

2004 Cadillac Escalade

2004 ACCESSORIES & EQUIPMENT Roof - C/K SUV

2004 ACCESSORIES & EQUIPMENT

Roof - C/K SUV

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Side Rail Attaching Bolt	4 N.m	35 lb in
Sunroof Glass Panel Adjustment Screw	7 N.m	62 lb in
Sunroof Module Retaining Screw	9 N.m	80 lb in
Sunroof Motor Screw	3 N.m	27 lb in

SCHEMATIC AND ROUTING DIAGRAMS

POWER SUNROOF SCHEMATICS

Refer to Power Top/Sunroof in System Wiring Diagrams .

COMPONENT LOCATOR

POWER ROOF SYSTEMS COMPONENT VIEWS

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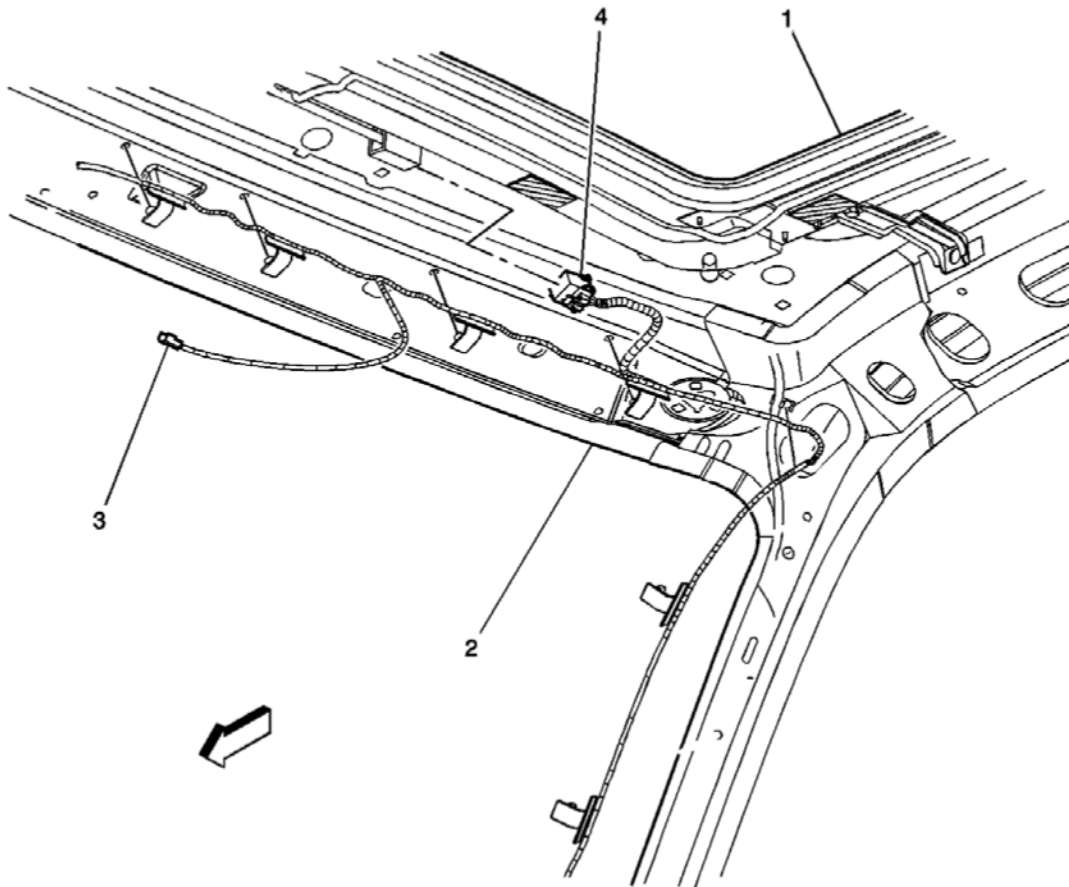


Fig. 1: Right A-Pillar Component View - Top
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 1

Callout	Component Name
1	Sunroof Opening
2	Front Roof Panel
3	Cellular Microphone Connector
4	C353

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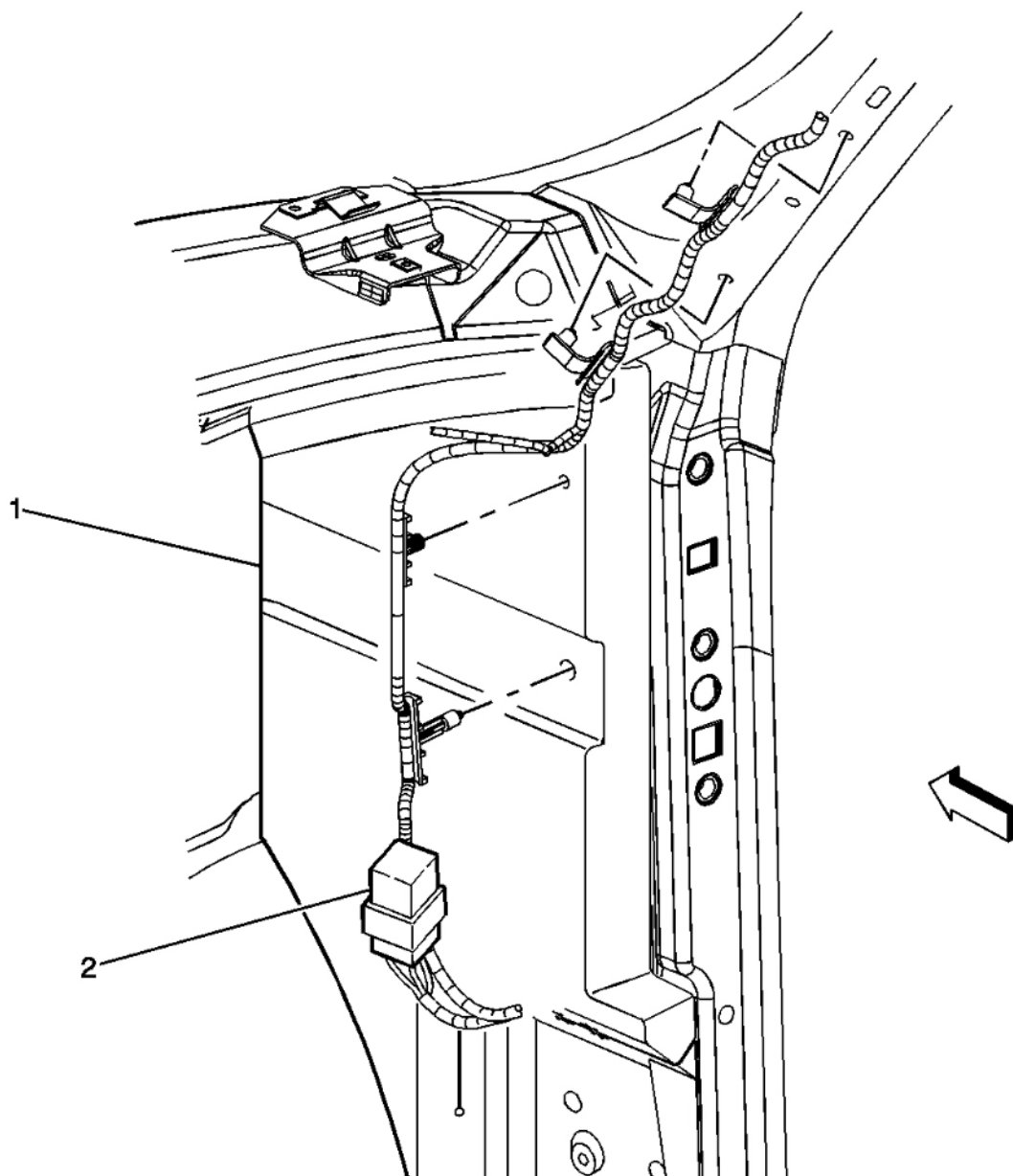


Fig. 2: Right A-Pillar Component View - Middle
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2

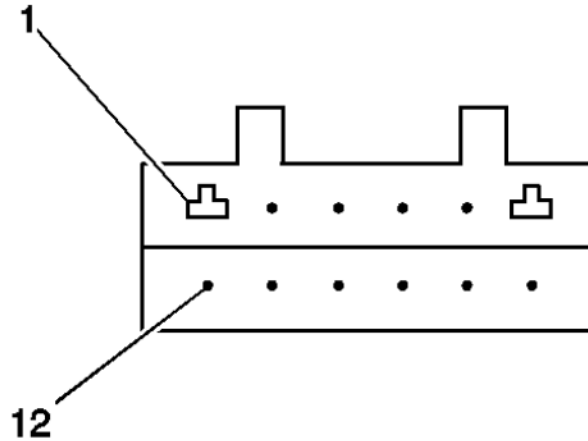
Callout	Component Name
1	Right A-Pillar
2	Sunroof Relay

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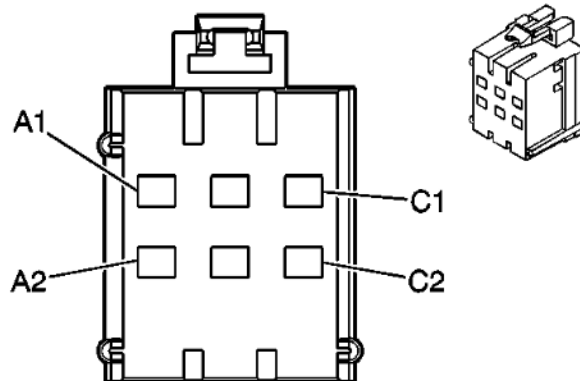
POWER ROOF SYSTEMS CONNECTOR END VIEWS

Sunroof Motor Connector End View



Connector Part Information		• 927084 • 12-Way F AMP (BLK)	
Pin	Wire Color	Circuit No.	Function
1	ORN	110	Sunroof Switch Close Signal
2	BRN	100	Sunroof Switch Open Signal
3	-	-	Not Used
4	RED	2	Battery Positive Voltage
5	DK GRN	801	RAP Relay Coil Control
6	BLK	1050	Ground
7-12	-	-	Not Used

Sunroof Relay Connector End View

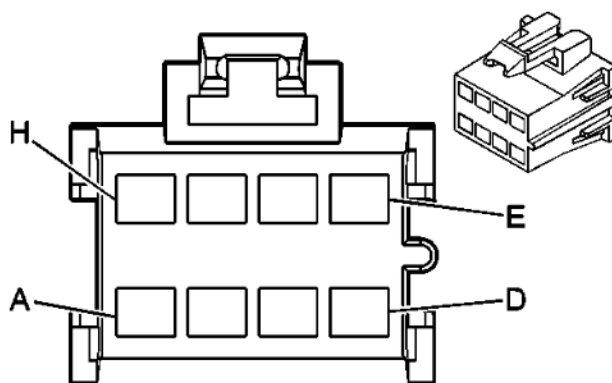


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Connector Part Information		• 12110541 • 6-Way F Metri-Pack 280 Series Flexlock (BLK)	
Pin	Wire Color	Circuit No.	Function
A1	BLK	1050	Ground
A2	BLK	755	RAP Relay Coil Control
B1-B2	-	-	Not Used
C1	ORN	3840	Battery Positive Voltage
C2	DK BLU	1353	RAP Supply Voltage

Sunroof Switch Connector End View



Connector Part Information		• 12129064 • 8-Way F Metri-Pack 280 Series (BLK)	
Pin	Wire Color	Circuit No.	Function
A	ORN	110	Sunroof Switch Close Signal
B	YEL	230	Instrument Panel Lamps Dimming Control
C	BLK	1050	Ground
D	-	-	Not Used
E	BRN	100	Sunroof Switch Open Signal
F	DK GRN	755	RAP Relay Coil Control
G-H	-	-	Not Used

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - ROOF

Begin the diagnosis with the **Diagnostic System Check - Power Sunroof** . The Diagnostic System Check will provide the following information:

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- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored DTCs and their status

The use of the Diagnostic System Check will identify the correct procedure for diagnosing the system and where the procedure is located.

Symptoms

When no DTCs are present, begin symptom diagnosis by reviewing the **Sunroof Description and Operation** . Reviewing the Description and Operation information will help you determine the correct symptom diagnostic procedure when a malfunction exists. Reviewing the Description and Operation information will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Roof** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

DIAGNOSTIC SYSTEM CHECK - POWER SUNROOF

Test Description

The numbers below refer to the step numbers on the diagnostic table.

2: Lack of communication may be due to a partial malfunction of the class 2 serial data circuit or due to a total malfunction of the class 2 serial data circuit. The specified procedure will determine the particular condition.

4: Determining if any DTCs are set. If no DTCs are set then proceed to the Symptoms.

5: The presence of DTCs which begin with "U" indicate some other module is not communicating. The specified procedure will compile all the available information before tests are performed. If no DTCs are set then proceed to the Symptoms.

Diagnostic System Check - Power Sunroof

Step	Action	Yes	No
1	Install a scan tool. Does the scan tool power up?	Go to Step 2	Go to <u>Scan Tool Does Not Power Up</u> in Data Link Communications
2	1. Turn ON the ignition, with the engine OFF. 2. Attempt to establish communication with the body control module (BCM). Does the scan tool communicate with the BCM?	Go to Step 3	Go to <u>Scan Tool Does Not Communicate with Class 2 Device</u> in Data Link Communications
	IMPORTANT: The engine may start during the		

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3	following step. Turn OFF the engine as soon as you have observed the Crank power mode. 1. Access the Class 2 Power Mode in the Diagnostic Circuit Check on the scan tool. 2. Rotate the ignition switch through all positions while observing the Ignition Switch Power Mode parameter. Does the Ignition Switch parameter reading match the ignition switch position for all switch positions?	Go to Step 4	Go to <u>Power Mode Mismatch</u> in Body Control System
4	Select the BCM display DTCs function on the scan tool. Does the scan tool display any DTCs?	Go to Step 5	Go to <u>Symptoms - Roof</u>
5	Select the BCM display DTCs function on the scan tool. Does the scan tool display any DTCs which begin with a "U"?	Go to <u>Diagnostic Trouble Code (DTC) List</u> in Data Link Communications	Go to <u>Symptoms - Roof</u>

SYMPTOMS - ROOF

IMPORTANT: If the suspected cause of an inoperative sunroof is a power interruption to the sunroof module, the sunroof must be re-initialized. Refer to **Sunroof Motor/Actuator Synchronization** .

IMPORTANT: The following must be completed before using the symptom tables.

1. Perform **Diagnostic Starting Point - Roof** in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control module(s) can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to **Sunroof Description and Operation** .

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the Power Sunroof system. Refer to **Checking Aftermarket Accessories** in Wiring Systems.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

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

Symptom List

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

- **Power Sunroof Inoperative**
- **Power Sunroof Does Not Open to Express Position**
- **Retained Accessory Power (RAP) On After Timeout** in Retained Accessory Power, if the power sunroof should operate longer than 20 minutes after the ignition has been turned OFF

POWER SUNROOF INOPERATIVE

Power Sunroof Inoperative

Step	Action	Yes	No
Schematic Reference: <u>Power Sunroof Schematics</u> Connector End View Reference: <u>Power Roof Systems Connector End Views</u>			
1	Did you perform the Power Sunroof Diagnostic System Check?	Go to Step 2	Go to <u>Diagnostic System Check - Power Sunroof</u>
2	Perform the sunroof re-initialization. Refer to <u>Sunroof Motor/Actuator Synchronization</u> . Does the system operate normally?	Go to <u>Testing for Intermittent Conditions and Poor Connections</u> in Wiring Systems	Go to Step 3
3	1. Disconnect the sunroof switch harness connector. 2. Turn ON the ignition, with the engine OFF. 3. Connect a test lamp between the retained accessory power (RAP) relay switched output circuit at the sunroof switch harness connector and a good ground. Does the test lamp illuminate?	Go to Step 4	Go to Step 10
	1. Connect a fused jumper wire to the RAP relay switched output circuit at the sunroof switch harness connector. 2. Observing the position of the sunroof glass, try to operate the sunroof system by connecting the other end of the fused jumper wire, at the		

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4	sunroof switch harness connector, to either of the following: • The sunroof switch open/tilt down signal circuit • The sunroof switch close/tilt upn signal circuit Does the system operate normally?	Go to Step 11	Go to Step 5
5	Test the sunroof switch open/tilt down signal circuit for an open, or a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 17	Go to Step 6
6	Test the sunroof switch close/tilt upn signal circuit for an open, or a short to voltage. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 17	Go to Step 7
7	1. Connect the sunroof switch harness connector. 2. Disconnect the sunroof module harness connector. 3. Connect a test lamp between the RAP relay switched output circuit at the sunroof module harness connector and a good ground. Does the test lamp illuminate?	Go to Step 8	Go to Step 10
8	Connect a test lamp between the battery positive voltage circuit at the sunroof module harness connector and a good ground. Does the test lamp illuminate?	Go to Step 9	Go to Step 13
9	Connect a test lamp between the battery positive voltage circuit and ground circuit at the sunroof module harness connector. Does the test lamp illuminate?	Go to Step 12	Go to Step 14
10	Test the RAP relay switched output circuit for an open. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	Go to Step 17	Go to <u>Retained Accessory Power (RAP) Inoperative</u> in Retained Accessory Power
	Inspect for a poor connections at the sunroof switch harness connector. Refer to <u>Testing for Intermittent Conditions and</u>		

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11	Poor Connections and Connector Repairs in Wiring Systems? Did you find and correct the condition?	Go to Step 17	Go to Step 15
12	Inspect for a poor connection at the sunroof module harness connector. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems. Did you find and correct the condition?	Go to Step 17	Go to Step 16
13	Repair the open in the battery positive voltage circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 17	-
14	Repair the open in the sunroof module ground circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you complete the repair?	Go to Step 17	-
15	Replace the sunroof switch. Refer to Sunroof Switch Replacement . Did you complete the replacement?	Go to Step 17	-
16	Replace the sunroof module. Refer to Sunroof Motor/Actuator Replacement . Did you complete the replacement?	Go to Step 17	-
17	1. Turn OFF the ignition. 2. Remove any jumper wires. 3. Reconnect all previously disconnected components. 4. Replace the fuse if necessary. 5. Re-initialize the sunroof. Refer to Sunroof Motor/Actuator Synchronization . 6. Operate the system in order to verify the repair. Did you correct the condition?	System OK	Go to Step 2

POWER SUNROOF DOES NOT OPEN TO EXPRESS POSITION

Power Sunroof Does Not Open to Express Position

Step	Action	Yes	No
Schematic Reference: <u>Power Sunroof Schematics</u>			
1	Did you perform the Power Sunroof Diagnostic System Check?	Go to Step 2	Go to Diagnostic System Check - Power Sunroof

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2	Perform the sunroof re-initialization. Refer to <u>Sunroof Motor/Actuator Synchronization</u> . Does the express open feature operate normally?	System OK	Go to Step 3
3	Replace the power sunroof module. Refer to <u>Sunroof Motor/Actuator Replacement</u> . Did you make the replacement?	Go to Step 4	-
4	1. Perform the sunroof re-initialization. Refer to <u>Sunroof Motor/Actuator Synchronization</u> . 2. Operate the system in order to verify the repair? Did you correct the condition?	System OK	Go to Step 2

REPAIR INSTRUCTIONS

SUNROOF WINDOW HEIGHT AND OPENING FIT ADJUSTMENT

1. In order to adjust the glass height, the sunroof glass must be in the zero (closed) position.

IMPORTANT: Do not remove the screws from the sunroof mechanism.

2. Loosen the 4 adjustment screws

NOTE: Refer to **Fastener Notice** in Cautions and Notices.

3. Adjust the rear glass panel (1) so that it is flush with the roof panel (3), (0-2.0 mm (0.079 in) above 3).

Tighten: Tighten all 4 adjustment screws to 7 N.m (62 lb in).

4. Adjust the front glass panel (2) so that it is flush with the roof panel (3), (0-2.0 mm (0.079 in) below 3).

Tighten: Tighten all 4 adjustment screws to 7 N.m (62 lb in).

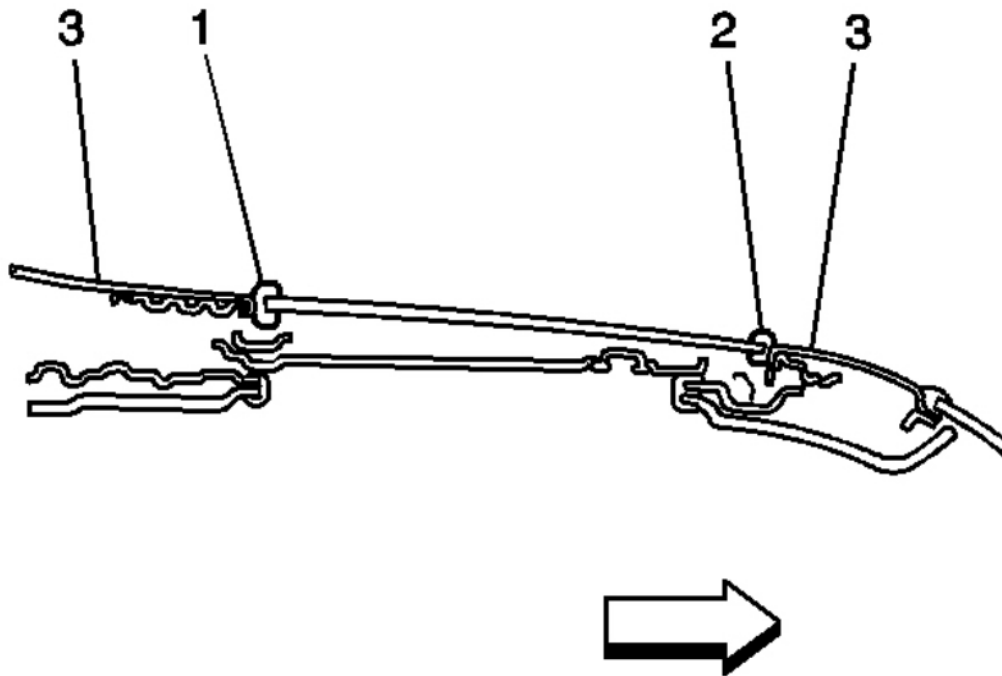


Fig. 3: Adjusting Rear & Front Glass Panels
Courtesy of GENERAL MOTORS CORP.

SUNROOF MOTOR/ACTUATOR SYNCHRONIZATION

Synchronization will be necessary anytime the sunroof module battery positive voltage circuit is interrupted. The sunroof module will be synchronized when the controller learns the full vent position. The sunroof system will ignore any open request until the system has been synchronized.

To synchronize the sunroof:

1. Turn ON the ignition, with the engine OFF.
2. Using the close/tilt up portion of the sunroof switch, operate the sunroof glass until it reaches the full vent position.
3. Verify that the system operates normally.

Once the sunroof glass reaches the full vent position, the actual position is stored in the memory of the sunroof module. The sunroof module will stop the motor one motor revolution before the defined actual positions.

SUNROOF DRAIN HOSE REPLACEMENT - FRONT

Removal Procedure

1. Remove the garnish molding/windshield pillar. Refer to **Garnish Molding Replacement - Windshield Pillar** in Interior Trim.
2. Remove the sunshades. Refer to **Sunshade Replacement** in Interior Trim.
3. Pull down the corner of the headliner.
4. Remove the hose from module nozzle.
5. Remove the hose from the clip.
6. Remove the hose.

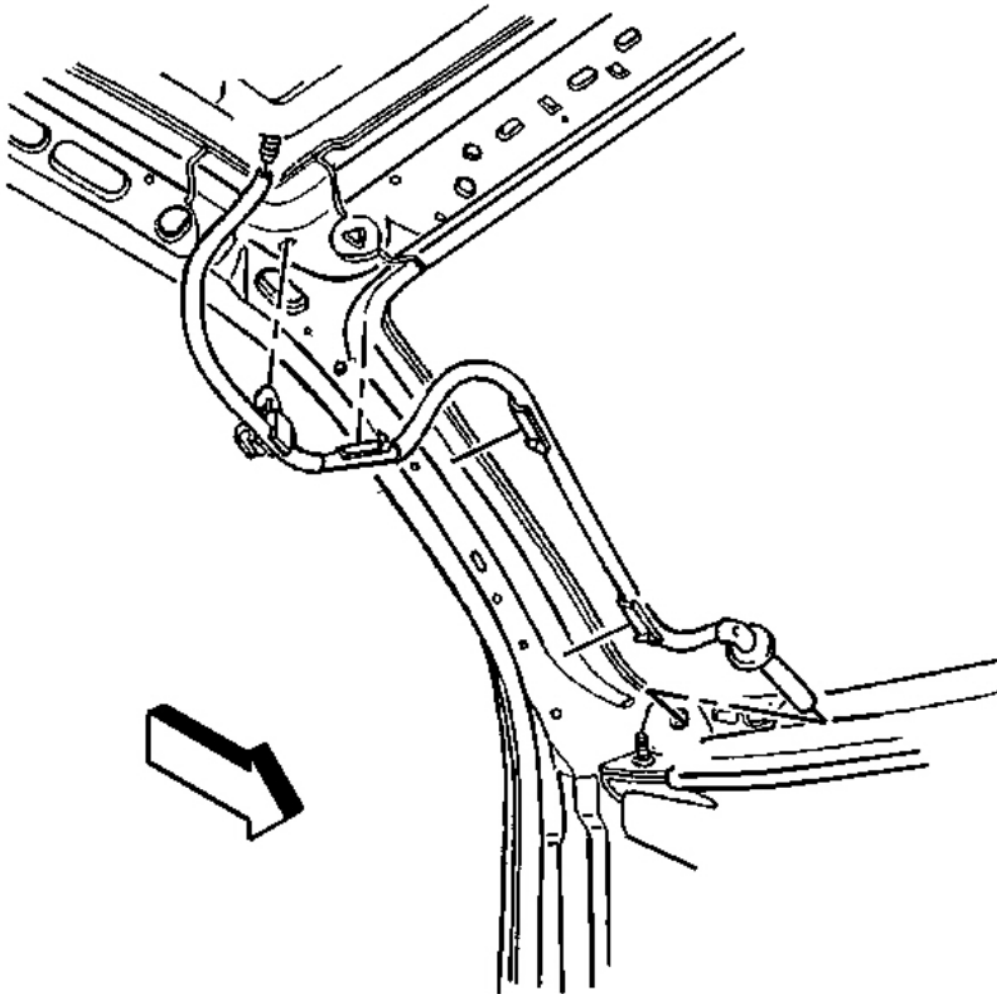


Fig. 4: View Of Front Sunroof Drain Hose

Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the hose.
2. Install the hose to clip.
3. Install the hose to module nozzle.
4. Be sure the seal is fully seated to plenum and hose is bottomed out against nozzle.
5. Inspect for kinks in the hose.

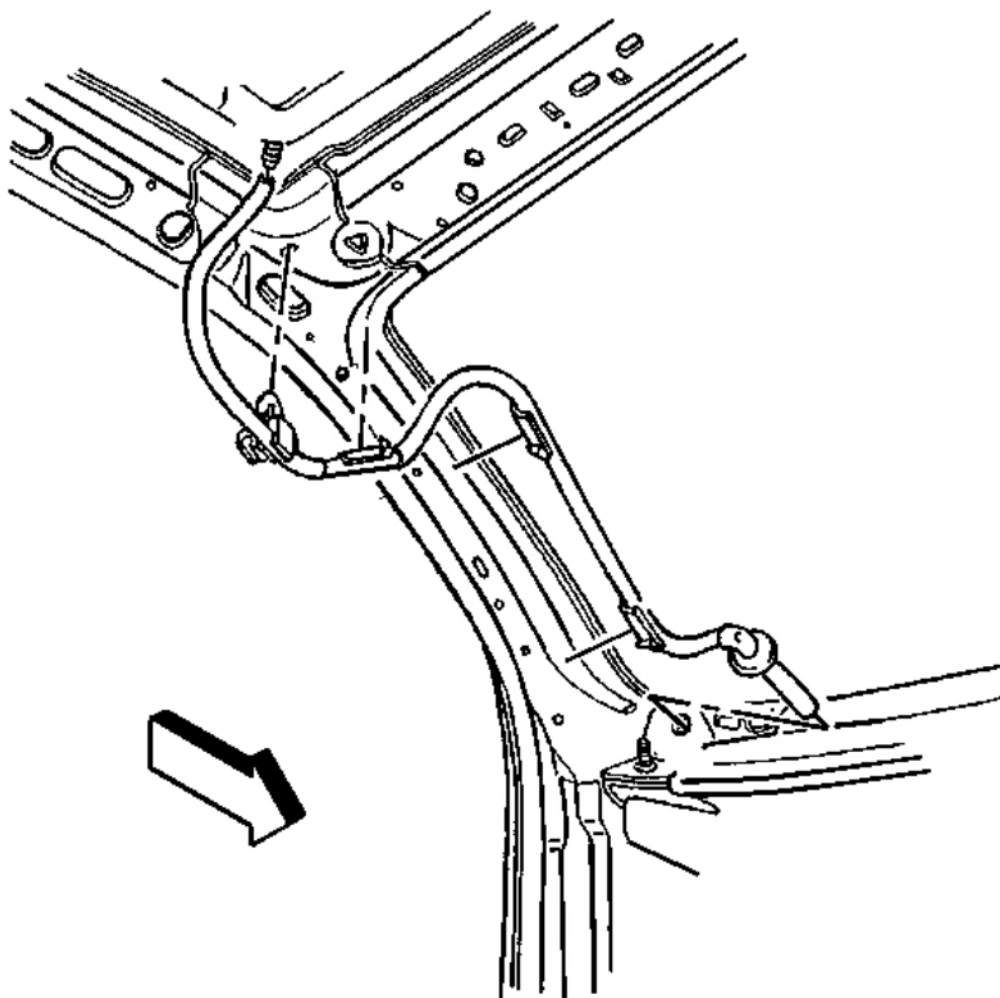


Fig. 5: View Of Front Sunroof Drain Hose

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Courtesy of GENERAL MOTORS CORP.

6. Push up the corner of headliner.
7. Install the sunshades. Refer to **Sunshade Replacement** in Interior Trim.
8. Install the garnish molding/windshield pillar. Refer to **Garnish Molding Replacement - Windshield Pillar** in Interior Trim.

SUNROOF DRAIN HOSE REPLACEMENT - REAR

Removal Procedure

1. Remove the center pillar trim. Refer to **Garnish Molding Replacement - Center Pillar** in Interior Trim.
2. Remove the headliner. Refer to **Headliner Replacement**.
3. Remove the drain hose from the nozzles rear, corner and side, assuring butyl tape is removed.
4. Remove the clip retaining hose to sheet metal.
5. Remove the grommet from the sealer plate.
6. Pull the hose away from sheet metal where attached with butyl tape.
7. Remove the hose.

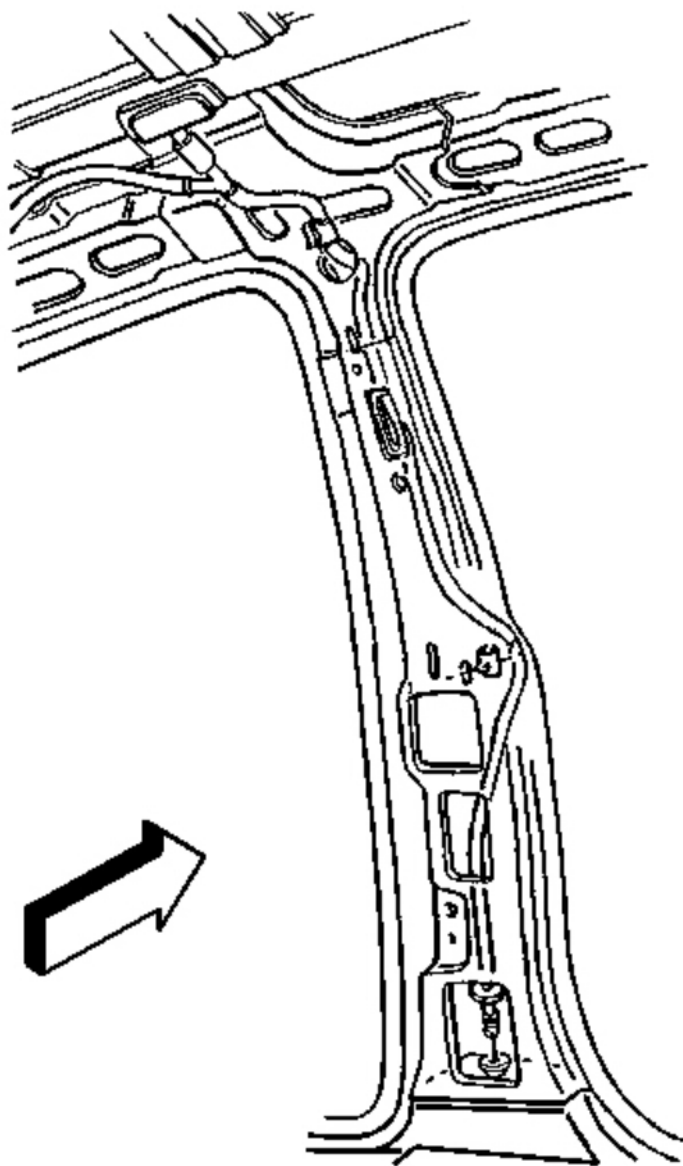


Fig. 6: View Of Rear Sunroof Drain Hose
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the hose.

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2. Re-locate the hose to sheet metal where attached with butyl tape.
3. Install the grommet to sealer plate.
4. Install the clip retaining hose to the sheet metal.
5. Install the hose to nozzles rear, corner and side, assure butyl tape is in position.

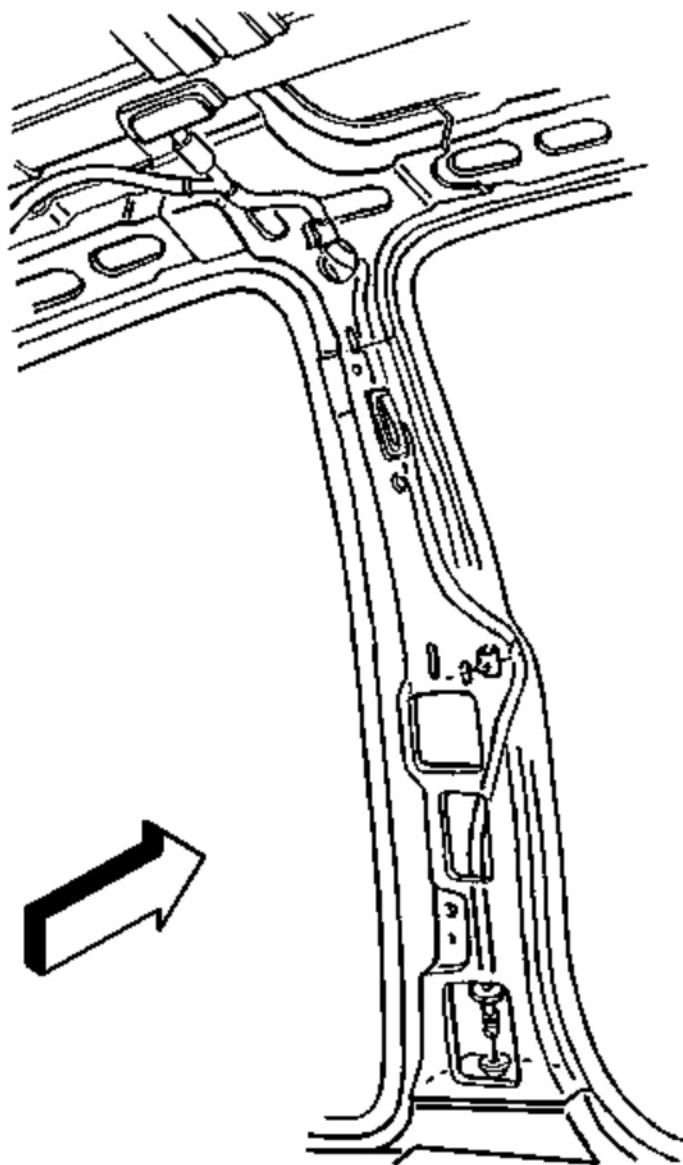


Fig. 7: View Of Rear Sunroof Drain Hose
Courtesy of GENERAL MOTORS CORP.

6. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.
7. Install the center pillar trim. Refer to **Garnish Molding Replacement - Center Pillar** in Interior Trim.

SUNROOF SUNSHADE PANEL REPLACEMENT

Removal Procedure

1. Remove the glass panel. Refer to **Sunroof Window Replacement** .
2. Remove the drain channel. Refer to **Roof Drain Channel Replacement** .
3. With the sunshade (1) in the closed position, push front (either side) sunshade spring (glider) (2) inward and release glider from the track.

Gently pull same corner of the sunshade outward and wiggle remaining gliders out of the track.

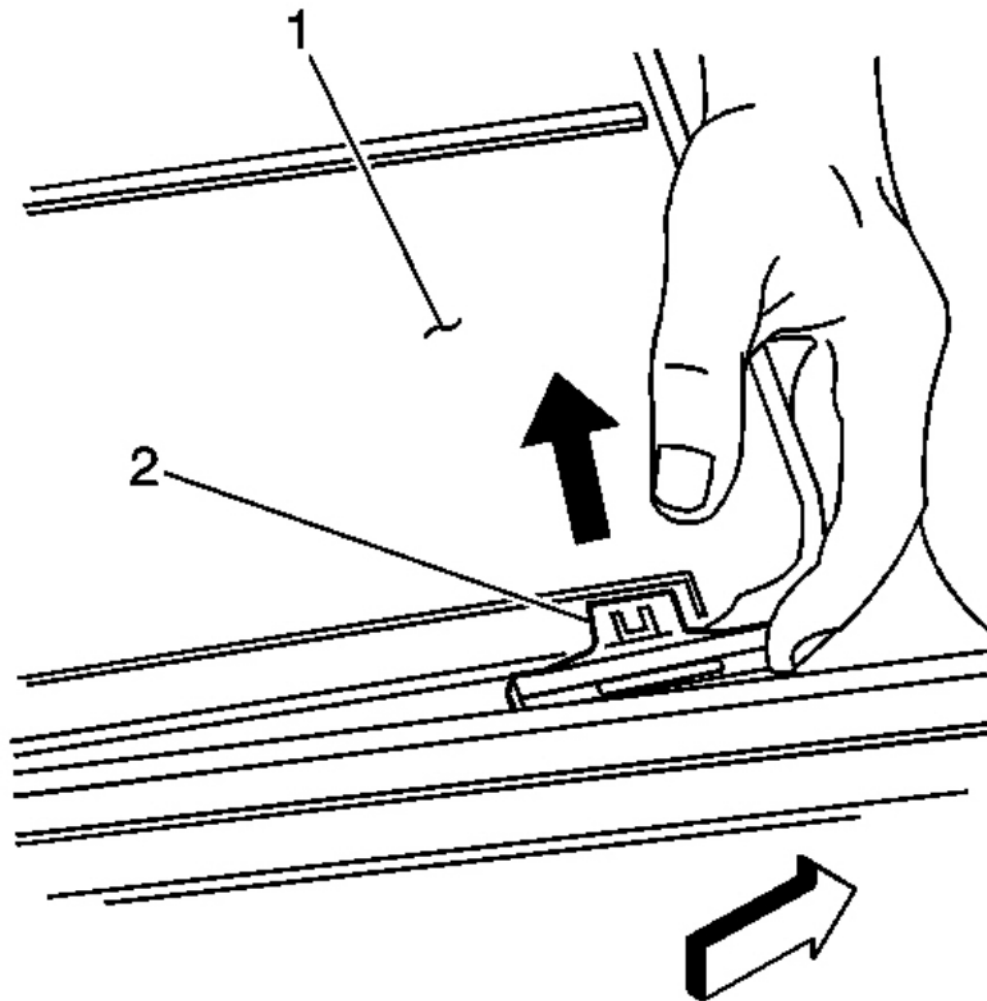


Fig. 8: View Of Sunshade Spring/Glider
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install sunshade (1) and place both gliders on one side into track. Now compress one of the other gliders (2) inward and slide into track.

Repeat this procedure for the last glider.

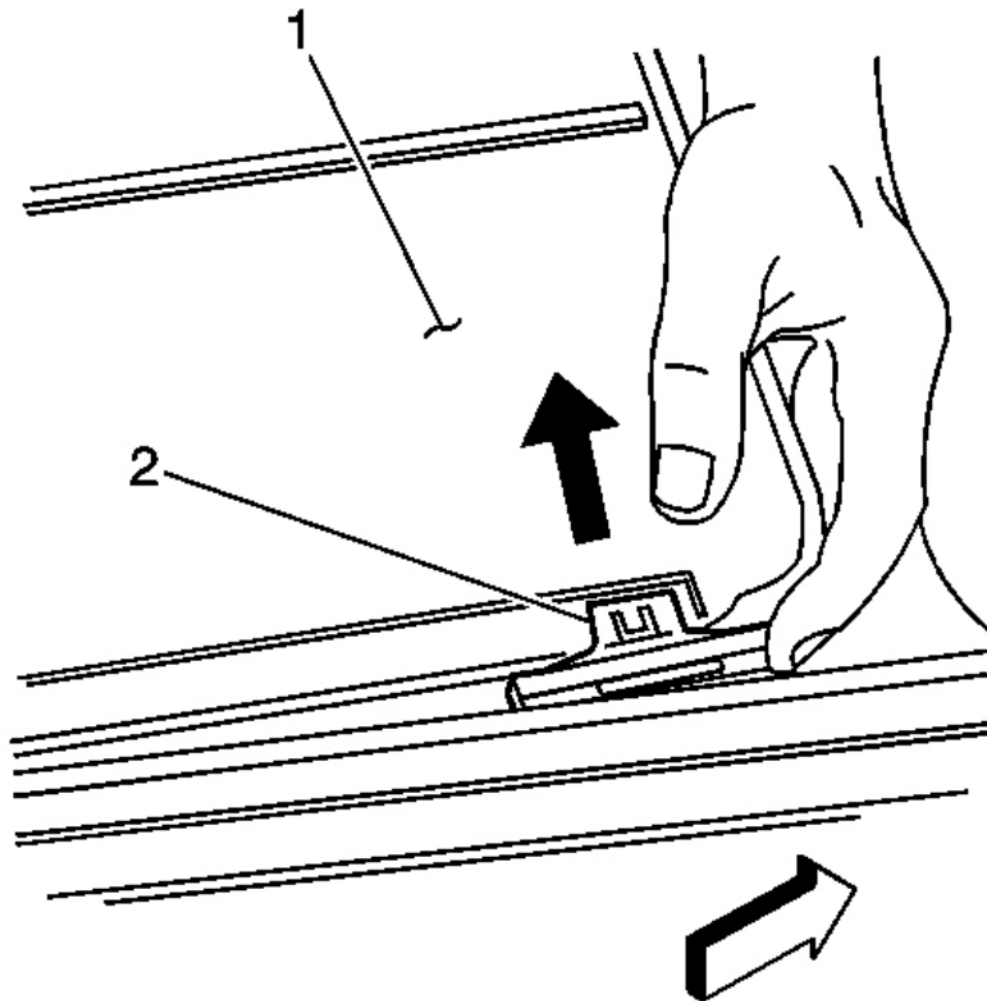


Fig. 9: View Of Sunshade Spring/Glider
Courtesy of GENERAL MOTORS CORP.

2. With the sunshade in half open position, install the drain channel. Refer to **Roof Drain Channel Replacement** .
3. Install the glass panel. Refer to **Sunroof Window Replacement** .

SUNROOF WINDOW REPLACEMENT

Removal Procedure

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1. Pull back the sunshade.
2. Set the sunroof in the closed position.
3. From inside of the vehicle remove the 4 glass panel adjustment screws.
4. From inside of the vehicle push up on the sunroof glass panel so that the glass panel can be grabbed and lifted from the roof opening.
5. Remove the glass panel from the roof opening.

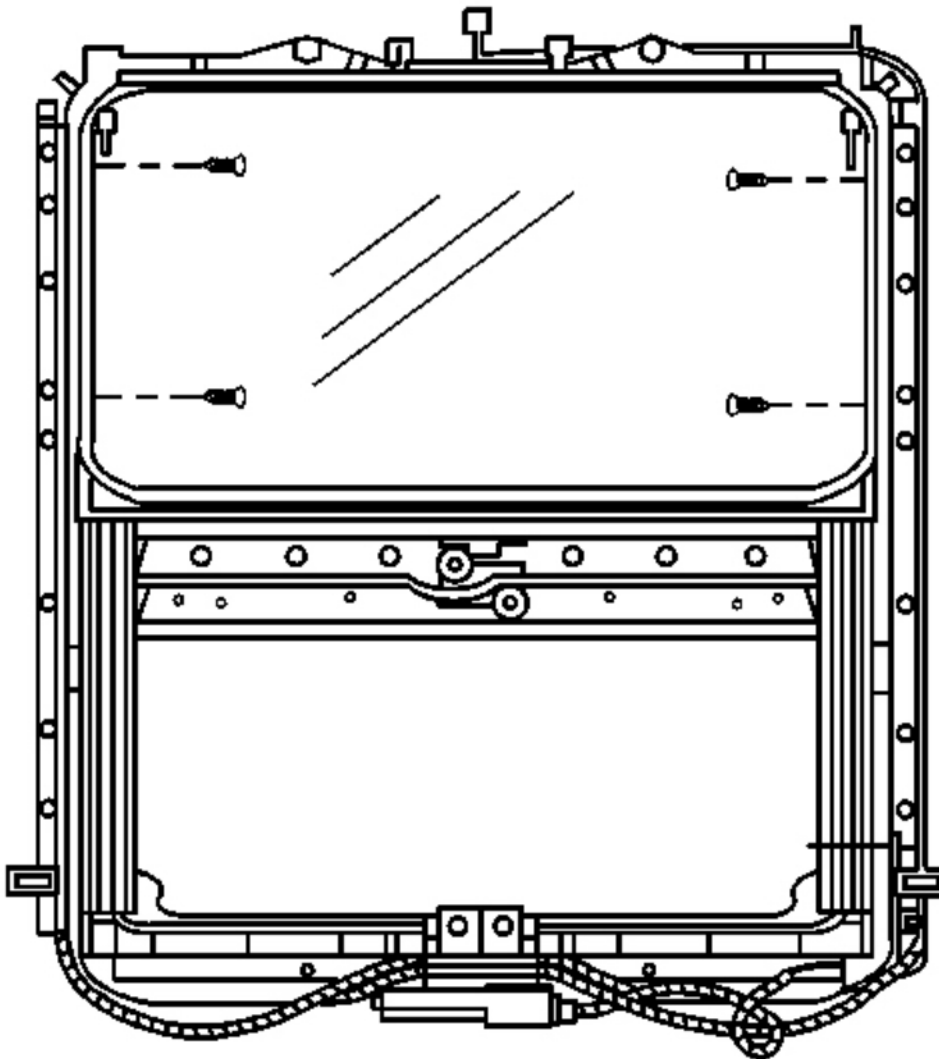


Fig. 10: View Of Sunroof Window

Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Ensure the glass panel mechanism is in the closed position.
2. From outside the vehicle, carefully place the glass panel onto the mechanism.
3. Loosely install the 4 adjustment screws.

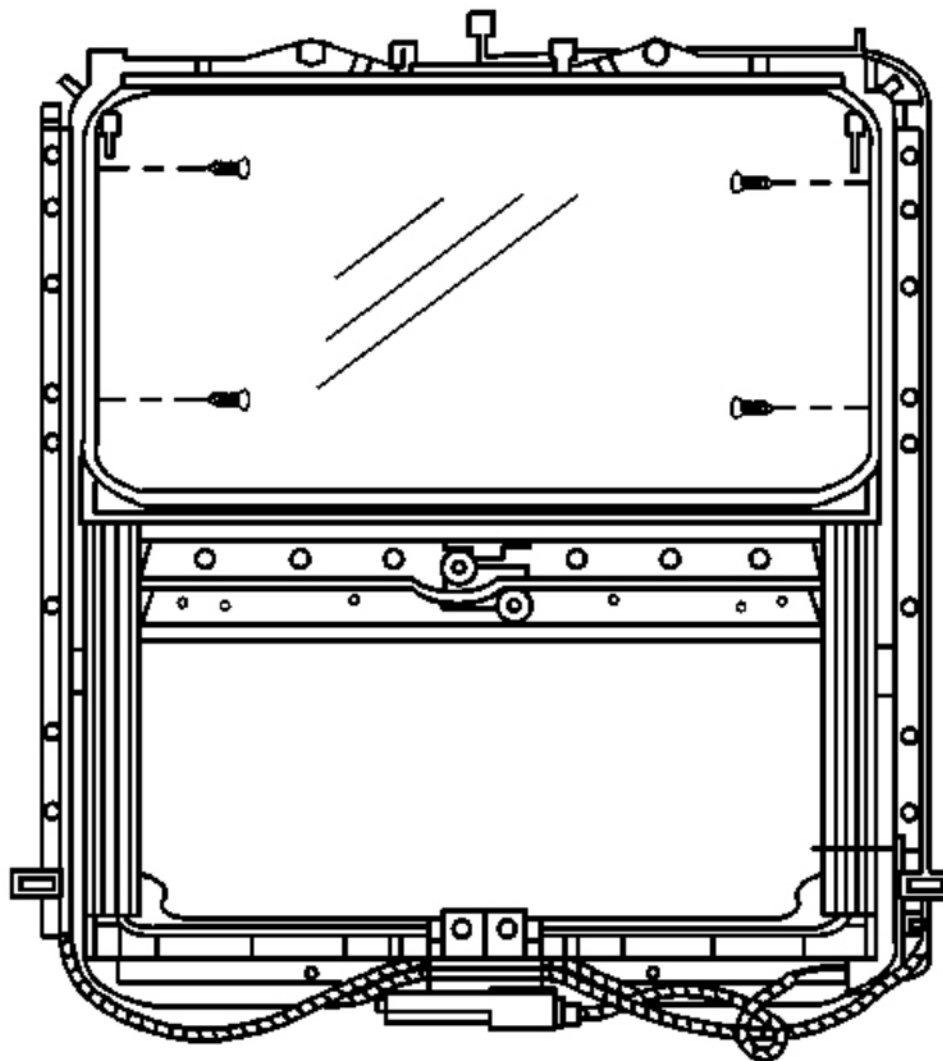


Fig. 11: View Of Sunroof Window

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Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Required position of the glass panel is when the front and rear of the sunroof glass panel is flushed with the roof panel.

4. Align the glass panel. Refer to Sunroof Window Height and Opening Fit Adjustment .
5. Inspect the operation of the sunroof.

SUNROOF SWITCH REPLACEMENT

Removal Procedure

1. Remove the roof console assembly. Refer to Headliner Replacement in Interior Trim.
2. Disconnect the electrical connector.
3. Remove the switch by unsnapping from roof console assembly.

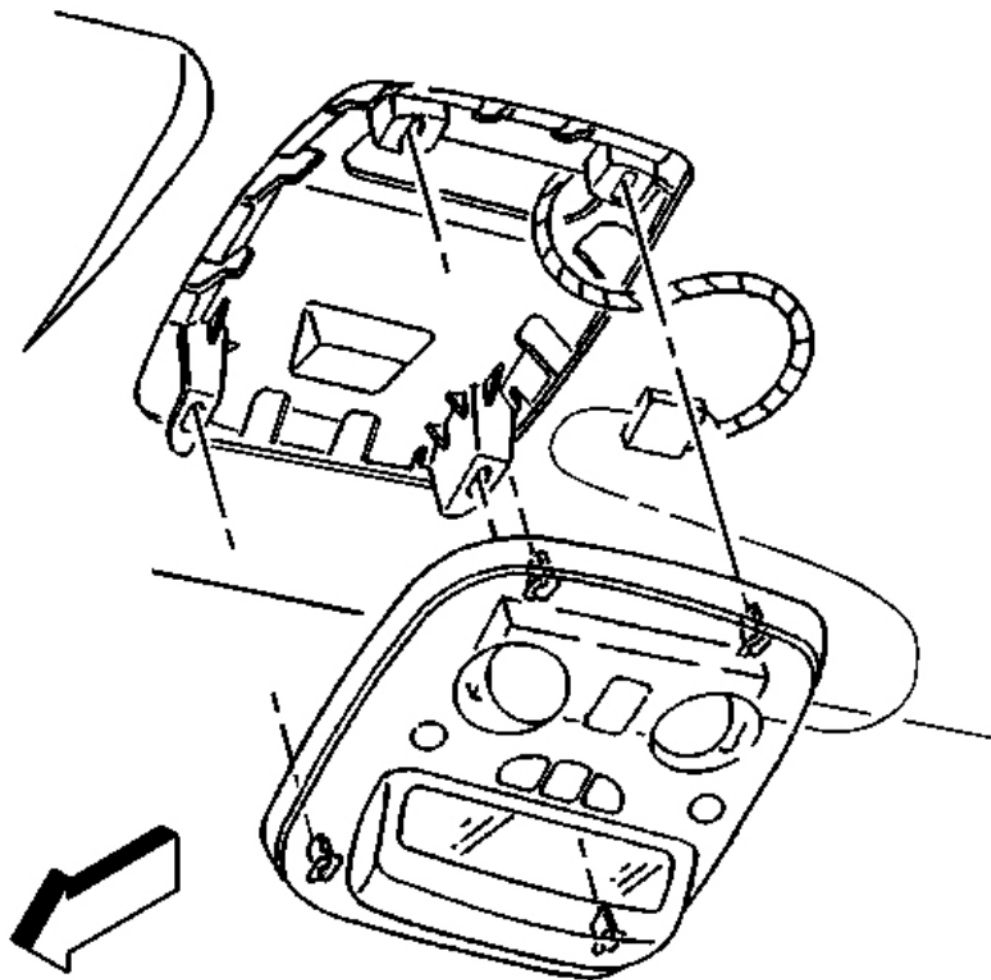


Fig. 12: View Of Sunroof Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the switch to roof console assembly by snapping into place.
2. Connect the electrical connector.

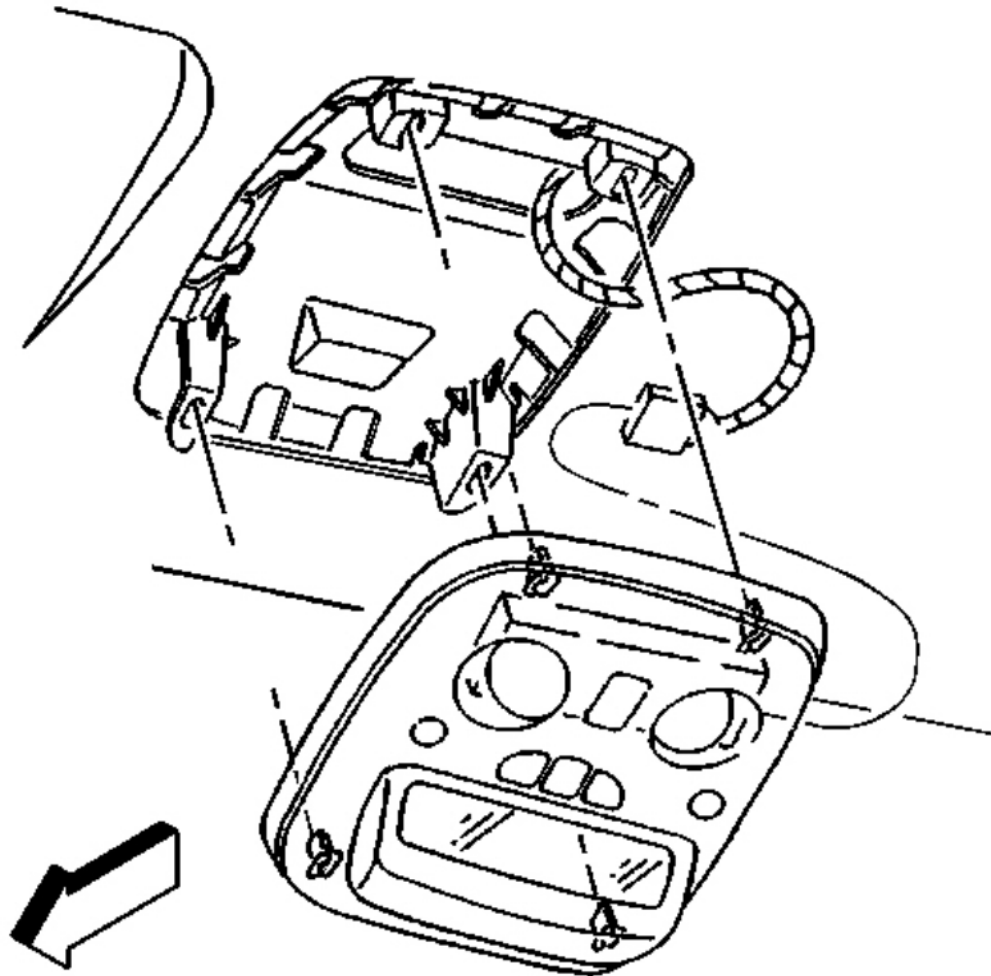


Fig. 13: View Of Sunroof Switch Electrical Connector
Courtesy of GENERAL MOTORS CORP.

3. Install the roof console assembly. Refer to **Headliner Replacement** in Interior Trim.
4. Synchronize the sunroof motor. Refer to **Sunroof Motor/Actuator Synchronization** .

SUNROOF MOTOR/ACTUATOR REPLACEMENT

1. Remove the headliner. Refer to **Headliner Replacement** in Interior Trim.
2. Disconnect the wire harness from the sunroof motor.
3. Remove the 2 screws retaining the motor.

4. Pull the motor from the unit.

Some gentle back and forth rotation may be required to release the motor gear from drive cables.

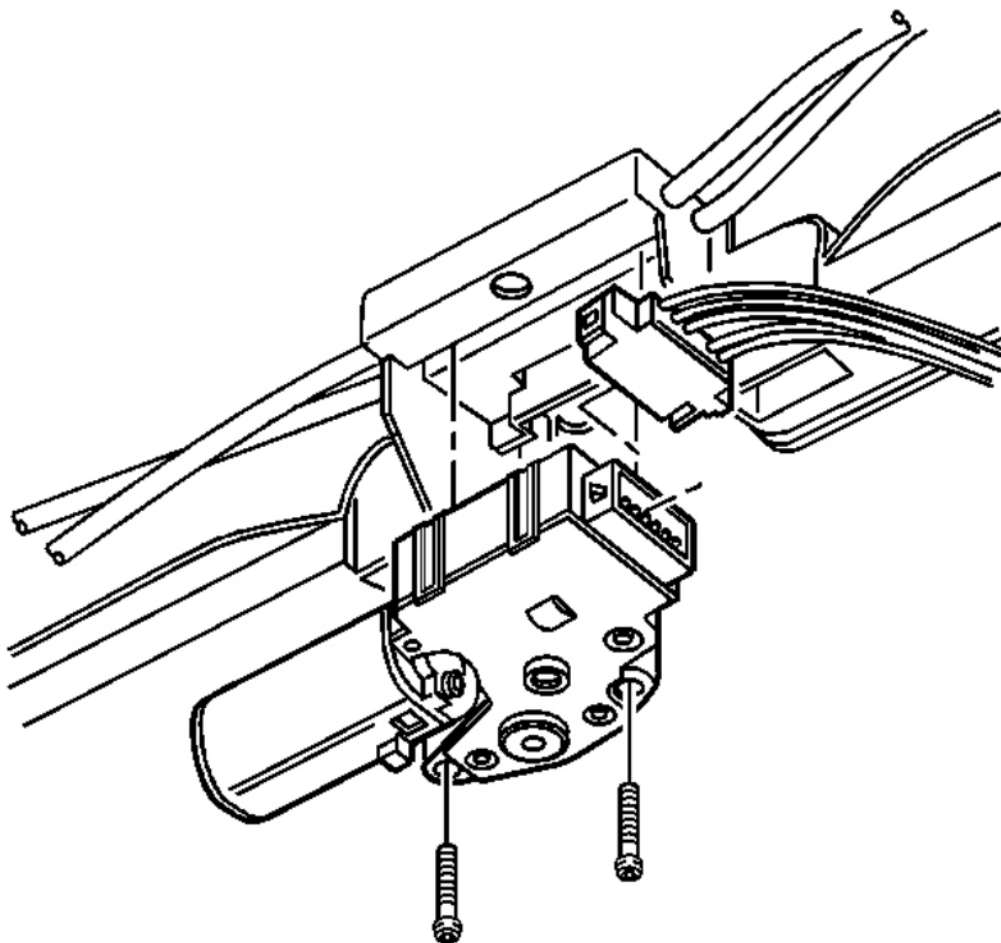


Fig. 14: View Of Sunroof Motor/Actuator
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the sunroof motor.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the 2 screws.

Tighten: Tighten the screws to 3 N.m (27 lb in).

3. Connect the wire harness to the sunroof motor.

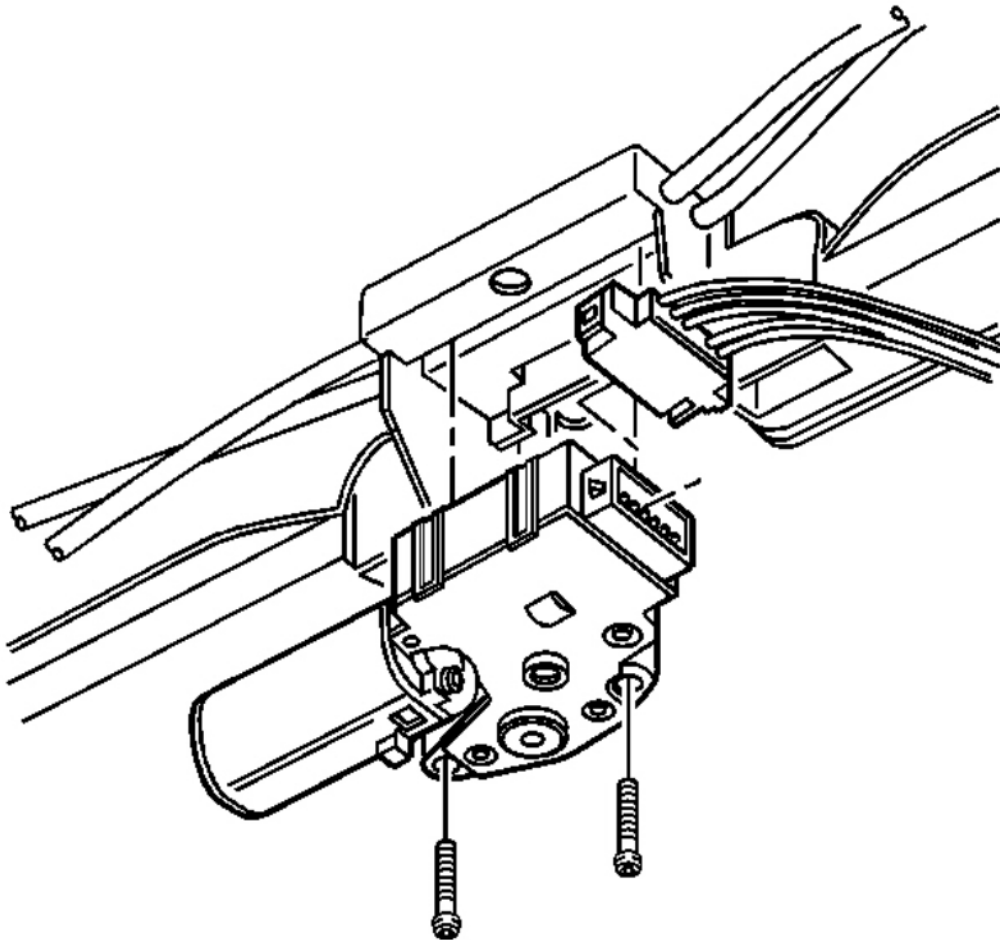


Fig. 15: View Of Sunroof Motor/Actuator
Courtesy of GENERAL MOTORS CORP.

4. Install the headliner. Refer to **Headliner Replacement** .
5. Inspect the operation of the sunroof.

Removal Procedure

1. Remove the headliner. Refer to **Headliner Replacement** in Interior Trim.

IMPORTANT: Observe the routing of the wire harness. Failure to route the wire the same will result in the wire harness being pinched during sunroof operation.

2. Disconnect the wire harness connectors (5) and (6).
3. Remove the wire from the sunroof module.

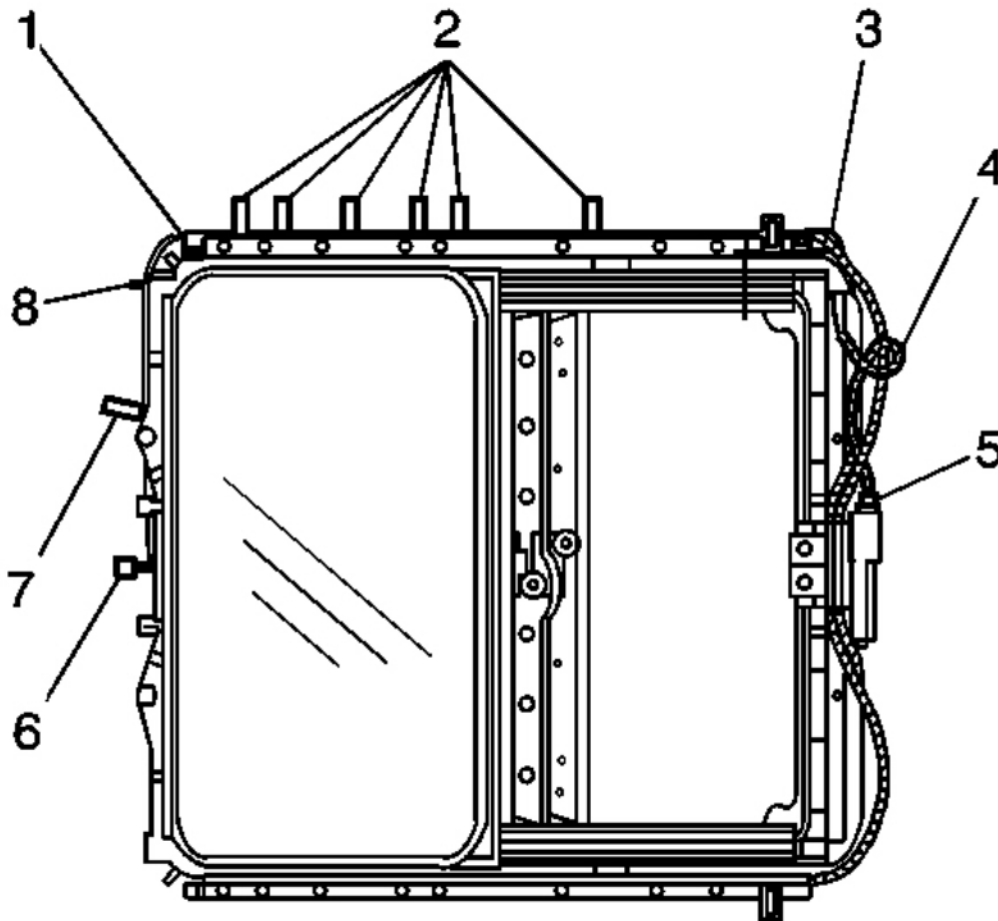


Fig. 16: View Of Sunroof Wiring Harness
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Connect the wire connector (6).

IMPORTANT: Do not route the wire harness on the top or the bottom of the flange as it will get pinched during sunroof operation.

2. Secure the wire harness along the out board flange (7) and (2).
3. Secure clip (1) and clip (3) to sunroof module flange.
4. Loop the wire harness around cable drive (4).
5. Connect the wire harness (5) to the sunroof motor.

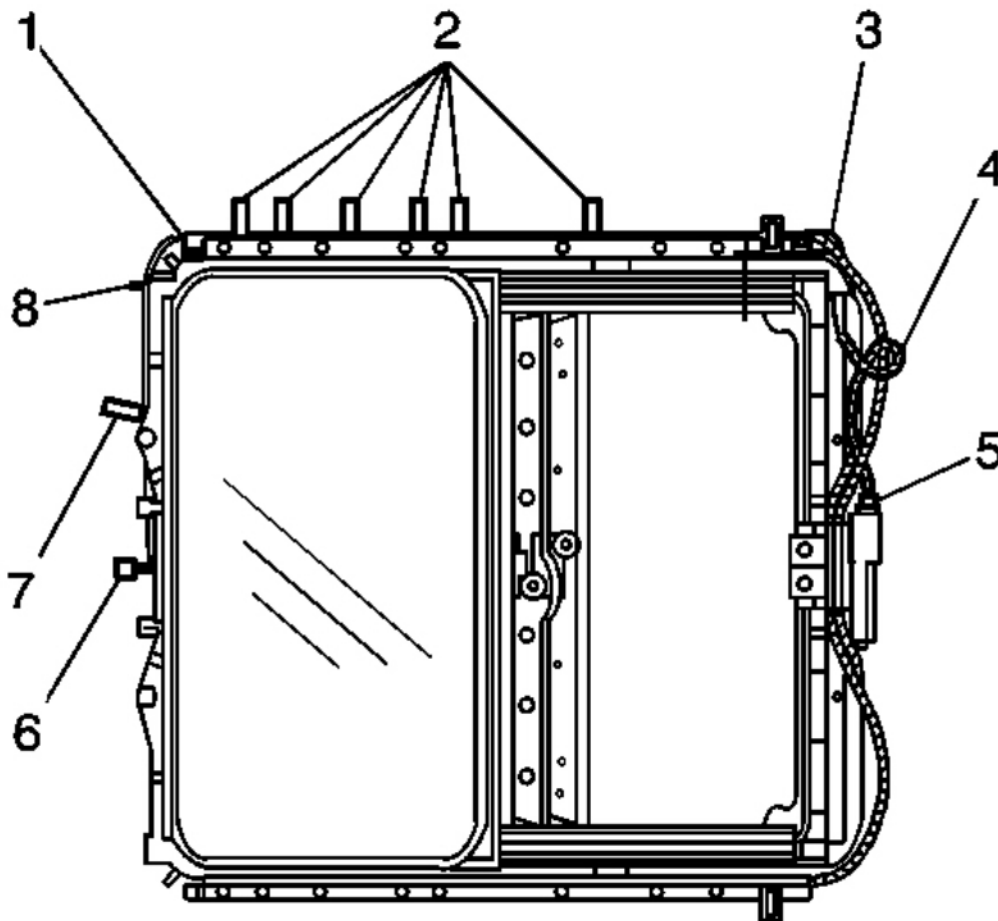


Fig. 17: View Of Sunroof Wiring Harness

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Courtesy of GENERAL MOTORS CORP.

6. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.
7. Inspect the operation of the sunroof.

SUNROOF CONNECTING LINK REPLACEMENT

Removal Procedure

The connecting link and other parts to complete this procedure are included in the sunroof guide kit.

1. Remove the sunroof window. Refer to **Sunroof Window Replacement** .
2. Remove the sunroof module from the vehicle. Refer to **Sunroof Module Assembly Replacement** .
3. Remove the roof drain channel. Refer to **Roof Drain Channel Replacement** .
4. Move the glass attachment to the forward position. If necessary, use the sunroof motor manual override (1).

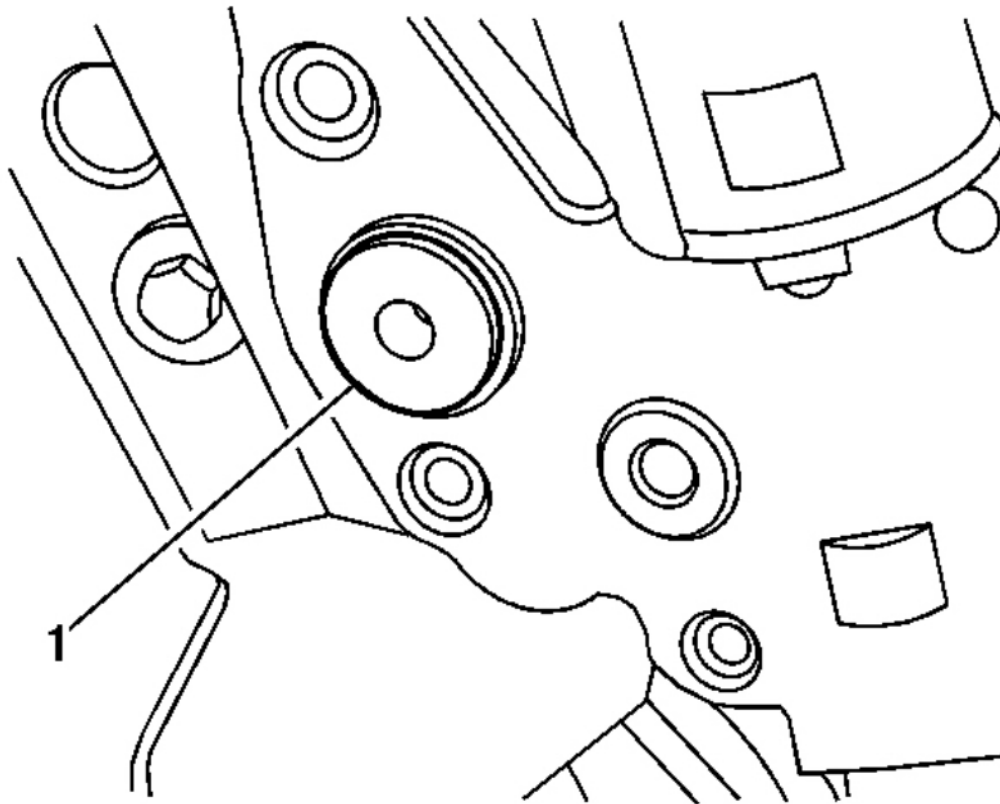


Fig. 18: Identifying Sunroof Motor Manual Override
Courtesy of GENERAL MOTORS CORP.

5. Remove the pin guide screw (1) and the pin guide (2).

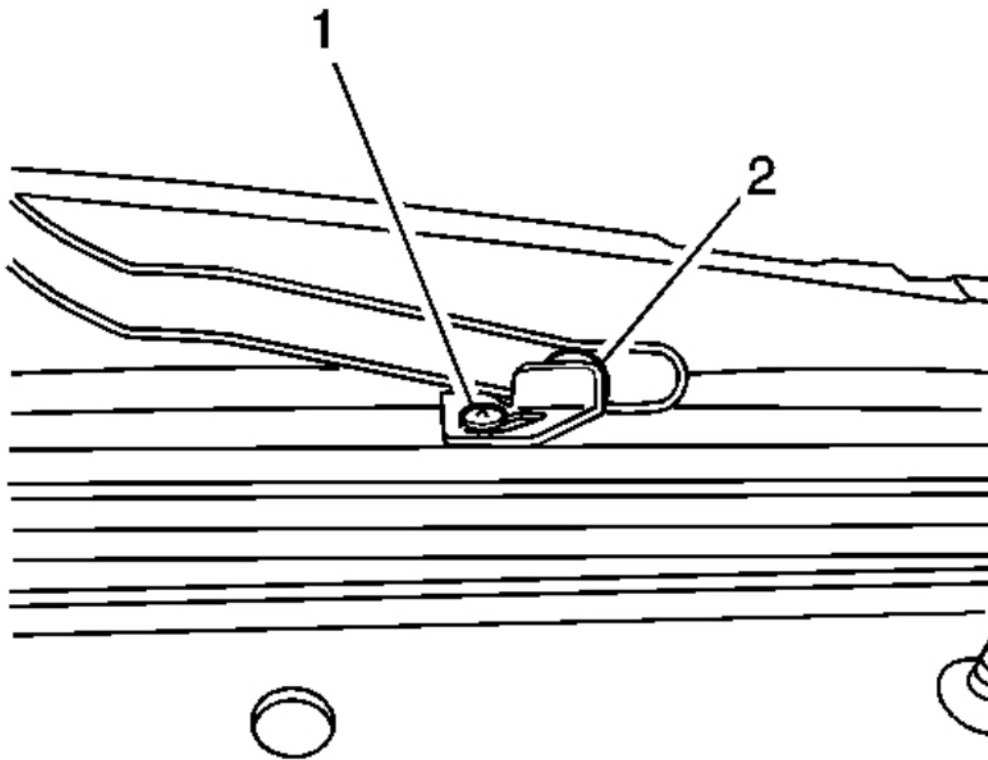


Fig. 19: View Of Pin Guide Screw & Pin Guide
Courtesy of GENERAL MOTORS CORP.

6. Remove the push nuts (1) and guide plate (2).

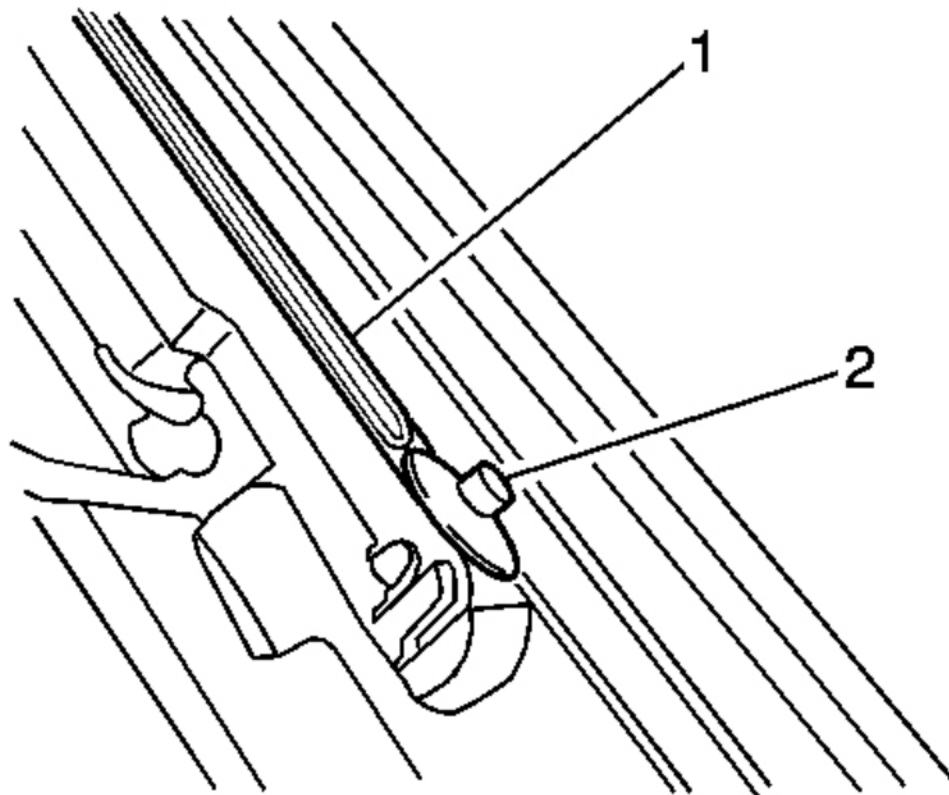


Fig. 20: View Of Push Nuts & Guide Plate
Courtesy of GENERAL MOTORS CORP.

7. Remove the water channel guide (1) by pushing the water channel guide out of the rear of the track.

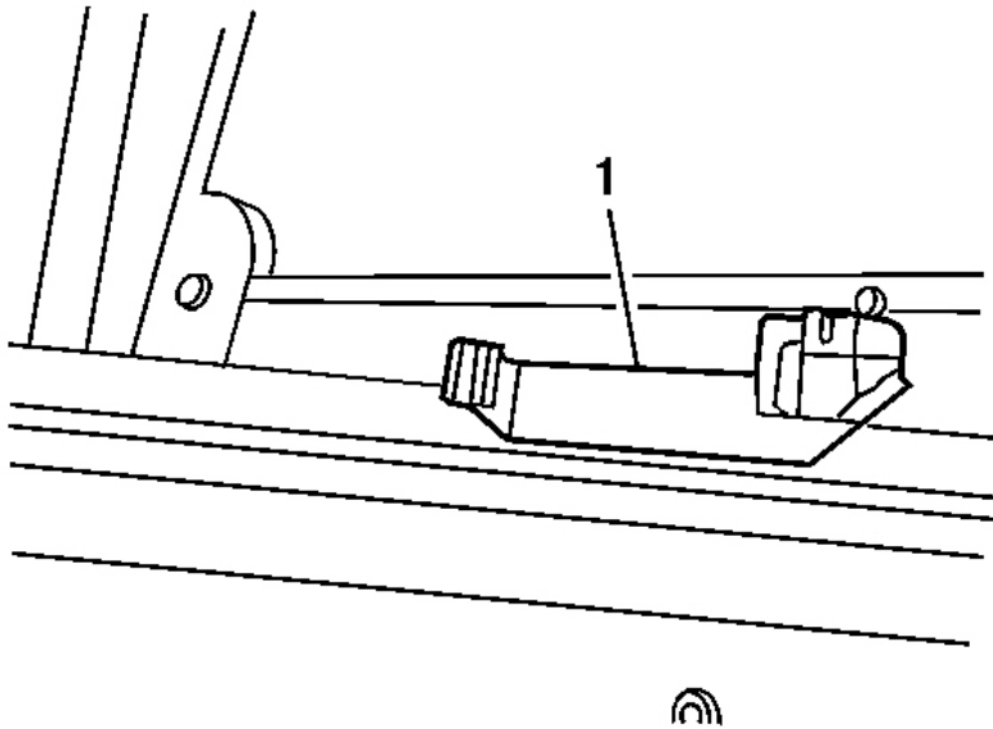


Fig. 21: View Of Water Channel Guide
Courtesy of GENERAL MOTORS CORP.

8. Move the lift mechanism (1) off to the side to disengage. Reposition the mechanism rearward using manual override.

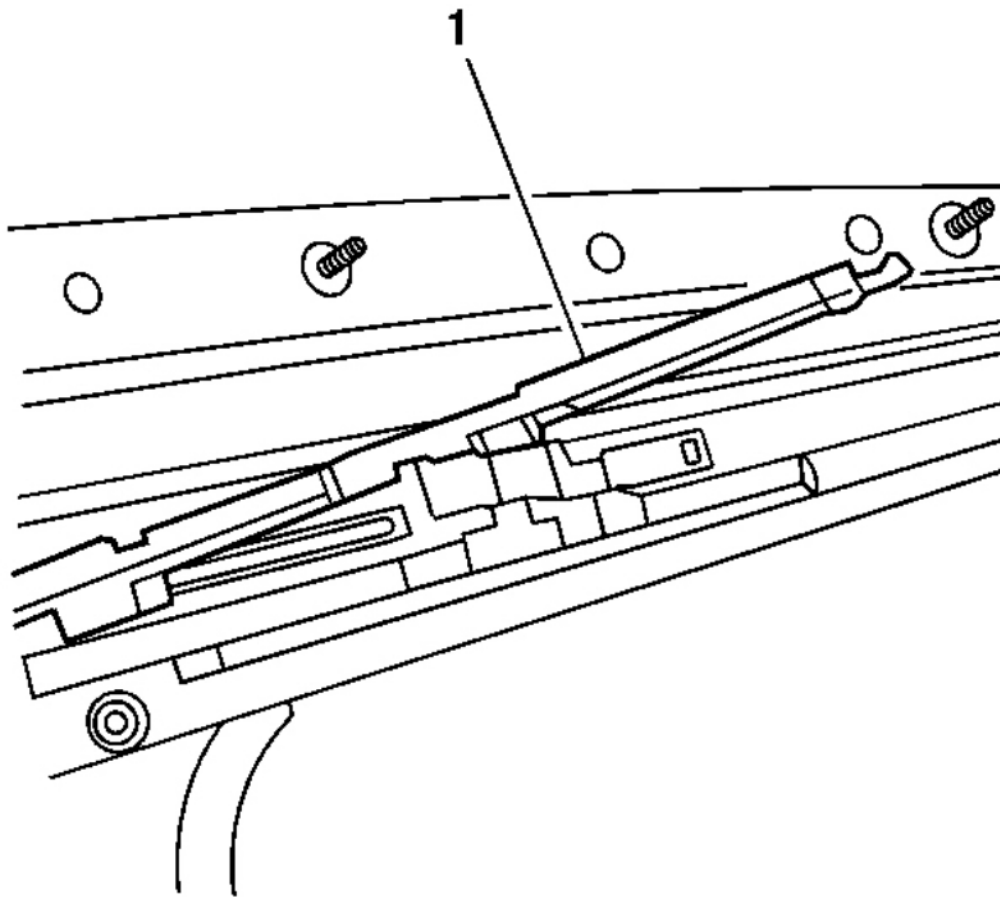


Fig. 22: View Of Lift Mechanism

Courtesy of GENERAL MOTORS CORP.

9. Remove the system stopper (1) using a small flat-bladed tool.

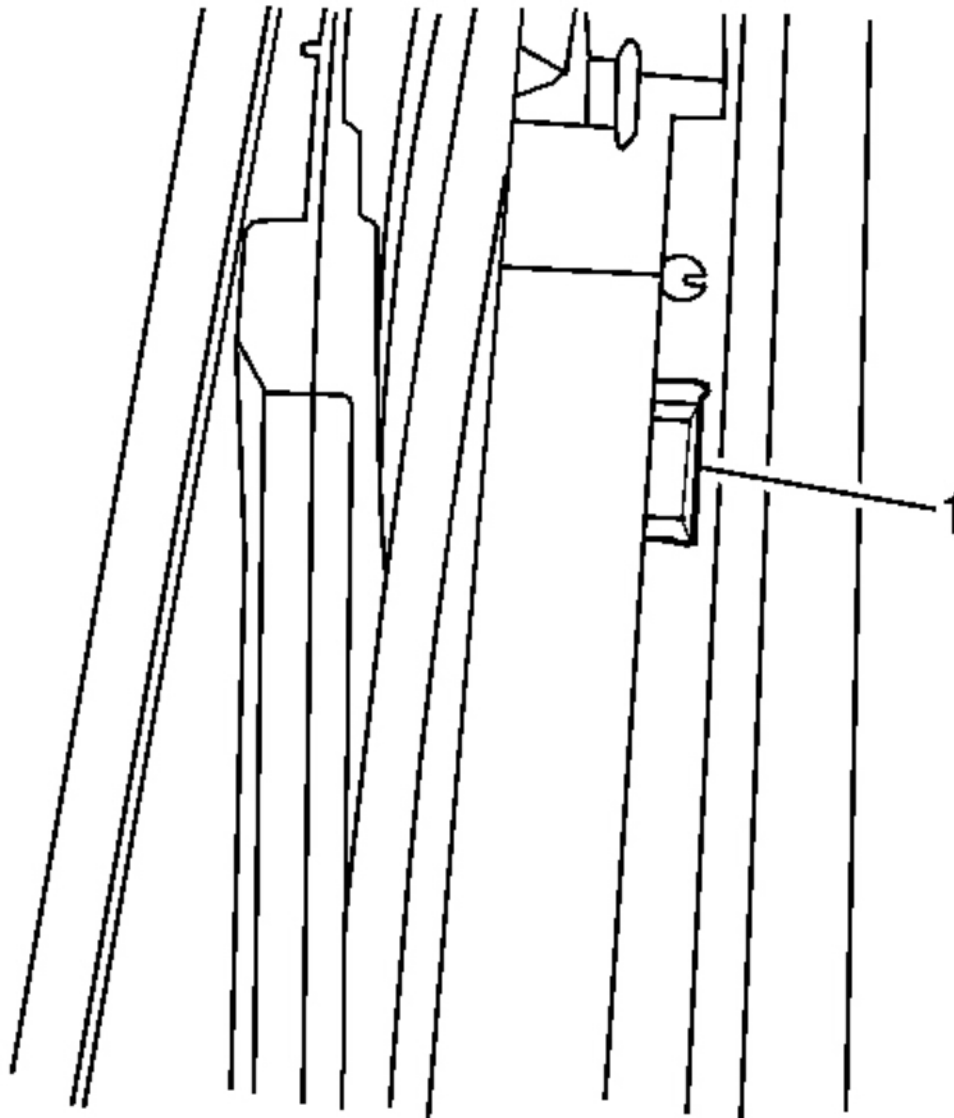


Fig. 23: View Of System Stopper
Courtesy of GENERAL MOTORS CORP.

10. Remove the connecting link (1) by lifting outward on the end in order to remove the link from the track.

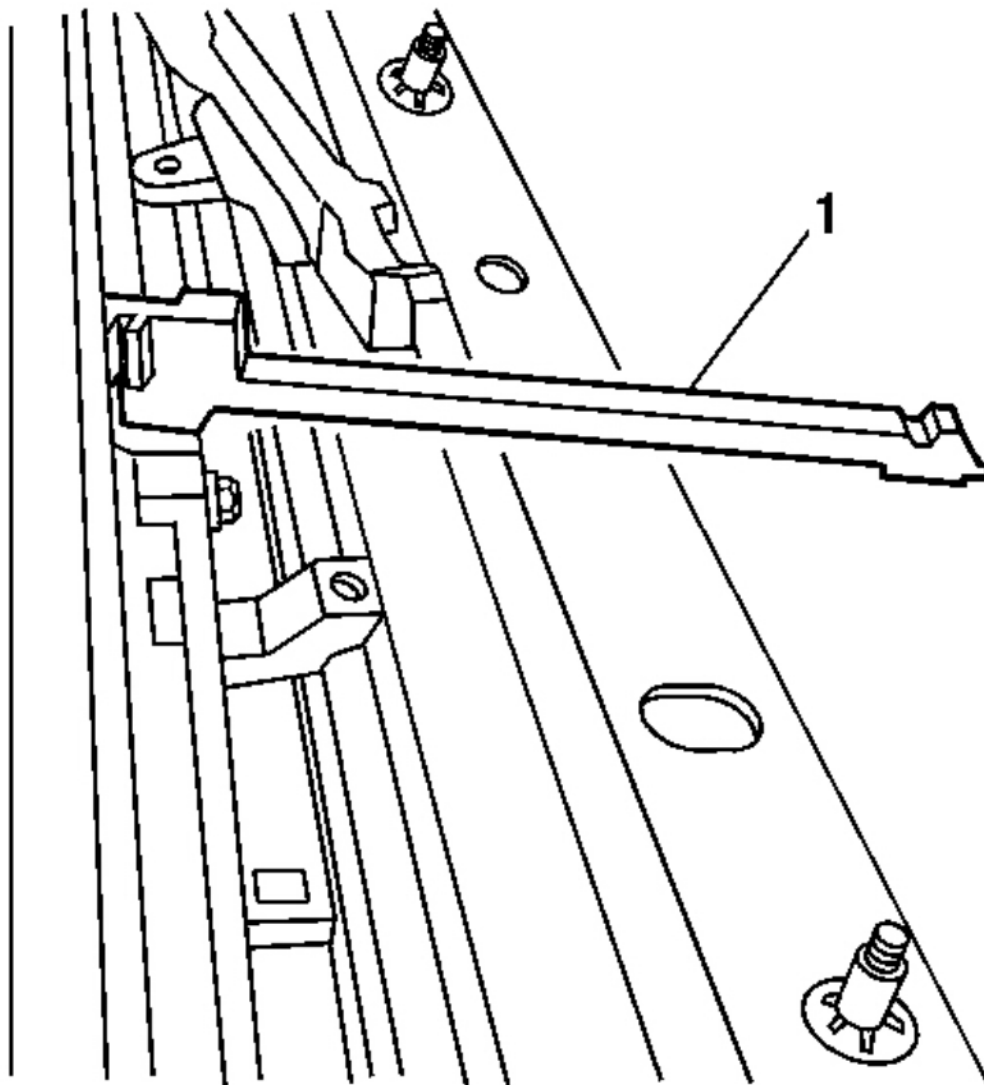


Fig. 24: View Of Connecting Link
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the connecting link into the sunroof channel (1).

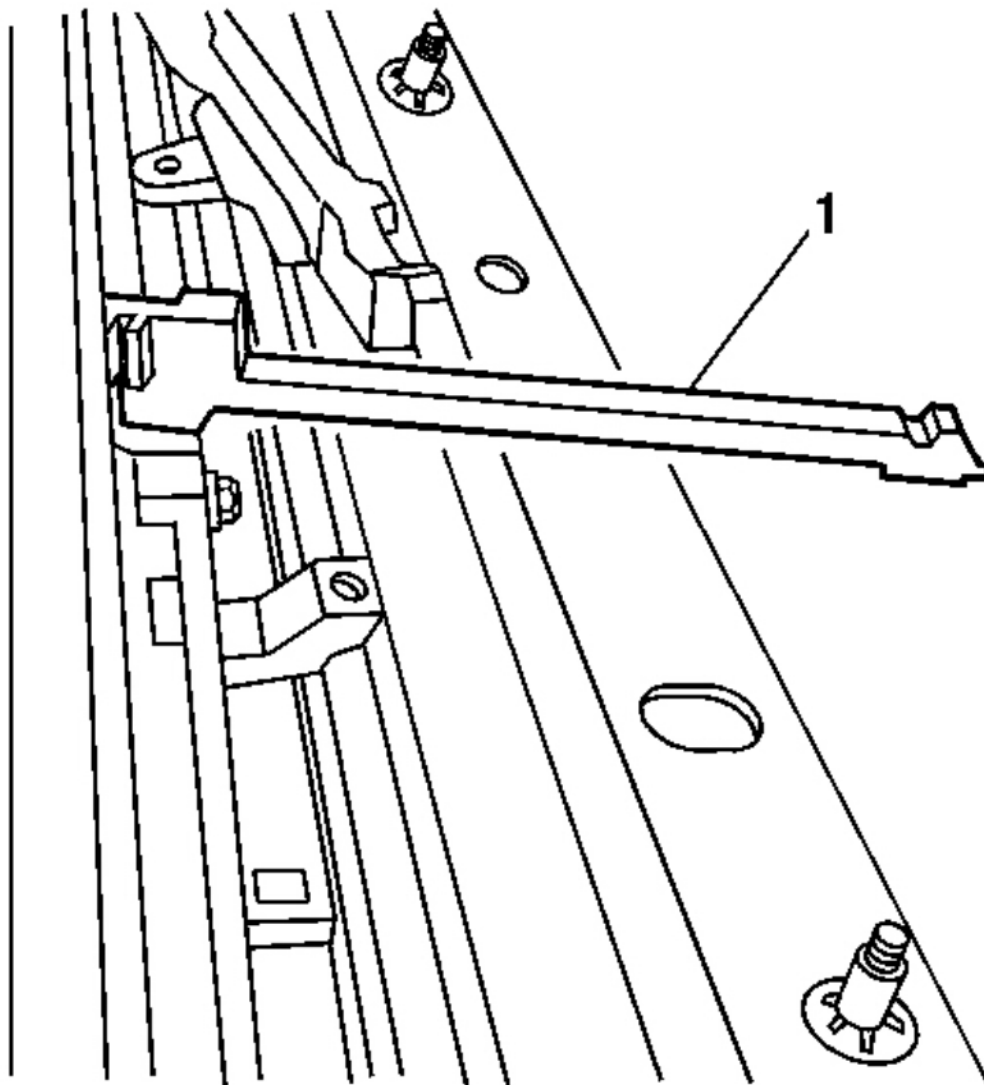


Fig. 25: View Of Connecting Link
Courtesy of GENERAL MOTORS CORP.

2. Install the system stopper (1) by pressing into place.

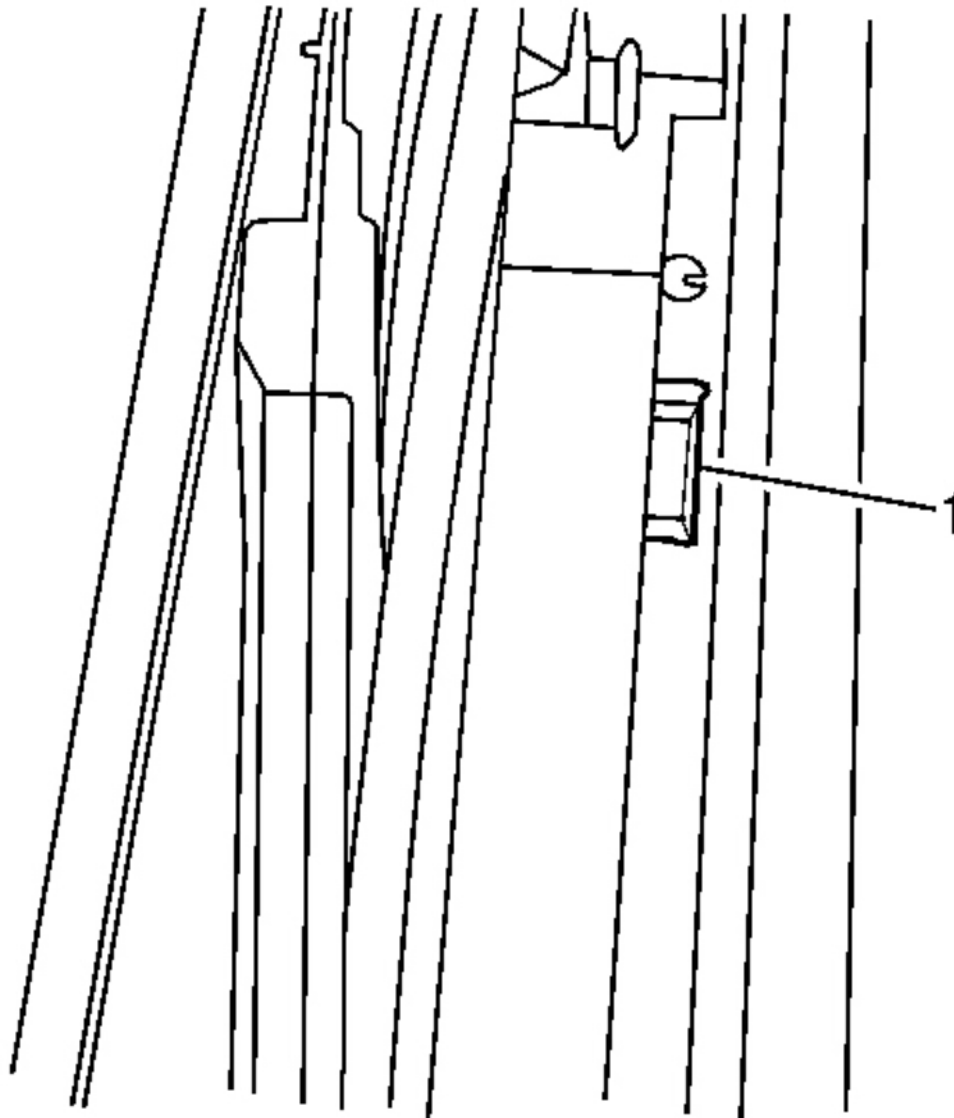


Fig. 26: View Of System Stopper
Courtesy of GENERAL MOTORS CORP.

3. Install the water channel guide (1) by pushing the water channel guide into the rear of the track.

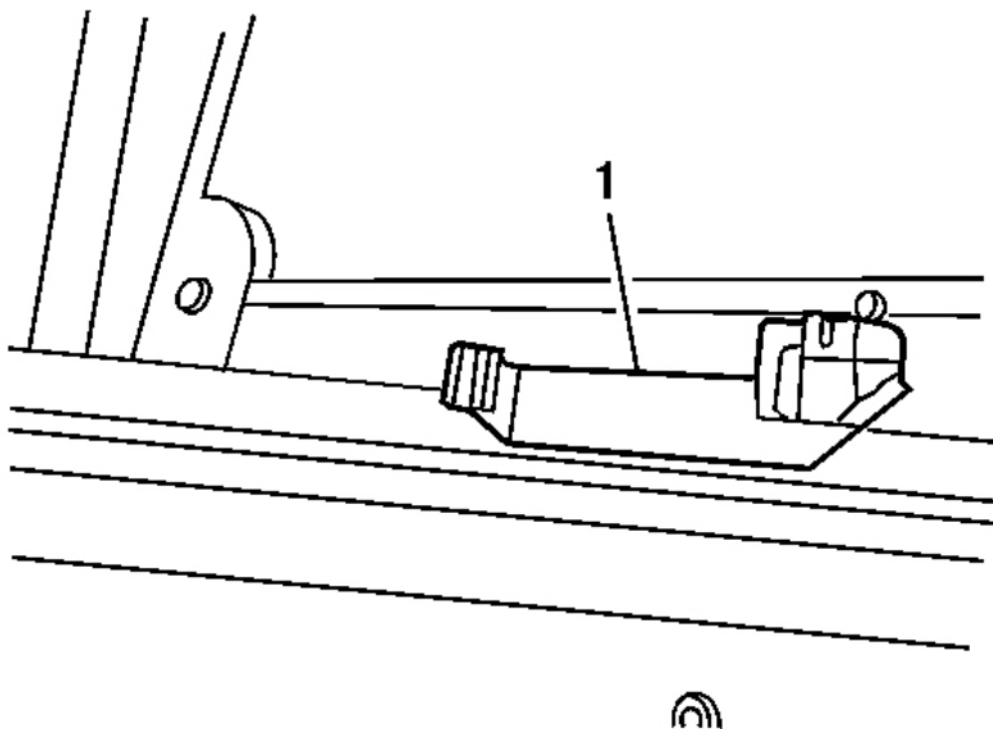


Fig. 27: View Of Water Channel Guide
Courtesy of GENERAL MOTORS CORP.

4. Using the sunroof motor manual override (1), move the sunroof lift mechanism to the forward position.

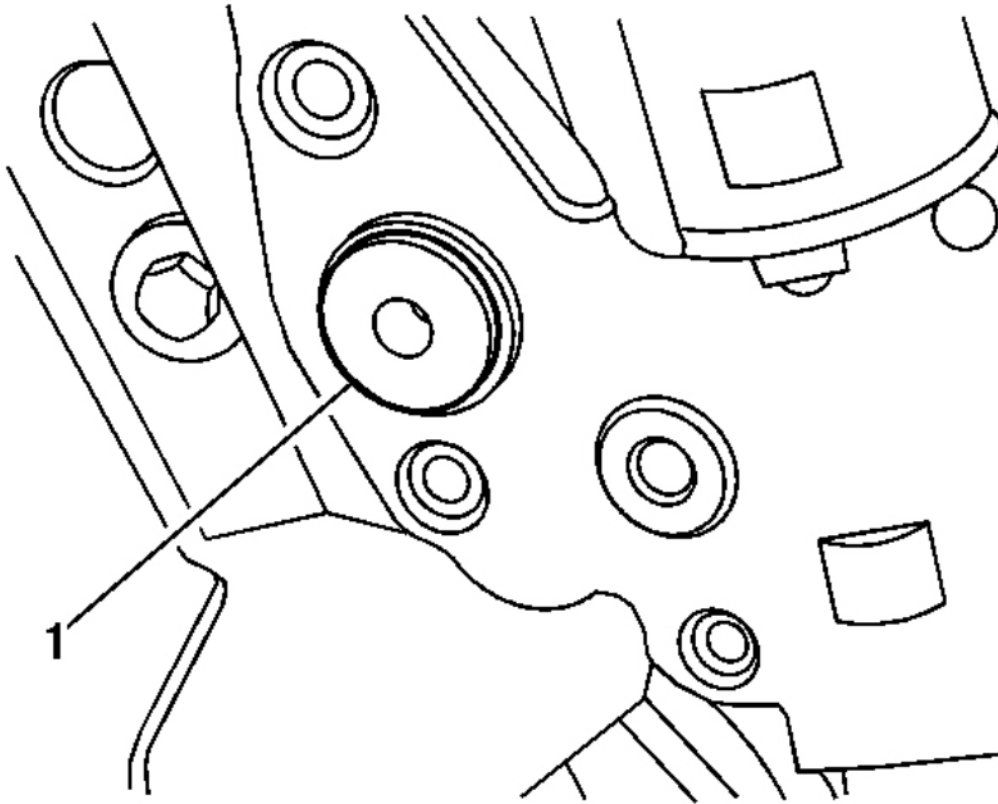


Fig. 28: Identifying Sunroof Motor Manual Override
Courtesy of GENERAL MOTORS CORP.

5. Align the lift mechanism to the connecting link.
6. Install the pin guide (2) and secure with pin guide screw (1).

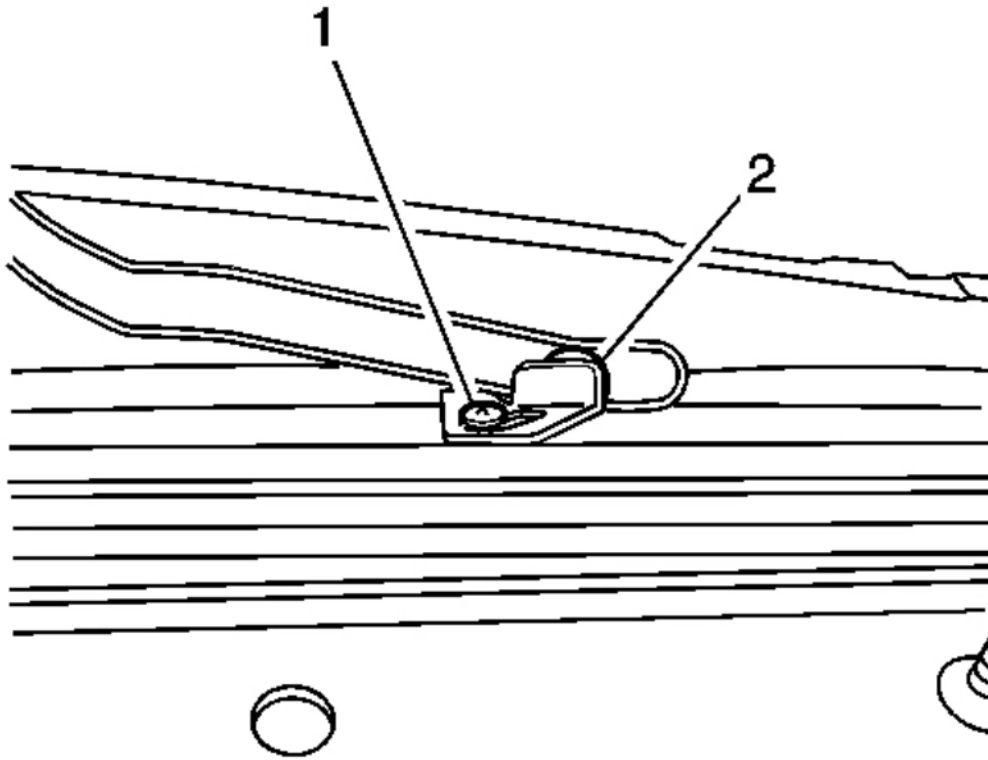


Fig. 29: View Of Pin Guide Screw & Pin Guide

Courtesy of GENERAL MOTORS CORP.

7. Install the roof drain channel. Refer to **Roof Drain Channel Replacement** .
8. Install the sunroof module into the vehicle. Refer to **Sunroof Module Assembly Replacement** .
9. Install the sunroof window. Refer to **Sunroof Window Replacement** .

SUNROOF MODULE ASSEMBLY REPLACEMENT

Removal Procedure

1. Remove the sunroof window. Refer to **Sunroof Window Replacement** .
2. Remove the sunroof finishing lace. Refer to **Sunroof Finishing Lace Replacement** .
3. Remove the headliner. Refer to **Headliner Replacement** in Interior Trim.
4. Remove the sunshade. Refer to **Sunroof Sunshade Panel Replacement** .
5. Remove the drain hoses. Refer to **Sunroof Drain Hose Replacement - Front** and **Sunroof Drain Hose Replacement - Rear** .

6. Disconnect the electrical connectors.
7. Remove the 9 bolts retaining sunroof module.
8. Remove the module from vehicle.

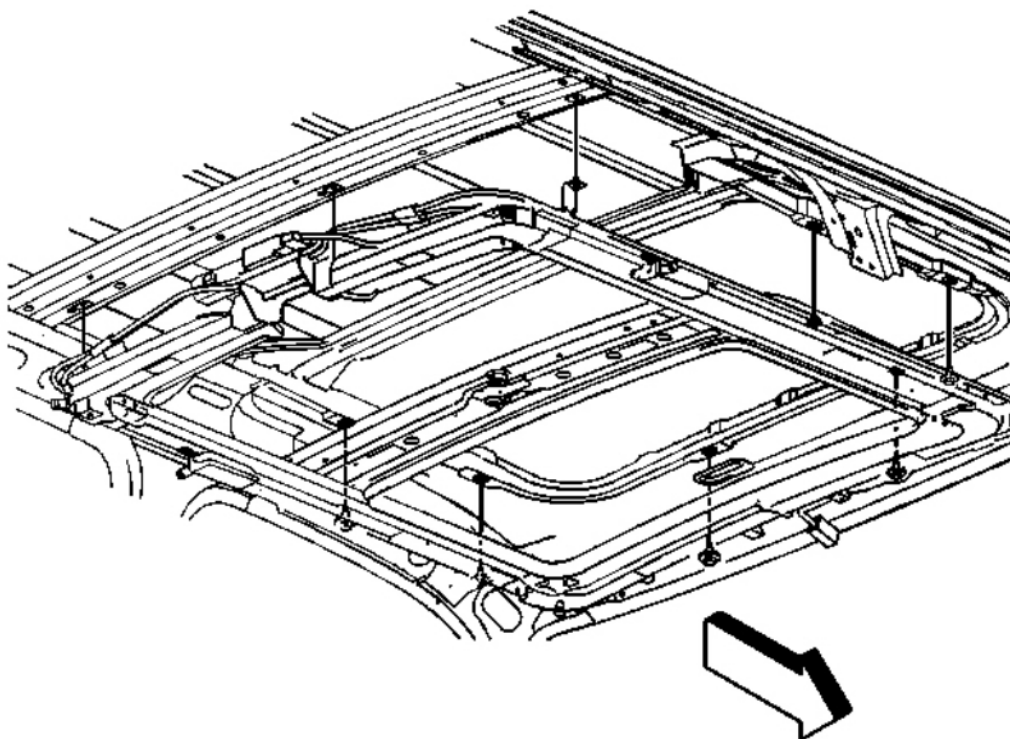


Fig. 30: View Of Sunroof Module Assembly
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the module to the vehicle.

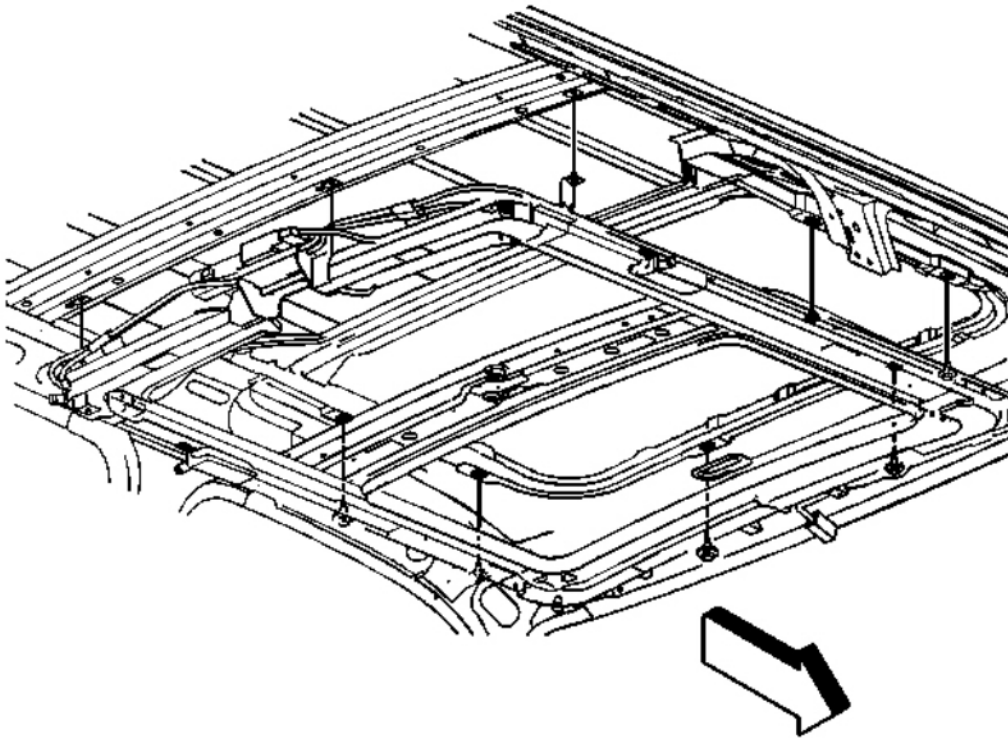


Fig. 31: View Of Sunroof Module Assembly
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Loosely install the 9 bolts retaining the module to the roof.

Use a drill bit to align the 2 holes A and B.

Tighten: Tighten the 9 bolts in the sequence shown to 9 N.m (80 lb in).

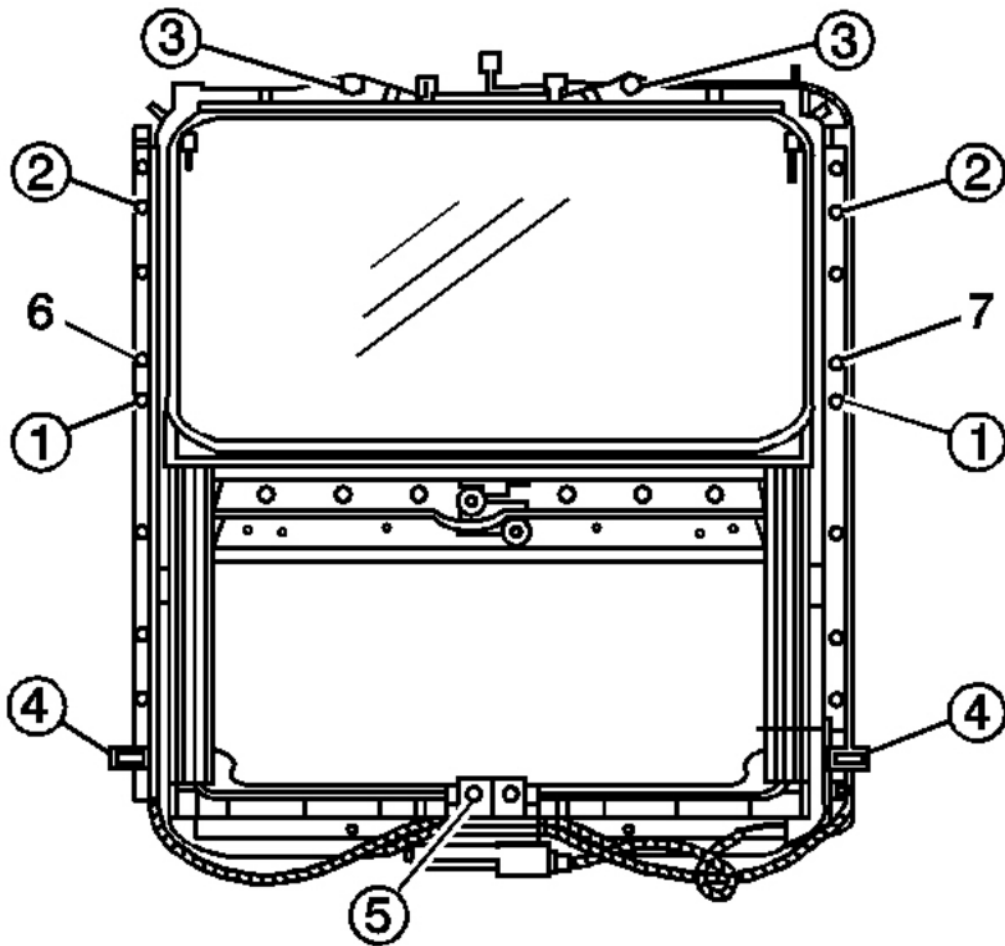


Fig. 32: Sunroof Module Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

3. Connect the electrical connectors.
4. Install the drain hoses. Refer to **Sunroof Drain Hose Replacement - Front** and **Sunroof Drain Hose Replacement - Rear**.
5. Install the sunshade. Refer to **Sunroof Sunshade Panel Replacement**.
6. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.
7. Install the finishing lace. Refer to **Sunroof Finishing Lace Replacement**.
8. Install the sunroof window. Refer to **Sunroof Window Replacement**.
9. Synchronize the sunroof motor if necessary. Refer to **Sunroof Motor/Actuator Synchronization**.

ROOF DRAIN CHANNEL REPLACEMENT

Removal Procedure

1. Remove the sunroof glass panel. Refer to [Sunroof Window Replacement](#) .
2. On one side of the drain channel (1), push the tab (3) rearwards and lift up the drain channel. Do the same for the other side.
3. Slide the drain channel from the guide (2).

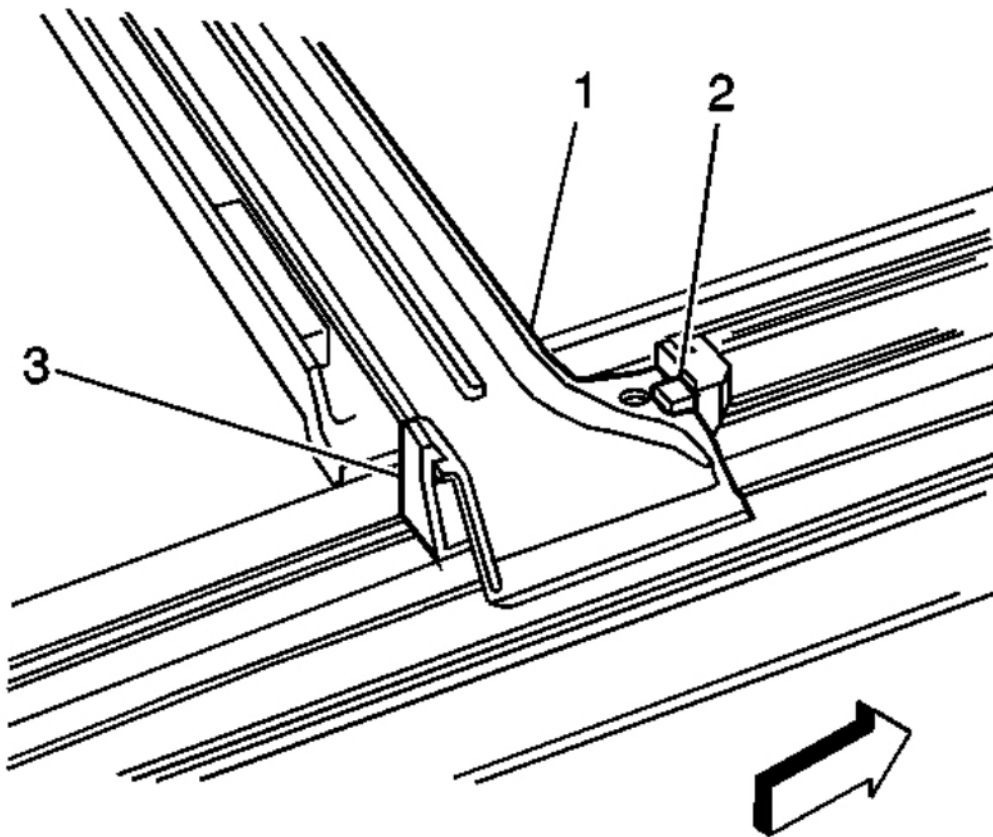


Fig. 33: View Of Sunroof Drain Channel, Tab & Guide
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Slide the drain channel into the guide tab (2).
2. Push on the drain channel (1) until it locks into place by the retainer (3). Do the same for the other side.

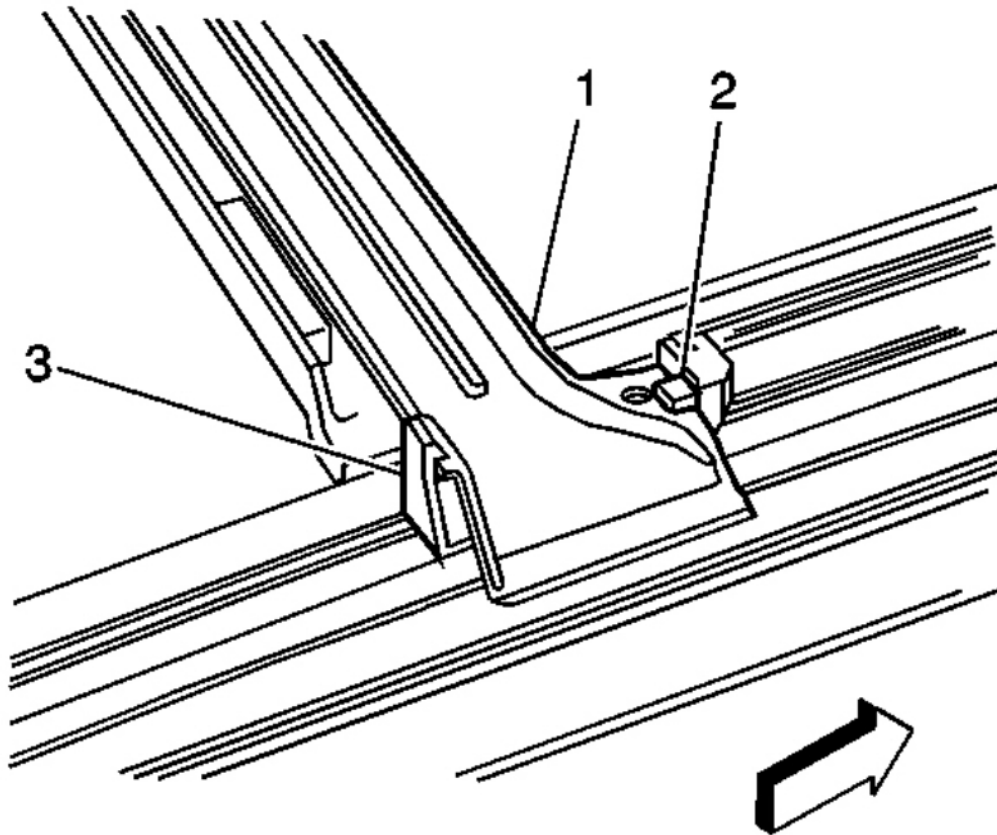


Fig. 34: View Of Sunroof Drain Channel, Tab & Guide
Courtesy of GENERAL MOTORS CORP.

3. Ensure both sides are properly seated in the guide.
4. Install the sunroof glass panel. Refer to **Sunroof Window Replacement**.

SUNROOF FINISHING LACE REPLACEMENT

Removal Procedure

From inside the vehicle, grab on one end of the lace at the joint. Pull gently until the lace is off the headliner and sunroof.

Installation Procedure

1. Center one end of the lace to the rear of the sunroof.

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2. Push on the lace to the sunroof by working slowly around the opening.

Once the halfway point is reached, start the other end around the opening.

The headliner will overlap the lace at this point.

3. With the lace fully seated on the sunroof, start at the joint and gently pull the pull-cord away from the lace to wrap the flange over the headliner.

LUGGAGE CARRIER REPLACEMENT (ALL EXCEPT Z-71)

Removal Procedure

1. Remove the rear pad covers.
2. Remove the cross rails by releasing the lever on both sides and sliding toward rear of vehicle.
3. Remove the side rail attaching bolts.
4. Remove the side rail(s).

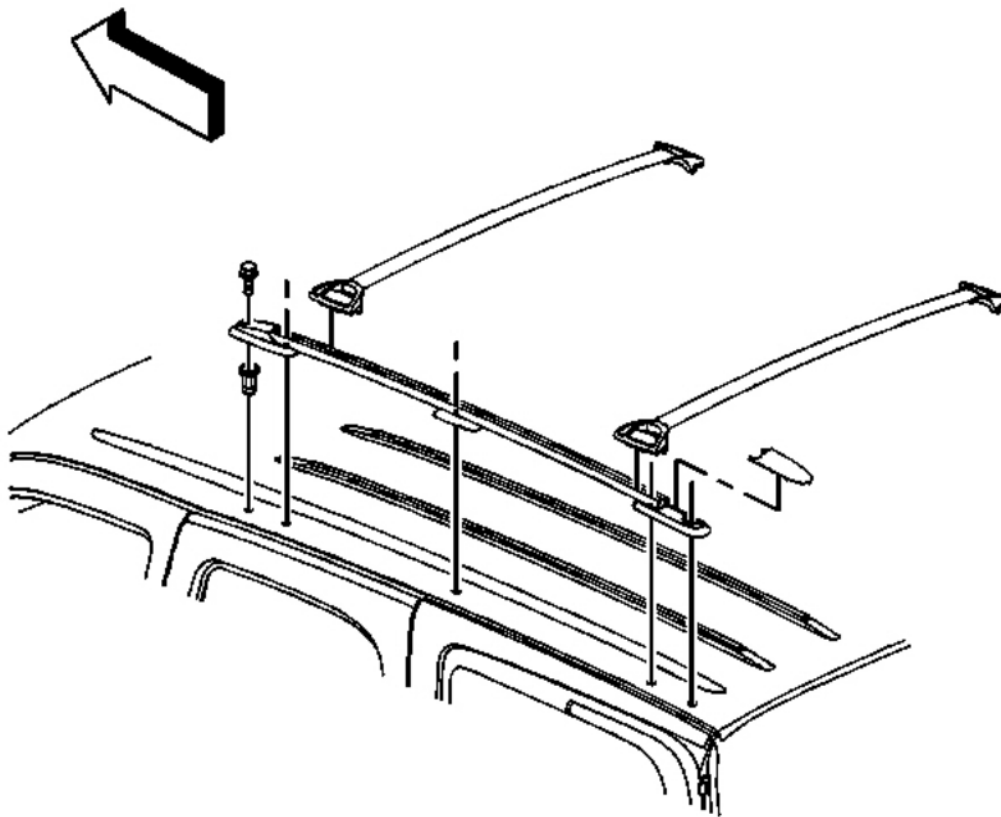


Fig. 35: View Of Side Rails & Cross Rails (All Except Z-71)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the side rail(s).

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the side rail attaching bolts.

Tighten: Tighten the bolts 4 N.m (35 lb in).

3. Install the cross rails by sliding toward front of vehicle and engaging lever on both sides.
4. Install the rear pad covers by snapping into place.

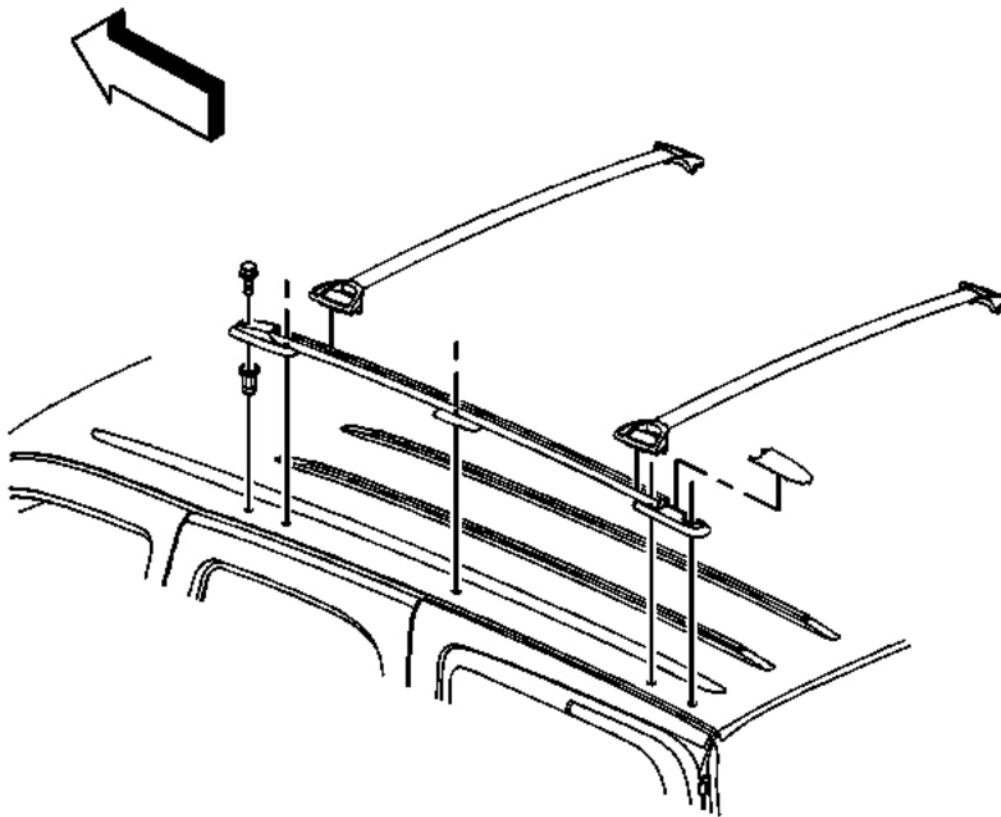


Fig. 36: View Of Side Rails & Cross Rails (All Except Z-71)
Courtesy of GENERAL MOTORS CORP.

LUGGAGE CARRIER REPLACEMENT (AVALANCHE)

Removal Procedure

1. Depress the tabs and remove rear rail covers (2).
2. Remove the rear support retainers.
3. Remove the rear supports and gaskets from the roof (3).

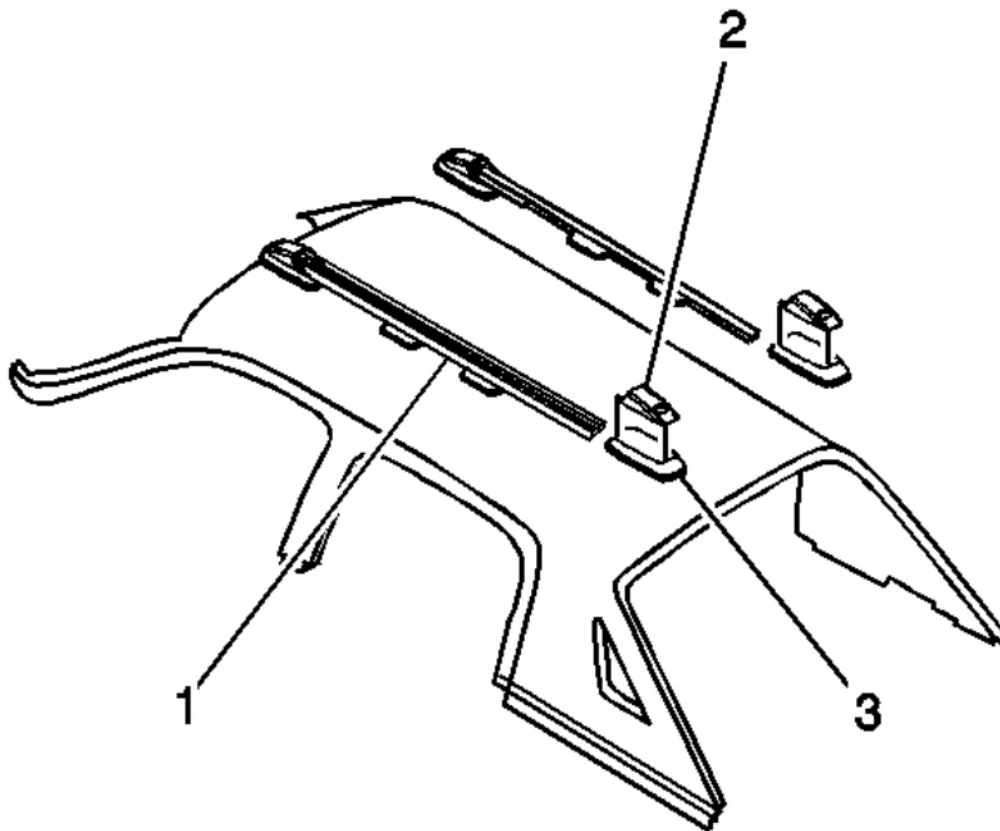


Fig. 37: View Of Side Rail Assembly & Rear Rail Covers (Avalanche)
Courtesy of GENERAL MOTORS CORP.

4. Unlock the cross rails (2).
5. Slide the rear and front cross rails from the carrier assembly (1).

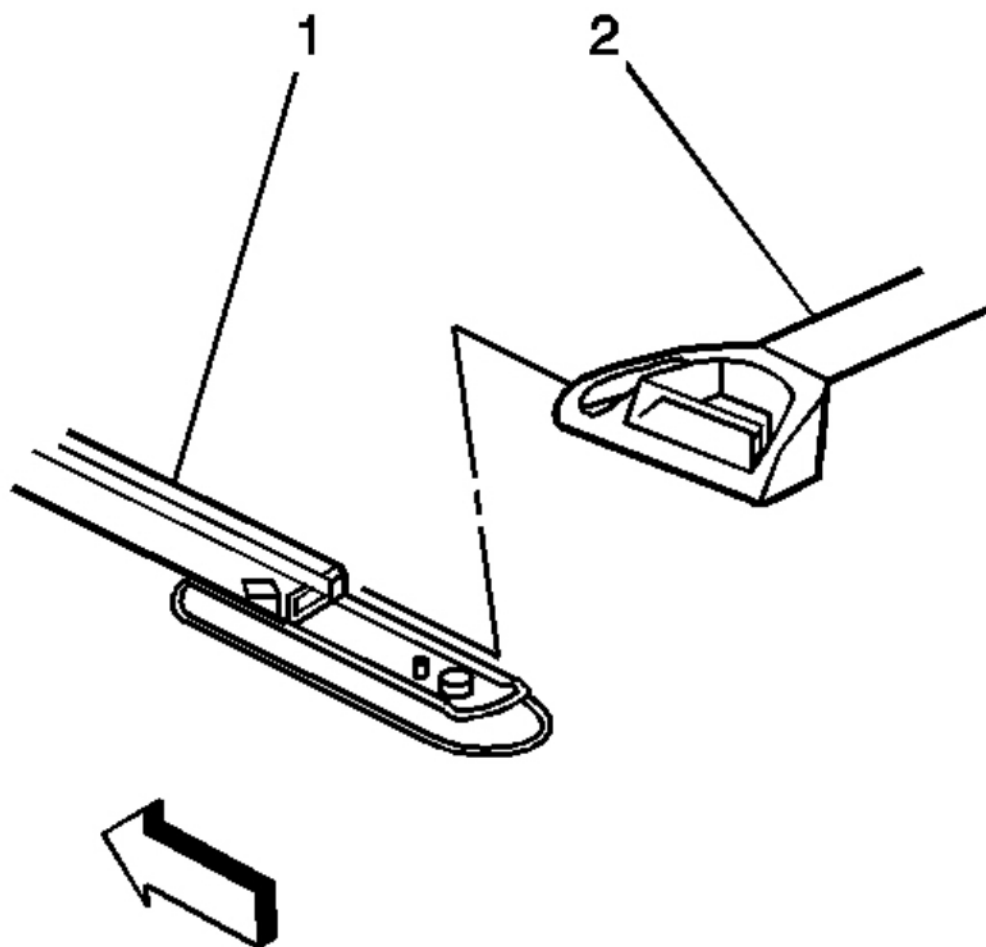


Fig. 38: View Of Cross Rails & Carrier Assembly (Avalanche)
Courtesy of GENERAL MOTORS CORP.

6. Remove the retainers from the side rails.
7. Remove the side rail assemblies from the roof.

Installation Procedure

1. Install the side rail assemblies (1) to the roof and align to the existing Welnuts.
2. Install the retainers to the side rails and hand tighten.

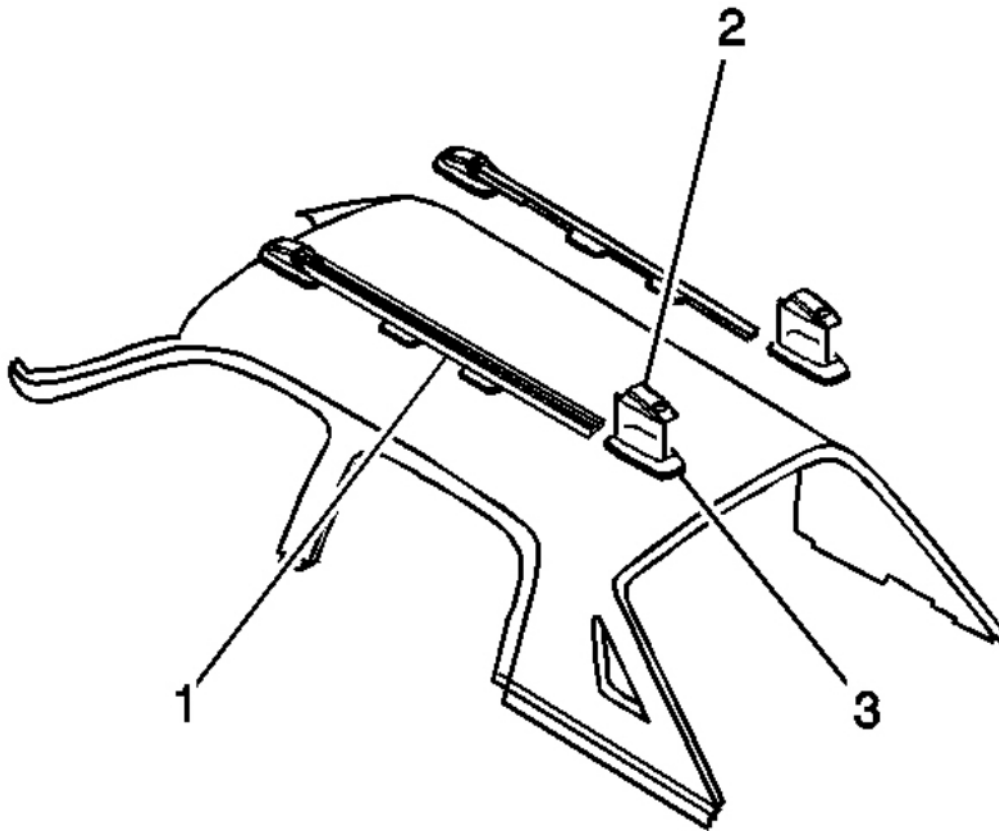


Fig. 39: View Of Side Rail Assembly & Rear Rail Covers (Avalanche)
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice in Cautions and Notices.

3. Torque the side rail retainers in this order.

Tighten: Tighten the side rail retainers to 2 N.m (20 lb in).

1. Torque the second hole from the front.
2. Torque the first hole.
3. Torque the third and forth holes.
4. Install the front cross rail assembly (2) to the side rails (1), stopping at the second or third notch from the front of each rail.

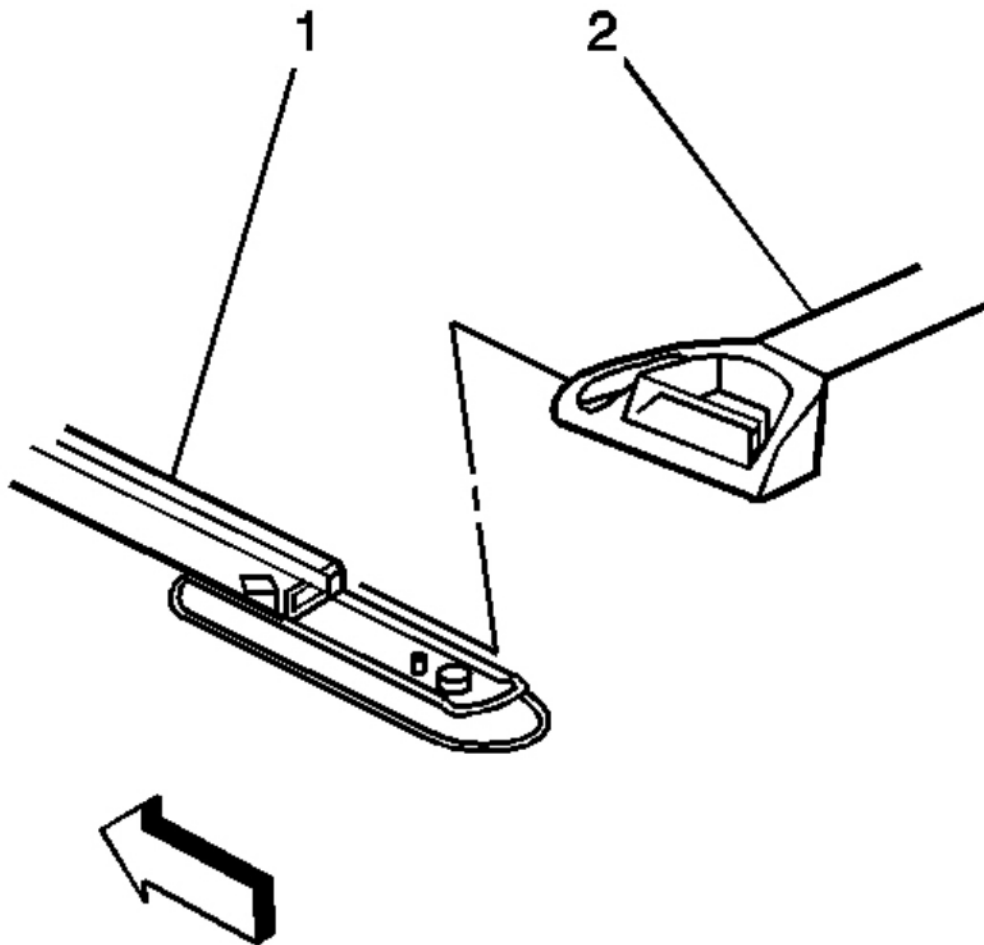


Fig. 40: View Of Cross Rails & Carrier Assembly (Avalanche)
Courtesy of GENERAL MOTORS CORP.

5. Depress the adjuster handles to lock each side.
6. Install the rear cross rail to the side rails, stopping at the second or third engagement notch.
7. Depress the adjuster handle to lock each side.
8. Install the rear rail covers (2) by inserting the legs of the cover and rotating cover down to engage the retainer.

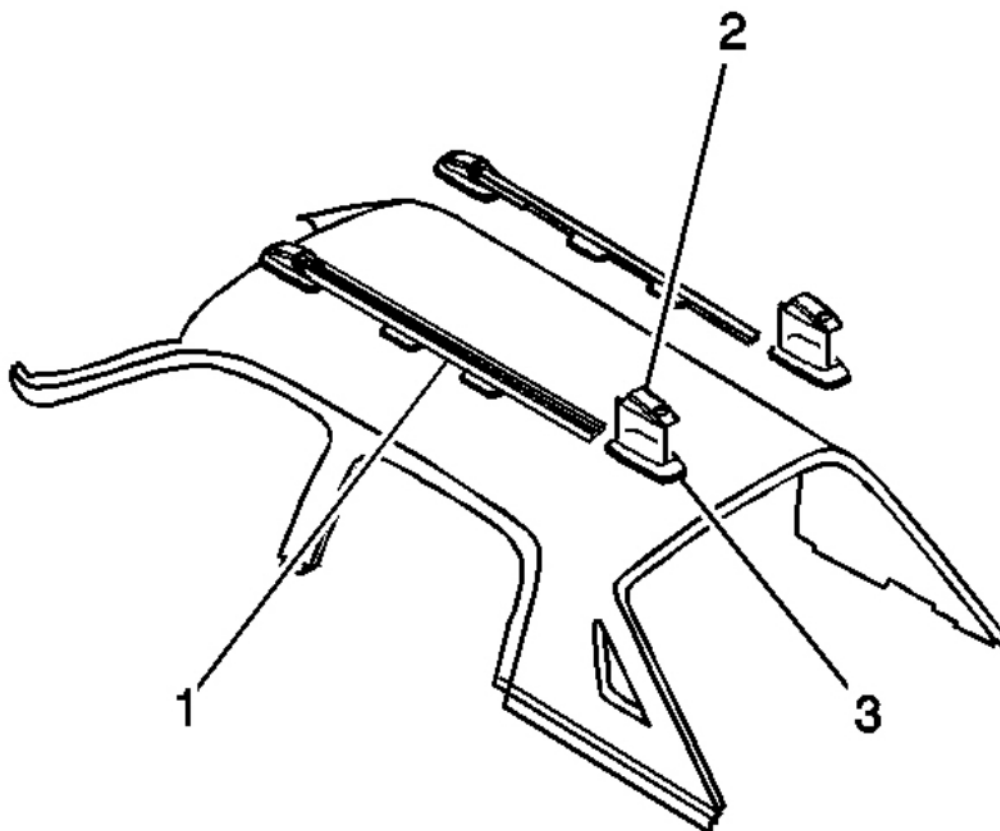


Fig. 41: View Of Side Rail Assembly & Rear Rail Covers (Avalanche)
Courtesy of GENERAL MOTORS CORP.

LUGGAGE CARRIER REPLACEMENT (Z-71)

Removal Procedure

1. Remove the 2 inboard fasteners from the luggage carrier base covers.
2. Remove the base covers.
3. Remove the fasteners from the front bases.

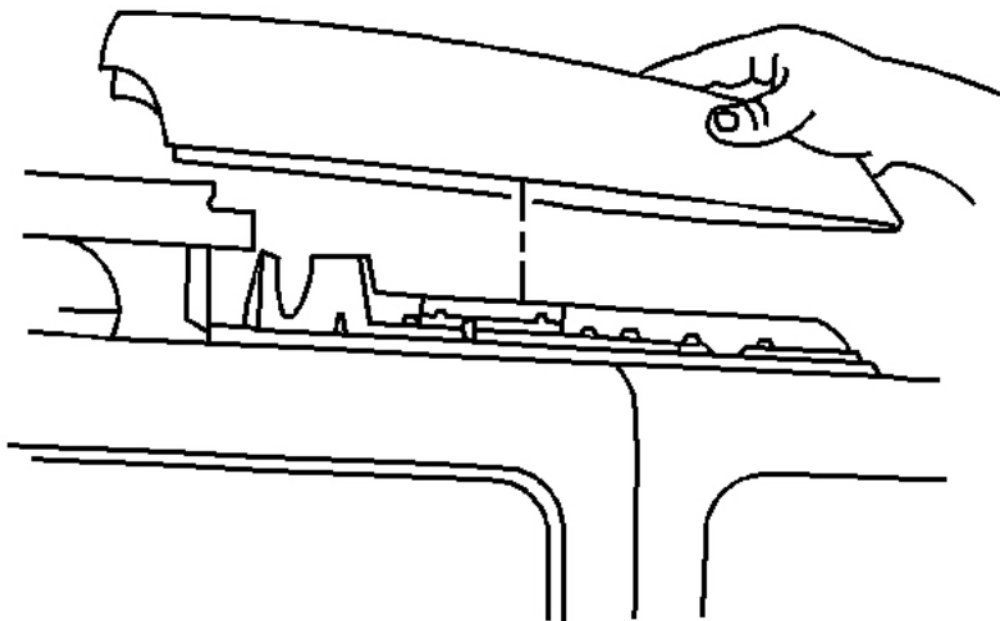


Fig. 42: View Of Luggage Carrier Base Cover (Z-71)

Courtesy of GENERAL MOTORS CORP.

4. Remove the fasteners (1) from each side of the rear base.
5. Remove the roller bar/rear cross rail assembly (3) from the vehicle.
6. Remove the fasteners (4) from the side rail/rear base.

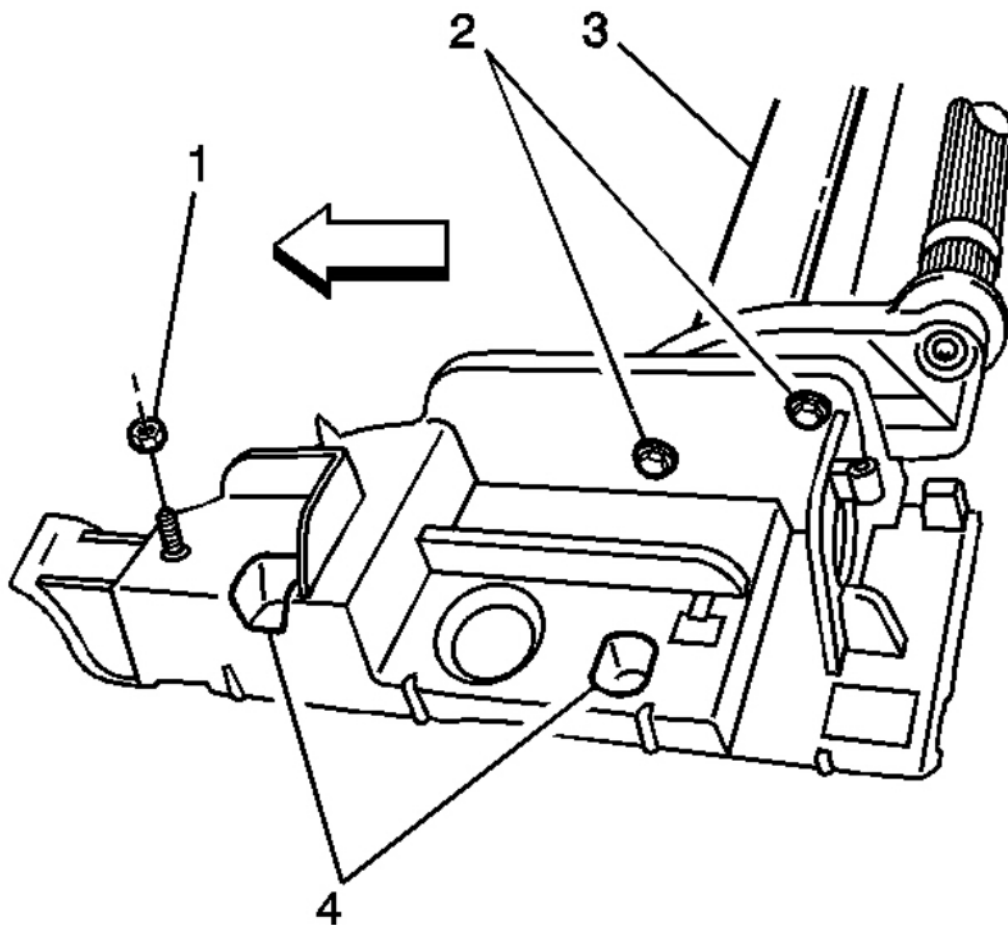


Fig. 43: View Of Roller Bar/Rear Cross Rail Assembly & Rear Base Fasteners (Z-71)
Courtesy of GENERAL MOTORS CORP.

7. With an assistant, pull gently back on the carrier (1) in order to release the carrier from the supports.
8. With an assistant, lift the carrier assembly up and off the vehicle.

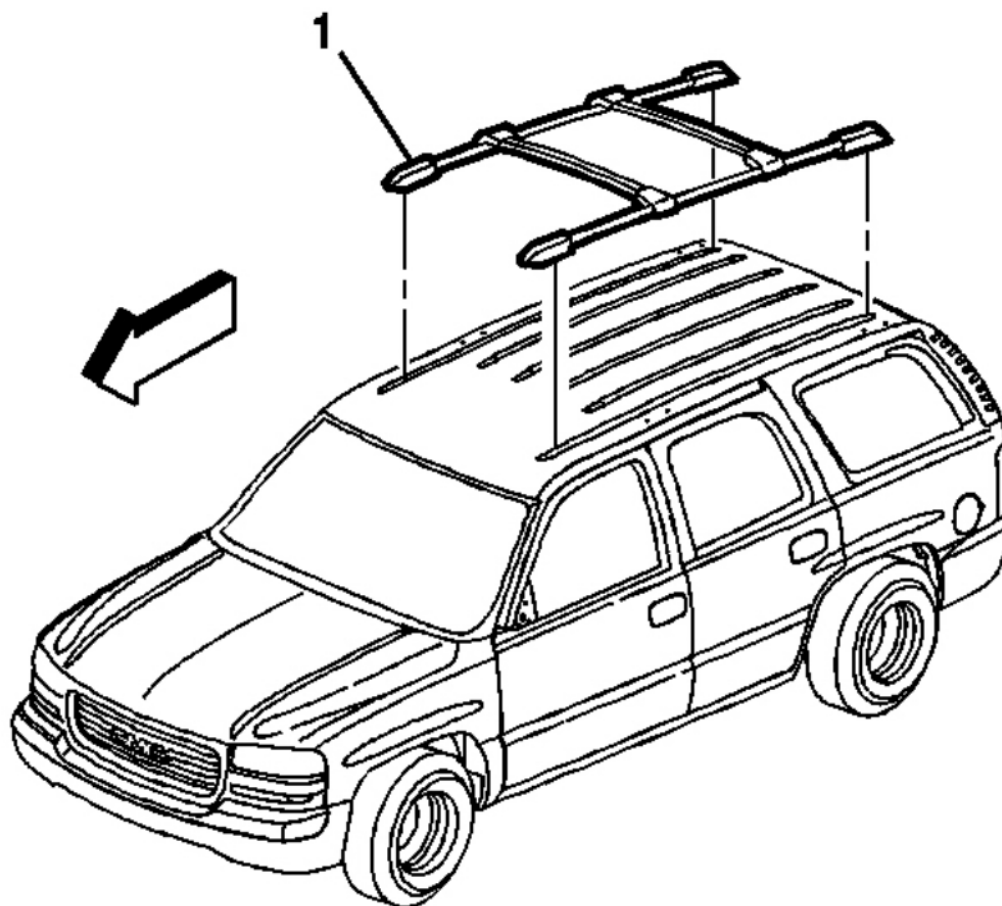


Fig. 44: View Of Luggage Carrier (Z-71)
Courtesy of GENERAL MOTORS CORP.

9. Remove the fasteners from the center supports.
10. Remove the center supports with pads from the vehicle.

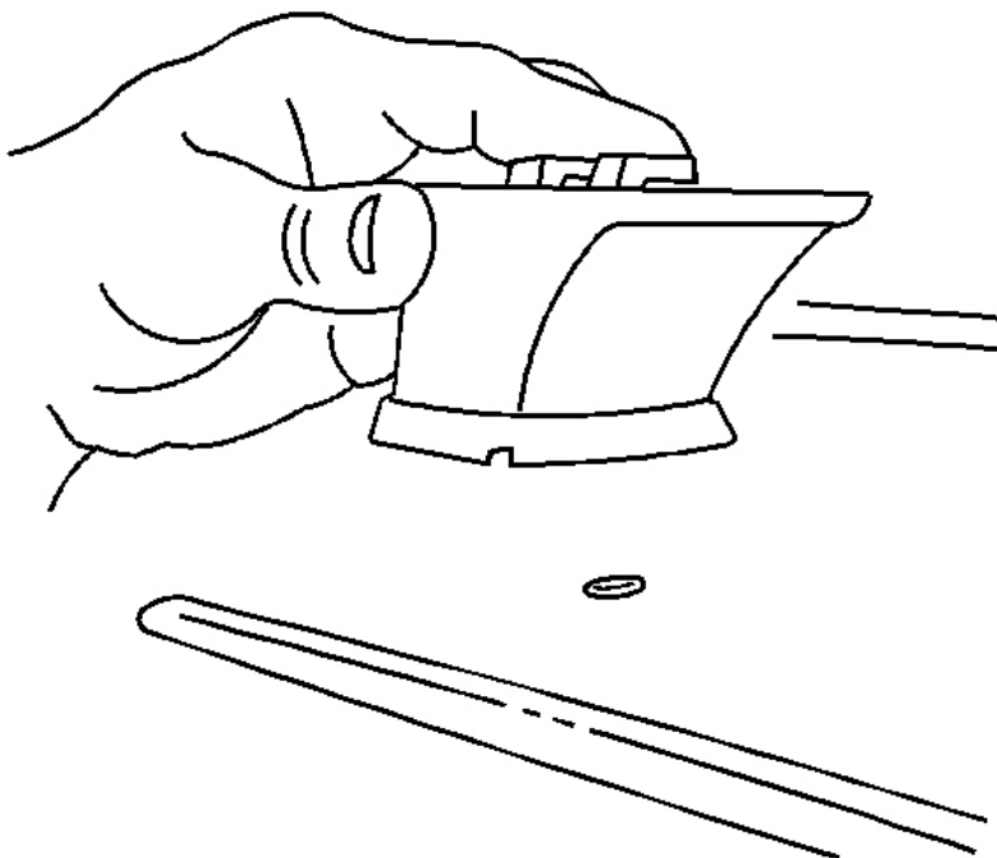


Fig. 45: View Of Center Supports (Z-71)
Courtesy of GENERAL MOTORS CORP.

11. Remove the rear base fasteners (2) from the vehicle.
12. Remove the rear bases with pads from the vehicle.

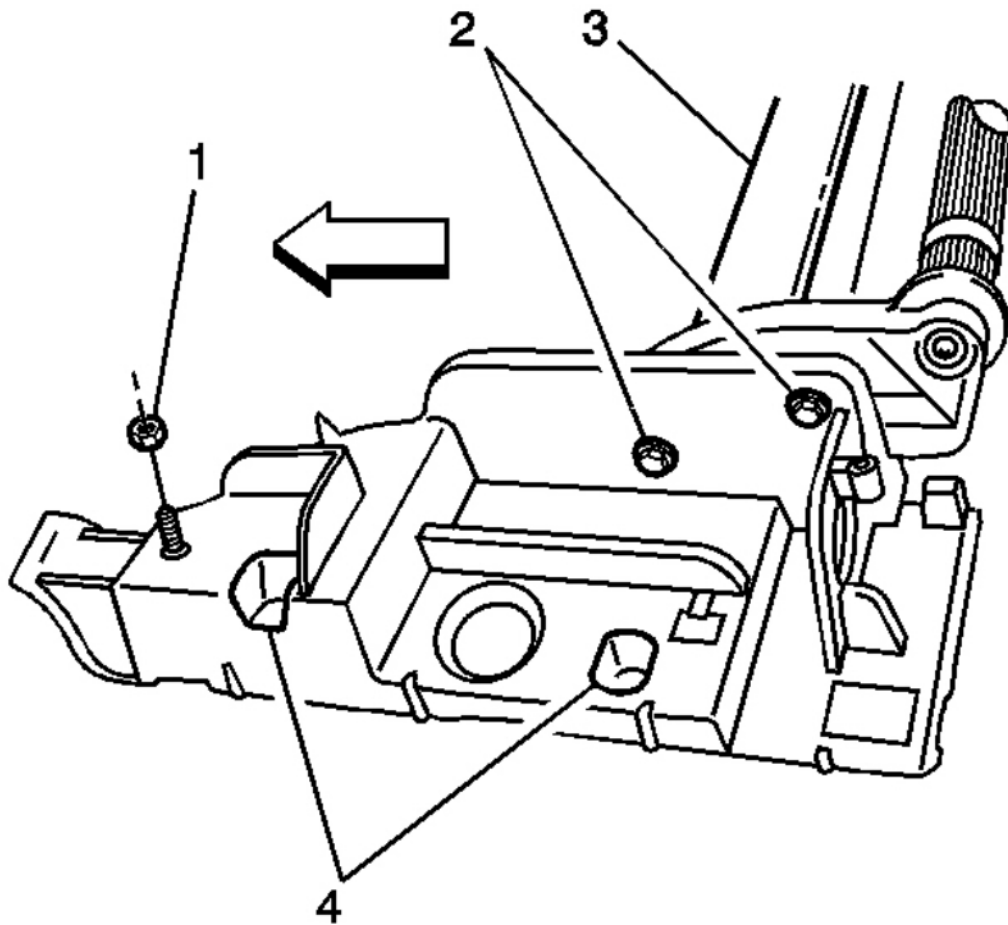


Fig. 46: View Of Roller Bar/Rear Cross Rail Assembly & Rear Base Fasteners (Z-71)
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

1. Install the rear bases with pads attached to the vehicle.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the rear base fasteners (2).

Tighten: Tighten the rear base fasteners to 2 N.m (18 lb in).

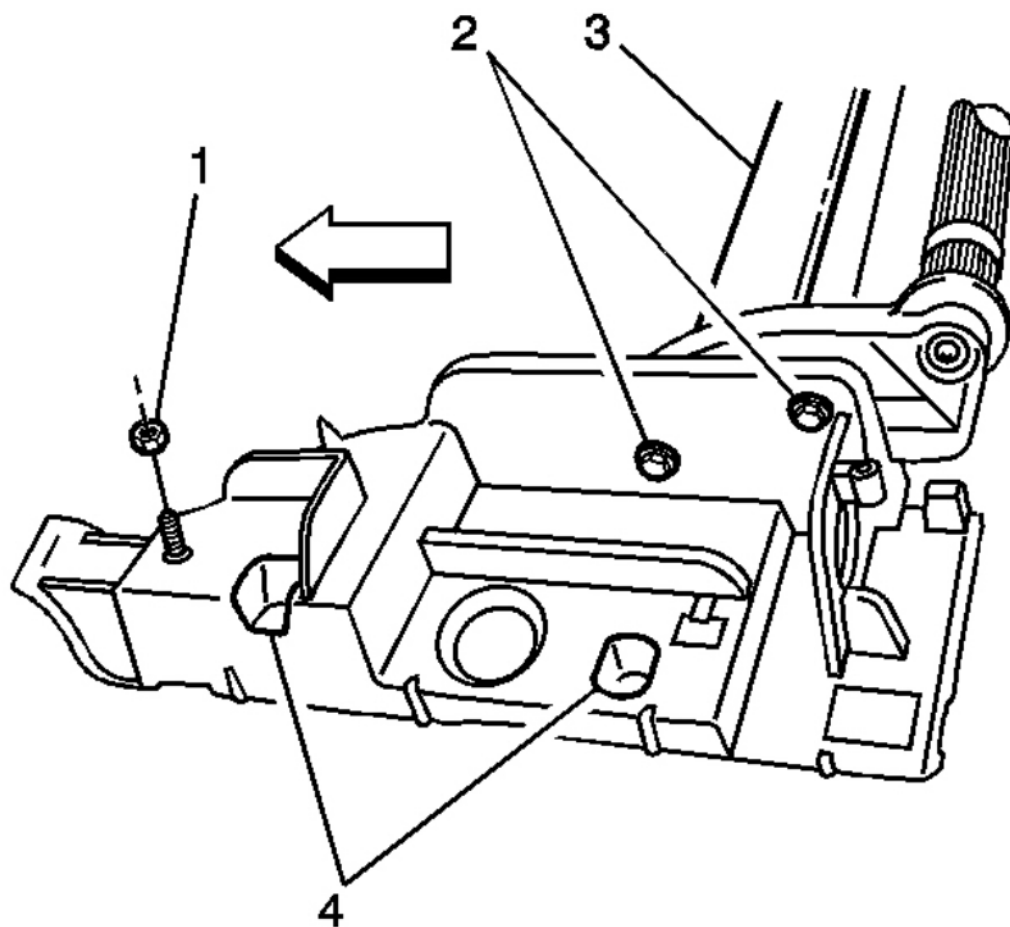


Fig. 47: View Of Roller Bar/Rear Cross Rail Assembly & Rear Base Fasteners (Z-71)
Courtesy of GENERAL MOTORS CORP.

3. Install the center supports with pads to the vehicle.
4. Install the support fasteners.

Tighten: Tighten the support fasteners to 3 N.m (27 lb in).

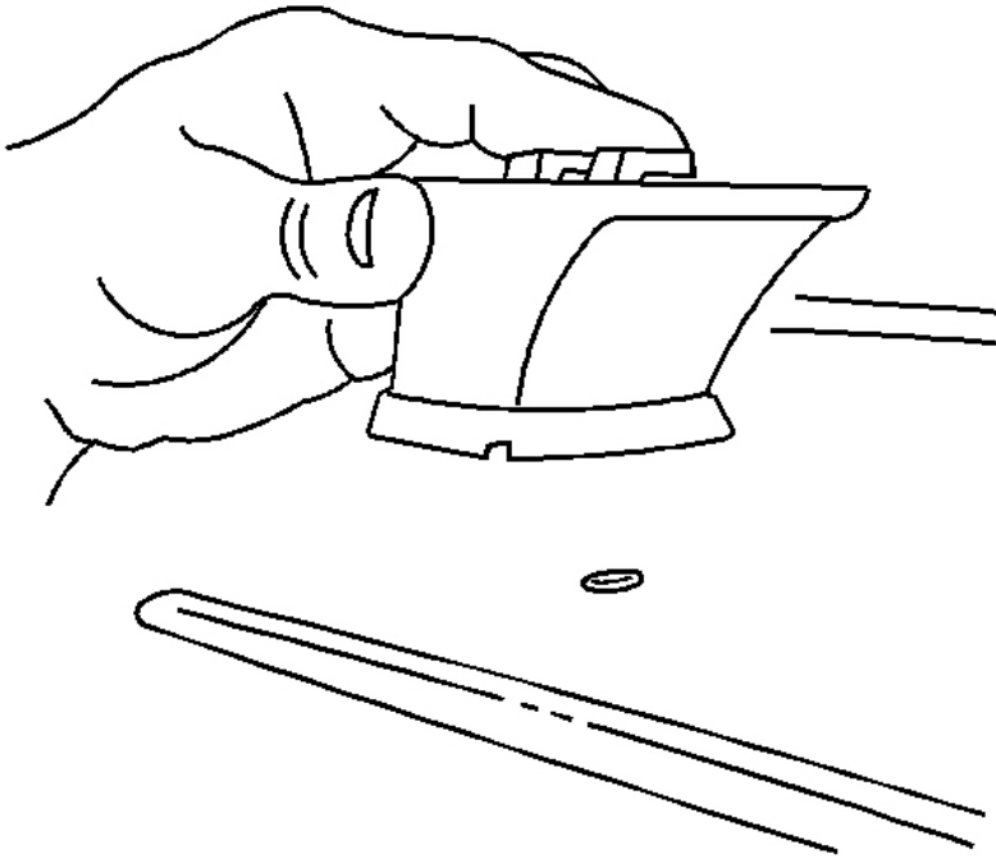


Fig. 48: View Of Center Supports (Z-71)
Courtesy of GENERAL MOTORS CORP.

5. With an assistant, lift the carrier (1) to the vehicle roof.
6. With an assistant, set the carrier assembly rails on the rear support assembly and pull forward, locking the carrier to the supports.

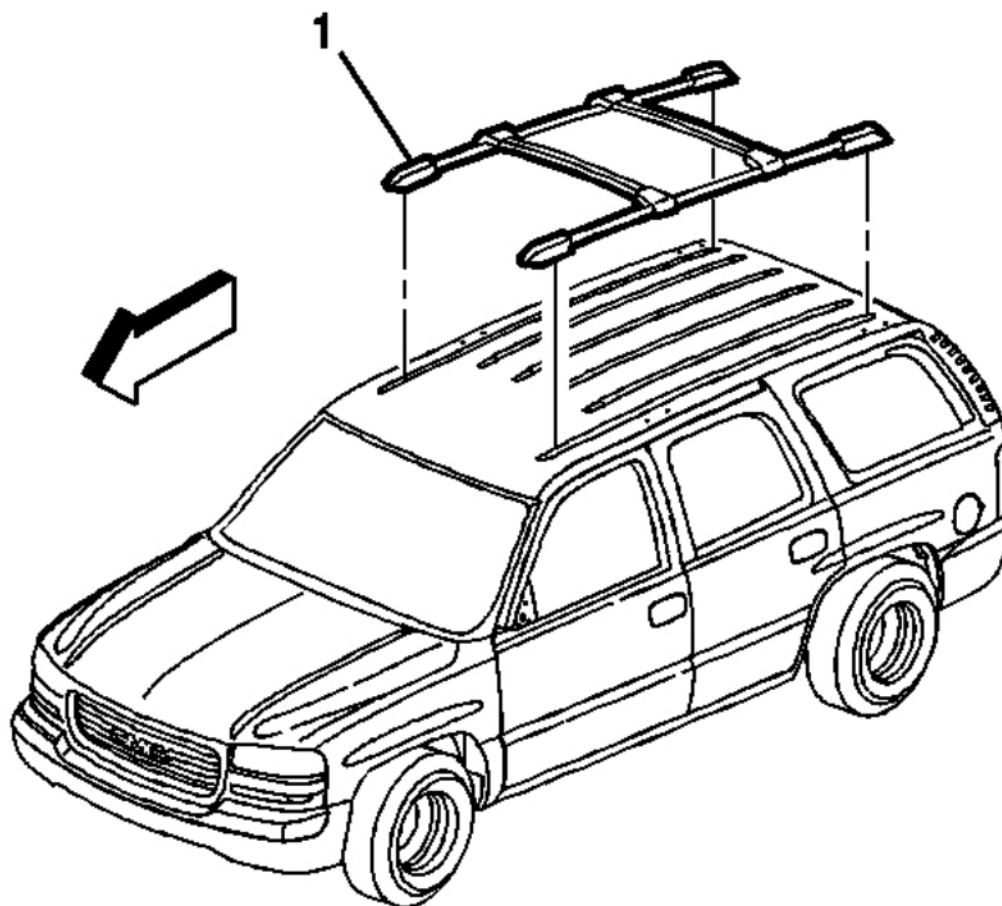


Fig. 49: View Of Luggage Carrier (Z-71)
Courtesy of GENERAL MOTORS CORP.

7. Install the fasteners (4) to the side rail/rear base.

Tighten: Tighten the side rail/rear base fasteners to 3 N.m (27 lb in).

8. Install the roller bar/rear cross rail assembly to the vehicle.
9. Install the fasteners (1) to each side of the rear base.

Tighten: Tighten the rear base fasteners to 3 N.m (27 lb in).

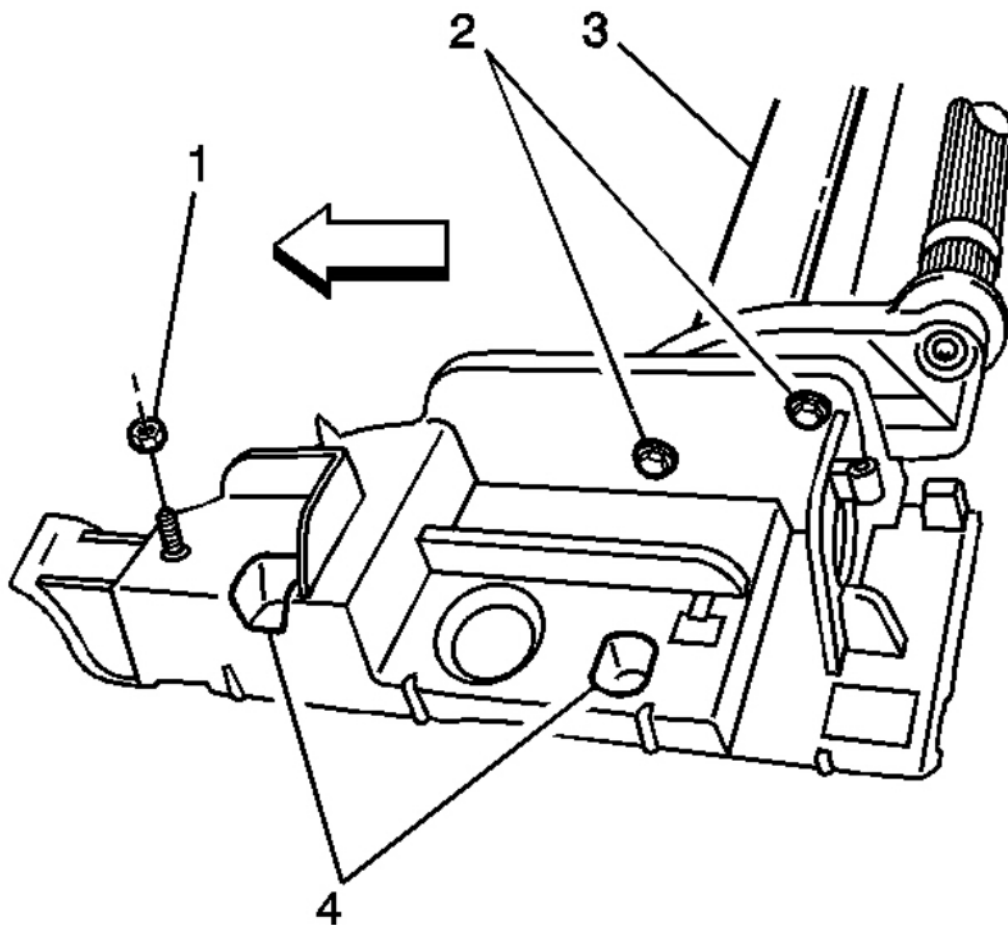


Fig. 50: View Of Roller Bar/Rear Cross Rail Assembly & Rear Base Fasteners (Z-71)
 Courtesy of GENERAL MOTORS CORP.

10. Install the fasteners to the front bases.

Tighten: Tighten the front base fasteners to 3 N.m (27 lb in).

11. Install the base covers.
12. Install the inboard fasteners to the luggage carrier base covers.

Tighten: Tighten the luggage carrier base cover fasteners to 1.2 N.m (11 lb in).

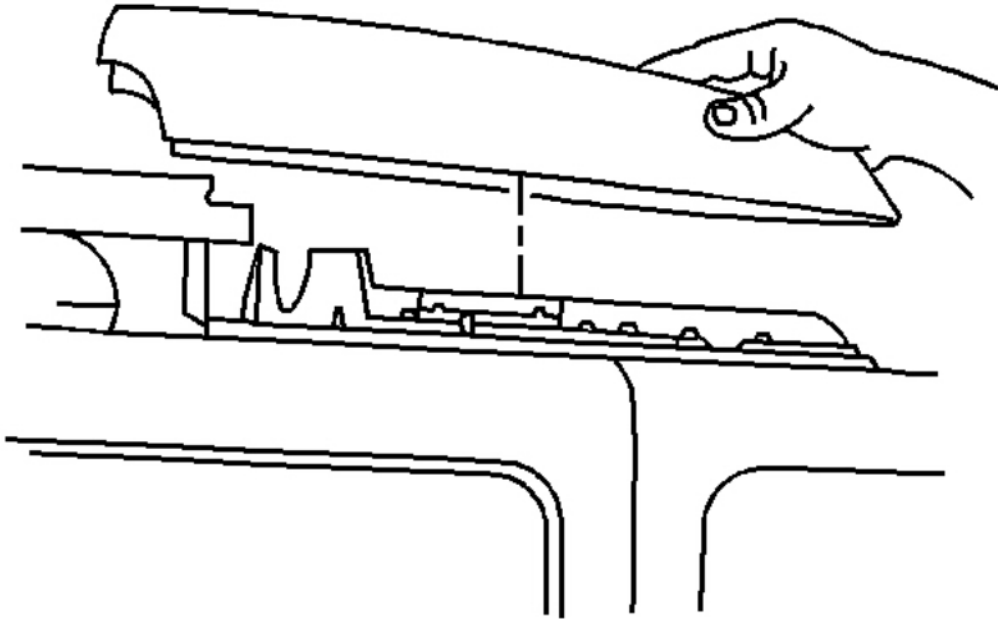


Fig. 51: View Of Luggage Carrier Base Cover (Z-71)
Courtesy of GENERAL MOTORS CORP.

LUGGAGE CARRIER SLATS REPLACEMENT

Tools Required

J 25070 Heat Gun

Removal Procedure

1. Mark the location of the luggage carrier slats on the roof with masking tape.
2. Use tape to protect the mounting surface during removal.
3. To remove the luggage carrier slats, heat the slats using **J 25070** . Apply heat in a circular motion for 30 seconds.

NOTE: Use a plastic, flat-bladed tool to prevent paint damage when removing an emblem/name plate.

4. Use a plastic, flat-bladed tool to lift or remove the slats from the vehicle.
5. Remove the luggage carrier slats from the vehicle.

6. When replacing the slats, remove all of the adhesive using a 3M(tm) Scotch Brite molding adhesive remover disk, 3M(tm) P/N 07501 or equivalent.

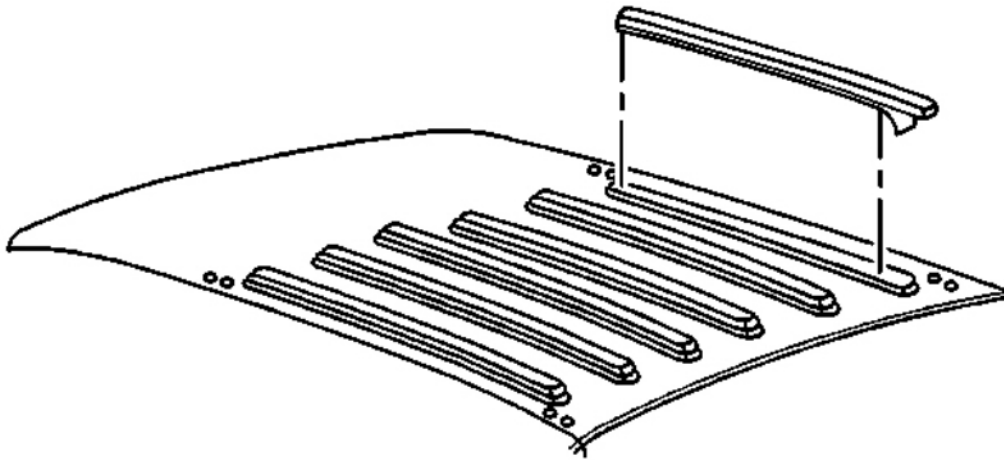


Fig. 52: View Of Luggage Carrier Slats
Courtesy of GENERAL MOTORS CORP.

Installation Procedure

IMPORTANT: Apply the slats in an environment that is free from dust or other dirt that could come into contact with the sticky backing. Foreign material may cause improper adhesion.

1. Heat the mounting surface to approximately 27-41°C (80-105°F).
2. Ensure that the temperature of the slats is approximately 29-32°C (85-90°F).

IMPORTANT: Do NOT touch the adhesive backing.

3. Remove the backing from the adhesive on the slats.
4. Align the luggage carrier slats with the masking tape.
5. Install the luggage carrier slats to the vehicle.

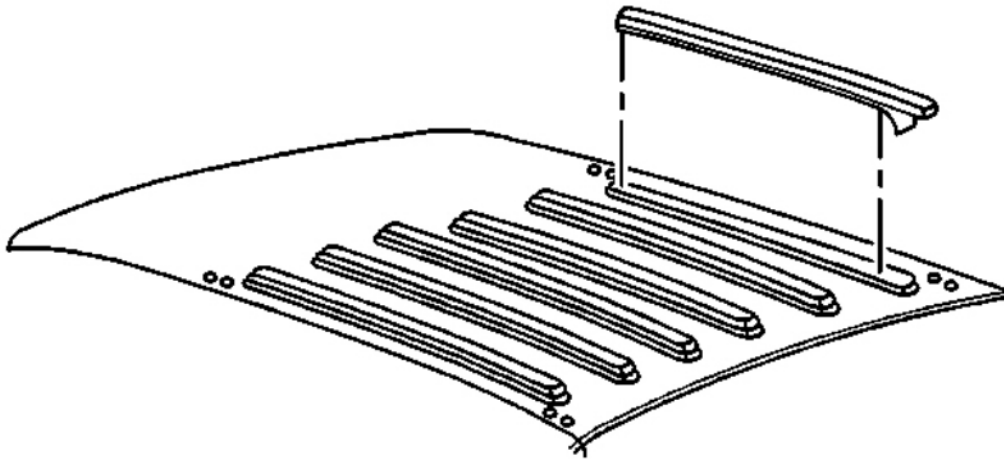


Fig. 53: View Of Luggage Carrier Slats
Courtesy of GENERAL MOTORS CORP.

6. Apply equal pressure along the slats in order to uniformly bond the item to the mounting surface.
7. Remove the masking tape from the vehicle.

DESCRIPTION AND OPERATION

SUNROOF DESCRIPTION AND OPERATION

Power Sunroof System Components

The power sunroof system consists of the following components:

- The sunroof module, includes motor
- The sunroof switch
- The sunroof glass
- The sunshade
- The rail and track assembly upon which the sunroof glass rides
- Power supply for the sunroof control module; SUNROOF 20 A fuse.

Power Sunroof Operation

The power sunroof will operate with the ignition switch turned to Accessory or RUN. Once the ignition switch is turned to OFF, from RUN, the sunroof will continue to operate until any door is open or when the Retained Accessory Power (RAP) has timed out. For a complete description of the RAP operation, refer to **Retained**

Accessory Power (RAP) Description and Operation in Retained Accessory Power.

IMPORTANT: After a power loss to the sunroof module through the battery positive voltage circuit protected by the **SUNROOF 20 A** fuse, the sunroof must be re-initialized. Refer to **Sunroof Motor/Actuator Synchronization** .

Use the rocker type sunroof switch to command the sunroof to:

- Express Open
- Closed
- Vent

Pressing the sunroof switch rearward, the sunroof glass will slide from:

- Vent position to the closed position
- Closed position to the open position

Pressing the sunroof switch forward, the sunroof glass will slide from:

- Open position to the closed position
- Closed position to the vent position

Express Open

The express open will work from the closed or partially open position. To express open the power sunroof, momentarily press the sunroof switch rearward. This will apply voltage momentarily through the sunroof switch open/tilt down contacts through the sunroof switch open signal circuit to the sunroof module indicating an express open request. From the closed position the sunroof glass will lower slightly, then automatically slide open the glass between the roof and the headliner, to the full open position. As the sunroof glass expresses open, the wind deflector will raise upward and the sunshade will move with the sunroof glass. To stop the sunroof glass in a desired position other than to the express open position, press the sunroof switch in either direction to stop the movement.

To Close

To close the power sunroof from the:

- Open position - press and hold the sunroof switch forward. This will apply voltage through the sunroof switch close/tilt up contacts through the sunroof switch close signal circuit to the sunroof module. The sunroof switch close/tilt up input at the sunroof module needs to have constant voltage applied, switch pressed, to allow the motor to drive the sunroof glass until it reaches the closed position. The wind deflector will retract prior to the sunroof glass reaching the fully closed position. To close the sunshade, this will have to be manually slid closed.
- Vent position - press and hold the sunroof switch rearward. This will apply voltage through the sunroof switch open/tilt down contacts through the sunroof switch circuit to the sunroof module. The sunroof switch open/tilt down input to the sunroof module needs to have constant voltage applied, switch pressed.

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to allow the motor to tilt the sunroof glass down to the fully closed position.

To Vent Open

To open the power sunroof to the vent position from the closed position, press and hold the sunroof switch forward. This will apply voltage through the sunroof switch close/tilt up contacts through the sunroof switch close signal circuit to the sunroof module. The sunroof switch close/tilt up input to the sunroof module needs to have constant voltage applied, switch pressed, to allow the motor to tilt the rear of the sunroof glass upward to the vent position.

Sunroof Motor

The sunroof has a bi-directional motor. When the motor is not operating both circuits are grounded. When the motor drives the sunroof glass in the direction from the vent position to the open position, the following occurs:

- Voltage is supplied to the sunroof motor open control/output 1 circuit.
- Ground is maintained to the sunroof motor close control/output 2 circuit.

When the motor drives the sunroof in the direction from the open position to the vent position, the following occurs:

- Voltage is supplied to the sunroof motor close control/output 2 circuit.
- Ground is maintained to the sunroof motor open control/output 1 circuit.

The sunroof module is equipped with a timer circuit which stops the operation of the sunroof motor after 15 seconds.

The sunroof glass will hard stop each time the sunroof glass reaches the following:

- Full vent
- Closed
- Full open

The hard stop will cause an over current condition that the sunroof module monitors. As an over current condition or hard stop is detected, the sunroof module will stop any motor control outputs.