ENGINE GENERAL

0000-00

GENERAL INFORMATION

GENERAL INSTRUCTIONS

OVERVIEW

ENGINE GENERAL

0000-00

GENERAL INFORMATION

1. LAYOUT

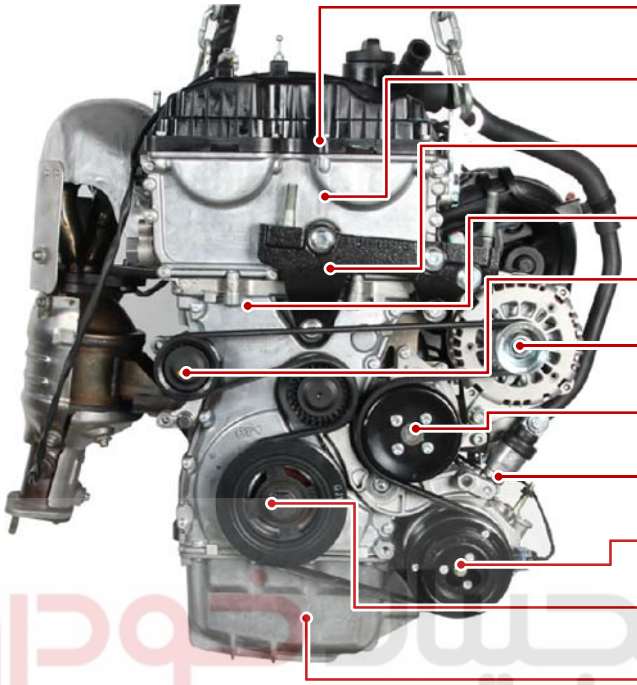
Front view	Rear view
	

Right side view	Left side view
	

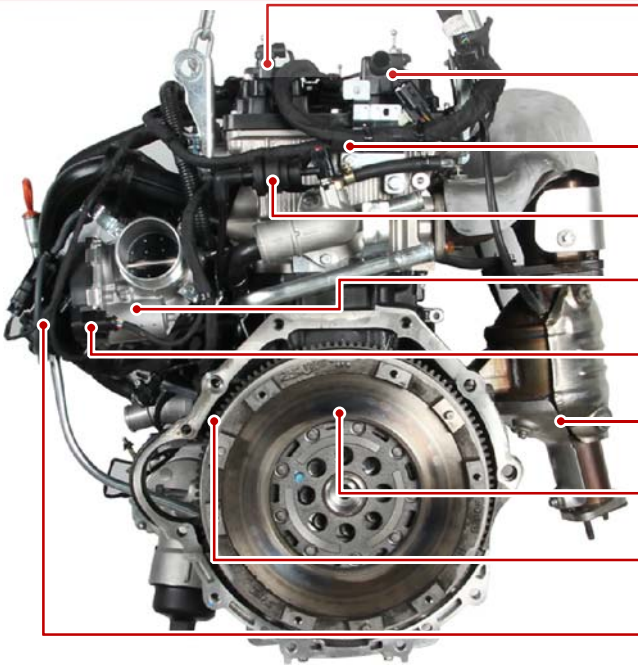
Modification basis	
Application basis	
Affected VIN	

2. MAJOR COMPONENTS

▶ **Front View**

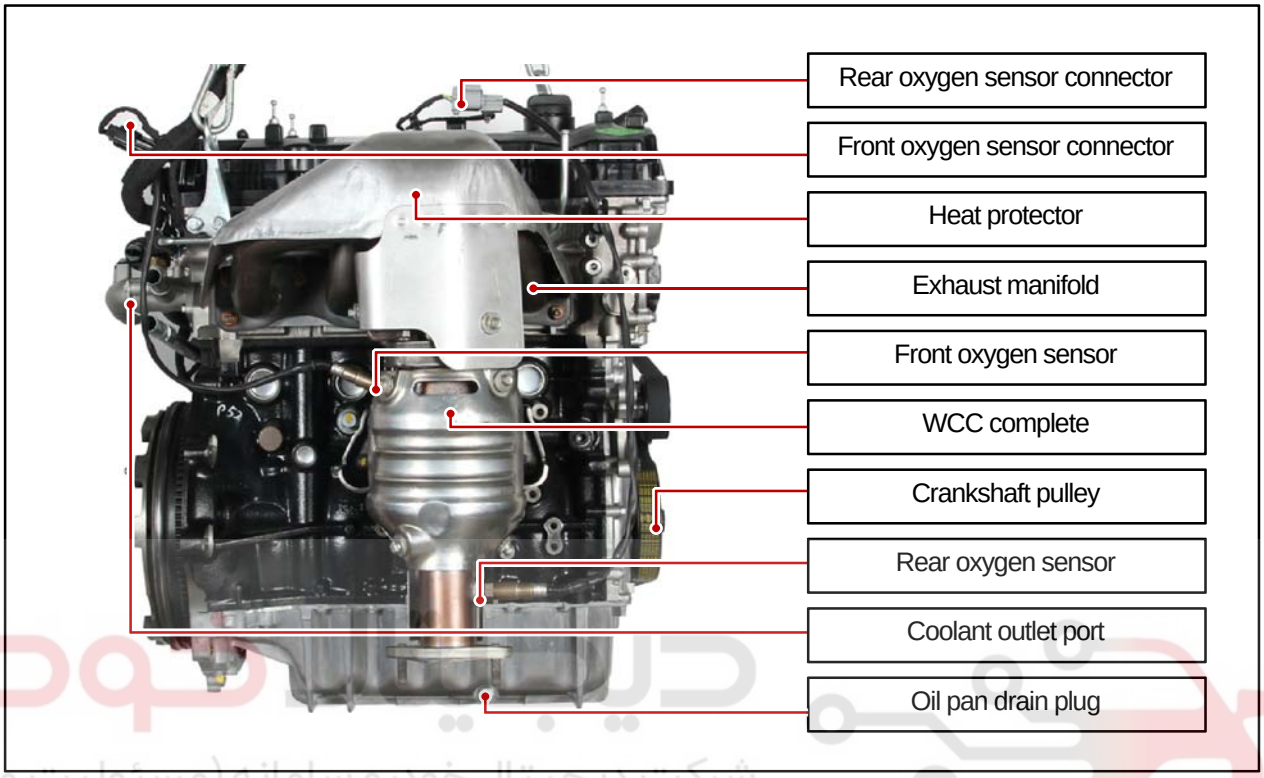


▶ **Rear View**

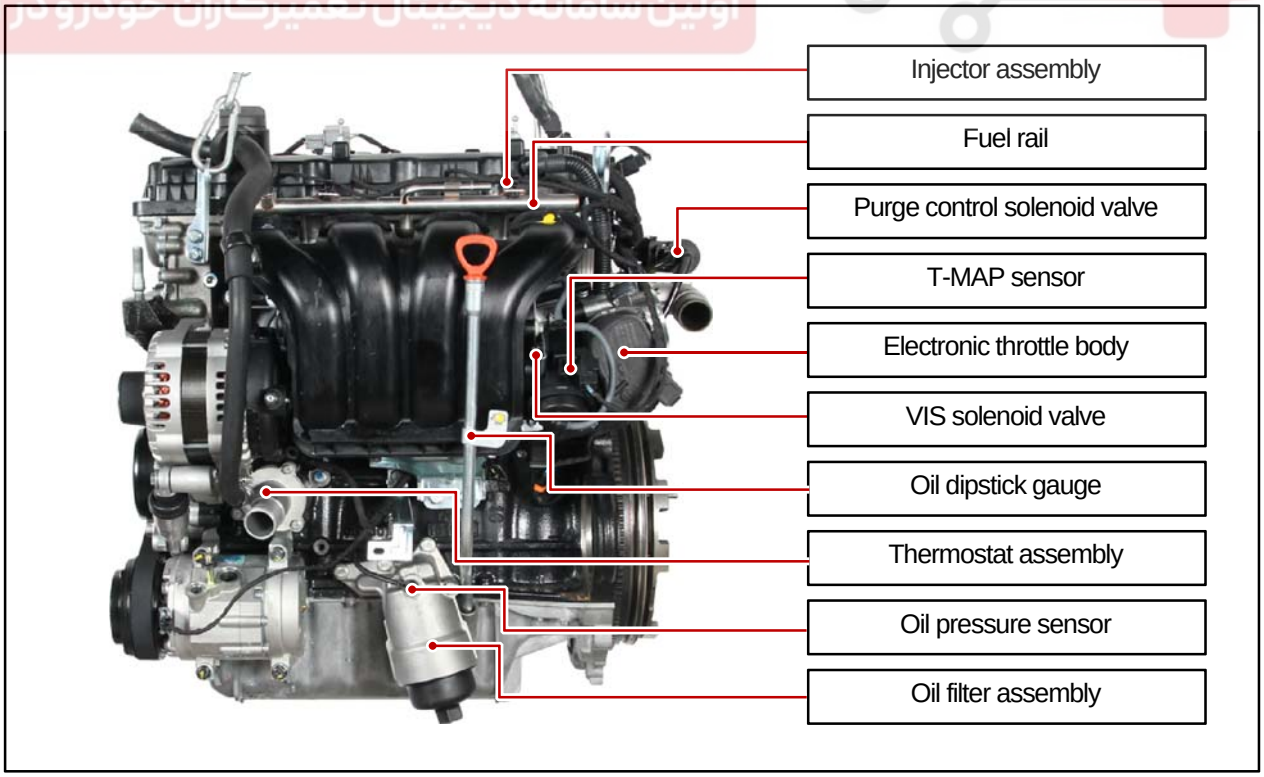


Modification basis	
Application basis	
Affected VIN	

▶ Right side view



▶ Left side view



Modification basis	
Application basis	
Affected VIN	

GENERAL INSTRUCTIONS

1. GUIDELINES FOR SERVICE WORKS

1) For Safety

To perform the service works easily ans safely, the service technicians must keep the proper working procedures and rules.
This manual provides the useful instructions to the service technicians so that they can perform the servive works with standard working process, skills, tips in time.
Please read this manual and follow the instructions carefully.

Signal words such as “WARNING”, “CAUTION” and “NOTE” have special meanings.

NOTE
indicates information to assist maintenance and instructions.

CAUTION
indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

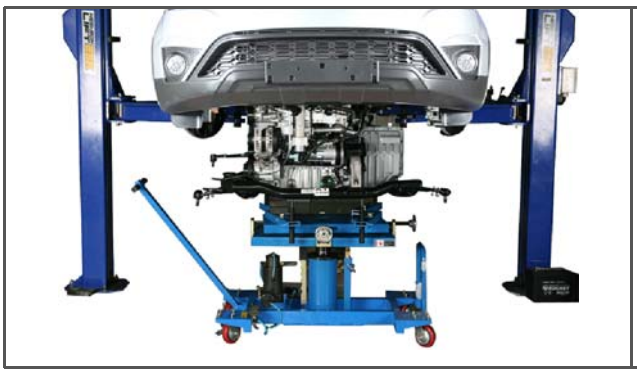
WARNING
indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

However, above references and cautions cannot be inclusive measures, so should have habits of paying attentions and cautions based on common senses.

Modification basis	
Application basis	
Affected VIN	

2) Equipment

- Korando is FF (Front Engine Front Drive) type vehicle, and engine and powertrain system are integrated into a module. Therefore, 2-post lift and general equipment are necessary when working on the engine and transmission.
- Major equipment: Engine and transmission jack, Engine stand, Engine crane, Transmission jack, Engine hanger



Remove the engine and transaxle as a set.

- Manual transaxle: Transaxle can be separated after removing the front module (sub frame, engine and transaxle).
- Automatic transaxle: Transaxle can be separated after removing the sub frame.

3) General Instructions

(1) Before lifting up the vehicle with a lift, correctly support the lifting points.
(2) When using a jack, park the vehicle on a level ground and place the wheel chocks under the tires. Position the jack under the frame and lift up the vehicle and then support with chassis stand before service work.
(3) Make sure to disconnect the negative (-) cable from the battery to prevent any damage to electric systems.
(4) If you have to work on vehicle, cover the seats and floor with protection covers to avoid any damage and contamination.
(5) Brake fluid and anti-freeze can damage the painted surface of body. So carefully handle them during service work.
(6) To improve the efficiency of service work, use only recommended and specified tools.
(7) Use only Ssangyong genuine spare parts.
(8) Never reuse the cotter pin, gasket, O-ring, oil seal, lock washer and self-locking nut. Replace them with new ones. If reused, normal functions cannot be maintained.
(9) Store the disassembled parts as a set based on disassembly order and unit.
(10) Pay particular attention not to miss or mix the fasteners.
(11) If necessary, especially for inspection, clean the removed parts completely.
(12) Apply the oil or grease on the running and sliding surfeces before installation. Use the specified sealant and gasket to prevent leakage if necessary.
(13) Tighten the fasteners to the specified tightening torque.
(14) As a final stage of service work, check if the serviced system is working properly and the problem has been eliminated clearly.

4) Basic Inspection

(1) Horn operation

- Listen for the horn sound when pressing the horn pad on the steering wheel.

(2) Brake operation

- Check if there is any abnormal noise, unusually long braking distance, or uneven braking force. If the brake warning lamp does not go out even after starting the engien or are flashing during driving, have the brake system checked immediately.
- Check the brake pipes and hoses for connection, oil leak, crack or interference after changing the position of tires. When replacing the tires, check the brake disc for surface condition and wear. Check the parking brake cable and brake operation. Shorten the checking interval if the parking
- brake is used frequently.

(3) Exhaust system

- Be aware to any changes in sound or smell from the exhaust system. These may be caused by leak or overheat. Have the exhaust system checked and repaired immediately.
- Inspect the exhaust system including catalytic converter. Inspect all the components and body frame near the exhaust system.

(4) Tires

- Unusual vibration of the steering wheel and seats or pulling to one side on the straight and level roads may indicates the uneven tire inflation pressure or poor wheel balance.

(5) Steering and suspension system

- Inspect the front and rear suspension and the steering system for damage, looseness or missing parts, signs of wear or lack of lubrication. Inspect the power steering line and the hoses for connection, leak, crack and chafing. Inspect the drive axle boot and seals for damage, tear or leak. Replace or repair the system if necessary.

(6) Engine oil

- Check the oil level when the engine is still warm and add the specified engine oil if necessary.

(7) Coolant

- Check the coolant level in the coolant reservoir, coolant conditions (contamination, foreign material), and hoses for damage and leak. Replace or add the Ssangyong genuine coolant, if needed.

(8) Engine drive belt

- Check all drive belts on the engine for wear, crack and looseness. Retighten or replace the belt, if needed.

Modification basis	
Application basis	
Affected VIN	

5) Guidelines on Engine Service

To prevent the personal injuries and vehicle damages that can be caused by mistakes during service and to provide the optimized performance and safety after service works, the service technicials must keep the basic cautions and service guidelines below. These could be easily forgotten during service works.

(1) Cautions before service works

- Make sure to disconnect the negative (-) cable from the battery to prevent any damage to electric systems.
- Make sure to clean the working area and to prepare the necessary tools before service works.
  Always place the ignition switch to OFF position if not required. Otherwise, there could be unexpected
- damage to electric devices or personal injuries due to short-circuit.
  To prevent the foreign material from entering into the fuel injection system, completely seal the inlets of
- HP pump, fuel hoses and high pressure pipes.
  To remoev the engine, use the dedicated equipments such as engine jack, transmission jack, engine
- stand and engine crane.

(2) Engine and accessories

Engine has a lot of precise components. The specified tightening torque and correct procedures should be kept during service works. And, the working area is always clean and well prepared.

- When disassembling the engine, related parts (bolts, gaskets, etc.) should be stored as a set.
- Clean the components completely with engine oil before assembling if needed.
- Fully drain the engine oil, coolant and fuel from the vehicle and seal the inlets with the plugs before removing the engine.
- All the interference should be eliminated before removing the engine.

(3) Electric devices

Extraordinary care should be taken when servicing the electric systems. Currently, the engine uses a lot of electric devices. Short circuit and poor contact may cause the low engine performance, incomplete combustion and other abnormalities.

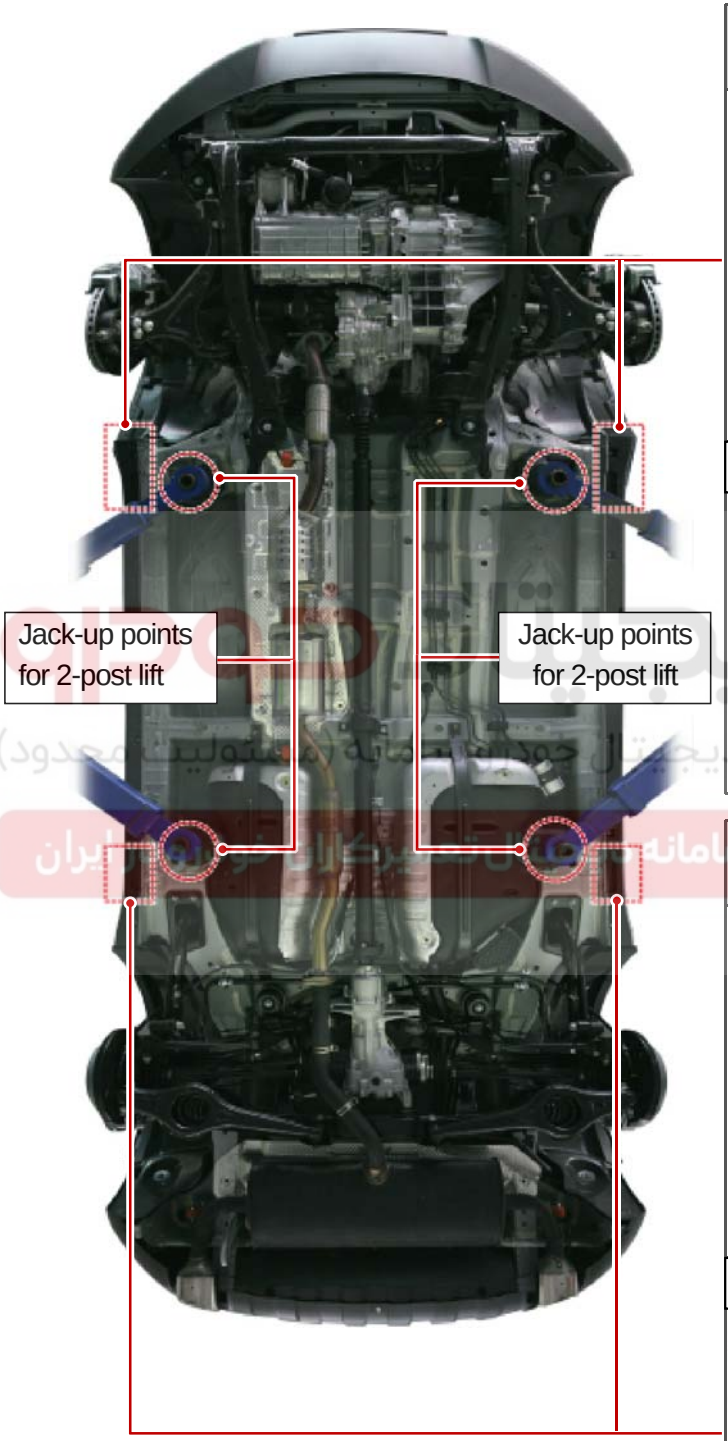
- To prevent any damage to electric systems, make sure to disconnect the negative (-) cable from the battery and place the ignition switch to OFF position before servicing.
- Use only the specified parts with same ratings when replacing the electric devices. Check the grounds and connections for looseness.

(4) Fuel and lubrication system

- When working with the fuel or oil systems in enclosed area, always keep the working area well-ventilated and never allow anybody to smoke.
- Gaskets and seals on the fuel and oil systems should be replaced with new ones. All bolts and nuts should be tightened as specified.
- Make sure to check the connections for leak after installation.

2. JACK-UP POINTS

▶ **Stand jack-up points and installation status (front side)**



Jack-up points and setup (front side)

Supporting

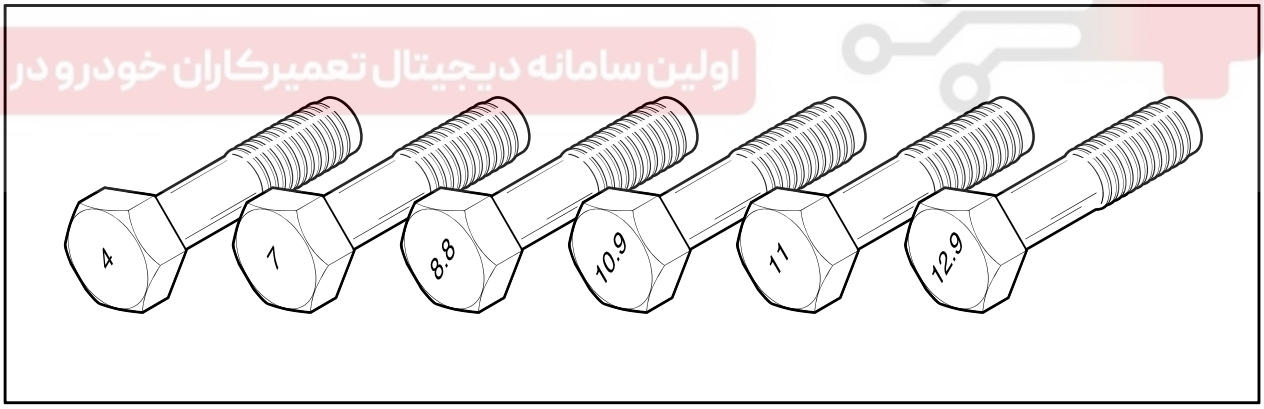
Jack-up points and setup (rear side)

Supporting

Modification basis	
Application basis	
Affected VIN	

3. STANDARD BOLTS SPECIFICATIONS

Bolt	Pitch	Tightening torque(kgf.cm)					
		Standard			Limit		
		4T	7T	9T	4T	7T	9T
M3	0.5	5	9	13	7	12	17
M4	0.7	12	20	30	16	27	40
M5	0.8	24	40	57	32	53	77
M6	1.0	41	68	99	55	91	130
M8	1.25	88	160	230	130	210	310
M10	1.25	190	330	470	260	430	620
	1.5	190	310	450	250	420	600
M12	1.25	350	580	840	460	770	1,100
	1.75	330	550	790	440	730	1,000
M14	1.5	550	910	1,300	730	1,200	1,900
M16	1.5	830	1,100	2,000	1,100	1,900	2,700
M18	1.5	1,200	2,000	2,900	1,600	2,700	3,800
M20	1.5	1,700	2,800	4,000	2,200	3,700	5,300
M22	1.5	2,300	3,800	5,400	3,000	5,000	7,200
M24	1.5	2,900	4,900	7,000	3,900	6,500	9,400
	2.0	2,800	4,700	6,800	3,800	6,300	9,100



1) Metric bolt strength is embossed on the head of each bolt. The strength of bolt can be classified as 4T, 7T, 8.8T, 10.9T, 11T and 12.9T in general.
2) Observe standard tightening torque during bolt tightening works and can adjust torque to be proper within 15 % if necessary. Try not to over max. allowable tightening torque if not required to do so. Determine extra proper tightening torque if tightens with washer or packing.
3) If tightens bolts on the below materials, be sure to determine the proper torque.
4)

- Aluminum alloy: Tighten to 80 % of above torque table.
- Plastics: Tighten to 20 % of above torque table.

Modification basis	
Application basis	
Affected VIN	

4. CODING

1) Variant Coding

Description	Selection	Coding
Unleaded/leaded	Unleaded	Select the appropriate system
	Leaded	
Cruise control	No system	Select the appropriate system
	Cruise control	
	ACC	
	Undefined	
Vehicle speed Max	180kph	Selec : 190kph
	190kph	
	200kph	
	210kph	
Tire size	215/65R 16	Select the appropriate system
	225/60R 17	
	225/55R 18	
	undefined	
Air-Conditionation	Not equipped	Select the appropriate system
	Equipped	
OBD Information	No MIL OBD - I	Select the appropriate system
	MIL treatment OBD - I	
	MIL treatment OBD - II	
	MIL treatment E - OBD	
	MIL treatment KOBD	
Engine	E20	Select : E20
	E23	
	E28	
	E32	
	E36	
Body	Sedan	Select : Sedan
	Limousine	

Modification basis	
Application basis	
Affected VIN	

Description	Selection	Coding
Transfer case	2WD	2WD : 2WD 4WD : AWD
	TOD	
	P/T 4WD	
	AWD	
EPS	Not equipped	Select the appropriate system
	Equipped	
Select lever	BTRA lever	M/T : M/T lever A/T : DURA lever
	DC lever	
	DURA lever	
	M/T lever	
EPB	Not equipped	Select : Not equipped
	Equipped	
Enable RON conection	RON 89	Select : RON 95
	RON 91	
	RON 93	
	RON 95	
	RON 97	
	RON 98	
	RON 100	
	Not defined	
MIL	MIL - not illuminate	Select : MIL - illuminate
	MIL - illuminate	
Engine fan	Relay	Select : Relay
	PWM	
Coding is completed	NO	Select : YES
	YES	

Modification basis	
Application basis	
Affected VIN	

Description	Selection	Coding
Immobilizer & Key	Non - IMMO	Select the appropriate system
	BCM(IMMO)	
	SKM	
Vehicle variant message	Not defined	Select : Yes
	No	
	Yes	
Vehicle	Chairman	Select : KORANDO C
	W200	
	REXTON	
	Musso	
	Kyron	
	KORANDO C	
	KORANDO (old)	
	Actyon Sport	
Vehicle code, transmission	M/T	M/T : M/T A/T : NAGI/HPT
	NAGI/HPT	
	BTRA A/T	
	ION 6 speed A/T	
	NAG2 A/T	
TPMS	Not equipped	Select the appropriate system
	Equipped	
EBS(ABS/ESP)	Not equipped	Select the appropriate system
	ABS	
	TCS	
	ESP	
Telematics	Not equipped	Select : Not equipped
	Equipped	

Modification basis	
Application basis	
Affected VIN	

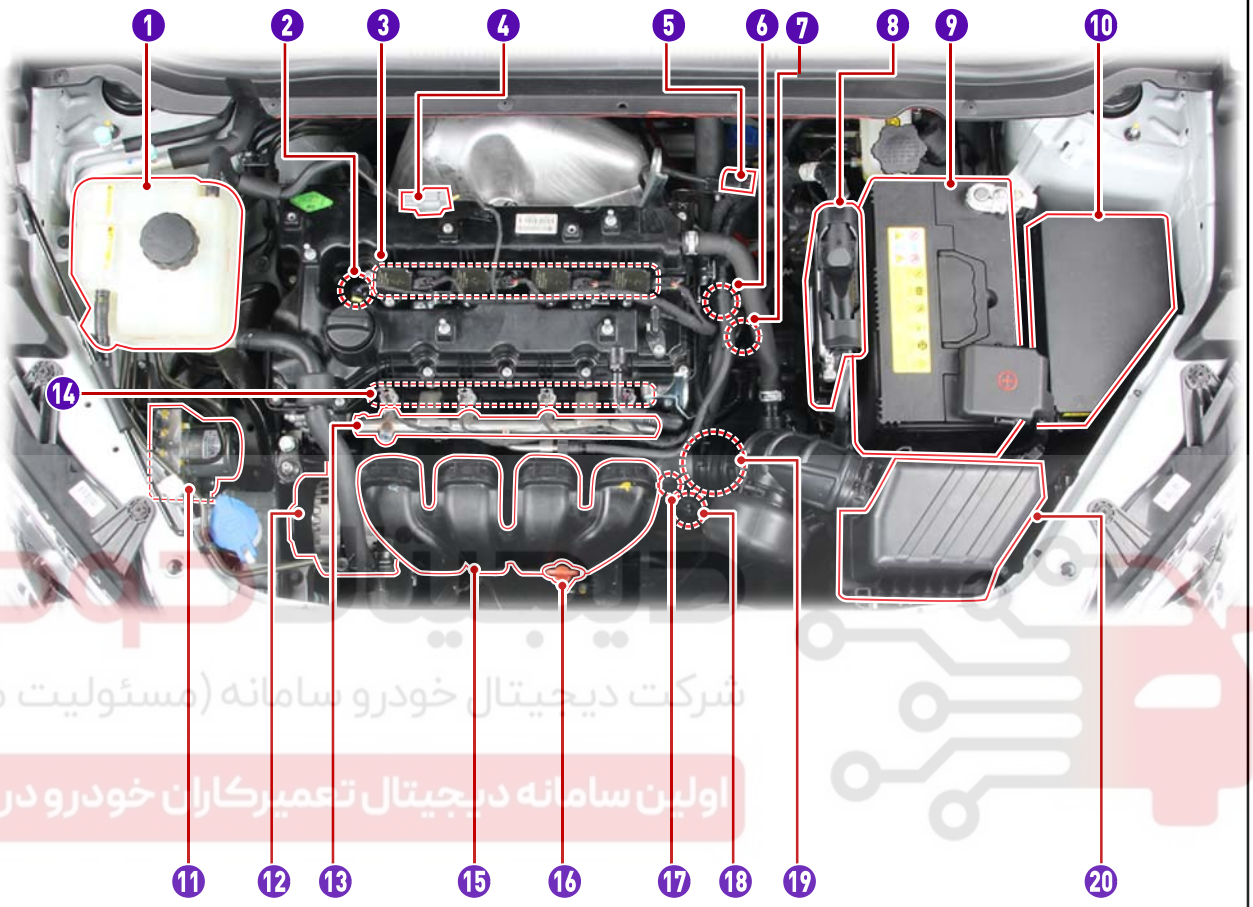
Description	Selection	Coding
EAS	Not equipped	Select : Not equipped
	ECS	
	2 Corner EAS	
	4 Corner EAS	
Domestic/Export	Domestic	Select the appropriate system
	General export	
	EU export	

2) Parameter Coding

Parameter	Range	Remark
Fuel characteristic	1 ~ 6	
Idle RPM(P)	-50 ~ 127	
Idle RPM(D)	-50 ~ 127	
CO correction	-6.945 ~ 6.8907	
Pedal progress coding	1 ~ 3	
Idle RPM(P) - cold condition	-50 ~ 127	
Idle RPM(D) - cold condition	-50 ~ 127	

OVERVIEW

1. ENGINE COMPARTMENT

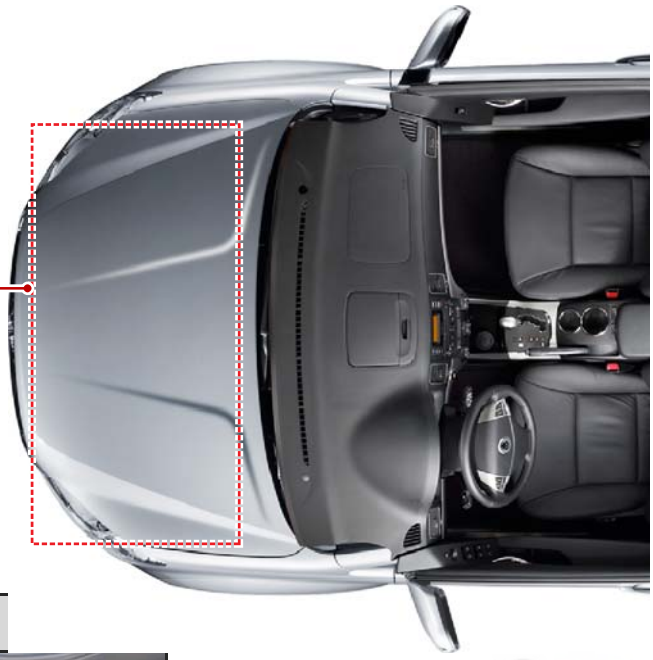


1. Coolant reservoir
2. OCV
3. Ignition coil
4. Rear oxygen sensor connector
5. Front oxygen sensor connector
6. Coolant temperature sensor
7. Purge control solenoid valve
8 Engine ECU
9. Battery
10. Fuse box
11. HECU assembly
12. Alternator
13. Fuel rail assembly
14. Injector
15. Intake manifold
16. Oil dipstick gauge
17. VIS solenoid valve
18. T-MAP sensor
19. Electronic throttle body
20. Air cleaner assembly

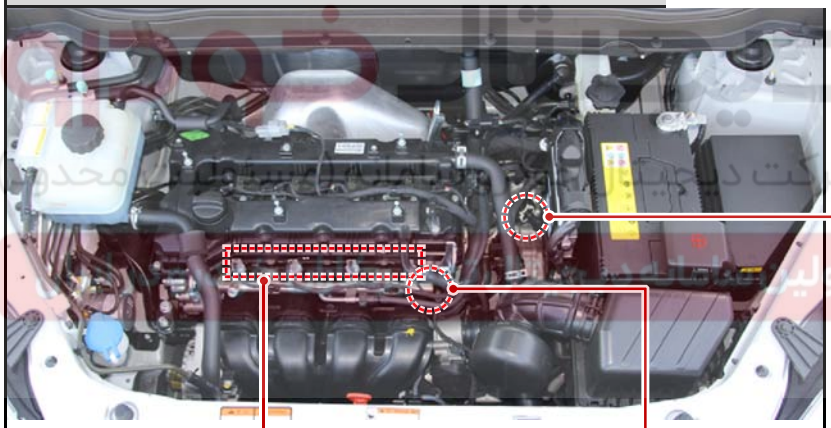
Modification basis	
Application basis	
Affected VIN	

2. FUEL SYSTEM

Engine ECU



Engine compartment

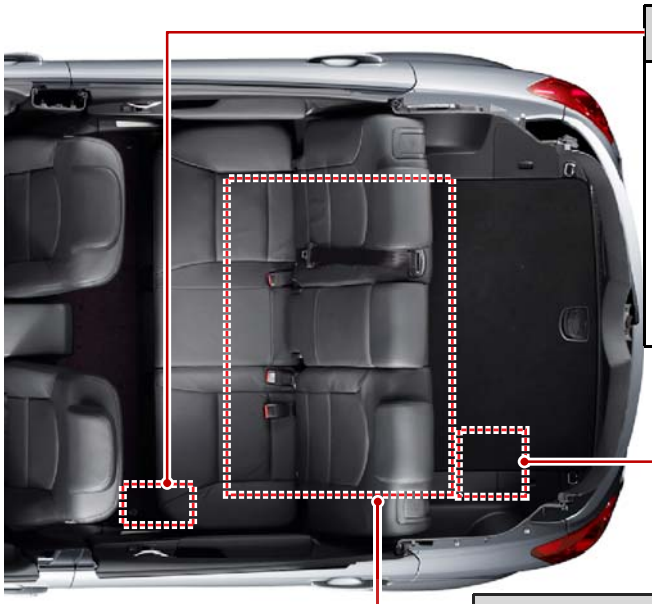


Injector

Fuel rail

Purge control solenoid valve

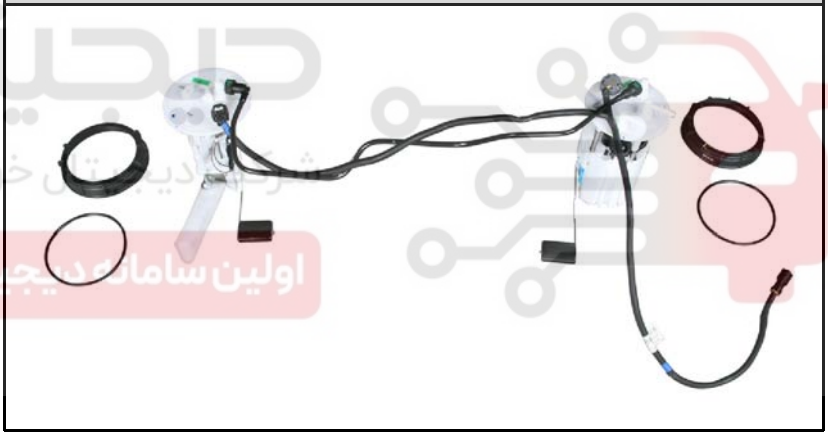
Modification basis	
Application basis	
Affected VIN	



Fuel filter

Canister

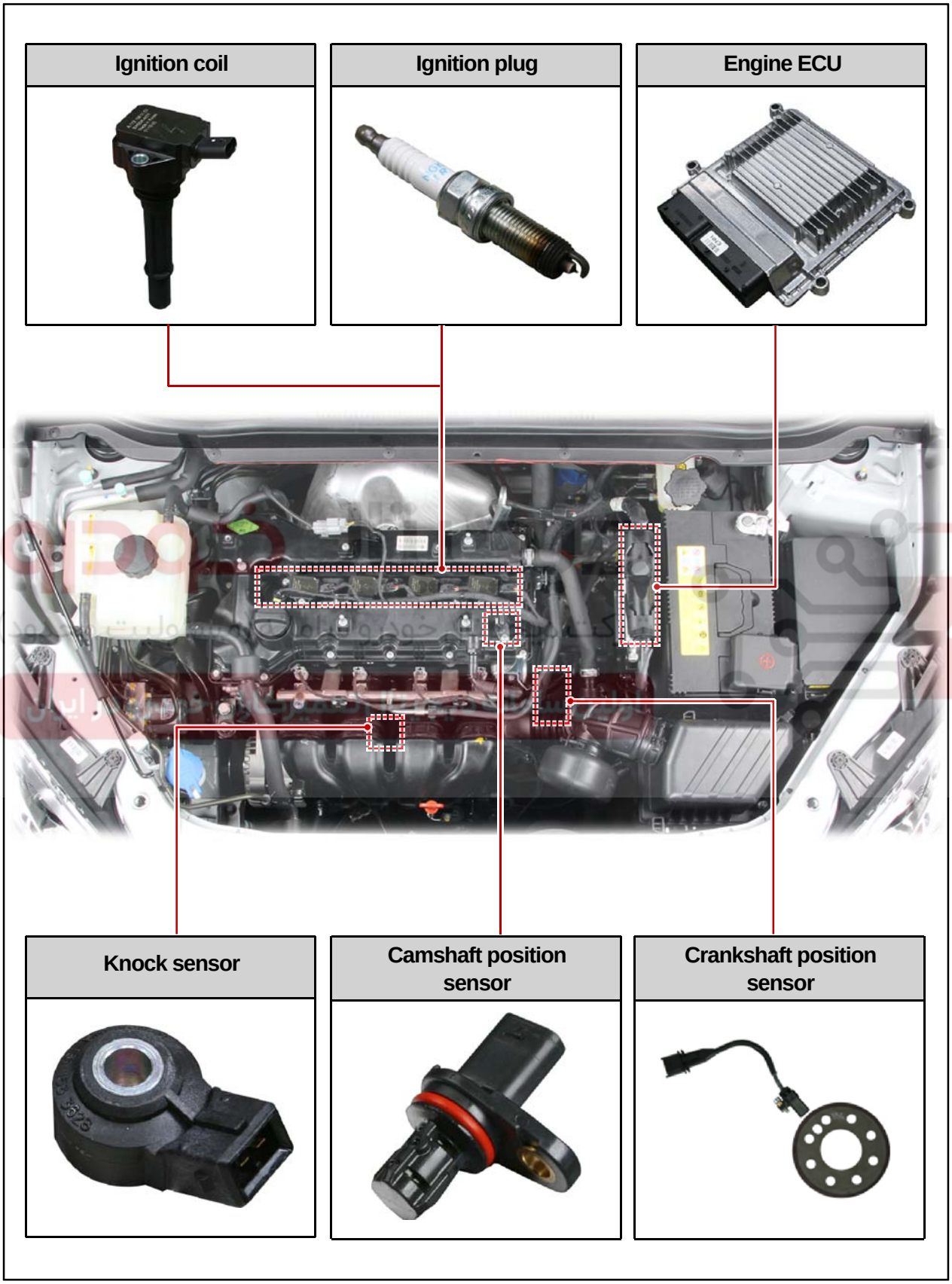
Fuel pump & fuel sender assembly



Fuel tank assembly

Modification basis	
Application basis	
Affected VIN	

3. IGNITION SYSTEM

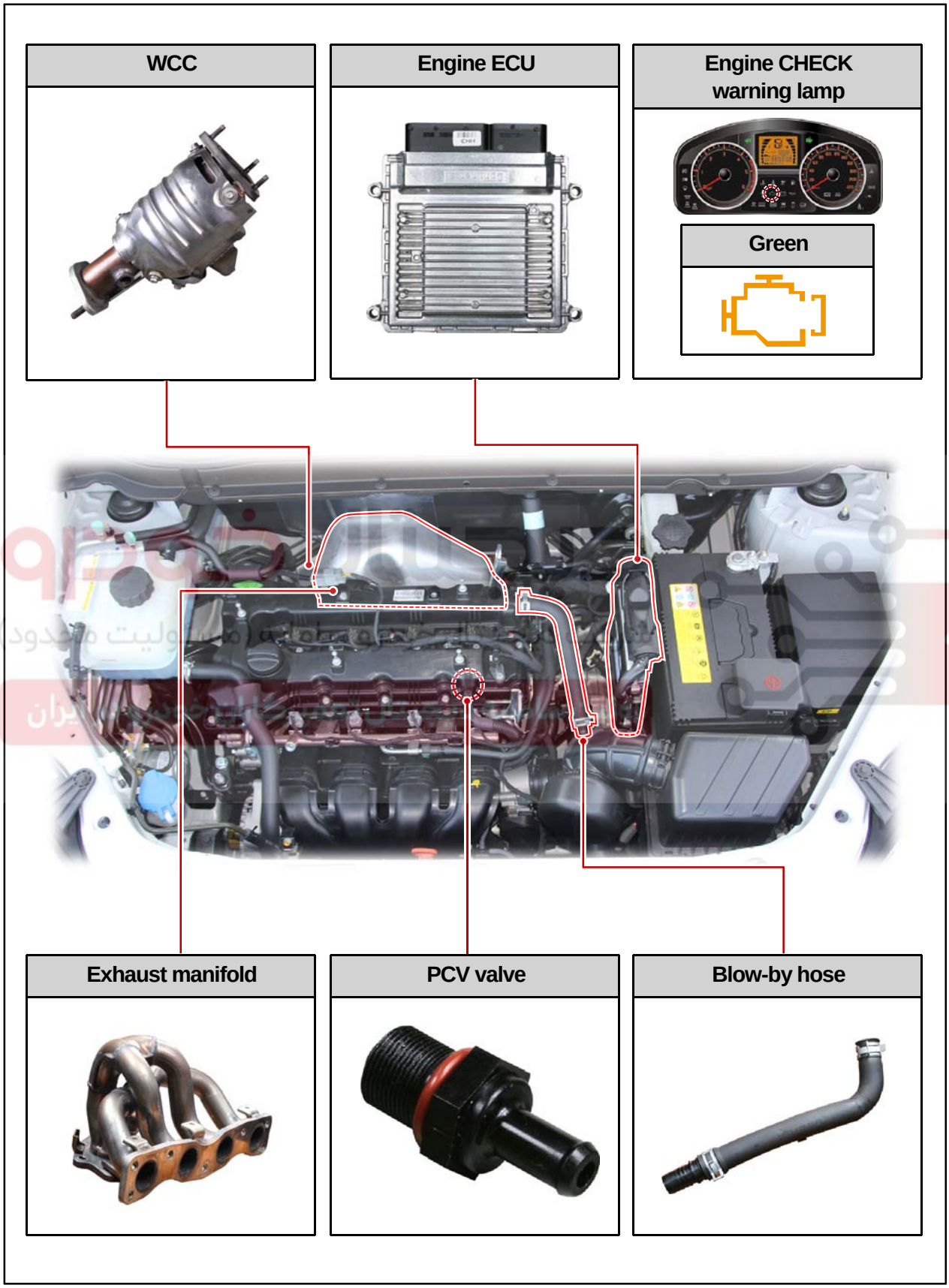


Modification basis	
Application basis	
Affected VIN	

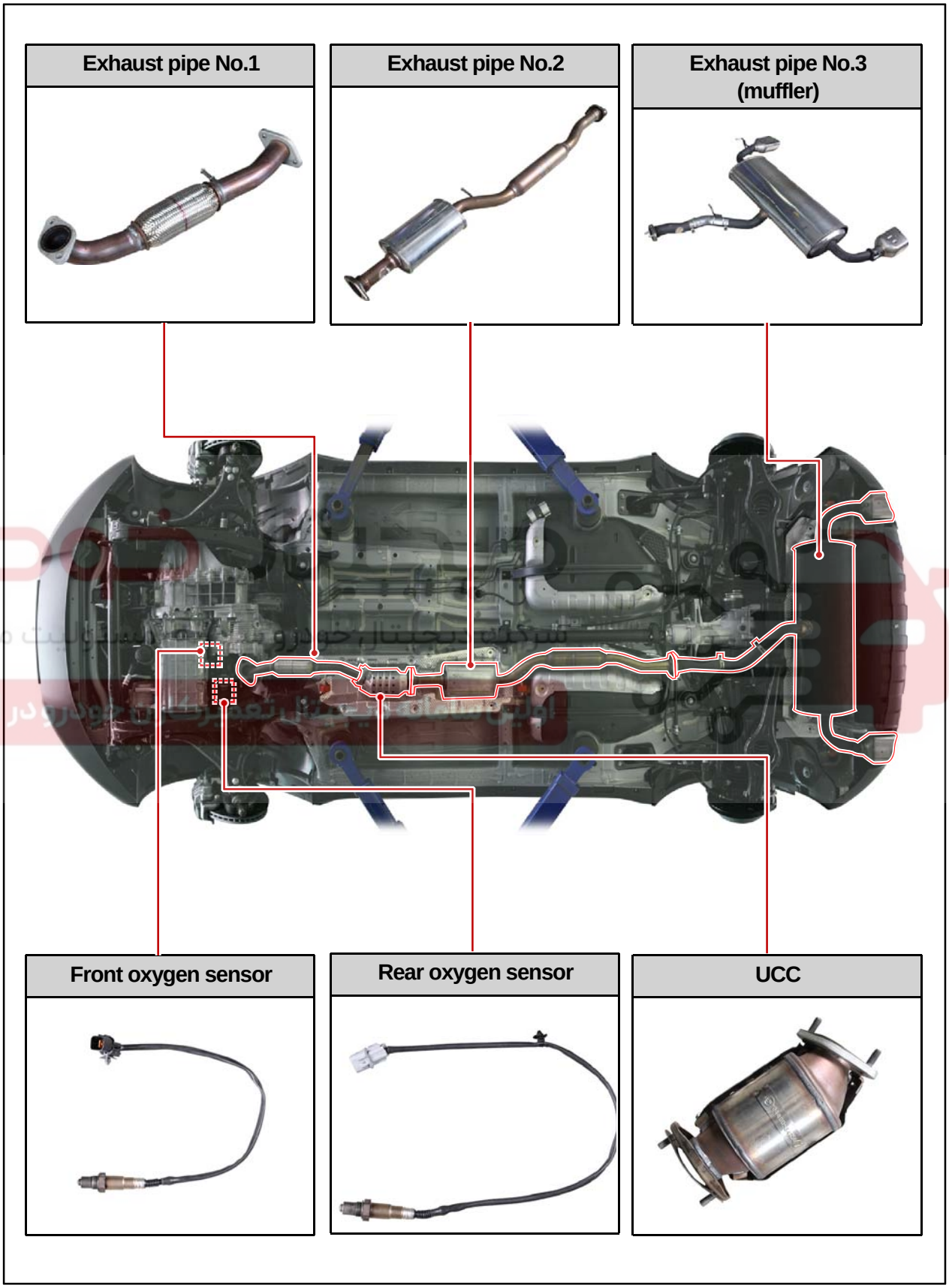
4. INTAKE SYSTEM

Modification basis	
Application basis	
Affected VIN	

5. EXHAUST SYSTEM

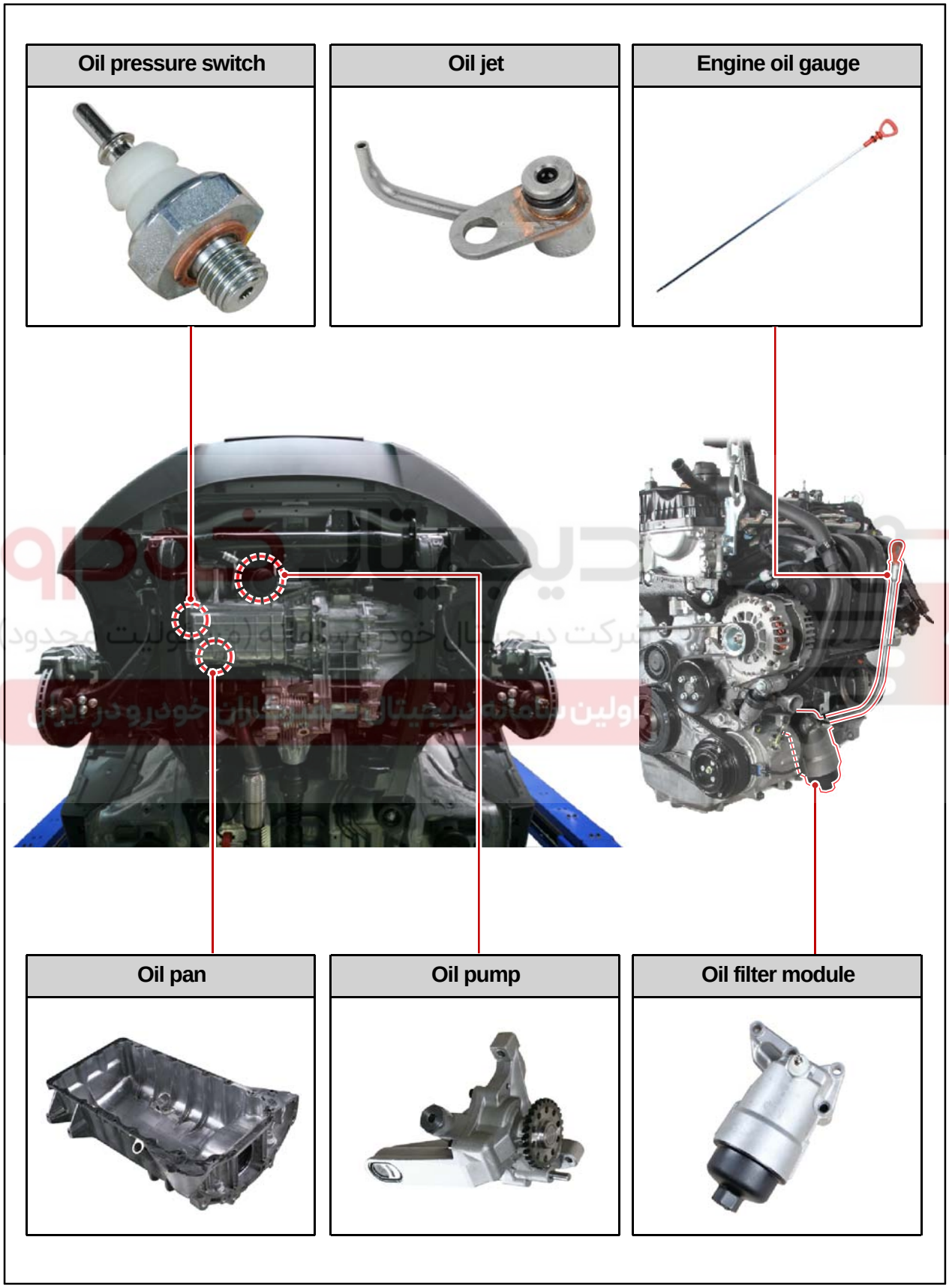


Modification basis	
Application basis	
Affected VIN	



Modification basis	
Application basis	
Affected VIN	

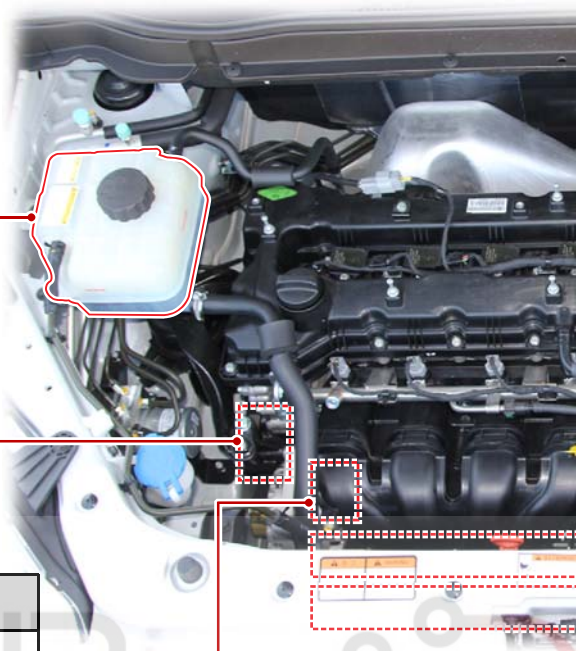
6. LUBRICATION SYSTEM



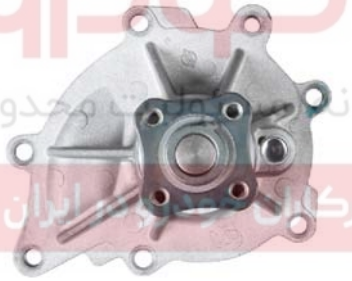
Modification basis	
Application basis	
Affected VIN	

Memo

7. COOLING SYSTEM

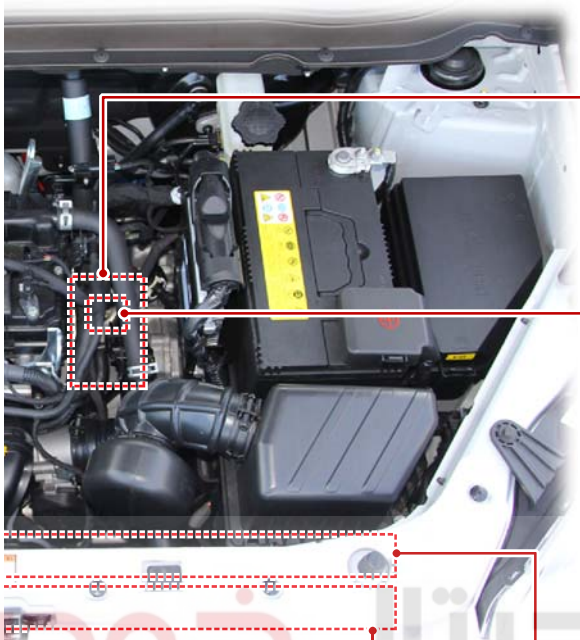


Coolant reservoir


Water pump assembly	
	
The water pump is driven by the engine drive belt and supplies the coolant to each area of the engine.	

Thermostat assembly	
	When the engine coolant reaches 90˚C, the thermostat starts to open (fully open at 100˚C) and lets the coolant flow to the radiator to maintain the engine temperature.

Modification basis	
Application basis	
Affected VIN	



Coolant outlet port

Coolant temperature sensor

Measures the coolant temperature and sends the result to the engine ECU.

Radiator assembly

Releases heat through fins and cools down the hot coolant as the coolant passes through the tube of the radiator core.

FAN

Circulates the fresh air forcibly to exchange heat with the radiator core fin.

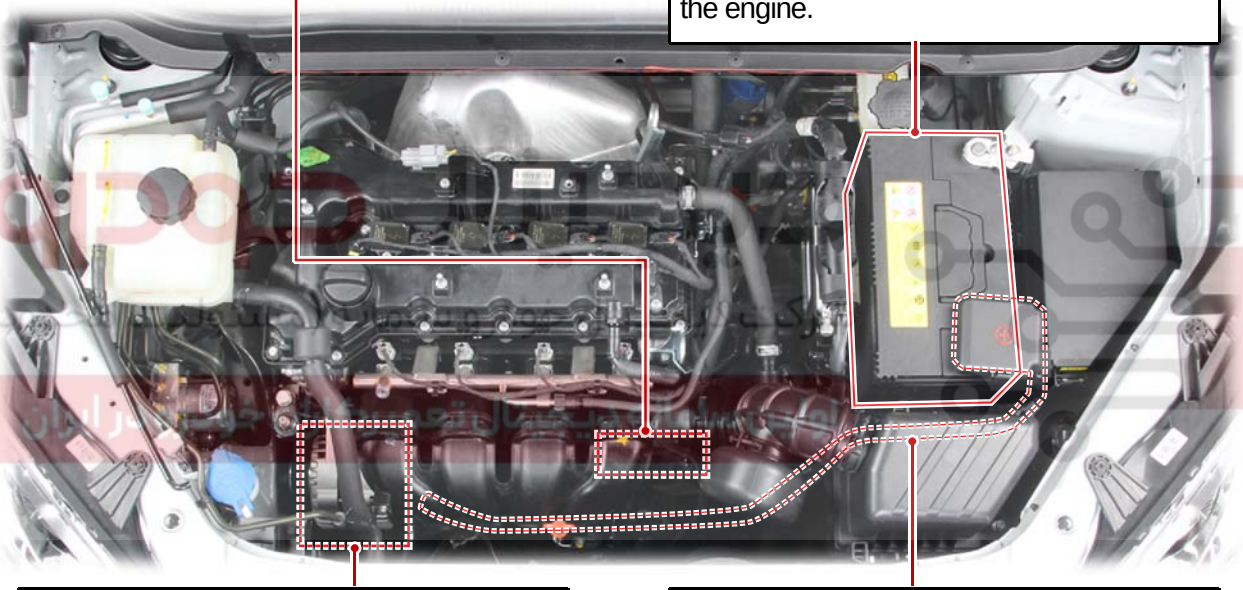
Modification basis	
Application basis	
Affected VIN	

8. ELECTRIC SYSTEM

Start motor assembly

Battery

Converts the chemical energy to the electrical energy and supplies power to the corresponding electric units when starting the engine.



Alternator

Charges the battery and supplies power to each electric unit by converting the mechanical energy to the electrical energy.

B+ wiring

Modification basis	
Application basis	
Affected VIN	