

## SLIDING ROOF

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شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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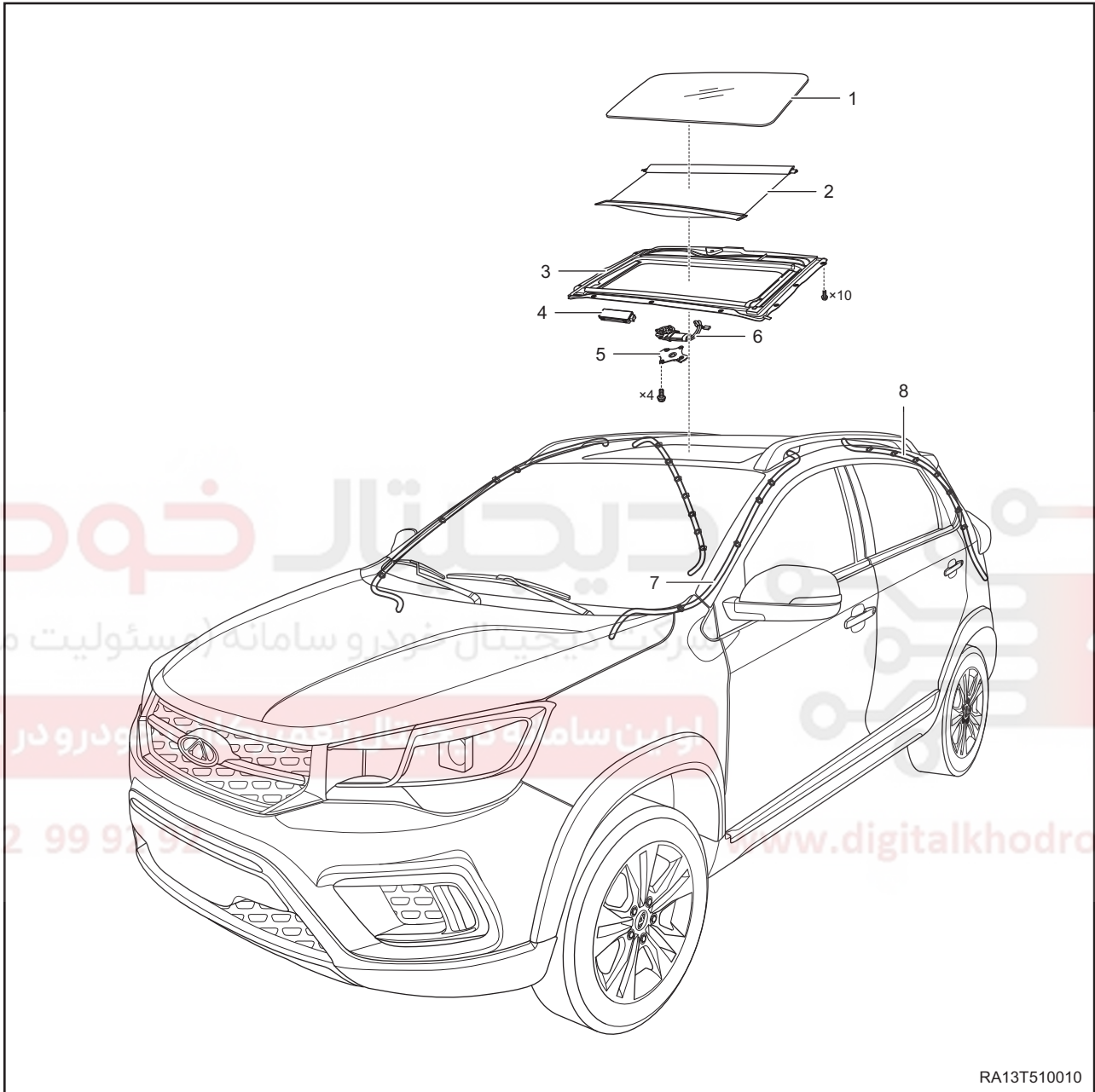


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# GENERAL INFORMATION

## Description



RA13T510010

1 - Sliding Roof Glass	2 - Sliding Roof Visor
3 - Sliding Roof Bracket	4 - Sliding Roof Control Unit Assembly
5 - Sliding Roof Seat	6 - Sliding Roof Motor
7 - Sliding Roof Front Drain Hose	8 - Sliding Roof Rear Drain Hose

## 51 - SLIDING ROOF

## Operation

By using principle of hydromechanics, sliding roof unit draws out turbid gas from vehicle to fully exchange air. In hydromechanics research filed, experiments showed that pressure acting on tube wall from fluid is low at high flow velocity, and pressure is high at low flow velocity. As roof cover has a certain radian, during high speed driving, the speed of outside airflow is high when it passes through roof cover. Pressure from outside airflow to roof cover is lower than pressure from inside airflow to roof cover. Inside air flows out to outside of vehicle, pressure becomes lower, then outside fresh air supplements into vehicle. Thus, inside air is circulated and fresh air is kept inside the vehicle.

### Function

It has functions of enhancing aesthetics, broadening horizon, increasing lighting, economy and practicability, beautifying car image, and it functions as movable window.

## Specifications

### Torque Specifications

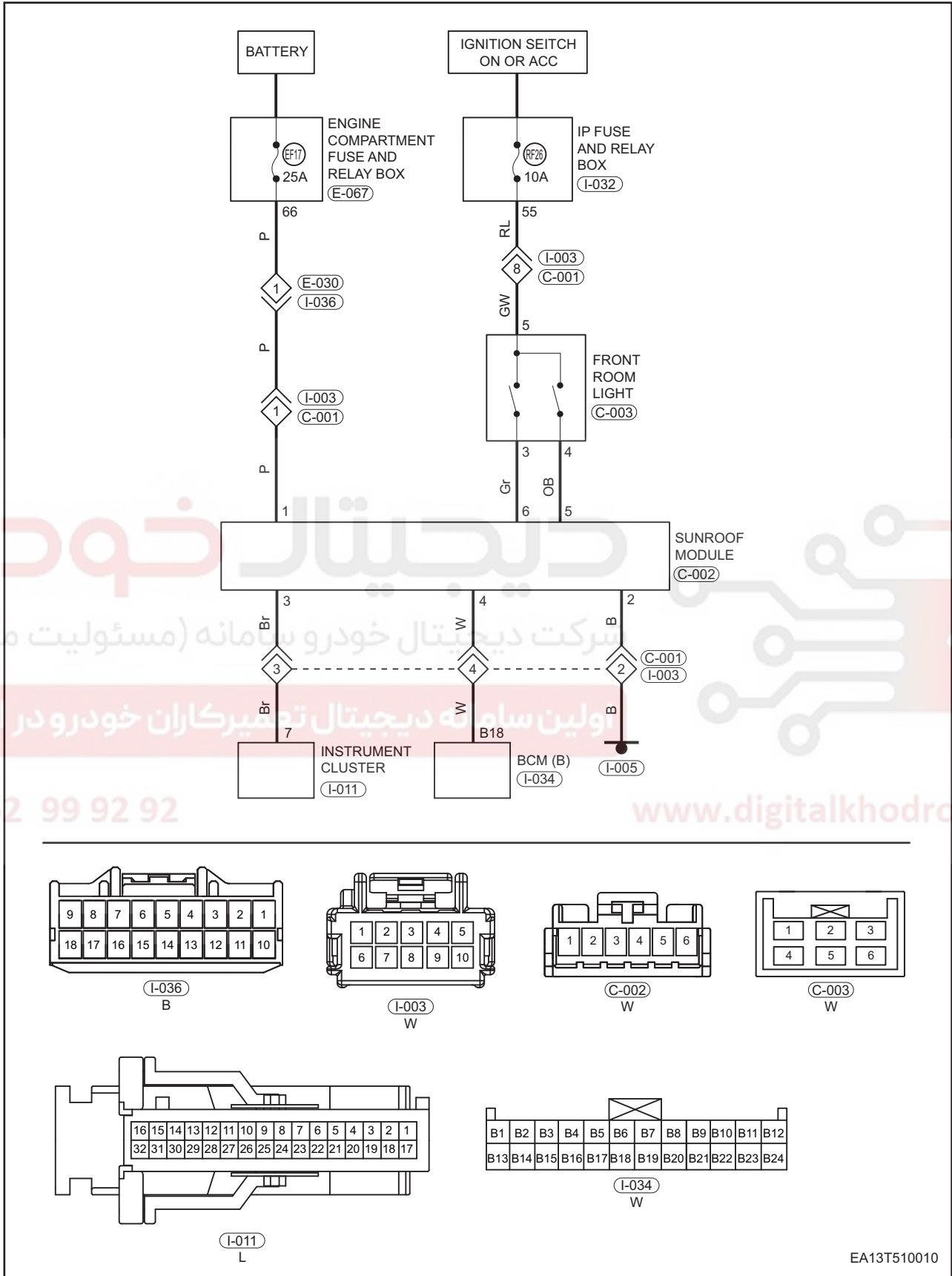
Description	Torque (N·m)
Sliding Roof Switch Assembly Fixing Screw	$1.5 \pm 0.5$
Sliding Roof Glass Fixing Bolt	$5 \pm 1$
Sliding Roof Bracket Fixing Bolt	$14 \pm 0.5$

## Tool

### General Tool

<p>Digital Multimeter</p>	 <p>RCH0000002</p>
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### Circuit Diagram



## DIAGNOSIS & TESTING

### Initialization

#### Sliding roof initial position losing

Definition: A situation that sliding roof cannot be opened, closed normally or closed to a normal position, and initial movement for sliding roof cannot be performed. When there is such problem in sliding roof, movement process for sliding roof will be disordered.

#### Problem Symptom

1. Sliding roof cannot be closed and opened completely or tilted. Shuddering may occur during the process from tilt to close.
2. When opening, tilting or closing sliding roof, it cannot reach to initial set position.
3. A function that short pressing the button to open and close sliding roof cannot be performed.
4. Sliding roof operation cannot be controlled by sliding roof module.

#### Solution Method

Perform repair according to following procedures with sliding roof mechanical fault repaired, and make sure that power supply shall not be shut off and battery voltage is higher than 10 V during operation. Make sure that there is no hard matter (all obstacles) which blocks operation of sliding mechanism before repairing. Make sure that problem symptom occurred in sliding roof is among four problem symptoms listed above.

1. Module initial memory position recovering method (pay attention that pressing way and pressed button)
  - 1st step: Open sliding roof visor to the maximum position.
  - 2nd step: Press and hold sliding roof ON/OFF button (be sure button is correct) for 10 seconds with sliding roof fully closed, and sliding roof initialization is complete when a "click" sound is heard from sliding roof motor.
  - 3rd step: Adjust sliding roof after completing above procedures, and replace module or motor if symptom still cannot be solved.

#### CAUTION

- After replacing sliding roof motor, sliding roof module, sliding roof assembly or if entire vehicle power is cut off, perform sliding roof initialization procedures.

## Problem Symptoms Repair Procedures

Problem	Cause	Repair Operation Method
Water leakage	Drain hose is clogged or folded	Check condition of drain hose.
	Weatherstrip is damaged with poor seals	Replace sliding roof glass assembly to ensure sealing performance.
Abnormal noise	Dust enters during sliding roof operation, causing a large movement resistance of sliding roof	Clean sliding roof rail during vehicle maintenance to reduce movement resistance of sliding roof, ensuring normal operation.
	Grease in sliding roof rail is reduced, causing insufficient lubrication	Apply grease to movement mechanism of sliding roof during vehicle maintenance to soften sliding roof effectively.
Jam protection function fault	When Slide/Tilt button is pressed, sliding roof cannot return automatically if it encounters an obstacle	•Check if P5 or P6 voltage on ECU side is high (battery voltage), if not, check Tilt/Slide operation signal circuit; Check the operation button.
Ignition key function fault	Sliding roof does not close automatically after removing ignition key for a certain amount of time	•Check if P4 voltage on ECU side is low (0 V), if not, check if igniter is in an effective position; Check state signal circuit and wire harness of igniter. •Check if P4 voltage on ECU side is low (0 V), if it is, the ECU or sliding roof mechanism is malfunctioning if relay operation sound is heard after a period of time; if relay operation sound is not heard after a period of time, the ECU is malfunctioning, replace it.
	Sliding roof does not close automatically in place after removing ignition key for a certain amount of time	•Sliding roof opens automatically during operation, and repeats for several times. Sliding roof resistance is large, please remove dust or apply lubricant; Sliding roof mechanism is deformed, replace sliding roof fixing bracket.
	Sliding roof can be operated without ignition key in effective position	•Check if P4 voltage on ECU side is low (0 V), if not, check state signal circuit and wire harness of ignition key.



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Problem	Cause	Repair Operation Method
Sliding roof does not operate	Mechanical fault	<ul style="list-style-type: none"> <li>If sliding roof moves slightly or relay operation sound can be heard without any sliding roof movement when Slide or Tilt button is pressed with ignition key in effective position, replace sliding roof fixing bracket. (Regardless of sliding roof fixing bracket, perform initialization of the sliding roof)</li> </ul>
	No drive power is applied	<ul style="list-style-type: none"> <li>Power supply circuit is fault. Check drive circuit fuse; Check sliding roof power supply circuit and wire harness.</li> </ul>
	No control signals	<ul style="list-style-type: none"> <li>Check if P4 voltage on ECU side is high (battery voltage), if not, check if ignition key is in an effective position; Check state signal circuit and wire harness of ignition key.</li> <li>With ignition key in effective position, long press Tilt button to check if P5 voltage on ECU side is high (battery voltage), if not, check Tilt state signal circuit; Check the operation button.</li> <li>With ignition key in effective position, long press Slide button to check if P6 voltage on ECU side is high (battery voltage), if not, check Slide state signal circuit; Check the operation button.</li> </ul>
	ECU failure	<ul style="list-style-type: none"> <li>With ignition key in effective position, long press Tilt and Slide buttons respectively, to check if P5 and P6 voltage on ECU side is high (battery voltage), if not, replace ECU.</li> </ul>
	Tilt/Slide button operation has no response or acts partially with no response	<ul style="list-style-type: none"> <li>Check if sliding roof is in full-tilted/fully open position, and if full-tilted/fully open does not response to operation.</li> <li>Long press Tilt button to check if P5/P6 voltage on ECU side is high (battery voltage), if not, check Tilt/Slide status signal circuit; Check the operation button.</li> <li>Briefly press Tilt/Slide button to check if P1 voltage is in effective range of 9~16 V immediately after sliding roof moves, if not, replace or recharge battery; check voltage drop of wire harness and connector.</li> </ul>



## ON-VEHICLE SERVICE

### Sliding Roof Switch Assembly

#### Removal

##### CAUTION

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof switch assembly.
- Appropriate force should be applied when removing sliding roof switch assembly. Be careful not to operate roughly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof switch assembly ([See page 50-25](#)).

#### Installation

Installation is in the reverse order of removal.

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## Sliding Roof Glass

### Removal

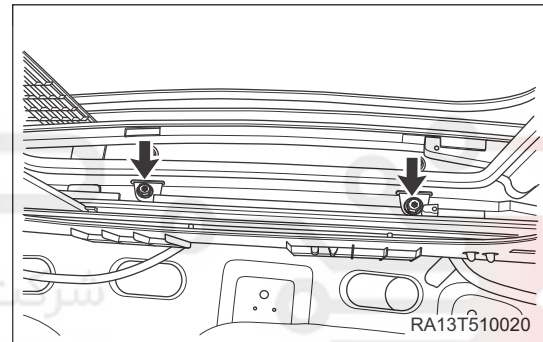
#### CAUTION

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof glass.
- Appropriate force should be applied when removing sliding roof glass. Be careful not to operate roughly to prevent sliding roof from being damage.

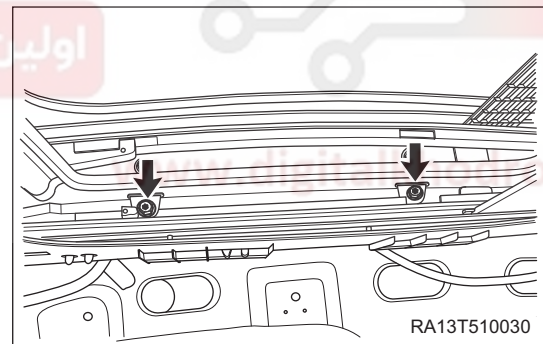
#### HINT:

Before removing sliding roof glass, press sliding roof switch to open the roof to full-tilted position.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof glass.
  - a. Remove 2 fixing bolts (arrow) from left side of sliding roof glass.  
(Tightening torque:  $5 \pm 1$  N·m)



- b. Remove 2 fixing bolts (arrow) from right side of sliding roof glass.  
(Tightening torque:  $5 \pm 1$  N·m)



- c. Remove the sliding roof glass.

### Installation

Installation is in the reverse order of removal.

#### CAUTION

- The flatness tolerance between front part of roof glass and top roof is  $1 \sim -2$  mm.
- The flatness tolerance between rear part of roof glass and top roof is  $-1 \sim 2$  mm.
- The flatness tolerance between side part of roof glass and top roof is  $-1.5 \sim 1.5$  mm.
- Check the open and close operations of roof after installation to ensure that there is no abnormality.

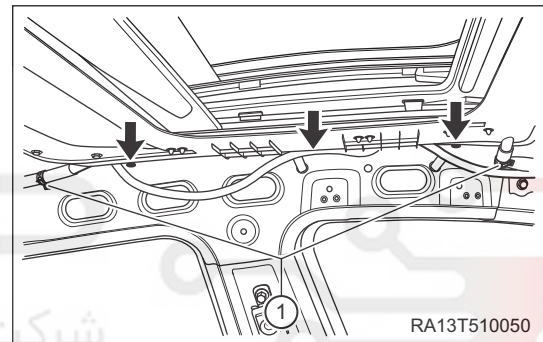
## Sliding Roof Bracket

### Removal

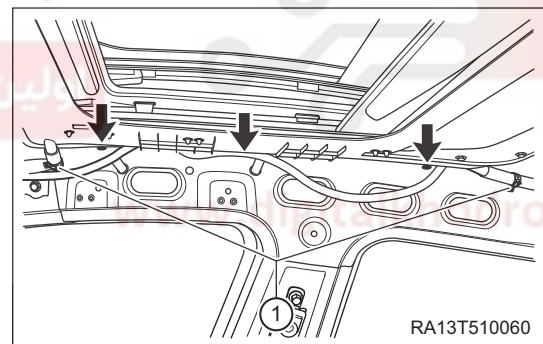
#### CAUTION

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof bracket.
- Appropriate force should be applied when removing sliding roof bracket. Be careful not to operate roughly.

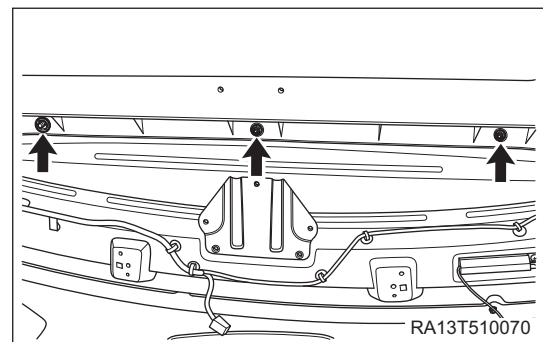
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof glass (See page 51-10).
4. Remove the sliding roof bracket.
  - a. Remove 2 clamps (1) from sliding roof left drain hose and sliding roof drain hose joint, and then remove 3 fixing bolts (arrow).  
(Tightening torque:  $14 \pm 0.5 \text{ N}\cdot\text{m}$ )



- b. Remove 2 clamps (1) from sliding roof right drain hose and sliding roof drain hose joint, and then remove 3 fixing bolts (arrow).  
(Tightening torque:  $14 \pm 0.5 \text{ N}\cdot\text{m}$ )



- c. Remove 3 fixing bolts (arrow) from front part of sliding roof bracket.  
(Tightening torque:  $14 \pm 0.5 \text{ N}\cdot\text{m}$ )



- d. Remove the sliding roof bracket.

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**Installation**

Installation is in the reverse order of removal.

**CAUTION**

- Make sure that the open and close operations of sliding roof have no any abnormal noise and resistance, after installing sliding roof bracket.
- Make sure sliding roof drain joint is installed in place and there is no any water leakage, after installing sliding roof bracket.

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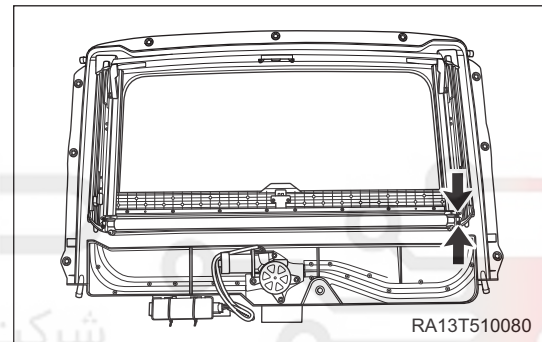
## Sliding Roof Visor Assembly

### Removal

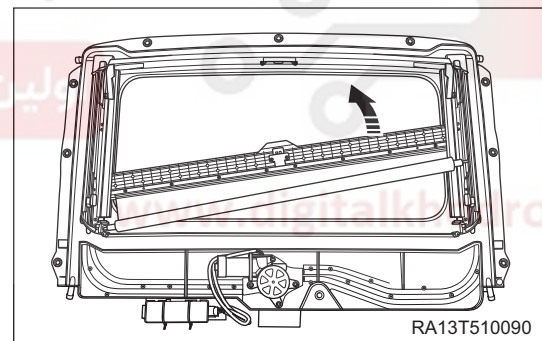
#### CAUTION

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof visor assembly.
- Try to prevent sliding roof visor assembly from being scratched or damaged, when removing sliding roof visor assembly.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the roof assembly (See page 50-25).
4. Remove the sliding roof visor assembly.
  - a. Remove 2 fixing bolts (arrow) from right end of sliding roof visor assembly.



5. Move sliding roof visor assembly in direction of arrow to remove it.



### Installation

Installation is in the reverse order of removal.

#### CAUTION

- Sliding roof visor should be wrapped firmly without any looseness and wrapping force of spring should be adjusted properly, when installing sliding roof visor assembly.
- After installing sliding roof visor assembly, sliding roof visor should return automatically once opened and be wrapped and pulled freely.

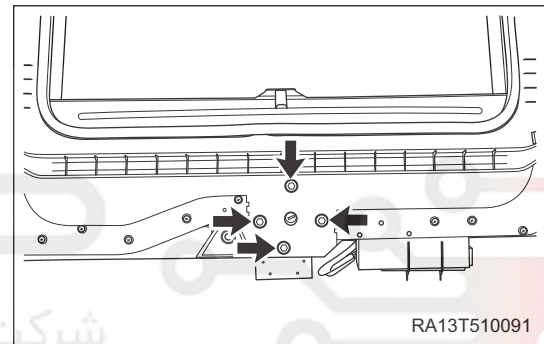
## Sliding Roof Motor and Control Unit Assembly

### Removal

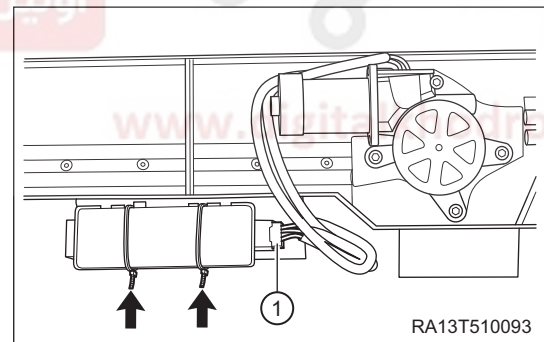
#### CAUTION

- Be sure to wear safety equipment to prevent accidents, when removing sliding roof motor and control unit assembly.
- Try to prevent sliding roof motor and control unit assembly from being damaged during removal.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the sliding roof bracket (See page 51-11).
4. Remove the sliding roof motor assembly.
  - a. Remove 4 fixing bolts (arrow) from sliding roof motor.



- b. Remove the sliding roof motor assembly.
5. Remove the sliding roof control unit assembly.
    - a. Cut off 2 fixing bands (arrow) from control unit, and unplug connector (1).



- b. Remove the sliding roof control unit assembly.

### Installation

Installation is in the reverse order of removal.

#### CAUTION

- Tighten fixing bolts in place and fix band securely to avoid looseness, when installing sliding roof motor and control unit assembly.
- Make sure no abnormal noise occurs between motor tooth and steel wire, after installing sliding roof motor.