

FUEL SYSTEM

1628-04/2211-01/2211-05/2211-06/2221-01/2221-09/
2245-01/2245-02/

INDEX

ENGINE FUEL SYSTEM

GENERAL INFORMATION

1. SPECIFICATION.....	3
2. SYSTEM LAYOUT.....	4

OVERVIEW AND OPERATING PROCESS

1. OVERVIEW.....	6
2. COMPONENTS.....	8
3. SCHEMATIC DIAGRAM OF FUEL FLOWS.....	10
4. INPUT/OUTPUT DEVICES.....	11

REMOVAL AND INSTALLATION

1628-04 PURGE CONTROL SOLENOID VALVE.....	24
2245-02 INJECTOR ASSEMBLY.....	27
2245-01 FUEL FILTER.....	32
2211-01 FUEL TANK.....	35
2211-06 FUEL SENDER.....	40
2221-09 CHARCOAL CANISTER.....	44

CONFIGURATION

1628-04 PURGE CONTROL SOLENOID VALVE.....	12
2245-02 INJECTOR.....	13
2245-01 FUEL RAIL.....	15
2221-01 FUEL FILTER ASSEMBLY.....	16
2221-09 CHARCOAL CANISTER.....	18
2211-01 FUEL TANK.....	19
2211-06 FUEL PUMP ASSEMBLY.....	20
2211-05 SENDER ASSEMBLY.....	21

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



FUEL SYSTEM**2221-01****GENERAL INFORMATION****1. SPECIFICATION**

Unit		Specification
Fuel system	Fuel	Unleaded gasoline
	Fuel injection	MPI (Multi Point Injector) type
	Fuel supply	Returnless Fuel System
Fuel tank	Capacity	57 L
	Material	Plastic
	Fuel sender	Dual sender type
Fuel filter	Service interval	Change every 100,000 km
Fuel pump	Pressure	3.8 bar
Injector	Color	Black
	Capacity	187.2 g/min

درجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

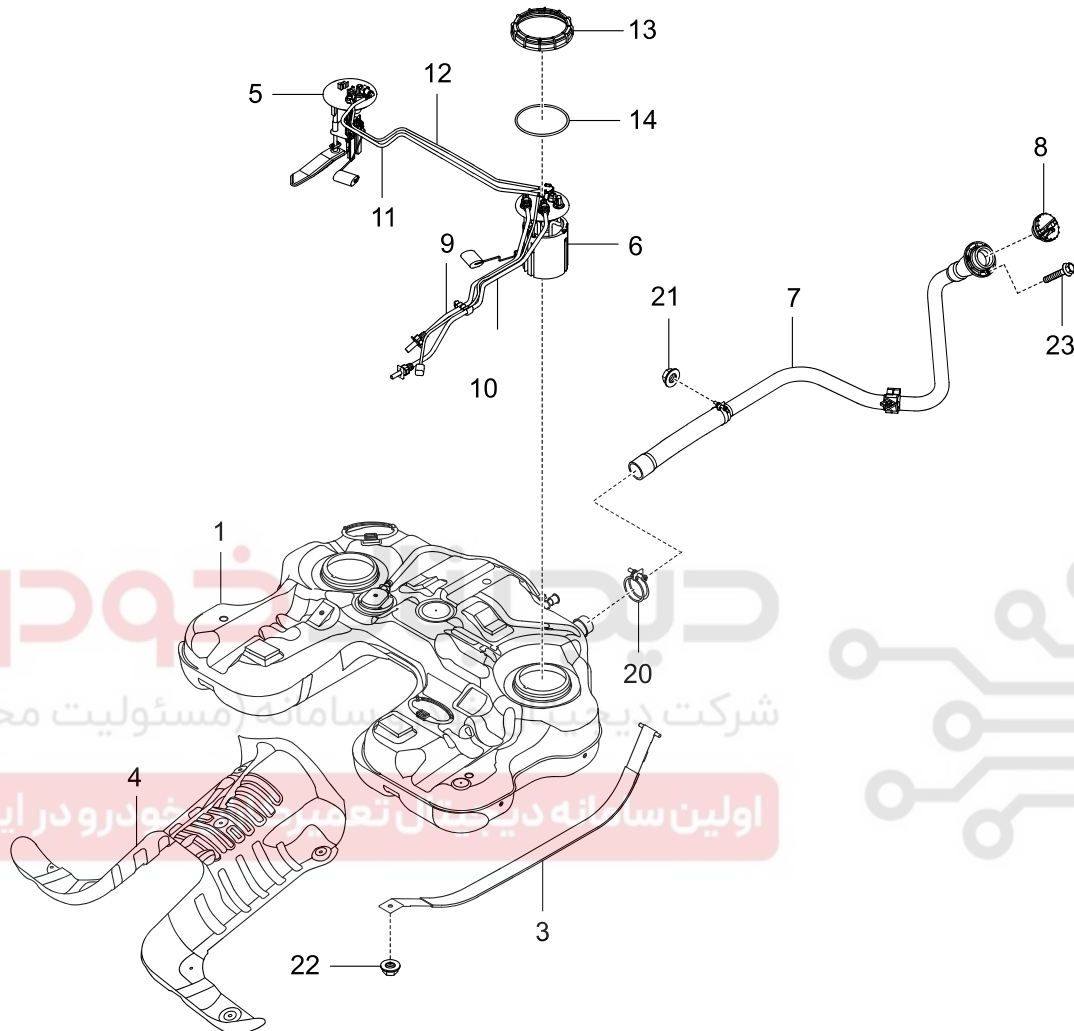
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

Modification basis	
Application basis	
Affected VIN	

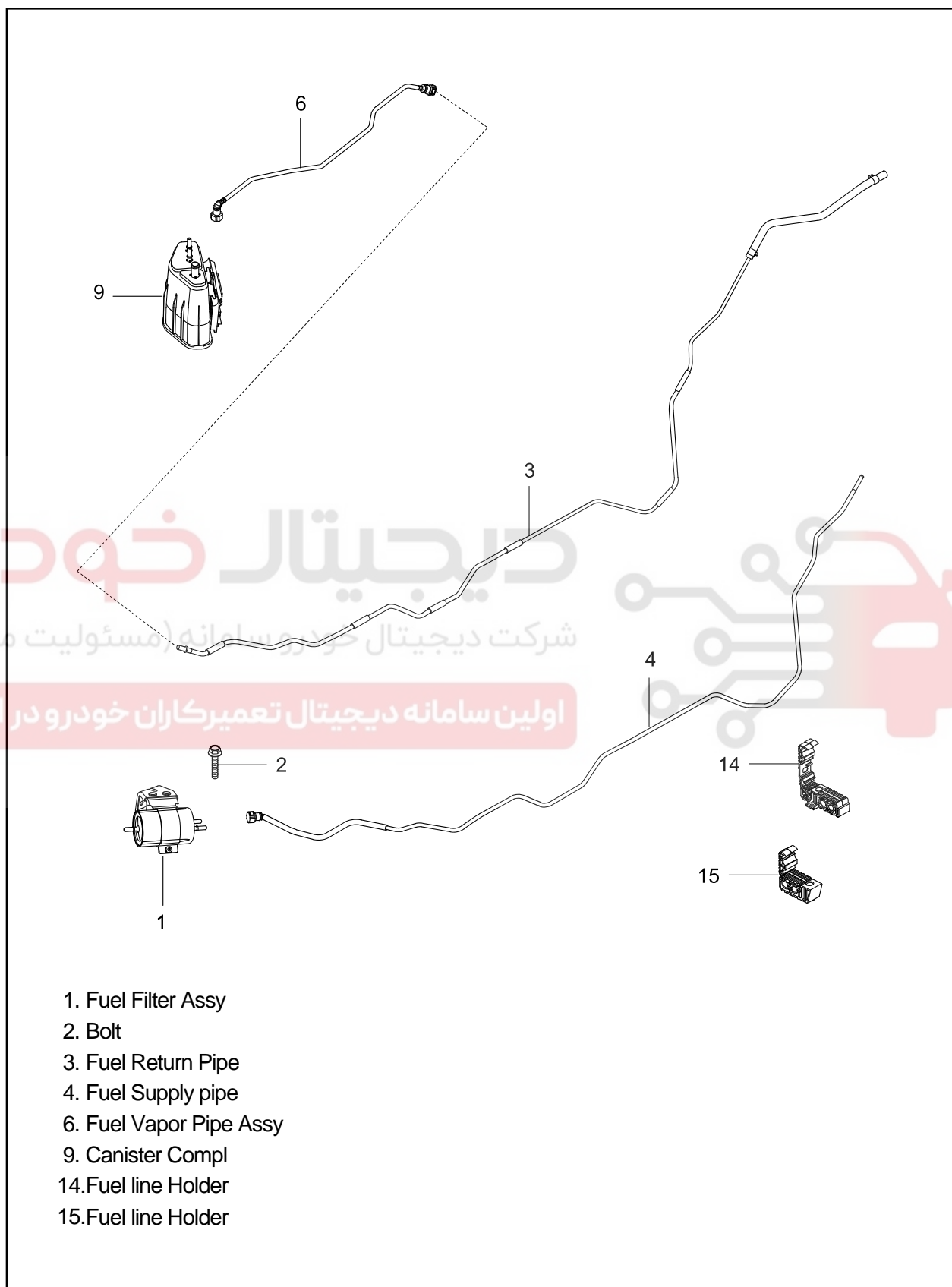
FUEL SYSTEM

KORANDO 2013.08

2. SYSTEM LAYOUT



- | | |
|-------------------------|---------------------------|
| 1. Fuel tank assy | 11. Suction tube assy |
| 3. Fuel tank strap assy | 12. Harness wiring assy |
| 4. Heat shield assy | 13. Fuel pump plate cover |
| 5. Sub sender assy | 14. O-ring |
| 6. Main fuel pump assy | 20. clamp |
| 7. Fuel filler assy | 21. Nut |
| 8. Fuel filler cap assy | 22. Nut |
| 9. Feed tube assy | 23. Screw |
| 10. Return tube assy | |



Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08

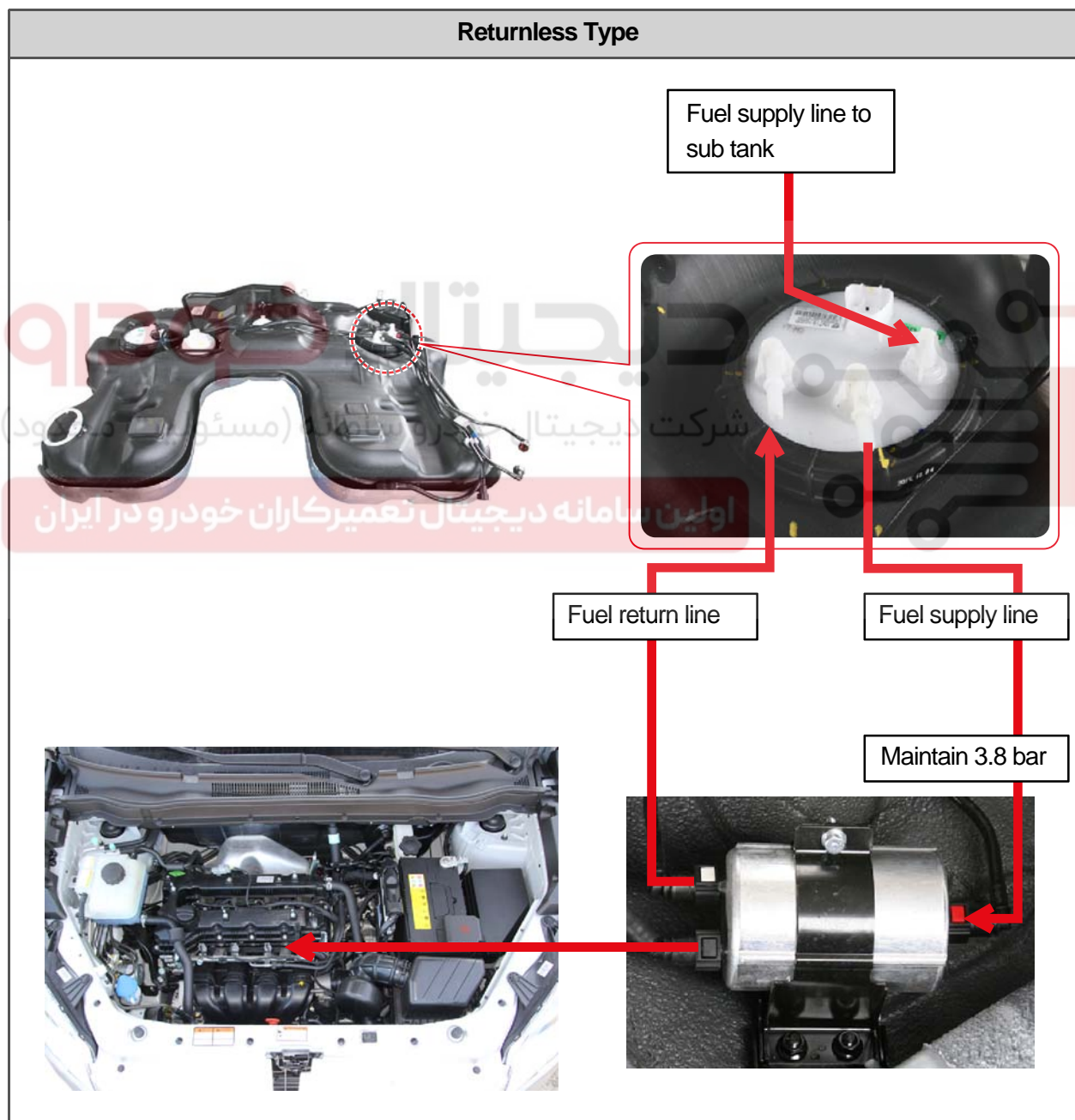
OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

The fuel system is a returnless type that the fuel pressure regulator is mounted inside the fuel tank.

The engine ECU controls the fuel injection in each injector electronically.

According to the engine loads, the engine ECU draws or cuts off the evaporated gas in canister into the combustion chamber. The fuel system consists of fuel tank, fuel lines, fuel pump and fuel pressure regulator.

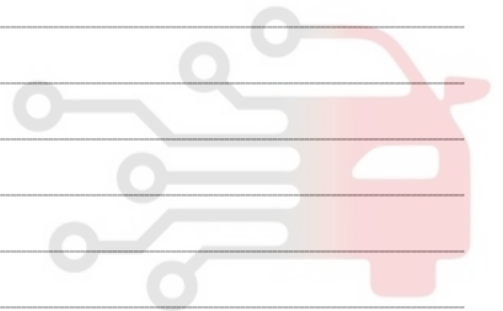


Memo

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



2. COMPONENTS

Canister



Fuel filter



Fuel pump and fuel sender assembly



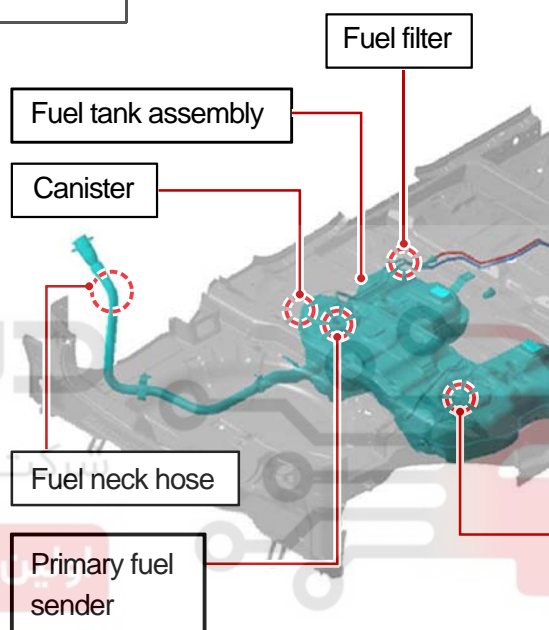
Fuel tank assembly

Canister

Fuel filter

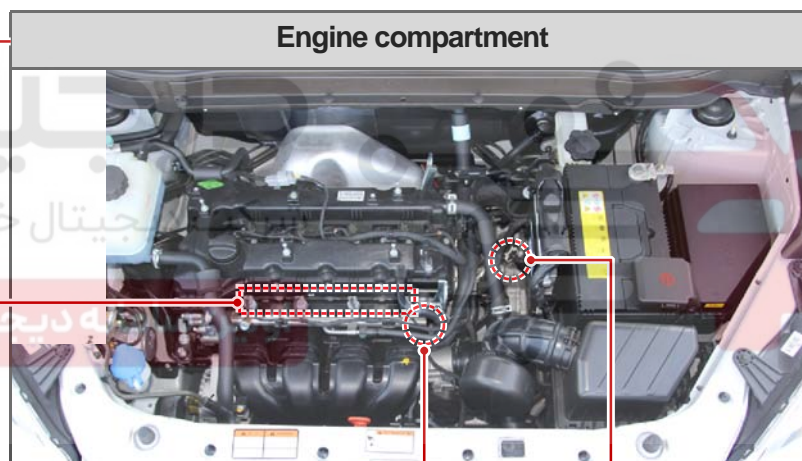
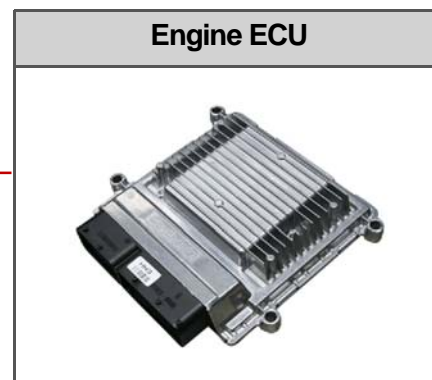
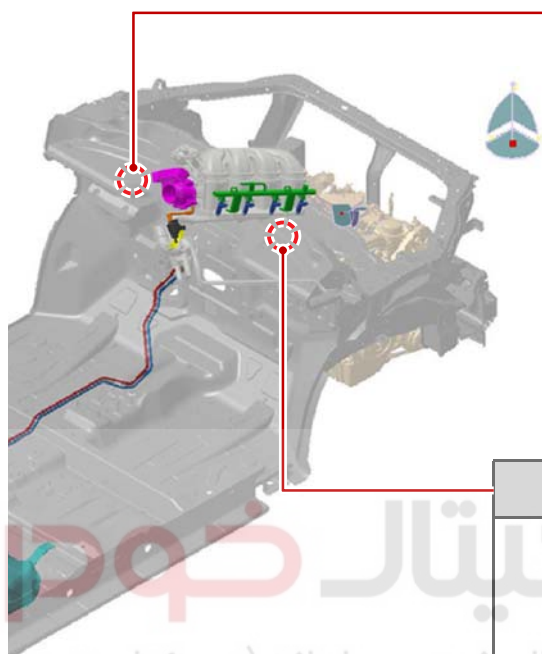
Fuel neck hose

Primary fuel sender

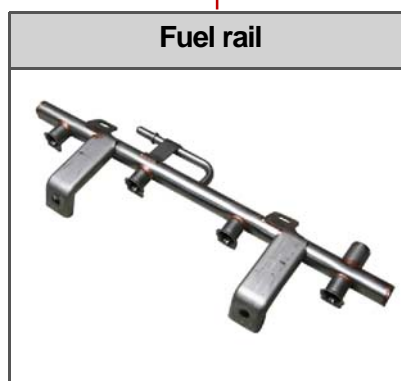


Fuel tank assembly



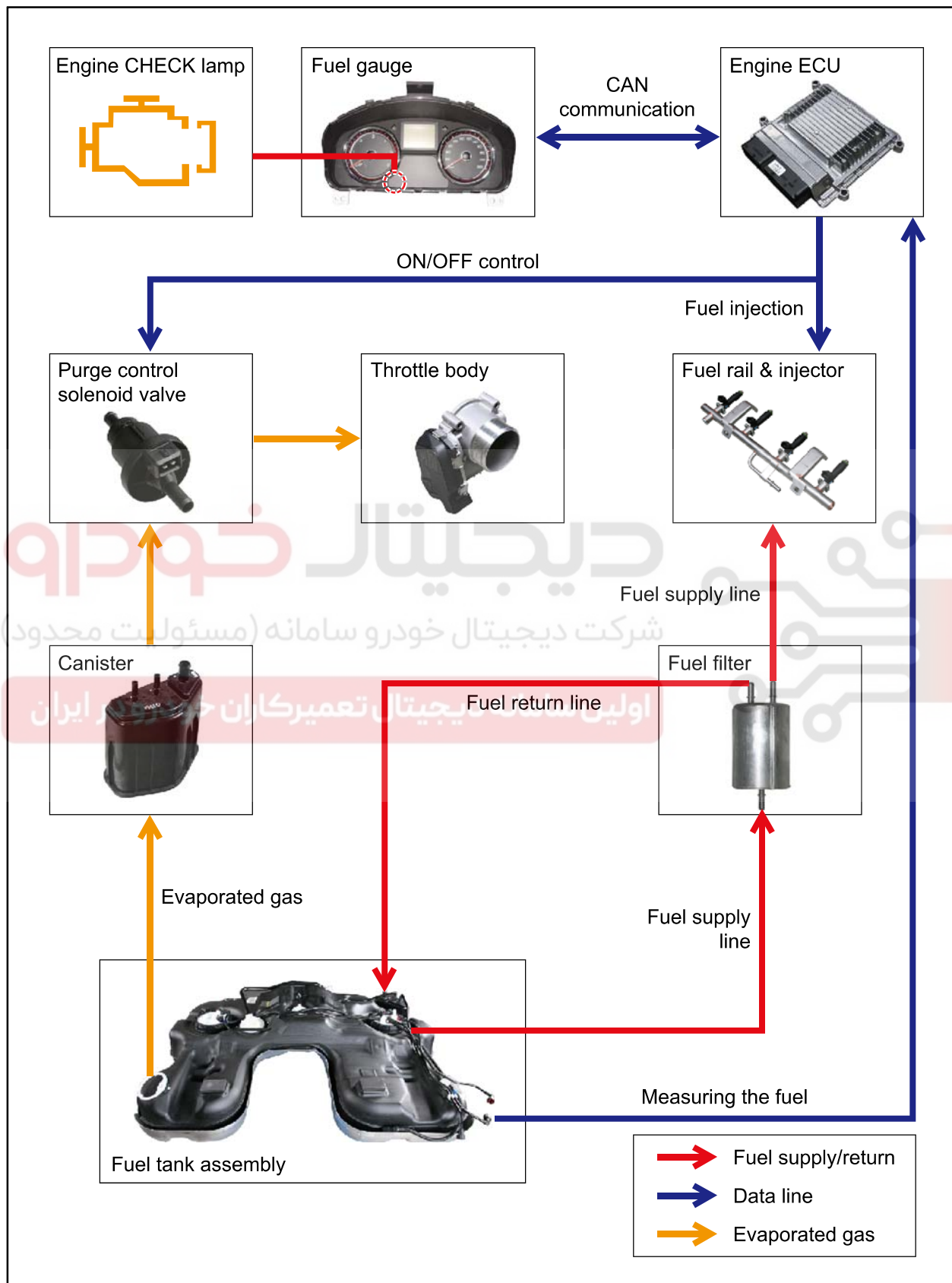


Secondary fuel sender

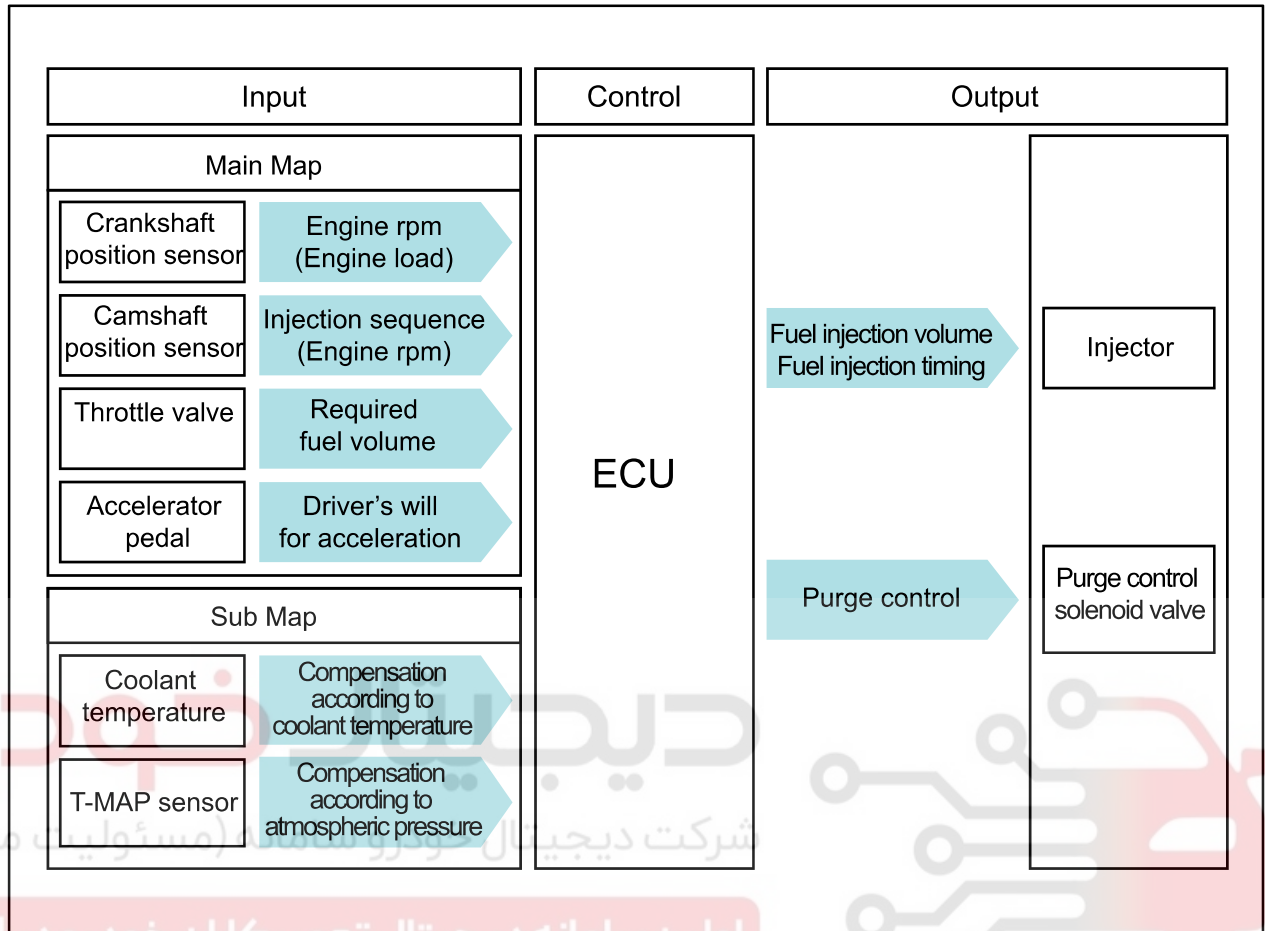


Modification basis	
Application basis	
Affected VIN	

3. SCHEMATIC DIAGRAM OF FUEL FLOWS



4. INPUT/OUTPUT DEVICES



The engine ECU calculates the accelerator pedal based on the input signals from various sensors, and controls the overall operation of the vehicle.

The ECU receives the signals from various sensor through data line, and performs effective air/fuel ratio control based on these signals.

Modification basis	
Application basis	
Affected VIN	

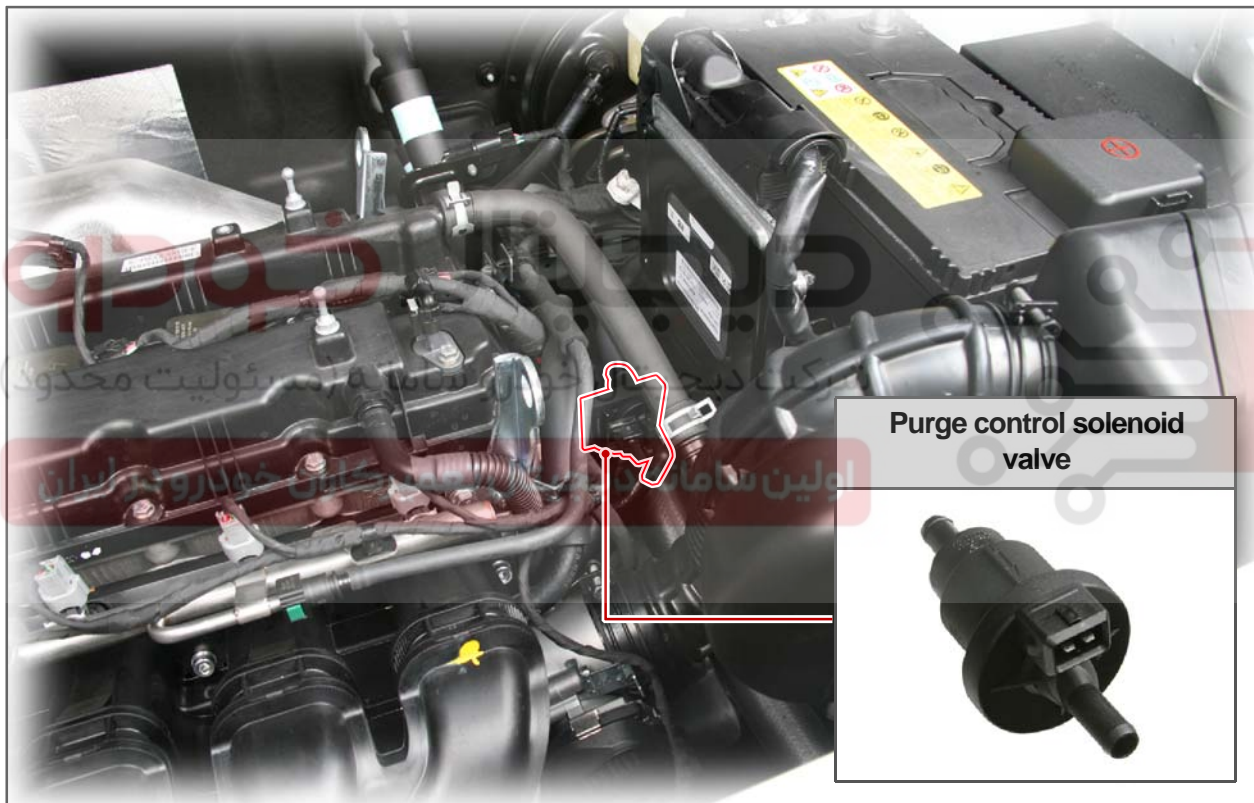
CONFIGURATION

S.G.N. 1628-04 PURGE CONTROL SOLENOID VALVE

1) Overview

The purge control solenoid valve is mounted on the enclosed vacuum line between the canister and intake manifold, and opens or closes the vacuum line according to the engine load conditions.

When the engine reaches normal operating temperature (80°C) or exceeds the idling speed, the engine ECU operates the purge control solenoid valve. Then, the purge control solenoid valve opens the vacuum line to send the evaporated gas in canister to the combustion chamber through the intake manifold.



S.G.N.

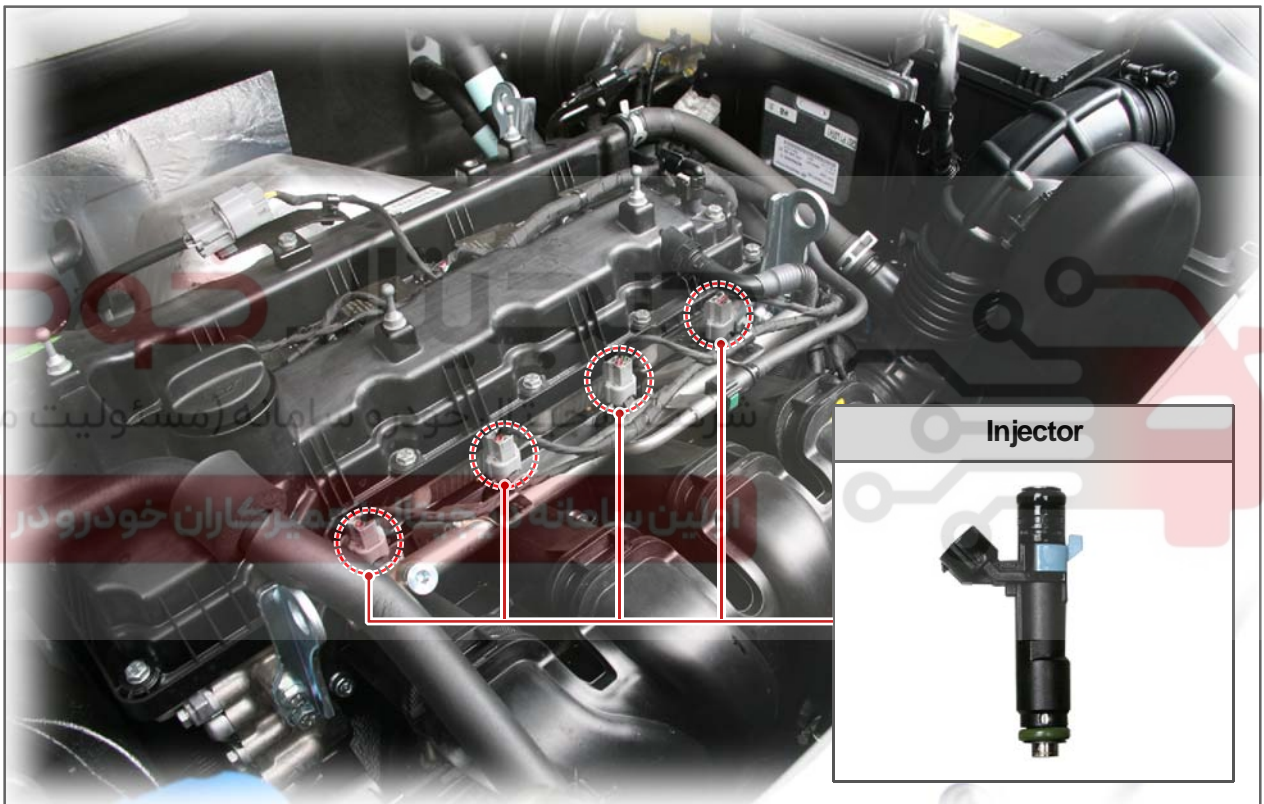
2245-02 INJECTOR**1) Overview**

The engine ECU controls the injectors according to the various signals such as piston position and engine rpm. When the engine ECU sends the injection command to the injector in accordance with the injection timing, the solenoid valve in injector is magnetized and open to inject the fuel into the combustion chamber.

Fuel injection sequence: 1-3-4-2

Proper mass flow: 187.2 g/min

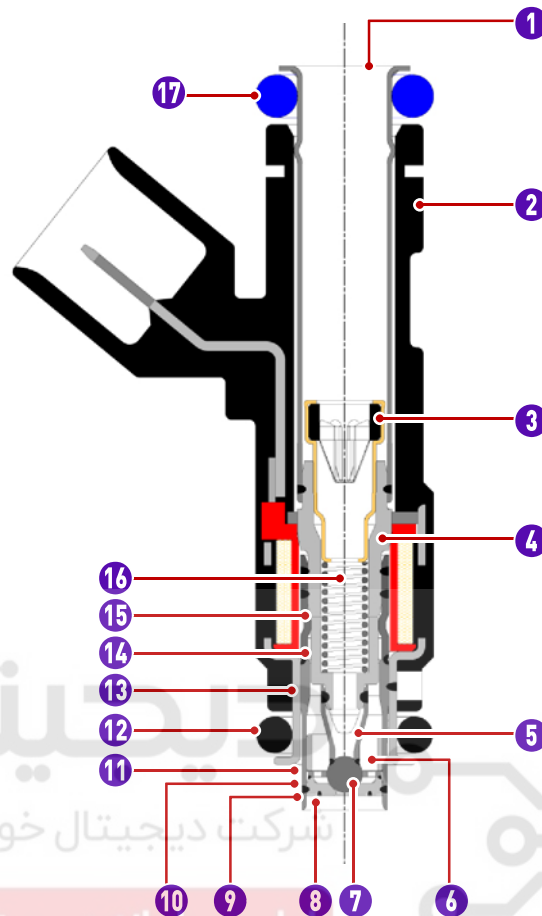
Internal resistance: 14.5Ω (20°C)

ENGINE
GENERALENGINE
ASSEMBLYINTAKE
SYSTEMFUEL
SYSTEMEXHAUST
SYSTEMIGNITION
SYSTEMLUBRICAT
IONCOOLING
SYSTEMCHARGE
SYSTEMSTARTIN
GCRUISE
CONTROLENGINE
CONTROL

Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08



1. Inlet tube
2. Housing
3. Filter & adjusting tube
4. Pole piece
5. Armature tube
6. Seat sleeve
7. Ball
8. Orifice
9. Seat

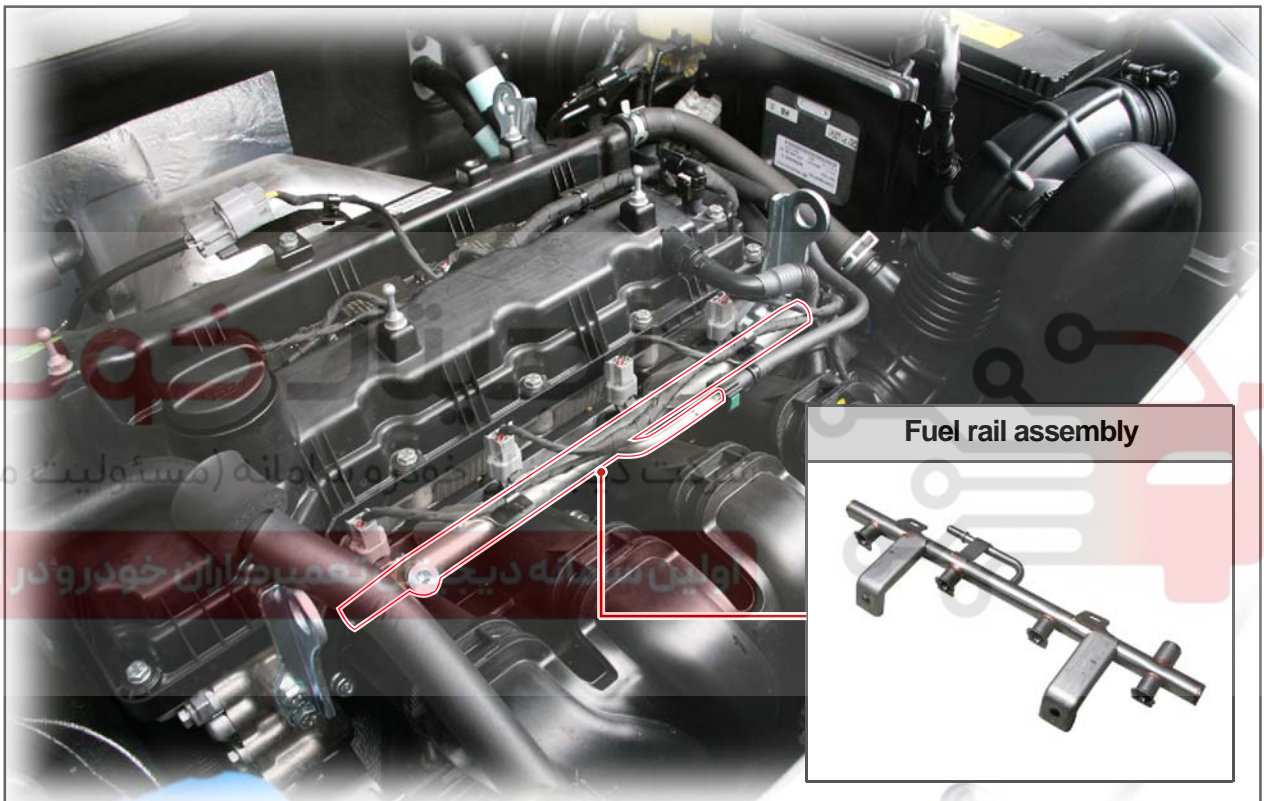
10. Lower guide
11. Lower screen
12. Lower external O-ring
13. Valve body
14. Armature
15. Non-magnetic cell
16. Spring
17. Upper external O-ring

S.G.N.

2245-01 FUEL RAIL**1) Overview**

The fuel rail is installed on the intake manifold. It contains four injectors and is the passage of fuel from the fuel pump.

- Specified fuel pressure: 3.8 ~ 4 bar
- Fuel pressure at ignition switch ON from OFF: 3.4 bar
- Remaining pressure in 30 minutes after key OFF : over 2.5 bar
- Fuel pump performance value: 35sec / 1ℓ

ENGINE
GENERALENGINE
ASSEMBLYINTAKE
SYSTEMFUEL
SYSTEMEXHAUST
SYSTEMIGNITION
SYSTEMLUBRICAT
IONCOOLING
SYSTEMCHARGE
SYSTEMSTARTIN
GCRUISE
CONTROLENGINE
CONTROL

Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08

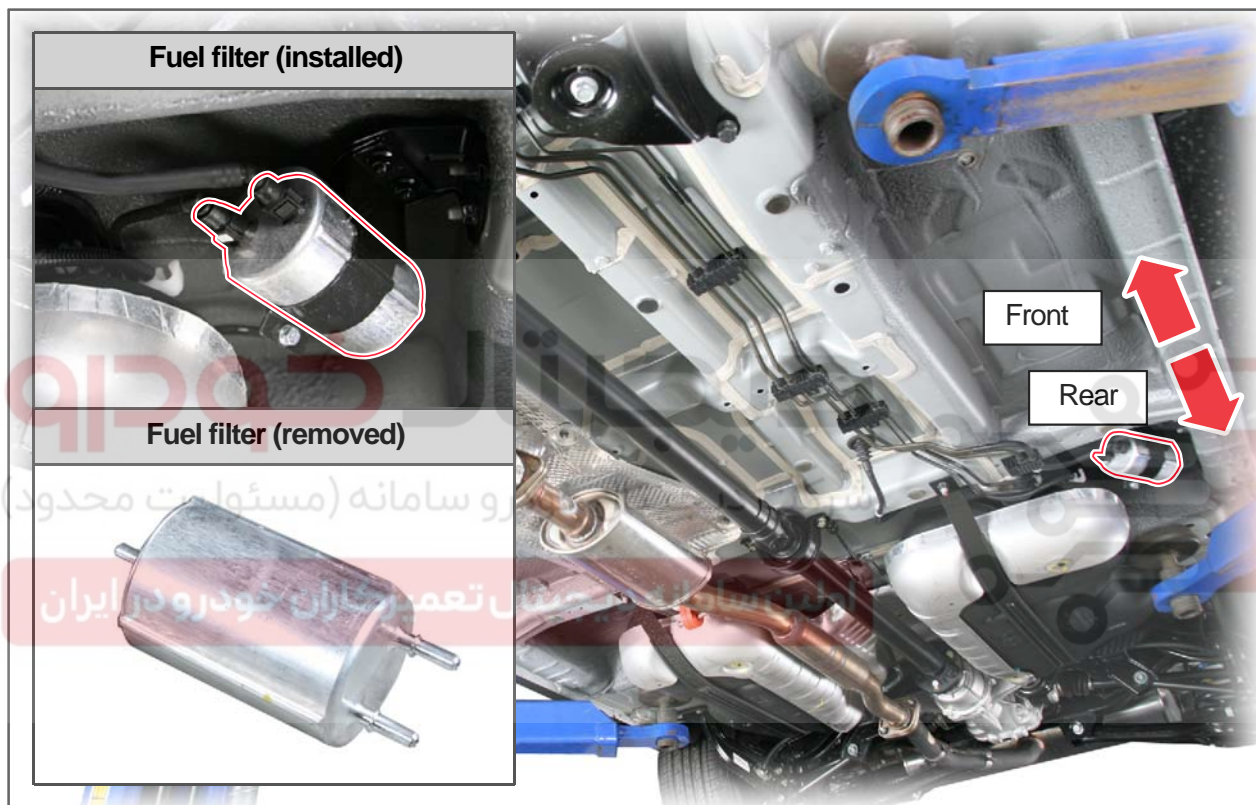
2221-01 FUEL FILTER ASSEMBLY

1) Overview

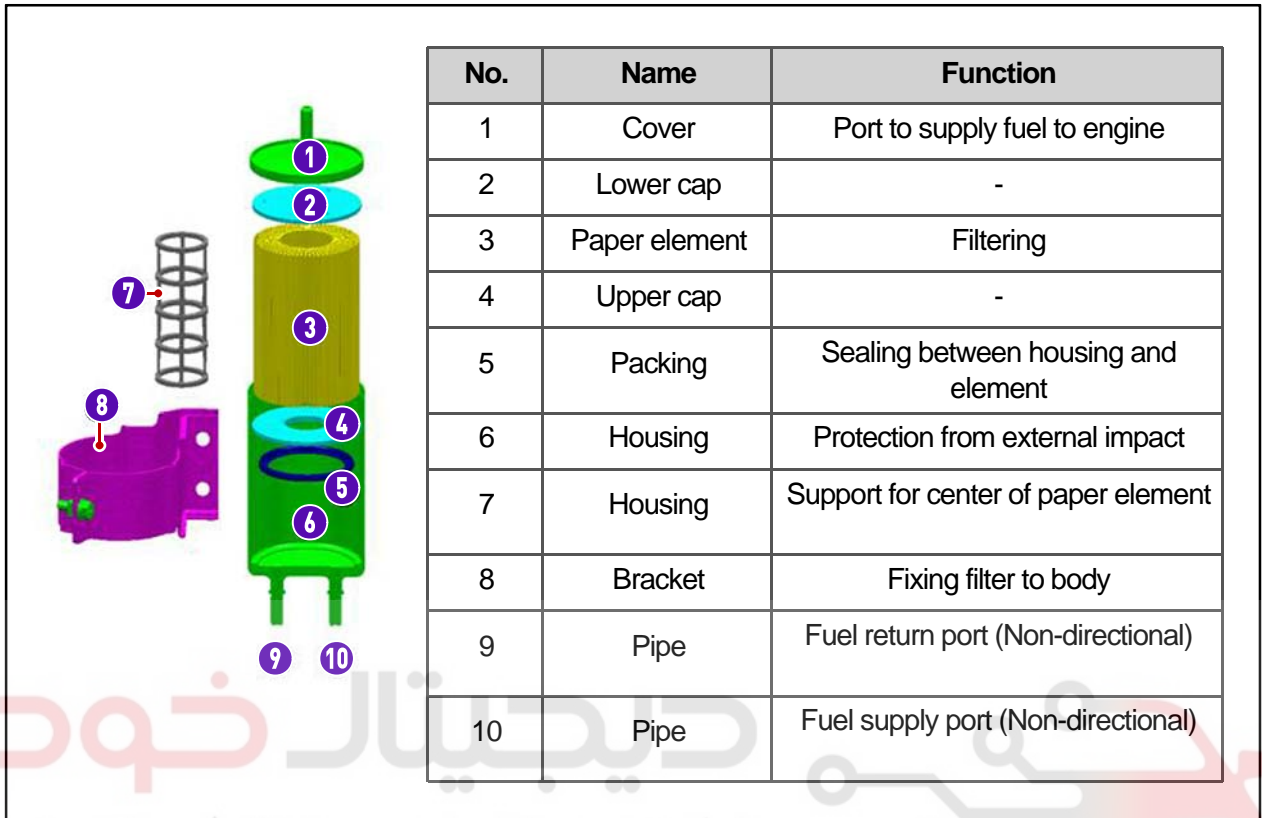
The fuel filter filters the water and dirt in fuel to prevent the engine disorder and wear of engine components. The fuel filter should be changed in specified service interval.

If the fuel filter has been used for an extended period of time, it could be clogged by dirt and foreign materials, resulting in cutting off of the fuel supply. Also, if foreign materials are delivered to the injector with the fuel may result in engine starting failure or engine disorder.

The fuel filter element is a micro type filter made by paper.



2) Components



شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

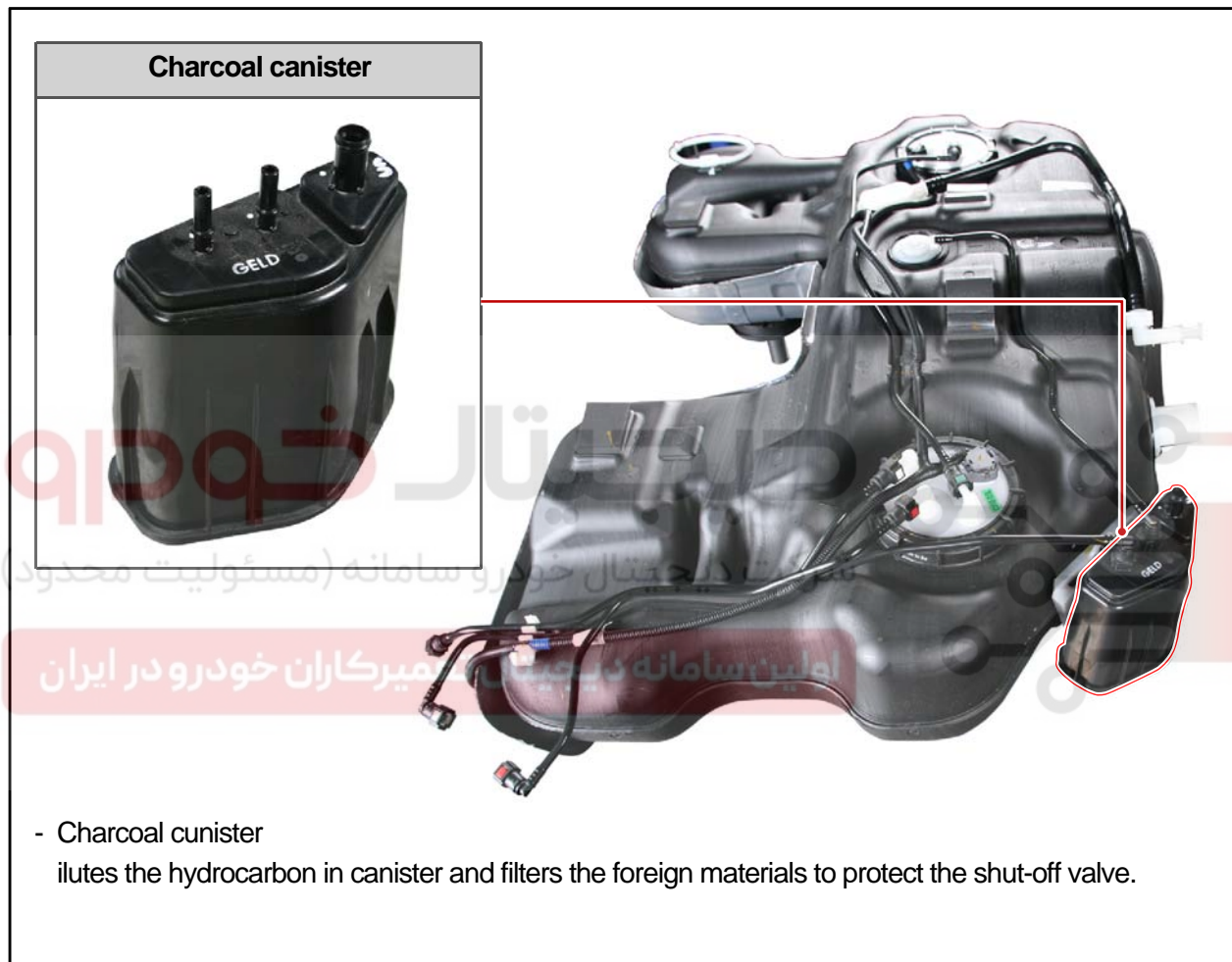
KORANDO 2013.08

2221-09 CHARCOAL CANISTER

1) Overview

The charcoal canister is installed on the side wall of fuel tank. It collects the evaporated gas from the fuel system. It draws and accumulates the evaporated gas from the fuel tank into the canister with charcoal, and send the gas to the intake system when the engine is running.

The air filter in canister dilutes the hydrocarbon (HC) and filters the foreign materials.



S.G.N.

2211-01 FUEL TANK**1) Overview**

To get the enough space for the propeller shaft in 4WD vehicle, the fuel tank is made in A-shape. It is made by plastic to prevent the corrosion. The fuel sender in each tank measures the fuel level by itself. The fuel in sub tank is transferred to the main pump through the jet valve in main sender. The permissible pressure in fuel tank is double (at least 0.3 bar) of the operating pressure. To avoid excessively high pressure, there are cap and safety valve.



Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08

S.G.N.

2211-06 FUEL PUMP ASSEMBLY**1) Overview**

The fuel pump is located inside of fuel tank and operated by the engine ECU.

The fuel pump can be operated after turning the ignition switch to ON (approx. 1~2 seconds). To keep the fuel pressure in fuel system to 3.7 ~ 4.1 bar during engine running, the fuel pressure regulator is integrated in the fuel pump.

**► Requirements**

Description	Specification
System pressure	3.8 bar
Operating voltage	12 V
Operating current	6.7 A
Operating temperature	-30°C ~ 70°C
Minimum delivering volume	114 ℓ/h (12 V, 3.8 bar, -30°C ~ 70°C)

S.G.N.

2211-05 SENDER ASSEMBLY

1) Overview

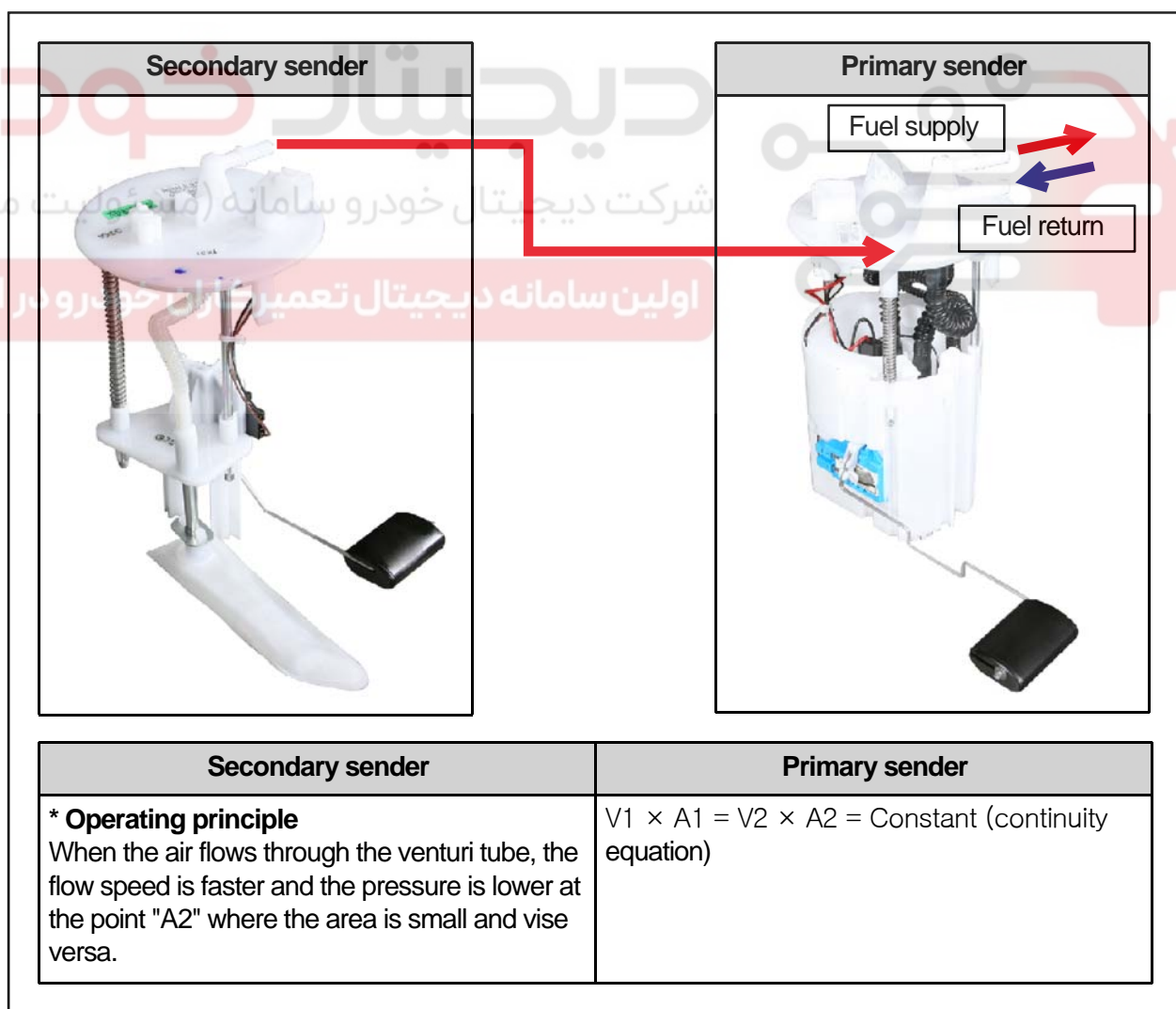
The fuel tank is divided in main tank and sub tank, and each tank has its own fuel sender (dual sender system). The fuel in sub tank is drawn into the main tank by venturi operation of orifice in jet pump of primary sender.

2) Operation Process

► Fuel Sender

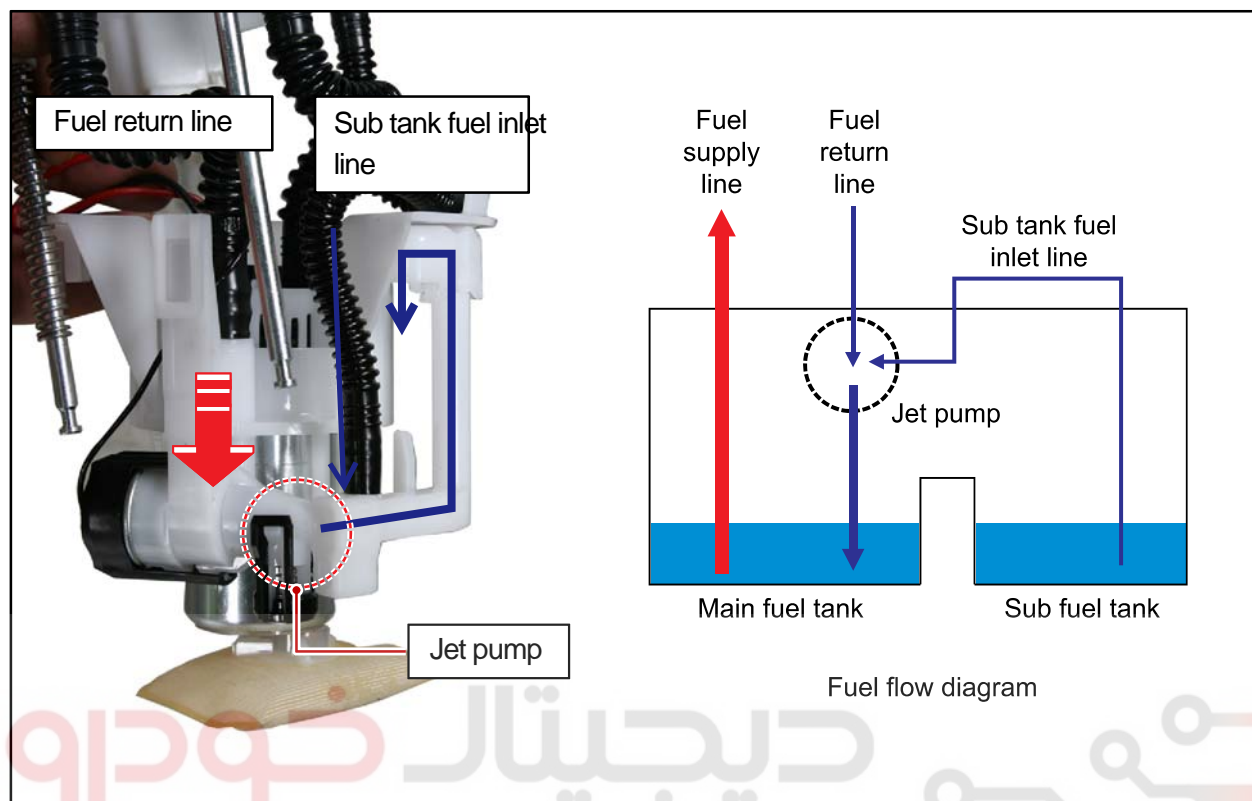
Fuel sender: The circuits of main sender and sub sender are parallel to each other. And the module in the instrument cluster displays the amount of remaining fuel by calculating the resistance value from the sender when the ignition switch is ON.

Low fuel level warning lamp : This warning lamp comes on when the fuel volume in the fuel tank becomes 10 L. The pointer on the instrument cluster returns to zero after the ignition is turned OFF.



Modification basis	
Application basis	
Affected VIN	

► Basic Principle of Jet Pump



شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

► Pin Arrangement



Pin No.	Function
1	Gauge, ground (-)
2	Gauge Unit (+)
3	Pump (+)
4	Pump (-)

► Resistance Value of Fuel Sender

Gauge pointer	Fuel tank capacity (L)	Unit resistance (Ω)	Combined resistance (Ω)
S / F	58.8	20.3 ± 1	38.0 ± 2
G / F	57.0	20.3 ± 1	54.3 ± 2
7 / 8	51.0	20.3 ± 1	78.8 ± 2
8 / 8	45.0	20.3 ± 1	103.3 ± 2
9 / 8	39.0	20.3 ± 1	127.8 ± 2
1 / 2	33.0	20.3 ± 1	152.3 ± 2
3 / 8	27.0	44.6 ± 1	176.2 ± 2
2 / 8	21.0	69.1 ± 1	201.3 ± 2
1 / 8	15.0	93.6 ± 1	225.8 ± 2
W'G	9.6	118.1 ± 1	250.3 ± 2
G / E	6.6	134.1 ± 1	266.7 ± 2
S / E	4.8	150.8 ± 1	283.0 ± 2

Modification basis	
Application basis	
Affected VIN	

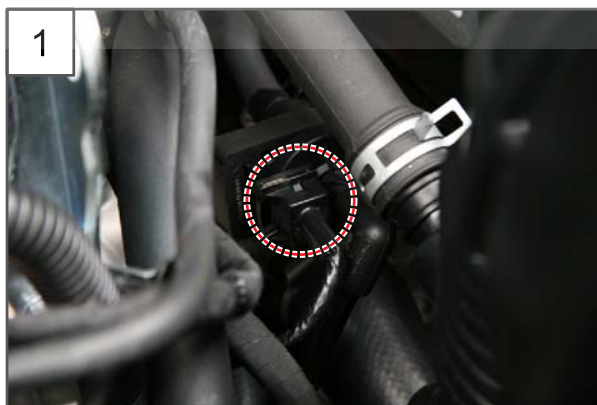
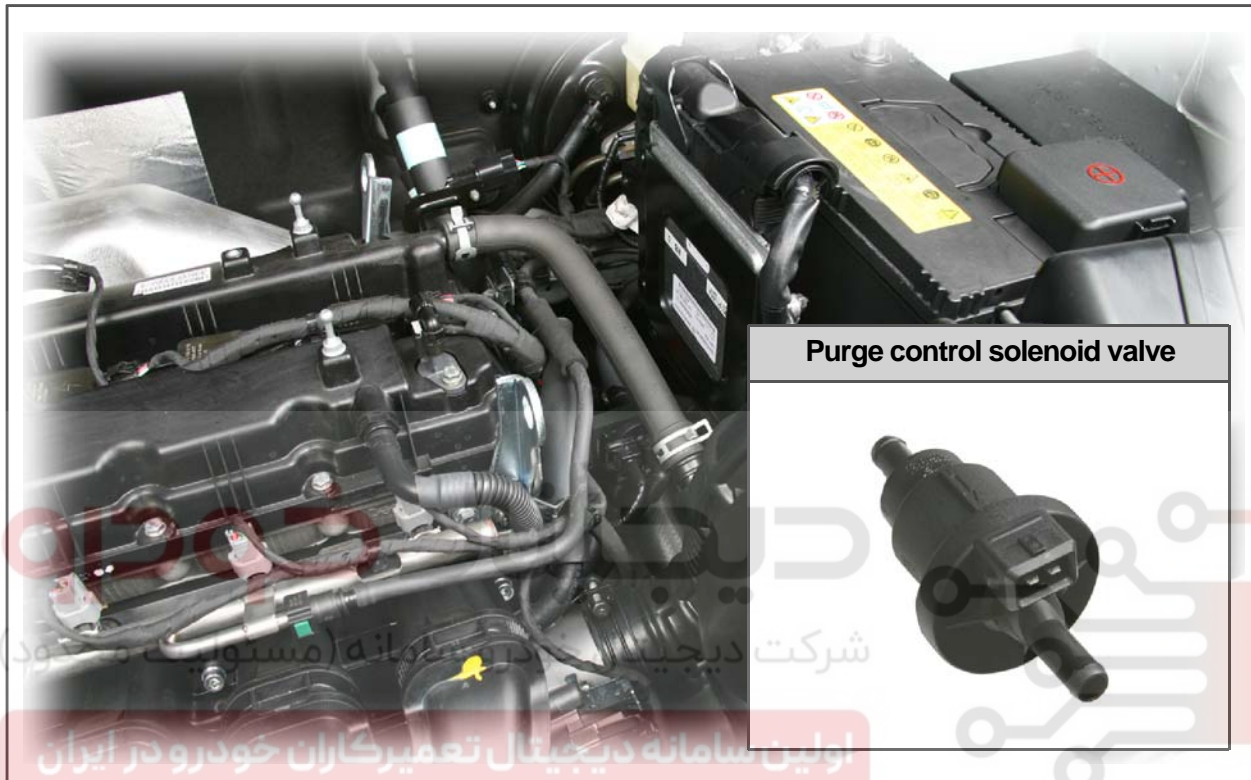
REMOVAL AND INSTALLATION

S.G.N.

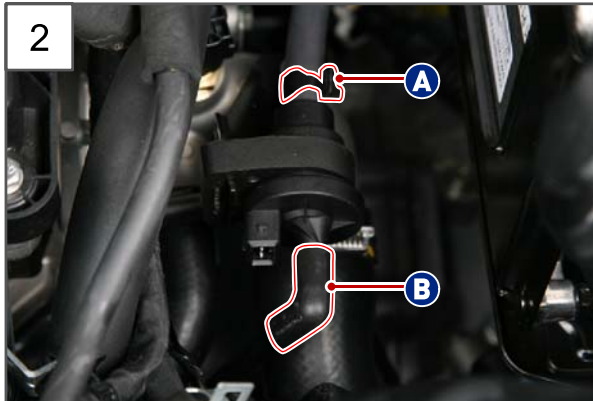
1628-04 PURGE CONTROL SOLENOID VALVE

Preceding work

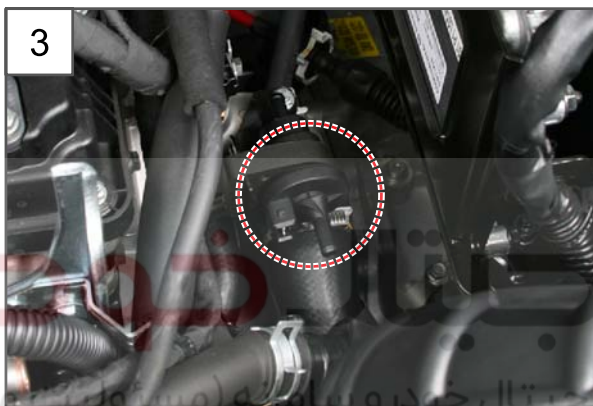
- Disconnect the negative cable from the battery.
- Remove the engine acoustic cover.



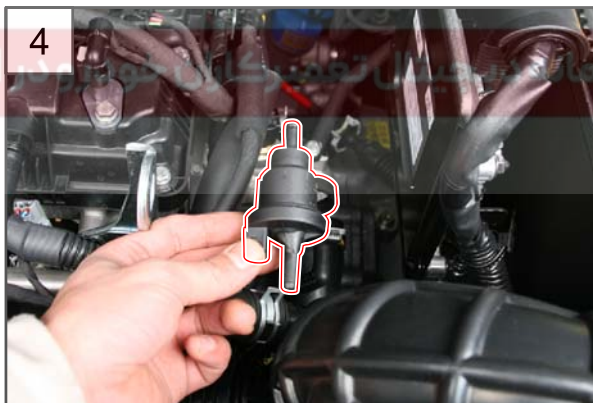
1. Disconnect the purge control solenoid valve connector.



2. Separate the hose (A) to canister and the hose (B) to intake manifold from the purge control solenoid valve.



3. Separate the purge control solenoid valve from the mounting rubber.



4. Remove the purge control solenoid valve.



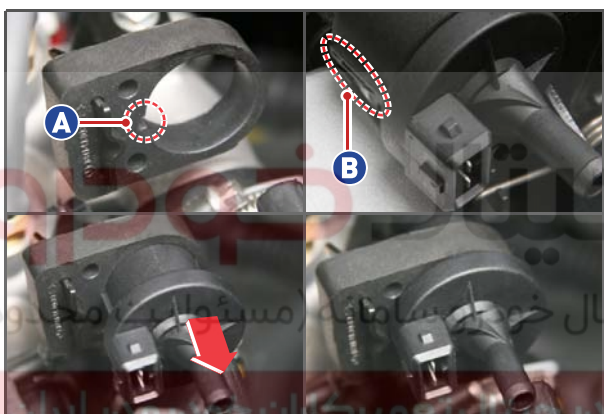
5. Install the purge control solenoid valve in the reverse order of removal.

Modification basis	
Application basis	
Affected VIN	

Cautions when installing



- The arrow mark on the valve should face toward intake manifold.



- Align the groove (A) in mounting rubber with the arrow mark (B) on the purge control solenoid valve.

S.G.N.

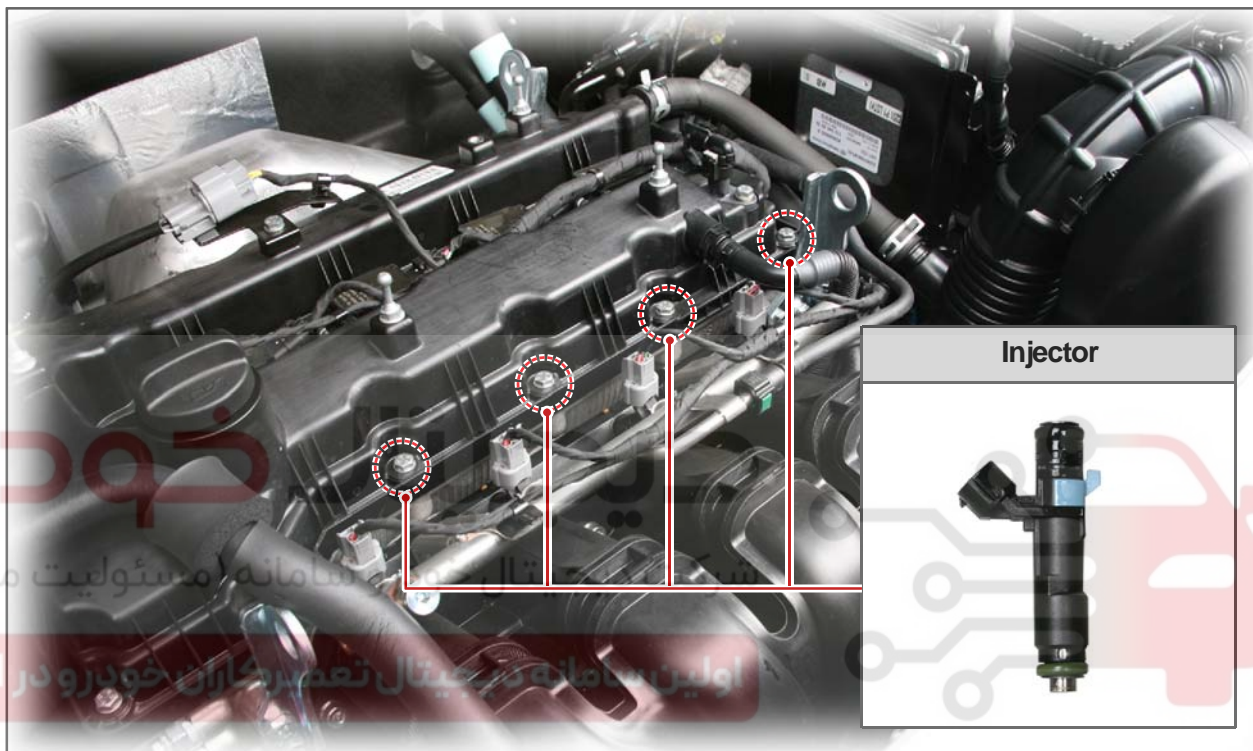
2245-02 INJECTOR ASSEMBLY

Preceding work

- Disconnect the negative cable from the battery.

**WARNING**

To prevent the personal injury and fire, the pressure in the fuel system should be released before disconnecting the fuel lines.

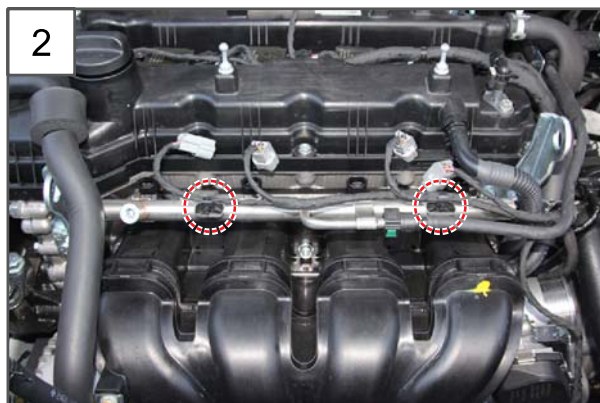


1. Disconnect four injector connectors.

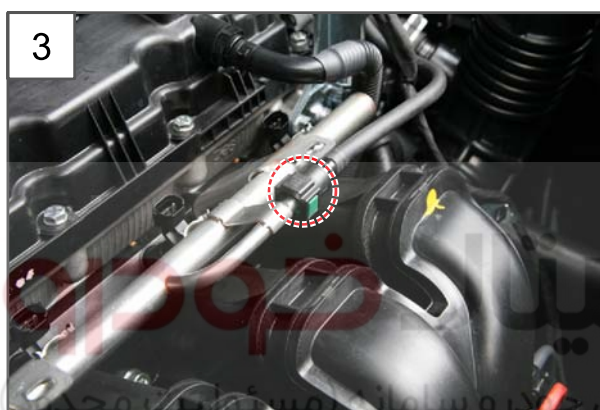
Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08



2. Release two clamps and separate the injector wiring.

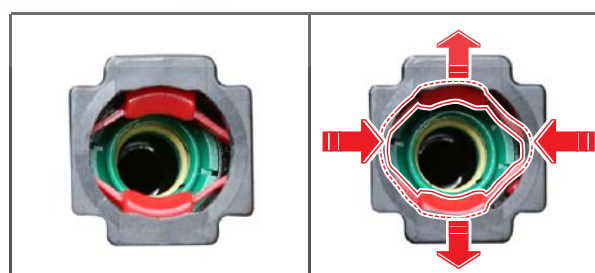
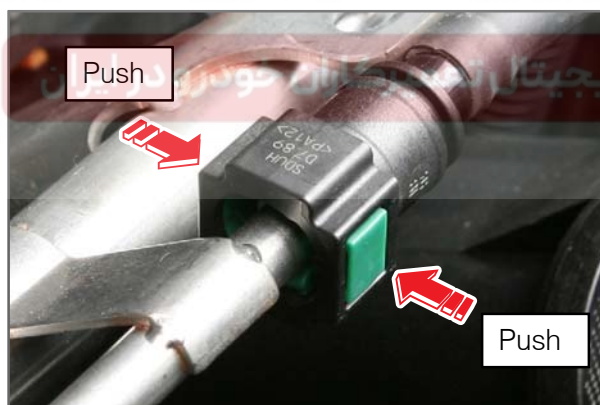


3. Release the quick connector on fuel supply hose to fuel rail assembly.



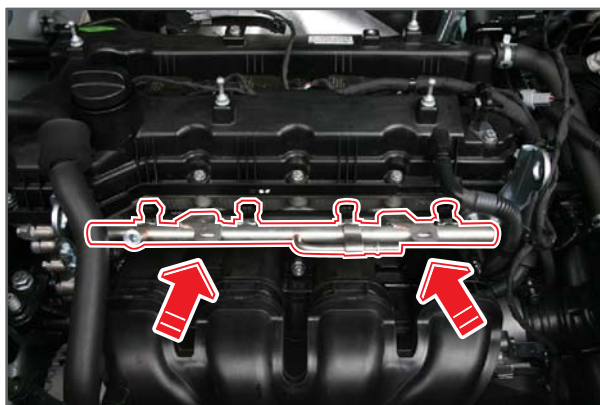
CAUTION

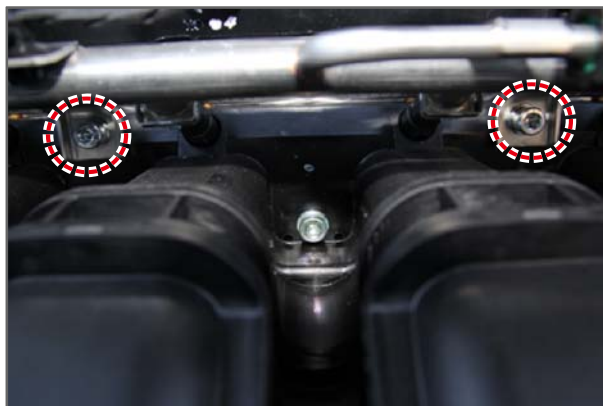
Make sure not to spill out the fuel from the fuel pipes.



4. Unscrew two bolts (6 mm) from the fuel rail.

Tightening torque $25.0 \pm 2.5\text{Nm}$





5. Separate the fuel rail assembly by pulling it evenly.



6. Remove the fuel rail assembly.

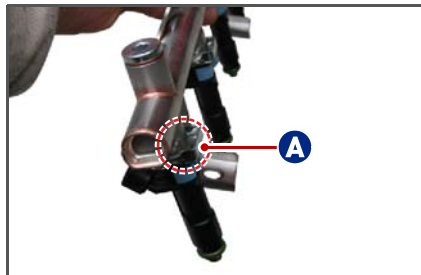
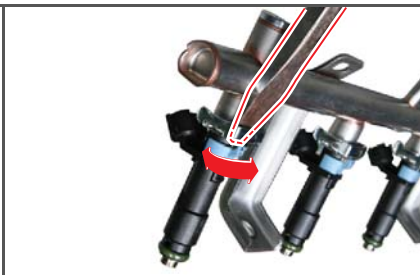
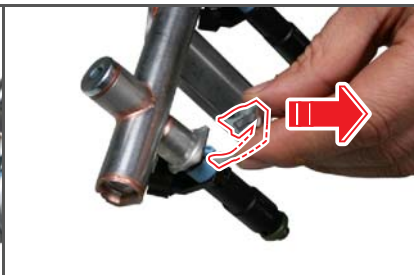
CAUTION

- Seal the injector mounting holes so that foreign material cannot get into the hole.



7. Remove the injector mounting retainer clip.

Modification basis	
Application basis	
Affected VIN	

		
Insert the screwdriver into the groove (A) of injector mounting retainer.	Separate the injector mounting retainer by turning the screwdriver right and left.	Remove the injector mounting retainer.



8. Remove the injectors from the fuel rail assembly.



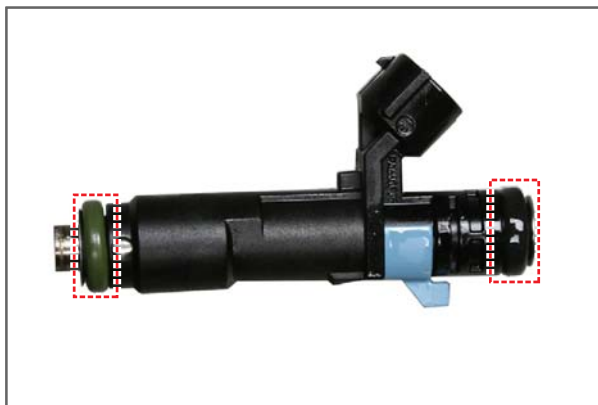
CAUTION

Replace the O-rings with new ones.



9. Install the injector assembly in the reverse order of removal.





Cautions when installing



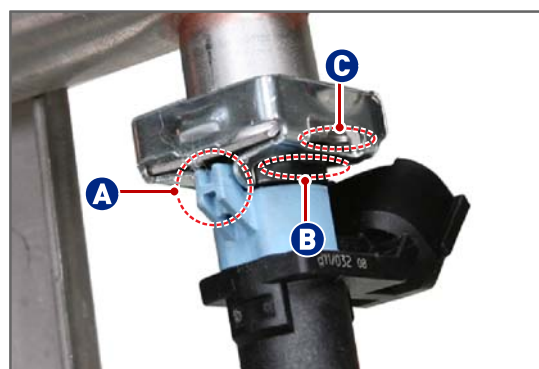
- Replace the O-rings with new ones.





- Push the injector into fuel rail assembly while turning it right and left.

	Injector	Retainer clip
A		
B		

- Check the installed conditions of injector mounting retainer clip, injector and fuel rail assembly after installation.



	Fuel rail	Retainer clip
C		

Modification basis	
Application basis	
Affected VIN	

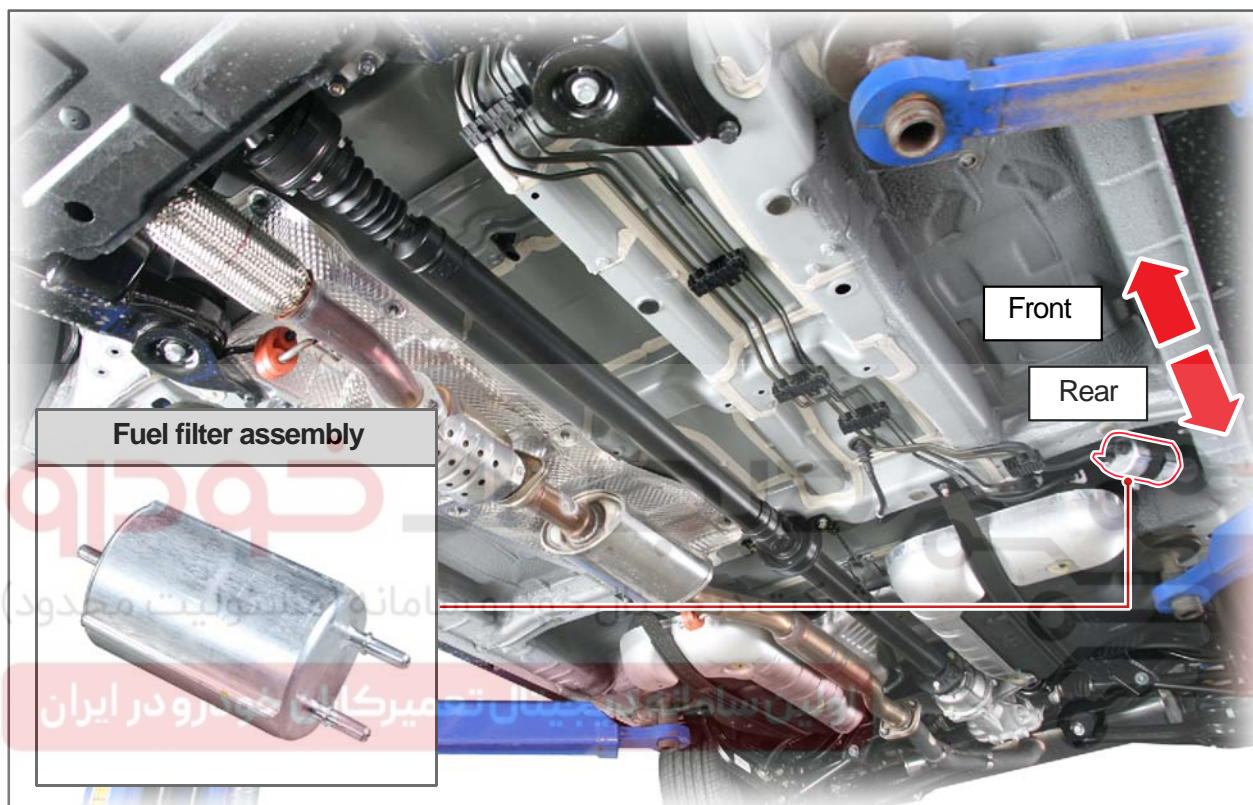
S.G.N.

2245-01 FUEL FILTER

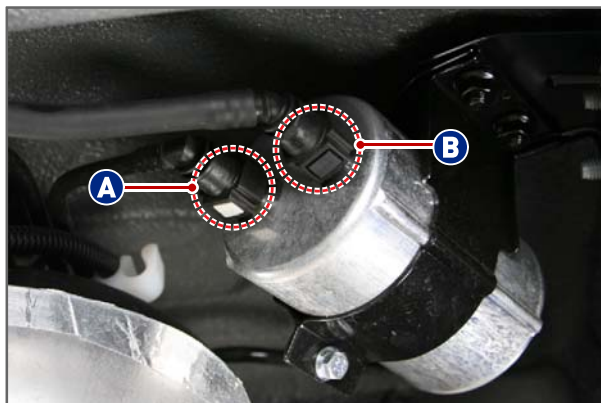
Preceding work - Disconnect the negative cable from the battery.

⚠ WARNING

To prevent the personal injury and fire, the pressure in the fuel system should be released before disconnecting the fuel lines.



1. Lift up the vehicle and release the quick connectors.



- Quick connector for fuel return line (A, White) to fuel tank
- Quick connector for fuel supply line to engine (B, Black)

CAUTION



Seal the inlets of fuel filter with protective caps.



- Quick connector for fuel supply line (C, Red) to fuel filter from fuel tank



2. Unscrew two nuts (12 mm) from the bracket and remove the fuel filter assembly.



3. Unscrew the clamp bolt (10 mm).

Modification basis	
Application basis	
Affected VIN	

4



4. Slide the fuel filter assembly out.

5



5. Install the fuel filter assembly in the reverse order of removal.



اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

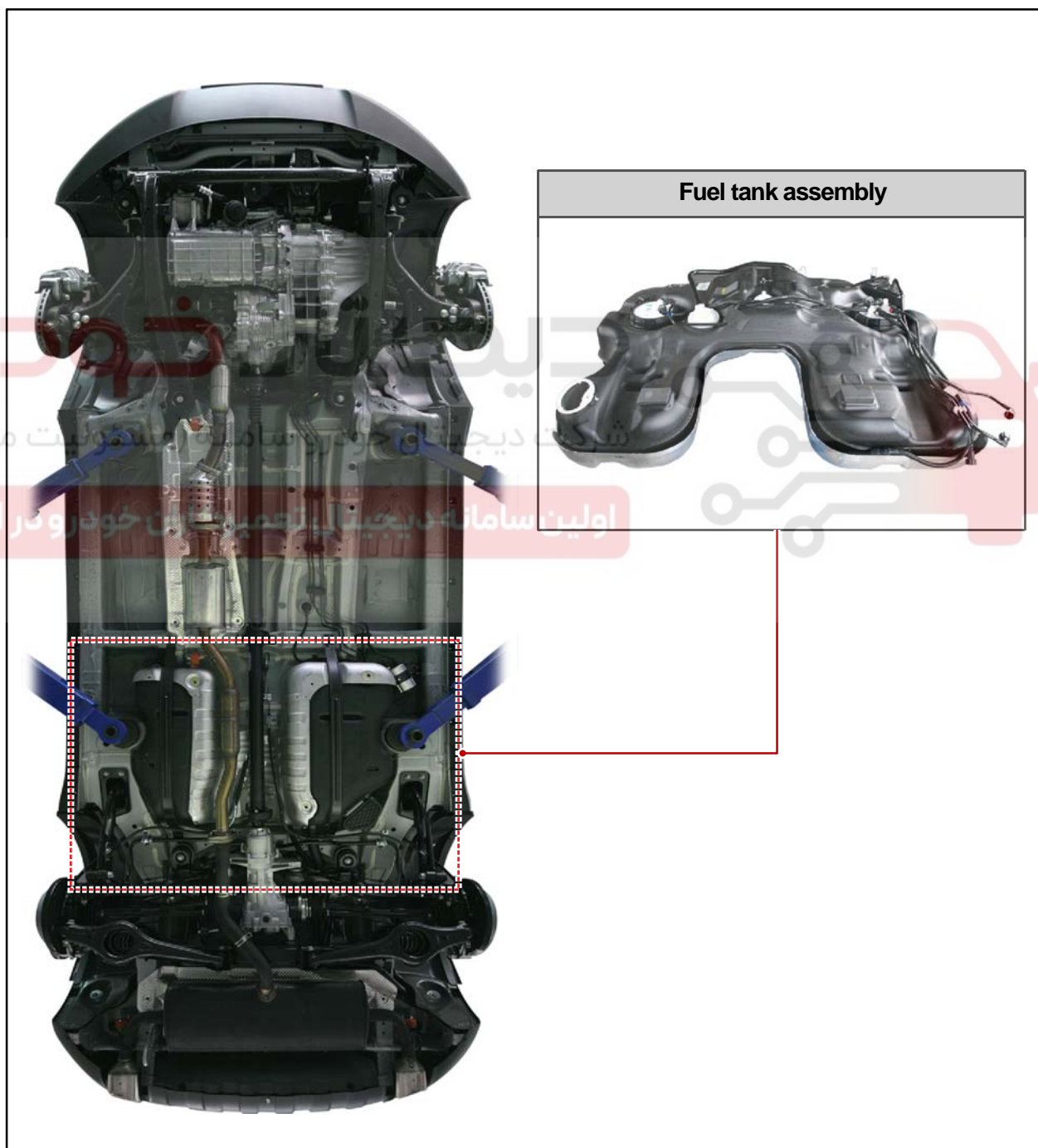
S.G.N.

2211-01 FUEL TANK**Preceding work** - Disconnect the negative cable from the battery.**⚠ WARNING**

To prevent the personal injury and fire, the pressure in the fuel system should be released before disconnecting the fuel lines.

Make sure not to spill out the fuel on the floor. Immediately wipe out the spilled fuel.

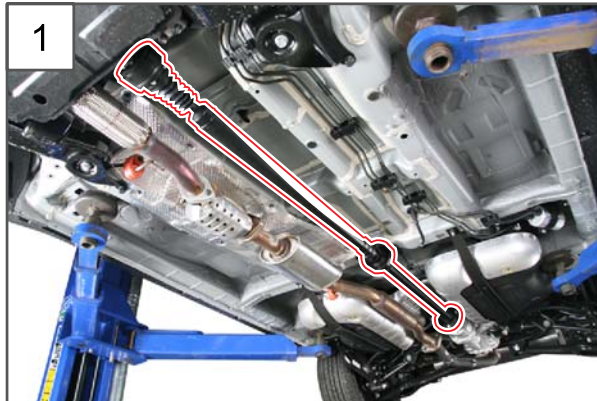
Do not smoke near the working area.



Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08

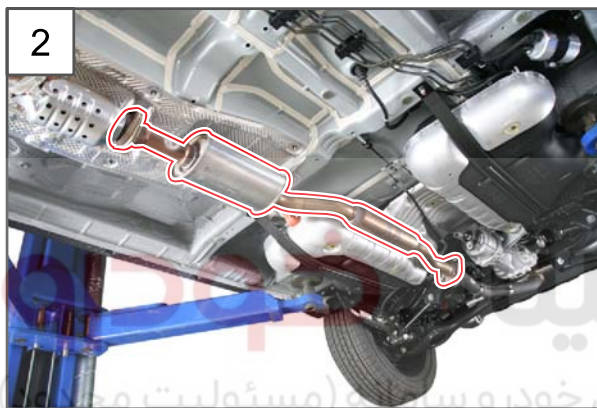


1. Remove the propeller shaft.



NOTE

Refer to Chapter "Propeller Shaft" in "CHASSIS".



2. Remove the No.2 muffler.



NOTE

Refer to Chapter "Exhaust System".

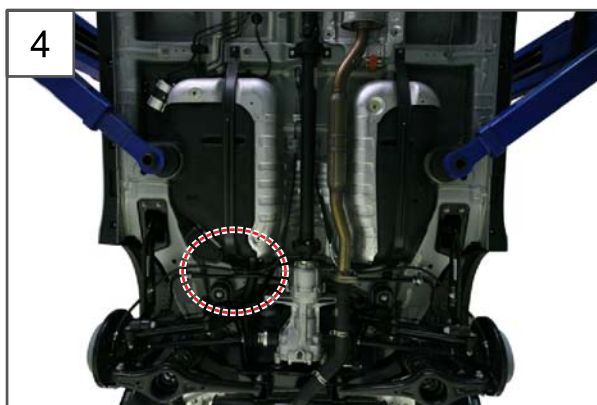


3. Remove the hand brake cable.

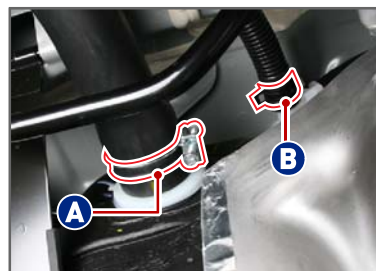


NOTE

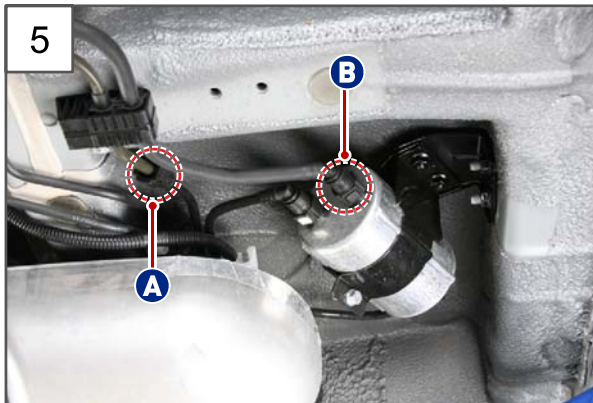
Refer to Chapter "Brake System" in "CHASSIS".



4. Separate the fuel filler hose (A) and the air breathing hose (B).



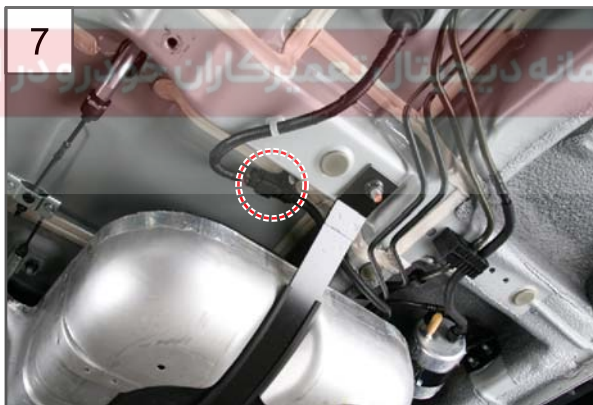
Modification basis	
Application basis	
Affected VIN	



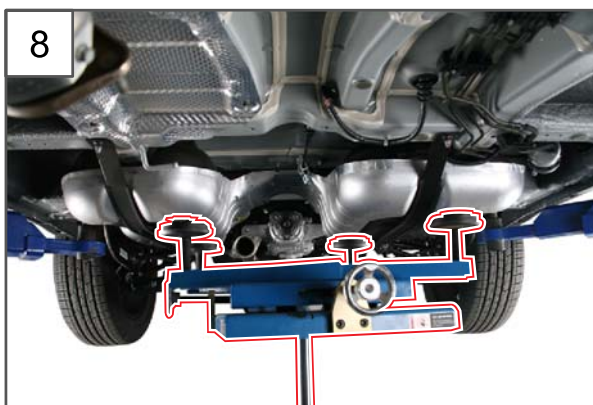
5. Release the quick connector (A) between canister and purge control solenoid valve and the quick connector (B) to fuel tank from fuel filter.



6. Release the quick connector for fuel supply line to fuel filter from fuel tank.



7. Disconnect the main connector for fuel line.



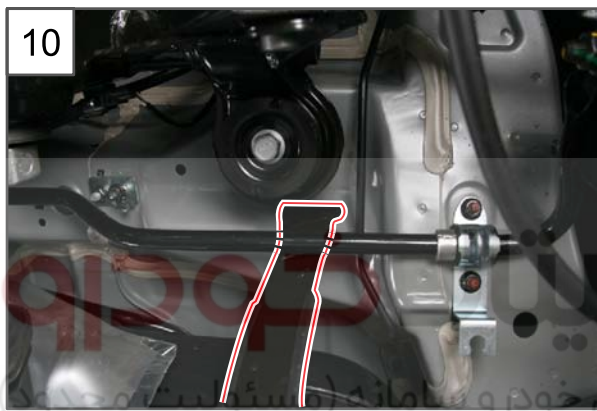
8. Support the bottom of fuel tank with a safety jack.

Modification basis	
Application basis	
Affected VIN	

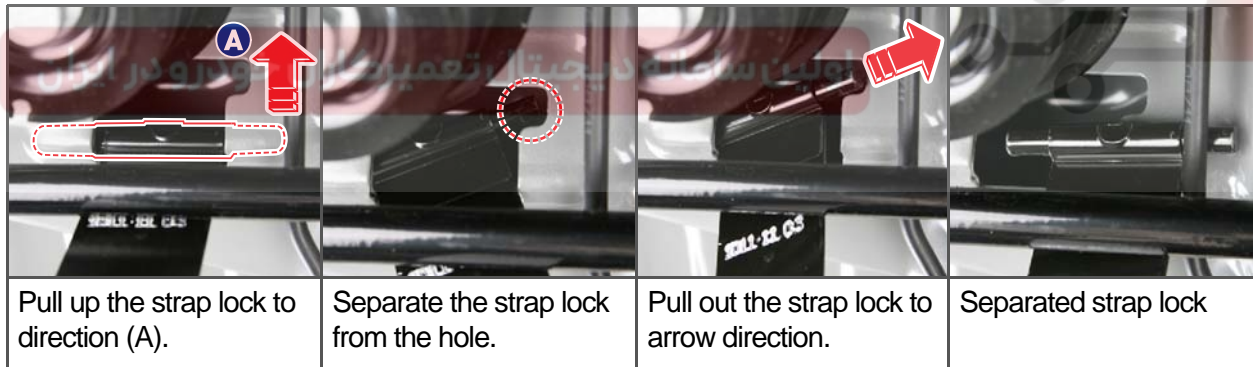


9. Unscrew two nuts (17 mm) on the fuel tank mounting straps.

Tightening torque $25.0 \pm 2.5\text{Nm}$



10. Remove the fuel tank mounting straps.

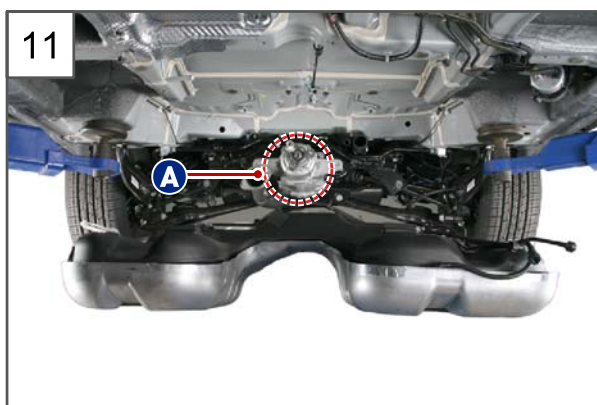


Pull up the strap lock to direction (A).

Separate the strap lock from the hole.

Pull out the strap lock to arrow direction.

Separated strap lock



11. Slowly lower the safety jack to remove the fuel tank assembly. Pay attention not to be hindered by the E-coupling (A) while removing it.

Interference between E-coupling and fuel tank

Front view



Rear view



13



13. Install the fuel tank in the reverse order of removal.

Modification basis	
Application basis	
Affected VIN	

FUEL SYSTEM

KORANDO 2013.08

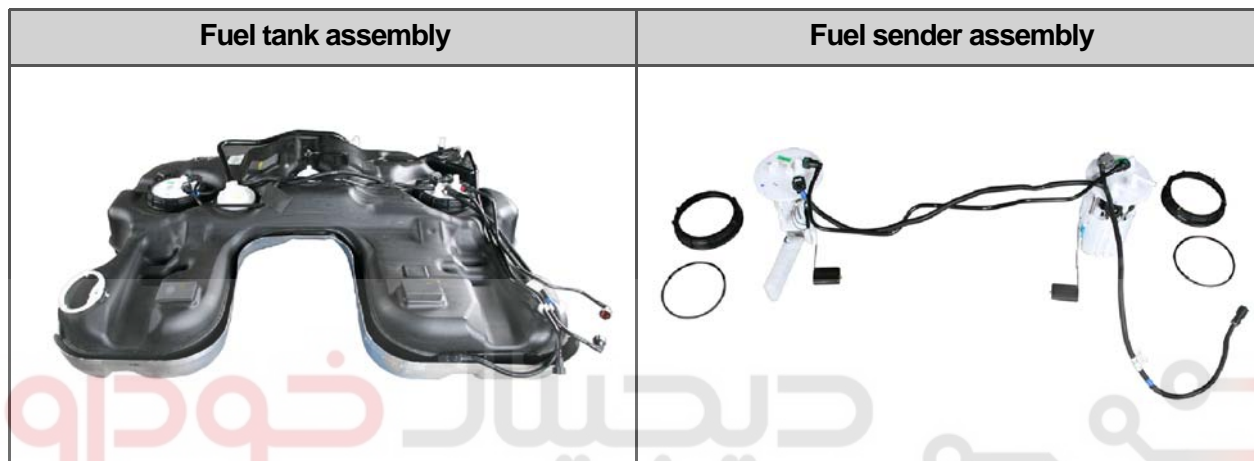
S.G.N.

2211-06 FUEL SENDER**Preceding work** - Remove the fuel tank assembly.**⚠ WARNING**

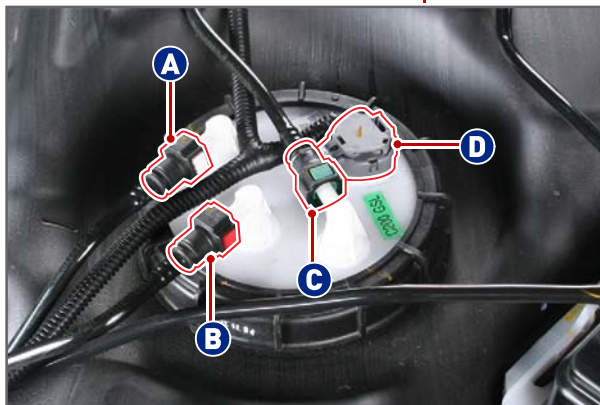
To prevent the personal injury and fire, the pressure in the fuel system should be released before disconnecting the fuel lines.

Make sure not to spill out the fuel on the floor. Immediately wipe out the spilled fuel.

Do not smoke near the working area.



1. Disconnect the fuel supply quick connector (A), fuel return quick connector (B), sub tank suction quick connector (C), and fuel pump assembly connector (D) from the primary fuel sender.





2. Remove the primary fuel sender cover with a special service tool.

Tightening torque 58.0 ~ 68.0Nm



Special service tool



3. Remove the primary fuel sender from the fuel tank.



Raise the primary fuel sender.



Tilt the primary fuel sender.

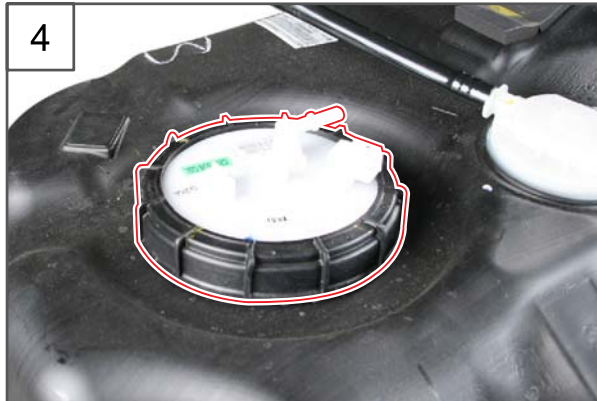


Separate the point (A) from the fuel tank first.



Remove the primary fuel sender.

Modification basis	
Application basis	
Affected VIN	

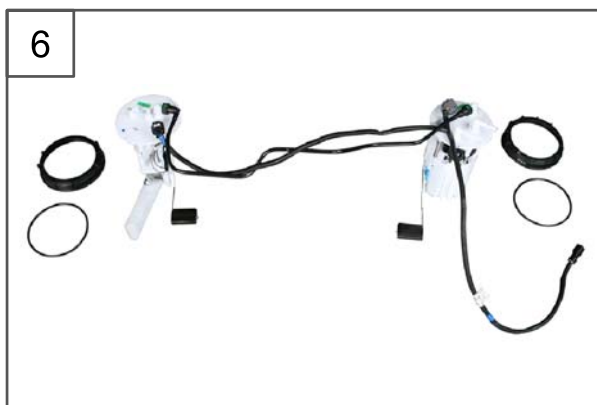


4. Remove the secondary fuel sender cover with a special service tool.

Tightening torque 58.0 ~ 68.0Nm



5. Remove the secondary fuel sender from the fuel tank.



6. Install the fuel senders in the reverse order of removal.

Modification basis	
Application basis	
Affected VIN	

Cautions when installing



- Align the tab (A) of plate cover and the groove (B) of fuel tank.



Modification basis	
Application basis	
Affected VIN	

S.G.N.

2221-09

CHARCOAL CANISTER

Preceding work

- Disconnect the negative cable from the battery.

**WARNING**

To prevent the personal injury and fire, the pressure in the fuel system should be released before disconnecting the fuel lines.



1. Remove the fuel tank assembly.

**NOTE**

Refer to Chapter "Fuel System".

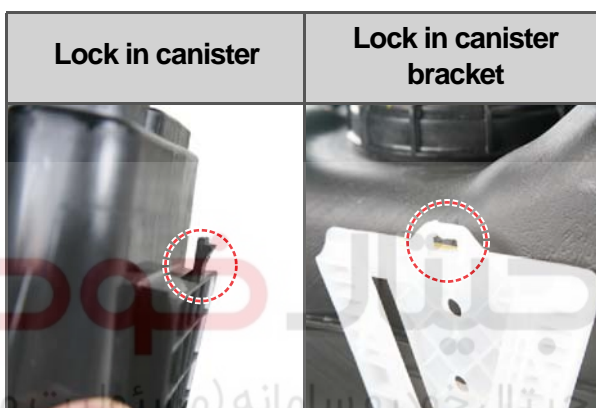


2. Separate the quick connector (A) to purge control valve hose and the quick connector (B) to fuel tank.

Modification basis	
Application basis	
Affected VIN	



3. Release the lock with a flat blade screwdriver.



4. Remove the canister assembly.



5. Install the canister assembly in the reverse order of removal.

Modification basis	
Application basis	
Affected VIN	

Memo

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

