

2017 ACCESSORIES AND EQUIPMENT

Fixed and Moveable Windows - Bolt EV

SPECIFICATIONS

FASTENER SPECIFICATIONS

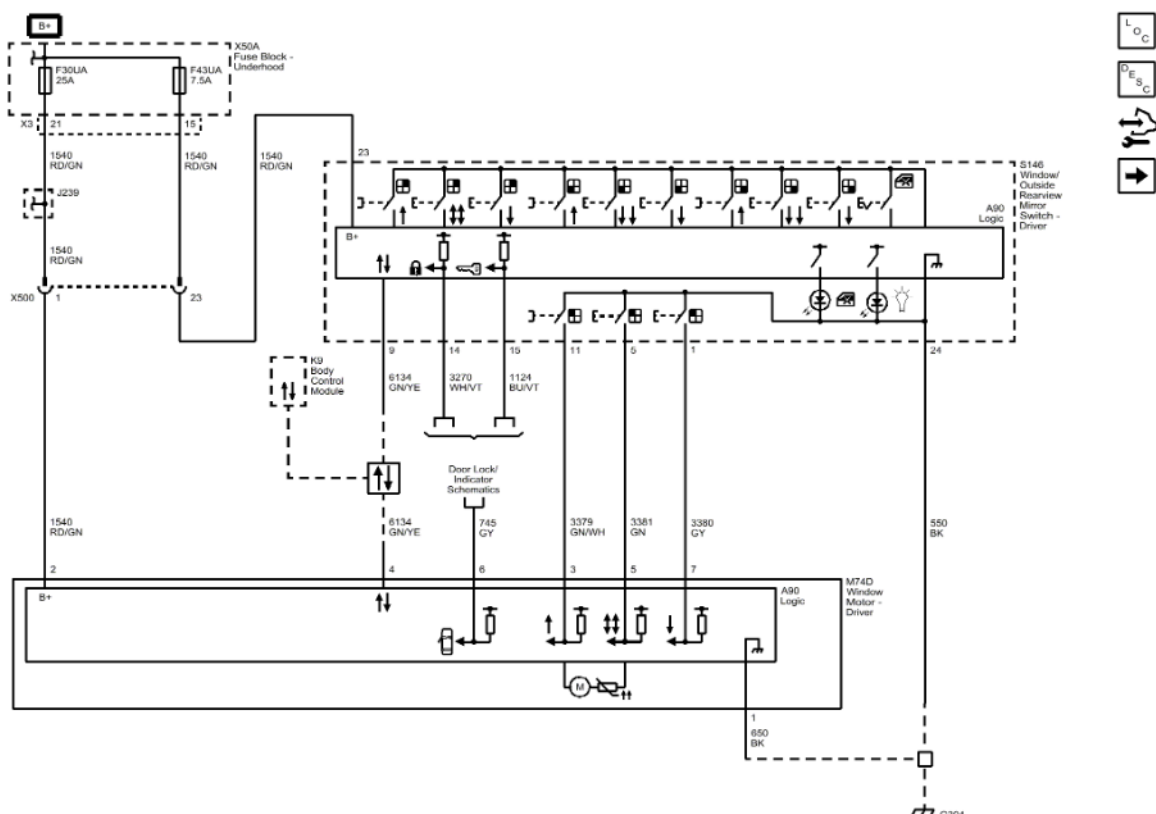
Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)
NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Front Side Door Window Belt Reveal Molding Screw	1.5 N.m (13 lb in)
Front Side Door Window Channel Retainer Bolt	9 N.m (80 lb in)
Front Side Door Window Regulator Bolt	11 N.m (97 lb in)
Front Side Door Window Regulator Nut	11 N.m (97 lb in)
Rear Side Door Window Belt Reveal Molding Screw	1.5 N.m (13 lb in)
Rear Side Door Window Channel Rear Retainer Bolt	9 N.m (80 lb in)
Rear Side Door Window Regulator Bolt	11 N.m (97 lb in)
Rear Side Door Window Regulator Nut	11 N.m (97 lb in)

SCHEMATIC WIRING DIAGRAMS

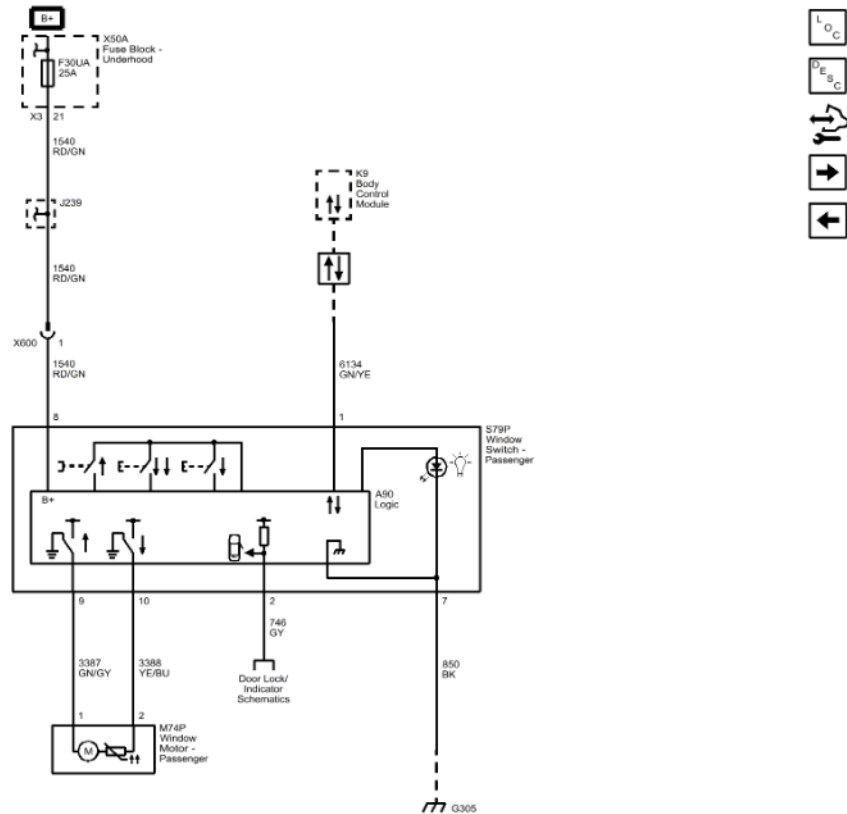
MOVEABLE WINDOW WIRING SCHEMATICS

Driver Door

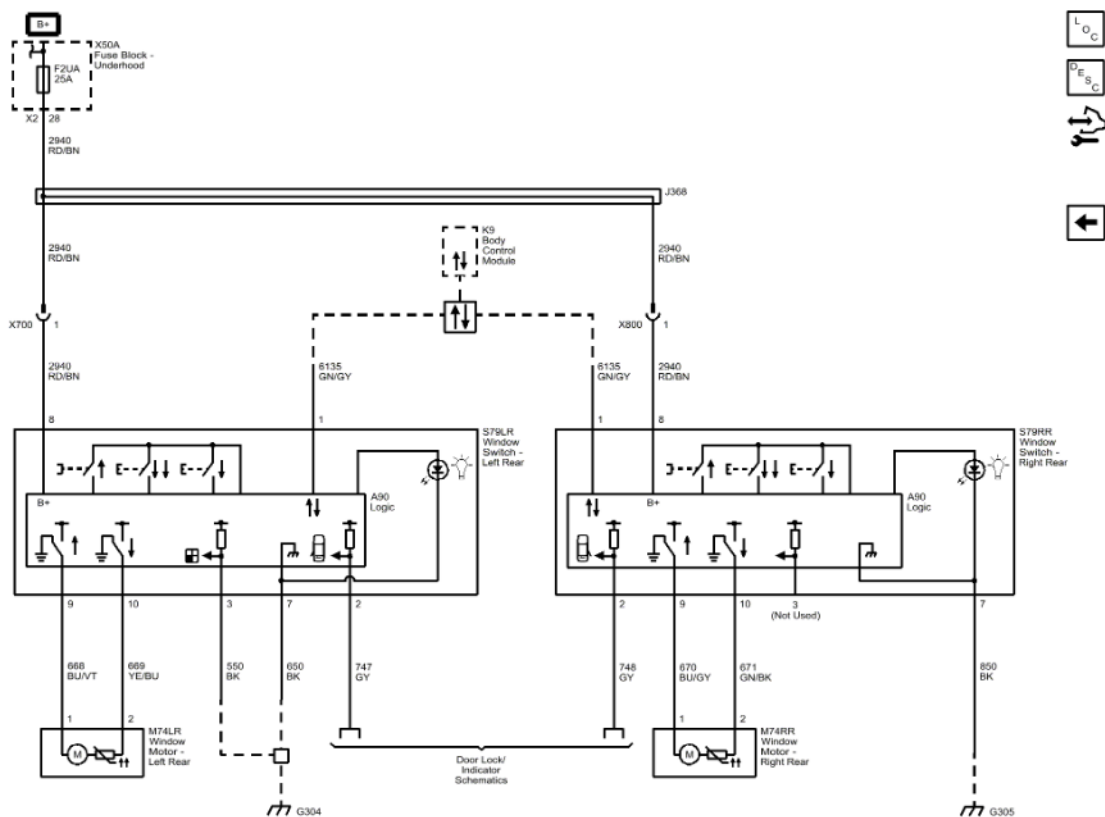


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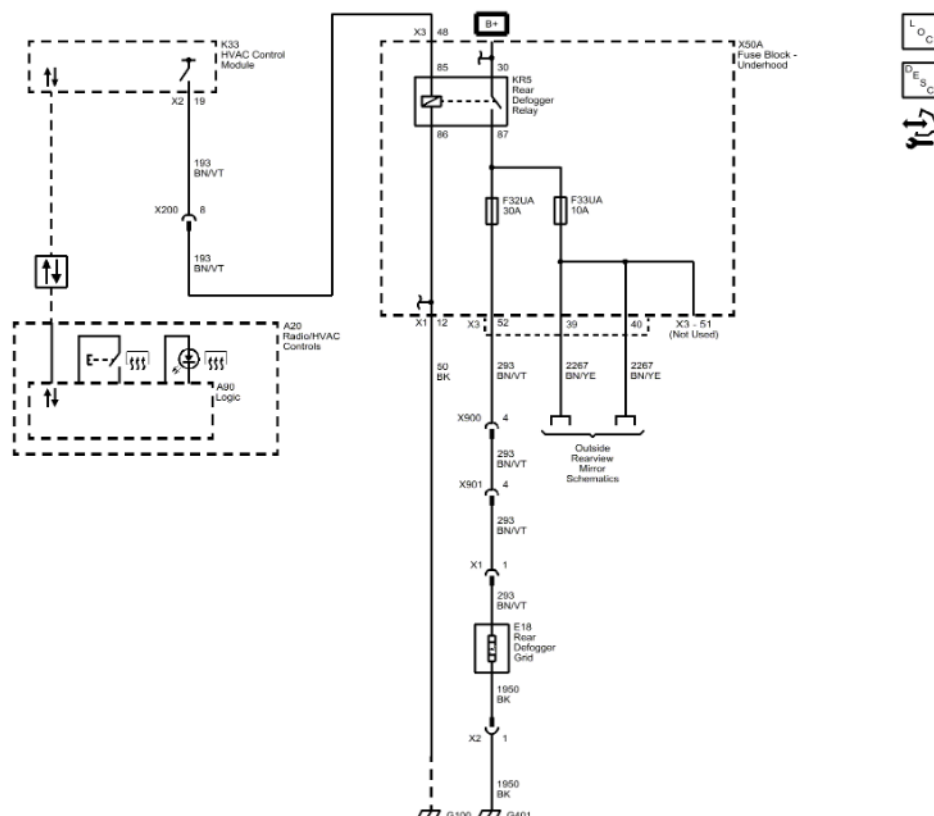


Courtesy of GENERAL MOTORS COMPANY



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Rear Window Defogger



Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B0283: REAR DEFOGGER CIRCUIT

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: [Diagnostic System Check - Vehicle](#)
- Review the description of Strategy Based Diagnosis: [Strategy Based Diagnosis](#)
- An overview of each diagnostic category can be found here: [Diagnostic Procedure Instructions](#)

DTC Descriptor

DTC B0283

Rear Defogger Circuit

Symptom Byte Information: [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control - Relay Coil	B0283 02	B0283 05	B0283 05	-
Ground - Relay Coil	-	B0283 05	-	-

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Circuit/System Description

Circuit	Description
B+ - Relay Switch	Supplied from a fuse.
E18 Rear Defogger GridControl - Component	The output circuit is switched to 12 V to activate the component.
Control - Relay Coil	The output circuit is switched to 12 V to activate the component.
E18 Rear Defogger GridGround - Component	Chassis Ground
Ground - Relay Coil	Chassis Ground

Component	Description
KR5 Rear Defogger Relay	A relay is a switch that is actuated by a solenoid.
E18 Rear Defogger Grid	Window defoggers are parallel resistive conductors in or on the glass that heat up when electric power is applied.
K33 HVAC Control Module	The control module controls a series of actuators to ensure optimal heating, ventilation and air conditioning of the passenger compartment. The control module does this by reading values from a variety of sensors and interprets the data and adjusts the actuators accordingly.
A26 HVAC Controls	This device is the user interface to control the HVAC system. Some buttons and indicators are hardwired, some functions use serial data communication.

Conditions for Running the DTC

Ignition - On / Vehicle - In Service Mode

Conditions for Setting the DTC

- B0283 02 Control Circuit = Short to Ground
- B0283 05 Control Circuit = OpenorShort to Battery

Actions Taken When the DTC Sets

- B0283 02E18 Rear Defogger Grid = Disabled
- B0283 05E18 Rear Defogger Grid = DisabledorAlways On

Conditions for Clearing the DTC

- A current DTC will clear when the diagnostic runs and passes.
- A history DTC will clear after 50 consecutive malfunction-free ignition cycles.

Reference Information

Schematic Reference

Defogger Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Component View Reference

Front of Vehicle/Engine Compartment Component Views

Electrical Information Reference

- [Circuit Testing](#)

- [Connector Repairs](#)
- [Relay Replacement \(Attached to Wire Harness\) Relay Replacement \(Within an Electrical Center\)](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#)

[Circuit/System Verification](#)

1. Ignition - On / Vehicle - In Service Mode
2. Perform the scan tool control function: Rear Defogger - On and Off

Verify the component turns On and Off: E18 Rear Defogger Grid

- **If the component does not turn On and Off**

Refer to: Circuit/System Testing

- **If the component turns On and Off**

3. All OK.

[Circuit/System Testing](#)

NOTE: It may take up to 2 min for all vehicle systems to power down before an accurate ground or low reference circuit continuity test can be performed.

1. Ignition/Vehicle & All vehicle systems - Off
2. Remove the component: KR5 Rear Defogger Relay
3. Test for less than 10 Ω between the test points: Ground circuit terminal 86 & Ground
 - **If 10 Ω or greater**
 1. Ground Connection - Disconnect
 2. Test for less than 2 Ω between the test points: Ground circuit terminal 86 & Ground Connection
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
4. Connect a test lamp between the test points: Control circuit terminal 85 & Ground circuit terminal 86
5. Ignition - On / Vehicle - In Service Mode
6. Perform the scan tool control function: Rear Defogger - On and Off

Verify the test lamp turns On and Off.

- **If the test lamp is always Off**

1. Ignition/Vehicle - Off & Remove - Test lamp
2. Disconnect the electrical connector: K33 HVAC Control Module
3. Test for infinite resistance between the test points: Control circuit terminal 85 at Relay Socket & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance
4. Test for less than 2 Ω between the test points: Control circuit terminal 85 at Relay Socket & Terminal 19 X2 at Control module harness
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Replace the component: K33 HVAC Control Module

- **If the test lamp is always On**

1. Ignition/Vehicle - Off & Remove - Test lamp
2. Disconnect the electrical connector: K33 HVAC Control Module
3. Ignition - On / Vehicle - In Service Mode
4. Test for less than 1 V between the test points: Control circuit terminal 85 at Relay Socket & Ground
 - If 1 V or greater - Repair the short to voltage on the circuit.
 - If less than 1 V - Replace the component: K33 HVAC Control Module

- **If the test lamp turns On and Off**

7. Test or replace the component: KR5 Rear Defogger Relay

Component Testing

Relay Test

1. Ignition/Vehicle - Off
2. Remove the component: KR5 Rear Defogger Relay
3. Test for 70 to 110 Ω between the test points: Component terminal 85 & Component terminal 86
 - **If not between 70 and 110 Ω**

Replace the component: KR5 Rear Defogger Relay

- **If between 70 and 110 Ω**

4. Test for infinite resistance between the test points:

- Component terminal 30 & 85
- Component terminal 30 & 86
- Component terminal 30 & 87
- Component terminal 85 & 87

- **If less than infinite resistance**

Replace the component: KR5 Rear Defogger Relay

- **If infinite resistance**

5. Connect a 3 A fused jumper wire between the test points: Component terminal 86 & 12 V

Connect a jumper wire between the test points: Component terminal 85 & Ground

6. Test for less than 2 Ω between the test points: Component terminal 30 & Component terminal 87
 - **If 2 Ω or greater**

Replace the component: KR5 Rear Defogger Relay

- **If less than 2 Ω**

7. All OK.

Repair Instructions

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

- [Relay Replacement \(Attached to Wire Harness\)](#) [Relay Replacement \(Within an Electrical Center\)](#)
- For control module replacement, programming, and setup refer to: [Control Module References](#)

DTC B316B, B317A, B318A, OR B319A: WINDOW SWITCH

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.

- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

DTC Descriptors

DTC B316B

Driver Window Switch

DTC B317A

Passenger Window Switch

DTC B318A

Left Rear Window Switch

DTC B319A

Right Rear Window Switch

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Window Switch Down Signal	B316B 02	1	1	-
Driver Window Switch Up Signal	B316B 02	2	2	-
Driver Window Switch Express Signal	B316B 02	3	3	-
1. Driver window switch down function inoperative 2. Driver window switch up function inoperative 3. Driver window switch express function inoperative				

Circuit/System Description

The driver window motor supplies 12 V signal circuits to the driver window switch, when a window switch has been activated, a switch closes providing a ground to the appropriate signal circuit causing the voltage to drop to 0 V. The driver window motor will detect the voltage drop in the signal circuit and will command the window to move in the desired direction.

The driver window/outside rearview mirror switch also contains control switches for the passenger, left rear and right rear window functions. When a window switch is pressed, a serial data message is sent to the body control module. The body control module examines the request and checks for messages from other power window motors that may prohibit window movement. If no prohibitive messages have been received, the body control module will send a serial data message to the appropriate passenger or rear window switch which will perform the command as requested.

Conditions for Running the DTC

Battery voltage must be between 9 - 16 V.

Conditions for Setting the DTC

B316B 00

The body control module has detected a control switch on the driver window/outside rearview mirror switch has been active for greater than 60 seconds.

B316B 02

The driver window motor has detected the driver window/outside rearview mirror switch is active for greater than 60 seconds.

B316B 39

The driver window motor has detected an internal failure within the driver window/outside rearview mirror switch.

B317A 02

The body control module has detected the passenger window switch is active for greater than 60 seconds.

B317A 39

The body control module has detected an internal failure within the passenger window switch.

B318A 02

The body control module has detected the left rear window switch is active for greater than 60 seconds.

B318A 39

The body control module has detected an internal failure within the left rear window switch.

B319A 02

The body control module has detected the right rear window switch is active for greater than 60 seconds.

B319A 39

The body control module has detected an internal failure within the right rear window switch.

Action Taken When the DTC Sets

The affected power window will malfunction.

Conditions for Clearing the DTC

B316B 00, B316B 02, B317A 02, B318A 02, B319A 02

- The DTC will be current for as long as the fault is present.
- The DTC will change from current to history when the fault is no longer present.
- A history DTC will clear after 100 consecutive ignition cycles if the condition for the malfunction is no longer present.

B316B 39, B317A 39, B318A 39, B319A 39

If the DTC is current, the affected window switch must be replaced before the DTC can be cleared.

Reference Information

Schematic Reference

Moveable Window Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Power Windows Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Verification

1. Vehicle in Service Mode.
2. Verify the scan tool parameters listed below change when pressing and pulling the passenger and rear window control switches on the S146 Window/Outside Rearview Mirror Switch-Driver:
 - Left Rear Main Control Down Switch - Inactive and Active
 - Left Rear Main Control Express Switch - Inactive and Active
 - Left Rear Main Control Up Switch - Inactive and Active
 - Right Rear Main Control Down Switch - Inactive and Active
 - Right Rear Main Control Express Switch - Inactive and Active
 - Right Rear Main Control Up Switch - Inactive and Active
 - Front Passenger Main Control Down Switch - Inactive and Active
 - Front Passenger Main Control Express Switch - Inactive and Active
 - Front Passenger Main Control Up Switch - Inactive and Active
 - **If any parameter does not change**

Replace the S146 Window/Outside Rearview Mirror Switch-Driver.

- **If the parameters change**
3. Verify the scan tool parameters listed below change when pressing and pulling the S79P Window Switch-Passenger, the S79LR Window Switch-Left Rear and the S79RR Window Switch-Right Rear.
 - Passenger Window Switch at Door - Inactive, Up, Down, Express Down
 - Left Rear Window Switch at Door - Inactive, Up, Down, Express Down
 - Right Rear Window Switch at Door - Inactive, Up, Down, Express Down
 - **If any parameter does not change**

Test or replace the appropriate passenger or rear S79 Window Switch

- **If all the parameters change**
4. Verify the scan tool parameters listed below change when pressing and pulling the driver window control switch on the S146 Window/Outside Rearview Mirror Switch-Driver:
 - Driver Window Main Control Down Switch - Inactive and Active
 - Driver Window Main Control Up Switch - Inactive and Active
 - Driver Window Main Control Express Down Switch - Inactive and Active
 - Driver Window Main Control Express Up Switch - Inactive and Active
 - **If any parameter does not change**

Refer to Circuit/System Testing.

- **If all the parameters change**
5. All OK.

Circuit/System Testing

1. Vehicle OFF and all vehicle systems OFF, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch-Driver. It may take up to 2 minutes for all vehicle systems

to power down.

2. Test for less than 10 Ω between the ground circuit terminal 24 and ground.

- **If 10 Ω or greater**

1. Vehicle OFF.

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

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

- **If less than 10 Ω**

3. Vehicle in Service Mode.

4. Verify a test lamp illuminates between the B+ circuit terminal 23 and ground.

- **If the test lamp does not illuminate and the circuit fuse is good**

1. Vehicle OFF.

2. Test for less than 2 Ω in the B+ circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.

- **If the test lamp does not illuminate and the circuit fuse is open**

1. Vehicle OFF.

2. Test for infinite resistance between the B+ circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the S146 Window/Outside Rearview Mirror Switch-Driver.

- **If the test lamp illuminates**

5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the ground circuit terminal 24.

NOTE: Leaving the 3 A fused jumper wire connected between the signal circuit and ground for greater than 60 sec will cause the scan tool Driver Window Main Control Down Switch parameter to change from Active to Inactive

6. Verify the scan tool Driver Window Main Control Down Switch parameter is Active

- **If not Active**

1. Vehicle OFF, remove the 3 A fused jumper wire, disconnect the harness connector at the M74D Window Motor-Driver, Vehicle in Service Mode.

2. Test for infinite resistance between the S146 Window/Outside Rearview Mirror Switch-Driver signal circuit terminal 1 and ground.

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

3. Test for less than 1 V between the S146 Window/Outside Rearview Mirror Switch-Driver signal circuit terminal 1 and ground.

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

4. Test for less than 2 Ω in the signal circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the M74D Window Motor-Driver.

- **If Active**

7. Install a 3 A fused jumper wire between the signal circuit terminal 11 and the ground circuit terminal 24.

NOTE: Leaving the 3 A fused jumper wire connected between the signal circuit and ground for greater than 60 sec will cause the scan tool Driver Window Main Control Up Switch parameter to change from Active to Inactive

8. Verify the scan tool Driver Window Main Control Up Switch parameter is Active

- **If not Active**

1. Vehicle OFF, remove the 3 A fused jumper wire, disconnect the harness connector at the M74D Window Motor-Driver, Vehicle in Service Mode.
2. Test for infinite resistance between the S146 Window/Outside Rearview Mirror Switch-Driver signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 1 V between the S146 Window/Outside Rearview Mirror Switch-Driver signal circuit 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
4. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the M74D Window Motor-Driver.

- **If Active**

9. Install a 3 A fused jumper wire between the signal circuit terminal 5 and the ground circuit terminal 24.

NOTE: Leaving the 3 A fused jumper wire connected between the signal circuit and ground for greater than 60 sec will cause the scan tool Driver Window Main Control Express Switch parameter to change from Active to Inactive

10. Verify the scan tool Driver Window Main Control Express Switch parameter is Active

- **If not Active**

1. Vehicle OFF, remove the 3 A fused jumper wire, disconnect the harness connector at the M74D Window Motor-Driver, Vehicle in Service Mode.
2. Test for infinite resistance between the S146 Window/Outside Rearview Mirror Switch-Driver signal circuit terminal 5 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 1 V between the S146 Window/Outside Rearview Mirror Switch-Driver signal circuit 5 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
4. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the M74D Window Motor-Driver.

- **If Active**

11. Test or replace the S146 Window/Outside Rearview Mirror Switch-Driver.

Repair Instructions

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

- [Front Side Door Window Switch Replacement](#)
- [Front Side Door Window Control Switch Replacement](#)
- [Rear Side Door Window Switch Replacement](#)
- [Front Side Door Window Regulator Replacement](#)
- [Rear Side Door Window Regulator Replacement](#)

Diagnostic Instructions

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

DTC Descriptors

DTC B3205

Driver Window Motor Circuit

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

Circuit/System Description

When a window switch is pressed on the driver window switch, a serial data message is sent to the body control module (BCM). The BCM examines the request and checks for messages from other power window motors prohibiting the window movement. If no prohibitive messages have been received, the BCM will send a serial data message to the passenger window motor or to the appropriate rear window switch which will perform the command as requested.

Conditions for Running the DTC

- The ignition switch is in the ON position.
- Battery voltage must be between 9 - 16 V.

Conditions for Setting the DTC

B3205 00

The BCM has detected that the compatibility code stored in the driver window motor does not match the compatibility code stored in the BCM.

B3205 39

An internal malfunction has been detected by the BCM in the driver window motor while commanding the window UP or DOWN.

B3205 42

The BCM will automatically attempt to download the calibration program into the driver window motor (As will occur when the window motor has been replaced), if the first calibration program fails to load, the BCM will attempt to download the calibration program a second time. If this download fails, the BCM will set DTC.

B3205 4B

The BCM detects that the driver window motor is "not normalized" which will occur under the following conditions:

- When the battery has been disconnected
- When the battery has been replaced
- When the door wiring harness has been disconnected
- When the window motor has been disconnected.

Action Taken When the DTC Sets

B3205 00, B3205 39, B3205 42

The driver motor will be inoperative.

B3205 4B

The driver motor will not perform the express up or express down functions and the driver information center will display Open, then Close Driver Window.

Conditions for Clearing the DTC

B3205 00

Installing a compatible window motor for that specific make and model vehicle.

B3205 39

The window motor must be replaced before the DTC can be cleared.

B3205 42

The window motor must be replaced before the DTC can be cleared.

B3205 4B

The window motor must be normalized before the DTC can be cleared.

Reference Information

Schematic Reference

Moveable Window Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Power Windows Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Verification

1. Ignition ON
2. Verify the driver window functions while commanding the Driver Window Motor Up and Down with a scan tool.
 - **If the Up and Down functions do not work**

Replace the M74D Window Motor - Driver.
 - **If the UP and DOWN functions works**
3. Verify the driver window performs the Express Up and Express Down functions with the S79D Window Switch-Driver.
 - **If the driver window does not Express Up and Express Down**

Normalize the M74D Window Motor - Driver, refer to [Window Motor Programming - Express Function](#).

- **If the driver window performs the Express Up and Express Down functions**
4. Ignition OFF and all vehicle systems OFF. It may take up to 2 minutes for all vehicle systems to power down.
 5. Ignition ON
 6. Verify the driver window performs the Express Up and Express Down functions with the S79D Window Switch-Driver.
 - **If the driver window does not Express Up and Express Down**
Replace the M74D Window Motor - Driver
 - **If the driver window performs the Express Up and Express Down functions**
 7. All OK.

Repair Instructions

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

Front Side Door Window Regulator Replacement

SYMPTOMS - FIXED AND MOVEABLE WINDOWS

Important Preliminary Checks Before Starting:

1. Perform the [Diagnostic System Check - Vehicle](#) before using the symptom tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the power window system operation or rear window defogger system operation in order to familiarize yourself with the system functions. Refer to the following:
 - [Rear Window Defogger Description and Operation](#)
 - [Power Windows Description and Operation](#)

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the rear window defogger. Refer to [Checking Aftermarket Accessories](#).
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

NOTE:

- **Inspect for proper installation of electrical components if an intermittent condition exists. Inspect for aftermarket theft deterrent devices, lights, and cellular phones. Ensure that no aftermarket equipment is connected to the class 2 circuit. If you can not locate an intermittent condition, a cellular phone signal may cause the condition. Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to [Testing for Intermittent Conditions and Poor Connections](#).**
- **The problem may or may not turn ON the SERVICE VEHICLE SOON indicator or store a DTC. Do not use the symptom tables to diagnose intermittent conditions. The malfunction must be present in order to locate the problem.**

Poor electrical connections or wiring cause most intermittent conditions. Perform a careful visual/physical check for the following conditions:

- Poor mating of the connector halves or a terminal not fully seated in the connector body

- An improperly formed or damaged terminal
- Reform or replace connector terminals in the problem circuit in order to ensure proper contact tension.
- Poor terminal to wire connection requires removing the terminal from the connector body in order to perform the check.

Use a scan tool in order to help detect intermittent conditions. The scan tool has several features that can be used to locate an intermittent condition. The snapshot feature can capture and store data parameters within the scan tool when the malfunction occurs. This information can then be reviewed in order to see what caused the malfunction.

Symptom List

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

- [Rear Window Defogger Malfunction](#)
- [Power Windows Malfunction](#)

REAR WINDOW DEFOGGER MALFUNCTION

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Relay B+	1	1	-	-
Relay Control	B0283 02	B0283 05	B0283 05	-
Rear Defogger Grid Control	1	1	2	-
Relay Ground	-	B0283 05	-	-
Rear Defogger Grid Ground	-	1	-	-
1. Rear Defogger Inoperative 2. Rear Defogger Always ON				

Circuit/System Description

When the HVAC control module receives a rear window defog request from the HVAC controls, the HVAC control module will supply voltage to the relay coil. Battery positive voltage is supplied at all times to the relay switched input and the relay coil is always grounded. This allows battery positive voltage from the relay switched input to flow through the switch contacts and out the relay switched output to the rear window defogger grid.

Diagnostic Aids

Rear window defogger indicator will still function when the switch is pressed but any of the following conditions may cause the rear window defogger not to function:

- Ambient temperature at the HVAC control module must be less than 10°C (50°F).
- System voltage is out of range.
- A DTC is set that disables rear window defogger functionality.

Reference Information

Schematic Reference

Defogger Schematics

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Rear Window Defogger Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Vehicle ON.
2. Verify the scan tool Rear Defogger Switch parameter changes between On and Off when pressing the rear window defogger switch.
 - **If the parameter does not change between On and Off**
Replace the A26 HVAC Controls.
 - **If the parameter changes between On and Off**
3. Verify the E18 Rear Defogger Grid turns ON and OFF when commanding the Rear Defogger On and Off with a scan tool.
 - **If the E18 Rear Defogger Grid does not turn ON and OFF**
Refer to Circuit/System Testing
 - **If the E18 Rear Defogger Grid turns ON and OFF**
4. Verify the rear window defogger indicator turns ON and OFF when pressing the rear window defogger switch.
 - **If the indicator does not turn ON and OFF**
Replace the A26 HVAC Controls.
 - **If the indicator turns ON and OFF**
5. All OK.

Circuit/System Testing

1. Vehicle OFF and all vehicle systems OFF, disconnect the KR5 Rear Defogger Relay. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 86 and ground.
 - **If 10 Ω or greater**
 1. Vehicle OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Vehicle in Service Mode.
4. Verify a test lamp illuminates between the B+ circuit terminal 30 and ground.

- **If the test lamp does not illuminate**
 - Replace the X50A Fuse Block-Underhood
 - **If the test lamp illuminates**
5. Connect a test lamp between the control circuit terminal 85 and the ground circuit terminal 86.
 6. Verify the test lamp turns ON and OFF pressing the rear window defogger switch.
 - **If the test lamp is always OFF**
 1. Vehicle OFF, remove the test lamp, disconnect the harness connector at the K33 HVAC Control Module.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K33 HVAC Control Module.
 - **If the test lamp is always ON**
 1. Vehicle OFF, remove the test lamp, disconnect the harness connector at the K33 HVAC Control Module, Vehicle in Service Mode.
 2. Test for less than 1 V between the control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K33 HVAC Control Module.
 - **If the test lamp turns ON and OFF**
 7. Verify that a test lamp does not illuminate between the control circuit terminal 87 and ground.
 - **If the test lamp illuminates**

Repair the short to voltage on the control circuit
 - **If the test lamp does not illuminate**
 8. Vehicle OFF and all vehicle systems OFF, disconnect the harness connector at the E18 Rear Defogger Grid. It may take up to 2 minutes for all vehicle systems to power down.
 9. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. Vehicle OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
 10. Connect the X2 harness connector at the E18 Rear Defogger Grid.
 11. Vehicle in Service Mode, connect a 30 A fused jumper wire between the B+ circuit terminal 30 and the control circuit terminal 87.
 12. Verify the E18 Rear Defogger Grid is activated.
 - **If the E18 Rear Defogger Grid does not activate**
 1. Vehicle OFF, remove the jumper wire, disconnect the harness connector at the E18 Rear Defogger Grid.
 2. Test for infinite resistance between the control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the E18 Rear Defogger Grid.
 - **If the E18 Rear Defogger Grid activates**
 13. Test or replace the KR5 Rear Defogger Relay.

Component Testing

Relay Test

1. Vehicle OFF, disconnect the KR5 Rear Defogger Relay.
2. Test for 60-180 Ω between terminals 85 and 86.

- **If less than 60 Ω or greater than 180 Ω**

Replace the KR5 Rear Defogger Relay.

- **If between 60-180 Ω**

3. Test for infinite resistance between the terminals listed below:

- 30 and 86
- 30 and 87
- 30 and 85
- 85 and 87

- **If less than infinite resistance**

Replace the KR5 Rear Defogger Relay.

- **If infinite resistance**

4. Install a 3 A fused jumper wire between relay terminal 86 and 12 V. Install a jumper wire between relay terminal 85 and ground.
5. Test for less than 2 Ω between terminals 30 and 87.

- **If 2 Ω or greater**

Replace the KR5 Rear Defogger Relay.

- **If less than 2 Ω**

6. All OK

Repair Instructions

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

- [Rear Window Replacement](#)
- [Relay Replacement \(Attached to Wire Harness\)](#) [Relay Replacement \(Within an Electrical Center\)](#)
- [Control Module References](#) for HVAC control module and HVAC controls replacement, programming and setup

POWER WINDOWS MALFUNCTION

Diagnostic Instructions

- Perform the Diagnostic System Check prior to using this diagnostic procedure: [Diagnostic System Check - Vehicle](#)
- Review the description of Strategy Based Diagnosis: [Strategy Based Diagnosis](#)
- An overview of each diagnostic category can be found here: [Diagnostic Procedure Instructions](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+ - S146 Window/Outside Rearview Mirror Switch - Driver	U1538 00	U1538 00	-	-
B+ - S146 Window/Outside Rearview Mirror Switch - Driver	U1534 00	U1534 00	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+ - S79P Window Switch - Passenger	U153A 00	U153A 00	-	-
B+ - S79RR Window Switch - Right Rear	U1534 00, U154A 00	U154A 00	-	-
B+ - S79LR Window Switch - Left Rear	U1534 00, U154A 00	U1534 00	-	-
Serial Data - S146 Window/Outside Rearview Mirror Switch - Driver	U1534 00, U1538 00, U153A 00	U1538 00	U1538 00	-
Serial Data - M74D Window Motor - Driver	U1534 00, U1538 00, U153A 00	U1534 00	U1534 00	-
Serial Data - S79P Window Switch - Passenger	U1534 00, U1538 00, U153A 00	U153A 00	U153A 00	-
Serial Data - S79LR Window Switch - Left Rear	U1534 00, U154A 00	U1534 00	U1534 00	-
Serial Data - S79RR Window Switch - Right Rear	U1534 00, U154A 00	U154A 00	U154A 00	-
Power Window Master Switch Left Front Down Signal	B316B 02	1	1	B316B 39
Power Window Switch Driver Express Signal	1	1	1	B316B 39
Power Window Master Switch Left Front Up Signal	B316B 02	1	1	B316B 39
Control - M74P Window Motor - Passenger	2	2	2	-
Control - M74LR Window Motor - Left Rear	3	3	3	-
Control - M74RR Window Motor - Right Rear	4	4	4	-
Ground - S146 Window/Outside Rearview Mirror Switch - Driver	-	U1538 00	-	-
Ground - M74D Window Motor - Driver	-	U1534 00	-	-
Ground - S79P Window Switch - Passenger	-	U153A 00	-	-
Ground - S79LR Window Switch - Left Rear	-	U1534 00	-	-
Ground - S79RR Window Switch - Right Rear	-	U154A 00	-	-
1. M74D Window Motor - Driver = Inoperative 2. M74P Window Motor - Passenger = Inoperative 3. M74LR Window Motor - Left Rear = Inoperative 4. M74RR Window Motor - Right Rear = Inoperative				

Circuit/System Description

For an overview of the component/system, refer to: [Power Windows Description and Operation](#)

Circuit	Description
B+ - M74D Window Motor - Driver	Supplied from a fuse. cardiagh.com
B+ - M74P Window Motor - Passenger	Supplied from a fuse.

Circuit	Description
B+ - S79LR Window Switch - Left Rear	Supplied from a fuse.
B+ - S79RR Window Switch - Right Rear	Supplied from a fuse.
Power Window Switch Driver Down Signal	The output circuit is switched to ground to activate the component.
Power Window Switch Driver Express Signal	The output circuit is switched to ground to activate the component.
Power Window Switch Driver Up Signal	The output circuit is switched to ground to activate the component.
Power Window Motor Passenger Down Control	The output circuit is switched from ground to 12 V to activate the component.
Power Window Motor Passenger Up Control	The output circuit is switched from ground to 12 V to activate the component.
Power Window Motor Left Rear Up Control	The output circuit is switched from ground to 12 V to activate the component.
Power Window Motor Left Rear Down Control	The output circuit is switched from ground to 12 V to activate the component.
Power Window Motor Right Rear Up Control	The output circuit is switched from ground to 12 V to activate the component.
Power Window Motor Right Rear Down Control	The output circuit is switched from ground to 12 V to activate the component.
Ground	Chassis Ground

Component	Description
S146 Window/Outside Rearview Mirror Switch - Driver	The S146 sends a serial data message to the K9 indicating the M74 function that has been requested.
M74D Window Motor - Driver	- Power Window Control - The control module and the DC motor are one assembly.
S79P Window Switch - Passenger	The switch has a normally open contact.
M74P Window Motor - Passenger	An electric DC motor.
S79LR Window Switch - Left Rear	The switch has a normally open contact.
M74LR Window Motor - Left Rear	An electric DC motor.
S79RR Window Switch - Right Rear	The switch has a normally open contact.
M74RR Window Motor - Right Rear	An electric DC motor.
K9 Body Control Module	The module controls various vehicle functions like lighting, central door locking, power windows, etc.

Diagnostic Aids

M74D Window Motor - Driver - Window Express Up System Not Initialized

- Battery - Disconnected/Replaced
- Front Side Door Wiring Harness - Disconnected
- M74 Window Motor - Disconnected

M74D Window Motor - Driver - Normalized - [Window Motor Programming - Express Function](#)

Reference Information

Schematic Reference

[Moveable Window Schematics](#)

Connector End View Reference

Component View Reference

Door Component Views

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

Control Module References

Circuit/System Verification

1. Ignition - On / Vehicle - In Service Mode
2. Perform the scan tool control function: Driver Window Motor - Up & Down

Verify the component operates in both directions: M74D Window Motor - Driver

- **If not the specified state**

Refer to: Circuit/System Testing - Test 1

- **If the specified state**

3. Operate the component: Driver Left Front Window Switch - Pressed & Pulled

Verify the component works as specified: M74D Window Motor - Driver = Up/Express Up /Down/Express Down

- **If not the specified state**

Refer to: Circuit/System Testing - Test 2

- **If the specified state**

4. S146 Window/Outside Rearview Mirror Switch - Driver - Not Pressed

Verify the scan tool parameter:

- Left Rear Window Main Control Down Switch = Inactive
- Left Rear Window Main Control Express Switch = Inactive
- Left Rear Window Main Control Up Switch = Inactive
- Right Rear Window Main Control Down Switch = Inactive
- Right Rear Window Main Control Express Switch = Inactive
- Right Rear Window Main Control Up Switch = Inactive
- Front Passenger Window Main Control Down Switch = Inactive
- Front Passenger Window Main Control Express Switch = Inactive
- Front Passenger Window Main Control Up Switch = Inactive
- **If not the specified state**

Test or replace the component: S146 Window/Outside Rearview Mirror Switch - Driver

- **If the specified state**

5. Operate the component: S146 Window/Outside Rearview Mirror Switch - Driver-Left Rear Window Switch - Pressed & Pulled

Verify the scan tool parameter:

- Left Rear Window Main Control Down Switch = Active
- Left Rear Window Main Control Express Switch = Active
- Left Rear Window Main Control Up Switch = Active
- **If not the specified state**

Test or replace the component: S146 Window/Outside Rearview Mirror Switch - Driver

- **If the specified state**

6. Operate the component: S146 Window/Outside Rearview Mirror Switch - Driver-Right Rear Window Switch - Pressed & Pulled

Verify the scan tool parameter:

- Right Rear Window Main Control Down Switch = Active
- Right Rear Window Main Control Express Switch = Active
- Right Rear Window Main Control Up Switch = Active
- **If not the specified state**

Test or replace the component: S146 Window/Outside Rearview Mirror Switch - Driver

- **If the specified state**

7. Operate the component: S146 Window/Outside Rearview Mirror Switch - Driver-Right Front Window Switch - Pressed & Pulled

Verify the scan tool parameter:

- Front Passenger Window Main Control Down Switch = Active
- Front Passenger Window Main Control Express Switch = Active
- Front Passenger Window Main Control Up Switch = Active
- **If not the specified state**

Test or replace the component: S146 Window/Outside Rearview Mirror Switch - Driver

- **If the specified state**

8. Perform the scan tool control function: Passenger Window Motor - Up & Down

Verify the component works as specified: M74P Window Motor - Passenger = Up & Down

- **If not the specified state**

Refer to: Circuit/System Testing - Test 3

- **If the specified state**

9. Perform the scan tool control function: Left Rear Window Motor - Up & Down

Verify the component works as specified: M74LR Window Motor - Left Rear = Up & Down

- **If not the specified state**

Refer to: Circuit/System Testing - Test 3

- **If the specified state**

10. Perform the scan tool control function: Right Rear Window Motor - Up & Down

Verify the component works as specified: M74RR Window Motor - Right Rear = Up & Down

- **If not the specified state**

- **If the specified state**

11. All OK.

Circuit/System Testing

Test 1

NOTE: It may take up to 2 min for all vehicle systems to power down before an accurate ground or low reference circuit continuity test can be performed.

1. Ignition/Vehicle & All vehicle systems - Off
2. Disconnect the electrical connector: M74D Window Motor - Driver
3. Test for less than 10 Ω between the test points: Ground circuit terminal 1 & Ground
 - **If 10 Ω or greater**
 1. Ground Connection - Disconnect
 2. Test for less than 2 Ω between the test points: Ground circuit terminal 1 at Component harness & Ground Connection
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
4. Ignition - On / Vehicle - In Service Mode
5. Verify a test lamp turns On between the test points: B+ circuit terminal 2 & Ground
 - **If the test lamp does not turn On and the circuit fuse is OK**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 2. Test for less than 2 Ω between the test points: M74D Window Motor - Driver B+ circuit terminal 2 at Output terminal at F28UA Fuse
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not turn On and the circuit fuse is open**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 2. Test for infinite resistance between the test points: B+ circuit terminal 2 & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance - Replace the component: M74D Window Motor - Driver
 - **If the test lamp turns On**
6. Test or replace the component: M74D Window Motor - Driver

Test 2

NOTE: It may take up to 2 min for all vehicle systems to power down before an accurate ground or low reference circuit continuity test can be performed.

1. Ignition/Vehicle & All vehicle systems - Off
2. Disconnect the electrical connector: S146 Window/Outside Rearview Mirror Switch - Driver
3. Test for less than 10 Ω between the test points: Ground circuit terminal 24 & Ground
 - **If 10 Ω or greater**
 1. Ground Connection - Disconnect
 2. Test for less than 2 Ω between the test points: Ground circuit terminal 24 at Component harness & Ground Connection
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Repair the open/high resistance in the ground connection.

- **If less than 10 Ω**
4. Ignition - On / Vehicle - In Service Mode
 5. Verify a test lamp turns On between the test points: B+ circuit terminal 23 & Ground
 - **If the test lamp does not turn On and the circuit fuse is OK**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not turn On and the circuit fuse is open**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 2. Test for infinite resistance between the test points: B+ circuit terminal 23 & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance - Replace the component: S146 Window/Outside Rearview Mirror Switch - Driver
 - **If the test lamp turns On**
 6. Verify the scan tool parameter: Driver Window Main Control Down Switch = Inactive
 - **If not the specified state**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: M74D Window Motor - Driver
 3. Test for infinite resistance between the test points: Signal circuit terminal 1 at Component harness & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance - Replace the component: M74D Window Motor - Driver
 - **If the specified state**
 7. Momentarily connect a 3 A fused jumper wire between the test points: Signal circuit terminal 1 & Ground circuit terminal 24

Verify the scan tool parameter: Driver Window Main Control Down Switch = Active

- **If not the specified state**
 1. Ignition/Vehicle - Off & Remove - Jumper wire(s)
 2. Disconnect the electrical connector: M74D Window Motor - Driver
 3. Ignition - On / Vehicle - In Service Mode
 4. Test for less than 1 V between the test points: Signal circuit terminal 1 at Component harness & Ground
 - If 1 V or greater - Repair the short to voltage on the circuit.
 - If less than 1 V
 5. Ignition/Vehicle - Off
 6. Test for less than 2 Ω between the test points: Signal circuit terminal 1 at Component harness & Terminal 7 at M74D Window Motor - Driver
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Replace the component: M74D Window Motor - Driver
 - **If the specified state**
- 8. Verify the scan tool parameter: Driver Window Main Control Up Switch = Inactive
 - **If not the specified state**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: M74D Window Motor - Driver
 3. Test for infinite resistance between the test points: Signal circuit terminal 11 at Component harness & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance - Replace the component: M74D Window Motor - Driver
 - **If the specified state**

9. Momentarily connect a 3 A fused jumper wire between the test points: Signal circuit terminal 11 & Ground circuit terminal 24

Verify the scan tool parameter: Driver Window Main Control Up Switch = Active

- **If not the specified state**

1. Ignition/Vehicle - Off & Remove - Jumper wire(s)
2. Disconnect the electrical connector: M74D Window Motor - Driver
3. Ignition - On / Vehicle - In Service Mode
4. Test for less than 1 V between the test points: Signal circuit terminal 11 at Component harness & Ground
 - If 1 V or greater - Repair the short to voltage on the circuit.
 - If less than 1 V
5. Ignition/Vehicle - Off
6. Test for less than 2 Ω between the test points: Signal circuit terminal 11 at Component harness & Terminal 3 at M74D Window Motor - Driver
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Replace the component: M74D Window Motor - Driver

- **If the specified state**

10. Test for greater than 10 V between the test points: Signal circuit terminal 5 at Component harness & Ground
 - **If 10 V or less**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: M74D Window Motor - Driver
 3. Test for infinite resistance between the test points: Signal circuit terminal 5 at Component harness & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If less than infinite resistance
 1. Ignition/Vehicle - Off
 2. Test for less than 2 Ω between the test points: Signal circuit terminal 11 at Component harness & Signal circuit terminal 3 at M74D Window Motor - Driver
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Replace the component: M74D Window Motor - Driver
 - **If the specified state**
 - 11. Test or replace the component: S146 Window/Outside Rearview Mirror Switch - Driver

Test 3

NOTE: It may take up to 2 min for all vehicle systems to power down before an accurate ground or low reference circuit continuity test can be performed.

1. Ignition/Vehicle & All vehicle systems - Off
2. Disconnect the appropriate electrical connector: S79P Window Switch - Passenger/S79LR Window Switch - Left Rear/S79RR Window Switch - Right Rear
3. Test for less than 10 Ω between the test points: Ground circuit terminal 7 & Ground
 - **If 10 Ω or greater**
 1. Ground Connection - Disconnect
 2. Test for less than 2 Ω between the test points: Ground circuit terminal 7 at Component harness & Ground Connection
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Repair the open/high resistance in the ground connection.cardiagn.com
 - **If less than 10 Ω**

4. Ignition - On / Vehicle - In Service Mode
5. Verify a test lamp turns On between the test points: B+ circuit terminal 8 & Ground
 - **If the test lamp does not turn On and the circuit fuse is OK**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Verify the fuse is OK and there is voltage at the fuse.
 - **If the test lamp does not turn On and the circuit fuse is open**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 2. Test for infinite resistance between the test points: B+ circuit terminal 8 & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance - Replace the component: S79 Window Switch
 - **If the test lamp turns On**
6. Ignition/Vehicle - Off
7. Connect the electrical connector: S79 Window Switch
8. Disconnect the electrical connector: M74 Window Motor
9. Connect a test lamp between the test points: Control circuit terminal 1 & Control circuit terminal 2
10. Ignition - On / Vehicle - In Service Mode
11. Perform the scan tool control function: Window Motor

Verify the test lamp state:

Window Motor - Stop = Test lamp Off

Window Motor - Up = Test lamp On

Window Motor - Down = Test lamp On

- **If not the specified state**
 1. Ignition/Vehicle - Off & Remove - Test lamp
 2. Disconnect the electrical connector: S79 Window Switch
 3. Ignition - On / Vehicle - In Service Mode
 4. Test for less than 1 V between the test points:
 - Control circuit terminal 1 at Component harness & Ground
 - Control circuit terminal 2 at Component harness & Ground
 - If 1 V or greater - Repair the short to voltage on the circuit.
 - If less than 1 V
 5. Ignition/Vehicle - Off
 6. Test for infinite resistance between the test points:
 - Control circuit terminal 1 at Component harness & Ground
 - Control circuit terminal 2 at Component harness & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - If infinite resistance
 7. Test for less than 2 Ω between the test points:
 - Control circuit terminal 1 at Component harness & Control circuit terminal 10 at S79 Window Switch
 - Control circuit terminal 2 at Component harness & Control circuit terminal 9 at S79 Window Switch
 - If 2 Ω or greater - Repair the open/high resistance in the circuit.
 - If less than 2 Ω - Replace the component: S79 Window Switch
 - **If the specified state**
12. Test or replace the component: M74 Window Motor

Component Testing

M74P Window Motor - Passenger/M74LR Window Motor - Left Rear/M74RR Window Motor - Right Rear

1. Ignition/Vehicle - Off
2. Disconnect the appropriate electrical connector:
 - M74P Window Motor - Passenger
 - M74LR Window Motor - Left Rear
 - M74RR Window Motor - Right Rear
3. Connect a 25 A fused jumper wire between the test points: Control terminal 1 & B+

CAUTION: Complete the testing as quickly as possible in order to prevent overheating and damaging the component.

4. Momentarily connect a jumper wire between the test points: Control terminal 2 & Ground

Reverse the jumper wires 2 times between the terminals.

Verify the component works as specified: M74 Window Motor = Up & Down

- **If not the specified state**

Replace the component:

- M74P Window Motor - Passenger
- M74LR Window Motor - Left Rear
- M74RR Window Motor - Right Rear
- **If the specified state**

5. All OK.

Repair Instructions

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

- [Front Side Door Window Switch Replacement](#)
- [Front Side Door Window Control Switch Replacement](#)
- [Rear Side Door Window Switch Replacement](#)
- [Front Side Door Window Regulator Replacement](#)
- [Rear Side Door Window Regulator Replacement](#)

REPAIR INSTRUCTIONS

WINDSHIELD REPLACEMENT

Special Tools

- **BO-24402-A** Glass Sealant Remover (Cold Knife).
- **BO-39032** Stationary Glass Removal Tool, or equivalent in order to remove the window.
- Use a urethane adhesive systems which meet GM Specification GM 3651G

Equivalent regional tools: [Special Tools](#)

Removal Procedure

NOTE: Before cutting out a stationary window, apply a double layer of masking tape around the perimeter of the painted surfaces and the interior trim.

1. Open the hood.
2. Battery Negative Cable - Disconnect - [Battery Negative Cable Disconnection and Connection](#)

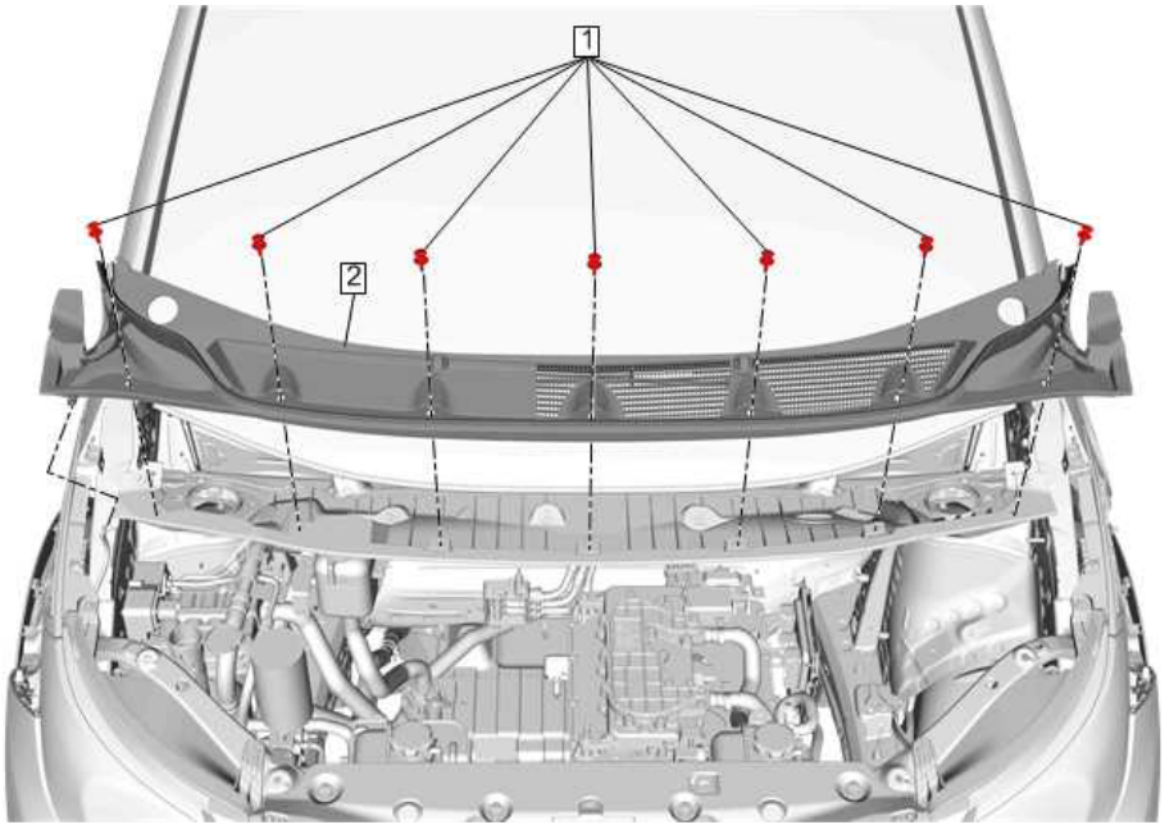


Fig. 5: Air Inlet Grille Panel

Courtesy of GENERAL MOTORS COMPANY

3. Air Inlet Grille Panel - Remove - [Air Inlet Grille Panel Replacement](#)

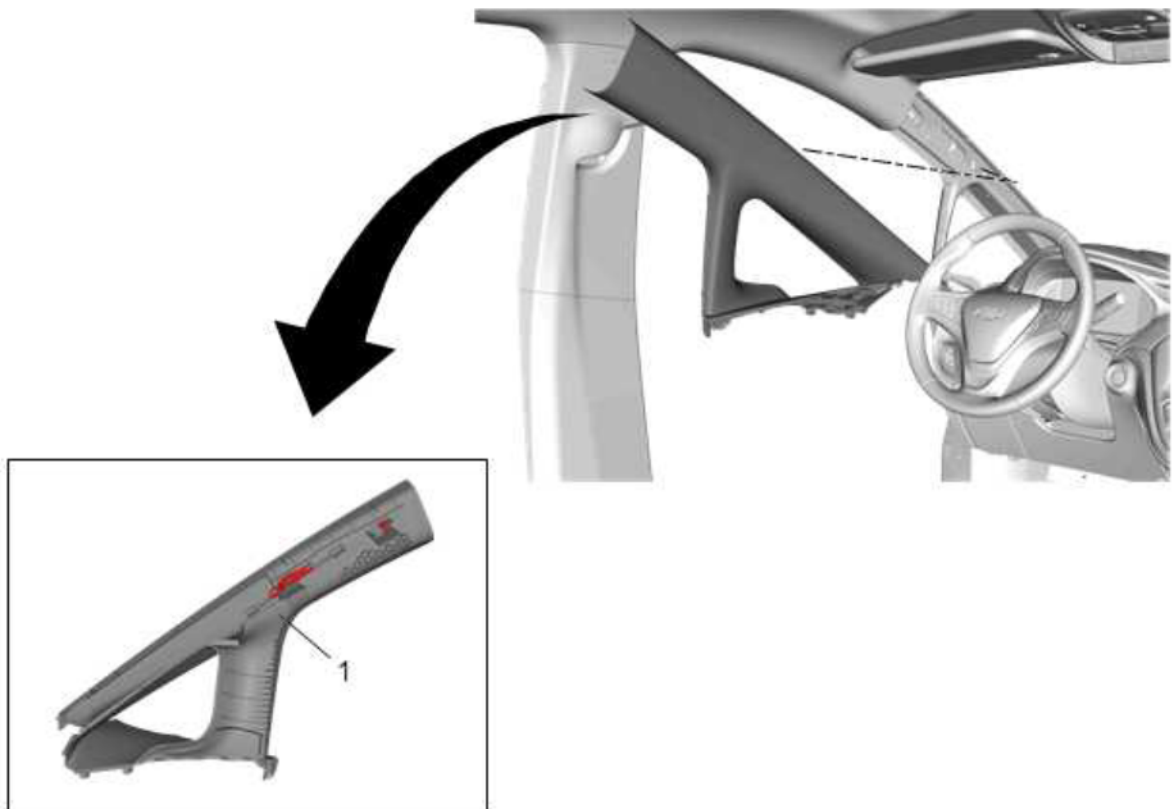


Fig. 6: Windshield Garnish Molding

Courtesy of GENERAL MOTORS COMPANY

4. Windshield Garnish Molding - Remove - [Windshield Garnish Molding Replacement](#)

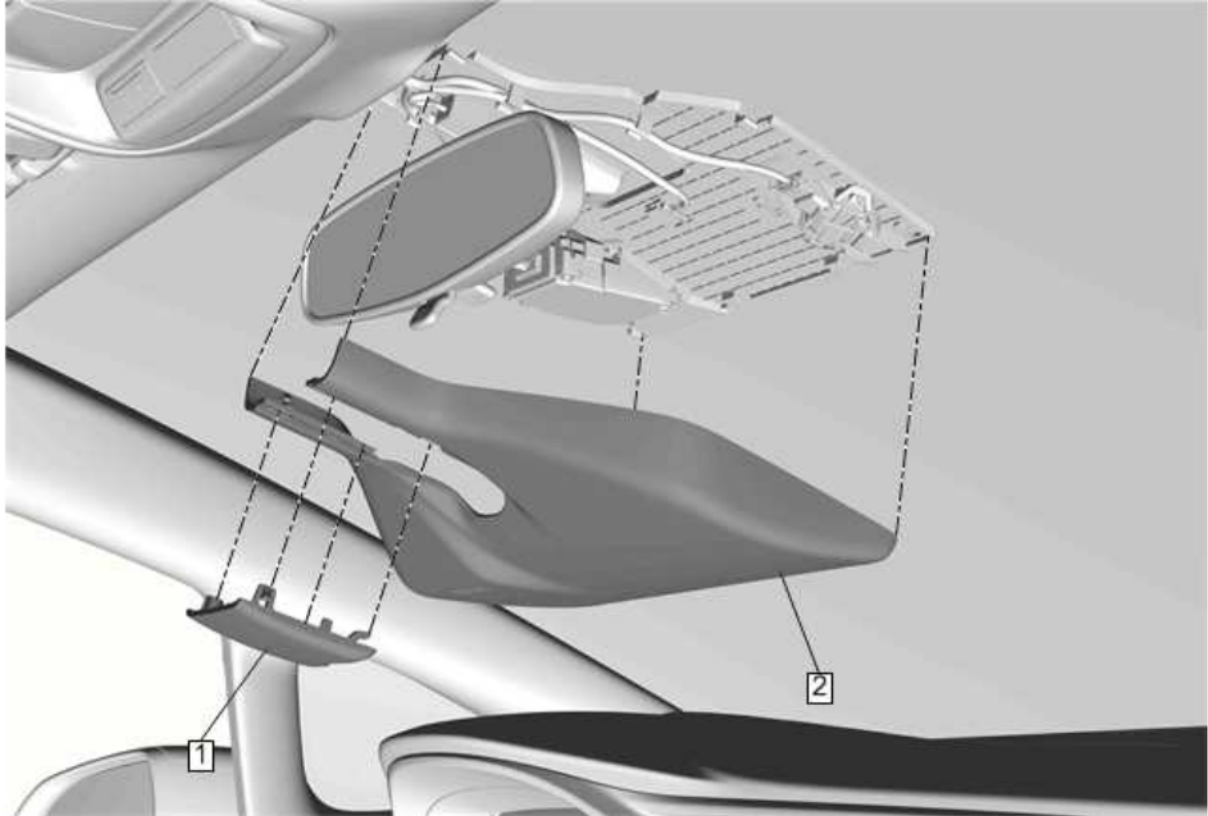


Fig. 7: Windshield Multifunction Sensor Mount Bracket Cover

Courtesy of GENERAL MOTORS COMPANY

5. Windshield Multifunction Sensor Mount Bracket Cover - Remove - **Windshield Multifunction Sensor Mount Bracket Cover Replacement (with Front View Camera)** **Windshield Multifunction Sensor Mount Bracket Cover Replacement (without Front View Camera)**

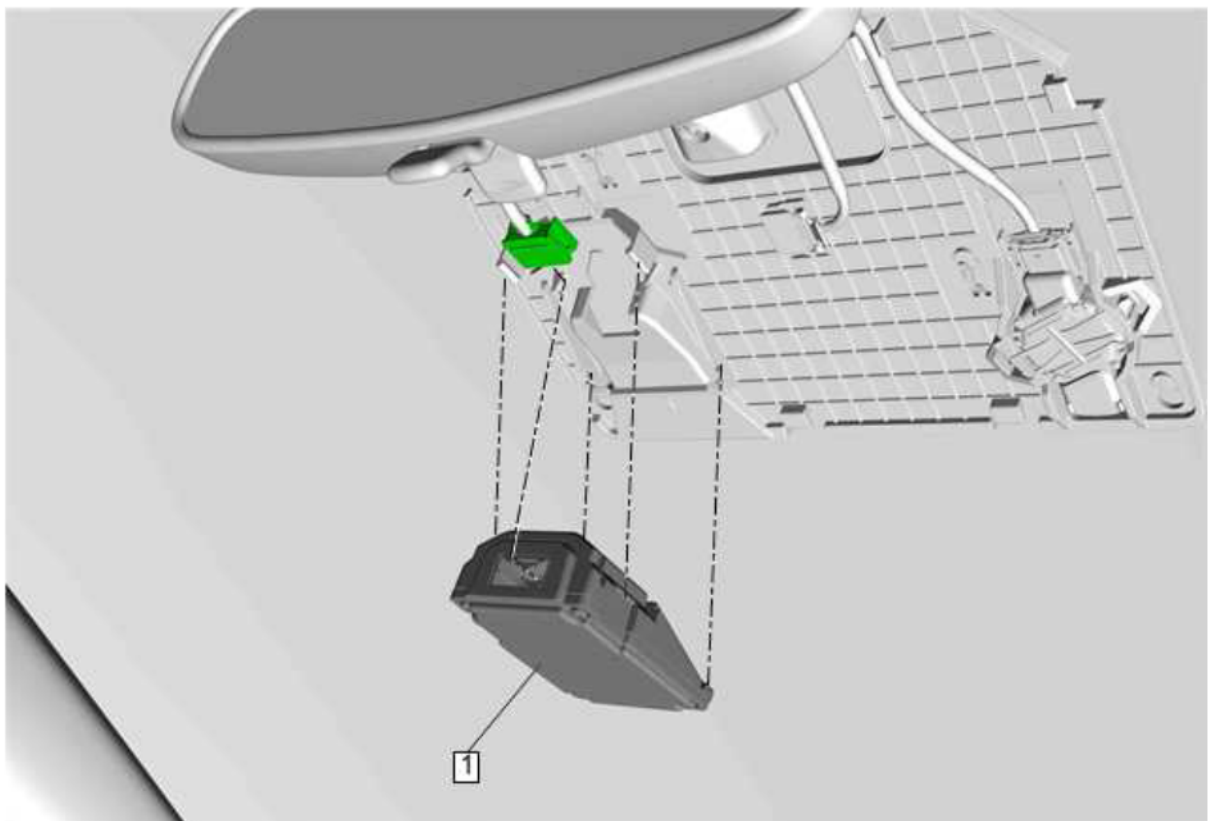


Fig. 8: Front View Camera

Courtesy of GENERAL MOTORS COMPANY

6. { If equipped } Front View Camera - Remove - **Front View Camera Replacement**

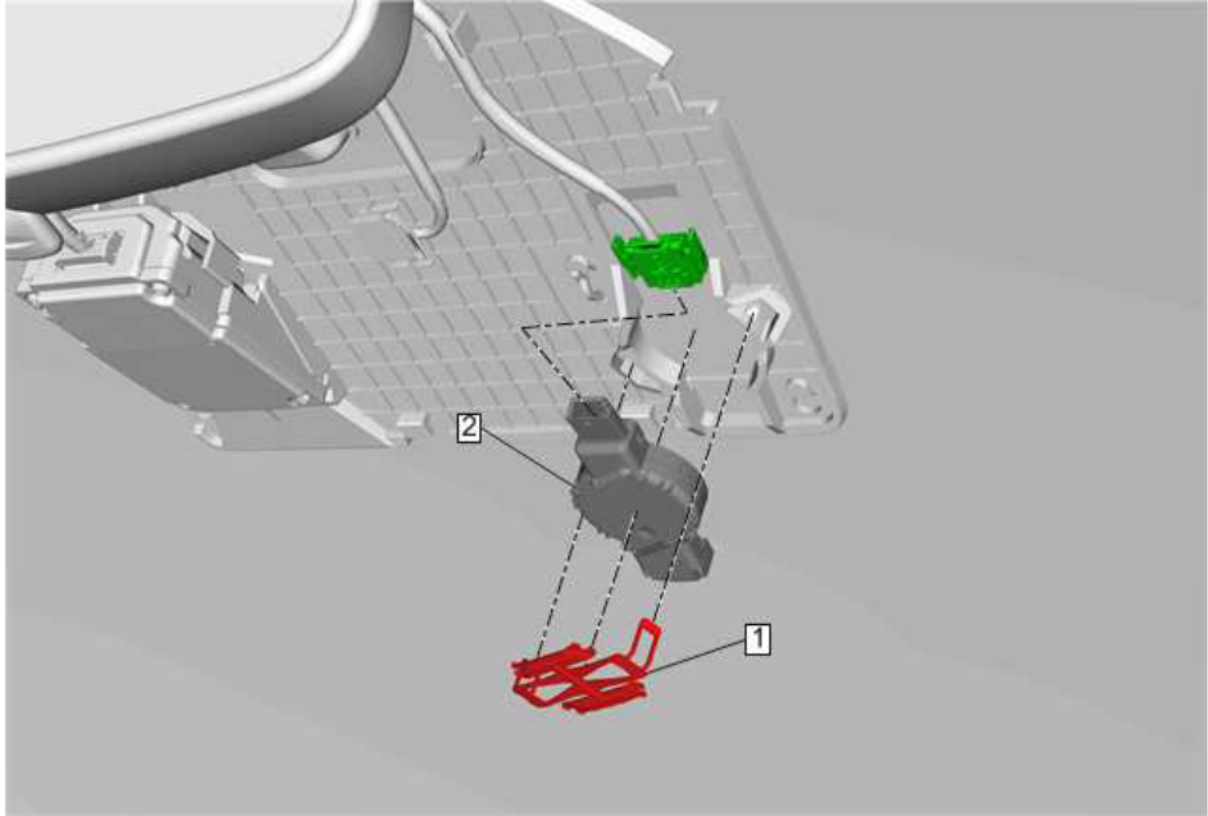


Fig. 9: Inside Air Moisture and Windshield Temperature Sensor

Courtesy of GENERAL MOTORS COMPANY

7. { If equipped } Inside Air Moisture and Windshield Temperature Sensor - Remove - **Inside Air Moisture and Windshield Temperature Sensor Replacement (With Front View Camera)** **Inside Air Moisture and Windshield Temperature Sensor Replacement (Without Front View Camera)**

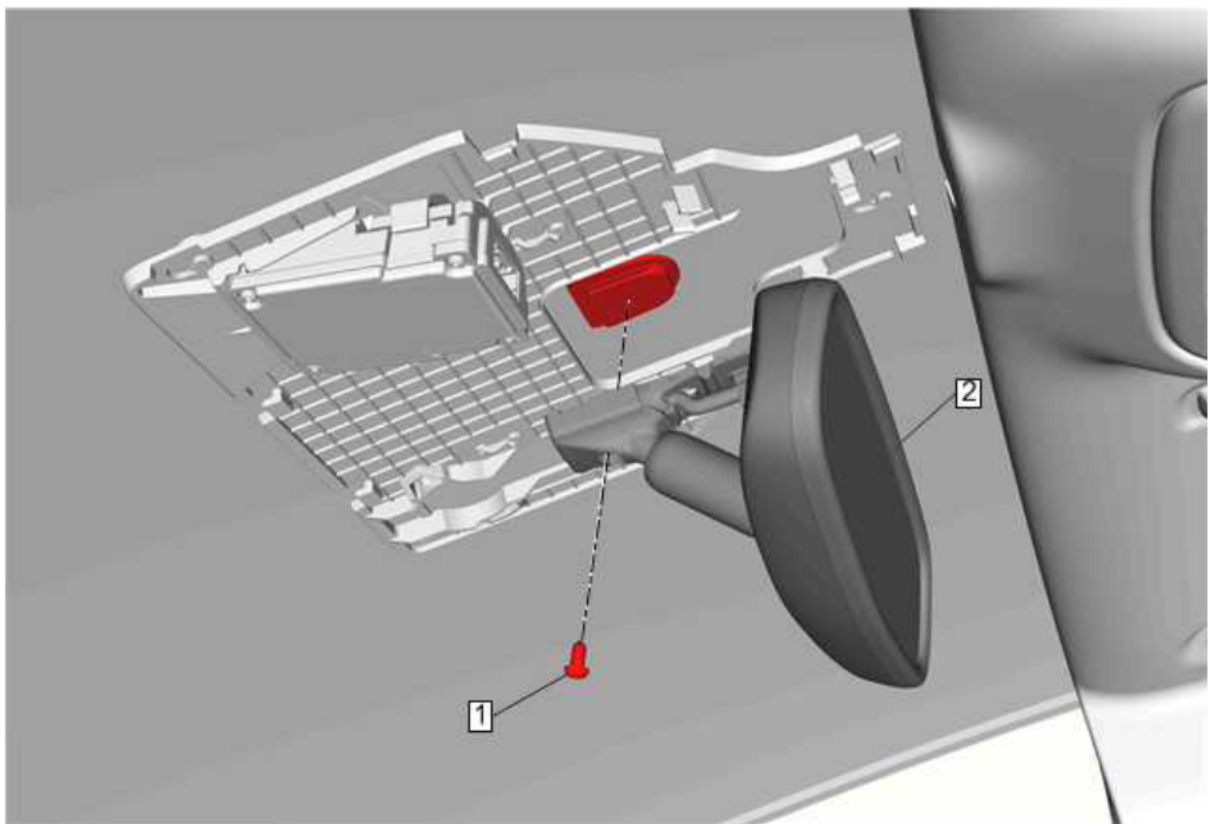


Fig. 10: Inside Rearview Mirror

Courtesy of GENERAL MOTORS COMPANY

8. Inside Rearview Mirror - Remove - **Inside Rearview Mirror Replacement**

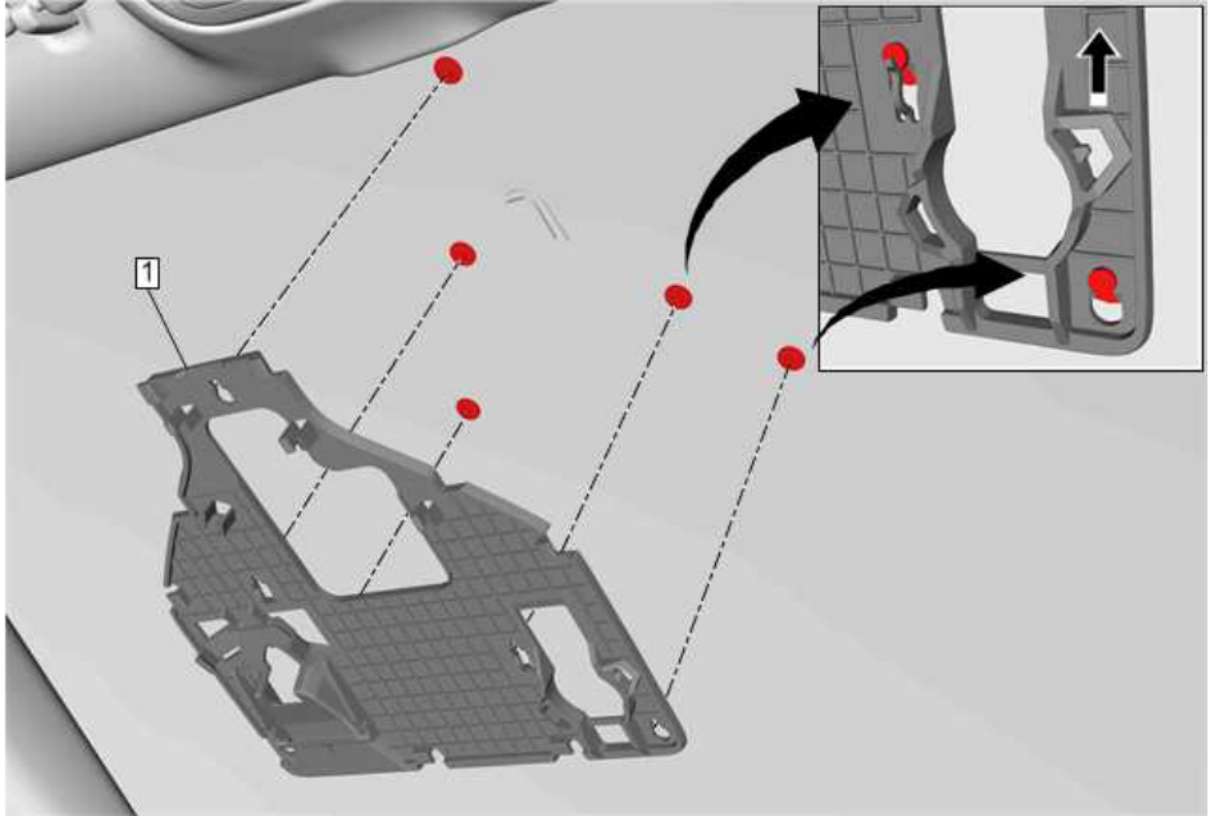


Fig. 11: Multifunction Relay Module Bracket (With Front View Camera)

Courtesy of GENERAL MOTORS COMPANY

9. Multifunction Relay Module Bracket - Remove - **Multifunction Relay Module Bracket Replacement (with Front View Camera) Multifunction Relay Module Bracket Replacement (without Front View Camera)**

WARNING: If broken glass falls into the defroster outlets, it can be blown into the passenger compartment and cause personal injury.

10. Cover to protect the following parts from broken glass:
- Upper Dash Pad
 - The defroster outlets and A/C outlets
 - The seats and carpeting
11. Remove the lower windshield supports from the cowl panel, if equipped.

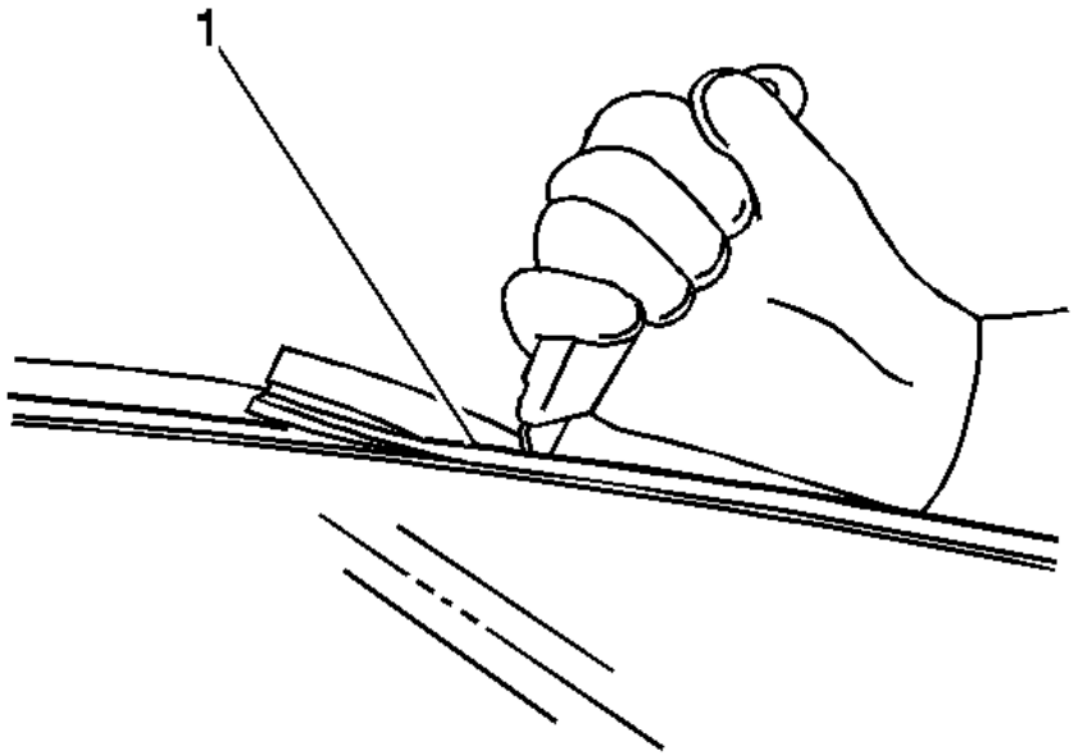


Fig. 12: Using Utility Knife To Remove Reveal Molding
Courtesy of GENERAL MOTORS COMPANY

WARNING: When working with any type of glass or sheet metal with exposed or rough edges, wear approved safety glasses and gloves in order to reduce the chance of personal injury.

12. Using the appropriate tool, carefully cut around the lace (1), start in the center working from side to side of the window to access the urethane adhesive bead, if equipped.

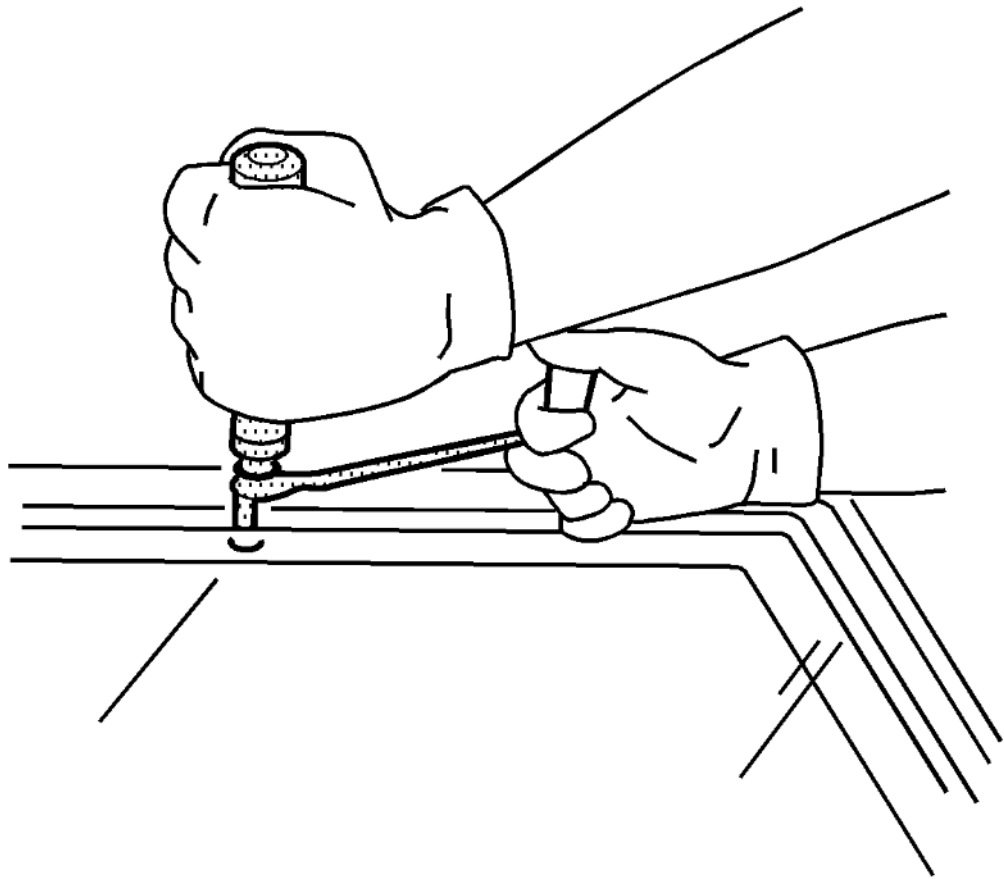


Fig. 13: Separating Urethane Adhesive From Window
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Keep the cutting edge of the tool against the window.

13. This will allow the urethane adhesive to be separated from the windshield.
 - Leave a base of urethane on the pinchweld flange.
 - The only suitable lubrication is clear water.
 - **BO-24402-A** Glass Sealant Remover (Cold Knife).
 - **BO-39032** Stationary Glass Removal Tool, or equivalent in order to remove the window.

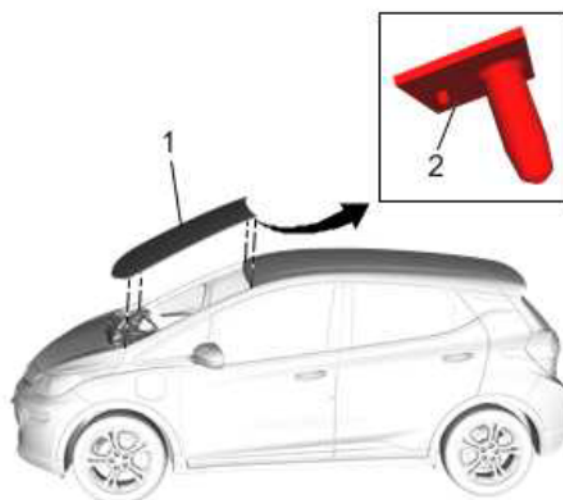


Fig. 14: Windshield And Locating Pin
 Courtesy of GENERAL MOTORS COMPANY

14. With the aid of an assistant, remove the windshield and locating pin from the vehicle.

Installation Procedure

1. Windshield - Install - [Adhesive Installation of Windshields](#)

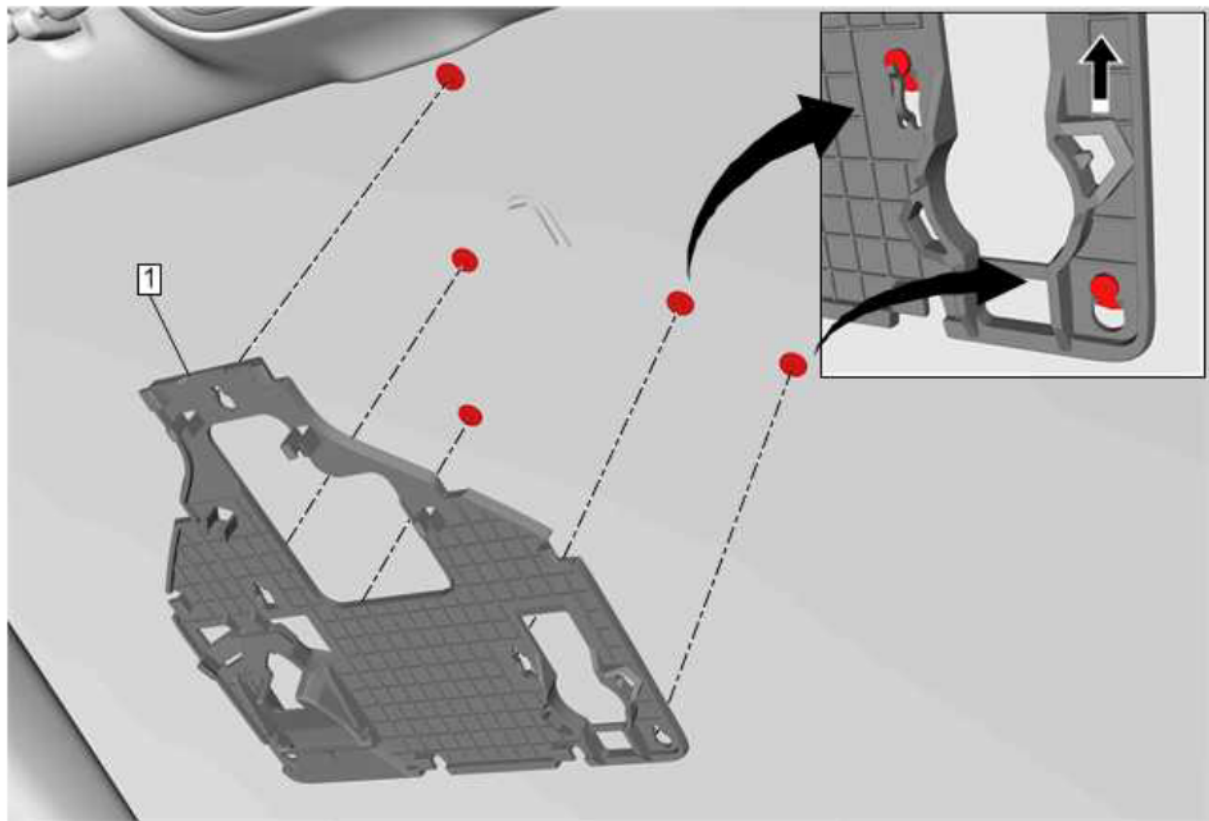


Fig. 15: Multifunction Relay Module Bracket (With Front View Camera)

Courtesy of GENERAL MOTORS COMPANY

2. Multifunction Relay Module Bracket - Install - [Multifunction Relay Module Bracket Replacement \(with Front View Camera\)](#) [Multifunction Relay Module Bracket Replacement \(without Front View Camera\)](#)

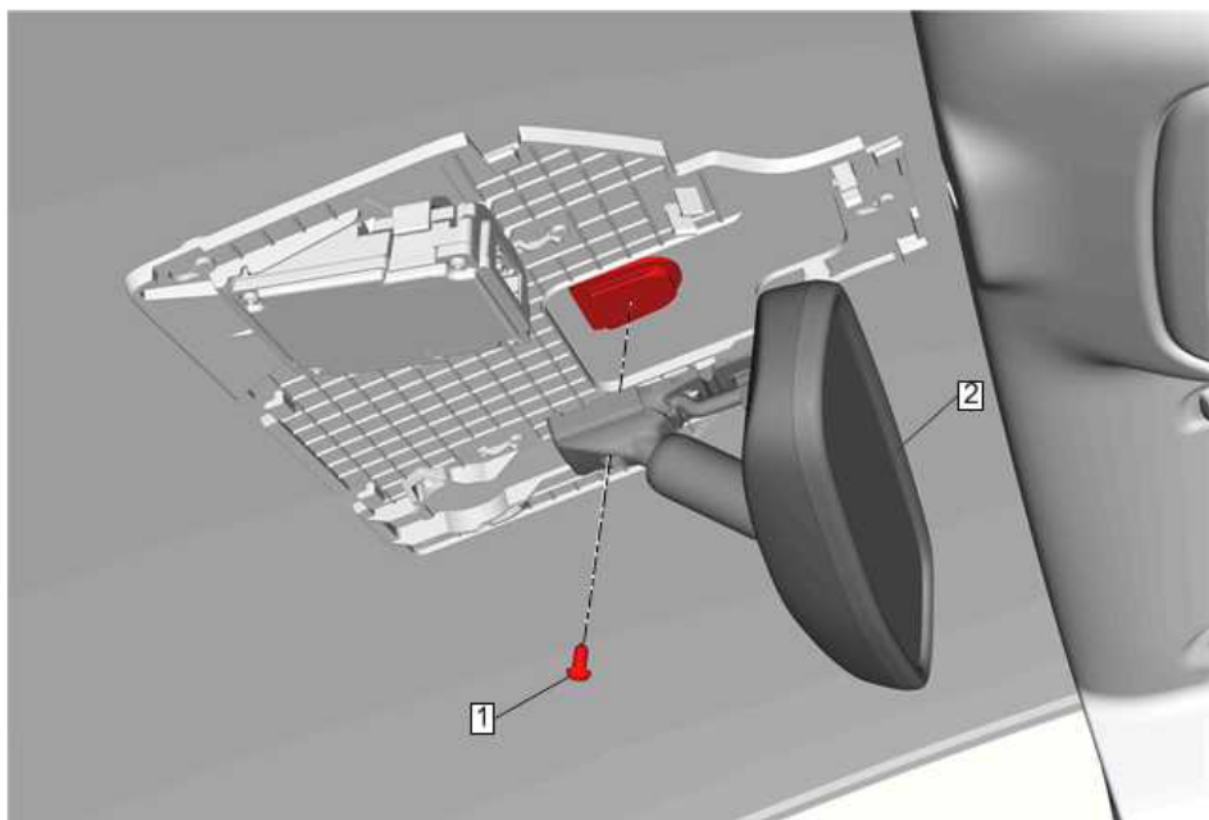


Fig. 16: Inside Rearview Mirror

Courtesy of GENERAL MOTORS COMPANY

3. Inside Rearview Mirror - Install - [Inside Rearview Mirror Replacement](#)

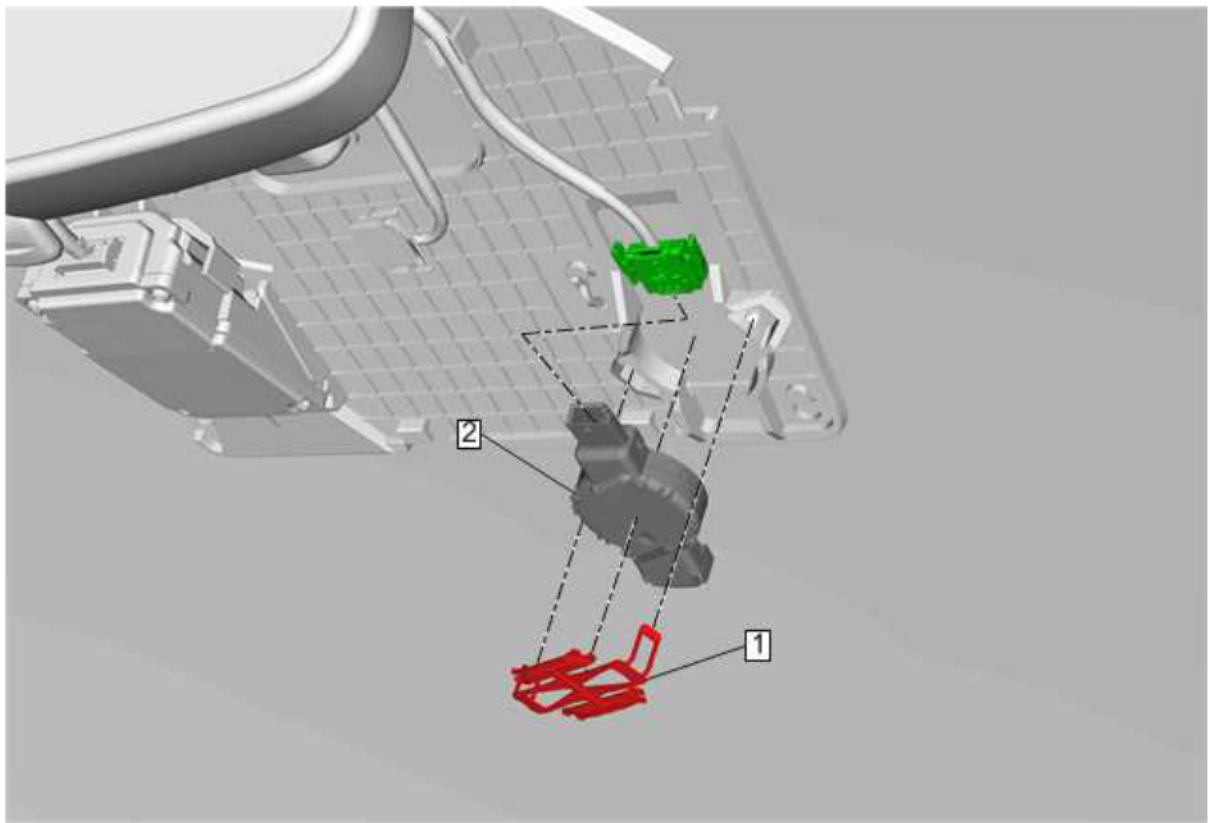


Fig. 17: Windshield Outside Moisture/Ambient Light and Humidity Sensor
Courtesy of GENERAL MOTORS COMPANY

4. Windshield Outside Moisture/Ambient Light and Humidity Sensor - Install - [Inside Air Moisture and Windshield Temperature Sensor Replacement \(With Front View Camera\)](#) [Inside Air Moisture and Windshield Temperature Sensor Replacement \(Without Front View Camera\)](#)

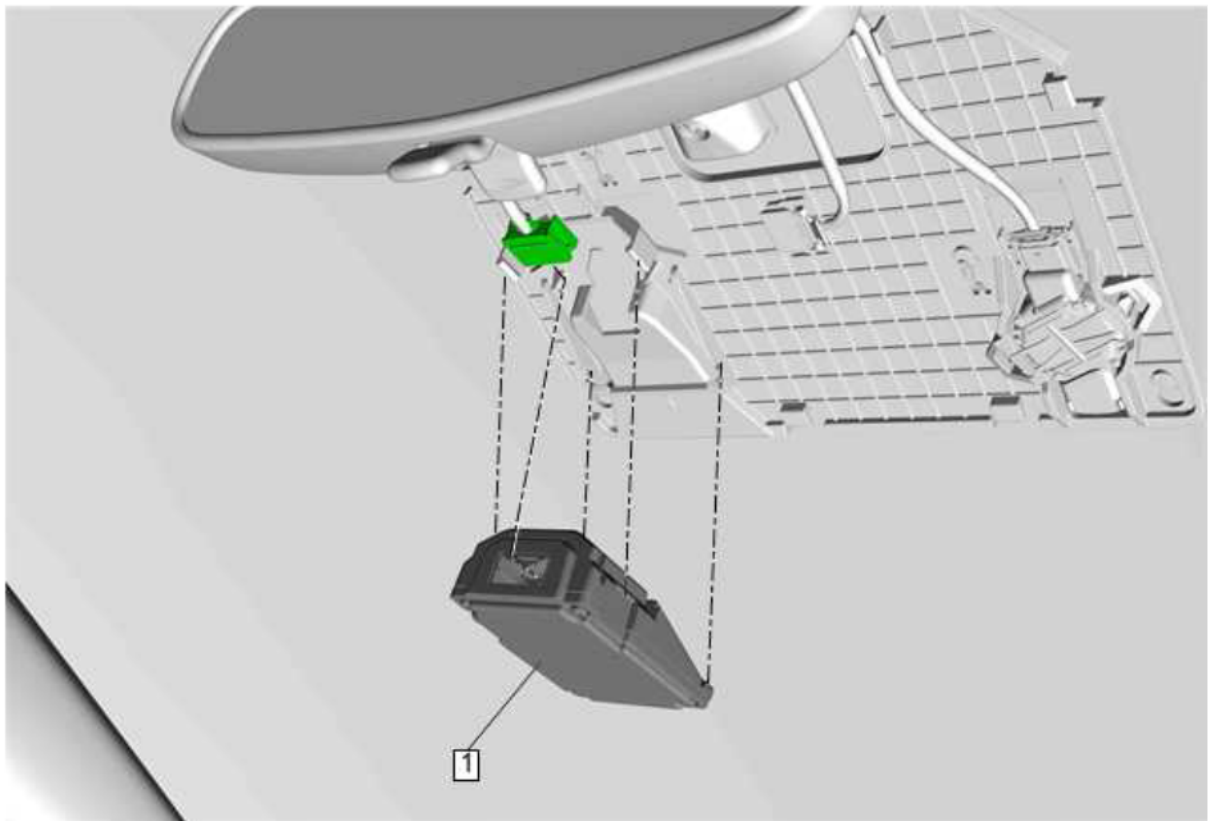


Fig. 18: Front View Camera
Courtesy of GENERAL MOTORS COMPANY

5. { If equipped } Front View Camera - Install - [Front View Camera Replacement](#)

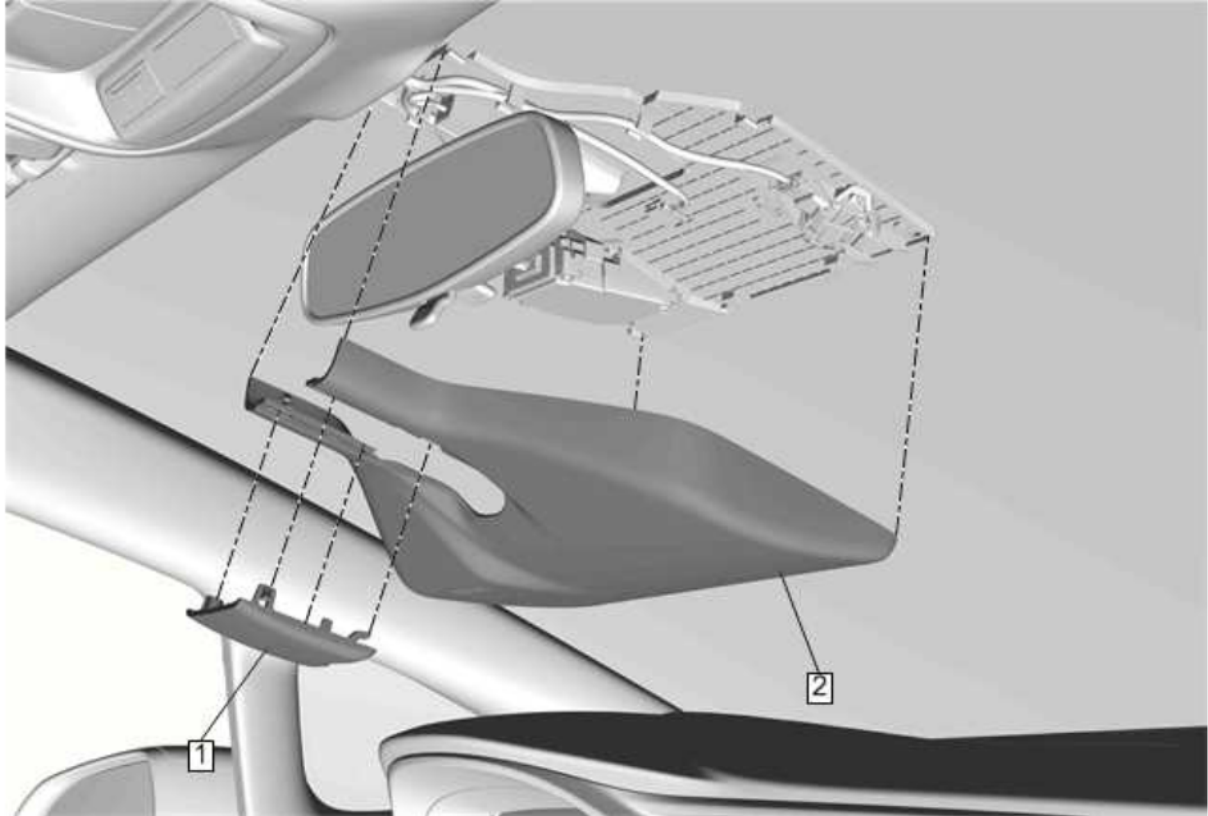


Fig. 19: Windshield Multifunction Sensor Mount Bracket Cover

Courtesy of GENERAL MOTORS COMPANY

6. Windshield Multifunction Sensor Mount Bracket Cover - Install - [Windshield Multifunction Sensor Mount Bracket Cover Replacement \(with Front View Camera\)](#) [Windshield Multifunction Sensor Mount Bracket Cover Replacement \(without Front View Camera\)](#)

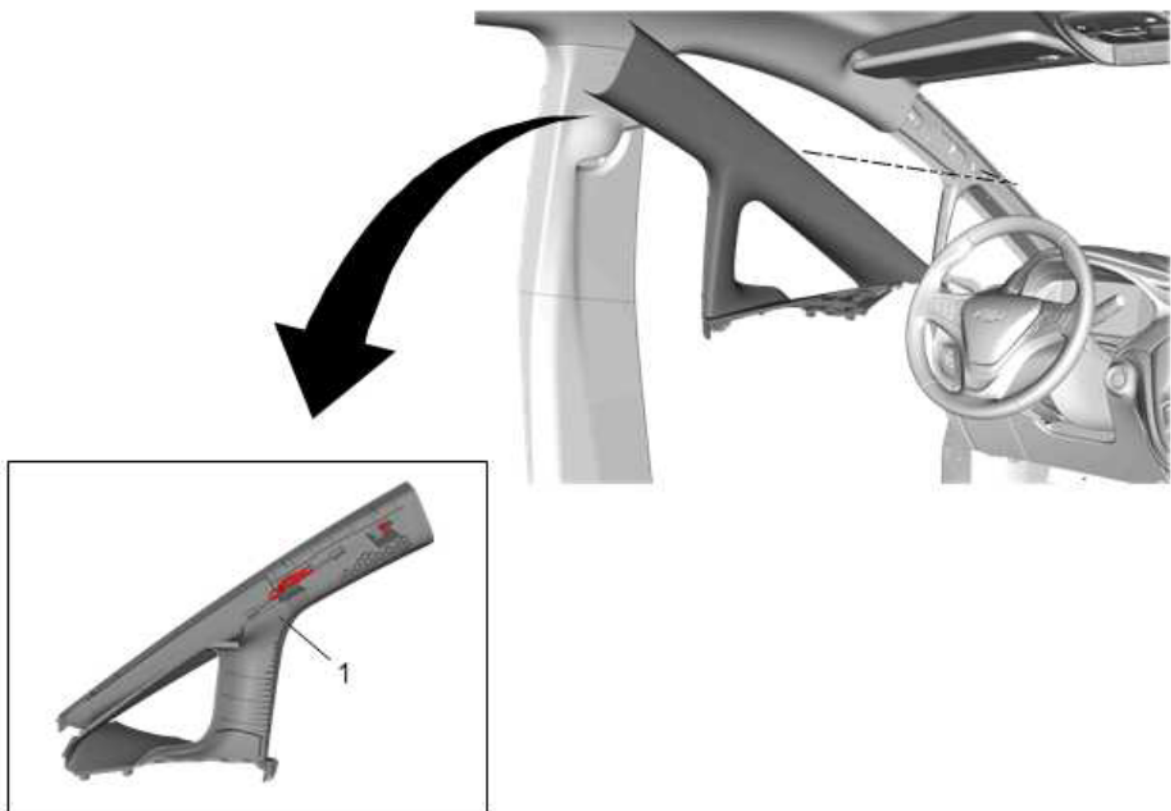


Fig. 20: Windshield Garnish Molding

Courtesy of GENERAL MOTORS COMPANY

7. Windshield Garnish Molding - Install - [Windshield Garnish Molding Replacement](#)

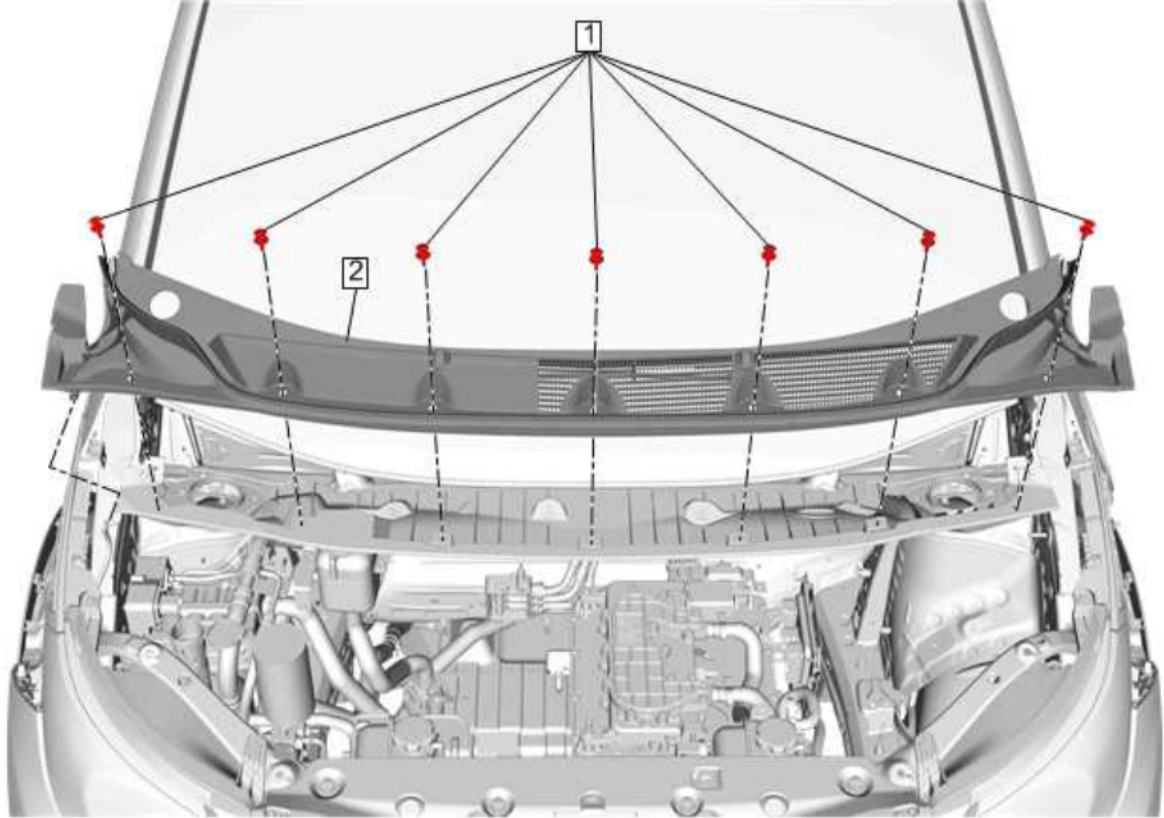


Fig. 21: Air Inlet Grille Panel

Courtesy of GENERAL MOTORS COMPANY

8. Air Inlet Grille Panel - Install - [Air Inlet Grille Panel Replacement](#) .
9. Battery Negative Cable - Connect - [Battery Negative Cable Disconnection and Connection](#)
10. Close the hood.
11. Remove the double layer of masking tape around the perimeter of the painted surfaces.

FRONT SIDE DOOR WINDOW REPLACEMENT

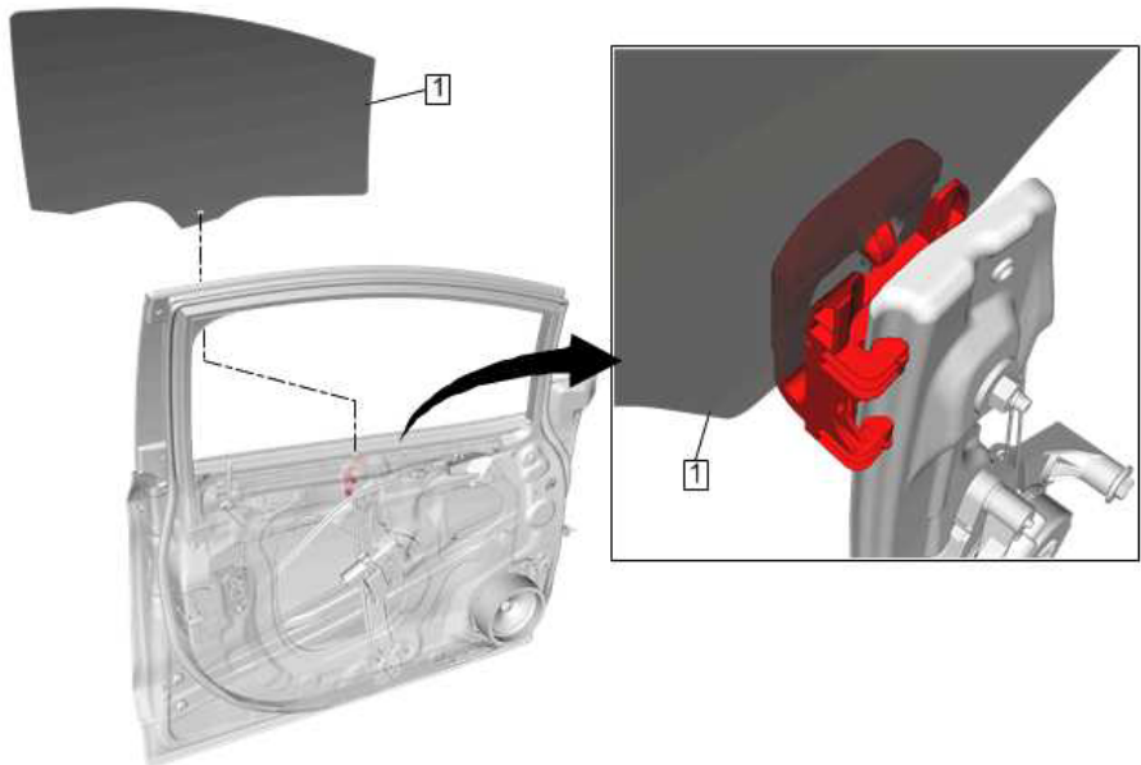


Fig. 22: Front Side Door Window

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
WARNING: <u>Glass and Sheet Metal Handling Warning</u>	
Preliminary Procedures 1. Position the window approximately half way down in the door 2. <u>Front Side Door Window Channel Retainer Replacement</u> 3. <u>Front Side Door Window Belt Reveal Molding Replacement</u>	
1	Front Side Door Window Procedure 1. Front Side Door Window at Front Side Door Window Regulator - Remove 2. Rotate the front side door window as necessary to remove it from the front side door.

REAR SIDE DOOR WINDOW REPLACEMENT

Removal Procedure

WARNING: Glass and Sheet Metal Handling Warning

1. Position the window approximately half way down in the door.

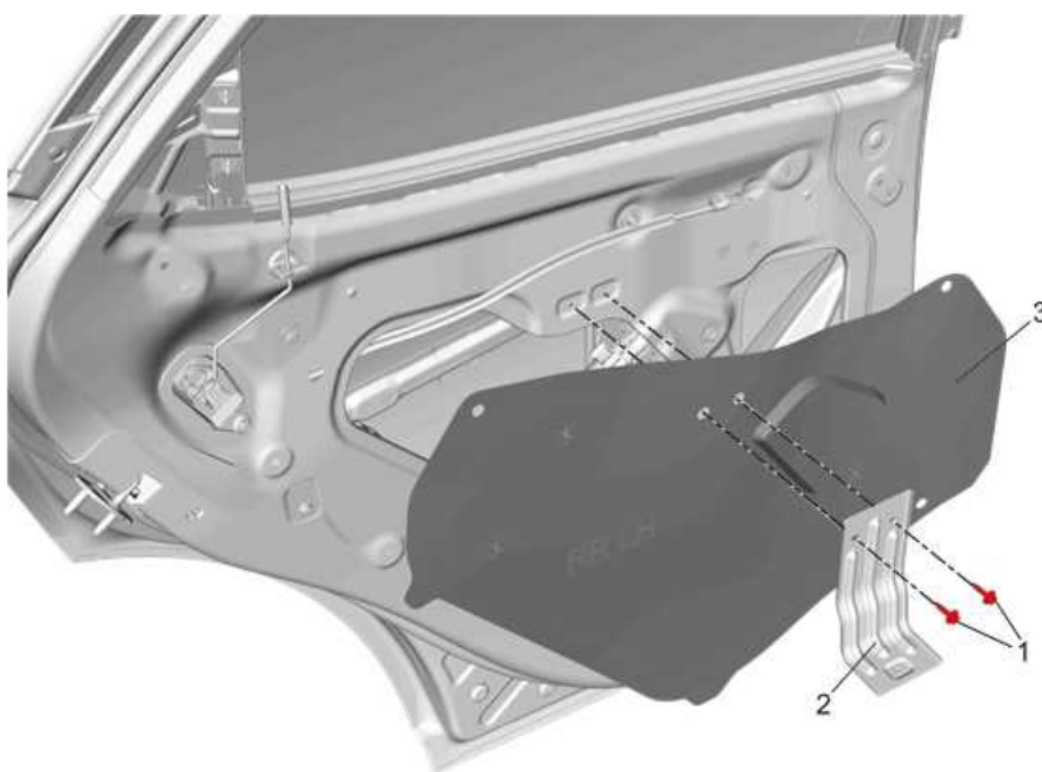


Fig. 23: Rear Side Door Water Deflector

Courtesy of GENERAL MOTORS COMPANY

2. Rear Side Door Water Deflector - Remove - Rear Side Door Water Deflector Replacement

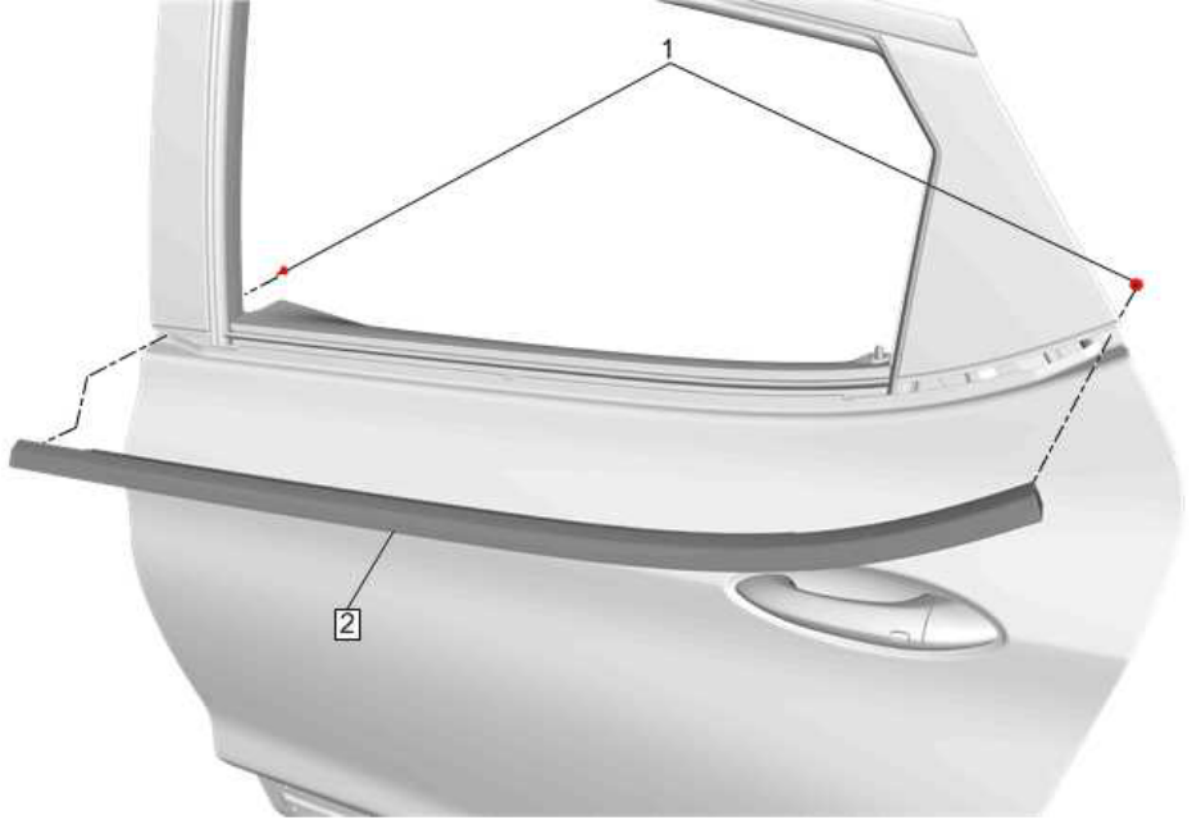


Fig. 24: Rear Side Door Window Belt Reveal Molding

Courtesy of GENERAL MOTORS COMPANY

3. Rear Side Door Window Belt Reveal Molding - Remove - **Rear Side Door Window Belt Reveal Molding Replacement**

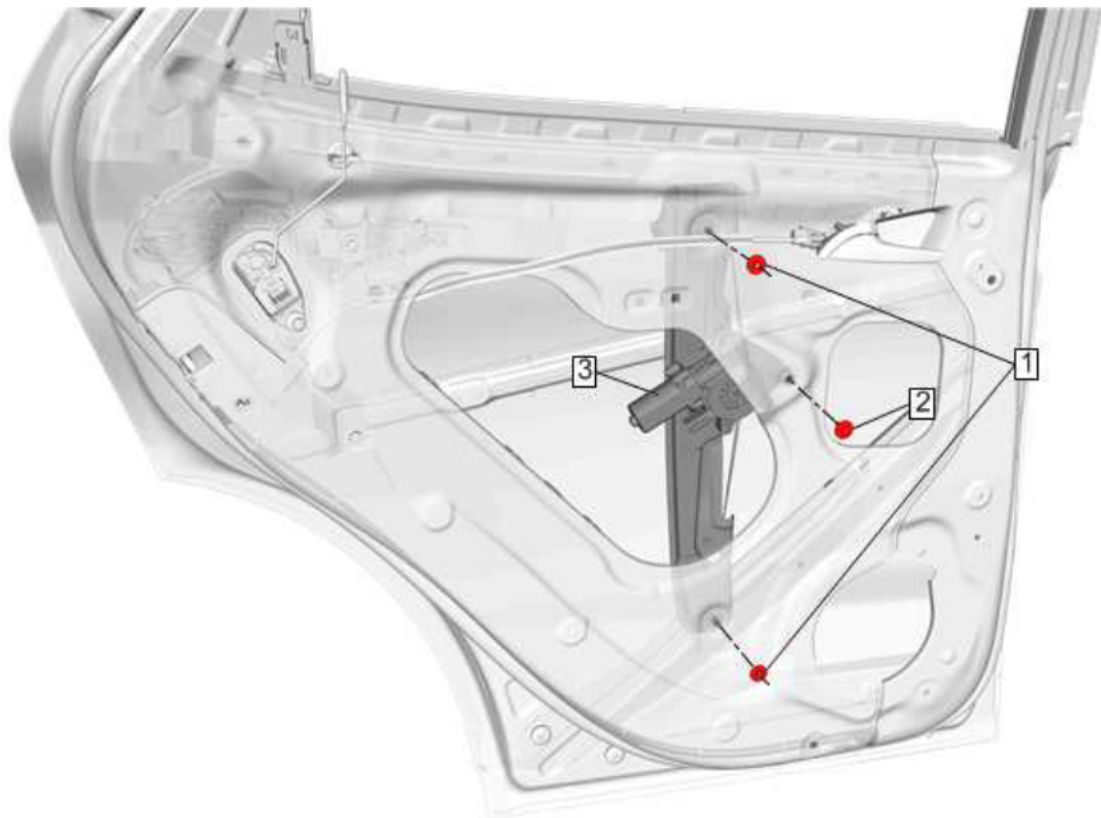


Fig. 25: Rear Side Door Window Regulator

Courtesy of GENERAL MOTORS COMPANY

4. Rear Side Door Window Regulator - Remove - **Rear Side Door Window Regulator Replacement**

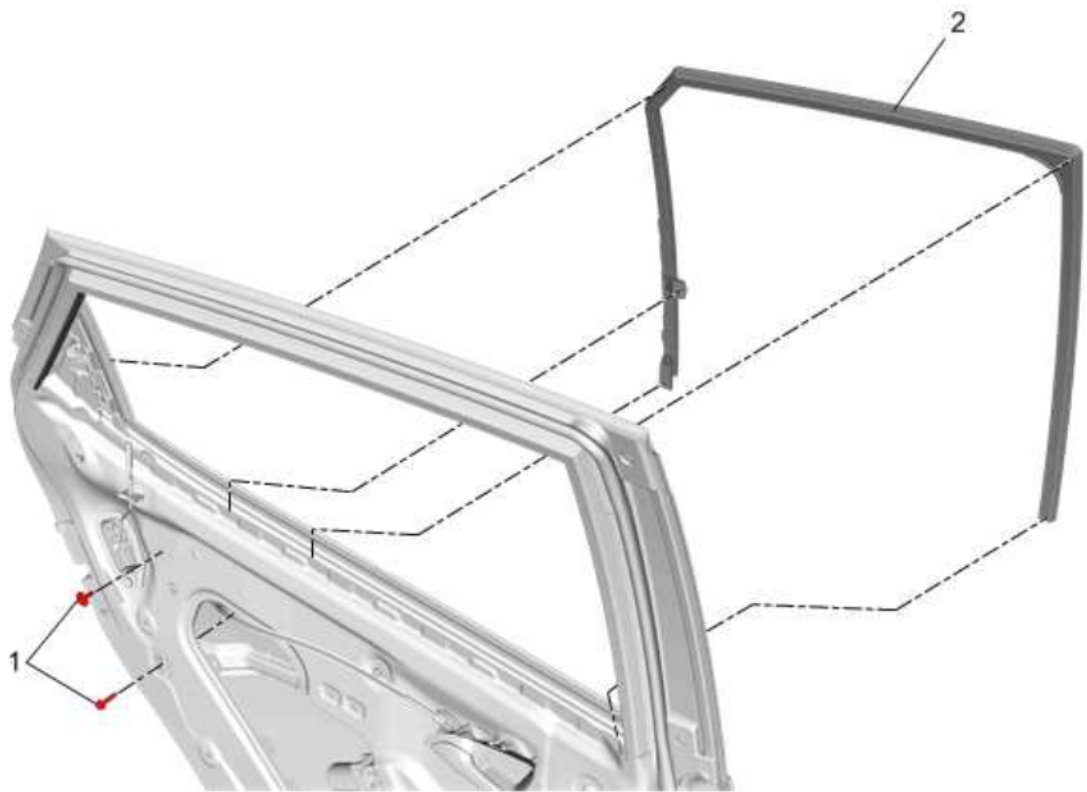


Fig. 26: Rear Side Door Window Channel Rear Retainer Bolts
 Courtesy of GENERAL MOTORS COMPANY

5. Remove the rear side door window channel rear retainer bolts and reposition the channel. **Rear Side Door Window Weatherstrip Replacement**

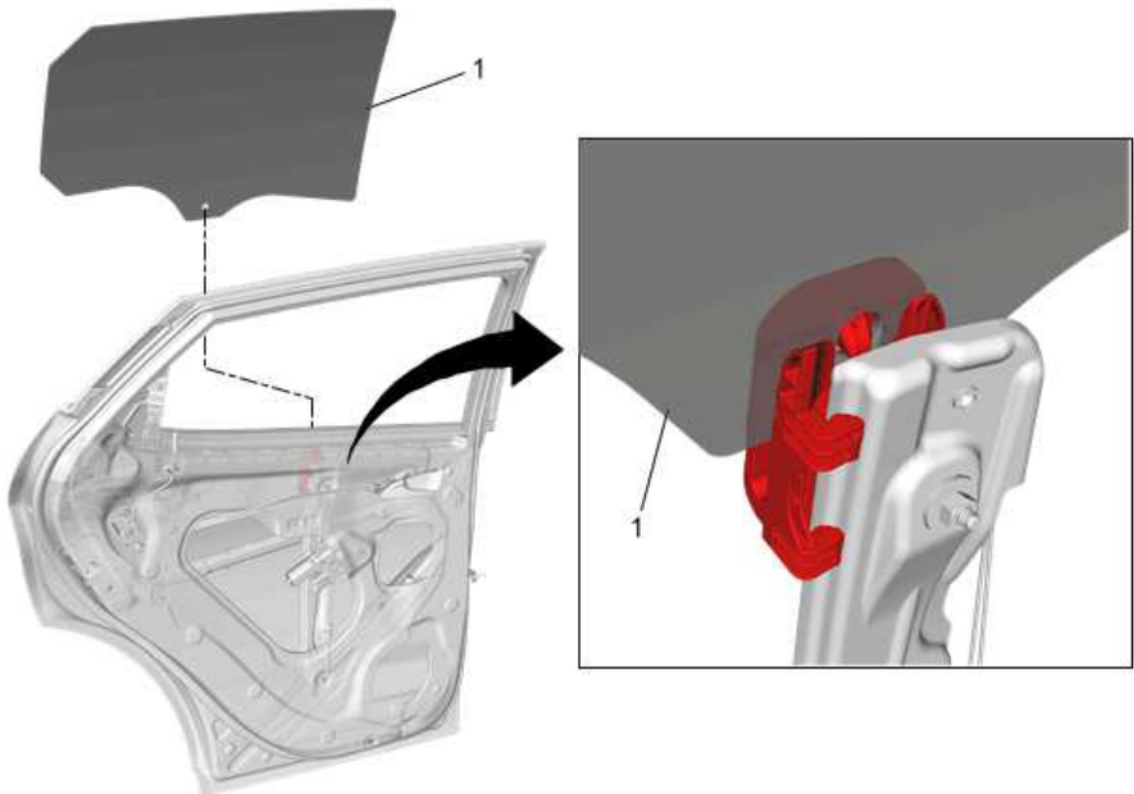


Fig. 27: Rear Side Door Window
 Courtesy of GENERAL MOTORS COMPANY

6. Rotate the rear side door window as necessary to remove it from the rear side door.

Installation Procedure

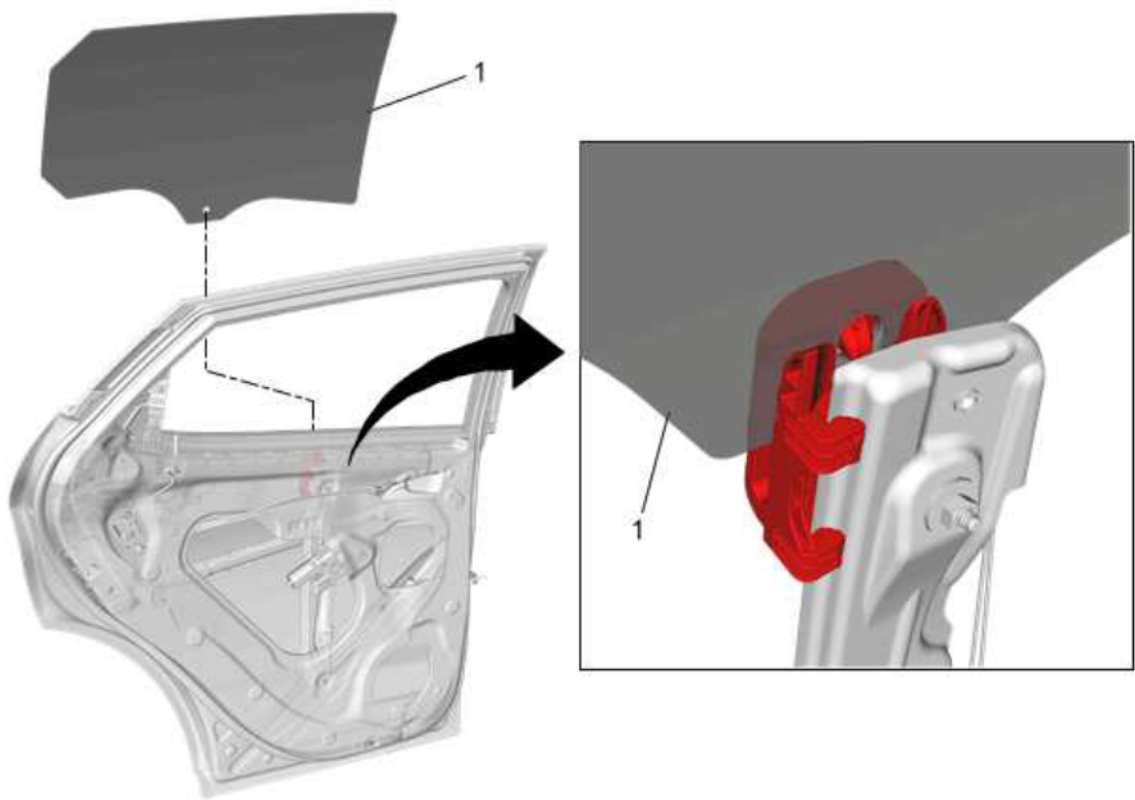


Fig. 28: Rear Side Door Window

Courtesy of GENERAL MOTORS COMPANY

1. Insert the rear side door window to the rear side door.

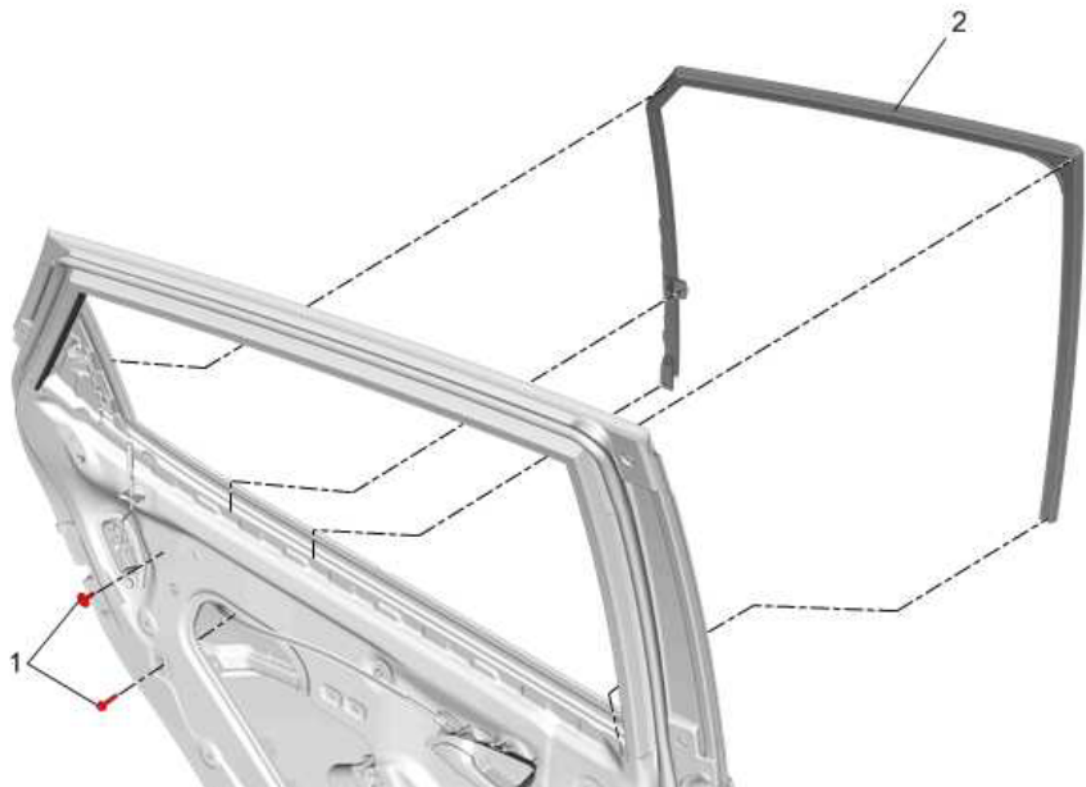


Fig. 29: Rear Side Door Window Channel Rear Retainer Bolts

Courtesy of GENERAL MOTORS COMPANY

2. Position the channel and Install the rear side door window channel rear retainer bolts. [Rear Side Door Window Weatherstrip Replacement](#)

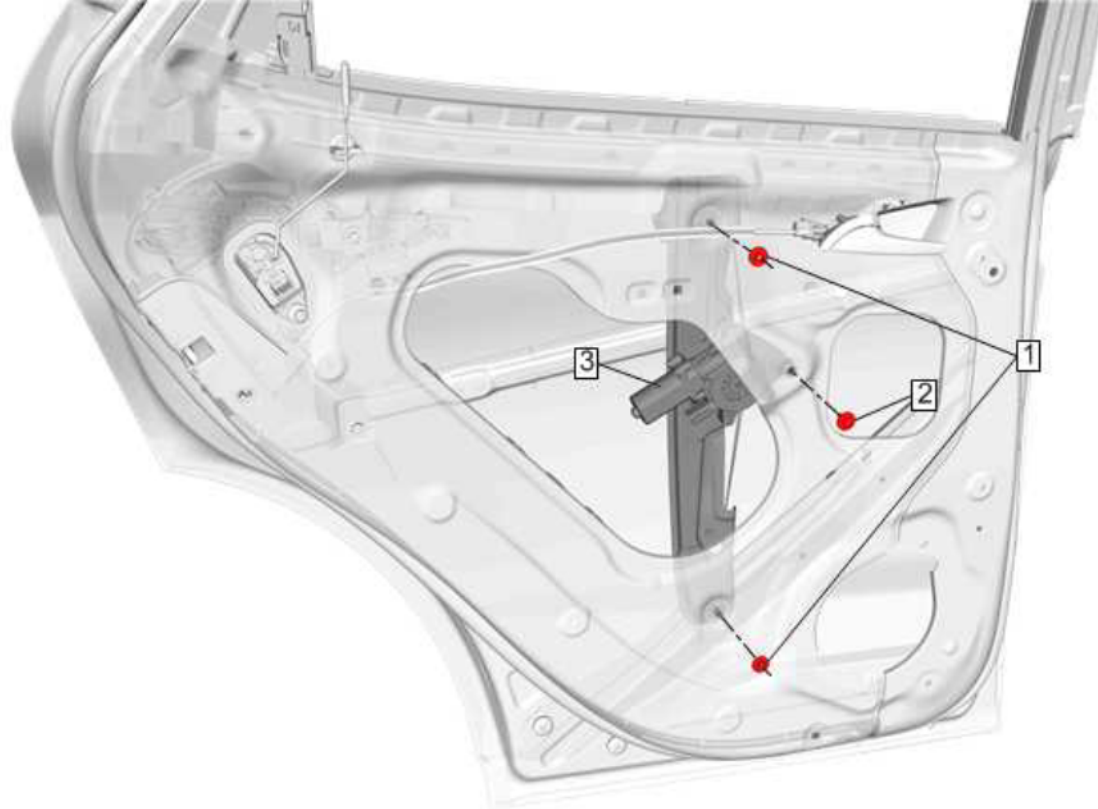


Fig. 30: Rear Side Door Window Regulator
 Courtesy of GENERAL MOTORS COMPANY

3. Rear Side Door Window Regulator - Install - [**Rear Side Door Window Regulator Replacement**](#)

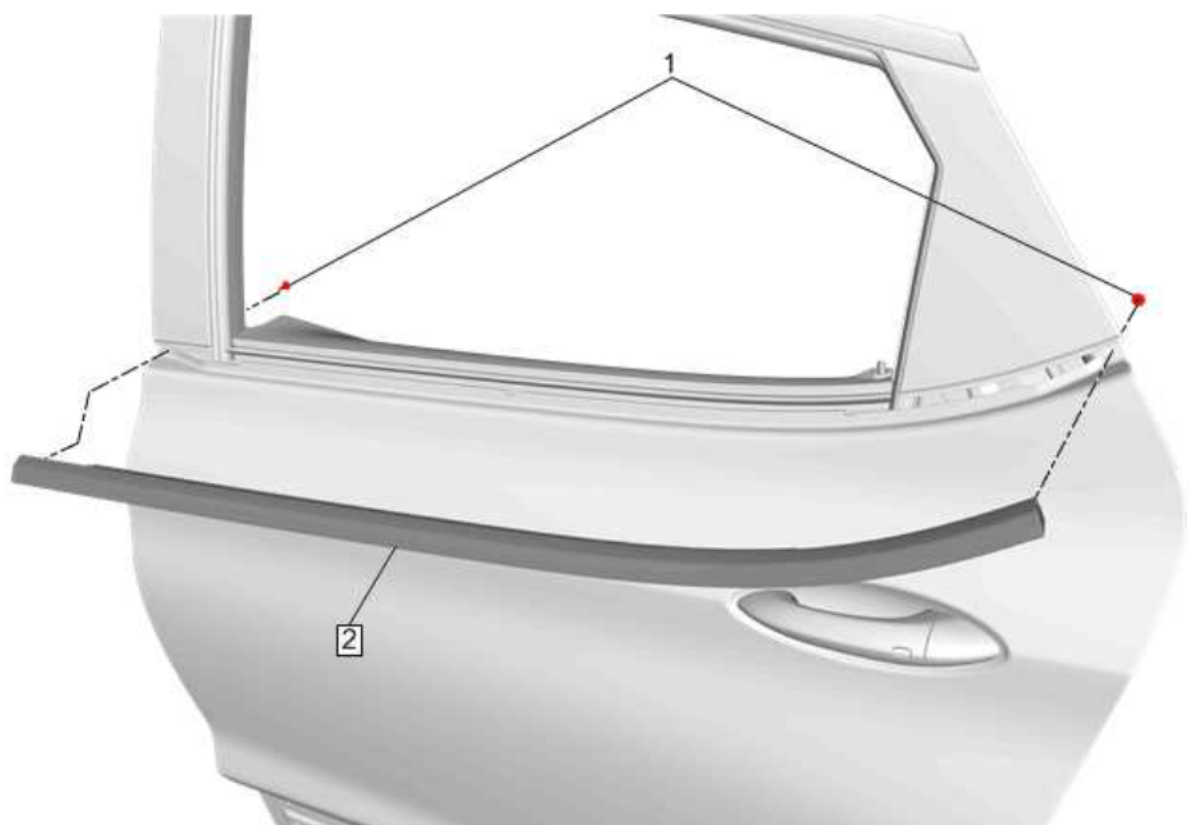


Fig. 31: Rear Side Door Window Belt Reveal Molding
 Courtesy of GENERAL MOTORS COMPANY

4. Rear Side Door Window Belt Reveal Molding - Install - [**Rear Side Door Window Belt Reveal Molding Replacement**](#)

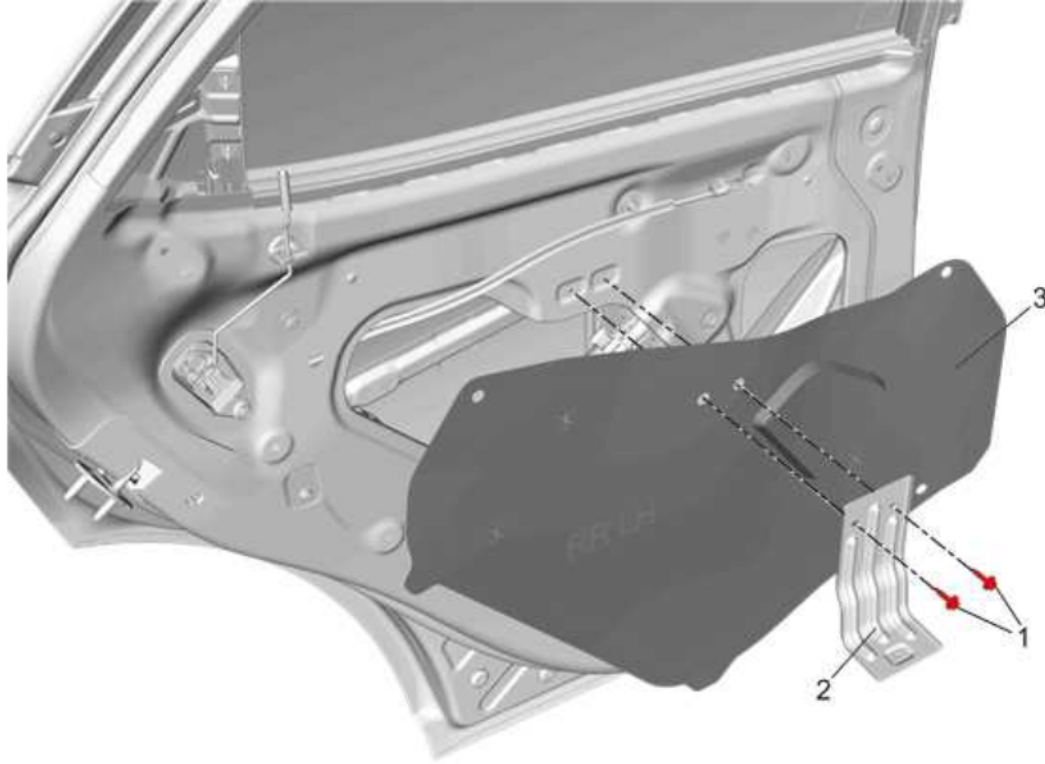


Fig. 32: Rear Side Door Water Deflector

Courtesy of GENERAL MOTORS COMPANY

5. Rear Side Door Water Deflector - Install - [Rear Side Door Water Deflector Replacement](#)
6. Inspect the door window for proper operation before installing the door trim.

REAR WINDOW REPLACEMENT

Special Tools

- **BO-24402-A** Glass Sealant Remover (Cold Knife).
- **BO-39032** Stationary Glass Removal Tool, or equivalent in order to remove the window.
- Use a urethane adhesive systems which meet GM Specification GM 3651G

Special Tools

Removal Procedure

WARNING: If a window is cracked but still intact, crisscross the window with masking tape in order to reduce the risk of damage or personal injury.

NOTE: Before cutting out a stationary window, apply a double layer of masking tape around the perimeter of the painted surfaces and inner trim.

1. Rear Compartment Lid - Open
2. Battery Negative Cable - Disconnect - [Battery Negative Cable Disconnection and Connection](#)

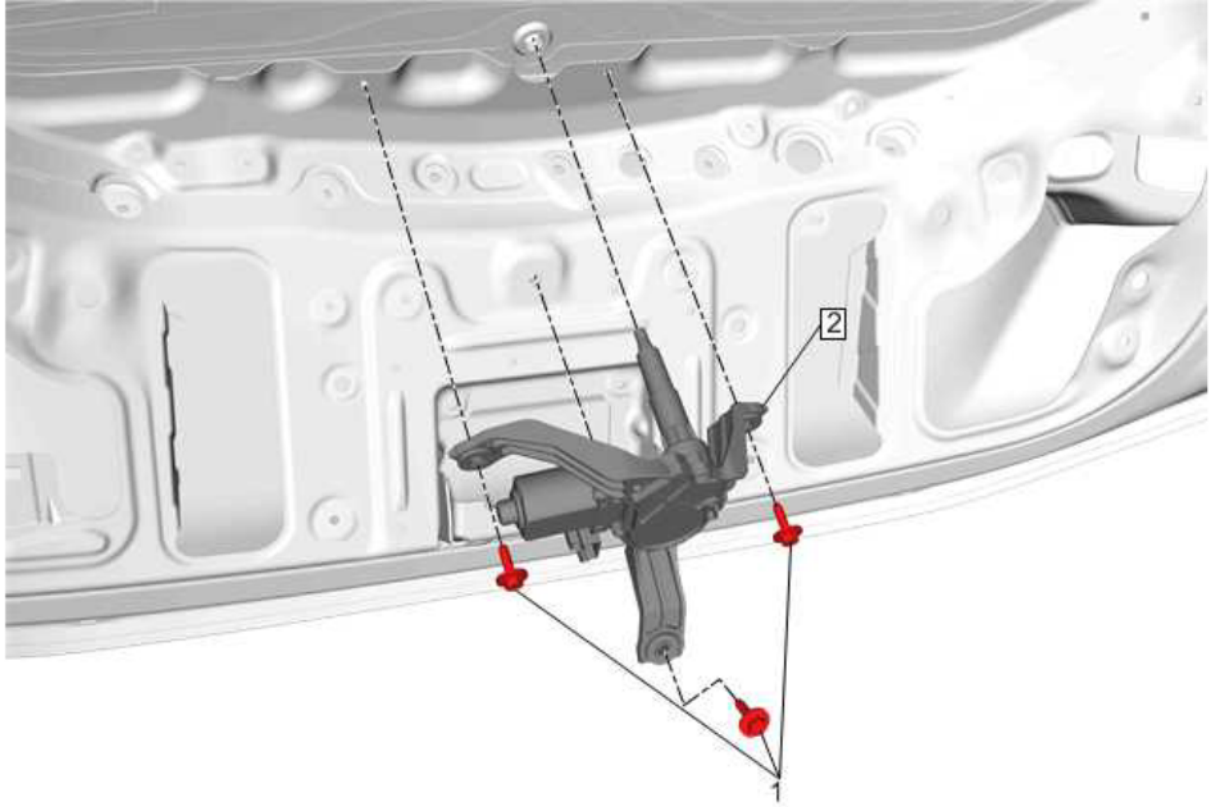


Fig. 33: Rear Window Wiper Motor
 Courtesy of GENERAL MOTORS COMPANY

3. Rear Window Wiper Motor - Remove - [Rear Window Wiper Motor Replacement](#)

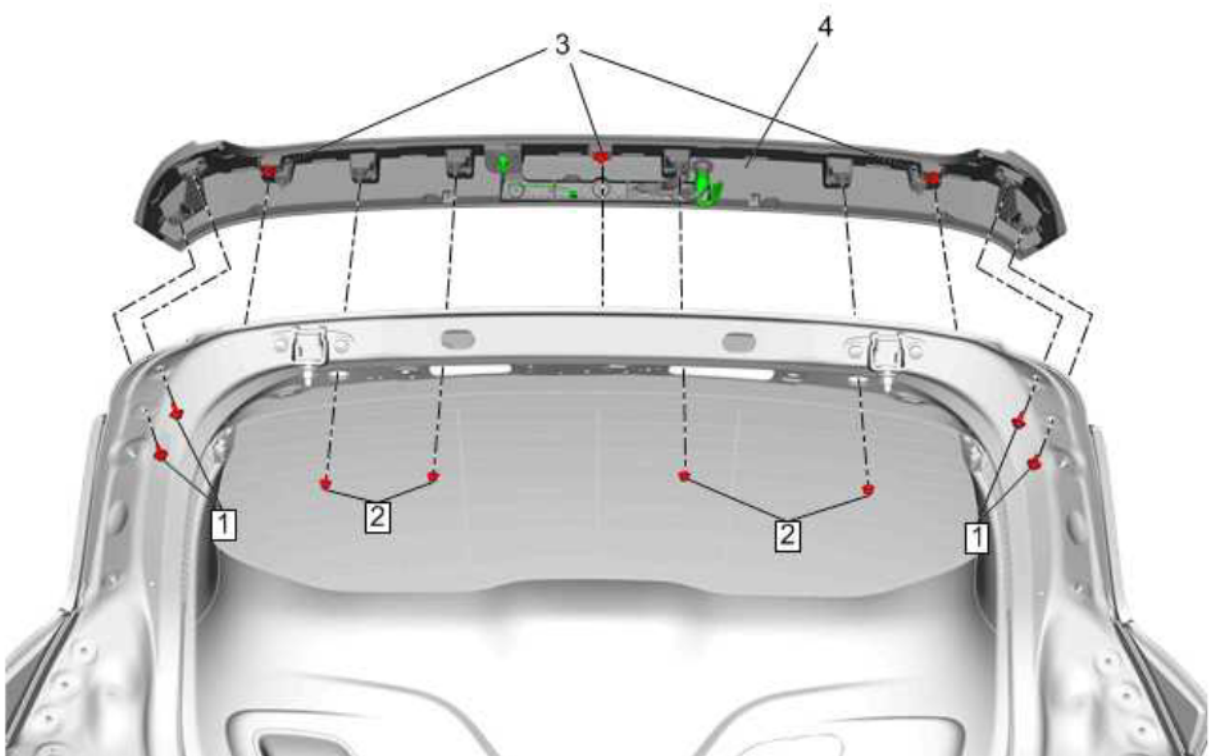


Fig. 34: Rear End Spoiler
 Courtesy of GENERAL MOTORS COMPANY

4. Rear End Spoiler - Remove - [Rear End Spoiler Replacement](#)

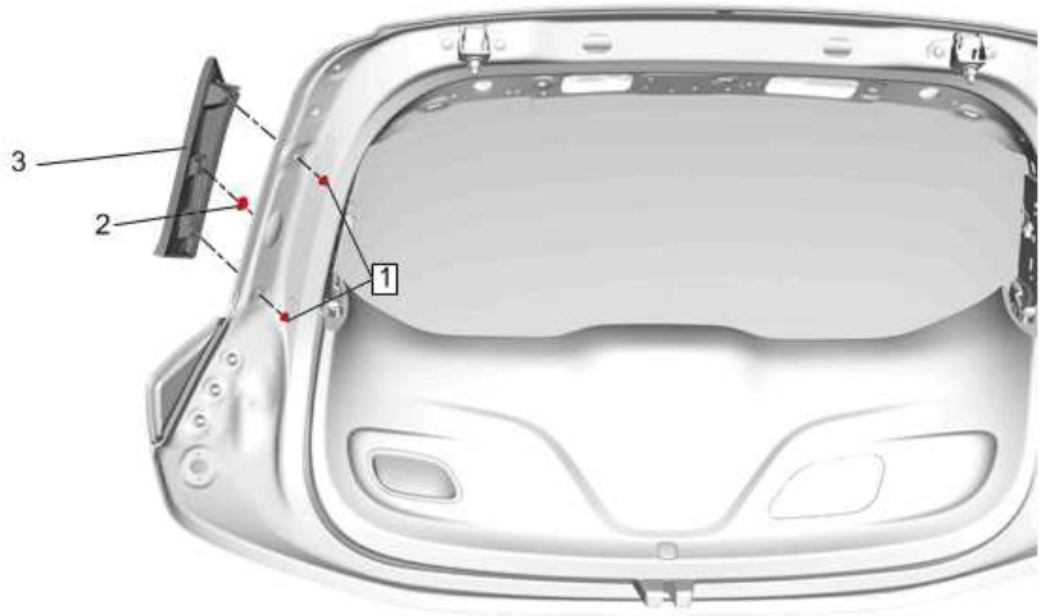


Fig. 35: Body Side Upper Rear Applique
 Courtesy of GENERAL MOTORS COMPANY

5. Body Side Upper Rear Applique - Remove - **Body Side Upper Rear Applique Replacement**

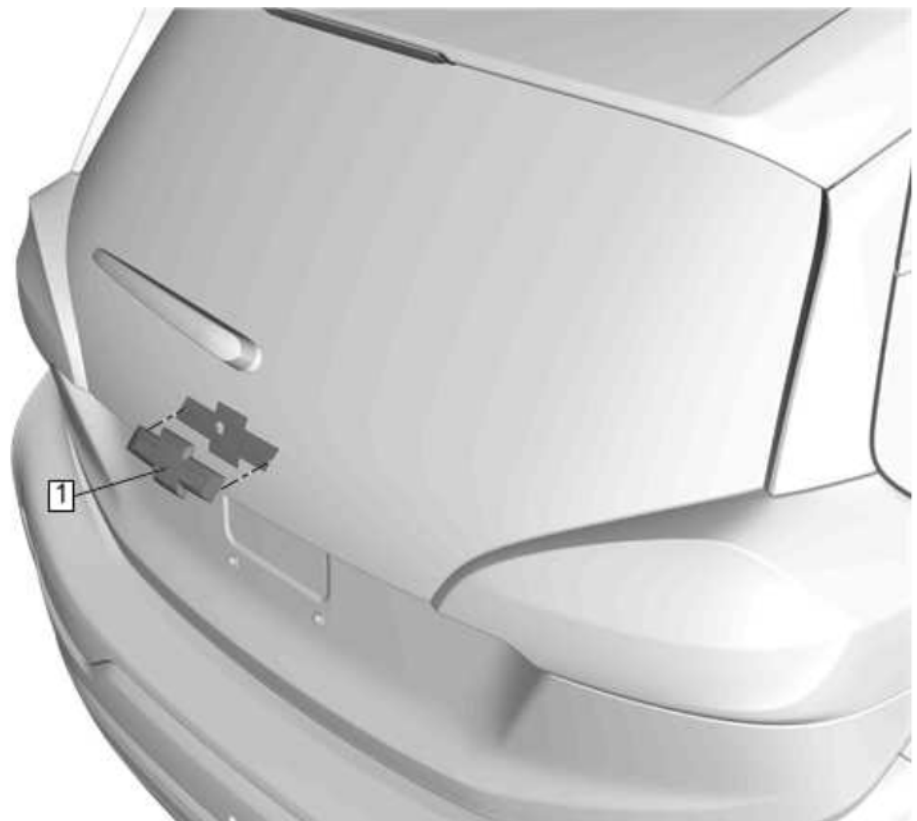


Fig. 36: Liftgate Emblem/Nameplate (Emblem)
 Courtesy of GENERAL MOTORS COMPANY

6. Liftgate Emblem/Nameplate - Remove -

Liftgate Emblem/Nameplate Replacement (Emblem) Liftgate Emblem/Nameplate Replacement (Nameplate)

7. Disconnect the rear window grid electrical connectors.

WARNING: If broken glass falls into the defroster outlets, it can be blown into the passenger compartment and cause personal injury.

8. Cover to protect the following parts from broken glass:

- Seats and carpeting

WARNING: Refer to [Glass and Sheet Metal Handling Warning](#) .

9. Using the appropriate tool, carefully cut around the lace, start in the center working from side to side of the window to access the urethane adhesive bead, if equipped.

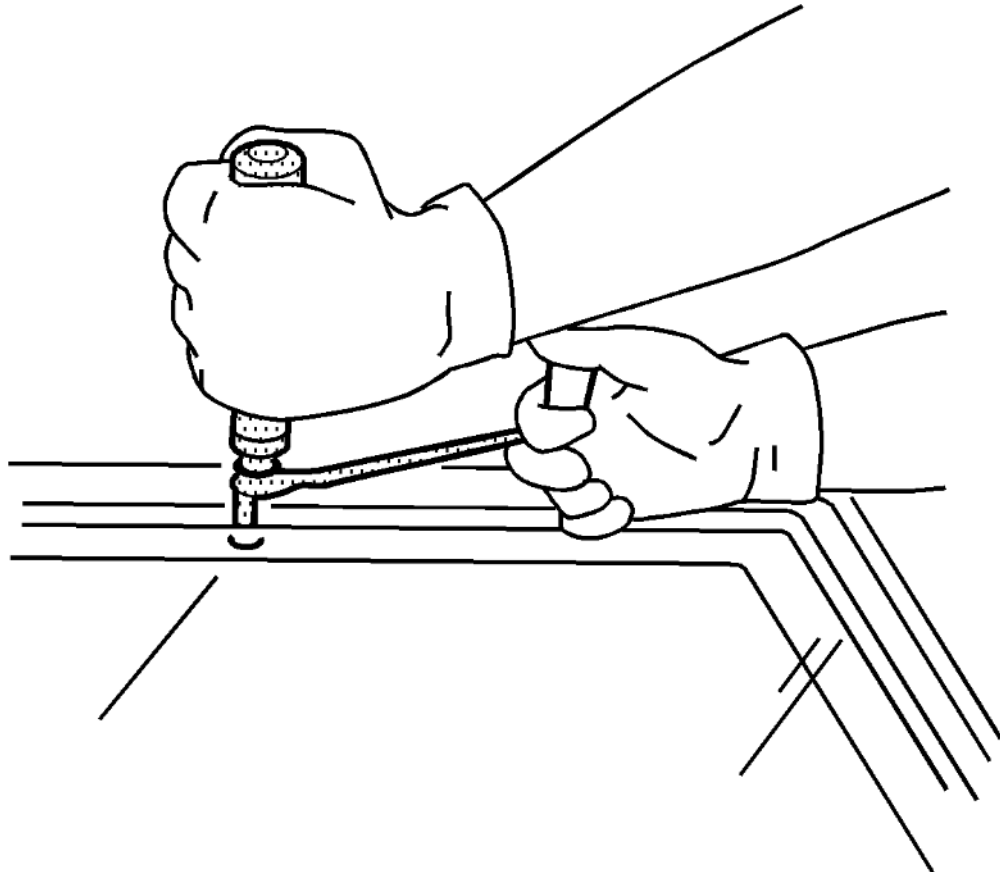


Fig. 37: Separating Urethane Adhesive From Window

Courtesy of GENERAL MOTORS COMPANY

NOTE: Keep the cutting edge of the tool against the window.

10. This will allow the urethane adhesive to be separated from the window.

- Leave a base of urethane on the pinchweld flange.
- The only suitable lubrication is clear water.
- **BO-24402-A** Glass Sealant Remover (Cold Knife).
- **BO-39032** Stationary Glass Removal Tool, or equivalent in order to remove the window.

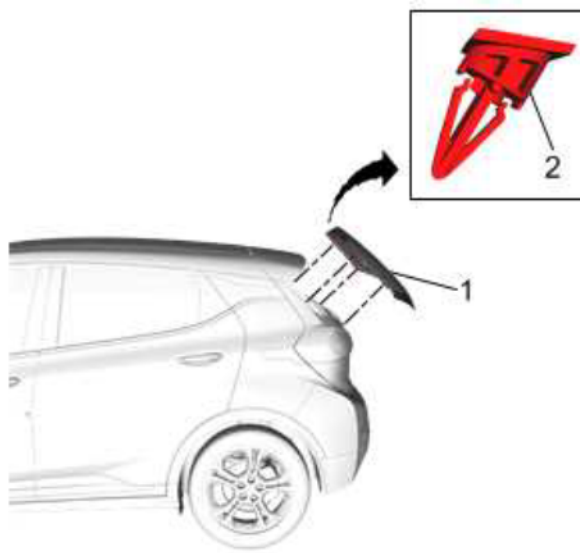


Fig. 38: Rear Window And Locating Pin

Courtesy of GENERAL MOTORS COMPANY

11. With the aid of an assistant lift the rear window (1) and locating pin (2) from vehicle.

Installation Procedure

1. Rear Window - Install - **Adhesive Installation of Rear Windows**
2. Connect the rear window grid electrical connectors.

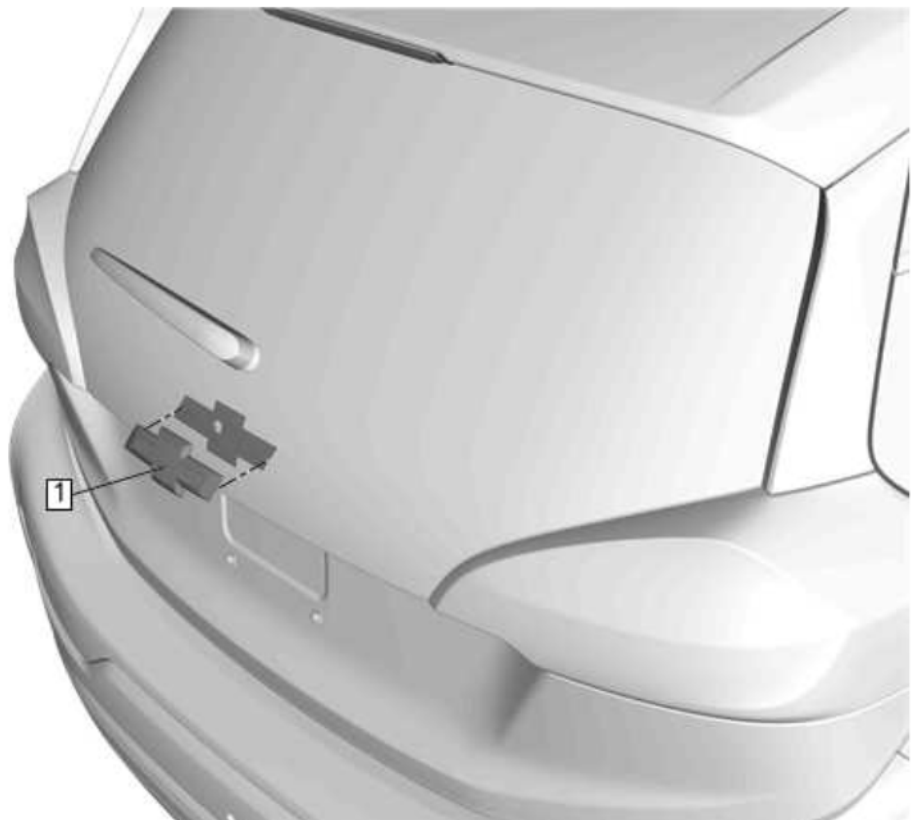


Fig. 39: Liftgate Emblem/Nameplate (Emblem)

Courtesy of GENERAL MOTORS COMPANY

3. Liftgate Emblem/Nameplate - Install -

Liftgate Emblem/Nameplate Replacement (Emblem) **Liftgate Emblem/Nameplate Replacement (Nameplate)**

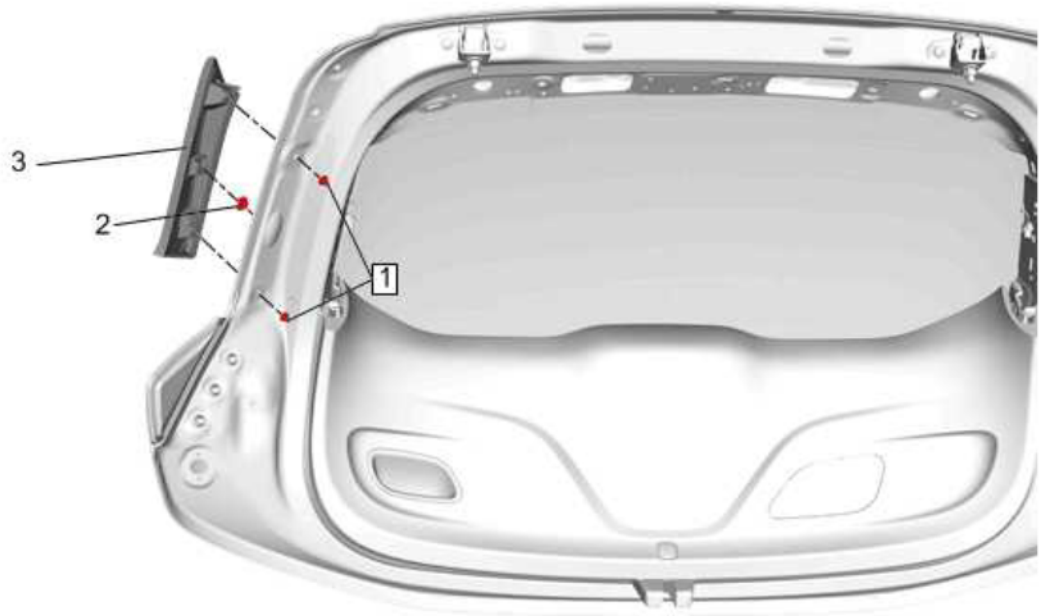


Fig. 40: Body Side Upper Rear Applique
 Courtesy of GENERAL MOTORS COMPANY

4. Body Side Upper Rear Applique - Install - **Body Side Upper Rear Applique Replacement**

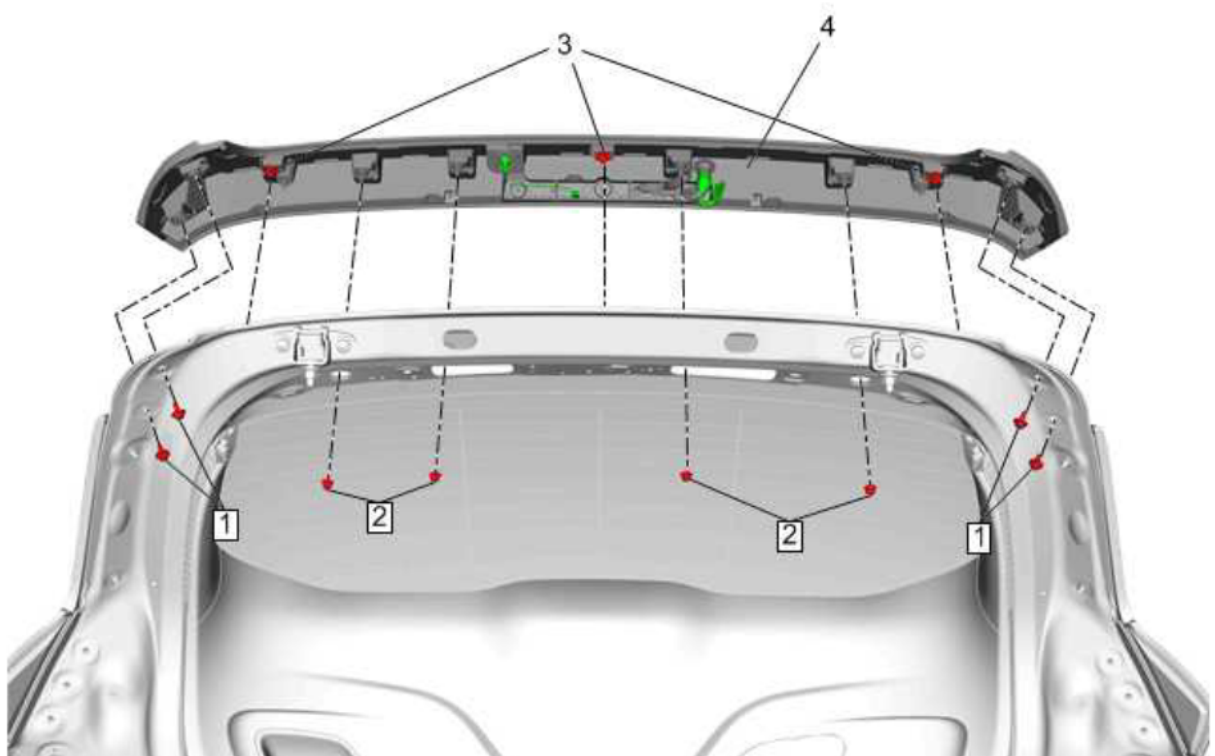


Fig. 41: Rear End Spoiler
 Courtesy of GENERAL MOTORS COMPANY

5. Rear End Spoiler - Install - **Rear End Spoiler Replacement**

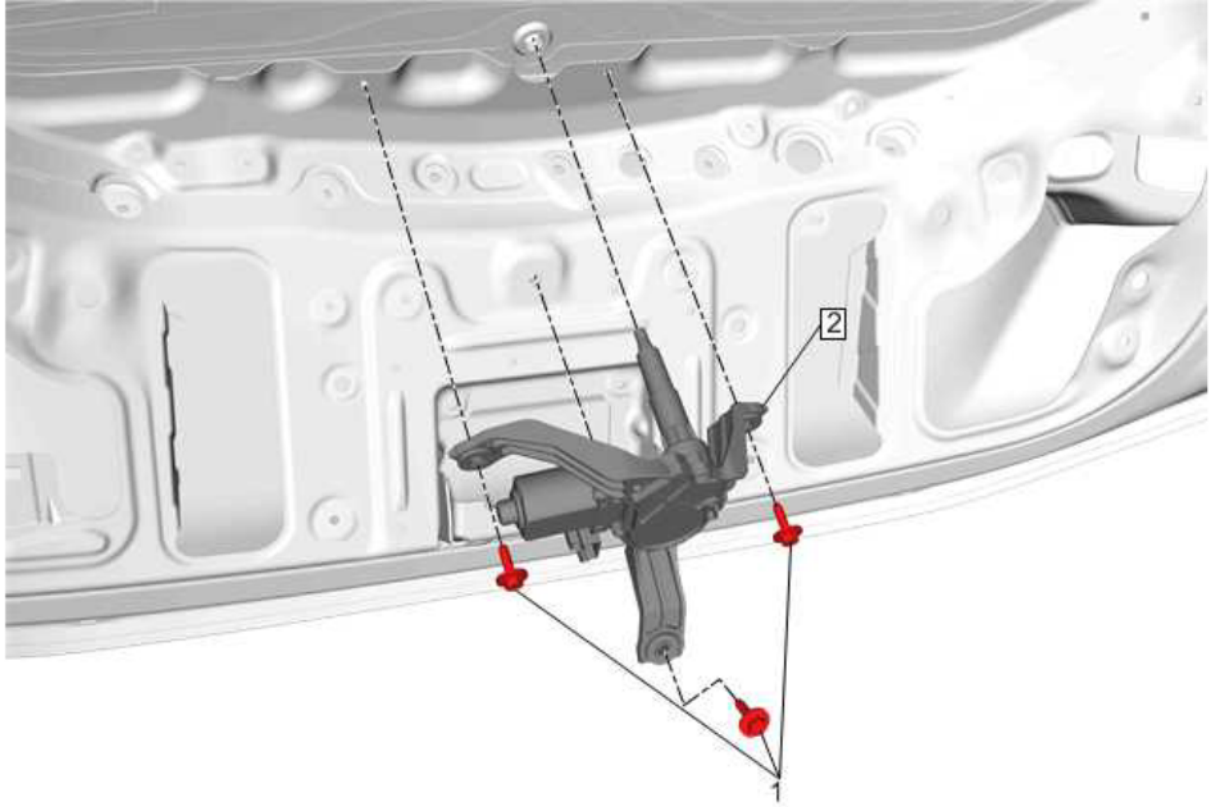


Fig. 42: Rear Window Wiper Motor

Courtesy of GENERAL MOTORS COMPANY

6. Rear Window Wiper Motor - Install - [Rear Window Wiper Motor Replacement](#)
7. Battery Negative Cable - Connect - [Battery Negative Cable Disconnection and Connection](#)
8. Rear compartment lid - Close
9. Double layer of masking tape around the perimeter of the painted surfaces and the interior trim - Remove

WINDSHIELD PILLAR STATIONARY WINDOW REPLACEMENT

Special Tools

- **BO-24402-A** Glass Sealant Remover (Cold Knife).
- **BO-39032** Stationary Glass Removal Tool, or equivalent in order to remove the window.
- Use a urethane adhesive systems which meet GM Specification GM 3651G

Special Tools

Removal Procedure

WARNING: If a window is cracked but still intact, crisscross the window with masking tape in order to reduce the risk of damage or personal injury.

NOTE: Before cutting out a stationary window, apply a double layer of masking tape around the perimeter of the painted surfaces and inner trim of the window.

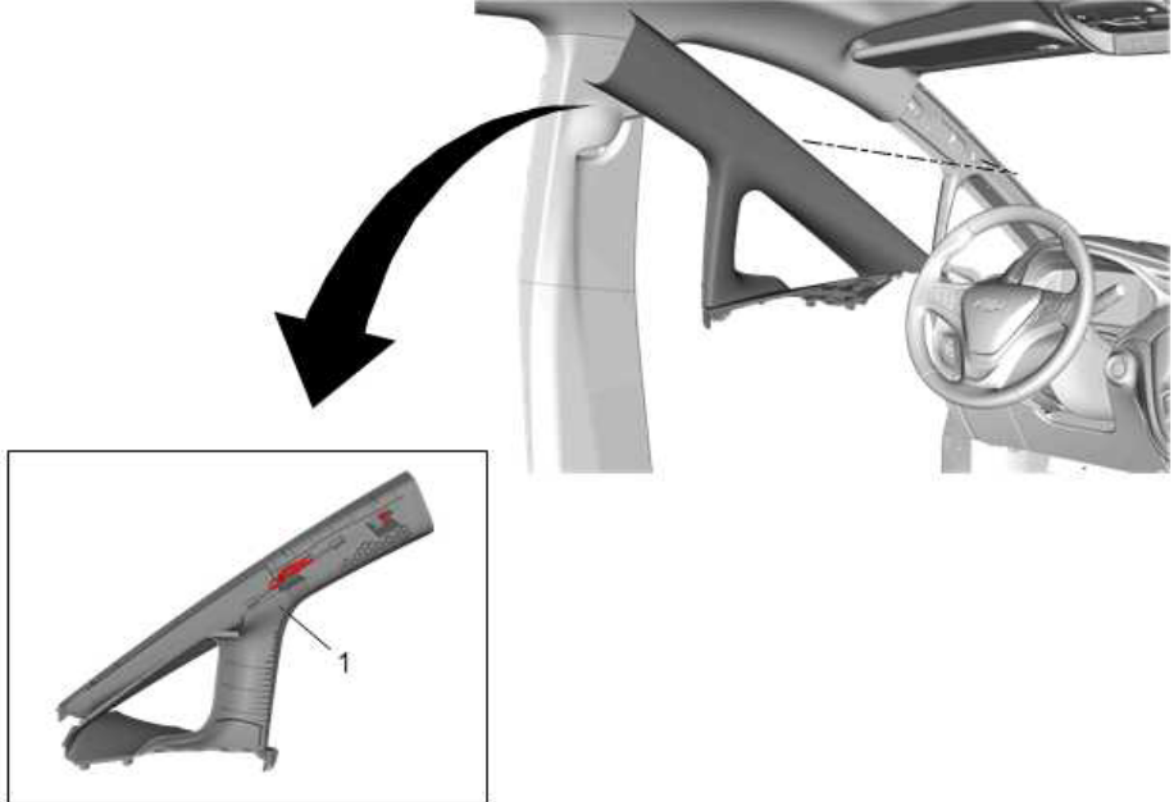


Fig. 43: Windshield Garnish Molding
Courtesy of GENERAL MOTORS COMPANY

1. Windshield Garnish Molding - Remove - [Windshield Garnish Molding Replacement](#)

WARNING: If broken glass falls into the defroster outlets, it can be blown into the passenger compartment and cause personal injury.

2. Cover to protect the following parts from broken glass:

- Upper dash pad
- Defroster outlets and A/C outlets
- Seats and carpeting

WARNING: Refer to [Glass and Sheet Metal Handling Warning](#) .

NOTE: Keep the cutting edge of the tool against the window. Do this from inside the vehicle to protect the outer painted surface.

3. Carefully cut around the inside of the quarter modular window to expose the urethane adhesive bead.

Use care not to damage the retainers. If the retainer get damaged it will be necessary to use mask tape to tape it in place while curing.

4. Keep the cutting edge of the tool against the inside of the window.

This will allow the urethane adhesive to be separated from the window.

- Leave a base of urethane on the pinch-weld flange.
- The only suitable lubrication is clear water.
- **BO-24402-A** Glass Sealant Remover (Cold Knife).
- **BO-39032** Stationary Glass Removal Tool, or equivalent in order to remove the window.

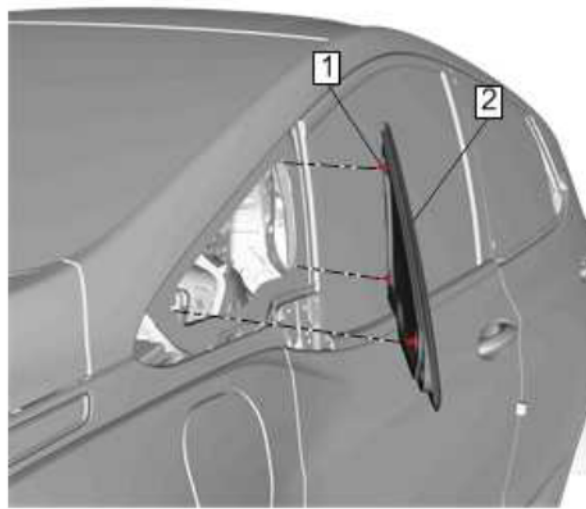


Fig. 44: Stationary Window

Courtesy of GENERAL MOTORS COMPANY

- Remove the stationary window (2) from the pinch-weld flange.

Installation Procedure

1. Windshield Pillar Stationary Window - Install - [Adhesive Installation of Stationary Windows](#)

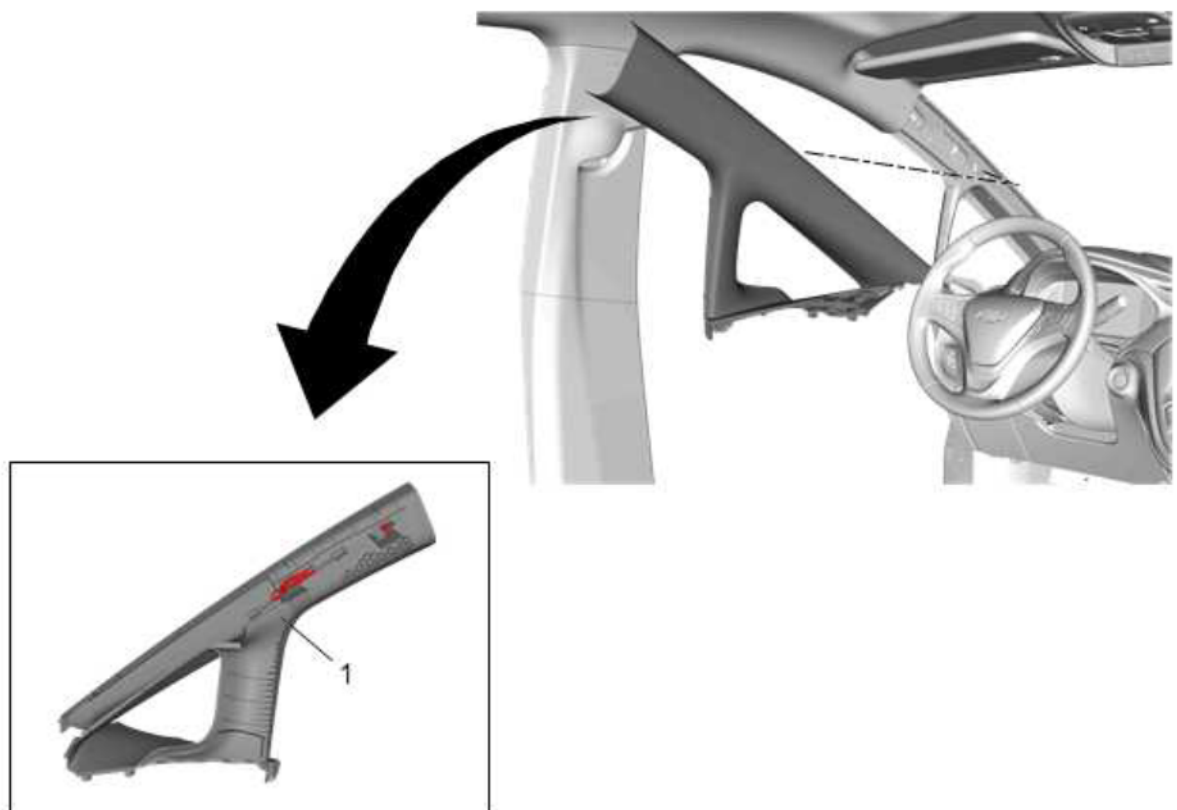


Fig. 45: Windshield Garnish Molding

Courtesy of GENERAL MOTORS COMPANY

2. Windshield Garnish Molding - Remove - [Windshield Garnish Molding Replacement](#)
3. Masking tape around the perimeter of the painted surfaces and the interior trim - Remove

FRONT SIDE DOOR WINDOW CONTROL SWITCH REPLACEMENT

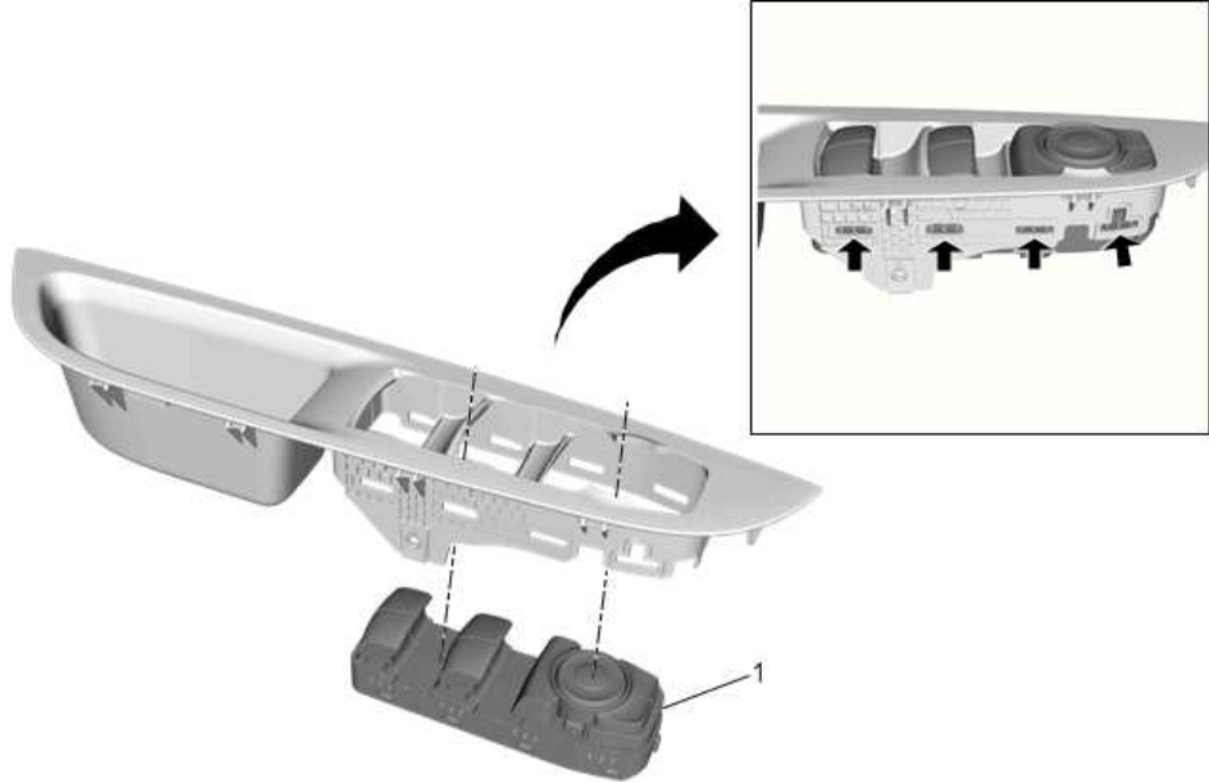


Fig. 46: Front Side Door Window Control Switch
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Front Side Door Armrest Switch Mount Plate Replacement</u>	
1	Front Side Door Window Control Switch Procedure 1. Remove the J-nut from the mount plate. 2. Release the switch from the switch mount plate by depressing the tabs along each side of the switch.

FRONT SIDE DOOR WINDOW SWITCH REPLACEMENT

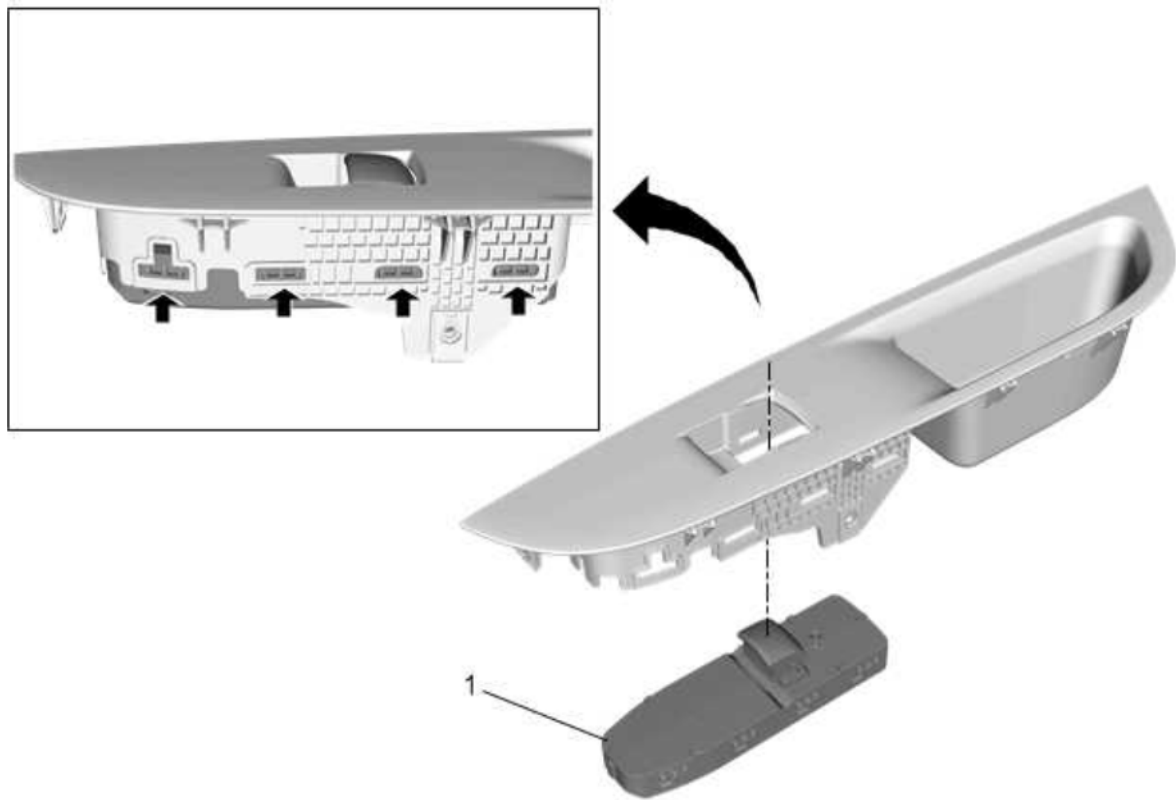


Fig. 47: Front Side Door Window Switch
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Front Side Door Armrest Switch Mount Plate Replacement</u>	
1	Front Side Door Window Switch Procedure 1. Remove the J-nut from the mount plate. 2. Release the switch assembly from the switch mount plate by depressing the tabs along each side of the switch.

REAR SIDE DOOR WINDOW SWITCH REPLACEMENT

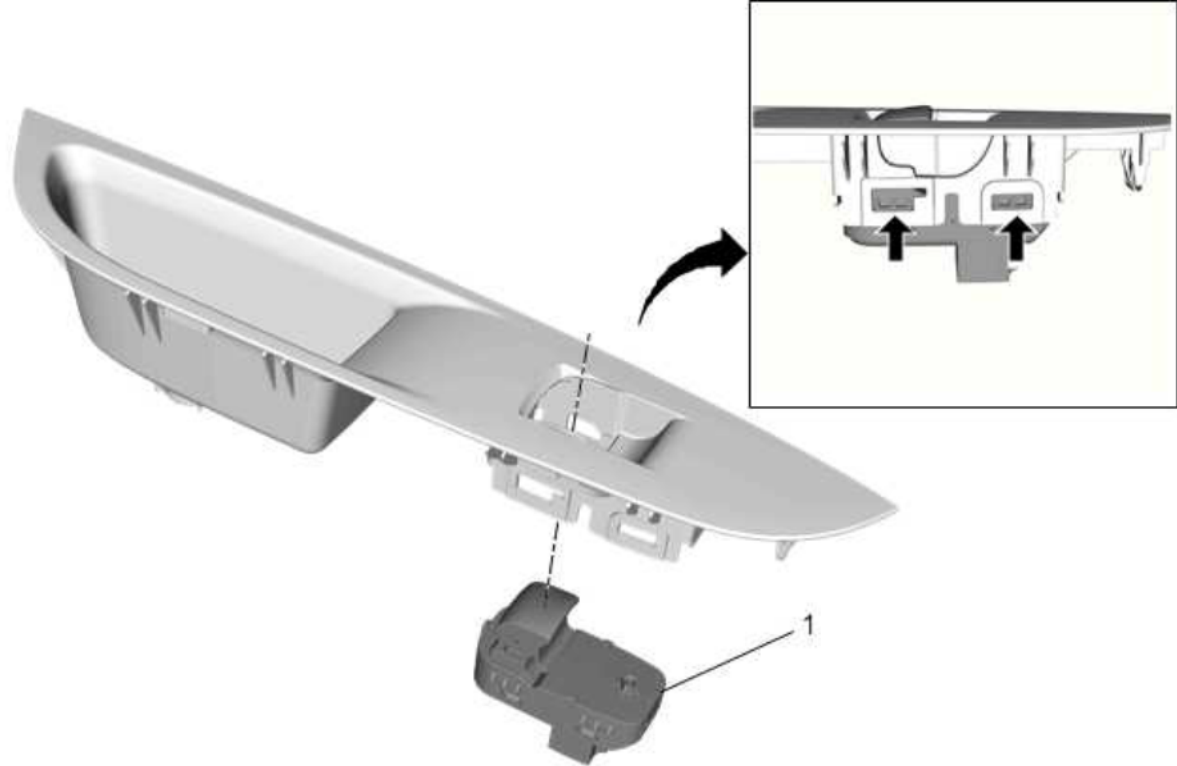


Fig. 48: Rear Side Door Window Switch

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Rear Side Door Armrest Switch Mount Plate Replacement</u>	
1	Rear Side Door Window Switch Procedure Release the switch assembly from the switch mount plate by depressing the tabs along each side of the switch.

FRONT SIDE DOOR WINDOW REGULATOR REPLACEMENT

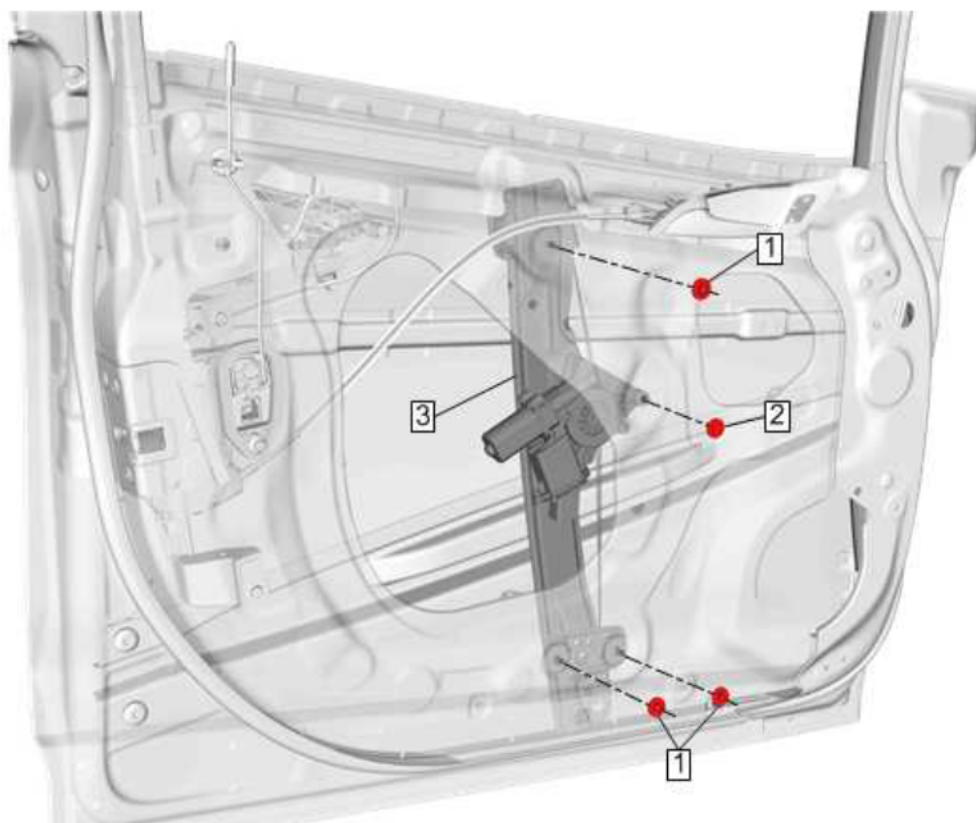


Fig. 49: Front Side Door Window Regulator
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: <u>Glass and Sheet Metal Handling Warning</u> Preliminary Procedures 1. Disconnect the window from the regulator. <u>Front Side Door Window Replacement</u> 2. Manually raise the window and tape in position.	
1	Front Side Door Window Regulator Nut (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 11 N.m (97 lb in)
2	Front Side Door Window Regulator Bolt Tighten 11 N.m (97 lb in)
3	Front Side Door Window Regulator Procedure 1. Disconnect the electrical connector. 2. Inspect the door window for proper operation before installing the door trim panel. 3. Perform the window regulator motor program relearn. <u>Window Motor Programming - Express Function</u>

WINDOW MOTOR PROGRAMMING - EXPRESS FUNCTION

Window Motor Normalized Procedure

A window motor that has not been normalized will no longer perform the express up and express down functions, this may occur during the following conditions:

- When a window motor has been disconnected
- When a door harness has been disconnected
- When the battery has been disconnected or replaced

NOTE: When DTC B3205 4B & 3210 4B are set, the following warnings will be displayed on the driver information center:

Open, then Close Driver Window

Open, then Close Passenger Window

These warnings will clear once the windows have been "Normalized" and the respective DTC will clear.

To normalize the window motor, follow these steps:

NOTE: The doors must be completely closed prior to normalizing the windows, a door that is open or ajar may cause the power window to function abnormally or to become inoperative while performing the

normalizing procedure. If this occurs, verify that the door is completely closed then repeat the normalizing procedure.

1. Vehicle in Service Mode.
2. Starting with the window completely UP, press and hold the power window switch until the window is fully open and continue holding the switch down for approximately 5 seconds after the window is completely open.
3. Pull the power window switch up until the window is fully closed and continue holding the switch up for approximately 5 seconds after the window is completely closed.

The window should now be normalized and the window should perform the express up and express down functions.

Window Motor Relearn Procedure

A relearn procedure may need to be performed for any Local Interconnect Network (LIN) window motor for the following conditions:

- When the window glass is out of alignment
- When the window glass has been replaced
- When the door has been replaced
- When the window regulator has been replaced

NOTE: Prior to performing the relearn procedure the vehicle must have all 4 wheels properly inflated and mounted, the vehicle must be sitting on a level surface and all doors must be completely closed.

To relearn the window motor, follow these steps:

1. Vehicle in Service Mode.
2. With a scan tool, select Module Diagnosis, Body Control Module, Configuration/Reset Functions and then select the appropriate Clear Window Learn Values for the window motor requiring the relearn procedure.
3. After the learn procedure, exit the scan tool learn procedure completely, the power window cannot be normalized and will not function until you exit the program.
4. Starting with the window completely UP, press and hold the power window switch until the window is fully open and continue holding the switch down for approximately 5 seconds after the window is completely open.
5. Pull the power window switch up until the window is fully closed and continue holding the switch up for approximately 5 seconds after the window is completely closed.

The window is now reprogrammed.

REAR SIDE DOOR WINDOW REGULATOR REPLACEMENT

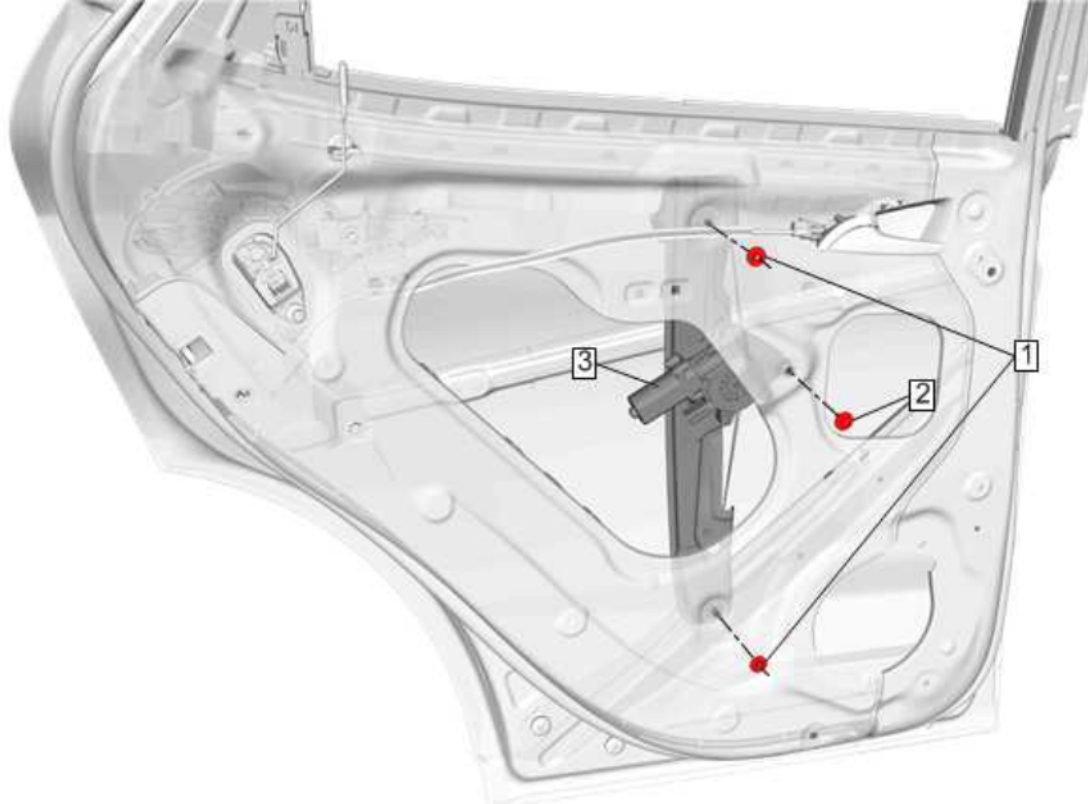


Fig. 50: Rear Side Door Window Regulator
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: <u>Glass and Sheet Metal Handling Warning</u> Preliminary Procedures 1. Disconnect the window from the regulator. <u>Rear Side Door Window Replacement</u> 2. Tape the window in the full up position.	
1	Rear Side Door Window Regulator Nut (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 11 N.m (97 lb in)
2	Rear Side Door Window Regulator Bolt Tighten 11 N.m (97 lb in)
3	Rear Side Door Window Regulator Procedure 1. Disconnect the electrical connector. 2. Inspect the door window for proper operation before installing the door trim panel. 3. Perform the window regulator motor program relearn. <u>Window Motor Programming - Express Function</u>

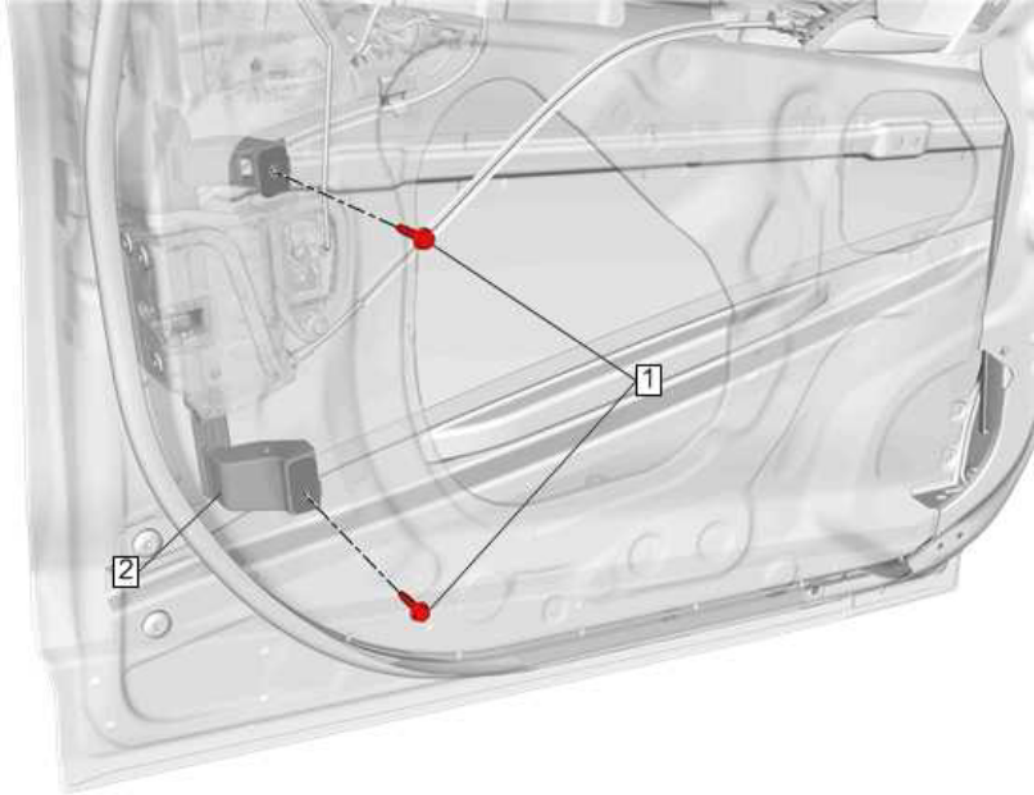


Fig. 51: Front Side Door Window Channel Retainer

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: <u>Glass and Sheet Metal Handling Warning</u> WARNING: Disconnect the power window switch when working inside the door. When operated, the Express Up/Down Feature allows the door window to move very quickly, without stopping, which could cause personal injury. Preliminary Procedures 1. <u>Front Side Door Trim Replacement</u> 2. <u>Front Side Door Water Deflector Replacement</u>	
1	Front Side Door Window Channel Retainer Bolt CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (80 lb in)
2	Front Side Door Window Channel Retainer Procedure Unclip the electrical harness from the window channel retainer.

FRONT SIDE DOOR WINDOW INNER SEALING STRIP REPLACEMENT

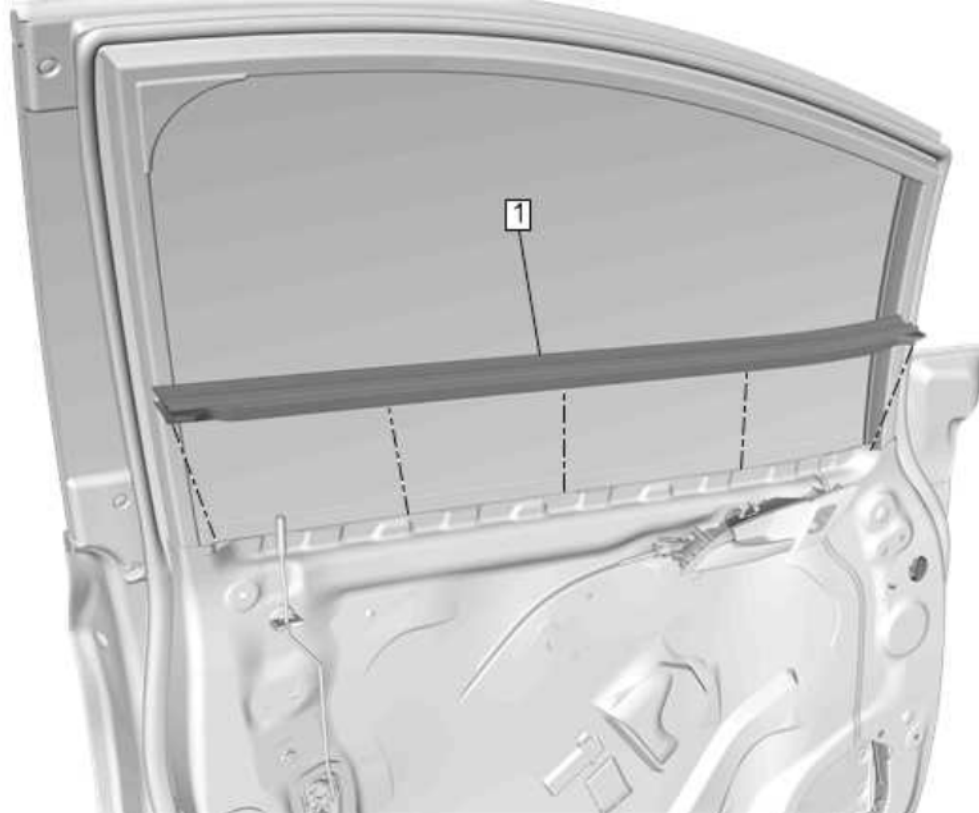


Fig. 52: Front Side Door Window Inner Sealing Strip

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures <u>Front Side Door Trim Replacement</u>	
1	Front Side Door Window Inner Sealing Strip NOTE: The sealing strip will come off with the door trim panel. It will need to be removed from the trim panel. Trim panel clips should be installed back to the door and then install the sealing strip.

REAR SIDE DOOR WINDOW UPPER REVEAL MOLDING REPLACEMENT

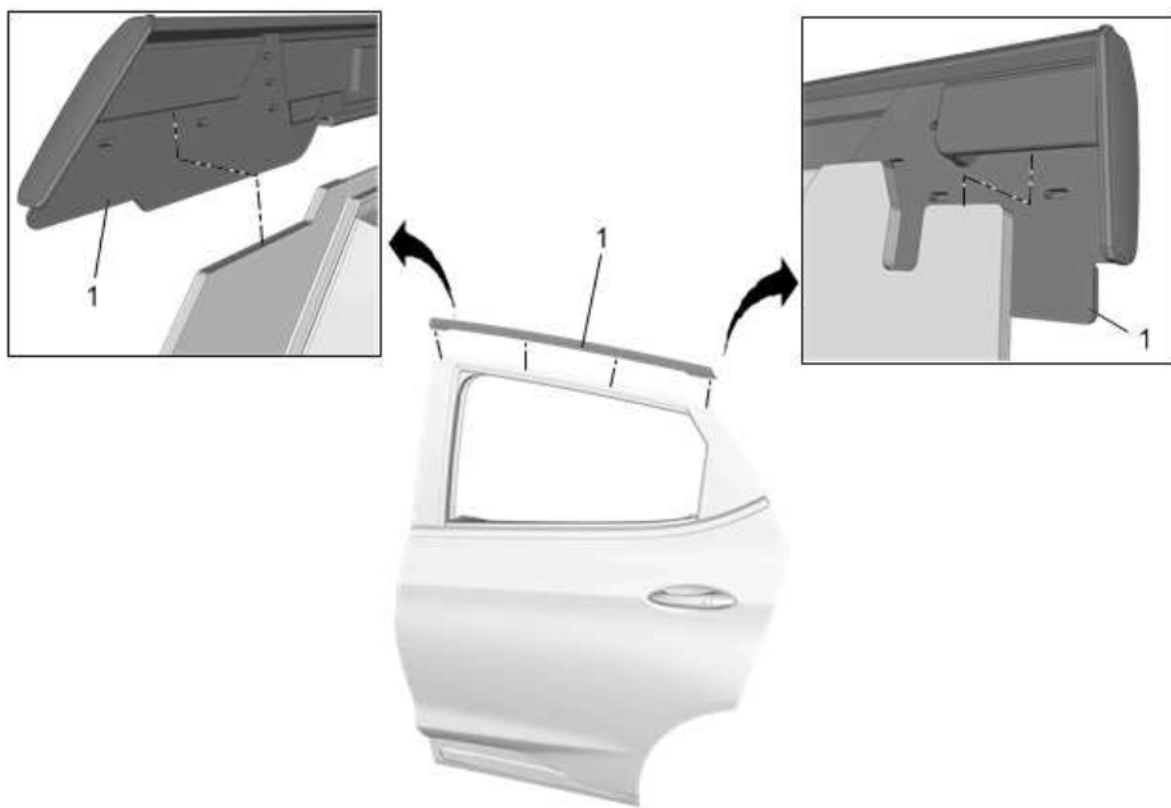


Fig. 53: Rear Side Door Window Upper Reveal Molding

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Reposition the upper portion of the door side weatherstrip. Rear Side Door Weatherstrip Replacement - Door Side	
1	Rear Side Door Window Upper Reveal Molding Procedure Using the appropriate tool, release the upper reveal molding starting at the rear of the rear door.

REAR SIDE DOOR WINDOW BELT REVEAL MOLDING REPLACEMENT

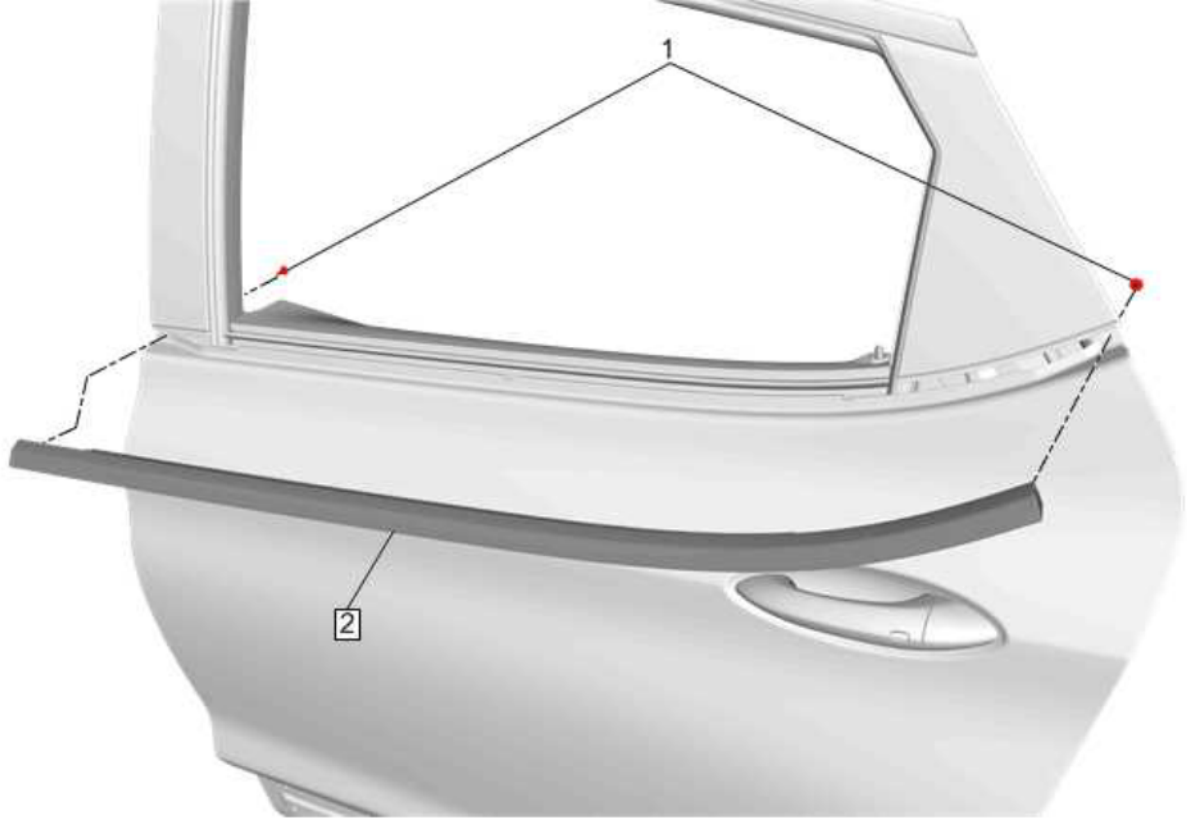


Fig. 54: Rear Side Door Window Belt Reveal Molding

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Release the rear side door weatherstrip to access the screw. <u>Rear Side Door Weatherstrip Replacement - Door Side</u>	
1	Rear Side Door Window Belt Reveal Molding Screw (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 1.5 N.m (13 lb in)
2	Rear Side Door Window Belt Reveal Molding

FRONT SIDE DOOR WINDOW BELT REVEAL MOLDING REPLACEMENT

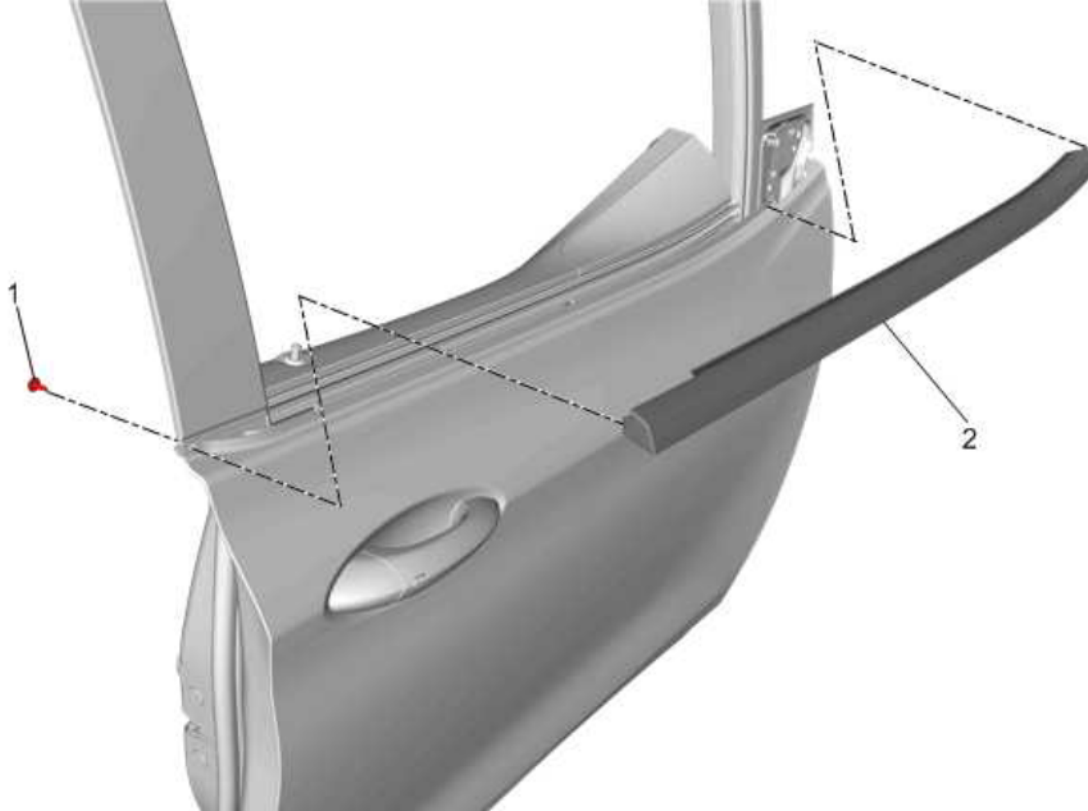


Fig. 55: Front Side Door Window Belt Reveal Molding

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Release the front side door weatherstrip to access the screw. Front Side Door Weatherstrip Replacement - Door Side 2. Remove the mirror fasteners, reposition and support the mirror. Outside Rearview Mirror Replacement	
1	Front Side Door Window Belt Reveal Molding Screw CAUTION: Refer to Fastener Caution . Tighten 1.5 N.m (13 lb in)
2	Front Side Door Window Belt Reveal Molding

FRONT SIDE DOOR WINDOW UPPER REVEAL MOLDING REPLACEMENT

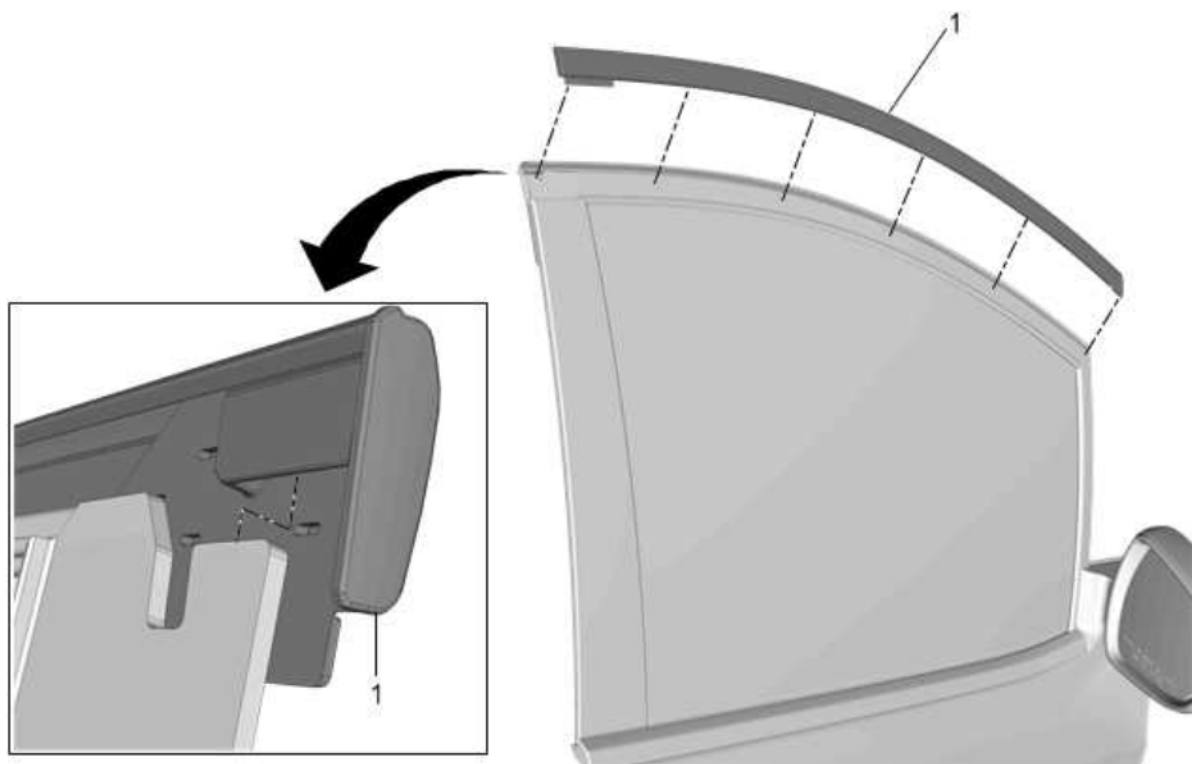


Fig. 56: Front Side Door Window Upper Reveal Molding

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Reposition the upper portion of the door side weatherstrip. <u>Front Side Door Weatherstrip Replacement - Door Side</u>	
1	Front Side Door Window Upper Reveal Molding Procedure Using the appropriate tool, release the upper reveal molding.

REAR SIDE DOOR WINDOW INNER SEALING STRIP REPLACEMENT

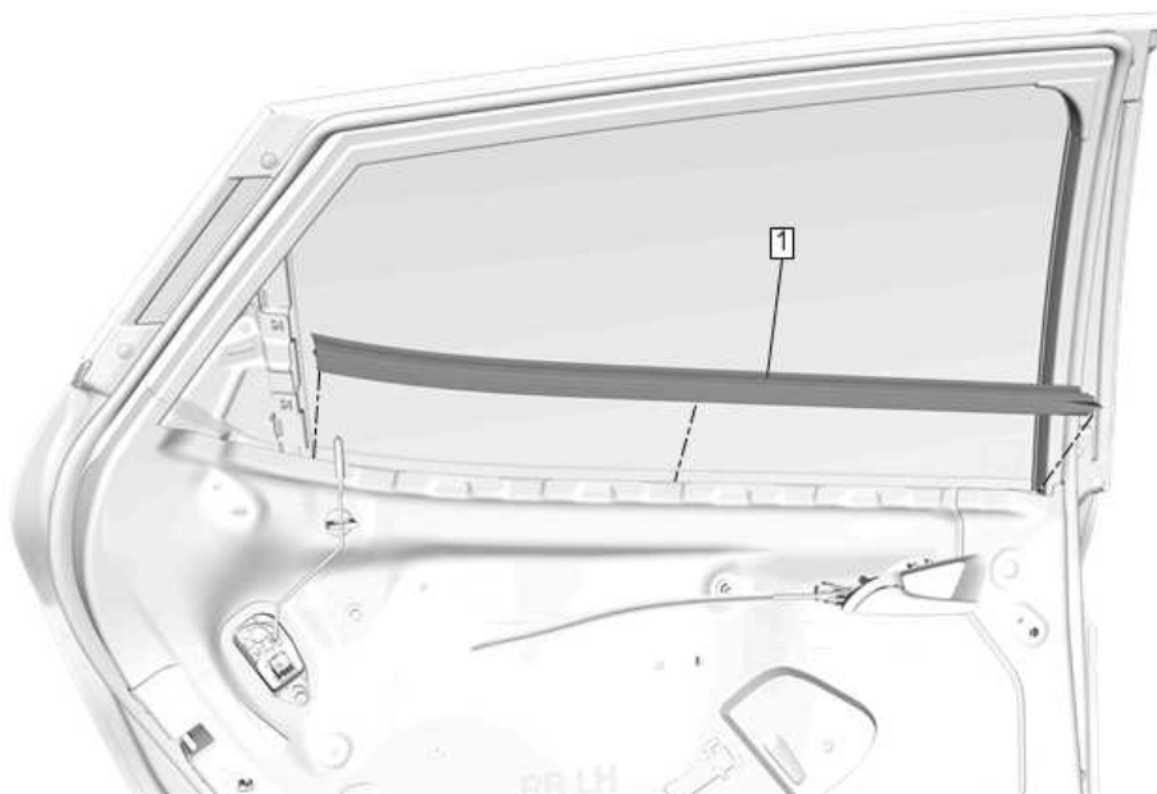


Fig. 57: Rear Side Door Window Inner Sealing Strip
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Rear Side Door Trim Replacement</u>	
1	Rear Side Door Window Inner Sealing Strip NOTE: The sealing strip will come off with the door trim panel. It will need to be removed from the trim panel. The trim panel clips will need to be installed back into the door and then install the sealing strip.

FRONT SIDE DOOR WINDOW WEATHERSTRIP REPLACEMENT

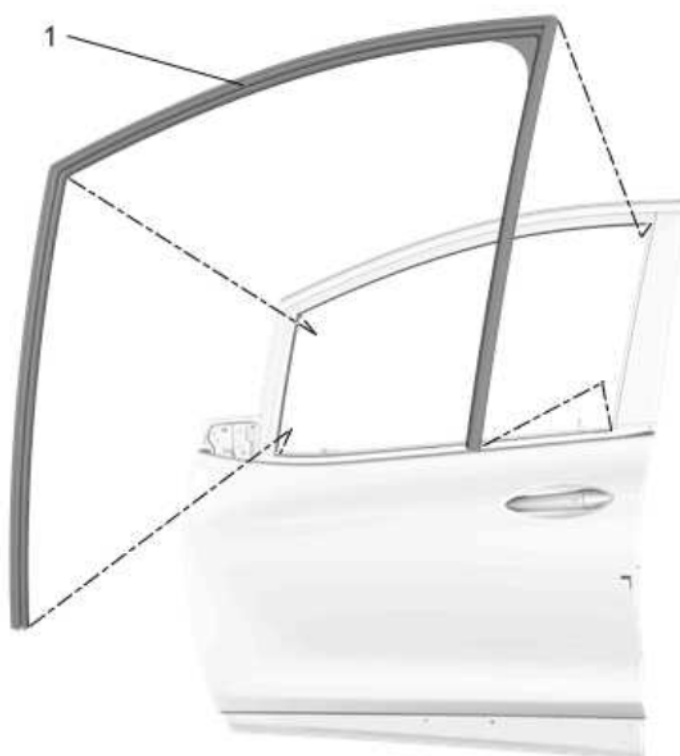


Fig. 58: Front Side Door Window Weatherstrip
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. <u>Front Side Door Window Replacement</u> 2. <u>Front Side Door Window Inner Sealing Strip Replacement</u> 3. <u>Radio Front Side Door Speaker Replacement</u>	
1	Front Side Door Window Weatherstrip Procedure 1. Grasp both upper corners of the window weatherstrip, pull downward releasing the window weatherstrip from the door frame. 2. Insert the weatherstrip downward in the front and rear channel until fully seated. 3. Inspect the door window for proper operation before installing the door trim panel.

REAR SIDE DOOR WINDOW WEATHERSTRIP REPLACEMENT

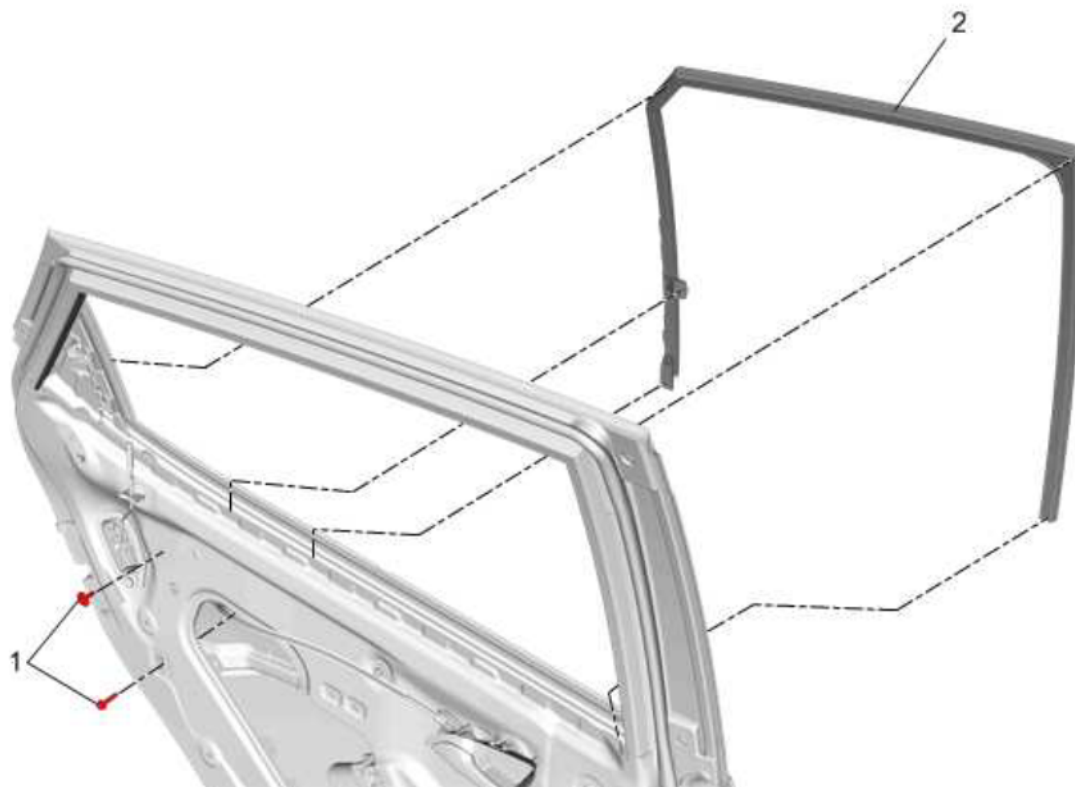


Fig. 59: Rear Side Door Window Weatherstrip
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures Rear Side Door Window Replacement Rear Side Door Window Inner Sealing Strip Replacement	
1	Rear Side Door Window Channel Rear Retainer Bolt (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Rear Side Door Window Weatherstrip Procedure - Grasp both upper corners of the window weatherstrip, pull downward releasing the window weatherstrip from the door frame. - Unclip electrical harness from the rear channel. - Insert the weatherstrip downward in the front and rear channel until fully seated. - Inspect the door window for proper operation before installing the door trim panel.

ADHESIVE INSTALLATION OF STATIONARY WINDOWS

WARNING: Refer to [Glass and Sheet Metal Handling Warning](#) .

- Use a urethane adhesive systems which meet GM Specification GM 3651G

2. Remove all mounds or loose pieces of urethane adhesive from the pinchweld area.
3. If the original window is being reused, remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinchweld flange by using a clean utility knife or razor blade scraper.
4. Inspect for any of the following problems in order to help prevent future breakage of the window:
 - The flange of the window opening
 - High weld
 - Solder spots
 - Hardened sealer
 - Any other obstruction or irregularity in the pinchweld flange

NOTE: If corrosion of the pinch-weld flange is present or if sheet metal repairs or replacements are required, the pinch-weld flange must be refinished in order to restore the bonding area strength. If paint repairs are required, mask the flange bonding area prior to applying the color coat in order to provide a clean primer only surface. Materials such as BASF DE15[®], DuPont 2610[®], Sherwin-Williams PSE 4600 and NP70[®] and Martin-Semour 5120 and 5130[®] PPG DP90LF SPIES/HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application.

5. After repairing the opening as indicated, perform the following steps:
6. Use an abrasive pad if necessary to remove mold release buildup from the encapsulated window. Use a dampened lint free cloth to remove any debris remaining on the window.

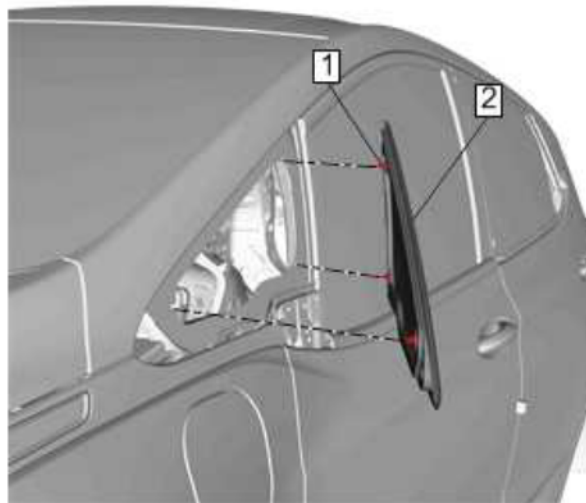


Fig. 60: Stationary Window

Courtesy of GENERAL MOTORS COMPANY

7. Ensure that the window locator pins (1) are positioned to the pinch-weld flange.
8. Dry fit the window (2) to the opening in order to determine the correct position.
9. Use masking tape to mark the locations of the window in the opening.
10. Cut the masking in the center and remove the window from the opening.
11. Verify all primers and urethane adhesive are within expiration dates.

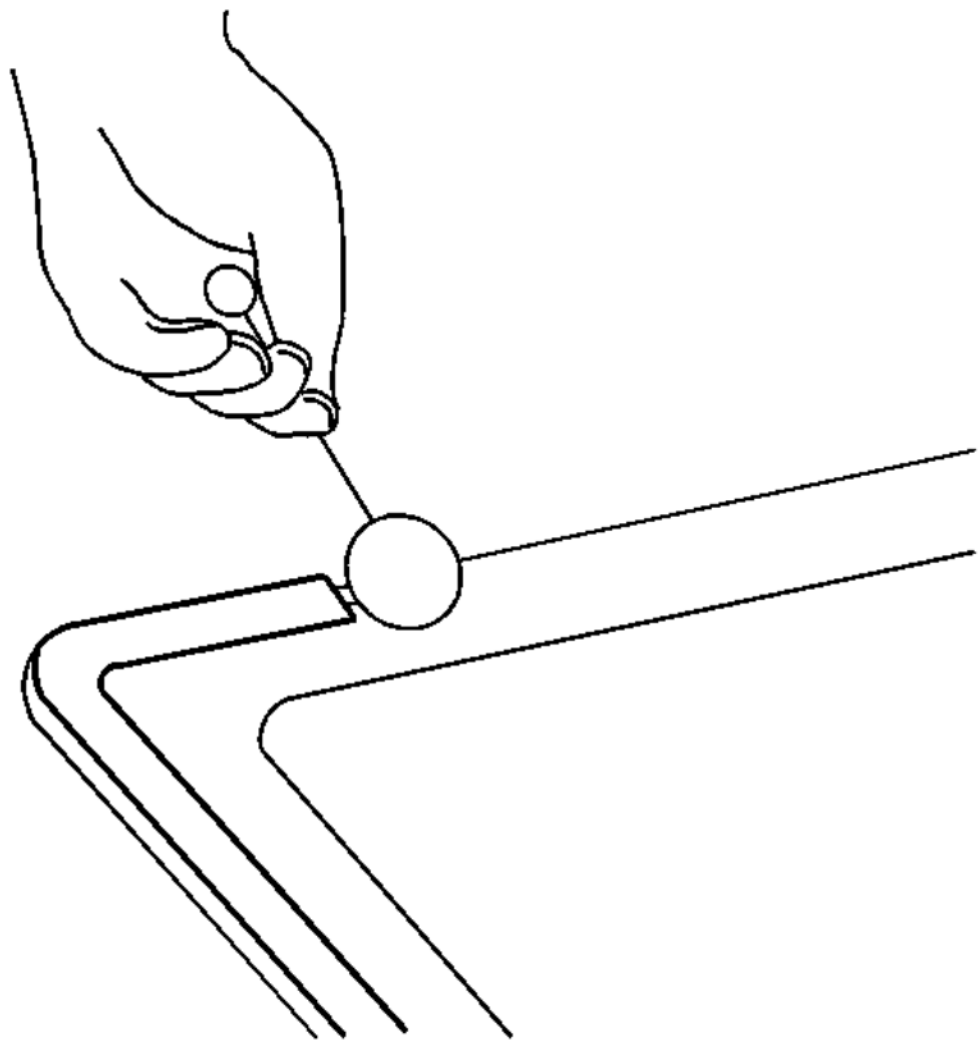


Fig. 61: Applying Glass Prep

Courtesy of GENERAL MOTORS COMPANY

WARNING: Failure to prep the area prior to the application of primer may cause insufficient bonding of urethane adhesive. Insufficient bonding of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

NOTE: Do not apply the black primer to the existing bead of the urethane adhesive on the pinch-weld flange. Apply the primer only to nicks, scratches or the primed surfaces.

12. Shake the primer clear for at least 1 minute.
13. Use a new dauber in order to apply the primer to the surface of the encapsulated window.
14. Allow the primer to dry for approximately 6 minutes.

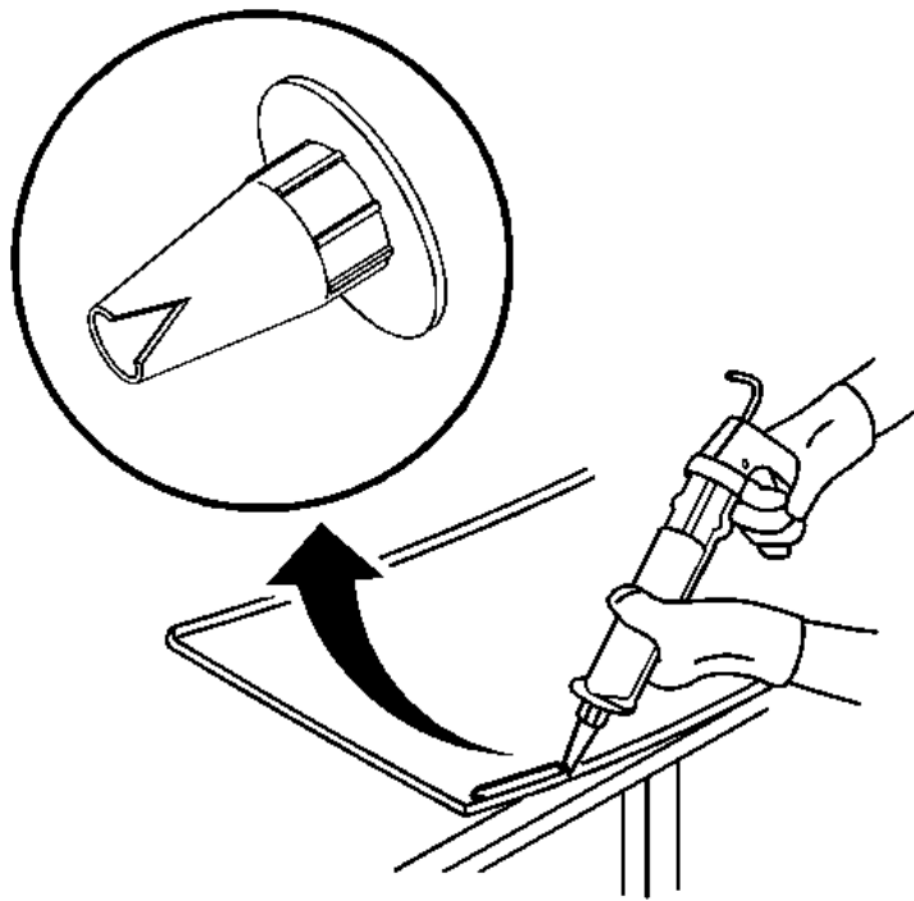


Fig. 62: Modified Applicator Nozzle

Courtesy of GENERAL MOTORS COMPANY

15. Cut the applicator nozzle in order to provide a bead of 8 mm (0. 31 in) wide, 12 mm (0. 50 in) high.

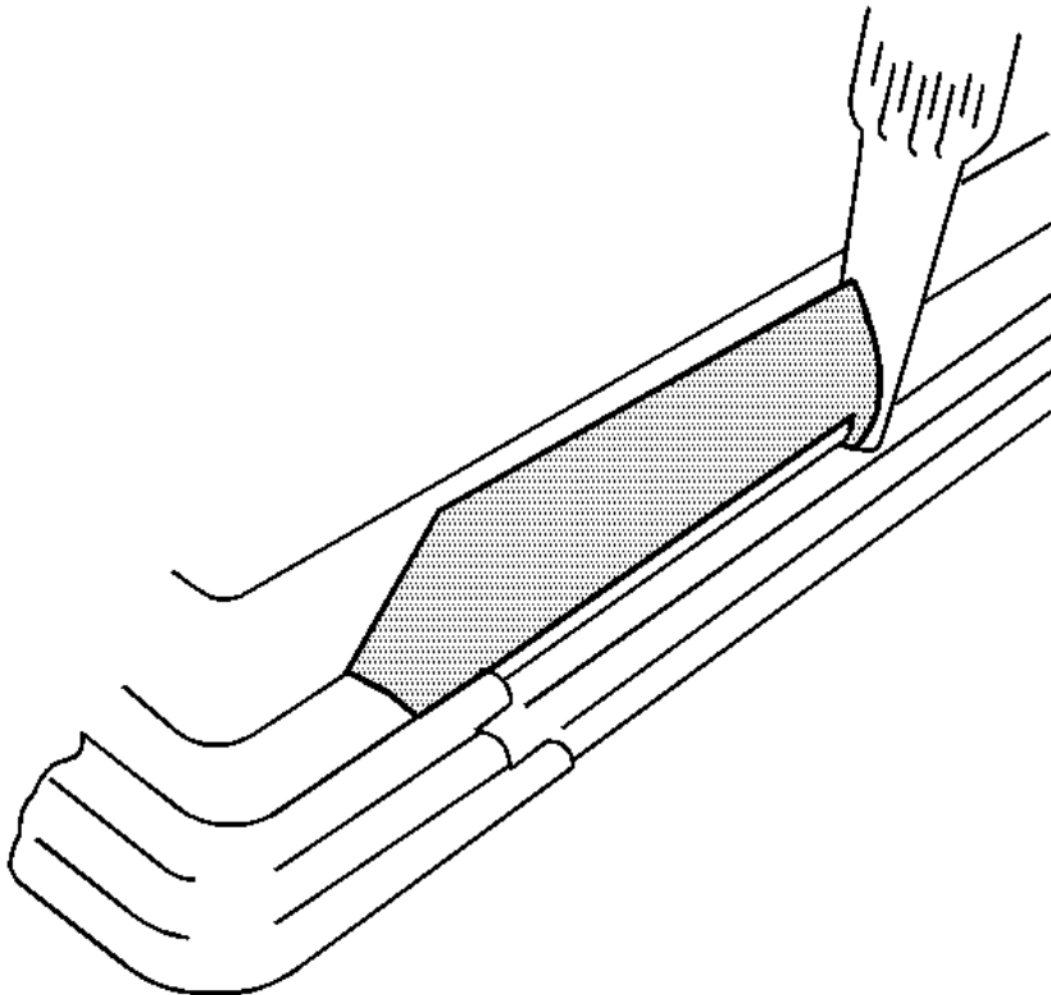


Fig. 63: Applying Continuous Bead Of Urethane Adhesive
Courtesy of GENERAL MOTORS COMPANY

16. Use a cartridge-type caulking gun in order to apply a smooth, continuous bead of urethane adhesive.
17. Use the edge of the inside encapsulated window track as a guide for the nozzle in order to apply the urethane adhesive.
18. Place the window in the opening.
19. Align the masking tape lines on the window and the body.
20. Press firmly around the entire periphery of the window in order to wet-out the urethane bead.
21. Tape the window to the body in order to minimize movement until the urethane adhesive cures.
22. Clean any excess urethane adhesive from the body.

NOTE: Do not direct a hard stream of high pressure water to the freshly applied urethane adhesive.

23. Use a soft spray of warm water in order to immediately water test the window.
24. Inspect the window for leaks.
25. If any leaks are found, use a plastic paddle in order to apply extra urethane adhesive at the leak point.
26. Retest the window for leaks.

WARNING: Insufficient curing of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

- For the moisture-curing type of urethane adhesive, allow a minimum of 6 hours at 21°C (70°F) or greater and with at least 30 percent relative humidity. Allow at least 24 hours for the complete curing of the urethane adhesive.

- For the chemical-curing type of urethane adhesive, allow a minimum of 1 hour.

Do NOT physically disturb the repair area until after these minimum times have elapsed.

27. Maintain the following conditions in order to properly cure the urethane adhesive:
 - Partially lower a door window in order to prevent pressure buildups when closing doors before the urethane adhesive cures.
 - Do not drive the vehicle until the urethane adhesive is cured. Refer to the above curing times.
 - Do not use compressed air in order to dry the urethane adhesive.
28. Complete the window installation.

ADHESIVE INSTALLATION OF WINDSHIELDS

WARNING: Refer to [Glass and Sheet Metal Handling Warning](#) .

1. Use a urethane adhesive systems which meet GM Specification GM 3651G.
2. Remove all mounds or loose pieces of urethane adhesive from the pinchweld area.
3. If the original window is being reused, remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinchweld flange by using a clean utility knife or razor blade scraper.
4. Inspect for any of the following problems in order to help prevent future breakage of the window:
 - The flange of the window opening
 - High weld
 - Solder spots
 - Hardened sealer
 - Any other obstruction or irregularity in the pinchweld flange

NOTE: If corrosion of the pinch-weld flange is present or if sheet metal repairs or replacements are required, the pinch-weld flange must be refinished in order to restore the bonding area strength. If paint repairs are required, mask the flange bonding area prior to applying the color coat in order to provide a clean primer only surface. Materials such as BASF DE15[®], DuPont 2610[®], Sherwin-Williams PSE 4600 and NP70[®] and Martin-Semour 5120 and 5130[®] PPG DP90LF SPIES/ HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application.

5. After repairing the opening as indicated, perform the following steps:
 1. Remove all traces of broken glass from the outer cowl panel, seats, floor and defroster ducts.
 2. Clean around the edge of the inside surface of the window with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth.
6. Verify all primers and urethane adhesive are within expiration dates.

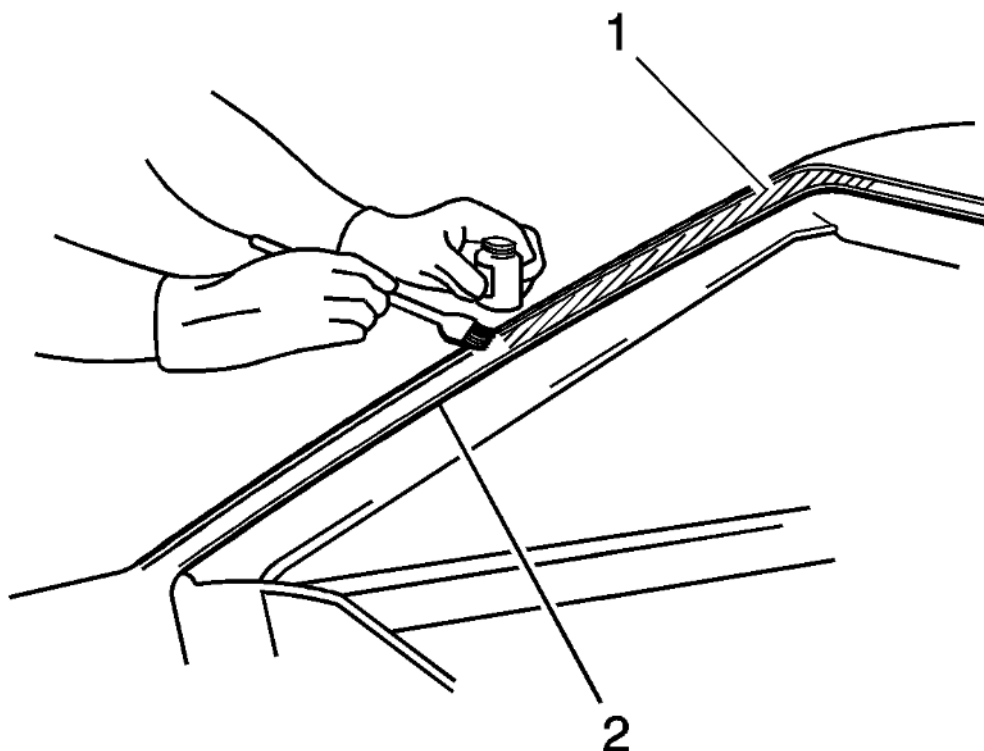


Fig. 64: Applying Pinch-Weld Primer

Courtesy of GENERAL MOTORS COMPANY

WARNING: Failure to prep the area prior to the application of primer may cause insufficient bonding of urethane adhesive. Insufficient bonding of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

NOTE: Do not apply the black primer to the existing bead of the urethane adhesive on the pinch-weld flange. Apply the primer only to nicks, scratches or the primed surfaces.

7. Shake the pinch-weld primer for at least 1 minute.
8. Use a new dauber in order to apply the primer to the surface of the pinch-weld flange (1).
9. Allow the pinch-weld primer to dry for approximately 10 minutes.

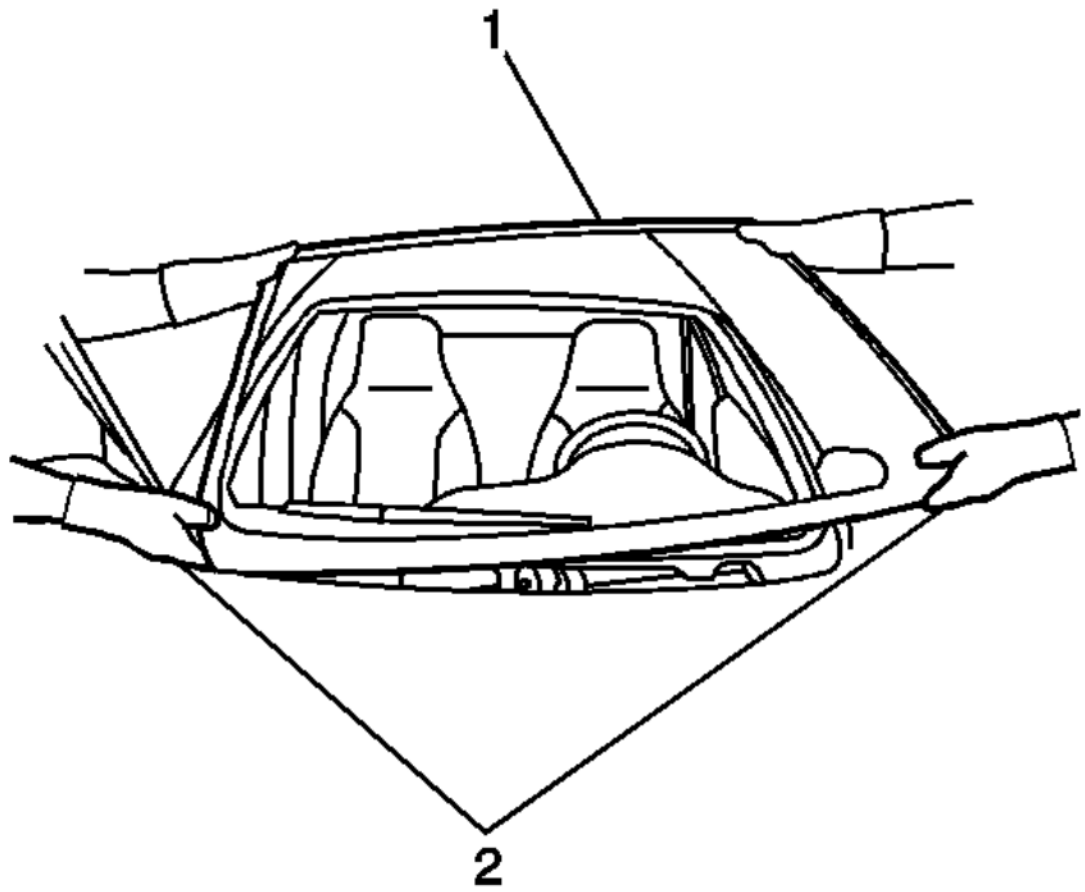


Fig. 65: Removing/Installing Windshield

Courtesy of GENERAL MOTORS COMPANY

10. With the an assistant, dry fit the window (1) to the opening in order to determine the correct position.

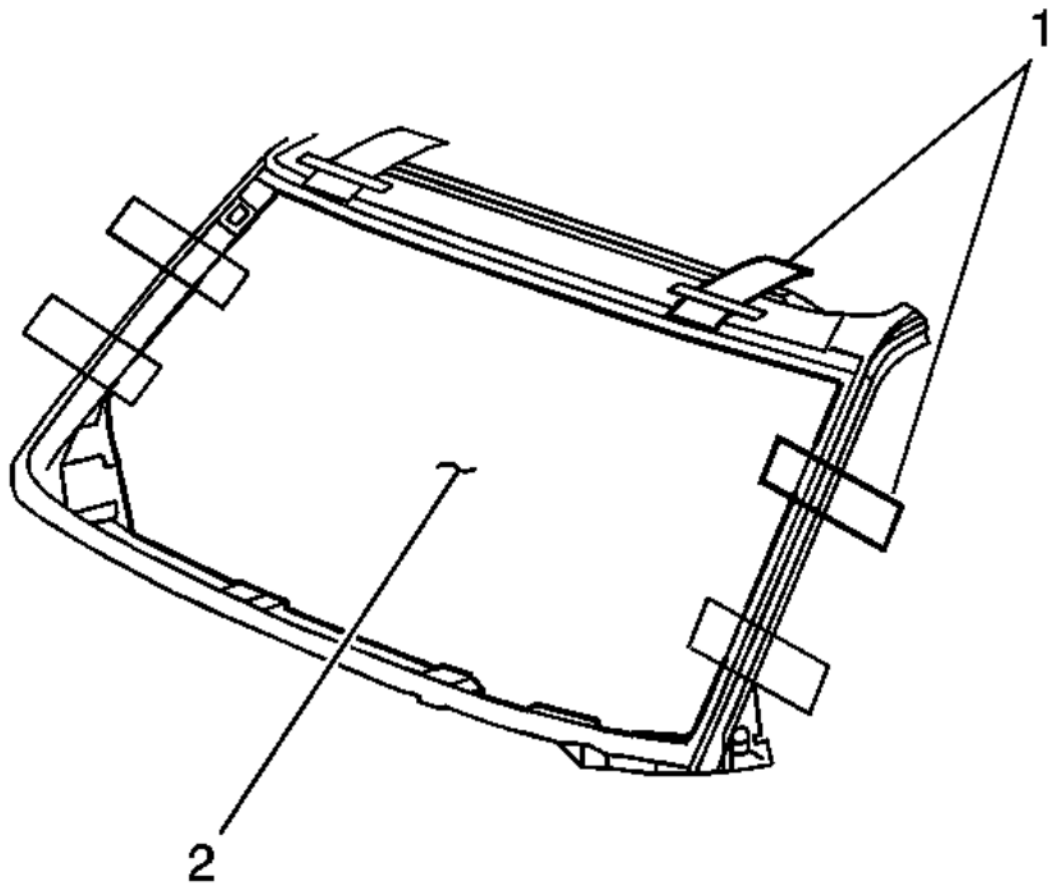


Fig. 66: Aligning Tape Lines On Window To Body.

Courtesy of GENERAL MOTORS COMPANY

11. Use masking tape in order to mark the locations (1) of the window (2) in the opening.
12. Cut the masking tape in the center and remove the window from the opening.

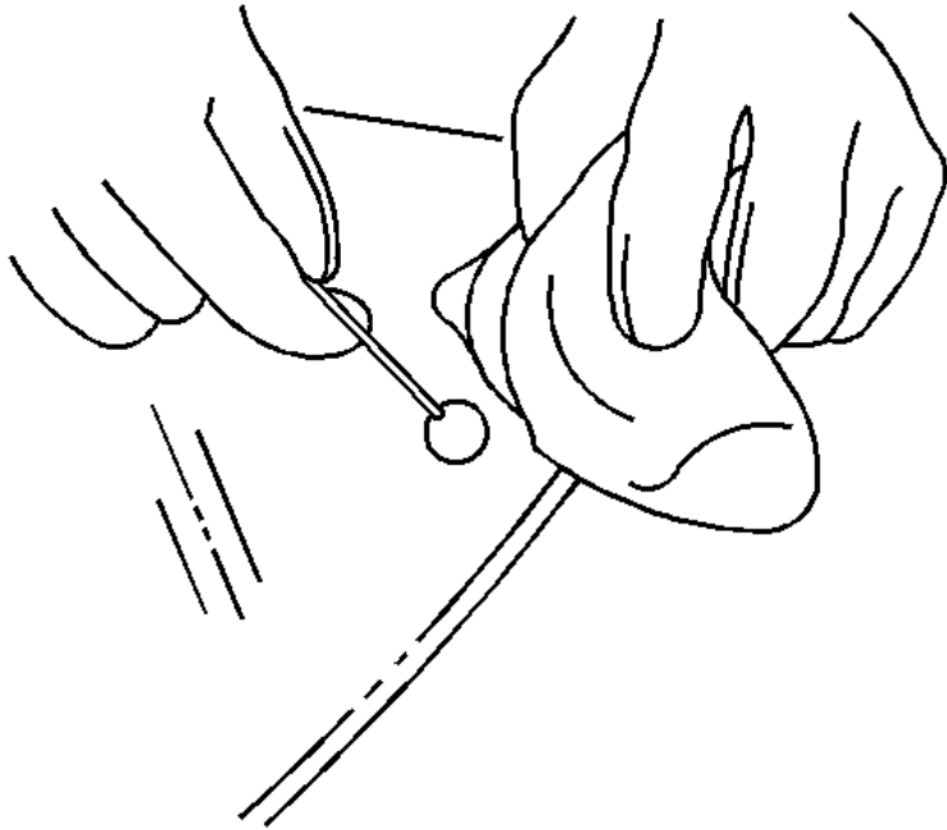


Fig. 67: Applying Glass Prep

Courtesy of GENERAL MOTORS COMPANY

NOTE: Use care when applying glass prep clear on the window. This primer dries almost instantly, and may stain the viewing area of the window if not applied evenly.

13. Use a new dauber in order to apply glass prep clear to the area approximately 10 - 16 mm (3/8 - 5/8 in) around the entire perimeter of the window inner surface.

Immediately wipe the glass primed area using a clean, lint-free cloth.

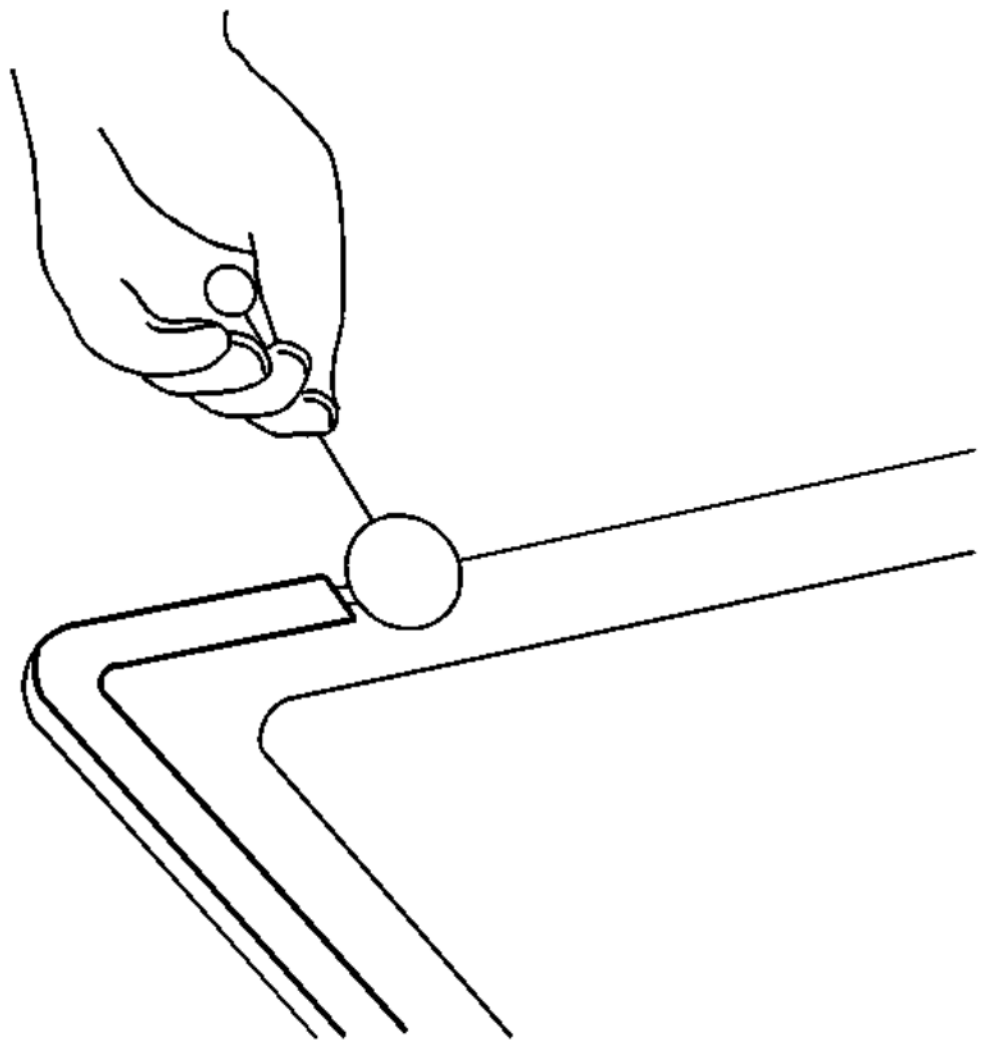


Fig. 68: Applying Glass Prep

Courtesy of GENERAL MOTORS COMPANY

14. Apply a second coat of the glass prep clear to the same area of the glass.

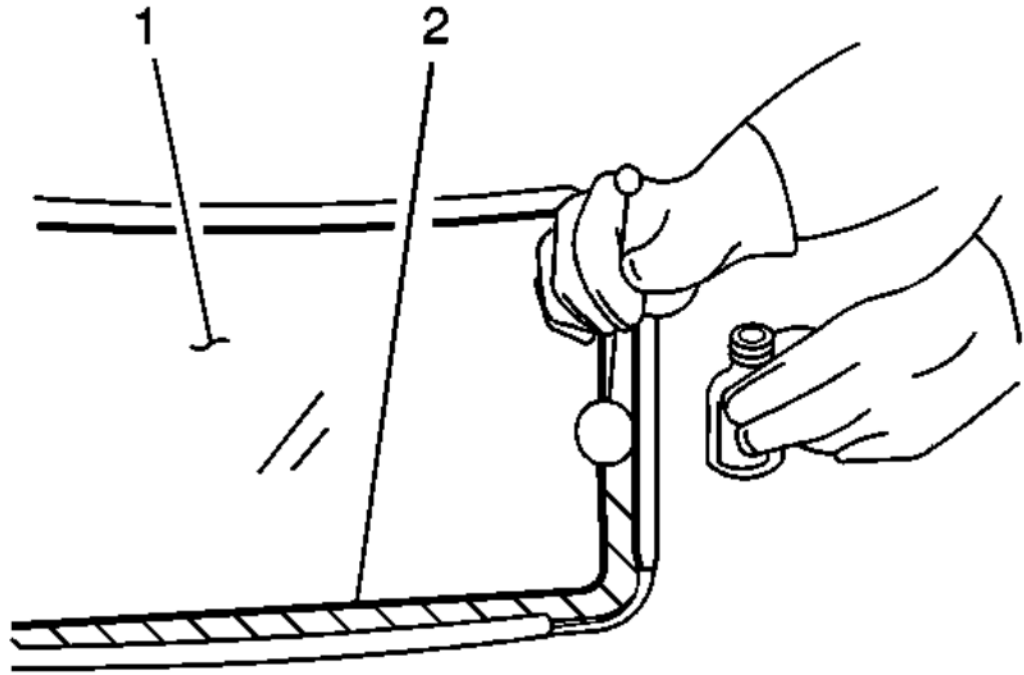


Fig. 69: Applying Glass Primer

Courtesy of GENERAL MOTORS COMPANY

NOTE: The glass primer black is effective up to 8 hours after applying it to the glass. The primed surface of the glass must be kept clean.

15. Shake the glass primer black for at least 1 minute.
16. Use a new dauber in order to apply the glass primer black to the same areas (2) that glass prep clear was applied.
17. Allow the glass primer to dry for approximately 10 minutes.

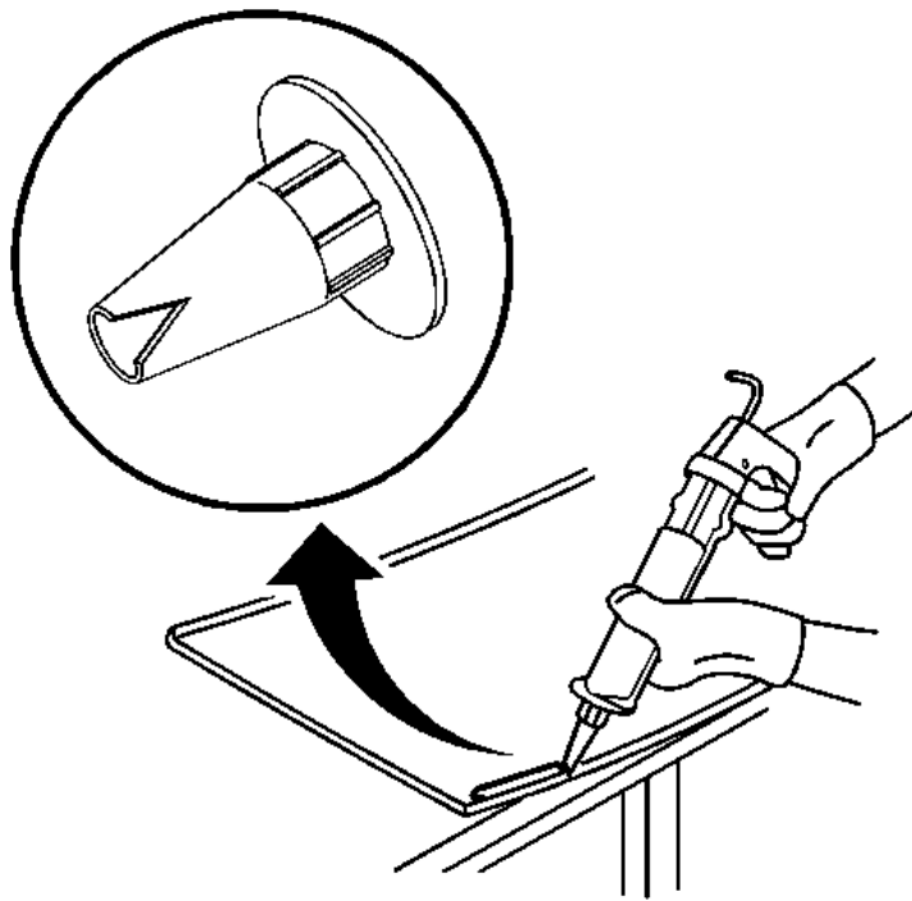


Fig. 70: Modified Applicator Nozzle

Courtesy of GENERAL MOTORS COMPANY

18. Cut the applicator nozzle in order to provide a bead of 12.7 mm (1/2 in) wide and 12.7 mm (1/2 in) high.

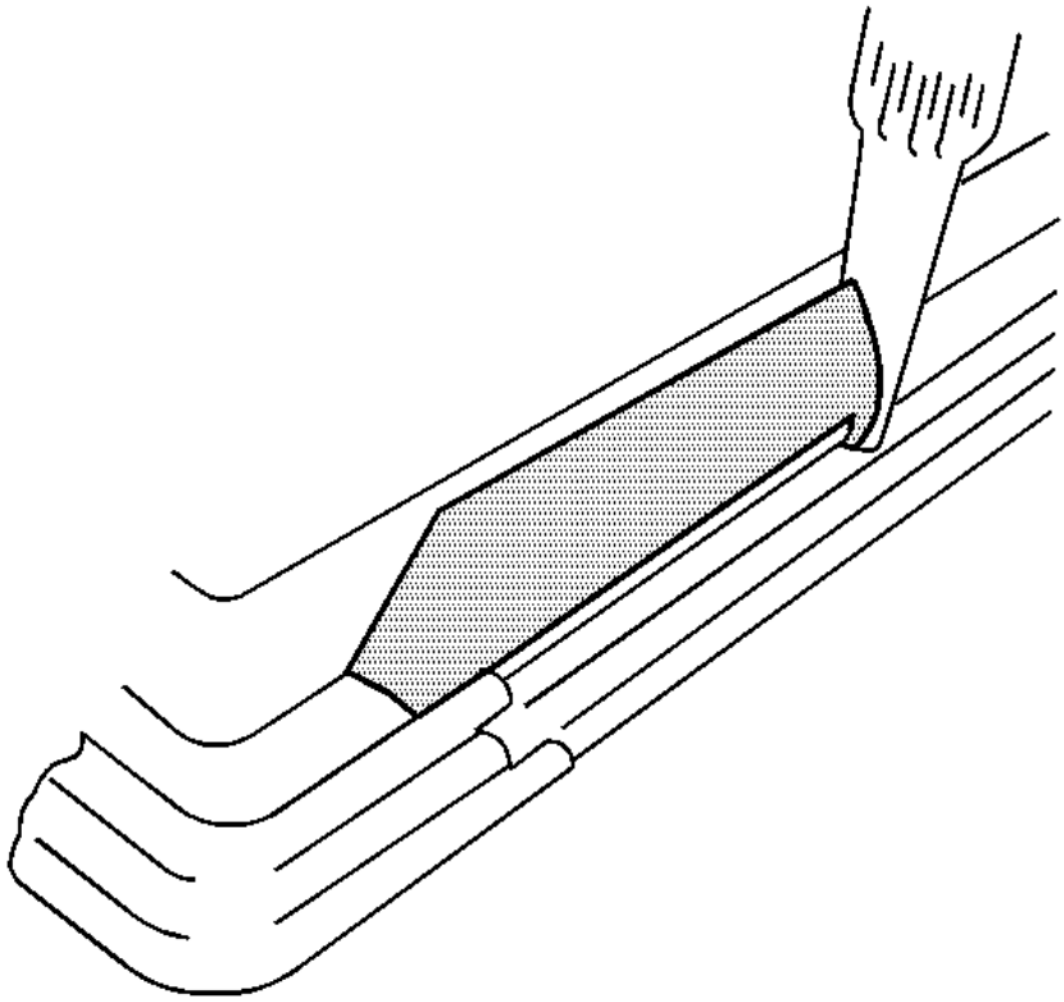


Fig. 71: Applying Continuous Bead Of Urethane Adhesive
Courtesy of GENERAL MOTORS COMPANY

19. Use a cartridge-type caulking gun in order to apply a smooth, continuous bead of urethane adhesive.

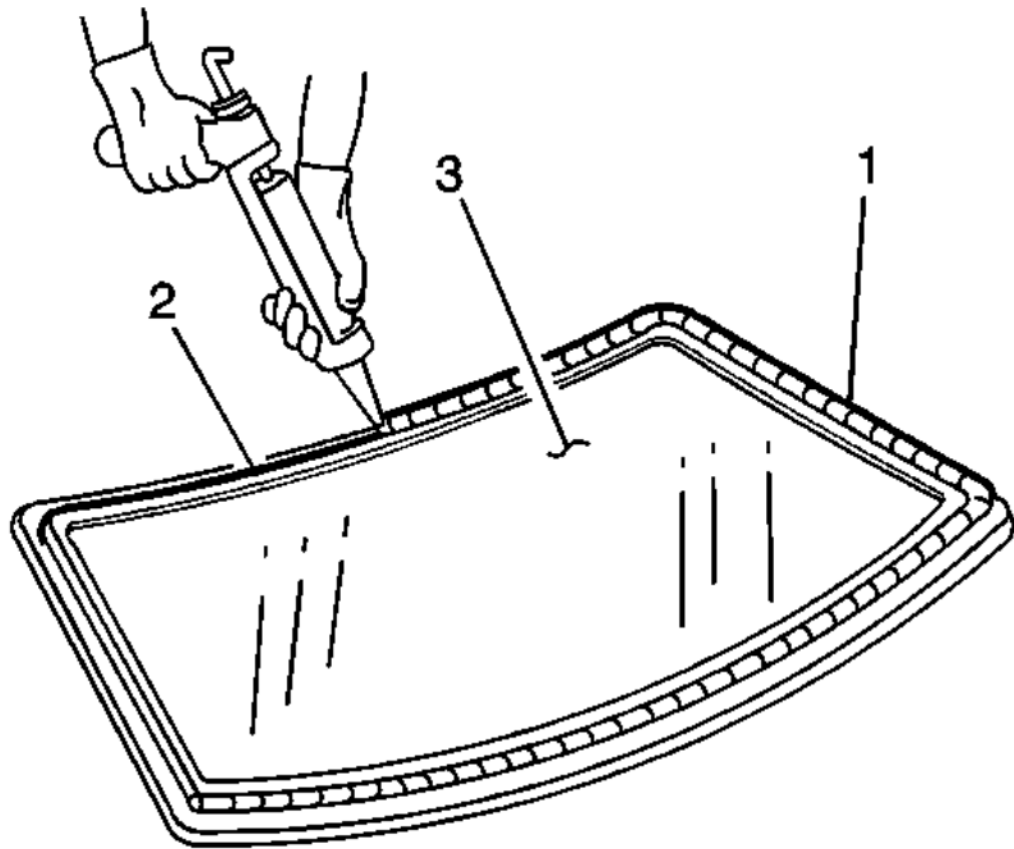


Fig. 72: Applying Urethane Adhesive To Inner Surface Of Window

Courtesy of GENERAL MOTORS COMPANY

20. Use the edge of the window as a guide for the nozzle in order to apply the urethane adhesive (1) to the inner surface of the window (3).

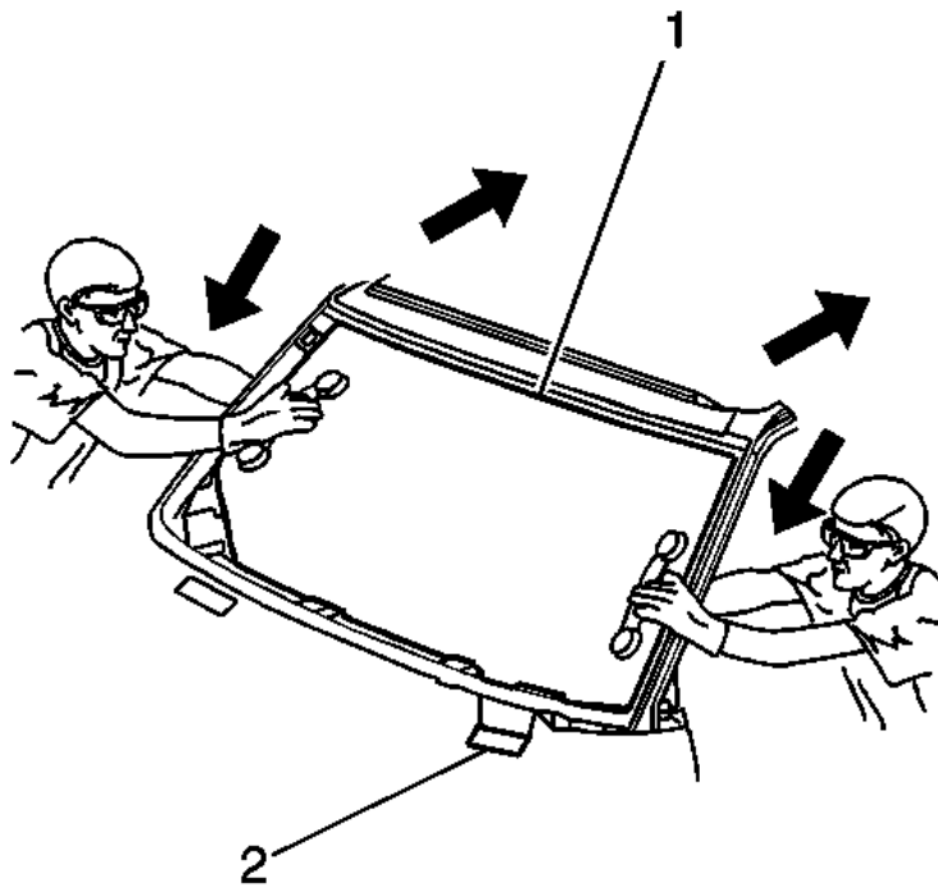


Fig. 73: Installing Windshield

Courtesy of GENERAL MOTORS COMPANY

21. With an assistant, installing the windshield (1) to the locator pins to the slots located in each corner of the upper pinch-weld flange.

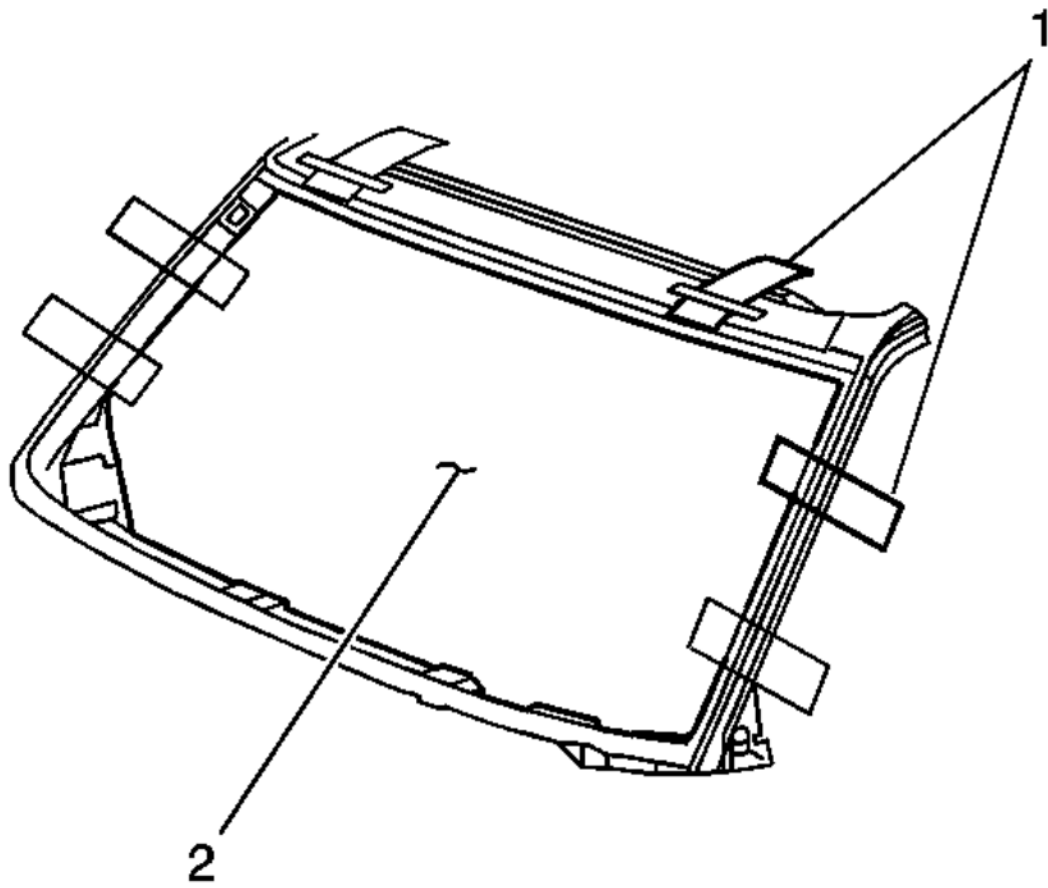


Fig. 74: Aligning Tape Lines On Window To Body.
Courtesy of GENERAL MOTORS COMPANY

22. Align the masking tape (1) lines on the window (2) and the body.

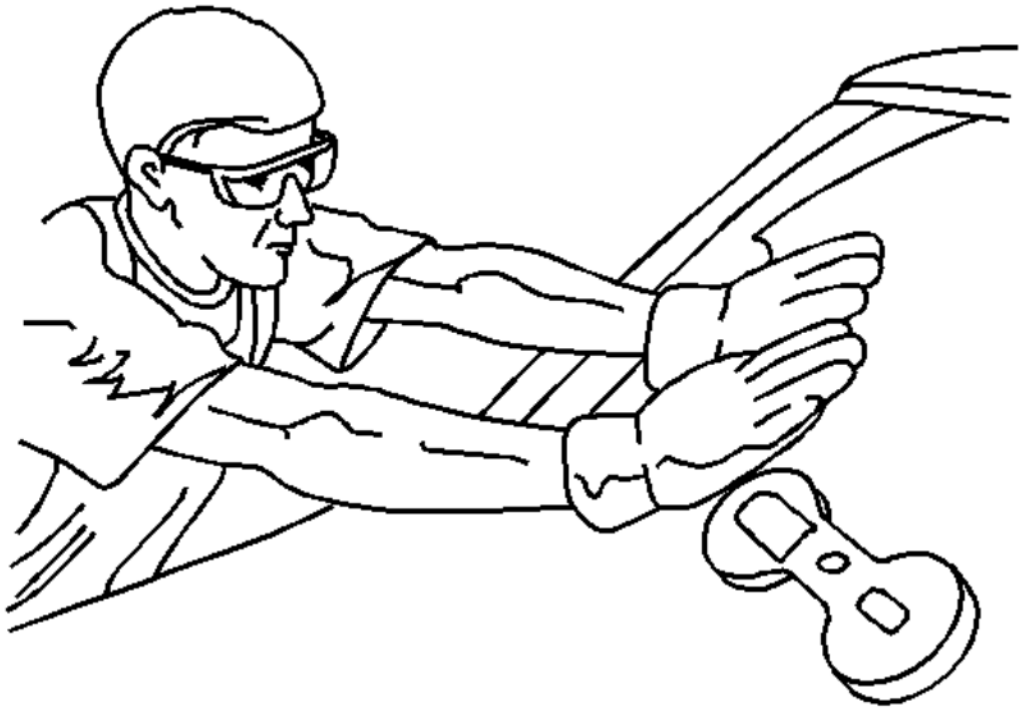


Fig. 75: Pressing Window Into Place

Courtesy of GENERAL MOTORS COMPANY

23. Press the window firmly into place, 1 mm (0.039 in) below surface.
24. Tape the window to the body in order to minimize movement until the urethane adhesive cures.

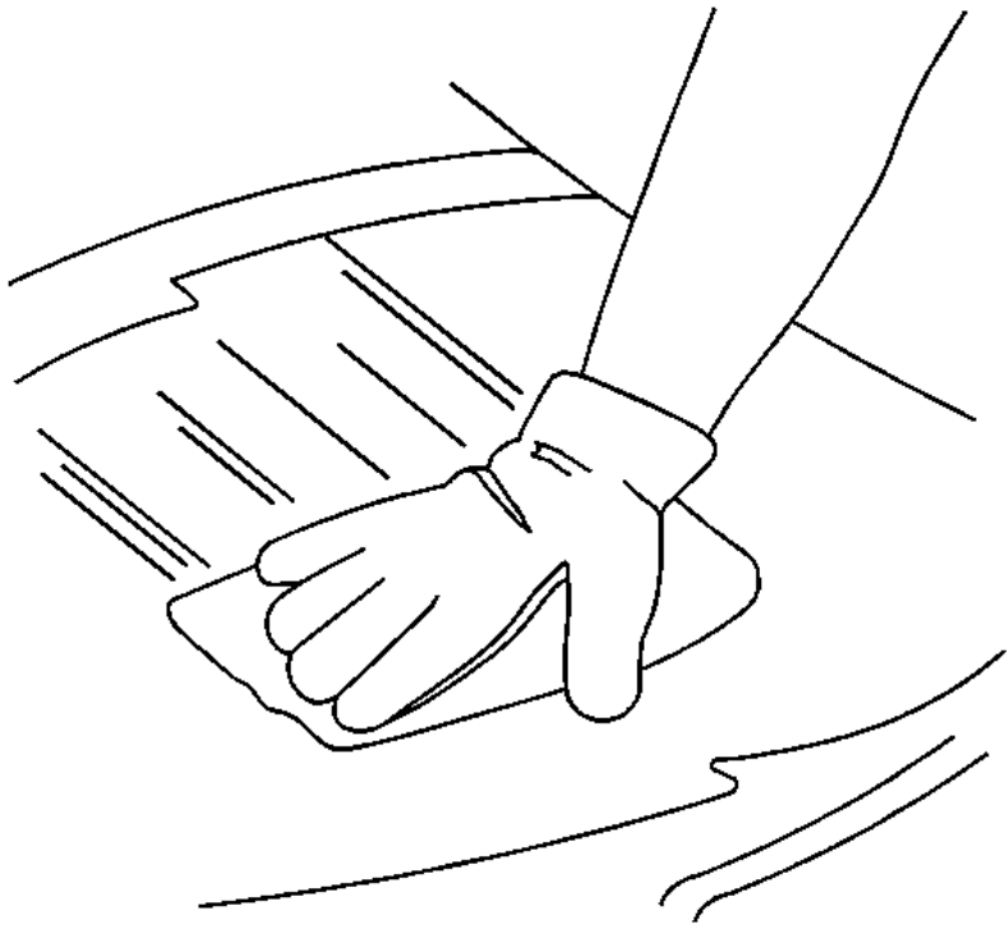


Fig. 76: Cleaning Excess Urethane Adhesive From Body.
Courtesy of GENERAL MOTORS COMPANY

25. Clean any excess urethane adhesive from the body.

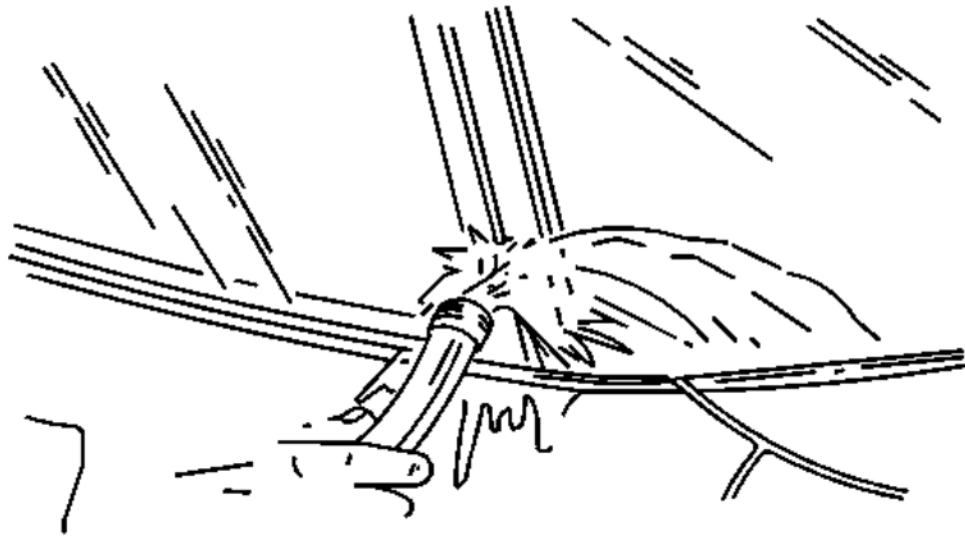


Fig. 77: Performing Water Hose Test
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not direct a hard stream of high pressure water to the freshly applied urethane adhesive.

26. Use a soft spray of warm water in order to immediately water test the window.
27. Inspect the window for leaks.
28. If any leaks are found, use a plastic paddle in order to apply extra urethane adhesive at the leak point.
29. Retest the window for leaks.

WARNING: Insufficient curing of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

- For the moisture-curing type of urethane adhesive, allow a minimum of 6 hours at 21°C (70°F) or greater and with at least 30 percent relative humidity. Allow at least 24 hours for the complete curing of the urethane adhesive.
- For the chemical-curing type of urethane adhesive, allow a minimum of 1 hour.

Do NOT physically disturb the repair area until after these minimum times have elapsed.

30. Maintain the following conditions in order to properly cure the urethane adhesive:
 - Partially lower a door window in order to prevent pressure buildups when closing doors before the urethane adhesive cures.
 - Do not drive the vehicle until the urethane adhesive is cured. Refer to the above curing times.

- Do not use compressed air in order to dry the urethane adhesive.

31. Complete the window installation.

ADHESIVE INSTALLATION OF REAR WINDOWS

WARNING: Refer to [Glass and Sheet Metal Handling Warning](#) .

1. Use a urethane adhesive systems which meet GM Specification GM 3651G.
2. Remove all mounds or loose pieces of urethane adhesive from the pinchweld area.
3. If the original window is being reused, remove all but approximately 2 mm (3/64 in) of the existing bead of urethane adhesive from the pinchweld flange by using a clean utility knife or razor blade scraper.
4. Inspect for any of the following problems in order to help prevent future breakage of the window:
 - The flange of the window opening
 - High weld
 - Solder spots
 - Hardened sealer
 - Any other obstruction or irregularity in the pinchweld flange

NOTE: If corrosion of the pinch-weld flange is present or if sheet metal repairs or replacements are required, the pinch-weld flange must be refinished in order to restore the bonding area strength. If paint repairs are required, mask the flange bonding area prior to applying the color coat in order to provide a clean primer only surface. Materials such as BASF DE15, DuPont 2610, Sherwin-Williams PSE 4600 and NP70 and Martin-Semour 5120 and 5130 PPG DP90LF SPIES/HECKER 3688/8590 - 3688/5150 - 4070/5090 STANDOX 11158/13320 - 14653/14980 products are approved for this application.

5. After repairing the opening as indicated, perform the following steps:
 1. Remove all traces of broken glass from the outer cowl panel, seats, floor and defroster ducts.
 2. Clean around the edge of the inside surface of the window with a 50/50 mixture of isopropyl alcohol and water by volume on a dampened lint free cloth.
6. Verify all primers and urethane adhesive are within expiration dates.

WARNING: Failure to prep the area prior to the application of primer may cause insufficient bonding of urethane adhesive. Insufficient bonding of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

NOTE: Do not apply the black #3 primer to the existing bead (1) of the urethane adhesive on the pinch-weld flange. Apply the primer only to nicks, scratches or the primed surfaces.

7. Shake the pinch-weld primer black #3 for at least 1 minute.
8. Use a new dauber in order to apply the primer to the surface of the pinch-weld flange (1).
9. Allow the pinch-weld primer to dry for approximately 10 minutes.

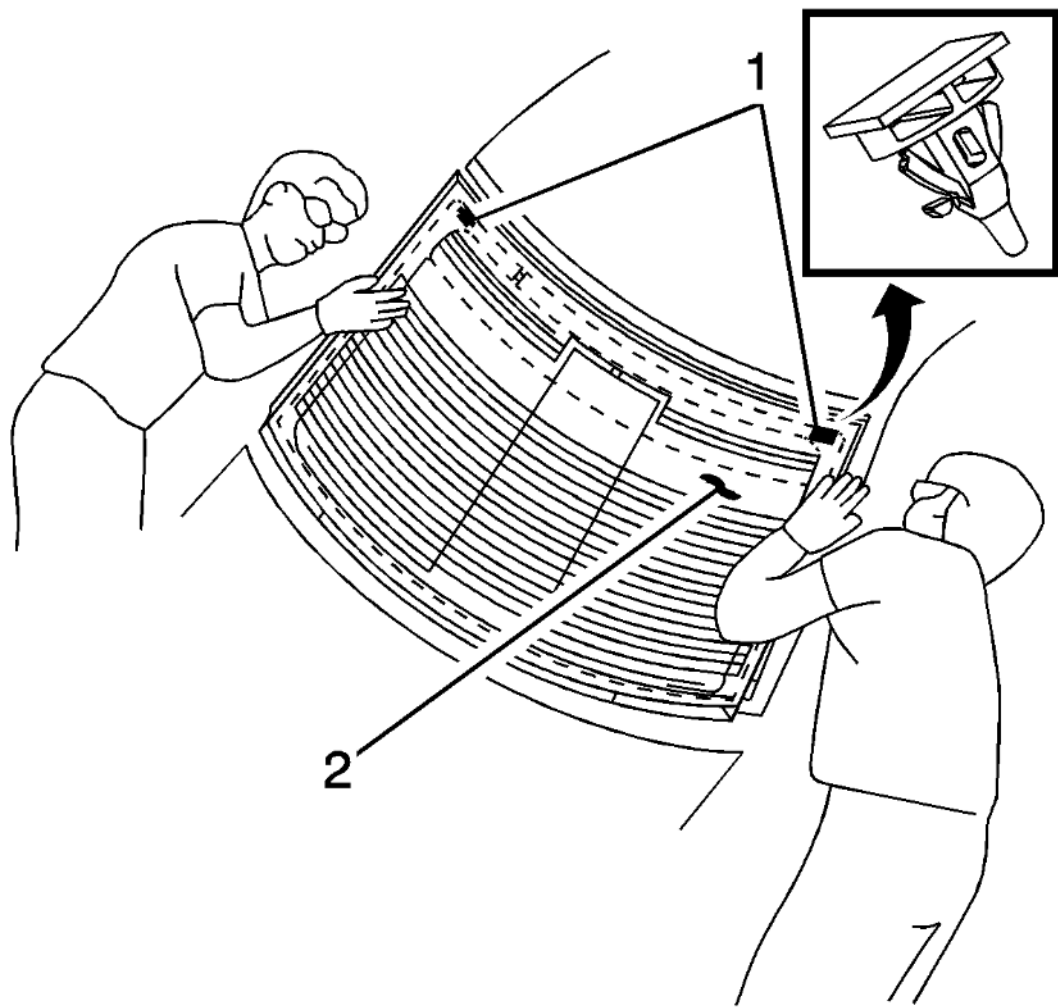


Fig. 78: Installing Rear Window

Courtesy of GENERAL MOTORS COMPANY

10. With the aid of an assistant, dry fit the window (1) to the opening in order to determine the correct position.
11. Ensure the window locator pins are positioned into the locator slots in the pinch-weld flange.
12. Use masking tape to mark the locations of the window in the opening.
13. Cut the masking in the center and remove the window from the opening.

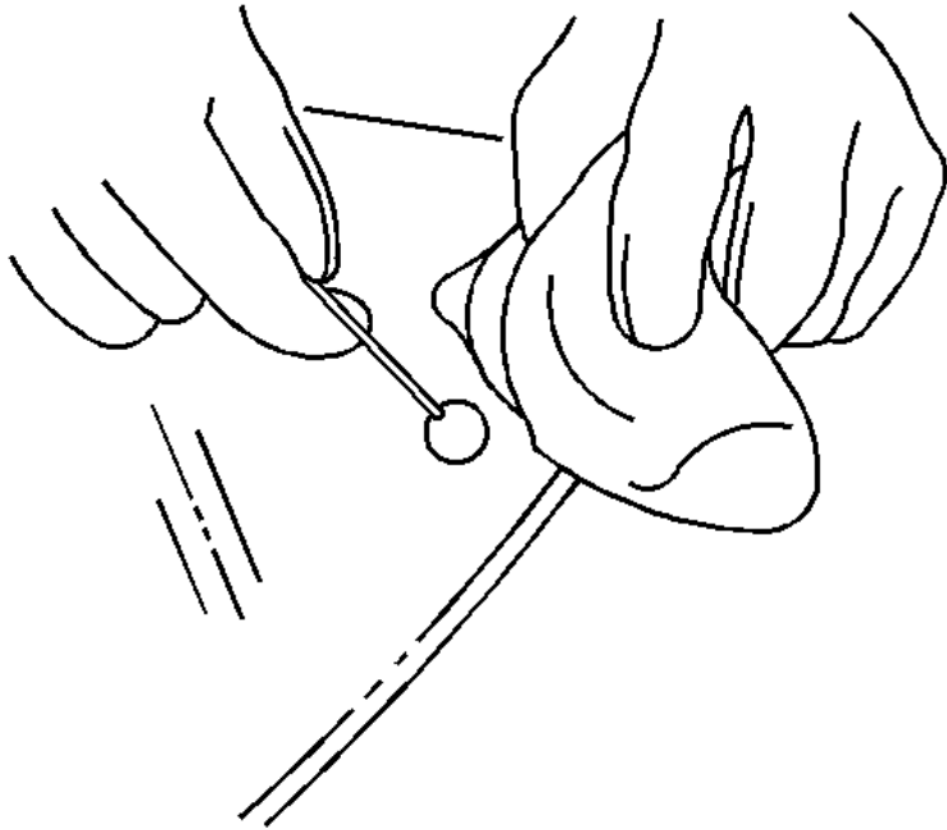


Fig. 79: Applying Glass Prep

Courtesy of GENERAL MOTORS COMPANY

NOTE: Use care when applying glass prep clear on the window. This primer dries almost instantly, and may stain the viewing area of the window if not applied evenly.

14. Use a new dauber in order to apply glass prep clear to the area approximately 18 mm (0.71 in) around the entire perimeter of the window inner surface.

Immediately wipe the glass primed area using a clean, lint-free cloth.

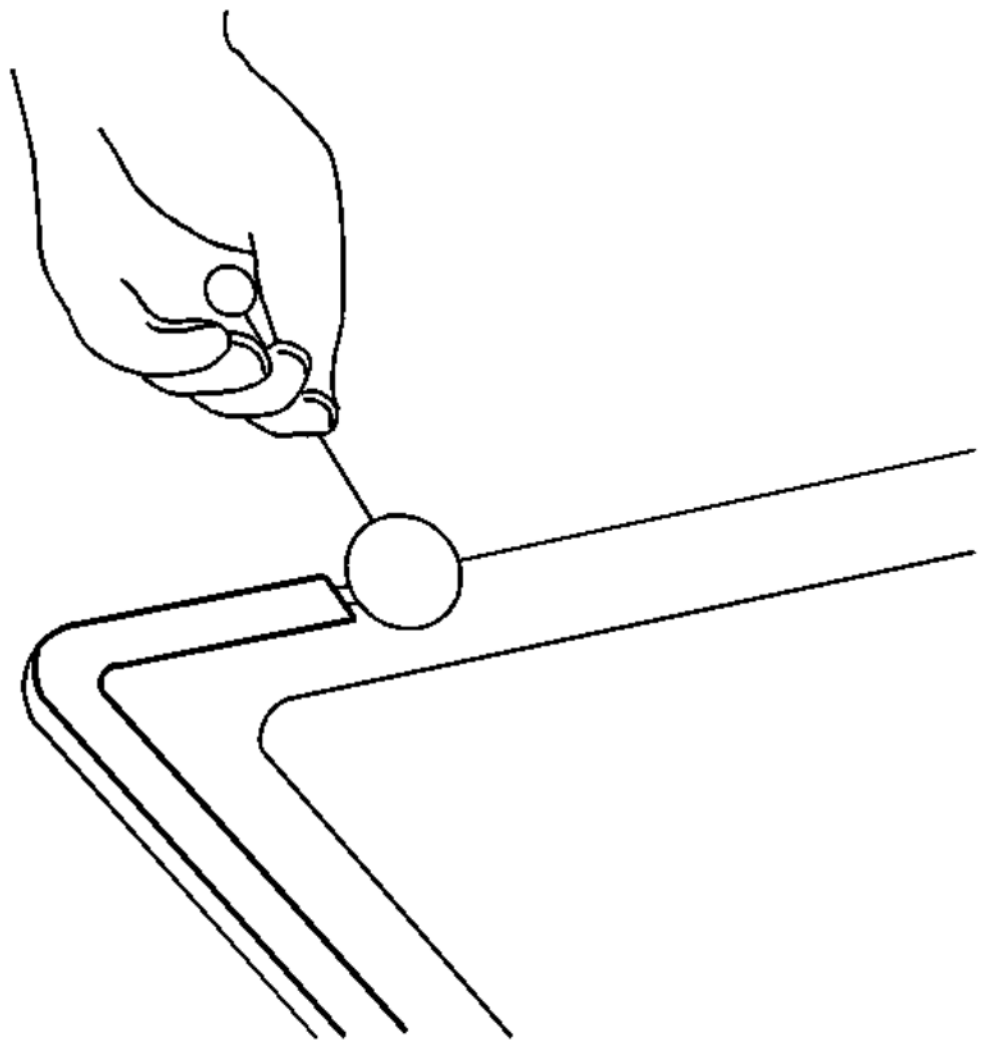


Fig. 80: Applying Glass Prep

Courtesy of GENERAL MOTORS COMPANY

15. Apply a second coat of the glass prep clear to the same area of the glass.

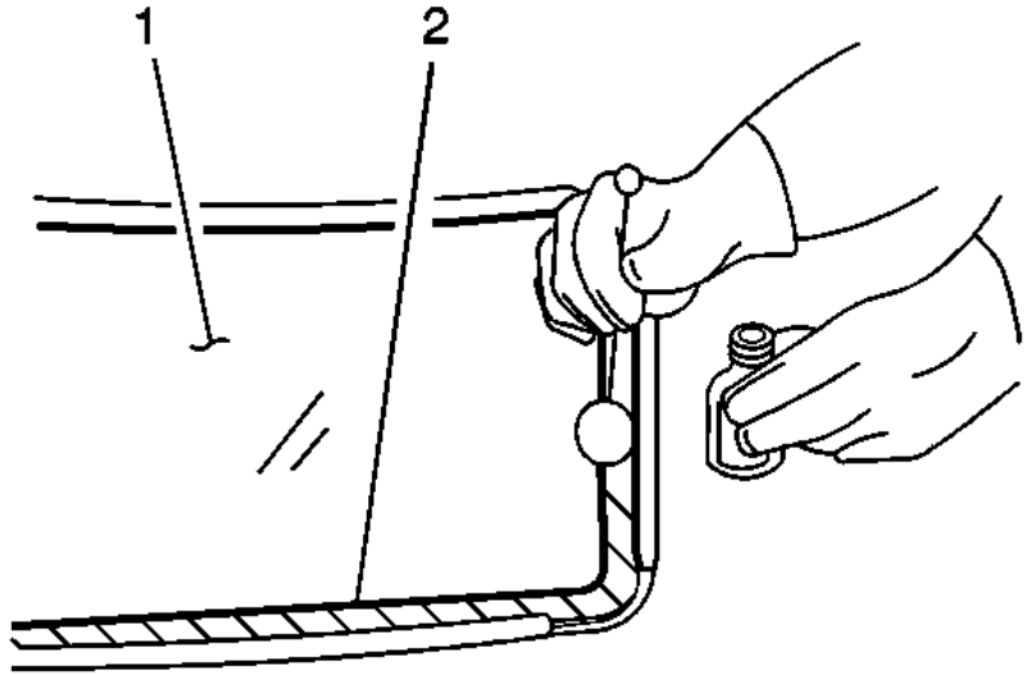


Fig. 81: Applying Glass Primer

Courtesy of GENERAL MOTORS COMPANY

NOTE: The glass primer black is effective up to 8 hours after applying it to the glass. The primed surface of the glass must be kept clean.

16. Shake the glass primer black for at least 1 minute.
17. Use a new dauber in order to apply the glass primer black to the same areas (2) that glass prep clear was applied.
18. Allow the glass primer to dry for approximately 10 minutes.

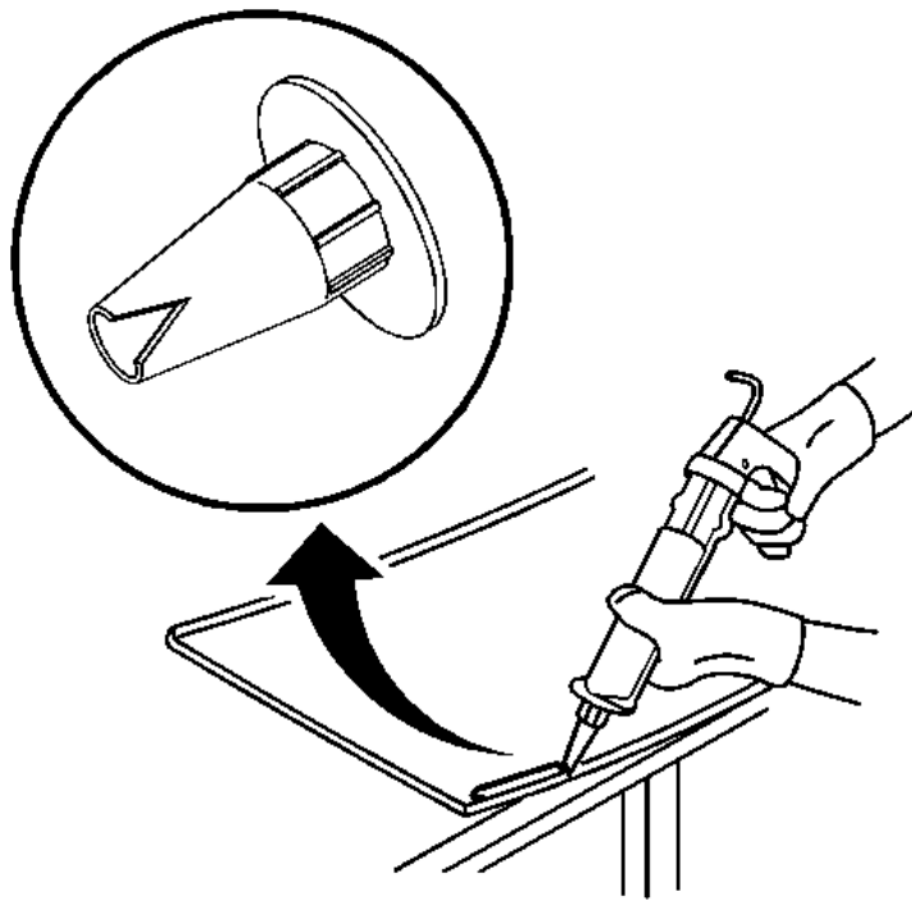


Fig. 82: Modified Applicator Nozzle

Courtesy of GENERAL MOTORS COMPANY

19. Cut the applicator nozzle in order to provide a bead of 12.7 mm (1/2 in) wide and 12.7 mm (1/2 in) high.

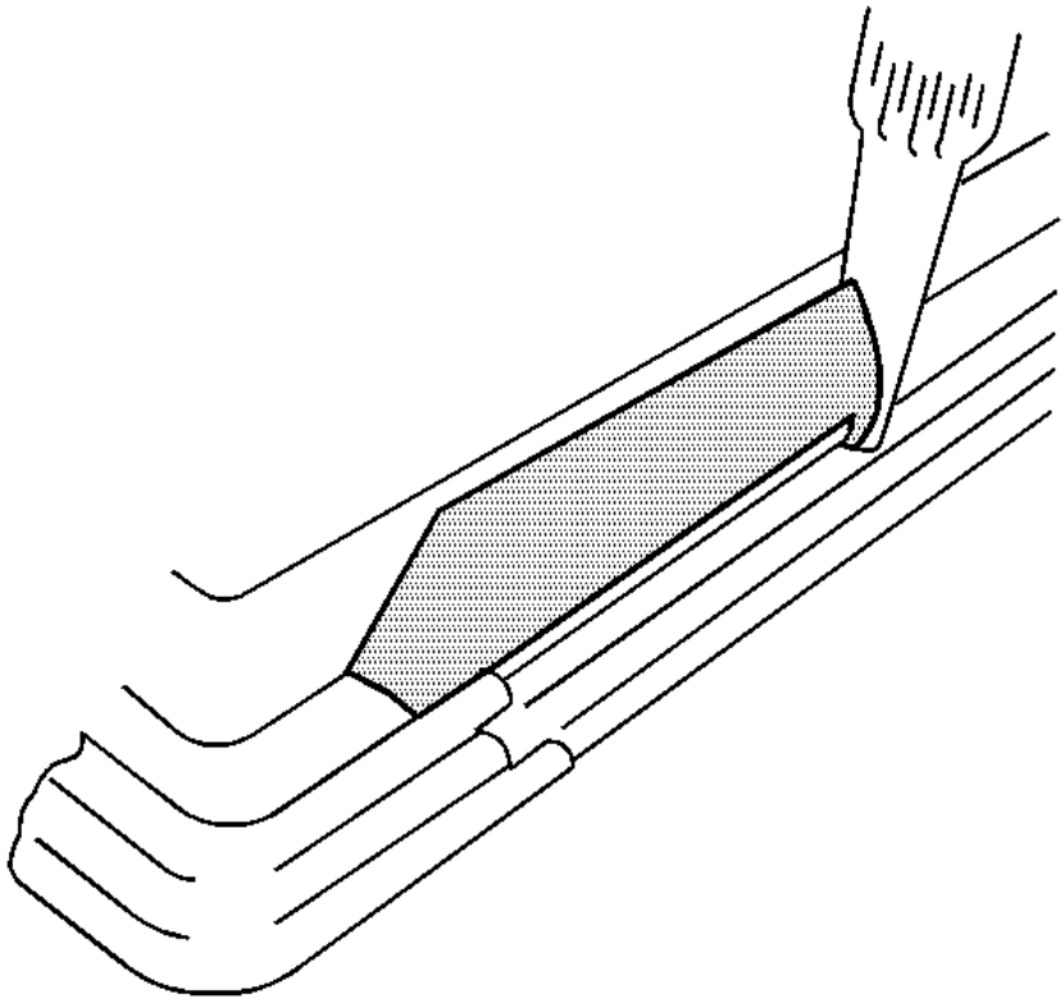


Fig. 83: Applying Continuous Bead Of Urethane Adhesive
Courtesy of GENERAL MOTORS COMPANY

20. Use a cartridge-type caulking gun in order to apply a smooth, continuous bead of urethane adhesive.

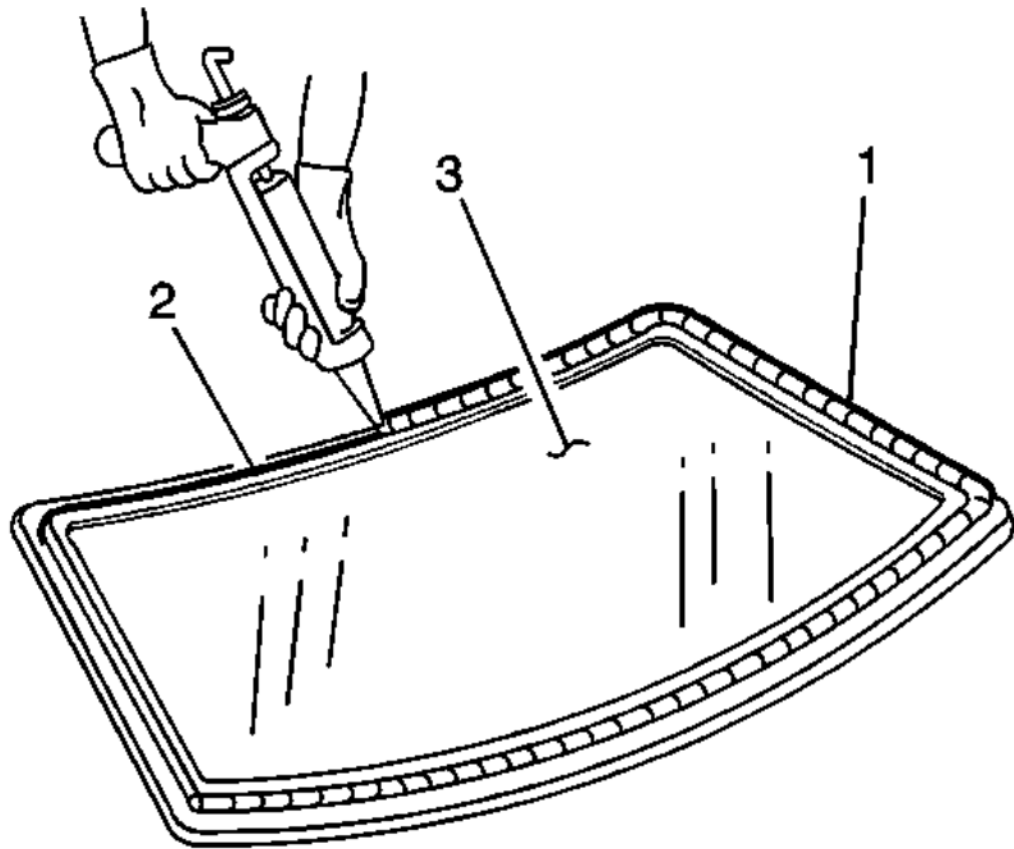


Fig. 84: Applying Urethane Adhesive To Inner Surface Of Window

Courtesy of GENERAL MOTORS COMPANY

21. Use the edge of the window as a guide for the nozzle in order to apply the urethane adhesive (1) to the inner surface of the window (3).
22. With the aid of an assistant, place the window in the opening.
23. Align the masking tape lines on the window and the body.

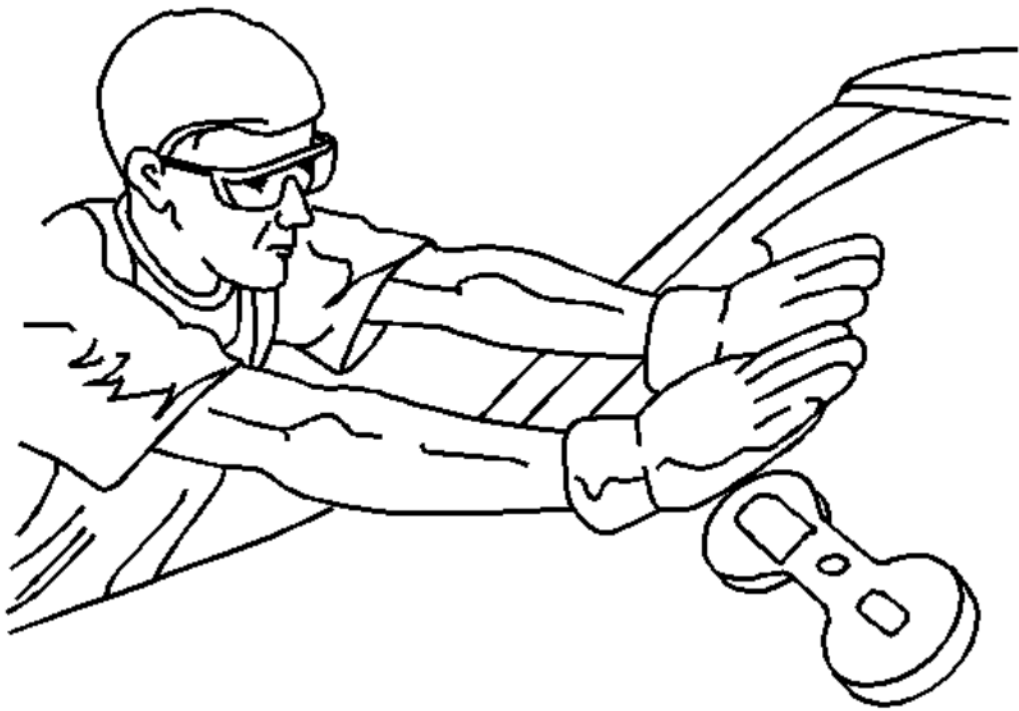


Fig. 85: Pressing Window Into Place

Courtesy of GENERAL MOTORS COMPANY

NOTE: To prevent damage to the window due to objects impacting an exposed edge, upon installation, the window must rest 1 mm (0.040 in) below the surface of the sheet metal.

24. Press firmly around the entire periphery of the window in order to wet-out the urethane bead.
25. Tape the window to the body in order to minimize movement until the urethane adhesive cures.

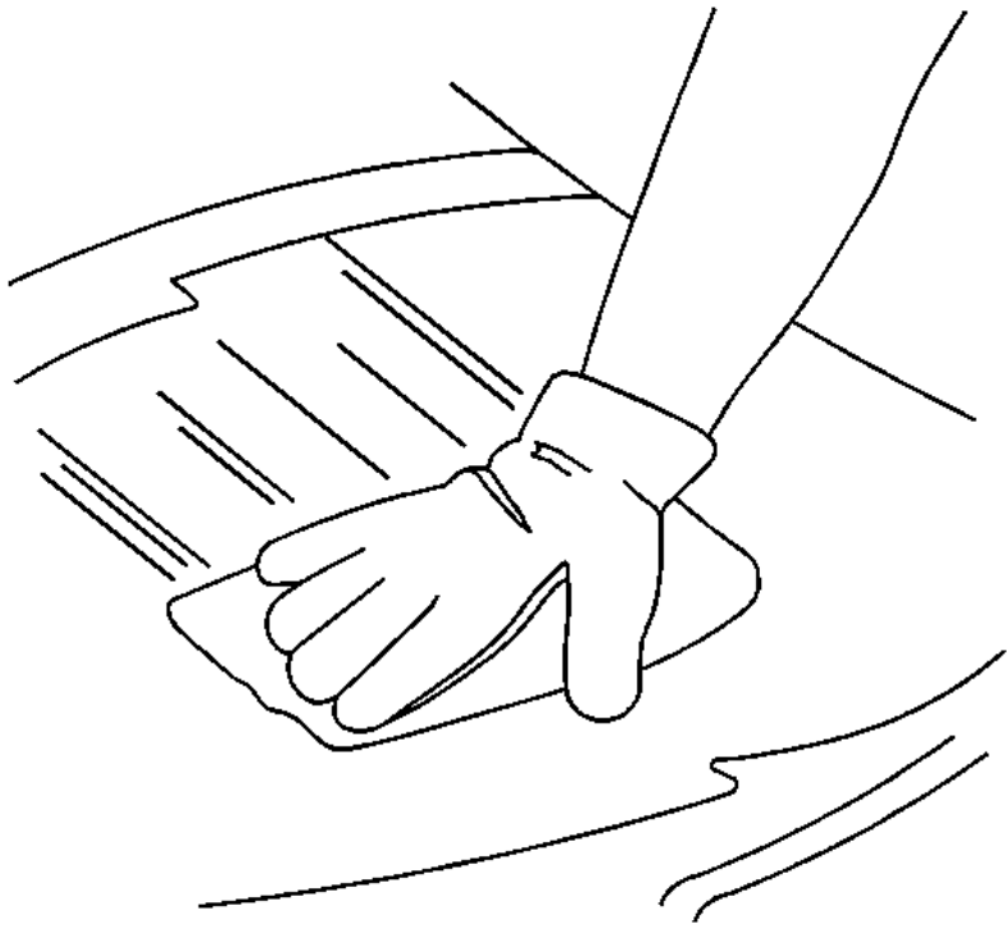


Fig. 86: Cleaning Excess Urethane Adhesive From Body
Courtesy of GENERAL MOTORS COMPANY

26. Clean any excess urethane adhesive from the body.

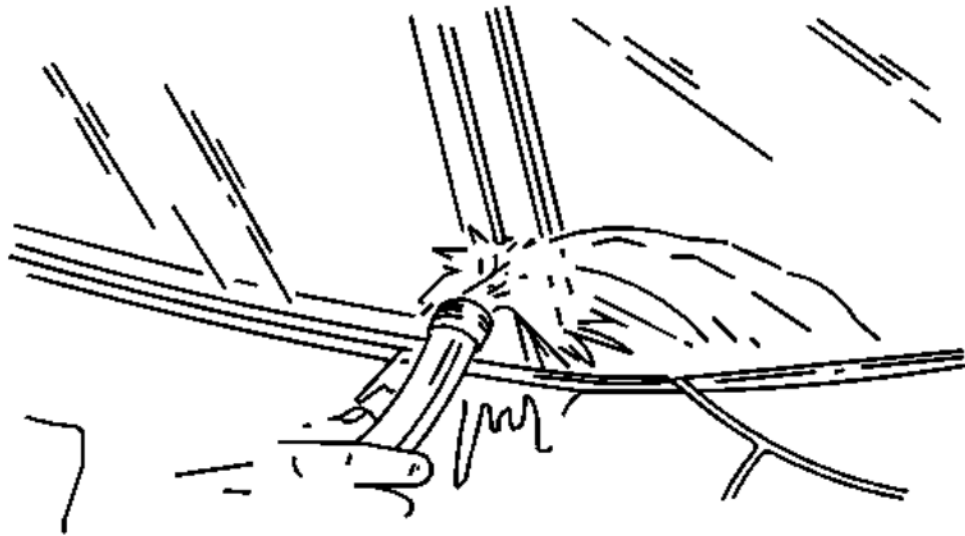


Fig. 87: Performing Water Hose Test
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Do not direct a hard stream of high pressure water to the freshly applied urethane adhesive.

27. Use a soft spray of warm water in order to immediately water test the window.
28. Inspect the window for leaks.
29. If any leaks are found, use a plastic paddle in order to apply extra urethane adhesive at the leak point.
30. Retest the window for leaks.

WARNING: Insufficient curing of urethane adhesive may allow unrestrained occupants to be ejected from the vehicle resulting in personal injury.

- For the moisture-curing type of urethane adhesive, allow a minimum of 6 hours at 21°C (70°F) or greater and with at least 30 percent relative humidity. Allow at least 24 hours for the complete curing of the urethane adhesive.
- For the chemical-curing type of urethane adhesive, allow a minimum of 1 hour.

Do NOT physically disturb the repair area until after these minimum times have elapsed.

31. Maintain the following conditions in order to properly cure the urethane adhesive:
 - Partially lower a door window in order to prevent pressure buildups when closing doors before the urethane adhesive cures.
 - Do not drive the vehicle until the urethane adhesive is cured. Refer to the above curing times.

- Do not use compressed air in order to dry the urethane adhesive.

32. Complete the window installation.

DESCRIPTION AND OPERATION

POWER WINDOWS DESCRIPTION AND OPERATION

Power Windows System Components

The power window system consists of the following components:

- Driver window/outside rearview mirror switch
- Passenger window switch
- Left rear window switch
- Right rear window switch
- Right rear door latch
- Left rear door latch
- Window motors in each of the doors
- 25A Fuse
- Body control module (BCM)

Driver Express Up and Express Down Power Window Motor

The driver door contains a window motor is smart motor that will detect excessive resistance while performing the express up function and automatically reverse direction to prevent injury to any occupants that may become trapped between the closing window and the door frame. The automatic reverse safety feature can be overridden by pulling and holding the window switch.

The logic circuit within the window motor monitors the up, down and express signal circuits which are normally equal to B+ voltage. When a switch is used on the driver window/outside rearview mirror switch, the contacts close causing a voltage drop within the appropriate signal circuit. The driver window motor will detect the voltage drop and will command the window to move in the direction requested.

Passenger, Left Rear and Right Rear Express Down Window Motors

For the passenger, right rear and left rear doors, when their window switch is pressed in the down position, battery positive voltage is applied to their respective window motor control circuit and ground to the other window motor control circuit causing that window to open. When the individual window switch is pulled in the up position, voltage and ground is applied to the window motor in the opposite direction causing that window to close. The return path to ground is supplied through the inactive control circuit being normally grounded through the window switch.

Each passenger and rear window switch communicates to the BCM by a serial data circuit. When the driver wishes to control the passenger, left rear or right rear window, the driver will use the appropriate switch on the driver window/outside rearview mirror switch. When this switch is used, a serial data message is sent to the BCM requesting a window motor command, the BCM will then send a serial data message to the appropriate door window switch which will then command that window to move in the direction requested.

Lockout Switch Feature

The driver window/outside rearview mirror switch contains a window lockout switch, when the driver presses the window lockout switch, a serial data message is sent to the BCM which will send a disable command to the rear window switches, the rear window switches will then ignore all functions when a passenger uses the rear window switch. The rear window motor commands will still function normally when the driver uses the appropriate switches on the driver window/outside rearview mirror switch.

REAR WINDOW DEFOGGER DESCRIPTION AND OPERATION

Rear Window Defogger System Components

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The rear window defogger system consists of the following components:

- HVAC Control Module
- HVAC Controls Switch Assembly
- Rear Defogger Relay
- Rear Defogger Grid
- Driver Outside Rearview Mirror
- Passenger Outside Rearview Mirror
- 40A Fuse

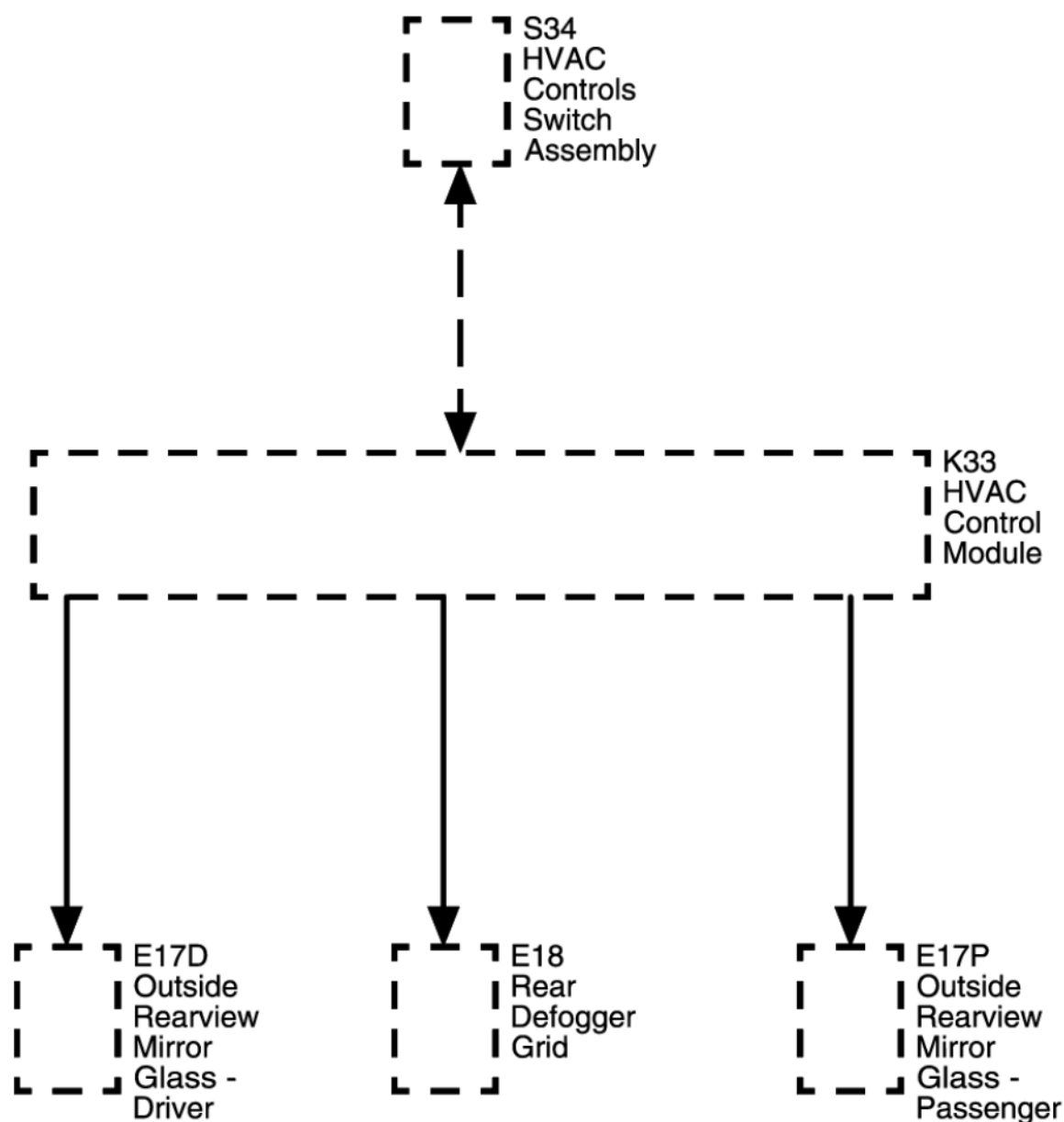


Fig. 88: S34-K33-X50A Defogger Block Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S34	S34 HVAC Controls Switch Assembly
E17D	E17D Outside Rearview Mirror Glass - Driver
E18	E18 Rear Defogger Grid
E17P	E17P Outside Rearview Mirror Glass - Passenger
K33	K33 HVAC Control Module

Rear Window Defogger Operation

The rear defog control system utilizes a single zone backlight design, driven with a single relay configuration. Additionally, up to two outside rear view mirrors can be heated if required. A switch for the

customer to control the system is provided within the HVAC controls switch assembly. Also included in the HVAC controls switch assembly is an indicator to inform the customer with the current state of the system. The system is only operational when the vehicle is ON/RUN.

Pressing the heated rear window switch causes the HVAC controls switch assembly to send a serial data message to the HVAC control module requesting rear window defog operation. The HVAC control module upon receipt of the serial data message will provide voltage to the coil side of the rear defogger relay, this will energize the relay causing the relay switch contacts to close allowing B+ voltage to flow through the rear defogger grid control circuit to the rear defogger grid.

When the rear heated rear window switch is pressed and the vehicle is ON/RUN, the rear window defogger grid will activate and will turn off automatically depending upon the vehicle speed (refer to owner's manual for rear window defogger operation cycles)

Heated Mirrors

The heated mirrors are also controlled through the rear defogger relay. Whenever the rear window defogger is turned on battery voltage is supplied to the mirror heater elements through the left and right mirror heater element control circuits.

STATIONARY WINDOW DESCRIPTION

Most stationary windows, specifically windshields, are retained to the body with adhesive which adheres the window to the body, increasing structural integrity. The reinstallation of the windows with adhesive requires complete replacement of the adhesive bead, and is known as the full cut method. All stationary windows must use a adhesive systems which meet GM Specification GMW-15672.

URETHANE ADHESIVE DESCRIPTION

For replacement of any adhesive-installed window, use the full cut method only.

Use an adhesive that is approved by GM, Specification GMW-15672.

Use these materials based on specific manufacturer. Do NOT intermix primers or adhesives from one manufacturer to another.

Always follow the system manufacturers instructions for application, handling, and curing.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
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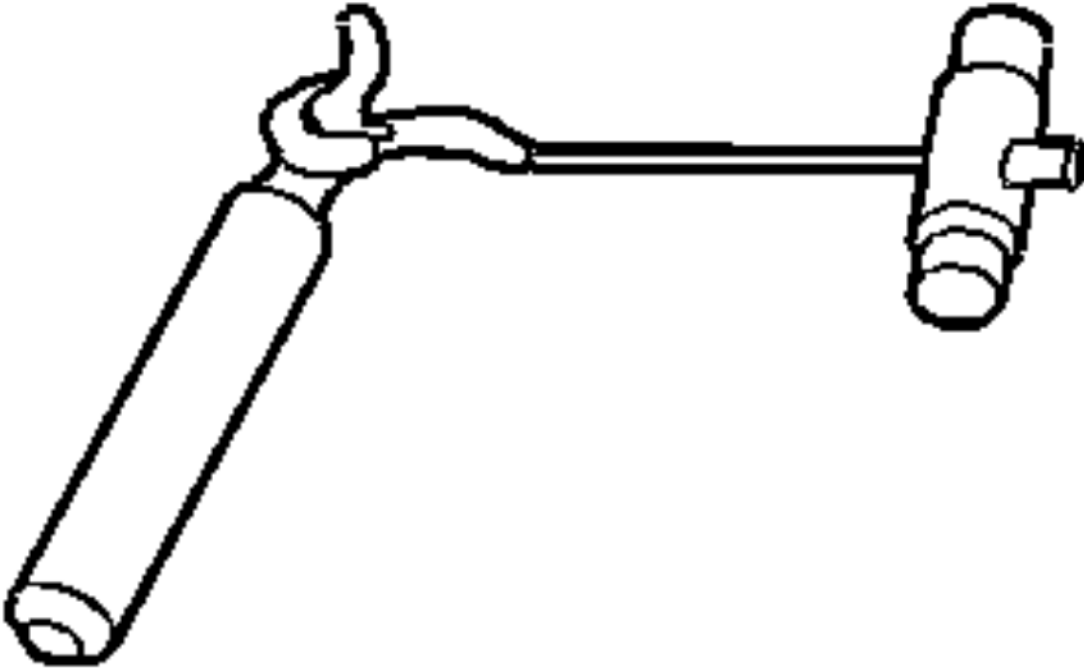
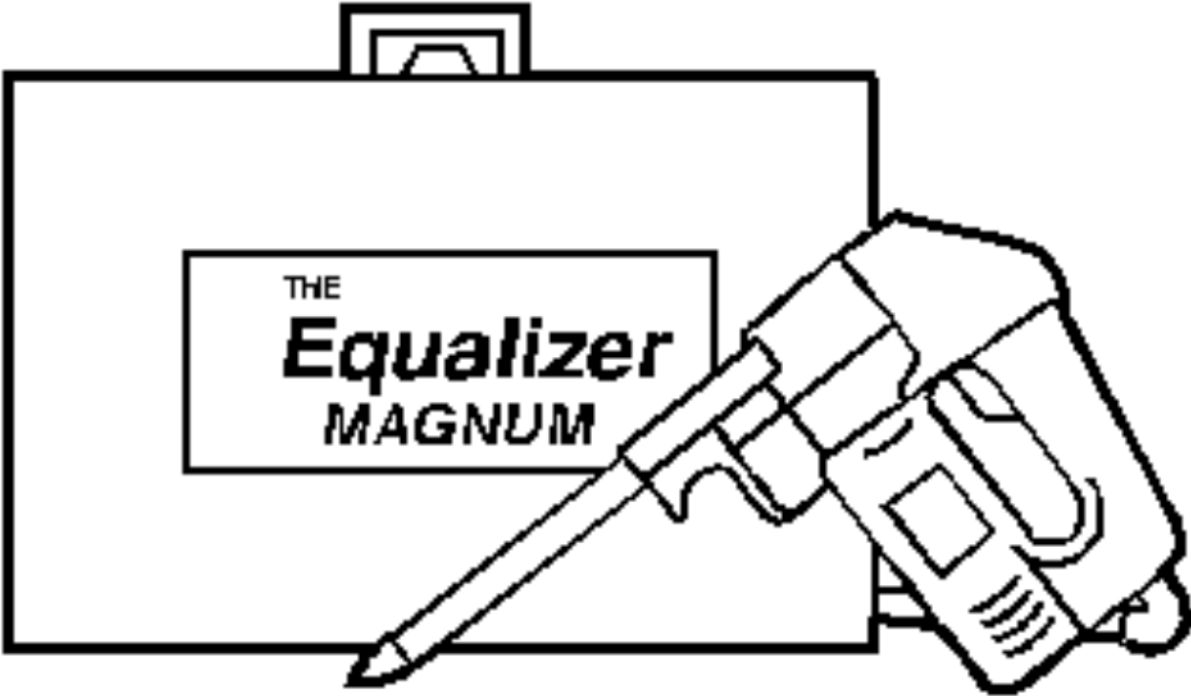
Illustration	Tool Number/ Description
	BO-24402-A J-24402-A Glass Sealant Cold Knife Remover
	BO-39032 J-39032 Stationary Glass Removal Tool

Illustration	Tool Number/ Description
 A line drawing of a clipboard with a label that reads "THE <i>Equalizer</i> MAGNUM". A pen is resting on the clipboard. The drawing is simple, using only black outlines on a white background.	