

2010 Cadillac SRX

2010 ACCESSORIES & EQUIPMENT Sunroof - SRX

2010 ACCESSORIES & EQUIPMENT

Sunroof SRX

SPECIFICATIONS

FASTER TIGHTENING SPECIFICATIONS

Application	Specifications	
	Metric	English
Air Deflector Screws	6 N.m	53 lb in
Sunroof Module/Frame Bolts	5.5 N.m	49 lb in
Sunroof Sunshade Actuator/Motor Screws	6 N.m	53 lb in
Sunroof Sunshade Retainer Screws	4 N.m	35 lb in
Sunroof Water Trough to Sunroof Module Screws	4 N.m	35 lb in
Sunroof Window Actuator/Motor Screws	6 N.m	53 lb in
Sunroof Window Front Screws	4 N.m	35 lb in
Sunroof Window Rear Screws	4 N.m	35 lb in

SCHEMATIC AND ROUTING DIAGRAMS

SUNROOF SCHEMATICS

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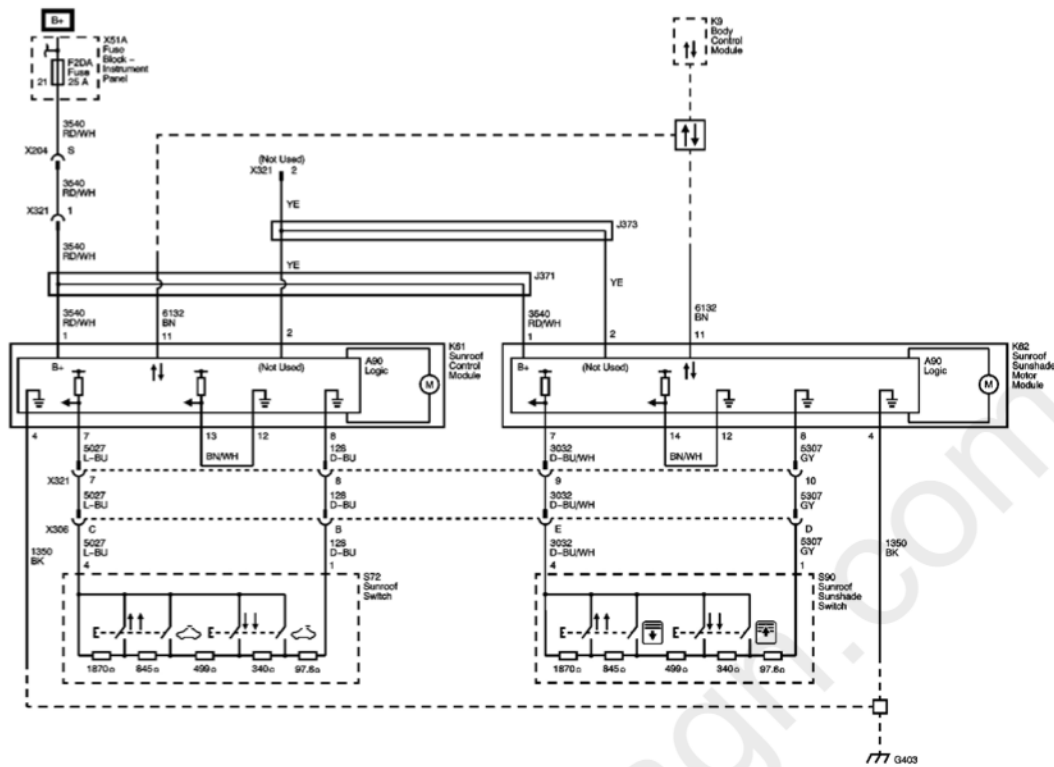


Fig Sunroof Sunshade Circuit Schematic C3

Courtesy of GE ERA MOTORS CORP

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DTC	Description
DTC B3664	B3664 02: Sunroof Position Select Switch High Signal Circuit Short to Ground B3664 05: Sunroof Position Select Switch High Signal Circuit High Voltage/Open B3664 59: Sunroof Position Select Switch High Signal Circuit Protection Time-Out
DTC B3697	B3697 00: Sunroof Actuator Malfunction B3697 39: Sunroof Actuator Internal Malfunction B3697 42: Sunroof Actuator Calibration Not Programmed B3697 4B: Sunroof Actuator Calibration Not Learned
DTC B369B	B369B 02: Sunroof Sunshade Position Select Switch Circuit Short to Ground B369B 05: Sunroof Sunshade Position Select Switch Circuit High Voltage/Open

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	B369B 59: Sunroof Sunshade Position Select Switch Circuit Protection Time-Out
DTC B369D	B369D 00: Sunroof Sunshade Actuator Malfunction B369D 39: Sunroof Sunshade Actuator Internal Malfunction B369D 42: Sunroof Sunshade Actuator Calibration Not Programmed B369D 4B: Sunroof Sunshade Actuator Calibration Not Learned

DTC B3664**Diagnostic Instructions**

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

DTC Descriptors**DTC B3664 02**

Sunroof Position Select Switch High Signal Circuit Short to Ground

DTC B3664 05

Sunroof Position Select Switch High Signal Circuit High Voltage/Open

DTC B3664 59

Sunroof Position Select Switch High Signal Circuit Protection Time-Out

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Sunroof Position Select Switch Control	B3664 02	B3664 05	B3664 05	-
Sunroof Position Select Switch Low Reference	-	1	1	-
1. Power Sunroof/Sunshade Malfunction				

Circuit/System Description

The sunroof position select switch is connected directly to the controller. The sliding glass switch provide detent positions for open, express open, off, close, and express close. The sunroof position select switch completes the circuit between two signals provided by the control module, a reference ground input and a pull-up voltage provided by an analog to digital switch input. The control switch places a different resistor ladder network in the circuit depending on the function selected.

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Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B3664 02

The sunroof module has detected and reported via the LIN-Bus that the sunroof position select switch high signal circuit is shorted to ground.

B3664 05

The sunroof module has detected and reported via the LIN-Bus that the sunroof position select switch high signal circuit is open or shorted to voltage.

B3664 59

The sunroof module has detected and reported via the LIN-Bus that the sunroof position select switch high signal has been the same active position for 20 seconds after the glass has stopped moving in the requested direction due to reaching the end of the allowable motion.

Action Taken When the DTC Sets

DTC B3664 is stored in the body control module (BCM) memory.

Conditions for Clearing the DTC

The BCM no longer detects a malfunction in the sunroof position select switch high signal circuit.

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs

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- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: **Because of the accessibility of the sunroof switch, perform the component testing before beginning the Circuit/System Testing.**

1. Ignition OFF, disconnect the harness connector at the S72 sunroof switch.
2. Scan tool not connected, doors closed, wait 5 minutes and test for less than 10 ohms between the low reference circuit terminal 1 and ground.
 - If greater than the specified value, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K61 sunroof control module.
3. Ignition ON, test for 4.5-5.5 V between the reference voltage circuit terminal 4 and ground.
 - If less than specified range, test the reference voltage circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K61 sunroof control module.
 - If greater than the specified range, test the reference circuit for a short to voltage. If the circuit tests normal, replace the K61 sunroof control module.
4. If all circuits test normal, test or replace the S72 sunroof switch.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the S72 sunroof switch.
2. Test for 3.6-3.7k ohms between the switch terminals 1 and 4.
 - If not within the specified range, replace the S72 sunroof switch.
3. Test for 430-440 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the open switch.
 - If not within the specified range, replace the S72 sunroof switch.
4. Test for 96-100 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express open switch.
 - If not within the specified range, replace the S72 sunroof switch.
5. Test for 1.7-1.8k ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the close switch.
 - If not within the specified range, replace the S72 sunroof switch.
6. Test for 930-940 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express close switch.
 - If not within the specified range, replace the S72 sunroof switch.

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Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Sunroof Switch Replacement**
- **Sunroof Window Motor Replacement**
- **Control Module References** for sunroof motor/actuator replacement, programming and setup

DTC B3697

Diagnostic Instructions

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

DTC Descriptors

DTC B3697 00

Sunroof Actuator Malfunction

DTC B3697 39

Sunroof Actuator Internal Malfunction

DTC B3697 42

Sunroof Actuator Calibration Not Programmed

DTC B3697 4B

Sunroof Actuator Calibration Not Learned

Circuit/System Description

The sunroof glass is controlled by its own integrated motor/controller containing the necessary electronics, motor, hall effect position sensors, as well as the interface to the driver control switches. The motor/controller is capable of controlling motion based on control switch activation and LIN-Bus message commands from the body control module (BCM).

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

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B3697 00

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator has a malfunction.

B3697 39

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator has a internal malfunction.

B3697 42

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator is not programmed.

B3697 4B

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator calibration is not learned.

Action Taken When the DTC Sets

DTC B3697 is stored in the BCM memory.

Conditions for Clearing the DTC

The BCM no longer detects a malfunction in the sunroof actuator.

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B3697 42 or DTC B3697 4B is not set.
 - If the DTC is set, program or calibrate the K61 Sunroof Control Module. If the DTC resets, replace the K61 Sunroof Control Module.
2. Replace the K61 Sunroof Control Module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Sunroof Module Assembly Replacement**
- **Control Module References** for sunroof motor/actuator replacement, setup and programming

DTC B369B

Diagnostic Instructions

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

DTC Descriptors

DTC B369B 02

Sunroof Sunshade Position Select Switch Circuit Short to Ground

DTC B369B 05

Sunroof Sunshade Position Select Switch Circuit High Voltage/Open

DTC B369B 59

Sunroof Sunshade Position Select Switch Circuit Protection Time-Out

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Sunroof Sunshade Position Select Switch Control	B369B 02	B369B 05	B369B 05	-

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Sunroof Sunshade Position Select Switch Low Reference	-	1	1	-
1. Power Sunroof/Sunshade Malfunction				

Circuit/System Description

The sunshade control switch is connected directly to the controller and provide detent positions for open, express open, off, close, and express close. The control switch completes the circuit between two signals provided by the control module, a reference ground Input and a pull-up voltage provided by the analog to digital switch input. The control switch places a different resistor ladder network in the circuit depending on the function selected. The controllers analog to digital switch input reads the resulting voltage range and determines the function.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B369B 02

The sunshade module has detected and reported via the LIN-Bus that the sunroof sunshade position select switch circuit is shorted to ground.

B369B 05

The sunshade module has detected and reported via the LIN-Bus that the sunroof sunshade position select switch circuit is open or shorted to voltage.

B369B 59

The sunshade module has detected and reported via the LIN-Bus that the sunroof sunshade position select switch has been the same active position for 20 s after the glass has stopped moving in the requested direction due to reaching the end of the allowable motion.

Action Taken When the DTC Sets

DTC B369B is stored in the body control module (BCM) memory.

Conditions for Clearing the DTC

The BCM no longer detects a malfunction in the sunroof sunshade position select switch signal circuit.

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference**Component Connector End Views****Description and Operation****Sunroof Description and Operation****Electrical Information Reference**

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Control Module References** for scan tool information**Circuit/System Testing**

NOTE: **Because of the accessibility of the sunshade switch, perform the component testing before beginning the Circuit/System Testing.**

1. Ignition OFF, disconnect the harness connector at the S90 sunroof sunshade switch.
2. Scan tool not connected, doors closed, wait 5 minutes and test for less than 10 ohms between the low reference circuit terminal 1 and ground.
 - If greater than the specified value, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K62 sunroof sunshade module.
3. Ignition ON, test for 4.5-5.5 V between the reference voltage circuit terminal 4 and ground.
 - If less than specified range, test the reference voltage circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the K62 sunroof sunshade module.
 - If greater than the specified range, test the reference circuit for a short to voltage. If the circuit tests normal, replace the K62 sunroof sunshade module.
4. If all circuits test normal, test or replace the S90 sunroof sunshade switch.

Component Testing**Static Test**

1. Ignition OFF, disconnect the harness connector at the S90 sunroof sunshade switch.
2. Test for 3.6-3.7k ohms between the switch terminals 1 and 4.
 - If not within the specified range, replace the S90 sunroof sunshade switch.
3. Test for 430-440 ohms between the signal terminal 1 and the low reference circuit terminal 4 while

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pressing the open switch.

- If not within the specified range, replace the S90 sunroof sunshade switch.
- 4. Test for 96-100 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express open switch.
 - If not within the specified range, replace the S90 sunroof sunshade switch.
- 5. Test for 1.7-1.8k ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the close switch.
 - If not within the specified range, replace the S90 sunroof sunshade switch.
- 6. Test for 930-940 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express close switch.
 - If not within the specified range, replace the S90 sunroof sunshade switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Sunroof Switch Replacement**
- **Sunroof Sunshade Motor Replacement**
- **Control Module References** for sunshade motor/actuator replacement, setup and programming

DTC B3 D

Diagnostic Instructions

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

DTC Descriptors

DTC B3 D

Sunroof Sunshade Actuator Malfunction

DTC B3 D 3

Sunroof Sunshade Actuator Internal Malfunction

DTC B3 D 42

Sunroof Sunshade Actuator Calibration Not Programmed

DTC B3 D 4B

Sunroof Sunshade Actuator Calibration Not Learned

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Circuit/System Description

The sunshade is controlled by its own integrated motor/controller containing the necessary electronics, motor, hall effect position sensors, as well as the interface to the driver control switches. The motor/controller is capable of controlling motion based on control switch activation and LIN-Bus message commands from the body control module (BCM).

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B3 D

The sunshade module has detected and reported via the LIN-Bus that the sunshade actuator has an malfunction.

B3 D 3

The sunshade module has detected and reported via the LIN-Bus that the sunshade actuator has an internal malfunction.

B3 D 42

The sunshade module has detected and reported via the LIN-Bus that the sunshade actuator calibration is not programmed.

B3 D 4B

The sunshade module has detected and reported via the LIN-Bus that the sunshade actuator calibration is not learned.

Action Taken When the DTC Sets

DTC B369D is stored in the BCM memory.

Conditions for Clearing the DTC

The BCM no longer detects a malfunction in the sunshade actuator circuit.

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B369D 42 or DTC B369D 4B is not set.
 - If the DTC is set, program or calibrate the K62 Sunroof Sunshade Motor Module. If the DTC resets, replace the K62 Sunroof Sunshade Motor Module.
2. Replace the K62 Sunroof Sunshade Motor Module.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Sunroof Sunshade Motor Replacement
- Control Module References for sunshade motor/actuator replacement, setup and programming

SYMPTOMS - ROOF

NOTE: Complete the following procedures before using the symptom tables.

1. Perform the Diagnostic System Check - Vehicle in order to verify that all of the following conditions are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system description and operation in order to learn the system functions. Refer to Sunroof Description and Operation.

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the power sunroof system. Refer to Checking Aftermarket Accessories.
- Inspect the accessible system components for obvious damage or for conditions which can cause the

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symptom.

Intermittent

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

Symptom List

Refer to **Power Sunroof/Sunshade Malfunction**.

POWER SUNROOF/SUNSHADE MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** 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	-	-
Sunroof Switch Close Signal	B3664 02	B3664 05	B3664 05	-
Sunroof Switch Open Signal	B3664 02	B3664 05	B3664 05	-
Sunshade Switch Close Signal	B369B 02	B369B 05	B369B 05	-
Sunshade Switch Open Signal	B369B 02	B369B 05	B369B 05	-
Sunroof Vent Switch Open Signal	B369C 02	B369C 05	B369C 05	-
Sunroof Vent Switch Close Signal	B369C 02	B369C 05	B369C 05	-
Sunroof Switch Ground	-	1	-	-
Sunroof Module Ground	-	1	-	-
Sunshade Switch Ground	-	1	-	-
Sunshade Module Ground	-	1	-	-
1. Power Sunroof/Sunshade Malfunction				

Circuit/System Description

The BCM communicates with the sunroof glass and sunshade control module to enable or disable sunroof and sunshade operation. The sunroof/sunshade control modules provide system status and diagnostic information to the BCM for diagnostic reporting and operational purposes.

The sunroof and power sunshade are each controlled by its own integrated motor/controller containing the necessary electronics, motor, sensors, as well as the interface to the driver control switches. Each motor/controller is capable of controlling motion based on control switch activation and message commands

from the BCM.

Diagnostic Aids

- A sunshade malfunction may prevent the sunroof from operating.
- Always program and setup the sunshade module before the sunroof module.

Reference Information**Schematic Reference****Sunroof Schematics****Connector End View Reference****Component Connector End Views****Description and Operation****Sunroof Description and Operation****Electrical Information Reference**

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Control Module References** for scan tool information**Circuit/System Verification****Sunroof/Sunshade**

1. Ignition ON.
2. Press the sunshade switch to the open and close positions. The sunshade should open and close when changing between the commanded states.
3. Press the sunroof switch to the open and close positions. The sunroof should open and close when changing between the commanded states.
4. If both the sunshade and the sunroof are inoperable, always diagnose the sunshade first.

Circuit/System Testing

NOTE: **ecause of the accessibility of the switches, perform the switch component**

testing before beginning the circuit/system testing.

1. Ignition OFF, disconnect the harness connector at the appropriate module, 61 sunroof control module or 62 sunroof shade control module.
2. Scan tool not connected, doors closed, wait 5 minutes and test for less than 30 ohms between the ground circuit terminal 4 and ground.
 - If greater than the specified value, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, determine if the appropriate module is causing the fuse to open. Replace the appropriate module.
4. Test for less than 30 ohms between the upper circuit terminals listed below:
 - 62 sunroof shade module terminals 14 and 12
 - 61 sunroof control module terminals 13 and 12
 - If not the specified value, test the upper circuit for an open/high resistance.
5. Test for infinity resistance between the upper circuit terminal listed below and ground:
 - 62 sunroof shade module terminals 14
 - 61 sunroof control module terminals 13
 - If not the specified value, test the upper circuit for a short to ground.
6. Verify a test lamp does not illuminate between the upper wire circuit terminal listed below and ground:
 - 62 sunroof shade module terminals 14
 - 61 sunroof control module terminals 13
 - If the test lamp illuminates, test the upper circuit for a short to voltage.
7. Connect the harness connector at the appropriate module, 62 sunroof shade module or 61 sunroof control module.
8. Disconnect the harness connector at the S72 sunroof switch or the S90 sunroof sunshade switch.
9. Scan tool not connected, doors closed, wait 5 minutes and test for less than 30 ohms between the low reference circuit terminal 1 and ground.
 - If greater than the specified value, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the appropriate module.
10. Ignition ON, test for 4.5 - 5.5 V between the reference voltage circuit terminal 4 and ground.
 - If less than the specified range, test the reference voltage circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the appropriate module.
 - If greater than the specified range, test the reference circuit for a short to voltage. If the circuit tests normal, replace the appropriate module.
11. If all circuits test normal, test or replace the appropriate switch.

Component Testing

Sunroof/Sunshade Switch - Static Test

1. Ignition O , disconnect the harness connector at the appropriate sunroof/sunshade switch.
2. Test for 3.6 3.7k ohms between the switch terminals 1 and the low reference circuit terminal 4.
 - If not within the specified range, replace the appropriate switch.
3. Test for 430 440 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the open switch.
 - If not within the specified range, replace the appropriate switch.
4. Test for 96 100 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express open switch.
 - If not within the specified range, replace the appropriate switch.
5. Test for 1.7 1.8k ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the close switch.
 - If not within the specified range, replace the appropriate switch.
6. Test for 930 940 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express close switch.
 - If not within the specified range, replace the appropriate switch.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Sunroof Switch Replacement**
- **Sunroof Module Assembly Replacement**
- **Sunroof Sunshade Motor Replacement**
- **Control Module References** for sunroof/sunshade motor/actuator replacement, setup, and programming

REPAIR INSTRUCTIONS

SUNROOF SUNSHADE CABLE ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the front sunroof window. Refer to **Sunroof Window Replacement - Front**.
2. Remove the rear sunroof window. Refer to **Sunroof Window Replacement - Rear**.
3. Remove the rear luggage shade and the left luggage shade bolt, if equipped.
4. Remove the rear compartment floor stowage cover assembly.
5. Remove the rear end trim finish panel and floor panel rails. Refer to **Rear End Trim Finish Panel Replacement**.
6. Remove the left body side trim panel and left quarter upper trim finish panel. Refer to **Quarter Upper Trim Panel Replacement**.

NOTE: It is only necessary to lower the headliner. Only do those step in headliner replacement that will lower the headliner enough to gain access to the

part.

7. Repositioning the rear door opening weatherstrip to lower the left rear corner of the headliner. Refer to **Headlining Trim Panel Replacement (With C3U)** or **Headlining Trim Panel Replacement (Without C3U)**
8. Remove the 3 sunroof sunshade motor bolts and disengage the motor from the frame. Refer to **Sunroof Sunshade Motor Replacement**.
9. Now working from the top side of the vehicle, unseat the sunroof inner window seal from the rear corners on both sides of the sunroof frame. This allows access to the sunshade cable retainers and guide extensions, as necessary.

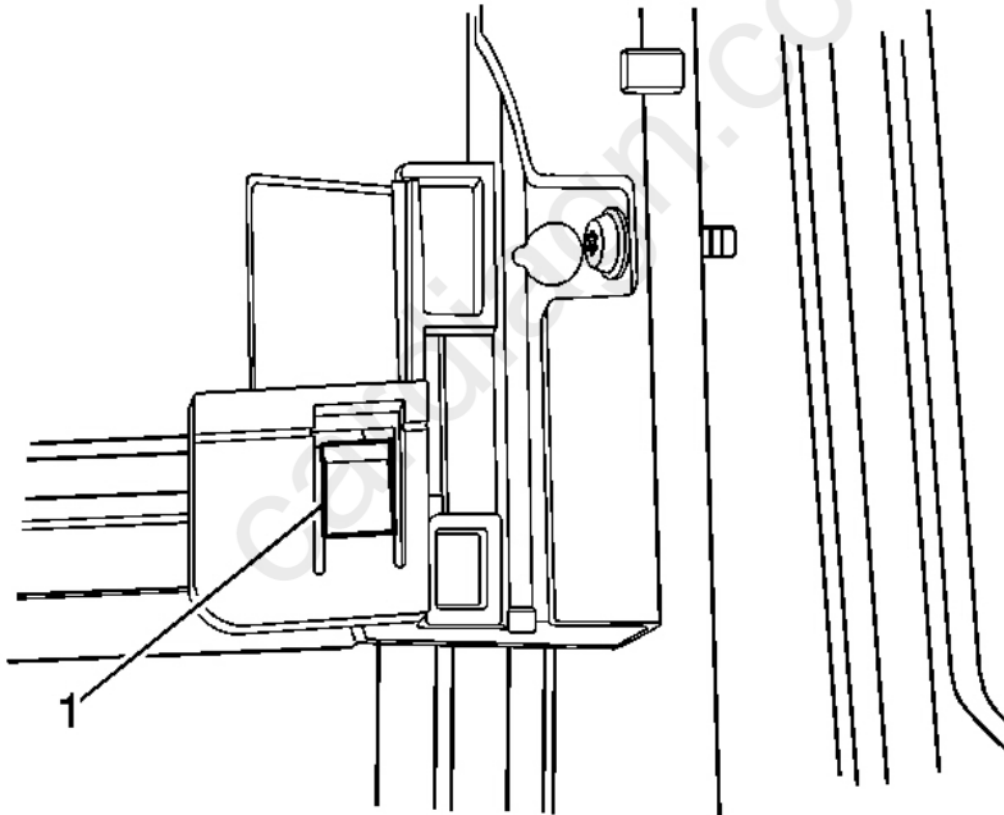


Fig. 2: Identifying Sunshade Retaining Tab
Courtesy of GENERAL MOTORS CORP.

NOTE: The sunshade should be free from the drive cable on the broken side, but remove any piece of the cable retainer end from the sunshade and retain the white guide clip.

10. On the side opposite the broken cable, detach the sunshade front crossbar from the cable retainer by carefully lifting the retaining tab (1) and pulling the crossbar forward.

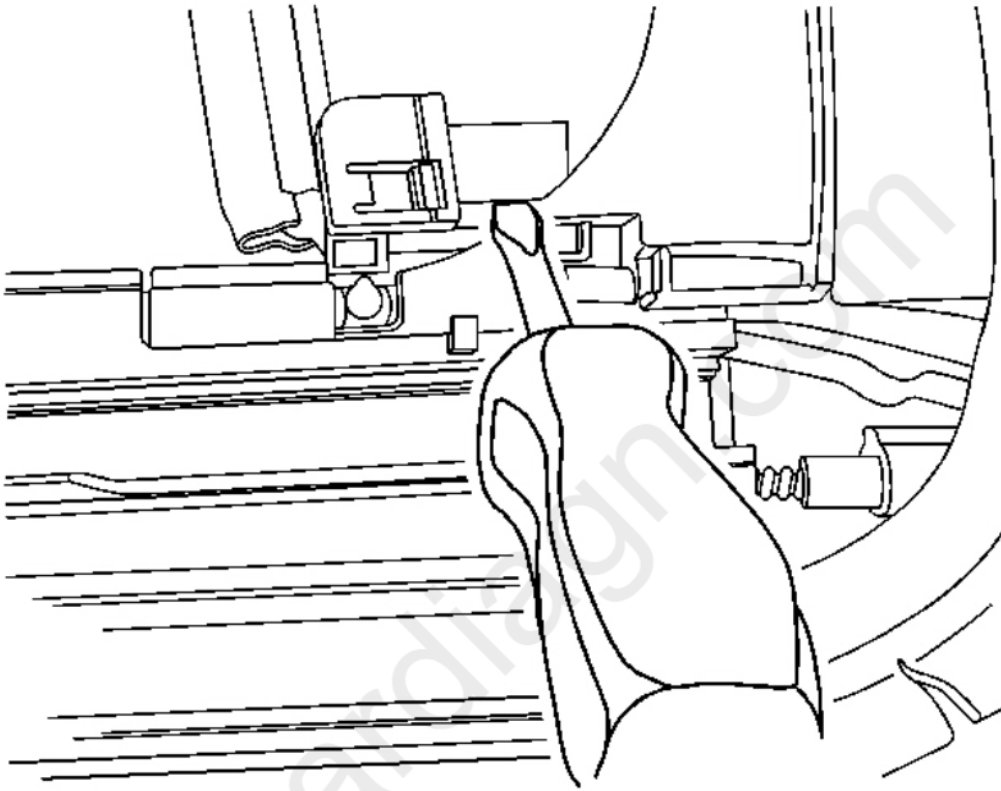


Fig. 3: Identifying Sunshade Guide Clip
Courtesy of GENERAL MOTORS CORP.

NOTE: Do Not force the white clip rearward off the cable retainer as it has a locking feature that prevents this direction of movement.

11. On the same side, disengage the white sunshade guide clip from the drive cable retainer by carefully prying the clip upward with a small flat blade screwdriver, to lift the clip over the ridge on the cable end.

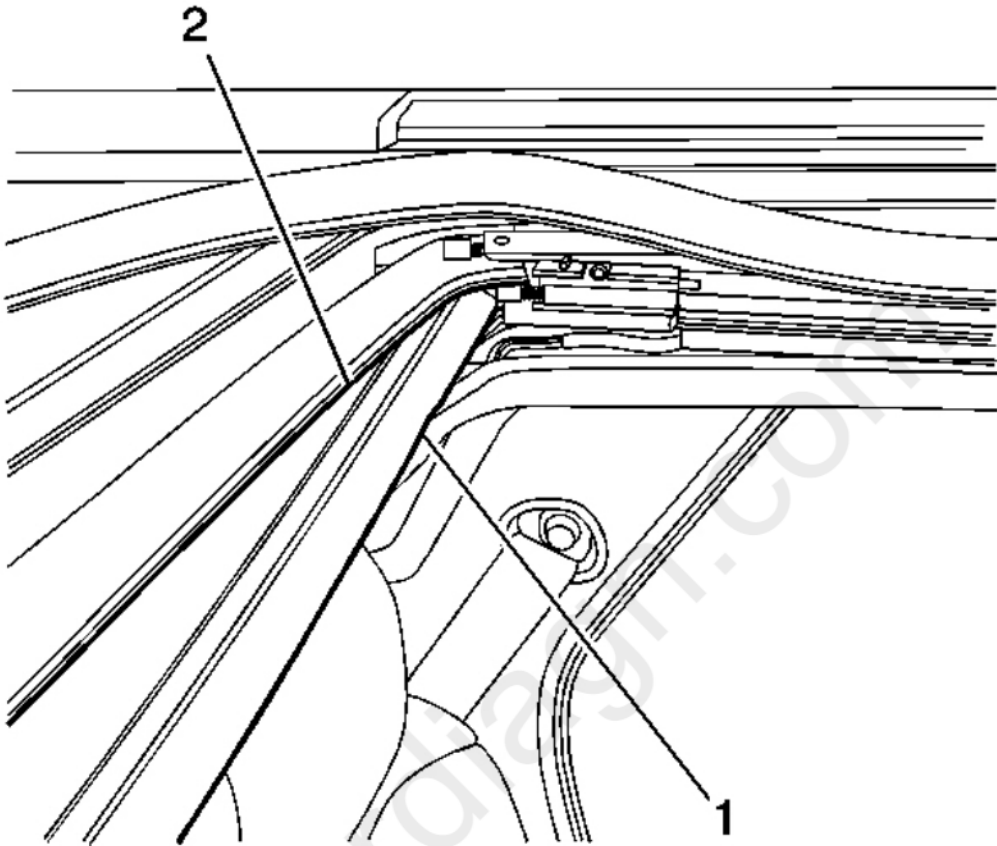


Fig. 4: Identifying Sunshade Front Crossbar & Rear Sunshade Bracket
Courtesy of GENERAL MOTORS CORP.

NOTE: The sunshade will still be under tension when removed from the retaining tabs. Securing the sunshade crossbar at the rear sunshade bracket will prevent the shade from recoiling into the housing. Adding a larger paper clip or small clamp may help hold the shade fabric out of the way.

12. With the shade now free from the cables, secure the shade front crossbar (1) against the rear sunshade bracket (2).
13. If the sunshade cables ends are forward in the frame track, it will be necessary to slide them rearward to position them within the width of the guide extension.

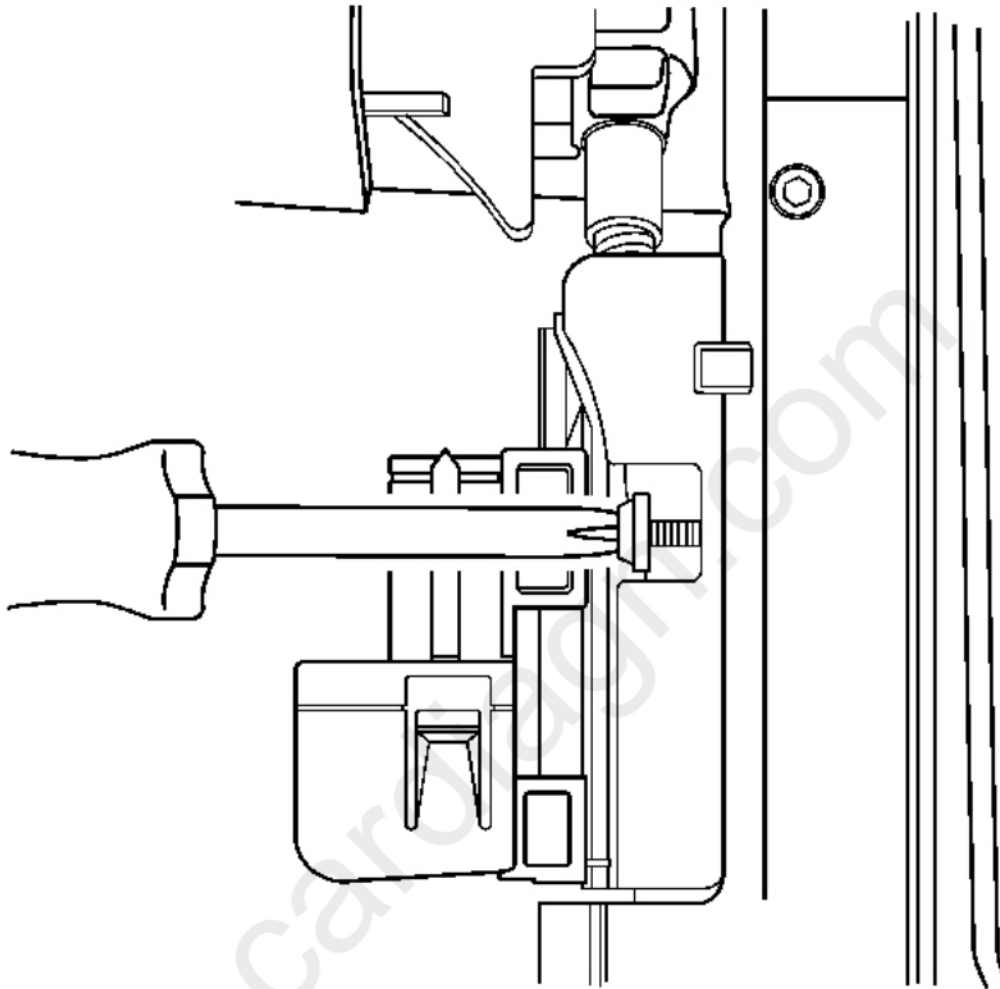


Fig. : Identifying Sunshade Guide Extension Fastener
Courtesy of GENERAL MOTORS CORP.

14. Remove the sunshade guide extension fastener, disengage the cable from the extension and remove the extension from the sunroof frame.

NOTE: Wear gloves when pulling the cable from the sunroof frame, as the edges of the frame side rails are sharp.

15. Remove the broken drive cable from the sunroof frame.

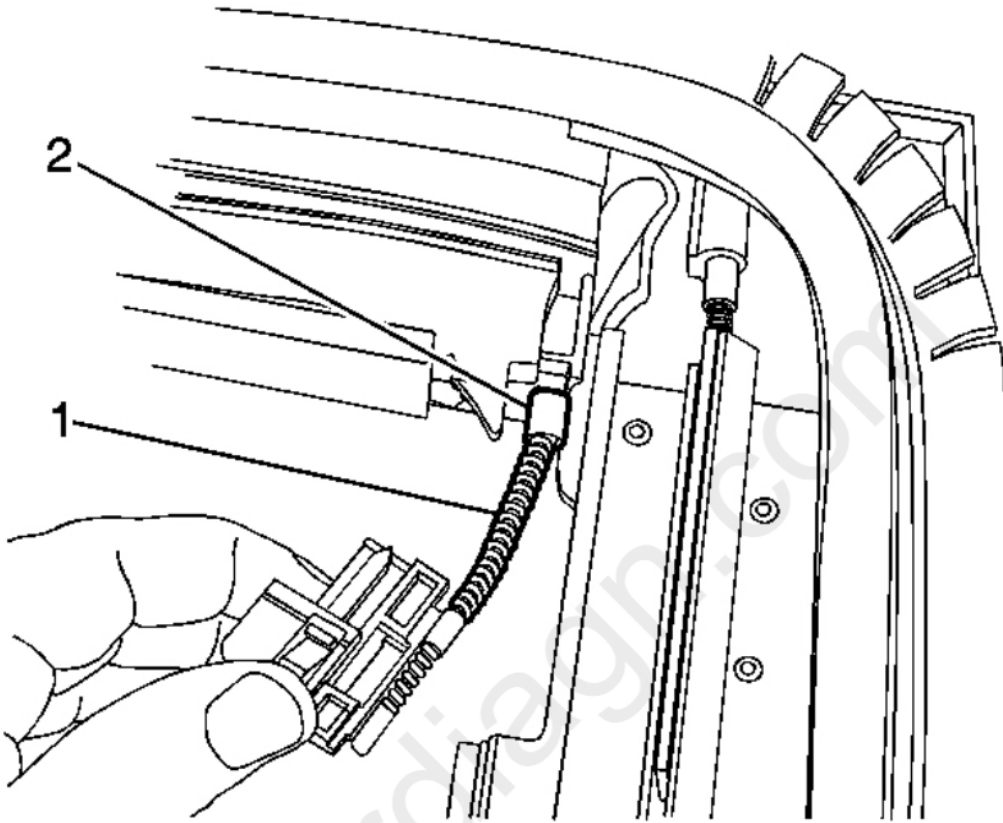


Fig. : View Of Sunshade Drive Cable & Guide Tube
Courtesy of GENERAL MOTORS CORP.

NOTE: The drive cables are left and right side specific. Look for L or R imprinted on the underside of the retaining tab at the end of the cable.

1. Install the end of the new sunshade drive cable (1) into the guide tube (2) at the rear of the sunroof frame.

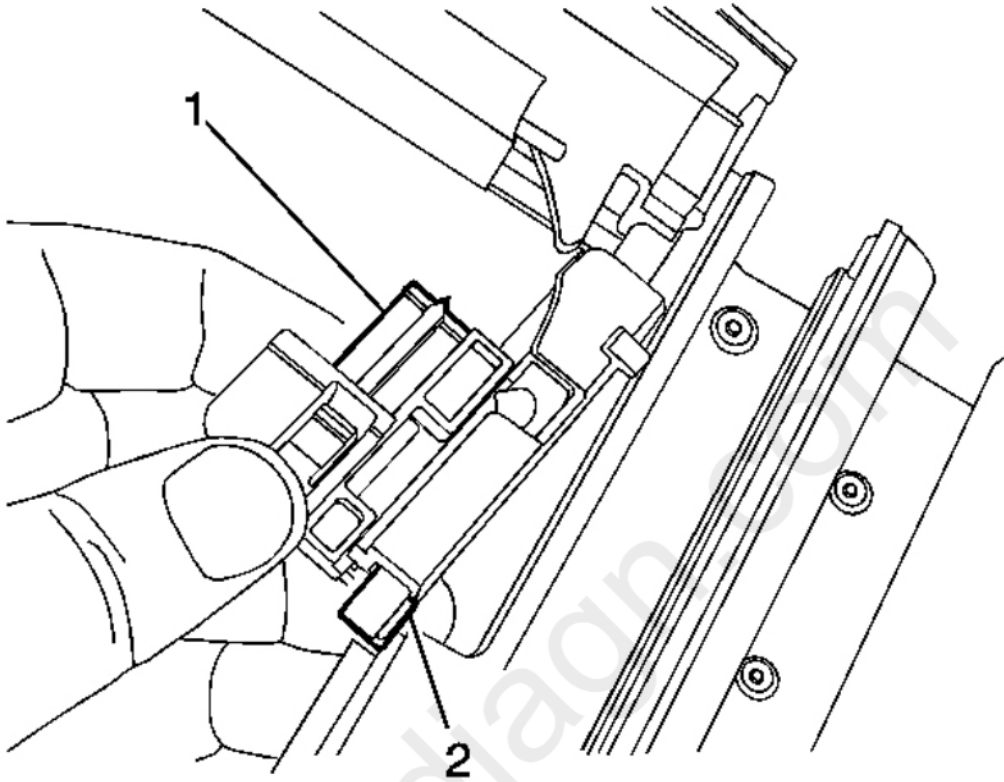


Fig. : Identifying Sunshade Cable Retaining Tab & Guide E tension
Courtesy of GENERAL MOTORS CORP.

2. Load the sunshade cable retaining tab (1) into the guide extension (2).

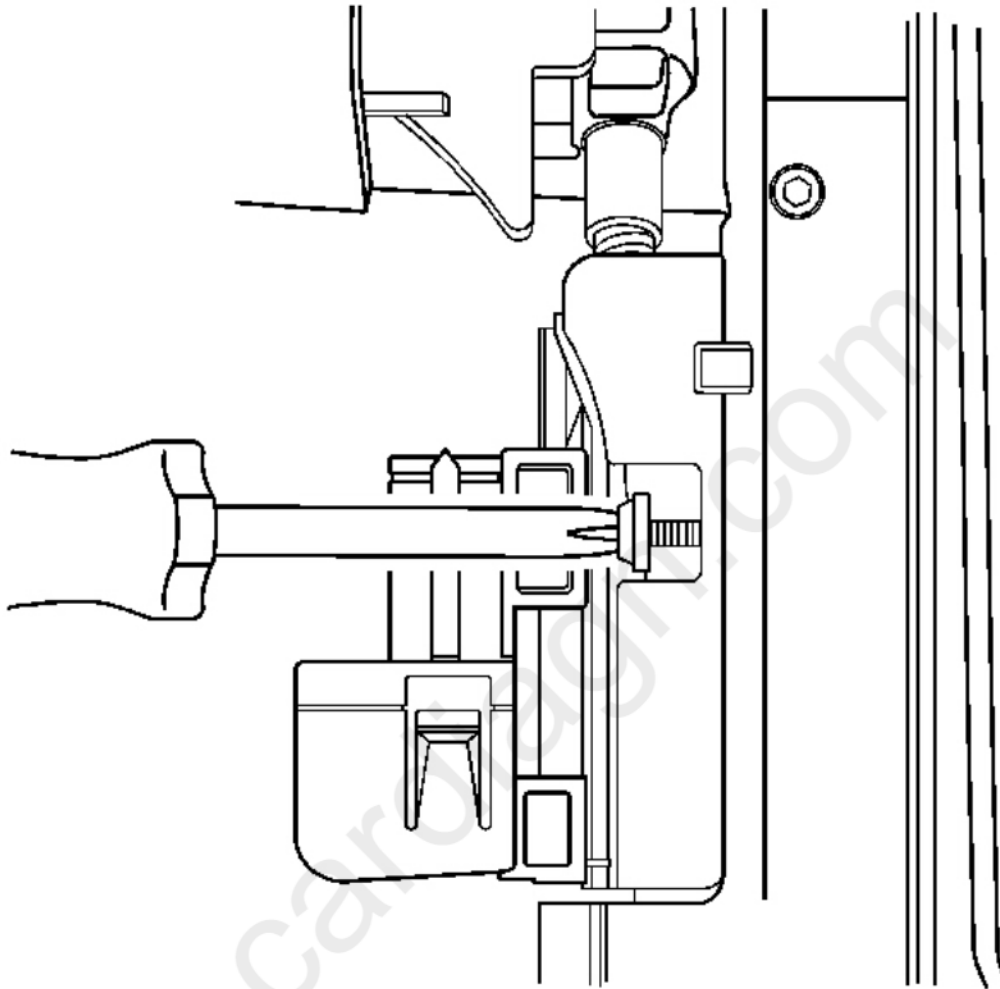


Fig. : Identifying Sunshade Guide E tension Fastener
Courtesy of GENERAL MOTORS CORP.

3. Install the cable guide extension and fastener to the sunroof frame.

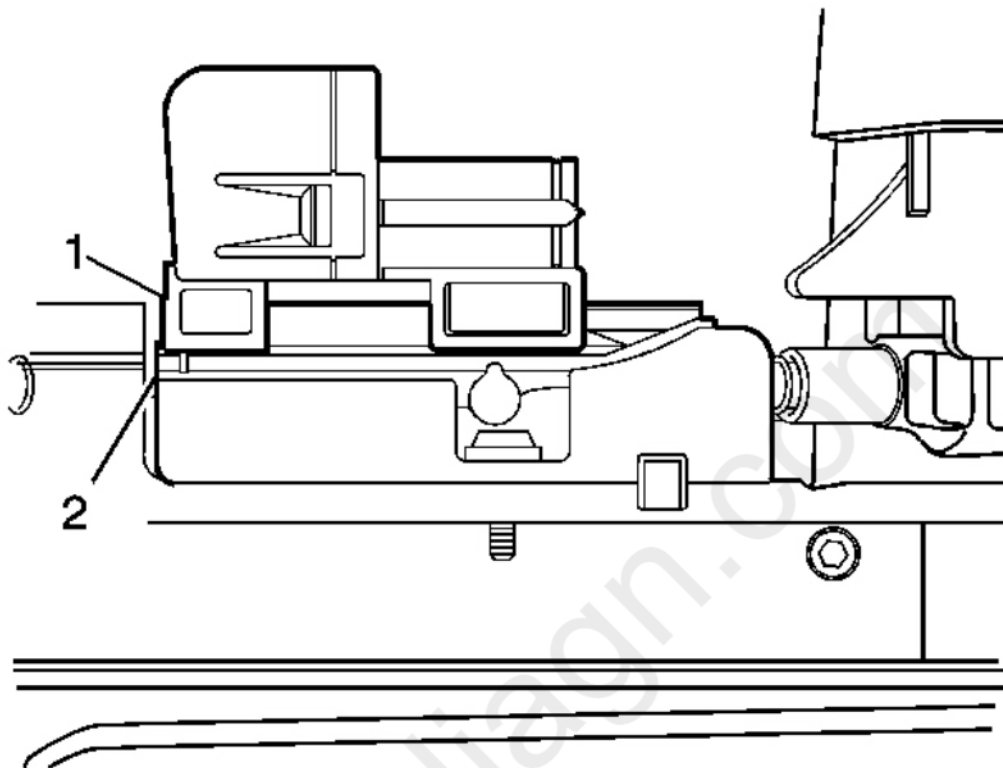


Fig. : Identifying drive Cable Retaining Tab & Guide Extension
Courtesy of GENERAL MOTORS CORP.

4. Align the drive cable retaining tab (1) with the end of the guide extension (2), as shown above, on both the right and left sides.

NOTE: Installing the sunshade motor will keep the cables in alignment, and not allow them to move when installing the sunshade.

5. Install the sunroof sunshade motor. Refer to [Sunroof Sunshade Motor Replacement](#).

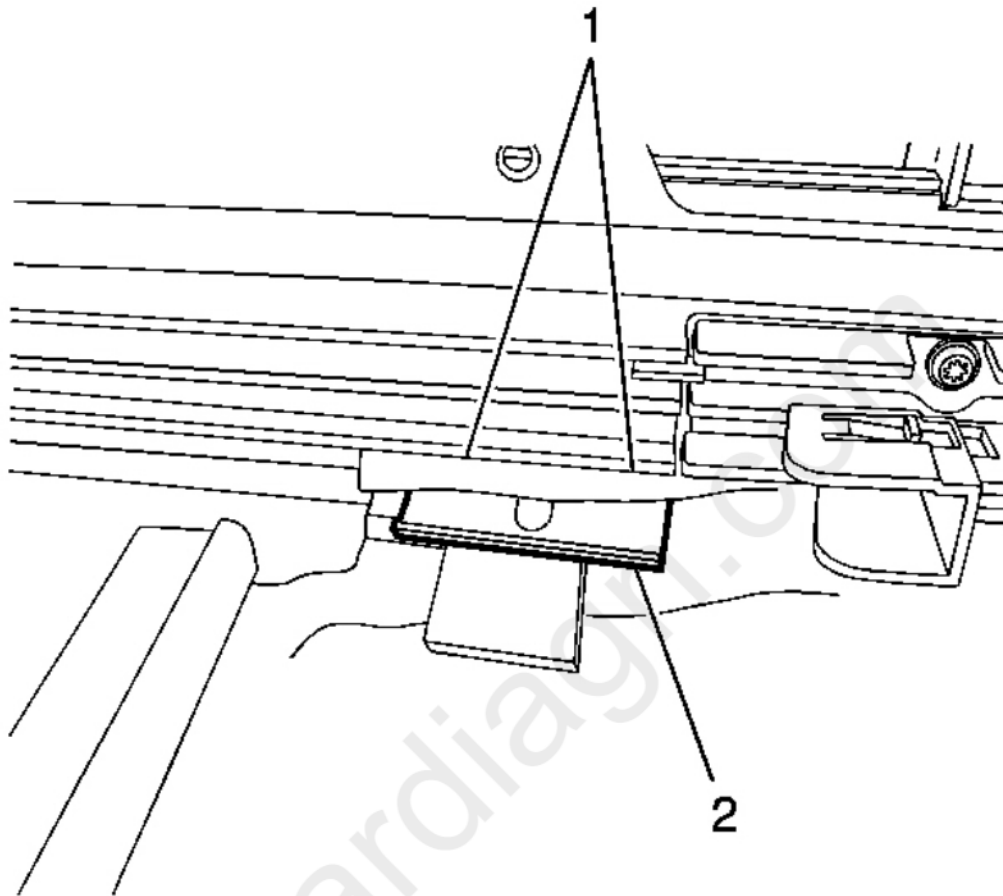


Fig. 10: Identifying Sunshade Guide Clip & Pocket
Courtesy of GENERAL MOTORS CORP.

NOTE: The graphics for steps 6,7,8 and 9 are mirror image for the right and left sides.

6. Pull the sunshade crossbar forward enough to access the pockets (1) sewn in the underside of the sunshade fabric and install the white sunshade guide clip (2) into the pockets.

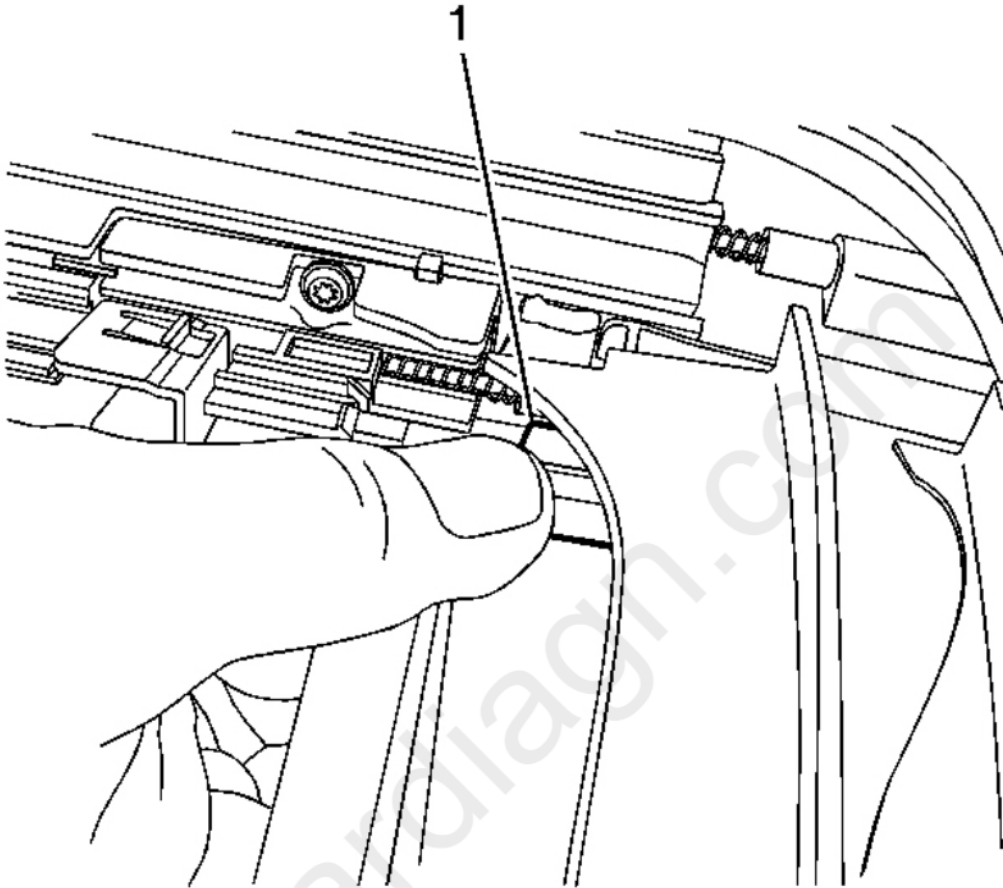


Fig. 11: View Of Guide Clip

Courtesy of GENERAL MOTORS CORP.

7. Holding the tension on the sunshade, allow the shade to recoil enough to position the guide clip (1) rearward of the side frame rail end.

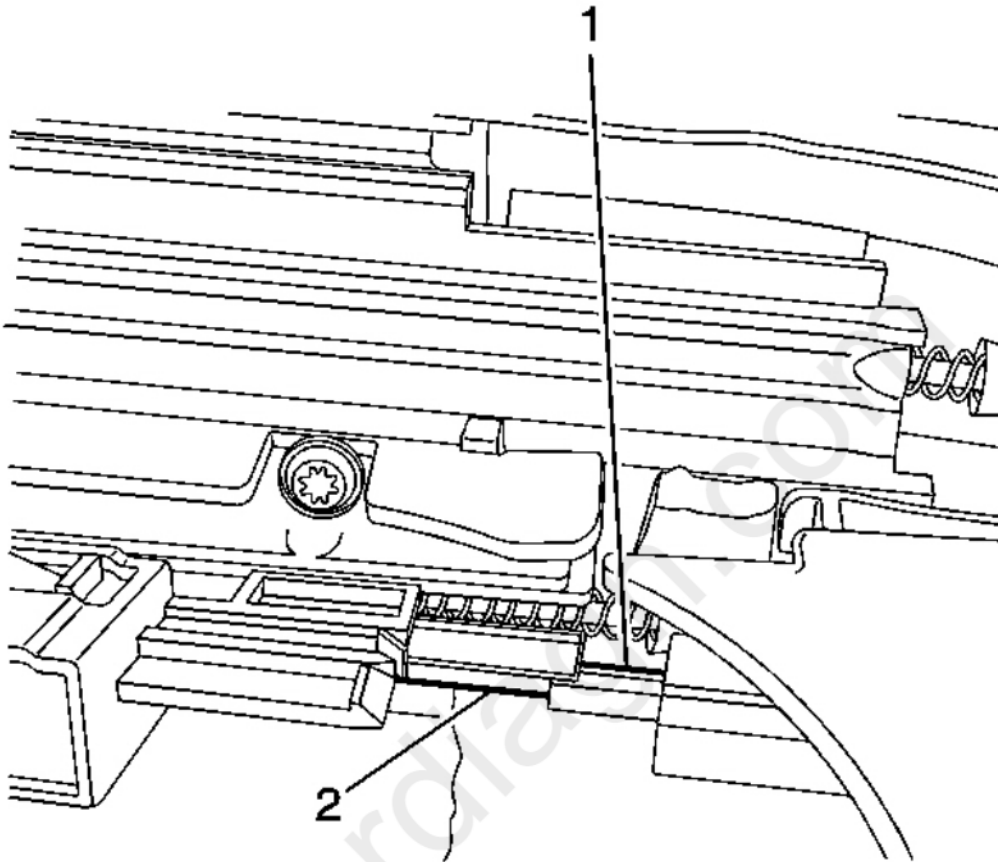


Fig. 12: View Of Guide Clip & Frame Rail
Courtesy of GENERAL MOTORS CORP.

8. Insert the guide clip/shade (1) into the open end of the lower track on the frame rail (2) and slide the clip forward.

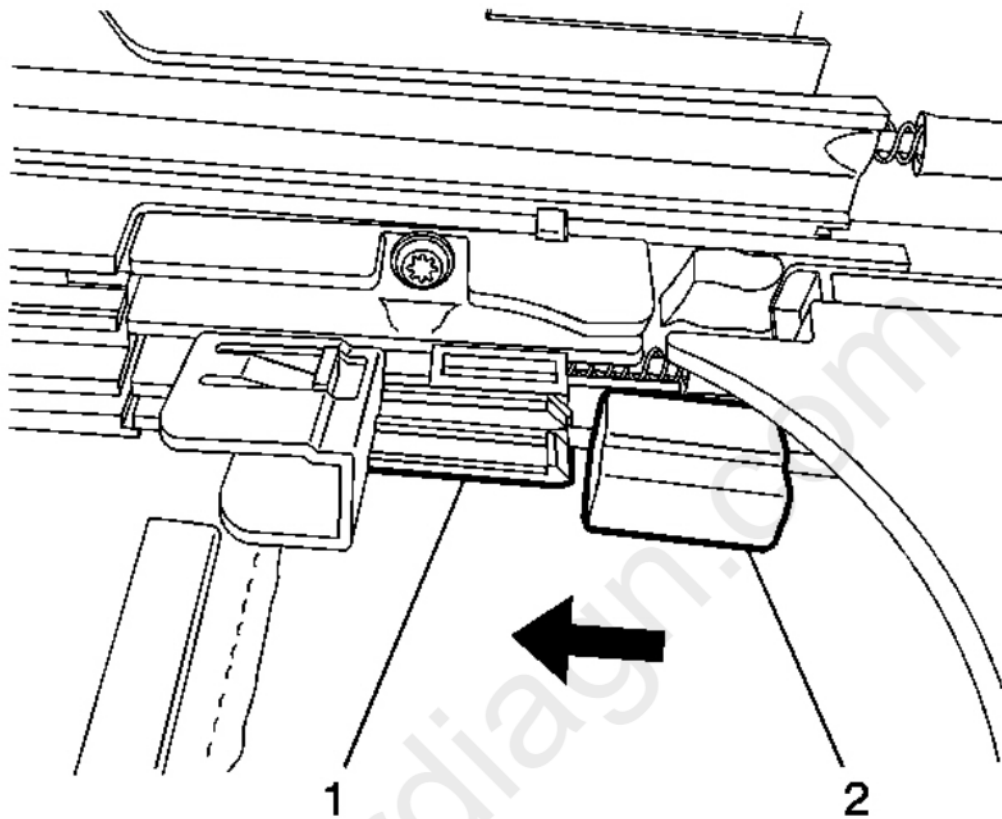


Fig. 13: Sliding Guide Clip/Shade Forward
Courtesy of GENERAL MOTORS CORP.

9. Continuing to slide the guide clip/shade forward, push the clip (2) onto the drive cable retaining tab (1). Continue pushing the guide clip forward until an audible click is heard and the retainer is fully seated.
10. Pulling the sunshade forward, fold over the front crossbar (1) and insert each side into the top retaining clips (2) at the ends of the drive cables.

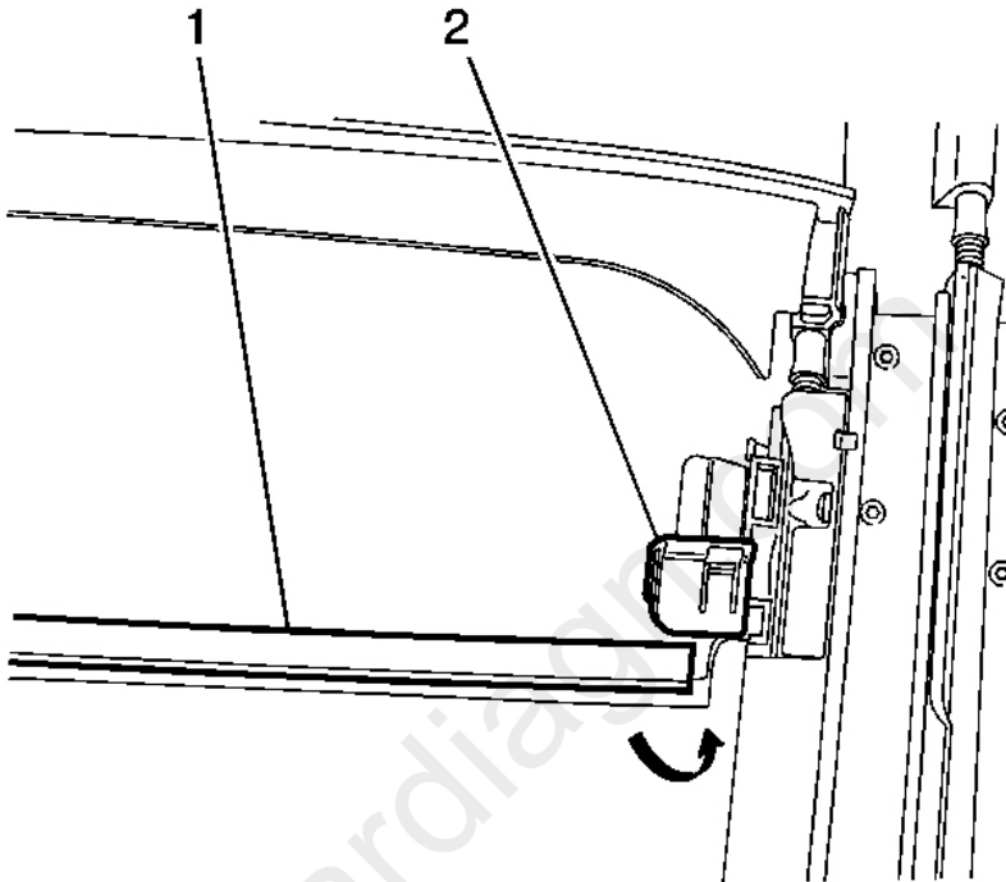


Fig. 14: Identifying Front Crossbar & Top Retaining Clips
Courtesy of GENERAL MOTORS CORP.

11. Pulling the sunshade forward, fold over the front crossbar (1) and insert each side into the top retaining clips (2) at the ends of the drive cables.

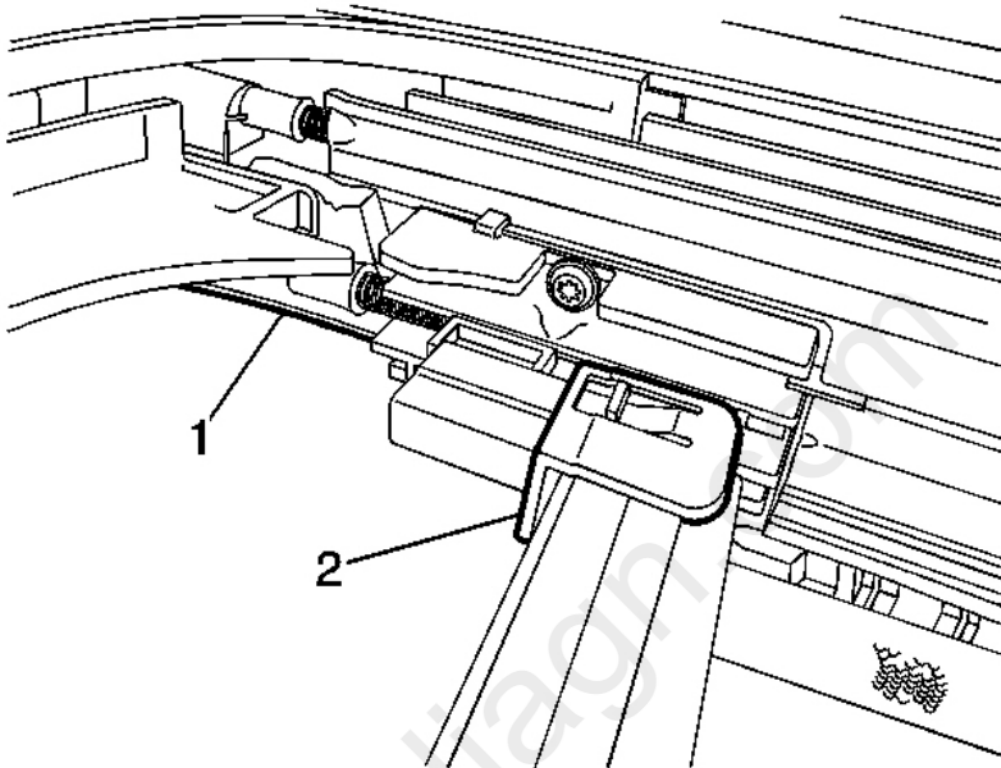


Fig. 1 : Locating Side Frame Tracks Retaining Clips
Courtesy of GENERAL MOTORS CORP.

12. Ensure the sunshade is routed properly into the side frame tracks (1) and the front crossbar is fully seated into the retaining clips (2), on both sides.

NOTE: Add blue OCTITE to all the fastening screws prior to reinstalling the sunroof windows.

13. Install the rear sunroof window. Refer to Sunroof Window Replacement - Rear.
14. Install the front sunroof window. Refer to Sunroof Window Replacement - Front.
15. Reinitializes/teach the sunroof motors. Refer to Sunroof Motor Actuator Initialization Teach Process.
16. Reposition the headliner and the left rear door opening weatherstrip.
17. Install the left quarter upper trim finish panel and left body side trim panel. Refer to Quarter Upper Trim Panel Replacement.
18. Install the rear end trim finish panel and floor panel rails. Refer to Rear End Trim Finish Panel Replacement.

19. Install the rear compartment floor stowage cover assembly.

CAUTION: Refer to Fastener Caution .

20. Install the rear luggage shade and the left luggage shade bolt, if equipped.

SUNROOF AIR DEFLECTOR REPLACEMENT

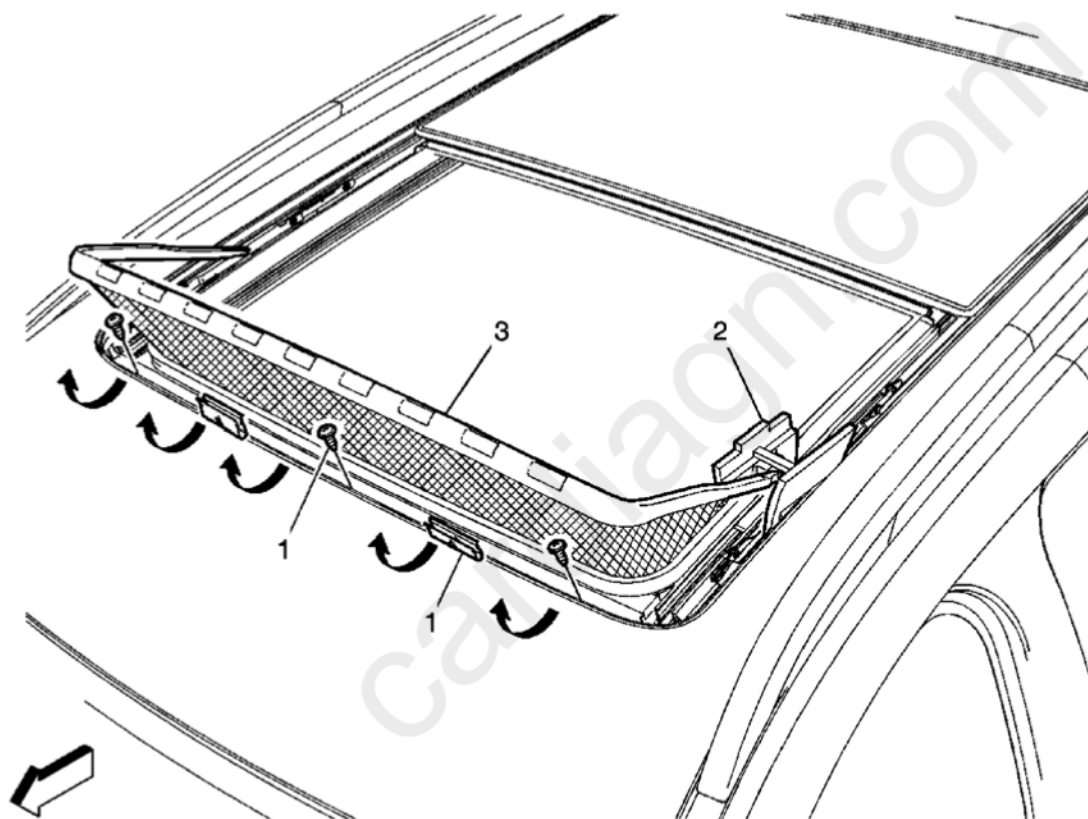


Fig. 1 : View Of Sunroof Air Deflector
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunroof Air Deflector Retainer Screws (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Procedures 1. Open the front sunroof window.

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	2. Push down on the air deflector to expose the screws. 3. Release sunroof air deflector from the retainer clips. Tighten: 6 N.m (53 lb in)
2	Sunroof Air Deflector Bracket (Qty: 2) Procedures 1. Rotate the entire air deflector to almost vertical position. 2. Release the air deflector from the bracket and remove the air deflector.
3	Sunroof Air Deflector Tip: Put the air deflector arms into the brackets first then install the front part of the air deflector to the clips.

SUNROOF DRAIN INSPECTION AND CLEANING

Drain Hose Routing

NOTE: If the headliner is wet DO NOT remove any interior trim. Do the plugged Drain hose test first.

A drain trough encircles the sunroof window panel and water is drained off by the drain hoses located at each corner of the housing. A drain channel spans across the sunroof housing at the rear of the window panel and directs water into the trough.

1. The front drain hoses are routed down the windshield pillars and out the center of the pillar between the door hinges. The front hoses are installed in a rubber grommet and retained by clips.
2. The rear drain hoses are routed through the rear pillars and out of the rocker panel. In some vehicle the drain hoses are routed out through the metal roof slots and routed to the lower wheelhouse to drain out of the vehicle. The rear hoses are installed in a rubber grommet and retained by clips.

Plugged Drain Hose

If a waterleak has occurred check for a plugged drain hose at each corner of drainage system.

1. Open the sunroof window.
2. To test for blockage, pour a small container of water into the housing drain trough. Check each corner to confirm the drain hose is draining water.

ARNIN : wear safety glasses in order to avoid eye damage.

3. Use compressed air, 241 kPa (35 psi) or less to blow out any drain hose that is plugged.
4. Test the system again.

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5. If the hose remains plugged, check to see it is properly routed and does not have a kink. Refer to **Sunroof Housing Front Drain Hose Replacement** or **Sunroof Housing Rear Drain Hose Replacement**.
6. Remove the blockage using the following steps.
 1. Push mechanics wire through the hose to remove the obstruction.
 2. Use compressed air in order to blow out any remaining material.

Disconnected Drain Hose

Inspect the drainage system for disconnected drain hoses. Complete the following steps in order to obtain partial access to drain hoses and check for a disconnected hose.

1. Open the sunroof window panel.
2. Lower the headliner as needed.
3. Connect any disconnected hoses. If tie straps are required, connect the hose and apply tie strap.
4. Ensure that the rear drain hoses are properly routed in the metal roof slot and taped in place.

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT

Removal Procedure

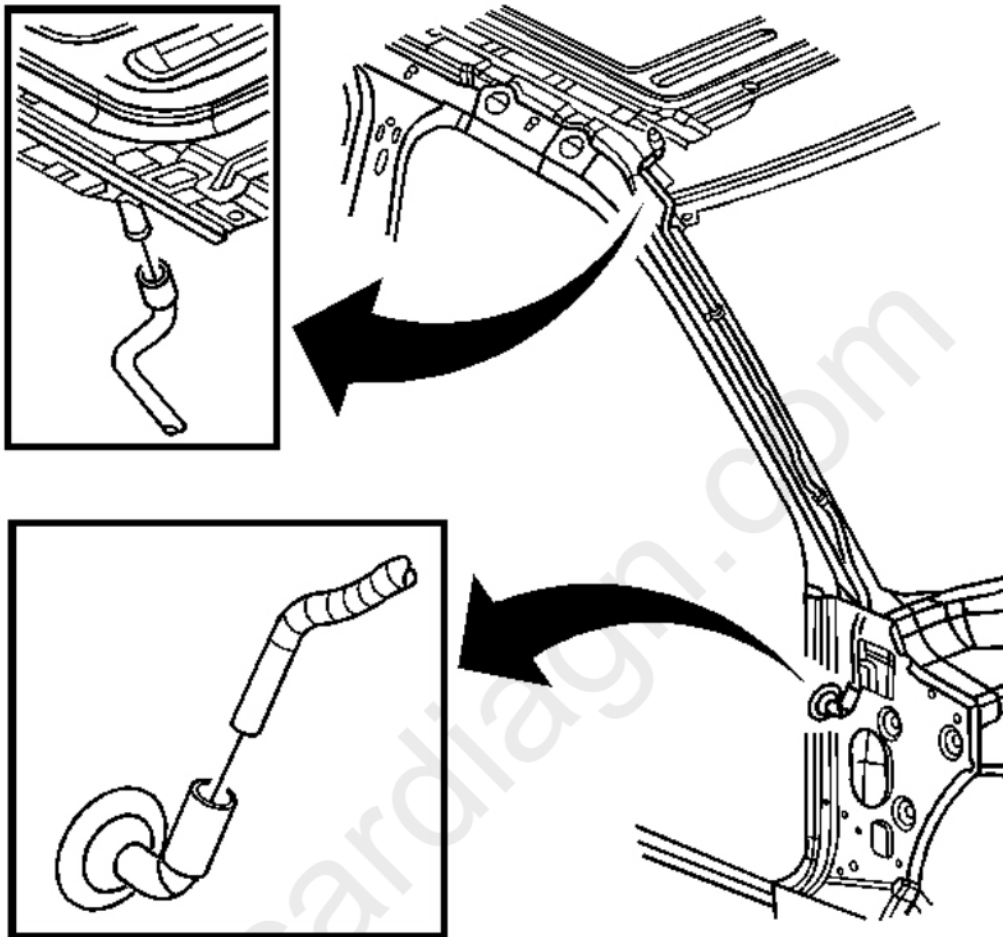


Fig. 1 : Identifying Front Sunroof Drain Hose Connections
Courtesy of GENERAL MOTORS CORP.

1. It is only necessary to lower the headliner. Only do those step in headliner replacement that will lower the headliner enough to gain access to the part. Refer to **Headlining Trim Panel Replacement (With C3U)** or **Headlining Trim Panel Replacement (Without C3U)** .
2. Disconnect the front sunroof drain hose from the sunroof drain spigot.
3. Disengage the sunroof drain hose from the attachment points on the windshield pillar.

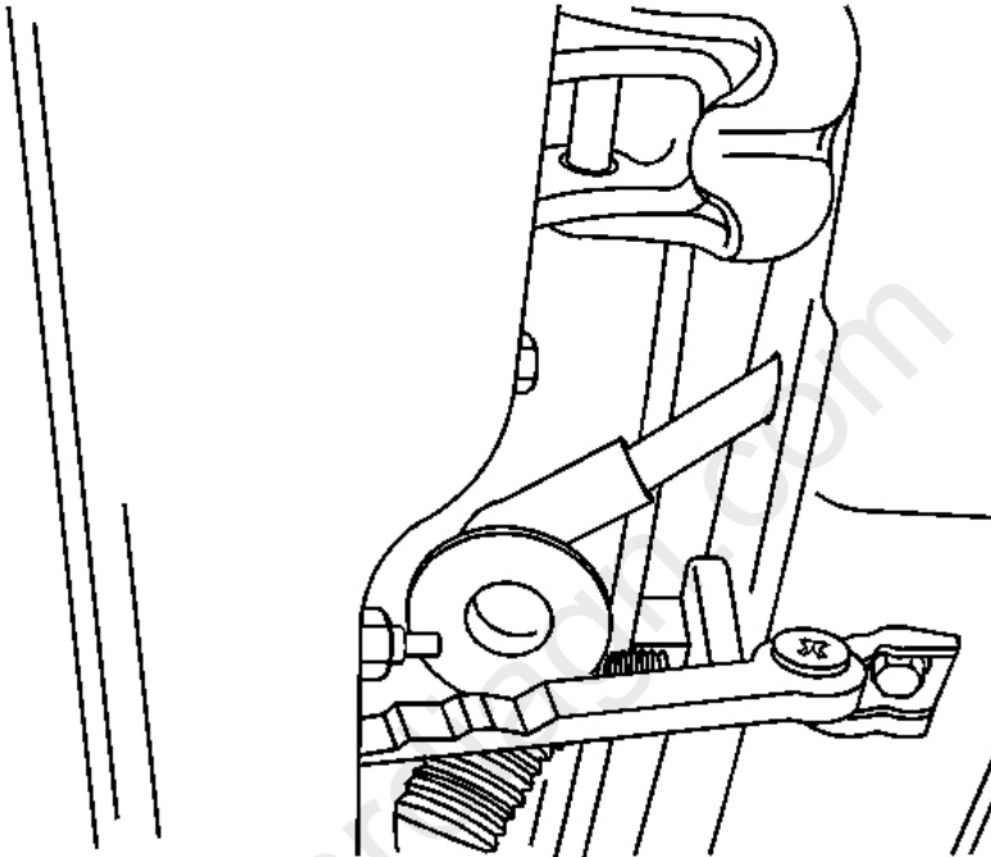


Fig. 18: View Of Grommet From Drain Hose
Courtesy of GENERAL MOTORS CORP.

4. Pull the grommet and a short length of the front drain hose out of the front hinge pillar.
5. Disconnect the grommet from the drain hose.
6. Remove the hose from the vehicle

Installation Procedure

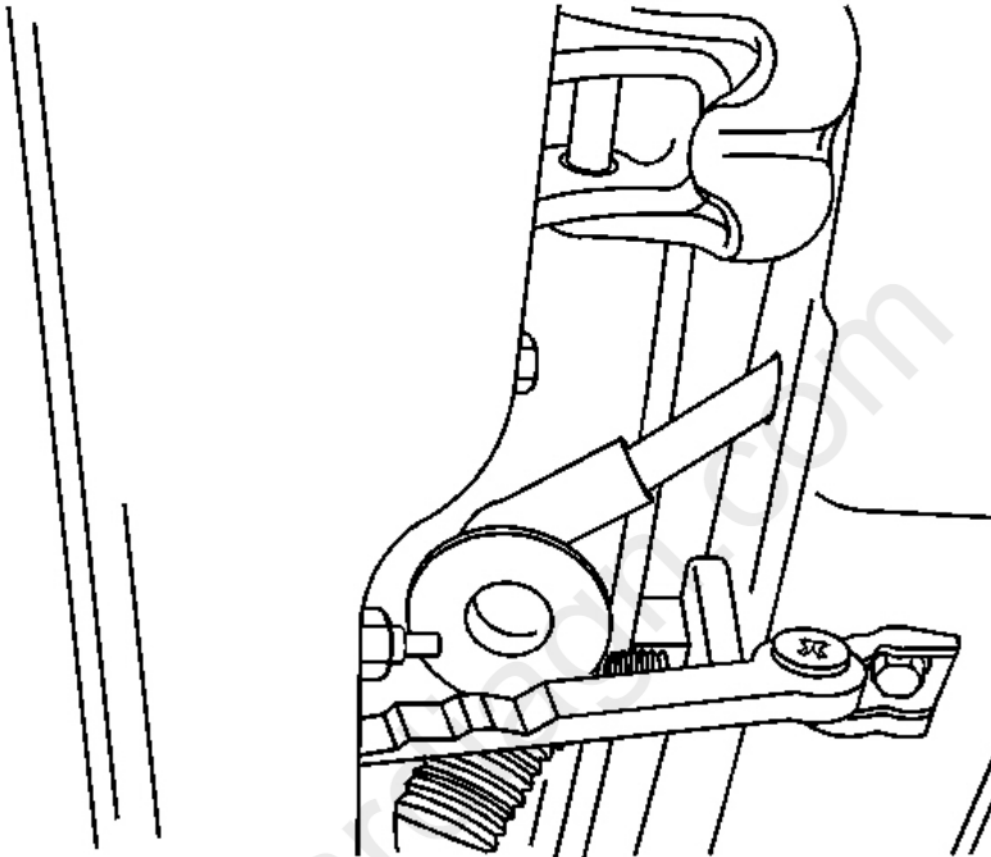


Fig. 19: View Of Grommet From Drain Hose
Courtesy of GENERAL MOTORS CORP.

1. Install the hose to the vehicle
2. Pull the hose out through the hole in the front hinge pillar.
3. Install the grommet onto the end of the hose.
4. Install the grommet into the hole in the front hinge pillar.

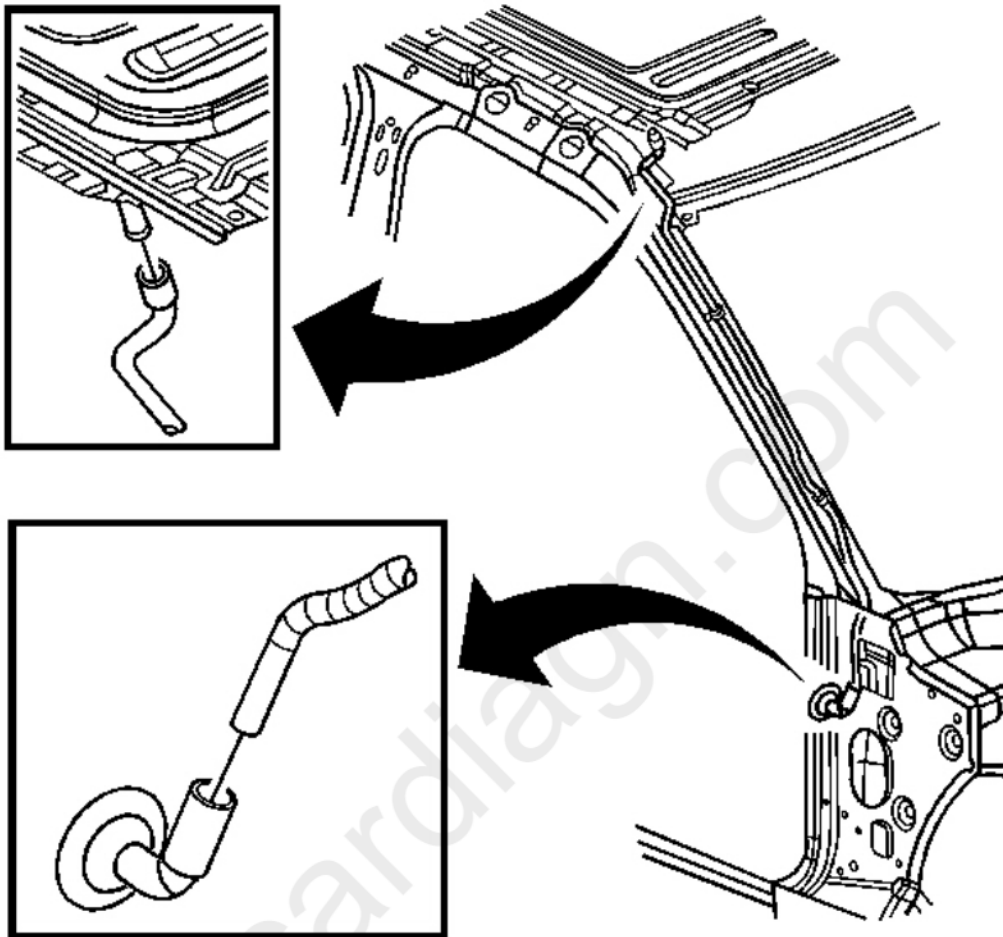


Fig. 20: Identifying Front Sunroof Drain Hose Connections
 Courtesy of GENERAL MOTORS CORP.

5. Connect the hose to the attachments on the windshield pillar.
6. Connect the front sunroof drain hose to the sunroof drain spigot.
 - . Water test the vehicle before installing the headliner.
 - . Install the headliner. Refer to **Headlining Trim Panel Replacement (With C3U)** or **Headlining Trim Panel Replacement (Without C3U)** .
9. Inspect sunroof for proper operation.

SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT

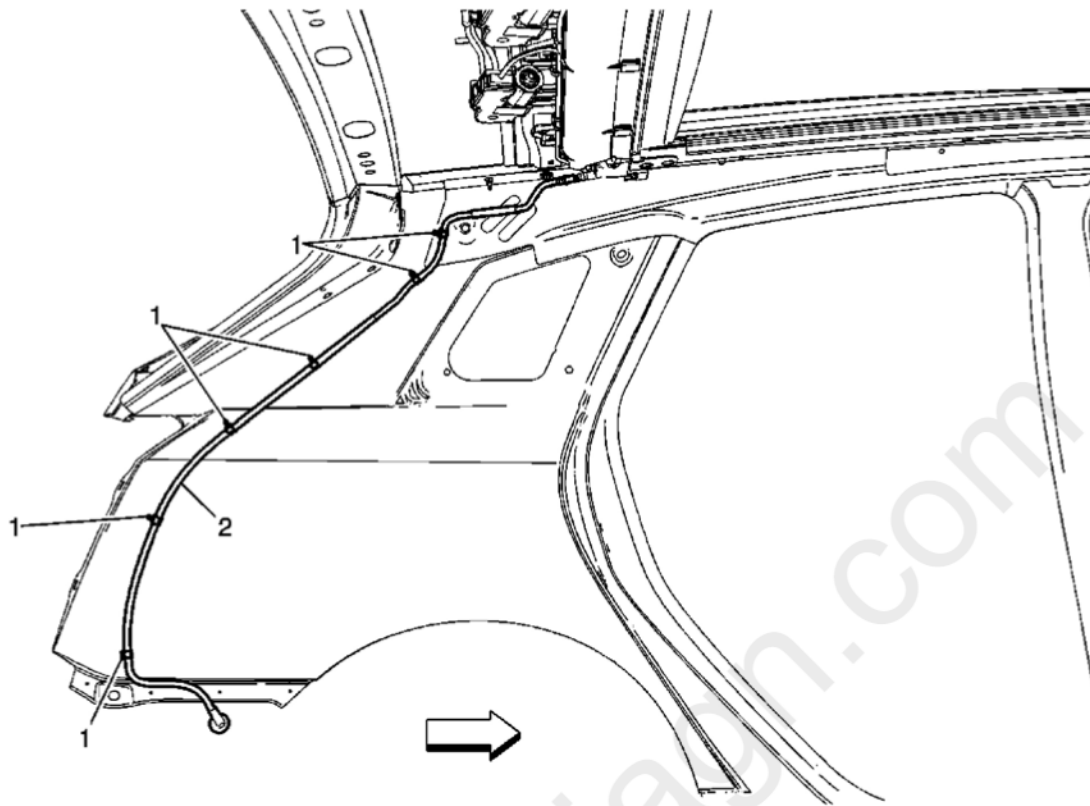


Fig. 21: Identifying Sunroof Housing Rear Drain Hose
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: 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 Headlining Trim Panel Replacement (With C3U) or Headlining Trim Panel Replacement (Without C3U) .	
1	Sunroof Housing Rear Drain Hose Fastener (Qty: 6) Procedure 1. Open the sunroof window. 2. Disconnect the drain hose and grommet at the rear quarter panel.
2	Sunroof Housing Rear Drain Hose

SUNROOF MODULE ASSEMBLY REPLACEMENT

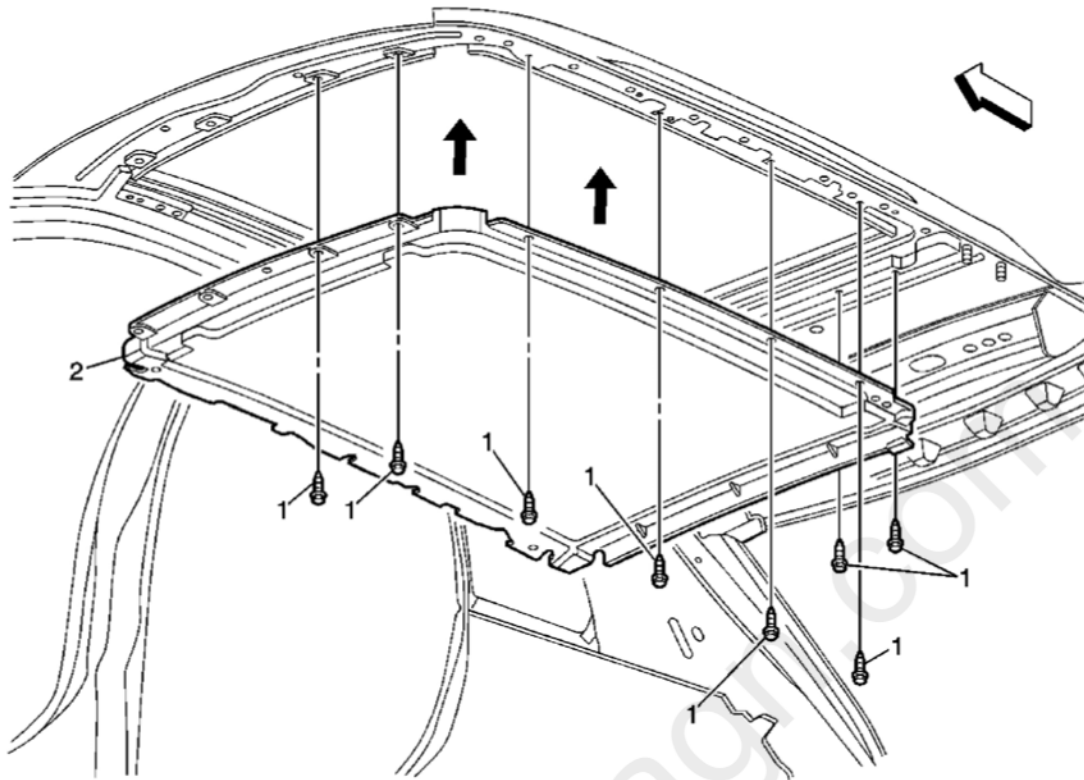


Fig. 22: View Of Sunroof Module Assembly
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove both sunroof windows from the module. Refer to <u>Sunroof Window Replacement - Front</u> and <u>Sunroof Window Replacement - Rear</u>. 2. 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 <u>Headlining Trim Panel Replacement (With C3U)</u> or <u>Headlining Trim Panel Replacement (Without C3U)</u>.	
1	Sunroof Module Fastener (Qty: 16) CAUTION: Refer to <u>Fastener Caution</u>. Procedures 1. Sunroof module has eight fastener on each side. 2. It will be necessary to have assistant to remove the sunroof module from the vehicle. 3. Disconnect the electrical connectors.

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4. Disconnect the drain hoses from the module.
5. Install a double layer of masking tape around the perimeter of the painted surfaces and protect the interior trim.
6. Remove the sunroof module through the liftgate opening.

Tighten: 5.5 N.m (49 lb in)

Sunroof Module

Procedures

2. Place the sunroof module on a soft surface.
2. Transfer all necessary parts.
3. Ensure that the window operate properly. Refer to Sunroof Window Adjustment and Sunroof Motor Actuator Initialization Teach Process.
4. Water test the vehicle before installing the headliner.

SUNROOF WINDOW MOTOR REPLACEMENT

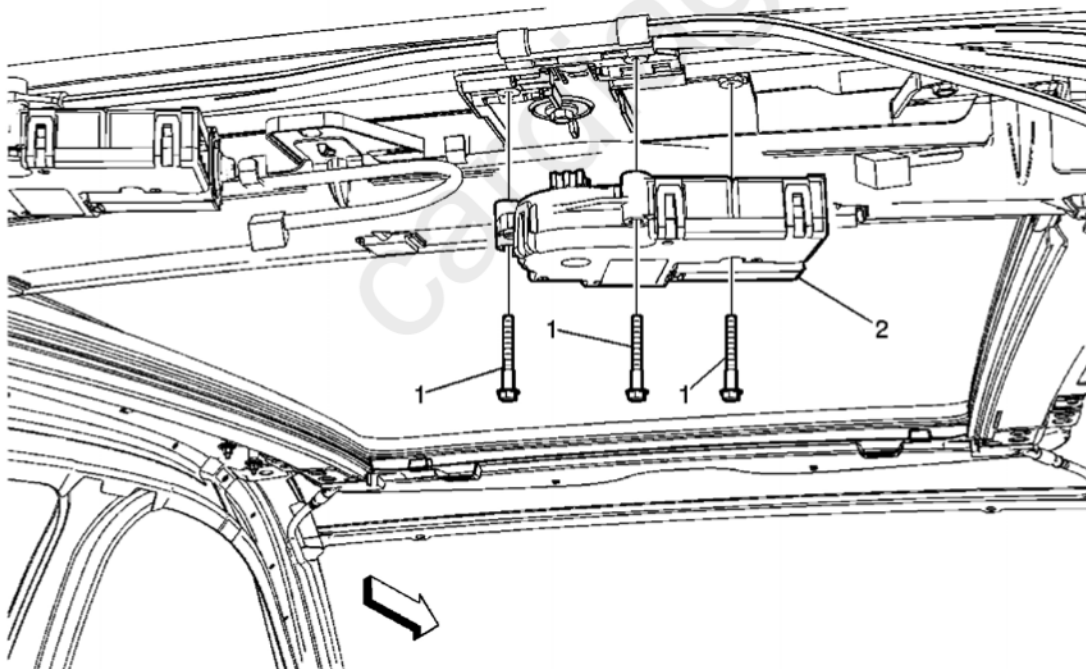


Fig. 2 : Identifying Sunroof Window Motor & Fasteners
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	

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1. Open the sunroof window.
2. 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 Headlining Trim Panel Replacement with C or Headlining Trim Panel Replacement without C.

1	Sunroof Window Motor Fastener (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u>. Procedures 1. Ensure that the window is all the way rearward before remove the motor. 2. Disconnect the electrical connector. Tighten: 6 N.m (53 lb in)
2	Sunroof Window Motor Procedure: Ensure that the sunroof sunshade and window operation properly. Refer to <u>Sunroof Motor Actuator Initialization Teach Process</u>.

SUNROOF MOTOR ACTUATOR INITIALIZATION TEACH PROCESS

Front Sunroof Power Sunshade

NOTE:

- Do the initialization/teach for the sunroof window first, then the sunroof sunshade.
- If you teach the sunshade first and then open, you Not be able to close the sunshade past the half way closed position until the sunroof window is initialization.
- If the engine is OFF, then the BCM disables the sunroof or sunshade. If the initial position is not known, the sunroof or sunshade will not move.
- If the sunroof or sunshade has lost initial position, the sunroof or sunshade cannot be opened more than one inch. One open attempt is allowed per ignition cycle.
- If the sunroof and sunshade have lose initialization and you teach the sunroof first, the BCM disables the sunroof until you teach the sunshade. The sunroof will not move until you teach the sunshade.

Initialization Teach Procedure, Manual Method, New First Time Installation

Perform the initialization/teach procedure at first operation test of the sunroof. Ensure the electrical harness on the headliner is connected and the engine running and the vehicle in park.

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1. Press the sunroof switch to the close position until the window stalls at the close hard stop in the full close position, and then moves slightly to the soft stop position. Release the button. This is the initialization portion.
2. Verify the operation of the sunroof window and sunshade runs two or three times full cycles.

The initialization teach procedure is not completed if one of the following events occurs before the initialization/teach cycle is done:

- The sunroof switch is not held in the close position.
- Ignition and/or battery power has been removed.
- The window panel has not reached the close position, and/or the sunshade has not reached the close position.

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

Re Initialization Teach Procedure, Manual Method, Reinstallation

Perform the initialization/teach procedure at first operation test of the sunroof. Ensure the electrical harness on the headliner is connected to the large roof, battery power is applied, and the ignition switch is on.

1. Press the sunroof switch to the close position until the window reaches the close soft stop position and release. Press the sunroof switch close and hold for approximately 30 seconds, until the window stalls at the front hard stop in the open position and then moves slightly to the soft stop position, release the button. This is the initialization portion.
2. Verify the operation of the sunroof window and sunshade runs two or three times full cycles.

The initialization teach procedure is not completed if one of the following events occurs before the initialization/teach cycle is done:

- The sunroof switch is not held in the close position approximately 30 seconds.
- Ignition and/or battery power has been removed.
- The window panel has not reached the close position, and/or the sunshade has not reached the close position.

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

SUNROOF SUNSHADE MOTOR REPLACEMENT

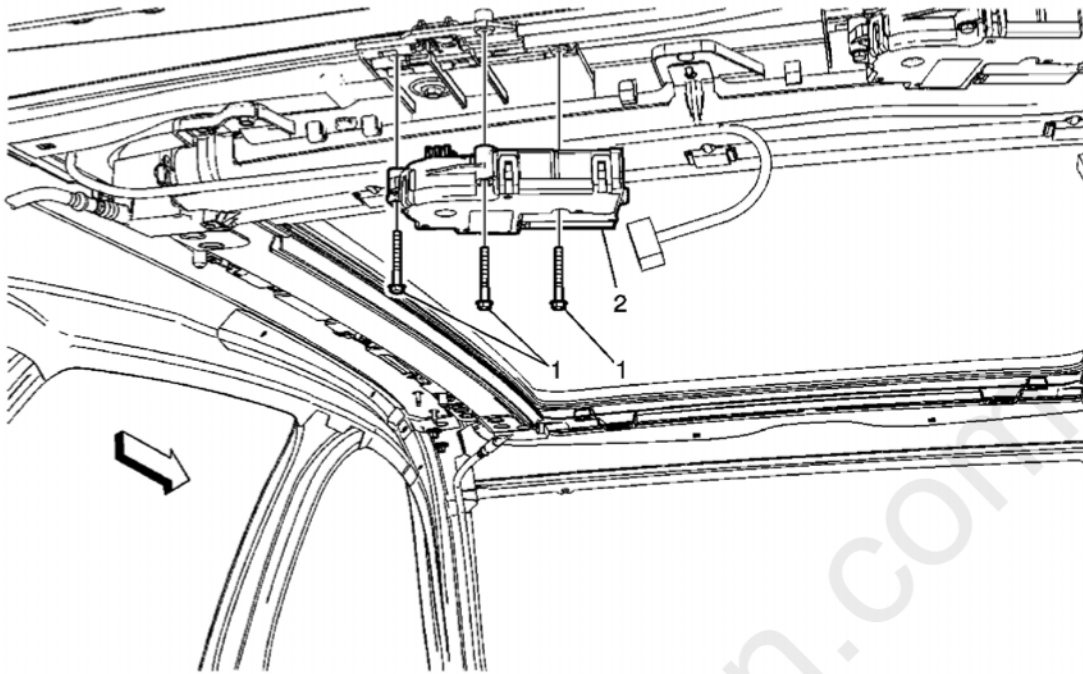


Fig. 2 : View Of Sunroof Sunshade Motor
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open the sunroof window. 2. 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 <u>Headlining Trim Panel Replacement with C</u> or <u>Headlining Trim Panel Replacement without C</u>.	
1	Sunroof Sunshade Motor Fastener (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Procedures: Disconnect the electrical connector. Tighten: 6 N.m (53 lb in)
2	Sunroof Sunshade Motor Procedure: Ensure that the sunroof sunshade and window operation properly. Refer to <u>Sunroof Motor Actuator Initialization Teach Process</u> .

SUNROOFS AND SUNSHADE REPLACEMENT**Removal Procedure**

NOTE: It is Not necessary to remove the sunroof assembly to replace the sunshade.

1. Open the sunshade to the fully open position.
2. Remove the window. Refer to **Sunroof Window Replacement Rear**.
3. It is only necessary to lower the headliner. Only do those step in headliner replacement that will lower the headliner enough to gain access to the part. Refer to **Headlining Trim Panel Replacement With C** or **Headlining Trim Panel Replacement Without C**.
4. Remove the white plastic retainers by sliding them rearward and disengage them from the track.

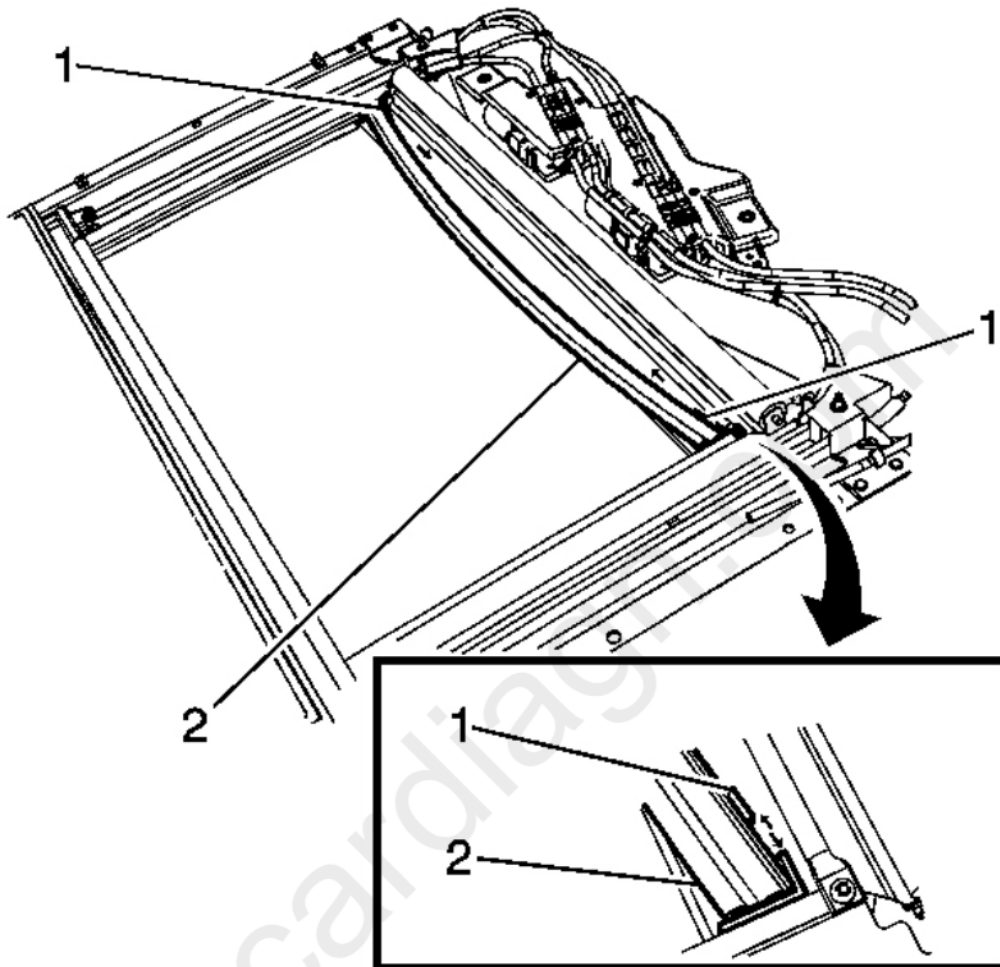


Fig. 25: View of Cable Guide and Cross Bar
Courtesy of GENERAL MOTORS CORP.

5. Release the cable guides tabs (1) located at each corner of the sunshade (2).
6. Allow the sunshade to return to a hard stop and release the tension.

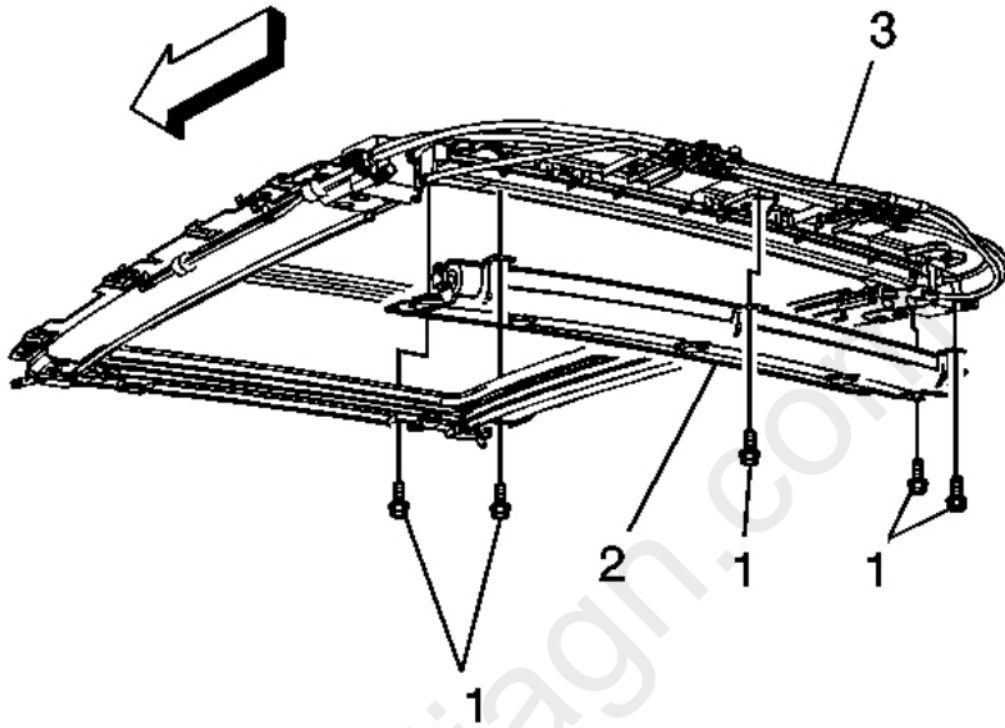


Fig. 26: View Of Sunshade Bracket, Sunroof Assembly & Screws
Courtesy of GENERAL MOTORS CORP.

7. Remove the screws (1) that retain the sunshade bracket (2) to the sunroof assembly (3).
8. Remove the sunshade with the sunshade bracket from the vehicle as a assembly.

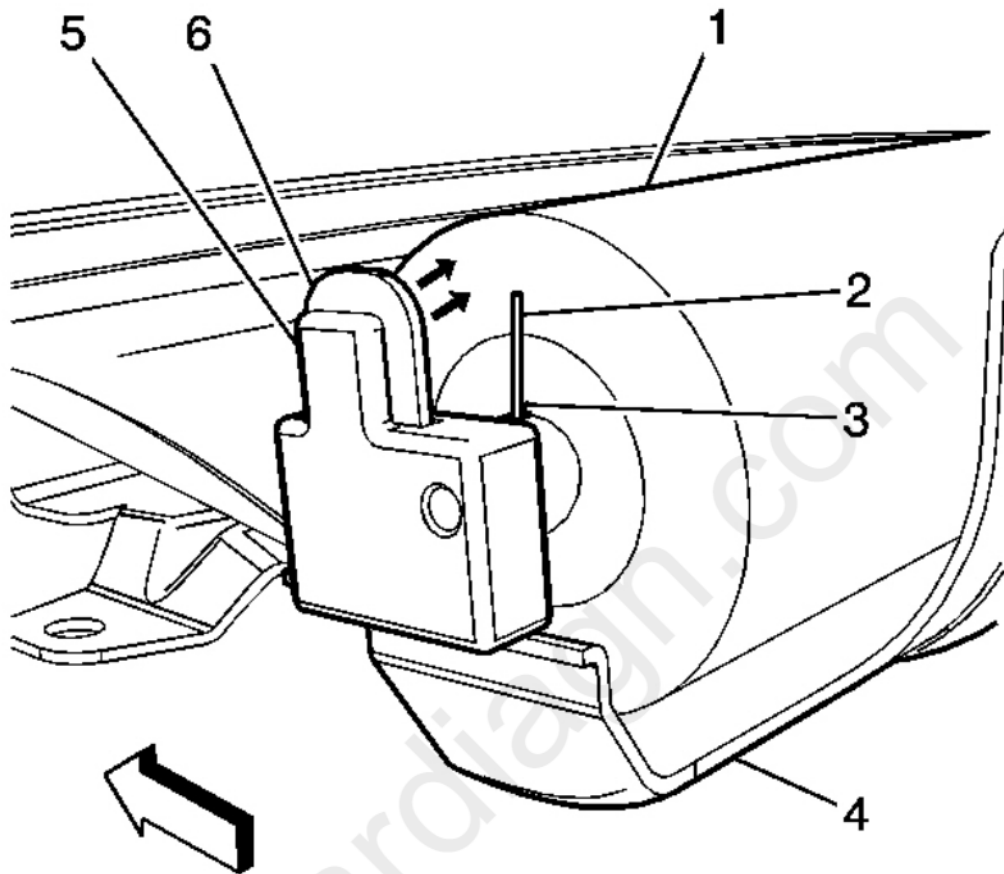


Fig. 27: View Of Sunshade Cam Locking Components
Courtesy of GENERAL MOTORS CORP.

NOTE: If the sunshade spring releases, it will be necessary to rewind it. Refer to step 2 in the install procedure.
A new service part sunshade comes pre-loaded with a pin tool holding spring tension on the sunshade. If the sunshade spring releases, it will be necessary to rewind it and reinstall the pin tool. Following installation procedure, retain the pin tool for future applications.

9. Move the sunshade (1) until the sunshade cam locking hole (2) come in to view.
10. Insert a suitable tool (3) into the sunshade cam locking hole.
11. Push inward on the end tab (4) releasing the sunshade end lock (5) from the sunshade bracket (6).

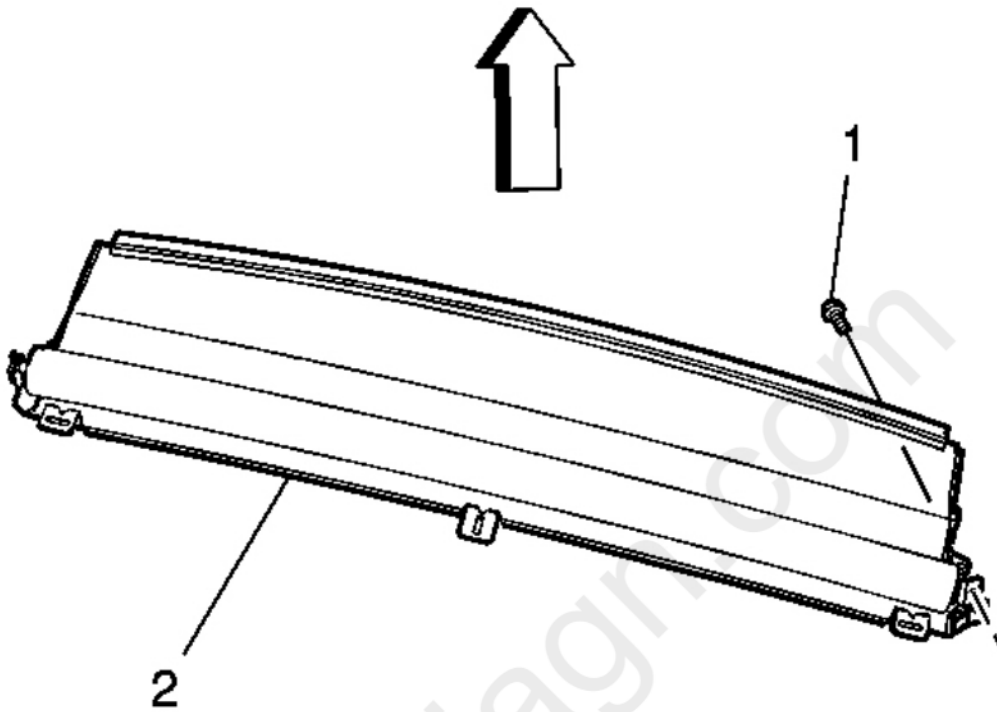


Fig. 28: View Of Sunshade Bracket Assembly
Courtesy of GENERAL MOTORS CORP.

12. Remove the screw (1) from the passengers side of the sunshade bracket (2).
13. Remove the sunshade from sunshade bracket.

Installation Procedure

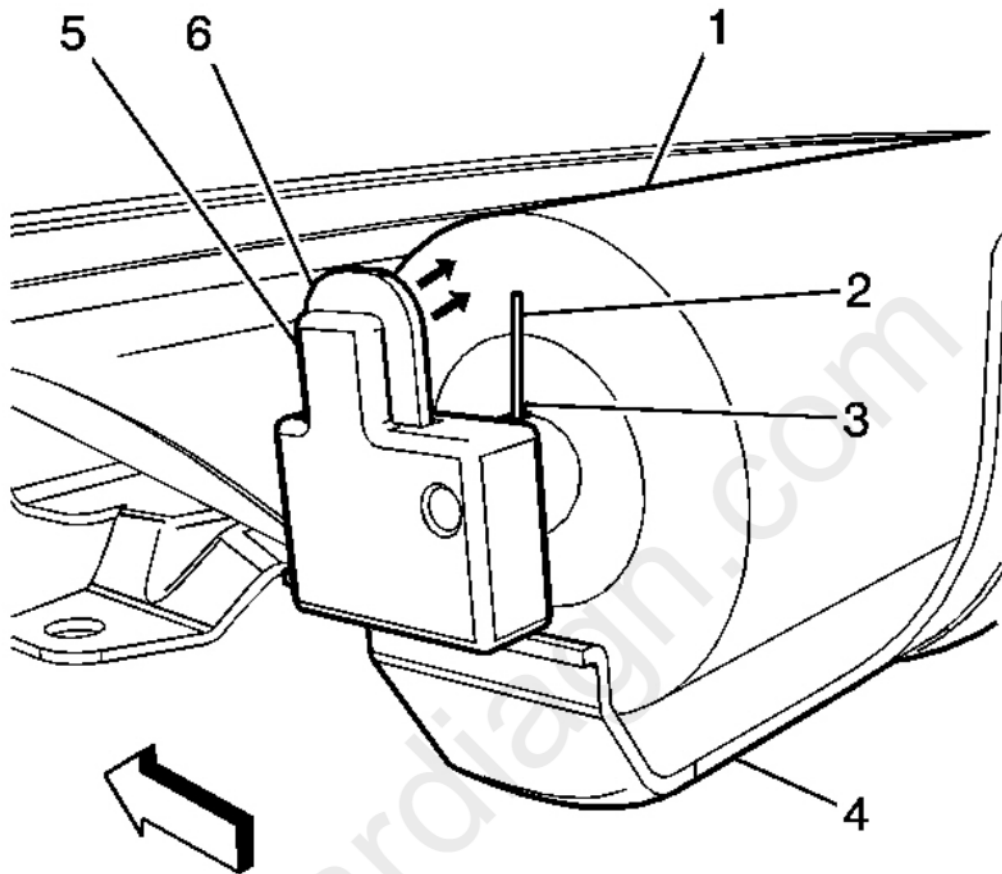


Fig. 29: View Of Sunshade Cam Locking Components
Courtesy of GENERAL MOTORS CORP.

NOTE: If the sunshade spring released turn the sunshade roller end slot 16 times in the counterclockwise direction. Insert a suitable tool into the sunshade cam locking hole.

1. Install the sunshade to the sunshade bracket by insert the end of the sunshade (1) to the driver side sunshade bracket (2), press downward until it lock in place.

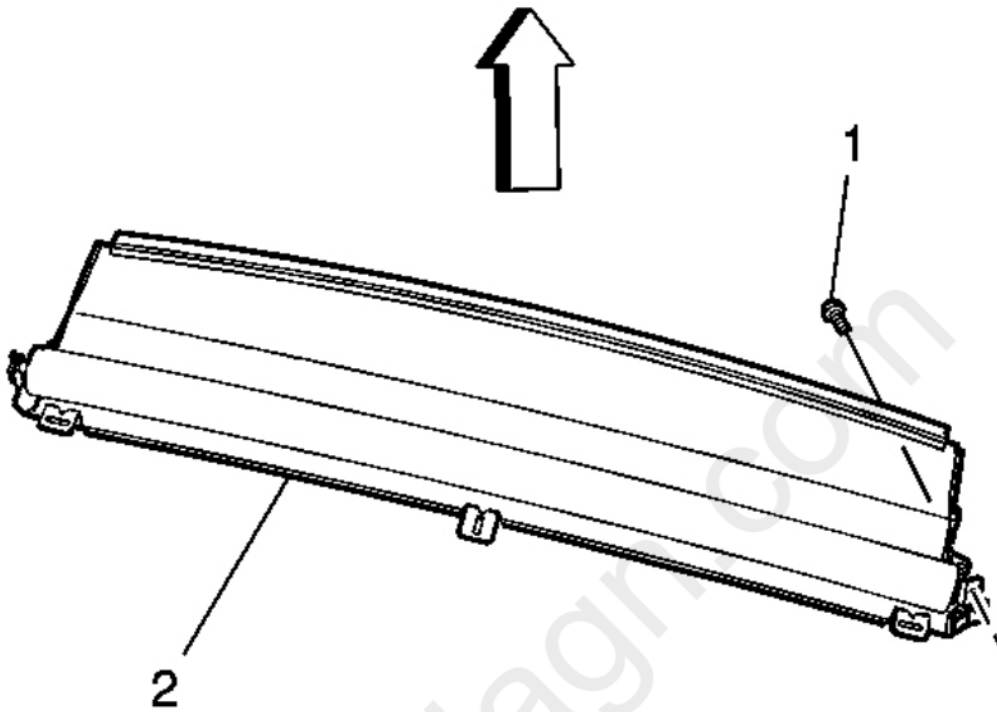


Fig. 3 : View Of Sunshade Bracket Assembly
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

2. Install the sunshade bracket screw (1) to the passengers side of the sunshade bracket (2) and tighten to N.m (80 lb in).
3. Remove the suitable tool from the sunshade cam locking hole.

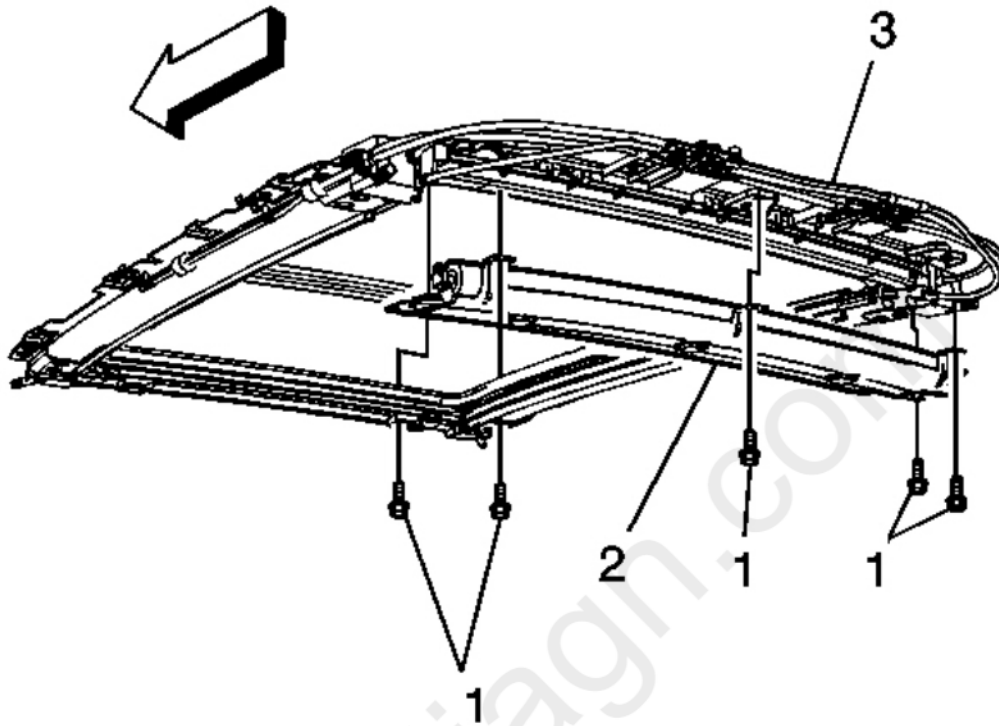


Fig. 3 : View Of Sunshade Bracket Sunroof Assembly & Screws
Courtesy of GENERAL MOTORS CORP.

4. Install the screws (1) that retain the sunshade bracket (2) to the sunroof assembly (3) and tighten to 10 N.m (80 lb in)

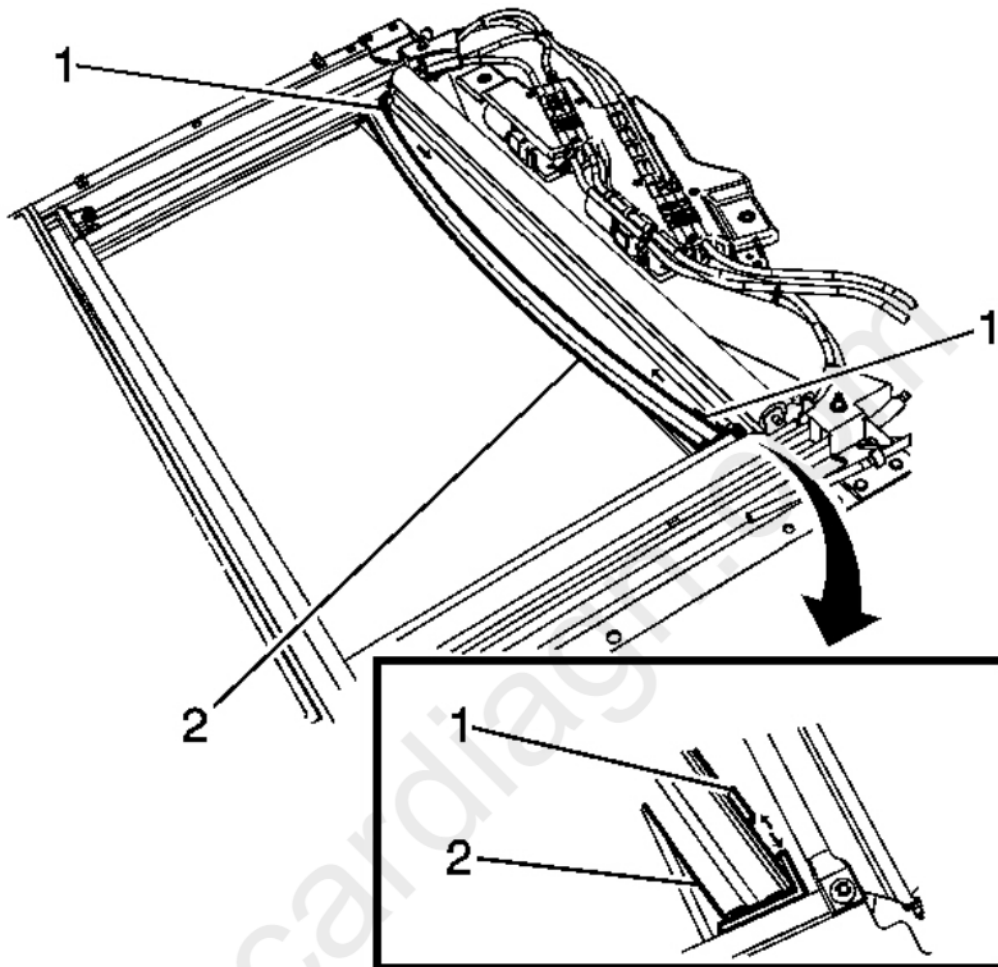


Fig. 3 : View of Cable Guide and Cross Bar
 Courtesy of GENERAL MOTORS CORP.

5. Install the cable guides tabs (1) located at each corner of the sunshade, lock in place.
6. Install the white plastic retainers, sliding the retainer over sunshade, lock in place.
7. Ensure that the sunshade cam is fully seated in the sunshade bracket and the sunshade slides smoothly.
8. Install the sunroof window. Refer to **Sunroof Window Replacement - Rear**.
9. Install the headliner. Refer to **Headlining Trim Panel Replacement With C3U** or **Headlining Trim Panel Replacement Without C3U**.
10. Verify the operation of the sunshade.

SUNROOF WINDOW SEAL REPLACEMENT - OUTER

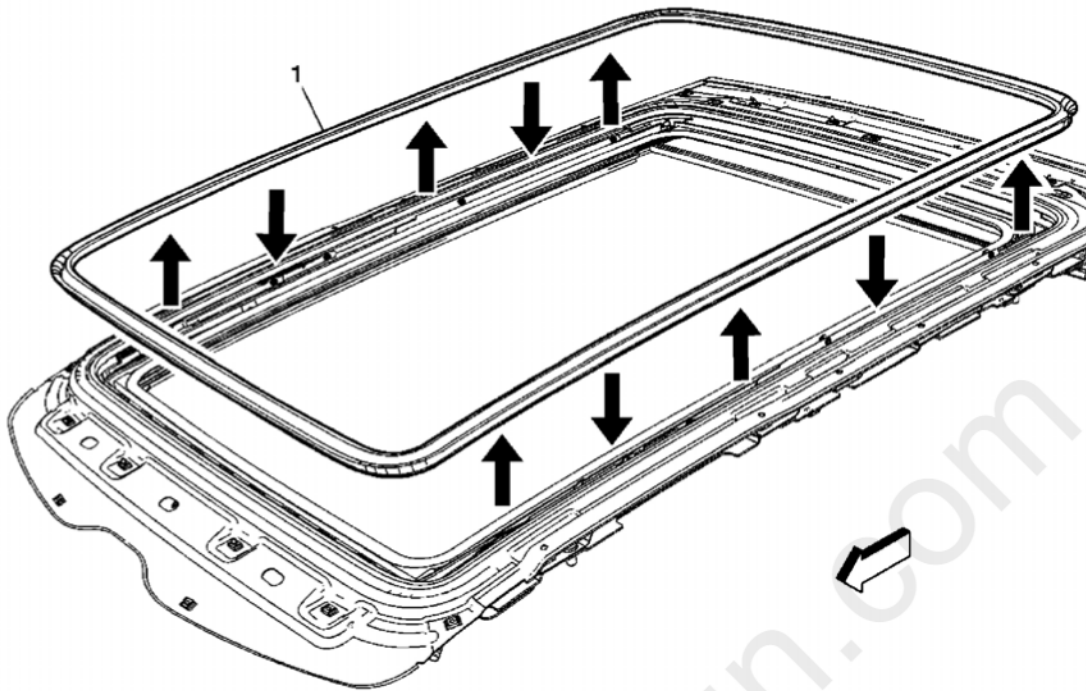


Fig. 33: View Of Sunroof Window Seal - Outer
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures	
1. Remove both sunroof windows. Refer to <u>Sunroof Window Replacement - Front</u> and <u>Sunroof Window Replacement - Rear</u>. 2. 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 <u>Headlining Trim Panel Replacement With C3U</u> or <u>Headlining Trim Panel Replacement Without C3U</u>. 3. Remove the sunroof module assembly. Refer to <u>Sunroof Module Assembly Replacement</u>.	
	Sunroof Window Seal
	Procedures
1	1. Start at one end of the seal, pulling up and away from the module. 2. Remove all traces of old sealer, clean around the edge of the inside surface of the module with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint-free cloth. 3. Water test the vehicle before installing the headliner.

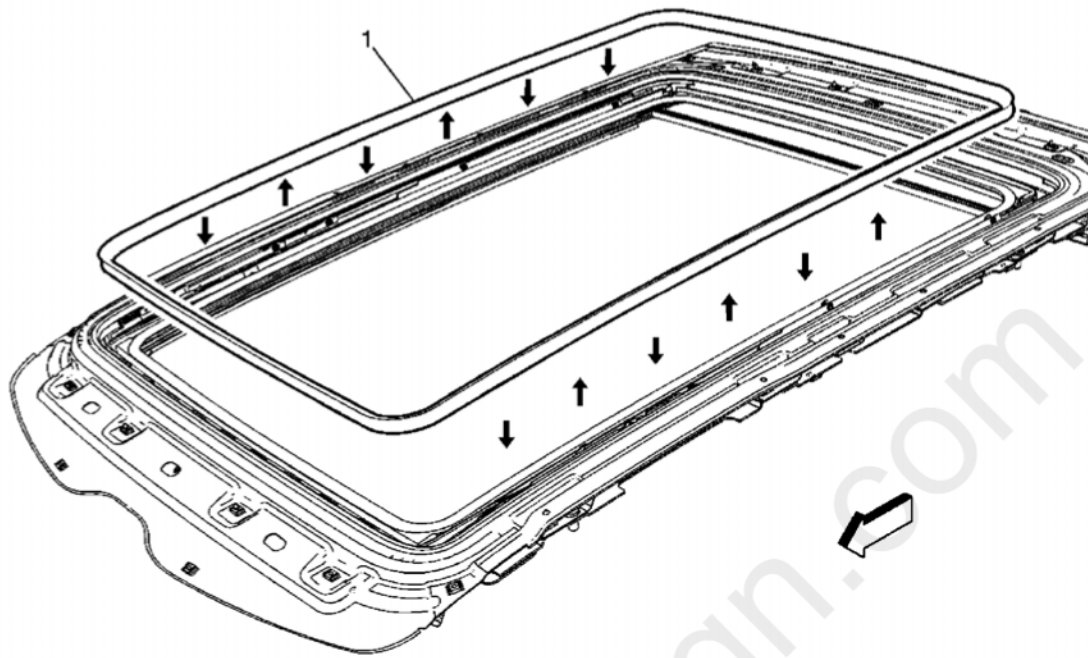
SUNROOF WINDOW SEAL REPLACEMENT - INNER

Fig. 3 : View Of Sunroof Window Seal - Inner
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove both sunroof windows. Refer to <u>Sunroof Window Replacement - Front</u> and <u>Sunroof Window Replacement - Rear</u> .	
1	Sunroof Window Seal Procedures 1. Start at one end of the seal, pulling up and away from the module. 2. Remove all traces of old sealer, clean around the edge of the inside surface of the module with a 50 50 mixture of isopropyl alcohol and water by volume on a dampened lint-free cloth. 3. Water test the vehicle before installing the headliner.

SUNROOF SUNSHADE SWITCH REPLACEMENT

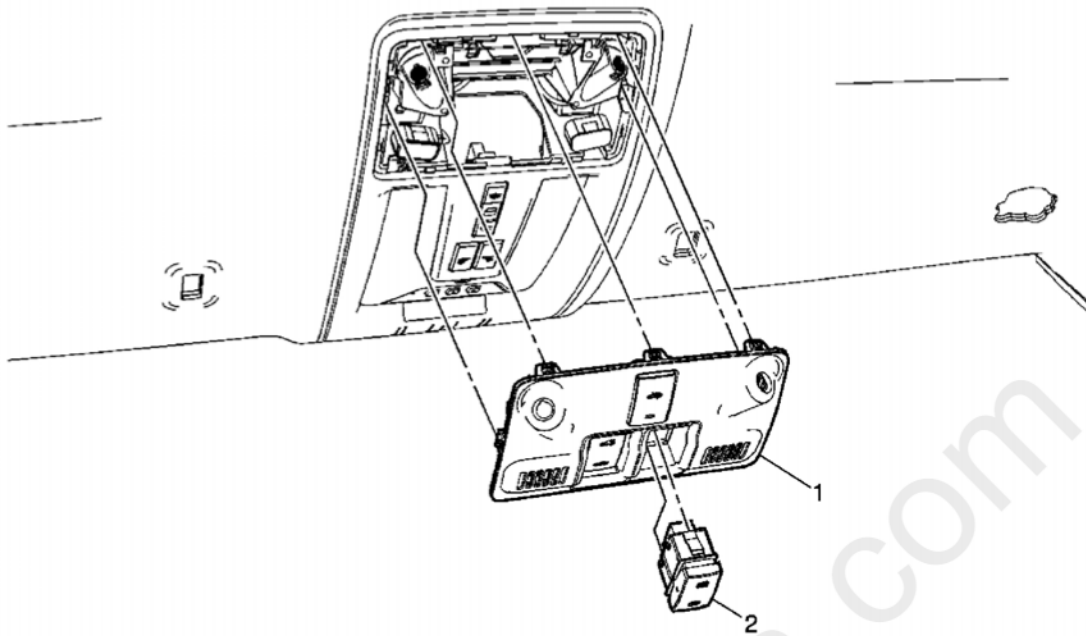
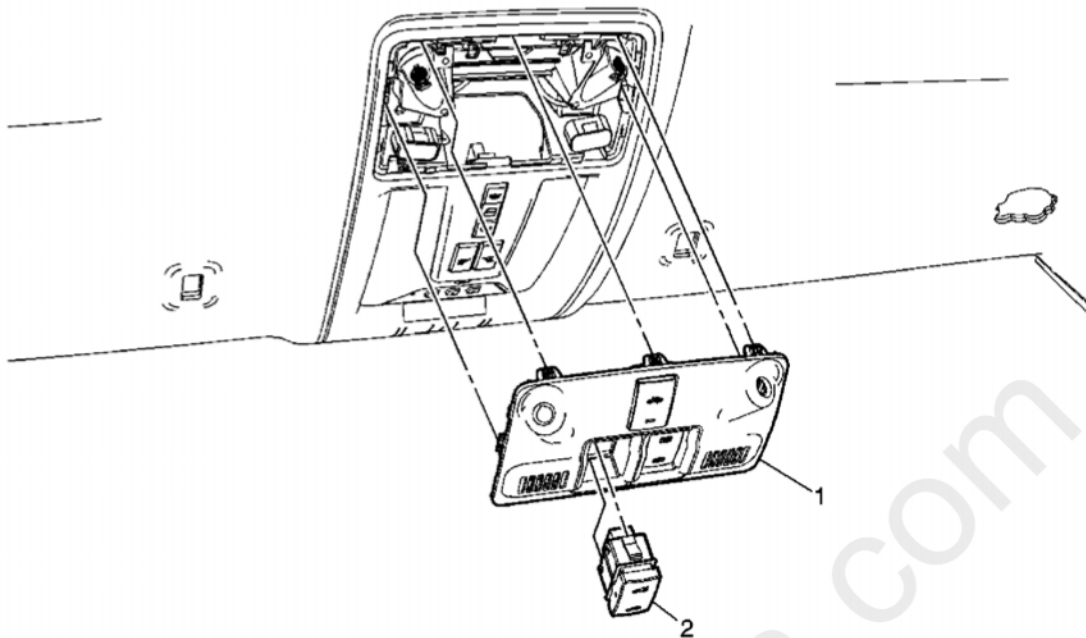


Fig. 35: Identifying Sunroof Sunshade Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Roof Console Opening Cover Procedure: Disconnect the electrical connectors.
2	Sunroof Sunshade Switch Procedure: Push in two tabs from the back of the cover and push forward through opening.

SUNROOF SWITCH REPLACEMENT

**Fig. 36: Identifying Sunroof Switch**

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Roof Console Opening Cover Procedure: Disconnect the electrical connectors.
2	Sunroof Switch Procedure: Push in two tabs from the back of the cover and push forward through opening.

SUNROOF WINDOW HEIGHT AND OPENING FIT ADJUSTMENT

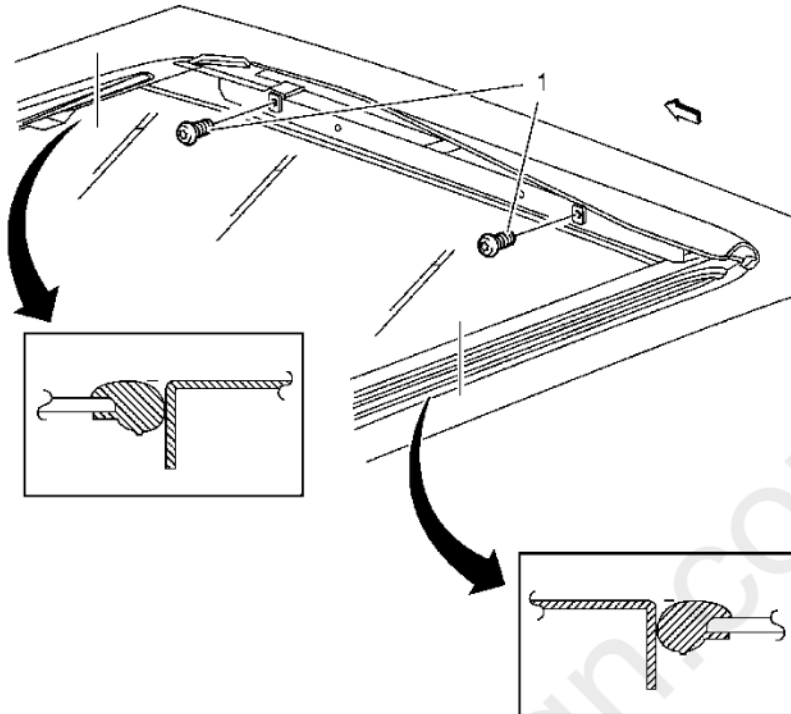


Fig. 37: Properly Adjusting Sunroof Window Height & Opening Fit
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunroof Window Fastener (Qty: 6) CAUTION: Refer to <u>Fastener Caution</u> . Procedures 1. Cycle the sunroof window from full open to closed position. 2. Pull down on the inner seal to expose the screws on both sides of the window. 3. Loosen the adjusting screws on the sunroof window. 4. Adjust the front of the sunroof window to 0.0-1.0 mm (0.0-0.04 in) below the top surface of the roof panel. 5. Adjust the rear center line of the sunroof window to 2-3 mm (0.08-0.12 in) below the top surface of the roof panel. 6. Cycle sunroof window through all positions. 7. Inspect the sunroof window adjustment. Adjust if necessary. 8. Water test the vehicle before installing the headliner. Tighten: 4 N.m (35 lb in)

SUNROOF WINDOW REPLACEMENT - FRONT

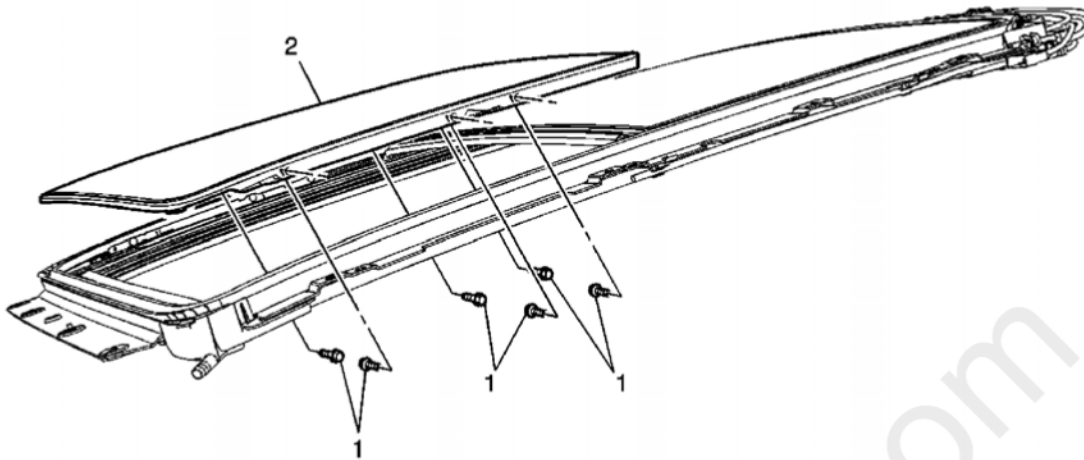


Fig. 38: View Of Sunroof Window - Front
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunroof Window Screws (Qty: 6) CAUTION: Refer to <u>Fastener Caution</u> . Procedures 1. Open the sunshade. 2. Open the sunroof window to the vent position. 3. Pull down on the inner seal to expose the screws on both sides of the window. 4. Remove the sunroof window bolts, three on each side. Tighten: 4 N.m (35 lb in)
2	Sunroof Window Procedures 1. Place the sunroof window on a soft surface. 2. Sunroof window height and opening fit adjustment. Refer to <u>Sunroof Window Height and Opening Fit Adjustment</u>. 3. Water test the vehicle before installing the headliner.

SUNROOF WINDOW REPLACEMENT - REAR

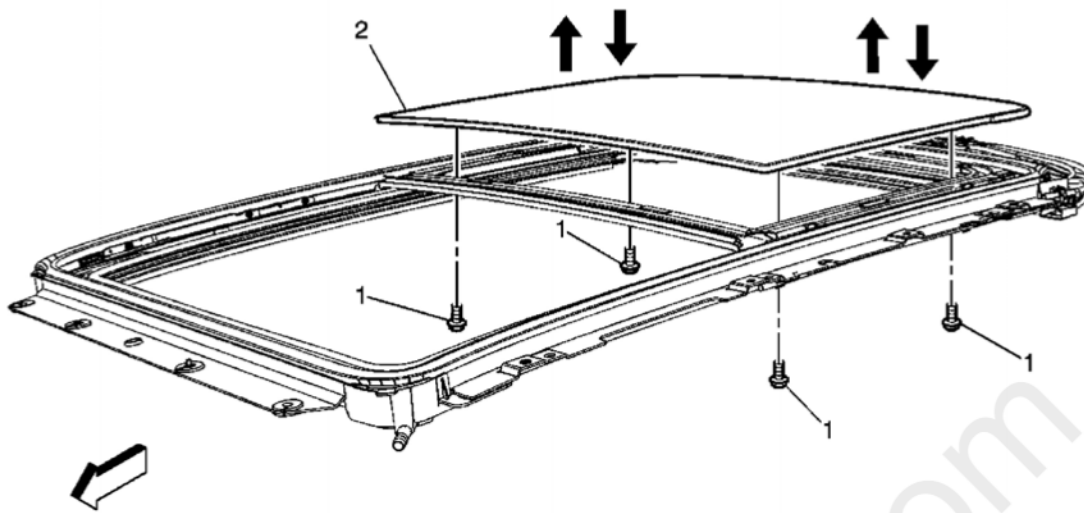


Fig. 39: View Of Sunroof Window - Rear
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunroof Window Screws (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Procedures 1. Open the sunshade. 2. Pull down on the inner seal to expose the screws on both sides of the window. 3. Remove the sunroof window bolts, two on each side. Tighten: 4 N.m (35 lb in)
2	Sunroof Window Procedure 1. Place the sunroof window on a soft surface. 2. Sunroof window height and opening fit adjustment. Refer to <u>Sunroof Window Height and Opening Fit Adjustment</u>.

DESCRIPTION AND OPERATION

SUNROOF DESCRIPTION AND OPERATION

The sunroof system consists of a moving glass panel and a 2nd fixed glass panel located just behind the moving

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glass panel. The moving glass component slides over the top of the fixed glass, and the roof panel. There is also a power roller sunshade which covers both glass panels. The electrical portion of the system controls the opening and closing of the sunroof glass and the power roller sunshade. The ignition must be in ON/RUN/START, ACC/ACCESSORY, or in retained accessory power (RAP) to operate the sunroof/sunshade.

The electrical portion of the spoiler sunroof system consists of:

- Body control module (BCM)
- Sunroof control module
- Sunshade control module
- Sunroof control switch assembly
- Sunshade control switch assembly

The BCM communicates with the sunroof glass and sunshade control module to enable or disable sunroof and sunshade operation. The sunroof/sunshade control modules provide system status and diagnostic information to the BCM for diagnostic reporting and operational purposes.

The sunroof glass and power sunshade are each controlled by its own integrated motor/controller containing the necessary electronics, motor, hall effect position sensors, as well as the interface to the driver control switches. Each motor/controller is capable of controlling motion based on control switch activation and message commands from the BCM.

There are times when the sunshade and sunroof operation are dependent on each other (see below). This dependency is controlled by the BCM.

Sunroof Glass and Sunshade Control Switches

The sunroof and sunshade control switches are connected directly to their respective controllers and provide positions for open, express open, off, close, and express close. The control switch completes the circuit between two signals provided by the control module, a reference ground input and a pull-up voltage.

System Protection Functions

Normal operation of the sunroof system may be altered by one of the following events.

Obstacle or Blockage Detection

When enabled, obstacle detection is active only while the sunroof or sunshade opening is approximately 4-200 mm (0.16-7.87 in) when moving in the closing direction. When an obstacle is detected in this range, the motion in the closing direction will stop and the sunroof/sunshade will reverse direction for a short distance. The reversal shall complete regardless of operating Mode. If the travel is outside the range defined above, the sunroof/sunshade will try to continue closing until it detects a motor stall condition or the system is at one of its defined stops.

Motor Stall

If the sunroof or sunshade is moving in the open or close direction and stops moving for 350 ms while a

command is active, and no obstacle has been detected, the motor shall be turned off to prevent overheating.

Sunroof System Thermal Protection

The sunroof/sunshade controllers have a thermal protection algorithm to protect the sunroof/sunshade controls and motors from damage due to overheating conditions resulting from immoderate switch actuations. The thermal protection algorithm will cause any new sunroof/sunshade open commands to be ignored until the motors are allowed to cool. A number of close requests during an over temperature condition will be allowed. If the thermal protection is triggered during an obstacle detection event, the sunroof/sunshade reversal shall be finished.

Coordination between Sunshade and Sunroof

There is an interaction between the sunshade and sunroof operation. The system master (BCM) will command the sunshade to open to predefined positions based on the requested sunroof position. This interaction may also prohibit the sunshade from closing past these points depending on the sunroof position.

Opening

If the Sunroof is opened anywhere between the fully closed and vent position, the BCM will command the sunshade to a minimum open position provided that the sunshade is opened less than this amount at the time of the sunroof command. If the sunroof receives an Open or Express Open command taking the sunroof past the vent position, the BCM will command the sunshade to open approximately half-way if the sunshade is opened less than this amount at the time of the sunroof command. This position corresponds to a point behind the leading edge of a fully opened sunroof glass.

Closing

Only if the sunroof is fully closed will the sunshade be allowed to fully close with a normal close or express close command. If the sunroof is opened past the vent position, the sunshade will not be allowed to close past the half way point mentioned above with either a normal close or express close command. If the sunroof is not fully closed but is open less than or at the vent position, the sunshade will not close past the minimum open position mentioned above with either a normal close or express close.

Sunroof Disabled with Sunshade Faults

When there is interaction between the sunroof and sunshade the sunroof shall be disabled if the sunroof is fully closed and any of the following sunshade faults are reported:

- Motor fault
- Sensor fault
- Thermal protection is active
- Sunshade not normalized
- Sunshade not configured
- Application failed

Service Tool Commanded Open

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When a service tool commands the sunshade open, it results in the Sunshade going to half way point mentioned above or to the fully open depending on the calibration. If the half way point is calibrated on, this position is as far as the sunshade can be opened with the service tool. To go beyond this point a switch activation must be used.

Sunroof Operation

Open to Vent Position

When the position of the sunroof is less than the defined vent position, activating the sunroof Open switch for less than 500 ms results in the sunroof moving until it reaches the vent position.

Normal Open (Non-Express)

When the sunroof switch is held in the Open position, the sunroof begins opening. As long as the switch is continuously held in the Open state the sunroof will not stop in the vent position.

Sunroof Express Open

Press and release the sunroof switch Open position, the Sunroof will Express Open until the controller determines the Sunroof has reached the Comfort Stop position or the Fully Open position.

Normal Close (Non-Express)

When the sunroof switch is in the Close state, the sunroof will begin moving in the closed direction.

Sunroof Express Close

Press and release the sunroof switch Close position, the Sunroof will express close until the controller determines the sunroof has reached the fully closed position.

Sunshade Operation

Sunshade Normal Open (Non-Express)

When the sunshade switch is held in the Open position, the sunshade begins opening.

Sunshade Express Open

Press and release the sunshade switch Open position, the sunshade will express open until the controller determines the sunshade has reached the fully open position.

Sunshade Normal Close (Non-Express)

When the sunshade switch is in the Close state, the sunshade will begin moving in the closed direction.

Sunshade Express Close

Press and release the sunshade switch Close position, the sunshade will express close until the controller

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determines the sunshade has reached the fully closed position.

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