General Information

SPECIFICATIONS

Item	Specification	
Purge Control Solenoid Valve (PCSV)	Type	Duty Control type
	Resistance (Ω)	24.5 ~ 27.5 at 20 °C (68 °F)

TIGHTENING TORQUES

Item	N·m	kgf·cm	lbf·ft
Positive Crankcase Ventilation Valve	7.8 ~ 11.8	0.8 ~ 1.2	5.8 ~ 8.7

COMPONENTS

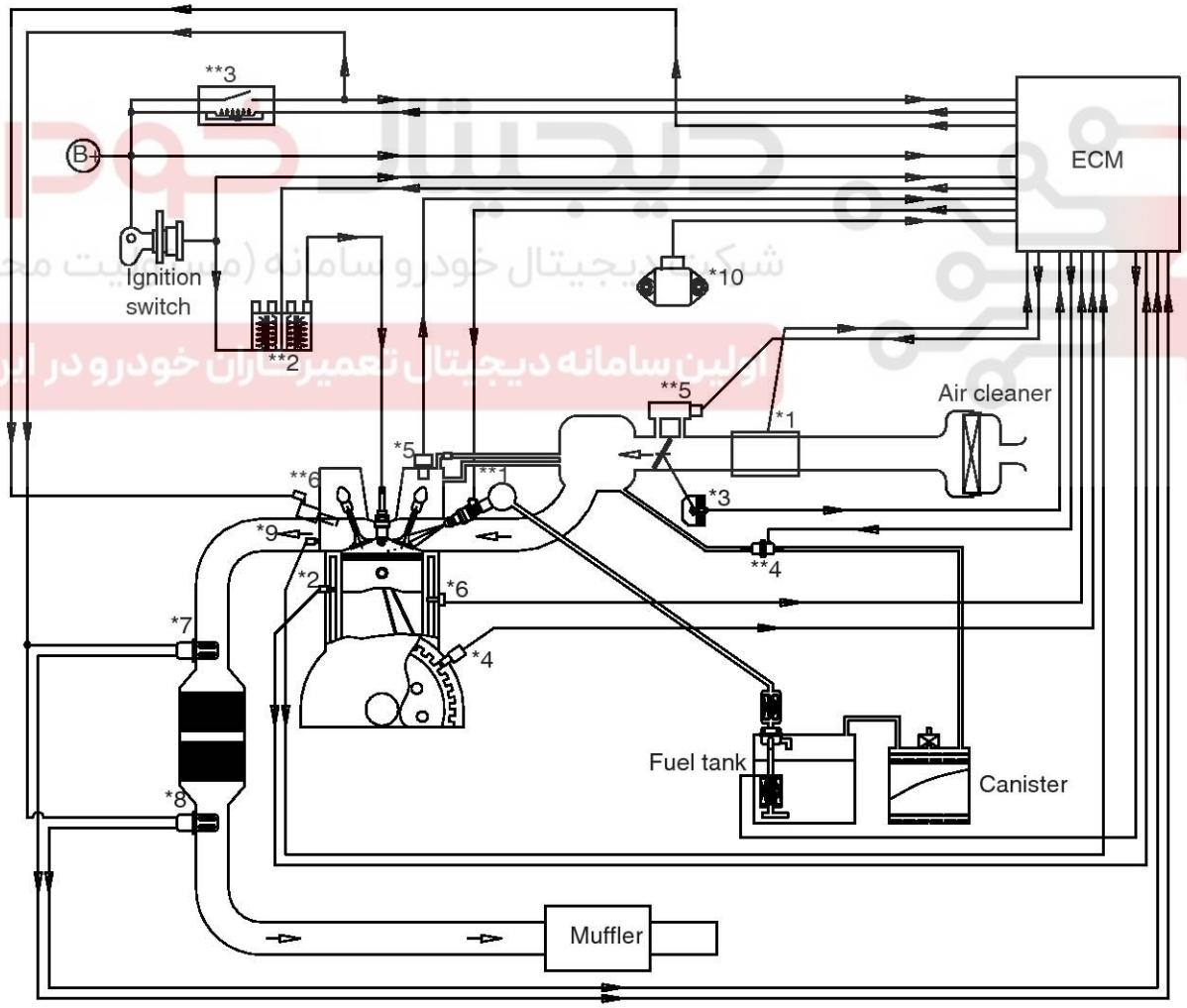
Components	Function	Remarks
Crankcase Emission System - Positive Crankcase Ventilation (PCV) valve	HC reduction	Variable flow rate type
Evaporative Emission System - Evaporative emission canister - Purge Control Solenoid Valve (PCSV)	HC reduction HC reduction	Duty control solenoid valve
Exhaust Emission System - MFI system (air-fuel mixtrue control device) - Three-way catalytic converter	CO, HC, NOx reduction CO, HC, NOx reduction	Heated oxygen sensor feedback type Monolithic type

TROUBLESHOOTING

Symptom	Suspect area	Remedy
Engine will not start or hard to start	Vacuum hose disconnected or damaged	Repair or replace
	Malfunction of the EVAP. Canister Purge Solenoid Valve	Repair or replace
Rough idle or engine stalls	Vacuum hose disconnected or damaged	Repair or replace
	Malfunction of the PCV valve	Replace
	Malfunction of the evaporative emission canister purge system	Check the system; if there is a problem, check related components parts
Excessive oil consumption	Positive crankcase ventilation line clogged	Check positive crankcase ventilation system

SCHEMATIC DIAGRAM
[2.0 DOHC, UNLEADED]

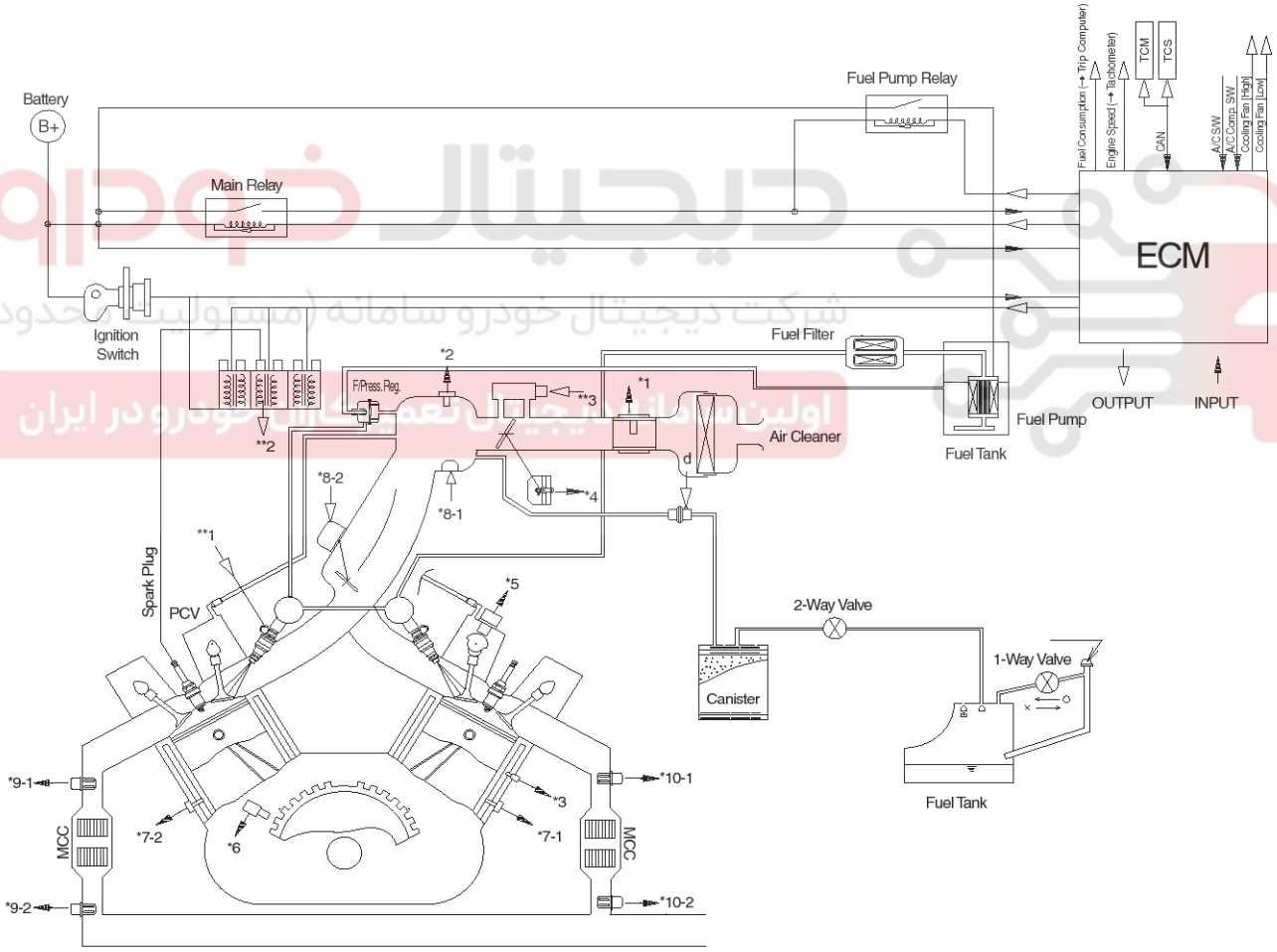
INPUT		OUTPUT
*1. Mass Air Flow Sensor (MAFS) & Intake Air Temp. Sensor (IATS) *2. Engine Coolant Temp. Sensor (ECTS) *3. Throttle Position Sensor (TPS) *4. Crankshaft Position Sensor (CKPS) *5. Camshaft Position Sensor (CMPS) *6. Knock Sensor (KS) *7. Heated Oxygen Sensor (H02S)-FR *8. Heated Oxygen Sensor (H02S)-RR *9. Oil Temp. Sensor (OTS) *10. Wheel speed Sensor	⇨ E C M ⇨	**1. Fuel Injector **2. Ignition Coil **3. Main Relay **4. Purge Control Solenoid Valve (PCSV) **5. Idle Speed Control Actuator (ISCA) **6. Oil Control Valve (OCV)



LEGE006F

[2.7 V6, UNLEADED]

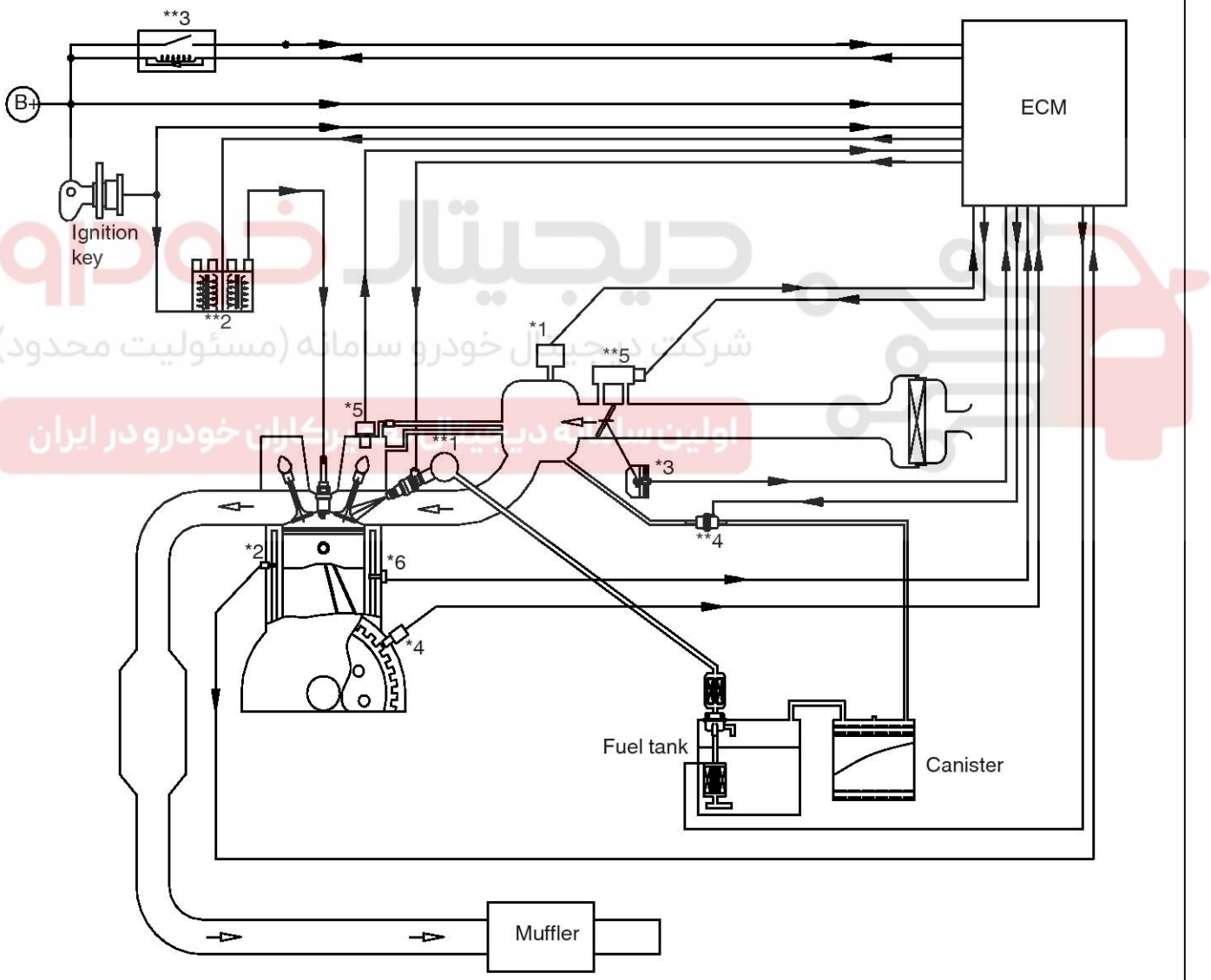
*1. Mass Air Flow Sensor (MAFS) *2. Intake Air Temperature Sensor (IATS) *3. Engine Coolant Temperature Sensor (ECTS) *4. Throttle Position Sensor (TPS) *5. Camshaft Position Sensor (CMPS) *6. Crankshaft Position Sensor (CKPS) *7-1. Knock Sensor (KS) #1 *7-2. Knock Sensor (KS) #2 *8-1. Intake Manifold Tuning Valve #1 (Surge Tank Side) *8-2. Intake Manifold Tuning Valve #2 (Intake Manifold Side) *9-1. Heated Oxygen Sensor (HO2S) [B1/S1] *9-2. Heated Oxygen Sensor (HO2S) [B1/S2] *10-1. Heated Oxygen Sensor (HO2S) [B2/S1] *10-2. Heated Oxygen Sensor (HO2S) [B2/S2]	• Ignition Switch • Battery Voltage • Vehicle Speed Sensor • Coolant Load Signal • "PNP" Switch (A/T only) • Fuel Pump Relay Signal	⇨ ECM ⇨	**1. Fuel Injector **2. Ignition Coil **3. Idle Speed Control Actuator (ISCA) **4. Purge Control Solenoid Valve (PCSV) . Fuel Pump Control . Main Relay . Cooler Relay . Ignition Timing Control . Diagnosis



LEIF008A

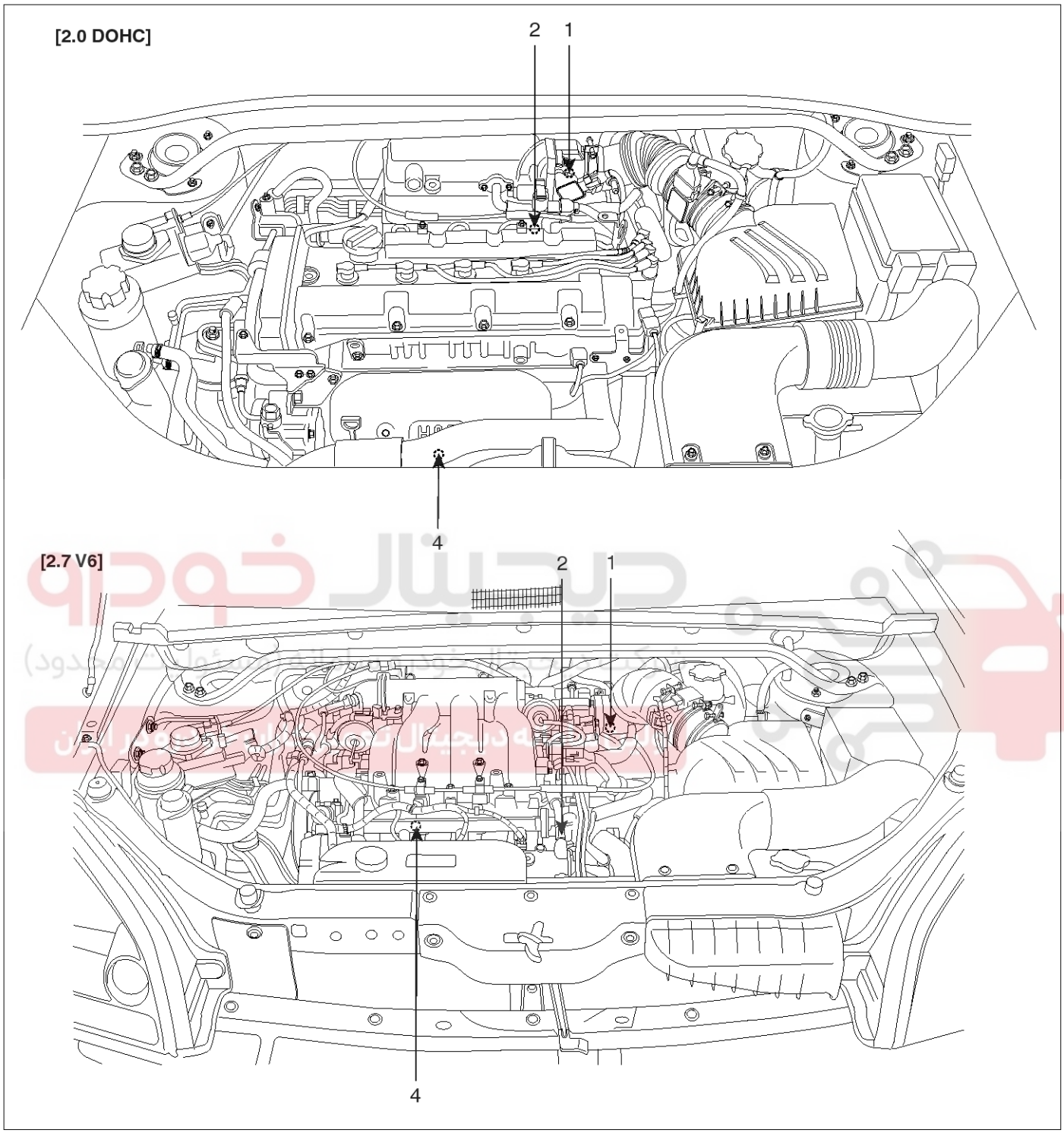
[2.0 DOHC, LEADED]

INPUT		OUTPUT
*1. Mass Air Flow Sensor (MAFS) & Intake Air Temp. Sensor (IATS) *2. Engine Coolant Temp. Sensor (ECTS) *3. Throttle Position Sensor (TPS) *4. Crankshaft Position Sensor (CKPS) *5. Camshaft Position Sensor (CMPS) *6. Knock Sensor (KS)	⇨ E C M ⇨	**1. Fuel Injector **2. Ignition Coil **3. Main Relay **4. Purge Control Solenoid Valve (PCSV) **5. Idle Speed Control Actuator (ISCA)



LEIF006H

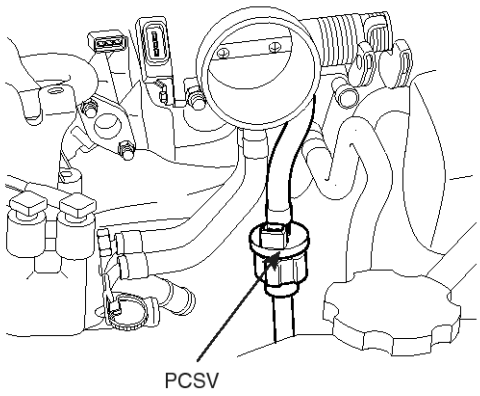
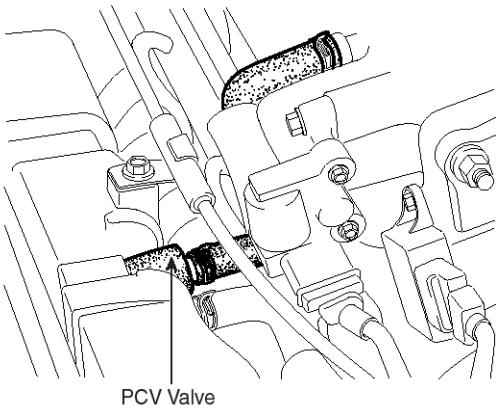
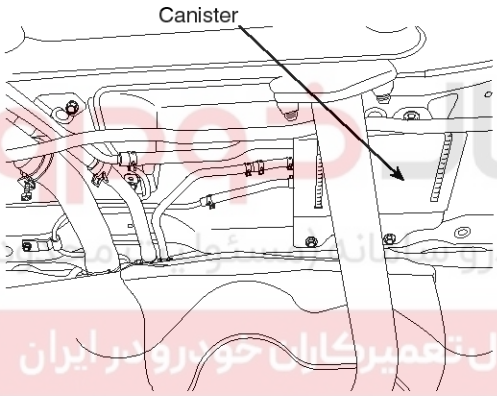
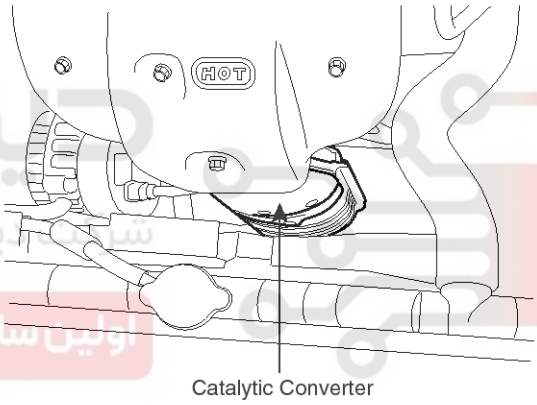
COMPONENTS LOCATION



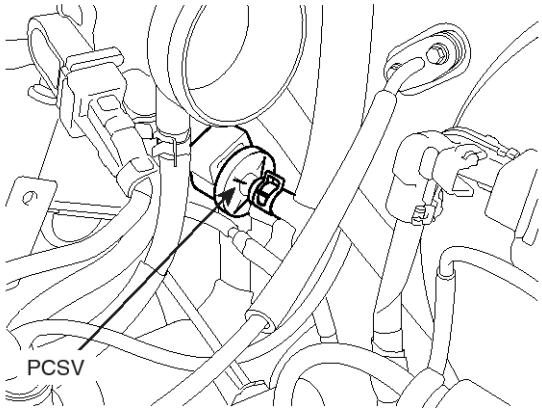
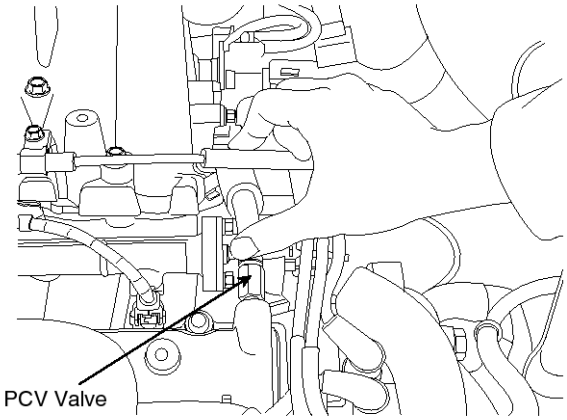
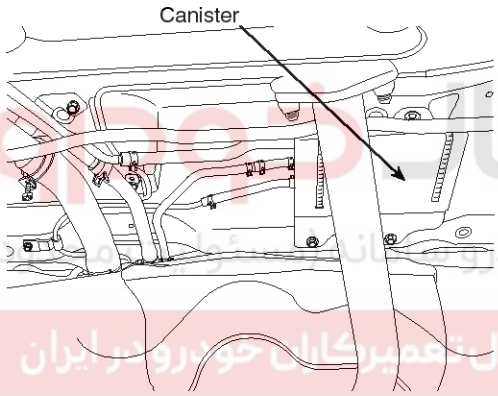
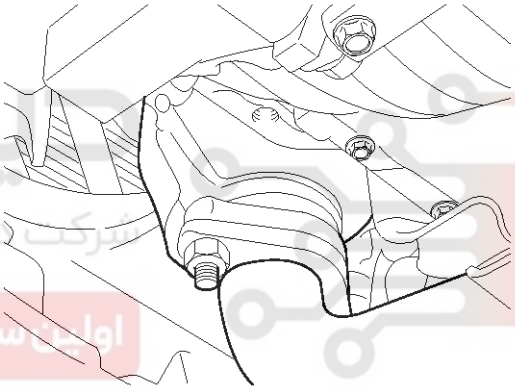
1. Purge Control Solenoid Valve (PCSV)
2. PCV Valve
3. Canister
4. Catalytic Converter
5. Canister close valve
6. Fuel Tank Pressure Sensor

LEIF603A

[2.0 DOHC]

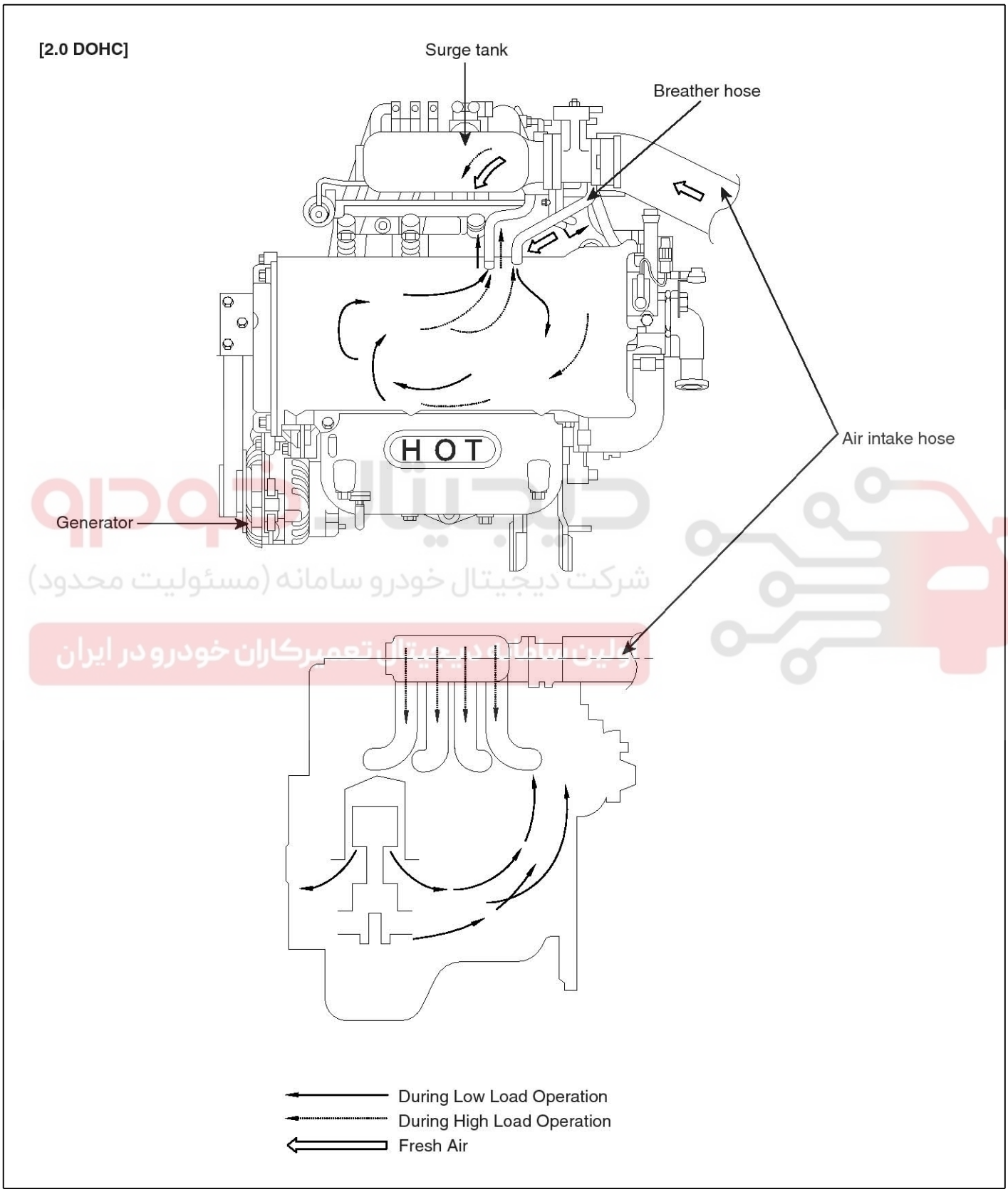
1.Purge Control Solenoid Valve (PCSV)	2. PCV Valve
	
3. Canister	**4. Catalytic Converter**
	

[2.7 V6]

1. Purge Control Solenoid Valve (PCSV)	2. PCV Valve
	
3. Canister	**4. Catalytic Converter**
	

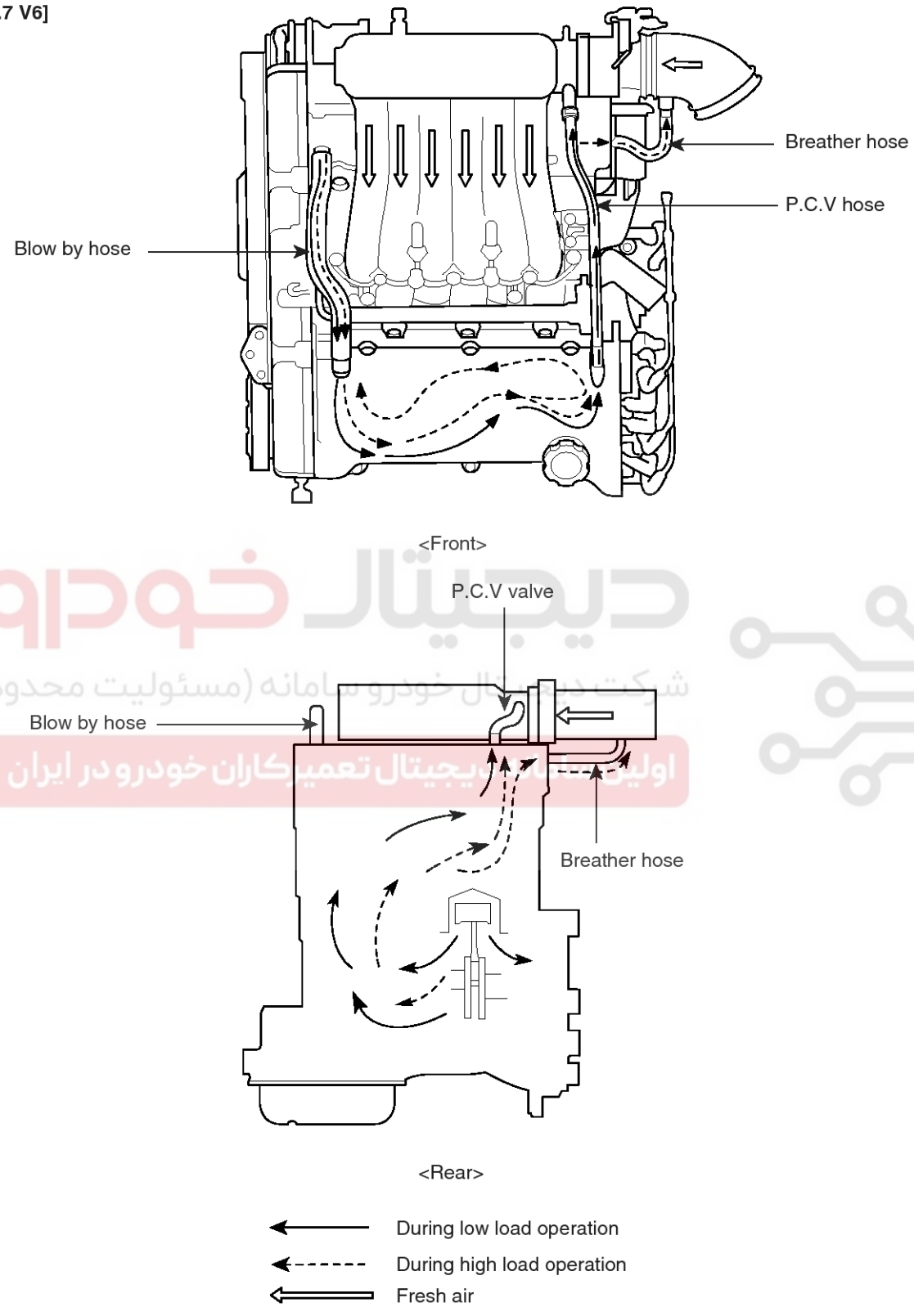
Crankcase Emission Control System

COMPONENTS LOCATION



LEIF603I

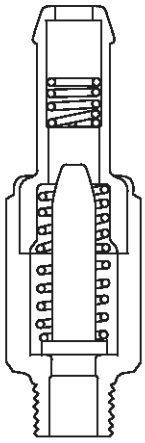
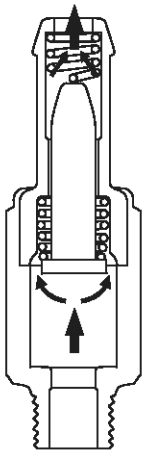
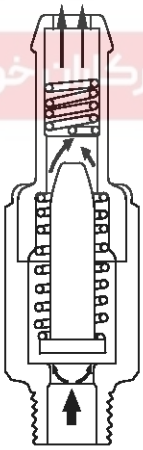
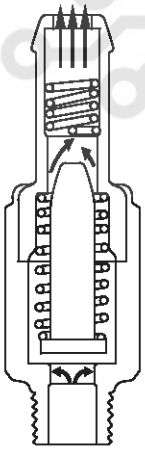
[2.7 V6]



LEIF013A

Positive Crankcase Ventilation (PCV) Valve

OPERATION

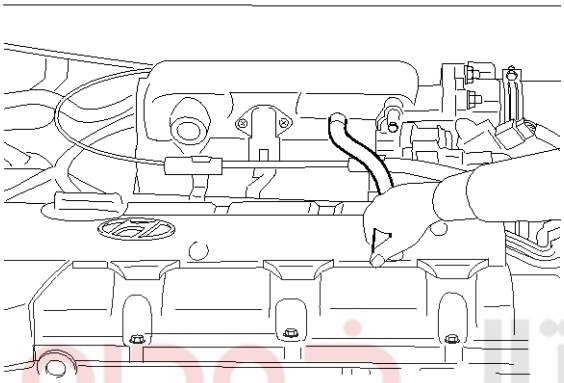
Intake manifold side (No vacuum)		Intake manifold side (High vacuum)	
 Rocker cover side		 Rocker cover side	
Engine condition	Not running	Engine condition	Idling or decelerating
PCV valve	Not operating	PCV valve	Fully operating
Vacuum passage	Restricted	Vacuum passage	Small
Intake manifold side (Moderate vacuum)		**Intake manifold side (Low vacuum)**	
 Rocker cover side		 Rocker cover side	
Engine condition	Normal operation	Engine condition	Accelerating and high load
PCV valve	Properly operating	PCV valve	Slightly operating
Vacuum passage	Large	Vacuum passage	Very large

REMOVAL

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.

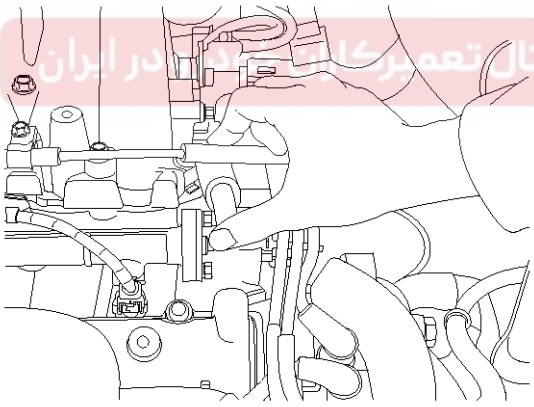
NOTICE

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



<2.0 DOHC>

LEIF603E



<2.7V6>

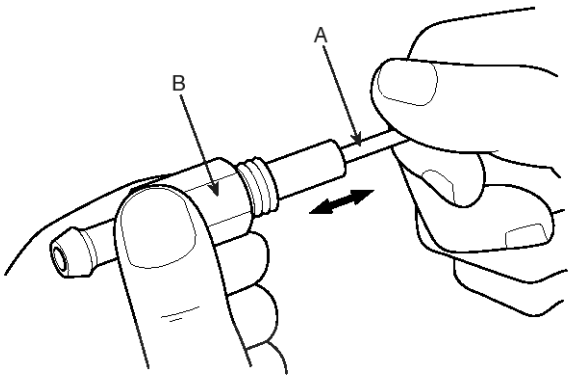
LEIF010B

INSTALLATION

Install the PCV valve and tighten to the specified torque.

INSPECTION

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.

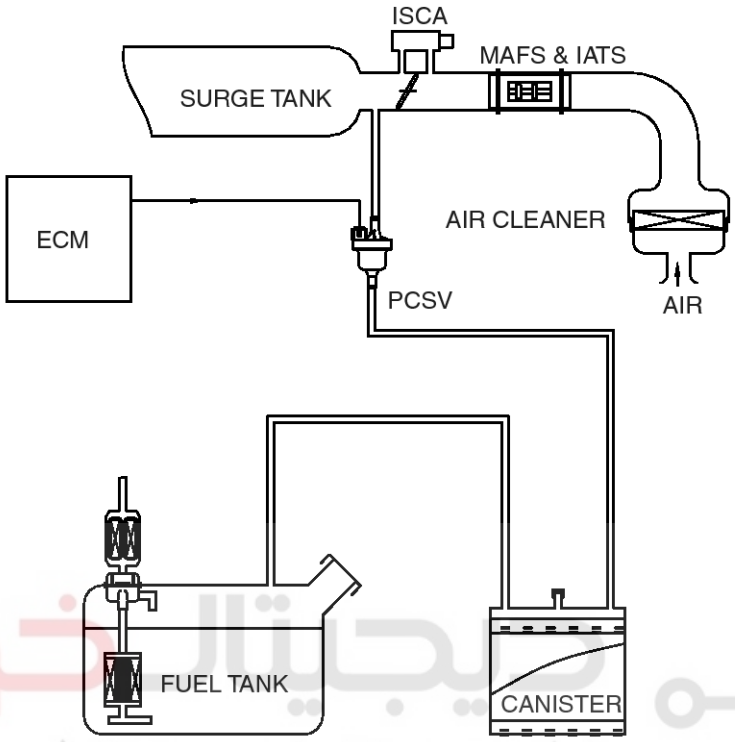


LEIF603J

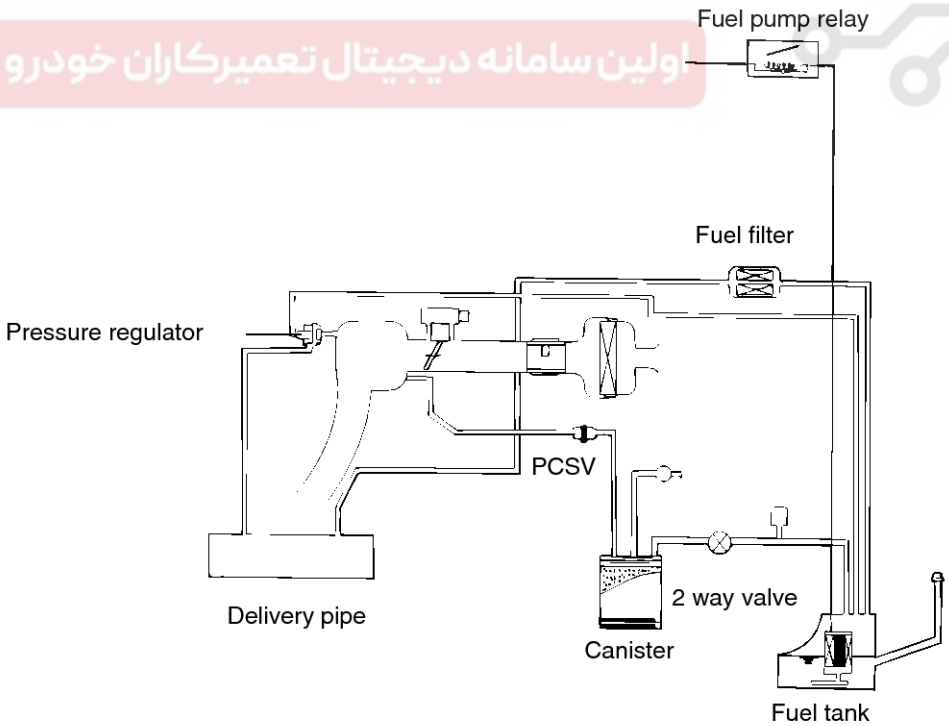
Evaporative Emission Control System

COMPONENTS

[2.0 DOHC]



[2.7 V6]



LEIF603F

INSPECTION

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		

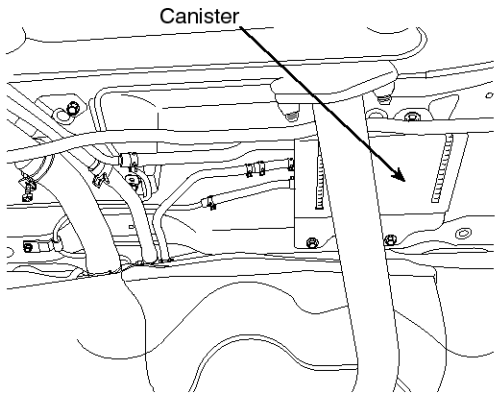
WHEN ENGINE IS WARM

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

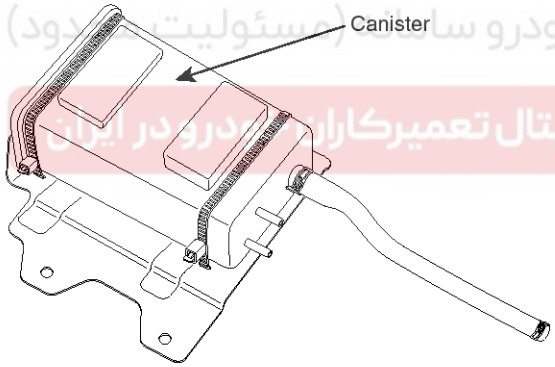
INSPECTION

1. Look for loose connections, sharp bends or damage to the fuel vapor lines.



LEIF013B

2. Look for distortion, cracks or fuel leakage.
3. After removing the EVAP. canister, inspect for cracks or damage.



LEIF002A

Purge Control Solenoid Valve (PCSV)

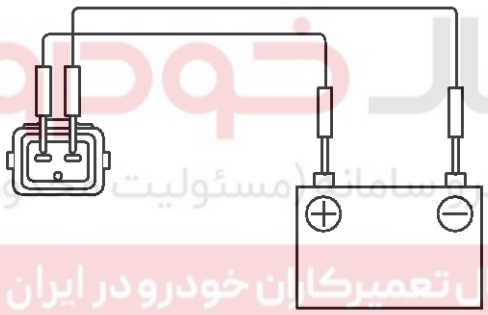
INSPECTION

NOTICE

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.

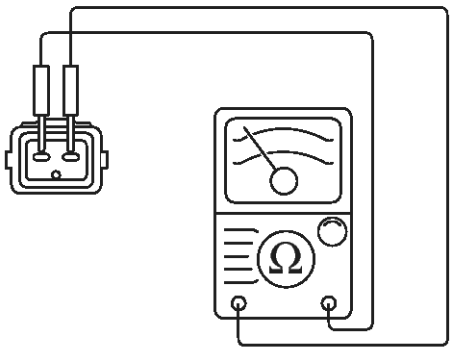
Battery voltage	Normal condition
When applied	Vacuum is released
When discontinued	Vacuum is maintained



LEIF603G

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

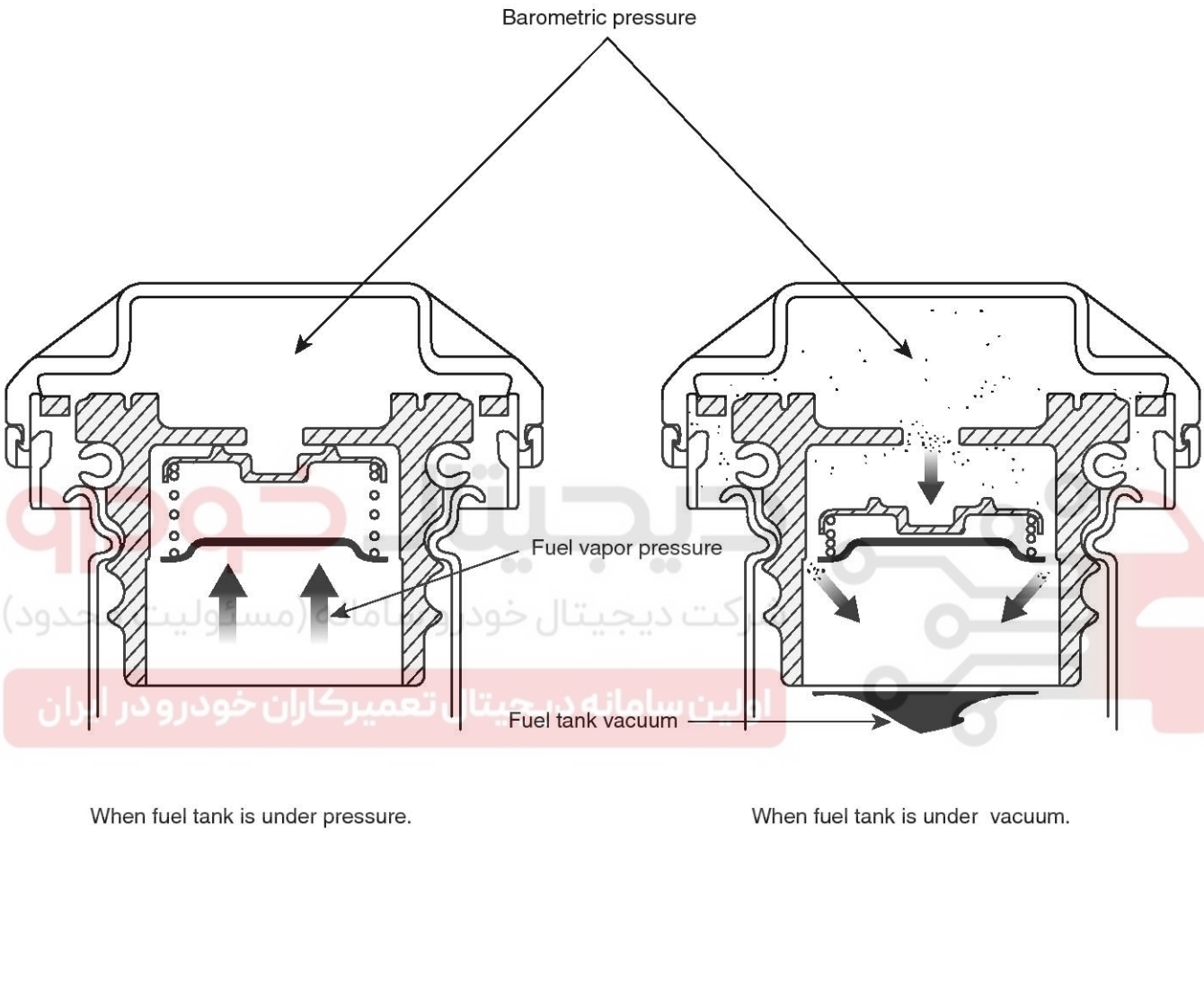
PCSV coil resistance (Ω):
24.5 ~ 27.5 Ω at 20℃ (68°F)



LEIF603H

Fuel Filler Cap

DESCRIPTION

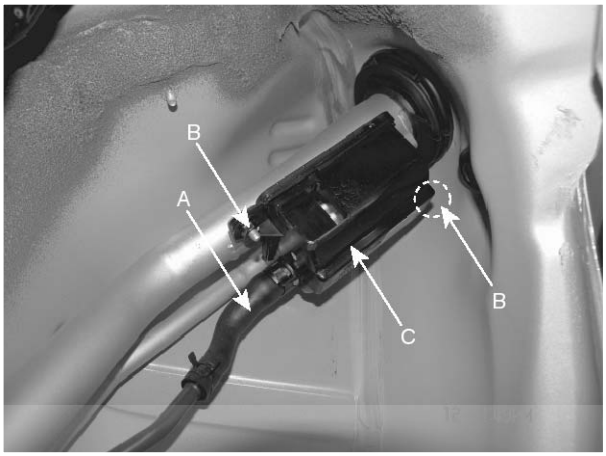


LEGE015A

Fuel Tank Air Filter

REPLACEMENT

1. Remove the rear-left wheel & tire, and then remove the inner wheel house cover.
2. Disconnect the vapor hose (A) from the fuel tank air filter (C).



SKMEC9000L

3. Remove the installation nuts (B), and then remove the fuel tank air filter (C) from the fuel fill-neck assembly.
4. Install a new fuel tank air filter.

Exhaust Emission Control System

DESCRIPTION

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]

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.

CVVT (Continuously Variable Valve Timing) System

DESCRIPTION

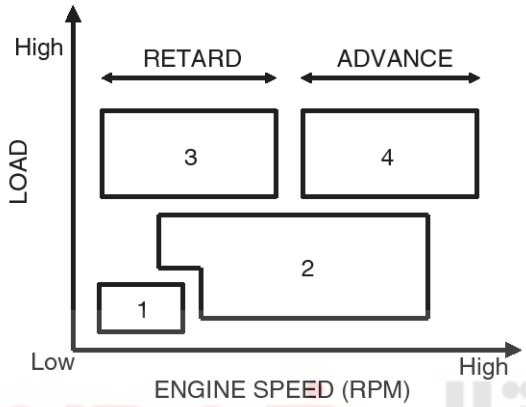
The CVVT (Continuously Variable Valve Timing) which is installed on the exhaust camshaft controls intake valve open and close timing in order to improve engine performance.

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

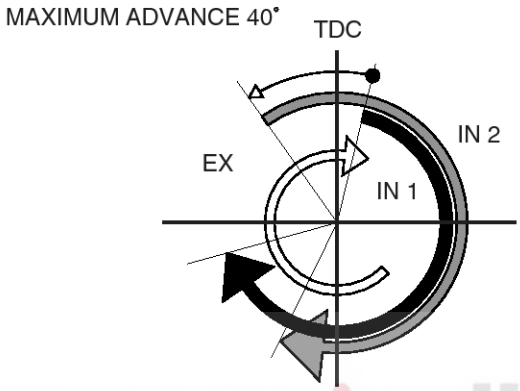
The CVVT system makes continuous intake valve timing changes based on operating conditions.

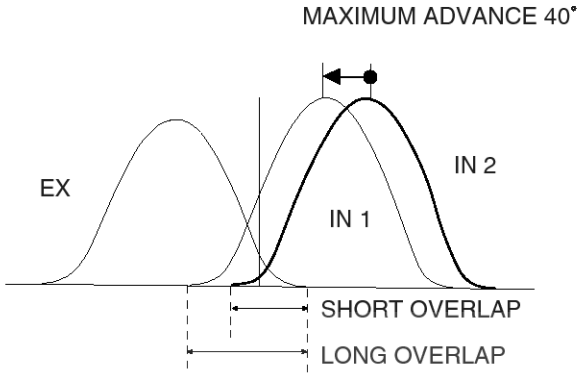
Intake valve timing is optimized to allow the engine to produce maximum power.

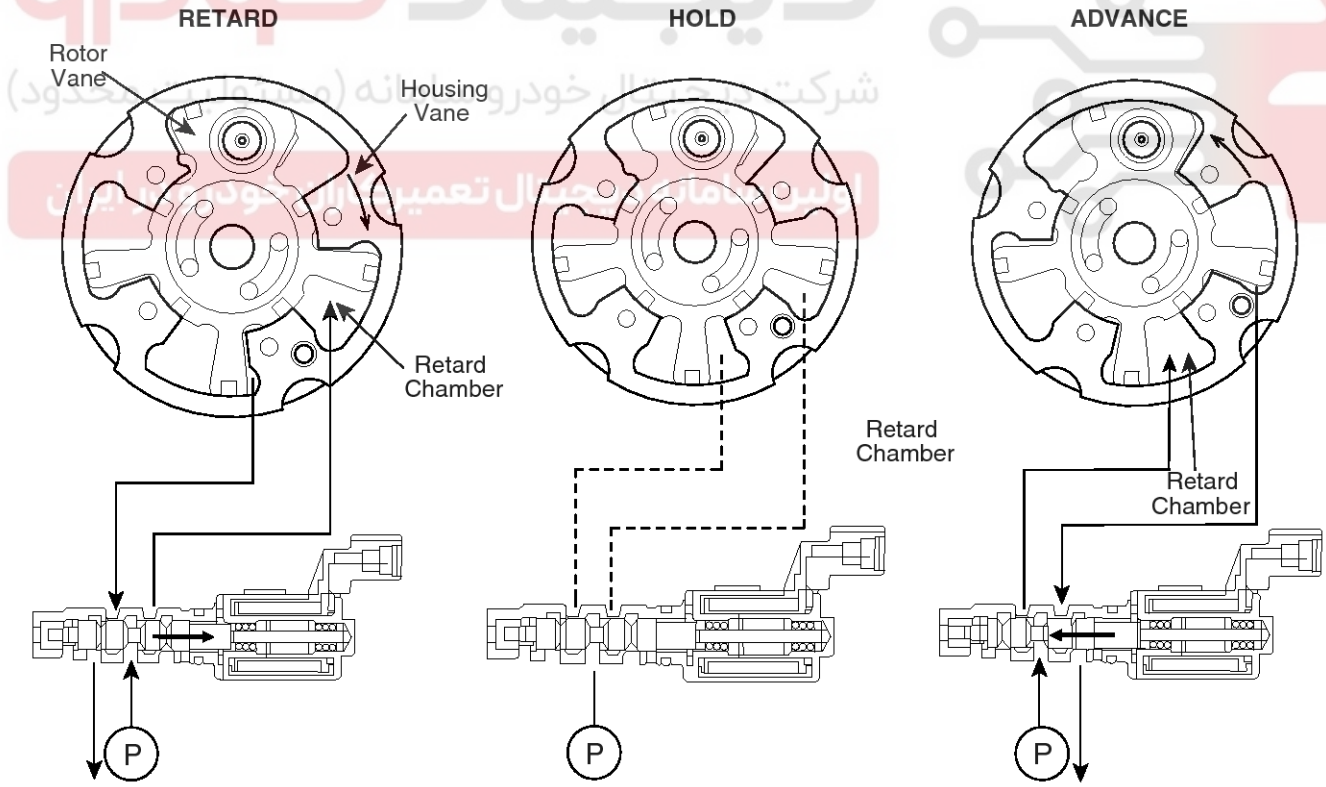
Cam angle is advanced to obtain the EGR effect and reduce pumping loss. The intake valve is closed quickly to reduce the entry of the air/fuel mixture into the intake port and improve the changing effect.

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.







LEIF001R

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).

COMPONENTS LOCATION [2.0 DOHC]