

Roof - Vue

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Sunroof Module Bolts	9 N.m	80 lb in
Sunroof Motor Screws	5 N.m	44 lb in
Sunroof Window Screws	5 N.m	44 lb in
Sunroof Window Adjusting Screws	5 N.m	44 lb in

SCHEMATIC AND ROUTING DIAGRAMS

POWER SUNROOF SCHEMATICS

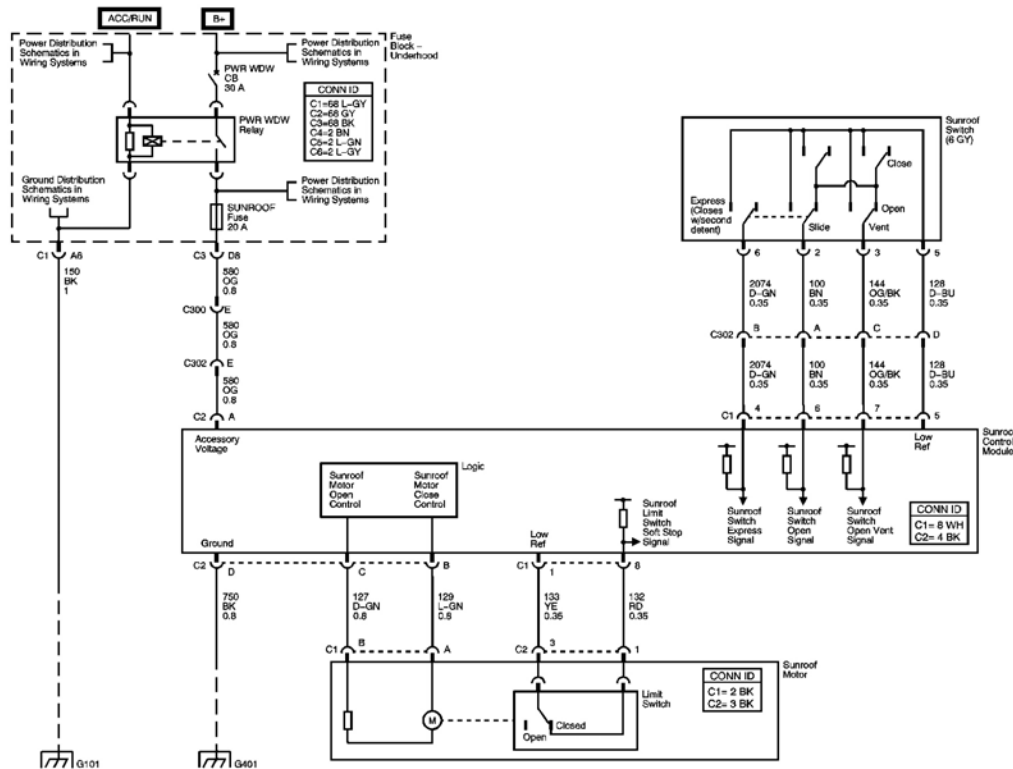


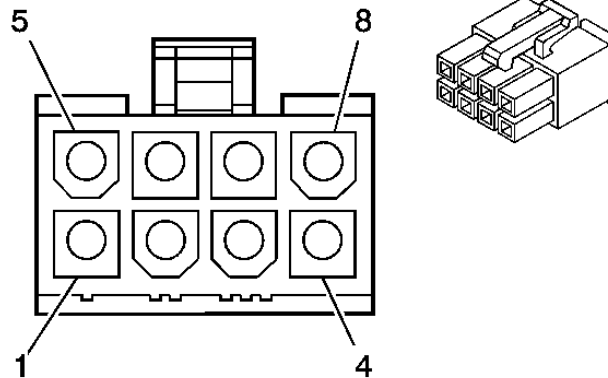
Fig. 1: View Of Power Sunroof Schematics

Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

POWER ROOF SYSTEMS CONNECTOR END VIEWS

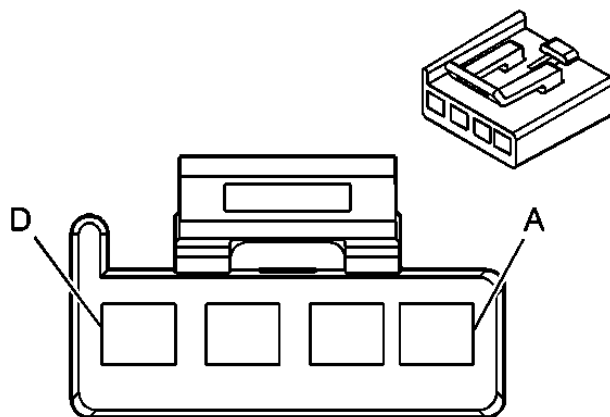
Sunroof Control Module C1 Connector End View



Connector Part Information		• 39-01-2080 • 8-Way F (WH)	
Pin	Wire Color	Circuit No.	Function
1	YE	133	Low Reference
2-3	-	-	Not Used
4	D-GN	2074	Sunroof Switch Express Signal
5	D-BU	128	Low Reference
6	BN	100	Sunroof Switch Open Signal
7	OG/BK	144	Sunroof Switch Open Vent Signal
8	RD	132	Sunroof Limit Switch Soft Stop Signal

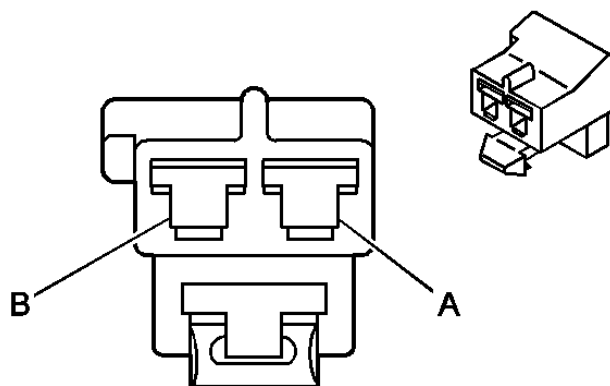
Sunroof Control Module C2 Connector End View





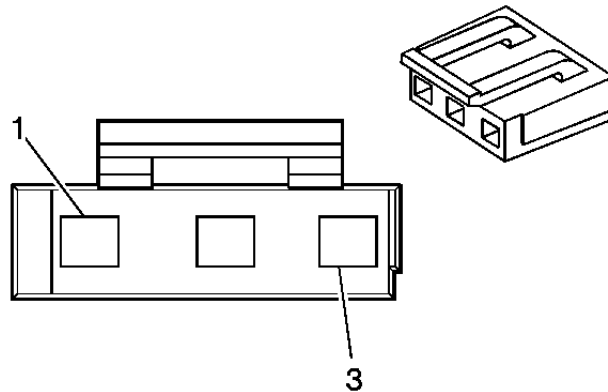
Connector Part Information		<ul style="list-style-type: none"> • 12052856 • 4-Way F Metri-Pack 280 Series (BK) 	
Pin	Wire Color	Circuit No.	Function
A	OG	580	Accessory Voltage
B	L-GN	129	Sunroof Motor Close Control
C	D-GN	127	Sunroof Motor Open Control
D	BK	750	Ground

Sunroof Motor C1 Connector End View



Connector Part Information		<ul style="list-style-type: none"> • 12064749 • 2-Way F Metri-Pack 480 Series (BK) 	
Pin	Wire Color	Circuit No.	Function
A	L-GN	129	Sunroof Motor Close Control

Sunroof Motor C2 Connector End View

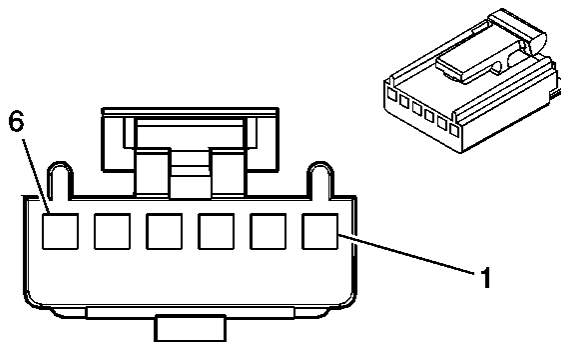


Connector Part Information

- 12186775
- 3-Way F (BK)

Pin	Wire Color	Circuit No.	Function
1	RD	132	Sunroof Limit Switch Soft Stop Signal
2	-	-	Not Used
3	YE	133	Low Reference

Sunroof Switch Connector End View



Connector Part Information

- 12064978
- 6-Way F Micro-Pack 100 Series (GY)

Pin	Wire Color	Circuit No.	Function
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1	-	-	Not Used
2	BN	100	Sunroof Window Open Signal
3	OG/BK	144	Sunroof Switch Open Vent Signal
4	-	-	Not Used
5	D-BU	128	Low Reference
6	D-GN	2074	Sunroof Switch Express Signal

POWER SUNROOF DISASSEMBLED VIEW

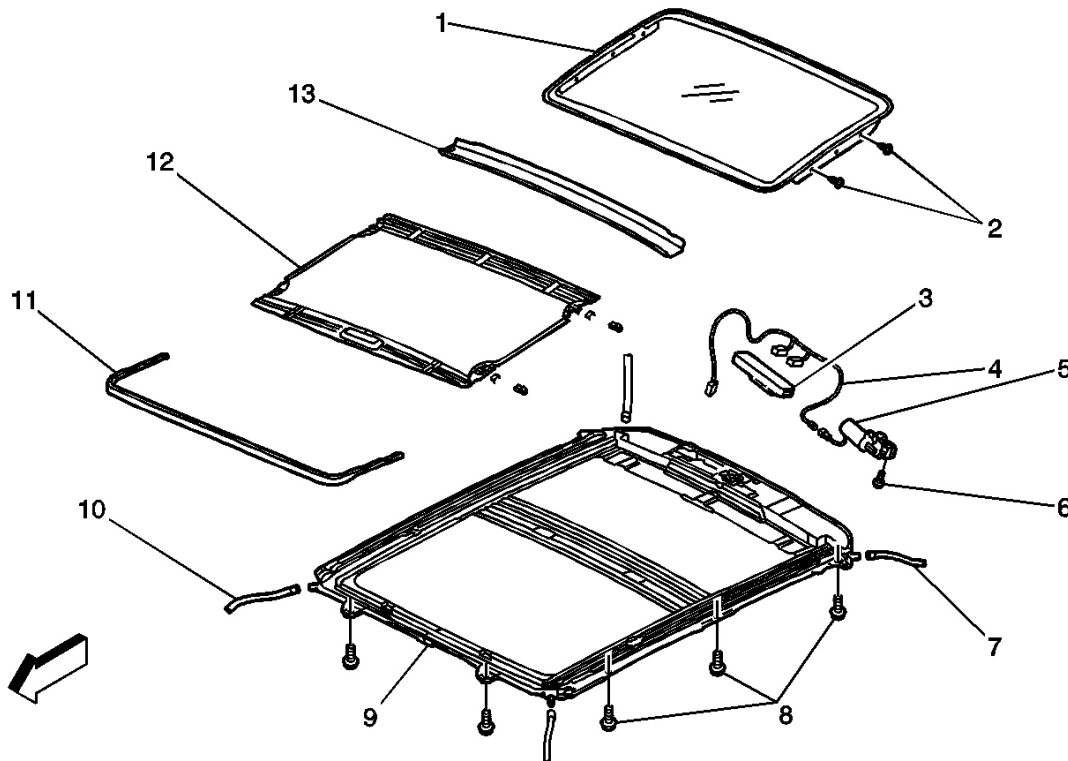


Fig. 2: Power Sunroof Disassembled View
 Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 2 Sunroof Disassembled View

Callout	Component Name
1	Sunroof Window
2	Sunroof Window Screws
3	Sunroof Control Module
4	Sunroof Wiring Harness
5	Sunroof Motor/Actuator
6	Sunroof Motor/Actuator Bolts

7	Sunroof Drain Hose-Rear
8	Sunroof Module Assembly Bolts
9	Sunroof Module Assembly
10	Sunroof Drain Hose-Front
11	Sunroof Air Deflector
12	Sunroof Sunshade Panel
13	Sunroof Drain Channel

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC STARTING POINT - ROOF

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

- 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 diagnostic trouble codes (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 the **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.
- 3:** The symptoms list in Symptoms will determine the correct diagnostic procedure to use.
- 4:** 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.

Diagnostic System Check - Power Sunroof

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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 body control module (BCM). Does the scan tool communicate with the control module?	Go to Step 3	Go to <u>Scan Tool Does Not Communicate with Class 2 Device</u> in Data Link Communications
3	Select the display DTC function on the scan tool for the BCM. Does the scan tool display any DTCs?	Go to Step 4	Go to <u>Symptoms - Roof</u>
4	Does the scan tool display any DTCs which begin with a U?	Go to <u>Scan Tool Does Not Communicate with Class 2 Device</u> in Data Link Communications	Go to Step 5
5	Does the scan tool display DTC B1000?	Go to <u>Diagnostic Trouble Code (DTC) List</u> in Body Control System	Go to <u>Symptoms - Roof</u>

SYMPTOMS - ROOF

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

- Perform **Diagnostic System Check - Power Sunroof** 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.
- 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

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
- Power Sunroof Does Not Close

POWER SUNROOF INOPERATIVE

Power Sunroof Inoperative

Step	Action	Value (s)	Yes	No
Schematic Reference:Power Sunroof Schematics				
Connector End View Reference:Power Roof Systems Connector End Views				
1	Did you perform the Power Sunroof Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - Power Sunroof
2	Operate the power sunroof. Does the system operate normally?	-	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	Disconnect the sunroof switch from the harness connector. Is the sunroof glass in the fully closed position?	-	Go to Step 4	Go to Step 5
4	1. Turn ON the ignition, with the engine OFF. 2. Attempt to slide the sunroof glass towards the open position, by connecting a jumper wire between the sunroof switch low reference circuit and the sunroof switch open signal circuit of the sunroof switch harness connector, for 3 seconds. Did the sunroof glass slide open?	-	Go to Step 28	Go to Step 6
	1. Turn the ignition ON, with the engine OFF. 2. At the sunroof switch harness connector, using 2 jumper wires, connect 1 jumper wire to each: <ul style="list-style-type: none"> • Sunroof switch open signal circuit • Sunroof switch open vent signal 			

5	<p>circuit</p> <p>3. Attempt to slide the sunroof glass towards the closed position, by connecting the other ends of the jumper wires (at the same time) for 3 seconds to the sunroof switch low reference circuit of the sunroof switch harness connector.</p> <p>Did the sunroof glass slide closed?</p>	-	Go to Step 28	Go to Step 6
6	<p>1. Remove the jumper wires.</p> <p>2. Measure the reference voltage of the sunroof switch open signal circuit at the sunroof switch harness connector to a good ground.</p> <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 7	Go to Step 13
7	<p>Measure the reference voltage of the sunroof switch open vent signal circuit at the sunroof switch harness connector to a good ground.</p> <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 8	Go to Step 17
8	<p>Measure the reference voltage between the sunroof switch express signal circuit at the sunroof switch harness connector to a good ground.</p> <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 9	Go to Step 32
9	<p>Measure the reference voltage between the sunroof switch express signal circuit and the sunroof switch low reference circuit at the sunroof switch harness connector.</p> <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 10	Go to Step 19
10	<p>1. Disconnect the sunroof module harness connector that contains the sunroof switch signal circuits.</p> <p>2. Test for shorts between the sunroof switch signal circuits. Refer to Circuit Testing and to Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 38	Go to Step 11
	<p>1. Reconnect the sunroof switch to the harness connector.</p> <p>2. Reconnect the sunroof module harness</p>			

11	<p>connector that contains the sunroof switch signal circuit to the sunroof module.</p> <ol style="list-style-type: none"> 3. Disconnect the sunroof motor connector. 4. Connect a test lamp between the sunroof motor open control and motor close control circuits at the harness connector, module side. <p>Does the test lamp illuminate?</p>	-	Go to Step 20	Go to Step 12
12	<ol style="list-style-type: none"> 1. Leave the test lamp between the sunroof motor open control and motor close control circuits at the harness connector, module side. 2. While observing the test lamp, press the sunroof switch for 3 seconds to the close position then 3 seconds to the open position. <p>Does test lamp illuminate with each command?</p>	-	Go to Step 30	Go to Step 23
13	<p>Measure the reference voltage of the sunroof switch open vent signal circuit at the sunroof switch harness connector to a good ground.</p> <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 16	Go to Step 14
14	<ol style="list-style-type: none"> 1. Disconnect the sunroof module harness connector that contains the power sunroof fuse supply voltage circuit. 2. Measure the sunroof fuse supply voltage circuit at the sunroof module harness connector to a good ground. <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 15	Go to Step 31
15	<p>Measure between the sunroof fuse supply voltage circuit and the ground circuit at the sunroof module harness connector.</p> <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 29	Go to Step 33
16	<p>Test for an open, high resistance or short to ground in the sunroof switch open signal circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 38	Go to Step 29
	<p>Test for an open, high resistance or short to ground in the sunroof switch open vent signal</p>			

17	circuit. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 18
18	Inspect for a poor connection in the sunroof switch open vent signal circuit. 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 38	Go to Step 35
19	Test the sunroof switch low reference circuit for an open or high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 29
20	Connect a test lamp between the sunroof motor open control circuit at the harness connector, module side, and a good ground. Does the test lamp illuminate?	-	Go to Step 21	Go to Step 22
21	Test the sunroof motor open control circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 36
22	Test the sunroof motor close control circuit for a short to voltage. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 35
23	Connect a test lamp between the sunroof motor open control circuit to B+ at the sunroof motor harness connector. Does the test lamp illuminate?	-	Go to Step 24	Go to Step 27
24	<ol style="list-style-type: none"> 1. Connect a test lamp between the sunroof motor open control circuit to a good ground. 2. Press the sunroof switch to the open direction for 3 seconds. Did the test lamp illuminate?	-	Go to Step 26	Go to Step 25
25	Test the sunroof motor open control circuit for a short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 35
26	Test the sunroof motor close control circuit for an open, a short to ground, or high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 29
	Test the sunroof motor open control circuit for an			

27	open or high resistance. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 29
28	Inspect for a poor connection at the sunroof switch. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 34
29	Inspect for a poor connection at the sunroof module. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 35
30	Inspect for poor connections at the sunroof motor. Refer to <u>Testing for Intermittent Conditions and Poor Connections</u> and <u>Connector Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 37
31	Test for an open, high resistance or short to ground in the sunroof fuse supply voltage circuit. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you find and correct the condition?	-	Go to Step 38	Go to Step 32
32	Repair the sunroof switch express signal circuit for an open or a short to ground. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	-	Go to Step 38	-
33	Repair the ground circuit of the sunroof module for an open or high resistance. Refer to <u>Circuit Testing</u> and <u>Wiring Repairs</u> in Wiring Systems. Did you complete the repair?	-	Go to Step 38	-
34	Replace the sunroof switch. Refer to <u>Sunroof Switch Replacement</u> . Did you complete the replacement?	-	Go to Step 38	-
35	Replace the sunroof module. Refer to <u>Sunroof Control Module Replacement</u> . Did you complete the replacement?	-	Go to Step 38	-
36	Replace the sunroof limit switch. Refer to <u>Sunroof Motor/Actuator Replacement</u> . Did you complete the replacement?	-	Go to Step 38	-
37	Replace the sunroof motor. Refer to <u>Sunroof Motor/Actuator Replacement</u> . Did you complete the replacement?	-	Go to Step 38	-
	1. Remove any jumper wires. 2. Reconnect all previously disconnected			

38	components.	-		
	<ol style="list-style-type: none"> 3. Replace sunroof fuse if necessary. 4. Turn ON the ignition, with the engine OFF. 5. Operate the system in order to verify the repair. 			
Did you correct the condition?			System OK	Go to Step 3

POWER SUNROOF DOES NOT OPEN TO EXPRESS POSITION

Test Description

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

2: If the express open feature does operate properly, then suspect the express open signal circuit for a poor connection or intermittent.

Power Sunroof Does Not Open to Express Position

Step	Action	Value (s)	Yes	No
Schematic Reference: Power Sunroof Schematics Connector End View Reference: Power Roof Systems Connector End Views DEFINITION: Express open feature is inoperative.				
1	Did you perform the Power Sunroof Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - Power Sunroof
2	Operate the power sunroof express open feature. Does the system operate normally?	-	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	<ol style="list-style-type: none"> 1. Remove the sunroof switch from the headliner. 2. Turn the ignition ON, with the engine OFF. 3. Operate the sunroof switch to slide the sunroof glass to the close position. 4. Connect a jumper wire between the sunroof switch express signal circuit and the sunroof switch open signal circuit at the sunroof switch harness connector. 5. Press the sunroof switch to the express open position. 	-		

	Does the sunroof glass express open?		Go to Step 7	Go to Step 4
4	<ol style="list-style-type: none"> 1. Disconnect the sunroof switch from the harness connector. 2. Measure the reference voltage of the sunroof switch express signal circuit of the sunroof switch harness connector to a known good ground. <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 9	Go to Step 5
5	<p>Test the sunroof switch express signal circuit for an open or high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 10	Go to Step 6
6	<p>Inspect the sunroof switch express signal circuit for a poor connection at the sunroof module. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 10	Go to Step 9
7	<p>Inspect for a poor connection at the sunroof switch. Refer to Testing for Intermittent Conditions and Poor Connections and Connector Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	-	Go to Step 10	Go to Step 8
8	<p>Replace the sunroof switch. Refer to Sunroof Switch Replacement.</p> <p>Did you complete the replacement?</p>	-	Go to Step 10	-
9	<p>Replace the sunroof module. Refer to Sunroof Control Module Replacement.</p> <p>Did you complete the replacement?</p>	-	Go to Step 10	-
10	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Remove any jumper wires. 3. Reconnect all previously disconnected components. 4. Operate the system in order to verify the repair. <p>Did you correct the condition?</p>	-	System OK	Go to Step 3

POWER SUNROOF DOES NOT CLOSE

Test Description

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

2: If the system does close properly, then suspect either the sunroof limit switch soft stop signal circuit or the sunroof limit switch low reference circuit for a poor connection or intermittent.

Power Sunroof Does Not Close

Step	Action	Value (s)	Yes	No
Schematic Reference: Power Sunroof Schematics				
Connector End View Reference: Power Roof Systems Connector End Views				
DEFINITION: Sunroof does not automatically stop in the flush closed position.				
1	Did you perform the Power Sunroof Diagnostic System Check?	-	Go to Step 2	Go to Diagnostic System Check - Power Sunroof
2	Operate the power sunroof to the close position. Does the system close properly?	-	Go to Testing for Intermittent Conditions and Poor Connections in Wiring Systems	Go to Step 3
3	<ol style="list-style-type: none"> Turn the ignition ON, with the engine OFF. Operate the sunroof switch to raise the sunroof glass to the vent position. Measure the reference voltage of the sunroof limit switch soft stop signal circuit of the limit switch harness connector to a good ground. <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 5	Go to Step 4
4	<ol style="list-style-type: none"> Disconnect the connector to the limit switch. Measure the reference voltage of the sunroof limit switch soft stop signal circuit of the limit switch harness connector to a good ground. <p>Does the voltage measure near the specified value?</p>	B+	Go to Step 12	Go to Step 9
5	Measure the reference voltage between the sunroof limit switch soft stop signal circuit and the sunroof limit switch low reference circuit of the limit switch harness connector. Does the voltage measure near the specified value?	B+	Go to Step 6	Go to Step 7
	While measuring the reference voltage between the sunroof limit switch soft stop signal circuit and the			

6	sunroof limit switch low reference circuit, toggle the sunroof switch to slide the sunroof glass in small increments, back and forth through the flush closed position. Did the voltage measure near the specified value as the sunroof past through the flush closed position?	0V	Go to Step 13	Go to Step 10
7	Test the sunroof limit switch low reference for an open or high resistance. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 14	Go to Step 8
8	Inspect the sunroof limit switch low reference circuit for a poor connection. 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 14	Go to Step 13
9	Test the sunroof limit switch soft stop signal circuit for an open, high resistance or short to ground. Refer to Circuit Testing and Wiring Repairs in Wiring Systems. Did you find and correct the condition?	-	Go to Step 14	Go to Step 11
10	Inspect the limit switch connector for a poor connection. 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 14	Go to Step 12
11	Inspect the limit switch soft stop signal circuit for a poor connection. 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 14	Go to Step 13
12	Replace the sunroof motor. Refer Sunroof Motor/Actuator Replacement . Did you complete the replacement?	-	Go to Step 14	-
13	Replace the sunroof module. Refer to Sunroof Control Module Replacement . Did you complete the replacement?	-	Go to Step 14	-
14	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Remove any jumper wires. 3. Reconnect all previously disconnected components. 4. Turn the ignition ON, with engine OFF. 5. Operate the system in order to verify the repair. Did you correct the condition?	-	System OK	Go to Step 3

REPAIR INSTRUCTIONS

SUNROOF WINDOW HEIGHT AND OPENING FIT ADJUSTMENT

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

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

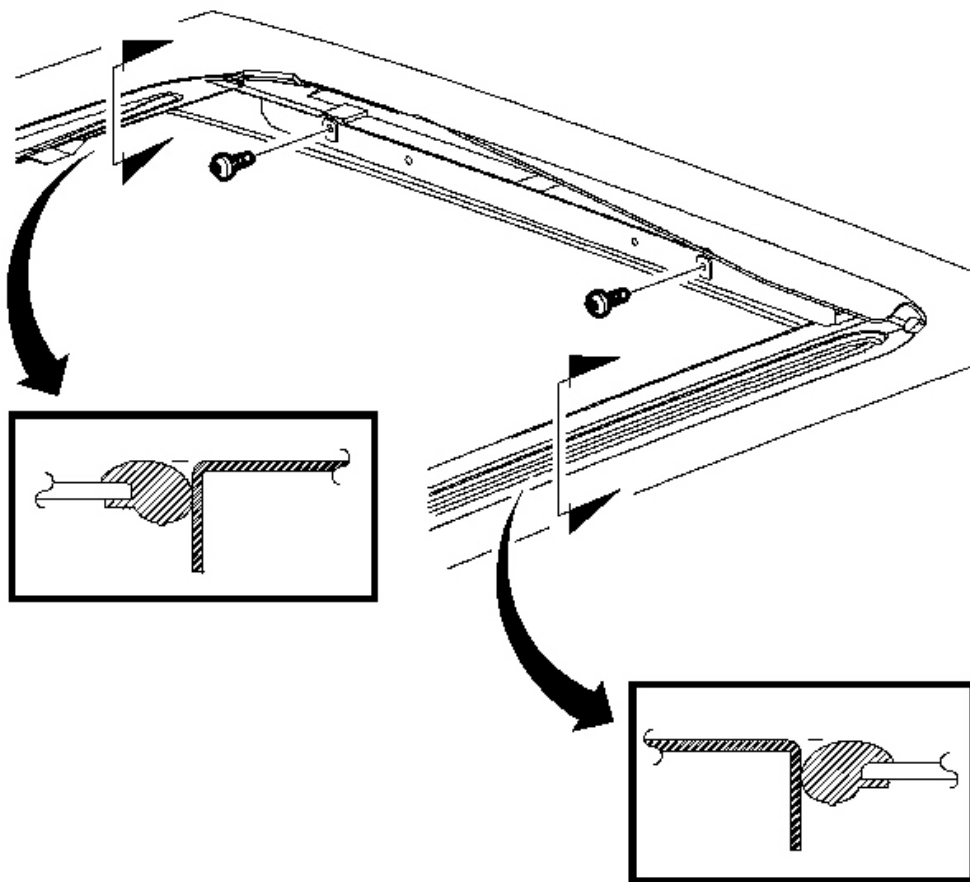


Fig. 3: View Of Sunroof Window & Opening Fit
Courtesy of GENERAL MOTORS CORP.

2. Loosen the adjusting screws.
3. Adjust the corners of the glass panel using the following guidelines:
 - Adjust the front of the sunroof window flush to 1 mm (0.04 in) below the top surface of the roof panel.
 - Adjust the rear of the sunroof window flush to 1 mm (0.04 in) above the top surface of the roof panel.

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

4. Install the sunroof window adjustment screws.

Tighten: Tighten the sunroof window adjusting screws to 6 N.m (53 lb in).

5. Cycle sunroof window through all positions.
6. Inspect the sunroof window adjustment. Adjust if necessary.

SUNROOF DRAIN HOSE REPLACEMENT - FRONT

Removal Procedure

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

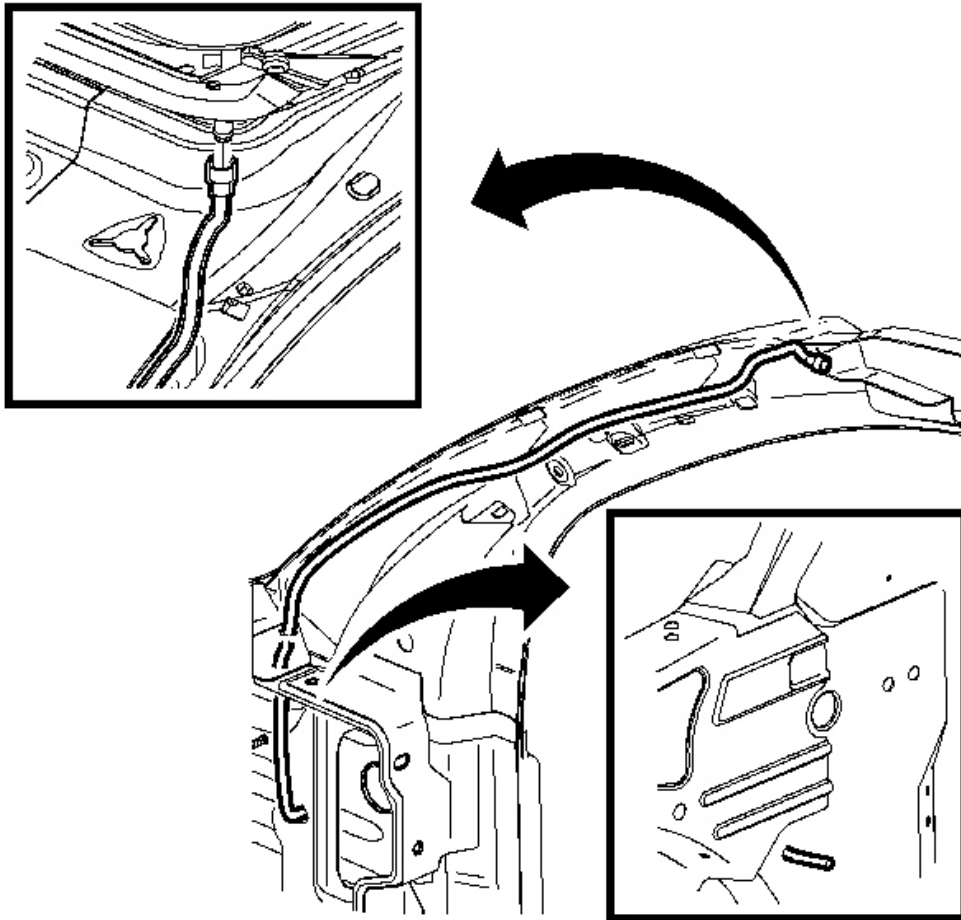


Fig. 4: View Of Sunroof Drain Hose
Courtesy of GENERAL MOTORS CORP.

2. Remove the front drain hose from the sunroof module.
3. Remove tape from the drain hose.
4. Remove the front drain hose from the retaining clips.
5. Pull the front drain hose out of the front hinge pillar.

Installation Procedure

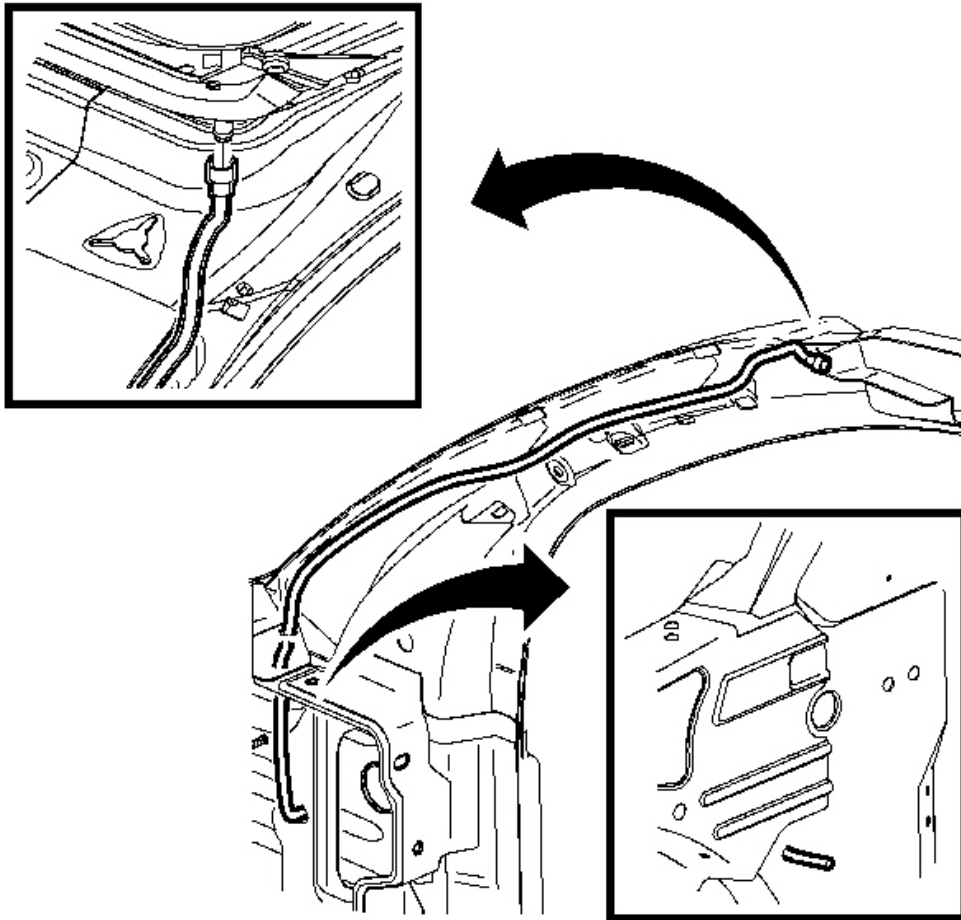


Fig. 5: View Of Sunroof Drain Hose
Courtesy of GENERAL MOTORS CORP.

1. Push the drain hose into the hole in the front hinge pillar.
2. Connect the front drain hose to the retaining clips.
3. Connect the drain hose to the sunroof module.
4. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.

SUNROOF DRAIN HOSE REPLACEMENT - REAR

Removal Procedure

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

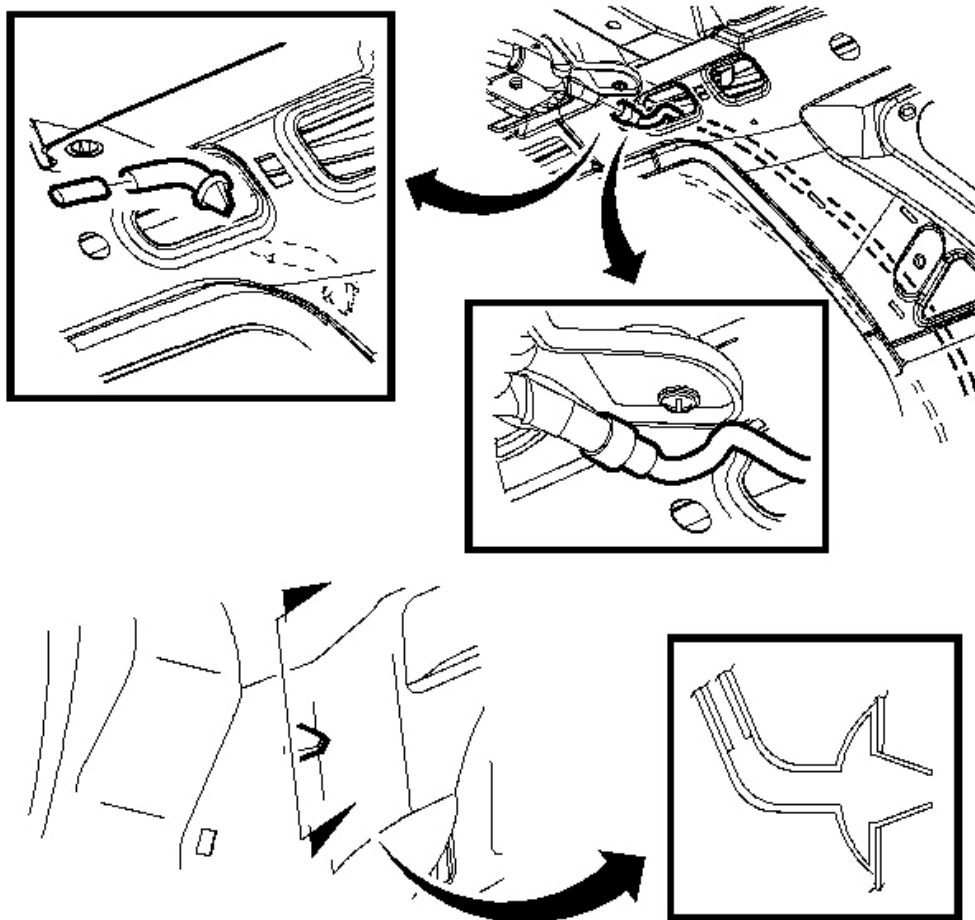


Fig. 6: Removing/Installing Rear Drain Hoses On Sunroof Module
Courtesy of GENERAL MOTORS CORP.

2. Remove the rear drain hoses from the sunroof module.
3. Remove the tape from the drain hose.
4. Remove the upper portion of the rear drain hoses from the retaining clips.
5. Remove the rear side trim panels. Refer to **Garnish Molding Replacement - Center Pillar Upper** in Interior Trim.
6. Remove the lower portion of the rear drain hoses from the retaining clips.
7. Pull the rear drain hoses up through the side rail.

Installation Procedure

1. Route the rear drain hose down through the access hole in the side rail.

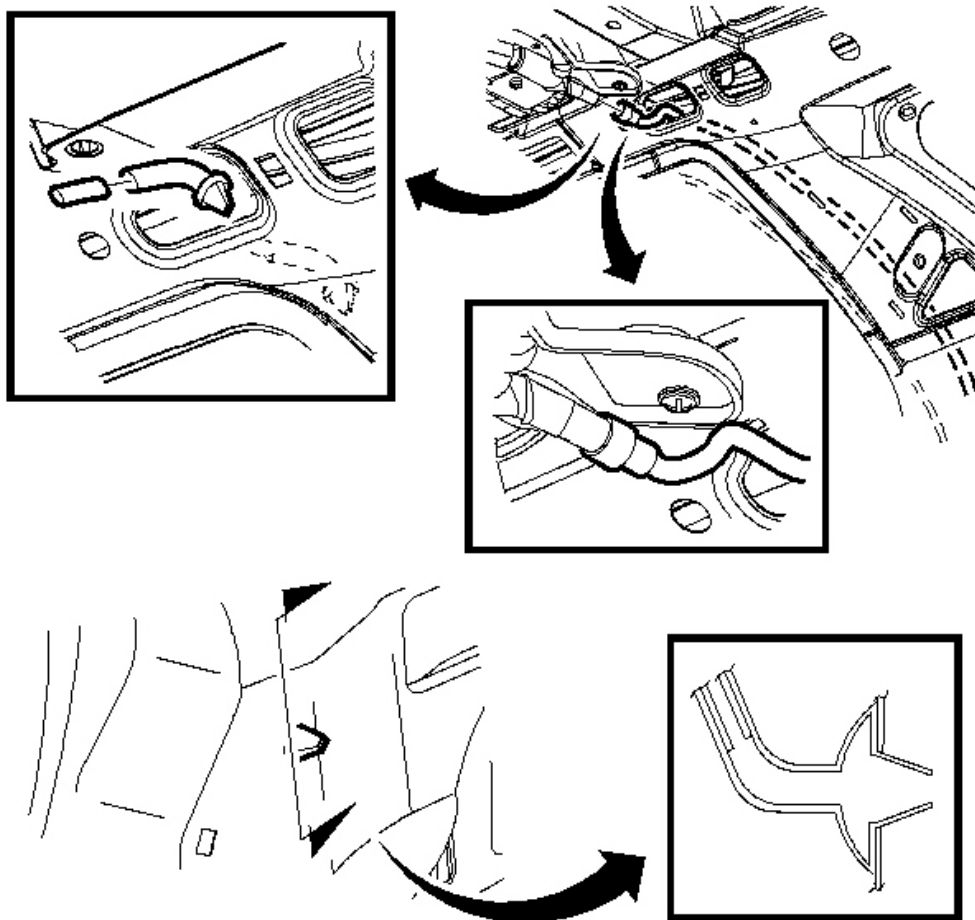


Fig. 7: Removing/Installing Rear Drain Hoses On Sunroof Module
Courtesy of GENERAL MOTORS CORP.

2. Push the end of the rear drain hoses down into the rear compartment opening.
3. Clip the lower portion of the rear drain hoses into position.
4. Install the rear side trim panels. Refer to **Garnish Molding Replacement - Center Pillar Upper** in Interior Trim.
5. Clip the upper portion of the rear drain hoses into position.

6. Install the drain hose spouts on the sunroof module.
7. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.

SUNROOF DRAIN INSPECTION AND CLEANING

Drain Hose Routing

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. Ensure the front drain hoses are routed down the windshield pillars and out the center of the pillar between the door hinges. Ensure the hoses are not kinked. Replace any torn or cracked hose. Refer to **Sunroof Drain Hose Replacement - Front** .
2. Ensure the rear drain hoses are routed through the rear pillars and out of the rocker panel. Ensure the rear hoses are properly routed in the metal roof slot and taped in place. Replace any torn or cracked hoses. Refer to **Sunroof Drain Hose Replacement - Rear** .

Plugged Drain Hose

If a waterleak has occurred inspect for a plugged drain hose at each corner of trough.

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

CAUTION: Wear safety glasses in order to avoid eye damage.

3. Use compressed air, 35 psi or less to blow out any drain hose that is plugged.
4. Test the system again.
5. If the hose remains plugged, inspect to see it is properly routed and does not have a kink.
6. Remove any hoses that remain plugged. Refer to **Sunroof Drain Hose Replacement - Front** or to **Sunroof Drain Hose Replacement - Rear** .
7. Remove the blockage.
 1. Push mechanics wire through the hose to remove the obstruction.
 2. Use compressed air in order to blow out any remaining debris.
8. Install the hose. Refer to **Sunroof Drain Hose Replacement - Front** or to **Sunroof Drain Hose Replacement - Rear** .

Disconnected Drain Hose

Inspect the drainage system for disconnected drain hoses. Complete the following steps in order to obtain partial

access to the drain hoses and to inspect for disconnected hoses.

1. Open the sunroof window panel.
2. Lower the headliner as needed. Refer to **Headliner Replacement** in Interior Trim.
3. Connect any disconnected hoses.
4. Ensure that the drain hoses are properly routed in the metal roof slot and secured into place.

SUNROOF SUNSHADE PANEL REPLACEMENT

Removal Procedure

1. Remove the sunroof window. Refer to **Sunroof Window Replacement** .

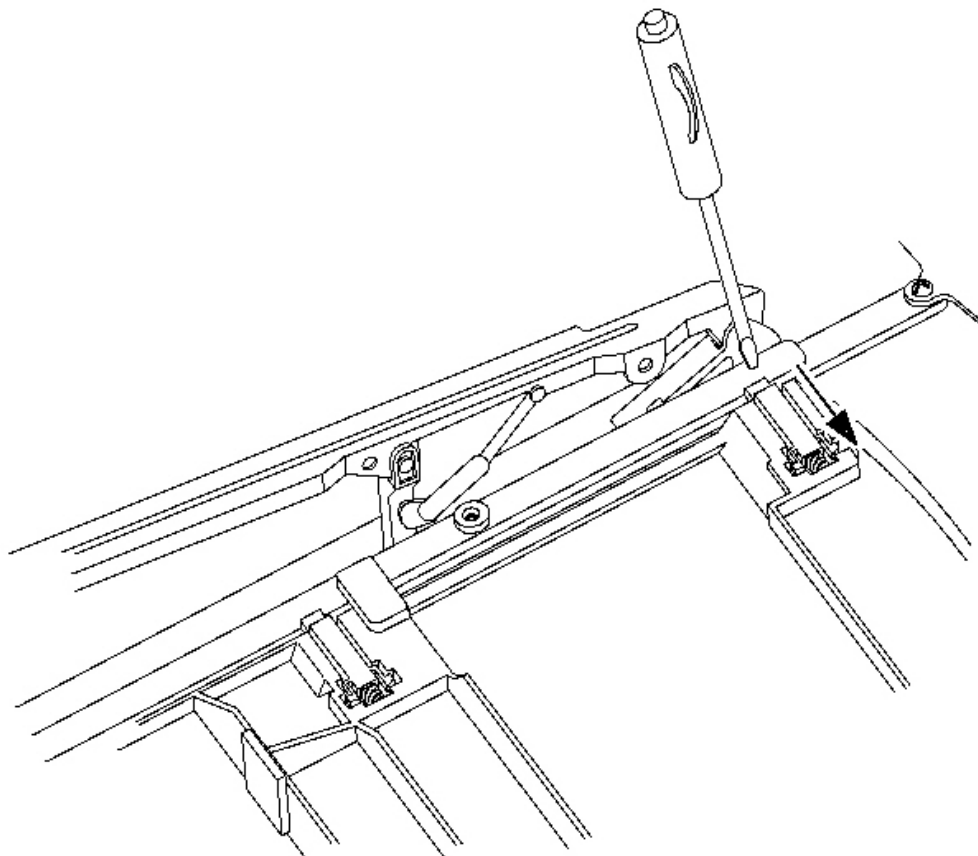


Fig. 8: View Of Sunroof Sunshade Panel
Courtesy of GENERAL MOTORS CORP.

2. Remove the screws from the sunroof drip channel.
3. Remove the sunroof drip channel.
4. Slide the sunshade forward to the closed position.
5. Push the spring retainer clips on the right side of the sunshade inward to disengage them from the track using an upward lifting motion.
6. Remove the sunshade from the sunroof module.

Installation Procedure

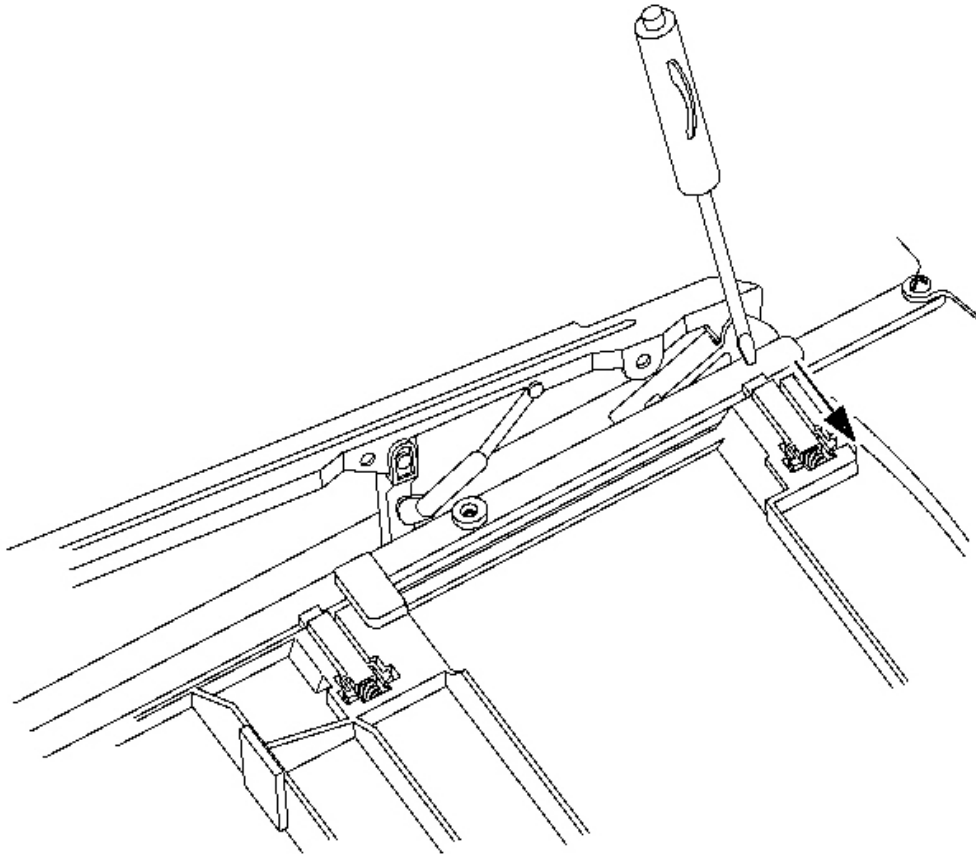


Fig. 9: View Of Sunroof Sunshade Panel
Courtesy of GENERAL MOTORS CORP.

1. Engage one side of the sunshade by positioning the spring clips into the track.
2. Push the spring retainer clips inward on the opposite side of the sunshade to engage them into the track.
3. Slide the sunshade back and forth to ensure proper operation.
4. Slide the sunshade to the half closed position.
5. Install the rear drain drip channel.
6. Install the sunroof window. Refer to **Sunroof Window Replacement** .

SUNROOF AIR DEFLECTOR REPLACEMENT

Removal Procedure

1. Cycle the sunroof window to the rear.

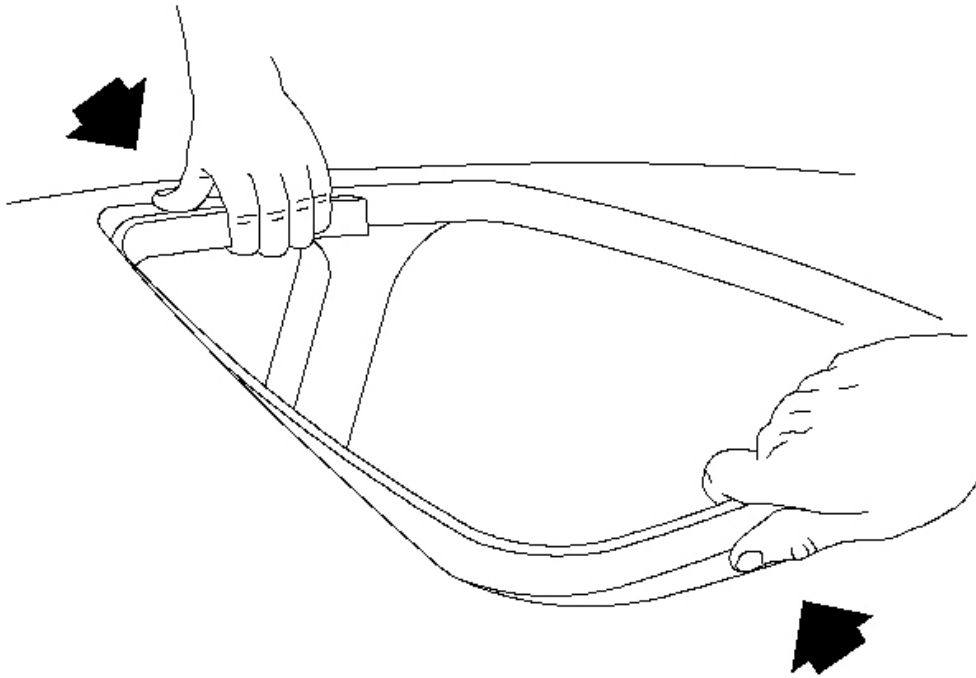


Fig. 10: View Of Sunroof Air Deflector
Courtesy of GENERAL MOTORS CORP.

2. Push down on the right front side of the air deflector.

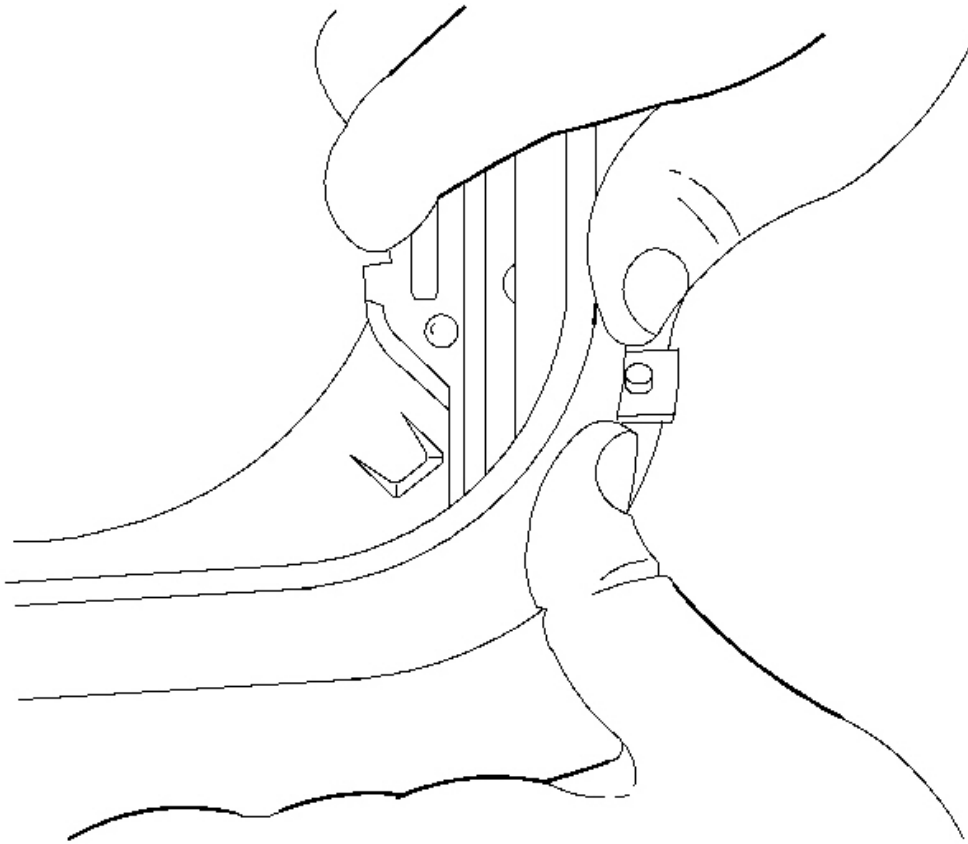


Fig. 11: Pushing Left Front Side Of Air Deflector Towards The Right
Courtesy of GENERAL MOTORS CORP.

3. Do the following while holding the right side down:
 - Push the left front side of the air deflector towards the right side.
 - Pull up on the left side until the lower tab clears the roof opening.

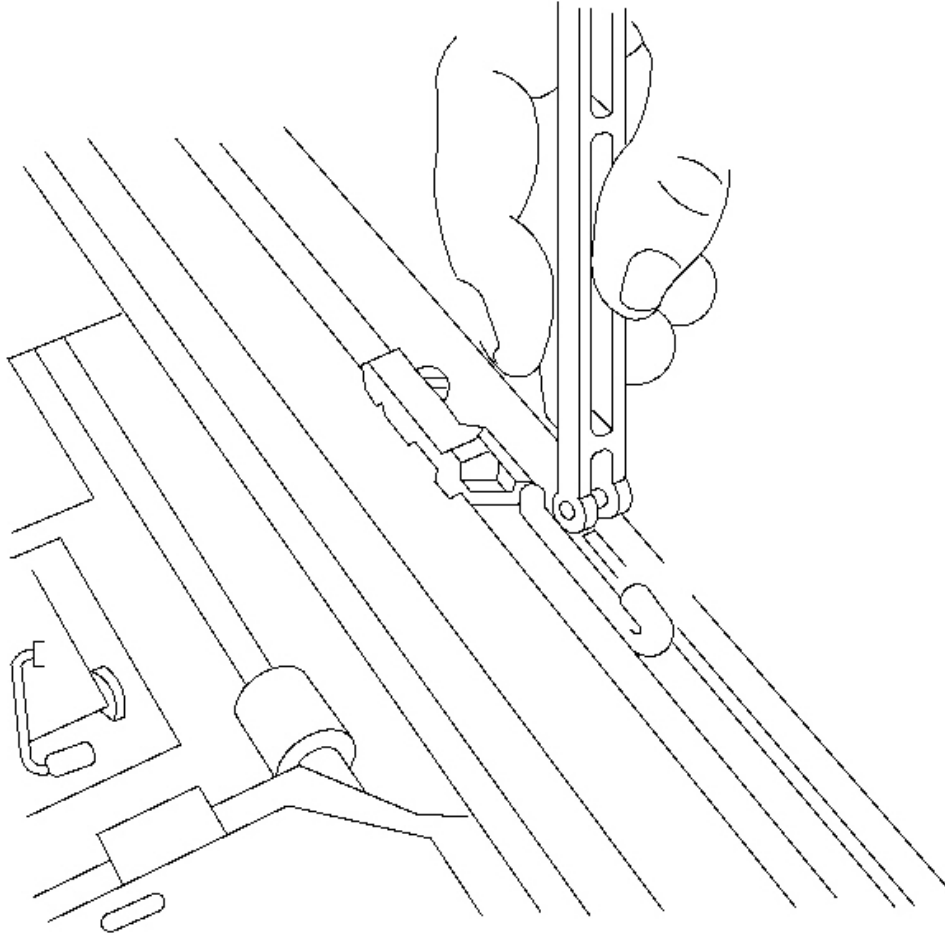


Fig. 12: Disengaging Air Deflector From The Hooks On Both Sides of Sunroof
Courtesy of GENERAL MOTORS CORP.

4. Swing the air deflector in an upward arc, rearward, to disengage air deflector from the hooks on both sides of the sunroof module.
5. Remove the air deflector from the vehicle.

Installation Procedure

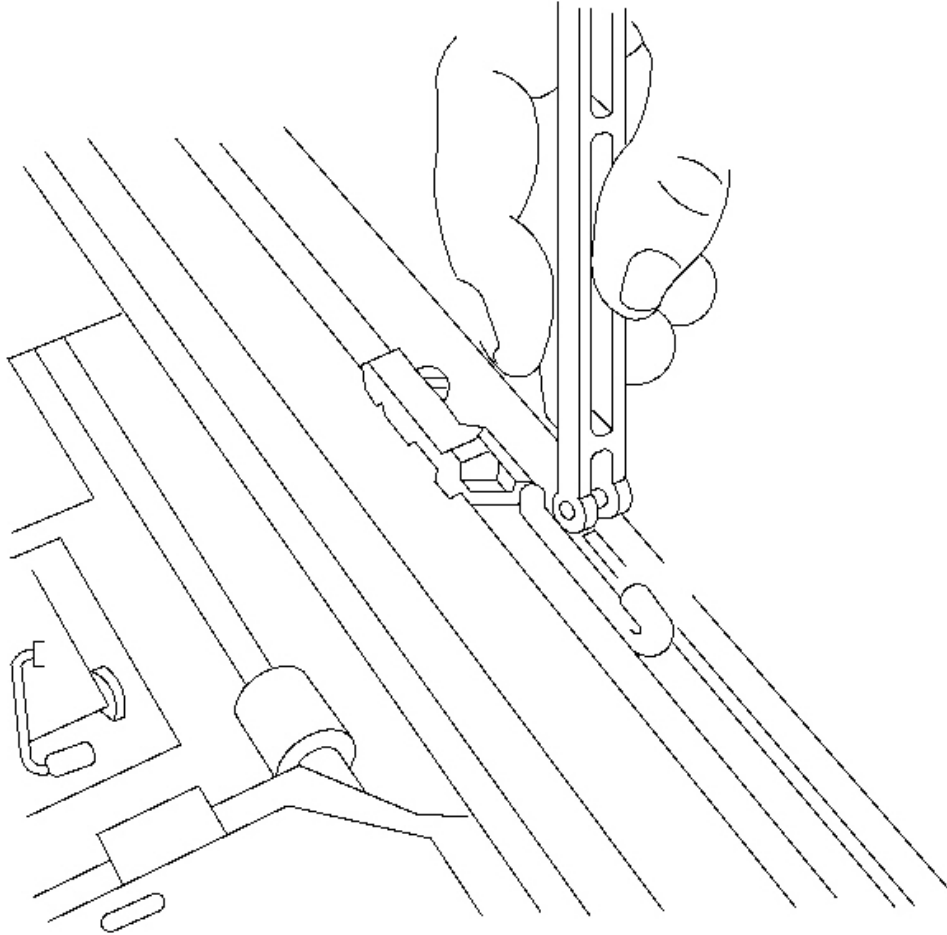


Fig. 13: Disengaging Air Deflector From The Hooks On Both Sides of Sunroof
Courtesy of GENERAL MOTORS CORP.

1. Engage the rear of the air deflector into the side hooks on the sunroof module.
2. Arc the air deflector in a forward motion.

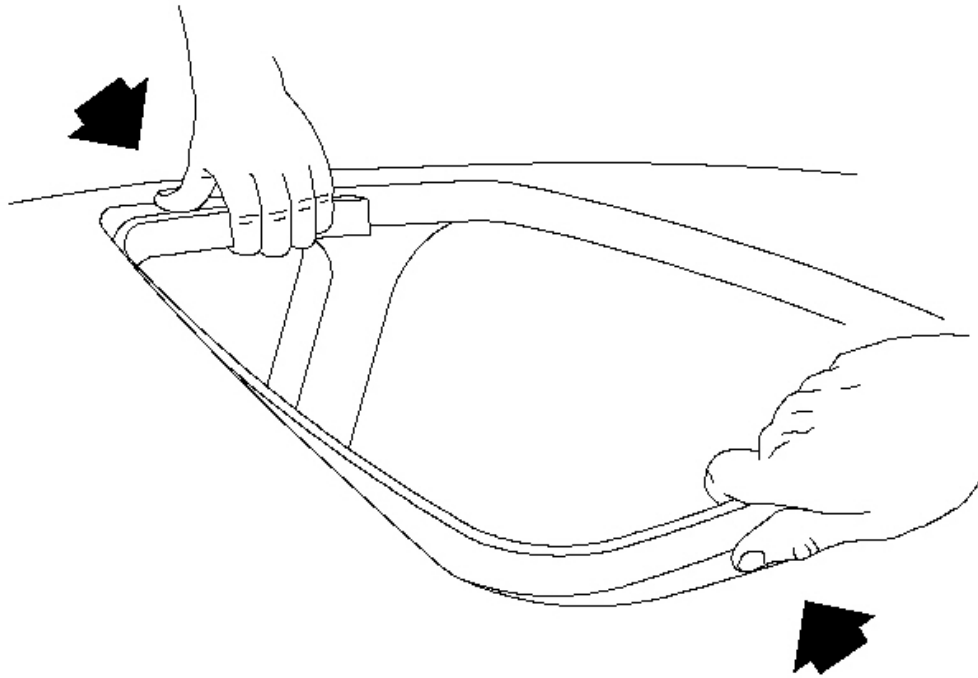


Fig. 14: View Of Sunroof Air Deflector
Courtesy of GENERAL MOTORS CORP.

3. Push the right side of the air deflector down into the roof opening.

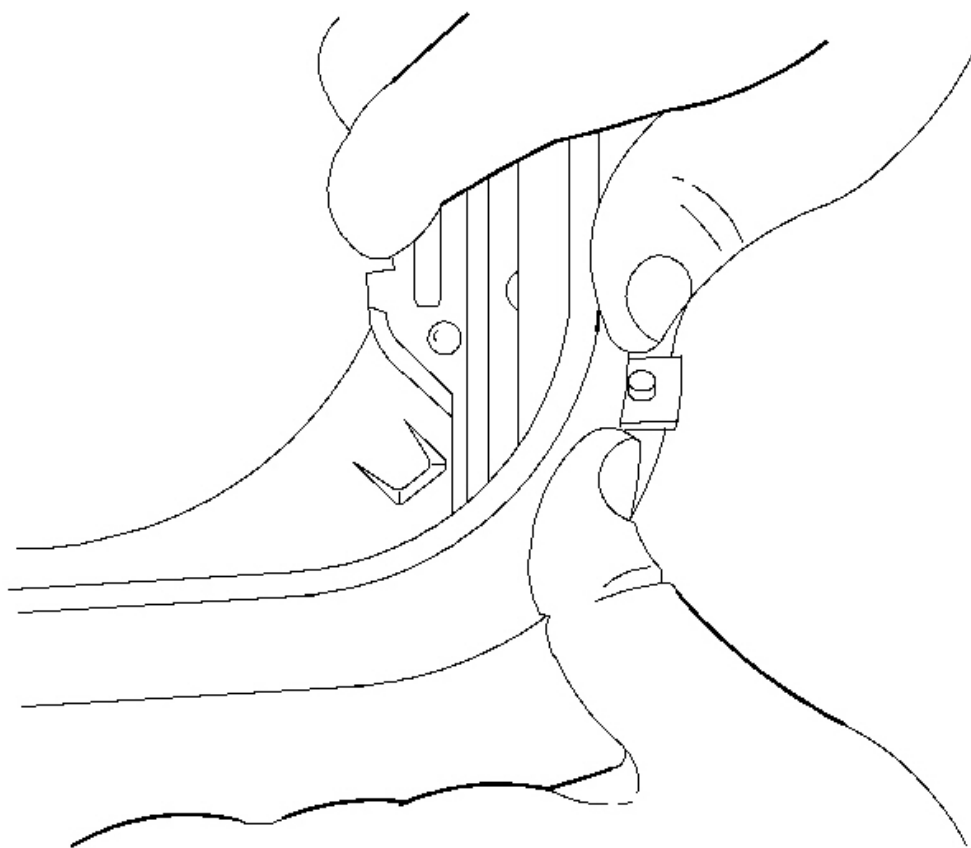


Fig. 15: Pushing Left Front Side Of Air Deflector Towards The Right
Courtesy of GENERAL MOTORS CORP.

4. Push the left front side of the air deflector inward and down so the tab clears the roof opening.
5. Close the sunroof window.

SUNROOF WINDOW REPLACEMENT

Removal Procedure

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

1. Cycle the sunroof window to the vent position.
2. Slide the sunshade rearward.

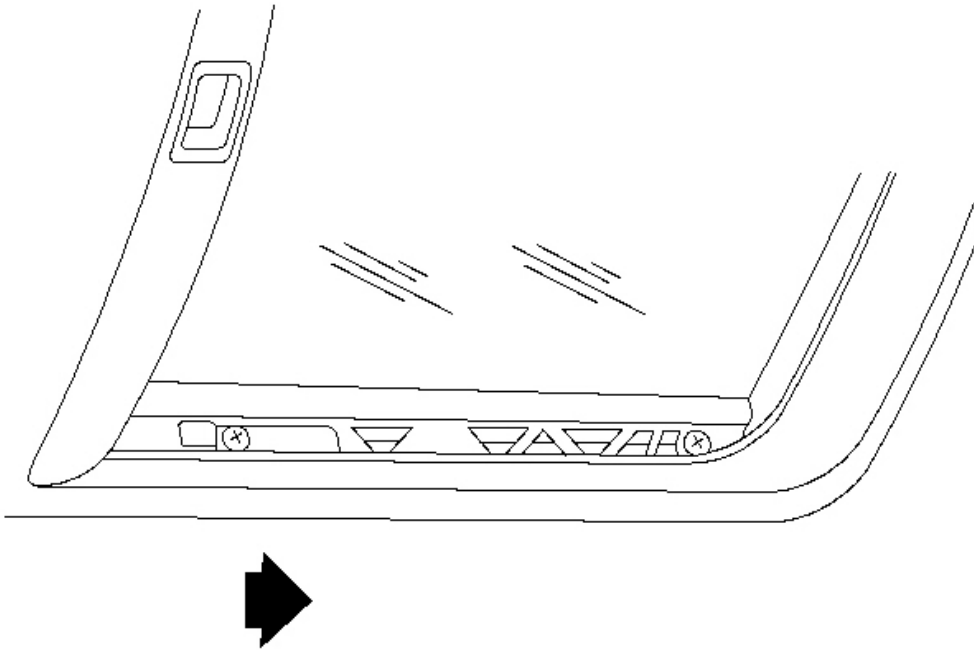


Fig. 16: View Of Sunroof Window
Courtesy of GENERAL MOTORS CORP.

3. Remove the sunroof window screws on both sides.

IMPORTANT: If operating the sunroof without the window, refer to Sunroof Air Deflector Replacement .

4. Lift the sunroof window from the sunroof opening.

Installation Procedure

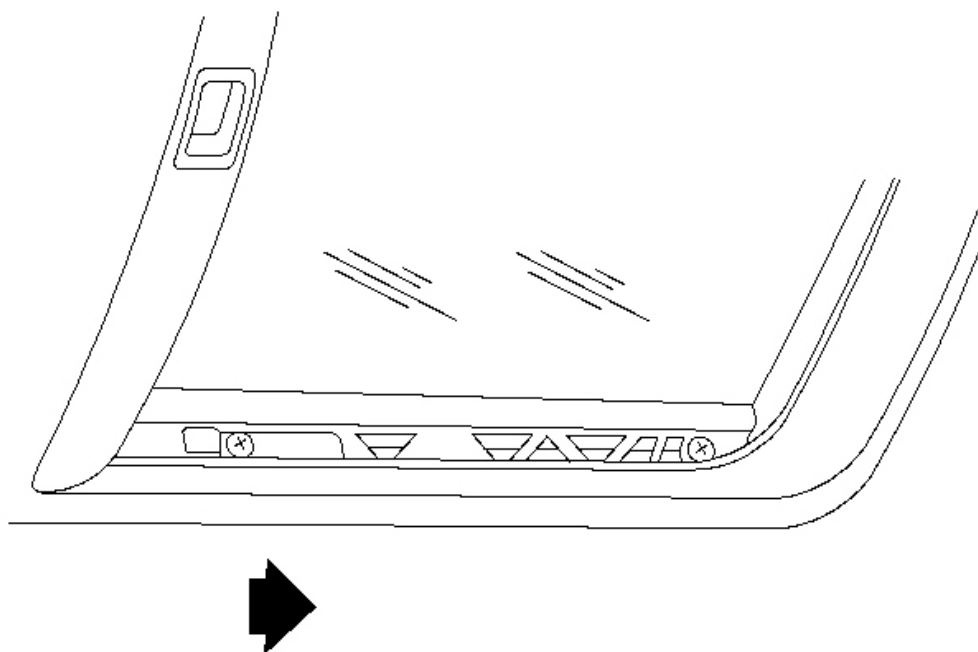


Fig. 17: View Of Sunroof Window
Courtesy of GENERAL MOTORS CORP.

1. Position the sunroof window into the opening.
2. Install the sunroof window screws. Do not tighten the screws.
3. Carefully close the sunroof window from the vent position to the full closed position.
4. Adjust the sunroof window. Refer to **Sunroof Window Height and Opening Fit Adjustment** .

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

5. Tighten the sunroof window screws.

Tighten: Tighten the screws to 5 N.m (44 lb in).

SUNROOF SWITCH REPLACEMENT

Removal Procedure

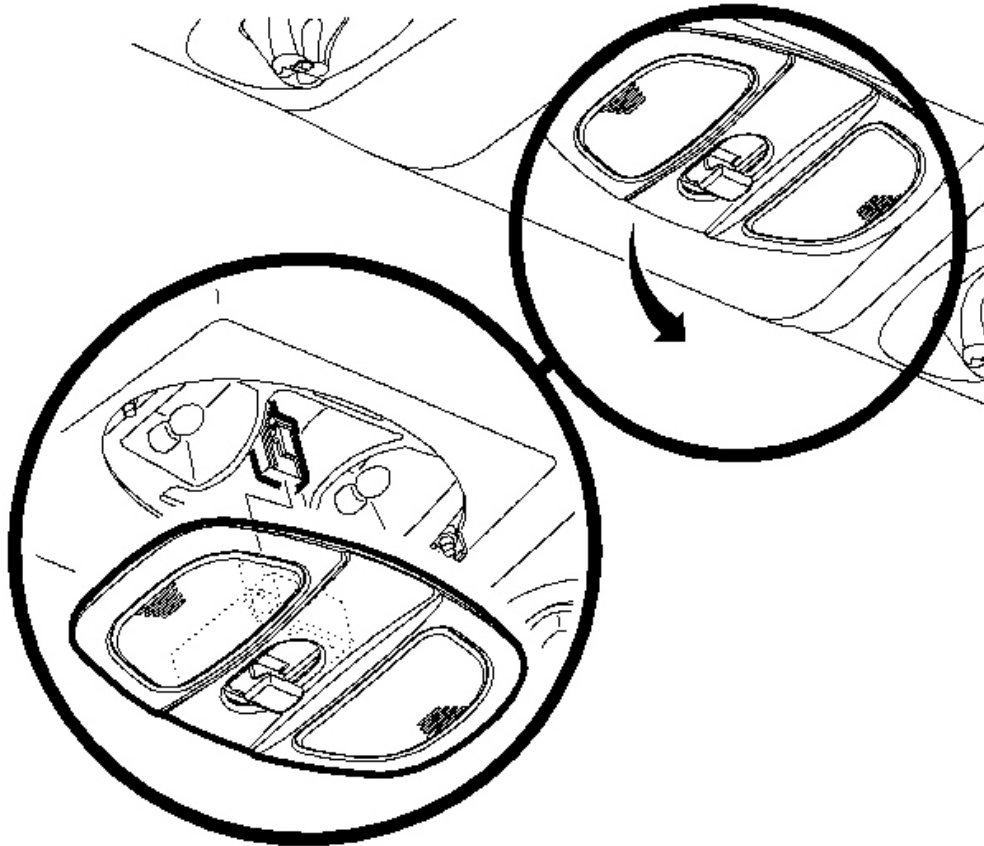


Fig. 18: View Of Sunroof Switch
Courtesy of GENERAL MOTORS CORP.

1. Pull gently at front of reading lamp cover to disengage retaining clips.
2. Rotate cover rearward until rear attaching hooks are released.

3. Disconnect sunroof switch harness from sunroof switch.

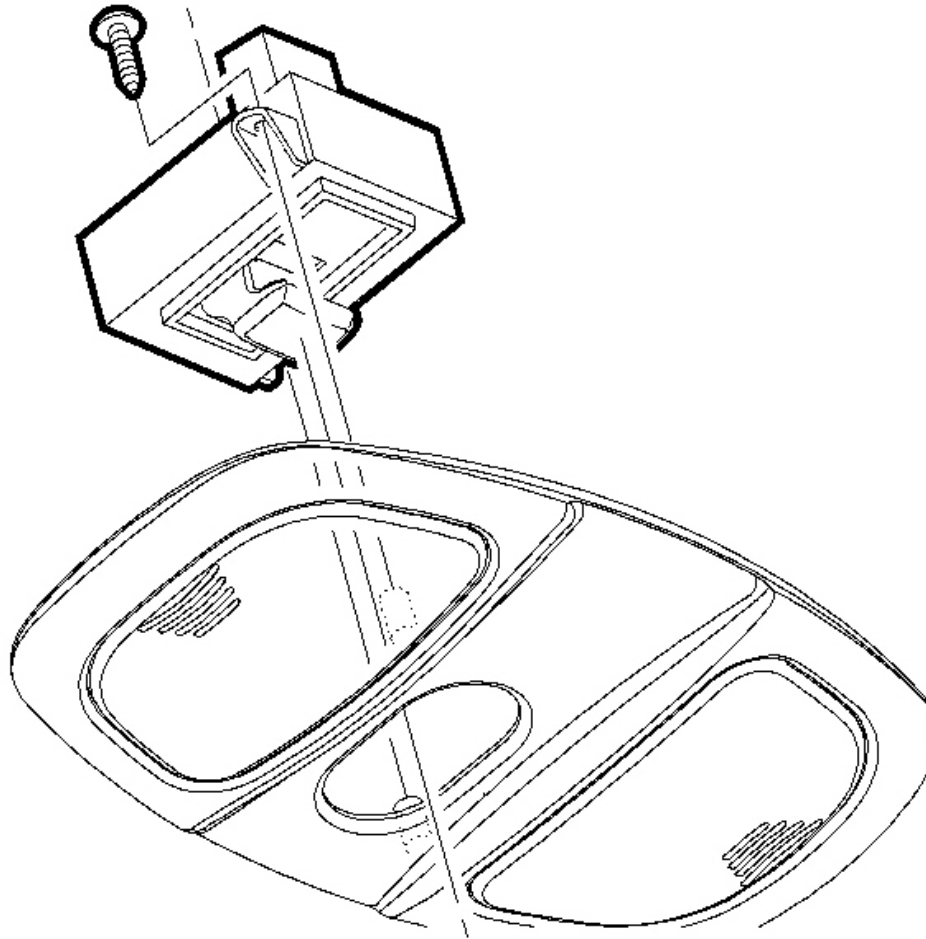


Fig. 19: Removing/Installing Sunroof Switch With Fasteners
Courtesy of GENERAL MOTORS CORP.

4. Remove sunroof switch fasteners and remove sunroof switch.

Installation Procedure

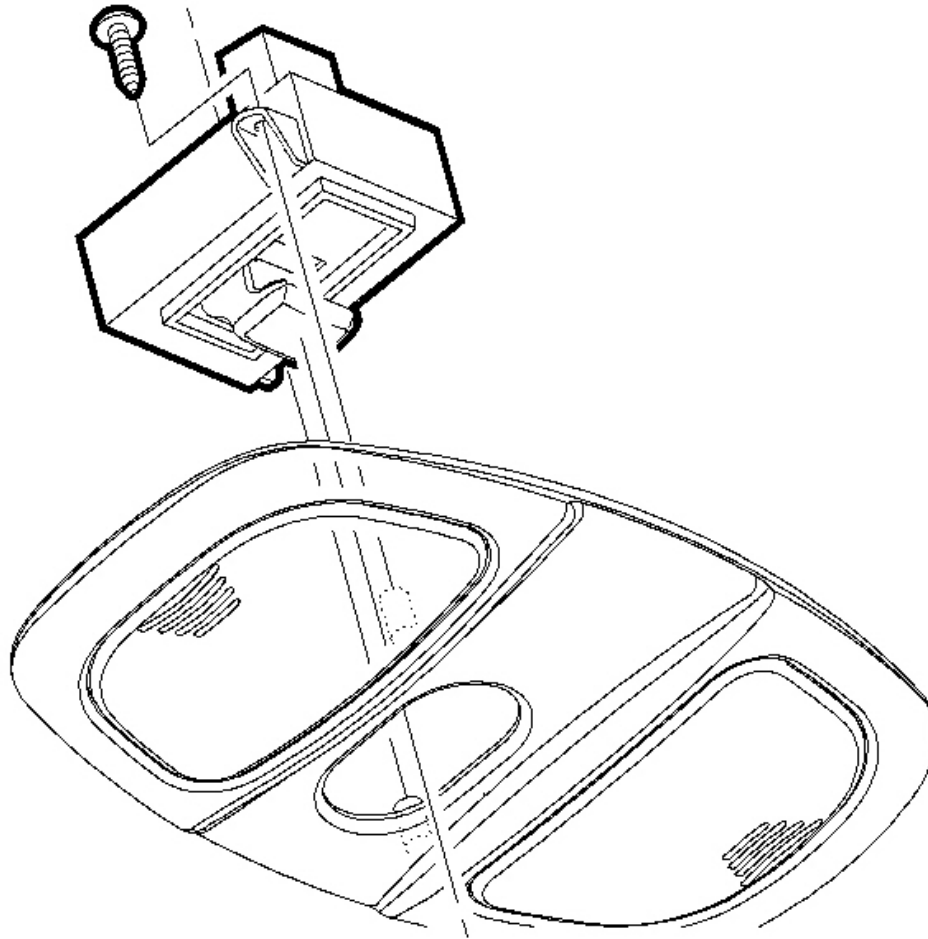


Fig. 20: Removing/Installing Sunroof Switch With Fasteners
Courtesy of GENERAL MOTORS CORP.

1. Install sunroof switch with fasteners.

Tighten: Tighten sunroof switch to 2.5 N.m (22 lb in)

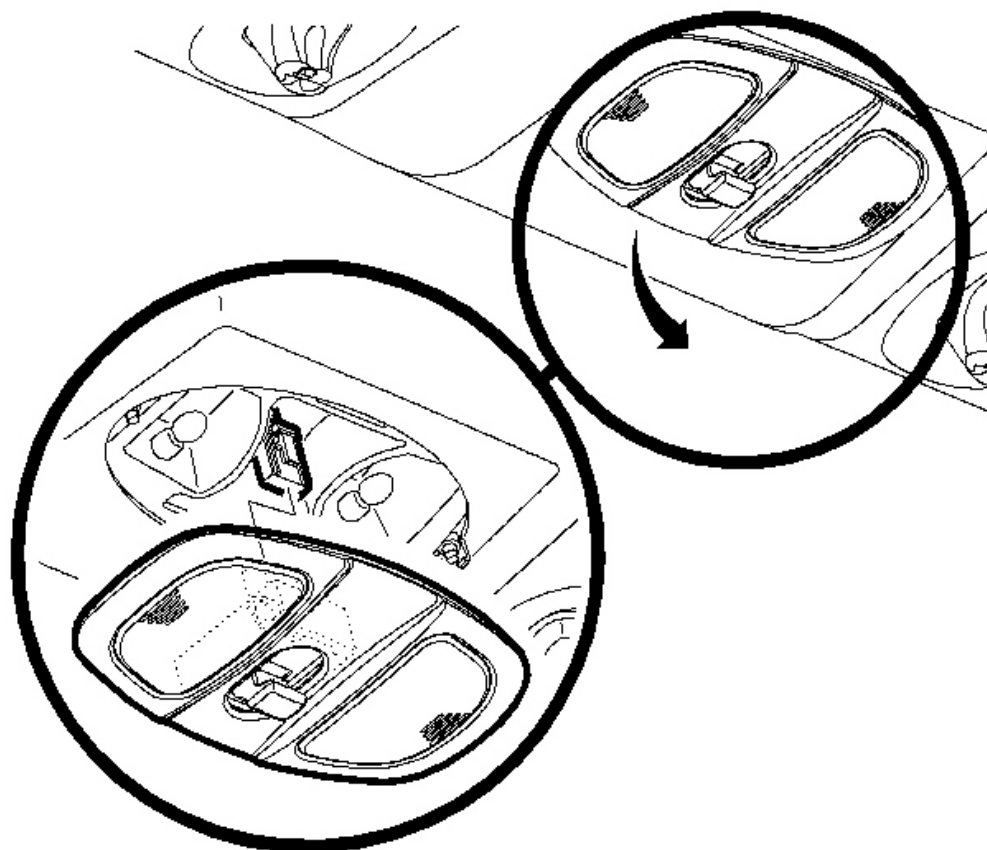


Fig. 21: View Of Sunroof Switch
Courtesy of GENERAL MOTORS CORP.

2. Connect sunroof switch harness to sunroof switch.
3. Position front reading lamp cover into rear attaching hooks.
4. Rotate front reading lamp cover into lamp assembly forward, then snap cover into place.
5. Function sunroof switch to ensure proper operation.

SUNROOF MOTOR/ACTUATOR REPLACEMENT

Removal Procedure

1. Remove the headliner. Refer to **Headliner Replacement** in Interior Trim.
2. Remove the sunroof window. Refer to **Sunroof Window Replacement** .

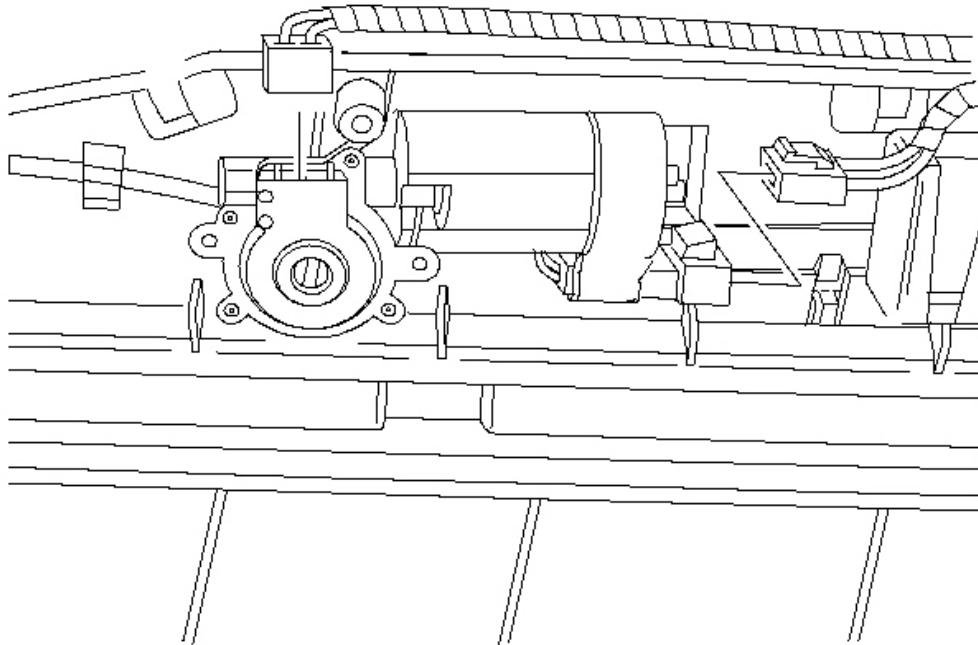


Fig. 22: View Of Sunroof Motor/Actuator
Courtesy of GENERAL MOTORS CORP.

3. Disconnect the sunroof motor harness.
4. Remove the screws securing the sunroof actuator to the sunroof module.
5. Remove the sunroof motor.

Installation Procedure

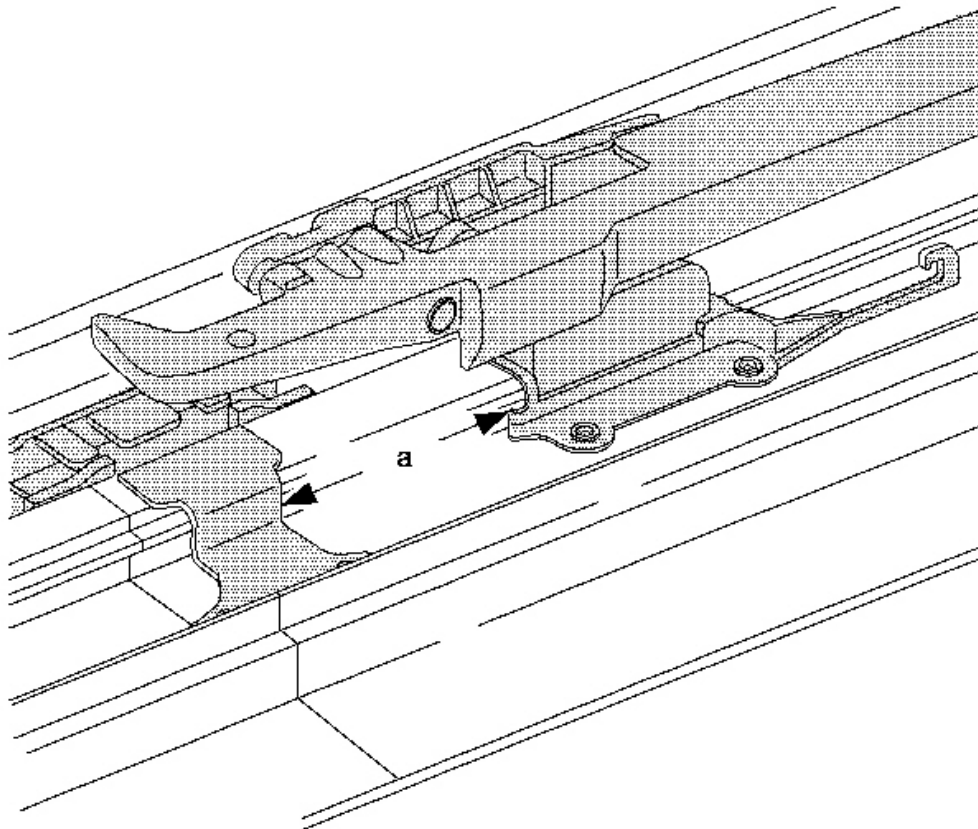


Fig. 23: Installing Sunroof Motor
Courtesy of GENERAL MOTORS CORP.

1. Manually adjust the track to achieve a distance of (a) 44.5 mm (1.75 in) between the left slide and track bracket.
2. Manually adjust the track to achieve a distance of (a) 44.5 mm (1.75 in) between the right slide and track bracket.
3. Install the sunroof motor to the sunroof module.

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

4. Install the sunroof motor screws.

Tighten: Tighten the screws to 5 N.m (44 lb in).

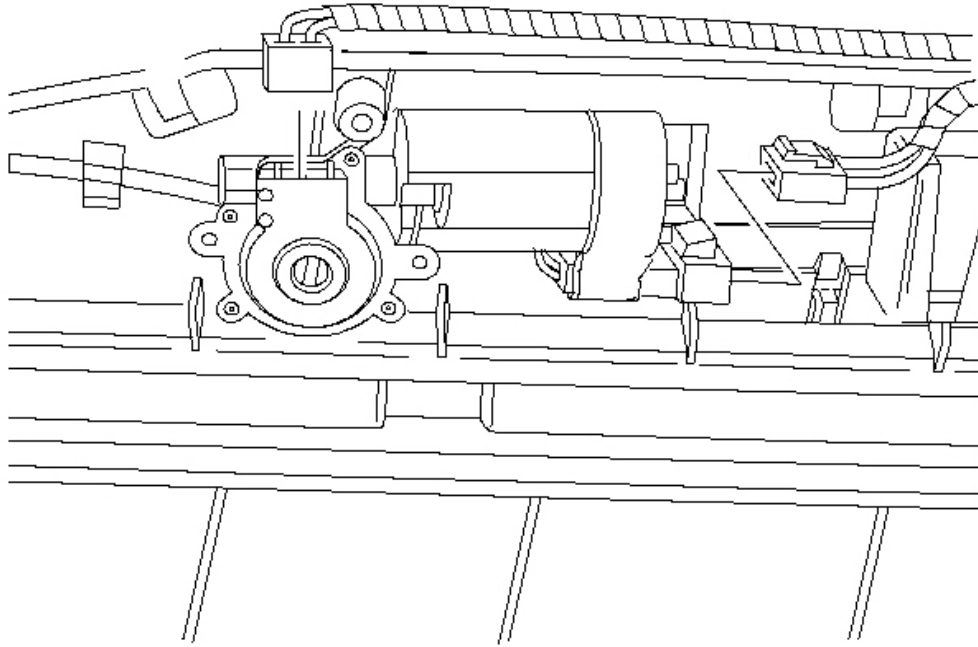


Fig. 24: View Of Sunroof Motor/Actuator
Courtesy of GENERAL MOTORS CORP.

5. Connect the electrical connectors to the sunroof motor.
6. Secure the electrical harness to the sunroof module.
7. Verify the sunroof operation.
8. Install the sunroof window. Refer to **Sunroof Window Replacement** .
9. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.

Removal Procedure

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

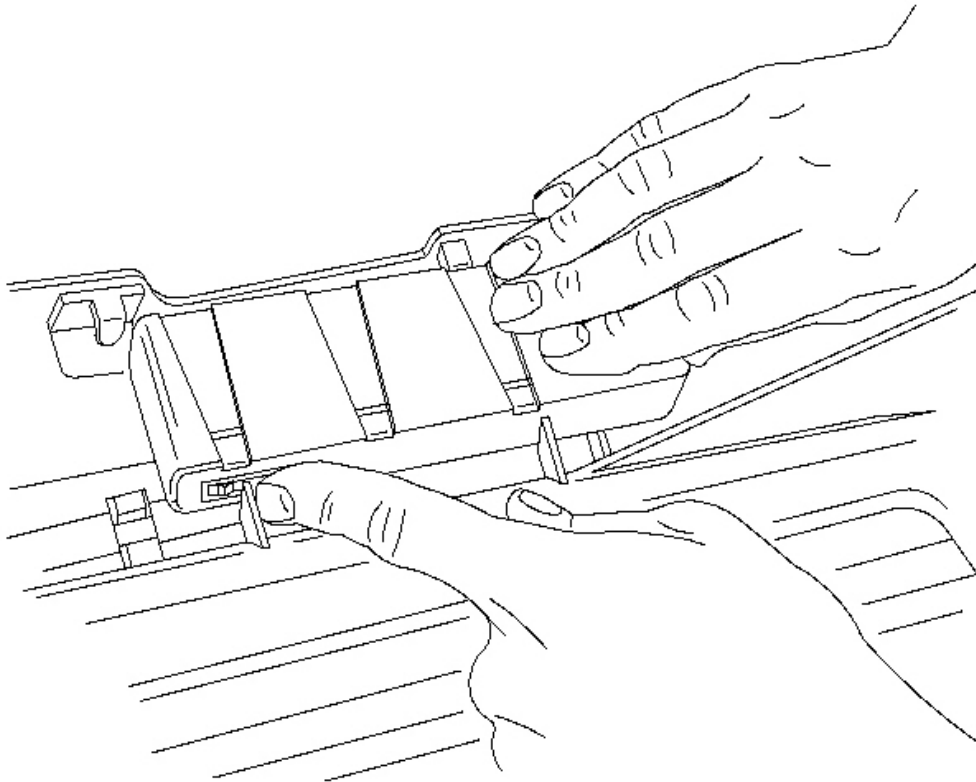


Fig. 25: View Of Sunroof Control Module
Courtesy of GENERAL MOTORS CORP.

2. Depress the tab on the side of the control module.
3. With the tab depressed, slide the sunroof control module toward the sunroof motor. This will release the control module from the sunroof module.

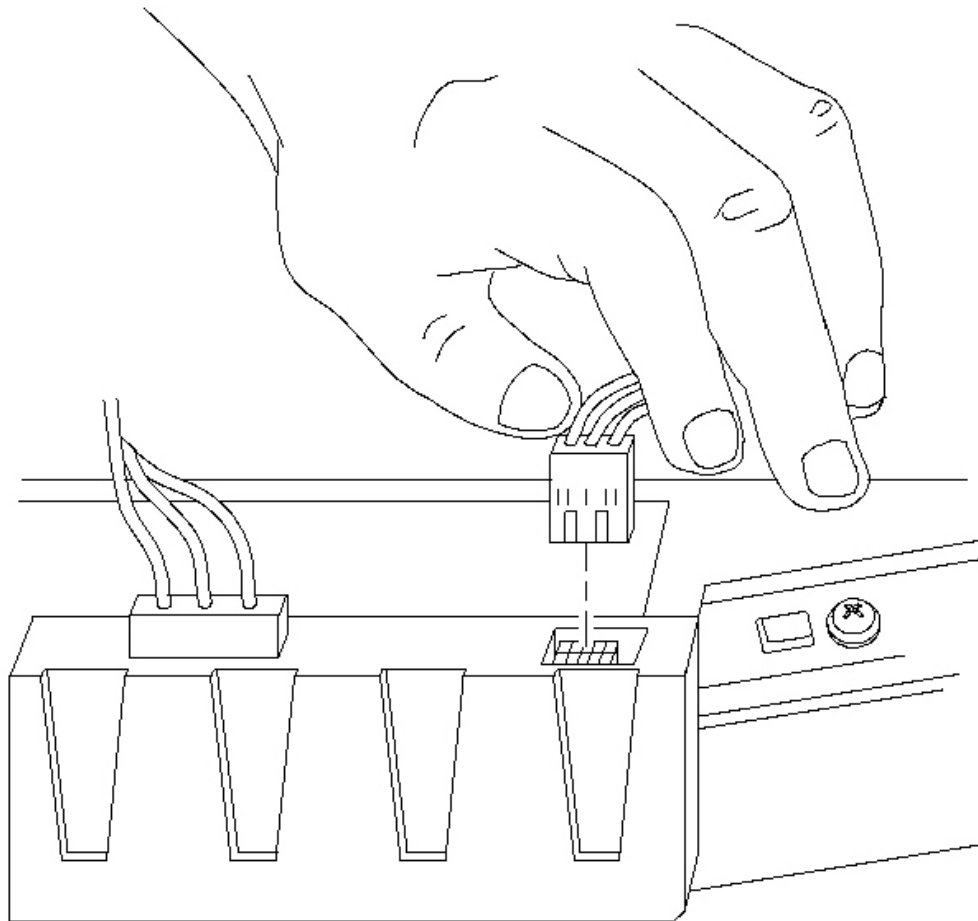


Fig. 26: Disconnecting/Connecting Electrical Connector To Sunroof Control Module
Courtesy of GENERAL MOTORS CORP.

4. Remove the control module from the sunroof module and disconnect the electrical connector.

Installation Procedure

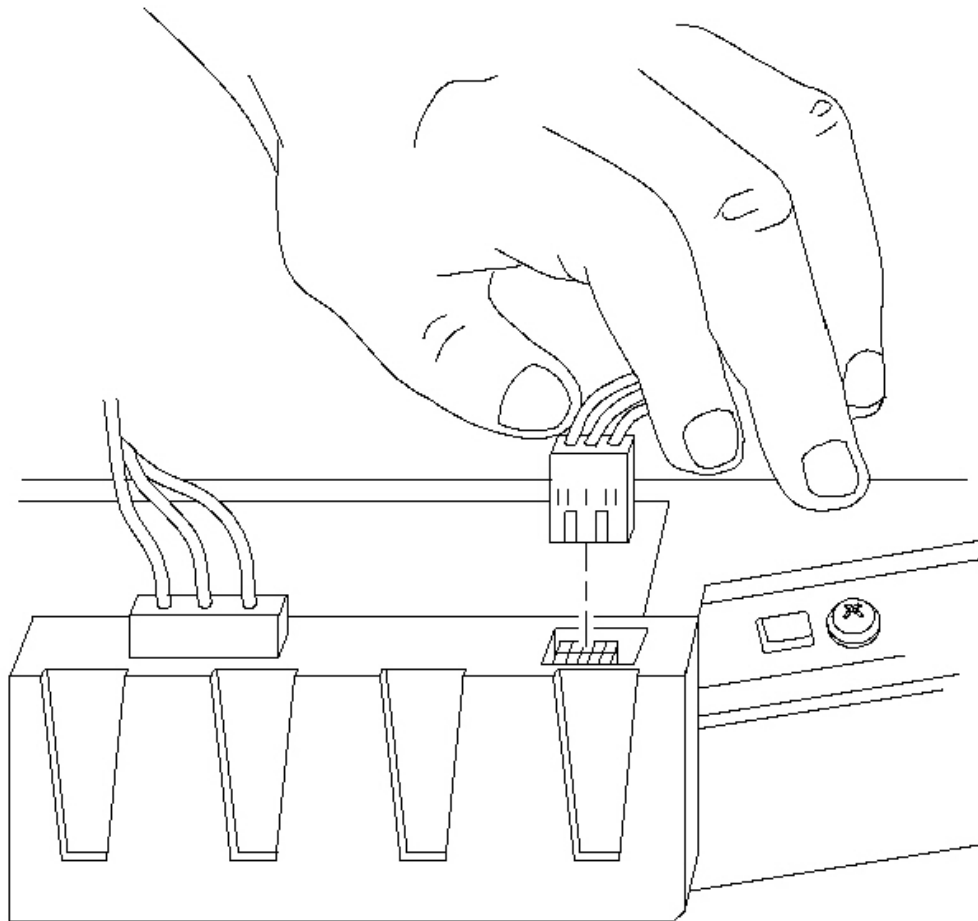


Fig. 27: Disconnecting/Connecting Electrical Connector To Sunroof Control Module
Courtesy of GENERAL MOTORS CORP.

1. Connect the electrical connector to the sunroof control module.

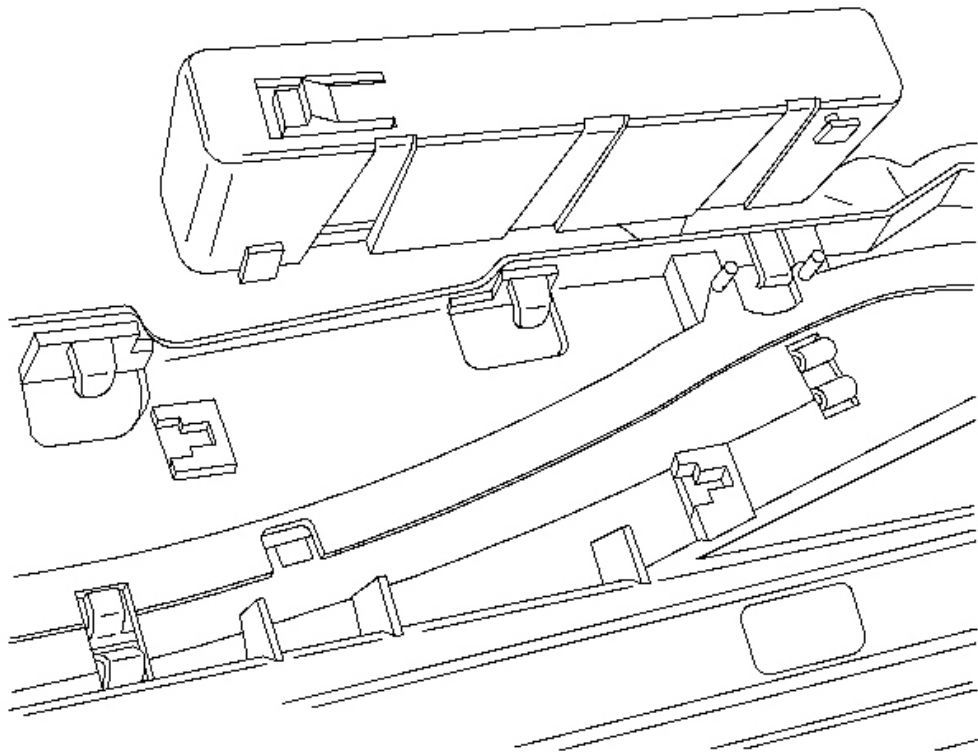


Fig. 28: Inserting Control Module Tabs
Courtesy of GENERAL MOTORS CORP.

2. Insert the control module tabs into the sunroof module slots.
3. Slide the sunroof express module away from the sunroof motor until it is fully engaged.
4. Verify the proper operation of the sunroof before securing the headliner.
5. Install the headliner. Refer to **Headliner Replacement** in Interior Trim.

SUNROOF MODULE ASSEMBLY REPLACEMENT

Removal Procedure

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

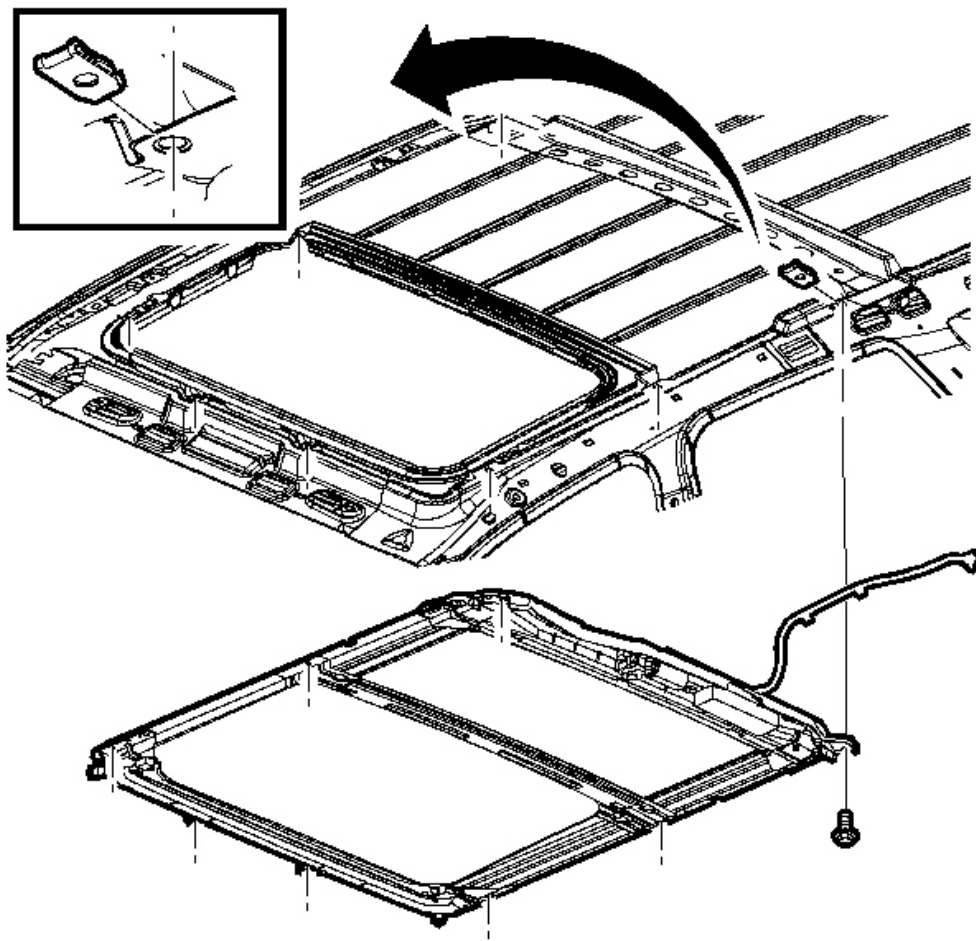


Fig. 29: View Of Sunroof Module Assembly
Courtesy of GENERAL MOTORS CORP.

2. Cycle the glass panel to the rear.
3. Disconnect the electrical connector from the sunroof module.
4. Remove the front and rear sunroof drain hoses. Refer to **Sunroof Drain Hose Replacement - Front** and **Sunroof Drain Hose Replacement - Rear**.
5. Remove the bolts that secure the sunroof module to the roof.
6. With an assistant, lower and remove the sunroof module assembly.

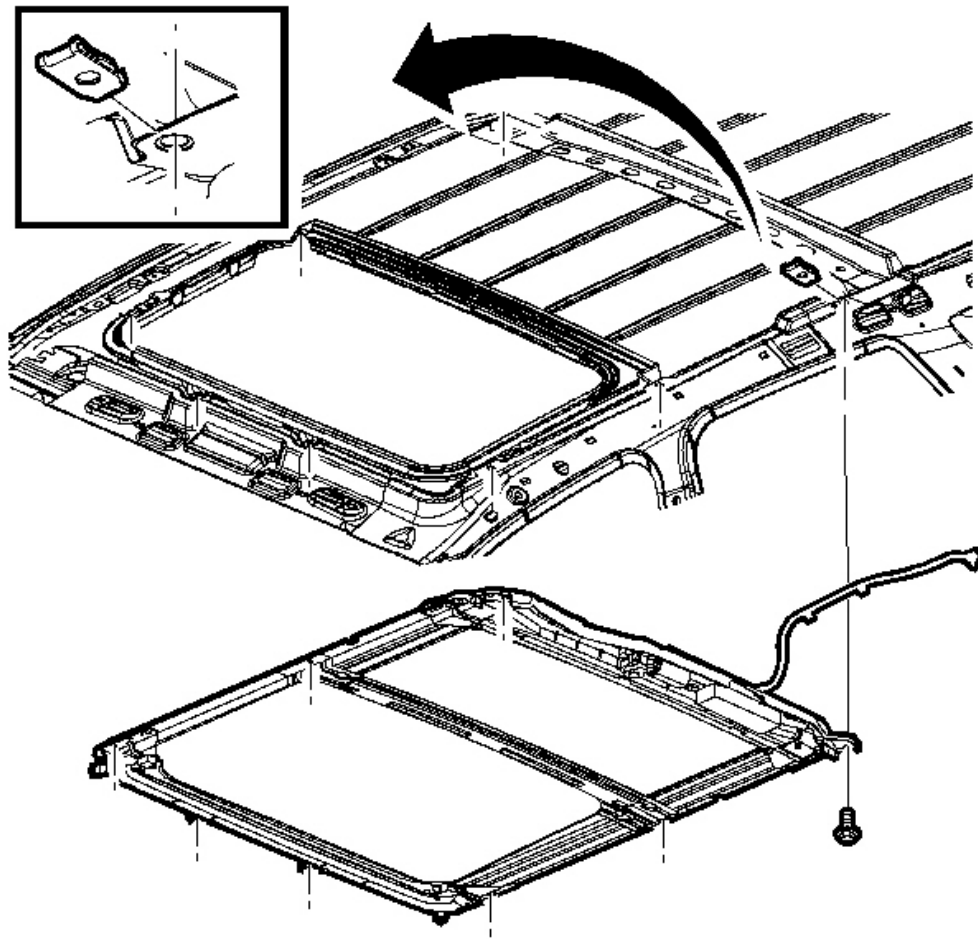


Fig. 30: View Of Sunroof Module Assembly
Courtesy of GENERAL MOTORS CORP.

1. With an assistant, position the new sunroof module assembly into the roof opening.
2. Install the bolts which secure the sunroof module assembly to the roof and tighten the bolts by hand.
3. Place a 12 mm (0.47 in) pin into the sunroof module alignment holes.

NOTE: Refer to Fastener Notice in Cautions and Notices.

4. Remove the alignment pins.

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

5. Install the front and rear sunroof drain hoses. Refer to **Sunroof Drain Hose Replacement - Front** and **Sunroof Drain Hose Replacement - Rear** .
6. Connect the electrical connectors to the sunroof module.
7. Secure the harness to the sunroof module.
8. Adjust the sunroof window. Refer to **Sunroof Window Height and Opening Fit Adjustment** .
9. Verify the proper operation of the sunroof before securing the headliner.
10. With an assistant, install the headliner. Refer to **Headliner Replacement** in Interior Trim.

SUNROOF MANUAL OPERATION

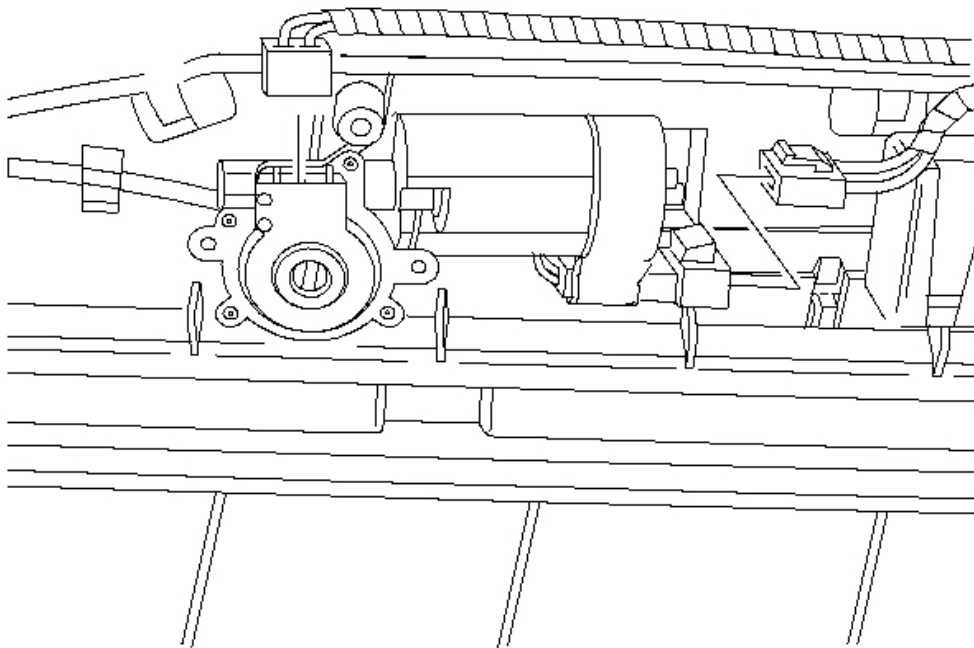


Fig. 31: View Of Sunroof Motor/Actuator
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: The sunroof motor drive gear is made of nylon. Care should be taken not to damage the slot in the drive gear.

Use a large straight-bladed screwdriver to simultaneously depress and turn the center slot in the sunroof motor drive gear. This will allow the sunroof to be opened or closed.

LUGGAGE CARRIER REPLACEMENT

Removal Procedure

1. Remove the roof front panel applique. Refer to **Panel Applique Replacement - Roof Front** in Exterior Trim.
2. Remove the roof rear panel applique. Refer to **Panel Applique Replacement - Roof Rear** in Exterior Trim.

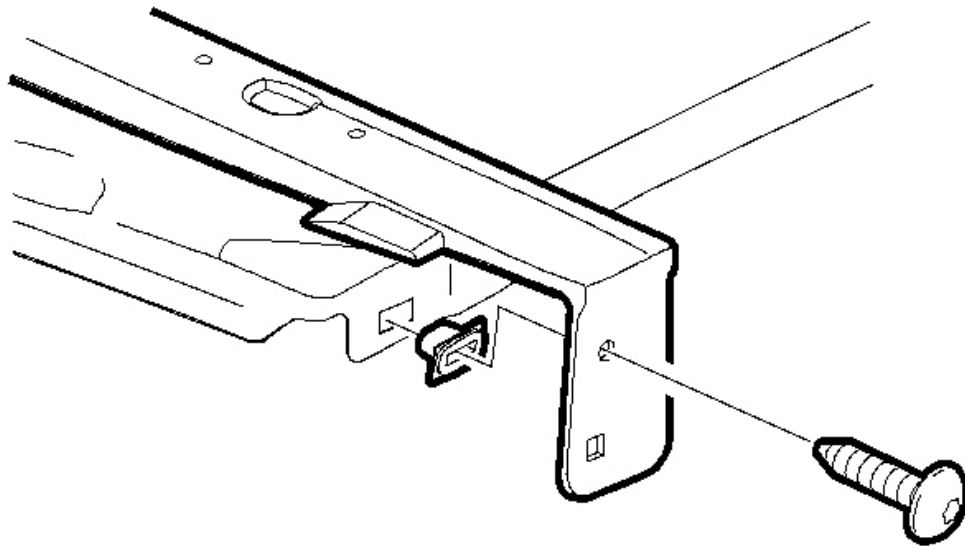


Fig. 32: Removing/Installing Rear Mounting Screws To Luggage Carrier
Courtesy of GENERAL MOTORS CORP.

3. Open the lift gate and support at a 45 degree angle, and remove the rear luggage carrier screws.

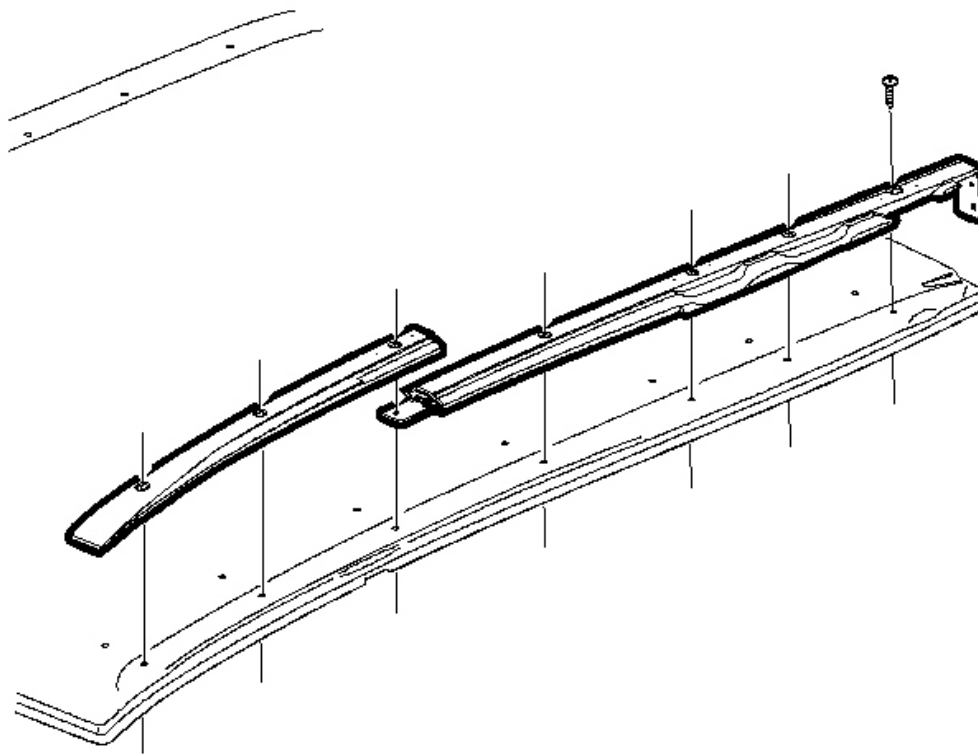


Fig. 33: Removing/Installing Remaining Screws From Luggage Carrier
Courtesy of GENERAL MOTORS CORP.

4. Remove the remaining screws from the luggage carrier.
5. Remove the luggage carrier from the roof.

Installation Procedure

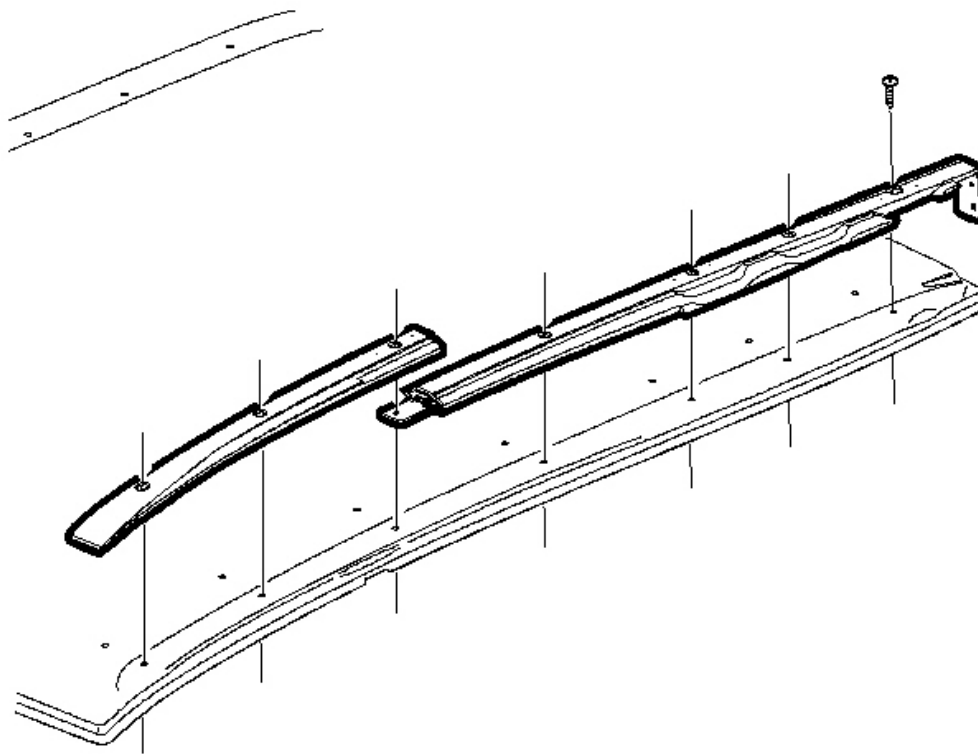


Fig. 34: Removing/Installing Remaining Screws From Luggage Carrier
Courtesy of GENERAL MOTORS CORP.

1. Position the front and rear sections of the luggage carrier to the roof.

NOTE: Refer to Fastener Notice in Cautions and Notices.

2. Install the luggage carrier top screws.

Tighten: Tighten the screws to 7 N.m (62 lb in).

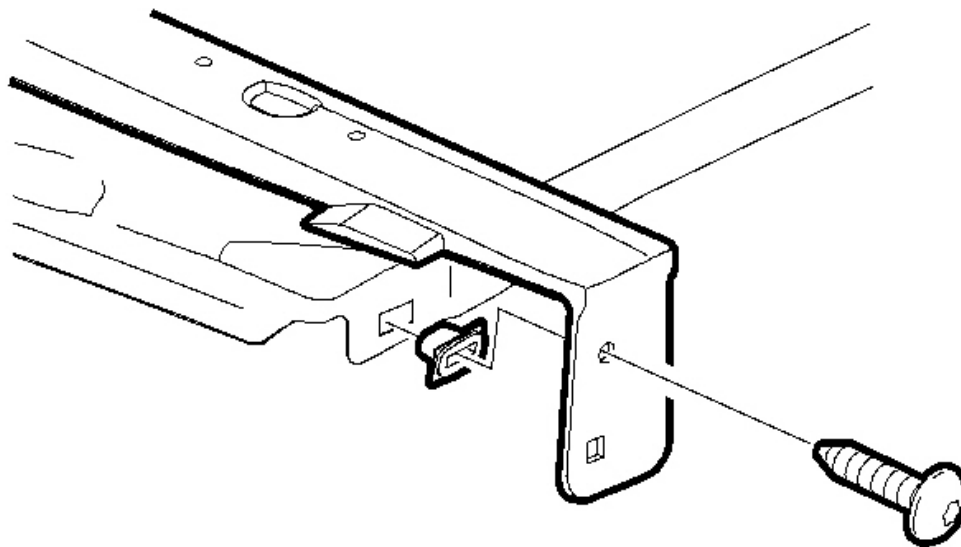


Fig. 35: Removing/Installing Rear Mounting Screws To Luggage Carrier
Courtesy of GENERAL MOTORS CORP.

3. Open the lift gate and support at a 45 degree angle, and install the rear mounting screws to the luggage carrier.

Tighten: Tighten the screws to 2.3 N.m (20 lb in).

4. Remove the roof rear panel applique. Refer to **Panel Applique Replacement - Roof Rear** in Exterior Trim.
5. Remove the roof front panel applique. Refer to **Panel Applique Replacement - Roof Front** in Exterior Trim.

DESCRIPTION AND OPERATION

SUNROOF DESCRIPTION AND OPERATION

Power Sunroof System Components

The power sunroof system consists of the following components:

- Sunroof module
- Sunroof motor with limit switch
- Sunroof switch
- Sunroof glass, tilt/slide type, with glass sliding between roof and headliner
- Sunshade
- Rail and track assembly upon which the sunroof glass rides
- Sunroof system fuse: sunroof 20 A fuse
- Ground G401

Power Sunroof Operation

The power sunroof will operate with the ignition switch turned to Accessory or RUN.

Use the multifunction type sunroof switch, located in the front center of the headliner, to command the sunroof to:

- Express open
- Slide fully open
- Vent fully open
- Partially open in either slide or vent mode
- Fully closed (flush with the vehicle roof)

Express Open

The express open will only operate with the sunroof in the fully closed or partially open position. To express open the sunroof glass, momentarily press the sunroof switch to the second rearward position once. This will apply the sunroof switch low reference circuit to both the sunroof switch express signal circuit and to the sunroof switch open signal circuit (12 volt references) inputs, pulling the them to 0 volts momentarily. The momentary transition inputs to the sunroof module indicates an express open request. Once the express open has been initiated, the sunroof module will drive the motor in the open direction, slightly lowering the rear edge of the sunroof glass, then sliding open with the sunshade, allowing the wind deflector to raise upward. The sunroof glass will continue to express open until:

- The sunroof glass reaches a predetermined (nearly full open) comfort stop position controlled by the limit switch.
- Activation of the sunroof switch (in any direction) to stop the sunroof glass in a desired position other

than the express open (comfort stop) position.

- Motor stall is sensed because the sunroof glass is being obstructed.
- The operation time-out expires, 15 seconds after the initiation of the express open feature has been requested.

To Open

Opening the sunroof can be done from any position between fully closed and partially open. To open the sunroof glass, press and hold the sunroof switch to the first rearward position. This will apply the sunroof switch low reference circuit to the sunroof switch open vent signal circuit (12 volt reference) input, pulling the reference voltage to 0 volts. The constant low (0 volts) input to the sunroof module indicates an open request. Once the open has been initiated, the sunroof module will drive the motor in the open direction, slightly lowering the rear edge of the sunroof glass, then sliding open with the sunshade, allowing the wind deflector to raise upward. The sunroof glass will continue to open until the sunroof motion is terminated by either:

- Motor stall is sensed because the sunroof has reached its limit of travel or due to an obstruction.
- Releasing of the sunroof switch. The sunroof may be left in any position between fully open and fully closed.
- The operation time-out expires, 15 seconds after the initiation of the express open feature had been commanded.

To Vent Open

Opening the sunroof glass, to the vent position, can be done when it is between fully closed and full vent. Press and hold the sunroof switch upward. This will apply the sunroof switch low reference circuit to the sunroof switch open vent signal circuit. Holding the sunroof switch in the vent position will cause the sunroof switch open vent signal circuit (12 volt reference) input to be pulled to 0 volts. The constant low input to the sunroof module indicates a vent request. Once the vent request has been initiated, the sunroof module will drive the motor in the closed direction (to vent position) until the sunroof motion is terminated by either:

- Motor stall is sensed because the sunroof has reached its limit of travel.
- Releasing the sunroof switch.

Closing to the Fully Closed Position

To close the power sunroof from the following positions:

- Open position, push and hold the sunroof switch forward.
- Vent position, pull and hold downward the sunroof switch.

Holding the sunroof switch to the closed position will apply the sunroof switch low reference circuit to both the sunroof switch open signal and sunroof switch open vent signal circuits. Holding the sunroof switch to the closed position will cause the sunroof switch open signal and sunroof switch open vent signal circuits (12 volt references) to be pulled to 0 volts. The constant low inputs to the sunroof module indicates a close request. As the close request has been initiated, the sunroof module will drive the motor to the closed position until the limit switch closes, indicating a flush close position. As the sunroof glass nears the closed position, the wind

deflector will retract, and the rear sunroof glass will raise slightly, then seats to flush with the roof panel. To close the sunshade, this will have to be manually slid closed.

Sunroof Motor

The sunroof has a 12 volt reversible DC motor, gear train and a limit switch. When the motor is not operating both circuits are at ground potential. When the motor drives the sunroof glass in the open direction (from the vent position to the open position), the following occurs:

- Voltage is supplied to the sunroof motor open control circuit.
- Ground is maintained to the sunroof motor close control circuit.

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

- Voltage is supplied to the sunroof motor close control circuit.
- Ground is maintained to the sunroof motor open control circuit.

Limit Switch

The limit switch is part of the sunroof motor assembly and is to signal the sunroof module when the sunroof glass is closed flush with the roof or when it reaches the comfort stop during the express open feature.

As the limit switch closes, the sunroof limit switch low reference circuit is applied to the sunroof limit switch soft stop signal circuit, pulling the 12 volt reference down to 0 volts. The 0 volts at the sunroof limit switch soft stop signal input indicates that the sunroof glass has either reached the flush close or the comfort stop position and that the voltage will be removed from the motor control circuits.