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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



GENERAL INFORMATION

1. SPECIFICATION

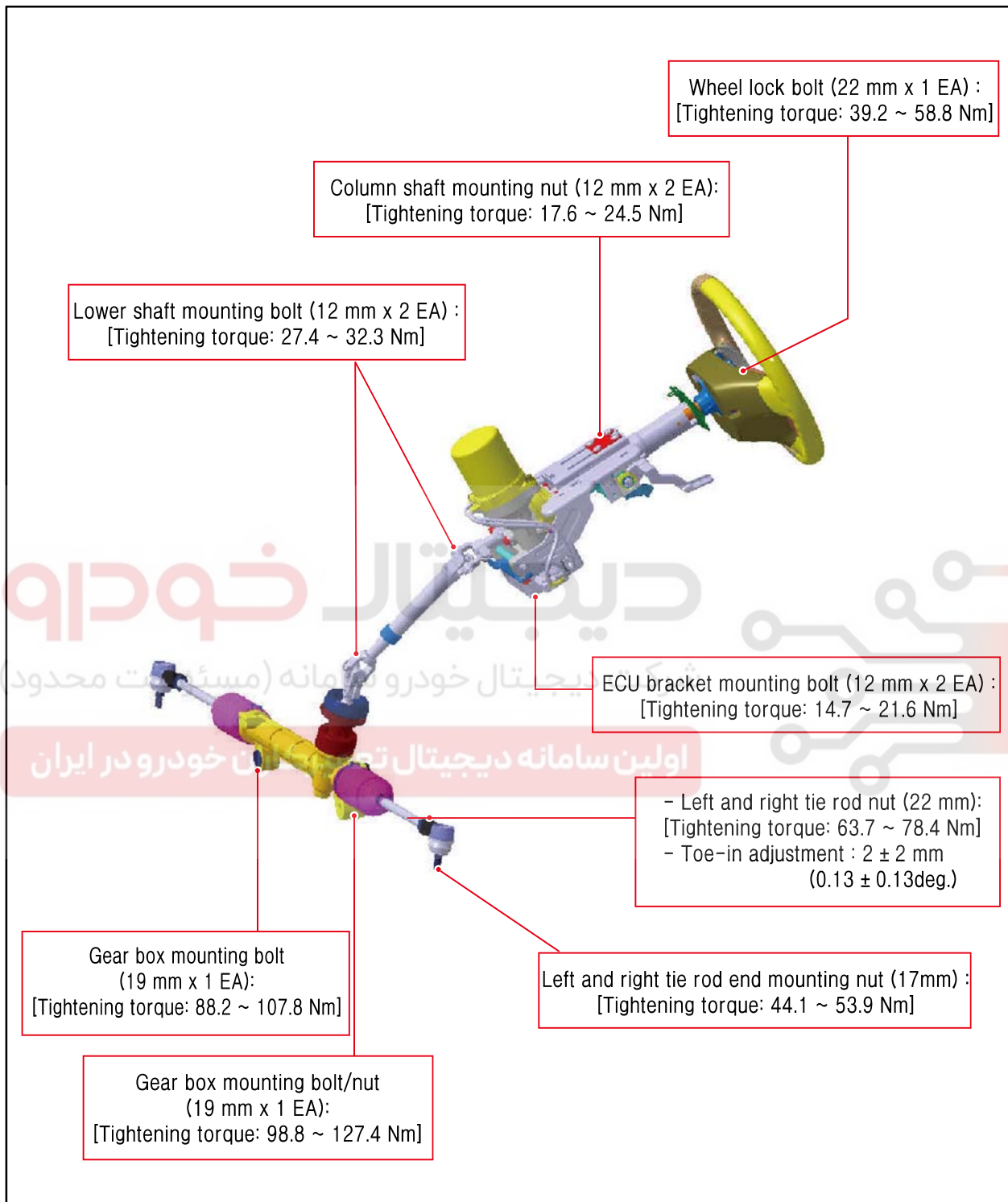
Unit	Description	Specification
System operation	Operating type	Motor driven power steering system
	Operating temperature	- 40°C to 80°C
	Rated voltage	12 V
	Rated current	85 A
Operating voltage	Network	8 to 16 V
	C-EPS ECU	8 to 16 V
	Full Performance	10 to 16 V
Motor	Type	3-Phase BLAC (Brushless AC)
	Rated current/voltage	85 A / 12 V (at idle 0.5 A)
	Position sensor type	Hall sensor type
Torque & angle sensor	Type	Non-contact type
Steering column	Operating type	Manual tilting & telescoping
Lower shaft	Type	Sliding (Ball slip) type
Steering gear	Gear ratio	50.7 mm/rev
	Rack stroke	145 mm
Maximum steering angle	Inner wheel	38.62°
	Outer wheel	31.07°

Modification basis	
Application basis	
Affected VIN	

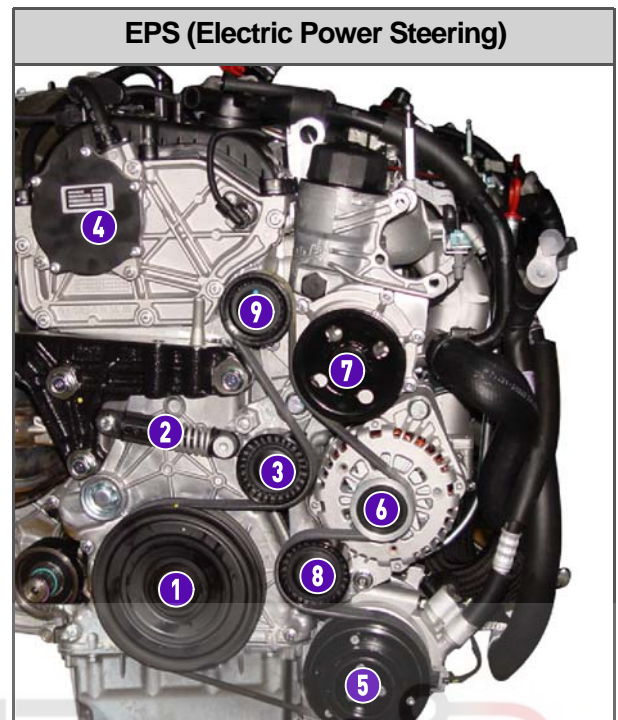
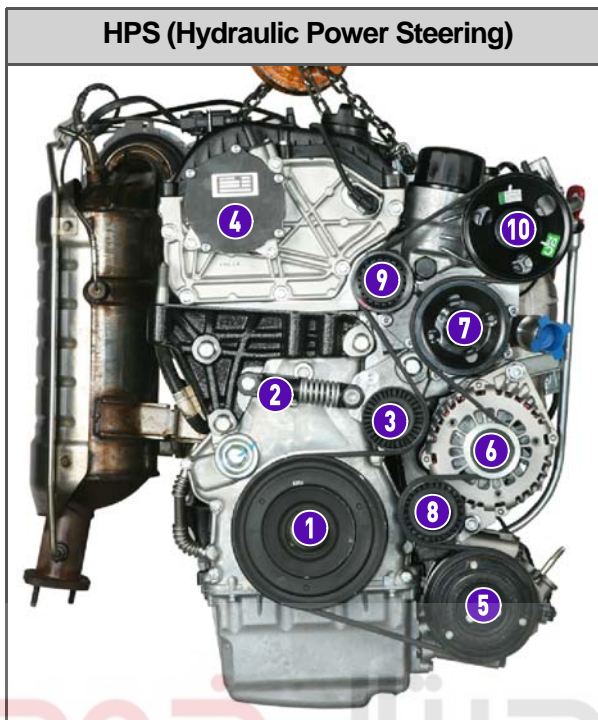
ELECTRIC POWER STEERING

KORANDO 2015.01

2. TIGHTENING TORQUE



3. DIFFERENCES BETWEEN HPS AND EPS



	HPS	EPS
1	Crankshaft pulley (DDU)	←
2	Auto tensioner	←
3	Tensioner pulley	←
4	Vacuum pump	←
5	A/C compressor pulley	←
6	Alternator pulley	←
7	Water pump pulley	←
8	No.1 idle pulley	←
9	No.2 idle pulley	←
10	Power steering pump	-

Modification basis	
Application basis	
Affected VIN	

ELECTRIC POWER STEERING

KORANDO 2015.01

OVERVIEW AND OPERATING PROCESS

1. OVERVIEW

The electric power steering, EPS, does not have any belt-driven steering pump constantly running, so it is lightweight and the motor consumes energy only when the steering wheel is turned by the driver, and this leads to improvement in fuel efficiency. Also, the elimination of a belt-driven pump and its accessories greatly simplifies manufacturing and maintenance. While offering these benefits, as it does not contain any steering oil, the environment is not polluted both when the steering system is produced and discarded.

In other words, the electric power steering (EPS) system uses the electric motor to assist the steering force. It functions independently regardless of whether the engine is running or not, unlike the existing hydraulic power steering.

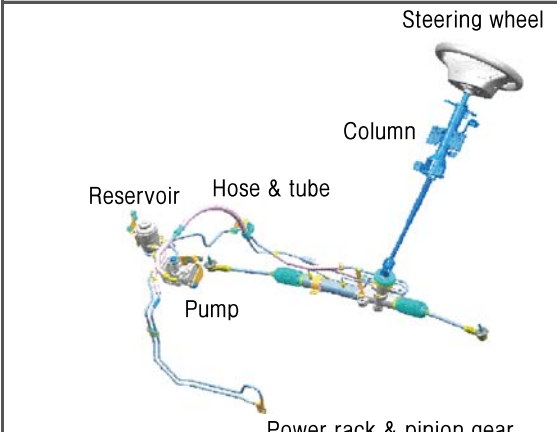
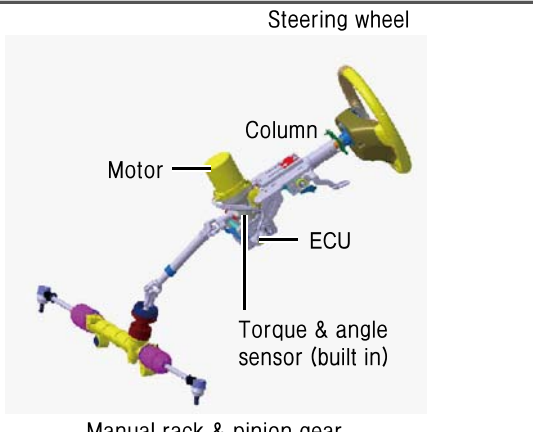
The EPS system generates an assist steering force variably depending on the driving conditions by controlling the motor's operation, based on the input signals from the sensors such as torque sensor and angle sensor. In turn, the EPS receives the torque signal by the driver's movements of the steering wheel, as well as the vehicle speed, and uses the motor to determine the assist torque. The EPS controls the motor for this. Another features of EPS are fail-safe function, diagnosis function, communication function between units and interface function for external diagnostic device.

The EPS system components such as the torque sensor, steering angle sensor, fail-safe relay, etc. are located in the steering column and EPS unit assembly.

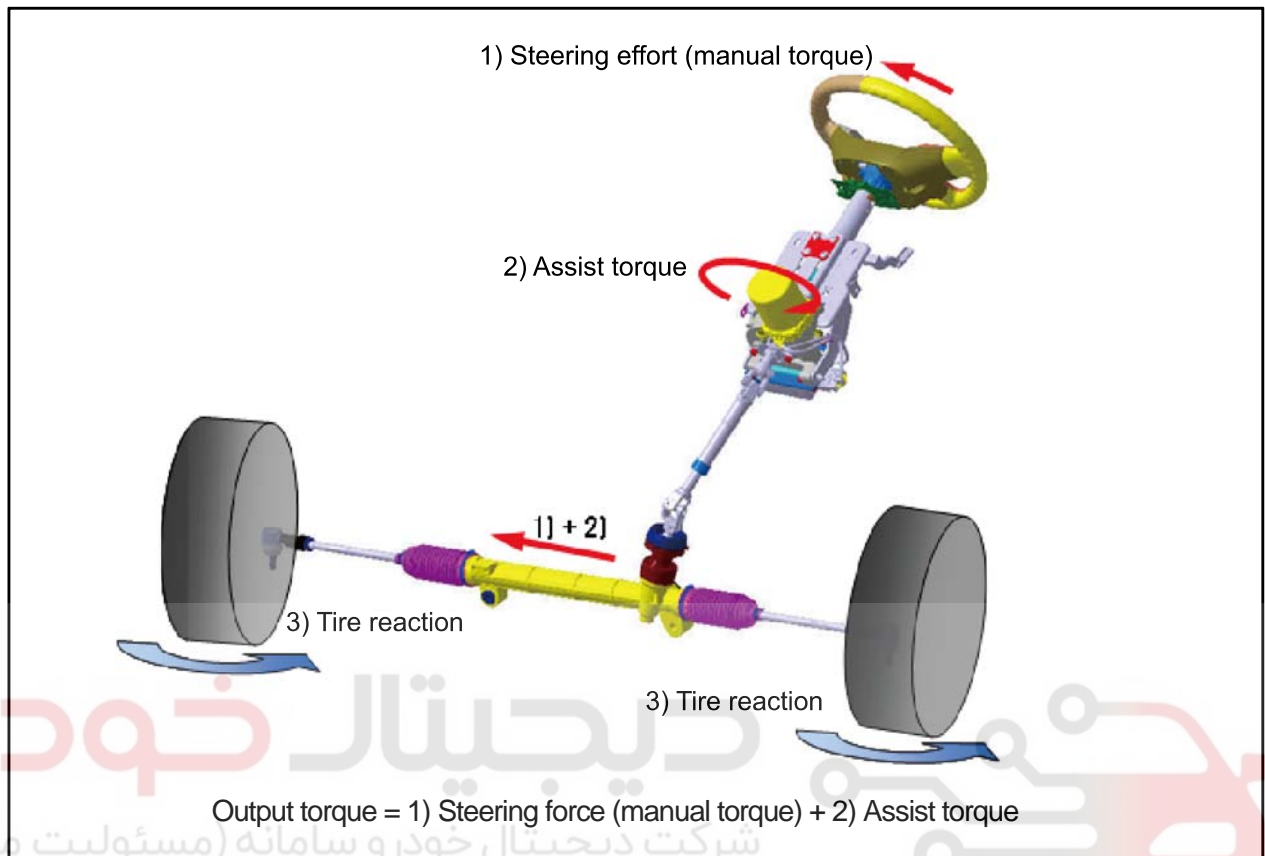
► Advantages:

- | | |
|---|---|
| <p>(1) Assurance of improved steering</p> <ul style="list-style-type: none"> - Provides optimal steering force according to the vehicle speed - Enhanced steering stability while driving at high speed | <p>(2) Reduced fuel consumption</p> <ul style="list-style-type: none"> - Consumes energy only when steering wheel is turned (improved by 3 to 5%) - Energy saving (reduced by 85% compared with hydraulic power steering) - Reduced number of parts: Elimination of steering pump, hydraulic hose, pump pulley, oil reservoir, belt, bracket, etc. |
|---|---|

► Comparison between hydraulic power steering and electric power steering (EPS)

Hydraulic power steering	Electric power steering
	

2. OPERATION

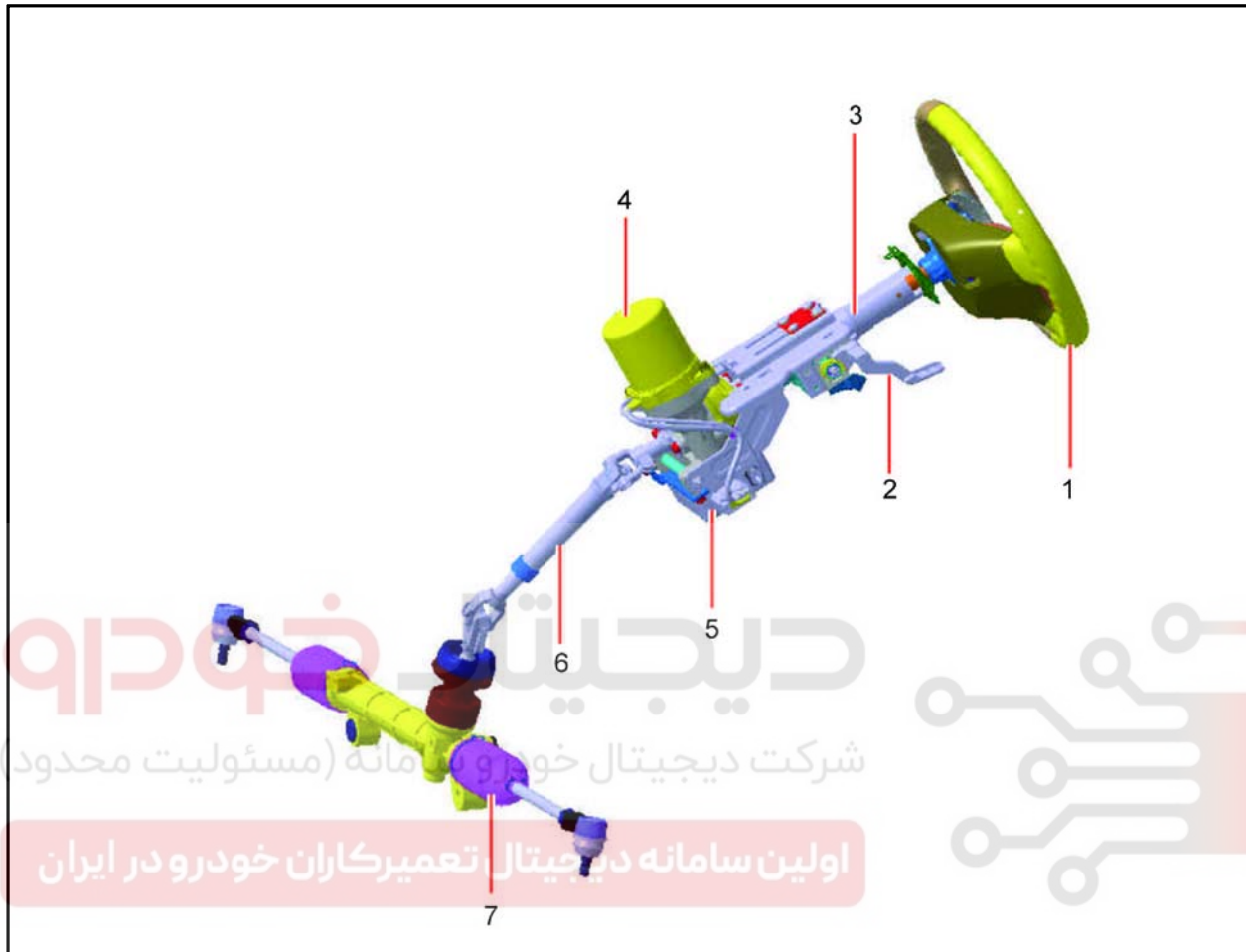


When the driver turns the steering wheel, a torque is generated and the torque sensor and the steering angle sensor in the EPS system detect the rotation of the steering column to run the electric motor. At this time, the worm gear connected to the motor drives the helical gear mounted to the steering column to generate the assist torque for the steering column. This allows the driver to operate the steering wheel easier.

Modification basis	
Application basis	
Affected VIN	

CONFIGURATION AND FUNCTION

1. SYSTEM LAYOUT

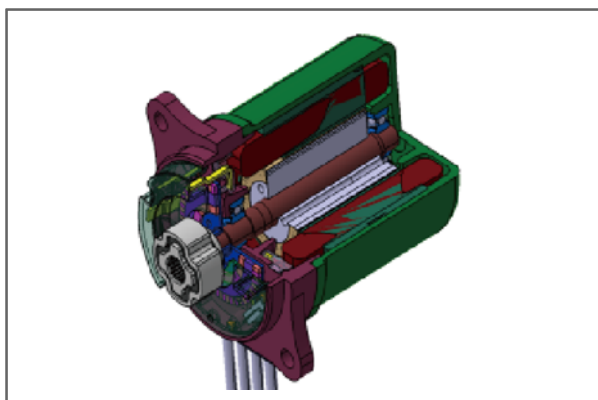


1. Steering wheel
2. Steering wheel tilting & telescopic lever
3. Column shaft
4. Motor
5. ECU
6. Lower shaft
7. Steering gear box

Modification basis	
Application basis	
Affected VIN	

2. COMPONENT

1) BLAC Motor



The BLAC motor is brushless, and while the coil had rotated for the existing DC motor, the magnet rotates. In this way, high power output, high responsiveness, high speed, high torque performance and high heat protection can be achieved.

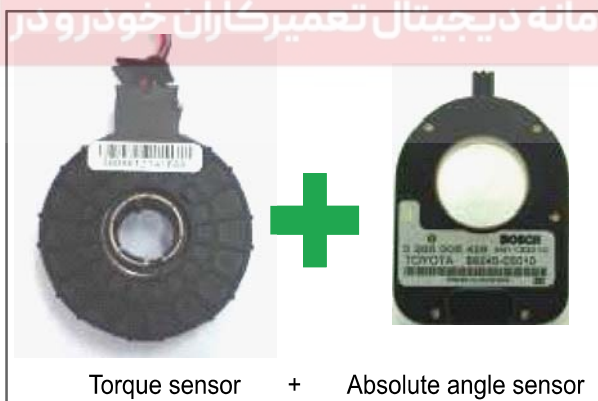
► Advantages:

- High power output density
- Low inertia (high responsiveness)
- High speed/torque performance
- Low maintenance cost
- High torque ratio/inertia ratio
- Good heat protection

2) Torque and Angle Sensor

The torque and angle sensor is one unit. The torque sensor outputs the analogue voltage and the angle sensor outputs two PWM signals.

(1) Torque sensor



Torque sensor + Absolute angle sensor

- Type: Non-contact type
- Operating voltage: $5\text{ V} \pm 5\%$
- Operating temperature: -40°C to 85°C
- Torque output signal: Two output signals
- Torque output voltage: 0.8 V to 4.2 V
- Torque sensitivity: 0.44 V/deg

(2) Angle sensor

- Type: Non-contact type
- Operating voltage: 8 to 16 V
- Repeatability: 1 deg
- Angle speed: Max. $1,016\text{ deg/sec}$
- Angle range: $\pm 720\text{ deg}$
- Locating absolute position after power up
: Power on True Signal Function

Modification basis	
Application basis	
Affected VIN	

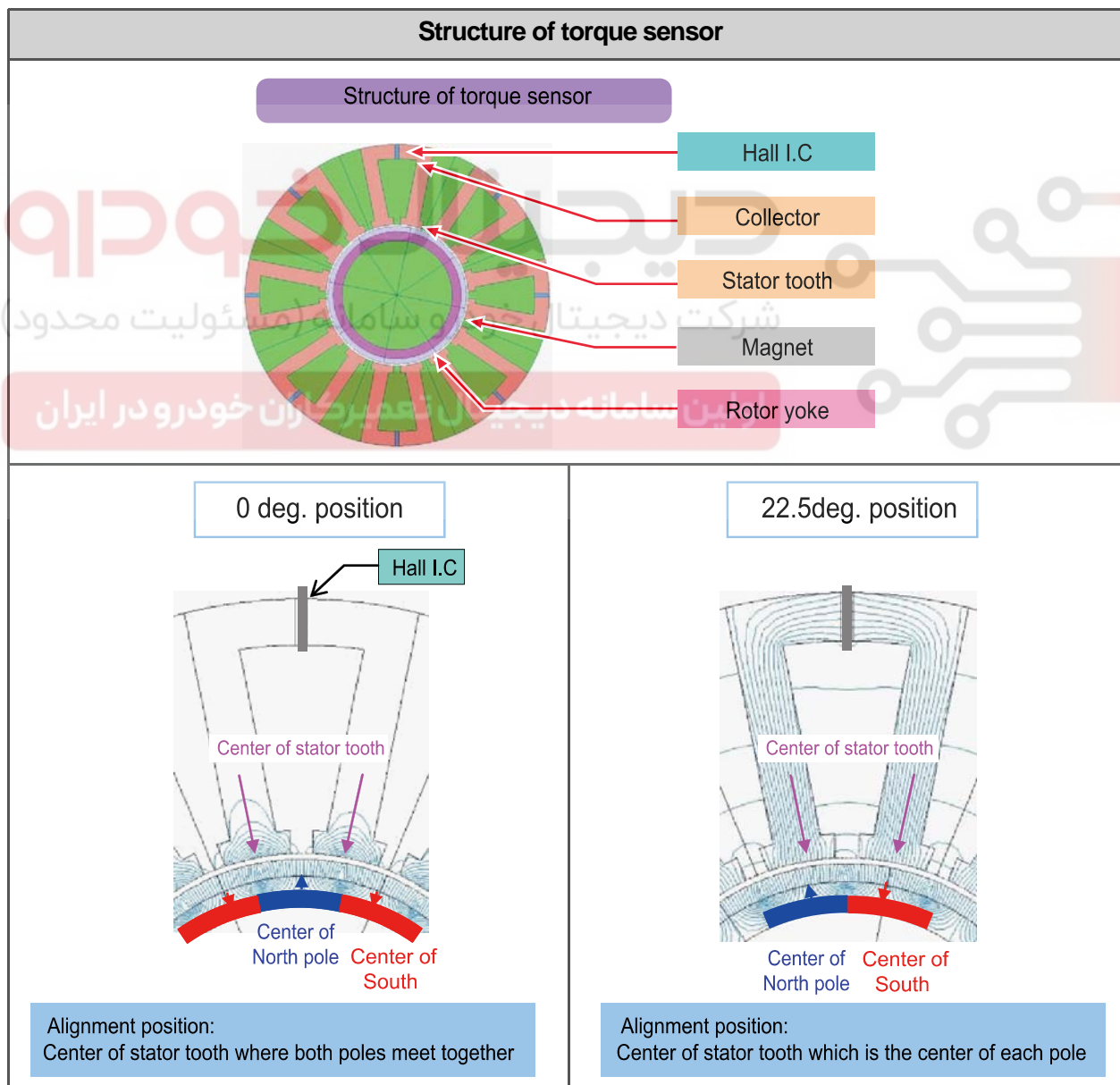
(3) Characteristics

► Torque sensor

- Detection

When a magnetic field is applied to a current flowing through a conductor, the electric current carriers in the conductor experience a force in a direction perpendicular to the magnetic field and current field. The newly developed electric field results in a potential difference and this effect is called Hall-effect. A Hall-effect sensor is based on this effect. The sensor converts the intensity of magnetic field into a voltage value. The torque sensor for EPS system uses a linear hall-IC to convert the value of intensity change in magnetic field strength into a voltage value.

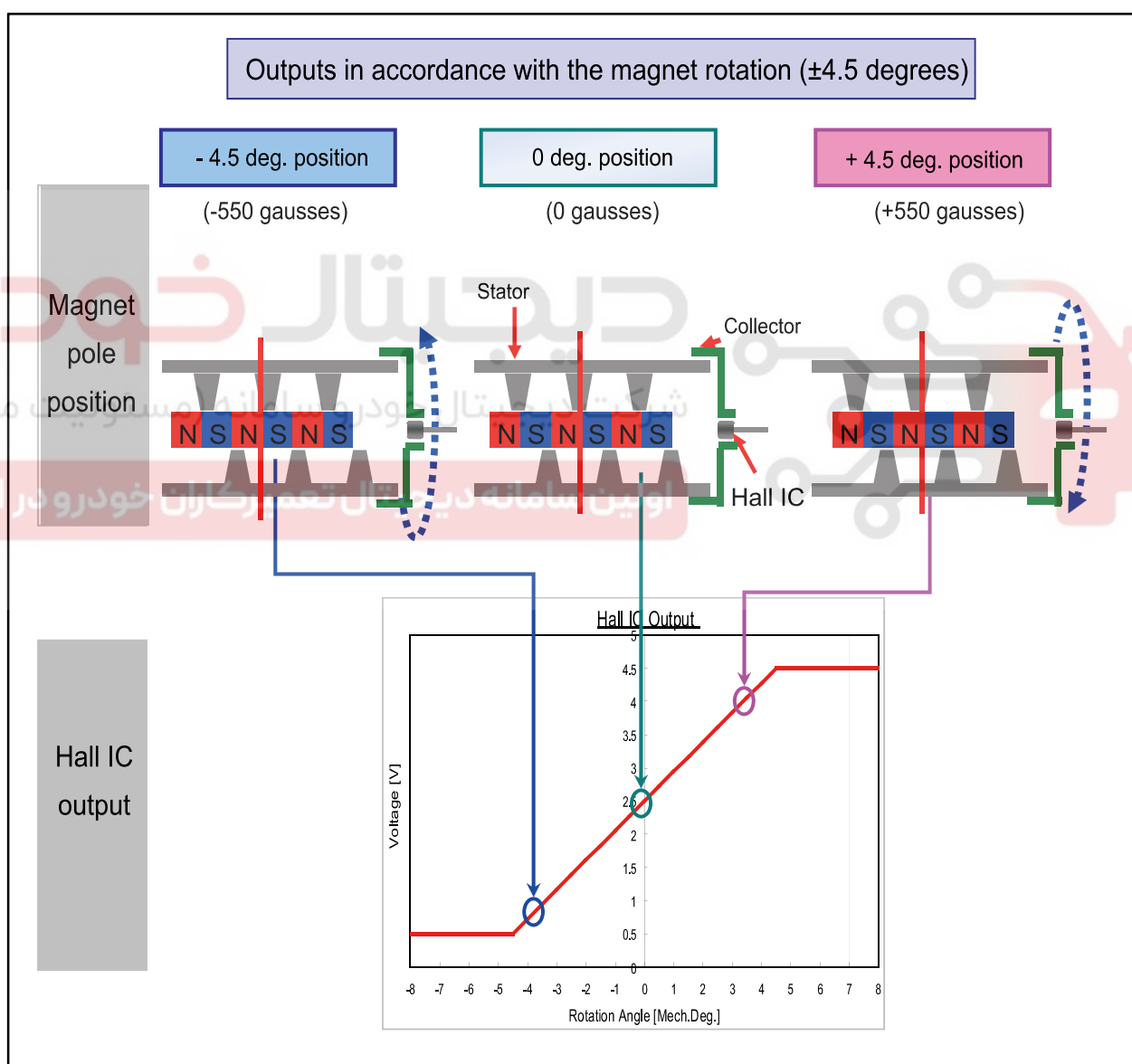
That is, the major function of the hall-effect type torque sensor is to detect the change in magnetic flux around the hall IC in accordance with the twist amount (angle) between the input shaft and the output shaft.



- Operation

The operation range of the torque sensor built in this system, is 2.5 rotations (± 900 degrees) on both sides (left & right) which is the same as that of the steering wheel. And this sensor should detect the twist amount (up to ± 4.5 degrees) between the input shaft and the output shaft within the operation range of the steering wheel.

The torque sensor consists of a permanently magnetized multi-pole (16 poles) magnet rotor with round shape connected to the input shaft of the steering wheel, upper and lower stators connected to the output shaft with a number of teeth which contacts with the magnetized poles, a collector which collects the magnetic flux induced to the stator which rotates as much as the steering wheel rotates, into the hall IC, and a hall IC sensor which converts the value of flux change into a voltage value.



Modification basis	
Application basis	
Affected VIN	

If the twist amount is zero, the magnet rotor poles and the stator teeth are equally spaced. Thus the magnetic flux generated by the permanent magnet cannot be induced to the hall IC.

That is, the flux value around the hall IC is zero. But, if the twist amount is not zero, a contact area difference is made between the permanent magnet poles and the upper & lower stator teeth. This leads to the change in the magnetic flux around the hall IC (with a value corresponding to the contact area difference). As a result, the output voltage value from the hall IC is changed.

When the driver turns the steering wheel counterclockwise while the vehicle is stationary or driven straight ahead, the permanent magnet rotor connected to the input shaft is turned counterclockwise in conjunction with the input shaft; but the upper and lower stators do not rotate as many as the rotor rotates.

If the amount of twist between the rotor and the stator reaches the maximum value (-4.5°), an upper stator tooth contacts completely with a South pole of the magnet and a lower stator tooth contacts completely with a North pole. So the force of magnetic flows from the North pole on the lower stator tooth to the upper stator tooth which rests against the South pole, through the collector. At this time, the magnetic flux increases to its maximum level around the hall effect sensor positioned in the collector.

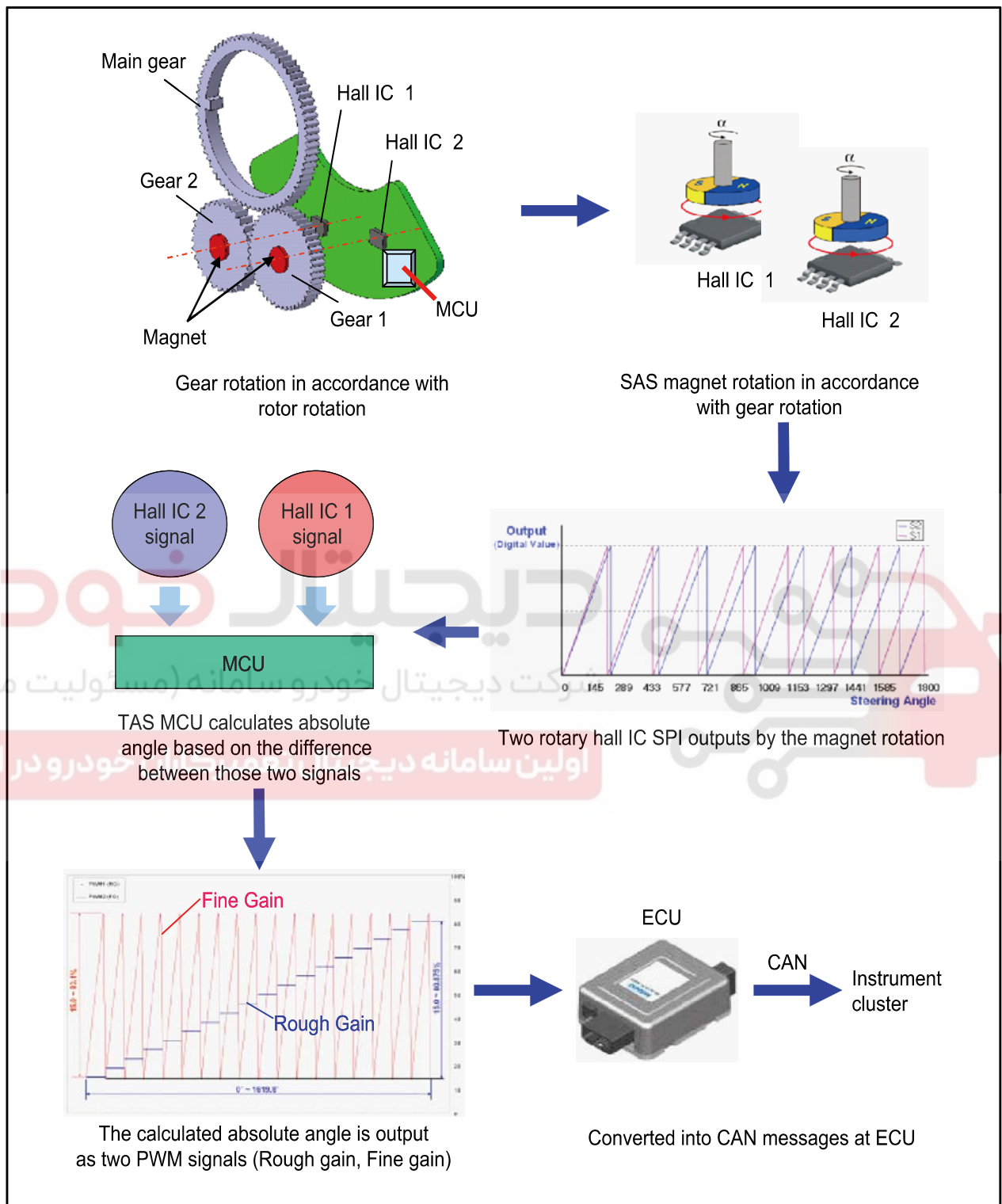
The relation between the twist amount and the contact area of the stator teeth and the permanent magnet is linear in the range between 0° and -4.5° . And the contact area has linear relation to the magnetic flux generated around the hall IC. The magnetic flux is converted into voltage as a output value, therefore the output voltage and the twist amount also have a linear relation.



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► Angle sensor



Modification basis	
Application basis	
Affected VIN	

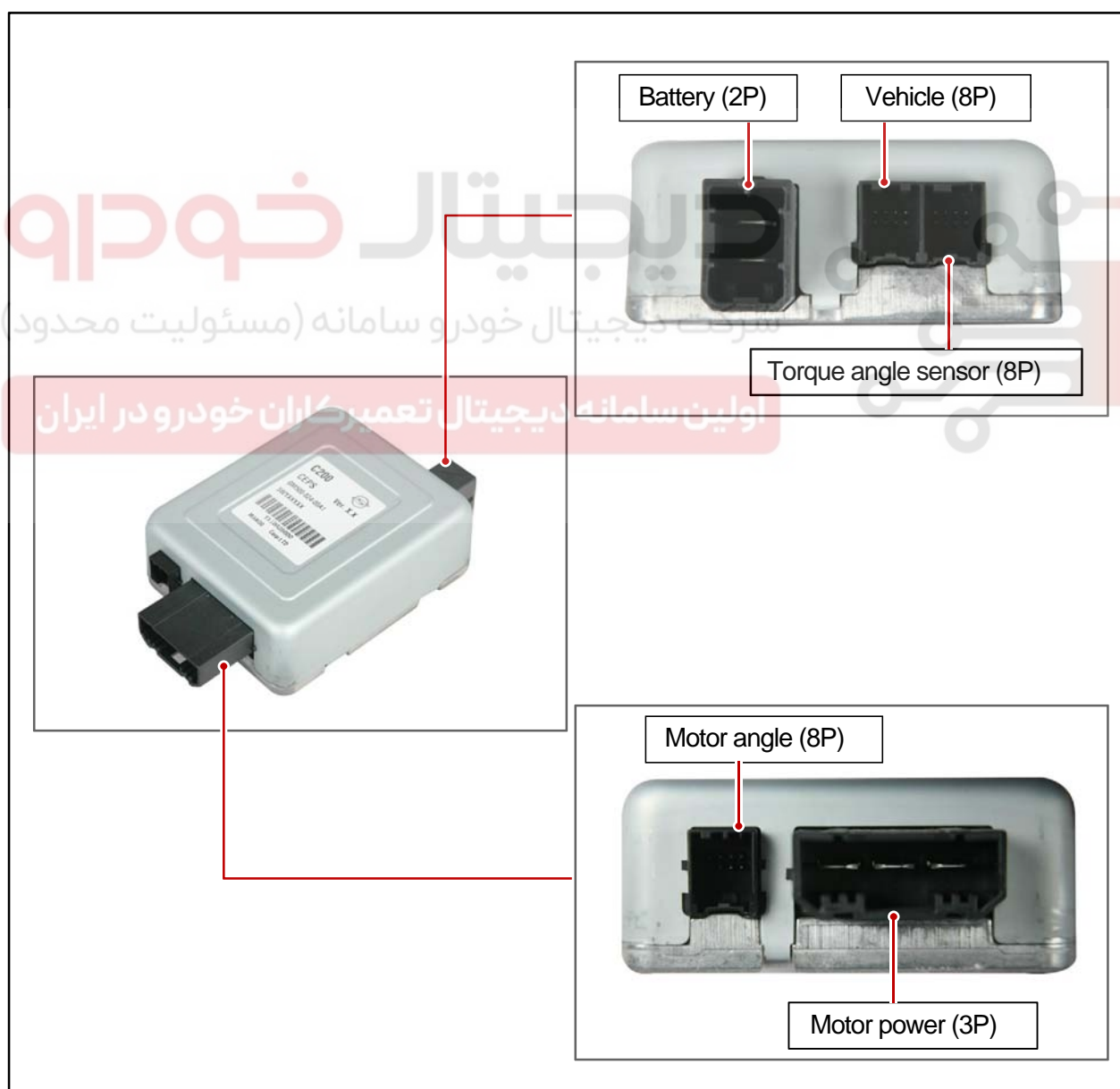
3) EPS ECU

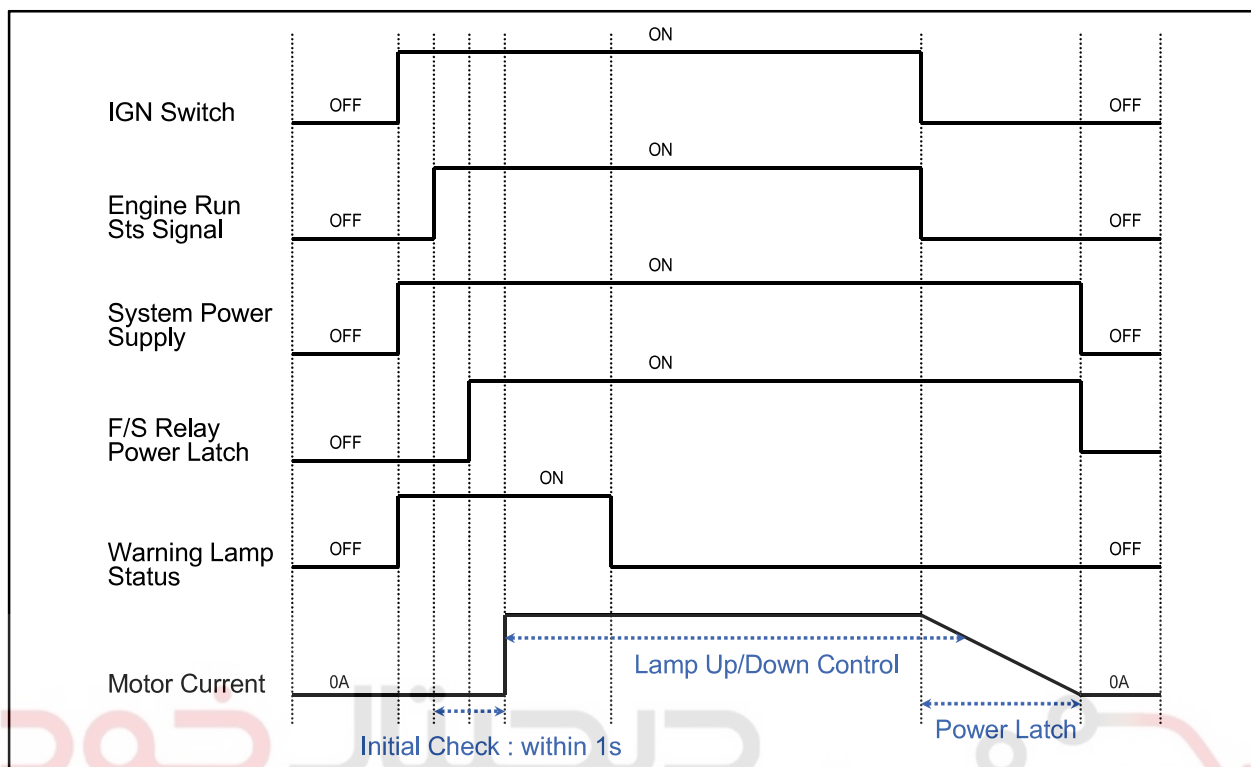


The ECU controls the electric power steering system depending on the driving conditions, based on the signals from the torque and angle sensor.

- Location: Steering column
- Operating voltage range: DC 8 V to 16 V
- Operating temperature range: -40°C to 80°C

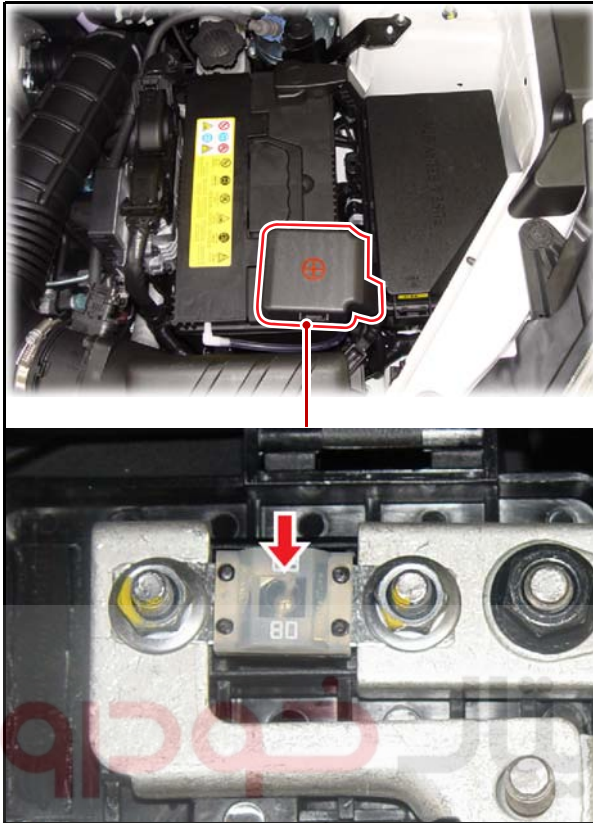
(1) External connection terminal



(2) EPS ECU operation**(3) Warning lamp turning on conditions**

Mode	EPS lamp	Remark
Initial check	ON	
Faulty EPS (Major fault)	ON	Serious faults, including a torque sensor signal error, defective motor, internal defect, etc.
Faulty EPS (Mild 1 fault)	ON	Faults that can be rectified such as problems regarding battery, insufficient ignition power, etc.
Faulty EPS (Mild 2 fault)	OFF	Faults that can be partially controlled such as incorrect messages, O.H.P, issues regarding vehicle speeds, etc.
EPS in operation	OFF	
Diagnostic mode	Flashing (1 Hz)	
Normal condition	OFF	
CAN error (Signal not received by instrument cluster, BUS OFF, message time out)	ON	EPS warning lamp comes ON if a CAN error has occurred within the same ignition cycle.
EPS not reinstalled after removal	ON	See active lamp specifications

Modification basis	
Application basis	
Affected VIN	

(4) Fuse For EPS

- The vehicle with EPS has EPS fuse (80A) mounted to the positive (+) terminal of the battery, and this fuse supplies power to the EPS unit directly.

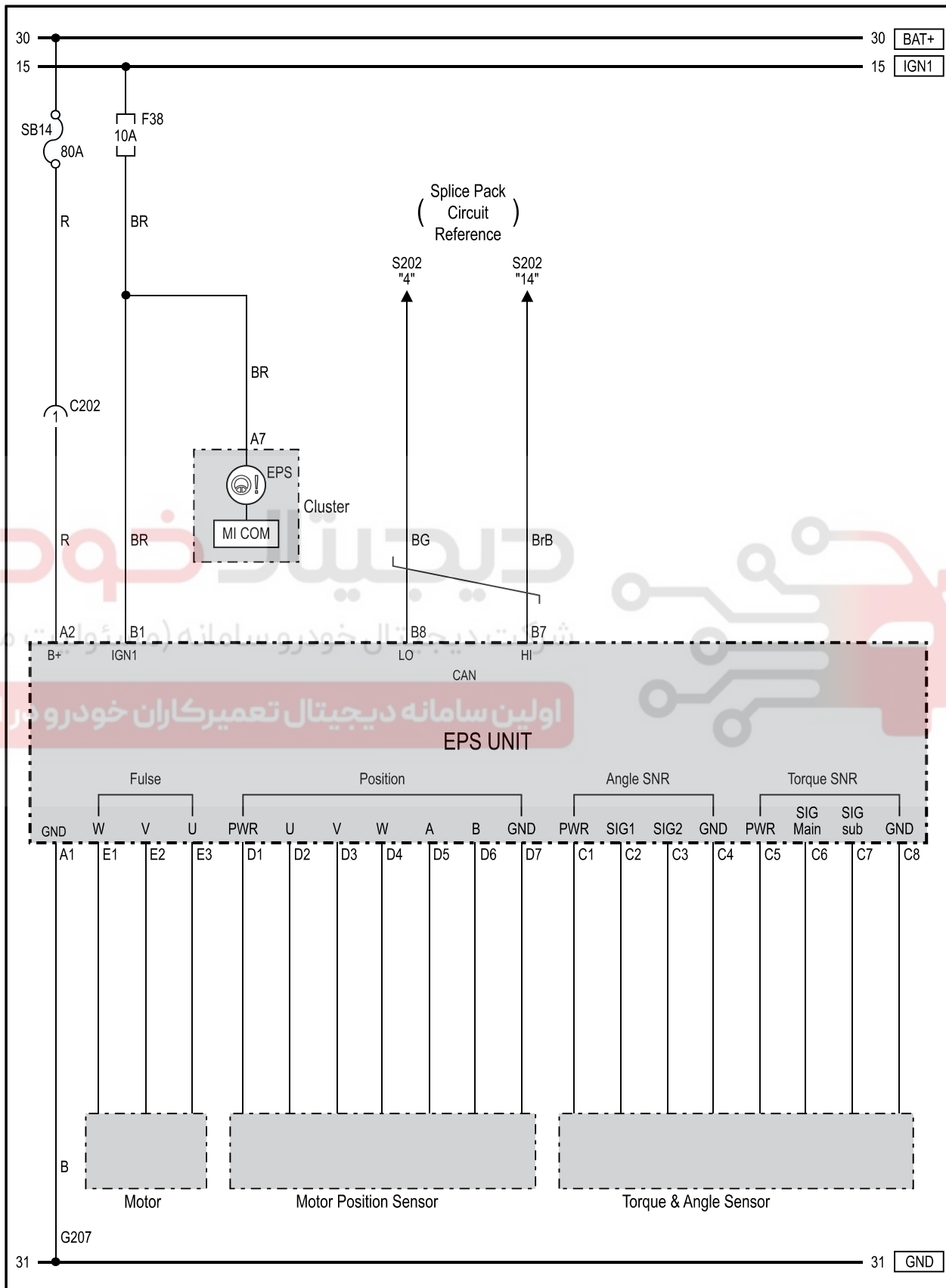
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Modification basis	
Application basis	
Affected VIN	

3. CIRCUIT DIAGRAM



Modification basis	
Application basis	
Affected VIN	

REMOVAL AND INSTALLATION

S.G.N.

4610-00

CAUTIONS FOR OPERATION &
MISDIAGNOSIS CASES

1) Cautions For Operation

Possible causes	Related parts	Vehicle symptom	Cause	Cautions
Drop, impact and overload	Motor	Noise increase	-Possible to cause internal damage without deformation and leads to uneven load distribution when using any dropped parts -Motor/precise parts in ECU are sensitive to vibration and impact and malfunction may arise -Excessive load weight causes unexpected faults	-Do not use the EPS exposed to an impact -Do not load weight more than the weight of the product itself to each part
	ECU	Malfunction due to broken circuit -Out of welding point -Damage to PCB -Damage to precise parts		
	Torque sensor	Impaired steerability due to torque sensor malfunction	Torque sensor malfunctions when applying excessive weight load to input shaft	-Do not impact when working on the connections -Always use the specified tool when removing steering wheel (do not use a hammer) -Do not use the EPS exposed to an impact
	Shaft	-Impaired steerability (not same on left and right sides) -Difficult installation resulting from shaft's deformation		

Possible causes	Related parts	Vehicle symptom	Cause	Cautions
Pull/ Dent	Harness	-Malfunction (impossible to switch on) -Unstable EPS performance	Harness connection and harness itself will be disconnected	-Do not load to the harness -Avoid an excessive use of EPS
Incorrect storage temperature/humidity	Motor/ECU	Poor steerability due to malfunctioning motor/ECU	-Waterproof is available in normal conditions but water in the parts may lead to breakdown -A small amount of water can lead to malfunction of motor/precise parts in ECU	-Store at room temperature and proper humidity -Avoid water penetration due to e.g. rain

1. Never impact the electronic parts. If those parts are exposed to a large impact such as dropping, you should replace them with new ones.
2. Do not keep the electronic parts in a place with high temperature and humidity.
3. Do not touch the connector terminal by your hands since problems may arise due to deformation and static electricity.
4. Never impact the motor and torque sensor. If those parts are exposed to a large impact such as dropping, you should replace them with new ones.
5. You should connect and disconnect the connector with the ignition off.

Modification basis	
Application basis	
Affected VIN	

2) Misdiagnosis Cases

(1) Over heat protection control

1. When the driver turns the steering wheel and the twist between the input shaft and the output shaft occurs, the motor generates an assist torque.
2. If the driver keeps the steering wheel at the maximum steering angle, the steering wheel is stopped rotating by the stopper but the torque signal is generated continuously.
3. If the motor keeps running according to the torque signal, it becomes overheated and results in system breakdown.
4. To prevent this, the C-EPS ECU gradually reduces the assist torque. (This can be confirmed by checking the current output using a diagnostic device.)
5. As the motor control level decreases, the steering effort continues to increase.
6. This is not a malfunction but a simple C-EPS control to prevent the motor from overheating.



NOTE

If the vehicle is equipped with EPS and is stationary, turning the steering wheel to the left or right end over a long time triggers the overheating protection and you may feel the steering becomes heavy. But it is not a malfunction and the system will be restored to its original status.

(2) Operating sound of C-EPS

For the vehicles with C-EPS, the motor is installed inside the vehicle, so the driver may misunderstand the operating sound of the motor as a noise. However, the system makes the following sounds during normal operation:

1. C-EPS ECU operating sound (clicking sound): Occurs about 1 sec after turning ignition key to on/off position
2. Motor operating sound (whining sound): Occurs primarily when the steering wheel is operated suddenly
3. Contact sound of outer ring in the worm shaft bearing (knocking sound): Can occur at the decelerator when driving on a poor road
4. In other cases, when creaking noise are heard, check the EPS assembly and check-tighten the bolts on the body.



NOTE

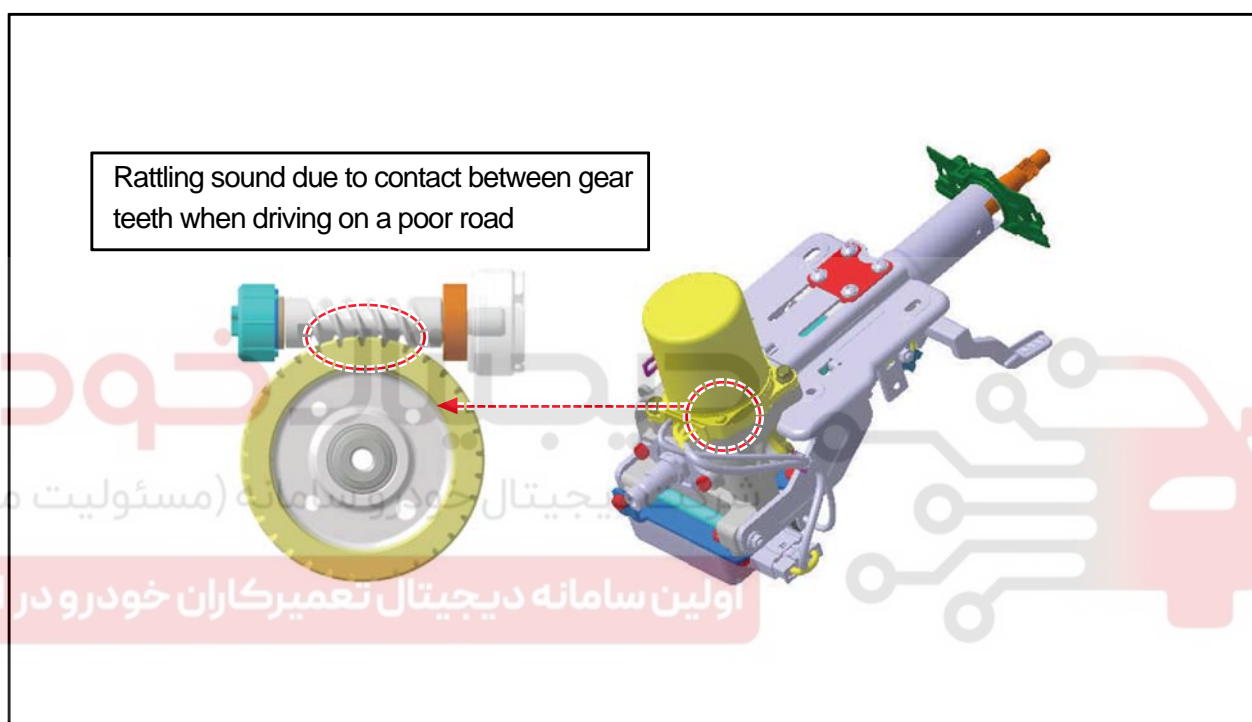
If one of the following occurs while no warning lamp on the instrument cluster is turned on, the EPS is operating normally.

- The steering effort becoming heavy during the time for C-EPS system diagnosis (1 sec) right after starting the engine, then it returns to normal.
- After turning the engine ON or OFF, a clicking relay sound is heard but this is not defective.
- When the steering wheel is turned while the vehicle is stationary or driving at low speed, a motor operating sound may be heard. This occurs when the power steering motor rotates and is not defective.

(3) EPS operation delay and operating sound

If one of the following occurs while no warning lamp on the instrument cluster is turned on, the EPS is operating normally.

- The steering effort becoming heavy during the time for EPS system diagnosis (1 sec) right after starting the engine, then it returns to normal.
- After turning the engine ON or OFF, a clicking relay sound is heard but this is not defective.
- When the steering wheel is turned while the vehicle is stationary or driving at low speed, a motor operating sound may be heard. This occurs when the power steering motor rotates and is not defective.

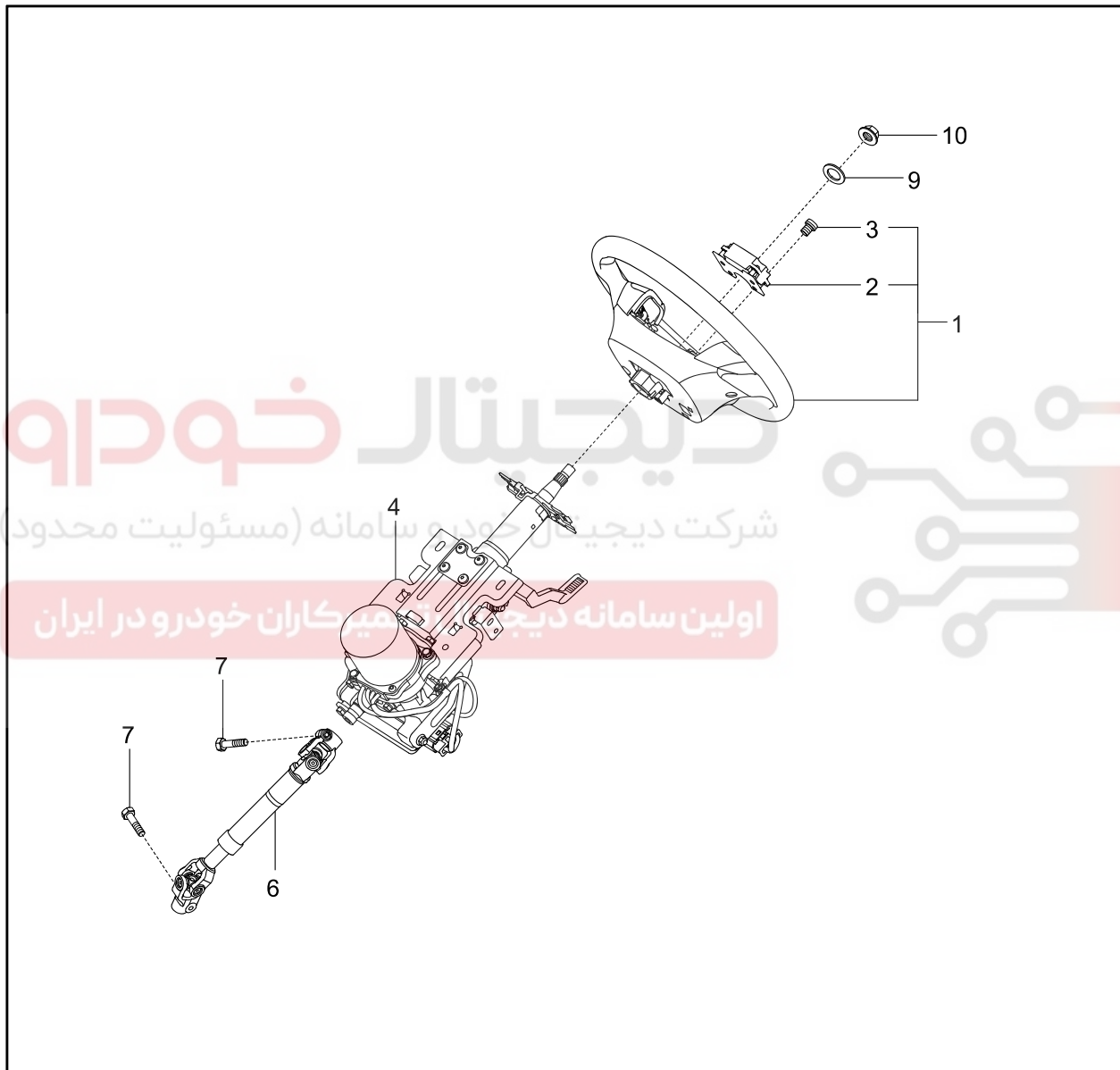


Modification basis	
Application basis	
Affected VIN	

S.G.N.

4610-04 STEERING COLUMN AND SHAFT**NOTE**

The column shaft can be removed in a similar way as in the hydraulic power steering, but removal of the EPS ECU connector is added.

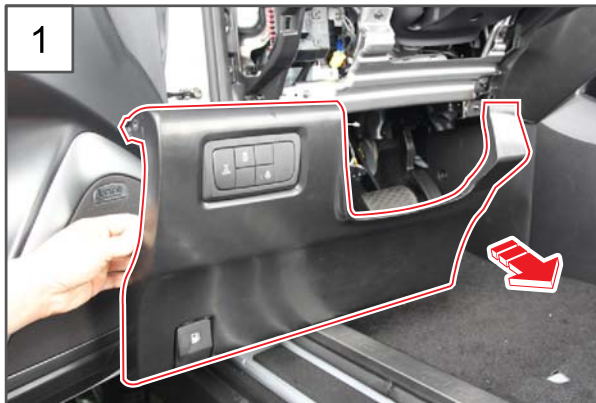
► Component

- 1. Body compl - Steering wheel
- 2. Damper - Steering wheel
- 3. Screw
- 4. Column & shaft assy - Tilt & tele

- 6. Shaft assy - LWR
- 7. Bolt - Joint
- 9. Washer
- 10. Nut

Modification basis	
Application basis	
Affected VIN	

Preceding work - Aim the wheels straight ahead and disconnect the negative battery cable.



1. Remove the LH lower main panel.



NOTE

Refer to "LH LOWER MAIN PANEL" under "REMOVAL AND INSTALLATION" in "BODY INTERIOR" chapter.

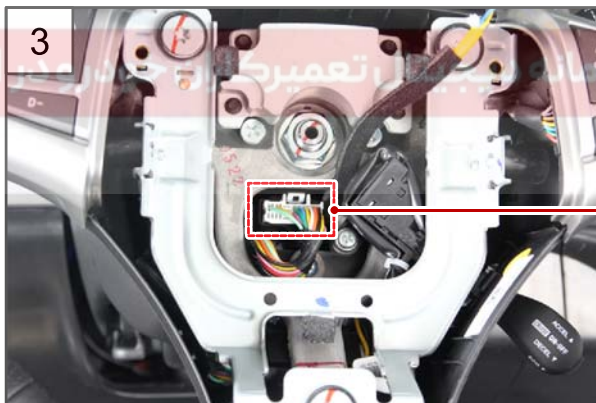


2. Remove the driver air bag.

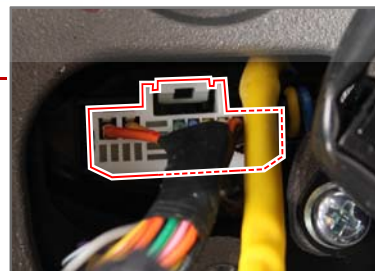


NOTE

Refer to "DRIVER AIR BAG" under "REMOVAL AND INSTALLATION" in "AIR BAG SYSTEM" chapter.



3. Disconnect the connector connected to the steering wheel.



4. Remove the one steering wheel mounting nut (22 mm).

Tightening torque 39.2 ~ 58.8Nm

Modification basis	
Application basis	
Affected VIN	

**NOTE**

Paint marks on the steering wheel so that the center is aligned when installing the steering wheel.



5. Remove the steering wheel.

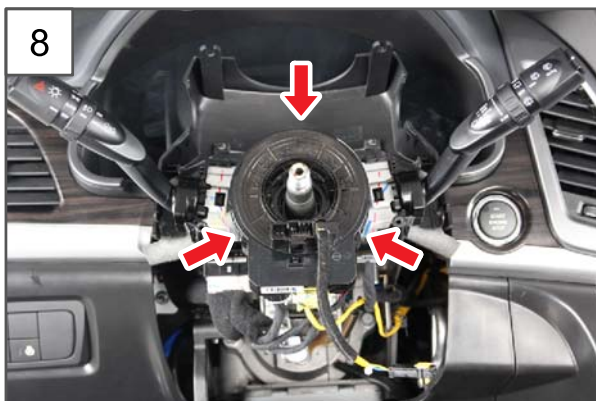


6. Unscrew the 3 shroud lower panel mounting screws.



7. Remove the shroud lower panel.

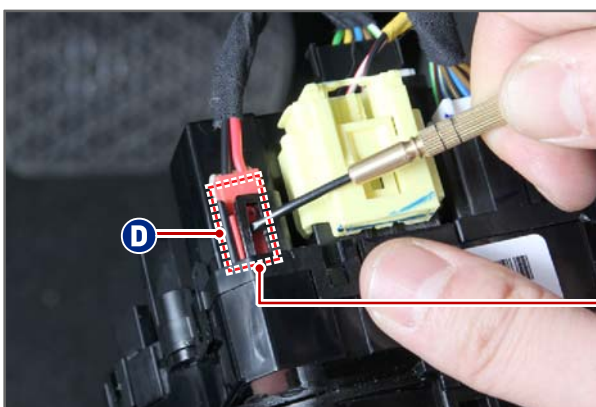
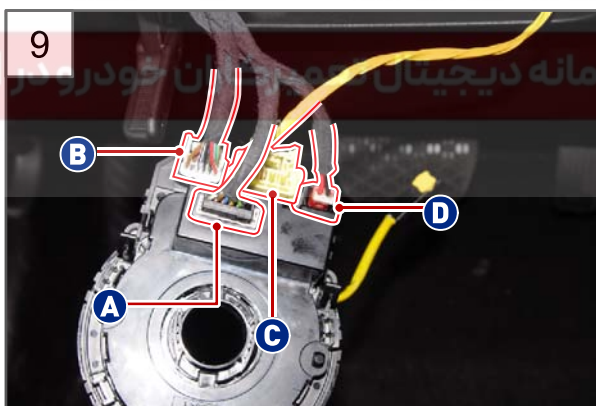
Modification basis	
Application basis	
Affected VIN	



8. Disengage the mountings (3 points) and remove the contact coil assembly from the column shaft.

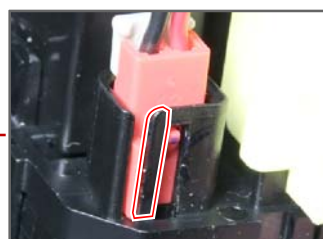


9. Disconnect the connectors (A), (B), (C), and (D) connected to the contact coil assembly.



NOTE

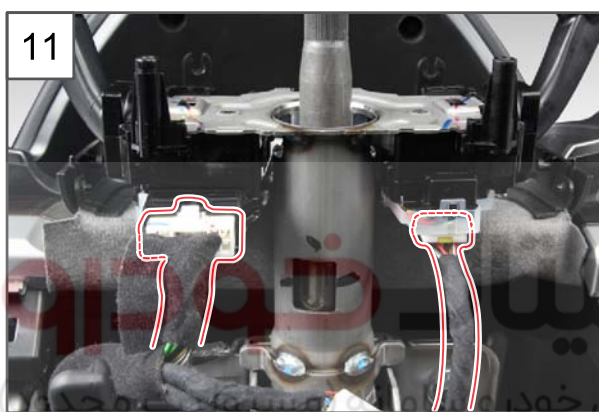
Carefully remove the connector (D) with a screw driver inserted between the grooves making sure not to damage it.



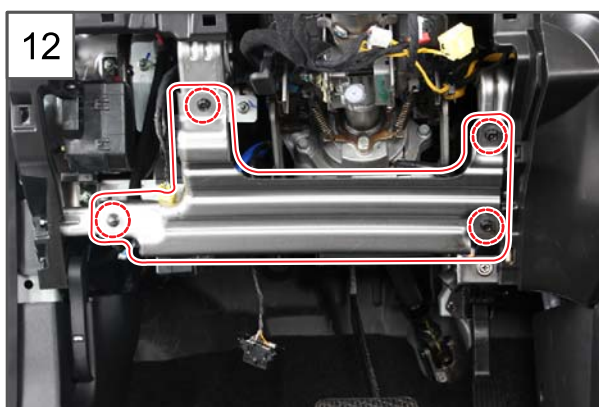
Modification basis	
Application basis	
Affected VIN	



10.Remove the contact coil assembly.



11.Disconnect the light switch (A) and wiper switch (B) connectors from the column shaft and remove the each switch.

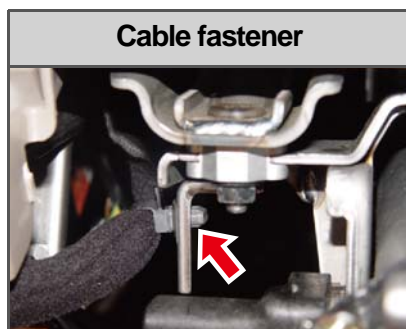
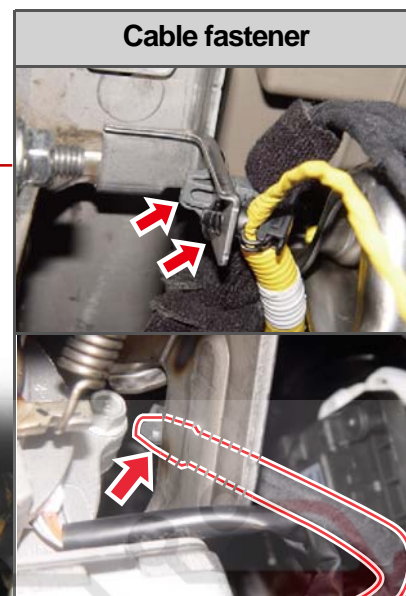
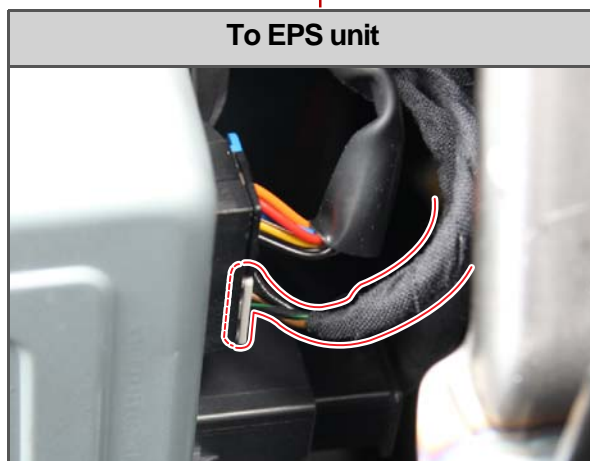
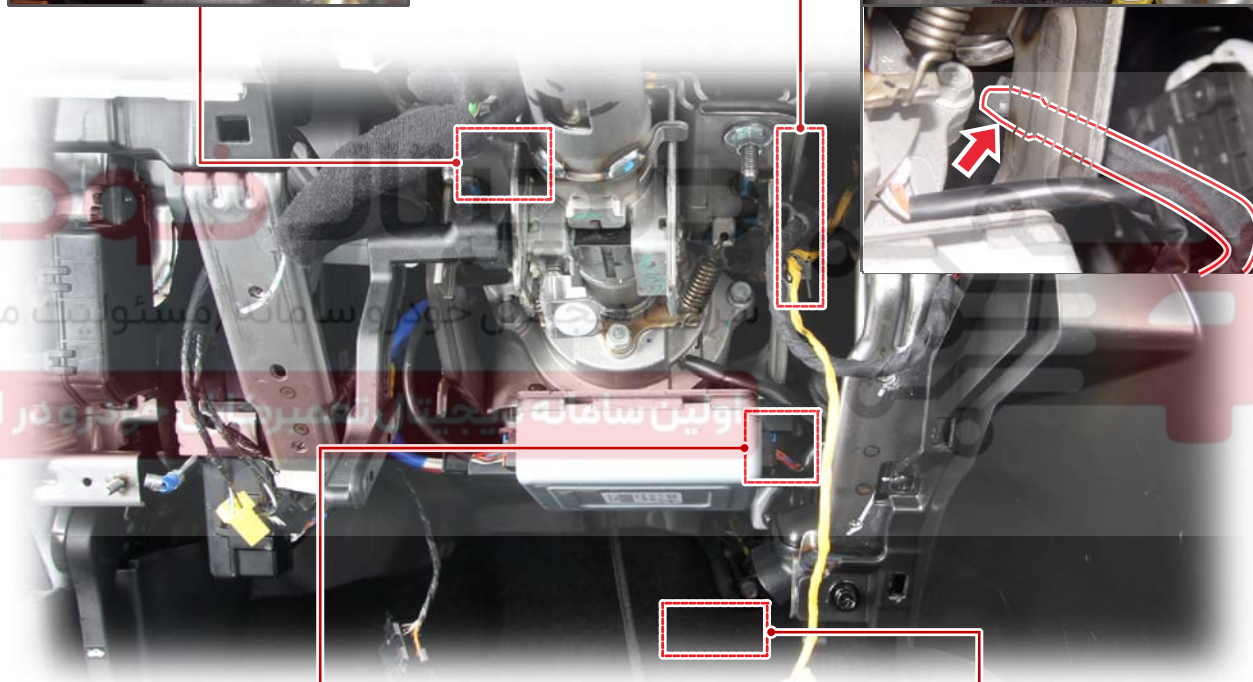


12.Unscrew the 4 mounting bolts and nuts (10 mm) to remove the knee bolster bracket.

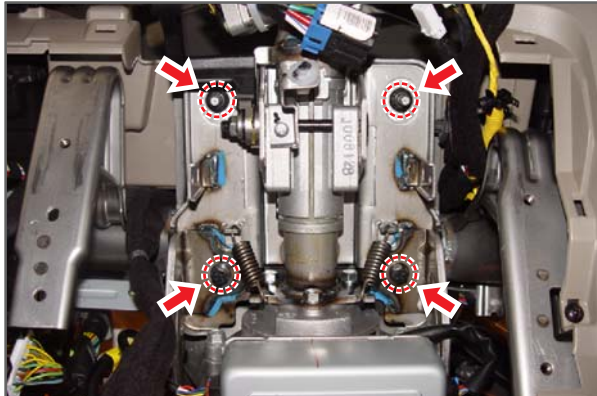
13. Remove the wiring fastener connected to the steering column shaft and the power connector to the EPS unit and unscrew the one lower shaft lower mounting bolt (12 mm).

**CAUTION**

Make an assembly mark (arrow) on the lower shaft and the steering gearbox shaft and remove them.

**Cable fastener****Cable fastener****To EPS unit****Lower shaft lower mounting bolt
(12 mm, 1 off)**

Modification basis	
Application basis	
Affected VIN	



14. Unscrew the mounting bolts/nuts (12 mm) from the column shaft.

Tightening torque 19.6 ~24.5Nm

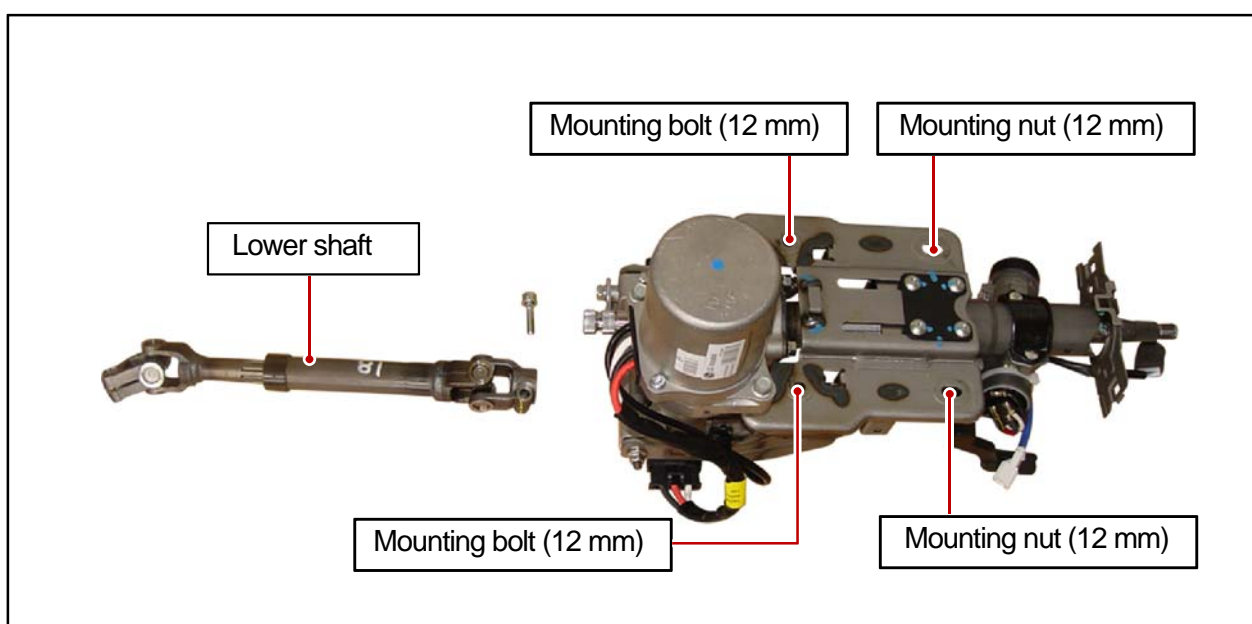


15. Remove the steering column shaft assembly, and then separate the column shaft from lower shaft.

CAUTION

Put a match mark (arrow) on the column shaft and lower shaft.

Tightening torque 24.5 ~29.4Nm



16.Disconnect the three ECU connectors from the removed column shaft and unscrew the two ECU bracket mounting bolts (12 mm) to remove the ECU assembly from the column shaft.

How to disconnect motor angle (8P) connector

1. Release the mounting lock (A) on the motor angle connector and disconnect the motor angle connector.

Tightening torque 14.7 to 21.6 Nm

Unscrew the two ECU bracket mounting bolts (12 mm).

ECU removed

Modification basis	
Application basis	
Affected VIN	

CHASSIS GENERAL
DSI 6 SPEED
ASIN 6 SPEED
HPT 6AT(6F2
6-SPEED M/T
CLUTCH
PROPELLER
DRIVE SHAFT
SUSPENSION
AWD
BRAKE SYSTEM
ANTI-LOCK
ELECTRONIC
POWER STEERING
ELECTRIC POWER
WHEEL & TIRE
SUB FRAME

17. Unscrew the three bracket mounting bolts (10 mm) from the removed ECU assembly to disconnect the ECU and the brackets.



18. Install in the reverse of removal, and take care the following things:

CAUTION

1. When fitting the contact coil to the column shaft, turn the contact coil clockwise until it stops and turn it counterclockwise 2.5 turns so that it is neutral position.
2. When connecting the ECU connectors, make sure that the mounting lock on the motor angle connector is engaged firmly.

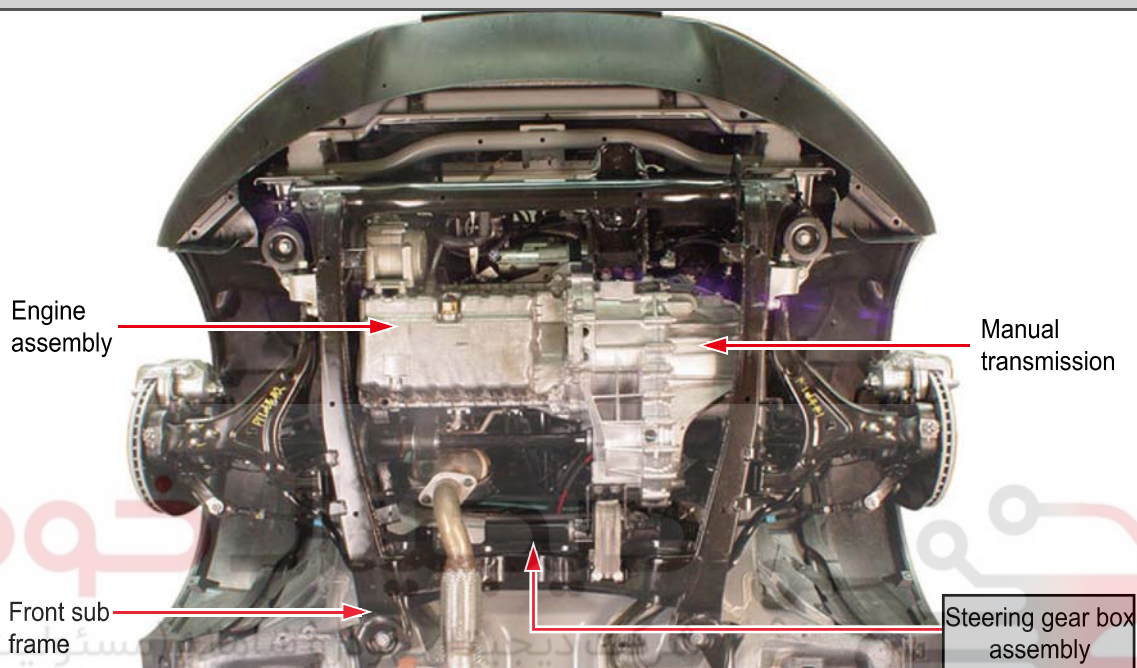
Modification basis	
Application basis	
Affected VIN	

S.G.N.

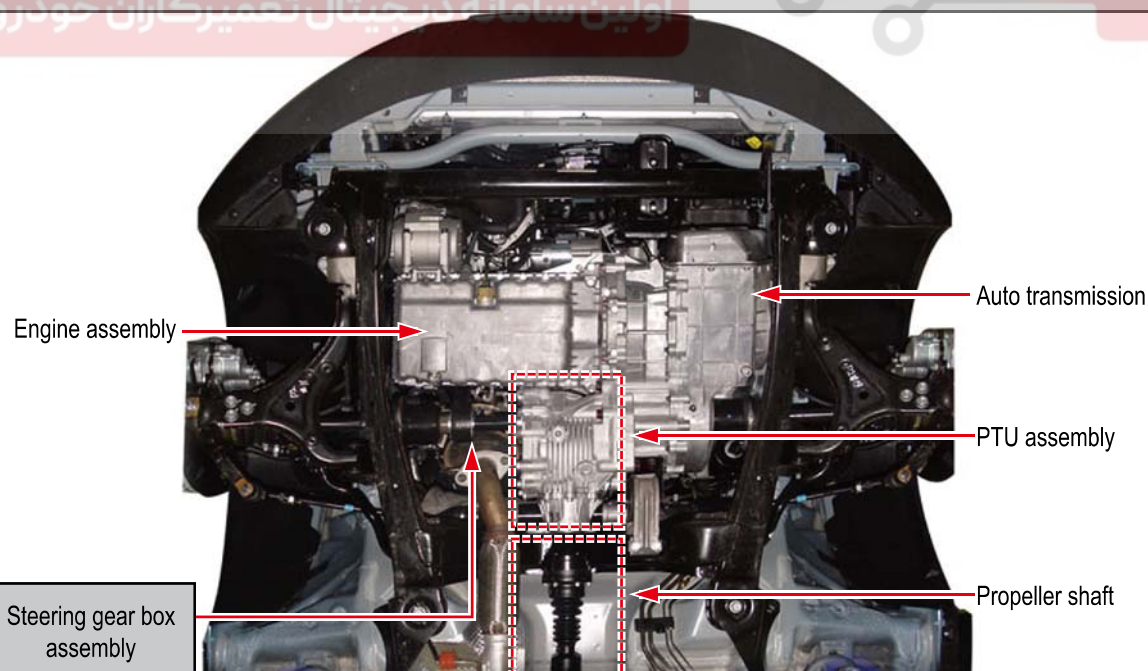
4620-01 STEERING GEAR BOX

The following description is based on the 2WD vehicle. You can see the work for the 4WD vehicle (removal of propeller shaft and PTU) by the text "Only for 4WD vehicle". Other works are the same for both vehicles.

View from below (2WD vehicle)



View from below (4WD vehicle)



Modification basis	
Application basis	
Affected VIN	

ELECTRIC POWER STEERING

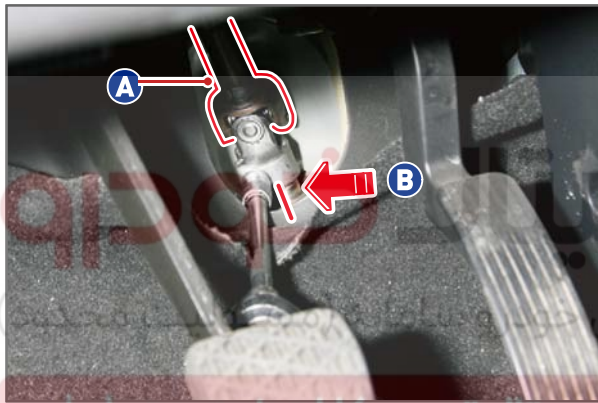
KORANDO 2015.01

Preceding work

- Disconnect the negative cable from the battery.
- Lift up the vehicle with a 2-post lift safely.
- Remove the front tires and under cover.



1. Set up the engine support hanger on engine hanger bracket.

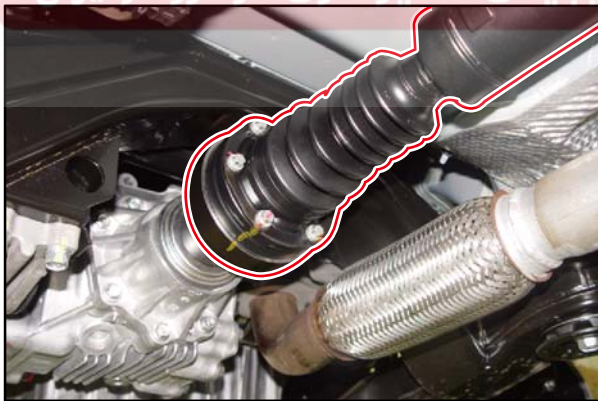


2. Unscrew the joint bolt (12 mm) on the lower shaft (A) and steering gear linkage.

CAUTION

Put a match mark (B) on the lower shaft and steering gear linkage.

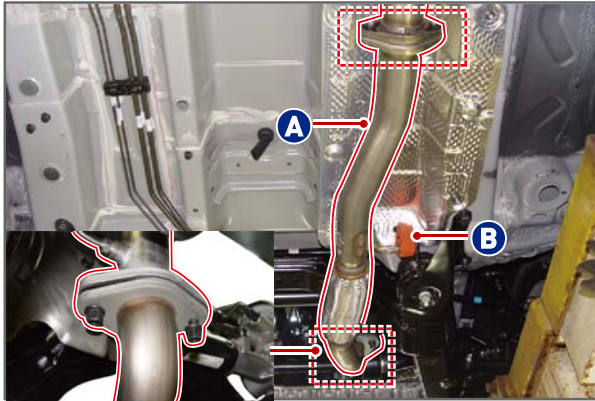
Tightening torque 27.4 ~ 32.3Nm



3. Remove the propeller (Refer to Chapter "Propeller Shaft".)

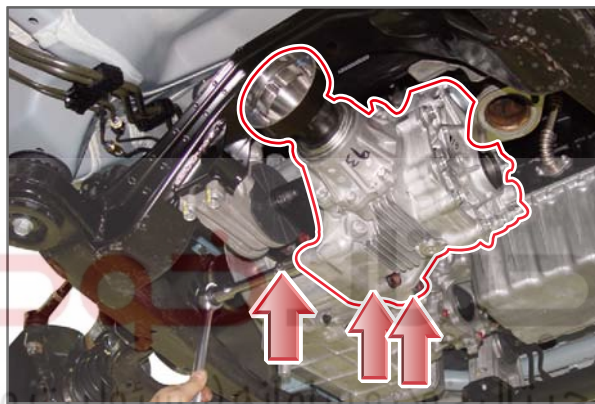
Only for 4WD vehicle

Modification basis	
Application basis	
Affected VIN	



4. Unscrew four bolts (14 mm), release the hanger (B), and then No.1 exhaust pipe (A).

Tightening torque 12.7 ~ 14.7Nm



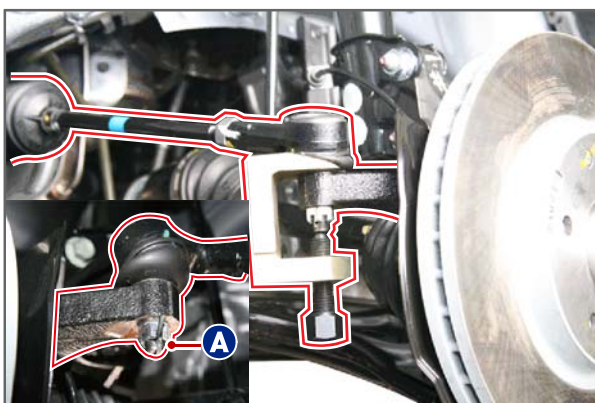
5. Remove the PTU assembly (Refer to Chapter "AWD".)

Only for 4WD vehicle



6. Unscrew two bolts (12 mm) on the steering gear linkage and remove the heat shield (A).

Tightening torque 8.8 ~ 13.7Nm



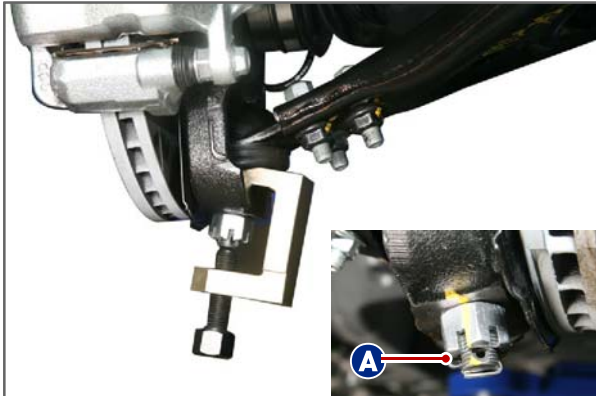
7. Pull out the split pin (A), unscrew the nut (17 mm), and then remove the tie rod end from the knuckle arm.

CAUTION

Replace the split pin (A) with new one.

Tightening torque 44.1 ~ 53.9Nm

Modification basis	
Application basis	
Affected VIN	

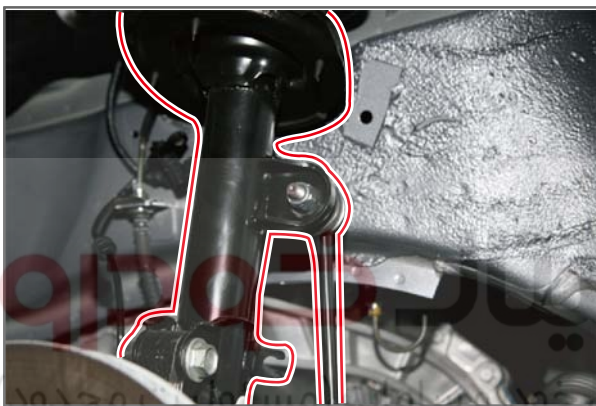


8. Pull out the split pin (A) from the ball joint of the lower arm, unscrew the mounting nut (22 mm) to remove the ball joint from the knuckle arm.

CAUTION

Replace the split pin (A) with new one.

Tightening torque 117.6 ~ 156.8Nm



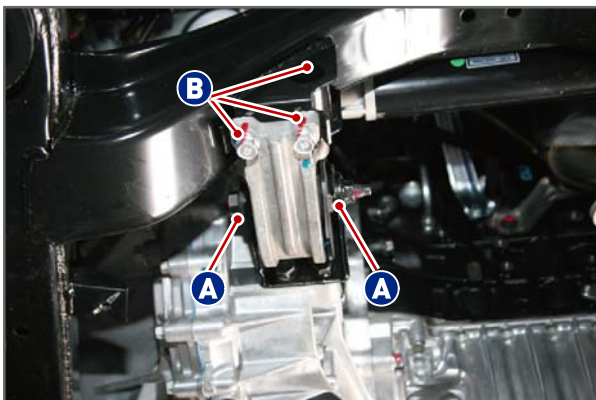
9. Unscrew the stabilizer link upper nut (17 mm).

Tightening torque 49.0 ~ 68.6Nm



10. Unscrew the bolt (14 mm) and nut (17 mm) from the front mounting of transaxle.

Tightening torque 68.6 ~ 88.2Nm



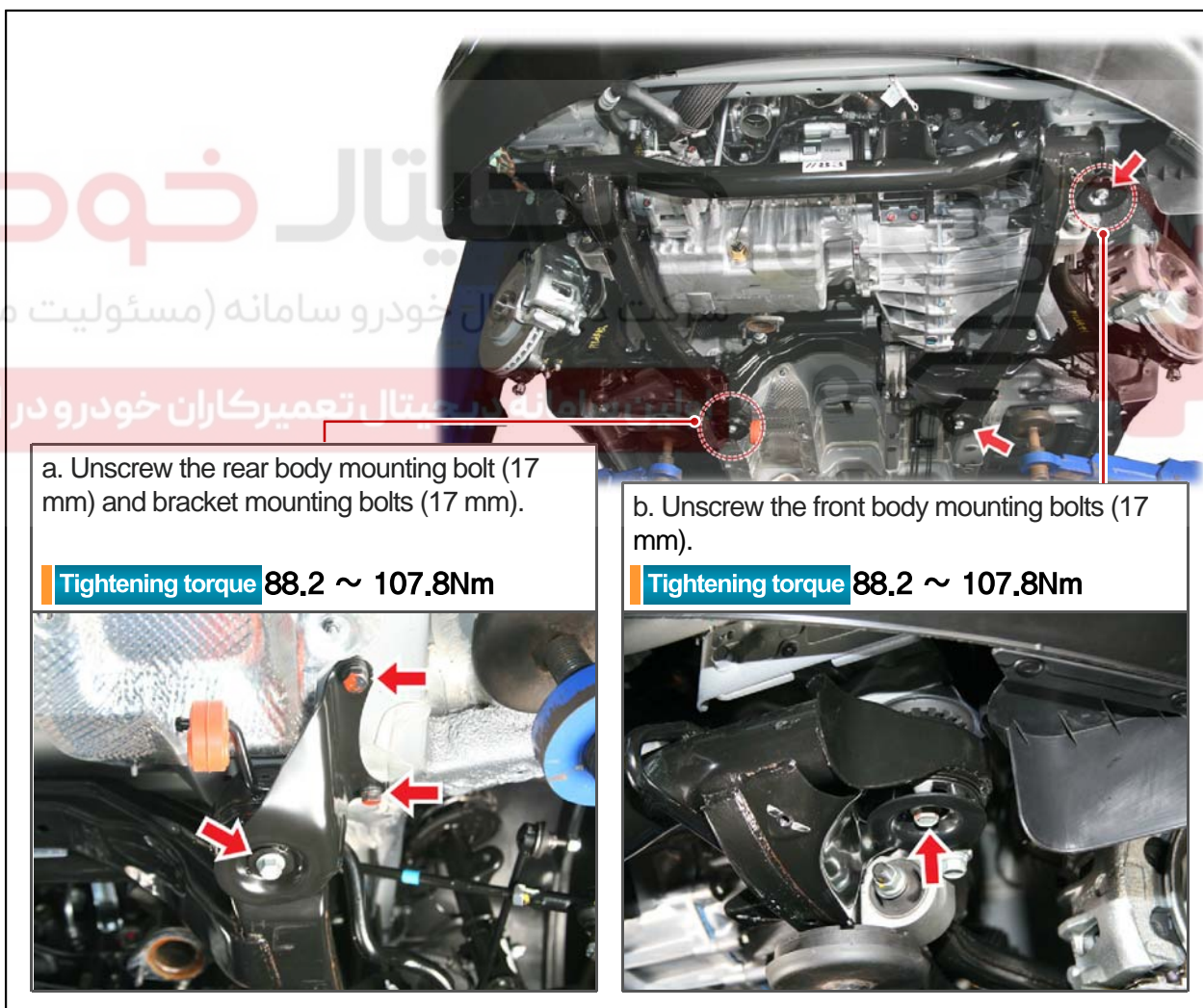
11. Unscrew the bolt/nut (A, 14 mm) and three bolts (B, 17 mm) from the rear mounting of transaxle.

Tightening torque (A)	29.4 ~ 49.0Nm
Tightening torque (B)	68.6 ~ 88.2Nm



12. Place the jack under the front sub frame.

13. Unscrew the mounting bolts on front sub frame and transaxle.



Modification basis	
Application basis	
Affected VIN	

ELECTRIC POWER STEERING

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14. Remove the sub frame assembly from the vehicle by slowly lowering the sub frame jack.



15. Unscrew the two mounting bolts (19 mm) on the left and right sides of the steering gear box.



Gear box mounting bolt/nut (19 mm):

Tightening torque 98.8 to 127.4 Nm



Gear box mounting bolt (19 mm):

Tightening torque 88.2 to 107.8 Nm

16. Remove the steering gear box from the sub frame. Install in the reverse order of removal.

S.G.N.

4610-00 TROUBLE DIAGNOSIS CODE**1. DTC LIST**

DTC	Description
C1101	Battery Voltage High
C1102	Battery Voltage Low
C1109	IGN Signal Error
C1112	Torque Sensor Supply Voltage Error
C1259	Steering Angle Sensor-Electrical Error
C1261	Steering Angle Sensor is not Calibrated
C1290	Torque Sensor Signal Error
C1603	Over Heat Protection
C1604	ECU Hardware Error
C1611	CAN: EMS Message not Received (Time Out)
C1616	CAN: Communication Interruption(Bus Off)
C1622	Vehicle Speed Signal Error
C1704	ECU Fail-safe Relay Fault
C2401	Motor Position Sensor Error
C2412	Motor Short or Open
C2413	Motor Current Error
C1702	Variant Coding Error

Modification basis	
Application basis	
Affected VIN	

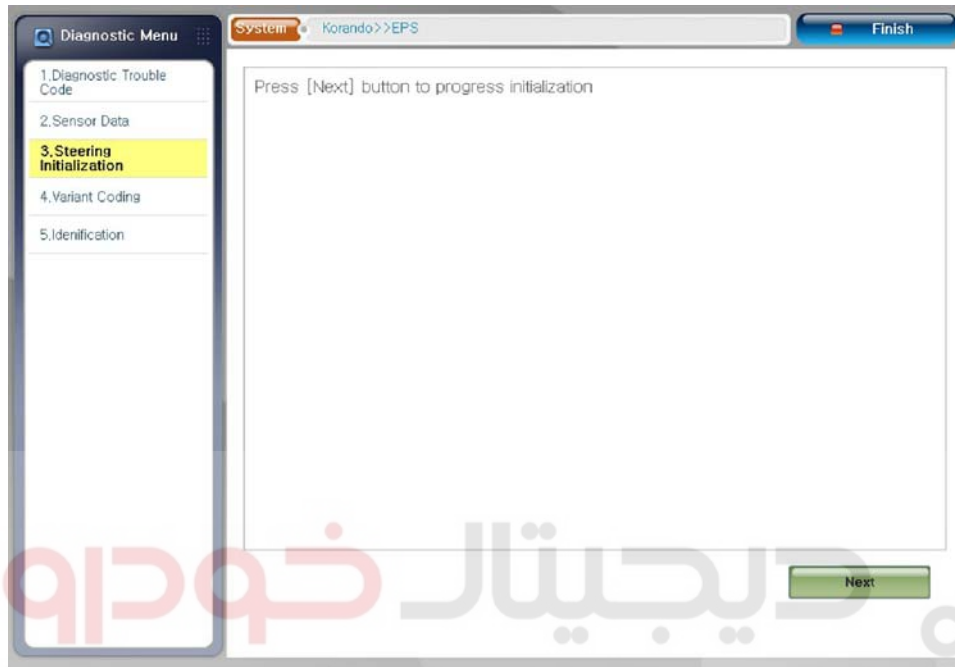
ELECTRIC POWER STEERING

KORANDO 2015.01

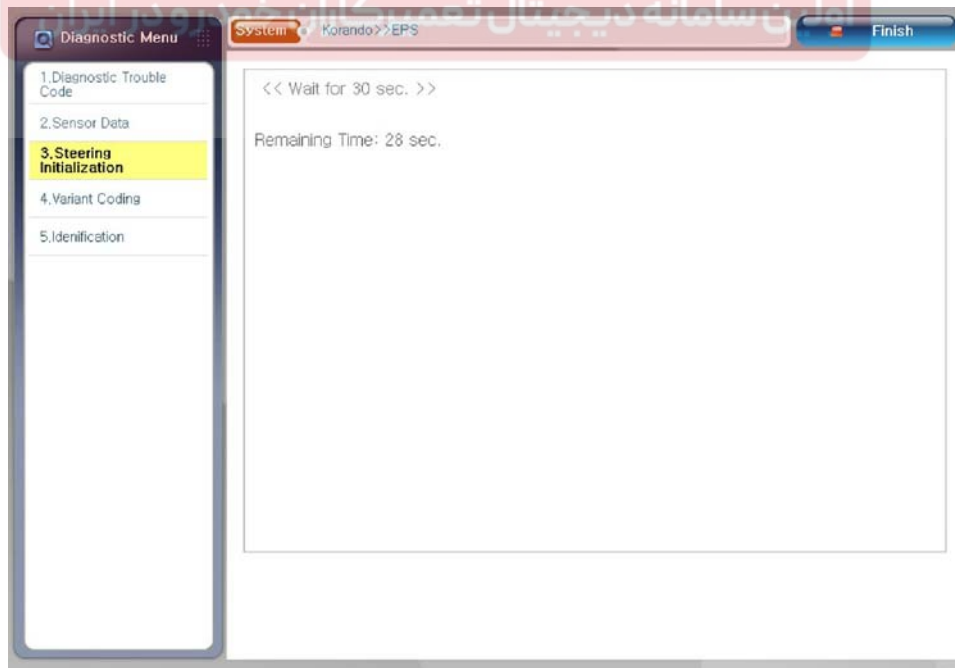
2. HOW TO USE DIAGNOSTIC TOOL

1) Initialization

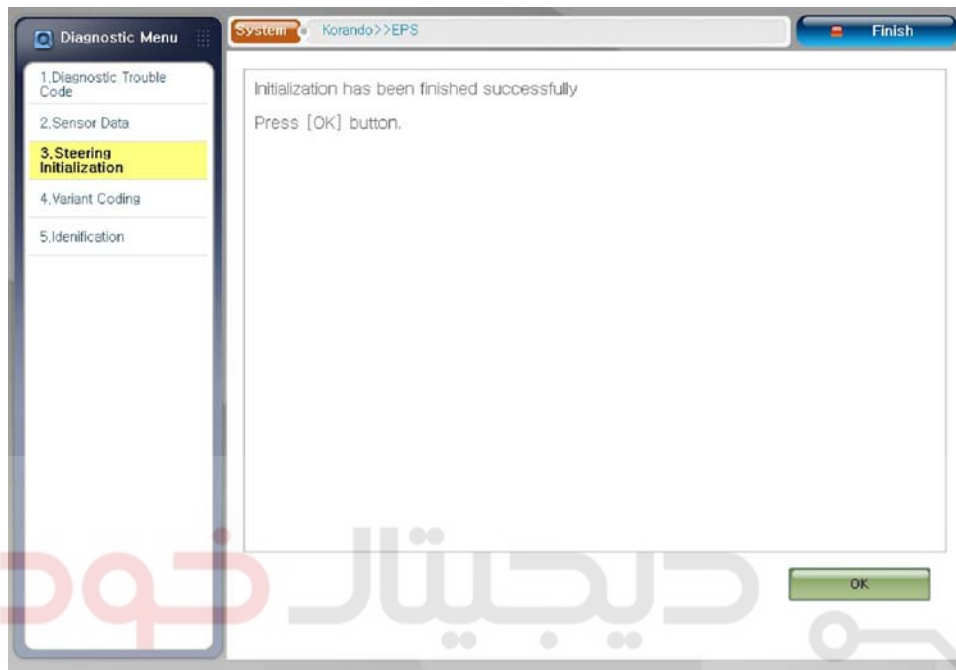
1. Select "3. Steering Initialization" in "Diagnostic Menu" screen and press 'Next'.



2. Wait for 30 seconds.

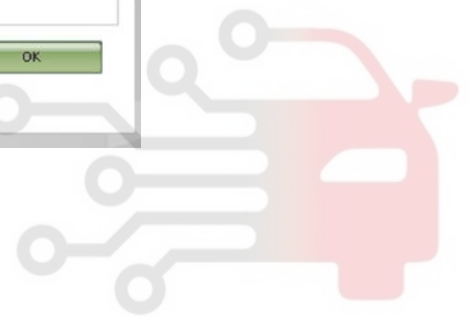


3. The screen below appears after completed the initialization process. Press "OK".



دیجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

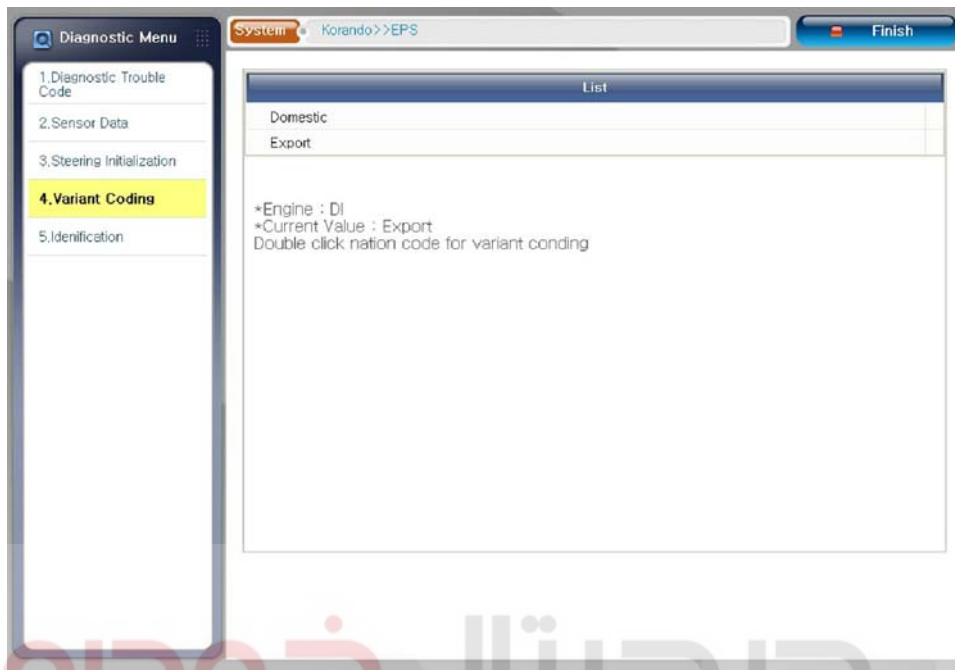
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



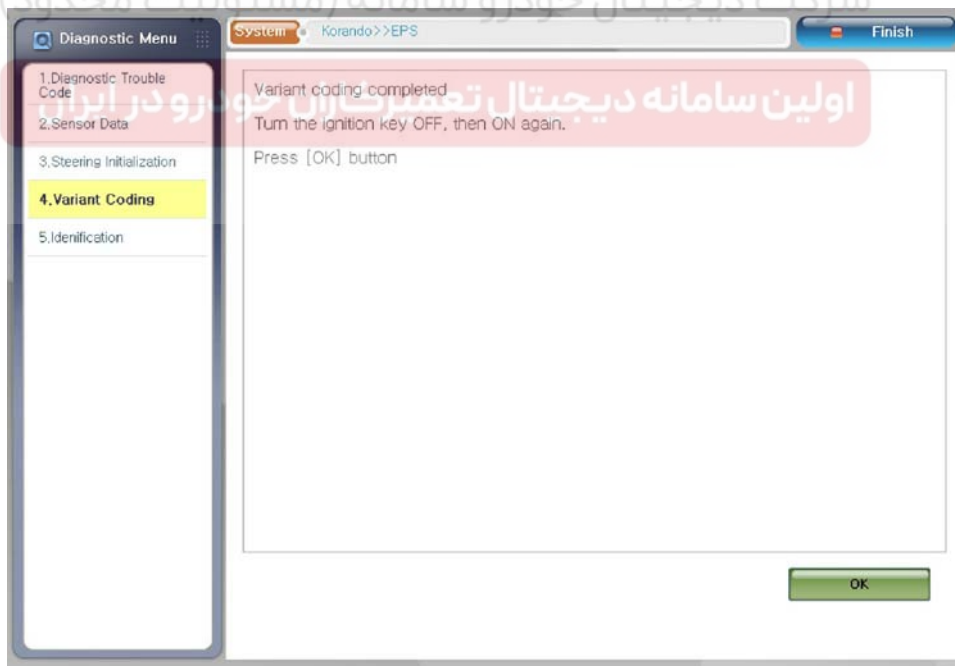
Modification basis	
Application basis	
Affected VIN	

2) Variant Coding

1. Select "4. Variant Coding" in "Diagnostic Menu" screen.



2. Turn the ignition OFF, then ON again after completed the variant coding. Then, press "OK".



NOTE

The result of variant coding can be seen in "5. Identification" in "Diagnostic Menu" screen.

Modification basis	
Application basis	
Affected VIN	