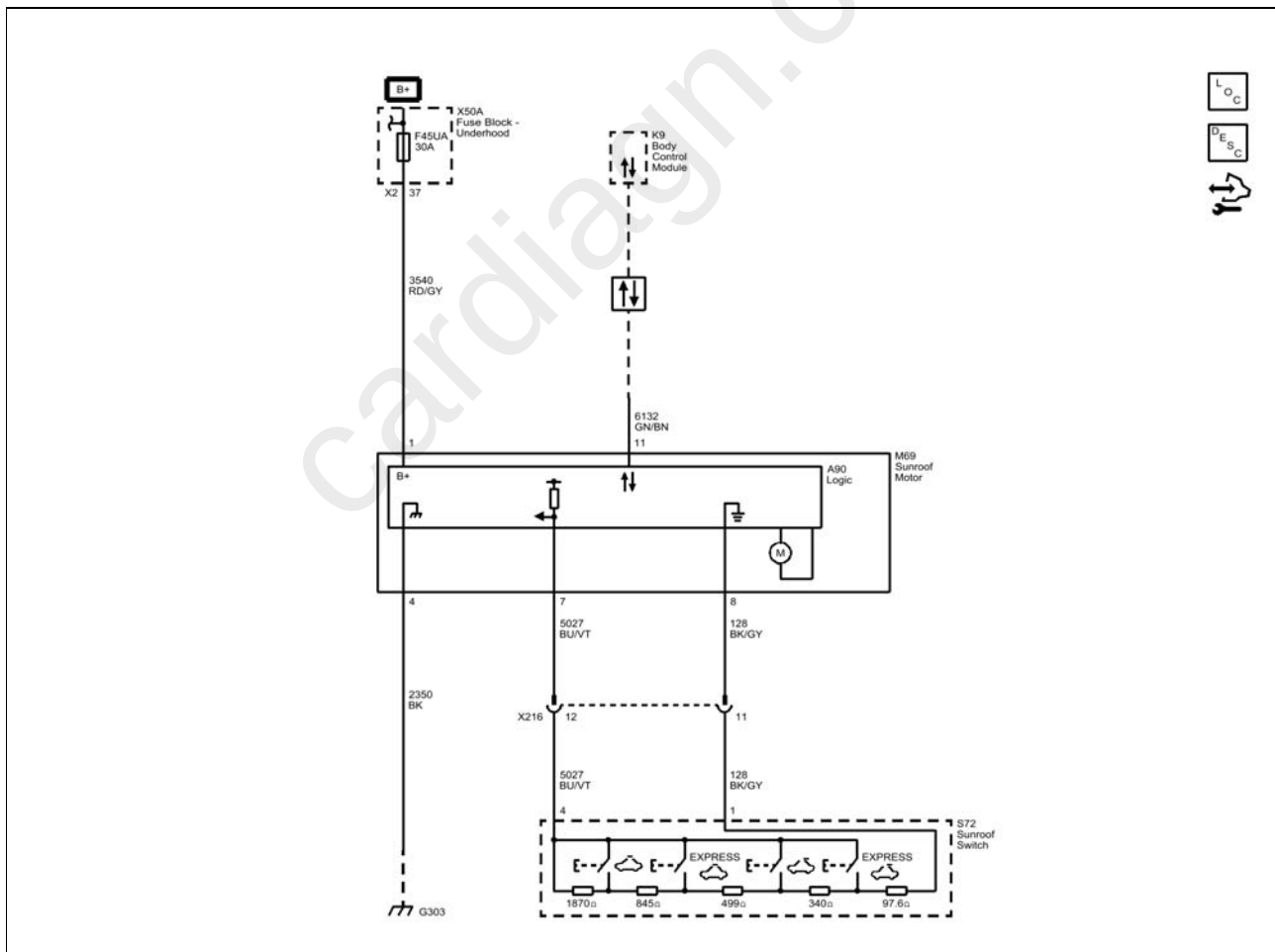


SPECIFICATIONS > FASTENER SPECIFICATIONS

Application	Specification	
	Metric	Metric (English)
Sunroof Actuator Motor Bolt	4 N.m	35 lb in
Sunroof Air Deflector Bolt	4 N.m	35 lb in
Sunroof Module Assembly Bolt	10 N.m	89 lb in
Sunroof Window Screw	8.5 N.m	75 lb in

SCHEMATIC WIRING DIAGRAMS > SUNROOF WIRING SCHEMATICS > SUNROOF (C3U)

Fig 1: 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.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > DTC DESCRIPTORS

DTC B3664

Sunroof Position Select Switch High Signal Circuit

For symptom byte information refer to Symptom Byte List .

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Sunroof Position Select Switch Signal Terminal 4	B3664 02	B3664 05	B3664 05	-
Sunroof Position Select Switch Low Reference Terminal 1	-	B3664 05	1	-
1. Power Sunroof Malfunction				

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > CIRCUIT/SYSTEM DESCRIPTION

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION

SELECT SWITCH HIGH SIGNAL CIRCUIT > CONDITIONS FOR RUNNING THE DTC

The ignition is ON.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > CONDITIONS FOR SETTING THE DTC

B3664 02

The sunroof motor has detected and reported via serial data that the sunroof switch signal is shorted to ground.

B3664 05

The sunroof motor has detected and reported via serial data that the sunroof switch signal is open or shorted to voltage.

B3664 59

The sunroof motor has detected and reported via serial data that the sunroof switch has been in 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > ACTION TAKEN WHEN THE DTC SETS

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > CONDITIONS FOR CLEARING THE DTC

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > REFERENCE INFORMATION

Schematic Reference

Sunroof Schematics

Connector End View Reference

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Sunroof Description and Operation

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

Scan Tool Reference

Control Module References for scan tool information

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > CIRCUIT/SYSTEM TESTING



NOTE:

Because of the accessibility of the S72 Sunroof Switch, perform the Component Testing before the Circuit/System Testing.

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S72 Sunroof Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 1 and ground.
 1. **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.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.
 2. If less than 2 Ω , test or replace the K61 Sunroof Control Module.
 1. **If less than 10 Ω**
3. Connect the harness connector at the S72 Sunroof Switch. Disconnect the harness connector at the K61 Sunroof Control Module.
4. Ignition ON.
5. Test for less than 1V between the signal circuit terminal 7 and ground:
 1. **If 1V or greater**
 1. Disconnect the harness connector at the S72 Sunroof Switch.
 2. Test for less than 1V between the appropriate signal circuit and ground.

1. If 1V or greater, repair the short to voltage on the circuit.

2. If less than 1V, test or replace the S72 Sunroof Switch.

- 1. If less than 1V**

6. Ignition OFF.

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

- 1. If less than infinite resistance**

1. Disconnect the harness connector at the S72 Sunroof Switch.

2. Test for less than infinite resistance between the appropriate signal circuit and ground.

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

2. If infinite resistance, test or replace the S72 Sunroof Switch.

- 1. If infinite resistance**

8. Disconnect the harness connector at the S72 Sunroof Switch.

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

1. S72 Sunroof Switch terminal 4 and K61 Sunroof Control Module

- 1. If greater than 5 Ω**

Repair the open/high resistance in the appropriate circuit.

- 1. If less than 5 Ω**

10. Test or replace the K61 Sunroof Control Module.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > COMPONENT TESTING

Sunroof Switch

Static Test

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch.

2. Test for 3.3-4.0k Ω between the signal circuit terminal 4 and the low reference terminal 1.

- 1. If not between 3.3-4.0k Ω**

Replace the S72 Sunroof Switch.

- 1. If between 3.3-4.0k Ω**

3. Test for 390-480 Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the open switch while pressing the open switch.

1. If not between 390-480 Ω

Replace the S72 Sunroof Switch.

1. If between 390-480 Ω

4. Test for 88-107 Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the express open switch.

1. If not between 88-107 Ω

Replace the S72 Sunroof Switch.

1. If between 88-107 Ω

5. Test for 1.6-2.0k Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the close switch.

1. If not between 1.6-2.0k Ω

Replace the S72 Sunroof Switch.

1. If between 1.6-2.0k Ω

6. Test for 840-1030 Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the express close switch.

1. If not between 840-1030 Ω

Replace the S72 Sunroof Switch.

1. If between 390-480 Ω

7. All OK

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3664: SUNROOF POSITION SELECT SWITCH HIGH SIGNAL CIRCUIT > REPAIR INSTRUCTIONS

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

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

DIAGNOSTIC INFORMATION AND PROCEDURES > 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.

- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > DTC DESCRIPTORS

DTC B3697

Sunroof Actuator Malfunction

For symptom byte information refer to Symptom Byte List .

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > 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).

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > CONDITIONS FOR RUNNING THE DTC

The ignition is ON.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > ACTION TAKEN WHEN THE DTC SETS

DTC B3697 is stored in the BCM memory.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > CONDITIONS FOR CLEARING THE DTC

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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > REFERENCE INFORMATION

Schematic Reference

Sunroof Schematics

Connector End View Reference

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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

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON.
2. Verify DTC B3697 42 or DTC B3697 4B is not set.

1. 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 (New Motor) Sunroof Motor/Actuator Initialization/Teach Process (Existing Motor) .
2. Verify DTC B3697 42 or DTC B3697 4B does not set while operating the sunroof.

1. If DTC B3697 42 or DTC B3697 4B sets

Replace the K61 Sunroof Control Module.

1. If DTC B3697 42 or DTC B3697 4B does not set

3. All OK.

1. If DTC B3697 42 or DTC B3697 4B is not set

3. Verify DTC B3697 00 or DTC B3697 39 is not set

1. If DTC B3697 00 or DTC B3697 39 is set

Replace the K61 Sunroof Control Module.

1. If DTC B3697 00 or DTC B3697 39 is not set

4. All OK.

DIAGNOSTIC INFORMATION AND PROCEDURES > DTC B3697: SUNROOF ACTUATOR MALFUNCTION > REPAIR INSTRUCTIONS

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Sunroof Actuator Motor Replacement
- Control Module References for sunroof motor/actuator replacement, setup, and programming.

DIAGNOSTIC INFORMATION AND PROCEDURES > 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:
 1. There are no DTCs set.
 2. 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 .

DIAGNOSTIC INFORMATION AND PROCEDURES > SYMPTOMS - ROOF > 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.

DIAGNOSTIC INFORMATION AND PROCEDURES > SYMPTOMS - ROOF > INTERMITTENT

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

DIAGNOSTIC INFORMATION AND PROCEDURES > SYMPTOMS - ROOF > SYMPTOM LIST

Refer to Power Sunroof Malfunction .

DIAGNOSTIC INFORMATION AND PROCEDURES > 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.
- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF MALFUNCTION > DIAGNOSTIC FAULT INFORMATION

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Serial Data	U151B	U151B	U151B	-
Sunroof Tilt Signal	1	1	B3664 05	-
Low Reference	-	B3664 05	-	-

Sunroof Motor Ground	-	1	-	-
1. Power Sunroof Malfunction				

DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF MALFUNCTION > CIRCUIT/SYSTEM DESCRIPTION

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

As the system master, the BCM uses the LIN-Bus communication bus to enable or disable sunroof operation, communicates vehicle information to the controller, and request sunroof movement. The sunroof controller provides system status and diagnostic information to the BCM for diagnostic reporting and operational purposes. The control switch places a different resistor ladder network in the circuit depending on the function selected. The controller analog to digital switch input reads the resulting voltage range and determines the function.

DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF MALFUNCTION > REFERENCE INFORMATION

Schematic Reference

Sunroof Schematics

Connector End View Reference

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

Scan Tool Reference

Control Module References for scan tool information

DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF MALFUNCTION > CIRCUIT/SYSTEM VERIFICATION

1. Ignition ON.
2. Verify DTC U151B is not set.
 1. **If DTC U151B is set**

Refer to DTC U1500-U15FF .
 1. **If DTC U151B is not set**
3. Verify the sunroof opens and closes when pressing the open and close sunroof switch.
 1. **If the sunroof does not open or close**

Refer to Circuit/System Testing.
 1. **If the sunroof opens and closes**
4. Verify the sunroof opens and closes to the vent position when pressing the open and close sunroof vent switch.
 1. **If the sunroof does not open or close to the vent position**

Refer to Circuit/System Testing.
 1. **If the sunroof opens and closes to the vent position**
5. All OK.

DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF MALFUNCTION > CIRCUIT/SYSTEM TESTING



NOTE:

Because of the accessibility of the switches, perform the Switch Component Testing before beginning the Circuit/System Testing.

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 terminals listed below and ground:
 1. Sunroof Control Module Ground - Terminal 4
 2. Low Reference - Terminal 8
1. **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 ground circuit end to end.
 1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , repair the open/high resistance in the ground connection.

1. If less than 10 Ω

3. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.

1. If 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.

1. If 2 Ω or greater, repair the open/high resistance in the circuit.

2. If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.

1. 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.

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

2. If infinite resistance, replace the K61 Sunroof Control Module.

1. If the test lamp illuminates

4. Ignition ON.

5. Test for less than 1 V between the signal circuit terminal 7 and ground:

1. If 1 V or greater

Repair the short to voltage on the signal circuit.

1. If less than 1 V

6. Ignition OFF.

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

1. If less than infinite resistance

Repair the short to ground on the signal circuit

1. If infinite resistance

8. Disconnect the harness connector at the S72 Sunroof Switch.

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

1. S72 Sunroof Switch terminal 4 and K61 Sunroof Control Module terminal 7

1. If greater than 5 Ω

Repair the open/high resistance in the circuit.

1. If less than 5 Ω

10. Test or replace the K61 Sunroof Control Module.

DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF MALFUNCTION > COMPONENT TESTING

Sunroof Switch

Static Test

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch.
2. Test for 3.3-4.0k Ω between the signal circuit terminal 4 and the low reference terminal 1.
 1. **If not between 3.3-4.0k Ω**
Replace the S72 Sunroof Switch.
 1. **If between 3.3-4.0k Ω**
3. Test for 390-480 Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the open switch while pressing the open switch.
 1. **If not between 390-480 Ω**
Replace the S72 Sunroof Switch.
 1. **If between 390-480 Ω**
4. Test for 88-107 Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the express open switch.
 1. **If not between 88-107 Ω**
Replace the S72 Sunroof Switch.
 1. **If between 88-107 Ω**
5. Test for 1.6-2.0k Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the close switch.
 1. **If not between 1.6-2.0k Ω**
Replace the S72 Sunroof Switch.
 1. **If between 1.6-2.0k Ω**
6. Test for 840-1030 Ω between the signal circuit terminal 4 and the low reference terminal 1 while pressing the express close switch.
 1. **If not between 840-1030 Ω**
Replace the S72 Sunroof Switch.
 1. **If between 390-480 Ω**
7. All OK

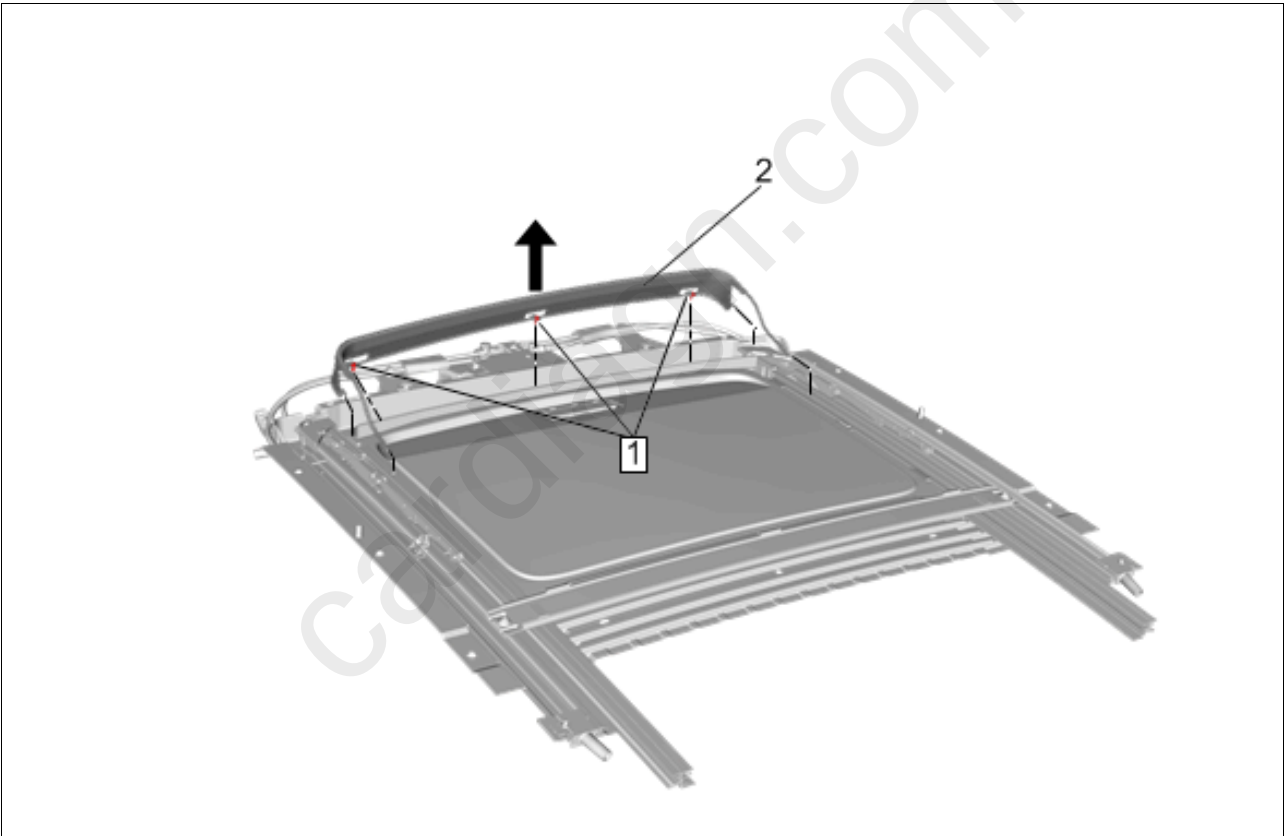
**DIAGNOSTIC INFORMATION AND PROCEDURES > POWER SUNROOF
MALFUNCTION > REPAIR INSTRUCTIONS**

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

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

REPAIR INSTRUCTIONS > SUNROOF AIR DEFLECTOR REPLACEMENT

Fig 1: Sunroof Air Deflector



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Sunroof Air Deflector Bolt (Qty: 3)

CAUTION:

Refer to Fastener Caution .

Procedure

1. Open the sunroof window to the fully open position.
2. Release the left and right side of the sunroof air deflector side tension arms from the frame.
3. Use care not to damage the sunroof air deflector screen.

Tighten

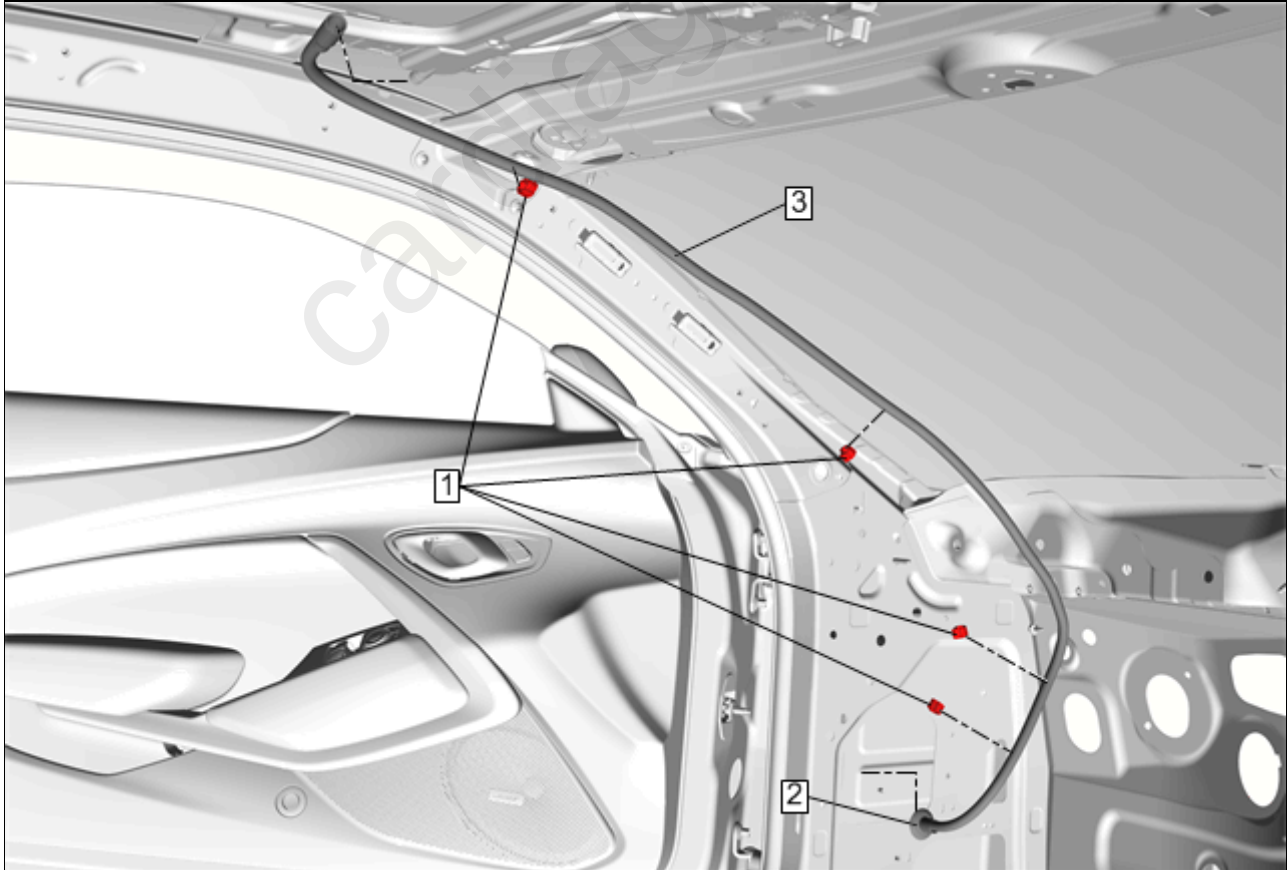
4 N.m (35 lb in).

2

Sunroof Air Deflector

REPAIR INSTRUCTIONS > SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT

Fig 1: Sunroof Housing Front Drain Hose



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Headlining Trim Panel Replacement 2. Front Side Door Sill Garnish Molding Replacement	
 NOTE: <i>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.</i>	
1	Sunroof Housing Front Drain Hose Retainer (Qty: 4)  NOTE: <i>Unclip the sunroof housing front drain hose from the retainer.</i>
2	Sunroof Housing Front Drain Hose Grommet Procedure Ensure the end of the drain hose grommet is fully seated in the access hole of the side pillar to prevent water leaks in the interior.
3	Sunroof Housing Front Drain Hose Procedure 1. Install the sunroof front drain hose to the sunroof housing. 2. Water test vehicle to ensure No leaks.  NOTE: <i>Attach a piece of mechanics wire to the sunroof drain hose prior to pulling the hose up and out of the pillar. Attach the NEW hose to the mechanics wire to assist in guiding the NEW hose through the pillar passage.</i>

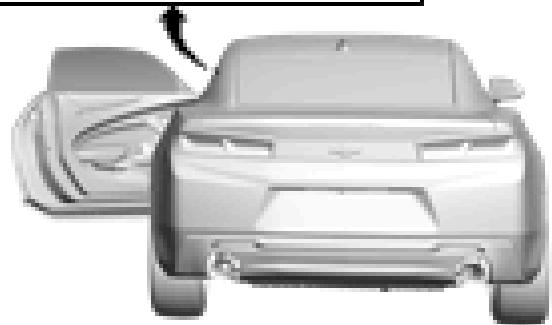
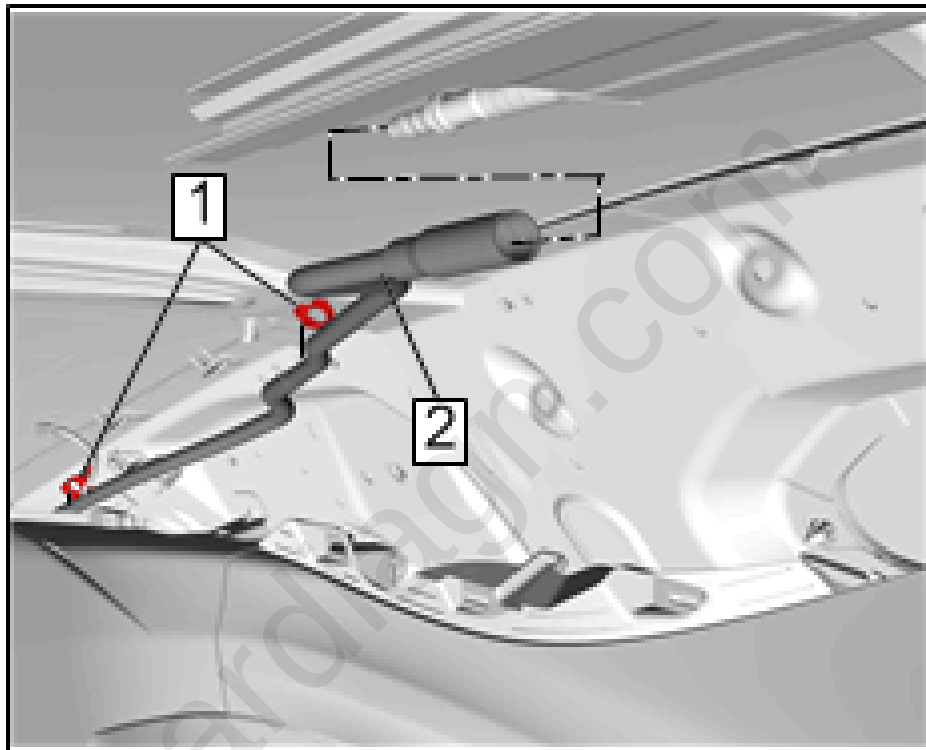
REPAIR INSTRUCTIONS > SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT (LEFT SIDE) > REMOVAL PROCEDURE

 NOTE:

It is only necessary to lower the headliner. Only do the steps in headliner replacement that will lower the headliner enough to gain access to the part.

1. Remove Headlining Trim Panel Replacement
2. Remove Rear Compartment Side Trim Replacement - Left Side (Coupe)Rear Compartment Side Trim Replacement - Left Side (Convertible)

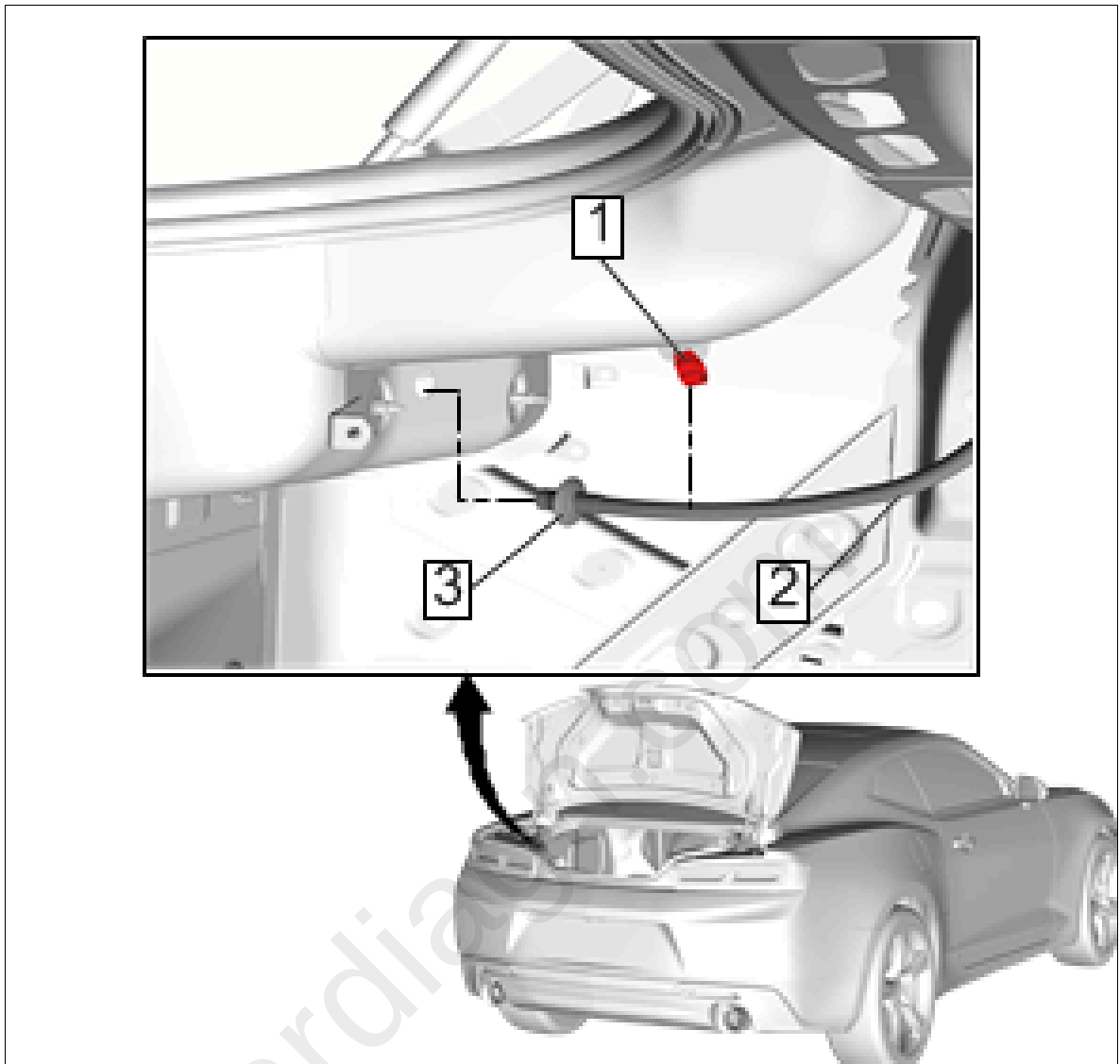
Fig 1: Sunroof Housing Rear Drain Hose And Retainers



Courtesy of GENERAL MOTORS COMPANY

3. Unclip Sunroof Housing Rear Drain Hose Retainer (1) (Qty: 2) at Sunroof Housing Rear Drain Hose (2)
4. Remove Sunroof Housing Rear Drain Hose (2) at Sunroof Module

Fig 2: Sunroof Housing Rear Drain Hose Retainer And Sunroof Housing Rear Drain Hose

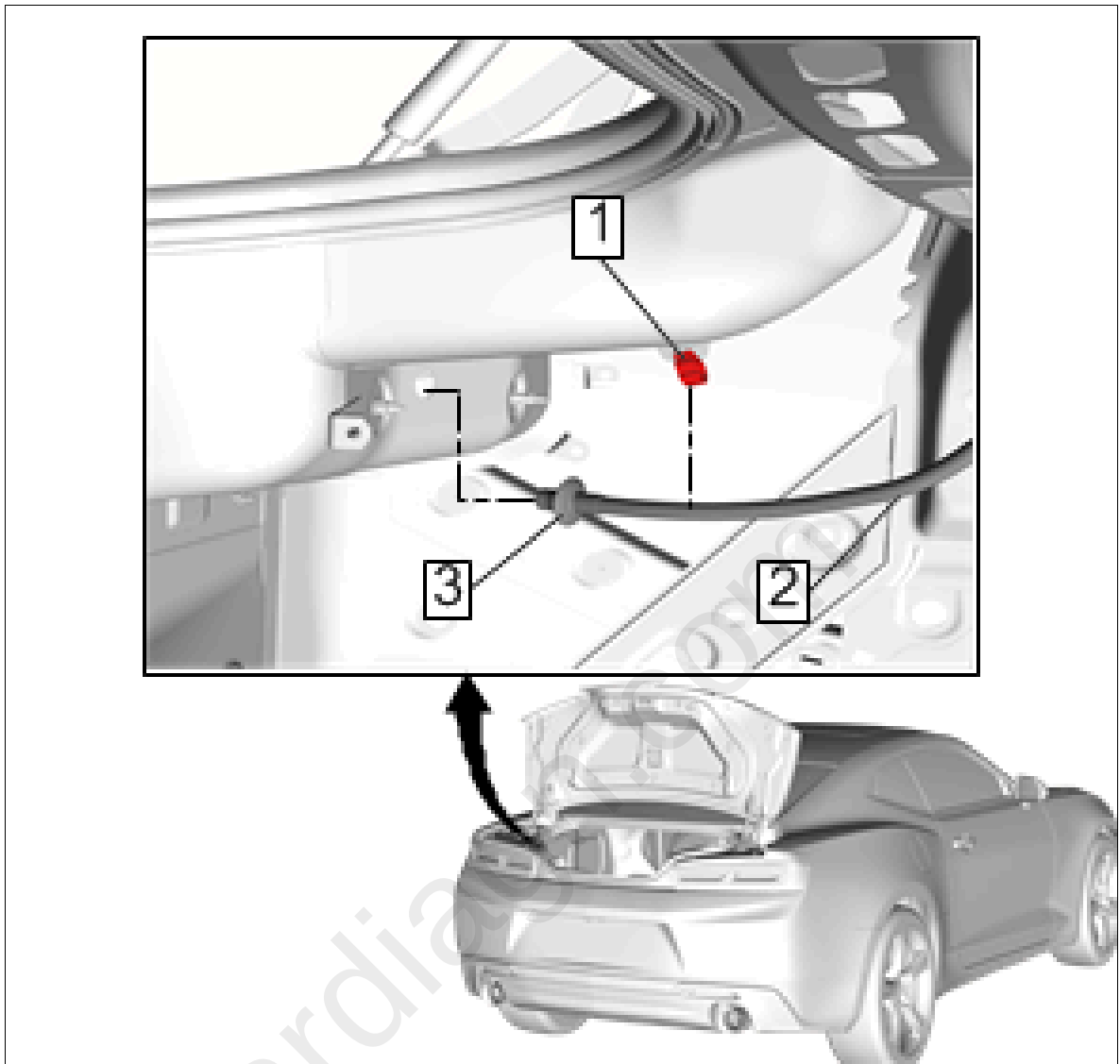


Courtesy of GENERAL MOTORS COMPANY

5. Unclip Sunroof Housing Rear Drain Hose Retainer (1) (Qty: 1) at Sunroof Housing Rear Drain Hose (2)
6. Remove Sunroof Housing Rear Drain Hose (2) at Sunroof Housing Rear Drain Hose Grommet (3)

**REPAIR INSTRUCTIONS > SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT
(LEFT SIDE) > INSTALLATION PROCEDURE**

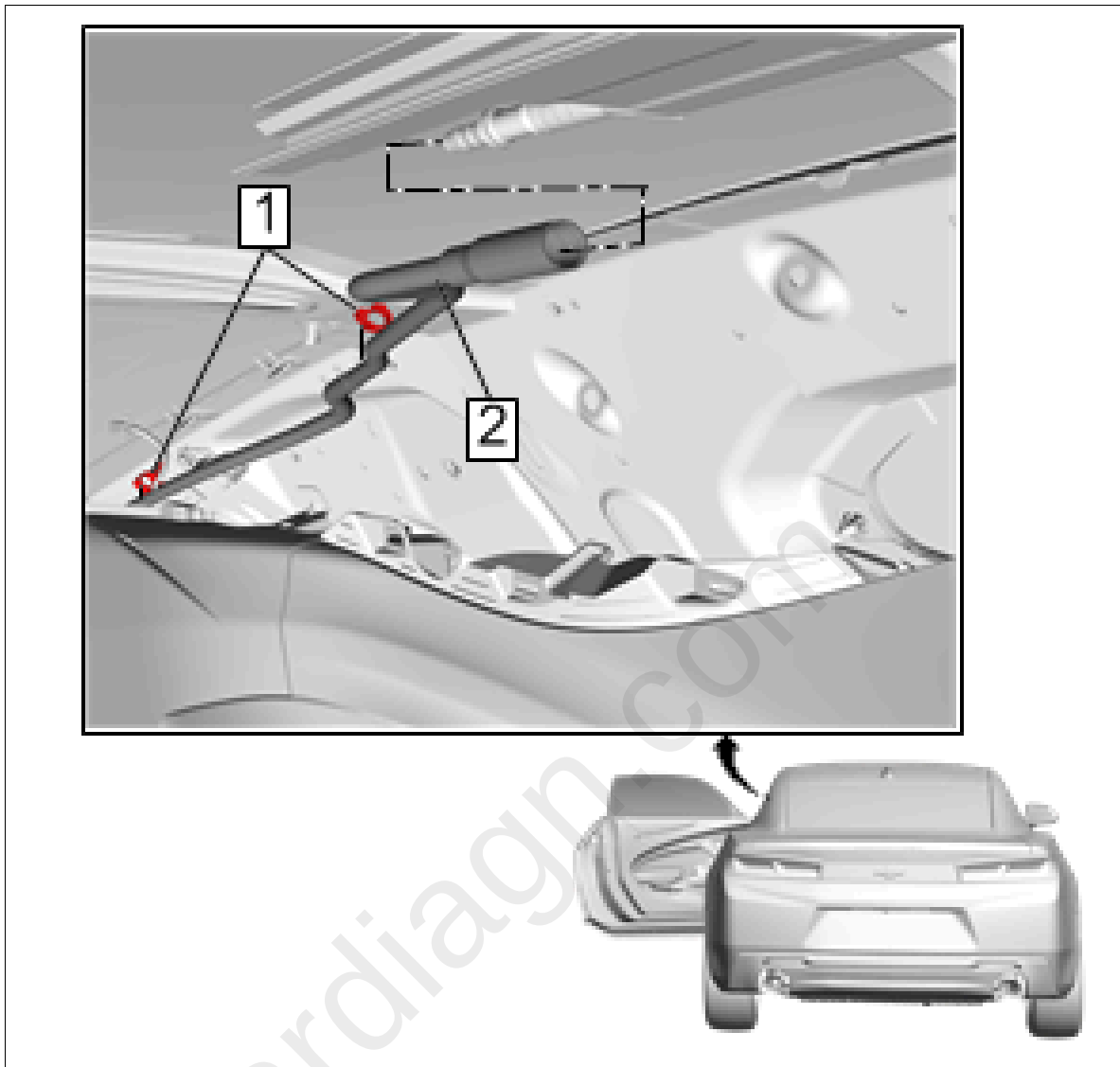
Fig 1: Sunroof Housing Rear Drain Hose Retainer And Sunroof Housing Rear Drain Hose



Courtesy of GENERAL MOTORS COMPANY

1. Clip Sunroof Housing Rear Drain Hose Retainer (1) at Sunroof Housing Rear Drain Hose (2)
2. Install Sunroof Housing Rear Drain Hose (2) at Sunroof Housing Rear Drain Hose Grommet (3)

Fig 2: Sunroof Housing Rear Drain Hose Retainers



Courtesy of GENERAL MOTORS COMPANY

3. Clip Sunroof Housing Rear Drain Hose Retainer (1) (Qty: 2) at Sunroof Housing Rear Drain Hose (2)
4. Install Sunroof Housing Rear Drain Hose (2) at Sunroof Module
5. Check sunroof rear drain hose for any leaks before installing the trim panels.
6. Install Rear Compartment Side Trim Replacement - Left Side (Coupe)Rear Compartment Side Trim Replacement - Left Side (Convertible)
7. Install Headlining Trim Panel Replacement

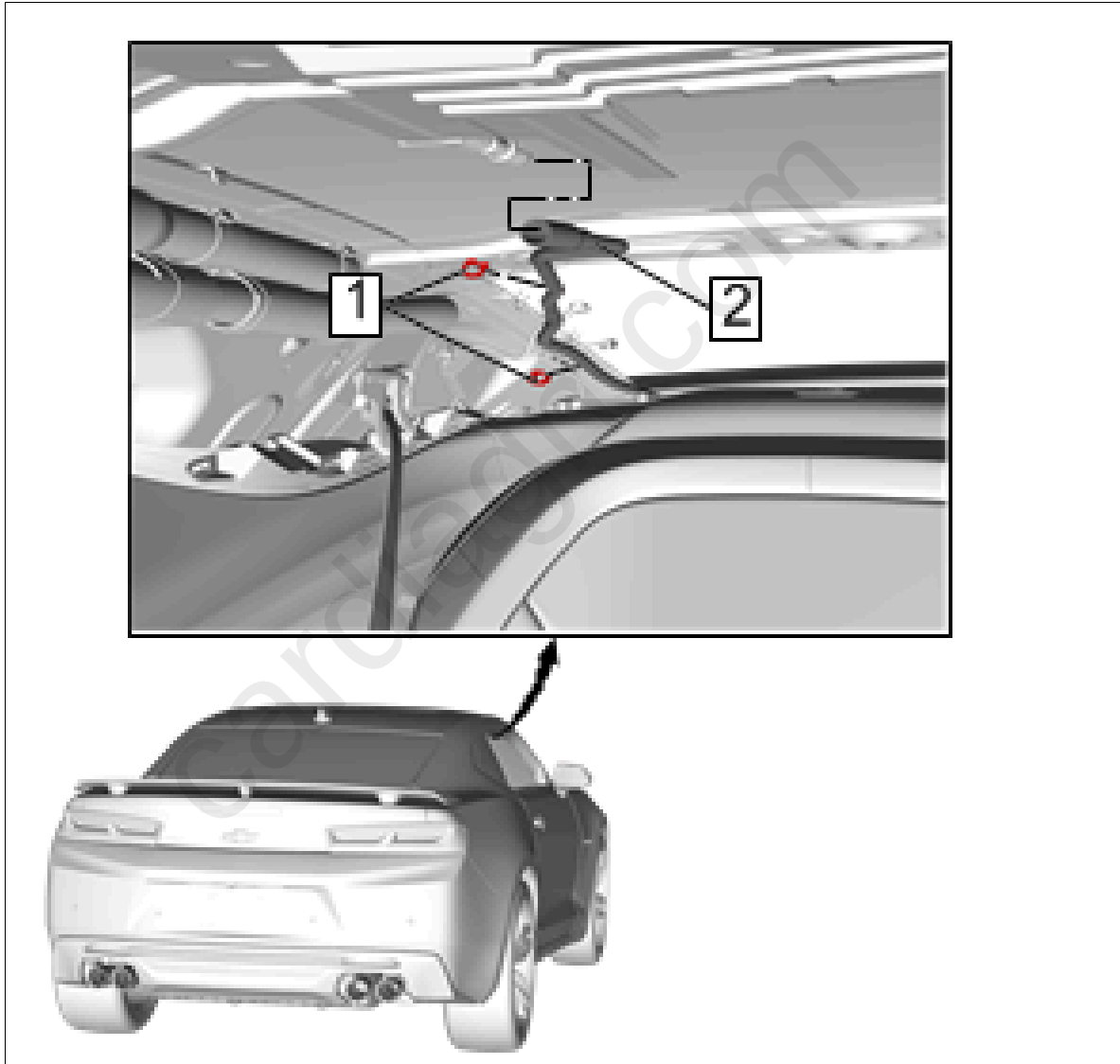
REPAIR INSTRUCTIONS > SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT (RIGHT SIDE) > REMOVAL PROCEDURE

 NOTE:

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.

1. Remove Headlining Trim Panel Replacement
2. Remove Rear Compartment Side Trim Replacement - Right Side (Coupe)Rear Compartment Side Trim Replacement - Right Side (Convertible)

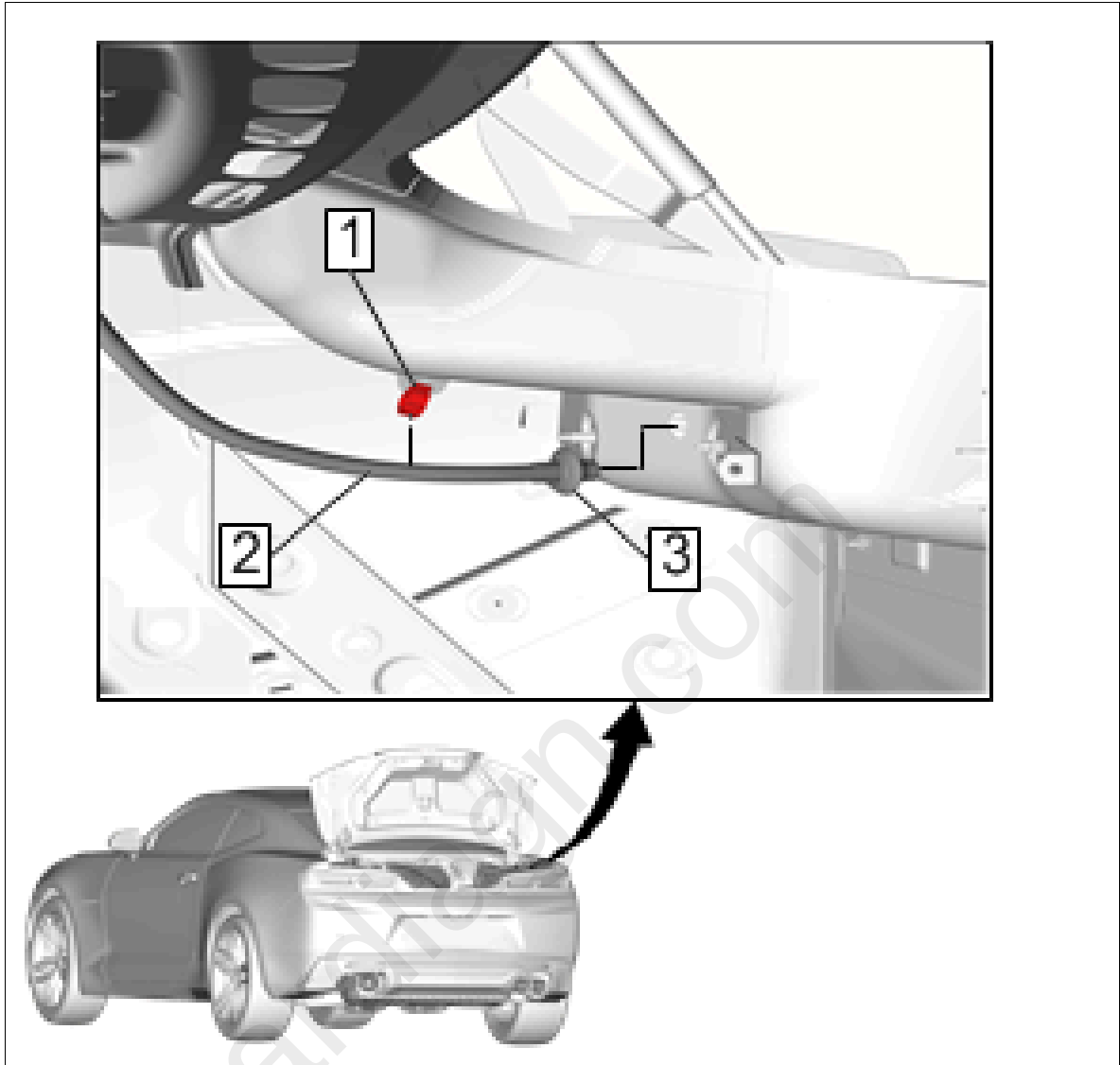
Fig 1: Sunroof Housing Rear Drain Hose Retainers



Courtesy of GENERAL MOTORS COMPANY

3. Unclip Sunroof Housing Rear Drain Hose Retainer (1) (Qty: 2) at Sunroof Housing Rear Drain Hose (2)
4. Remove Sunroof Housing Rear Drain Hose (2) at Sunroof Module

Fig 2: Sunroof Housing Rear Drain Hose Retainer, Grommet And Sunroof Housing Rear Drain Hose

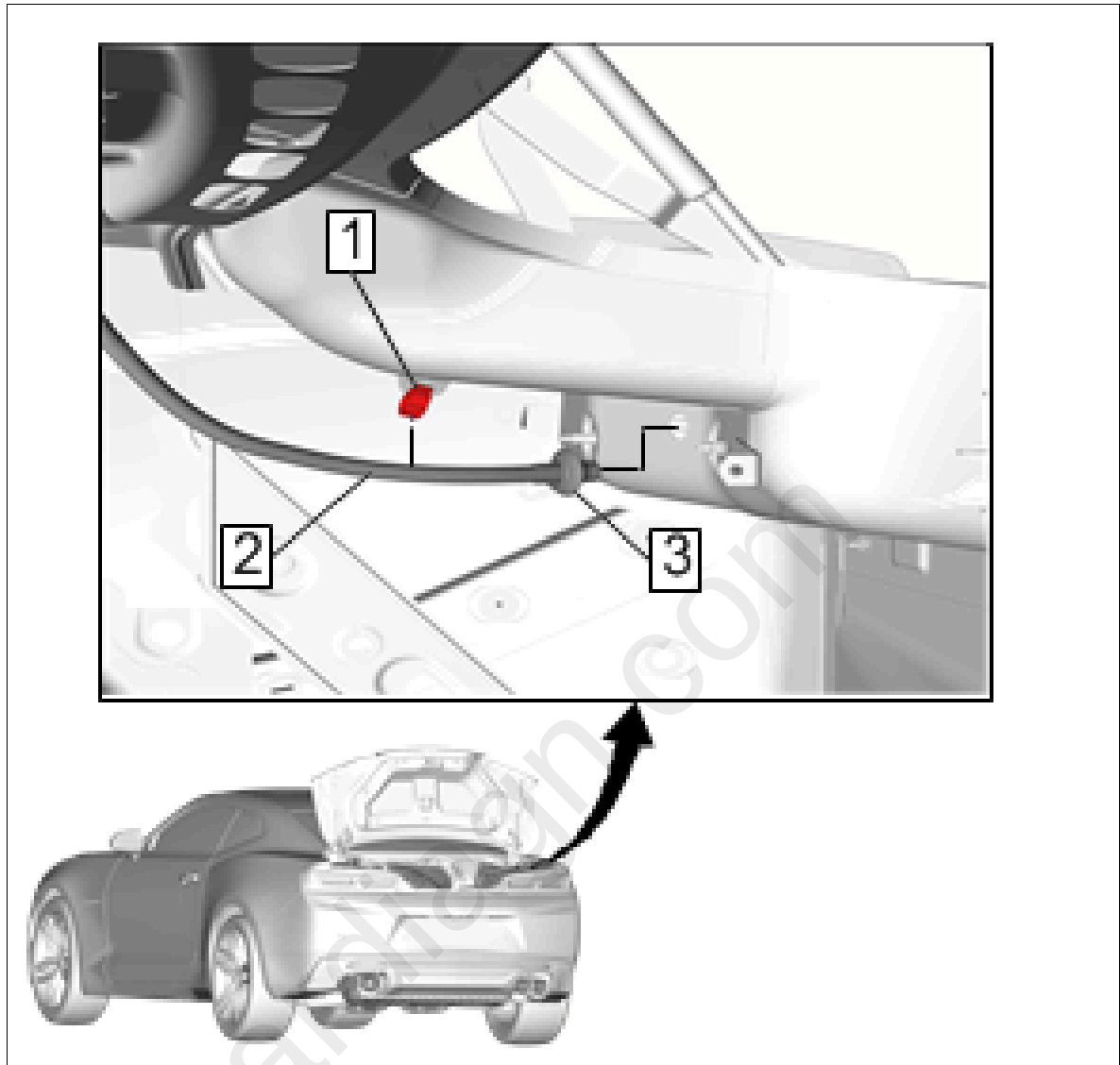


Courtesy of GENERAL MOTORS COMPANY

5. Unclip Sunroof Housing Rear Drain Hose Retainer (1) at Sunroof Housing Rear Drain Hose (2)
6. Remove Sunroof Housing Rear Drain Hose (2) at Sunroof Housing Rear Drain Hose Grommet (3)

**REPAIR INSTRUCTIONS > SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT
(RIGHT SIDE) > INSTALLATION PROCEDURE**

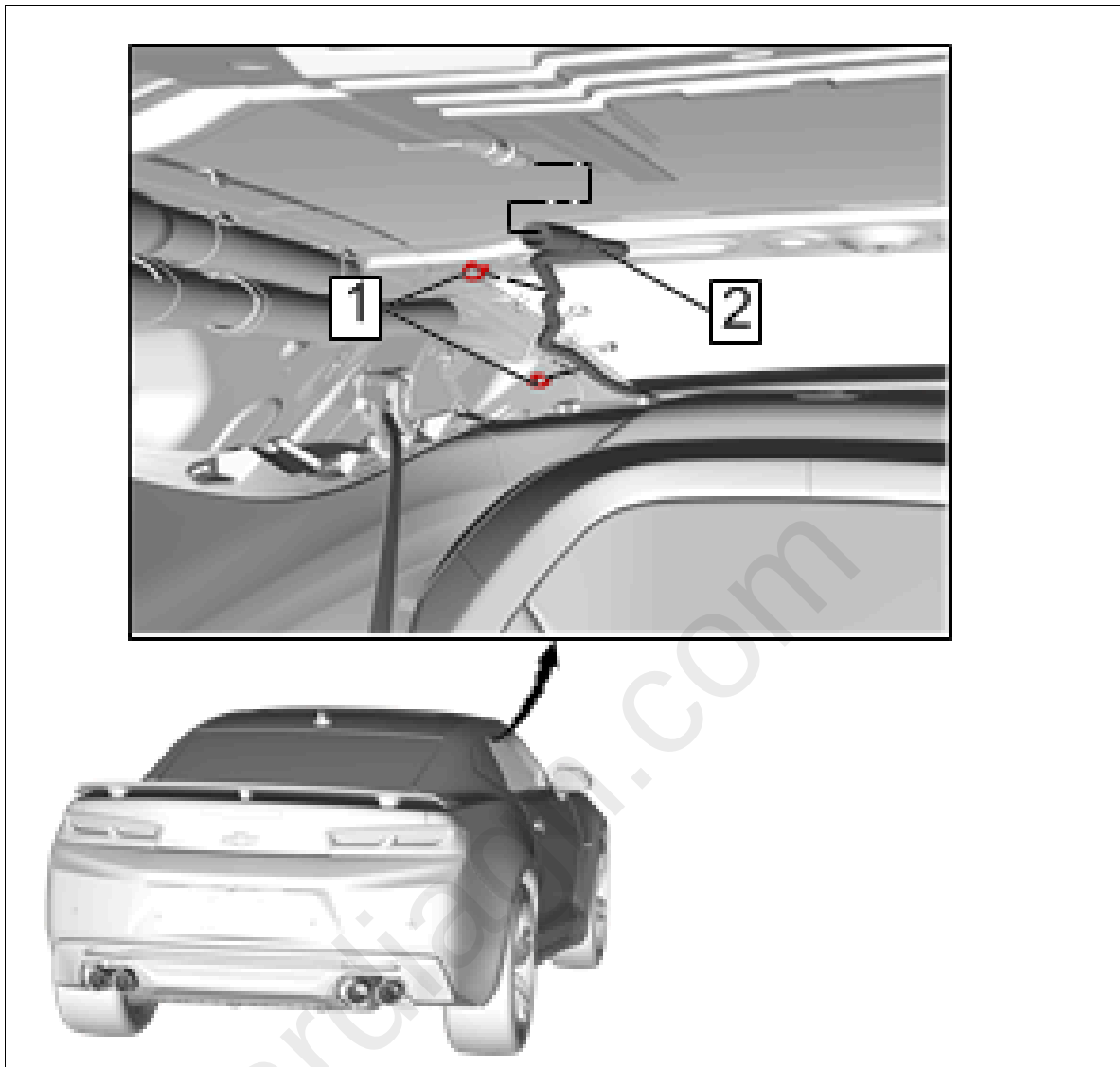
Fig 1: Sunroof Housing Rear Drain Hose Retainer, Grommet And Sunroof Housing Rear Drain Hose



Courtesy of GENERAL MOTORS COMPANY

1. Clip Sunroof Housing Rear Drain Hose Retainer (1) at Sunroof Housing Rear Drain Hose (2)
2. Install Sunroof Housing Rear Drain Hose (2) at Sunroof Housing Rear Drain Hose Grommet (3)

Fig 2: Sunroof Housing Rear Drain Hose Clips

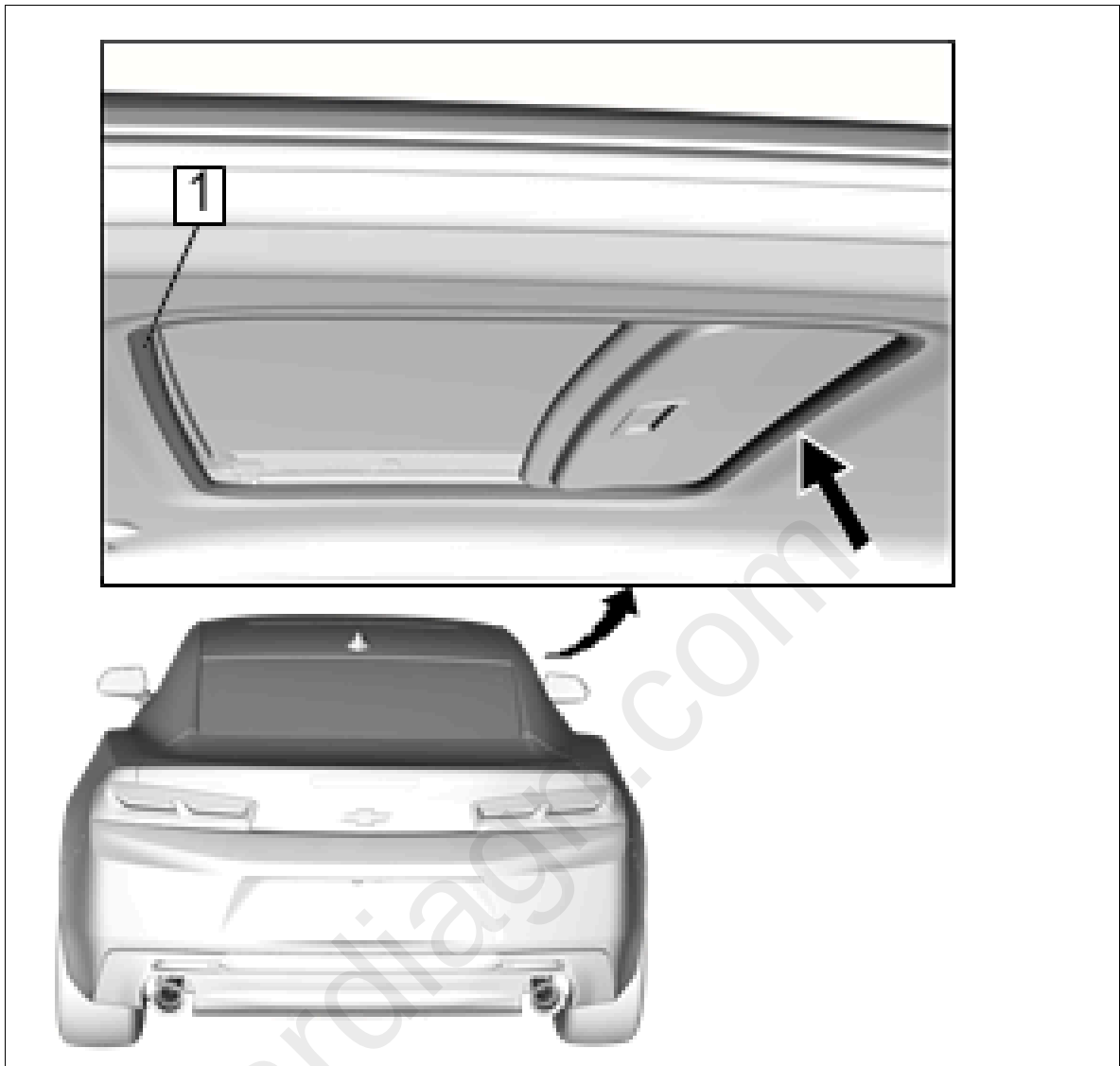


Courtesy of GENERAL MOTORS COMPANY

3. Clip Sunroof Housing Rear Drain Hose (1) (Qty: 2) at Sunroof Housing Rear Drain Hose (2)
4. Install Sunroof Housing Rear Drain Hose (2) at Sunroof Module
5. Check sunroof rear drain hose for any leaks before installing the trim panels.
6. Install Rear Compartment Side Trim Replacement - Right Side (Coupe)Rear Compartment Side Trim Replacement - Right Side (Convertible)
7. Install Headlining Trim Panel Replacement

**REPAIR INSTRUCTIONS > SUNROOF OPENING TRIM FINISH LACE REPLACEMENT
> REMOVAL PROCEDURE**

Fig 1: Sunroof Opening Trim Finish Lace

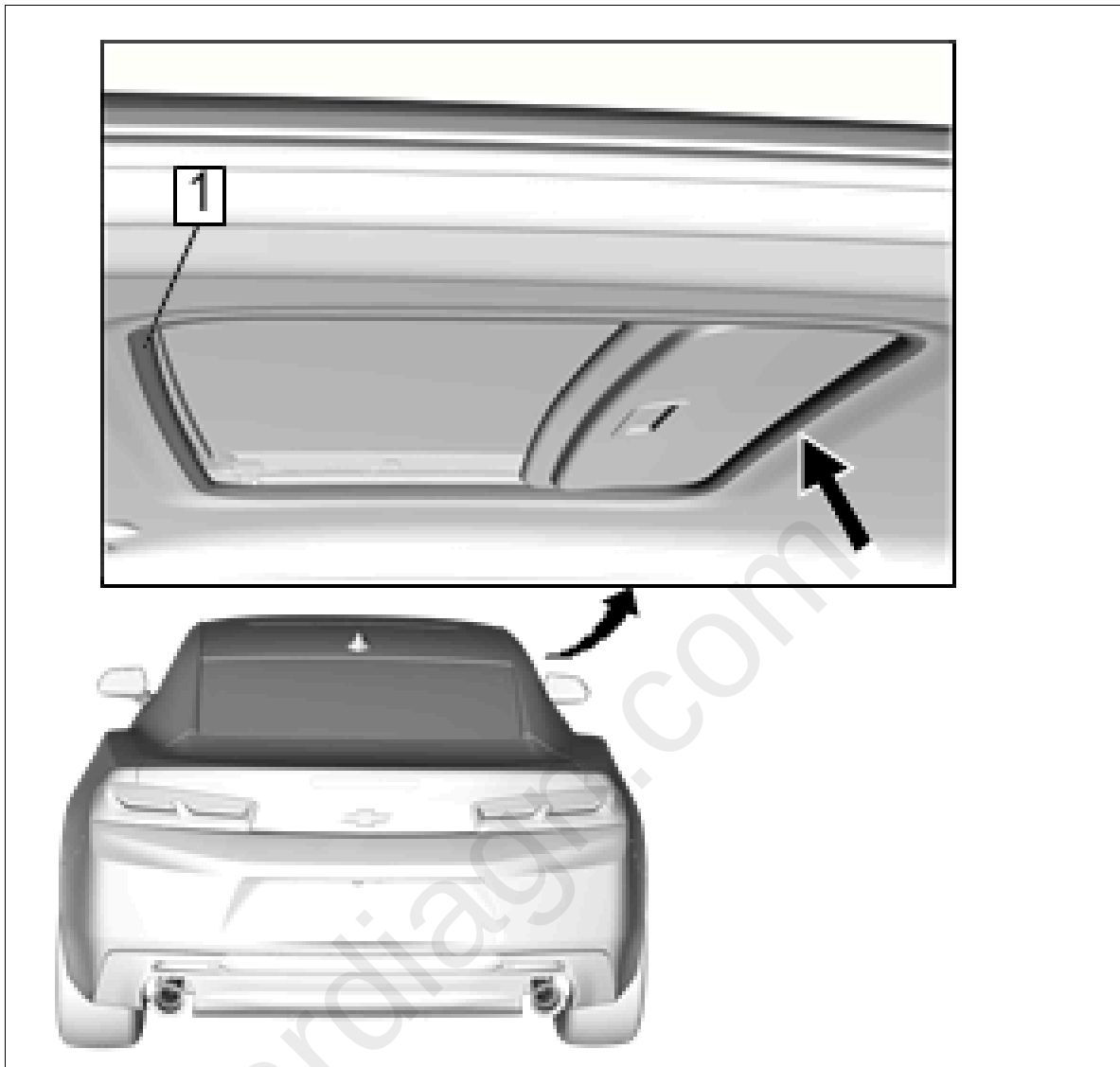


Courtesy of GENERAL MOTORS COMPANY

1. Beginning at the joint on the rear center of the sunroof opening, pull the sunroof finishing lace (1) from the sunroof window track assembly.
2. Remove the sunroof finishing lace (1) from the track assembly.

**REPAIR INSTRUCTIONS > SUNROOF OPENING TRIM FINISH LACE REPLACEMENT
> INSTALLATION PROCEDURE**

Fig 1: End Of Sunroof Finishing Lace At Center Of Rear Center Of Sunroof Opening



Courtesy of GENERAL MOTORS COMPANY

1. Position the end of the sunroof finishing lace (1) at the center of the rear center of the sunroof opening.
2. Push the sunroof finishing lace (1) onto the track assembly flange until fully seated around the sunroof opening.
3. Ensure that the sunroof finishing lace (1) is properly seated over the outer surface of the headliner.

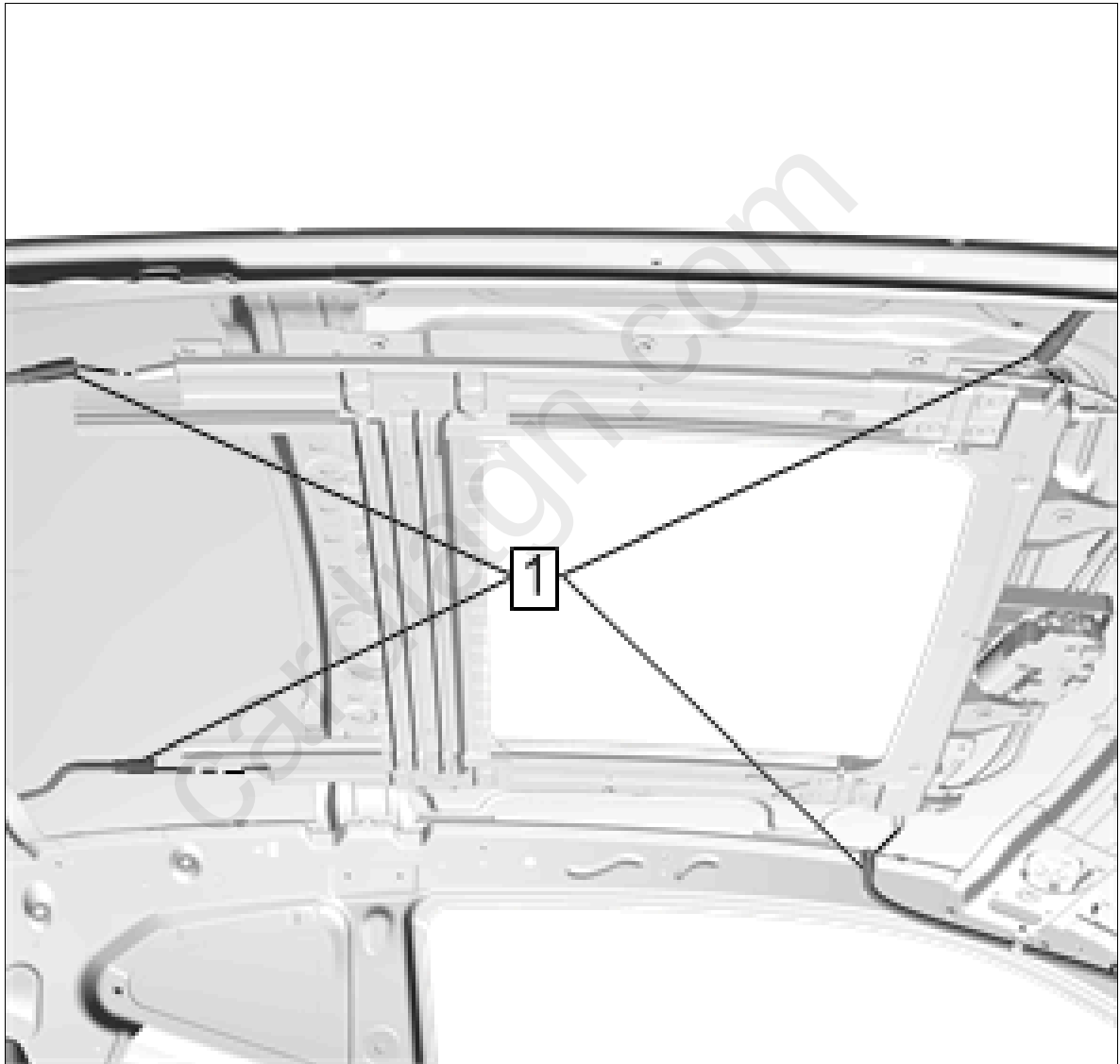
REPAIR INSTRUCTIONS > SUNROOF MODULE ASSEMBLY REPLACEMENT > REMOVAL PROCEDURE

 **NOTE:**

A new sunroof module assembly does not include the sunroof window. You must install the old sunroof window to the new sunroof module assembly.

1. Remove Sunroof Window - Sunroof Window Replacement
2. Remove Headlining Trim Panel - Headlining Trim Panel Replacement
3. Remove Electrical Connector at Sunroof Window Motor
4. Remove Electrical Harness at Sunroof Module Assembly

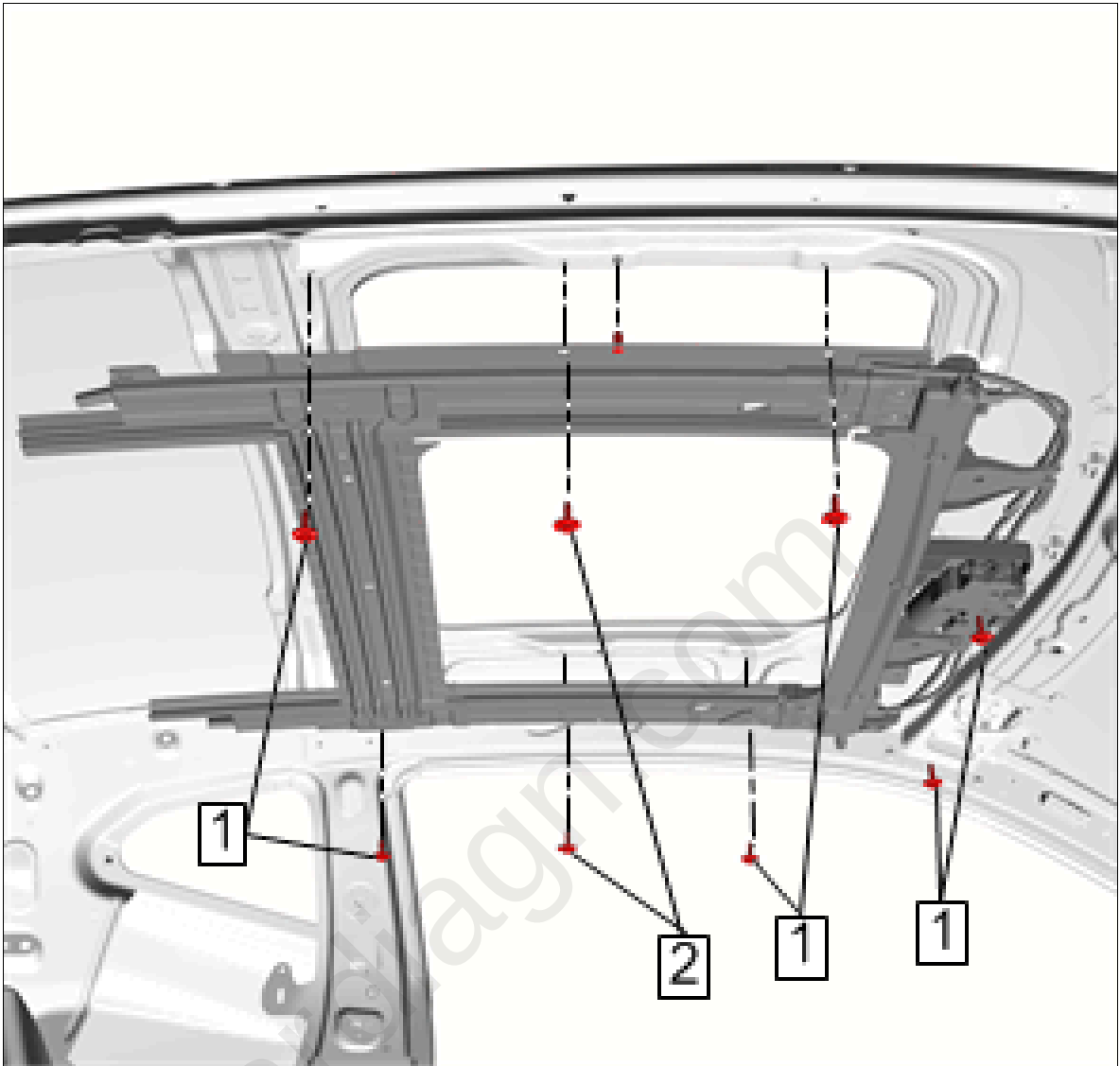
Fig 1: Drain Hose At Sunroof Module Assembly



Courtesy of GENERAL MOTORS COMPANY

5. Remove Drain Hose (1) at Sunroof Module Assembly

Fig 2: Sunroof Module Bolts



Courtesy of GENERAL MOTORS COMPANY

 NOTE:

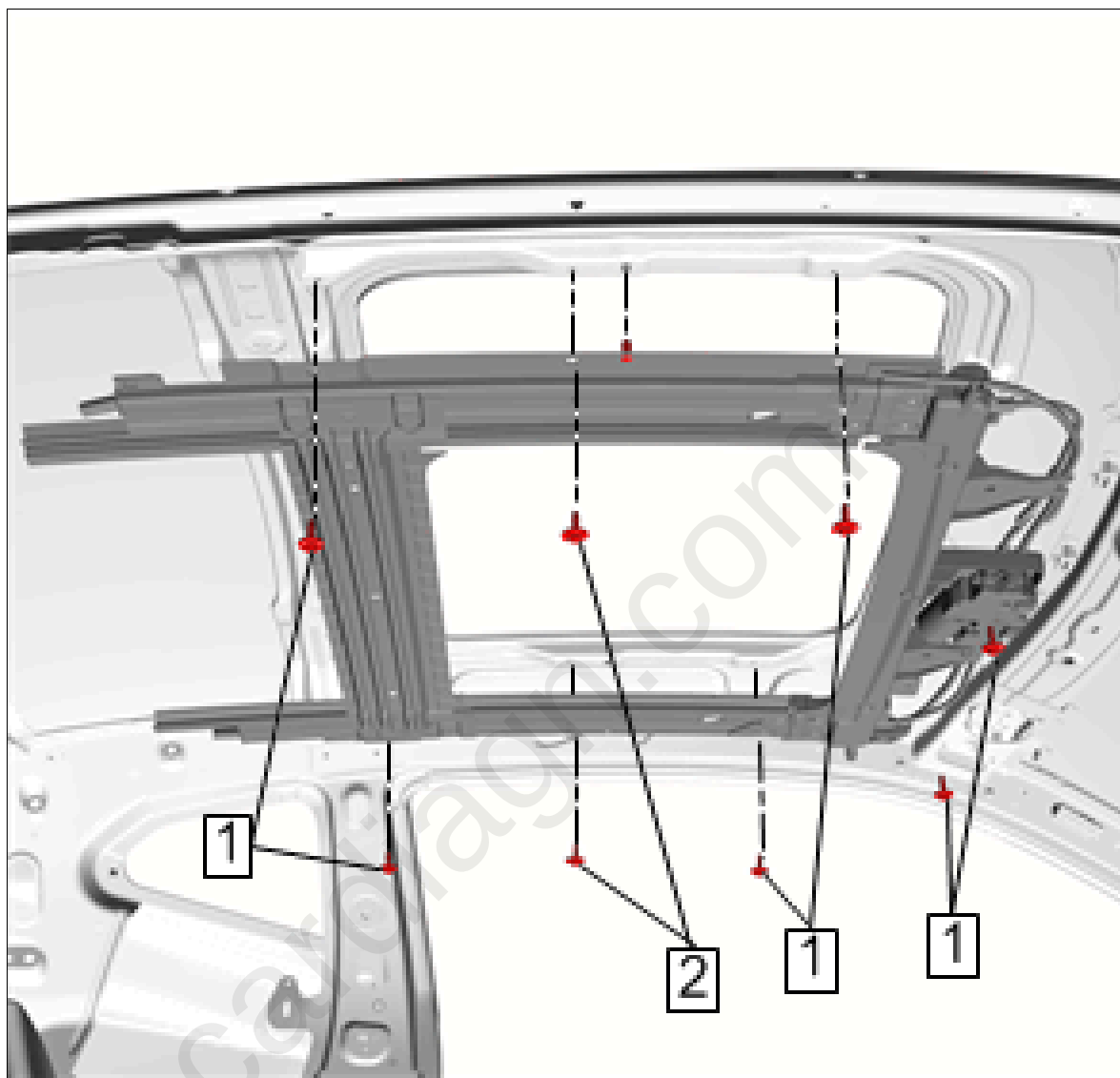
Remove the 2 center bolts last in order to help support the sunroof module assembly to the roof.

6. Remove Sunroof Module Bolt (1) at Sunroof Module Assembly (Qty: 6)
7. Remove Sunroof Module Bolt (2) at Sunroof Module Assembly (Qty: 2)
8. With the aid of an assistant, lower the sunroof module assembly and remove through the passenger side door.

INSTALLATION PROCEDURE

1. Transfer components as necessary.

Fig 1: Sunroof Module Bolts



Courtesy of GENERAL MOTORS COMPANY

2. With the aid of an assistant, position the new sunroof module assembly using the studs to align the bolt holes.
3. Hand tighten Sunroof Module Bolt (2) at roof (Qty: 2)
4. Hand tighten Sunroof Module Bolt (1) at Sunroof Module Assembly (Qty: 6)



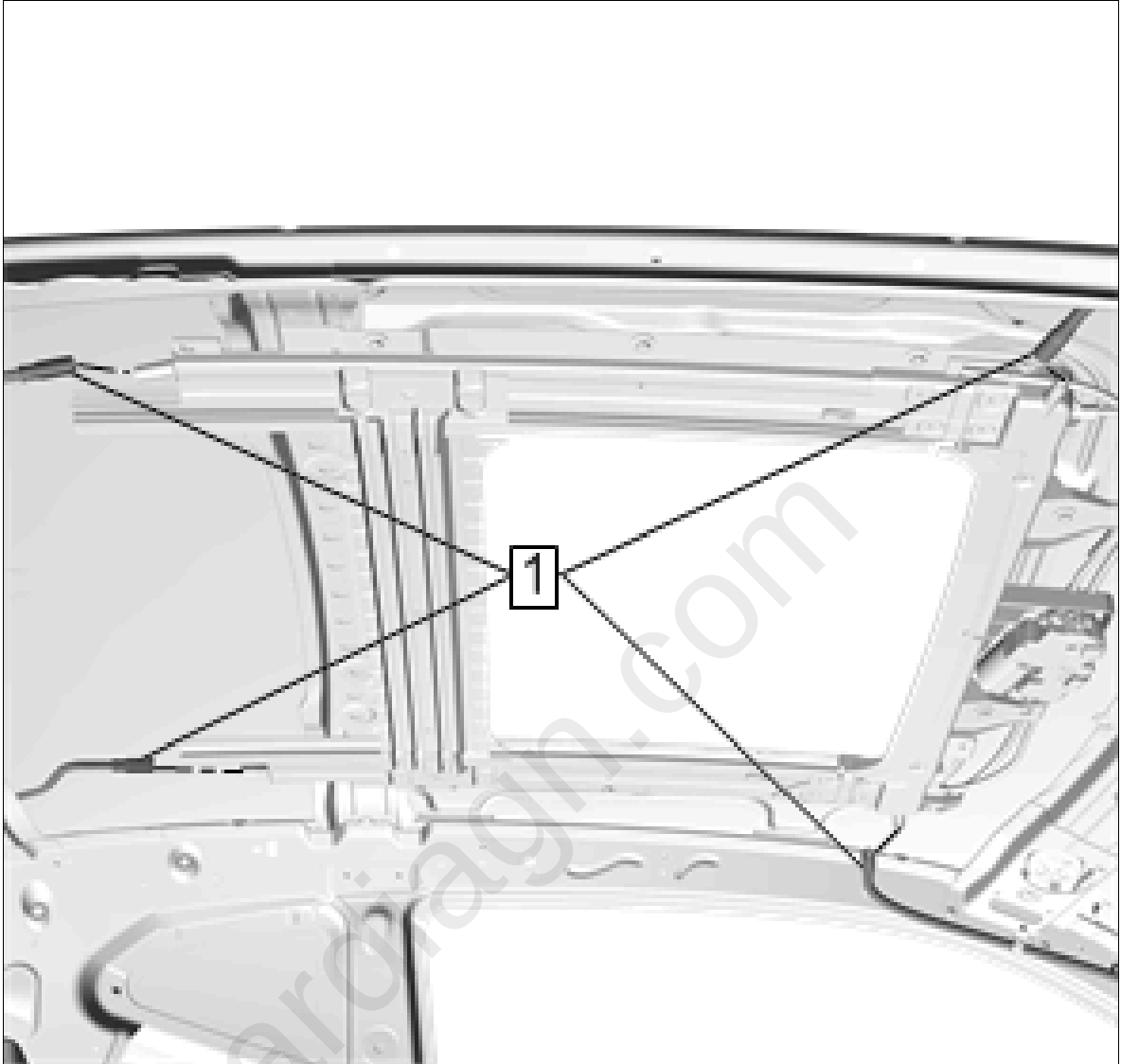
CAUTION:

Refer to Fastener Caution .

5. Install and tighten Sunroof Module Bolt (2) at Roof (Qty: 2) to 10 N.m (89 lb in)

6. Install and tighten Sunroof Module Bolt (1) at Roof (Qty: 6) to 10 N.m (89 lb in)

Fig 2: Drain Hose At Sunroof Module Assembly



Courtesy of GENERAL MOTORS COMPANY

7. Install Drain Hose (1) at Sunroof Module Assembly
8. Install Electrical Connector at Sunroof Window Motor
9. Install Electrical Harness at Sunroof Module Assembly
10. Sunroof Motor/Actuator Initialization/Teach Process (New Motor) Sunroof Motor/Actuator Initialization/Teach Process (Existing Motor)
11. Install Headlining Trim Panel - Headlining Trim Panel Replacement

**REPAIR INSTRUCTIONS > SUNROOF MOTOR/ACTUATOR INITIALIZATION/TEACH
PROCESS (NEW MOTOR)**

Perform the Initialization/Teach Process any time a new sunroof motor actuator is installed in the vehicle.

1. Ensure that the electrical harness on the headliner is connected to the sunroof motor.
2. Put the ignition in the RUN position.
3. Re-initialization (Normalization), press "Manual Close Switch" until the sunroof window reaches the Close Position or stops moving.
4. Release the switch.
5. Press "Manual Close Switch" for more than 10 seconds until the sunroof window starts and reaches the hard stop.
6. Verify the operation of the sunroof.



NOTE:

The Initialization/Teach Process is not complete if any of the following actions take place before the initialization cycle is done:

- *The sunroof switch is not held in the close position.*
- *The ignition and/or battery power has been removed.*
- *The glass panel has not reached the closed position.*

The Initialization/Teach Process must be restarted if the procedure is not carried out completely.

REPAIR INSTRUCTIONS > SUNROOF MOTOR/ACTUATOR INITIALIZATION/TEACH PROCESS (EXISTING MOTOR)

Perform the Initialization/Teach Process any time the sunroof motor/actuator is removed from the sunroof.

1. Ensure that the electrical harness on the headliner is connected to the sunroof motor.
2. Re-initialization (Normalization), press "Manual Close Switch" until the sunroof reaches the Close Position or stops moving.
3. Release the switch.
4. Press "Manual Close Switch" for more then 10 seconds or until the sunroof window starts and reaches the hard stop.
5. Verify the operation of the sunroof.



NOTE:

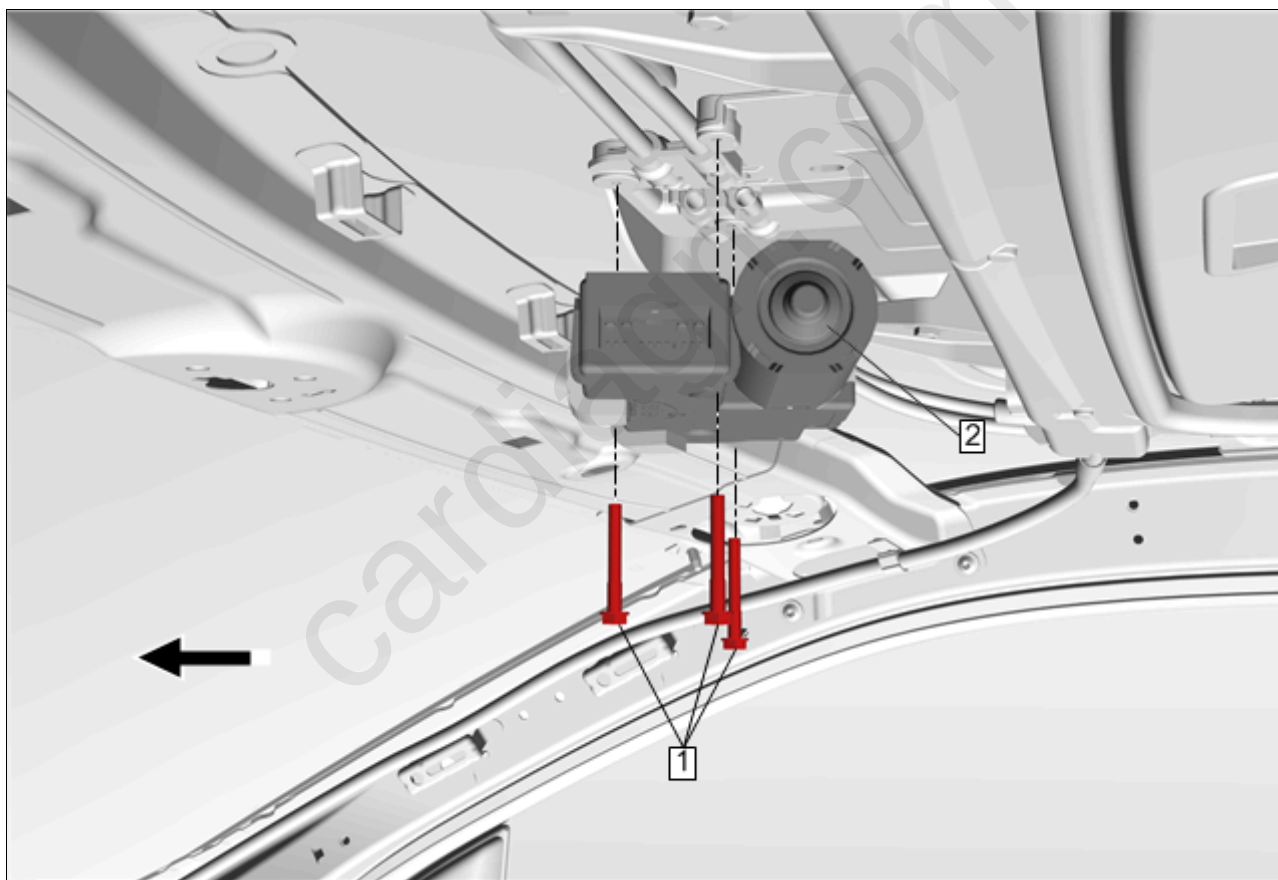
The Initialization/Teach Process is not complete if any of the following actions take place before the initialization cycle is done:

- *The sunroof switch is not held in the close position.*
- *The ignition and/or battery power has been removed.*
- *The glass panel has not reached the closed position.*

The Initialization/Teach Process must be restarted if the procedure is not carried out completely.

REPAIR INSTRUCTIONS > SUNROOF ACTUATOR MOTOR REPLACEMENT

Fig 1: Sunroof Actuator Motor



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Headlining Trim Panel Replacement	
1	Sunroof Actuator Motor Bolt (Qty: 3)

CAUTION:

Refer to Fastener Caution .

Tighten

4 N.m (35 lb in)

Sunroof Window Motor

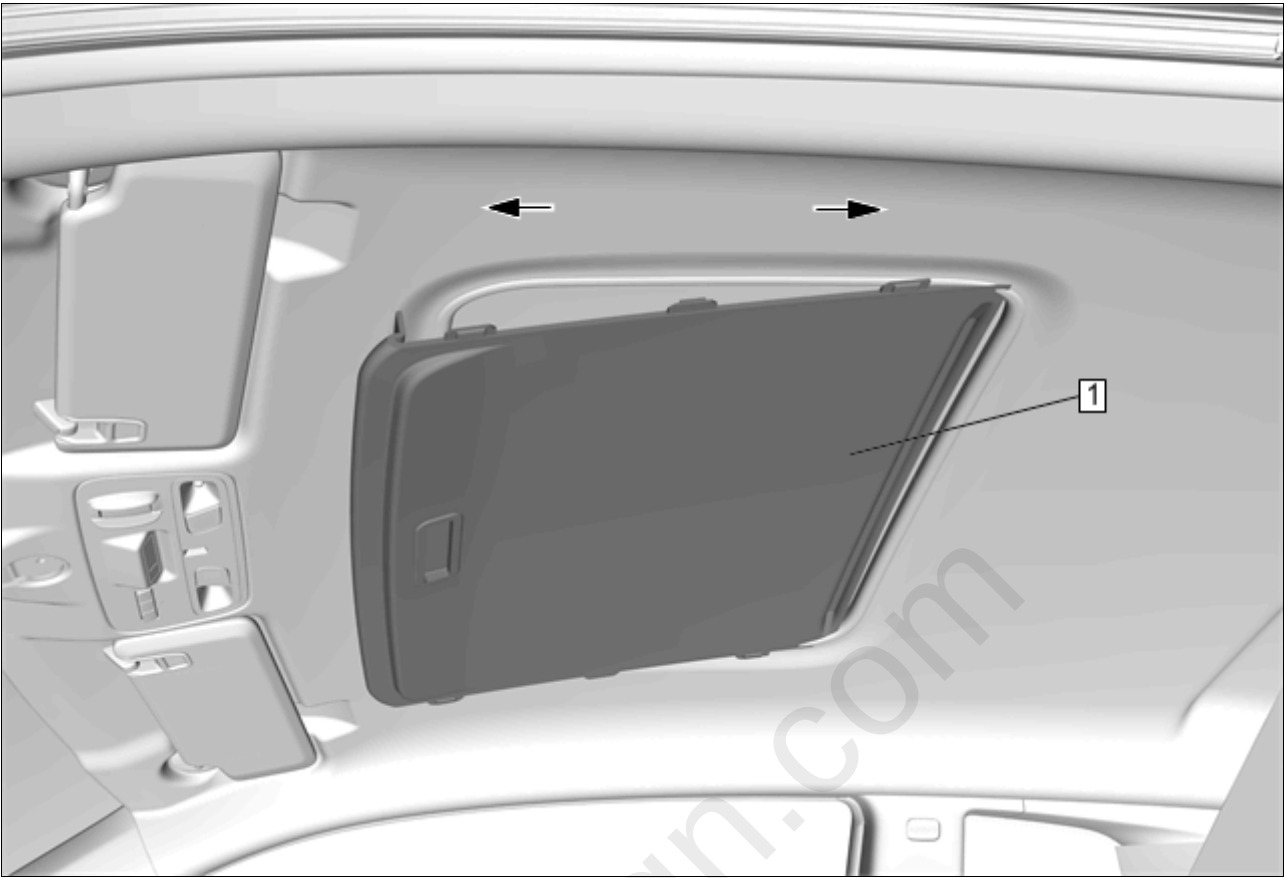
Procedure

2

1. Disconnect the electrical connector.
2. Pull downward and turn the sunroof window motor to disengage the motor from the drive cables.
3. Install the sunroof window motor to the frame with a turning motion, pushing upward. This will engage the motor into the drive cables.
4. Sunroof Motor/Actuator Initialization/Teach Process (New Motor) Sunroof Motor/Actuator Initialization/Teach Process (Existing Motor)
5. Verify the sunroof window motor operation.

REPAIR INSTRUCTIONS > SUNROOF SUNSHADE REPLACEMENT

Fig 1: Sunroof Sunshade

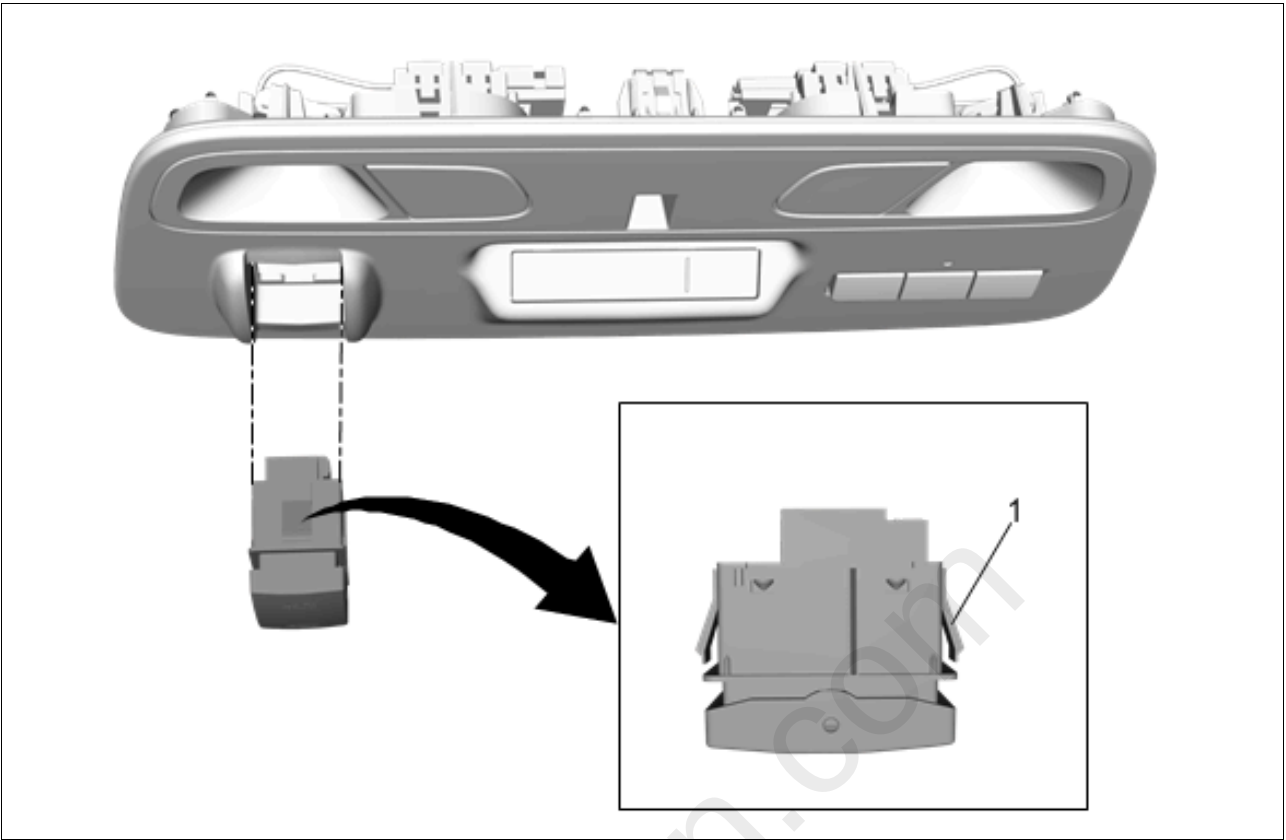


Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Sunroof Opening Trim Finish Lace Replacement	
1	Sunroof Sunshade 1. Depress the panel to one side of the track. 2. Carefully arch the sunshade upward in the center while pulling down at one edge to remove from guide.

REPAIR INSTRUCTIONS > SUNROOF SWITCH REPLACEMENT

Fig 1: Sunroof Switch



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Roof Console Replacement	
1	Sunroof Switch Procedure Depress tabs on the switch to remove from roof console.

REPAIR INSTRUCTIONS > SUNROOF WINDOW ALIGNMENT

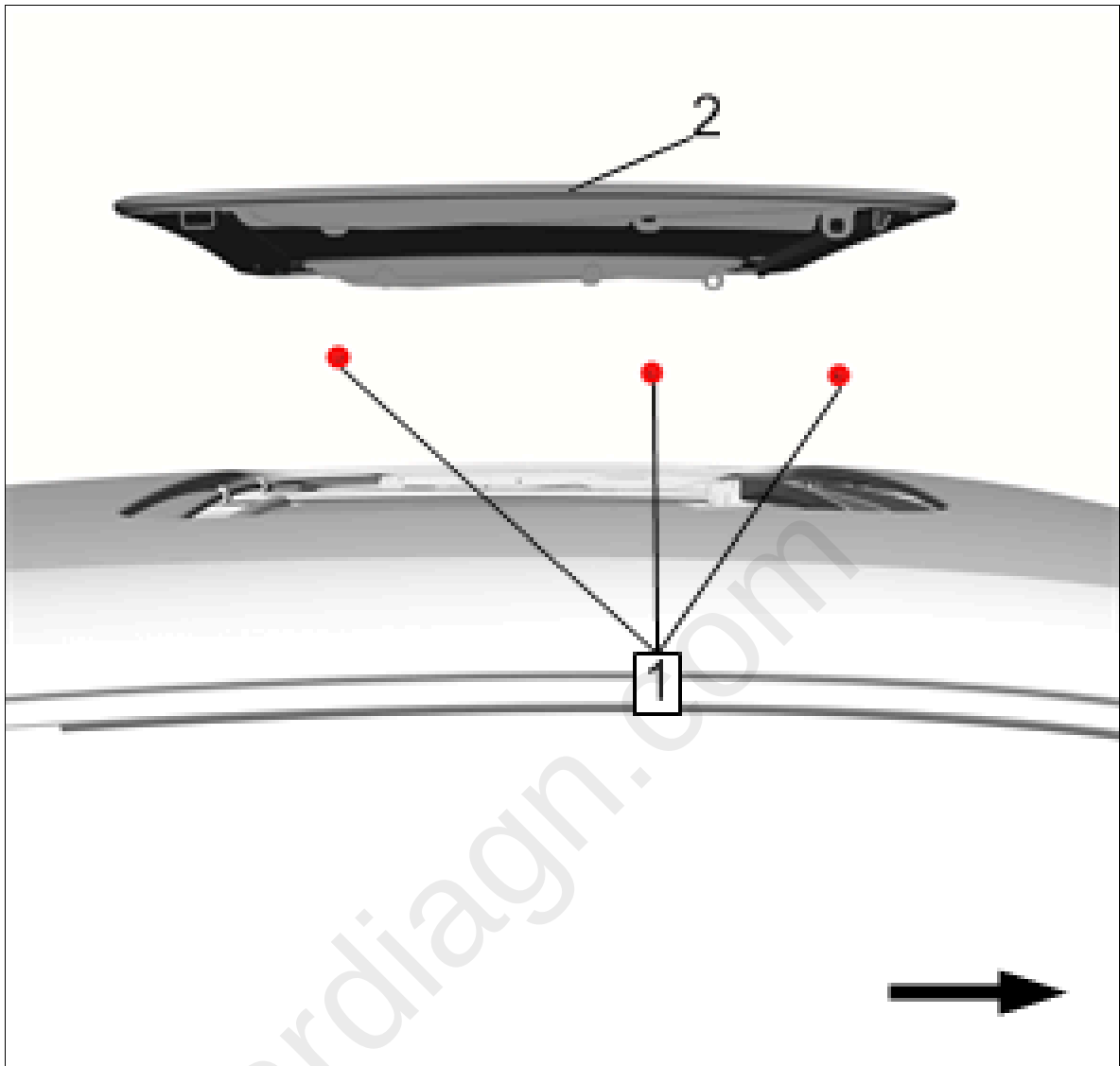


NOTE:

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

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

Fig 1: Adjusting Screws



Courtesy of GENERAL MOTORS COMPANY

 NOTE:

Do not remove, or lower the headliner to access the six sunroof window adjustment screws.

2. Loosen the six adjusting screws (1) from both sides of the sunroof window (2).
3. Adjust the corners of the front window panel using the following guidelines:
 1. Adjust the front of the sunroof window to 0.0 mm - 1.0 mm (0.0 in - 0.04 in) below the top surface of the roof panel.
 2. Adjust the rear center line of the sunroof window to 1 mm - 1.5 mm (0.04 in - 0.06 in) above the top surface of the roof panel.

 **CAUTION:**

Refer to Fastener Caution

4. Tighten the sunroof window six adjustment screws (1) to 8.5 N.m (75 lb in).
5. Cycle the sunroof window (2) through all positions.
6. Inspect the sunroof window adjustment. Adjust if necessary.

REPAIR INSTRUCTIONS > SUNROOF WINDOW REPLACEMENT > REMOVAL PROCEDURE

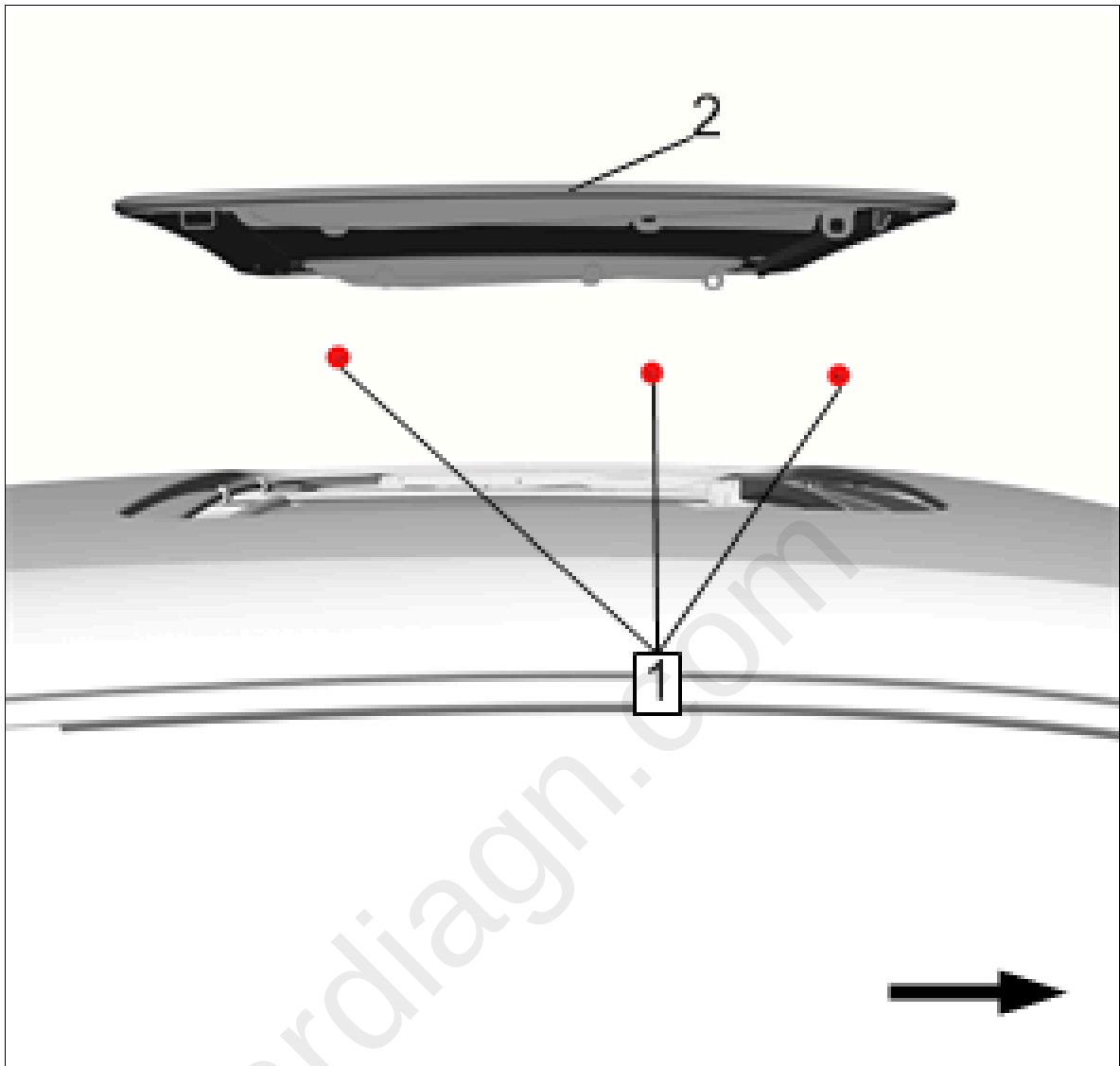
1. Slide the sunshade to the full rearward position.

 **CAUTION:**

In order to prevent damage to the paint, mask the roof panel in front of the sunroof opening using masking tape and paper.

2. Open the sunroof window to the vent position.

Fig 1: Sunroof Window Screws



Courtesy of GENERAL MOTORS COMPANY

3. Remove Sunroof Window Screw (1) (Qty: 3) at Window (2)

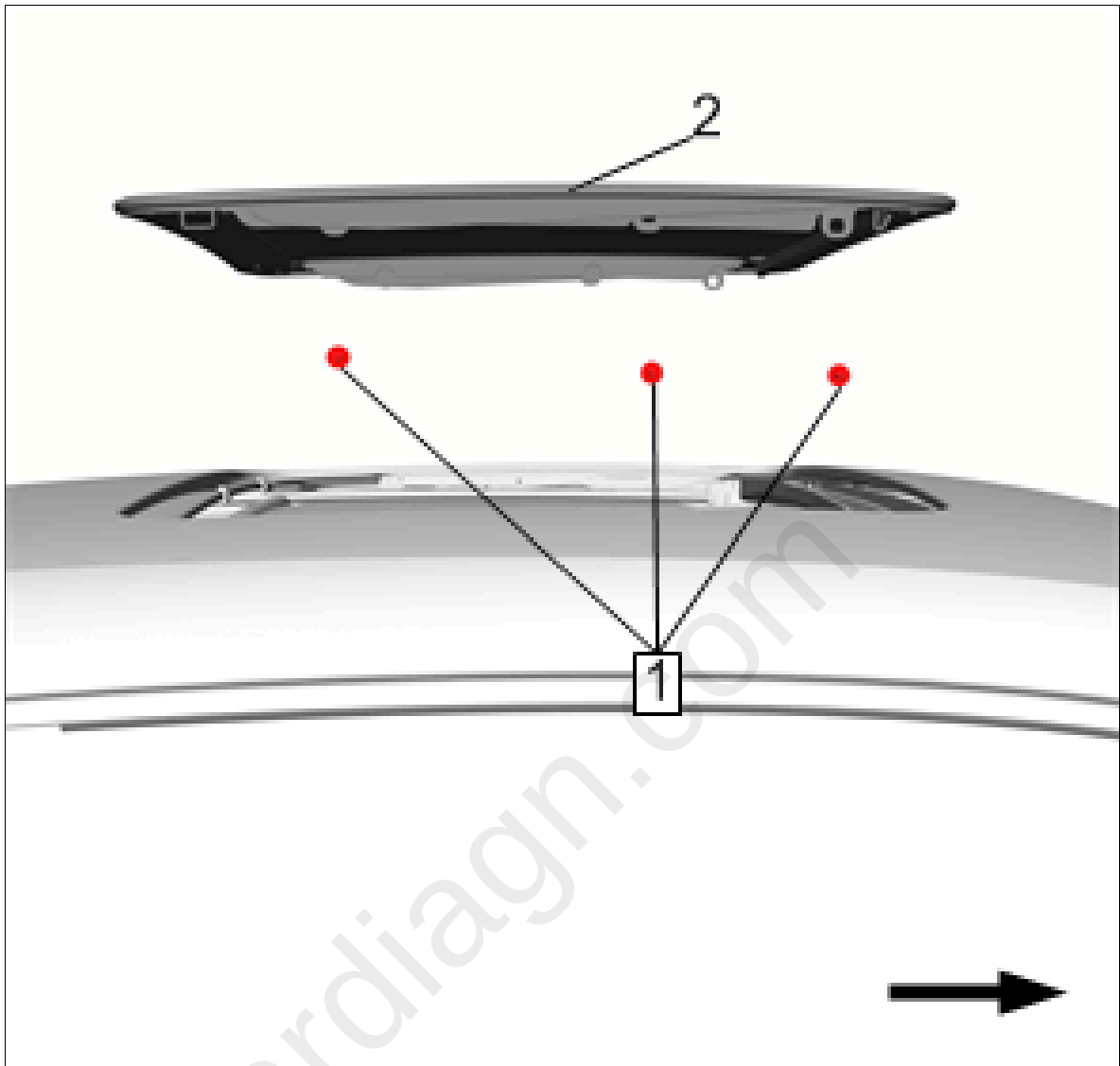
 **NOTE:**

Do NOT scratch the roof surface or the sunroof window.

4. Lift the sunroof window out of the frame.

**REPAIR INSTRUCTIONS > SUNROOF WINDOW REPLACEMENT > INSTALLATION
PROCEDURE**

Fig 1: Sunroof Window Screws



Courtesy of GENERAL MOTORS COMPANY

1. Ensure that the window trade mark is to the rear of the opening and that sunroof window attachment tabs are to the inboard side of the mounting arms.

 **CAUTION:**

Refer to Fastener Caution .

2. Install and tighten Sunroof Window Screw (1) (Qty: 3) to 8.5 N.m (75 lb in)
3. Carefully close the sunroof window from the vent position to the full closed position.
4. Sunroof Window Alignment
5. Close the sunshade.

6. Cycle the sunroof window through all positions.

DESCRIPTION AND OPERATION > SUNROOF DESCRIPTION AND OPERATION

The slide sunroof consists of a moving glass panel and a manual sunshade. With the spoiler sunroof system, the glass slides over the top of vehicle's roof. The glass is controlled by an integrated motor/controller. The sunshade has a mechanical connection to the glass causing it to open with the glass and keeping it from closing more than the glass.

The electrical portion of the slide sunroof system consists of:

- Body control module (BCM)
- Sunroof glass control module
- Sunroof control switch assembly
- Local interconnected network (LIN-Bus)

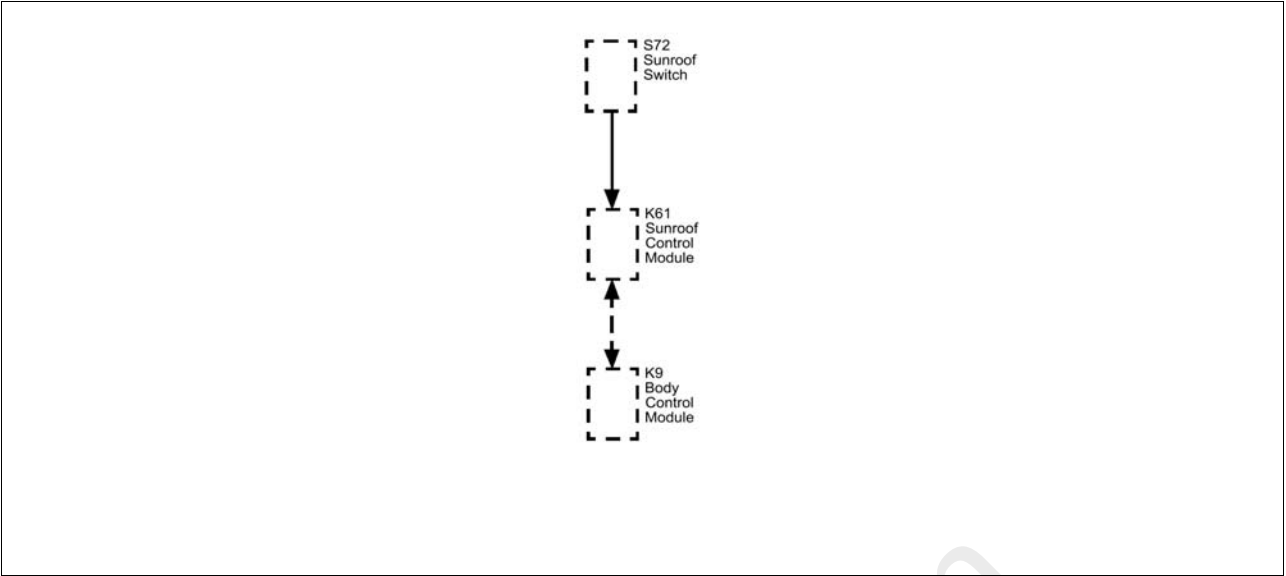
The sunroof electrical system uses a master/slave configuration utilizing a LIN-Bus based system for communication. The BCM is designated as the master, while the sunroof control module is configured as the slave.

As the system master, the BCM uses the LIN-Bus communication bus to enable or disable sunroof operation, communicate vehicle information to the sunroof controller, and request sunroof movement. The sunroof controller provides system status and diagnostic information to the BCM for diagnostic reporting and operational purposes.

The sunroof glass is controlled by a 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 system master.

The operational calibrations for the sunroof integrated motor/controller are loaded over the LIN-Bus communication bus by the sunroof system master, the BCM.

Fig 1: Sunroof System Block Diagram



Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S72	S72 Sunroof Switch
K61	K61 Sunroof Control Module
K9	K9 Body Control Module

DESCRIPTION AND OPERATION > SUNROOF DESCRIPTION AND OPERATION > SUNROOF GLASS CONTROL SWITCH

The sunroof control switch is connected directly to the controller. The sliding glass switch provide detent positions for open, express open, off, and 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 an analog to digital switch input. The control switch 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 appropriate function.

DESCRIPTION AND OPERATION > SUNROOF DESCRIPTION AND OPERATION > SYSTEM PROTECTION FUNCTIONS

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

Motor stall

If the sunroof is moving in the open or close direction and stops moving for 350 ms while the switch or LIN-Bus command is active, the motor shall be turned off to prevent overheating.

Sunroof System Thermal Protection

The sunroof controllers have a thermal protection algorithm to protect the sunroof controller and motor from damage due to overheating conditions resulting from immoderately switch actuations. The thermal protection algorithm will cause any new sunroof open commands to be ignored until the motor is allowed to cool. A number of close requests during an over temperature condition will be allowed.

DESCRIPTION AND OPERATION > SUNROOF DESCRIPTION AND OPERATION > SUNROOF OPERATION

Sliding Class - Normal Open

When the sunroof sliding glass switch is held in the OPEN position, the sunroof will begin opening. Motion will continue until the switch returns to the OFF state.

Sliding Class - Express Open

When the sunroof control switch transitions to the EXPRESS OPEN state, the sunroof will express open until the controller determines the sunroof has reached the comfort stop position or the fully OPEN position, the switch transitions to another state after first returning to the OFF position.

Sliding Class - Normal Close

When the sunroof switch is in the CLOSE state, the controller will begin moving the sunroof in the close direction. The EXPRESS CLOSE operation is not available.