

Sunroof

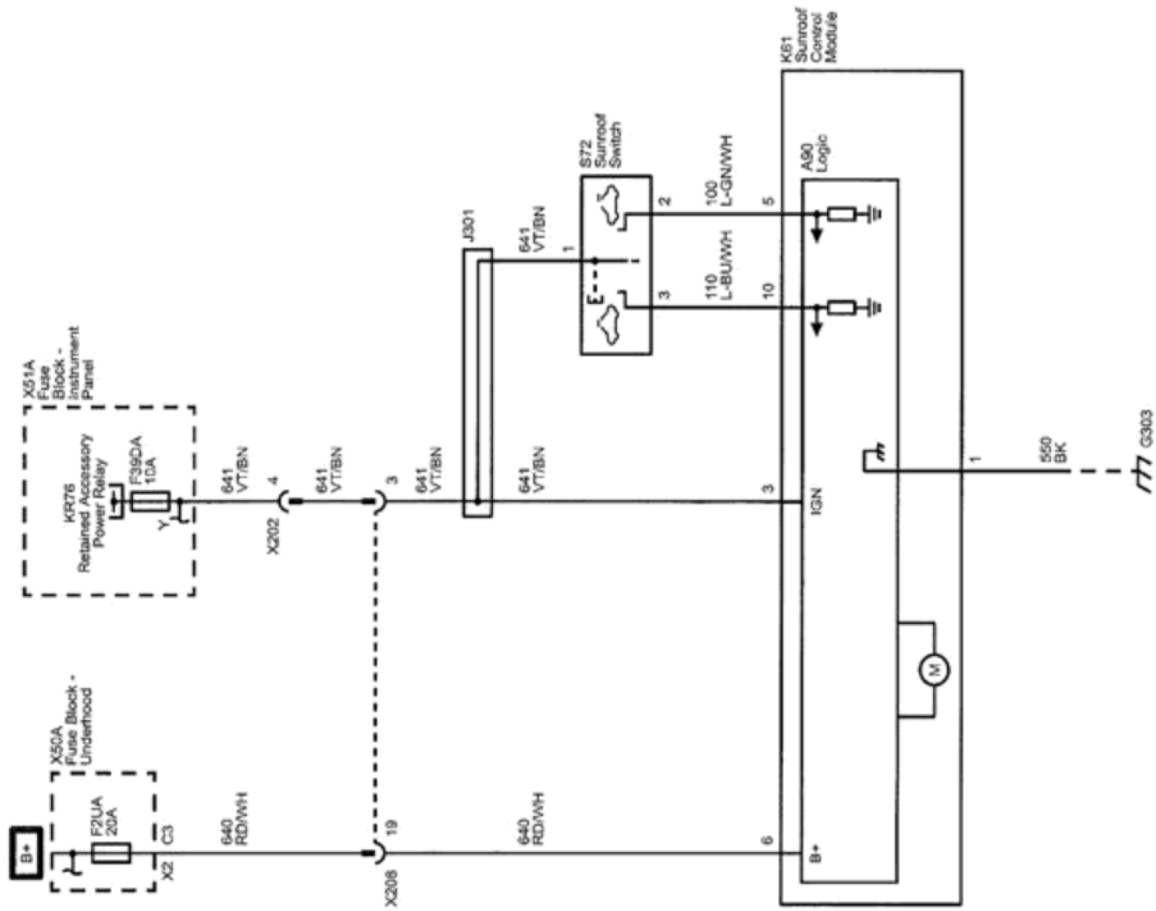
Specifications

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Sunroof Module Bolts	9 N•m	80 lb in
Sunshade Motor/Actuator Screws	6 N•m	53 lb in
Sunroof Window Screws	5 N•m	44 lb in

Schematic and Routing Diagrams

Sunroof Schematics (Power Sunroof (CF5))



Diagnostic Information and Procedures

Symptoms - Roof

1. There is no scan tool support for the sunroof since it not connected to the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to *Sunroof Description and Operation (Tilt and Slide)* on page 12-18.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the sunroof. Refer to *Checking Aftermarket Accessories* on page 11-525.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Inspect for mechanical binding.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to *Testing for Intermittent Conditions and Poor Connections* on page 11-531.

Symptom List

Refer to *Power Sunroof Malfunction* on page 12-5 in order to diagnose the symptom.

Power Sunroof Malfunction

Diagnostic Instructions

- Perform the *Diagnostic System Check - Vehicle* on page 6-66 prior to using this diagnostic procedure.
- Review *Strategy Based Diagnosis* on page 6-58 for an overview of the diagnostic approach.
- *Diagnostic Procedure Instructions* on page 6-59 provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	—	—
Ignition	1	1	2	—
Ground	—	1	—	—
Sunroof Open Switch Signal	1	1	1	—
Sunroof Close Switch Signal	1	1	1	—
Sunroof Switch Ignition	1	1	—	—
1. Power Sunroof Malfunction 2. Sunroof works with ignition off				

Circuit/System Description

Battery voltage is applied to the sunroof module via the SUNROOF fuse. Ignition voltage is applied to the sunroof switch via the MIRROR/SUNROOF fuse. The sunroof switch provides a voltage signal to the sunroof control module. The sunroof control module then applies ground and voltage to the motor control circuits according to the sunroof direction selected. When the sunroof reaches the end of it's travel, a limit switch is engaged and a signal is sent to the sunroof control module to stop the motor.

Reference Information

Schematic Reference

Sunroof Schematics on page 12-4

Connector End View Reference

Component Connector End Views on page 11-269

Description and Operation

Sunroof Description and Operation (Tilt and Slide) on page 12-18

Electrical Information Reference

- *Circuit Testing on page 11-526*
- *Connector Repairs on page 11-548*
- *Testing for Intermittent Conditions and Poor Connections on page 11-531*
- *Wiring Repairs on page 11-537*

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch, Ignition ON.
2. Verify a test lamp illuminates between the ignition circuit terminal 1 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

- 2.1. Ignition OFF.
- 2.2. Test for less than 2 Ω in the ignition circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , verify the fuse is OK and there is voltage at the fuse.

⇒ **If the test lamp does not illuminate and the circuit fuse is open**

- 2.1. Ignition OFF, disconnect the K61 Sunroof Control Module
- 2.2. Test for infinite resistance between the ignition circuit and ground.
 - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
 - ⇒ If infinite resistance, replace the K61 Sunroof Control Module.

⇓ **If the test lamp illuminates**

3. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down.
4. Connect the harness connector at the S72 Sunroof Switch, disconnect the harness connector at the K61 Sunroof Control Module.
5. Test for less than 10 Ω between the ground circuit terminal 1 and ground.

⇒ **If 10 Ω or greater**

- 5.1. Ignition OFF.
- 5.2. Test for less than 2 Ω in the ground circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , repair the open/high resistance in the ground connection.

⇓ **If less than 10 Ω**

6. Verify a test lamp illuminates between the B+ circuit terminal 6 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

- 6.1. Ignition OFF.
- 6.2. Test for less than 2 Ω in the B+ circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.

⇒ **If the test lamp does not illuminate and the circuit fuse is open**

- 6.1. Ignition OFF.
- 6.2. Test for infinite resistance between the B+ circuit and ground.
 - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
 - ⇒ If infinite resistance, replace the K61 Sunroof Control Module.

⇓ **If the test lamp illuminates**

7. Ignition ON.
8. Verify a test lamp illuminates between the ignition circuit terminal 3 and ground.

⇒ **If the test lamp does not illuminate and the circuit fuse is good**

- 8.1. Ignition OFF.
- 8.2. Test for less than 2 Ω in the ignition circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇒ If less than 2 Ω , verify the fuse is OK and there is voltage at the fuse.

⇒ **If the test lamp does not illuminate and the circuit fuse is open**

- 8.1. Ignition OFF.
- 8.2. Test for infinite resistance between the ignition circuit and ground.
 - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
 - ⇒ If infinite resistance, replace the K61 Sunroof Control Module.

⇓ **If the test lamp illuminates**

9. Ignition ON, connect a test lamp between the signal circuit terminal 5 and ground.

10. Verify the test lamp illuminates when pressing the sunroof open switch.
 - ⇒ **If the test lamp does not illuminate**
 - 10.1. Ignition OFF.
 - 10.2. Test for less than 2 Ω in the signal circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇓ If less than 2 Ω
 - 10.3. Test for infinite resistance between the signal circuit and ground.
 - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
 - ⇒ If infinite resistance, test or replace the S72 Sunroof Switch.
 - ⇓ **If the test lamp illuminates**
11. Ignition ON, connect a test lamp between the signal circuit terminal 10 and ground.
12. Verify the test lamp illuminates when pressing the sunroof close switch.
 - ⇒ **If the test lamp does not illuminate**
 - 12.1. Ignition OFF.
 - 12.2. Test for less than 2 Ω in the signal circuit end to end.
 - ⇒ If 2 Ω or greater, repair the open/high resistance in the circuit.
 - ⇓ If less than 2 Ω
 - 12.3. Test for infinite resistance between the signal circuit and ground.
 - ⇒ If less than infinite resistance, repair the short to ground on the circuit.
 - ⇒ If infinite resistance, test or replace the S72 Sunroof Switch.
 - ⇓ **If the test lamp illuminates**
13. Replace the K61 Sunroof Control Module.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch.
2. Test for infinite resistance between the following signal circuit terminals and the ignition terminal 1 with the switch in the open position.
 - Terminal 2
 - Terminal 3
- ⇒ **If less than infinite resistance**
Replace the S72 Sunroof Switch.
- ⇓ **If infinite resistance**
3. Test for less than 5 Ω between the signal terminal 2 and the ignition terminal 1 with the sunroof open switch pressed.
 - ⇒ **If 5 Ω or greater**
Replace the S72 Sunroof Switch.
4. Test for less than 5 Ω between the signal terminal 3 and the ignition terminal 1 with the sunroof close switch pressed.
 - ⇒ **If 5 Ω or greater**
Replace the S72 Sunroof Switch.
 - ⇓ **If less than 5 Ω**
5. All OK

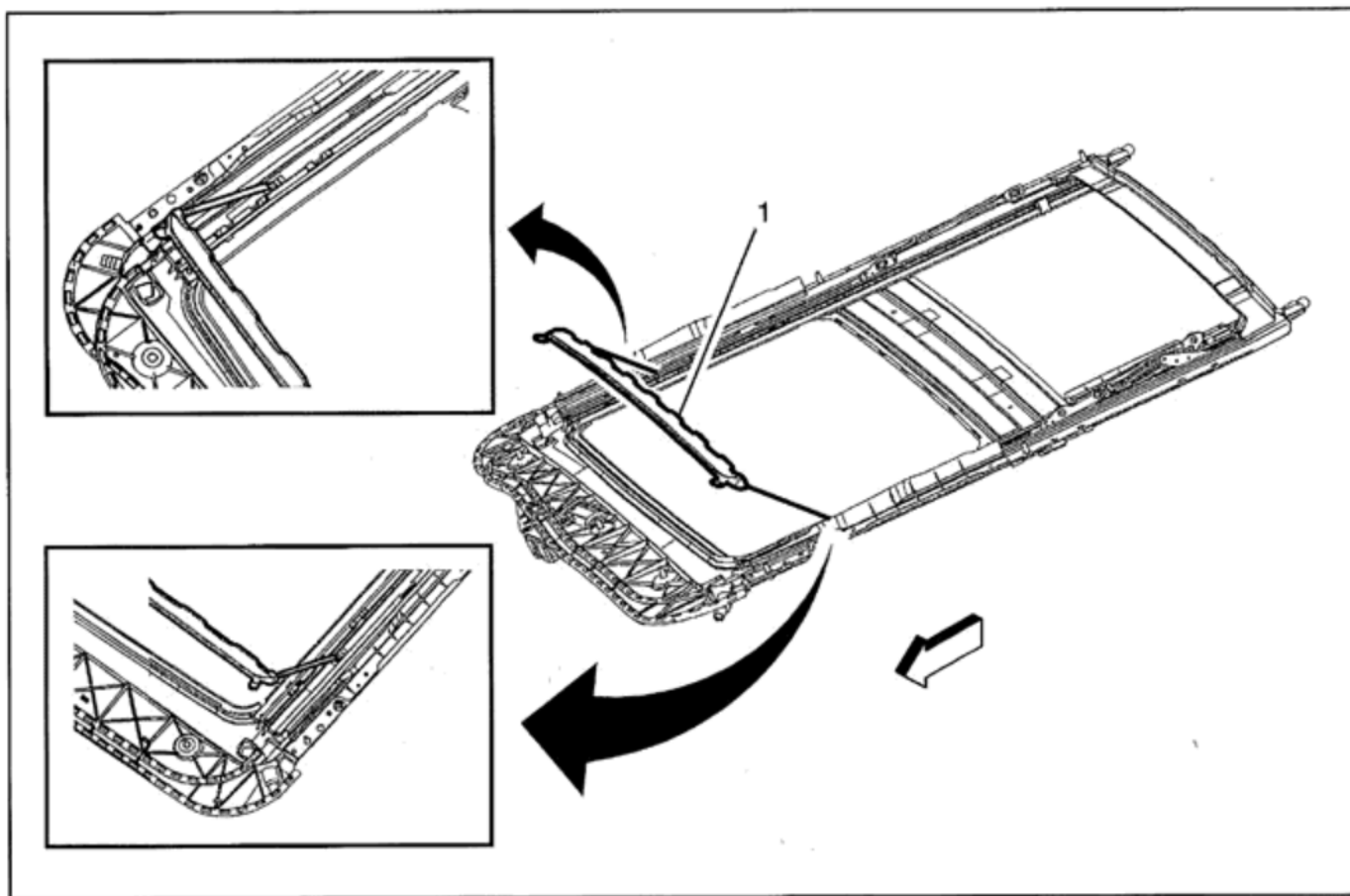
Repair Instructions

Perform the *Diagnostic Repair Verification* on page 6-92 after completing the repair.

- *Control Module References* on page 6-3 for sunroof control module replacement, programming and setup.
- *Sunroof Switch Replacement* on page 12-15

Repair Instructions

Sunroof Air Deflector Replacement

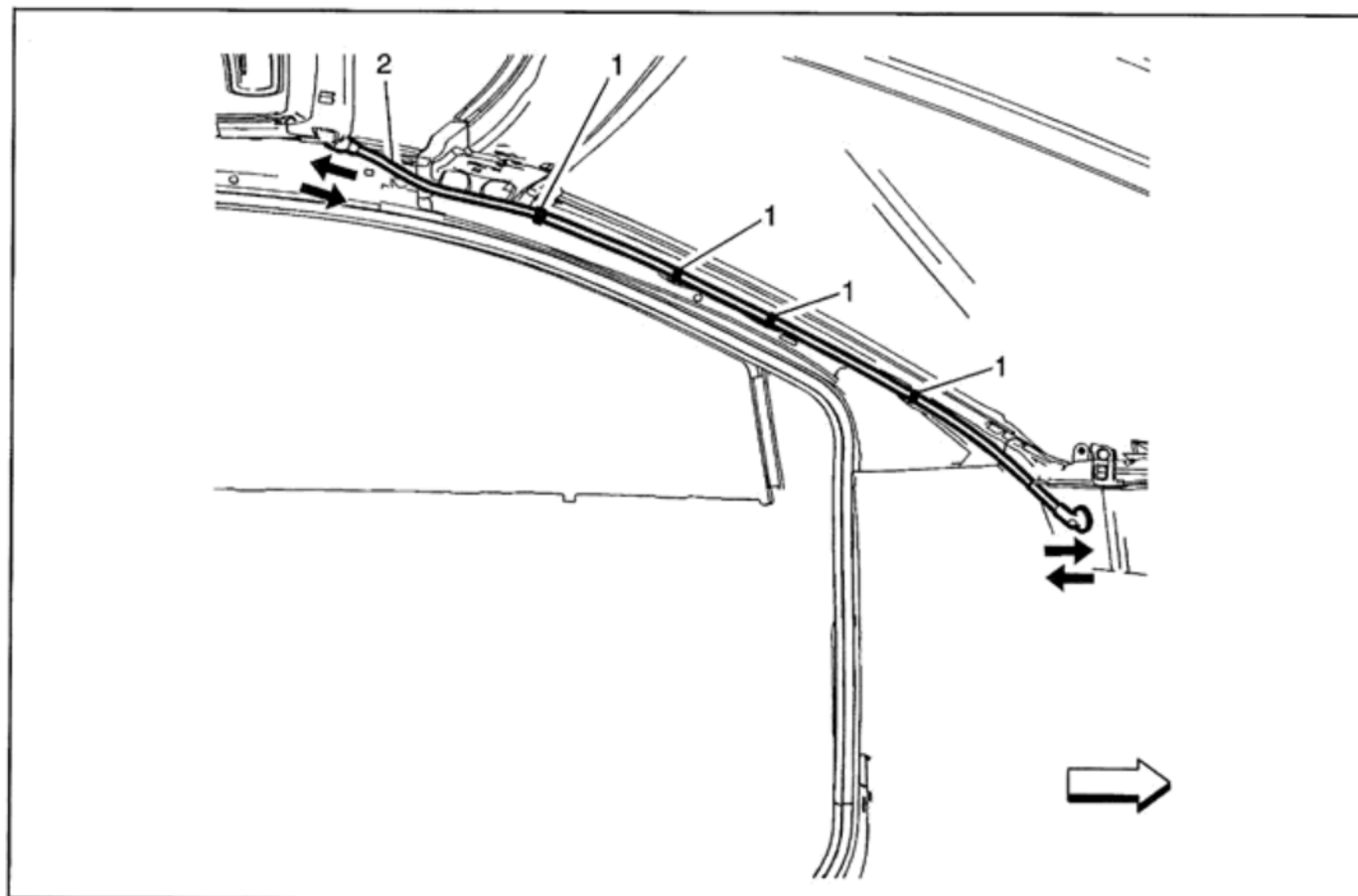


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Sunroof Air Deflector Replacement

Callout	Component Name
Preliminary Procedure Remove the sunroof module. Refer to <i>Sunroof Module Assembly Replacement</i> on page 12-11.	
1	Sunroof Air Deflector Tip: Cycle the sunroof window to the full rearward position.

Sunroof Housing Front Drain Hose Replacement

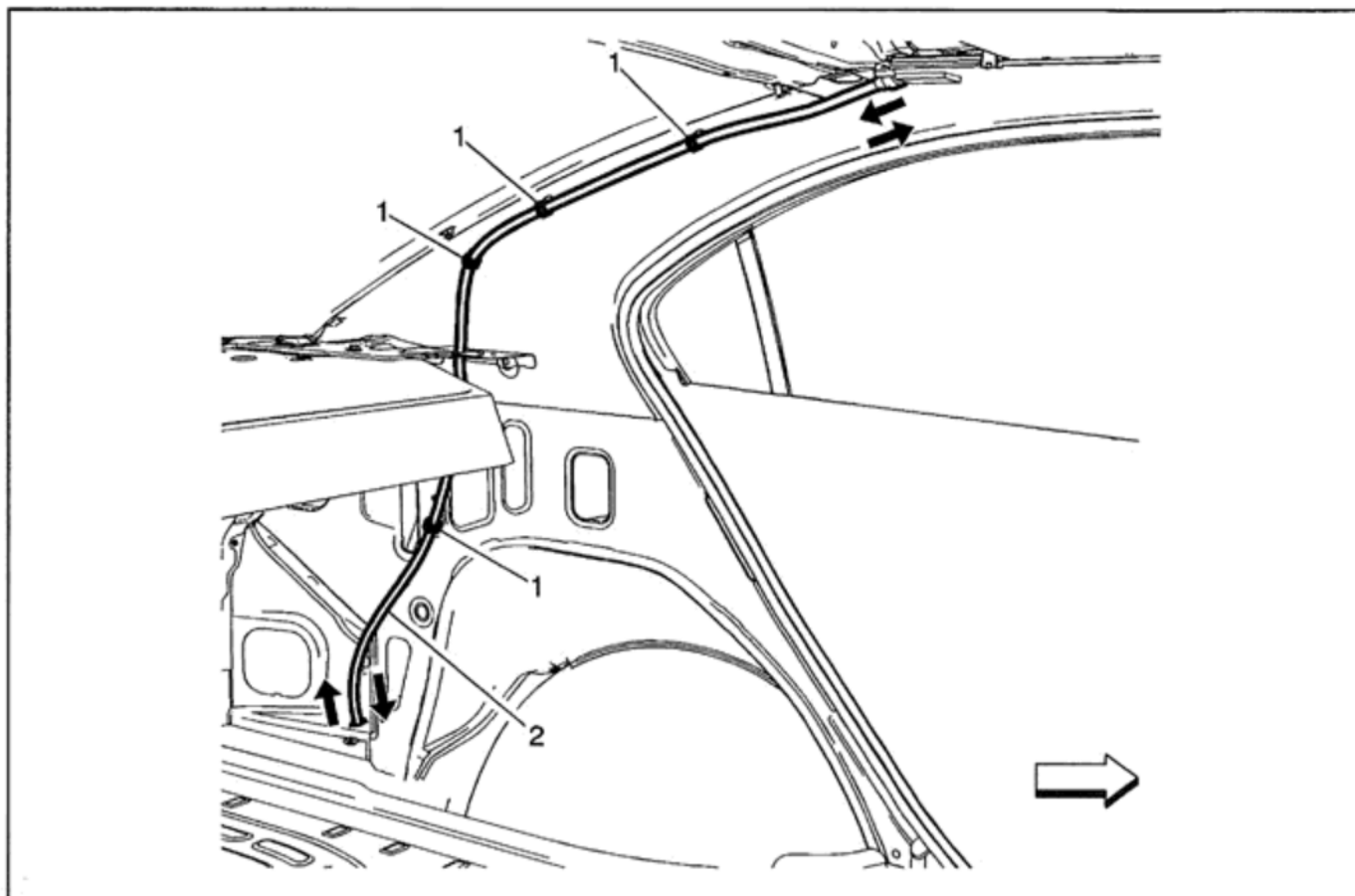


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Sunroof Housing Front Drain Hose Replacement

Callout	Component Name
Preliminary Procedure It is only necessary to lower the headliner. Only do those steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to <i>Headlining Trim Panel Replacement (Sedan with Sunroof)</i> on page 2-26 or <i>Headlining Trim Panel Replacement (Hatchback with Sunroof)</i> on page 2-24 or <i>Headlining Trim Panel Replacement (Hatchback without Sunroof)</i> on page 2-25 or <i>Headlining Trim Panel Replacement (Sedan without Sunroof)</i> on page 2-27.	
1	Sunroof Housing Front Drain Hose Retainers (Qty: 4)
2	Sunroof Housing Front Drain Hose Procedure 1. Remove the sunroof housing front drain hose and grommet from plenum. 2. Water test the vehicle before installing the headliner to ensure no water leaks.

Sunroof Housing Rear Drain Hose Replacement

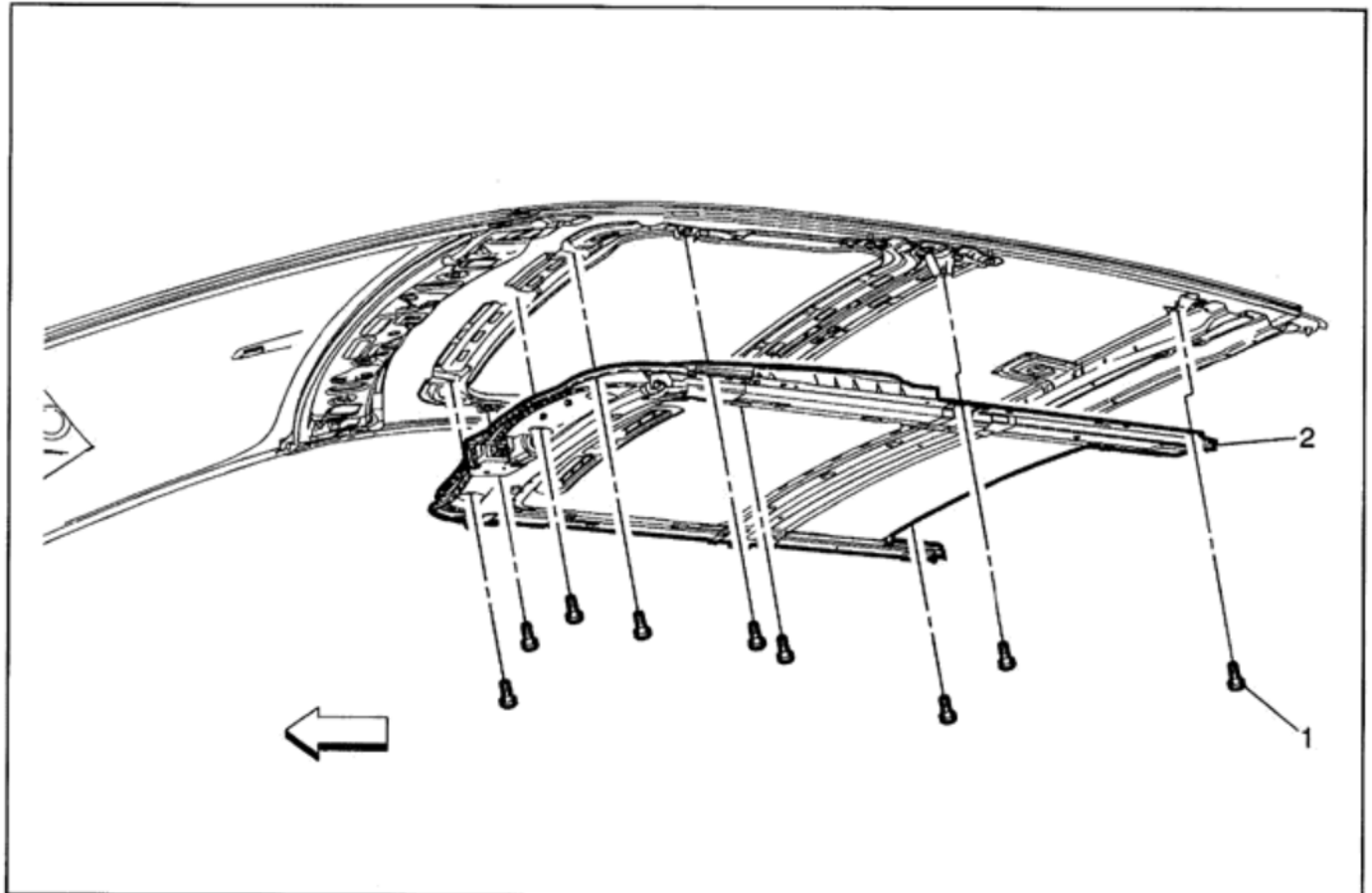


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Sunroof Housing Rear Drain Hose Replacement

Callout	Component Name
Preliminary Procedures	
1. It is only necessary to lower the headliner. Only do those steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to <i>Headlining Trim Panel Replacement (Sedan with Sunroof)</i> on page 2-26 or <i>Headlining Trim Panel Replacement (Hatchback with Sunroof)</i> on page 2-24 or <i>Headlining Trim Panel Replacement (Hatchback without Sunroof)</i> on page 2-25 or <i>Headlining Trim Panel Replacement (Sedan without Sunroof)</i> on page 2-27. 2. Remove the body side trim panel. Refer to <i>Body Lock Pillar Upper Trim Panel Replacement (Hatchback)</i> on page 2-77 or <i>Body Lock Pillar Upper Trim Panel Replacement (Sedan)</i> on page 2-78. 3. Remove the rear window panel trim. Refer to <i>Rear Window Panel Trim Replacement</i> on page 2-81. 4. Remove the rear compartment trim on the side being repaired. Refer to <i>Rear Compartment Side Trim Replacement - Right Side (Sedan)</i> on page 2-90.	
1	Sunroof Housing Rear Drain Hose Retainers (Qty: 4)
2	Sunroof Housing Rear Drain Hose
	Procedure
	1. Remove the sunroof housing rear drain hose and grommet from the rear compartment quarter panel. 2. Water test the vehicle before installing the headliner to ensure no water leaks.

Sunroof Module Assembly Replacement



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Sunroof Module Assembly Replacement

Callout	Component Name
Preliminary Procedures 1. Remove the sunroof window. Refer to <i>Sunroof Window Replacement</i> on page 12-17. 2. Remove the headliner. Refer to <i>Headlining Trim Panel Replacement (Sedan with Sunroof)</i> on page 2-26 or <i>Headlining Trim Panel Replacement (Hatchback with Sunroof)</i> on page 2-24 or <i>Headlining Trim Panel Replacement (Hatchback without Sunroof)</i> on page 2-25 or <i>Headlining Trim Panel Replacement (Sedan without Sunroof)</i> on page 2-27. 3. Disconnect the front and rear sunroof drain hoses. Refer to <i>Sunroof Housing Front Drain Hose Replacement</i> on page 12-9 and <i>Sunroof Housing Rear Drain Hose Replacement</i> on page 12-10.	
1	Sunroof Module Bolts (Qty :9) Caution: Refer to <i>Fastener Caution</i> on page 0-8. Procedure 1. With an assistant, lower and remove the sunroof module assembly from the vehicle. 2. Place the sunroof assembly on a clean dry surface. 3. Transfer all necessary components to the new module assembly. Tighten 9 N·m (80 lb in)
2	Sunroof Module Procedure 1. Secure the harness to the sunroof module. 2. Adjust the sunroof window. Refer to <i>Sunroof Window Height and Opening Fit Adjustment</i> on page 12-16. 3. Verify the proper operation of the sunroof before securing the headliner. 4. Ensure the motor/actuator initialization/teach process has been done. Refer to <i>Sunroof Motor/Actuator Initialization/Teach Process</i> on page 12-12.

Sunroof Motor/Actuator Initialization/Teach Process

Note: If the sunroof motor is new, cycle the sunroof seven (7) times to teach the motor/actuator initialization process.

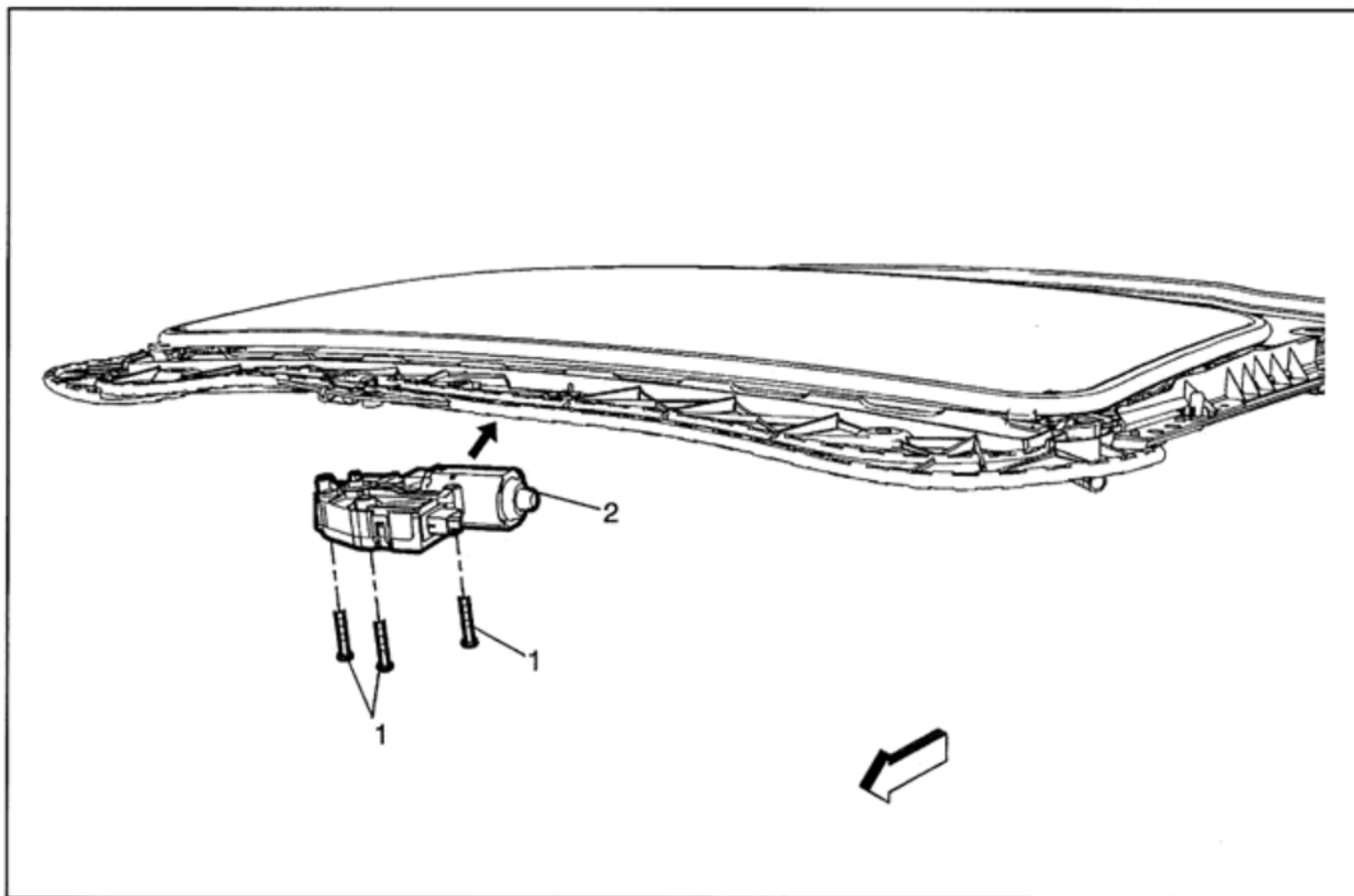
Perform the initialization/teach procedure on a reinstall motor or a new motor. Ensure the electrical harness on the headliner is connected to the sunroof motor, battery power is applied, and the ignition switch is ON.

Note: If the sunroof window doesn't go to the vent open position first time, release the switch and press the switch again.

1. Press and hold the sunroof switch to the vent open position until the sunroof window stops in the vent open position.
2. Again press and hold the sunroof switch to the vent open position for at least 10 seconds, then the window should move slightly.
3. Verify the sunroof operation.

If the initialization/teach procedure is not carried out completely, it has to be started again.

Sunroof Actuator Motor Replacement



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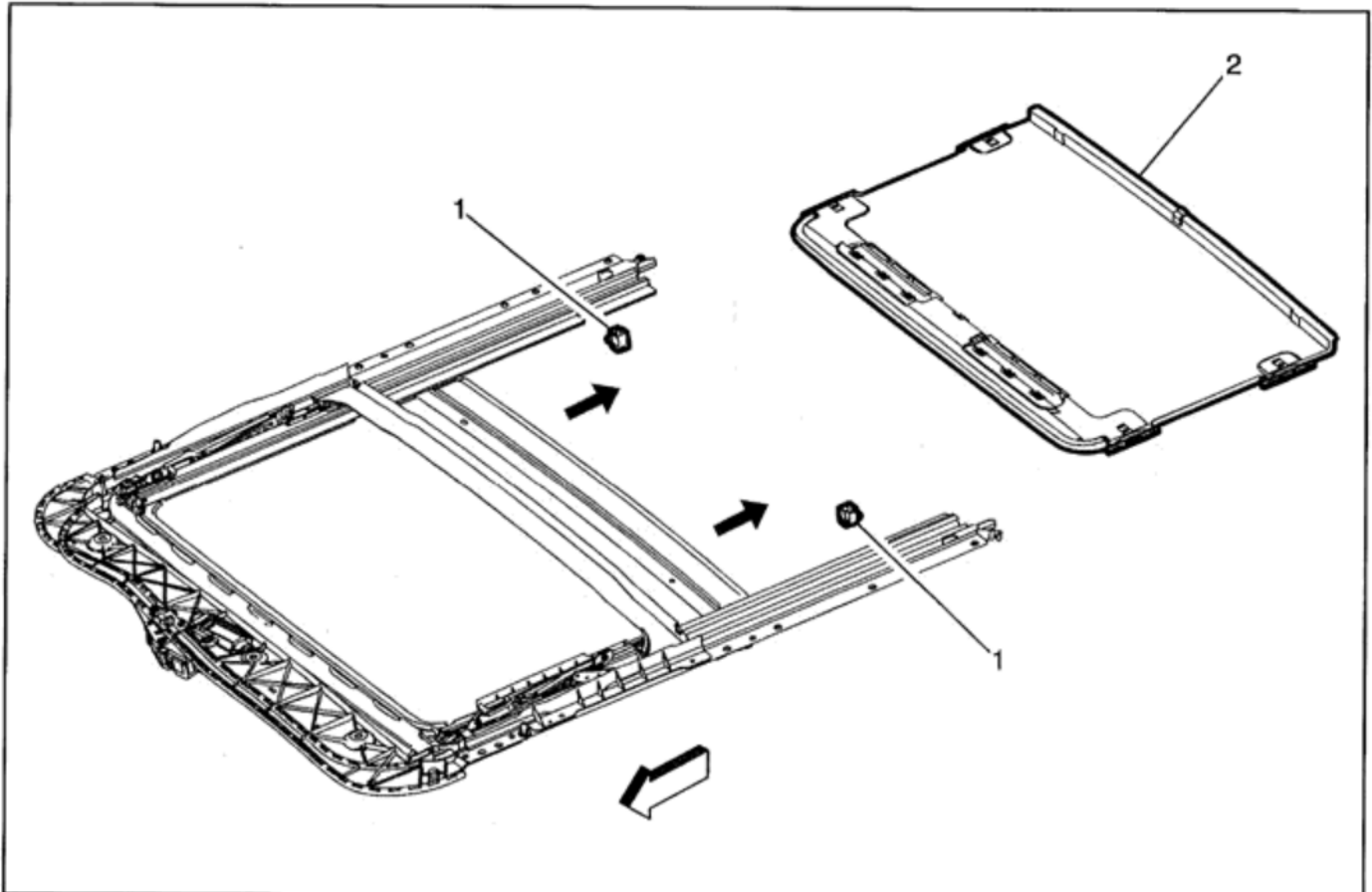
Sunroof Actuator Motor Replacement

Callout	Component Name
Preliminary Procedure Remove the dome lamp bezel. Refer to <i>Dome Lamp Bezel Replacement</i> on page 4-190.	
1	Sunroof Actuator Motor Screw (Qty: 3) Caution: Refer to <i>Fastener Caution</i> on page 0-8. Procedure 1. The sunroof window must be in the fully closed position before disconnecting the harness, to ensure synchronization of the sunroof motor to the sunroof module. 2. Disconnect the electrical connector from the sunroof motor. Tighten 6 N•m (53 lb in)

Sunroof Actuator Motor Replacement (cont'd)

Callout	Component Name
	Sunroof Actuator Motor
2	Procedure 1. Pull downward to disengage the actuator motor from the sunroof module. 2. Install the motor, verify the sunroof operation. 3. Ensure the actuator motor initialization/teach process has been done. Refer to <i>Sunroof Motor/Actuator Initialization/Teach Process</i> on page 12-12. 4. Verify the proper operation of the sunroof before installing the dome lamp bezel.

Sunroof Sunshade Replacement



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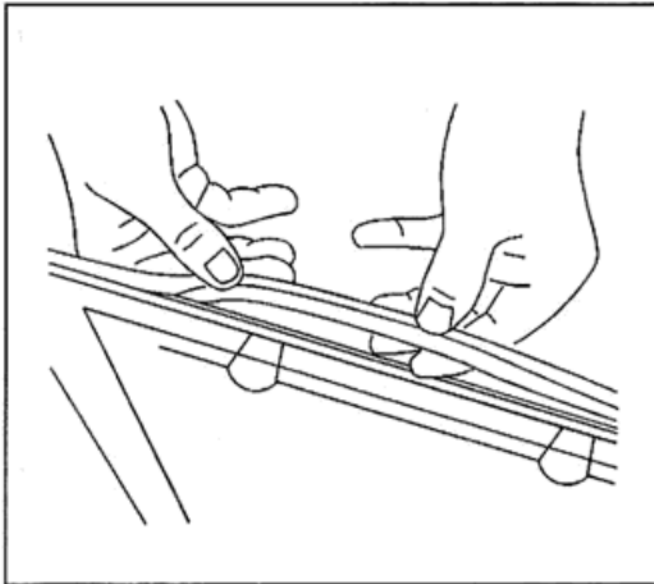
Sunroof Sunshade Replacement

Callout	Component Name
Preliminary Procedures Remove the sunroof module. Refer to <i>Sunroof Module Assembly Replacement</i> on page 12-11.	
1	Sunroof Sunshade Stops (Qty :2)
2	Sunroof Sunshade Procedure 1. Remove the stops located at the rear of the sunroof module. 2. Remove the sunshade by sliding it rearward out the ends of the module. 3. Verify the proper operation of the sunroof sunshade before securing the headliner.

Sunroof Window Seal Replacement

Removal Procedure

1. Remove the sunroof window panel. Refer to *Sunroof Window Replacement* on page 12-17.

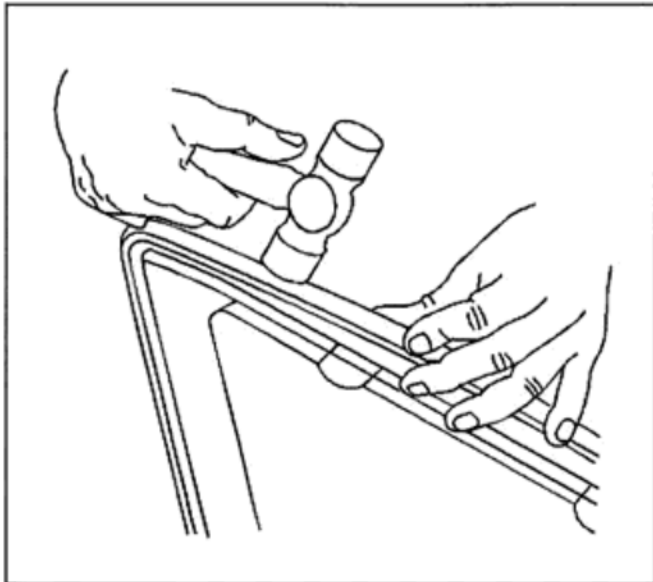


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2. Remove the seal from the window panel frame by pulling the seal away at one point and continuing around the perimeter of the frame.
3. Clean around the edge of the inside surface of the window with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth, allow to air dry.

Installation Procedure

1. Using a clean dampened cloth wipe the seal with a small amount of the same window cleaner in order to ease installation.



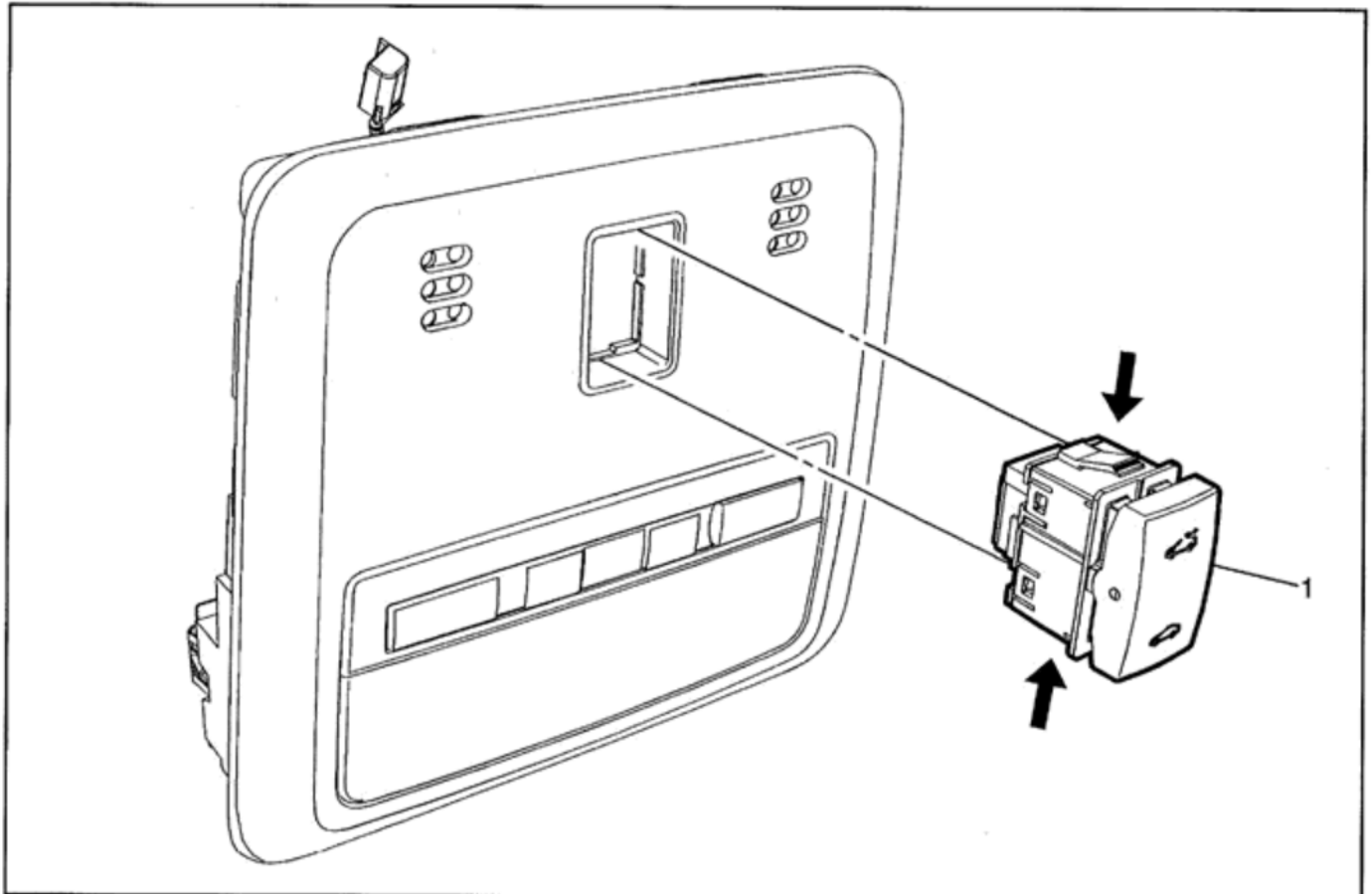
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2. Position the sunroof window panel seal onto the window frame, locating the starting end of the seal at the relief notch in the center of the passenger side of the frame.

Note: Ensure that the seal is properly seated around the entire perimeter of the window frame.

3. Firmly press the window seal into the retainer edge of the sunroof window, a 50/50 mixture of soap and water by volume will help in the installation.
4. Install the sunroof window panel. Refer to *Sunroof Window Replacement* on page 12-17.
5. Adjust the window panel height. Refer to *Sunroof Window Height and Opening Fit Adjustment* on page 12-16.
6. Inspect sunroof for proper operation.

Sunroof Switch Replacement



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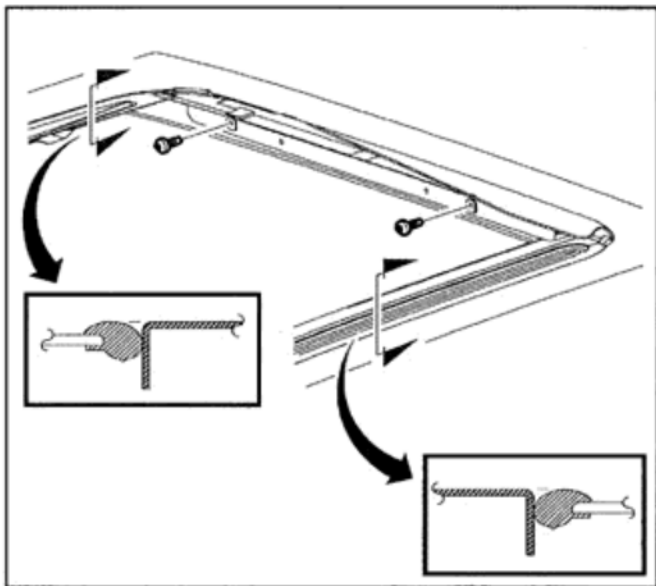
Sunroof Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the dome lamp bezel. Refer to <i>Dome Lamp Bezel Replacement</i> on page 4-190.	
1	Sunroof Switch Procedure 1. Disconnect electrical connector. 2. Depress tabs to release switch.

Sunroof Window Height and Opening Fit Adjustment

Note: Correct adjustment cannot be achieved if the sunroof window is closed from vent position.

1. Cycle the sunroof window from full open to closed position.



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Note: Do Not remove or lower headliner to access sunroof window screws.

2. Loosen the adjusting screws on the window.

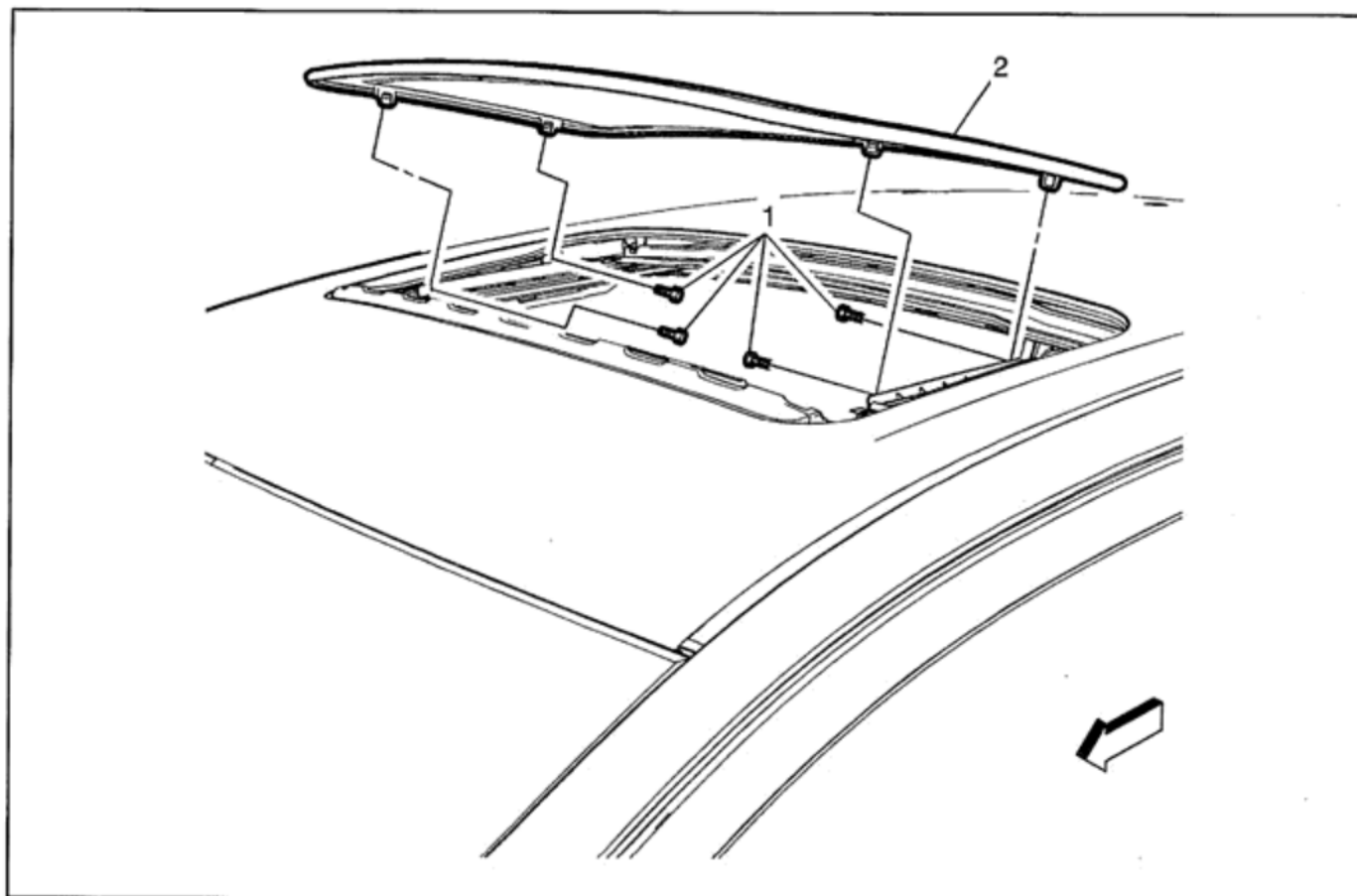
3. Adjust the corners of the front window panel using the following guidelines:

- Adjust the front of the sunroof window to 0.0 mm – 1.0 mm (0.0 in – 0.04 in) below the top surface of the roof panel.
- Adjust the rear center line of the sunroof window to 2 mm to 3 mm (0 .08 in to 0.12 in) below the top surface of the roof panel.

Caution: Refer to *Fastener Caution* on page 0-8.

4. Tighten the sunroof window adjustment screws to **5 N·m (44 lb in)**.
5. Cycle sunroof window through all positions.
6. Inspect the sunroof window adjustment. Adjust if necessary.

Sunroof Window Replacement



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Sunroof Window Replacement

Callout	Component Name
1	Sunroof Window Bolt (Qty: 4) Caution: Refer to <i>Fastener Caution</i> on page 0-8. Tighten 5 N·m (44 lb in)
2	Sunroof Window Procedure 1. Turn the ignition on. 2. Slide the sunshade to the full rearward position. 3. Move the sunroof window to the vent position. 4. Verify the proper operation of the sunroof. Refer to <i>Sunroof Window Height and Opening Fit Adjustment</i> on page 12-16.

Description and Operation

Sunroof Description and Operation (Tilt and Slide)

The Tilt/Slide sunroof consists of a moving glass panel and a manual sunshade. In the Tilt/Slide sunroof system the rear of the glass tilts up above the roof line for venting, and slides between the headliner and the roof panel to open fully.

The sunshade is operated by manually pushing or pulling it. It has a mechanical connection to the glass causing it to open with the glass and keeping it from closing more than the glass. If the glass is fully closed it will move without restriction.

The sunroof glass is controlled by an integrated motor/controller containing the interface to the sunroof switch, internal Hall effect position sensors, a bi-directional motor as well as the necessary control electronics. The Sunroof Motor/Controller is not connected to a serial data communication bus thus the Service scan tool is not capable of communicating with it.

The sunroof switch is connected directly to the Sunroof Motor/Controller and is a momentary rocker type switch with center off. It has two contacts, one for open movement and one for close movement. When activated, each switch contact completes the circuit

between the appropriate Sunroof Motor/Controller input and battery voltage provided by the energized Rap/Accessory Relay.

Sunroof System Thermal Protection

The sunroof controller has a thermal protection algorithm to protect the Sunroof controller and motor from damage due to overheating conditions resulting from excessive switch actuations. The thermal protection algorithm will cause any new sunroof commands to be ignored until the motor is allowed to cool.

Sunroof Operation

The sunroof will operate when the vehicle is in either the Run or Accessory Mode

Open/Close

To open the sunroof, press and hold the rear of the switch. The sunroof may be expressed to the fully open position by pressing the switch twice within 3 seconds. To close the sunroof, press and hold the front of the switch. There is no express close function.

Vent

From the fully closed position, press and hold the front of the switch to vent the sunroof. To close from the tilt position, press the back of the switch.