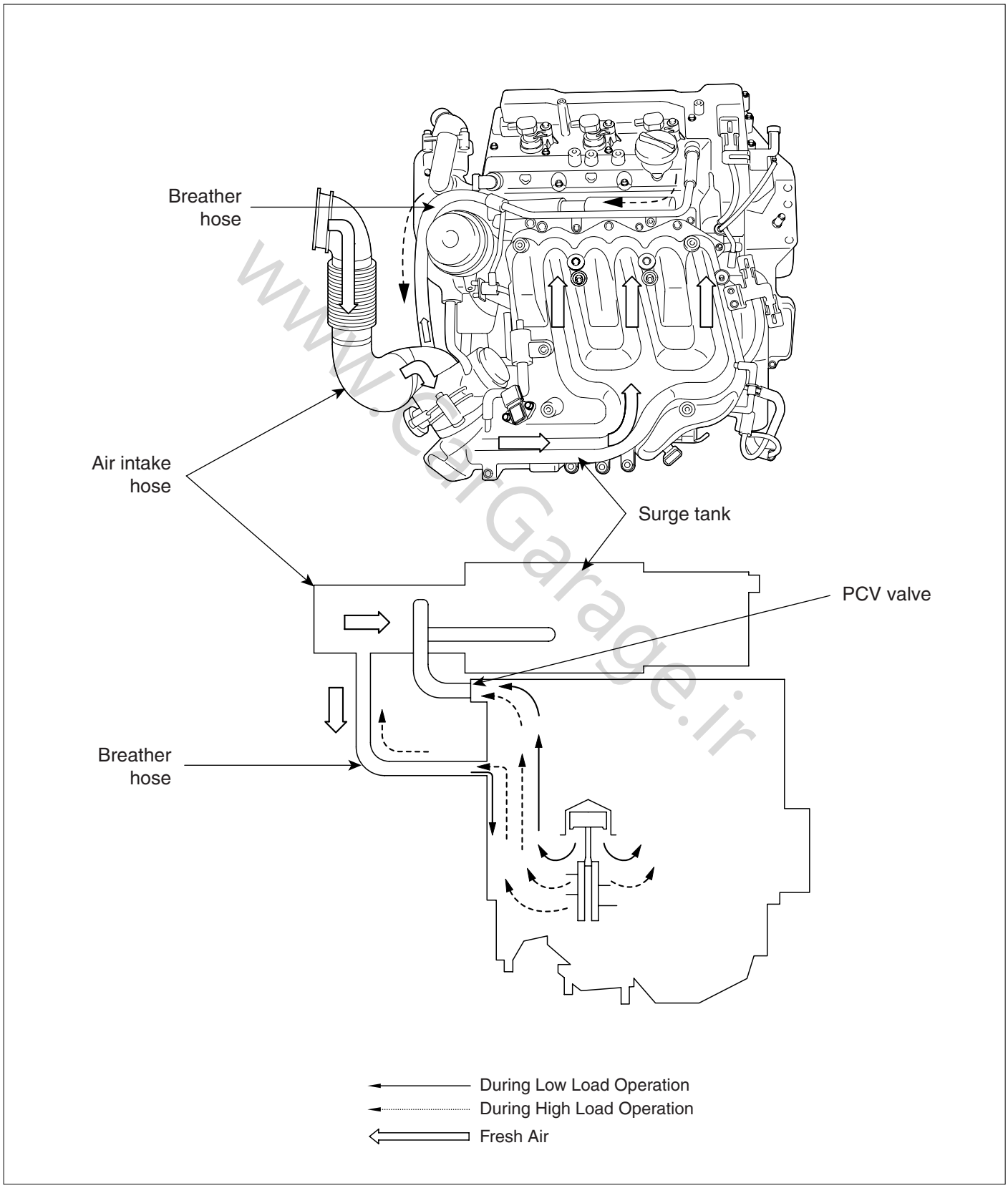
*1. Mass Air Flow Sensor (MAFS) *2. Intake Air Temperature Sensor (IATS) *3. Engine Coolant Tmeperature Sensor (ECTS) *4. Throttle Position Sensor (TPS) *5-1. Camshaft Position Sensor (CMPS) [BANK1] *5-2. Camshaft Position Sensor (CMPS) [BANK2] *6. Crankshaft Position Sensor (CKPS) *7-1. Knock Sensor (KS) #1 *7-2. Knock Sensor (KS) #2 *8-1. Heated Oxygen Sensor (HO2S) [B1/S1] *8-2. Heated Oxygen Sensor (HO2S) [B1/S2] *9-1. Heated Oxygen Sensor (HO2S) [B2/S1] *9-2. Heated Oxygen Sensor (HO2S) [B2/S2] *10. Manifold Absolute Pressure Sensor (MAPS) *11. CVVT Oil Temperature Sensor (OTS)	· Ignition Switch · Battery Voltage · Vehicle Speed Signal · Coolant Load Signal · "PNP" Switch (A/T only) · Fuel Pump Relay Signal	PCM	**1. Fuel Injector **2. Ignition Coil **3. Purge Control Solenoid Valve (PCSV) **4-1. CVVT Oil control valve (OCV) [BANK1] **4-2. CVVT Oil control valve (OCV) [BANK2] **5. Variable Intake Manifold solenoid (VIS) Valve **6. ETC Motor . Fuel Pump Contorl . Main Relay . Cooler Relay . Ignition Timing Control . Disagnosis



EERF600G

CRANKCASE EMISSION CONTROL SYSTEM

COMPONENT LOCATION E9392CEB



EERF086B

INSPECTION E4D4E85E

1. Disconnect the ventilation hose from the positive crankcase ventilation (PCV) valve. Remove the PCV valve from the rocker cover and reconnect it to the ventilation hose.

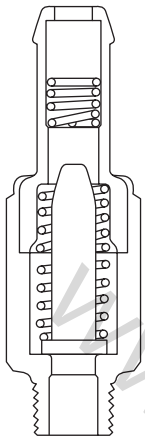
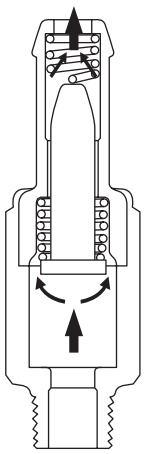
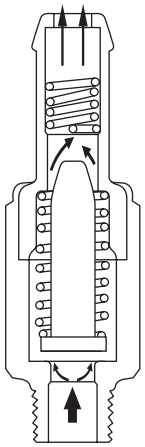
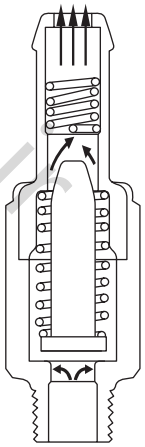
2. Run the engine at idle and put a finger on the open end of the PCV valve and make sure that intake manifold vacuum can be felt.

   NOTE

   The plunger inside the PCV valve will move back and forth.

POSITIVE CRANKCASE VENTILATION (PCV) VALVE

OPERATION EAB4CA0E

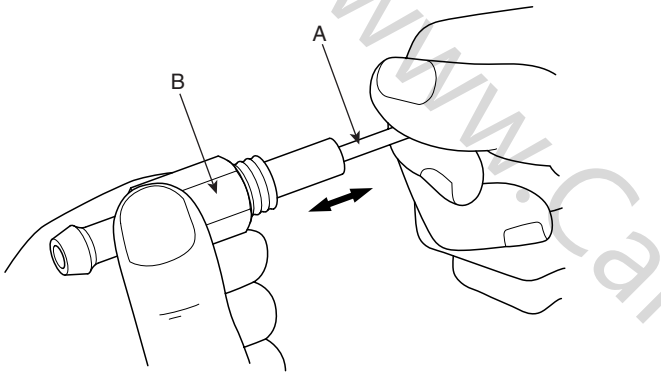
<table>
<tr><td colspan="2">Intake manifold side (No vacuum)
 
Rocker cover side
BEGE001S</td><td colspan="2">Intake manifold side (High vacuum)
 
Rocker cover side
BEGE001T</td></tr>
<tr><td>Engine condition</td><td>Not running</td><td>Engine condition</td><td>Idling or decelerating</td></tr>
<tr><td>PCV valve</td><td>Not operating</td><td>PCV valve</td><td>Fully operating</td></tr>
<tr><td>Vacuum passage</td><td>Restricted</td><td>Vacuum passage</td><td>Small</td></tr>
<tr><td colspan="2">Intake manifold side (Moderate vacuum)
 
Rocker cover side
BEGE001U</td><td colspan="2">Intake manifold side (Low vacuum)
 
Rocker cover side
BEGE001V</td></tr>
<tr><td>Engine condition</td><td>Normal operation</td><td>Engine condition</td><td>Accelerating and high load</td></tr>
<tr><td>PCV valve</td><td>Properly operating</td><td>PCV valve</td><td>Slightly operating</td></tr>
<tr><td>Vacuum passage</td><td>Large</td><td>Vacuum passage</td><td>Very large</td></tr>
</table>

REMOVAL EEC034EC

1. Remove the valve pad and disconnect the vacuum hose.
2. Remove the PCV Valve.

INSPECTION E9E1DD71

1. Remove the PCV valve.
2. Insert a thin stick(A) into the PCV valve(B) from the threaded side to check that the plunger moves.
3. If the plunger does not move, the PCV valve is clogged. Clean it or replace.



EERF600J

INSTALLATION EB1FC46B

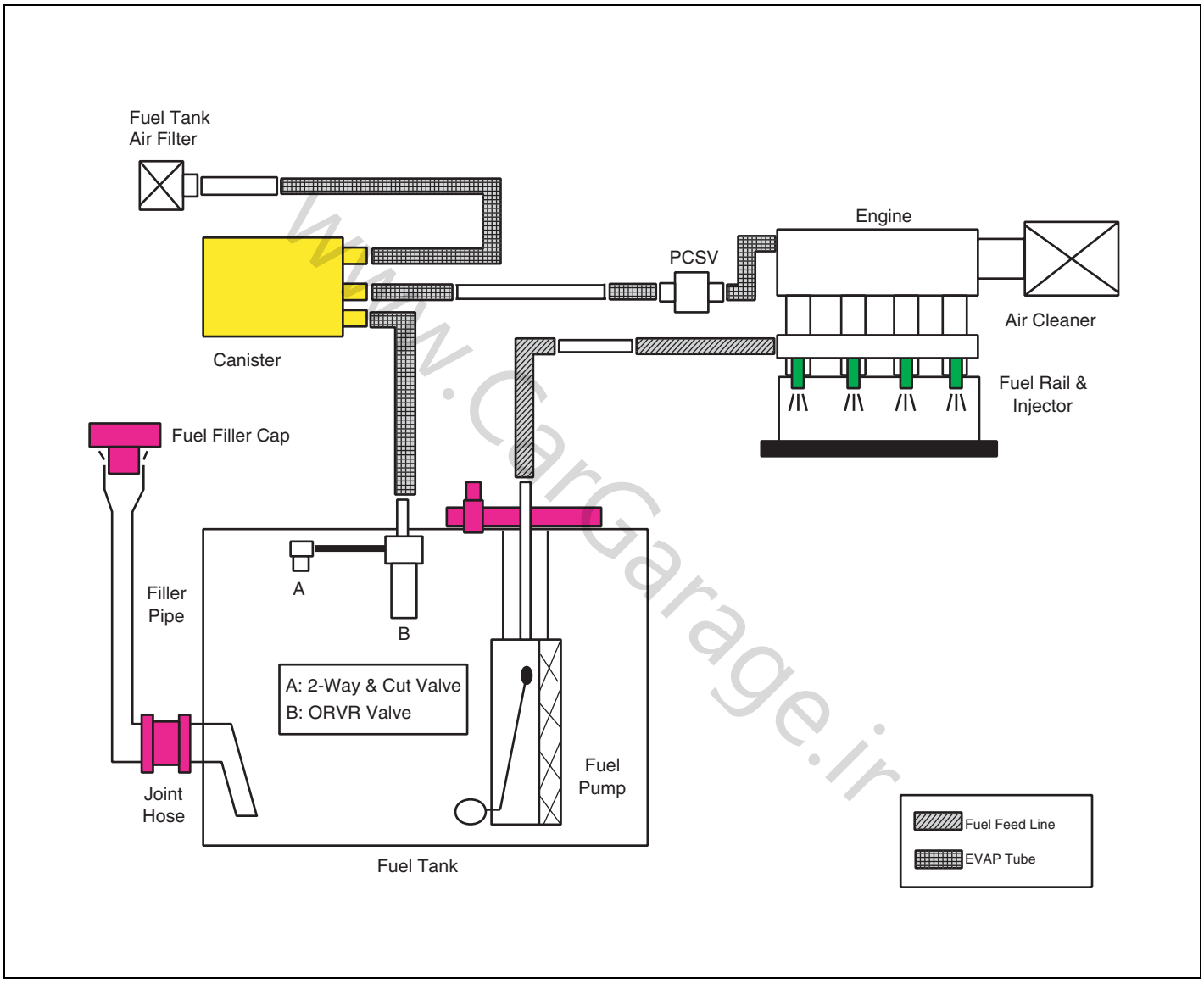
Install the PCV valve and tighten to the specified torque.

PCV Valve installation : 7.8 ~ 11.8 N·m (0.8 ~ 1.2 kgf·m, 5.8 ~ 8.7lbf·ft)

EVAPORATIVE EMISSION CONTROL SYSTEM

DESCRIPTION E8A5EE08

Evaporative Emission Control System prevents fuel vapor stored in fuel tank from vaporizing into the atmosphere. When the fuel evaporates in the fuel tank, the vapor passes through vent hoses or tubes to the canister filled with charcoal and the canister temporarily holds the vapor in the charcoal. If ECM determines to draw the gathered vapor into the combustion chambers during certain operating conditions, it will use vacuum in intake manifold to move it.



LEKG033A

CANISTER

Canister is filled with charcoal and absorbs evaporated vapor in fuel tank. The gathered fuel vapor in canister is drawn into the intake manifold by the ECM/PCM when appropriate conditions are set.

PURGE CONTROL SOLENOID VALVE (PCSV)

Purge Control Solenoid Valve (PCSV) is installed in the passage connecting canister and intake manifold. It is a duty type solenoid valve and is operated by ECM/PCM signal. To draw the absorbed vapor into the intake manifold, the ECM/PCM will open the PCSV, otherwise the passage remains closed.

FUEL FILLER CAP

A ratchet tightening device on the threaded fuel filler cap reduces the chances of incorrect installation, which would seal the fuel filler. After the gasket on the fuel filler cap and the fill neck flange contact each other, the ratchet produces a loud clicking noise indicating the seal has been set.

INSPECTION E760548F

1. Disconnect the vacuum hose from the throttle body, and connect a vacuum pump to the vacuum hose.
2. Check the following points when the engine is cold [engine coolant temperature 60°C(140°F) or below] and when it is warm [engine coolant temperature 80°C(176°F) or higher].

WHEN ENGINE IS COLD

Engine operating condition	Applied vacuum	Result
Idling	50 kPa (7.3 psi)	Vacuum is held
3,000 rpm		

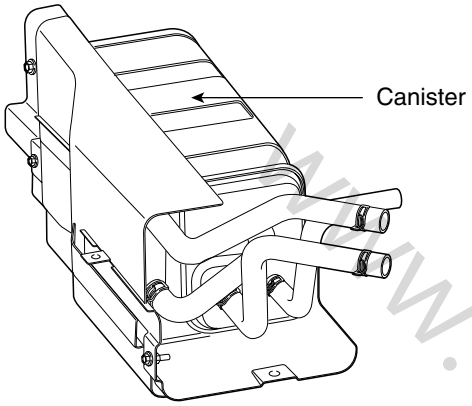
WHEN ENGINE IS WARM

Engine operating condition	Applied vacuum	Result
Idling	50 kPa (7.3 psi)	Vacuum is held
Within 3 minutes after engine start at 3,000 rpm	Try to apply vacuum	Vacuum is released
After 3 minutes have passed after engine start at 3,000 rpm	50 kPa (7.3 psi)	Vacuum will be held momentarily, after which, it will be released

CANISTER

INSPECTION E66AB61C

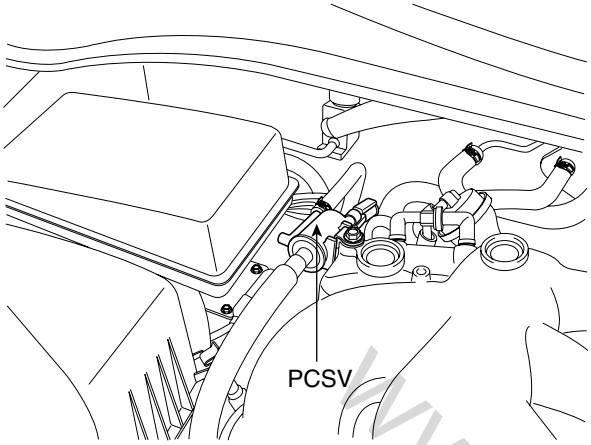
1. Lock for loose connections, sharp bends or damage to the fuel vapor lines.
2. Look for distortion, cracks or fuel damage.
3. After removing the canister, inspect for cracks or damage.



SBLEC6101L

PURGE CONTROL SOLENOID VALVE (PCSV)

INSPECTION EF3502F4



SBLEC6102L

NOTE

When disconnecting the vacuum hose, make an identification mark on it so that it can be reconnected to its original position.

1. Disconnect the vacuum hose from the solenoid valve.
2. Detach the harness connector.
3. Connect a vacuum pump to the nipple to which the red-striped vacuum hose was connected.
4. Apply vacuum and check when voltage is applied to the PCSV and when the voltage is discontinued.

Battery voltage	Normal condition
When applied	Vacuum is released
When discontinued	Vacuum is maintained

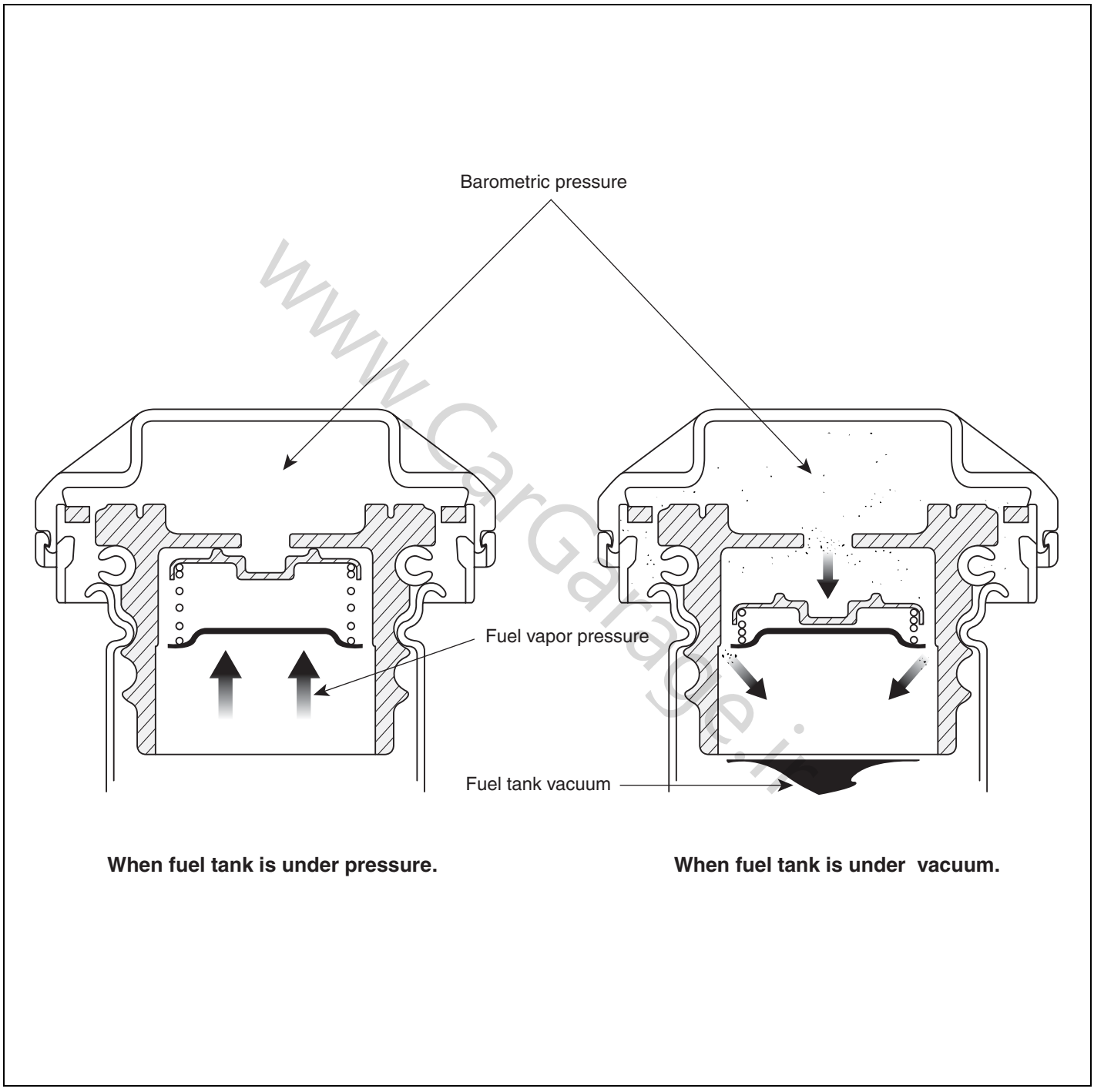
5. Measure the resistance between the terminals of the solenoid valve.

PCSV coil resistance(Ω) : 19.0 ~ 22.0 Ω at 20℃ (68˚F)

FUEL FILLER CAP

DESCRIPTION EEDE651D

A ratchet tightening device on the threaded fuel filler cap reduces the chances of incorrect installation, which would seal the fuel filler. After the gasket on the fuel filler cap and the filler neck flange contact each other, the retchet produces a loud clicking noise indicating the seal has been set.



LEGE015A

EXHAUST EMISSION CONTROL SYSTEM

DESCRIPTION E6B1AEC2

Exhaust emissions (CO, HC, NOx) are controlled by a combination of engine modifications and the addition of special control components.

Modifications to the combustion chamber, intake manifold, camshaft and ignition system form the basic control system.

These items have been integrated into a highly effective system which controls exhaust emissions while maintaining good driveability and fuel economy.

AIR/FUEL MIXTURE CONTROL SYSTEM [MULTIPORT FUEL INJECTION (MFI) SYSTEM]

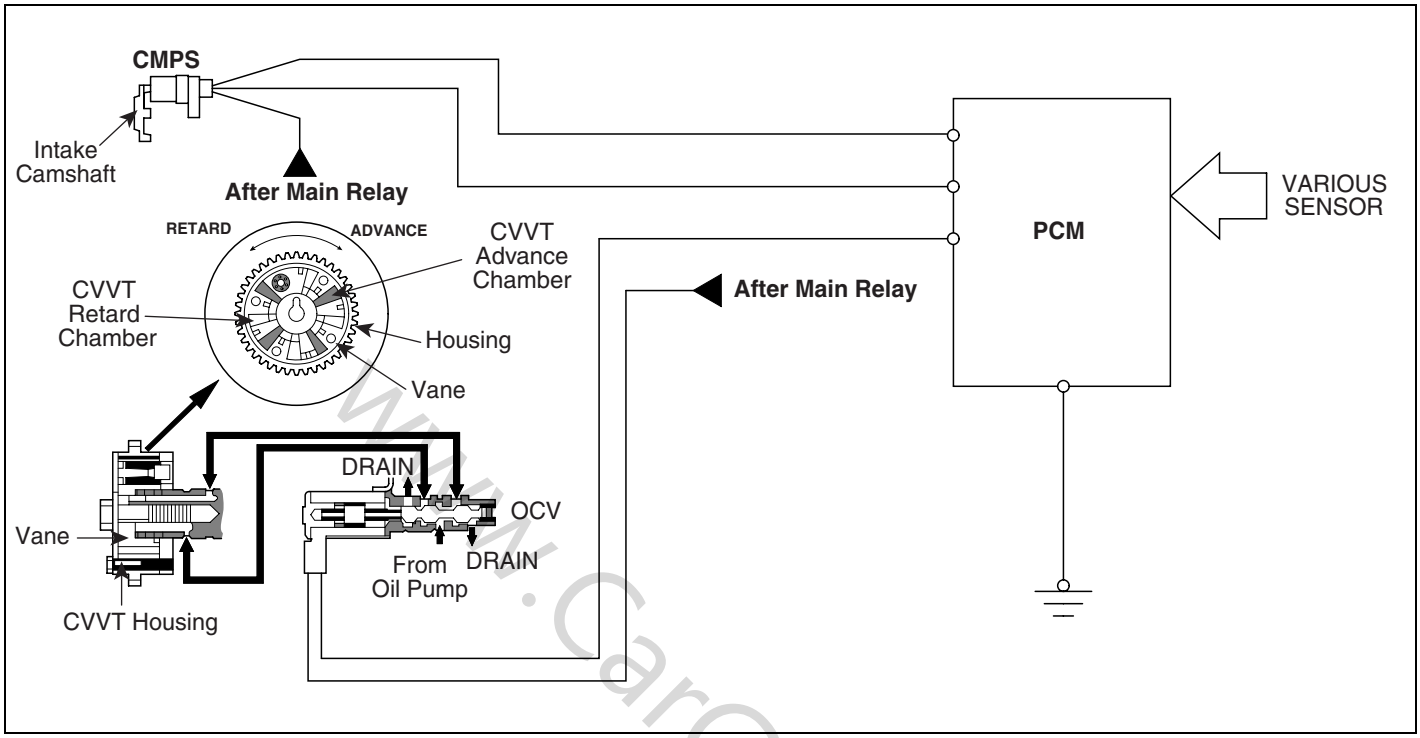
The MFI system is a system which uses the signals from the heated oxygen sensor to activate and control the injector installed in the manifold for each cylinder, thus precisely regulating the air/fuel mixture ratio and reducing emissions.

This in turn allows the engine to produce exhaust gases of the proper composition to permit the use of a three way catalyst. The three way catalyst is designed to convert the three pollutants (1) hydrocarbons (HC), (2) carbon monoxide (CO), and (3) oxides of nitrogen (NOx) into harmless substances. There are two operating modes in the MFI system.

1. Open Loop air/fuel ratio is controlled by information programmed into the ECM.
2. Closed Loop air/fuel ratio is adjusted by the ECM based on information supplied by the oxygen sensor.

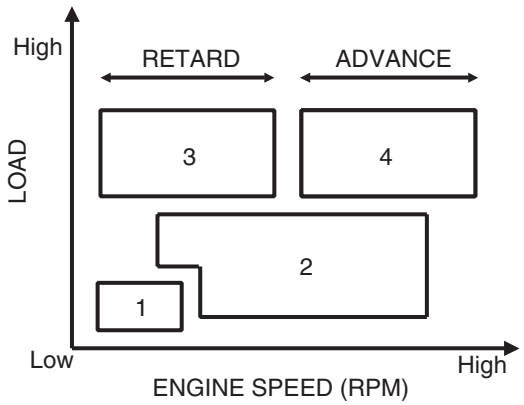
CONTINUOUS VARIABLE VALVE TIMING (CVVT)

DESCRIPTION E293858A



UEBG013A

The CVVT (Continuously Variable Valve Timing) which is installed on the exhaust camshaft controls intake valve open and close timing in order to improve engine performance.
The intake valve timing is optimized by CVVT system depending on engine rpm.
This CVVT system improves fuel efficiency and reduces NOx emissions at all levels of engine speed, vehicle speed, and engine load by EGR effect because of valve over-lap optimization.
The CVVT changes the phase of the intake camshaft via oil pressure.
It changes the intake valve timing continuously.

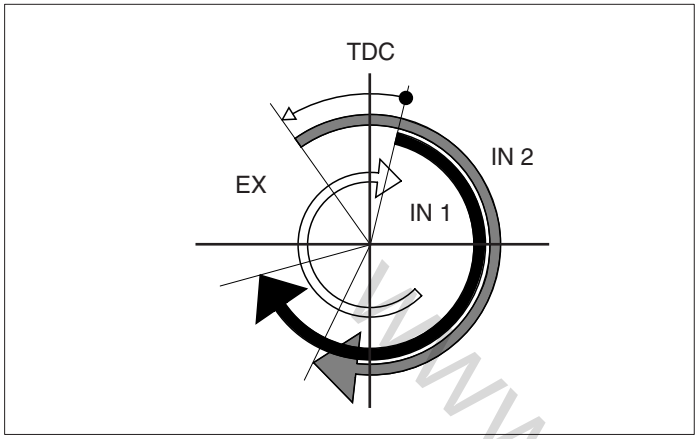


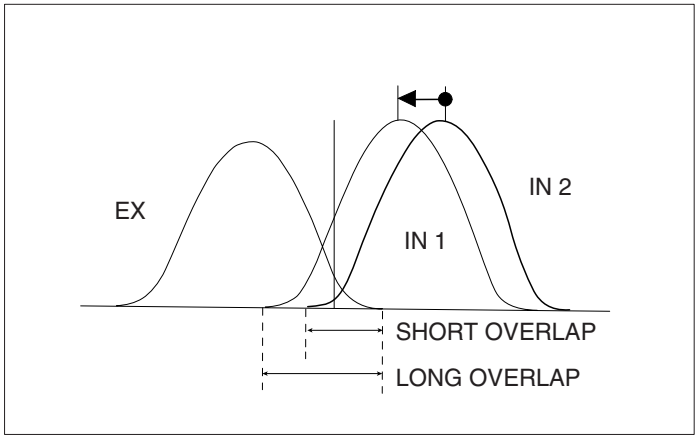
Driving Condition	Intake Valve Timing	Effect
Light load (1)	Retard	Stable combustion
Part load (2)	Advance	Enhanced fuel economy and exhaust emissions
High load& Low rpm (3)	Advance	Enhanced torque
High load& High rpm (4)	Retard	Enhanced Power

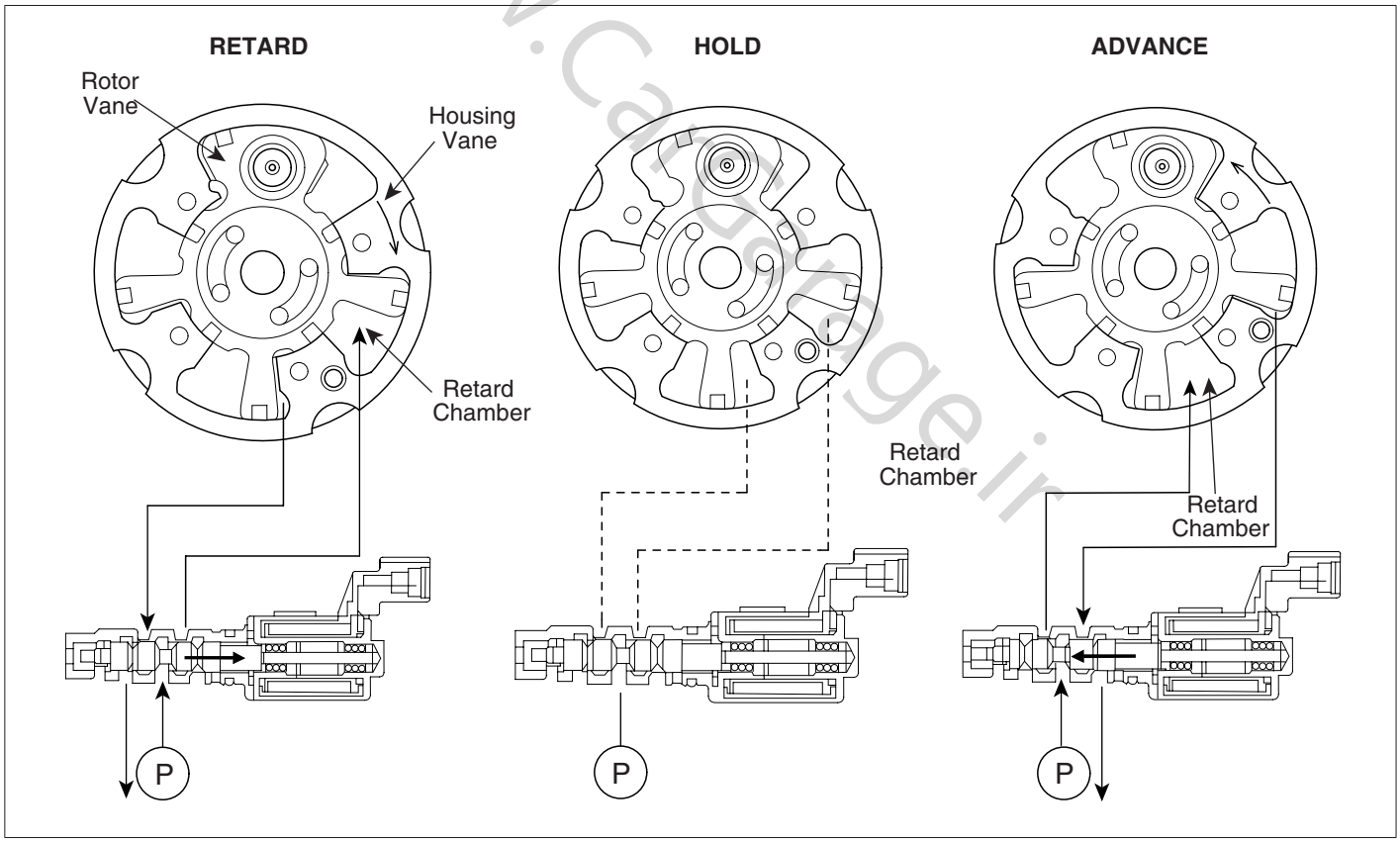
LEIF001Q

OPERATION EF8C1BC4

The CVVT system makes continuous intake valve timing changes based on operating conditions.
Intake valve timing is optimized to allow the engine to produce maximum power.
Cam angle is advanced to obtain the EGR effect and reduce pumping loss. The intake valve is closed quickly to reduce the entry of the air/fuel mixture into the intake port and improve the changing effect.
Reduces the cam advance at idle, stabilizes combustion, and reduces engine speed.
If a malfunction occurs, the CVVT system control is disabled and the valve timing is fixed at the fully retarded position.







UEBG014A

1. The above figure shows the relative operation structures of the housing vane to the rotor vane.
2. If the CVVT is held a certain control angle, to hold this state, oil is replenished as much as oil leaks from the oil pump.

The OCV (Oil-flow Control Valve) spool location at this time is as follows.
Oil pump → Advance oil chamber (Little by little open the inflow side to the advance oil chamber) → Almost close the drain side

Be sure there might be a difference in the position according to the engine running state (rpm, oil temperature, and oil pressure).