

2018 ACCESSORIES & EQUIPMENT

Sunroof - Equinox & Terrain

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE:

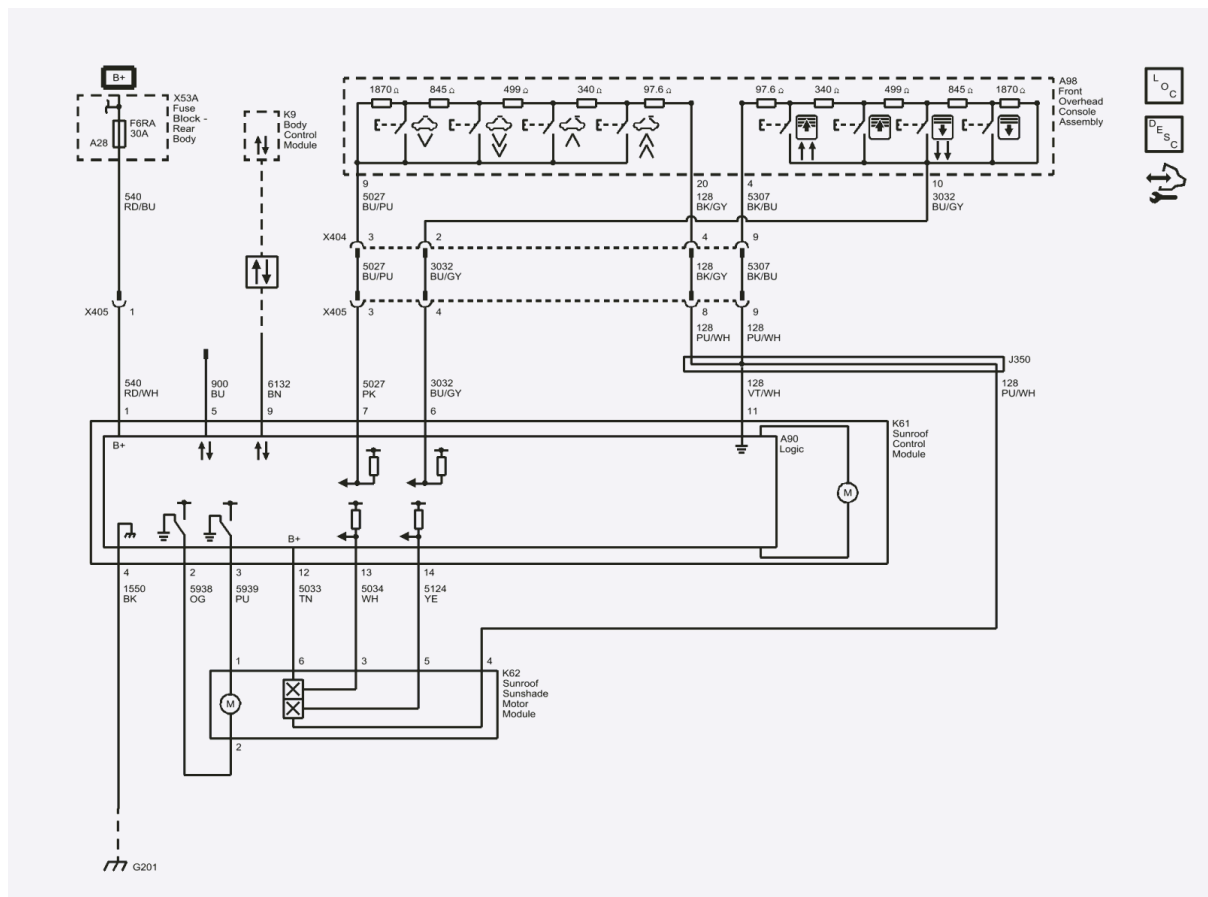
All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Roof Stationary Window Screw	1.5 N.m (13 lb in)
Sunroof Housing Bolt	9 N.m (80 lb in)
Sunroof Sunshade Bracket Screw	2.5 N.m (22 lb in)
Sunroof Sunshade Motor Bolt	5 N.m (44 lb in)
Sunroof Sunshade Screw	2.5 N.m (22 lb in)
Sunroof Sunshade Side Housing Bracket Bolt	2.5 N.m (22 lb in)
Sunroof Window Motor Bolt	4 N.m (35 lb in)
Sunroof Window Screw	1.5 N.m (13 lb in)

SCHEMATIC WIRING DIAGRAMS

SUNROOF WIRING SCHEMATICS

Power Sunroof (C3U)



DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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.

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B3664 02

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

B3664 05

The sunroof module has detected and reported via the serial data 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 serial data 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 Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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 sunroof switch, perform the component testing before beginning the Circuit/System Testing.

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 20 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the K62 Sunroof Sunshade Motor Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Test for 4.5 - 5.5 V between the 5 V reference circuit terminal 9 and ground.
 - **If less than 4.5 V**
 1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance
3. Test for less than 2 Ω in the 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K62 Sunroof Sunshade Motor Module.
 - **If greater than 5.5 V**
 1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K62 Sunroof Sunshade Motor Module.
 - **Go to next step: If between 4.5 - 5.5 V**
5. Test or replace the A98 Front Overhead Console Assembly.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the diagnostic procedure.

- Refer to [Roof Console Replacement](#)
- Refer to [Control Module References](#) for sunroof motor/actuator replacement, programming and setup

DTC B3697: SUNROOF ACTUATOR 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B3697

Sunroof Actuator Malfunction

For symptom byte information, refer to [Symptom Byte List](#) .

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 serial data message commands from the body control module (BCM).

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B3697 00

The sunroof motor has detected and reported via serial data that the sunroof actuator has a malfunction.

B3697 39

The sunroof motor has detected and reported via serial data that the sunroof actuator has an internal malfunction.

B3697 42

The sunroof motor has detected and reported via serial data that the sunroof actuator is not programmed.

B3697 4B

The sunroof motor has detected and reported via serial data 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 Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC B3697 42 or DTC B3697 4B is not set.
 - **If DTC B3697 42 or DTC B3697 4B is set**
 1. Calibrate the K61 Sunroof Control Module. Refer to **Sunroof Motor/Actuator Initialization/Teach Process.**
 2. Verify DTC B3697 42 or DTC B3697 4B does not set while operating the sunroof.
 - **If DTC B3697 42 or DTC B3697 4B sets**

Replace the K61 Sunroof Control Module.
 - **Go to next step: If DTC B3697 42 or DTC B3697 4B does not set**
3. All OK.
 - **Go to next step: If DTC B3697 42 or DTC B3697 4B is not set**
3. Verify DTC B3697 00 or DTC B3697 39 is not set
 - **If DTC B3697 00 or DTC B3697 39 is set**

Replace the K61 Sunroof Control Module.
 - **Go to next step: If DTC B3697 00 or DTC B3697 39 is not set**

4. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

Refer to [Sunroof Window Motor Replacement](#)

DTC B369B: POWER SUNSHADE/SUNROOF 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Sunshade Motor Close Control	2	2	2	-
Sunshade Motor Open Control	2	2	2	-
Sunshade Switch Low Reference	-	1	-	-
Sunroof Sunshade Motor Ground	-	1	-	-
1. Power Sunshade Malfunction 2. Power Sunroof Malfunction				

Circuit/System Description

The sunshade electrical system uses a master/slave configuration utilizing a serial data based system for communication. The body control module (BCM) is designated as the master, while the sunshade control modules is configured as the slave.

As the system master, the BCM uses the serial data communication bus to enable or disable sunshade operation, communicate vehicle information to each controller, and request sunshade movement. The sunshade control module provides system status and diagnostic information to the BCM for diagnostic reporting and operational purposes. The control switches 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.

Reference Information

Schematic Reference

[Sunroof Wiring Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

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. Perform the sunroof motor initialization procedure. Refer to [Sunroof Motor/Actuator Initialization/Teach Process](#).
2. Ignition ON.
3. Verify the scan tool Sunroof/Sunshade Switch parameter changes from Inactive to Open, Express Open, Close and Express Close when pressing the A98 Front Overhead Console Assembly.
 - **If the sunshade switch parameter does not change**
Refer to Circuit/System Testing - Sunshade Switch Malfunction
 - **Go to next step: if sunshade switch parameter does change**
4. Command the sunroof to OPEN and CLOSE by pressing the appropriate switch on the A98 Front Overhead Console Assembly.
 - **If the sunshade does not OPEN or CLOSE**
Refer to Circuit/System Testing - Sunshade Malfunction.
 - **Go to next step: If the sunshade opens and closes to the vent position**
5. Verify the sunroof will OPEN and CLOSE when commanding the sunroof motor Open/Close with a scan tool.
 - **If the sunroof motor does not OPEN or CLOSE**
Refer to Circuit/System Testing - Sunshade Malfunction.
 - **Go to next step: If the sunroof motor does OPEN and CLOSE**
6. All OK.

Circuit/System Testing

Sunshade Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly. It may take up to 2 minutes for all vehicle systems to power down.

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

2. Test for less than 10 Ω between the low reference circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the K62 Sunroof Sunshade Motor Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Test for 4.5 - 5.5 V between the 5 V reference circuit terminal 10 and ground.
 - **If less than 4.5 V**
 1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module.

2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in the 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K62 Sunroof Sunshade Motor Module.
- **If greater than 5.5 V**
 1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K62 Sunroof Sunshade Motor Module.
- **Go to next step: If between 4.5 - 5.5 V**
5. Test or replace the A98 Front Overhead Console Assembly.

Power Sunshade Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 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**
 1. Ignition OFF.
 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 K62 Sunroof Sunshade Motor Module.
 - **Go to next step: If the test lamp illuminates**

NOTE: Sunroof must be completely closed and latched prior to performing test

5. Verify the test lamp turns ON and OFF when pressing the sunshade OPEN switch on the A98 Front Overhead Console Assembly.
 - **If the test lamp remains OFF**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuits end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K62 Sunroof Sunshade Motor Module.
- **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module, ignition ON.
 2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K62 Sunroof Sunshade Motor Module.
- **Go to next step: If the test lamp turns ON and Off**
- 6. Replace the K62 Sunroof Sunshade Motor Module.

Component Testing

Sunroof Switch

1. Ignition OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly.
2. Test for infinite resistance between the control circuit terminal 10 and the low reference terminal 4.
 - **If less than infinite resistance**
Replace the A98 Front Overhead Console Assembly.
 - **Go to next step: If infinite resistance**
3. Test for less than 5 Ω between the control terminals listed below and the low reference terminal 4 with the switch in the appropriate position.
 - A98 Front Overhead Console Assembly terminal 10, sunshade switch OPEN position
 - A98 Front Overhead Console Assembly terminal 10, sunshade switch CLOSE position
 - **If not less than 5 Ω**
Replace the A98 Front Overhead Console Assembly.
 - **Go to next step: If less than 5 Ω**
4. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Refer to [Roof Console Replacement](#)
- Refer to [Sunroof Sunshade Motor Replacement](#)
- Refer to [Control Module References](#) for sunroof control module replacement, programming and setup

DTC B369D: SUNROOF SUNSHADE ACTUATOR

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

DTC Descriptors

DTC B369D 00

Sunroof Sunshade Actuator Malfunction

DTC B369D 39

Sunroof Sunshade Actuator Internal Malfunction

DTC B369D 42

Sunroof Sunshade Actuator Calibration Not Programmed

DTC B369D 4B

Sunroof Sunshade Actuator Calibration Not Learned

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 serial data message commands from the body control module (BCM).

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

B369D 00

The sunshade module has detected and reported via serial data that the sunshade actuator has an malfunction.

B369D 39

The sunshade module has detected and reported via serial data that the sunshade actuator has an internal malfunction.

B369D 42

The sunshade module has detected and reported via serial data that the sunshade actuator calibration is not programmed.

B369D 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 Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

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. Ignition ON.
2. Verify DTC B369D 42 or DTC B369D 4B is not set.
 - **If DTC B369D 42 or DTC B369D 4B is set**
 1. Calibrate the K62 Sunroof Sunshade Motor Module. Refer to [Sunroof Motor/Actuator Initialization/Teach Process](#).
 2. Verify DTC B369D 42 or DTC B369D 4B does not set while operating the sunroof.
 - If DTC B369D 42 or DTC B369D 4B sets, replace the K62 Sunroof Sunshade Motor Module.
 - If DTC B369D 42 or DTC B369D 4B does not set
 - 3. All OK.
3. Verify DTC B369D 00 or DTC B369D 39 is not set
 - If DTC B369D 00 or DTC B369D 39 is set, replace the K62 Sunroof Sunshade Motor Module.
 - If DTC B369D 00 or DTC B369D 39 is not set
4. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the diagnostic procedure.

- Refer to [Sunroof Sunshade Motor Replacement](#)
- Refer to [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 symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to [Testing for Intermittent Conditions and Poor Connections](#).

Power Sunroof Malfunction**Power Sunshade Malfunction****POWER SUNROOF 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.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Serial Data	2	2	2	-
Sunroof Switch Signal	B3664 02	B3664 05	B3664 05	-
Sunroof Motor Close Control	2	2	2	-
Sunroof Motor Open Control	2	2	2	-
Sunroof Motor Low Reference	-	1	-	-
Sunroof Motor Ground	-	1	-	-
1. Power Sunshade Malfunction 2. Power Sunroof Malfunction				

Circuit/System Description

The sunroof electrical system uses a master/slave configuration utilizing a serial data based system for communication. The body control module (BCM) is designated as the master, while the sunroof control modules is configured as the slave.

As the system master, the BCM uses the serial data communication bus to enable or disable sunshade operation, communicate vehicle information to each controller, and request sunroof movement. The sunroof e control module provides system status and diagnostic information to the BCM for diagnostic reporting and operational purposes. The control switches 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.

Reference Information

Schematic Reference

Sunroof Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

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

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Perform the sunroof motor initialization procedure. Refer to [Sunroof Motor/Actuator Initialization/Teach Process](#).
2. Ignition ON.
3. Verify the scan tool Sunroof Switch parameter changes from Inactive to Open, Express Open, Close and Express Close when pressing the A98 Front Overhead Console Assembly.
 - **If the sunroof switch parameter does not change**

Refer to Circuit/System Testing - Sunroof Switch Malfunction
 - **Go to next step: If the sunroof switch parameter does change**
4. Command the sunroof to OPEN and CLOSE by pressing the appropriate switch on the A98 Front Overhead Console Assembly.
 - **If the sunroof does not OPEN or CLOSE**

Refer to Circuit/System Testing - Power Sunroof Malfunction.
 - **Go to next step: If the sunroof opens and closes to the vent position**
5. Verify the sunroof will OPEN and CLOSE when commanding the sunroof motor Open/Close with a scan tool.
 - **If the sunroof motor does not OPEN or CLOSE**

Refer to Circuit/System Testing - Power Sunroof Malfunction.
 - **Go to next step: If the sunroof motor does OPEN and CLOSE**
6. All OK.

Circuit/System Testing

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

Sunroof Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the K61 Sunroof Control Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Test for 4.5 - 5.5 V between the 5 V reference circuit terminal 10 and ground.
 - **If less than 4.5 V**
 1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.
 2. Test for infinite resistance between the 5 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.

- If less than 2 Ω , replace the K61 Sunroof Control Module.
- **If greater than 5.5 V**
 1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K61 Sunroof Control Module.
 - **Go to next step: If between 4.5 - 5.5 V**
- 5. Test or replace the A98 Front Overhead Console Assembly.

Power Sunroof Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K61 Sunroof Control Module. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 4 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 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**
 1. Ignition OFF.
 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.
 - **Go to next step: If the test lamp illuminates**
5. Test for less than 1 V between the signal circuit terminal 6 and ground.
 - **If 1 V or greater**
Repair the short to voltage on the signal circuit.
 - **Go to next step: If less than 1 V**
6. Ignition OFF.
7. Test for infinite resistance between the signal circuit terminal 6 and ground:
 - **If less than infinite resistance**
Repair the short to ground on the signal circuit
 - **Go to next step: If infinite resistance**
8. Disconnect the harness connector at the K61 Sunroof Control Module.
9. Test for less than 5 Ω between the circuit terminals listed below:
 - A98 Front Overhead Console Assembly terminal 10 and K61 Sunroof Control Module terminal 6
 - **If greater than 5 Ω**

Repair the open/high resistance in the circuit.

- **Go to next step: If less than 5 Ω**

10. Replace the K61 Sunroof Control Module.

Component Testing

Sunroof Switch

1. Ignition OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly.
2. Test for infinite resistance between the control circuit terminal 10 and the low reference terminal 4.

- **If less than infinite resistance**

Replace the A98 Front Overhead Console Assembly.

- **Go to next step: If infinite resistance**

3. Test for less than 5 Ω between the control terminals listed below and the low reference terminal 4 with the switch in the appropriate position.

- A98 Front Overhead Console Assembly terminal 10, sunroof switch CLOSE position
- A98 Front Overhead Console Assembly terminal 10, sunroof switch OPEN position
- **If not less than 5 Ω**

Replace the A98 Front Overhead Console Assembly.

- **Go to next step: If less than 5 Ω**

4. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Refer to [Roof Console Replacement](#)
- Refer to [Sunroof Window Motor Replacement](#)
- Refer to [Sunroof Sunshade Motor Replacement](#)
- Refer to [Control Module References](#) for sunroof control module replacement, programming and setup

POWER 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Sunshade Position Sensor 12 V Reference Voltage	1	1	-	-
Sunshade Switch Signal	B369B 02	B369B 05	B369B 05	-
Sunshade Position Sensor 1 Signal	1	1	1	-
Sunshade Position Sensor 2 Signal	1	1	1	-
Sunshade Motor Close Control	2	2	2	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Sunshade Motor Open Control	2	2	2	-
Sunshade Switch Low Reference	-	1	-	-
Sunroof Motor Ground	-	1	-	-
1. Power Sunshade Malfunction 2. Power Sunroof Malfunction				

Circuit/System Description

The sunshade electrical system uses a master/slave configuration utilizing a serial data based system for communication. The body control module (BCM) is designated as the master, while the sunshade control modules are configured as the slave.

As the system master, the BCM uses the serial data communication bus to enable or disable sunshade operation, communicate vehicle information to each controller, and request sunshade movement. The sunshade control module provides system status and diagnostic information to the BCM for diagnostic reporting and operational purposes. The control switches place 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.

Diagnostic Aids

- The sunshade glass is controlled by an integrated motor/controller containing the motor, electronics, and position sensors. If the motor and sunshade mechanism get out of sync the sunshade may operate erratically. To re-synchronize the motor and sunshade mechanism, perform the [Sunroof Motor/Actuator Initialization/Teach Process](#).
- The sunshade control module provides obstacle/blockage detection. If the [Sunroof Motor/Actuator Initialization/Teach Process](#) is not carried out completely, the sunshade may stop and reverse slightly when it gets to the location where it needs to push down the windscreen. Make sure to complete the process.

Reference Information

Schematic Reference

[Sunroof Wiring Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

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. Perform the sunroof motor initialization procedure. Refer to [Sunroof Motor/Actuator Initialization/Teach Process](#).

2. Ignition ON.

3. Verify the scan tool Sunroof/Sunshade Switch parameter changes from Inactive to Open, Express Open, Close and Express Close when pressing the A98 Front Overhead Console Assembly.

- **If the sunshade does not open and close**

Refer to Circuit/System Testing - Sunshade Switch Malfunction

- **Go to next step: If the sunshade opens and closes**

4. Command the sunroof to OPEN and CLOSE by pressing the appropriate switch on the A98 Front Overhead Console Assembly.

- **If the sunshade does not open or close**

Refer to Circuit/System Testing - Sunshade Malfunction.

- **Go to next step: If the sunshade opens and closes to the vent position**

5. Verify the sunroof will OPEN and CLOSE when commanding the sunroof motor Open/Close with a scan tool.

- **If the sunroof motor does not OPEN or CLOSE**

Refer to Circuit/System Testing - Sunshade Malfunction.

- **Go to next step: If the sunroof motor does OPEN and CLOSE**

6. All OK.

Circuit/System Testing

Sunshade Switch Malfunction

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

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 10 Ω between the low reference circuit terminal 20 and ground.

- **If 10 Ω or greater**

1. Ignition OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module.

2. Test for less than 2 Ω in the low reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , test or replace the K62 Sunroof Sunshade Motor Module.

- **Go to next step: If less than 10 Ω**

3. Ignition ON.

4. Test for less than 1 V between the signal circuit terminal 5 and ground.

5. Test or replace the A98 Front Overhead Console Assembly.

- **If 1 V or greater**

Repair the short to voltage on the signal circuit.

- **Go to next step: If less than 1 V**

6. Ignition OFF.

7. Test for infinite resistance between the signal circuit terminal 5 and ground:

- **If less than infinite resistance**

Repair the short to ground on the signal circuit

- **Go to next step: If infinite resistance**

8. Disconnect the harness connector at the K61 Sunroof Control Module.

9. Test for less than 5 Ω between the circuit terminals listed below:

- A98 Front Overhead Console Assembly terminal 20 and K61 Sunroof Control Module terminal 5.
- **If greater than 5 Ω**

Repair the open/high resistance in the circuit.

- **Go to next step: If less than 5 Ω**

10. Replace the K61 Sunroof Control Module.

Power Sunshade Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K62 Sunroof Sunshade Motor Module. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 10 Ω between the low reference circuit terminal 4 and ground.

- **If 10 Ω or greater**

1. Ignition OFF.

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.

- **Go to next step: If less than 10 Ω**

3. Ignition ON.

4. Test for greater than 11 V between the 12 V reference circuit terminal 6 and ground.

- **If 11 V or less**

1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.

2. Test for infinite resistance between the 12 V reference circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the 12 V reference circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K61 Sunroof Control Module.

- **Go to next step: If greater than 11 V**

5. Test for greater than 11 V between the Position Sensor Signal 1 circuit terminal 3 and ground.

- **If 11 V or less**

1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.

2. Test for infinite resistance between the Position Sensor Signal 1 circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the Position Sensor Signal 1 circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K61 Sunroof Control Module.

- **Go to next step: If greater than 11 V**

6. Test for greater than 11 V between the Position Sensor Signal 2 circuit terminal 5 and ground.

- **If 11 V or less**

1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.

2. Test for infinite resistance between the Position Sensor Signal 2 circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance

3. Test for less than 2 Ω in the Position Sensor Signal 2 circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K61 Sunroof Control Module.
 - **Go to next step: If greater than 11 V**
7. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.
 8. Connect a test lamp between the control circuit terminal 1 and control circuit terminal 2, ignition ON.

NOTE: Sunroof must be completely open prior to performing test

9. Verify the test lamp turns ON and OFF when pressing the sunshade CLOSE switch on the A98 Front Overhead Console Assembly.
 - **If the test lamp remains OFF**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K61 Sunroof Control Module.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K61 Sunroof Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K61 Sunroof Control Module, ignition ON.
 2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K61 Sunroof Control Module.
 - **Go to next step: If the test lamp turns ON and Off**

NOTE: Sunroof must be completely closed and latched prior to performing test

10. Verify the test lamp turns ON and OFF when pressing the sunshade OPEN switch on the A98 Front Overhead Console Assembly.
 - **If the test lamp remains OFF**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K61 Sunroof Control Module.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuits end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K61 Sunroof Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K61 Sunroof Control Module, ignition ON.
 2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K61 Sunroof Control Module.
 - **Go to next step: If the test lamp turns ON and Off**
11. Replace the K61 Sunroof Control Module.

1. Ignition OFF, disconnect the harness connector at the A98 Front Overhead Console Assembly.
2. Test for infinite resistance between the control terminals listed below and the low reference terminal 4.
 - A98 Front Overhead Console Assembly terminal 9
 - A98 Front Overhead Console Assembly terminal 10
 - **If less than infinite resistance**

Replace the A98 Front Overhead Console Assembly.
 - **Go to next step: If infinite resistance**
3. Test for less than 5 Ω between the control terminals listed below and the low reference terminal 4 with the switch in the appropriate position.
 - A98 Front Overhead Console Assembly terminal 9, sunroof switch CLOSE position
 - A98 Front Overhead Console Assembly terminal 9, sunroof switch OPEN position
 - A98 Front Overhead Console Assembly terminal 10, sunshade switch OPEN position
 - A98 Front Overhead Console Assembly terminal 10, sunshade switch CLOSE position
 - **If not less than 5 Ω**

Replace the A98 Front Overhead Console Assembly.
 - **Go to next step: If less than 5 Ω**
4. All OK.

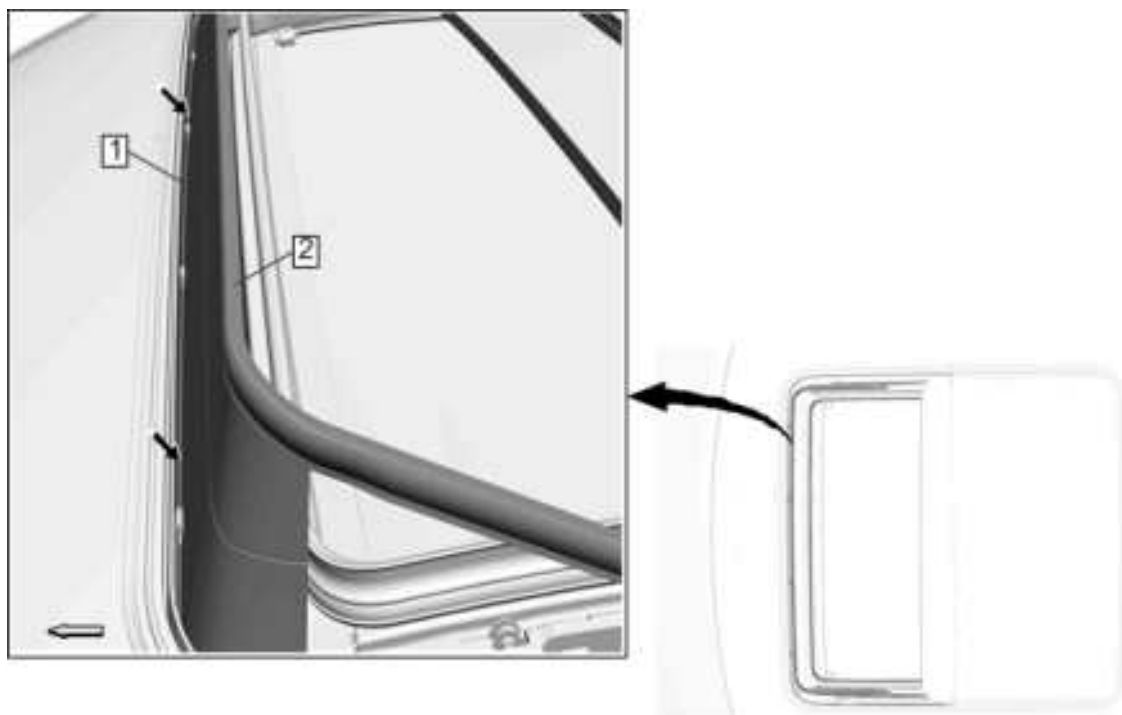
Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- Refer to [Roof Console Replacement](#)
- Refer to [Sunroof Sunshade Motor Replacement](#)
- Refer to [Control Module References](#) for sunroof control module replacement, programming and setup.

REPAIR INSTRUCTIONS

SUNROOF AIR DEFLECTOR REPLACEMENT



Callout	Component Name
1	Sunroof Air Deflector Retainer Procedure 1. Open the front sunroof window to the full open position. 2. Using the appropriate tool, push the sunroof air deflector retainer down and back, then pull upward to release from the sunroof module housing clips.
2	Sunroof Air Deflector Procedure Lift the sunroof air deflector up and back to remove. NOTE: Verify the sunroof window and the sunroof air deflector for proper operation.

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 module 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 module housing drain trough. Check each corner to confirm the drain hose is draining water.

WARNING: 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.
 - [Sunroof Housing Front Drain Hose Replacement \(Equinox Right Side\)](#)[Sunroof Housing Front Drain Hose Replacement \(Equinox Left Side\)](#)[Sunroof Housing Front Drain Hose Replacement \(Terrain Right Side\)](#)[Sunroof Housing Front Drain Hose Replacement \(Terrain Left Side\)](#)
 - [Sunroof Housing Rear Drain Hose Replacement \(Left Rear\)](#)[Sunroof Housing Rear Drain Hose Replacement \(Right Rear\)](#)
4. Test the system again.
5. If the hose remains plugged, check to see it is properly routed and does not have a kink.
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. Refer to [Headlining Trim Panel Replacement](#) .
3. Connect any disconnected hoses.
4. Ensure that the rear drain hoses are properly routed in the metal roof slot and taped in place.

SUNROOF HOUSING REPLACEMENT

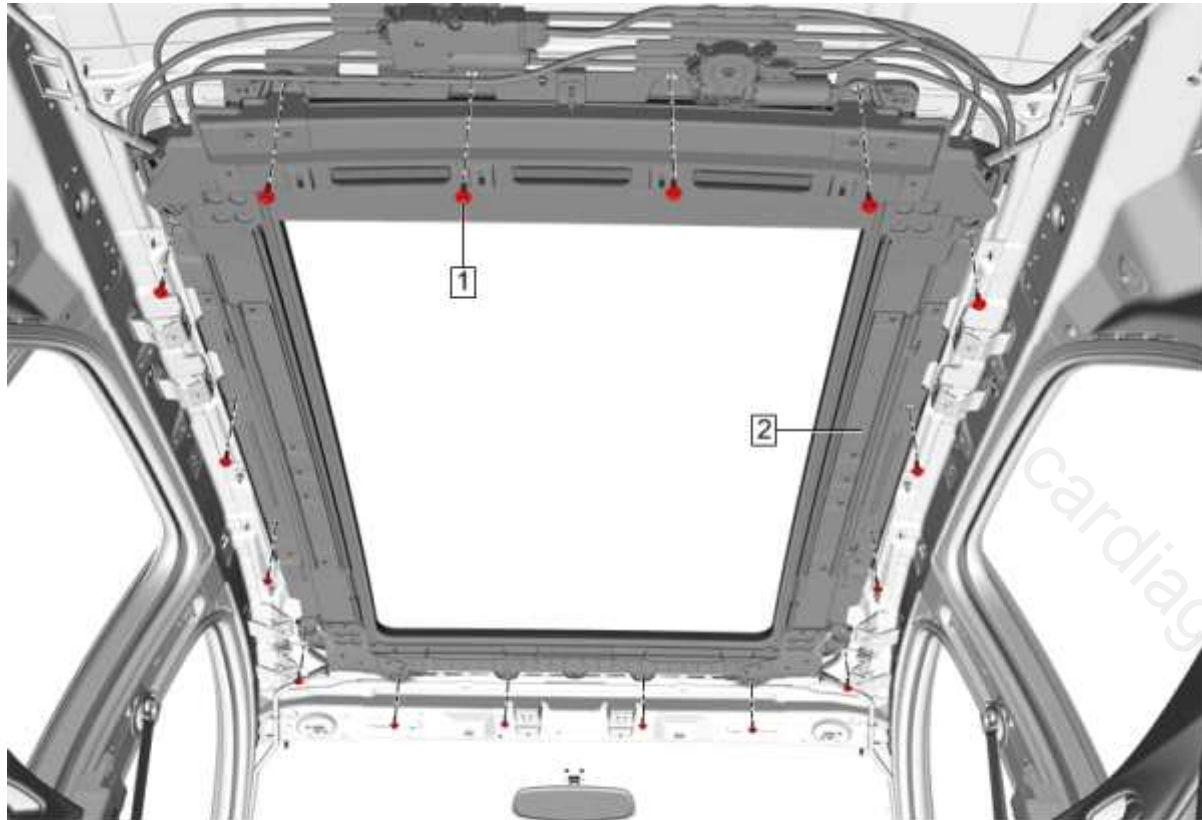


Fig. 3: Sunroof Housing

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures	
1. Remove Sunroof Window - Front. Refer to Sunroof Window Replacement - Front (Equinox)Sunroof Window Replacement - Front (Terrain). 2. Remove Roof Stationary Window. Refer to Roof Stationary Window Replacement (Equinox)Roof Stationary Window Replacement (Terrain). 3. Remove Headlining Trim Panel. Refer to Headlining Trim Panel Replacement 4. Do not remove the drain hoses from the vehicle, disconnect the drain hoses from all corners of the sunroof frame spigot only. Refer to Sunroof Housing Front Drain Hose Replacement (Equinox Right Side)Sunroof Housing Front Drain Hose Replacement (Equinox Left Side)Sunroof Housing Front Drain Hose Replacement (Terrain Right Side)Sunroof Housing Front Drain Hose Replacement (Terrain Left Side), and Sunroof Housing Rear Drain Hose Replacement (Left Rear)Sunroof Housing Rear Drain Hose Replacement (Right Rear).	

Callout	Component Name
1	Sunroof Housing Bolt (Qty: 16) CAUTION: Refer to Fastener Caution . Procedure Disconnect the electrical connectors. Tighten 9 N.m (80 lb in)
2	Sunroof Housing Procedure 1. With aid of assistant, remove the sunroof housing from the vehicle and place it on a clean dry prepared surface. 2. Transfer components as necessary. 3. Water test and inspect sunroof for proper operation.

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT (EQUINOX RIGHT SIDE)

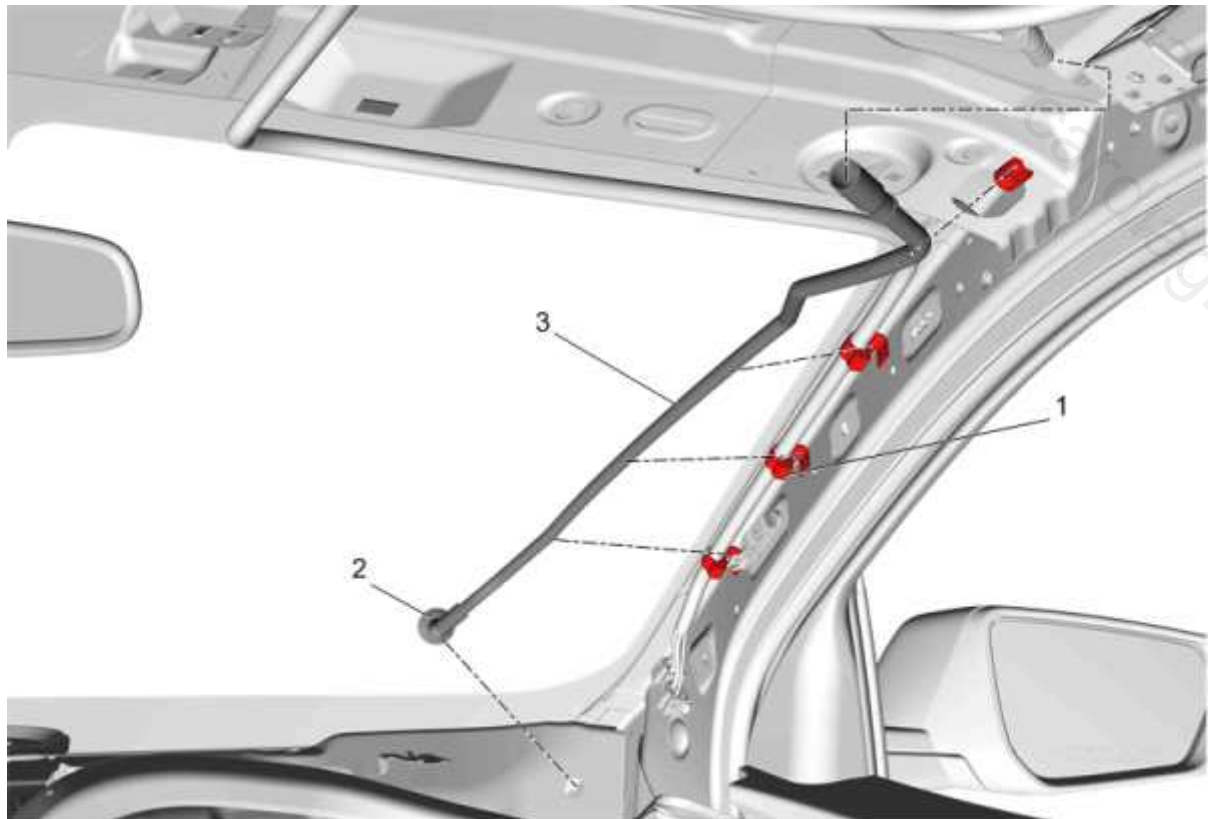


Fig. 4: Sunroof Housing Front Drain Hose (Equinox Right Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement 2. Remove Instrument Panel Upper Trim Panel. Refer to Instrument Panel Upper Trim Panel Replacement (Equinox).	

Callout	Component Name
1	Sunroof Housing Front Drain Hose Retainer (Qty: 4) Procedure 1. Disconnect the electrical connectors. 2. Disconnect the sunroof drain hose from the sunroof drain hose retainers.
2	Sunroof Housing Front Drain Hose Grommet Procedure Grasp the grommet and pull rearward to release it from the plenum upper panel.
3	Sunroof Housing Front Drain Hose Procedure 1. Disconnect the sunroof drain hose from the sunroof frame spigot. 2. When installing the drain hose, ensure that the routing of the end of the drain hose and grommet are installed through the access hole in the plenum upper panel to prevent interior water leaks. 3. Water test and inspect sunroof for proper operation. NOTE: If the drain hoses are retained with a tie strap it will be necessary to replace them when reinstalling.

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT (EQUINOX LEFT SIDE)



Fig. 5: Sunroof Housing Front Drain Hose (Equinox Left Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement 2. Remove Instrument Panel Upper Trim Panel. Refer to Instrument Panel Upper Trim Panel Replacement (Equinox).	
1	Sunroof Housing Front Drain Hose Retainer Procedure Disconnect the sunroof drain hose from the sunroof drain hose retainer.
2	Sunroof Housing Front Drain Hose Grommet Procedure Grasp the grommet and pull rearward to release it from the plenum upper panel.
3	Sunroof Housing Front Drain Hose Procedure 1. Disconnect the sunroof drain hose from the sunroof frame spigot. 2. When installing the drain hose, ensure that the routing of the end of the drain hose and grommet are installed through the access hole in the plenum upper panel to prevent interior water leaks. 3. Water test and inspect sunroof for proper operation. NOTE: If the drain hoses are retained with a tie strap it will be necessary to replace them when reinstalling.

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT (TERRAIN RIGHT SIDE)

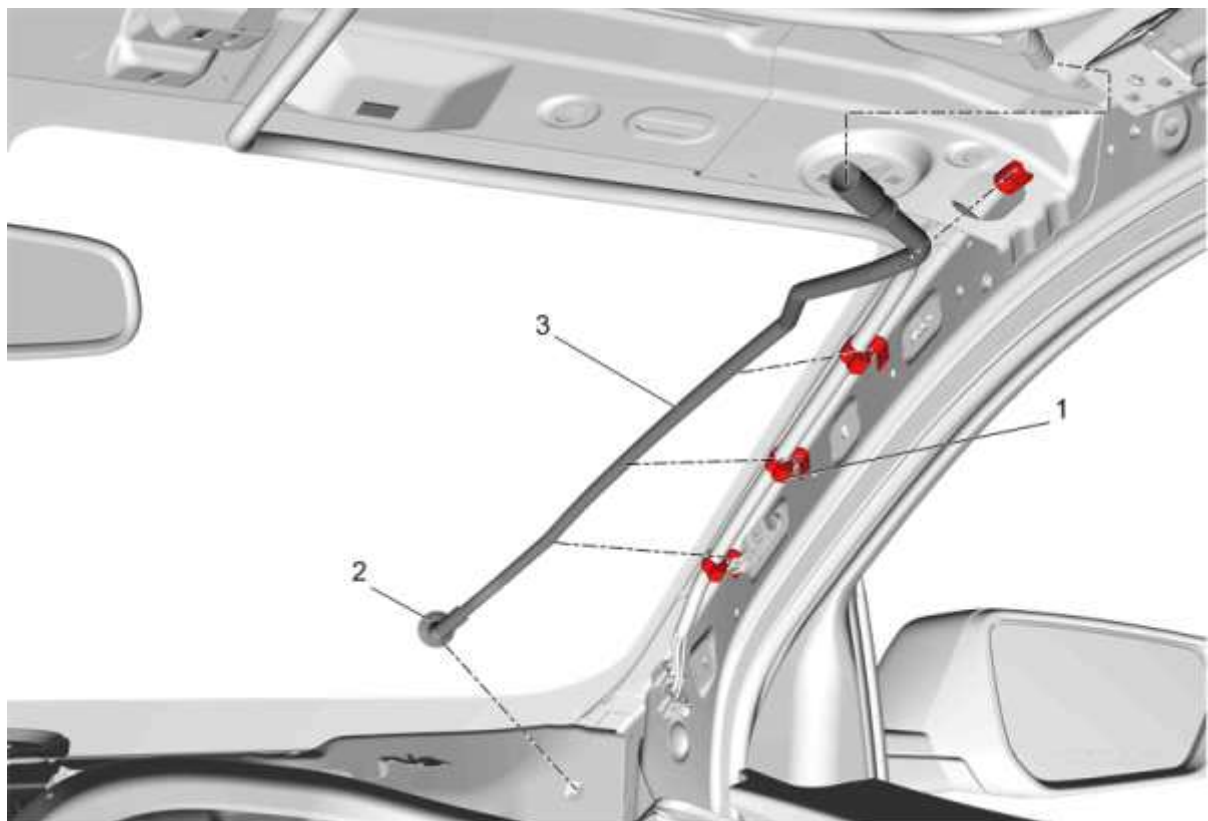


Fig. 6: Sunroof Housing Front Drain Hose (Terrain Right Side)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement 2. Remove Instrument Panel Extension. Refer to Instrument Panel Extension Replacement (Terrain).	
1	Sunroof Housing Front Drain Hose Retainer (Qty: 4) Procedure Disconnect the sunroof drain hose from the sunroof drain hose retainers.
2	Sunroof Housing Front Drain Hose Grommet Procedure Grasp the grommet and pull rearward to release it from the plenum upper panel.
3	Sunroof Housing Front Drain Hose Procedure 1. Disconnect the sunroof drain hose from the sunroof frame spigot. 2. When installing the drain hose, ensure that the routing of the end of the drain hose and grommet are installed through the access hole in the plenum upper panel to prevent interior water leaks. 3. Water test and inspect sunroof for proper operation. NOTE: If the drain hoses are retained with a tie strap it will be necessary to replace them when reinstalling.

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT (TERRAIN LEFT SIDE)



Fig. 7: Sunroof Housing Front Drain Hose (Terrain Left Side)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement 2. Remove Instrument Panel Extension. Refer to Instrument Panel Extension Replacement (Terrain)	
1	Sunroof Housing Front Drain Hose Retainer Procedure Disconnect the sunroof drain hose from the sunroof drain hose retainer.
2	Sunroof Housing Front Drain Hose Grommet Procedure Grasp the grommet and pull rearward to release it from the plenum upper panel.
3	Sunroof Housing Front Drain Hose Procedure 1. Disconnect the sunroof drain hose from the sunroof frame spigot. 2. When installing the drain hose, ensure that the routing of the end of the drain hose and grommet are installed through the access hole in the plenum upper panel to prevent interior water leaks. 3. Water test and inspect sunroof for proper operation. NOTE: If the drain hoses are retained with a tie strap it will be necessary to replace them when reinstalling.

SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT (LEFT REAR)

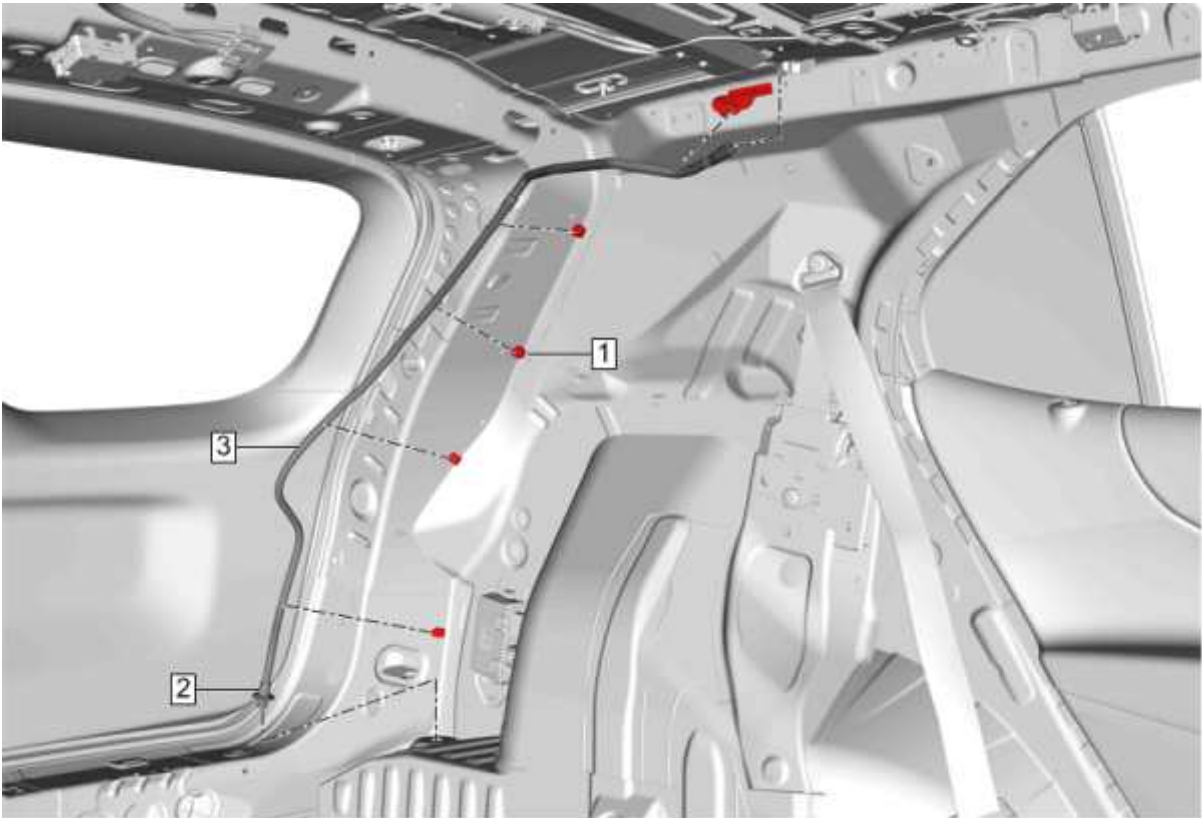


Fig. 8: Sunroof Housing Rear Drain Hose (Left Rear)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement 2. Remove Quarter Lower Rear Trim Panel (Left Side). Refer to Quarter Lower Rear Trim Panel Replacement (Left Side)	
1	Sunroof Housing Rear Drain Hose Retainer (Qty: 5)
2	Sunroof Housing Rear Drain Hose Grommet Procedure 1. Grasp the grommet and pull upward to release. 2. When installing the drain hose grommet, ensure the end of the drain hose is installed through the access drain hole to prevent interior water leaks.
3	Sunroof Housing Rear Drain Hose Procedure 1. Disconnect the sunroof drain hose from the sunroof frame spigot. 2. Water test and inspect sunroof for proper operation.

SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT (RIGHT REAR)

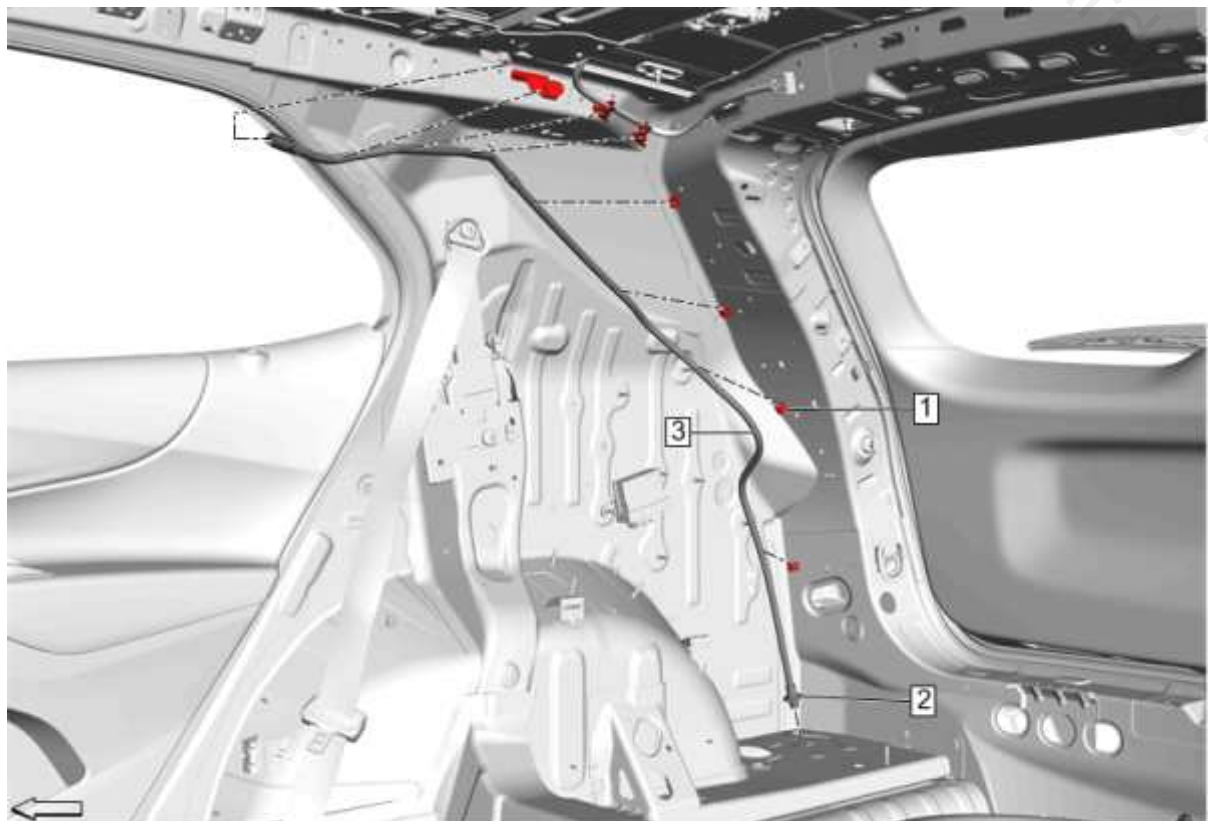


Fig. 9: Sunroof Housing Rear Drain Hose (Right Rear)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement 2. Remove Quarter Lower Rear Trim Panel (Right Side). Refer to Quarter Lower Rear Trim Panel Replacement (Right Side)	
1	Sunroof Housing Rear Drain Hose Retainer (Qty: 7)
2	Sunroof Housing Rear Drain Hose Grommet Procedure 1. Grasp the grommet and pull upward to release. 2. When installing the drain hose grommet, ensure the end of the drain hose is installed through the access drain hole to prevent interior water leaks.
3	Sunroof Housing Rear Drain Hose Procedure 1. Disconnect the sunroof drain hose from the sunroof frame spigot. 2. Water test and inspect sunroof for proper operation.

SUNROOF WINDOW MOTOR REPLACEMENT

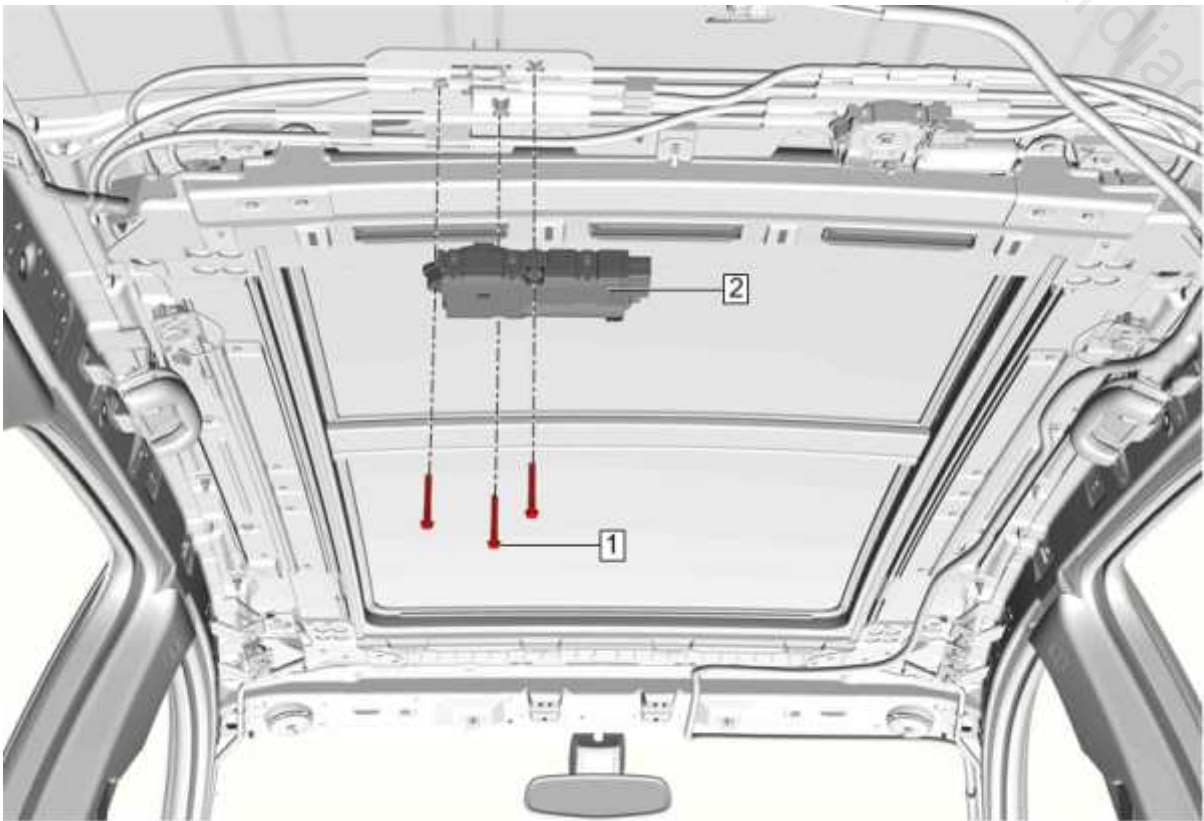


Fig. 10: Sunroof Window Motor
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedures 1. It is only necessary to lower the headlining. Only do those steps in the headlining procedure that will allow access to the component being removed. Refer to Headlining Trim Panel Replacement 2. Disconnect the electrical connector.	
1	Sunroof Window Motor Bolt (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 4 N.m (35 lb in)
2	Sunroof Window Motor Procedure 1. With a turning motion, pull downward on the sunroof window motor to disengage the motor from the drive cables. 2. Install the sunroof window motor to the frame with a turning motion, pushing upward to engage the motor into the drive cables. 3. Refer to Sunroof Motor/Actuator Initialization/Teach Process 4. Verify the sunroof window motor operation.

SUNROOF MOTOR/ACTUATOR INITIALIZATION/TEACH PROCESS

Initialization Procedure

"Initialization" refers to the sunroof system learning the reference location of the hard stop. Initialization is done in the following scenarios:

- First Time System is Powered - Initialization has not been executed yet
- Sunroof/Sunshade lost calibration or false reversal
- Motor assembly has been removed or replaced
- If the glass is adjusted after Sunroof/Sunshade initialization has already been completed

Until the motor assembly has been initialized, the express open and close switch inputs and manual open inputs are disregarded. During the process of initialization, anti-pinch detection is not active.

Initialization/Teach Procedure/First Time Installation For a New Drive Assembly:

"Teach" refers to the sunroof system's learning a baseline profile for the system. This is almost always done following an initialization.

1. Press/hold on the Sunroof Close button until the sunroof close/open cycle complete (5 Sec - 15 Sec) to activate the Initialization Procedure (Teach).
2. And keep holding the Sunroof switch until the Initialization Procedure is complete (Initialization start).
3. Press the sunroof Open switch and once the sunroof open to vent, the procedure is complete.
4. When Hard stop is encountered Sunroof/Sunshade will move towards open position.
5. When Sunroof/Sunshade reaches close position it will automatically stop.
6. Now the Normalization procedure is complete.

Sunroof/Sunshade Re-Initialization/Teach Procedure/Reinstallation For an Existing Drive Assembly:

NOTE:

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

1. Press/hold on the Sunshade Close button until the sunshade close/open cycle complete (15 Sec) to activate the Initialization Procedure (Teach).
2. And keep holding the Sunshade switch until the Initialization Procedure is complete (Initialization start).
3. When the sunshade Open and close, the procedure is complete.

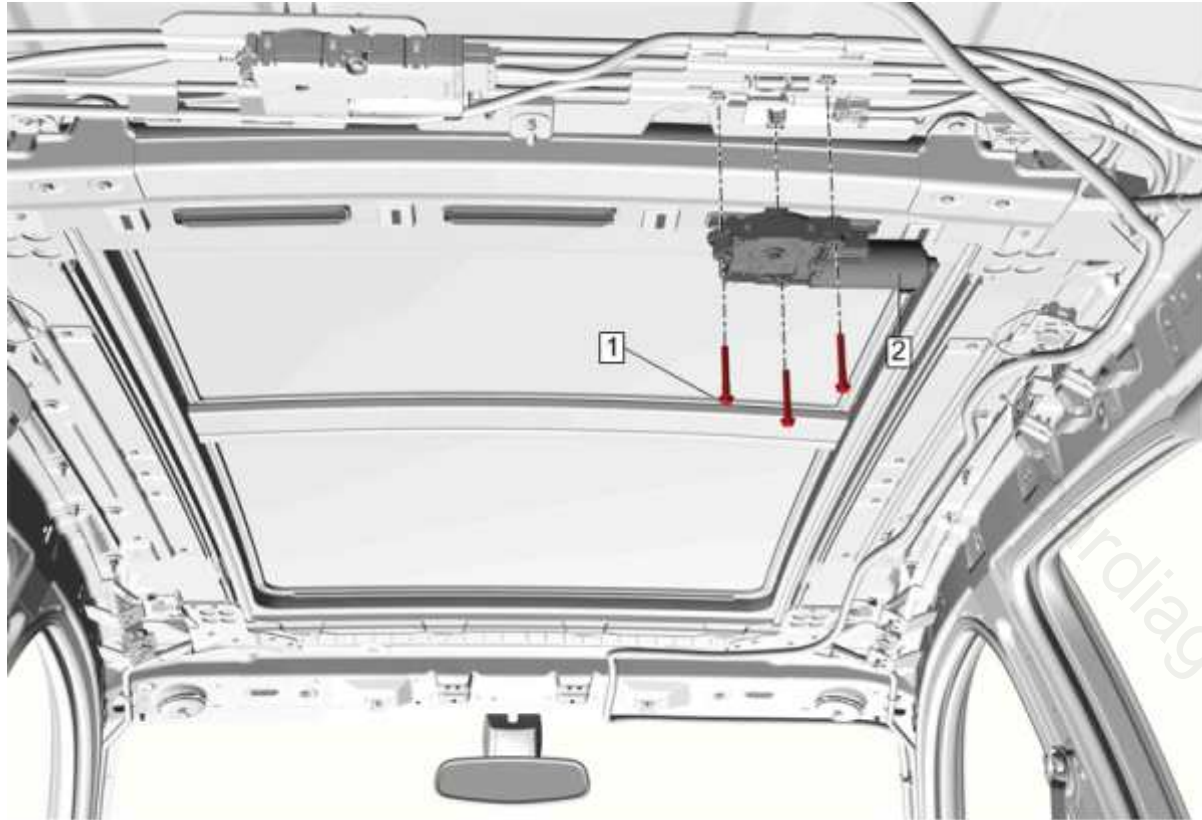
SUNROOF SUNSHADE MOTOR REPLACEMENT

Fig. 11: Sunroof Sunshade Motor

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures	
1. It is only necessary to lower the headlining. Only do those steps in the headlining procedure that will allow access to the component being removed. Refer to Headlining Trim Panel Replacement 2. Disconnect the electrical connector.	
1	Sunroof Sunshade Motor Bolt (Qty: 3) CAUTION: Refer to Fastener Caution . Tighten 5 N.m (44 lb in)

Callout	Component Name
2	Sunroof Sunshade Motor Procedure 1. With a turning motion, pull downward on the sunroof sunshade motor. Disengage the motor from the drive cables. 2. Install the sunroof sunshade motor to the frame with a turning motion, pushing upward. This will engage the motor into the drive cables. 3. Refer to Sunroof Motor/Actuator Initialization/Teach Process 4. Verify the sunroof sunshade motor operation.

SUNROOF SUNSHADE REPLACEMENT

Removal Procedure

NOTE: It is not necessary to remove the sunroof module to replace the sunroof sunshade.

1. Place the sunshade in the full open position.

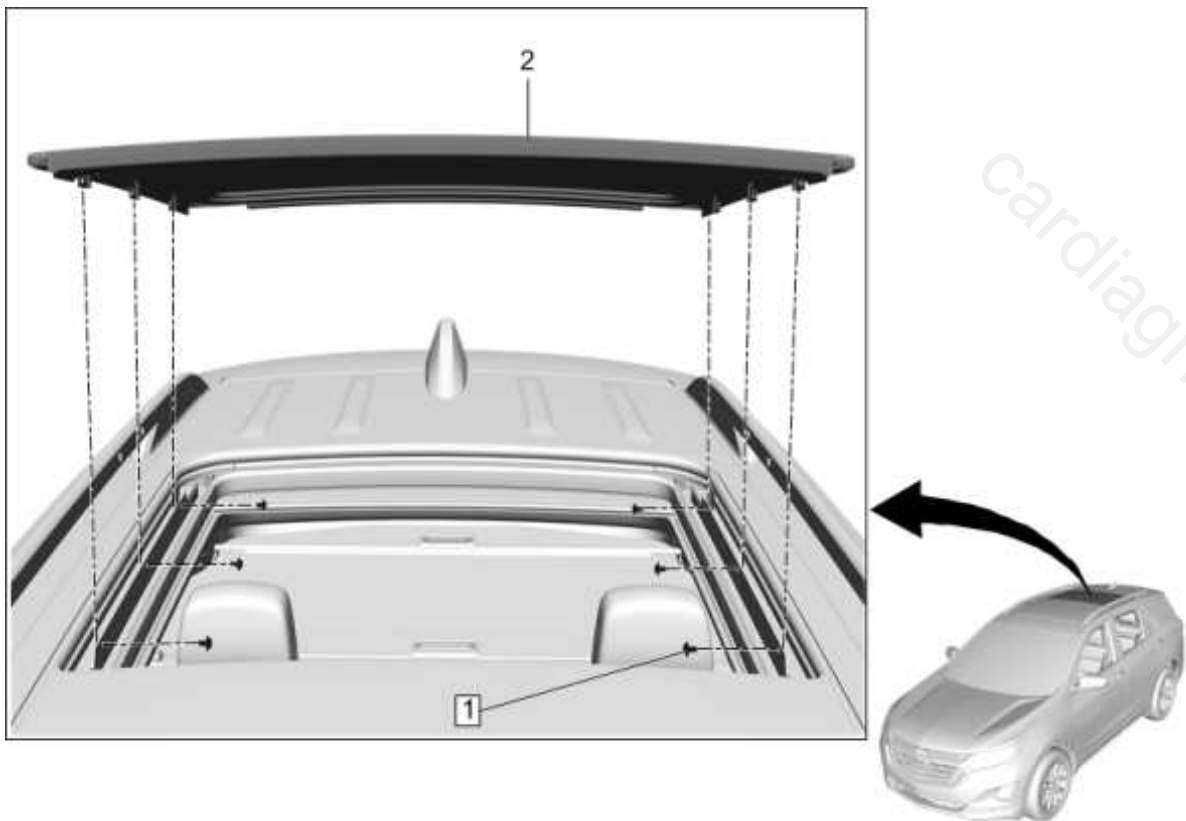


Fig. 12: Roof Stationary Window

Courtesy of GENERAL MOTORS COMPANY

2. Remove Roof Stationary Window (2). Refer to [Roof Stationary Window Replacement \(Equinox\)](#)[Roof Stationary Window Replacement \(Terrain\)](#)
3. Reposition sunroof seal to access sunshade clips. It is not necessary to completely remove.

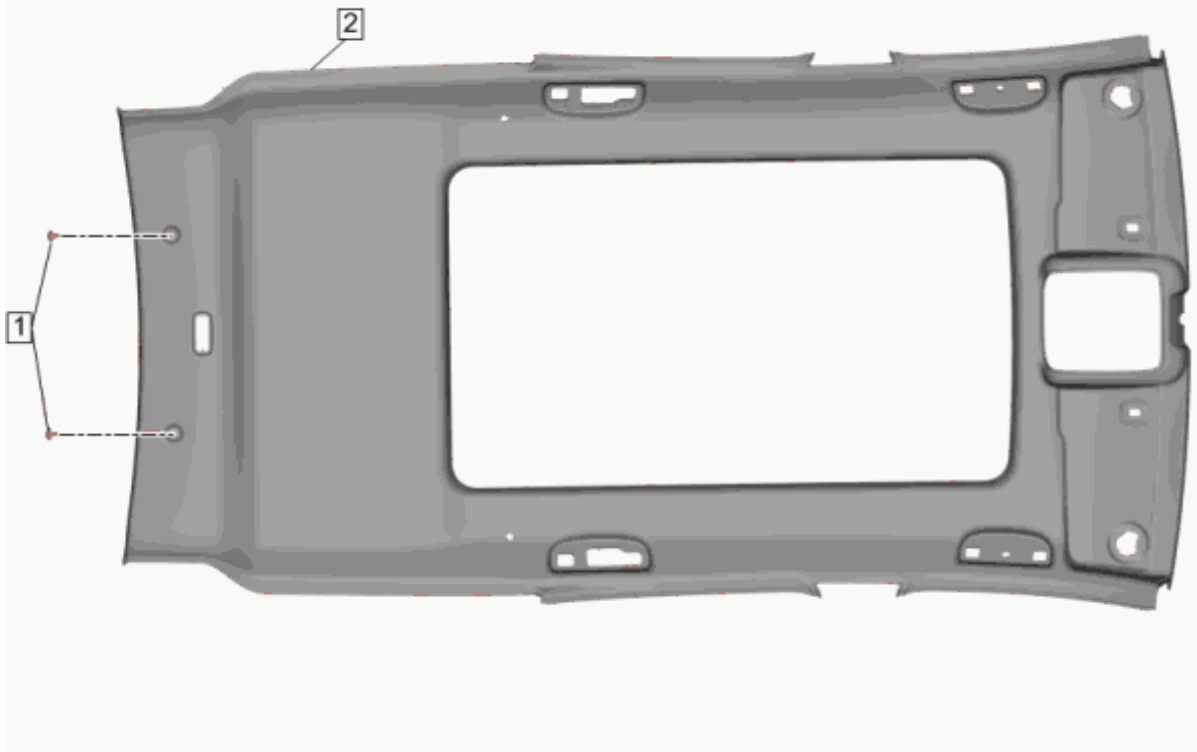


Fig. 13: Headlining Trim Panel And Fasteners
 Courtesy of GENERAL MOTORS COMPANY

NOTE: It is only necessary to lower the headlining. Only do those steps in the headlining procedure that will allow access to the component being removed.

4. Remove Headlining Trim Panel (2). Refer to [Headlining Trim Panel Replacement](#)

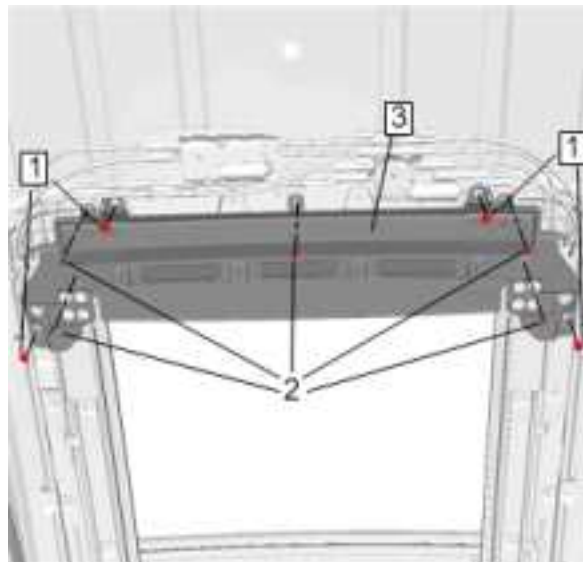


Fig. 14: Rear Sunroof Sunshade Housing Bracket, Screws And Bolts
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the sunroof sunshade bracket screws (2) (Qty: 5) from the sunroof housing.
6. Remove the rear sunroof sunshade side housing bracket bolts (1) (Qty: 4) and the rear sunroof sunshade housing bracket (3).

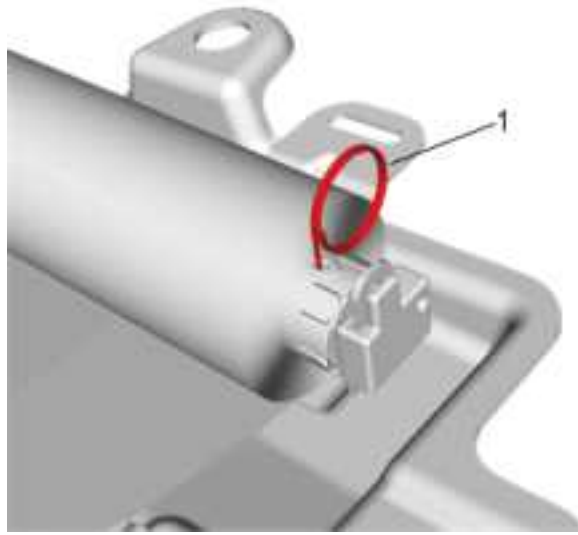


Fig. 15: Sunshade Locking Pin

Courtesy of GENERAL MOTORS COMPANY

7. Hold and let the fabric wind up slow until the sunshade locking pin (1) can be installed into the sunshade hole.

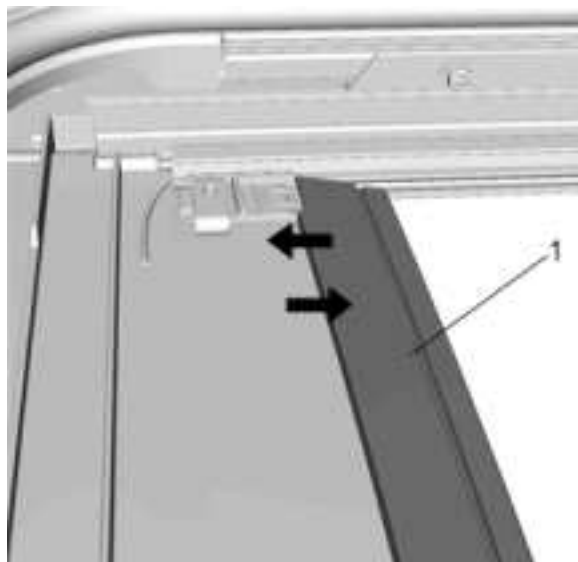


Fig. 16: Sunshade Leading Edge Stiffener

Courtesy of GENERAL MOTORS COMPANY

8. Remove the sunshade leading edge stiffener (1) by pulling it out of the front of the sunshade clips.

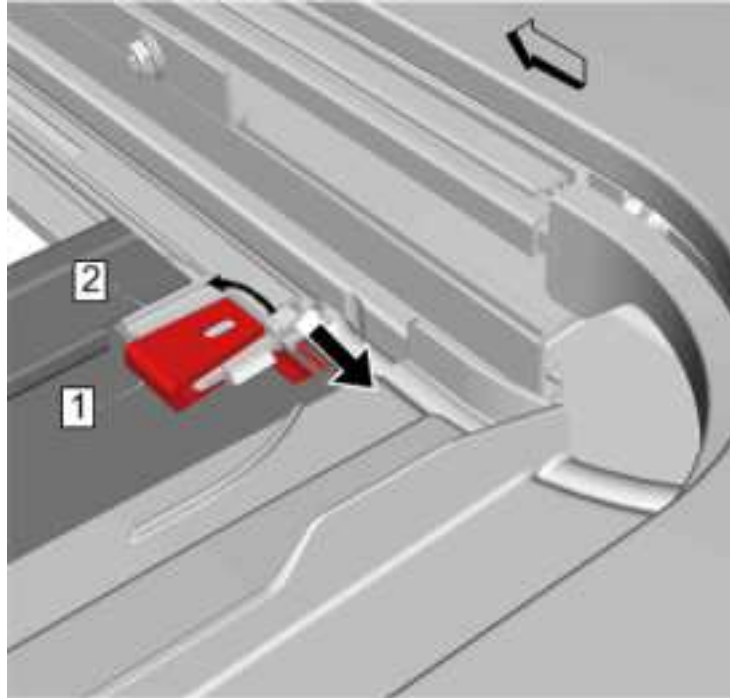


Fig. 17: Sunshade Retainer And Sunshade Drive Cable Plate

Courtesy of GENERAL MOTORS COMPANY

NOTE: Be careful when releasing the tab on the assembly clip as not to damage components. Lower portion of the clip is thin and fragile.

9. Lift the top of the sunshade retainer (1) upward while sliding each sunshade retainer (1) rearward to remove from the sunshade drive cable plate (2).

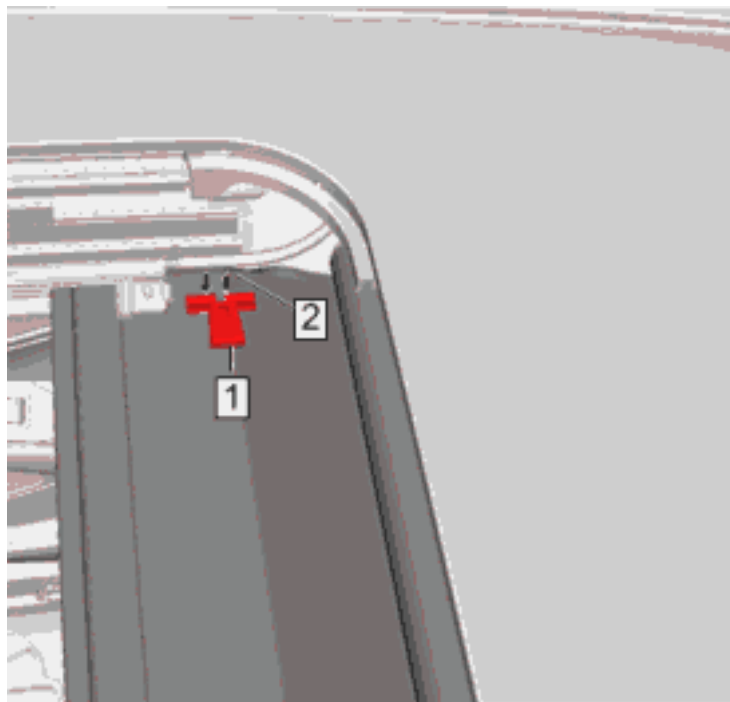


Fig. 18: Sunshade Retainer And Sunshade Fabric Edge

Courtesy of GENERAL MOTORS COMPANY

10. Remove each sunshade retainer (1) by sliding inward from the edge of the sunshade fabric (2).

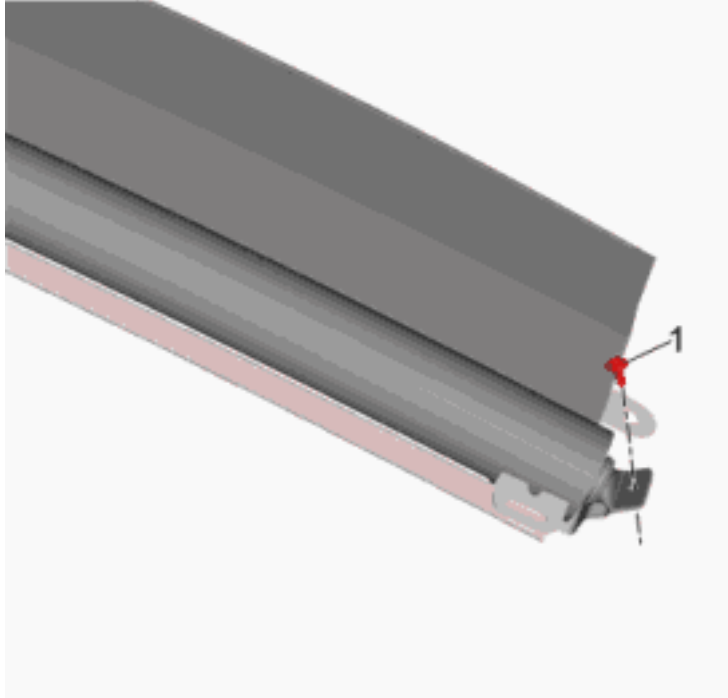


Fig. 19: Sunroof Sunshade Bracket Screw

Courtesy of GENERAL MOTORS COMPANY

11. Remove the sunroof sunshade screw (1) from the sunroof sunshade bracket.



Fig. 20: Sunroof Sunshade

Courtesy of GENERAL MOTORS COMPANY

12. Remove the sunroof sunshade (1) by pulling up and away from sunroof sunshade bracket.

Installation Procedure

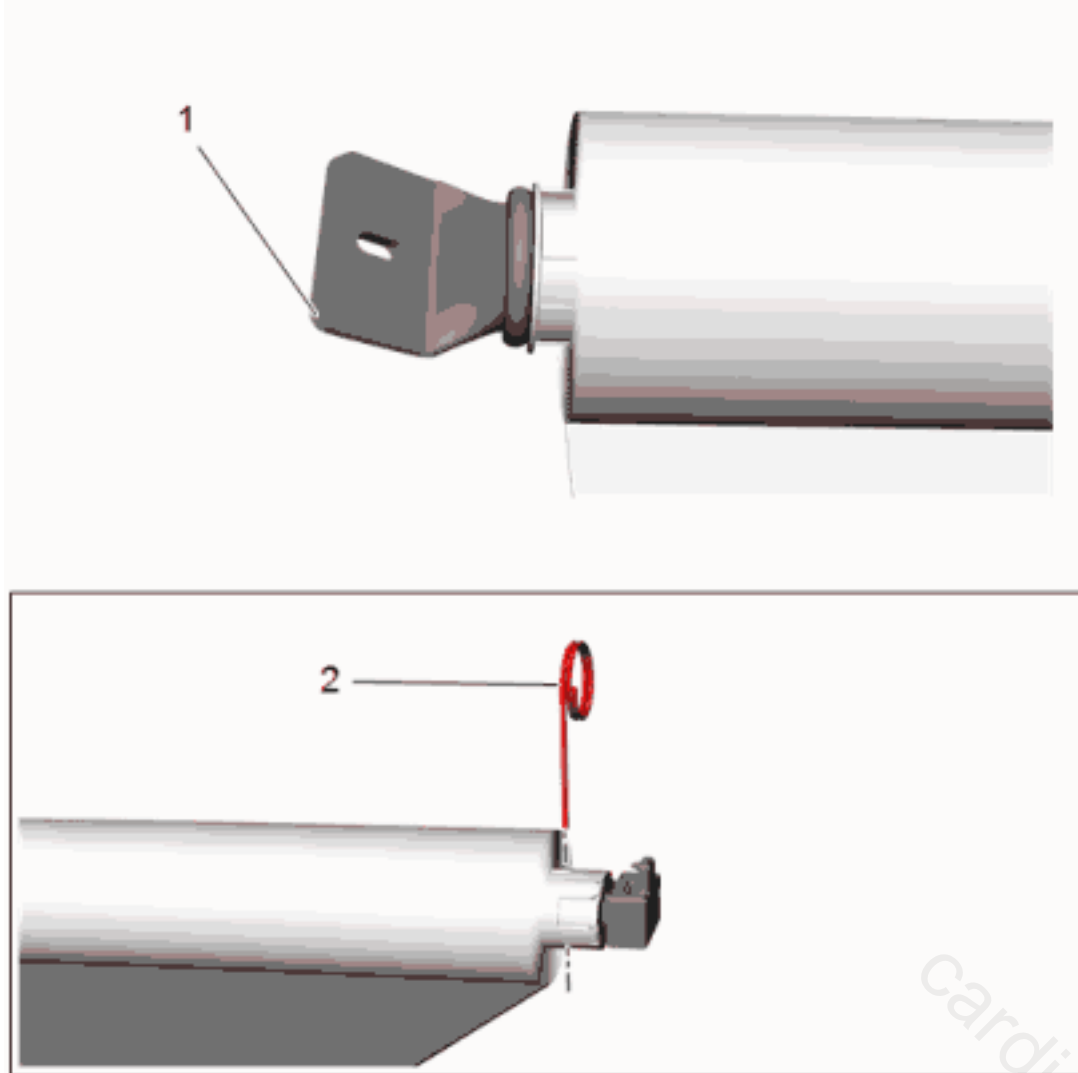


Fig. 21: Tube Assembly Stationary End And Locking Pin
Courtesy of GENERAL MOTORS COMPANY

NOTE: If the sunshade spring releases, it will be necessary to rewind it and reinstall the locking pin. If this is the case then perform steps 1 - 7 for rewinding the sunshade.

1. Use caution when removing the locking pin (2), the tube assembly may have sufficient tension causing stationary end (1) to rotate.

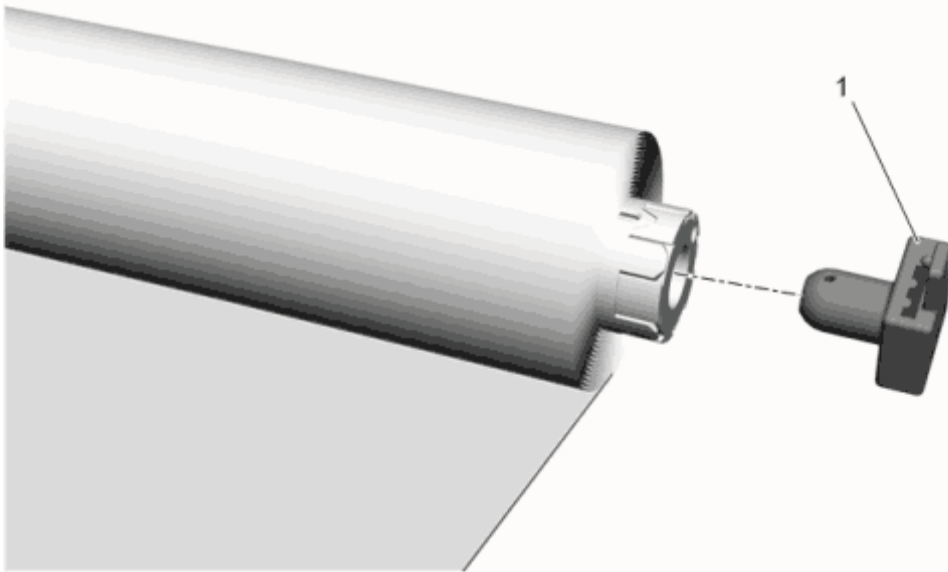


Fig. 22: Retainer

Courtesy of GENERAL MOTORS COMPANY

2. Remove the retainer (1) from the tube assembly.
3. Ensure the sunshade fabric is wound around the tube assembly as if it were in the full open position.

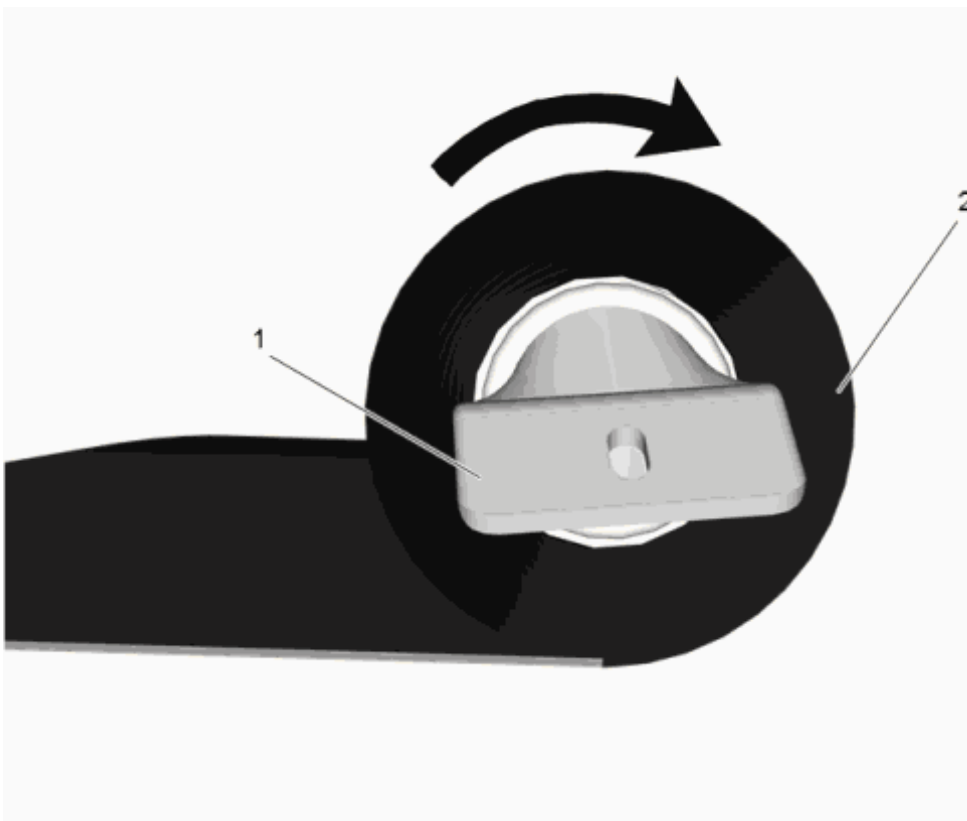


Fig. 23: Tube Assembly Stationary End And Sunshade Fabric

Courtesy of GENERAL MOTORS COMPANY

4. Place the tube assembly stationary end (1) into a vise, or similar holding device, to hold the stationary end firmly secured.
5. With the stationary end (1) secured, rotate both, the tube assembly and sunshade fabric (2) 360 degrees 21 times in the clock wise direction as if the sunshade were being closed.

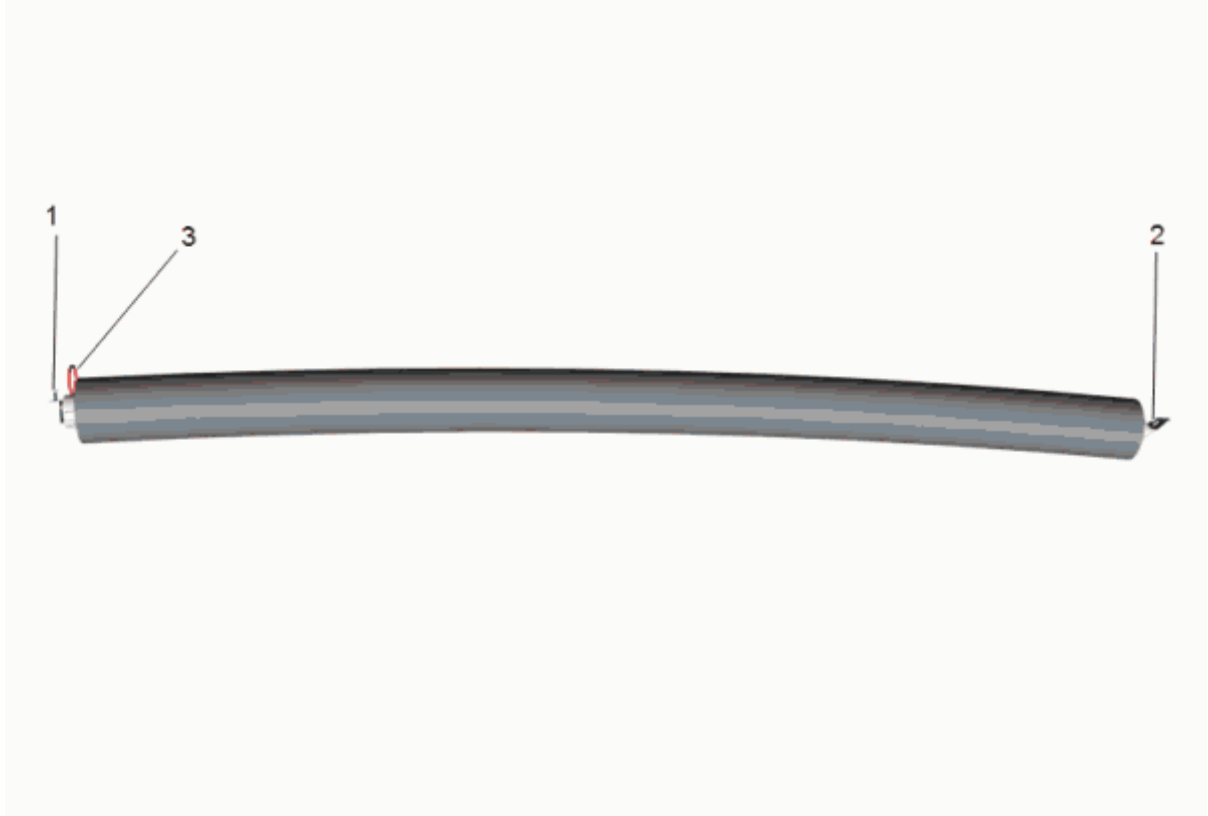


Fig. 24: Tube Assembly Stationary End, Retainer And Locking Pin
Courtesy of GENERAL MOTORS COMPANY

6. After completing the 21 turns place the retainer (1) into the tube assembly making sure the retainer and the tube assembly stationary end (2) are aligned in the same direction.
7. Locate the through hole on the tube assembly and fully install the locking pin (3) before releasing your grip of the sunshade tube assembly.



Fig. 25: Sunroof Sunshade
Courtesy of GENERAL MOTORS COMPANY

8. Install the sunroof sunshade (1) into the sunroof sunshade bracket

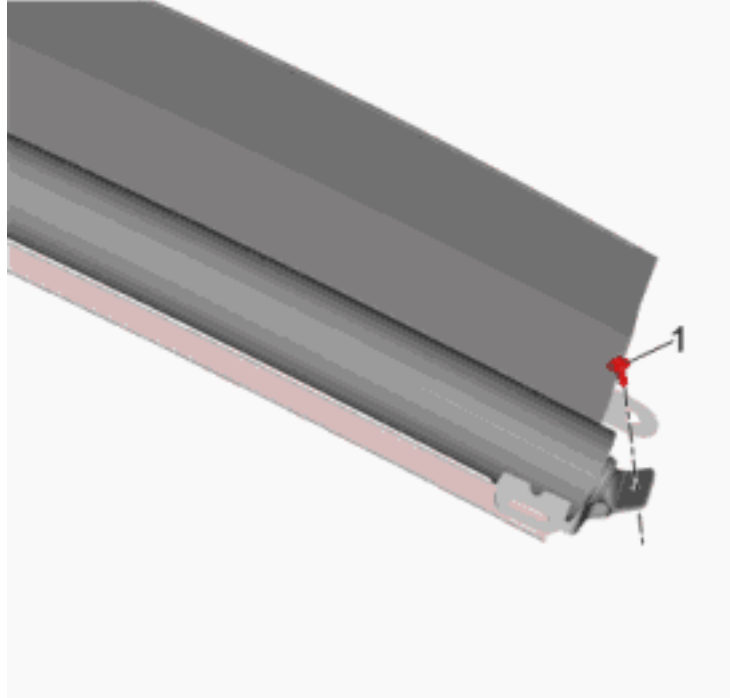


Fig. 26: Sunroof Sunshade Bracket Screw
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

9. Install the sunroof sunshade screw (1) to the sunroof sunshade bracket and tighten to 2.5 N.m (22 lb in).

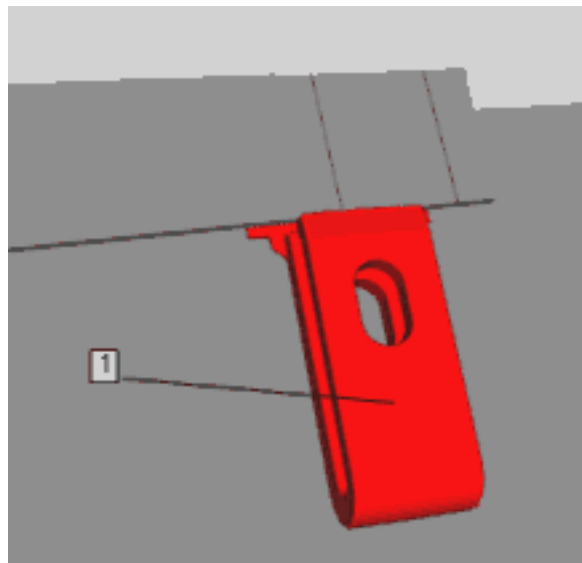


Fig. 27: Sunshade Retainer
Courtesy of GENERAL MOTORS COMPANY

10. Install sunshade retainer (1) in shown location of the fabric.
11. Ensure the sunshade retainer (1) front tang is inserted into the stitched pocket and the rear tang is tucked beneath the shade welting behind the stitched pocket as shown.

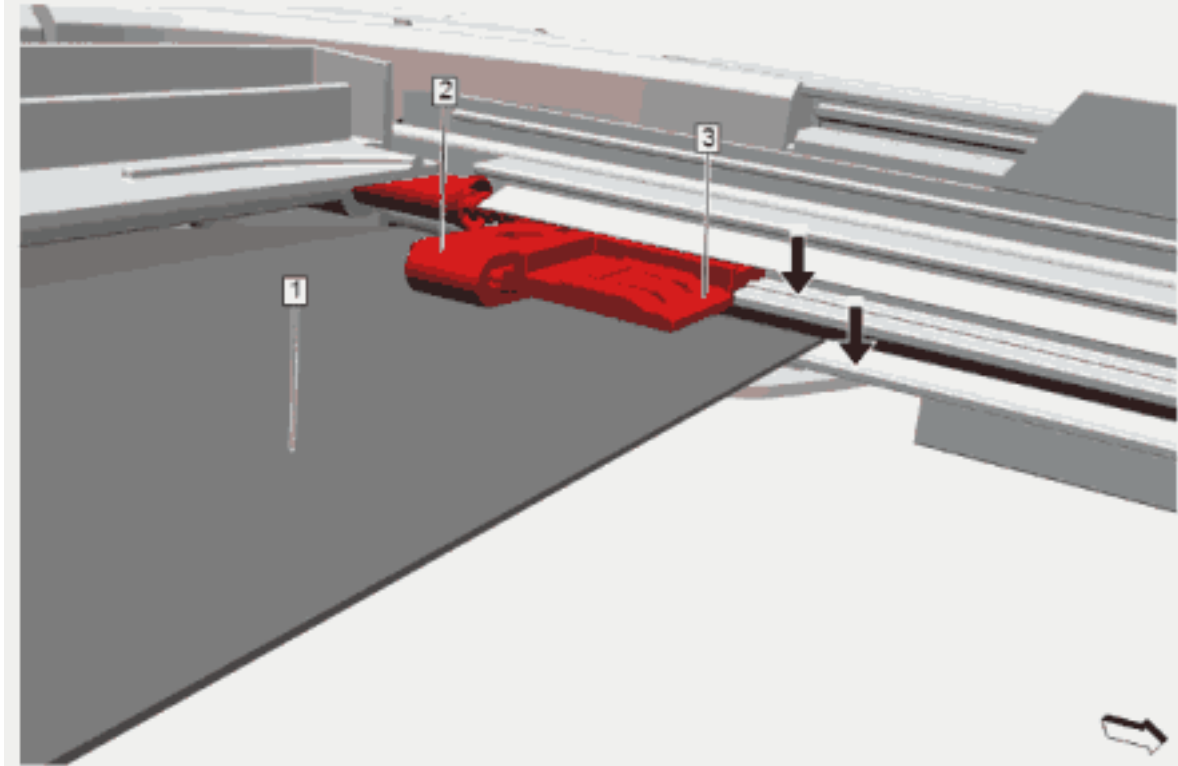


Fig. 28: Sunshade Fabric, Sunshade Retainer And Drive Cable Plate
Courtesy of GENERAL MOTORS COMPANY

12. Install the sunshade fabric (1) and sunshade retainer (2) in the lower groove of the sunroof housing below the drive cable plate (3).

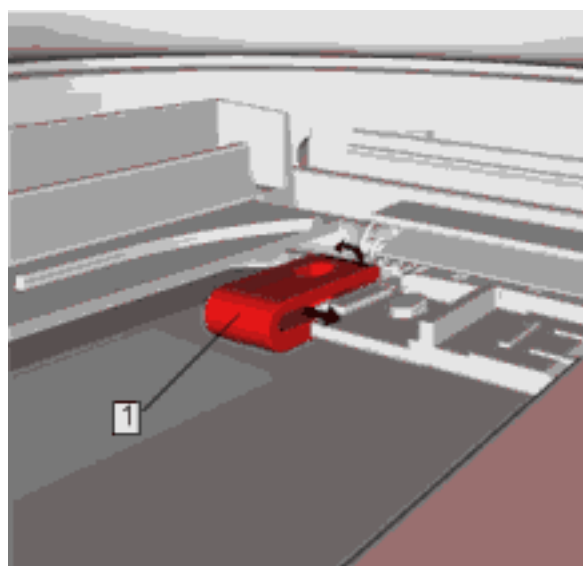


Fig. 29: Sunshade Retainer
Courtesy of GENERAL MOTORS COMPANY

13. Install sunshade retainer (1) onto the sunshade drive cable plate.

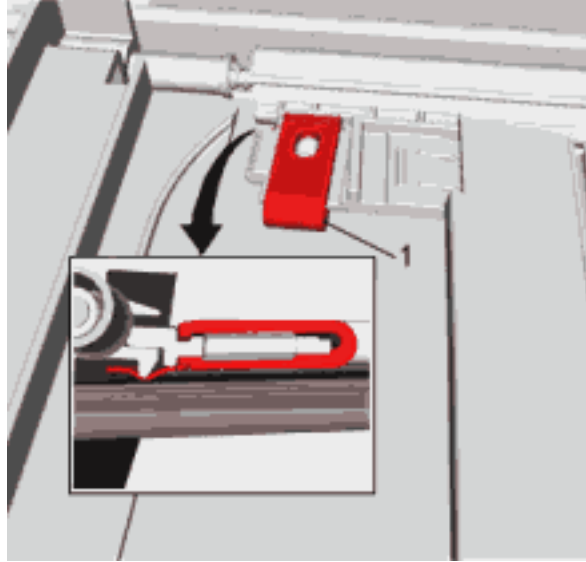


Fig. 30: Sunshade Retainer Installed Properly.
 Courtesy of GENERAL MOTORS COMPANY

14. Ensure the sunshade retainer (1) is in the proper groves of the sunroof housing.

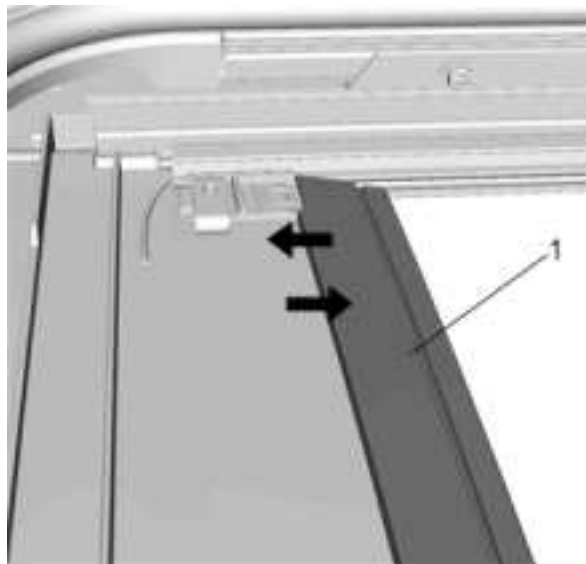
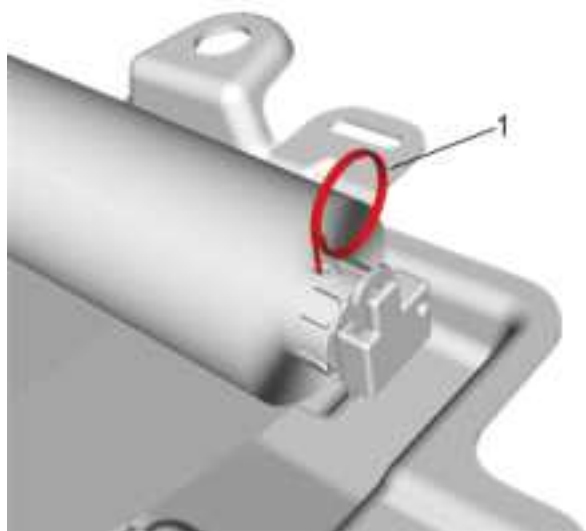


Fig. 31: Sunshade Leading Edge Stiffener
 Courtesy of GENERAL MOTORS COMPANY

NOTE: When the sunshade is not fed into side guides, the sunshade will droop and not be firm.

15. Install the sunroof edge stiffener (1) to the sunshade side rail guide. The edges of sunshade must be fed into groves of sunroof module.



NOTE: If the sunshade spring releases, it will be necessary to rewind it and reinstall the locking pin.

16. A new sunroof sunshade comes pre-loaded with a locking pin (1) holding spring tension on the sunshade.
17. Remove the locking pin (1) that holds the sunshade tension.

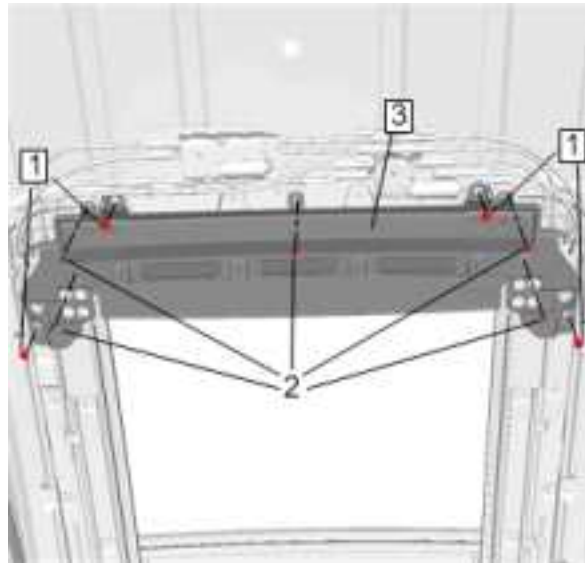


Fig. 33: Rear Sunroof Sunshade Housing Bracket, Screws And Bolts
Courtesy of GENERAL MOTORS COMPANY

18. Install the sunroof sunshade side housing bracket bolts (1) (Qty: 4) and tighten to 2.5 N.m (22 lb in).
19. Install the sunroof sunshade bracket screws (2) (Qty: 5) and the sunshade bracket (3) to the sunroof housing and tighten to 2.5 N.m (22 lb in).

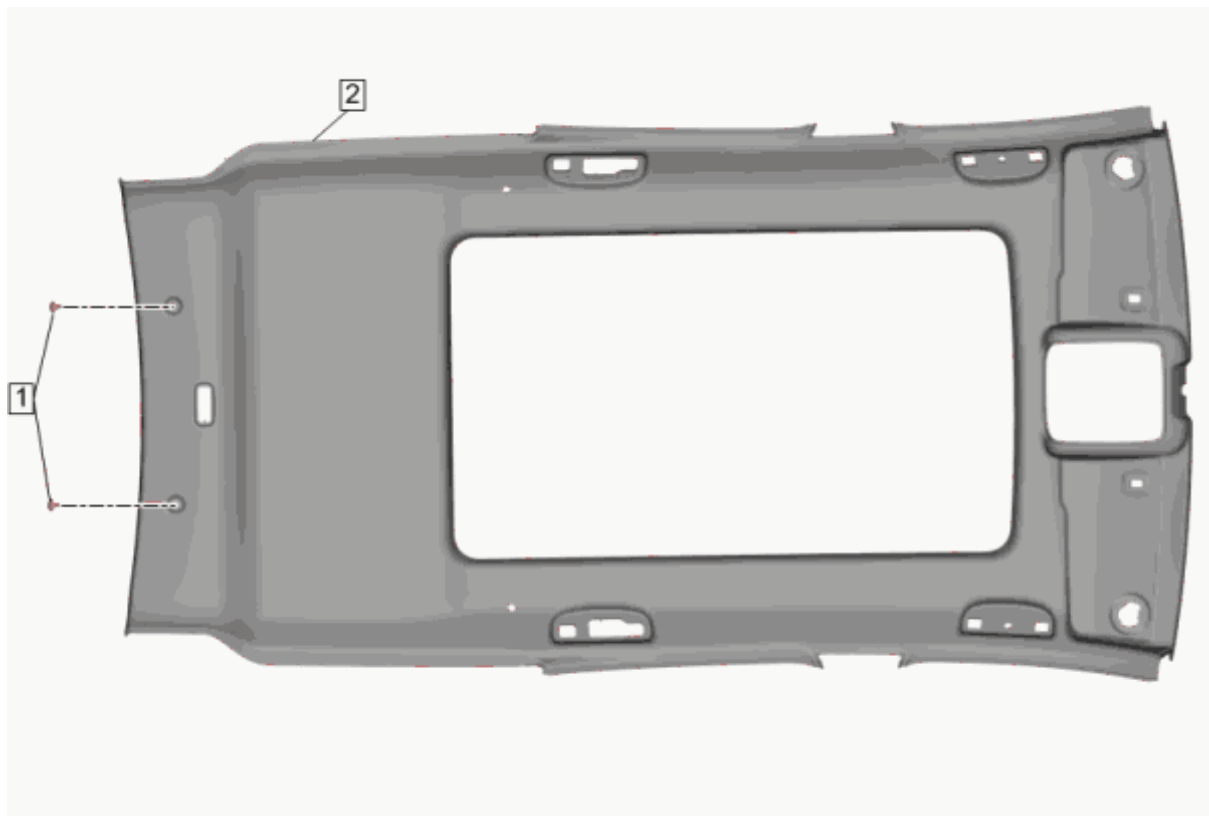


Fig. 34: Headlining Trim Panel And Fasteners
Courtesy of GENERAL MOTORS COMPANY

20. Install Headlining Trim Panel (2). Refer to [Headlining Trim Panel Replacement](#)

21. Reinstall sunroof seal to correct location.

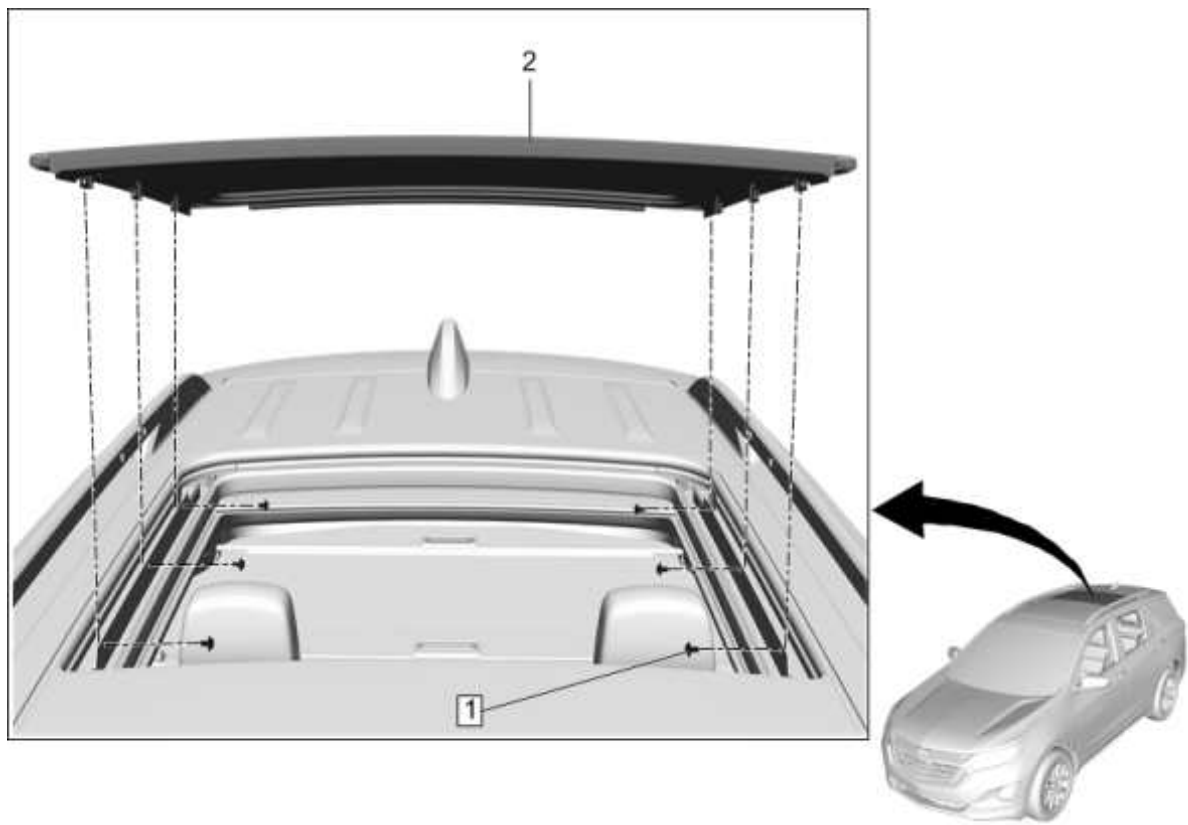


Fig. 35: Roof Stationary Window

Courtesy of GENERAL MOTORS COMPANY

22. Install Roof Stationary Window (2). Refer to [Roof Stationary Window Replacement \(Equinox\)](#)[Roof Stationary Window Replacement \(Terrain\)](#)
23. Ensure that the sunroof sunshade and window operate properly. Refer to [Sunroof Motor/Actuator Initialization/Teach Process](#)

SUNROOF WINDOW SEAL REPLACEMENT - OUTER

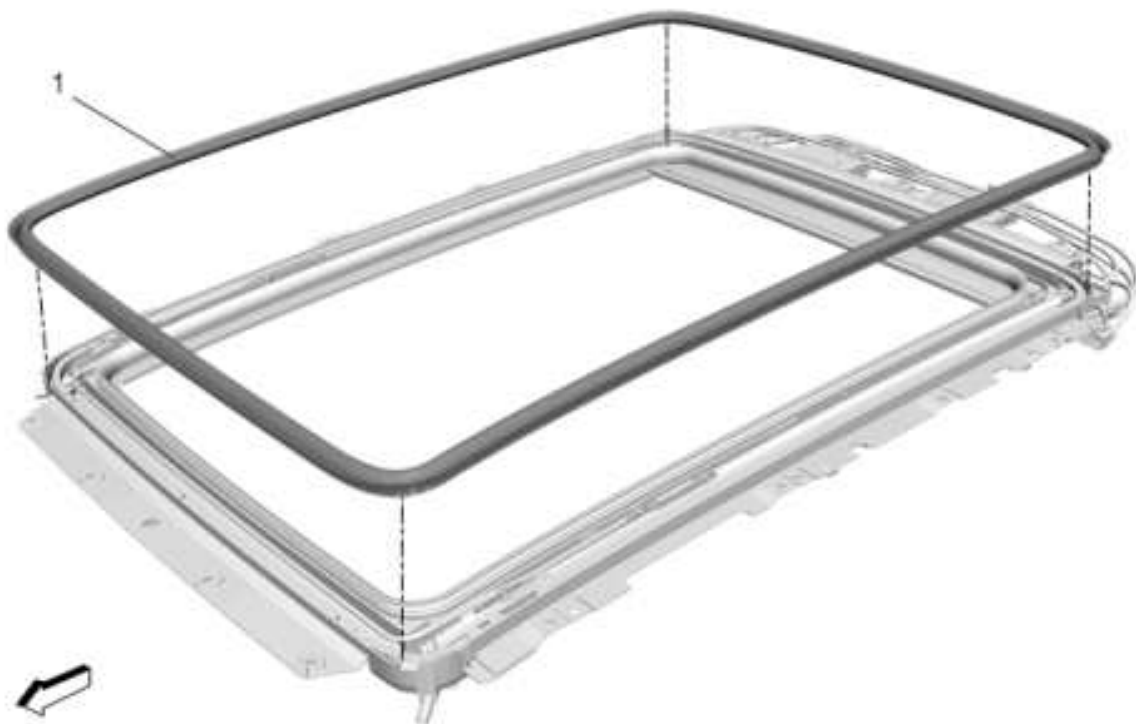


Fig. 36: Sunroof Window Seal (Outer)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Sunroof Housing. Refer to Sunroof Housing Replacement	
1	Sunroof Window Seal - Outer Procedure 1. Start at one end of the seal, pulling up and away from the housing. 2. Clean around the edge of the inside surface of the housing 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 headlining trim panel.

SUNROOF WINDOW SEAL REPLACEMENT - INNER

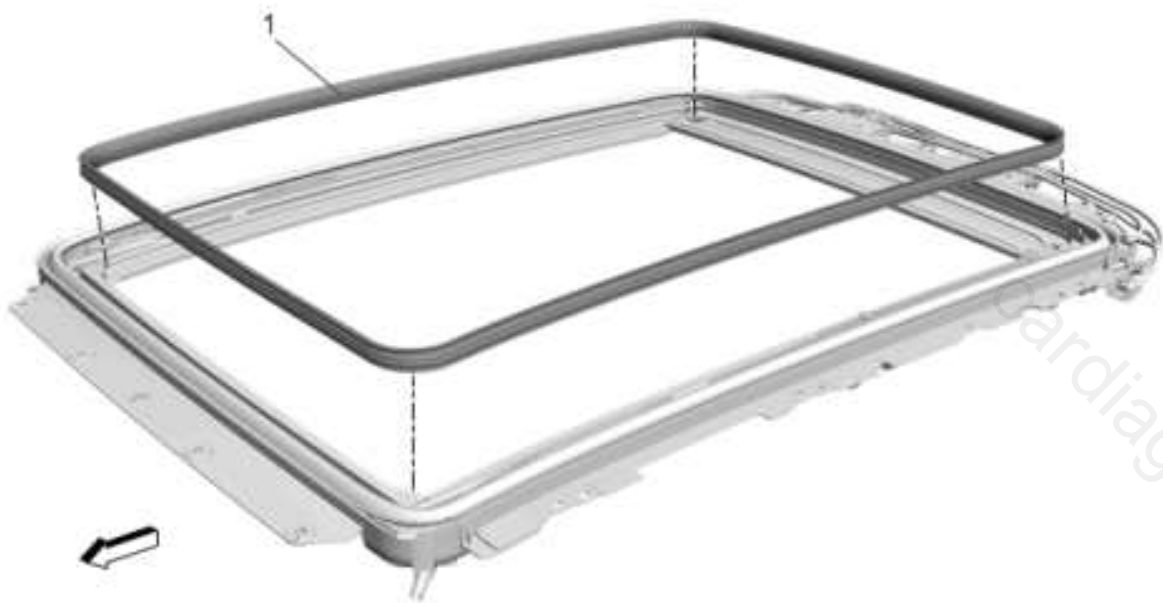


Fig. 37: Sunroof Window Seal (Inner)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Roof Stationary Window. Refer to Roof Stationary Window Replacement (Equinox)Roof Stationary Window Replacement (Terrain) 2. Remove Sunroof Window - Front. Refer to Sunroof Window Replacement - Front (Equinox)Sunroof Window Replacement - Front (Terrain)	
1	Sunroof Window Seal - Inner Procedure 1. Start at one end of the seal, pulling up and away from the frame. 2. Clean around the edge of the inside surface of the housing 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 headlining trim panel.

SUNROOF SUNSHADE SWITCH REPLACEMENT



Fig. 38: Sunroof Sunshade Switch

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Roof Console. Refer to Roof Console Replacement	
1	Sunroof Sunshade Switch Procedure 1. Disconnect all electrical connectors. 2. Transfer components as necessary. NOTE: The sunroof sunshade switch is serviced as part of the roof console assembly.

SUNROOF SWITCH REPLACEMENT



Fig. 39: Sunroof Switch

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Roof Console. Refer to Roof Console Replacement	
1	Sunroof Switch Procedure 1. Disconnect all electrical connectors. 2. Transfer components as necessary. NOTE: The sunroof switch is serviced as part of the roof console assembly.

ROOF STATIONARY WINDOW REPLACEMENT (EQUINOX)

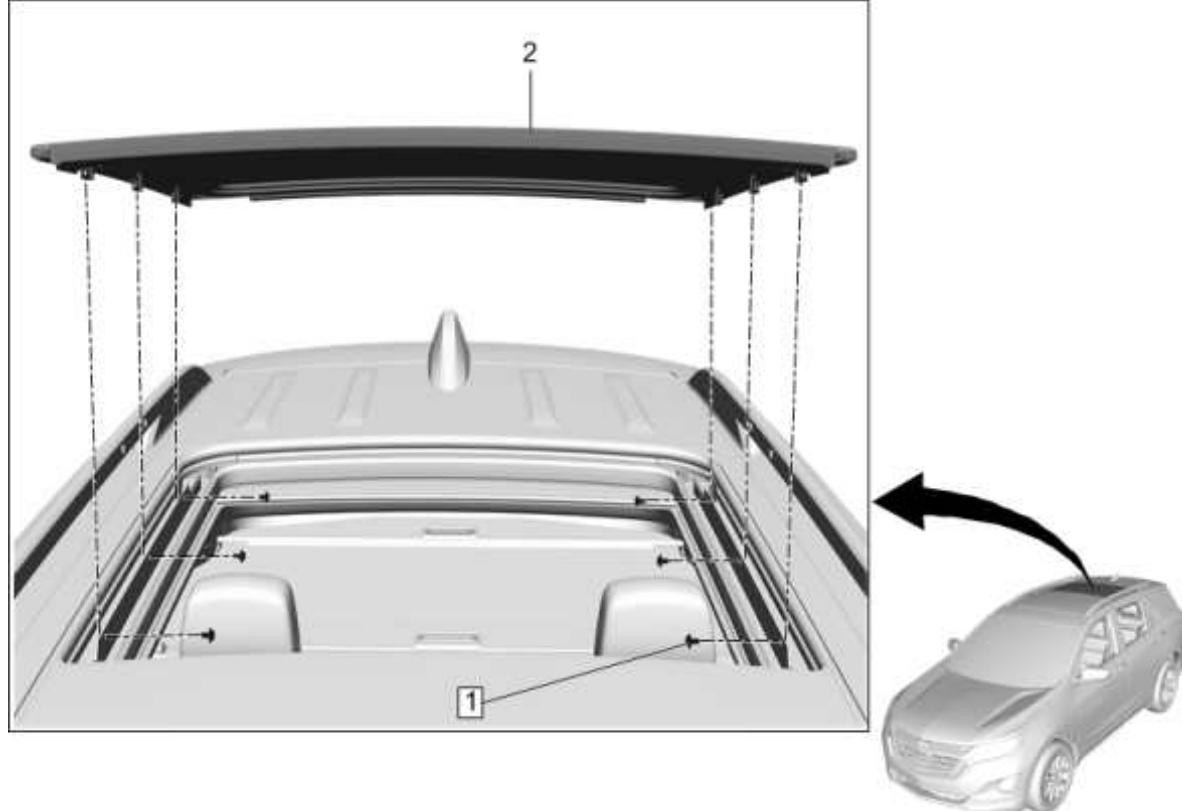


Fig. 40: Roof Stationary Window (Equinox)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Place the sunroof front window in the vent position.	
1	Roof Stationary Window Screw (Qty: 6) CAUTION: Refer to Fastener Caution . Procedure Pull down on the inner sunroof window seal to gain access to the stationary window screws. Tighten 1.5 N.m (13 lb in)
2	Roof Stationary Window Procedure 1. Lift the sunroof window out of the frame. 2. Refer to Sunroof Window Height and Opening Fit Adjustment 3. Water test and inspect sunroof for proper operation.

ROOF STATIONARY WINDOW REPLACEMENT (TERRAIN)



Fig. 41: Roof Stationary Window (Terrain)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Place the sunroof front window in the vent position.	
1	Roof Stationary Window Screw (Qty: 6) CAUTION: Refer to Fastener Caution . Procedure Pull down on the inner sunroof window seal to gain access to the stationary window screws. Tighten 1.5 N.m (13 lb in)
2	Roof Stationary Window Procedure 1. Lift the sunroof window out of the frame. 2. Refer to Sunroof Window Height and Opening Fit Adjustment 3. Water test and inspect sunroof for proper operation.

SUNROOF WINDOW HEIGHT AND OPENING FIT ADJUSTMENT



Fig. 42: Front Sunroof Window Rear Screws

Courtesy of GENERAL MOTORS COMPANY

1. Open the front sunroof window to the vent position.
2. Loosen the front sunroof window rear screws (1), left and right side.
3. Open the front sunroof to the half open position.
4. Loosen the front and middle sunroof window screws (1), left and right side.
5. Close the front sunroof.

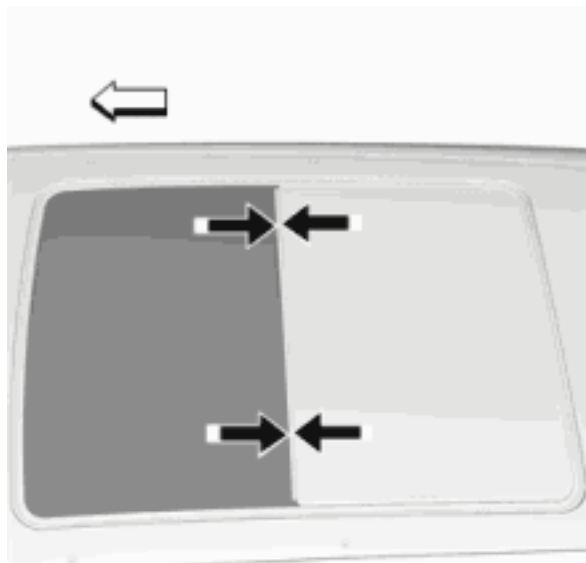


Fig. 43: Adjust Sunroof Window

Courtesy of GENERAL MOTORS COMPANY

NOTE: Tighten the sunroof window in the upper position.

6. Adjust the window to the following specs, gap 11.0 + or - 0.3 mm (0.43 in) between the front rear and rear front edges.

CAUTION: Refer to [Fastener Caution](#) .

7. Tighten the front sunroof window rear screws (1) to 1.5 N.m (13 lb in).
8. Open the front sunroof window until the rear part is in the vent position.
9. Tighten the front and middle sunroof window screws (1) to 1.5 N.m (13 lb in).
10. Close the front sunroof.

SUNROOF WINDOW REPLACEMENT - FRONT (EQUINOX)

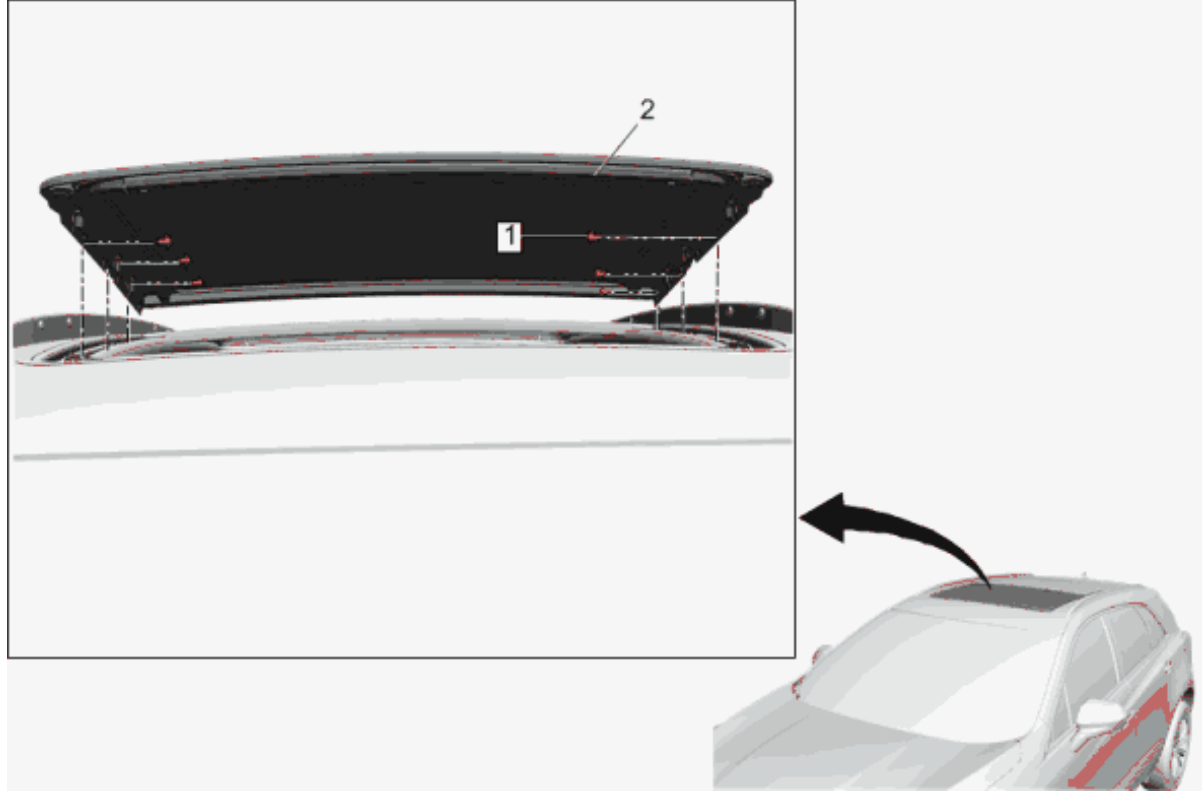


Fig. 44: Sunroof Window - Front (Equinox)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Sunroof Window Screw (Qty: 6) Procedure Pull down on the inner sunroof window seal to gain access to the screws. CAUTION: Refer to <u>Fastener Caution</u> . Tighten 1.5 N.m (13 lb in)
2	Sunroof Window Procedure 1. Lift the sunroof window out of the frame. 2. Refer to <u>Sunroof Window Height and Opening Fit Adjustment</u> 3. Water test and inspect sunroof for proper operation.

SUNROOF WINDOW REPLACEMENT - FRONT (TERRAIN)

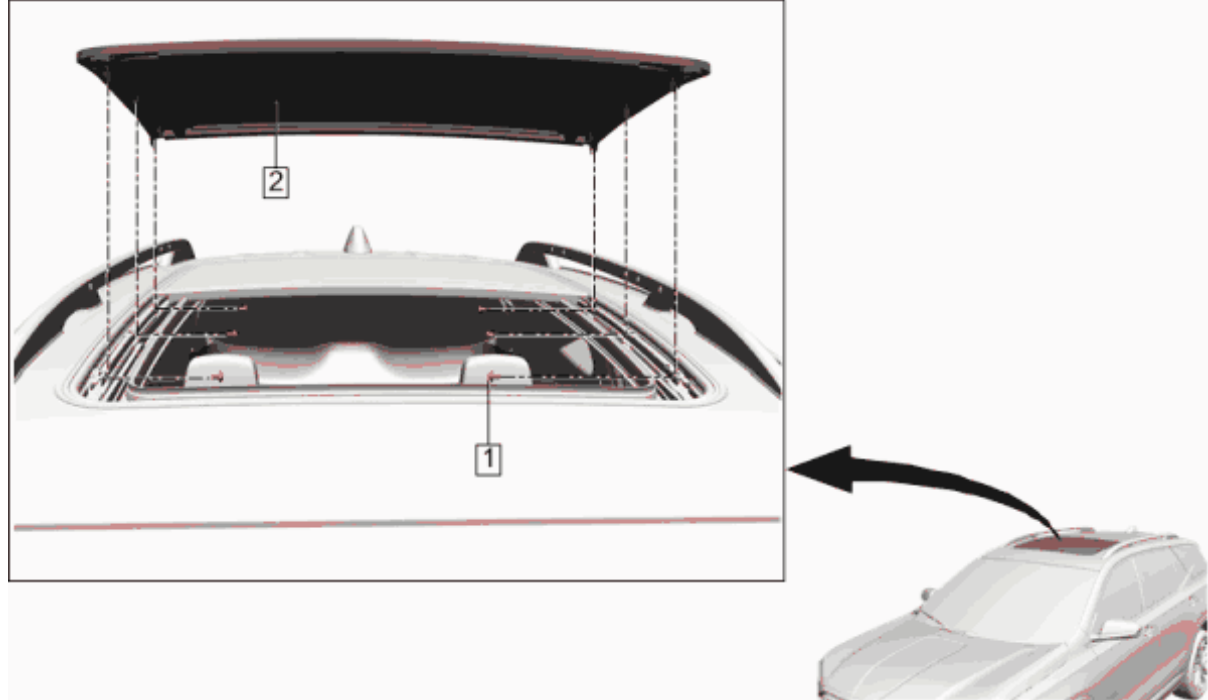


Fig. 45: Sunroof Window - Front (Terrain)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Sunroof Window Screw (Qty: 6) Procedure Pull down on the inner sunroof window seal to gain access to the screws. CAUTION: Refer to Fastener Caution . Tighten 1.5 N.m (13 lb in)
2	Sunroof Window Procedure 1. Lift the sunroof window out of the frame. 2. Refer to Sunroof Window Height and Opening Fit Adjustment 3. Water test and inspect sunroof for proper operation.

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 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.

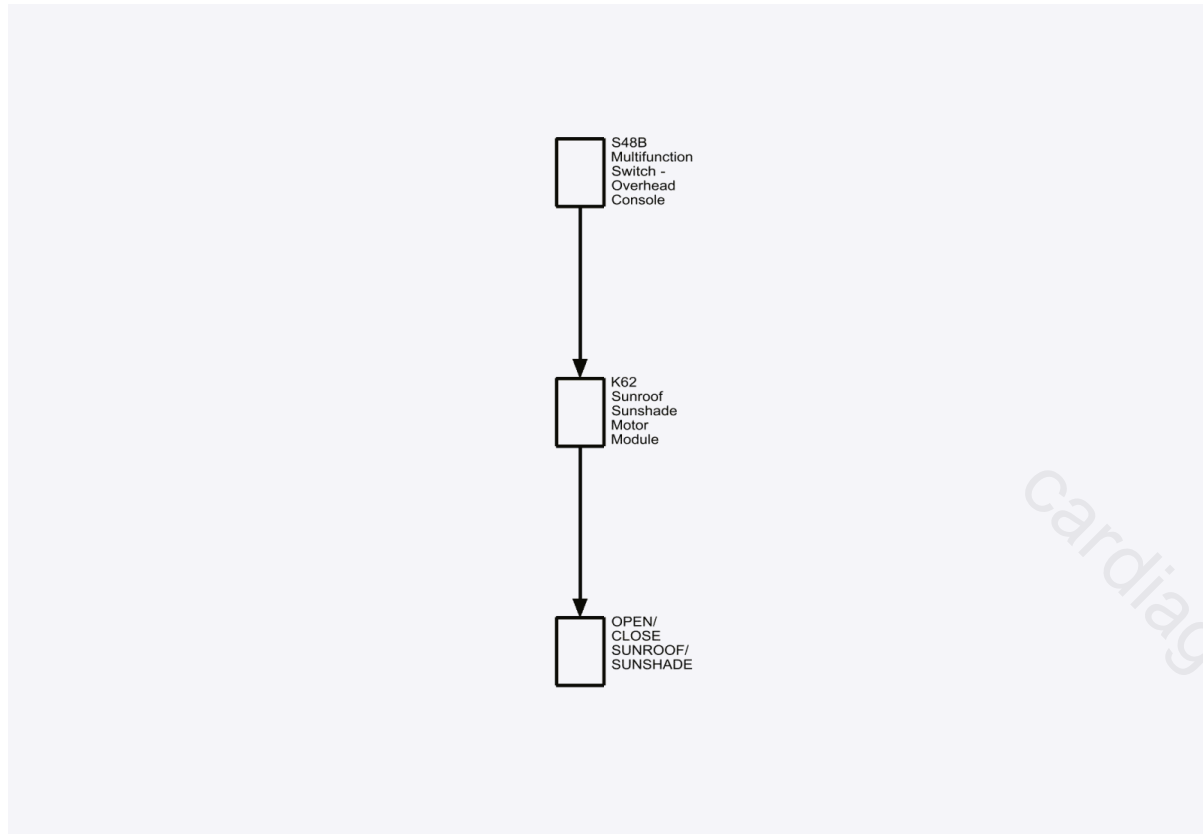


Fig. 46: Sunroof Sunshade Block Diagram
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S48B	S48B Multifunction Switch - Overhead Console
K62	K62 Sunroof Sunshade Motor Module

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

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 determines the sunshade has reached the fully closed position.
