## Specification

# General Specifications

| Name | Parameter |
|---|---|
| Working voltage | 9 ~ 16 V |
| Initialize voltage | No less than 10 V |
| Static current | No more than 250 uA |

## Description and Operation

# System Overview

If your vehicle is equipped with a sunroof, you can use the sunroof control switch on the roof for opening, closing or tilting. Only when the ignition switch is in "ON" position, the sunroof can work.

**WARNING: Do not operate the sunroof when driving the vehicle, otherwise, your attention will be distracted and lead to losing control of the vehicle and traffic accidents resulting in personal injury or damage to the properties even death.**

### Sunroof system is composed of the following components:

- Sunroof switch
- Sunroof control module
- Sunroof motor with sensor
- Sunroof frame assembly

### Sunroof Anti-pinch Function

The sunroof has the anti-pinch function, and when the resistance is too large during the sunroof automatically shutdown (including sliding close and tilt close), it is determined logically as there are objects or body parts jammed by the sunroof glass and the sunroof glass will immediately reverse move to completely open state.

If there is any tiny obstacle between the sliding glass and the sunroof frame, the anti-pinch function may not be enabled.

The sunroof anti-pinch function can only be enabled when the sunroof glass operates. When pressing and holding, the anti-pinch function will fail.

**WARNING: Although the sunroof has the anti-pinch function, due to the large reaction force required by trigging the anti-pinch, in order to protect the occupant safety, do not extand the head, hands and other parts out of the sunroof to avoid injury.**

### Overheating Protection Function

If the actual operation time of the sunroof motor in all the modes exceeds the specified operation time limit, the motor will stop to cool down. When the specified cool-down time is reached, the normal operation will resume without the need of re-initialization.

### Sunroof Initialization Function

Sunroof synchronizes the zero point recorded by the control module and that of the sunroof assembly through touching the hard block point. Thus, the sunroof can work normally, or there will be devation of sunroof working position.

### Sunroof Initialization Method

When the sunroof does not work normally caused by the disconnected battery or lack of power, please follow the steps on the sunroof initialization:

1. Put the ignition switch at "ON" position.
2. Press and hold the "CLOSE" button, the sunroof is completely shut down and bounces up and down once until the sunroof is fully tilted open, the whole process will continue for 7~15 s;
3. Press the "SLIDE OPEN" button to close the sunroof.
    - After several opening and closing strokes of the sunroof, the sunroof bounce may occur. The phenomenon is the normal sunroof auto initialization performance.

When the above steps are completed, run the sunroof for a routine so that it automatically adjusts the anti-pinch force.

Re-initialization shall be performed in case of following conditions:

- If the sunroof is de-energized during operation, the ECU will become abnormal and re-initialization shall be performed.
- If power supply is interrupted within 5 s after the sunroof stops, the time is not long enough for ECU to store the parameters and re-initialization shall be performed.
- It is normally around 2 years in operation before the sunroof is unable to be closed in place (long time operation, wearing gap between mechanical group).

## Sunroof Initialization Notes

When initializing, the locked current will reach about 10 A. If the power is not sufficient, the voltage drop occurs and when the voltage drops below 9 V, the sunroof control module will stop working and the initialization will be unfinished.

## General Procedures

# Sunroof Switch Inspection

1. Hold the "CLOSE" button and measure the resistance between the terminal 3 and terminal 6 of the sunroof switch L01.

   **Standard Resistance Value: less than 1 Ω**

2. Release the "CLOSE" button and measure the resistance between the terminal 3 and terminal 6 of the sunroof switch L01.

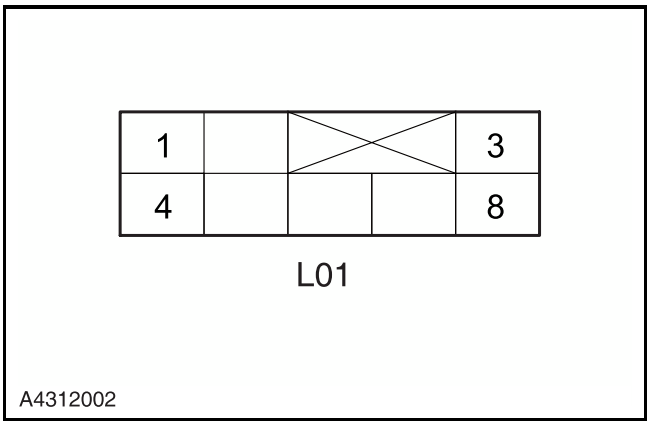
   **Standard Resistance Value: 10 MΩ or more**

3. Hold the "UP" button and measure the resistance between the terminal 7 and terminal 6 of the sunroof switch L01.

   **Standard Resistance Value: less than 1 Ω**

4. Release the "UP" button and measure the resistance between the terminal 7 and terminal 6 of the sunroof switch L01.

   **Standard Resistance Value: 10 MΩ or more**



## Symptom Diagnosis and Testing

# Inspection and Verification

1. Verify the customer concern.
2. Obvious symptom in electrical appliance by visual inspect.
3. Inspect the visible system circuit.
4. If an obvious cause for an observed or reported concern is found, correct the cause before proceeding to the next step.
5. If the cause is not visually evident, verify the symptom and refer to the Symptom Chart.

**Visual Inspection Chart**

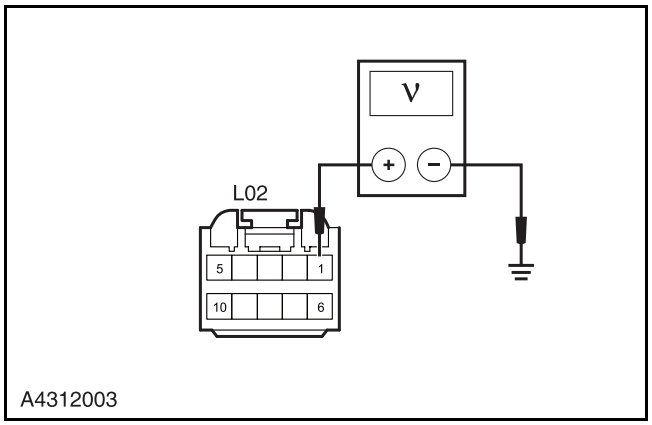
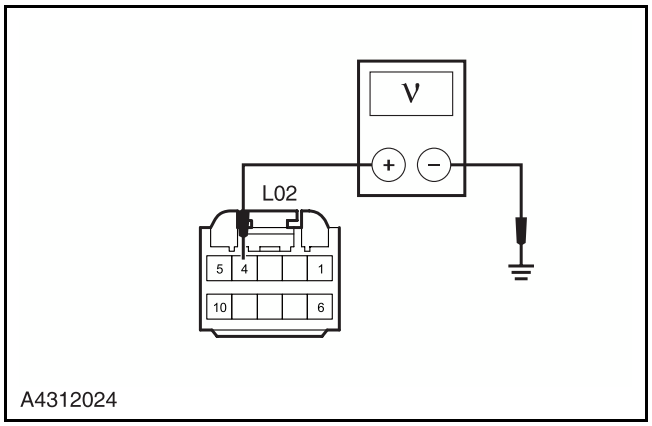
| Electric Part |
|---|
| • Battery |
| • Fuse |
| • Connection plug of electric appliance loose or being corroded |
| • Wiring harness |
| • Sunroof control module and motor assembly |

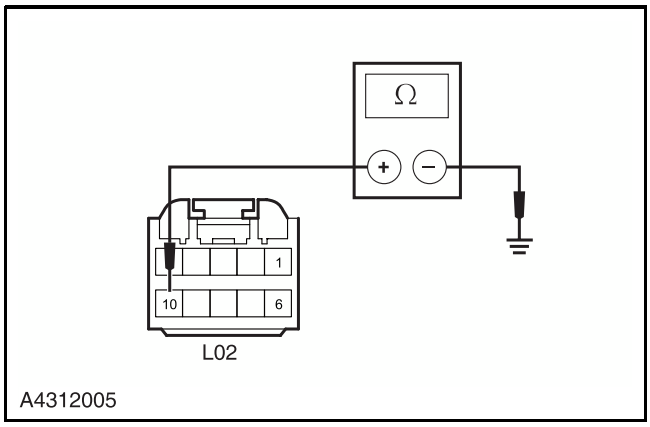
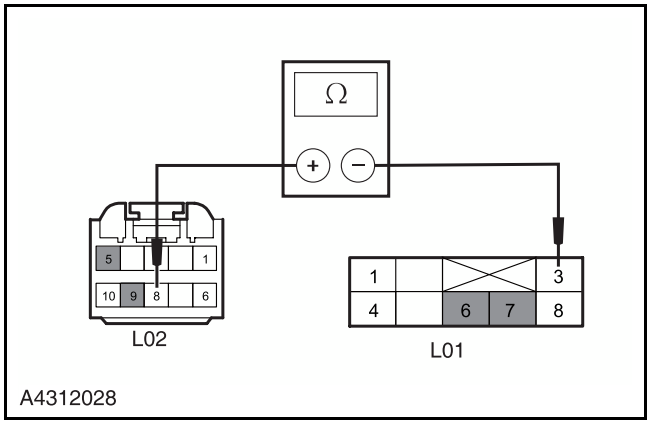
## Symptom Chart

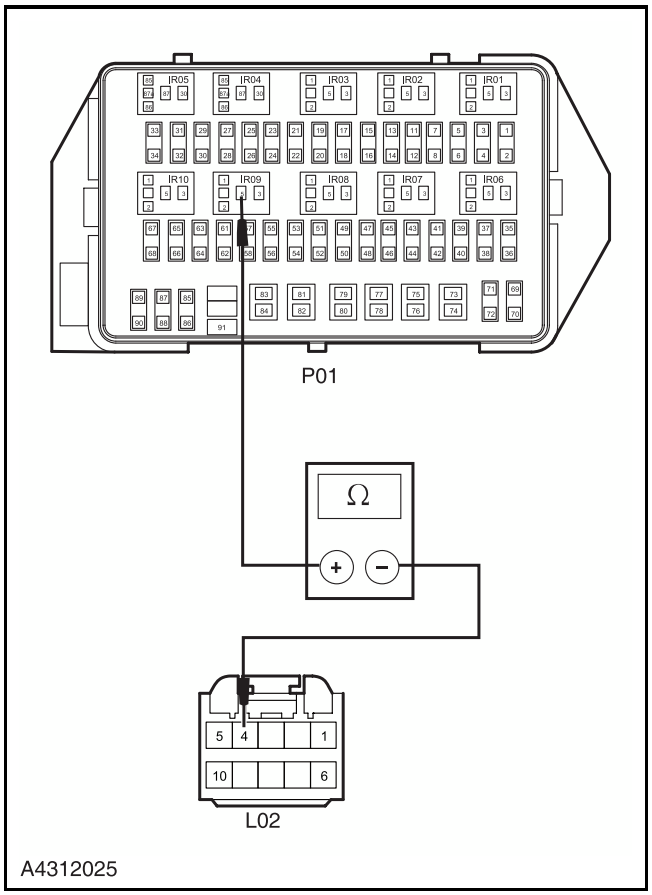
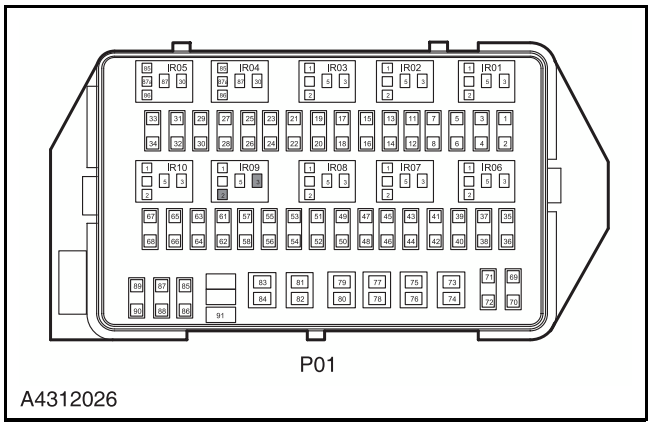
| Symptoms | Possible Sources | Action |
|---|---|---|
| Sunroof fault | • Fuses<br>• Relay<br>• Sunroof switch<br>• Sunroof control module and motor assembly<br>• Circuit<br>• BCM | Refer to: Sunroof Not Working Diagnosis (4.3.12 Sunroof, Symptom Diagnosis and Testing). |
| The sunroof can't be closed | • Sunroof switch<br>• Sunroof motor seized<br>• Sunroof control module and motor assembly<br>• Circuit<br>• Sunroof frame assembly | Refer to: Sunroof Unable to Close Diagnosis (4.3.12 Sunroof, Symptom Diagnosis and Testing). |
| Abnormal sound of sunroof motor | • Sunroof motor<br>• Sunroof frame | • Replace the sunroof control module and motor assembly<br>• Replace the sunroof frame |

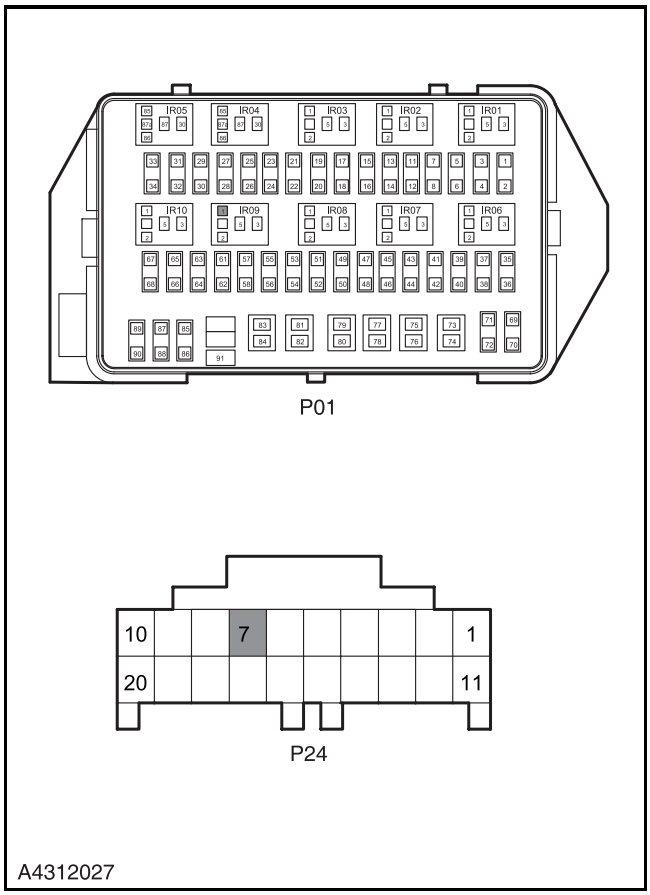
## Sunroof Not Working Diagnosis

| Test Conditions | Details/Results/Actions |
|---|---|
| 1. General inspection | |
| | A.Inspect the wiring harness connectors of switch and motor for signs of damage, poor contact, aging, or loose.<br>Is it normal?<br>**Y**<br>Go to step 2.<br>**N**<br>Repair the fault. |
| 2. Inspect the fuse | |
| | A.Inspect the sunroof control module fuse IF30, EF14.<br>**Fuse Rated Capacity: 30 A (IF30), 25 A (EF14)**<br>Is the fuse normal?<br>**Y**<br>Go to step 3.<br>**N**<br>Inspect and repair the fuse circuit, replace the fuse in rated capacity. |

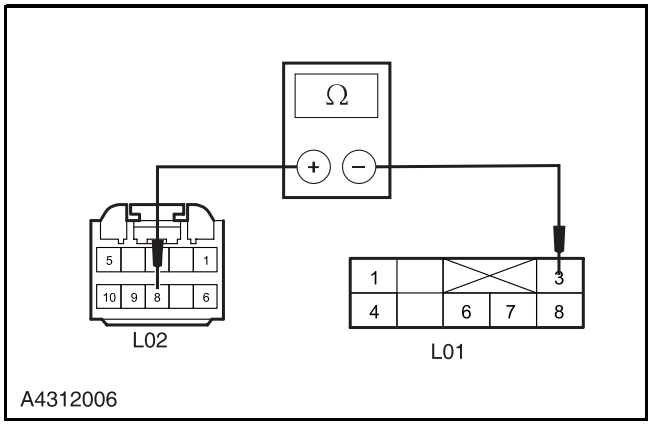
| Test Conditions | Details/Results/Actions |
|---|---|
| 3.Inspect the sunroof switch | |
| | A.Inspect the sunroof switch.<br>**Refer to: Sunroof Switch Inspection (4.3.12 Sunroof, General Procedures).**<br>Is the switch normal?<br>**Y**<br>Go to step 4.<br>**N**<br>Replace the sunroof switch. |
| 4. Inspect the power supply of the terminal 1 of the sunroof control module wiring harness connector L02 | |
|  A4312003 | A.Turn the ignition switch to position "LOCK".<br>B.Disconnect the wiring harness connector L02 of the sunroof control module.<br>C.Measure the resistance between the terminal 1 of sunroof control module wiring harness connector L02 and reliable ground.<br>**Standard Voltage Value: 11 ~ 14 V**<br>Is the voltage normal?<br>**Y**<br>Go to step 5.<br>**N**<br>Repair the open circuit between the terminal 1 of sunroof control module wiring harness connector L02 and the terminal 27 of fuse EF14 of engine compartment fuse and relay box C01. |
| 5. Inspect the power supply of the terminal 4 of the sunroof control module wiring harness connecto L02 | |
|  A4312024 | A.Turn the ignition switch to position "LOCK".<br>B.Disconnect the wiring harness connector L02 of the sunroof control module.<br>C.Turn the ignition switch to "ON".<br>D.Measure the resistance between the terminal 4 of sunroof control module wiring harness connector L02 and reliable ground.<br>**Standard Voltage Value: 11 ~ 14 V**<br>Is the voltage normal?<br>**Y**<br>Go to step 6.<br>**N**<br>Go to step 8. |

| Test Conditions | Details/Results/Actions |
|---|---|
| 6.Inspect the ground circuit of the sunroof control module | |
|  <br>A4312005 | A.Turn the ignition switch to position "LOCK".<br>B.Disconnect the sunroof control module wiring harness connector L02.<br>C.Measure the resistance between the terminal 10 of sunroof control module wiring harness connector L02 and reliable ground.<br>**Standard Resistance Value: less than 5 Ω**<br>Is the resistance value normal?<br>**Y**<br>Go to step 7.<br>**N**<br>Inspect and repair the open circuit between the terminal 10 of sunroof control module wiring harness connector L02 and the ground point G201. |
| 7. Inspect the circuit between sunroof control module and sunroof switch | |
|  <br>A4312028 | A.Turn the ignition switch to position "LOCK".<br>B.Disconnect the wiring harness connector L02 of the sunroof control module.<br>C.Disconnect the wiring harness connector L01 of the sunroof switch.<br>D.Measure the respective resistance between terminal 5, 8, 9 of sunroof control module wiring harness connector L02 and terminal 6, 3, 7 of sunroof switch wiring harness connector L01.<br>**Standard Resistance Value: less than 5 Ω**<br>Is the resistance value normal?<br>**Y**<br>Replace the sunroof control module and motor assembly.<br>**Refer to: Sunroof Motor (4.3.12 Sunroof, Removal and Installation).**<br>**Refer to: Sunroof Control Module (4.3.12 Sunroof, Removal and Installation).**<br>Carry out the sunroof initialization procedure to verify that the system is normal.<br>**N**<br>Inspect and repair the open circuit between the terminal 5, 8, 9 of sunroof control module wiring harness connector L02 and the terminal 6, 3, 7 of sunroof switch wiring harness connector L01. |

| Test Conditions | Details/Results/Actions |
|---|---|
| 8. Inspect the circuit between the sunroof control module and the relay IR09 | |
|  <br>A4312025 | A.Turn the ignition switch to position "LOCK".<br>B.Remove the relay IR09.<br>C.Disconnect the wiring harness connector L02 of the sunroof control module.<br>D.Measure the resistance between the terminal 4 of sunroof control module wiring harness connector L02 and reliable ground.<br>**Standard Resistance Value: less than 5 Ω**<br>Is the resistance value normal?<br>**Y**<br>Go to step 9.<br>**N**<br>Repair the open circuit between the terminal 4 of sunroof control module wiring harness connector L02 and the terminal 5 of relay IR09. |
| 9. Inspect the power supply circuit of the IR09 relay | |
|  <br>A4312026 | A.Turn the ignition switch to position "LOCK".<br>B.Remove the relay IR09.<br>C.Measure the voltage between terminal 2 and 3 of relay IR09 of I/P fuse and relay box P01, and reliable ground respectively.<br>**Standard Voltage Value: 11 ~ 14 V**<br>Is the voltage normal?<br>**Y**<br>Go to step 10.<br>**N**<br>Inspect and repair the open circuit between the terminal 63 of IF30 in the fuse and relay box P01 and the terminal 2 and 3 of the relay IR09 respectively, and replace the I/P fuse and relay box P01 as necessary. |

| Test Conditions | Details/Results/Actions |
|---|---|
| 10. Inspect the relay IR09 ground circuit | |
|  | A.Turn the ignition switch to "LOCK" position and disconnect the battery negative cable.<br>B.Remove the relay IR09.<br>C.Disconnect the BCM wiring harness connector P24.<br>D.Measure the resistance between terminal 1 of the relay IR09 and terminal 7 of the BCM wiring harness connector P24 .<br>**Standard Resistance Value: less than 5 Ω**<br>Is the resistance value normal?<br>**Y**<br>Go to step 11.<br>**N**<br>Inspect and repair the open circuit fault between the terminal 1 of the relay IR09 and the terminal 7 of the the BCM wiring harness connector P24. |
| 11. Inspect the BCM power supply and the ground circuit | |
| | A. Inspect the BCM power supply circuit.<br>**Refer to: DTC Diagnostic Procedure Index (4.3.14 Body Control System, DTC Diagnosis and Testing).**<br>Is the BCM power supply and the ground circuit normal?<br>**Y**<br>Go to step 12.<br>**N**<br>Repair the fault part. |
| 12. Replace the BCM | |
| | A.Turn the ignition switch to position "LOCK" and disconnect the battery negative cable.<br>B.Replace the BCM.<br>**Refer to: Body Control Module (4.3.14 Body Control System, Removal and Installation).**<br>Confirm the maintenance is finished. |

# Sunroof Can’t Be Closed Diagnosis

| Test Conditions | Details/Results/Actions |
|---|---|
| 1.Inspect the sunroof switch | |
| | A.Inspect the sunroof switch.<br>**Refer to: Sunroof Switch Inspection (4.3.12 Sunroof, General Procedures).**<br>Is the switch normal?<br>**Y**<br>Go to step 2.<br>**N**<br>Replace the sunroof switch. |
| 2. Carry out the sunroof initialization | |
| | A.Carry out the initialization program.<br>B.Operate the sunroof switch.<br>Does the sunroof work normal?<br>**Y**<br>Confirm the maintenance is finished.<br>**N**<br>Go to step 3. |
| 3. Inspect the circuit between sunroof control module and sunroof switch | |
|  | A.Turn the ignition switch to position "LOCK".<br>B.Disconnect the wiring harness connector L02 of the sunroof control module.<br>C.Disconnect the wiring harness connector L01 of the sunroof switch.<br>D.Measure the respective resistance between terminal 8 of sunroof control module wiring harness connector L02 and terminal 3 of sunroof switch wiring harness connector L01.<br>**Standard Resistance Value: less than 5 Ω**<br>Is the resistance normal?<br>**Y**<br>Go to step 4.<br>**N**<br>Repair the open circuit between the terminal 8 of sunroof control module wiring harness connector L02 and the terminal 3 of sunroof switch wiring harness connector L01. |

| Test Conditions | Details/Results/Actions |
|---|---|
| 4. Replace the sunroof control module and motor assembly | |
| | A.Replace the sunroof control module and motor assembly.<br>**Refer to: Sunroof Motor (4.3.12 Sunroof, Removal and Installation).**<br>**Refer to: Sunroof control module (4.3.12 Sunroof, Removal and Installation).**<br>Execute the initialization program.<br>Does the sunroof work normal?<br>**Y**<br>Verify the system is normal.<br>**N**<br>Replace the sunroof frame assembly.<br>**Refer to: Sunroof Frame (4.3.12 Sunroof, Removal and Installation).** |

## Removal and Installation

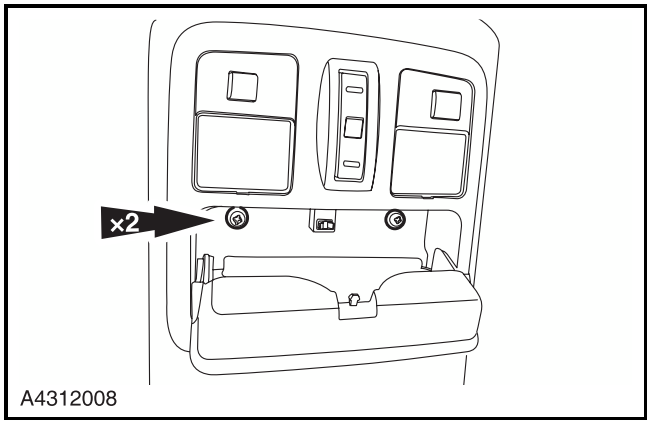
# Sunroof Switch

### Removal

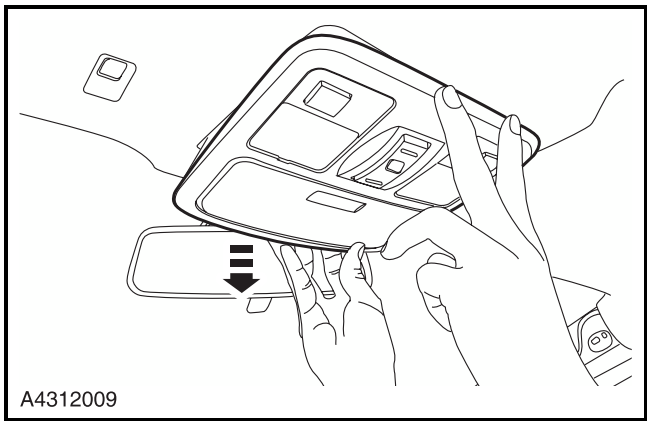
1. Disconnect the battery negative cable.

   **Refer to: Battery Inspection (3.1.10 Charging System, General Procedures).**

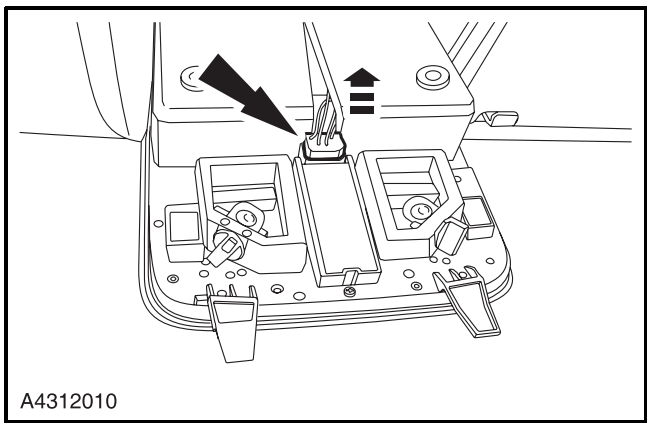
2. Open the spectacle case, and remove the retaining screws of the sunroof switch.




3. Detach the sunroof switch from the roof lining.




4. Disconnect the wiring harness connector of the sunroof switch.




### Installation

1. To install, reverse the removal procedure.

# Sunroof Motor

## Removal

1. Disconnect the battery negative cable.

   **Refer to: Battery Inspection (3.1.10 Charging System, General Procedures).**

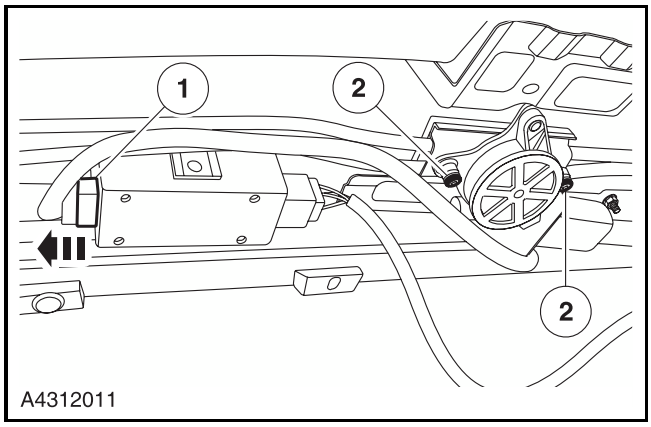
2. Remove the roof lining.

   **Refer to: Roof Lining (5.1.9 Interior Trim and Ornamentation, Removal and Installation).**

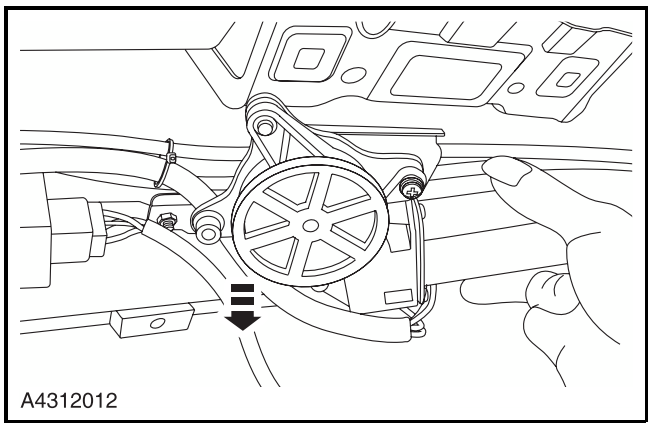
3. Remove the sunroof motor.

   1. Disconnect the sunroof motor wiring harness connector.

   2. Remove the 2 retaining screws of the sunroof motor.




4. Remove the sunroof motor assembly.




## Installation

1. To install, reverse the removal procedure.
2. Conduct the initial setup.

# Sunroof Motor Control Module

## Removal

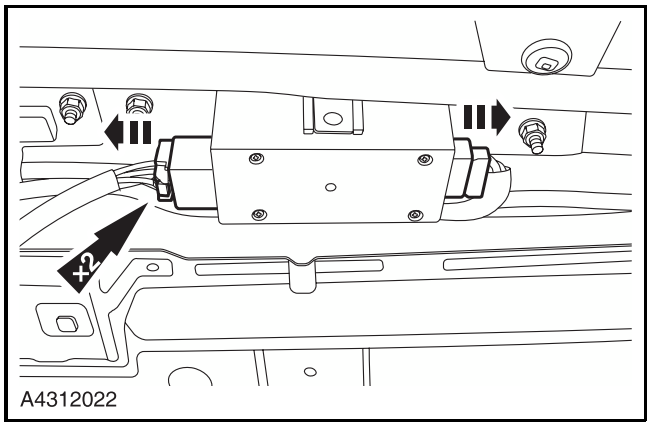
1. Disconnect the battery negative cable.

   **Refer to: Battery Inspection (3.1.10 Charging System, General Procedures).**

2. Remove the roof lining.

   **Refer to: Roof Lining (5.1.9 Interior Trim and Ornamentation, Removal and Installation).**

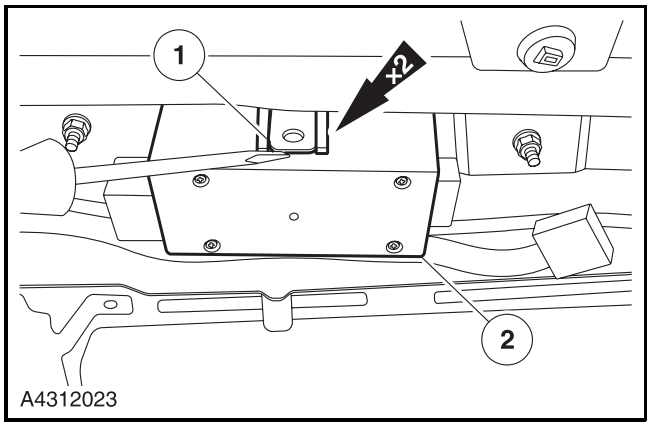
3. Disconnect the sunroof motor control module wiring harness connector.




4. Drive the sunroof motor control module.

   1. Use a proper tool to remove the 2 clips on the sunroof motor control module.

   2. Take out the sunroof motor control module.




## Installation

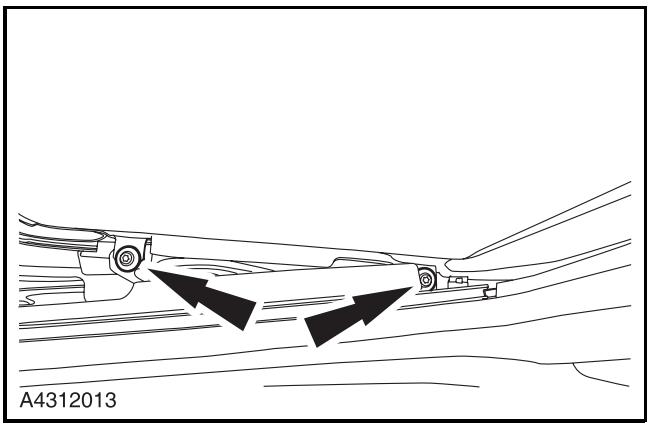
1. To install, reverse the removal procedure.
2. Conduct the initial setup.

# Sunroof Glass

## Removal

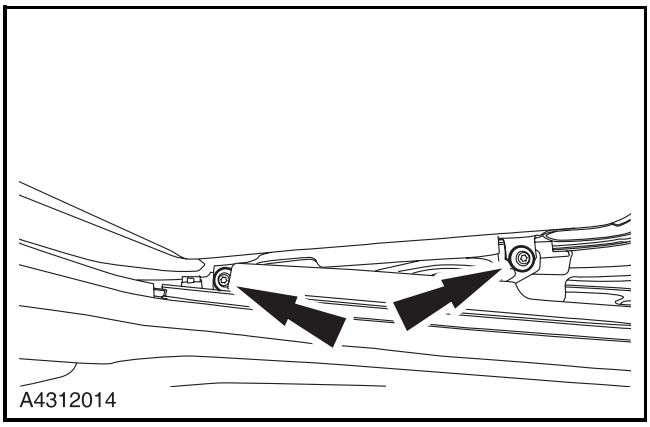
1. Remove the 2 retaining bolts of the left side of the sunroof glass.

   Torque: 8 Nm

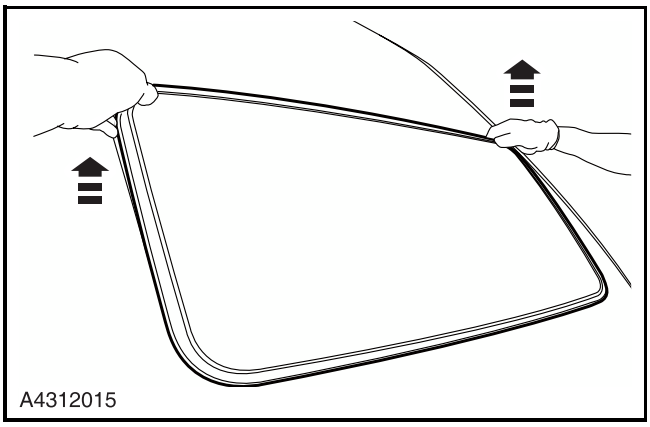



2. Remove the 2 retaining bolts of the sunroof glass.

   Torque: 8 Nm




3. Take out the sunroof glass from the vehicle top.




## Installation

1. To install, reverse the removal procedure.
2. Adjust the sunroof glass position.
3. Test the sealing performance.

# Sunroof Sun Visor

## Removal

1. Disconnect the battery negative cable.

   **Refer to: Battery Inspection (3.1.10 Charging System, General Procedures).**

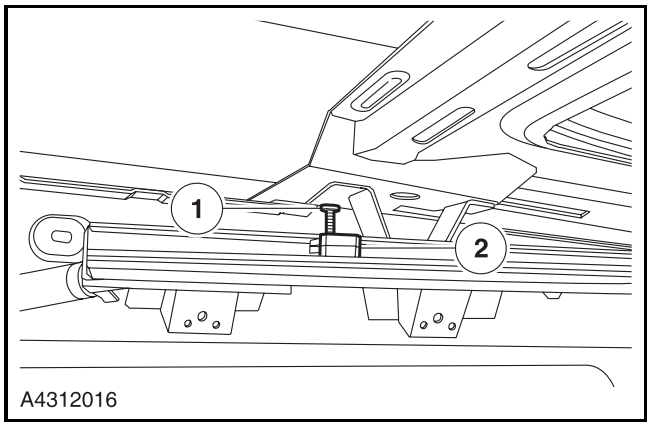
2. Remove the roof lining.

   **Refer to: Roof Lining (5.1.9 Interior Trim and Ornamentation, Removal and Installation).**

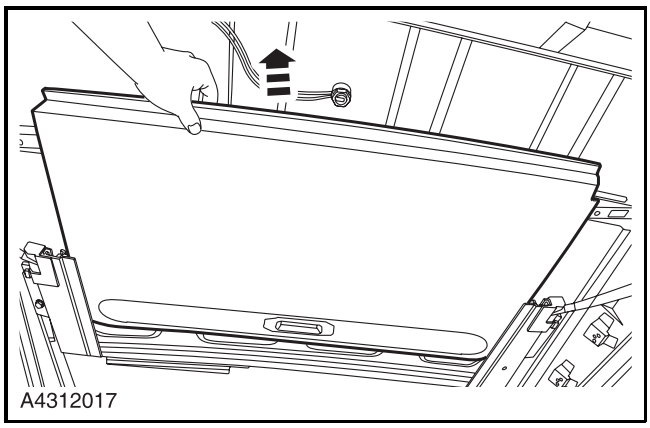
3. Remove the limit stop on both sides.

   1. Remove the retaining screw of the limit stop.

   2. Take out the limit stop.




4. Take out the sunroof sun visor.




## Installation

1. To install, reverse the removal procedure.

# Sunroof Frame

## Removal

1. Disconnect the battery negative cable.

   **Refer to: Battery Inspection (3.1.10 Charging System, General Procedures).**

2. Remove the roof lining.

   **Refer to: Roof Lining (5.1.9 Interior Trim and Ornamentation, Removal and Installation).**

3. Remove the sunroof motor.

   **Refer to: Sunroof Motor (4.3.12 Sunroof , Removal and Installation).**

4. Drive the sunroof motor control module.

   **Refer to: Sunroof Motor Control Module (4.3.12 Sunroof, Removal and Installation).**

5. Remove the sunroof glass.

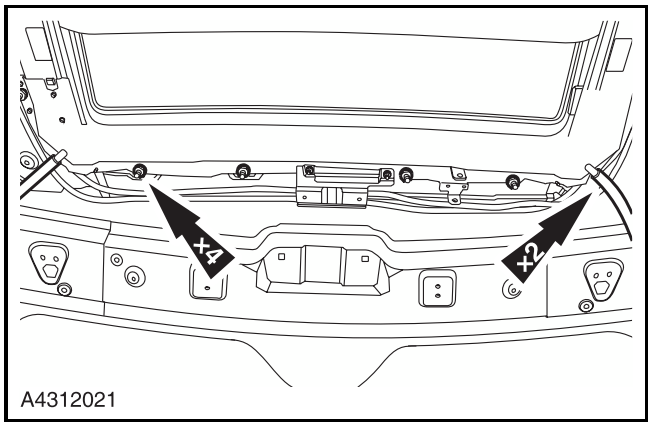
   **Refer to: Sunroof Glass (4.3.12 Sunroof, Removal and Installation).**

6. Remove the sunroof frame.

   1. Disconnect the 2 connections between the sunroof exhaust water pipe and the sunroof frame.

   2. Remove the 4 retaining bolts of the front side of the sunroof frame.

   Torque: 12 Nm



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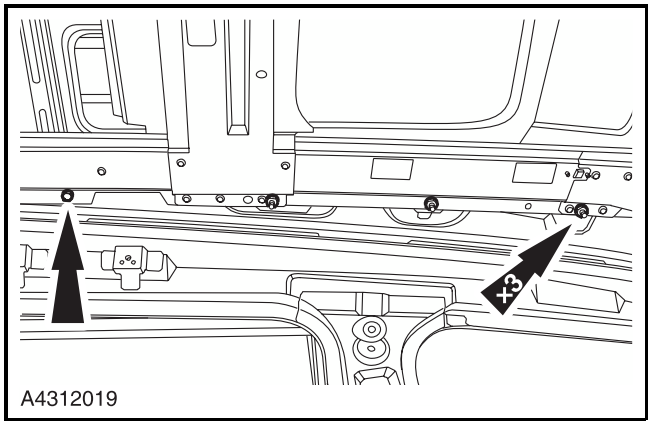
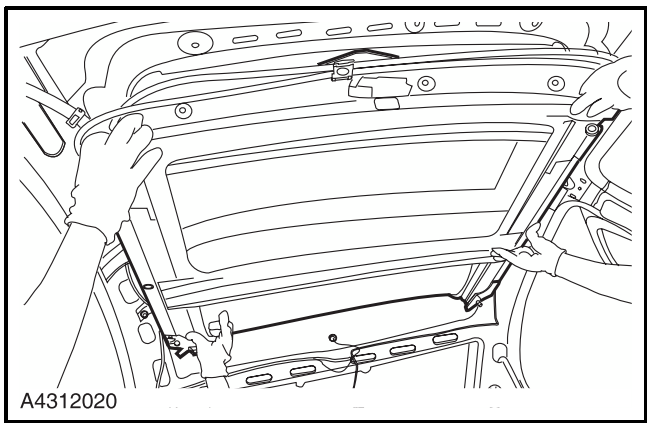
7. Remove the 3 retaining bolts and the 1 nuts on the left and right sides of the sunroof frame.

   Torque: 12 Nm



A4312019

8. Remove the sunroof frame assembly.




## Installation

1. To install, reverse the removal procedure.
2. Adjust the sunroof glass position.
3. Test the sunroof sealing performance.