

It is illegal to directly dump waste engine oil on the ground, sewer, drain or water source.

### Noise

Some operations produce high decibel noise, which may damage the hearing. Wear ear protectors at this time. Coating

Paint is a flammable substance, and smoking is prohibited.

#### 1 Single component

It may contain some toxic and harmful pigments, desiccants and other solvents. Spray only in well-ventilated places.

#### 2 Multi-component

It may contain some toxic and harmful unreacted resins and resin curing agents. The manufacturer's instructions must be followed and painting must be done in a well-ventilated place away from the crowd. The operator shall wear protective mask.

### Solder

Solder is a mixture of many metals with a lower melting point than the metals (usually lead and tin). There is usually no toxic lead gas generated during welding. Oxygen-containing acetylene flames cannot be used because they can produce lead-containing smoke at very high temperatures.

Some smoke may be generated when the flame is sprayed onto the grease-bearing surface. Avoid inhalation. Care must be taken to remove excess solder and ensure that no fine lead dust is produced. If inhaling lead dust, it will be harmful to human body. Gas mask must be worn. Solder leaks and filings must be uniformly collected and disposed of quickly to prevent air contamination by lead. Lead ingestion or dust ingestion of solder shall be avoided.

### Solvent

Common solvents include acetone, petroleum solvent oil, toluene, xylene and chloroform. Use clean and dewaxing substances, paints, plastics, resins and diluents. Some substances are flammable. Prolonged contact with such substances will dry the skin with irritation. Some toxic and harmful substances will be absorbed through the skin.

If accidentally splashed into the eye, there will be strong irritation and even blindness. High-concentration solvent exposure to steam or smoke generated in the air can irritate the eyes and throat, causing dizziness and headache. Severe can cause loss of consciousness.

Excessive exposure of low-concentration solvents to the air for a long time will produce vapors and fumes. As there is no obvious symptom, it will often cause more serious toxicity. Avoid splashing such substances on people's eyes, skin and clothes. Wear protective work clothes, protective gloves and protective glasses.

When using such substances, ensure that the site is well ventilated, that smoke, vapor and spray are avoided as much as possible, and that the container is sealed. Do not use in narrow spaces.

When spraying materials with solvents such as paint and adhesive, it shall be ensured that the site is well ventilated and gas mask shall be used when the air circulation is not smooth. Heating or burning may only be carried out under the special guidance of the manufacturer.

### Suspension load



Temporary piecing of lifting equipment is prohibited.

Heavy objects are dangerous when lifted or suspended. Never work on unsupported, suspended or lifted objects, such as suspended engines. Ensure that lifting equipment such as jacks, lifters, axle supports and harnesses are in good condition and regularly inspected.

### Welding

Welding procedures include spot welding, arc welding and gas welding.

## Fault symptom diagnosis check and confirmation

- 1 Confirm the customer's problem
- 2 Visually inspect for visible signs of mechanical or electrical damage.
- 3 If the observed or raised problem is obvious and the cause has been found, the cause must be corrected before proceeding to the next step.
- 4 If the problem cannot be found obviously, confirm the fault and refer to the symptom table.

## Appearance check list

Mechanical	Electrical
<ul style="list-style-type: none"> <li>• Front gear belt</li> <li>• Alternator</li> </ul>	<ul style="list-style-type: none"> <li>• Fuse</li> <li>• Harness</li> <li>• Electrical connector</li> <li>• Battery</li> <li>• Battery harness</li> <li>• Charging system warning lamp</li> </ul>

## Fault symptom table

If the fault occurs but no DTCs are stored in the ECM and the cause of the fault cannot be confirmed in the basic inspection, the fault diagnosis and rule out shall be performed according to the sequence listed in the following table.

Symptoms	Possible causes	Measures
Insufficient battery charge	<ul style="list-style-type: none"> <li>• Front gear belt</li> <li>• Alternator regulator</li> <li>• Alternator</li> </ul>	Reference: Battery undercharging diagnosis process
Battery overcharge	<ul style="list-style-type: none"> <li>• Alternator regulator</li> <li>• Alternator</li> </ul>	Reference: Intelligent generator diagnostic process
Charging indicator lamp is always on	<ul style="list-style-type: none"> <li>• Drive belt wear</li> <li>• Front end belt tensioner damaged</li> <li>• Alternator</li> <li>• Circuit fault</li> </ul>	Reference: Charging indicator lamp is always on
Charging indicator lamp does not light up	<ul style="list-style-type: none"> <li>• Instrument light emitting diode</li> <li>• Instrument</li> <li>• Circuit fault</li> </ul>	Reference: Charging indicator lamp not on
Generator noise	<ul style="list-style-type: none"> <li>• Front gear belt</li> <li>• Bearing</li> <li>• Stator and rotor</li> </ul>	Reference: Generator Noise Diagnostic Procedure

## Diagnostic process of insufficient battery charge

Test conditions	Details/Results/Measures
1. Check alternator charging voltage	
	A. Start the engine to increase the engine speed from idle speed to 2000 rpm. B. Use a multimeter to measure the voltage of battery positive wire to negative.

70	P036800	Exhaust camshaft sensor signal short circuit to power supply(Bank1)	✓
71	P036700	Exhaust camshaft sensor signal short circuit to ground (Bank1)	✓
72	P001778	Crankshaft-exhaust camshaft relative position deviation is too large fault(Bank1)	✓
73	P033664	Crankshaft sensor pulse width signal is unreasonable	✓
74	P033900	Unreasonable fault of speed sensor signal	✓
75	P261700	Speed sensor signal loss fault	✓
76	P057700	Cruise control circuit voltage too high	×
77	P057600	Cruise control circuit voltage too low	×
78	P057500	Unreasonable fault of cruise control signal	×
79	P057800	Cruise control button sticking fault	×
80	P058500	Cruise control module AD conversion fault	×
81	P217700	Air-fuel ratio closed-loop control self-learning value exceeds the upper limit (Middle load area)	✓
82	P217800	Air-fuel ratio closed loop control self-learning value exceeds the lower limit (Middle load area)	✓
83	P046300	Oil level sensor circuit voltage too high	✓
84	P046200	Oil level sensor circuit voltage too low	✓
85	P046000	Oil level sensor original signal out of range	✓
86	U067600	Oil level sensor signal loss/failure/calibration error	✓
87	P25B000	Oil level sensor signal sticking fault	✓
88	P128400	Fuel level signal out of range	✓
89	P046129	Fuel level signal is unreasonable	✓
90	P209700	Closed loop correction value based on downstream oxygen sensor exceeds the upper limit - too high	✓
91	P209600	Closed loop correction value based on downstream oxygen sensor exceeds the lower limit - too lean	✓
92	P048371	Cooling fan rationality Type 1 fault	×
93	P048372	Cooling fan rationality Type 2 fault	×
94	P048000	Cooling fan 1 control circuit open	×
95	P063400	Cooling fan 1 drive chip overheating	×
96	P069200	Cooling fan 1 control circuit voltage too high	×
97	P069100	Cooling fan 1 control circuit voltage too low	×

**2. Possible fault causes:**

Internal fault of engine control unit  
3. Post-fault treatment and phenomenon: Engine shutdown

**4. Diagnostic process:**

Step	Operation	Yes	No
1	Replace ECM	Turn to section Step 2	Troubles hooting other fault codes
2	Clear the fault code, restart the vehicle, and check whether the fault code is eliminated.	Fault Exclude, the system is normal	

**P14A500**

**Fault Code P14A 500: Start/stop indicator lamp control circuit open circuit**

**1. Fault triggering conditions:**

1. Trigger start/stop switch

**2. Possible fault causes:**

- 1 Connector is not firmly connected or in poor contact
- 2 Start/stop indicator lamp control circuit pin open circuit
- 3 ECU corresponding start/stop indicator lamp control circuit pin is open circuit or damaged

**3. Post-fault treatment and phenomenon:**

None

**4. Diagnosis process**

Serial number	Operation steps	Test result	Next steps
1	Inspect whether the connector is not firmly connected or in poor contact.	Yes	Reconnect
		No	Next step
2	Check start/stop indicator lamp control circuit pin for open circuit	Yes	Wiring harness maintenance
		No	Next step
3	Inspect whether ECU corresponding start/stop indicator lamp control circuit pin is open circuit or damaged.	Yes	Check ECU
		No	Diagnostic aid

**P14A400**

**Fault Code P14A 400: Start/stop indicator lamp control circuit voltage too low**

**1. Fault triggering conditions:**

1. Trigger start/stop switch

**2. Possible fault causes:**

- 1 Start/stop indicator lamp control circuit pin is short to ground.
- 2 ECU corresponding start/stop indicator lamp control circuit pin is short to ground.

**3. Post-fault treatment and phenomenon:**

None

**4. Diagnosis process**

## Fault symptom diagnosis check and confirmation

Check and confirm layout position

The ECM is designed to be installed in the engine compartment (but not on the engine body), and shall be placed in an easy-to-maintain place. The ECM assembly position shall be sufficiently ventilated, and the ECM installation direction shall be such that the heat dissipating fins on the housing conform to the air flow direction, so as to effectively prevent the heat released by the surrounding parts from dissipating heat to the ECM; The installation position shall effectively prevent electromagnetic and RF interference of other parts to ECM; Do not install the ECM in a position that is very dirty and damp, or is liable to cause water ingress or water droplets to spill; The ECM housing must be properly grounded to the vehicle, and the ECM housing and retaining bolts must be electrically insulated from the vehicle chassis.

## Appearance check list

The housing of ECM is composed of aluminum alloy upper cover and aluminum alloy bottom plate press buckle, and assembled with silicone seal. The upper cover is covered with black coating, and the bottom plate is not specially treated and coated, but shall not have sharp burrs and sharp edges. (The material of upper cover and bottom plate is aluminum alloy AW -5754. )Nominal dimensions of housing of ECM are as follows (excluding female end of ECM connector): Without bracket: Length 200 .7 mm, width 181 mm, thickness 45 mm; Bracket included: Length 200 .7 mm, width 202 .5 mm, thickness 46 mm. Product identification label is affixed in the middle of ECM housing, which can indicate customer information, engine model, ECM number and calibration data version number. ECM connector has two configurations: 198 pins and 164 pins. Connector pin material is CuZn30, large terminal is tinned, and small terminal is silver plated.

## Fault phenomenon and judgment method

- 1 Fault phenomenon: Unstable idle speed, poor acceleration, unable to start, high idle speed, out-of-standard exhaust gas, difficult start, A/C failure, injector control failure, flameout, etc.
- 2 General fault cause:
  - Due to electrical overload of external device, internal parts of ECU are burnt down, resulting in failure.
  - The circuit board is rusted due to ECU water intake.
  - The status of the part changes or the self-learning value is cleared.
- 3 Maintenance precautions:
  - Do not dismantle ECU randomly during maintenance;
  - Please dismantle the battery head for more than 1 minute before dismantling ECU;
  - Disassemble ECU before electric welding, and store ECU after disassembling;
  - It is forbidden to install any circuit on the ECU connecting line.
- 4 Simple measurement method:
  - (Connect connector) Read engine fault record with engine data K line;
  - Remove connector) Check whether ECU connection line is in good condition and check whether ECU power supply and grounding circuit are normal;
  - Check whether the external sensor works normally, whether the output signal is credible and whether the circuit is in good condition;
  - Check whether the actuator works normally and whether the circuit is in good condition;
  - Finally replace ECU for test.

## Troubleshooting process according to fault symptoms

Before starting the steps of fault diagnosis according to engine fault phenomenon, preliminary inspection shall be carried out first:

- 1 Confirm the engine malfunction indicator lamp works normally;
- 2 Check with a fault diagnostic scanner and confirm that there is no fault information record;
- 3 Confirm that the fault phenomenon of the owner complaint

exists, and confirm the conditions under which the fault occurs. Then

perform visual inspection:

- 1 Check whether there is fuel pipeline leakage;
- 2 Check whether the vacuum pipeline is broken or kinked, and whether the connection is correct;
- 3 Check whether the inlet trachea circuit is blocked, leaking, flattened or damaged;
- 4 Check whether the high voltage line of the ignition system is broken and aged, and whether the ignition sequence is correct;
- 5 Check whether the harness grounding is clean and firm;
- 6 Inspect each sensor and actuator connector for looseness or poor contact.

Important note: If the above phenomenon exists, first carry out maintenance work according to the fault condition, or else it will affect the later fault diagnosis and repair work. Diagnostic aid

- 1 Confirm that the engine has no fault records;
- 2 Confirm the symptom of complaint;
- 3 Check according to the above steps, and no abnormality is found;
- 4 Do not ignore the impact of vehicle maintenance, cylinder pressure, mechanical ignition timing and fuel on the system during overhaul;
- 5 Replace ECU and perform test.

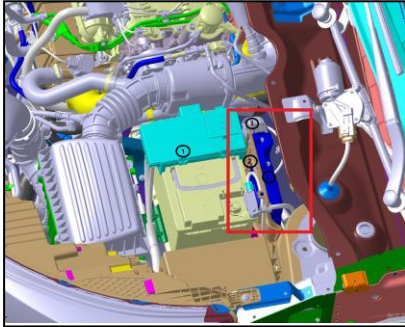
If the fault phenomenon can be eliminated at this time, the fault position is in ECU; if the fault phenomenon still exists at this time, replace the original ECU, repeat the process, and perform overhaul again.

## Removal and installation

### Electronic controller unit

#### 1. Removal

- 1 Remove battery. Reference: Battery assembly Battery assembly
- 2 Remove the ECU mounting bracket (as shown in Figure 2): Remove the mounting bolts of 4 ECU bracket with M6 sleeve.
- 3 Manually remove the harness connector at ECU end (as shown in Figure 3), and then use M6 sleeve to remove 4 ECU mounting bolts.
- 4 Take out 4 ECU mounting bolts and remove ECU.(As shown in Figure 4)



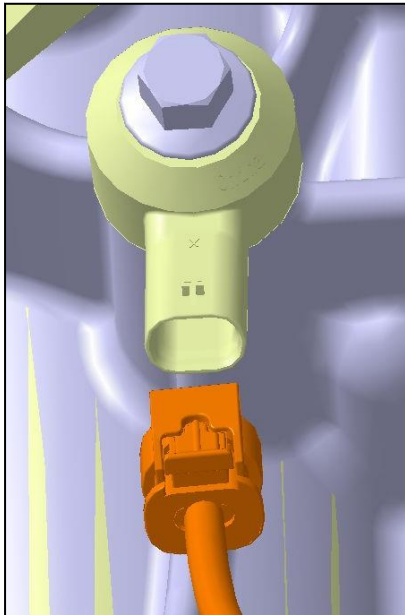
#### 2. Installation

- 1 **Installation sequence is reverse to removal sequence**

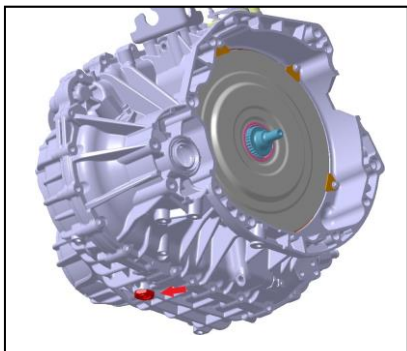
### Knock sensor

#### 1. Removal

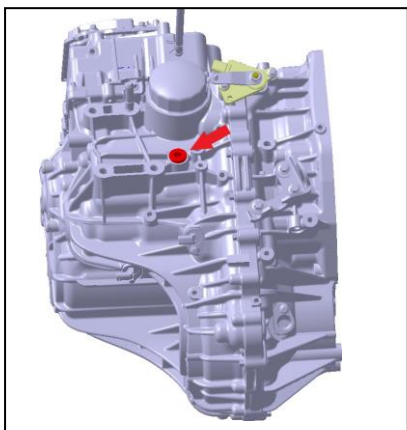
- 1 Power off the vehicle.
- 2 Release knock sensor connector.



- 3 Loosen the knock sensor bolts.



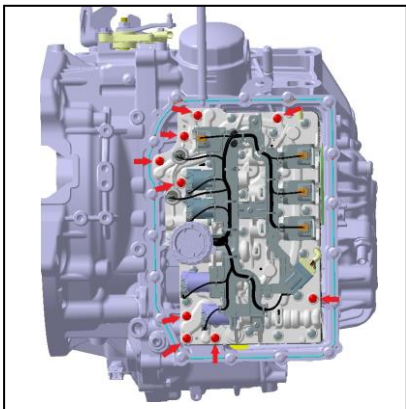
- 3 Fill BOT 351 C4 transmission fluid  $4.8 \pm 0.1$  L from the fill hole, fill plug torque:  $30 \pm 3$  N.m.



### Valve body assembly

#### Removal

- 1 Remove oil pan. Refer to Oil Pan
- 2 Remove 9 retaining bolts of valve body. Torque:  $11 \pm 1$  N.m



- 3 Grasp the valve body assembly, shake slightly left and right, and take out the valve body assembly.

- KL15 1s after power-on.
- Power supply voltage: 6.5 V-18 V.
- Continuous ON time  $\geq 300\text{S}$  for any one of/2 circuits in the double circuit.

## 2 Possible fault causes

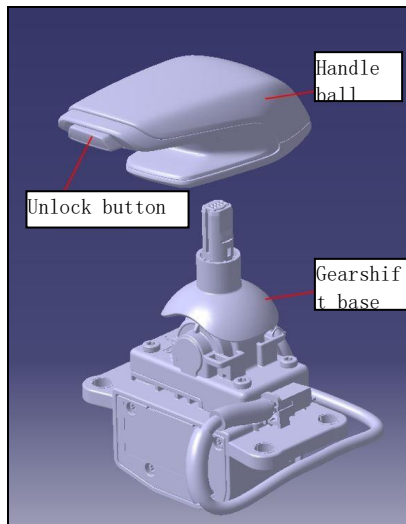
- The unlock button is physically stuck.
- Unlock key internal short circuit fault.
- Gear shift base internal short circuit fault.

## 3 Failure mode

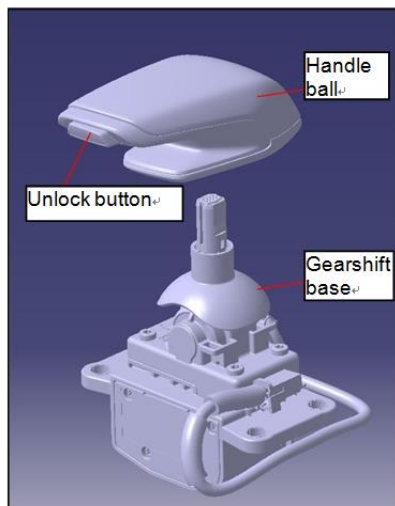
- You can exit P gear or enter R gear without pressing the unlock button.

## 4 Diagnostic process

- Replace the handle ball assembly.



- Replace the handle ball assembly fault, and replace the gearshift base assembly.



## P 119323: KL15 disconnection signal conflict

### 1 Fault triggering conditions

- ESL is not in sleep mode.
- Power supply voltage: 6.5 V-18 V.
- KL15 hard wire signal power-down is detected.
- BCM\_PowerStatusFeedback=0x2/0x3=ON/Start detected.

### 2 Possible fault causes


- The ESL harness end is disconnected or in poor contact.
- BCM fault.



### Removing and installing drive shaft

**Left drive shaft removal**

Special tool

	<p>Drive shaft</p>
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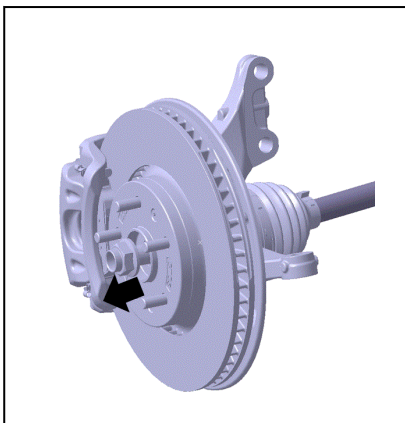
- 1 Disconnect battery negative harness
- 2 Removing wheel
- 3 Lifting the vehicle

**⚠ Warning**

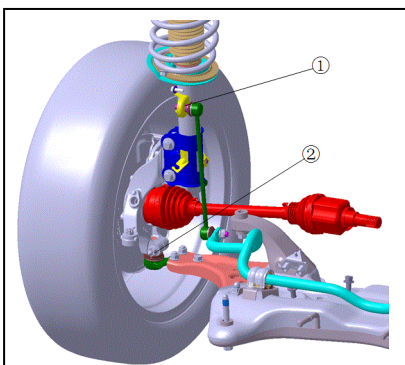
Note: When lifting the vehicle with a two-pillar lift, the horizontal pad must be used in the lifting position.

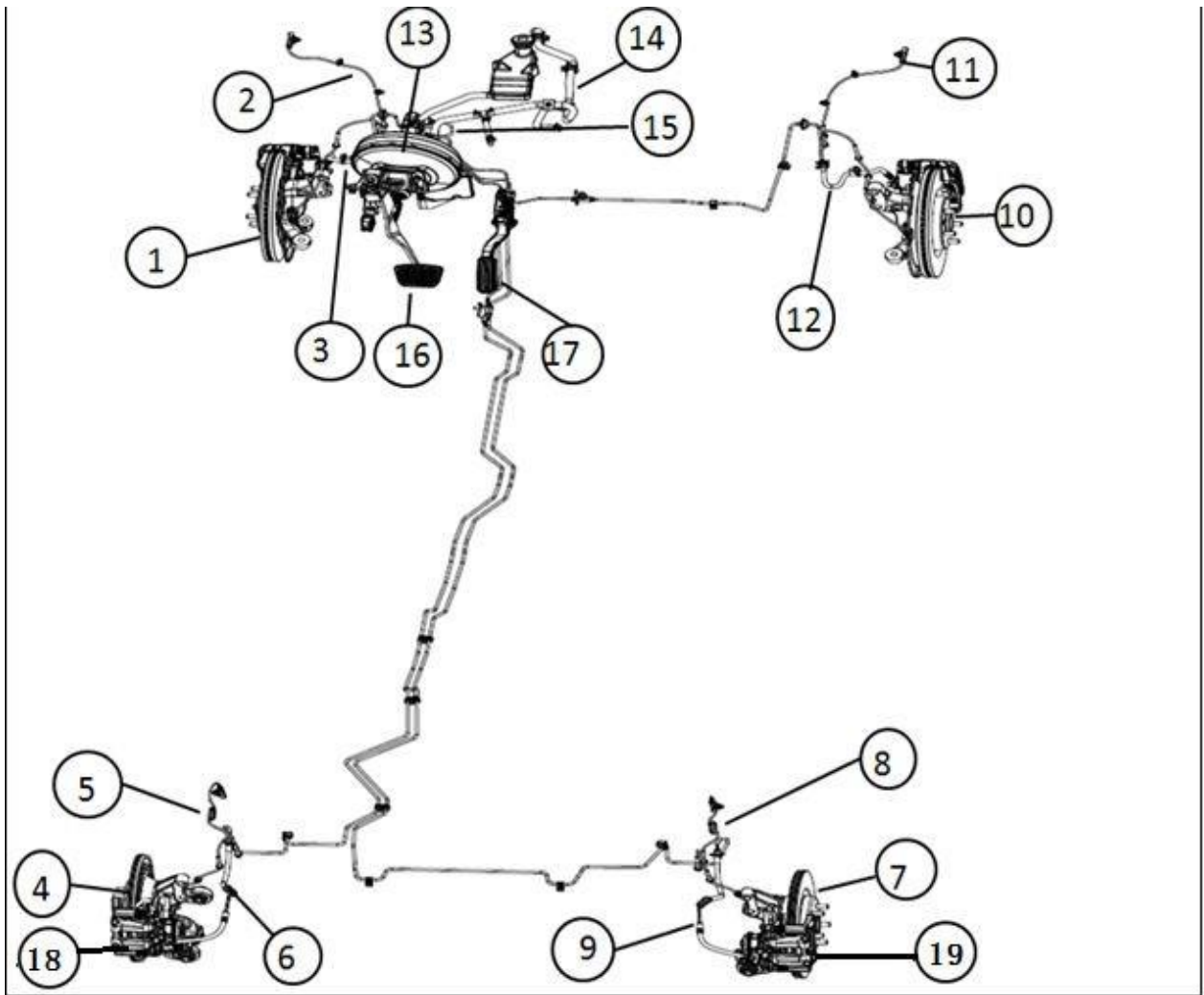
- 4 Removing lock nut

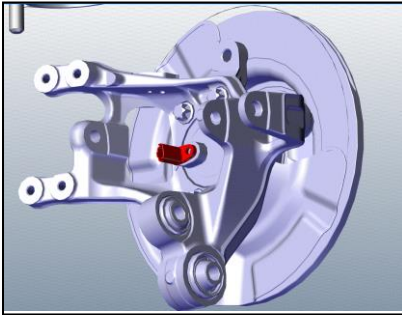
Removing lock nut(Not reusable)



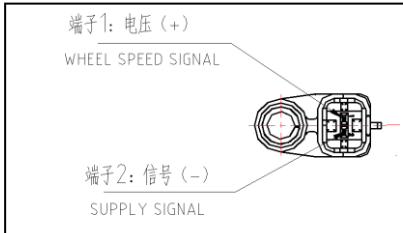
- 5 Take out fixed end of drive shaft from brake end  
Remove front swing arm ball joint cotter pin and slotted nut and bolt, straighten and remove locking pin © Remove connecting rod mounting nut ©



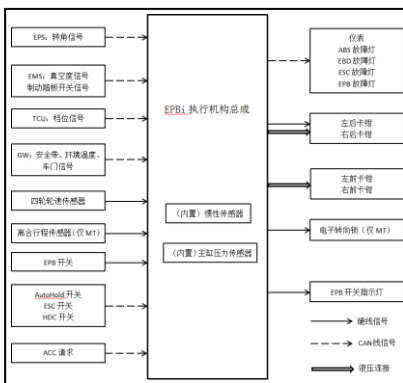




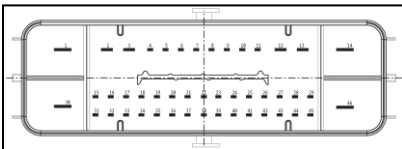
Interface definition:



**Hydraulic Control Mechanism Assembly (HCU) System Schematic**



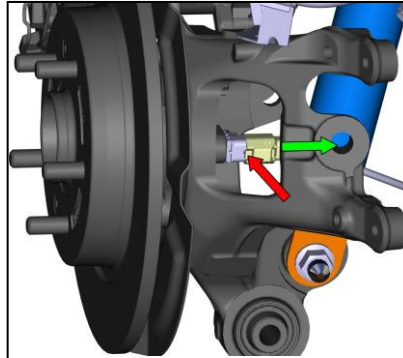
**Connector Section**



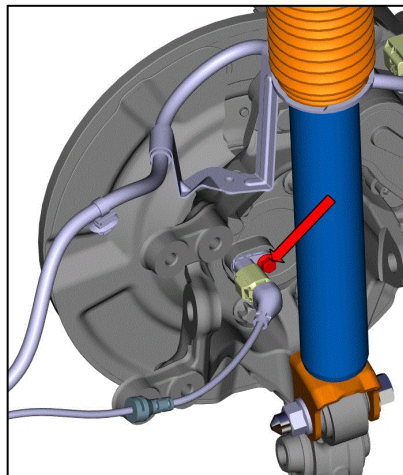
**Terminal definition**

Pin	Function Abbreviation	Function Description
1	KL30_P	EPBi Motor power supply
2	MOT_R_A	Rear right caliper motor positive
3	MOT_R_B	Rear right caliper motor negative
4	FR_GND	Front right wheel speed sensor ground
5	FR_SIG	Right Front Wheel Speed Sensor Signal Input
6	RL_GND	Left rear wheel speed sensor ground
7	RL_SIG	Rear left wheel speed sensor signal input
8	FL_GND	Front left wheel speed sensor ground

- 1 Disconnect the negative battery harness. Reference: Battery assembly
- 2 Lift the vehicle. Reference: Lifting
- 3 Gently pull up the spring piece of harness connector shown by the red arrow, pull out the connector along the direction of the wheel speed sensor axis (green arrow), so as to disconnect the wheel speed sensor and the harness.



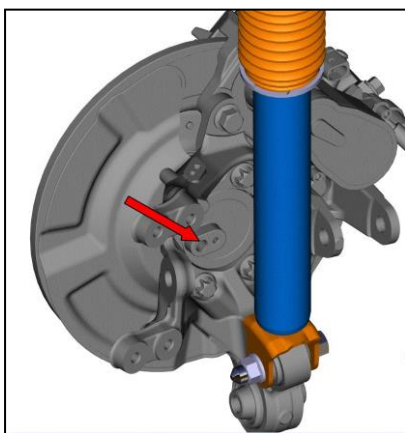
- 4 Remove connecting bolt between rear wheel speed sensor and rear horn bearing end cover, tool: M8 hexagon socket, torque:  $8\pm 1\text{N.m}$



- 5 Take out rear wheel speed sensor assembly.

## 2. Installation

- 1 Insert rear wheel speed sensor assembly into corresponding mounting hole of rear horn bearing end cover



**Filling refrigerant**

Fill refrigerant according to the following standard

Refrigerant model	Refrigerant filling amount
R134a	600±20g

**Warning** Fill the refrigerant after replenishing the A/C compressor lubricating oil.

- 1 Connect high and low pressure pipes of refrigeration circuit
- 2 Select the equipment "Refrigerant replenishment" option to adjust the filling amount.
- 3 Open the low-pressure valve switch and start the device for filling.
- 4 Observe the device display, and when the filling amount reaches the set value, the screen displays that the filling is completed.
- 5 Close the valve.
- 6 If the device shows the filling speed is too slow, refer to the following filling methods:
  - 1 Disconnect the refrigeration circuit high pressure connector and connect only the low pressure end.
  - 2 Close the high and low pressure valves of the equipment.
  - 3 Set the vehicle to parking position, start the vehicle, turn on the air conditioner, and set it to low temperature mode.
  - 4 Open the equipment mortgage valve and refrigerant will be injected into the refrigeration pipeline from the low pressure end.
  - 5 When the pressure gauge shows the low pressure standard value, disconnect the low pressure end connector.
  - 6 Refrigerant filling is completed.

**Refrigeration system leakage check**

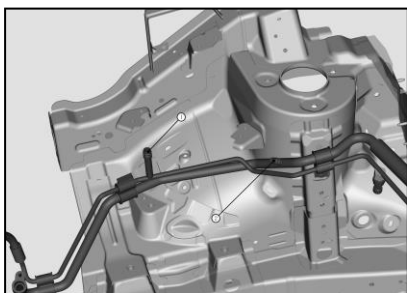
Adopt refrigerant (R134a) leakage detection equipment, set the leakage amount as  $\leq 1.5$  g/years, the leakage detection probe at each leakage detection position needs to stay for more than 2s, and the movement speed of leakage detector probe at the leakage detection position is not higher than 2.5 cm/s.

Leak detection position: Expansion valve high and low pressure inlet and outlet, pipeline high and low pressure filler, low pressure pipe sectional connection interface, condenser high and low pressure inlet and outlet, compressor high and low pressure inlet and outlet, pressure sensor connection interface.

**Recovery and replenishment of compressor oil****Recover compressor oil**

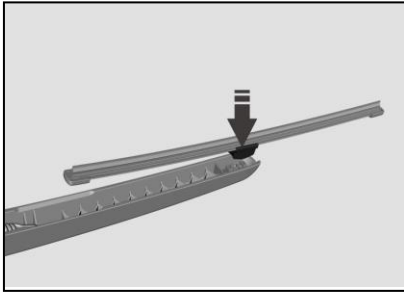
**Warning** • After the refrigerant is recovered, discharge the lubricating oil of A/C compressor.

- Recycle waste lubricating oil and refrigerant according to relevant regulations.
  - Empty the filler drain collection bottle.
- 1 Connect high and low pressure pipes of refrigeration circuit.
  - 2 Open the low-pressure valve switch (2) and high-pressure valve switch (1) of the equipment.
  - 3 Open the oil drain valve on the A/C refrigerant filling machine control panel, start the equipment, and check whether the A/C compressor lubricating oil drains into the collection bottle.
  - 4 After the lubricating oil of A/C compressor is drained, stop the oil draining and close the oil draining valve.
  - 5 Check the collection bottle and record the oil quantity.

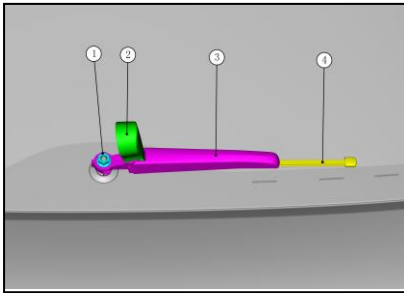
**Replenish compressor lubricating oil**

- 1 Add new lubricating oil according to the amount of lubricating oil in the collection bottle.
- 2 If the following components are replaced separately, supplement the A/C compressor lubricating oil according to the standard.

Component	Filling amount: MI
Condenser	30
Evaporator	35
Expansion valve	30

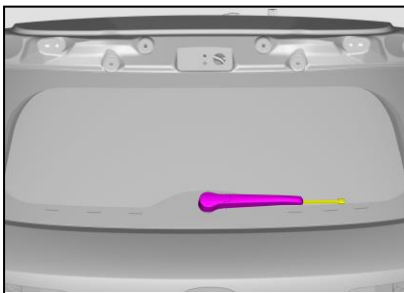


5 Rear window wiper arm and wiper brush assembly installation:



Serial number	Name
1	Hexagon flange nut
2	Wiper arm trim cover
3	Rear wiper arm assembly
4	Rear wiper brush assembly

Remove the wiper arm trim cover, install the rear wiper arm assembly on the wiper motor output shaft, and make the initial parking position of the rear wiper brush approximately flush with the lower edge of the glass black edge. Tighten hexagon flange nut with 10 mm sleeve, torque requirement (9~11) N·m. Install the wiper arm trim cover buckle back on the wiper arm. (It is required to fasten when installing back and hear "click"). The following figure shows the effect after the rear wiper is installed.



2. Removal

- 1 Rear window wiper arm and wiper brush assembly:
  - The removal method is the reverse of the installation sequence.
- 2 Rear window wiper assembly

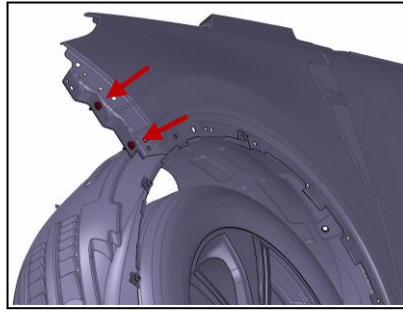


Figure 138:

Remove the front wheel housing panel clips - arrow -, remove the front wheel housing panel (1), and expose the mounting nuts in the lower middle position on the rear side of the fender.

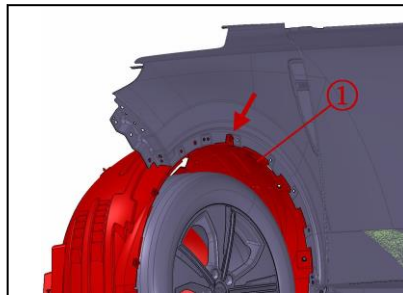


Figure 139:

Unscrew the fender mounting nuts - arrow -. Nut Tightening torque  $9\pm 2N$  (17 ftlb.).

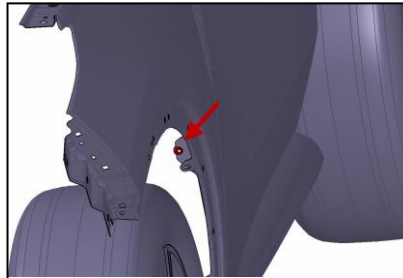


Figure 140:

Unscrew the fender mounting bolts - arrow -. Bolt Tightening torque  $9\pm 2N$  (17 ftlb.).