SPECIFICATIONS

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number
GM Vehicle Care Odor Eliminator	Fluids	Refer to Electronic Parts Catalog.

REPAIR INSTRUCTIONS

ELIMINATING UNWANTED ODORS IN VEHICLES

GM Vehicle Care Odor Eliminator, Refer to **Adhesives, Fluids, Lubricants, and Sealers**, 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.

NOTE: **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.
- 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.

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.

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 (CREW CAB)

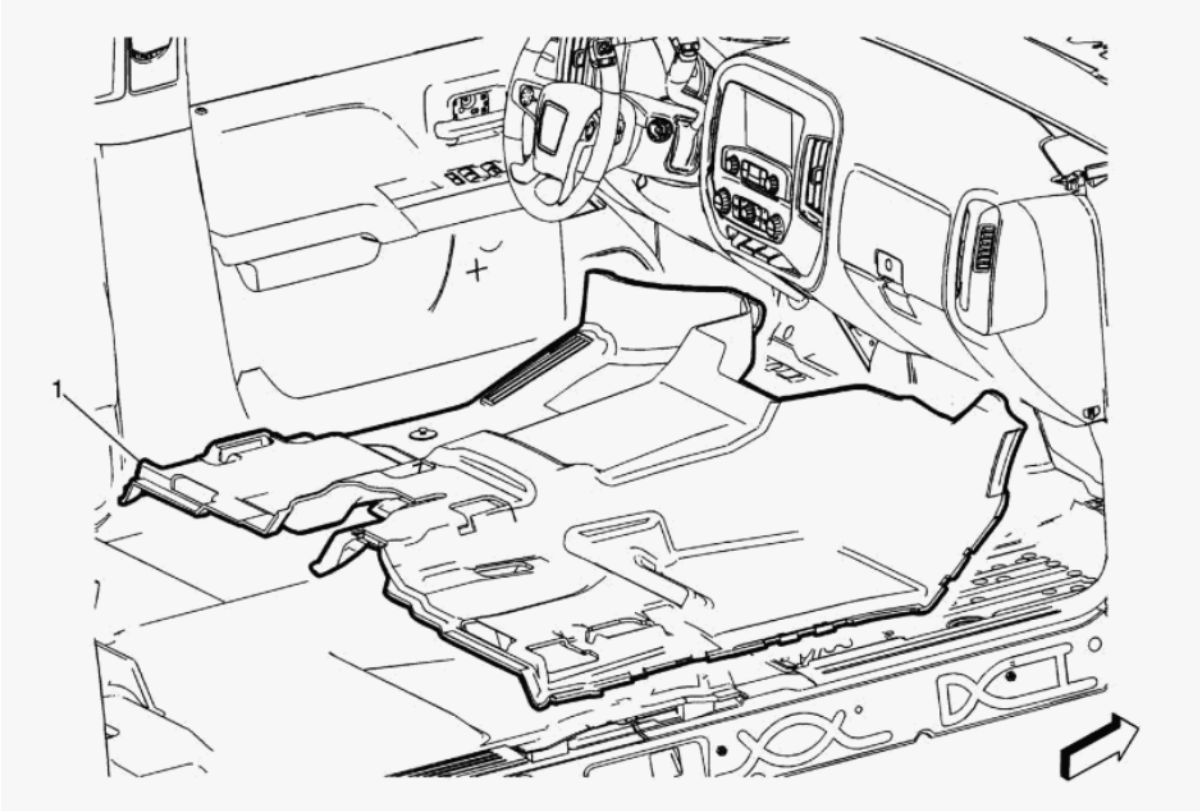


Fig. 1: Floor Panel Carpet (Crew Cab)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures	
1. Remove the driver and passenger seat. Refer to **Driver or Passenger Seat Removal and Installation** .	
2. Remove the center front seat, if equipped. Refer to **Front Center Seat Removal and Installation**	

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Callout	Component Name
	(Except HP5) Front Center Seat Removal and Installation (HP5) . 3. Remove the front floor console, if equipped. Refer to Front Floor Console Assembly Replacement (without HP5) Front Floor Console Assembly Replacement (with HP5) . 4. Remove the transmission control lever boot, if equipped. Refer to Transmission Control Lever Boot Replacement . 5. Remove the transfer case control lever bezel, if equipped. Refer to Transfer Case Control Lever Replacement . 6. Remove the instrument panel tie bar brace. Refer to Instrument Panel Tie Bar Brace Replacement . 7. Remove front side door sill garnish molding. Refer to Front Side Door Sill Garnish Molding Replacement (Crew Cab, Extended Cab) Front Side Door Sill Garnish Molding Replacement (Regular Cab) . 8. Remove the center pillar lower trim panel. Refer to Center Pillar Lower Trim Panel Replacement .
1	Floor Panel Carpet Assembly **Procedure** Lift the HVAC floor ducts to place the carpet underneath.

FLOOR PANEL CARPET REPLACEMENT (EXTENDED CAB)

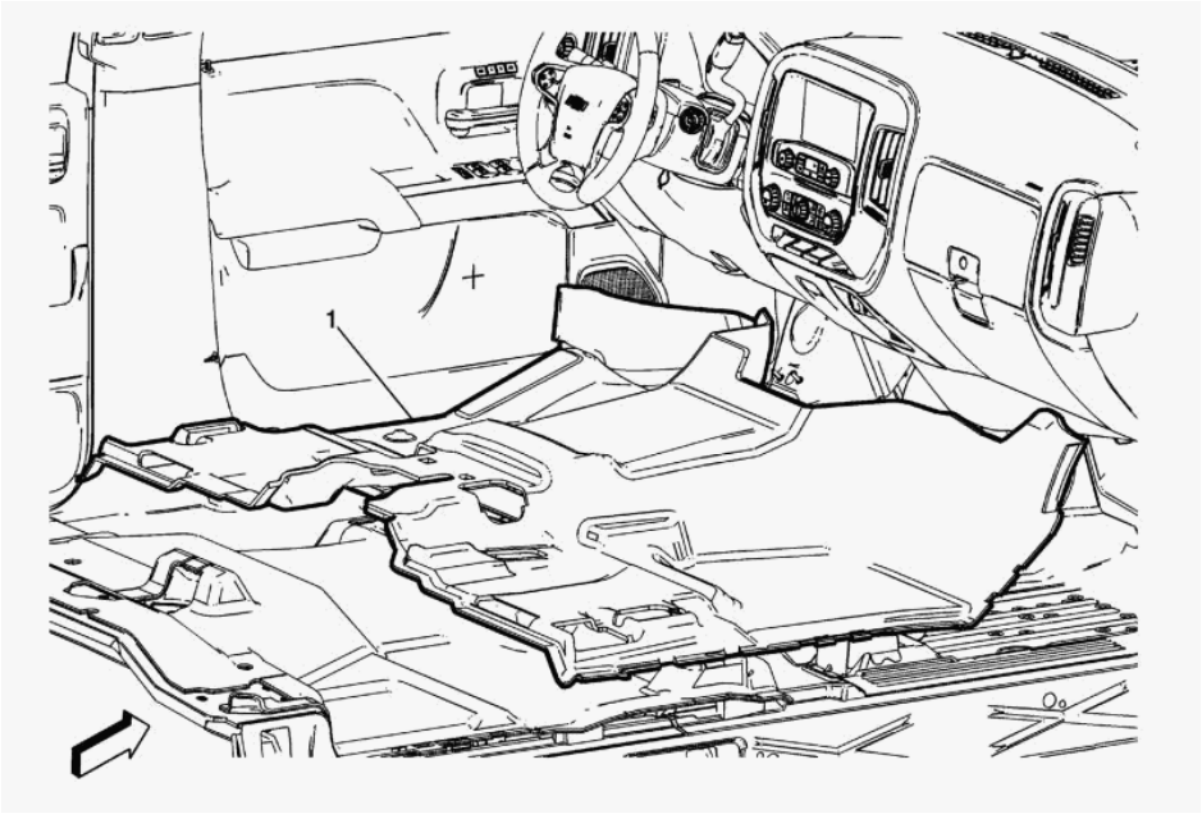


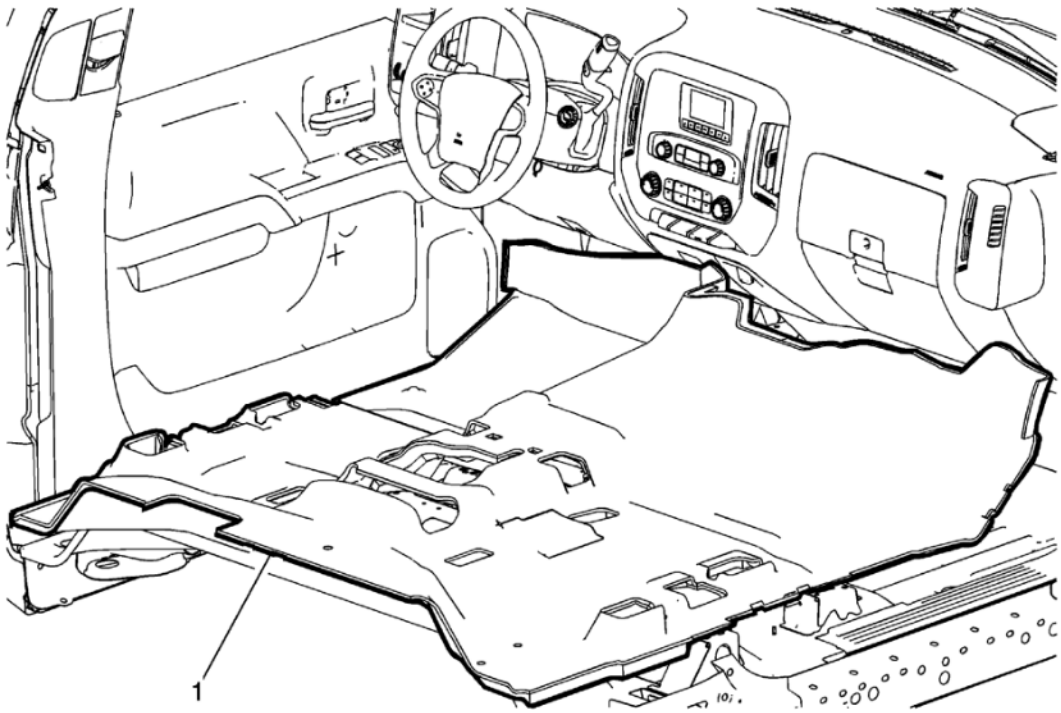
Fig. 2: Floor Panel Carpet (Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

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Callout	Component Name
Preliminary Procedures 1. Remove the driver and passenger seat. Refer to **Driver or Passenger Seat Removal and Installation** . 2. Remove the center front seat, if equipped. Refer to **Front Center Seat Removal and Installation (Except HP5)** **Front Center Seat Removal and Installation (HP5)** . 3. Remove the front floor console, if equipped. Refer to **Front Floor Console Assembly Replacement (without HP5)** **Front Floor Console Assembly Replacement (with HP5)** . 4. Remove the transmission control lever boot, if equipped. Refer to **Transmission Control Lever Boot Replacement** . 5. Remove the transfer case control lever bezel, if equipped. Refer to **Transfer Case Control Lever Replacement** . 6. Remove the instrument panel tie bar brace. Refer to **Instrument Panel Tie Bar Brace Replacement** . 7. Remove front side door sill garnish molding. Refer to **Front Side Door Sill Garnish Molding Replacement (Crew Cab, Extended Cab)** **Front Side Door Sill Garnish Molding Replacement (Regular Cab)** . 8. Remove the center pillar lower trim panel. Refer to **Center Pillar Lower Trim Panel Replacement** .	
1	Floor Panel Carpet Assembly **Procedure** Lift the HVAC floor ducts to place the carpet underneath.

FLOOR PANEL CARPET REPLACEMENT (REGULAR CAB)



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Fig. 3: Floor Panel Carpet (Regular Cab)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the driver and passenger seat. Refer to **Driver or Passenger Seat Removal and Installation** . 2. Remove the center front seat. Refer to **Front Center Seat Removal and Installation (Except HP5)** **Front Center Seat Removal and Installation (HP5)** . 3. Remove the transmission control lever boot, if equipped. Refer to **Transmission Control Lever Boot Replacement** . 4. Remove the transfer case control lever bezel, if equipped. Refer to **Transfer Case Control Lever Replacement** . 5. Remove the instrument panel tie bar brace. Refer to **Instrument Panel Tie Bar Brace Replacement** . 6. Remove front side door sill garnish molding. Refer to **Front Side Door Sill Garnish Molding Replacement (Crew Cab, Extended Cab)** **Front Side Door Sill Garnish Molding Replacement (Regular Cab)** . 7. Remove the body lock pillar garnish molding. Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .	
1	Floor Panel Carpet Assembly **Procedure** Lift the HVAC floor ducts to place the carpet underneath.

FRONT SEAT BACK BODY PANEL CARPET REPLACEMENT (REGULAR CAB)

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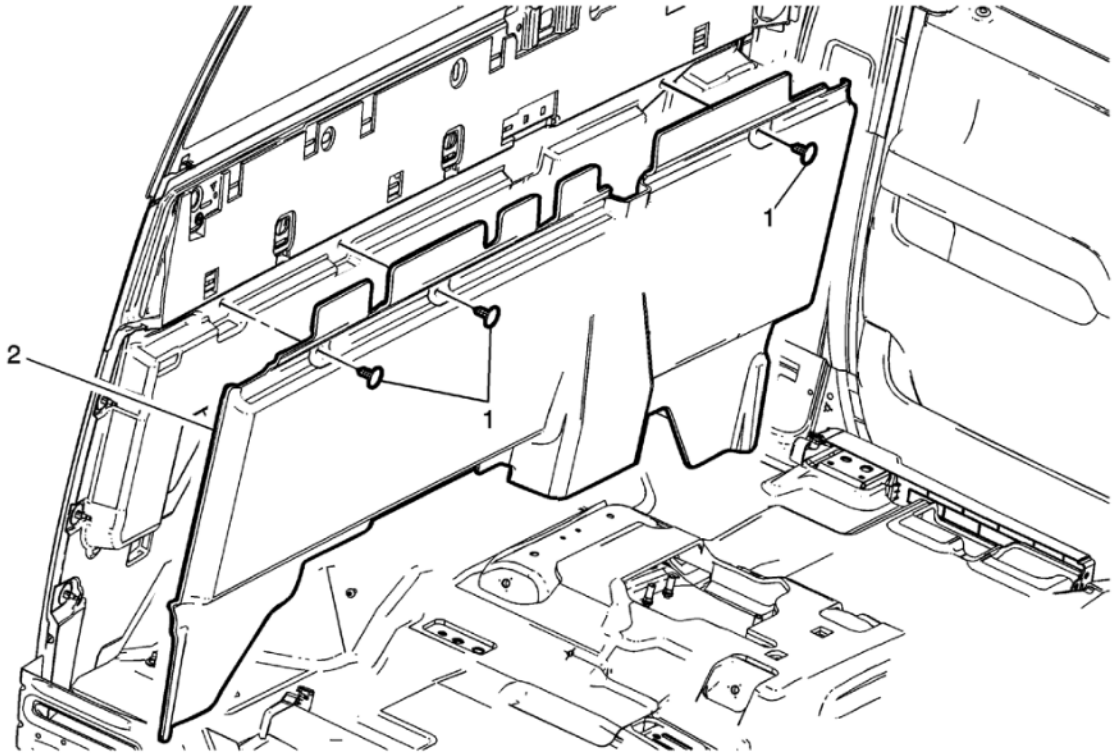


Fig. 4: Front Seat Back Body Panel Carpet (Regular Cab)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the driver and passenger seat. Refer to **Driver or Passenger Seat Removal and Installation** . 2. Remove the center front seat. Refer to **Front Center Seat Removal and Installation (Except HP5)** **Front Center Seat Removal and Installation (HP5)** . 3. Remove the rear window lower garnish molding. Refer to **Rear Window Lower Garnish Molding Replacement (Crew Cab, Extended Cab)** **Rear Window Lower Garnish Molding Replacement (Regular Cab)** .	
1	Body Rear Panel Insulator Retainer (Qty: 3)
2	Front Seat Back Body Panel Carpet Assembly

REAR FLOOR PANEL CARPET REPLACEMENT

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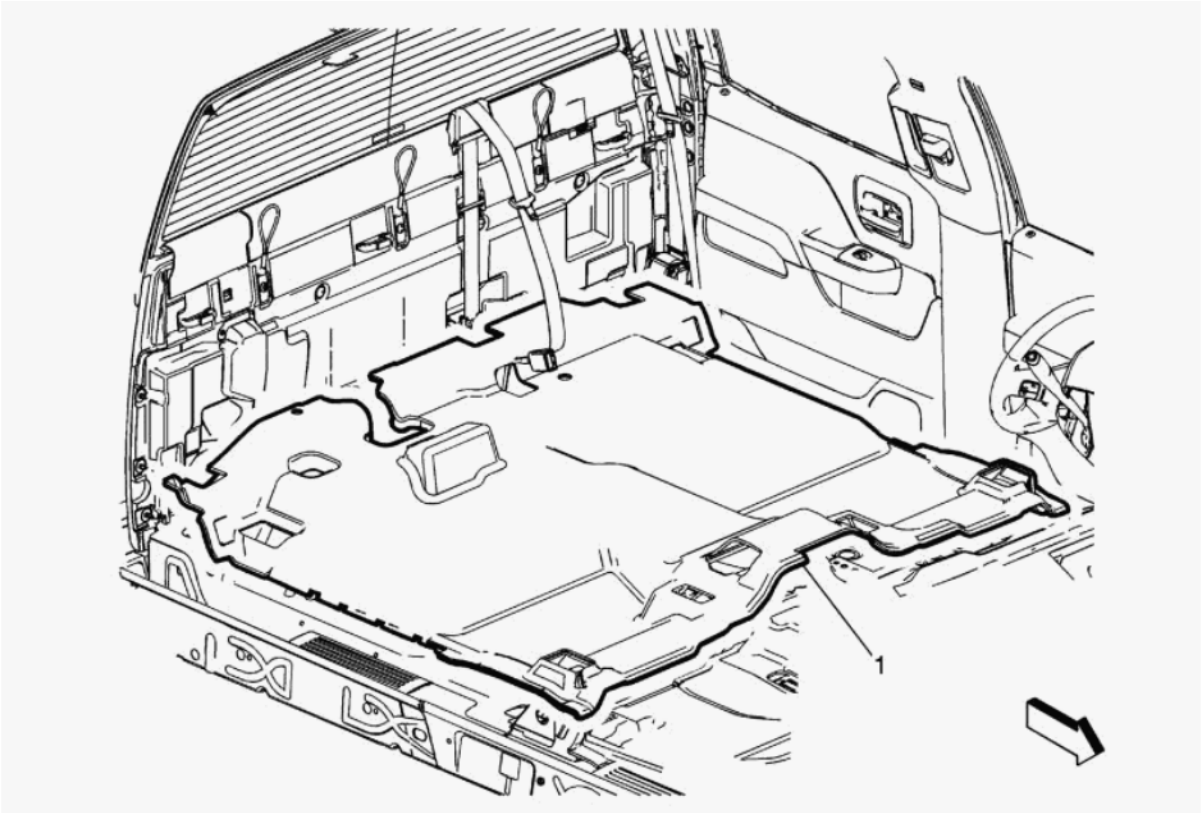


Fig. 5: Rear Floor Panel Carpet (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the driver and passenger seat. Refer to **Driver or Passenger Seat Removal and Installation** . 2. Remove the center front seat, if equipped. Refer to **Front Center Seat Removal and Installation (Except HP5)** **Front Center Seat Removal and Installation (HP5)** . 3. Remove the rear seats. Refer to **Rear Seat Removal and Installation (Extended Cab with AM7)** **Rear Seat Removal and Installation (Heavy Duty Crew Cab with A68)** **Rear Seat Removal and Installation (Light Duty Crew Cab with A68)** **Rear Seat Removal and Installation (Extended Cab with A68)** . 4. Remove the front floor console, if equipped. Refer to **Front Floor Console Assembly Replacement (without HP5)** **Front Floor Console Assembly Replacement (with HP5)** . 5. Remove the transmission control lever boot. Refer to **Transmission Control Lever Boot Replacement** . 6. Remove the body lock pillar garnish molding. Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** . 7. Remove the center pillar lower trim panel. Refer to **Center Pillar Lower Trim Panel Replacement** . 8. Remove the jack stowage bracket, if equipped.	
1	Rear Floor Panel Carpet Assembly

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HEADLINING TRIM PANEL REPLACEMENT (CREW CAB WITHOUT SUNROOF)

Removal Procedure

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: **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.**

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.**

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

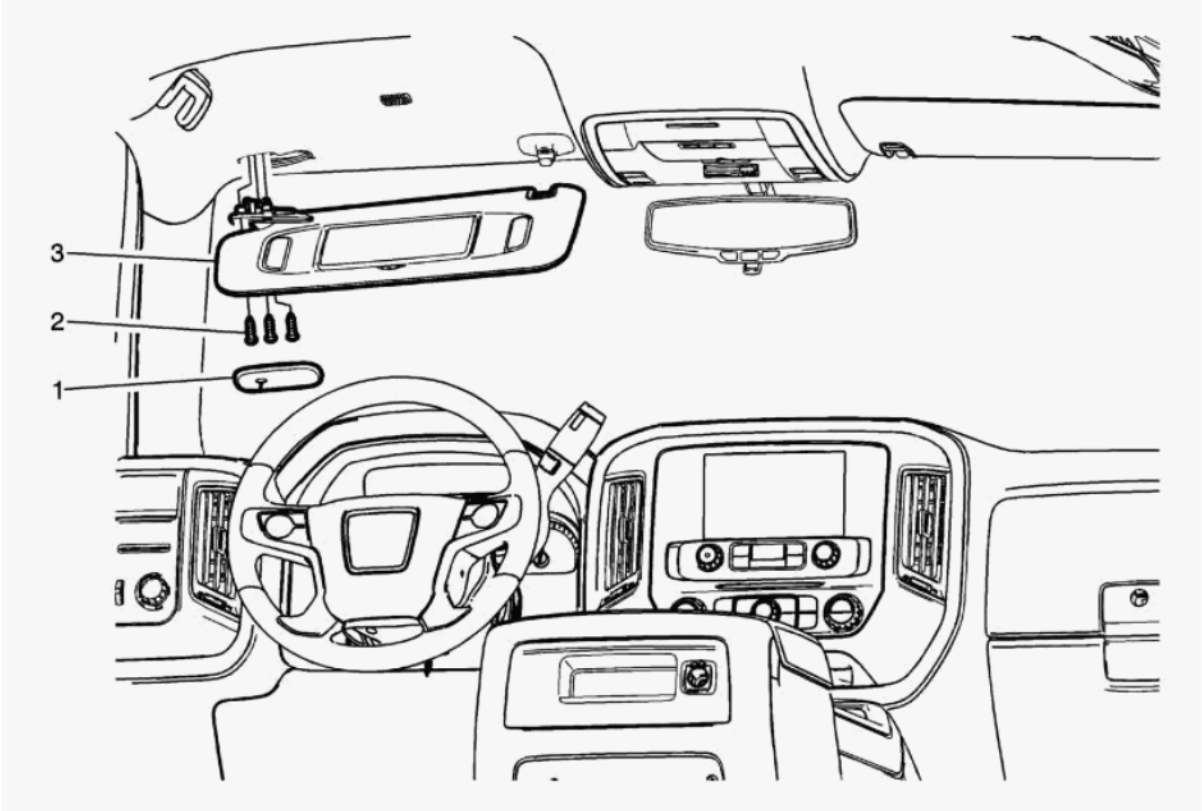


Fig. 6: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Remove the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .

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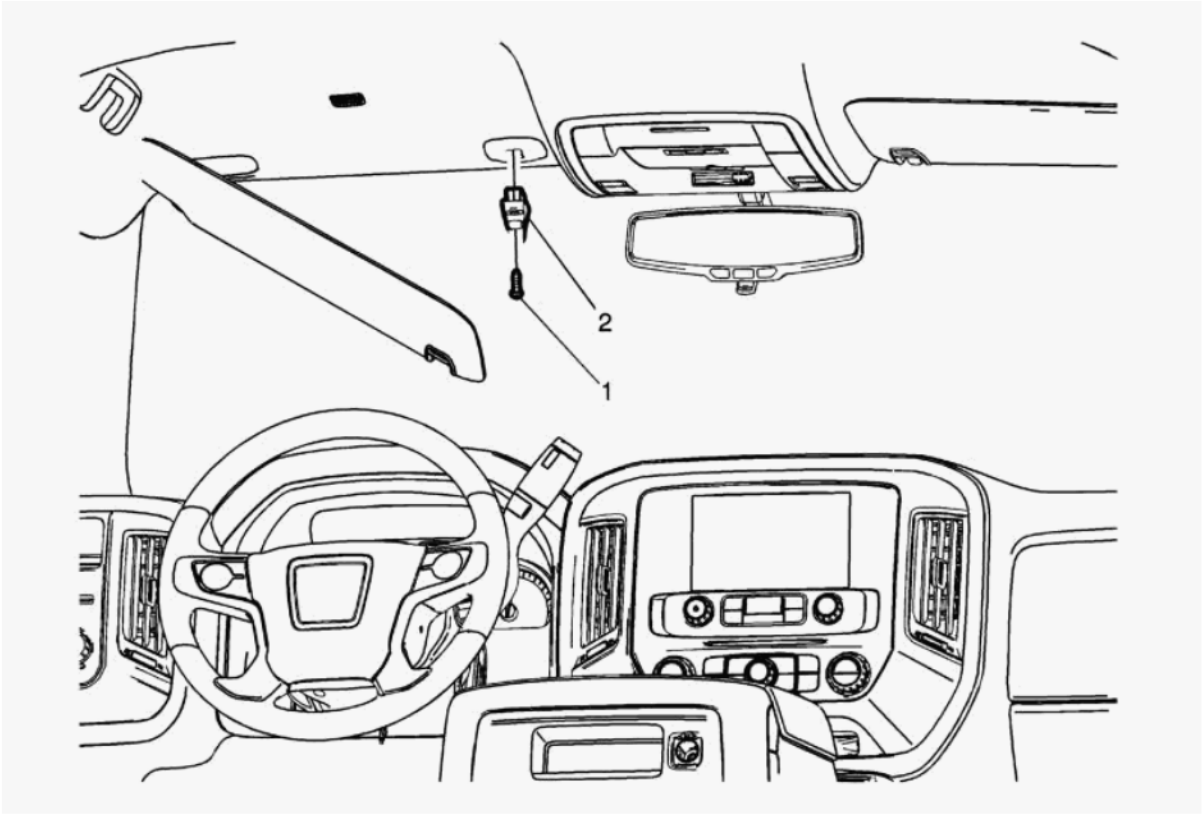
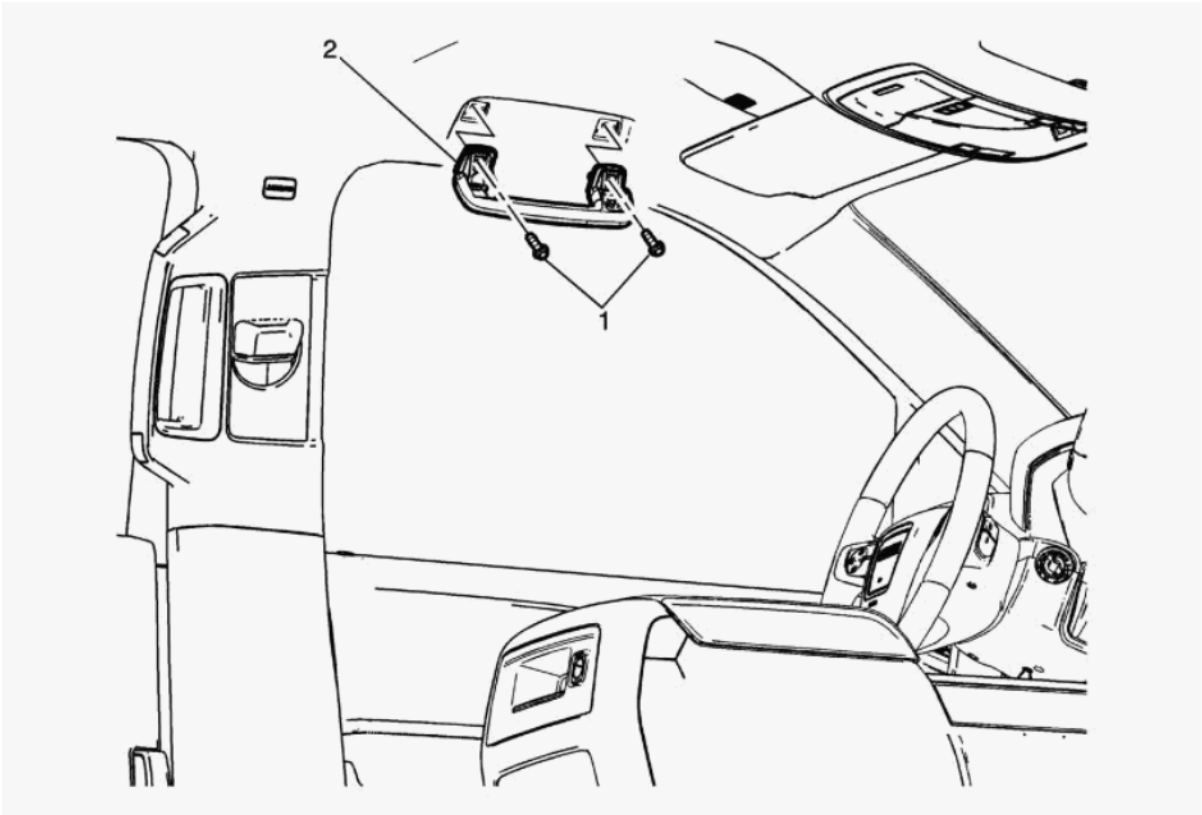


Fig. 7: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

3. Remove the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .



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Fig. 8: Roof Rail Assist Handle Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Remove the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .



Fig. 9: Roof Rail Rear Assist Handle (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

5. Remove the roof rail rear assist handle (2). Refer to **Roof Rail Rear Assist Handle Replacement (Crew Cab, Extended Cab)** .

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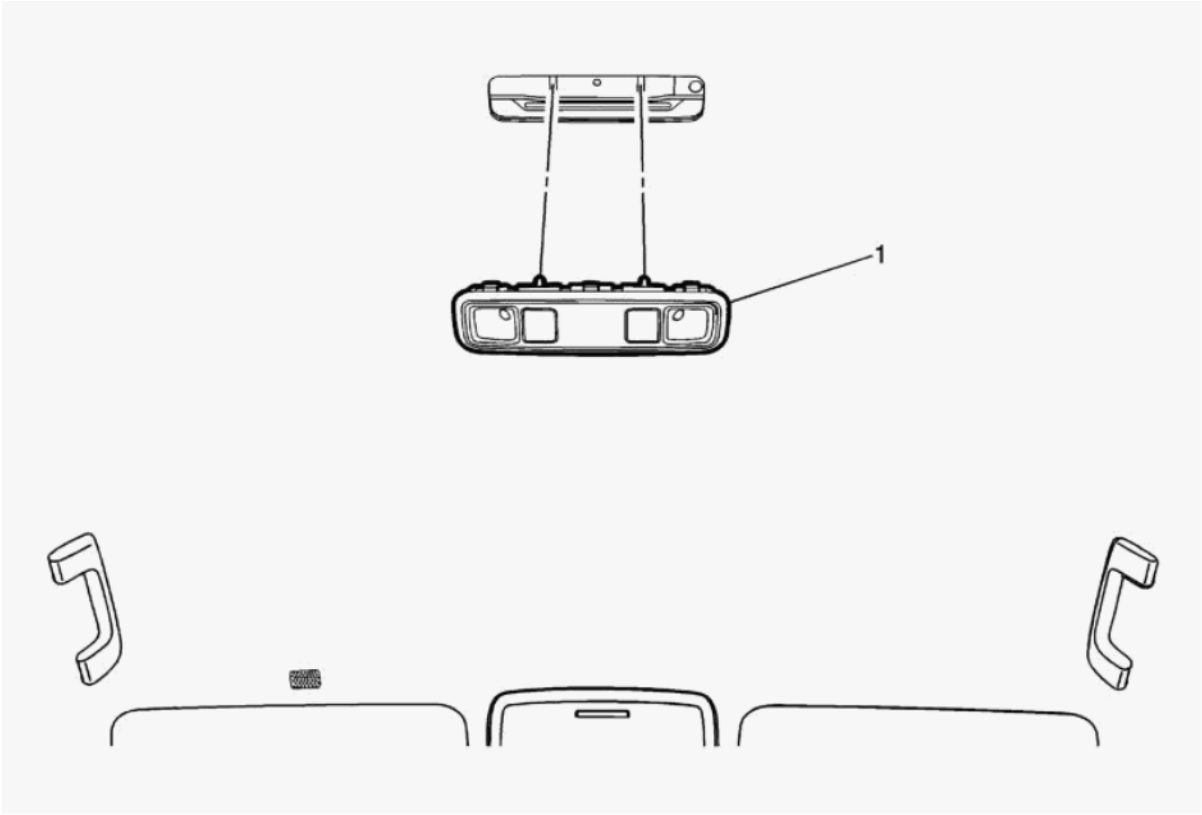
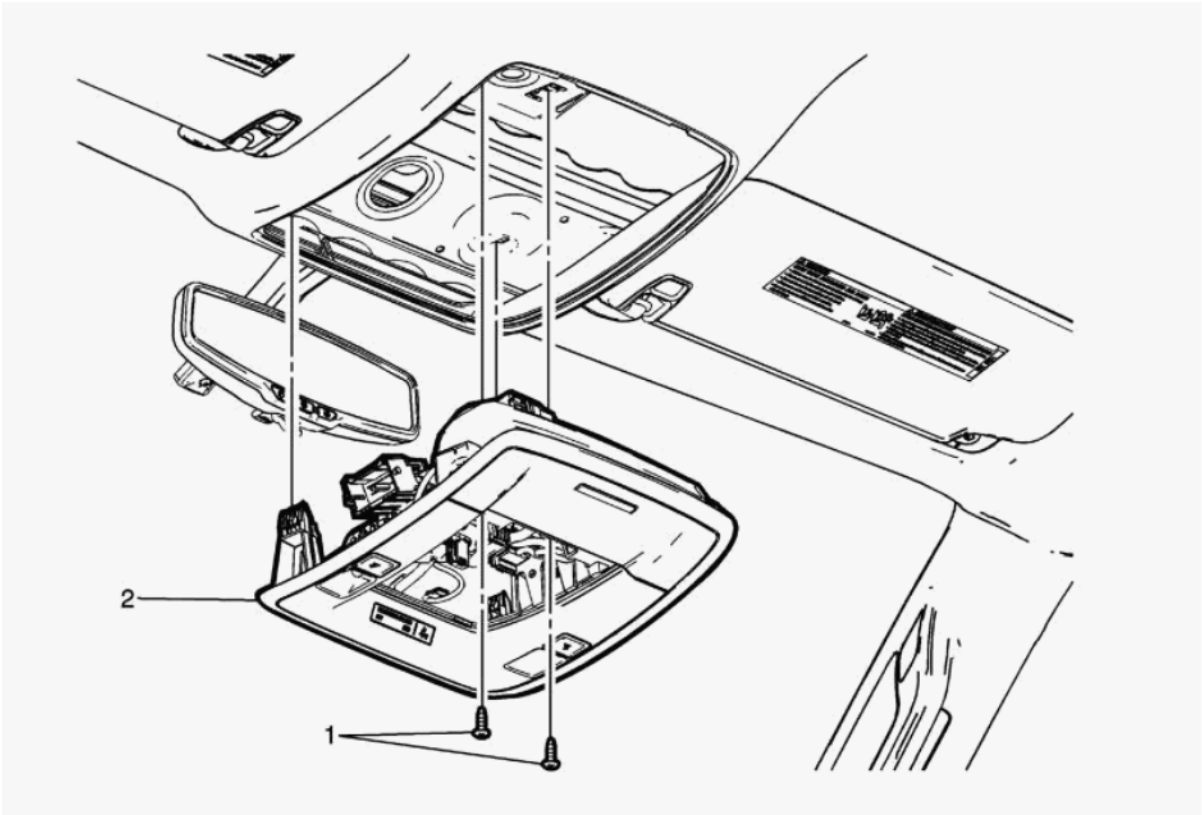


Fig. 10: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

6. Remove the rear seat position center reading and courtesy lamp (1). Refer to **Rear Seat Position Center Reading and Courtesy Lamp Replacement** .



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Fig. 11: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Remove the roof console assembly (2). Refer to **Roof Console Replacement** .

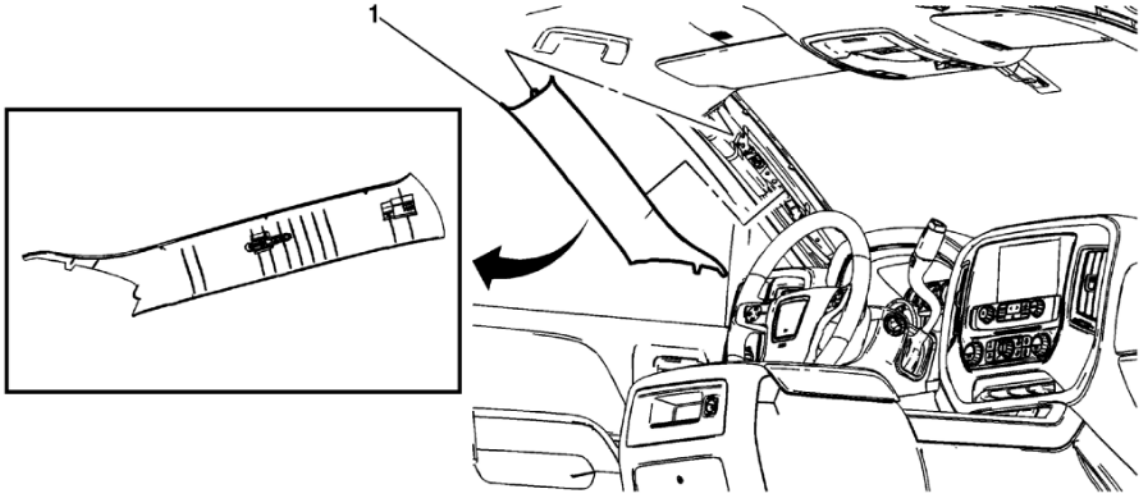


Fig. 12: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

8. Remove the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .

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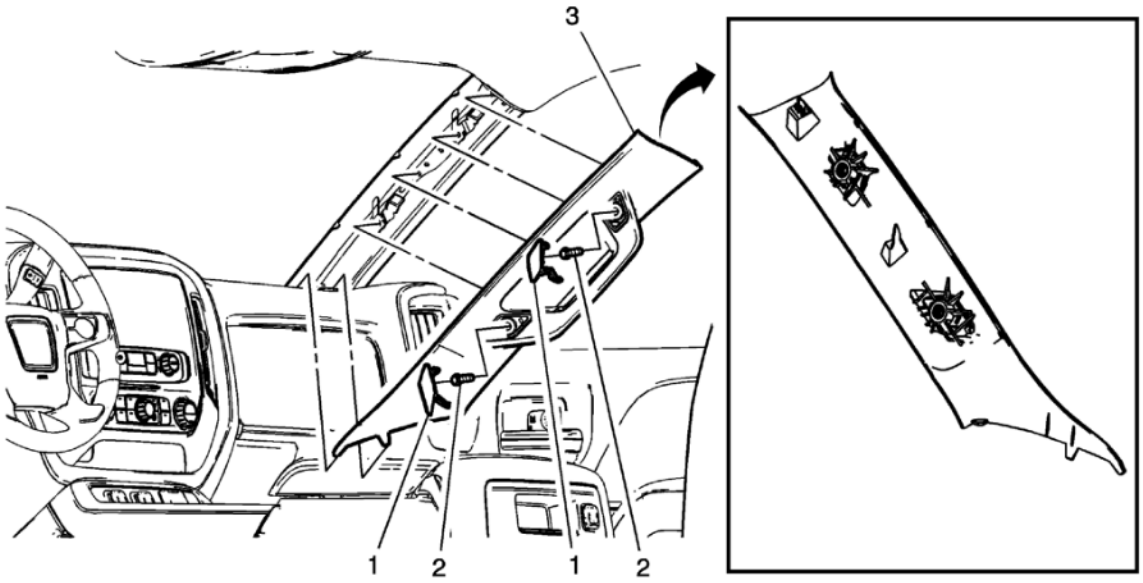
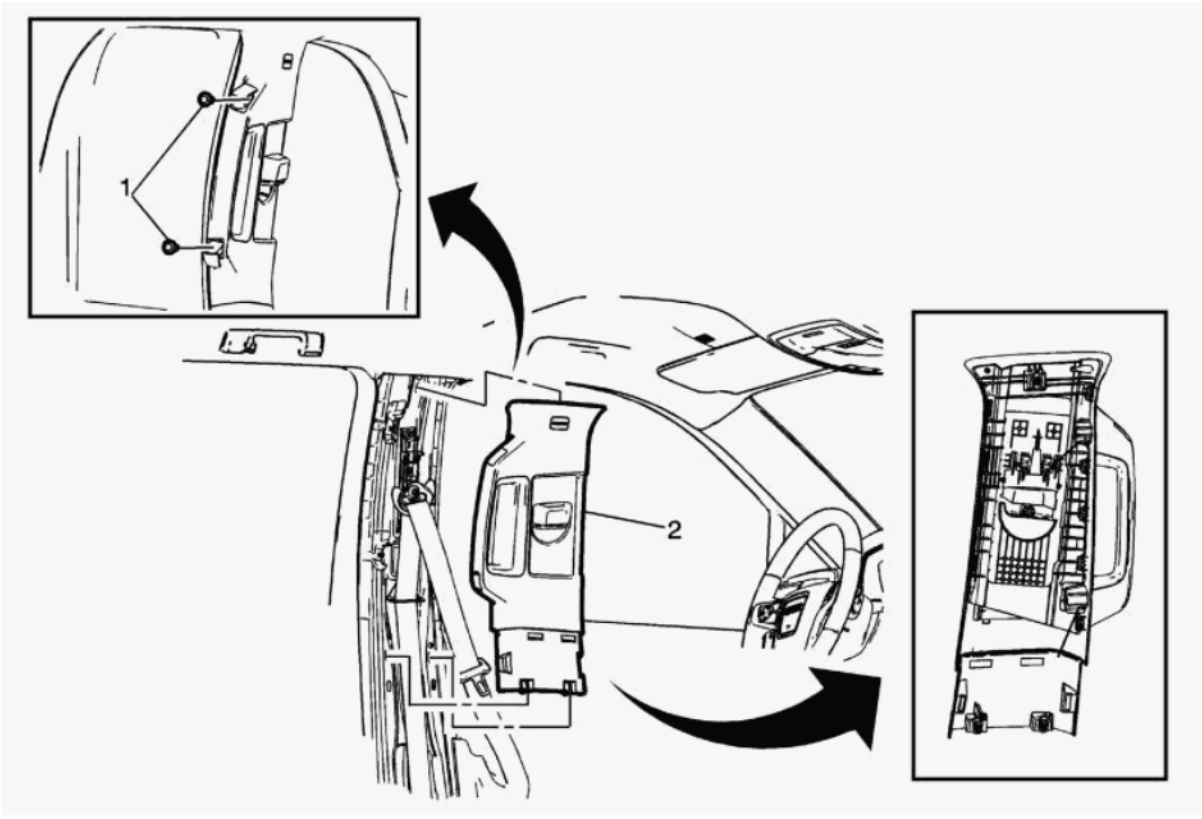


Fig. 13: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

9. Remove the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .



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Fig. 14: Center Pillar Upper Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Remove the center pillar upper trim panel assembly (2). Refer to **Center Pillar Upper Trim Panel Replacement** .

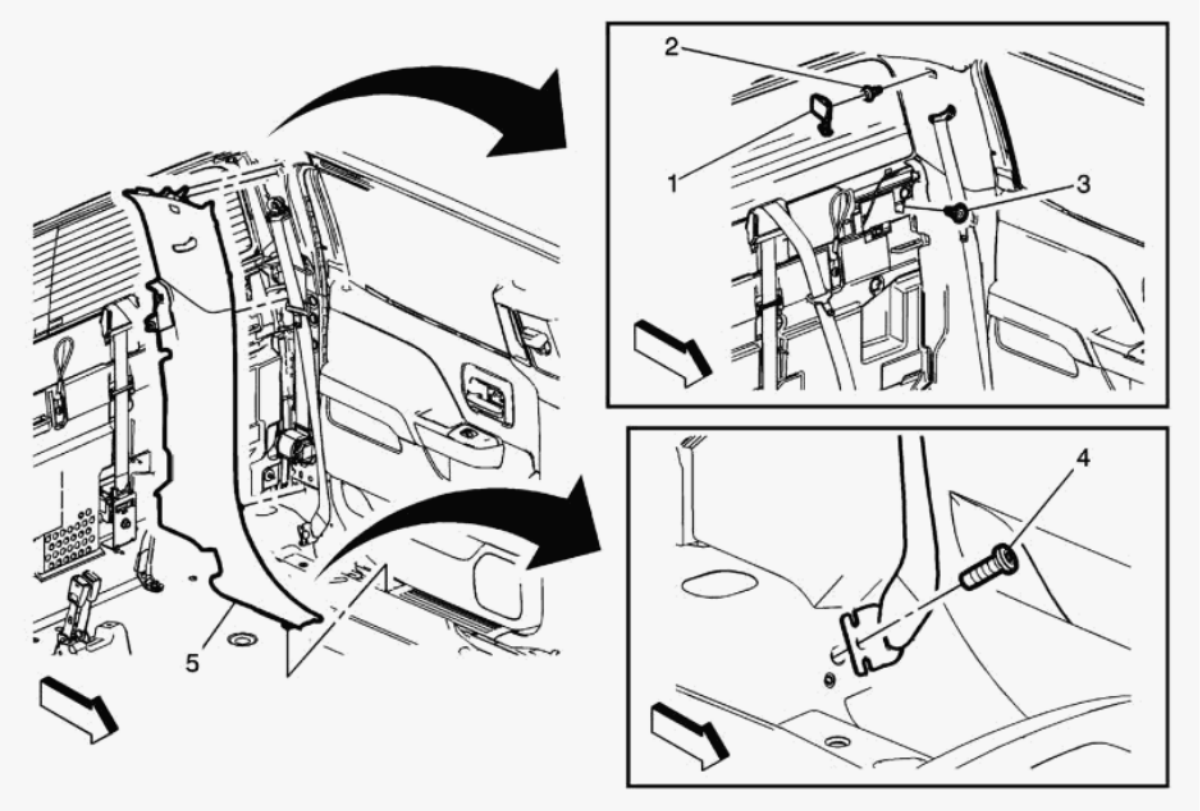


Fig. 15: Body Lock Pillar Garnish Molding (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

11. Remove the body lock pillar garnish molding (5). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .
12. Move the driver and passenger seats fully forward and recline.

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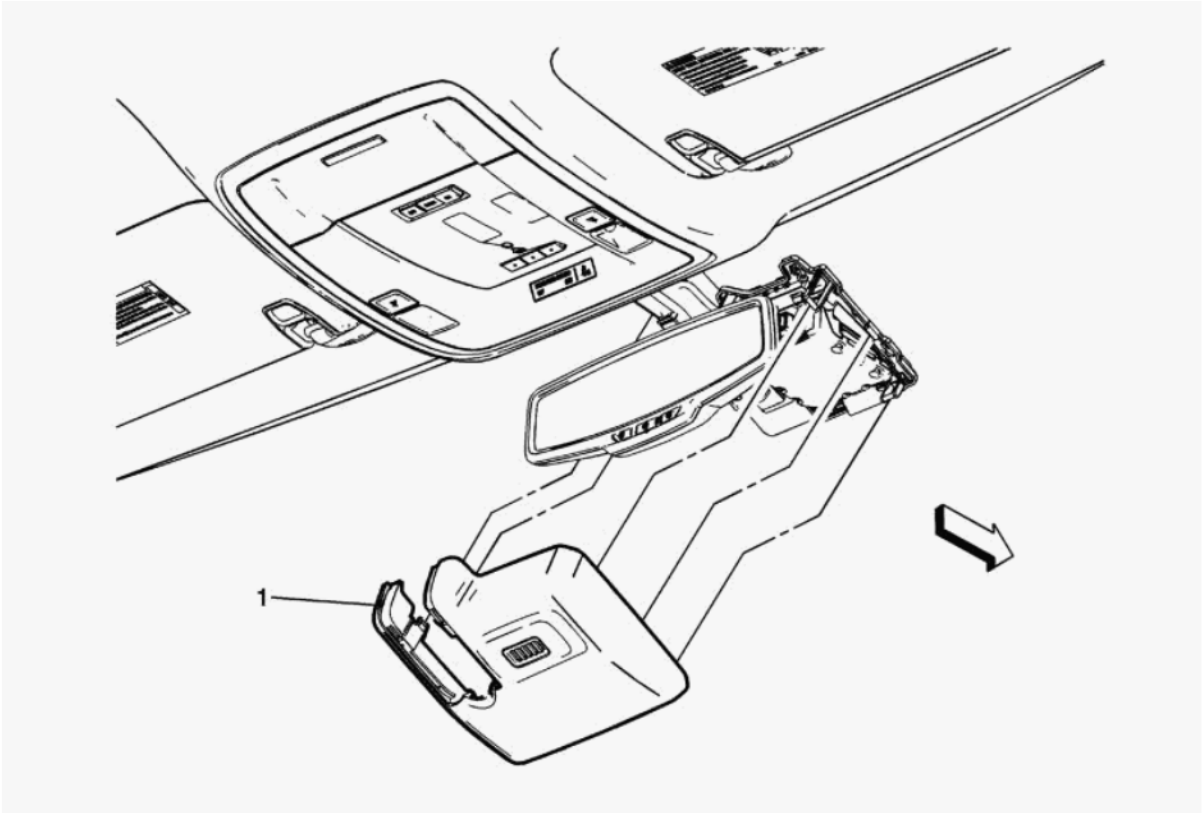
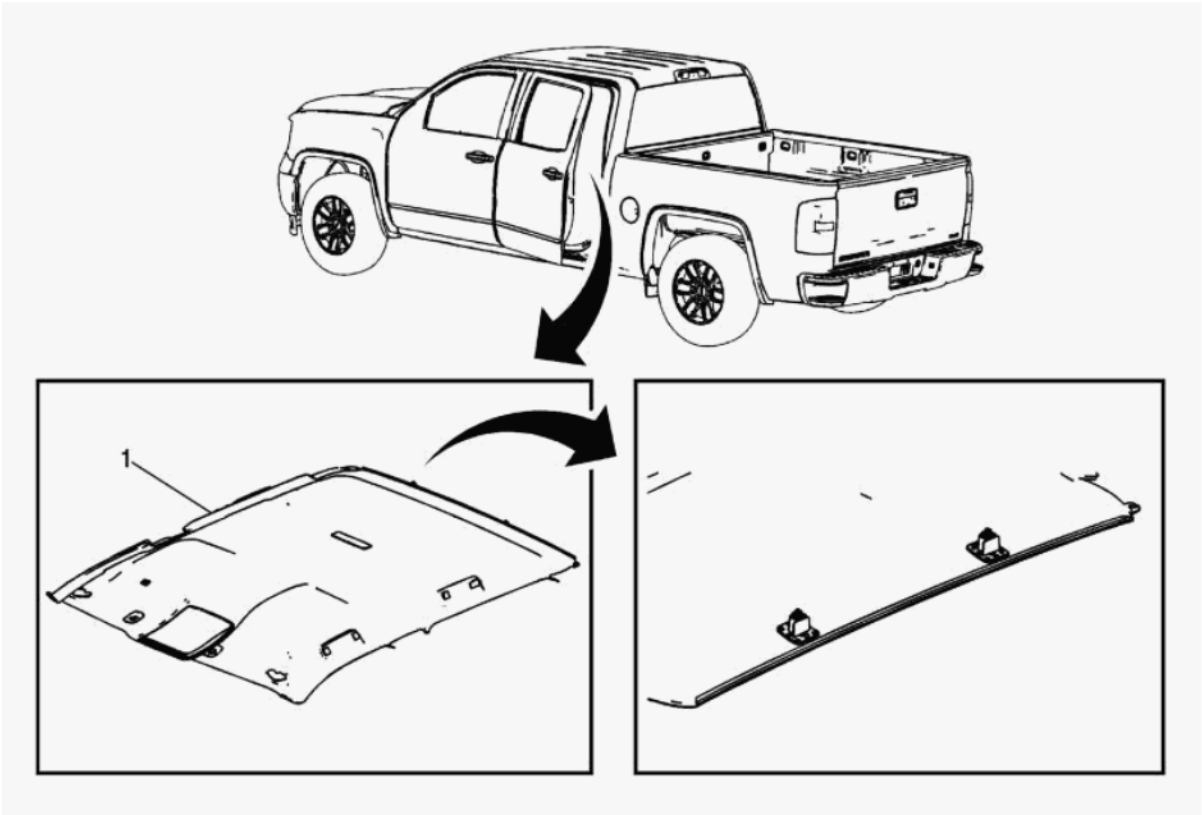


Fig. 16: Windshield Multifunction Sensor Mount Bracket Cover
Courtesy of GENERAL MOTORS COMPANY

13. Remove the windshield multifunction sensor mount bracket cover. Refer to **Windshield Multifunction Sensor Mount Bracket Cover Replacement** .



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Fig. 17: Headliner Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

14. Disconnect the electrical connectors from the headliner trim panel assembly (1).
15. There are two retainers at the rear underside of the headliner, if necessary remove.
16. Remove the windshield. Refer to **Windshield Replacement** .
17. Take note of the wiring harness locations and measure the harness lead length prior to removing. Mark harness routing locations on new headliner prior to harness removal.

NOTE: **Use a camera to take pictures and use a pencil to mark the new headliner.**

18. Use fiber or plastic trim tool to assist in removing the wiring harness from the headliner, taking care not to damage the harness.
19. Remove excess glue and material from the wiring harness and re-tape areas where the tape was removed or damaged.
20. With the aid of an assistant, remove the headliner trim panel assembly (1) from the vehicle through the front windshield.

Installation Procedure

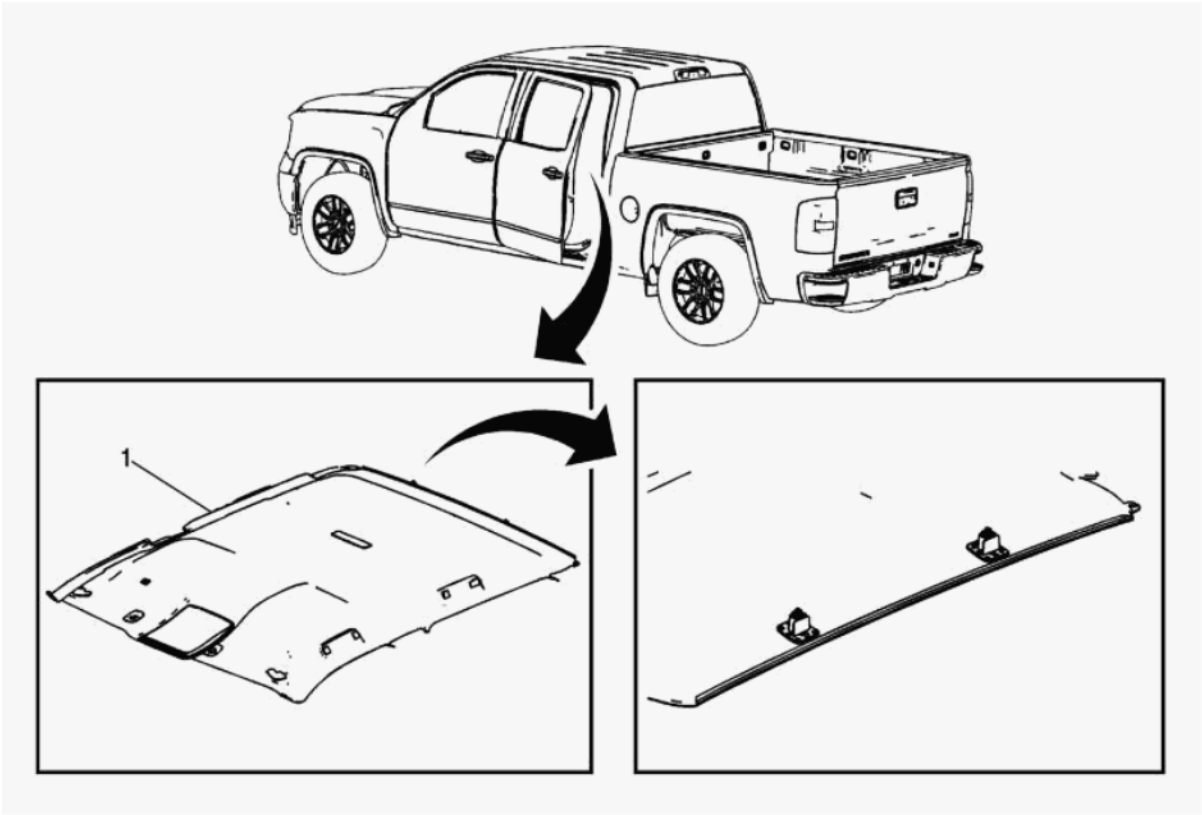


Fig. 18: Headliner Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, position the headliner trim panel assembly (1) into the vehicle through the front windshield.
2. Lay the wiring harness on the new headliner assembly to confirm correct routing and ensure harness leads are proper length for mating connections prior to gluing.

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WARNING: **Do not change the wiring harness routing locations. Correct harness routing is critical for air bag deployment. Possible personal injury or vehicle damage could result if the harness routing is changed.**

NOTE: **When installing a new headliner harness, tape any unused connector to the headliner with a high adhesive tape.**

3. Use hot melt adhesive to install the wiring harness. Apply insulator tape over glued locations to prevent squeaks and rattles as needed.
4. Install the windshield. Refer to **Windshield Replacement** .
5. Engage the two retainers at the rear underside of the headliner.
6. Connect the electrical connectors and secure.
7. If replacing the headliner assembly, transfer all necessary components.

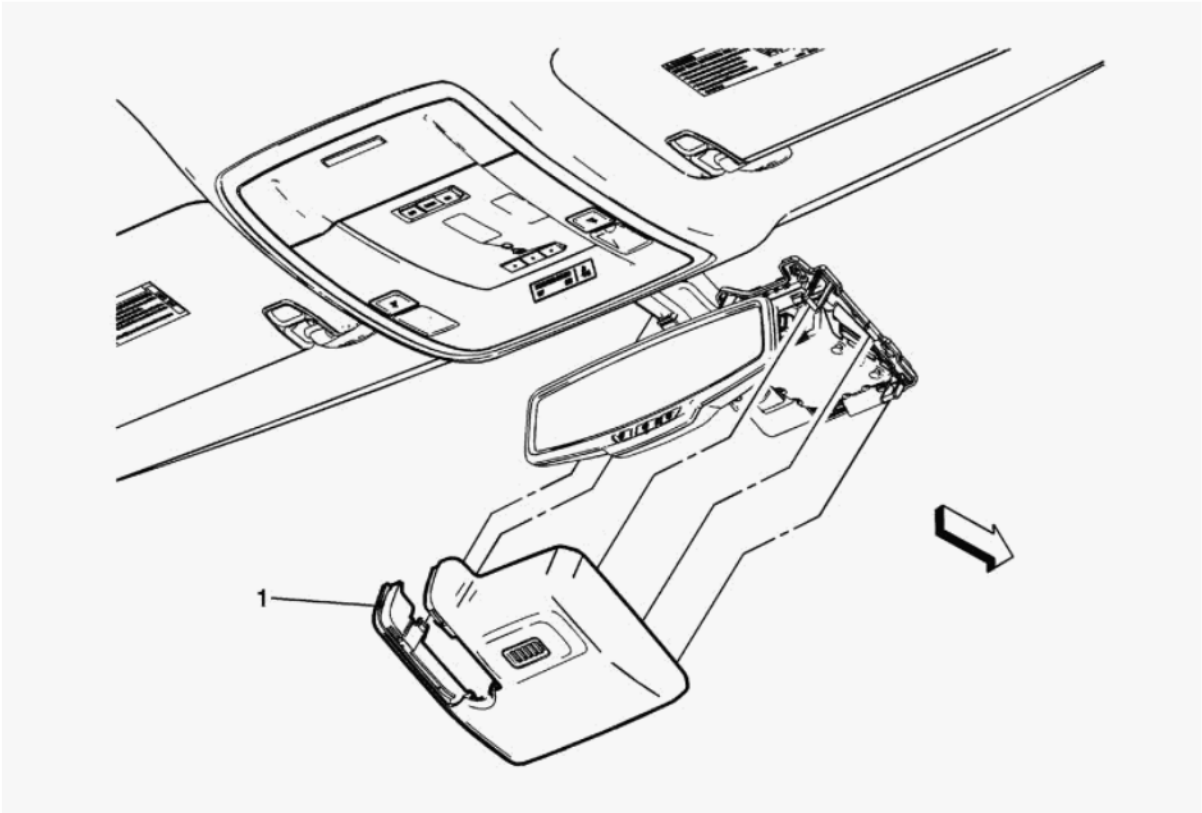


Fig. 19: Windshield Multifunction Sensor Mount Bracket Cover
Courtesy of GENERAL MOTORS COMPANY

8. Install the windshield multifunction sensor mount bracket cover. Refer to **Windshield Multifunction Sensor Mount Bracket Cover Replacement** .

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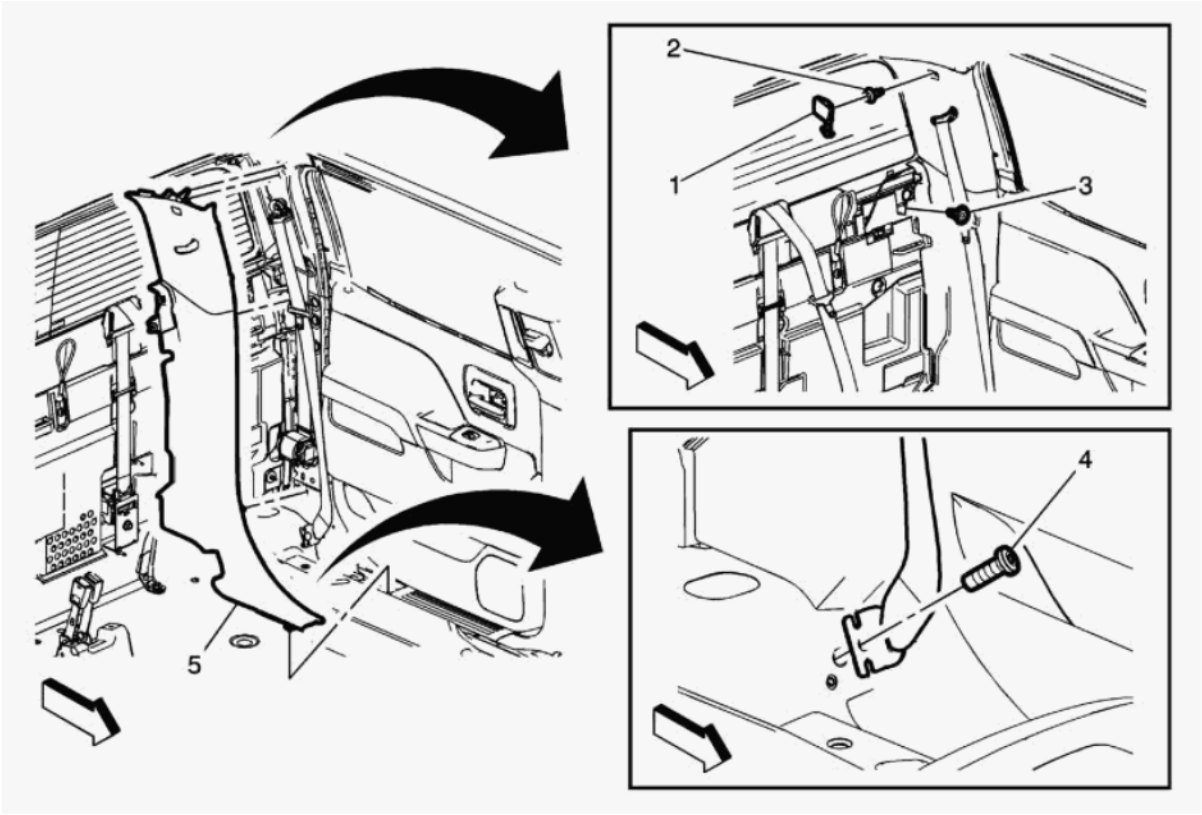
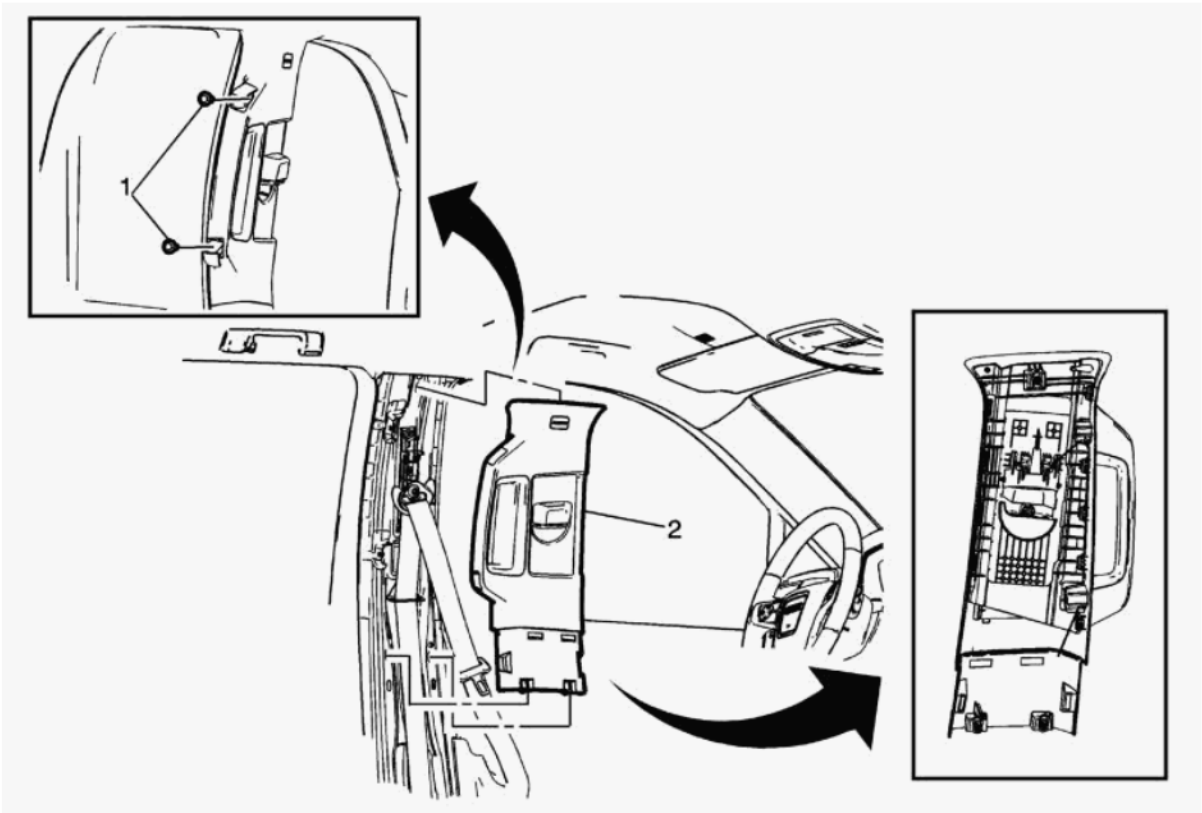


Fig. 20: Body Lock Pillar Garnish Molding (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

9. Install the body lock pillar garnish molding (5). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .



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Fig. 21: Center Pillar Upper Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Install the center pillar upper trim panel assembly (2). Refer to **Center Pillar Upper Trim Panel Replacement** .

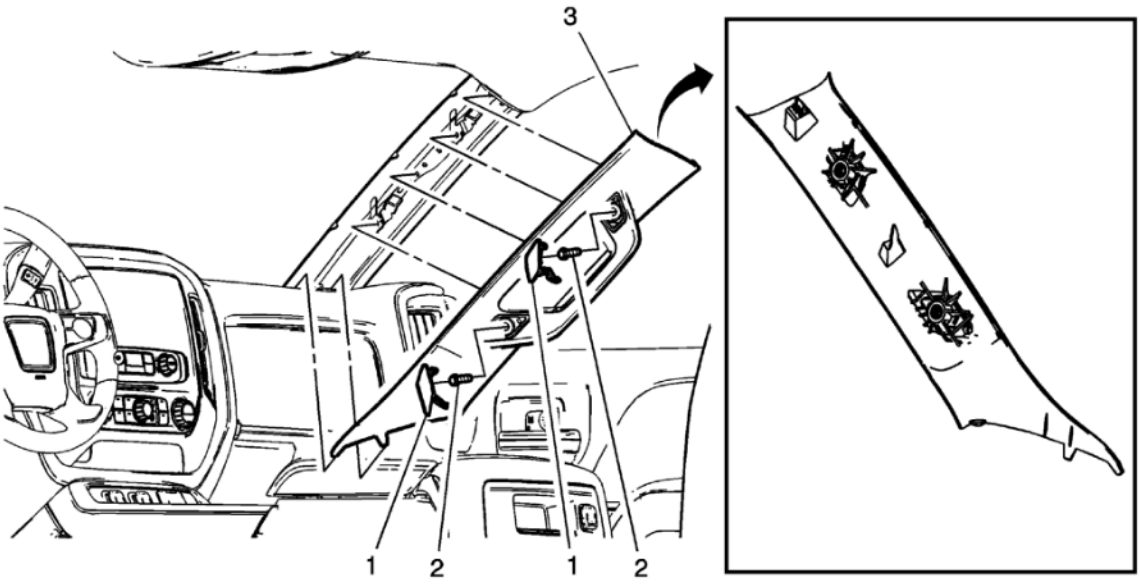


Fig. 22: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

11. Install the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .

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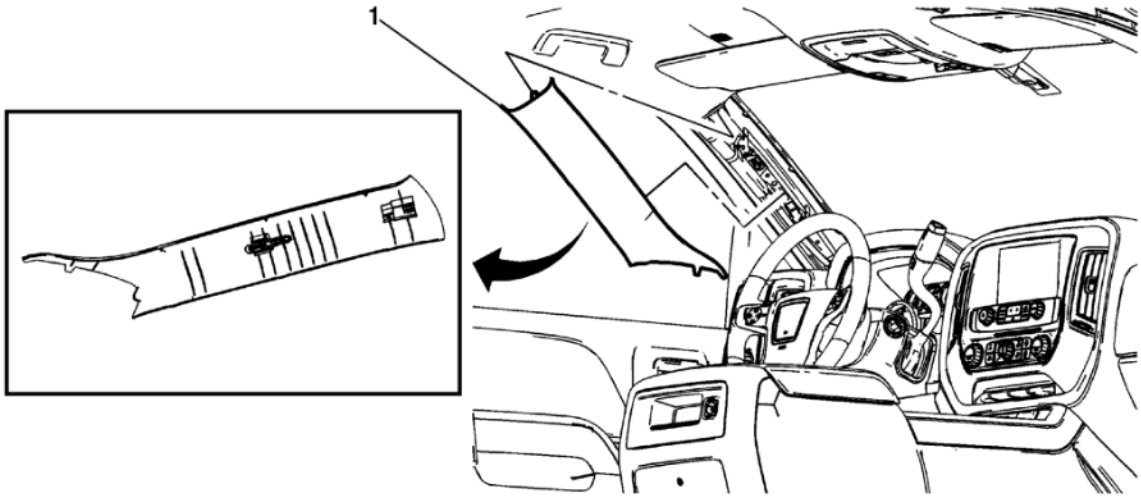
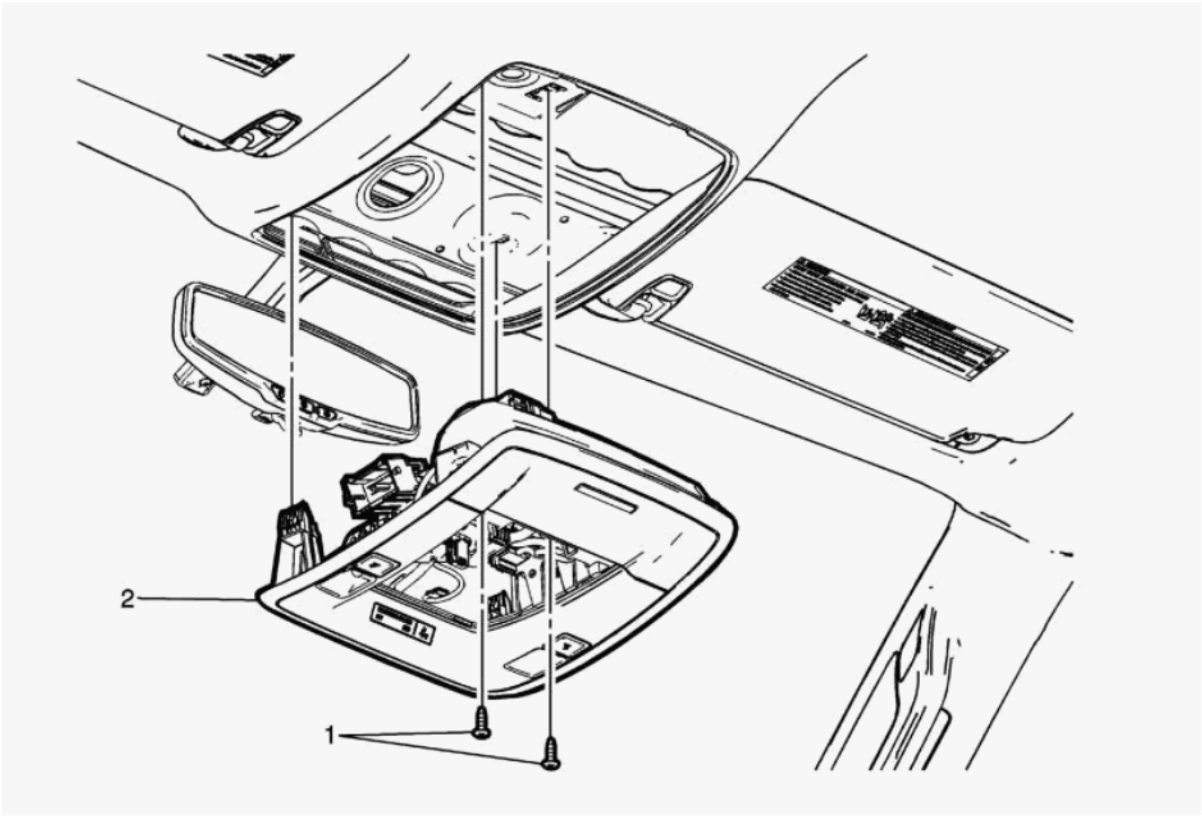


Fig. 23: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

12. Install the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .



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Fig. 24: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

13. Install the roof console assembly (2). Refer to **Roof Console Replacement** .

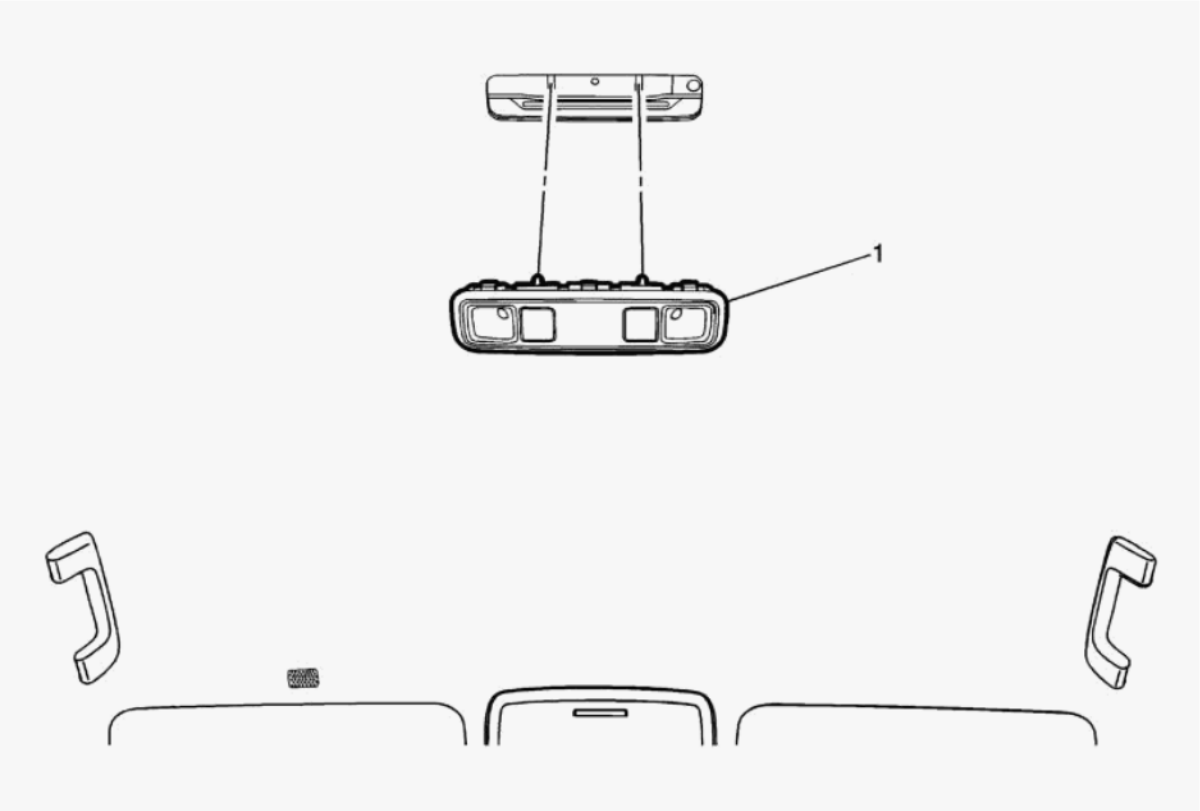


Fig. 25: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

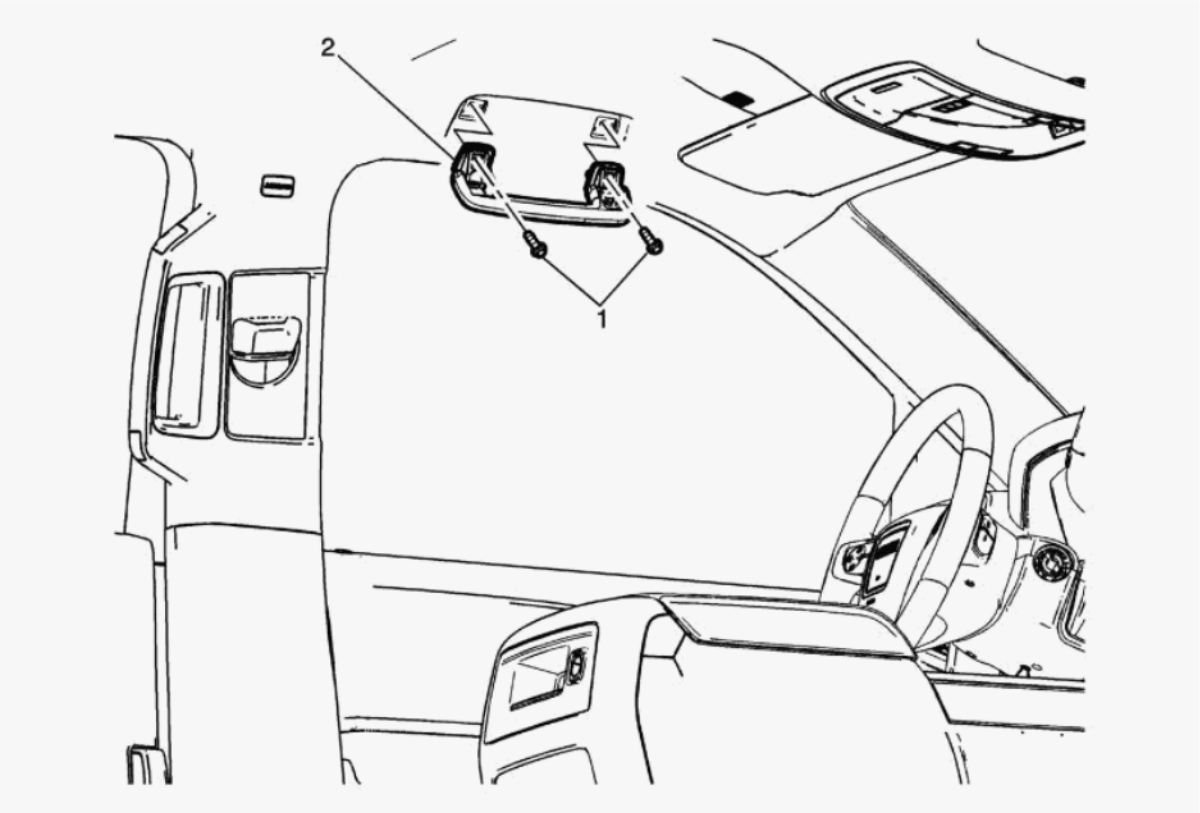
14. Install the rear seat position center reading and courtesy lamp (1). Refer to **Rear Seat Position Center Reading and Courtesy Lamp Replacement** .

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Fig. 26: Roof Rail Rear Assist Handle (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

15. Install the roof rail rear assist handle assembly (2). Refer to **Roof Rail Rear Assist Handle Replacement (Crew Cab, Extended Cab)** .



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Fig. 27: Roof Rail Assist Handle Assembly
Courtesy of GENERAL MOTORS COMPANY

16. Install the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

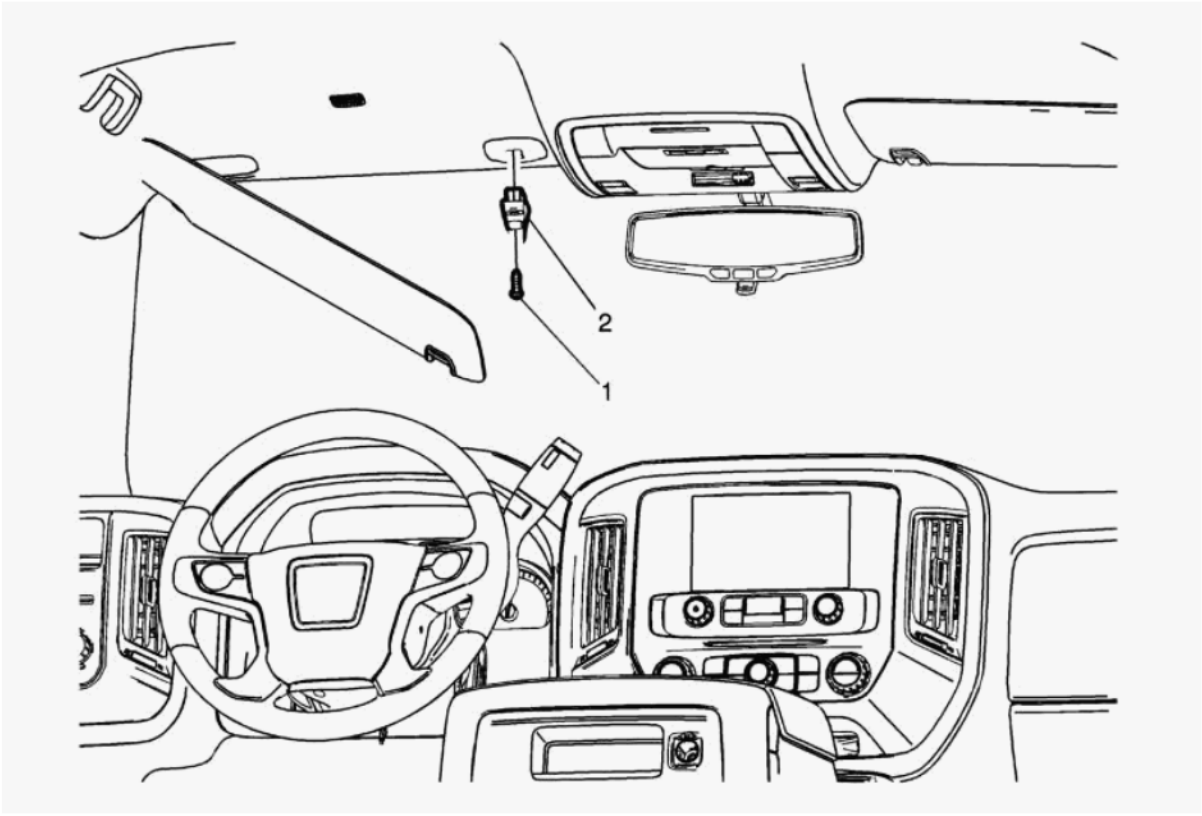


Fig. 28: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

17. Install the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

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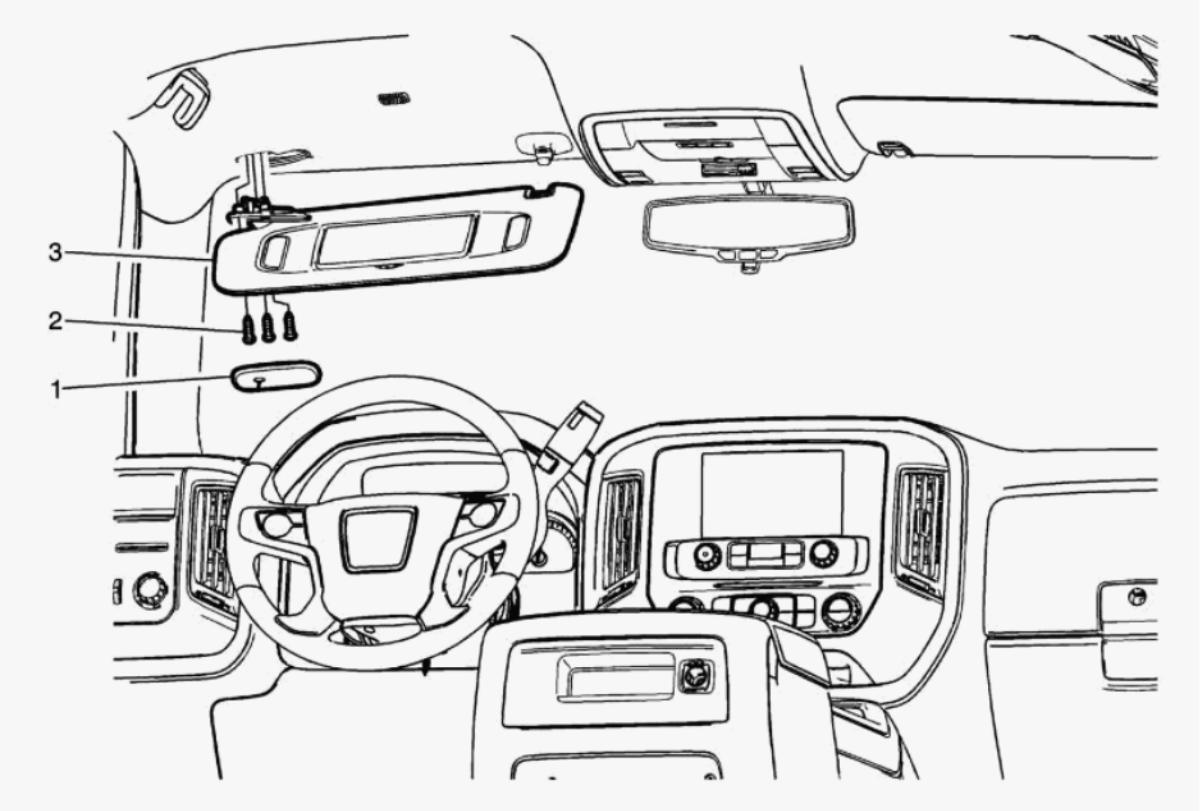


Fig. 29: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

18. Install the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .
19. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

HEADLINING TRIM PANEL REPLACEMENT (CREW CAB WITH SUNROOF)

Removal Procedure

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: **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.**

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.**

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

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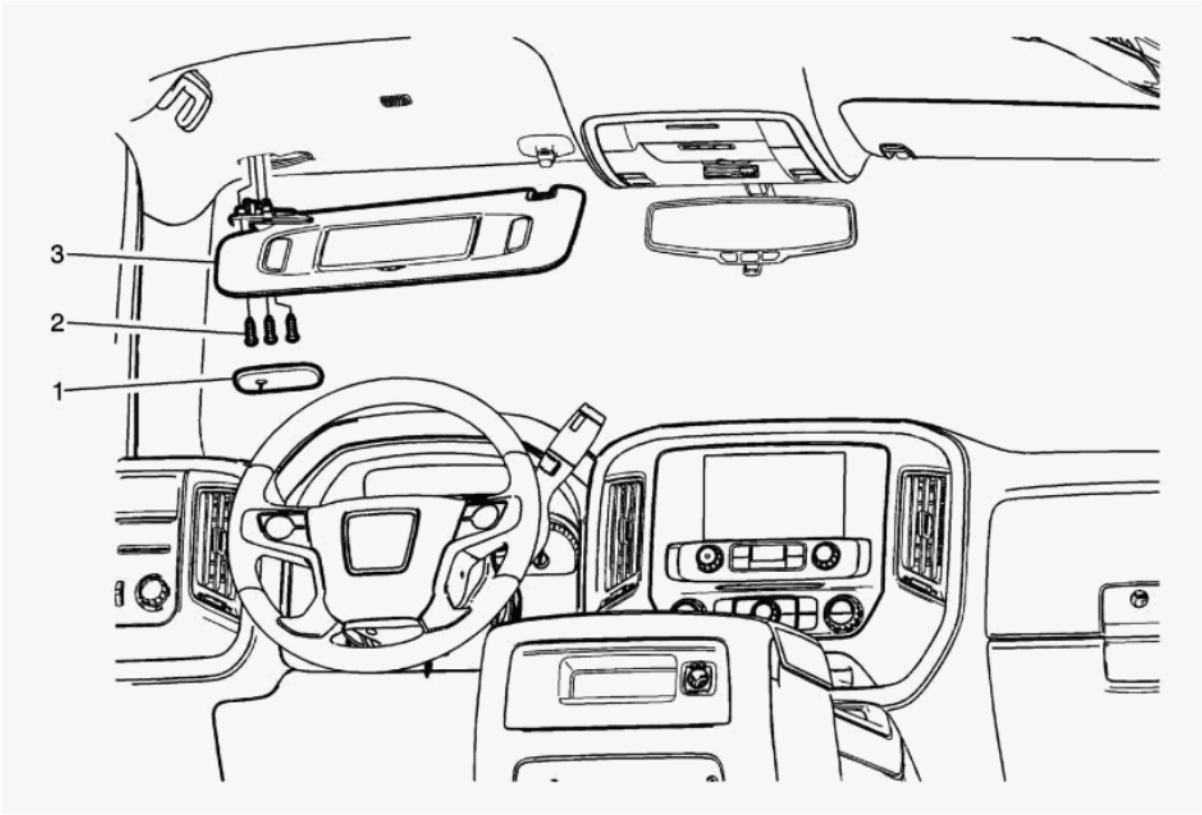
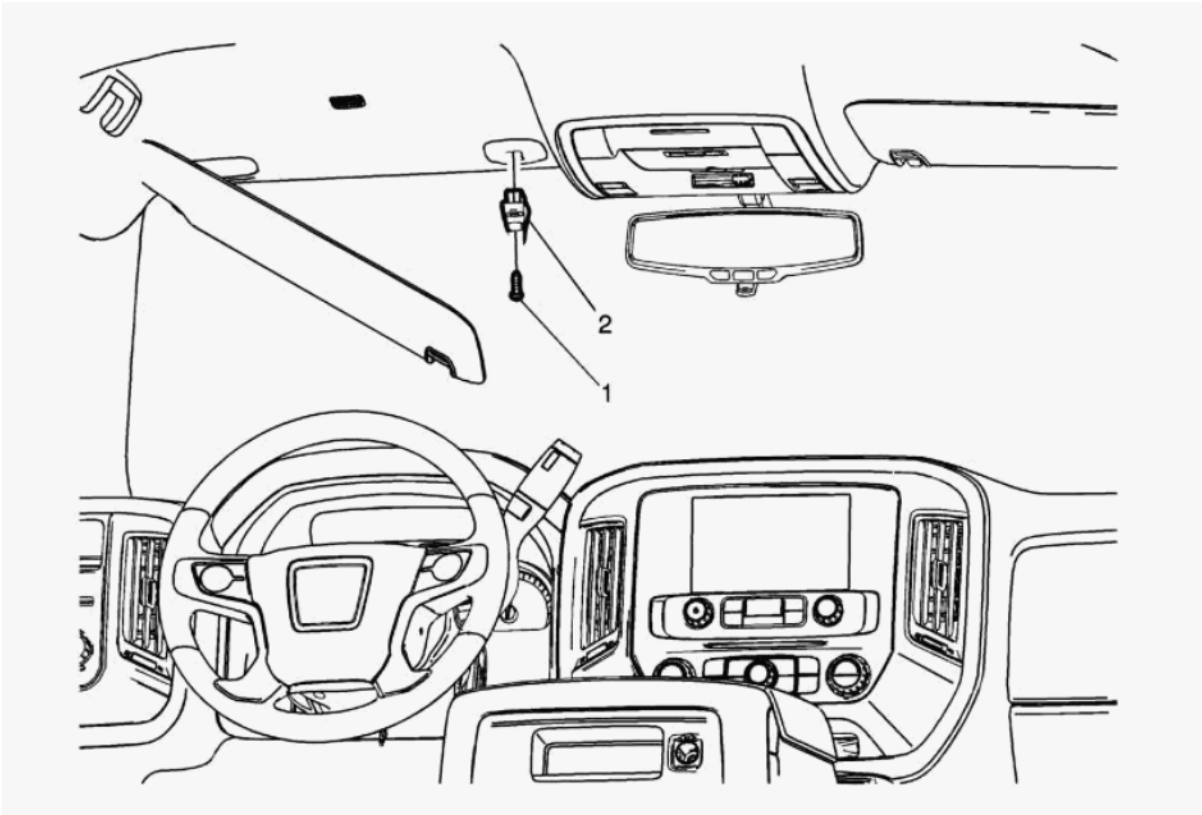


Fig. 30: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Remove the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .



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Fig. 31: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

3. Remove the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

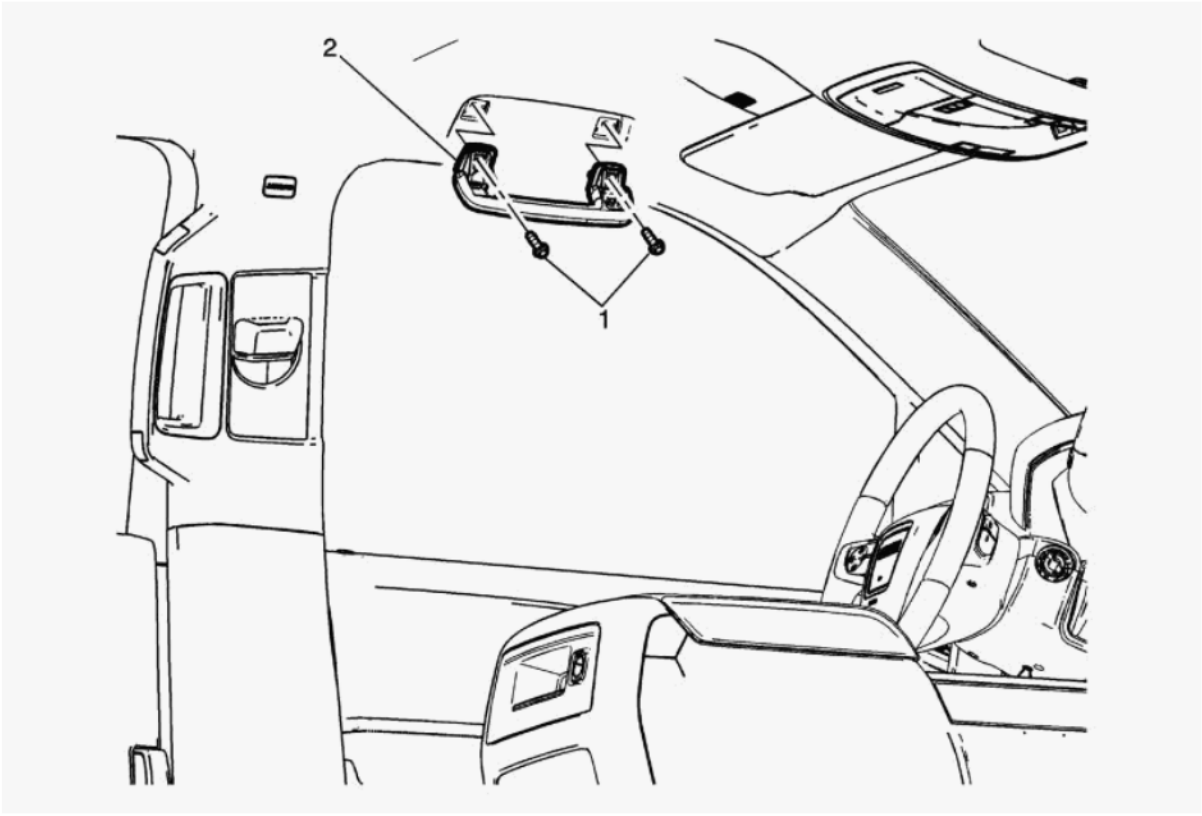


Fig. 32: Roof Rail Assist Handle Assembly
Courtesy of GENERAL MOTORS COMPANY

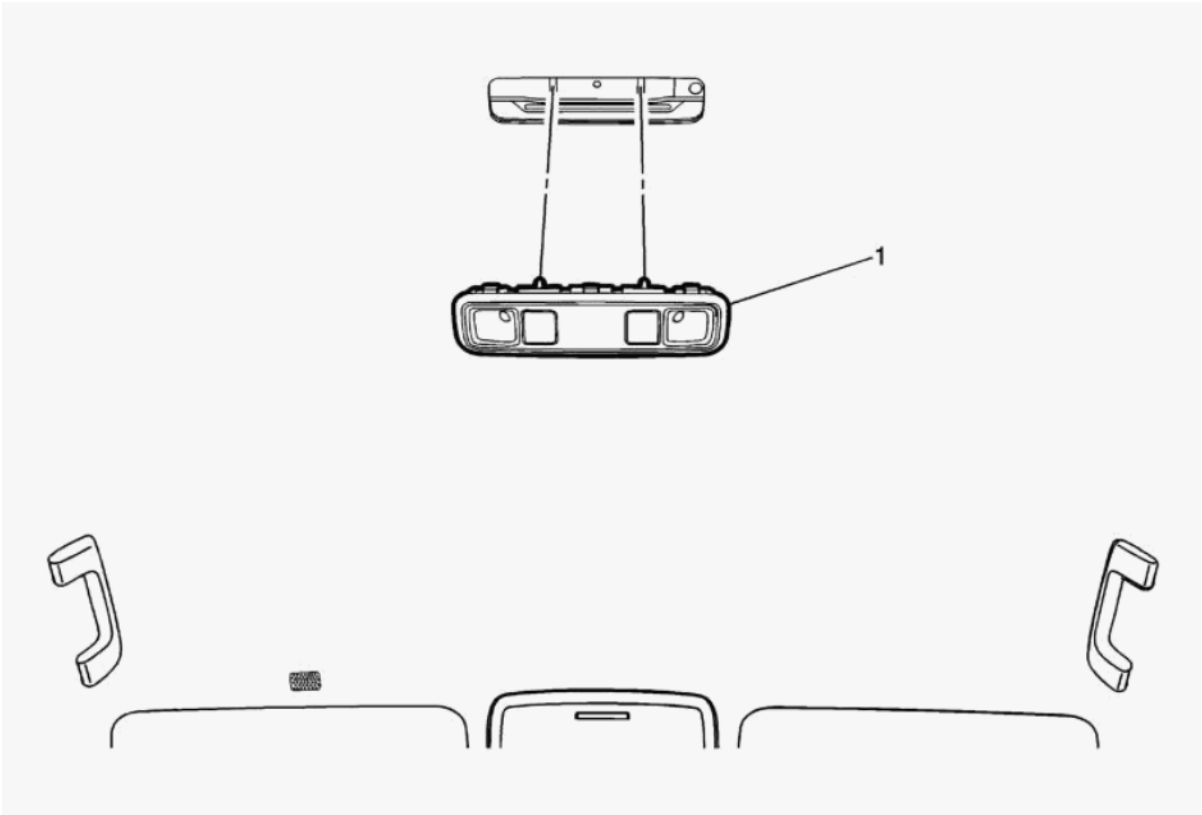
4. Remove the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

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Fig. 33: Roof Rail Rear Assist Handle (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

5. Remove the roof rail rear assist handle (2). Refer to **Roof Rail Rear Assist Handle Replacement (Crew Cab, Extended Cab)** .



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Fig. 34: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

6. Remove the rear seat position center reading and courtesy lamp (1). Refer to **Rear Seat Position Center Reading and Courtesy Lamp Replacement** .

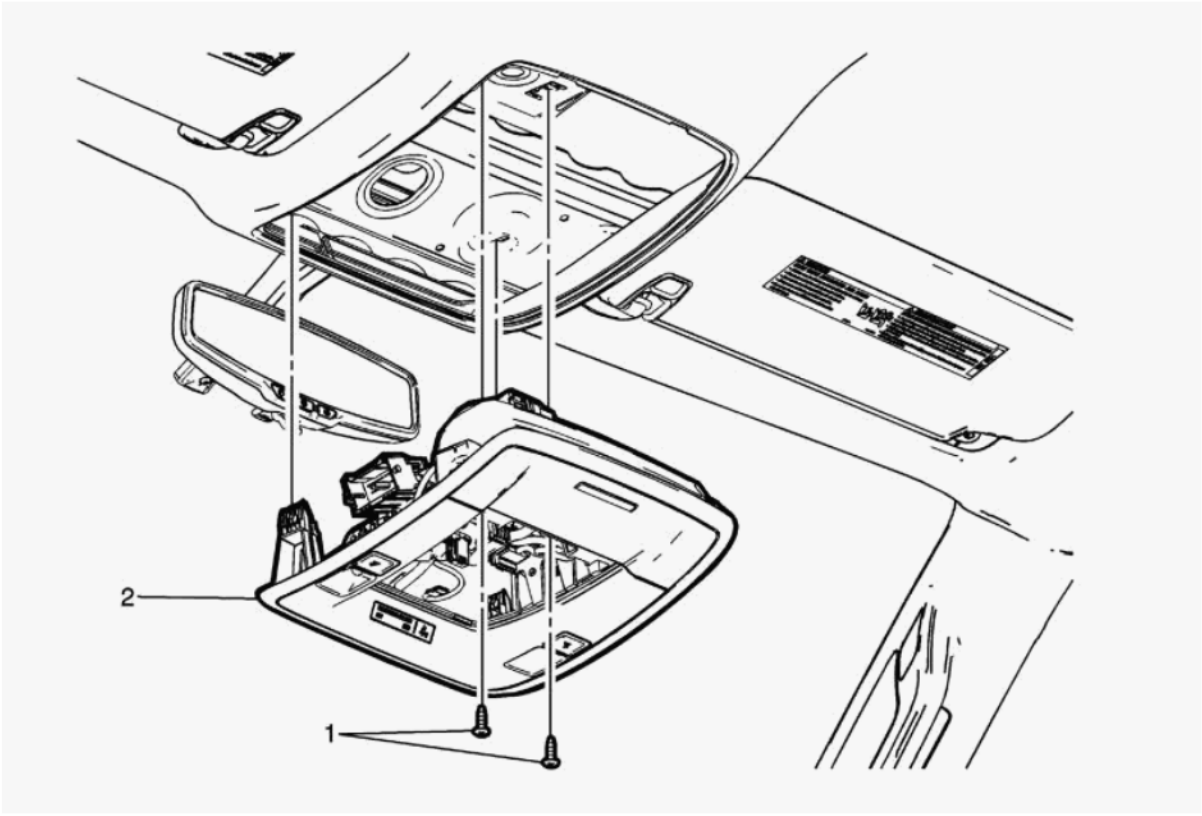


Fig. 35: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Remove the roof console assembly (2). Refer to **Roof Console Replacement** .

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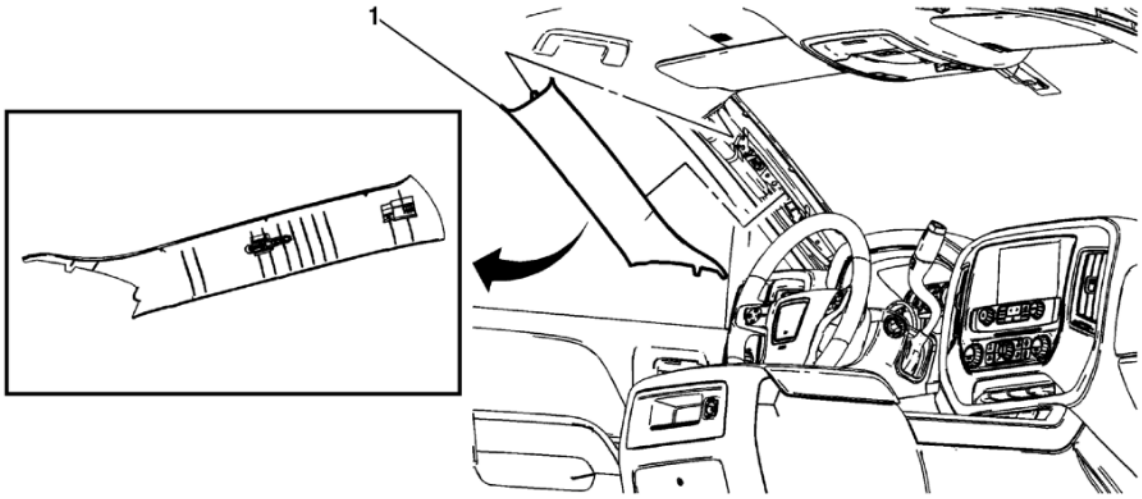
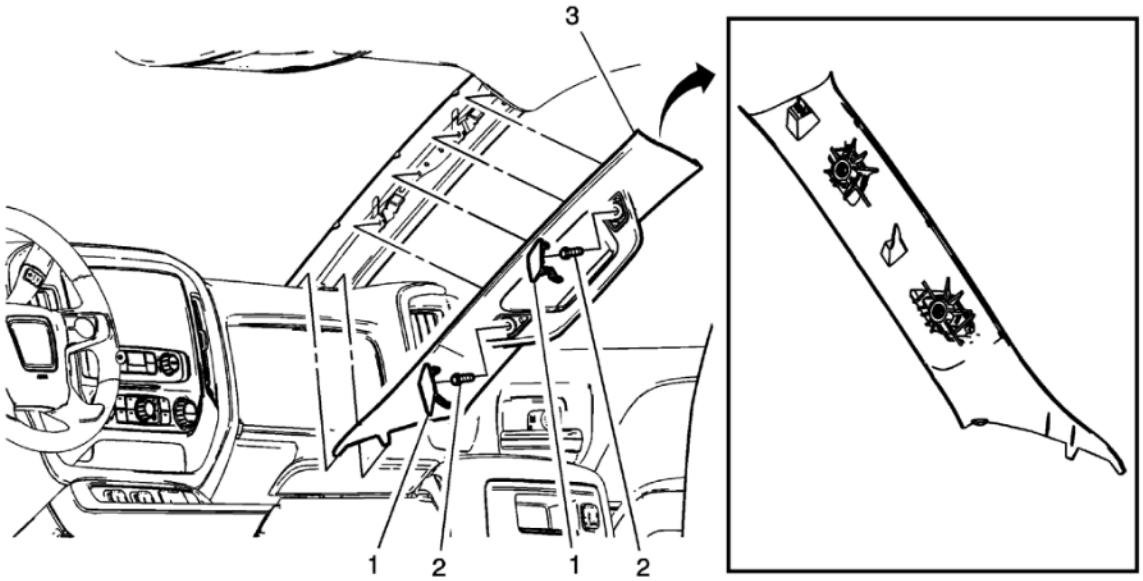


Fig. 36: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

8. Remove the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .



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Fig. 37: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

9. Remove the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .

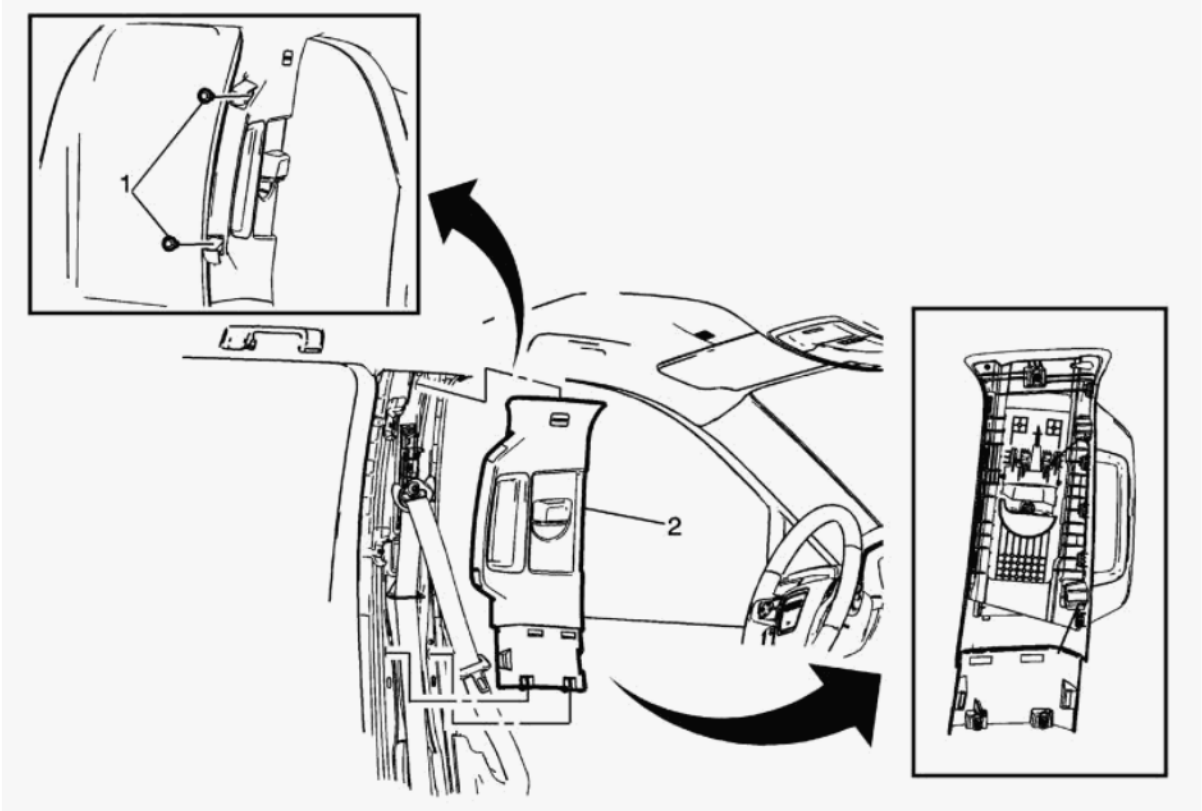


Fig. 38: Center Pillar Upper Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Remove the center pillar upper trim panel assembly (2). Refer to **Center Pillar Upper Trim Panel Replacement** .

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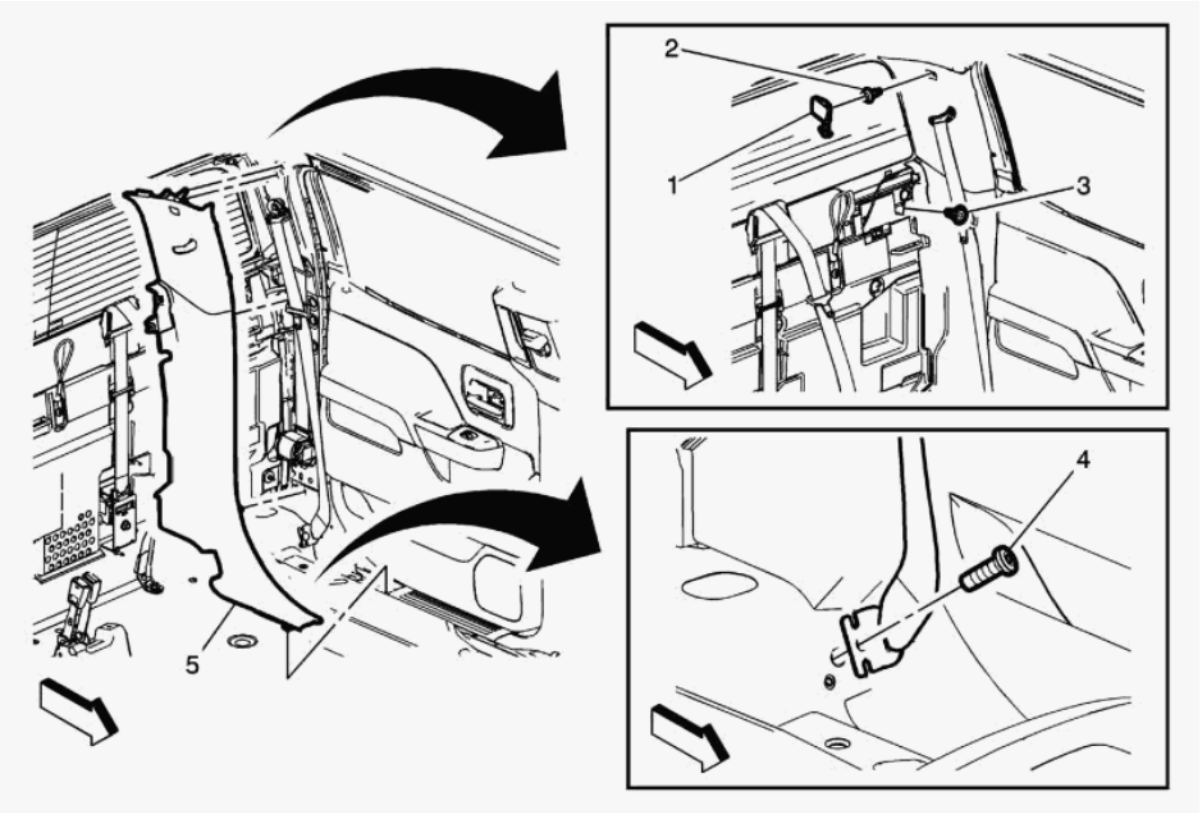


Fig. 39: Body Lock Pillar Garnish Molding (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

11. Remove the body lock pillar garnish molding (5). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .
12. Move the driver and passenger seats fully forward and recline.

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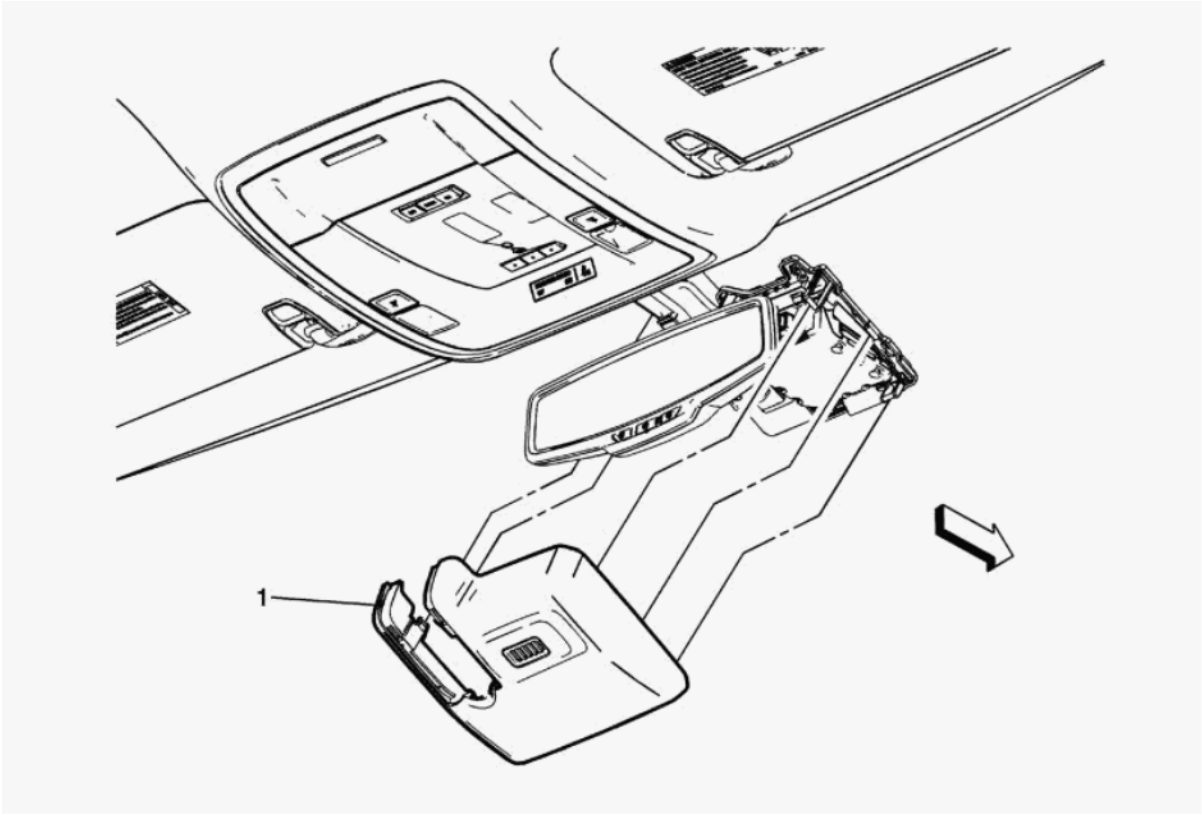
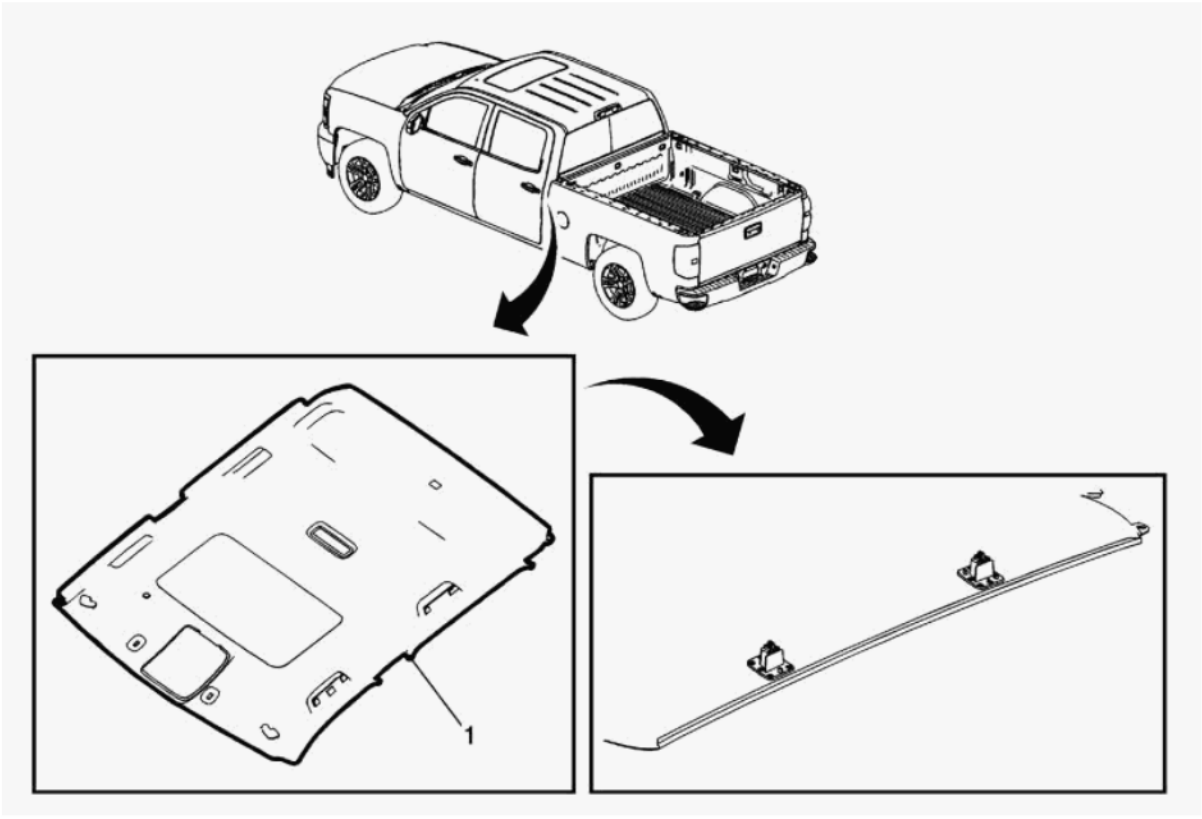


Fig. 40: Windshield Multifunction Sensor Mount Bracket Cover
Courtesy of GENERAL MOTORS COMPANY

13. Remove the windshield multifunction sensor mount bracket cover (1). Refer to **Windshield Multifunction Sensor Mount Bracket Cover Replacement** .



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Fig. 41: Headliner Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

14. Disconnect the electrical connectors from the headliner trim panel assembly (1).
15. There are two retainers at the rear underside of the headliner, if necessary remove.
16. Remove the windshield. Refer to **Windshield Replacement** .
17. Take note of the wiring harness locations and measure the harness lead length prior to removing. Mark harness routing locations on new headliner prior to harness removal.

NOTE: **Use a camera to take pictures and use a pencil to mark the new headliner.**

18. Use fiber or plastic trim tool to assist in removing the wiring harness from the headliner, taking care not to damage the harness.
19. Remove excess glue and material from the wiring harness and re-tape areas where the tape was removed or damaged.
20. With the aid of an assistant, remove the headliner trim panel assembly (1) from the vehicle through the front windshield.

Installation Procedure

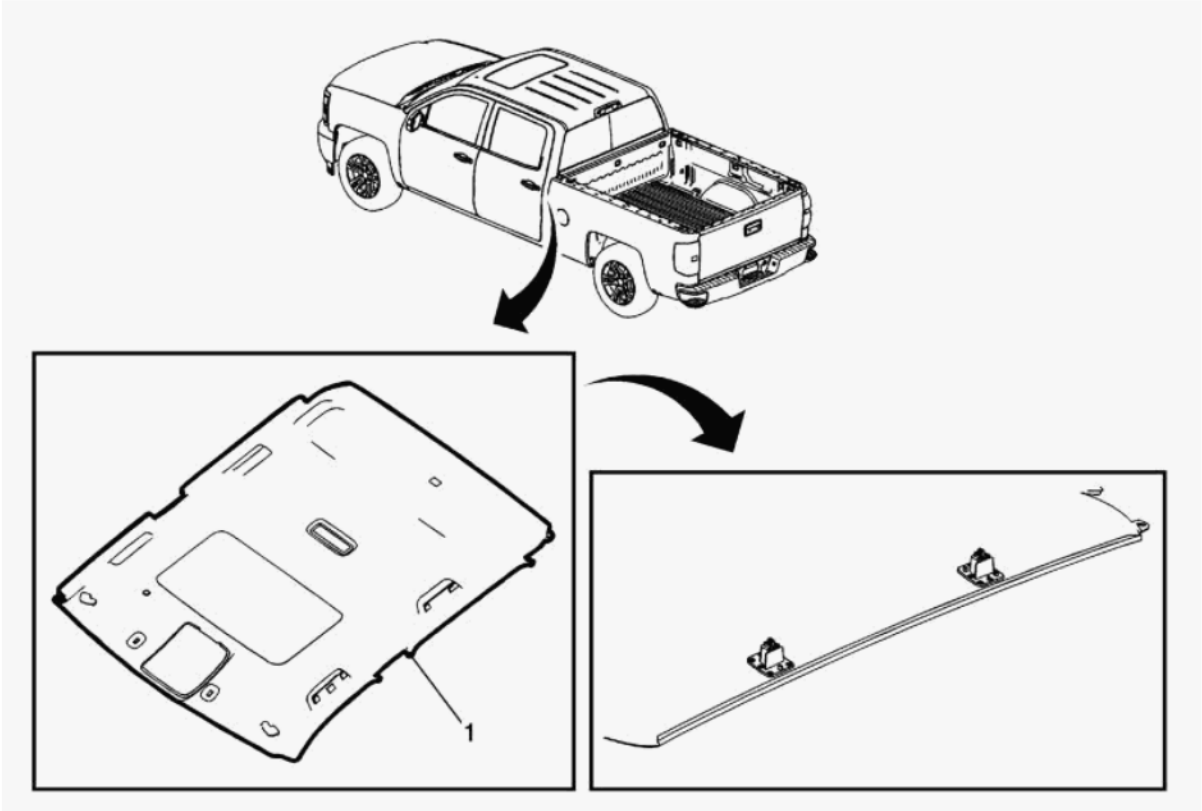


Fig. 42: Headliner Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, position the headliner trim panel assembly (1) into the vehicle through the front windshield.
2. Lay the wiring harness on the new headliner assembly to confirm correct routing and ensure harness leads are proper length for mating connections prior to gluing.

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WARNING: **Do not change the wiring harness routing locations. Correct harness routing is critical for air bag deployment. Possible personal injury or vehicle damage could result if the harness routing is changed.**

NOTE: **When installing a new headliner harness, tape any unused connector to the headliner with a high adhesive tape.**

3. Use hot melt adhesive to install the wiring harness. Apply insulator tape over glued locations to prevent squeaks and rattles as needed.
4. Install the windshield. Refer to **Windshield Replacement** .
5. Engage the two retainers at the rear underside of the headliner.
6. Connect the electrical connectors and secure.
7. If replacing the headliner assembly, transfer all necessary components.

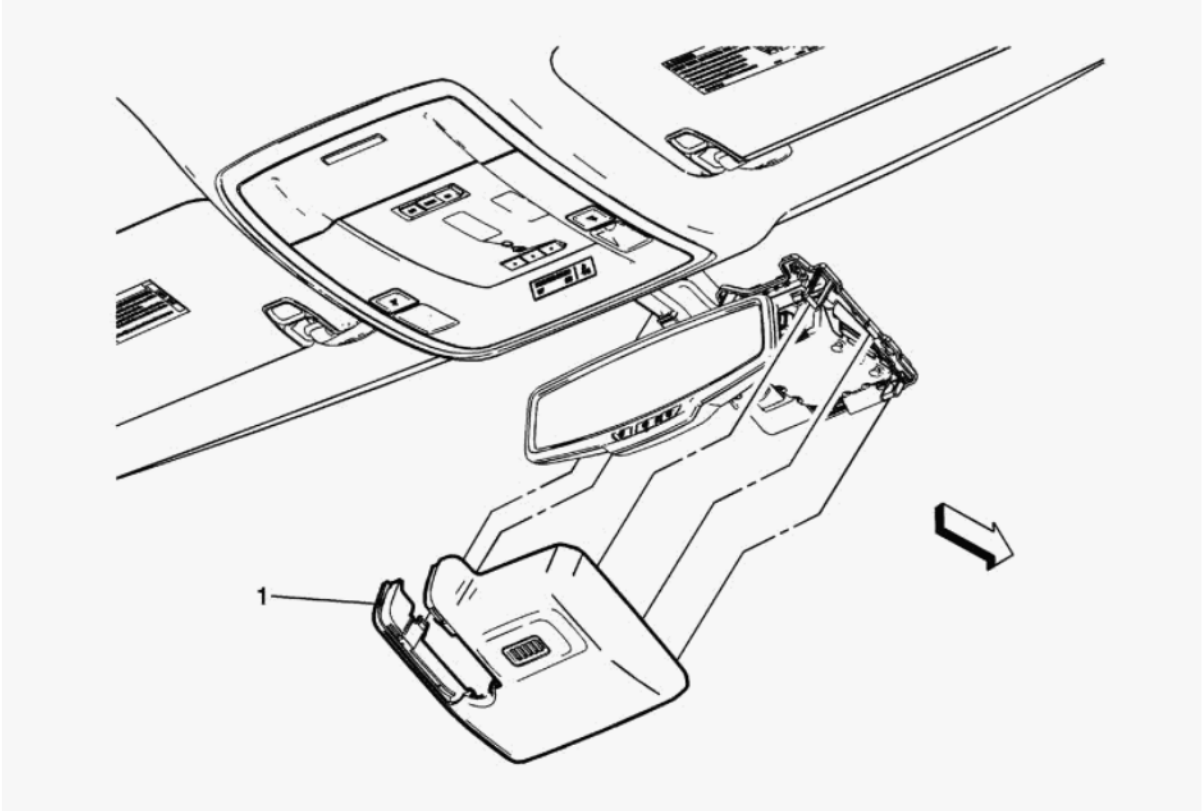


Fig. 43: Windshield Multifunction Sensor Mount Bracket Cover
Courtesy of GENERAL MOTORS COMPANY

8. Install the windshield multifunction sensor mount bracket cover (1). Refer to **Windshield Multifunction Sensor Mount Bracket Cover Replacement** .

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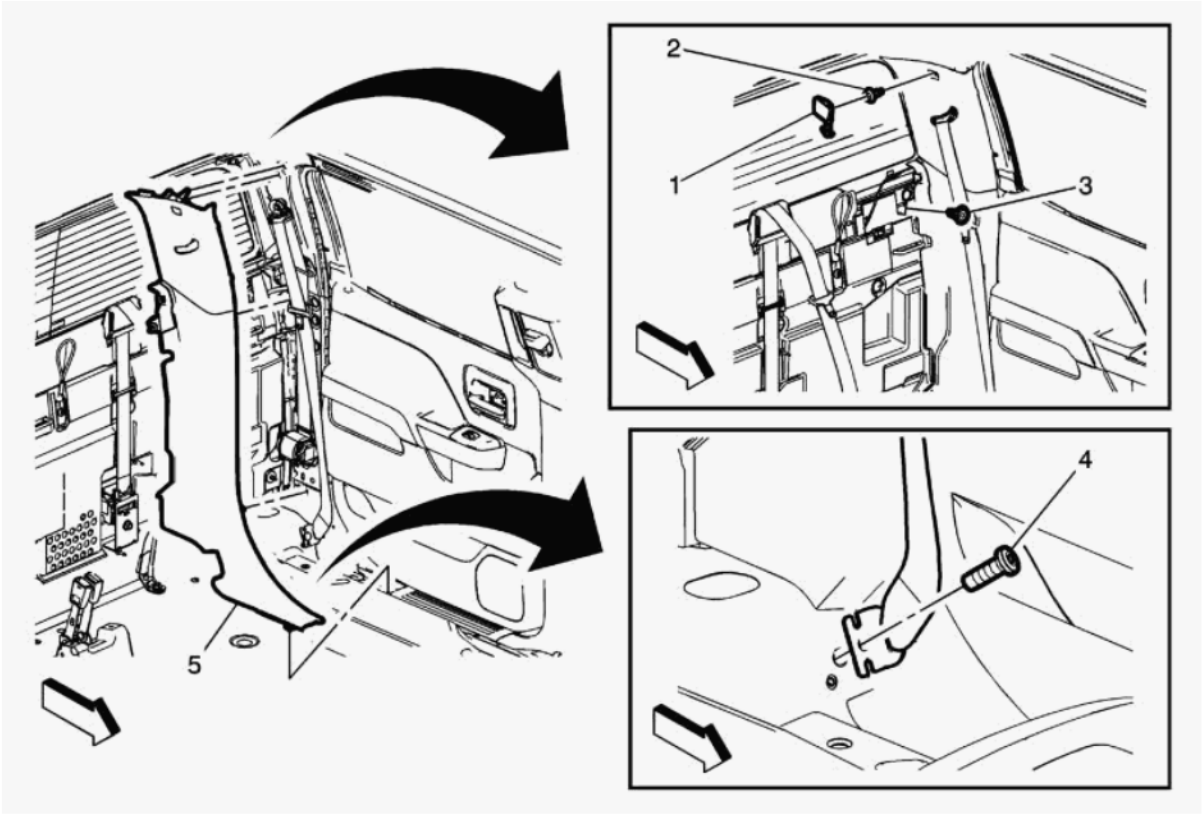
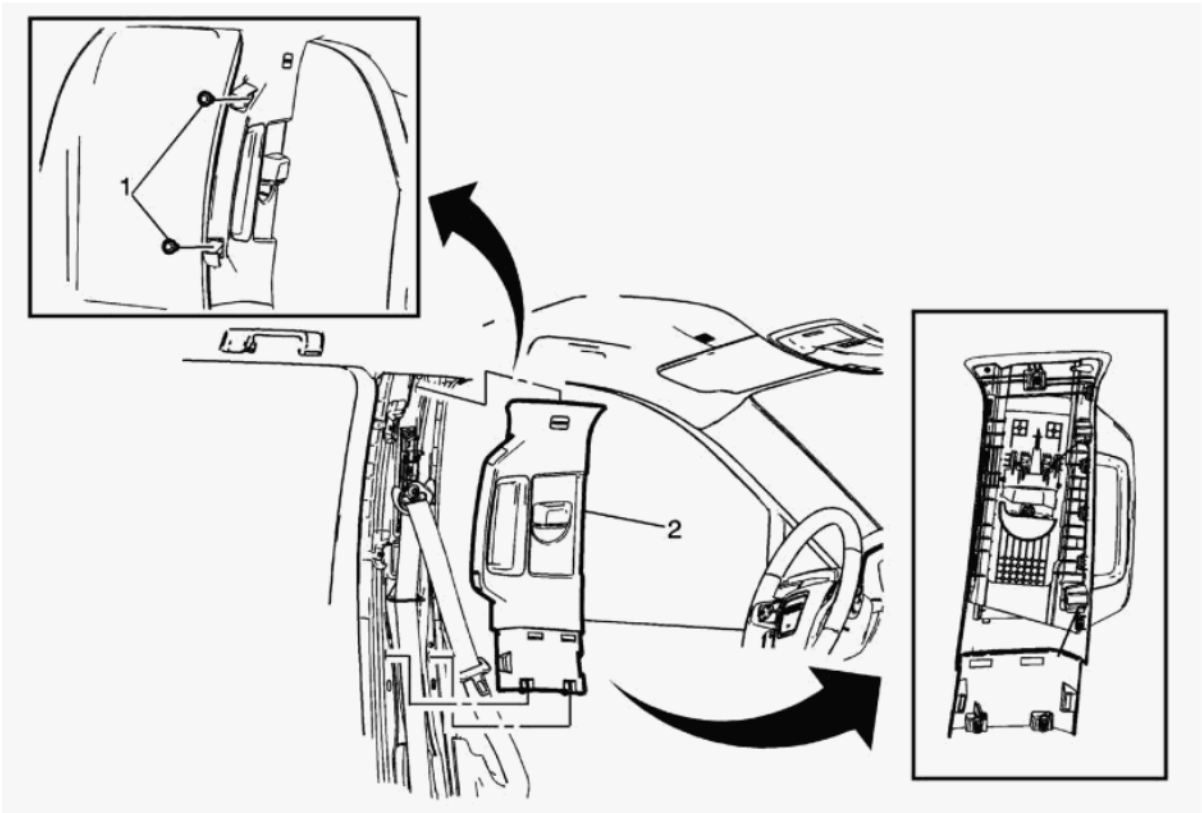


Fig. 44: Body Lock Pillar Garnish Molding (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

9. Install the body lock pillar garnish molding (5). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .



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Fig. 45: Center Pillar Upper Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Install the center pillar upper trim panel assembly (2). Refer to **Center Pillar Upper Trim Panel Replacement** .

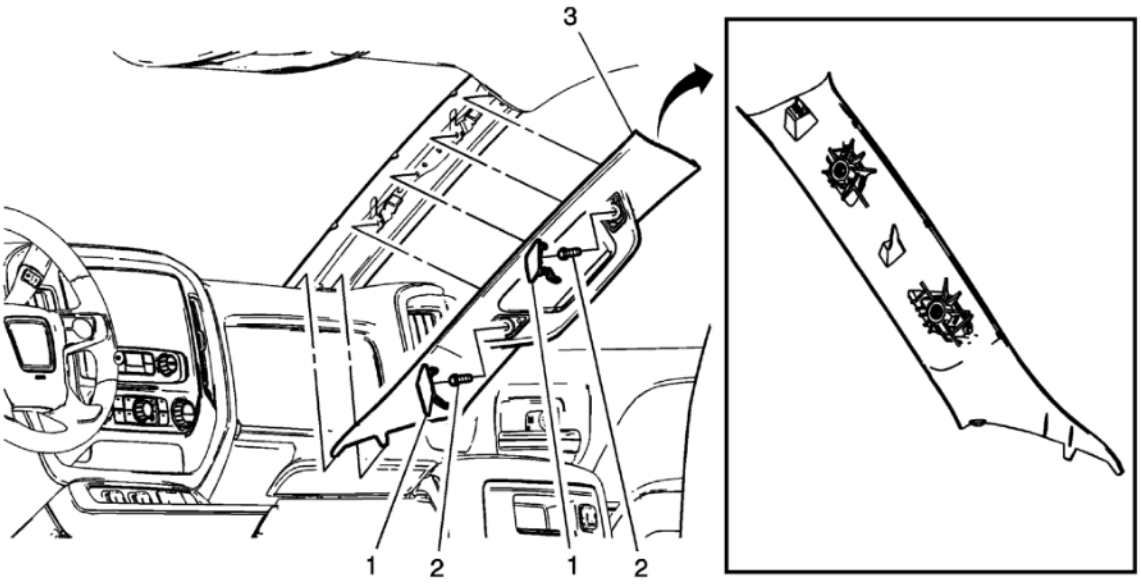


Fig. 46: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

11. Install the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .

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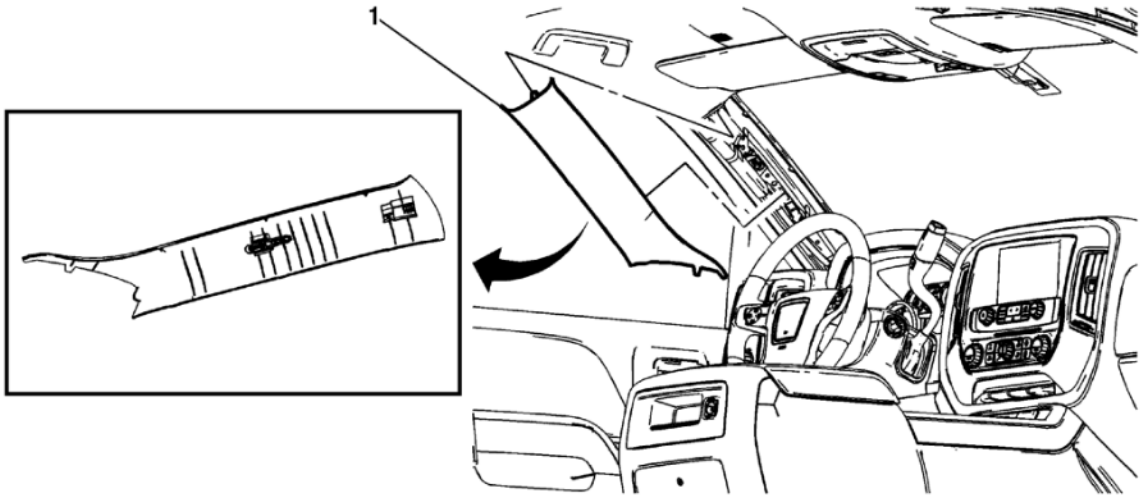
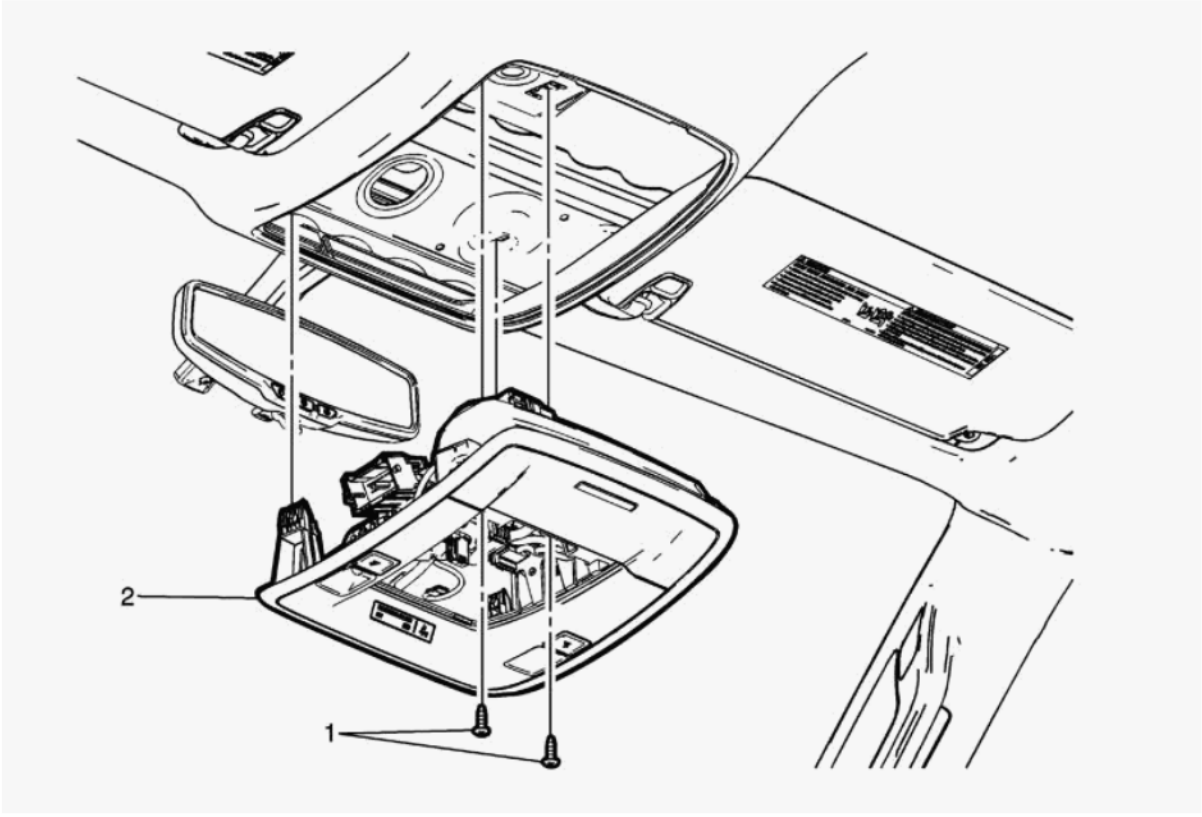


Fig. 47: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

12. Install the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .



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Fig. 48: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

13. Install the roof console assembly (2). Refer to **Roof Console Replacement** .

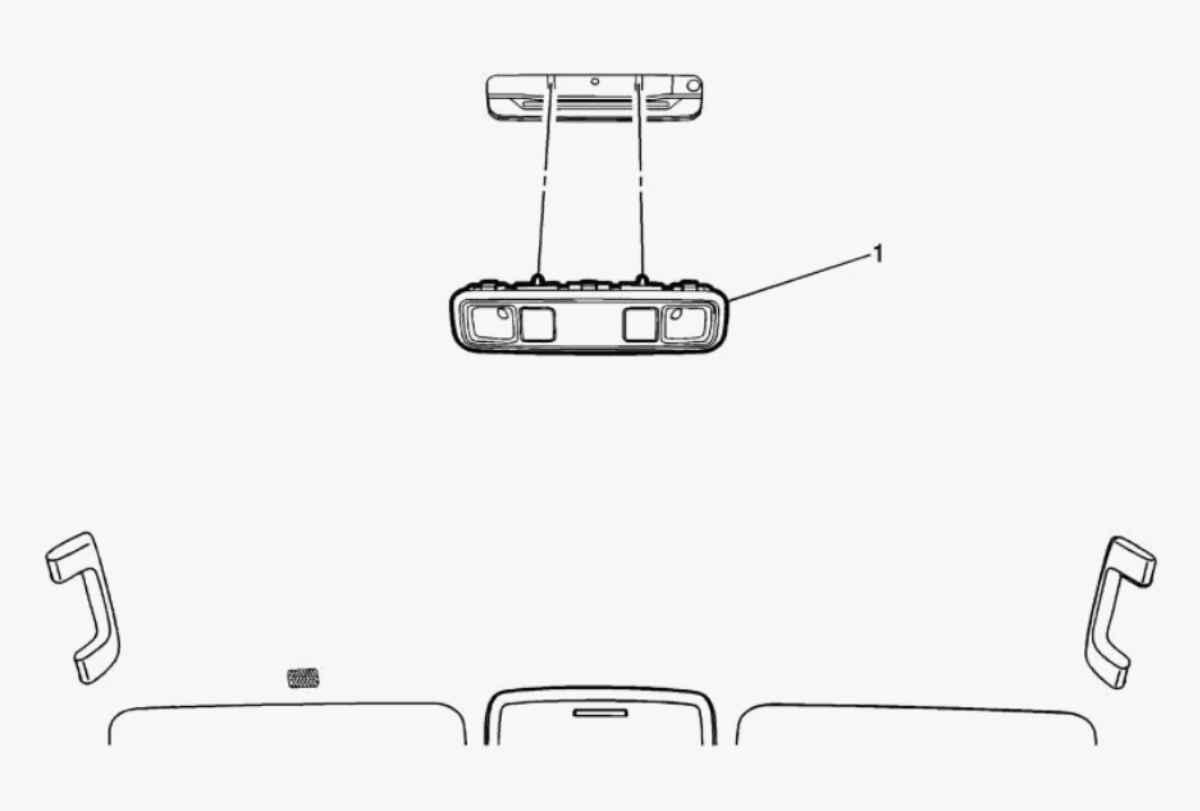


Fig. 49: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

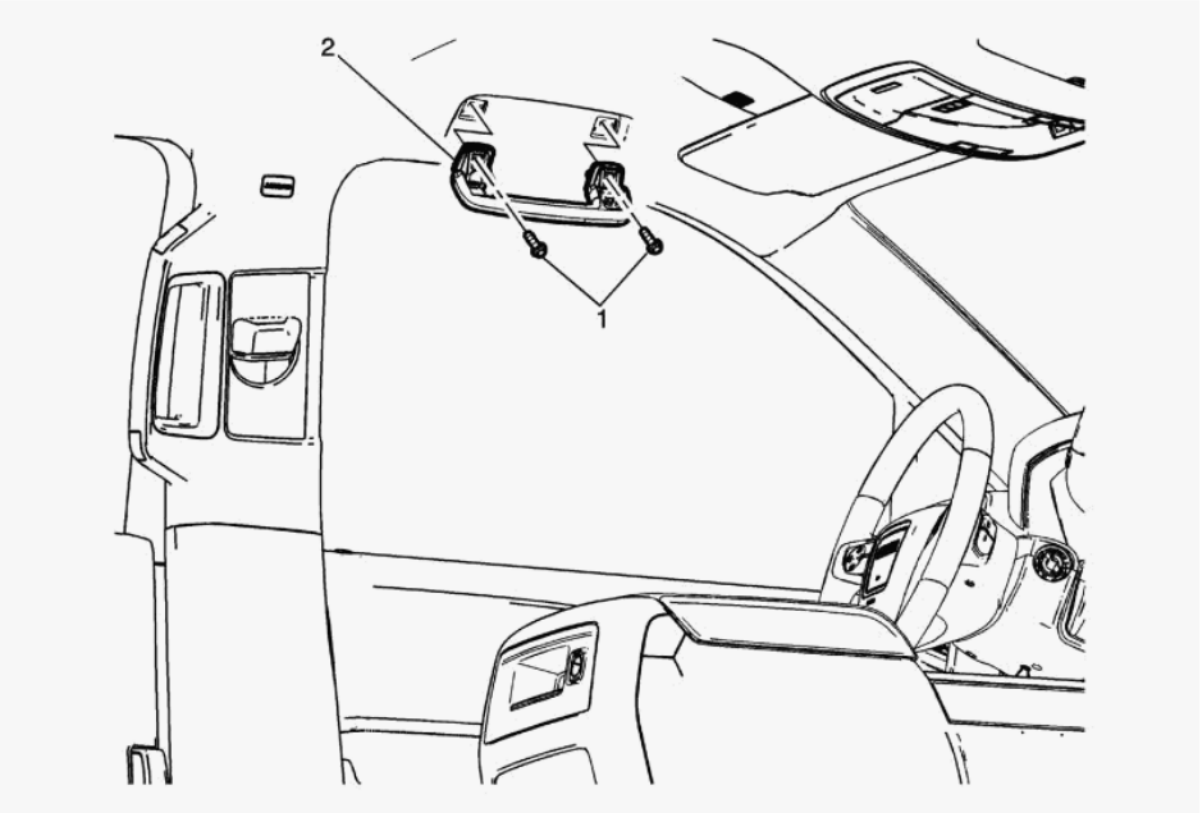
14. Install the rear seat position center reading and courtesy lamp (1). Refer to **Rear Seat Position Center Reading and Courtesy Lamp Replacement** .

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Fig. 50: Roof Rail Rear Assist Handle (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

15. Install the roof rail rear assist handle assembly (2). Refer to **Roof Rail Rear Assist Handle Replacement (Crew Cab, Extended Cab)** .



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Fig. 51: Roof Rail Assist Handle Assembly
Courtesy of GENERAL MOTORS COMPANY

16. Install the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

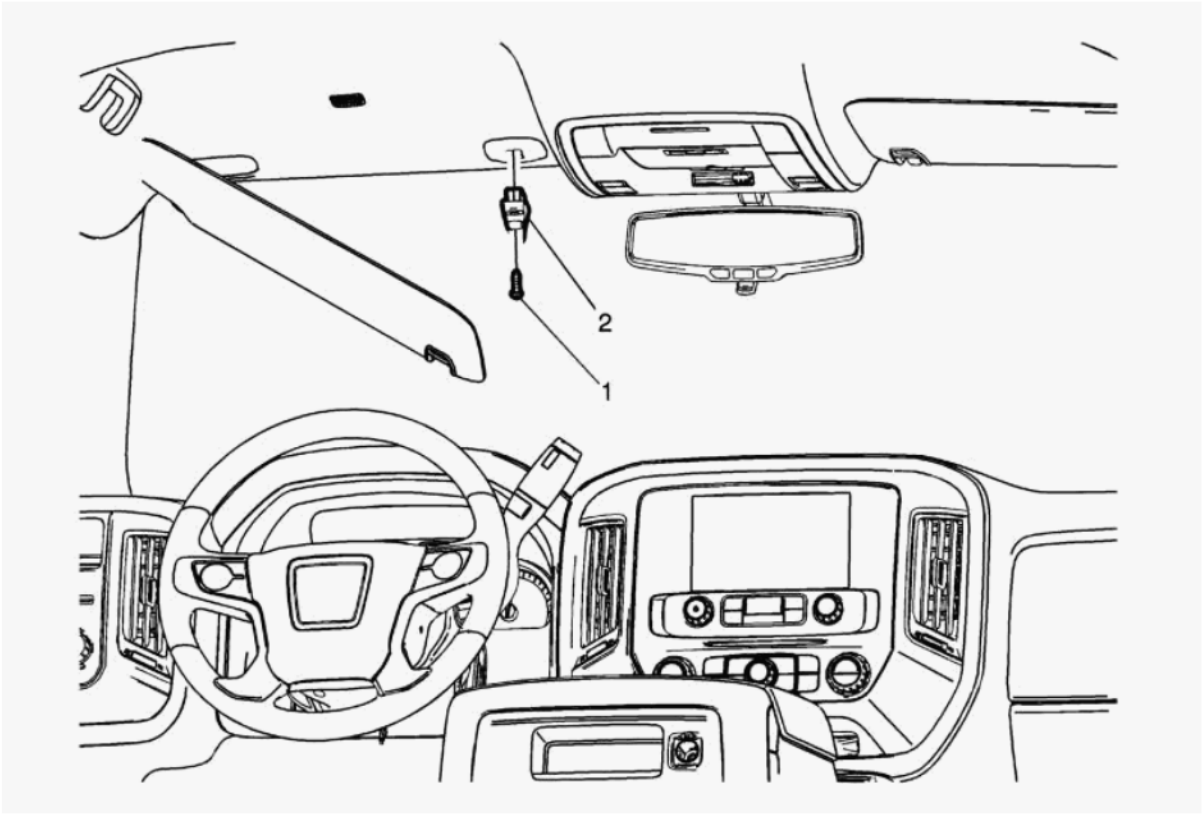


Fig. 52: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

17. Install the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

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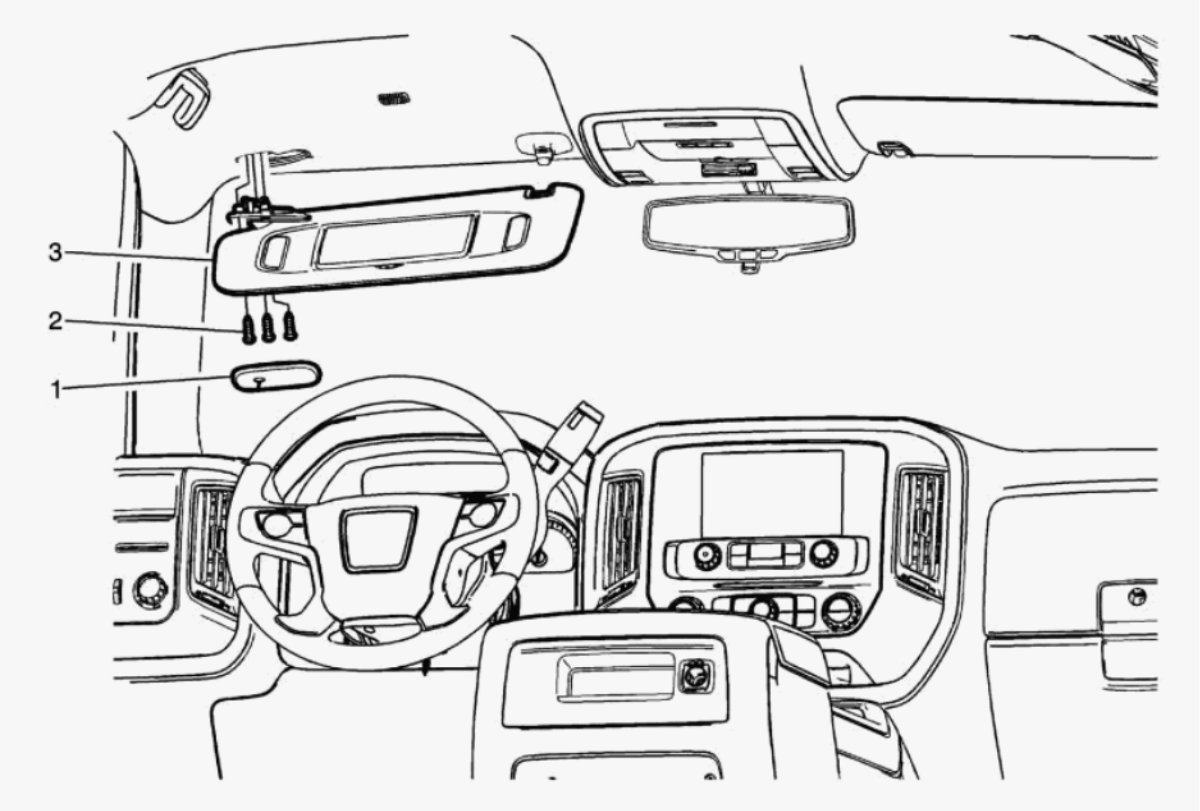


Fig. 53: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

18. Install the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .
19. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

HEADLINING TRIM PANEL REPLACEMENT (EXTENDED CAB)

Removal Procedure

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: **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.**

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.**

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

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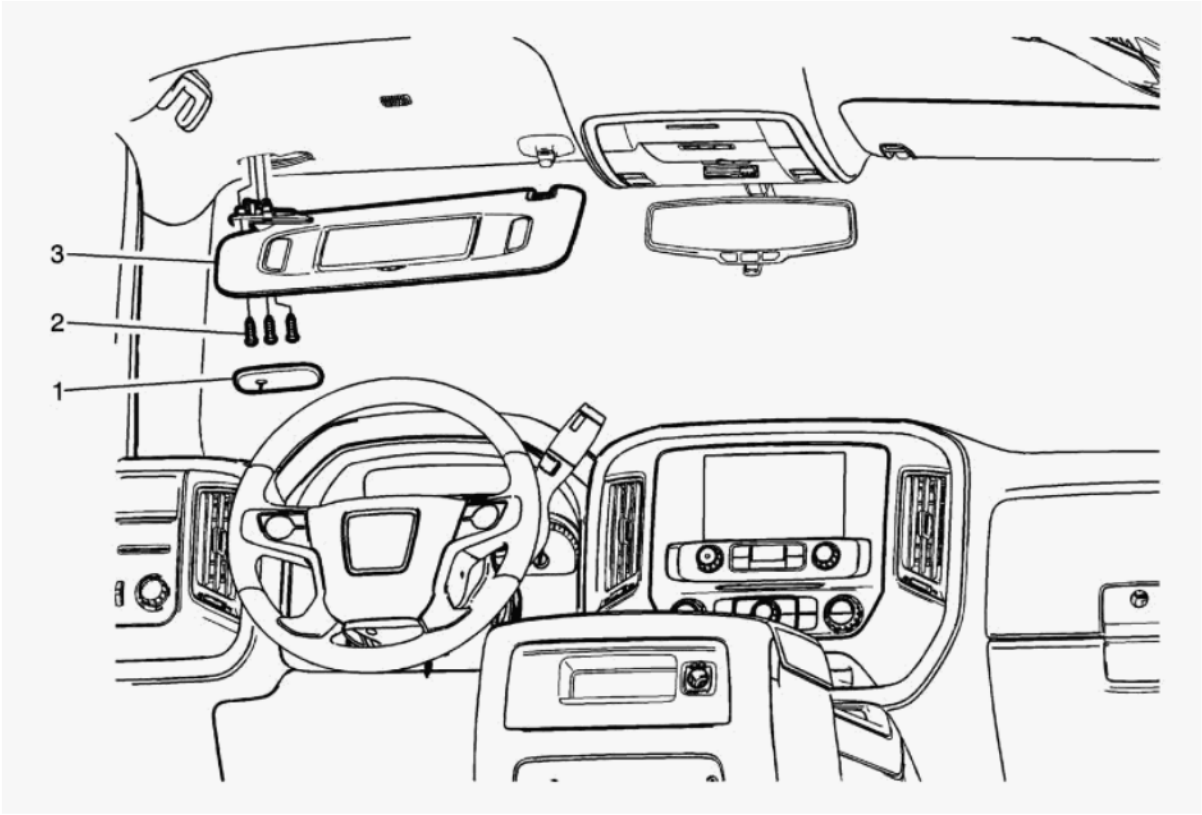
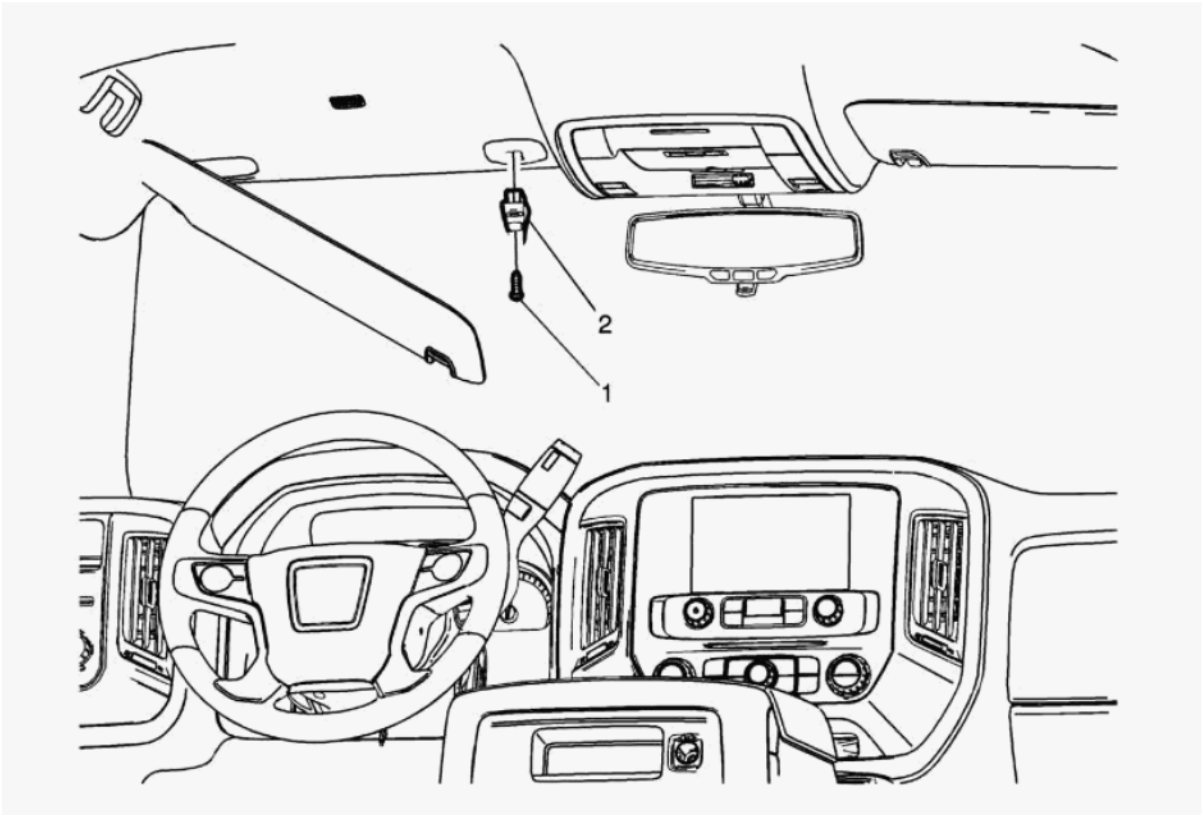


Fig. 54: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Remove the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .



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Fig. 55: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

3. Remove the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

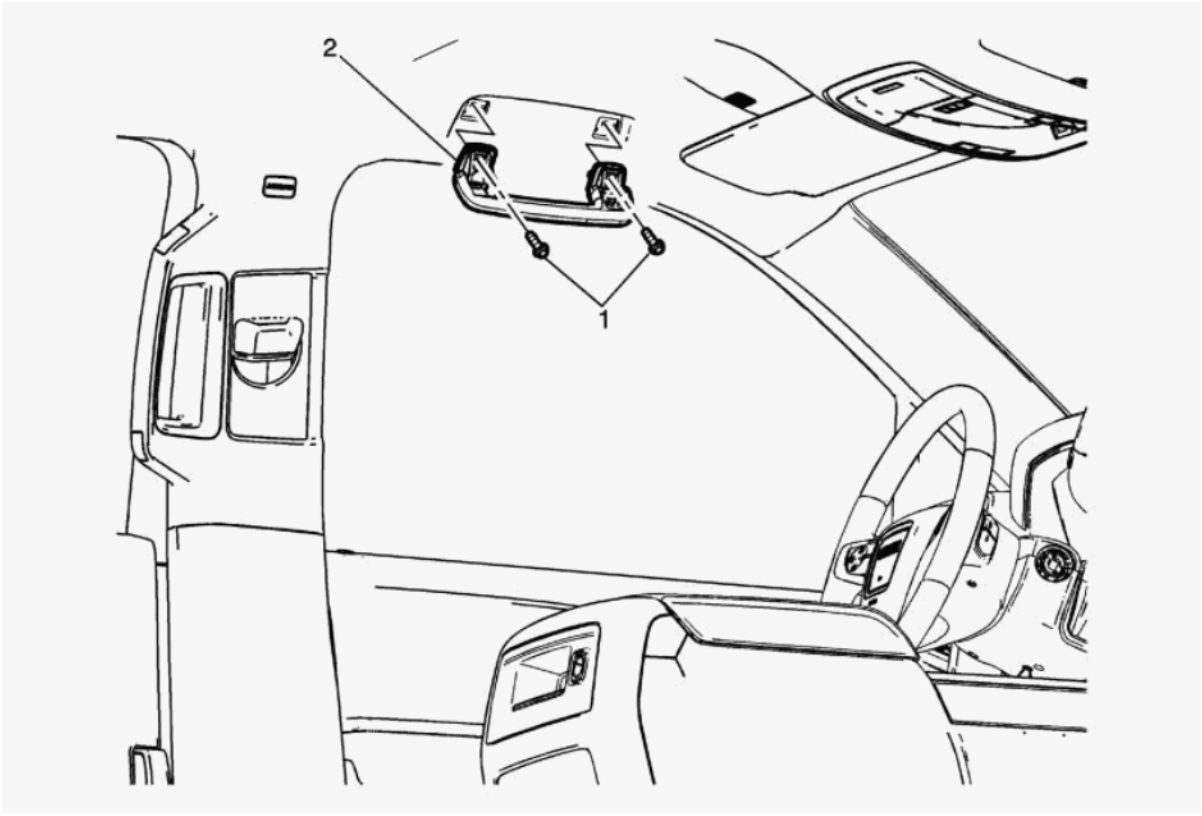


Fig. 56: Roof Rail Assist Handle Assembly
Courtesy of GENERAL MOTORS COMPANY

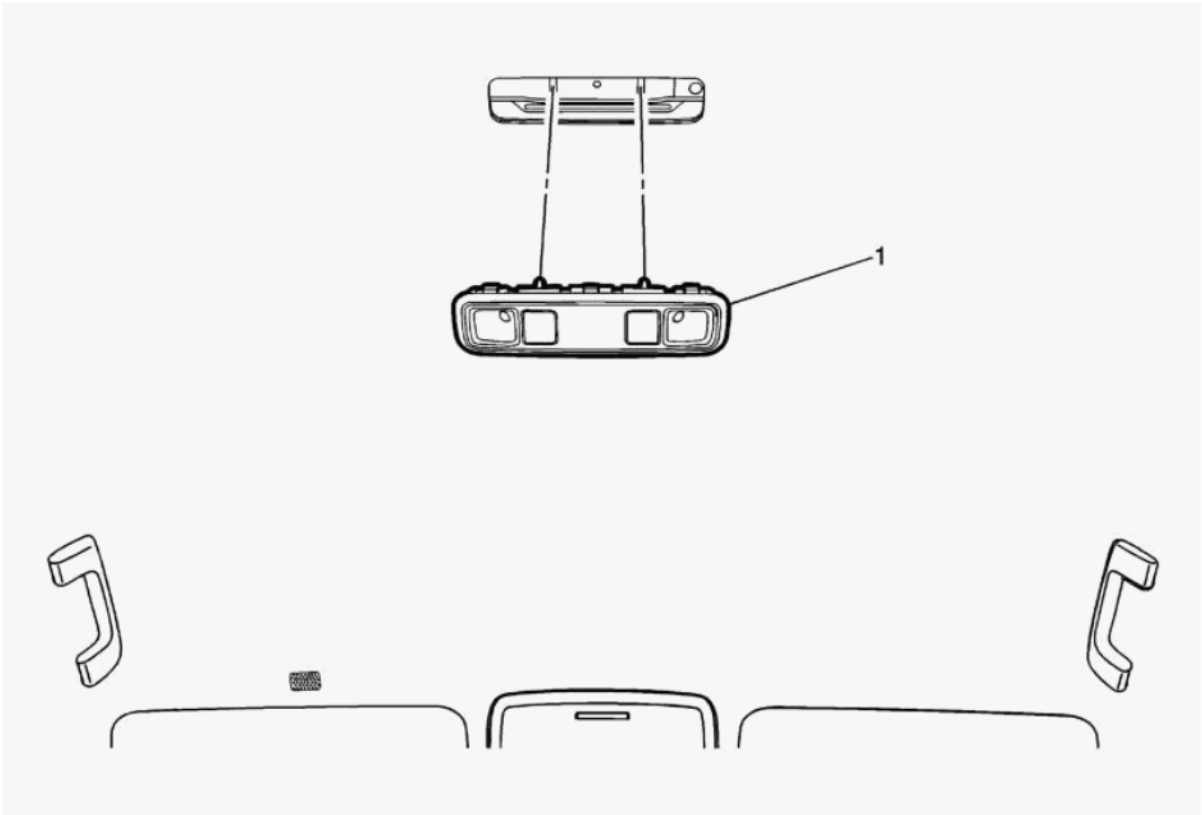
4. Remove the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

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Fig. 57: Roof Rail Rear Assist Handle (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

5. Remove the roof rail rear assist handle (2). Refer to **Roof Rail Rear Assist Handle Replacement (Crew Cab, Extended Cab)** .



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Fig. 58: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

6. Remove the rear seat position center reading and courtesy lamp (1). Refer to **Rear Seat Position Center Reading and Courtesy Lamp Replacement** .

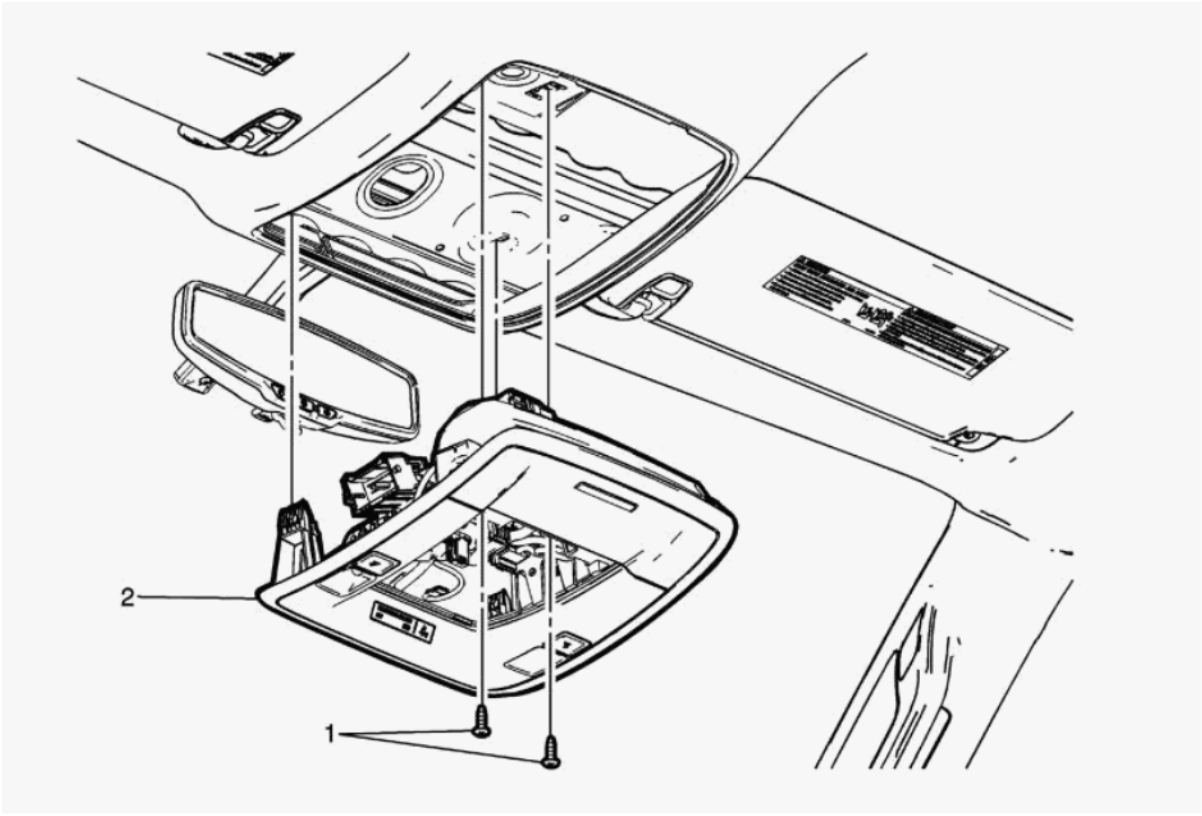


Fig. 59: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Remove the roof console assembly (2). Refer to **Roof Console Replacement** .

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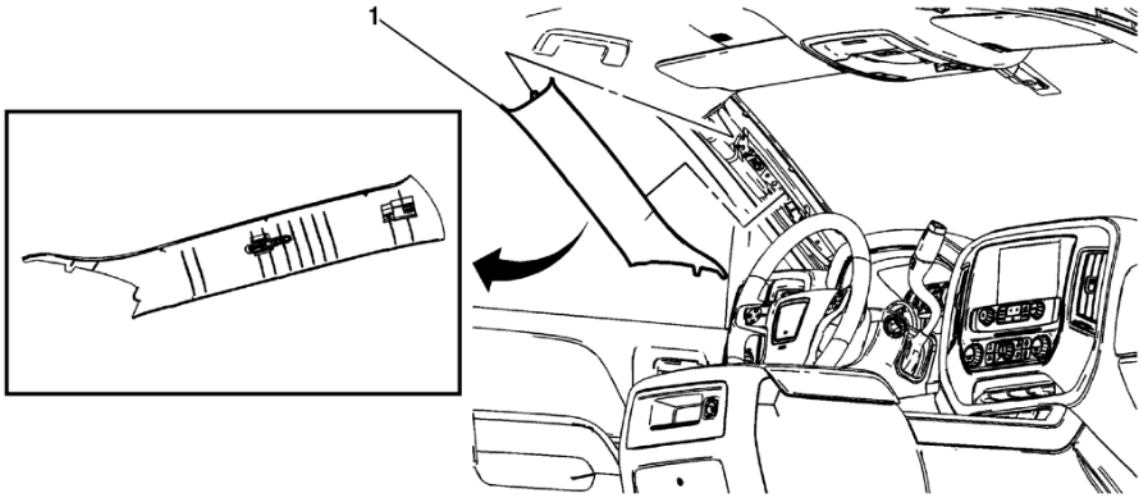
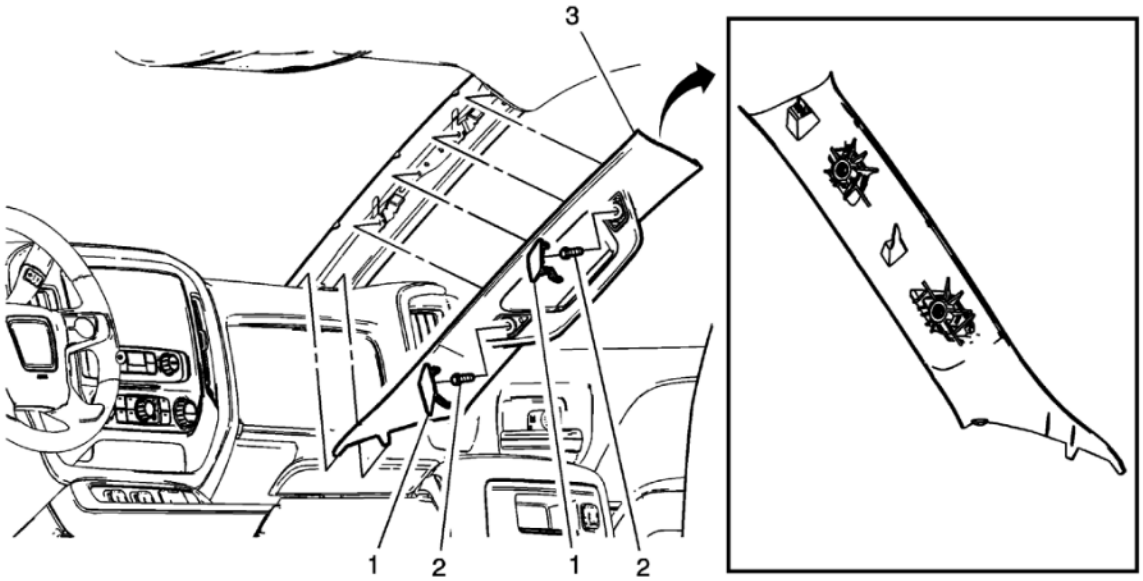


Fig. 60: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

8. Remove the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .



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Fig. 61: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

9. Remove the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .

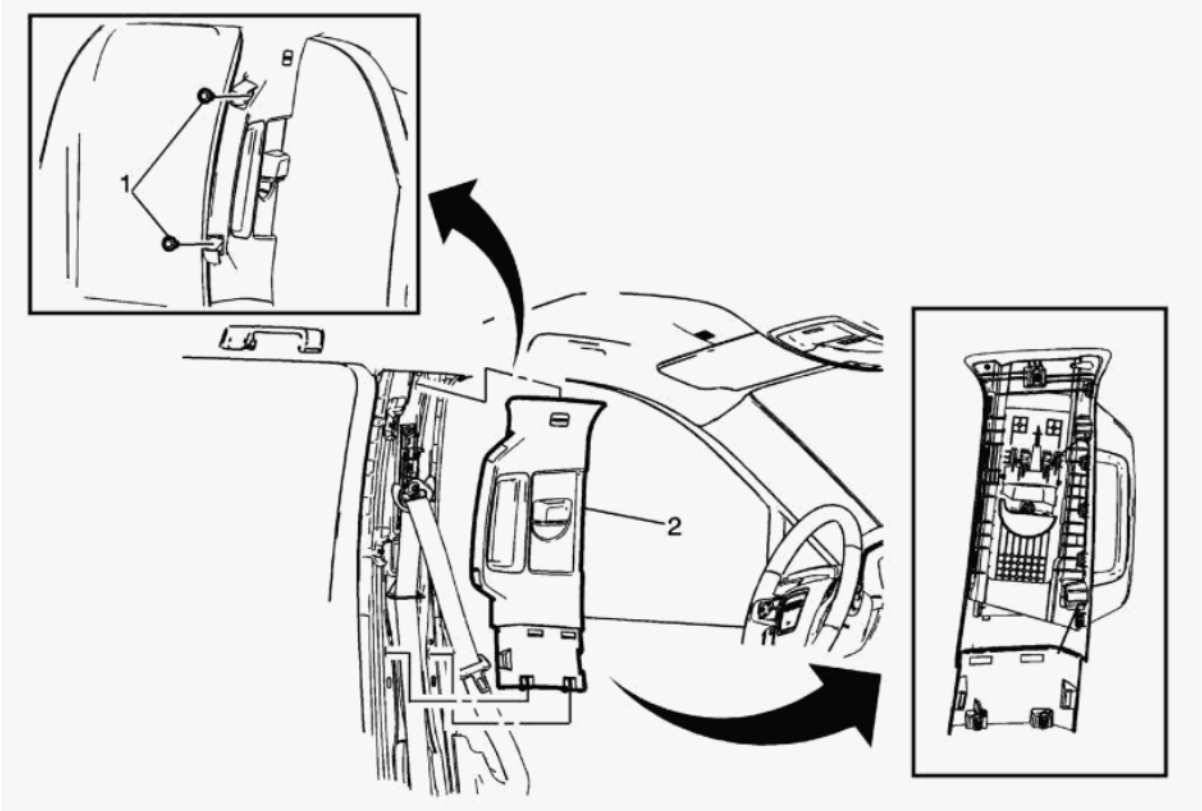


Fig. 62: Center Pillar Upper Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Remove the center pillar upper trim panel assembly (2). Refer to **Center Pillar Upper Trim Panel Replacement** .

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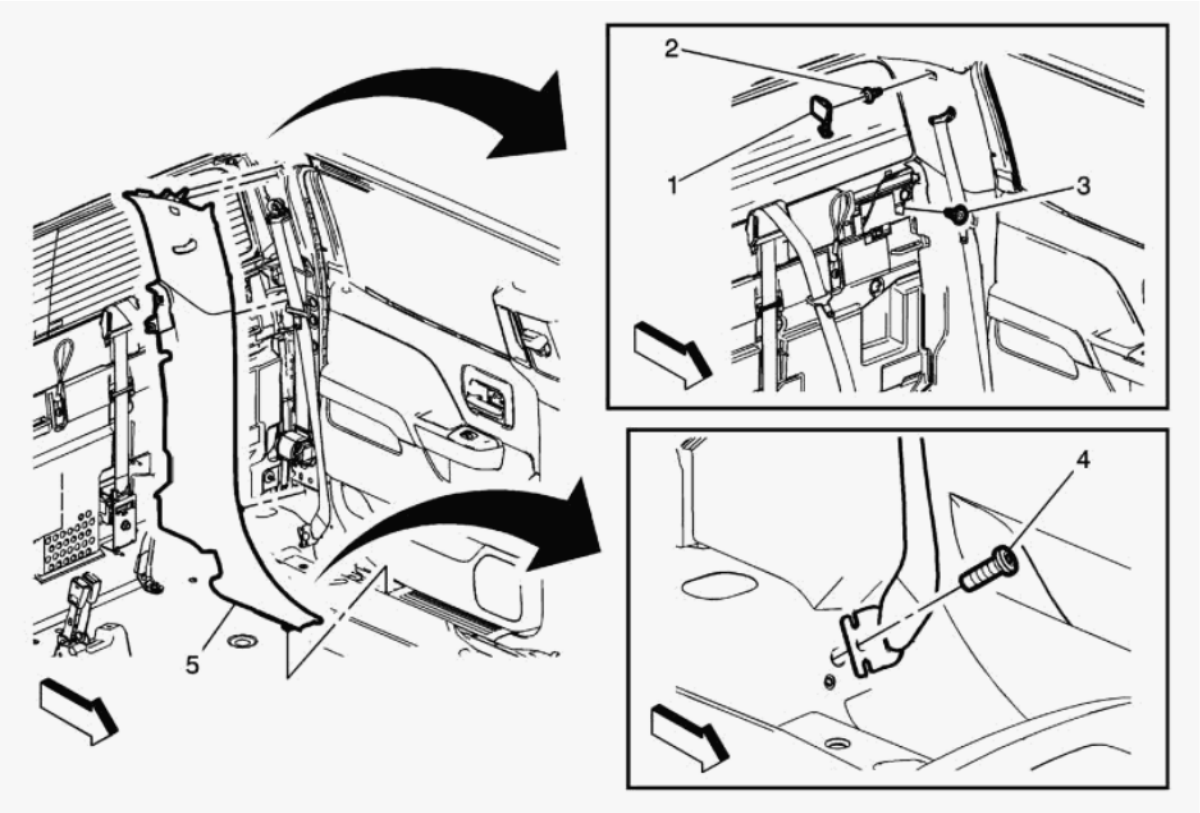


Fig. 63: Body Lock Pillar Garnish Molding (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

11. Remove the body lock pillar garnish molding (5). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .
12. Move the driver and passenger seats fully forward and recline.

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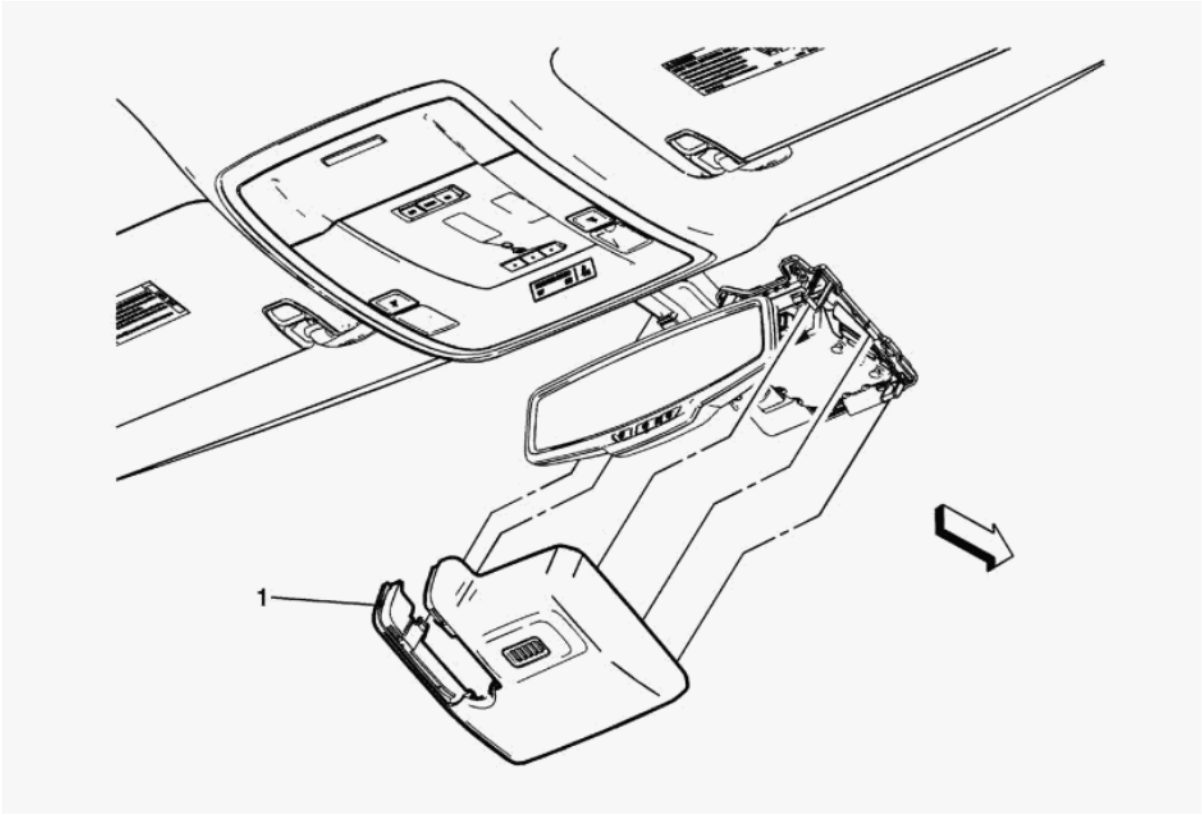
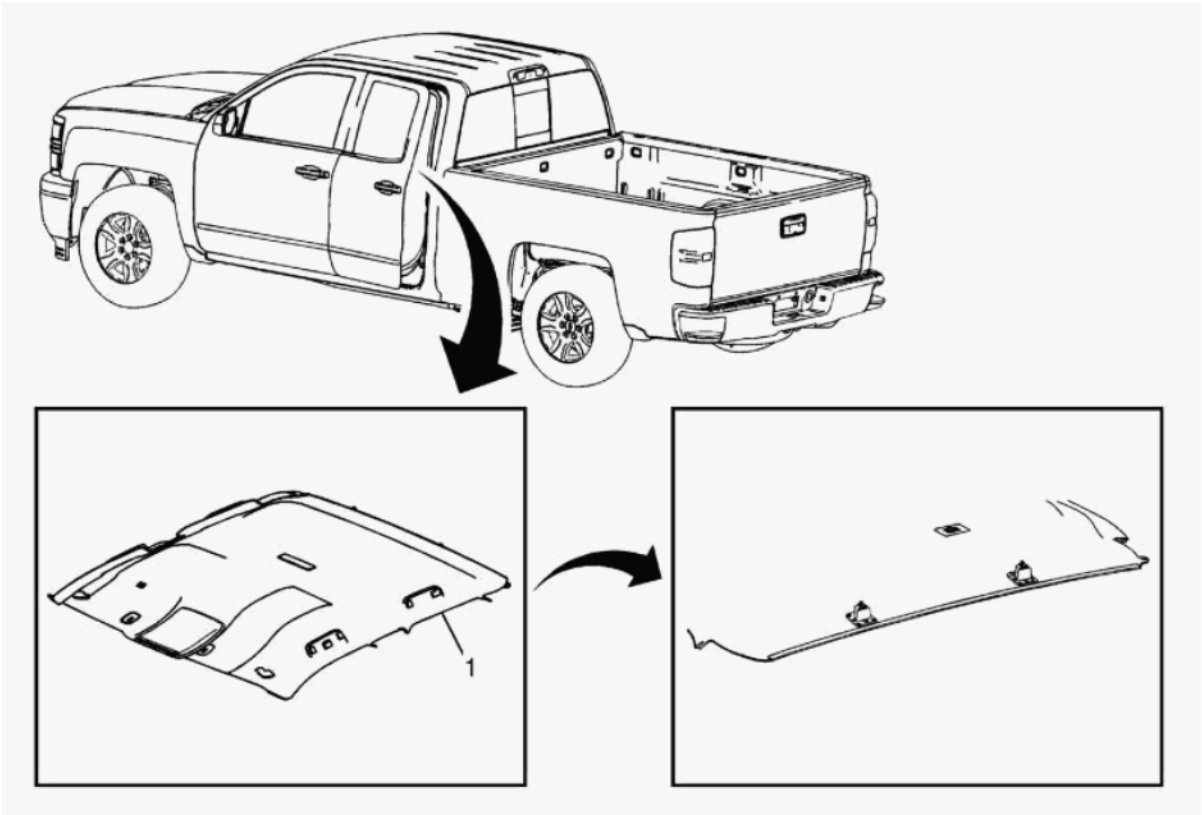


Fig. 64: Windshield Multifunction Sensor Mount Bracket Cover
Courtesy of GENERAL MOTORS COMPANY

13. Remove the windshield multifunction sensor mount bracket cover (1). Refer to **Windshield Multifunction Sensor Mount Bracket Cover Replacement** .



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Fig. 65: Headliner Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

14. Disconnect the electrical connectors from the headliner trim panel assembly (1).
15. There are two retainers at the rear underside of the headliner, if necessary remove.
16. Remove the windshield. Refer to **Windshield Replacement** .
17. Take note of the wiring harness locations and measure the harness lead length prior to removing. Mark harness routing locations on new headliner prior to harness removal.

NOTE: **Use a camera to take pictures and use a pencil to mark the new headliner.**

18. Use fiber or plastic trim tool to assist in removing the wiring harness from the headliner, taking care not to damage the harness.
19. Remove excess glue and material from the wiring harness and re-tape areas where the tape was removed or damaged.
20. With the aid of an assistant, remove the headliner trim panel assembly (1) from the vehicle through the front windshield.

Installation Procedure

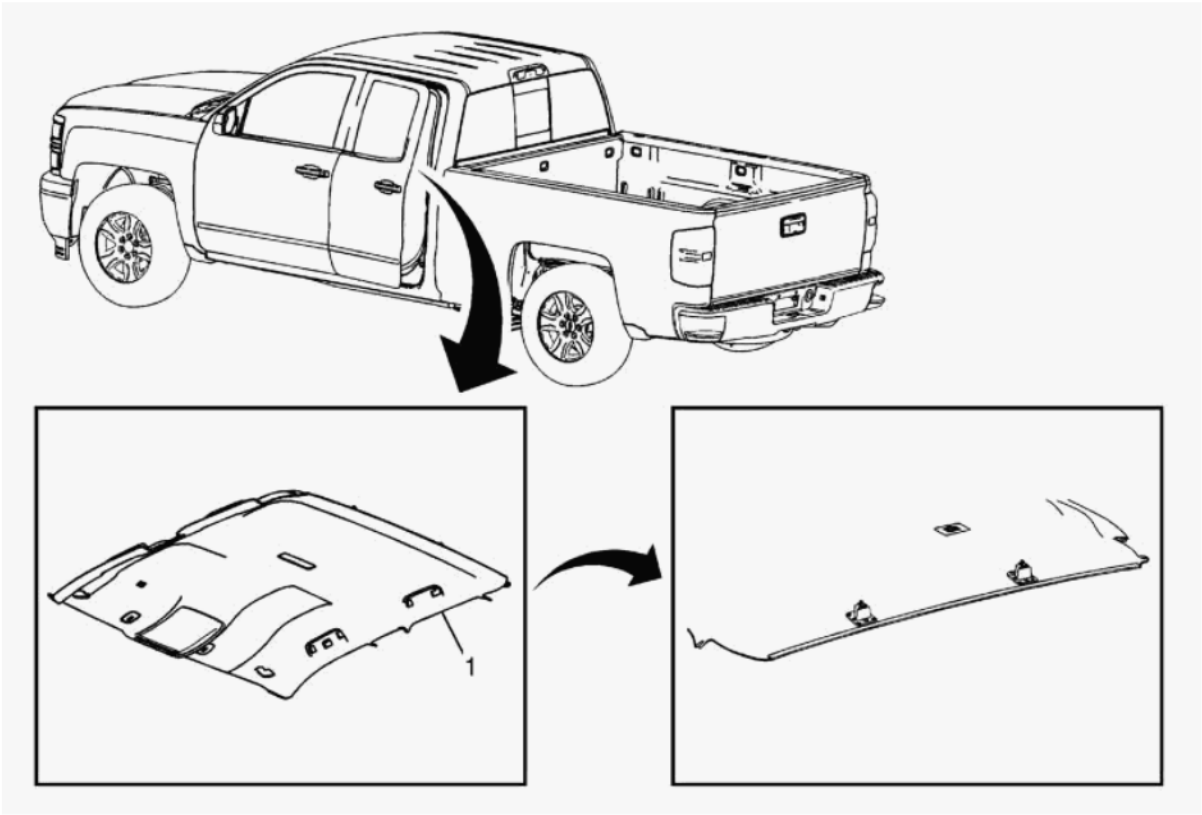


Fig. 66: Headliner Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, position the headliner trim panel assembly (1) into the vehicle through the front windshield.
2. Lay the wiring harness on the new headliner assembly to confirm correct routing and ensure harness leads are proper length for mating connections prior to gluing.

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WARNING: **Do not change the wiring harness routing locations. Correct harness routing is critical for air bag deployment. Possible personal injury or vehicle damage could result if the harness routing is changed.**

NOTE: **When installing a new headliner harness, tape any unused connector to the headliner with a high adhesive tape.**

3. Use hot melt adhesive to install the wiring harness. Apply insulator tape over glued locations to prevent squeaks and rattles as needed.
4. Install the windshield. Refer to **Windshield Replacement** .
5. Engage the two retainers at the rear underside of the headliner.
6. Connect the electrical connectors and secure.
7. If replacing the headliner assembly, transfer all necessary components.

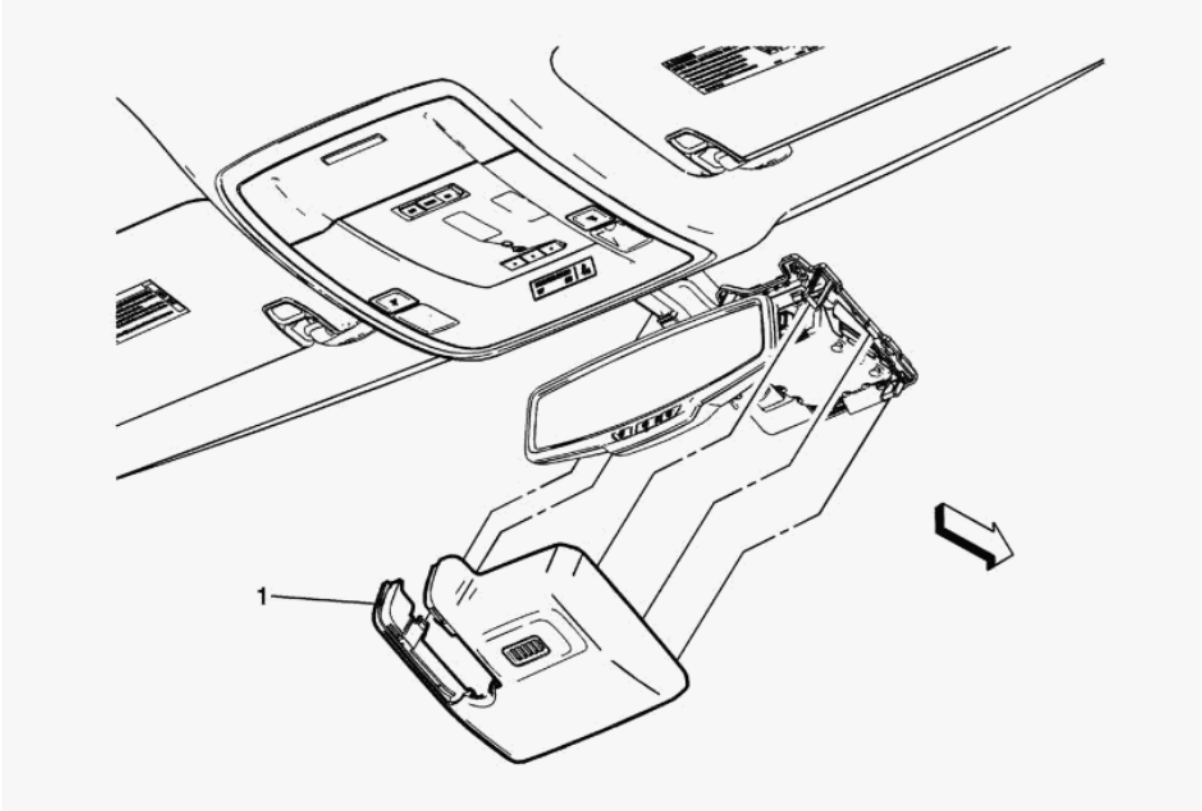


Fig. 67: Windshield Multifunction Sensor Mount Bracket Cover
Courtesy of GENERAL MOTORS COMPANY

8. Install the windshield multifunction sensor mount bracket cover (1). Refer to **Windshield Multifunction Sensor Mount Bracket Cover Replacement** .

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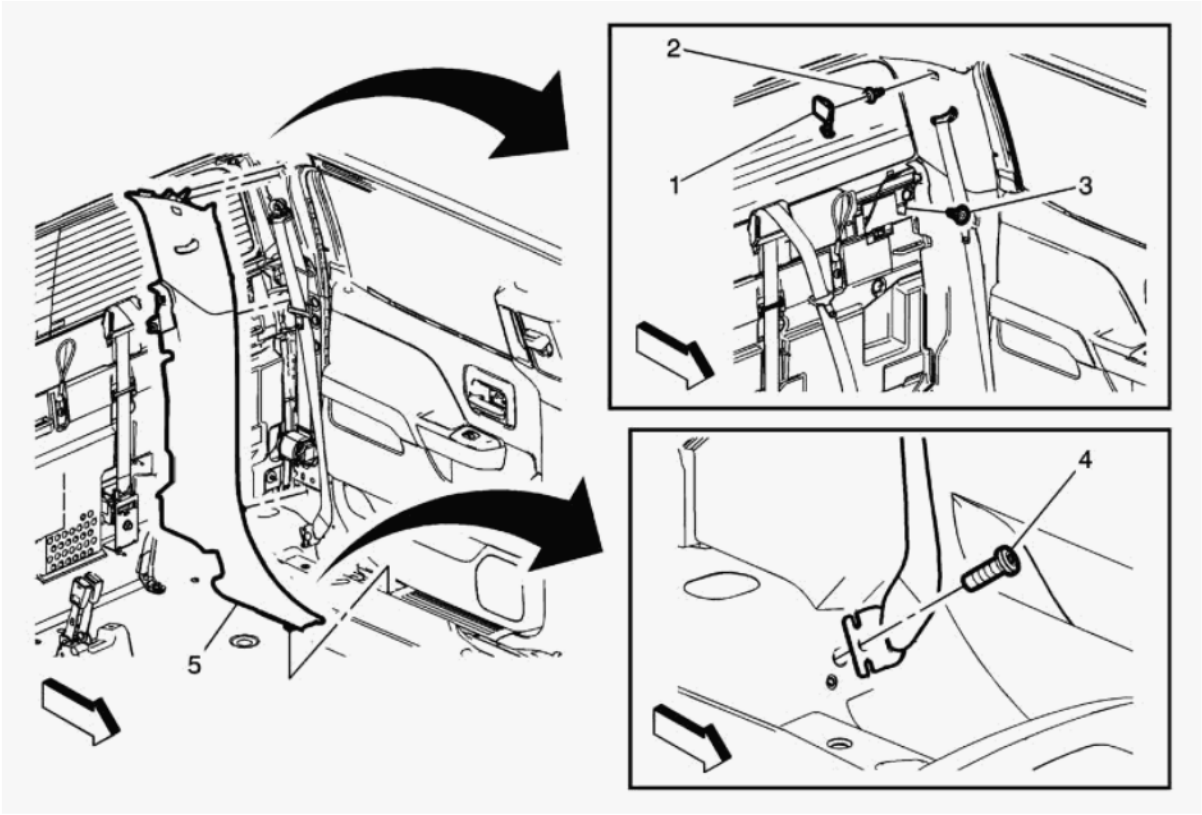
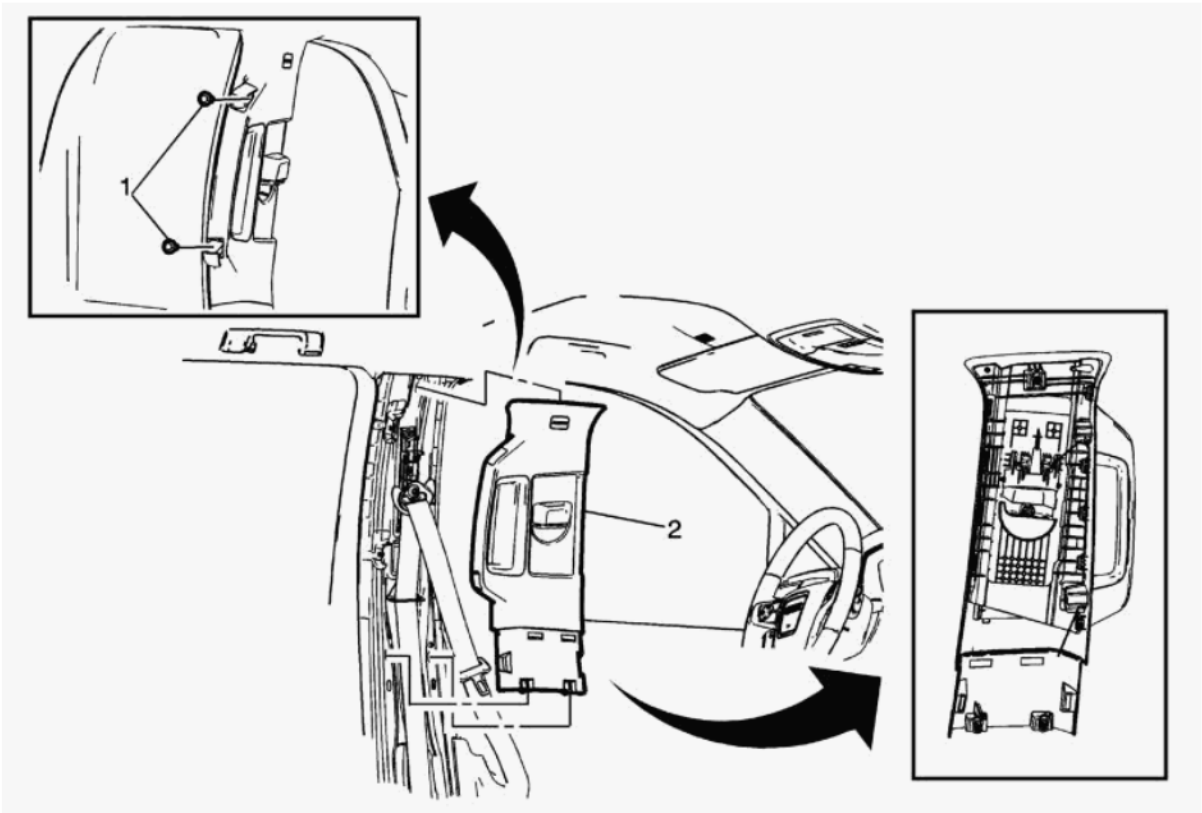


Fig. 68: Body Lock Pillar Garnish Molding (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

9. Install the body lock pillar garnish molding (5). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .



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Fig. 69: Center Pillar Upper Trim Panel Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Install the center pillar upper trim panel assembly (2). Refer to **Center Pillar Upper Trim Panel Replacement** .

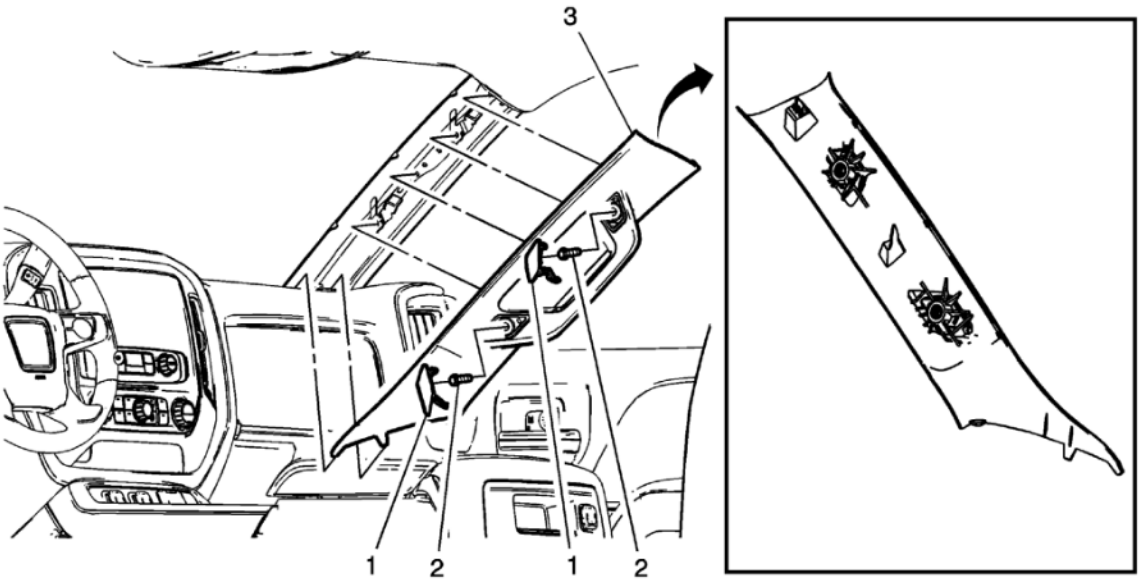


Fig. 70: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

11. Install the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .

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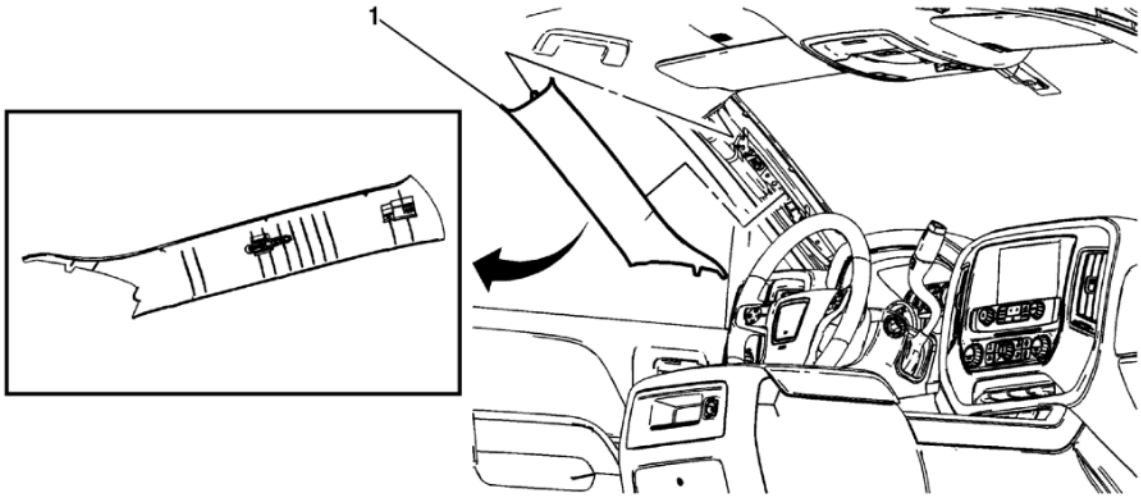
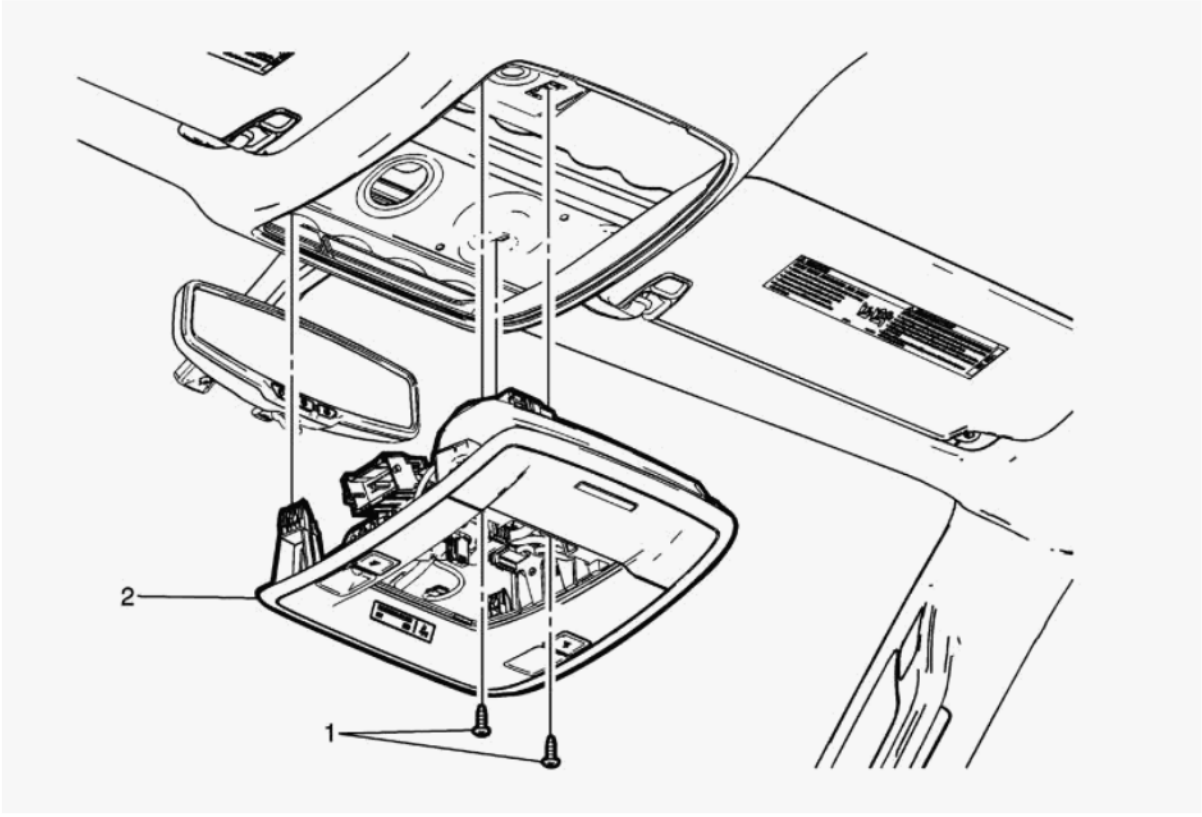


Fig. 71: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

12. Install the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .



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Fig. 72: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

13. Install the roof console assembly (2). Refer to **Roof Console Replacement** .

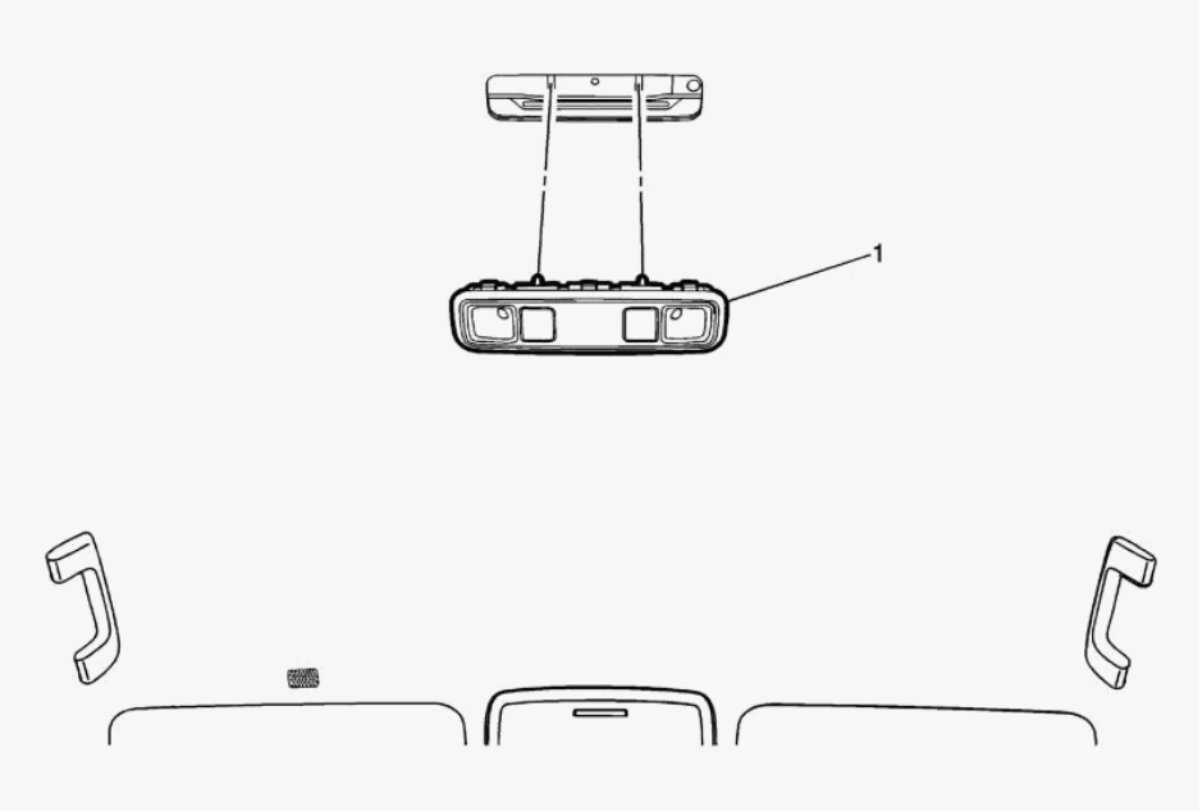


Fig. 73: Rear Seat Position Center Reading and Courtesy Lamp
Courtesy of GENERAL MOTORS COMPANY

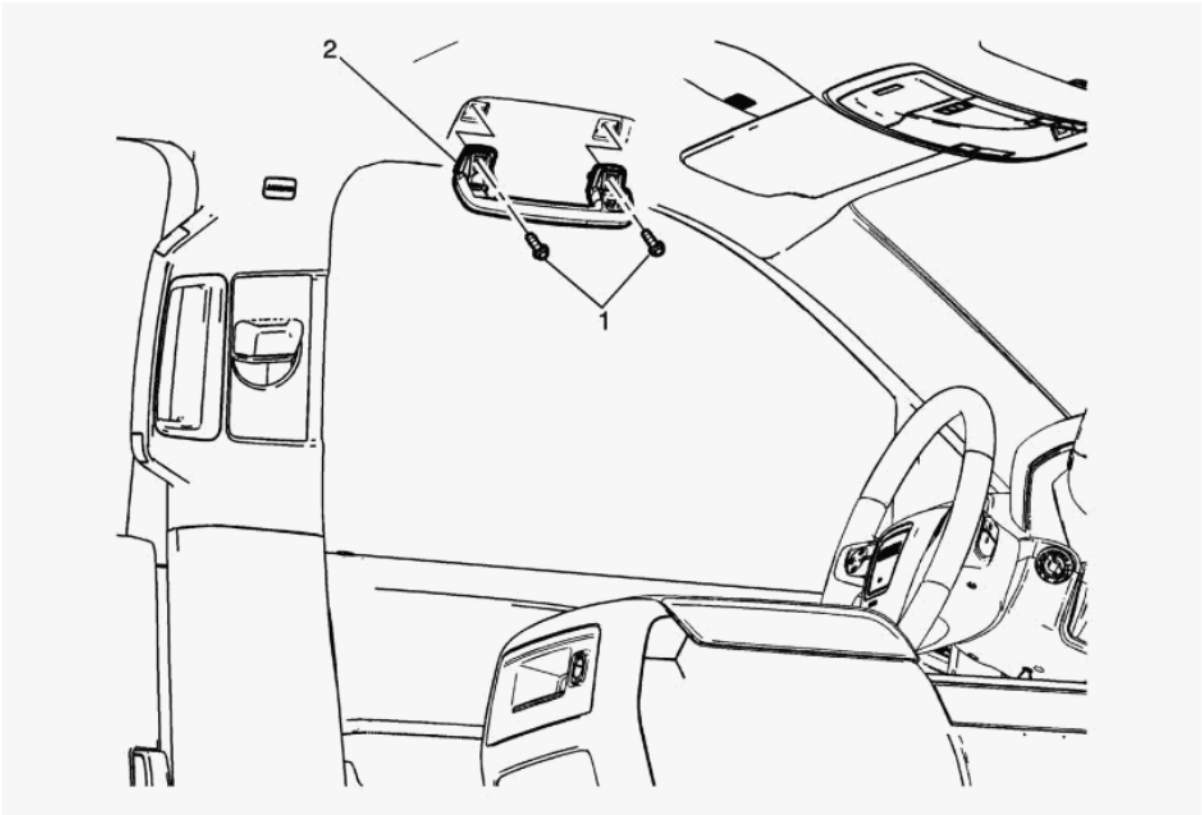
14. Install the rear seat position center reading and courtesy lamp (1). Refer to **Rear Seat Position Center Reading and Courtesy Lamp Replacement** .

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Fig. 74: Roof Rail Rear Assist Handle (Crew Cab, Extended Cab)
Courtesy of GENERAL MOTORS COMPANY

15. Install the roof rail rear assist handle assembly (2). Refer to **Roof Rail Rear Assist Handle Replacement (Crew Cab, Extended Cab)** .



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Fig. 75: Roof Rail Assist Handle Assembly
Courtesy of GENERAL MOTORS COMPANY

16. Install the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

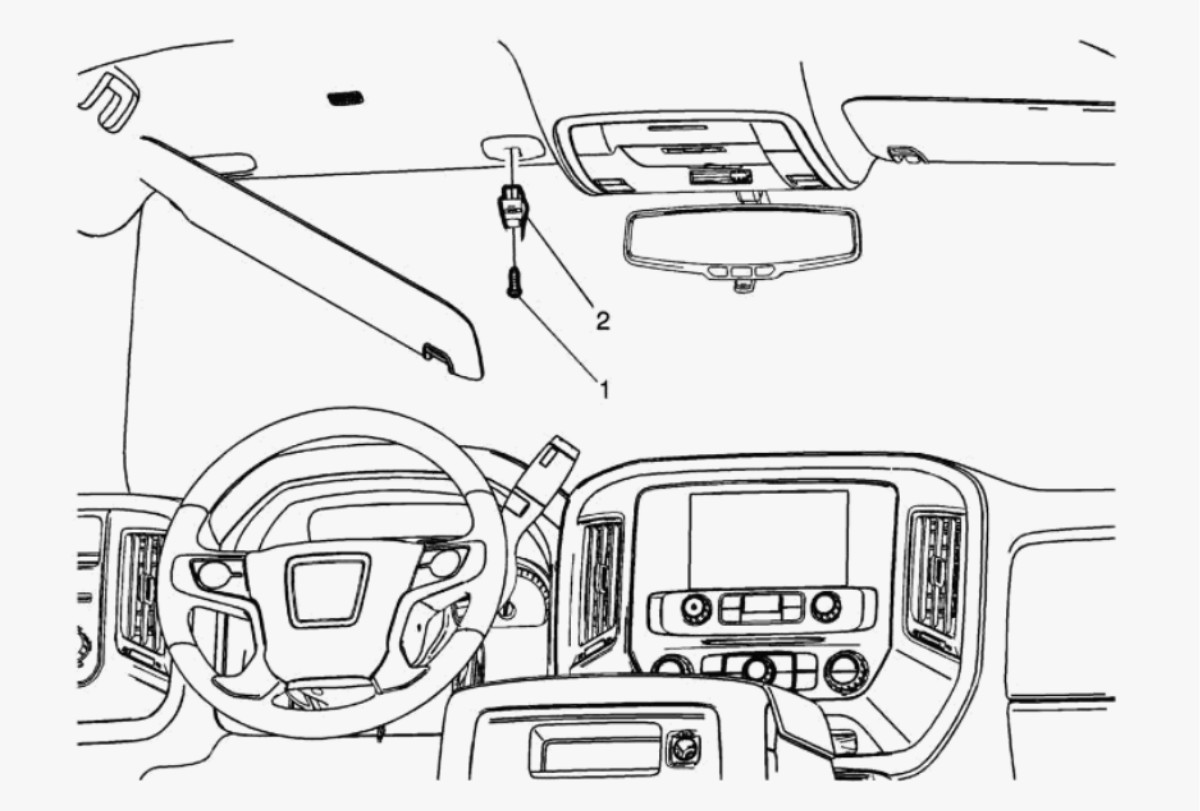


Fig. 76: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

17. Install the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

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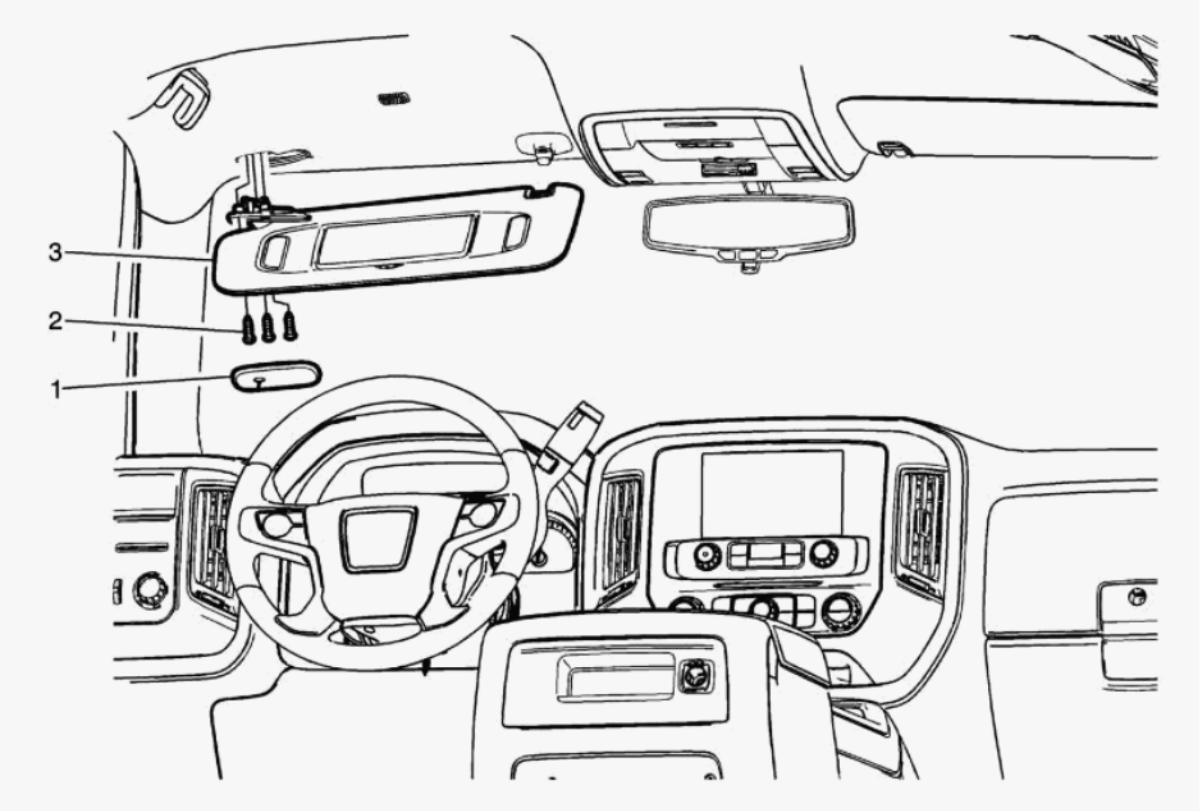


Fig. 77: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

18. Install the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .
19. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

HEADLINING TRIM PANEL REPLACEMENT (REGULAR CAB)

Removal Procedure

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: **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.**

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.**

1. Disable the SIR system. Refer to **SIR Disabling and Enabling** .
2. If replacing the headliner and not lowering it for other component service, remove the instrument panel. Refer to **Instrument Panel Assembly Removal** .

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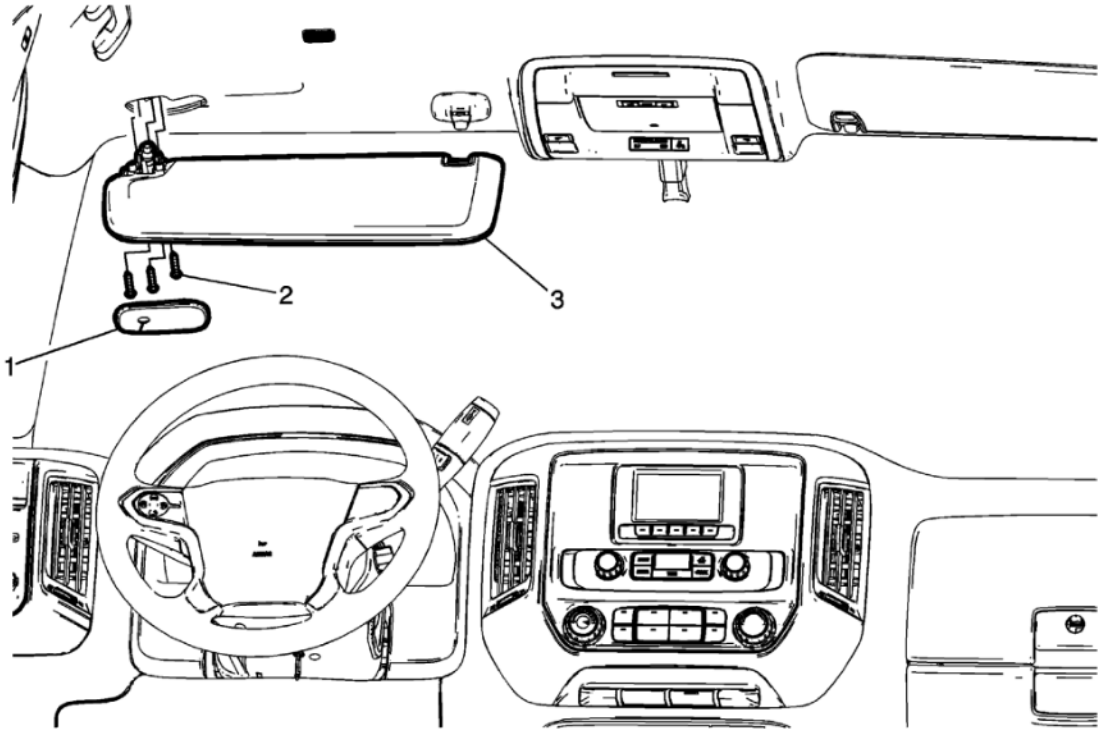
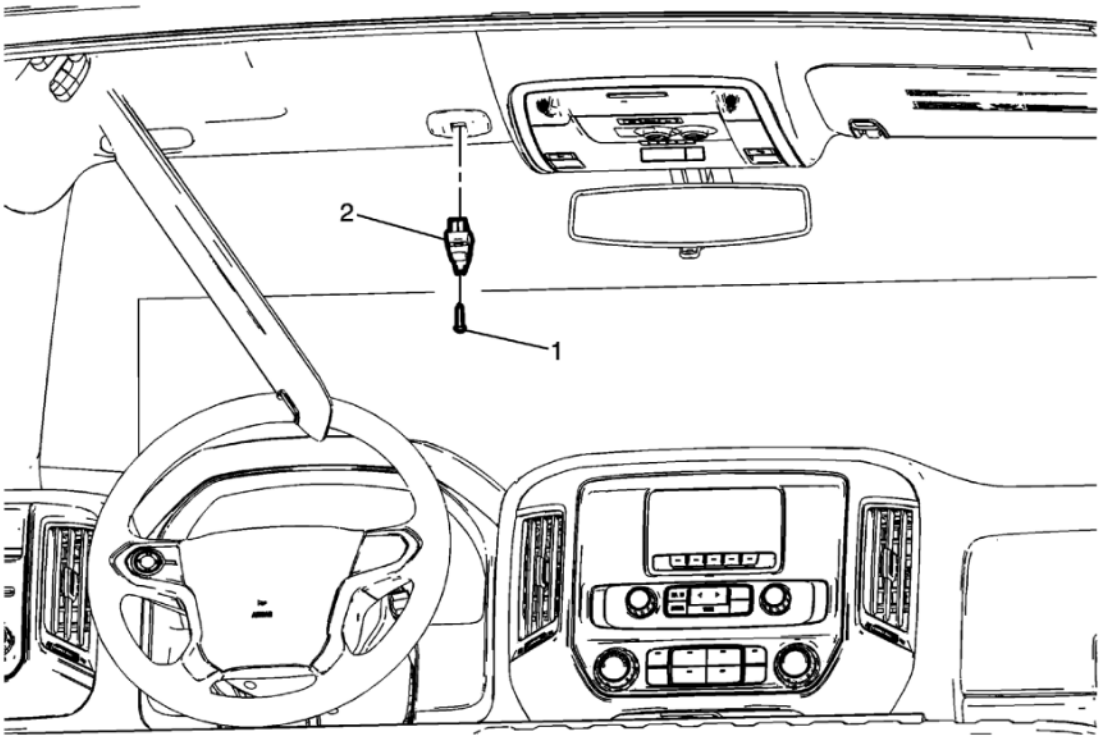


Fig. 78: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

3. Remove the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .



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Fig. 79: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

4. Remove the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

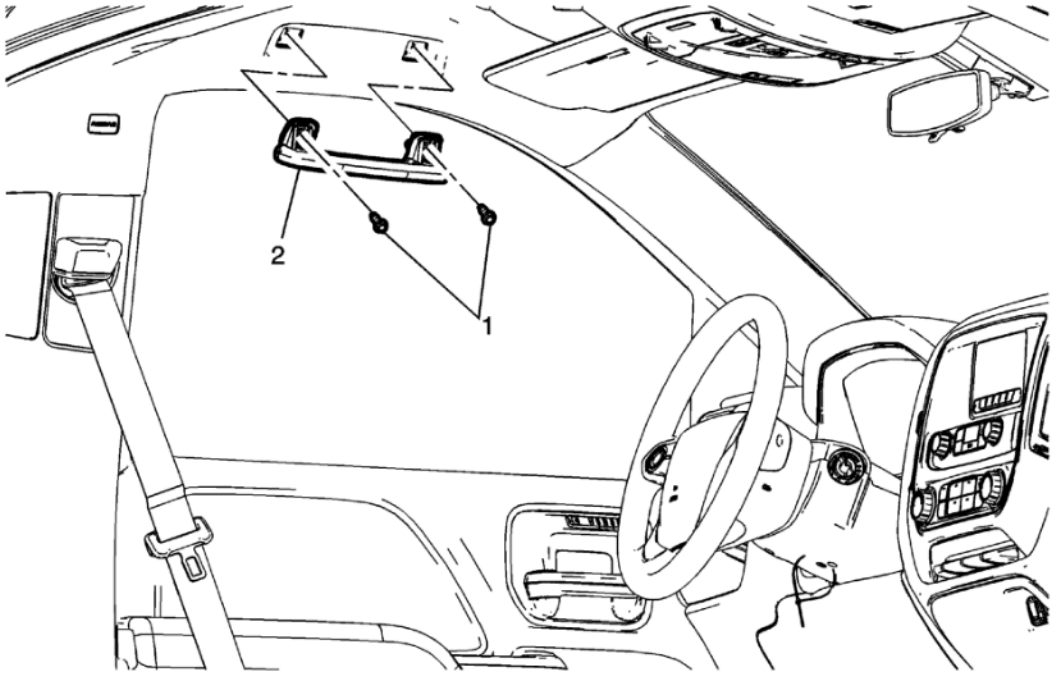


Fig. 80: Roof Rail Assist Handle (Regular Cab)
Courtesy of GENERAL MOTORS COMPANY

5. Remove the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

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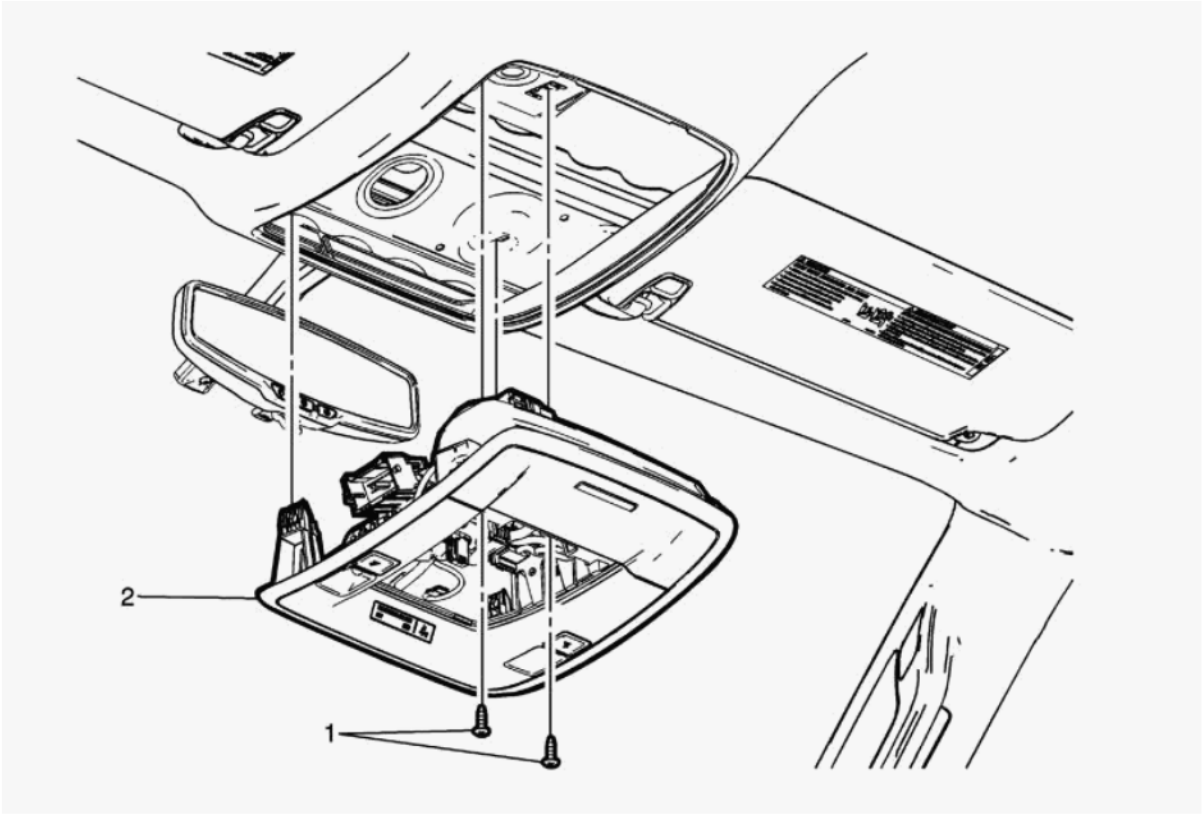


Fig. 81: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

6. Remove the roof console assembly (2). Refer to **Roof Console Replacement** .

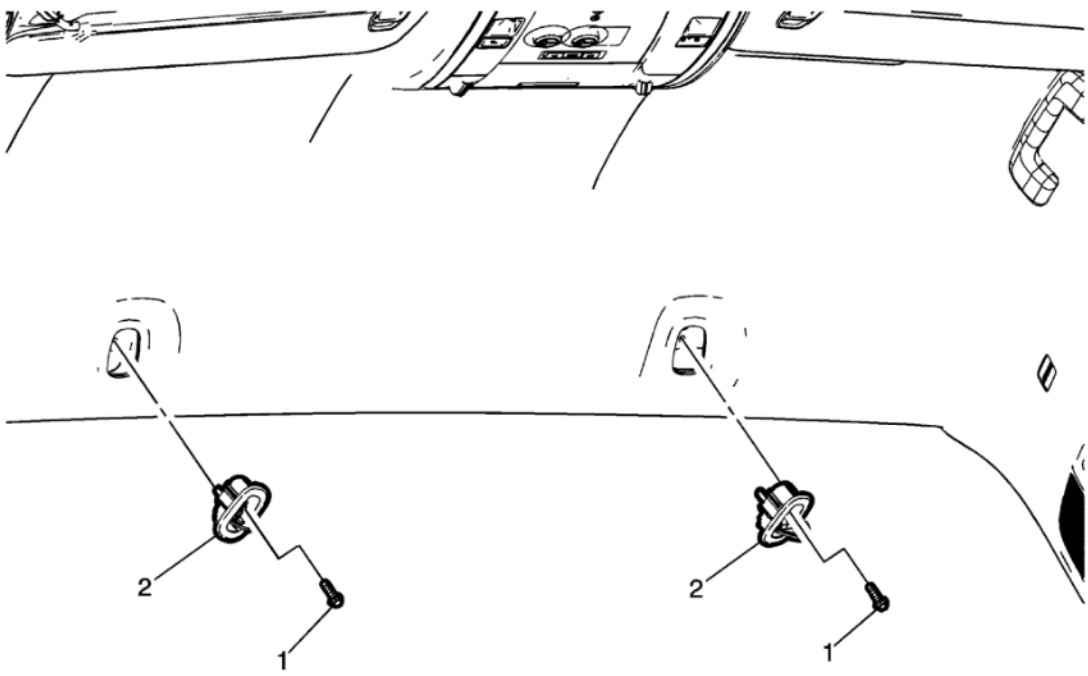


Fig. 82: Coat Hooks

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Courtesy of GENERAL MOTORS COMPANY

7. Remove the coat hooks (2). Refer to **Coat Hook Replacement** .

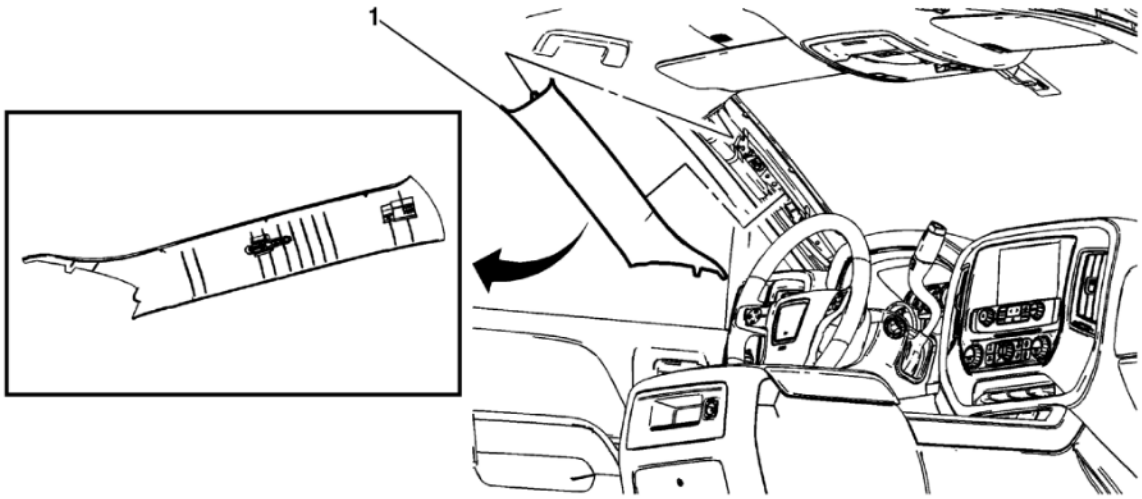


Fig. 83: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

8. Remove the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .

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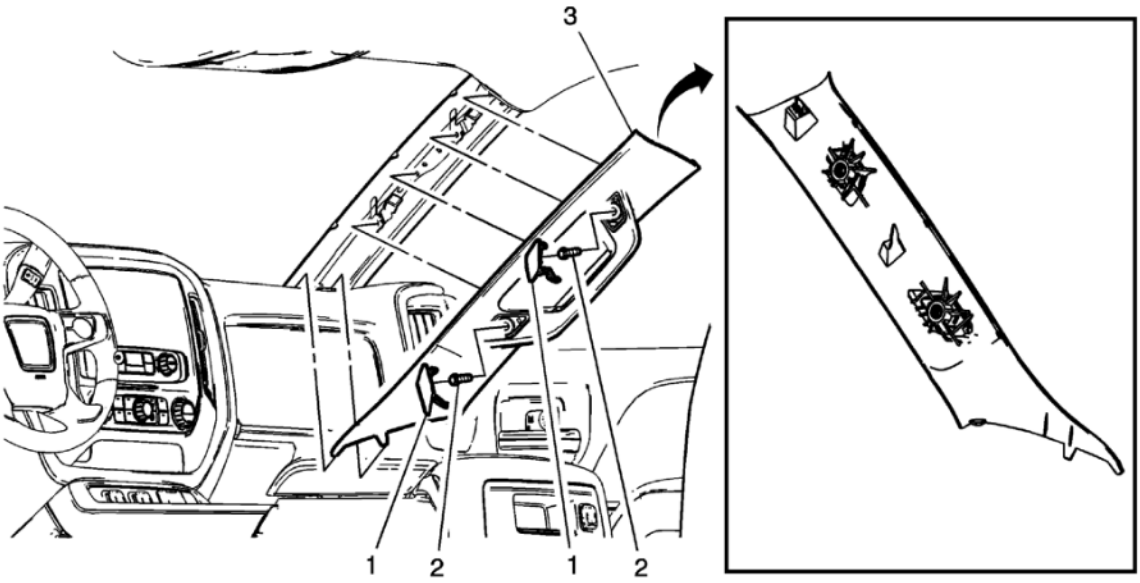
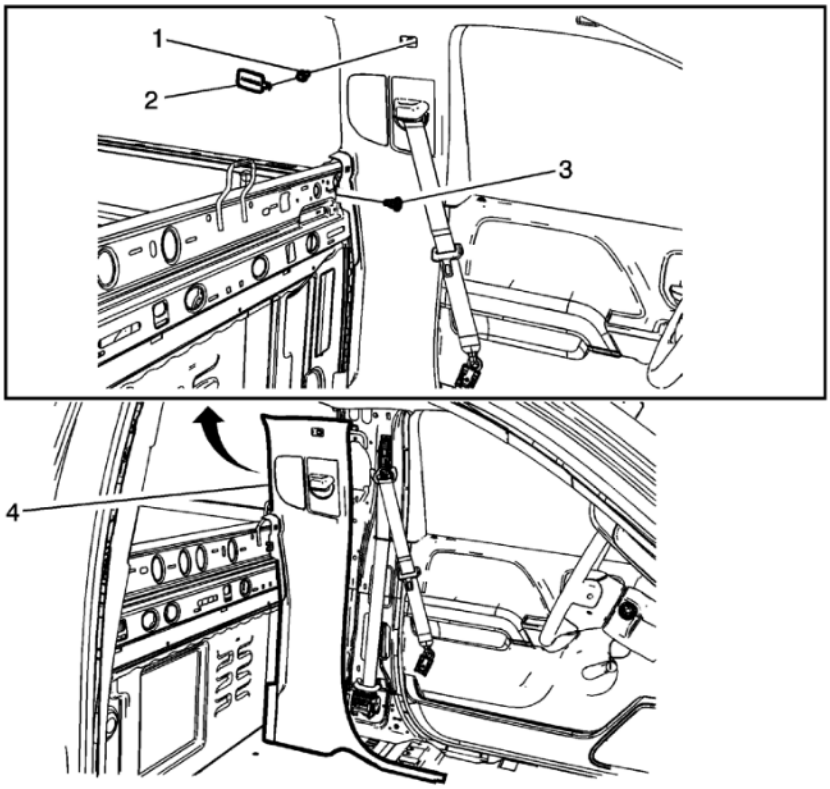


Fig. 84: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

9. Remove the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .



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Fig. 85: Body Lock Pillar Garnish Molding (Regular Cab)
Courtesy of GENERAL MOTORS COMPANY

10. Remove the body lock pillar garnish molding (4). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .
11. Remove the driver and passenger seats. refer to **Driver or Passenger Seat Removal and Installation** .

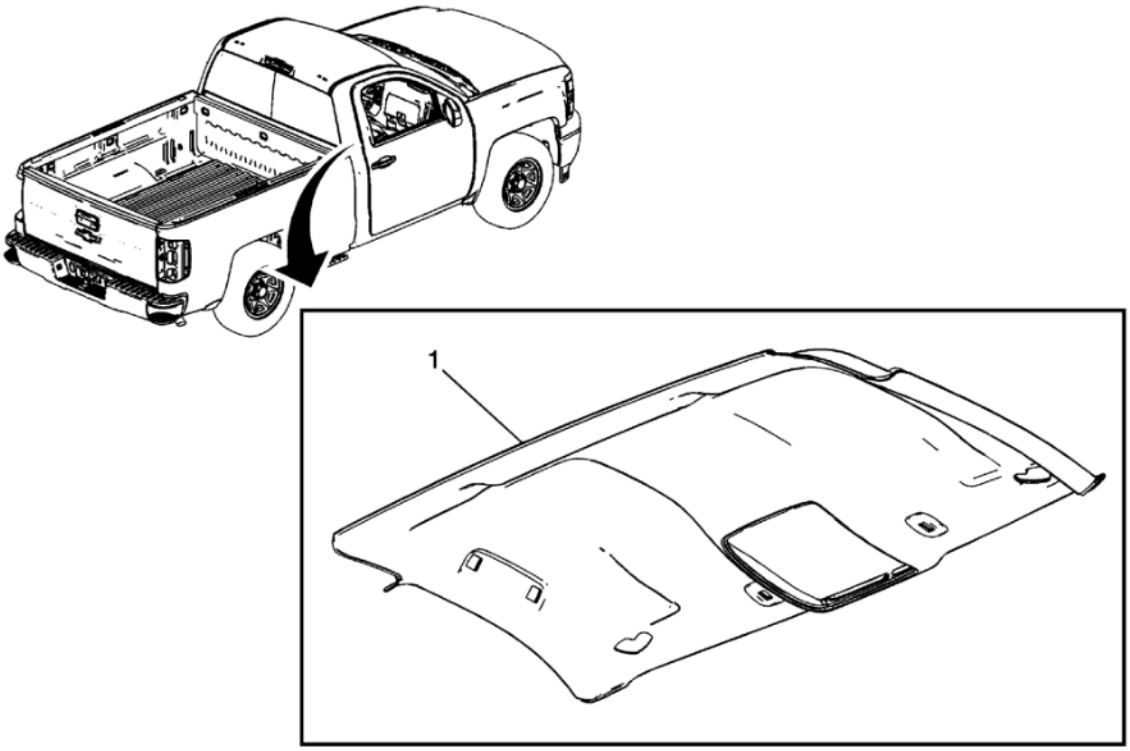


Fig. 86: Headliner Trim Panel
Courtesy of GENERAL MOTORS COMPANY

12. Disconnect the electrical connectors from the headliner trim panel assembly (1).
13. Take note of the wiring harness locations and measure the harness lead length prior to removing. Mark harness routing locations on new headliner prior to harness removal.

NOTE: **Use a camera to take pictures and use a pencil to mark the new headliner.**

14. Use fiber or plastic trim tool to assist in removing the wiring harness from the headliner, taking care not to damage the harness.
15. Remove excess glue and material from the wiring harness and re-tape areas where the tape was removed or damaged.
16. With the aid of an assistant, remove the headliner trim panel assembly (1) from the vehicle through the passenger door opening.

Installation Procedure

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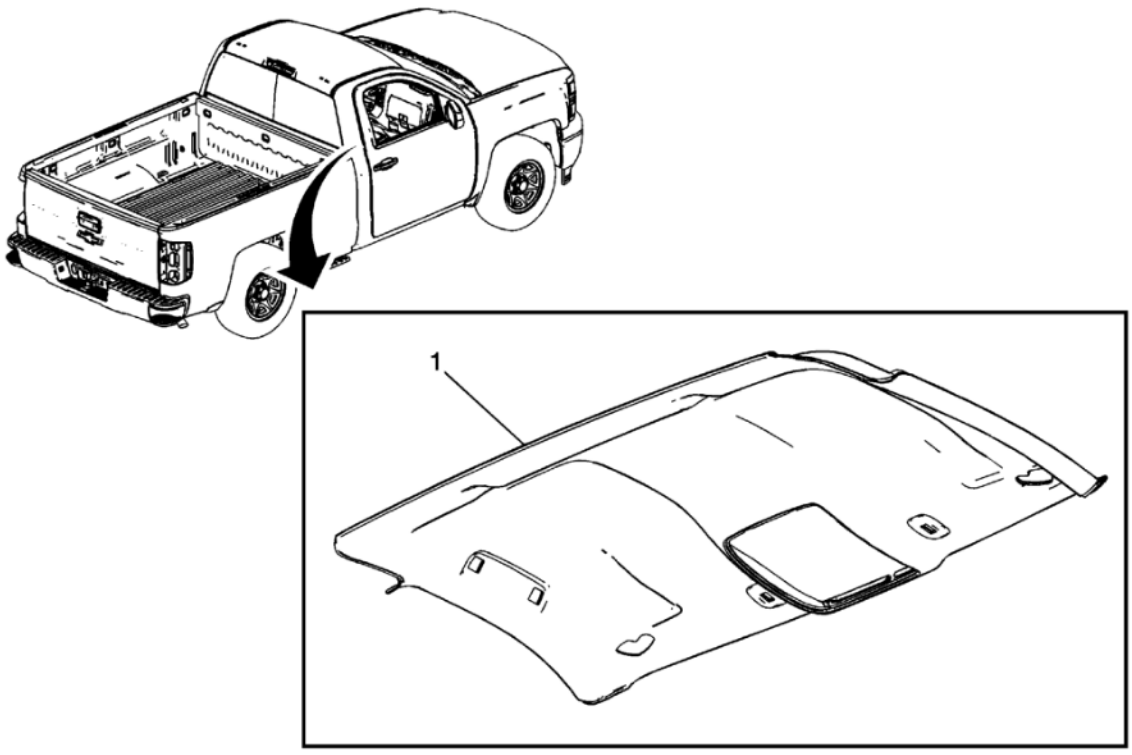


Fig. 87: Headliner Trim Panel
Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, position the headliner trim panel assembly (1) into the vehicle through the passenger door opening.
2. Lay the wiring harness on the new headliner assembly to confirm correct routing and ensure harness leads are proper length for mating connections prior to gluing.

WARNING: **Do not change the wiring harness routing locations. Correct harness routing is critical for air bag deployment. Possible personal injury or vehicle damage could result if the harness routing is changed.**

NOTE: **When installing a new headliner harness, tape any unused connector to the headliner with a high adhesive tape.**

3. Use hot melt adhesive to install the wiring harness. Apply insulator tape over glued locations to prevent squeaks and rattles as needed.
4. Connect the electrical connectors and secure.
5. If replacing the headliner assembly, transfer all necessary components.
6. Install the driver and passenger seats. refer to **Driver or Passenger Seat Removal and Installation** .

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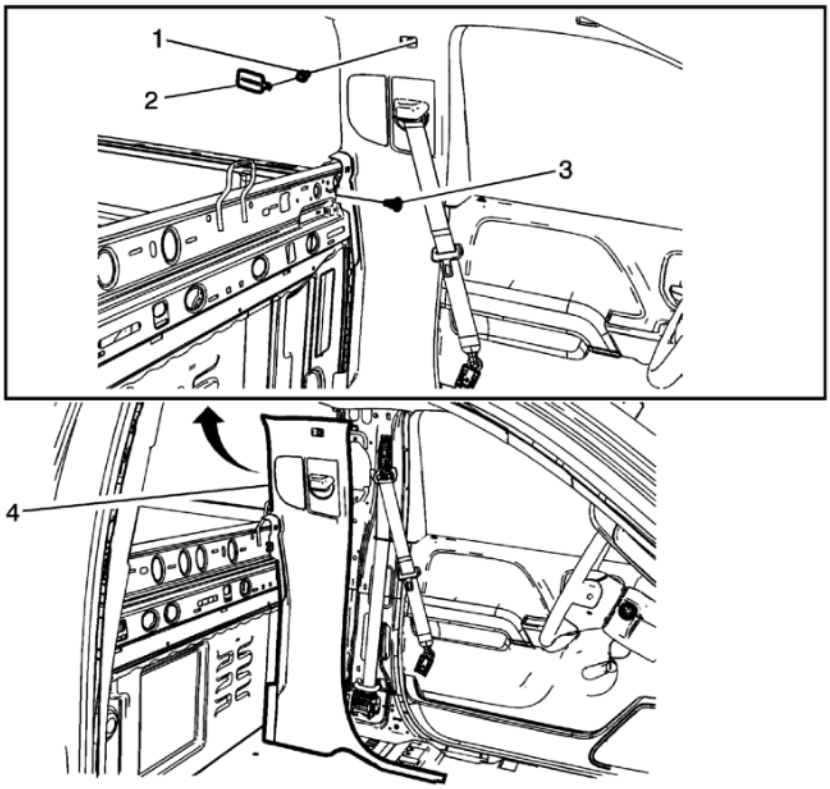
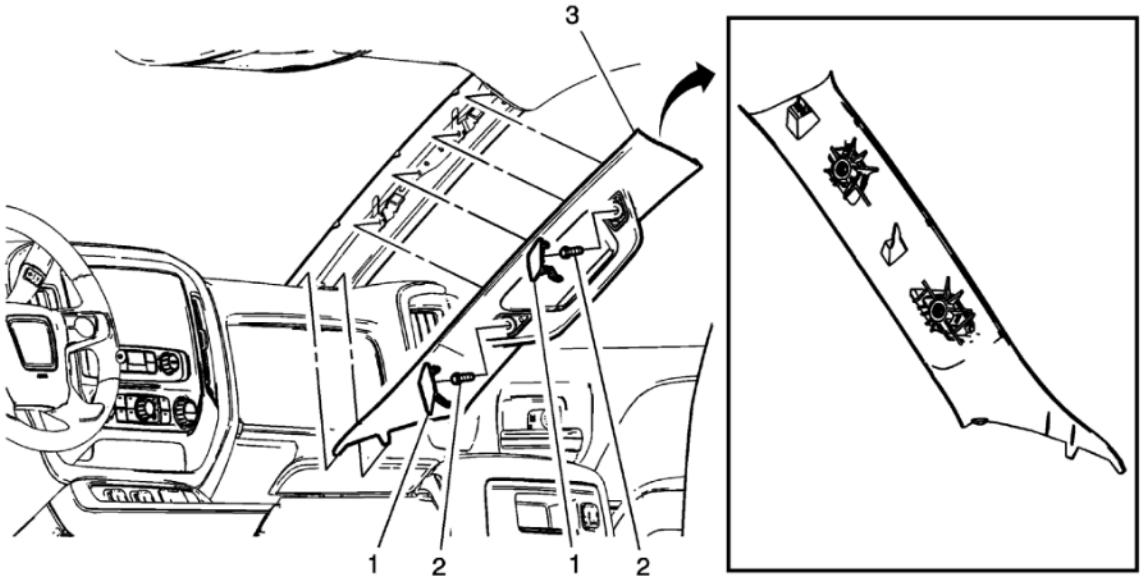


Fig. 88: Body Lock Pillar Garnish Molding (Regular Cab)
Courtesy of GENERAL MOTORS COMPANY

7. Install the body lock pillar garnish molding (4). Refer to **Body Lock Pillar Garnish Molding Replacement (Crew Cab, Extended Cab)** **Body Lock Pillar Garnish Molding Replacement (Regular Cab)** .



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Fig. 89: Windshield Garnish Molding Assembly Right Side
Courtesy of GENERAL MOTORS COMPANY

8. Install the windshield garnish molding assembly right side (3). Refer to **Windshield Garnish Molding Replacement - Right Side** .

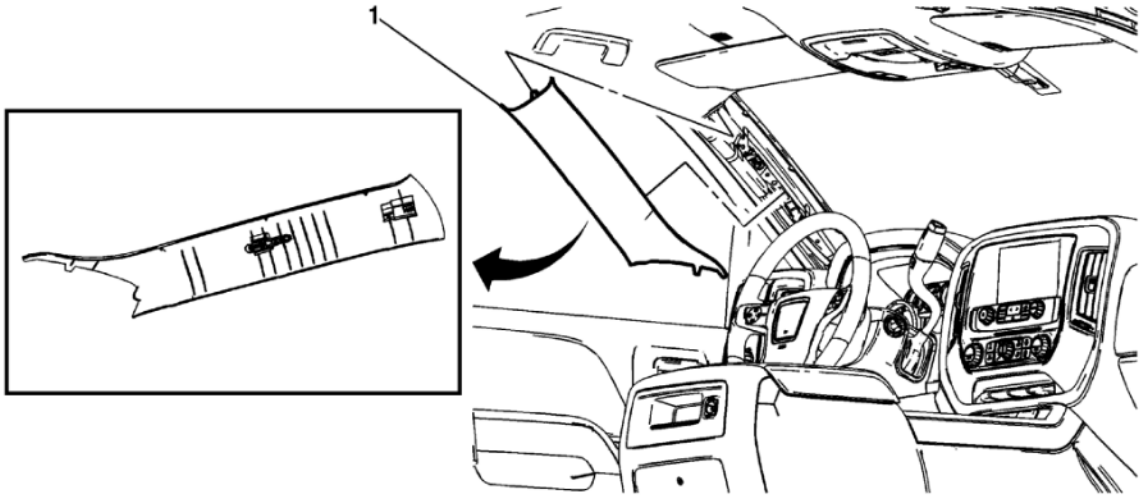


Fig. 90: Windshield Garnish Molding Assembly Left Side
Courtesy of GENERAL MOTORS COMPANY

9. Install the windshield garnish molding assembly left side (1). Refer to **Windshield Garnish Molding Replacement - Left Side** .

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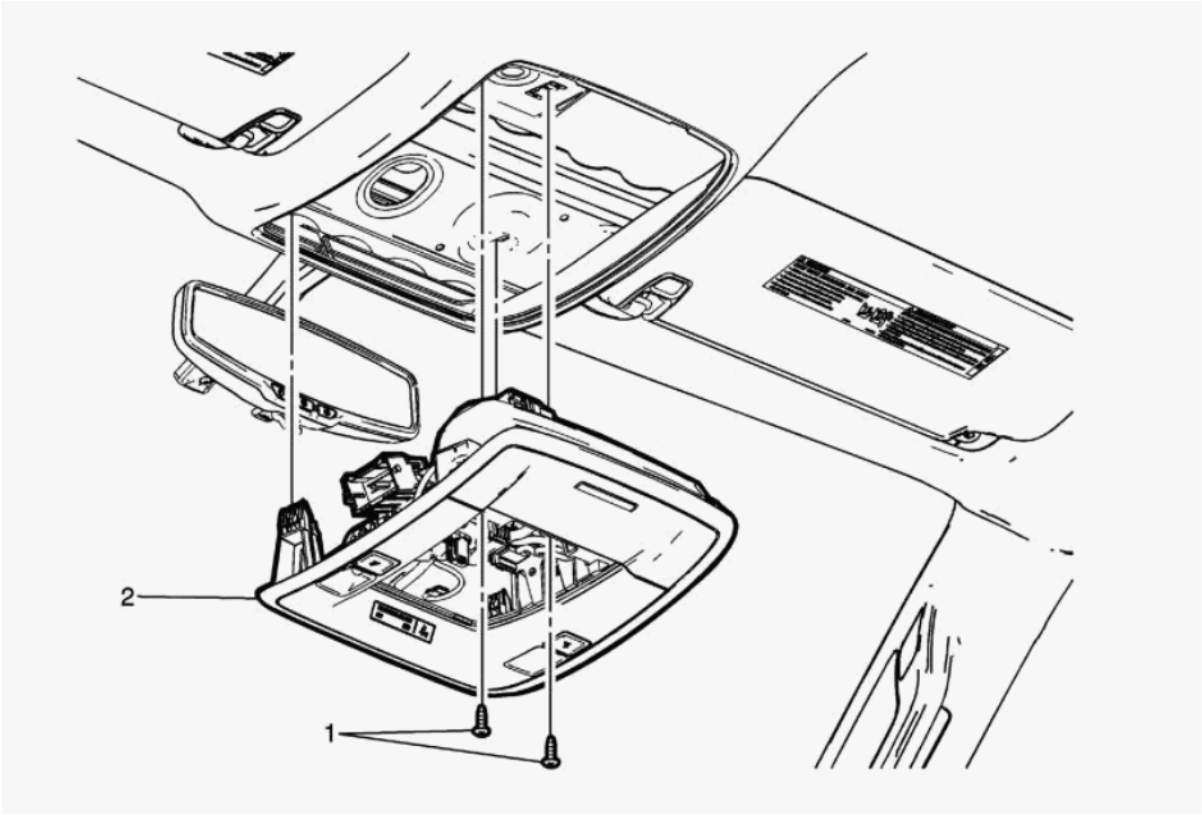


Fig. 91: Roof Console Assembly
Courtesy of GENERAL MOTORS COMPANY

10. Install the roof console assembly (2). Refer to **Roof Console Replacement** .

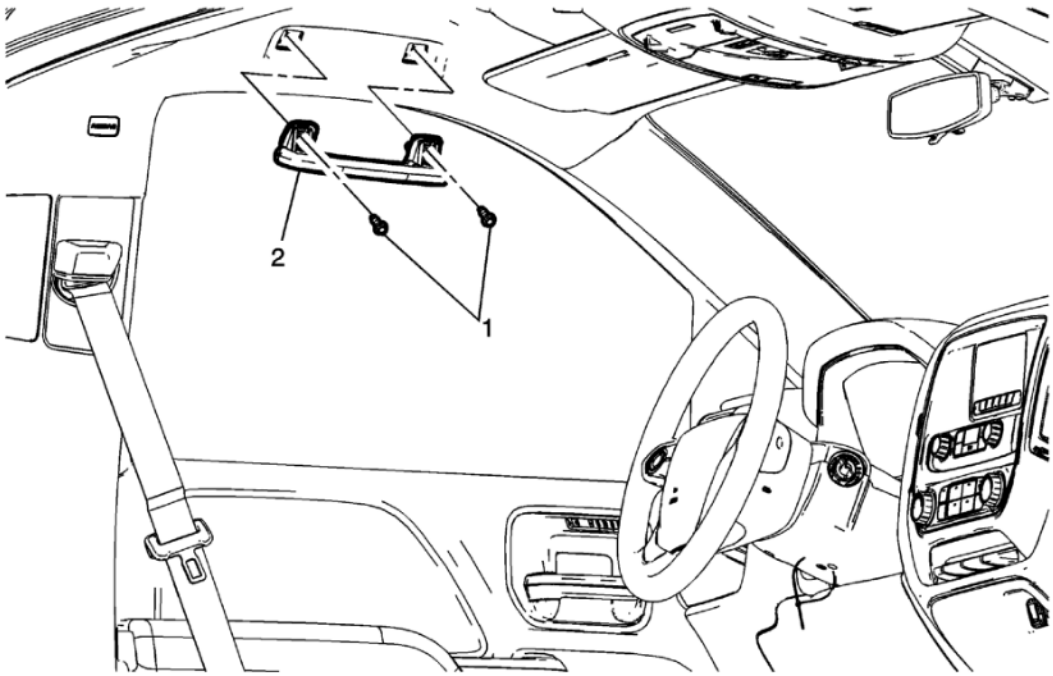


Fig. 92: Roof Rail Assist Handle (Regular Cab)

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Courtesy of GENERAL MOTORS COMPANY

11. Install the roof rail assist handle assembly (2). Refer to **Roof Rail Assist Handle Replacement (Crew Cab, Extended Cab)** **Roof Rail Assist Handle Replacement (Regular Cab)** .

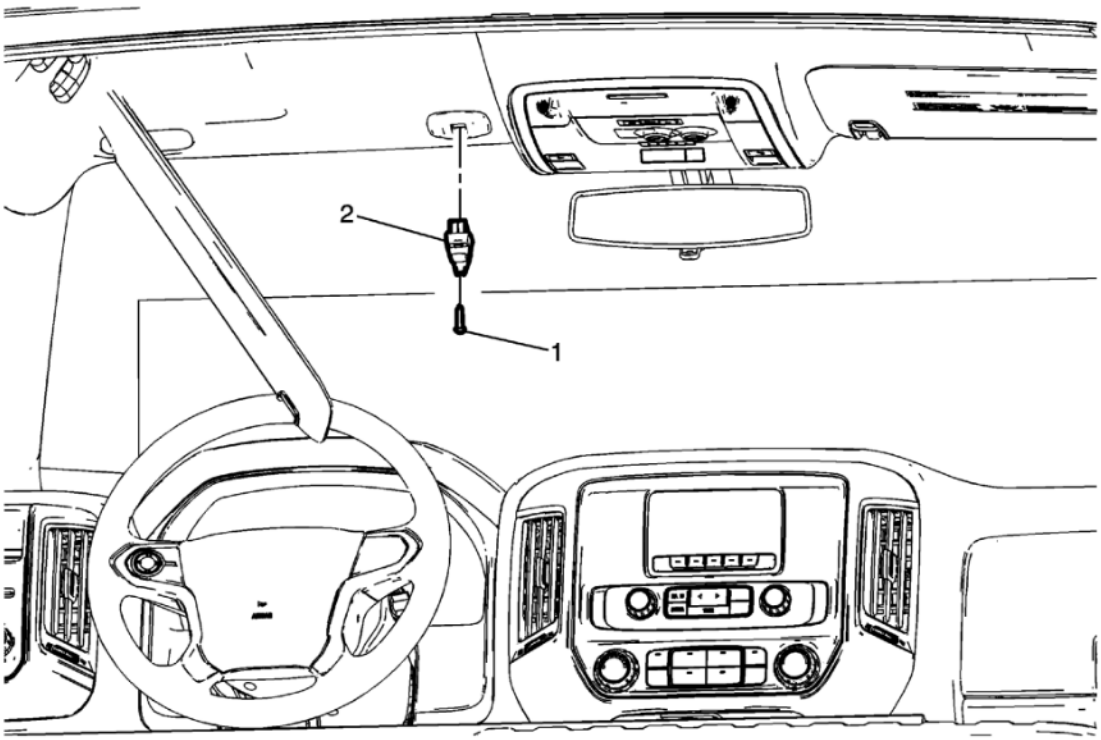


Fig. 93: Sunshade Support Assembly
Courtesy of GENERAL MOTORS COMPANY

12. Install the sunshade support assembly (2). Refer to **Sunshade Support Replacement (Crew Cab, Extended Cab)** **Sunshade Support Replacement (Regular Cab)** .

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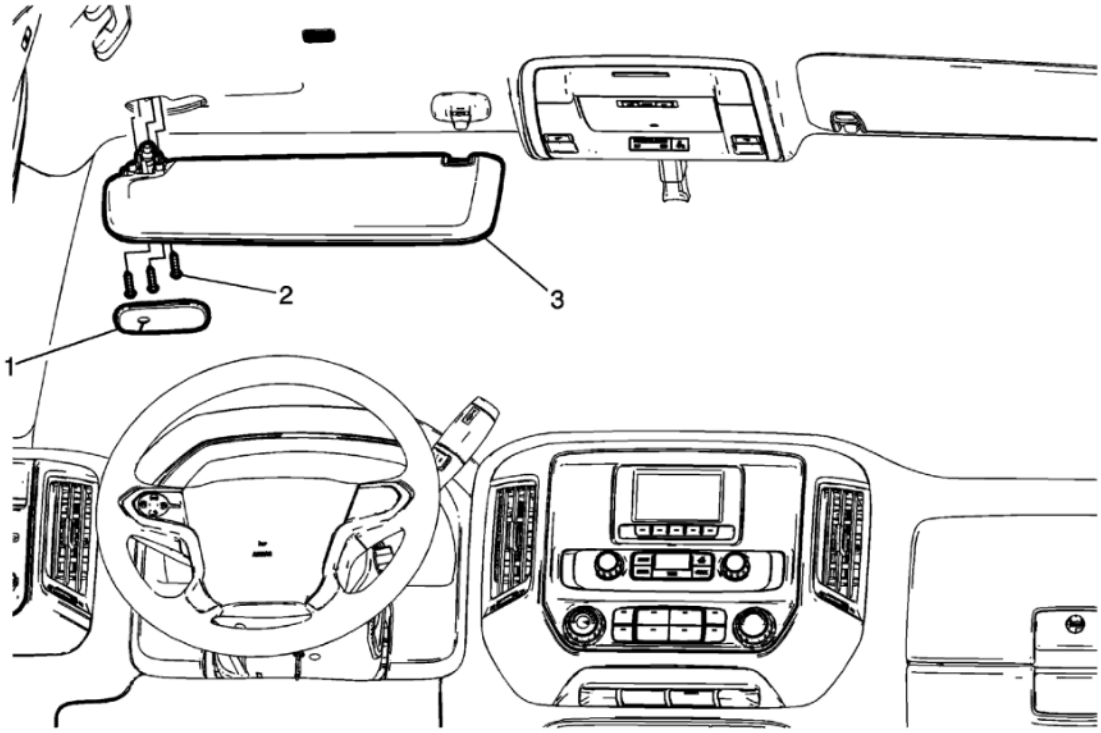


Fig. 94: Sunshade Assembly
Courtesy of GENERAL MOTORS COMPANY

13. Install the sunshade assembly (3). Refer to **Sunshade Replacement (Crew Cab, Extended Cab)** **Sunshade Replacement (Regular Cab)** .
14. Enable the SIR system. Refer to **SIR Disabling and Enabling** .

WIRE TO WIRE REPAIR - HEADLINER

Special Tools

- **EL-38125-10** Splice Sleeve Crimping Tool (non GMNA)
- **J-38125-5A** Ultra Torch Special Tool
- **J-38125-8** Splice Sleeve Crimping Tool (GMNA)

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

WARNING: **In order to reduce the risk of personal injury, loss of high voltage isolation to ground and higher system impedance, do not attempt to repair any HV wiring, connector, or terminal that is damaged. High voltage coaxial type cables are not repairable. Never attempt to repair a coaxial type cable. The entire cable/harness or component must be replaced. In order to maintain system integrity and personal safety, never attempt to repair any high voltage wiring, cables, or terminals. Performing this procedure on high voltage circuits may result in serious injury or death.**

NOTE: **If the wiring harness internal to the transmission is damaged, the wiring harness must be replaced. The use of splice sleeves in an attempt to repair the**

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internal transmission wires, connectors, or terminals could result in performance issues.

NOTE: **Do not splice wires in Door Harness Grommets.**

NOTE: **The DuraSeal splice sleeves have the following 2 critical features:**

- **A special heat shrink sleeve environmentally seals the splice. The heat shrink sleeve contains a sealing adhesive inside.**
- **A cross hatched (knurled) core crimp provides the necessary low resistance contact integrity for these sensitive, low energy circuits.**

Use only DuraSeal splice sleeves to form a one-to-one splice on all types of insulation except high voltage and specialty cables. Use DuraSeal splice sleeves where there are special requirements such as moisture sealing. Follow the instructions below in order to splice copper wire using DuraSeal splice sleeves.

Splice Sleeve Selection

Splice Sleeve Color	Crimp Tool Nest Color		Wire Gauge mm^2 / (AWG)
	3 Crimp Nests	4 Crimp Nests	
Salmon (Yellow-Pink) 19300089	Red (1) or Red/Green (1)	Red (2)	0.22-0.8/(18-26)
Blue 19168447	Blue (2)	Blue (3)	1.0-2.0/(14-16)
Yellow 19168448	Yellow (3)	Yellow (4)	3.0-5.0/(10-12)

NOTE: **You must perform the following procedures in the listed order. Repeat the procedure if any wire strands are damaged. You must obtain a clean strip with all of the wire strands intact.**

1. Open the harness by removing any tape:
   - Use a sewing seam ripper, available from sewing supply stores, in order to cut open the harness in order to avoid wire insulation damage.
   - Use the DuraSeal splice sleeves on all types of insulation except Tefzel and coaxial.
   - Do not use the crimp and DuraSeal splice sleeve to form a splice with more than 2 wires coming together.
2. Cut as little wire off the harness as possible. You may need the extra length of wire in order to change the location of a splice.

   Adjust splice locations so that each splice is at least 40 mm (1.5 in) away from the other splices, harness branches, or connectors.

3. Strip the insulation:
   - When adding a length of wire to the existing harness, use the same size wire as the original wire.
   - Perform one of the following items in order to find the correct wire size:
     - Find the wire on the schematic and convert to regional wiring gauge size.
     - If you are unsure of the wire size, begin with the largest opening in the wire stripper and

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work down until achieving a clean strip of the insulation.

- Strip approximately 5.0 mm (0.20 in) of insulation from each wire to be spliced.
- Do not nick or cut any of the strands. Inspect the stripped wire for nicks or cut strands.
- If the wire is damaged, repeat this procedure after removing the damaged section.

4. For high temperature wiring, slide a section of high temperature SCT1 shrink tubing down the length of wire to be spliced. Ensure that the shrink tubing will not interfere with the splice procedure.
5. Select the proper DuraSeal splice sleeve according to the wire size. Refer to the above table at the beginning of the repair procedure for the color coding of the DuraSeal splice sleeves and the crimp tool nests.

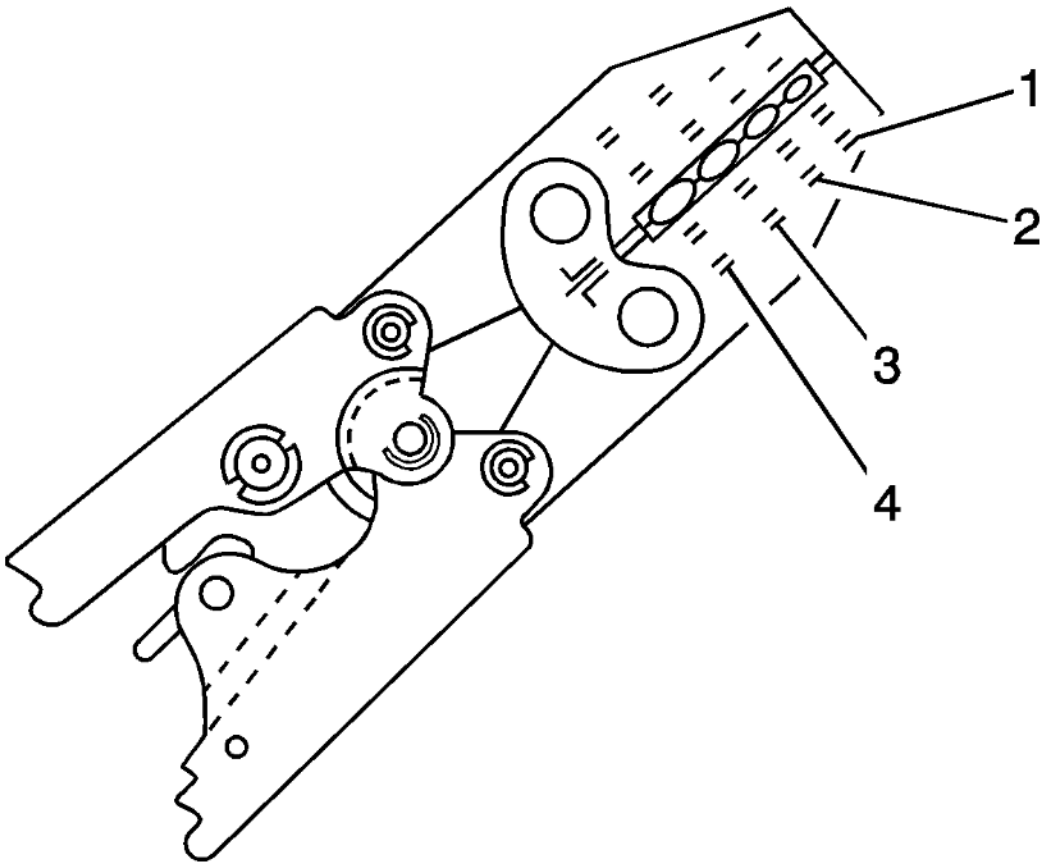


Fig. 95: Crimping Tool
Courtesy of GENERAL MOTORS COMPANY

6. The **EL-38125-10** splice sleeve crimping tool has four crimp nests. The largest crimp nest (4) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (3) is used for crimping 14 and 16 gauge wires. The third largest crimp nest (2) is used for crimping 18 and 20 gauge wires. The smallest crimp nest (1) is used for crimping 22 to 26 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.

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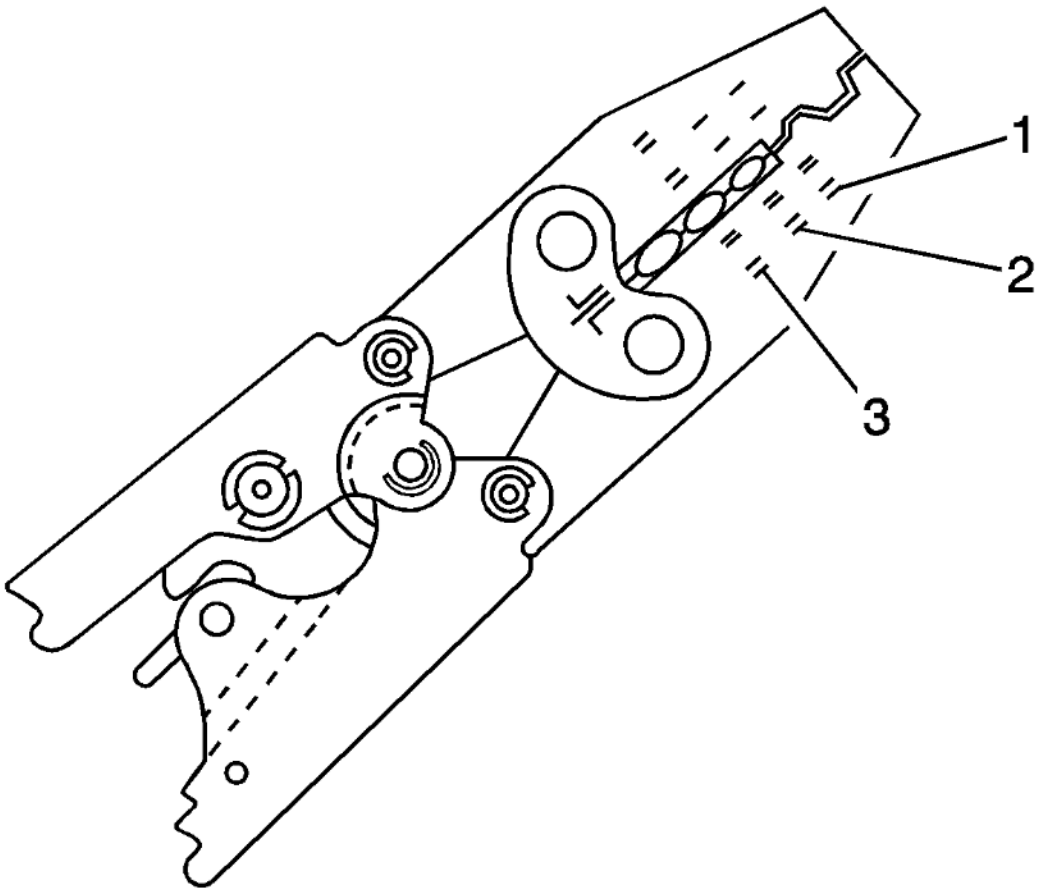


Fig. 96: Identifying Splice Crimp Tool Nests Terminal Identification
Courtesy of GENERAL MOTORS COMPANY

7. The **J-38125-8** splice sleeve crimping tool has three crimp nests. The largest crimp nest (3) is used for crimping 10 and 12 gauge wires. The second largest crimp nest (2) is used for crimping 14 and 16 gauge wires. The smallest crimp nest (1) is used for crimping 18 to 20 gauge wires. The crimp nests are referenced in the table (farther above) under the crimp tool nest color.
8. Use the splice sleeve crimp tool in order to position the DuraSeal splice sleeve in the proper color nest of the splice sleeve crimp tool. For the four crimp nest tool, use the three largest crimp nests to crimp the splice sleeves. For the three crimp nest tool, use all three crimp nests to crimp the splice sleeves. Use the four and three crimp tool diagrams (above) and the table (farther above) to match the splice sleeve with the correct crimp nest. The crimp tool diagram callout numbers match the numbers in the table (under crimp tool nest color).

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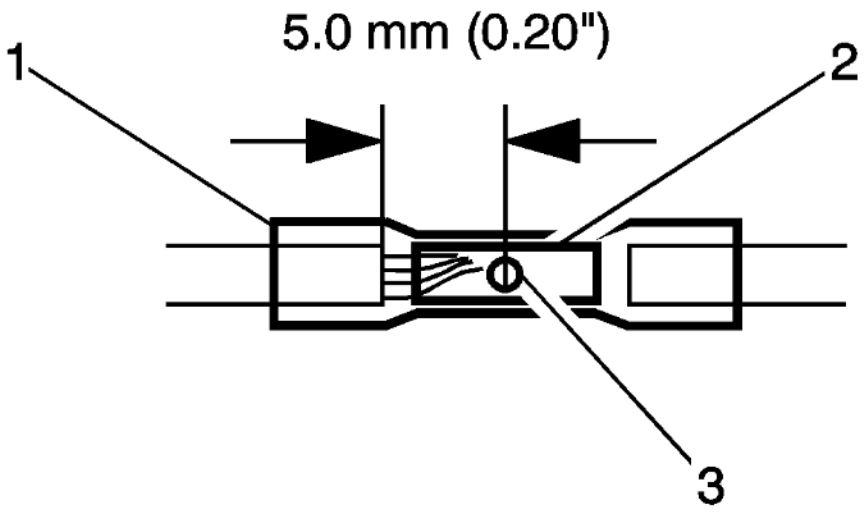


Fig. 97: Identifying Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

9. Place the DuraSeal splice sleeve in the nest. Ensure that the crimp falls midway between the end of the barrel and the stop. The sleeve has a stop (3) in the middle of the barrel (2) in order to prevent the wire (1) from going further. Close the hand crimper handles slightly in order to firmly hold the DuraSeal splice sleeve in the proper nest.

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Fig. 98: Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

10. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.
11. Tightly close the handles of the crimp tool until the crimper handles open when released.

    The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Repeat steps 4 and 6 for the opposite end of the splice.

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Fig. 99: Crimped Duraseal Splice Sleeve
Courtesy of GENERAL MOTORS COMPANY

12. Using the heat torch, apply heat to the crimped area of the barrel.
13. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

Weatherpack™ Wiring Repair

NOTE: **Some replacement pigtail connectors may be delivered without the terminated leads installed into the connector. For Weatherpack™ connectors, all terminated leads included in the package should to be installed into the connector. If the connector end view shows that a terminal is not occupied, the extra terminated lead(s) need to be installed and the end(s) sealed using a DuraSeal splice sleeve and taped back into the harness.**

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1. Insert the wire into the splice sleeve barrel until the wire hits the barrel stop. Refer to **Folded-Over Wire Repair** for splicing wires of 0.35 mm or less (22, 24, 26 gauge sizes) and for splicing wires of different gauges.

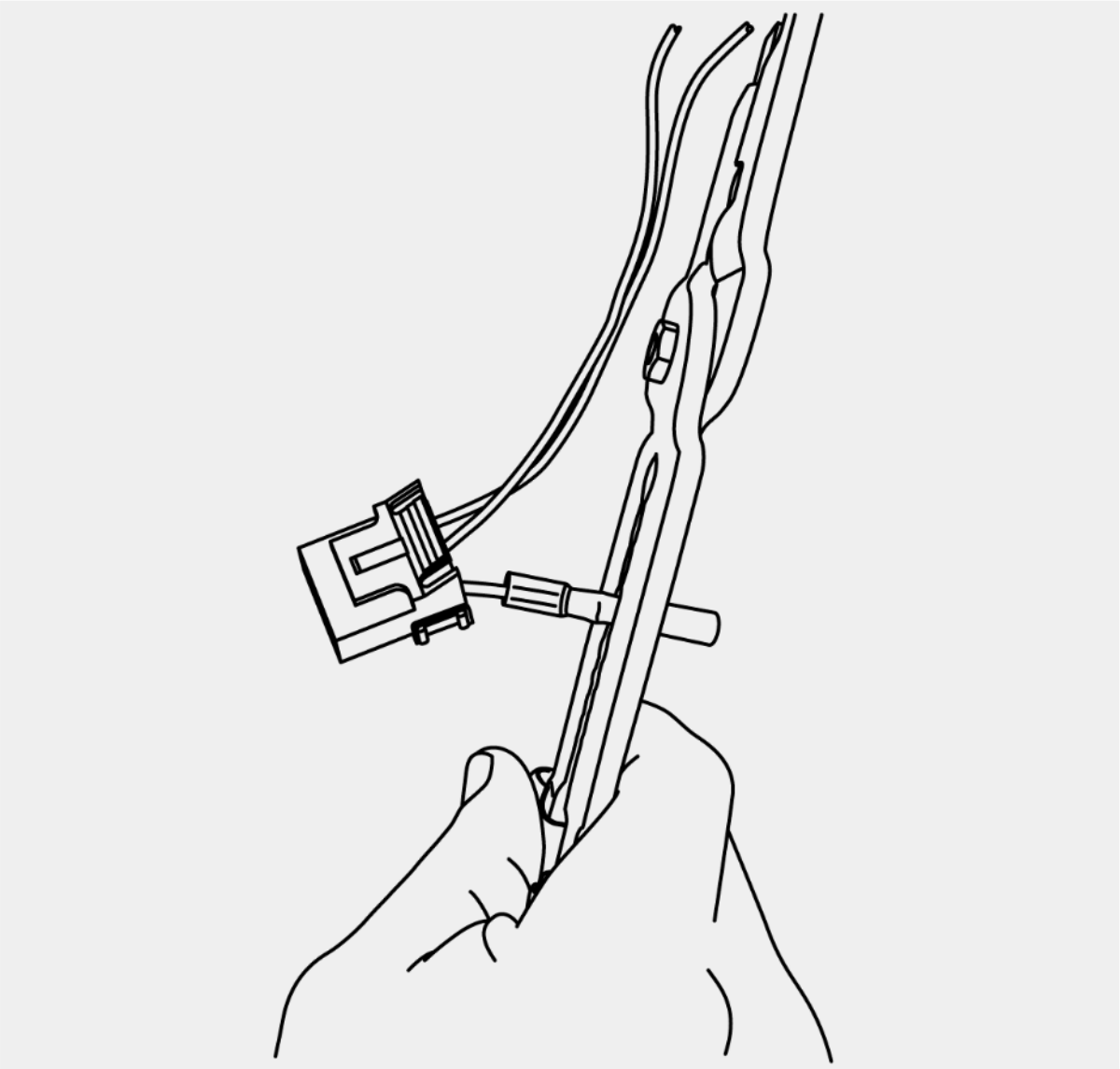


Fig. 100: Tightly Close Handles Of Crimp Tool
Courtesy of GENERAL MOTORS COMPANY

2. Tightly close the handles of the crimp tool until the crimper handles open when released.

   The crimper handles will not open until you apply the proper amount of pressure to the DuraSeal splice sleeve. Holding the DuraSEAL with one hand gently tug on the wire to ensure it is crimped in the DuraSeal.

3. Using the heat torch, apply heat to the crimped area of the barrel.

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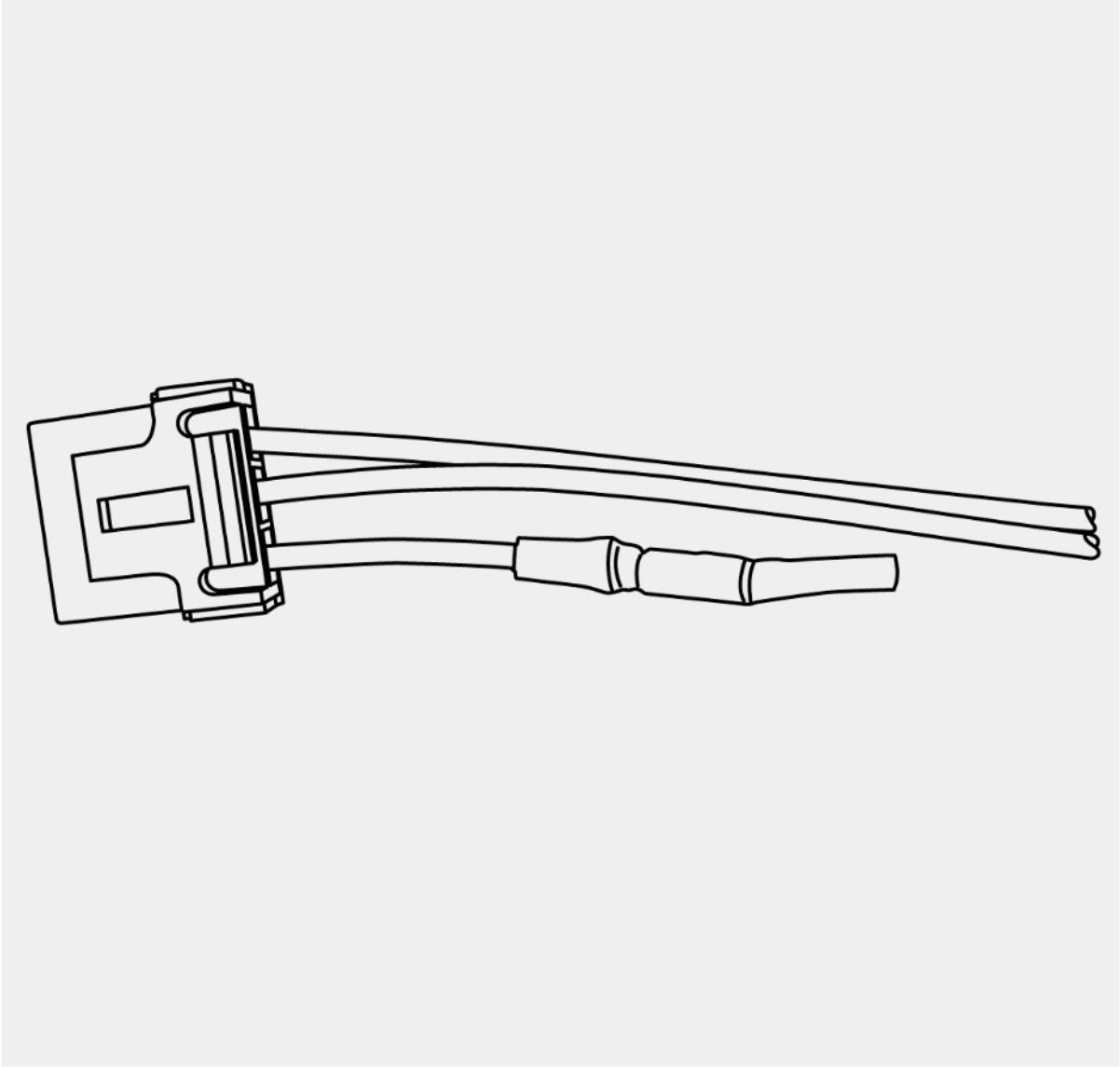


Fig. 101: Heat To Crimped Area Of Barrel
Courtesy of GENERAL MOTORS COMPANY

4. Start in the middle and gradually move the heat barrel to the open ends of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.

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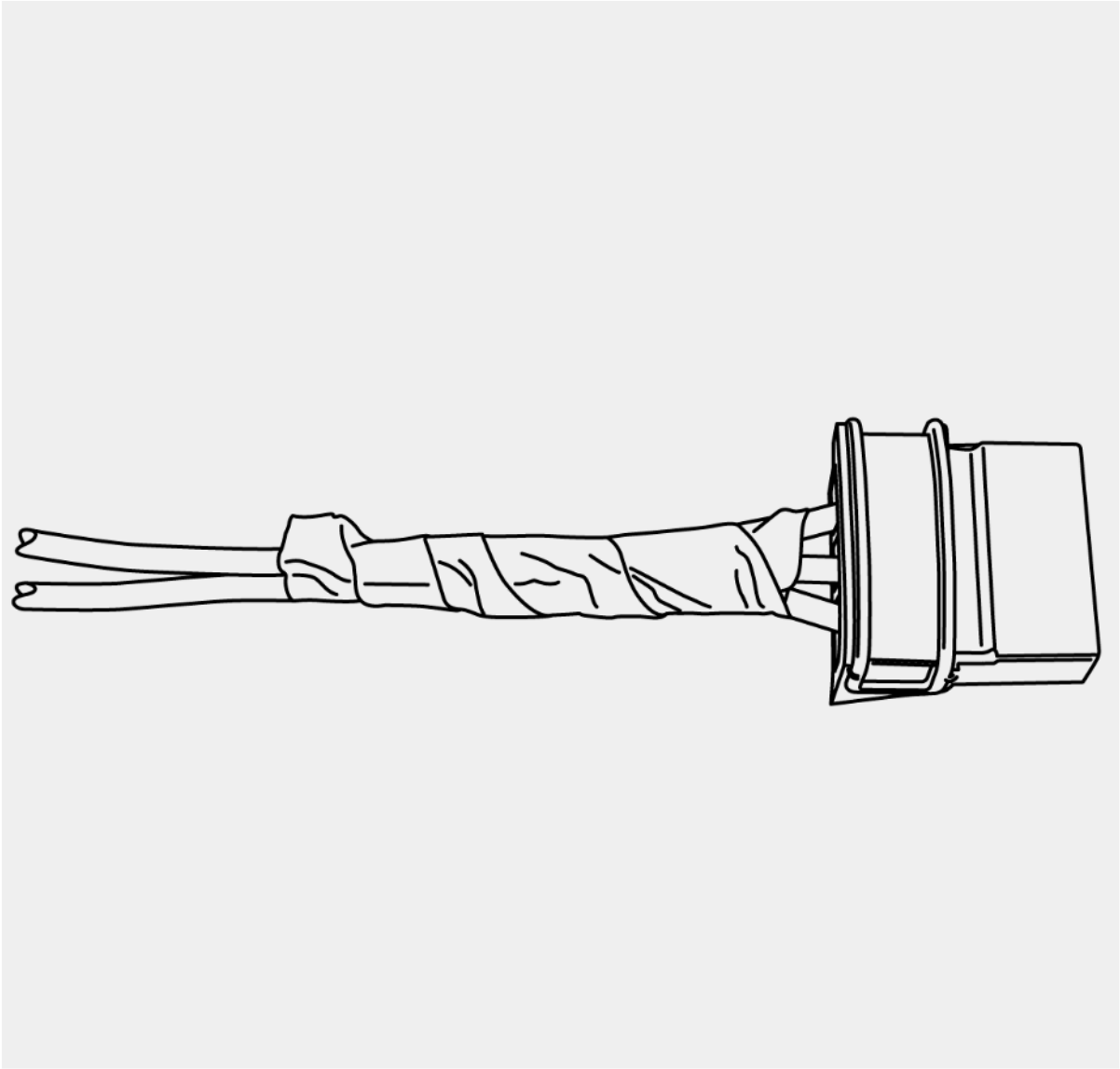


Fig. 102: Taping Extra Terminated Leads Back Into Harness
Courtesy of GENERAL MOTORS COMPANY

5. Tape the extra terminated lead(s) back into the harness.

High Temperature Wiring Repairs

Use the following procedures to perform high temperature wiring repairs:

1. Center the high temperature SCT1 shrink tube over the DuraSeal splice sleeve.
2. Using the heat torch, apply heat to the high temperature heat shrink tubing.
3. Gradually move the heat from the center to the open end of the tubing:
    - The tubing will shrink completely as the heat is moved along the insulation.
    - A small amount of sealant will come out of the end of the tubing when sufficient shrinkage is achieved.
4. Replace any reflective tape and clips that may have been removed during the repair.

CONNECTOR RECONNECTION - HEADLINER

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Special Tools

EL-35616 Terminal Test Probe Kit

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

When the condition is not currently present, but is indicated in DTC history, the cause may be intermittent. An intermittent may also be the cause when there is a customer complaint, but the symptom cannot be duplicated. Refer to the Symptom Table of the system that is suspect of causing the condition before trying to locate an intermittent condition.

Most intermittent conditions are caused by faulty electrical connections or wiring. Inspect for the following items:

- Loose, corroded, or painted terminal stud/fastener
- Wiring broken inside the insulation
- Poor connection between the male and female terminal at a connector
- A terminal not seated all the way into the connector body
- Poor terminal to wire connection - Some conditions which fall under this description are poor crimps, poor solder joints, crimping over the wire insulation rather than the wire itself, and corrosion in the wire to terminal contact area, etc.
- Pierced or damaged insulation can allow moisture to enter the wiring causing corrosion. The conductor can corrode inside the insulation, with little visible evidence. Look for swollen and stiff sections of wire in the suspect circuits.
- Wiring which has been pinched, cut, or its insulation rubbed through may cause an intermittent open or short as the bare area touches other wiring or parts of the vehicle.
- Wiring that comes in contact with hot or exhaust components
- Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required, in order to verify the customer concern.
- Refer to **Testing for Electrical Intermittents** for test procedures to detect intermittent open, high resistance, short to ground, and short to voltage conditions.
- Refer to **Scan Tool Snapshot Procedure** for advanced intermittent diagnosis and Vehicle Data Recorder operation.

Testing for Terminal Fretting

Some intermittent conditions can be caused by wire terminal fretting corrosion. Fretting corrosion is a build-up of insulating, oxidized wear debris that can form when there is a small motion between electrical contacts. The oxidized wear debris can pile up enough at the electrical contact spots that the electrical resistance across the connection increases. Movement between the contacting surfaces as small as 10 to 100 microns can cause fretting. To put this in perspective, a sheet of paper is about 100 microns thick, so fretting motion is small and hard to see. Vibration and thermal expansion/contraction are the main sources that create fretting motion. Since vehicles vibrate and can experience large temperature swings, they are a good source for fretting motion. Tin, copper, nickel, and iron surfaces are all susceptible to fretting corrosion. Fretting corrosion can be difficult to see but it looks like small, dark smudges on the terminals contact surface.

To correct a fretting condition disconnect the suspect connector and add dielectric grease / lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to both sides of the connector terminals. Then reconnect the connector and wipe away any excess lubricant. This will correct the additional terminal contact resistance due to the terminal fretting corrosion.

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Testing for Proper Terminal Contact

It is important to test terminal contact at the component and any inline connectors before replacing a suspect component. Mating terminals must be inspected to ensure good terminal contact. A poor connection between the male and female terminal at a connector may be the result of contamination or deformation.

Contamination may be caused by the connector halves being improperly connected. A missing or damaged connector seal, damage to the connector itself, or exposing the terminals to moisture and dirt can also cause contamination. Contamination, usually in the underhood or underbody connectors, leads to terminal corrosion, causing an open circuit or intermittently open circuit.

Deformation is caused by probing the mating side of a connector terminal without the proper adapter. Always use the **EL-35616** kit when probing connectors. Other causes of terminal deformation are improperly joining the connector halves, or repeatedly separating and joining the connector halves. Deformation, usually to the female terminal contact tang, can result in poor terminal contact causing an open or intermittently open circuit.

Testing for Proper Terminal Contact in Bussed Electrical Centers

It is very important to use the correct test adapter when testing for proper terminal contact of fuses and relays in a bussed electrical center. Use the **EL-35616** kit to test for proper terminal contact. Failure to use the **EL-35616** kit can result in improper diagnosis of the bussed electrical center.

Follow the procedure below in order to test terminal contact:

1. Separate the connector halves.
2. Visually inspect the connector halves for contamination. Contamination may result in a white or green build-up within the connector body or between terminals. This causes high terminal resistance, intermittent contact, or an open circuit. An underhood or underbody connector that shows signs of contamination should be replaced in its entirety: terminals, seals, and connector body.
3. Using an equivalent male terminal/terminated lead, verify that the retention force is significantly different between a known good terminal and the suspect terminal. Replace the female terminal in question.

Flat Wire Connectors

There are no serviceable parts for flat wire connectors on the harness side or the component side.

Follow the procedure below in order to test terminal contact:

1. Remove the component in question.
2. Visually inspect each side of the connector for signs of contamination. Avoid touching either side of the connector as oil from your skin may be a source of contamination as well.
3. Visually inspect the terminal bearing surfaces of the flat wire circuits for splits, cracks, or other imperfections that could cause poor terminal contact. Visually inspect the component side connector to ensure that all of the terminals are uniform and free of damage or deformation.
4. Insert the appropriate adapter into the flat wire harness connector in order to test the circuit in question.

Control Module/Component Voltage and Grounds

Poor voltage or ground connections can cause widely varying symptoms.

- Test all control module voltage supply circuits. Many vehicles have multiple circuits supplying voltage to a control module. Other components in the system may have separate voltage supply circuits that may

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also need to be tested. Inspect connections at the module/component connectors, fuses, and any intermediate connections between the voltage source and the module/component. A test lamp or a DMM may indicate that voltage is present, but neither tests the ability of the circuit to carry sufficient current. Operate the component to test the ability of the circuit to carry sufficient current. Refer to **Circuit Testing** , and **Power Distribution Schematics (1500)** **Power Distribution Schematics ((2500/3500))** .

- Test all control module ground and system ground circuits. The control module may have multiple ground circuits. Other components in the system may have separate grounds that may also need to be tested. Inspect grounds for clean and tight connections at the grounding point (screw or stud). Inspect the connections at the component and in splice packs, where applicable. Operate the component to test the ability of the circuit to carry sufficient current. Refer to **Circuit Testing** , and **Ground Distribution Schematics (1500)** **Ground Distribution Schematics ((2500/3500))** .

Temperature Sensitivity

- An intermittent condition may occur when a component/connection reaches normal operating temperature. The condition may occur only when the component/connection is cold, or only when the component/connection is hot.
- Freeze Frame, Failure Records, Snapshot, or Vehicle Data Recorder data may help with this type of intermittent condition, where applicable.
- If the intermittent is related to heat, review the data for a relationship with the following:
  - High ambient temperatures
  - Underhood/engine generated heat
  - Circuit generated heat due to a poor connection, or high electrical load
  - Higher than normal load conditions, towing, etc.
- If the intermittent is related to cold, review the data for the following:
  - Low ambient temperatures - In extremely low temperatures, ice may form in a connection or component. Inspect for water intrusion.
  - The condition only occurs on a cold start.
  - The condition goes away when the vehicle warms up.
- Information from the customer may help to determine if the trouble follows a pattern that is temperature related.
- If temperature is suspected of causing an intermittent fault condition, attempt to duplicate the condition. Refer to **Inducing Intermittent Fault Conditions** in order to duplicate the conditions required.

Electromagnetic Interference and Electrical Noise

Some electrical components/circuits are sensitive to electromagnetic interference or other types of electrical noise. Inspect for the following conditions:

- A mis-routed harness that is too close to high voltage/high current devices such as secondary ignition components, motors, generator etc. - These components may induce electrical noise on a circuit that could interfere with normal circuit operation.
- Electrical system interference caused by a malfunctioning relay, or a control module driven solenoid or switch - These conditions can cause a sharp electrical surge. Normally, the condition will occur when the malfunctioning component is operating.
- Installation of non-factory or aftermarket add on accessories such as lights, 2-way radios, amplifiers, electric motors, remote starters, alarm systems, cell phones, etc. - These accessories may create interference in other circuits while operating and the interference would disappear when the accessory is

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not operating. Refer to **Checking Aftermarket Accessories** .

- Test for an open diode across the A/C compressor clutch and for other open diodes. Some relays may contain a clamping diode.
- The generator may be allowing AC noise into the electrical system.

Incorrect Control Module

- There are only a few situations where reprogramming a control module is appropriate:
  - A new service control module is installed.
  - A control module from another vehicle is installed.
  - Revised software/calibration files have been released for this vehicle.

NOTE: **DO NOT re-program the control module with the SAME software/calibration files that are already present in the control module. This is not an effective repair for any type of concern.**

- Verify that the control module contains the correct software/calibration. If incorrect programming is found, reprogram the control module with the most current software/calibration. Refer to **Control Module References** for replacement, setup, and programming.

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