

2017 ACCESSORIES AND EQUIPMENT**Frame and Underbody - Bolt EV****SPECIFICATIONS****FASTENER SPECIFICATIONS****Reusable Threaded Fastener Tightening Specifications**

Application	Specification
	Metric (English)
NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Battery Negative Cable Ground Bolt	22 N.m (16 lb ft)
Battery Positive and Negative Cable Bracket Bolt	9 N.m (80 lb in)
Battery Positive and Negative Cable Bracket Nut	9 N.m (80 lb in)
Drivetrain and Front Suspension Cradle Front Bolt	
• First Pass:	160 N.m (118 lb ft)
• Final Pass:	60 - 75 Degrees
Drivetrain and Front Suspension Cradle Intermediate Bolt	
• First Pass:	160 N.m (118 lb ft)
• Final Pass:	60 - 75 Degrees
Drivetrain and Front Suspension Cradle Nut	58 N.m (43 lb ft)
Drivetrain and Front Suspension Cradle Rear Bolt	
• First Pass:	160 N.m (118 lb ft)
• Final Pass:	60 - 75 Degrees
Drivetrain and Front Suspension Crossmember Center Bolt	58 N.m (43 lb ft)
Front Bumper Fascia Wheel Opening Screw	2.5 N.m (22 lb in)
Front Compartment Insulator Bolt	9 N.m (80 lb in)
Front Compartment Insulator Screw	2.5 N.m (22 lb in)
Front Tire Front Air Deflector Fastener	2.5 N.m (22 lb in)
Front Wheelhouse Liner Screw	2.5 N.m (22 lb in)
Power Electric Carrier Frame Bolt (Front Mounting)	160 N.m (118 lb ft)
Power Electric Carrier Frame Bolt (Rear Mounting)	58 N.m (43 lb ft)
Rear Tire Front Air Deflector Fastener	2.5 N.m (22 lb in)
Rear Wheelhouse Liner Screw	2.5 N.m (22 lb in)

REPAIR INSTRUCTIONS**POWER ELECTRIC CARRIER FRAME REPLACEMENT**

WARNING:

Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

1. Disable the high voltage system. [High Voltage Disabling](#)
2. Battery Tray - Remove - [Battery Tray Replacement](#)

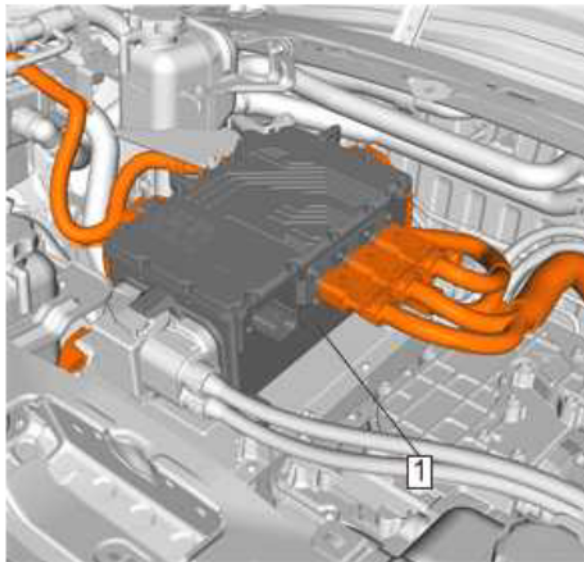


Fig. 1: Generator Battery Control Wiring Junction Block

Courtesy of GENERAL MOTORS COMPANY

3. Generator Battery Control Wiring Junction Block - Remove - [High Voltage Battery Control Wiring Junction Block Replacement \(With quick charge\)](#) [High Voltage Battery Control Wiring Junction Block Replacement \(Without quick charge\)](#)

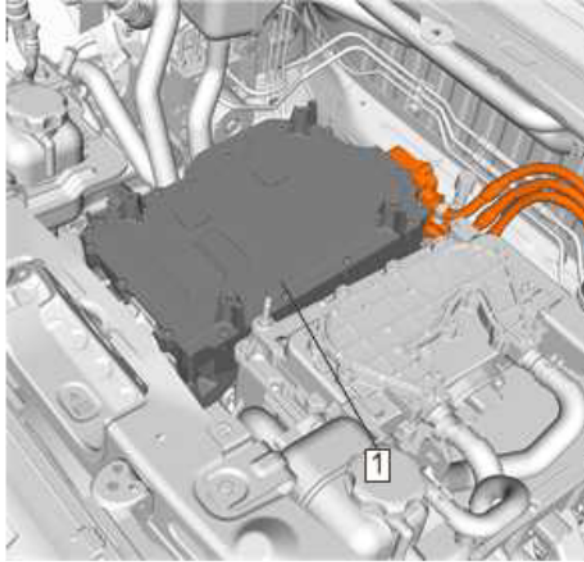


Fig. 2: Drive Motor Power Inverter Module
Courtesy of GENERAL MOTORS COMPANY

4. Drive Motor Power Inverter Module - Remove - **Drive Motor Power Inverter Module Replacement**

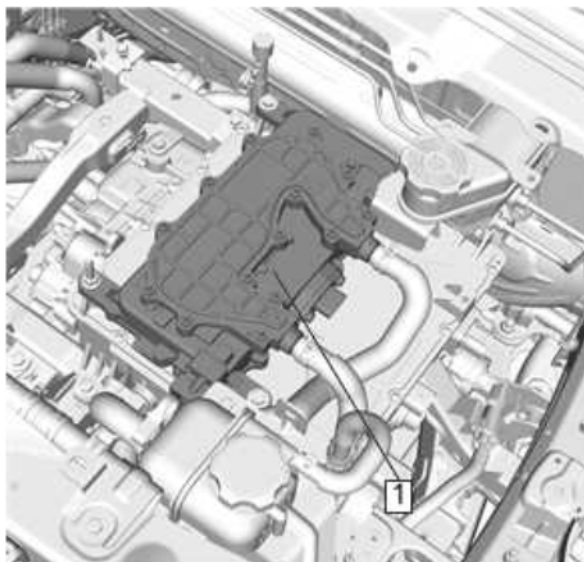
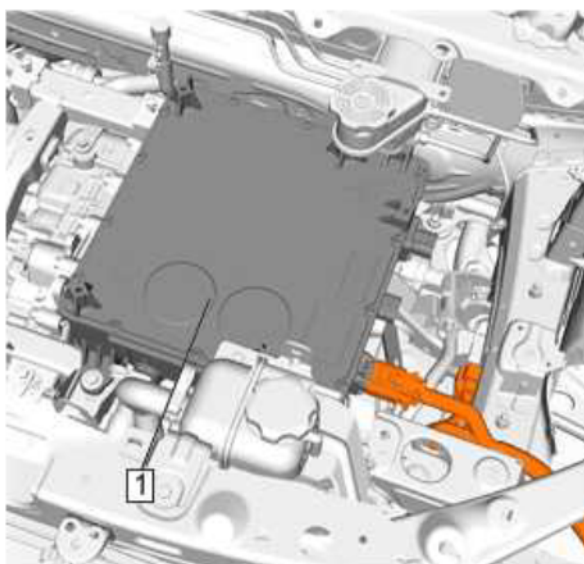


Fig. 3: Accessory DC Power Control Module
Courtesy of GENERAL MOTORS COMPANY

5. Accessory DC Power Control Module - Remove - **Accessory DC Power Control Module Replacement**



6. Drive Motor Battery Charger - Remove - **Drive Motor Battery Charger Replacement (Except Dubai) Drive Motor Battery Charger Replacement (Dubai)**

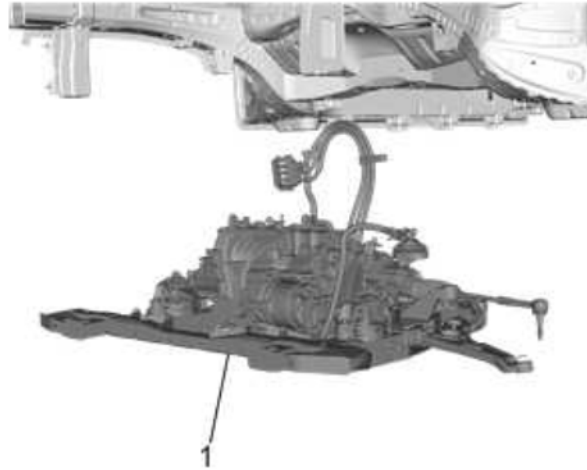


Fig. 5: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Automatic Transmission and Drivetrain and Front Suspension Frame Assembly - Remove - **Drivetrain and Front Suspension Frame Removal and Installation**
1. Remove the drive motor battery coolant pump instead of supporting the drive motor battery coolant pump to the power electric carrier frame with a wire during the removal process of the drive unit and drivetrain and front suspension frame assembly.
 2. Remove the heater coolant pump instead of supporting the heater coolant pump to the power electric carrier frame with a wire during the removal process of the drive unit and drivetrain and front suspension frame assembly.
8. Auxiliary Battery Negative Cable-Chassis Structure to Front Compartment Side Rail - Remove - **Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 2nd Cable) Auxiliary Battery Negative Cable Replacement (Chassis Structure to Front Compartment Side Rail) Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 1st Cable)**
9. Auxiliary Battery Negative Cable-Drive Unit to Chassis Structure - Remove - **Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 2nd Cable) Auxiliary Battery Negative Cable Replacement (Chassis Structure to Front Compartment Side Rail) Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 1st Cable)**

NOTE: Mark the routes of the wiring harness and their locations.

10. Remove the wiring harness connectors, retainers and ground from the power electric carrier frame.

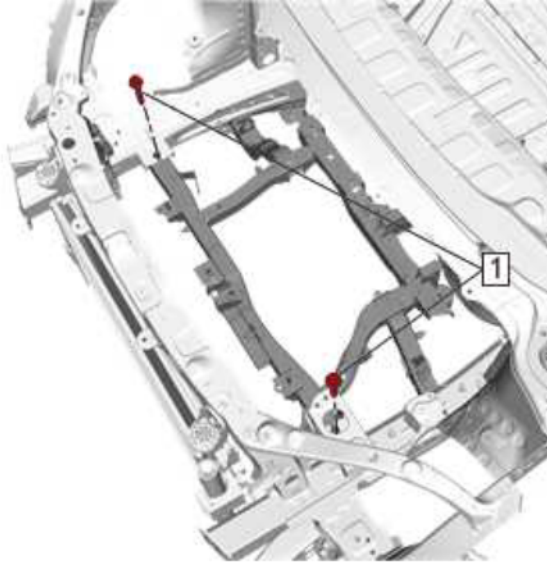


Fig. 6: Power Electric Carrier Frame Bolt
 Courtesy of GENERAL MOTORS COMPANY

11. Power Electric Carrier Frame Bolt at Body Lower Structure - Remove

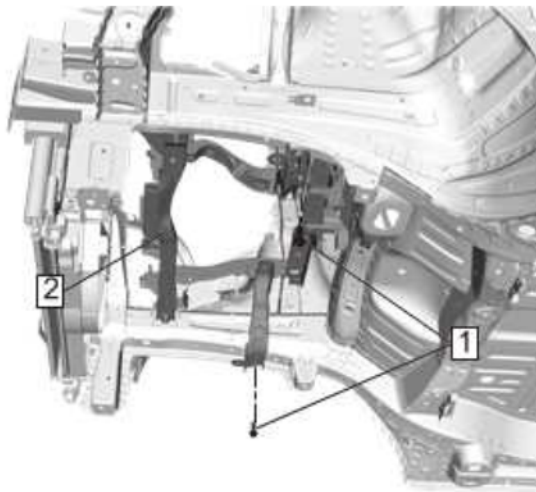


Fig. 7: Power Electric Carrier Frame Bolt at Body Lower Structure
 Courtesy of GENERAL MOTORS COMPANY

12. Power Electric Carrier Frame Bolt at Body Lower Structure - Remove

13. With the aid of an assistant, remove the power electric carrier frame (2) from the vehicle

Installation Procedure

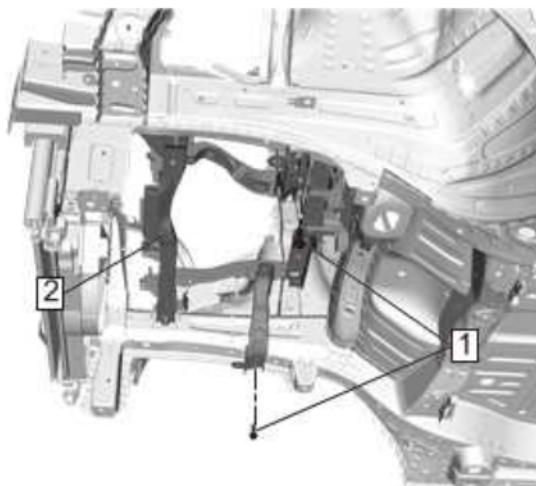


Fig. 8: Power Electric Carrier Frame Bolt at Body Lower Structure
Courtesy of GENERAL MOTORS COMPANY

1. With the aid of an assistant, install the power electric carrier frame (2) to the vehicle

CAUTION: Fastener Caution

2. Power Electric Carrier Frame Bolt at Body Lower Structure - Install and tighten to 58 N.m (43 lb ft)

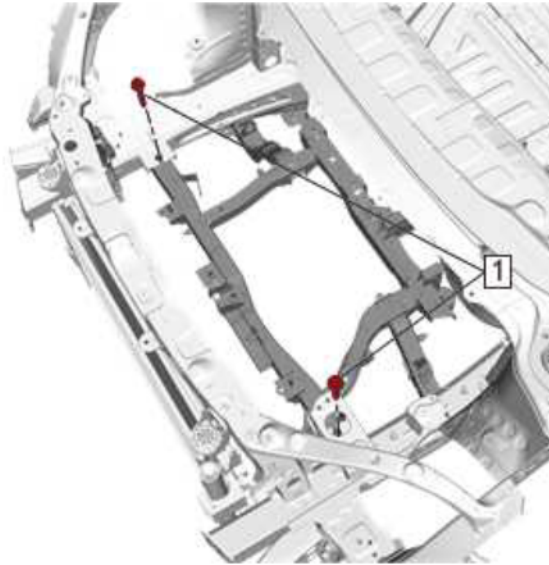


Fig. 9: Power Electric Carrier Frame Bolt
Courtesy of GENERAL MOTORS COMPANY

3. Power Electric Carrier Frame Bolt at Body Lower Structure - Install and tighten to 160 N.m (118 lb ft)
4. Install the wiring harness connectors, retainers and ground to the power electric carrier frame in the proper locations.
5. Auxiliary Battery Negative Cable-Drive Unit to Chassis Structure - Install - Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 2nd Cable) Auxiliary Battery Negative Cable Replacement (Chassis Structure to Front Compartment Side Rail) Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 1st Cable)
6. Auxiliary Battery Negative Cable-Chassis Structure to Front Compartment Side Rail - Install - Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 2nd Cable) Auxiliary Battery Negative Cable Replacement (Chassis Structure to Front Compartment Side Rail) Auxiliary Battery Negative Cable Replacement (DU to Chassis Structure, 1st Cable)

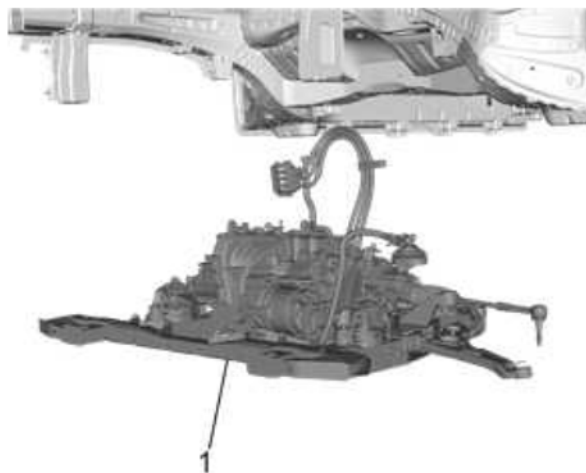


Fig. 10: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
Courtesy of GENERAL MOTORS COMPANY

7. Automatic Transmission and Drivetrain and Front Suspension Frame Assembly - Install - [Drivetrain and Front Suspension Frame Removal and Installation](#)

1. Drive Motor Battery Coolant Pump - Install - [Drive Motor Battery Coolant Pump Replacement \(RESS Pump\)](#) [Drive Motor Battery Coolant Pump Replacement \(PE Pump\)](#)
2. Heater Coolant Pump - Install -

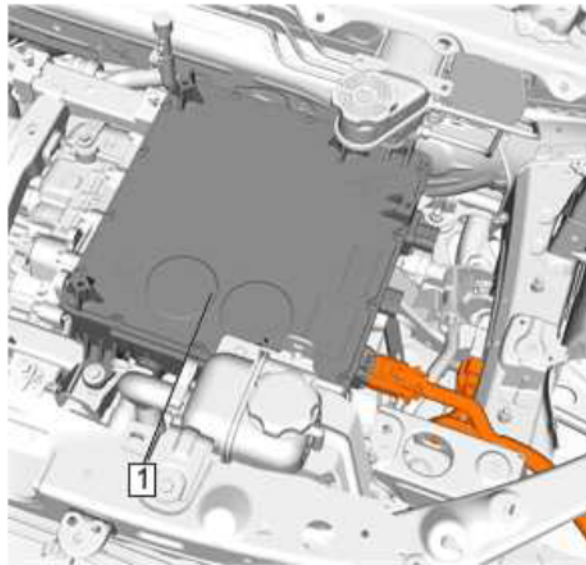


Fig. 11: Drive Motor Battery Charger

Courtesy of GENERAL MOTORS COMPANY

8. Drive Motor Battery Charger - Install - [Drive Motor Battery Charger Replacement \(Except Dubai\)](#) [Drive Motor Battery Charger Replacement \(Dubai\)](#)

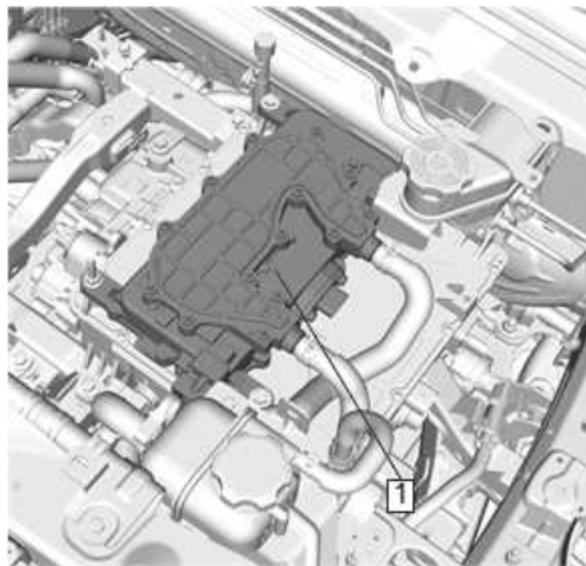


Fig. 12: Accessory DC Power Control Module

Courtesy of GENERAL MOTORS COMPANY

9. Accessory DC Power Control Module - Install - [Accessory DC Power Control Module Replacement](#)

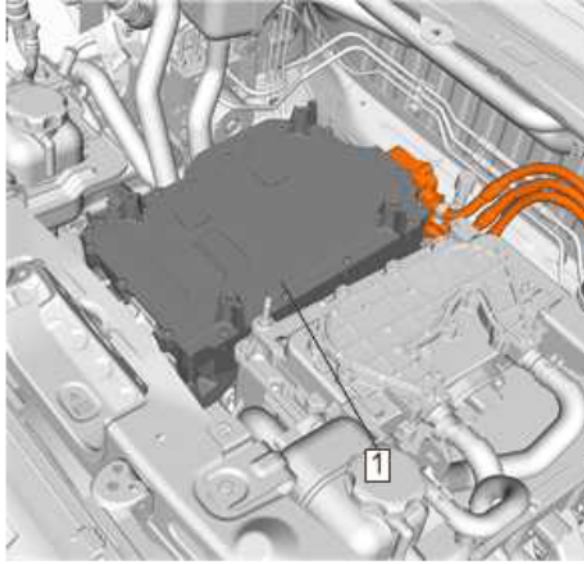


Fig. 13: Drive Motor Power Inverter Module
 Courtesy of GENERAL MOTORS COMPANY

10. Drive Motor Power Inverter Module - Install - [Drive Motor Power Inverter Module Replacement](#)

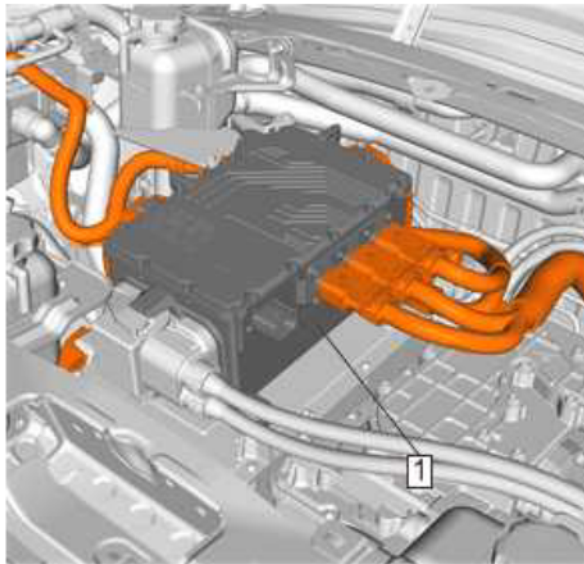


Fig. 14: Generator Battery Control Wiring Junction Block
 Courtesy of GENERAL MOTORS COMPANY

11. Generator Battery Control Wiring Junction Block - Install - [High Voltage Battery Control Wiring Junction Block Replacement \(With quick charge\)](#) [High Voltage Battery Control Wiring Junction Block Replacement \(Without quick charge\)](#)
12. Battery Tray - Install - [Battery Tray Replacement](#)
13. Enable the high voltage system. [High Voltage Enabling](#)

FRONT COMPARTMENT AIR DEFLECTOR REPLACEMENT

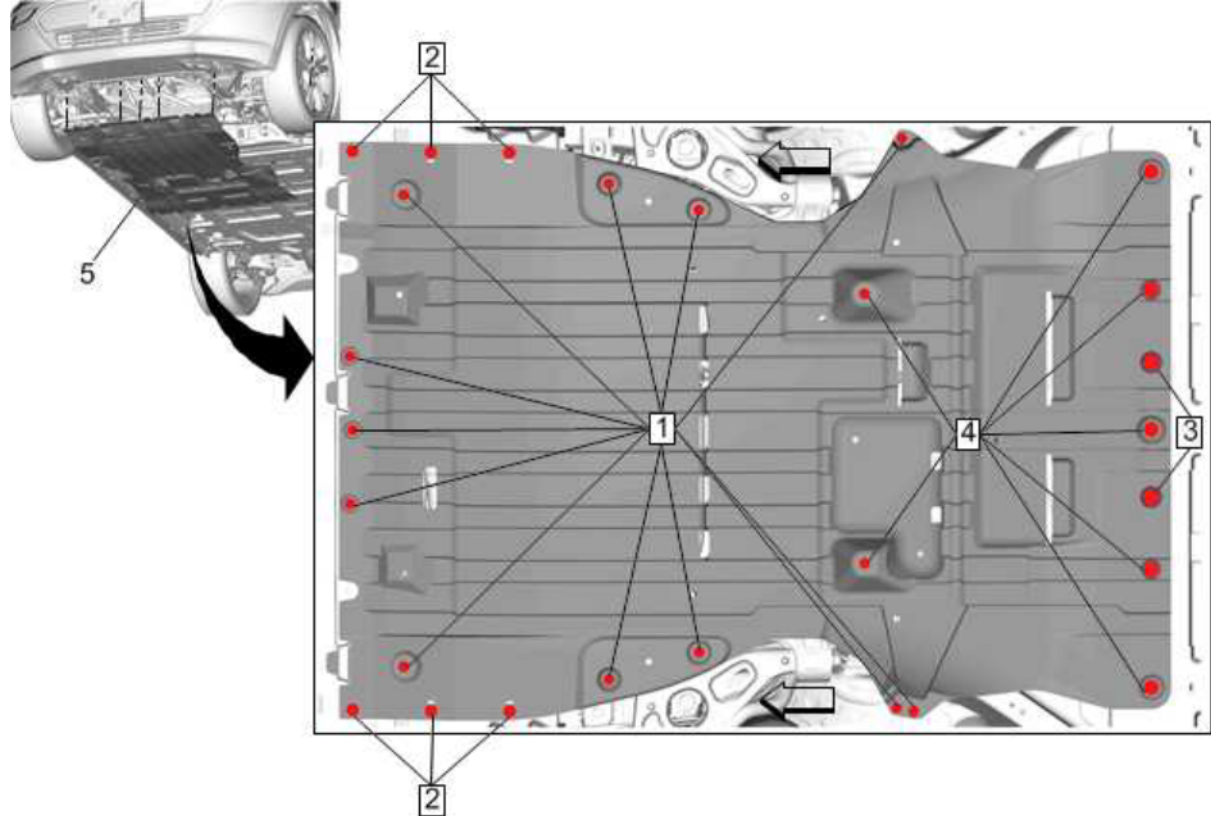


Fig. 15: Front Compartment Air Deflector
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Lifting and Jacking the Vehicle	
1	Front Compartment Insulator Screw (Qty: 12) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Front Bumper Fascia Wheel Opening Screw (Qty: 6) Tighten 2.5 N.m (22 lb in)
3	Front Compartment Insulator Retainer (Qty: 2)
4	Front Compartment Insulator Bolt (Qty: 7) Tighten 9 N.m (80 lb in)
5	Front Compartment Air Deflector

DRIVETRAIN AND FRONT SUSPENSION CROSSMEMBER EXTENSION REPLACEMENT

Removal Procedure

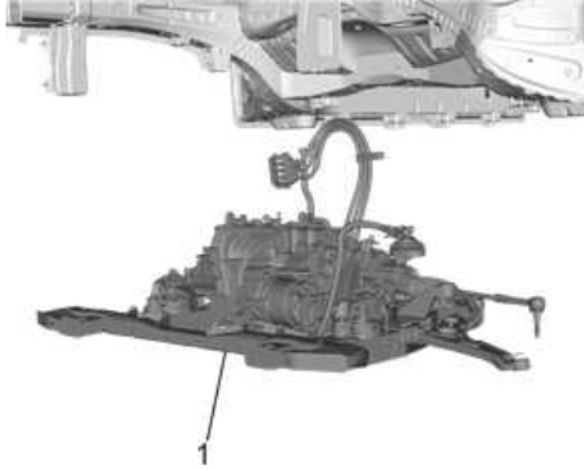


Fig. 16: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
 Courtesy of GENERAL MOTORS COMPANY

1. Automatic Transmission and Drivetrain and Front Suspension Frame Assembly - Remove - **Drivetrain and Front Suspension Frame Removal and Installation**
2. Automatic Transmission - Remove - **Transmission Replacement**

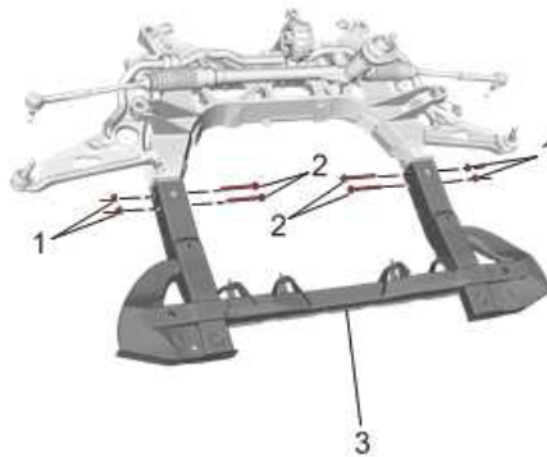


Fig. 17: Drivetrain and Front Suspension Cradle Nut
 Courtesy of GENERAL MOTORS COMPANY

3. Drivetrain and Front Suspension Cradle Nut (1) (Qty: 4) - Remove
4. Drivetrain and Front Suspension Crossmember Extension Rear Bolt (2) (Qty: 4) - Remove
5. Drivetrain and Front Suspension Crossmember Extension (3) at Drivetrain and Front Suspension Crossmember - Remove

Installation Procedure

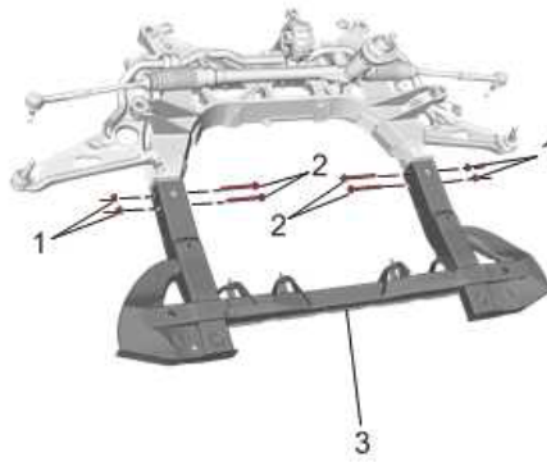


Fig. 18: Drivetrain and Front Suspension Cradle Nut
 Courtesy of GENERAL MOTORS COMPANY

1. Drivetrain and Front Suspension Crossmember Extension (3) at Drivetrain and Front Suspension Crossmember - Install
2. Drivetrain and Front Suspension Crossmember Extension Rear Bolt (2) (Qty: 4) - Install

CAUTION: Fastener Caution

3. Drivetrain and Front Suspension Cradle Nut (1) (Qty: 4) - Install and tighten to 58 N.m (43 lb ft)
4. Automatic Transmission - Install - Transmission Replacement

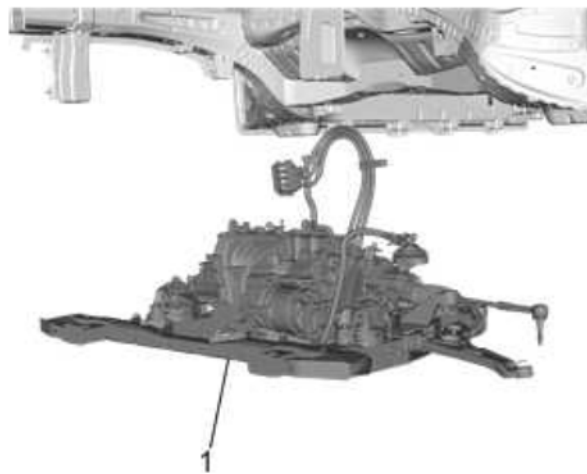


Fig. 19: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
 Courtesy of GENERAL MOTORS COMPANY

5. Automatic Transmission and Drivetrain and Front Suspension Frame Assembly (1) - Install - Drivetrain and Front Suspension Frame Removal and Installation

DRIVETRAIN AND FRONT SUSPENSION FRAME FRONT CROSSMEMBER REPLACEMENT

Removal Procedure

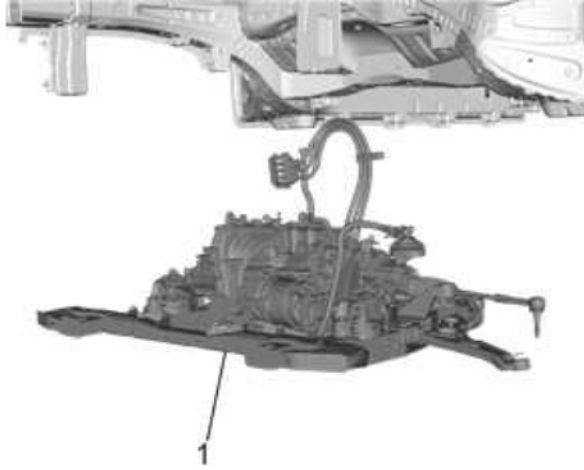


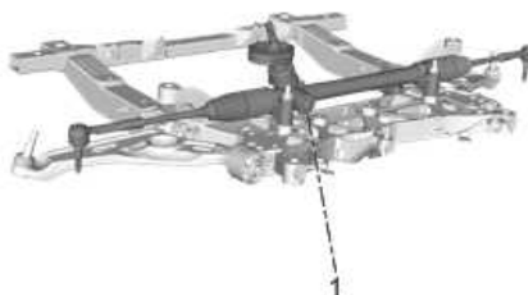
Fig. 20: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
 Courtesy of GENERAL MOTORS COMPANY

1. Automatic Transmission and Drivetrain and Front Suspension Frame Assembly - Remove - **Drivetrain and Front Suspension Frame Removal and Installation**
2. Automatic Transmission - Remove - **Transmission Replacement**



Fig. 21: Front Stabilizer Shaft
 Courtesy of GENERAL MOTORS COMPANY

3. Front Stabilizer Shaft - Remove - **Stabilizer Shaft Replacement**



4. Rack and Pinion Steering Gear - Remove - **Steering Gear Replacement**



Fig. 23: Front Lower Control Arm
Courtesy of GENERAL MOTORS COMPANY

5. Front Lower Control Arm - Remove - **Lower Control Arm Replacement**

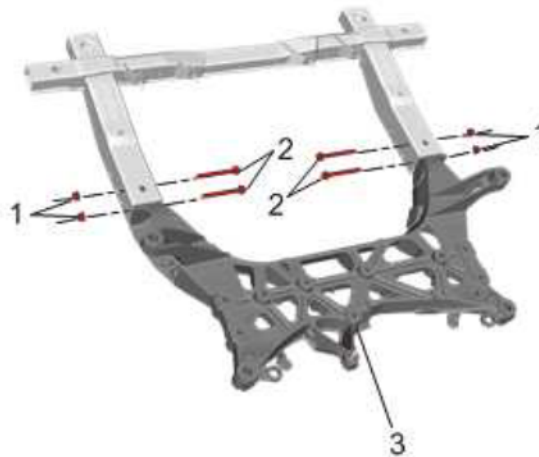


Fig. 24: Drivetrain and Front Suspension Cradle Nut
Courtesy of GENERAL MOTORS COMPANY

6. Drivetrain and Front Suspension Cradle Nut (1) (Qty: 4) - Remove
7. Drivetrain and Front Suspension Crossmember Extension Rear Bolt (2) (Qty: 4) - Remove
8. Drivetrain and Front Suspension Crossmember (3) at Drivetrain and Front Suspension Crossmember Extension - Remove

Installation Procedure

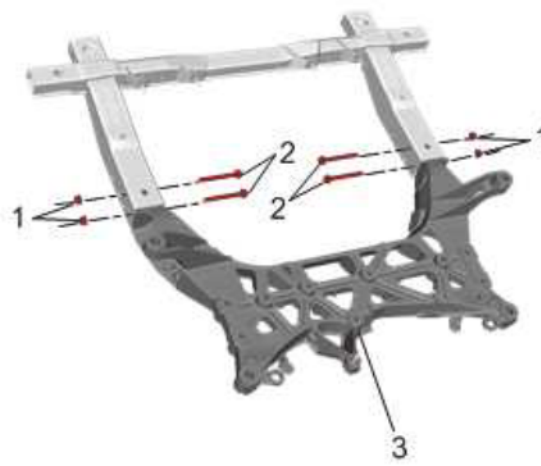


Fig. 25: Drivetrain and Front Suspension Cradle Nut
 Courtesy of GENERAL MOTORS COMPANY

1. Drivetrain and Front Suspension Crossmember (3) at Drivetrain and Front Suspension Crossmember Extension - Install
2. Drivetrain and Front Suspension Crossmember Extension Rear Bolt (2) (Qty: 4) - Install

CAUTION: Fastener Caution

3. Drivetrain and Front Suspension Cradle Nut (1) (Qty: 4) - Install and tighten to 58 N.m (43 lb ft)



Fig. 26: Front Lower Control Arm
 Courtesy of GENERAL MOTORS COMPANY

4. Front Lower Control Arm - Install - Lower Control Arm Replacement



Fig. 27: Rack and Pinion Steering Gear
 Courtesy of GENERAL MOTORS COMPANY

5. Rack and Pinion Steering Gear - Install - [Steering Gear Replacement](#)



Fig. 28: Front Stabilizer Shaft
 Courtesy of GENERAL MOTORS COMPANY

6. Front Stabilizer Shaft - Install - [Stabilizer Shaft Replacement](#)
7. Automatic Transmission - Install - [Transmission Replacement](#)

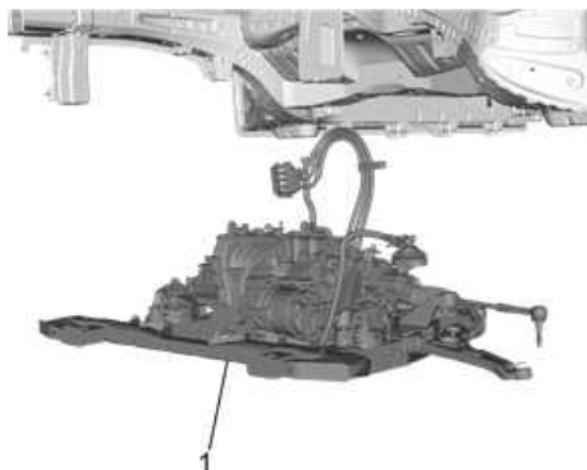


Fig. 29: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
 Courtesy of GENERAL MOTORS COMPANY

DRIVETRAIN AND FRONT SUSPENSION FRAME REMOVAL AND INSTALLATION

Special Tools

- **CH-51034** Cradle Alignment Guide Pins

Equivalent regional tools: [Special Tools](#)

Removal Procedure

WARNING: Always perform the High Voltage Disabling procedure prior to servicing any High Voltage component or connection. Personal Protection Equipment (PPE) and proper procedures must be followed.

The High Voltage Disabling procedure includes the following steps:

- Identify how to disable high voltage.
- Identify how to test for the presence of high voltage.
- Identify condition under which high voltage is always present and personal protection equipment (PPE) and proper procedures must be followed.

Before working on any high voltage system, be sure to wear the following Personal Protection Equipment:

- Safety glasses with appropriate side shields when within 15 meters (50 feet) of the vehicle, either indoors or outdoors.
- Certified and up-to-date Class "0" Insulation gloves rated at 1000V with leather protectors.
 - Visually and functionally inspect the gloves before use.
 - Wear the Insulation gloves with leather protectors at all times when working with the high voltage battery assembly, whether the system is energized or not.

Failure to follow the procedures may result in serious injury or death.

1. Disable the high voltage system. [High Voltage Disabling](#)
2. Turn the steering wheel to the straight ahead position and lock it in place.

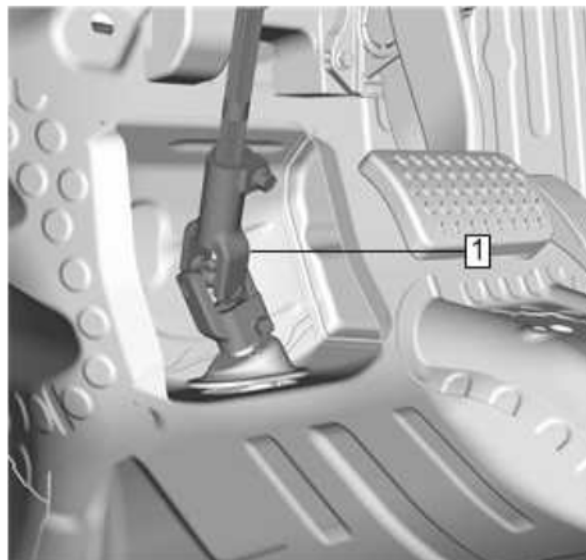


Fig. 30: Intermediate Steering Shaft
Courtesy of GENERAL MOTORS COMPANY

3. Disconnect the intermediate steering shaft (1) from the steering gear. [Intermediate Steering Shaft Replacement](#)
4. Recover the refrigerant. [Refrigerant Recovery and Recharging](#)
5. Dash Panel Upper Extension Panel Extension - Remove - [Dash Panel Upper Extension Panel Extension Replacement](#)

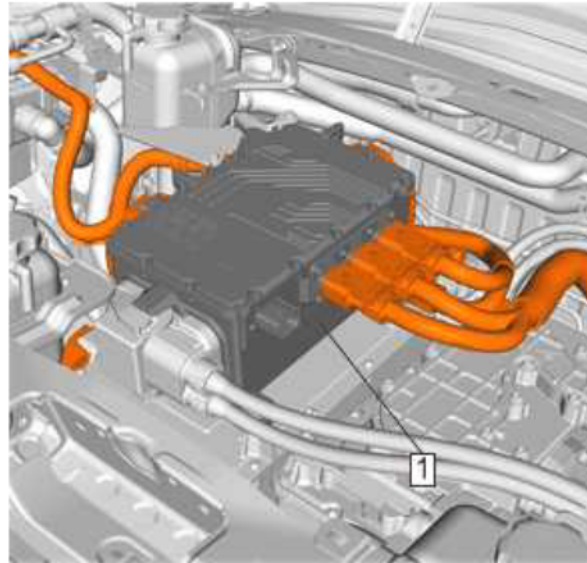


Fig. 31: Generator Battery Control Wiring Junction Block

Courtesy of GENERAL MOTORS COMPANY

6. Generator Battery Control Wiring Junction Block - Remove - [High Voltage Battery Control Wiring Junction Block Replacement \(With quick charge\)](#) [High Voltage Battery Control Wiring Junction Block Replacement \(Without quick charge\)](#)

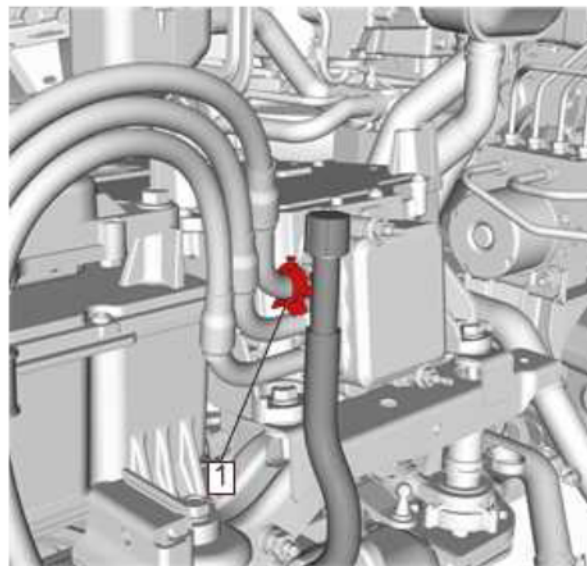


Fig. 32: Transmission Vent Pipe Clip at Drive Motor Power Inverter Module 3 Phase Cable

Courtesy of GENERAL MOTORS COMPANY

7. Transmission Vent Pipe Clip at Drive Motor Power Inverter Module 3 Phase Cable - Unclip

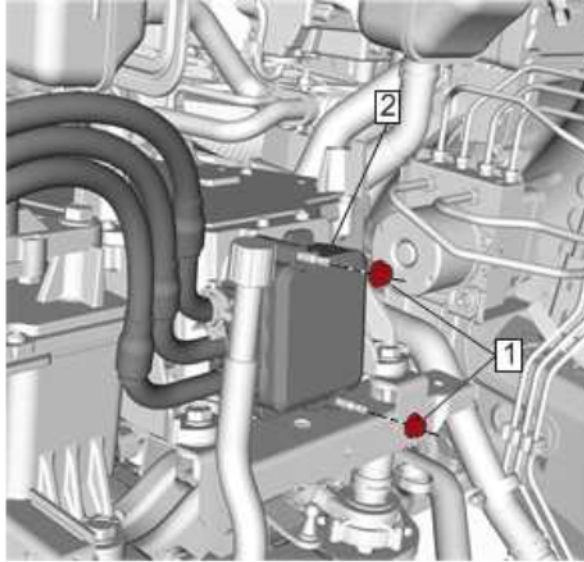


Fig. 33: Drive Motor Power Inverter Module 3 Phase Cable Cover Nut
 Courtesy of GENERAL MOTORS COMPANY

8. Drive Motor Power Inverter Module 3 Phase Cable Cover Nut - Remove
9. Drive Motor Power Inverter Module 3 Phase Cable at Drive Motor Power Inverter Module - Disconnect

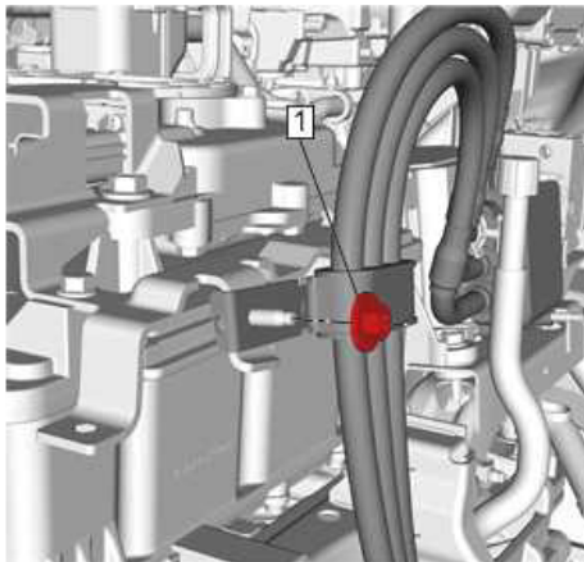


Fig. 34: Drive Motor Power Inverter Module Cable Bracket Nut
 Courtesy of GENERAL MOTORS COMPANY

10. Drive Motor Power Inverter Module Cable Bracket Nut at Accessory DC Power Control Module High Voltage Connector Protector - Remove

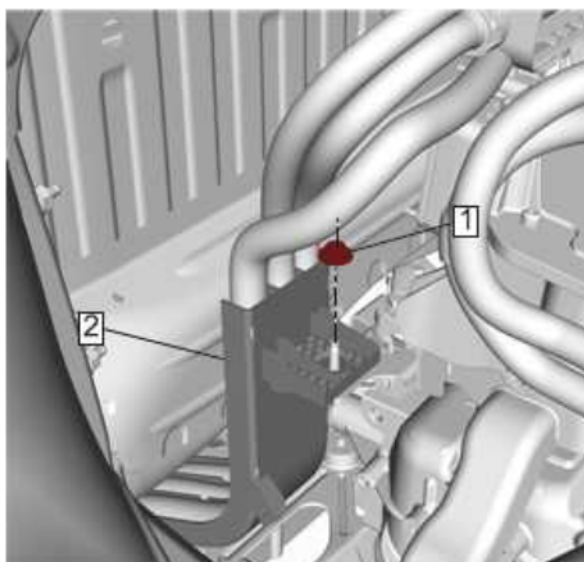


Fig. 35: Battery Positive and Negative Cable Bracket Nut
Courtesy of GENERAL MOTORS COMPANY

11. Battery Positive and Negative Cable Bracket Nut - Remove
12. Battery Cable Protector at Power Electric Carrier Frame Stud Bolt - Remove
13. Battery Tray - Remove - [**Battery Tray Replacement**](#)

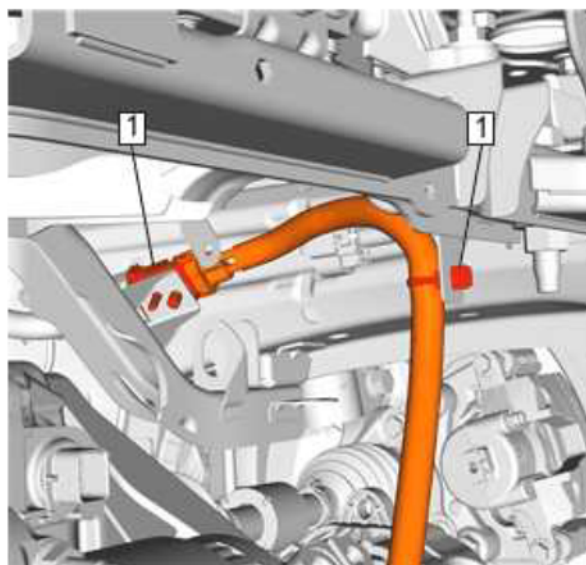


Fig. 36: Air Conditioning Compressor High Voltage Cable Retainer
Courtesy of GENERAL MOTORS COMPANY

14. Air Conditioning Compressor High Voltage Cable Retainer at Power Electric Carrier Frame - Unclip

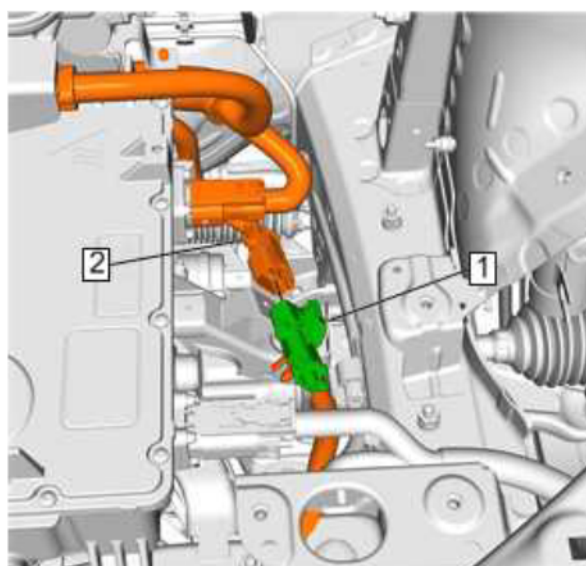


Fig. 37: Air Conditioning Compressor High Voltage Cable Connector
Courtesy of GENERAL MOTORS COMPANY

15. Air Conditioning Compressor High Voltage Cable Connector at High Voltage Battery Cable - Disconnect
16. Remove the front tire and wheel assemblies. [**Tire and Wheel Removal and Installation**](#)
17. Front Compartment Air Deflector - Remove - [**Front Compartment Air Deflector Replacement**](#)
18. Front Wheelhouse Liner - Remove - [**Front Wheelhouse Liner Replacement**](#)
19. Front Bumper Fascia - Remove - [**Front Bumper Fascia Replacement \(North America\)**](#) [**Front Bumper Fascia Replacement \(Europe, Korea\)**](#)
20. Radiator Air Lower Baffle - Remove - [**Radiator Air Lower Baffle and Deflector Replacement**](#)
21. Drain the drive motor generator power inverter module cooling system. [**Drive Motor Generator Power Inverter Module Cooling System Draining and Filling**](#)

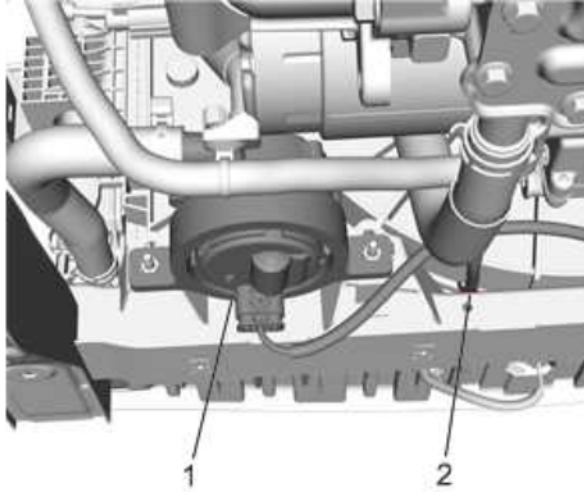


Fig. 38: Drive Motor Generator Control Module Coolant Pump

Courtesy of GENERAL MOTORS COMPANY

22. Drive Motor Generator Control Module Coolant Pump - Remove - **Drive Motor Battery Coolant Pump Replacement (RESS Pump)** **Drive Motor Battery Coolant Pump Replacement (PE Pump)**
23. Engine Wiring Harness Retainer at Drivetrain and Front Suspension Crossmember Extension - Unclip

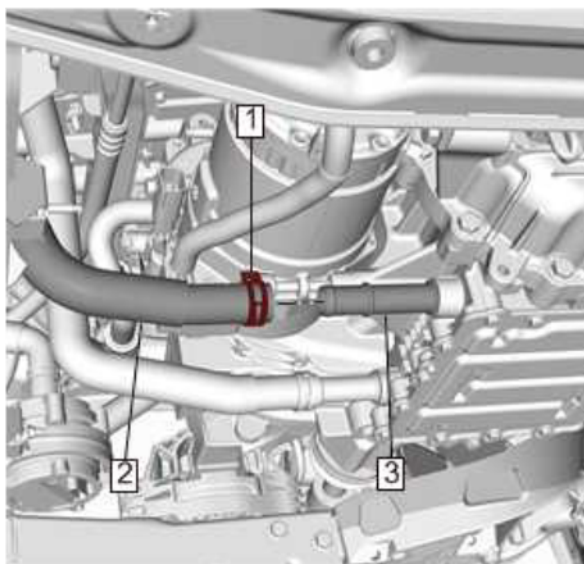


Fig. 39: Clamp at Drive Motor Stator Cooling Tube

Courtesy of GENERAL MOTORS COMPANY

24. Clamp at Drive Motor Stator Cooling Tube - Loosen
25. Generator Control Module Coolant Tank Hose at Drive Motor Stator Cooling Tube - Disconnect

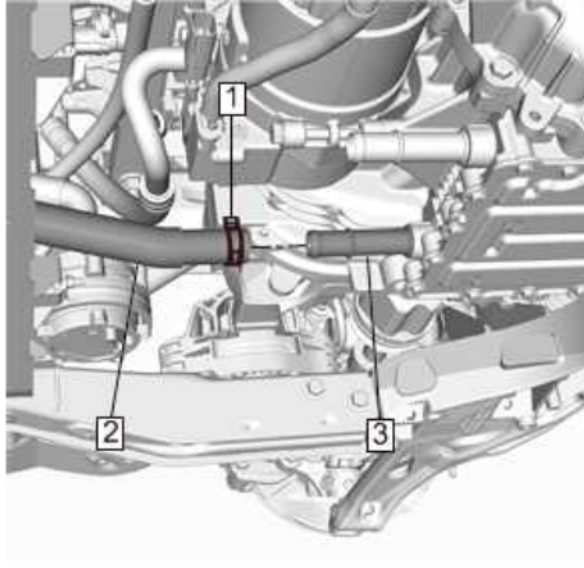


Fig. 40: Clamp at Drive Motor Stator Cooling Tube
 Courtesy of GENERAL MOTORS COMPANY

- 26. Clamp at Drive Motor Stator Cooling Tube - Loosen
- 27. Drive Motor Power Inverter Module Cooling Inlet Hose at Drive Motor Stator Cooling Tube - Disconnect

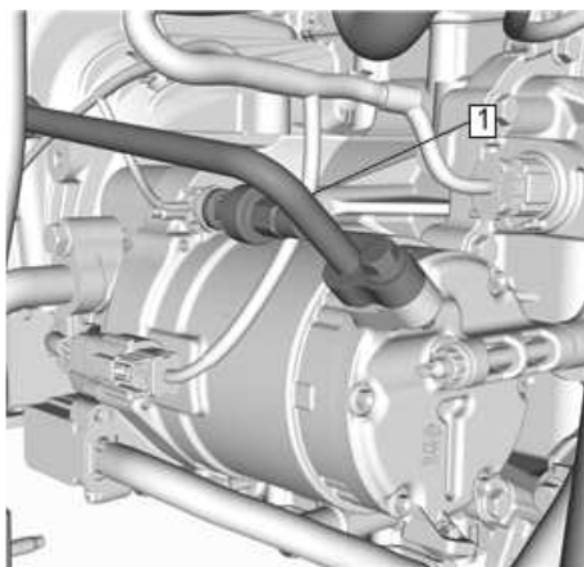


Fig. 41: Air Conditioning Condenser Hose at Air Conditioning Compressor
 Courtesy of GENERAL MOTORS COMPANY

- 28. Air Conditioning Condenser Hose at Air Conditioning Compressor - Disconnect - **Air Conditioning Condenser Hose Replacement**

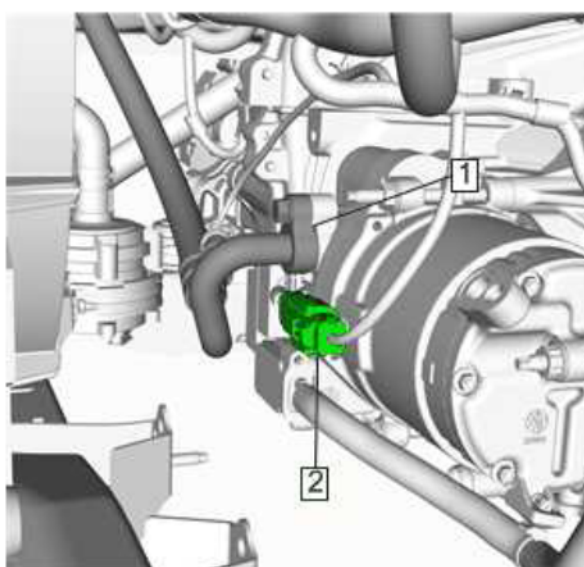


Fig. 42: Air Conditioning Compressor Hose at Air Conditioning Compressor
Courtesy of GENERAL MOTORS COMPANY

- 29. Air Conditioning Compressor Hose at Air Conditioning Compressor - Disconnect - [Air Conditioning Compressor Hose Replacement](#)
- 30. Electrical Connector at Air Conditioning Compressor - Disconnect

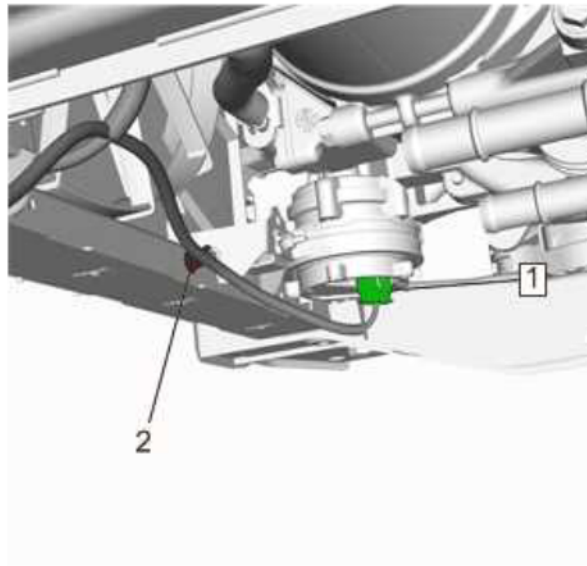


Fig. 43: Electrical Connector at Drive Motor Battery Coolant Pump
Courtesy of GENERAL MOTORS COMPANY

- 31. Electrical Connector at Drive Motor Battery Coolant Pump - Disconnect
- 32. Engine Wiring Harness Clip at Drivetrain and Front Suspension Crossmember Extension - Unclip

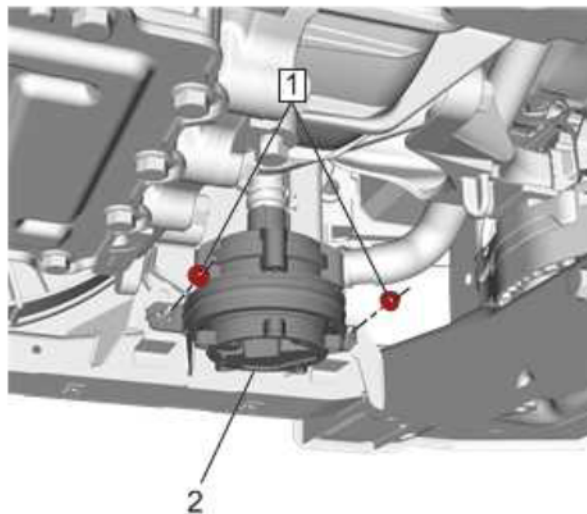


Fig. 44: Drive Motor Battery Coolant Pump Nut
Courtesy of GENERAL MOTORS COMPANY

NOTE: Do NOT disconnect the coolant hose.

- 33. Drive Motor Battery Coolant Pump Nut - Remove
- 34. Support the drive motor battery coolant pump (2) to the power electric carrier frame with a wire.
- 35. Disconnect both of the steering gear tie rod ends from the steering knuckle. [Steering Linkage Outer Tie Rod Replacement](#)
- 36. Remove both of the stabilizer shaft links. [Stabilizer Shaft Link Replacement](#)
- 37. Disconnect both of the control arm ball joints from the steering knuckles. [Lower Control Arm Replacement](#)
- 38. Remove both of the front wheel drive shaft. [Front Wheel Drive Shaft Replacement](#) cardiagn.com

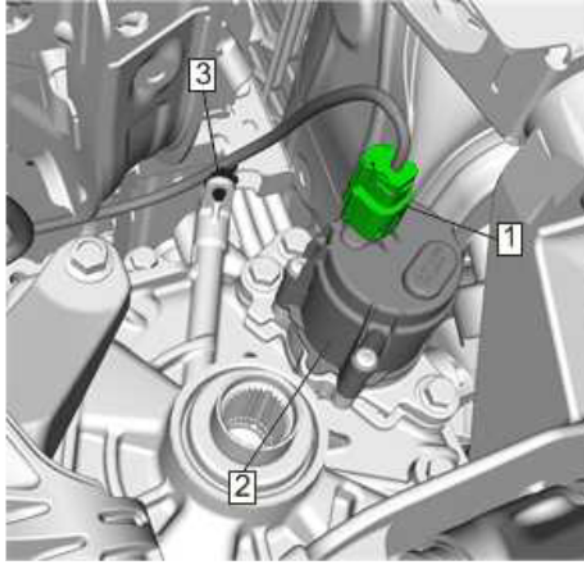


Fig. 45: Electrical Connector at Automatic Transmission Fluid Pump
Courtesy of GENERAL MOTORS COMPANY

- 39. Electrical Connector at Automatic Transmission Fluid Pump - Disconnect
- 40. Engine Wiring Harness Retainer at Drive Motor Housing Assembly - Unclip

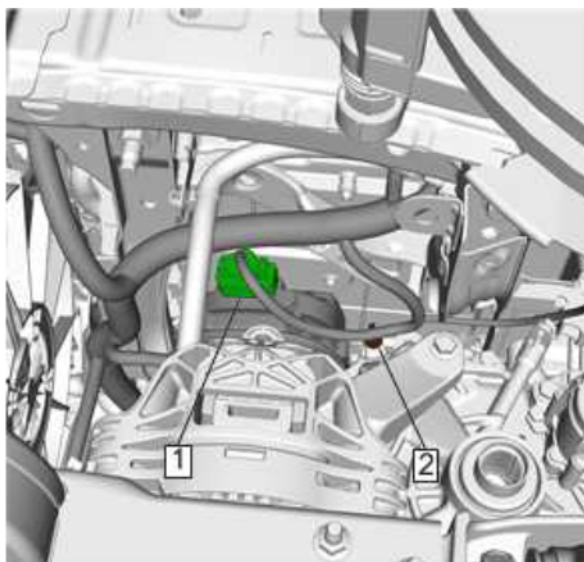


Fig. 46: Electrical Connector at Automatic Transmission Range Select Actuator Hardware Module
Courtesy of GENERAL MOTORS COMPANY

- 41. Electrical Connector at Automatic Transmission Range Select Actuator Hardware Module - Disconnect
- 42. Engine Wiring Harness Retainer at Drive Motor Housing Assembly - Unclip

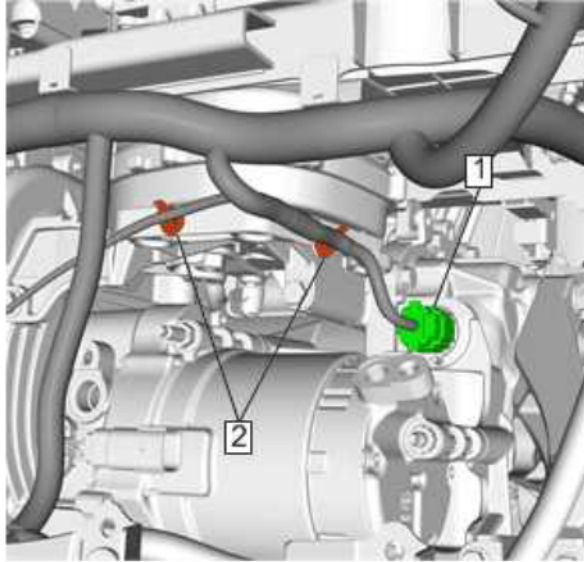


Fig. 47: Electrical Connector at Automatic Transmission
 Courtesy of GENERAL MOTORS COMPANY

- 43. Electrical Connector at Automatic Transmission - Disconnect
- 44. Engine Wiring Harness Retainer at Automatic Transmission Range Select Actuator Hardware Module - Unclip

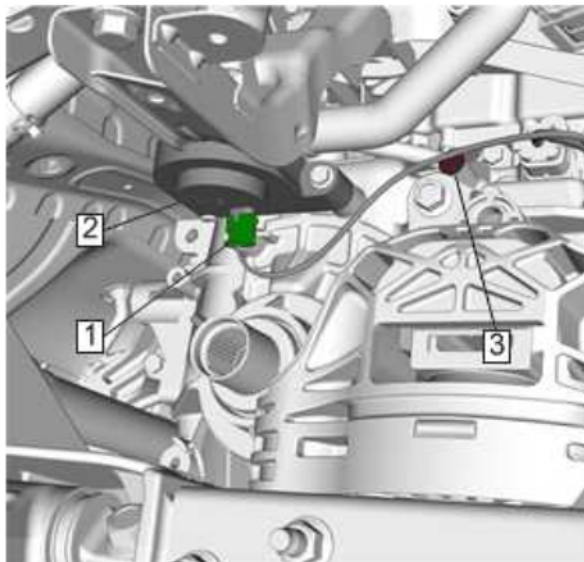
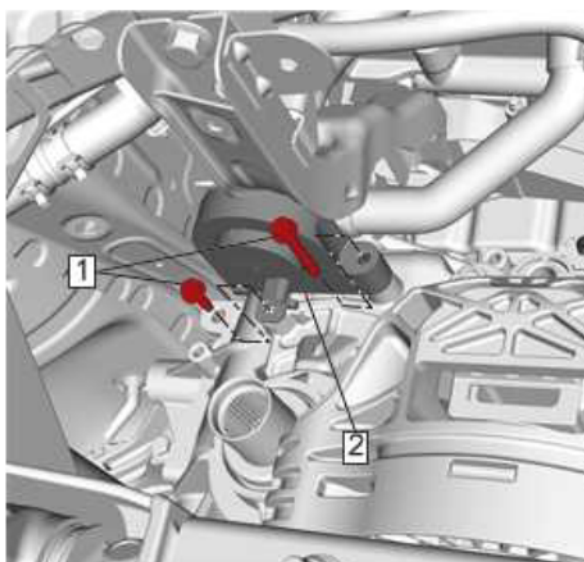


Fig. 48: Electrical Connector at Heater Coolant Pump
 Courtesy of GENERAL MOTORS COMPANY

- 45. Electrical Connector at Heater Coolant Pump - Disconnect
- 46. Engine Wiring Harness Retainer at Automatic Transmission Case - Unclip



NOTE: Do NOT disconnect the coolant hose.

- 47. Heater Coolant Pump Bolt at Automatic Transmission - Remove
- 48. Support the heater coolant pump (2) to the power electric carrier frame with a wire.

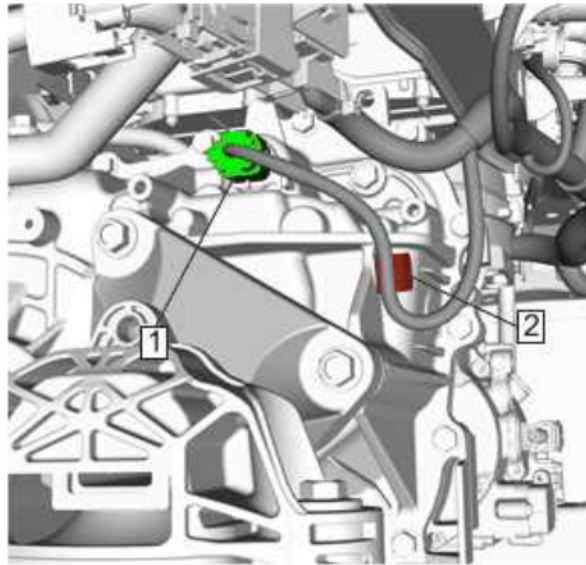


Fig. 50: Electrical Connector at Automatic Transmission Shift Shaft Position Switch
Courtesy of GENERAL MOTORS COMPANY

- 49. Electrical Connector at Automatic Transmission Shift Shaft Position Switch - Disconnect
- 50. Engine Wiring Harness Retainer at Automatic Transmission Case - Unclip

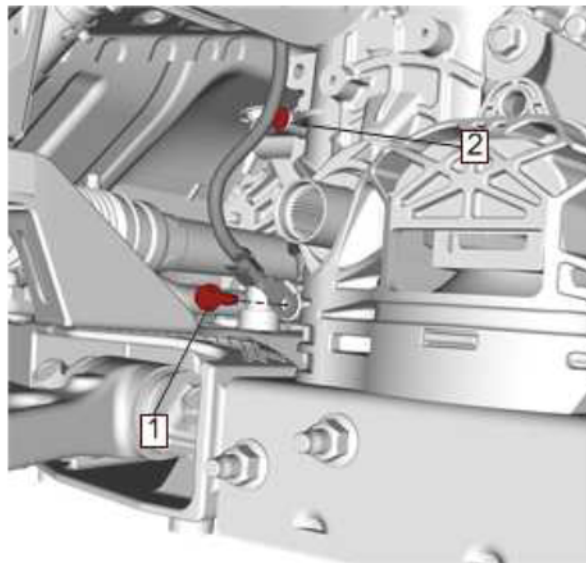


Fig. 51: Battery Negative Cable Ground Bolt at Automatic Transmission Case
Courtesy of GENERAL MOTORS COMPANY

- 51. Battery Negative Cable Ground Bolt at Automatic Transmission Case - Remove
- 52. Battery Negative Cable Retainer at Automatic Transmission Case - Unclip

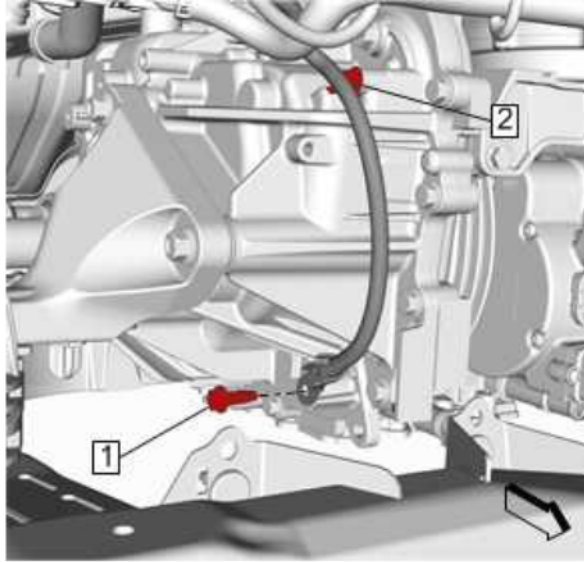


Fig. 52: Battery Negative Cable Ground Bolt at Automatic Transmission Case
 Courtesy of GENERAL MOTORS COMPANY

- 53. Battery Negative Cable Ground Bolt at Automatic Transmission Case - Remove
- 54. Battery Negative Cable Retainer at Automatic Transmission Case - Unclip

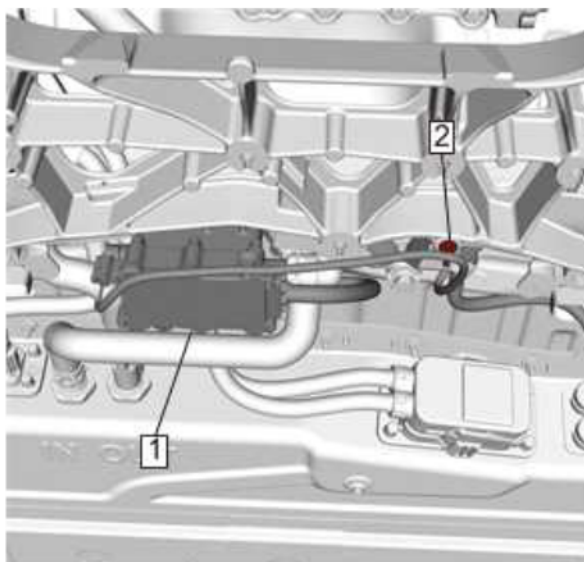


Fig. 53: High Voltage Battery Heater at Vehicle
 Courtesy of GENERAL MOTORS COMPANY

- 55. High Voltage Battery Heater at Vehicle - Remove - **High Voltage Battery Heater Replacement**
- 56. Wiring Harness Retainer at Drivetrain and Front Suspension Frame - Unclip
- 57. Secure the condenser, radiator and fan module to the upper body structure with a suitable strap.

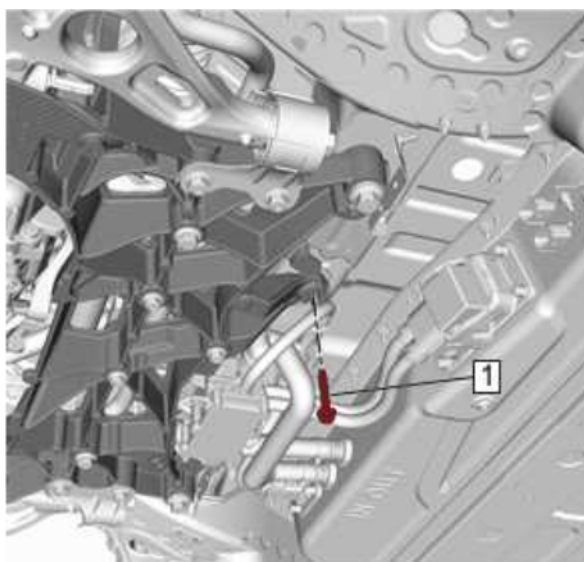


Fig. 54: Drivetrain and Front Suspension Crossmember Center Bolt
Courtesy of GENERAL MOTORS COMPANY

58. Drivetrain and Front Suspension Crossmember Center Bolt - Remove

NOTE: Blocks of wood can be used on the table to level the powertrain during the removal.

59. Position a powertrain support table under the powertrain assembly.

60. With the table positioned, fully raise the table to contact with the powertrain assembly.

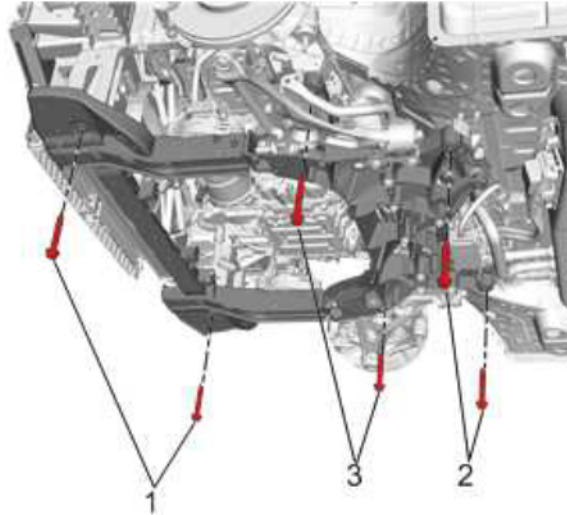


Fig. 55: Drivetrain and Front Suspension Cradle Front Bolt
Courtesy of GENERAL MOTORS COMPANY

61. Drivetrain and Front Suspension Cradle Front Bolt (1) (Qty: 2) - Remove

62. Drivetrain and Front Suspension Cradle Rear Bolt (2) (Qty: 2) - Remove

63. Drivetrain and Front Suspension Cradle Intermediate Bolt (3) (Qty: 2) - Remove

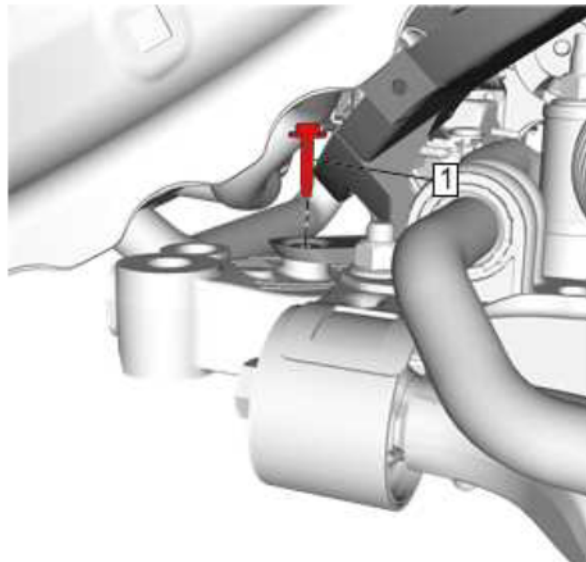


Fig. 56: Battery Positive and Negative Cable Bracket Bolt
Courtesy of GENERAL MOTORS COMPANY

NOTE: Ensure that the harnesses and hoses are clear, and do not become stuck on anything as the front suspension frame assembly is being lowered.

64. Partially lower the powertrain support table to get an access to the battery positive and negative cable bracket bolt. cardiagn.com

65. Battery Positive and Negative Cable Bracket Bolt (1) - Remove

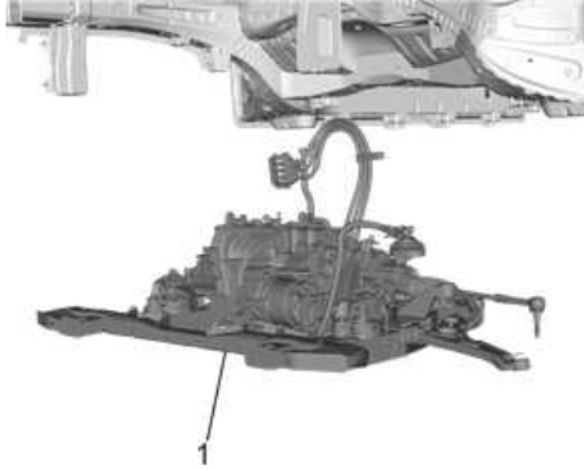


Fig. 57: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
Courtesy of GENERAL MOTORS COMPANY

66. Carefully lower the powertrain support table and raise the vehicle on the hoist to separate the automatic transmission and drivetrain and front suspension frame assembly (1) from the vehicle.
67. Remove the automatic transmission as necessary. [Transmission Replacement](#)

Installation Procedure

1. Install the automatic transmission as necessary. [Transmission Replacement](#)

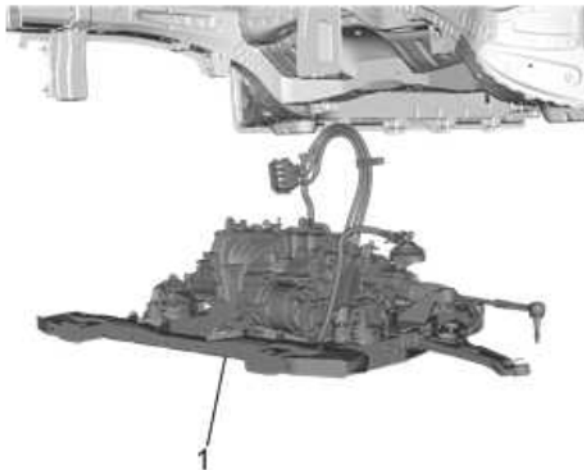


Fig. 58: Automatic Transmission and Drivetrain and Front Suspension Frame Assembly
Courtesy of GENERAL MOTORS COMPANY

2. Carefully raise the powertrain support table and lower the vehicle on the hoist to install the automatic transmission and drivetrain and front suspension frame assembly (1) to the vehicle.

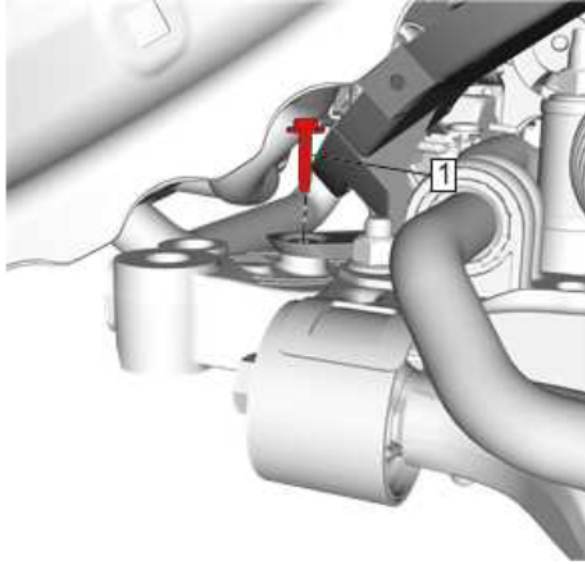


Fig. 59: Battery Positive and Negative Cable Bracket Bolt
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Fastener Caution

3. Battery Positive and Negative Cable Bracket Bolt (1) - Install and tighten to 9 N.m (80 lb in)

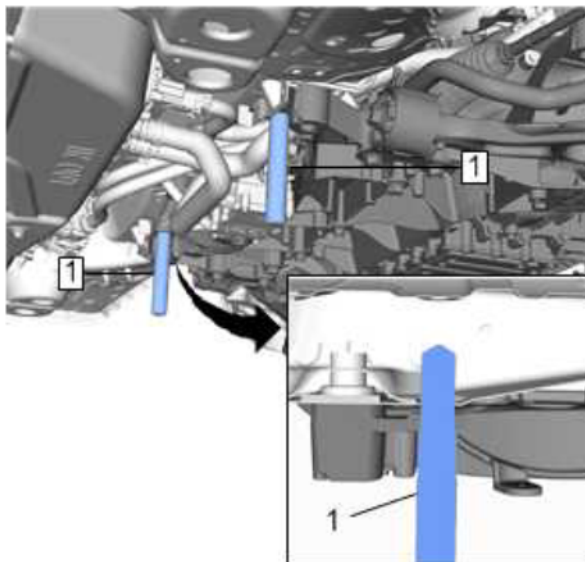


Fig. 60: Special Tool Cradle Alignment Guide Pins
 Courtesy of GENERAL MOTORS COMPANY

4. Using the CH-51034 Cradle Alignment Guide Pins (1), have an assistant vertically insert and hold the pins through the front suspension cradle and floor panel.

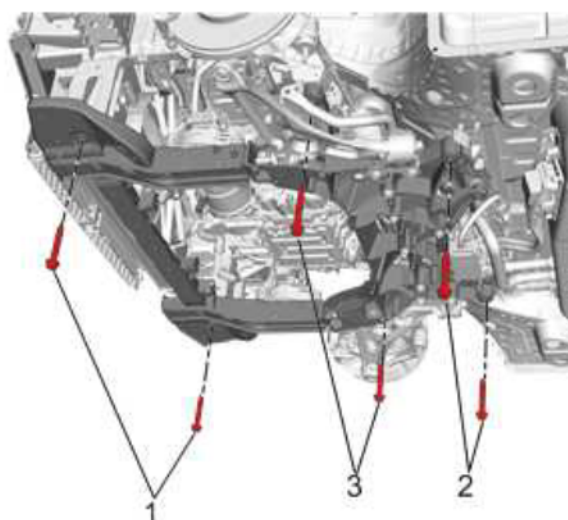


Fig. 61: Drivetrain and Front Suspension Cradle Front Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Drivetrain and Front Suspension Cradle Intermediate Bolt (3) (Qty: 2) - Install and tighten
 1. First Pass: 160 N.m (118 lb ft)
 2. Final Pass: 60 - 75 Degrees
6. Drivetrain and Front Suspension Cradle Rear Bolt (2) (Qty: 2) - Install and tighten
 1. First Pass: 160 N.m (118 lb ft)
 2. Final Pass: 60 - 75 Degrees
7. Drivetrain and Front Suspension Cradle Front Bolt (1) (Qty: 2) - Install and tighten
 1. First Pass: 160 N.m (118 lb ft)
 2. Final Pass: 60 - 75 Degrees
8. Remove the powertrain support table.

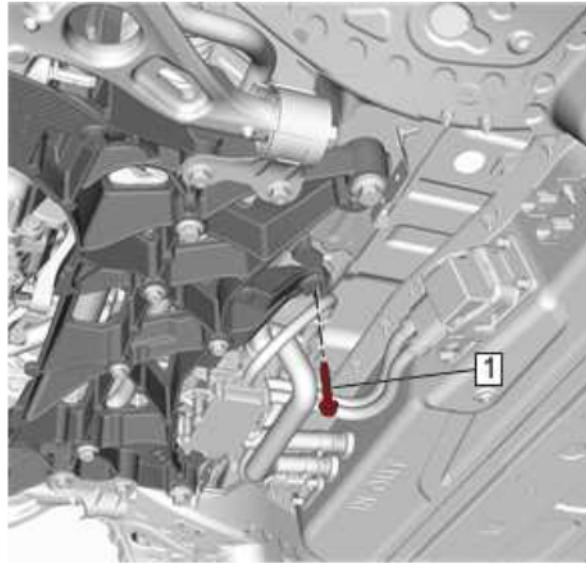


Fig. 62: Drivetrain and Front Suspension Crossmember Center Bolt
Courtesy of GENERAL MOTORS COMPANY

9. Drivetrain and Front Suspension Crossmember Center Bolt (1) - Install and tighten to 58 N.m (43 lb ft)
10. Remove the strap which secures the condenser, radiator and fan module from the upper body structure.

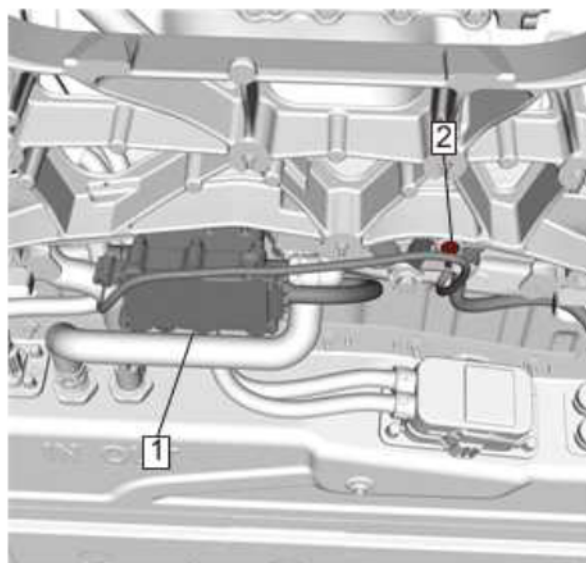


Fig. 63: High Voltage Battery Heater at Vehicle
Courtesy of GENERAL MOTORS COMPANY

11. Wiring Harness Retainer (2) at Drivetrain and Front Suspension Frame - Install

12. High Voltage Battery Heater (1) at Vehicle - Install - [High Voltage Battery Heater Replacement](#)
13. Retainer (1) at Front Compartment Side Rail - Install

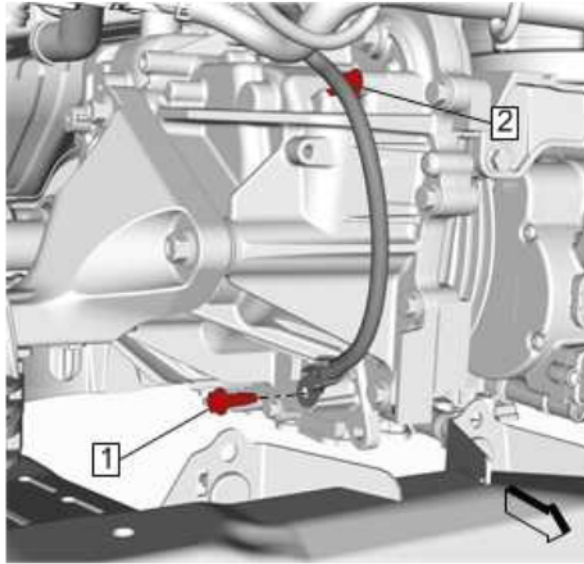


Fig. 64: Battery Negative Cable Ground Bolt at Automatic Transmission Case
Courtesy of GENERAL MOTORS COMPANY

14. Battery Negative Cable Retainer (2) at Automatic Transmission Case - Install
15. Battery Negative Cable Ground Bolt (1) at Automatic Transmission Case - Install and tighten to 22 N.m (16 lb ft)

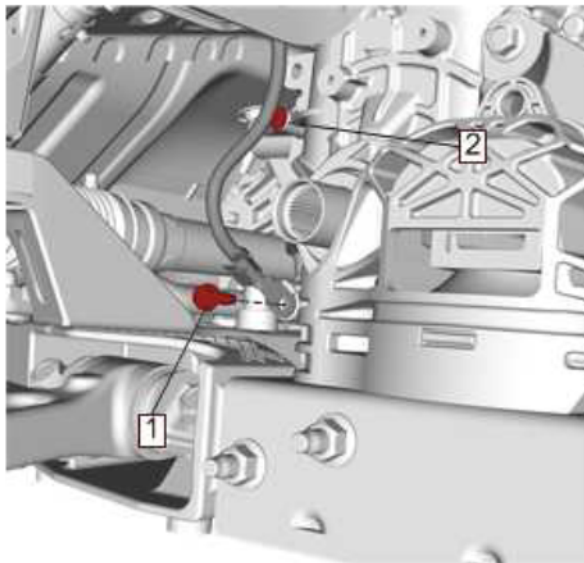


Fig. 65: Battery Negative Cable Ground Bolt at Automatic Transmission Case
Courtesy of GENERAL MOTORS COMPANY

16. Battery Negative Cable Retainer (2) at Automatic Transmission Case - Install
17. Battery Negative Cable Ground Bolt (1) at Automatic Transmission Case - Install and tighten to 22 N.m (16 lb ft)

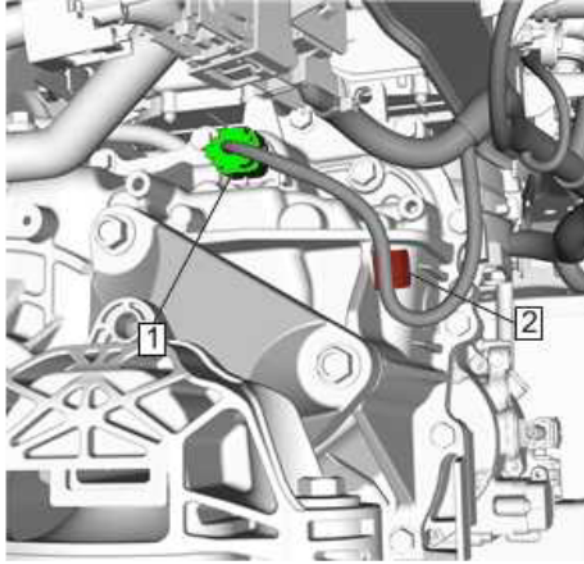


Fig. 66: Electrical Connector at Automatic Transmission Shift Shaft Position Switch
 Courtesy of GENERAL MOTORS COMPANY

- 18. Engine Wiring Harness Retainer (2) at Automatic Transmission Case - Install
- 19. Electrical Connector (1) at Automatic Transmission Shift Shaft Position Switch - Connect

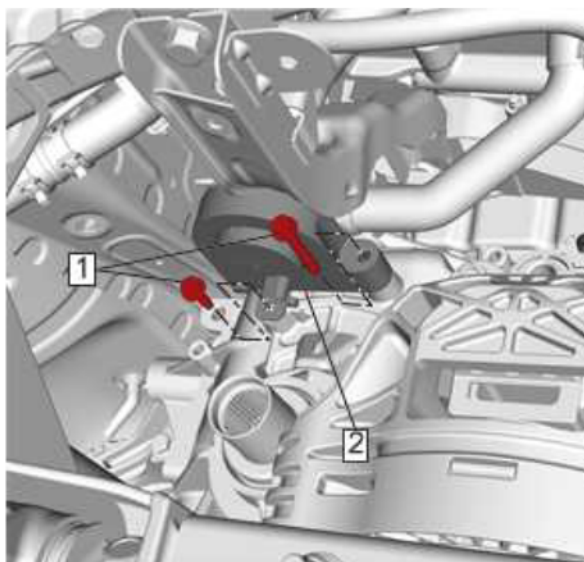


Fig. 67: Heater Coolant Pump Bolt at Automatic Transmission
 Courtesy of GENERAL MOTORS COMPANY

- 20. Remove the support wire supporting the heater coolant pump (2) to the power electric carrier frame.
- 21. Heater Coolant Pump Bolt (1) (Qty: 2) at Automatic Transmission - Install - **Heater Coolant Pump Replacement**

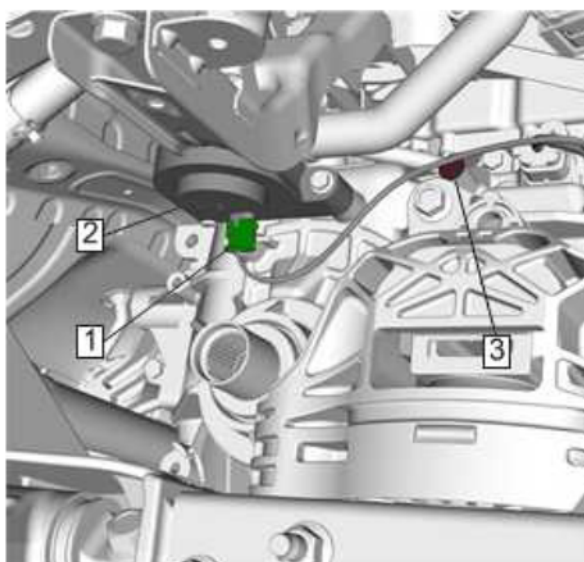


Fig. 68: Electrical Connector at Heater Coolant Pump
Courtesy of GENERAL MOTORS COMPANY

- 22. Engine Wiring Harness Retainer (3) at Automatic Transmission Case - Install
- 23. Electrical Connector (1) at Heater Coolant Pump (2) - Connect

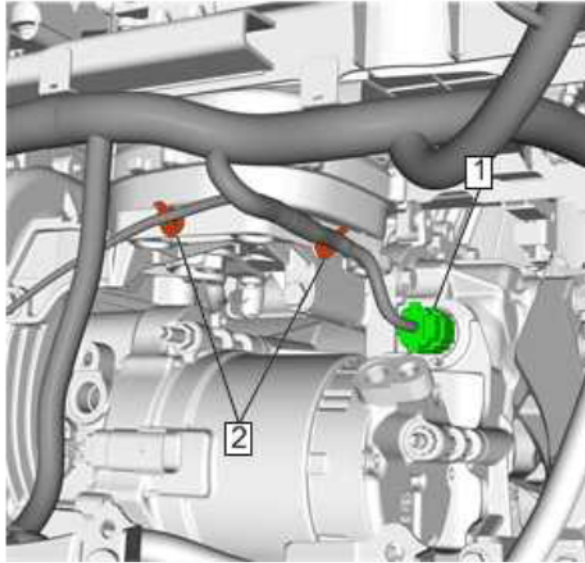


Fig. 69: Electrical Connector at Automatic Transmission
Courtesy of GENERAL MOTORS COMPANY

- 24. Engine Wiring Harness Retainer (2) (Qty: 2) at Automatic Transmission Range Select Actuator Hardware Module - Install
- 25. Electrical Connector (1) at Automatic Transmission - Connect

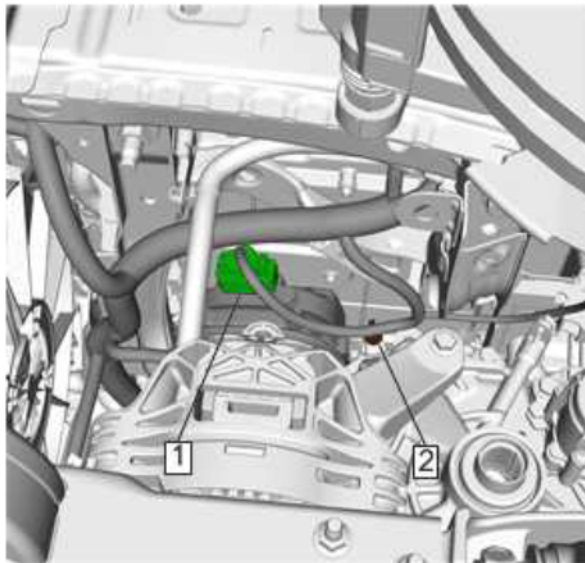


Fig. 70: Electrical Connector at Automatic Transmission Range Select Actuator Hardware Module
Courtesy of GENERAL MOTORS COMPANY

- 26. Engine Wiring Harness Retainer (2) at Drive Motor Housing Assembly - Install
- 27. Electrical Connector (1) at Automatic Transmission Range Select Actuator Hardware Module - Connect

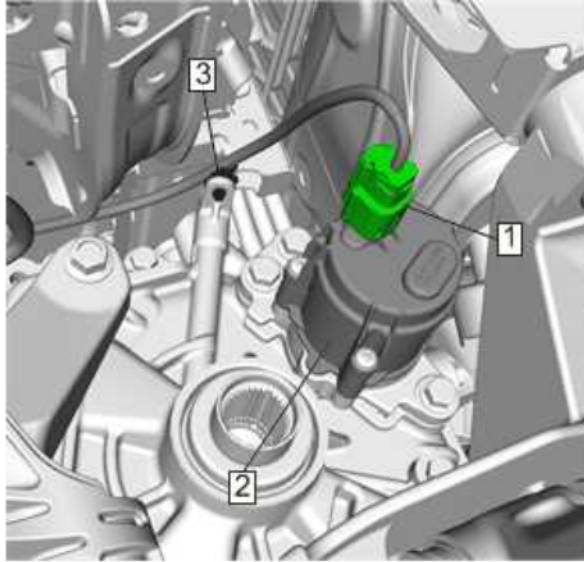


Fig. 71: Electrical Connector at Automatic Transmission Fluid Pump
 Courtesy of GENERAL MOTORS COMPANY

28. Engine Wiring Harness Retainer (3) at Drive Motor Housing Assembly - Install
29. Electrical Connector (1) at Automatic Transmission Fluid Pump (2) - Connect
30. Install both of the front wheel drive shaft. [**Front Wheel Drive Shaft Replacement**](#)
31. Connect both of the control arm ball joints to the steering knuckles. [**Lower Control Arm Replacement**](#)
32. Install both of the stabilizer shaft links. [**Stabilizer Shaft Link Replacement**](#)
33. Connect both of the steering gear tie rod ends to the steering knuckle. [**Steering Linkage Outer Tie Rod Replacement**](#)

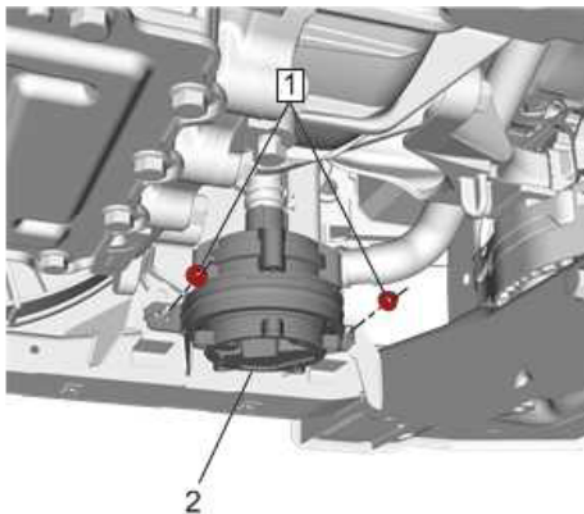


Fig. 72: Drive Motor Battery Coolant Pump Nut
 Courtesy of GENERAL MOTORS COMPANY

34. Remove the support wire supporting the drive motor battery coolant pump (2) to the power electric carrier frame.
35. Drive Motor Battery Coolant Pump Nut (1) (Qty: 2) - Install - [**Drive Motor Battery Coolant Pump Replacement \(RESS Pump\)**](#) [**Drive Motor Battery Coolant Pump Replacement \(PE Pump\)**](#)

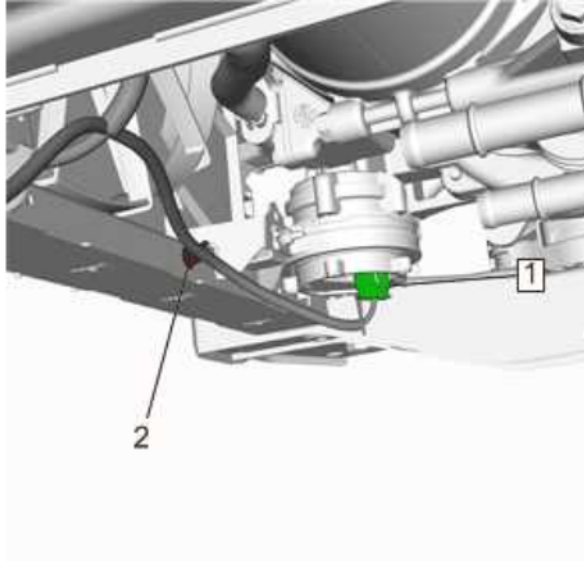


Fig. 73: Electrical Connector at Drive Motor Battery Coolant Pump
 Courtesy of GENERAL MOTORS COMPANY

- 36. Engine Wiring Harness Retainer (2) at Drivetrain and Front Suspension Crossmember Extension - Install
- 37. Electrical Connector (1) at Drive Motor Battery Coolant Pump - Connect

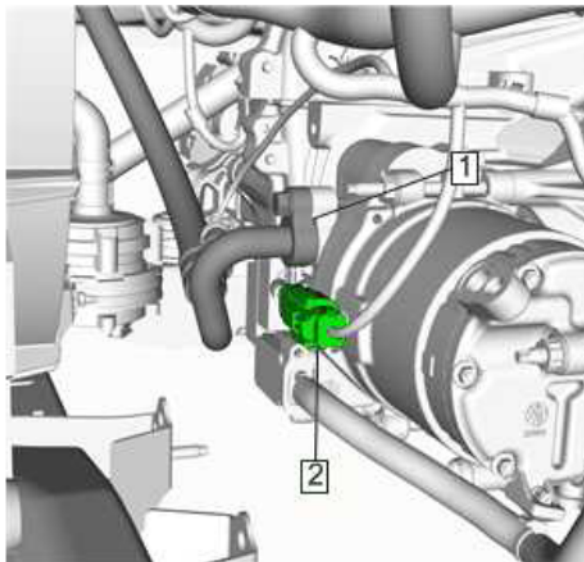


Fig. 74: Air Conditioning Compressor Hose at Air Conditioning Compressor
 Courtesy of GENERAL MOTORS COMPANY

- 38. Electrical Connector (2) at Air Conditioning Compressor - Connect
- 39. Air Conditioning Compressor Hose (1) at Air Conditioning Compressor - Connect - [Air Conditioning Compressor Hose Replacement](#)

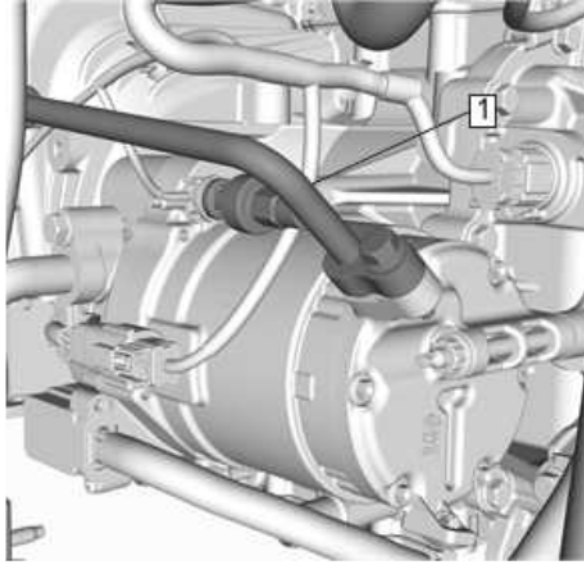


Fig. 75: Air Conditioning Condenser Hose at Air Conditioning Compressor
 Courtesy of GENERAL MOTORS COMPANY

40. Air Conditioning Condenser Hose (1) at Air Conditioning Compressor - Connect - **Air Conditioning Condenser Hose Replacement**

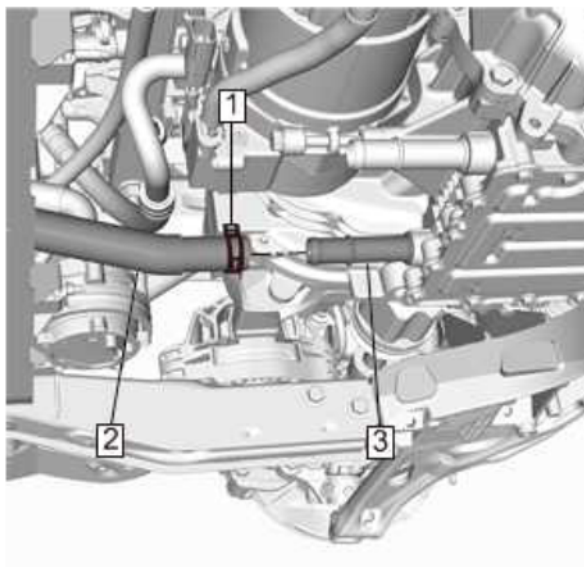


Fig. 76: Clamp at Drive Motor Stator Cooling Tube
 Courtesy of GENERAL MOTORS COMPANY

41. Drive Motor Power Inverter Module Cooling Inlet Hose (2) at Drive Motor Stator Cooling Tube (3) - Connect
42. Clamp (1) at Drive Motor Stator Cooling Tube (3) - Install

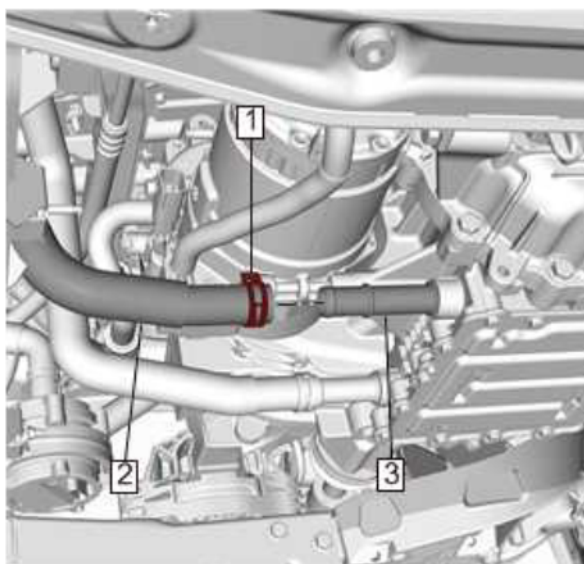


Fig. 77: Clamp at Drive Motor Stator Cooling Tube
Courtesy of GENERAL MOTORS COMPANY

- 43. Generator Control Module Coolant Tank Hose (2) at Drive Motor Stator Cooling Tube (3) - Connect
- 44. Clamp (1) at Drive Motor Stator Cooling Tube (3) - Install

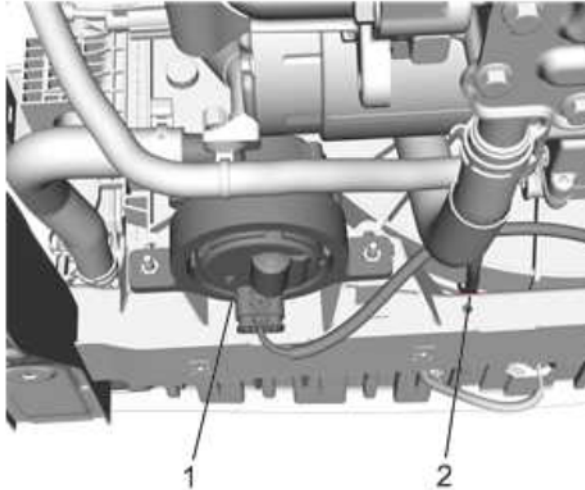


Fig. 78: Drive Motor Generator Control Module Coolant Pump
Courtesy of GENERAL MOTORS COMPANY

- 45. Engine Wiring Harness Retainer (2) at Drivetrain and Front Suspension Crossmember Extension - Install
- 46. Drive Motor Generator Control Module Coolant Pump (1) - Install - [**Drive Motor Battery Coolant Pump Replacement \(RESS Pump\)**](#) [**Drive Motor Battery Coolant Pump Replacement \(PE Pump\)**](#)
- 47. Radiator Air Lower Baffle - Install - [**Radiator Air Lower Baffle and Deflector Replacement**](#)
- 48. Front Bumper Fascia - Install - [**Front Bumper Fascia Replacement \(North America\)**](#) [**Front Bumper Fascia Replacement \(Europe, Korea\)**](#)
- 49. Front Wheelhouse Liner - Install - [**Front Wheelhouse Liner Replacement**](#)
- 50. Front Compartment Air Deflector - Install - [**Front Compartment Air Deflector Replacement**](#)
- 51. Install the front tire and wheel assemblies. [**Tire and Wheel Removal and Installation**](#)

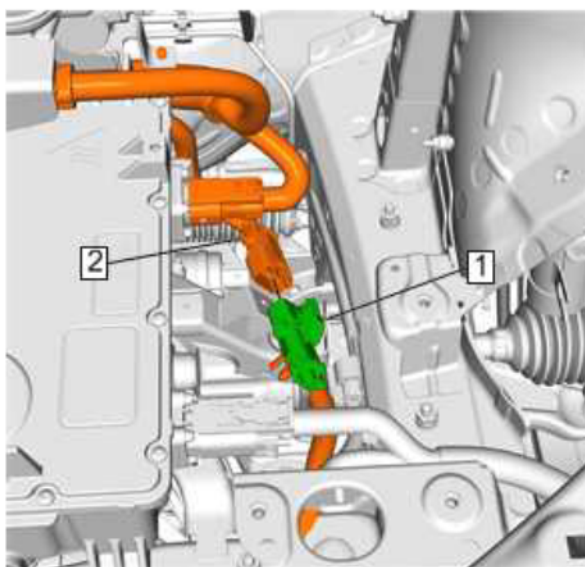


Fig. 79: Air Conditioning Compressor High Voltage Cable Connector
Courtesy of GENERAL MOTORS COMPANY

- 52. Air Conditioning Compressor High Voltage Cable Connector (1) at High Voltage Battery Cable - Connect

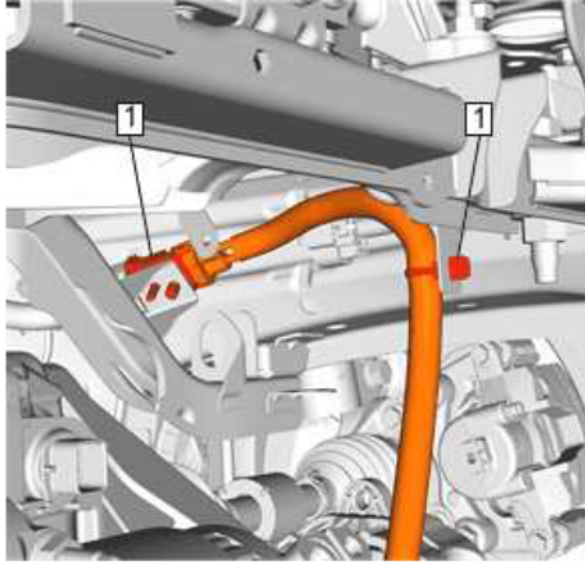


Fig. 80: Air Conditioning Compressor High Voltage Cable Retainer
Courtesy of GENERAL MOTORS COMPANY

- 53. Air Conditioning Compressor High Voltage Cable Retainer (1) (Qty: 2) at Power Electric Carrier Frame - Install
- 54. Battery Tray - Install - **Battery Tray Replacement**

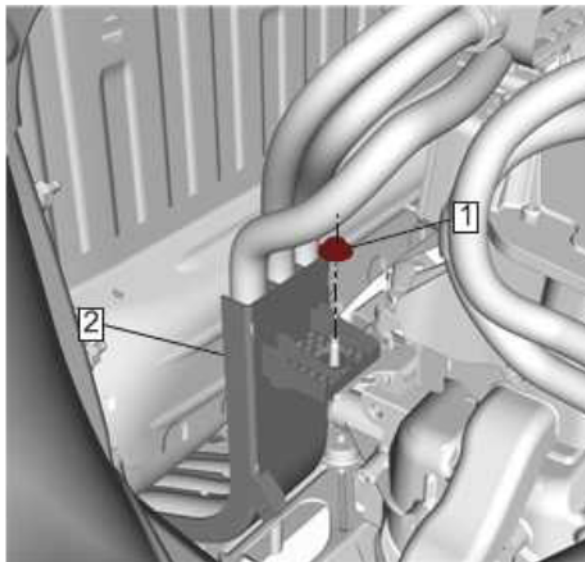


Fig. 81: Battery Positive and Negative Cable Bracket Nut
Courtesy of GENERAL MOTORS COMPANY

- 55. Battery Cable Protector (2) at Power Electric Carrier Frame Stud Bolt - Install
- 56. Battery Positive and Negative Cable Bracket Nut (1) - Install and tighten to 9 N.m (80 lb in)

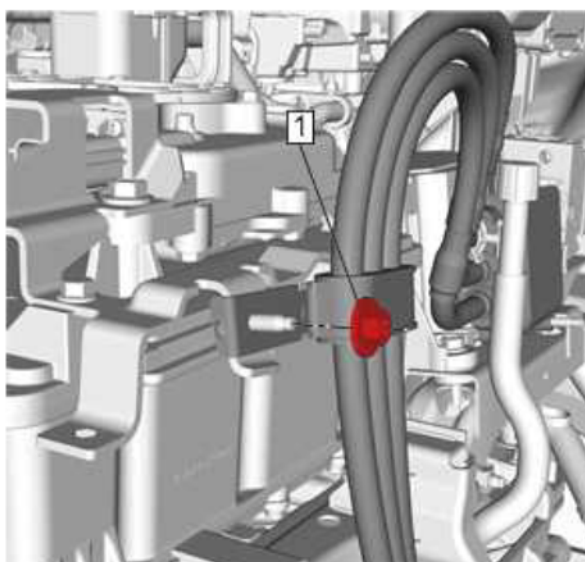


Fig. 82: Drive Motor Power Inverter Module Cable Bracket Nut
Courtesy of GENERAL MOTORS COMPANY

57. Drive Motor Power Inverter Module Cable Bracket Nut (1) at Accessory DC Power Control Module High Voltage Connector Protector - Install and tighten - **Drive Motor Power Inverter Module 3 Phase Cable Replacement**

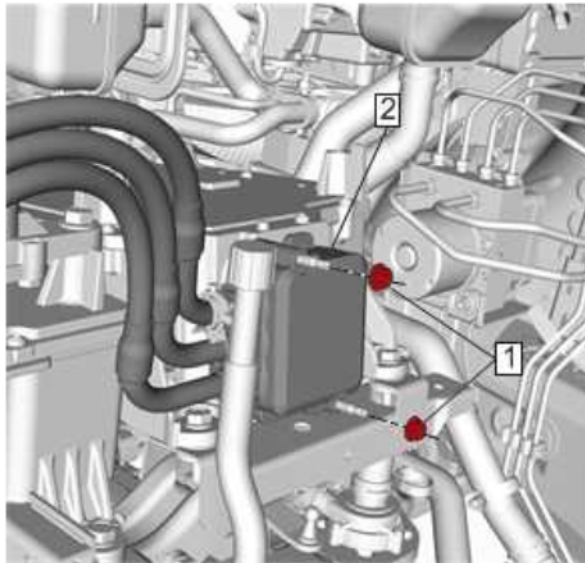


Fig. 83: Drive Motor Power Inverter Module 3 Phase Cable Cover Nut
Courtesy of GENERAL MOTORS COMPANY

58. Drive Motor Power Inverter Module 3 Phase Cable (2) at Drive Motor Power Inverter Module - Connect
59. Drive Motor Power Inverter Module 3 Phase Cable Cover Nut (1) (Qty: 2) - Install and tighten - **Drive Motor Power Inverter Module 3 Phase Cable Replacement**

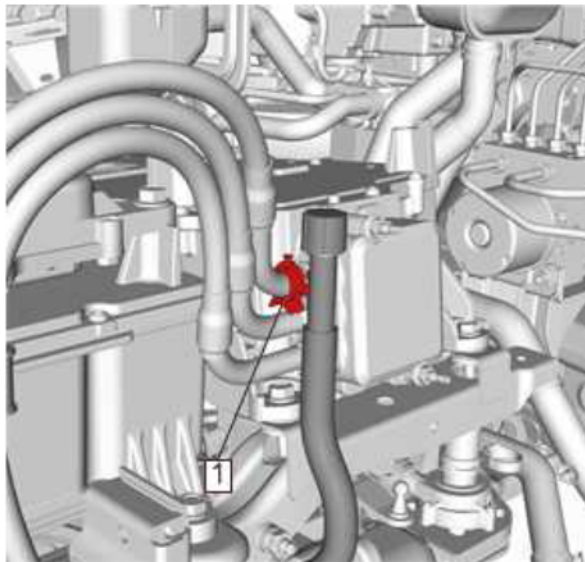


Fig. 84: Transmission Vent Pipe Clip at Drive Motor Power Inverter Module 3 Phase Cable
Courtesy of GENERAL MOTORS COMPANY

60. Transmission Vent Pipe Clip (1) at Drive Motor Power Inverter Module 3 Phase Cable - Install

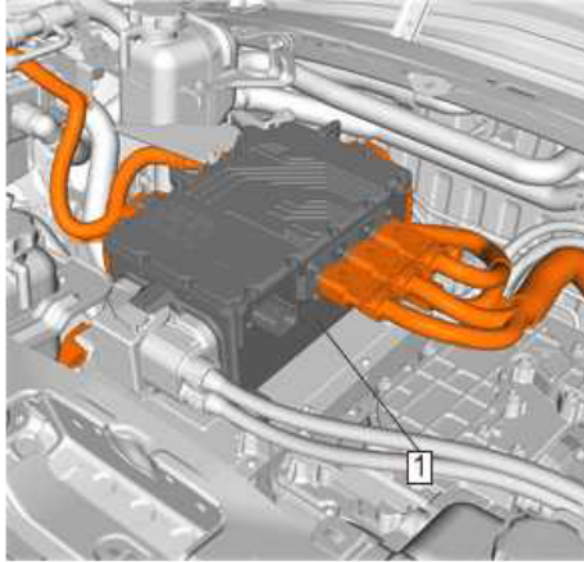


Fig. 85: Generator Battery Control Wiring Junction Block
 Courtesy of GENERAL MOTORS COMPANY

61. Generator Battery Control Wiring Junction Block (1) - Install - [High Voltage Battery Control Wiring Junction Block Replacement \(With quick charge\)](#) [High Voltage Battery Control Wiring Junction Block Replacement \(Without quick charge\)](#)
62. Dash Panel Upper Extension Panel Extension - Install - [Dash Panel Upper Extension Panel Extension Replacement](#)

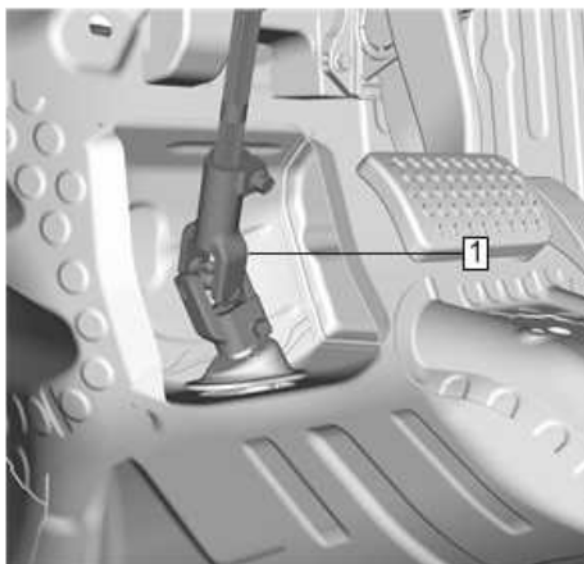


Fig. 86: Intermediate Steering Shaft
 Courtesy of GENERAL MOTORS COMPANY

63. Connect the intermediate steering shaft (1) to the steering gear. [Intermediate Steering Shaft Replacement](#)
64. Fill the drive motor generator power inverter module cooling system. [Drive Motor Generator Power Inverter Module Cooling System Draining and Filling](#)
65. Recharge the refrigerant. [Refrigerant Recovery and Recharging](#)
66. Enable the high voltage system. [High Voltage Enabling](#)
67. Center the steering angle sensor. [Steering Wheel Angle Sensor Centering](#)
68. Measure the wheel alignment. [Wheel Alignment Measurement](#)

FRONT WHEELHOUSE LINER REPLACEMENT

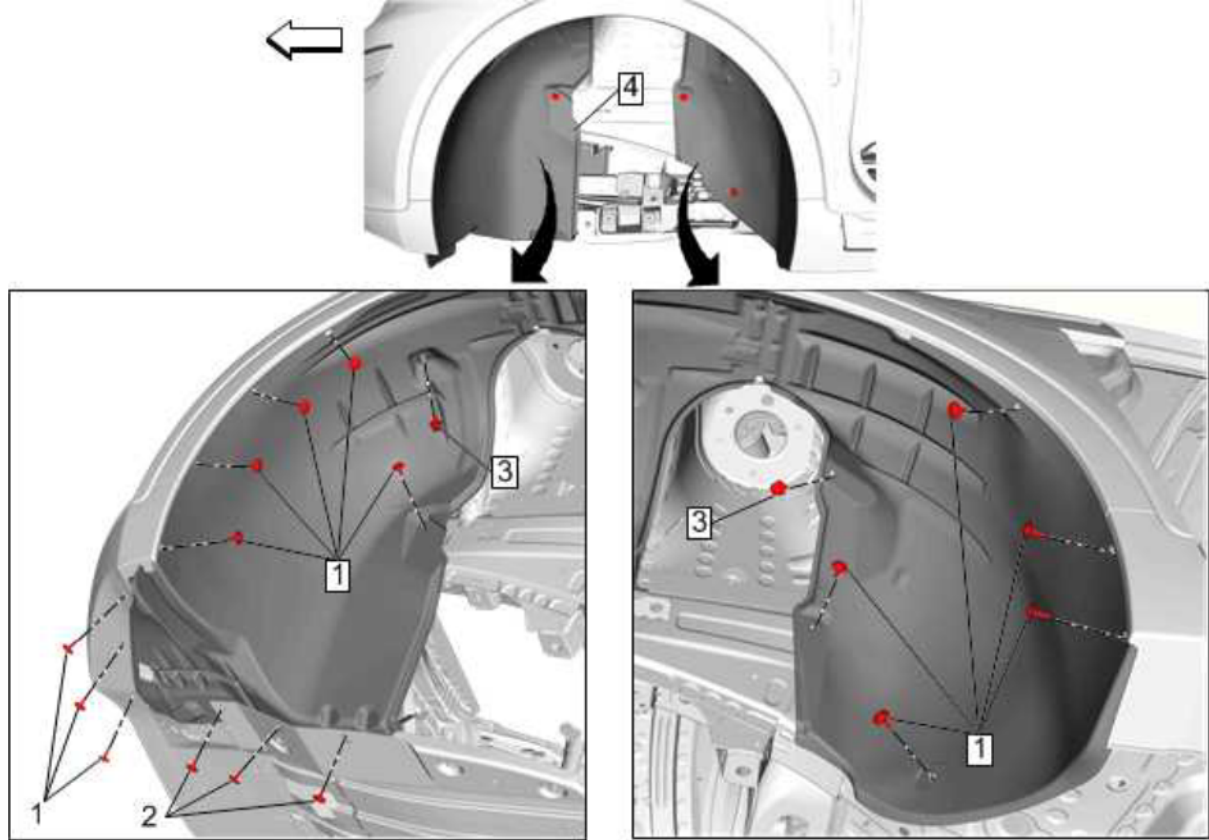


Fig. 87: Front Wheelhouse Liner

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Tire and Wheel Removal and Installation</u>	
1	Front Wheelhouse Liner Screw (Qty: 13) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Front Bumper Fascia Wheel Opening Screw (Qty: 3) Tighten 2.5 N.m (22 lb in)
3	Front Wheelhouse Liner Retainer (Qty: 2)
4	Front Wheelhouse Liner

REAR WHEELHOUSE LINER REPLACEMENT

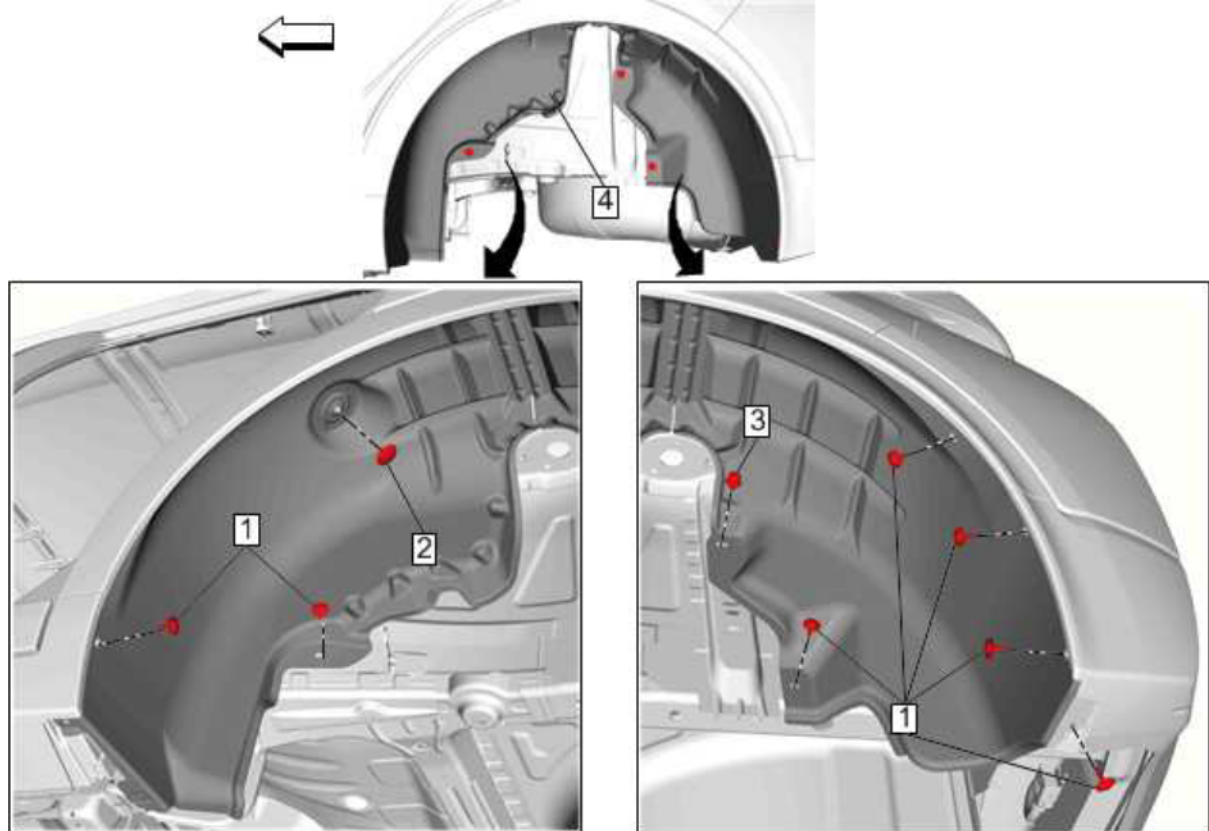


Fig. 88: Rear Wheelhouse Liner

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures <u>Tire and Wheel Removal and Installation</u> <u>Rear Tire Front Air Deflector Replacement</u>	
1	Rear Wheelhouse Liner Screw (Qty: 7) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Rear Wheelhouse Liner Retainer
3	Rear Wheelhouse Liner Push-Pin
4	Rear Wheelhouse Liner

FRONT TIRE FRONT AIR DEFLECTOR REPLACEMENT

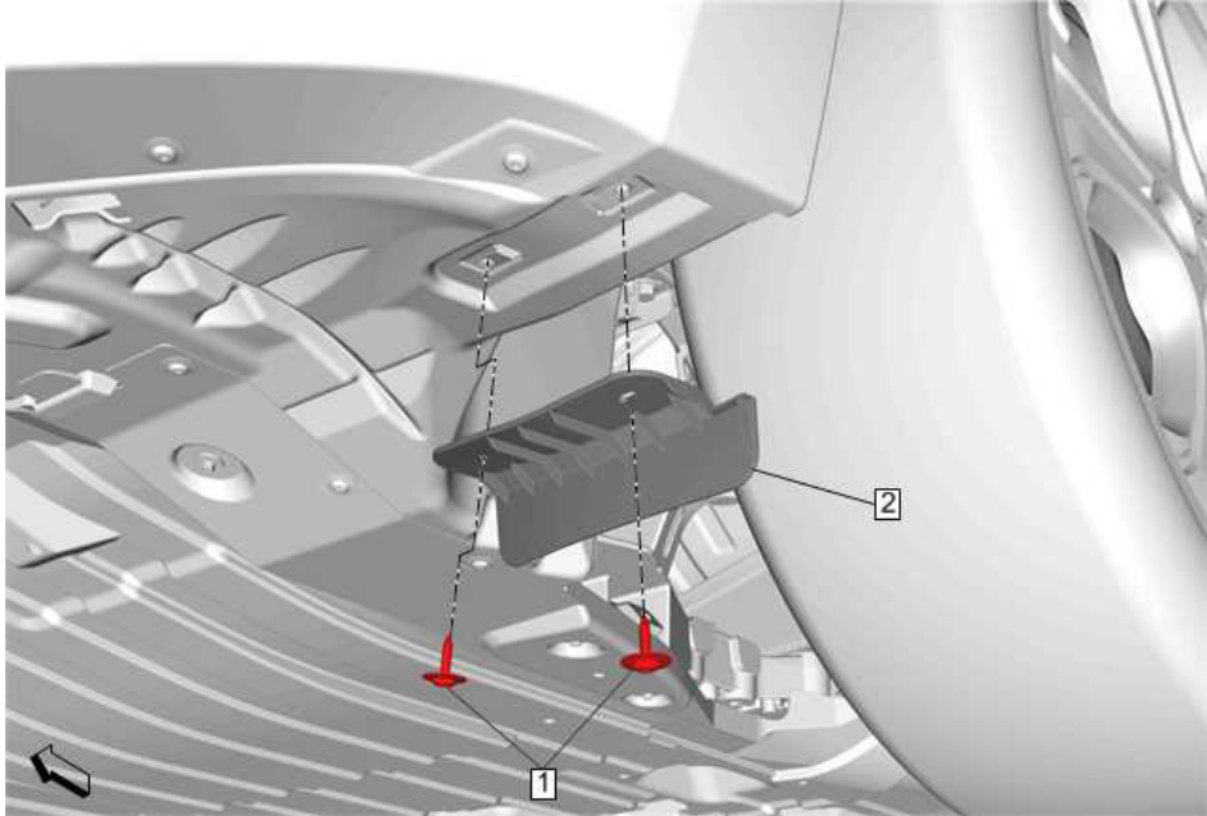


Fig. 89: Front Tire Front Air Deflector

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Front Tire Front Air Deflector Fastener (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Front Tire Front Air Deflector

REAR TIRE FRONT AIR DEFLECTOR REPLACEMENT

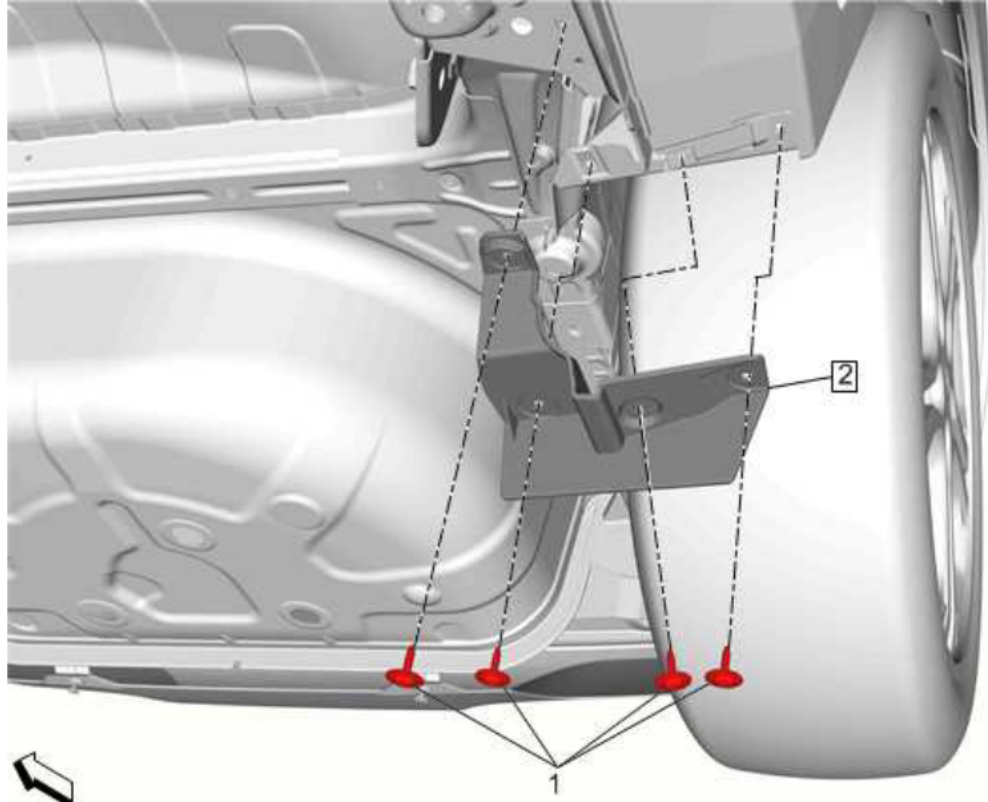


Fig. 90: Rear Tire Front Air Deflector

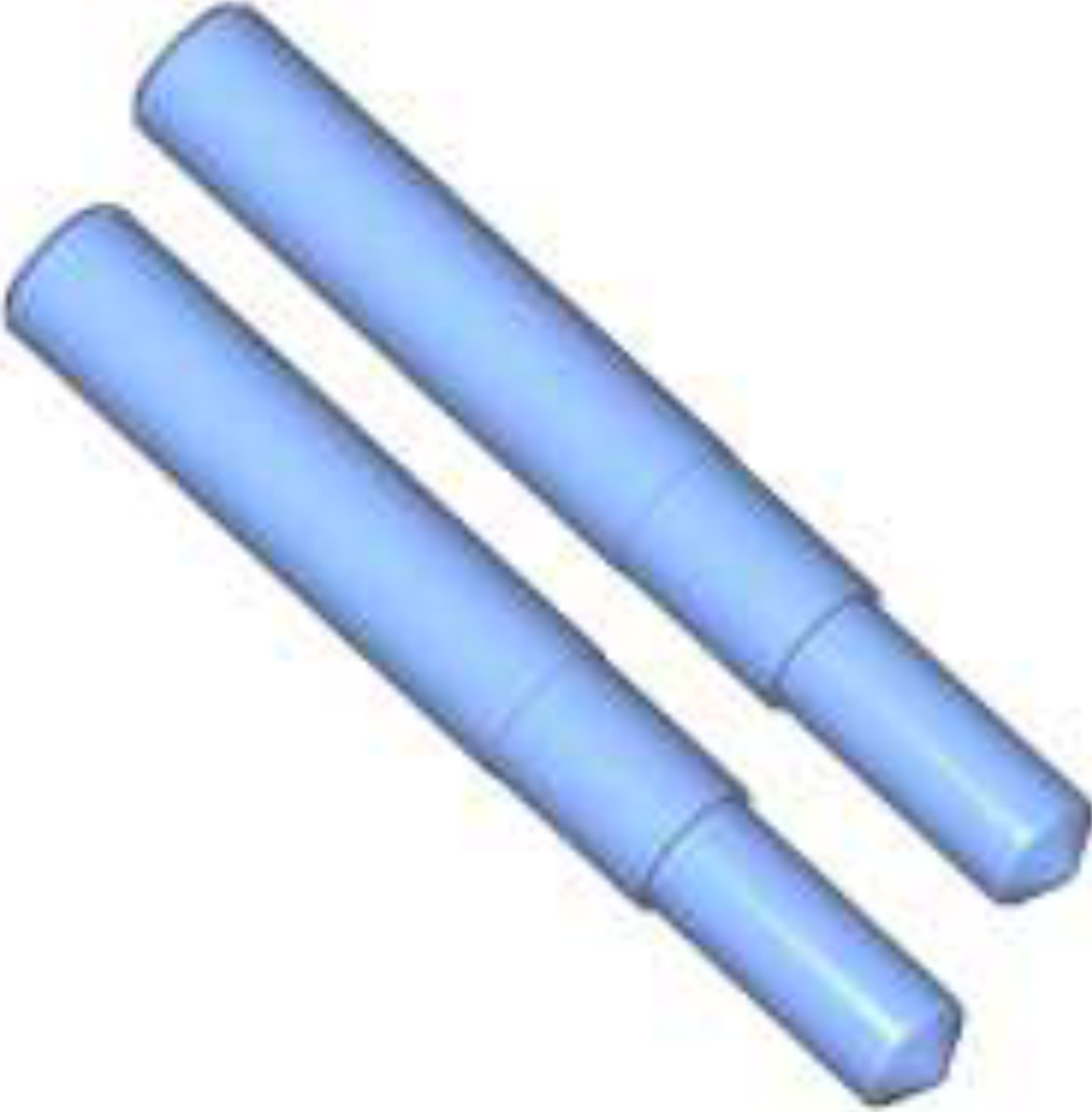
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
Raise and support the vehicle. Lifting and Jacking the Vehicle	
1	Rear Tire Front Air Deflector Fastener (Qty: 4) CAUTION: Refer to Fastener Caution . Tighten 2.5 N.m (22 lb in)
2	Rear Tire Front Air Deflector Procedure Lower the vehicle. Lifting and Jacking the Vehicle

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number / Description

Illustration	Tool Number / Description
 The illustration shows two identical blue, cylindrical cradle alignment guide pins. Each pin has a series of three raised rings or segments along its length. They are positioned diagonally, with one pin slightly above and to the right of the other, against a plain white background.	CH-51034 Cradle Alignment Guide Pins