

ACCESSORIES & EQUIPMENT

Sunroof - CTS Coupe & Wagon

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specifications	
	Metric	English
Sunroof Frame Bolts	10 N.m	89 lb in
Sunroof Motor/Actuator Screws	4 N.m	35 lb in
Sunroof Sunshade Motor/Actuator Screws	4 N.m	35 lb in
Sunroof Sunshade Switch Bracket Screws	2 N.m	18 lb in
Sunroof Window Screws	5 N.m	44 lb in

SCHEMATIC WIRING DIAGRAMS

SUNROOF WIRING SCHEMATICS

Sunroof System (Wagon)

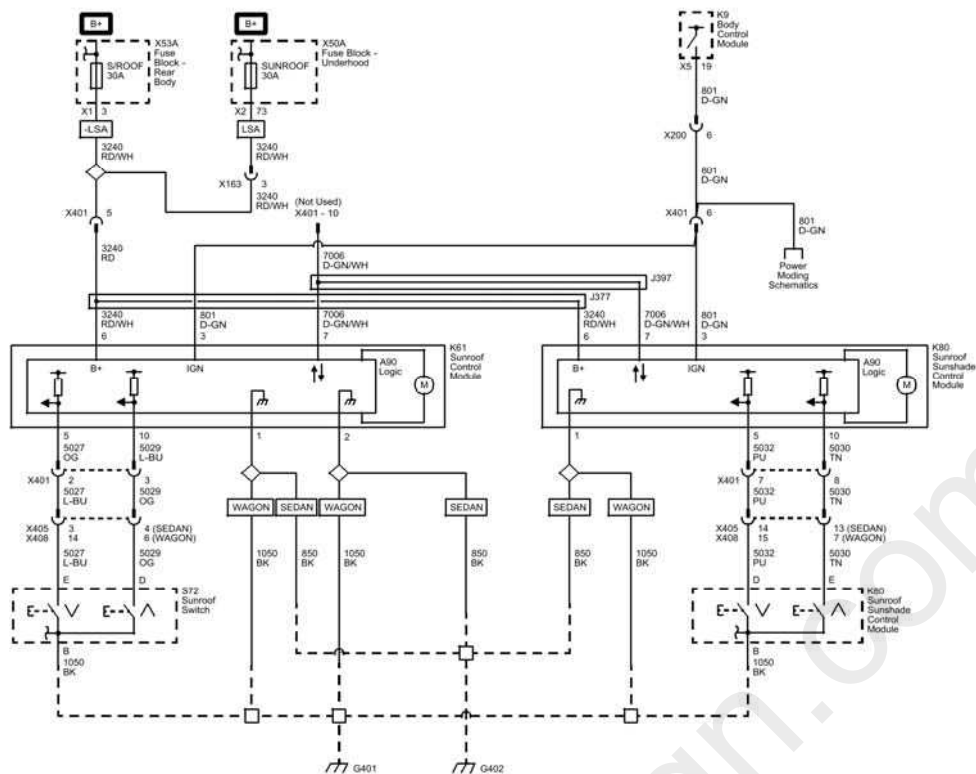


Fig. 1: Sunroof System (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Sunroof System (Coupe)

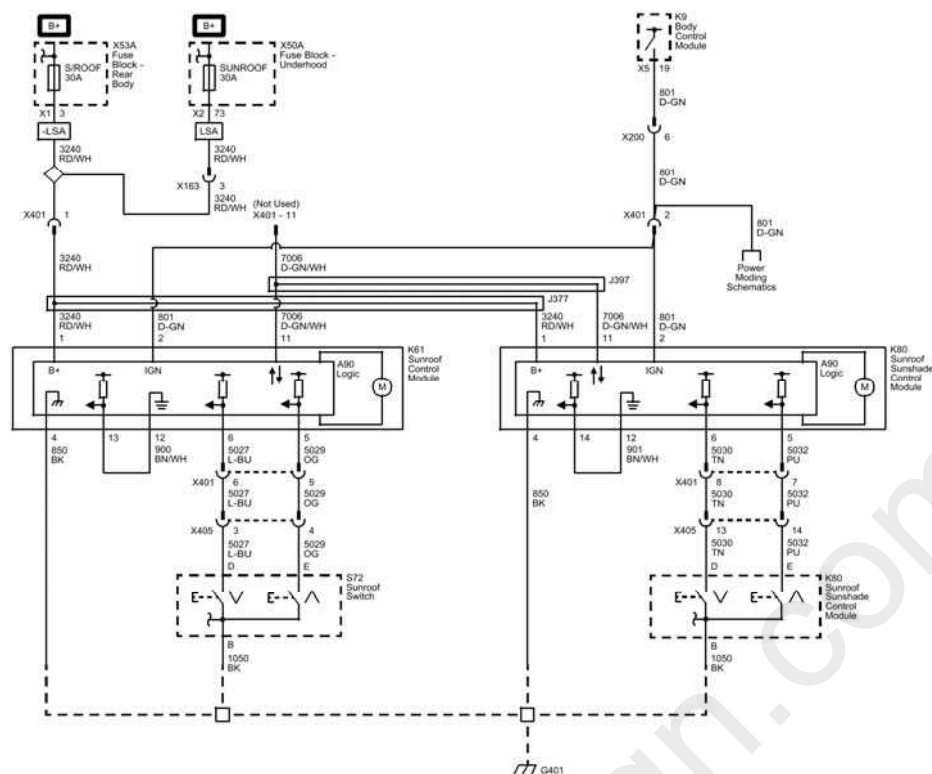


Fig. 2: Sunroof System (Coupe)

Courtesy of GENERAL MOTORS COMPANY

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:
 - No DTCs are 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 (Wagon)**, **Sunroof Description and Operation (Coupe)**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could 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 intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Power Sunroof Malfunction (Coupe), Power Sunroof Malfunction (Wagon)**
- **Retained Accessory Power Description and Operation** , if the power sunroof should operate longer than the retained accessory power (RAP) time-out.

POWER SUNROOF MALFUNCTION (COUPE)

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1, 2	1, 2	-	-
Ignition	1, 2	1, 2	3	-
Serial Data	1, 2	1, 2	1, 2	-
Sunroof Switch Close Signal	1, 2	1	1, 2	-
Sunroof Switch Open Signal	1, 2	1	1, 2	-
Sunroof Shade Switch Close Signal	1, 2	2	1, 2	-
Sunroof Shade Switch Open Signal	1, 2	2	1, 2	-
Sunroof Switch Ground	-	1, 2	-	-
Sunroof Shade Switch Ground	-	1, 2	-	-
Sunroof Control Module Ground	-	1, 2	-	-
Sunroof Shade Module Ground	-	2	-	-
1. Power Sunroof Malfunction 2. Power Sunshade Malfunction 3. Power Sunroof and Sunshade Operate With Ignition Off				

Circuit/System Description

Ignition voltage is supplied to the sunroof control and sunroof shade modules by the BCM. B+ is applied to the sunroof control and sunroof shade modules via the S/ROOF or SUNROOF fuse. The sunroof control and

sunroof shade modules supply each of the switch signal circuits with a voltage reference. When a switch is pressed the signal circuit is pulled low signaling the sunroof or sunshade open or close request. The modules determine the motor direction based on inputs received from the switches. When the modules reverse the polarity of the applied voltage, the motors reverse direction. The sunroof shade module contains the logic for opening and closing the sunshade based on Serial Data from the sunroof control module.

The sunroof shade module contains the logic for opening and closing the sunshade based on Serial Data received from the sunroof control module. The sunroof shade module internally applies voltage and ground to the appropriate circuits of the reversible sunshade motor in order to move the sunshade panel to the open or closed positions.

Diagnostic Aids

- A sunshade malfunction may prevent the sunroof from operating.
- Always program and setup the sunshade module before the sunroof module.
- If the sunroof and/or sunshade are experiencing an intermittent inoperative condition, check the sunroof switch ground circuit for an open condition. If the sunroof switch ground circuit is open, the switch may take a redundant path to ground through the switch illumination circuit. When the lights are turned ON, the redundant path is removed, and the sunroof and/or sunshade will become inoperative.

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Sunroof Description and Operation (Coupe)

Electrical Information Reference

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

Circuit/System Verification

1. With the sunroof in the closed position, press the sunroof open switch. The sunroof should open.
 - If the sunroof does not open, refer to Power Sunroof Malfunction.
2. With the sunroof in the open position, press the sunroof close switch. The sunroof should close.

- If the sunroof does not close, refer to Power Sunroof Malfunction.
- 3. With the sunshade in the closed position, press the sunshade open switch. The sunshade should open.
 - If the sunshade does not open, refer to Power Sunshade Malfunction.
- 4. With the sunshade in the open position, press the sunshade close switch. The sunshade should close.
 - If the sunshade does not close, refer to Power Sunshade Malfunction.

Circuit/System Testing

Power Sunroof Malfunction

1. Ignition OFF, disconnect the harness connector at the sunroof control module.
2. Test for less than 30 ohms between the ground circuit terminal 4 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, determine if the sunroof module is causing the fuse to open. Replace the sunroof control module.
4. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 2 and ground.
 - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, refer to **Retained Accessory Power Malfunction**.
5. Test for less than 30 ohms between the jumper circuit terminals 13 and 12.
 - If not the specified value, test the jumper circuit for an open/high resistance.
6. Test for infinity resistance between the jumper circuit terminal 13 and ground.
 - If not the specified value, test the jumper circuit for a short to ground.
7. Verify a test lamp does not illuminate between jumper circuit terminal 13 and ground.
 - If the test lamp illuminates, test the jumper circuit for a short to voltage.
8. Test for 10-40 Hz between the serial data circuit terminal 11 and ground.
 - If less than the specified range, test the serial data circuit for a short to ground, a short to voltage, or an open/high resistance. If the circuit tests normal, replace the sunroof shade module.
9. Test for 50-200 Hz between the serial data circuit terminal 11 and ground while operating the sunshade in the open direction.
 - If not within the specified range, replace the sunroof shade module.
10. Ignition OFF, connect the harness connector at the sunroof control module.
11. Disconnect the harness connector at the sunroof switch.
12. Test for less than 30 ohms between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

NOTE: Apply ground to the module for no longer than 2 seconds at a time or the module could be damaged.

When performing the following tests, make sure that the sunroof is not at

its end of travel position by switching the grounded jumper to the other signal circuit if the sunroof did not move in one direction.

13. Ignition ON, momentarily install a 10 A fused jumper wire between the signal circuit terminal D and ground. The sunroof should move.
 - If the sunroof does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof control module.
14. Momentarily install a 10 A fused jumper wire between the signal circuit terminal E and ground. The sunroof should move.
 - If the sunroof does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof control module.
15. If all circuits test normal, test or replace the sunroof switch.

Power Sunshade Malfunction

1. Ignition OFF, disconnect the harness connector at the sunroof shade module.
2. Test for less than 30 ohms between the ground circuit terminal 4 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. the circuit tests normal and the B+ circuit fuse is open, determine if the sunroof shade module is causing the fuse to open. Replace the sunroof shade module.
4. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 2 and ground.
 - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, refer to **Retained Accessory Power Malfunction** .
5. Test for less than 30 ohms between the jumper circuit terminals 14 and 12.
 - If not the specified value, test the jumper circuit for an open/high resistance.
6. Test for infinity resistance between the jumper circuit terminal 14 and ground.
 - If not the specified value, test the jumper circuit for a short to ground.
7. Verify a test lamp does not illuminate between jumper circuit terminal 14 and ground.
 - If the test lamp illuminates, test the jumper circuit for a short to voltage.
8. Test for 10-40 Hz between the serial data circuit terminal 11 and ground.
 - If less than the specified range, test the serial data circuit for a short to ground, a short to voltage, or an open/high resistance. If the circuit tests normal, replace the sunroof control module.
9. Test for 50-200 Hz between the serial data circuit terminal 11 and ground while operating the sunroof in the open direction.
 - If not within the specified range, replace the sunroof control module.
10. Ignition OFF, connect the harness connector at the sunroof shade module.
11. Disconnect the harness connector at the sunroof shade switch.
12. Test for less than 30 ohms between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

NOTE: Apply ground to the module for no longer than 2 seconds at a time or the module could be damaged.

When performing the following tests, make sure that the sunshade is not at its end of travel position by switching the grounded jumper to the other signal circuit if the sunshade did not move in one direction.

13. Ignition ON, momentarily install a 10 A fused jumper wire between the signal circuit terminal D and ground. The sunshade should move.
 - If the sunshade does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof shade module.
14. Momentarily install a 10 A fused jumper wire between the signal circuit terminal E and ground. The sunshade should move.
 - If the sunshade does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof shade module.
15. If all circuits test normal, test or replace the sunroof shade switch.

Component Testing

1. With the ignition OFF, disconnect the harness connector at the sunroof or sunroof shade switch.
2. Test for infinite resistance between the switch terminals listed below and the ground terminal B with the switch in the neutral position.
 - Open terminal D
 - Close terminal E
 - If not the specified value, replace the appropriate switch.

NOTE: If the switch tests open in any switch position other than Off, test the switch signal circuits for a short to voltage before replacing the switch.

3. Test for less than 5 ohms between the switch terminals listed below and the ground terminal B with the switch in the appropriate position.
 - Open terminal D
 - Close terminal E
 - If greater than the specified range, replace the appropriate switch.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

- **Sunroof Switch Replacement**
- **Sunroof Sunshade Switch Replacement**
- **Control Module References** for sunroof control module or sunroof shade module replacement, programming and setup

POWER SUNROOF MALFUNCTION (WAGON)

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
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Sunroof Switch Close Signal	1, 2	1	1, 2	-
Sunroof Switch Open Signal	1, 2	1	1, 2	-
Sunroof Shade Switch Close Signal	1, 2	2	1, 2	-
Sunroof Shade Switch Open Signal	1, 2	2	1, 2	-
Sunroof Switch Ground	-	1, 2	-	-
Sunroof Shade Switch Ground	-	1, 2	-	-
Sunroof Control Module Ground	-	1, 2	-	-
Sunroof Shade Module Ground	-	2	-	-
1. Power Sunroof Malfunction 2. Power Sunshade Malfunction 3. Power Sunroof and Sunshade Operate With Ignition Off				

Circuit/System Description

Ignition voltage is supplied to the sunroof control and sunroof shade modules by the BCM. B+ is applied to the sunroof control and sunroof shade modules via the S/ROOF or SUNROOF fuse. The sunroof control and sunroof shade modules supply each of the switch signal circuits with a voltage reference. When a switch is pressed the signal circuit is pulled low signaling the sunroof or sunshade open or close request. The modules determine the motor direction based on inputs received from the switches. When the modules reverse the polarity of the applied voltage, the motors reverse direction. The sunroof shade module contains the logic for opening and closing the sunshade based on Serial Data from the sunroof control module.

The sunroof shade module contains the logic for opening and closing the sunshade based on Serial Data received from the sunroof control module. The sunroof shade module internally applies voltage and ground to the appropriate circuits of the reversible sunshade motor in order to move the sunshade panel to the open or closed positions.

Diagnostic Aids

If the sunroof and/or sunshade are experiencing an intermittent inoperative condition, check the sunroof switch ground circuit for an open condition. If the sunroof switch ground circuit is open, the switch may take a redundant path to ground through the switch illumination circuit. When the lights are turned ON, the redundant path is removed, and the sunroof and/or sunshade will become inoperative.

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX - COUPE AND WAGON

Description and Operation

Sunroof Description and Operation (Wagon)

Electrical Information Reference

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

Circuit/System Verification

1. With the sunroof in the closed position, press the sunroof open switch. The sunroof should open.
 - If the sunroof does not open, refer to Power Sunroof Malfunction.
2. With the sunroof in the open position, press the sunroof close switch. The sunroof should close.
 - If the sunroof does not close, refer to Power Sunroof Malfunction.
3. With the sunshade in the closed position, press the sunshade open switch. The sunshade should open.
 - If the sunshade does not open, refer to Power Sunshade Malfunction.
4. With the sunshade in the open position, press the sunshade close switch. The sunshade should close.
 - If the sunshade does not close, refer to Power Sunshade Malfunction.

Circuit/System Testing

Power Sunroof Malfunction

1. Ignition OFF, disconnect the harness connector at the sunroof control module.
2. Test for less than 5.0 ohms between the ground circuit terminal 1 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

3. Test for less than 5.0 ohms between the ground circuit terminal 2 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
4. Verify that a test lamp illuminates between the B+ circuit terminal 6 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. the circuit tests normal and the B+ circuit fuse is open, replace the sunroof control module.
5. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 3 and ground.
 - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, refer to **Retained Accessory Power Malfunction** .
6. Test for 10-40 Hz between the serial data circuit terminal 7 and ground.
 - If less than the specified range, test the serial data circuit for a short to ground, a short to voltage, or an open/high resistance. If the circuit tests normal, replace the sunroof shade module.
7. Test for 50-200 Hz between the serial data circuit terminal 7 and ground while operating the sunroof in the open direction.
 - If not within the specified range, replace the sunroof shade module.
8. Ignition OFF, connect the harness connector at the sunroof control module.
9. Disconnect the harness connector at the sunroof switch.
10. Test for less than 5.0 ohms between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

NOTE: **Apply ground to the module for no longer than 2 seconds at a time or the module could be damaged.**

When performing the following tests, make sure that the sunroof is not at its end of travel position by switching the grounded jumper to the other signal circuit if the sunroof did not move in one direction.

11. Ignition ON, momentarily install a 10 A fused jumper wire between the signal circuit terminal D and ground. The sunroof should move.
 - If the sunroof does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof control module.
12. Momentarily install a 10 A fused jumper wire between the signal circuit terminal E and ground. The sunroof should move.
 - If the sunroof does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof control module.
13. If all circuits test normal, test or replace the sunroof switch.

Power Sunshade Malfunction

1. Ignition OFF, disconnect the harness connector at the sunroof shade module.
2. Test for less than 5.0 ohms between the ground circuit terminal 1 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

3. Verify that a test lamp illuminates between the B+ circuit terminal 6 and ground.
 - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, replace the sunroof shade module.
4. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 3 and ground.
 - If the test lamp does not illuminate, test the ignition circuit for an open/high resistance. If the circuit tests normal, refer to **Retained Accessory Power Malfunction**.
5. Test for 10-40 Hz between the serial data circuit terminal 7 and ground.
 - If less than the specified range, test the serial data circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the sunroof control module.
6. Test for 50-200 Hz between the serial data circuit terminal 7 and ground while operating the sunroof in the open direction.
 - If not within the specified range, replace the sunroof control module.
7. Ignition OFF, connect the harness connector at the sunroof shade module.
8. Disconnect the harness connector at the sunroof shade switch.
9. Test for less than 5.0 ohms between the ground circuit terminal B and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.

NOTE: **Apply ground to the module for no longer than 2 seconds at a time or the module could be damaged.**

When performing the following tests, make sure that the sunshade is not at its end of travel position by switching the grounded jumper to the other signal circuit if the sunshade did not move in one direction.

10. Ignition ON, momentarily install a 10 A fused jumper wire between the signal circuit terminal D and ground. The sunshade should move.
 - If the sunshade does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof shade module.
11. Momentarily install a 10 A fused jumper wire between the signal circuit terminal E and ground. The sunshade should move.
 - If the sunshade does not move, test the signal circuit for a short to ground, short to voltage or an open/high resistance. If the circuit tests normal, replace the sunroof shade module.
12. If all circuits test normal, test or replace the sunroof shade switch.

Component Testing

1. With the ignition OFF, disconnect the harness connector at the sunroof or sunroof shade switch.
2. Test for infinite resistance between the switch terminals listed below and the ground terminal B with the switch in the neutral position.
 - Open terminal D
 - Close terminal E

- If not the specified value, replace the appropriate switch.

NOTE: If the switch tests open in any switch position other than Off, test the switch signal circuits for a short to voltage before replacing the switch.

3. Test for less than 5 ohms between the switch terminals listed below and the ground terminal B with the switch in the appropriate position.
 - Open terminal D
 - Close terminal E
- If greater than the specified range, replace the appropriate switch.

Repair Instructions

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

- **Sunroof Switch Replacement**
- **Sunroof Sunshade Switch Replacement**
- **Control Module References** for Sunroof Control Module or Sunroof Shade Module replacement, programming and setup

REPAIR INSTRUCTIONS

SUNROOF PANEL SIDE OPENING CLOSEOUT COVER REPLACEMENT (COUPE)

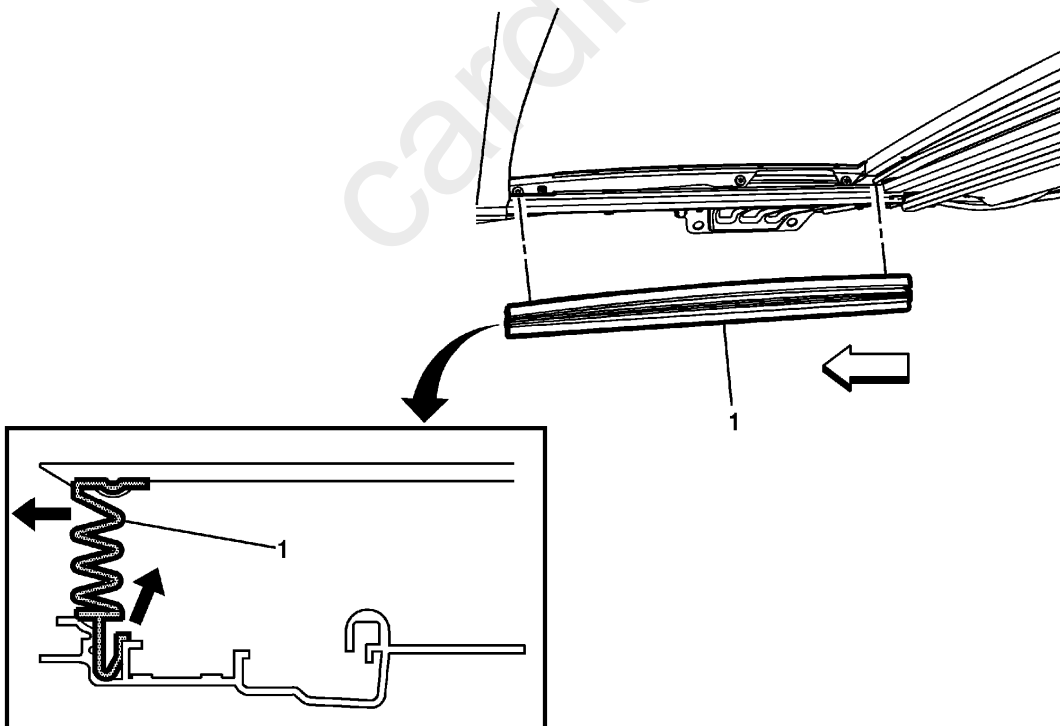


Fig. 3: Sunroof Panel Side Opening Closeout Cover (Coupe)
Courtesy of GENERAL MOTORS COMPANY

Sunroof Panel Side Opening Closeout Cover Replacement (Coupe)

Callout	Component Name
1	Sunroof Panel Side Opening Closeout Cover
Procedure	
1. Place the sunshade in the full open position. 2. Position the sunroof window in the vent position. 3. Remove the sunroof side opening closeout panel covers, grasp the top corner working it rearward releasing it from the frame.	

SUNROOF AIR DEFLECTOR REPLACEMENT (WAGON)

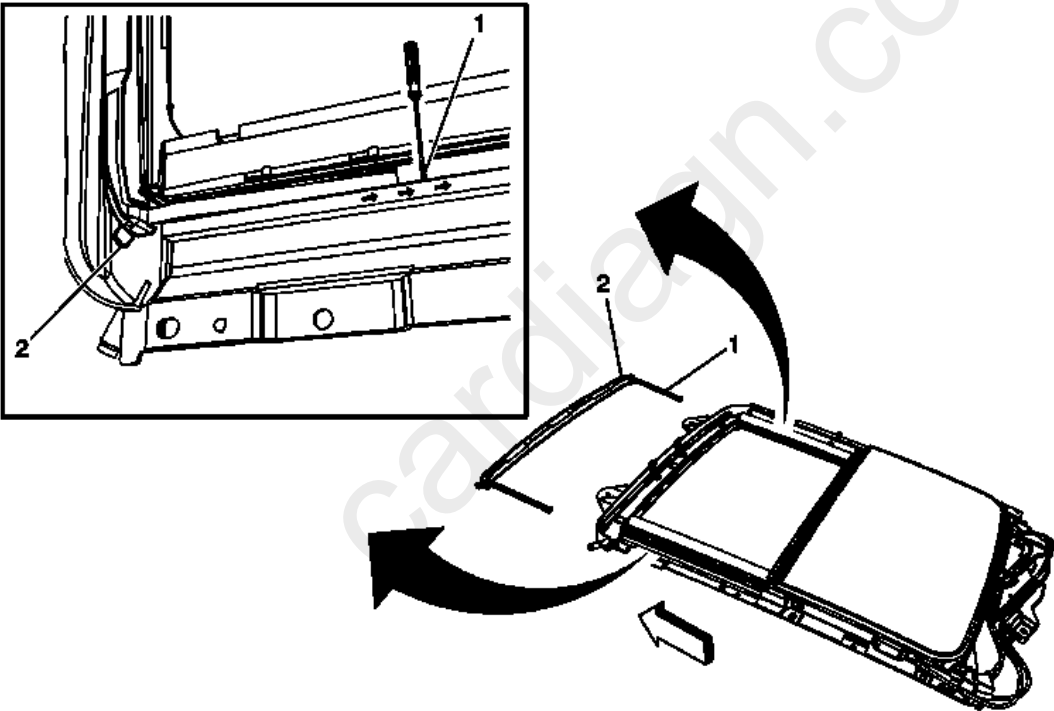


Fig. 4: Sunroof Air Deflector (Wagon)
Courtesy of GENERAL MOTORS COMPANY

Sunroof Air Deflector Replacement (Wagon)

Callout	Component Name
	Sunroof Air Deflector Support
Procedure	

1	1. Cycle the sunroof window to the fully open position. 2. Using a suitable tool push down on the left or right of the air deflector support hooks. This will release the hooks from the left/right sides of the module. 3. Swing the air deflector (2) in a vertical position, slide rearward, in order to disengage the air deflector from the hooks (1). 4. Remove the sunroof air deflector module.
2	Sunroof Air Deflector

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

Disconnected Drain Hose

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

1. Open the sunroof window panel.
2. Lower the headliner as needed. Refer to Headlining Trim Panel Replacement (Coupe) , Headlining Trim Panel Replacement (Wagon) .
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 FRAME REPLACEMENT (COUPE)

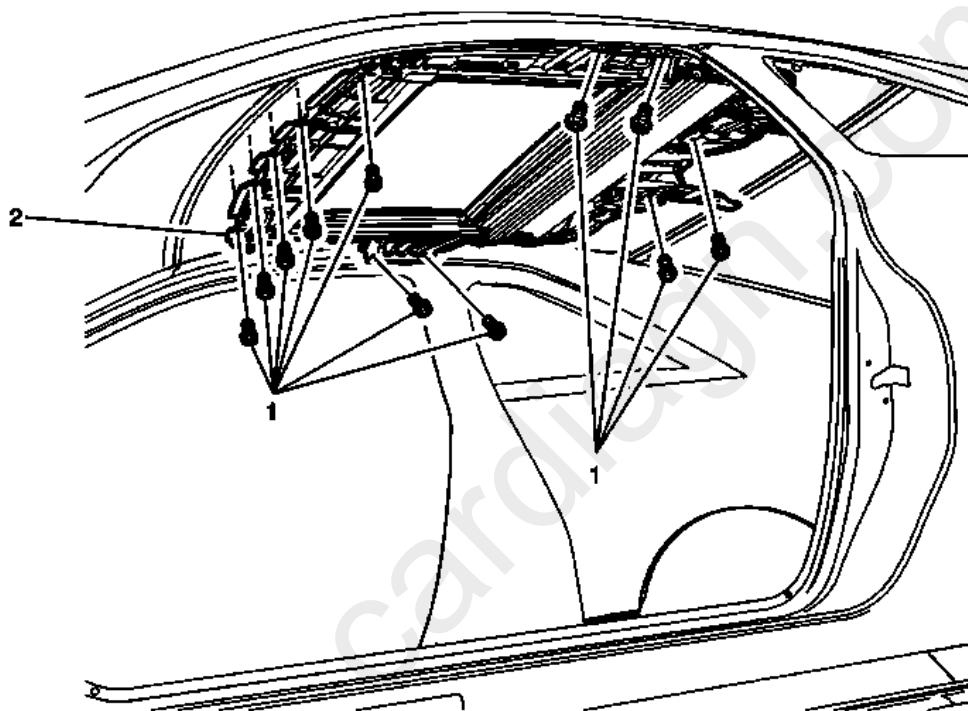


Fig. 5: Sunroof Frame & Bolts (Coupe)
Courtesy of GENERAL MOTORS COMPANY

Sunroof Frame Replacement (Coupe)

Callout	Component Name
Preliminary Procedure	
1. Remove the front sunroof window. Refer to <u>Sunroof Window Replacement - Front (Coupe)</u>. 2. It is only necessary to lower the headliner. Only do those steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to <u>Headlining Trim Panel Replacement (Coupe)</u> .	

3. Disconnect the sunroof harness electrical connectors.
4. Disconnect the drain hoses from the sunroof frame . Refer to **Sunroof Housing Front Drain Hose Replacement**, and **Sunroof Housing Rear Drain Hose Replacement**.

Do not remove the drain hoses from the vehicle, disconnect the drain hoses at the frame only.

5. Mark the sunroof frame bolt sequence for installing.

1	Sunroof Frame Bolt (Qty: 11) CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Leave the four corner bolts until last. 2. Recline the seats all the way rearward. 3. With the an assistant, remove the sunroof frame from the vehicle and place on a clean, prepared surface. Tighten 10 N.m (89 lb in)
2	Sunroof Frame Procedure 1. Mark the motors to ensure proper reinstalling. The motor can not be interchanged. 2. Transfer all the necessary component to the new sunroof assembly. 3. Install the sunroof frame follow the mandatory sequence 4. Sunroof track timing/synchroization.. 5. Initialize/Teach the sunroof and sunshade motor/actuators..

SUNROOF HOUSING DRAIN GUTTER REPLACEMENT (WAGON)

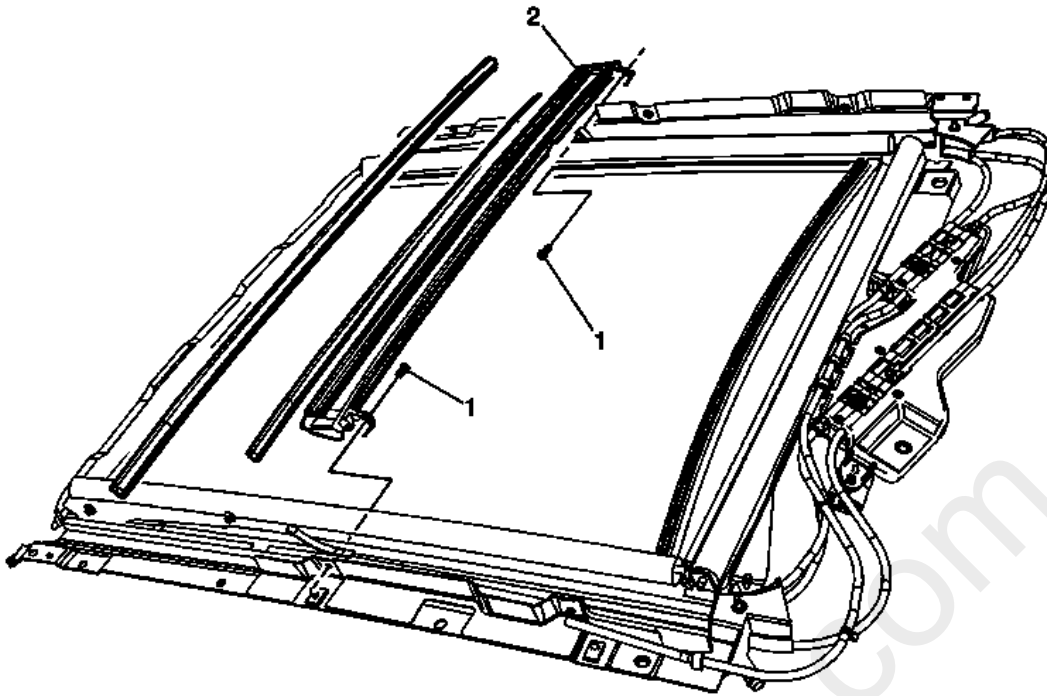


Fig. 6: Sunroof Water Gutter (Wagon)
 Courtesy of GENERAL MOTORS COMPANY

Sunroof Housing Drain Gutter Replacement (Wagon)

Callout	Component Name
1	Sunroof Water Gutter Housing Drain Screw (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Push downward on the sunroof panel side opening cover to view the sunroof water gutter housing drain screws. 2. After removing the screws, push outward on each rear corner of the gutter to release it from the side tracks. Tighten 4 N.m (35 lb in)
2	Sunroof Water Gutter Housing Drain

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT

Removal Procedure

1. It is only necessary to lower the headliner. Only do those steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to **Headlining Trim Panel Replacement (Coupe)** , **Headlining Trim Panel Replacement (Wagon)** .

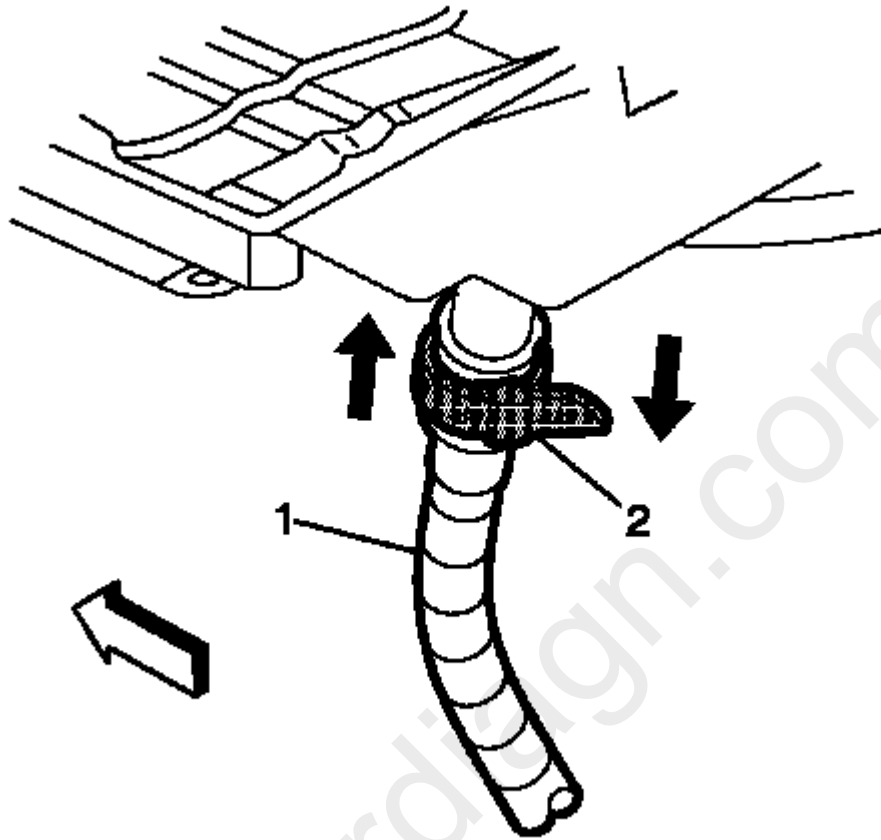


Fig. 7: Front Sunroof Drain Hose From Sunroof Module Front Spigot
Courtesy of GENERAL MOTORS COMPANY

2. Remove tie strap (2) if equipped, disengage the drain hoses (1) from the drain spouts connected to the front of the sunroof module.
3. Remove the instrument panel (I/P) carrier. Refer to **Instrument Panel Lower Trim Panel Replacement (Left Hand Drive)** , **Instrument Panel Lower Trim Panel Replacement (Right Hand Drive)** .
4. Fold the sound barrier inward from the cowl in order to access the sunroof drain hose.

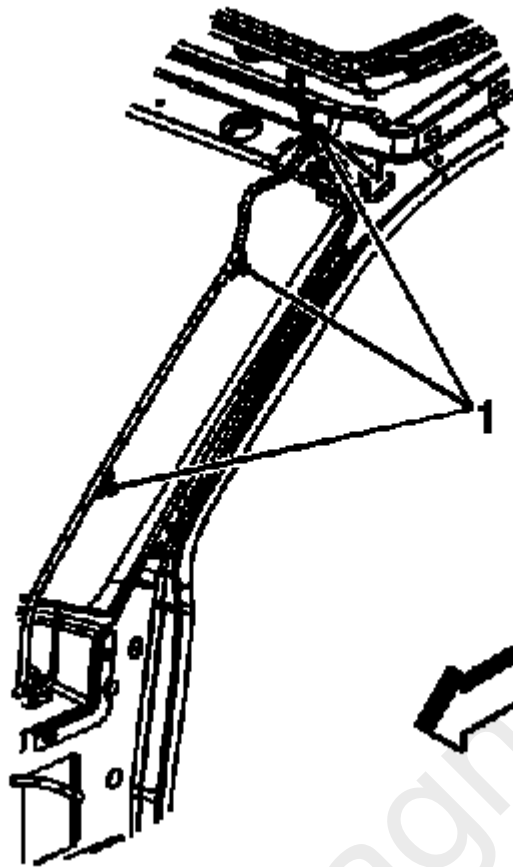


Fig. 8: Identifying Retainers Clips On "A" Pillar
Courtesy of GENERAL MOTORS COMPANY

5. Disengage the retaining clips (1) on the A-pillar.

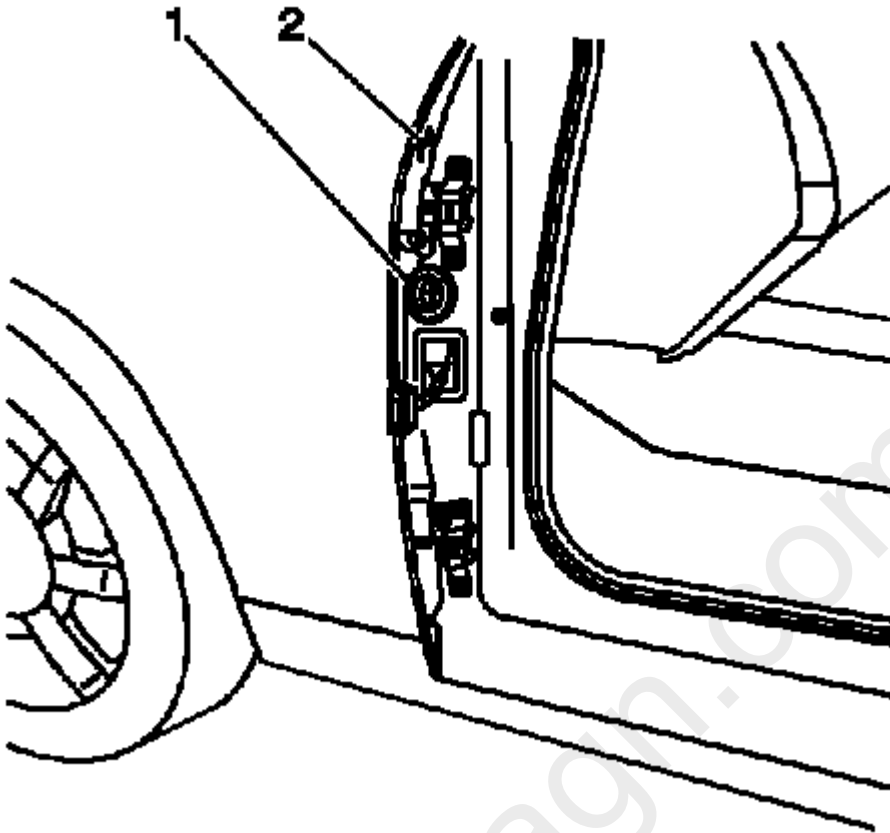


Fig. 9: View Of "A" Pillar And Drain Hose Access Hole
Courtesy of GENERAL MOTORS COMPANY

NOTE: The door must be removed prior to removing the drain hose (1) from the hinge pillar (2).

6. Complete the following steps in order to remove the door:
 1. Open the door.
 2. Support the door with a suitable floor jack.
 3. Remove the check link bolt from the hinge pillar.
 4. Remove the hinge to door bolts.
 5. Carefully move the door away from the hinge pillar.
 6. Disengage the 4 locking tabs on the electrical harness connector to the hinge pillar.
 7. Disconnect the electrical connector.
 8. Remove the door, with an assistant.

NOTE: Attach a cord to the drain spout end of the drain hose in order to re-route the new drain hose in the original location.

7. Attach a cord to the end of the drain hose.
8. Carefully guide the sunroof drain hose (1) outward from the front hinge pillar (2).

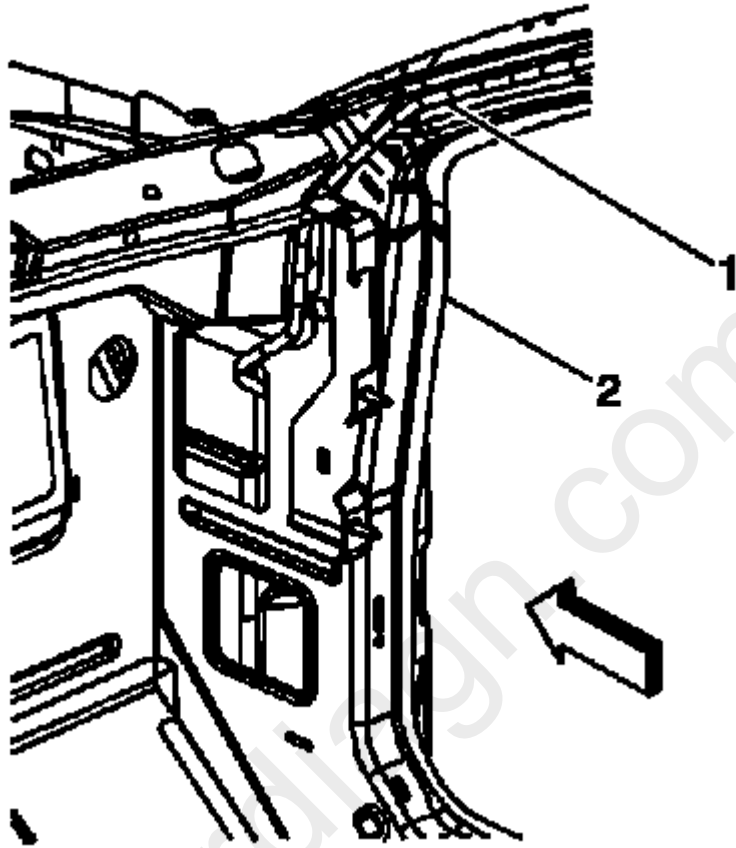


Fig. 10: Identifying Drain Hose
Courtesy of GENERAL MOTORS COMPANY

9. Remove the drain hose (1) from the vehicle.
10. Remove the drain hose from the cord.

Installation Procedure

1. Attach the cord to the drain spout end of the new drain hose.

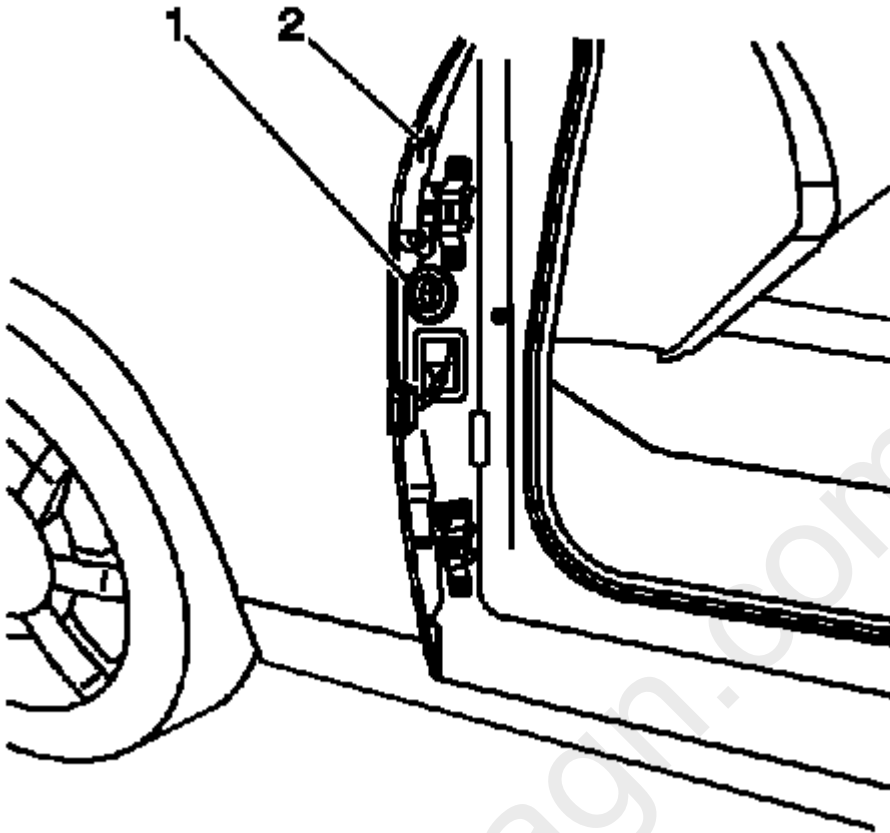


Fig. 11: View Of "A" Pillar And Drain Hose Access Hole
Courtesy of GENERAL MOTORS COMPANY

2. Install the front drain hose (1) into the hinge pillar (2) guide hole.
3. Guide the drain hose up through the hinge pillar panel near the A-pillar while pulling on the cord.
4. Secure the grommet end (1) to the hinge pillar.
5. Remove the cord from the drain hose.
6. Complete the following steps in order to install the door:
 1. Position the door to the vehicle, with the aid from an assistant.
 2. Connect the electrical harness connector.
 3. Push the harness inward, in order to secure the 4 locking tabs on the connector to the hinge pillar.
 4. Carefully move the door toward the hinge pillar.

CAUTION: Refer to Fastener Caution .

5. Apply LOCTITE® Blue, GM P/N 12345382 (Canadian P/N 10953489) or the equivalent to the door hinge bolts.

Install the hinge to pillar bolts tighten to 33 N.m (24 lb ft).

6. Install the check link bolt to pillar tighten to 22 N.m (16 lb ft).

CAUTION: Striker alignment is a crucial part of door latch operation. Do not use the door striker to adjust the door to the vehicle. Failure to properly adjust the striker can result in damage to the door latch and the striker.

7. Adjust the door for proper alignment. Refer to Door Adjustment .
8. Use body color paint in order to touch up the door hinge bolt heads.

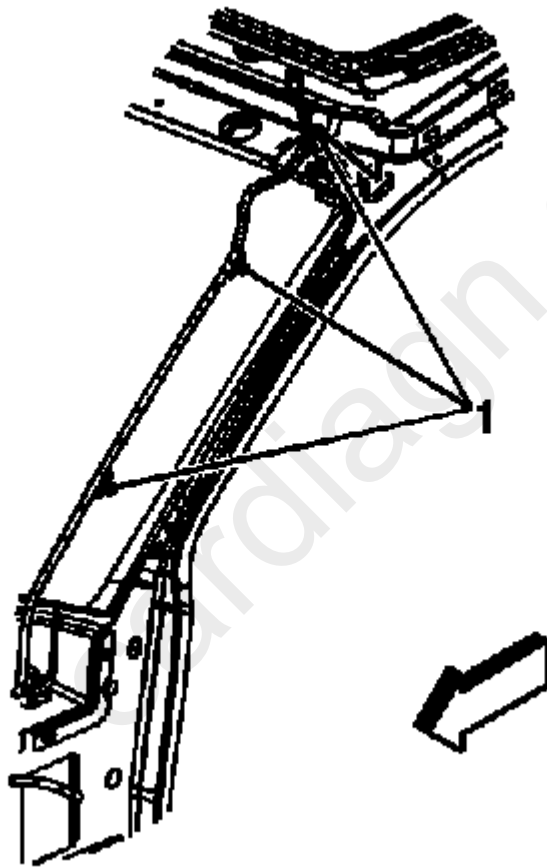


Fig. 12: Identifying Retainers Clips On "A" Pillar
Courtesy of GENERAL MOTORS COMPANY

7. Secure the drain hose retainers to the "A" pillar (1).

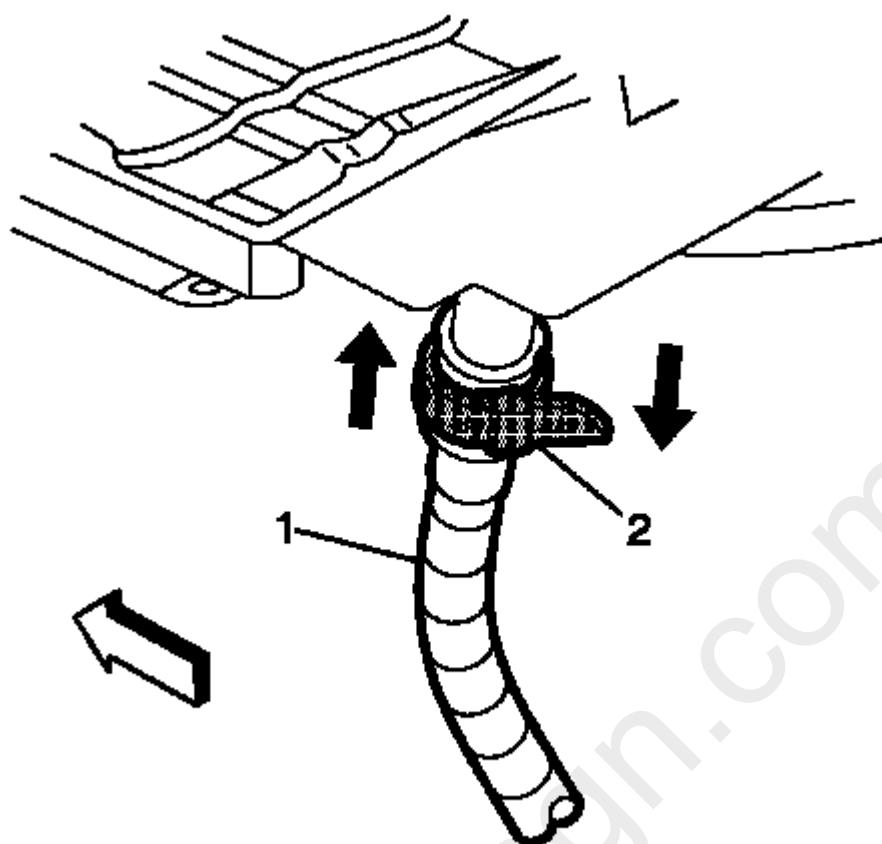


Fig. 13: Front Sunroof Drain Hose From Sunroof Module Front Spigot
 Courtesy of GENERAL MOTORS COMPANY

8. Secure the drain hose (1) to the drain spigot using a tie strap (2) or equivalent .

The only suitable lubricant is clean water for the drain hose to drain spigot installation.

9. Position the sound barrier to the cowl.
10. Install the instrument panel carrier. Refer to **Instrument Panel Lower Trim Panel Replacement (Left Hand Drive)** , **Instrument Panel Lower Trim Panel Replacement (Right Hand Drive)** .
11. Install the headliner. Refer to **Headlining Trim Panel Replacement (Coupe)** , **Headlining Trim Panel Replacement (Wagon)** .

SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT

Removal Procedure

1. It is only necessary to lower the headliner. Only do those steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to **Headlining Trim Panel Replacement (Coupe)** , **Headlining Trim Panel Replacement (Wagon)** .

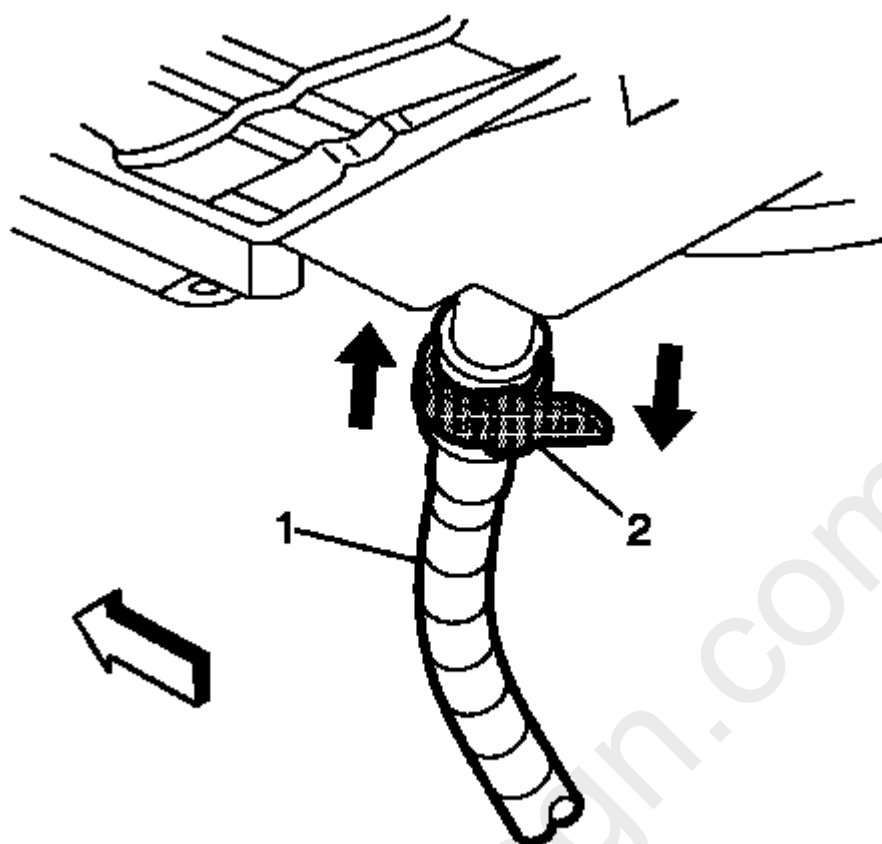


Fig. 14: Front Sunroof Drain Hose From Sunroof Module Front Spigot
Courtesy of GENERAL MOTORS COMPANY

2. Remove tie strap (2) if equipped, disengage the drain hoses (1) from the drain spouts connected to the front of the sunroof module.

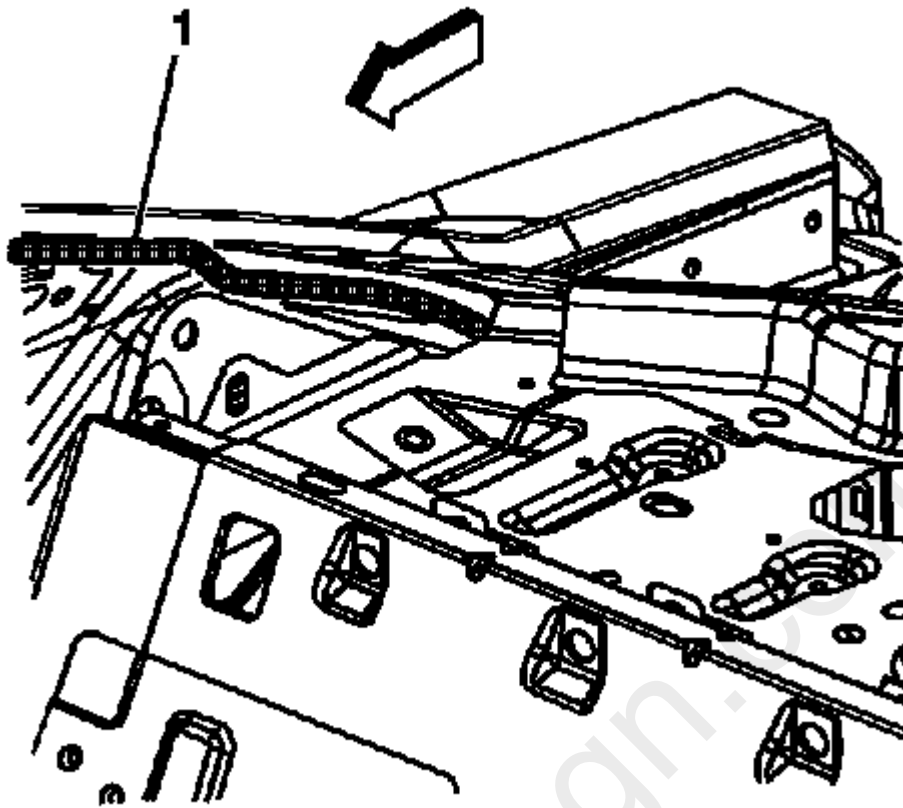


Fig. 15: Identifying Rear Upper Drain Hose
Courtesy of GENERAL MOTORS COMPANY

3. Disengage the rear upper drain hose (1) from the conduit.

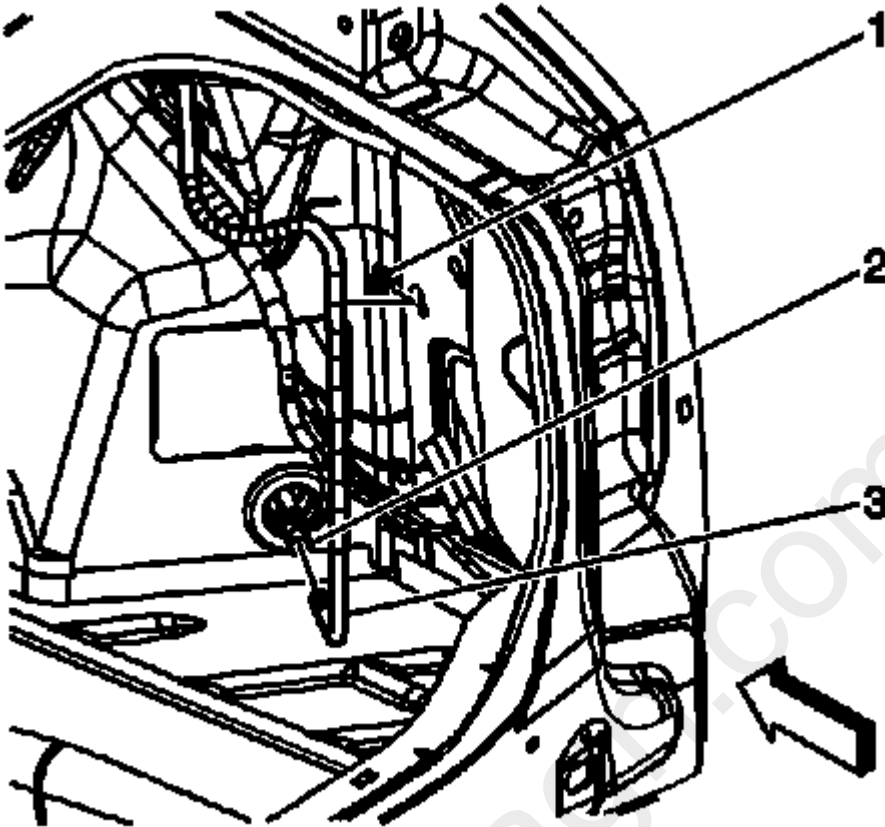


Fig. 16: Identifying Rear Drain Hose
Courtesy of GENERAL MOTORS COMPANY

4. Remove the rear compartment trim panel. Refer to **Rear Compartment Side Trim Panel Replacement (Coupe)**.
5. Remove the rear lower drain hose from the retaining clips (1).
6. Remove the rear drain hose (3) from the inner wheelhouse drain spout (2).
7. Remove the drain hose from the vehicle.

Installation Procedure

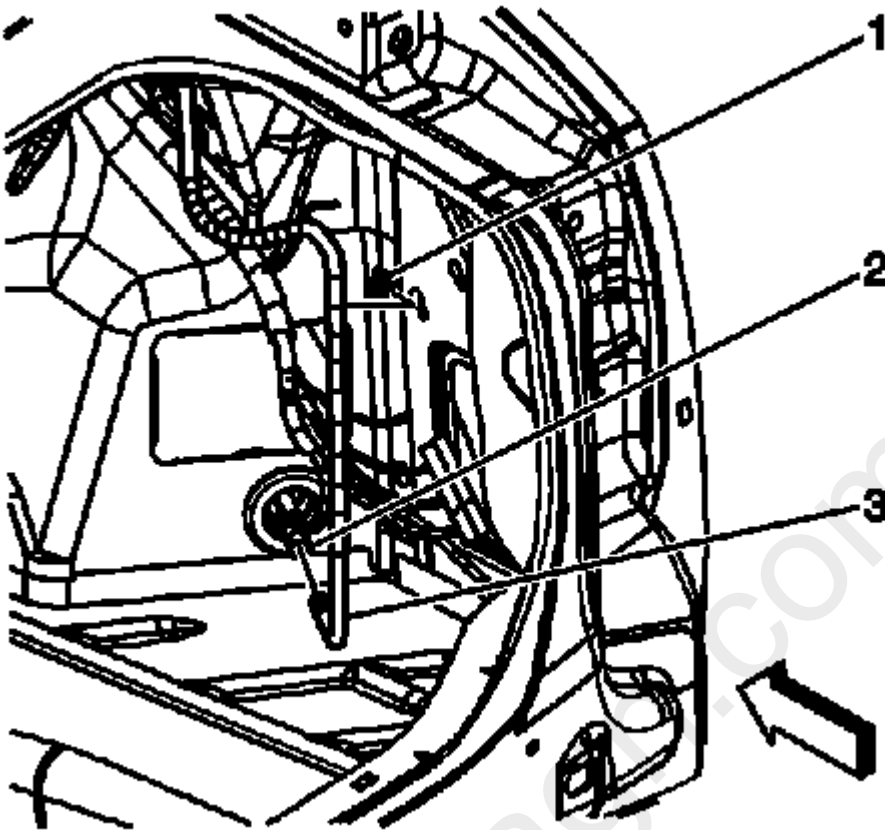


Fig. 17: Identifying Rear Drain Hose
Courtesy of GENERAL MOTORS COMPANY

1. Guide the drain hose through the rear shelf panel to the "D" pillar behind the shoulder belt retractor.
2. Clip the rear lower drain hose (3) into the retention clips.
3. Secure the drain hose retainer clips to the sheet metal.

NOTE: **Secure the lower drain hose to the drain spout (2) at the inner wheelhouse panel.**

4. Ensure the electrical grommet to drain hose drain spout is not pinched off after drain hose installation.
5. Install the rear compartment trim panel. Refer to **Rear Compartment Side Trim Panel Replacement (Coupe)** .

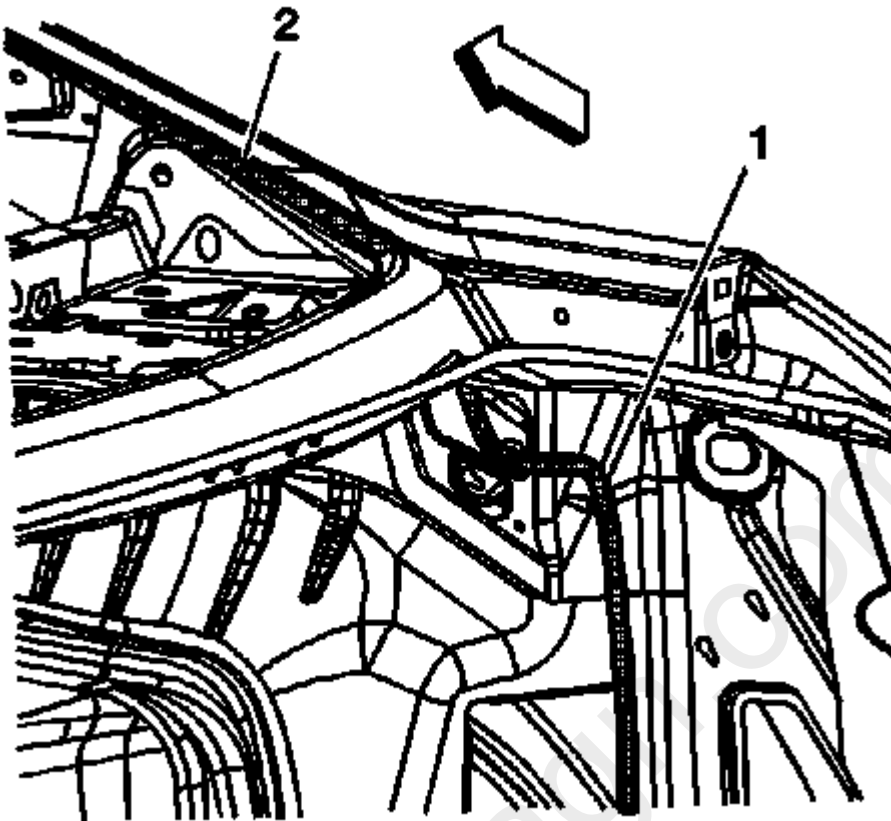


Fig. 18: Identifying Rear Upper Drain Hoses
Courtesy of GENERAL MOTORS COMPANY

6. Clip the rear upper drain hoses (1) into position (2).

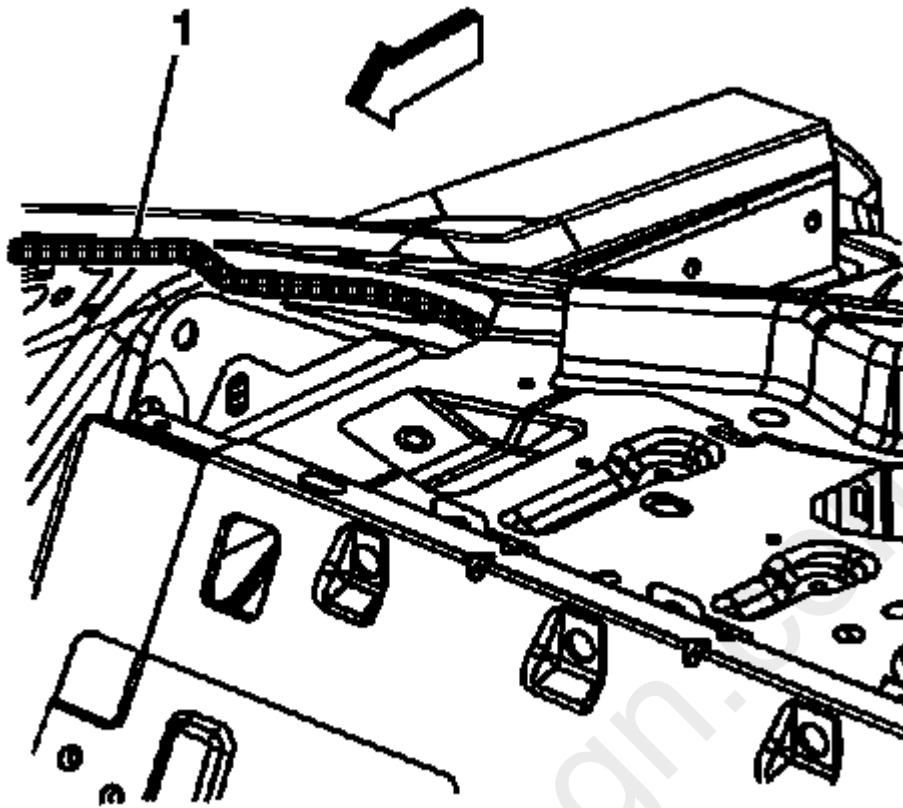


Fig. 19: Identifying Rear Upper Drain Hose
Courtesy of GENERAL MOTORS COMPANY

7. Insert the rear upper drain hose (1) to the conduit.

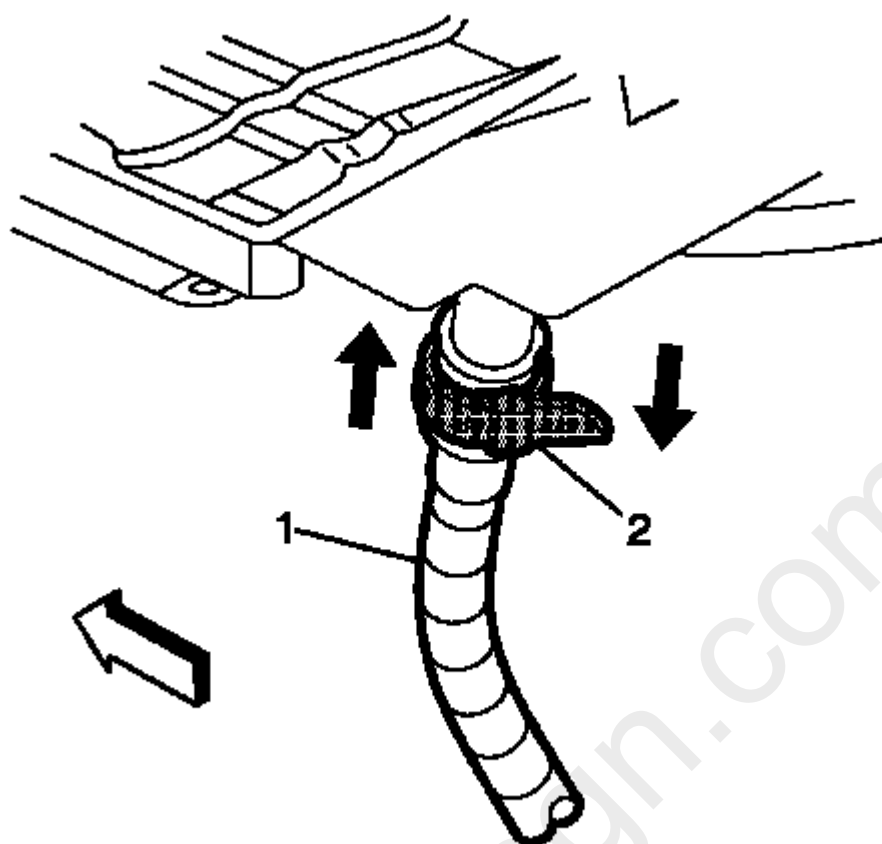


Fig. 20: Front Sunroof Drain Hose From Sunroof Module Front Spigot
 Courtesy of GENERAL MOTORS COMPANY

8. Secure the drain hose (1) to the drain spout using a tie strap (2) or equivalent .

The only suitable lubricant is clean water for the drain hose to drain spout installation.

9. Inspect for proper drainage.
10. Install the headliner with the aid of an assistant. Refer to **Headlining Trim Panel Replacement (Coupe)** , **Headlining Trim Panel Replacement (Wagon)** .

SUNROOF MOTOR/ACTUATOR INITIALIZATION/TEACH PROCESS (WAGON)

Initialization/Teach Procedure, Manual Method, New/First Time Installation

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

1. Press the sunroof switch to the open position until the window stalls at the rear hard stop in the full open position, and the power sunshade stalls at the rear hard stop position and then moves slightly to the soft stop position. Release the button. This is the initialization portion.

2. Within 3 seconds, press and hold the sunroof switch open again. The sunroof window will move to flush and open/close again. The sunshade will move to the flush position and stop. This is the teach portion.
3. Verify the operation of the sunroof.

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

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

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

Re-Initialization/Teach Procedure, Manual Method, Reinstallation

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

1. Press the sunroof switch to the open position until the window reaches the open soft stop position and release. Press the sunroof switch open and hold for approximately 10 seconds, until the window stalls at the rear hard stop in the open position and then moves slightly to the soft stop position, and the power sunshade stalls at rear open hard stop and moves slightly to soft stop. Release the button. This is the initialization portion.
2. Within 3 seconds, press and hold the sunroof switch open again. The sunroof window will move to flush and open/close again. The sunshade will move to the flush position and stop. This is the teach portion.
3. Verify the operation of the sunroof.

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

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

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

SUNROOF MOTOR/ACTUATOR REPLACEMENT (WAGON)

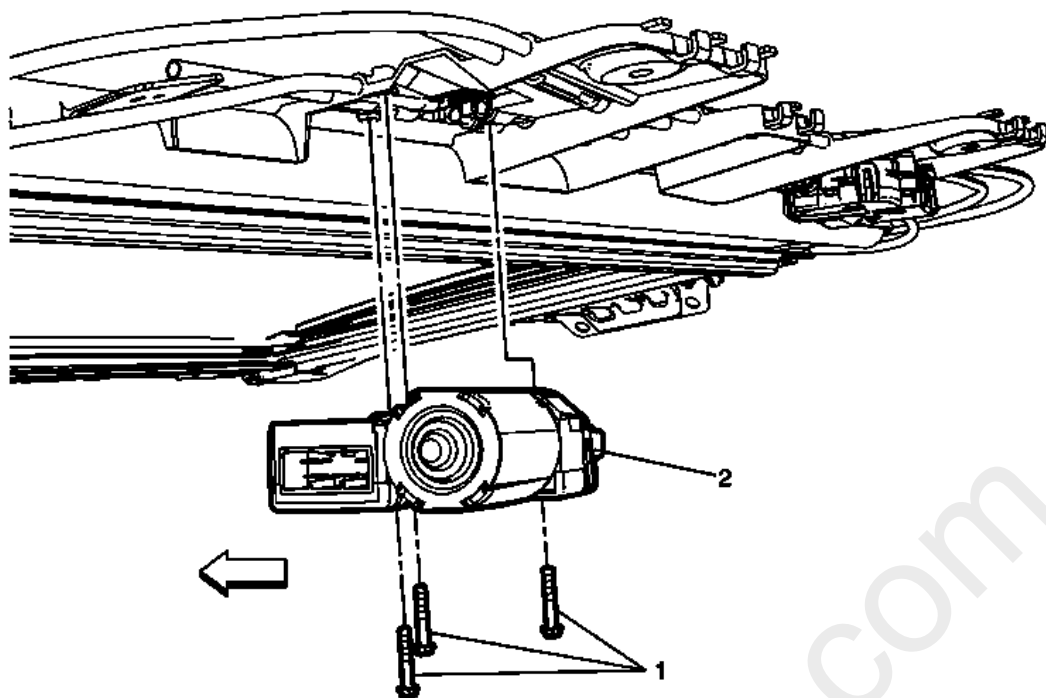


Fig. 21: Sunroof Motor/Actuator & Bolts (Wagon)

Courtesy of GENERAL MOTORS COMPANY

Sunroof Motor/Actuator Replacement (Wagon)

Callout	Component Name
Preliminary Procedure It is only necessary to lower the headliner. Only perform the steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to <u>Headlining Trim Panel Replacement (Wagon)</u> .	
1	Sunroof Motor/Actuator Bolt (Qty: 3)
	CAUTION: Refer to <u>Fastener Caution</u> .
	Procedure 1. Disconnect the electrical connector. 2. With a turning motion, pull downward on the motor/actuator. Disengage the motor from the drive cables. 3. Install the motor/actuator to the frame with a turning motion. Push upward. This will engage the motor/actuator into the drive cables.
	Tighten 4 N.m (35 lb in)

	Sunroof Motor/Actuator
	Procedure
2	1. Verify the sunroof motor/actuator operation. 2. Sunroof track timing/synchronization. Refer to <u>Sunroof Track Timing/Synchronization (Wagon)</u>. 3. After installing the sunroof motor/actuator, refer to <u>Sunroof Motor/Actuator Initialization/Teach Process (Wagon)</u>.

SUNROOF SUNSHADE MOTOR/ACTUATOR REPLACEMENT (WAGON)

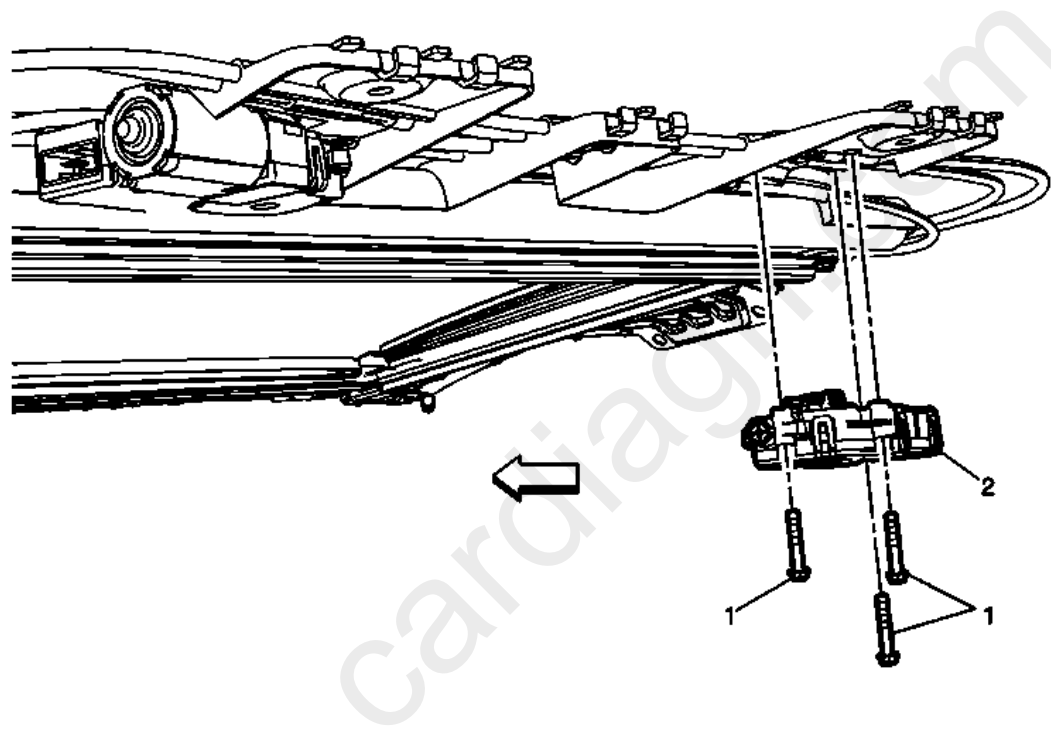


Fig. 22: Sunroof Sunshade Motor/Actuator & Bolts (Wagon)
Courtesy of GENERAL MOTORS COMPANY

Sunroof Sunshade Motor/Actuator Replacement (Wagon)

Callout	Component Name
Preliminary Procedure It is only necessary to lower the headliner. Only perform the steps in the headliner replacement procedure that will lower the headliner enough to gain access to the part. Refer to <u>Headlining Trim Panel Replacement (Wagon)</u> .	
	Sunroof Sunshade Motor/Actuator Bolt (Qty: 3) CAUTION:

1	Refer to <u>Fastener Caution</u> . Procedure 1. Open sunshade fully open position. 2. Disconnect the electrical connector. 3. With a turning motion, pull downward on the motor/actuator. Disengage the motor from the drive cables. 4. Install the motor/actuator to the frame with a turning motion. Push upward. This will engage motor/actuator into the drive cables. Tighten 4 N.m (35 lb in)
2	Sunroof Sunshade Motor/Actuator Procedure 1. Verify the sunroof sunshade motor/actuator operation. 2. Sunroof track timing/synchronization. Refer to <u>Sunroof Track Timing/Synchronization (Wagon)</u>. 3. After installing the sunroof motor/actuator, refer to <u>Sunroof Motor/Actuator Initialization/Teach Process (Wagon)</u>.

SUNROOF SUNSHADE REPLACEMENT (WAGON)

Removal Procedure

1. Open the sunshade to the fully open position.
2. Remove the rear sunroof window.

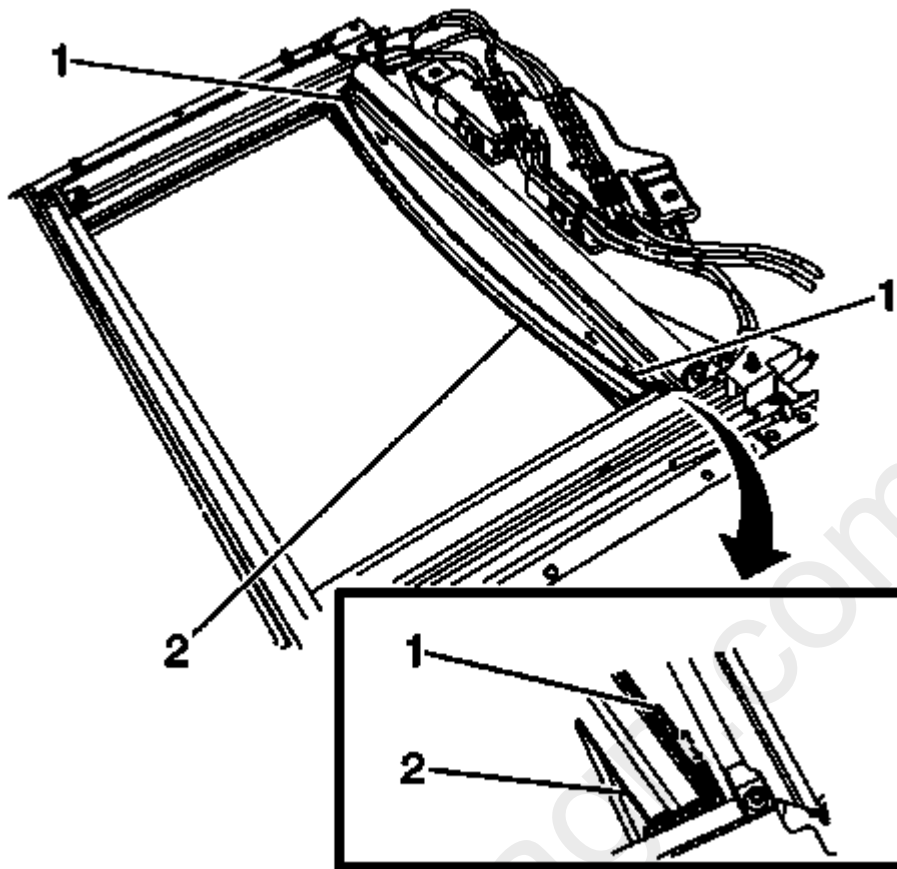


Fig. 23: View of Cable Guide and Cross Bar
Courtesy of GENERAL MOTORS COMPANY

3. Push inward on the cable guides tabs (1) located at each end of the cross bar (2) then grasp the front corners of the sunshade, roll the sunshade counterclockwise to release tension on the cable guides tabs (1).

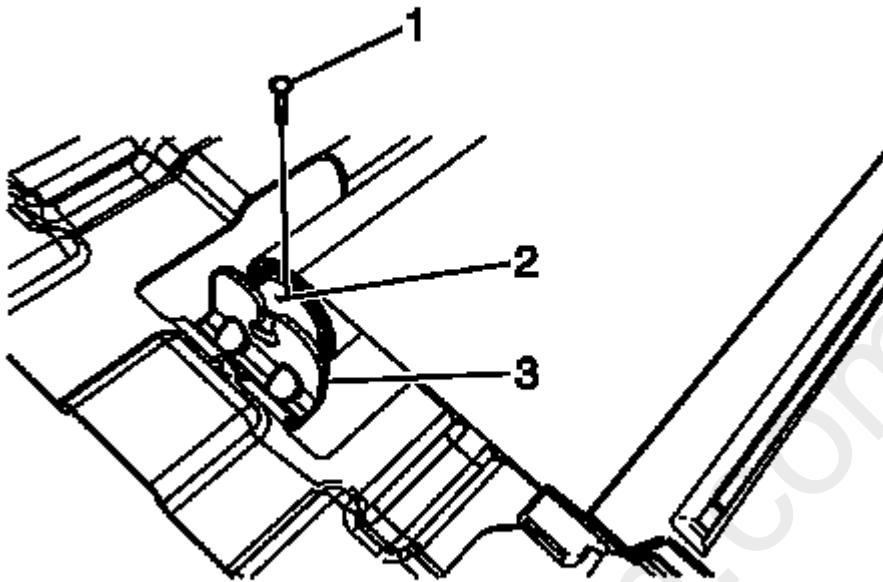


Fig. 24: Identifying Sunshade Cam Locking Hole
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: If the sunshade spring releases, it will be necessary to rewind it. Refer to step one in the install procedure.

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

The cam locking hole will come in to view when the sunshade is in the fully open position on the passengers side.

4. Close the sunshade until the cam locking hole (2) come in to view.
5. Insert a suitable tool (1) into the sunshade cam locking hole (2).

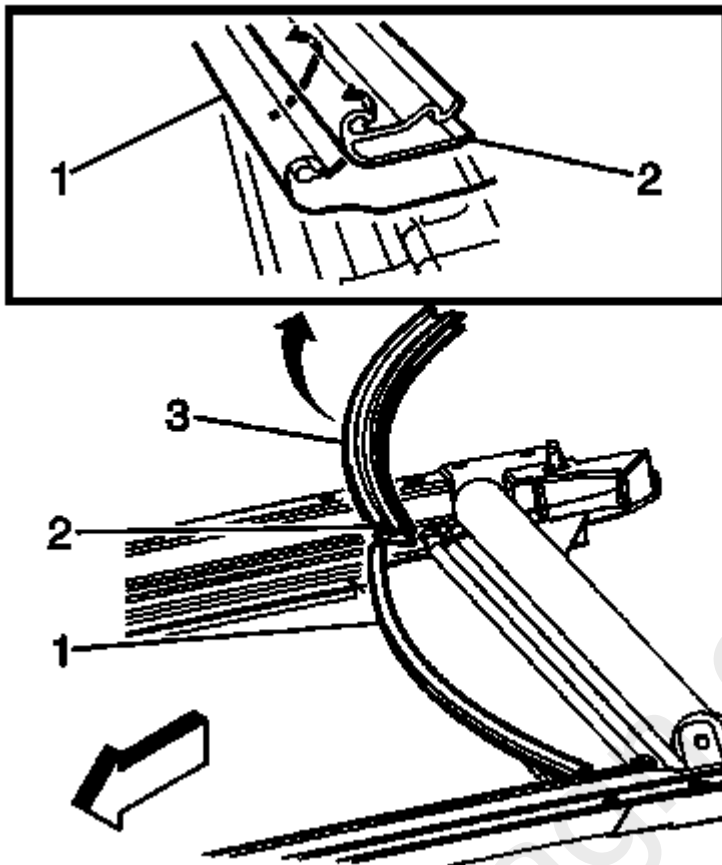


Fig. 25: View Of Cross Bar Retaining Edge
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: If installing a new service part sunshade it will be necessary to remove the cross bar from the sunshade.

6. Separate the sunshade material (1) from the cross bar (3) by turning it counterclockwise.
 - Lift up on the sunshade to view the retaining edge of the of the cross bar (3).
 - Slide the sunshade material (1) out of the retaining edge (2) of the cross bar (3).

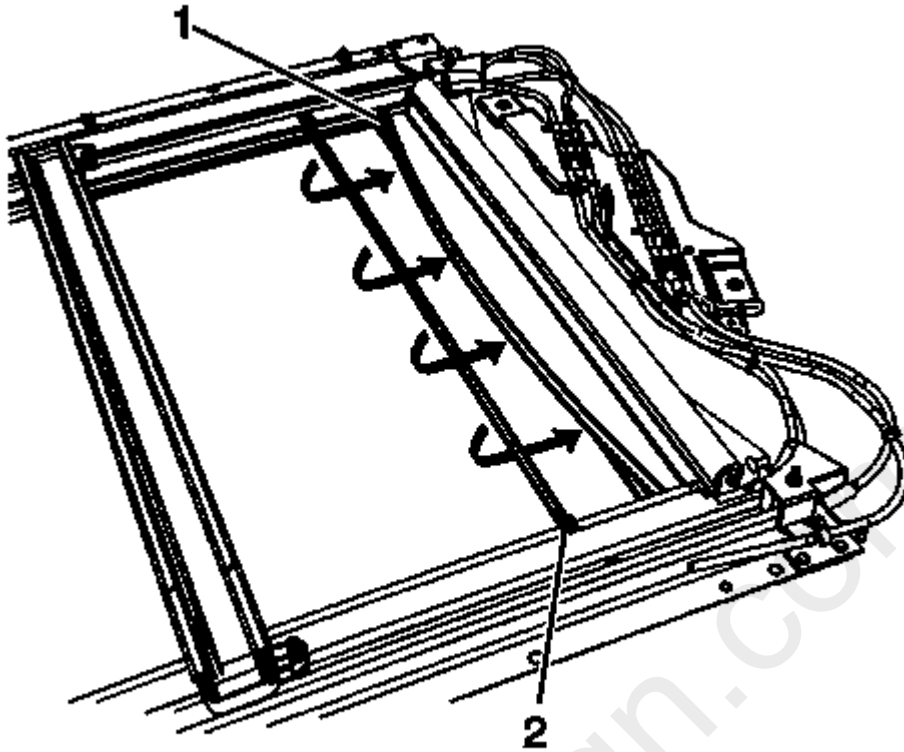


Fig. 26: View of Sunshade and Tension Bar
Courtesy of GENERAL MOTORS COMPANY

7. Remove the sunshade material (1) from under the tension bar (2).

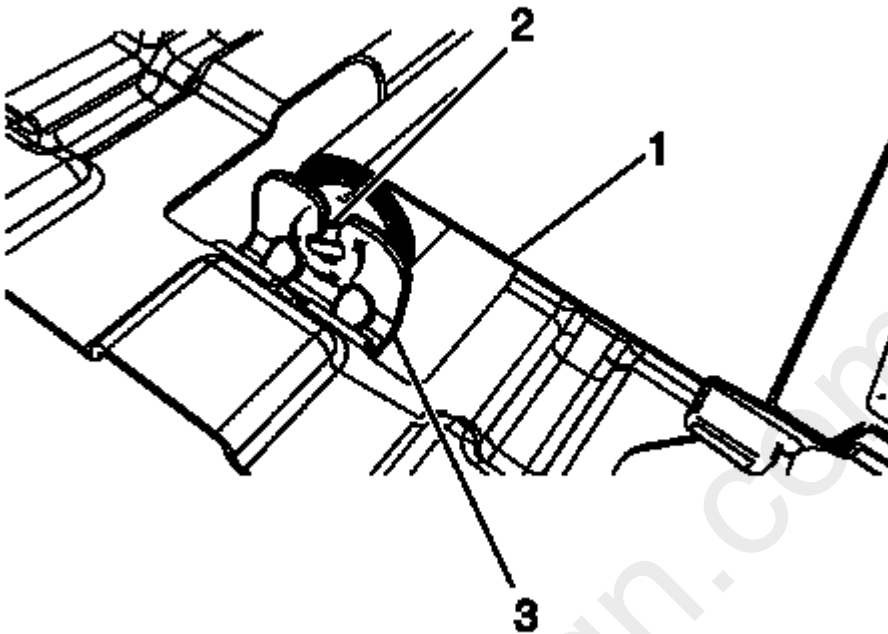


Fig. 27: Turning The Sunshade Cam Counterclockwise
Courtesy of GENERAL MOTORS COMPANY

8. Turn the sunshade (1) counterclockwise until the shade cam (2) is aligned with the bracket (3) notch.

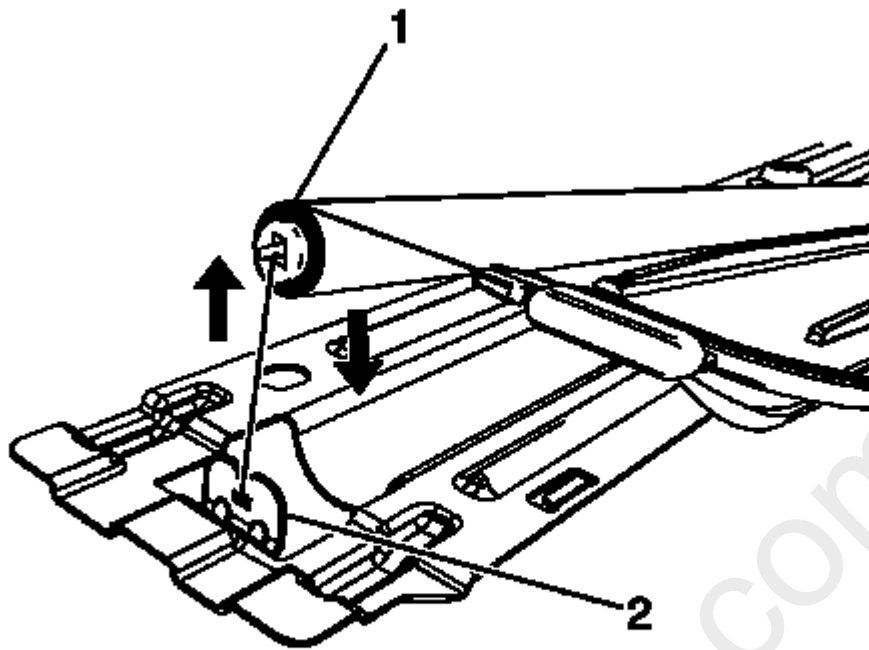


Fig. 28: Identifying Sunshade Bracket Notch
Courtesy of GENERAL MOTORS COMPANY

9. Lift upward on the sunshade (1) removing it from the bracket (2).

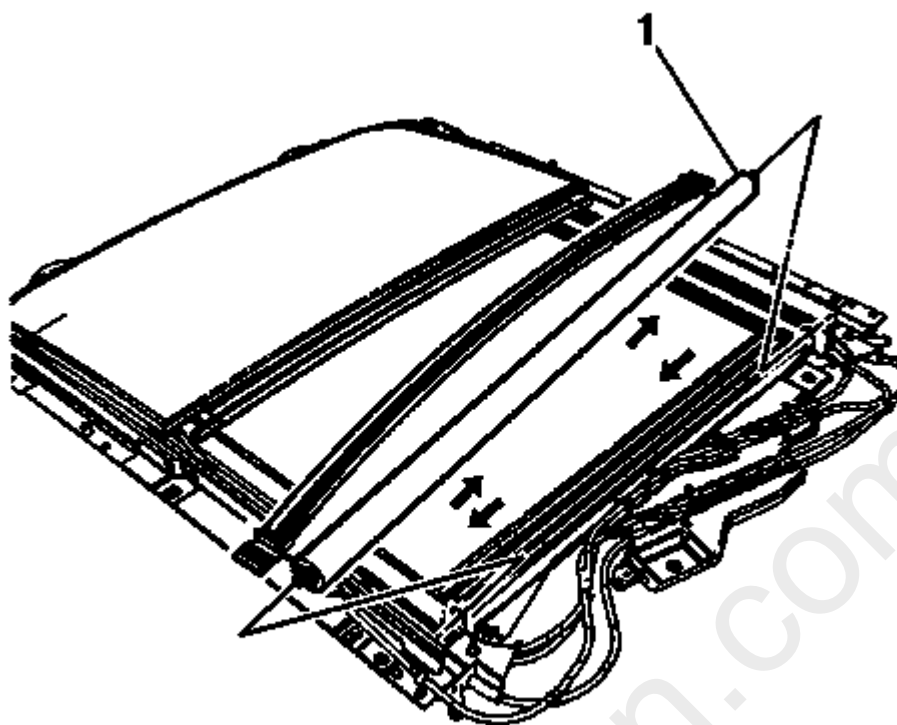


Fig. 29: View of Sunshade

Courtesy of GENERAL MOTORS COMPANY

10. Remove the sunshade (1) from outside of the vehicle.

Installation Procedure

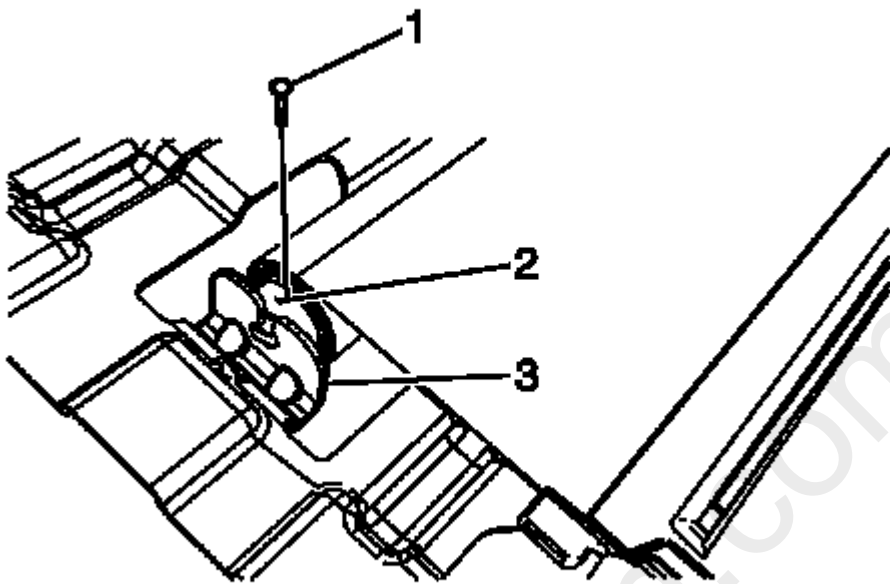


Fig. 30: Identifying Sunshade Cam Locking Hole
Courtesy of GENERAL MOTORS COMPANY

IMPORTANT: If the sunshade spring releases, it will be necessary to rewind it.

1. If the sunshade spring released turn the sunshade roller end slot 16 times in the counterclockwise direction. Insert a suitable tool (1) into the sunshade cam locking hole (2).
2. Install the sunshade to the vehicle from the passengers side.

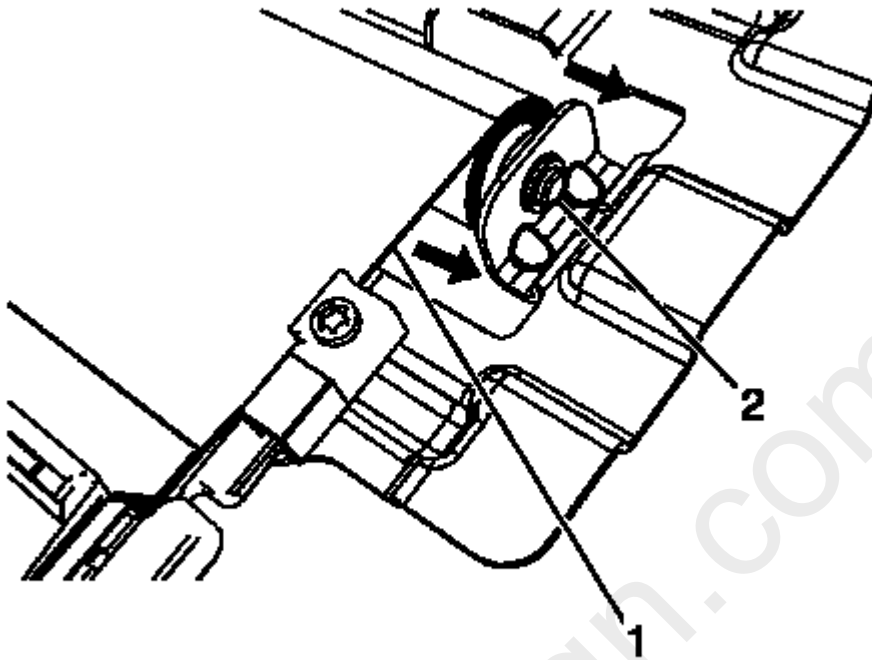


Fig. 31: View Of Sunshade End & Bracket Notch
Courtesy of GENERAL MOTORS COMPANY

3. Insert the end of the sunshade (1) to the driver side bracket (2) hole.

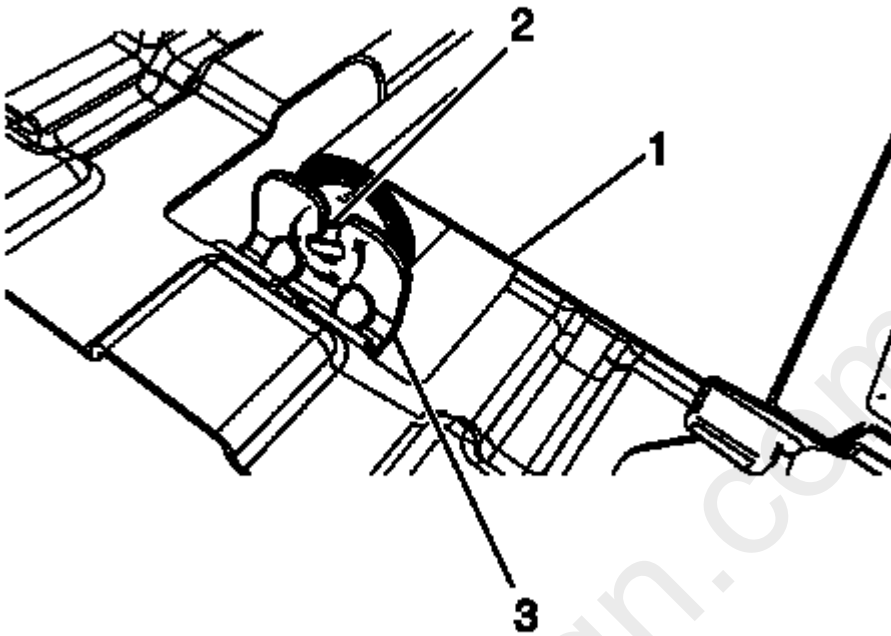


Fig. 32: Turning The Sunshade Cam Counterclockwise
Courtesy of GENERAL MOTORS COMPANY

4. Turn the sunshade cam (2) until it is aligned with the bracket (3) notch on the passengers side.

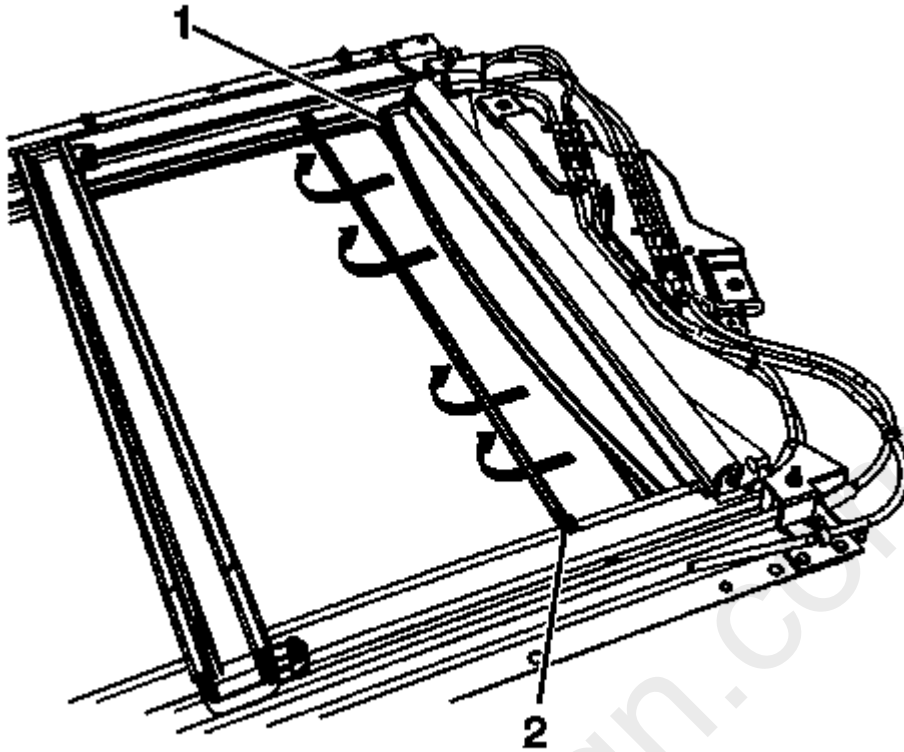


Fig. 33: Identifying Sunshade and Tension Bar
Courtesy of GENERAL MOTORS COMPANY

5. Install the sunshade material (1) under the tension bar (2).

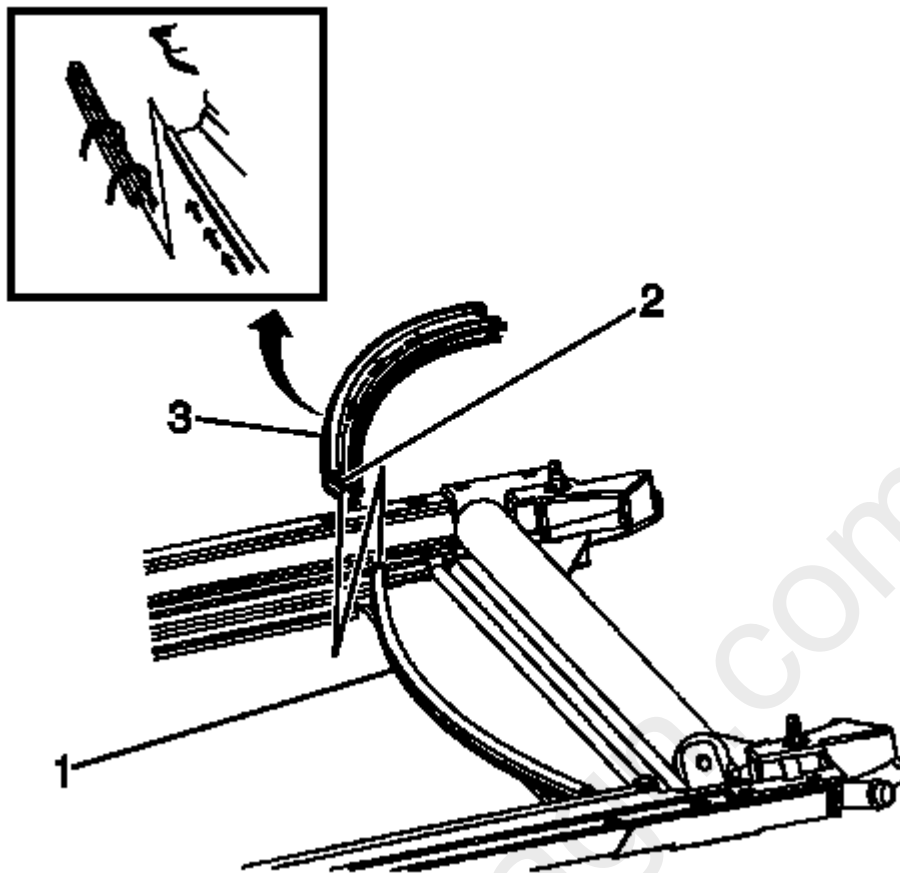


Fig. 34: View of Sunshade and Crossbar
Courtesy of GENERAL MOTORS COMPANY

6. Install the sunshade material (1) to the cross bar (3) retaining edge.
 - Lift upward on the sunshade and cross bar (3), align the sunshade material (1) to the cross bar (3) opening.
 - Slide the sunshade material (1) through the opening (2) of the cross bar (3) completely.
 - Turn the sunshade material (1) clockwise half a turn to lock the material in cross bar (3).

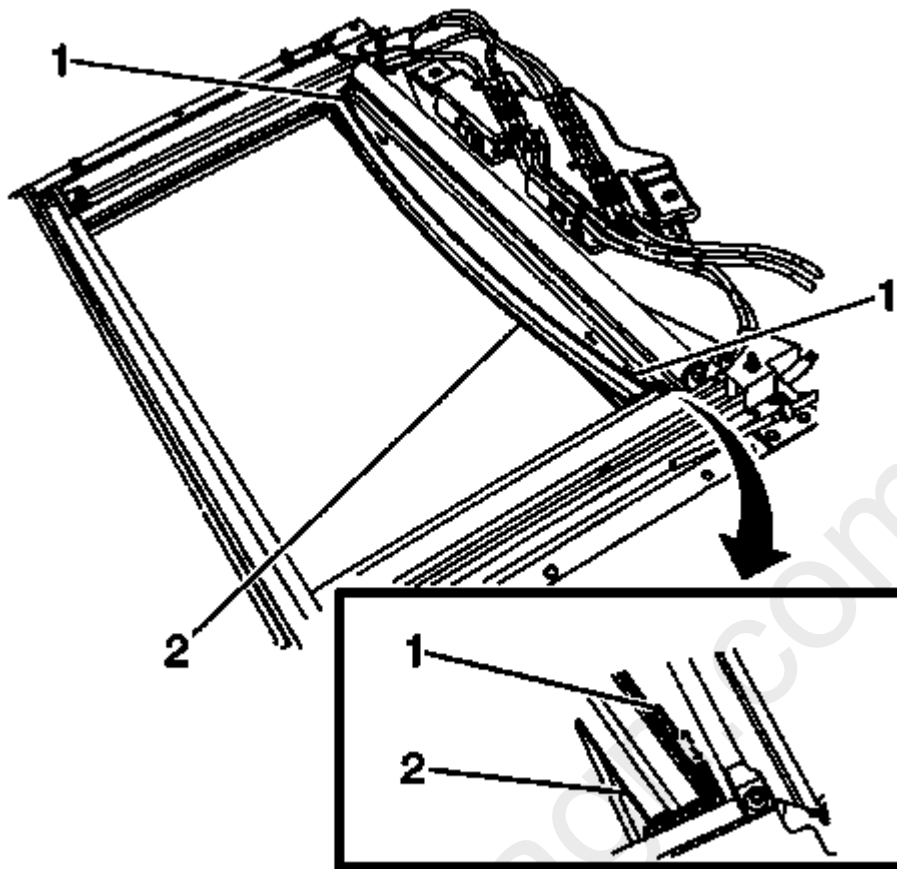


Fig. 35: View of Cable Guide and Cross Bar
Courtesy of GENERAL MOTORS COMPANY

7. Install the sunshade to the cable guides tabs (1) located at each end of the cross bar (2).
8. Push each end of the sunshade cable guides tabs into the ends of the sunshade until they locked in place.

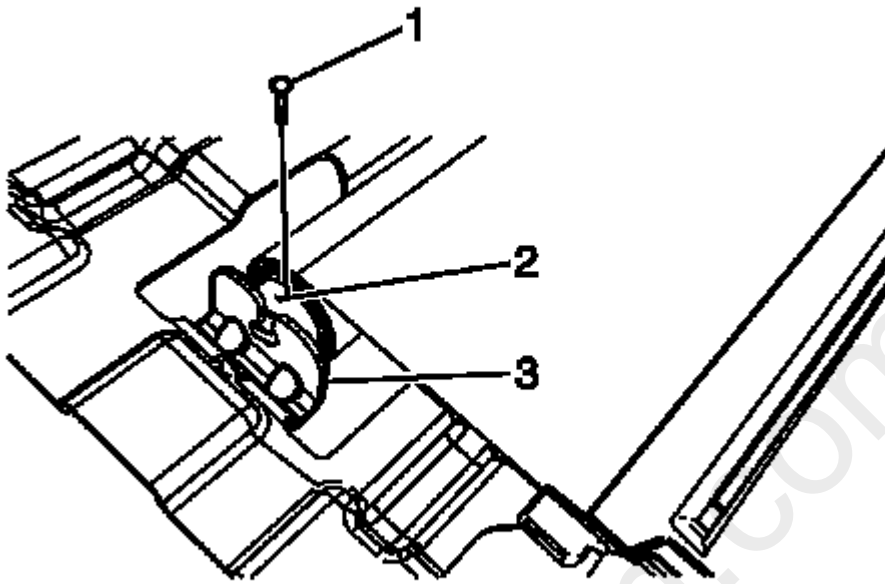


Fig. 36: Identifying Sunshade Cam Locking Hole
Courtesy of GENERAL MOTORS COMPANY

9. Remove the suitable tool (1) from the sunshade cam locking hole (2).
10. Ensure that the sunshade cam (2) is fully seated in the bracket (3) and the sunshade slides smoothly.
11. Verify the operation of the sunshade.
12. Install the rear sunroof window.

SUNROOF WINDOW SEAL REPLACEMENT - FRONT (WAGON)

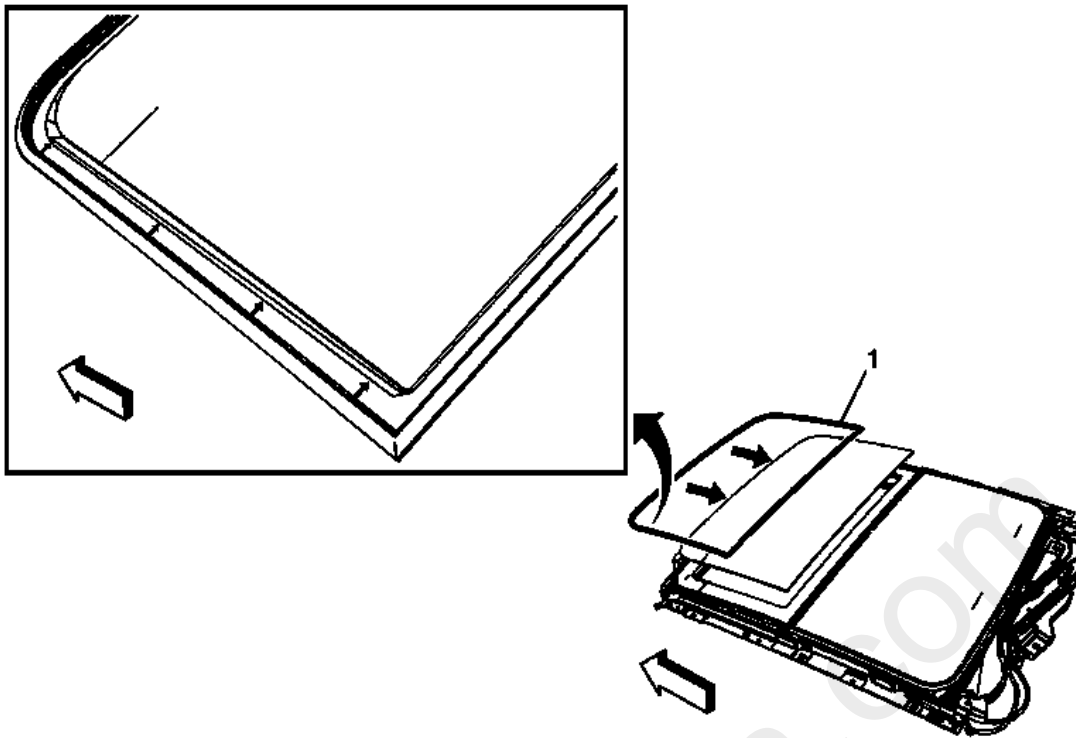


Fig. 37: Sunroof Window Seal - Front (Wagon)

Courtesy of GENERAL MOTORS COMPANY

Sunroof Window Seal Replacement - Front (Wagon)

Callout	Component Name
Preliminary Procedure	
Remove the front sunroof window panel.	
1	Front Sunroof Window Panel Seal Procedure 1. Place the front sunroof window panel on a protect cover. 2. Remove the seal from the window panel frame by pulling the seal away at one corner point and continuing around the perimeter of the frame. 3. Clean around the edge of the window and inside seat with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth. 4. Wipe the perimeter with a clean, dampened cloth using window cleaner GM P/N 1050427 (Canadian P/N 992727) or equivalent in order to clean the surface of the perimeter. Allow to air dry. 5. Position the sunroof window panel seal onto the window frame, locating the starting corner point.

6. Firmly press the window seal into place. A small rubber hammer will help in the installation.
7. Ensure that the seal is properly seated around the entire perimeter of the window frame.
8. Sunroof window height and opening fit adjustment. Refer to **Sunroof Window Height and Opening Fit Adjustment (Wagon)**.
9. Inspect sunroof for proper operation.

SUNROOF WINDOW SEAL REPLACEMENT - REAR (WAGON)

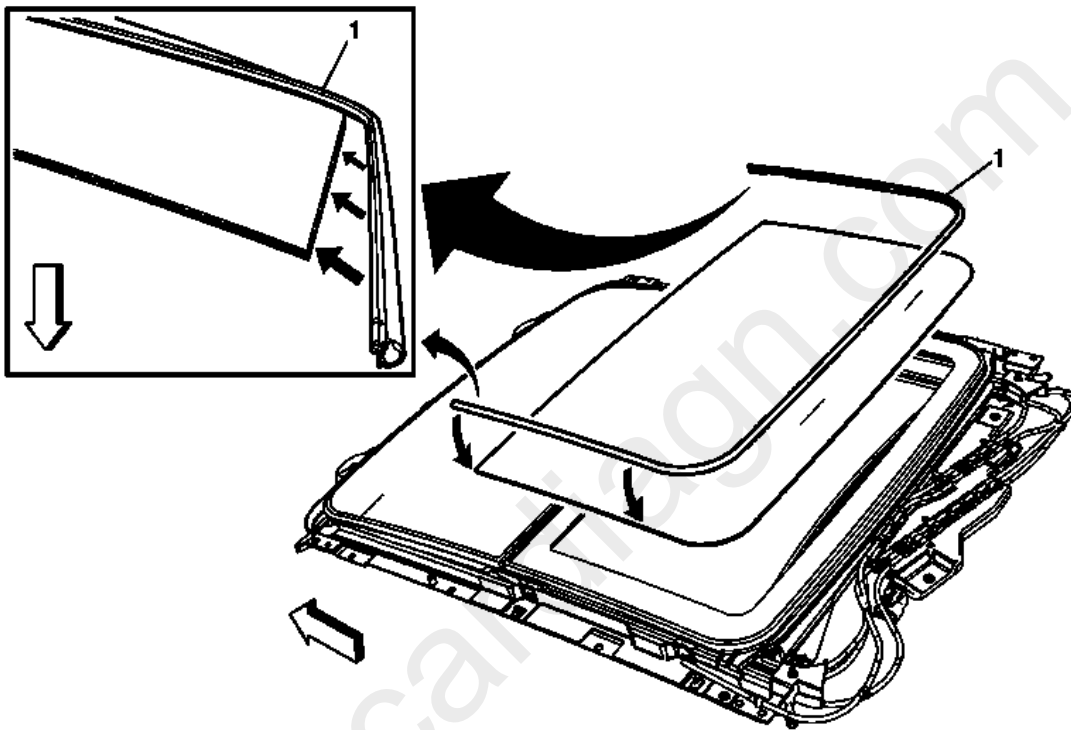


Fig. 38: Sunroof Window Seal - Rear (Wagon)

Courtesy of GENERAL MOTORS COMPANY

Sunroof Window Seal Replacement - Rear (Wagon)

Callout	Component Name
Preliminary Procedure	
Remove the rear sunroof window panel. Refer to <u>Sunroof Window Replacement - Rear</u> .	
	Rear Sunroof Window Panel Seal
Procedure	
1. Open the sunshade. 2. Place the rear sunroof window panel on a protect cover. 3. Remove the seal from the window panel frame by pulling the seal away from the	

front edge and continuing around the perimeter of the frame.

4. Clean around the edge of the window and inside seat with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth.
5. Wipe the perimeter with a clean, dampened cloth using window cleaner GM P/N 1050427 (Canadian P/N 992727) or equivalent in order to clean the surface of the perimeter.

Allow to air dry.

1

6. Position the sunroof window panel seal onto the window frame, locating the starting front edge work it around perimeter.
7. Firmly press the window seal into place. A small rubber hammer will help in the installation.
8. Ensure that the seal is properly seated around the entire perimeter of the window frame.
9. Sunroof window height and opening fit adjustment. Refer to **Sunroof Window Height and Opening Fit Adjustment (Wagon)**.
10. Inspect sunroof for proper operation.

SUNROOF SUNSHADE SWITCH REPLACEMENT

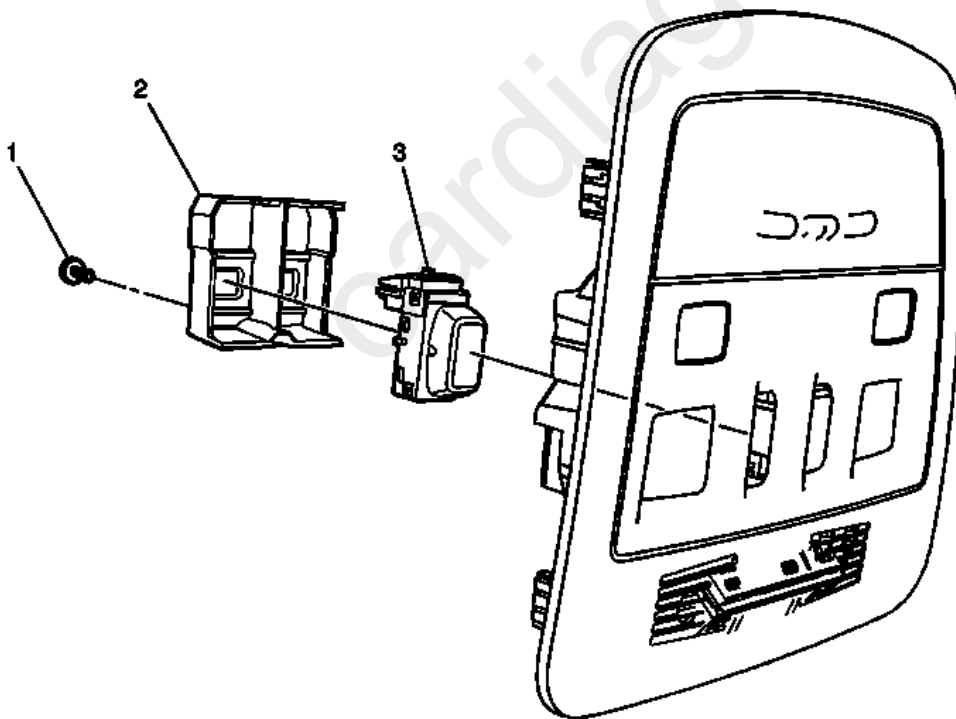


Fig. 39: Sunroof Sunshade Switch

Courtesy of GENERAL MOTORS COMPANY

Sunroof Sunshade Switch Replacement

Callout	Component Name
Preliminary Procedure Remove the roof console. Refer to Roof Console Replacement .	
1	Sunroof Switch Bracket Screw CAUTION: Refer to Fastener Caution . Tighten 2 N.m (18 lb in)
2	Sunroof Switch Bracket
3	Sunroof Sunshade Switch Procedure Unsnap the switch from the roof console.

SUNROOF SWITCH REPLACEMENT

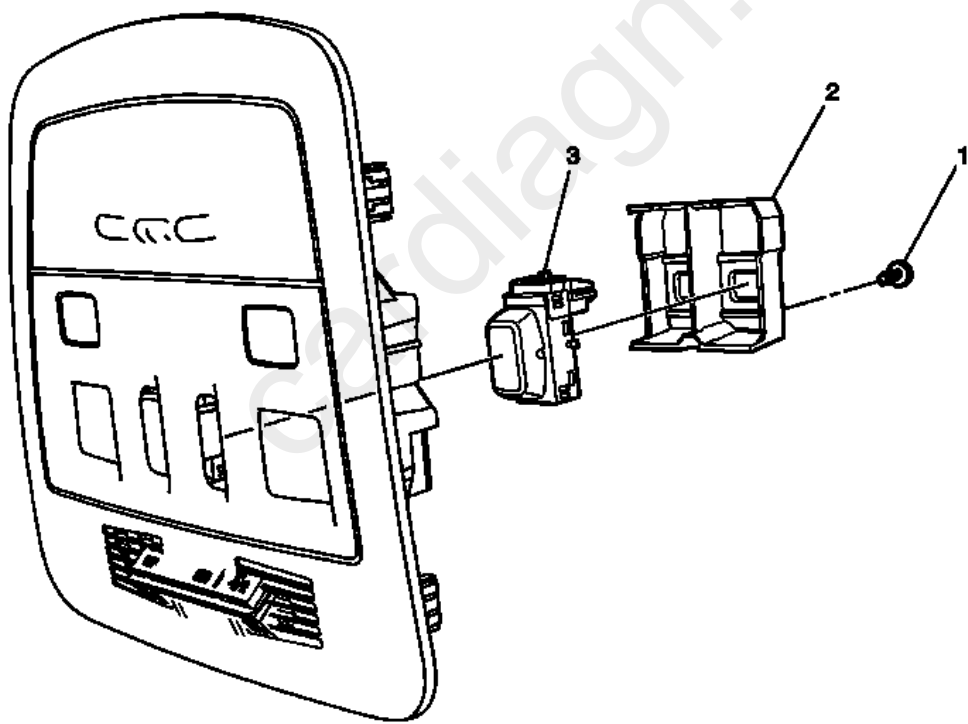


Fig. 40: Sunroof Switch
Courtesy of GENERAL MOTORS COMPANY

Sunroof Switch Replacement

Callout	Component Name

Preliminary Procedure

Remove the roof console. Refer to **Roof Console Replacement** .

1	Sunroof Switch Bracket Screw CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2 N.m (18 lb in)
2	Sunroof Switch Bracket
3	Sunroof Switch Procedure Unsnap the switch from the roof console.

SUNROOF TRACK TIMING/SYNCHRONIZATION (WAGON)**Removal Procedure**

1. Place the frame in the closed/flush position.
2. Lower the headliner. Refer to **Headlining Trim Panel Replacement (Wagon)** .
3. Disconnect the electrical connector from the motor/actuator.
4. Remove the motor/actuator. Refer to **Sunroof Motor/Actuator Replacement (Wagon)**.

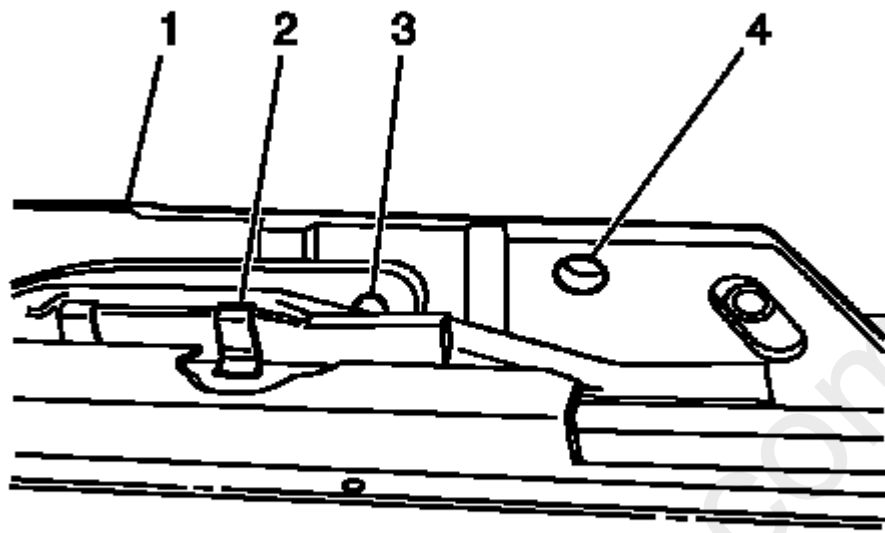


Fig. 41: Identifying Cam Assembly, Timing Hole & Lifter Arm
Courtesy of GENERAL MOTORS COMPANY

5. Push the lift link (2) forward until the timing hole (3) in the lift link is aligned with the timing hole (4) in the lifter arm (1).

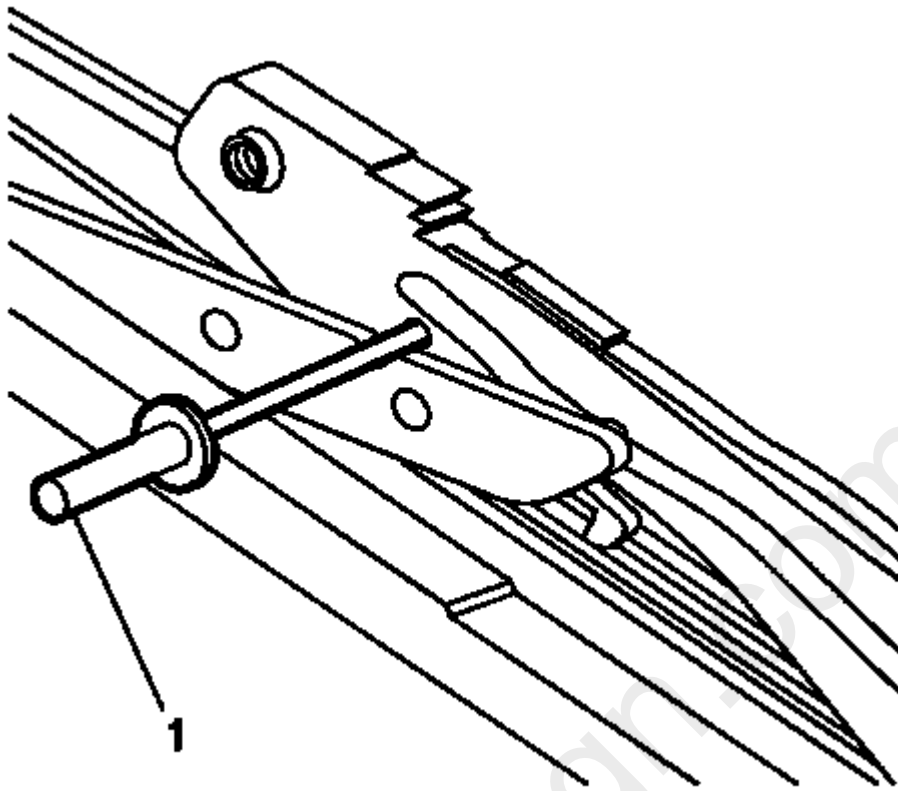


Fig. 42: Frame Hole Pin

Courtesy of GENERAL MOTORS COMPANY

NOTE: Both mechanisms should now be in the closed position.

Using a suitable tool, insert it into the hole of the mechanism arm, it will not go all the way through mechanism.

6. Insert a pin (1) in the holes on both sides of the frame to hold the position while installing the drive motor.

Installation Procedure

CAUTION: Refer to Fastener Caution .

1. Install the motor/actuator. Refer to Sunroof Motor/Actuator Replacement (Wagon). Tighten the motor attachment screws to 4 N.m (35 lb in).
2. Connect the electrical connector to the motor/actuator.

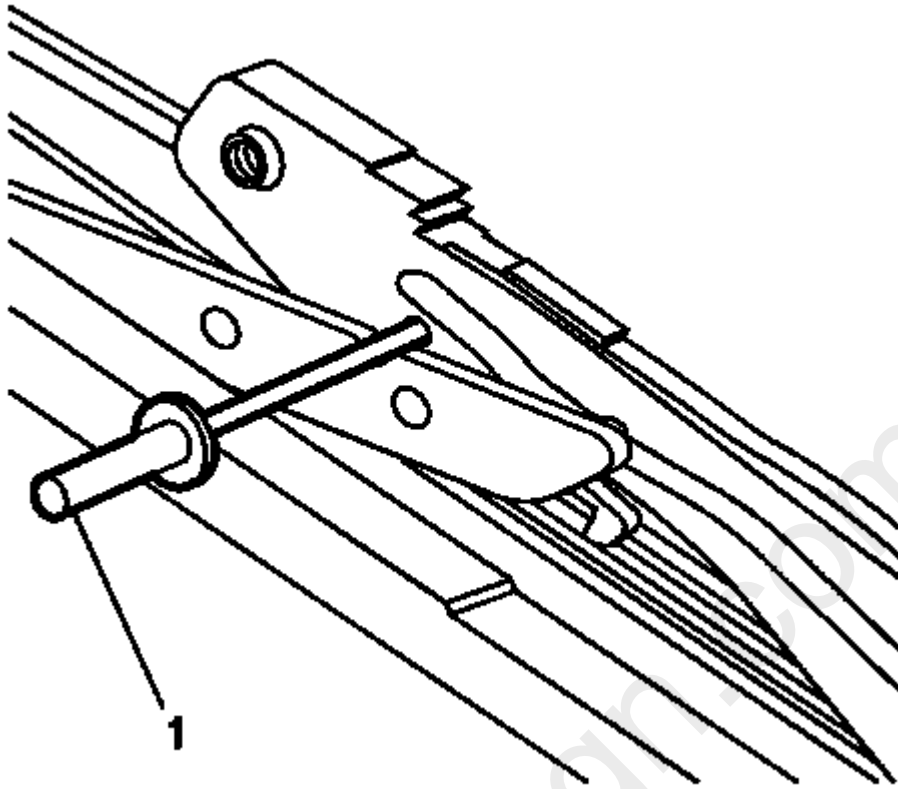


Fig. 43: Frame Hole Pin

Courtesy of GENERAL MOTORS COMPANY

3. Remove the pin (1) from the holes that held the position while installing the drive motor.
4. Install the sunroof window. Tighten the screws to 5 N.m (44 lb in).
5. Verify the operation of the sunroof.
6. Perform the initialization/teach procedure. Refer to **Sunroof Motor/Actuator Initialization/Teach Process (Wagon)**.
7. Install the headliner. Refer to **Headlining Trim Panel Replacement (Wagon)**.

SUNROOF WINDOW HEIGHT AND OPENING FIT ADJUSTMENT (WAGON)

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

1. Cycle the sunroof window to the full open position.
2. Remove left and right side sunroof panel side opening closeout covers to expose screws.
3. Cycle the sunroof window to the closed position.

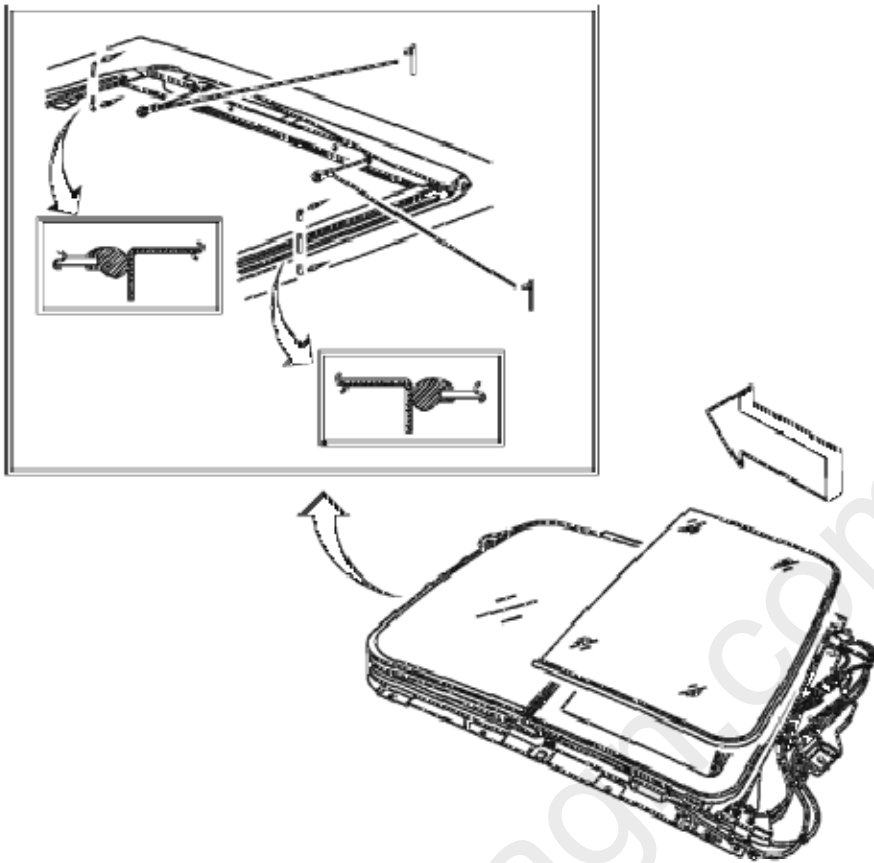


Fig. 44: Adjusting Sunroof Window Height & Opening Fit
 Courtesy of GENERAL MOTORS COMPANY

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

To ensure proper adjustment on the sunroof windows all eight (8) screws (1) Must be loosen.

4. Loosen the adjusting screws (1) on left and right sides of the front and rear windows.
5. Adjust both sunroof windows to a uniform seal tension fore/aft and panel to panel.
6. Adjust the corners of the front window panel using the following guidelines:
 - Adjust the front of the front sunroof window to 0.0 mm - 1.5 mm (0.0 in - 0.06 in) below the top surface of the roof panel.
 - Adjust the rear of the rear sunroof window to 0.0 mm + 1.5 mm (0 .0 in + 0.06 in) above the top surface of the roof panel.
 - Adjust the rear edge of the front sunroof window to leading edge of the rear window to 0.0 mm +1.0 mm (0.0 in + .04in) to the panel shingling.

CAUTION: Refer to Fastener Caution .

7. Tighten the adjusting screws (1) on left and right sides of the front and rear windows.

Tighten

Tighten the sunroof window adjusting screws to 4 N.m (35 lb in).

8. Cycle sunroof window to vent, then close. Cycle the sunroof window from full open to closed position.
9. Using 0.25 mm (0.01 in) shim or a similar item to check the sunroof window seal for even compression around the seal opening periphery and between the window panels.
10. Inspect the sunroof window adjustment. Adjust if necessary.
11. Install left and right side sunroof panel side opening closeout covers.

SUNROOF WINDOW REPLACEMENT - FRONT (COUPE)

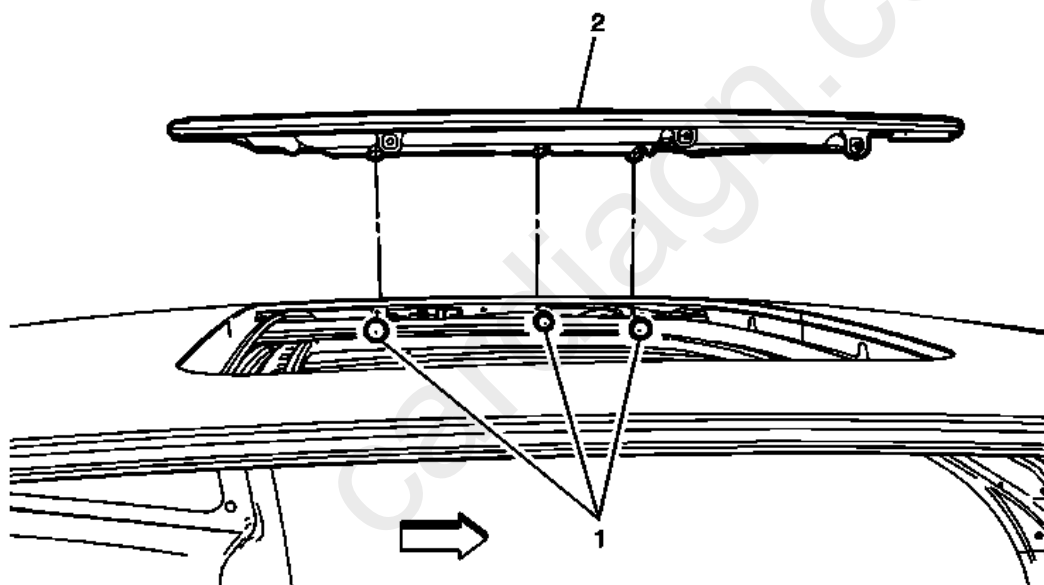


Fig. 45: Sunroof Window - Front (Coupe)
Courtesy of GENERAL MOTORS COMPANY

Sunroof Window Replacement - Front (Coupe)

Callout	Component Name
	Sunroof Window Screws (Qty: 6)
	CAUTION: Refer to <u>Fastener Caution</u> .

1	Procedure 1. Open the sunshade fully. 2. Place the sunroof in the vent position to access the screws. 3. Remove the sunroof window panel closeout panel cover. Refer to <u>Sunroof Panel Side Opening Closeout Cover Replacement (Coupe)</u>. Tighten 5 N.m (44 lb in) TIP: Remove the sunroof window panel closeout panel cover to expose the three screws on each side.
2	Sunroof Window Procedure 1. Sunroof window height and opening fit adjustment. 2. Ensure that sunroof window seals and operation properly.

SUNROOF WINDOW REPLACEMENT - REAR

Removal Procedure

NOTE: The front sunroof window **MUST** be removed. The rear sunroof window cannot be removed by simply pushing upward as in the front sunroof window.

1. Remove the front sunroof window.

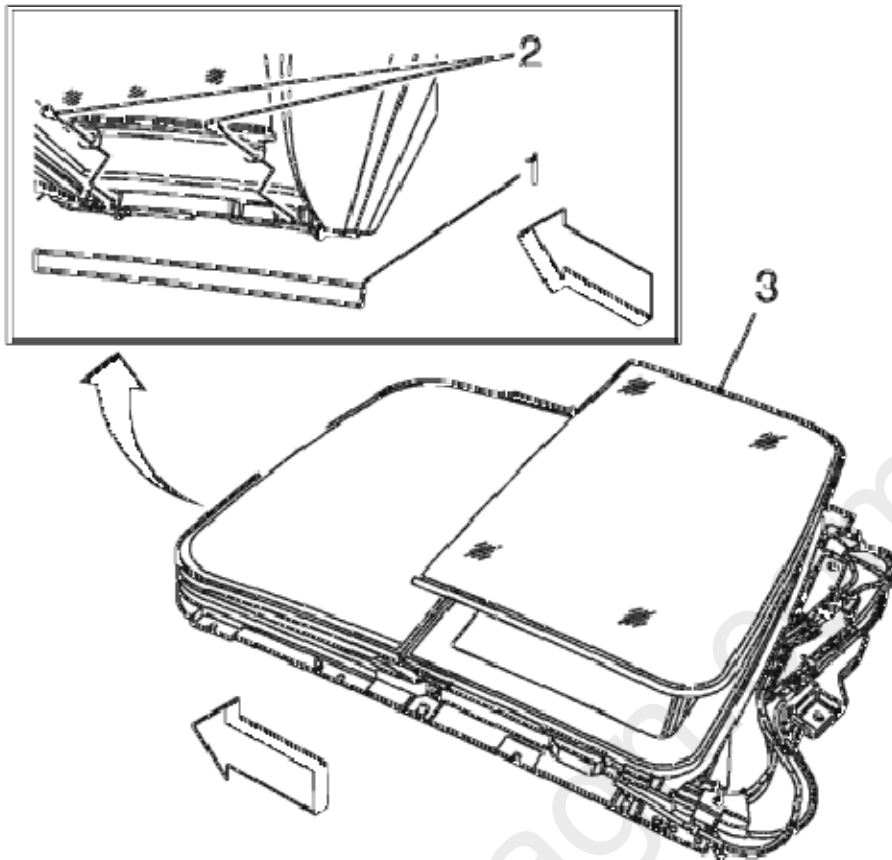


Fig. 46: Sunroof Window - Rear
Courtesy of GENERAL MOTORS COMPANY

NOTE: Use masking tape to tape off the sunroof opening. Do Not scratch the roof with the sunroof window brackets on the bottom side of the sunroof window.

2. Remove the screws (2) from the left and right sides of the rear sunroof window (3) that attach the window to the sides of the module.
3. Rear sunroof window is loose in the module.

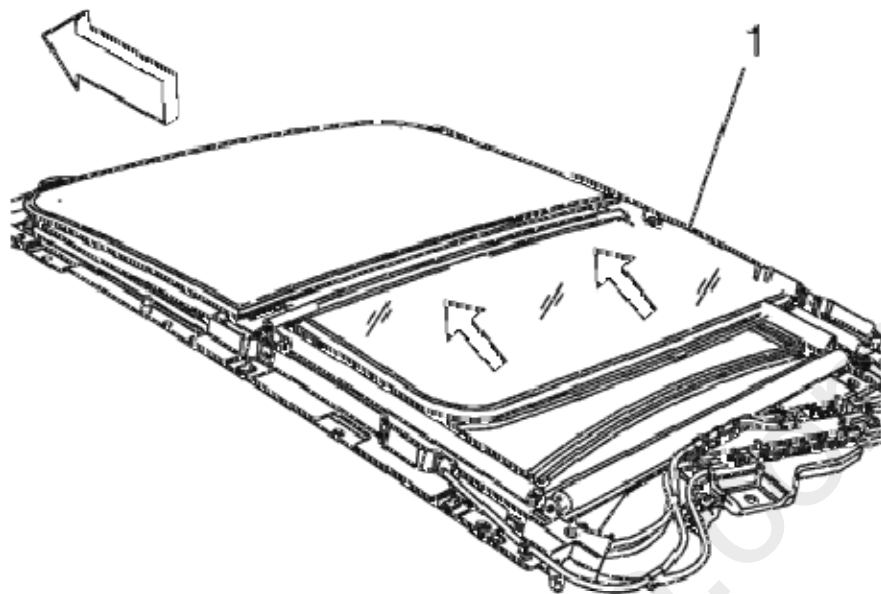


Fig. 47: Moving Rear Sunroof Window Forward
Courtesy of GENERAL MOTORS COMPANY

4. Move the rear sunroof window (1) forward in the opening approximately 76.2 mm (3 in).

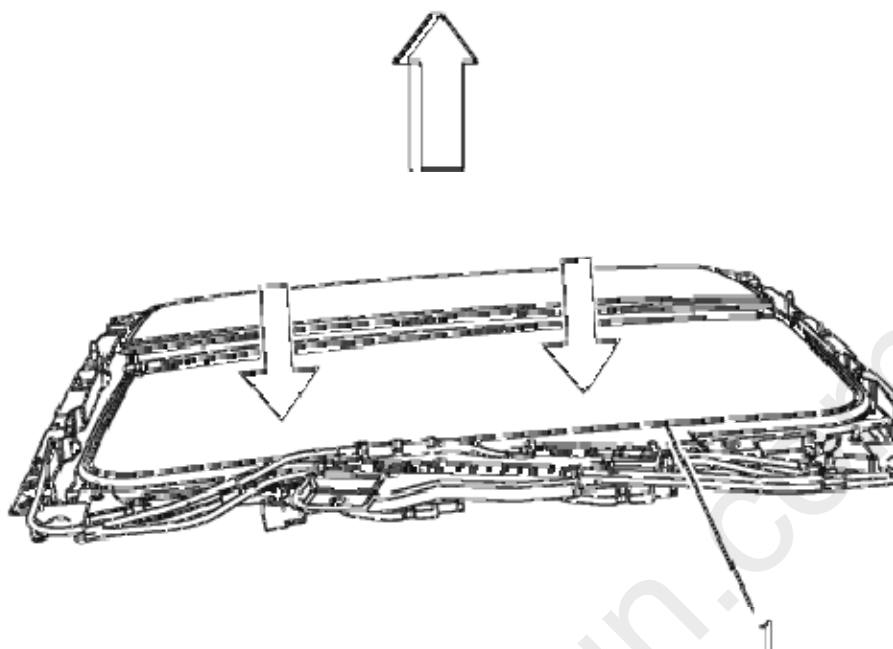


Fig. 48: Rear Sunroof Window

Courtesy of GENERAL MOTORS COMPANY

5. Remove the rear sunroof window (1) by pushing downward.

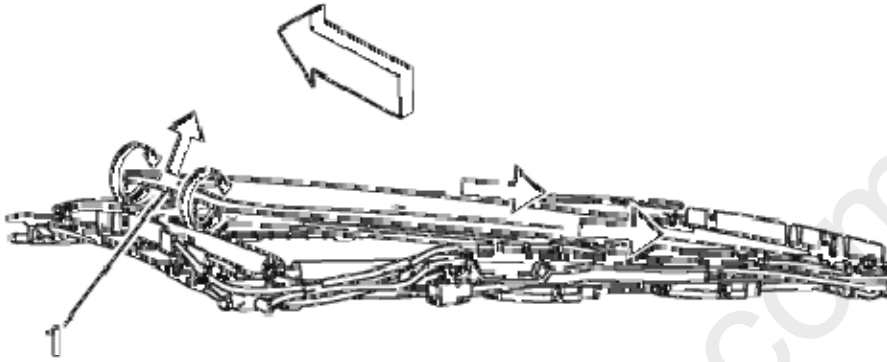


Fig. 49: Sunroof Window

Courtesy of GENERAL MOTORS COMPANY

6. Slide the sunroof window (1) to the right side under the roof flange. This will allow the left edge of the sunroof window to be lifted high enough to clear the top side of the roof panel.
7. Remove the sunroof window from the vehicle.

Installation Procedure

NOTE: Use masking tape to tape off the sunroof opening. Do Not scratch the roof with the sunroof window brackets on the bottom side of the sunroof window.

1. Position the rear sunroof window into the roof opening.

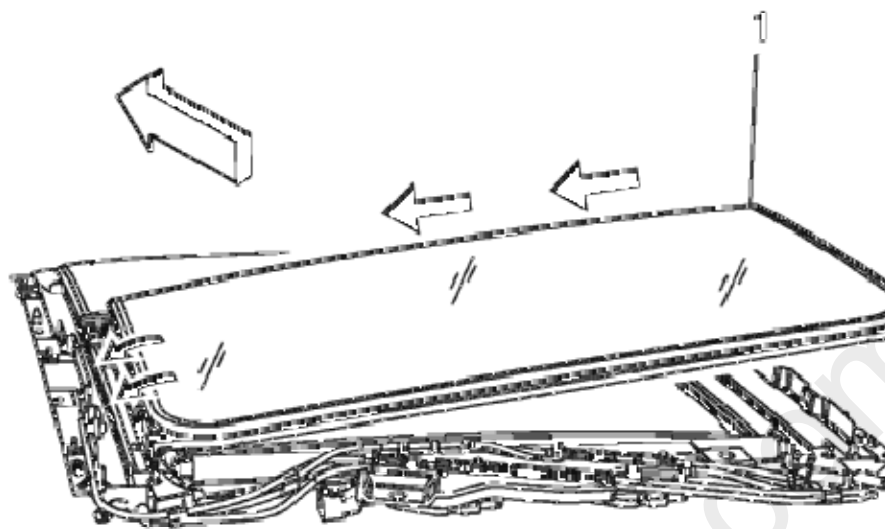


Fig. 50: Left Side Of Sunroof Window
Courtesy of GENERAL MOTORS COMPANY

2. Install the left side of the sunroof window (1) under flange until the right side clears the sunroof module opening.
3. Position the sunroof window brackets into the module.

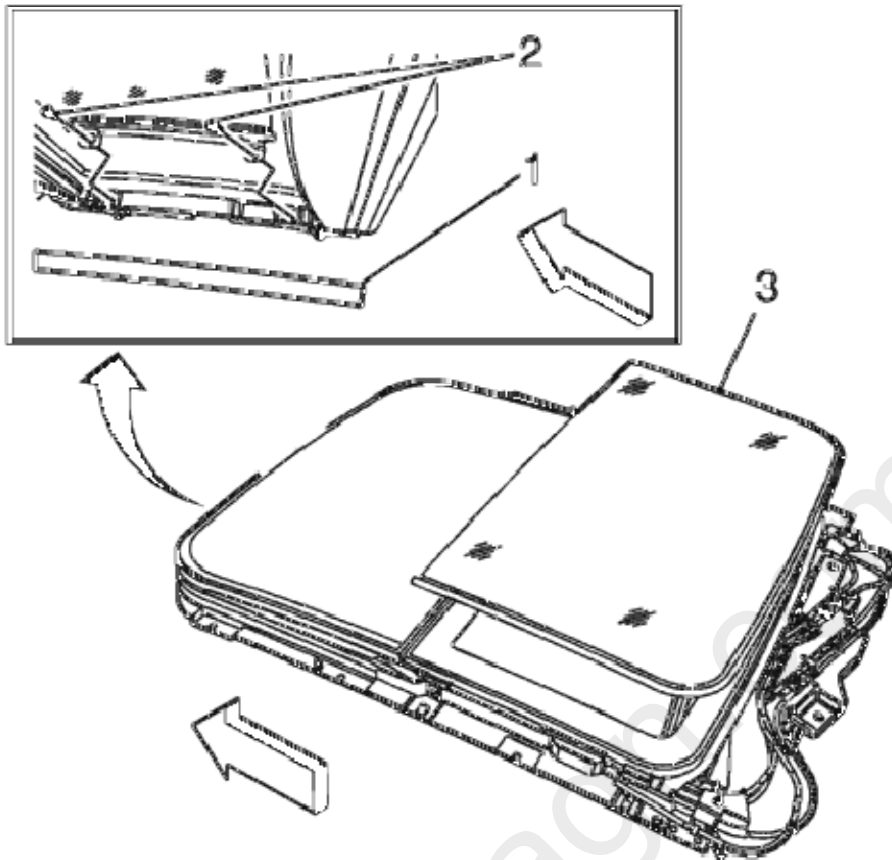


Fig. 51: Sunroof Window - Rear
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

4. Install the screws (2) to the left and right sides of the rear sunroof window (3) that attach the window to the sides of the module and tighten to 5 N.m (44 lb in).
5. Remove masking tape from the sunroof window opening.
6. Install the front sunroof window.
7. Adjust the sunroof windows as needed. Refer to Sunroof Window Height and Opening Fit Adjustment (Wagon).
8. Inspect the sunroof windows for proper operation.

DESCRIPTION AND OPERATION

SUNROOF DESCRIPTION AND OPERATION (COUPE)

Power Sunroof System Components

The Power Sunroof and Sunshade System consists of the following components:

- Sunroof control module
- Sunroof shade module
- Sunroof switch
- Sunroof shade switch
- Sunroof window
- Sunshade panel
- Rail and track assembly upon which the sunroof and sunshade glass rides
- S/ROOF or SUNSHADE Fuse 30 A
- Body control module (BCM)

Power and Grounds

Battery positive voltage is supplied at all times to the sunroof control and sunroof shade modules from the 30 A S/ROOF or SUNROOF Fuse located in the rear or underhood fuse block, respectively. Ground is supplied to the sunroof control and sunroof shade modules through the body ground circuit G401.

Ground is supplied to the sunroof and sunroof shade switch through the body ground circuit G401.

Power Sunroof Operation

The Power Sunroof System will operate only with the ignition turned to the RUN or Accessory position, this allows for retained accessory power (RAP) control of the sunroof and sunshade through the body control module (BCM). With the ignition in the run or accessory position, the BCM supplies the sunroof control and sunroof shade modules with ignition voltage which allows sunroof and sunshade operation. Once the ignition switch is turned to OFF the sunroof and sunshade will continue to operate until any door is opened or when the RAP timer reaches its shut-off limit. For a description and operation of the RAP operation, refer to **Retained Accessory Power Description and Operation** .

Sunshade Switch

The sunshade switch assembly contains two rocker type switches that are used to control the following functions:

- Express open - A momentary press of the switch will automatically open the sunshade. To stop the sunshade partway, press the switch a second time.
- Express close - A momentary press of the switch will automatically close the sunshade. To stop the sunshade partway, press the switch a second time.

Sunroof Switch

Press and hold the front of the switch to vent the sunroof. The sunshade will automatically open approximately fifteen inches. Press and hold the rear of the switch to close the sunroof vent.

Sunroof and Sunshade Modules

The sunroof control and sunroof shade module assemblies have internal bi-directional motors and hall effect sensors. The hall effect sensors create pulses that are counted by the modules until the end of travel position is reached.

Sunshade Operation

The sunroof shade module determines the sunshade motor direction based on inputs received from the sunroof shade switch. The sunroof shade module controls the sunshade motor direction by changing the polarity of the applied voltage.

In addition, during sunroof or vent open operation, the sunroof control module sends a message through the K-Bus circuit to the sunroof shade module to open the sunshade while the glass panel is being commanded open. The sunshade will not fully close unless the sunroof is completely closed. If there is a problem with the K-Bus circuit signal the sunshade will not operate when commanded.

SUNROOF DESCRIPTION AND OPERATION (WAGON)

Power Sunroof System Components

The Power Sunroof and Sunshade System consists of the following components:

- Sunroof control module
- Sunroof shade module
- Sunroof switch
- Sunroof shade switch
- Sunroof window
- Sunshade panel
- Rail and track assembly upon which the sunroof and sunshade glass rides
- S/ROOF or SUNSHADE Fuse 30 A
- Body control module (BCM)

Power and Grounds

Battery positive voltage is supplied at all times to the sunroof control and sunroof shade modules from the 30 A S/ROOF or SUNROOF Fuse located in the rear or underhood fuse block, respectively. Ground is supplied to the sunroof control and sunroof shade modules through the body ground circuit G401.

Ground is supplied to the sunroof and sunroof shade switch through the body ground circuit G401.

Power Sunroof Operation

The Power Sunroof System will operate only with the ignition turned to the RUN or Accessory position, this allows for retained accessory power (RAP) control of the sunroof and sunshade through the body control module (BCM). With the ignition in the run or accessory position, the BCM supplies the sunroof control and sunroof shade modules with ignition voltage which allows sunroof and sunshade operation. Once the ignition switch is turned to OFF the sunroof and sunshade will continue to operate until any door is opened or when the

RAP timer reaches its shut-off limit. For a description and operation of the RAP operation, refer to **Retained Accessory Power Description and Operation** .

Sunroof Switch

The sunroof and sunroof shade switch assembly contains two rocker type switches that are used to control the following functions:

- Roof express open - A momentary press of the switch will open the roof to the comfort stop position. Press the switch again and the roof will open to the full open position.
- Roof express close - A momentary press of the switch will close the roof to the closed position.
- Roof open/close - A supervised press and hold of the switch will open or close the roof to the desired position.
- Vent open - With the roof in the closed position, press and hold the roof open switch for the desired vent open position.
- Vent close - With the roof in the vent open position, press and hold the roof close switch to close the roof.

Comfort Stop Feature

The comfort stop feature represents a point between the close and full open position providing the greatest opening while minimizing wind buffeting. Maximum sunroof opening can still be achieved by operating the switch and requesting movement past the comfort stop position.

Sunroof and Sunshade Modules

The sunroof control and sunroof shade module assemblies have internal bi-directional motors and hall effect sensors. The hall effect sensors create pulses that are counted by the modules until the end of travel position is reached.

Sunshade Operation

The sunroof shade module determines the sunshade motor direction based on inputs received from the sunroof shade switch. The sunroof shade module controls the sunshade motor direction by changing the polarity of the applied voltage.

In addition, during sunroof or vent open operation, the sunroof control module sends a message through the K-Bus circuit to the sunroof shade module to open the sunshade while the glass panel is being commanded open. The sunshade will not fully close unless the sunroof is completely closed. If there is a problem with the K-Bus circuit signal the sunshade will not operate when commanded.