

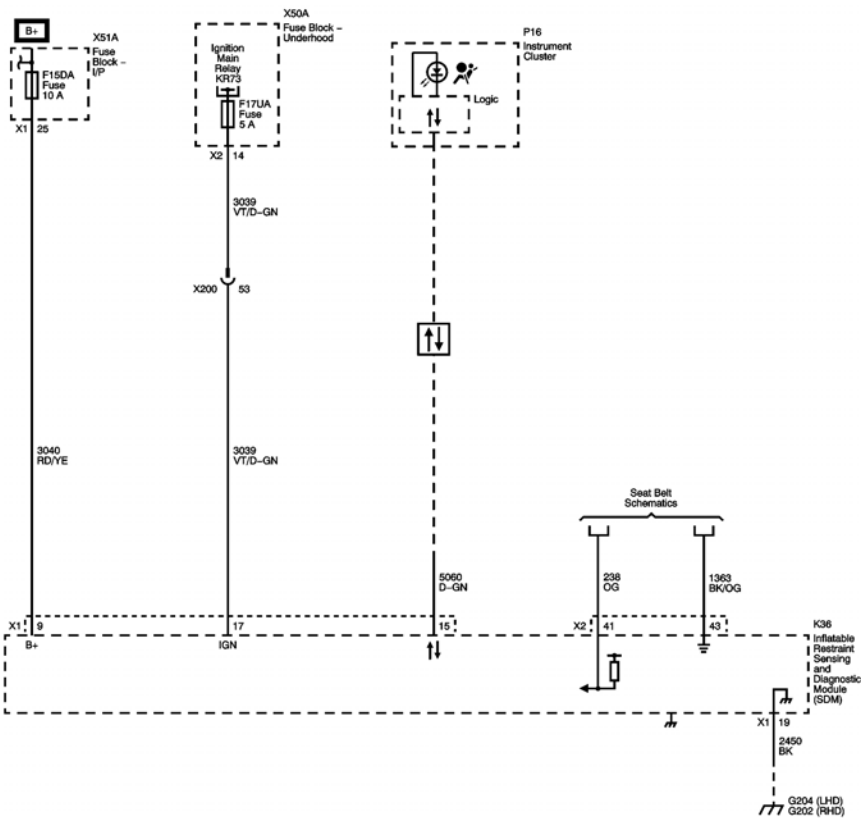
Select a Document:

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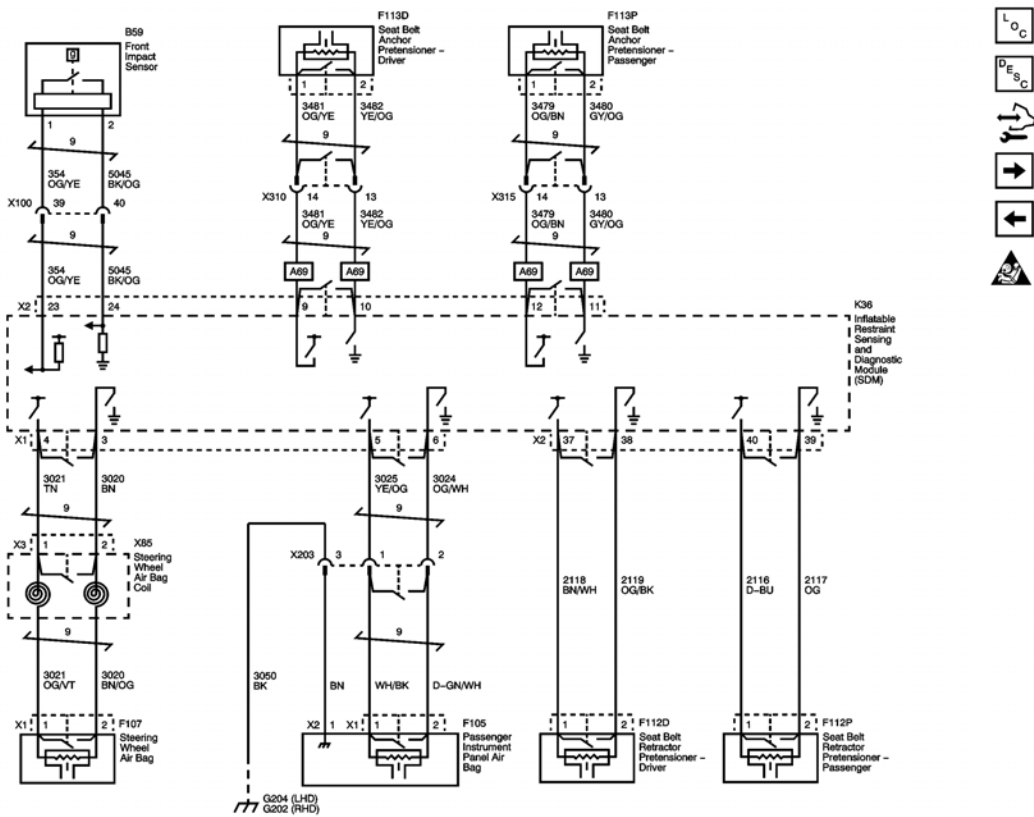
## Fastener Tightening Specifications

| Application                                                        | Specification |          |
|--------------------------------------------------------------------|---------------|----------|
|                                                                    | Metric        | English  |
| Front End Inflatable Restraint Discriminating Sensor               | 7.5 N·m       | 66 lb in |
| Inflatable Restraint Control Module Bracket Bolt                   | 10 N·m        | 89 lb in |
| Inflatable Restraint Instrument Panel Module Nut                   | 8 N·m         | 71 lb in |
| Inflatable Restraint Sensing and Diagnostic Module                 | 10 N·m        | 89 lb in |
| Inflatable Restraint Side Impact Sensor                            | 7.5 N·m       | 66 lb in |
| Instrument Panel Inflatable Restraint Module Bracket Bolt          | 9 N·m         | 80 lb in |
| Instrument Panel Inflatable Restraint Module Trim Cover Hinge Bolt | 2.5 N·m       | 22 lb in |
| Steering Wheel Inflatable Restraint Module Coil                    | 15 N·m        | 11 lb ft |

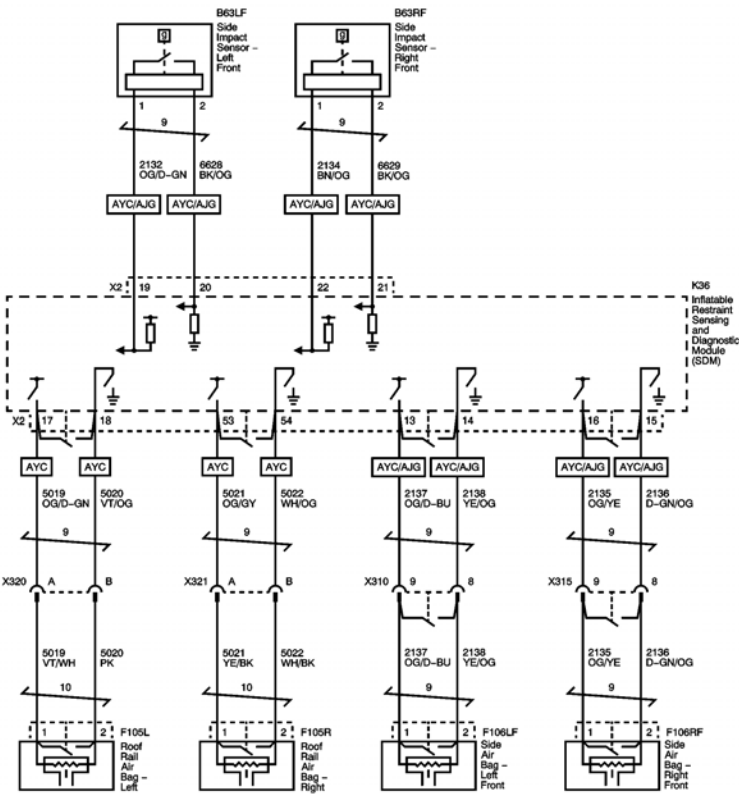
Module Power, Ground, and MIL



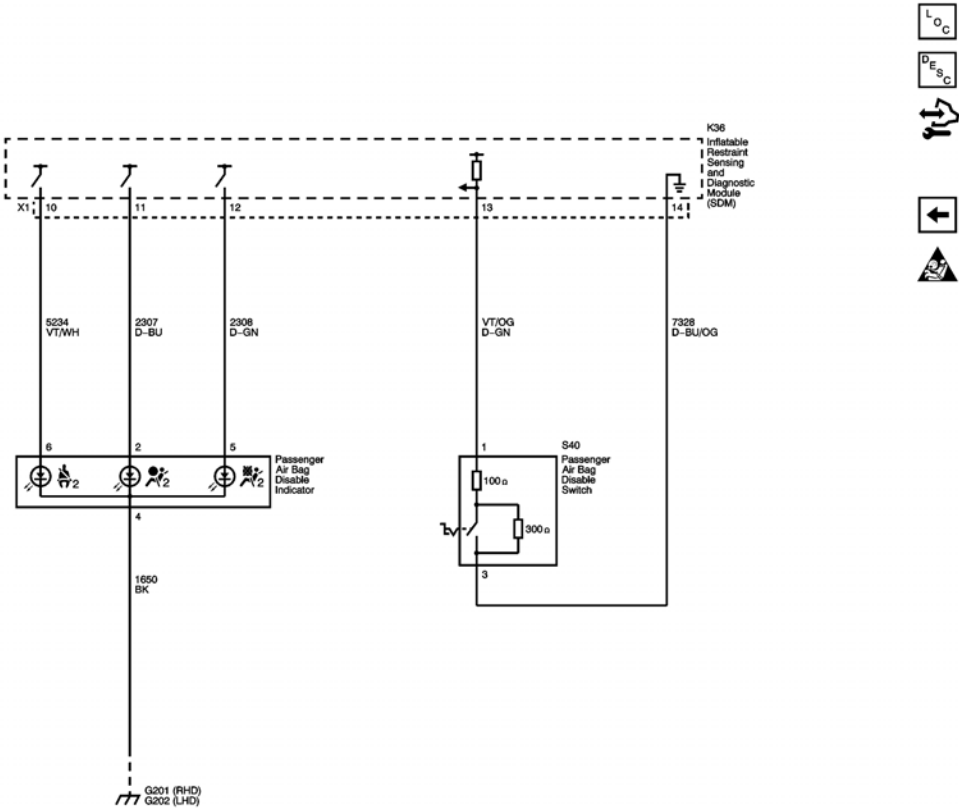
Front Impact Sensor, Retractors, and Driver / Passenger Air Bags



Side Impact Sensors and Side/Roof Air Bags

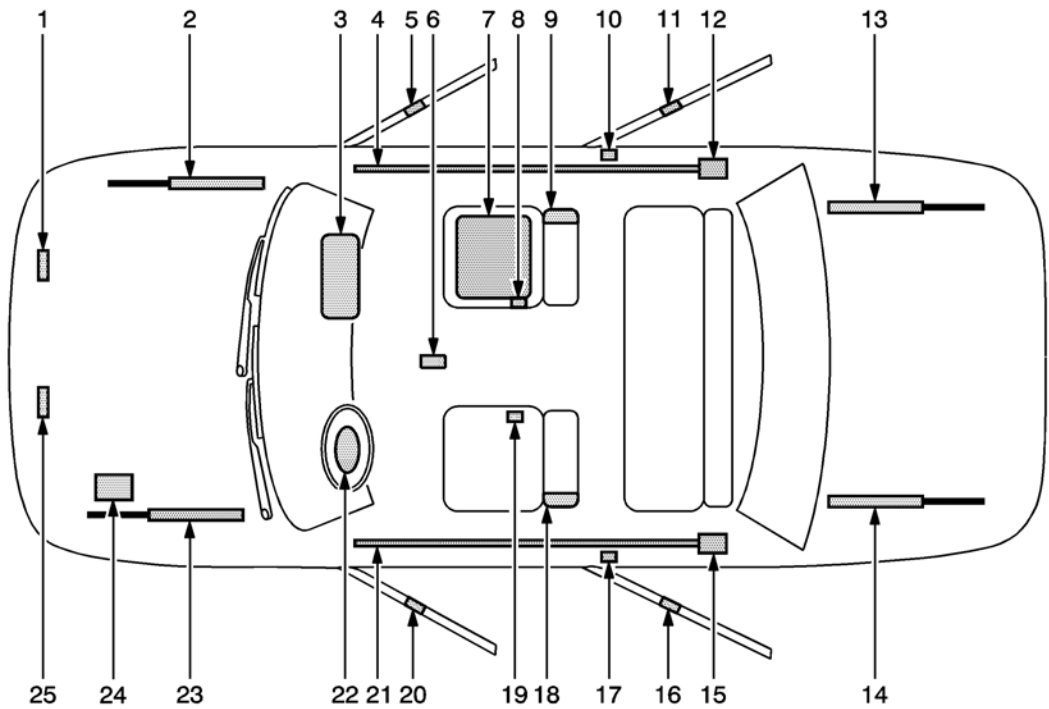


Air Bag Indicator and Disable Switch (C99)



## SIR Identification Views

The SIR Identification Views shown below illustrate the approximate location of all SIR components available for the vehicle. This will assist in determining the appropriate SIR Disabling and Enabling for a given service procedure, refer to [SIR Disabling and Enabling](#).



- (1) Front End Sensor--Located under the hood at the front right side of the vehicle
- (2) Front Hood Assist Rod--A gas shock located under the front hood on the passenger side
- (3) I/P Air Bag--Located at the top right under the instrument panel
- (4) Roof Rail Air Bag--Located under the headliner, extending from the passenger front windshield pillar to the passenger rear windshield pillar
- (5) Right Front Side Impact Sensor (SIS)--Located behind the door panel on the right front passenger door
- (6) Sensing and Diagnostic Module (SDM)--Located underneath the center console
- (7) Passenger Presence System (PPS)--Located on the passenger front seat underneath the seat bottom trim
- (8) Seat Belt Pretensioner--Located under the passenger front seat on the left rear side
- (9) RF Side Impact Air Bag--Located on the seat back of passenger seat
- (10) Seat Belt Retractor Pretensioner--Located under the trim near the bottom of the center pillar on the passenger side of vehicle
- (11) Right Rear Side Impact Sensor (SIS)--Located behind the door panel on the right rear passenger door
- (12) Inflator Module for Roof Rail Air Bag--Located behind the garnish molding on the upper rear pillar
- (13) Rear Hood Assist Rod--A gas shock located under the rear truck lid on the passenger side
- (14) Rear Hood Assist Rod--A gas shock located under the rear truck lid on the driver side
- (15) Inflator Module for Roof Rail Air Bag--Located behind garnish molding on the upper rear pillar
- (16) Left Rear Side Impact Sensor (SIS)--Located behind the door panel on the left rear passenger door
- (17) Seat Belt Retractor Pretensioner--Located under the trim near the bottom of the center pillar on the driver side of vehicle
- (18) LF Side Impact Air Bag--Located on the seat back of driver seat
- (19) Seat Belt Pretensioner--Located under the driver front seat on the right rear side
- (20) Left Front Side Impact Sensor (SIS)--Located behind the door panel on the left front driver door
- (21) Roof Rail Air Bag--Located under the headliner, extending from the driver front windshield pillar to the driver rear windshield pillar
- (22) Steering Wheel Air Bag--Located on the steering wheel
- (23) Front Hood Assist Rod--A gas shock located under the front hood on the driver side
- (24) Vehicle Battery--Located under the hood on the left side
- (25) Front End Sensor--Located under the hood at the front left side of the vehicle

## SIR Service Precautions

### SIR Service Precautions

**Warning:** When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Failure to observe the correct procedure could cause deployment of the SIR components. Serious injury can occur. Failure to observe the correct procedure could also result in unnecessary SIR system repairs.

The inflatable restraint sensing and diagnostic module (SDM) maintains a reserved energy supply. The reserved energy supply provides deployment power for the air bags. Deployment power is available for as much as 1 minute after disconnecting the vehicle power. Disabling the SIR system prevents deployment of the air bags from the reserved energy supply.

### General Service Instructions

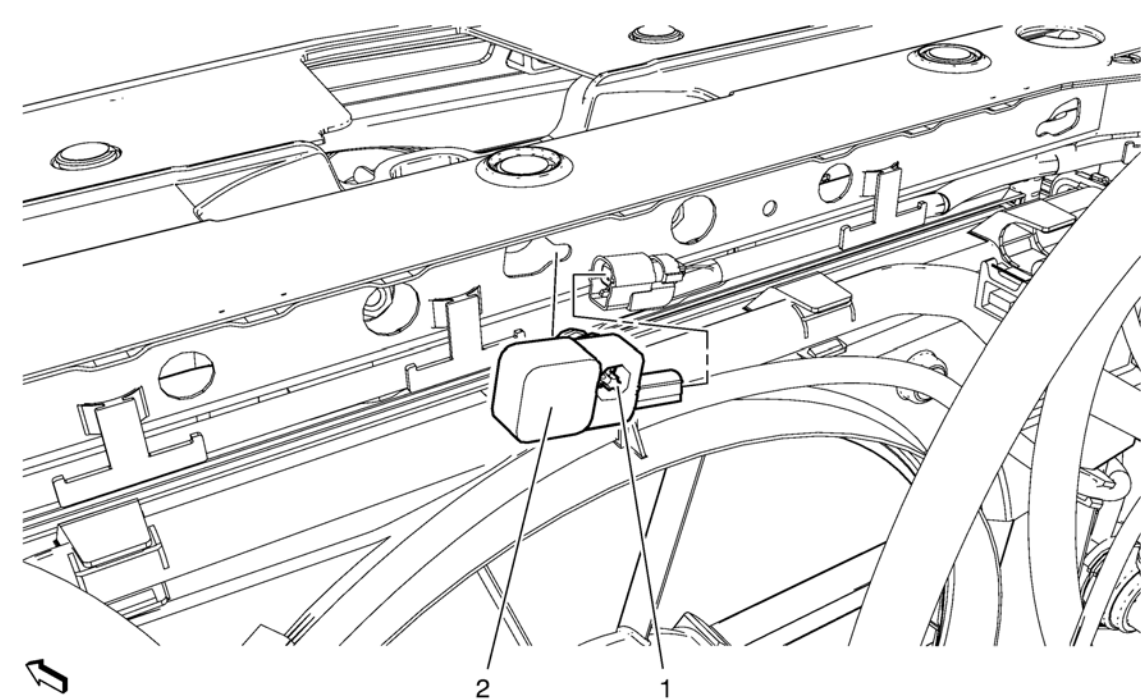
The following are general service instructions which must be followed in order to properly repair the vehicle and return it to its original integrity:

- Do not expose inflator modules to temperatures above 65°C (150°F).
- Verify the correct replacement part number. Do not substitute a component from a different vehicle.
- Use only original GM replacement parts available from your authorized GM dealer. Do not use salvaged parts for repairs to the SIR system.

Discard any of the following components if it has been dropped from a height of 91 cm (3 ft) or greater:

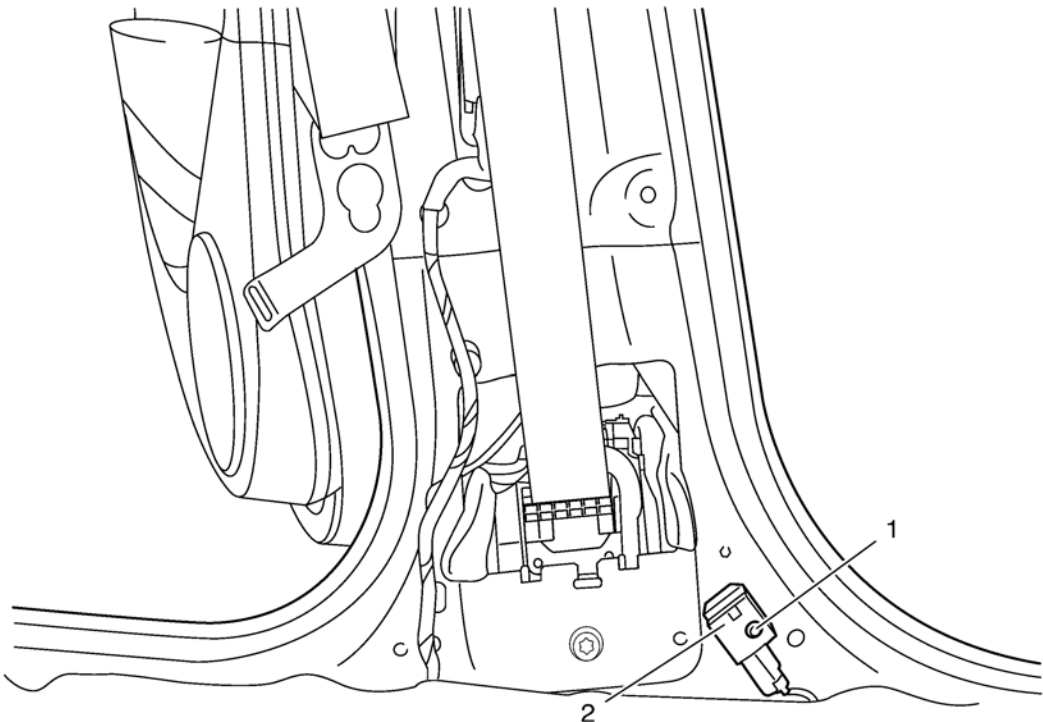
- Inflatable restraint sensing and diagnostic module (SDM)
- Inflatable restraint I/P module
- Inflatable restraint steering wheel module
- Inflatable restraint steering wheel module coil
- Inflatable restraint roof side rail modules
- Inflatable restraint side impact sensors (SIS)
- Inflatable restraint seat belt retractor pretensioners
- Inflatable restraint front end sensors

## Front End Inflatable Restraint Discriminating Sensor Replacement



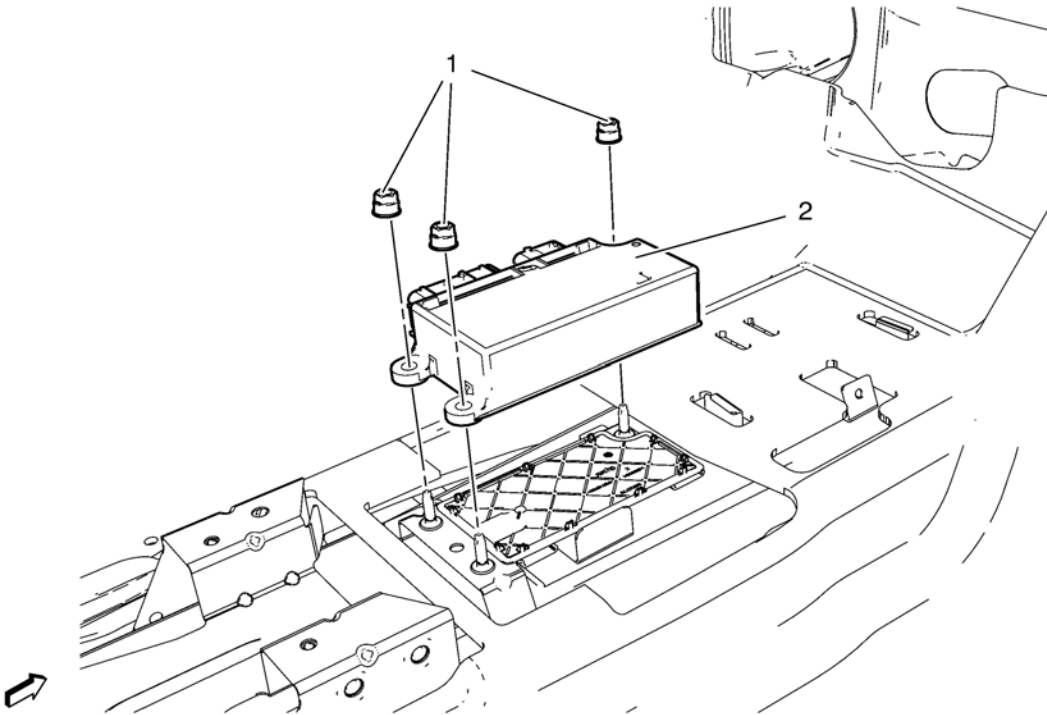
| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Component Name                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Warning:</b> Refer to <a href="#">SIR Warning</a> in the Preface section.</p> <p><b>Warning:</b> Following the deployment of a side impact air bag, inspect the following parts for damage. Replace these parts if necessary:</p> <ul style="list-style-type: none"><li>• The seat cushion frame</li><li>• The seat recliner, if equipped</li><li>• The seat adjuster</li><li>• The seat back frame</li></ul> <p>Failure to do so may cause future personal injury.</p> <p><b>Preliminary Procedure</b></p> <p>Disable the SIR system. Refer to <a href="#">SIR Disabling and Enabling</a>.</p> |                                                                                                                                                                                                                                                                                                                                         |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Inflatable Restraint Front End Sensor Bolt</p> <p><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.</p> <p><b>Tighten</b><br/>7.5 N·m (66 lb in)</p>                                                                                                                                                 |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>Inflatable Restraint Front End Sensor Assembly</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect electrical connector.</li><li>2. Loosen the bolt and slide the sensor out of the keyhole slot.</li></ol> <p><b>Tip</b><br/>The bolt is integral to the sensor assembly, DO NOT remove separately.</p> |

Inflatable Restraint Side Impact Sensor Replacement



| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Component Name                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Warning:</b> Refer to <a href="#">SIR Warning</a> in the Preface section.</p> <p><b>Warning:</b> Refer to <a href="#">SIR Inflator Module Handling and Storage Warning</a> in the Preface section.</p> <p><b>Warning:</b> Following the deployment of a side impact air bag, inspect the following parts for damage. Replace these parts if necessary:</p> <ul style="list-style-type: none"><li>• The seat cushion frame</li><li>• The seat recliner, if equipped</li><li>• The seat adjuster</li><li>• The seat back frame</li></ul> <p>Failure to do so may cause future personal injury.</p> <p><b>Preliminary Procedure</b></p> <ol style="list-style-type: none"><li>1. Disable the SIR system. Refer to <a href="#">SIR Disabling and Enabling</a></li><li>2. Remove center pillar lower garnish molding. Refer to <a href="#">Center Pillar Lower Garnish Molding Replacement</a></li></ol> |                                                                                                                                                                                                                                                                                                                                             |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Inflatable Restraint Side Impact Sensor Screw</p> <p><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.</p> <p><b>Tighten</b><br/>7.5 N·m (66 lb in)</p>                                                                                                                                                  |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p>Inflatable Restraint Side Impact Sensor Assembly</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"><li>1. Disconnect electrical connector.</li><li>2. Loosen the bolts and slide the sensor out of the keyhole slots.</li></ol> <p><b>Tip</b><br/>The bolt is integral to the sensor assembly, DO NOT remove separately.</p> |

Inflatable Restraint Sensing and Diagnostic Module Replacement



| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                 | Component Name                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Preliminary Procedure</b></p> <p>1. Disable the supplemental inflatable restraint (SIR) system. Refer to <a href="#">SIR Disabling and Enabling</a>.</p> <p>2. Remove the instrument panel lower trim panel. Refer to <a href="#">Instrument Panel Lower Trim Panel Replacement - Left Side</a> and <a href="#">Instrument Panel Lower Trim Panel Replacement - Right Side</a></p> <p>3. Disconnect the electrical connector.</p> |                                                                                                                                                                                                            |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Inflatable Restraint Sensing and Diagnostic Module Nut (Qty: 3)</p> <p><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.</p> <p><b>Tighten</b><br/>10 N·m(89 lb in)</p> |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>Inflatable Restraint Sensing and Diagnostic Module Assembly</p> <p><b>Tip</b><br/>If installing a replacement module, program the module. Refer to <a href="#">Control Module References</a></p>        |

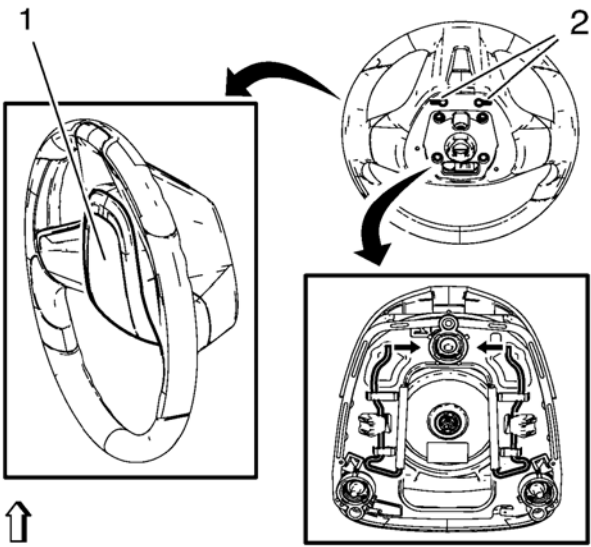
## Steering Wheel Inflatable Restraint Module Replacement

### Removal Procedure

**Warning:** When carrying a live inflator module, make sure the bag opening is pointed away from you. This minimizes the chance of injury in the case of an accidental deployment. Never carry the inflator module by the wires. Never carry the inflator module by the connector on the underside of the module.

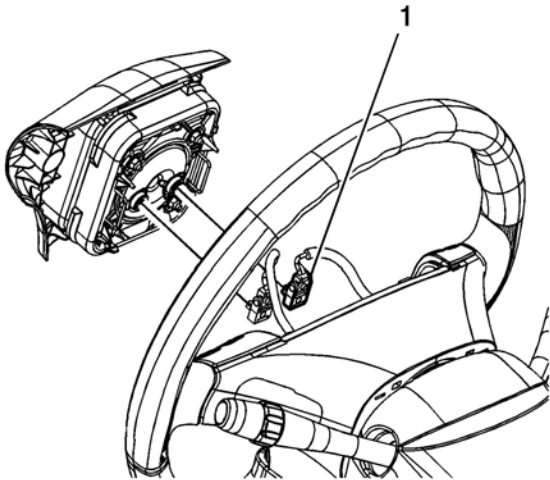
Make sure that the bag and trim cover are facing up whenever you place a live inflator module on any surface. This is necessary to provide a free space for the bag to expand in the unlikely event of accidental deployment. Never rest the steering column assembly on the steering wheel with the inflator module face down, and the column vertical. This may result in personal injury.

**Warning:** Refer to [SIR Warning](#) in the Preface section.

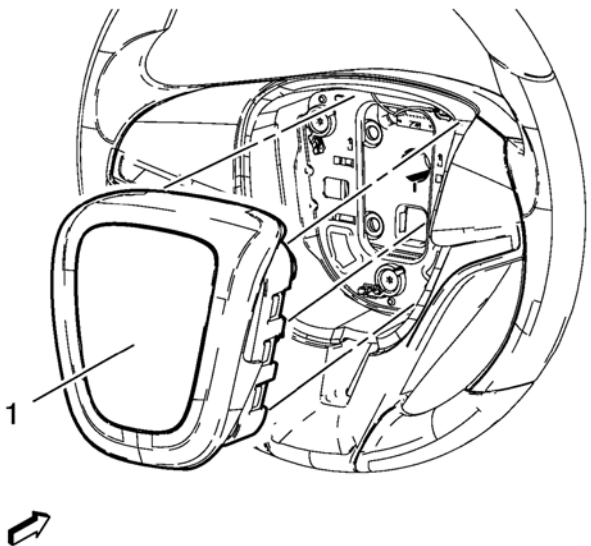


1. Disable the supplemental inflatable restraint (SIR) system. Refer to [SIR Disabling and Enabling](#).
2. Insert suitable tools to the openings (2) on both sides of the steering wheel (1).
3. Release the springs in direction of the arrows.
4. Disconnect the electrical connectors.

### Installation Procedure



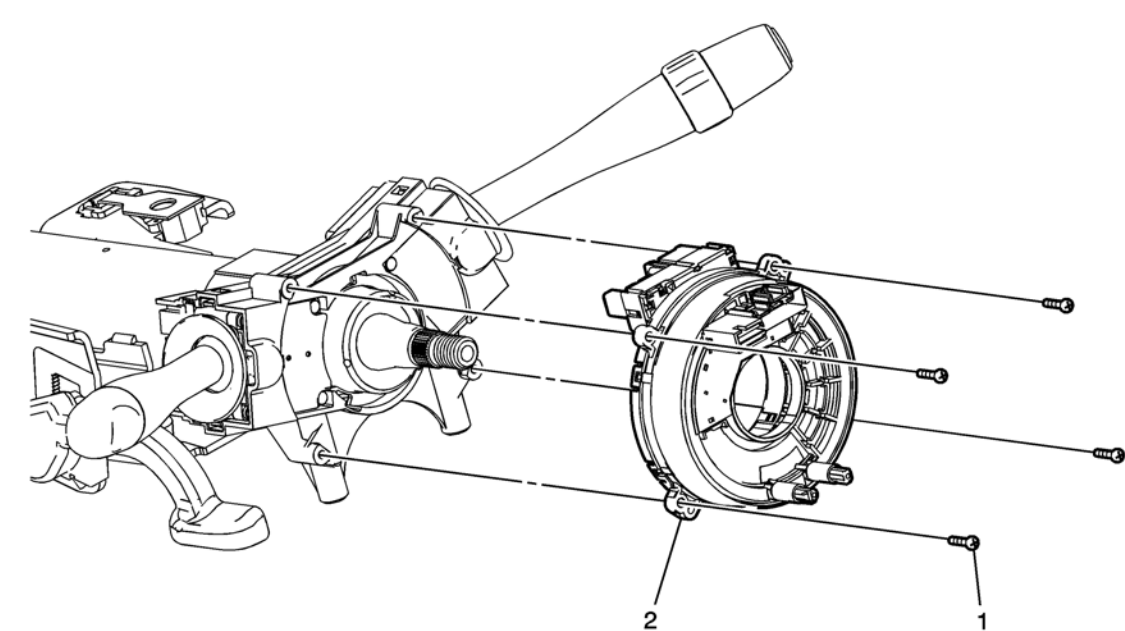
1. Connect the electrical connectors (1).



2. Align the steering wheel module fasteners to the steering column fastener holes.
3. Push the steering wheel module (1) firmly into the steering column in order the engage the fasteners.

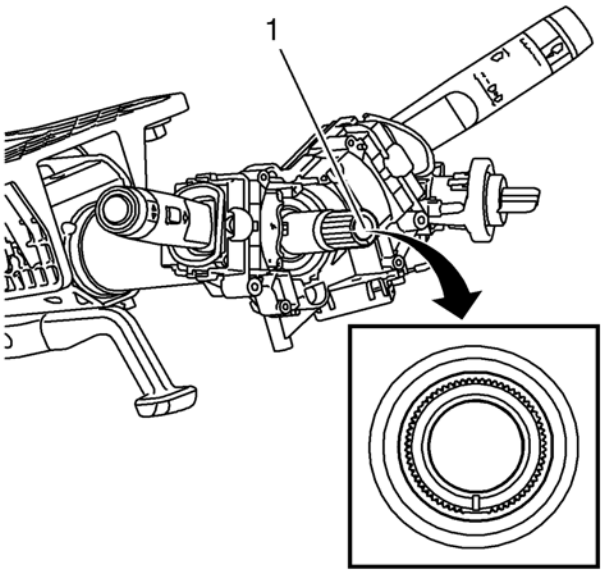
- 4. Enable the SIR system. Refer to [SIR Disabling and Enabling](#).
- 5. After replacing the module, fully deploy the old module before disposal.

Steering Wheel Inflatable Restraint Module Coil Replacement



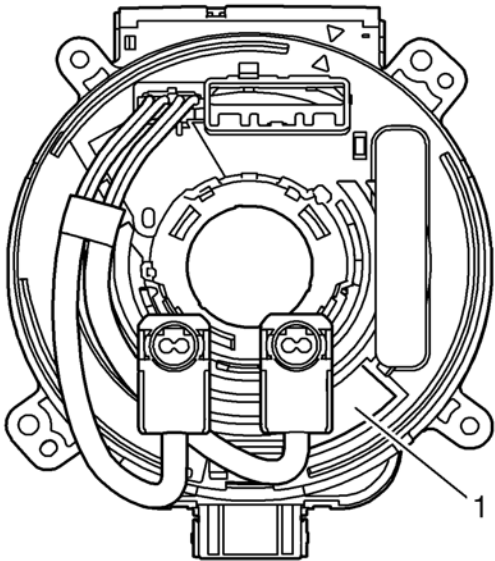
| Callout                                                                                                                                                                                                                                                                                                                                                                                   | Component Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Preliminary Procedure</b></p> <p>1. Remove the steering column upper trim cover. Refer to <a href="#">Steering Column Upper Trim Cover Replacement</a>.</p> <p>2. Remove the steering column lower trim cover. Refer to <a href="#">Steering Column Lower Trim Cover Replacement</a>.</p> <p>3. Remove the steering wheel. Refer to <a href="#">Steering Wheel Replacement</a>.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1                                                                                                                                                                                                                                                                                                                                                                                         | <p>Steering Wheel Inflatable Restraint Module Coil Screw Bolt (Qty: 4)</p> <p><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.</p> <p><b>Tighten</b><br/>15 N·m (11 lb ft)</p>                                                                                                                                                                                                                                                                                                                                             |
| 2                                                                                                                                                                                                                                                                                                                                                                                         | <p>Steering Wheel Inflatable Restraint Module Coil Assembly</p> <p><b>Procedure</b></p> <p>Disconnect any electrical connectors as needed.</p> <p><b>Tip</b></p> <ul style="list-style-type: none"><li>Do not remove the centering tab from a new steering wheel inflatable restraint module coil until it has been installed or re-centering will be required.</li><li>If re-centering of the steering wheel inflatable restraint module coil is needed then refer to <a href="#">Inflatable Restraint Steering Wheel Module Coil Centering</a>.</li></ul> |

## Inflatable Restraint Steering Wheel Module Coil Centering



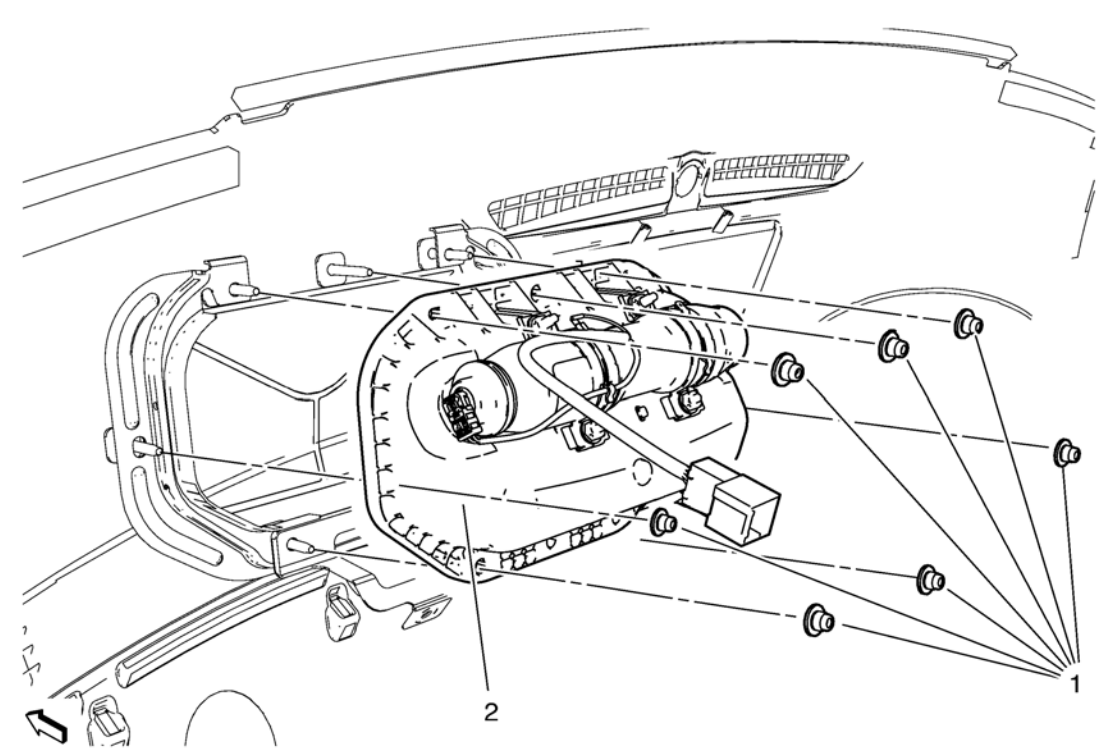
**Caution:** The new SIR coil assembly will be centered. Improper alignment of the SIR coil assembly may damage the unit, causing an inflatable restraint malfunction.

1. Verify the following conditions before centering the supplemental inflatable restraint (SIR) steering wheel module coil:
  - The wheels on the vehicle are straight ahead.
  - The centering mark (1) of the steering shaft is in the 6 o'clock position.
2. Turn the lobe of the clock spring clockwise until the coil ribbon stops. Do not force.
3. Turn the lobe of the clock spring counterclockwise approximately 3 turns to the Neutral position.



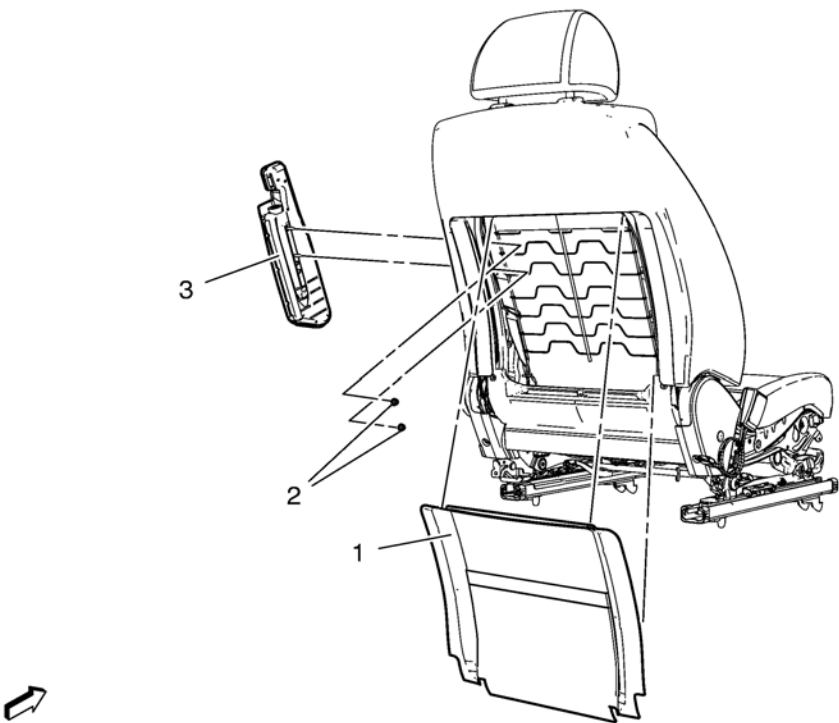
4. Properly align until the centering window turns yellow (1). This indicates the CENTER position.

Instrument Panel Inflatable Restraint Module Replacement



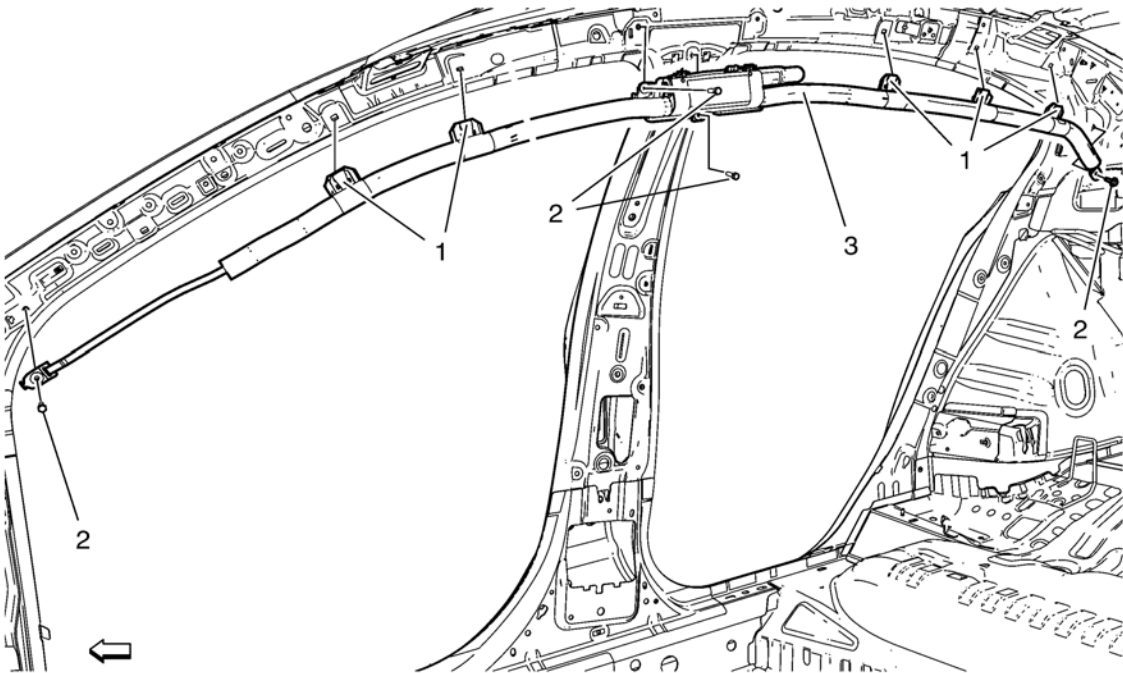
| Callout                                                                                                                                                                                                                                                                                                                        | Component Name                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Warning:</b> Refer to <a href="#">SIR Warning</a> in the Preface section.</p> <p><b>Preliminary Procedure</b></p> <p>1. Disable the SIR system. Refer to <a href="#">SIR Disabling and Enabling</a>.</p> <p>2. Remove the instrument panel assembly. Refer to <a href="#">Instrument Panel Assembly Replacement</a>.</p> |                                                                                                                                                                                                      |
| 1                                                                                                                                                                                                                                                                                                                              | <p>Instrument Panel Inflatable Restraint Module Nut (Qty: 7)</p> <p><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.</p> <p><b>Tighten</b><br/>8 N·m (71 lb in)</p> |
| 2                                                                                                                                                                                                                                                                                                                              | <p>Instrument Panel Inflatable Restraint Module Assembly</p> <p><b>Tip</b><br/>Disconnect the electrical connectors.</p>                                                                             |

Driver or Passenger Seat Side Inflatable Restraint Module Replacement



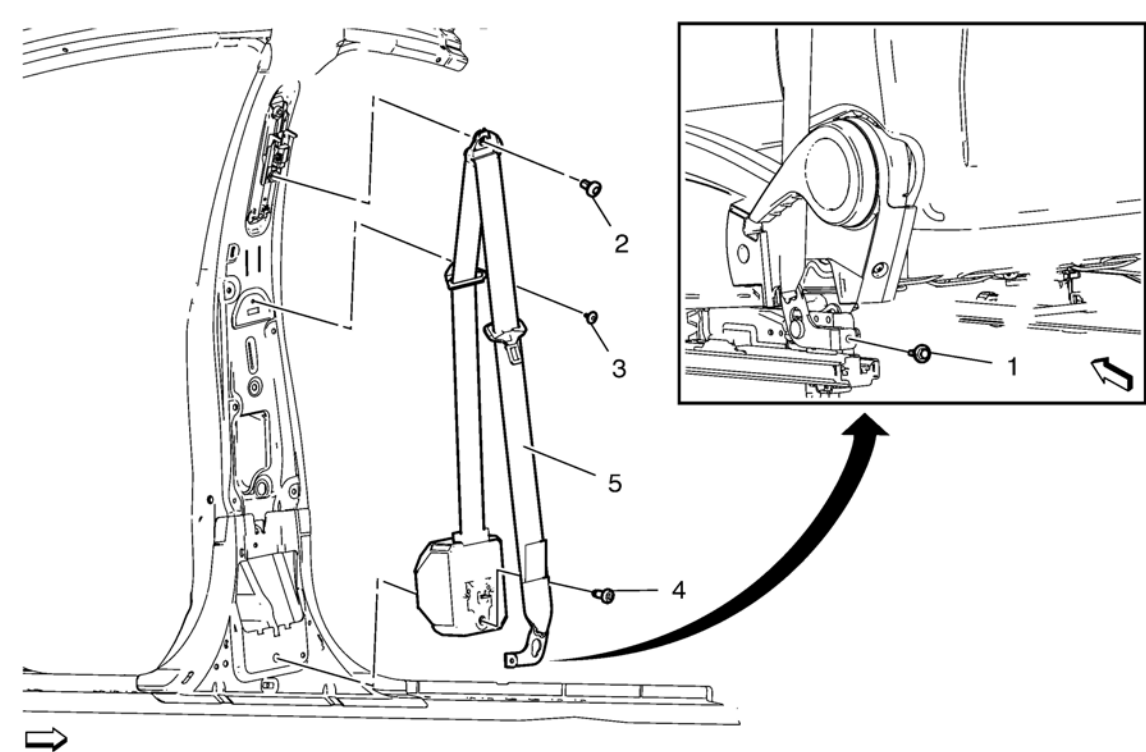
| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Component Name                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Warning:</b> Refer to <a href="#">SIR Inflator Module Handling and Storage Warning</a> in the Preface section.</p> <p><b>Warning:</b> Following the deployment of a side impact air bag, inspect the following parts for damage. Replace these parts if necessary:</p> <ul style="list-style-type: none"><li>• The seat cushion frame</li><li>• The seat recliner, if equipped</li><li>• The seat adjuster</li><li>• The seat back frame</li></ul> <p>Failure to do so may cause future personal injury.</p> <p><b>Preliminary Procedure</b></p> <p>Disable the SIR system. Refer to <a href="#">SIR Disabling and Enabling</a>.</p> |                                                                                                                                                                                     |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Front Seat Back Trim                                                                                                                                                                |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Front Seat Side Inflatable Restraint Module Nut (Qty: 2)<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.<br><b>Tighten</b><br>4 N·m (36 lb in) |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Front Seat Side Inflatable Restraint Module Assembly<br><b>Tip</b><br>Disconnect the electrical connector.                                                                          |

Roof Side Rail Inflatable Restraint Module Replacement



| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Component Name                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Warning:</b> In order to prevent SIR deployment, personal injury, or unnecessary SIR system repairs, do not strike the door or the door pillar in the area of the side impact sensor (SIS). Turn OFF the ignition and remove the key when performing service in the area of the SIS.</p> <p><b>Warning:</b> When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Refer to SIR Disabling and Enabling . Failure to observe the correct procedure could cause deployment of the SIR components, personal injury, or unnecessary SIR system repairs.</p> <p><b>Preliminary Procedure</b></p> <ol style="list-style-type: none"><li>Disable SIR system. Refer to <a href="#">SIR Disabling and Enabling</a>.</li><li>Remove the headliner. Refer to <a href="#">Headlining Trim Panel Replacement</a>.</li></ol> |                                                                                                                                                                           |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Inflatable Restraint Roof Rail Retainer (Qty: 5)                                                                                                                          |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Inflatable Restraint Roof Rail Bolt (Qty: 4)<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.<br><b>Tighten</b><br>9.5 N·m (84 lb in) |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Inflatable Restraint Roof Rail Module Assembly                                                                                                                            |

Driver or Passenger Seat Retractor Side Belt Replacement



| Callout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Component Name                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Warning:</b> Refer to <a href="#">SIR Warning</a> in the Preface section.</p> <p><b>Warning:</b> In order to prevent accidental deployment and the risk of personal injury, do not dispose of an undeployed inflatable restraint seat belt pretensioner as normal shop waste. Undeployed seat belt pretensioners contain substances that could cause severe illness or personal injury if their sealed containers are damaged during disposal. Use the following deployment procedures to safely dispose of an undeployed seat belt pretensioner. Failure to observe the following disposal methods may be a violation of federal, state, or local laws.</p> <p><b>Warning:</b> Refer to <a href="#">SIR Seatbelt Pretensioner Handling Warning</a> in the Preface section.</p> <p><b>Preliminary Procedure</b></p> <ol style="list-style-type: none"><li>Remove the Center Pillar Upper Garnish Molding. Refer to <a href="#">Center Pillar Upper Garnish Molding Replacement</a>.</li><li>Remove the Front Seat Outer Recliner Upper Finish Cover. Refer to <a href="#">Front Seat Outer Recliner Upper Finish Cover Replacement</a>.</li></ol> |                                                                                                                                                              |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Front Seat Belt Anchor Plate Bolt<br><b>Caution:</b> Refer to <a href="#">Fastener Caution</a> in the Preface section.<br><b>Tighten</b><br>9 N·m (80 lb in) |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Front Seat Belt Retractor D Ring Bolt<br><b>Tighten</b><br>45 N·m (33 lb ft)                                                                                 |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Front Seat Shoulder Belt Guide Retainer                                                                                                                      |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Front Seat Shoulder Belt Retractor Assembly Bolt<br><b>Tighten</b><br>45 N·m (33 lb ft)                                                                      |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Front Seat Retractor Side Belt Assembly                                                                                                                      |

## Repairs and Inspections Required After a Collision

### Accident With or Without Air Bag Deployment - Component Inspections

**Warning:** Proper operation of the Supplemental Inflatable Restraint (SIR) sensing system requires that any repairs to the vehicle structure return the vehicle structure to the original production configuration. Not properly repairing the vehicle structure could cause non-deployment of the air bag(s) in a frontal collision or deployment of the air bag(s) for conditions less severe than intended.

After any collision, inspect the following components as indicated. If you detect any damage, replace the component. If you detect any damage to the mounting points or mounting hardware, repair the component or replace the hardware as needed.

- The steering column--Inspect the steering column for bending, twisting, buckling or any type of damage.
- The instrument panel knee bolsters and mounting points--Inspect the knee bolsters for bending, twisting, buckling, or any other type of damage.
- The instrument panel brackets, braces, etc.--Inspect for bending, twisting, buckling, or any other type of damage.
- The seat belts--Perform the seat belt operational and functional checks. Refer to [Repairs and Inspections Required After a Collision](#).
- The instrument panel cross car beam--Inspect for bending, twisting, buckling, or any other type of damage.
- The instrument panel mounting points and brackets--Inspect for bending, twisting, buckling, or any other type of damage.
- The seats and seat mounting points--Inspect for bending, twisting, buckling, or any other type of damage.
- The roof and headliner mounting points.

### Accident With Frontal Air Bag Deployment - Component Replacement and Inspections

After a collision involving air bag deployment, replace the following components.

- Inflatable restraint passenger instrument panel air bag module
- Inflatable restraint steering wheel module
- Inflatable restraint sensing and diagnostic module (SDM)
- Inflatable restraint front end sensors
- Inflatable restraint left front/right front air bag module, if deployed
- Seat back cover on internal seat side air bag module, if deployed
- Inflatable restraint seat belt pretensioners

Perform additional inspections on the following components.

- Steering wheel module coil and the coil wiring pigtail--Inspect for melting, scorching, or other damage due to excessive heat.
- Mounting points or mounting hardware for the passenger instrument panel module, steering wheel module, SDM, side air bag module (if deployed) and seat belt pretensioners--Inspect for any damage and repair or replace each component as needed.

### Accident With Side Air Bag Module Deployment - Component Replacement and Inspections

After a collision involving left/right side air bag module deployment, replace the following components.

- Left/right inflatable restraint side impact sensors on the side of the impact.
- Left/right inflatable restraint roof rail module on the side of the impact.
- Inflatable restraint sensing and diagnostic module (SDM).
- Inflatable restraint seat belt pretensioner.
- Driver or passenger seat back cushion cover replacement, if equipped left front/right front side air bag.

**Warning:** Do not repair or replace the seat stitching or seams in the seat back trim cover with an internal mounted seat side airbag module. Replace the complete seat back trim cover from the OEM. Non-OEM seat stitching may cause improper airbag deployment which could result in personal injury.

Perform additional inspections on the following components.

- Mounting points or mounting hardware for the side impact sensors, and left front/right front side air bag modules on the side of impact--Inspect for any damage and repair or replace each component as needed.
- Mounting points, mounting hardware, headliner and trim pieces for the left/right roof rail air bag module on the side of impact--Inspect for any damage and repair or replace each component as needed.
- Mounting points or mounting hardware for the SDM and seat belt pretensioners--Inspect for any damage and repair or replace each component as needed.
- The seat cushion frame
- The seat recliner and cover, if equipped
- The seat adjuster
- The seat back frame
- Door trim assembly
- Impacted seat cushion side covers and switches

### Inflatable Restraint Impact Sensor Replacement Guidelines

The inflatable restraint impact sensor replacement policy requires replacing sensors in the area of the accident damage. The area of accident damage is defined as the portion of the vehicle which is crushed, bent, or damaged due to a collision. An example of this would be a moderate collision where the front of the vehicle impacts a object. If the vehicle has an inflatable restraint impact sensor mounted forward of the radiator, it must be replaced.

- Replace the inflatable restraint impact sensor whether or not the air bags have deployed.
- Replace the inflatable restraint impact sensor even if it appears to be undamaged.

Sensor damage which is not visible, such as slight bending of the mounting bracket or cuts in the wire insulation, can cause improper



operation of the inflatable restraint impact sensing system. Do not try to determine whether the sensor is undamaged, replace the inflatable restraint impact sensor. Also, if you follow a diagnostic trouble code (DTC) procedure and a malfunctioning sensor is indicated, replace the inflatable restraint impact sensor.



## Inflatable Restraint Module Handling and Scrapping

### Special Tools

- *EL-38826* SIR Deployment Harness
- *EL-39401-B* SIR Deployment Fixture

For equivalent regional tools, refer to [Special Tools](#).

### Live and Undeployed Inflator Module

**Warning:** Refer to [SIR Inflator Module Handling and Storage Warning](#) in the Preface section.

Take special care when handling or storing an undeployed inflator module. An inflator module deployment produces a rapid generation of gas. This may cause the inflator module, or an object in front of the inflator module, to project through the air in the event of an unlikely deployment.

### Dual Stage Inflator Module

Dual stage inflator modules have two deployment stages. If stage 1 was used to deploy a dual stage inflator module, stage 2 may still be active. Therefore, a deployed dual stage inflator module must be treated as an active module. If disposal of a dual stage module is required, both deployment loops must be energized to deploy the air bag.

### Scrapping Procedure

During the course of a vehicle's useful life, certain situations may arise which will require the disposal of a live and undeployed inflator module. Do NOT dispose a live and undeployed inflator module through normal disposal channels until the inflator module has been deployed.

Do not deploy the inflator module in the following situations:

- After replacement of an inflator module under warranty--the inflator module may need to be returned undeployed to the manufacturer.
- If the vehicle is the subject of a product liability claim, related to the SIR system and is subject to a preliminary investigation--do NOT alter the SIR system in any manner.
- If the vehicle is involved in a campaign affecting the inflator modules--follow the instructions in the campaign service bulletin for proper SIR handling procedures.

### Deployment Procedures

You can deploy the inflator module either inside or outside of the vehicle. The method used depends upon the final disposition of the vehicle. Review the following procedures in order to determine which will work best in a given situation:

#### Deployment Outside Vehicle - Steering Wheel Module, Instrument Panel Module, and Roof Rail Module

Deploy the inflator module outside of the vehicle when the vehicle will be returned to service. Situations that require deployment outside of the vehicle include the following:

- Using the SIR diagnostics, you determine that the inflator module is malfunctioning.
- The inflator module is cosmetically damaged, scratched, or ripped.
- The inflator module pigtail is damaged.
- The inflator module connector is damaged.
- The inflator module connector terminals are damaged.

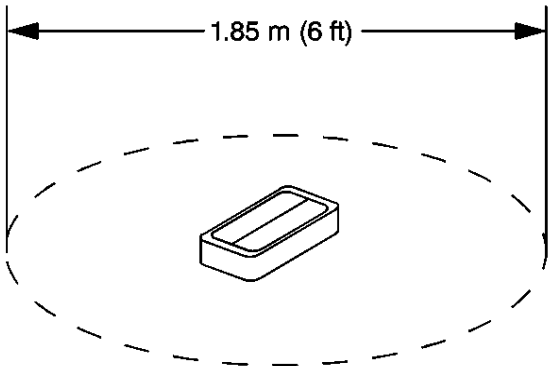
Deployment and disposal of a malfunctioning inflator module is subject to any required retention period.

**Warning:** Refer to [SIR Inflator Module Disposal Warning](#) in the Preface section.

1. Turn OFF the ignition.

**Warning:** Refer to [SIR Inflator Module Handling and Storage Warning](#) in the Preface section.

2. Remove the inflator module.



3. Clear a space on the ground about 1.85 m (6 ft) in diameter for deployment of the inflator module or deployment fixture. If possible, use a paved, outdoor location free of activity. Otherwise, use a space free of activity on the shop floor. Ensure you have sufficient

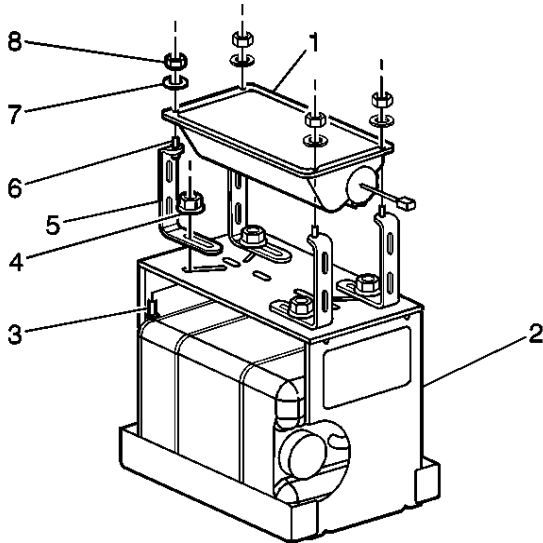
ventilation.

4. Clear the area of loose or flammable objects.

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**Note:** Dual stage deployments are only used in steering wheel and instrument panel air bag modules. If stage 1 was used to de dual stage inflator module, stage 2 may still be active. If disposal of a dual stage module is required, both deployment loops mu<sub>ver</sub> energized to deploy the air bag.

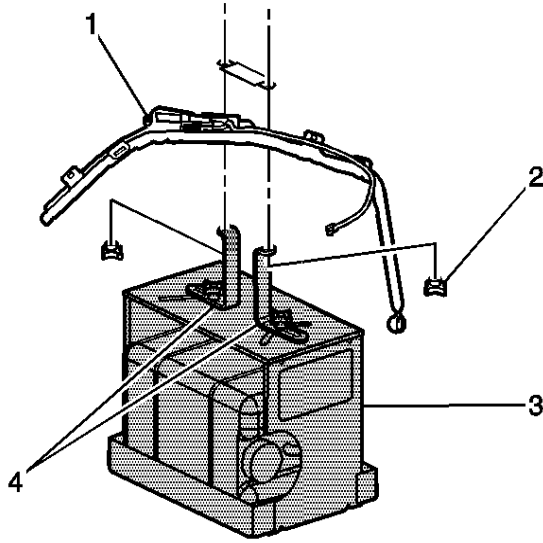
5. If you are deploying a steering wheel inflator module, place the inflator module in the center of the space with the vinyl trim co facing up and away from the surface.



6. When deploying an instrument panel air bag module, perform the following instructions:

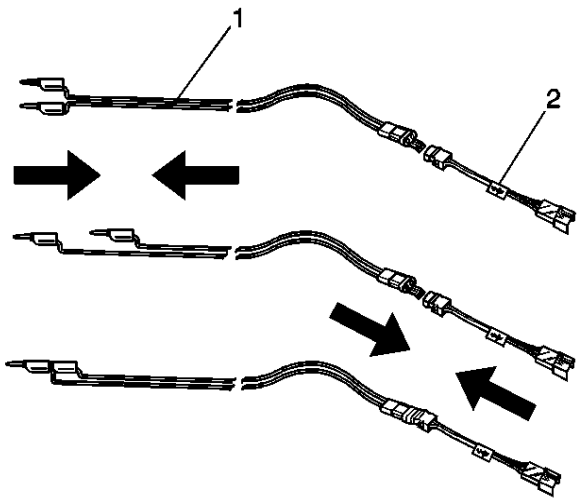
inyl

- 6.1. Place the *EL-39401-B* fixture in the center of the cleared area.
- 6.2. Fill the deployment fixture with water or sand.
- 6.3. Using the proper nuts and bolts, mount the instrument panel air bag module (1) to the deployment fixture (2), with the v trim facing up.
- 6.4. Securely tighten all fasteners that hold the instrument panel air bag module (1) to the deployment fixture (2).

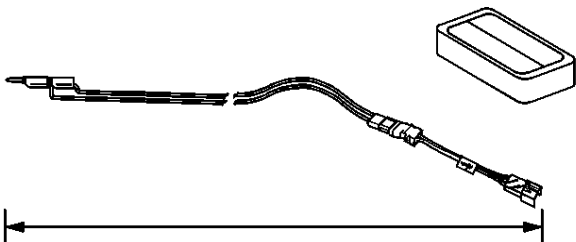


7. When deploying a roof rail module, perform the following instructions:

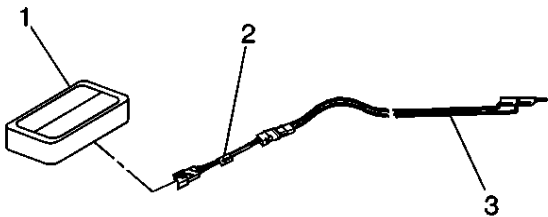
- 7.1. Place the *EL-39401-B* fixture (3) in the center of the cleared area.
- 7.2. Fill the deployment fixture with water or sand to provide sufficient stabilization of fixture during deployment.
- 7.3. Adjust and secure the fixture arms (4) to the deployment fixture (3), using the proper nuts and bolts.
- 7.4. Attach the roof rail module in the deployment fixture and securely tighten all fasteners.



8. Inspect the *EL-38826* harness and the appropriate pigtail adapter (2) for damage. Replace as needed.
9. Short the 2 SIR deployment harness leads (1) together using one banana plug seated into the other.
10. Connect the appropriate pigtail adapter (2) to the SIR deployment harness (1).



11. Extend the SIR deployment harness and adapter to the full length from the deployment fixture or area.



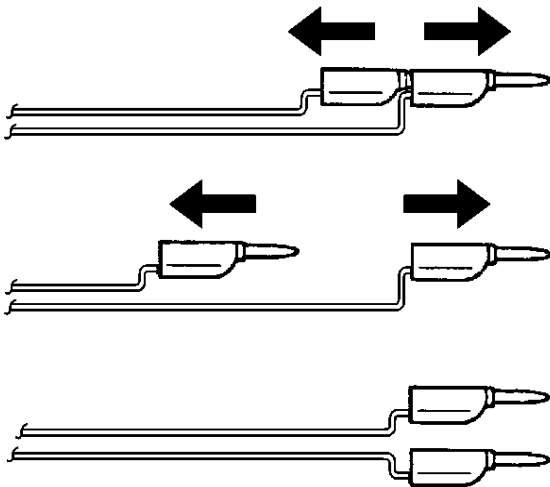
**Note:** On a dual stage inflator module, both connectors must be attached to the deployment harness adapter. This will ensure that both stage 1 and stage 2 of the deployment loops are energized, regardless of the deployment state.

12. Connect the inflator module (1) to the adapter (2) on the SIR deployment harness (3).

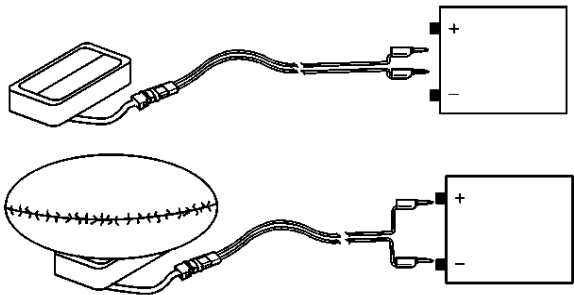
**Note:**

- The rapid expansion of gas involved with deploying an inflator module is very loud. Notify all the people in the immediate area that you intend to deploy the inflator module.
- When the inflator module deploys, the deployment fixture may jump about 30 cm (1 ft) vertically. This is a normal reaction of the inflator module due to the force of the rapid expansion of gas inside the inflator module.
- If you are deploying a dual stage inflator module with stage 1 already deployed, the fixture may not move and the noise may have been reduced.

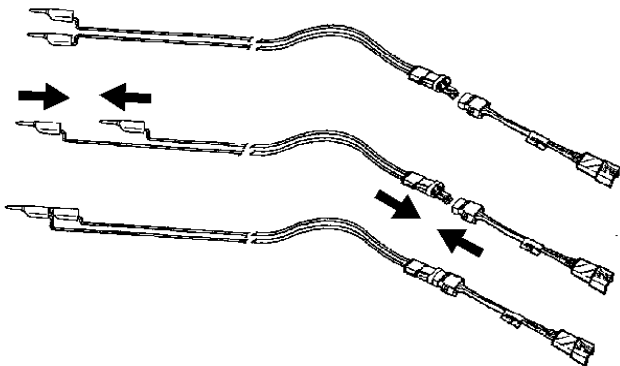
13. Clear the area of people.



14. Separate the 2 banana plugs on the SIR deployment harness that were shorted together earlier in the procedure.



15. Place a 12 V minimum/2A minimum power source, such as a vehicle battery, near the shorted end of the harness.
16. Connect the SIR deployment harness wires to the power source. Deployment of the Inflator module will occur when contact is made.



17. Disconnect the SIR deployment harness from the power source after the inflator module deploys.
18. If the inflator module did not deploy, disconnect the adapter and discontinue the procedure and contact the Technical Assistance Group.

If deployment was successful, proceed to the following steps.

**Warning:** Refer to [SIR Deployed Inflator Modules Are Hot Warning](#) in the Preface section.

19. Seat one banana plug into the other in order to short the deployment harness leads.
20. Put on a pair of shop gloves.
21. Disconnect the pigtail adapter from the inflator module as soon as possible.
22. Inspect the pigtail adapter and the SIR deployment harness. Replace as needed.
23. Dispose of the deployed inflator module through normal refuse channels.
24. Wash your hands with a mild soap.

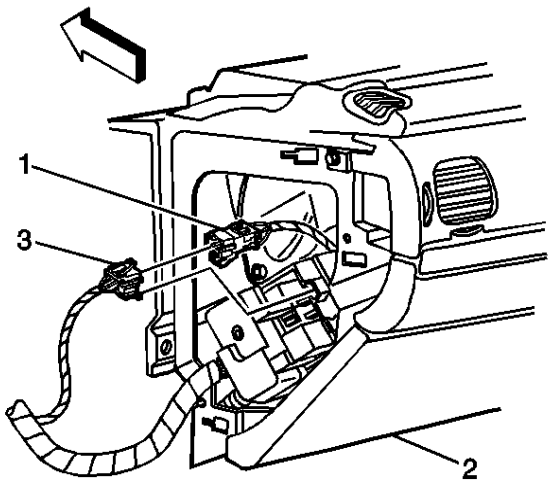
Deployment Inside Vehicle - Vehicle Scrapping Procedure

Deploy the inflator modules inside of the vehicle when destroying the vehicle or when salvaging the vehicle for parts. This includes, but is not limited to, the following situations:

- The vehicle has completed all useful life.
- Irreparable damage occurred to the vehicle in a non-deployment type accident.
- Irreparable damage occurred to the vehicle during a theft.
- The vehicle is being salvaged for parts to be used on a vehicle with a different VIN, as opposed to rebuilding as the same VIN.

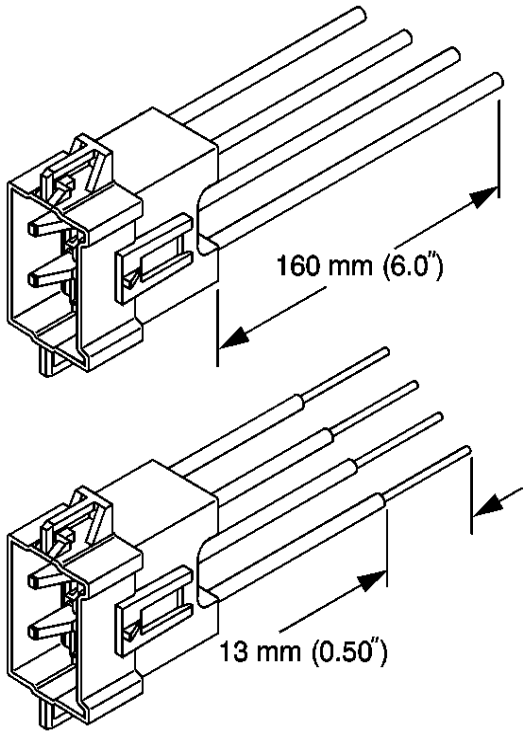
**Warning:** Refer to [SIR Inflatable Module Deployment Outside Vehicle Warning](#) in the Preface section.

1. Lower the driver and passenger windows.
2. Turn the ignition switch to the OFF position and remove the ignition key.
3. Check that all inflator modules which will be deployed are mounted securely.
4. Remove all loose objects from the front seats.



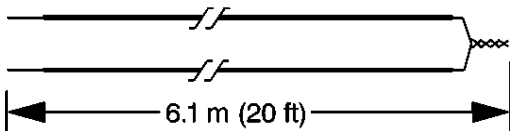
**Warning:** A deployed dual stage inflator module will look the same whether one or both stages were used. Always assume a deployed dual stage inflator module has an active stage 2. Improper handling or servicing can activate the inflator module and cause personal injury.

5. Disconnect the steering wheel module yellow connector (1) from vehicle harness yellow connector (3).

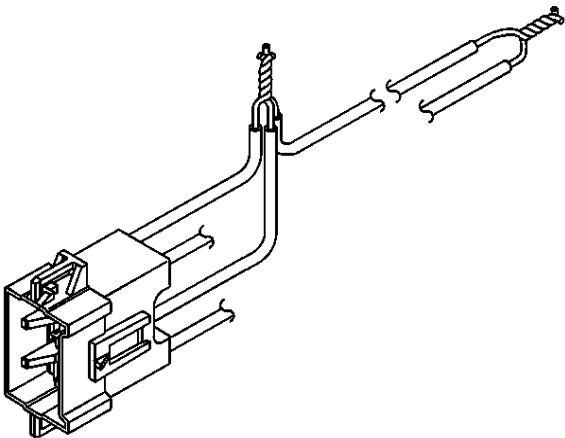


**Note:** If the vehicle is equipped with dual stage air bags the steering wheel module and instrument panel module will each have 4 wires. Refer to [Component Connector End Views](#) for determining high and low circuits.

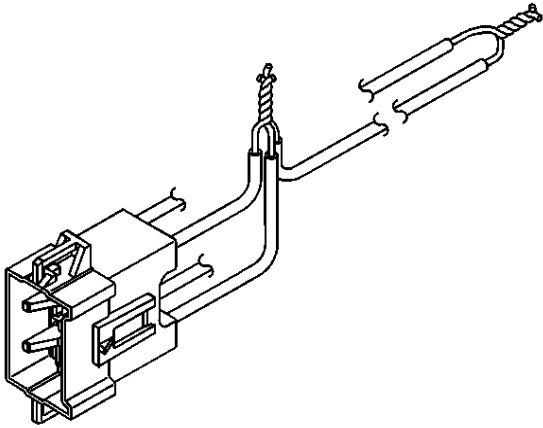
6. Cut the yellow harness connector out of the vehicle, leaving at least 16 cm (6 in) of wire at the connector.  
7. Strip 13 mm (0.5 in) of insulation from each of the connector wire leads.



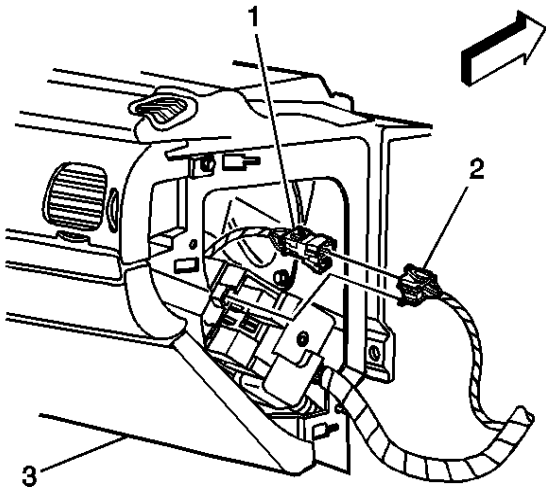
8. Cut two 6.1 m (20 ft) deployment wires from a 0.8 mm (18 gauge) or thicker multi-strand wire. Use these wires to fabricate the driver deployment harness.  
9. Strip 13 mm (0.5 in) of insulation from both ends of the wires.  
10. Twist together one end from each of the wires in order to short the wires. Deployment wires shall remain shorted, and not connected to a power source until you are ready to deploy the inflator module.



- 11. Twist together the 2 connector wire leads from the high circuits from both stages of the steering wheel module, to one set of deployment wires. Refer to [Component Connector End Views](#) in order to determine the correct circuits.
- 12. Inspect that the 3-wire connection is secure.
- 13. Secure and insulate the 3-wire connection to the deployment harness using electrical tape.



- 14. Twist together the 2 connector wire leads from the low circuits from both stages of the steering wheel module, to one set of deployment wires. Refer to [Component Connector End Views](#) in order to determine the correct circuits.
- 15. Inspect that the 3-wire connection is secure.
- 16. Secure and insulate the 3-wire connection to the deployment harness using electrical tape.
- 17. Connect the deployment harness to the connector on the steering wheel module.
- 18. Route the deployment harness out of the driver side of the vehicle.
- 19. Disconnect the yellow left roof rail harness connector from the vehicle harness connector.
- 20. Cut the harness connector out of the vehicle, leaving at least 16 cm (6 in) of wire at the connector.
- 21. Strip 13 mm (0.5 in) of insulation from each of the connector wire leads.
- 22. Cut two 6.1 m (20 ft) deployment wires from a 0.8 mm (18 gauge) or thicker multi-strand wire. These wires will be used to fabricate the roof rail air bag deployment harness.
- 23. Strip 13 mm (0.5 in) of insulation from both ends of the wires.
- 24. Twist together one end from each of the wires in order to short the wires.
- 25. Twist together one connector wire lead to one deployment wire.
- 26. Secure and insulate the connection using electrical tape.
- 27. Twist together and tape the remaining connector wire lead to the remaining deployment wire.
- 28. Connect the deployment harness to the yellow connector of the roof rail module.
- 29. Route the deployment harness out of the driver side of the vehicle.



- 30. Disconnect the instrument panel module yellow harness connector (1) from the vehicle harness connector (2).

**Note:** If the vehicle is equipped with dual stage air bags the steering wheel module and instrument panel module will each have 4 wires. Refer to [Component Connector End Views](#) for determining high and low circuits.

- 31. Cut the yellow harness connector out of the vehicle, leaving at least 16 cm (6 in) of wire at the connector.
- 32. Strip 13 mm (0.5 in) of insulation from each of the connector wire leads.

- Cut two 6.1 m (20 ft) deployment wires from a 0.8 mm (18 gauge) or thicker multi-strand wire. These wires will be used to fabricate the passenger deployment harness.
- Strip 13 mm (0.5 in) of insulation from both ends of the wires.
- Twist together one end from each of the wires in order to short the wires.
- Twist together the 2 connector wire leads from the high circuits from both stages of the instrument panel module to one set of deployment wires. Refer to [Component Connector End Views](#) in order to determine the correct circuits.
- Inspect that the 3-wire connection is secure.
- Secure and insulate the 3-wire connection to the deployment harness using electrical tape.
- Twist together the 2 connector wire leads from the low circuits from both stages of the instrument panel module to one set of deployment wires. Refer to [Component Connector End Views](#) in order to determine the correct circuits.
- Inspect that the 3-wire connection is secure.
- Secure and insulate the 3-wire connection to the deployment harness using electrical tape.
- Connect the deployment harness to the instrument panel module in-line connector.
- Route the deployment harness out of the passenger side of the vehicle.
- Disconnect the yellow harness connector to the right roof rail air bag from the vehicle harness connector.
- Cut the harness connector out of the vehicle, leaving at least 16 cm (6 in) of wire at the connector.
- Strip 13 mm (0.5 in) of insulation from each of the connector wire leads.
- Cut two 6.1 m (20 ft) deployment wires from a 0.8 mm (18 gauge) or thicker multi-strand wire. These wires will be used to fabricate the roof rail air bag deployment harness.
- Strip 13 mm (0.5 in) of insulation from both ends of the wires.
- Twist together one end from each of the wires in order to short the wires.
- Twist together one connector wire lead to one deployment wire.
- Secure and insulate the connection using electrical tape.
- Twist together and tape the remaining connector wire lead to the remaining deployment wire.
- Connect the deployment harness to the roof rail module yellow connector.
- Route the deployment harness out of the passenger side of the vehicle.
- Completely cover the windshield and the front door window openings with a drop cloth.
- Stretch to the full length all of the deployment harness wires on the right side of the vehicle.
- Deploy each deployment loop one at a time.
- Place a power source, 12 V minimum/2A minimum, such as a vehicle battery, near the shorted end of the harnesses.
- Separate one set of wires and touch the wire ends to the power source in order to deploy the selected inflator module.
- Disconnect the deployment harness from the power source and twist the wire ends together.
- Continue the same process with the remaining deployment harnesses.
- Disconnect all harnesses from the vehicle.
- Discard the harnesses.
- Scrap the vehicle in the same manner as a non-SIR equipped vehicle.
- If one or all of the inflator modules did not deploy, remove the undeployed modules from the vehicle.

## Pretensioner Handling and Scrapping

### Special Tools

- *EL-38826* SIR Deployment Harness
- *EL-39401-B* SIR Deployment Fixture

For equivalent regional tools, refer to [Special Tools](#).

**Warning:** When you are carrying an undeployed seat belt pretensioner:

- Do not carry the seat belt pretensioner by the wires or connector on the pretensioner.
- Do not touch the seat belt pretensioner in the area of the cable.
- Do not cover the tube opening with your hand.
- Keep the open end of the tube pointed away from you. Do not point the open end of the tube at another person.
- When the pretensioner deploys the cable retracts. This shortens the pretensioner between the buckle and the mounting bolt. Grasp the pretensioner by the piston tube.

Disregarding these precautions may result in personal injury or unnecessary SIR system repairs.

### Scrapping Procedure

During the course of a vehicle's useful life, certain situations may arise which will necessitate the disposal of a live (undeployed) pretensioner. The following information covers the proper procedures for the disposing of a live (undeployed) pretensioner. Deploy the pretensioner before disposal. Do not dispose of a live (undeployed) pretensioner through normal disposal channels until the pretensioner has been deployed. The following information covers the proper procedures for the disposing of a live (undeployed) pretensioner.

- After replacement of a pretensioner under warranty. The pretensioner may need to be returned undeployed to the original manufacturer of pretensioner.
- If the vehicle is the subject of a product liability report related to the SIR system and is subject to a preliminary investigation (GM-1241). Do not alter the SIR system in any manner.
- If the vehicle is involved in a campaign affecting the pretensioners. Follow the instructions in the campaign service bulletin for proper SIR handling procedures.

### Deployment Procedures

The pretensioner can be deployed inside or outside of the vehicle. The method used depends upon the final disposition of the vehicle. Review the following procedures in order to determine which will work best in a given situation.

#### Deployment Inside the Vehicle

Refer to [Inflatable Restraint Module Handling and Scrapping](#) for deploying the pretensioner inside vehicle under vehicle scrapping procedure.

#### Deployment Outside Vehicle for Seat Belt Pretensioners

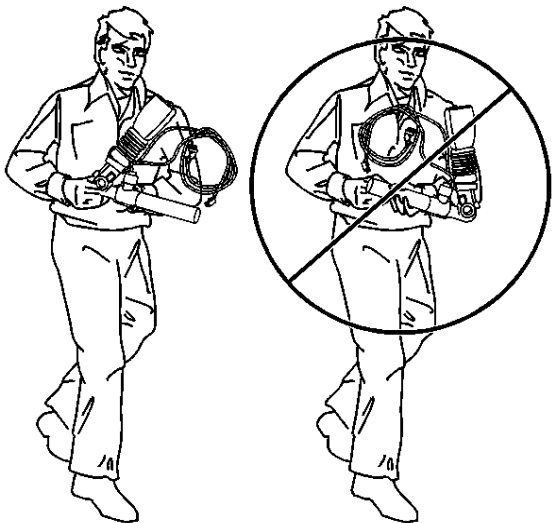
Deploy the seat belt pretensioners outside of the vehicle when the vehicle will be returned to service. Situations that require deployment outside of the vehicle include the following:

- Using the SIR diagnostics, you determine that the seat belt pretensioner is malfunctioning.
- The pretensioner pigtail (if equipped) is damaged.
- The pretensioner connector is damaged.
- The pretensioner connector terminal is damaged.

Deployment and disposal of a malfunctioning seat belt pretensioner is subject to any required retention period.

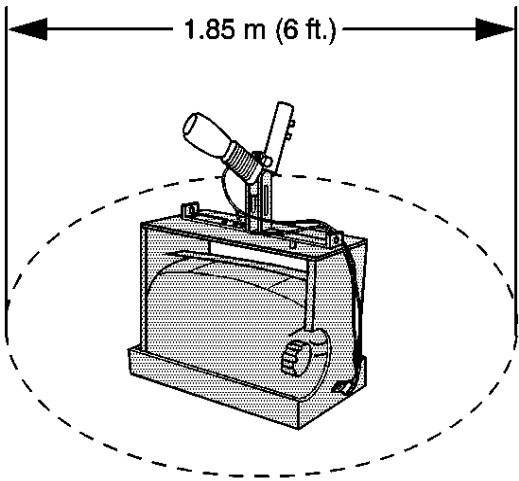
**Warning:** In order to prevent accidental deployment of the pretensioner which could cause personal injury, do not dispose of an undeployed pretensioner as normal shop waste. The undeployed pretensioner contains substances that could cause severe illness or personal injury if the sealed container is damaged during disposal. Use the following deployment procedures to safely dispose of an undeployed pretensioner. Failure to dispose of a pretensioner as instructed may be a violation of federal, state, or local laws.

**Warning:** When you are deploying a pretensioner for disposal, perform the deployment procedures in the order listed. Failure to follow the procedures in the order listed may result in personal injury.

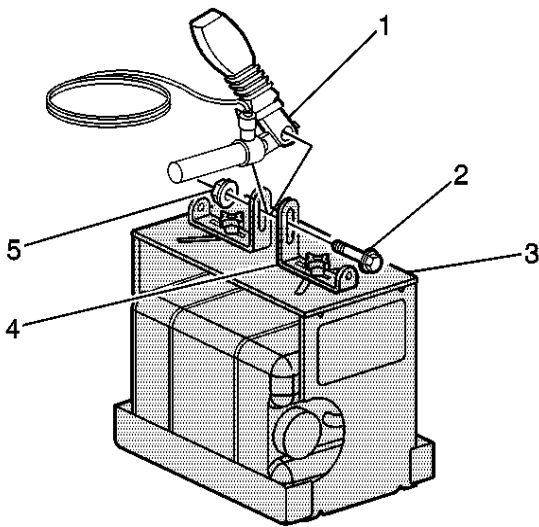


1. Turn the ignition switch to the OFF position.

2. Remove the seat belt pretensioner from the vehicle.
3. When carrying a pretensioner to the deployment area keep the open end of pretensioner pointed away from the body.



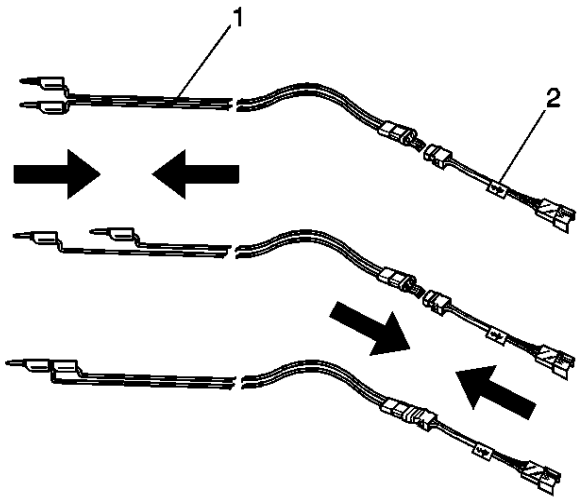
4. Clear a space on the ground about 1.85 M (6 ft) in diameter for deployment of the pretensioner. If possible, use a paved, outdoor location free of activity. Otherwise, use a space free of activity on the shop floor. Make sure you have sufficient ventilation.
5. Make sure no loose or flammable objects are in the area.
6. Place the *EL-39401-B* fixture in the center of the cleared area.
7. Fill the fixture plastic reservoir with water or sand.



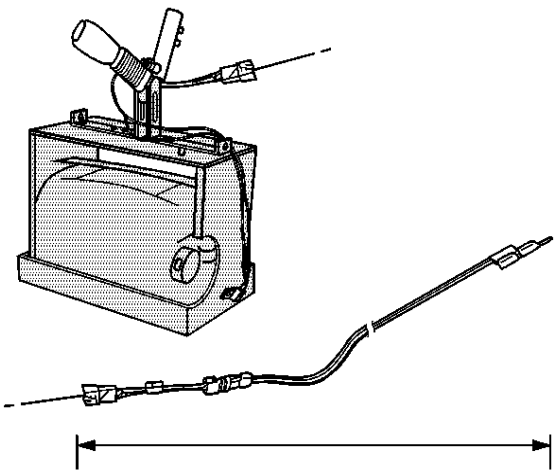
8. Mount the module (1) in the SIR deployment fixture (3) with the open end facing up using the following mounting method.
- Adjust and secure the *EL-39401-B* fixture arms (4) to the deployment fixture (3).

• To mount, use the proper size bolt (2) and nut (5) with washers in order to secure the pretensioner (1) to the deployment fixture brackets (4).

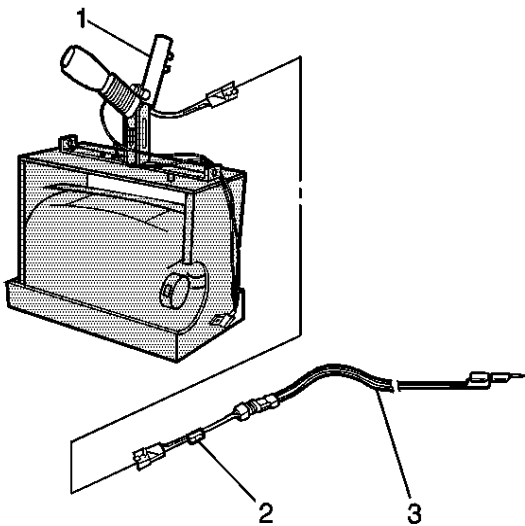
• Securely tighten all fasteners prior to deployment.



9. Inspect the *EL-38826* harness and the appropriate pigtail adapter for damage. Replace as needed.
10. Short the 2 SIR deployment harness (1) leads together using one banana plug seated into the other.
11. Connect the appropriate pigtail adapter (2) to the SIR deployment harness (1).



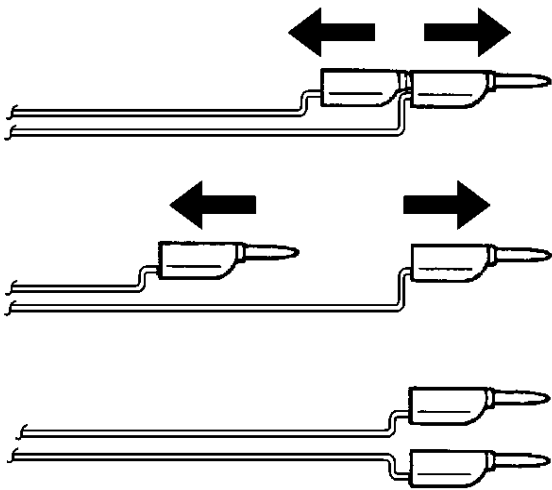
12. Extend the SIR deployment harness and adapter to full length from the deployment fixture.



13. Connect the pretensioner (1) to the adapter (2) on the deployment harness (3).

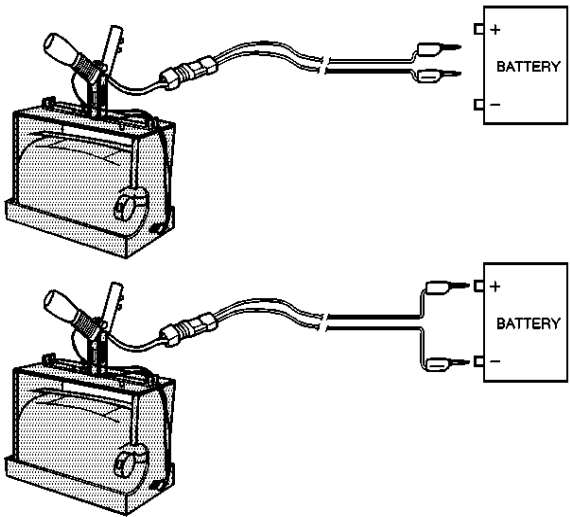
**Note:** The rapid gas expansion involved with deploying a pretensioner is very loud. Notify all the people in the immediate area that you intend to deploy the seat belt pretensioner.

14. Clear the area of people.



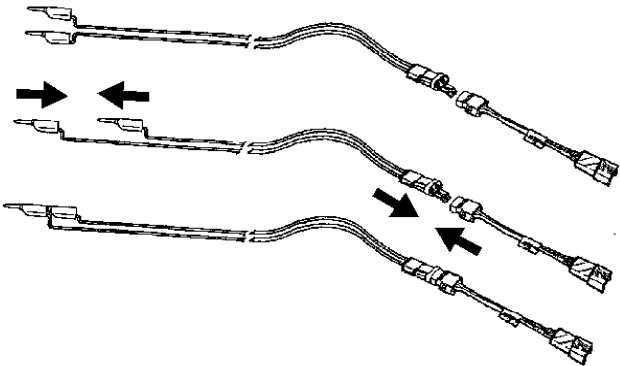
**Warning:** When you are deploying a pretensioner for disposal, perform the deployment procedures in the order listed. Failure to follow the procedures in the order listed may result in personal injury.

15. Separate the 2 banana plugs on the SIR deployment harness.



**Note:** When the seat belt pretensioner deploys, the deployment fixture may jump about 30 cm (1 ft) vertically. This is a normal reaction of the seat belt pretensioner due to the force of the rapid expansion of gas inside the pretensioner.

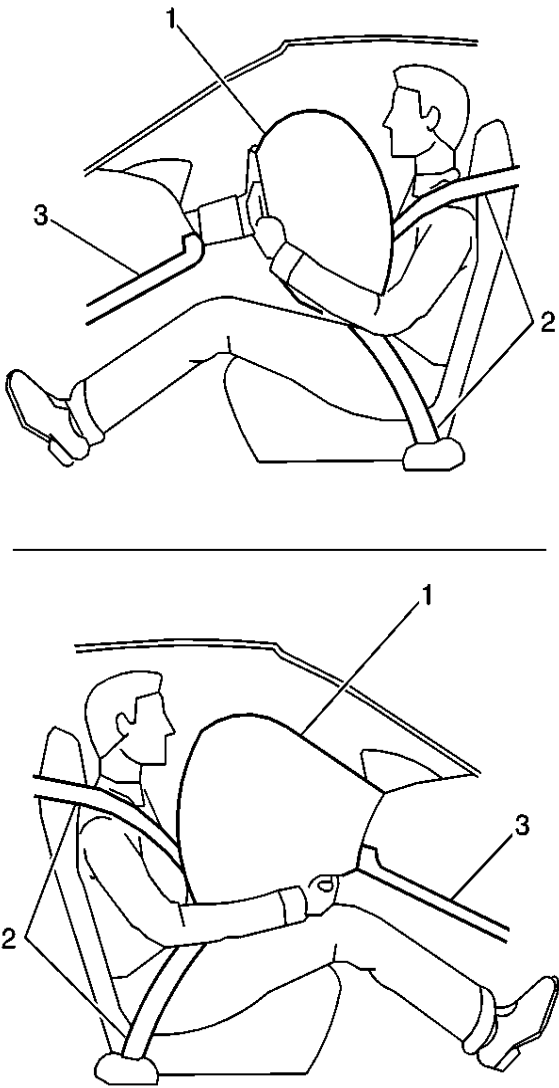
- 16. Place a 12V minimum/2A minimum power source (i.e., vehicle battery) near the shorted end of the harness.
- 17. Connect the SIR deployment harness wires to the power source. Pretensioner deployment will occur when contact is made.
- 18. Disconnect the SIR deployment harness from the power source after the pretensioner deploys.



- 19. Seat one banana plug into the other in order to short the deployment harness leads.
- 20. If the pretensioner did not deploy, disconnect the adapter and discontinue the procedure. Contact the Technical Assistance Group. Otherwise, proceed to the following steps.
- 21. Put on a pair of shop gloves.
- 22. Disconnect the pigtail adapter from the pretensioner as soon as possible.
- 23. Inspect the pigtail adapter and the SIR deployment harness. Replace as needed.
- 24. Dispose of the deployed pretensioner through normal refuse channels.
- 25. Wash hands with a mild soap.

## SIR System Description and Operation

### SIR System Overview



The supplemental inflatable restraint (SIR) system supplements the protection offered by the occupants Seat Belt System (2). The SIR system may contain several inflator modules located throughout the vehicle, i.e. steering wheel module (1), instrument panel module (1), or roof rail modules (1). In addition to inflator modules, the vehicle may contain seat belt pretensioners (2) that tighten the seat belt in the event of a collision, thus reducing the distance between the occupant and the seat belt when an inflator module is deployed. Each inflator module has a deployment loop that is controlled by the inflatable restraint sensing and diagnostic module (SDM) mounted inside the vehicle. The SDM determines the severity of a collision with the assistance of various sensor inputs located at strategic points on the vehicle. When the SDM detects a collision, it will process the information provided by the sensors to further support air bag or pretensioner deployment. The SDM will deploy the frontal air bags and pretensioners if it detects a collision of sufficient force. If the force of the impact is not sufficient to warrant inflator module deployment, the SDM may still deploy the seat belt pretensioners. The SDM performs continuous diagnostic monitoring of the SIR system electrical components. Upon detection of a circuit malfunction, the SDM will set a DTC and inform the driver by illuminating the AIR BAG indicator. The steering column (3) and knee bolsters (3) are designed to absorb energy and compress during frontal collisions in order to limit leg movement and decrease the chance of injury to the driver and passenger.

### Frontal SIR System Description

The frontal supplemental inflatable restraint (SIR) system consists of the following components:

- AIR BAG indicator located in the instrument cluster
- Inflatable restraint sensing and diagnostic module (SDM)
- Inflatable restraint passenger presence detection system
- Inflatable restraint Passenger AIR BAG ON/OFF indicator
- Inflatable restraint passenger frontal air bag module
- Inflatable restraint seat position sensors
- Inflatable restraint driver frontal air bag module
- Inflatable restraint steering wheel module coil
- Inflatable restraint seat belt retractor pretensioners
- Inflatable restraint wiring harnesses
- Steering wheel and column
- Driver and front passenger knee bolsters

A frontal collision of sufficient force will deploy the frontal air bags and/or pretensioners. The inflatable restraint sensing and diagnostic module (SDM) contains a sensing device that converts vehicle velocity changes to an electrical signal. The SDM compares these signals to values stored in memory. If the signals exceed a stored value, the SDM will determine the severity of the impact and either cause current to flow through the frontal deployment loops deploying the frontal air bags and pretensioners, or it will deploy the pretensioners only. The SDM, instrument panel module, steering wheel module, steering wheel module coil, seat belt retractor pretensioners, and the connecting wires make up the frontal deployment loops. The SDM continuously monitors the deployment loops for malfunctions and illuminates the AIR BAG indicator if a fault is detected.

### Inflatable Restraint Sensing and Diagnostic Module (SDM)

The inflatable restraint sensing and diagnostic module (SDM) is a microprocessor and the control center for the supplemental inflatable restraint (SIR) system. The SDM contains internal sensors along with several external sensors, if equipped, mounted at strategic locations on the vehicle. In the event of a collision, the SDM compares the signals from the internal and external sensors to a value stored in memory. When the generated signals exceed the stored value, the SDM will cause current to flow through the appropriate deployment loops to deploy the air bags. The SDM records the SIR system status when a deployment occurs and illuminates the AIR BAG indicator located in the instrument cluster. The SDM performs continuous diagnostic monitoring of the SIR system electrical components and circuitry when the ignition is turned ON. If the SDM detects a malfunction, a DTC will be stored and the SDM will request the instrument cluster to illuminate the AIR BAG indicator, notifying the driver that a malfunction exists. In the event that ignition positive voltage is lost during a collision, the SDM maintains a 23-volt loop reserve for deployment of the air bags. It is important when disabling the SIR system for servicing or rescue operations to allow the 23-volt loop reserve to dissipate, which could take up to 1 minute.

### Inflatable Restraint Passenger Presence Detection System - If Equipped

**Note:** The passenger presence detection system includes an ECU and a sensor mat that can be serviced separately. After repairing or replacing any part of the passenger presence detection system, the system must be rezeroed in order to function properly.

The passenger presence detection system is used to monitor the weight of an occupant on the front outboard passenger seat and communicate the status to the inflatable restraint sensing and diagnostic module (SDM) whether to enable or suppress the deployment of the passenger frontal air bag module. The passenger presence detection system consist of an electronic control module, sensor mat, heated seat element (if equipped), wiring harness, and PASSENGER AIR BAG ON/OFF indicators. The sensor is made up of flexible plastic material placed underneath the seat cushion foam. Pressure on the passenger presence detection mass sensor is converted into an electrical signal that the module reads and determines the passengers classification. If the sensor determines that the occupant weight is less than a specified value, the passenger presence detection module will send a suppress signal to the SDM to disable the passenger frontal air bag module. If the sensor determines the occupant weight is higher than a specified value, the passenger presence detection module will send an enable signal to the SDM to enable the passenger frontal air bag module. The passenger presence system module will notify the customer of the enable/disable status by illuminating one of the PASSENGER AIR BAG ON/OFF indicators. The passenger presence system will also notify the SDM of a fault and the SDM will request the instrument cluster to illuminate the AIR BAG indicator.

### Inflatable Restraint PASSENGER AIR BAG ON/OFF Indicator - If Equipped

The PASSENGER AIR BAG ON/OFF indicators are used to notify the driver and passenger when the passenger frontal air bag module is enabled or disabled.

### AIR BAG Indicator

The AIR BAG indicator, located in the instrument cluster and is used to notify the driver of SIR system malfunctions and to verify that the inflatable restraint sensing and diagnostic module (SDM) is communicating with the instrument cluster. When the ignition is turned ON, the SDM is supplied with ignition positive voltage. The SDM requests the instrument cluster will momentarily turn on the AIR BAG indicator. While the indicator is on, the SDM conducts tests on all SIR system components and circuits. If no malfunctions are detected the SDM will communicate with the instrument cluster through the serial data circuit and command the AIR BAG indicator OFF. The SDM provides continuous monitoring of the air bag circuits by conducting a sequence of checks. If a malfunction is detected the SDM will store a diagnostic trouble code (DTC) and command the instrument cluster to illuminate the AIR BAG indicator via serial data. The presence of a SIR system malfunction could result in non-deployment of the air bags or deployment in conditions less severe than intended. The AIR BAG indicator will remain ON until the malfunction has been repaired.

### Dual Stage Inflator Modules

Dual stage inflator modules contain a housing, inflatable air bag, two initiating devices, canister of gas generating material and, in some cases, stored compressed gas. The two initiators are part of the frontal deployment loop. The function of the frontal deployment loops are to supply current through the steering wheel and instrument panel inflator modules to deploy the air bags. The inflator modules have two stages of deployment, which varies the amount of restraint to the occupant according to the collision severity. For moderate frontal collisions the inflator modules deploy at less than full deployment (low deployment) which consists of stage 1 of the inflator module. For more severe frontal collisions a full deployment is initiated which consists of stage 1 and stage 2 of the inflator module. The current passing through the initiators ignites the material in the canister producing a rapid generation of gas and in some cases, the release of compressed gas. The gas produced from this reaction rapidly inflates the air bag. Once the air bag is inflated it quickly deflates through the air bag vent holes and/or the bag fabric.

Each dual stage inflator modules is equipped with a shorting bar located in the connectors of the module. The shorting bar shorts the inflator module deployment loop circuitry to prevent unwanted deployment of the air bag when it is disconnected.

### Inflatable Restraint Seat Belt Pretensioners

The seat belt retractor pretensioners consist of a housing, seat belt retractor and/or seat belt anchor, seat belt webbing, an initiator, and a canister of gas generating materials. The initiator is part of the seat belt pretensioner deployment loop. When the vehicle is involved in a collision of sufficient force, the inflatable restraint sensing and diagnostic module (SDM) causes current to flow through the seat belt deployment loops to the initiator. Current passing through the initiator ignites the material in the canister producing a rapid generation of gas. The gas produced from this reaction deploys the seat belt pretensioners and retracts the seat belt webbing, which removes all of the slack in the seat belts. Depending on the severity of the collision, the seat belt pretensioners may deploy without the frontal inflator modules deploying, or they will deploy immediately before the frontal inflator modules deploy. Each seat belt pretensioner is equipped with a shorting bar that is located in the connector of the seat belt pretensioner. The shorting bar shorts the seat belt pretensioner circuitry to prevent unwanted deployment of the seat belt pretensioner when the connector is disconnected.

### Inflatable Restraint Seat Position Sensors - If Equipped

The inflatable restraint seat position sensor is used to determine the proximity of a front driver or passenger seat position with respect to the frontal air bag. The seat position sensor interfaces with the inflatable restraint sensing and diagnostic module (SDM). The state of the seat position sensor allows the SDM to disable stage 2 of the frontal air bag for a front seat that is forward of the forward/rearward point in seat track travel. The seat position sensor is a hall effect sensor that is mounted on the outboard seat track of the driver and passenger seats. The seat track includes a metal bracket that shunts the seat position sensor magnetic circuit creating 2 states of seat position. The shunted state represents a rearward seat position. The non-shunted state represents a forward position. The seat position sensor provides 2 current ranges, one range for the shunted state and a second range for a non-shunted state. These 2 states are inputs to the SDM, state 1 (shunted) being the rearward threshold and state 2 (non-shunted) being the forward threshold. When the SDM receives input from a seat position sensor that state 1 threshold is reached (seat is rearward), the SDM will not disable stage 2 deployment, if required by the deployment sensors. When state 2 threshold is reached (seat is forward), the SDM will disable stage 2 deployment on the side the seat is forward. The SDM monitors the seat position sensor circuit and if a fault is detected, the SDM will set code B0079 and disable stage 2 frontal deployment

### Inflatable Restraint Steering Wheel Module Coil

The steering wheel module coil is attached to the steering column and is located under the steering wheel. The steering wheel module coil

consists of two or more current-carrying coils. The coils allow the rotation of the steering wheel while maintaining continuous electrical contact between the driver deployment loop and the steering wheel module. Two or four, if equipped with dual stage air bags, coil wires are used for the steering wheel module deployment loop. Additional coil wires are used for accessories attached to the steering wheel depending on the vehicle model. The steering wheel module coil connector is located near the base of the steering column. The connector contains a shorting bar that shorts the steering wheel module coil deployment loop circuitry to prevent unwanted deployment of the air bag when servicing the inflator module.

### Steering Column and Wheel

The steering wheel and columns are designed to absorb energy when driver contact is made with the steering wheel or inflated air bag. In a frontal collision the driver may come in contact with the steering wheel directly or load the steering wheel and column through the inflated air bag. When the driver applies load to the air bag or the steering wheel the column will compress downward absorbing some of the impact, helping to reduce bodily injuries to the driver. The steering wheel and column must be inspected for damages after a collision.

### Knee Bolster

The knee bolsters are designed to help restrain the lower torso of front seat occupants by absorbing the energy through the front seat occupants upper legs. In a frontal collision the front seat occupant legs may come in contact with the knee bolsters. The knee bolsters are designed to crush or deform, absorbing some of the impact, which helps to reduce bodily injuries. The driver and passenger knee bolsters are located in the lower part of the instrument panel and must be inspected for damages after a collision.

### Side SIR System Description

The side supplemental inflatable restraint (SIR) system consists of the following components:

- AIR BAG indicators
- Inflatable restraint sensing and diagnostic module (SDM)
- Inflatable restraint side impact sensors
- Inflatable restraint roof rail air bag modules
- Inflatable restraint wiring harnesses

### Inflatable Restraint Roof Rail Modules

The roof rail modules are located under the headliner extending from the front windshield pillar to the rear window pillar. The roof rail modules contain a housing, inflatable air bag, initiating device, and a canister of gas generating material. The initiator is part of the roof rail module deployment loop. When a side impact of sufficient force occurs the side impact sensor detects the impact and sends a signal to the inflatable restraint sensing and diagnostic module (SDM). The SDM compares the signal received from the side impact sensor to a value stored in memory. When the generated signal exceeds the stored value, the SDM will cause current to flow through the side deployment loop deploying the roof rail air bags. The SDM, roof rail modules, and the connecting wires make up the side deployment loops. The SDM continuously monitors the deployment loops for malfunctions and illuminates the AIR BAG indicator if a fault is present.

Each roof rail module is equipped with a shorting bar located on the connector of the module. The shorting bar shorts the roof rail module deployment loop circuitry to prevent unwanted deployment of the air bag when servicing the inflator module.

### Inflatable Restraint Side Impact Modules

The side impact modules are located in the outside portion of the seat backs. The side impact modules contain a housing, inflatable air bag, initiating device, and a canister of gas generating material. The initiator is part of the side impact deployment loop. When a side impact of sufficient force occurs the side impact sensor detects the impact and sends a signal to the inflatable restraint sensing and diagnostic module (SDM). The SDM compares the signal received from the side impact sensor to a value stored in memory. When the generated signal exceeds the stored value, the SDM will cause current to flow through the side deployment loop deploying the side air bags. The SDM, side impact modules, and the connecting wires makeup the side deployment loops. The SDM continuously monitors the deployment loops for malfunctions and turns the AIR BAG indicator ON if a fault is present.

Each side impact is equipped with a shorting bar located on the connector of the module. The shorting bar shorts the side impact module deployment loop circuitry to prevent unwanted deployment of the air bag when servicing the inflator module.

### Inflatable Restraint Side Impact Sensor

The side impact sensor contains a sensing device which monitors vehicle acceleration and velocity changes to detect side collisions that are severe enough to warrant air bag deployment. The side impact sensor is not part of the deployment loop, but instead provides an input to the inflatable restraint sensing and diagnostic module (SDM). The SDM contains a microprocessor that performs calculations using the measured accelerations and compares these calculations to a value stored in memory. When the generated calculations exceed the stored value, the SDM will cause current to flow through the deployment loops deploying the roof rail module air bags.

### Inflatable Restraint Wiring Harness

The inflatable restraint wiring harnesses connect the inflators modules, inflatable restraint sensing and diagnostic module (SDM), deployment loops, and serial data together using weather pack connectors. SIR system connectors are yellow in color for easy identification. When repairing the SIR wiring harnesses follow the proper testing and wiring repair procedures listed in this manual.

## SIR Disabling and Enabling

SIR component location affects how a vehicle should be serviced. There are parts of the SIR system installed in various locations around a vehicle. To find the location of the SIR components refer to [SIR Identification Views](#).

There are several reasons for disabling the SIR system, such as repairs to the SIR system or servicing a component near or attached to an SIR component. There are several ways to disable the SIR system depending on what type of service is being performed. The following information covers the proper procedures for disabling/enabling the SIR system.

| Condition                                                                                                                        | Action                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| If the vehicle was involved in an accident with an air bag deployment.                                                           | Disconnect the negative battery cable(s) *. Refer to <a href="#">Repairs and Inspections Required After a Collision</a> . |
| When performing SIR diagnostics.                                                                                                 | Follow the appropriate SIR service manual diagnostic procedure(s) *                                                       |
| When moving, removing or replacing an SIR component or a component attached to an SIR component. (Anytime you remove fasteners.) | Disconnect the negative battery cable(s) *                                                                                |
| If the vehicle is suspected of having shorted electrical wires.                                                                  | Disconnect the negative battery cable(s) *                                                                                |
| When performing electrical diagnosis on components other than the SIR system.                                                    | Remove the SIR/Airbag fuse(s) when indicated by the diagnostic procedure to disable the SIR system                        |
| * DTCs will be lost when the negative battery cable is disconnected.                                                             |                                                                                                                           |

### SIR Service Precautions

**Warning:** When performing service on or near the SIR components or the SIR wiring, the SIR system must be disabled. Failure to observe the correct procedure could cause deployment of the SIR components. Serious injury can occur. Failure to observe the correct procedure could also result in unnecessary SIR system repairs.

The inflatable restraint sensing and diagnostic module (SDM) maintains a reserved energy supply. The reserved energy supply provides deployment power for the air bags if the SDM loses battery power during a collision. Deployment power is available for as much as 1 minute after disconnecting the vehicle power. Waiting 1 minute before working on the system after disabling the SIR system prevents deployment of the air bags from the reserved energy supply.

### General Service Instructions

The following are general service instructions which must be followed in order to properly repair the vehicle and return it to its original integrity:

- Do not expose inflator modules to temperatures above 65°C (150°F).
- Verify the correct replacement part number. Do not substitute a component from a different vehicle.
- Use only original GM replacement parts available from your authorized GM dealer. Do not use salvaged parts for repairs to the SIR system.

Discard any of the following components if it has been dropped from a height of 91 cm (3 feet) or greater:

- Inflatable restraint sensing and diagnostic module (SDM)
- Any Inflatable restraint air bag module
- Inflatable restraint steering wheel module coil
- Any Inflatable restraint sensor
- Inflatable restraint seat belt pretensioners
- Inflatable restraint passenger presence detection module or sensor

### Disabling Procedure - Air Bag Fuse

- Turn the steering wheel so that the vehicles wheels are pointing straight ahead.
- Place the ignition in the OFF position.

**Note:** The SDM may have more than one fused power input. To ensure there is no unwanted SIR deployment, personal injury, or unnecessary SIR system repairs, remove all fuses supplying power to the SDM. With all SDM fuses removed and the ignition switch in the ON position, the AIR BAG warning indicator illuminates. This is normal operation, and does not indicate a SIR system malfunction.

- Locate and remove the fuse(s) supplying power to the SDM. Refer to [SIR Schematics](#) or [Electrical Center Identification Views](#).
- Wait 1 minute before working on the system.

### Enabling Procedure - Air Bag Fuse

- Place the ignition in the OFF position.
- Install the fuse(s) supplying power to the SDM. Refer to [SIR Schematics](#) or [Electrical Center Identification Views](#).
- Turn the ignition switch to the ON position. The AIR BAG indicator will flash then turn OFF.
- Perform the Diagnostic System Check - Vehicle if the AIR BAG warning indicator does not operate as described. Refer to [Diagnostic System Check - Vehicle](#).

**Disabling Procedure - Negative Battery Cable**

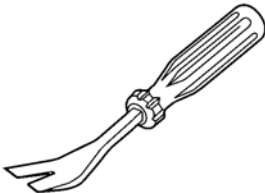
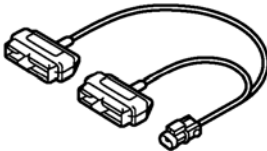
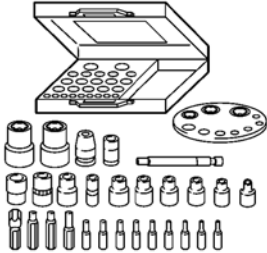
1. Turn the steering wheel so that the vehicles wheels are pointing straight ahead.
2. Place the ignition in the OFF position.
3. Disconnect the negative battery cable from the battery. Refer to [Battery Negative Cable Disconnection and Connection](#).
4. Wait 1 minute before working on system.

**Enabling Procedure - Negative Battery Cable**

1. Place the ignition in the OFF position.
2. Connect the negative battery cable to the battery. Refer to [Battery Negative Cable Disconnection and Connection](#).
3. Turn the ignition switch to the ON position. The AIR BAG indicator will flash then turn OFF.
4. Perform the Diagnostic System Check - Vehicle if the AIR BAG warning indicator does not operate as described. Refer to [Diagnostic System Check - Vehicle](#).

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Special Tools

| Illustration                                                                        | Tool Number / Description                                    |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------|
|    | BO-569-A<br>KM-569-A<br>Plug Lifter                          |
|   | DT-6459-B<br>MKM-J-6459-B<br>Torque Wrench                   |
|  | EL-799-3<br>KM-799-3<br>Adapter Cable Airbag Deployment Unit |
|  | EL-799-13<br>KM-799-13<br>Airbag Deployment Unit             |
|  | GE-604-D<br>MKM-604<br>Torx Bit and Socket Set               |