2010 ACCESSORIES & BODY, CAB

Air/Wind Noise - Camaro

DIAGNOSTIC INFORMATION AND PROCEDURES

AIR/WIND NOISE

Special Tools

- **CH-39570:** Chassis Ear
- **GE-41416:** Ultrasonic Leak Detector

For equivalent regional tools, refer to **Special Tools**.

WARNING: Refer to Assistant Driving Warning .

To analyze a reported windnoise condition, test drive the vehicle to determine the origin of the noise.

Choose a regular route with smooth and straight streets that run in all 4 directions: North, South, East, and West. The area should have little traffic or little noise in order to eliminate interference with the test.

NOTE: Often there is one primary leak source and one or more secondary leaks that contribute to the noise condition. Repairing only one of the contributing leak sources may not completely repair the total condition but only reduce the condition.

Drive the vehicle at the speed in which the noise was noticed, or until the noise is heard. Maintain safe and legal speeds.

Many of the waterleak diagnosis tests are also used for the windnoise diagnosis.

Most windnoise is caused either by leaking seals or by misaligned body surfaces. You can diagnose the following types of windnoise with the aid of **CH-39570:** ear or **GE-41416:** detector.

- Wind whistle
- Wind roar
- Wind rush

When moving at highway speeds, air pressure inside the vehicle becomes greater than the air pressure outside. When a leak occurs, the escaping air causes a hiss or a whistle.

Wind roar occurs when air passes over or through an opening between the 2 body surfaces. To correct the condition, adjust the alignment to the body surfaces.

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Wind rush occurs when air presses over the vehicle's body, and is related to the aerodynamics of the vehicle. Wind whistle and wind roar are repairable. Rule out wind whistle and wind roar before concluding that the wind noise is due to wind rush.

Use the following inspections in order to aid in diagnosing wind whistle or wind roar:

1. Note the details for wind noise:
    - The perceived location
    - The location where the noise is loudest
    - When the noise occurs
    - The vehicle speed
    - The interior fan speed
    - The position of the windows
    - What the noise sounds like
2. Inspect the vehicle for the possible cause of the windnoise.
3. Test drive the vehicle and determine if the windnoise is external or internal.
4. Perform a visual inspection of the following components:
    - Loose fasteners
    - Torn weatherstrips
    - Broken weld joints
    - Sealer and/or adhesive skips

TRACING POWDER OR CHALK TEST

Clean the weatherstrips and the contact surfaces with cleaning solvent.

1. Apply powder or chalk in an unbroken line to the contact surface of the weatherstrip surrounding the perimeter of the suspected areas.
2. Close the panel completely without slamming the panel. Closing the panel completely presses the weatherstrip firmly against the mating surface.
3. Inspect the applied line on the weatherstrip. The applied line is marred where contact is good. A corresponding imprint is on the mating surfaces.
4. Gaps or irregularities in the powder or the chalk line on the mating surfaces indicate the areas with a poor seal.

AIR PRESSURE TEST

1. Mask off both the pressure relief valves.
2. Close all the windows.
3. Turn the vehicles ventilation fan to the on position, with the selector on high speed and in the defrost mode.
4. Unlock and close the doors.

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5. Listen for escaping air along the door and the window seals with a stethoscope or a length of heater hose.

SOAP SUDS OR BUBBLE TEST

1. Mask off the pressure relief valves.
2. Close all the windows and the doors.
3. Turn the vehicles ventilation fan to the on position, with the selector on high speed and in the defrost mode.
4. Unlock and close the doors.
5. Apply the soap solution to the potential leak areas.
6. Look for bubbles revealing escaping air.

REPAIR INSTRUCTIONS

EXTERIOR WINDNOISE

WARNING: Refer to Assistant Driving Warning .

Exterior windnoise is louder when the vehicle is driven with one or more windows down. Exterior windnoise occurs when air passes over the body panels, the seams, or the openings. Use the following items during the test drive in order to aid in the detection of leaks:

- Mechanic's stethoscope or heater hose
- Masking tape-51 mm (2 in) width
- Strip caulk
- A water soluble marking pencil

1. While driving, determine the location of the exterior windnoise by lowering one window at a time. If the location corresponds with the condition in step 2, pull over and make a temporary repair with 51 mm (2 in) wide masking tape.
2. Tape over the gaps and the moldings one at a time. Test between each taping. Taping over the gaps and moldings will correct the condition.
3. Temporarily repair the condition with masking tape. Adjust the tape when needed.
4. Continue testing in order to determine if the noise has been eliminated or other leak areas exist.
5. When all the reported leak conditions are located, make permanent repairs using the proper alignment techniques and the sealing materials.

INTERIOR WINDNOISE

WARNING: Refer to Assistant Driving Warning .

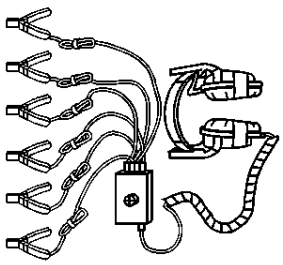
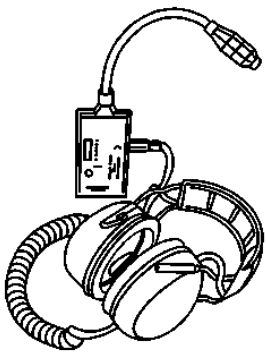
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Interior windnoise is not heard when the window is lowered. Interior windnoise is caused by the air leaving the inside of the vehicle through a seal or a seam.

1. Tape over the relief valves to cause added air pressure within the vehicle.
2. Test drive the vehicle and listen for windnoise or a whistle.
3. Pull the vehicle over and make the temporary repairs using masking tape. If you cannot determine the source of the windnoise, perform one or more of the following diagnostic tests:
   - **Air Pressure Test**
   - **Soap Suds or Bubble Test**
   - **Tracing Powder or Chalk Test**

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	CH-39570 J 39570 Chassis Ear
	GE-41416 J 41416 Ultrasonic Leak Detector

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Bolted Exterior Body Panels and Closures - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Fender Bolts	10 N.m	89 lb in
Front Side Door Check Link Nuts	10 N.m	89 lb in
Front Side Door Check Link Bolts	10 N.m	89 lb in
Front Side Door Check Link Screw to Pillar	10 N.m	89 lb in
Front Side Door Lower Hinge to Body Bolts	34 N.m	25 lb ft
Front Side Door Upper Hinge to Body Bolts	34 N.m	25 lb ft
Front Side Door Lower Hinge to Door Bolts	10 N.m	89 lb in
Front Side Door Upper Hinge to Door Bolts	10 N.m	89 lb in
Hood Hinge Bolts	25 N.m	18 lb ft
Hood Hinge Nuts	25 N.m	18 lb ft
Hood Latch Bolts	25 N.m	18 lb ft
Rear Compartment Lid Hinge Bolts	10 N.m	89 lb in
Rear Compartment Lid Hinge Nuts	10 N.m	89 lb in
Rear Compartment Lid Latch Bolts	10 N.m	89 lb in
Rear Compartment Lid Nuts	10 N.m	89 lb in

REPAIR INSTRUCTIONS

HOOD PRIMARY LATCH RELEASE CABLE REPLACEMENT

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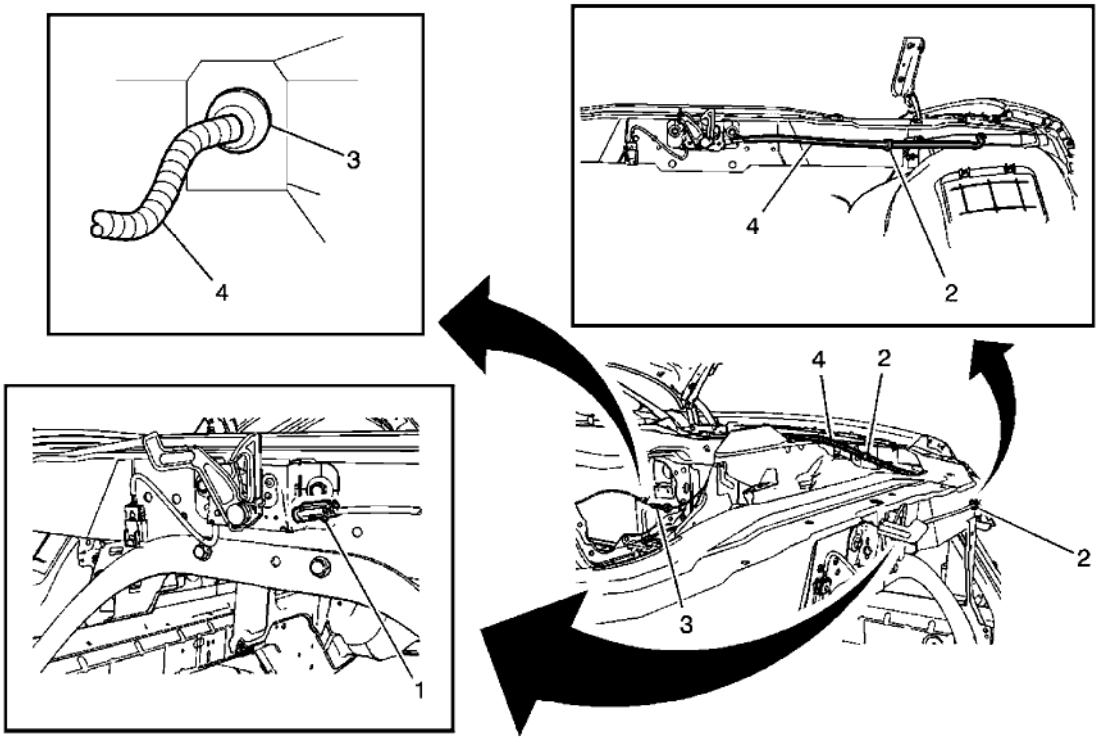


Fig. 1: Hood Primary Latch Release Cable
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front bumper fascia upper support. Refer to **Front Bumper Fascia Upper Support Replacement** .	
1	Hood Primary Latch Cable **Procedure:** Disconnect the hood primary latch release cable from the primary hood latch.
2	Hood Primary Latch Release Cable Retainer **Procedure:** Disconnect the hood release cable retainers from the hood release cable.
3	Hood Primary Latch Release Cable Grommet
4	Hood Primary Latch Release Cable **Procedure:** Disconnect the hood primary latch release cable handle from the hood latch cable. Refer to **Hood Primary Latch Release Cable Handle Replacement**.

FRONT SIDE DOOR REPLACEMENT

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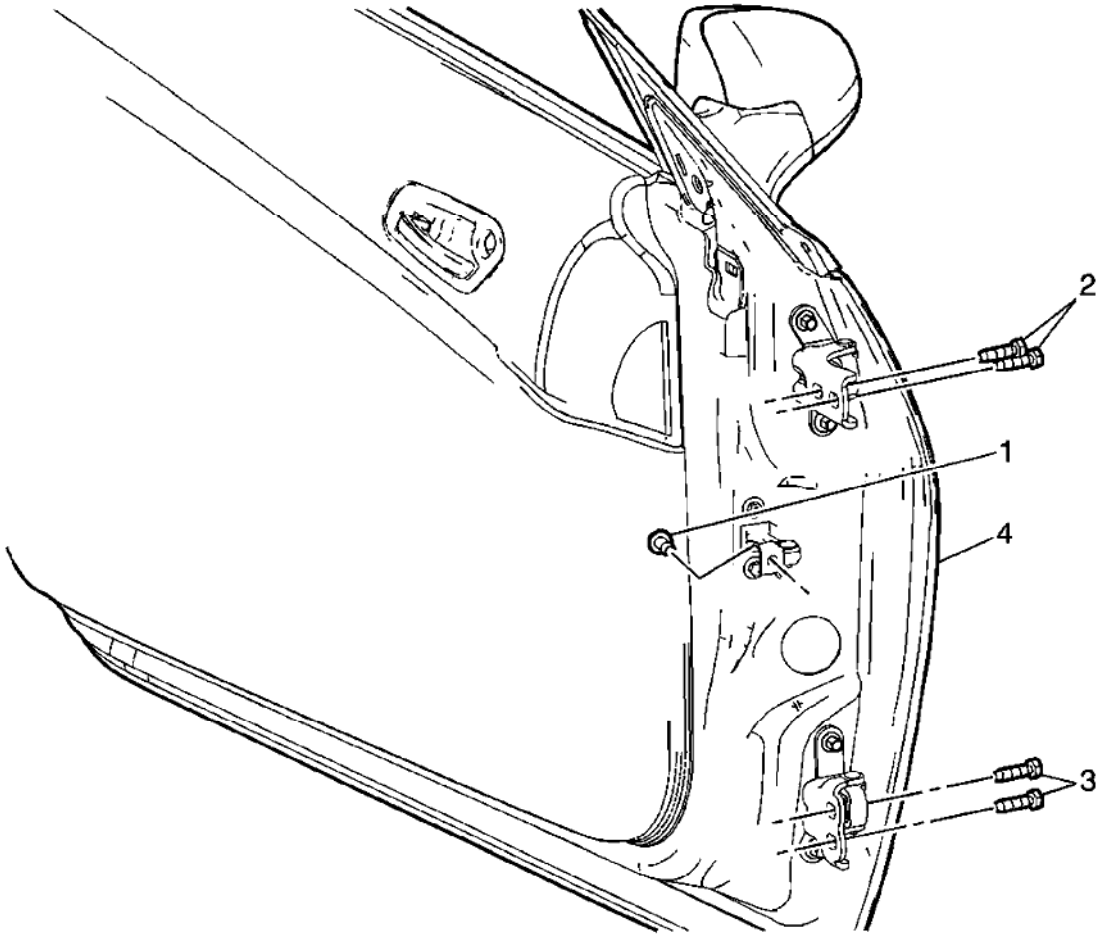


Fig. 2: Front Side Door
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .** **Preliminary Procedures** 1. Remove the front wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** 2. Disable the supplemental inflatable restraint (SIR) system. Refer to **SIR Disabling and Enabling** . 3. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** .	
1	Front Side Door Check Link Bolt **CAUTION:** **Refer to Fastener Caution .**

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	Tighten: 10 N.m (89 lb in)
2	Front Side Door Upper Hinge Bolt (Qty: 2) **Procedure** 1. Before removing the door, apply a double layer of masking tape around the perimeter of the painted surfaces. 2. Mark the location of the hinges before removing the door. 3. Remove the water deflector. 4. Support the door before removing the hinge bolts. 5. Disconnect the electrical connector 6. With the aid of an assistant, remove the door. **Tighten:** 34 N.m (25 lb ft)
3	Front Side Door Lower Hinge Bolt (Qty: 2) **Tighten:** 34 N.m (25 lb ft)
4	Front Side Door **Procedure:** When replacing the door it is necessary to transfer all of the internal components.

FRONT FENDER REPLACEMENT

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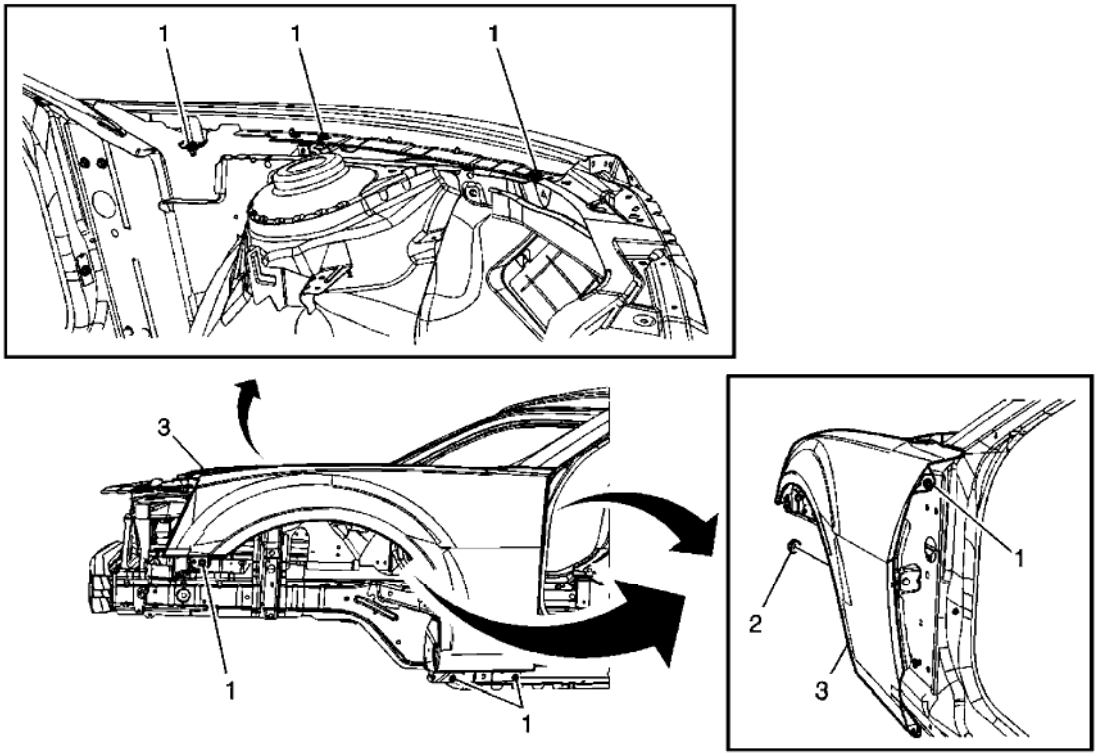


Fig. 3: Front Fender
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement** . 2. Remove the headlamp. Refer to **Headlamp Replacement** . 3. Remove the rocker panel molding. Refer to **Rocker Panel Molding Replacement** .	
1	Front Fender Bolt (Qty: 7) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Front Fender Nut **Tighten:** 10 N.m (89 lb in)
3	Front Fender

HOOD PRIMARY LATCH RELEASE CABLE HANDLE REPLACEMENT

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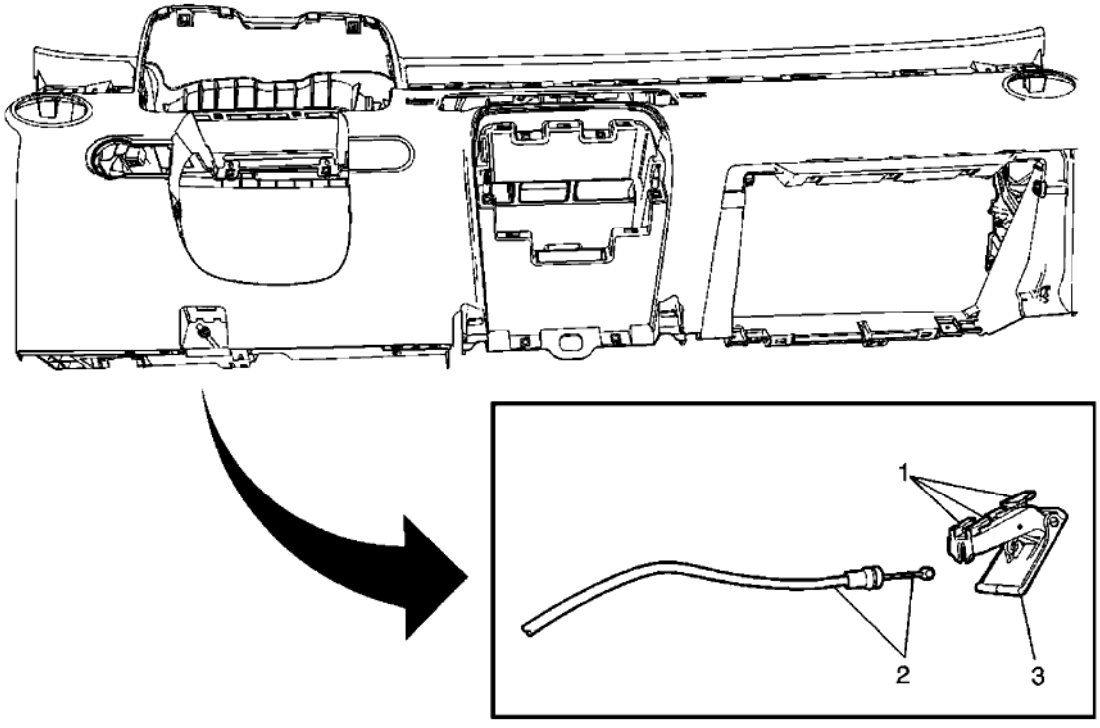


Fig. 4: Hood Primary Latch Release Cable Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Hood Primary Latch Release Cable Handle Retainer **Procedure:** Press the release cable handle inward/downward to release the retainers from the instrument panel.
2	Hood Primary Latch Release Cable **Procedure:** Disconnect the hood release cable from the hood release handle.
3	Hood Primary Latch Release Cable Handle

FRONT SIDE DOOR UPPER HINGE AND LOWER HINGE REPLACEMENT

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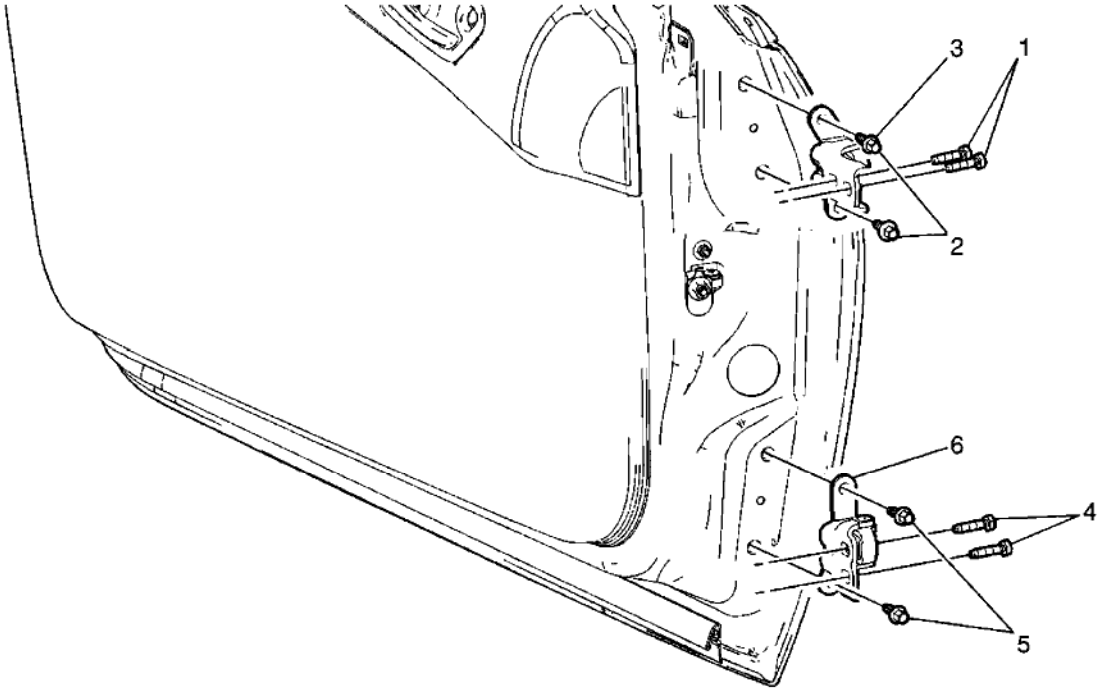


Fig. 5: Front Side Door Upper Hinge & Lower Hinge
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Side Door Upper Hinge to Body Bolts (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Procedures** 1. Before removing the door, apply a double layer of masking tape around the perimeter of the painted surfaces. 2. Mark the location of the hinge being removed. 3. Remove the front wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** 4. Support the door before removing the hinge bolts. **Tighten:** 34 N.m (25 lb ft)
2	Front Side Door Upper Hinge to Door Bolts (Qty: 2) **Tighten:** 10 N.m (89 lb in)
3	Front Side Door Upper Hinge
4	Front Side Door Lower Hinge to Body Bolts (Qty: 2)

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	Tighten: 34 N.m (25 lb ft)
5	Front Side Door Lower Hinge to Door Bolts (Qty: 2) **Tighten:** 10 N.m (89 lb in)
6	Front Side Door Lower Hinge

HOOD HINGE REPLACEMENT

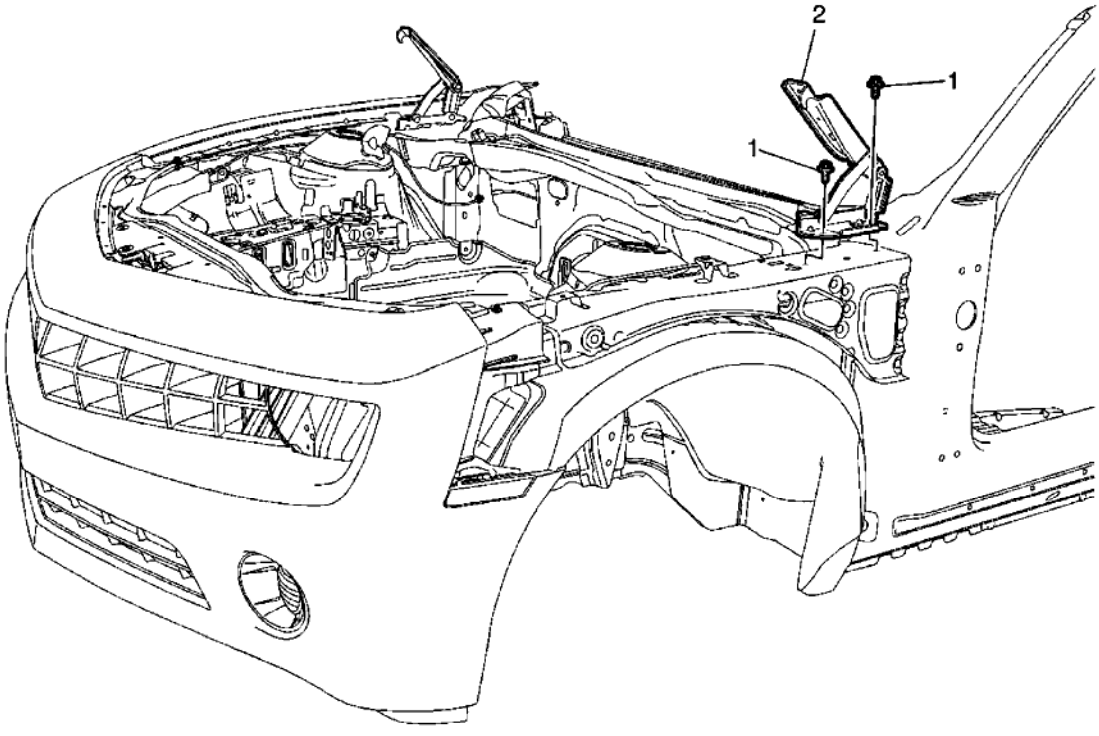


Fig. 6: Hood Hinge
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the hood. Refer to **Hood Replacement**. 2. Remove the appropriate front fender. Refer to **Front Fender Replacement**.	
1	Hood Hinge Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Procedure:**

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	Mark the location of the hinge to the hood and upper rail with a grease pencil to aid in alignment. **Tighten:** 25 N.m (18 lb ft)
2	Hood Hinge

REAR COMPARTMENT LID HINGE REPLACEMENT

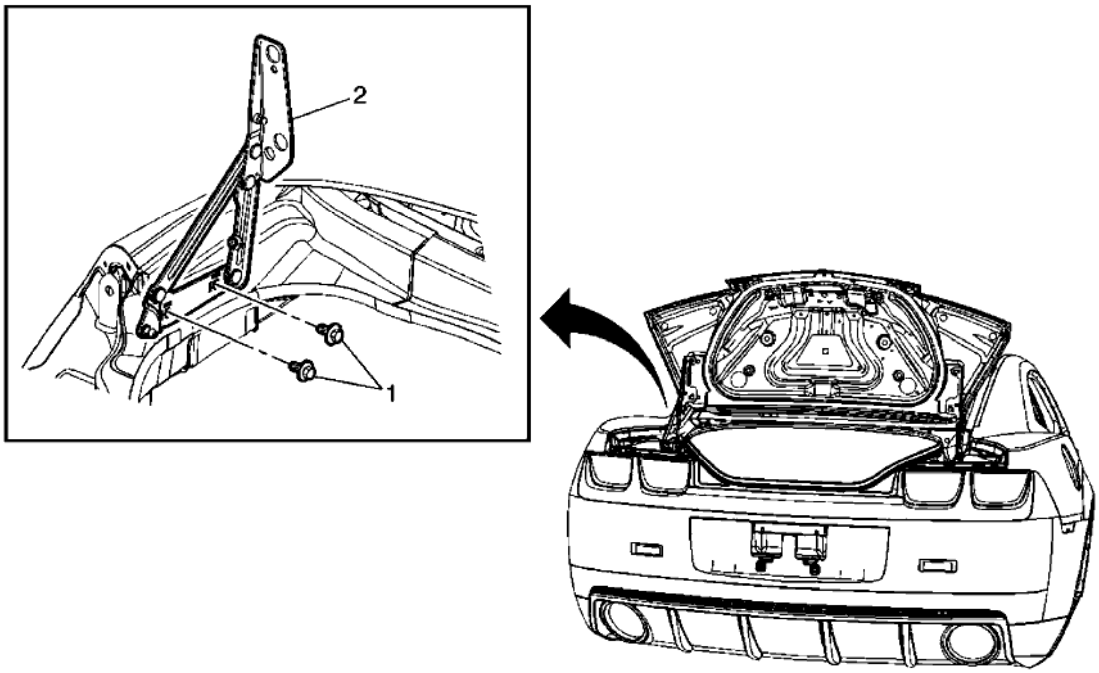


Fig. 7: Rear Compartment Lid Hinge
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the rear compartment lid. Refer to **Rear Compartment Lid Replacement**. 2. Remove the rear compartment lid strut. Refer to **Rear Compartment Lid Strut Replacement**.	
1	Rear Compartment Lid Hinge Bolt/Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Rear Compartment Lid Hinge

HOOD REPLACEMENT

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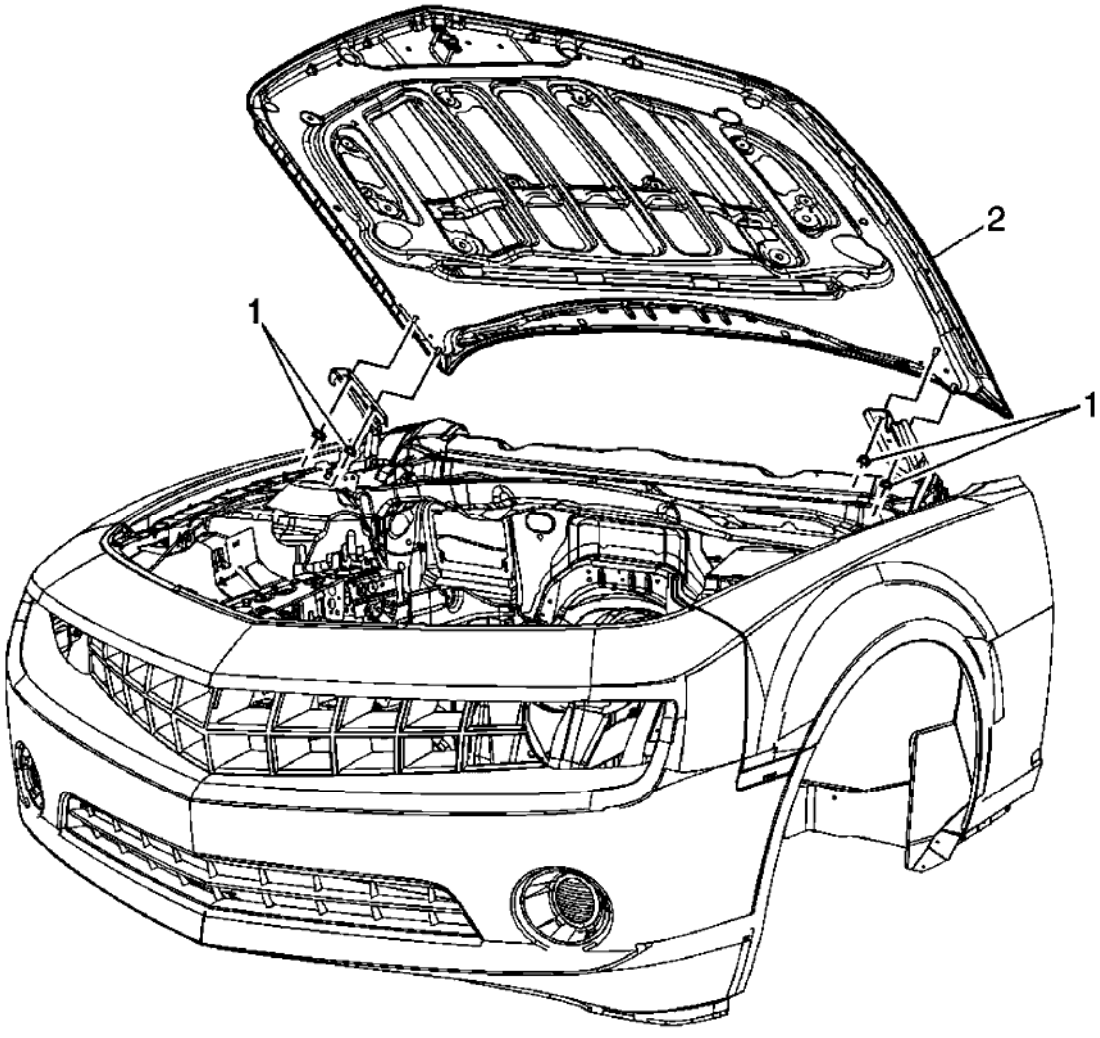


Fig. 8: Hood
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the hood strut rod. Refer to **Hood Strut Replacement**.	
1	Hood Hinge Nut (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Mark the location of the hinge to the hood with a grease pencil to aid in alignment. **Tighten:** 25 N.m (18 lb ft)

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2	Hood **Procedure:** Disconnect the wiper washer hoses from the hood.

HOOD INSULATOR REPLACEMENT

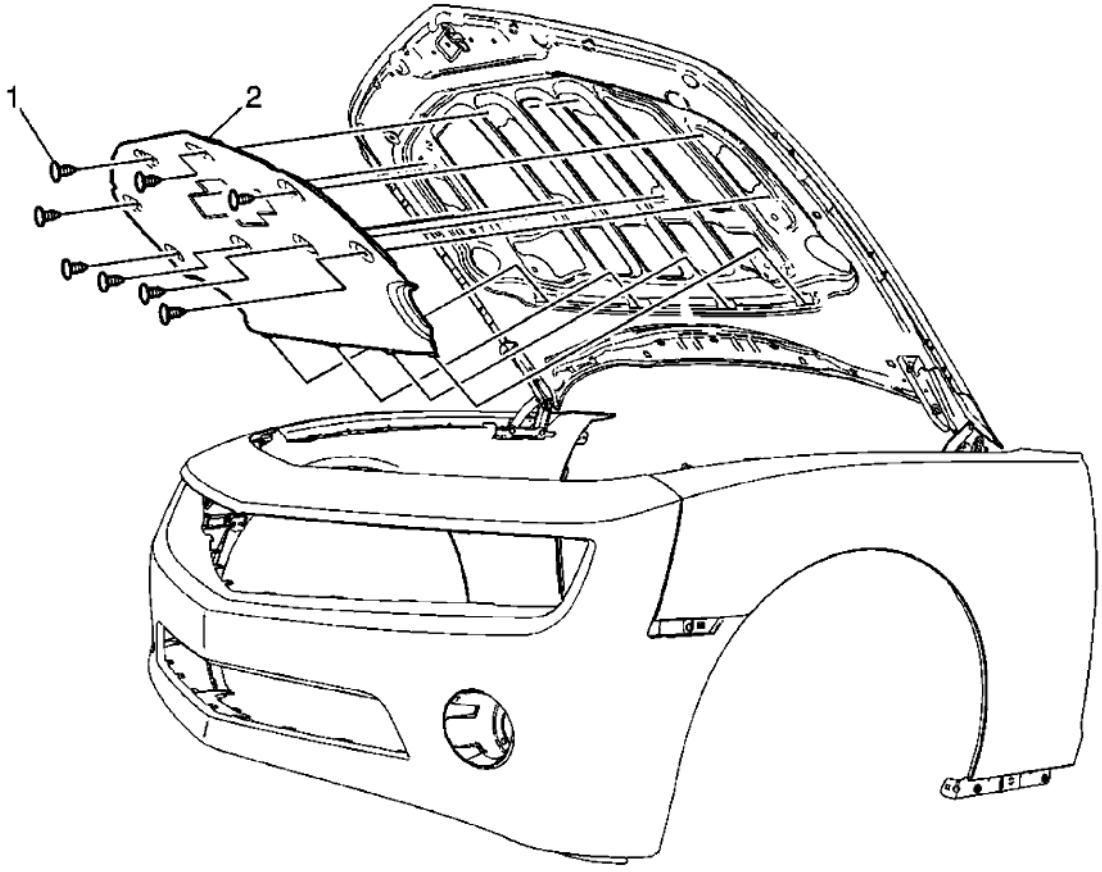


Fig. 9: Hood Insulator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Hood Insulator Plastic Retainer (Qty: 8)
2	Hood Insulator **Procedure:** Ensure the 4 integral tabs are secured to the hood.

HOOD PRIMARY AND SECONDARY LATCH REPLACEMENT

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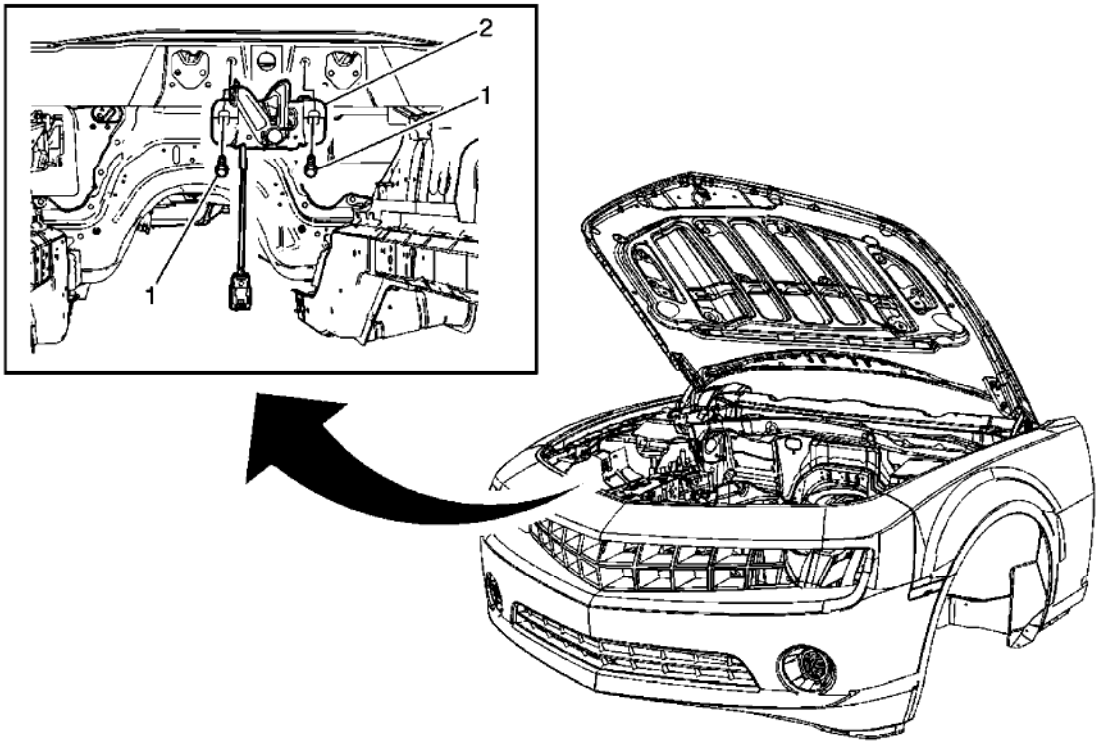


Fig. 10: Hood Primary & Secondary Latch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front bumper fascia upper support. Refer to **Front Bumper Fascia Upper Support Replacement** .	
1	Hood Primary and Secondary Latch Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 25 N.m (18 lb ft)
2	Hood Primary and Secondary Latch **Procedure:** Disconnect the hood release cable and the electrical connector.

REAR COMPARTMENT LID REPLACEMENT

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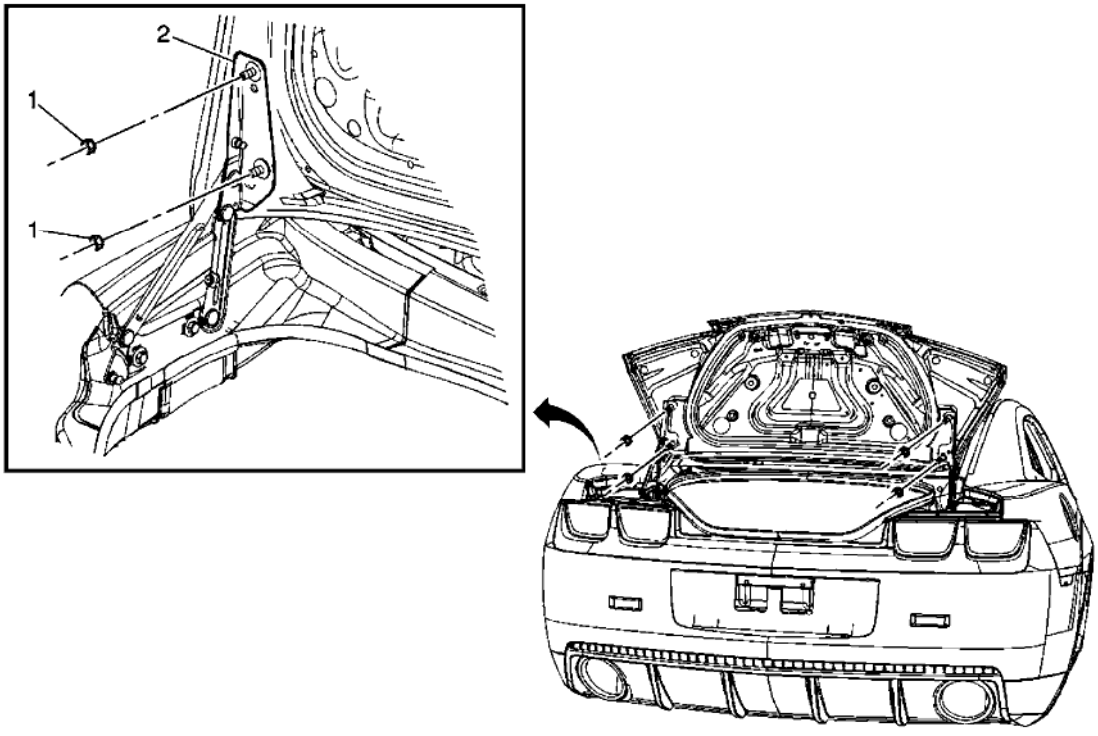


Fig. 11: Rear Compartment Lid
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Compartment Lid Nut (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Rear Compartment Lid **Procedure** 1. Disconnect the electrical connectors. 2. Transfer components as necessary.

FRONT SIDE DOOR CHECK REPLACEMENT

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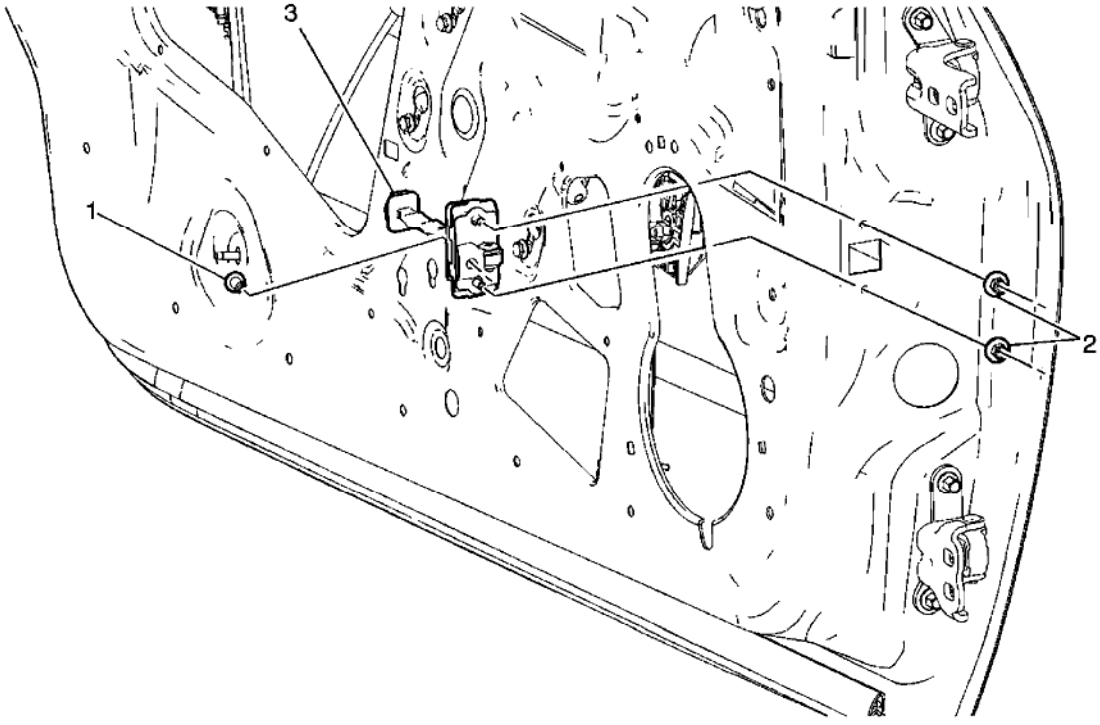


Fig. 12: Front Side Door Check
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front side door trim panel. Refer to **Front Side Door Trim Panel Replacement** . 2. Move the window to the full up position.	
1	Front Side Door Check Link Screw to Pillar **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Remove the water deflector. **Tighten:** 10 N.m (89 lb in)
2	Front Side Door Check Link Nut (Qty: 2) **Tighten:** 10 N.m (89 lb in)
3	Front Side Door Check Link

FUEL TANK FILLER DOOR REPLACEMENT

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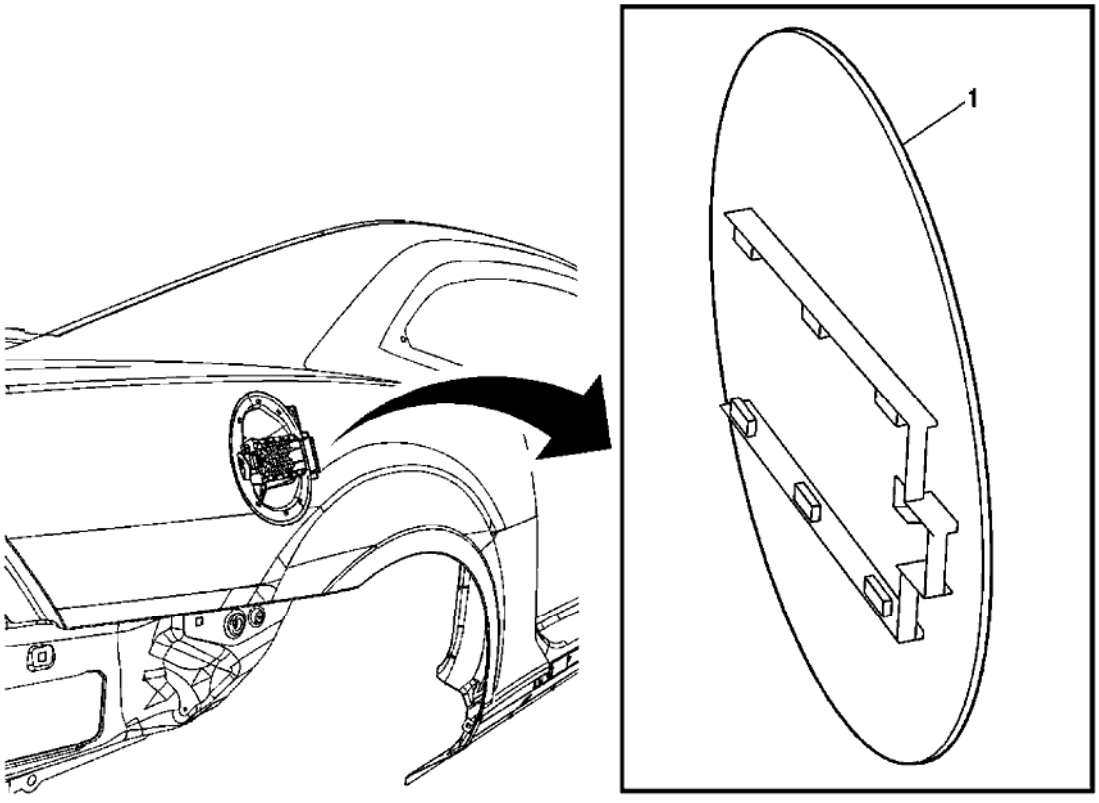


Fig. 13: Fuel Tank Filler Door
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Fuel Tank Filler Door **Procedure:** Position the fuel tank filler door to the full open position. Using light outward sliding pressure on the filler door, release the retainer on the fuel tank filler door from the hinge.

FUEL TANK FILLER PIPE HOUSING REPLACEMENT

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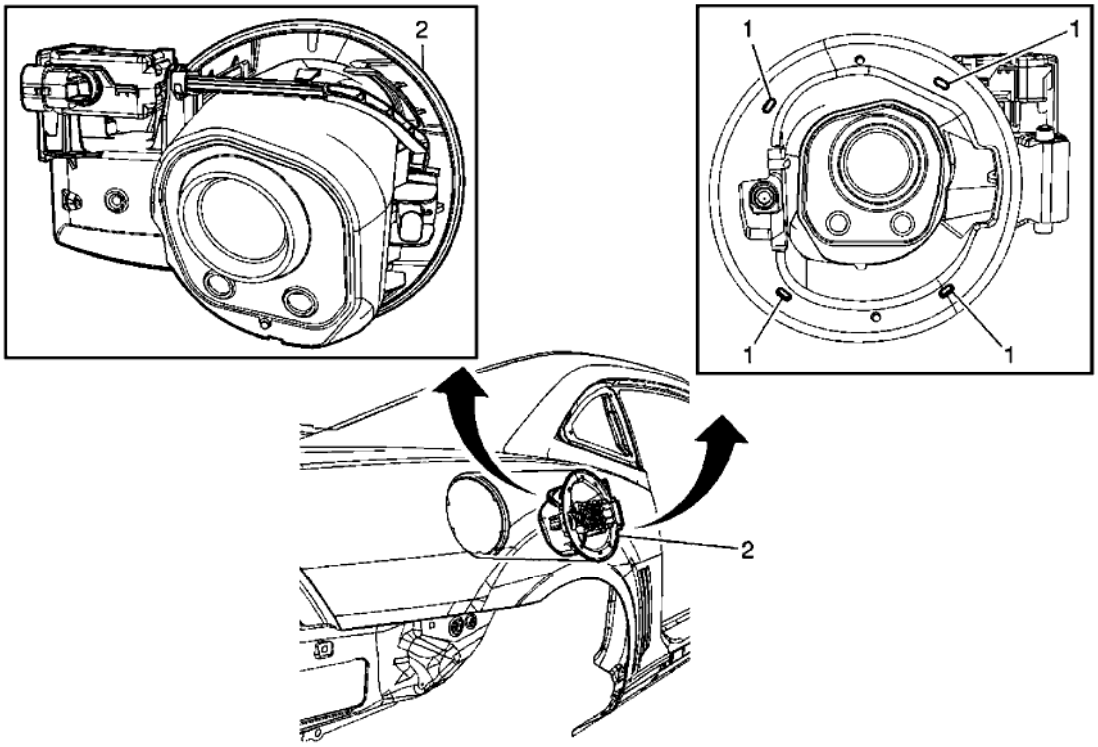


Fig. 14: Fuel Tank Filler Pipe Housing
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the filler pipe. Refer to **Fuel Tank Filler Pipe Replacement** for the 2.8L, 3.0L, 3.2L, or 3.6L engine or **Fuel Tank Filler Pipe Replacement** for the 4.8L, 5.3L, 6.0L, 6.2L, or 7.0L engine.	
1	Fuel Tank Filler Pipe Housing Retainer (Qty: 4) **Procedure:** Using a flat-bladed tool that fits into the 4 depression, break through the 4 depressions with light pressure and then pry the clips free to release the fuel tank filler pipe housing from the panel. **Tip:** The fuel tank filler pipe housing once removed cannot be reused and must be replaced with a NEW fuel tank filler pipe housing.
2	Fuel Tank Filler Pipe Housing **Tip:** Disconnect the electrical connector.

HOOD STRUT REPLACEMENT

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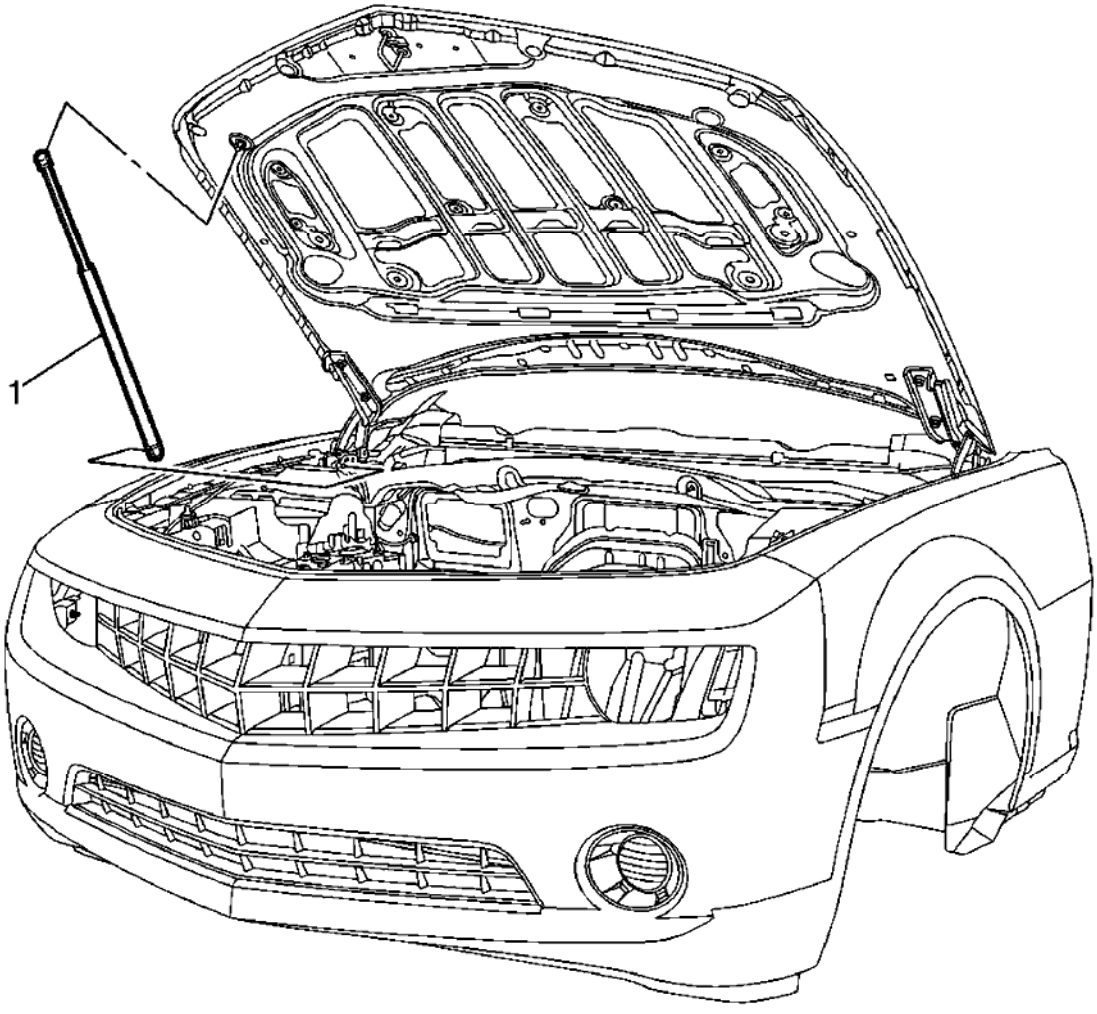


Fig. 15: Hood Strut
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Hood Strut Assembly **WARNING:** **When a hood hold open device is being removed or installed, provide alternate support to avoid the possibility of damage to the vehicle or personal injury.** **CAUTION:** **Apply pressure only at the end of the liftgate/hood assist rod that you are removing or attaching. Do NOT apply pressure to the middle of the rod because damage or bending will result.** **Tip:** Remove the metal clip at the ends of the hood strut, then pull away from the stud.

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HOOD FRONT WEATHERSTRIP REPLACEMENT

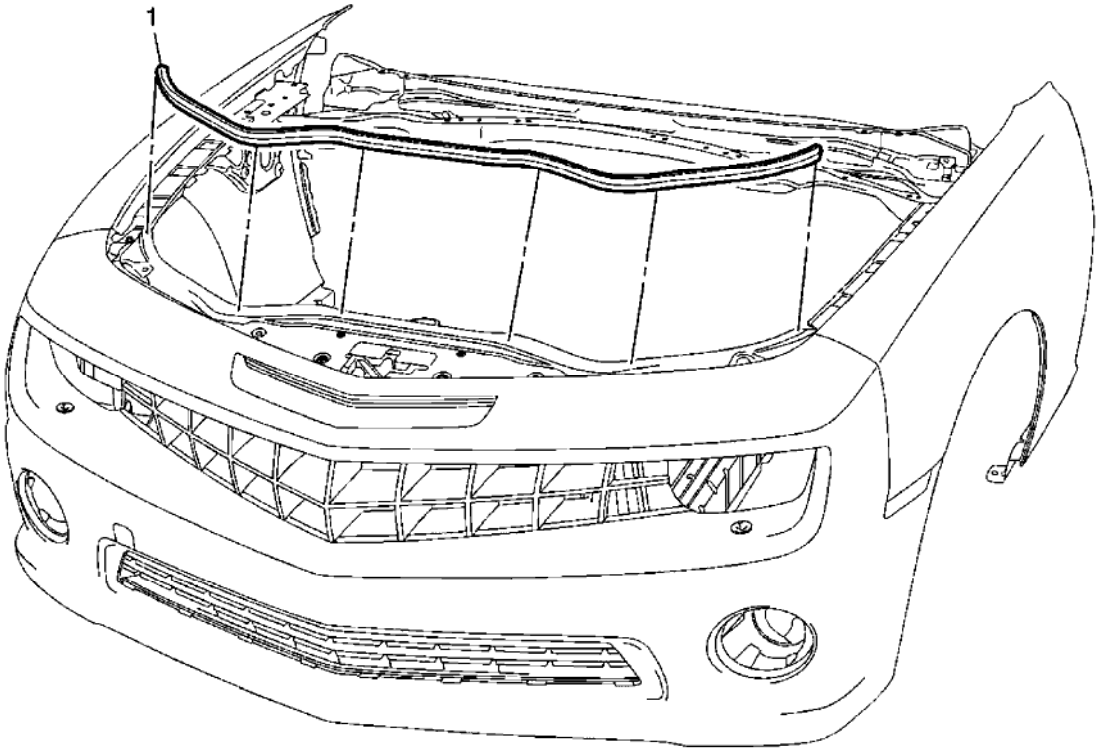


Fig. 16: Hood Front Weatherstrip
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Hood Front Weatherstrip **Procedure:** Clean the area where the seal will be mounted. Use a suitable solvent with a mixture of 50 percent isopropyl alcohol and 50 percent water by volume, or high-flash naphtha.

HOOD REAR WEATHERSTRIP REPLACEMENT

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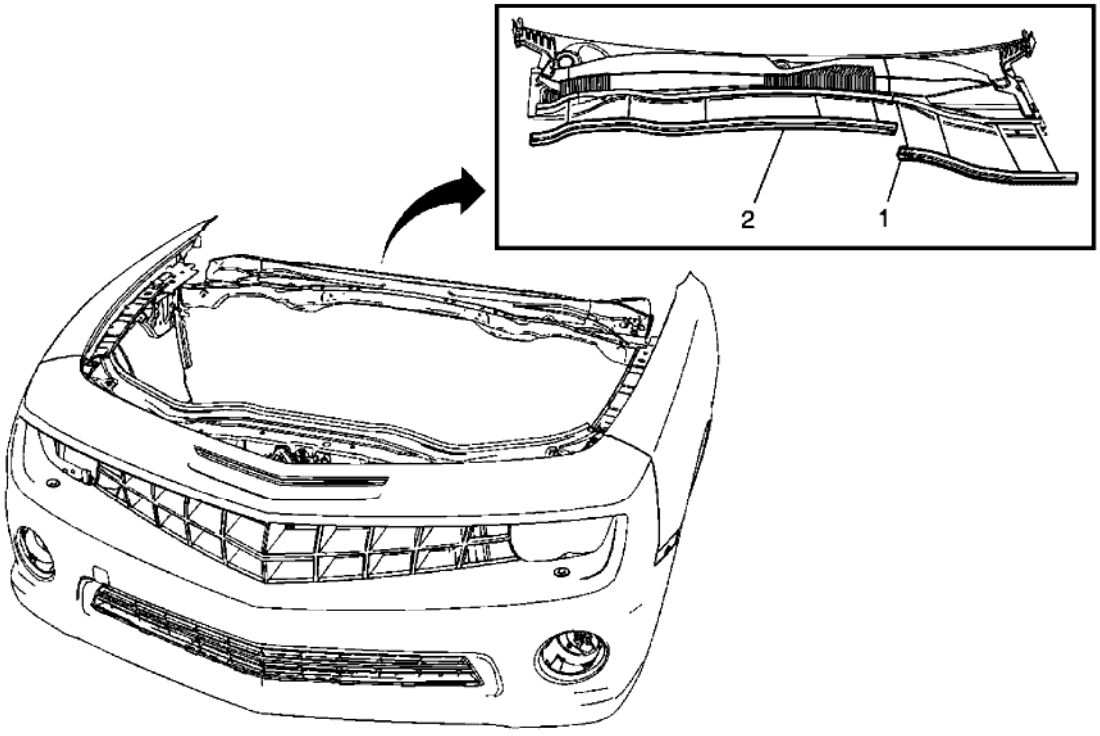


Fig. 17: Hood Rear Weatherstrip
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Hood Rear Weatherstrip - Left **Procedure:** Clean the area where the weatherstrip will be mounted. Use a suitable solvent with a mixture of 50 percent isopropyl alcohol and 50 percent water by volume, or high flash naphtha.
2	Hood Rear Weatherstrip - Right **Procedure:** Clean the area where the weatherstrip will be mounted. Use a suitable solvent with a mixture of 50 percent isopropyl alcohol and 50 percent water by volume, or high flash naphtha.

REAR COMPARTMENT LID STRUT REPLACEMENT

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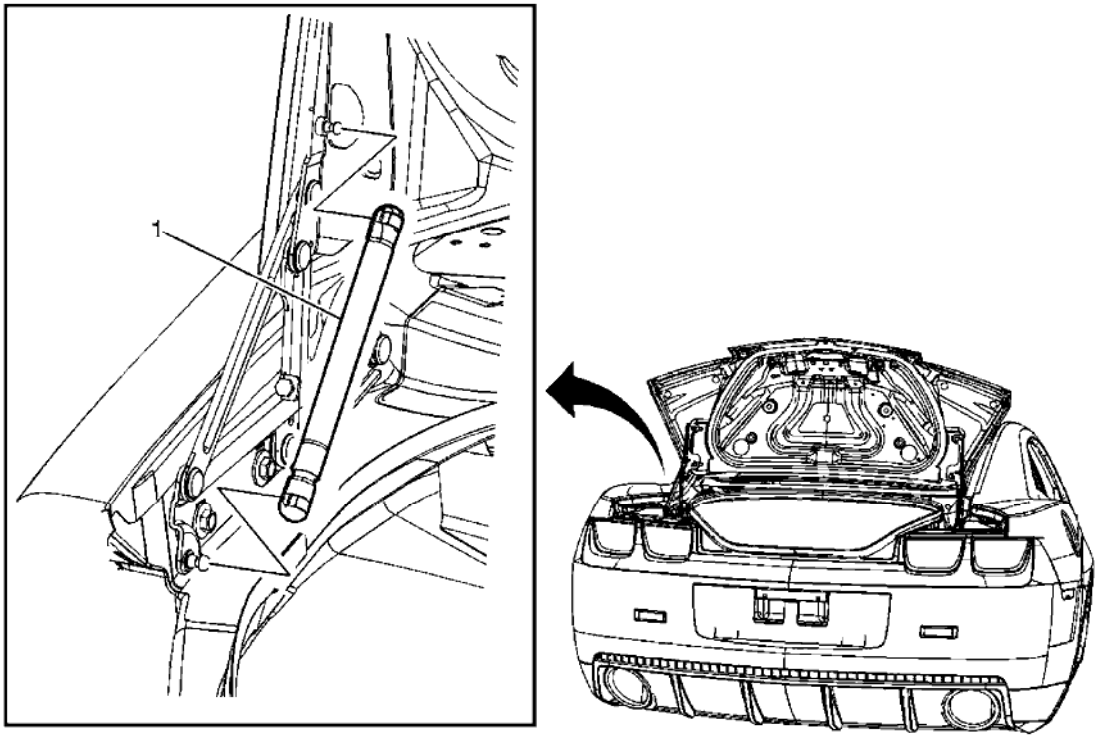


Fig. 18: Rear Compartment Lid Strut
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Compartment Lid Strut **WARNING:** **When a hood hold open device is being removed or installed, provide alternate support to avoid the possibility of damage to the vehicle or personal injury.** **CAUTION:** **Apply pressure only at the end of the liftgate/hood assist rod that you are removing or attaching. Do NOT apply pressure to the middle of the rod because damage or bending will result.** **Procedure** 1. Release the locking retainers on the strut. 2. Ensure the retainers are fully seated when the retainers are reinstalled. If the retainers cannot be fully seated, a new strut should be installed.

FRONT SIDE DOOR WEATHERSTRIP REPLACEMENT - BODY SIDE

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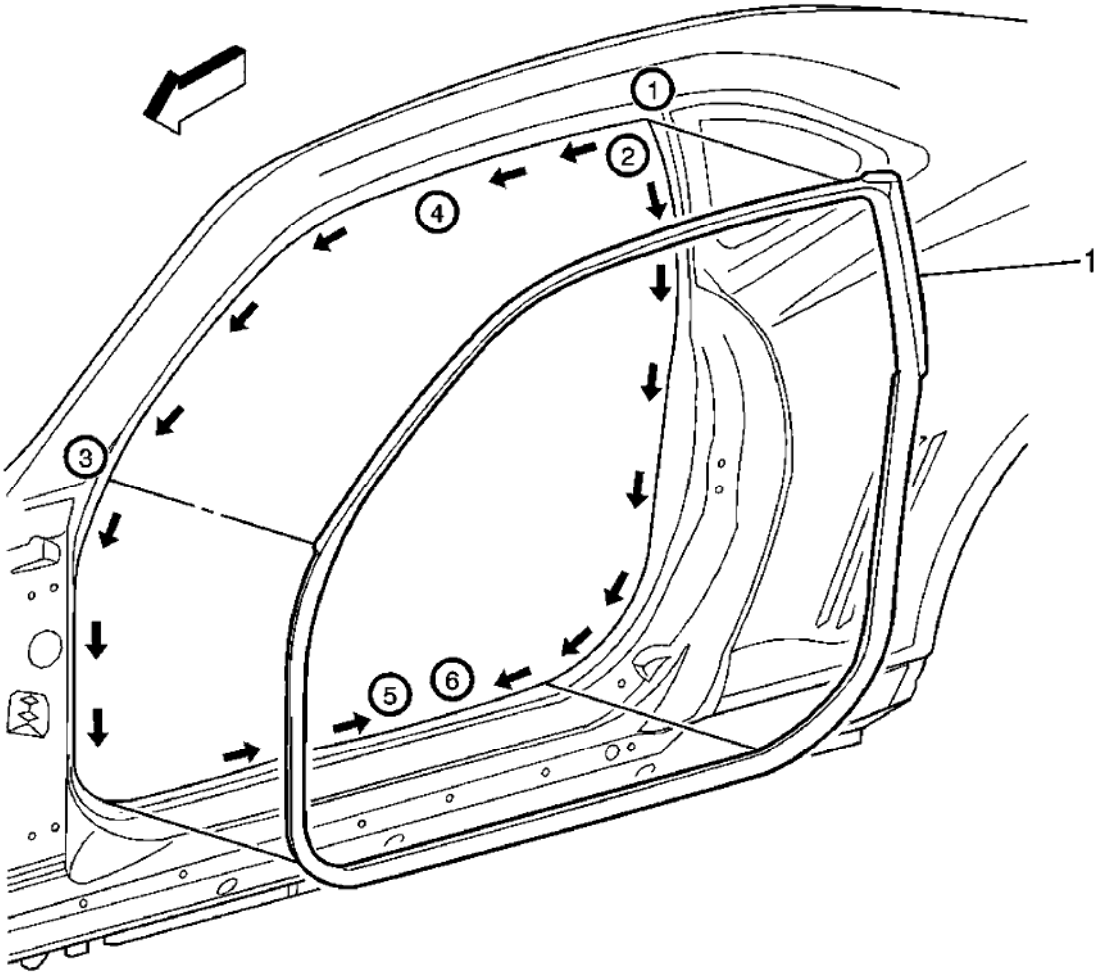


Fig. 19: Front Side Door Weatherstrip - Body Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front carpet retainer. Refer to **Front Side Door Opening Floor Carpet Retainer Replacement**	
1	Front Side Door Weatherstrip **Procedure:** When installing the weatherstrip start in the right upper corner (1) working counter clockwise around the door ring.

REAR COMPARTMENT LID WEATHERSTRIP REPLACEMENT

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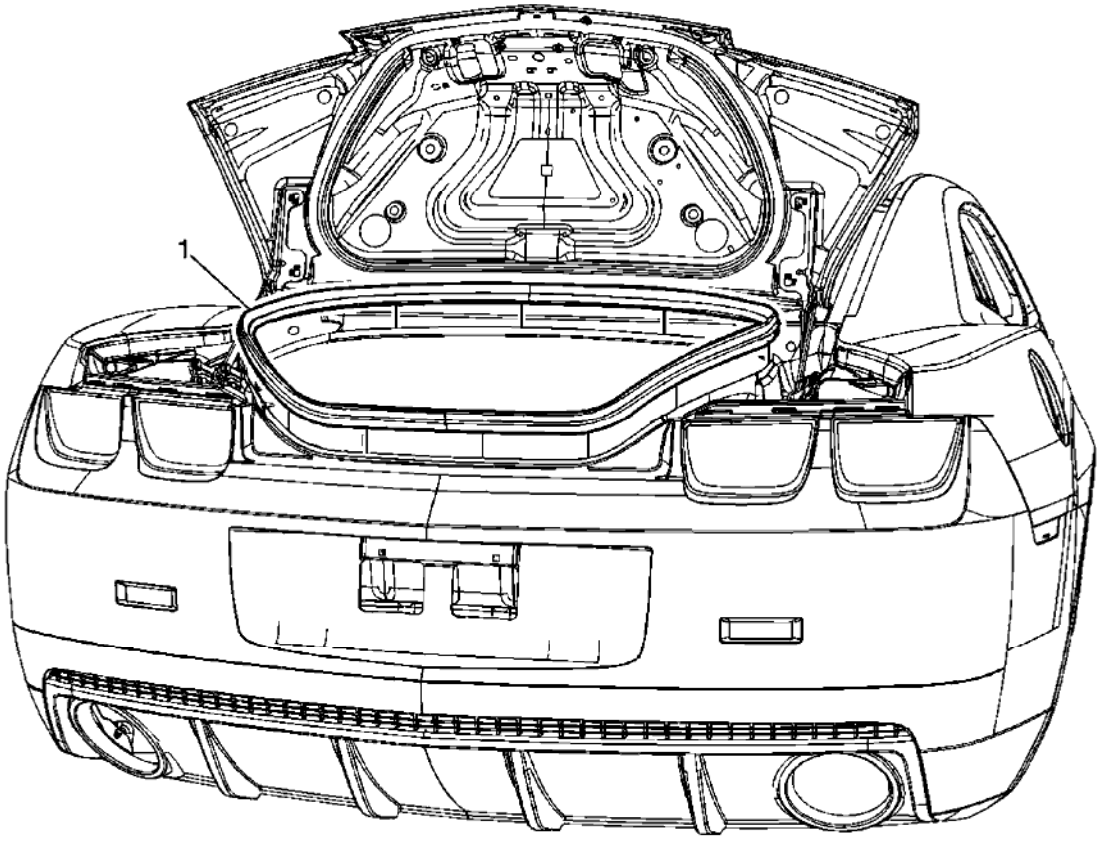


Fig. 20: Rear Compartment Lid Weatherstrip
Courtesy of GENERAL MOTORS CORP.

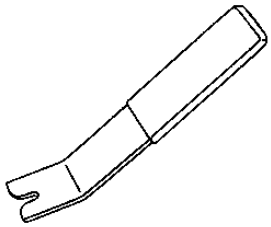
Callout	Component Name
1	Compartment Lid Weatherstrip **Procedure:** Clean the mounting surface using a mixture of 50 percent isopropyl alcohol and 50 percent water by volume, or high-flash naphtha.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J-38778 Door Trim Pad Clip Remover

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Bumpers and Fascias - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Bumper Fascia Air Deflector Bolts	10 N.m	89 lb in
Front Bumper Fascia Bolts	3 N.m	27 lb in
Front Bumper Fascia Lower Bolts	7 N.m	62 lb in
Front Bumper Fascia Lower Screws	7 N.m	62 lb in
Front Bumper Fascia Outer Bracket Nuts	7 N.m	62 lb in
Front Bumper Fascia Upper Support Bolts	10 N.m	89 lb in
Front Bumper Impact Bar Bracket Bolts	30 N.m	22 lb ft
Front Fender Support Bracket Screws	7 N.m	62 lb in
Rear Bumper Fascia Energy Absorber Bolts	10 N.m	89 lb in
Rear Bumper Fascia Molding Bolts	10 N.m	89 lb in
Rear Fascia Guide Outer Bolt	7 N.m	62 lb in
Rear Impact Bar Bolts	25 N.m	18 lb ft

REPAIR INSTRUCTIONS

FRONT BUMPER FASCIA ENERGY ABSORBER REPLACEMENT

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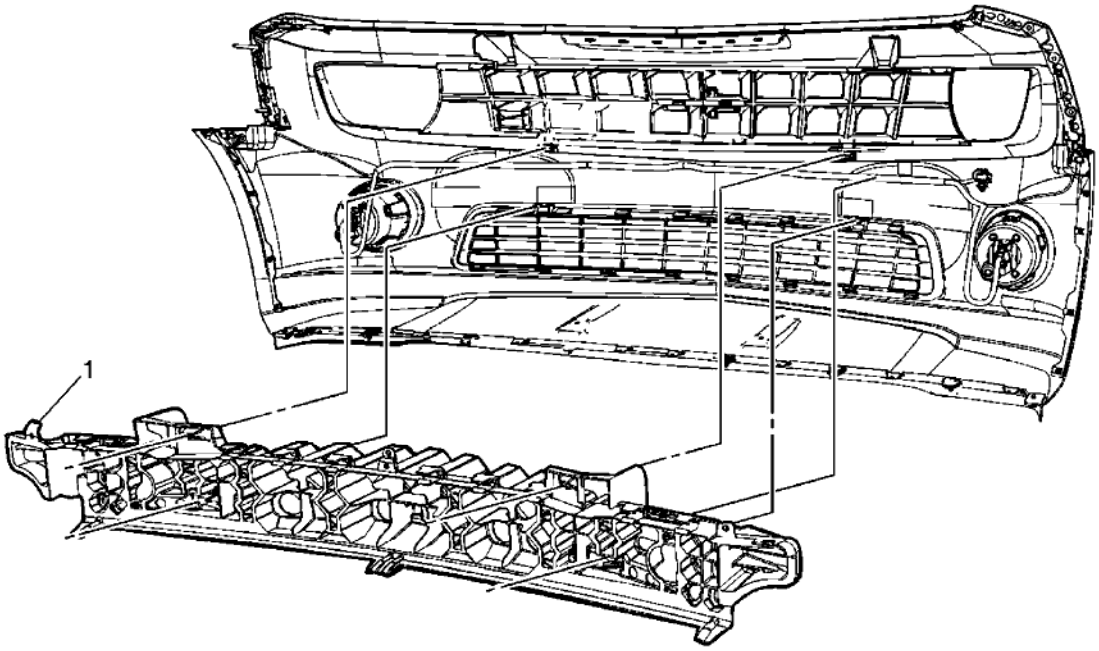


Fig. 1: Front Bumper Fascia Energy Absorber
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front fascia. Refer to **Front Bumper Fascia Replacement**.	
1	Front Bumper Fascia Energy Absorber **Procedure** 1. Disconnect the electrical harness from the front fascia energy absorber and reposition. 2. Release both retainer tabs before removing the absorber.

FRONT BUMPER IMPACT BAR REPLACEMENT

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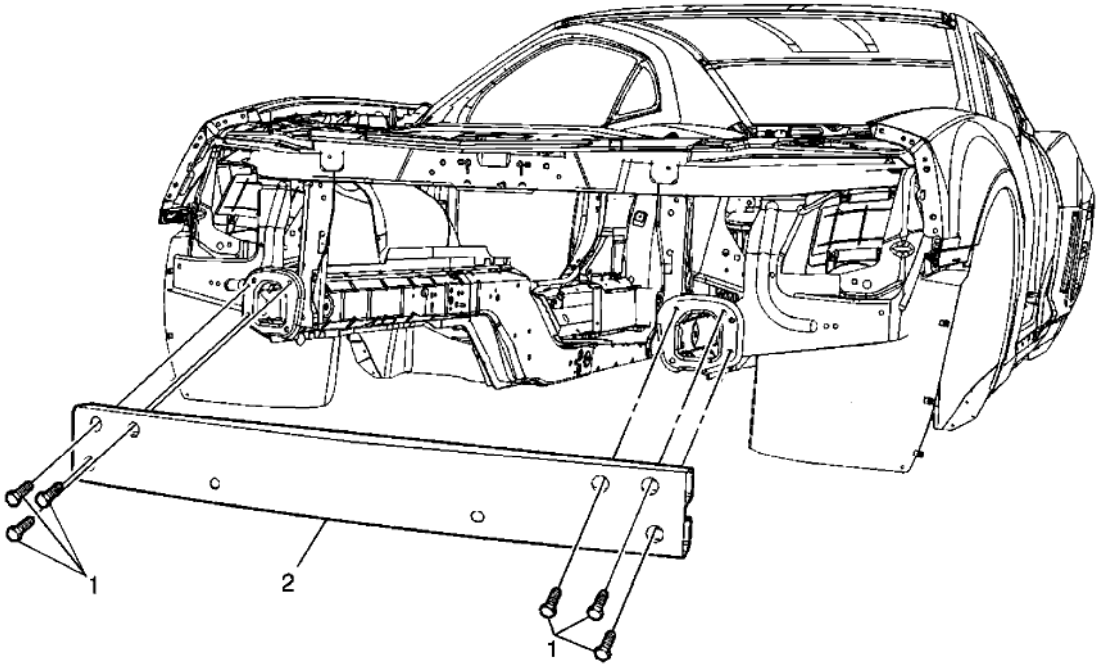


Fig. 2: Front Bumper Impact Bar
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the bumper fascia. Refer to **Front Bumper Fascia Replacement**.	
1	Front Bumper Impact Bar Bracket Bolt (Qty: 6) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 30 N.m (22 lb ft)
2	Front Bumper Impact Bar

FRONT BUMPER FASCIA REPLACEMENT

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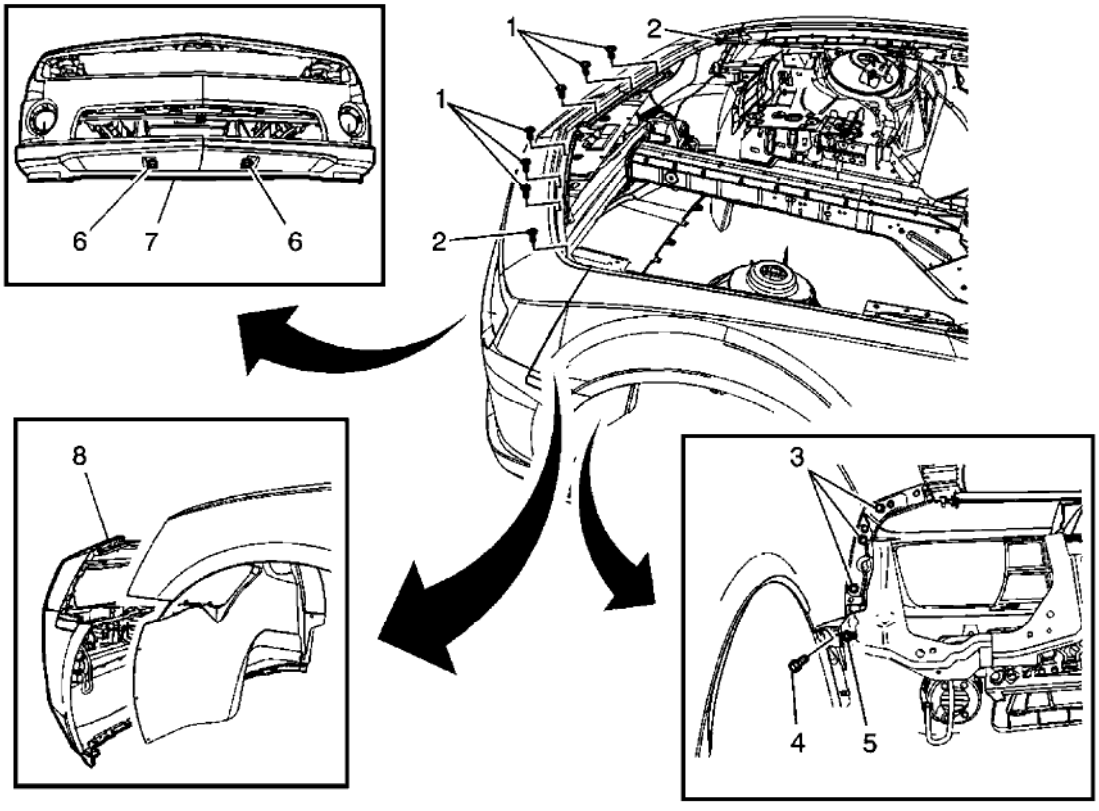


Fig. 3: Front Bumper Fascia
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front wheelhouse liners. Refer to **Front Wheelhouse Liner Replacement** .	
1	Front Bumper Fascia Upper Support Push-In Retainer (Qty: 6)
2	Front Fender Support Bracket Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 7 N.m (62 lb in)
3	Front Bumper Fascia Outer Bracket Nut (Qty: 6) **Tighten:** 7 N.m (62 lb in)
4	Front Bumper Fascia Bolt (Qty: 2) **Tighten:** 3 N.m (27 lb in)
5	Front Bumper Fascia Lower Bolt (Qty: 2)

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	Tighten: 7 N.m (62 lb in)
6	Front Bumper Fascia Lower Screw (Qty: 2) **Tighten:** 7 N.m (62 lb in)
7	Front Bumper Fascia Lower Retainer (Qty: 6)
8	Front Bumper Fascia **Procedure:** Disconnect the main electrical connector.

FRONT BUMPER FASCIA UPPER SUPPORT REPLACEMENT

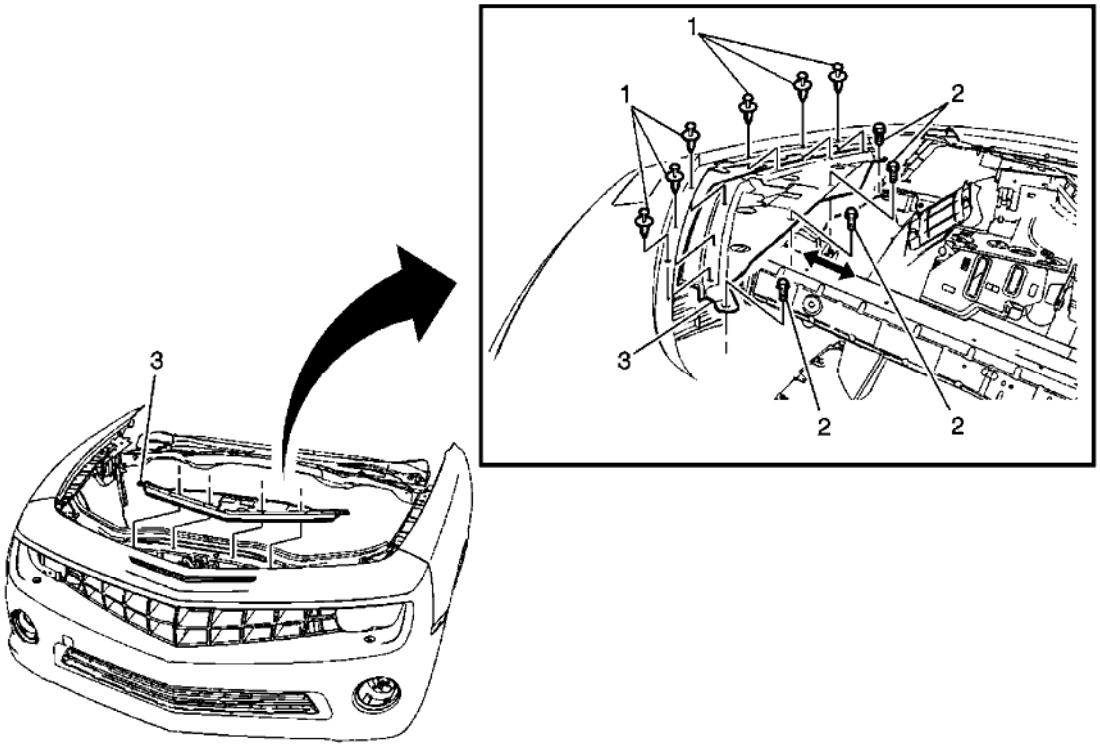


Fig. 4: Front Bumper Fascia Upper Support
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Bumper Fascia Upper Support Push-In Retainer (Qty: 6)
2	Front Bumper Fascia Upper Support Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
	Front Bumper Fascia Upper Support

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3	**Procedure:** Slide upward and rearward to clear hood primary latch.

FRONT BUMPER FASCIA LOWER REINFORCEMENT REPLACEMENT

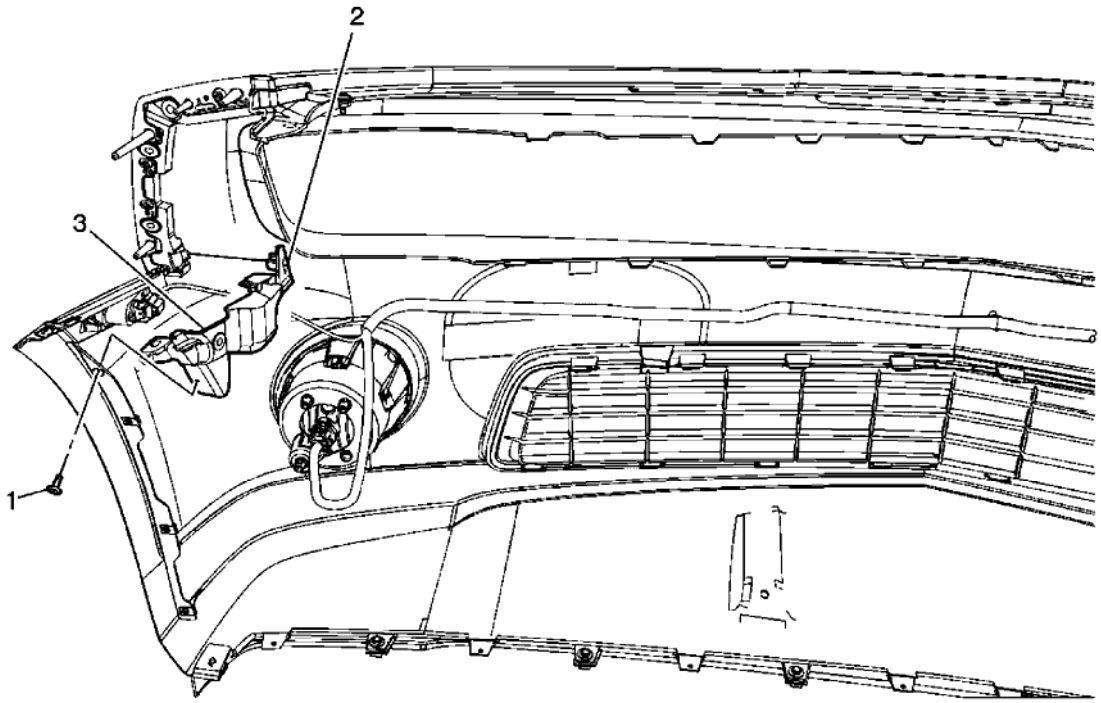


Fig. 5: Front Bumper Fascia Lower Reinforcement
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement**.	
1	Front Bumper Fascia Lower Reinforcement Rivet **WARNING:** **Refer to Eye Protection Warning .**
2	Front Bumper Fascia Lower Reinforcement Retainer
3	Front Bumper Fascia Lower Reinforcement

FRONT BUMPER FASCIA REINFORCEMENT REPLACEMENT

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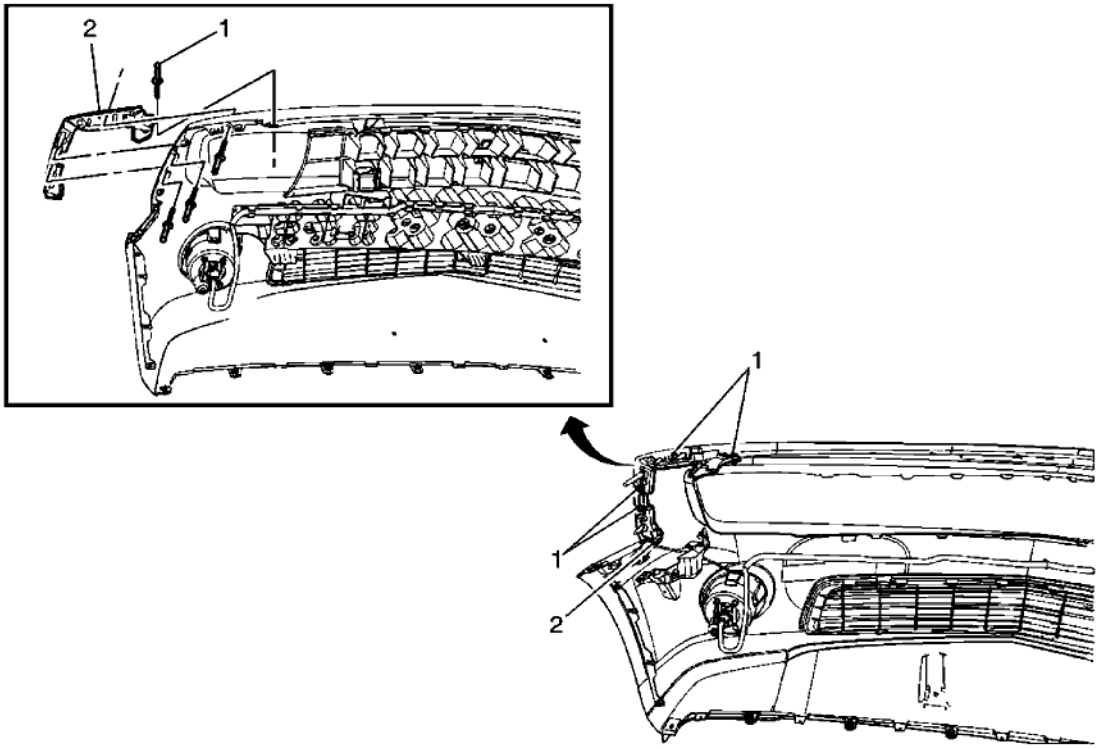


Fig. 6: Front Bumper Fascia Reinforcement
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement**.	
1	Front Bumper Fascia Lower Reinforcement Rivet (Qty: 4)
2	Front Bumper Fascia Lower Reinforcement

FRONT BUMPER FASCIA AIR DEFLECTOR REPLACEMENT

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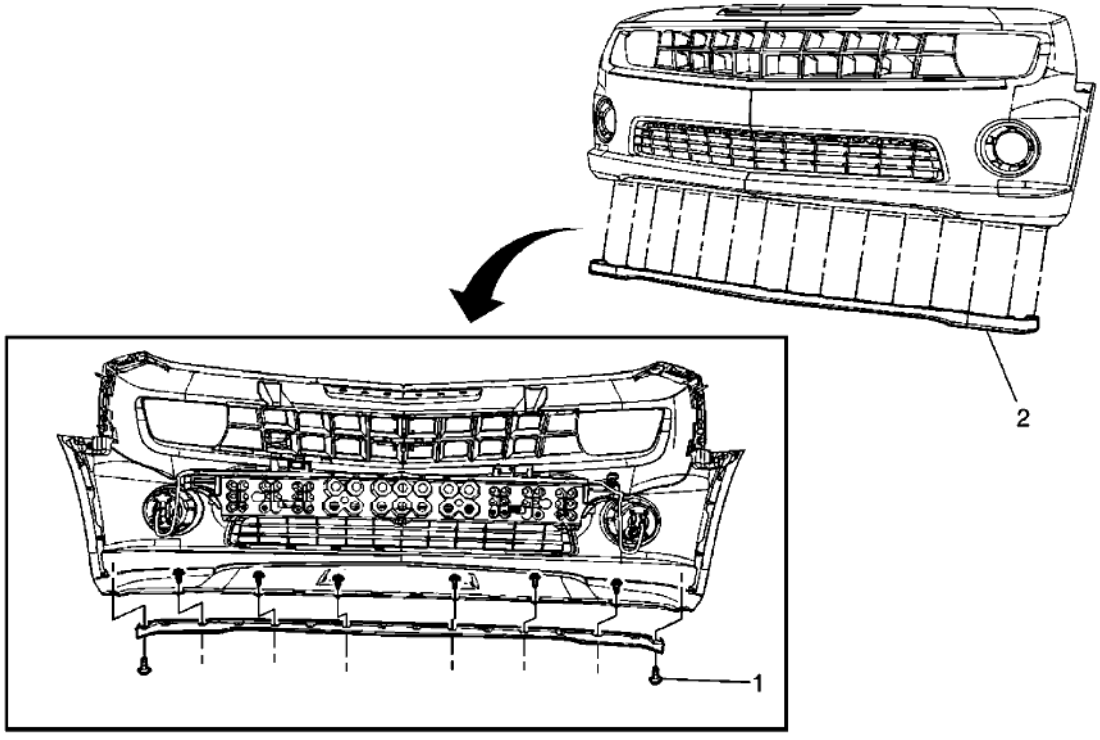


Fig. 7: Front Bumper Fascia Air Deflector
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Bumper Fascia Air Deflector Bolt (Qty: 16) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Front Bumper Fascia Air Deflector

REAR BUMPER FASCIA MOLDING REPLACEMENT

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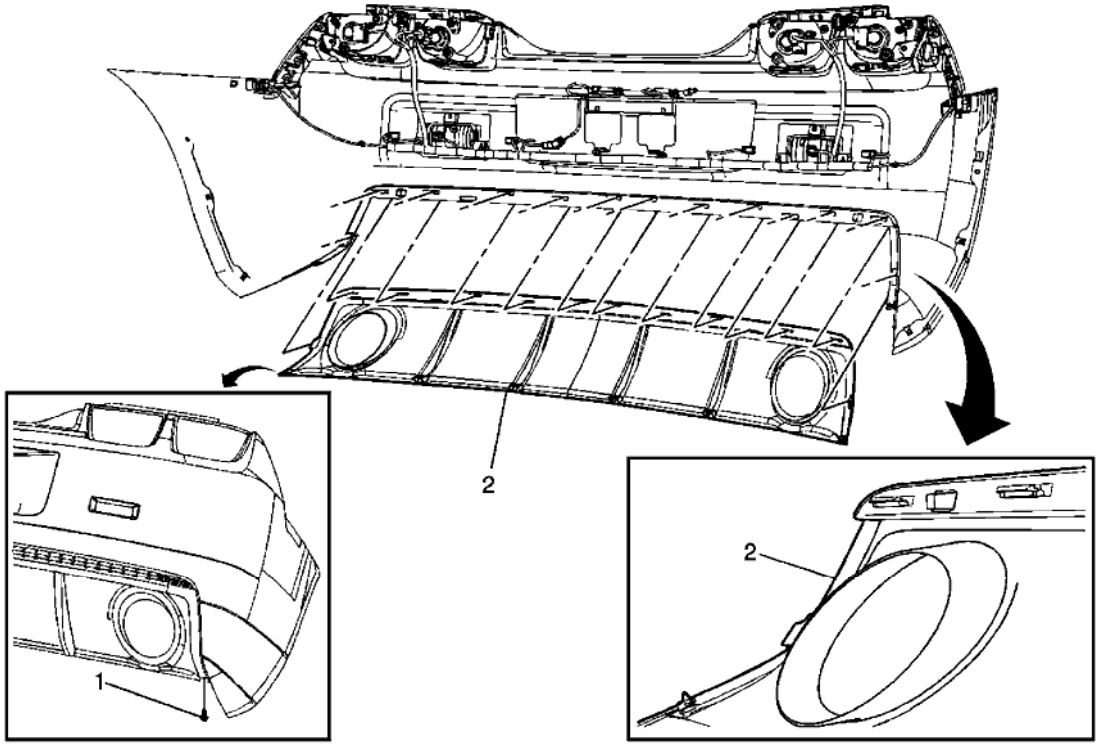


Fig. 8: Rear Bumper Fascia Molding
Courtesy of GENERAL MOTORS CORP.

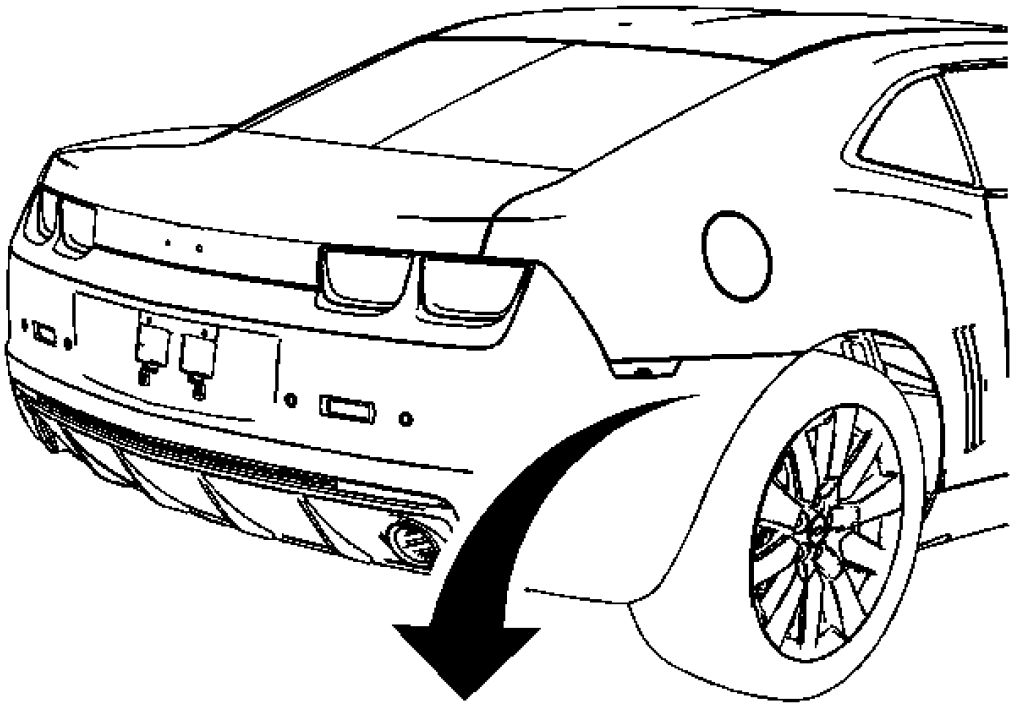
Callout	Component Name
Preliminary Procedure: Remove the rear bumper fascia energy absorber. Refer to **Rear Bumper Fascia Energy Absorber Replacement**.	
1	Rear Bumper Fascia Molding Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Rear Bumper Fascia Molding **Procedure:** Carefully push a small nylon wedge between the rear fascia and the fascia molding. Insert a small flat-bladed tool into the fascia slot and depress the tabs one at a time and pull on the fascia at the same time to gradually remove the fascia molding from the rear fascia.

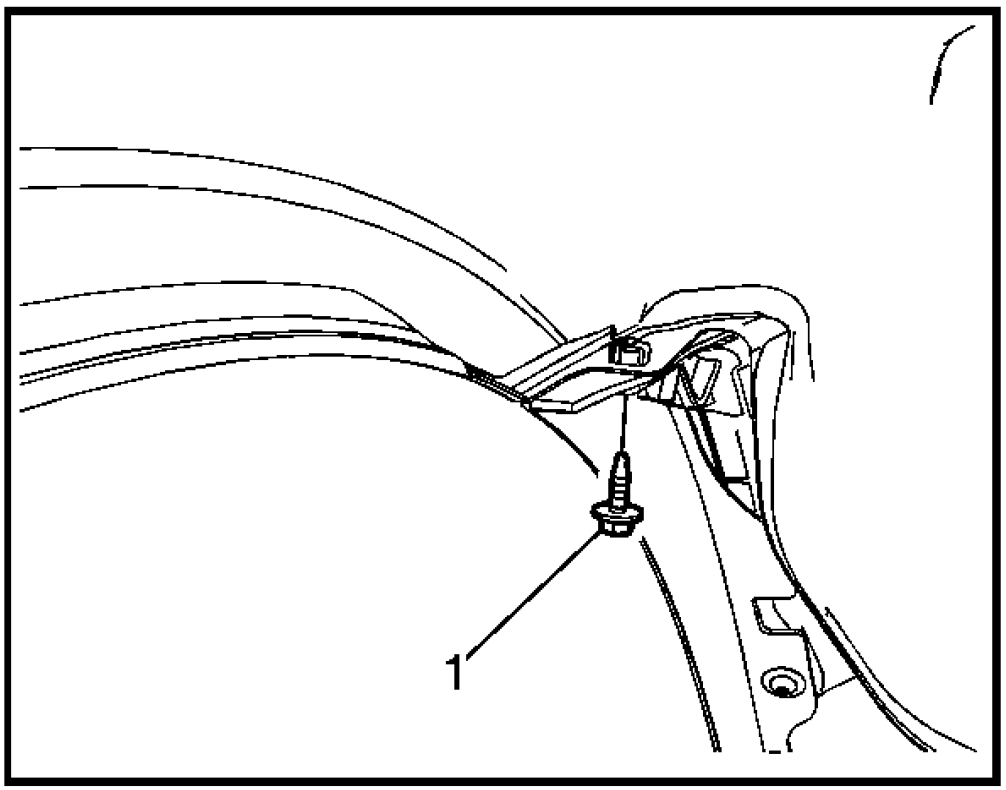
REAR BUMPER FASCIA REPLACEMENT

Removal Procedure

1. Remove the tail lamp filler closeout panels. Refer to **Tail Lamp Closeout Filler Replacement** .

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Fig. 9: Rear Fascia Outer Bolt
Courtesy of GENERAL MOTORS CORP.

2. Remove the rear fascia (1) outer bolt.
3. Remove the rear wheelhouse liners. Refer to **Rear Wheelhouse Panel Liner Replacement** .

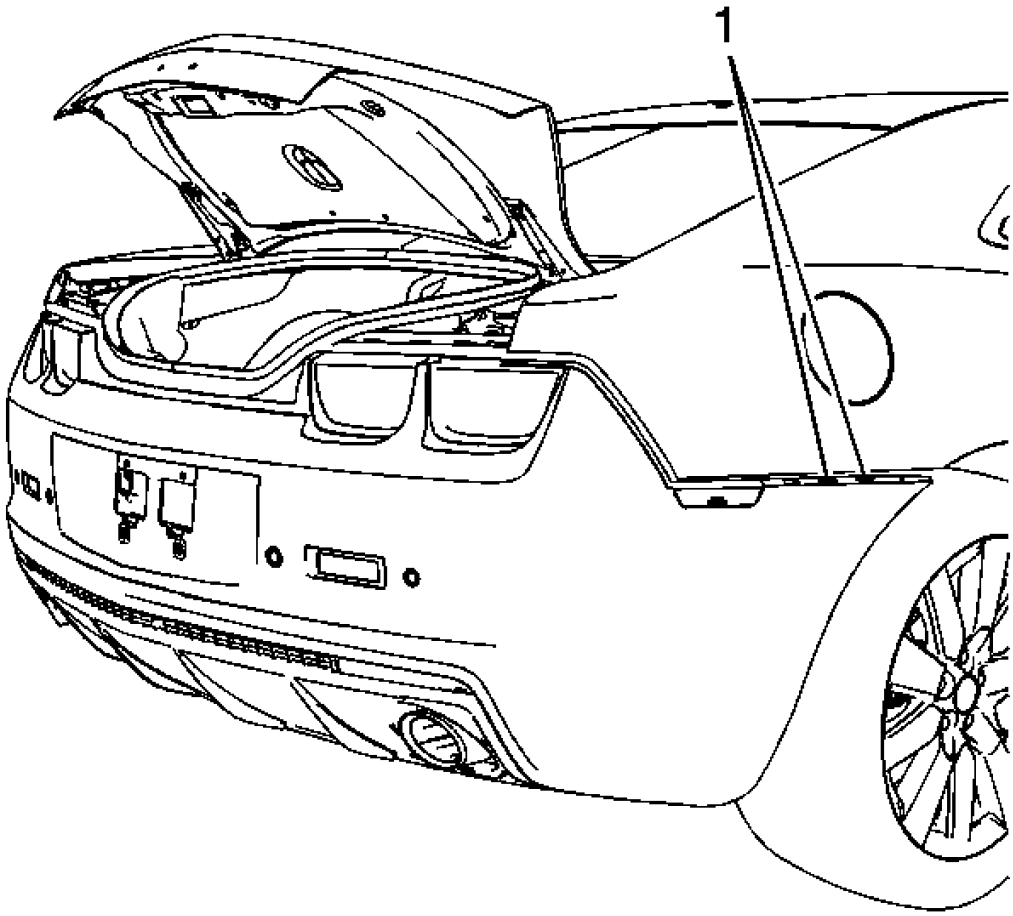


Fig. 10: First Two Fascia Side Retainers
Courtesy of GENERAL MOTORS CORP.

4. Release the first two fascia side retainers (1) by carefully pushing a thin nylon wedge between the forward edge of the fascia and the fascia guide retainers and releasing the retainers while pulling on the fascia at the same time to gradually release the fascia from the fascia guide.

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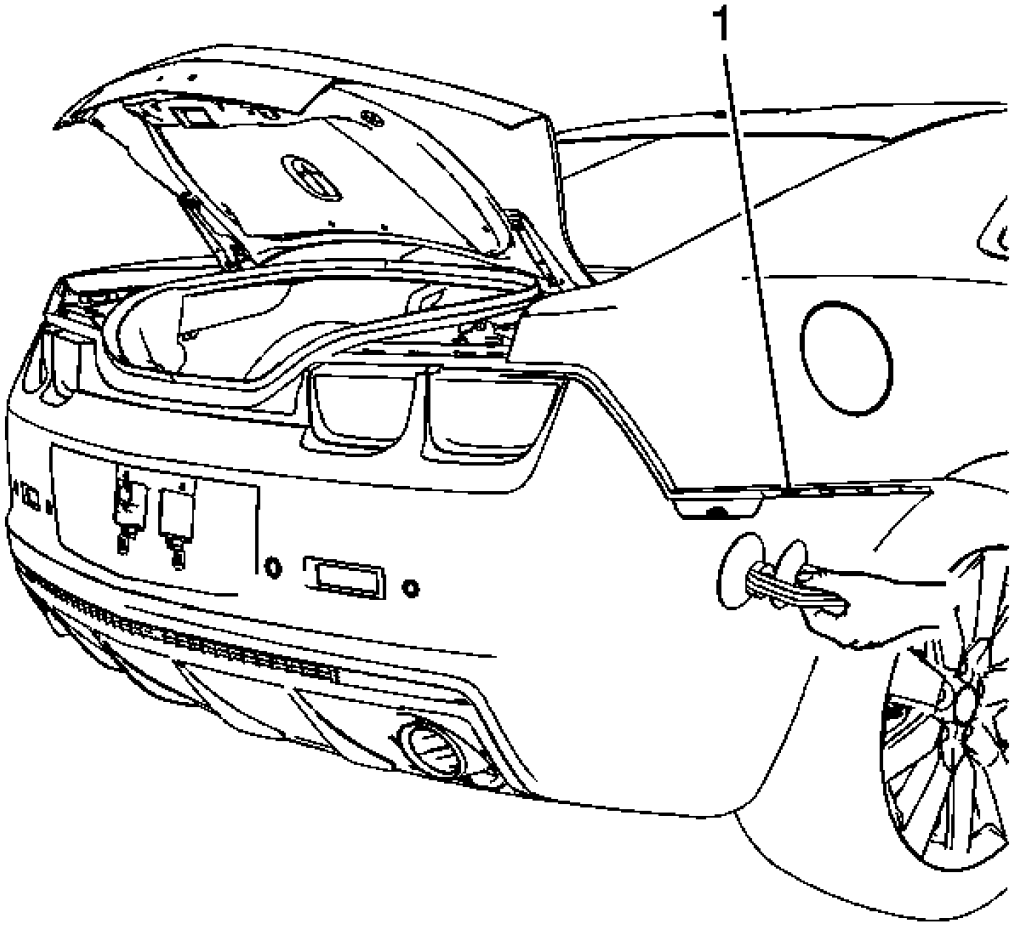


Fig. 11: Last Fascia Side Retainer
Courtesy of GENERAL MOTORS CORP.

5. Release the last fascia side retainer (1) by using suitable suction cups immediately forward of the side marker lamp to assist in releasing the fascia side retainer from the fascia guide.

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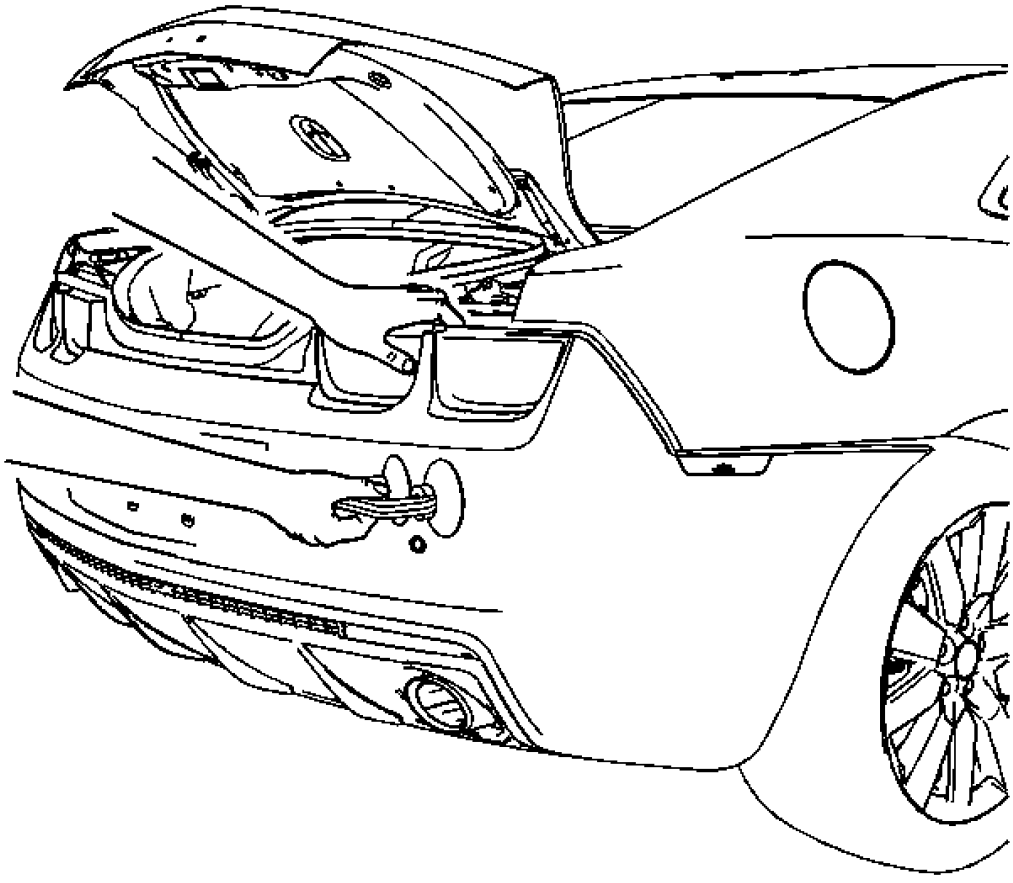


Fig. 12: Releasing Outboard Corner Of Fascia From Fascia Guide
Courtesy of GENERAL MOTORS CORP.

6. Release the outboard corner of the fascia from the fascia guide by pulling rearward carefully above the tail lamps by hand and with suitable suction cups positioned below the tail lamps on a flat surface of the rear fascia to release the rib-lock retainers.

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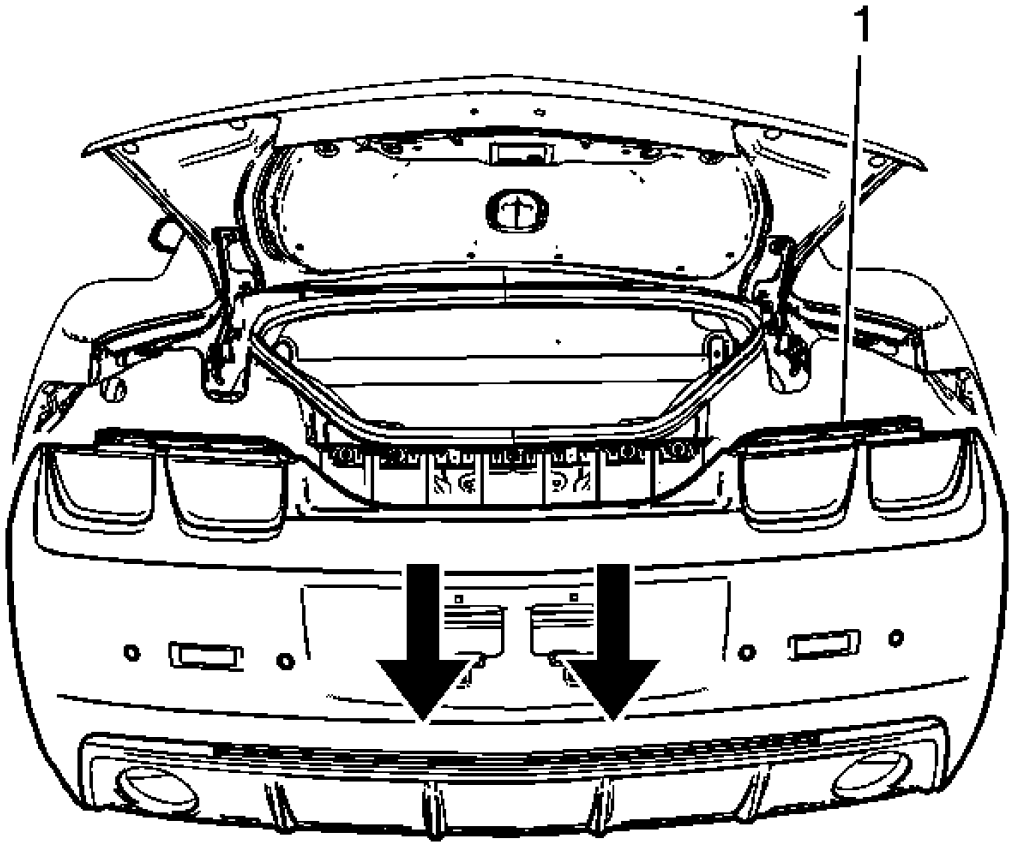


Fig. 13: Releasing Fascia From Rear Fascia Support
Courtesy of GENERAL MOTORS CORP.

7. Release the fascia from the rear fascia support by carefully pushing a thin nylon wedge between the edge of the fascia and the rear fascia support retainers and releasing the retainers while pulling on the fascia at the same time to gradually release the rear fascia (1) from the rear fascia support.
8. Disconnect the main electrical harness connectors.
9. Remove the rear fascia from the vehicle.

Installation Procedure

1. Transfer parts as necessary to the rear fascia.
2. Position the fascia to the vehicle and connect the main electrical harness connectors.
3. Reposition the fascia to the rear fascia support and the rear fascia guide outboard corner.
4. Press the rear fascia into the retainers on the rear fascia support first while guiding the fascia to the rear fascia guide outboard corner.

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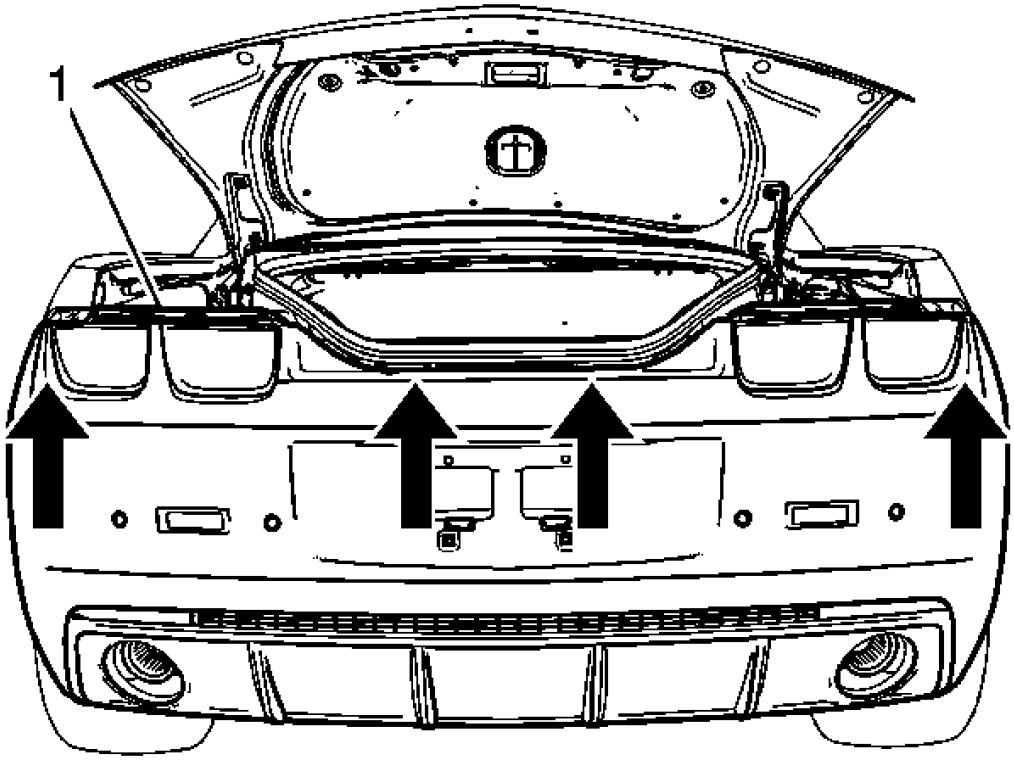


Fig. 14: Pressing Fascia Into Retainers On Rear Fascia Support
Courtesy of GENERAL MOTORS CORP.

5. Press the fascia into the retainers on the rear fascia support to the rear fascia (1) guide outboard corner.

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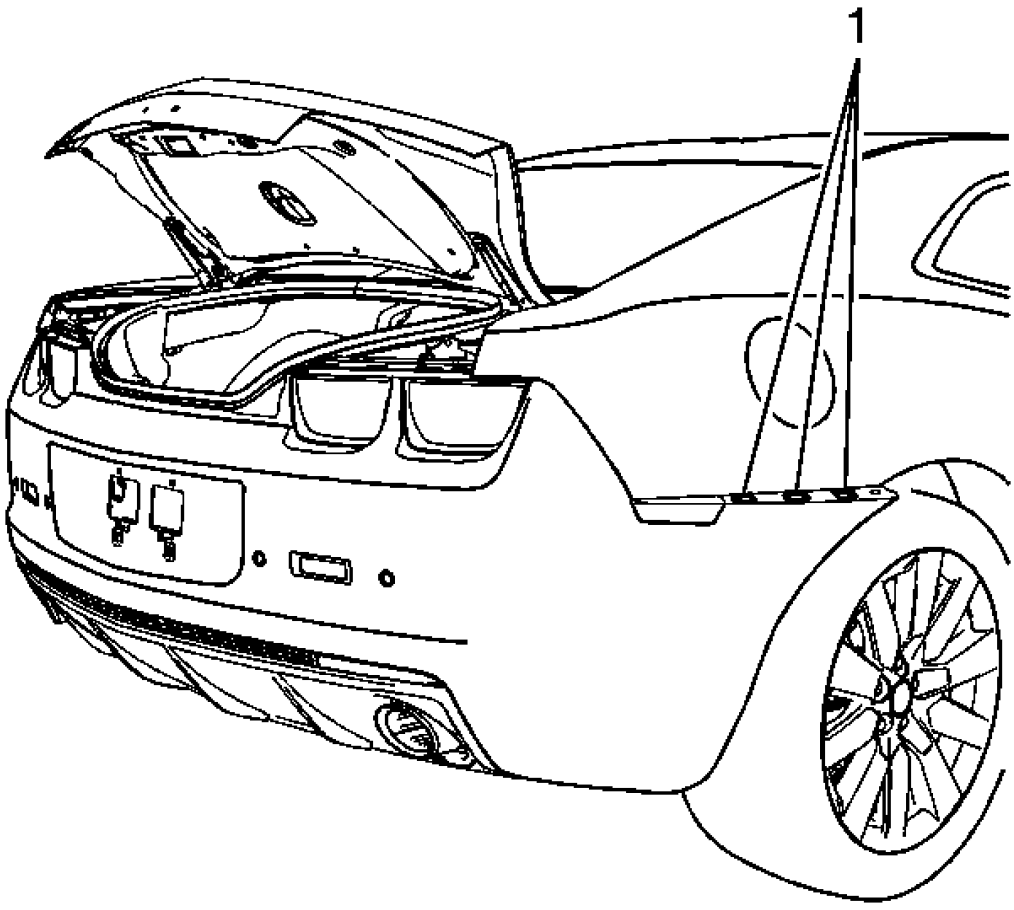
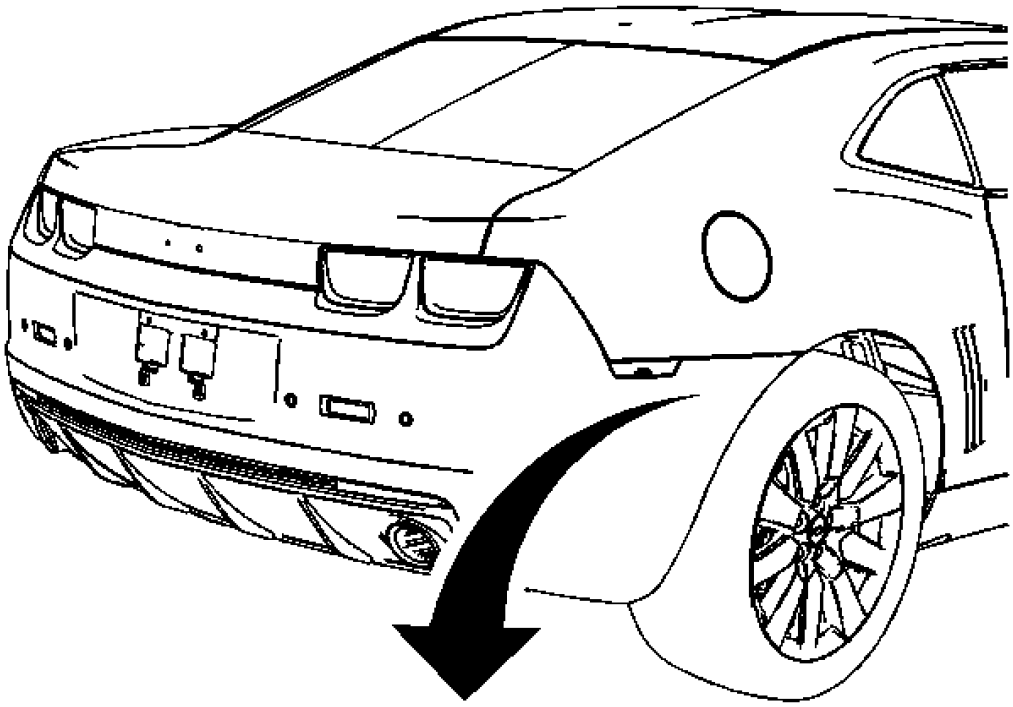
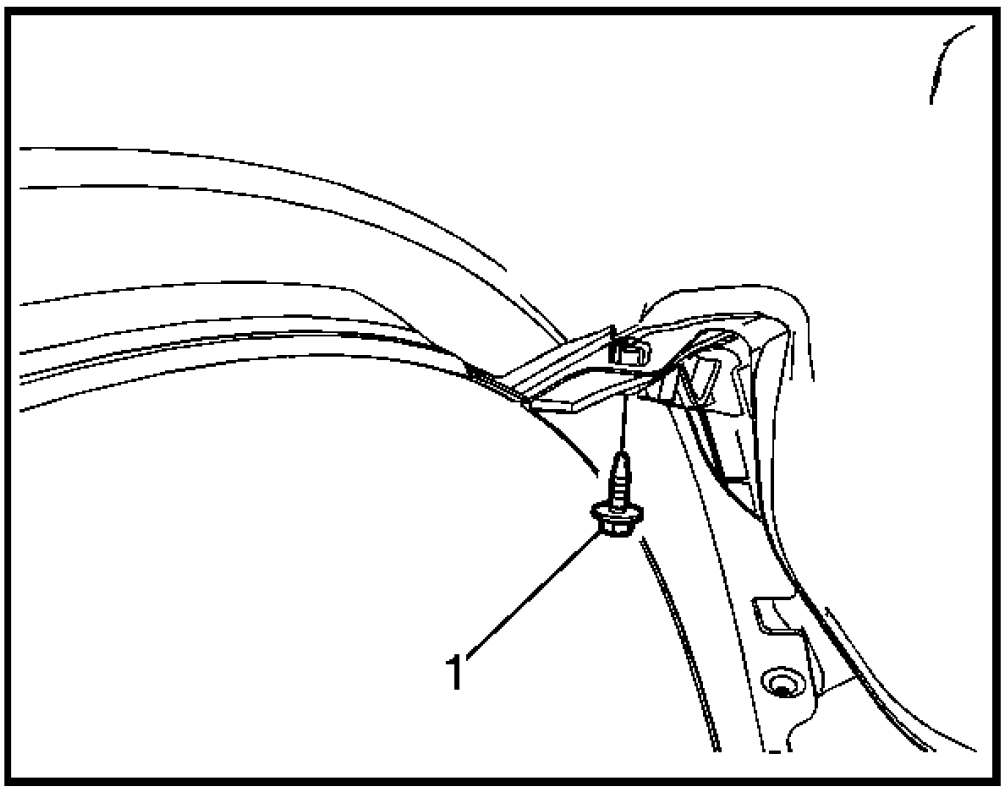


Fig. 15: Pressing Fascia Into Retainers On Fascia To Side Fascia Guide
Courtesy of GENERAL MOTORS CORP.

6. Press the fascia into the retainers on the fascia to the side fascia guide (1).
7. Install the rear wheelhouse liners. Refer to **Rear Wheelhouse Panel Liner Replacement** .

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Fig. 16: Rear Fascia Outer Bolt
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

8. Install the rear fascia (1) outer bolt and tighten to 7 N.m (62 lb in).
9. Install the tail lamp filler closeout panels. Refer to **Tail Lamp Closeout Filler Replacement** .

REAR BUMPER FASCIA GUIDE REPLACEMENT

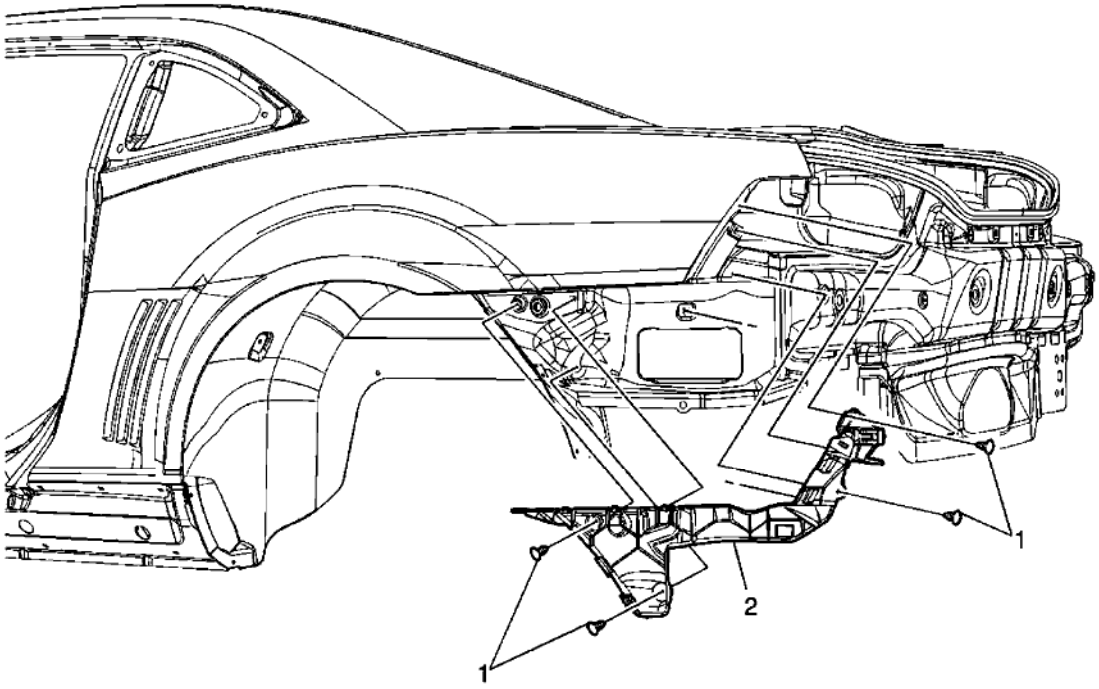


Fig. 17: Rear Bumper Fascia Guide
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement**.	
1	Rear Bumper Fascia Guide Rivet (Qty: 4) **WARNING:** **Refer to Eye Protection Warning .**
2	Rear Bumper Fascia Guide **Procedure:** Align the 3 integral retainers to the body side rear outer panel and extension.

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REAR BUMPER FASCIA SUPPORT REPLACEMENT

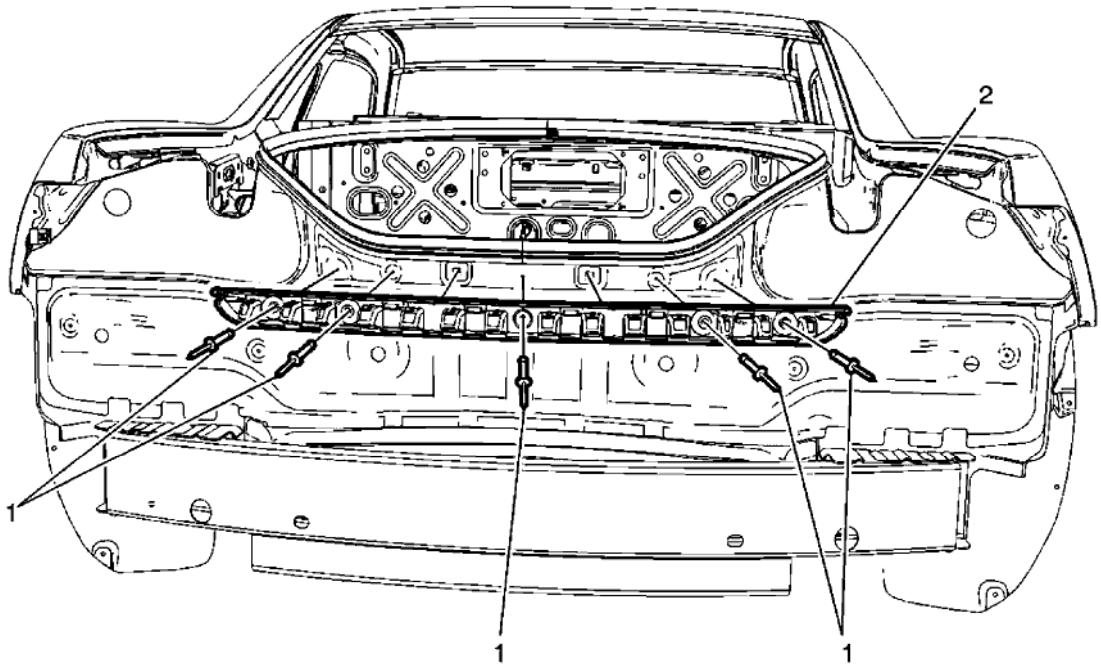


Fig. 18: Rear Bumper Fascia Support
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement**.	
1	Rear Bumper Fascia Support Rivet (Qty: 5) **WARNING:** **Refer to Eye Protection Warning .**
2	Rear Bumper Fascia Support **Procedure:** Align the 2 integral retainers and secure to vehicle.

REAR BUMPER FASCIA CENTER BRACKET REPLACEMENT

1. Remove the rear fascia. Refer to **Rear Bumper Fascia Replacement**.

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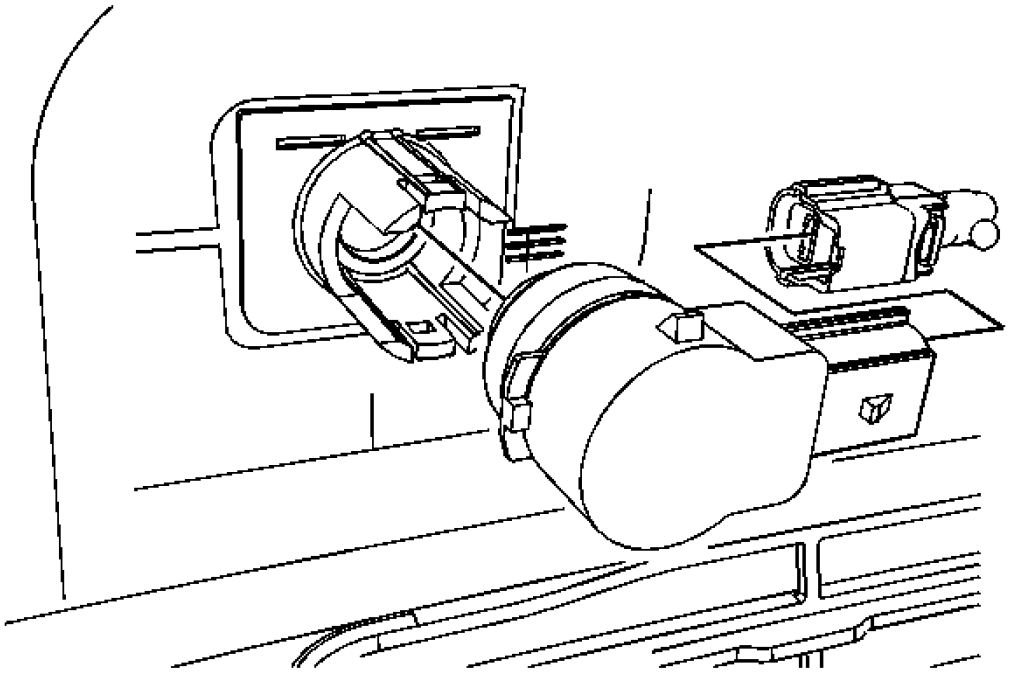


Fig. 19: Object Sensor & Housing
Courtesy of GENERAL MOTORS CORP.

2. Disconnect the sensor harness.
3. Remove the sensor from the center bracket.

The center bracket must be painted if replaced. If reinstalled, painting will not be necessary.

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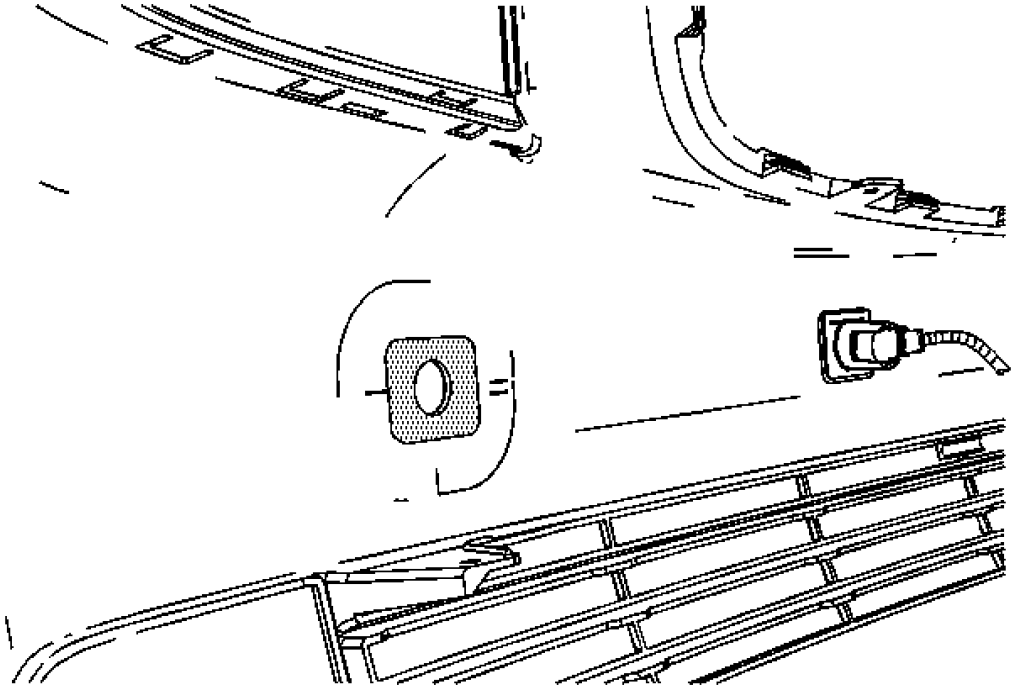


Fig. 20: Sonic Weld Plastic Residue
Courtesy of GENERAL MOTORS CORP.

NOTE: Do Not grind off alignment tabs.

4. Sand/grind sonic weld plastic residue from the fascia.

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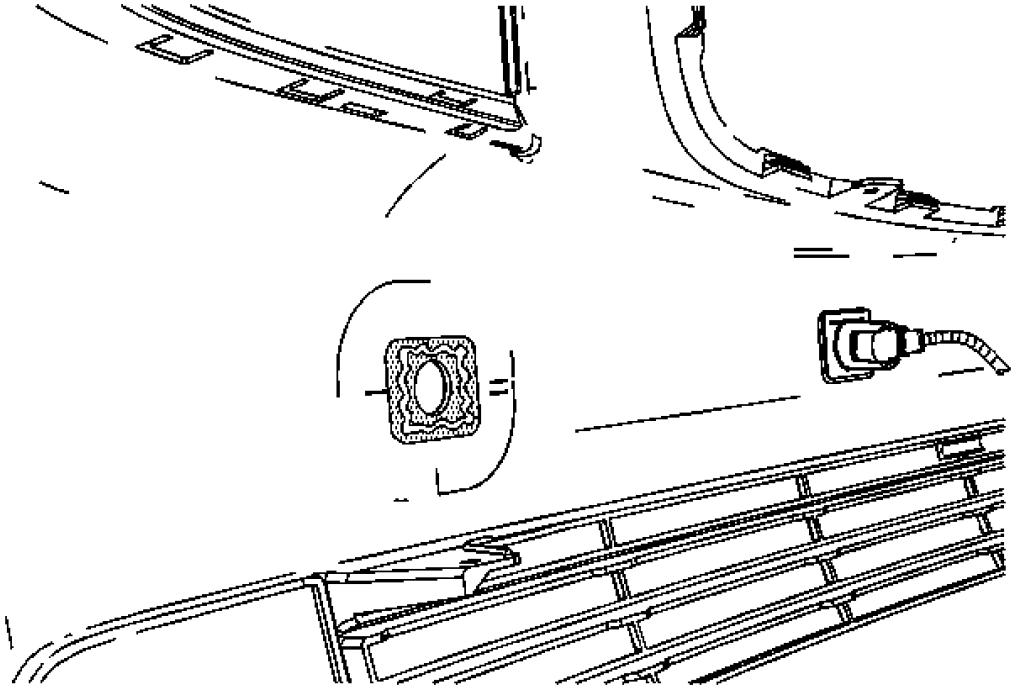


Fig. 21: View Of Structural Adhesive Epoxy On Fascia
Courtesy of GENERAL MOTORS CORP.

5. Apply structural adhesive epoxy, Lord Fusor™ 127EZ or equivalent, to fascia at mating surface.

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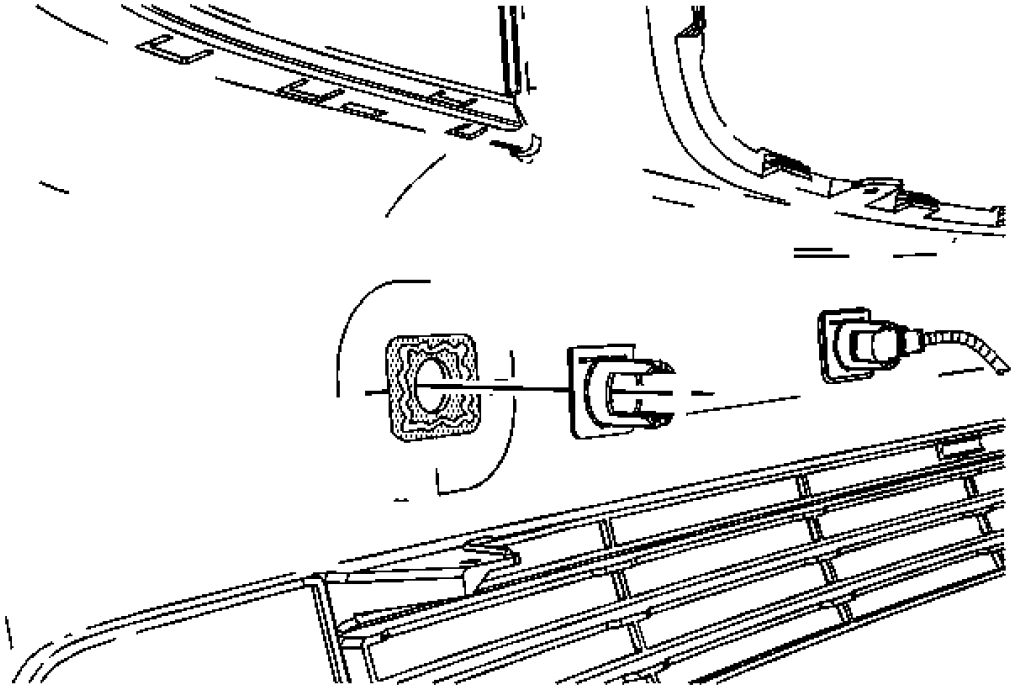


Fig. 22: Installing Sensor Housing
Courtesy of GENERAL MOTORS CORP.

6. Using the housing pilot, install the center bracket to the fascia.
7. Allow adhesive to cure according to manufacturer's directions.

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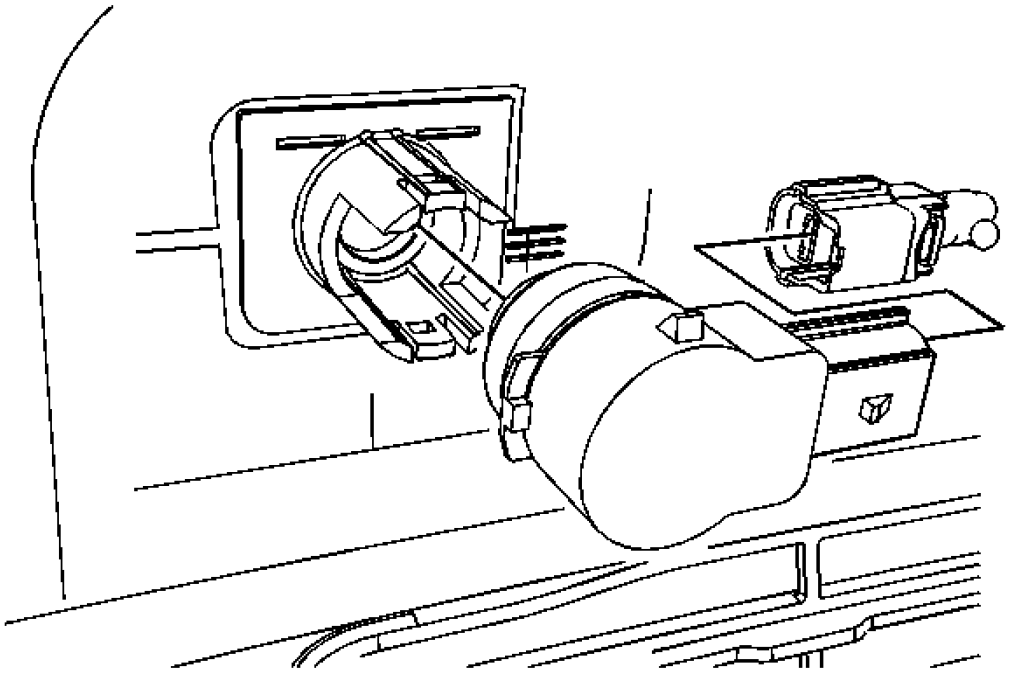


Fig. 23: Object Sensor & Housing
Courtesy of GENERAL MOTORS CORP.

8. Install the sensor to the center bracket.
9. Connect the electrical harness.
10. Install the rear fascia. Refer to **Rear Bumper Fascia Replacement**.

REAR BUMPER FASCIA REINFORCEMENT REPLACEMENT

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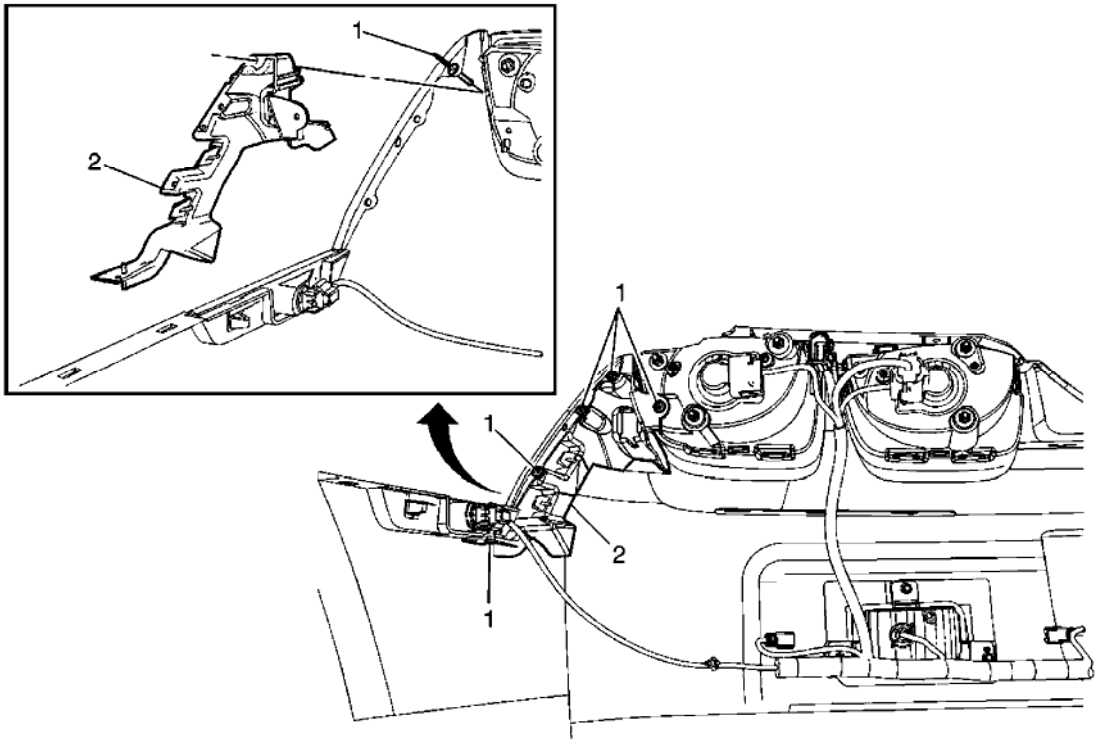


Fig. 24: Rear Bumper Fascia Reinforcement
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement**.	
1	Rear Bumper Fascia Reinforcement Rivet (Qty: 5) **WARNING:** **Eye protection must be worn when drilling rivets to reduce the chance of personal injury.**
2	Rear Bumper Fascia Reinforcement

REAR BUMPER FASCIA ENERGY ABSORBER REPLACEMENT

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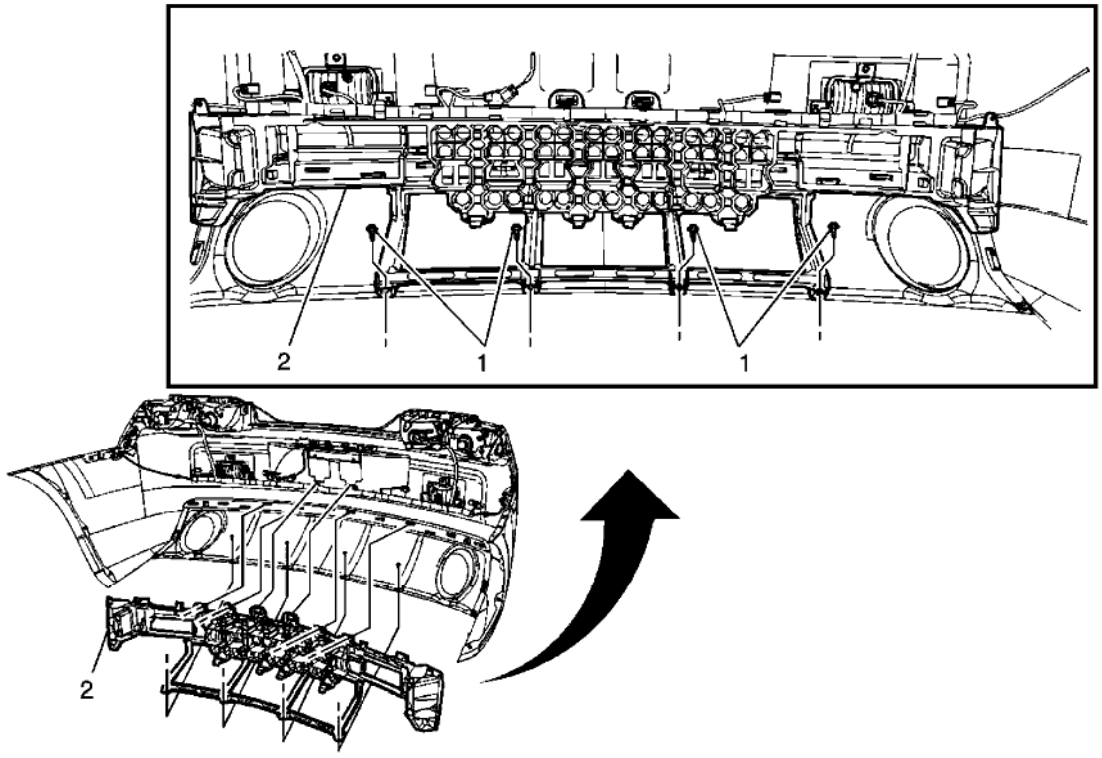


Fig. 25: Rear Bumper Fascia Energy Absorber
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement**.	
1	Rear Bumper Fascia Energy Absorber Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 10 N.m (89 lb in)
2	Rear Bumper Fascia Energy Absorber **Procedure** 1. Disconnect the electrical connectors. 2. Align the integral retaining tabs. 3. Transfer parts as needed.

REAR BUMPER IMPACT BAR REPLACEMENT

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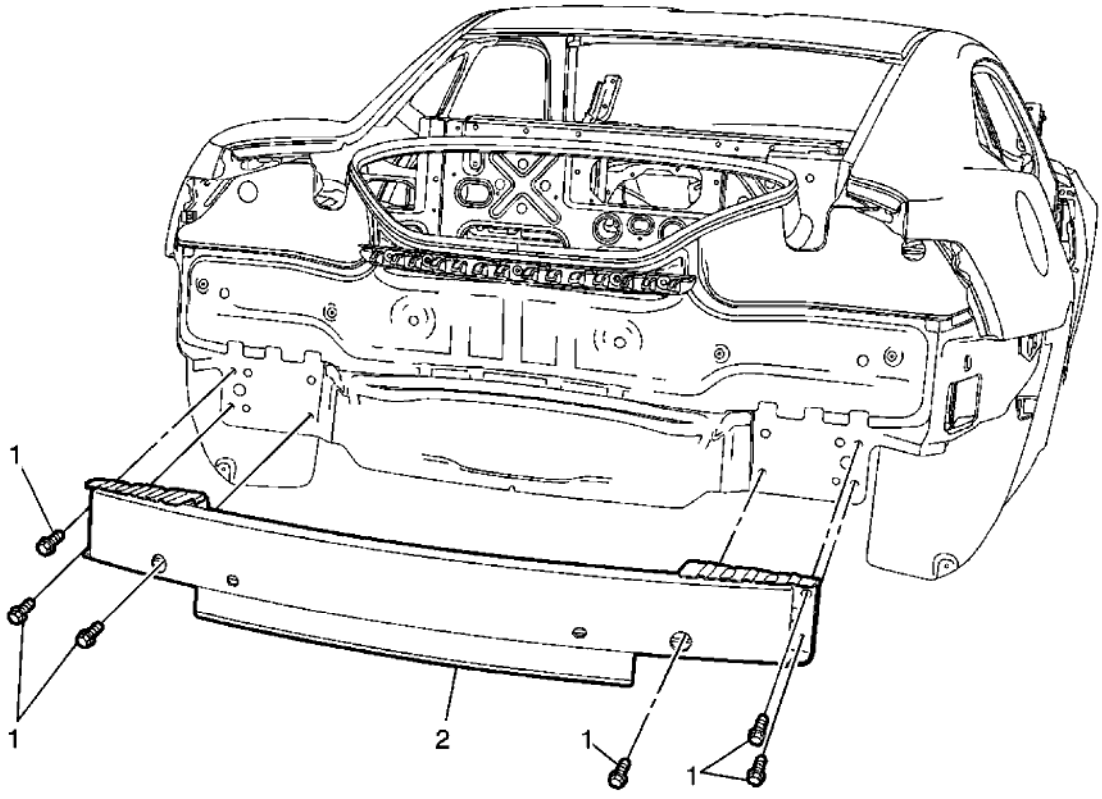


Fig. 26: Rear Bumper Impact Bar
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear fascia. Refer to **Rear Bumper Fascia Replacement**.	
1	Rear Impact Bar Bolt (Qty: 6) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 25 N.m (18 lb ft)
2	Rear Impact Bar

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Collision Repair -Camaro

VISUAL IDENTIFICATION

STRUCTURE IDENTIFICATION

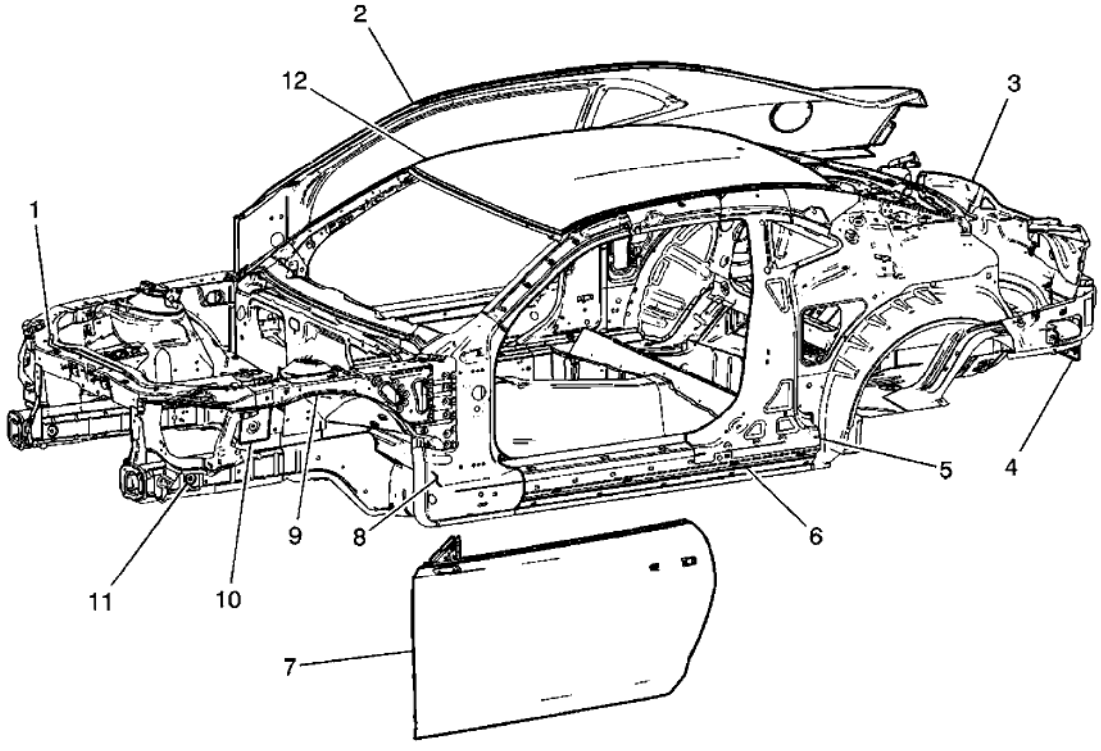


Fig. 1: Structure Identification
Courtesy of GENERAL MOTORS CORP.

Number	Description	Material	Procedure
1	Front End Uper Tie Bar Replacement	Mild Steel	Front End Upper Tie Bar Replacement
2	Outer Bodyside Panel	Mild Steel	• Front Hinge Pillar Body Sectioning • Rocker Outer Panel Sectioning
3	Rear End Panel	Mild Steel	Body Rear End Panel Replacement
4	Rear Frame Rail	High Strength Low Alloy Steel	Rail Replacement - Rear Section
5	Center Pillar Reinforcement	High Strength Low Alloy Steel	Door Frame Reinforce Sectioning - Center Pillar

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6	Rocker Inner Panel	**Ultra High Strength Steel**	**Rocker Inner Panel Reinforcement Replacement**
7	Front Outer Door Panel	**Mild Steel**	**Front Side Door Outer Panel Replacement**
8	Front Body Inner Hinge Pillar	**High Strength Low Alloy Steel**	**Body Hinge Pillar Extension Panel Replacement**
9	Front Side Rail	**High Strength Low Alloy Steel**	**Front Compartment Upper Side Rail Replacement**
10	Front Wheelhouse	**Mild Steel**	**Front Wheelhouse Panel Replacement**
11	Front Compartment Lower rail	**High Strength Low Alloy Steel**	• **Front Compartment Inner Side Rail Replacement** • **Front Compartment Inner Side Rail Sectioning** • **Underbody Outer Front Side Rail Sectioning**
12	Roof Outer	**Mild Steel**	**Roof Outer Panel Replacement**

REPAIR INSTRUCTIONS

FRONT END UPPER TIE BAR REPLACEMENT

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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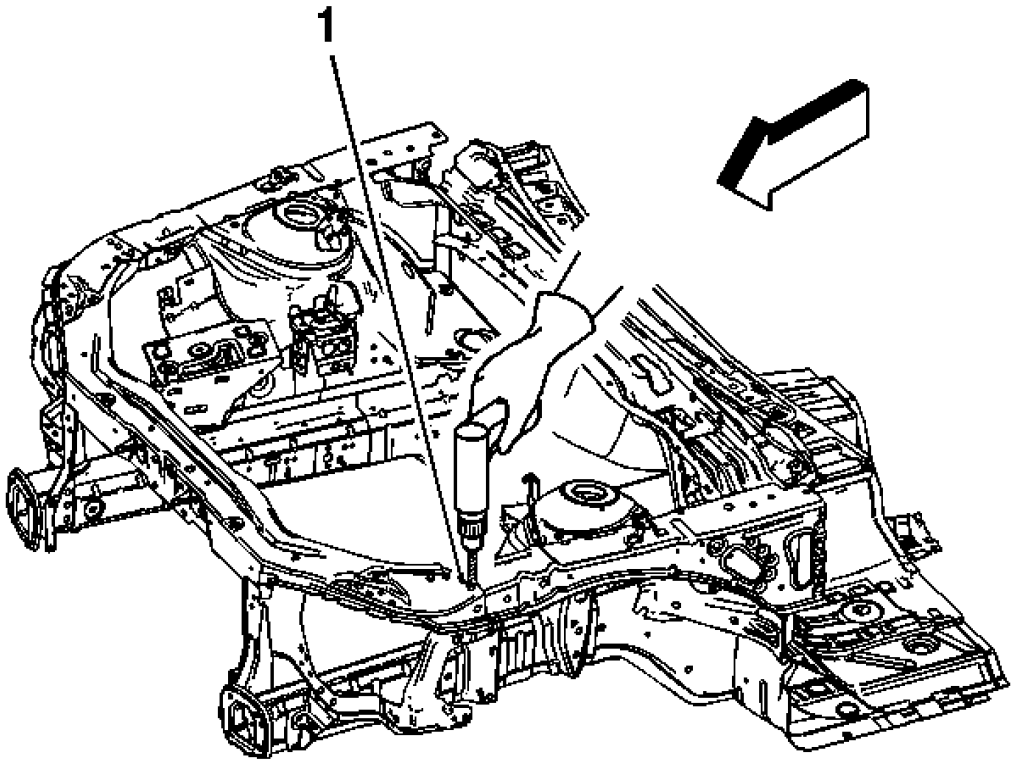


Fig. 2: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

6. Locate and drill out all factory welds (1).

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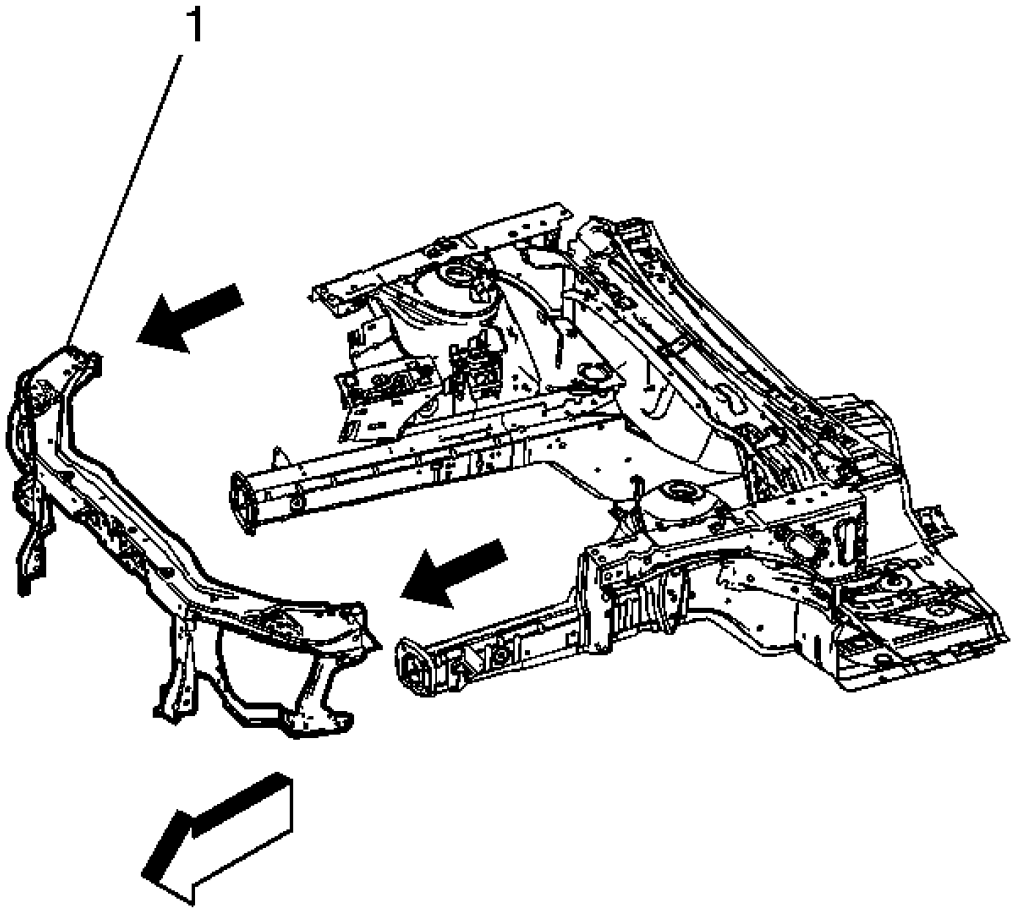


Fig. 3: Removing Damaged Front End Upper Tie Bar
Courtesy of GENERAL MOTORS CORP.

7. Remove the damaged front end upper tie bar (1).

Installation Procedure

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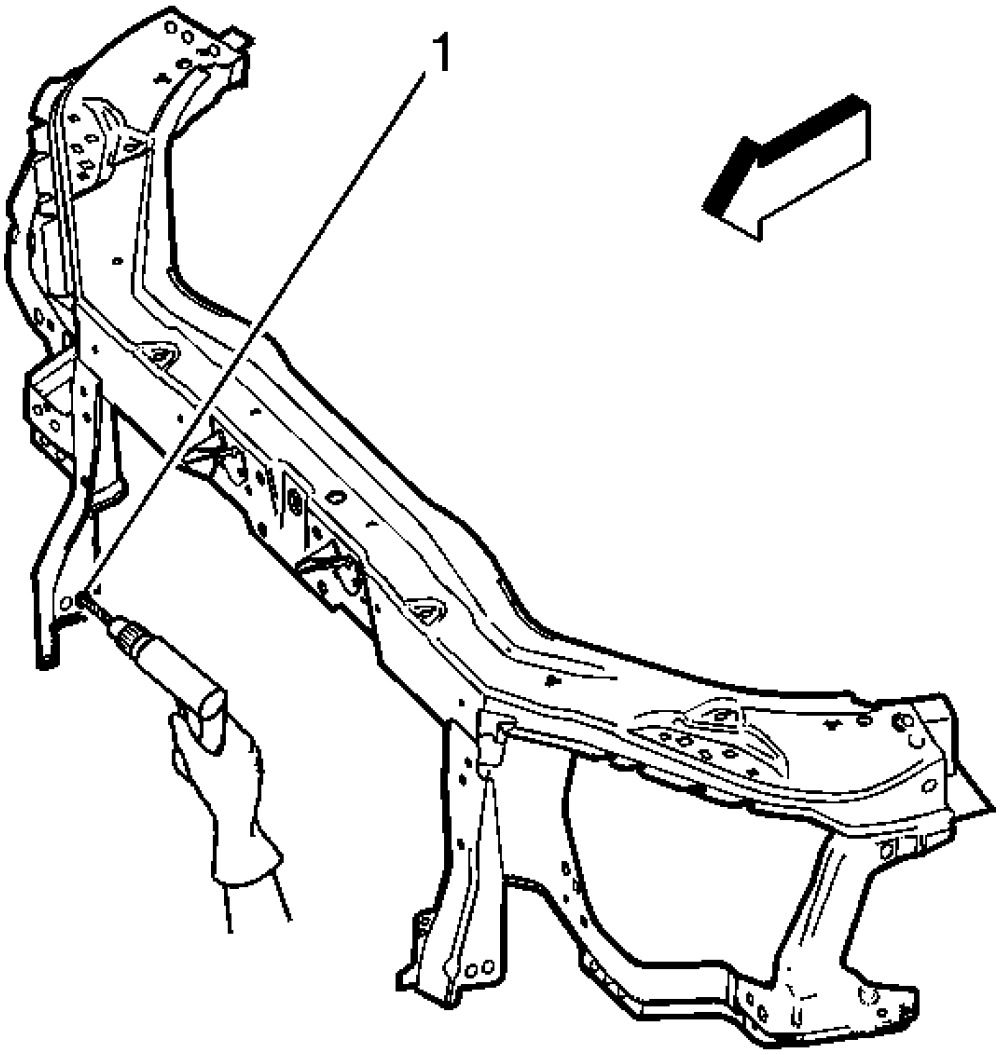


Fig. 4: Drilling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary (1), in the locations noted from the original panel.
2. Prepare all attachment surfaces as necessary.

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3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

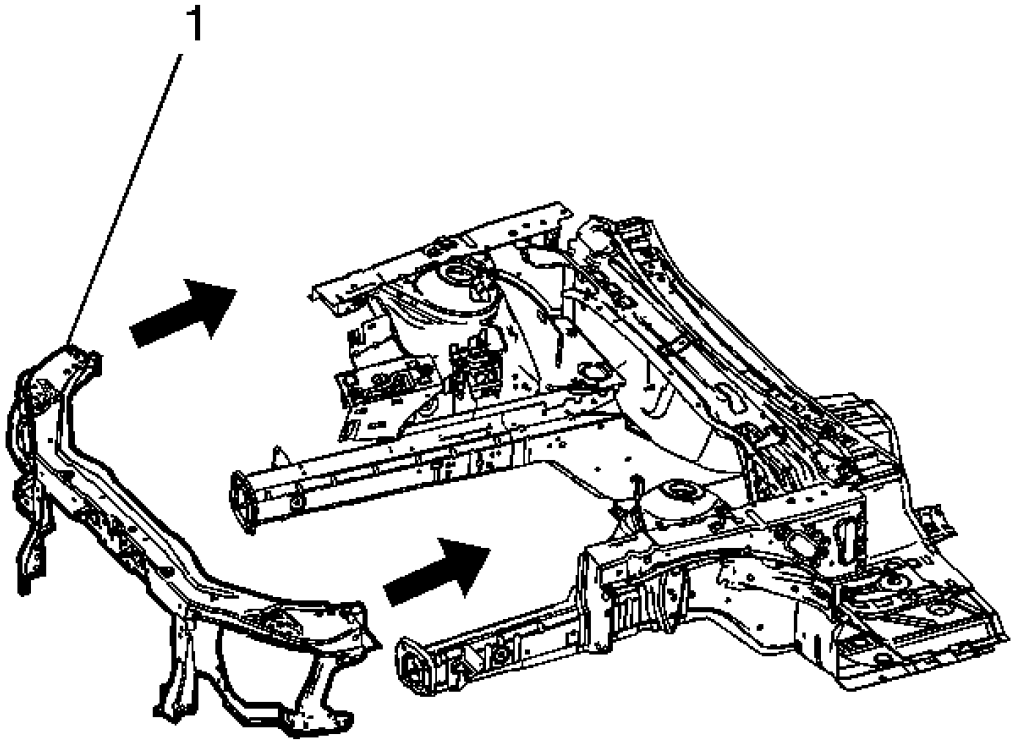


Fig. 5: Positioning Front End Upper Tie Bar
Courtesy of GENERAL MOTORS CORP.

4. Position the new front end upper tie bar (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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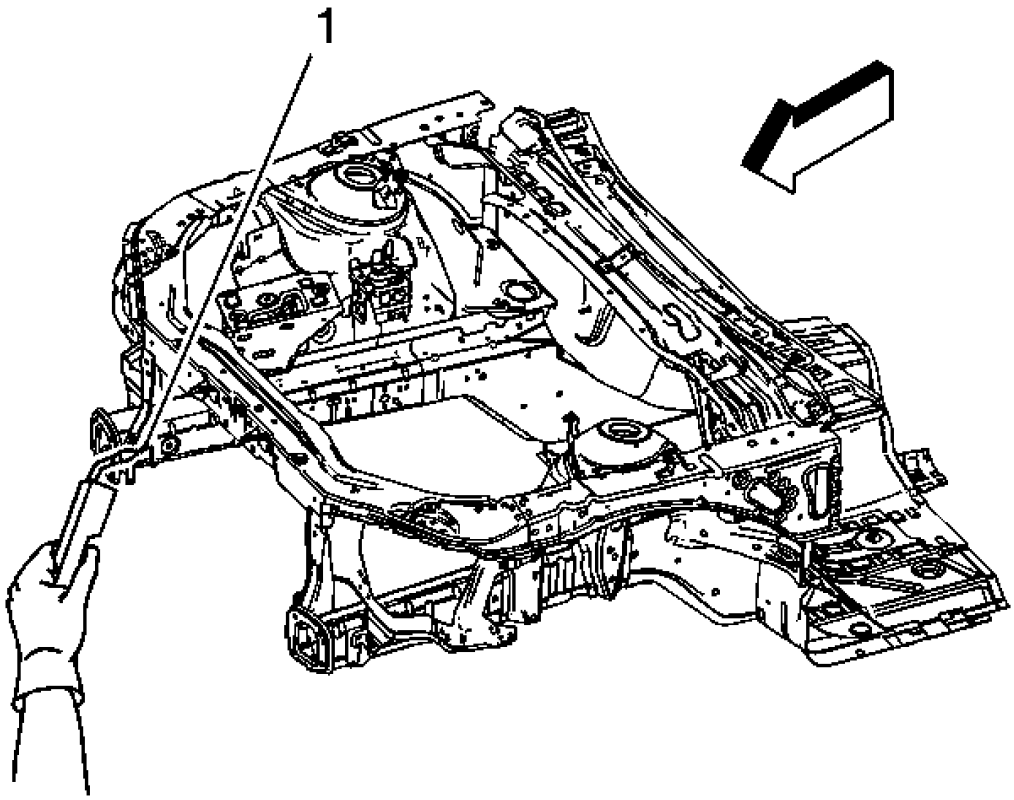


Fig. 6: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT WHEELHOUSE PANEL REPLACEMENT

Removal Procedure

WARNING: Refer to Collision Sectioning Warning

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WARNING: Refer to Approved Equipment for Collision Repair Warning

WARNING: Refer to Glass and Sheet Metal Handling Warning

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

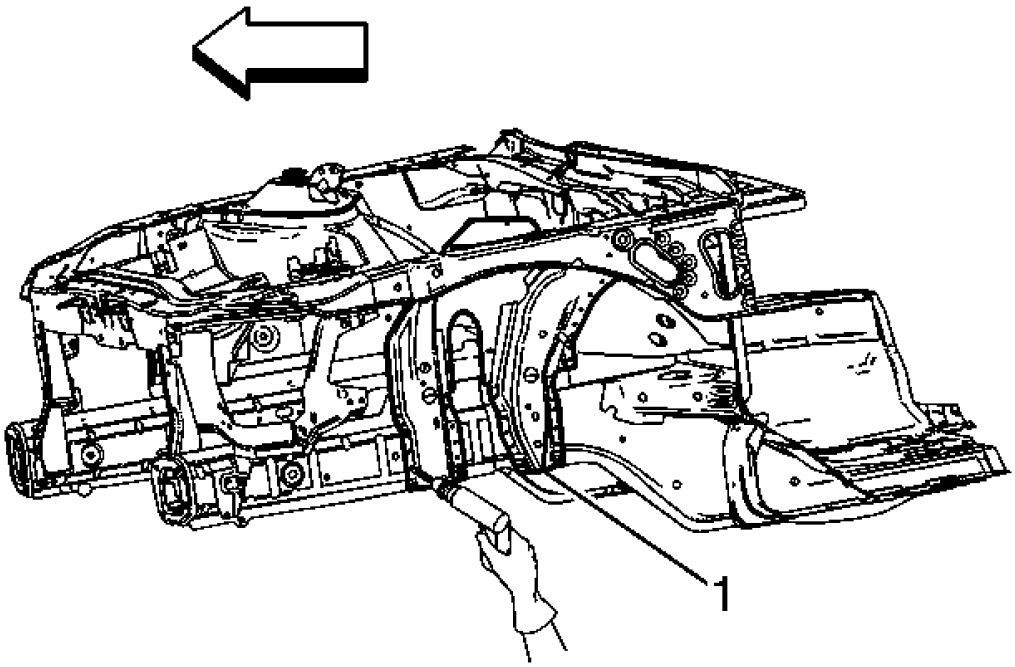


Fig. 7: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

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NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

6. Locate and drill out all factory welds (1).

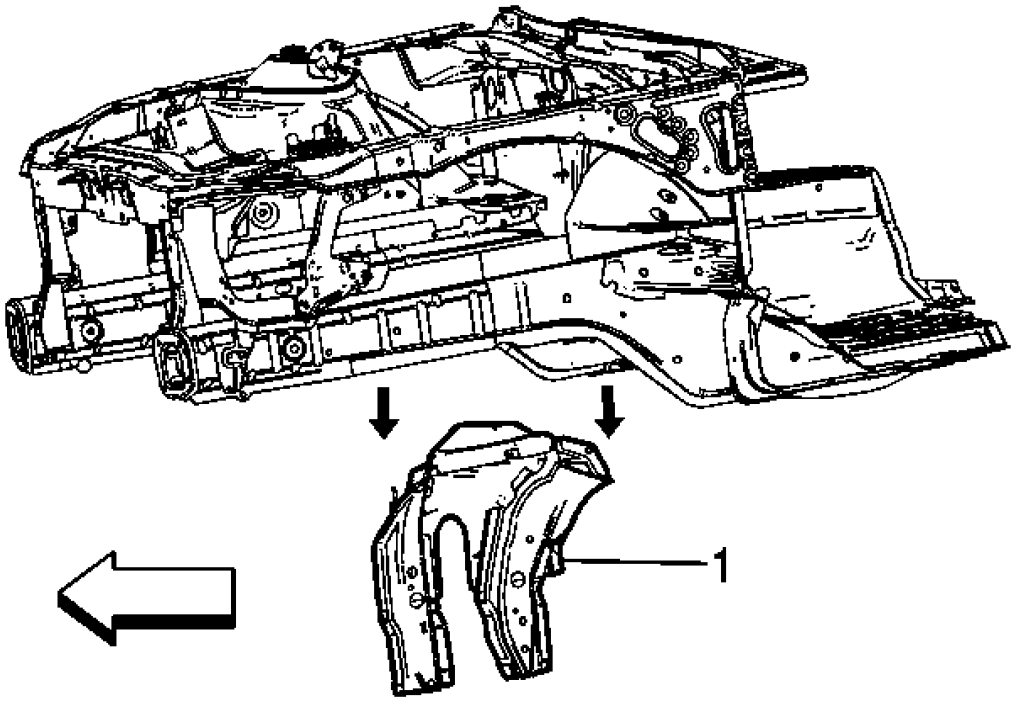


Fig. 8: Removing Damaged Front Wheel House
Courtesy of GENERAL MOTORS CORP.

7. Remove the damaged front wheel house (1).

Installation Procedure

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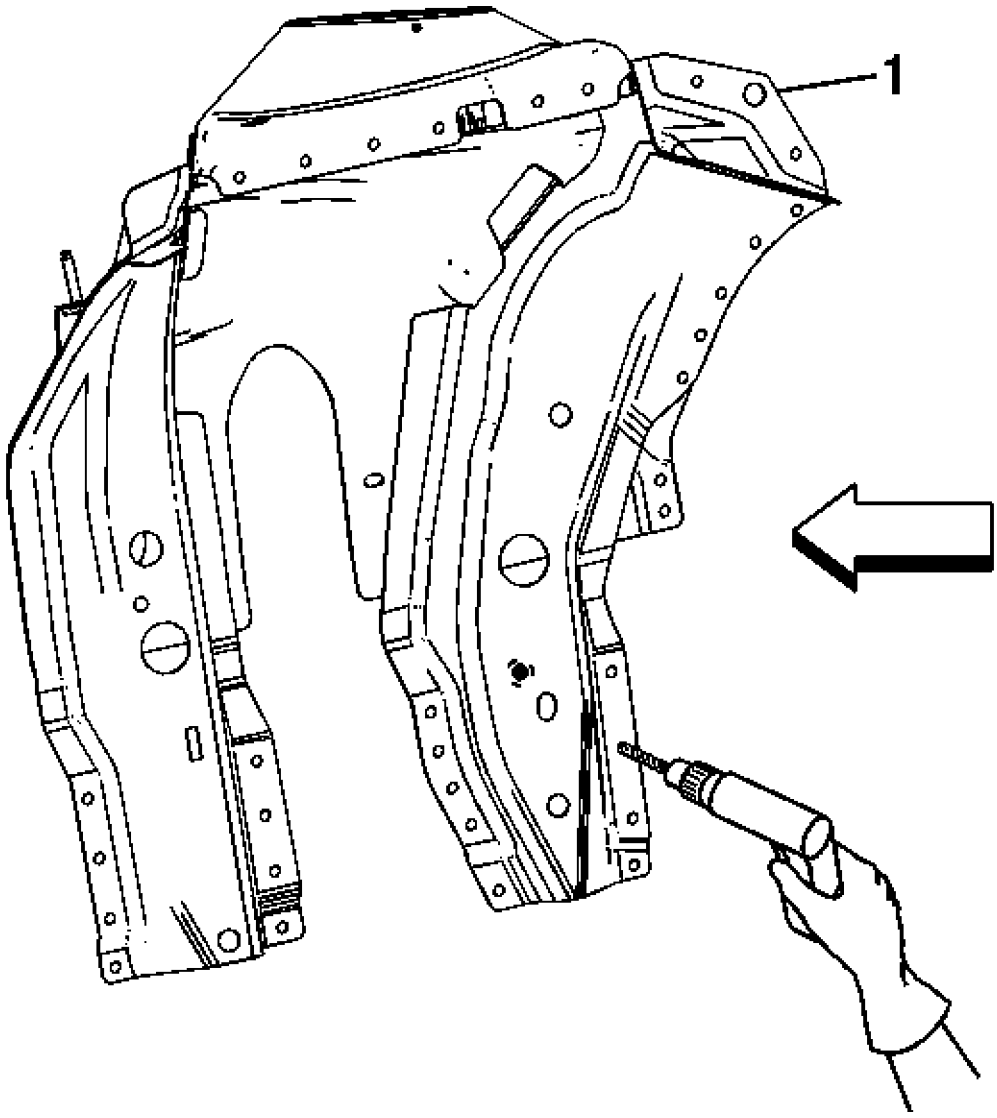


Fig. 9: Drilling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the

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original panel (1).

2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

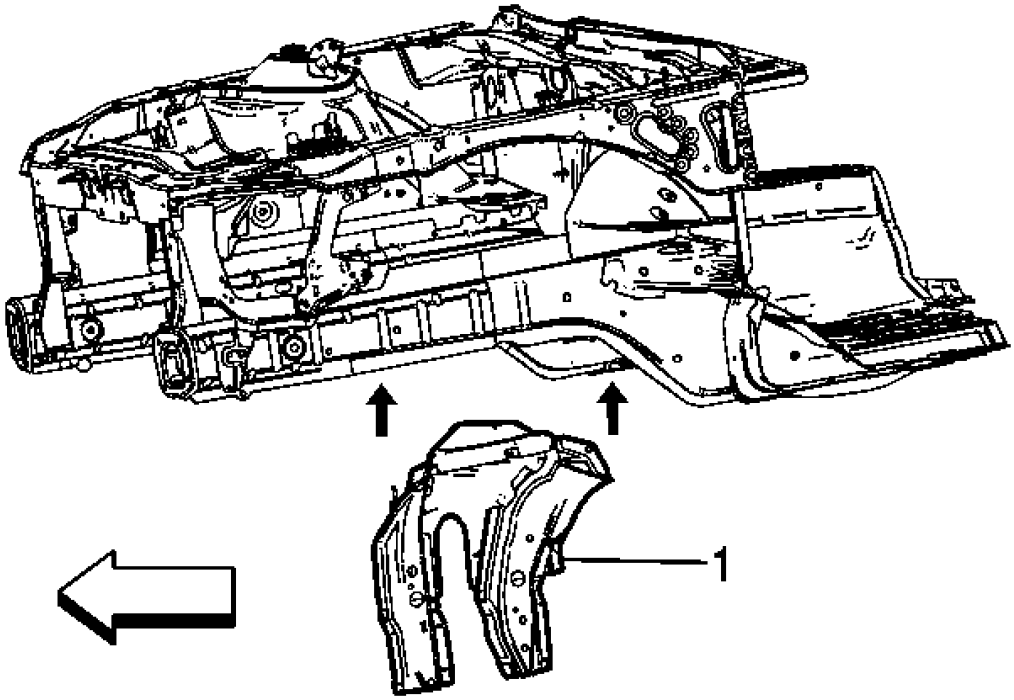


Fig. 10: Positioning Front Wheel House
Courtesy of GENERAL MOTORS CORP.

4. Position the new front wheel house (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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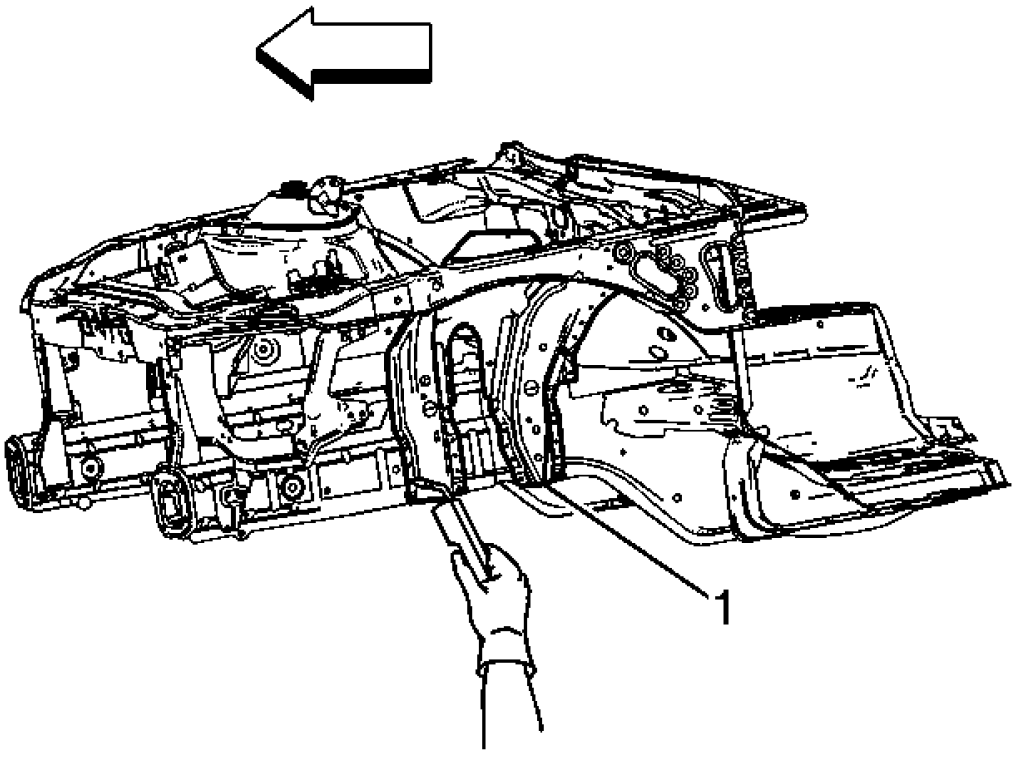


Fig. 11: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT COMPARTMENT UPPER SIDE RAIL REPLACEMENT

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

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WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
6. Perform the necessary procedures to gain access to the repair. Refer to **Front Compartment Upper Side Rail Replacement**.

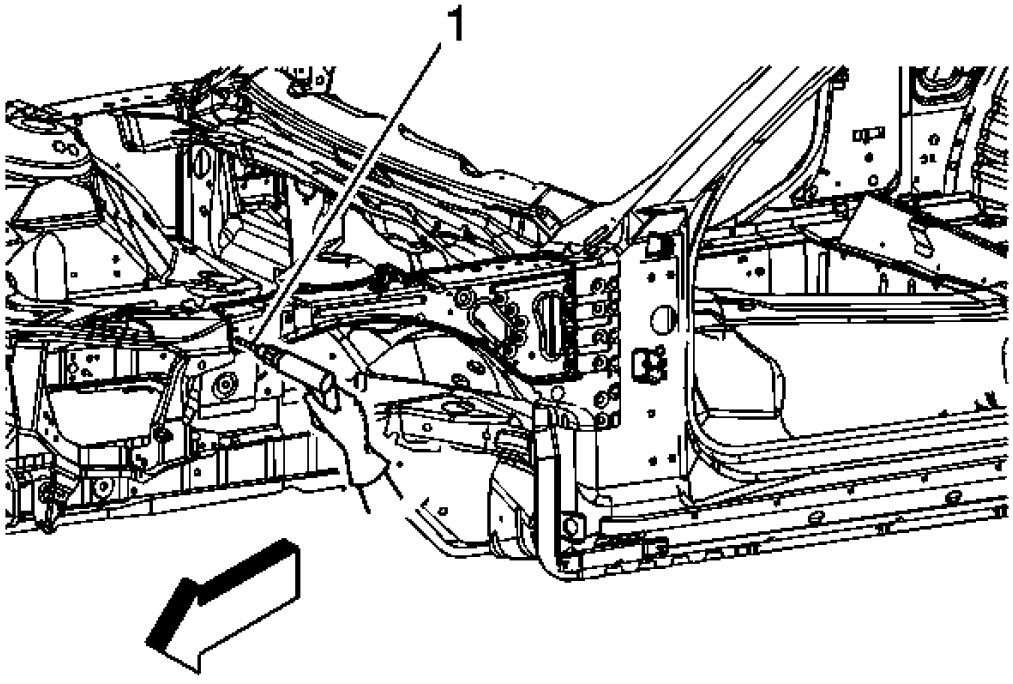


Fig. 12: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

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NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

7. Locate and drill out all factory welds (1).
8. Remove the Upper Side Rail.

Installation Procedure

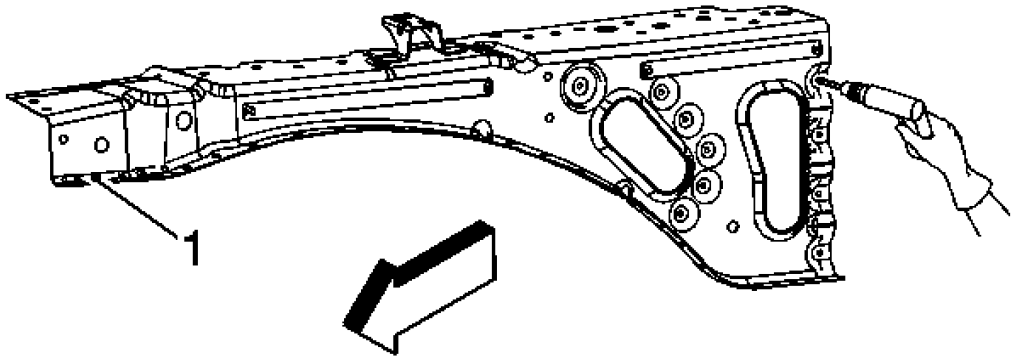


Fig. 13: Drilling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel (1).
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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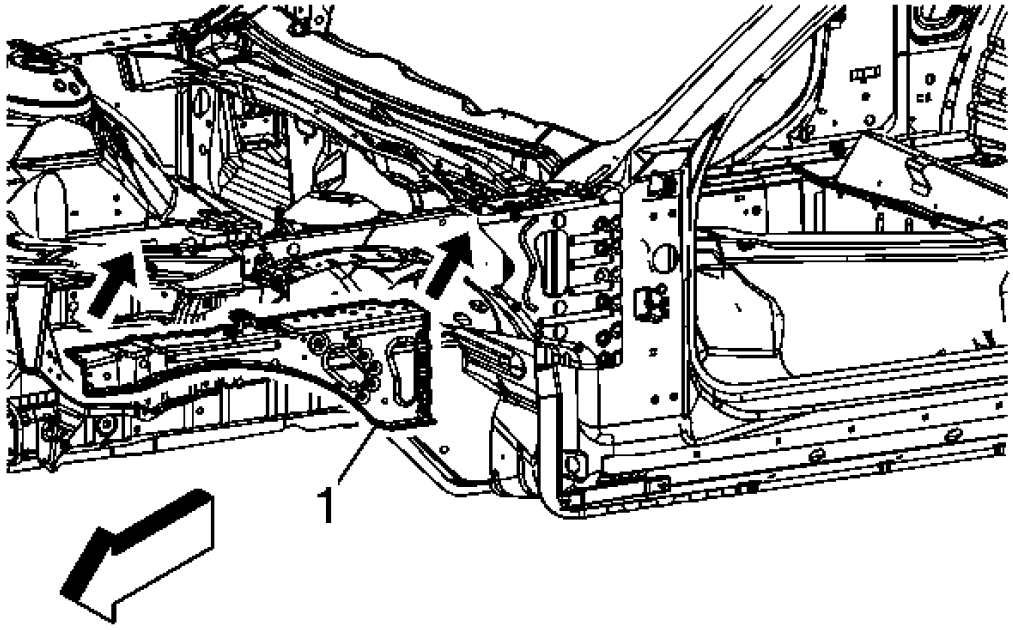


Fig. 14: Positioning Upper Side Rail
Courtesy of GENERAL MOTORS CORP.

4. Position the Upper Side Rail (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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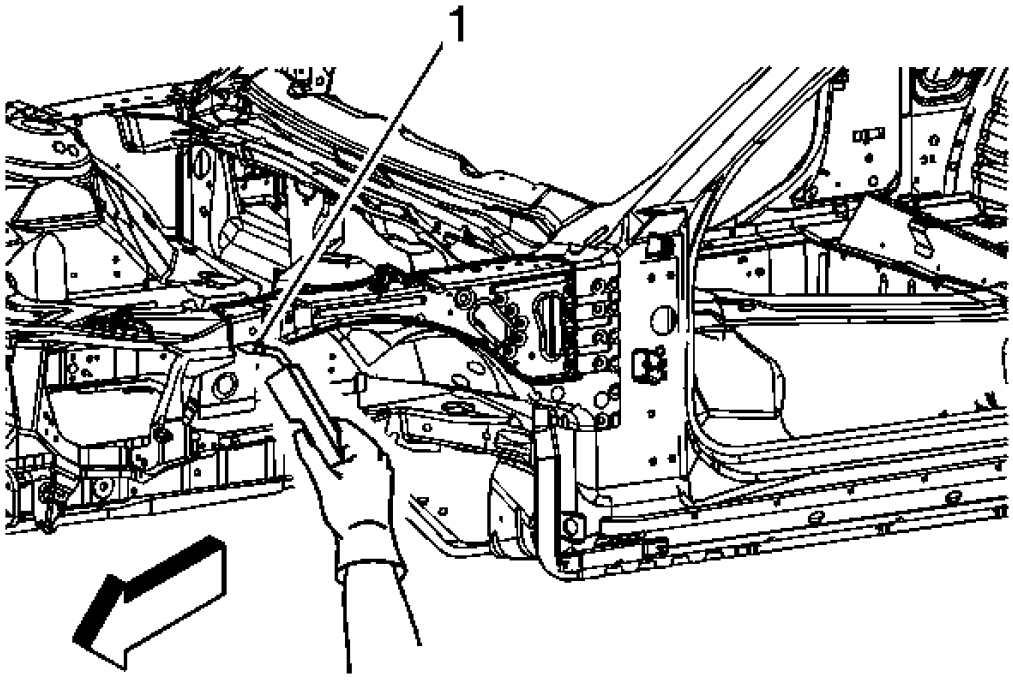


Fig. 15: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT COMPARTMENT INNER SIDE RAIL REPLACEMENT

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

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WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

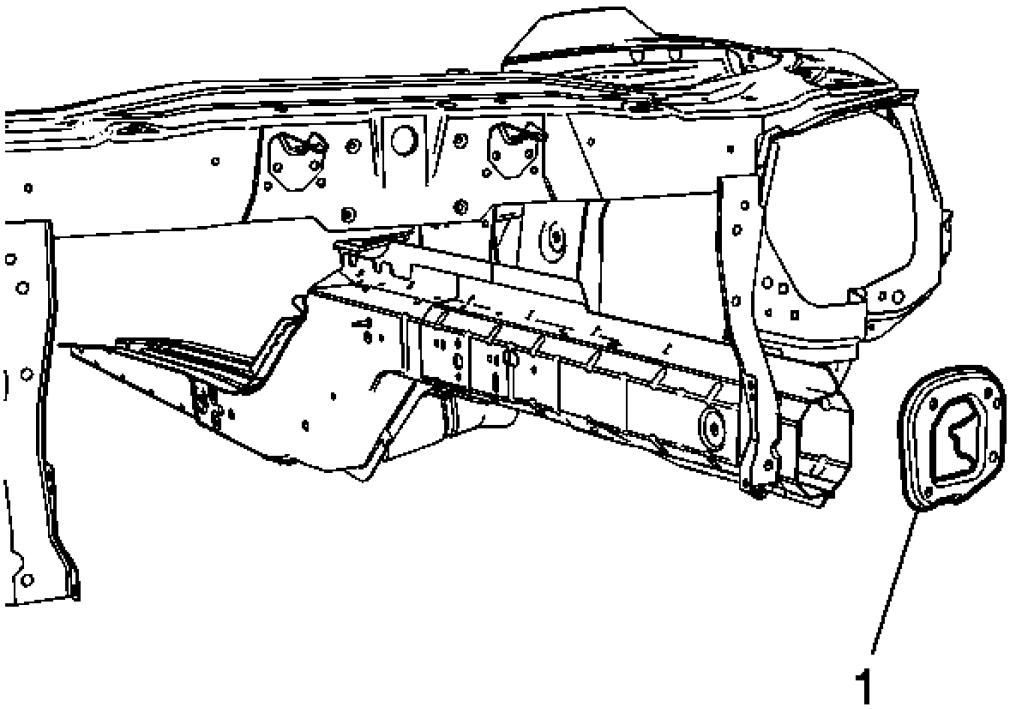


Fig. 16: Front Bumper Bracket
Courtesy of GENERAL MOTORS CORP.

6. Remove the Front Bumper Bracket (1).

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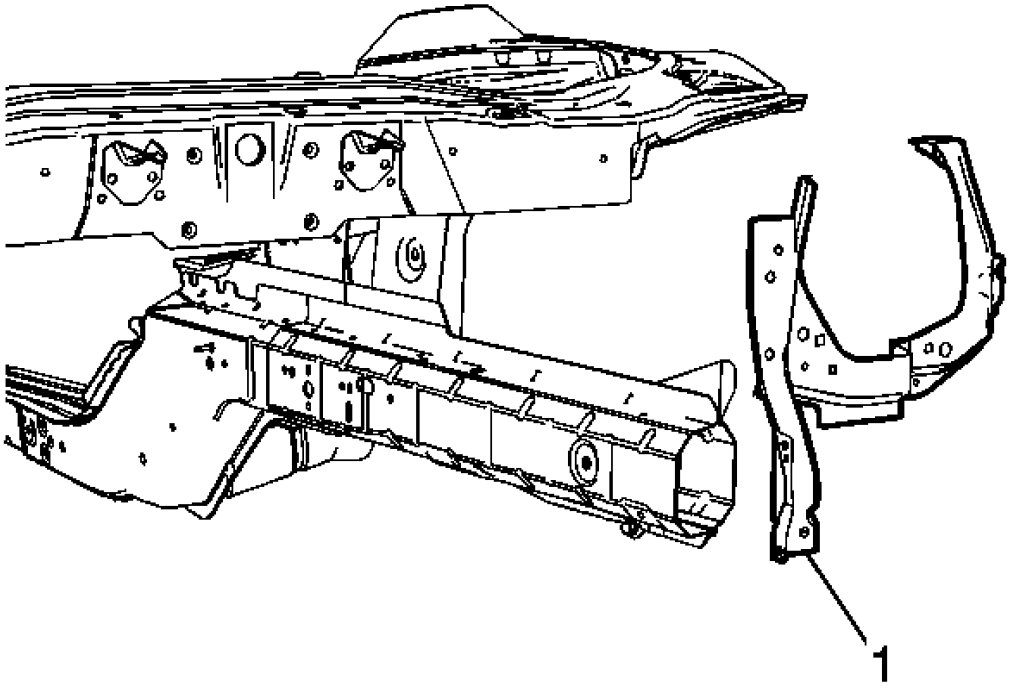


Fig. 17: Upper Tie Bar Reinforcement
Courtesy of GENERAL MOTORS CORP.

7. Remove the Upper Tie Bar Reinforcement (1).

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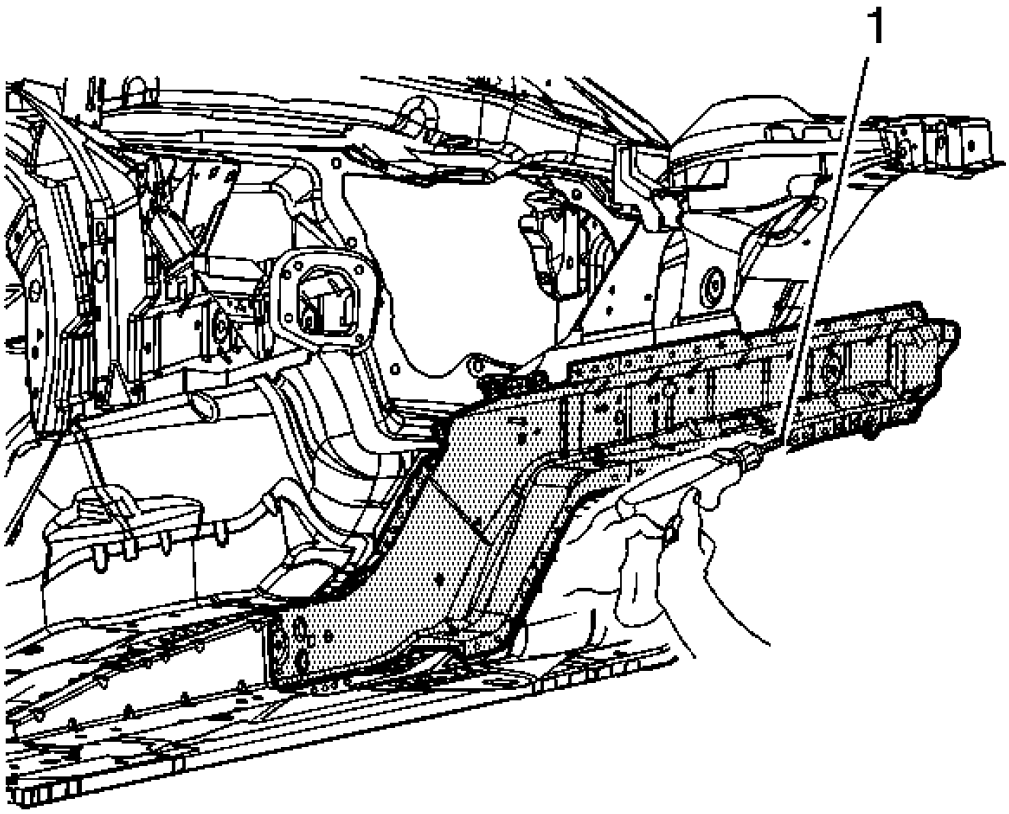


Fig. 18: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements.

8. Locate and drill out all factory welds (1). Note the number and location of the welds for installation of the Inner Side Rail.
9. Using a chisel or equivalent Separate the Inner Rail form the Outer Rail and Extension.

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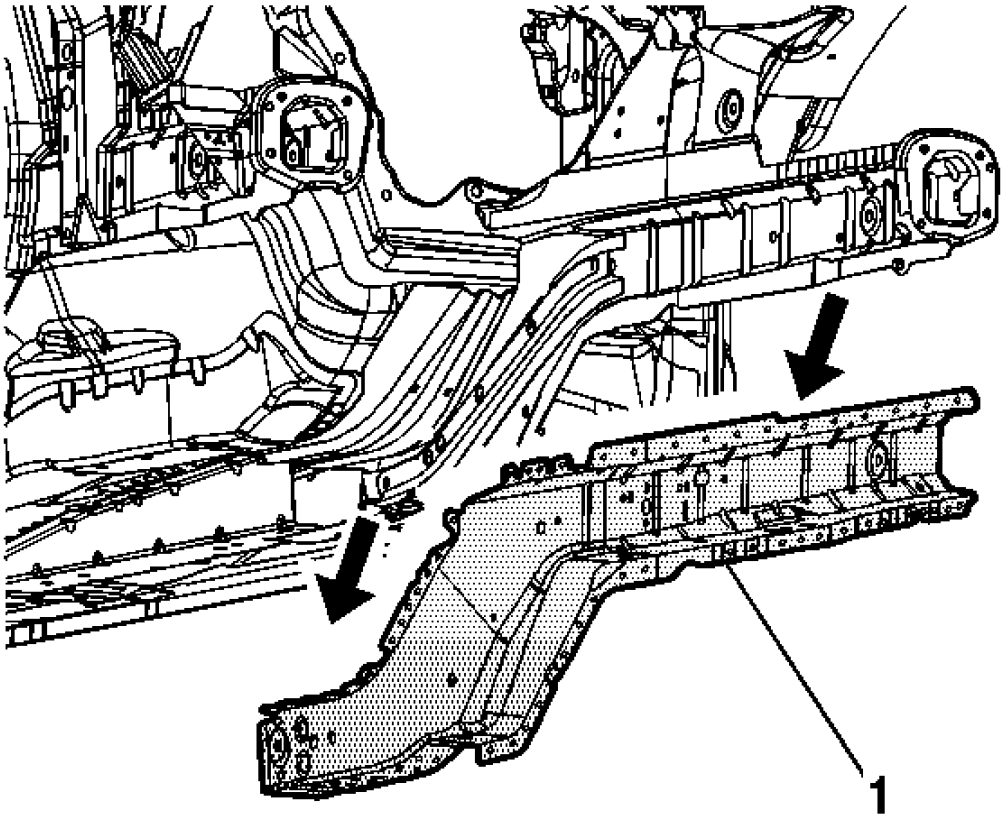


Fig. 19: Removing Inner Side Rail
Courtesy of GENERAL MOTORS CORP.

10. Remove the Inner Side Rail (1).

Installation Procedure

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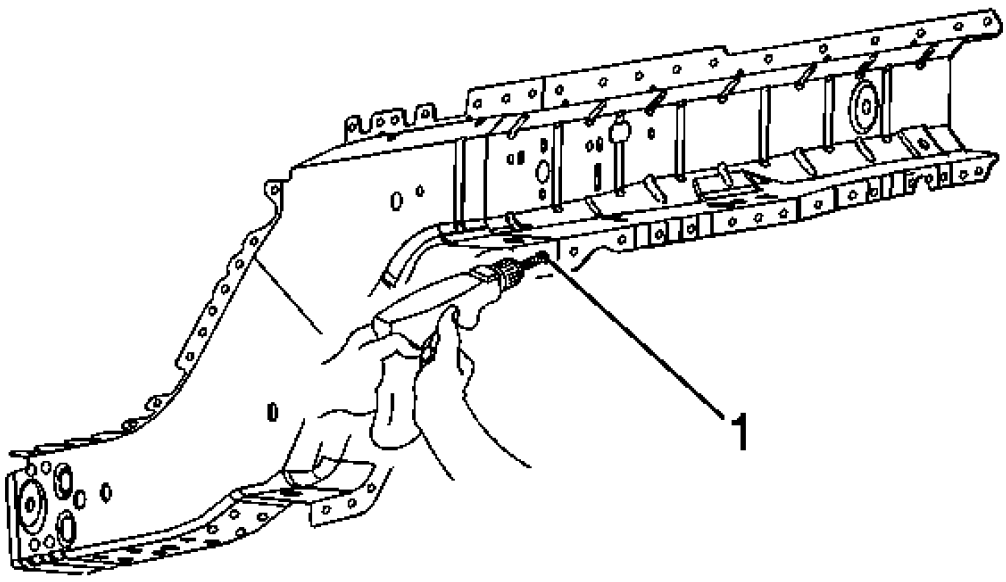


Fig. 20: Drilling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel (1).
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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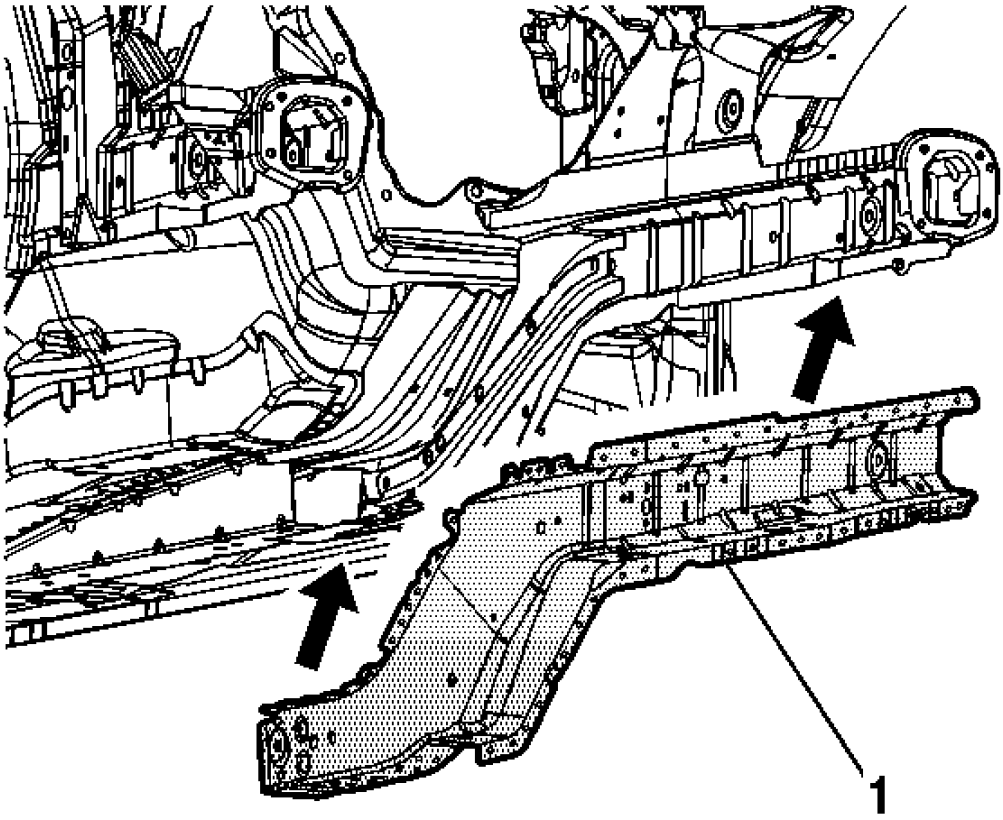


Fig. 21: Positioning Inner Side Rail
Courtesy of GENERAL MOTORS CORP.

4. Position the Inner Side Rail (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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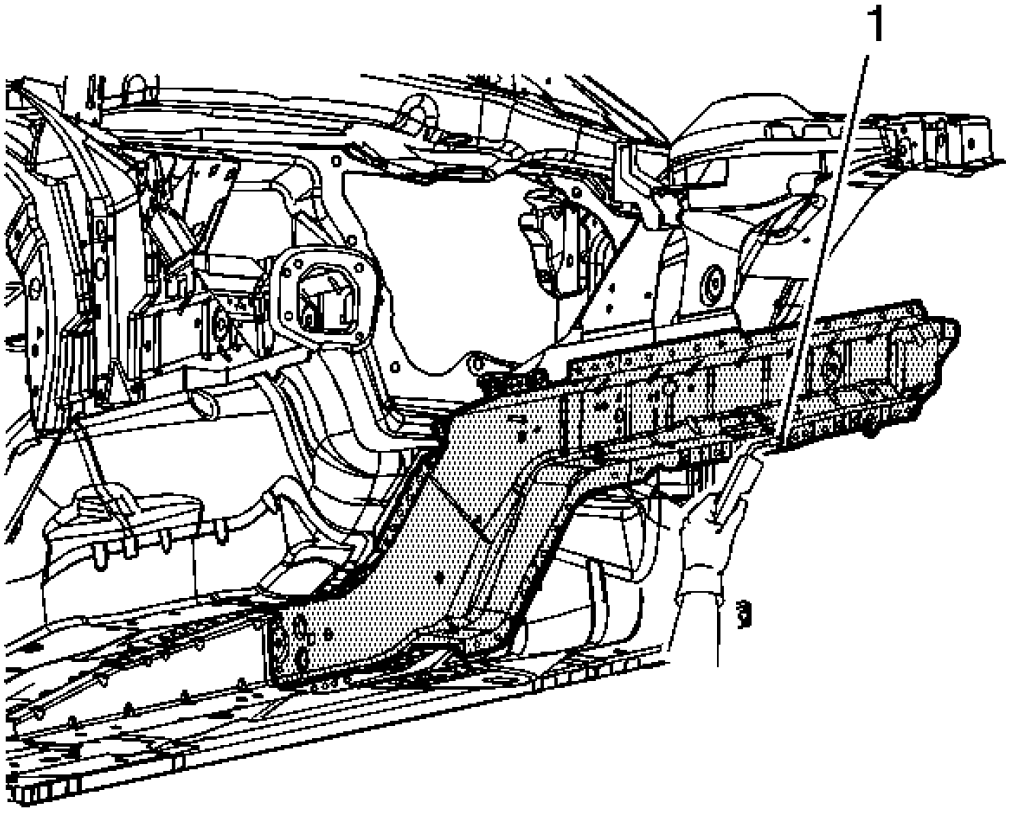


Fig. 22: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT COMPARTMENT INNER SIDE RAIL SECTIONING

Removal Procedure

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The front lower inner rail can be replaced at factory seams, refer to **Front Compartment Inner Side Rail Replacement**, but requires the removal of the engine, transmission and front suspension. The sectioning procedure has been developed as a more cost-effective alternative to complete replacement.

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

WARNING: Refer to Collision Sectioning Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components to gain access to the repair.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.

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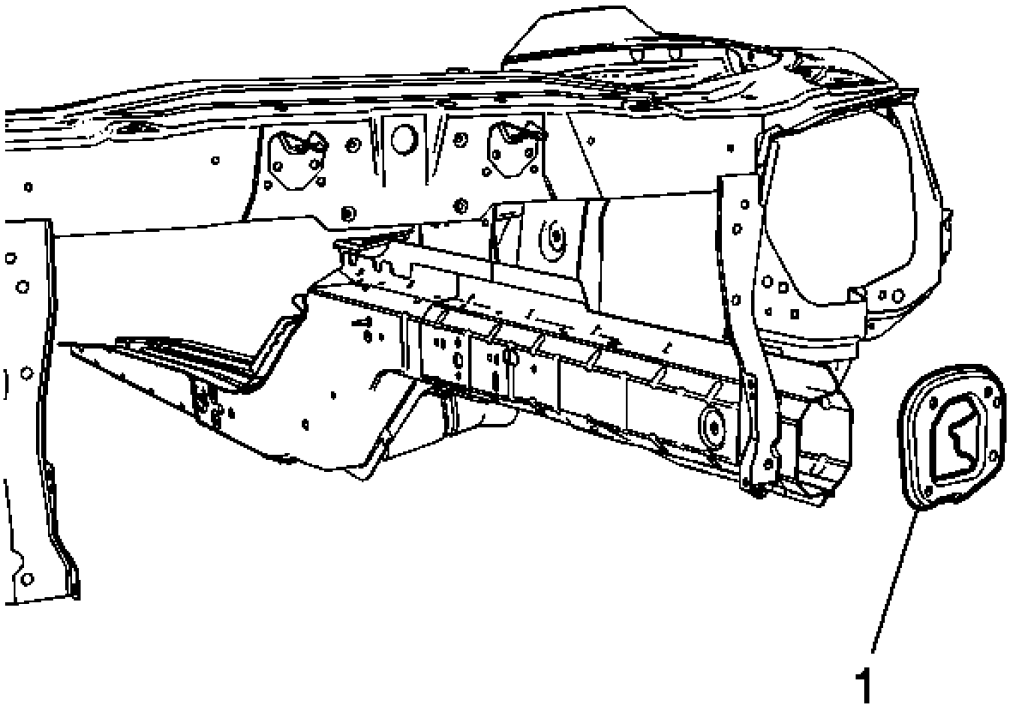


Fig. 23: Front Bumper Bracket
Courtesy of GENERAL MOTORS CORP.

5. Remove front bumper bracket (1).

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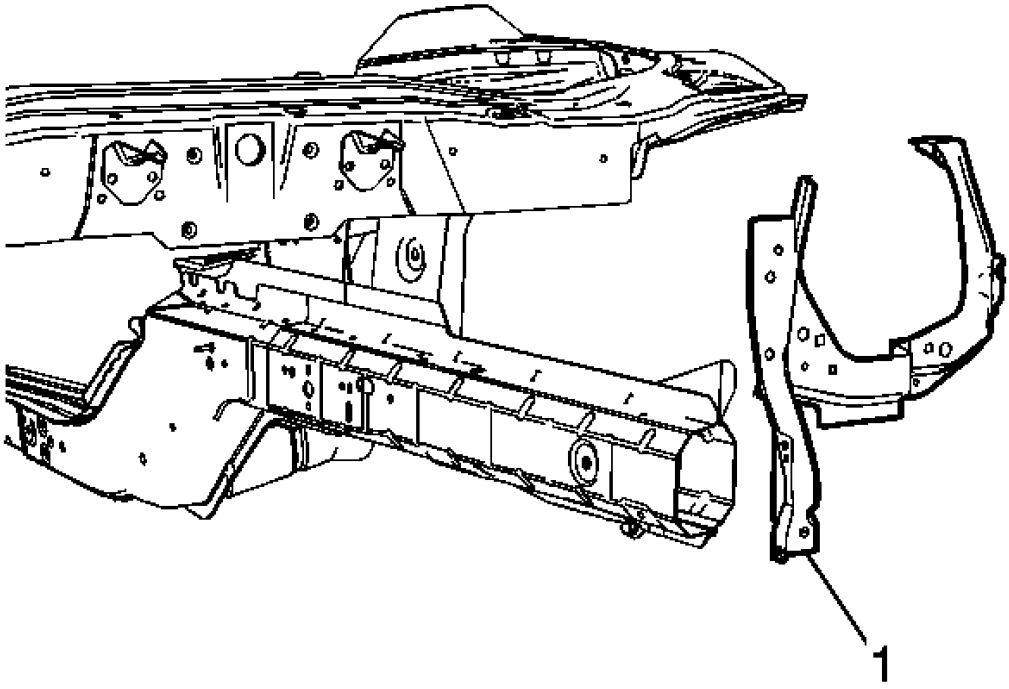


Fig. 24: Upper Tie Bar Reinforcement
Courtesy of GENERAL MOTORS CORP.

6. Remove upper tie bar reinforcement (1).

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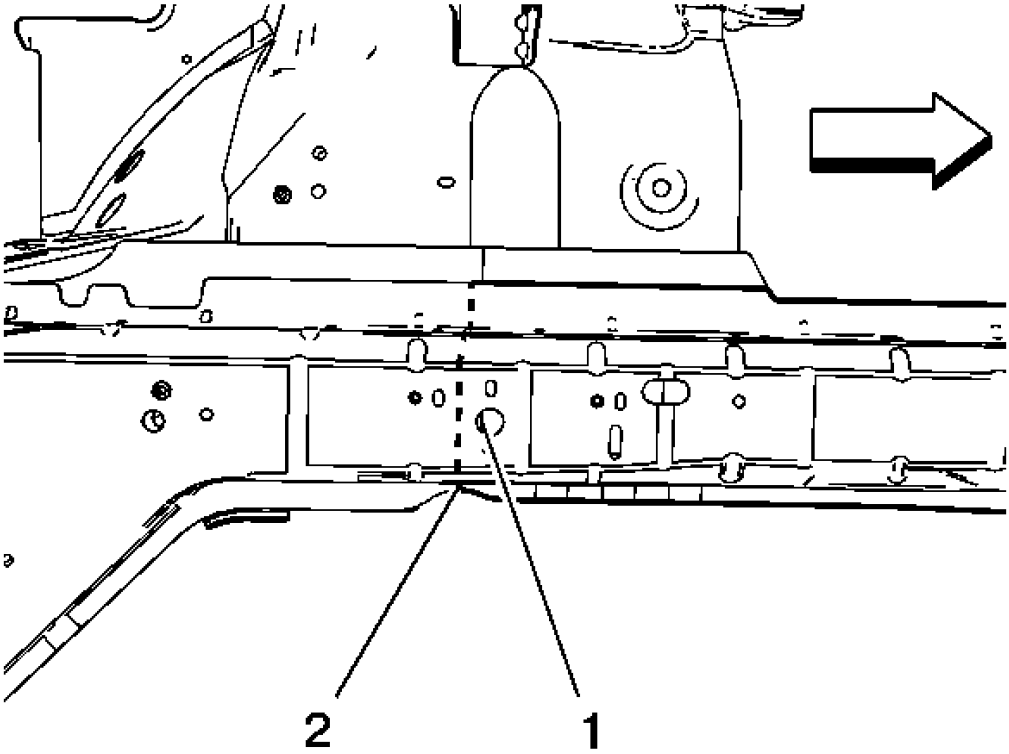


Fig. 25: Locating Horizontal Line
Courtesy of GENERAL MOTORS CORP.

7. Measure 13 mm (0.5 in) rearward from 21 mm (0.8 in) gauge hole (1) and scribe a horizontal line (2).

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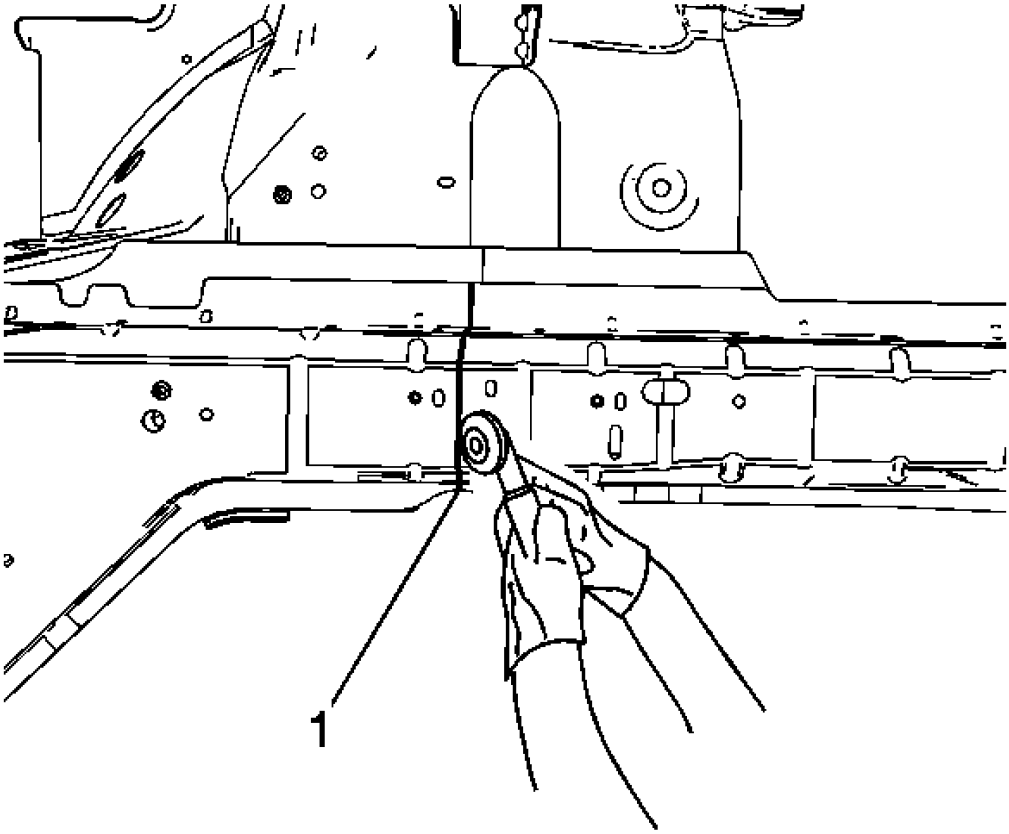


Fig. 26: Cutting Panel
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements.

8. Cut the panel where sectioning is to be performed (1).

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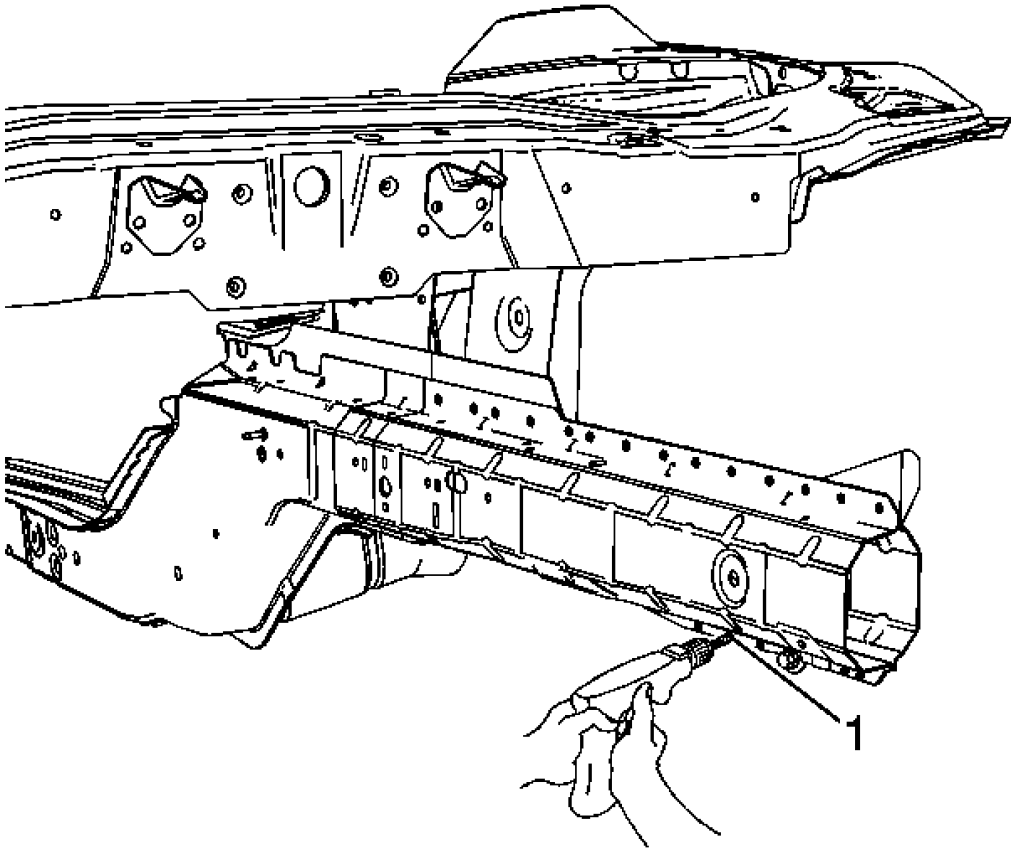


Fig. 27: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Record the number and location of the original welds for installation of the service part.

9. Locate and drill out all factory welds (1).

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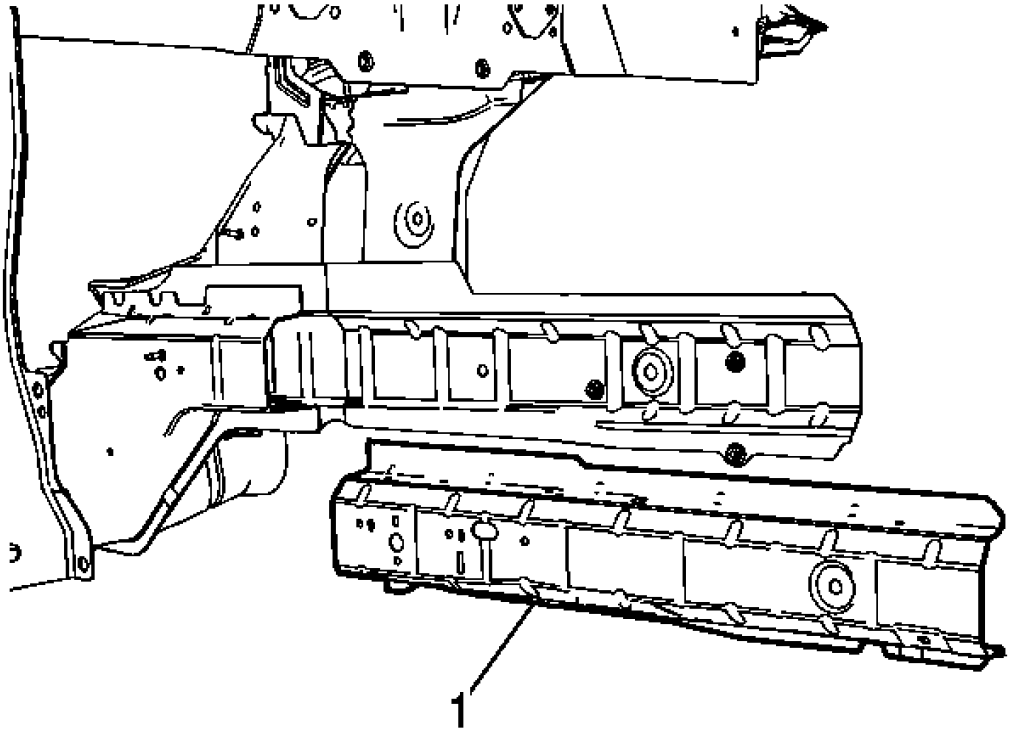


Fig. 28: Removing Damaged Front Lower Rail
Courtesy of GENERAL MOTORS CORP.

10. Remove the damaged front lower rail (1).

Installation Procedure

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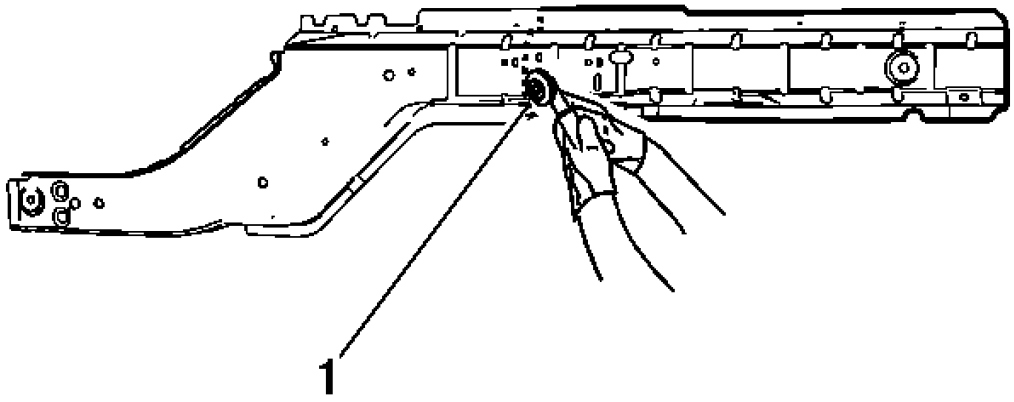


Fig. 29: Cutting Replacement Front Lower Rail
Courtesy of GENERAL MOTORS CORP.

1. Cut the replacement front lower rail in corresponding locations to fit the original panel (1). The sectioning joint should be trimmed to allow 1.5 times the metal thickness at the sectioning joint.

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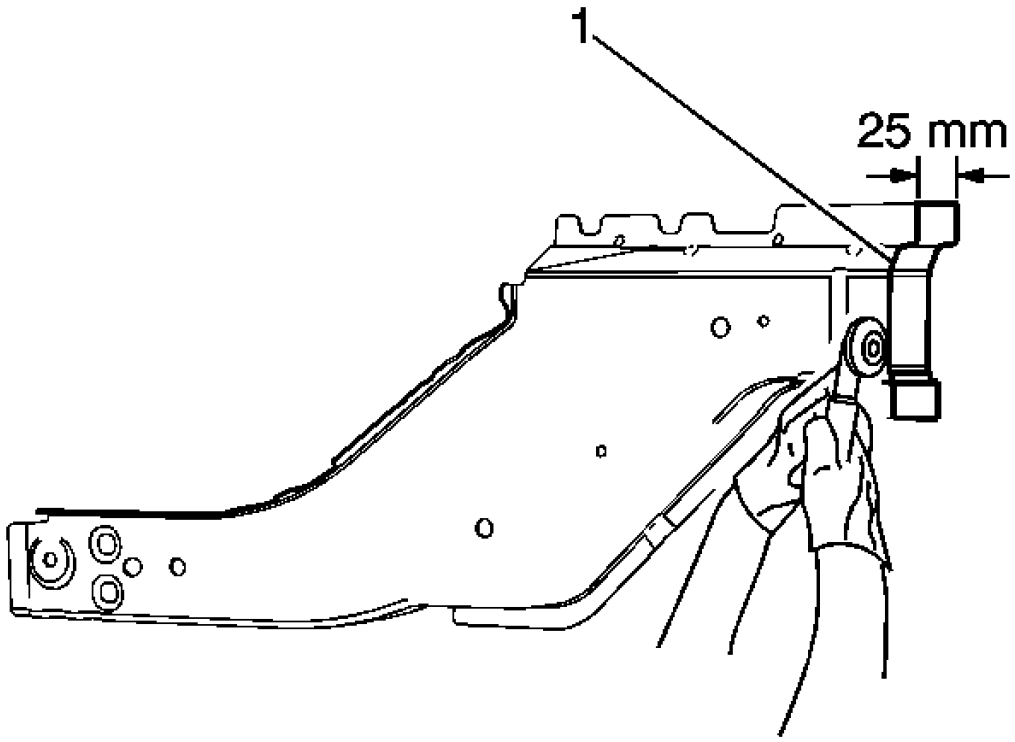


Fig. 30: Creating Backing Plate
Courtesy of GENERAL MOTORS CORP.

2. Create a 25 mm (1.0 in) backing plate from the unused portion of the service part (1). Trim the backing plate as necessary to fit behind the sectioning joint.

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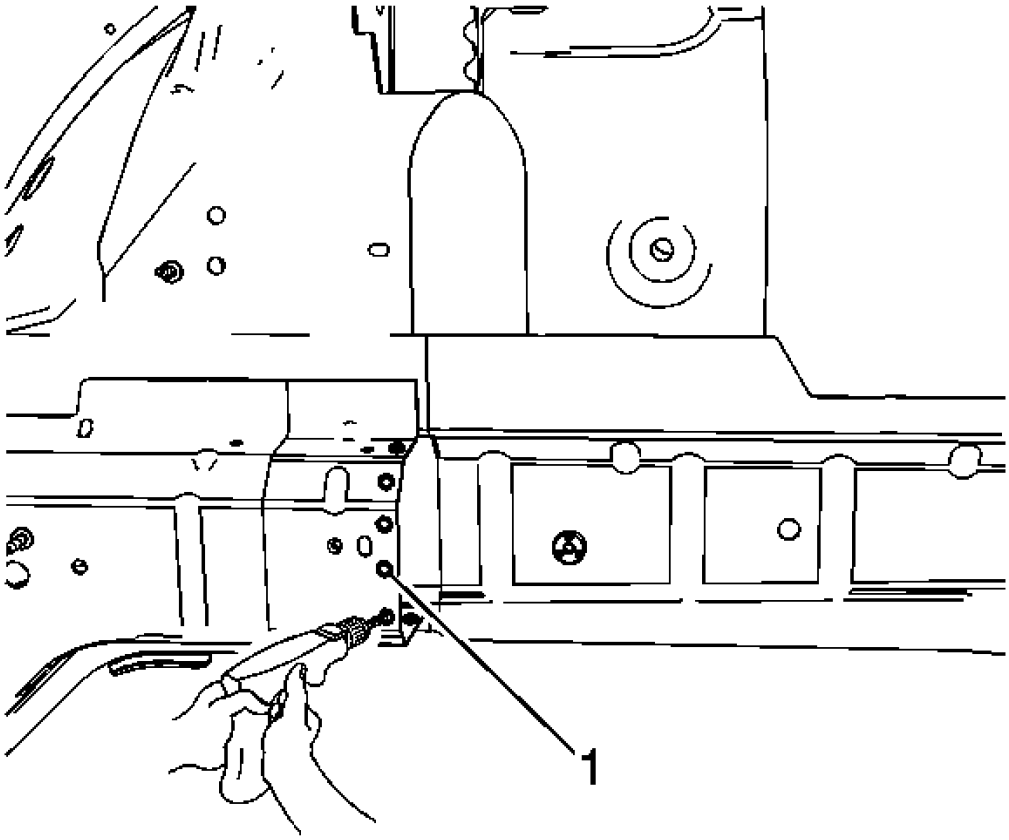


Fig. 31: Drilling Plug Weld Holes On Original Part
Courtesy of GENERAL MOTORS CORP.

3. Drill 8 mm plug weld holes along the sectioning cut on the remaining original part (1). Space these holes 40 mm (1.5 in) apart.

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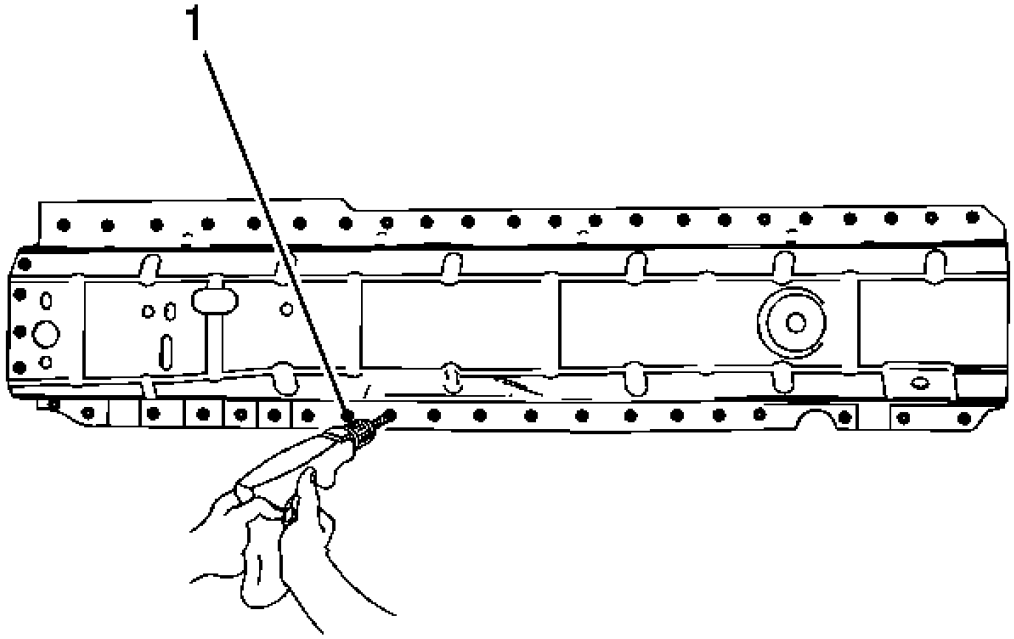


Fig. 32: Drilling Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: In any area damaged beyond recognition, space plug weld holes every 40 mm (1.5 in) apart.

4. Drill 8 mm plug weld holes in the service part as necessary in the locations noted from the original panel and along the sectioning cut (1).
5. Prepare all attached surfaces as necessary for welding.
6. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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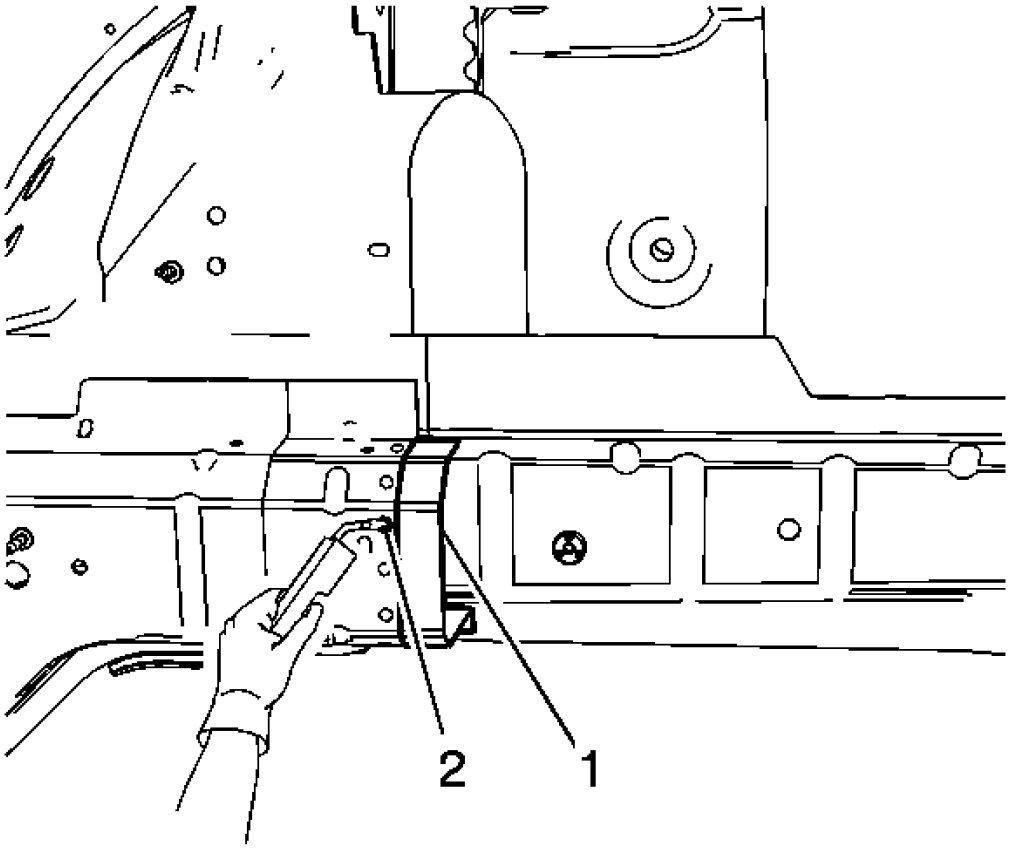


Fig. 33: Fitting Backing Plate
Courtesy of GENERAL MOTORS CORP.

7. Fit the backing plate halfway into the sectioning joint (1), clamp and plug weld to the vehicle (2).

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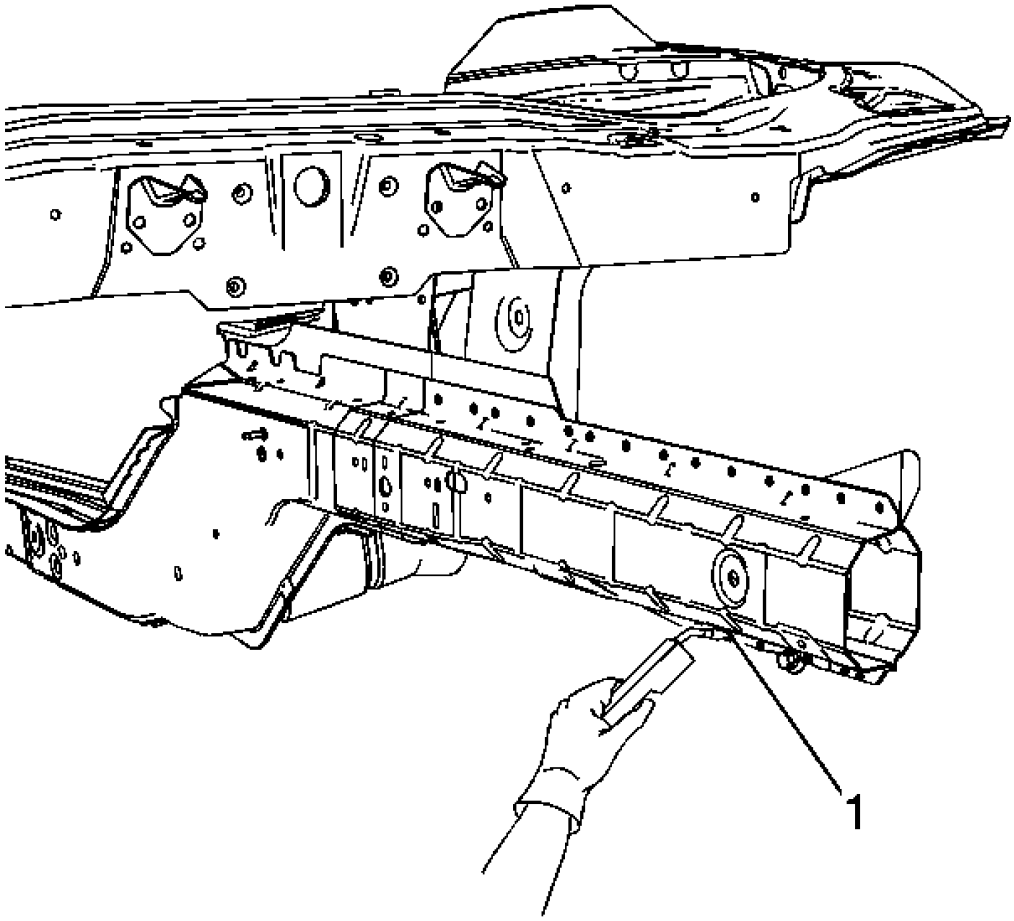


Fig. 34: Plug Welding
Courtesy of GENERAL MOTORS CORP.

8. Position the service front lower rail to the vehicle.
9. Plug weld accordingly (1).

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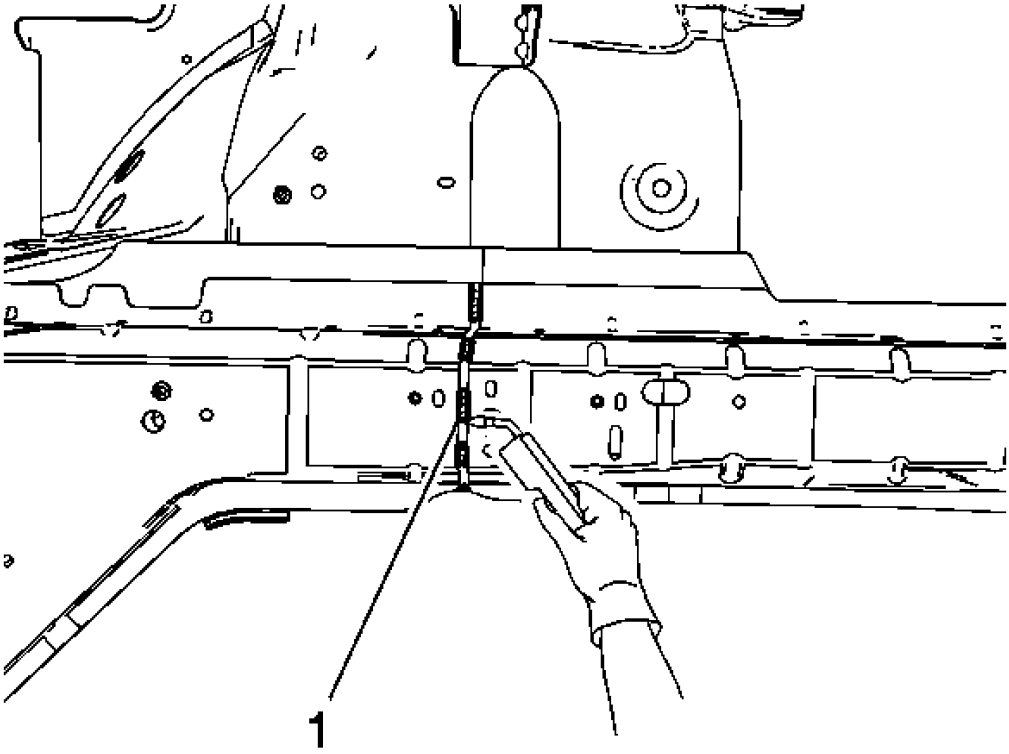


Fig. 35: Stitch Welding
Courtesy of GENERAL MOTORS CORP.

NOTE: To create a solid weld with minimum heat distortion make 25 mm (1.0 in) stitch welds along the seam with 25 mm (1.0 in) gaps between them. Then go back and complete the stitch weld.

10. Stitch weld sectioning joint (1).
11. Clean and prepare all welding surfaces.
12. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
13. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
14. Install all related panels and components.
15. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
16. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

UNDERBODY OUTER FRONT SIDE RAIL SECTIONING

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Removal Procedure

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

WARNING: Refer to Collision Sectioning Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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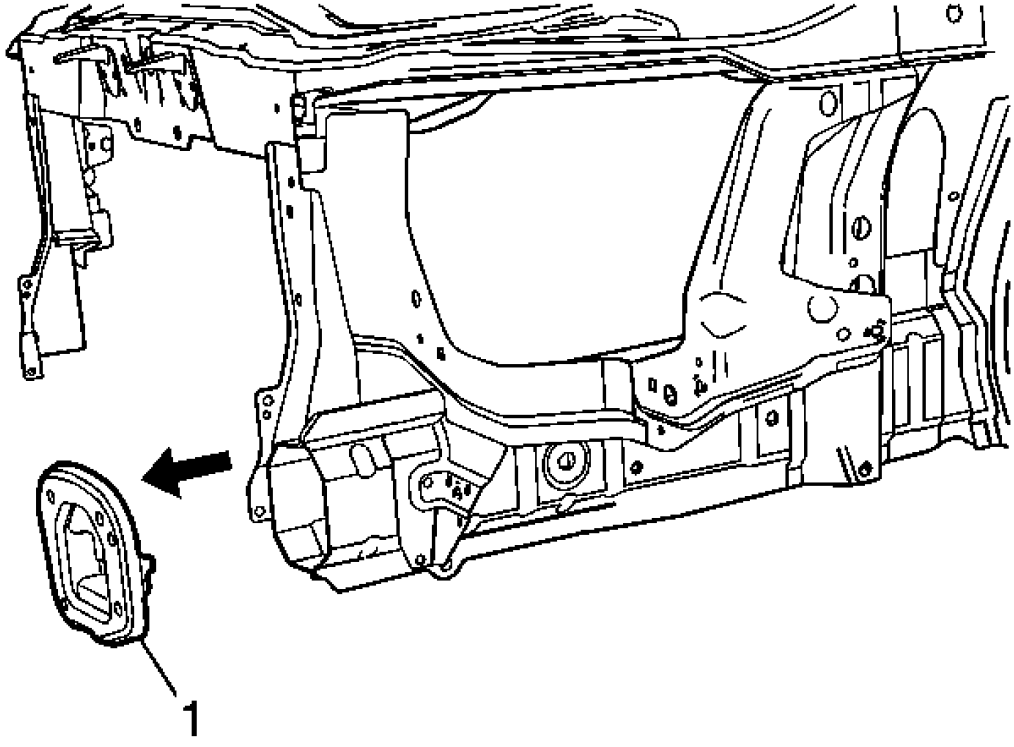


Fig. 36: Removing Front bumper Bracket
Courtesy of GENERAL MOTORS CORP.

6. Remove the Front bumper Bracket (1).

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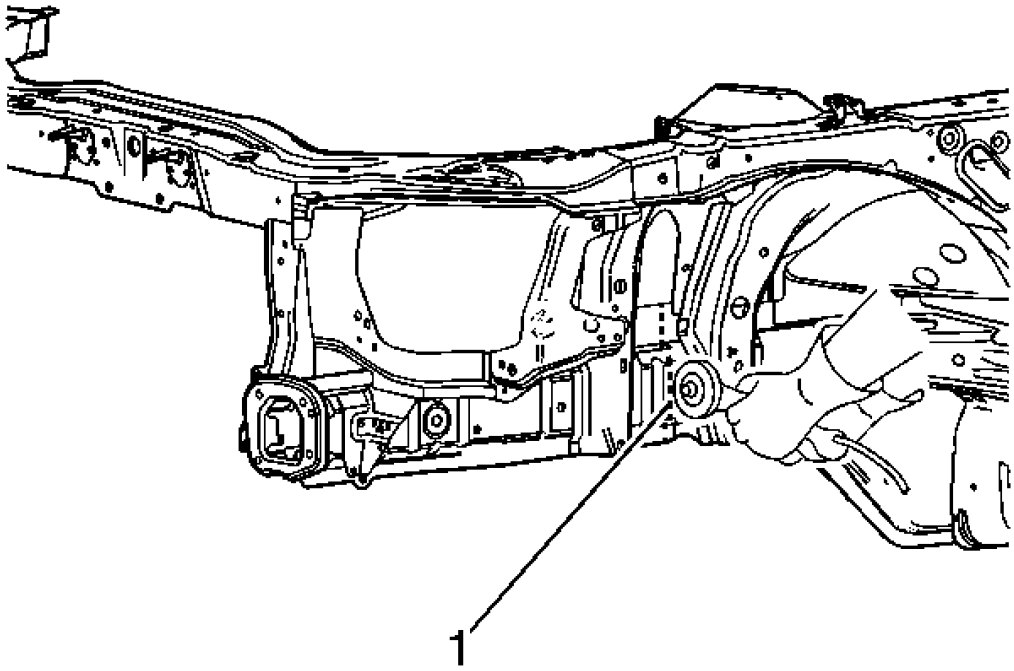


Fig. 37: Cutting Rail Front Outer Side
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements.

7. Cut the Rail Front Outer Side at the rear edge of the strengthening bead located between the Wheelhouse reinforcements (1).

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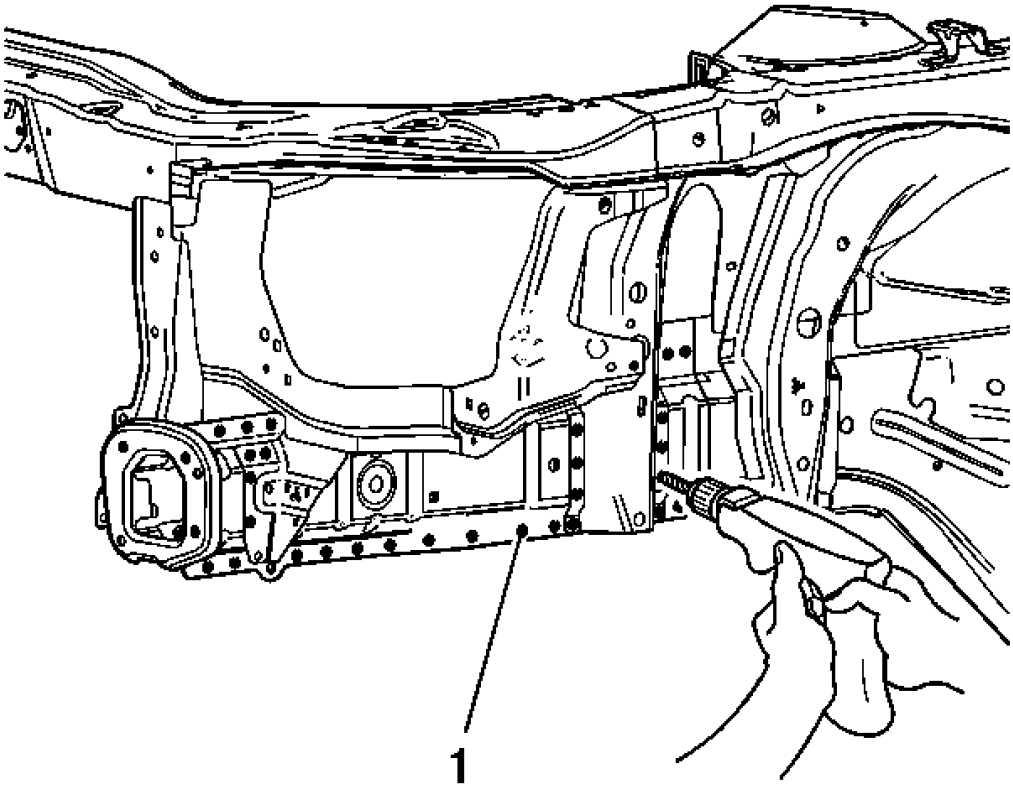


Fig. 38: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements.

8. Locate and drill out all factory welds. Note the number and note the location of the welds for installation of the service Rail Front Outer Side (1).

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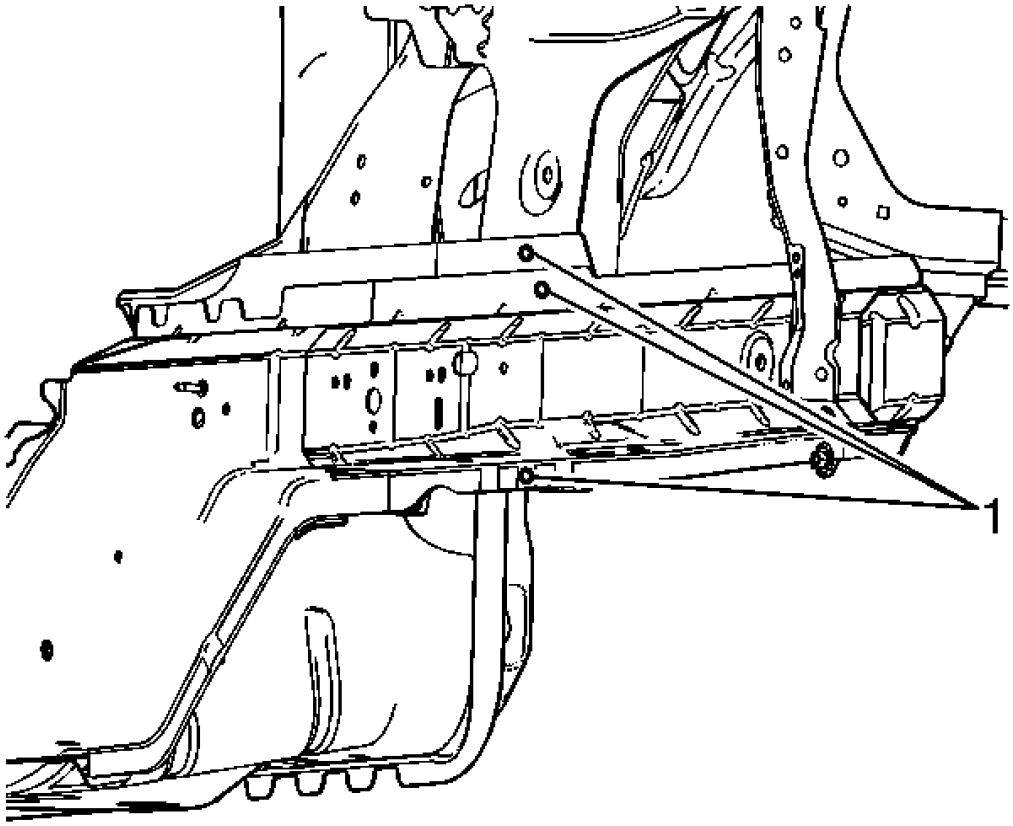


Fig. 39: Locating Hidden Welds
Courtesy of GENERAL MOTORS CORP.

9. Locate and drill out the three hidden welds on the inside flange of the Rail (1). These welds must be drilled all the way through.

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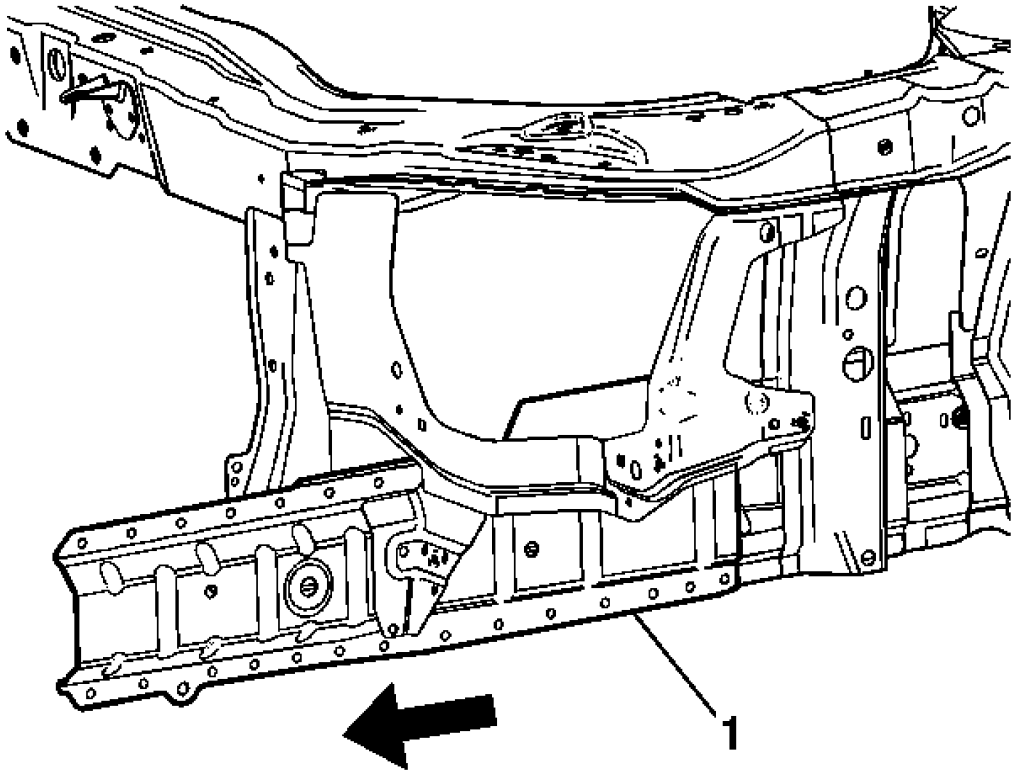


Fig. 40: Removing Damaged Rail Front Outer Side
Courtesy of GENERAL MOTORS CORP.

10. Remove the damaged Rail Front Outer Side (1).

Installation Procedure

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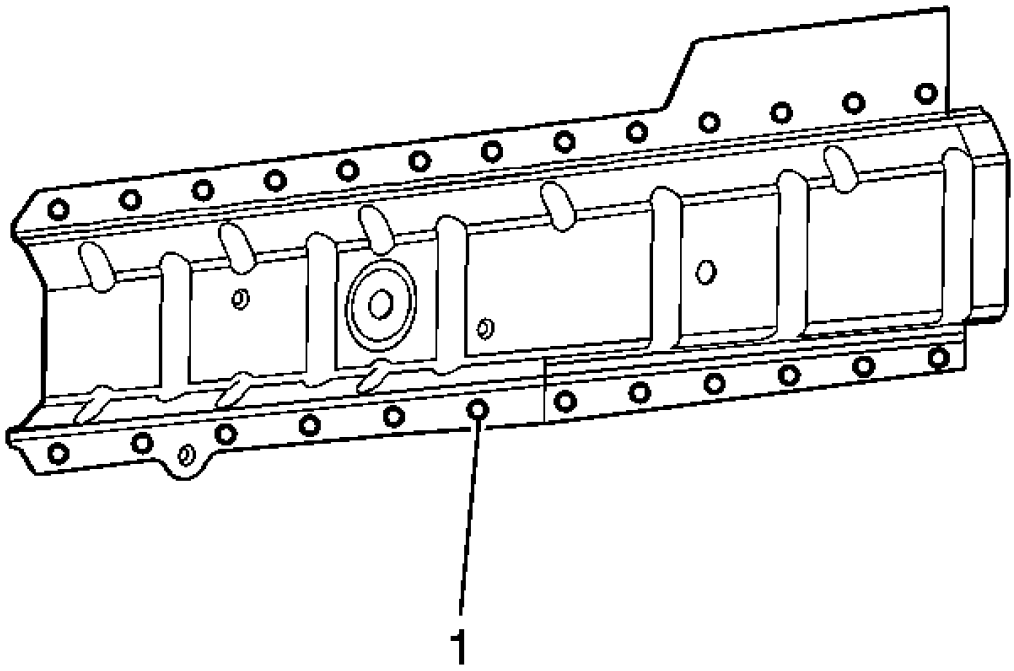


Fig. 41: Plug Weld Holes In Original Panel
Courtesy of GENERAL MOTORS CORP.

NOTE: In any area damaged beyond recognition, space plug weld holes every 40 mm (11/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel (1).

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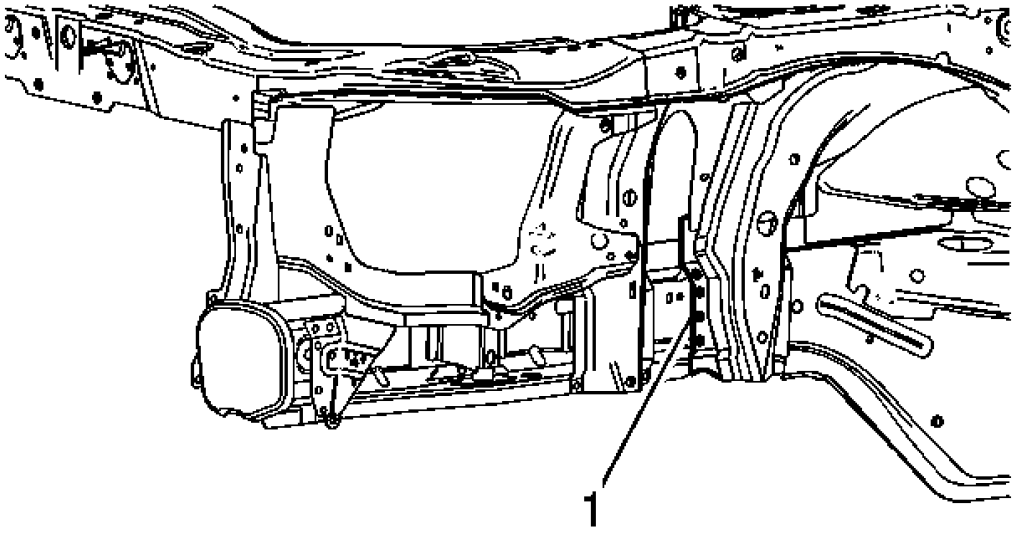


Fig. 42: Plug Weld Holes Along Sectioning Cut On Remaining Original Rail
Courtesy of GENERAL MOTORS CORP.

2. Drill 8 mm (5/16 in) plug weld holes along the sectioning cut on the remaining original rail (1). Locate these holes 40 mm (11/2 in) apart.
3. Prepare all attachment surfaces as necessary for welding.
4. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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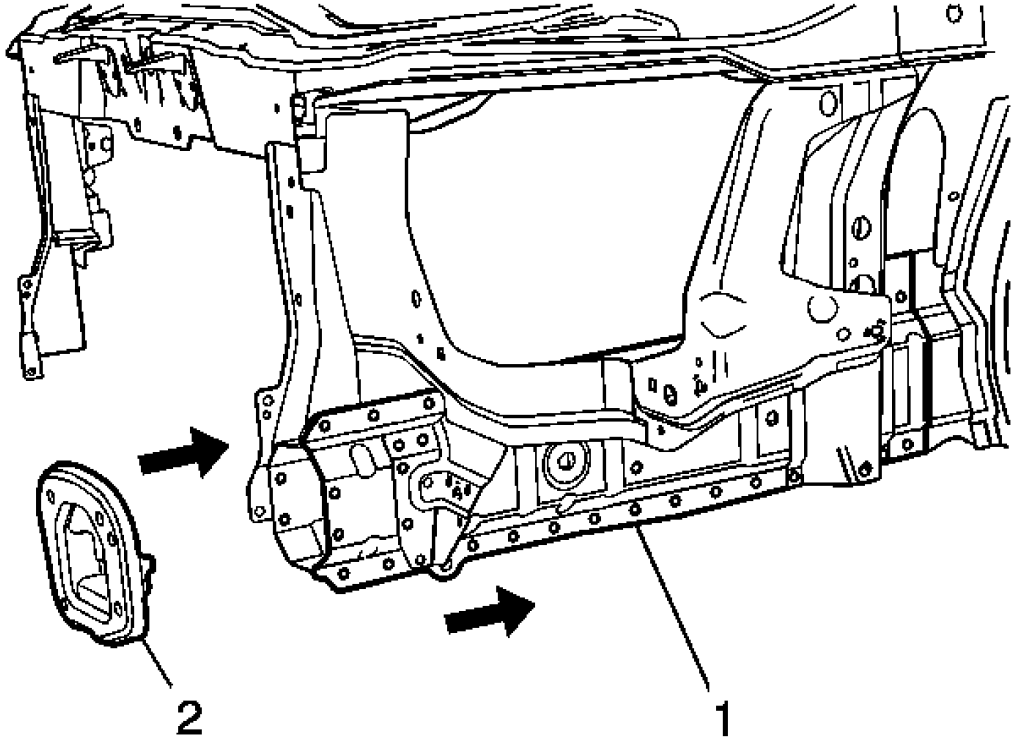


Fig. 43: Positioning Service Rail Front Outer Side & Front Bumper Bracket
Courtesy of GENERAL MOTORS CORP.

5. Position the service Rail Front Outer Side by sliding the pre-stepped portion of the service rail under the original rail (1).
6. Position the Front Bumper Bracket (2).
7. Clamp service parts in position.
8. Inspect the rail for proper position using 3-dimensional measuring equipment.

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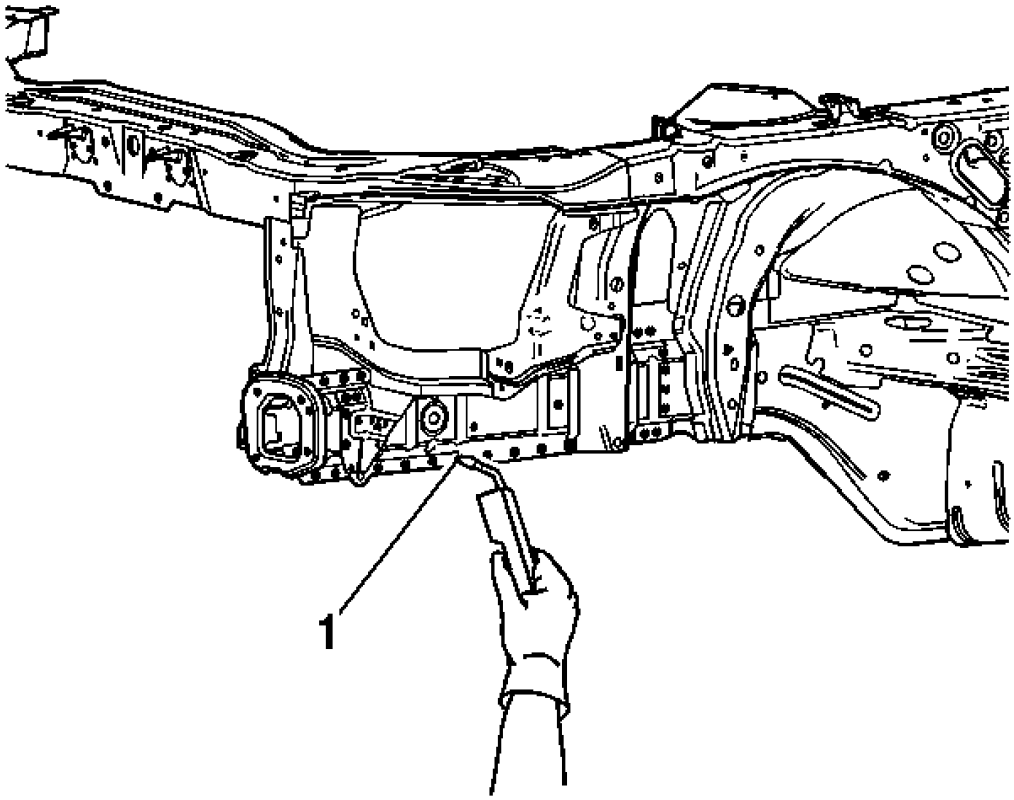


Fig. 44: Tack Welding
Courtesy of GENERAL MOTORS CORP.

9. Tack weld the parts in position (1).
10. Plug weld accordingly.

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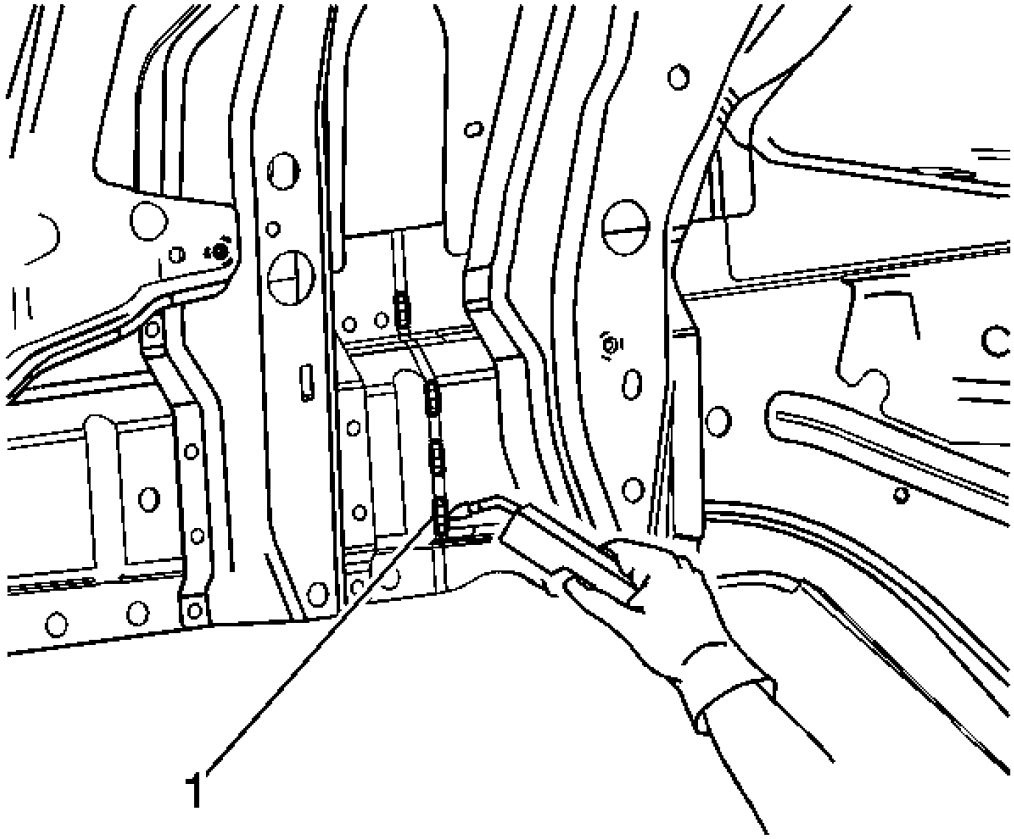


Fig. 45: Stitch Welding
Courtesy of GENERAL MOTORS CORP.

11. Stitch weld along the entire sectioning joint (1), make 25 mm (1 in) welds along the seam with 25 mm (1 in) gaps between.
12. Complete the stitch welds.
13. Clean and prepare all welded surfaces.
14. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
15. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
16. Install all related panels and components.
17. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
18. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT INNER HINGE PILLAR BODY REPLACEMENT

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Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. refer to **Anti-Corrosion Treatment and Repair** .
6. Perform the necessary procedures to gain access to the repair. Refer to **Front Hinge Pillar Body Sectioning**.

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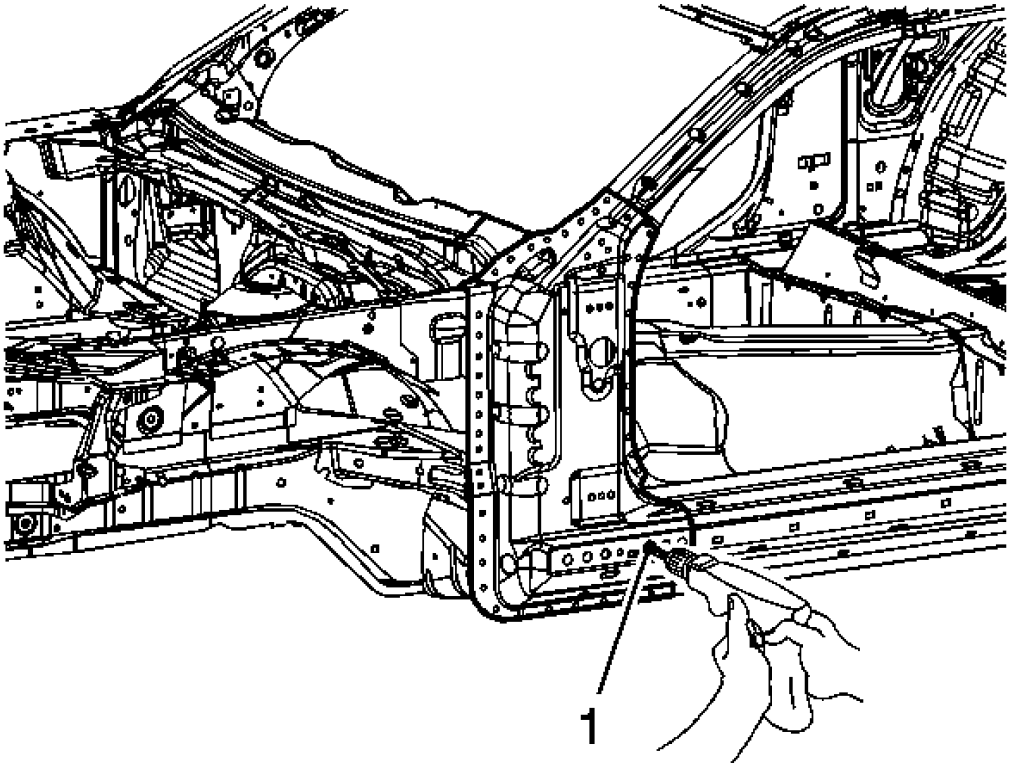


Fig. 46: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

7. Locate and drill out all factory welds (1).

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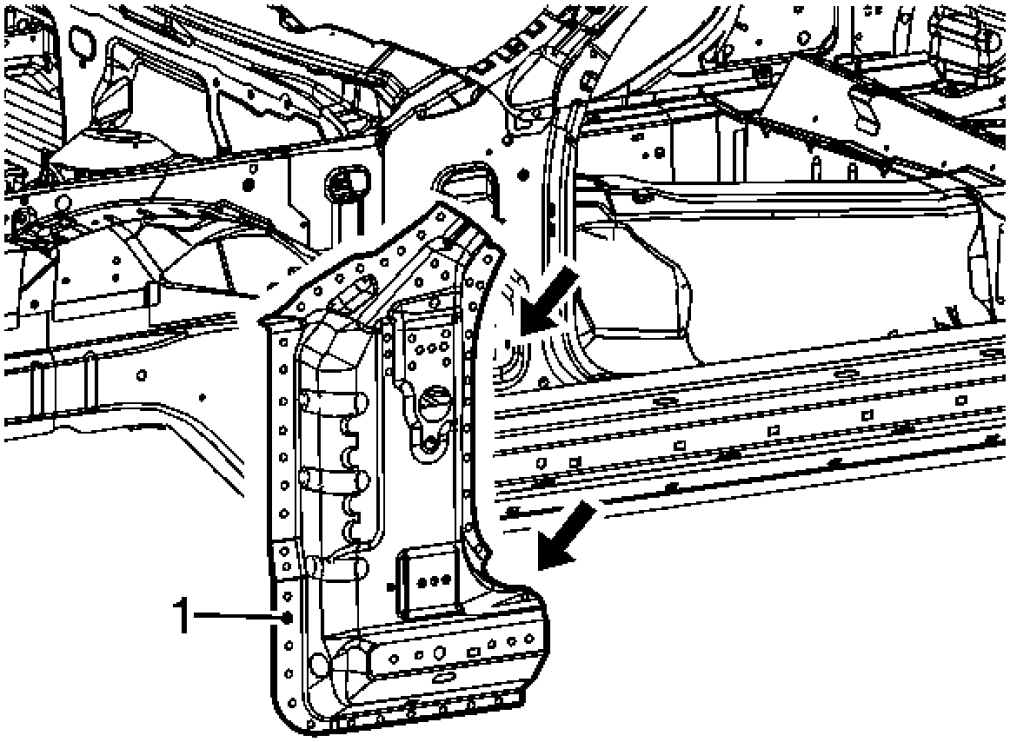


Fig. 47: Removing Damaged Inner Hinge Pillar
Courtesy of GENERAL MOTORS CORP.

8. Remove the damaged Inner Hinge Pillar (1).

Installation Procedure

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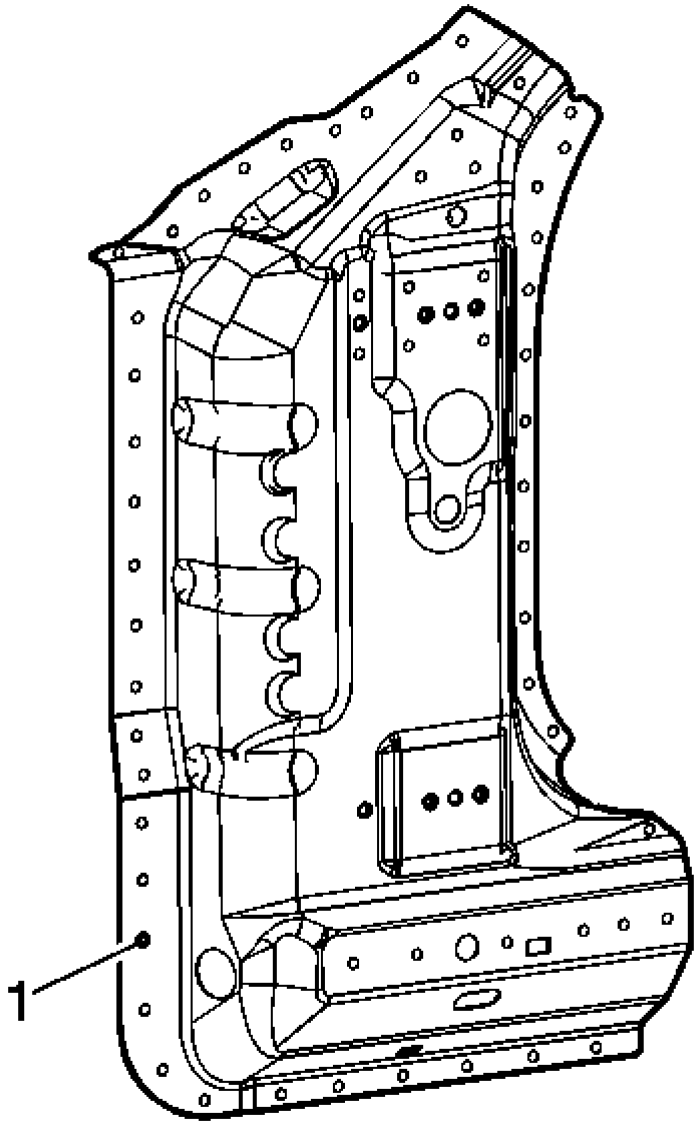


Fig. 48: Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part (1), as necessary in the locations noted from the

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original panel.

2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

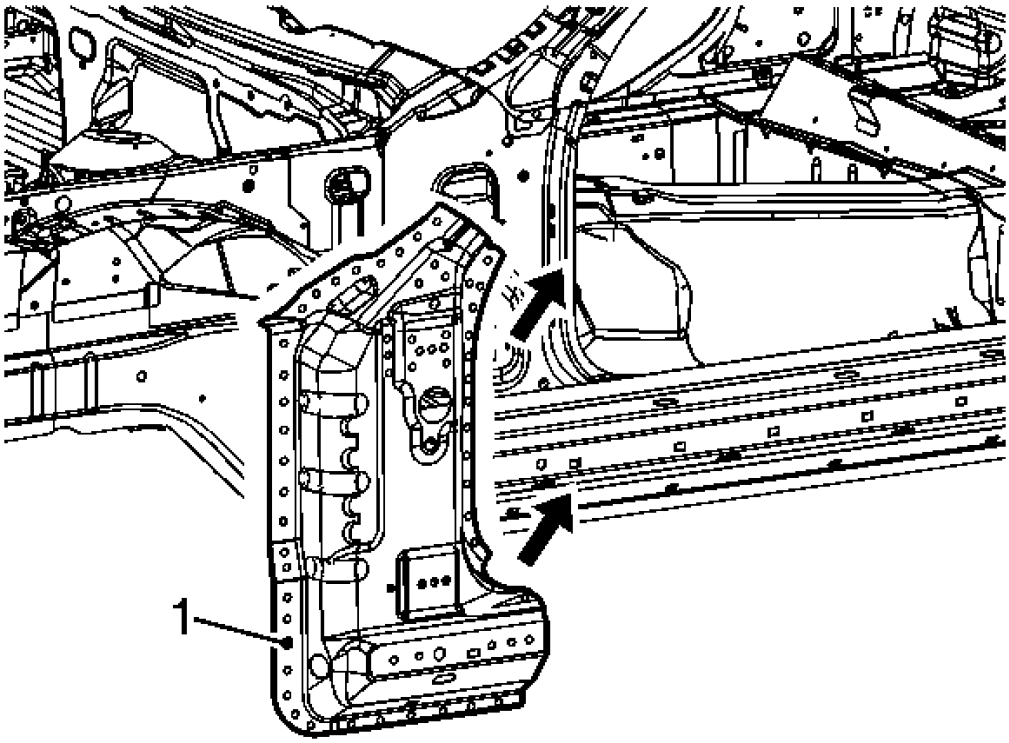


Fig. 49: Positioning Inner Hinge Pillar
Courtesy of GENERAL MOTORS CORP.

4. Position the Inner Hinge Pillar (1).
5. Clamp service parts in position
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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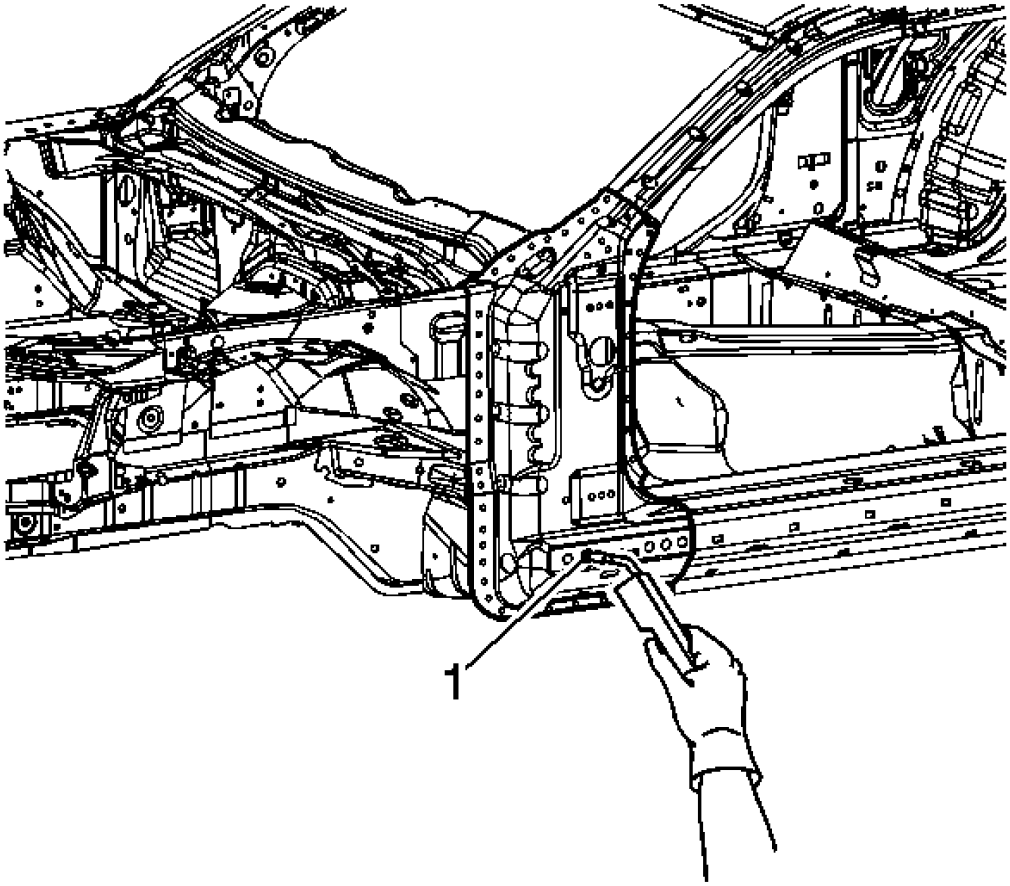


Fig. 50: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

BODY HINGE PILLAR EXTENSION PANEL REPLACEMENT

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Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
6. Perform the necessary procedures to gain access to the repair. Refer to **Front Compartment Upper Side Rail Replacement**.

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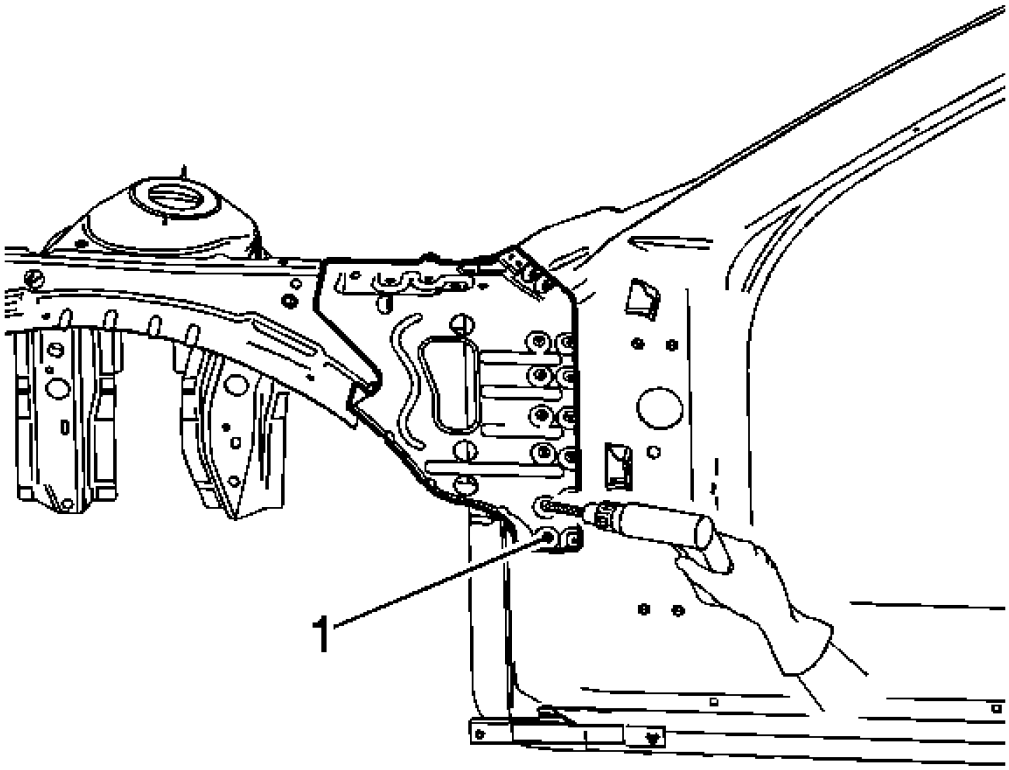


Fig. 51: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

7. Locate and drill out all factory welds (1).
8. Remove the Pillar Extension.

Installation Procedure

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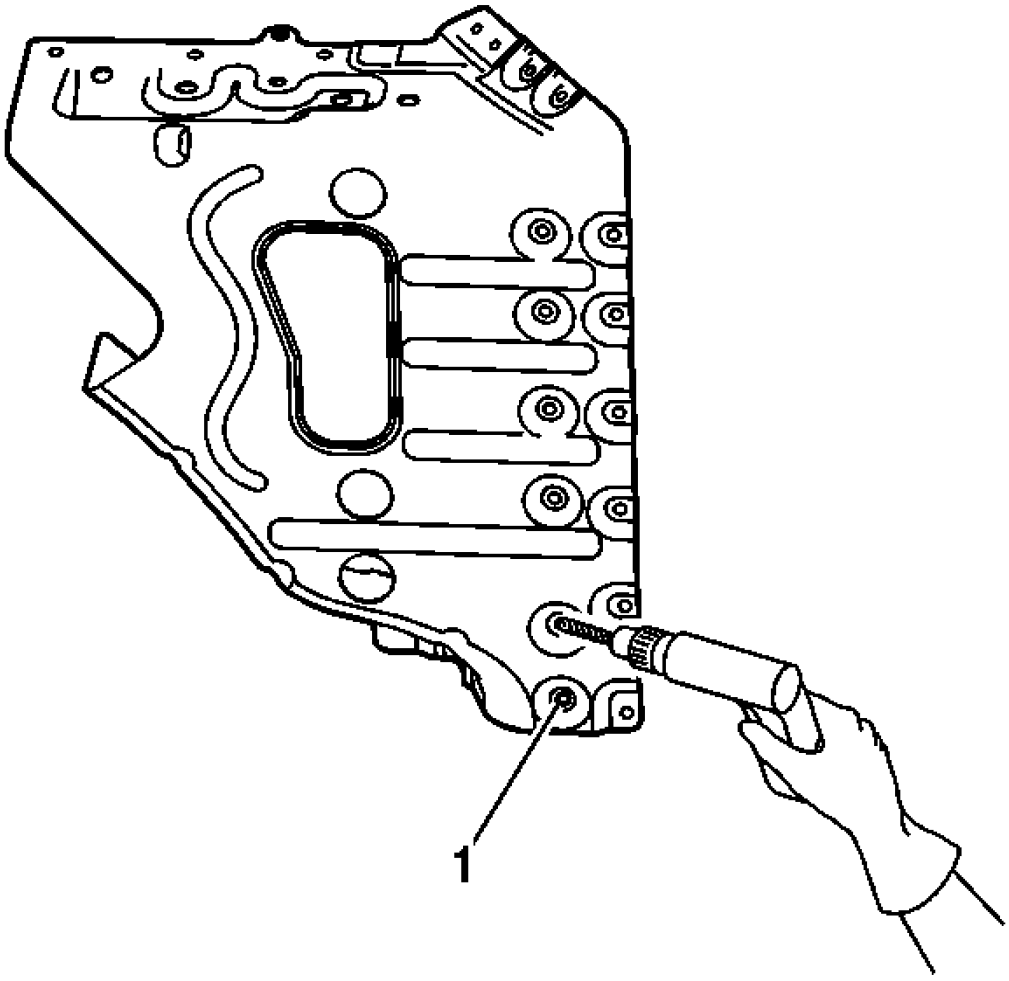


Fig. 52: Drilling Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel (1).
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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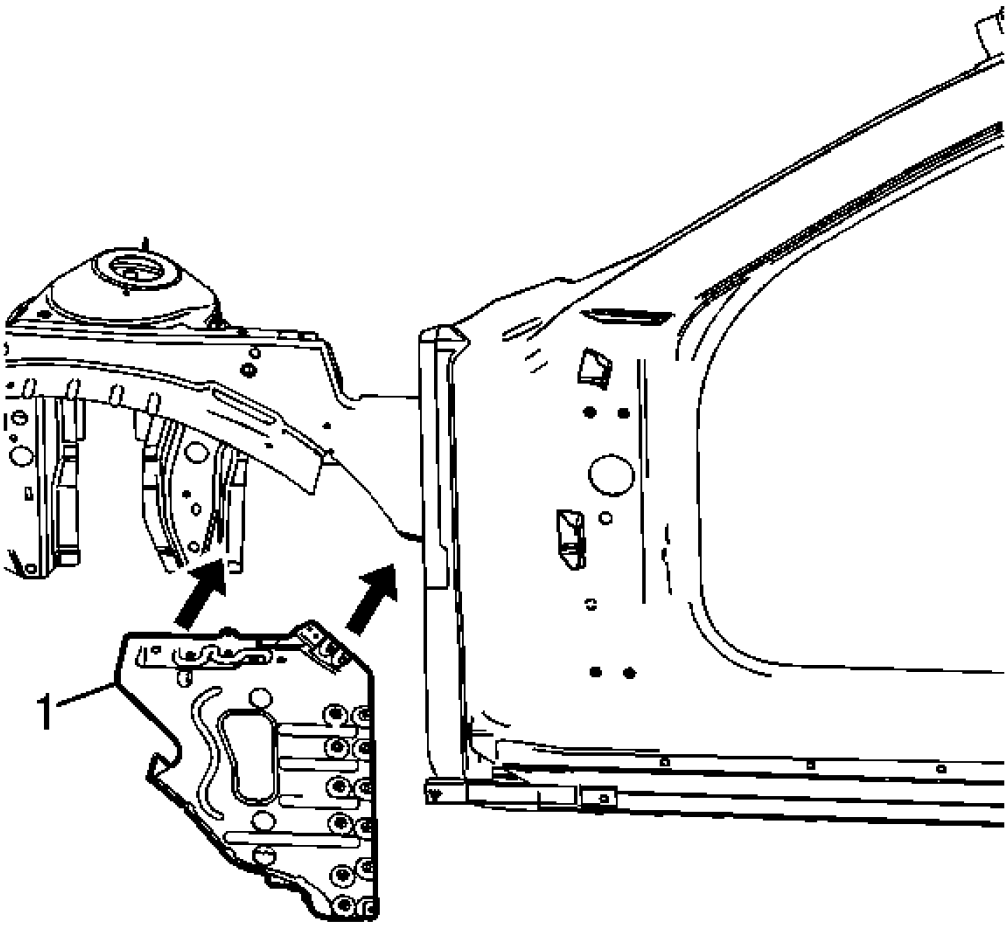


Fig. 53: Positioning Pillar Extension
Courtesy of GENERAL MOTORS CORP.

4. Position the Pillar Extension (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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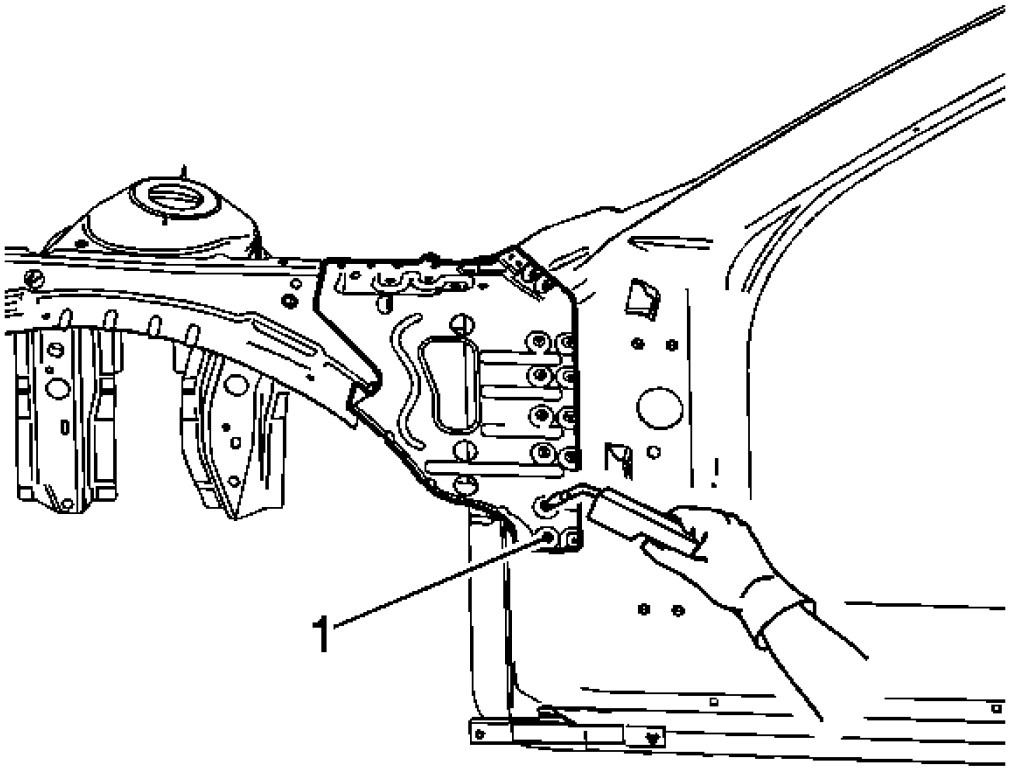


Fig. 54: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT HINGE PILLAR BODY SECTIONING

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

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WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

NOTE: The front body hinge pillar can be replaced at factory seams, but requires the removal of the rocker panel and roof. The sectioning procedures have been developed as a more cost effective alternative to complete replacement. The specific area to be sectioned is determined by the extent of the damage to the vehicle.

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Repair as much of the damage as possible to factory specifications.

WARNING: Refer to Foam Sound Deadeners Warning .

5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
6. Perform additional sectioning procedures as necessary.

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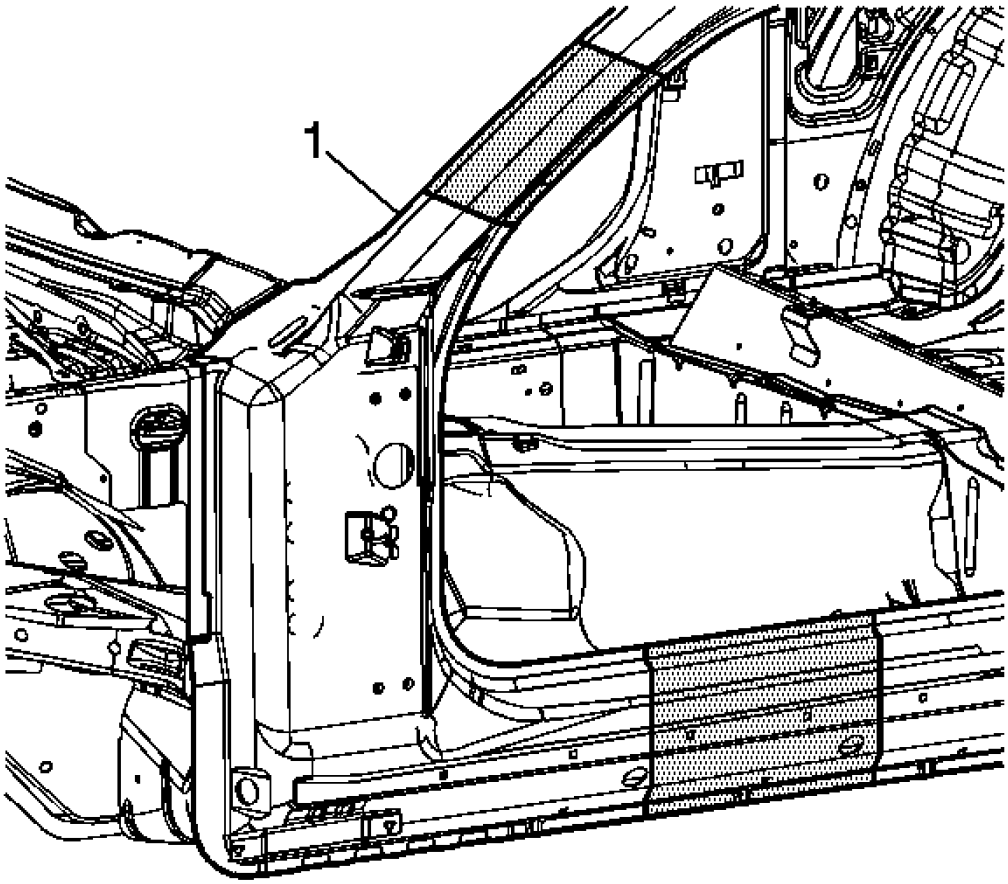


Fig. 55: Locating Sectioning Area
Courtesy of GENERAL MOTORS CORP.

NOTE: Sectioning can be done in the straight areas of the windshield pillar and rocker panel.

7. Locate the area on the panel where the sectioning is to be performed (1).

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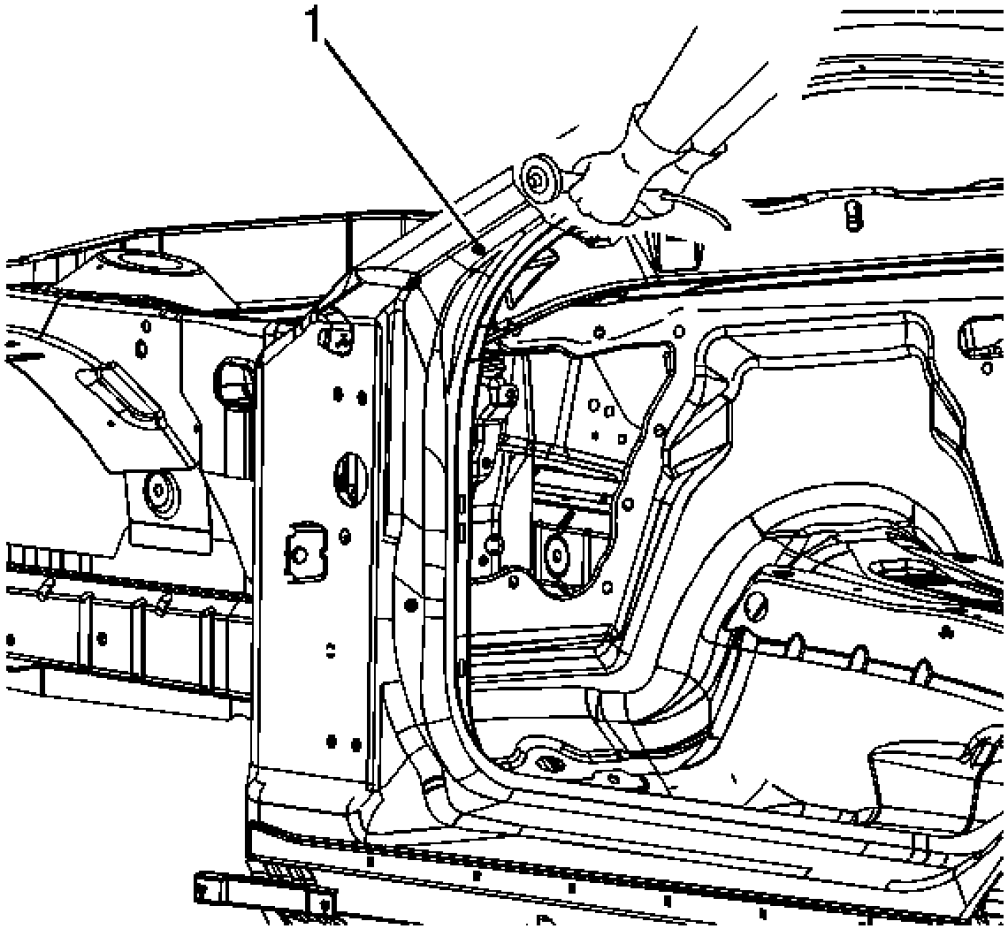


Fig. 56: Cutting Panel
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements when removing the damaged part.

8. Cut the panel where sectioning is to be performed (1).

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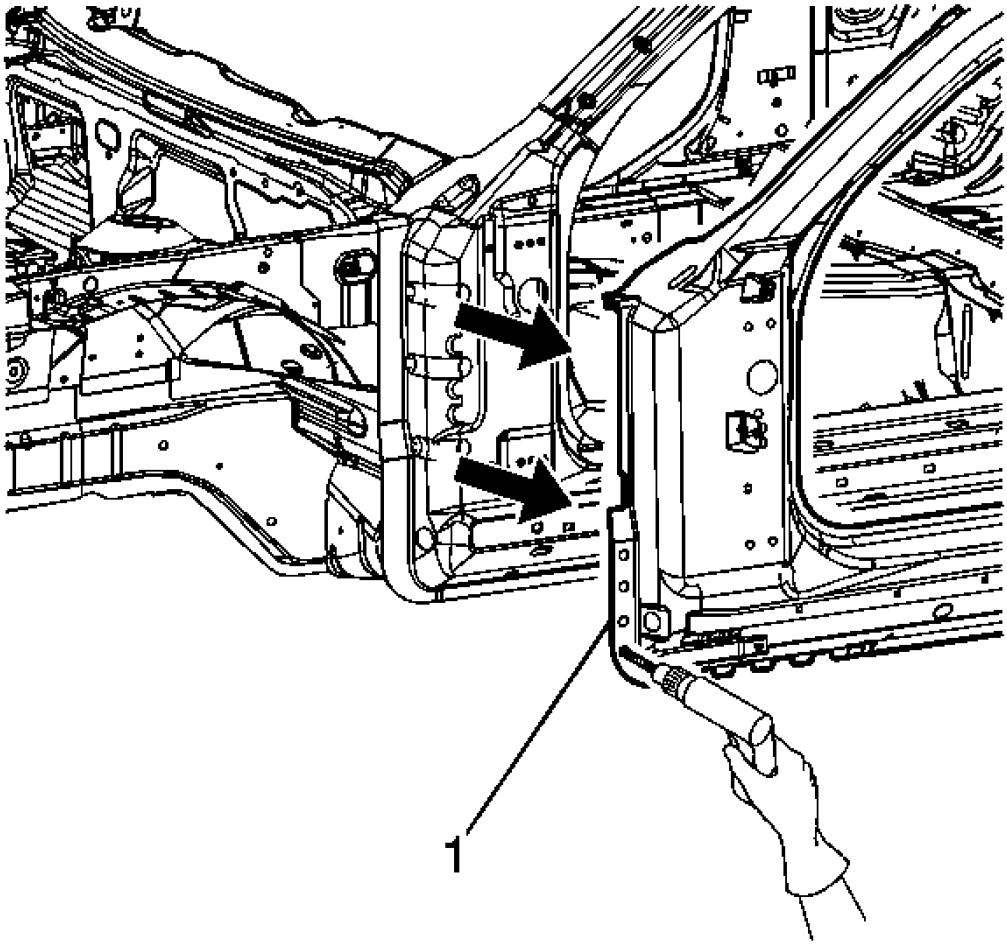


Fig. 57: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Record the number and location of the original welds for installation of the service part.

9. Locate and drill out all factory welds (1) and remove the damaged hinge pillar section.

Installation Procedure

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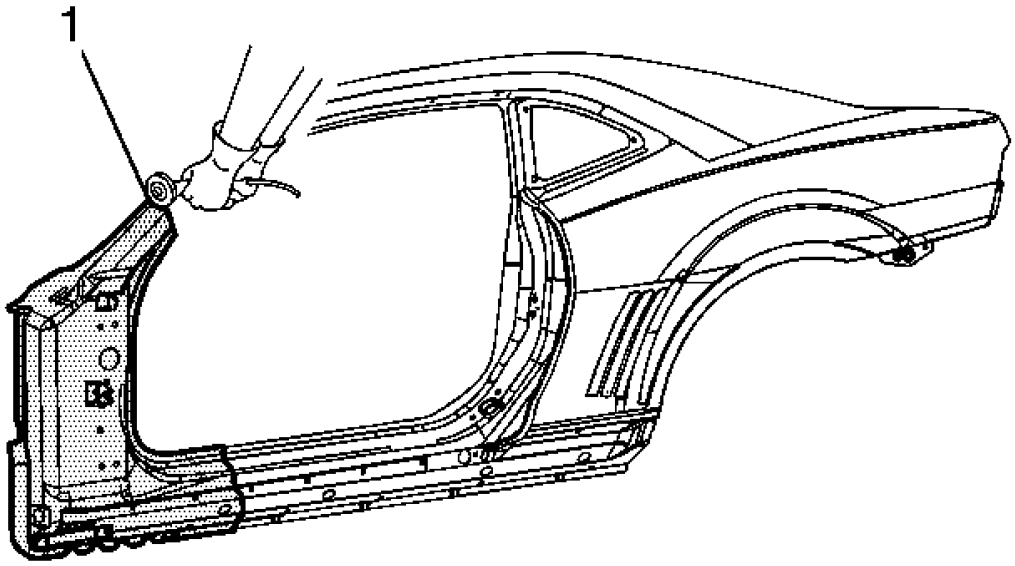


Fig. 58: Cutting Replacement Hinge Pillar
Courtesy of GENERAL MOTORS CORP.

1. Cut the replacement hinge pillar in corresponding locations to fit the original panel (1). The sectioning joint should be trimmed to allow 1.5 times the metal thickness at the sectioning joint.

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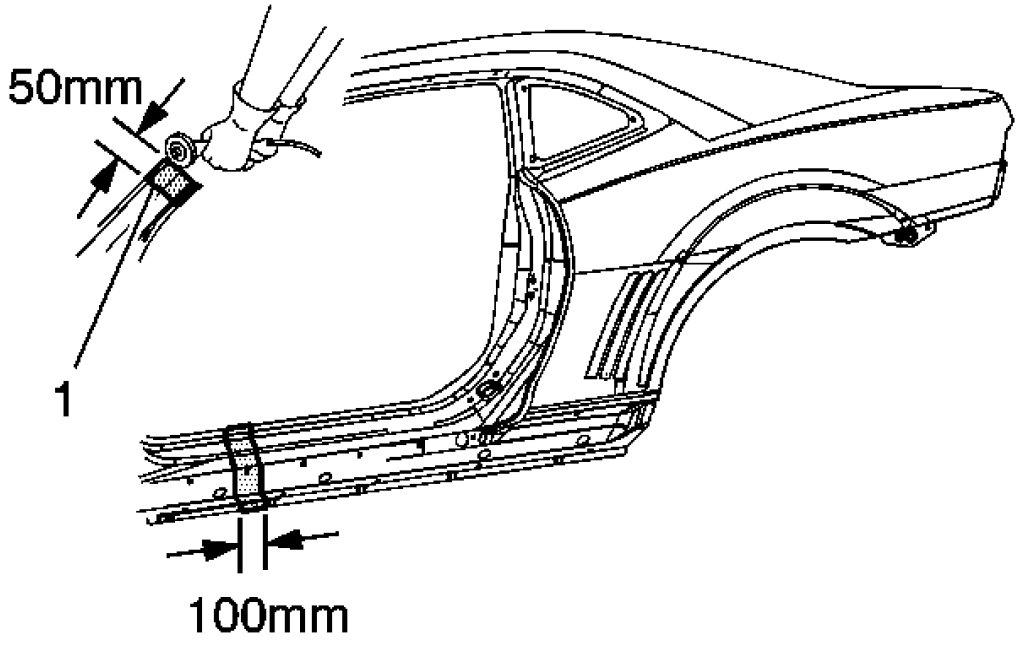


Fig. 59: Creating Backing Plates
Courtesy of GENERAL MOTORS CORP.

2. Create a 50 mm (2 in) backing plate for the windshield pillar and a 100 mm (4 in) backing plate for the rocker from the unused portion of the service part (1). Trim the backing plates as necessary to fit behind the sectioning joint where there is no reinforcement.

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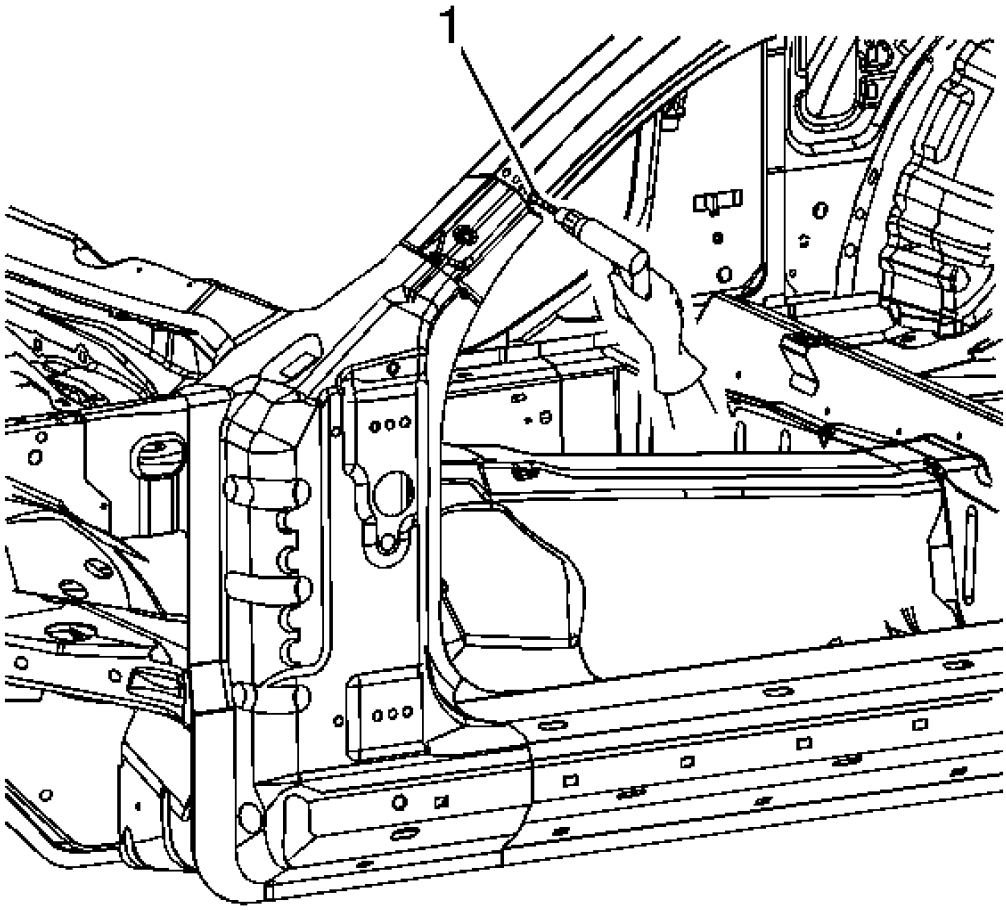


Fig. 60: Drilling Plug Weld Holes On Original Part
Courtesy of GENERAL MOTORS CORP.

3. Drill 8 mm (5/16 in) plug weld holes along the sectioning cut on the remaining original part (1). Locate these holes centered on the flange and spaced 40 mm (1 1/2 in) apart

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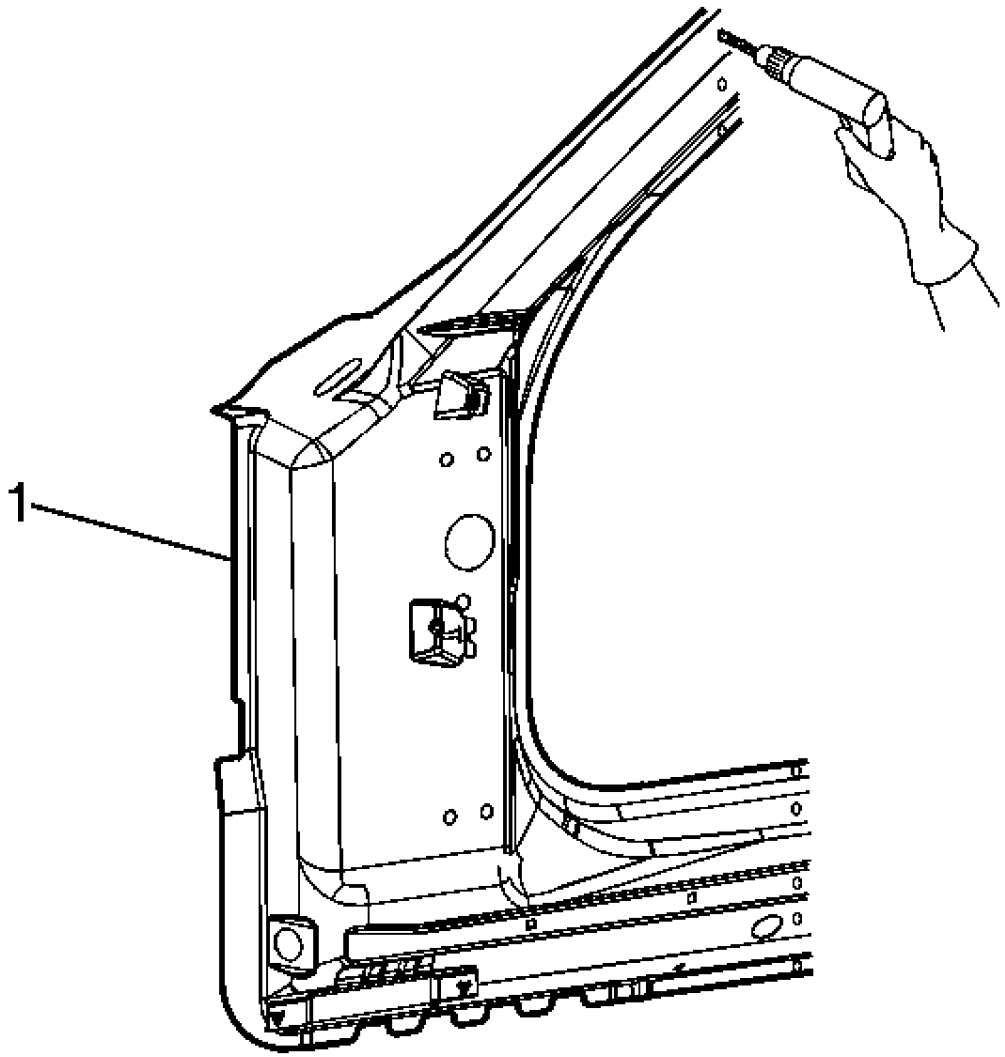


Fig. 61: Drilling Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: In any area damaged beyond recognition, or structural weld-thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

4. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel and along the sectioning cut (1).
5. Prepare all attachment surfaces as necessary.
6. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion**

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Treatment and Repair .

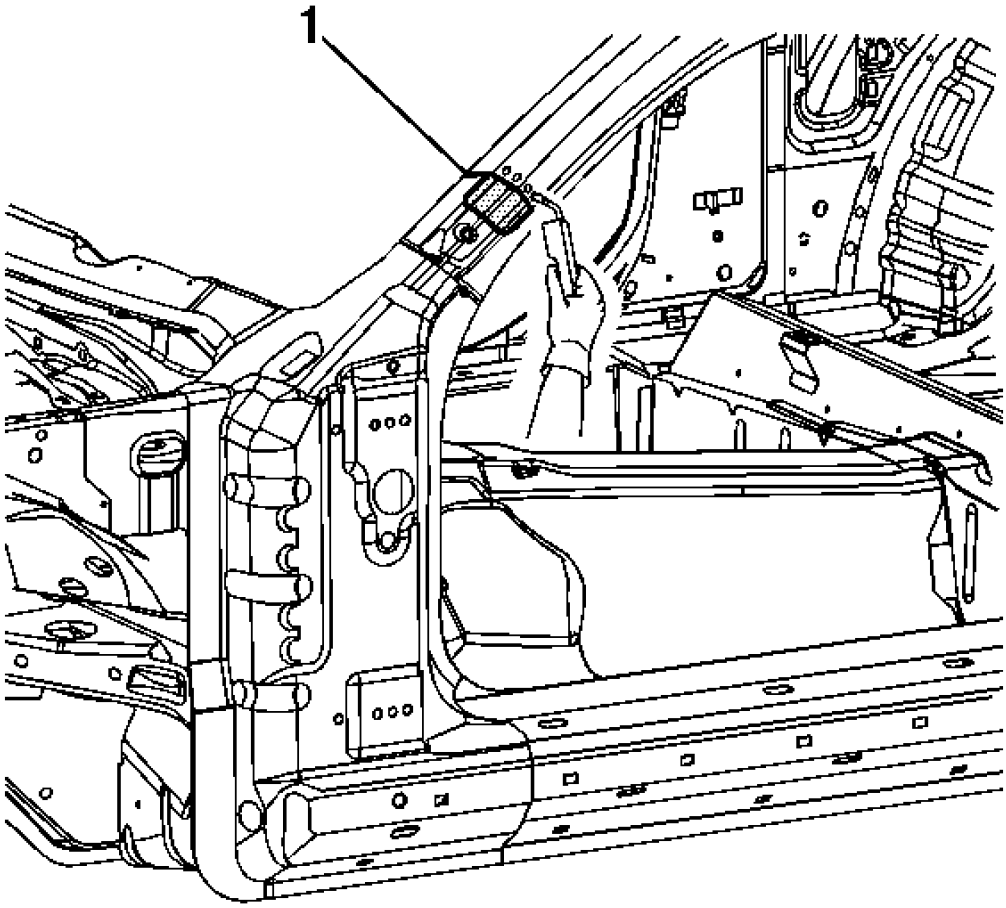


Fig. 62: Plug Welding Backing Plate
Courtesy of GENERAL MOTORS CORP.

7. Fit the backing plate halfway into the sectioning joints, clamp and plug weld to the vehicle (1).

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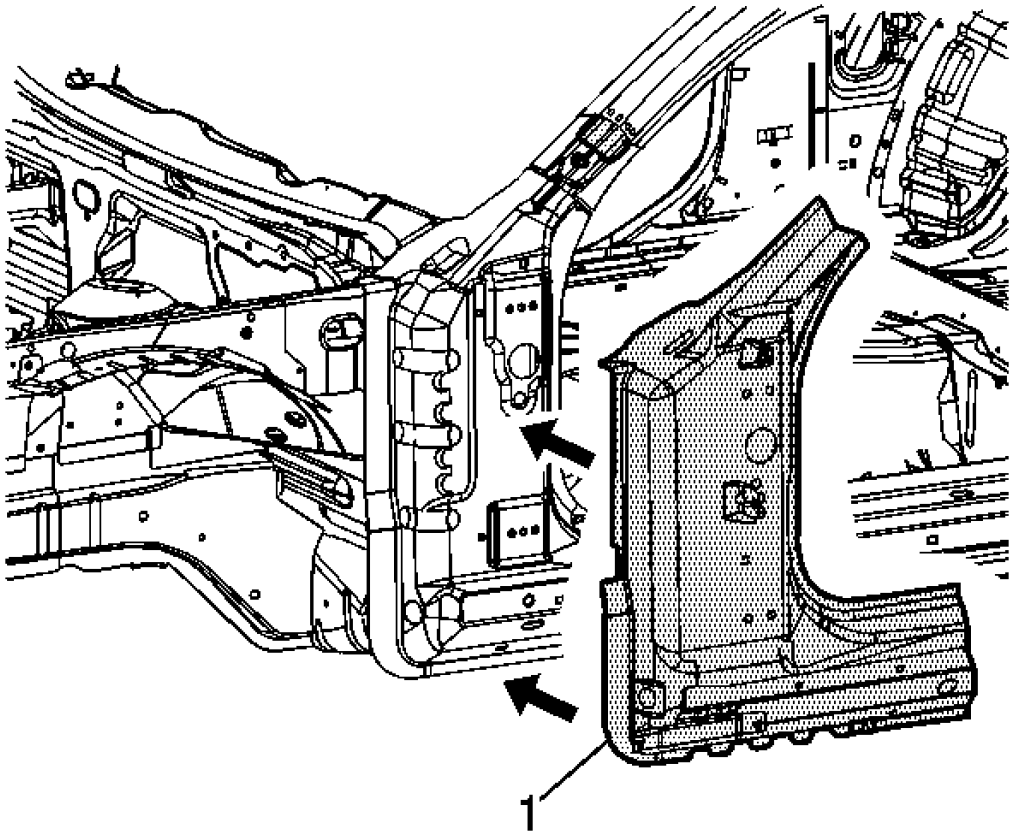


Fig. 63: Positioning Hinge Pillar
Courtesy of GENERAL MOTORS CORP.

8. Position the hinge pillar to the vehicle using 3-dimensional measuring equipment (1), clamp in place.

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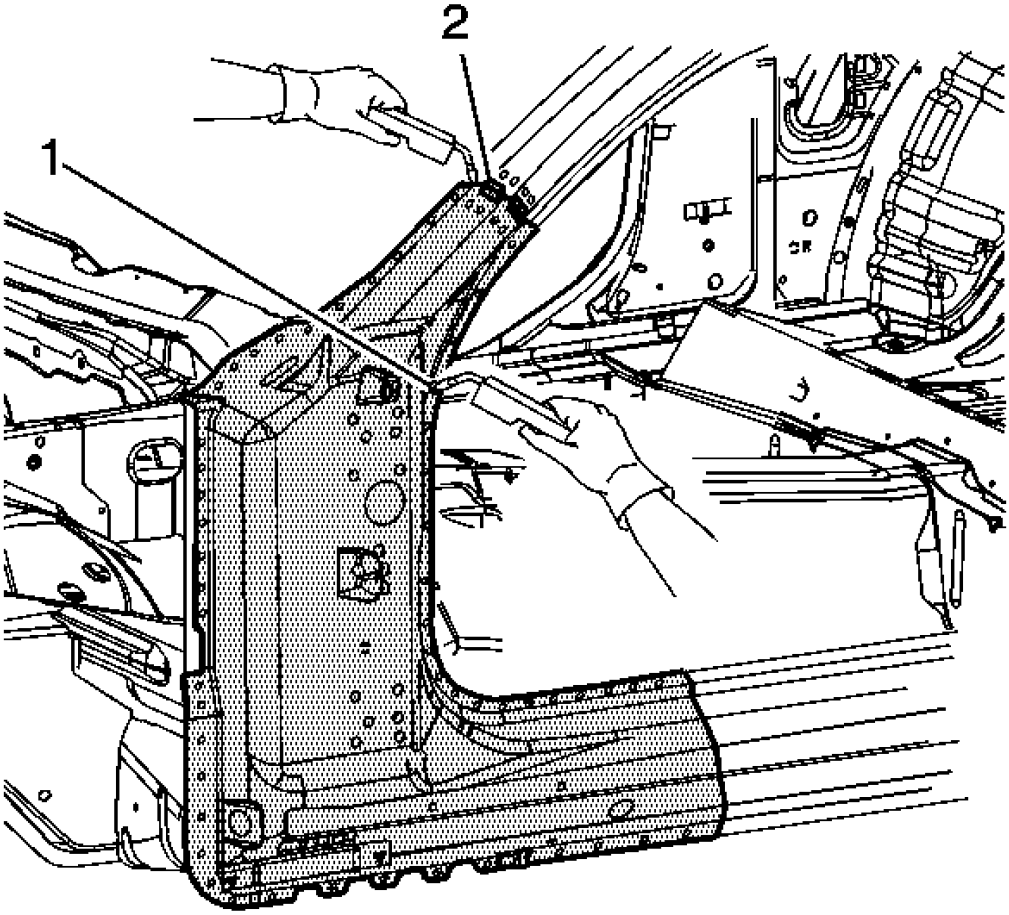


Fig. 64: Plug & Stitch Welding
Courtesy of GENERAL MOTORS CORP.

9. Plug weld accordingly (1).

NOTE: **To create a solid weld with minimum heat distortion make 25 mm (1 in) stitch welds along the seam with 25 mm (1 in) gaps between them. Then go back and complete the stitch weld.**

10. Stitch weld sectioning joint
11. Clean and prepare all welded surfaces.
12. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
13. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .

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14. Install all related panels and components.
15. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
16. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

ROOF OUTER PANEL REPLACEMENT

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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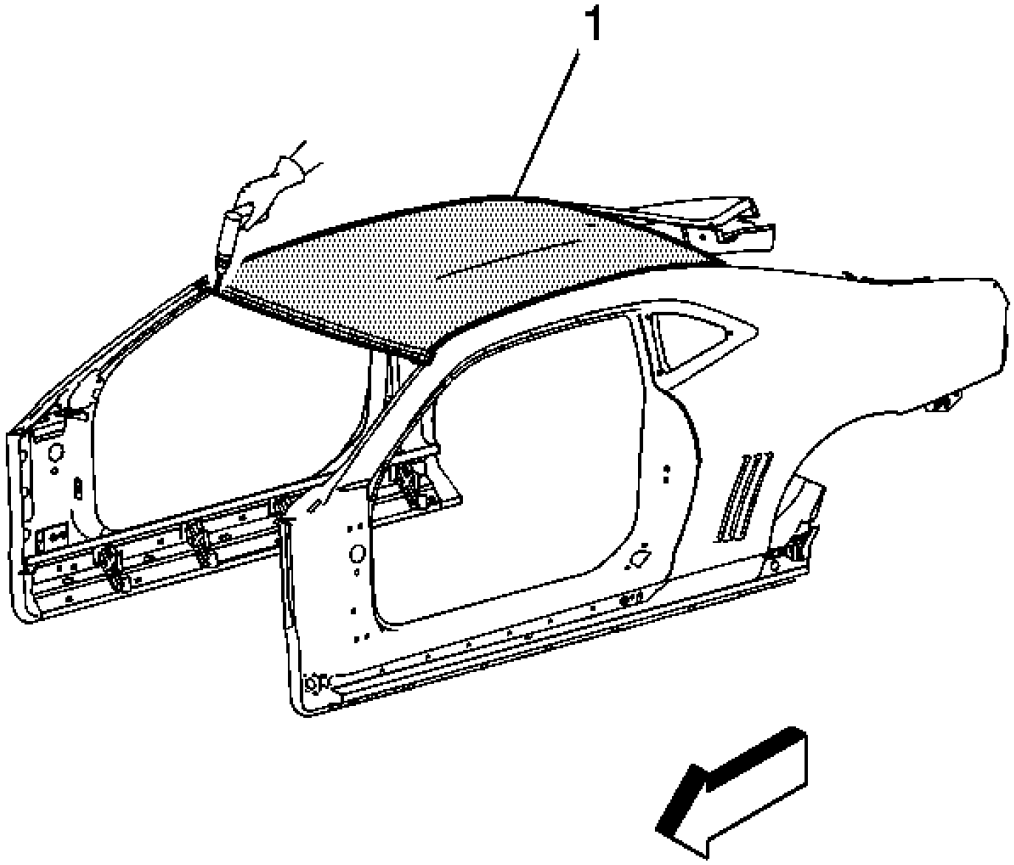


Fig. 65: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

6. Locate and drill out all factory welds (1).
7. Remove the damaged roof outer panel.

Installation Procedure

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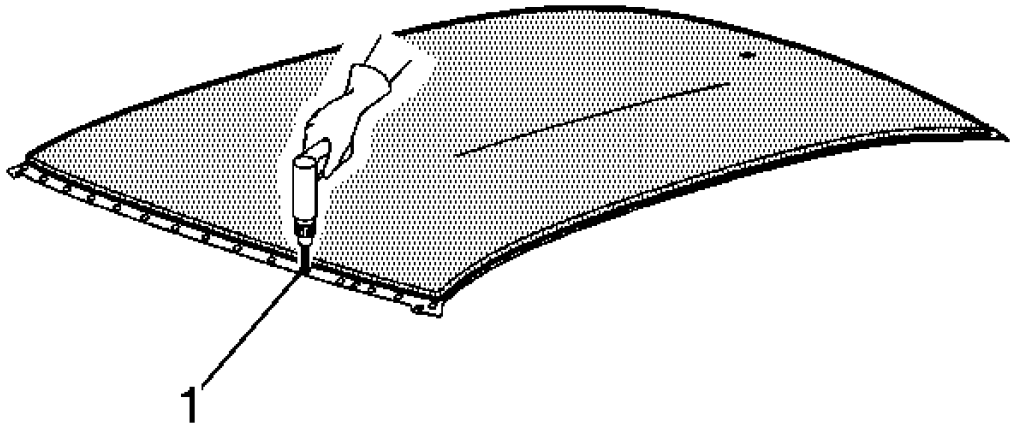


Fig. 66: Drilling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary (1), in the locations noted from the original panel.
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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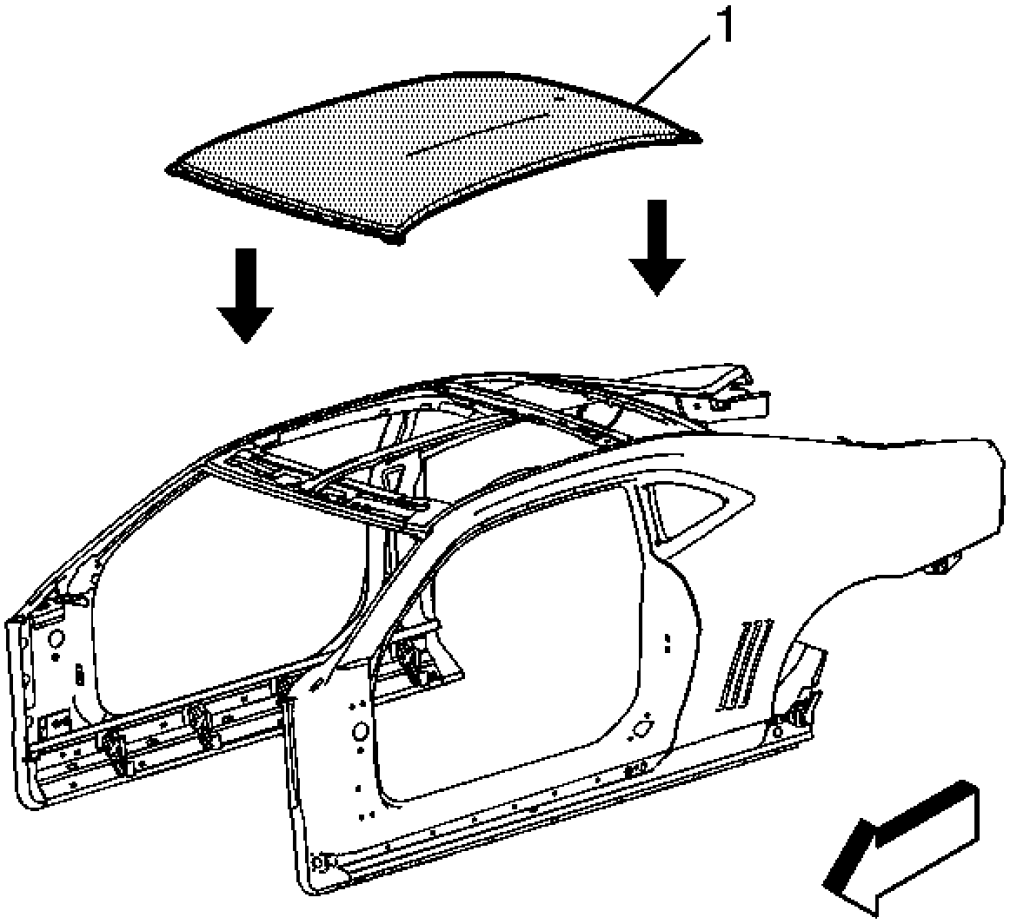


Fig. 67: Positioning Roof Outer Panel
Courtesy of GENERAL MOTORS CORP.

4. Position the roof outer panel (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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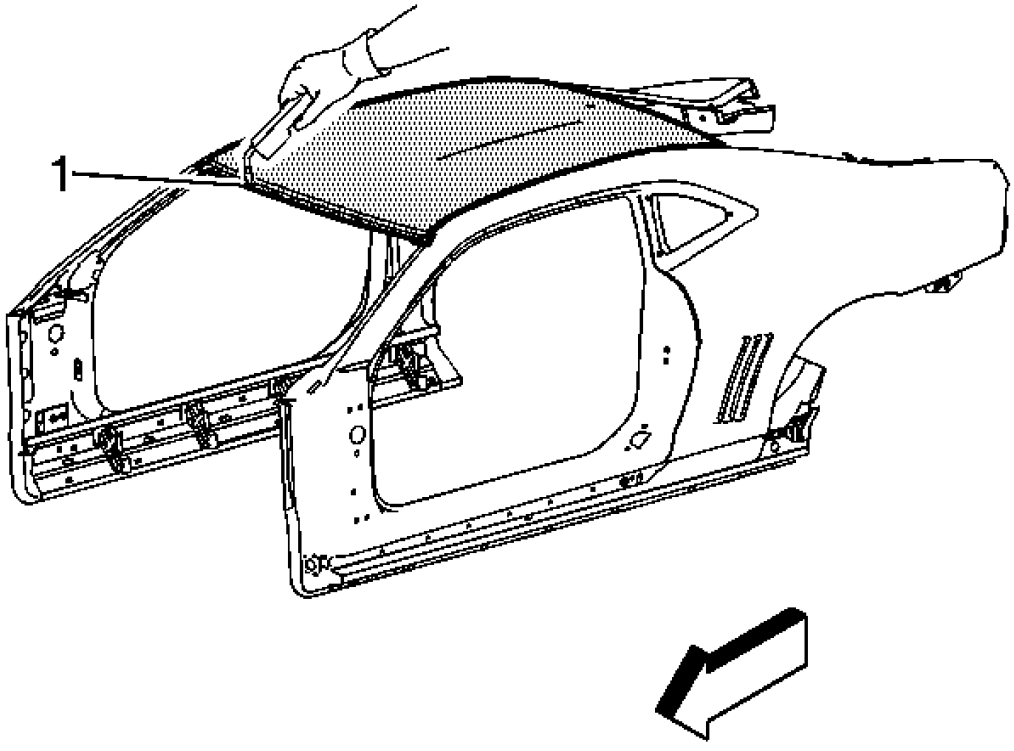


Fig. 68: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.

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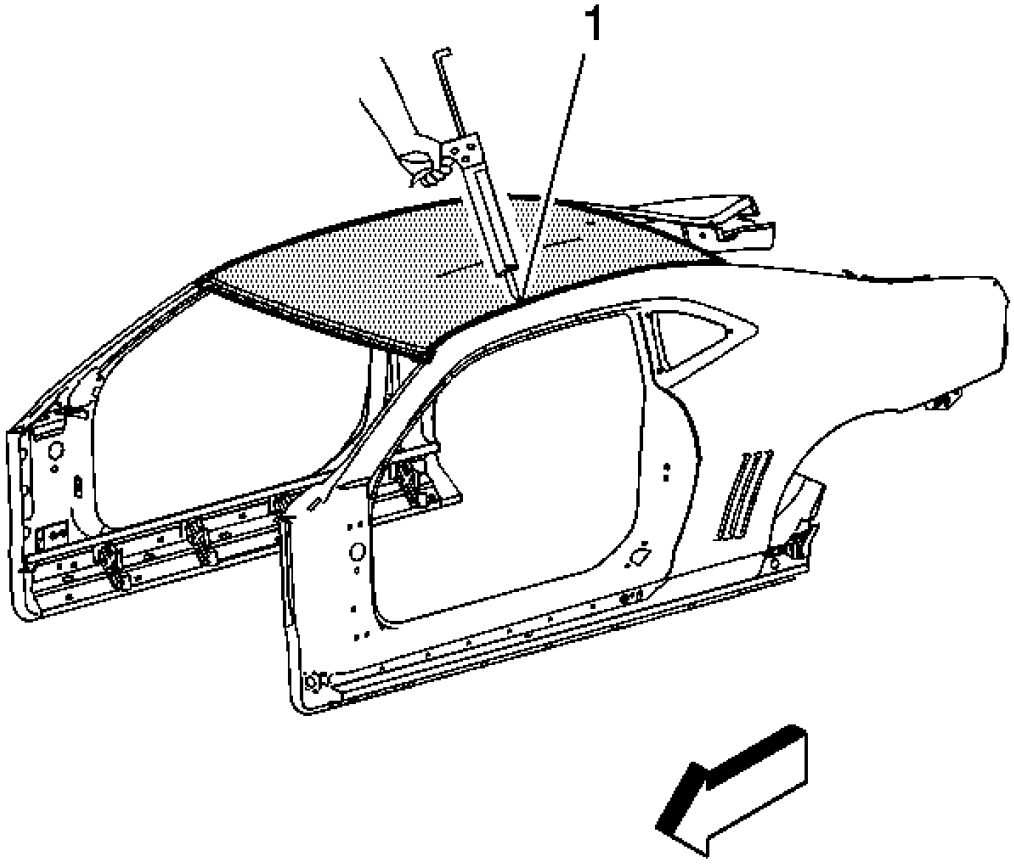


Fig. 69: Applying Sealers & Anti-Corrosion Materials
Courtesy of GENERAL MOTORS CORP.

9. Apply the sealers and anti-corrosion materials to the repair area, as necessary (1). Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

ROCKER INNER PANEL REINFORCEMENT REPLACEMENT

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

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WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Perform additional procedures as necessary. Refer to **Front Hinge Pillar Body Sectioning** and **Quarter Outer Panel Sectioning**.
5. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.

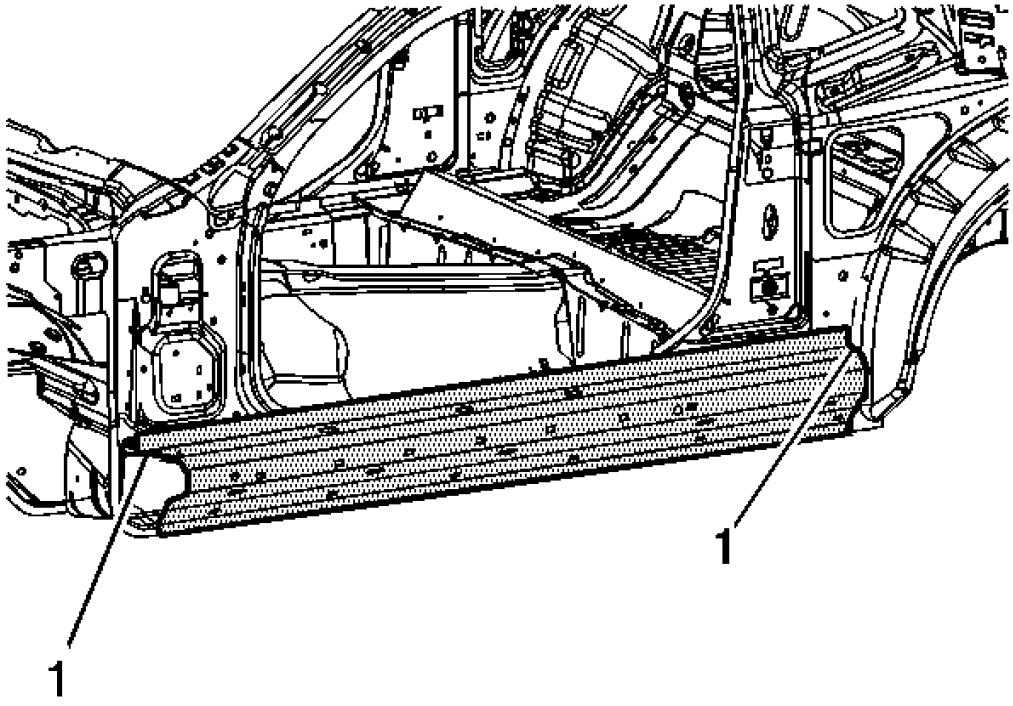


Fig. 70: Repair Area
Courtesy of GENERAL MOTORS CORP.

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6. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary (1). Refer to **Anti-Corrosion Treatment and Repair** .

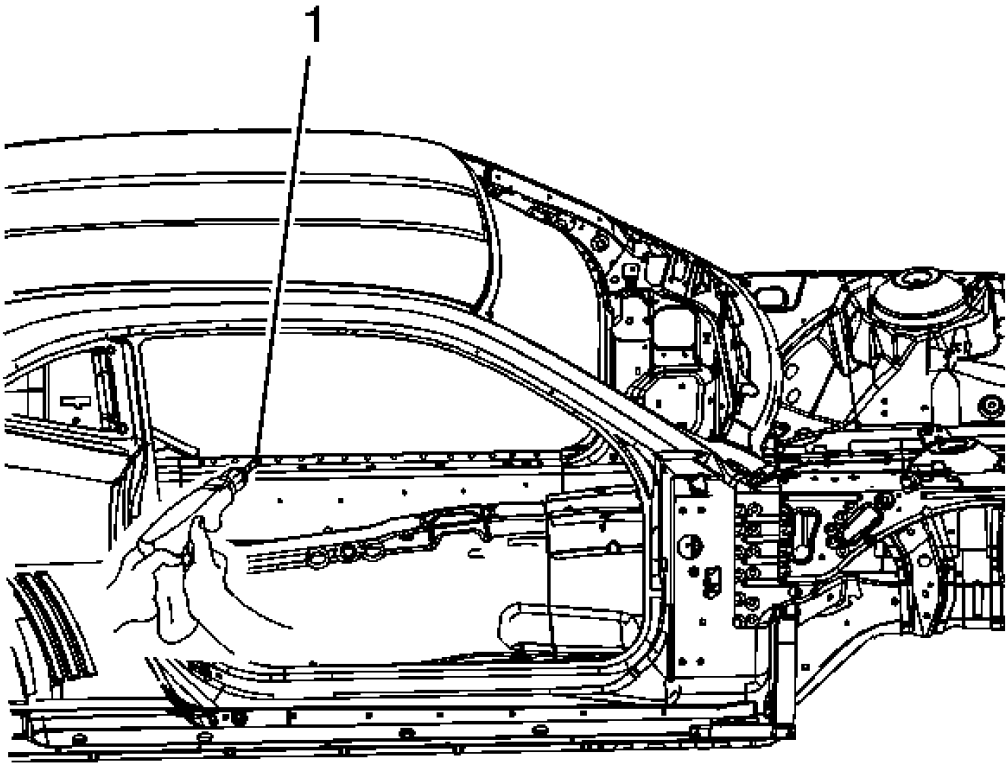


Fig. 71: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: **Do not damage any inner panels or reinforcements.**

NOTE: **The Rocker Inner Panel is made of Ultra High Strength Steel and should be replaced only at factory joints. Sectioning or straightening are not recommended. Refer to Ultra High Strength Steel.**

NOTE: **Ultra High Steel is very difficult to drill. When possible drill spot welds from the back side of the panel.**

NOTE: **Record the number and location of the original welds for installation of the service part.**

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7. Locate and drill out all factory welds (1).

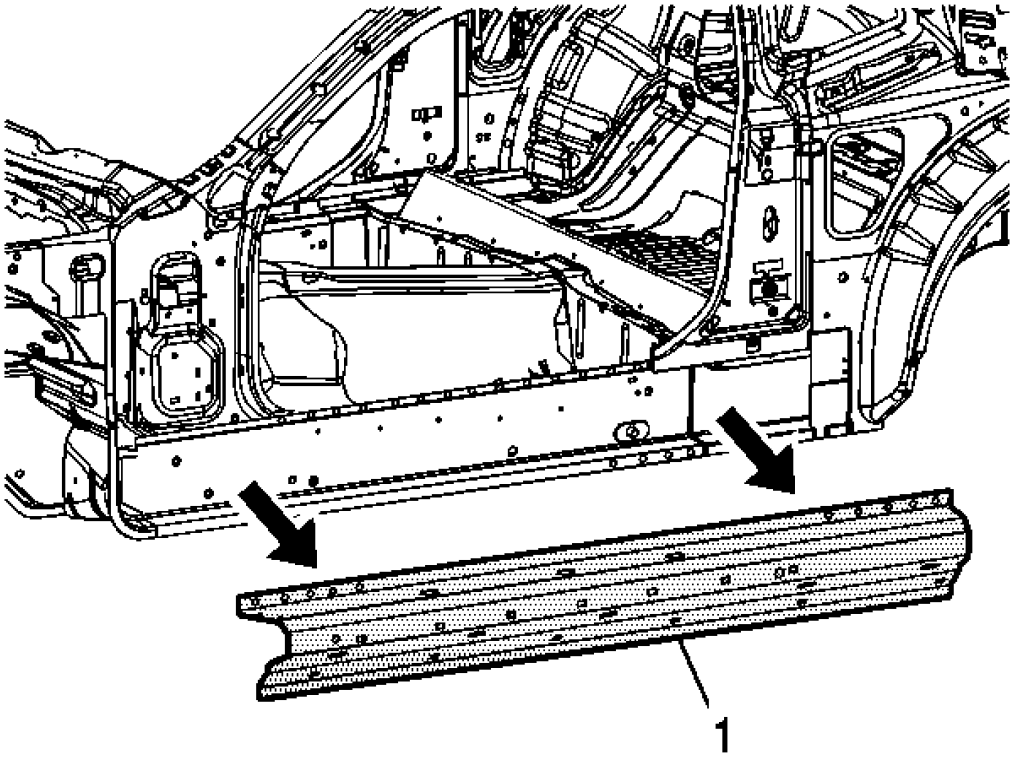


Fig. 72: Removing Damaged Inner Rocker Panel
Courtesy of GENERAL MOTORS CORP.

8. Remove the damaged Inner Rocker Panel (1).

Installation Procedure

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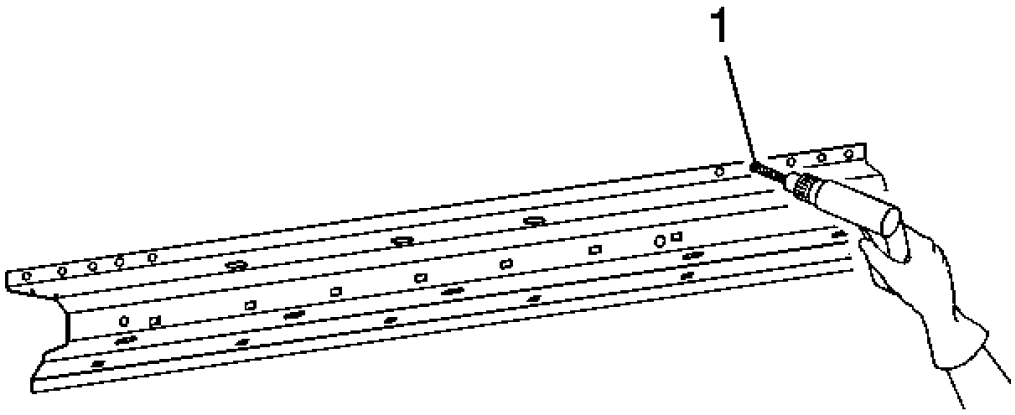


Fig. 73: Drilling Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or Structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary (1), in the locations noted from the original panel.
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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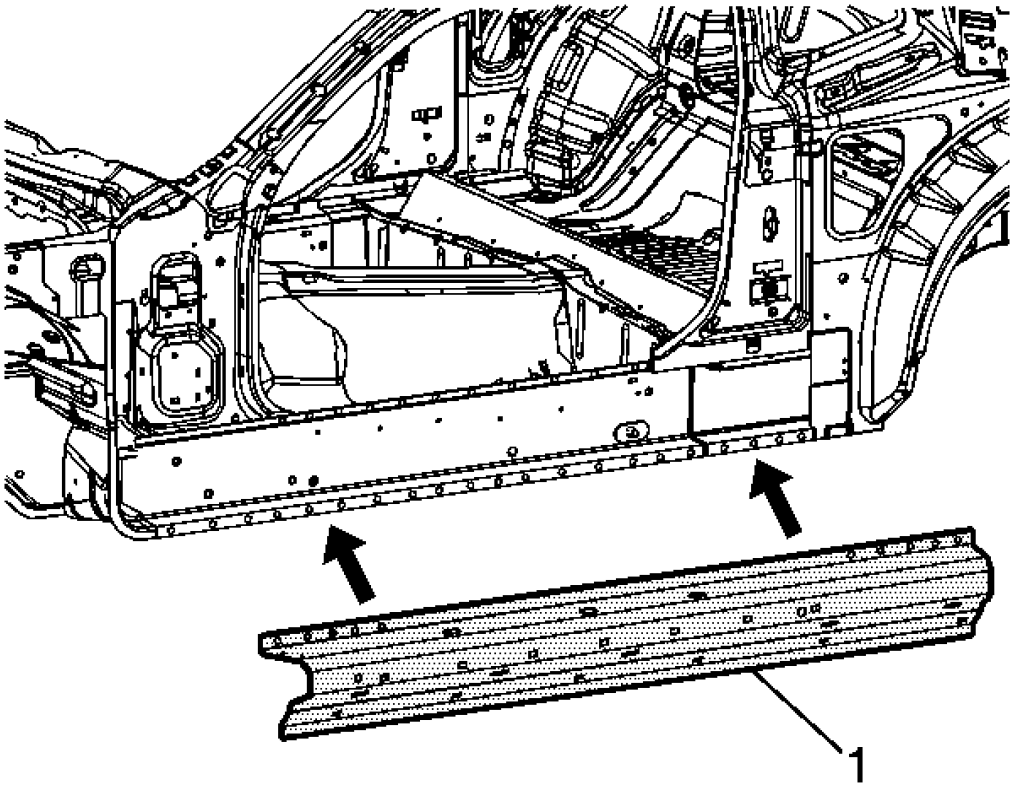


Fig. 74: Positioning Inner Rocker Panel
Courtesy of GENERAL MOTORS CORP.

4. Position the Inner Rocker Panel (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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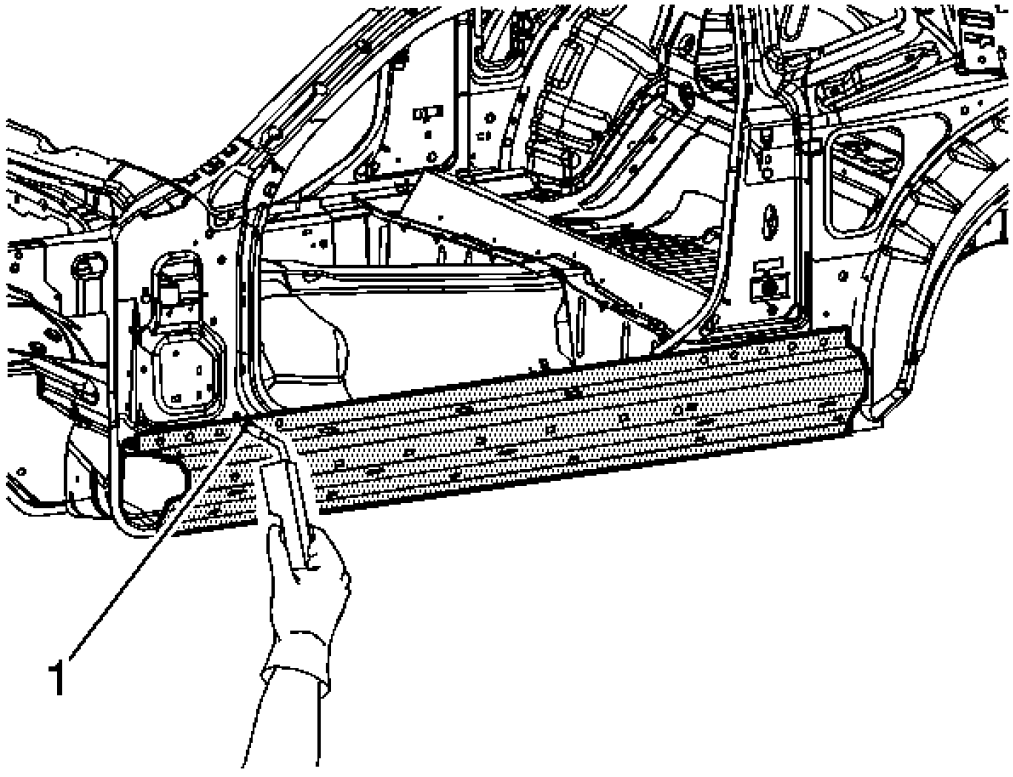


Fig. 75: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

ROCKER OUTER PANEL SECTIONING

Removal Procedure

WARNING: Refer to Collision Sectioning Warning

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WARNING: Refer to Approved Equipment for Collision Repair Warning

WARNING: Refer to Glass and Sheet Metal Handling Warning

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Foam Sound Deadeners Warning** .

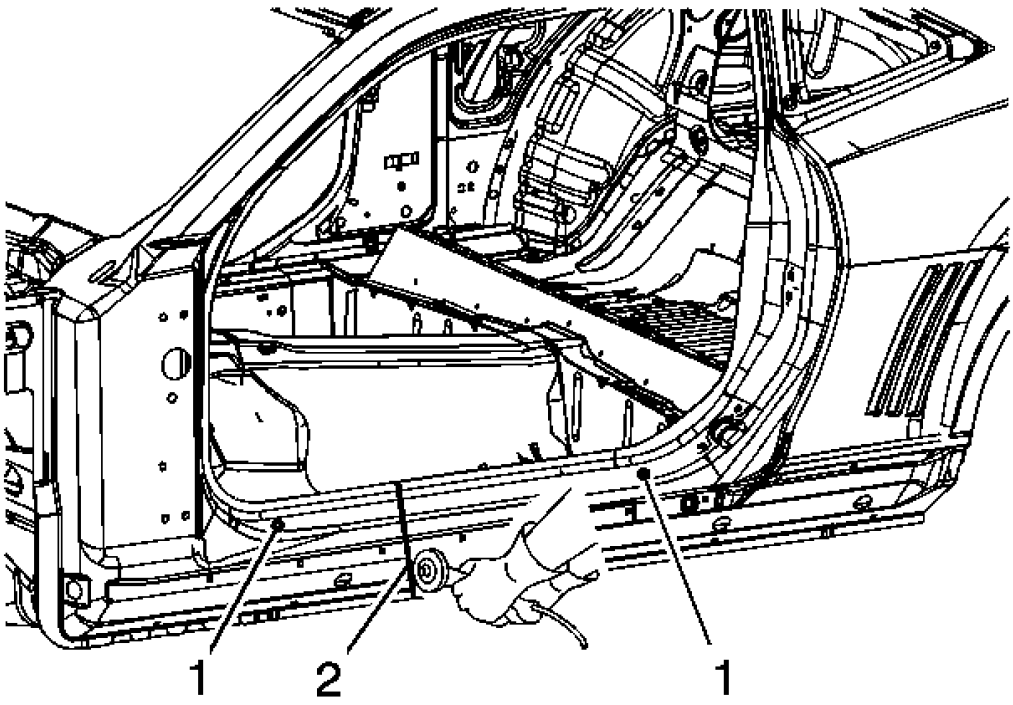


Fig. 76: Identifying & Cutting Rocker Panel Section
Courtesy of GENERAL MOTORS CORP.

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NOTE: **There is minimal clearance between the outer rocker panel and the rocker inner panel reinforcement. Do not damage the inner reinforcement during the rocker outer panel sectioning process. The inner reinforcement is made of ultra high strength steel and should be replaced only at the factory joints. Sectioning or straightening of the reinforcement is not recommended. The rocker outer panel may be sectioned at any location between the radius of the hinge pillar and lock pillar (1) using a 25 mm (1.0 in) overlap joint. Refer to Rocker Inner Panel Reinforcement Replacement.**

6. Cut the rocker panel where sectioning is to be performed (2).
7. Perform additional sectioning procedures as necessary. Refer to **Quarter Outer Panel Sectioning** and **Front Hinge Pillar Body Sectioning**.

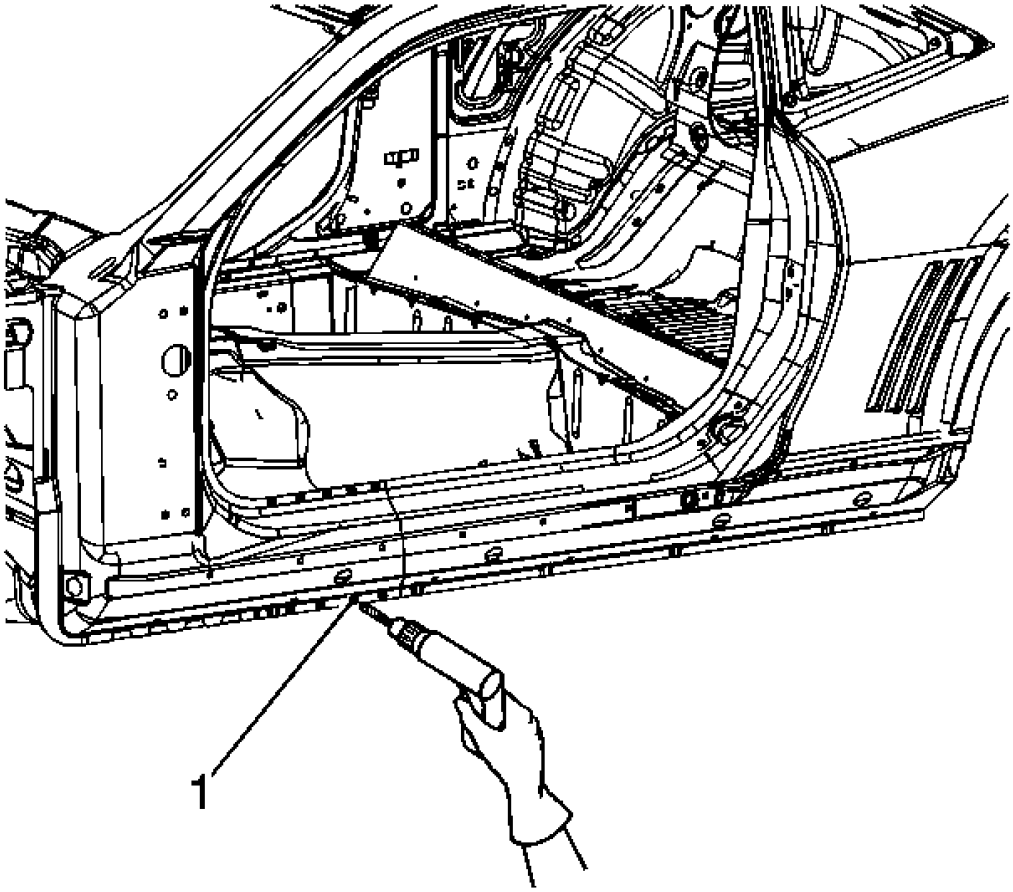


Fig. 77: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

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8. Locate and drill out all factory welds (1). Note the number and location of the welds for installation of the service part.

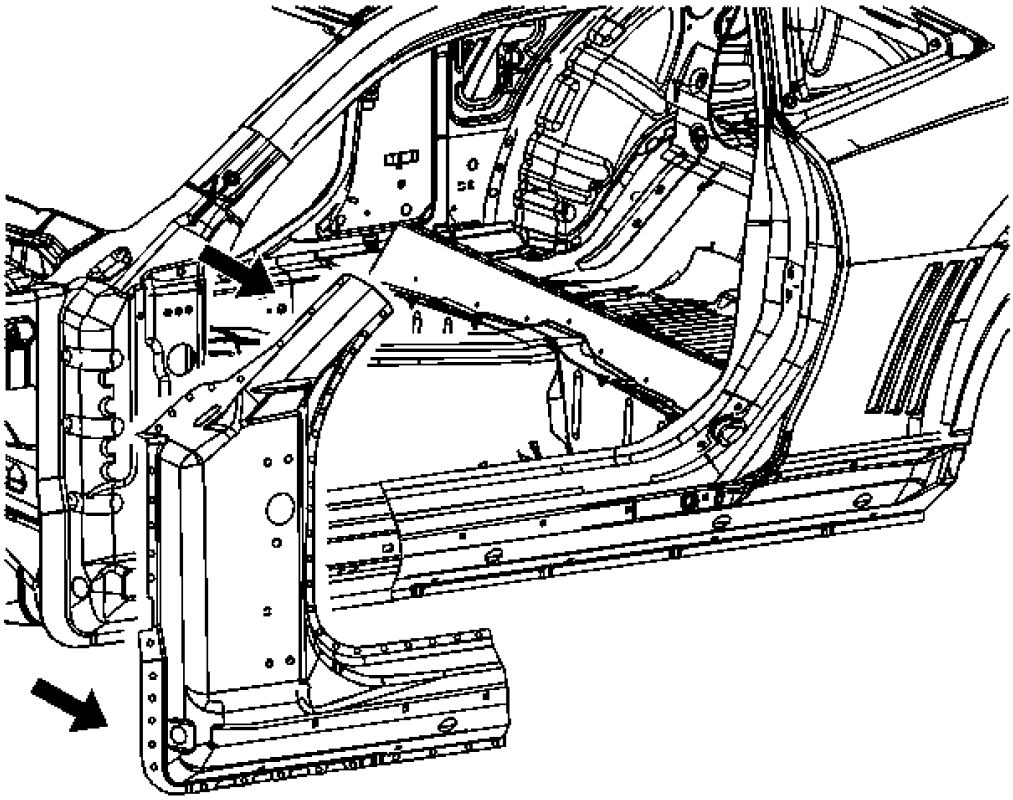


Fig. 78: Removing Damaged Rocker Panel
Courtesy of GENERAL MOTORS CORP.

9. Remove the damaged rocker panel (1).

Installation Procedure

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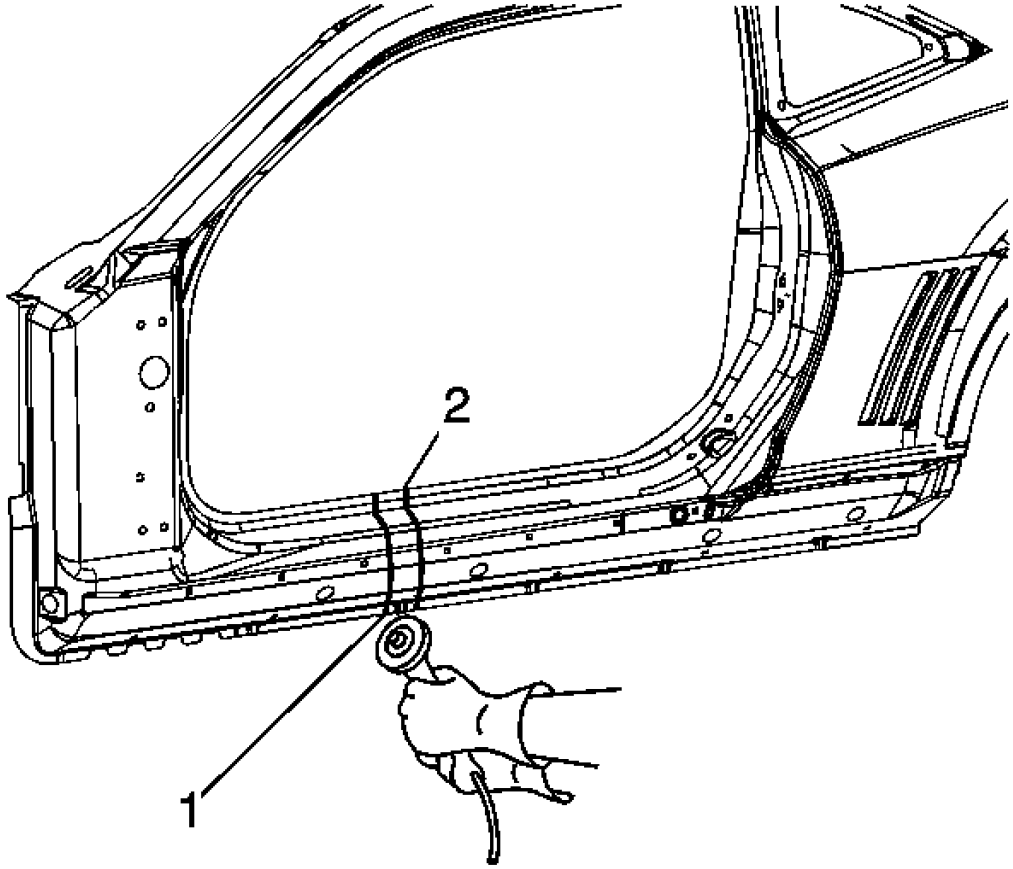


Fig. 79: Cutting Replacement Rocker Panel
Courtesy of GENERAL MOTORS CORP.

1. Cut the replacement rocker panel (2) to create a 25 mm (1.0 in) overlap from the original cut location (1).

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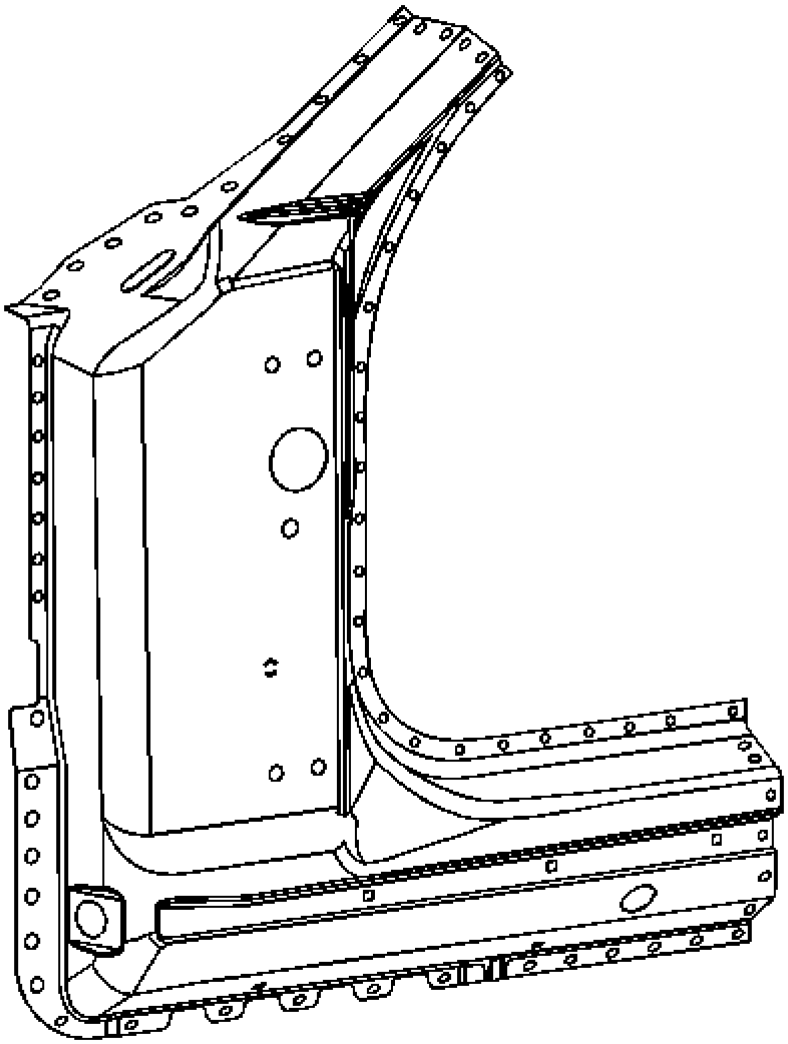


Fig. 80: Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: In any area damaged beyond recognition, or structural weld-thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

2. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel and along the sectioning cut (1).
3. Prepare all attachment surfaces as necessary.

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4. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

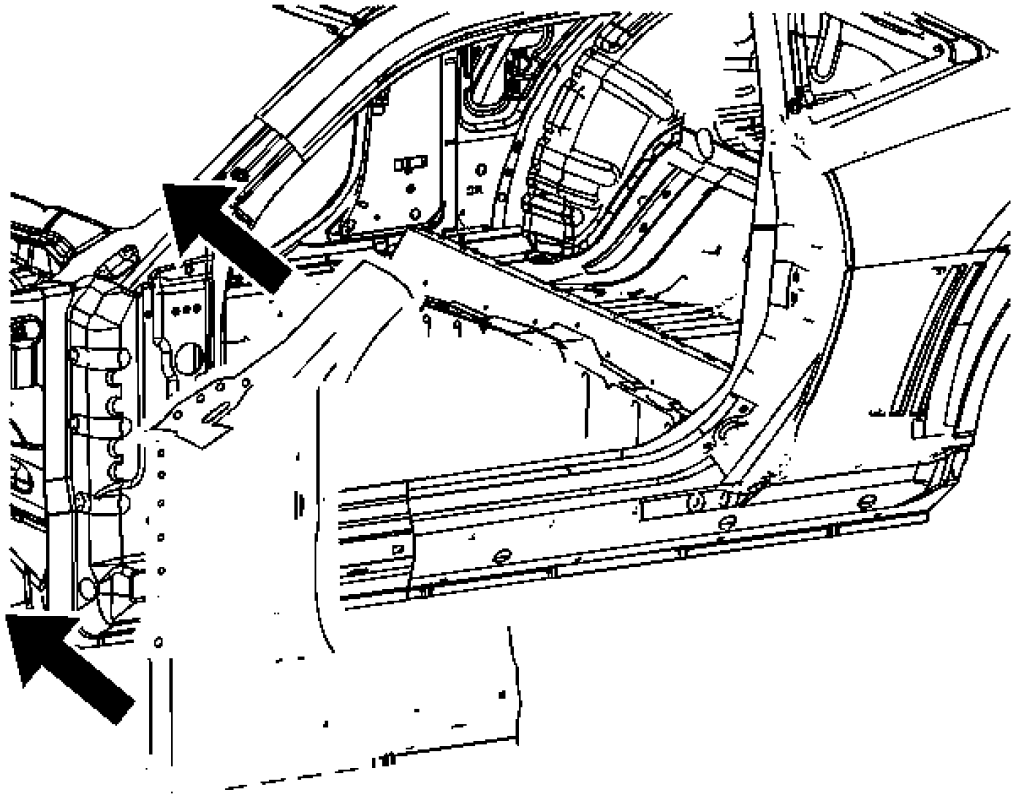


Fig. 81: Positioning Service Panel
Courtesy of GENERAL MOTORS CORP.

NOTE: The service part should overlap the original panel at the cut location by 25 mm (1.0 in).

5. Position the service panel to the vehicle (1).
6. Clamp service part in place.
7. Inspect the vehicle for proper dimensions using 3-dimensional measuring equipment.

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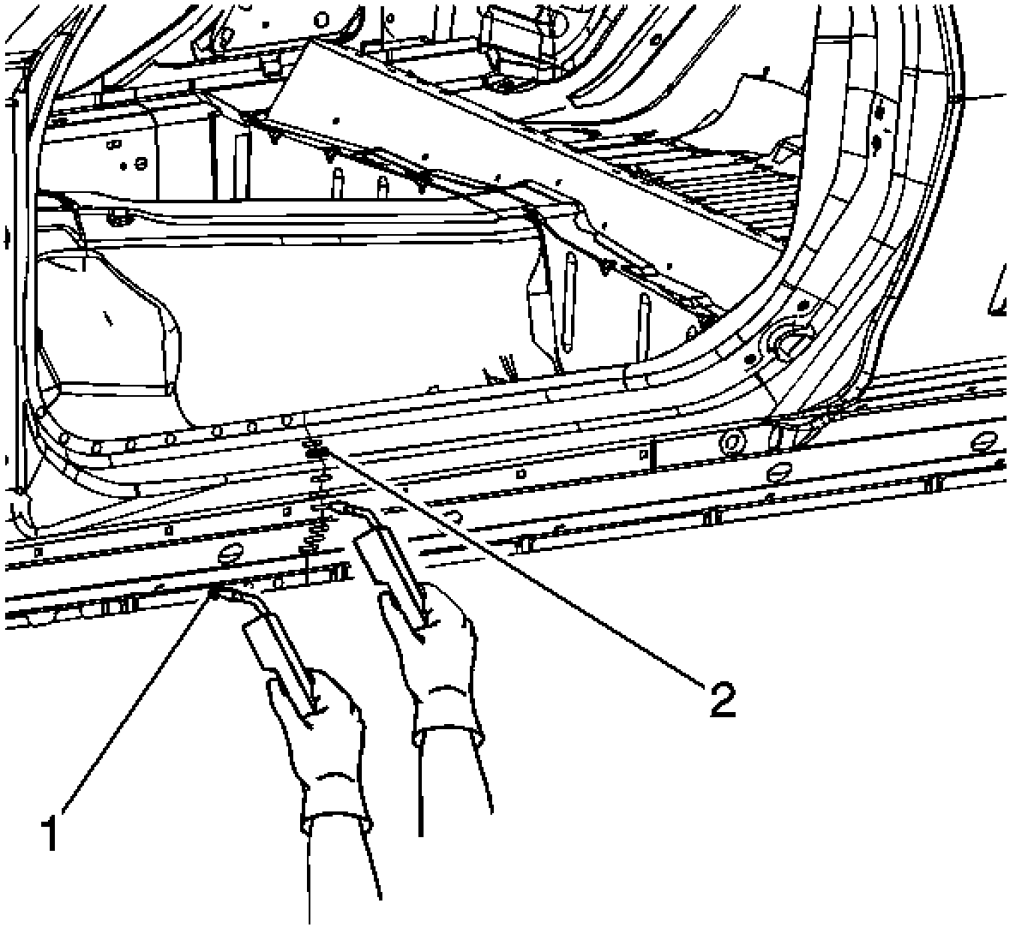


Fig. 82: Plug & Stitch Welding
Courtesy of GENERAL MOTORS CORP.

8. Plug weld accordingly (1).

NOTE: **To create a solid weld with minimum heat distortion make 25 mm (1 in) stitch welds along the seam with 25 mm (1 in) gaps between them. Then go back and complete the stitch weld.**

9. Stitch weld sectioning joint (2).
10. Clean and prepare all welded surfaces.
11. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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12. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
13. Install all related panels and components.
14. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
15. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

FRONT SIDE DOOR OUTER PANEL REPLACEMENT

Removal Procedure

WARNING: Refer to Approved Equipment for Collision Repair Warning .

NOTE: Before beginning the repair, refer to Metal Panel Bonding for proper adhesive applicator preparations and general information.

1. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
2. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
3. Remove the door from the vehicle. Refer to **Front Side Door Replacement** .
4. Remove all related panels and components.

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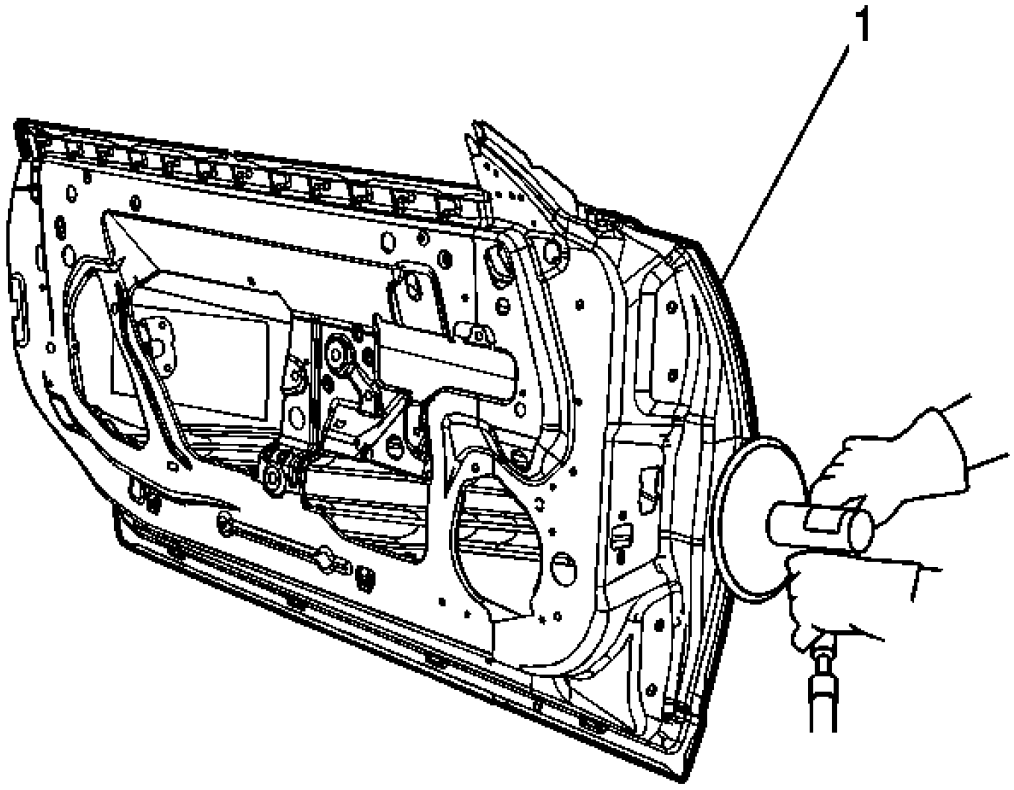


Fig. 83: Separating Outer Door Panel From Door Shell
Courtesy of GENERAL MOTORS CORP.

NOTE: The inner belt reinforcement is welded to the door assembly and is not serviced separately. Do not remove it during this procedure. If it is damaged then the door must be replaced.

5. Grind the edges of the door outer panel to separate the outer door panel from the door shell (1).

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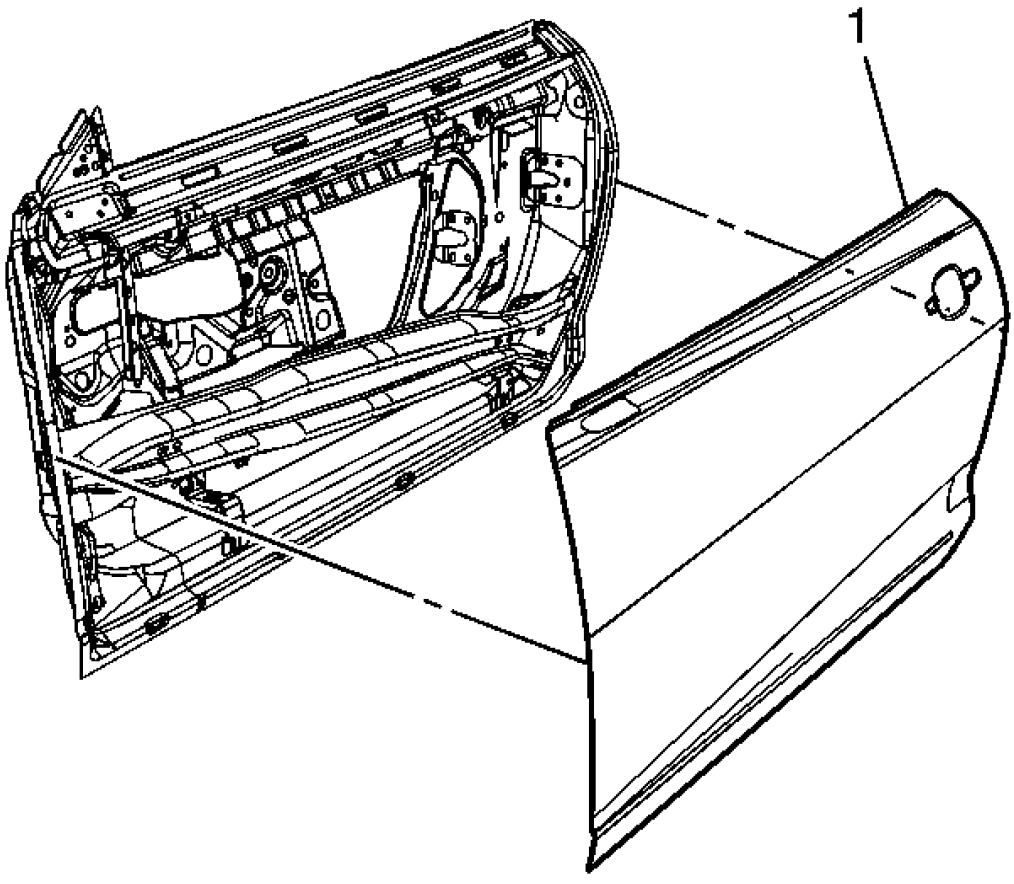


Fig. 84: Removing Outer Door Panel
Courtesy of GENERAL MOTORS CORP.

WARNING: Inspection of the door guard beam for damage must be performed before replacement of the door outer panel. If damage to the door guard beam is found the door must be replaced. Failure to do so may compromise the structural integrity of the vehicle and may cause personal injury if the vehicle is involved in a collision.

6. Remove the outer door panel (1).
7. Remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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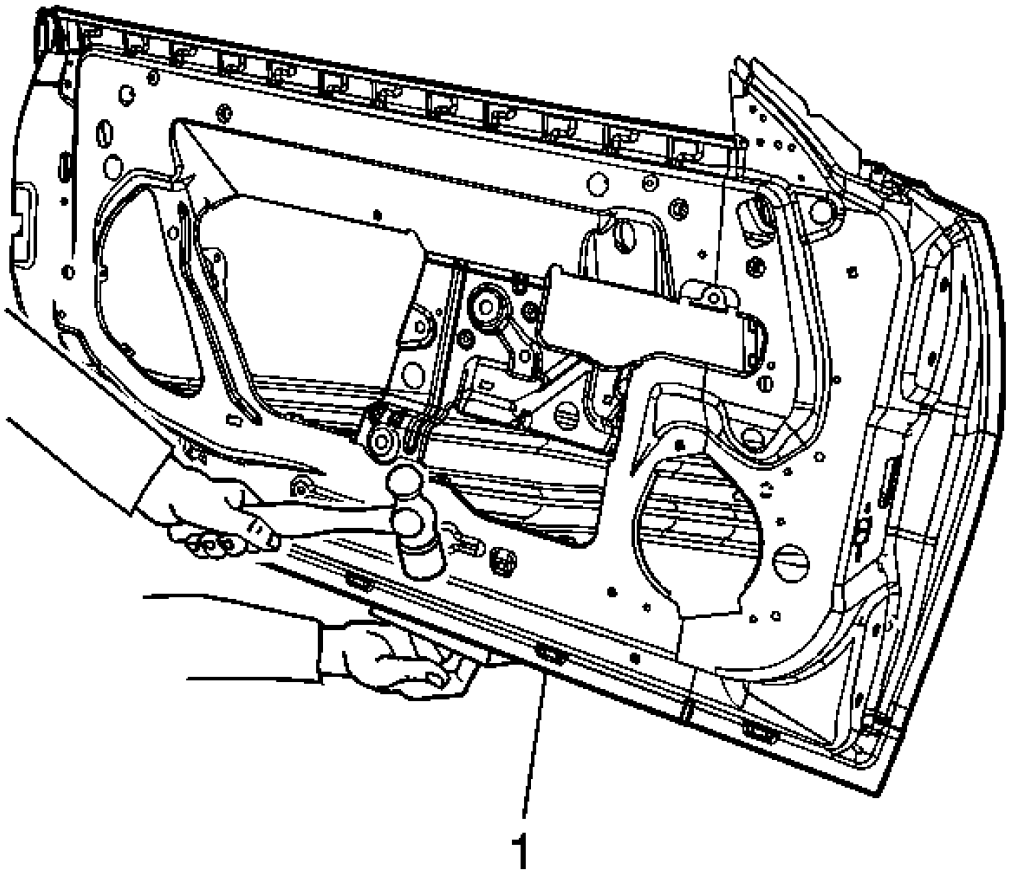


Fig. 85: Straightening Edges Of Door Shell
Courtesy of GENERAL MOTORS CORP.

8. Straighten the edges of the door shell (1).

Installation Procedure

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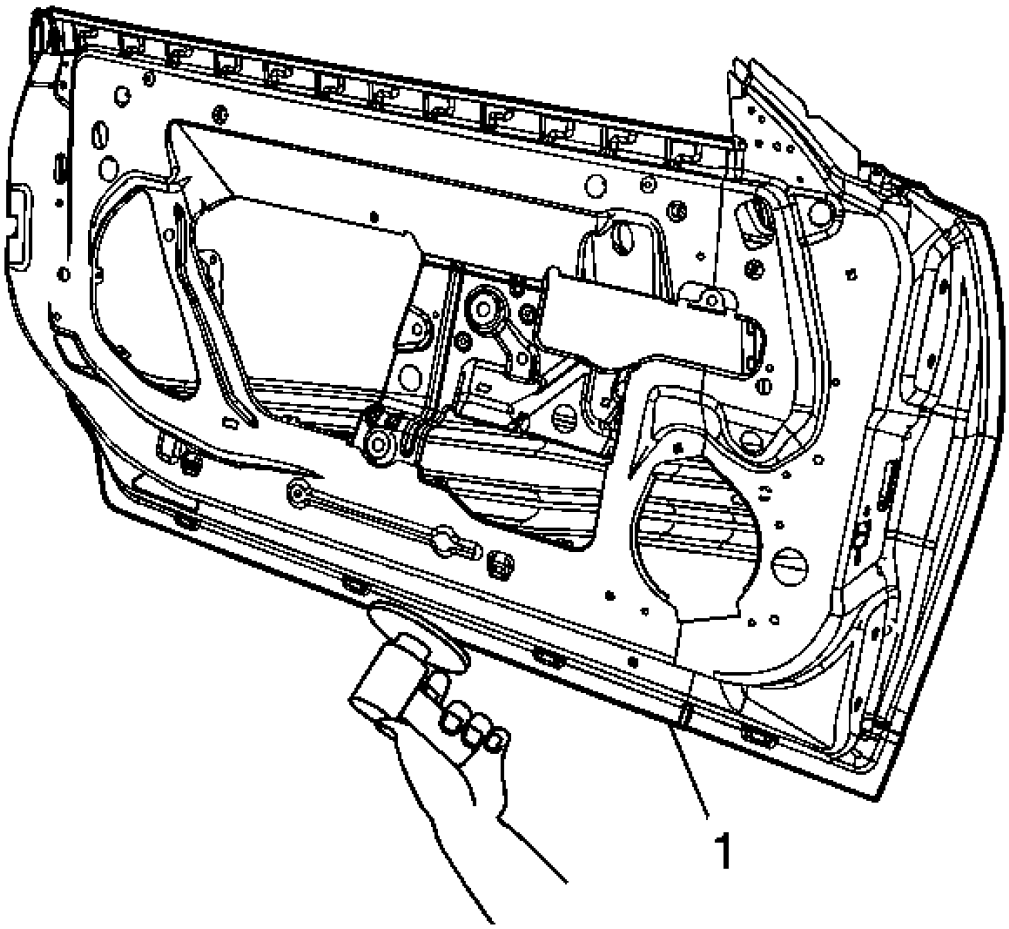


Fig. 86: Grinding Surface Of Door Shell Mating Flanges
Courtesy of GENERAL MOTORS CORP.

1. Using a grinding disk grind the surface of the door shell mating flanges to bare steel (1).

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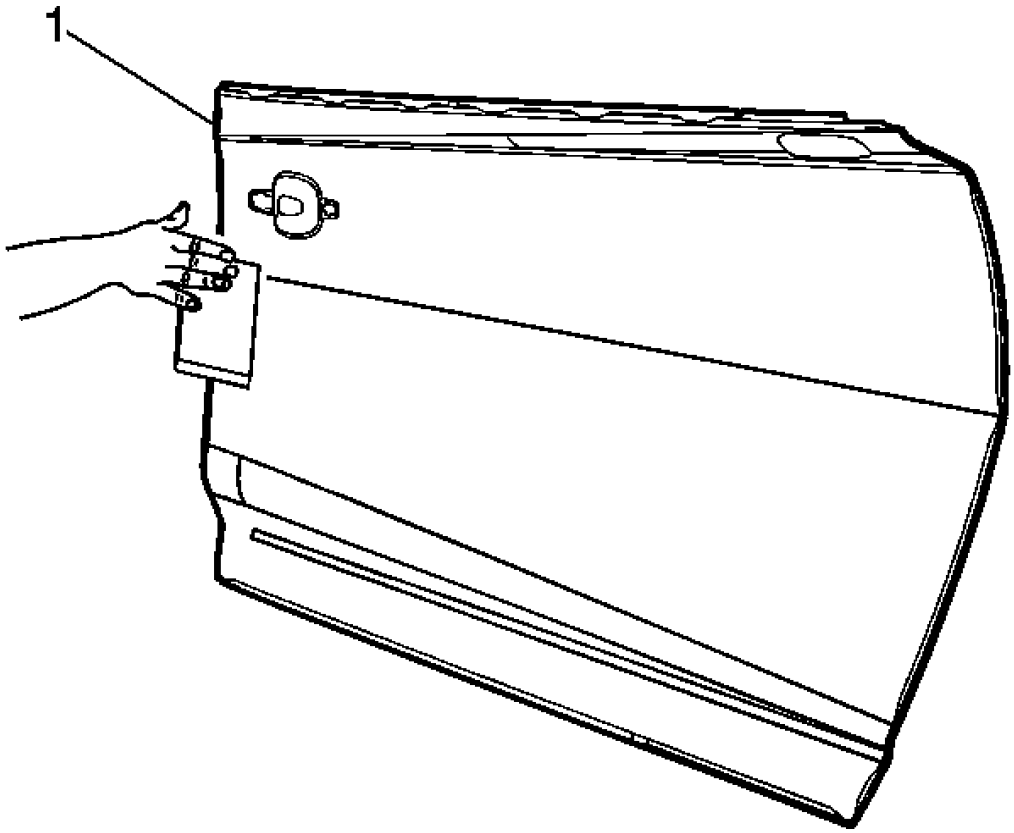


Fig. 87: Removing Gloss Of E-Coat
Courtesy of GENERAL MOTORS CORP.

2. Scuff the opposing mating surfaces of the door outer panel to remove the gloss of the E-Coat (1).
3. Clean the mating surfaces.

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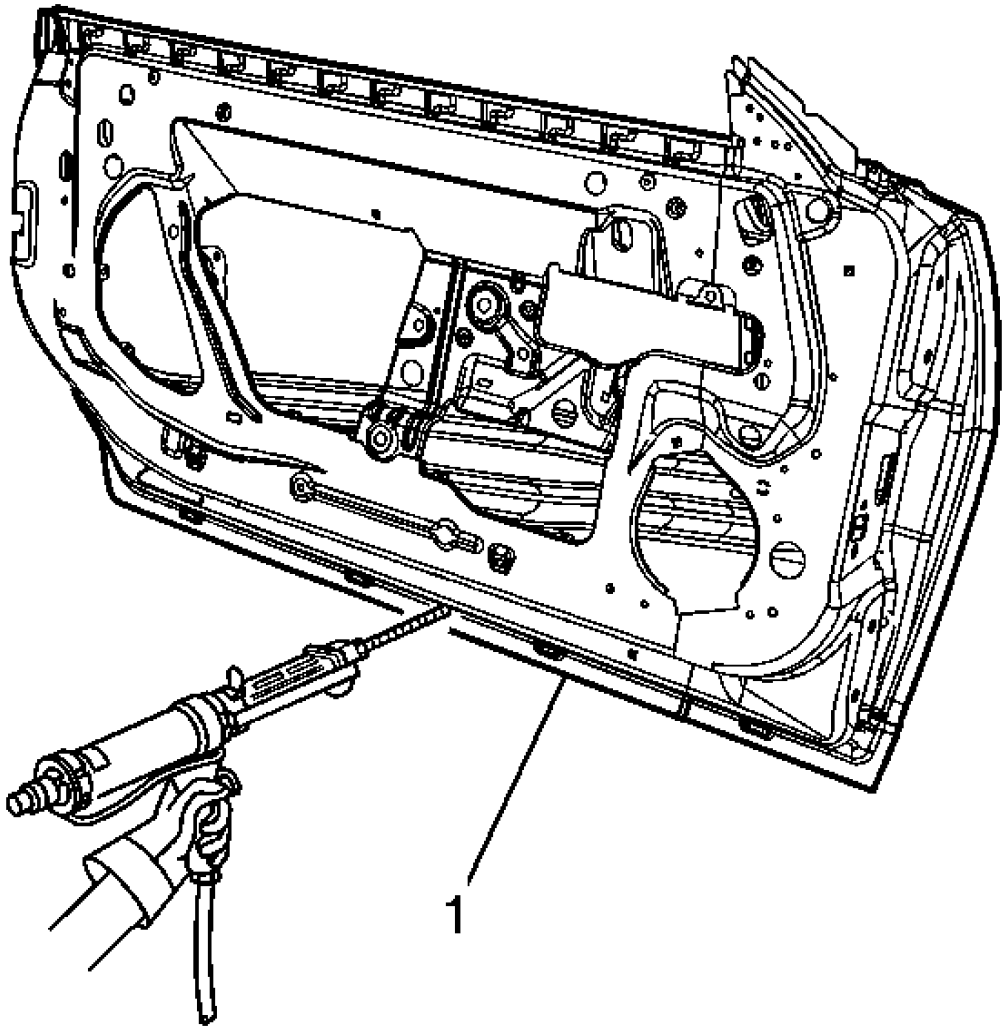


Fig. 88: Applying Metal Panel Bonding Adhesive
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not allow the adhesive to totally cure off the vehicle, as proper alignment of the door outer panel to the door shell will be difficult.

4. Apply a 3-6 mm (1/8-1/4 in) bead of metal panel bonding adhesive to both of the mating surfaces (1).
5. Using a small acid brush, spread a coat of adhesive to cover all the bare metal surfaces to ensure corrosion protection.

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NOTE: Do NOT pull the panels apart after joined together. Slide the panels against each other to realign the panels.

6. Apply a 9-13 mm (3/8-1/2 in) bead of metal panel bonding adhesive to the mating surface of the service panel.

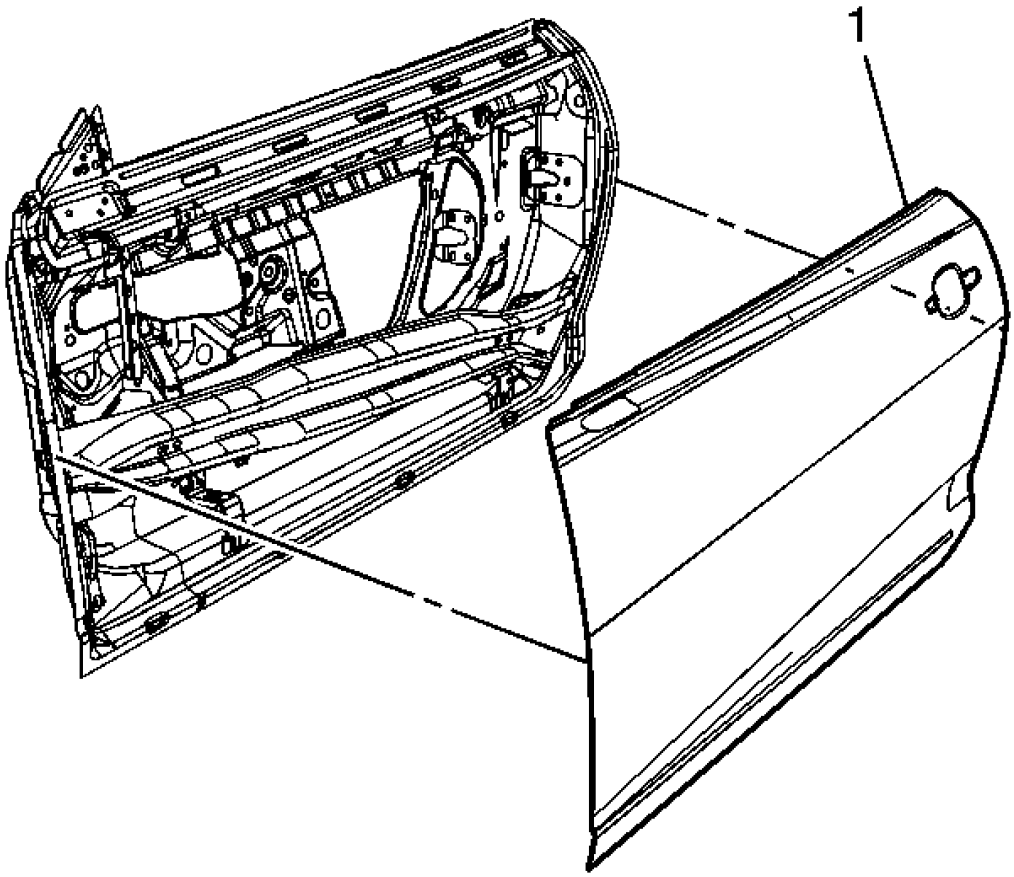


Fig. 89: Installing Door Outer Panel To Door Shell
Courtesy of GENERAL MOTORS CORP.

7. Install the door outer panel to the door shell (1).
8. Clamp the door outer panel into position as required.

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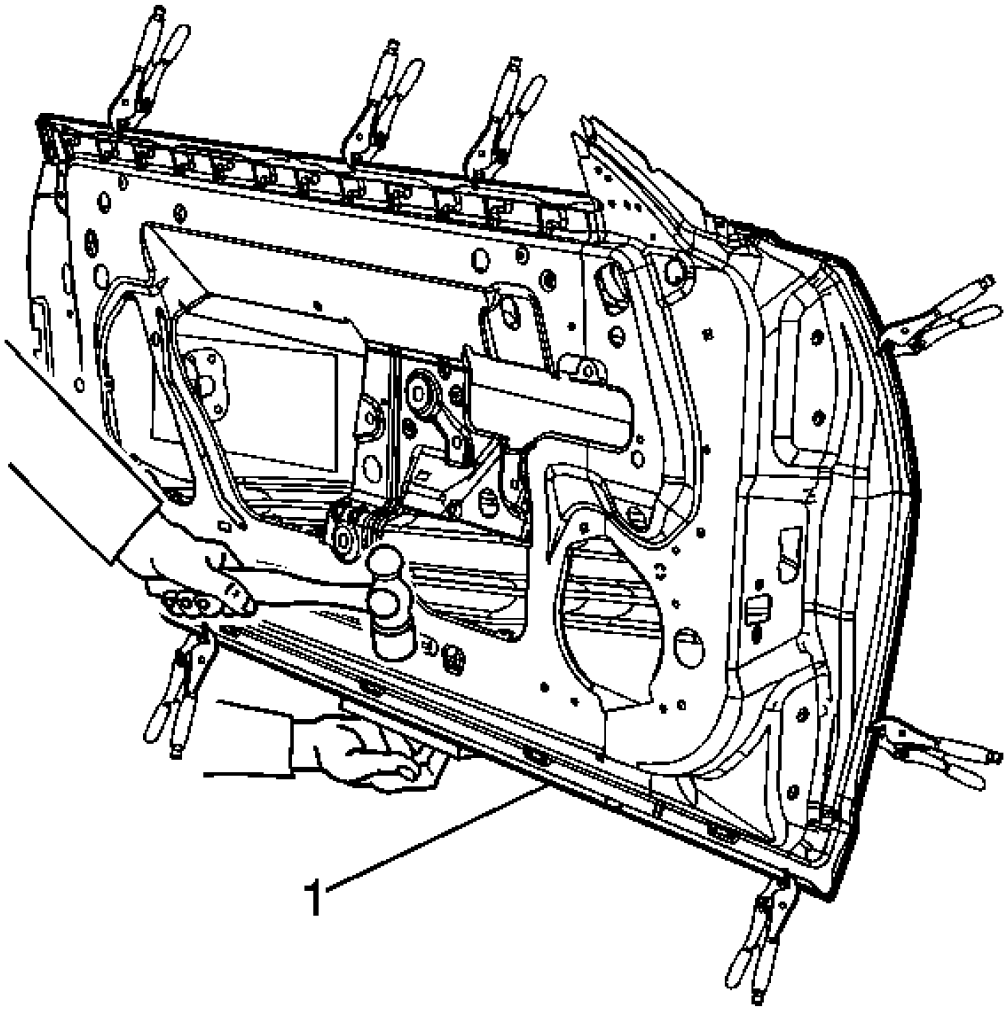


Fig. 90: Re-Hemming Hem Flanges Around Door Shell
Courtesy of GENERAL MOTORS CORP.

9. Using a hammer, re-hem the hem flanges around the door shell (1).

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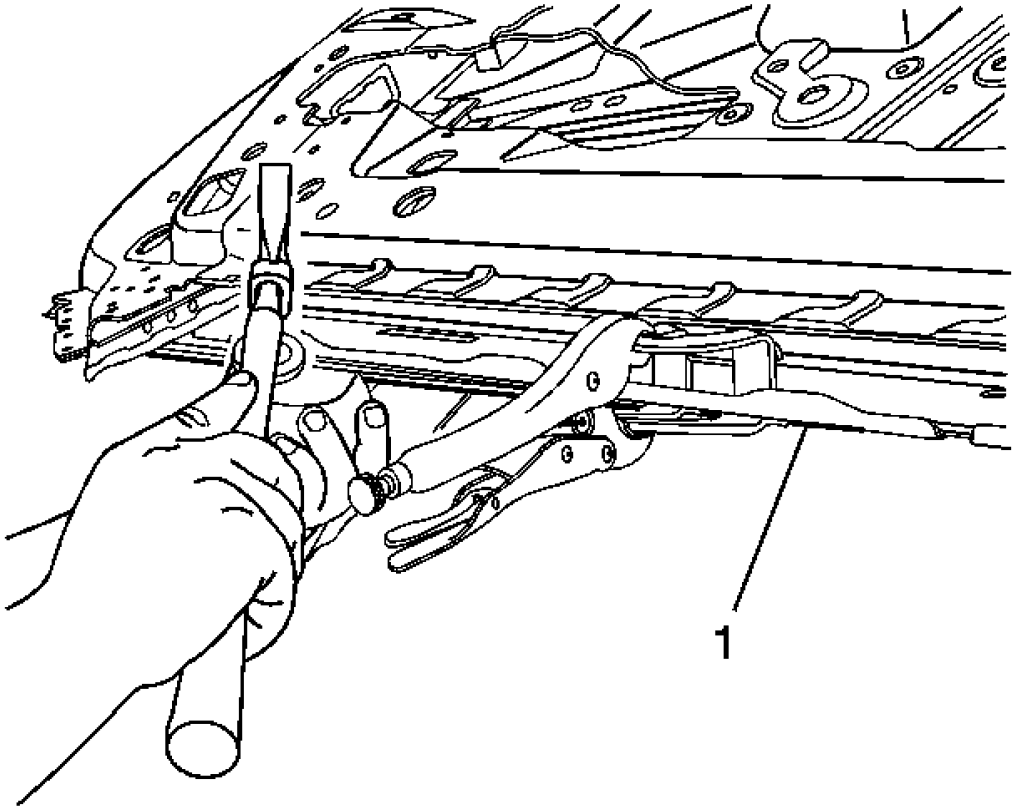


Fig. 91: Hammering In Stages
Courtesy of GENERAL MOTORS CORP.

10. Continue to hammer in stages along the hem flanges (1), paying attention to the upper belt flange area due to the close proximity.
11. Using lacquer thinner remove the excess adhesive from the door panel area.
12. Install the door to the vehicle. Inspect the door outer panel for proper alignment. Adjust the alignment as required. Refer to **Front Side Door Replacement** .
13. Clean and prepare all welded surfaces.

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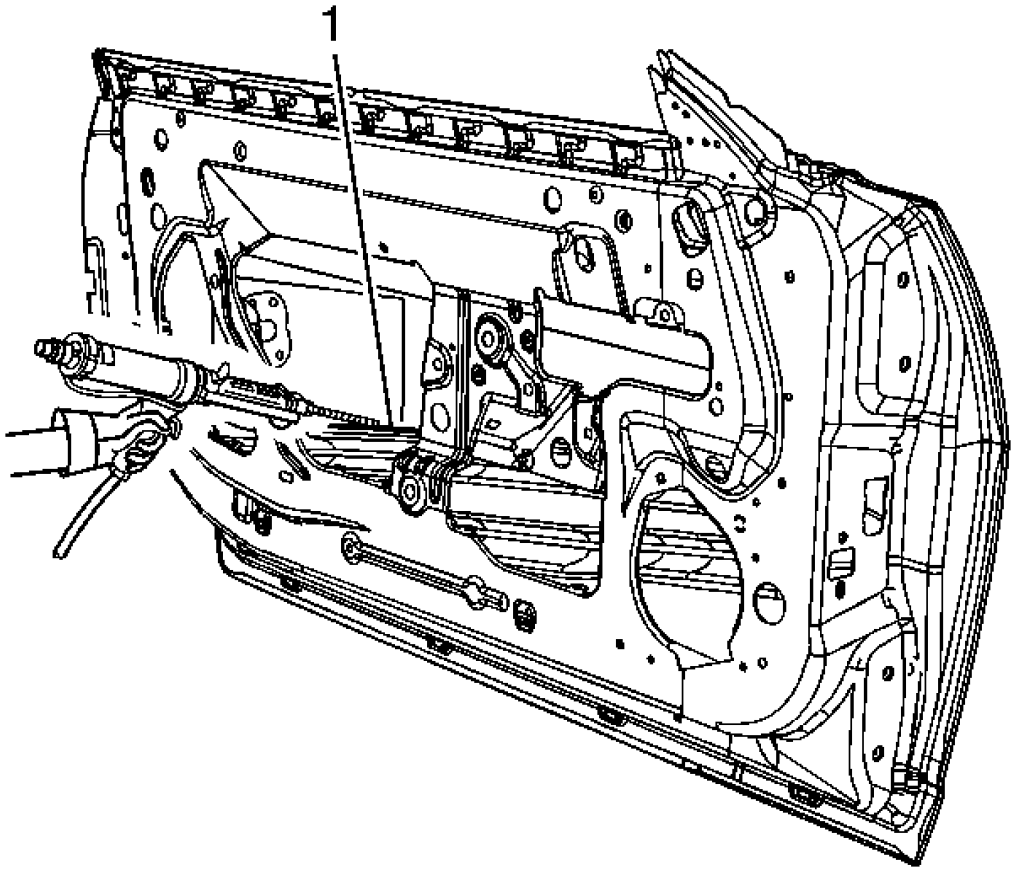


Fig. 92: Applying Fusor Super Flexible Anti-Flutter Foam
Courtesy of GENERAL MOTORS CORP.

14. Apply Fusor super flexible anti-flutter foam - fast set, Fusor P/N 121/124 or equivalent in 4-5 evenly spaced locations between the door outer panel and the inner safety beam and the upper belt reinforcement (1).
15. Apply sealers and anti-corrosion materials to the repair area as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
16. Paint the repaired area. Refer to **Basecoat/Clearcoat Paint Systems** .
17. Install all related panels and components.
18. Enable the SIR system. Refer to **SIR Disabling and Enabling** .
19. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .

QUARTER OUTER PANEL SECTIONING

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Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

NOTE: The body side can be replaced at factory seams, but requires the removal of the roof and front upper rail. The sectioning procedures have been developed as a more cost effective alternative to complete replacement. The specific area to be sectioned is determined by the extent of the damage to the vehicle.

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Foam Sound Deadeners Warning** .

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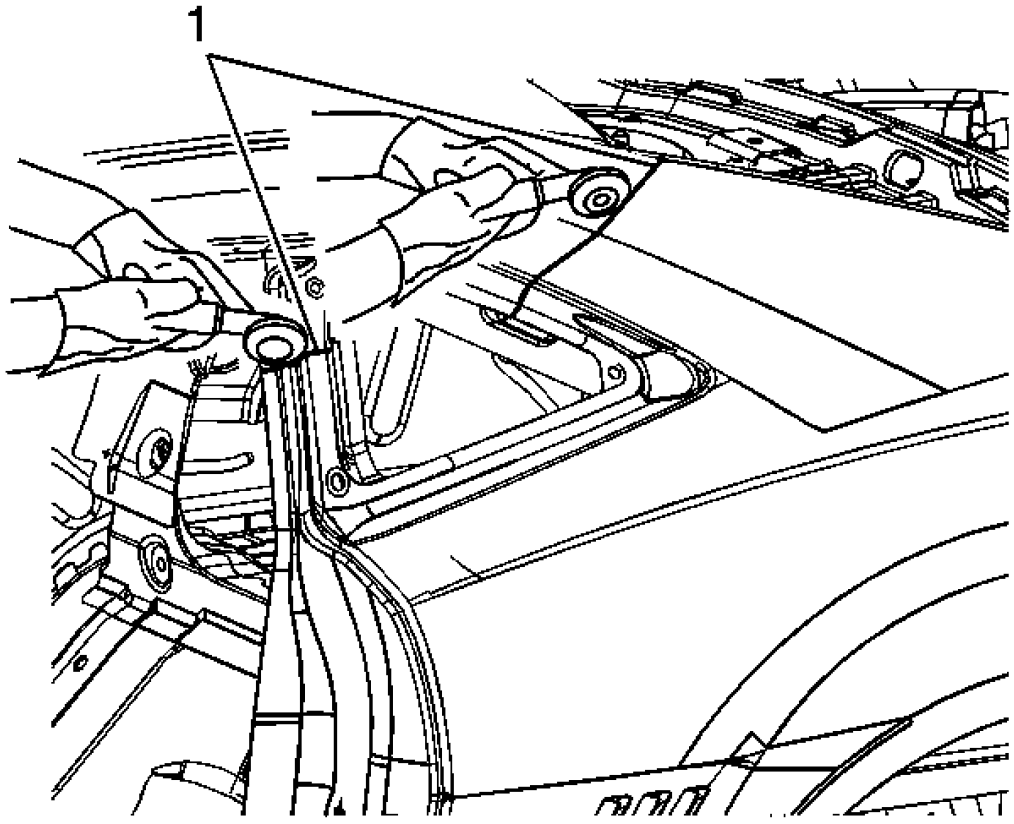


Fig. 93: Cutting Quarter Panel
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements. The Quarter Panel may be sectioned between the quarter glass opening and the rear window opening, using a 50 mm (2.0 in) sleeve.

6. Cut the quarter panel where sectioning is to be performed (1).
7. Perform additional sectioning procedures as necessary. Refer to **Rocker Outer Panel Sectioning**.

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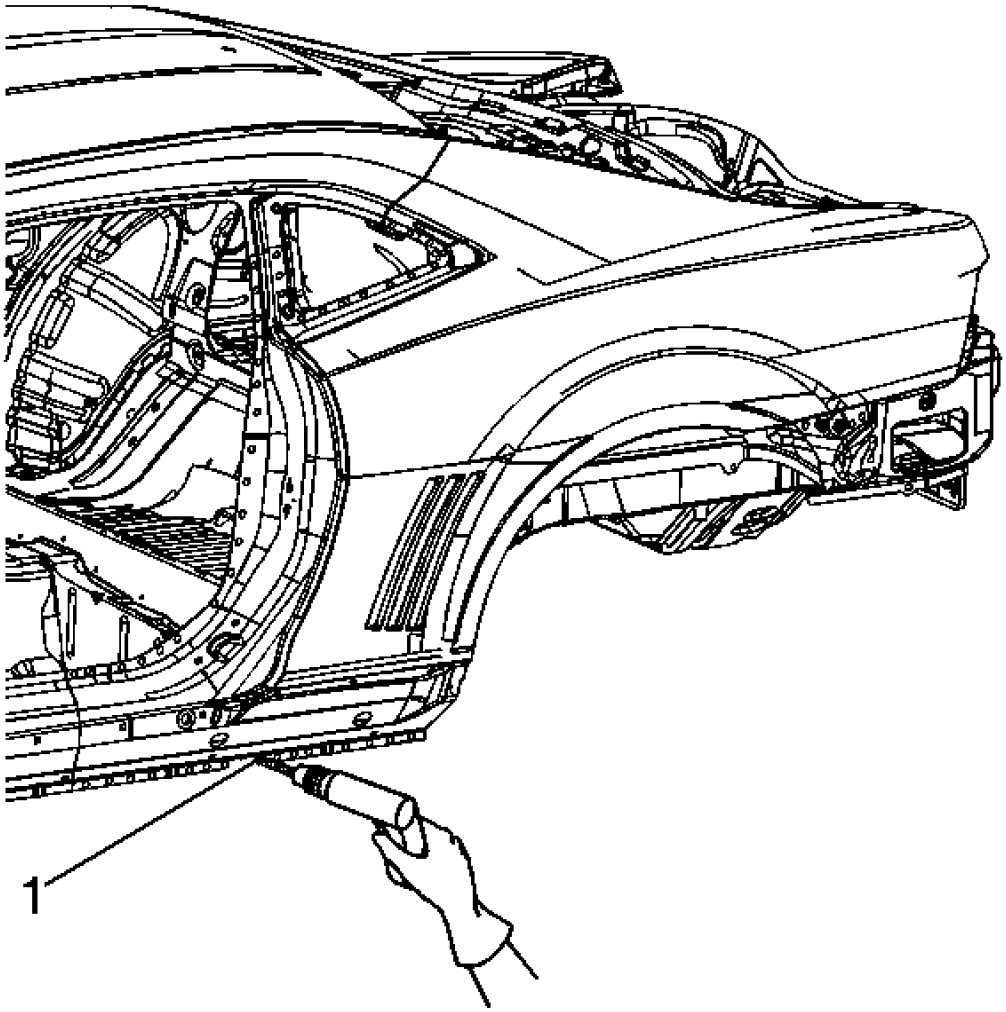


Fig. 94: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Record the number and location of the original welds for installation of the service part.

8. Locate and drill out all factory welds (1).

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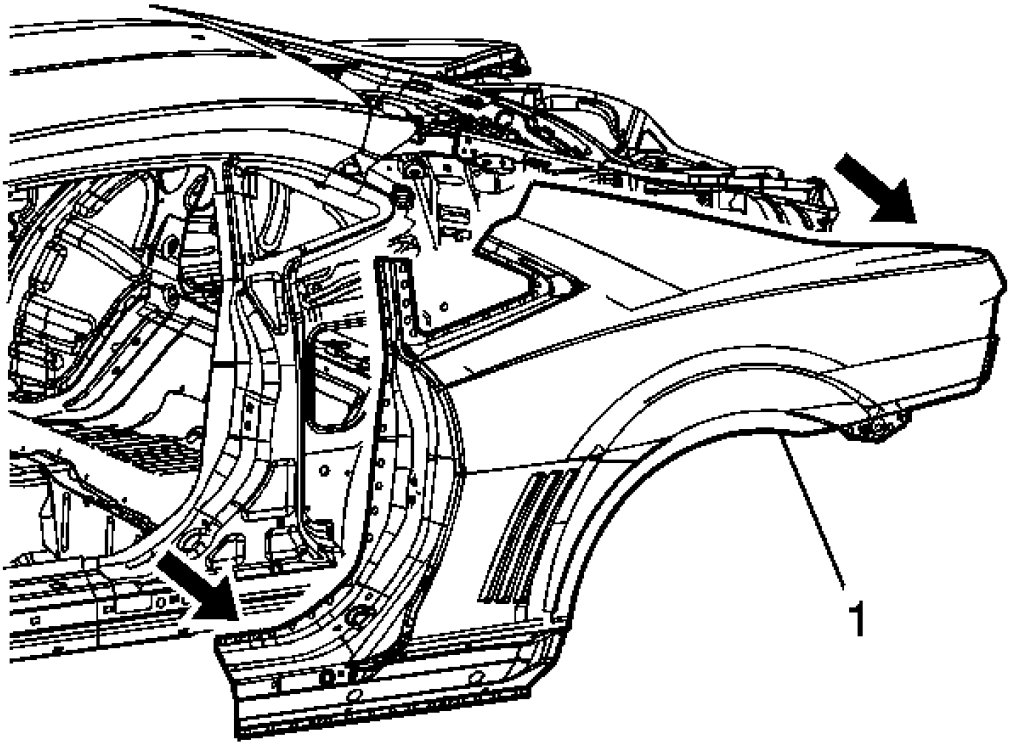


Fig. 95: Removing Damaged Quarter Panel
Courtesy of GENERAL MOTORS CORP.

9. Remove the damaged quarter panel (1).

Installation Procedure

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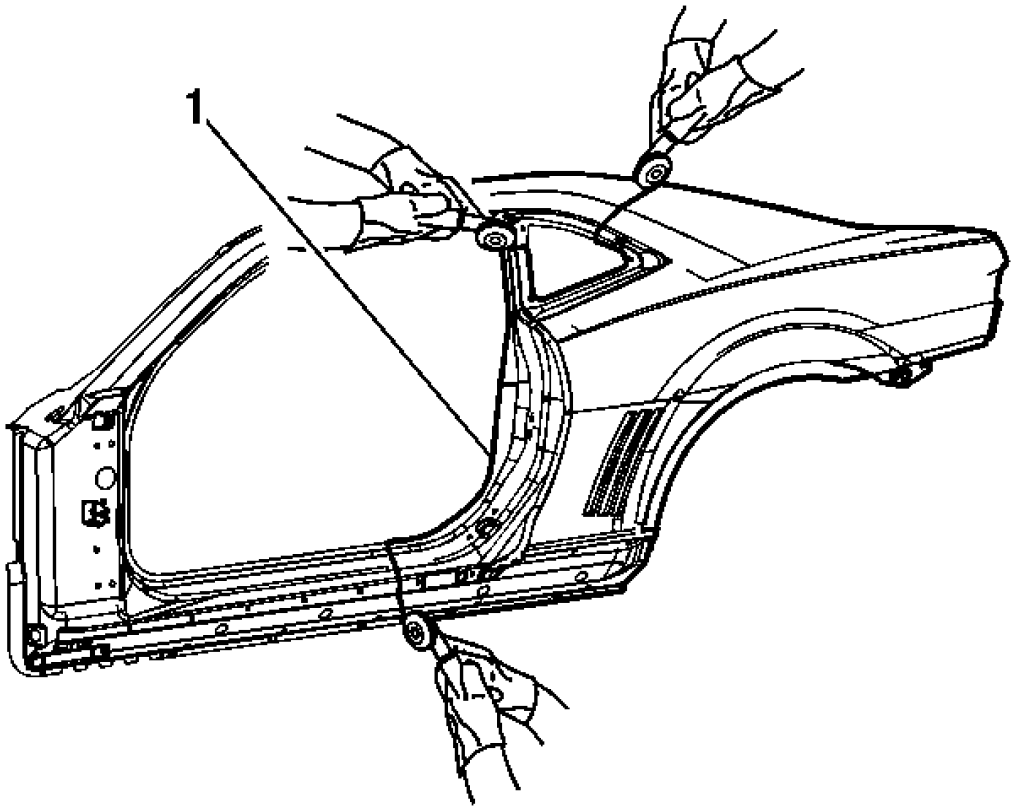


Fig. 96: Cutting Replacement Body Side
Courtesy of GENERAL MOTORS CORP.

1. Cut the replacement body side in corresponding locations to fit the original panel (1). The sectioning joint should be trimmed to allow 1.5 times the metal thickness at the sectioning joint.

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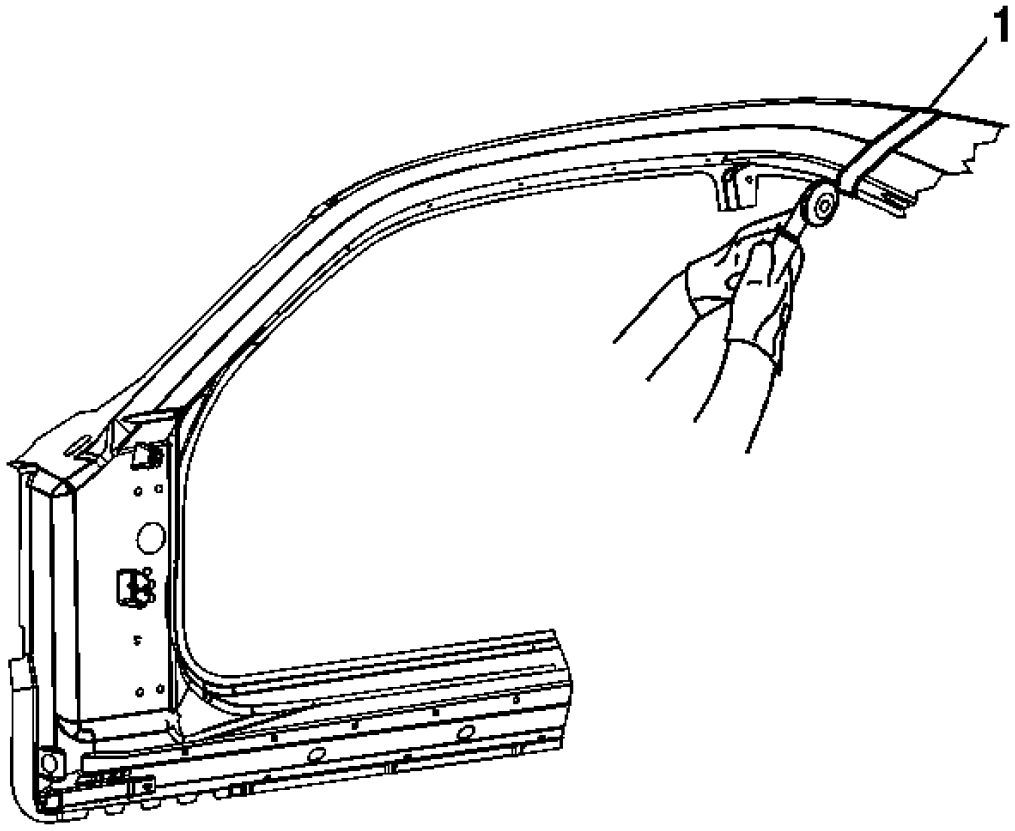


Fig. 97: Creating Backing Plate
Courtesy of GENERAL MOTORS CORP.

NOTE: The sectioning joint in the center pillar does not require a backing plate the center pillar reinforcement can be used as a weld backer.

2. Create a 50 mm (2 in) backing plate from the unused portion of the service part (1). Trim the backing plate as necessary to fit behind the sectioning joint where there is no reinforcement.

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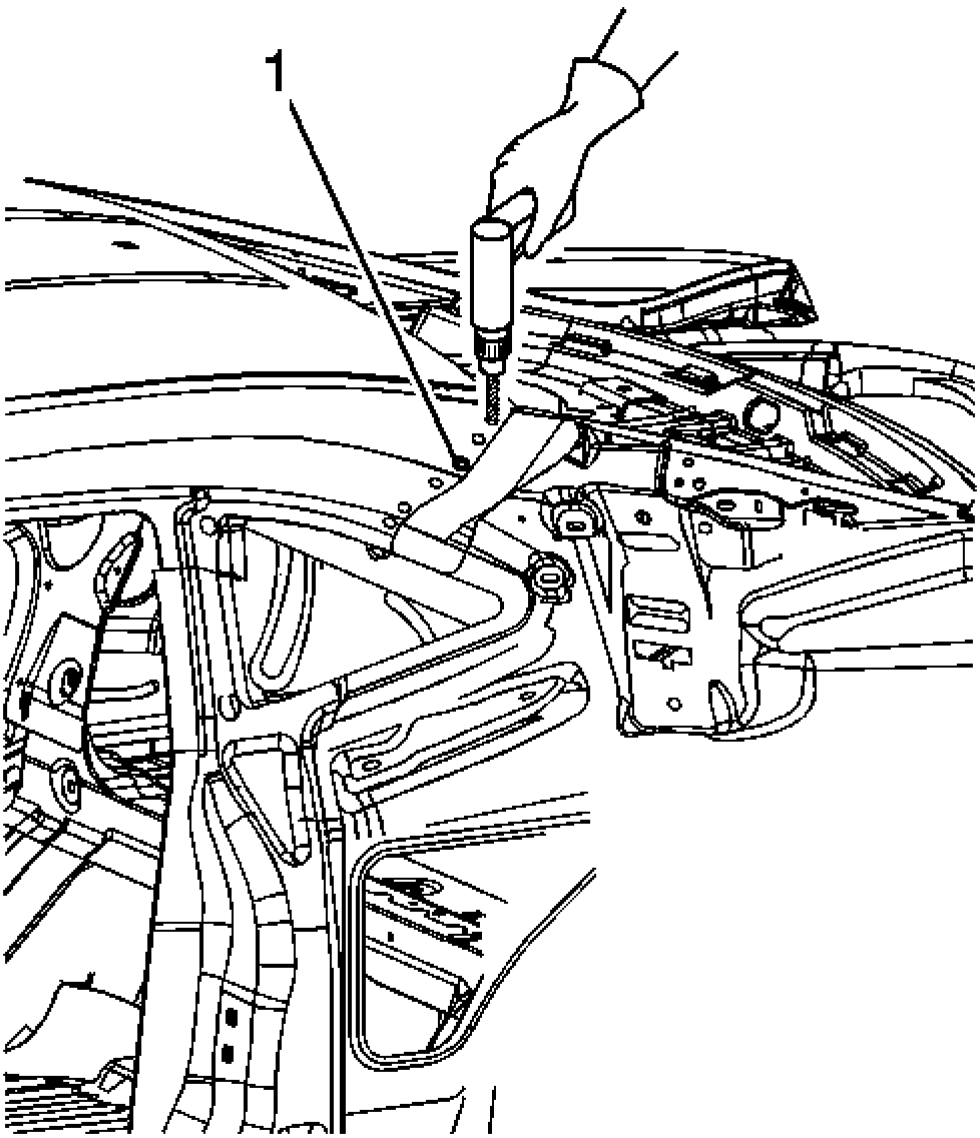


Fig. 98: Driling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

3. Drill 8 mm (5/16 in) plug weld holes along the sectioning cut on the remaining original part (1). Locate these holes 13 mm (1/2 in) from the edge and spaced 40 mm (1.5 in) apart.

NOTE: In any area damaged beyond recognition, or Structural weld-thru adhesive

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was present, space plug weld holes every 40 mm (1.5 in) apart.

4. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel.
5. Prepare all attachment surfaces as necessary.
6. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

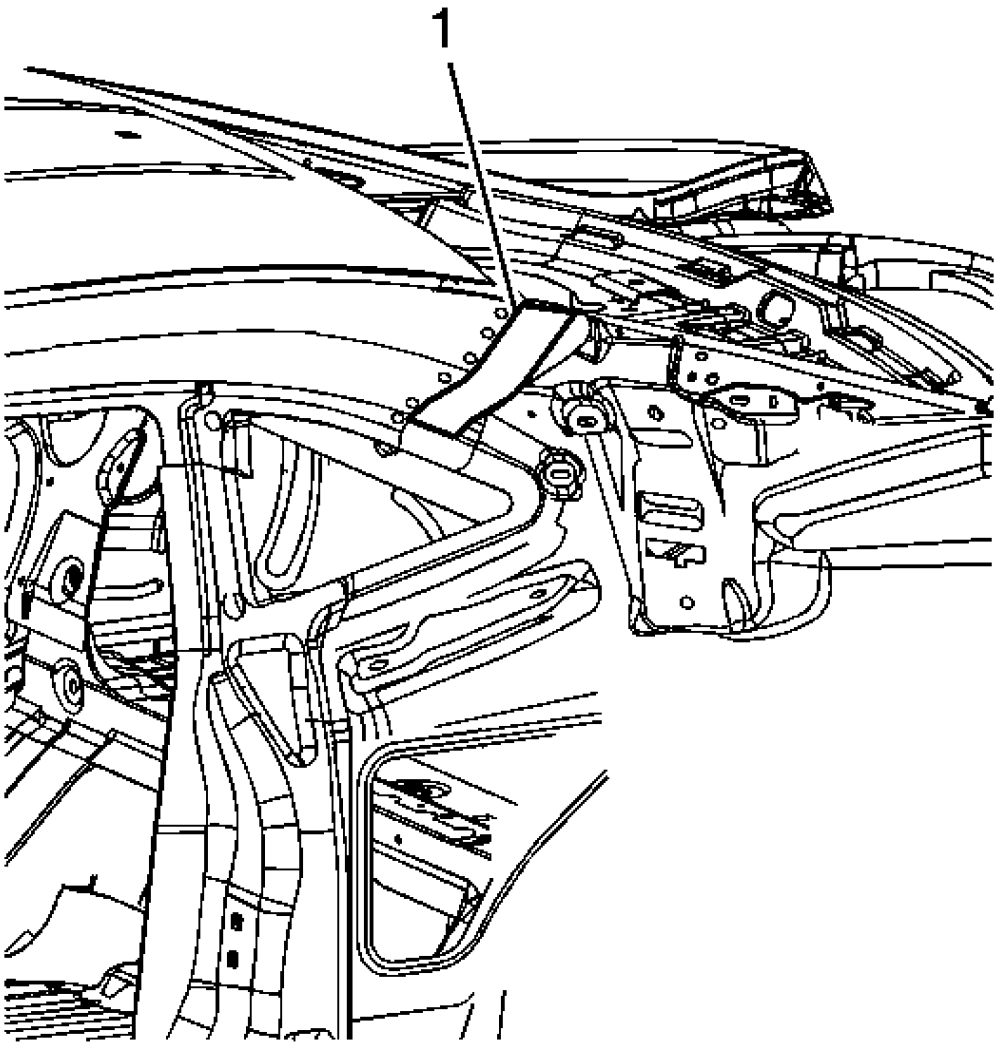


Fig. 99: Fitting Backing Plate
Courtesy of GENERAL MOTORS CORP.

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7. Fit the backing plate halfway into the sectioning joint (1), clamp and plug weld to the vehicle

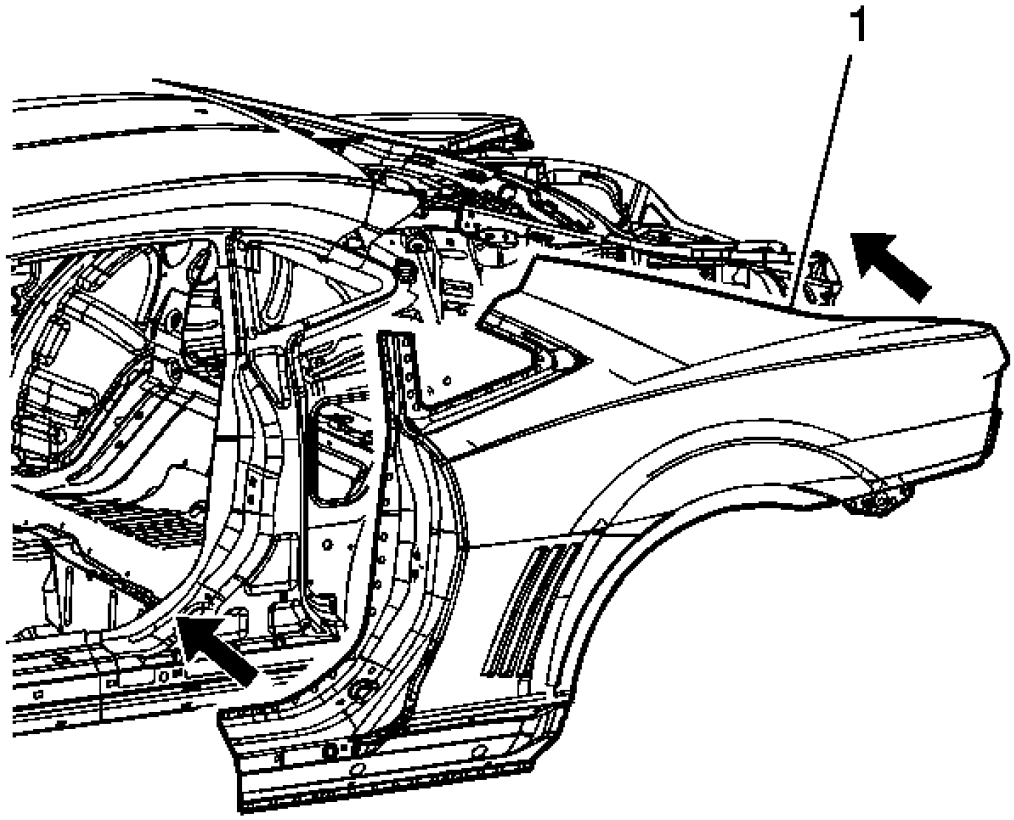


Fig. 100: Positioning Service Panel To Vehicle
Courtesy of GENERAL MOTORS CORP.

8. Position the service panel to the vehicle (1).
9. Clamp service part in place.
10. Inspect the vehicle for proper dimensions using 3-dimensional measuring equipment.

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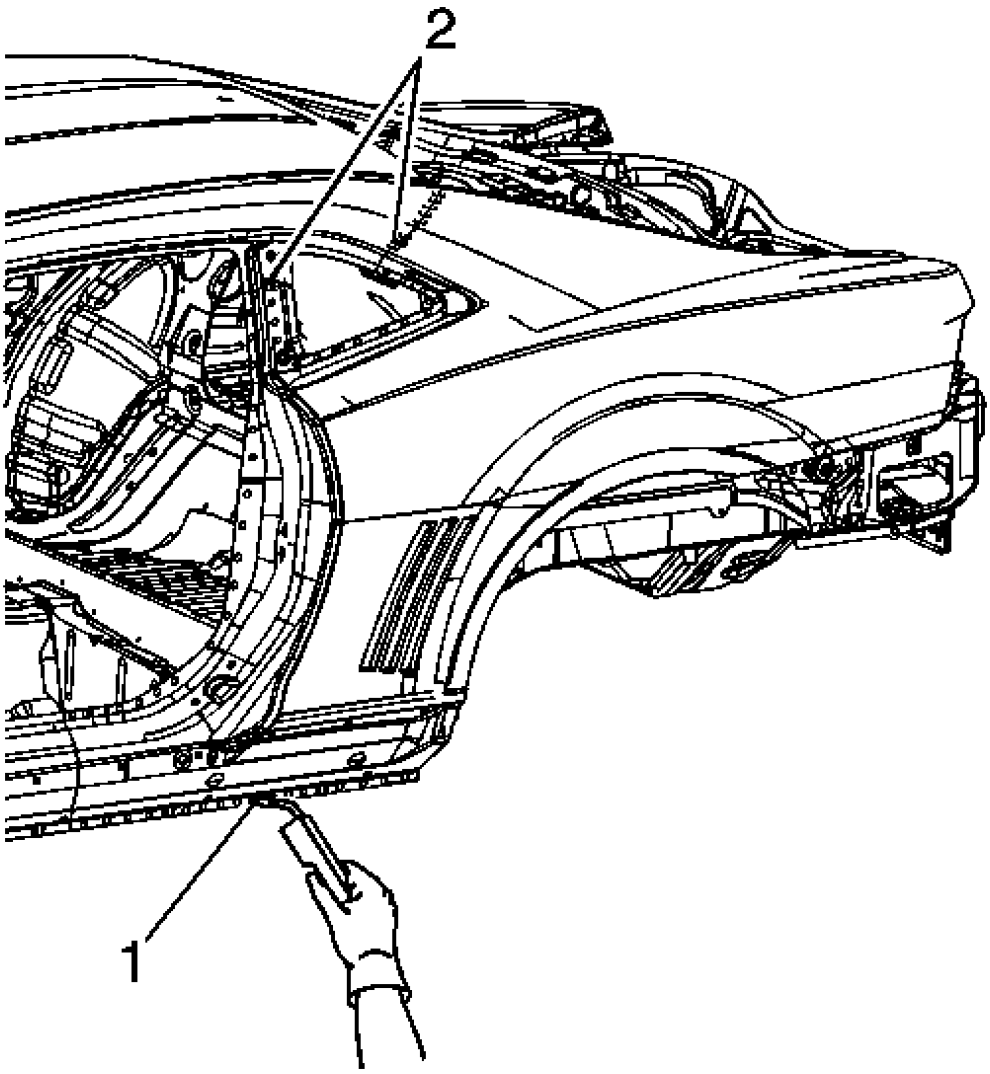


Fig. 101: Plug & Stitch Welding
Courtesy of GENERAL MOTORS CORP.

11. Plug weld accordingly (1).

NOTE: To create a solid weld with minimum heat distortion make 25 mm (1 in) stitch welds along the seam with 25 mm (1 in) gaps between them. Then go back and complete the stitch weld.

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12. Stitch weld sectioning joint (2).
13. Clean and prepare all welded surfaces.
14. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
15. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
16. Install all related panels and components.
17. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection**
18. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

BODY REAR END PANEL REPLACEMENT

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment.
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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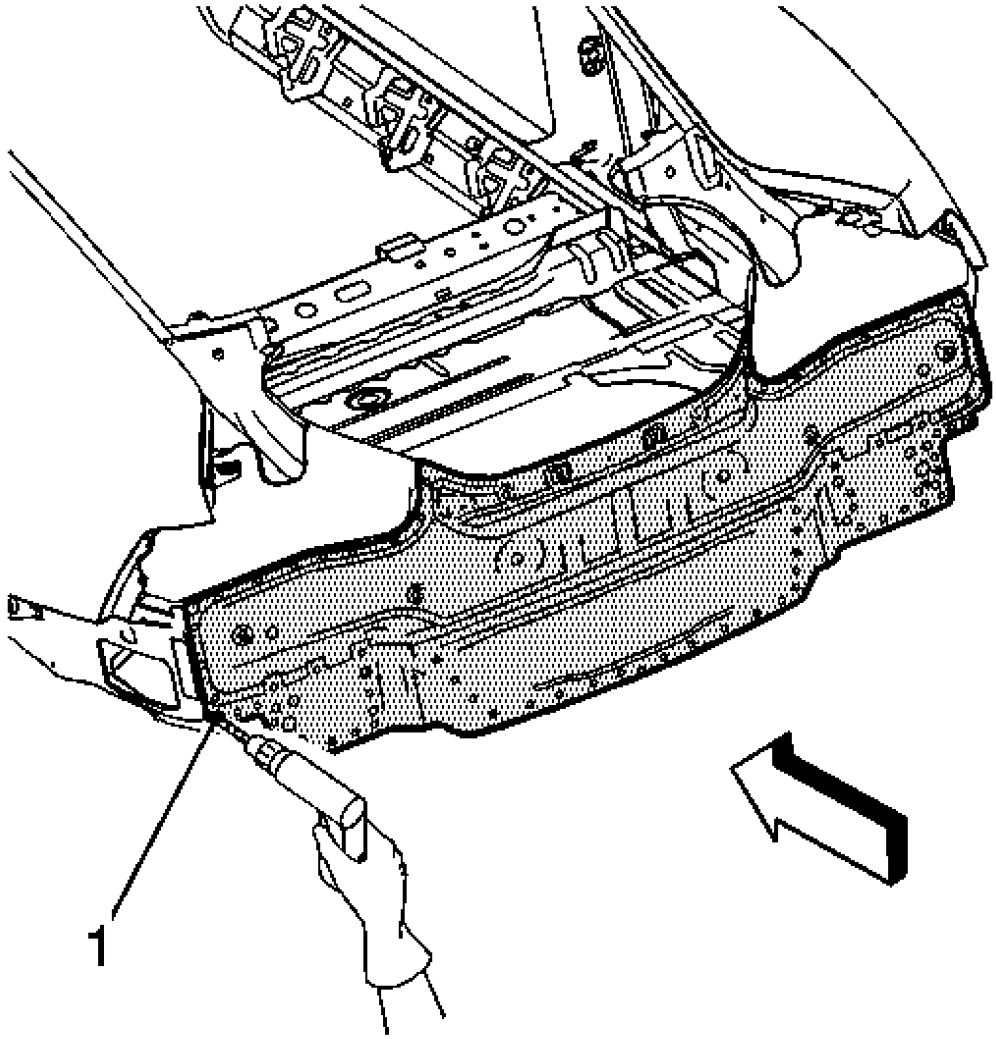


Fig. 102: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Record the number and location of the original welds for installation of the service part.

6. Locate and drill out all factory welds (1).
7. Remove the damaged rear end panel.

Installation Panel

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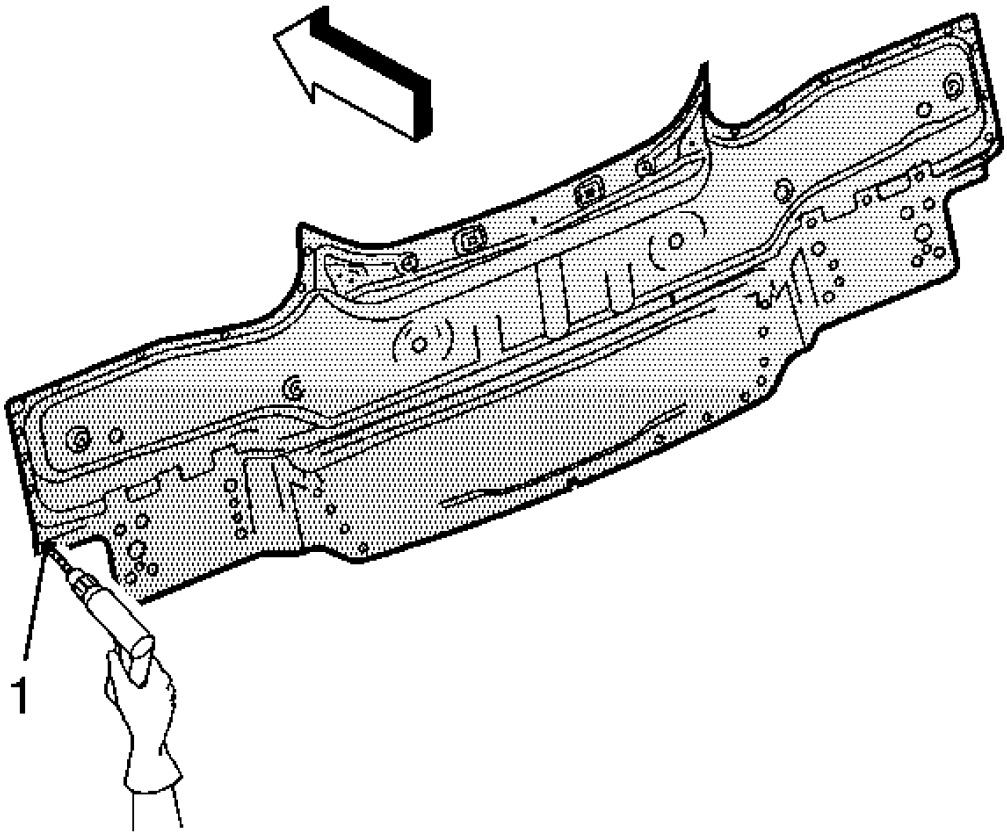


Fig. 103: Drilling Plug Weld Holes
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds cannot be determined or structural weld thru adhesive was present, space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes.
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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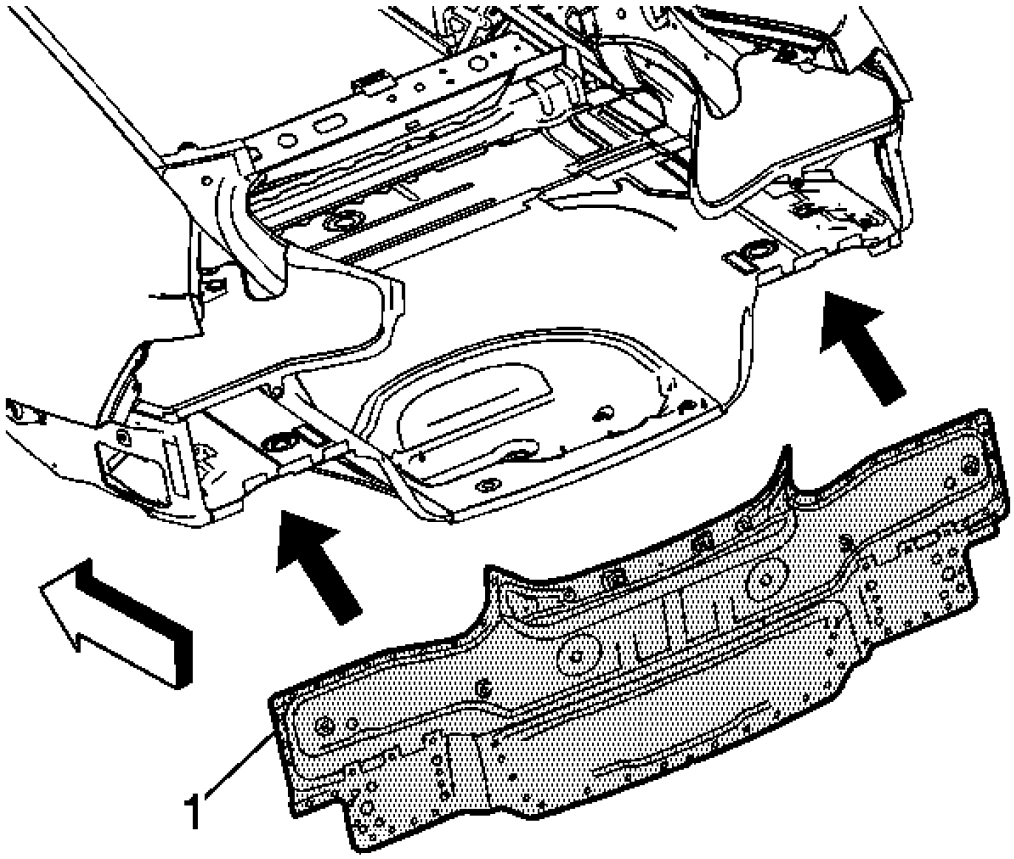


Fig. 104: Positioning Rear End Panel
Courtesy of GENERAL MOTORS CORP.

4. Position the rear end panel (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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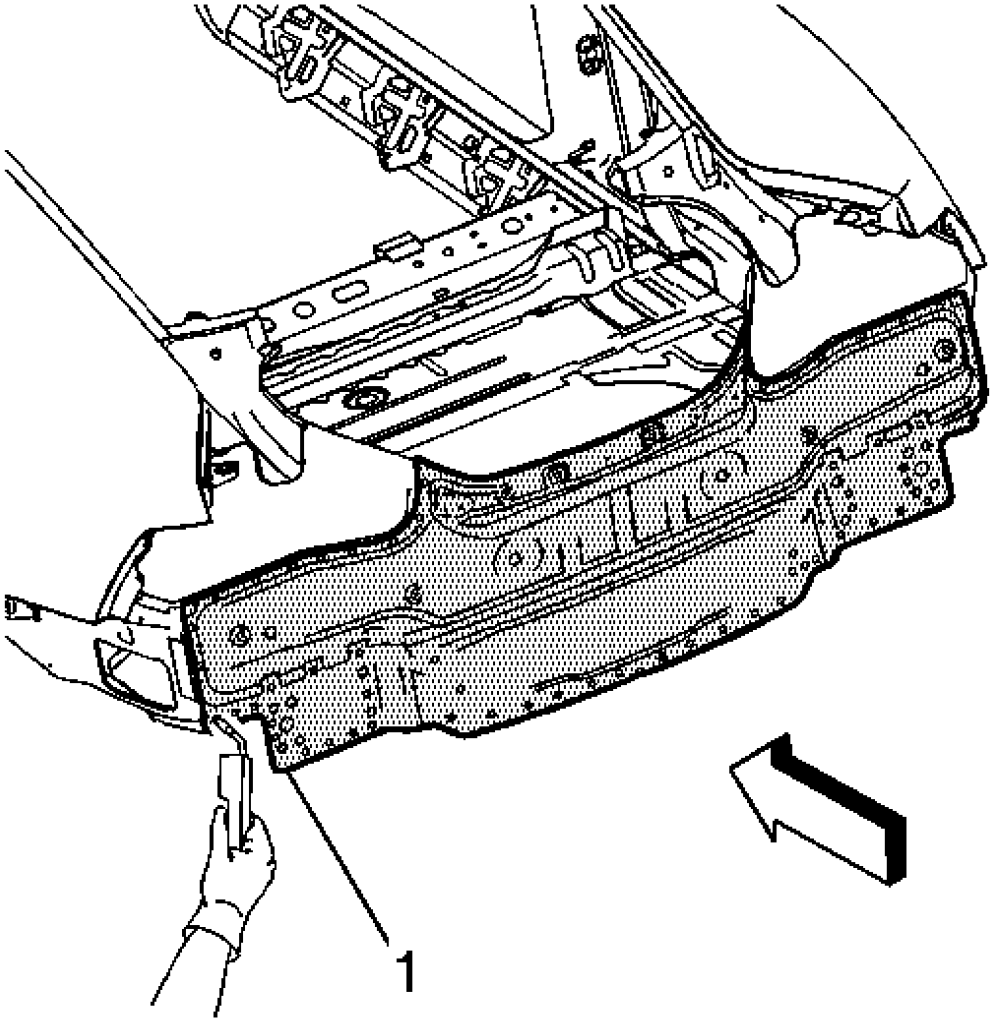


Fig. 105: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .

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13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

DOOR FRAME REINFORCE SECTIONING - CENTER PILLAR

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning

NOTE: The center pillar reinforcement can be replaced at factory seams, but requires the removal of the roof, body side outer and front upper rail. The sectioning procedures have been developed as an alternative to complete replacement.

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications.
5. Perform additional procedures as necessary. Refer to **Quarter Outer Panel Sectioning**.
6. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Foam Sound Deadeners Warning** .

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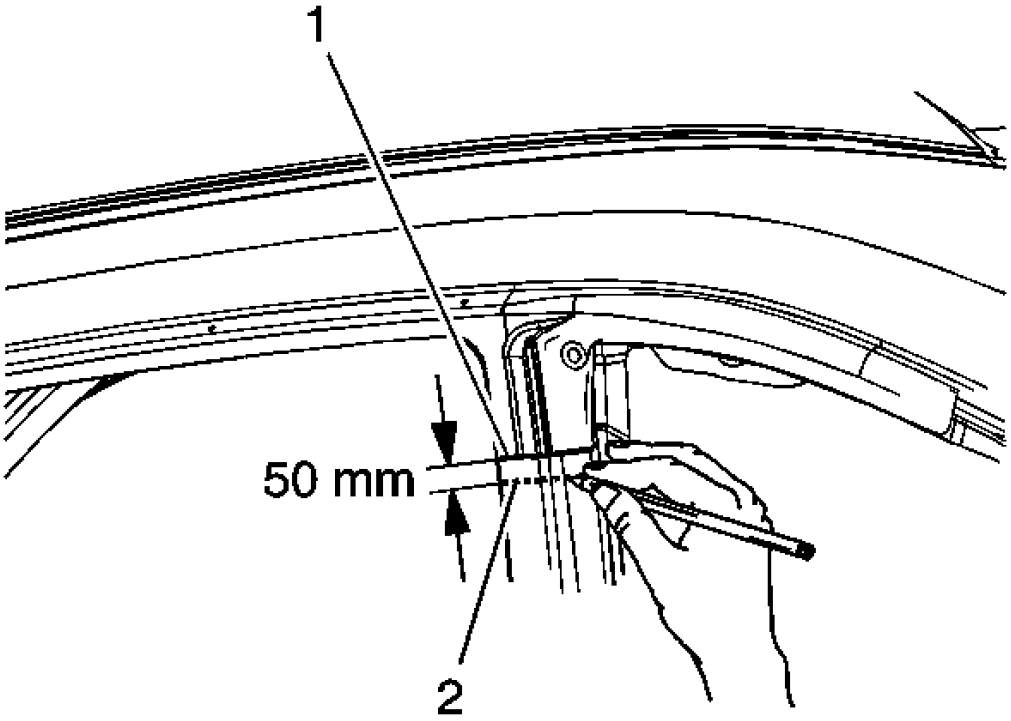


Fig. 106: Scribing Line Below Cut Line
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements.

7. From the quarter outer panel sectioning cut line (1), measure down 50 mm (2 in) and scribe a line (2).
8. Cut the center pillar where sectioning is to be performed.

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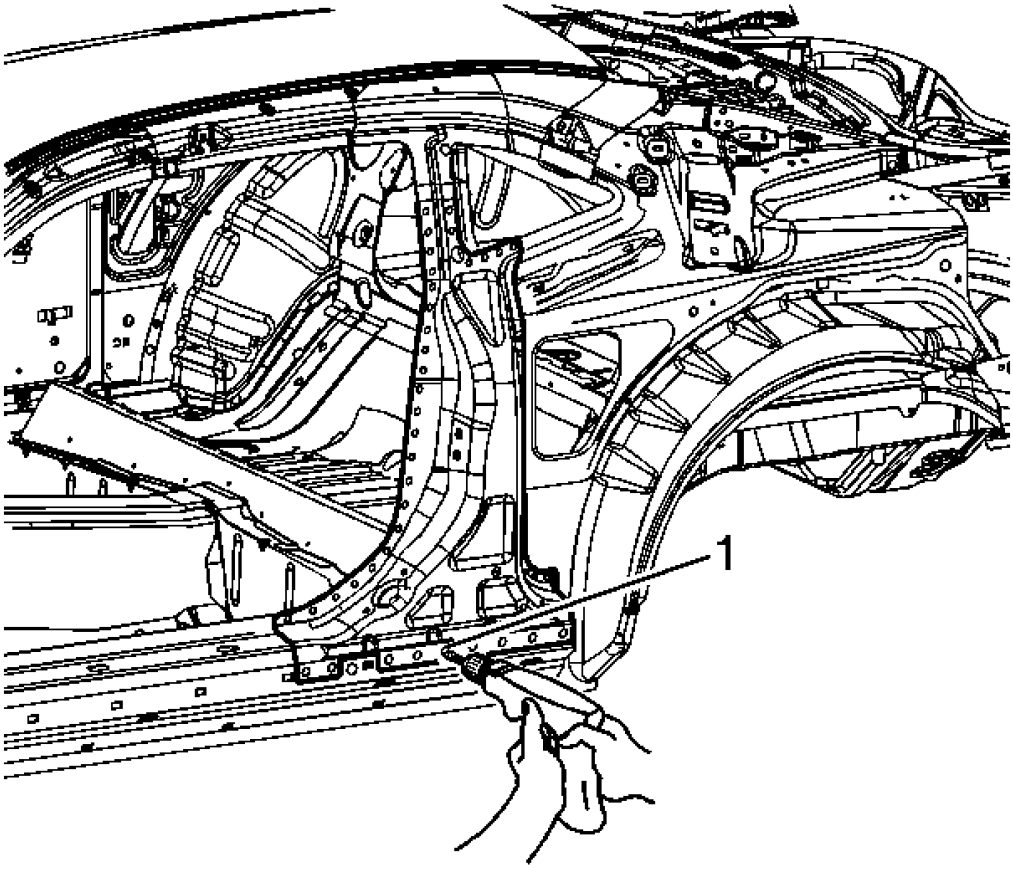


Fig. 107: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Record the number and location of the original welds for installation of the service part.

9. Locate and drill out all factory welds (1).

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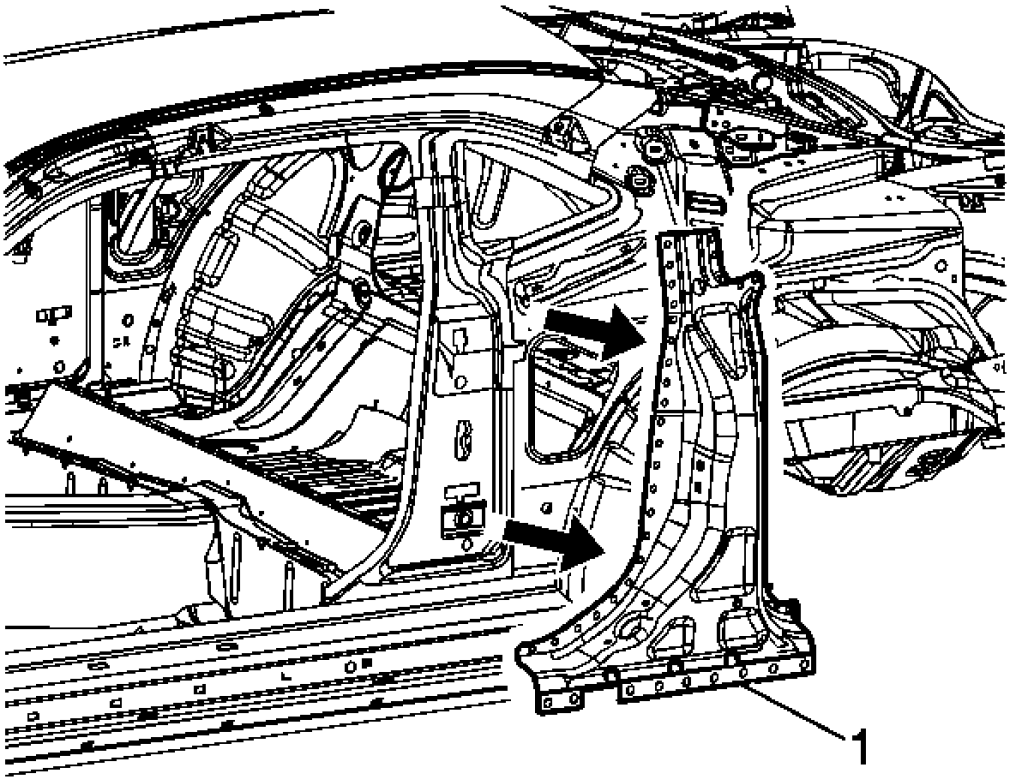


Fig. 108: Removing Damaged Center Pillar
Courtesy of GENERAL MOTORS CORP.

10. Remove the damaged center pillar (1).

Installation Procedure

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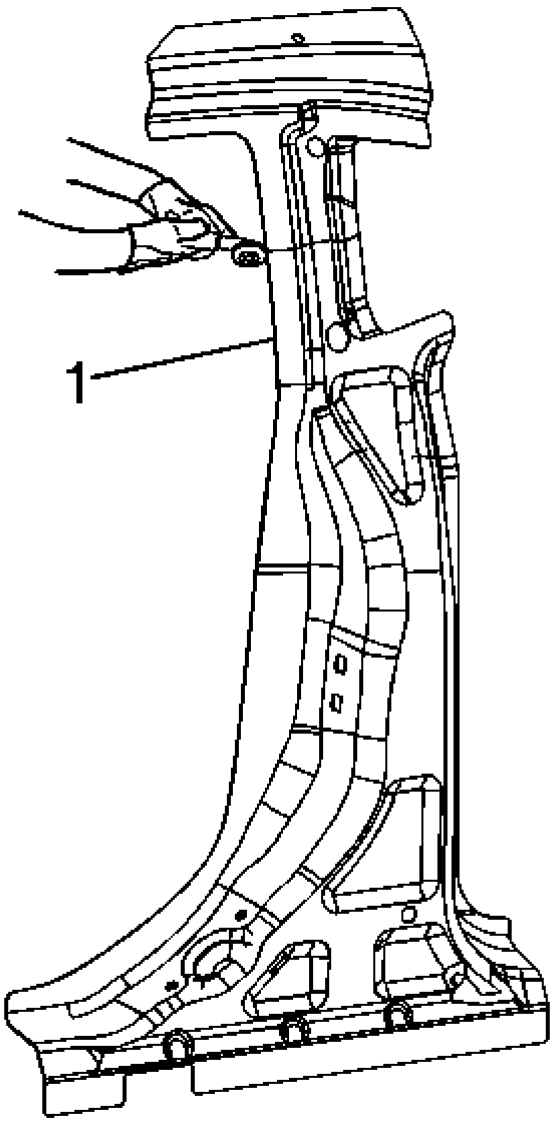


Fig. 109: Creating Backing Plate
Courtesy of GENERAL MOTORS CORP.

NOTE: The sectioning joint in the center pillar requires a backing plate. A piece of the center pillar reinforcement can be used as a weld backer.

1. Cut the replacement center pillar in corresponding locations to fit the original panel (1). The sectioning joint should be trimmed to allow 1.5 times the metal thickness at the sectioning joint.

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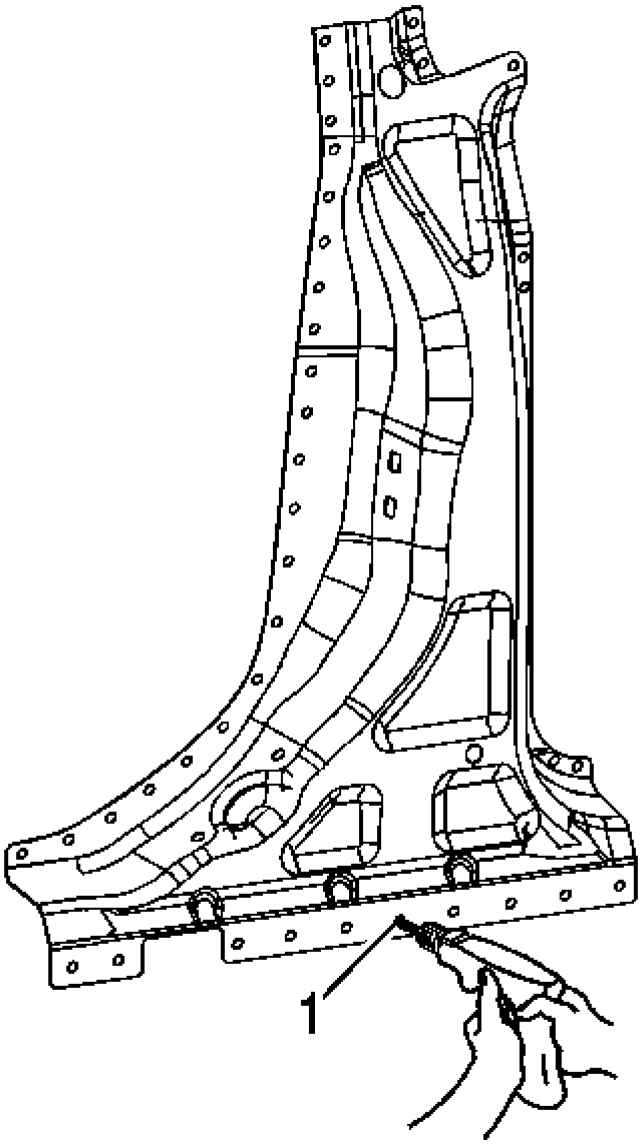


Fig. 110: Drilling Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: In any area damaged beyond recognition, or structural weld thru adhesive was present space plug weld holes every 40 mm (1 1/2 in) apart.

2. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the

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original panel and along the sectioning cut (1).

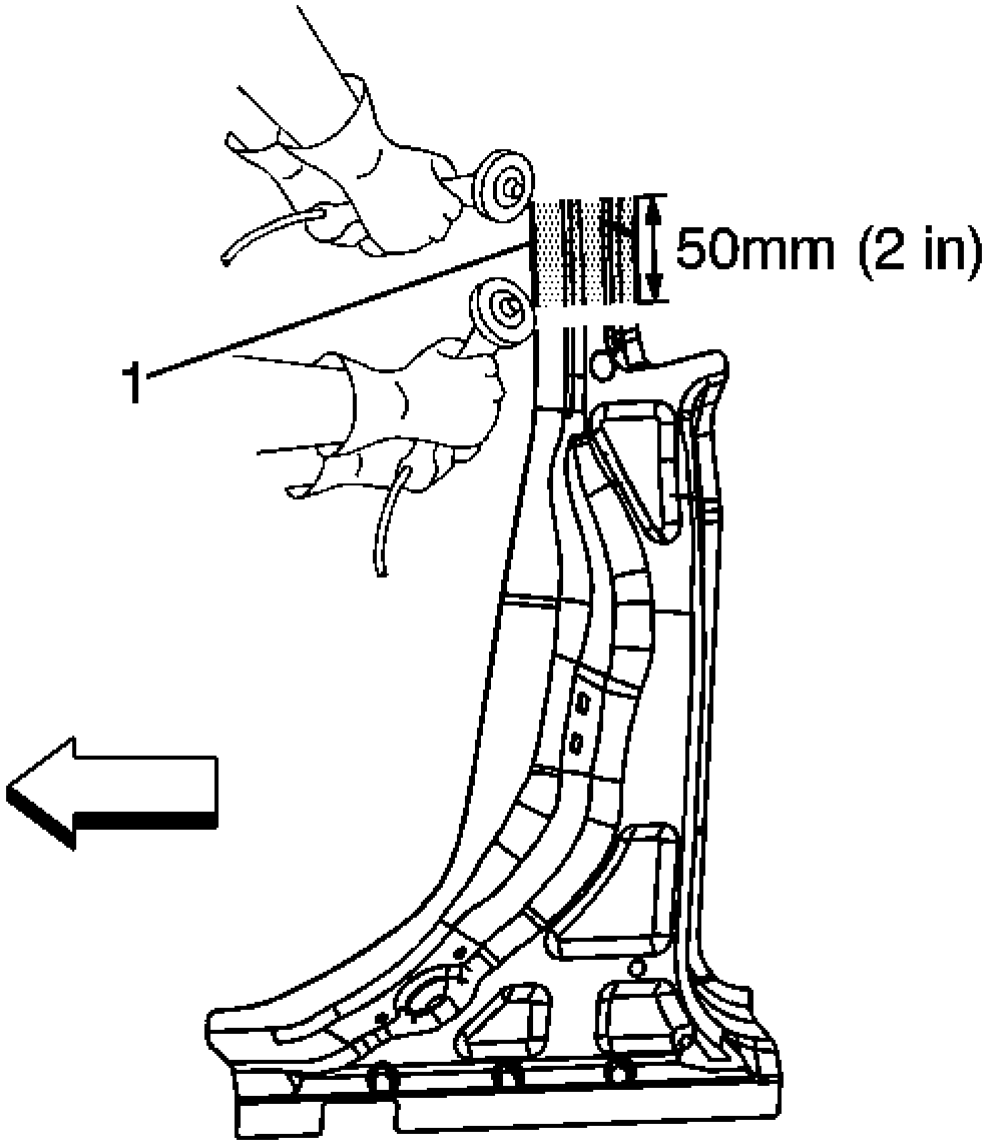


Fig. 111: Cutting Backing Plate
Courtesy of GENERAL MOTORS CORP.

3. Cut a 50 mm (2 in) backing plate from the unused portion of the service part (1).

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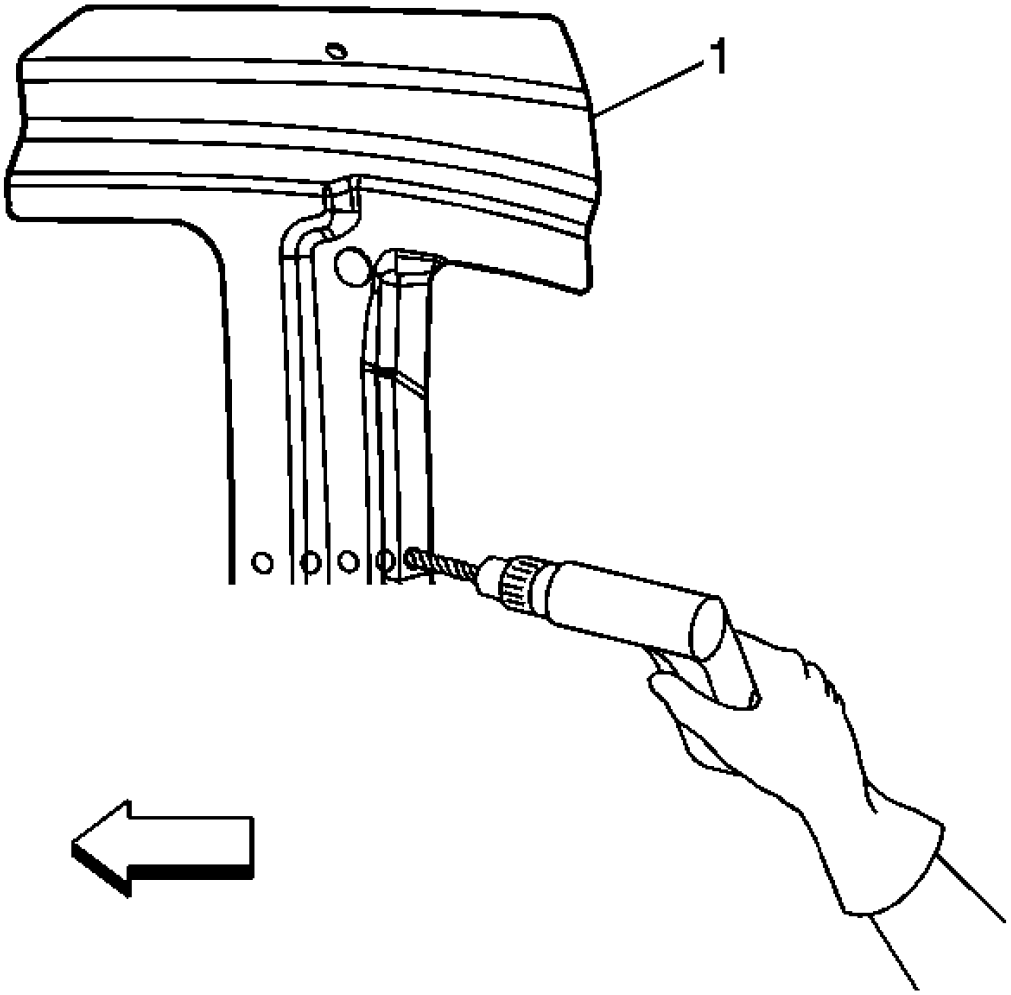


Fig. 112: Drilling Plug Weld Holes On Original Part
Courtesy of GENERAL MOTORS CORP.

4. Drill 8 mm (5/16 in) plug weld holes along the sectioning cut on the remaining original part. Locate these holes approximately 13 mm (1/2 in) from the edge and spaced 40 mm (1 1/2 in) apart (1).

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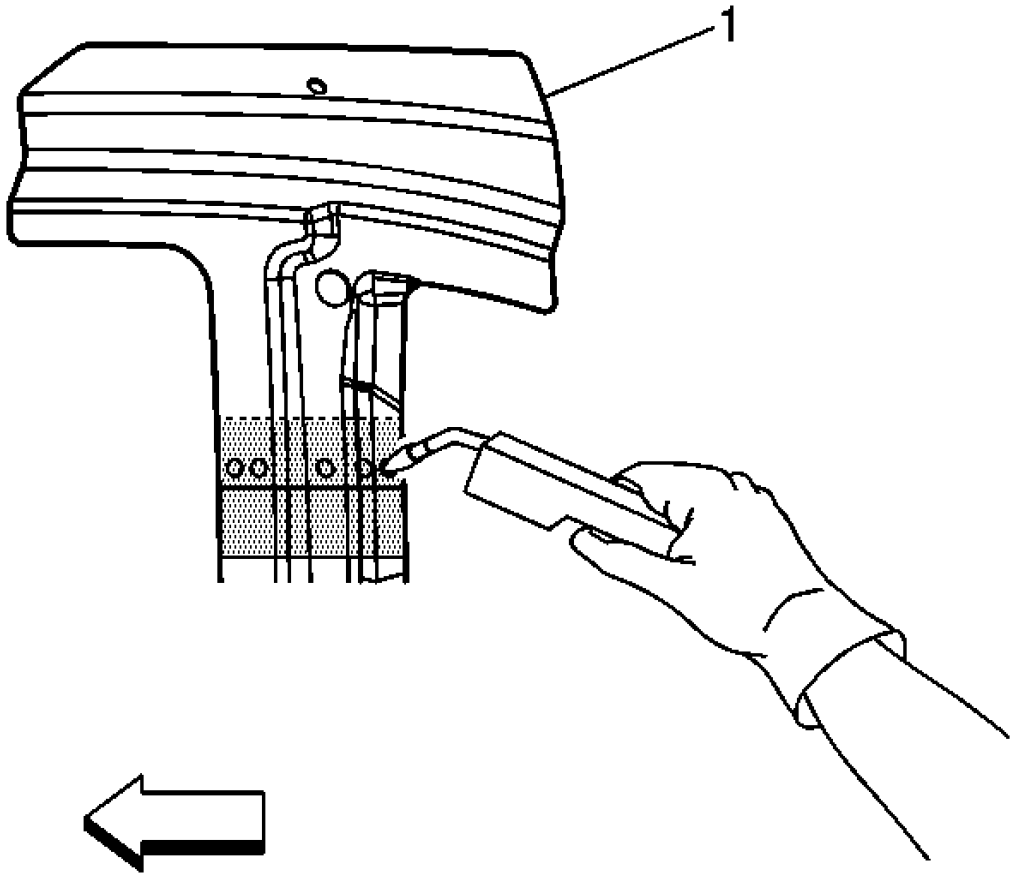


Fig. 113: Plug Welding Backing Plate
Courtesy of GENERAL MOTORS CORP.

5. Fit the backing plate half way into the sectioning joint, clamp and plug weld to the vehicle (1).
6. Prepare all attachment surfaces as necessary.
7. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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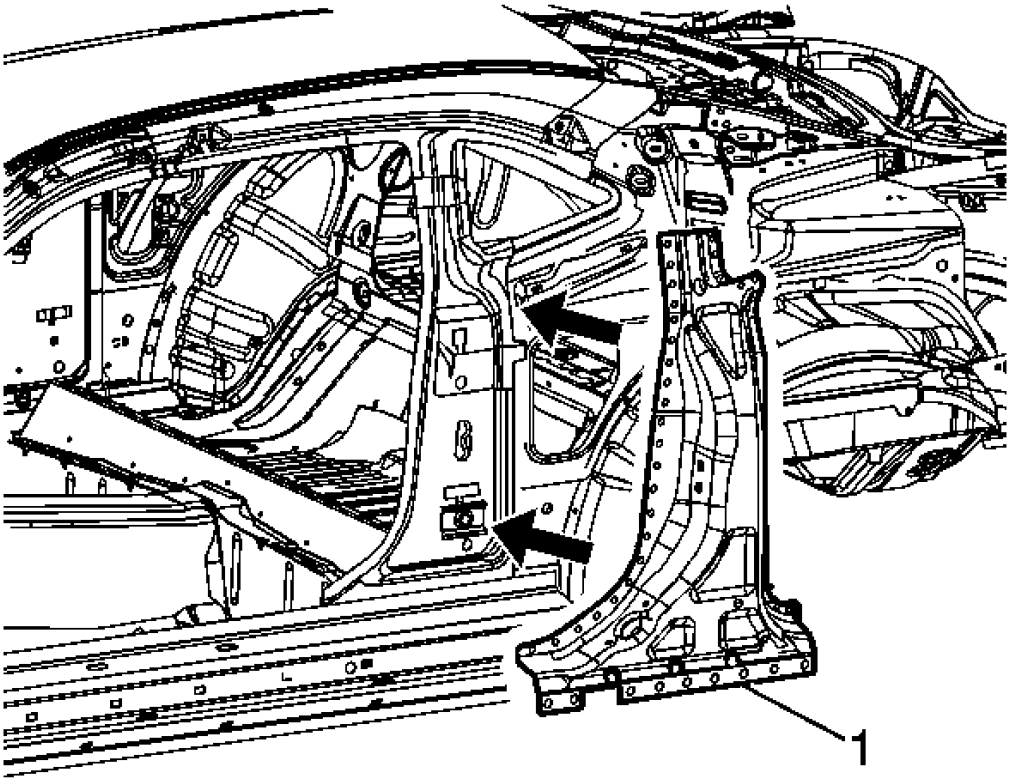


Fig. 114: Positioning Service Panel To Vehicle
Courtesy of GENERAL MOTORS CORP.

8. Position the service panel to the vehicle (1).
9. Clamp service part in place.
10. Inspect the vehicle for proper dimensions using 3-dimensional measuring equipment.

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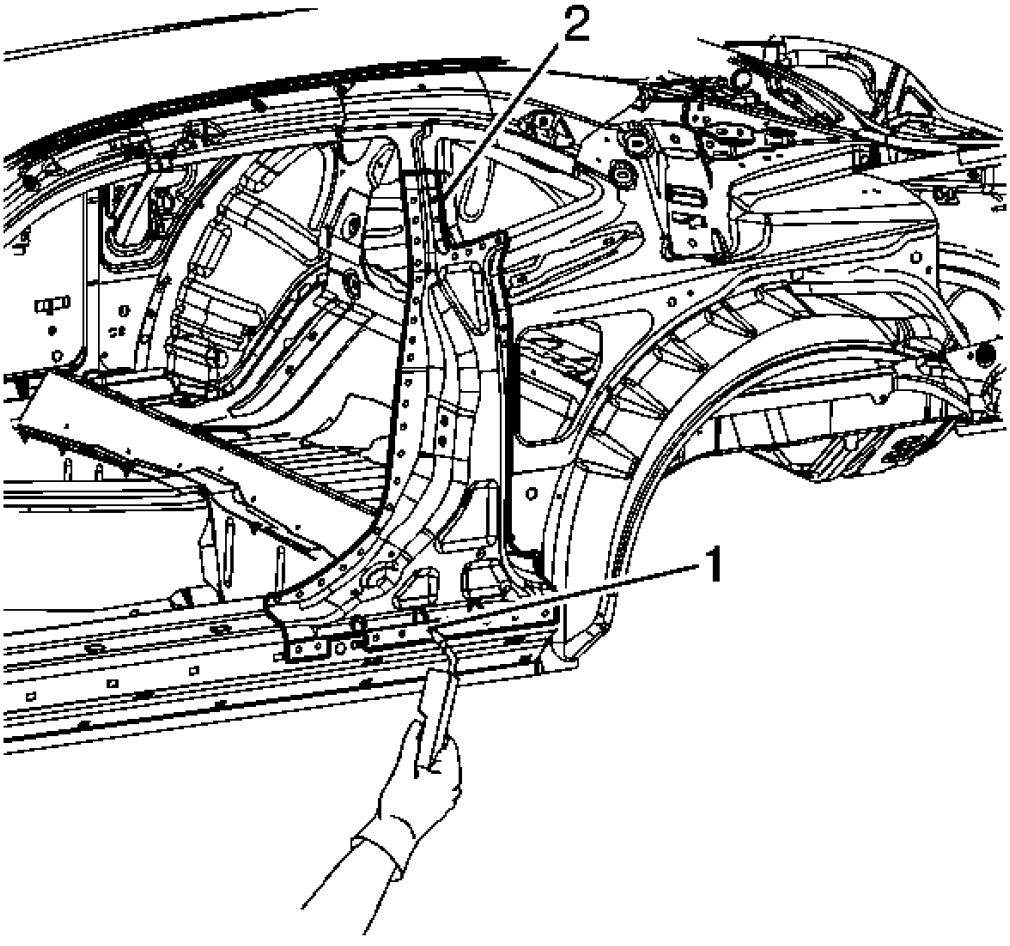


Fig. 115: Plug & Stitch Welding
Courtesy of GENERAL MOTORS CORP.

11. Plug weld accordingly (1).

NOTE: To create a solid weld with minimum heat distortion make 25 mm (1 in) stitch welds along the seam with 25 mm (1 in) gaps between them. Then go back and complete the stitch weld.

12. Stitch weld sectioning joint (2).
13. Clean and prepare all welded surfaces.
14. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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15. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
16. Install all related panels and components.
17. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
18. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

RAIL REPLACEMENT - REAR SECTION

Removal Procedure

WARNING: Refer to Collision Sectioning Warning .

WARNING: Refer to Approved Equipment for Collision Repair Warning .

WARNING: Refer to Glass and Sheet Metal Handling Warning .

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Disconnect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
3. Remove all related panels and components.
4. Restore as much of the damage as possible to factory specifications using 3-dimensional measuring equipment
5. Note the location and remove the sealers and anti-corrosion materials from the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .

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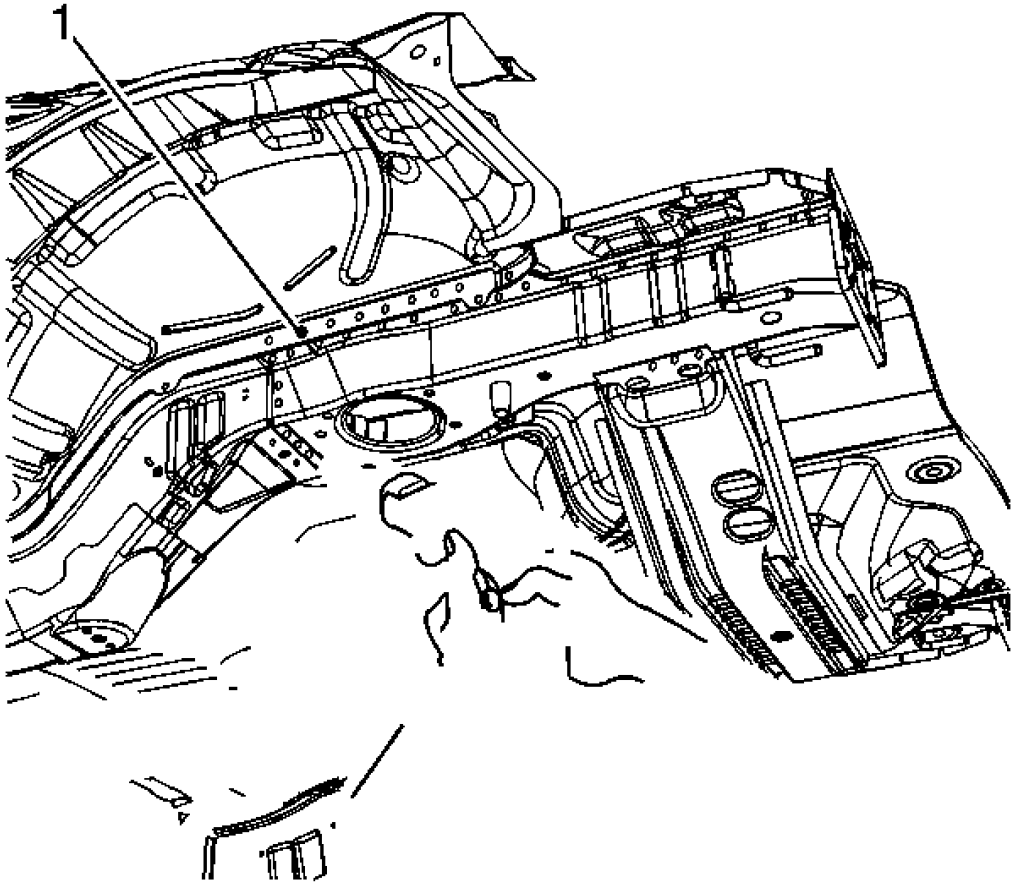


Fig. 116: Drilling Out Factory Welds
Courtesy of GENERAL MOTORS CORP.

NOTE: Do not damage any inner panels or reinforcements. Record the number and location of the original welds for installation of the service part.

6. Locate and drill out all factory welds (1).

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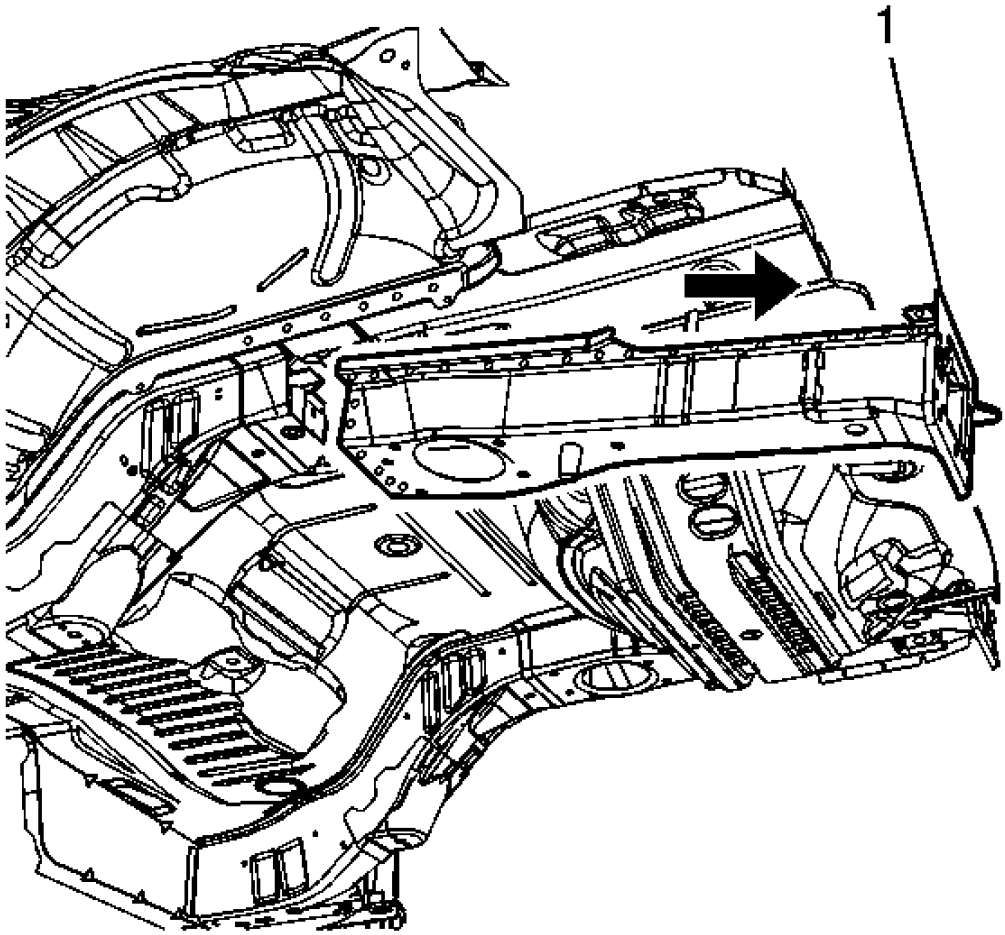


Fig. 117: Removing Damaged Rail Section
Courtesy of GENERAL MOTORS CORP.

7. Remove the damaged rail section (1).

Installation Procedure

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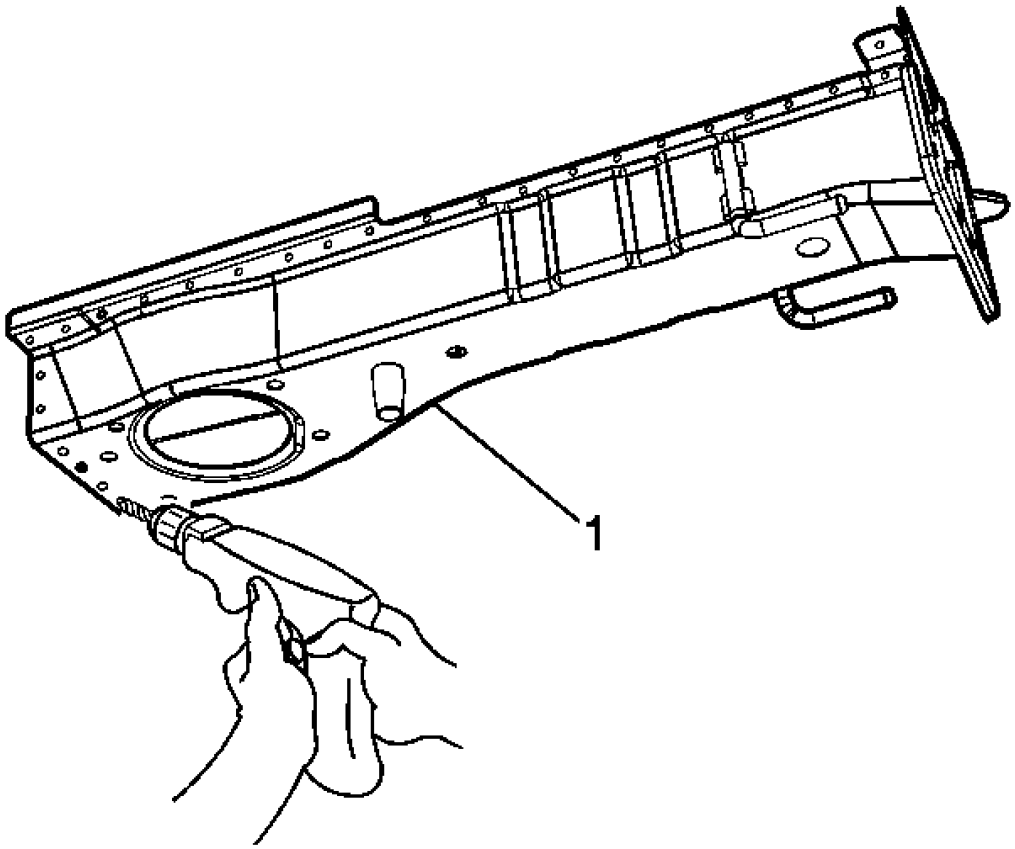


Fig. 118: Drilling Plug Weld Holes In Service Part
Courtesy of GENERAL MOTORS CORP.

NOTE: If the location of the original plug welds can not be determined, or structural weld thru adhesive was present space plug weld holes every 40 mm (1 1/2 in) apart.

1. Drill 8 mm (5/16 in) plug weld holes in the service part as necessary in the locations noted from the original panel (1).
2. Prepare all attachment surfaces as necessary.
3. Apply GM approved Weld-Thru Coating or equivalent to all mating surfaces. Refer to **Anti-Corrosion Treatment and Repair** .

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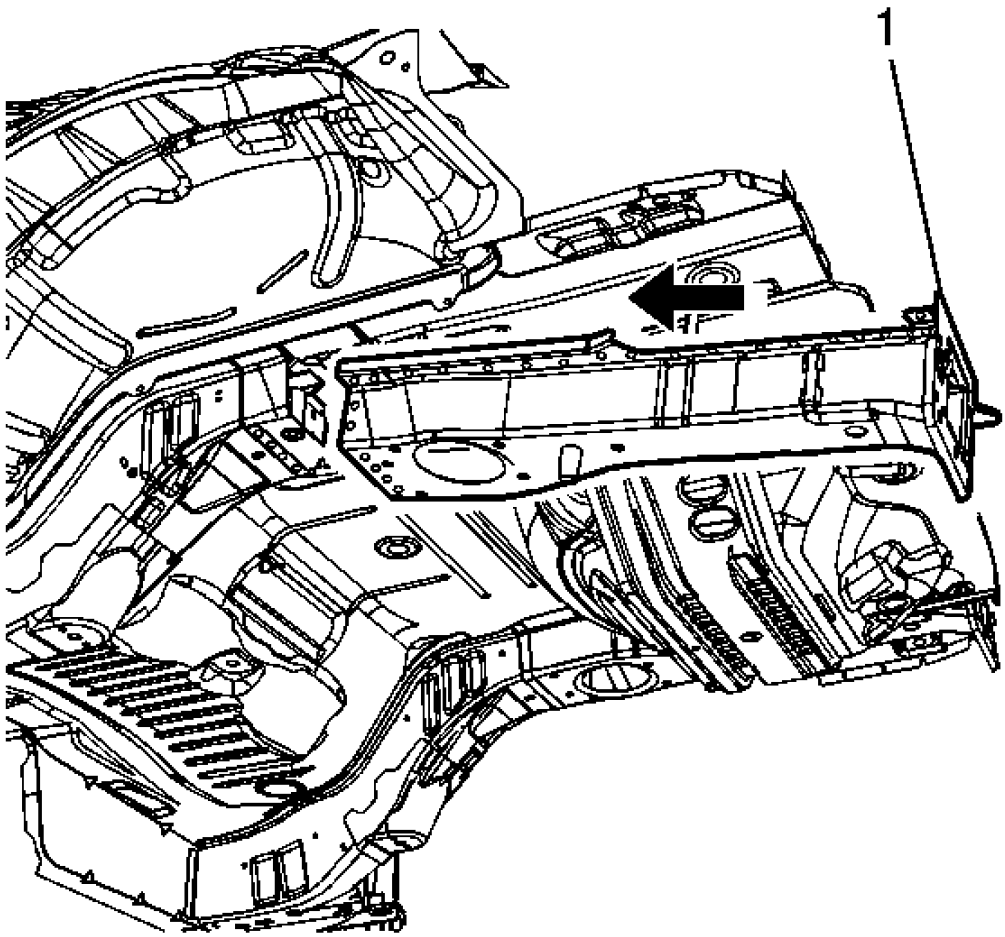


Fig. 119: Positioning New Rail Section
Courtesy of GENERAL MOTORS CORP.

4. Position the new rail section (1).
5. Clamp service parts in position.
6. Inspect the vehicle for proper dimensions using 3-dimensional equipment.

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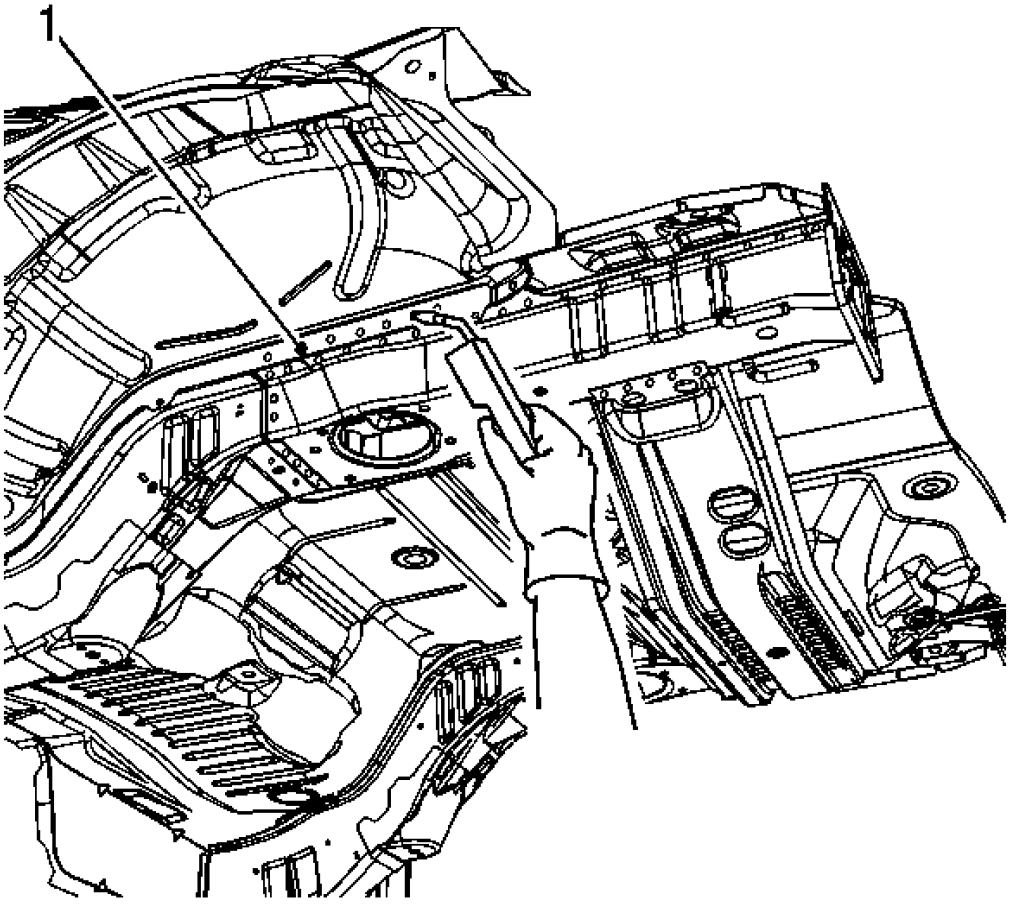


Fig. 120: Plug Welding
Courtesy of GENERAL MOTORS CORP.

7. Plug weld accordingly (1).
8. Clean and prepare all welded surfaces.
9. Apply the sealers and anti-corrosion materials to the repair area, as necessary. Refer to **Anti-Corrosion Treatment and Repair** .
10. Paint the repair area. Refer to **Basecoat/Clearcoat Paint Systems** .
11. Install all related panels and components.
12. Connect the negative battery cable. Refer to **Battery Negative Cable Disconnection and Connection** .
13. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

DESCRIPTION AND OPERATION

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DUAL PHASE STEEL

This information provides repair recommendations and general guidelines for steel classified as Dual Phase Steel (Dual Phase Steel with a tensile strength up to and including 800 MPa), also known as DP.

General Motors recommends the following when repairing or replacing this type of steel during collision repair.

NOTE: The use of heat to repair damage is not recommended for this classification of steel.

Recommended Repairs

- Cold repairs can be performed on this type of steel, unless the damage includes kinks. If the damage includes kinks, the part should be replaced.
- Sectioning or partial replacement of this type of steel is recommended only at approved locations, in a specific sectioning procedure.
- This type of steel can be used as a sleeve, or backer plate, when recommended in a specific sectioning procedure.
- Squeeze Resistance Spot Welding can be used to replace factory spot welds, where applicable.
- MIG plug welding and MIG stitch welding can be used on this type of steel.
- MIG Brazing can be used on this type of steel.

HIGH STRENGTH LOW ALLOY STEEL

This information provides repair recommendations and general guidelines for steel classified as High Strength Low Alloy Steel, also known as HSLA. This type of steel normally has a tensile strength range from 300-700 MPa.

General Motors recommends the following when repairing or replacing this type of steel during collision repair.

Recommended Repairs

- Cold repairs can be performed on this type of steel, unless the damage includes kinks. If the damage includes kinks, the part should be replaced.
- Controlled use of heat can be used to repair damage, if the heat does not exceed 650°C (1200°F). The heat should be applied a maximum of 2 times, for up to 90 seconds.
- Sectioning or partial replacement of this type of steel is recommended only at approved locations, in a specific sectioning procedure.
- This type of steel can be used as a sleeve, or backer plate, during sectioning procedures.
- Squeeze Resistance Spot Welding can be used to replace factory spot welds, where applicable.
- MIG plug welding and MIG stitch welding can be used on this type of steel.
- MIG Brazing can be used on this type of steel.

METAL PANEL BONDING

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This is intended to provide general guidelines for adhesive bonding of exterior panels as an alternative to Metal-Inert Gas (MIG) welding. Panel bonding may be seen as an alternative to MIG welding to provide full panel replacement in regards to collision repair procedures. The benefits of panel bonding is:

- No heat or burn damage when additional welding is not required
- Corrosion protection
- Can act as a sealant
- Improved process for complicated shapes (wheelhouse area)

The General Motors specification for metal bonding adhesives is GM 6449G. The scope of this specification is intended to provide the performance guidelines of structural adhesive systems used to repair (metallic) automotive bodies in the aftermarket. These types of adhesives are intended for use when bonding replacement body panels as an option to welding as the attachment means. GM information outlines the use of room temperature cure acrylic adhesives that contain glass bead technology.

Bonding procedures in general are applicable only to a factory seams type approach.

Sectioning or partial paneling of full panels is not supported by General Motors unless specifically documented in a Service Bulletin or Manual.

Applicable components for this technology are EXTERIOR PANELS ONLY, including door skins, tail panels, roof outer panels and quarter panels.

IMPORTANT: Do not use adhesives for vehicle underbody or upper body structure type repairs such as structural rails, shock/strut towers, floor pans, upper fender rails, body side pillars, door rings-side or rear, rocker panels, unless specifically documented in a GM Service Bulletin or Manual. If in doubt, use only the procedures referenced in the Service Manual for the specific vehicle being repaired.
Always follow the system manufacturer's instructions for application, handling, and curing.

Adhesives currently meeting the performance requirements include General Motors materials and products manufactured by Lord Adhesives. At this time, ONLY the adhesive products listed below meet this guideline:

Manufacturer and Part Number	Description
GM P/N 12378566 (US)	Fast Set Panel Bonding Adhesive
GM P/N 88901674 (Canada)	
Lord Fusor P/N 110B/111B	
GM P/N 12378567 (US)	Medium Set Panel Bonding Adhesive
GM P/N 88901675 (Canada)	
Lord Fusor P/N 108B/109B	
3M P/N 8116	Panel Bonding Adhesive
Ashland Plio Grip Panel 60	Panel Bonding Adhesive

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MILD STEEL

This information provides repair recommendations and general guidelines for steel classified as Mild Steel. This type of steel normally has a tensile strength less than 270 MPa. This includes the common steel names of:

- Mild Steel
- Bake Hardenable Steel (BH)
- Solid Solution Strengthened Steel

General Motors recommends the following when repairing or replacing this type of steel during collision repair.

Recommended Repairs:

- Cold repairs can be performed on this type of steel, unless the damage includes kinks. If the damage includes kinks, the part should be replaced.
- Controlled use of heat can be used to repair damage, if the heat does not exceed 650°C (1200°F). The heat should be applied a maximum of 2 times, for up to 90 seconds.
- Sectioning or partial replacement of this type of steel is recommended only at approved locations, in a specific sectioning procedure.
- This type of steel can be used as a sleeve, or backer plate, when recommended in a specific sectioning procedure.
- Squeeze Resistance Spot Welding can be used to replace factory spot welds, where applicable
- MIG plug welding and MIG stitch welding can be used on this type of steel.
- MIG Brazing can be used on this type of steel.

ULTRA HIGH STRENGTH STEEL

This information provides repair recommendations and general guidelines for steel classified as Ultra High Strength Steel, also know as UHSS. This type of steel normally has a tensile strength greater than 700 MPa.

This includes the common steel names of

- Ultra High Strength Steel (UHSS)
- Martensitic Steel (MS)
- Press Hardened Steel (PHS)
- Boron Steel

General Motors recommends the following when repairing or replacing this type of steel during collision repair.

NOTE:

- **Repair of this type of steel is not recommended.**
- **This type of steel should be replaced only, at factory joints. Sectioning or partial replacement is not recommended.**
- **The use of heat to repair damage is not recommended for this type of**

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steel.

- **Stitch Welding is not recommended for this type of steel.**
- **This type of steel can not be used as a backing reinforcement or a sleeve for a sectioning joint.**

Recommended Repairs

- Squeeze Resistance Spot Welding can be used to replace factory spot welds, where applicable.
- MIG plug welding can be used to replace factory spot welds.
- MIG Brazing can be used to replace factory spot welds.

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2010 ACCESSORIES & BODY, CAB

Exterior Trim - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Wheelhouse Liner Screw	3 N.m	27 lb in
Rear Wheelhouse Liner Screw	3 N.m	27 lb in
Rear End Spoiler Nut	6 N.m	53 lb in

REPAIR INSTRUCTIONS

EMBLEM/NAMEPLATE REPLACEMENT

Special Tools

EL-25070: Heat Gun

For equivalent regional tools, refer to **Special Tools**.

CAUTION: Refer to Exterior Trim Emblem Removal Caution .

1. The part and vehicle surface should be 21°C (70°F) prior to installation. The vehicle should remain inside in a temperature range of 21°C (70°F) for 1 hour after assembly to allow the adhesive to develop sufficient bond strength.
2. Using masking tape, mark two sides of the placement where the old emblem/nameplate was placed.
3. Use a **EL-25070:** heat gun or equivalent, to heat the adhesive backed emblem/nameplates.
4. A flat-bladed plastic tool can assist in the removal process.
5. Wipe the vehicle surface area with a 50/50 solution by volume of isopropyl alcohol and clean drinkable water.
6. Dry the area with a clean lint-free cotton cloth.
7. Close any doors, liftgates, endgates and rear compartment lids where emblem/nameplates are to be placed.
8. When removing protective liners from adhesive backed emblem/nameplates, be careful not to touch the adhesive tape or allow the tape to come in contact with dirt or any foreign matter prior to the placement and adhesion.
9. Remove the protective liner from the emblem/nameplate.
10. Position, align and press the emblem/nameplate to the previously marked location.

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11. Using a clean towel and the palm of the hand, press firmly for approximately 30 seconds, the emblem/nameplate to the vehicle body panel surface.
12. Ensure the emblem/nameplate is attached firmly to the body panel surface.
13. Remove the masking tape and clean all tape residue from the vehicle body panel surface around the emblem/nameplate attachment location.

BODY PANEL PAINT PROTECTOR REPLACEMENT (VGC)

1. The paint protective film and vehicle surface temperature should be 13-32°C (55-90°F) for best results.
2. Automatic car washes should be avoided for at least 24 hours after the paint protective film application.
3. Wipe the vehicle surface with isopropyl alcohol or flash naptha at the application area.
4. Dry the surface with a clean lint-free cloth.
5. Create a mixture of 25 percent isopropyl alcohol and 75 percent water and two drops of baby shampoo per 16 oz of fluid mixture.
6. Remove the backing liner from the protective film patch.
7. Use the solution to liberally spray the adhesive side of the protective patch, the mounting location along with your hands.
8. Position the paint protective film patch to the desired location on the vehicle.
9. Spray the surface of the film with the alcohol, water and soap solution.
10. Using a dampened squeegee, start at the center of the protective patch, working outward in order to remove the air and solution from under the protective patch.
11. Release any air bubbles with a pin.
12. Dry the surface with a clean, lint-free cotton cloth.

TAIL LAMP BEZEL REPLACEMENT

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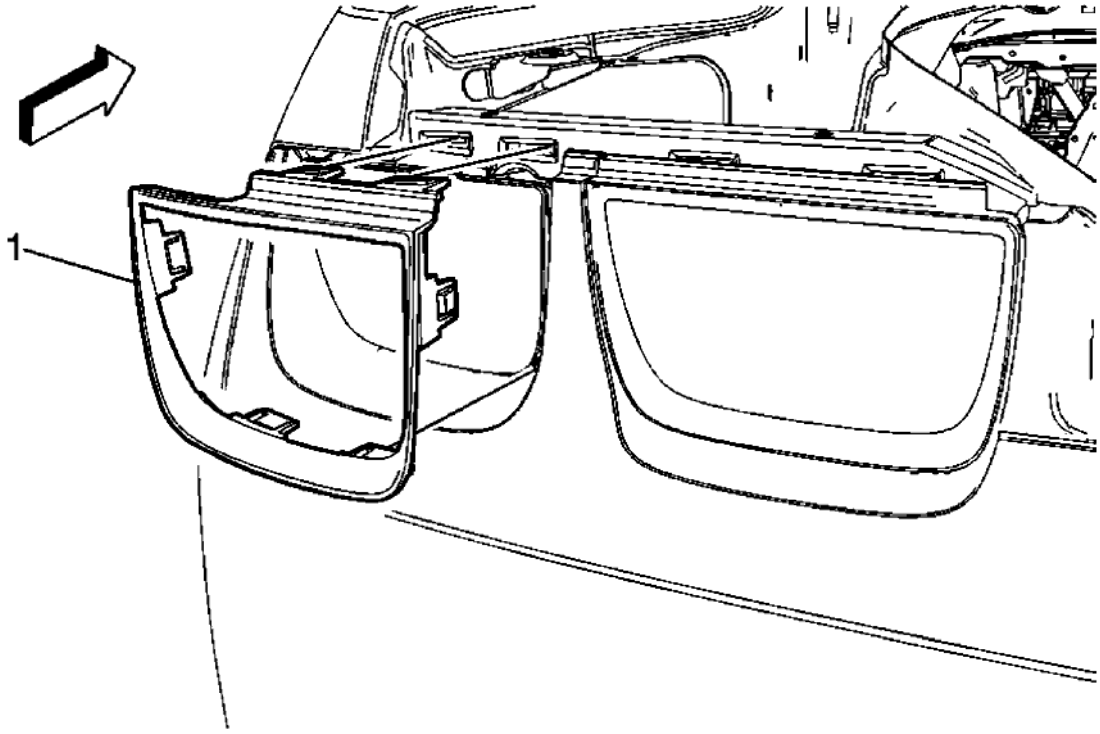


Fig. 1: Tail Lamp Bezel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open and support the rear compartment lid. 2. Remove the tail lamp closeout filler panel. Refer to **Tail Lamp Closeout Filler Replacement**.	
1	Tail Lamp Bezel **Procedure:** Use a thin flat-bladed tool, release the six tabs securing the bezel to the rear bumper fascia and push outward in order to remove.

TAIL LAMP CLOSEOUT FILLER REPLACEMENT

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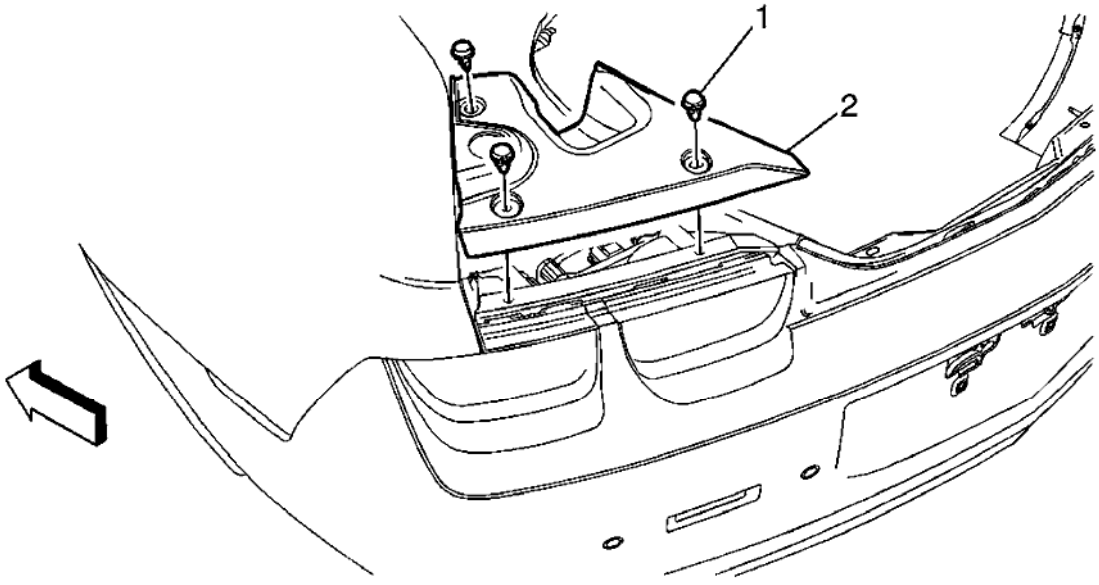


Fig. 2: Tail Lamp Closeout Filler
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Open and support the rear compartment lid.	
1	Tail Lamp Closeout Filler Panel Retainer (Qty: 3) **Procedures** 1. Use a small flat-bladed tool in order to release the retainer top cap. 2. Lift the bottom half of the retainer from the tail lamp closeout filler panel hole. 3. Remove the tail lamp closeout filler panel from the body panel.
2	Tail Lamp Filler Closeout Panel

FRONT BUMPER IMPACT BAR FOG LAMP ACCESS HOLE COVER REPLACEMENT

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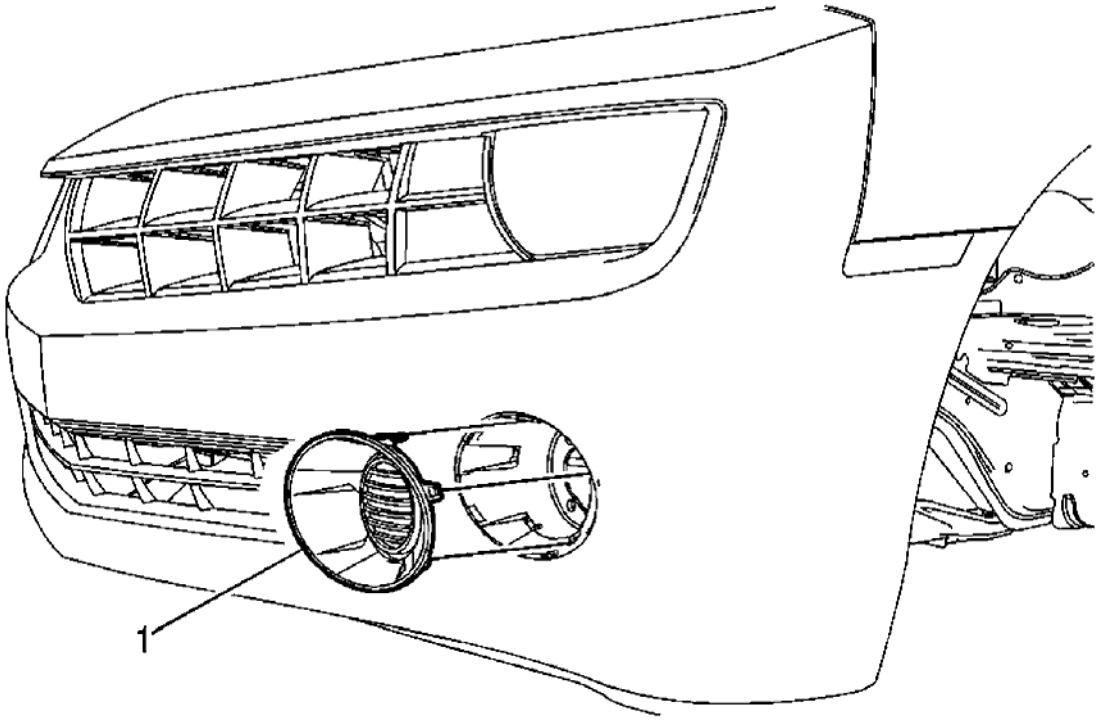


Fig. 3: Front Bumper Impact Bar Fog Lamp Access Hole Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** . 2. Remove the front wheelhouse panel liner. Refer to **Front Wheelhouse Liner Replacement** .	
1	Front Bumper Impact Bar Fog Lamp Access Hole Cover **Procedure** 1. Using a flat-bladed tool from inside the bumper fascia, release the tabs securing the front fog lamp access hole cover to the front bumper fascia. 2. Push the front fog lamp access hole cover outward from the front bumper fascia.

FRONT FOG LAMP BEZEL REPLACEMENT

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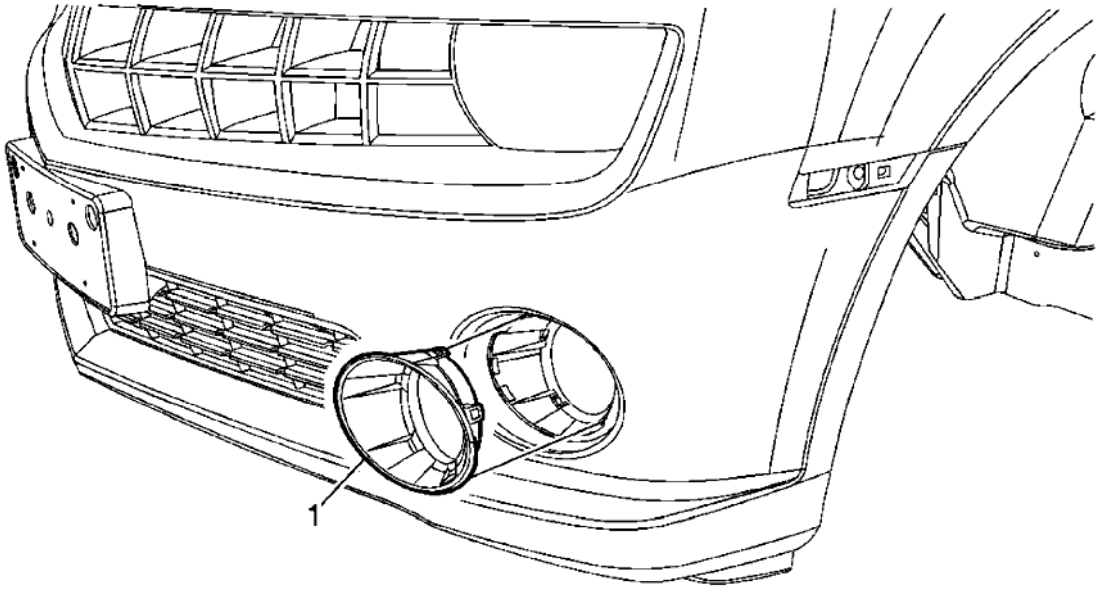


Fig. 4: Front Fog Lamp Bezel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** . 2. Remove the front wheelhouse liner. Refer to **Front Wheelhouse Liner Replacement** .	
1	Front Fog Lamp Bezel **Procedure** 1. Using a flat-bladed tool from inside the bumper fascia, release the tabs securing the front fog lamp bezel to the front bumper fascia. 2. Push the bezel outward from the fascia.

DECAL OR STRIPE REPLACEMENT

A pressure sensitive adhesive adheres the stripes and decals to the painted surfaces.

Use a wetting solution in order to lift and position the stripe or decal during installation.

A wetting solution ensures a better bond between the stripe or decal and the panel assembly.

If the metal or underlying painted surfaces are damaged, repair and refinish the metal as needed before you install the stripes or decals.

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CAUTION: Striping material highlights vehicle surface imperfection. All dings, rough metal, paint defects and uneven two-tone paint breaklines must be eliminated before stripe/decal application. Freshly painted surfaces must be allowed to dry thoroughly before installing stripe or decal. Residual solvents in fresh painted surfaces can lead to subsequent blistering problems if stripe or decal is applied before complete release of solvents.

Maintain body surface and decal temperature between 21-38°C (70 -100°F) during installation.

NOTE: DO NOT apply the decals when the body surface and the decal temperatures are below 21°C (70°F).

Use auxiliary heat sources to warm the body surface and decals if the temperature is less than 21°C (70°F).

CAUTION: Use of harsh chemicals when cleaning can damage exterior lamps. Suggested cleaners are a mild soap and water, or Varnish Makers and Painters (VM&P) Naptha. VM&P Naptha is a specific type of naptha and should not be substituted by any other naptha.

NOTE: When you apply stripes or decals on flexible surfaces (fascias, etc.), use the WET method. The WET method reduces the formation of bubbles under the decal due to the outgassing potential of the flexible materials.

You may apply stripes and decals dry. If the stripe or decal shows bubbles, use the "wet" method. Use the "wet" method for large graphics packages.

The following equipment and materials, or the equivalent, are necessary when making a quality stripe or decal installation:

- Wetting solution foaming type window cleaner that does not contain ammonia
- Silicone, wax and grease remover
- Varnish Makers and Painters (VM&P) naphtha
- Isopropyl alcohol
- Squeegee about 75-100 mm (3-4 in) wide, plastic or hard rubber. Deburr any sharp or rough edges in order to prevent scratching of the stripe or decal
- Water bucket and sponge or spray bottle
- Sandpaper 800 grit or finer, wet or dry type
- Heat gun
- Clean, lint-free wiping cloth
- Sharp knife or razor blade
- Scissors
- Fine pin or needle
- Marking pencil

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Removal Procedure

1. Remove the necessary molding and trim panel.
2. Wash and clean the following items using Liquid Wash and Wax GM P/N 1052870 or the equivalent:
   - The repair surfaces
   - The adjacent panel
   - The openings
3. Remove the following components:
   - The molding attaching clips
   - The handles
   - The sidemarker reflector
   - Other stripe or decal overlapping parts

CAUTION: To avoid damaging the paint finish, do not use pointed or sharp instruments to remove the stripe or the decal.

4. Use heat in order to remove the stripe or decal. Start at one edge and peel the stripe or decal from the panel surface.
5. Remove all traces of adhesive residue from the painted surfaces using the following items:
   - Silicone, wax and grease remover
   - Varnish makers and painters (VM&P) naphtha

Installation Procedure

1. Prepare the surface.

CAUTION: To prevent possible vehicle, stripe or decal damage, always refer to manufacturer's packaged instructions.

NOTE: If the area where you apply the stripe or decal has been refinished, remove any imperfections that may show through the stripe or decal.

2. Clean the painted surface with the following items:
   - Silicone
   - Wax
   - Grease remover
3. Clean the area where you apply the stripe or decal. Use a 50/50 mixture of isopropyl alcohol and water.
4. Wipe the panel surface with a clean cloth while the solvent drys.
5. Apply the wetting solution to the area where you install the stripe or decal.

NOTE: DO NOT touch the adhesive backing of the stripes.

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6. Use the wetting solution on the adhesive side of the stripe or decal.
7. Remove the backing material of the stripe or decal as needed.
8. Install the stripe or decal to the panel.
9. Working from the center if possible, squeegee the stripe or decal into position.
10. Apply additional wetting solution in order to ease installation of the stripe or decal.

    Apply a soapy wetting solution on the top side of the stripe or decal for the following reasons:

    - In order to ease the pull of the squeegee on the stripe or decal
    - In order to eliminate the possibility of damage
11. Apply heat to the stripe or decal at recessed areas.
12. Press the stripe or decal into recess in order to obtain a firm bond.
13. Use adequate light reflection in order to detect any irregularities in the stripe or decal that may have developed during installation.

    NOTE: DO NOT use a razor blade or a knife edge.

14. Use one of the following items in order to remove all bubbles by piercing:
    - A safety pin
    - A needle
    - A tool with the same size piercing tip
15. Pierce a bubble on the outer edge.
16. Force the air out from the opposite edge with the blade of the squeegee.
17. Install all previously removed components. Clean the components as needed.

RADIATOR GRILLE REPLACEMENT

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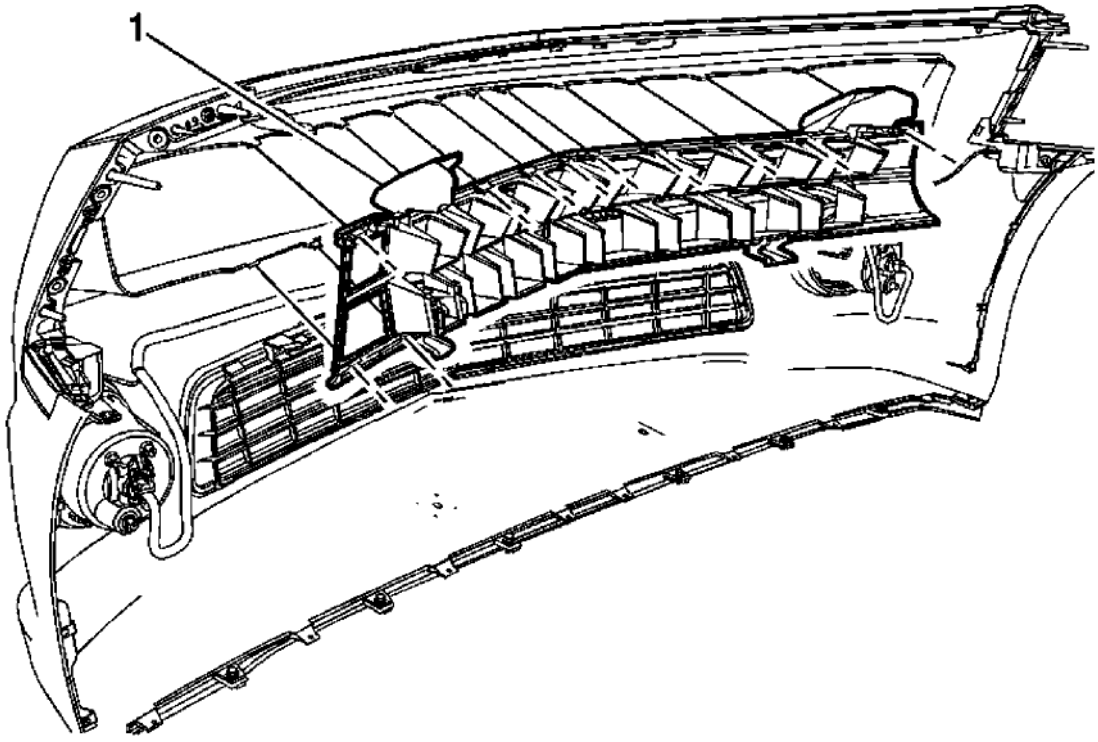


Fig. 5: Radiator Grille
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement** . 2. Remove the front bumper energy absorber. Refer to **Front Bumper Fascia Energy Absorber Replacement** . 3. Place the bumper fascia face down on a clean protected surface. 4. Release the grille tabs securing the center grille to the front bumper fascia.	
1	Radiator Center Grille **Tip:** Each individual front bumper fascia tab must be secure to each slot in the center grille prior to re-assemble of the fascia to the vehicle.

RADIATOR UPPER GRILLE REPLACEMENT

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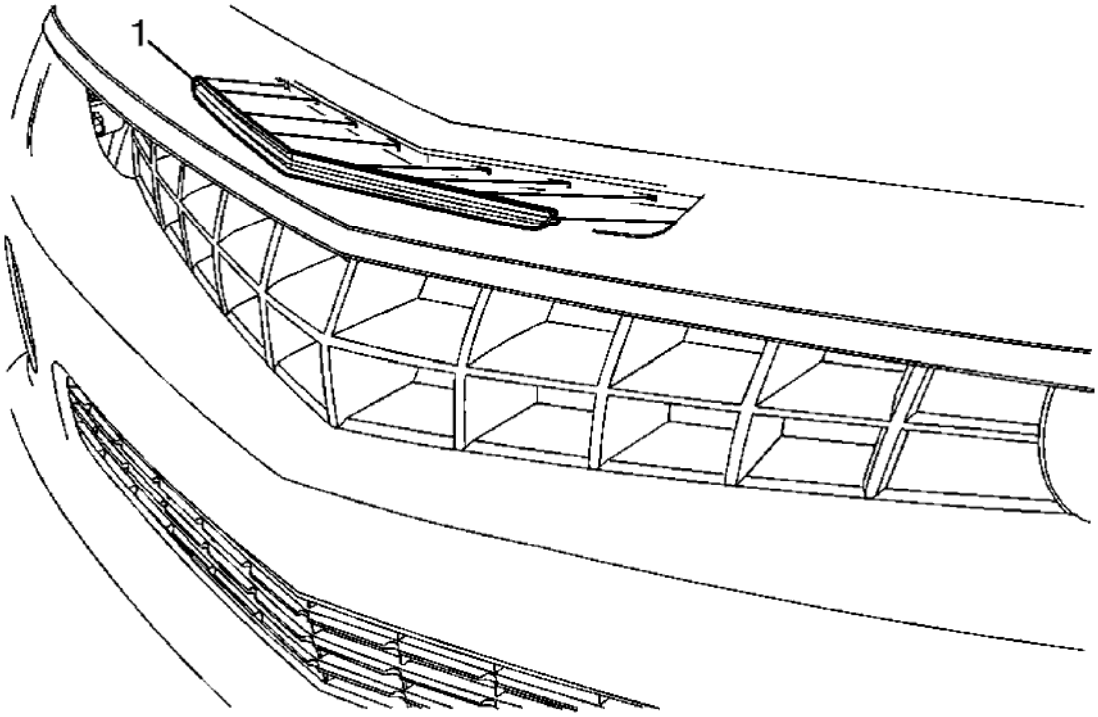


Fig. 6: Radiator Upper Grille
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open and support the hood. 2. Remove the front bumper fascia upper support. Refer to **Front Bumper Fascia Upper Support Replacement** . 3. Release the outer grille tabs securing the upper grille to the front bumper fascia. 4. Gently flex the center of the upper grille outward, from the bumper fascia, in order to release the two outer grille tabs from the corners of the fascia and remove.	
1	Radiator Upper Grille **Tip:** Each individual front bumper fascia tab must be secure to each slot in the upper grille prior to re-assemble of the front bumper fascia support to the vehicle.

RADIATOR LOWER GRILLE REPLACEMENT

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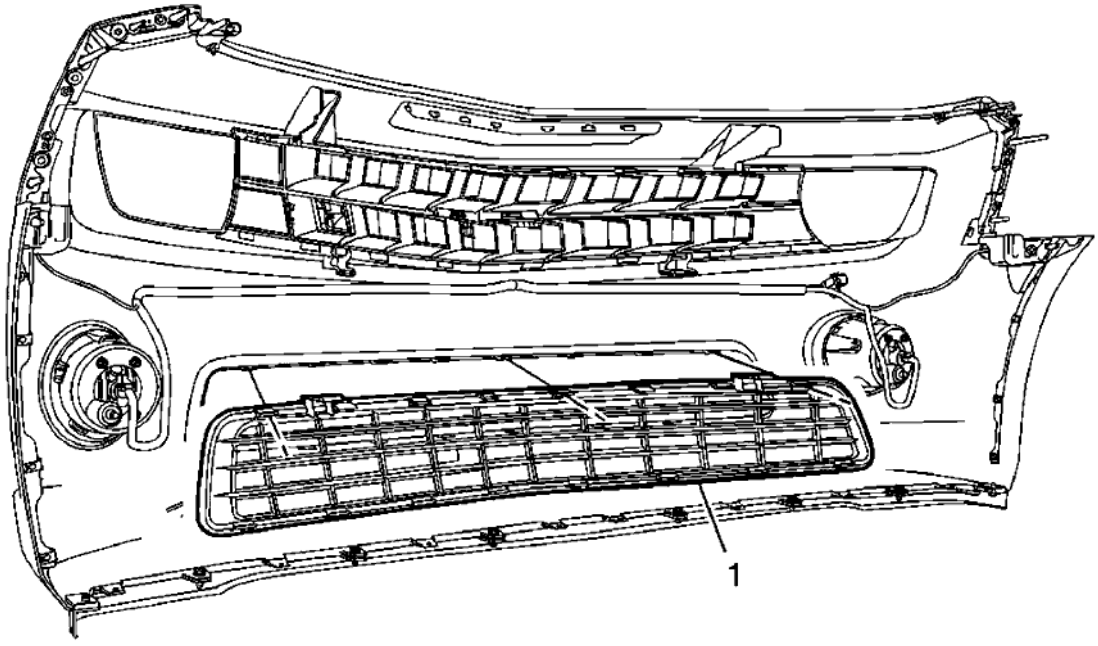


Fig. 7: Radiator Lower Grille
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front bumper fascia energy absorber. Refer to **Front Bumper Fascia Energy Absorber Replacement** . 2. Place the bumper fascia face down on a clean protected surface. 3. Release the grille tabs securing the lower grille to the front bumper fascia.	
1	Radiator Lower Grille **Tip:** Each individual front bumper fascia tab must be secure to each slot in the lower grille prior to re-assemble.

ROCKER PANEL MOLDING REPLACEMENT

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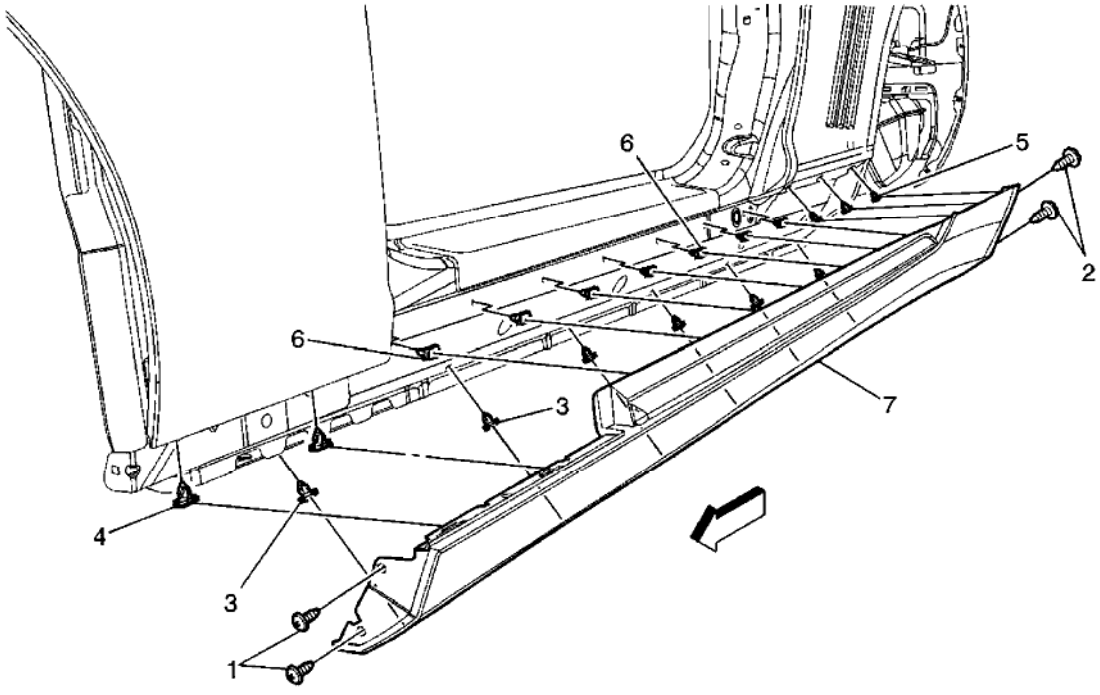


Fig. 8: Rocker Panel Molding
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open the door on the side the lower rocker molding is being serviced. 2. Remove the rear wheel and tire assembly on the side the lower rocker molding is being serviced. Refer to **Tire and Wheel Removal and Installation** .	
1	Front Wheelhouse Panel Liner Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 3 N.m (27 lb in)
2	Rear Wheelhouse Panel Liner Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 3 N.m (27 lb in)
3	Lower Rocker Molding W-Clip (Qty: 6) **Tip:** Use a trim-type release tool in order to disengage the w-clips from the lower body panel.

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4	Front Fender Upper Flange W-Clip (Qty: 2)
5	Rear Bodyside Panel W-Clip (Qty: 3)
6	Door Opening Sil Panel W-Clip (Qty: 7)
7	Lower Rocker Molding **Procedure** 1. Transfer the front side door lower auxiliary weatherstrip to the New rocker molding. **Tip:** A small trim type release tool is necessary for removal of the weatherstrip retainers. 2. Install New w-clips if any are damaged or broken after the rocker molding has been removed.

ROOF DRIP SCALP MOLDING REPLACEMENT

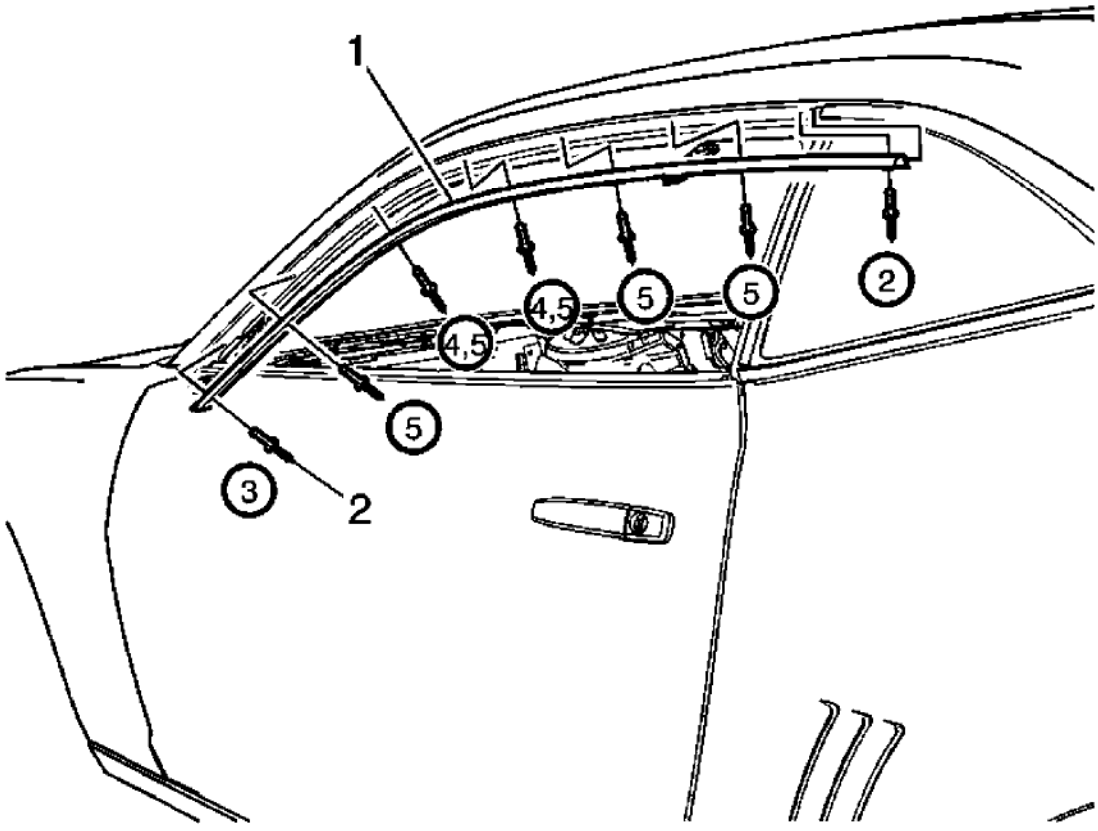


Fig. 9: Roof Drip Scalp Molding
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

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Preliminary Procedures

1. Open the door on the side the roof drip scalp molding is to be replaced.
2. Pull the top half of the front side door opening weatherstrip downward from the roof drip scalp molding and quarter window in order to access the rivets in the roof drip scalp molding.

WARNING:

Use the proper eye protection when drilling to prevent metal chips from causing physical injury.

3. Drill the rivets in order to remove the roof drip scalp molding from the body outer panel surface.

1	Roof Drip Scalp Molding **Procedures** 1. Insert the rearward end of the roof drip scalp molding into the front end of the rear encapsulated glass molding. **Tip:** Medium insertion effort is required when securing the roof drip scalp molding into the front end of the rear encapsulated quarter glass upper joint. 2. Hold the roof drip scalp molding into position on the body side outer. 1. Install and secure a rivet to the center of the molding 2. Install and secure a rivet to the rear edge 3. Install and secure a rivet to the front edge 4. Install and secure the remaining rivets 3. Reposition the upper half of the front side door weatherstrip into roof drip scalp molding and quarter window channel.
2	Roof Drip Scalp Molding Rivet (Qty: 7) **Tip:** Follow the mandatory sequence when securing the rivets to body panel.

ROOF PANEL JOINT FINISH MOLDING REPLACEMENT

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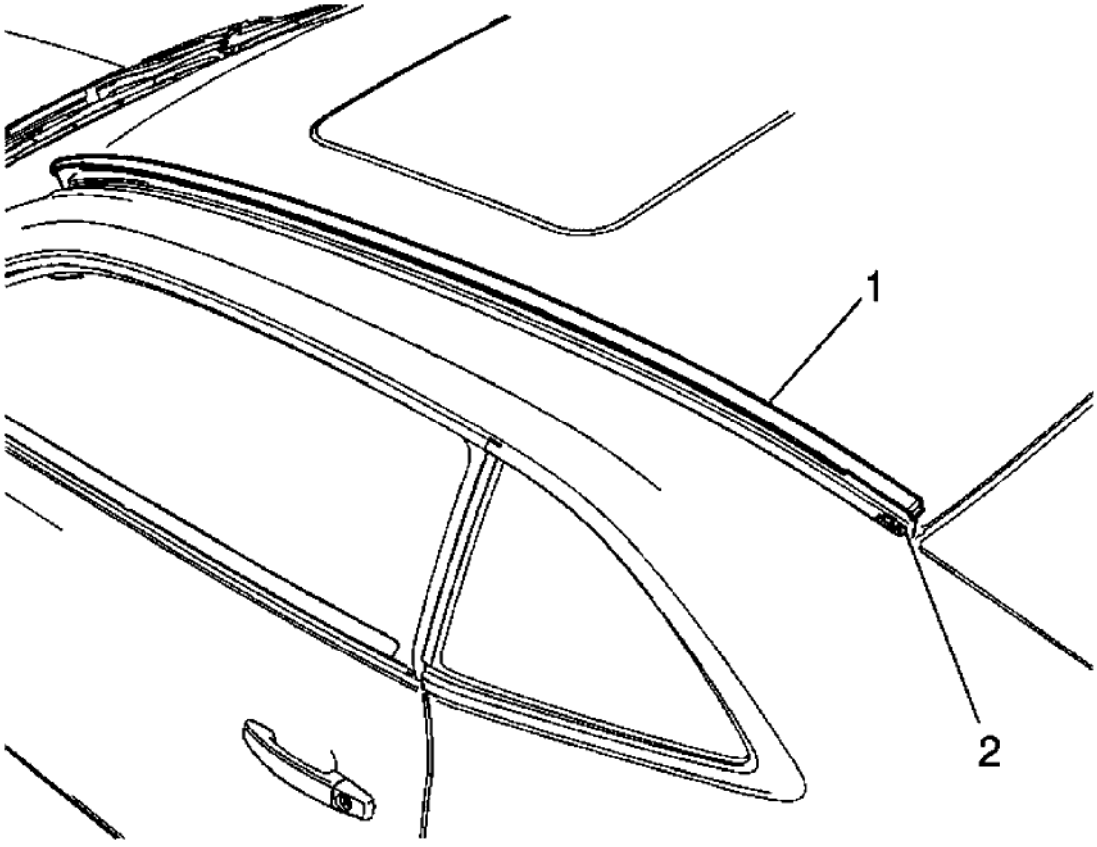


Fig. 10: Roof Panel Joint Finish Molding
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Begin at the rear window and lift the molding from the ditch, disengaging the molding from the integral ditch retaining clips.	
1	Roof Panel Joint Finish Molding Assembly **Procedures** 1. Begin at the front windshield, tuck the finish molding tab to the front roof header. 2. Using a roller-type tool, roll the ditch molding into the ditch securing the molding to each of the integral ditch retainers. 3. Inspect the levelness of the ditch molding to the roof panel. 4. If not level, roll the area again to achieve a smooth fit to the ditch.
2	Integral Ditch Retaining Clip (Qty: 2) **Tip:** Ensure the retaining clips are secure to the roof ditch prior to installing the New molding.

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REAR END SPOILER REPLACEMENT

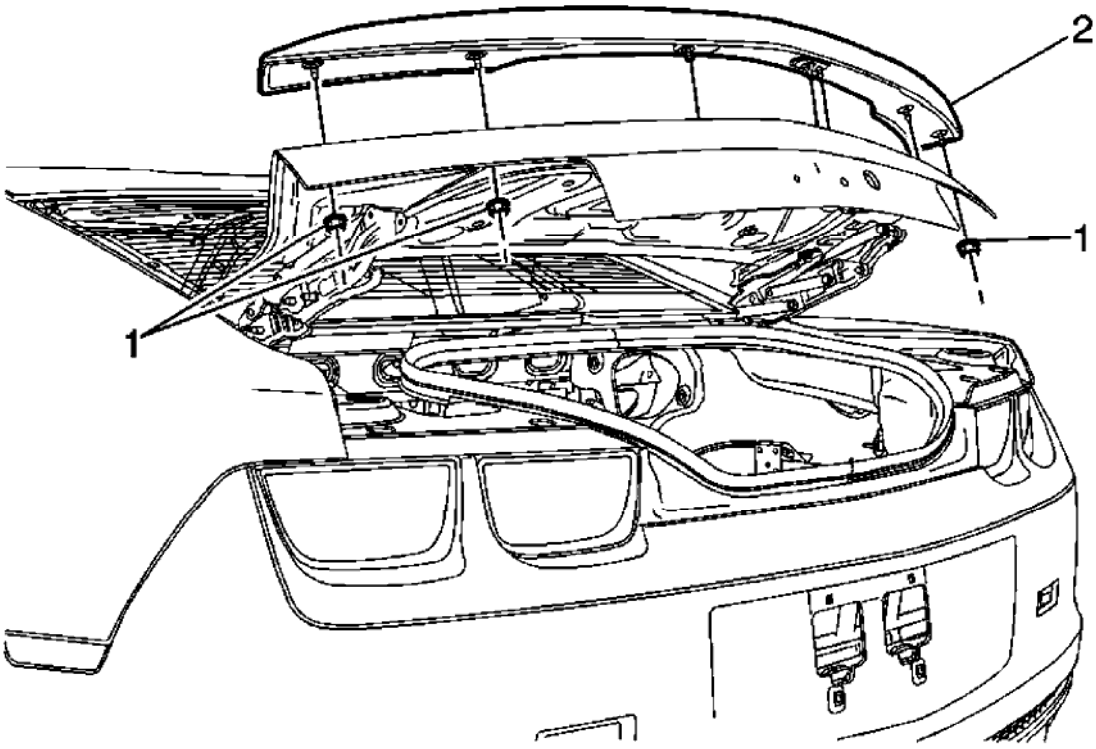


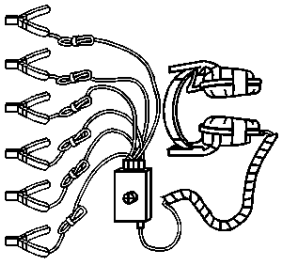
Fig. 11: Rear End Spoiler
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Open the rear compartment lid. 2. Remove the rear compartment lid carpet. Refer to **Rear Compartment Lid Carpet Replacement** .	
1	Rear End Spoiler Nut (Qty: 6) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 6 N.m(53 lb in)
2	Rear End Spoiler Assembly **Procedures** 1. Position the new spoiler to the rear compartment lid stud holes. 2. Raise the rear compartment lid. 3. Install and secure all nuts.

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SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J 25070 Heat Gun - 500-700°F

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Floor Coverings and Headlinings - Camaro

REPAIR INSTRUCTIONS

ELIMINATING UNWANTED ODORS IN VEHICLES

GM Vehicle Care Odor Eliminator, GM P/N 88861431 (Canadian P/N 88861436), may control or eliminate odors in the interior and luggage compartment areas of GM vehicles. This non-toxic, biodegradable, odorless product has been shown to greatly reduce or remove the following types of odor:

- Objectionable smells of mold and mildew resulting from vehicle water leaks
- Customer created odors, such as smoke

You may safely use GM Vehicle Care Odor Eliminator on fabrics, vinyl, leather, carpet, and sound deadening materials. You may also induce this product into HVAC modules and instrument panel ducts for the control of non-bacterial related odors.

IMPORTANT: This product leaves no residual scent and should not be used as an air freshener.

This product may result in the permanent elimination of an odor and may be preferable to customers whose allergies make them sensitive to perfumes. This product may effectively remove odors when directly contacting the odor source. In cases such as water leaks, use this product with diagnostic procedures to first eliminate the primary cause of the odor. Then use further applications on the residual odor to permanently correct the vehicle condition.

How to Use this Product

- Spray GM Vehicle Care Odor Eliminator directly or as an additive with carpet shampoo in steam cleaners.
- Do not use on any interior surface that plain water would deteriorate, because this product will have the same effect. Also avoid letting this product come into contact with vinegar or any acidic substance. Acid-based products will hamper the effectiveness of GM Vehicle Care Odor Eliminator.
- Complete eight page treatment sheets are enclosed within each case of GM Vehicle Care Odor Eliminator. These treatment instructions range from simple vehicle odor elimination to full step by step procedures for odor removal from water leaks. If lost, contact 800-977-4145 to get a replacement set faxed or e-mailed to your dealership.
- Instructions and cautions are printed on the bottle, but additional help is available. If you encounter a persistent or recurring odor, you may call to obtain additional information and usage suggestions.
    - In the USA, call 1-800-955-8591.
    - In Canada, call 1-800-977-4145.

FLOOR CARPET DRYING

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If the carpet or the pad or insulator is wet, use the following criteria for drying or for replacing the components:

- For a 1-piece carpet assembly bonded to a cotton or a fiber padding, replace the entire assembly.
- For a 2-piece carpet assembly with a cotton or a fiber padding, replace the padding only. While the carpet is out of the vehicle, dry the carpet using the method described below.
- For a 1-piece carpet assembly bonded to a foam padding or attached to a synthetic padding, dry the carpet using the method described below.
- For a 2-piece carpet assembly with a synthetic padding, dry the assembly using the method described below.
- For a 1-piece carpet assembly with a separate cotton or a fiber padding, replace the cotton or fiber padding. While the carpet is out of the vehicle, dry the carpet using the method described below.

Drying Method

1. If you observe puddles of liquid on the carpet face, use a wet vacuum to remove the excess moisture.
2. Blot the face of the carpet with a towel in order to absorb as much moisture as possible.
3. Point a fan at the affected area and air dry the carpet.

FLOOR PANEL CARPET REPLACEMENT

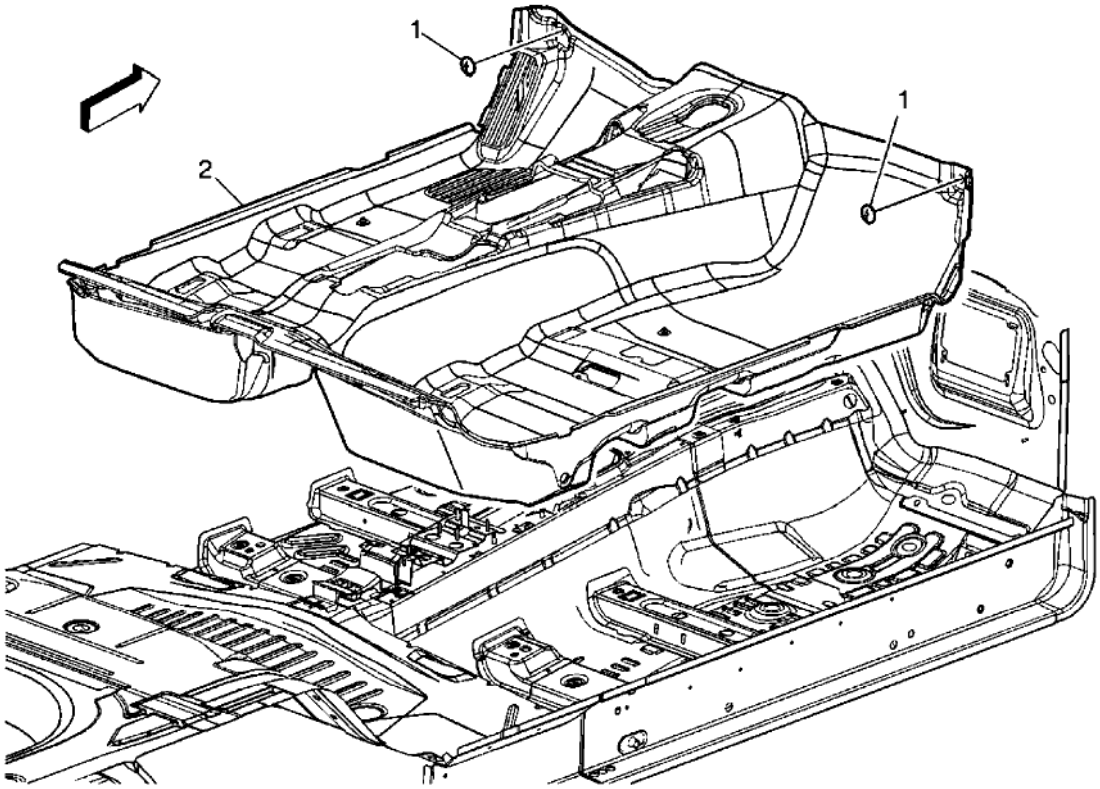


Fig. 1: Floor Panel Carpet
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedures 1. Remove the front seats. Refer to **Driver or Passenger Seat Replacement** . 2. Remove the front floor console. Refer to **Front Floor Console Replacement** . 3. Remove the front side door opening floor carpet retainer. Refer to **Front Side Door Opening Floor Carpet Retainer Replacement**. 4. Remove the body hinge pillar trim panel. Refer to **Body Hinge Pillar Trim Panel Replacement** . 5. Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement** . 6. Remove the quarter trim panel. Refer to **Quarter Trim Panel Replacement** .	
1	Front Floor Panel Carpet Retainer (Qty: 2)
2	Front Floor Panel Carpet **Procedure:** Cut the carpet and reposition as required.

FRONT SIDE DOOR OPENING FLOOR CARPET RETAINER REPLACEMENT

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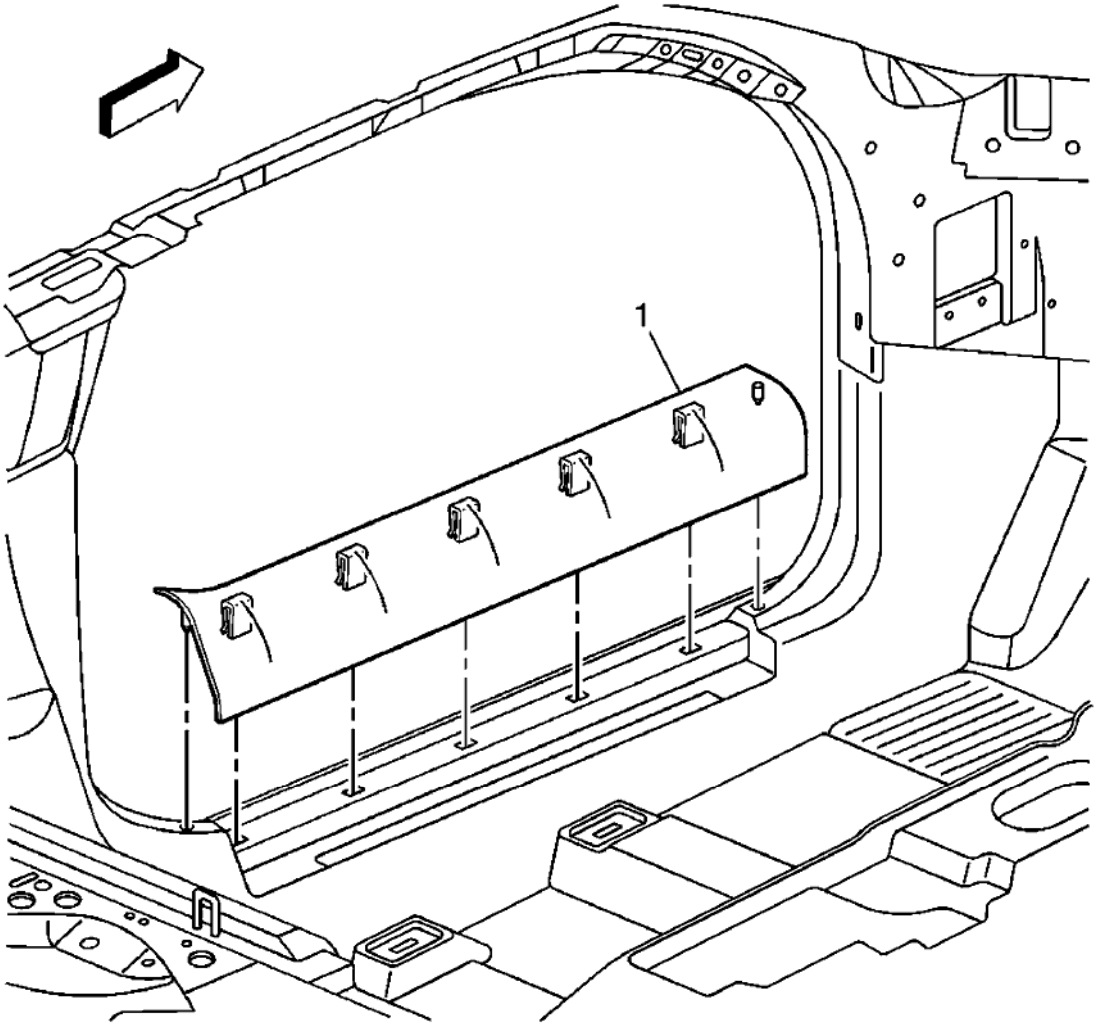


Fig. 2: Front Side Door Opening Floor Carpet Retainer
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Side Door Opening Floor Carpet Retainer **Procedure:** Pull up at the rear edge first, then pull rearward to remove.

DRIVER FOOTREST REPLACEMENT

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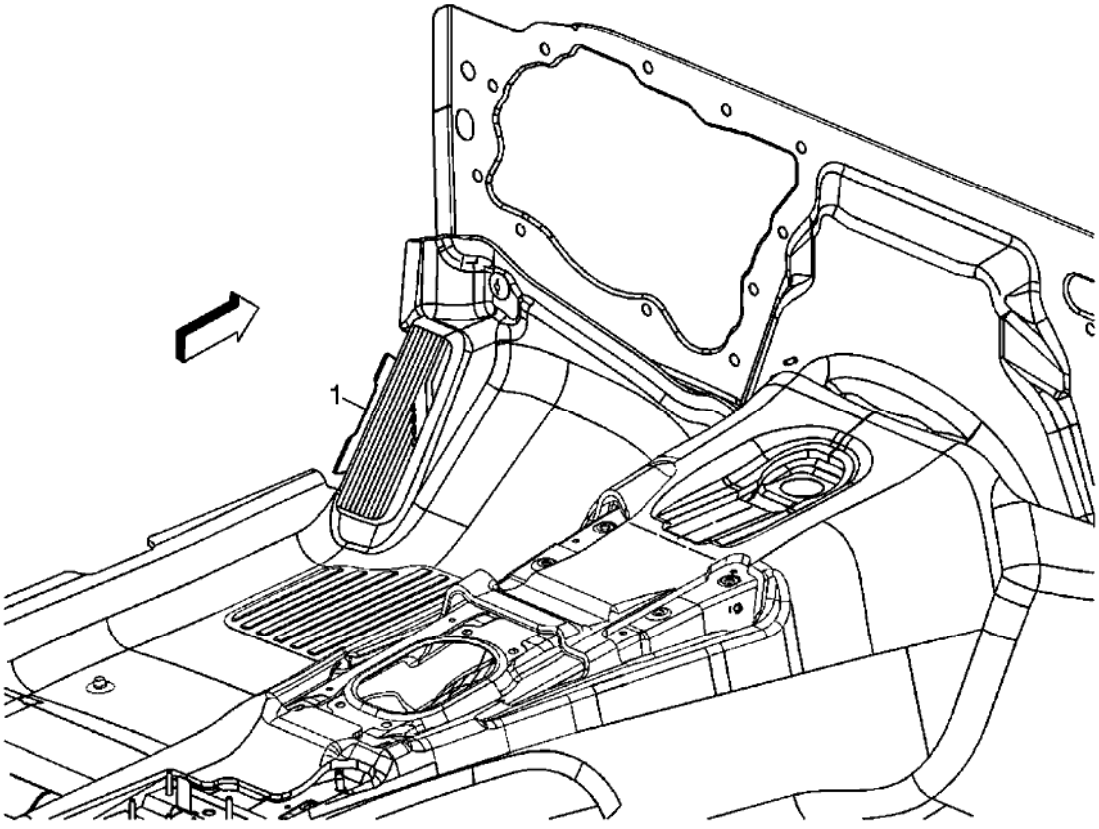


Fig. 3: Driver Footrest
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the body hinge pillar trim panel. Refer to **Body Hinge Pillar Trim Panel Replacement** . 2. Remove the front side door opening floor carpet retainer. Refer to **Front Side Door Opening Floor Carpet Retainer Replacement**.	
1	Driver Footrest

HEADLINING TRIM PANEL REPLACEMENT

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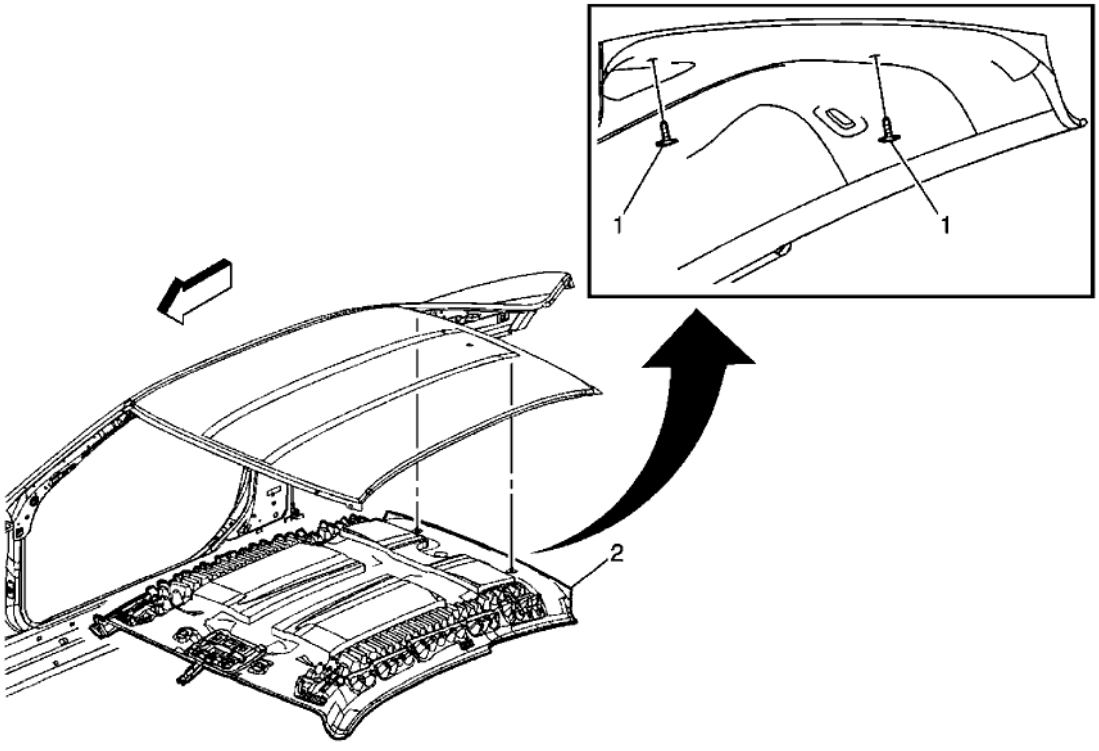


Fig. 4: Headlining Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

WARNING:

Do not attempt to repair or alter the head impact energy-absorbing material glued to the headliner or to the garnish trims. If the material is damaged, replace the headliner and/or the garnish trim. Failure to do so could result in personal injury.

CAUTION:

Use care when working around the head curtain inflator module. Sharp tools may puncture the curtain airbag. If the head curtain inflator module is damaged in any way, it must be replaced.

CAUTION:

If a vehicle is equipped with a head curtain inflator module ensure that the inflator module and tether are undamaged. If tether or curtain airbag are damaged in any way, they must be replaced.

Preliminary Procedures

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Remove the windshield side garnish moldings. Refer to **Windshield Side Garnish Molding Replacement** .
3. Remove the sunshade assemblies. Refer to **Sunshade Replacement** .

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	4. Remove the sunshade support. Refer to **Sunshade Support Replacement** . 5. Remove the overhead console assembly. Refer to **Roof Console Replacement** . 6. Remove the coat hooks. Refer to **Coat Hook Replacement** . 7. Remove the rear quarter trim panel. Refer to **Quarter Upper Trim Panel Replacement** . 8. Remove the front seat. Refer to **Driver or Passenger Seat Replacement** 9. Move the driver seat fully forward and recline.
1	Headliner Trim Panel Retainer
2	Headliner Trim Panel Assembly **Procedure** 1. Prior to removal, note routing of wire harness to aid in assembly and to ensure proper installation. 2. Disconnect the electrical connectors. 3. Removal and installation of the headliner must be completed through the right front door opening with the aid of an assistant to prevent kinking or damage to the headliner. **Tip:** When installing a new headliner, tape any unused connector to the headliner with a high adhesive tape.

SUNROOF PANEL TRIM PANEL REPLACEMENT

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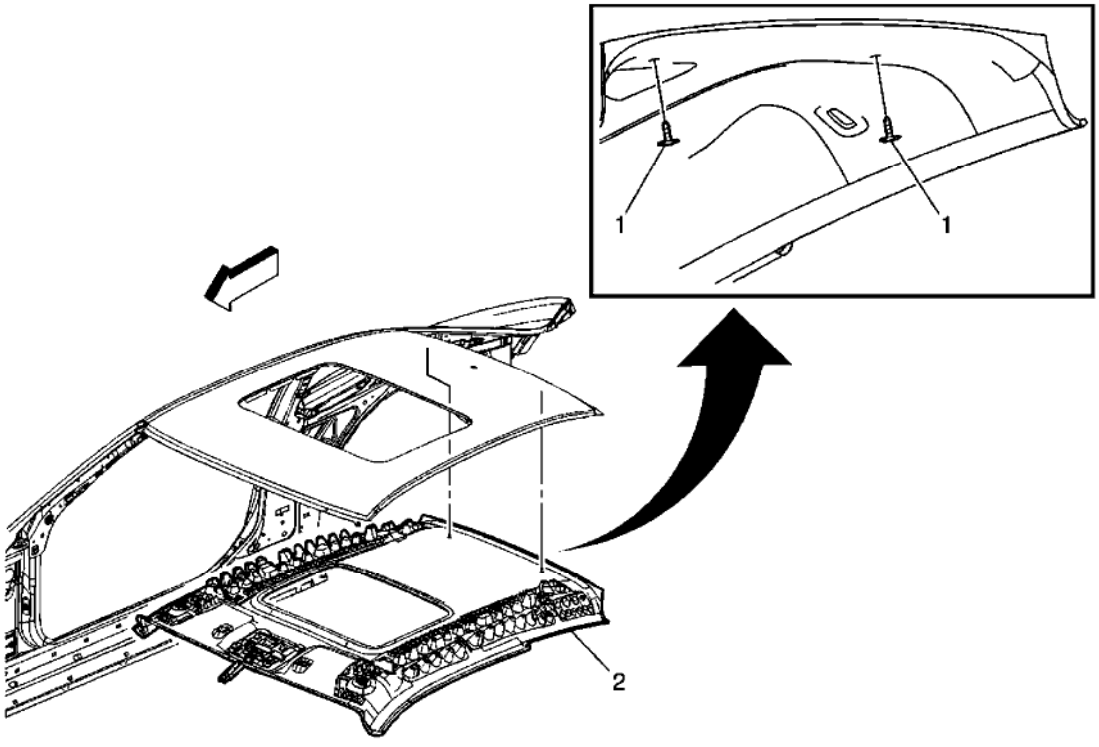


Fig. 5: Sunroof Panel Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

WARNING:

Do not attempt to repair or alter the head impact energy-absorbing material glued to the headliner or to the garnish trims. If the material is damaged, replace the headliner and/or the garnish trim. Failure to do so could result in personal injury.

CAUTION:

Use care when working around the head curtain inflator module. Sharp tools may puncture the curtain airbag. If the head curtain inflator module is damaged in any way, it must be replaced.

CAUTION:

If a vehicle is equipped with a head curtain inflator module ensure that the inflator module and tether are undamaged. If tether or curtain airbag are damaged in any way, they must be replaced.

Preliminary Procedures

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Remove the windshield side garnish moldings. Refer to **Windshield Side Garnish Molding Replacement** .
3. Remove the sunshade assemblies. Refer to **Sunshade Replacement** .

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4. Remove the sunshade supports. Refer to **Sunshade Support Replacement** .
5. Remove the overhead console assembly. Refer to **Roof Console Replacement** .
6. Remove the coat hooks. Refer to **Coat Hook Replacement** .
7. Remove the sunroof opening trim finish lace. Refer to **Sunroof Opening Trim Finish Lace Replacement** .
8. Remove the rear quarter trim panel. Refer to **Quarter Upper Trim Panel Replacement** .
9. Remove the front seat. Refer to **Driver or Passenger Seat Replacement** .
10. Remove the instrument panel outer air outlet duct in order to allow access to unclip the harness. Refer to **Instrument Panel Outer Air Outlet Duct Replacement - Right Side** .
11. Move the driver seat fully forward and recline.

1	Sunroof Panel Trim Panel Retainer
2	Sunroof Panel Trim Panel Assembly **Procedure** 1. Prior to removal, note routing of wire harness to aid in assembly and to ensure proper installation. 2. Disconnect the electrical connectors. 3. Removal and installation of the headliner must be completed through the right front door opening with the aid of an assistant to prevent kinking or damage to the headliner.

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2010 ACCESSORIES & BODY, CAB

Frame and Underbody - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Brake Line Bracket to Frame Nut	10 N.m	89 lb in
Brake Module to Bracket Nut	10 N.m	89 lb in
Brake Pipe Fittings	15 N.m	11 lb ft
Engine Mount Nuts to Frame	50 N.m	37 lb ft
Front Frame Anchor Bolts to Body	Front Bolts 160 N.m Rear Bolts 240 N.m	Front Bolts 118 lb ft Rear Bolts 177 lb ft
Front Lower Ball Joint Nut (Front and Rear)		
• First Pass	40 N.m	30 lb ft
• Second Pass	plus 90 degrees	
Front Lower Control Arm Front to Frame Nut	50 N.m plus 120 degrees turn	37 lb ft plus 120 degrees turn
Front Lower Control Arm Rear to Frame	50 N.m plus 120 degrees turn	37 lb ft plus 120 degrees turn
Front Outer Tie Rod to Knuckle Nut		
• First Pass	30 N.m	22 lb ft
• Second Pass	plus 120 degrees turn	
Front Stabilizer Shaft Bracket Bolts	17 N.m	13 lb ft
Front Stabilizer Shaft Link Nut	49 N.m	36 lb ft
Power Steering Gear to Frame Mounting Bolts	50 N.m plus 120 degrees turn	37 lb ft plus 120 degrees turn
Rear Adjuster Link to Frame Nuts	115 N.m	85 lb ft
Rear Adjuster Link to Knuckle Bolts	140 N.m	103 lb ft
Rear Frame Insulator Anchor Bolts to Body	100 N.m plus 110 degrees turn	74 lb ft plus 110 degrees turn
Rear Lower Control Arm to Knuckle Bolts	40 N.m plus 120 degrees turn	30 lb ft plus 120 degrees turn
Rear Lower Control Arm to Frame Nuts	115 N.m	85 lb ft
Rear Shock Lower Nut	80 N.m plus 120 degrees turn	59 lb ft plus 120 degrees turn
Rear Shock Mount to Body Bolts	58 N.m	43 lb ft
Rear Stabilizer Shaft Clamp Bolt	20 N.m	16 lb ft
Rear Stabilizer Shaft Link Nuts	49 N.m	36 lb ft

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Rear Trailing Arm to Frame Bolts	100 N.m	74 lb ft
Rear Trailing Arm to Knuckle Bolts	40 N.m plus 120 degrees turn	30 lb ft plus 120 degrees turn
Rear Upper Control Arm Bushing to Control Arm Bolt	160 N.m	118 lb ft
Rear Upper Control Arm Bushing Bracket to Frame Bolts	50 N.m plus 120 degrees turn	37 lb ft plus 120 degrees turn
Transmission Mount Lower Nuts	60 N.m	44 lb ft
Transmission Support to Body Bolts	58 N.m	43 lb ft
Under Body Brace	58 N.m	43 lb ft
Upper Control Arm to Knuckle Bolt	60 N.m plus 120 degrees turn	44 lb ft plus 120 degrees turn
Washer Solvent Bottle Bracket Nut	10 N.m	89 lb in

REPAIR INSTRUCTIONS

REAR SUSPENSION SUPPORT REPLACEMENT

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the rear wheels. Refer to **Tire and Wheel Removal and Installation** .
3. Remove the exhaust system. Refer to **Exhaust Muffler with Resonator, Exhaust, and Tail Pipe Replacement (H-Pipe)** or **Exhaust Muffler with Resonator, Exhaust, and Tail Pipe Replacement (Vehicle Service)** .
4. Remove the propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement** .

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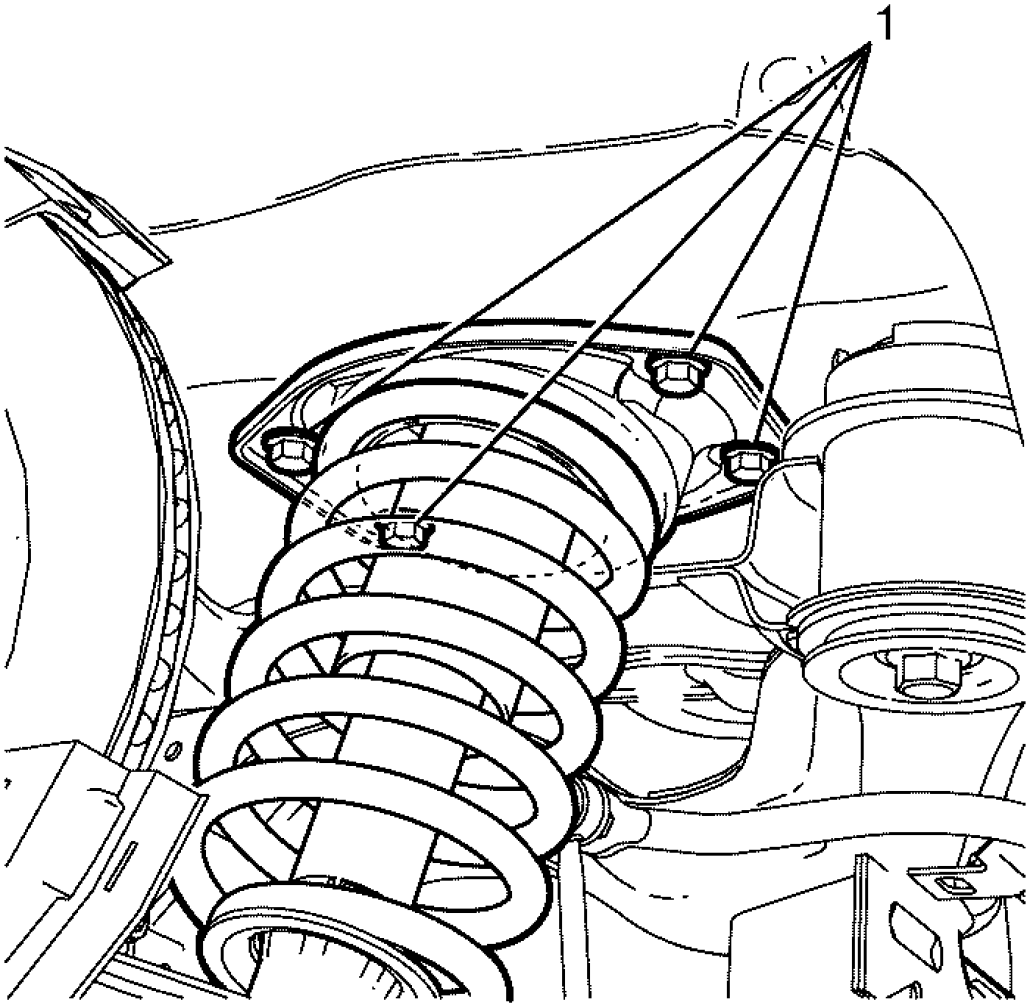


Fig. 1: Identifying Top Strut Assembly To Body Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

5. Remove the top strut assembly to body retaining bolts (1).

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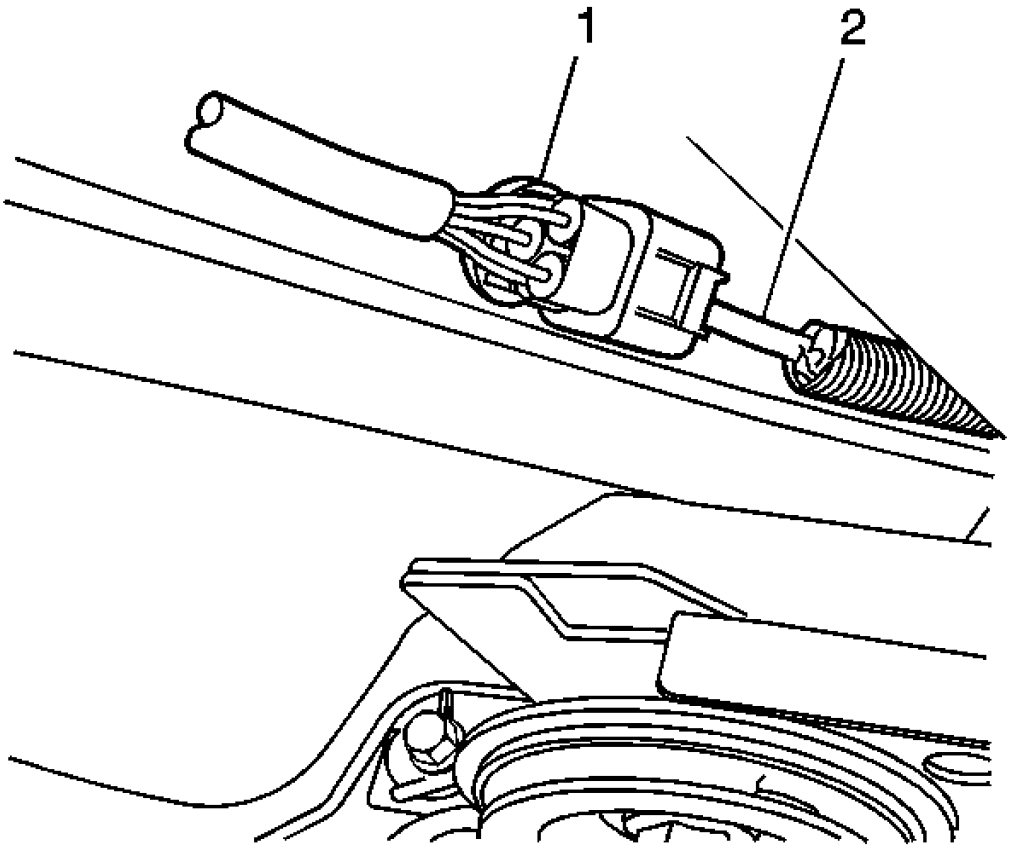


Fig. 2: Wheel Speed Sensor Jumper Harness Electrical Connector
Courtesy of GENERAL MOTORS CORP.

6. Disconnect the wheel speed sensor jumper harness electrical connector (1).

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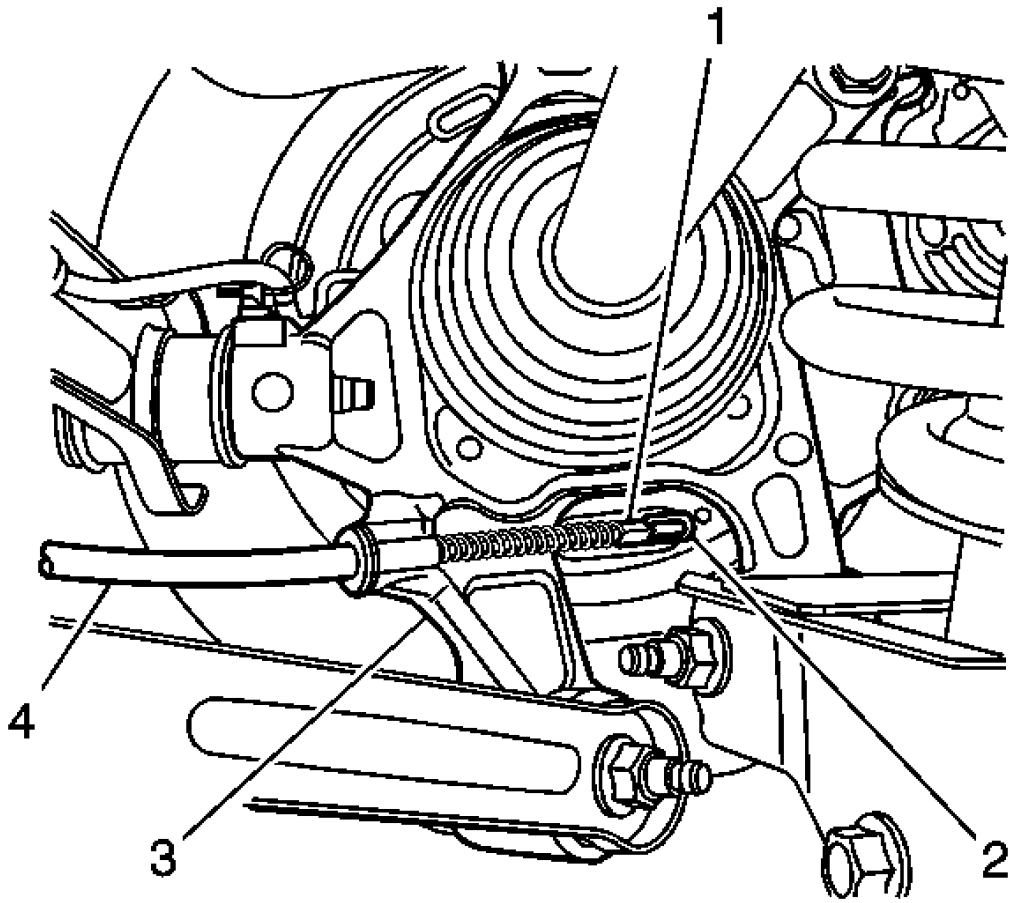


Fig. 3: Rear Park Brake Cable Components
Courtesy of GENERAL MOTORS CORP.

NOTE: Detach the rear park brake cable and clevis (1) from the park brake actuator (2) by pivoting the rear park brake cable and clevis (1) rearward using pliers.

7. Detach the rear park brake cable and clevis (1) from the park brake actuator (2).

NOTE: Remove the outer cable (4) from the rear knuckle (3) by pulling the outer cable (4) forward.

8. Remove the outer cable (4) from the rear knuckle (3).

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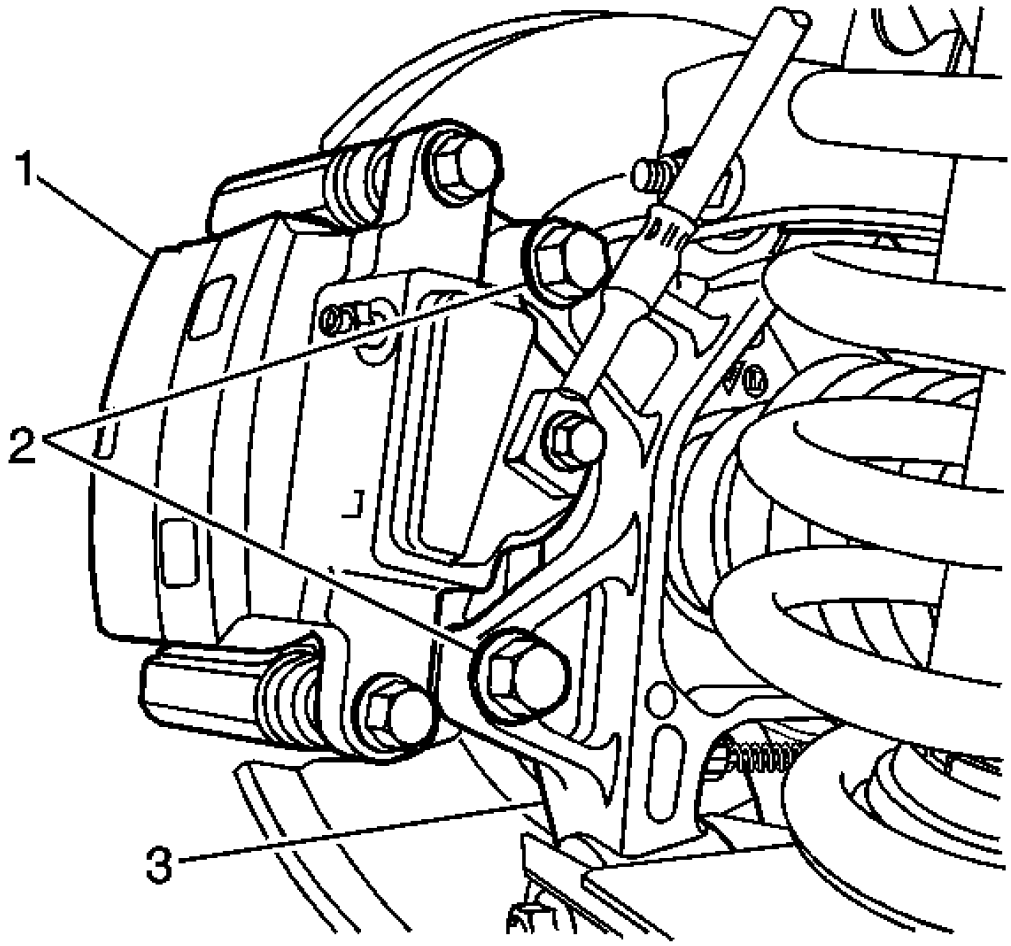


Fig. 4: Brake Caliper Anchor Plate To Knuckle Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

NOTE: Bolts with thread sealant must be discarded after removal.

9. Remove the brake caliper anchor plate to knuckle retaining bolts (2).

   Discard the bolts.

NOTE: DO NOT disconnect the hydraulic brake flexible hose from the brake caliper otherwise complete bleeding of the braking system will be necessary.

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10. Remove the brake caliper from the knuckle.

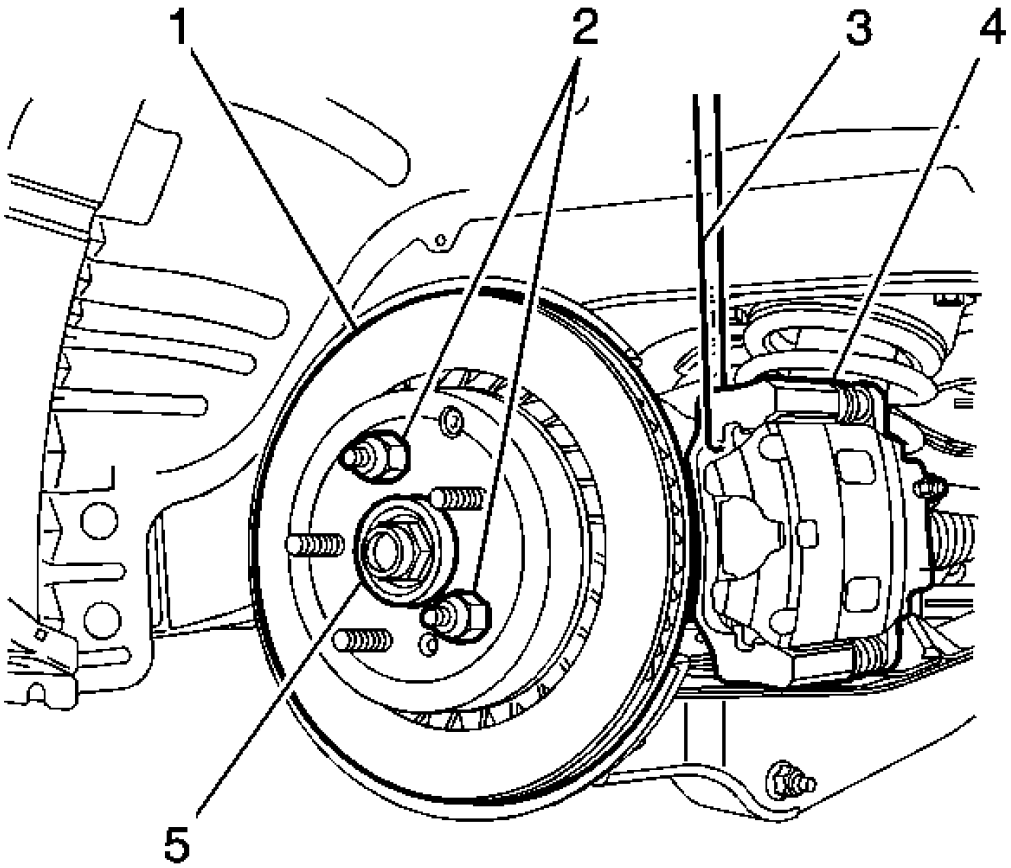


Fig. 5: Supporting Brake Caliper
Courtesy of GENERAL MOTORS CORP.

WARNING: Refer to Brake Fluid Irritant Warning .

11. Support the brake caliper (4) with heavy mechanic's wire, or equivalent (3).
12. Clean all dirt and foreign material from the brake hose and the brake pipe fittings.

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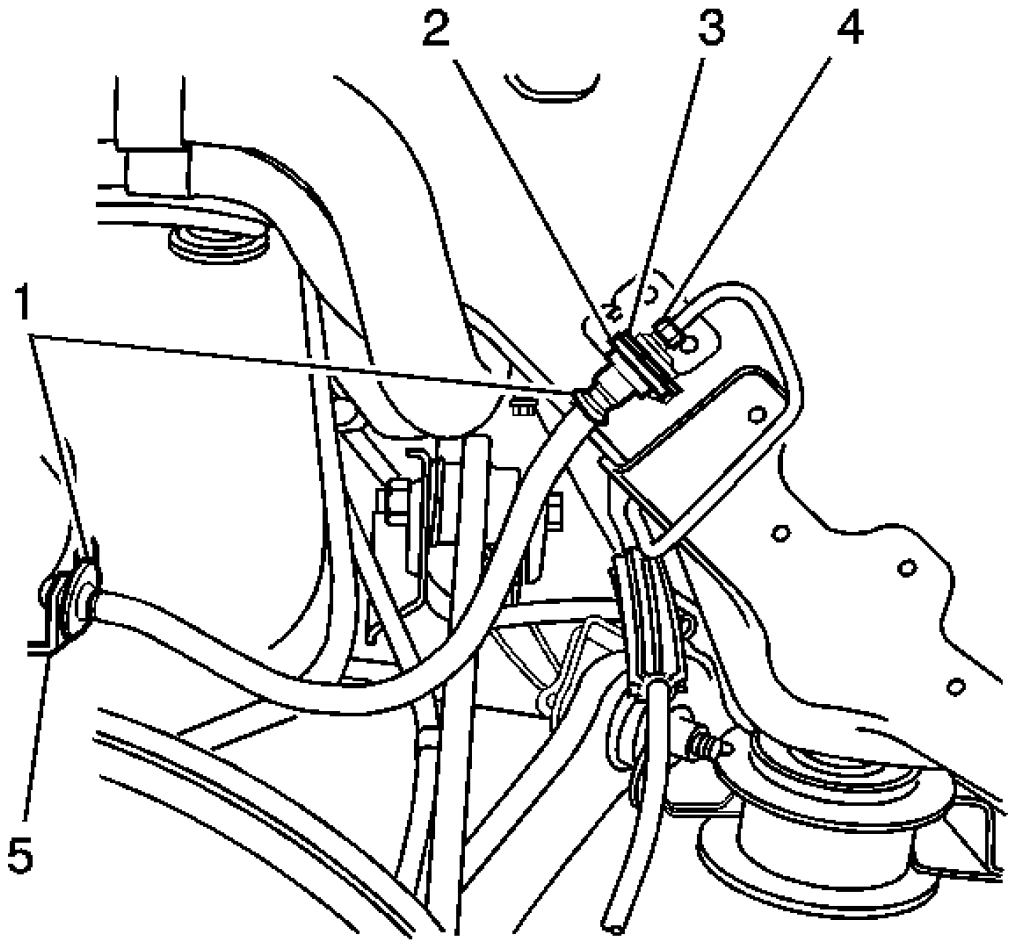


Fig. 6: Upper Control Arm Mounted Brake Hose Retaining Bracket
Courtesy of GENERAL MOTORS CORP.

13. Detach the brake hose (1) from the upper control arm mounted brake hose retaining bracket (5).
14. Position the suitable frame support table under the vehicle.
15. Using suitable frame support table, lower the vehicle to the frame support table.
16. Remove the rear sub frame to rear chassis rail retaining fasteners.
17. Carefully raise the vehicle from the rear frame assembly.
18. Remove the stabilizer shaft link. Refer to **Stabilizer Shaft Link Replacement** .
19. Remove the stabilizer shaft. Refer to **Stabilizer Shaft Replacement** .
20. Remove the rear wheel hub and knuckle assembly. Refer to **Knuckle Replacement** .

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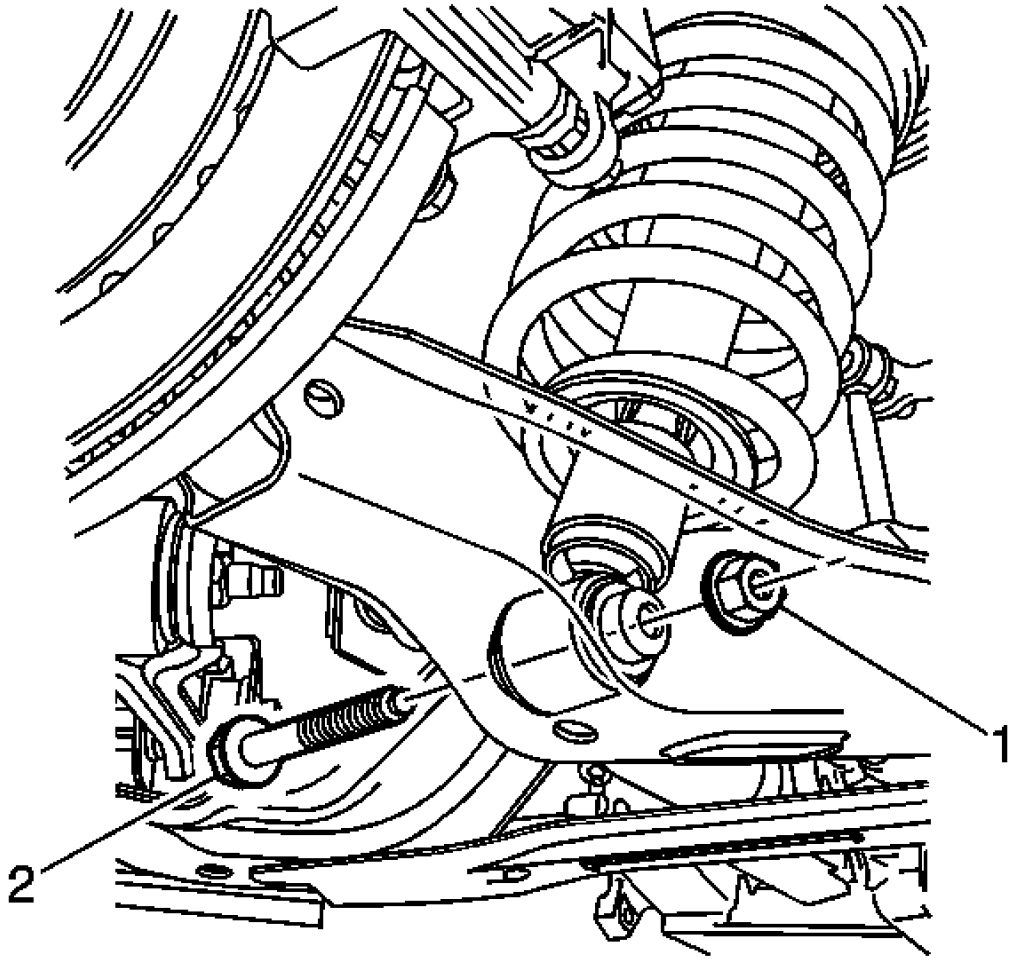


Fig. 7: Rear Strut Assembly To Lower Control Arm Retaining Bolt & Nut
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21. Remove the rear strut assembly to lower control arm retaining bolt (2) and nut (1).

    Discard the nut.

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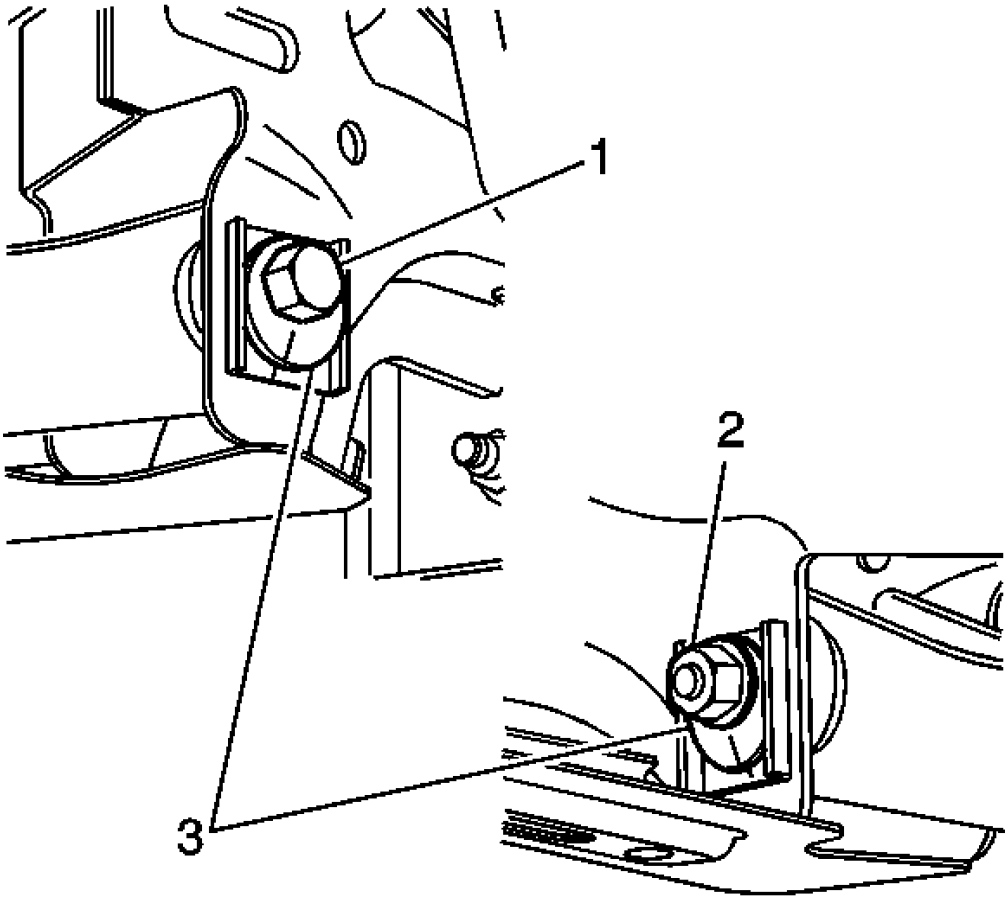


Fig. 8: Lower Control Arm To Subframe Retaining Bolt & Nut Eccentric Washers
Courtesy of GENERAL MOTORS CORP.

NOTE: The lower control arm to subframe retaining bolt (1) and nut (2) eccentric washers (3) that are used to adjust the rear suspension camber. One eccentric washer (3) is mounted directly to the head of the lower control arm to subframe retaining bolt (1).

22. Mark the eccentric washers (3) with reference to their seating position relative to the subframe.

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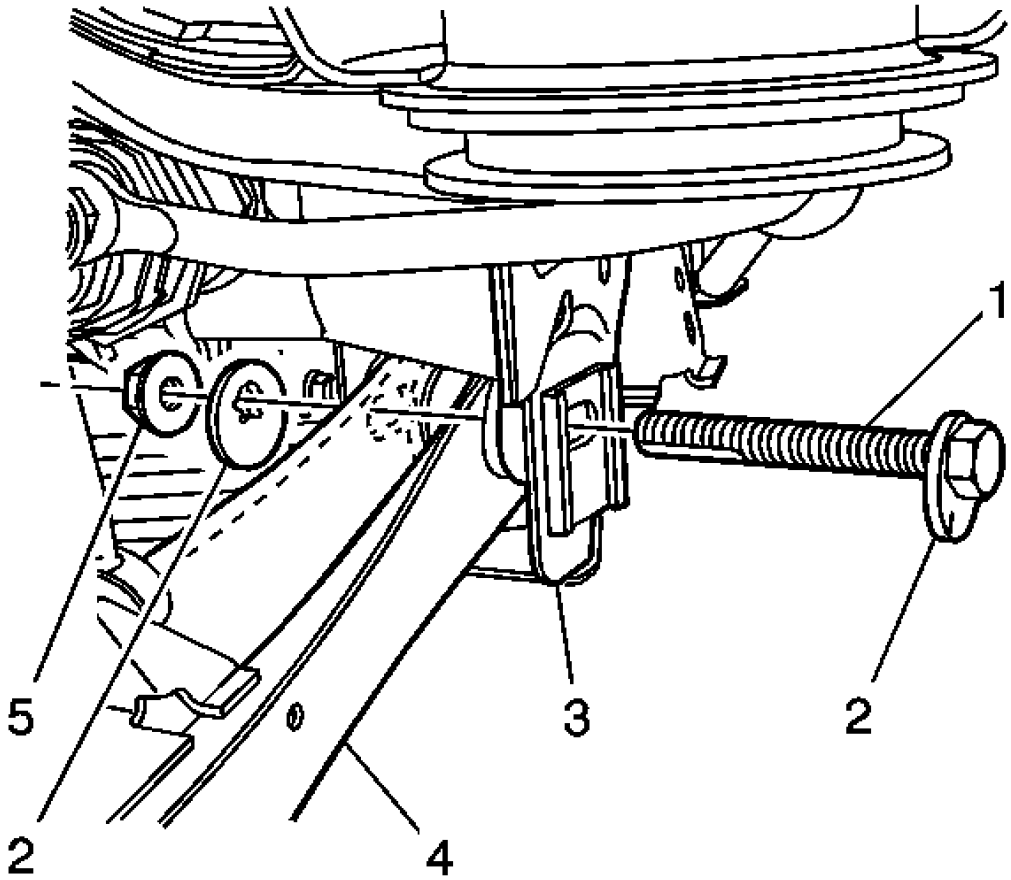


Fig. 9: Lower Control Arm To Subframe Retaining Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

23. Remove the lower control arm to subframe retaining bolt (1) and nut (5).

    Discard the nut.

24. Remove the lower control arm (4) from the subframe (3).
25. Remove the upper control arm pivot bushing. Refer to **Rear Suspension Upper Control Arm Bushing Replacement** .

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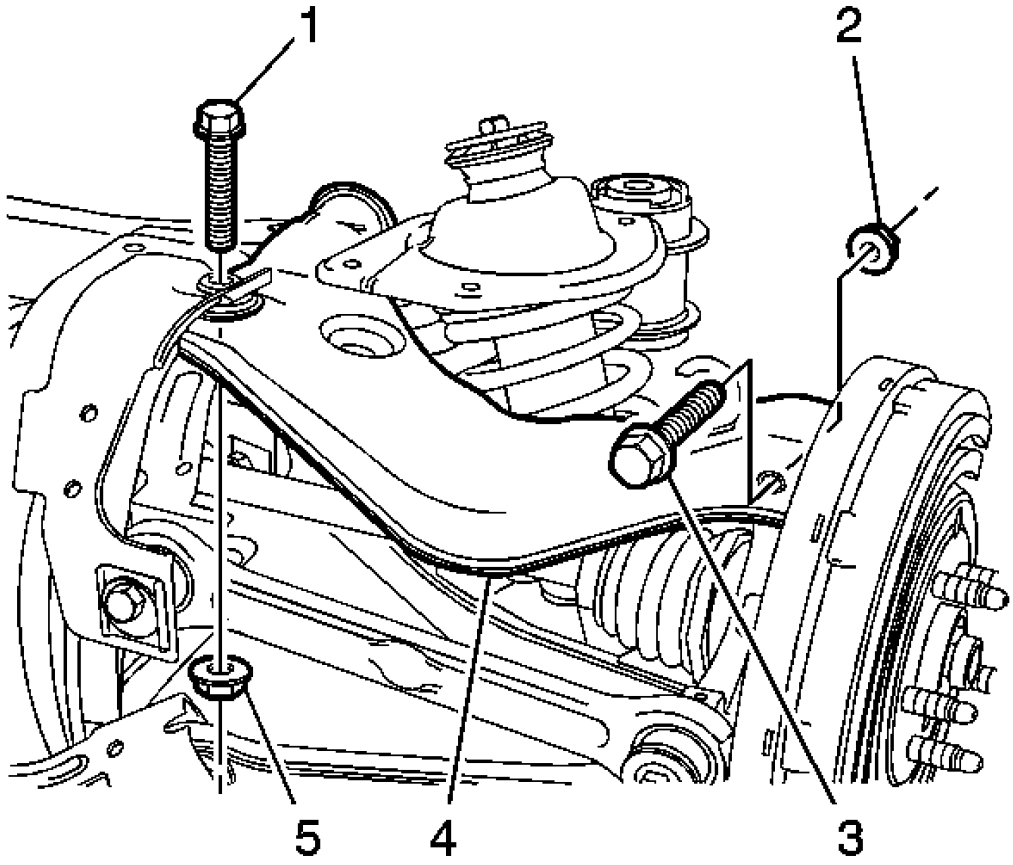


Fig. 10: Upper Control Arm Ball Joint To Subframe Retaining Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

NOTE: Fasteners with thread sealant must be replaced after removal.

26. Remove the upper control arm ball joint to subframe retaining bolt (1) and nut (5).

    Discard the nut.

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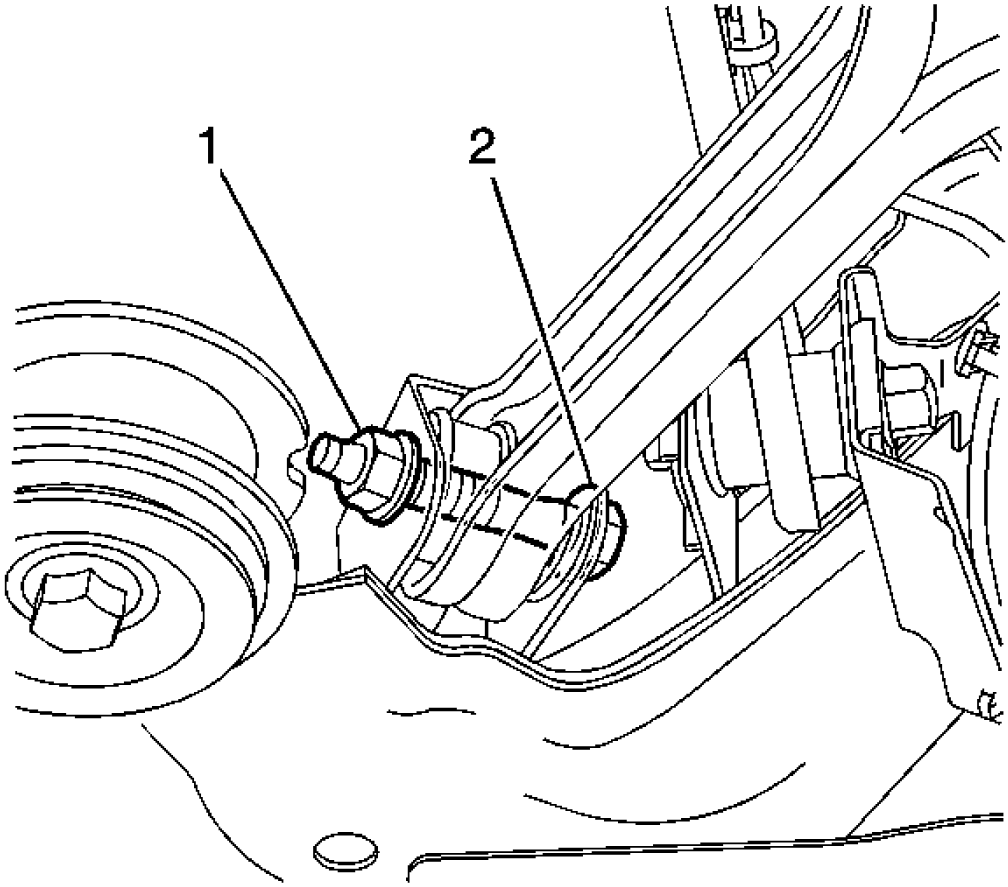


Fig. 11: Trailing Arm To Subframe Retaining Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

27. Remove the trailing arm to subframe retaining bolt (2) and nut (1).

    Discard the nut.

28. Remove the drive shafts. Refer to **Rear Wheel Drive Shaft Replacement** .
29. Remove the trailing arm.
30. Remove the differential. Refer to **Differential Replacement** .

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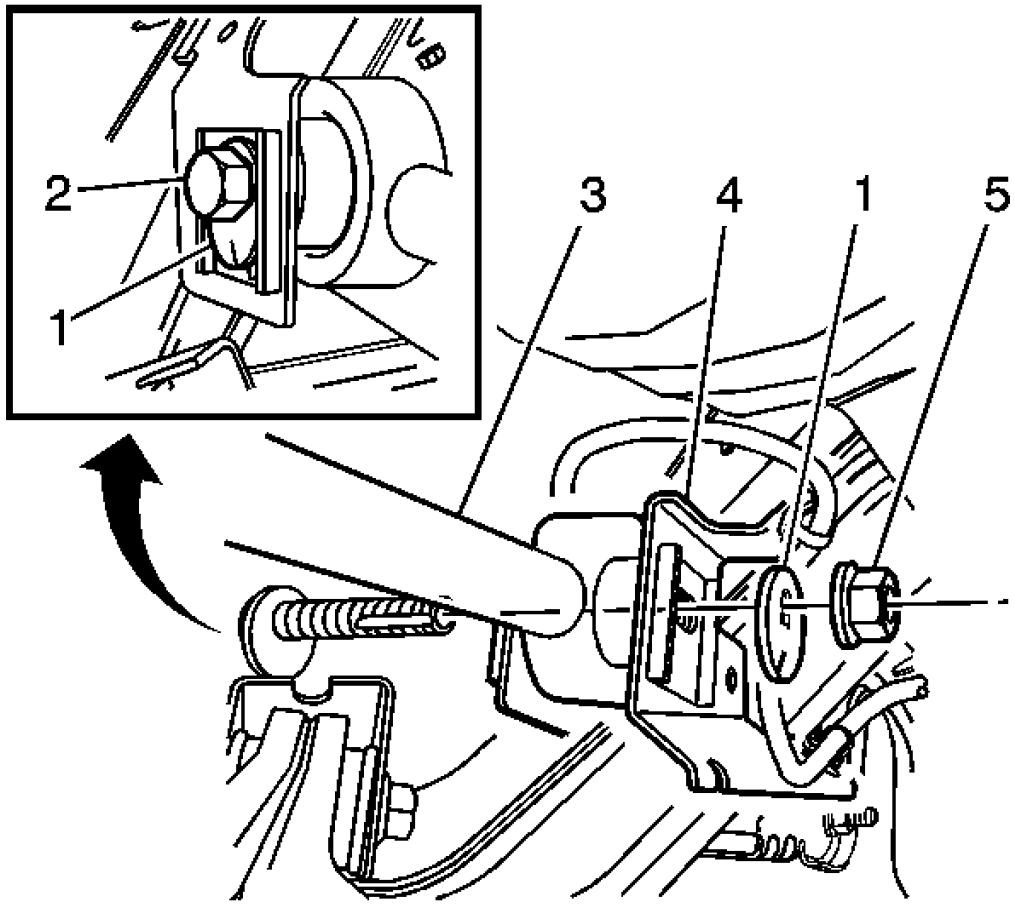


Fig. 12: Adjust Link To Subframe Retaining Bolt, Nut & Eccentric Washers
Courtesy of GENERAL MOTORS CORP.

NOTE: The adjust link to subframe retaining bolt (2), nut (5) and eccentric washers (1) are used to adjust the rear suspension toe. One eccentric washer (1) is mounted directly to the head of the adjust link to subframe retaining bolt (2).

NOTE: Fasteners with thread sealant must be discarded after removal. Discard the nut.

31. Mark the eccentric washers (1) with reference to their seating position relative to the subframe (4).

    Remove the adjust link to subframe retaining bolt (2) and nut (5).

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32. Remove the adjust link (3) from the subframe (4).

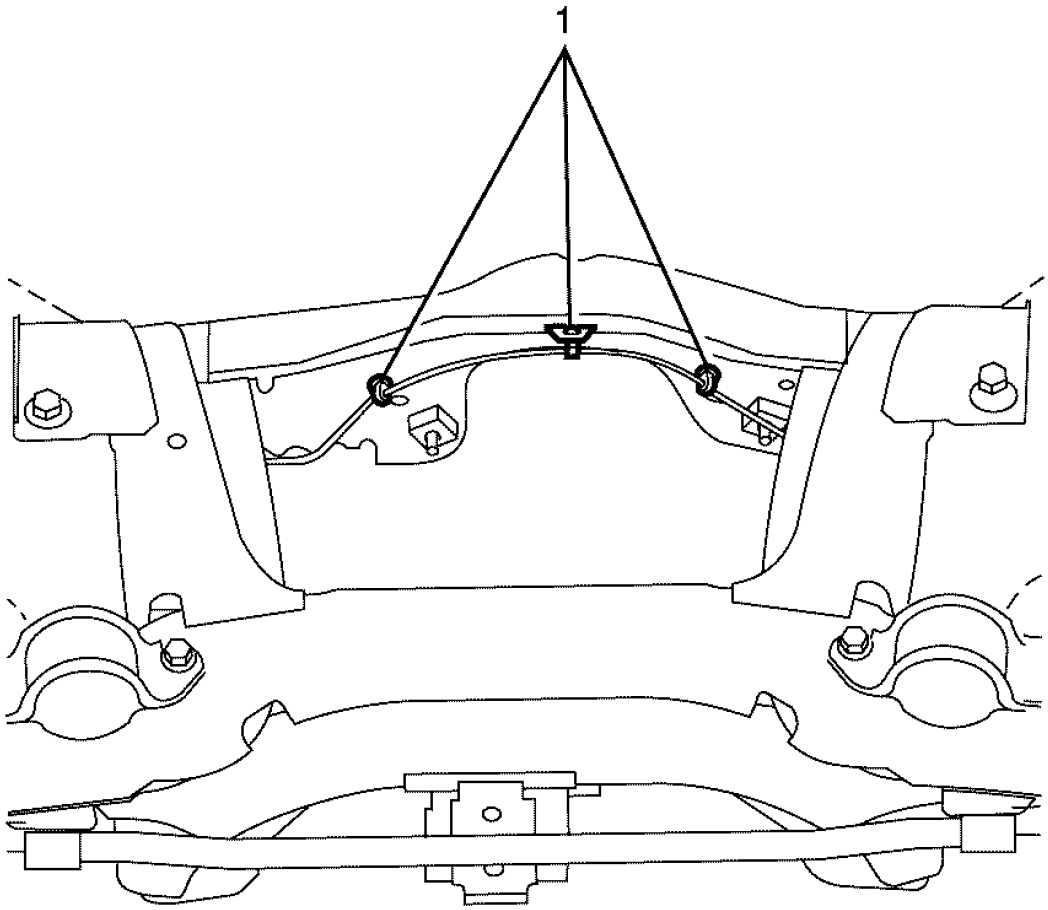


Fig. 13: Identifying Rear Frame Wiring Harness To Rear Subframe Center Retaining Clips
Courtesy of GENERAL MOTORS CORP.

33. Disconnect the rear frame wiring harness to rear frame center retaining clips (1).

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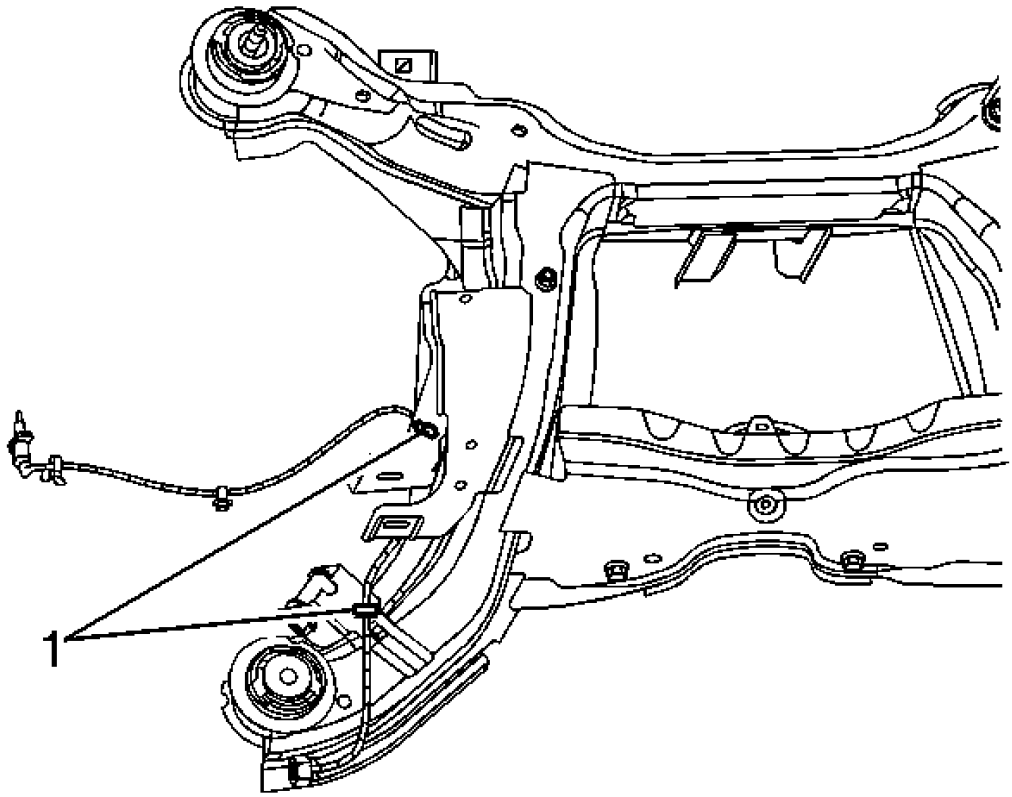


Fig. 14: Rear Frame Wiring Harness To Rear Frame Side Retaining Clips
Courtesy of GENERAL MOTORS CORP.

34. Disconnect the rear frame wiring harness to rear frame side retaining clips (1).

Installation Procedure

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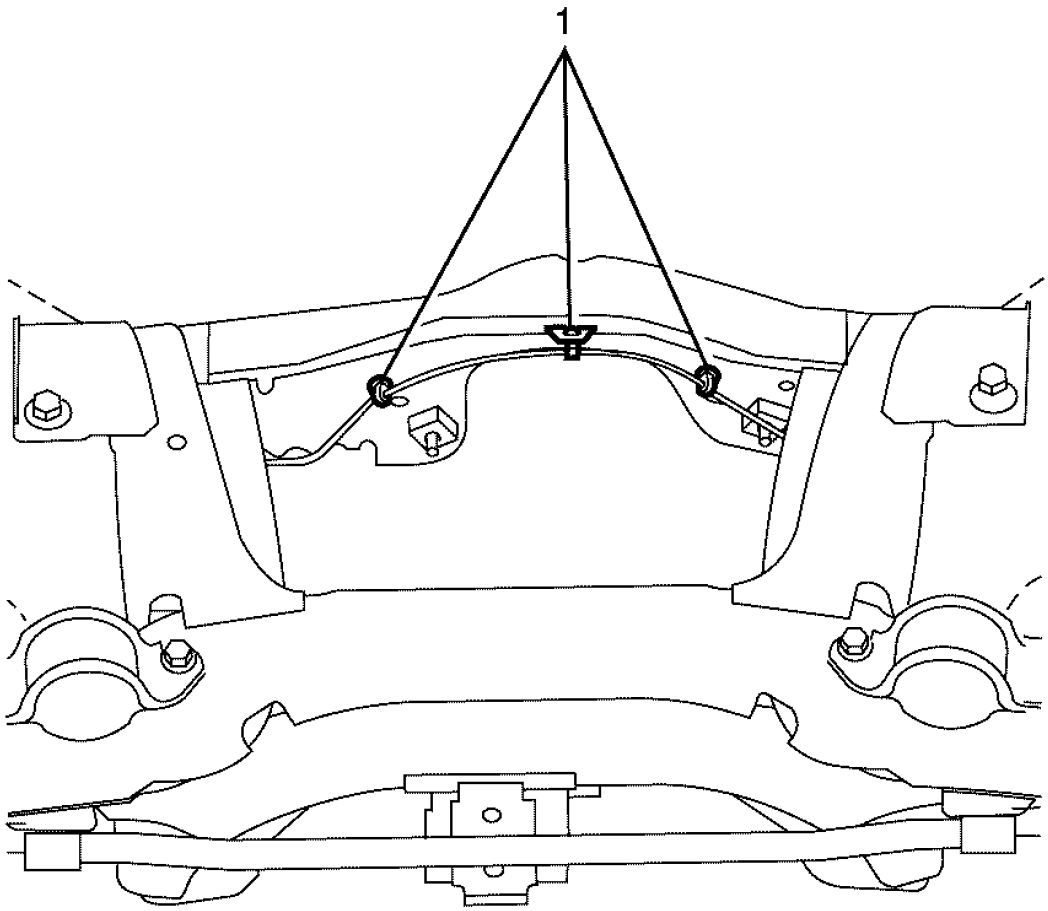


Fig. 15: Identifying Rear Frame Wiring Harness To Rear Subframe Center Retaining Clips
Courtesy of GENERAL MOTORS CORP.

1. Connect the rear frame wiring harness to rear subframe side retaining clips (1).

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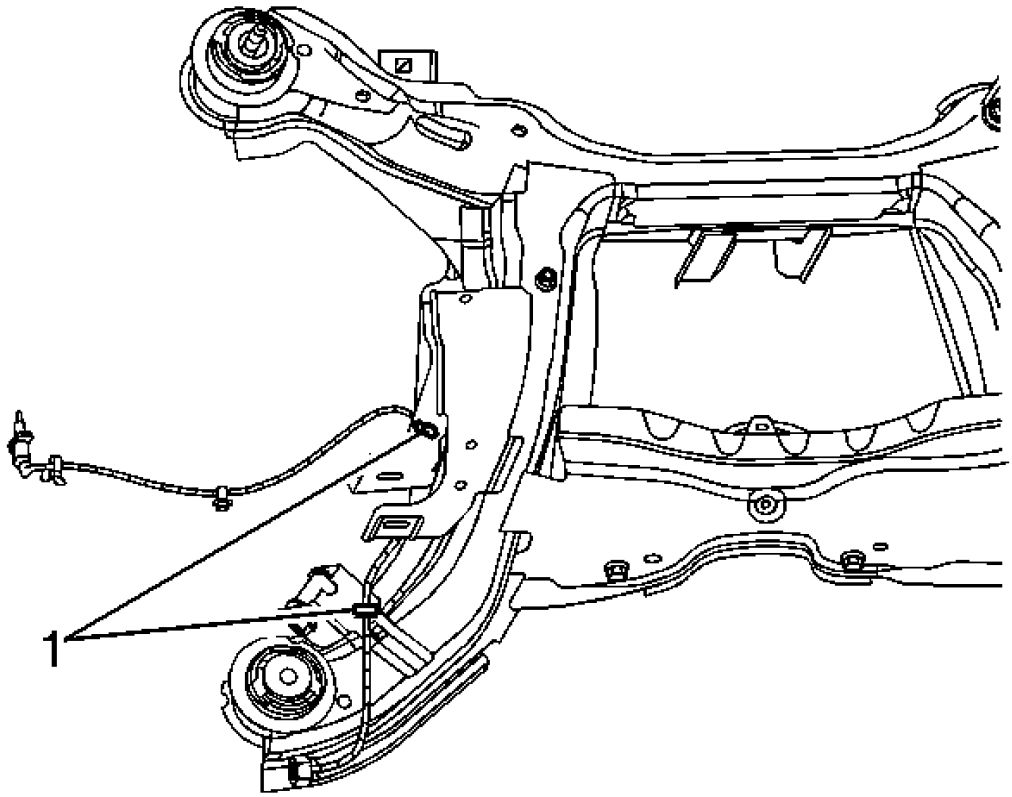


Fig. 16: Rear Frame Wiring Harness To Rear Frame Side Retaining Clips
Courtesy of GENERAL MOTORS CORP.

2. Connect the rear frame wiring harness to rear subframe center retaining clips (1).

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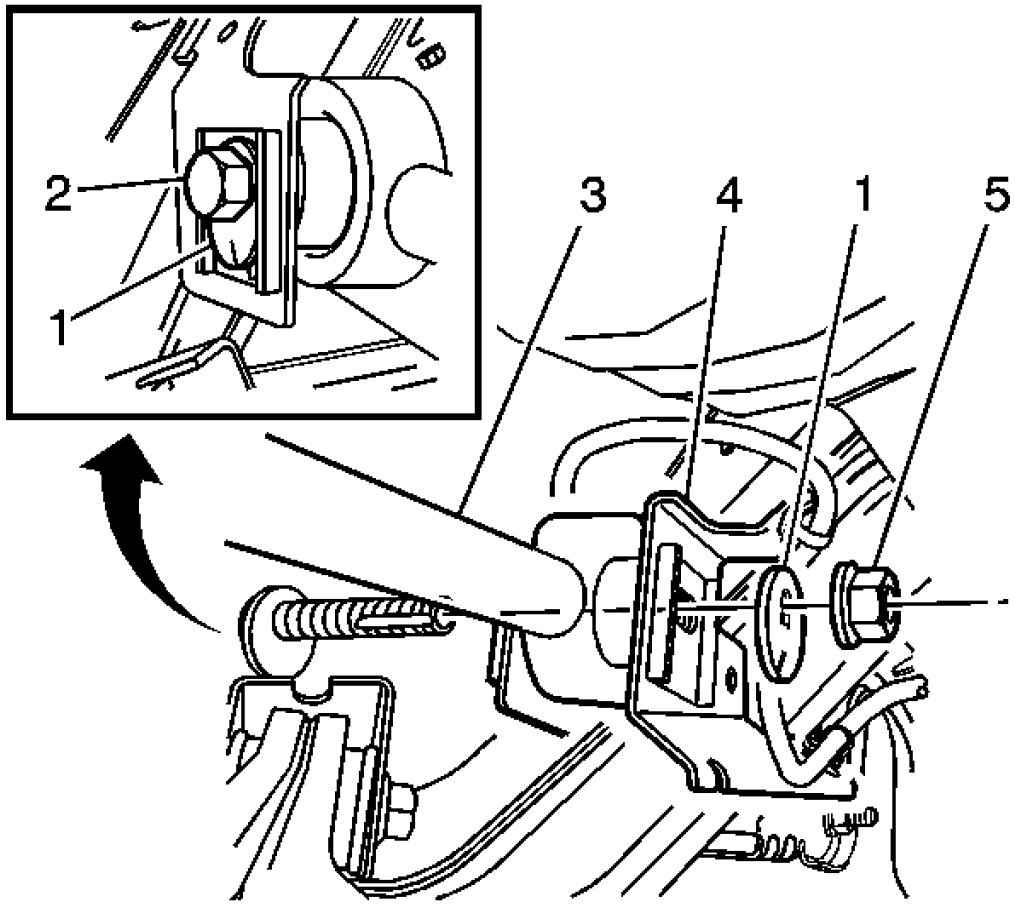


Fig. 17: Adjust Link To Subframe Retaining Bolt, Nut & Eccentric Washers
Courtesy of GENERAL MOTORS CORP.

3. Install the adjust link (3) into the rear subframe (4).

NOTE:

- **The eccentric washers (1) must be fitted correctly in terms of their orientation and alignment marks.**
- **The adjust link to rear subframe retaining bolt (2) and NEW nut (5) must not to be fully tightened at this stage.**

4. Install the adjust link to rear subframe retaining bolt (2).
5. Install the eccentric washer (1) and the NEW nut (5).

Do not fully tighten at this stage.

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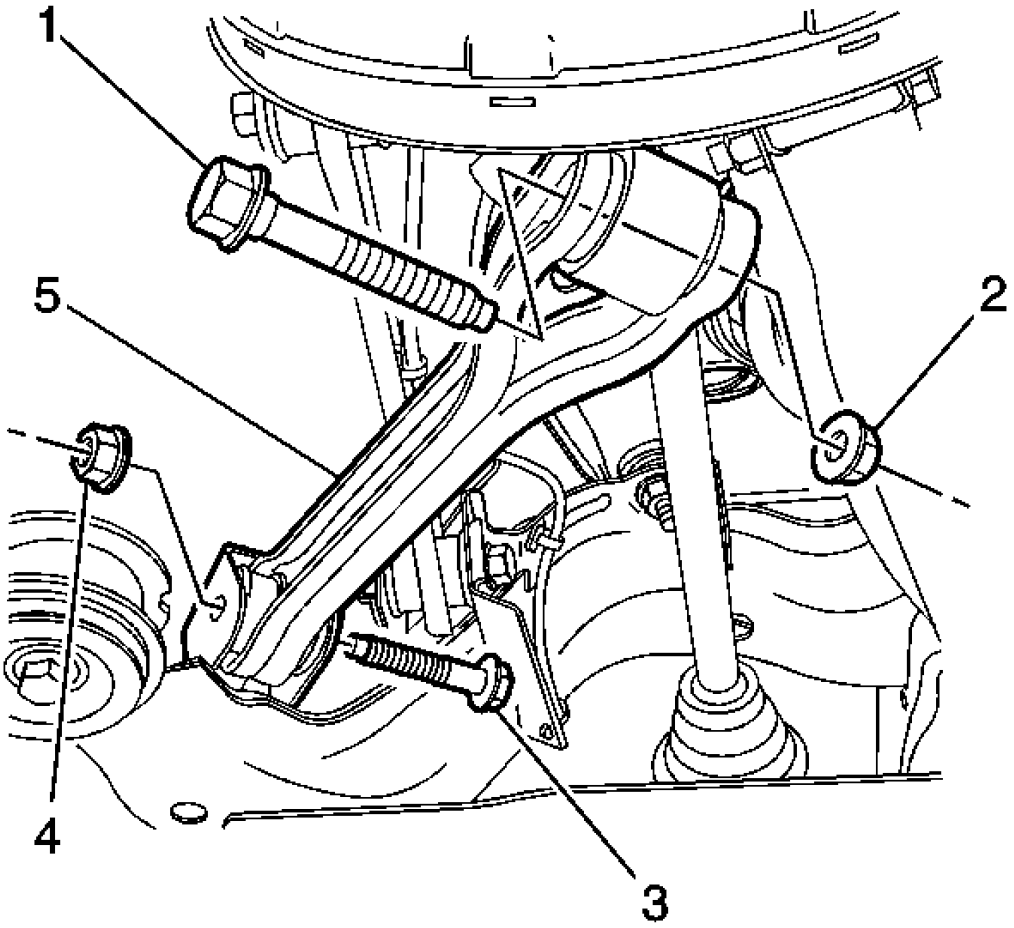


Fig. 18: Trailing Arm Components
Courtesy of GENERAL MOTORS CORP.

6. Install the trailing arm (5) to the rear subframe.

NOTE: The upper control arm to subframe retaining bolt (3) and nut (4) must not to be fully tightened at this stage.

7. Install the trailing arm to rear subframe retaining bolt (3) and NEW nut (4).

   Do not fully tighten at this stage.

NOTE: The trailing arm to knuckle retaining bolt (1) and nut (2) must not to be fully tightened at this stage.

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8. Install the trailing arm to knuckle retaining bolt (1) and NEW nut (2).

   Do not fully tighten at this stage.

9. Install the upper control arm into the rear subframe.

   CAUTION: Refer to Fastener Caution .

10. Install the upper control arm ball joint to rear subframe retaining bolt (1) and NEW nut and tighten a first pass to 80 N.m (59 lb ft) and a final pass 120 degrees.
11. Install the upper control arm to knuckle retaining bolt (3) and NEW nut (4) and tighten the bolt first pass to 60 N.m (44 lb ft) and an additional 90 degrees.
12. Install the upper control arm pivot bushing. Refer to **Upper Control Arm Replacement** .

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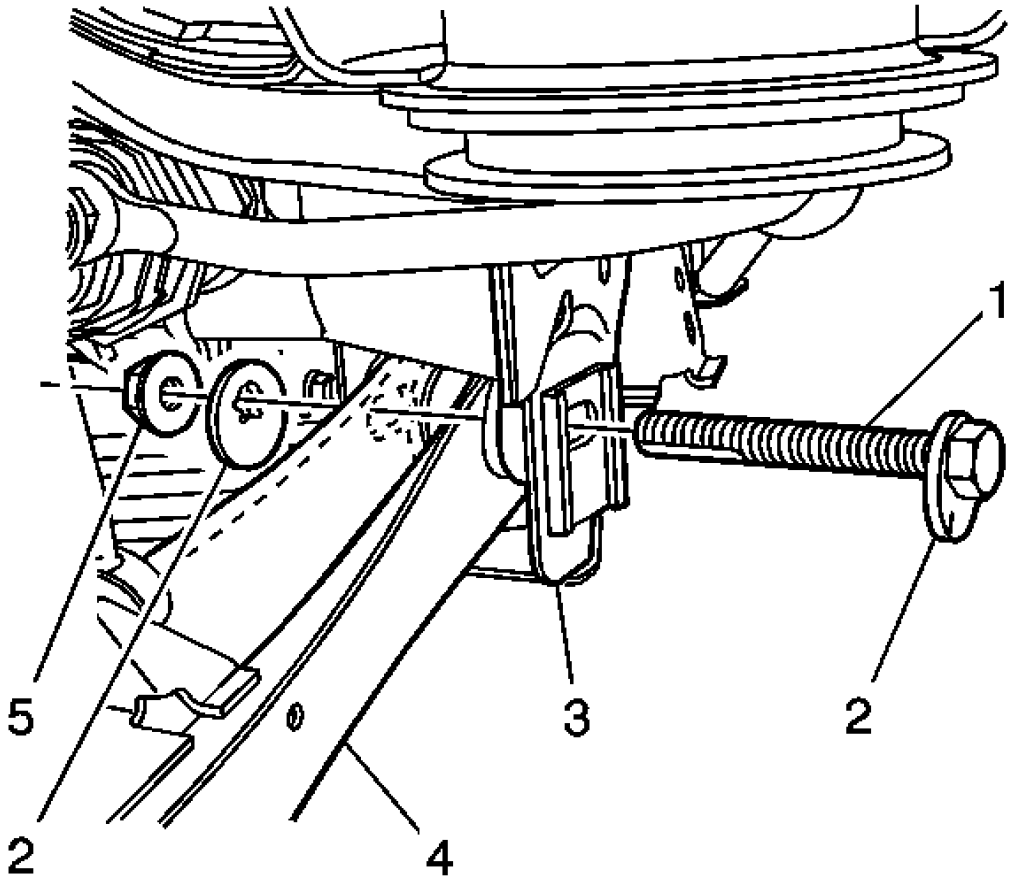


Fig. 19: Lower Control Arm To Subframe Retaining Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

13. Install the lower control arm (4) into the rear subframe (3).

NOTE:

- **The eccentric washers (2) must be fitted correctly in terms of their orientation and alignment marks.**
- **Do not fully tighten the lower control arm to rear subframe retaining bolt (1) and nut (5) at this stage.**

14. Install the lower control arm to rear subframe retaining bolt (1).
15. Install the eccentric washer (2) and the NEW nut (5).

Do not fully tighten at this stage.

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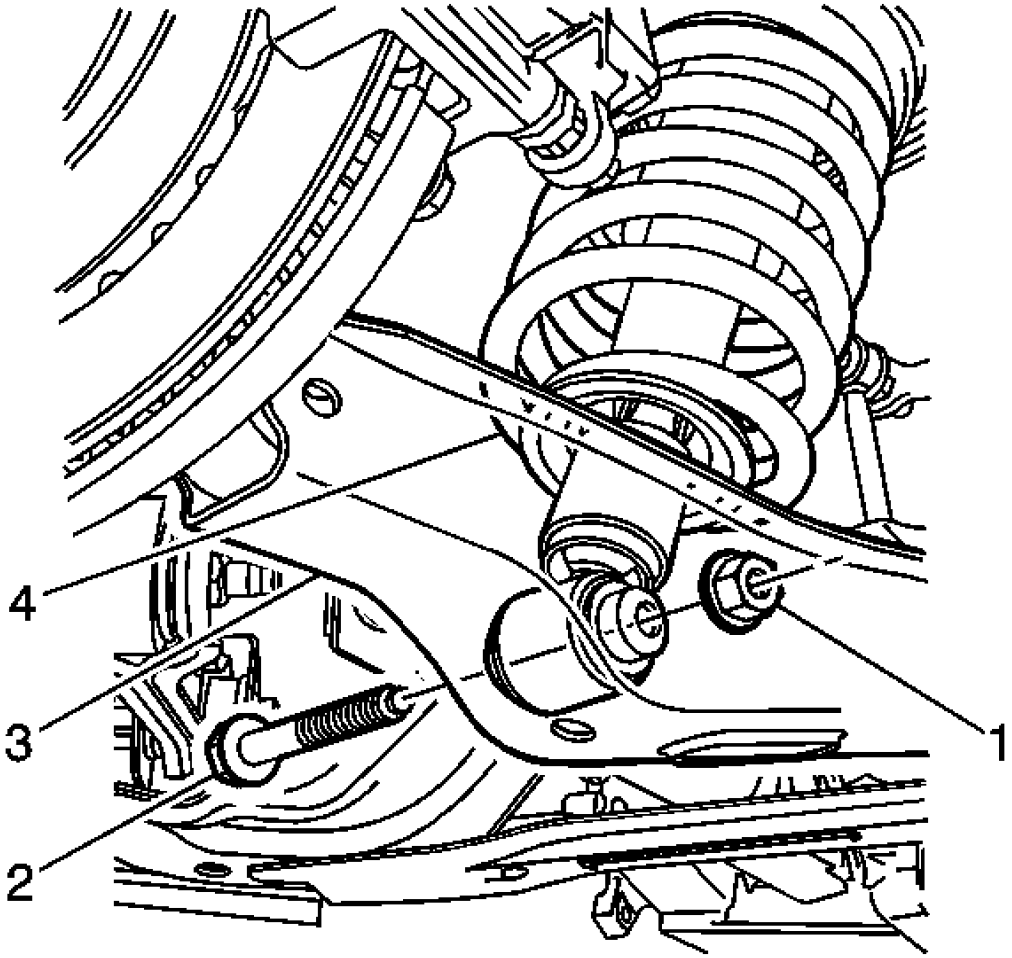


Fig. 20: Rear Strut Assembly To Lower Control Arm
Courtesy of GENERAL MOTORS CORP.

16. Connect the rear strut assembly (4) to the lower control arm (3).

NOTE: Do not fully tighten the lower control arm to strut assembly retaining bolt (2) and nut (1) at this stage.

17. Install the lower control arm to strut assembly retaining bolt (2) and NEW nut (1).

    Do not fully tighten at this stage.

18. Install the rear wheel hub and knuckle assembly. Refer to **Knuckle Replacement** in rear Suspension.

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19. Install the stabilizer shaft. Refer to **Stabilizer Shaft Replacement** .
20. Install the stabilizer shaft link. Refer to **Stabilizer Shaft Link Replacement** .

NOTE: Make sure the intermediate brake cable is clear of the rear frame to body mount prior to securing the frame retaining bolts.

21. Lower the vehicle to the frame.
22. Index the rear side frame mounts to the rear locator sleeves located on the body.
23. Lower the vehicle until the frame mounts contact the body rail.
24. Install the rear sub frame to rear chassis rail retaining bolts and tighten to 100 N.m (74 lb ft) and a final pass of 110 degrees.
25. Raise the vehicle.
26. Remove the frame support table from under the vehicle.

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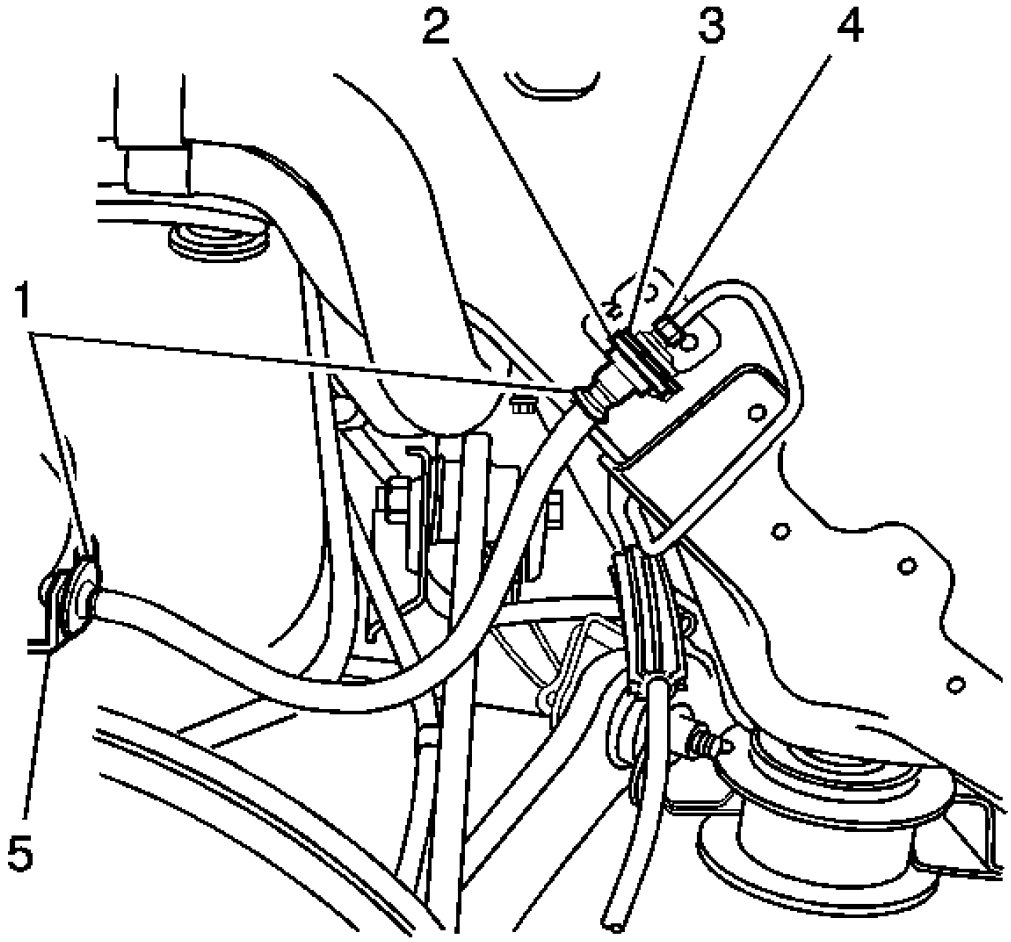


Fig. 21: Upper Control Arm Mounted Brake Hose Retaining Bracket
Courtesy of GENERAL MOTORS CORP.

27. Attach the brake hose (1) from the upper control arm mounted brake hose retaining bracket (5).

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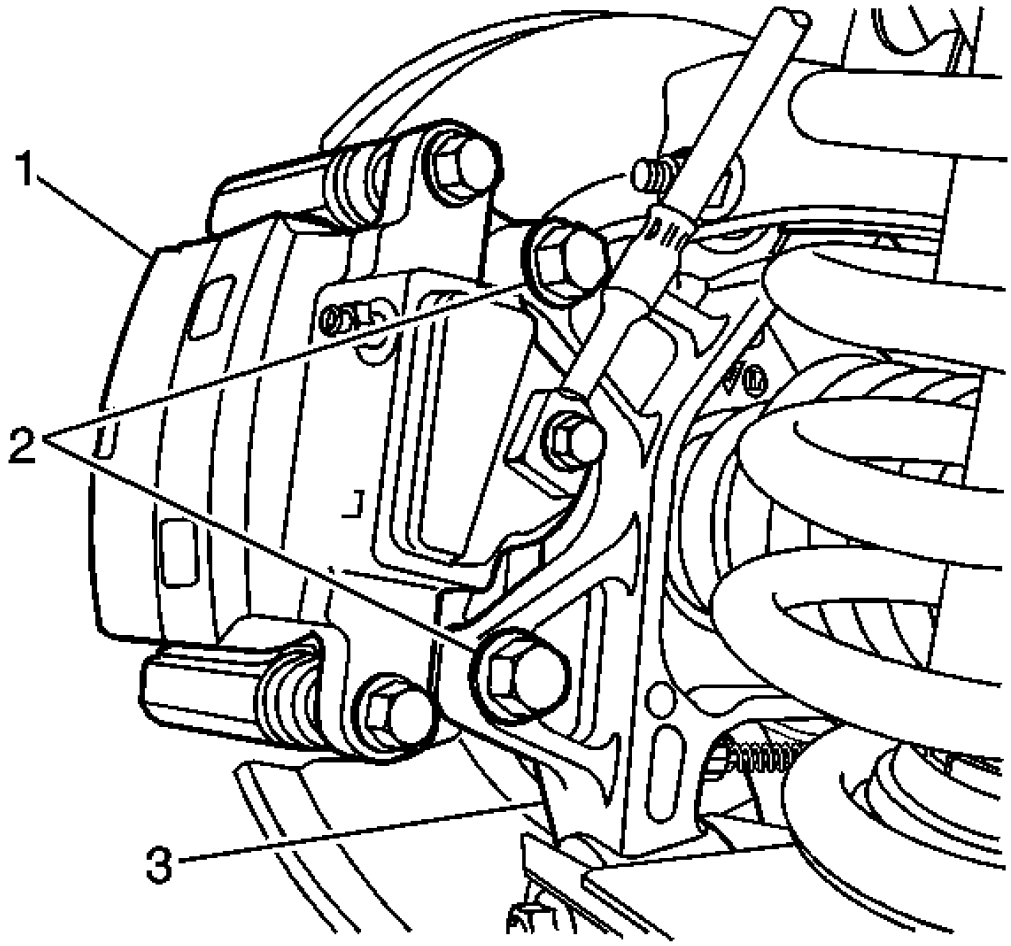


Fig. 22: Brake Caliper Anchor Plate To Knuckle Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

28. Remove the heavy mechanic's wire, or equivalent support (2) from the brake caliper (1).

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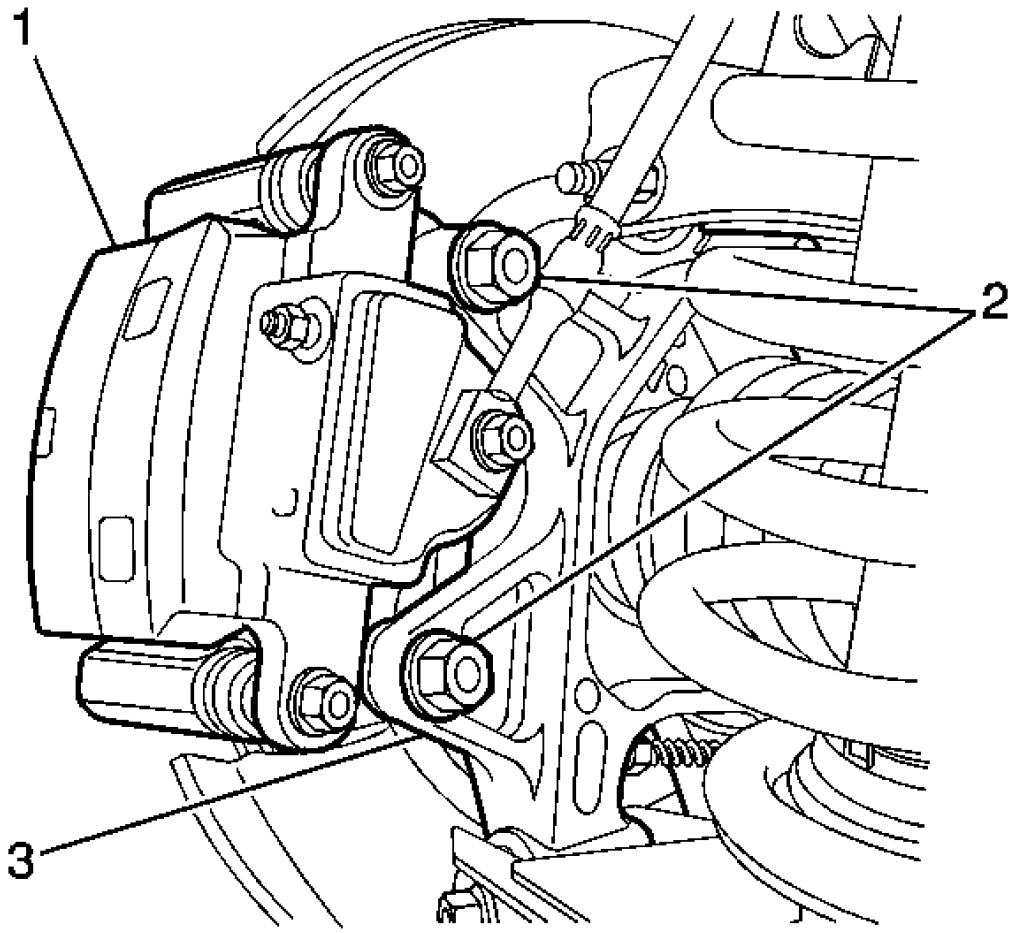


Fig. 23: Brake Caliper Assembly & Knuckle
Courtesy of GENERAL MOTORS CORP.

CAUTION: Make sure the brake hose is not twisted or kinked after installation. Damage to the hose could result.

29. Install the brake caliper assembly (2) to the knuckle (3).
30. Install the NEW brake caliper anchor plate to knuckle retaining bolts (1) and tighten to 110 N.m (81 lb ft).

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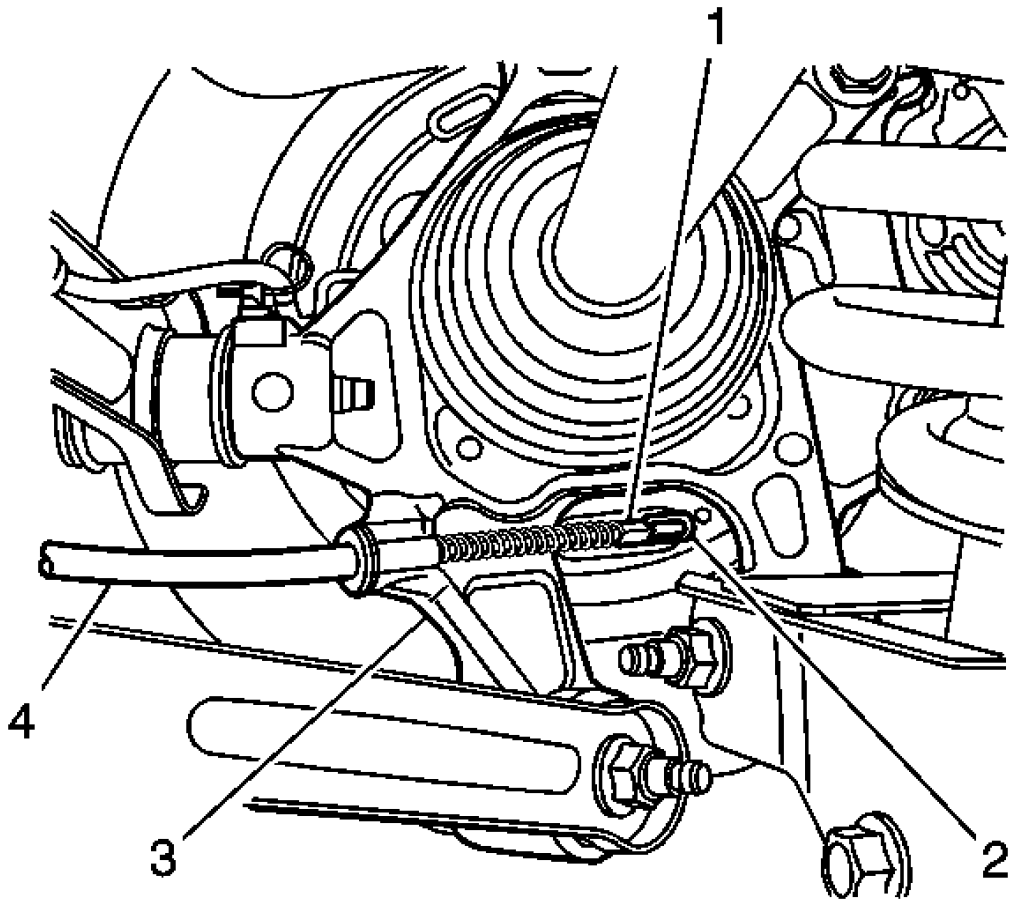


Fig. 24: Rear Park Brake Cable Components
Courtesy of GENERAL MOTORS CORP.

31. Install the rear park brake cable (4) into the rear knuckle (3).

    Make sure that the rear park brake cables (4) are properly seated.

    NOTE: Attach the rear park brake cable and clevis (1) to the park brake actuator (2) by pivoting the rear park brake cable and clevis (1) rearward using pliers.

32. Attach the rear park brake cable and clevis (1) to the park brake actuator (2).

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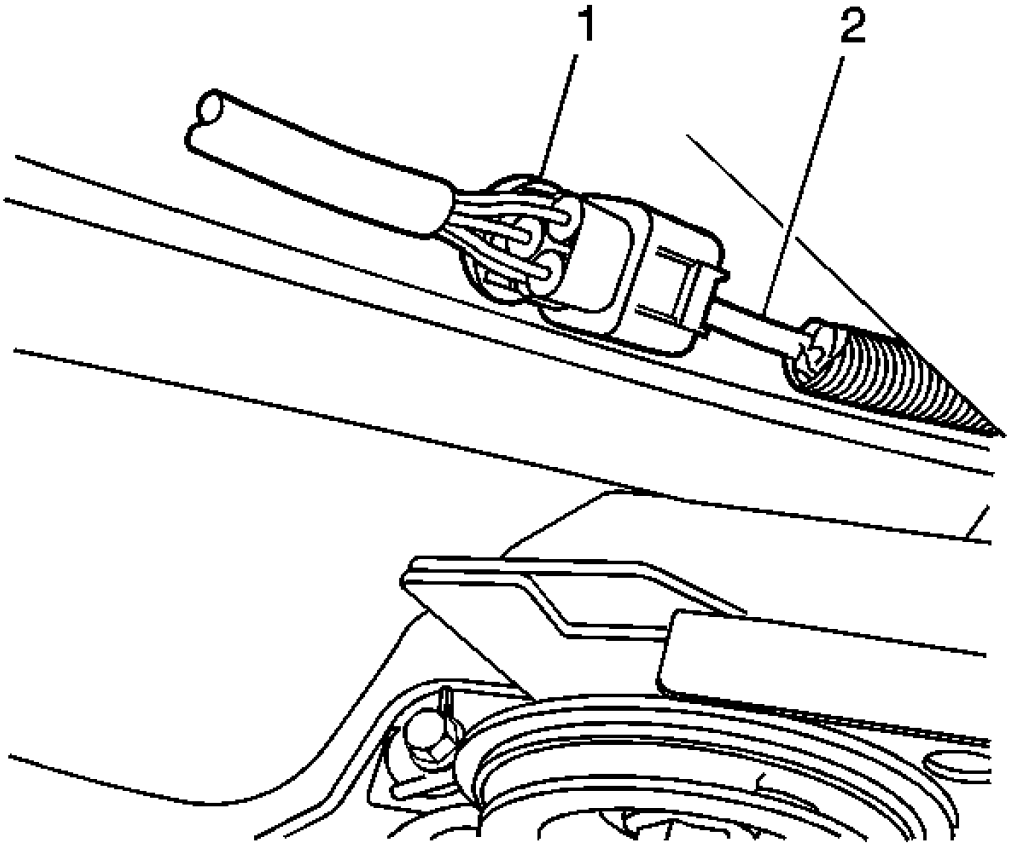


Fig. 25: Wheel Speed Sensor Jumper Harness Electrical Connector
Courtesy of GENERAL MOTORS CORP.

33. Connect the wheel speed sensor jumper harness electrical connector (1).

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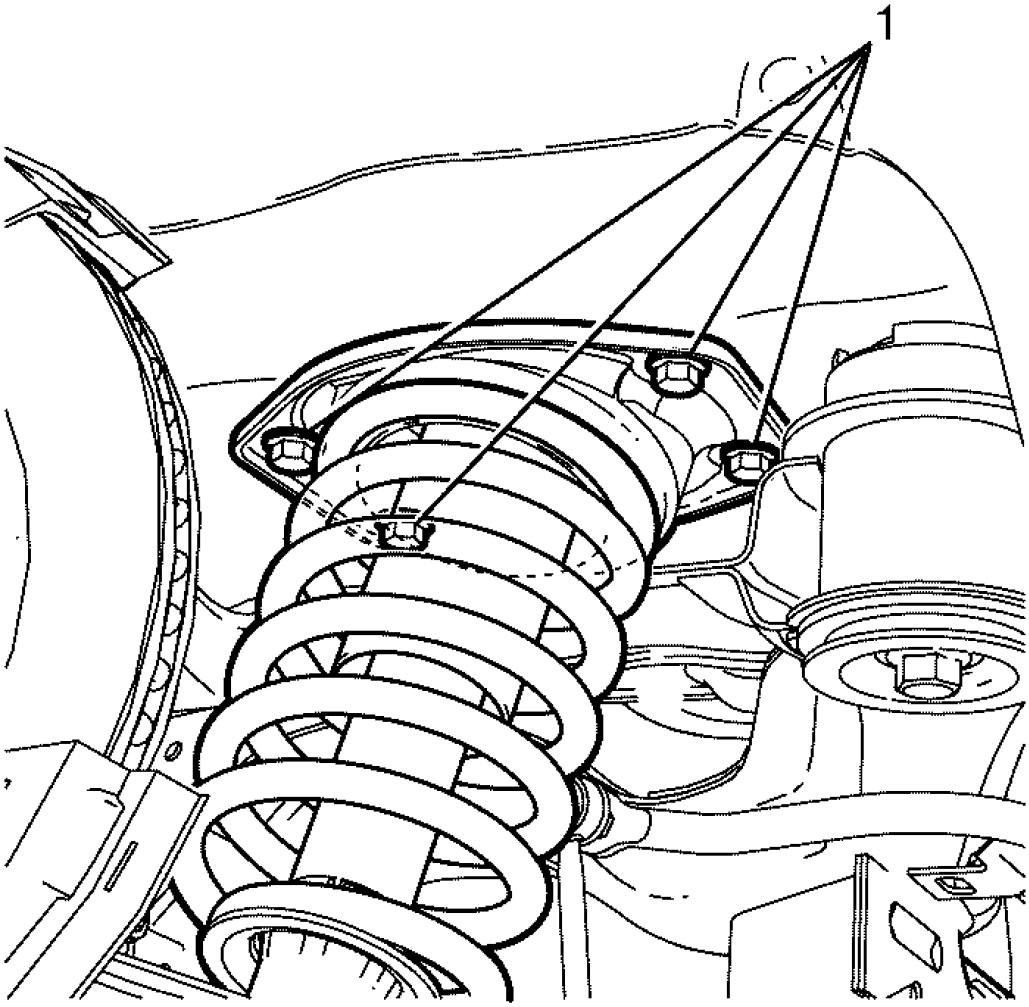


Fig. 26: Identifying Top Strut Assembly To Body Retaining Bolts
Courtesy of GENERAL MOTORS CORP.

34. Install the top strut assembly to body retaining bolts (1) and tighten to 58 N.m (43 lb ft).
35. Attach the electrical connector to the right hand rail.

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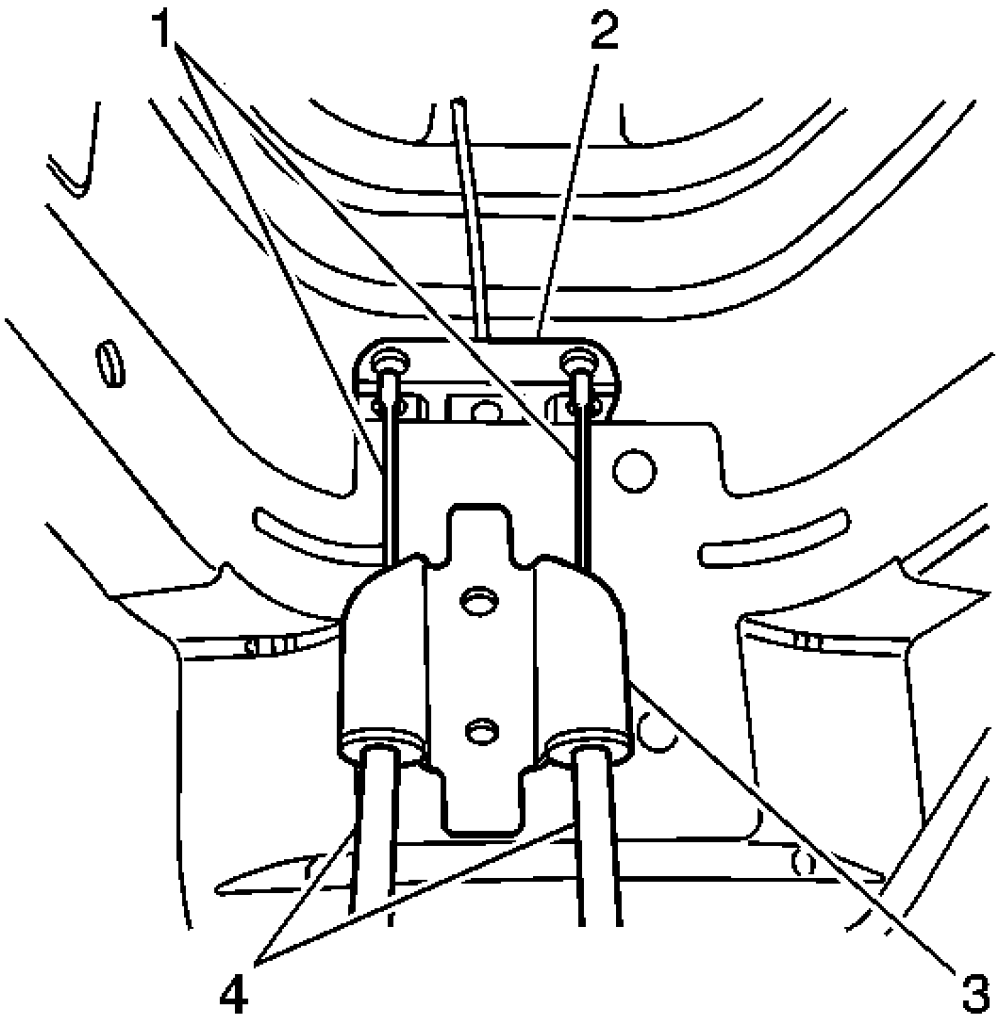


Fig. 27: Outer Cable & Vehicle Underbody Bracket
Courtesy of GENERAL MOTORS CORP.

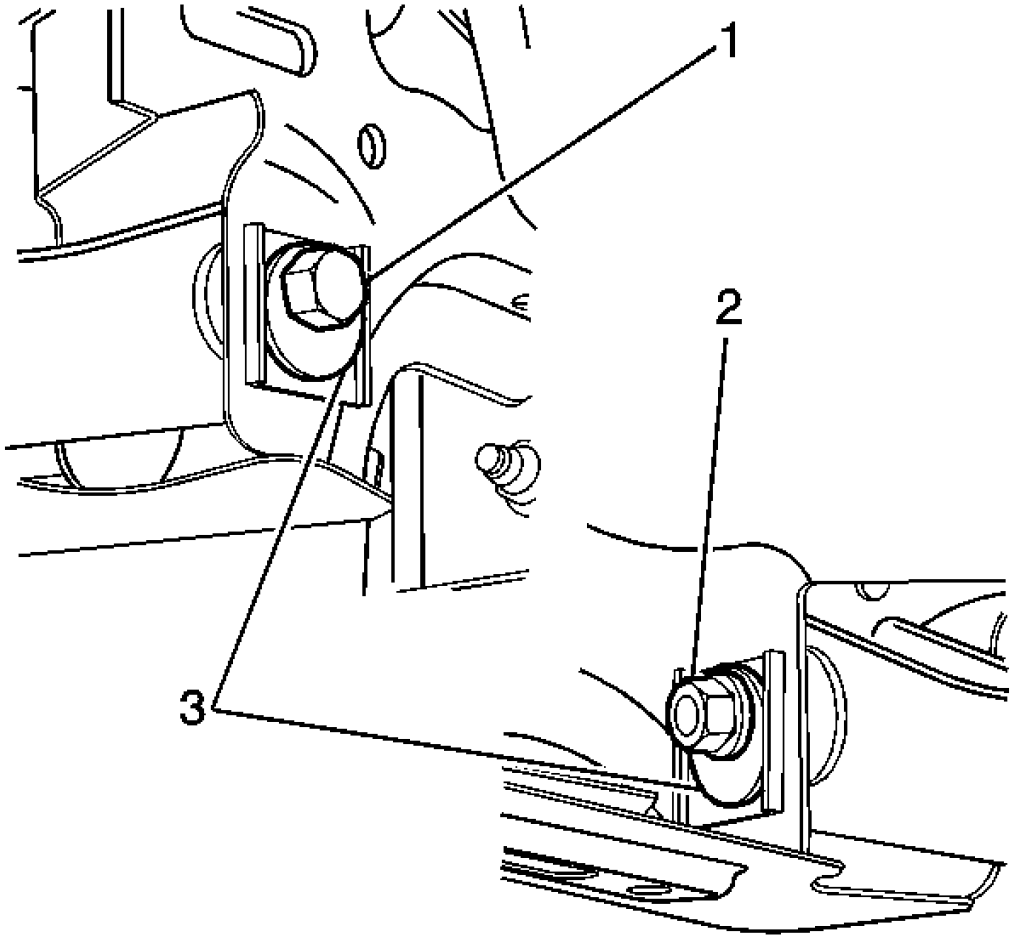
36. Install the outer cable (4) to the vehicle underbody bracket (3).

    Make sure that the outer cables (4) are properly seated in the vehicle underbody bracket (3).

    NOTE: Wrap a workshop cloth around the rear inner cable (1) to protect it from damage. Using pliers, pull the rear inner cable (1) forward and downwards to install the ball nipple to the front park brake cable and equalizer bracket assembly (2).

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37. Install the rear inner cables (1) to the front park brake cable and equalizer bracket assembly (2).
38. Install the differential. Refer to **Differential Replacement** .
39. Install the drive shafts. Refer to **Rear Wheel Drive Shaft Replacement** .
40. Install the rear strut assembly. Refer to **Shock Absorber Replacement** .
41. Install the propeller shaft. Refer to **Two-Piece Propeller Shaft Replacement** .
42. Install the exhaust system. Refer to **Exhaust Muffler with Resonator, Exhaust, and Tail Pipe Replacement (H-Pipe)** or **Exhaust Muffler with Resonator, Exhaust, and Tail Pipe Replacement (Vehicle Service)** .
43. Install the rear wheel. Refer to **Tire and Wheel Removal and Installation** .
44. Lower the vehicle to the ground.
45. Bounce the vehicle several times to settle the suspension.



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Fig. 28: Lower Control Arm To Subframe Retaining Bolt & Nut Eccentric Washers
Courtesy of GENERAL MOTORS CORP.

NOTE: The lower control arm to the subframe retaining bolt (1) and nut (2) eccentric washers (3) are used to adjust rear suspension camber.

46. Align the marks on the eccentric washers (3) with the marks on the subframe.

NOTE: Make sure that the vehicle is positioned on a suitable hoist to load the rear suspension bushes to the correct position.

47. Tighten the lower control arm to subframe retaining bolt (1) and nut (2) and tighten to 115 N.m (85 lb ft).

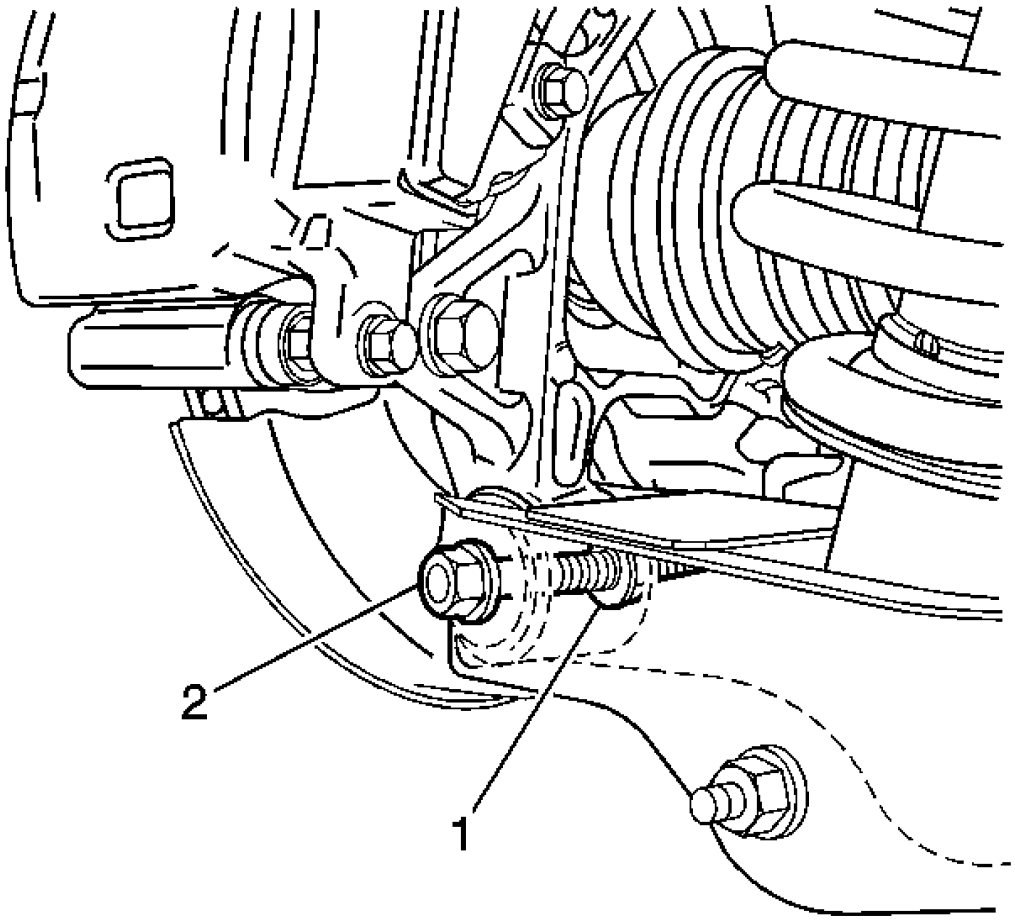


Fig. 29: Lower Control Arm To Knuckle Retaining Bolt & Nut

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Courtesy of GENERAL MOTORS CORP.

48. Tighten the lower control arm to knuckle retaining bolt (2) and nut (1) a first pass to 40 N.m (30 lb ft) and a final pass 120 degrees.

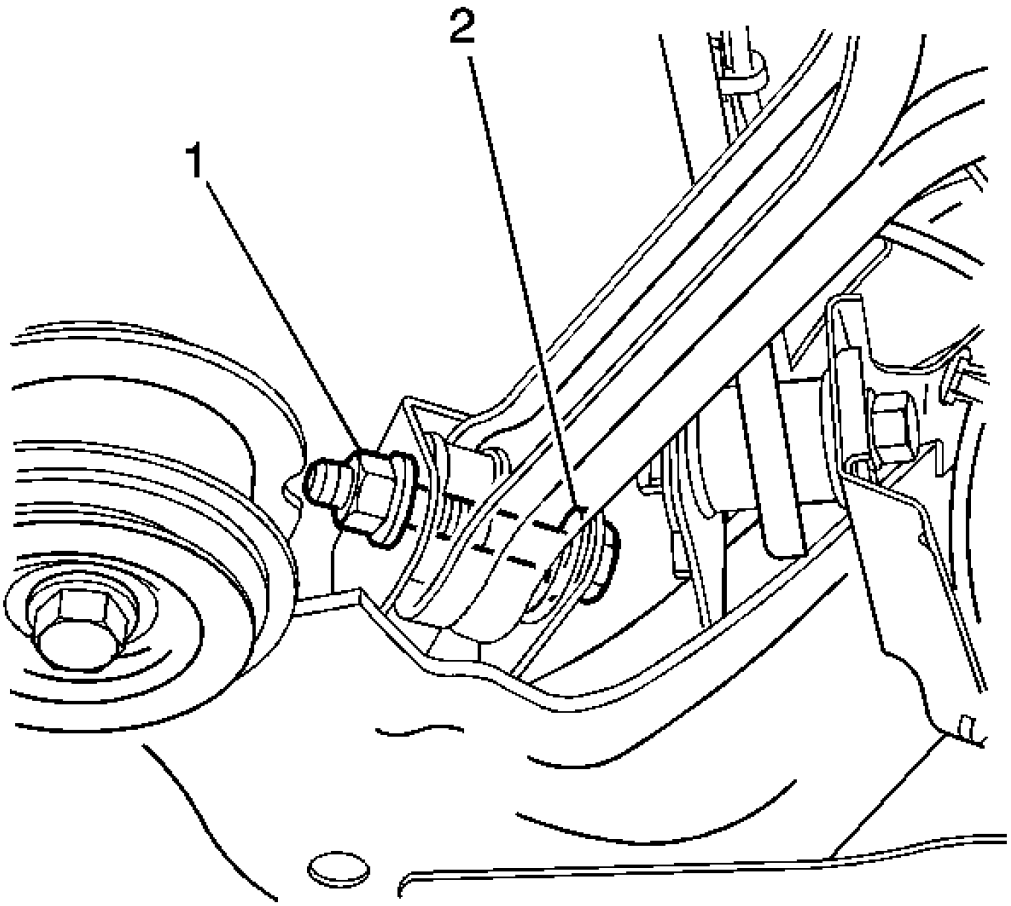


Fig. 30: Trailing Arm To Subframe Retaining Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

NOTE: Make sure that the vehicle is positioned on a suitable hoist to load the rear suspension bushes to the correct position.

49. Tighten the trailing arm to subframe retaining bolt (2) and NEW nut (1) to 100 N.m (74 lb ft).

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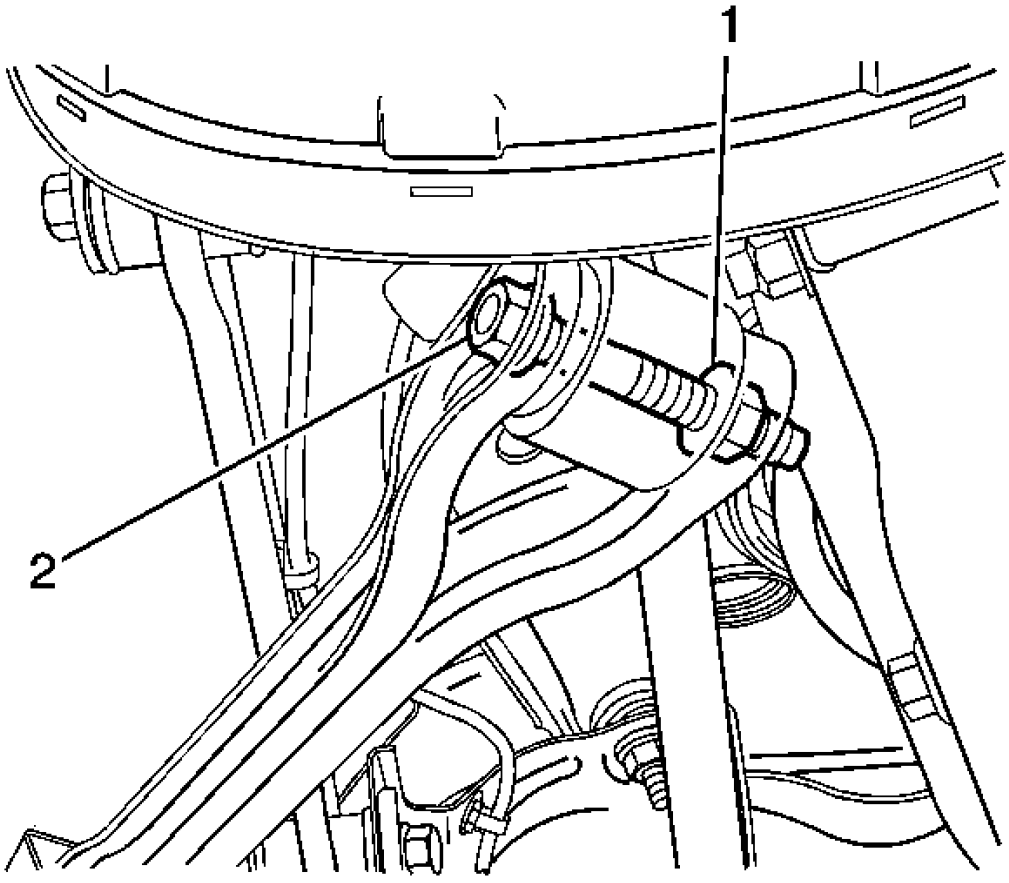


Fig. 31: Trailing Arm To Knuckle Retaining Bolt & Nut
Courtesy of GENERAL MOTORS CORP.

50. Tighten the trailing arm to knuckle retaining bolt (2) and NEW nut (1) to 40 N.m (30 lb ft) and final pass 120 degrees.

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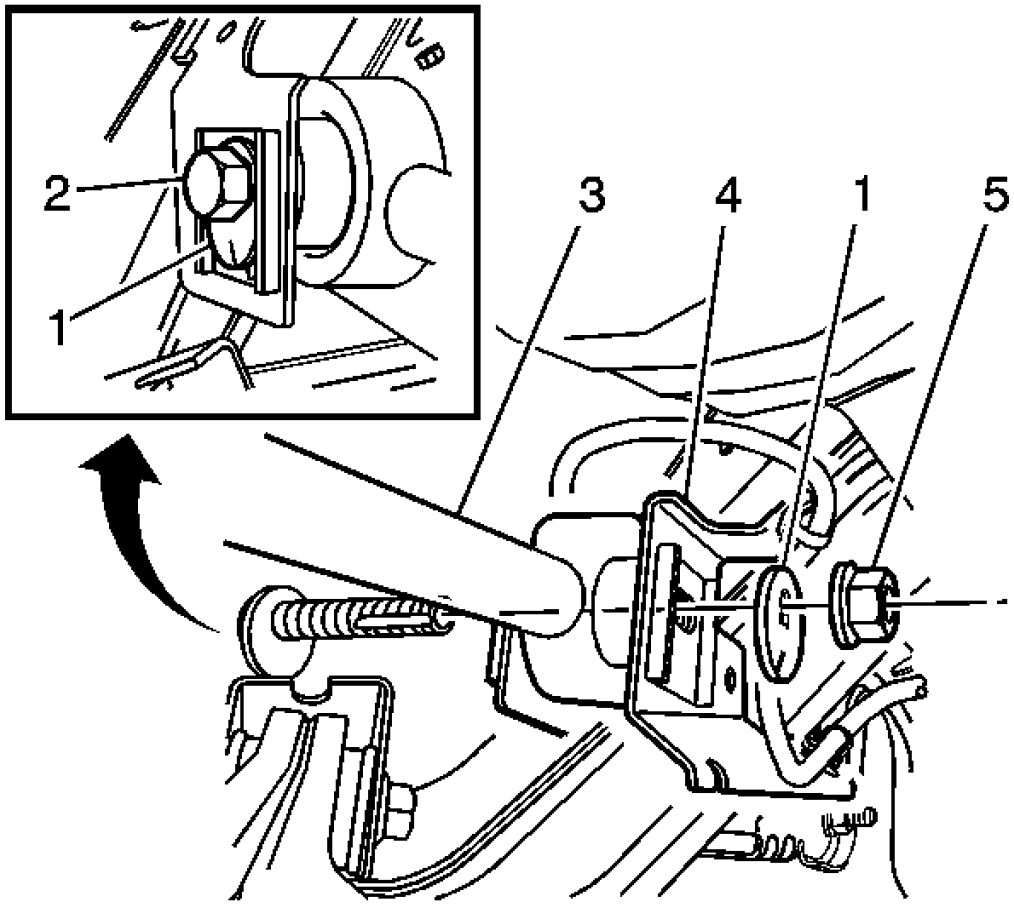


Fig. 32: Adjust Link To Subframe Retaining Bolt, Nut & Eccentric Washers
Courtesy of GENERAL MOTORS CORP.

NOTE: Make sure that the vehicle is positioned on a suitable hoist to load the rear suspension bushes to the correct position.

51. Align the marks on the eccentric washers (1) with the marks on the subframe (3).
52. Tighten the adjust link to subframe retaining bolt (2) and NEW nut (4) to 115 N.m (85 lb ft).
53. Correct the wheel alignment of the vehicle, if necessary. Refer to **Wheel Alignment Specifications** .

DRIVETRAIN AND FRONT SUSPENSION FRAME REPLACEMENT

Special Tools

J 39580 Engine Support Stand. See **Special Tools**.

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Removal Procedure

1. Remove the front bumper fascia. Refer to **Front Bumper Fascia Replacement**
2. Using mechanics wire, support the radiator and AC condenser assembly to the vehicle body.
3. Install the engine support fixture. Refer to **Engine Support Fixture (V6)** .
4. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
5. Remove the front wheels. Refer to **Tire and Wheel Removal and Installation** .
6. Remove the electrical harness retainers, if equipped, securing the engine harness to the frame.
7. Remove the stabilizer shaft links from the strut assemblies. Refer to **Stabilizer Shaft Link Replacement** .
8. Remove the power steering gear mounting bolts. Refer to **Steering Gear Replacement** .
9. Remove the six power steering pipe fasteners from the frame.
10. Using mechanics wire secure the power steering gear to the engine.
11. Separate the outer tie rods from the steering knuckles. Refer to **Steering Linkage Outer Tie Rod Replacement** .
12. Disconnect the lower ball joints from the steering knuckles. Refer to **Front Lower Control Rear Arm Replacement** and **Front Lower Control Front Arm Replacement** .
13. Remove the engine mounts lower retaining fasteners.
14. Install **J 39580** under the frame. See **Special Tools**.
15. Lower the vehicle to the frame support table.
16. Remove the six frame mounting bolts.
17. With the aid of an assistant, carefully raise the body from the frame.
18. Ensure when raising the body the following items are clear from the frame:
    - Steering knuckles
    - Electrical wiring harnesses
    - Power steering pipes
19. Remove the lower control arms. Refer to **Front Lower Control Rear Arm Replacement** and **Front Lower Control Front Arm Replacement** .
20. Remove the stabilizer shaft. Refer to **Stabilizer Shaft Replacement** .
21. With the aid of an assistant, remove the frame from the support fixture.

Installation Procedure

1. Install the lower control arms to the frame. Refer to **Front Lower Control Rear Arm Replacement** and **Front Lower Control Front Arm Replacement** .

NOTE: Do not tighten the stabilizer shaft mounting bolts at this time.

2. Install the stabilizer shaft to the frame. Refer to **Stabilizer Shaft Replacement** .
3. With the aid of an assistant, position and secure the new frame assembly to the support fixture.
4. With the aid of an assistant, carefully lower the body to the frame.

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5. Ensure the following components are clear from the frame:
   - Electrical wiring harness
   - Steering knuckles
   - Power steering pipes

CAUTION: Refer to Fastener Caution .

6. Install the front frame mountings bolts and tighten to 160 N.m (118 lb ft).
7. Install the rear frame mountings bolts and tighten to 240 N.m (177 lb ft).
8. Raise the vehicle.
9. Install the engine mount lower retaining fasteners and tighten to 50 N.m (37 lb ft).
10. Remove the **J 39580** from under the vehicle. See **Special Tools**.
11. Remove the mechanics wire supporting the power steering gear.
12. Install the power steering gear retaining fasteners. Refer to **Steering Gear Replacement** .
13. Install the six power steering pipe to frame fasteners and tighten 20 N.m (15 lb ft)
14. Install the lower ball joints to the steering knuckles. Refer to **Front Lower Control Rear Arm Replacement** and **Front Lower Control Front Arm Replacement** .
15. Install the outer tie rods to the knuckle assemblies. Refer to **Steering Linkage Outer Tie Rod Replacement** .
16. Install the stabilizer links to the strut assemblies. Refer to **Stabilizer Shaft Link Replacement** .
17. Remove the mechanics wire supporting the radiator.
18. Install the electrical harness retainers, if equipped, securing the engine harness to the frame.
19. Install the front tires and wheels. Refer to **Tire and Wheel Removal and Installation** .
20. Lower the vehicle.
21. Tighten the stabilizer shaft fasteners to 17 N.m (13 lb ft).
22. Remove the engine support fixture. Refer to **Engine Support Fixture (V6)** .
23. Install the front bumper fascia. Refer to **Front Bumper Fascia Replacement**
24. Align the vehicle. Refer to **Wheel Alignment Specifications** .

FRONT WHEELHOUSE LINER REPLACEMENT

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Fig. 33: Front Wheelhouse Liner
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .	
1	Front Wheelhouse Liner Screw (Qty: 5) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 3 N.m (27 lb in)
2	Front Wheelhouse Liner Push-In Retainer (Qty: 5)
3	Front Wheelhouse Liner

REAR WHEELHOUSE PANEL LINER REPLACEMENT

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Fig. 34: Rear Wheelhouse Panel Liner
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the tire and wheel assembly. Refer to **Tire and Wheel Removal and Installation** .	
1	Rear Wheelhouse Panel Liner Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 3 N.m (27 lb in)
2	Rear Wheelhouse Panel Liner Bolt **Tighten:** 3 N.m (27 lb in)
3	Rear Wheelhouse Panel Liner Push-In Retainer (Qty: 2)
4	Rear Wheelhouse Panel Liner Nut (Qty: 3)
5	Rear Wheelhouse Panel Liner

DESCRIPTION AND OPERATION

FRAME AND UNDERBODY DESCRIPTION

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The following components are supported by a front crossmember frame which is rigidly bolted to the body rail at 6 locations.

- The engine
- The front suspension components
- The steering linkage

The following components are supported by the rear suspension frame which is attached to the body rail through rubber insulators at 4 locations:

- The rear drive axle assembly
- The rear suspension components

The transmission support is rigidly bolted to the floor pan and supports the transmission extension.

The underbody frames must be properly aligned to maintain the correct transmission, suspension and wheel alignment.

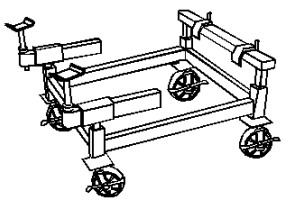
NOTE: In the event there is evidence of structural damage to the frames they must be replaced.

The individual underbody components contribute directly to the overall strength of the unibody. Use proper metal panel bonding techniques during service repair operations to the underbody. Refer to **Metal Panel Bonding** for metal panel bonding information and for vehicle preparation.

The components must be corrosion protected whenever body repair operations damage or destroy the original sealing surfaces. Use a two part catalysed primer when corrosion protection is needed to welded surfaces. Apply the sealers and anti-corrosion materials as necessary. Refer to **Anti-Corrosion Treatment and Repair** . Do not combine paint systems. Refer to **Basecoat/Clearcoat Paint Systems** , for further information.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J 39580 Engine Support Stand

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2010 ACCESSORIES & BODY, CAB

Instrument Panel and Console Trim - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Front Floor Console Fastener	2.5 N.m	22 lb in
Front Floor Console Rear Cover Fasteners	2.5 N.m	22 lb in
Instrument Panel Assembly Fasteners	2.5 N.m	22 lb in
Instrument Panel Carrier Support Bracket Fasteners	2.5 N.m	22 lb in
Instrument Panel Compartment Door Dampener Fasteners	2.5 N.m	22 lb in
Instrument Panel Compartment Door Fasteners	2.5 N.m	22 lb in
Instrument Panel Compartment Door Latch Fasteners	2.5 N.m	22 lb in
Instrument Panel Driver Knee Bolster Energy Absorber Fastener	2.5 N.m	22 lb in
Instrument Panel Inflatable Restraint Fasteners	22 N.m	16 lb ft
Instrument Panel Tie Bar Assembly to the Vehicle Body	25 N.m	18 lb ft
Instrument Panel Tie Bar Assembly to the Vehicle Cowl	9 N.m	80 lb in
Instrument Panel Tie Bar Assembly to the Windshield Frame and Plenum Panel	22 N.m	16 lb ft
Instrument Panel Trim Pad Fasteners	2.5 N.m	22 lb in
Instrument Panel Trim Plate Retainer Fastener	2.5 N.m	22 lb in
Instrument Tie Bar Assembly to the HVAC Module Assembly	9 N.m	80 lb in
Roof Console Fasteners	2.5 N.m	22 lb in

REPAIR INSTRUCTIONS

INSTRUMENT PANEL INSULATOR SEAL REPLACEMENT

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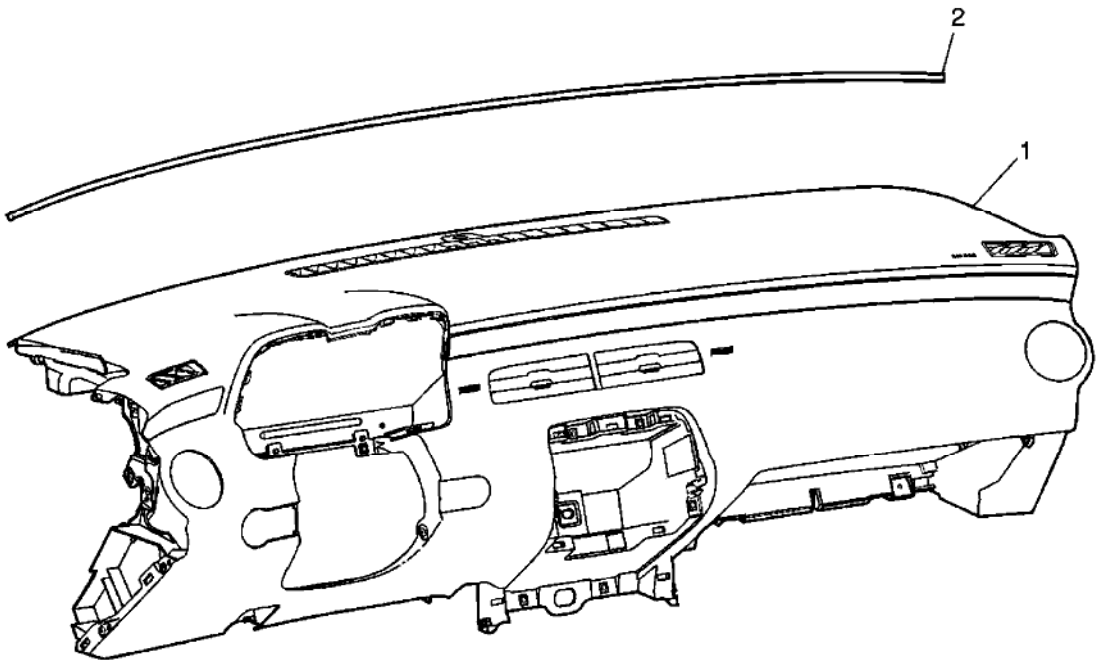


Fig. 1: Instrument Panel Insulator Seal
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Pad Refer to **Instrument Panel Trim Pad Replacement**
2	Instrument Panel Insulator Seal **Procedure** 1. The seal and Instrument Panel surface should be 21°C (70°F) prior to installation. The vehicle should remain 21°C (70°F) for one hour after assembly to allow adhesive to develop sufficient bond strength. 2. Clean all adhesive from the Instrument Panel and wipe the surface dry with a clean lint-free towel prior to installing the new seal. 3. When removing protective film from the adhesive backed seal, be careful not to touch the adhesive with your hands and do not allow the adhesive to come in contact with dirt or any foreign matter prior to adhesion. 4. Peel the adhesive backing from the seal. 5. Locate and position the seal to the instrument panel. 6. Using the palm of the hand, press the seal to the instrument panel and ensure full adhesion of the seal to the instrument panel is made

INSTRUMENT PANEL DRIVER KNEE BOLSTER ENERGY ABSORBER REPLACEMENT

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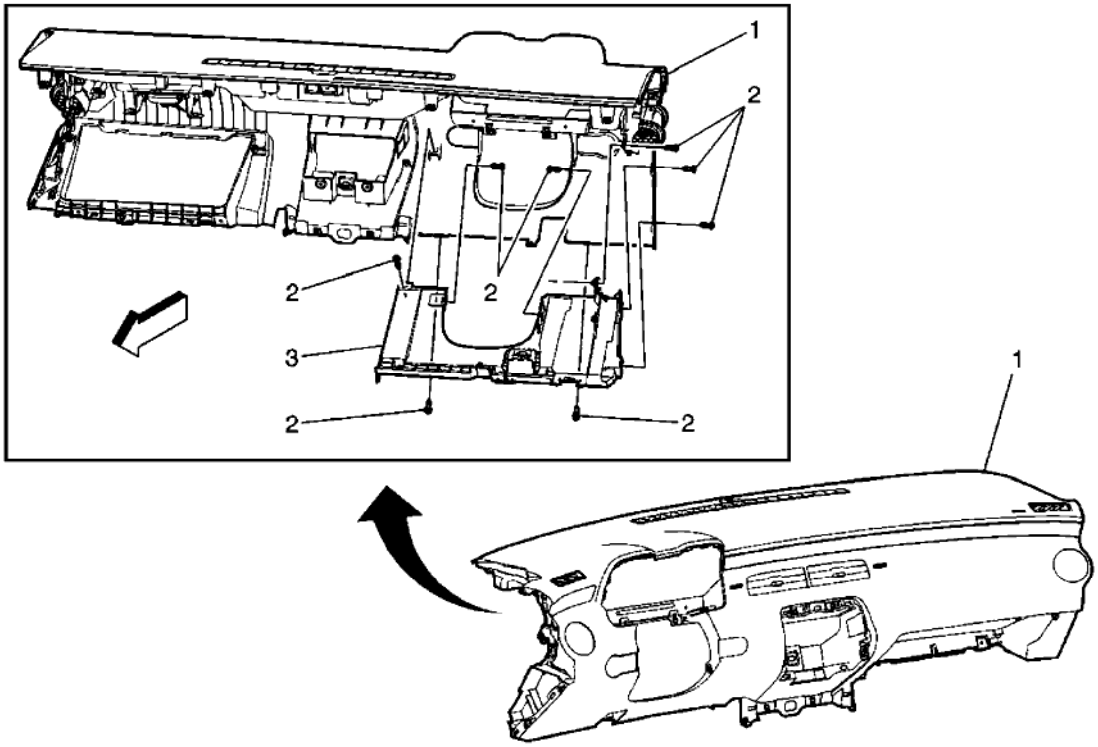


Fig. 2: Instrument Panel Driver Knee Bolster Energy Absorber
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Pad Refer to **Instrument Panel Trim Pad Replacement**
2	Instrument Panel Driver Knee Bolster Energy Absorber Fasteners (Qty: 8) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Instrument Panel Driver Knee Bolster Energy Absorber

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - RIGHT SIDE (WITHOUT GRE)

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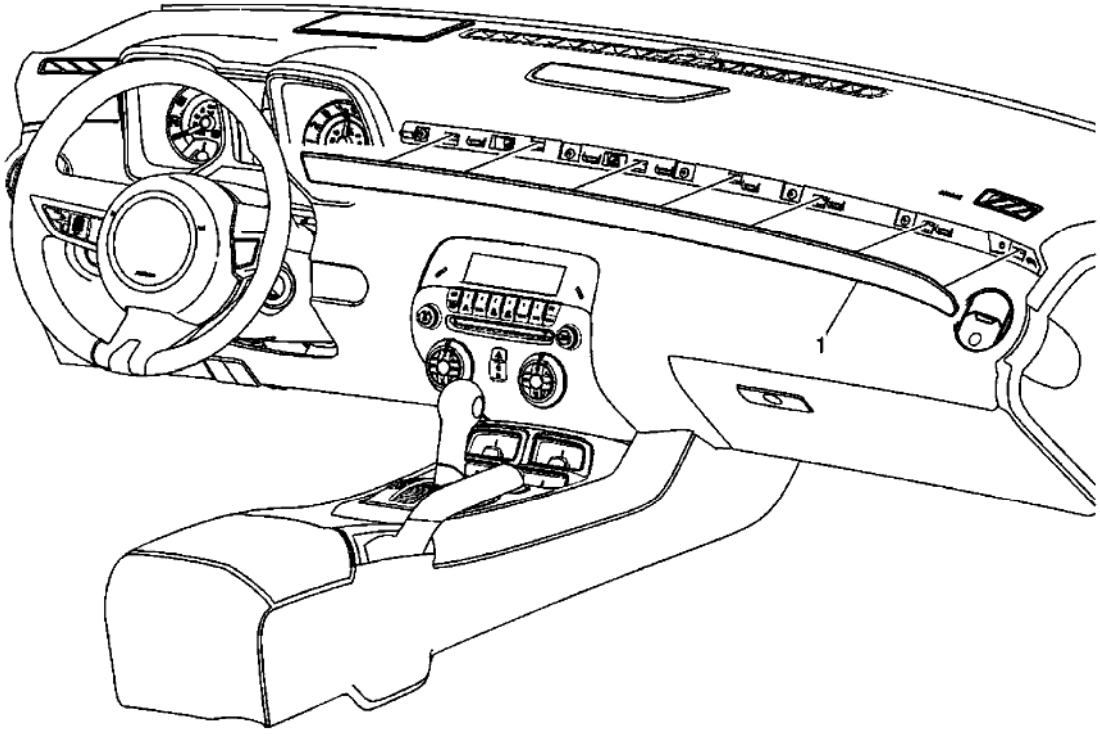


Fig. 3: Instrument Panel Trim Plate Applique - Right Side (Without GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure:** Use a flat bladed plastic trim tool in order to release the retainer clips securing the applique to the instrument panel assembly.

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - RIGHT SIDE (WITH GRE)

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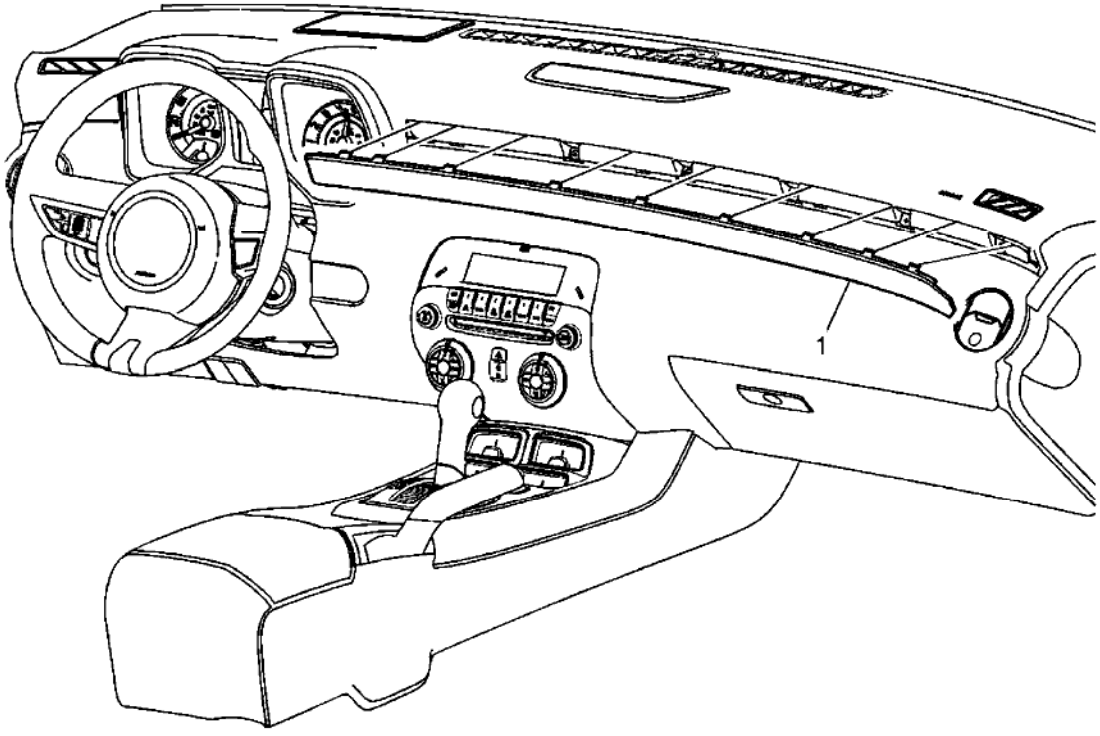


Fig. 4: Instrument Panel Trim Plate Applique - Right Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the lower edge of the applique from the instrument panel trim plate retainer. 2. Unsnap the top edge of the applique from the instrument panel trim plate retainer.

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - LEFT SIDE (WITHOUT GRE)

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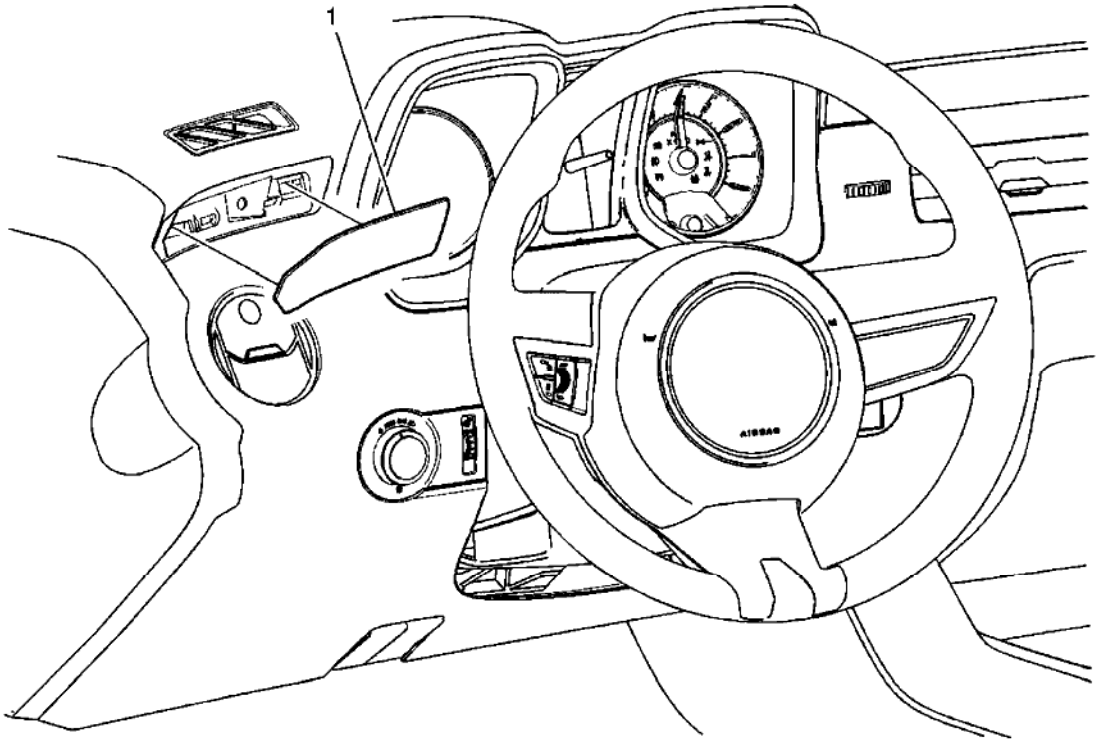


Fig. 5: Instrument Panel Trim Plate Applique - Left Side (Without GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure:** Use a flat bladed plastic trim tool in order to release the retainer clips securing the applique to the instrument panel assembly.

INSTRUMENT PANEL TRIM PLATE APPLIQUE REPLACEMENT - LEFT SIDE (WITH GRE)

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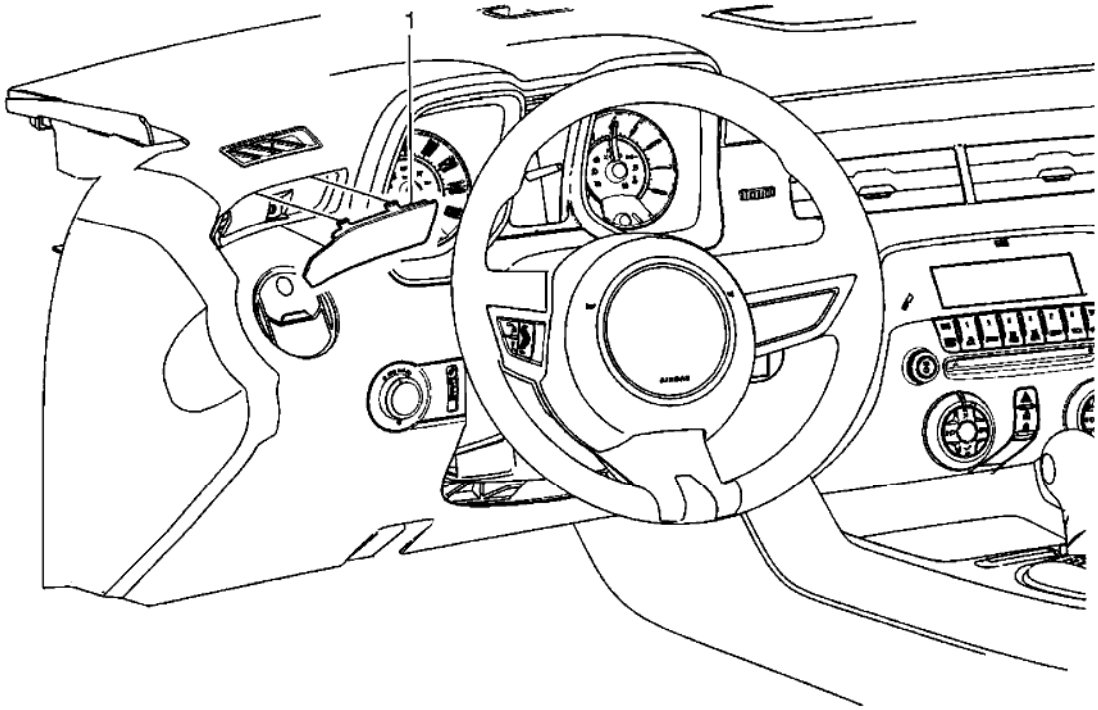


Fig. 6: Instrument Panel Trim Plate Applique - Left Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Trim Plate Applique Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the lower edge of the applique from the instrument panel trim plate retainer. 2. Unsnap the top edge of the applique from the instrument panel trim plate retainer.

INSTRUMENT PANEL TRIM PLATE RETAINER REPLACEMENT - RIGHT SIDE (WITH GRE)

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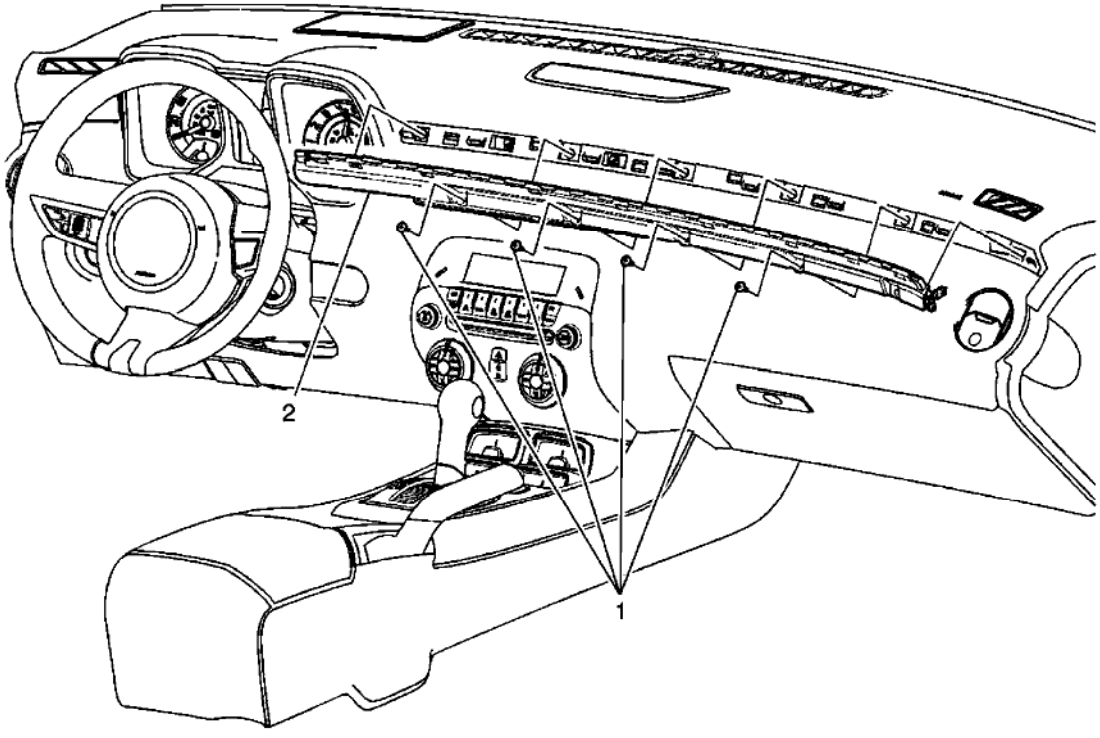


Fig. 7: Instrument Panel Trim Plate Retainer - Right Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the right instrument panel trim plate applique. Refer to **Instrument Panel Trim Plate Applique Replacement - Right Side (Without GRE)** or **Instrument Panel Trim Plate Applique Replacement - Right Side (With GRE)**.	
1	Instrument Panel Trim Plate Retainer Fastener (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Trim Plate Retainer Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the retainer clips securing the instrument panel trim plate retainer to the instrument panel assembly. 2. Disconnect the electrical connections.

INSTRUMENT PANEL TRIM PLATE RETAINER REPLACEMENT - LEFT SIDE (WITH GRE)

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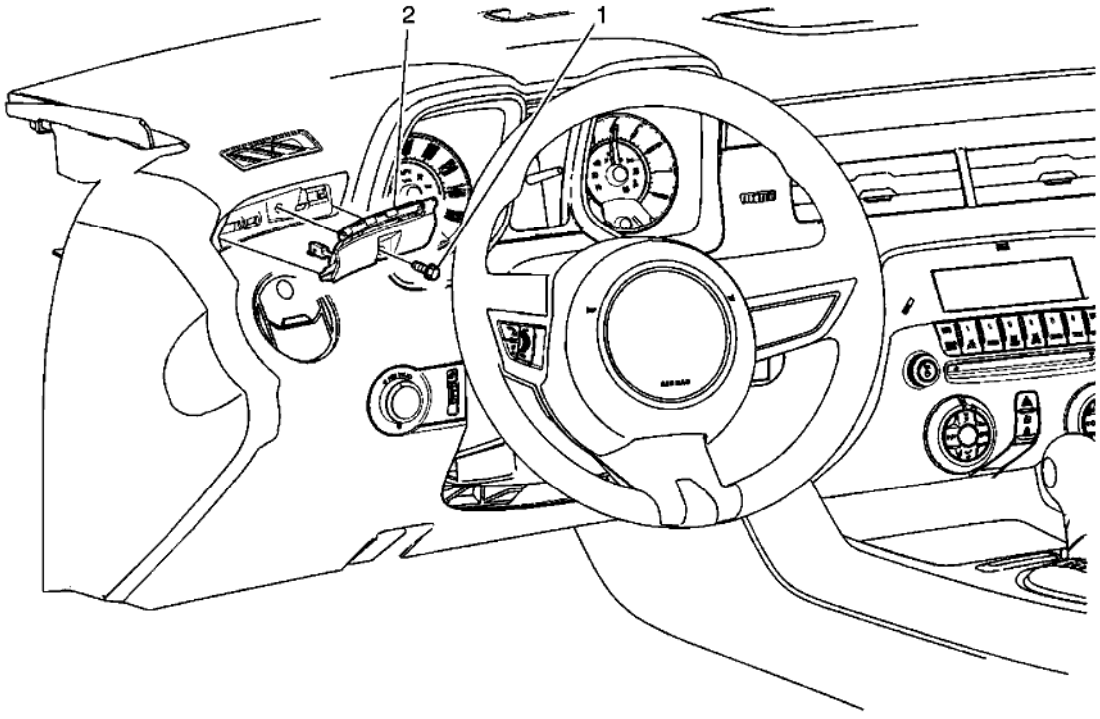


Fig. 8: Instrument Panel Trim Plate Retainer - Left Side (With GRE)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the left instrument panel trim plate applique. Refer to **Instrument Panel Trim Plate Applique Replacement - Left Side (Without GRE)** or **Instrument Panel Trim Plate Applique Replacement - Left Side (With GRE)**.	
1	Instrument Panel Trim Plate Retainer Fastener **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Trim Plate Retainer Assembly **Procedure** 1. Use a flat bladed plastic trim tool in order to release the retainer clips securing the instrument panel trim plate retainer to the instrument panel assembly. 2. Disconnect the electrical connections.

INSTRUMENT PANEL CLUSTER TRIM PLATE REPLACEMENT

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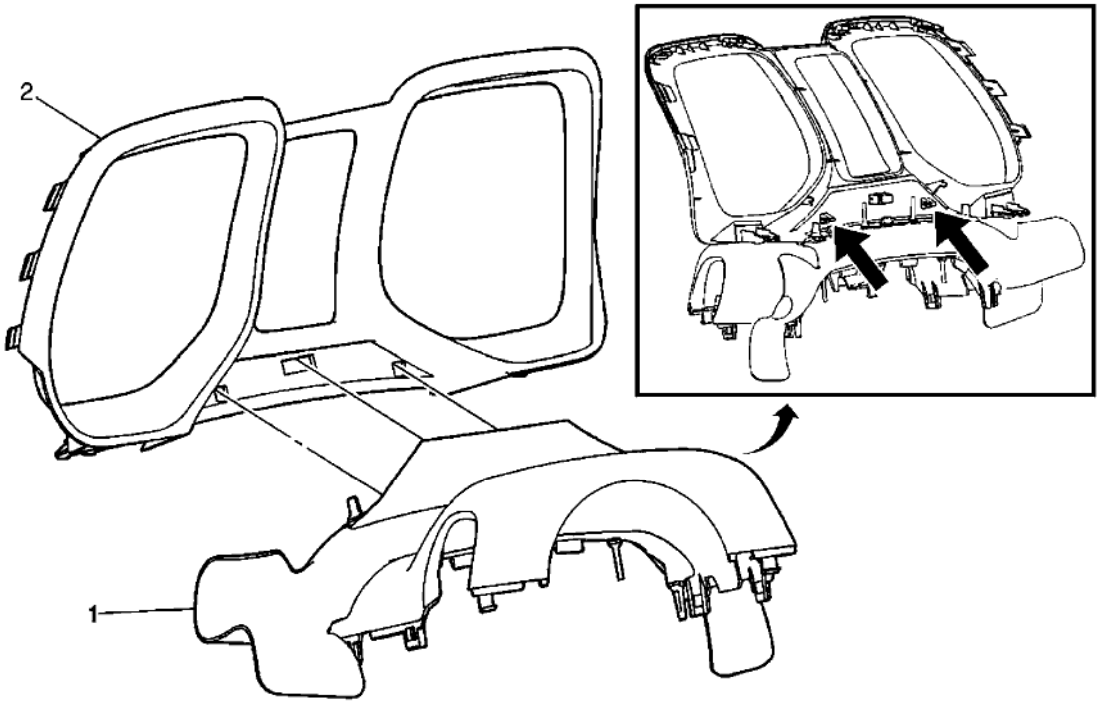
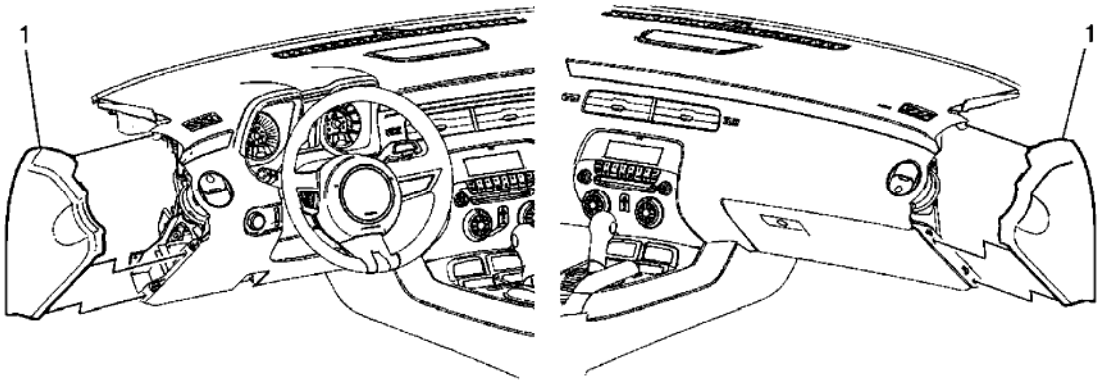


Fig. 9: Instrument Panel Cluster Trim Plate
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Upper Steering Column Shroud Refer to **Steering Column Shroud Replacement** .
2	Instrument Panel Cluster Trim Plate Assembly **Procedure:** Squeeze the tabs on the back of the upper steering column shroud in order to release the instrument panel cluster plate from the shroud.

INSTRUMENT PANEL OUTER TRIM COVER REPLACEMENT



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Fig. 10: Instrument Panel Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Outer Trim Cover Assemblies (Right or Left) **Procedure:** Use a flat bladed plastic trim tool in order to release the retainer clips securing the outer trim covers to the instrument panel assembly.

INSTRUMENT PANEL COMPARTMENT REPLACEMENT

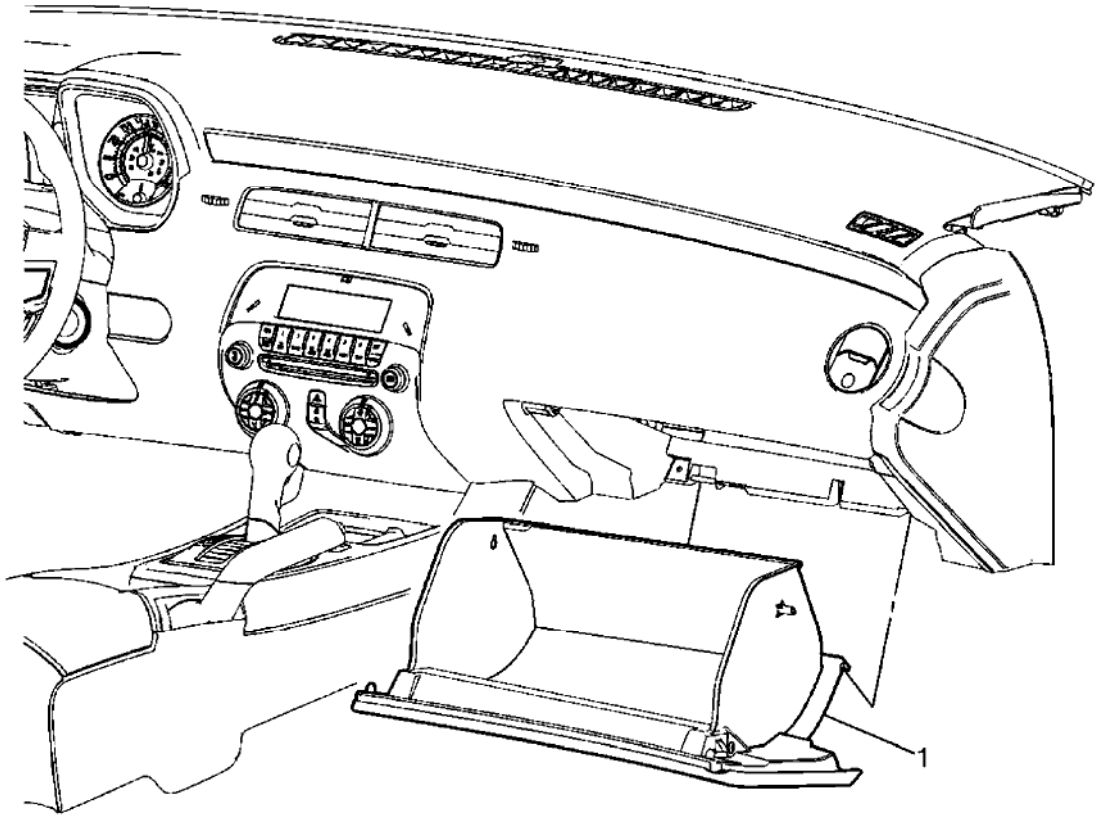


Fig. 11: Instrument Panel Compartment
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Disconnect the instrument panel compartment door dampener from the compartment assembly. 2. Squeeze the sides of the instrument panel compartment assembly allowing the compartment to open past the stops.	
	Instrument Panel Compartment Assembly

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1	**Procedure:** Unsnap the instrument panel compartment assembly from the instrument panel.

INSTRUMENT PANEL COMPARTMENT DOOR LATCH RELEASE ROD REPLACEMENT

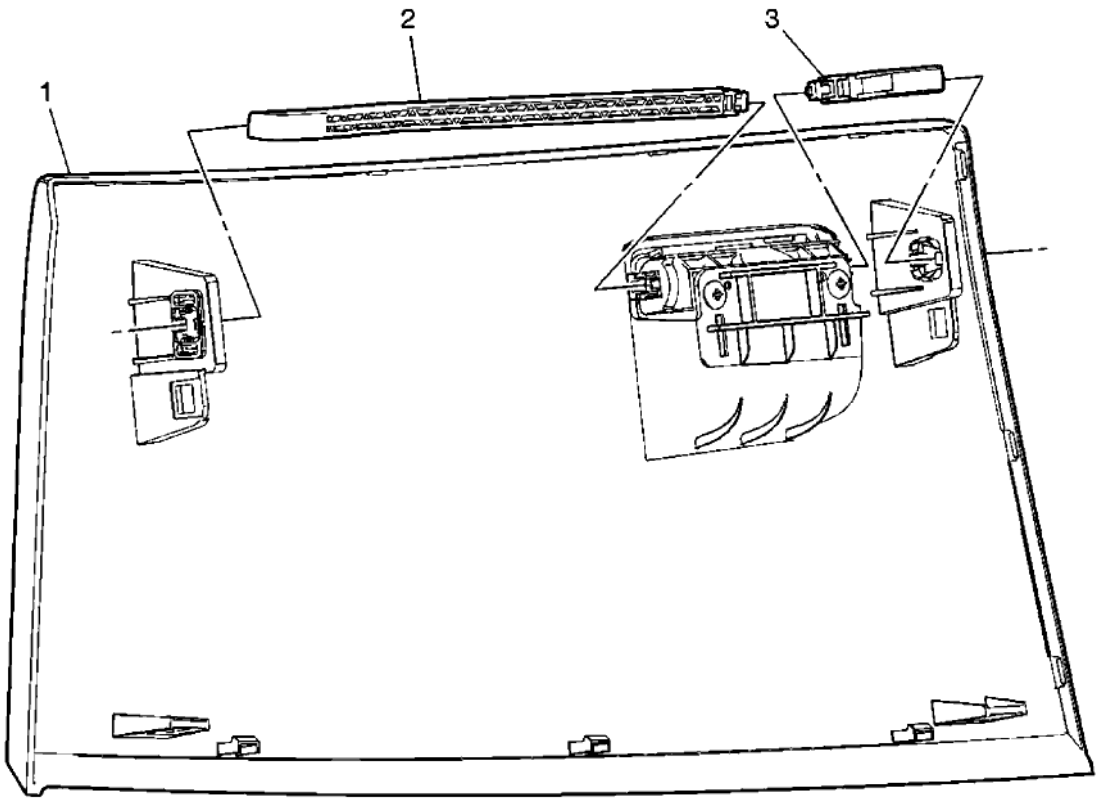


Fig. 12: Instrument Panel Compartment Door Latch Release Rod
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Compartment Door Refer to **Instrument Panel Compartment Door Assembly Replacement**.
2	Instrument Panel Compartment Door Latch Release Rod - Right **Procedure:** Unsnap the release rod from the latch assembly and the guide.
3	Instrument Panel Compartment Door Latch Release Rod - Left **Procedure:** Unsnap the release rod from the latch assembly and the guide.

INSTRUMENT PANEL COMPARTMENT DOOR FOUNDATION REPLACEMENT

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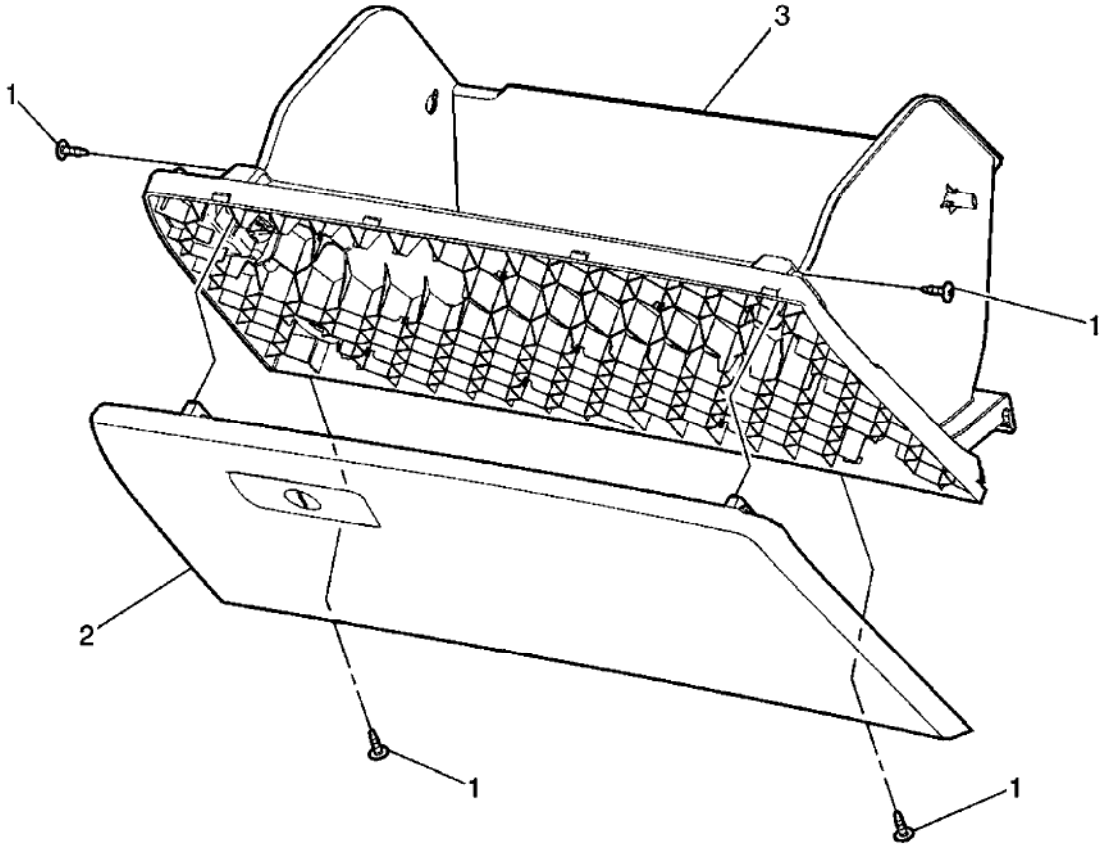


Fig. 13: Instrument Panel Compartment Door Foundation
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.	
1	Instrument Panel Compartment Door Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Compartment Door
3	Instrument Panel Compartment Door Foundation

INSTRUMENT PANEL COMPARTMENT DOOR ASSEMBLY REPLACEMENT

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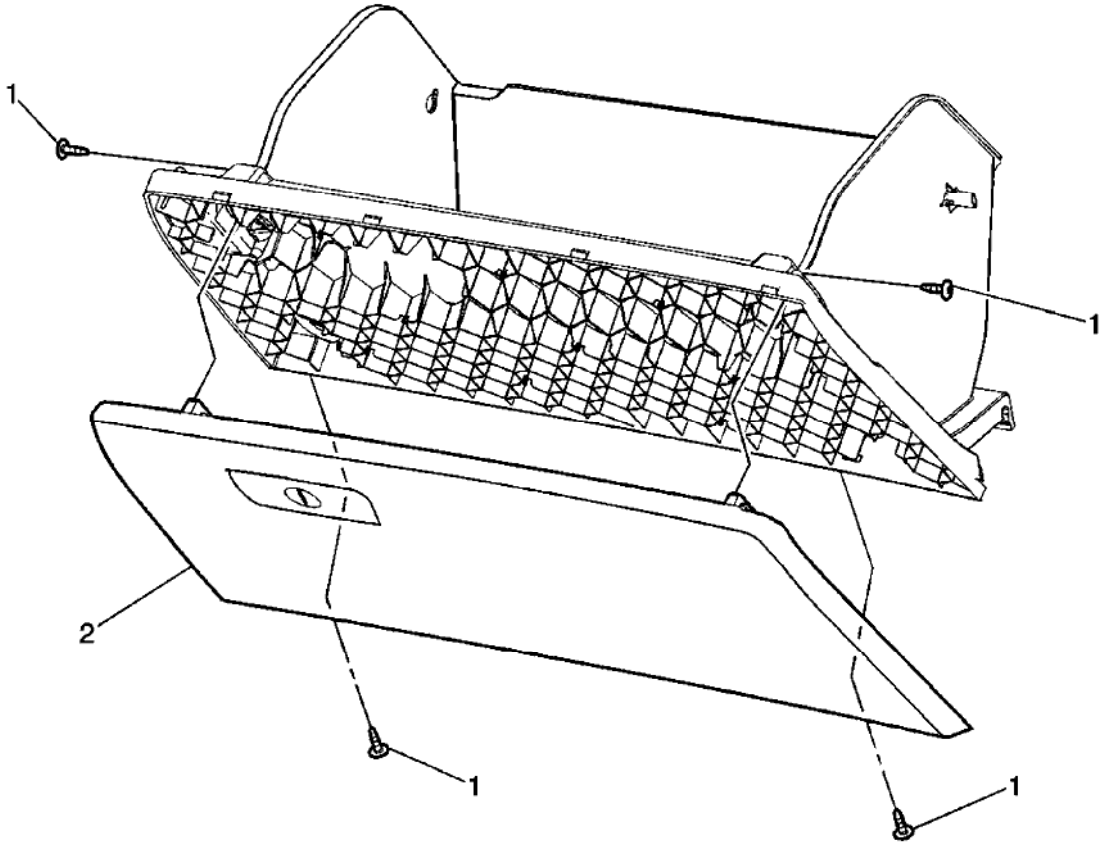


Fig. 14: Instrument Panel Compartment Door Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.	
1	Instrument Panel Compartment Door Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Compartment Door **Procedure:** When replacing the instrument panel compartment door assembly, transfer all necessary components.

INSTRUMENT PANEL COMPARTMENT DOOR LATCH REPLACEMENT

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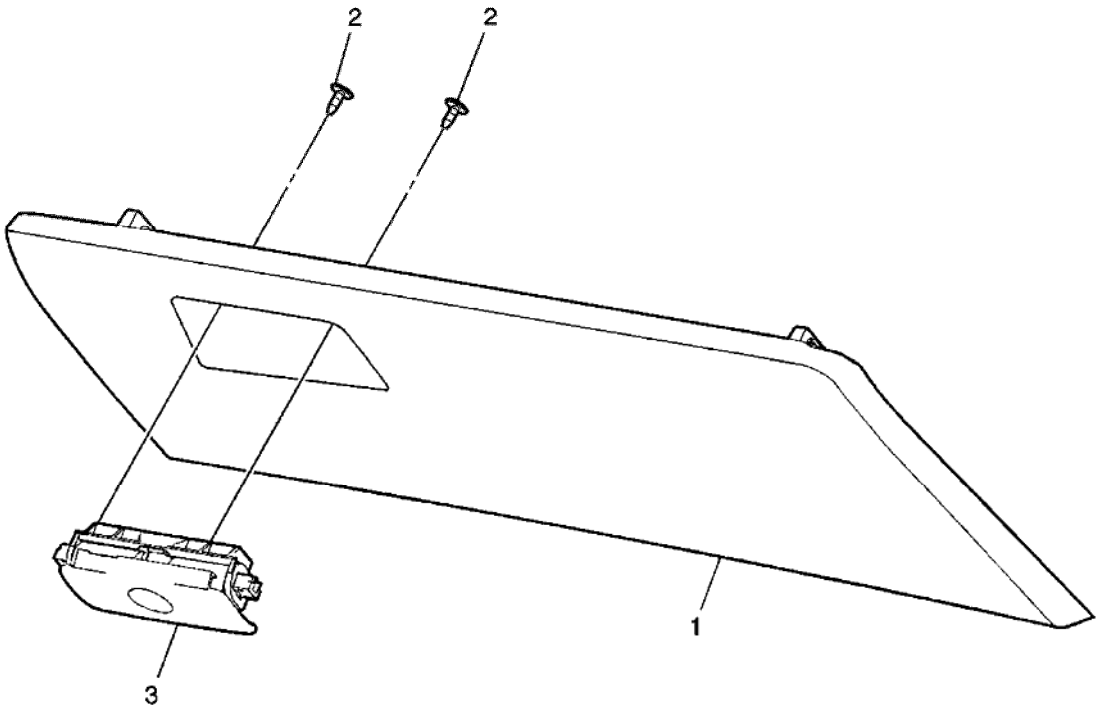


Fig. 15: Instrument Panel Compartment Door Latch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Instrument Panel Compartment Door Refer to **Instrument Panel Compartment Door Assembly Replacement**.
2	Instrument Panel Compartment Door Latch Fasteners (Qty; 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Instrument Panel Compartment Door Latch Assembly **Procedure:** Unsnap the instrument panel compartment door latch release rods from the latch assembly.

INSTRUMENT PANEL COMPARTMENT DOOR DAMPENER REPLACEMENT

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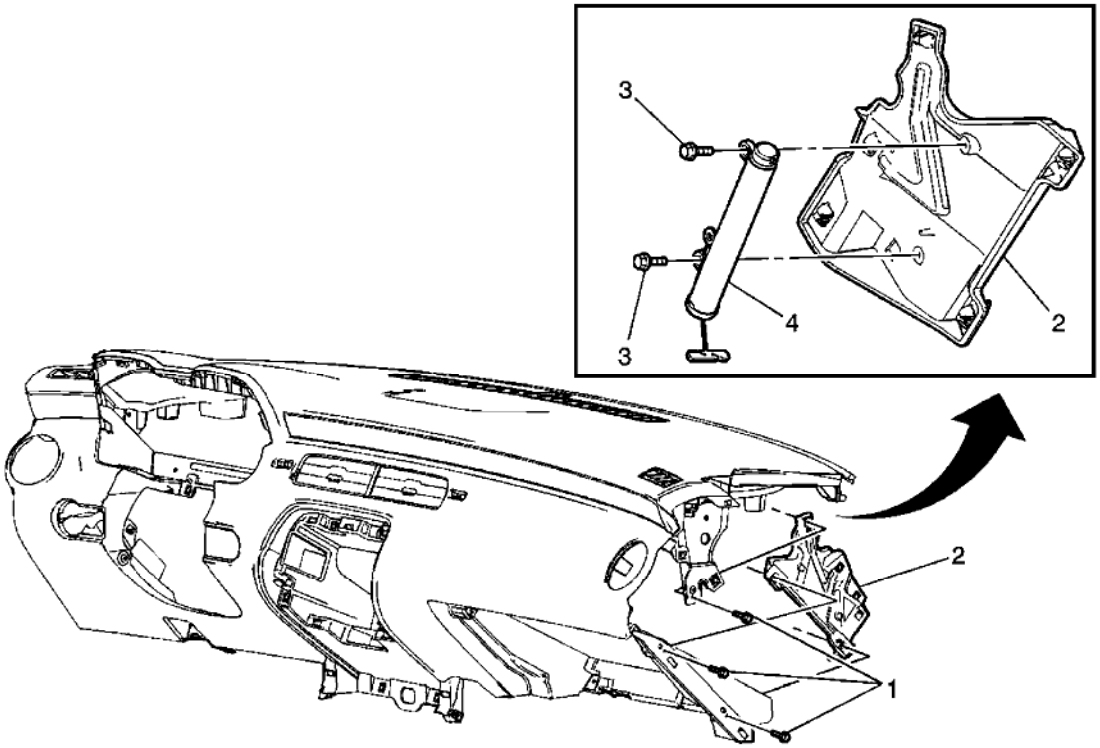


Fig. 16: Instrument Panel Compartment Door Dampener
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the right instrument panel outer trim cover. Refer to **Instrument Panel Outer Trim Cover Replacement**. 2. Remove the right instrument panel outer air outlet duct. Refer to **Instrument Panel Outer Air Outlet Duct Replacement - Right Side** . 3. Remove the instrument panel assembly. Refer to **Instrument Panel Assembly Replacement**.	
1	Instrument Panel Carrier Support Bracket Fasteners (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Carrier Support Bracket
3	Instrument Panel Compartment Door Dampener Fasteners (Qty: 2) **Tighten:** 2.5 N.m (22 lb in)
4	Instrument Panel Compartment Door Dampener Assembly

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INSTRUMENT PANEL TRIM PAD REPLACEMENT

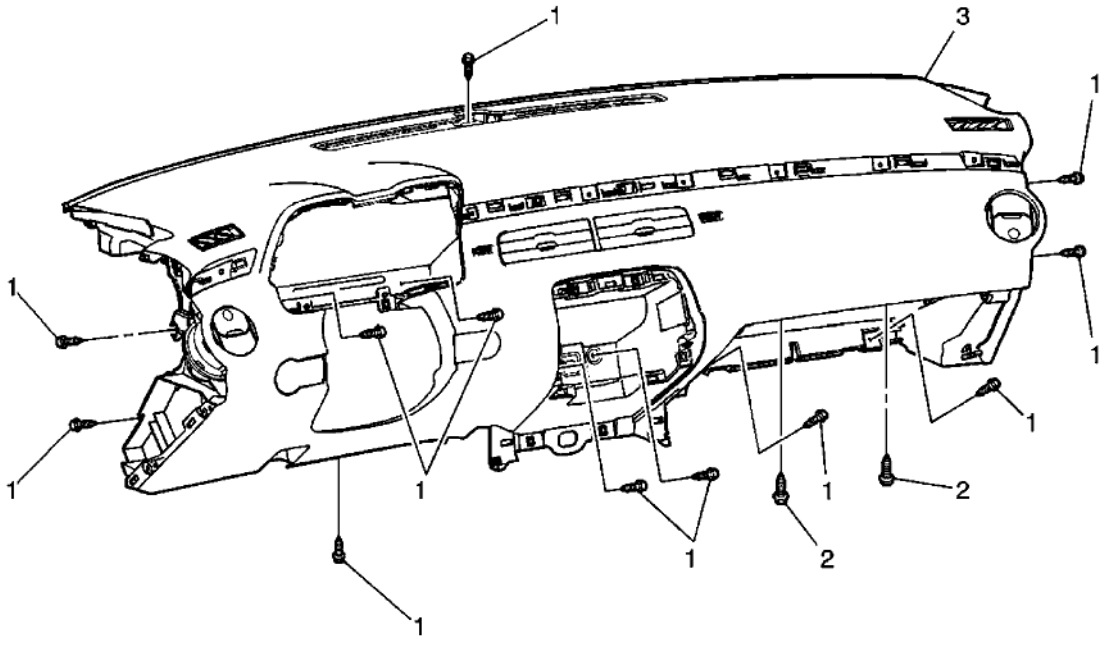


Fig. 17: Instrument Panel Trim Pad
Courtesy of GENERAL MOTORS CORP.

Callous	Component Name

Preliminary Procedure

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. Remove the right and left windshield garnish moldings. Refer to **Windshield Side Garnish Molding Replacement** .
3. Remove the front floor console assembly. Refer to **Front Floor Console Replacement**.
4. Remove the right and left instrument panel outer trim covers. Refer to **Instrument Panel Outer Trim Cover Replacement**.
5. Remove the left and right instrument panel outer air outlet ducts. Refer to **Instrument Panel Outer Air Outlet Duct Replacement - Left Side** and **Instrument Panel Outer Air Outlet Duct Replacement - Right Side** .
6. Remove the instrument panel cluster assembly. Refer to **Instrument Cluster Replacement** .
7. Remove the steering wheel. Refer to **Steering Wheel Replacement** .
8. Remove the turn signal multifunction switch assembly and the wiper washer switch. Refer to **Turn Signal Multifunction Switch Replacement** and **Windshield Wiper and Washer Switch Replacement** .
9. Remove the radio control assembly. Refer to **Radio Control Assembly Replacement** .
10. Remove the radio. Refer to **Radio Replacement** .

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11. Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.
12. Remove the instrument panel center air outlet grille assembly. Refer to **Instrument Panel Center Air Outlet Grille Replacement** .
13. Remove the communication interface module and battery. Refer to **Communication Interface Module Replacement** and **Communication Interface Module Battery Replacement** .
14. Disconnect the DLC Connector and hood release handle.
15. Remove the head lamp switch. Refer to **Headlamp, Instrument Panel Lamp Dimmer, and Fog Lamp Switch Replacement** .

1	Instrument Panel Trim Pad Fasteners (Qty: 12) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Inflatable Restraint Fasteners (Qty: 2) **Tighten:** 22 N.m (16 lb ft)
3	Instrument Panel Trim Pad Assembly **Procedure** 1. Note location and routing of the electrical harnesses in order to ensure proper reinstallation. 2. Disconnect the electrical harnesses and connectors. 3. When replacing the instrument panel trim pad, transfer all necessary components.

INSTRUMENT PANEL ASSEMBLY REPLACEMENT

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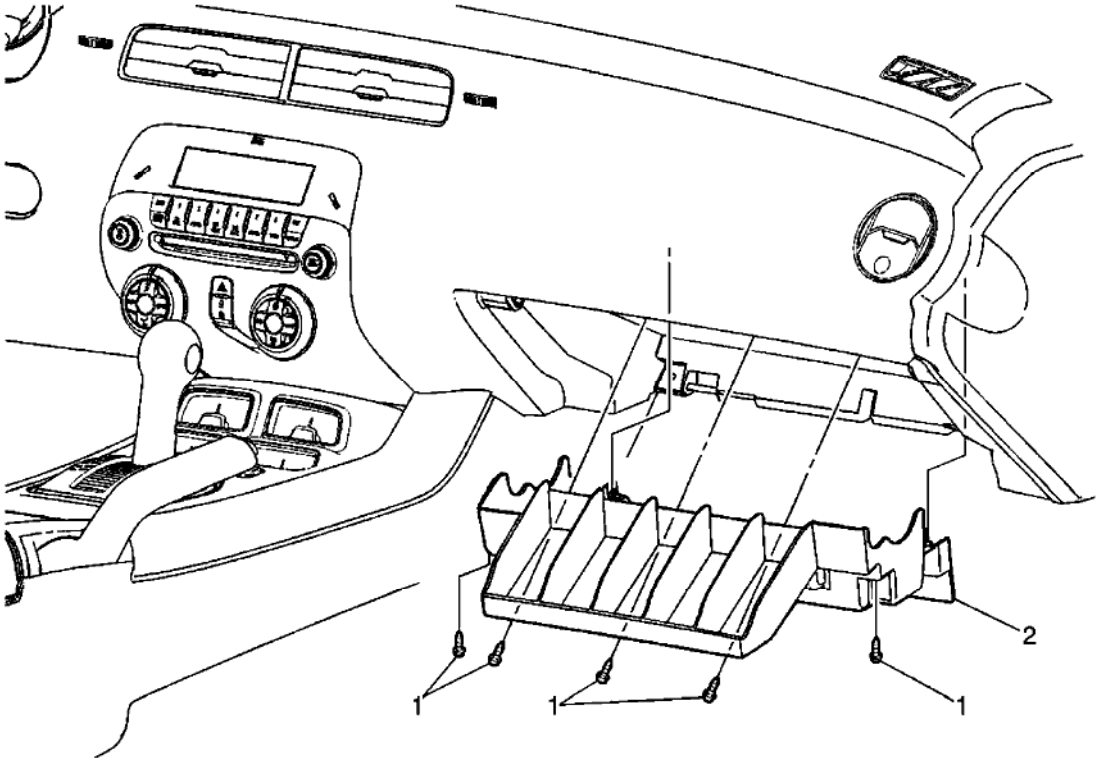


Fig. 18: Instrument Panel Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment assembly. Refer to **Instrument Panel Compartment Replacement**.	
1	Instrument Panel Assembly Fasteners (Qty: 5) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
2	Instrument Panel Assembly

INSTRUMENT PANEL TIE BAR REPLACEMENT

Removal Procedure

1. Remove the instrument panel trim pad assembly. Refer to **Instrument Panel Trim Pad Replacement**.
2. Remove the steering column assembly. Refer to **Steering Column Replacement** .
3. Remove the windshield. Refer to **Windshield Replacement** .

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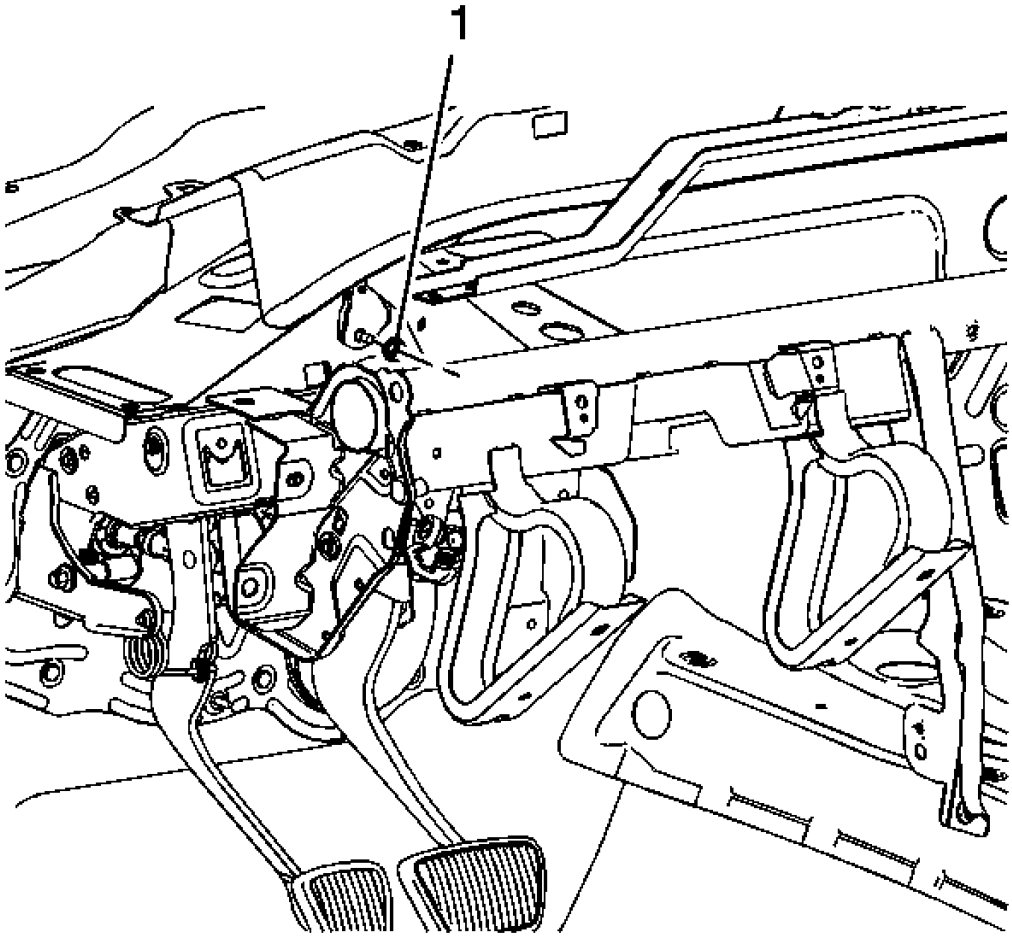


Fig. 19: Instrument Panel Tie Bar Assembly Nut To Vehicle Cowl Panel
Courtesy of GENERAL MOTORS CORP.

4. Remove the nut (1) securing the instrument panel tie bar assembly to the vehicle cowl panel.
5. Remove the fasteners securing the brake pedal assembly to the instrument panel tie bar. Refer to **Brake Pedal Assembly Replacement** .
6. If equipped with a manual transmission, remove the fasteners securing the clutch pedal assembly to the instrument panel tie bar. Refer to **Clutch Pedal Replacement** .
7. Note the location and routing of the instrument panel electrical harness assembly, to ensure proper reinstallation.
8. Disconnect the fasteners securing the instrument panel electrical harness assembly to the instrument panel tie bar and position out of the way.

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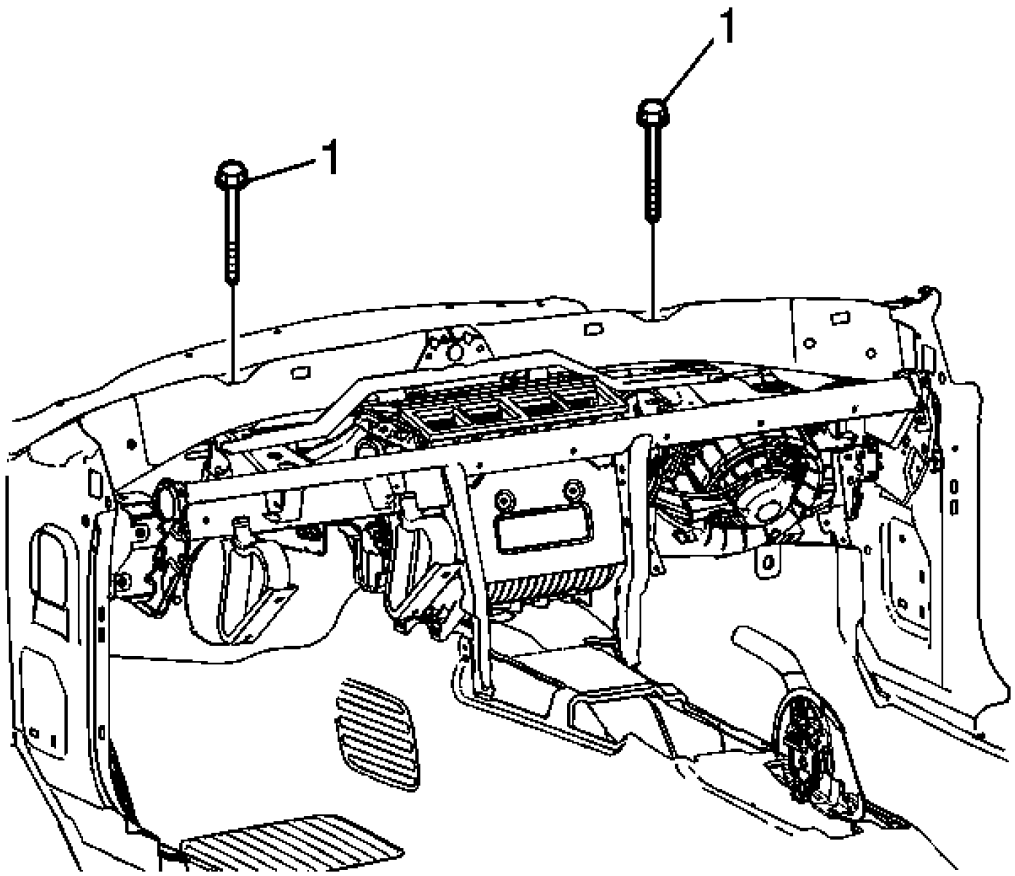


Fig. 20: Instrument Panel Tie Bar Assembly To Windshield Frame & Plenum Panel Fasteners
Courtesy of GENERAL MOTORS CORP.

9. Remove the 2 fasteners (1) securing the instrument panel tie bar assembly to the windshield frame and plenum panel.

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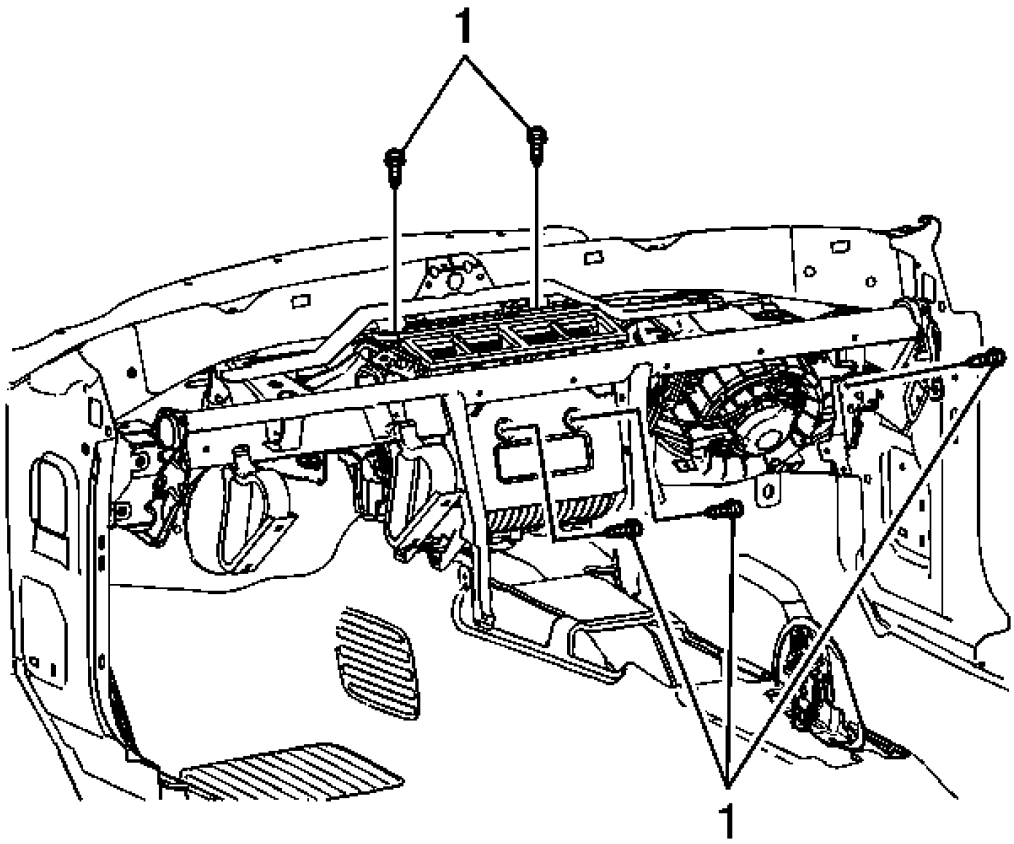


Fig. 21: Instrument Panel Tie Bar Assembly To Hvac Module Assembly Fasteners
Courtesy of GENERAL MOTORS CORP.

10. Remove the 5 fasteners (1) securing the instrument panel tie bar assembly to the HVAC module assembly.

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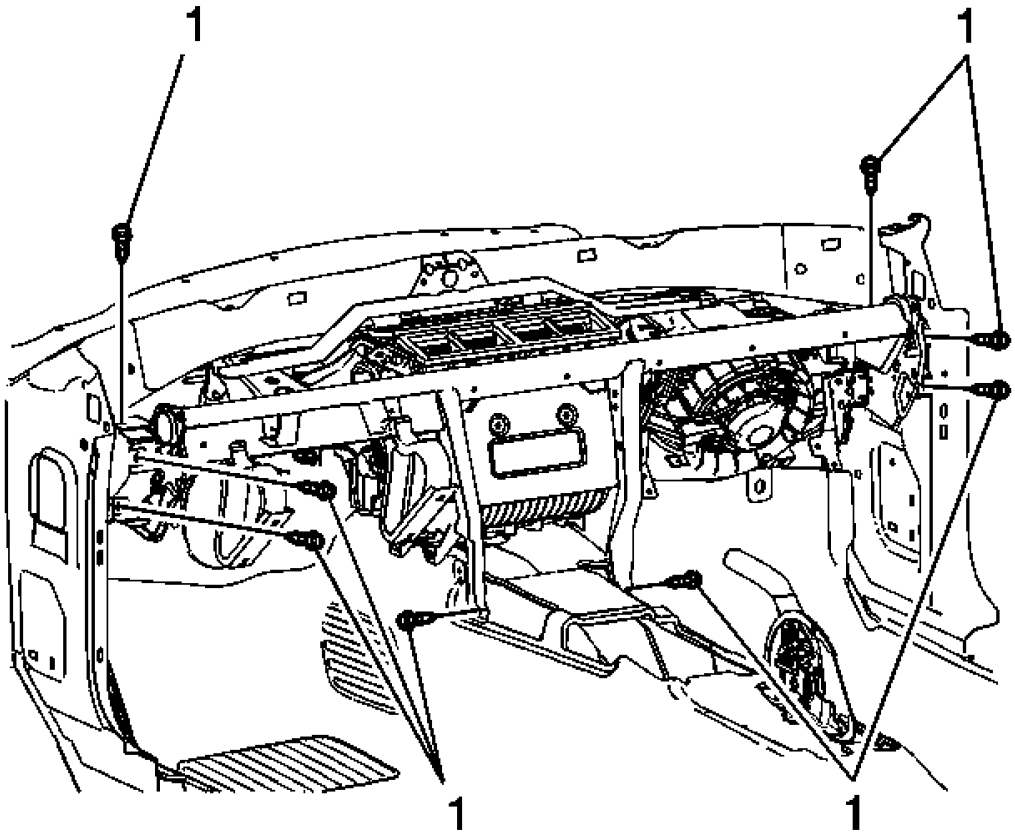


Fig. 22: Instrument Panel Tie Bar Assembly To Vehicle Body Fasteners
Courtesy of GENERAL MOTORS CORP.

11. Remove the 8 fasteners (1) securing the instrument panel tie bar assembly to the vehicle body.
12. Support the HVAC module assembly, as needed.

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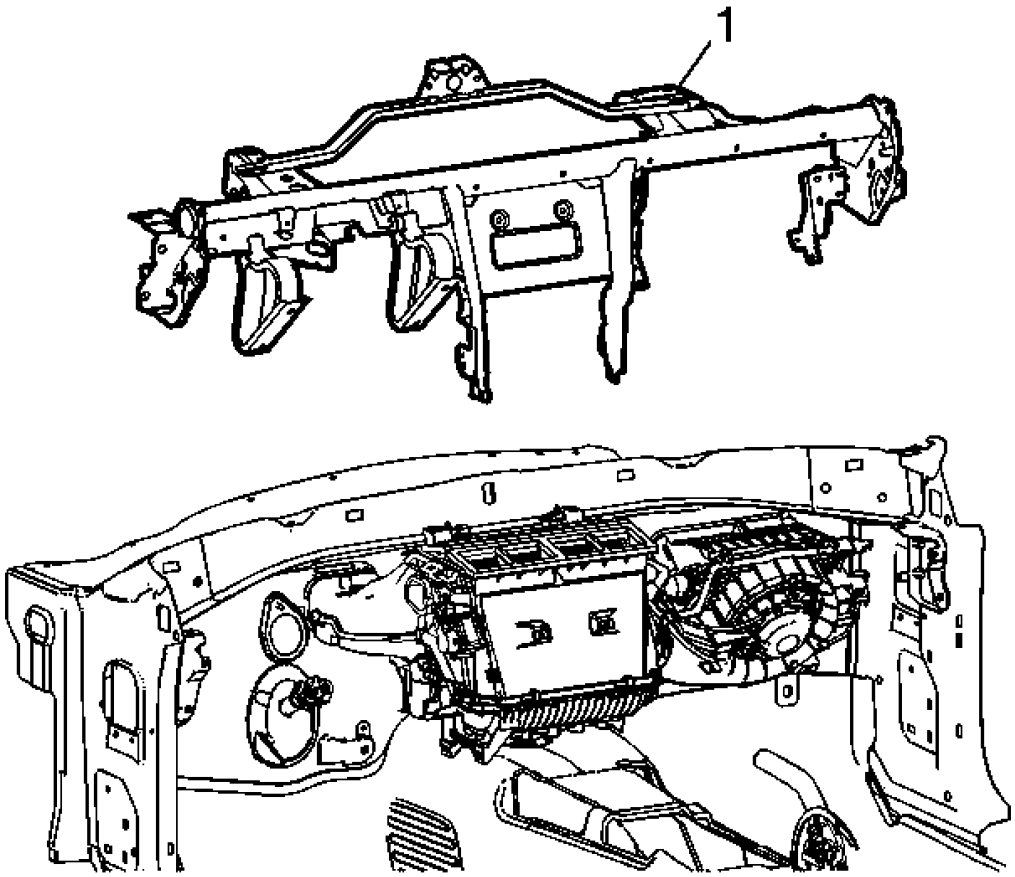


Fig. 23: Instrument Panel Tie Bar Assembly
Courtesy of GENERAL MOTORS CORP.

13. Remove the instrument panel tie bar assembly (1) from the vehicle.

Installation Procedure

1. Position the instrument panel tie bar assembly into the vehicle.

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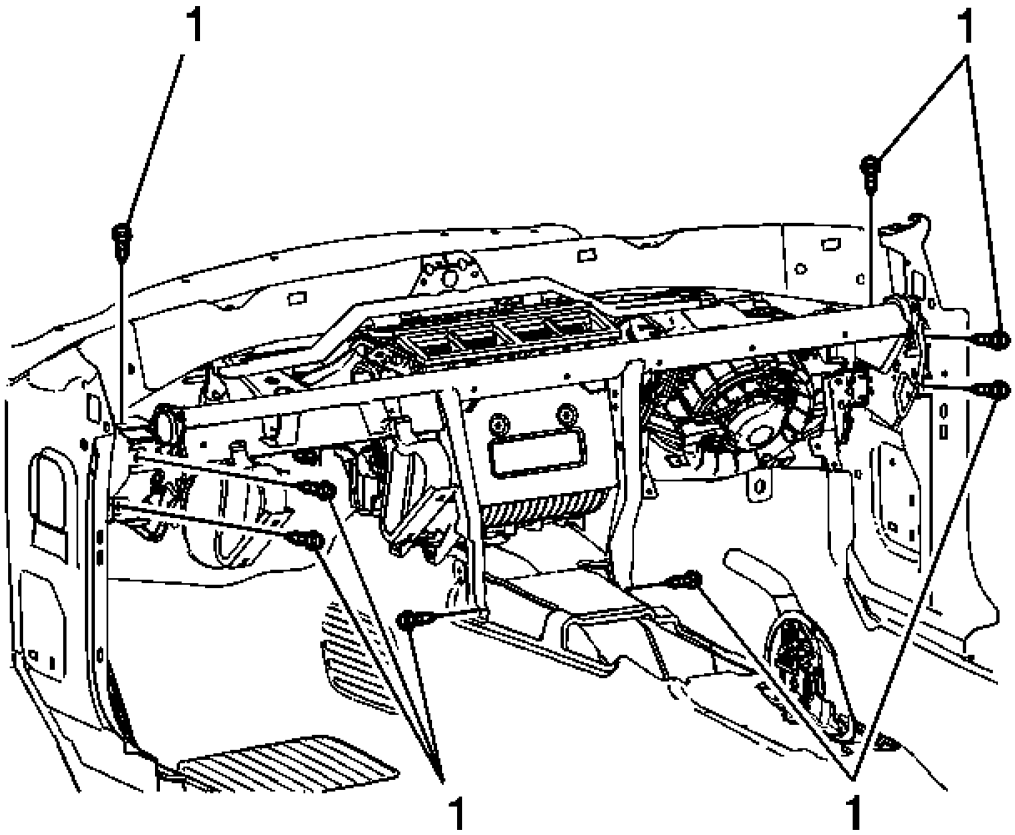


Fig. 24: Instrument Panel Tie Bar Assembly To Vehicle Body Fasteners
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Fastener Caution .

2. Install the 8 fasteners (1) securing the instrument panel tie bar assembly to the vehicle body and tighten to 25 N.m (18 lb ft).

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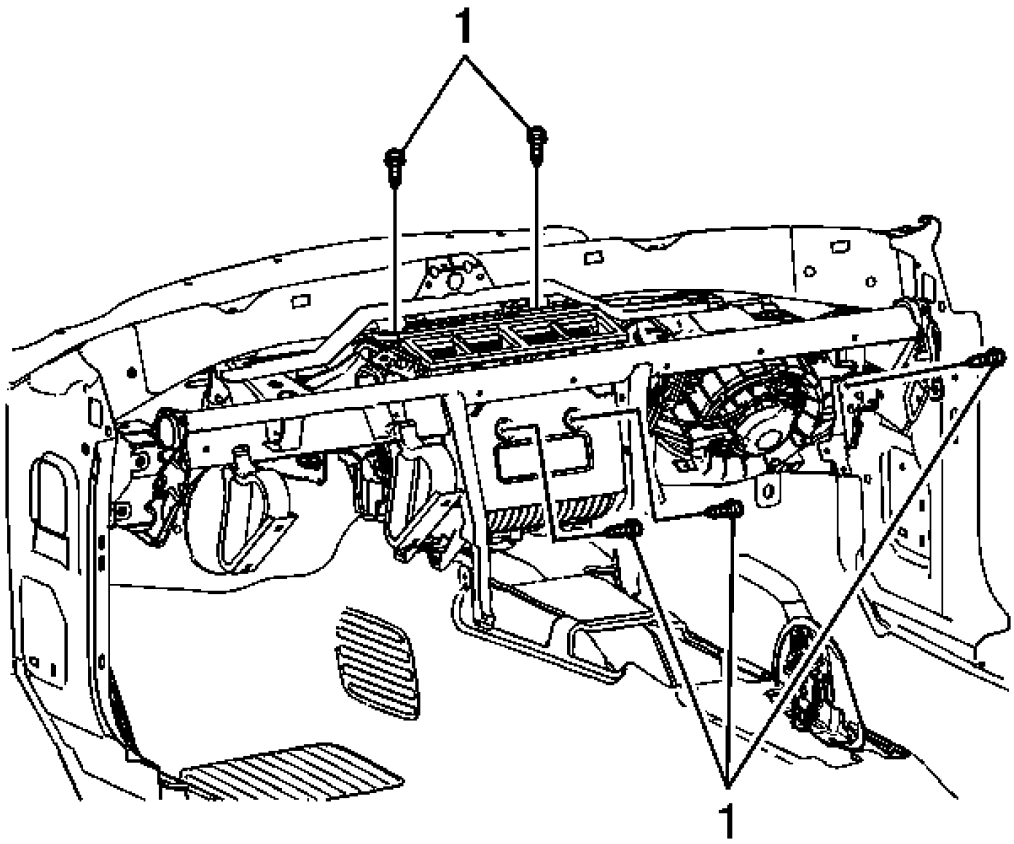


Fig. 25: Instrument Panel Tie Bar Assembly To Hvac Module Assembly Fasteners
Courtesy of GENERAL MOTORS CORP.

3. Install the 5 fasteners (1) securing the instrument panel tie bar assembly to the HVAC module assembly and tighten to 9 N.m (80 lb in).

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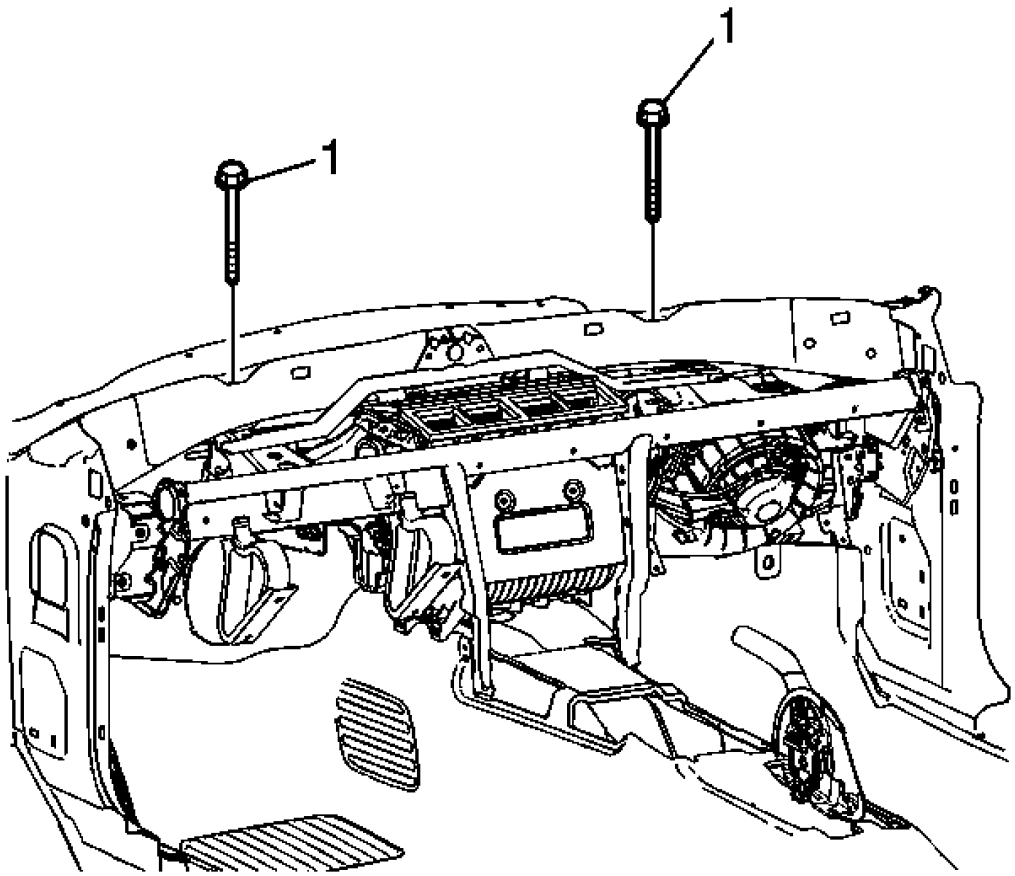


Fig. 26: Instrument Panel Tie Bar Assembly To Windshield Frame & Plenum Panel Fasteners
Courtesy of GENERAL MOTORS CORP.

4. Install the 2 fasteners (1) securing the instrument panel tie bar assembly to the windshield frame and plenum panel and tighten to 22 N.m (16 lb ft).
5. Reposition the instrument panel wiring harness into vehicle position as was noted in the removal process and connect the fasteners securing the instrument panel electrical harness assembly to the instrument panel tie bar.
6. If equipped with a manual transmission, Install the fasteners securing the clutch pedal assembly to the instrument panel tie bar. Refer to **Clutch Pedal Replacement** .
7. Install the fasteners securing the brake pedal assembly to the instrument panel tie bar. Refer to **Brake Pedal Assembly Replacement** .

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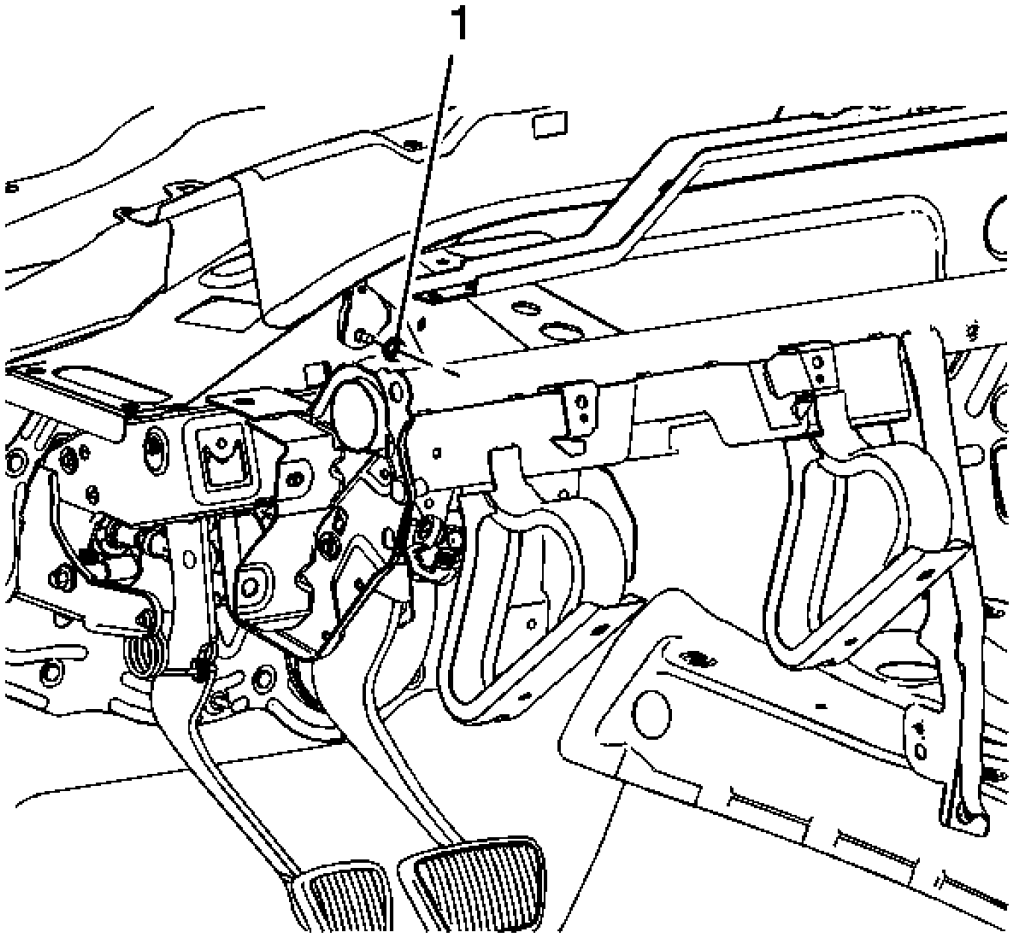


Fig. 27: Instrument Panel Tie Bar Assembly Nut To Vehicle Cowl Panel
Courtesy of GENERAL MOTORS CORP.

8. Install the nut (1) securing the instrument panel tie bar assembly to the vehicle cowl panel and tighten to 9 N.m (80 lb in).
9. Install the windshield. Refer to **Windshield Replacement** .
10. Install the steering column assembly. Refer to **Steering Column Replacement** .
11. Install the instrument panel trim pad assembly. Refer to **Instrument Panel Trim Pad Replacement**.

FRONT FLOOR CONSOLE SIDE COVER REPLACEMENT - RIGHT SIDE

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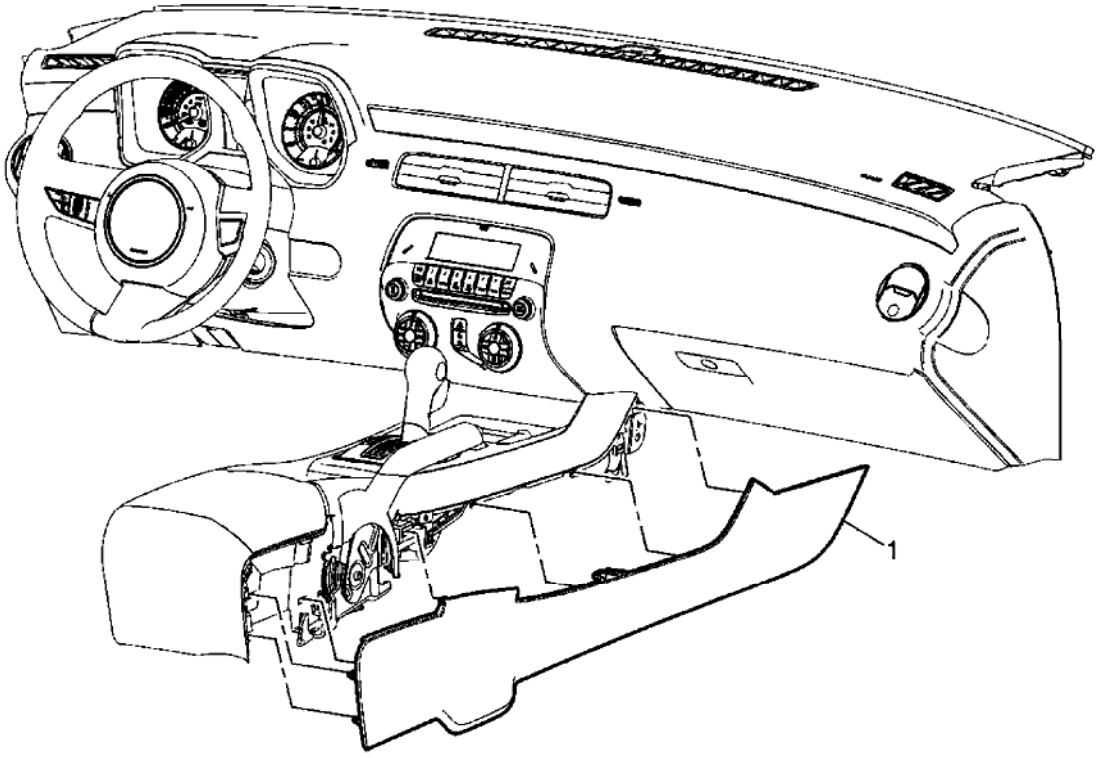


Fig. 28: Front Floor Console Side Cover - Right Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Side Cover Assembly - Right **Procedure:** Use a flat bladed plastic trim tool and release the retainer clips securing the console side cover to the front floor console assembly.

FRONT FLOOR CONSOLE SIDE COVER REPLACEMENT - LEFT SIDE

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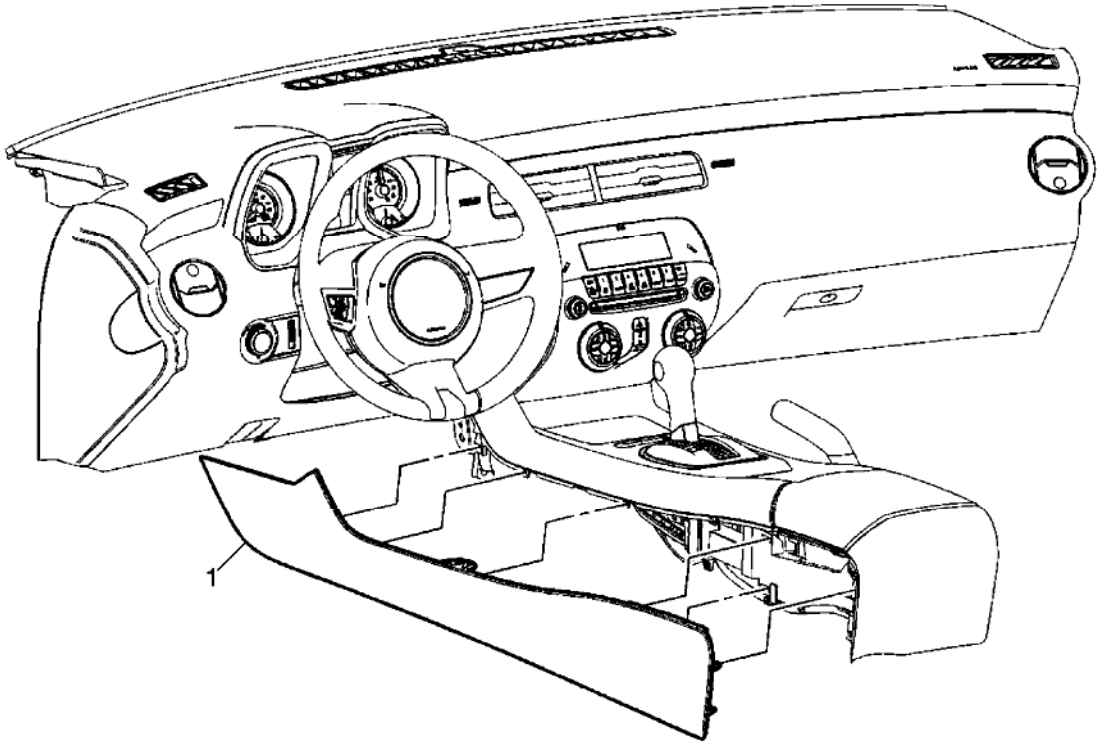


Fig. 29: Front Floor Console Side Cover - Left Side
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Side Cover Assembly - Left **Procedure:** Use a flat bladed plastic trim tool and release the retainer clips securing the console side cover to the front floor console assembly.

FRONT FLOOR CONSOLE REPLACEMENT

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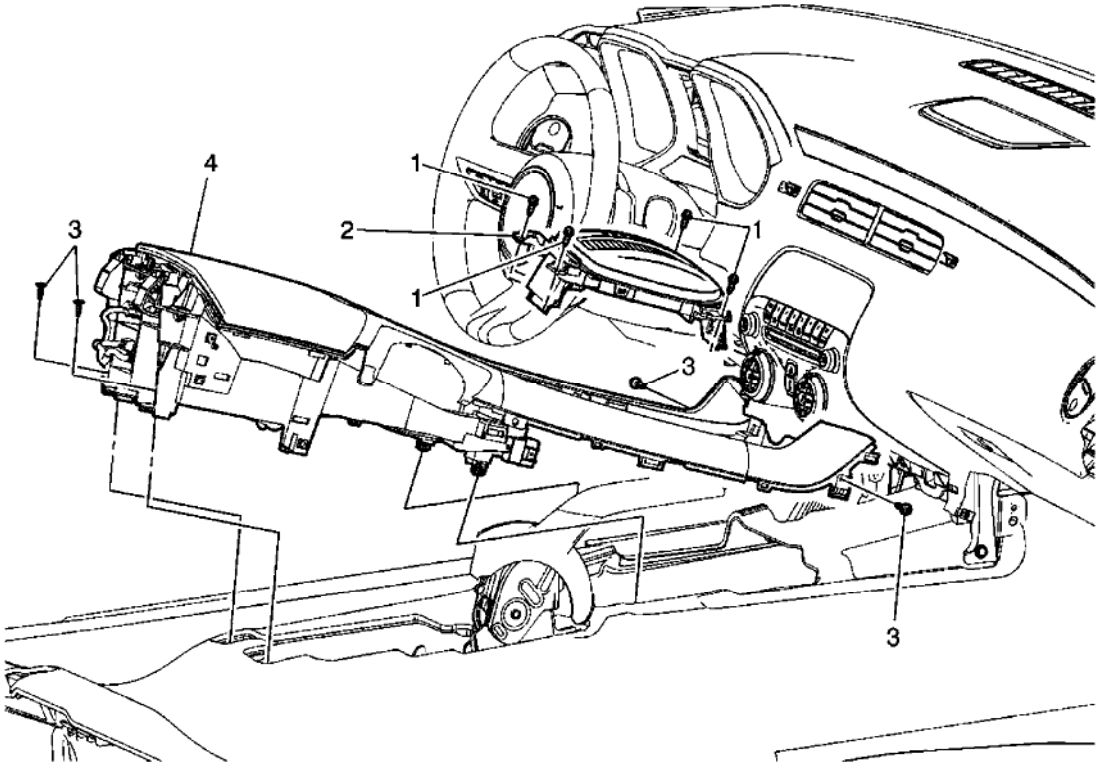


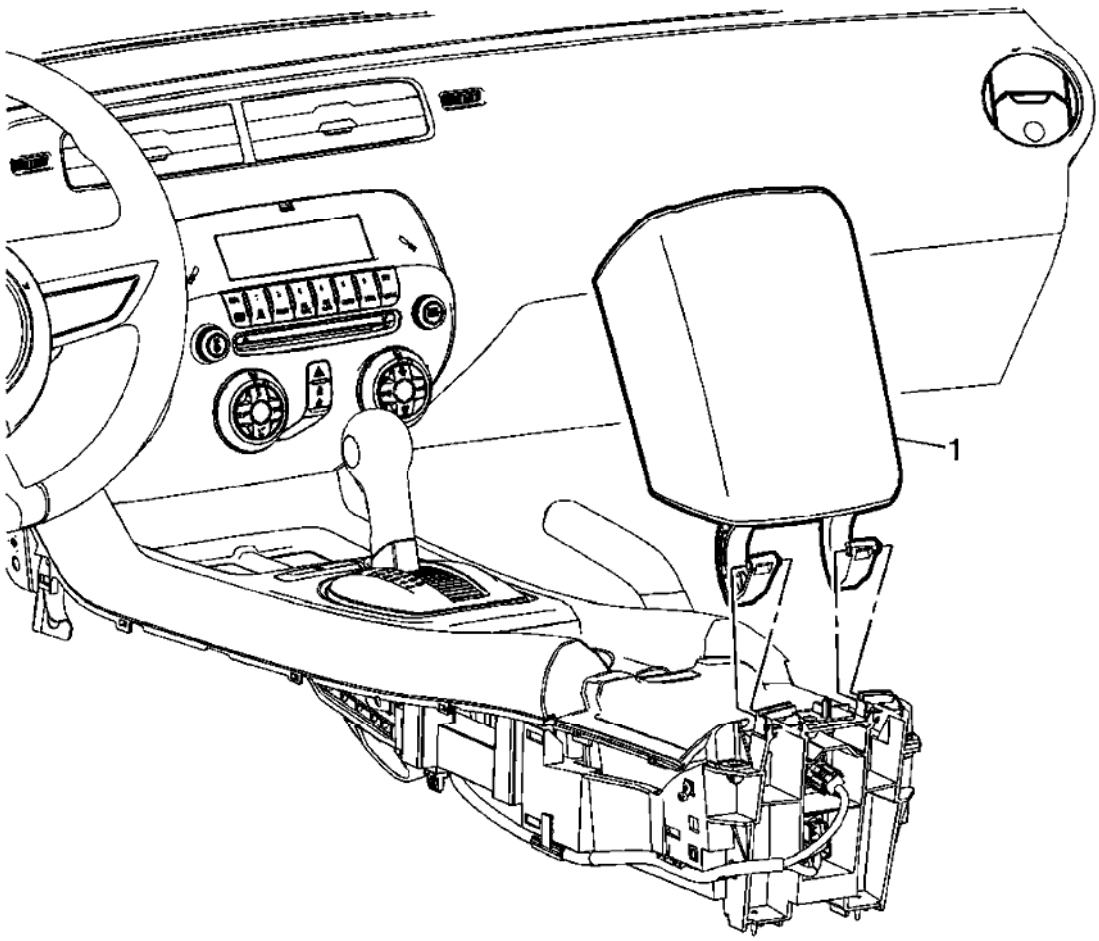
Fig. 30: Front Floor Console
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the right and left front floor console side cover assemblies. Refer to **Front Floor Console Side Cover Replacement - Right Side** and **Front Floor Console Side Cover Replacement - Left Side**. 2. Remove the front floor console rear cover. Refer to **Front Floor Console Rear Cover Replacement**. 3. Remove the front floor console front cover assembly. Refer to **Front Floor Console Front Cover Replacement (Without UMQ)** or **Front Floor Console Front Cover Replacement (With UMQ)**. 4. Remove the transmission control lever knob, if equipped with a automatic transmission. Refer to **Transmission Control Lever Knob Replacement** . 5. Remove the transmission control lever knob, if equipped with a manual transmission. Refer to **Transmission Control Lever Knob Replacement** or **Transmission Control Lever Knob Replacement** .	
1	Automatic Control Transmission Control Lever Housing Bezel Fastener (Qty: 4) **CAUTION:**

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	Refer to Fastener Caution . **Tighten:** 2.5 N.m (22 lb in)
2	Automatic Control Transmission Control Lever Housing Bezel **Procedure:** Disconnect the electrical connections.
3	Front Floor Console Fastener (Qty: 4) **Tighten:** 2.5 N.m (22 lb in)
4	Front Floor Console Assembly **Procedure** 1. Disconnect the electrical connections. 2. When replacing the front floor console assembly, transfer all necessary components.

FRONT FLOOR CONSOLE ARMREST REPLACEMENT



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Fig. 31: Front Floor Console Armrest
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the right and left front floor console side cover assemblies. Refer to **Front Floor Console Side Cover Replacement - Right Side** and **Front Floor Console Side Cover Replacement - Left Side**. 2. Remove the front floor console rear cover. Refer to **Front Floor Console Rear Cover Replacement**.	
1	Front Floor Console Armrest Assembly **Procedure** 1. Lift the front floor console armrest assembly to the full open position. 2. Unsnap the armrest from the front floor console assembly.

FRONT FLOOR CONSOLE FRONT COVER REPLACEMENT (WITHOUT UMQ)

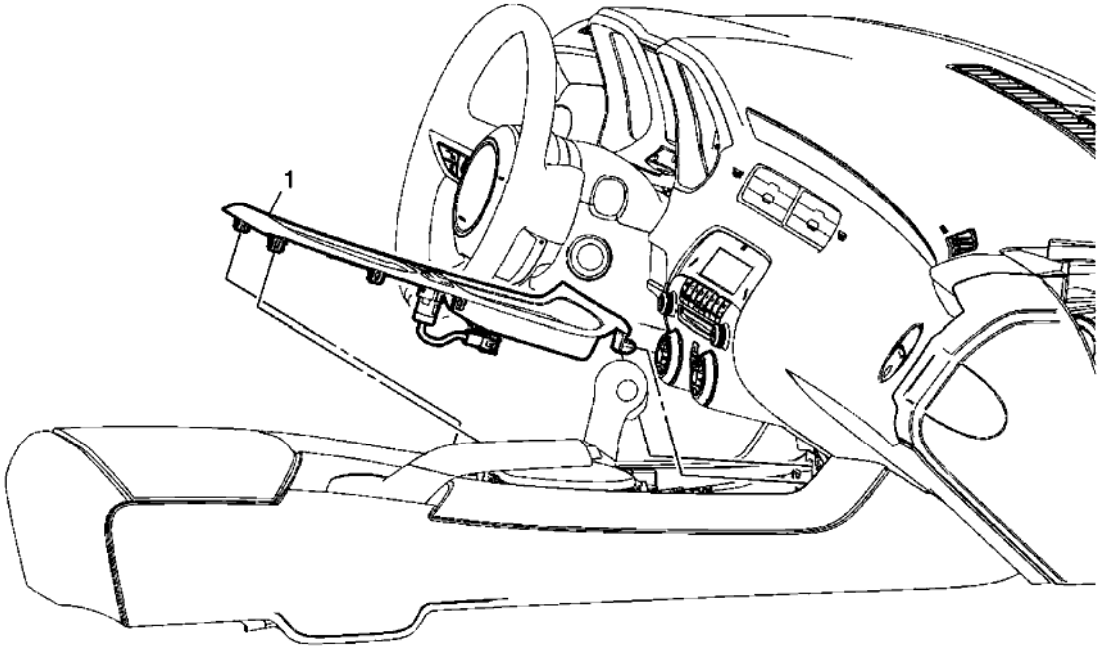


Fig. 32: Front Floor Console Front Cover (Without UMQ)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	Front Floor Console Front Cover Assembly

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1	**Procedure** 1. Use a flat bladed plastic trim tool and release the retainer tabs securing the front floor console front cover to the console assembly. 2. Disconnect the electrical connections. 3. When replacing the front floor console front trim cover, transfer all necessary components.

FRONT FLOOR CONSOLE FRONT COVER REPLACEMENT (WITH UMQ)

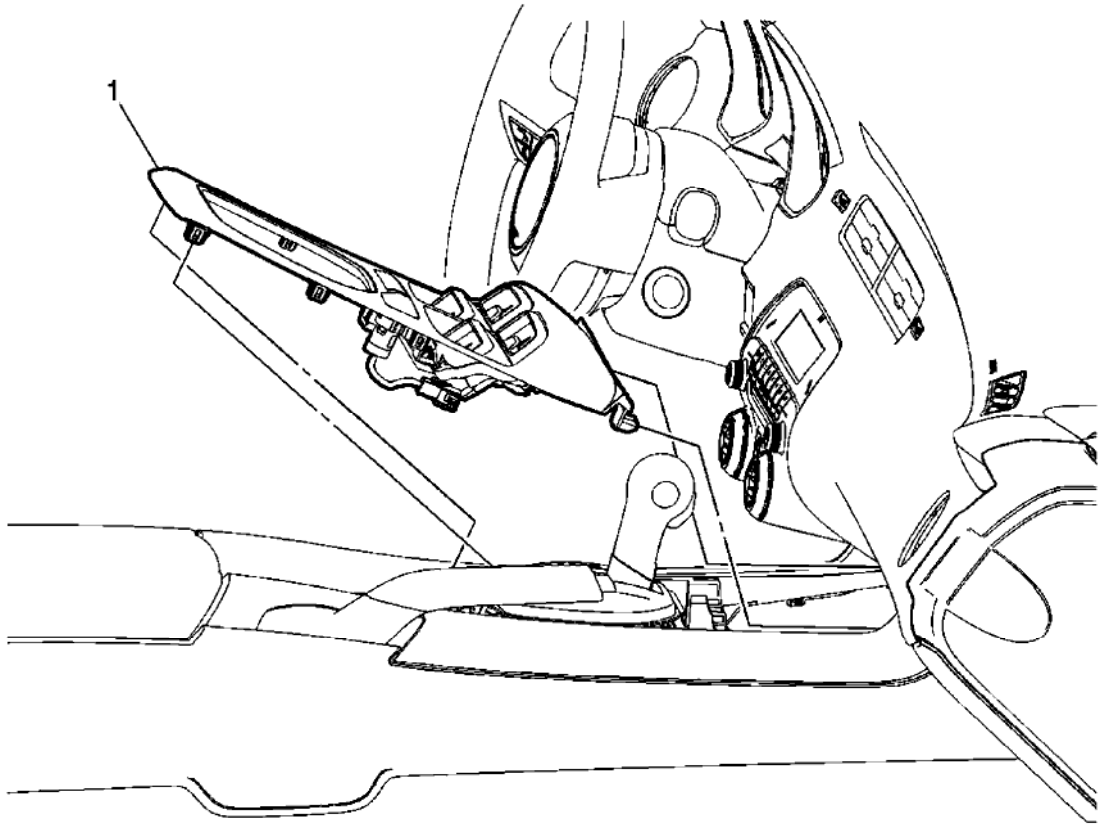


Fig. 33: Front Floor Console Front Cover (With UMQ)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Front Cover Assembly **Procedure** 1. Apply the parking brake. 2. Move the transmission shift assembly to the most rearward position possible.

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	3. Use a flat bladed plastic trim tool and release the retainer tabs securing the front floor console front cover to the console assembly. 4. Disconnect the electrical connections. 5. When replacing the front floor console front trim cover, transfer all necessary components.

FRONT FLOOR CONSOLE REAR COVER REPLACEMENT

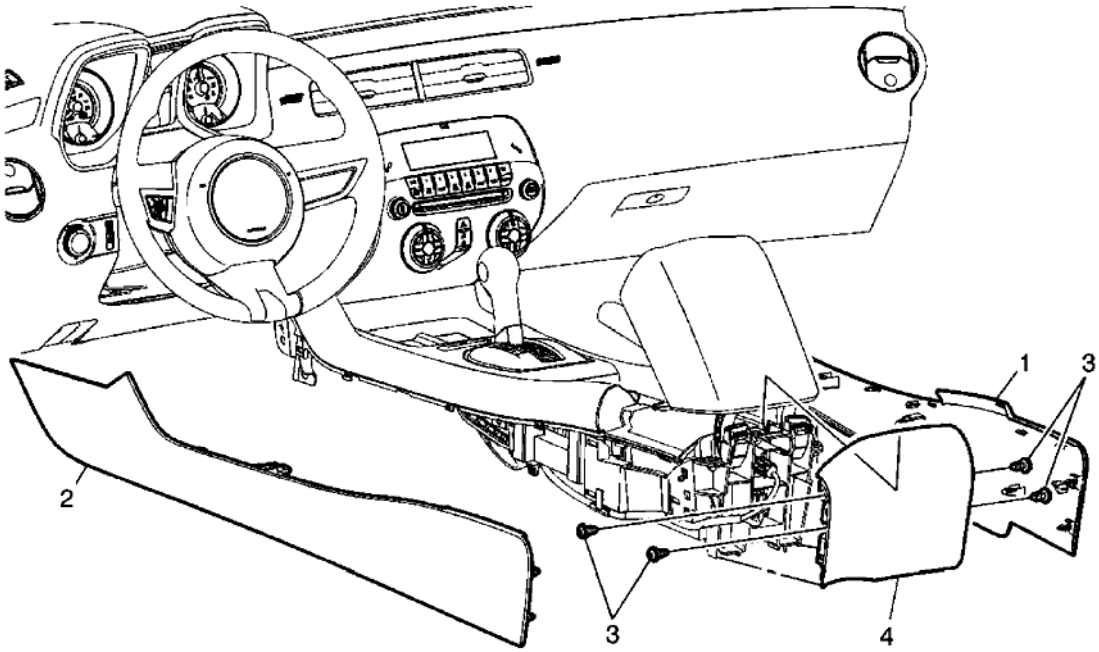


Fig. 34: Front Floor Console Rear Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front Floor Console Side Cover - Right Refer to **Front Floor Console Side Cover Replacement - Right Side**
2	Front Floor Console Side Cover - Left Refer to **Front Floor Console Side Cover Replacement - Left Side**
3	Front Floor Console Rear Cover Fasteners (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
4	Front Floor Console Rear Cover

ROOF CONSOLE REPLACEMENT

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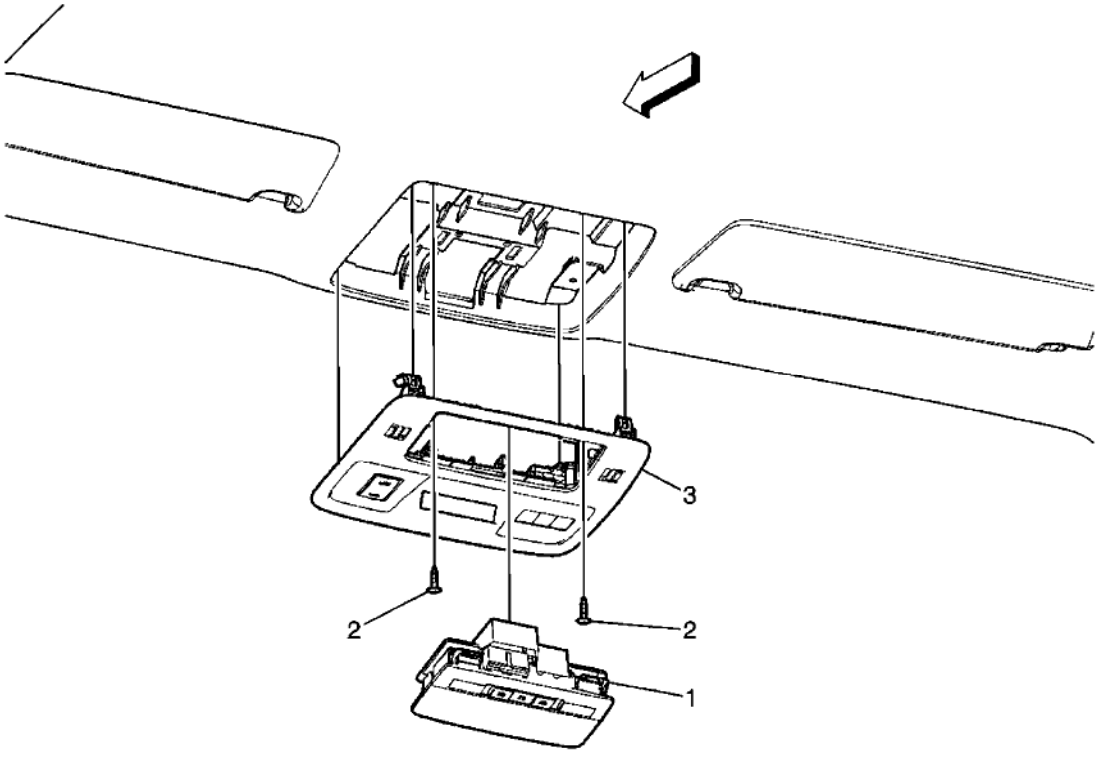


Fig. 35: Roof Console
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Courtesy Lamp Assembly Refer to **Courtesy Lamp Replacement** .
2	Roof Console Fasteners (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2.5 N.m (22 lb in)
3	Roof Console Assembly **Procedure** 1. Grasp the right and left sides of the roof console assembly and pull downward using equal force on each side in order to release the four retainer clips securing the roof console assembly to the headlining assembly. 2. Disconnect the electrical connections. 3. When replacing the roof console assembly, transfer all necessary components.

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2010 ACCESSORIES & BODY, CAB

Interior Trim and Paneling - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Coat Hook Screw	6 N.m	53 lb in
Front Side Door Trim Panel Screw	2 N.m	18 lb in
Sunshade Anchor Screw	3 N.m	25 lb in
Sunshade Screw	3 N.m	25 lb in

REPAIR INSTRUCTIONS

FRONT SIDE DOOR TRIM PANEL REPLACEMENT

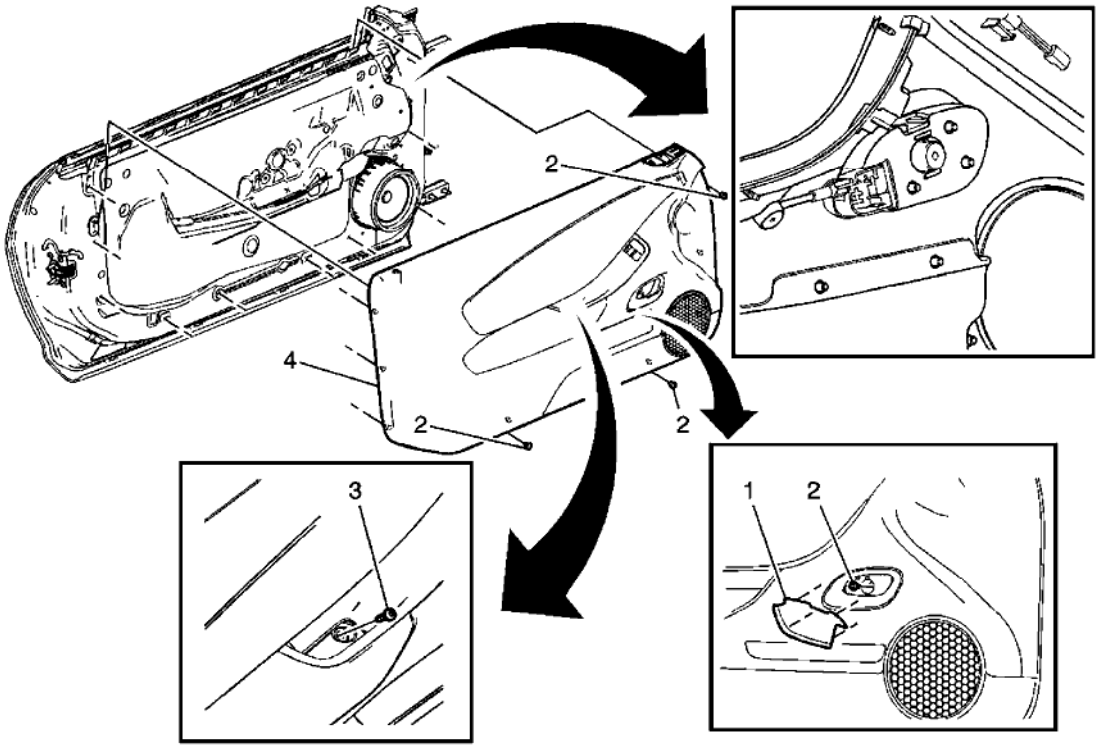


Fig. 1: Front Side Door Trim Panel
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Preliminary Procedure: Remove the radio front side door upper speaker grille. Refer to **Radio Front Side Door Upper Speaker Grille Replacement** .	
1	Front Side Door Inside Handle Bolt Finish Cap **Procedure:** Use a small flat bladed tool at the front edge of the cover to aid in removal.
2	Front Side Door Trim Fastener (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)
3	Front Side Door Pull Cup Fastener **Procedure:** Remove the front side pull cup liner to access the fastener. **Tighten:** 2 N.m (18 lb in)
4	Front Side Door Trim Panel **Procedure** 1. Use a door trim tool or equivalent to aid in the removal of the door trim. 2. Disconnect the inside handle release cable from the trim panel. 3. Disconnect the electrical connectors. 4. Transfer parts as required.

BODY HINGE PILLAR TRIM PANEL REPLACEMENT

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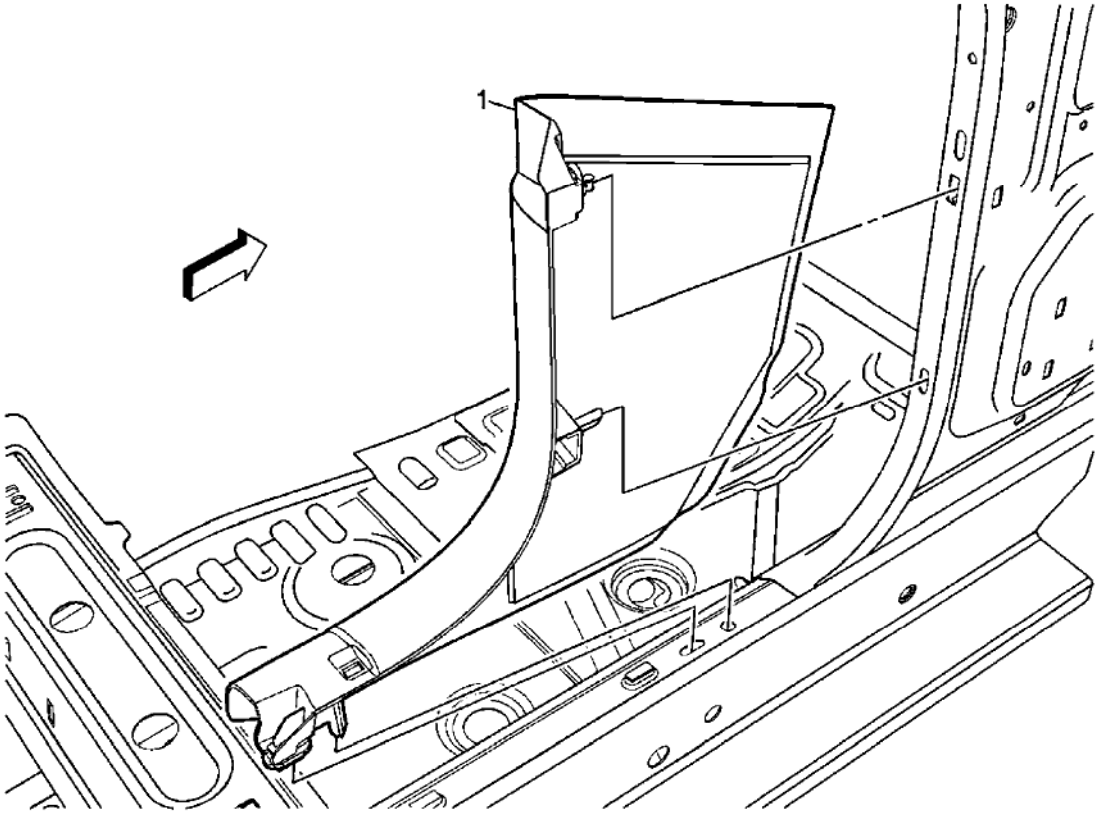


Fig. 2: Body Hinge Pillar Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the front side door opening floor carpet retainer. Refer to **Front Side Door Opening Floor Carpet Retainer Replacement** . 2. Remove instrument panel outer trim cover. Refer to **Instrument Panel Outer Trim Cover Replacement** .	
1	Body Hinge Pillar Trim Panel Assembly

REAR COMPARTMENT SIDE TRIM PANEL REPLACEMENT

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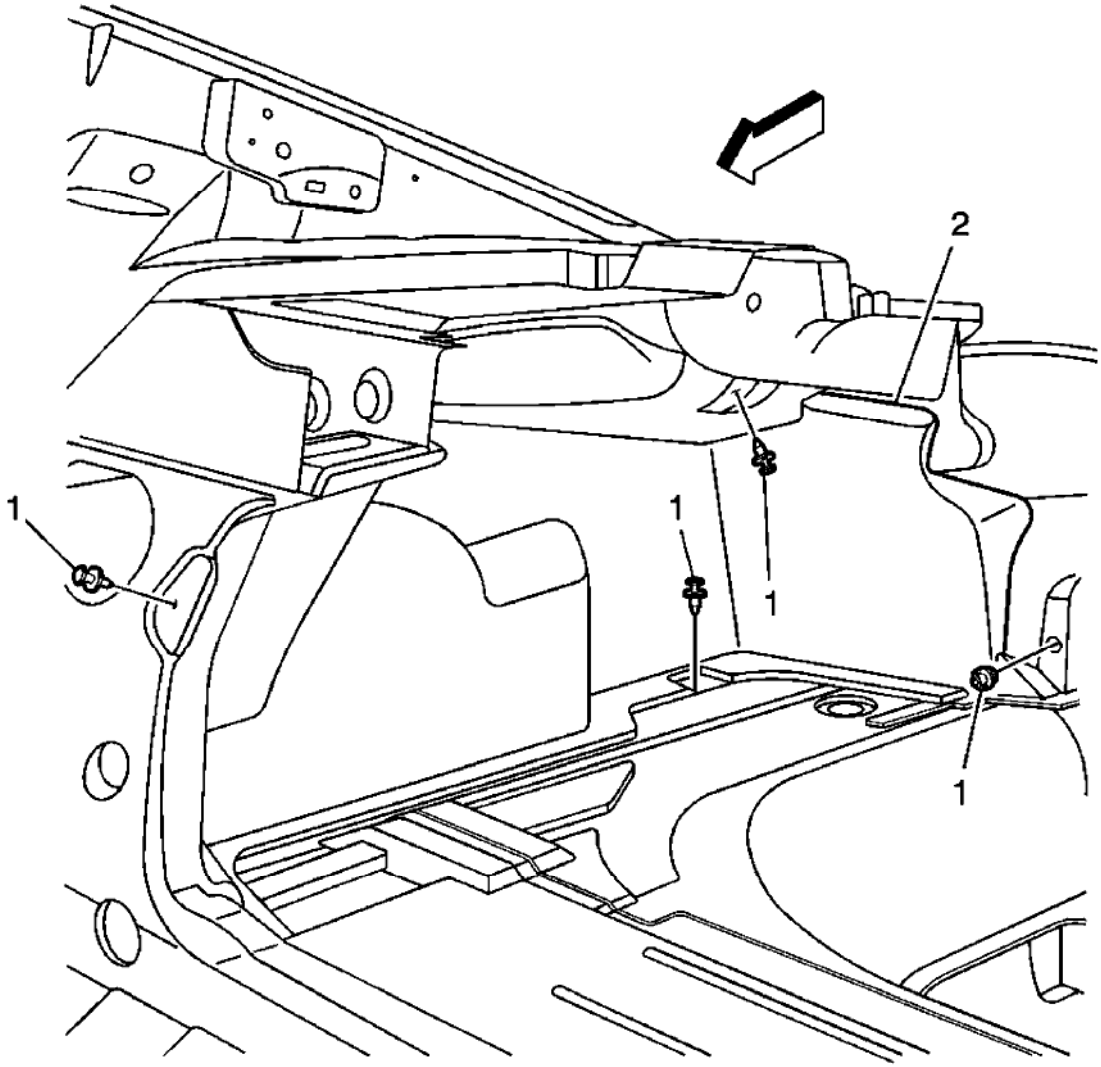


Fig. 3: Rear Compartment Side Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the rear seat back. Refer to **Rear Seat Back Cushion Replacement** . 2. Remove the quarter trim panel. Refer to **Quarter Trim Panel Replacement**. 3. Remove the rear end trim finish panel. Refer to **Rear End Trim Finish Panel Replacement**.	
1	Rear Compartment Side Trim Retainer (Qty: 4)
2	Rear Compartment Side Trim

COAT HOOK REPLACEMENT

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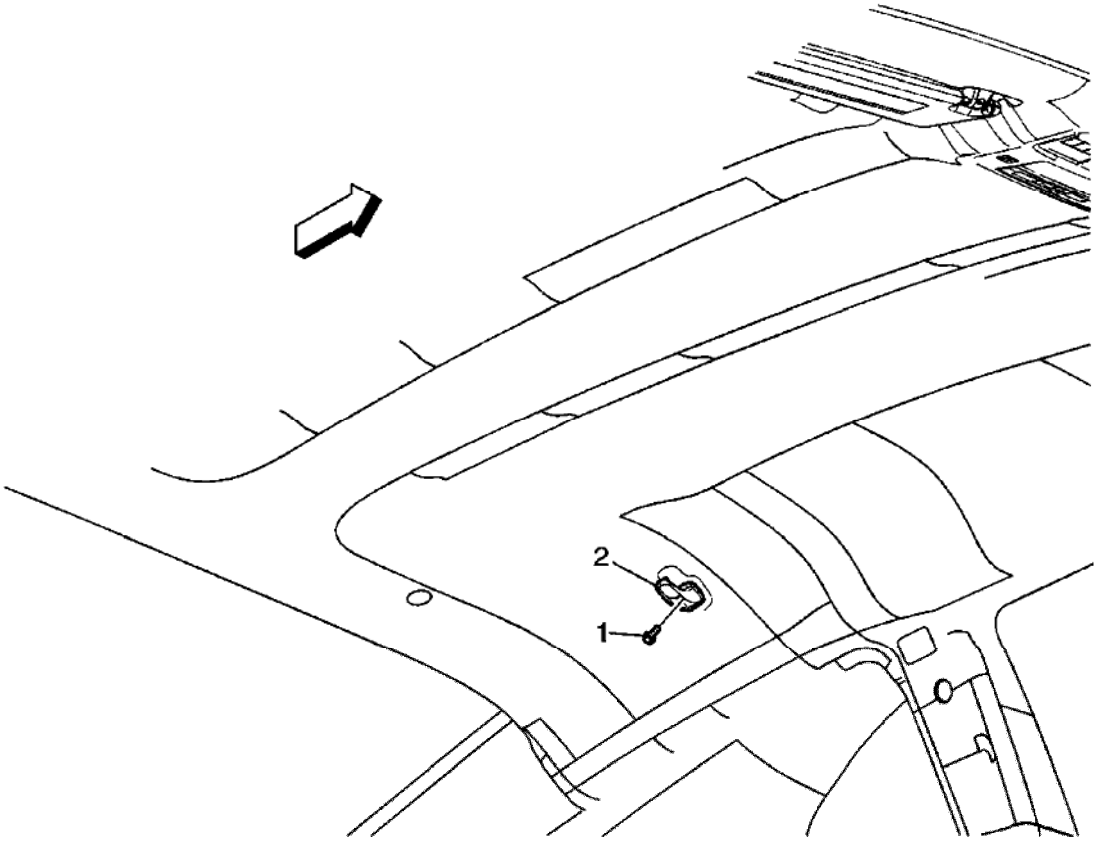


Fig. 4: Coat Hook
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Coat Hook Fastener **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Use a small flat-bladed tool to open the integral coat hook cover to access the screw. **Tighten:** 6 N.m (53 lb in)
2	Coat Hook Assembly

SUNSHADE REPLACEMENT

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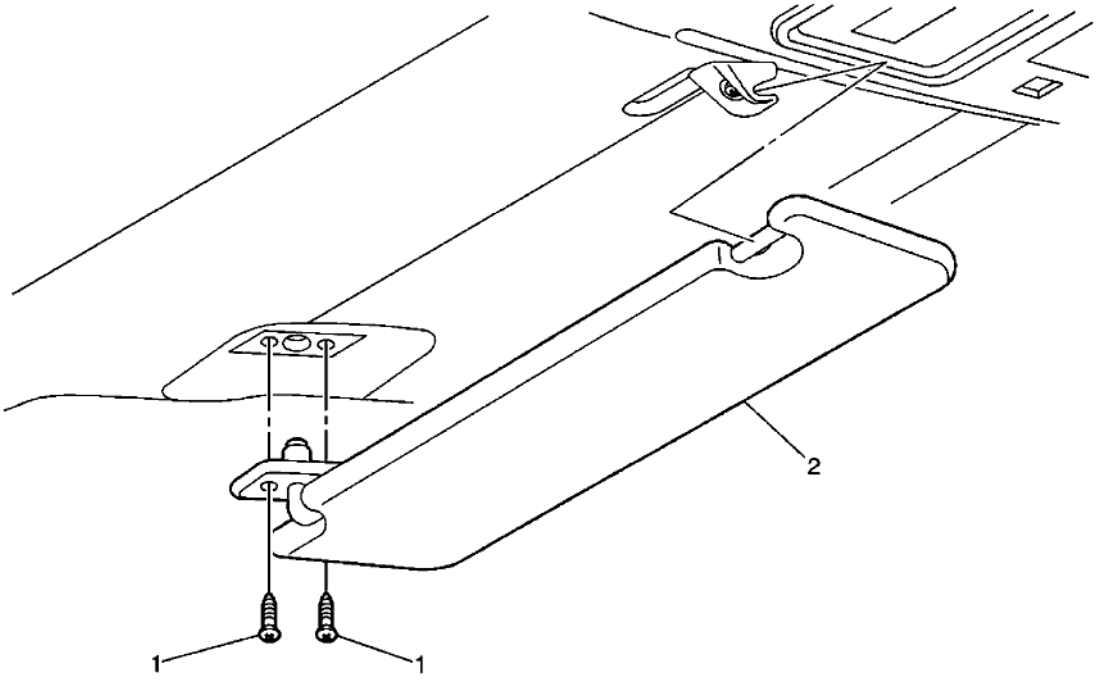


Fig. 5: Sunshade
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunshade Support Fastener (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Procedure:** Tilt the sunshade down toward the windshield to access fasteners. **Tighten:** 3 N.m (25 lb in)
2	Sunshade Assembly

SUNSHADE SUPPORT REPLACEMENT

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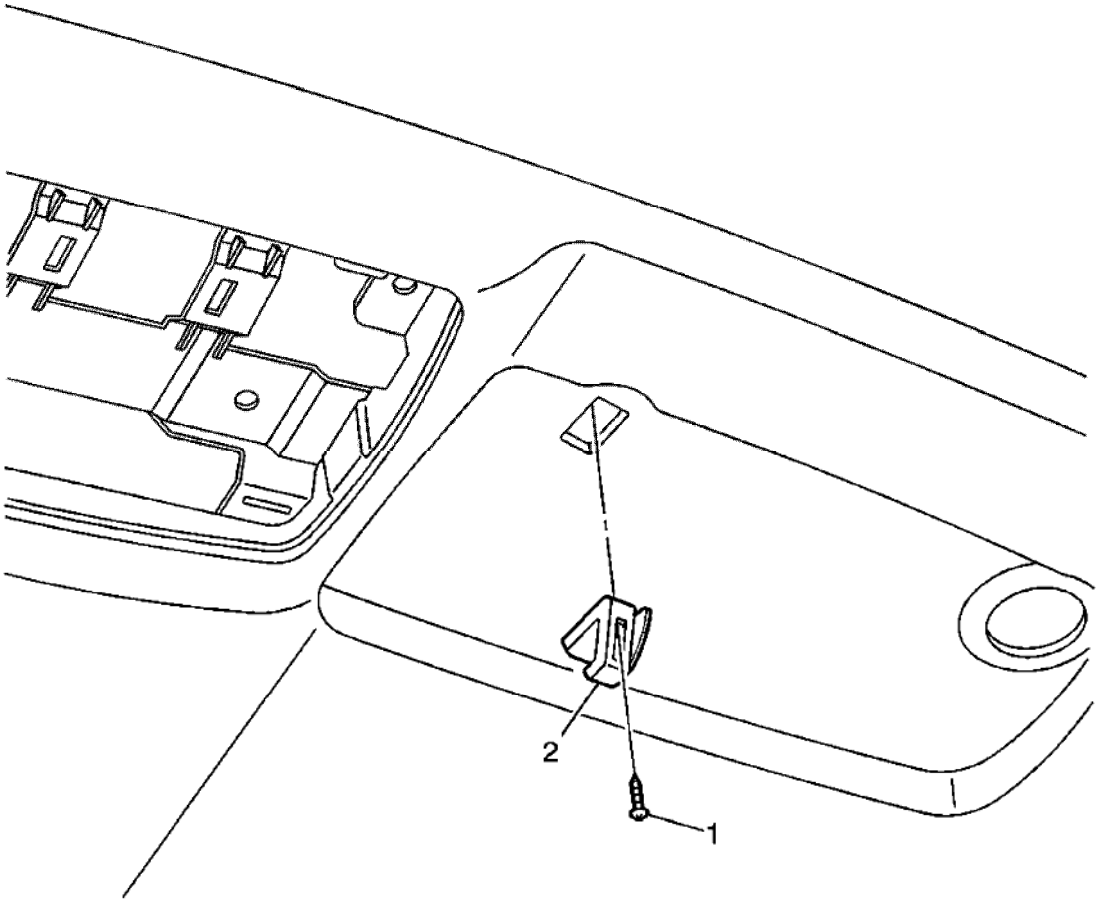


Fig. 6: Sunshade Support
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunshade Support Fastener **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 3 N.m (25 lb in)
2	Sunshade Support Assembly **Procedure:** Unclip the Sunvisor from anchor and reposition.

WINDSHIELD SIDE GARNISH MOLDING REPLACEMENT

CAUTION: Whenever the windshield side garnish molding is removed or replaced, the upper retaining clip and tether must be replaced with a new one-piece service retainer clip. Failure to replace clip may cause the windshield side

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garnish molding to not fit or function as designed. Do not reuse the old clip, it is a one time only use design. Do not separate the two halves of the service retainer clip.

Removal Procedure

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .

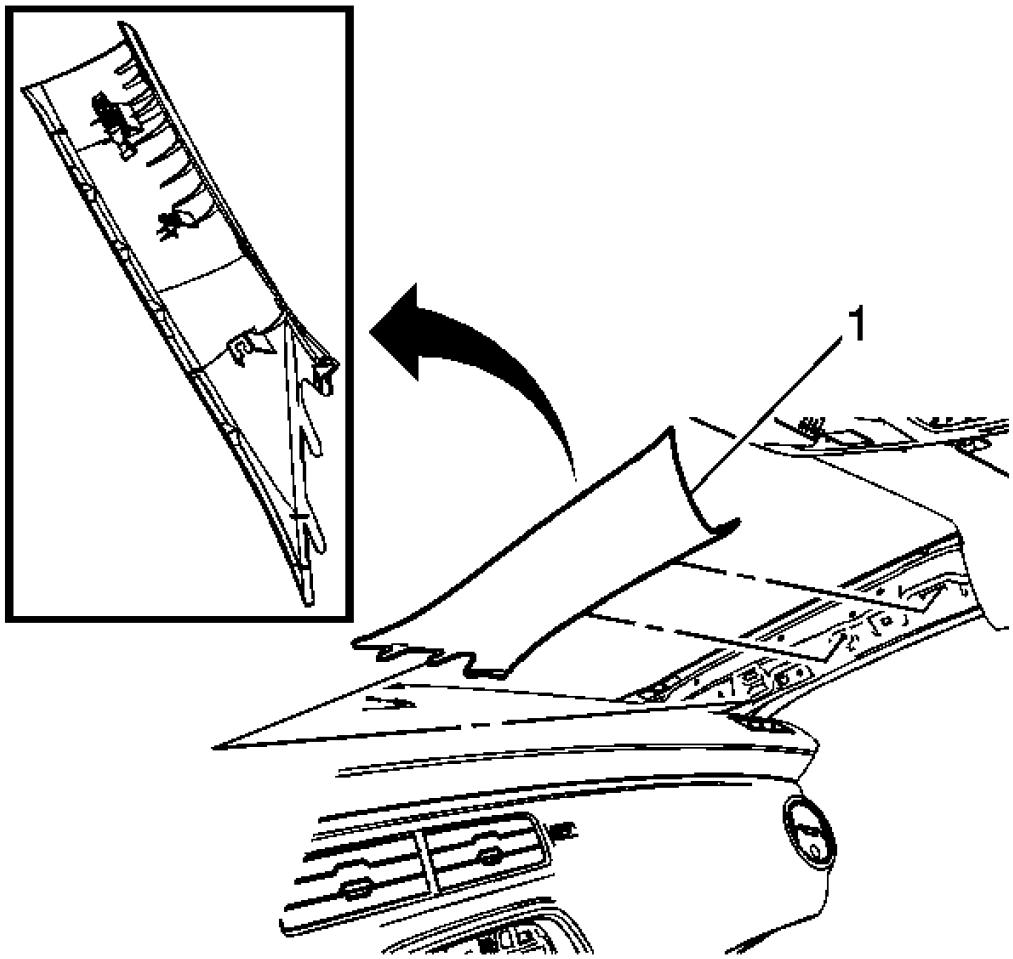


Fig. 7: Windshield Side Garnish Molding Assembly
Courtesy of GENERAL MOTORS CORP.

2. Remove the windshield side garnish molding assembly (1) from the clip retainers on the upper side rail.

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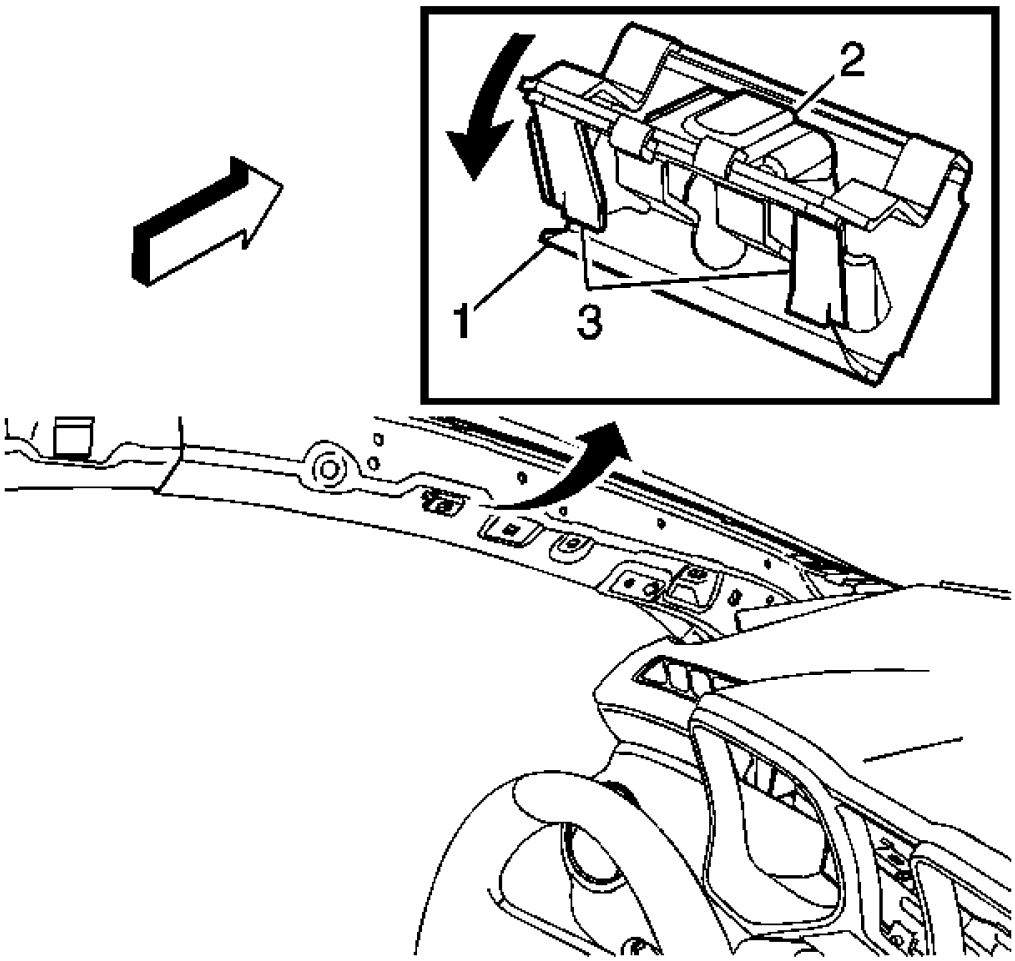


Fig. 8: Bodyside Retainer
Courtesy of GENERAL MOTORS CORP.

NOTE: Take care not to drop any portion of the retaining clip into the bodyside hinge pillar. This could cause an irreversible rattle condition.

3. Remove the retainer (1) from the bodyside.
    1. Slide a small flat-bladed tool on the outboard side to disengage the center retainer (2), maintain pressure on the tab.
    2. Slide another small flat-bladed tool on the opposite side of the retainer to depress the outer tabs (3), maintain pressure on the tabs.
    3. Rotate the retainer out parallel to the upper reinforcement body hinge pillar.

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Installation Procedure

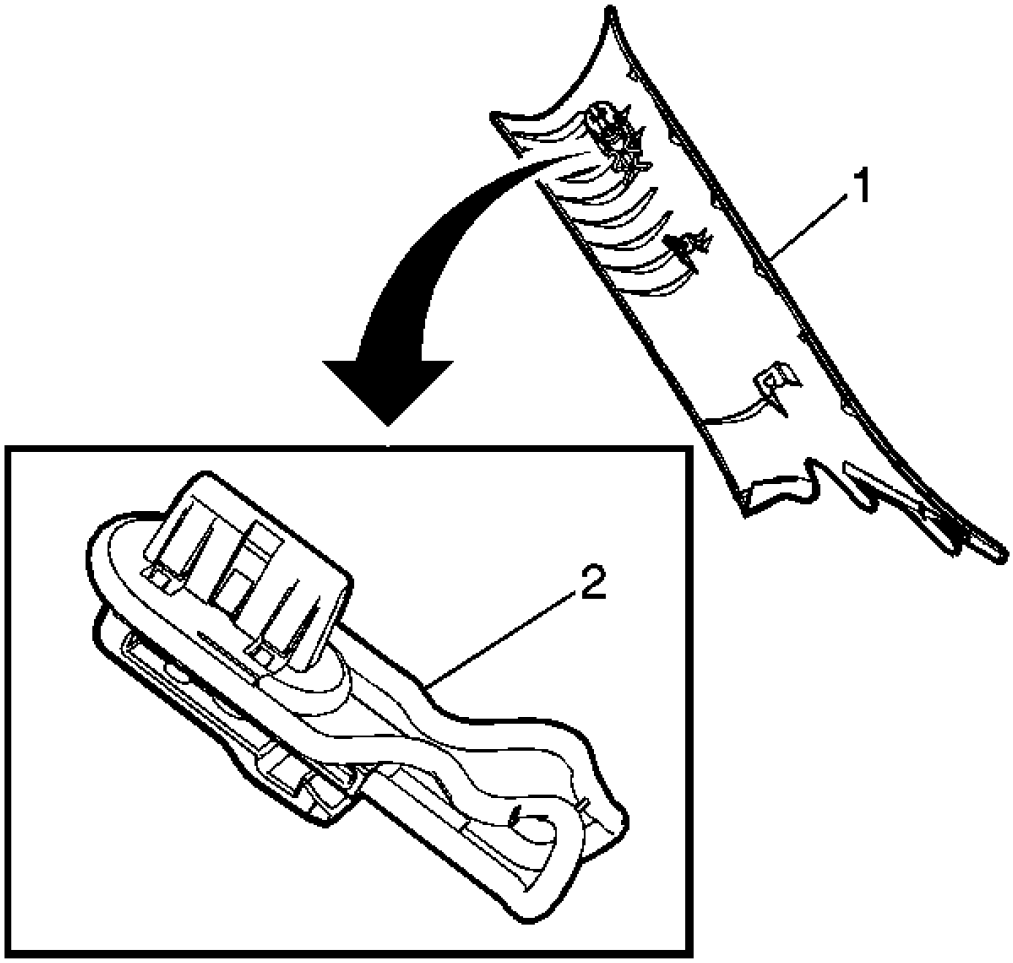


Fig. 9: Retainer To Windshield Side Garnish Molding Assembly
Courtesy of GENERAL MOTORS CORP.

1. Install the one-piece service closed retainer (2) to the windshield side garnish molding assembly (1).

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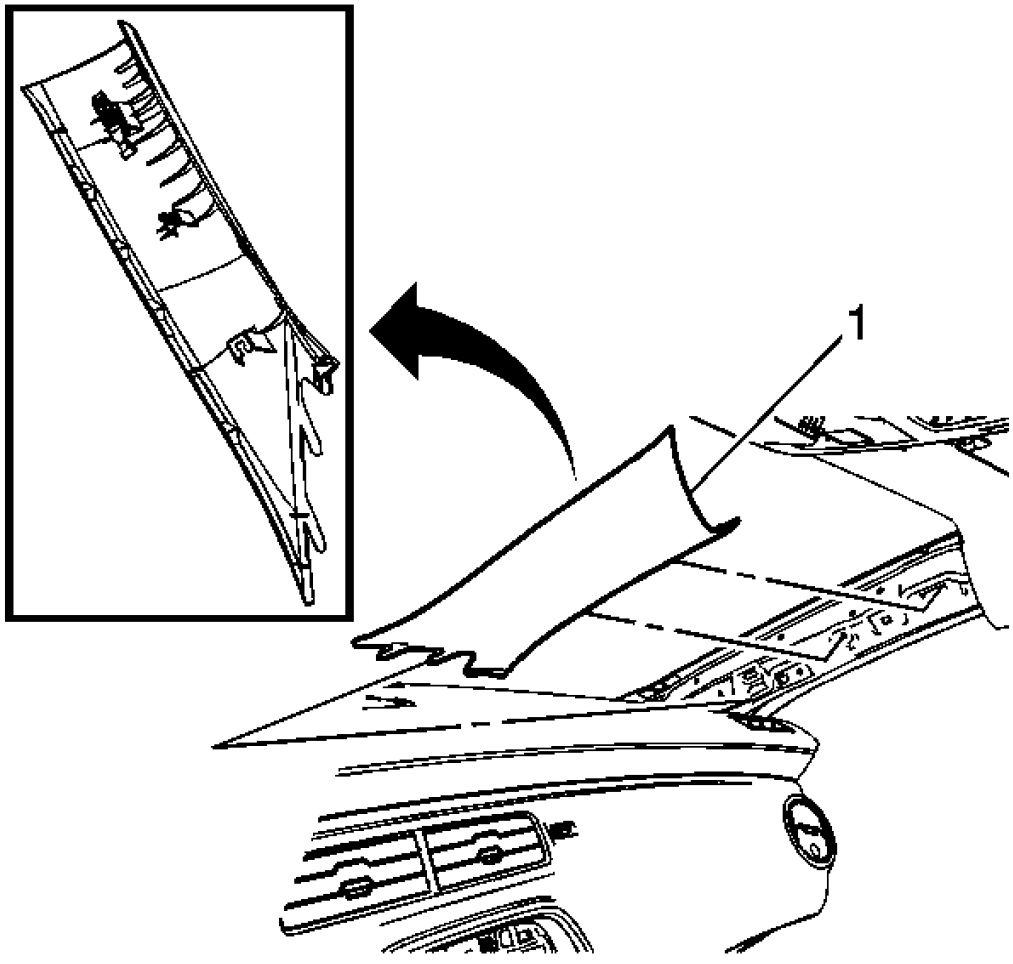


Fig. 10: Windshield Side Garnish Molding Assembly
Courtesy of GENERAL MOTORS CORP.

2. Install the windshield side garnish molding assembly (1).

QUARTER UPPER TRIM PANEL REPLACEMENT

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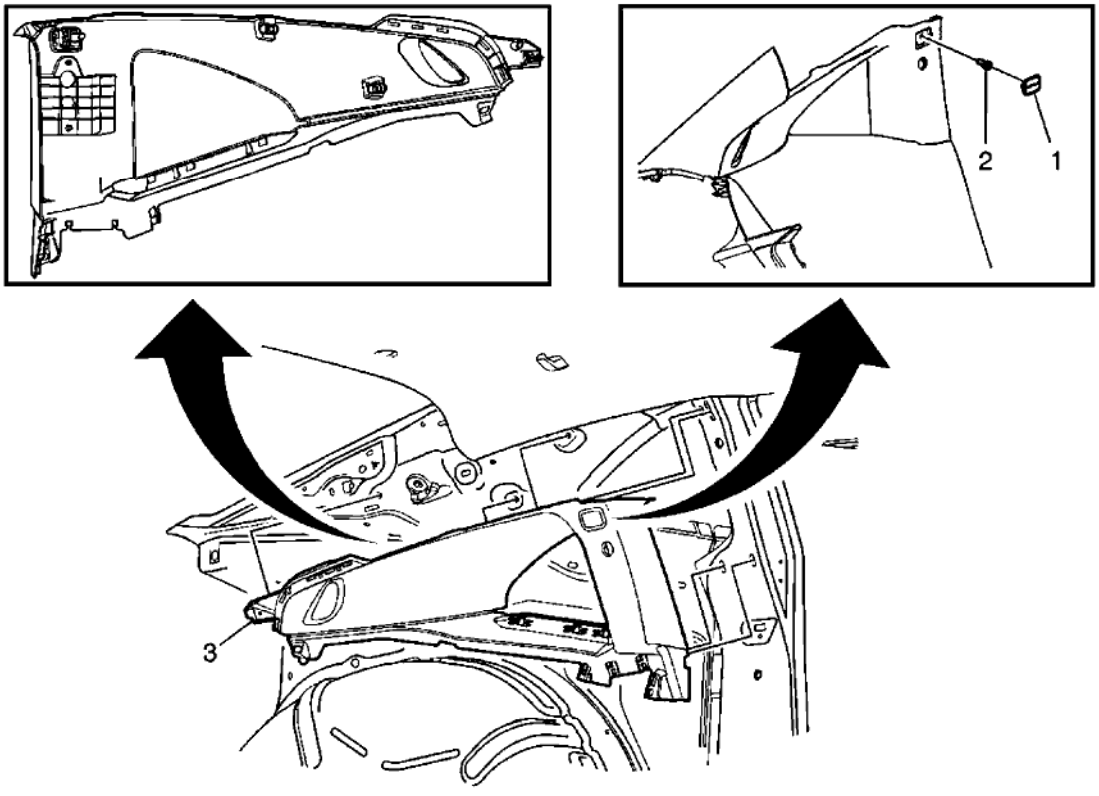


Fig. 11: Quarter Upper Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Remove the quarter trim panel. Refer to **Quarter Trim Panel Replacement**. 3. Remove the quarter upper rear trim panel. Refer to **Quarter Upper Rear Trim Panel Replacement**. 4. Remove the rear seat retractor side belt. Refer to **Rear Seat Retractor Side Belt Replacement** . 5. Remove the driver or passenger seat retractor side belt. Refer to **Driver or Passenger Seat Retractor Side Belt Replacement** .	
1	Quarter Upper Trim Panel Bolt Cover **Procedure:** Use a flat-bladed tool to release the cover.
2	Quarter Upper Trim Panel Fastener **CAUTION:** **Refer to Fastener Caution .**

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	Tighten: 2 N.m (18 lb in)
3	Quarter Upper Trim Panel Assembly **Procedure:** Disconnect the seat belt through the slot in the escutcheon opening.

QUARTER UPPER REAR TRIM PANEL REPLACEMENT

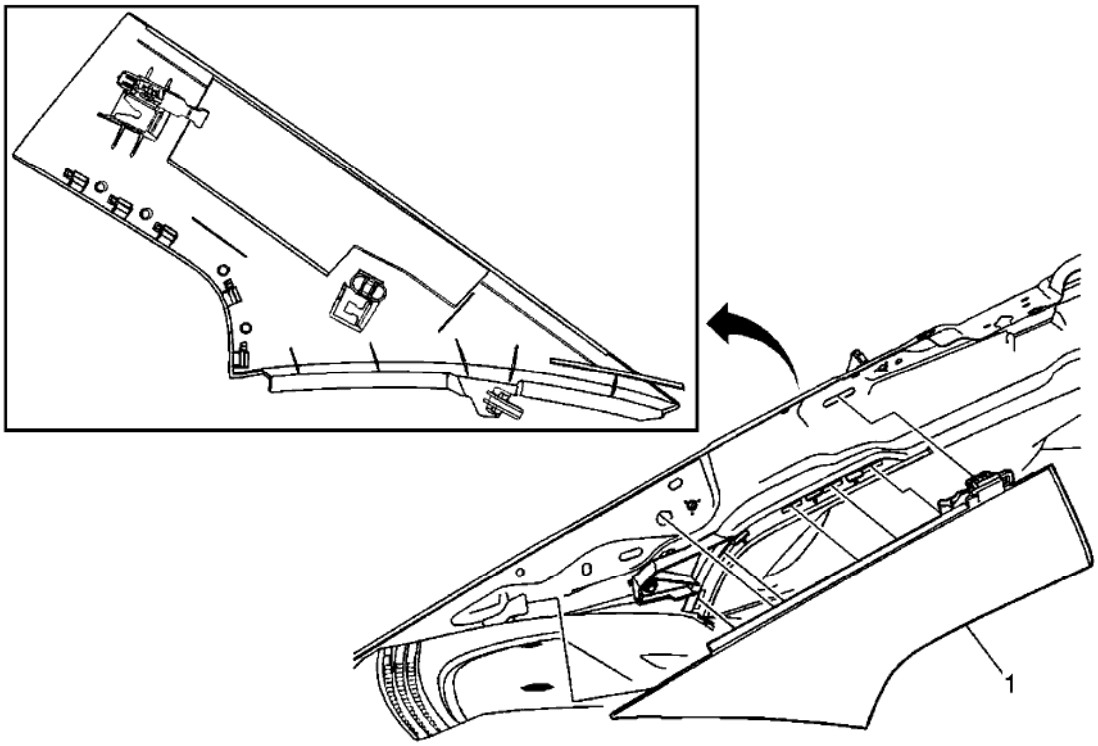


Fig. 12: Quarter Upper Rear Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Disable the SIR system. Refer to **SIR Disabling and Enabling** .	
1	Quarter Upper Rear Trim Panel Assembly **Procedure** 1. The tether clip at the upper portion of the garnish molding MUST be replaced every time the quarter upper rear trim panel is removed. 2. Release the tether to remove. 3. Securely attach the tether when reinstalling the molding.

QUARTER TRIM PANEL REPLACEMENT

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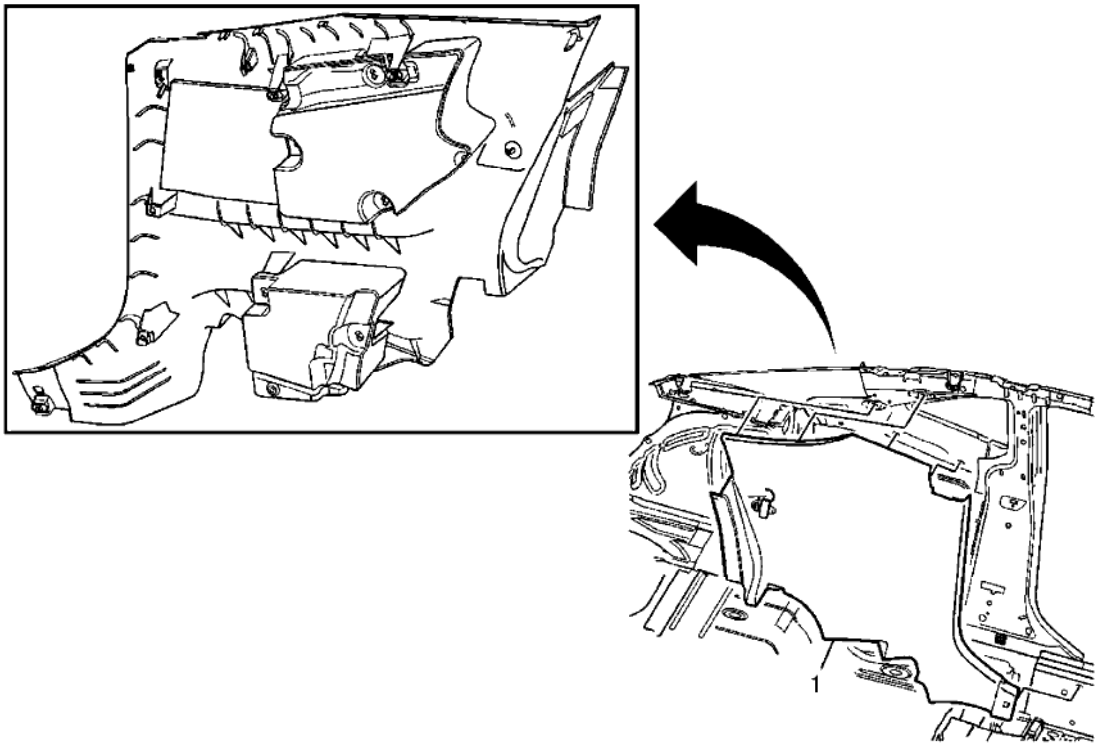


Fig. 13: Quarter Trim Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front side door carpet retainer. Refer to **Front Side Door Opening Floor Carpet Retainer Replacement** . 2. Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement** . 3. Remove rear seat back. Refer to **Rear Seat Back Cushion Replacement** .	
1	Rear Quarter Lower Trim Panel **Procedure:** Use trim tool or equivalent to aid in the removal of trim panel.

REAR WINDOW PANEL TRIM REPLACEMENT

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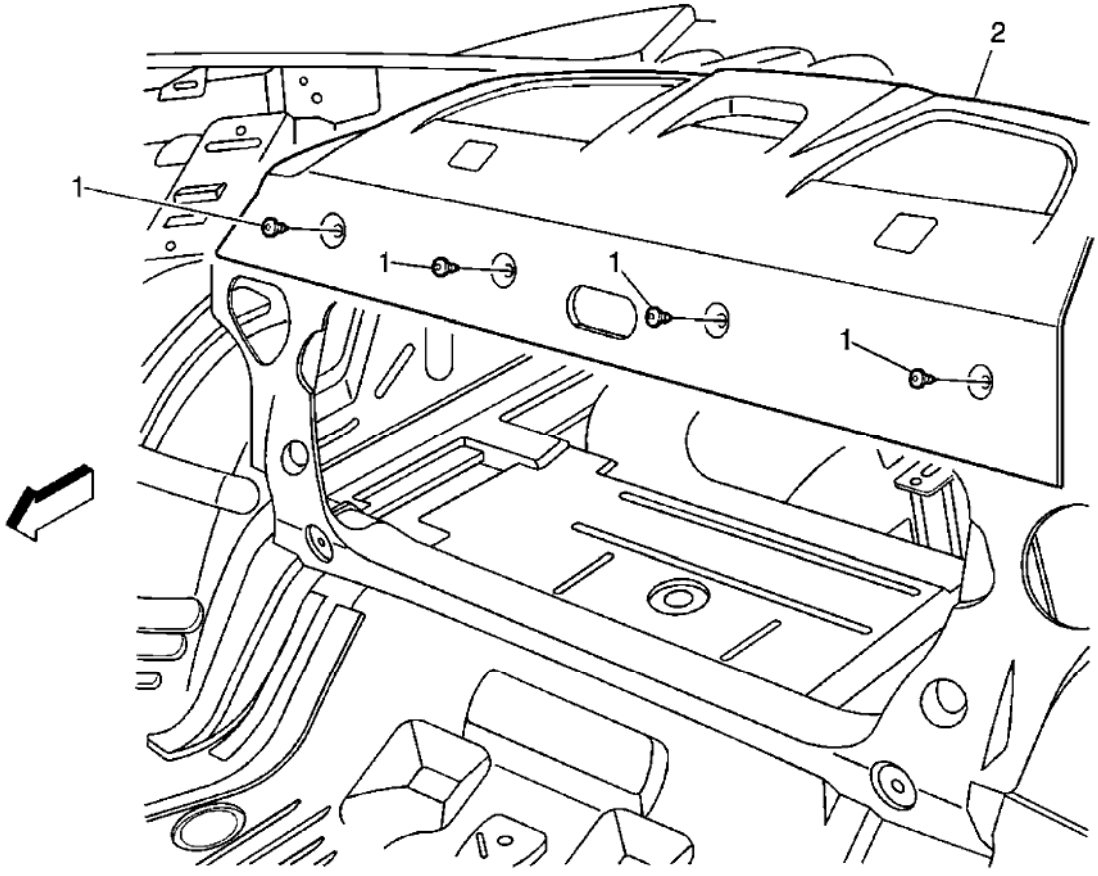


Fig. 14: Rear Window Panel Trim
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Disable SIR system. Refer to **SIR Disabling and Enabling** . 2. Remove quarter upper trim panel. Refer to **Quarter Upper Trim Panel Replacement**. 3. Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement** . 4. Pull the release strap located in the center of the rear seat back cushion, folding the rear seat forward.	
1	Rear Window Panel Trim Fastener (Qty: 4)
2	Rear Window Panel Trim Assembly **Procedure:** When replacing the rear window panel trim assembly, transfer all necessary components.

REAR END TRIM FINISH PANEL REPLACEMENT

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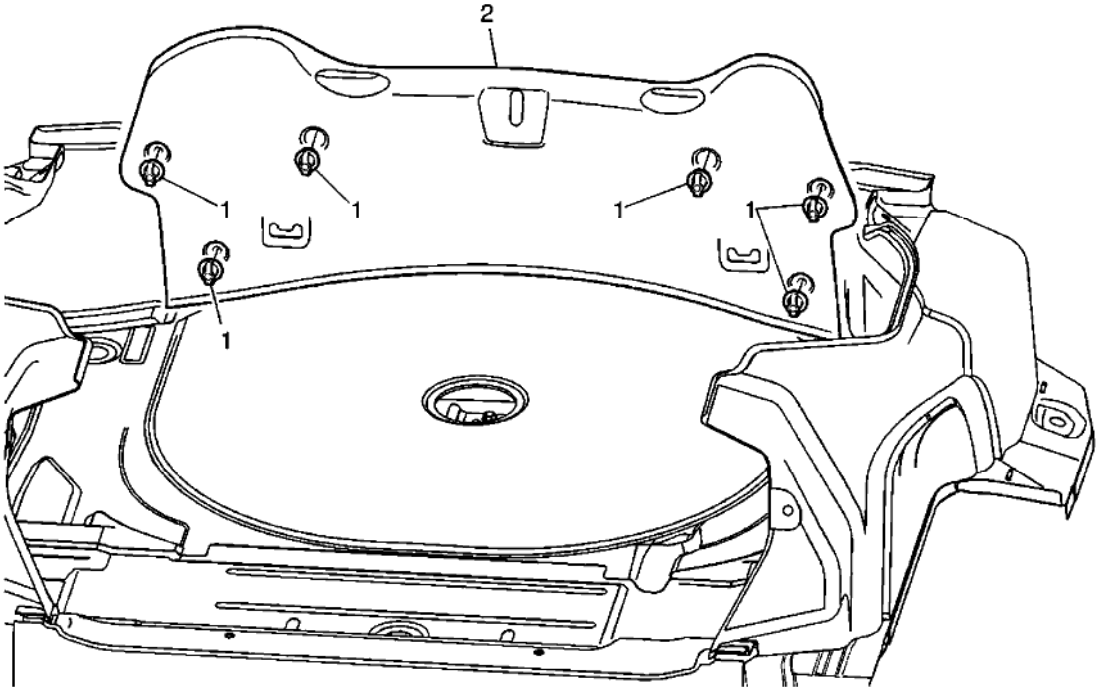


Fig. 15: Rear End Trim Finish Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Cargo Net Fastener (Qty: 6)
2	Rear End Trim Finish Panel Assembly

REAR COMPARTMENT LID CARPET REPLACEMENT

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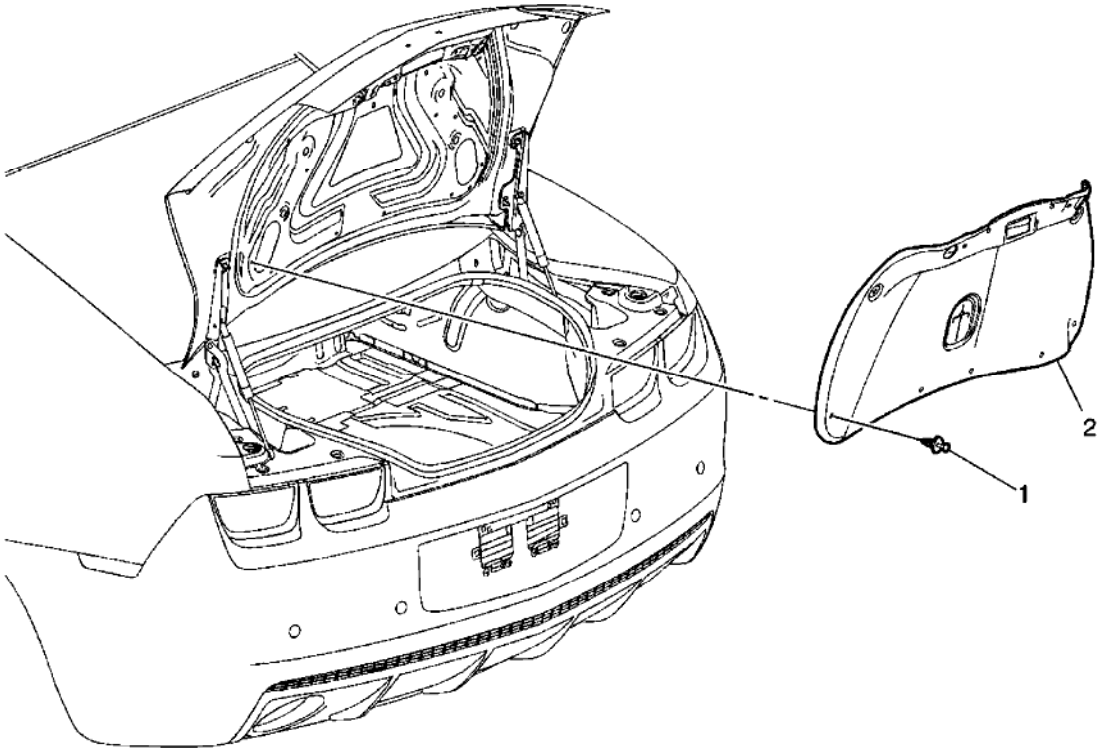


Fig. 16: Rear Compartment Lid Carpet
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Compartment Lid Carpet Fastener (Qty: 11)
2	Rear Compartment Lid Carpet **Procedure:** Remove the rear compartment lid stop bumpers.

QUARTER OUTER PANEL PRESSURE RELIEF VALVE REPLACEMENT

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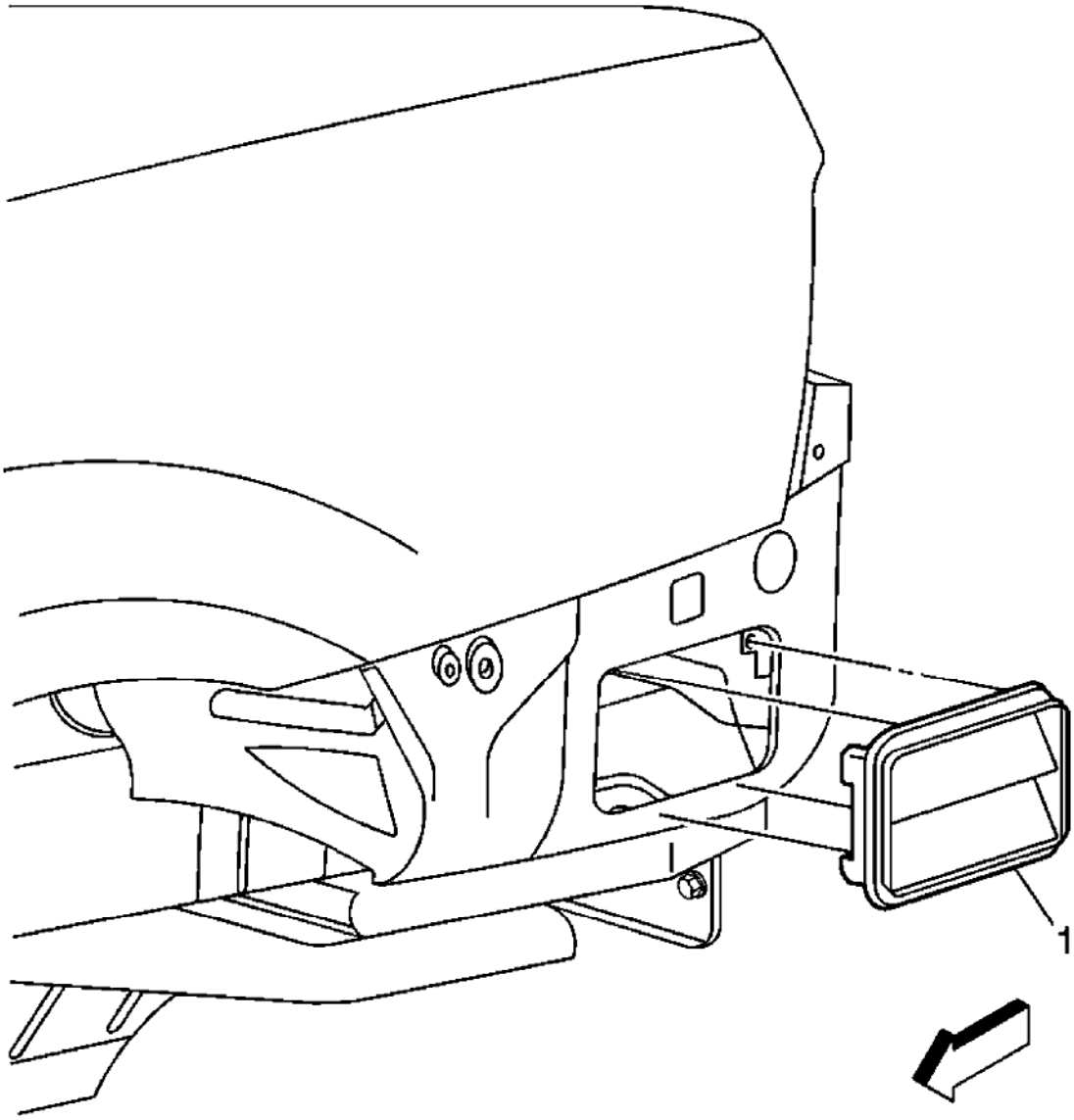


Fig. 17: Quarter Outer Panel Pressure Relief Valve
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** . 2. Reposition any wiring to gain access to pressure relief valve.	
1	Pressure Relief Valve

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2010 ACCESSORIES & BODY, CAB

Paint and Coatings - Camaro

SPECIFICATIONS

CLEARCOAT REPAIR SPECIFICATIONS - 3M PRODUCTS

Paint Condition	Wet Sanding	Scratch Refinement	Compounding	Rotary Polisher	Dual Action Orbital Polisher	Hand Glazing Polishing
New vehicle prep or fine wheel marks	-	-	-	-	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit DA 6-inch Backup Pad P/N 05776	• Perfect-It Wax P/N 39026/395 • Detail Clo P/N 06016
Swirl marks, water spotting, or light oxidation	-	-	-	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit SBS/Perfect-it Backup Pad P/N 05717/18	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit DA 6-inch Backup	• Perfect-It 3000 Swir Mark Remover P/N 06066 • Perfect-It I Foam DA Pad P/N 05729 • Detail Clo P/N 06016 • Perfect-It Wax P/N 39026/395

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					Pad P/N 05776	
Overspray or medium oxidation	-	-	• Perfect-It III Cleaning Clay P/N 38070 • Perfect-It 3000 Rubbing Compound P/N 06060/62 • Superbuff III Buff Pad P/N 05703/04	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit SBS/Perfect-it Backup Pad P/N 05717/18	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit DA 6-inch Backup Pad P/N 05776	• Perfect-It 3000 Swir Mark Remover P/N 06066 • Perfect-It I Foam DA Pad P/N 05729 • Detail Clo P/N 06016 • Perfect-It Wax P/N 39026/395
Heavy oxidation or minor acid rain pitting	Micro Fine 2000	-	• Perfect-It 3000 Rubbing Compound P/N 06060/62 • Superbuff III Buff Pad P/N 05703/04	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit SBS/Perfect-It Backup Pad P/N 05717/18	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit DA 6 in Backup Pad P/N 05776	• Perfect-It 3000 Swir Mark Remover P/N 06066 • Perfect-It I Foam DA Pad P/N 05729 • Detail Clo P/N 06016 • Perfect-It Wax P/N 39026/395
Dust nibs,		• Trizact Hookit II Foam Disc 6 in 3000 P/N 02075 • Hookit	• Perfect-It 3000 Rubbing	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It	• Perfect-It 3000 Swirl Mark Remover P/N 06064	• Perfect-It 3000 Swir Mark Remover P/N 06066

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minor scratches, or major acid rain pitting	Micro Fine 1500 or 2000	II Soft Interface Pad 6 in P/N 05274 • Hookit II Painters Disc Pad 6 in P/N 05251	Compound P/N 06060/62 • Superbuff III Buff Pad P/N 05703/04	Foam Polishing Pad P/N 05725/38 • Hookit SBS/Perfect-It Backup Pad P/N 05717/18	• Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit DA 6 in Backup Pad P/N 05776	• Perfect-It I Foam DA Pad P/N 05729 • Detail Clo P/N 06016 • Perfect-It Wax P/N 39026/395
Orange peel, paint runs or sags	• Hookit II Film Disc 6 in P1200 P/N 00868 • Hookit II Film Disc 6 in P1500 P/N 000850 • Hookit II Painters Disc Pad P/N 05251	• Trizact Hookit II Foam Disc 6 in 3000 P/N 02075 • Hookit II Soft Interface Pad 6 in P/N 05274 • Hookit II Painters Disc Pad 6 in P/N 05251	• Perfect-It 3000 Rubbing Compound P/N 06060/62 • Superbuff III Buff Pad P/N 05703/04	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit SBS/Perfect-It Backup Pad P/N 05717/18	• Perfect-It 3000 Swirl Mark Remover P/N 06064 • Perfect-It Foam Polishing Pad P/N 05725/38 • Hookit DA 6 in Backup Pad P/N 05776	• Perfect-It 3000 Swir Mark Remover P/N 06066 • Perfect-It I Foam DA Pad P/N 05729 • Detail Clo P/N 06016 • Perfect-It Wax P/N 39026/395

INTRODUCTION

BASECOAT/CLEARCOAT PAINT SYSTEMS

WARNING: Exposure to isocyanates during paint preparation and application processes can cause severe breathing problems. Read and follow all of the instructions from the manufacturers of painting materials, equipment, and protective gear.

All paint finish repairs of rigid exterior surfaces must meet GM standards. Refer to the latest revision of the GM Approved Refinish Materials book to identify the paint systems you may use that have been engineered to meet GM standards. The GM Approved Refinish Materials book supplies all approved products, including volatile

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organic compound (VOC) compliant regulations recommended by the individual manufacturer, and detailed procedures for materials used in their paint system.

The latest revision of the GM Approved Refinish Materials booklet is located on the Goodwrench website at www.gmgoodwrench.com.

ANTI-CORROSION TREATMENT AND REPAIR

WARNING: When applying sound deadeners, or anti-corrosion materials due care and preventative measures must be exercised to prevent any material from being sprayed into door and quarter panel mechanisms such as door locks, window run channels, window regulators and seat belt retractors, as well as any moving or rotating mechanical or suspension parts on the underbody, particularly the parking brake cable. After material application, be sure that all body drain holes are open. Improper application may increase chance of corrosion damage or limit the operation of moving parts, resulting in personal injury.

Any procedure that disturbs these special treatments, such as panel replacement or collision damage repair operations, may leave the metal unprotected and result in corrosion. Proper recoating of these surfaces with service-type anti-corrosion material is essential.

After repair and/or replacement parts are installed, all accessible bare metal surfaces must be treated with metal conditioner and reprimed. Refer to the GM Approved Refinish Materials book which identifies the paint systems you may use.

The latest revision of the GM Approved Refinish Materials booklet is located on the Goodwrench website at www.gmgoodwrench.com.

Anti-corrosion compounds are light-bodied materials designed to penetrate between metal-to-metal surfaces, such as pinch-weld joints, hem flanges, and integral panel attaching points where metal surfaces are difficult to coat with conventional undercoating materials, and are inaccessible for painting. The materials that are suitable for interior and exterior are listed in the chart below. Conventional undercoating is recommended in order to coat large areas, such as replacement door and quarter outer panels, floor pan sections, lids, hoods, fenders, etc. During undercoating operations, care should be taken to prevent the material from being sprayed into door and quarter panel hardware mechanisms, such as door locks, window run channels, window regulators, and seat belt retractors. On the underbody, the material should not be applied to any moving or rotating part, energy absorbing bumper components, or shock absorbers. After undercoating, ensure that all body drain holes are open.

Interior Protectant

The following products are available from GM Dealer Equipment. For technical information, call 187-Permatex (1-877-376-2839):

Permatex Part Number	Description
310-JDI-UCA1	Permatex Canister and Wand Assembly

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310-81881	Permatex Amber Rust Proofing (24 oz) (Qty of 12)
310-81882	Permatex Amber Rust Proofing (1 gal)

Exterior Protectants

The following product is available from *ECP, Inc. Contact them at 1-800-323-3521 or www.ecpinc.net.

Part Number	Description
178660	Nox Rust X-121B (12 cans per case)

The following products are available from your local *3M® distributor, or call 1-800-521-8180, ext. 779-5165.

3M® Part Number	Description
08804	Water-Based Undercoat
08801	No Clean-Up Applicator Gun
05917	Weld-Thru Coating
08891	Rust Fighter-I

The following product is available from *Transtar Autobody Technologies. Contact the company at 1-800-824-2843 or www.tat-co.com

Part Number	Description
4353	Weld-Through Primer

*We believe these sources and their products to be reliable. There may be additional manufacturers of such material. General Motors does not endorse, indicate any preference for, or assume any responsibility for the products from these firms, or for any such items which may be available from other sources.

These sealers are intended to prevent water and dust from entering the vehicle and also are anti-corrosion barriers. Sealers are applied to such areas as rear compartment lid hem flanges, wheelhouse, quarter outer, floor, cowl, roof, and various other panel to panel attaching points. The originally sealed joints are obvious and any damage to these sealed locations should be corrected by resealing. Attaching points of new replacement panels should be resealed. Replacement lids and doors will also require sealing in the hem flange areas.

Flanged joints, overlap joints, and seams should be sealed using a quality sealer of medium-bodied consistency. The sealer used must retain its flexible characteristics after curing and be paintable.

Open joints which require bridging of the sealer in order to close a gap should be sealed using a heavy-bodied caulking material. Follow the label directions for the material selected.

Color application may be required in order to restore repaired areas such as hood, fenders, doors, quarters, lid, roof, engine compartment, underbody, and inner panels to original appearance. When this is necessary, conventional refinishing preparation, undercoat buildup, and color application techniques should be followed.

Deadener materials, spray-on type, are used on various metal panels in order to provide corrosion resistance and

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joint sealing. They control the general noise level inside the passenger area of the vehicle. When deadeners are disturbed because of damage, are removed during repair operations, or a new replacement panel is installed, the deadener material must be replaced by a service equivalent material. The application pattern and location of deadener materials can be determined by observing the original production installation.

Cleaning of the interior and underbody panel surfaces is necessary when original galvanized or other anti-corrosion materials have been burned off during welding or heating operations. Removal of the residue from burning will require additional care in such areas as interior surfaces of box-type construction and when configurations of the metal panels limit access to interior surfaces.

PAINT IDENTIFICATION

WARNING: Exposure to isocyanates during paint preparation and application processes can cause severe breathing problems. Read and follow all of the instructions from the manufacturers of painting materials, equipment, and protective gear.

NOTE: Always refer to the GM Approved Refinish Materials book. This book identifies the paint systems you may use.

The latest revision of the GM Approved Refinish Materials booklet is located on the Goodwrench website at www.gmgoodwrench.com.

Use the service parts identification label to identify the type of paint technology, paint codes, trim level, and any special order paint colors on the vehicle. Refer to **Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label** .

REPAIR INSTRUCTIONS

CLEARCOAT REPAIR WITHOUT REPAINTING

Repair Procedure

1. Thoroughly wash the repair area with Liquid Wash and Wax GM P/N 1052870 or the equivalent.
2. Environmental damage may be corrected. Refer to **Environmental Fallout (Acid Rain)** or **Rail Dust Damage Repair**.

   IMPORTANT: Follow all of the instructions from the manufacturer of the polishing material.

3. Use a paint gauge before, during, and after sanding and/or polishing, to avoid removing too much clearcoat. Refer to **Paint Gauges**.

ENVIRONMENTAL FALLOUT (ACID RAIN)

CAUTION: Refer to Clearcoat/Ultraviolet Screeners Caution .

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NOTE: Always refer to the manufacturer's packaged instructions for the detailed procedures of materials used for compounding and/or polishing.

Since the severity of the condition varies from area to area, proper diagnosis of the contamination extent is critical to the success of the repairs. Perform the diagnosis under high intensity fluorescent lighting on the horizontal surfaces (hood, roof panel, rear compartment lid), after the surfaces have been properly cleaned by washing the vehicle with GM Wash and Wax GM P/N 1237841 (Canadian P/N 10953203), or equivalent.

There are 3 basic types of acid rain damage:

Surface Level Contamination

May be repaired by simply washing the vehicle, cleaning the surface with a silicone wax and grease remover, neutralizing acidic residue, and finesse polishing-Refer to Surface Level Contamination Repair.

Clearcoat Etching

Slight etching is still noticeable after the above washing and finesse polishing procedure. Refer to Slight Clearcoat Damage - Wet Sanding, Finesse Polishing.

Basecoat Etching

Severe etching beyond the clearcoat into the basecoat in the affected areas will require refinishing. Refer to **Basecoat/Clearcoat Paint Systems**.

Surface Level Contamination Repair

1. Thoroughly wash and dry the contaminated area with GM Wash and Wax GM P/N 1237841 (Canadian P/N 10953203), or equivalent.
2. Clean the affected area with silicone, wax and grease remover.
3. Remove and neutralize acidic residue by cleaning the contaminated areas with a mixture of baking soda and water (1 tablespoon of baking soda per 1 liter or 1 quart of water). Rinse thoroughly and dry the panel completely.
4. Apply finesse-type polish with a foam panel. If damage has been repaired, remove any swirl marks with a dual action orbital polisher and foam pad. Refer to **Clearcoat Repair Specifications - 3M Products**.
5. If some damage remains, refer to Slight Clearcoat Damage - Wet Sanding, Finesse Polishing.

Slight Clearcoat Damage - Wet Sanding, Finesse Polishing

1. Select a small contaminated test area.
2. Film thickness should be taken prior to the sanding and polishing. Refer to **Paint Gauges**.
3. Wet sand and finesse polish the contaminated test area. Refer to **Clearcoat Repair Specifications - 3M Products**. If during the polishing you suspect or observe that etching has penetrated into the basecoat, too

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much clearcoat has been removed during sanding, or base color is transferred to the polishing pad during polishing, then the affected areas will require refinishing. Refer to **Basecoat/Clearcoat Paint Systems**.

PAINT GAUGES

Paint thickness gauges measure the total thickness of the vehicle finish. It is important to accurately measure the thickness of the finish on each vehicle as the thickness of the finish will vary on each vehicle. Use a paint gauge before the sanding process in order to accurately measure how much finish there is to remove before, during, and after the sanding process. Paint gauges range from magnetic pull type to sophisticated electronic types, and are available from a variety of sources. The older magnetic type gauges, at best have a 5 percent accuracy range and are not sensitive enough to detect removal of 0.02 mm 0.5 mil (0.0005 in) clearcoat. The newer type magnetic gauges have improved accuracy ranges. Most gauges are confined to checking either ferrous metal, steel, non-ferrous metal, or aluminum panel. At this time, there are no viable gauges for reading film thickness on composite (SCM doors, RIM fenders) panels. The more sophisticated (ETG) electronic paint thickness gauges digital type gauges are able to read film thickness on both ferrous and non-ferrous metal panel. Digital ETG gauges may have an accuracy range of 1 percent and include thickness standards for recalibration. The following paint thickness gauges are available. Call 1-800-GM-TOOLS for information:

Paint Thickness Gauges

- 147-5437-ETG Standard model
- 147-5437-ETG-P Standard model with print option
- 147-5437-N-ETG-N Non-ferrous model for aluminum panels
- 147-5437-NP-ETG-NP Non-ferrous model with print option
- 147-54437-SD-ETG Steel and aluminum gauge

CLEARCOAT THICKNESS

The clearcoat on the vehicle is typically 0.059-0.078 mm (1.5-2 mils [0.0015-0.0020 in]) thick. The clearcoat contains ultraviolet screeners. Removing more than 0.5 mils (0.019 in) of the clearcoat may result in early paint failure.

RAIL DUST DAMAGE REPAIR

WARNING: Refer to Eye Protection Warning .

NOTE: If rail dust has penetrated into the basecoat, the panel requires refinishing. Ensure all the rail dust has been removed prior to refinishing or the rust spots will return.

Rail dust damage comes from the tiny iron particles produced from the friction between the train wheels and the track. It can also be deposited on vehicles if stored near any operation producing iron dust (i.e., steel ore yards). This dust can either lay on top of, or embed into the paint surface. It is usually diagnosed as bumps in the paint surface or rust colored spots in the paint.

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1. Move the vehicle to a cool shaded area and ensure the vehicle surfaces are cool during the removal process.
2. Thoroughly wash the repair area with Liquid Wash and Wax GM P/N 1052870, or equivalent.
3. Wipe the area dry.
4. Clean the affected area with silicone, wax and grease remover.
5. Perform the removal process according to the manufacturer's directions of the type of repair material used (Gel Type Oxalic Acid or Clay Type Non-Acid Based). If, upon inspection, some particles are still present, the process may be repeated. If the damage has been repaired, complete the repair to the entire panel.
6. Polish the entire panel after the removal process. Refer to **Clearcoat Repair Specifications - 3M Products**. If small pits remain in the clearcoat after all of the damage has been repaired, refer to **Clearcoat Repair without Repainting**.

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Plastic Panel Information and Repair - Camaro

SPECIFICATIONS

FLEXIBLE PLASTIC PART REPAIR MATERIALS

Product - 88861039, *88861040, High Strength Plastic Repair 50 ml

Components - 12 cartridges with 2 mixers each

Structural and Cosmetic

Recommended Repair Material

Product	Components	Recommended Repair Material	Work Time 70°F	Handling Strength at 70°F
88861039 *88861040 High Strength Plastic Repair 50 ml	12 cartridges with 2 mixers each	Structural and cosmetic bonding and repairing of all flexible plastics. Requires GM P/N 12378462 on TPO plastics. Will also bond e-coated/primed metals.	90 seconds	10 minutes
* TPO, TEO, (Polyolefin Plastics) require the application of polyolefin adhesive primer before the GM P/N 88861039 repair compound is applied.				

Working Time

Product	Adhesive Sandability at 70°F	Part Paintability at 70°F	Adhesive Full Cure at 70°F	Program
88861039 *88861040 High Strength Plastic Repair 50 ml	20 minutes	30 minutes	24 hours	Bumper covers, emblems, door trims, exterior and interior repairs*
* TPO, TEO, (Polyolefin Plastics) require the application of polyolefin adhesive primer before the GM P/N 88861039 repair compound is applied.				

RIGID PLASTIC PART REPAIR MATERIALS

Thermoset Plastic Type	Type of Repair	Recommended Repair Material	Availability
		GM Goodwrench®	

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Sheet metal compound (SMC), RIM rigid plastic parts	Cosmetic filling	Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer
		Sikkens Polystop LP™ or equivalent polyester repair putty	Refer to a local paint supplier
Most rigid plastic parts	Cosmetic repair, adhesive bonding	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer
		Lord Fusor® SMC Body Panel Repair Adhesive or equivalent	Refer to local paint supplier
Most rigid plastic parts	Adhesive bonding	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer
		Dynatron Dyna-Weld Plio Grip® or equivalent (OE structural adhesive)	Refer to local paint supplier
Most rigid plastic parts	Adhesive structural* bonding	GM Goodwrench® Structural Bonding Epoxy (GM P/N 12345726 or equivalent)	GM Dealer
Most rigid plastic parts	Adhesive bonding Structural bonding	Ashland Pliogrip® 7773B-3-minute Ashland Pliogrip® 7779B-10-minute Ashland Pliogrip® 7770B-35-minute	Supplied by Crest Industries 1-800-822-4100 fax 1-800-344-4461
SRIM most rigid plastic parts	Cosmetic repair, adhesive bonding	GM Goodwrench® SRIM™ repair kit (GM P/N 12378523) or SIA™ Adhesives, INC. SRIM™ repair kit P/N 30208030001 adhesive 200ML TUBES P/N 30208020001 50ML TUBES P/N 30208010001	SIA Adhesives, INC. customer service 1-330-374-2468
* Structural adhesive bonding may require the use of a pneumatic applicator, A8-37479-1A, or equivalent, to speed the application of the GM P/N 12345726 epoxy.			Kent-Moore 1-800-GM-TOOLS

REPAIR INSTRUCTIONS

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GENERAL PLASTIC REPAIR

WARNING: In order to reduce the risk of personal injury when exposed to toxic fumes while grinding, cutting, or applying repair material on any type of sheet molded compound or RIM rigid plastic, observe the following guidelines:

- **Work in a properly ventilated area**
- **Apply protective cream to any exposed skin**
- **Remove any mixture that comes into contact with skin**
- **Wash skin with cold water to remove glass and resin dust**
- **Use a sander with a vacuum attachment**
- **Follow the repair material manufacturer's instructions**

Also, always wear the following:

- **An approved respirator, or air supplied respirator**
- **Eye protection**
- **Rubber gloves**
- **Earplugs**
- **Protective clothing**

The following procedures should be followed when repairing all types of thermoset plastic:

- Follow the manufacturer's application and curing recommendations.
- Do not intermix systems. Use the supplies and the repair materials from the same manufacturer.
- Clean the inner and outer surfaces of the repair area with a soap impregnated scouring pad in order to remove any dirt or mold release agent.
- Clean the area with a wax and grease remover, using only enough of the remover to dampen a cloth. Allow the panel to dry thoroughly.
- Remove the surface finish from the area to be repaired. Adhesives are designed to adhere to the plastic substrate, not the finish.
- Prime a metal surface before applying the repair material.
- Inspect the rear side of the work area before making repairs in order to avoid possible damage to wires, motors, etc.

DESCRIPTION AND OPERATION

HOW TO IDENTIFY PLASTIC PARTS

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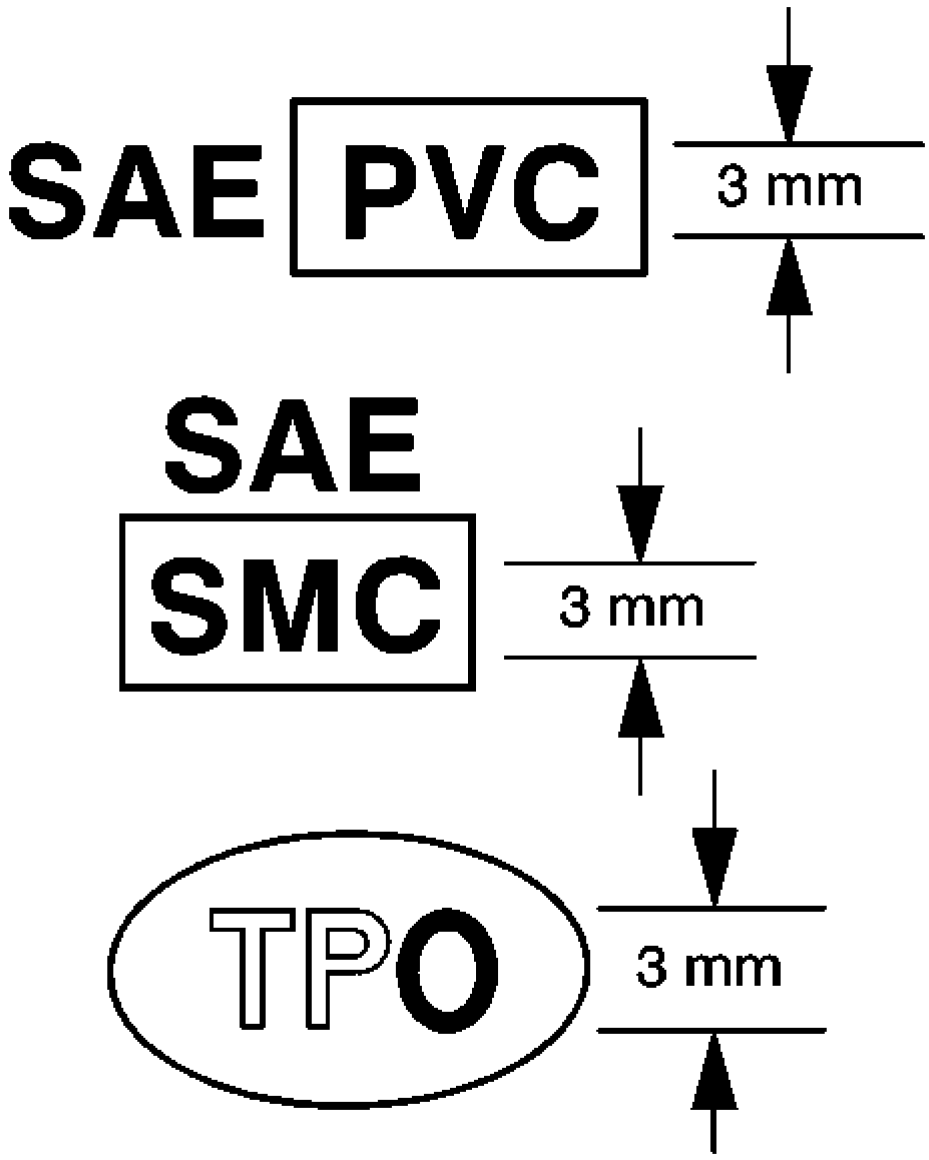


Fig. 1: Identifying SAE Code
Courtesy of GENERAL MOTORS CORP.

Plastic parts can be identified by the SAE code, which is usually found on the rear of the part, and/or by the characteristics of the plastic. Knowing the type of plastic aids in selecting the proper repair materials and in selecting the proper repair procedure.

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Look for the SAE code stamped into the part.

Code Found

Match the code to those in the plastic identification chart to determine whether the plastic is thermoplastic or thermoset plastic, and whether the plastic is rigid or flexible. Refer to **Plastic Identification and Refinishing Systems**.

No Code Found

WARNING: Do NOT use a plastic burn test to distinguish the type of plastic. The burn test produces vapors which are harmful.

Perform one or both of the following tests to determine if the part is thermoplastic polyolefin or thermoset non-polyolefin.

Float Test

1. Cut a shaving of plastic from the back of the part.

   The shaving should be free of mold release agents and paint.

2. Place the shaving in a container of water.
   - Thermoplastic polyolefin floats.
   - Thermoset non-polyolefin sinks.

Abrasion Test

- Sand a spot near the damaged area with Grade 36 Roloc Disc.
- Thermoplastic polyolefin material melts or frays when sanded.
- Thermoset non-polyolefin material sands cleanly.

Thermoplastic and thermoset plastics can be either rigid or flexible. Thermoplastic plastic parts are best repaired with a hot iron plastic material-feed welder, but are usually replaced. Thermoset plastic can be repaired with epoxy or other more rigid 2 package repair material.

- For rigid thermoset repair materials, refer to **Rigid Plastic Part Repair Materials**.
- For flexible thermoset repair materials, refer to **Flexible Plastic Part Repair Materials**.
- For general repair instructions, refer to **General Plastic Repair**.

PLASTIC IDENTIFICATION AND REFINISHING SYSTEMS

Identifying Symbol - Old Symbol in ( )s	Chemical Composition or Plastic Family Name	Typical Area(s) Where Part is Used	Examples of Common / Trade Names	Type of Plastic

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ABS	Acrylonitrile / Butadiene-Styrene	Armrest Support, Console, IPC, Steering Column Bracket / Jacket, Trim Molding	ABS, Absafil, Magnum, Cycolac, Dyel, Kralastic, Lustran	Thermoplastic
ABS + PC	Acrylonitrile / Butadiene-Styrene + Polycarbonate	Instrument Panel, IPC	Bayblend, Cycoloy, KHA, Pulse	Rigid
ABS / PVC	ABS/Vinyl (Soft)	Head Rest Cover, Instrument Panel Pad, Trim Molding / Panel	ABS Vinyl	Flexible, Vinyl
EPDM	Ethylene Propylene Diene Monomer	Body Panel, Bumper Impact Strip	EPDM, Nordel	Rigid
EVA (EVAC)	Ethylene / Vinyl Acetate	Head Rest Cover, Misc Soft Trim	Elvax, Microthane	Flexible
PA	Polyamide	Headlamp Bezels, Quarter Panel Extensions, Exterior Finish Trim Panels	Nylon, Capron, Zytel, Rilsan, Minion, Vydyne, Welland	Rigid
PA, PAG, PAGG	Polyamide	Exterior Finish Trim Panel, Headlamp Bezel, Quarter Panel Extension	Capron, Minlon, Nylon, Rilsan, Vydyne, Wellamid, Zytel	Rigid, Thermoset
PA + PPE	Polymide + Polypheneylene Ether	Exterior Trim, Fender	GTX	Rigid, Thermoset
PBT + TEEE (PBTP + EEBC)	Polybutylene, Terephthalate + Ether, Ester Block Compound	Fascia, Rocker Panel Molding	Bexloy M	Rigid
PC	Polycarbonate	Interior Rigid / Hard Trim Panel, Valance Panel	Calibre, Lexan, Merlon, Makrolon	Rigid, Thermoset
PC + PETP	Polycarbonate + Polybutylene, Terephthalate	Bumper Fascia	Macroblend, Valox, Xenoy	Flexible, Thermoset
PE	Polyethylene	Fuel Tank Shield, Inner Fender Panel, Interior Trim Panel, Seat Belt Cover, Spoiler, Valance	Alathon, Dylan, Foriflex, Hi-fax, Hosalen, Marlex, Paxon	Rigid, Thermoplastic
PF	Phenol Formaldehyde	Ashtray	Amberol, Bakelite, Durez, Genal, Phenolic, Plyophen, Resinox	Rigid, Thermoset
		Bumper Fascia, Cowl Panel, Deflector Panel, Door Panel, Inner	Azdel, Daplen,	

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PP	Polypropylene	Fender, Interior Molding, Kick Panel, Load Floor, Radiator Shroud, Wheel Cover	Escorene, Marlex, Novolen, Oleflo, Profax, Tenite	Flexible, Thermoplastic
PPE (PPO)	Polyphenylene Ether	Bezels, Chromed Plastic, Headlamp Door, Ornaments	Noryl, Oleflo, Prevex	Rigid, Thermoset
PS	Polystyrene	Dash Panel, Door Panel	Durathon, Dylan, Lustrex, Polystyrol, Styron	Flexible, Soft
PUR	Polyurethane, Thermoset (Unsaturated)	Bumper Fascia, Filler Panel, Front/Rear Body Panel, Pickup Box	Bayflex, Castethane, RIM, RRIM, SRIM	Thermoset
PVC	Polyvinyl Chloride (Vinyl)	Interior Soft Trim, I/P Skins, Roof Cover	Geon, Pliovic, Unichem, Vinoflex, Vinyl, Vinylite	Flexible, Vinyl
SAN (SA)	Styrene Acrylonitrite	Center Console, Glove Box Door, Interior Trim Panel	Foracryl, Lustran, Tyril	Rigid
TEO (EP, EPM, TPO)	Ethylene / Propylene (Rubber)	Air Dam, Bumper Fascia, Valance Panel	EPI, EPII, TPO, TPR (Thermoplastic Rubber)	Flexible, Thermoplastic
TPO	Thermal Plastic Oletin	Bumper Covers	TPO	Flexible Thermoplastic
TPU (TPUR)	Polyurethane, Polyolefin	Bumper Fascia, Gravel Deflector, Soft Filler Panel, Window Molding	Estane, Pellethane, Roylar, Toxin	Flexible, Thermoplastic
UP	Polyester / Thermoset	Air Scoop, Air Spoiler, Fascia Extension, Hood, Instrument Housing, Rear Compartment Lid, Roof, Ventilation Grid	Fiberglass, Premi-glass, Selectron, SMC, Vibrinmat	Rigid, Thermoset
For symbols not listed in this table, contact the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.				

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Seat Hardware, Trim, and Upholstery - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Adjuster Vertical Actuator Handle Screw	19 N.m	14 lb ft
Front Seat Belt Buckle Bolt	40 N.m	30 lb ft
Front Seat Mounting Bolt	45 N.m	33 lb ft
Rear Seat Back Cushion Lower Cross Bar Bolts	49 N.m	36 lb ft
Rear Seat Back Cushion Lower Cross Bar Nut	74 N.m	55 lb ft
Rear Seat Back Cushion Stowage Latch Actuator	7.5 N.m	66 lb in
Seat Adjuster Handle Screw	2 N.m	18 lb in
Seat Back Cushion Frame Bolts	35 N.m	26 lb ft
Seat Back Cushion Latch Cable Screws	3 N.m	26 lb in
Seat Back Cushion Latch Cable Strap Screws	10 N.m	88 lb in
Seat Back Cushion Latch Release Handle Screws	3 N.m	26 lb in
Seat Cushion Frame Bolts	35 N.m	26 lb ft
Seat Cushion Frame Rear Bracket Screw	4 N.m	35 lb in
Seat Inner Recliner Finish Cover Rear Screw	4 N.m	35 lb in
Seat Inner Recliner Finish Cover Side Screw	5 N.m	44 lb in
Seat Outer Adjuster Finish Cover Front Screw	4 N.m	35 lb in
Seat Outer Adjuster Finish Cover Rear Screw	4N.m	35 lb in

REPAIR INSTRUCTIONS

DRIVER OR PASSENGER SEAT REPLACEMENT

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Fig. 1: Driver Or Passenger Seat
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	WARNING: **Refer to SIR Warning .** **WARNING:** **To avoid personal injuries, re-zero the passenger presence system whenever you remove or replace the seat cushion or trim. Failure to do so may cause the system to malfunction.** **Preliminary Procedures** 1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Control Module References** for replacement and setup information.
1	Front Seat Bolt (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 45 N.m (33 lb ft)

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	Procedure: Adjust the seat to the full forward position to gain access to the rear bolts.
2	Front Seat Assembly **Procedure** 1. Disconnect the front seat and pretensioner electrical connector, and passenger presence system connector, if equipped. 2. With the aid of an assistant remove the front seat, by tilting the seat forward, and then lifting and pulling the seat rearwards to disengage the front hooks.

DRIVER OR PASSENGER SEAT OUTER ADJUSTER FRONT FINISH COVER REPLACEMENT

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Fig. 2: Driver Or Passenger Seat Outer Adjuster Front Finish Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Outer Adjuster Finish Cover **Tip:** Use a flat-bladed tool to release the adjuster finish cover from the seat verticle actuator handle.

DRIVER OR PASSENGER SEAT ADJUSTER VERTICAL ACTUATOR HANDLE REPLACEMENT

Fig. 3: Driver Or Passenger Seat Adjuster Vertical Actuator Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the driver or passenger seat outer adjuster front finish cover. Refer to Driver or Passenger Seat Outer Adjuster Front Finish Cover Replacement.**	
1	Driver Seat Adjuster Verticle Actuator Handle Cover **Procedure:** Use a flat-bladed tool to release the handle cover from the verticle actuator handle.
2	Driver Seat Adjuster Verticle Actuator Handle Screw **CAUTION:** **Refer to Component Fastener Tightening Caution** **Tighten:** 19 N.m (14 lb ft)
3	Driver or Passenger Seat Outer Adjuster Finish Cover **Procedure:** Remove the driver or passenger seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement**

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	(with Manual Height Adjuster)
4	Driver Seat Adjuster Verticle Actuator Handle **Procedure:** Note the location and routing of the handle prior to removal in order to ensure proper reinstallation.

DRIVER OR PASSENGER SEAT ADJUSTER HANDLE REPLACEMENT

Fig. 4: Driver Or Passenger Seat Adjuster Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Seat Adjuster Handle Retainer **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 2 N.m (18 lb in)

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2	Seat Adjuster Handle

DRIVER OR PASSENGER SEAT ADJUSTER HANDLE KNOB REPLACEMENT

Fig. 5: Driver Or Passenger Seat Adjuster Handle Knob
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Adjuster Handle Knob **Tip:** Use a flat-bladed tool to release adjuster handle knob from the finish cover.

DRIVER SEAT RECLINER LEVER KNOB REPLACEMENT

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Fig. 6: Driver Seat Recliner Lever Knob
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver Seat Recliner Lever Knob **Tip:** Use a flat-bladed tool to release the recliner lever knob from the finish cover.

DRIVER OR PASSENGER SEAT HEAD RESTRAINT REPLACEMENT

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Fig. 7: Driver Or Passenger Seat Head Restraint

Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Head Restraint **Procedure** 1. Lower the seat back rearward to gain space between the head restraint and the roof. 2. Raise the headrest to the full upward position. 3. Depress the large button on the head restraint guide and raise the head restraint to the full up position. 4. Depress the smaller button on the opposite head restraint guide and pull upward to remove from the seat.

FRONT SEAT HEAD RESTRAINT GUIDE REPLACEMENT

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Fig. 8: Front Seat Head Restraint Guide
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the seat head restraint. Refer to Driver or Passenger Seat Head Restraint Replacement.**	
	Front Seat Head Restraint Guide (Qty: 2)

1	**Procedure:** Using a suitable flat-bladed tool, slide the tool on the inside of the guide until it finds the slot. Then push the tool forward pulling the guide tab inward, while pulling upward to remove the guide from the seat back frame.

DRIVER OR PASSENGER SEAT OUTER ADJUSTER FINISH COVER REPLACEMENT (WITH POWER HEIGHT ADJUSTER)

Fig. 9: Driver Or Passenger Seat Outer Adjuster Finish Cover (With Power Height Adjuster)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front seat adjuster handle knob. Refer to **Driver or Passenger Seat Adjuster Handle Knob Replacement**. 2. Remove the front seat recliner lever knob. Refer to **Driver Seat Recliner Lever Knob Replacement**.	
1	Driver or Passenger Seat Outer Adjuster Finish Cover Rear Screw
2	Driver or Passenger Seat Outer Adjuster Finish Cover Front Screw
3	Driver or Passenger Seat Outer Adjuster Finish Cover Retainer
	Driver or Passenger Seat Outer Adjuster Finish Cover

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4	**Procedure** 1. Disconnect the electrical connectors. 2. Firmly grasp the upper area of the finish cover that folds over the seat cushion frame, this area needs to be flexed outward while sliding the finish cover rearward. 3. If replacing the cover, transfer components as necessary.

DRIVER OR PASSENGER SEAT OUTER ADJUSTER FINISH COVER REPLACEMENT (WITH MANUAL HEIGHT ADJUSTER)

Fig. 10: Driver Or Passenger Seat Outer Adjuster Finish Cover (With Manual Height Adjuster)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the front seat recliner lever knob, if necessary. Refer to **Driver Seat Recliner Lever Knob Replacement** 2. Remove the front seat adjuster vertical actuator handle cover. Refer to **Driver or Passenger Seat Adjuster Vertical Actuator Handle Replacement**	
1	Driver or Passenger Seat Outer Adjuster Finish Cover Rear Screw

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2	Driver or Passenger Seat Outer Adjuster Finish Cover Side Screw **Tip:** Lift up on the seat back recliner adjuster handle to gain access to finish cover side screw.
3	Driver or Passenger Seat Outer Adjuster Finish Cover Front Screw
4	Driver or Passenger Seat Outer Adjuster Finish Cover **Procedure** 1. Disconnect the electrical connectors. 2. Firmly grasp the upper area of the finish cover that folds over the seat cushion frame, this area needs to be flexed outward while sliding the finish cover rearward. 3. If replacing the cover, transfer components as necessary.

DRIVER OR PASSENGER SEAT INNER RECLINER FINISH COVER REPLACEMENT

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Fig. 11: Driver Or Passenger Seat Inner Recliner Finish Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

1	Driver or Passenger Seat Inner Recliner Finish Cover Side Screw
2	Driver or Passenger Seat Inner Recliner Finish Cover Rear Screw
3	Driver or Passenger Seat Inner Recliner Finish Cover **Procedure:** Firmly grasp the top of the finish cover, pull upward and then outboard to disengage the finish cover from the seat cushion frame.

DRIVER OR PASSENGER SEAT CUSHION FRAME REPLACEMENT

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Fig. 12: Driver Or Passenger Seat Cushion Frame
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	WARNING: **Refer to SIR Warning .** **Preliminary Procedure** 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**. 2. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**. 3. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**. 4. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement**. 5. When working with the passenger seat re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Control Module References** .
1	Front Seat Back Cushion Frame Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 35 N.m (26 lb ft)
2	Front Seat Cushion Frame **Procedure** 1. Disconnect electrical connectors as needed. 2. When replacing the front passenger seat cushion, you must also replace the inflatable restraint front passenger mass sensor. Refer to **Inflatable Restraint Front Passenger Mass Sensor Replacement** . 3. If replacing with a new front seat cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT CUSHION PAD SUPPORT SPRING REPLACEMENT

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Fig. 13: Driver Or Passenger Seat Cushion Pad Support Spring
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .** **Preliminary Procedure** 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**. 2. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement**.	
1	Front Seat Cushion Pad Support Spring

DRIVER OR PASSENGER SEAT CUSHION FRAME FRONT BRACKET REPLACEMENT

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Fig. 14: Driver Or Passenger Seat Cushion Frame Front Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front seat back cushion cover and pad. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.	
1	Driver or Passenger Seat Cushion Frame Front Bracket Rivet (Qty: 2) **WARNING:** **Use the proper eye protection when drilling to prevent metal chips from causing physical injury.** **Procedure:** Drill out both guide rivets before removing.
2	Driver or Passenger Seat Cushion Frame Front Bracket **Procedure** 1. When re-installing the bracket re-riveted at the bottom of the lower cushion frame with new rivets.

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	2. If replacing with a new front seat back cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT CUSHION FRAME REAR BRACKET REPLACEMENT (6 WAY)

Fig. 15: Driver Or Passenger Seat Cushion Frame Rear Bracket (6 Way)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front seat back cushion cover and pad. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.	
1	Driver or Passenger Seat Cushion Frame Rear Bracket Screw **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 4 N.m (35 lb in)
2	Driver or Passenger Seat Cushion Frame Rear Bracket **Procedure:**

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	If replacing with a new front seat back cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT CUSHION FRAME REAR BRACKET REPLACEMENT (4 WAY)

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Fig. 16: Driver Or Passenger Seat Cushion Frame Rear Bracket (4 Way)
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the front seat back cushion cover and pad. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.	
1	Driver or Passenger Seat Cushion Frame Rear Bracket Screw (Qty: 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 4 N.m (35 lb in)
2	Driver or Passenger Seat Cushion Frame Rear Bracket **Procedure:**

	If replacing with a new front seat back cushion frame, transfer components as necessary.

FRONT SEAT CUSHION COVER AND PAD REPLACEMENT

Fig. 17: Front Seat Cushion Cover & Pad
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
	WARNING: **Refer to SIR Warning .** **WARNING:** **To avoid personal injuries, re-zero the passenger presence system whenever you remove or replace the seat cushion or trim. Failure to do so may cause the system to malfunction.** **Preliminary Procedure** 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**.

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2. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.
3. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**.
4. When working with the passenger seat re-zero the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Control Module References** .

1	Front Seat Cushion Cover **Procedure** 1. Remove the rear hog rings on the seat cushion cover from the seat frame. 2. Disengage the J-channel retainer from the seat frame. 3. Disconnect the electrical connector, if equipped with heated seats. 4. Remove the seat cushion cover and pad from the seat cushion frame as an assembly.
2	Front Seat Cushion Pad **Procedure** 1. Remove the hog rings from the under side of the seat cushion. 2. Pull the cushion cover off of the pad. 3. When replacing the front passenger seat cushion, you must also replace the inflatable restraint front passenger mass sensor. Refer to **Inflatable Restraint Front Passenger Mass Sensor Replacement** .

DRIVER OR PASSENGER SEAT BACK CUSHION COVER AND PAD REPLACEMENT

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Fig. 18: Driver Or Passenger Seat Back Cushion Cover & Pad
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

WARNING:
Refer to SIR Warning .

WARNING:
Do not repair or replace the seat stitching or seams in the seat back trim cover with an internal mounted seat side airbag module. Replace the complete seat back trim cover from the OEM. Non-OEM seat stitching may cause improper airbag deployment which could result in personal injury.

Preliminary Procedure

1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**.
2. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**.
3. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Power Height Adjuster)** or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**.
4. Remove the front seat head restraint guides. Refer to **Front Seat Head Restraint Guide Replacement**.
5. Remove the driver or passenger seat recliner handle bezel, if equipped. Refer to **Driver or**

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	Passenger Seat Recliner Handle Bezel Bracket Replacement.
1	Driver or Passenger Seat Back Cushion Cover **Procedure** 1. Disengage the j-channel retainers from the seat back cushion frame. 2. Disengage both seat cover side j-channel straps from under the seat bottom frame and note the location and routing for installation. 3. Disengage both cushion cover zippers, then flip the cover up to expose the seat back pad and frame. 4. Remove the connector position assurance (CPA) from the SIR module electrical connector. 5. Remove the Inflatable restraint front seat side module nuts (2) from the seat back frame. 6. Disconnect the SIR electrical connector. 7. Note the routing of the inflatable restraint electrical cable for installation. 8. Disconnect the electrical connectors that attach to the seat back cushion, if equipped with seat back cushion heater. 9. Remove the seat back cushion cover, airbag module and pad from the seat cushion frame as an assembly.
2	Inflatable Restraint Front Seat Side Module Nut (Qty: 2) **CAUTION:** **Refer to Fastener Caution** **Tighten:** 3.5 N.m (31 lb in)
3	Driver or Passenger Seat Back Cushion Pad **Procedure** 1. Remove the SIR module from the seat back cushion cover chute. Refer to **Driver or Passenger Seat Side Inflatable Restraint Module Replacement** 2. Remove the hog rings from the seat back pad. 3. Pull the cushion cover off of the pad.

DRIVER OR PASSENGER SEAT BACK CUSHION FRAME REPLACEMENT

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Fig. 19: Driver Or Passenger Seat Back Cushion Frame
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the front seat. Refer to **Driver or Passenger Seat Replacement**. 2. Remove the front seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer**	

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	Adjuster Finish Cover Replacement (with Power Height Adjuster) or **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement (with Manual Height Adjuster)**. 3. Remove the front seat inner recliner finish cover. Refer to **Driver or Passenger Seat Inner Recliner Finish Cover Replacement**. 4. Remove the front seat cushion cover and pad. Refer to **Front Seat Cushion Cover and Pad Replacement**. 5. Remove the inflatable restraint side impact module. Refer to **Driver or Passenger Seat Side Inflatable Restraint Module Replacement** .
1	Driver or Passenger Seat Back Cushion Frame Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 35 N.m (26 lb ft)
2	Driver or Passenger Seat Back Cushion Frame **Procedure** 1. Disconnect electrical connectors as needed. 2. If replacing with a new front seat back cushion frame, transfer components as necessary.

DRIVER OR PASSENGER SEAT RECLINER HANDLE BEZEL BRACKET REPLACEMENT

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Fig. 20: Driver Or Passenger Seat Recliner Handle Bezel Bracket
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Driver or Passenger Seat Recliner Handle Bezel Bracket **Tip:** Use a flat-bladed tool to release the handle bezel bracket lower tab.

DRIVER OR PASSENGER SEAT BACK CUSHION LATCH RELEASE HANDLE REPLACEMENT

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Fig. 21: Driver Or Passenger Seat Back Cushion Latch Release Handle
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: **Refer to SIR Warning .** **Preliminary Procedures** 1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Remove the driver or passenger seat back cushion cover and pad. Refer to **Driver or Passenger Seat Back Cushion Cover and Pad Replacement**.	
1	Driver or Passenger Seat Back Cushion Latch Release Handle Screw (Qty: 4) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 3 N.m (26 lb in)
2	Driver or Passenger Seat Back Cushion Latch Release Handle Clip (Qty: 2) **Procedure:** Disengage both the cable and clips from the seat back cushion frame.
3	Driver or Passenger Seat Back Cushion Latch Release Handle Screw (Qty: 2) **Procedure:**

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	Remove fasteners holding the cables to the seat back cushion frame.
4	Driver or Passenger Seat Back Cushion Latch Release Handle Assembly **Procedure** 1. Note the location and routing of the cable prior to removal in order to ensure proper reinstallation. 2. Disconnect both ends of the cable and remove from the seat assembly.

DRIVER OR PASSENGER SEAT LUMBAR SUPPORT REPLACEMENT

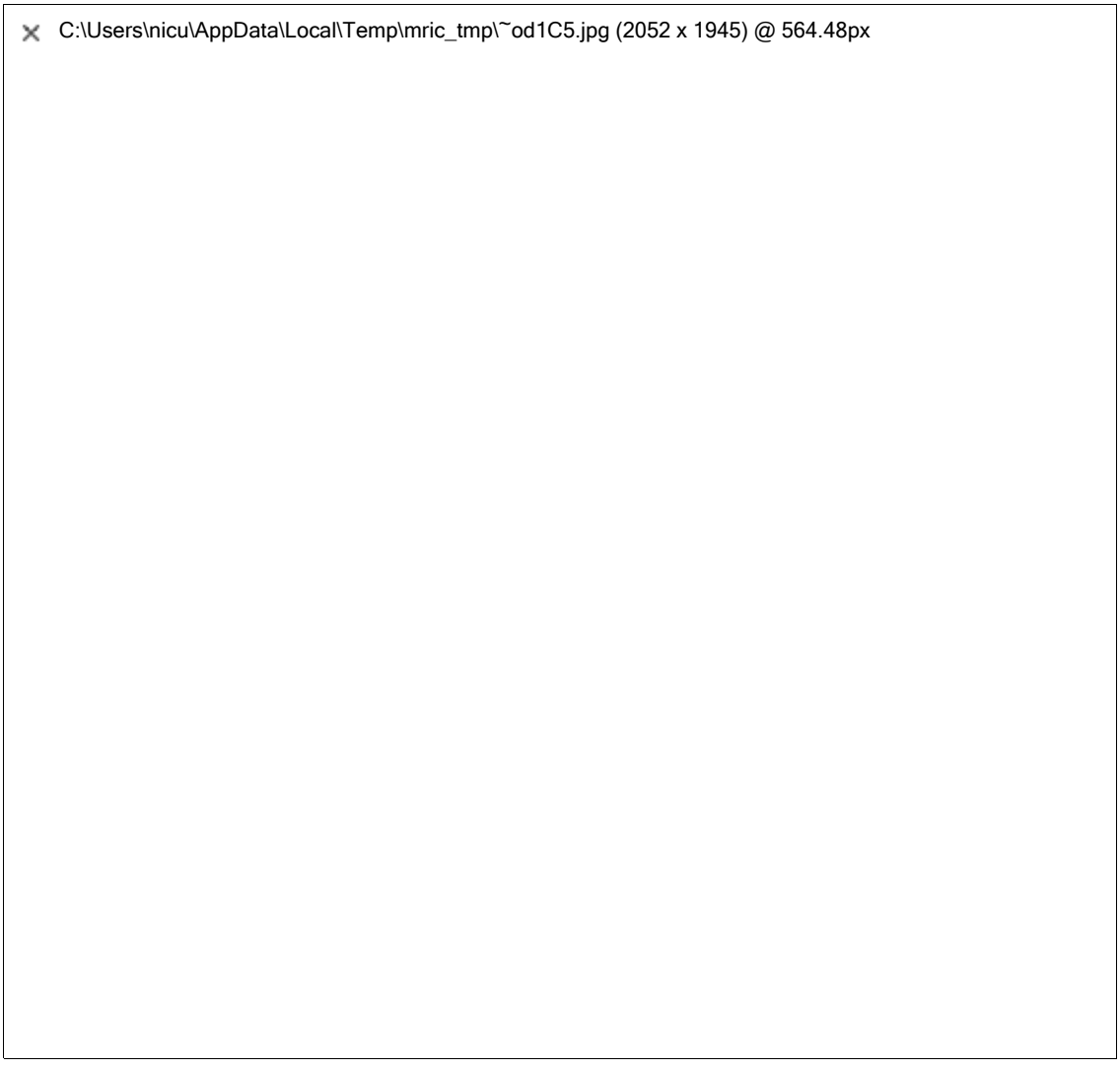


Fig. 22: Driver Or Passenger Seat Lumbar Support
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure	

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	1. Disable the SIR system. Refer to **SIR Disabling and Enabling** . 2. Remove the driver or passenger seat back cushion cover and pad. Refer to **Driver or Passenger Seat Back Cushion Cover and Pad Replacement**.
1	Front Seat Lumbar Support **Procedure** 1. Disconnect the electrical connectors. 2. Pull outward at the bottom of the seat to release the bottom support wires. 3. Pull the bottom of the lumbar forward and up until the lumbar support wires disengage from the seat back frame.

REAR SEAT CUSHION COVER REPLACEMENT

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Fig. 23: Rear Seat Cushion Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement**.	
	Rear Seat Cushion Cover **Procedure**

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1	1. Remove the hog rings from the under side of the rear seat cushion. 2. Pull the cover away from the pad to disengage any retainers. **Tip:** When installing the rear seat cushion cover, pull the cover tightly in all corners to ensure that no creasing occurs.

REAR SEAT CUSHION REPLACEMENT



Fig. 24: Rear Seat Cushion
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Seat Cushion **Procedure** 1. Lift up on the front of the seat cushion to disengage the cushion from the floor retainers. 2. Push down on the rear of the seat to unhook the cushion wire from the lower cross bar hinges.

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REAR SEAT BACK CUSHION LATCH CABLE REPLACEMENT



Fig. 25: Rear Seat Back Cushion Latch Cable
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion pad. Refer to **Rear Seat Back Cushion Pad Replacement**. 2. Remove the rear seat back cushion opening panel. Refer to **Rear Seat Back Cushion Panel Replacement**.	
1	Rear Seat Back Cushion Latch Cable Strap Retainer (Qty: 2) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 10 N.m (88 lb in)
2	Rear Seat Back Cushion Latch Cable Retainer (Qty: 4) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 3 N.m (26 lb in)

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3	Rear Seat Back Cushion Latch Cable Assembly **Procedure:** Disconnect the cable from the latch actuator.

REAR SEAT BACK CUSHION REPLACEMENT

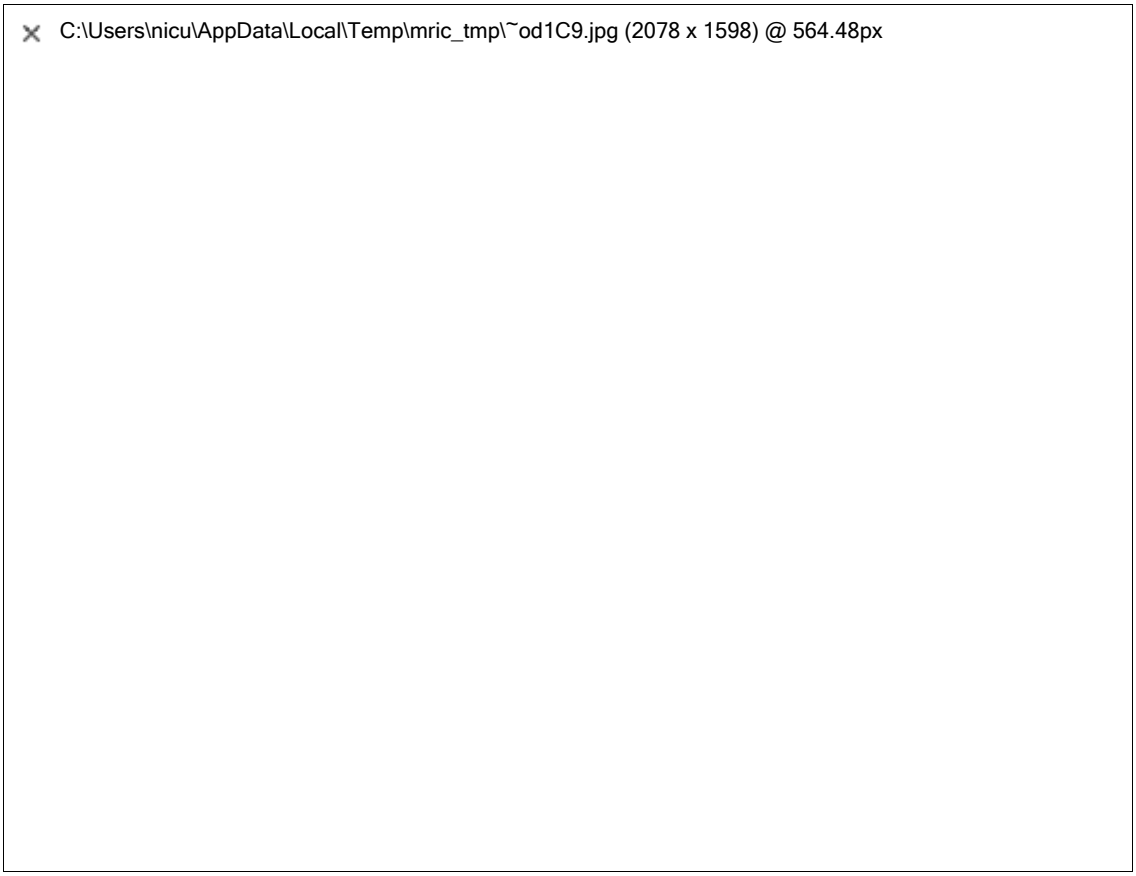


Fig. 26: Rear Seat Back Cushion
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: **Remove the rear seat cushion. Refer to Rear Seat Cushion Replacement.**	
1	Rear Seat Back Cushion **Procedure** 1. Pull the release strap located in the center of the seat back, folding the rear seat forward. 2. Push rearward on both lower cross bar hinge locks to release the seat back frame. 3. Pull the seat back cushion forward and upward to remove it from the vehicle. 4. Transfer components as necessary.

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REAR SEAT BACK CUSHION PANEL REPLACEMENT



Fig. 27: Rear Seat Back Cushion Panel
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure: Remove the rear seat back cushion pad. Refer to **Rear Seat Back Cushion Pad Replacement**.	
1	Rear Seat Back Cushion Panel Retainer (Qty: 2) **Tip:** Use a flat-bladed tool for retainer removal.
2	Rear Seat Back Cushion Panel **Procedure:** Release the seat back panel integral retainers from the seat back frame. **Tip:** Lay the seat down before trying to remove the seat back cushion panel.

REAR SEAT BACK CUSHION PAD REPLACEMENT

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Fig. 28: Rear Seat Back Cushion Pad
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion cover. Refer to **Rear Seat Back Cushion Cover Replacement**. 2. Remove the rear seat back cushion latch cover. Refer to **Rear Seat Back Cushion Latch Cover Replacement**.	
1	Rear Seat Back Cushion Pad Retainer (Qty: 4) **Tip:** Use a flat bladed tool for retainer removal.
2	Rear Seat Back Cushion Pad **Tip:** Lay the seat down before trying to remove the seat back cushion pad.

REAR SEAT BACK CUSHION REAR LOWER CENTER COVER CARPET REPLACEMENT

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Fig. 29: Rear Seat Back Cushion Rear Lower Center Cover Carpet
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Seat Back Cushion Rear Lower Center Cover Carpet Retainer (Qty: 2) **Tip:** Pull the release strap located in the center of the seat back, folding the rear seat forward. **Tip:** Use a flat-bladed tool to release the carpet retainers from the floor.
2	Rear Seat Back Cushion Rear Lower Center Cover Carpet

REAR SEAT BACK CUSHION LOWER CROSS BAR REPLACEMENT

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Fig. 30: Rear Seat Back Cushion Lower Cross Bar
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat cushion. Refer to **Rear Seat Cushion Replacement** 2. Remove the rear seat back cushion. Refer to **Rear Seat Back Cushion Replacement**	
1	Rear Seat Back Cushion Lower Cross Bar Nut **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 74 N.m (55 lb ft)
2	Rear Seat Back Cushion Lower Cross Bar Bolt (Qty: 4) **CAUTION:** **Refer to Fastener Caution .** **Tighten:** 49 N.m (36 lb ft)
3	Rear Seat Back Cushion Lower Cross Bar **Procedure:** After removing all retainers, pull upward on the lower cross bar to remove it off the center

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REAR SEAT BACK CUSHION COVER REPLACEMENT



Fig. 31: Rear Seat Back Cushion Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the rear seat back cushion latch cover. Refer to **Rear Seat Back Cushion Latch Cover Replacement**. 2. Remove the rear seat back cushion. Refer to **Rear Seat Back Cushion Replacement**.	
1	Rear Seat Back Cushion Cover **Procedure** 1. Push rearward on both lower cross bar hinge locks to release the seat back frame. 2. Disengage the J-channel retainers from the seat back cushion frame. 3. Remove the hog rings from the under side of the rear seat back cushion cover. 4. Pull the cover away from the pad to disengage the hook and loop retainers. **Tip:** When installing the rear seat back cover, pull the cover tightly in all corners to ensure

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	that no creasing occurs.

REAR SEAT BACK CUSHION LATCH COVER REPLACEMENT



Fig. 32: Rear Seat Back Cushion Latch Cover
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Rear Seat Back Cushion Latch Cover **Procedure** 1. Lay the seat down before trying to remove the latch cover. 2. Use a flat bladed tool to release both tabs inside the cover to avoid breakage.

REAR SEAT BACK CUSHION FRAME REPLACEMENT

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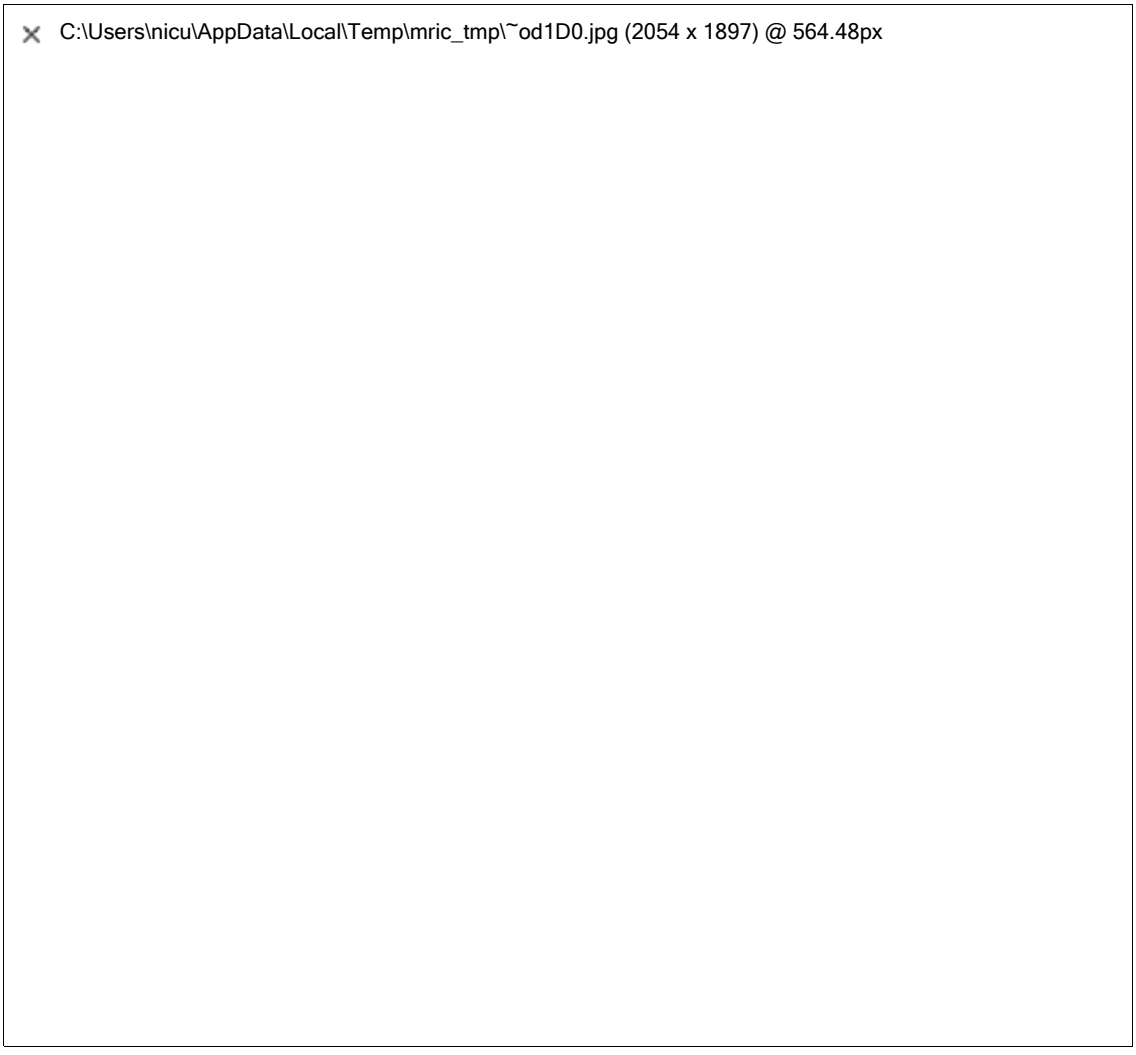


Fig. 33: Rear Seat Back Cushion Frame
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion opening panel. Refer to **Rear Seat Back Cushion Panel Replacement**. 2. Remove the rear seat back cushion latch actuator. Refer to **Rear Seat Back Cushion Stowage Latch Actuator Replacement**.	
1	Rear Seat Back Cushion Frame Assembly **Procedure:** Transfer components as necessary.

REAR SEAT BACK CUSHION STOWAGE LATCH ACTUATOR REPLACEMENT

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Fig. 34: Rear Seat Back Cushion Stowage Latch Actuator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedure 1. Remove the rear seat back cushion latch cable. Refer to **Rear Seat Back Cushion Latch Cable Replacement**. 2. Remove the rear seat back cushion opening panel. Refer to **Rear Seat Back Cushion Panel Replacement**.	
1	Rear Seat Back Cushion Stowage Latch Actuator Retainer (Qty: 4) **CAUTION:** **Refer to Component Fastener Tightening Caution .** **Tighten:** 7.5 N.m (66 lb in)
2	Rear Seat Back Cushion Stowage Latch Actuator Assembly **Procedure:** Disconnect the cable from the latch actuator.

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2010 GENERAL INFORMATION

Squeaks and Rattles - Camaro

DIAGNOSTIC INFORMATION AND PROCEDURES

SQUEAKS AND RATTLES

Special Tools

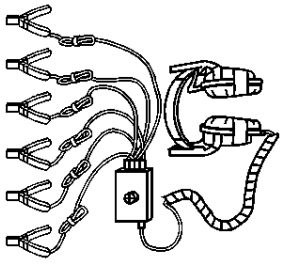
- **J 39570** Chassis Ear
- **J 41416** Ultrasonic Leak Detector

NOTE: **Squeaks and rattles are caused by improperly controlled relative motion between vehicle components. There are 4 ways to prevent squeaks and rattles.**
To aid in diagnosing, use J 39570 or J 41416 .

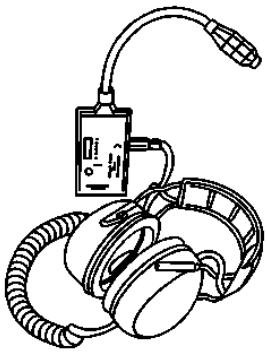
- Attach the component that squeaks or rattles securely.
- Separate the components that squeak or rattle to prevent contact.
- Insulate the components that squeak or rattle.
- Insulate low uniform friction surfaces to eliminate stickslip motion.

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	CH-39570 J 39570 Chassis Ear

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	GE-41416 J 41416 Ultrasonic Leak Detector

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2010 ACCESSORIES & BODY, CAB

Sunroof - Camaro

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Air Outlet Screw	2 N.m	89 lb in
Sunroof Air Deflector Screw	4 N.m	35 lb in
Sunroof Motor/Actuator Bolts	5 N.m	44 lb in
Sunroof Air Deflector Screw	4 N.m	35 lb in
Sunroof Frame to Roof Bolts	10 N.m	89 lb in
Sunroof Window Screws	8.5 N.m	75 lb in

SCHEMATIC AND ROUTING DIAGRAMS

SUNROOF SCHEMATICS

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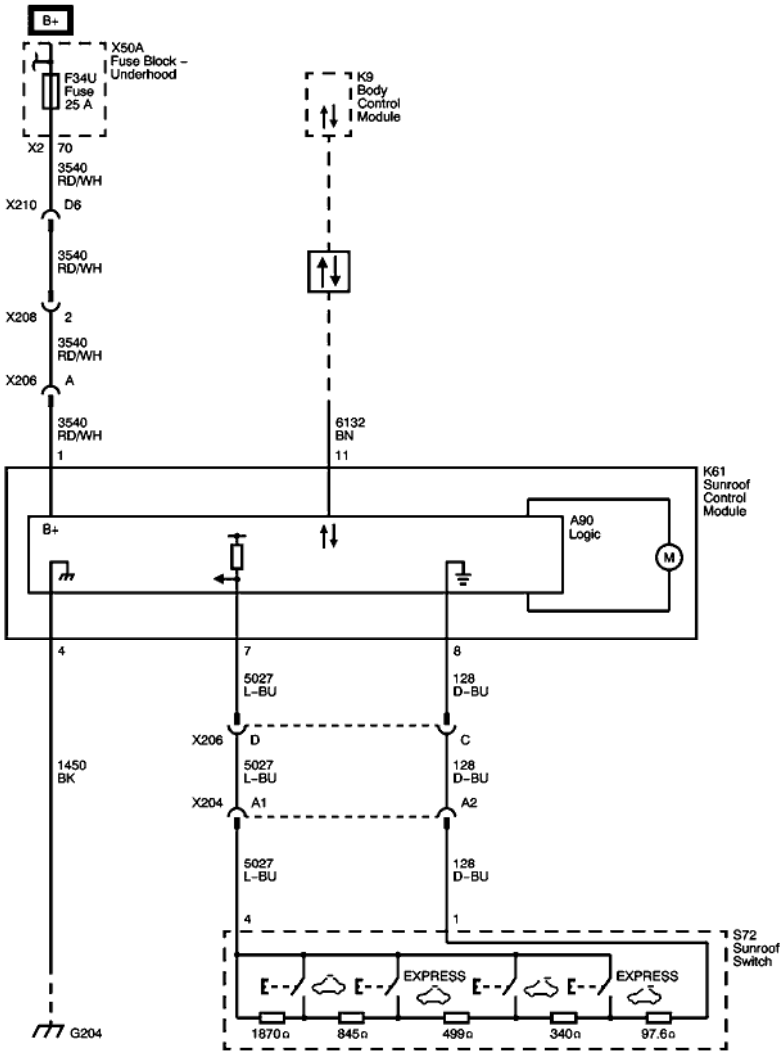


Fig. 1: Sunroof
Courtesy of GENERAL MOTORS CORP.

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
DTC B3664	B3664 02: Sunroof Position Select Switch High Signal Circuit Short to Ground B3664 05: Sunroof Position Select Switch High Signal Circuit High Voltage/Open B3664 59: Sunroof Position Select Switch High Signal Circuit Protection Time-Out

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DTC B3697	B3697 00: Sunroof Actuator Malfunction B3697 39: Sunroof Actuator Internal Malfunction B3697 42: Sunroof Actuator Calibration Not Programmed B3697 4B: Sunroof Actuator Calibration Not Learned

DTC B3664

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 Descriptor

DTC B3664 02

Sunroof Position Select Switch High Signal Circuit Short to Ground

DTC B3664 05

Sunroof Position Select Switch High Signal Circuit High Voltage/Open

DTC B3664 59

Sunroof Position Select Switch High Signal Circuit Protection Time-Out

Diagnostic Fault Information

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

Circuit/System Description

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

Conditions for Running the DTC

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The ignition is ON.

Conditions for Setting the DTC

B3664 02

The sunroof module has detected and reported via the LIN-Bus that the sunroof position select switch high signal circuit is shorted to ground.

B3664 05

The sunroof module has detected and reported via the LIN-Bus that the sunroof position select switch high signal circuit is open or shorted to voltage.

B3664 59

The sunroof module has detected and reported via the LIN-Bus that the sunroof position select switch high signal has been the same active position for 20 s after the glass has stopped moving in the requested direction due to reaching the end of the allowable motion.

Action Taken When the DTC Sets

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

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

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

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- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

NOTE: Because of the accessibility of the sunroof switch, perform the component testing before beginning the Circuit/System Testing.

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch.
2. Test for less than 5 ohms between the low reference circuit terminal 1 and ground.
    - If greater than the specified value, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool sunroof slide switch is short to battery.
    - If not the specified value, test the signal circuit terminal 4 for a short to ground. If the circuit tests normal, replace the K61 Sunroof Control Module.
4. Install a 5 A fused jumper wire between the signal circuit terminal 4 and the ground circuit terminal 1. Verify the scan tool sunroof slide switch is stuck.
    - If not the specified value, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the K61 Sunroof Control Module.
5. If all circuits test normal, test or replace the S72 Sunroof Switch.

Component Testing

Static Test

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch.
2. Test for 3.6-3.7 kohms between the switch terminals 1 and 4.
    - If not within the specified range, replace the S72 Sunroof Switch.
3. Test for 430-440 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the open switch.
    - If not within the specified range, replace the S72 Sunroof Switch.
4. Test for 96-100 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express open switch.
    - If not within the specified range, replace the S72 Sunroof Switch.
5. Test for 1.7-1.8 kohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the close switch.
    - If not within the specified range, replace the S72 Sunroof Switch.
6. Test for 930-940 ohms between the signal terminal 1 and the low reference circuit terminal 4 while pressing the express close switch.
    - If not within the specified range, replace the S72 Sunroof Switch.

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Repair Procedures

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

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

DTC B3697

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 Descriptor

DTC B3697 00

Sunroof Actuator Malfunction

DTC B3697 39

Sunroof Actuator Internal Malfunction

DTC B3697 42

Sunroof Actuator Calibration Not Programmed

DTC B3697 4B

Sunroof Actuator Calibration Not Learned

Circuit/System Description

The sunroof glass is controlled by its own integrated motor/controller containing the necessary electronics, motor, hall effect position sensors, as well as the interface to the driver control switches. The motor/controller is capable of controlling motion based on control switch activation and LIN-Bus message commands from the body control module (BCM).

Conditions for Running the DTC

The ignition is ON.

Conditions for Setting the DTC

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B3697 00

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator has a malfunction.

B3697 39

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator has a internal malfunction.

B3697 42

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator is not programmed.

B3697 4B

The sunroof module has detected and reported via the LIN-Bus that the sunroof actuator calibration is not learned.

Action Taken When the DTC Sets

DTC B3697 is stored in the BCM memory.

Conditions for Clearing the DTC

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

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

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

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Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B3697 42 or DTC B3697 4B is not set.
   - If the DTC is set, program or calibrate the K61 Sunroof Control Module. If the DTC resets, replace the K61 Sunroof Control Module.
2. Replace the K61 Sunroof Control Module.

Repair Procedures

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

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

SYMPTOMS - ROOF

NOTE: Complete the following procedures before using the symptom tables.

1. Perform the **Diagnostic System Check - Vehicle** in order to verify that all of the following conditions are true:
   - There are no DTCs set.
   - The control modules can communicate via the serial data link.
2. Review the system description and operation in order to learn the system functions. Refer to **Sunroof Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the power sunroof system. Refer to **Checking Aftermarket Accessories** .
- Inspect the accessible system components for obvious damage or for conditions which can cause the symptom.

Intermittent

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

Symptom List

Refer to **Power Sunroof Malfunction**.

POWER SUNROOF MALFUNCTION

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Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	1	1	-	-
Sunroof Switch Close Signal	1	1	1	-
Sunroof Switch Open Signal	1	1	1	-
Sunroof Module Ground	-	1	-	-
1. Power Sunroof Malfunction				

Circuit/System Description

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

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

Reference Information

Schematic Reference

Sunroof Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Sunroof Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Ignition ON, press the sunroof switch to the open and close positions. The sunroof should open and close when changing between the commanded states.

Circuit/System Testing

NOTE: Because of the accessibility of the switches, perform the switch component testing before beginning the circuit/system testing.

1. Ignition OFF, disconnect the harness connector at the K61 Sunroof Control Module.
2. Test for less than 5 ohms between the ground circuit terminal 4 and ground.
    - If greater than the specified value, test the ground circuit for an open/high resistance.
3. Verify that a test lamp illuminates between the B+ circuit terminal 1 and ground.
    - If the test lamp does not illuminate, test the B+ circuit for a short to ground or an open/high resistance. If the circuit tests normal and the B+ circuit fuse is open, determine if the K61 Sunroof Control Module is causing the fuse to open. Replace the K61 Sunroof Control Module.
4. Ignition ON, verify that a test lamp does not illuminate between the circuit terminals listed below and ground:
    - Terminal 7
    - Terminal 8
    - If the test lamp does illuminate, test the appropriate circuit for a short to voltage.
5. Ignition OFF, verify that a test lamp does not illuminate between the circuit terminals listed below and B+:
    - Terminal 7
    - Terminal 8
    - If the test lamp does illuminate, test the appropriate circuit for a short to ground.
6. Disconnect the harness connector at the K9 Body Control Module.
7. Test for less than 5 ohms between the signal circuit terminal 11 at the K61 Sunroof Control Module and signal circuit terminal 16 X6 at the K9 Body Control Module.
    - If not the specified value, test the signal circuit for an open/high resistance, short to ground or a short to voltage.
8. Test for infinite resistance between signal circuit terminal 11 at the K61 Sunroof Control Module and ground.
    - If not the specified value, test the signal circuit for a short to ground.

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9. If all circuits test normal, test or replace the K9 Body Control Module.
10. Connect the harness connector at the K9 Body Control Module.
11. Disconnect the harness connector at the S72 Sunroof Switch.
12. Test for less than 5 ohms between the circuit terminals listed below:
    - S72 Sunroof Switch terminal 1 and K61 Sunroof Control Module terminal 8
    - S72 Sunroof Switch terminal 4 and K61 Sunroof Control Module terminal 7
    - If greater than the specified value, test the appropriate circuit for an open/high resistance.
13. If all circuits test normal, test or replace the K61 Sunroof Control Module.

Component Testing

Sunroof Switch

Static Test

1. Ignition OFF, disconnect the harness connector at the S72 Sunroof Switch.
2. Test for 3.5-3.7 kohms between the signal terminal 4 and the low reference circuit terminal 1.
    - If not within the specified range, replace the S72 Sunroof Switch.
3. Test for 430-440 ohms between the signal terminal 4 and the low reference circuit terminal 1 while pressing the open switch.
    - If not within the specified range, replace the S72 Sunroof Switch.
4. Test for 96-100 ohms between the signal terminal 4 and the low reference circuit terminal 1 while pressing the express open switch.
    - If not within the specified range, replace the S72 Sunroof Switch.
5. Test for 1.7-1.8 kohms between the signal terminal 4 and the low reference circuit terminal 1 while pressing the close switch.
    - If not within the specified range, replace the S72 Sunroof Switch.
6. Test for 930-940 ohms between the signal terminal 4 and the low reference circuit terminal 1 while pressing the express close switch.
    - If not within the specified range, replace the S72 Sunroof Switch.

Repair Procedures

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

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

REPAIR INSTRUCTIONS

SUNROOF AIR DEFLECTOR REPLACEMENT

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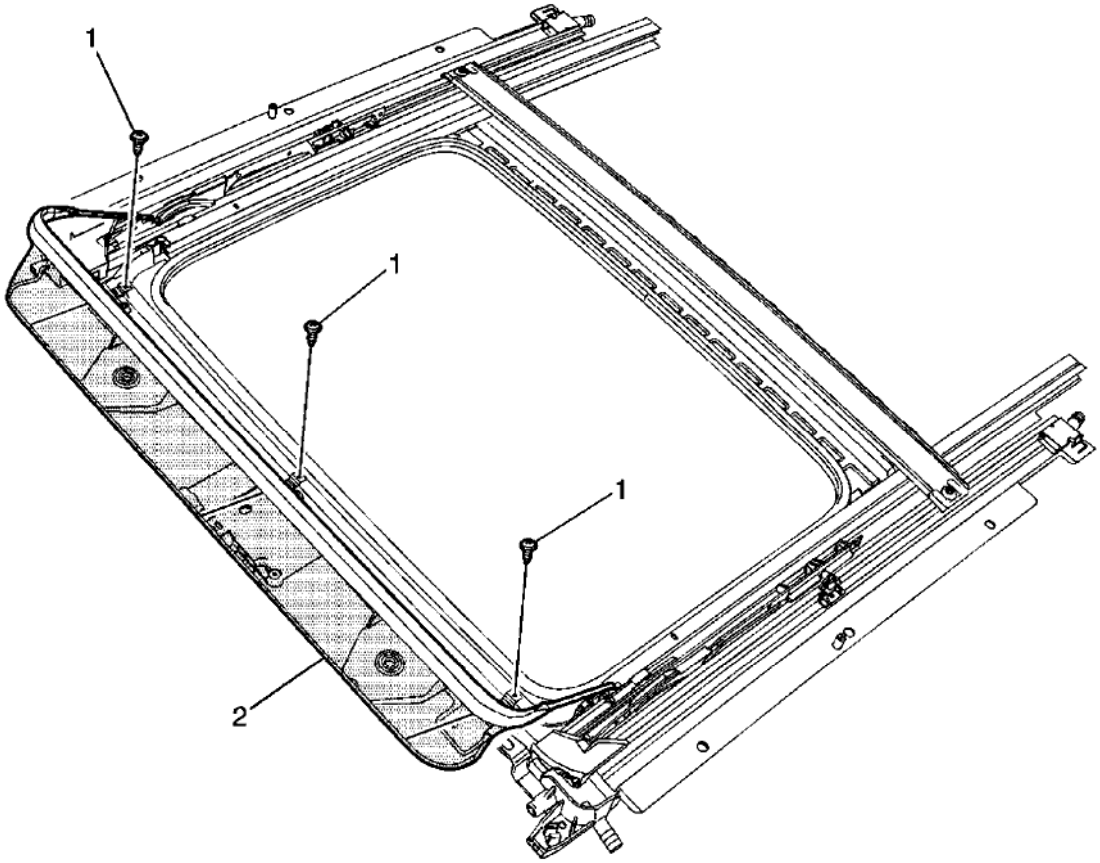


Fig. 2: Sunroof Air Deflector
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Sunroof Air Defector Retainers (Qty: 3) **CAUTION:** **Refer to Fastener Caution .** **Procedures** 1. Open the sunroof window to the fully open position. 2. Release the left and right side of the sunroof air deflector side tension arms from the frame. 3. Use care not to damage the sunroof air deflector screen. **Tighten:** 4 N.m (35 lb in).
2	Sunroof Air Deflector

SUNROOF DRAIN INSPECTION AND CLEANING

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Drain Hose Routing

NOTE: If the headliner is wet DO NOT remove any interior trim. Do the Plugged Drain Hose test first.

A drain trough encircles the sunroof window panel and water is drained off by the drain hoses located at each corner of the housing. A drain channel spans across the sunroof module at the rear of the window panel and directs water into the trough.

1. The front drain hoses are routed down the windshield pillars and out the center of the pillar between the door hinges. The front hoses are installed in a rubber grommet and retained by clips.
2. The rear drain hoses are routed around the trunk opening just below the back glass. In some vehicle the drain hoses are routed out through the metal roof slots and routed to the lower wheelhouse to drain out of the vehicle. The rear hoses are installed in a rubber grommet and retained by clips.

Plugged Drain Hose

If a waterleak has occurred check for a plugged drain hose at each corner of drainage system.

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

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

3. Use compressed air, 241 kPa (35 psi) or less to blow out any drain hose that is plugged.
4. Test the system again.
5. If the hose remains plugged, check to see it is properly routed and does not have a kink. Refer to **Sunroof Housing Front Drain Hose Replacement** or **Sunroof Housing Rear Drain Hose Replacement**.
6. Remove the blockage using the following steps.
    1. Push mechanics wire through the hose to remove the obstruction.
    2. Use compressed air in order to blow out any remaining material.

Disconnected Drain Hose

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

1. Open the sunroof window panel.
2. Lower the headliner as needed. Refer to **Headlining Trim Panel Replacement** .
3. Connect any disconnected hoses and replace the tie strap if necessary.
4. Ensure that the rear drain hoses are properly routed in the metal roof slot and taped in place.

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SUNROOF FRAME REPLACEMENT

Removal Procedure

NOTE: A new sunroof frame does not include the sunroof window or the sunshade as components. You must install the old sunroof window and sunshade to the new sunroof frame.

1. Remove the sunshade panel. Refer to **Sunroof Sunshade Replacement**.
2. Remove the sunroof window. Refer to **Sunroof Window Replacement**.
3. It is only necessary to lower the headliner. Only do the steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to **Headlining Trim Panel Replacement** .
4. Disconnect the electrical connector to the sunroof actuator/motor.
5. Disconnect the electrical connector from the sunroof frame.

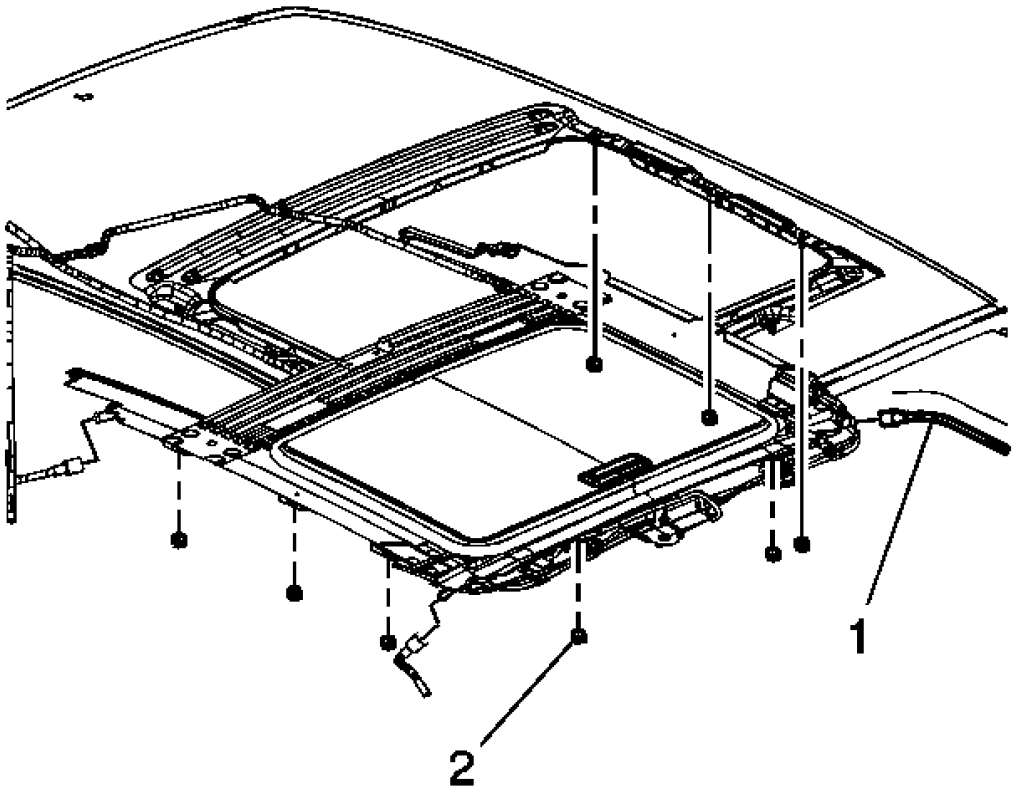


Fig. 3: Sunroof Module Assembly
Courtesy of GENERAL MOTORS CORP.

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6. Disconnect the front and rear drain hoses (1) from the drain spouts on the sunroof frame. Refer to **Sunroof Housing Front Drain Hose Replacement** and **Sunroof Housing Rear Drain Hose Replacement**.

NOTE: Remove the 2 center bolts last in order to help support the sunroof frame to the roof ring.

7. Remove the sunroof frame bolts (2) from the roof.
8. Remove the center bolts from the sunroof frame.
9. With the aid of an assistant, lower and remove the sunroof frame out through the passenger side door.

Installation Procedure

1. Transfer all the necessary components to the new module.

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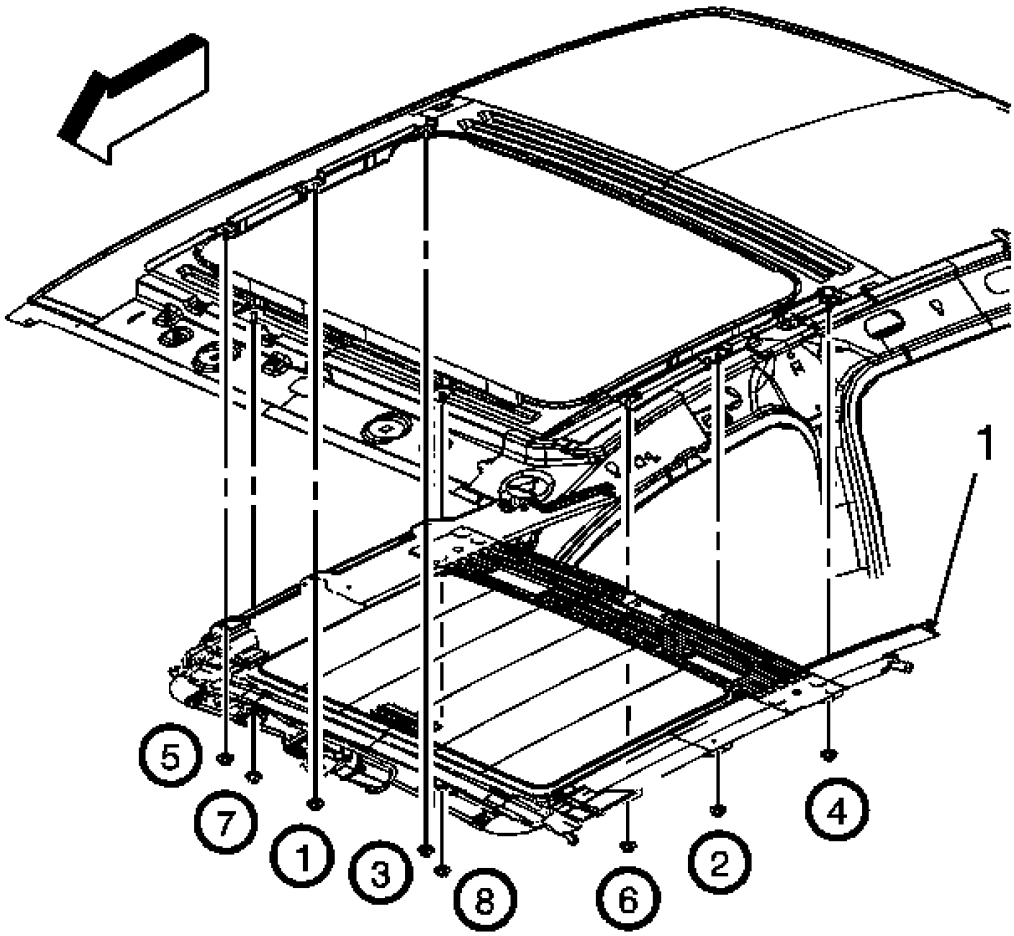


Fig. 4: Sunroof Module To Roof Nut Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

2. With the aid of an assistant, position the new sunroof frame to the studs located on the roof ring.
3. Install the center sunroof frame to roof bolts (1, 2) and tighten by hand.

CAUTION: Refer to Fastener Caution .

4. Install the remaining sunroof frame (1) bolts to the frame in sequence (3-8) and tighten to 10 N.m (89 lb in).

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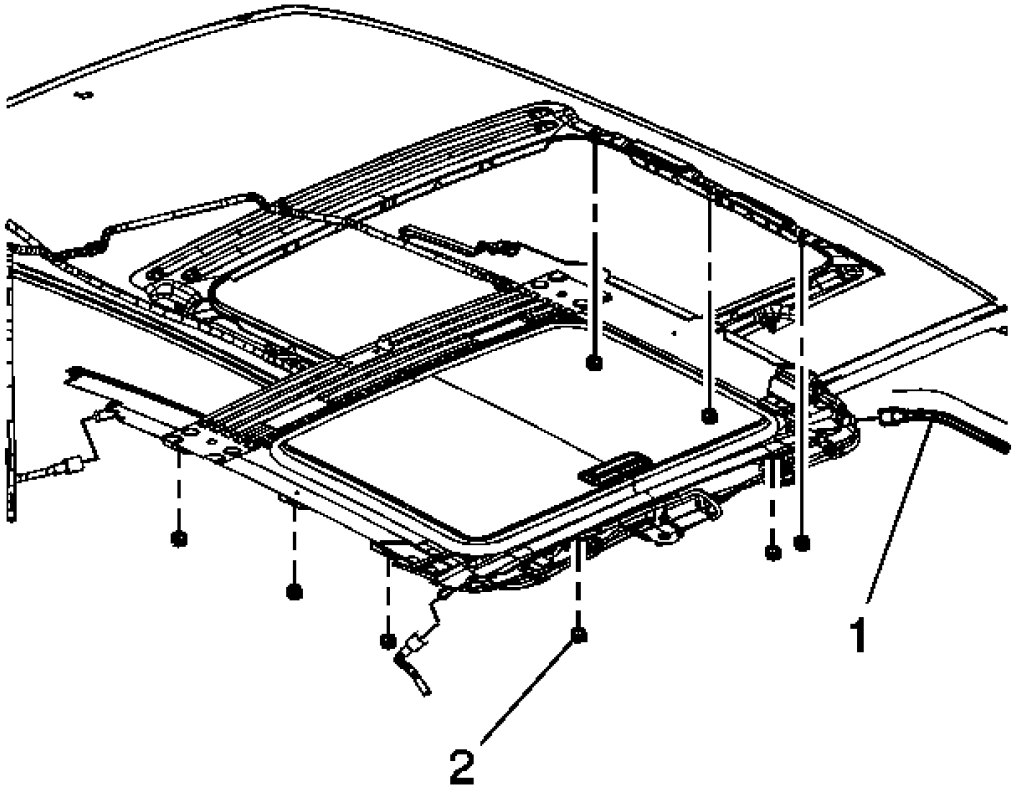


Fig. 5: Sunroof Module Assembly
Courtesy of GENERAL MOTORS CORP.

5. Connect the front and rear drain hoses (1) to the drain spouts on the sunroof frame. Refer to **Sunroof Housing Front Drain Hose Replacement** and **Sunroof Housing Rear Drain Hose Replacement**.
6. Install the sunroof window to the new sunroof frame. Refer to **Sunroof Window Replacement**.
7. Install the sunshade panel to the new sunroof frame. Refer to **Sunroof Sunshade Replacement**.
8. Connect the electrical connector to the sunroof actuator/motor.
9. Secure the harness to the sunroof frame.
10. Verify the proper operation of the sunroof before securing the headliner. Refer to **Sunroof Motor/Actuator Initialization/Teach Process (New Motor)** or **Sunroof Motor/Actuator Initialization/Teach Process (Existing Motor)**.
11. Install the headliner. Refer to **Headlining Trim Panel Replacement** .

SUNROOF HOUSING FRONT DRAIN HOSE REPLACEMENT

Removal Procedure

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

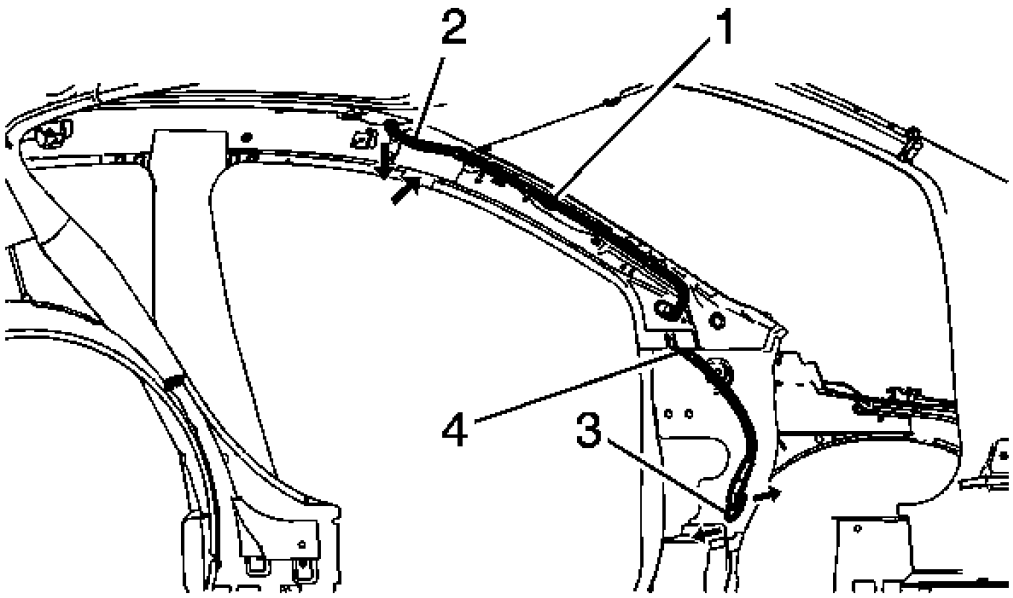


Fig. 6: Front Drain Hose Components
Courtesy of GENERAL MOTORS CORP.

2. Remove the front drain hose (1) from the sunroof frame.
3. Disengage the sunroof drain hose from the attachment points (2) on the windshield pillar.
4. Remove the body hinge pillar trim panel. Refer to **Body Hinge Pillar Trim Panel Replacement** .
5. Pull the front drain hose grommet (3) out of the front lower hinge pillar.
6. Tie a 3-foot length of string onto the lower end of the front drain hose.
7. Remove the hose through the top of the I/P. Do NOT pull the string all of the way out.
8. Remove the left and right air outlet duct and screw.
9. Disconnect the string from the hose.

Installation Procedure

1. Attach the string used in the removal procedure to the lower end of the drain hose.
2. Pulling the hose in place with the string, route the front drain hose down the windshield post and into the front lower hinge pillar.

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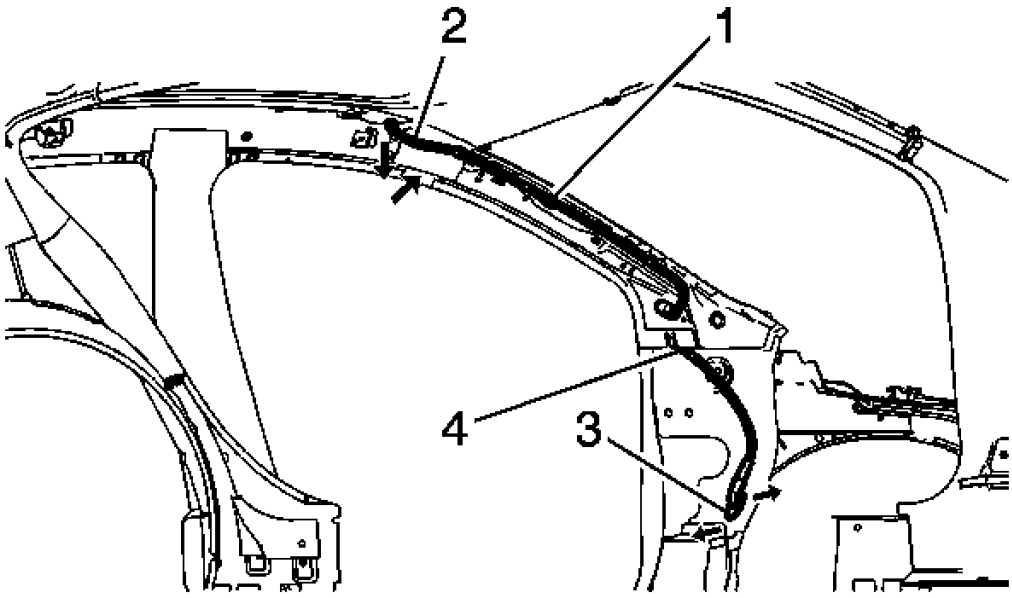


Fig. 7: Front Drain Hose Components
Courtesy of GENERAL MOTORS CORP.

3. Push the drain hose into the hole in the front lower hinge pillar. Insert approximately 25 mm (1 in) of drain hose into the hole.
4. Connect the drain hose (1) to the sunroof frame.
5. Connect the front drain hose to the attachments points (2) on the windshield pillar.
6. Install the front drain hose grommet (3) in the front lower hinge pillar.
7. Install the body hinge pillar trim panel. Refer to **Body Hinge Pillar Trim Panel Replacement** .
8. Install the left and right air outlet duct.

CAUTION: Refer to Fastener Caution .

9. Install the outlet screw. Tighten the door striker bolts to 2 N.m (89 lb in).
10. Install the carpet retainer.
11. Install the headliner. Refer to **Headlining Trim Panel Replacement** .

SUNROOF HOUSING REAR DRAIN HOSE REPLACEMENT

Removal Procedure

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

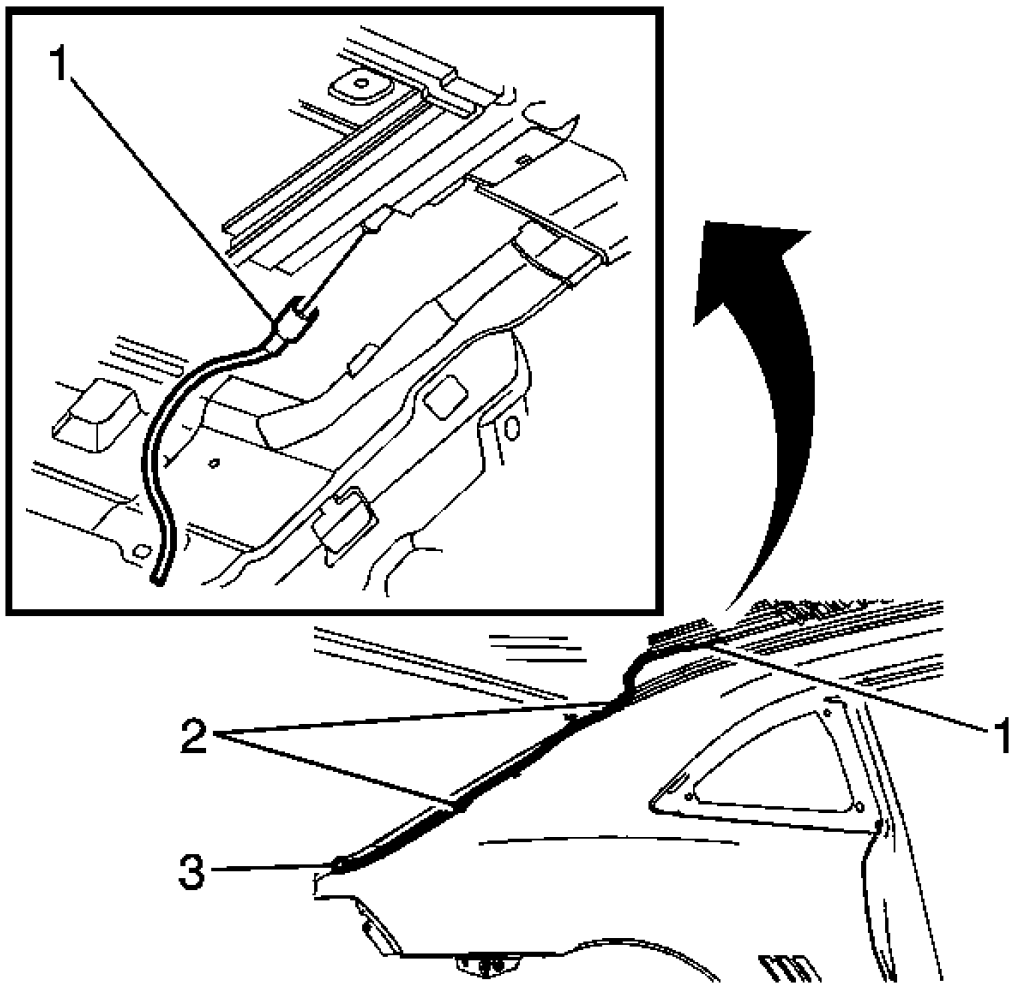


Fig. 8: Rear Drain Hose Components
Courtesy of GENERAL MOTORS CORP.

2. Remove the rear drain hose from the sunroof frame (1).
3. Disengage the sunroof drain hose from the attachment points (2) on the rear body side quarter panel.
4. Remove the rear window panel trim. Refer to **Rear Window Panel Trim Replacement** .
5. Pull the sunroof drain hose and grommet (3) out of the rear compartment panel.
6. Pull the rear drain hose out of the rear compartment. Remove the rear drain hose.

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Installation Procedure

1. Route the rear drain hose down the rear body side quarter panel.

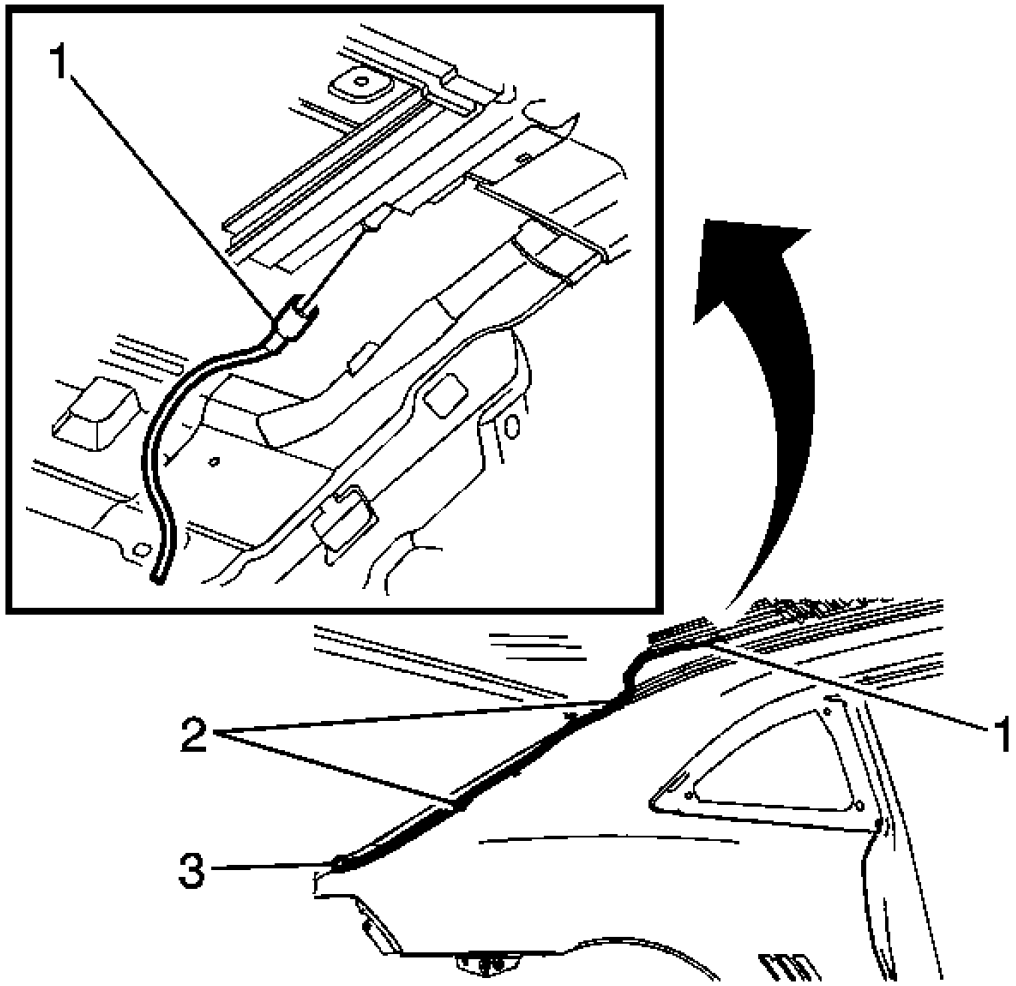


Fig. 9: Rear Drain Hose Components
Courtesy of GENERAL MOTORS CORP.

2. Connect the rear drain hose to the sunroof frame (1).
3. Connect the rear drain hose to the attachments points (2) on the rear body side quarter panel.
4. Install the rear window panel trim. Refer to **Rear Window Panel Trim Replacement** .
5. Push the rear drain hose and grommet (3) into the hole in the rear compartment panel until the grommet is fully engaged.

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6. Install the rear window panel trim. Refer to **Rear Window Panel Trim Replacement** .
7. Install the rear compartment trim panel. Refer to **Rear Compartment Side Trim Panel Replacement** .
8. Install the headliner. Refer to **Headlining Trim Panel Replacement** .

SUNROOF OPENING TRIM FINISH LACE REPLACEMENT

Removal Procedure

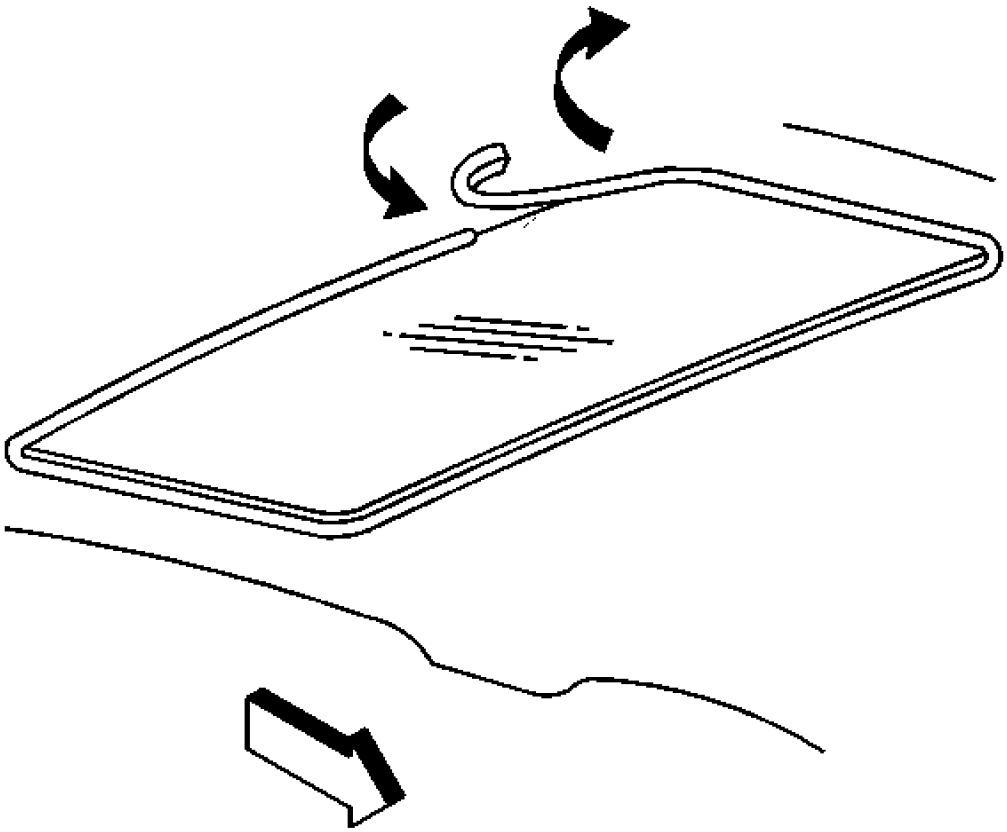


Fig. 10: View Of Sunroof Finishing Lace
Courtesy of GENERAL MOTORS CORP.

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

Installation Procedure

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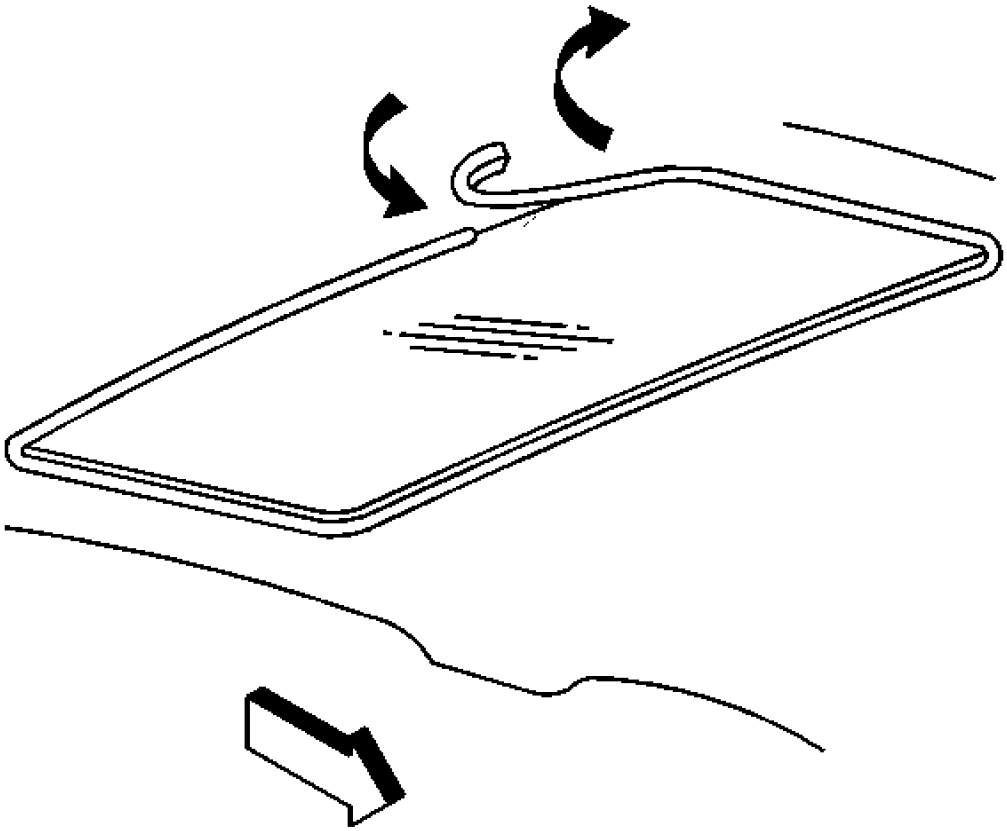


Fig. 11: View Of Sunroof Finishing Lace
Courtesy of GENERAL MOTORS CORP.

1. Position the end of the sunroof finishing lace at the center of the rear center of the sunroof opening.

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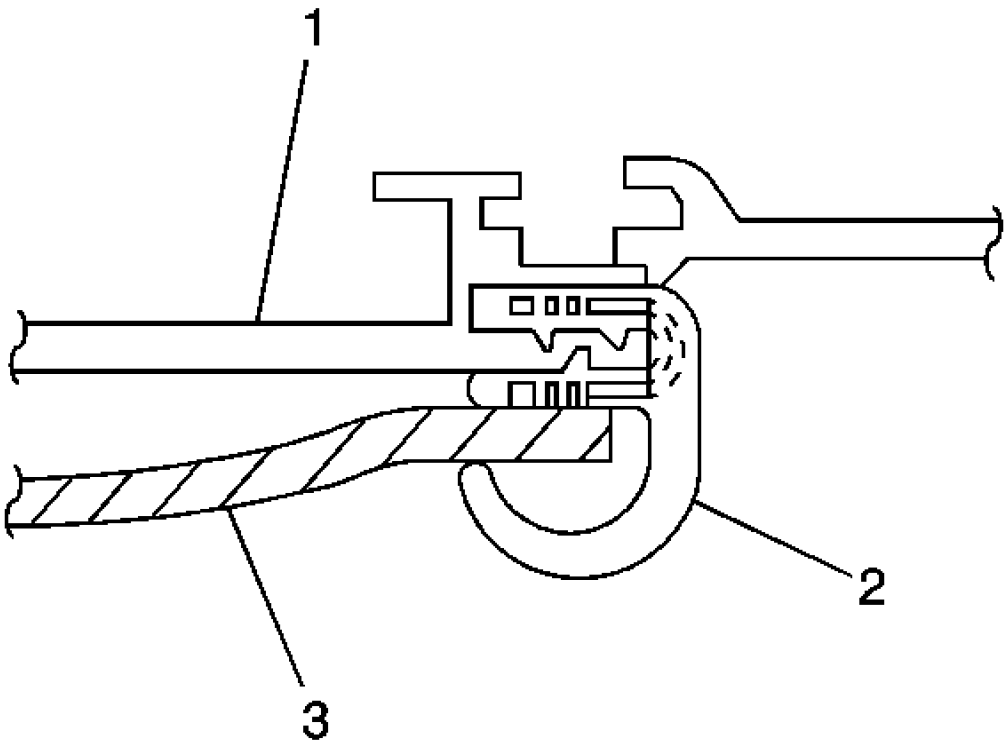


Fig. 12: Pushing Finishing Lace Onto Track Assembly Flange
Courtesy of GENERAL MOTORS CORP.

2. Push the finishing lace (2) onto the track assembly flange (1) until fully seated around the sunroof opening.
3. Pull the finishing lace draw cord toward the sunroof opening. Remove the cord from the periphery of the opening.
4. Ensure that the finishing lace (2) is properly seated over the outer surface of the headliner (3).

SUNROOF MOTOR/ACTUATOR INITIALIZATION/TEACH PROCESS (NEW MOTOR)

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

1. Ensure that the electrical harness on the headliner is connected to the sunroof motor.
2. Put the ignition in the RUN position.
3. Re-initialization (Normalization), press "Manual Close Switch" until the sunroof window reaches the Close Position or stops moving.
4. Release the switch.

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5. Press "Manual Close Switch" for more than 10 seconds until the sunroof window starts and reaches the hard stop.
6. Verify the operation of the sunroof.

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

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

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

SUNROOF MOTOR/ACTUATOR INITIALIZATION/TEACH PROCESS (EXISTING MOTOR)

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

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

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

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

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

SUNROOF ACTUATOR MOTOR REPLACEMENT

Removal Procedure

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

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Replacement .

NOTE: If the sunroof window is partially closed, remove the actuator/motor first before moving the sunroof window forward to the close position.

2. Disconnect the actuator/motor harness from the sunroof frame.
3. Disconnect the electrical connector from the sunroof actuator/motor.

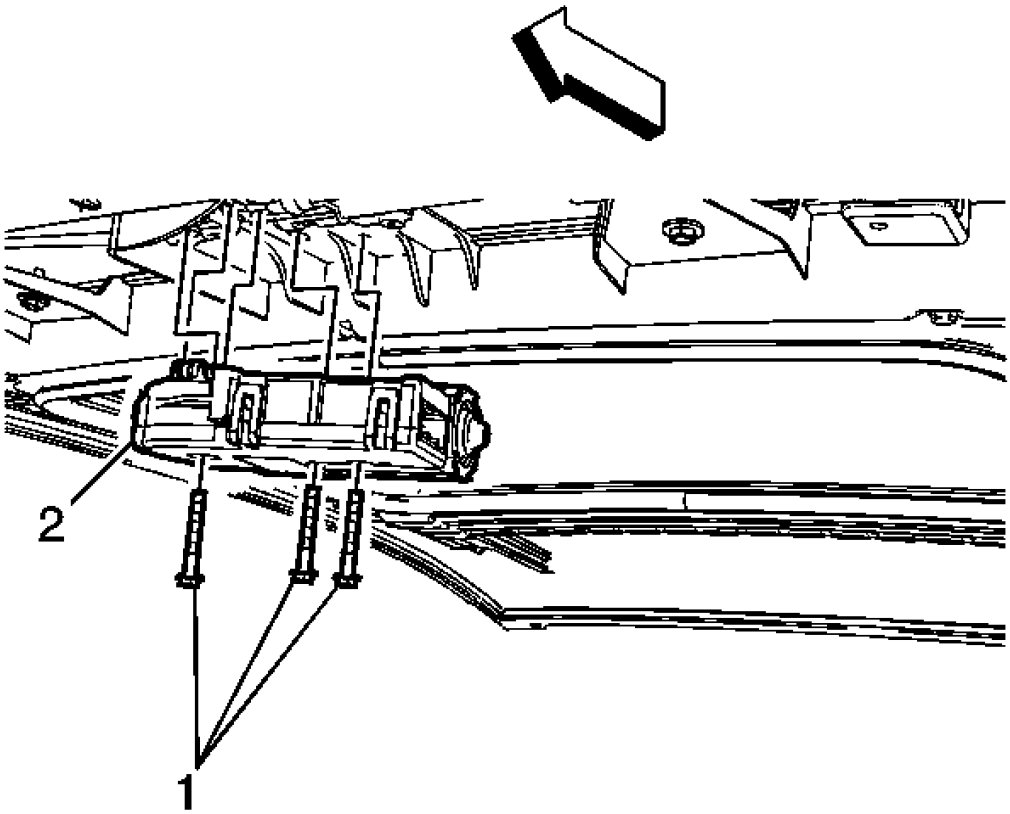


Fig. 13: Sunroof Actuator/Motor & Bolts
Courtesy of GENERAL MOTORS CORP.

4. Remove the sunroof actuator/motor bolts (1) from the sunroof frame.
5. Remove the sunroof actuator/motor (2) from the sunroof frame.

Installation Procedure

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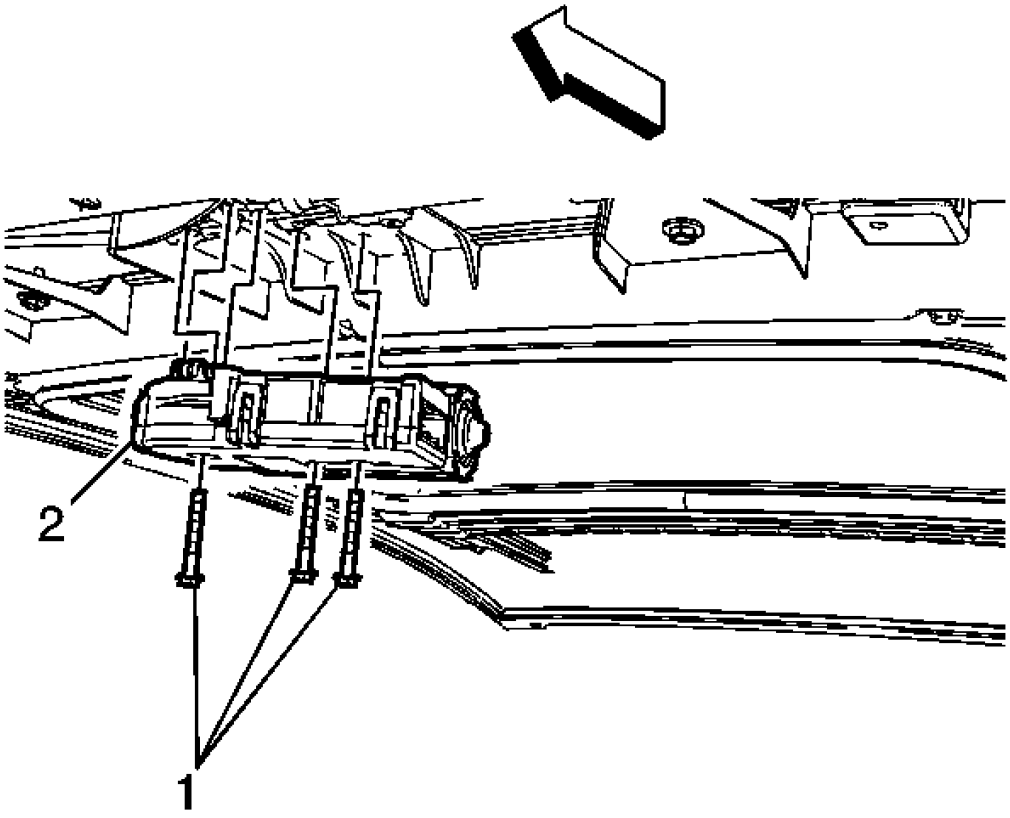


Fig. 14: Sunroof Actuator/Motor & Bolts
Courtesy of GENERAL MOTORS CORP.

1. Install the sunroof actuator/motor (2) to the sunroof frame.

CAUTION: Refer to Fastener Caution .

2. Install the sunroof actuator/motor bolts (1) and tighten to 5 N.m (44 lb in).
3. Connect the electrical connector to the sunroof actuator/motor.
4. Secure the electrical harness to the sunroof frame.
5. Ensure the motor/actuator initialization teach process has been done. Refer to **Sunroof Motor/Actuator Initialization/Teach Process (New Motor)** or **Sunroof Motor/Actuator Initialization/Teach Process (Existing Motor)**.
6. Verify the proper operation of the sunroof before securing the headliner.
7. Install the headliner. Refer to **Headlining Trim Panel Replacement** .

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SUNROOF SUNSHADE REPLACEMENT

Removal Procedure

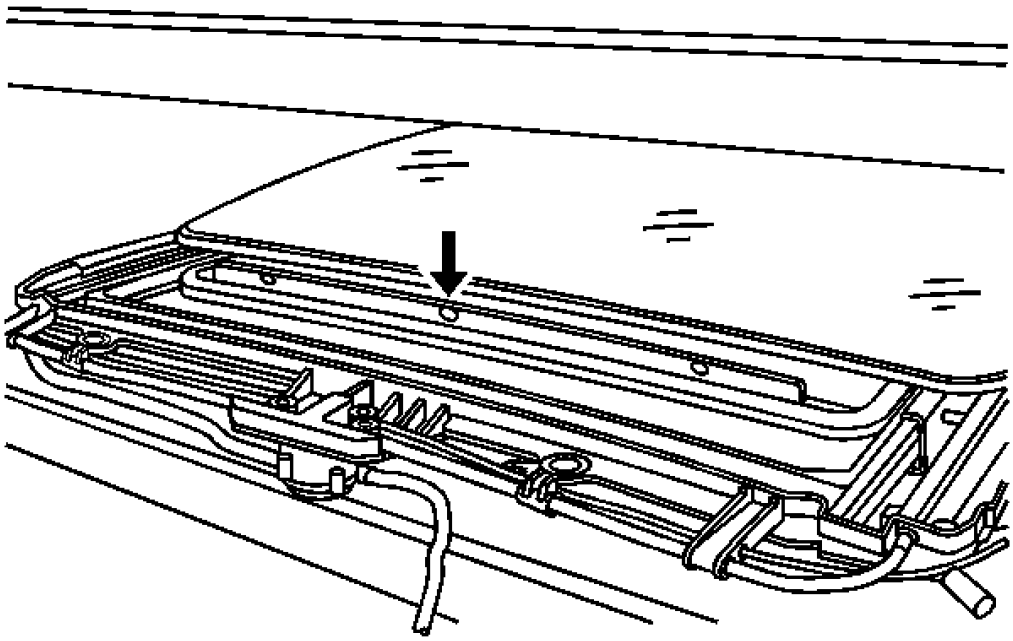


Fig. 15: Locating Sunshade
Courtesy of GENERAL MOTORS CORP.

1. Cycle the sunroof window to the partially open position.
2. Pull downward on the sunshade. Cycle the sunroof to full open position. Disengage the sunshade from the sunroof glass panel.

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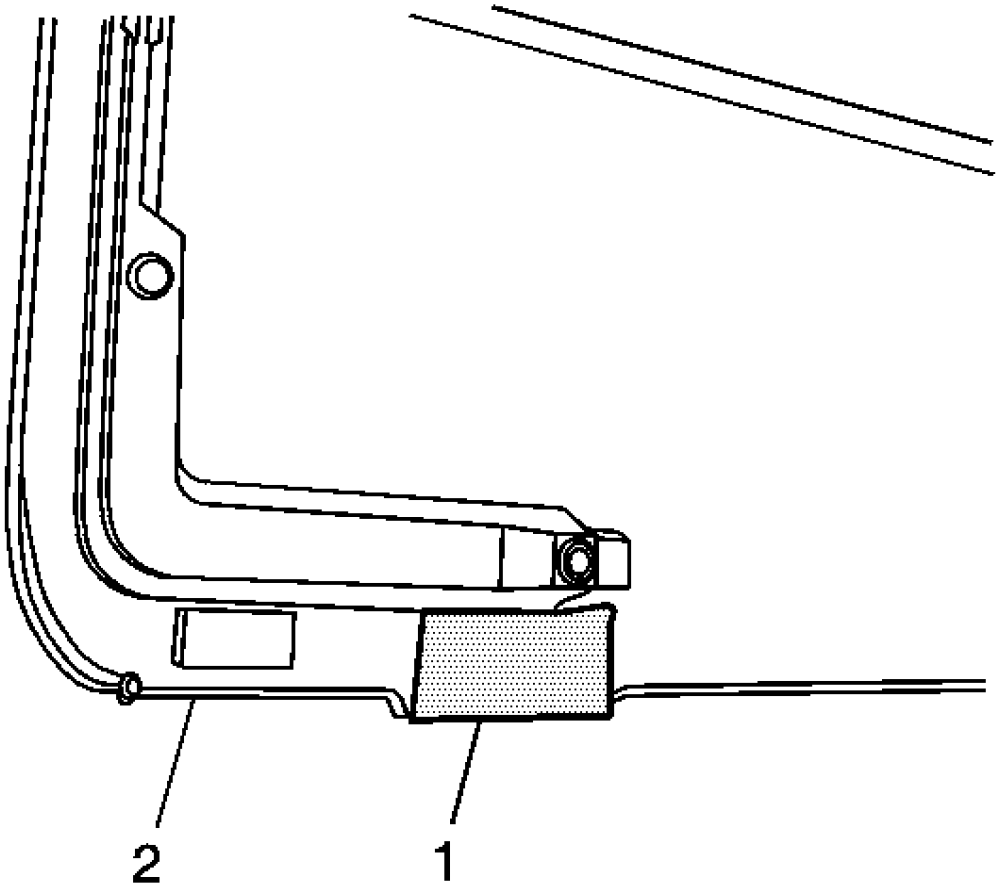


Fig. 16: Identifying Front Edge Of Sunshade Panel Slider Pad
Courtesy of GENERAL MOTORS CORP.

3. Depress the panel (2) to one side of the track.
4. Carefully arch the sunshade upward at the forward center edge.
5. Carefully lift the front edge (1) of the sunshade upward out of the track.

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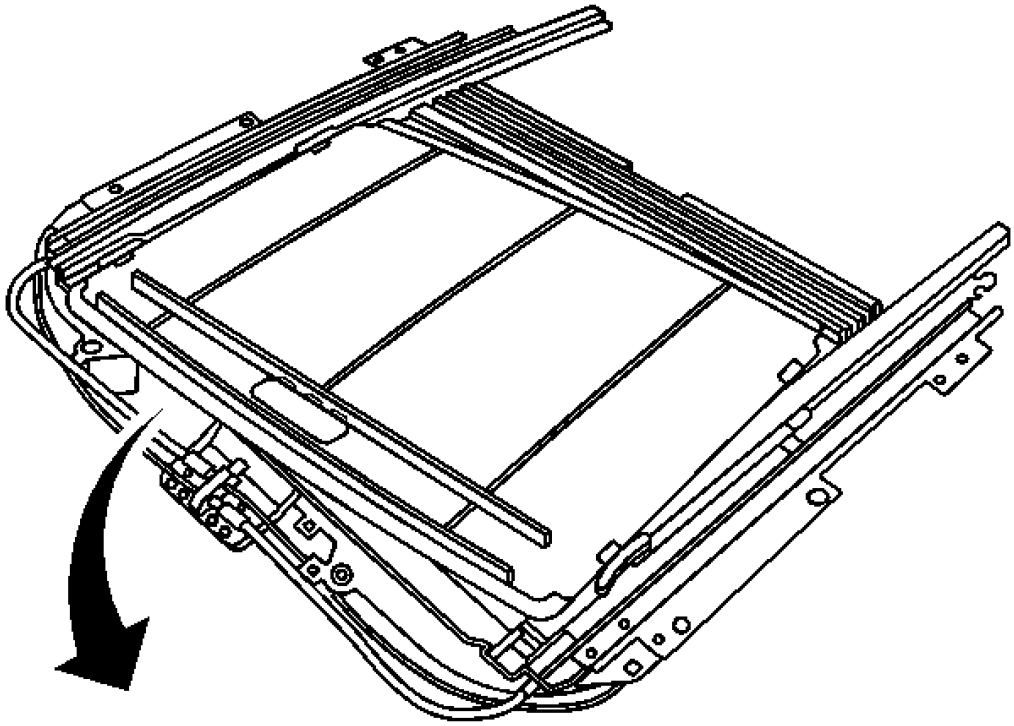


Fig. 17: View Of Sunshade & Track Assembly
Courtesy of GENERAL MOTORS CORP.

6. Slightly rotate the sunshade panel in order to remove the panel from the track.
7. Carefully remove the sunshade panel upward from the sunroof frame.

Installation Procedure

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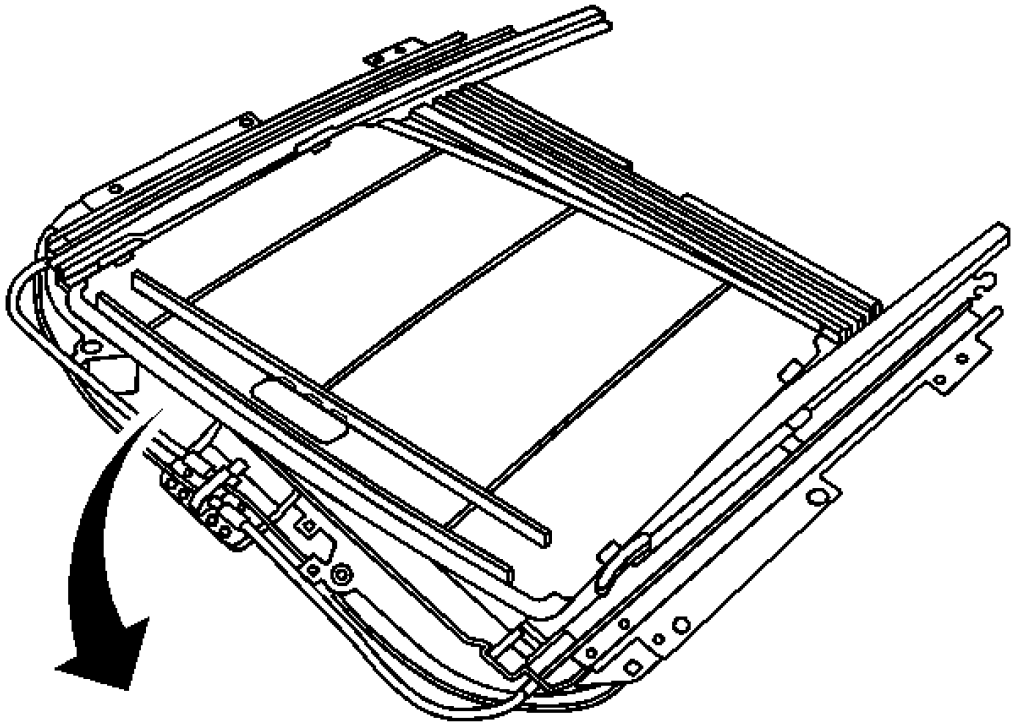


Fig. 18: View Of Sunshade & Track Assembly
Courtesy of GENERAL MOTORS CORP.

1. Position rear edge of the sunshade panel to the track.
2. Ensure that the slider pad at the rear is positioned into the track.
3. Depress the rear slider pad on the opposite side of the sunshade panel and release it into the track.

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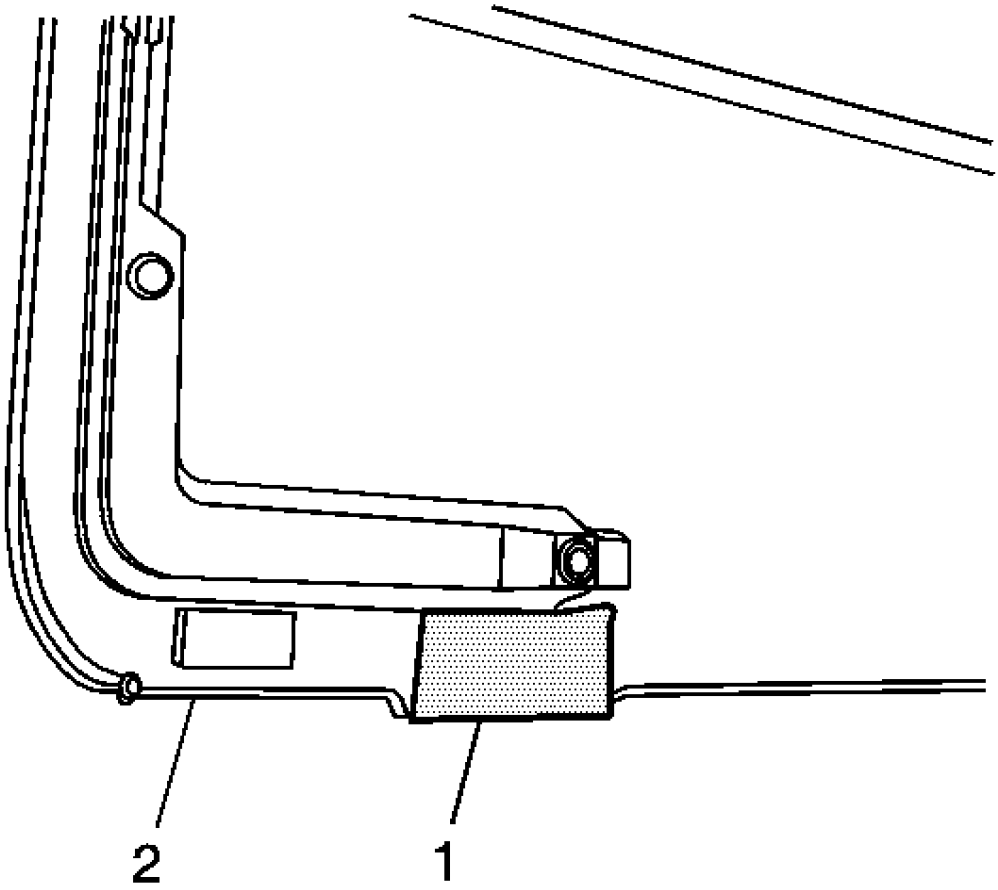


Fig. 19: Identifying Front Edge Of Sunshade Panel Slider Pad
Courtesy of GENERAL MOTORS CORP.

4. Install the front edge (1) of the sunshade panel slider pad into the track.
5. Arch the forward edge of the sunshade in order to insert it into sunshade track.
6. Install the slider pad into the track and release.
7. Slide the sunshade panel forward and rearward to ensure free operation is present.
8. With the sunshade partially open, pull downward on the sunshade. Cycle the sunroof to the vent position, allowing the glass panel to travel past the sunshade front edge.

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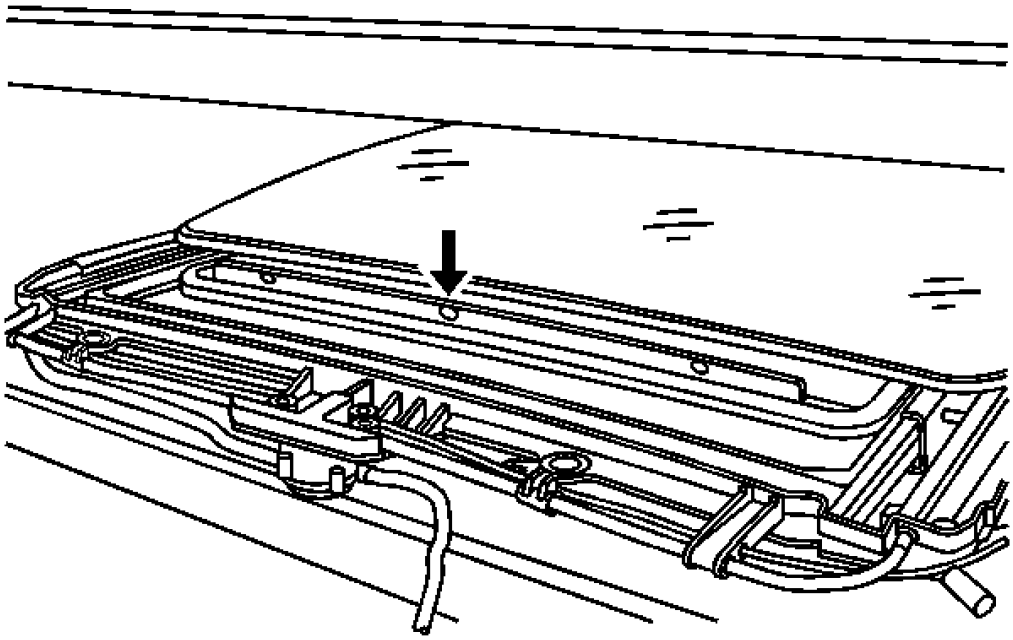


Fig. 20: Locating Sunshade
Courtesy of GENERAL MOTORS CORP.

9. Release the sunshade. Cycle the sunroof to the open position. Inspect for proper engagement of the sunroof glass panel and the sunshade panel.

SUNROOF OPENING POSITION SWITCH REPLACEMENT

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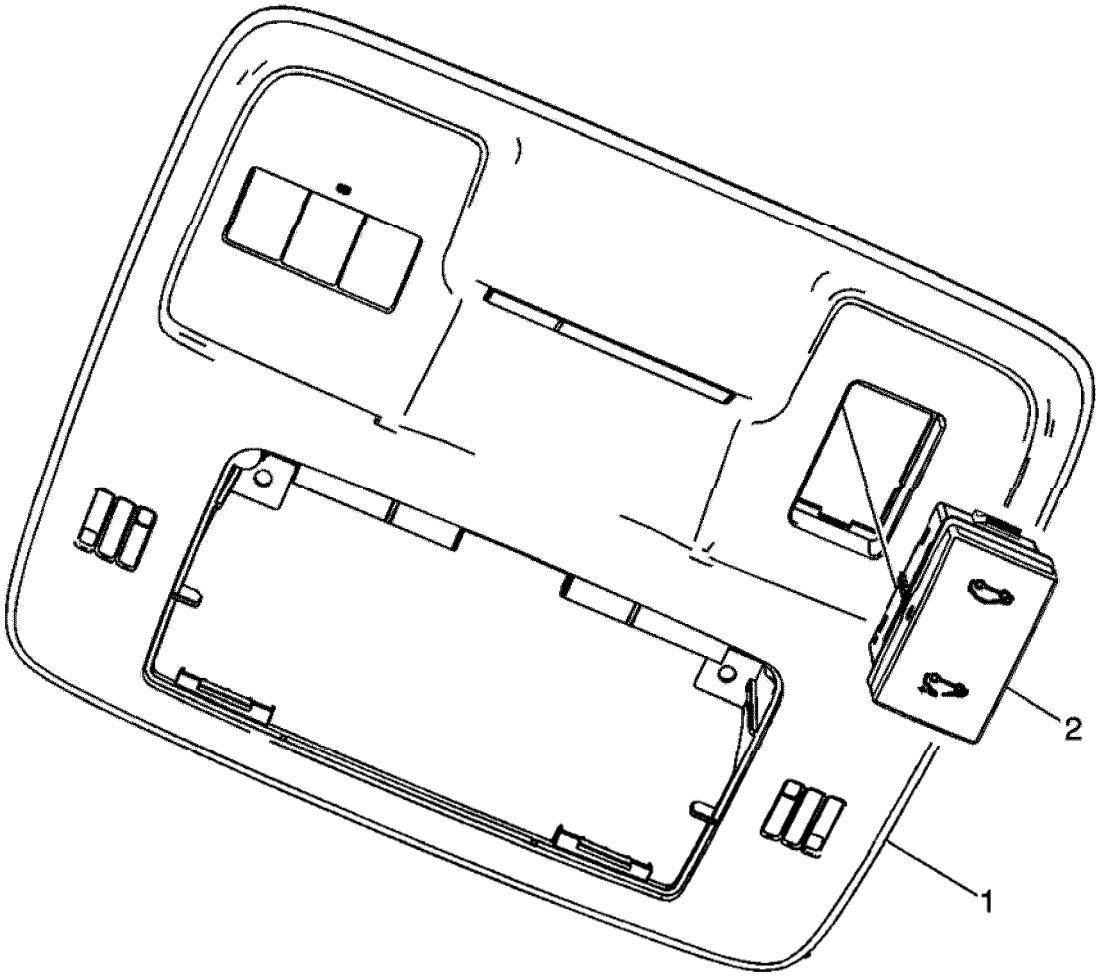


Fig. 21: Sunroof Opening Position Switch
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Roof Console Refer to **Roof Console Replacement**
2	Sunroof Switch **Procedure:** Unsnap the switch from the roof console.

SUNROOF WINDOW HEIGHT AND OPENING FIT ADJUSTMENT

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

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

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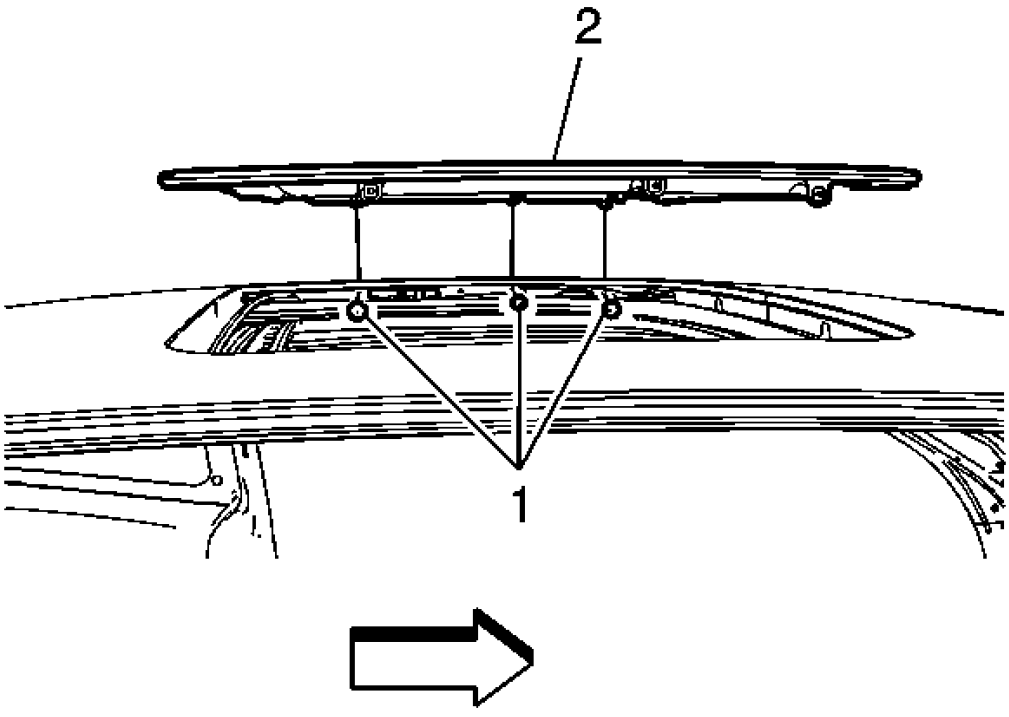


Fig. 22: Sunroof Window Screws
Courtesy of GENERAL MOTORS CORP.

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

2. Loosen the adjusting screws on the window.
3. Adjust the corners of the front window panel using the following guidelines:
   - Adjust the front of the sunroof window to 0.0 mm - 1.0 mm (0.0 in - 0.04 in) below the top surface of the roof panel.
   - Adjust the rear center line of the sunroof window to 2 mm - 3 mm (0.08 in - 0.12 in) above the top surface of the roof panel.

CAUTION: Refer to Fastener Caution

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

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SUNROOF WINDOW REPLACEMENT

Removal Procedure

1. Slide the sunshade rearward.

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

2. Cycle the sunroof window to the vent position.

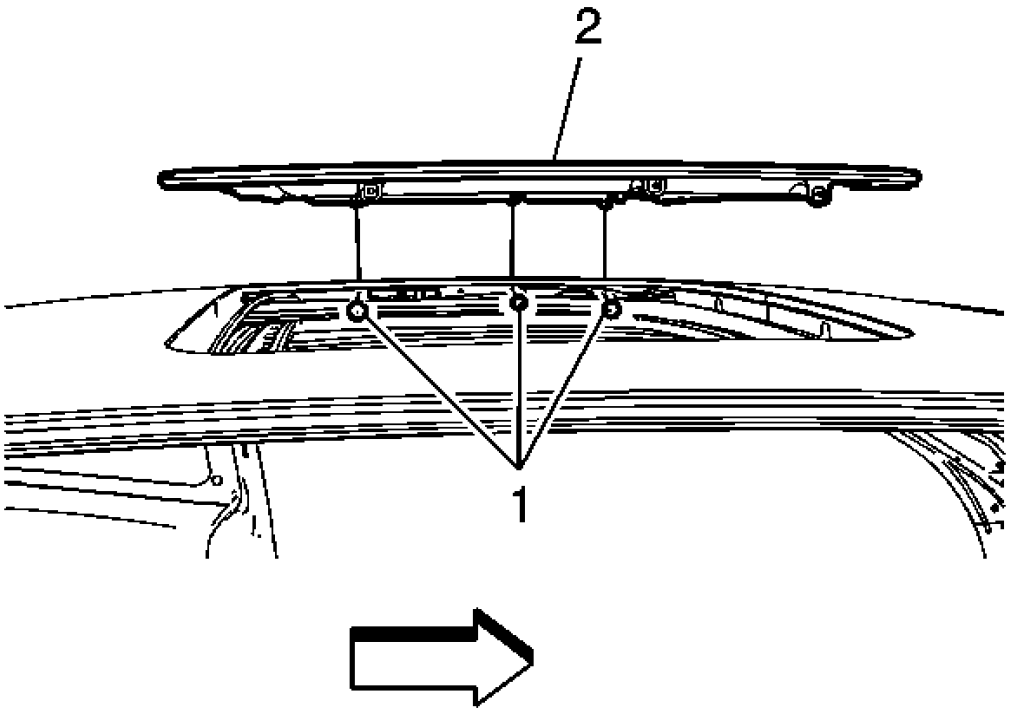


Fig. 23: Sunroof Window Screws
Courtesy of GENERAL MOTORS CORP.

3. Remove the sunroof window screws (1) from the window (2) on each side.

NOTE: Do NOT scratch the roof surface or the sunroof window.

4. Lift the sunroof window from the sunroof opening.

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Installation Procedure

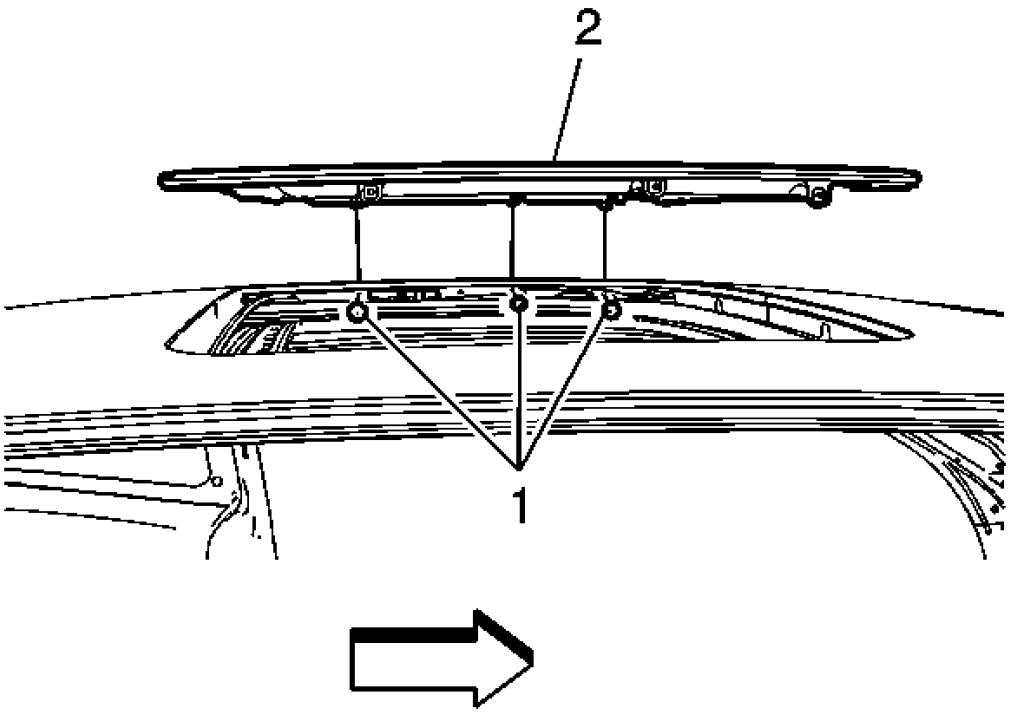


Fig. 24: Sunroof Window Screws
Courtesy of GENERAL MOTORS CORP.

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

CAUTION: Refer to Fastener Caution .

3. Install the sunroof window screws (1) to each side of the window (2). Do not tighten the screws.

   Tighten the screws to 8.5 N.m (75 lb in).

4. Carefully close the sunroof window from the vent position to the full closed position.
5. Adjust the sunroof window. Refer to **Sunroof Window Height and Opening Fit Adjustment**.
6. Close the sunshade.

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7. Cycle the sunroof window to ensure proper operation and fit.

DESCRIPTION AND OPERATION

SUNROOF DESCRIPTION AND OPERATION

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

The electrical portion of the slide sunroof system consists of:

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

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

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

The sunroof glass is controlled by a integrated motor/controller containing the necessary electronics, motor, hall effect position sensors, as well as the interface to the driver control switches. The motor/controller is capable of controlling motion based on control switch activation and LIN-Bus message commands from the system master.

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

Sunroof Glass Control Switch

The sunroof control switch is connected directly to the controller. The sliding glass switch provide detent positions for open, express open, off, and close. The control switch completes the circuit between two signals provided by the control module, a reference ground input and a pull-up voltage provided by an analog to digital switch input. The control switch place a different resistor ladder network in the circuit depending on the function selected. The controllers analog to digital switch input reads the resulting voltage range and determines the appropriate function.

System Protection Functions

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

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Motor stall

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

Sunroof System Thermal Protection

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

Sunroof Operation

Sliding Class

Normal Open

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

Express Open

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

Normal Close

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

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Waterleaks - Camaro

DIAGNOSTIC INFORMATION AND PROCEDURES

WATERLEAK TEST PREPARATION

- GM vehicles are designed to operate under normal environmental conditions.
- The design criteria for sealing materials and components takes into consideration the sealing forces required to withstand the natural elements. These specifications cannot take into consideration any artificial conditions, i.e., high pressure car washes.
- The water leak test procedure has been correlated to the natural elements and will determine the ability of a vehicle to perform under normal operating conditions.
- The first step in diagnosing a leak is determining the conditions under which a leak occurs. If the general leak area can be found, the exact entry point can be isolated using a water hose or an air hose. Some trim panels or components may need to be removed in order to repair the leak.
- If leaks are found around a door, door window, rear compartment lid or liftgate area this does not necessarily indicate a bad weatherstrip. An adjustment to these areas may resolve the condition.

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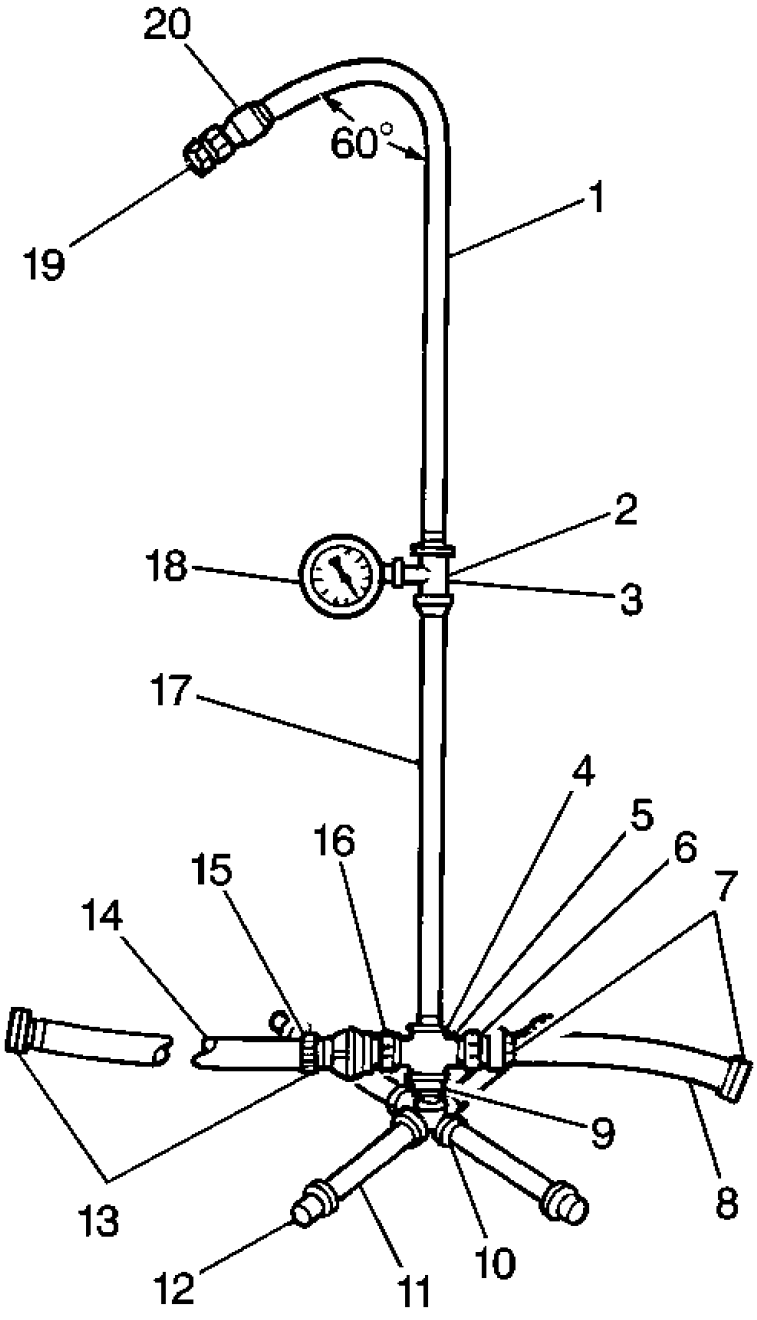


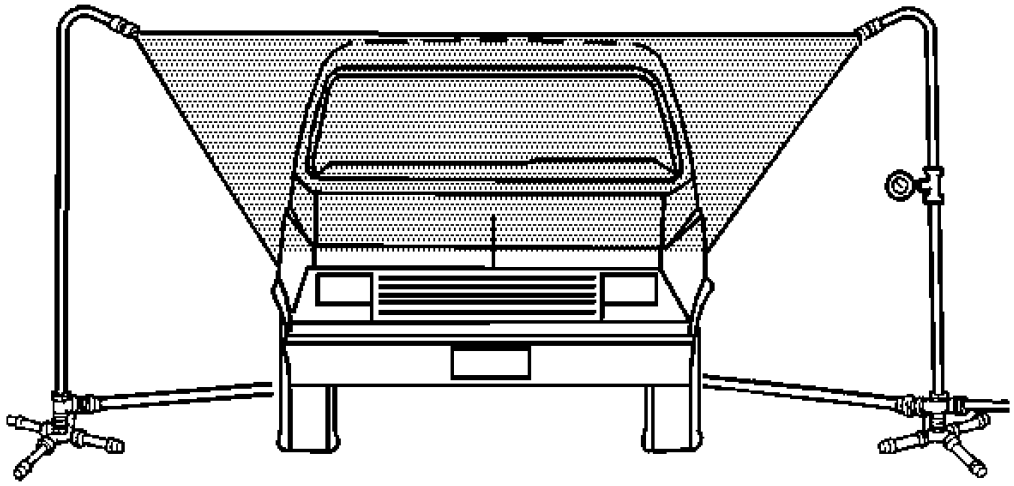
Fig. 1: Watertest Stand Assembly
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1.	

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1	Pipe (0.5 x 36 in)
2	Reducing Tee, Right Stand Only (0.5 x 0.5 x 0.25 in)
3	Coupling, Left Stand Only, (0.5 in)
4	Tee, Left Stand Only (0.5 in)
5	Cross, Right Stand Only (0.5 in)
6	Pipe to Hose Nipple, Right Stand Only (0.5 in)
7	Female Hose Coupling (5/8 in)
8	Input Hose, Right Stand Only (2.0 ft) (5/8 in diameter)
9	Close Nipple (0.5 in)
10	Cross (0.5 in) with Weld-On Cap (0.5 in)
11	Nipple (0.5 x 12 in)
12	Cap (0.5 in)
13	Female Hose Coupling (5/8 in)
14	Cross Hose (12 ft) (5/8 in diameter)
15	Hose Quick Connect
16	Pipe to Hose Nipple (0.5 in)
17	Pipe (0.5 x 60 in)
18	Water Pressure Gauge, Right Stand Only
19	Full Jet Spray Nozzle, No. 1/2GG-25 or Equivalent
20	Coupling (0.5 in)

1. Assemble the water test stand as shown.



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Fig. 2: Positioning Watertest Stands
Courtesy of GENERAL MOTORS CORP.

2. Position the stands as shown.

   The water spray from the stands should overlap the vehicle as shown.

3. Have an assistant inside of the vehicle during the test in order to locate any leaks.
4. The water pressure at the nozzle should maintain a 155 kPa (22 psi), for at least 4 minutes.

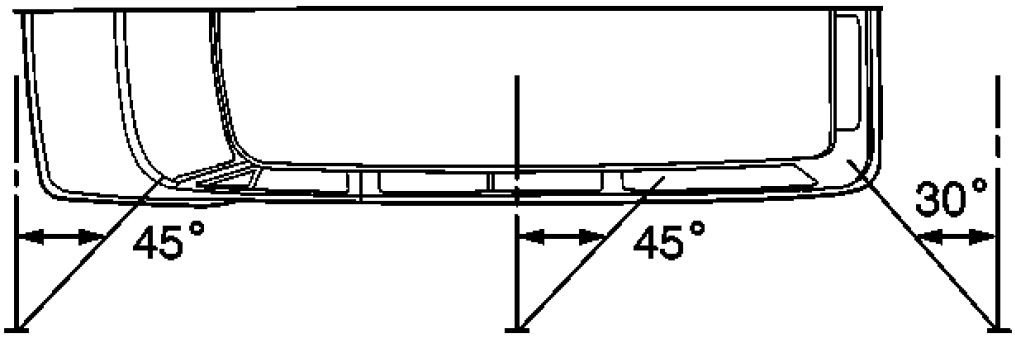


Fig. 3: Identifying Proper Water Spray Angles
Courtesy of GENERAL MOTORS CORP.

5. In order to check the windshield, aim the water spray 30 degrees down and 45 degrees toward the rear.

   Aim the water towards the corner of the windshield.

6. In order to check the side windows for leaks, position the water stand towards the center of the rear quarter, aiming the water spray 30 degrees down and 45 degrees toward the rear.
7. In order to check the back window, aim the water spray 30 degrees down and 30 degrees toward the front.

DUST LEAKS

Dust may leak into the vehicle where water will not. This happens particularly in the lower portion of the interior.

Forward motion of the vehicle can create a slight vacuum which pulls air and dust into the vehicle.

In order to determine the location of dust leaks, perform the following steps:

1. Remove the mats from the floor.

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2. Remove the mats from the kick panel.
3. Remove the insulation from the floor.
4. Remove the insulation from the kick panel.
5. Drive the vehicle on a dusty road.
6. Examine the interior.

   Dust in the shape of a small cone or slit will usually be found at the point of leakage.

7. Mark the points of leakage.

   NOTE: Ensure that the interior is darkened when performing this step.

8. Shine bright lamps on the underside of the floor and the cowl.
9. Have an assistant mark any points inside of the vehicle for any points where the light shines through.
   - Inspect the weld joints.
   - Inspect the body mounts.
10. Seal any leaks with an air-drying, body-sealing compound.

WATER HOSE TEST

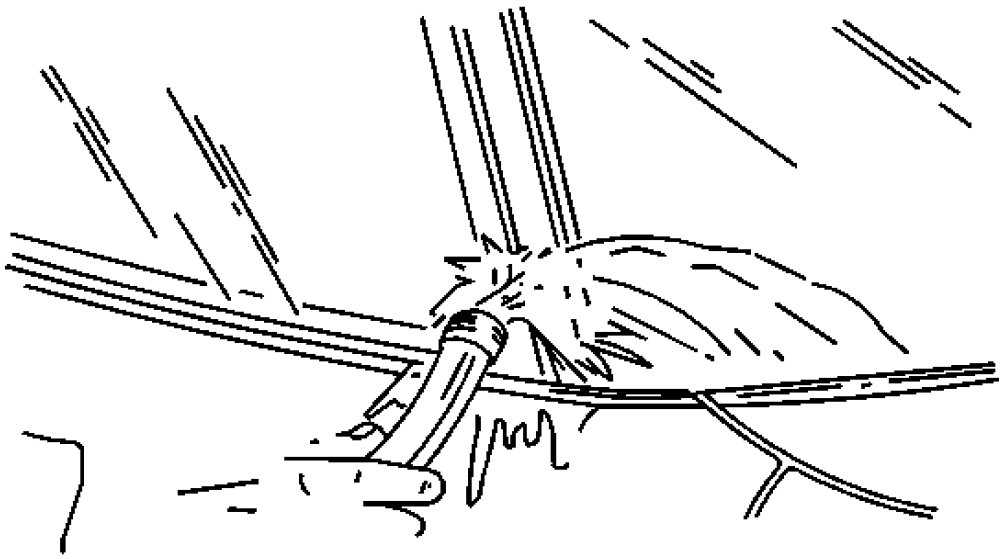


Fig. 4: Performing Water Hose Test
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NOTE: Use a water hose without the nozzle attached.

1. Have an assistant inside of the vehicle in order to locate the leak.
2. Begin testing at the base of the window or the windshield.
3. Slowly move the hose upward and across the top of the vehicle.

AIR HOSE TEST

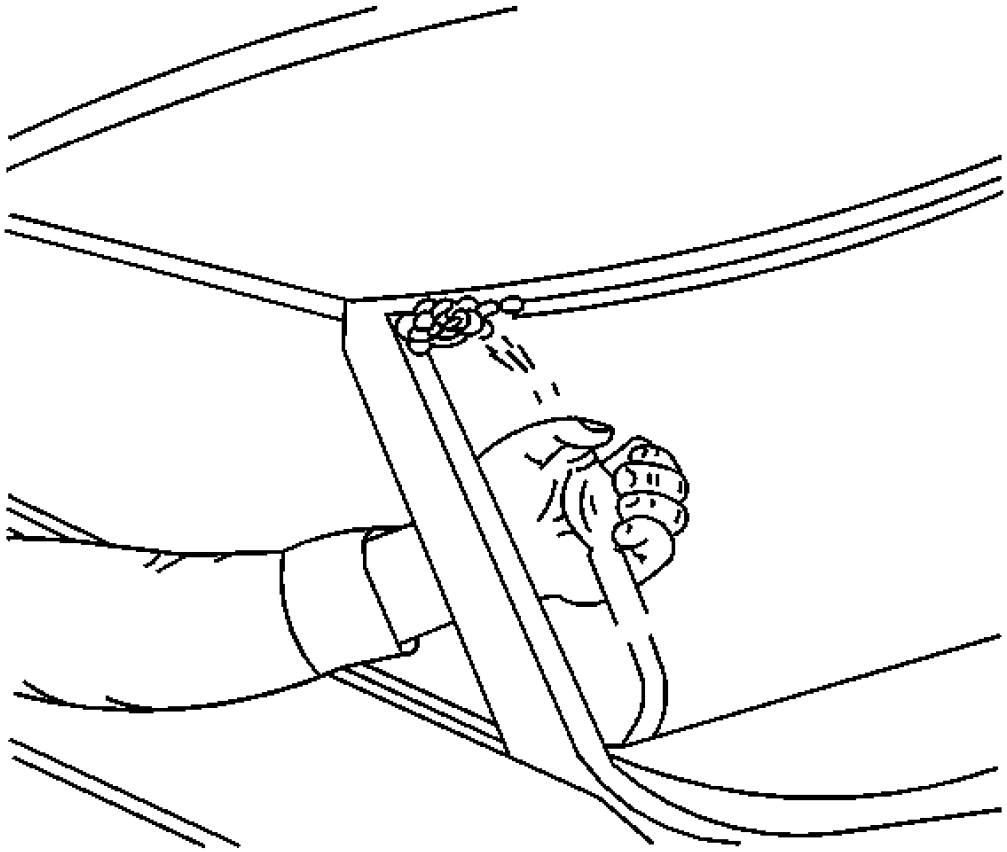


Fig. 5: Performing Air Hose Test
Courtesy of GENERAL MOTORS CORP.

CAUTION: The air hose test should only be used on fully cured urethane adhesive. Otherwise, damage to the urethane adhesive bead could result in additional leaks.

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1. Using a liquid detergent, diluted with water in a spray bottle, spray the window at the edges. Begin at the bottom and gradually move up and across the top.

NOTE: The compressed air should not exceed 205 kPa (30 psi).

2. Have an assistant inside of the vehicle with an air hose.
3. Have the assistant aim the compressed air at the suspected areas.

Bubbles will form in the soap solution at the location of the leak.

REPAIR INSTRUCTIONS

BODY WATERLEAK REPAIR

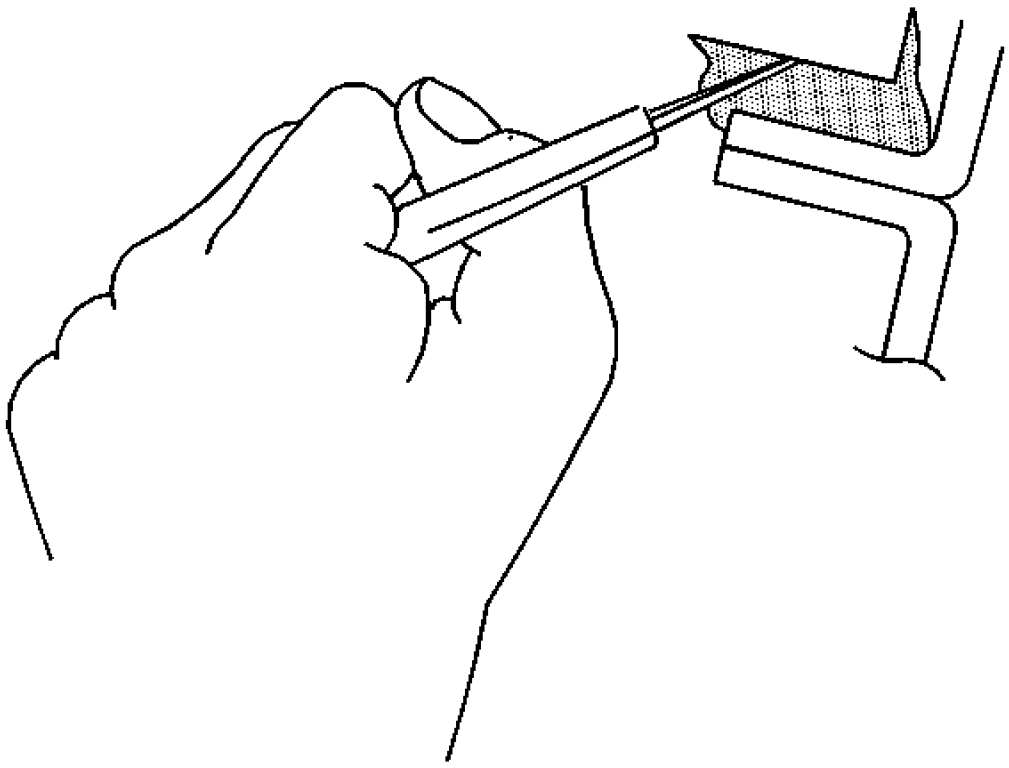


Fig. 6: Cutting Out Adhesive Caulking (1 Of 2)
Courtesy of GENERAL MOTORS CORP.

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WARNING: If the vehicle interior is exposed to moisture and becomes soaked up to the level of the sensing and diagnostic module (SDM), the SDM and SDM harness connector must be replaced. The SDM could be activated when powered, which could cause airbag deployment and result in personal injury.

Depending on the location of the waterleak, you may have to remove certain interior components in order to repair the leak.

1. If the floor carpet is wet refer to **Floor Carpet Drying** .

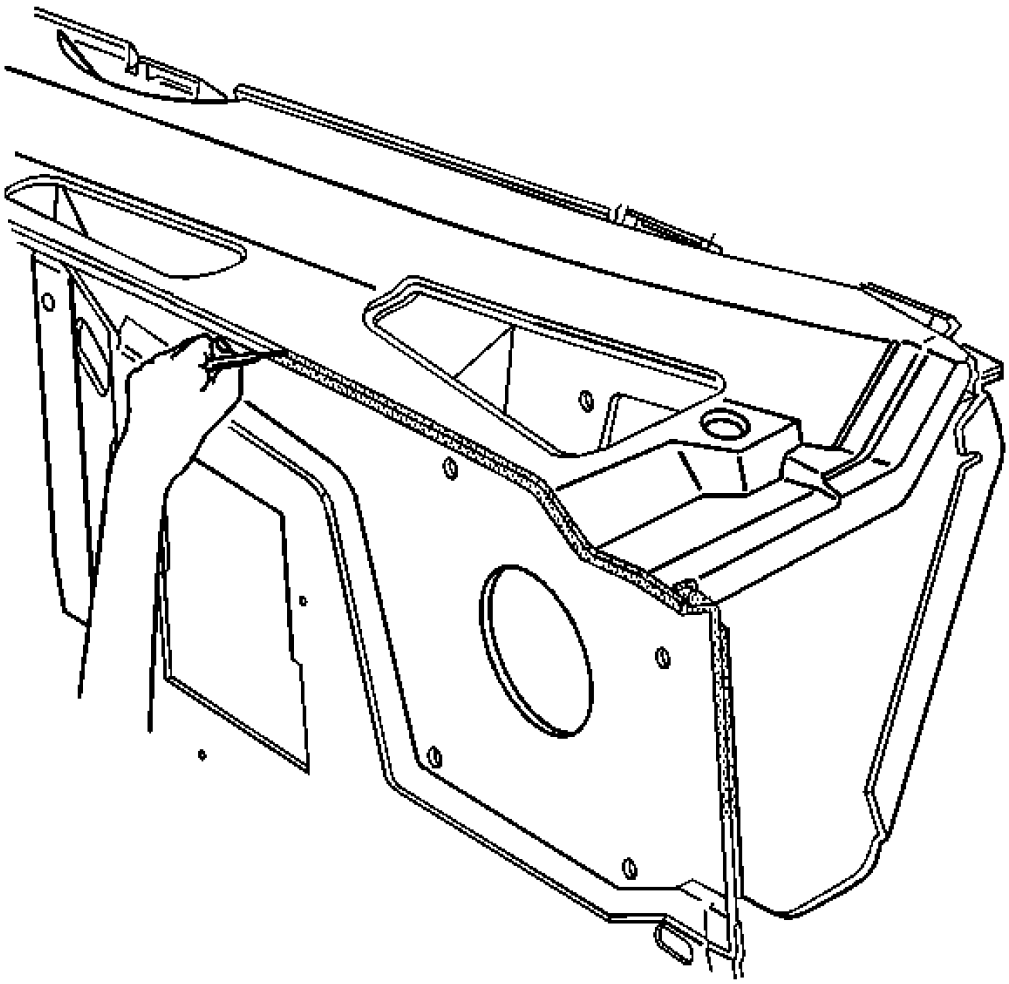


Fig. 7: Cutting Out Adhesive Caulking (2 Of 2)
Courtesy of GENERAL MOTORS CORP.

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2. Cut out a portion of the adhesive caulking in the leak area from inside or outside of the vehicle.
3. Clean and remove all loose particles of the adhesive old caulking from the area.
4. Apply joint body and seam sealer where the old adhesive caulking was removed.
5. Allow the adhesive caulking to dry for several hours.
6. Test for leaks.
7. Install the trim, if removed.

STATIONARY WINDOW WATERLEAK REPAIR

WARNING: If any water enters the vehicle's interior up to the level of the carpet or higher and soaks the carpet, the sensing and diagnostic module (SDM) and the SDM harness connector may need to be replaced. The SDM could be activated when powered, which could cause deployment of the air bag (s) and result in personal injury. Before attempting these procedures, the SIR system must be disabled. Refer to Disabling the SIR System.
With the ignition OFF, inspect the SDM mounting area, including the carpet. If any significant soaking or evidence of significant soaking is detected, you must perform the following tasks:

1. **Remove all water.**
2. **Repair the water damage.**
3. **Replace the SDM harness connector.**
4. **Replace the SDM.**

Failure to follow these tasks could result in possible air bag deployment, personal injury, or otherwise unneeded SIR system repairs.

1. If the floor carpet is wet refer to **Floor Carpet Drying** .
2. Remove the trim moldings or the headliner in order to repair the leak, if needed.
3. Determine the source of water entry.
4. If water is leaking at the edge of the windshield, reseal the windshield using Urethane Adhesive Systems which meet GM Specification GM 3651G.
5. If water leaks into the vehicle at the sides of the stationary windows, reseal the window using Urethane Adhesive Systems which meet GM Specification GM 3651G.

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