

BODY SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

| | |
|---|-----------------|
| HVAC SYSTEM (HEATER, VENTILATOR AND A/C) | AC |
| HVAC SYSTEM (AUTO A/C) (DIAGNOSTICS) | AC(diag) |
| AIRBAG SYSTEM | AB |
| AIRBAG SYSTEM (DIAGNOSTICS) | AB(diag) |
| SEAT BELT SYSTEM | SB |
| LIGHTING SYSTEM | LI |
| WIPER AND WASHER SYSTEMS | WW |
| ENTERTAINMENT | ET |
| COMMUNICATION SYSTEM | COM |
| GLASS/WINDOWS/MIRRORS | GW |
| BODY STRUCTURE | BS |
| INSTRUMENTATION/DRIVER INFO | IDI |
| SEATS | SE |
| SECURITY AND LOCKS | SL |
| SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF) | SR |
| EXTERIOR/INTERIOR TRIM | EI |
| EXTERIOR BODY PANELS | EB |

BODY SECTION

CRUISE CONTROL SYSTEM CC

CRUISE CONTROL SYSTEM (DIAGNOSTICS) CC(diag)

IMMOBILIZER (DIAGNOSTICS) IM(diag)

LAN SYSTEM (DIAGNOSTICS) LAN(diag)

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

SR

| | Page |
|---------------------------------|------|
| 1. General Description | 2 |
| 2. Sunroof Control System | 5 |
| 3. Glass Lid | 6 |
| 4. Sunroof Assembly | 9 |
| 5. Sunroof Motor | 12 |
| 6. Sunroof Switch | 15 |

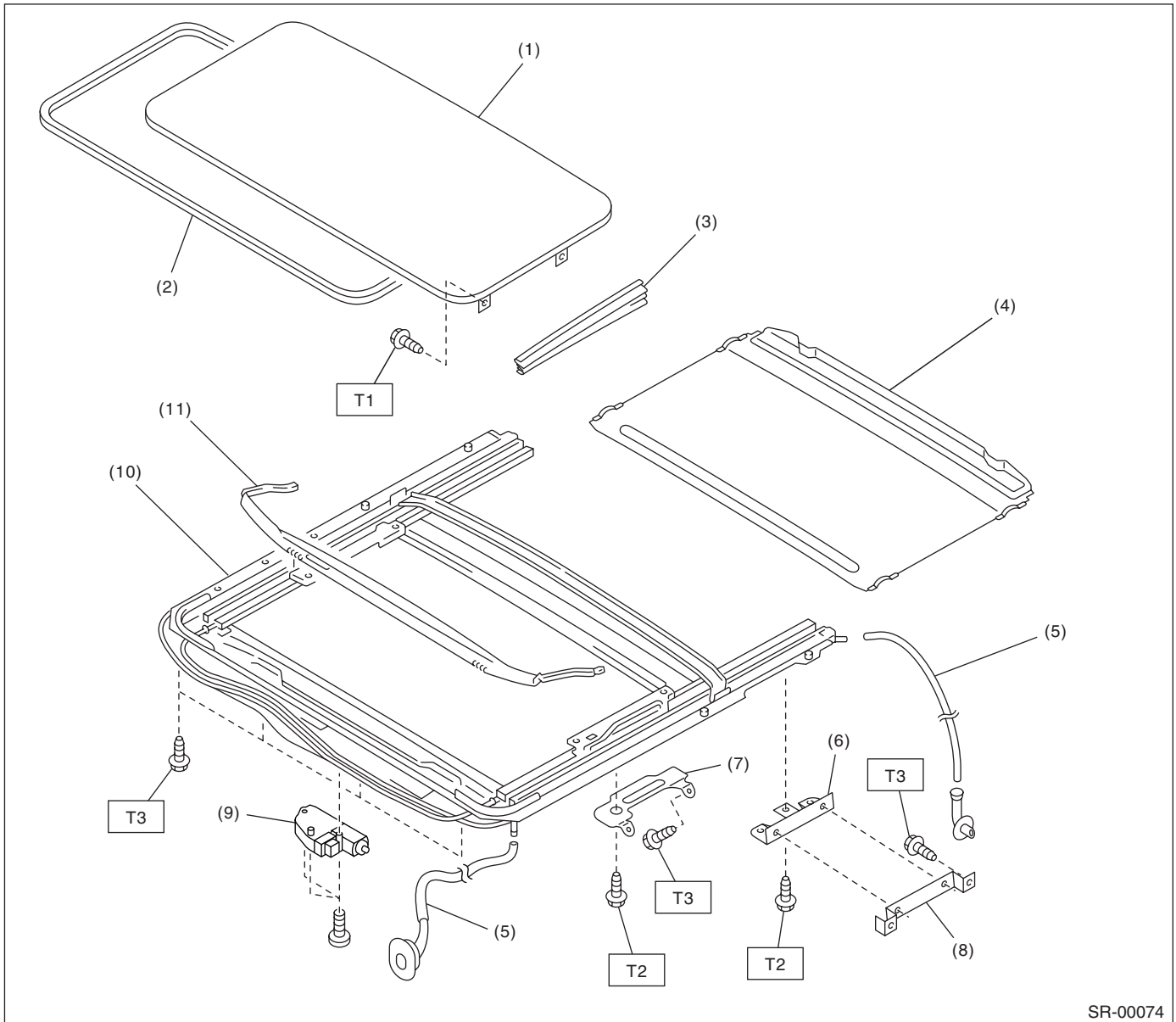
General Description

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

1. General Description

A: COMPONENT

1. SEDAN MODEL



- (1) Glass lid
- (2) Weatherstrip
- (3) Guide rail cover
- (4) Sunshade
- (5) Drain tube
- (6) Assist rail bracket (Rear)
- (7) Assist rail bracket (Front)
- (8) Sunroof bracket (Rear)
- (9) Motor ASSY
- (10) Frame ASSY
- (11) Deflector

Tightening torque: N·m (kgf·m, ft·lb)

T1: 4.5 (0.46, 3.3)

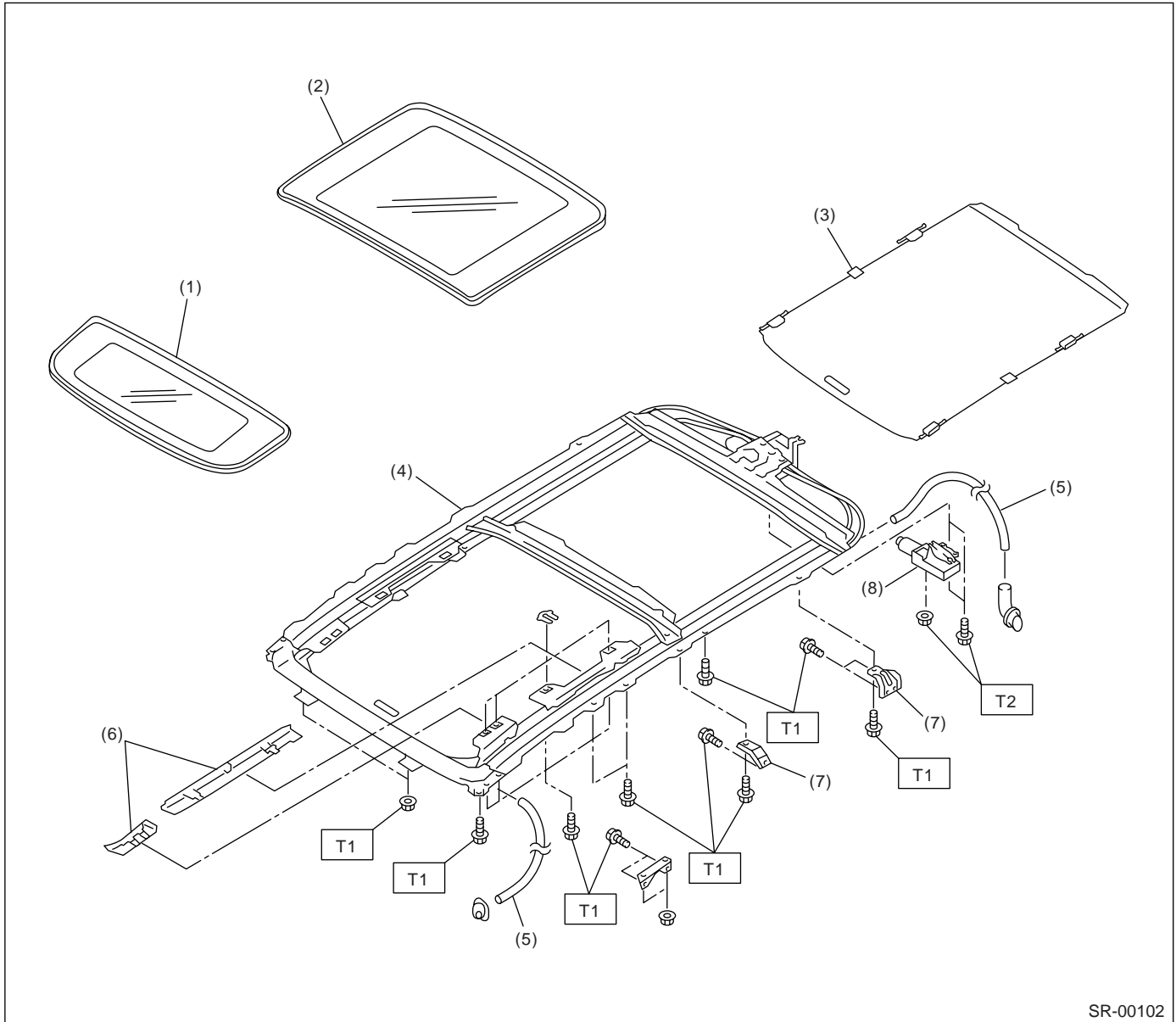
T2: 6.0 (0.61, 4.4)

T3: 7.5 (0.76, 5.3)

General Description

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

2. WAGON MODEL



- (1) Glass lid (Front)
- (2) Glass lid (Rear)
- (3) Sunshade
- (4) Frame ASSY
- (5) Drain tube
- (6) Cover (Front and rear)
- (7) Frame bracket
- (8) Motor ASSY

Tightening torque: N·m (kgf·m, ft·lb)

T1: 7.5 (0.76, 5.3)

T2: 4.5 (0.46, 3.0)

General Description

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

B: CAUTION

- Before disassembling or reassembling parts, always disconnect the battery ground cable. When replacing the audio, control unit, and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable in order to prevent memory deletion.
- Reassemble the parts in the reverse order of disassembly unless otherwise indicated.
- Adjust parts to the given specifications.
- Connect the connectors securely for reassembly.
- After reassembly, make sure functional parts operate smoothly.

C: PREPARATION TOOL

1. GENERAL TOOL

| TOOL NAME | REMARKS |
|----------------|--|
| Circuit tester | Used for measuring resistance and voltage. |

Sunroof Control System

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

2. Sunroof Control System

A: WIRING DIAGRAM

1. SUNROOF

<Ref. to WI-316, WIRING DIAGRAM, Sunroof System.>

B: INSPECTION

| Symptom | Inspection order |
|--|---|
| Water leakage | (1) Check roof panel and glass lid for improper or poor sealing. (2) Check drain tube for clogging. (3) Check sunroof frame seal and body for improper fit. |
| Booming noise, wind noise and other noise | (1) Check glass lid and roof panel for improper clearance. (2) Check sunshade and roof trim for improper clearance. |
| Motor noise | (1) Check installing part of motor for looseness. (2) Check gears and bearings for wear. (3) Check cable for wear. (4) Check cable pipe for deformities. |
| Failure of sunroof (Motor operates properly.) | (1) Check guide rail for foreign particles. (2) Check guide rail for improper installation. (3) Check parts for mutual interference. (4) Check cable slider for improper clinching. (5) Check cable for improper installation. |
| Motor does not rotate or rotate improperly. | (1) Check fuse for blown out. (2) Check switch for improper function. (3) Check motor for incorrect terminal voltage. (4) Check the relay for improper operation. (5) Check poor grounding system. (6) Check harness for open or short and terminals for poor connections. |
| Failure turn of glass lid | Check guide rail for foreign particles. |

- Failure turn of glass lid while driving rough road.

Glass lid has auto-reverse function. When applied above specified force to the glass lid, the lid turns back and stops. When operating the glass lid (open or close) while driving the rough road, the lid judges vibration as a force and may causes failure turns. When the failure turn is occurred, the initialize operation is required with following procedure.

1. INITIALIZE OPERATION (SEDAN MODEL)

- 1) Tilt up the glass lid.
- 2) Release the switch once, and press the tilt up switch again for 15 seconds.
- 3) When the glass lid is raised a little and returned to tilt up position, release the switch for the moment. (Initialization of position detecting function)
- 4) Keep pressing the tilt up switch within 5 seconds from releasing the switch, glass lid tilts down → slides open → slides close operation automatically. (Time gap of more than 5 seconds will result in cancellation of position detecting function.)
- 5) Initialize operation is completed.

2. INITIALIZE OPERATION (WAGON MODEL)

- 1) Apply the force to glass lid in the direction of glass lid open while glass lid (rear) is closing, and then reverse the lid five times in a row.

However, in the following situation, the initialize operation is canceled.

- When the lid is fully closed once during auto-reverse operation five times in a row.
 - When the interval of auto-reverse operation is more than 30 seconds once.
- 2) When the operation of glass lid shift to brink operation*, fully close the lid on switch operation.
 - 3) Initialize operation is completed.

*Brink operation: Although keep pressing the switch, glass lid operates only at a moment when the switch is pressed.

Glass Lid

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

3. Glass Lid

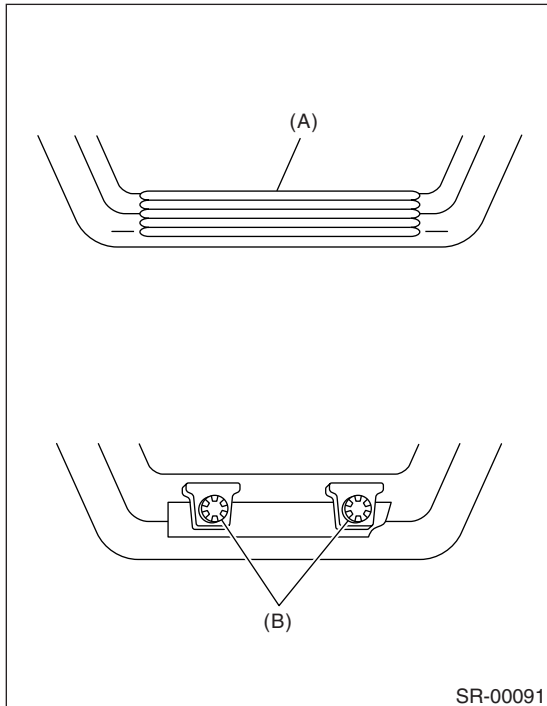
A: REMOVAL

1. SEDAN MODEL

- 1) Completely close the glass lid, and then open the sunshade.
- 2) Remove the cover (A), and then remove the TORX® bolts (B).

CAUTION:

TORX® bolts are applied with thread locker. If they are removed, replace with new ones.

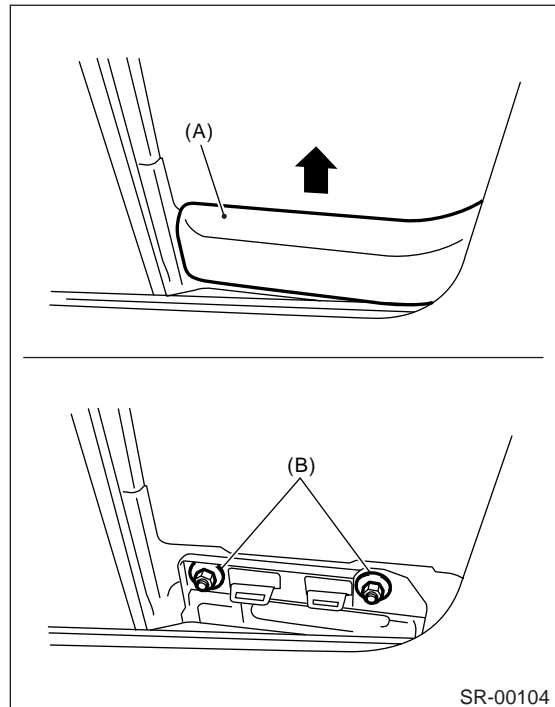


- 3) Remove the glass lid carefully.

2. WAGON MODEL (FRONT)

- 1) Open the sunshade.

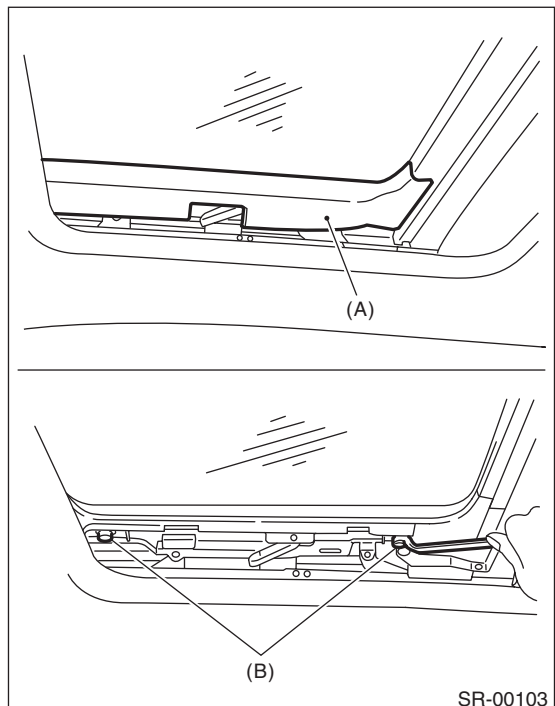
- 2) Pull out the cover (A) toward arrow mark, and then remove the nut (B).



- 3) Remove the glass lid (front) carefully.

3. WAGON MODEL (REAR)

- 1) Tilt up the glass lid (front), and then open the sunshade.
- 2) Remove the cover (A), and then remove the nut (B).



- 3) Remove the glass lid carefully.

Glass Lid

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

B: INSTALLATION

Install in the reverse order of removal.

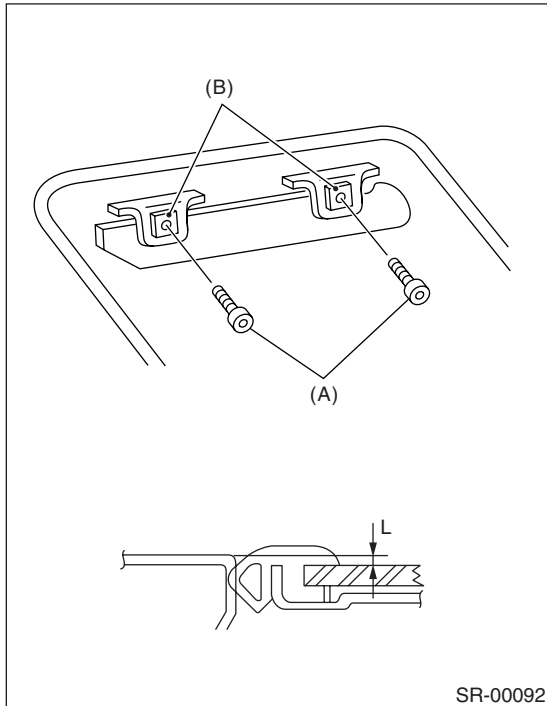
C: ADJUSTMENT

1. SEDAN MODEL

Loosen the glass lid mounting TORX® bolts (A), and then adjust the height with moving 9.5 mm (0.374 in) nut (B) on lid side.

Difference in height between glass lid and roof panel L:

$2.0 \pm 1.0 \text{ mm (0.079} \pm 0.039 \text{ in)}$

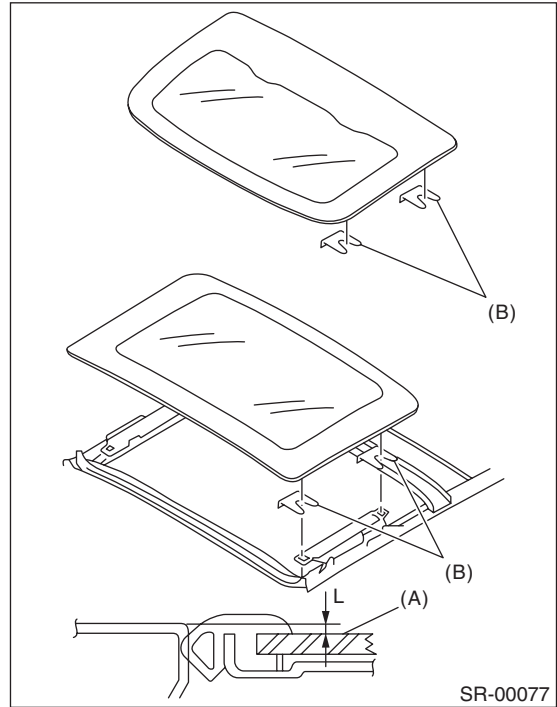


2. WAGON MODEL

Loosen the glass lid installation nuts, and then adjust the height by adding (max: four pieces) or extracting (min: zero piece) shims (B) (standard: two pieces) which installed between glass lid (A) and body.

Difference in height between glass lid and roof panel L:

$2.0 \pm 1.0 \text{ mm (0.079} \pm 0.039 \text{ in)}$



D: FORCED DRIVE

If glass lid dose not operate or is not supplied with power, move the glass lid using the emergency handle (wrench)*.

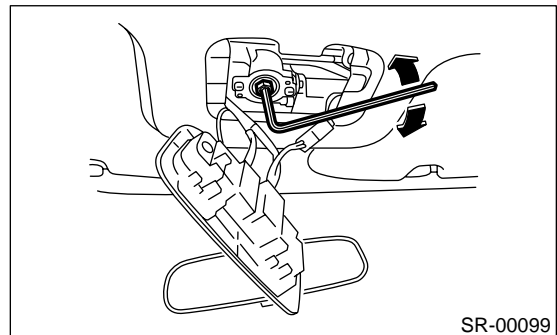
*: Emergency handle (L shape general purpose hexagon wrench)

Sedan model: bolt width 4 mm (0.16 in)

Wagon model: bolt width 5 mm (0.20 in)

1. SEDAN MODEL

- 1) Remove the spot map light. <Ref. to LI-34, REMOVAL, Spot Map Light.>
- 2) Insert the wrench securely until it touches the motor shaft edge.
- 3) Turn the wrench, and move the glass lid.
 - Turning right, the glass lid open.
 - Turning left, the glass lid close.

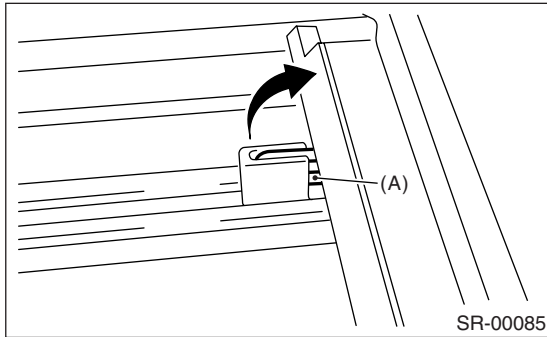


Glass Lid

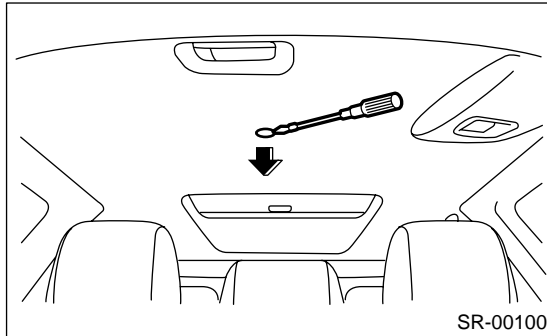
SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

2. WAGON MODEL

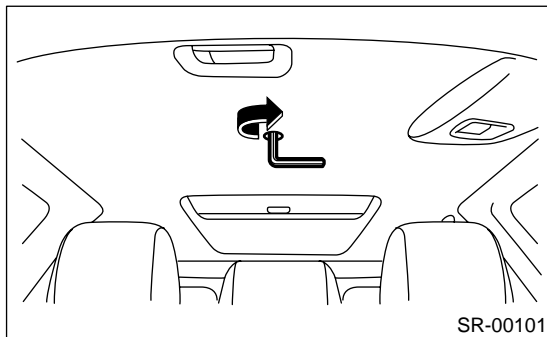
1) Raise the left and right side hook (A) of sunshade.



2) Slide the sunshade forward.
3) Remove the plug in the rear side of roof trim.



4) Insert the wrench securely until it touches the motor shaft edge.
5) Turn the wrench to right, and close the glass lid (front and rear).



CAUTION:
After forced drive, the initialize operation is required. <Ref. to SR-5, INSPECTION, Sunroof Control System.>

Sunroof Assembly

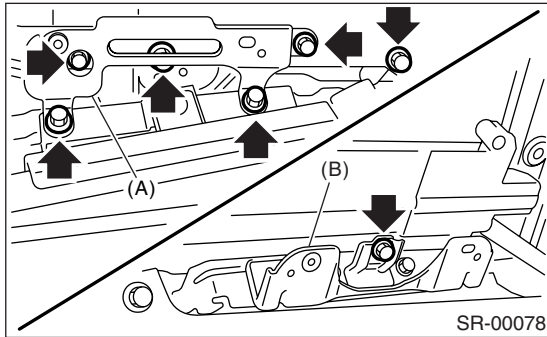
SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

4. Sunroof Assembly

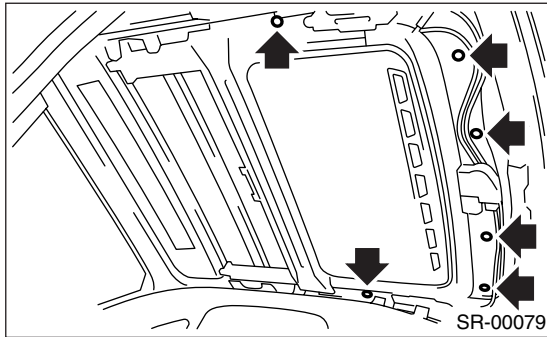
A: REMOVAL

1. SEDAN MODEL

- 1) Disconnect the ground cable from battery.
- 2) Remove the roof trim. <Ref. to EI-67, SEDAN MODEL, REMOVAL, Roof Trim.>
- 3) Disconnect the harness connector of sunroof motor.
- 4) Remove the glass lid. <Ref. to SR-6, SEDAN MODEL, REMOVAL, Glass Lid.>
- 5) Remove the drain tube from frame assembly.
- 6) Remove the assist rail bracket (front) (A) and sunroof bracket (rear) (B).



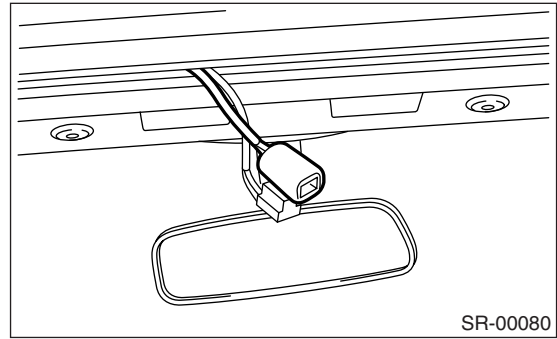
- 7) Remove the nuts, and then remove the frame assembly.



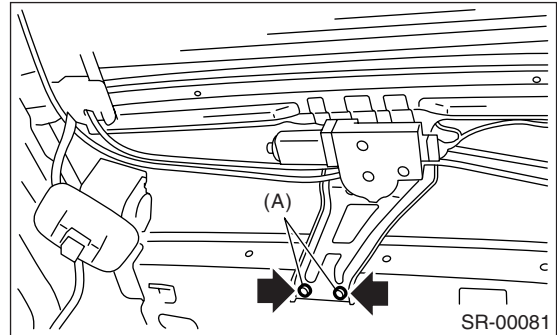
2. WAGON MODEL

- 1) Disconnect the ground cable from battery.
- 2) Remove the roof trim. <Ref. to EI-67, WAGON MODEL, REMOVAL, Roof Trim.>

- 3) Disconnect the harness connector of motor assembly.



- 4) Remove the front and rear glass lid. <Ref. to SR-6, WAGON MODEL (FRONT), REMOVAL, Glass Lid.> <Ref. to SR-6, WAGON MODEL (REAR), REMOVAL, Glass Lid.>
- 5) Remove the installation bolts (A) on rear side frame bracket of frame assembly.

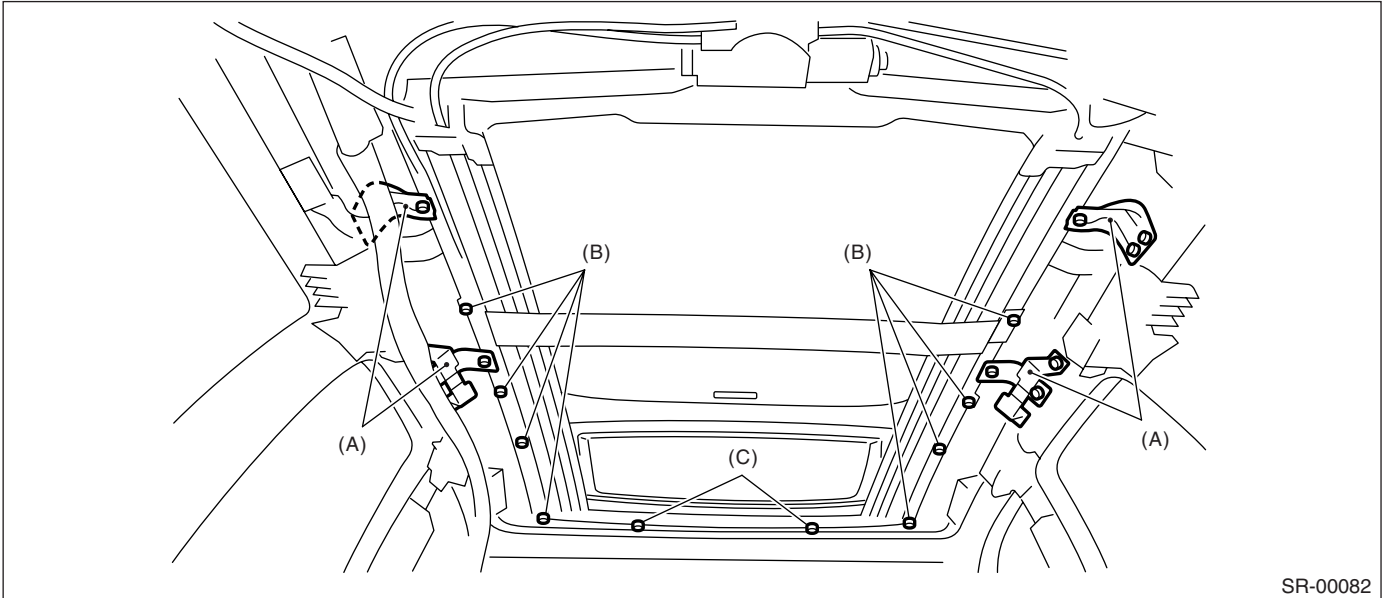


- 6) Remove the drain tube from frame assembly.
- 7) Remove the frame bracket (A).

Sunroof Assembly

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

8) Remove the bolts (B) and nuts (C), and then remove the frame assembly.



SR-00082

B: INSTALLATION

Install in the reverse order of removal.

CAUTION:

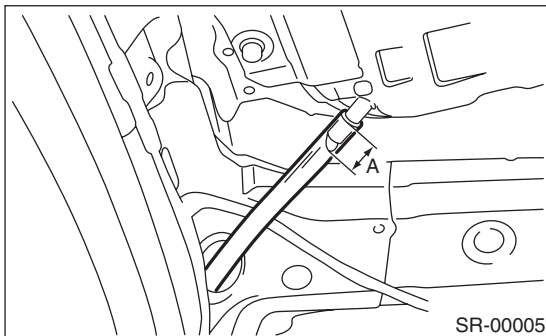
Be careful not to snag the harness.

NOTE:

- Be sure to connect the harness connector.
- When installing the drain tube, insert it securely into drain pipe.

Length A:

15 mm (0.59 in) or more



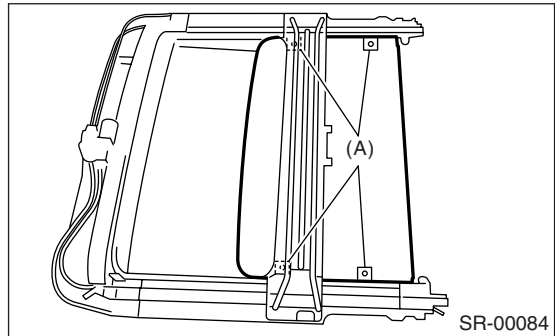
SR-00005

C: DISASSEMBLY

1. SEDAN MODEL

- 1) Remove the glass lid.
- 2) Slide the sunshade to full front end.

3) Remove the screw from the slider bracket (A) of roof side.



SR-00084

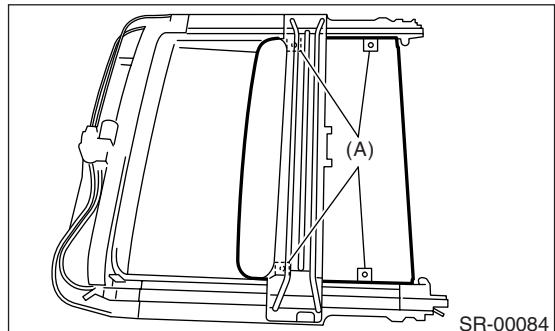
4) Pull out the sunshade from roof opening.

NOTE:

For sedan model, sunshade can be removed/installed with frame assembly installed to the vehicle.

2. WAGON MODEL (FRONT)

- 1) Remove the frame assembly. <Ref. to SR-9, REMOVAL, Sunroof Assembly.>
- 2) Slide the sunshade to fully open position, and then remove the screw from slider bracket (A).



SR-00084

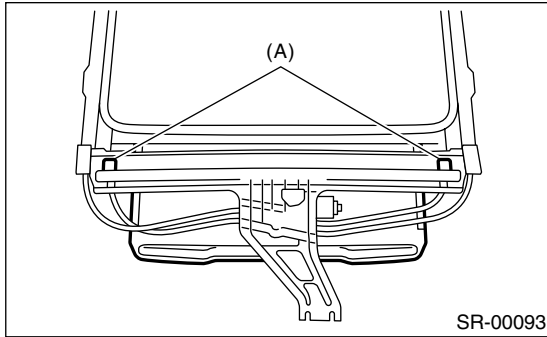
3) Pull out the sunshade to backward.

Sunroof Assembly

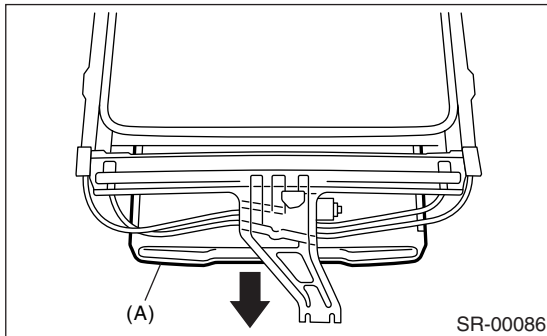
SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

3. WAGON MODEL (REAR)

- 1) Remove the frame assembly.
- 2) Remove the shade stopper (A) of sunshade.



- 3) Pull out the sunshade (A) from sunroof frame.



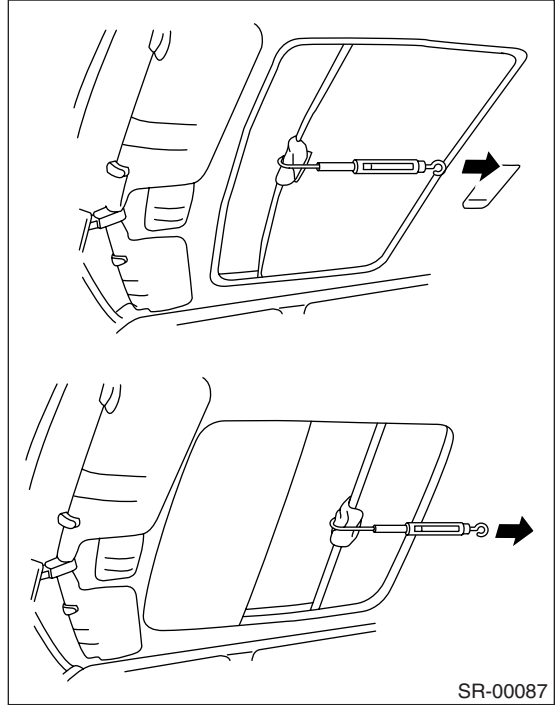
D: ASSEMBLY

Assemble in the reverse order of disassembly.

E: INSPECTION

1. CHECK FOR MOVING LOAD OF SUNSHADE

- 1) Attach a spring balance to sunshade edge using a cloth.



- 2) Pull the spring balance to measure moving load of the sunshade.

Moving load of sunshade:

Standard value

18.0 ± 5.0 N (1.8 ± 0.5 kgf, 13 ± 3.7 lb)

NOTE:

Moving load is larger at the beginning of pulling a spring balance, so take a spring balance reading while sunshade sliding smoothly.

- 3) If moving load exceeds specifications, check the glass lid, sunshade and frame assembly for improper installation.

Sunroof Motor

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

5. Sunroof Motor

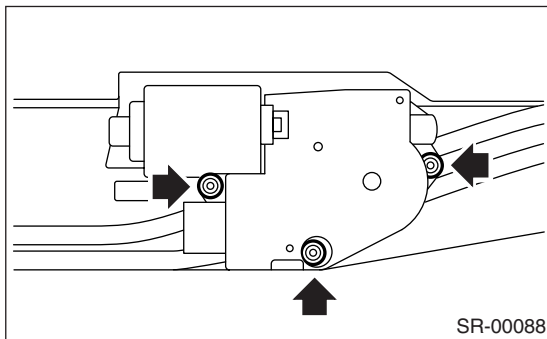
A: REMOVAL

CAUTION:

- When removing the clip, use great care not to damage the roof trim.
- Never rotate the sunroof motor after removing it.

1. SEDAN MODEL

- 1) Completely close the glass lid.
- 2) Disconnect the ground cable from battery.
- 3) Remove the roof trim. <Ref. to EI-67, SEDAN MODEL, REMOVAL, Roof Trim.>
- 4) Disconnect the harness connector, and then remove the motor assembly mounting screw.

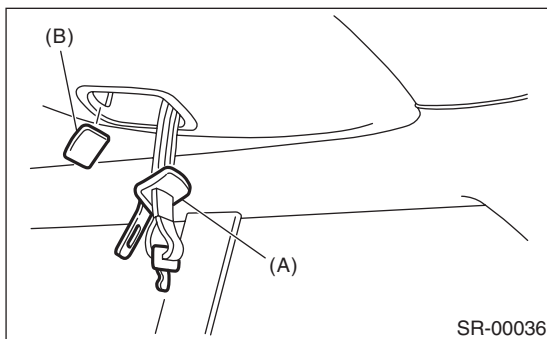


CAUTION:

When removing the motor assembly, secure the cable wires to prevent moves.

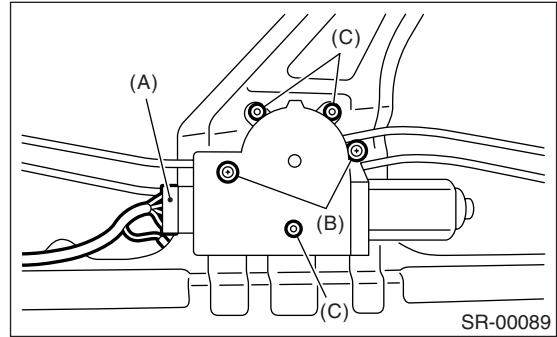
2. WAGON MODEL

- 1) Fully close the glass lid (front) and glass lid (rear).
- 2) Disconnect the ground cable from battery.
- 3) Remove the luggage room light. <Ref. to LI-36, REMOVAL, Luggage Room Light.>
- 4) Remove the roof trim. <Ref. to EI-67, WAGON MODEL, REMOVAL, Roof Trim.>
- 5) Pass the seat belt tongue (A) located on center of rear seat through the hole, and then pull it out to the opposite side of trim.



- 6) Remove the clips, and then drop the rear end of roof trim.

- 7) Disconnect the harness connector (A), and then remove the motor assembly mounting bolt (B) and nuts (C).



B: INSTALLATION

CAUTION:

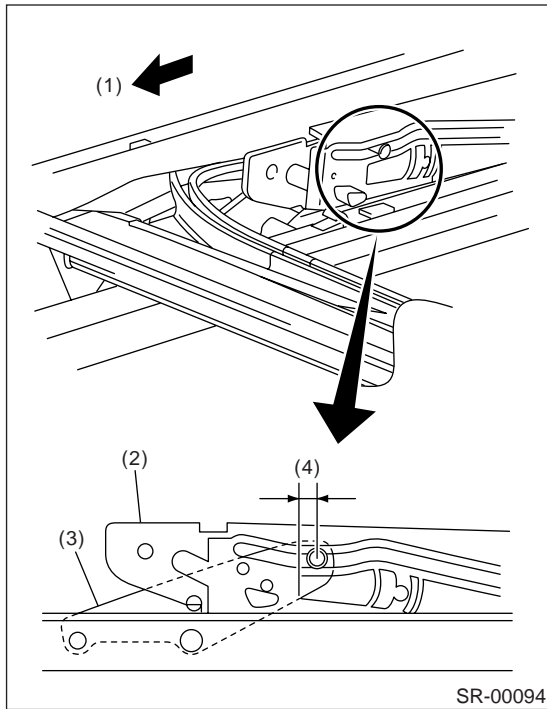
When installing the motor assembly, be careful not to move the sunroof cable.

Sunroof Motor

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

1. SEDAN MODEL

1) Align the coulisse assembly and link assembly in the same position.



- (1) Front
- (2) Coulisse ASSY
- (3) Link ASSY
- (4) 4.7 mm (0.185 in)

2) Install the motor assembly.

3) Connect the harness connector of motor assembly, and then connect the battery ground cable to battery.

4) Perform the initialize operation of motor.

(1) Tilt up the glass lid.

(2) Release the switch once, and press the tilt up switch again for 15 seconds.

(3) When the glass lid is raised a little and on tilt up position, release the switch for the moment.

(4) Keep pressing the tilt up switch within 5 seconds from releasing the switch, glass lid tilts down → slides open → slides close operation automatically, and then initialize operation is completed.

5) Check the operation of sunroof with following table.

| Operation | Switch position |
|---|-----------------|
| (1) Glass lid closes completely. | Close |
| (2) Glass lid tilt up to the top position. | Tilt up |
| (3) Glass lid lowers completely. | Tilt down |
| (4) Glass lid opens completely. | Open |
| (5) Glass lid closes 150 mm (5.91 in) away from completely closed position. | Close |
| (6) Glass lid closes completely. | Close |

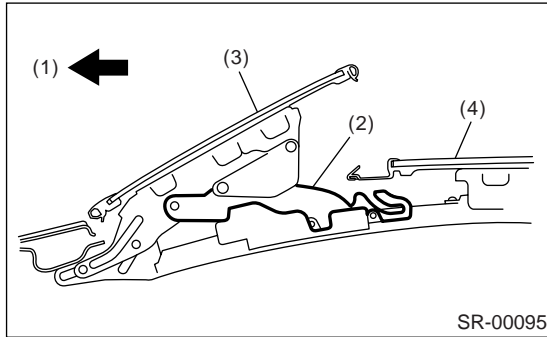
6) Install the trim in the reverse order of removal.

Sunroof Motor

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

2. WAGON MODEL

Check that the wedge of glass lid (front) bracket part is contacting in the direction of vehicle front. At this time, the lid is at fully open position.



- (1) Front
- (2) Wedge
- (3) Glass lid (Front)
- (4) Glass lid (Rear)

1) Install the motor assembly.

2) After the installation of motor assembly, check again that the wedge of glass lid (front) bracket part is contacting in the direction of vehicle front.

3) Connect the harness connector of motor assembly, and then connect the battery ground cable to battery.

4) Perform the initialize operation of motor.

- When replacing the motor with a new one, fully close the glass once and perform the initialization of position, because the movement of glass lid shifts to brink operation.
- When reusing the motor, operate the auto-reverse function five times in a row to shifts brink operation, and then perform the initialization of position.

5) Check the operation of sunroof with following table.

| Operation | Switch position |
|---|-----------------|
| (1) Glass lid (front) and glass lid (rear) closes completely. | Close |
| (2) Glass lid (front) tilt up to the ventilating position. | Open |
| (3) Glass lid (front) tilts up to top position, and glass lid (rear) opens near the completely open position. | Open |
| (4) Glass lid (rear) opens completely. | Open |
| (5) Glass lid (rear) closes on 150 mm (5.91 in) from rear end of tilted up glass lid (front). | Close |
| (6) Glass lid (rear) closes completely. | Close |
| (7) Glass lid (front) lowers, and then glass lid (front) and glass lid (rear) closes completely. | Close |

6) Install the trim in the reverse order of removal.

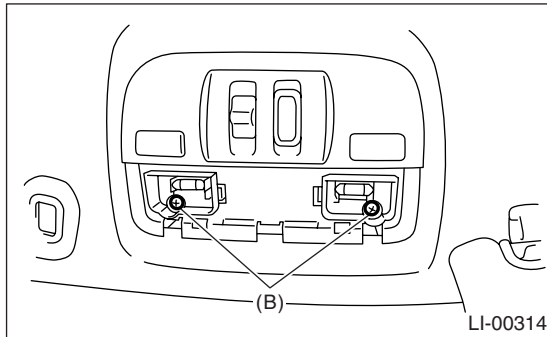
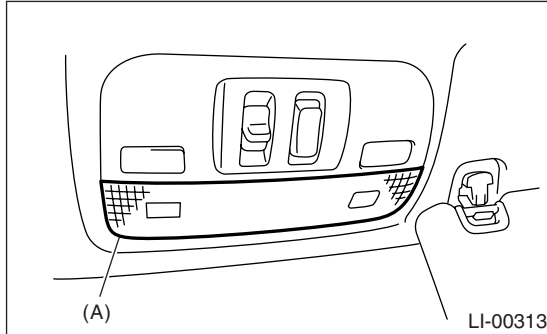
Sunroof Switch

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

6. Sunroof Switch

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the spot map light lens (A) and sunroof switch mounting screws (B).



- 3) Disconnect the harness connector, and then remove the sunroof switch.

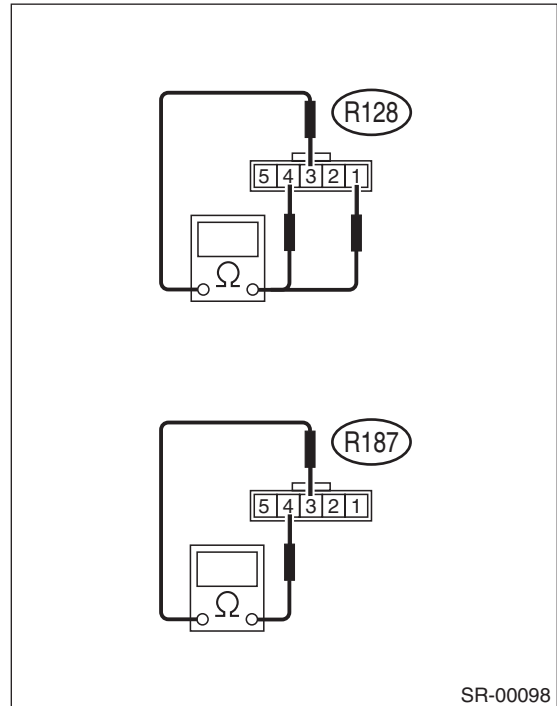
B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

1. SEDAN MODEL

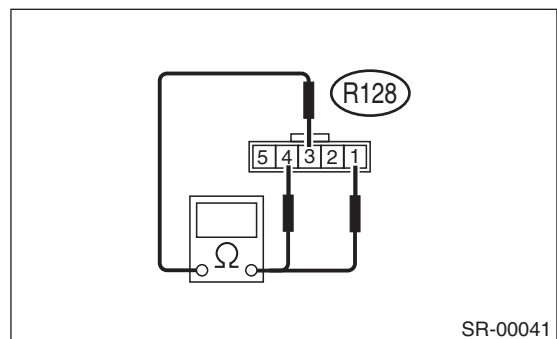
Measure the sunroof switch resistance.



| Switch position | Terminal No. | Standard | Connector No. |
|-----------------|--------------|---------------|---------------|
| Open | 1 and 3 | Less than 1 Ω | R128 |
| Close | 3 and 4 | Less than 1 Ω | |
| Tilt up | 4 and 3 | Less than 1 Ω | R187 |
| Tilt down | 3 and 4 | Less than 1 Ω | |

2. WAGON MODEL

Measure the sunroof switch resistance.



| Switch position | Terminal No. | Standard |
|-----------------|--------------|---------------|
| Open | 1 and 3 | Less than 1 Ω |
| Close | 3 and 4 | Less than 1 Ω |

Sunroof Switch

SUNROOF/T-TOP/CONVERTIBLE TOP (SUNROOF)

NOTE:

If glass lid does not operate or is not supplied with power, move the glass lid using the emergency handle. <Ref. to SR-7, FORCED DRIVE, Glass Lid.>