

2010 RESTRAINTS

Supplemental Inflatable Restraints - Equinox & Terrain

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Driver or Passenger Seat Side Inflatable Restraint Module Nut	9 N.m	80 lb in
Driver or Passenger Seat Belt Tensioner Assembly Fastener	45 N.m	33 lb ft
Driver or Passenger Seat Belt Tensioner Fastener	7.5 N.m	66 lb in
Driver or Passenger Seat Shoulder Belt Guide Fastener	45 N.m	33 lb ft
Driver or Passenger Seat Shoulder Belt Retractor Fastener	45 N.m	33 lb in
Front Seat Belt Tensioner Fastener	7.5 N.m	66 lb in
Inflatable Restraint Remote Impact Fasteners	7.5 N.m	66 lb in
Inflatable Restraint Roof Side Rail Module Fasteners	9 N.m	80 lb in
Inflatable Restraint Sensing and Diagnostic Module (SDM) Fasteners	10 N.m	89 lb in
Inflatable Restraint Side Impact Sensor Bolts	7.5 N.m	66 lb in
Inflatable Restraint Steering Wheel Module Coil Bolt	3 N.m	27 lb in

SCHEMATIC AND ROUTING DIAGRAMS

SIR SCHEMATICS

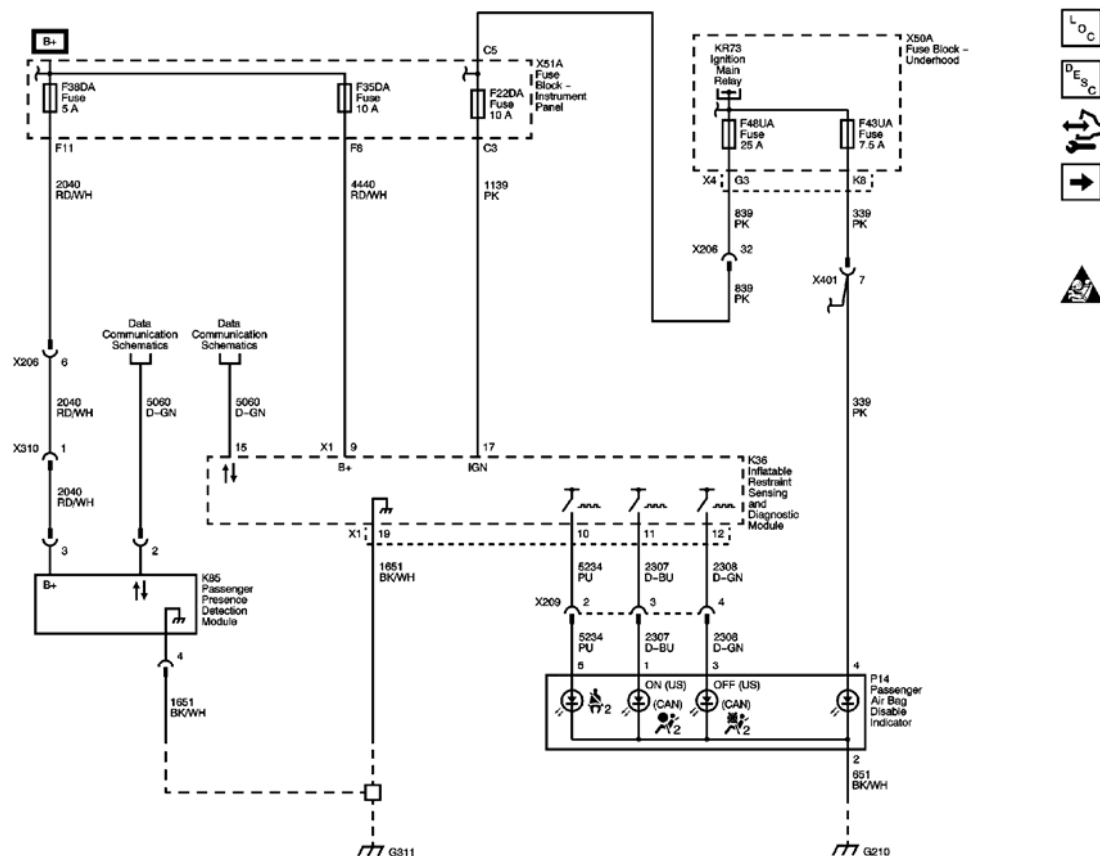


Fig. 1: Module Power, Ground, Serial Data, and Front Passenger Presence System
 Courtesy of GENERAL MOTORS CORP.

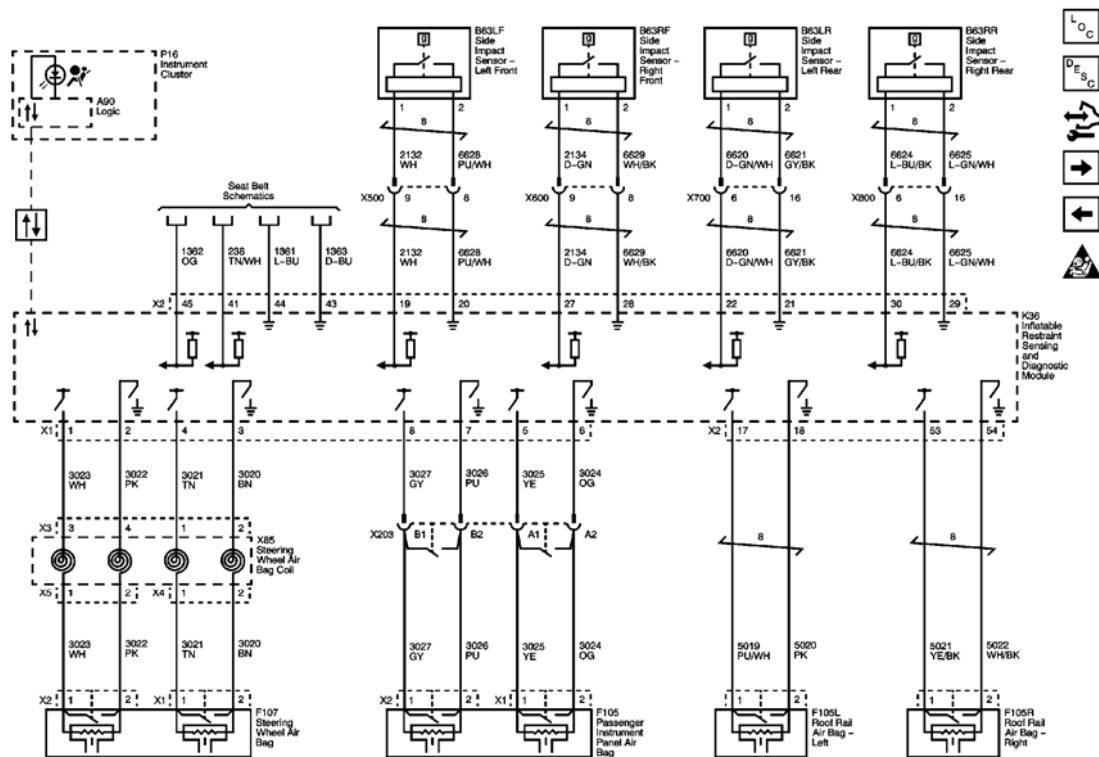


Fig. 2: Airbags and Sensors (1 of 2)
 Courtesy of GENERAL MOTORS CORP.

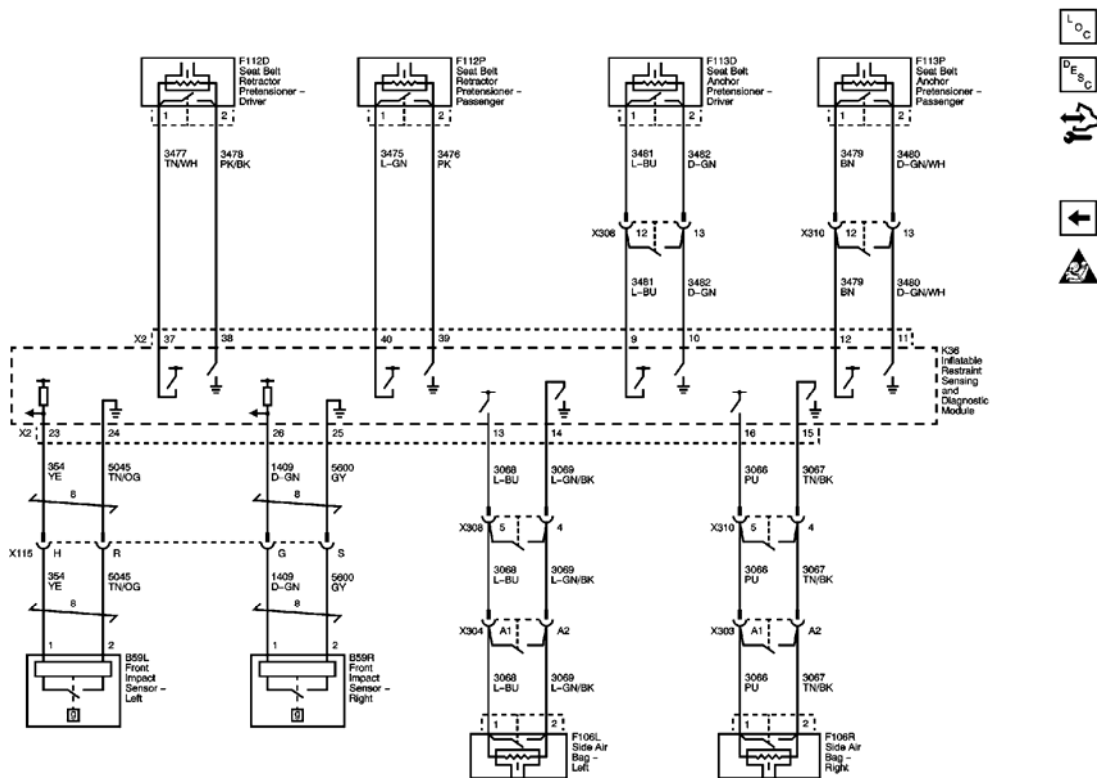


Fig. 3: Airbags and Sensors (2 of 2)
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

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**.

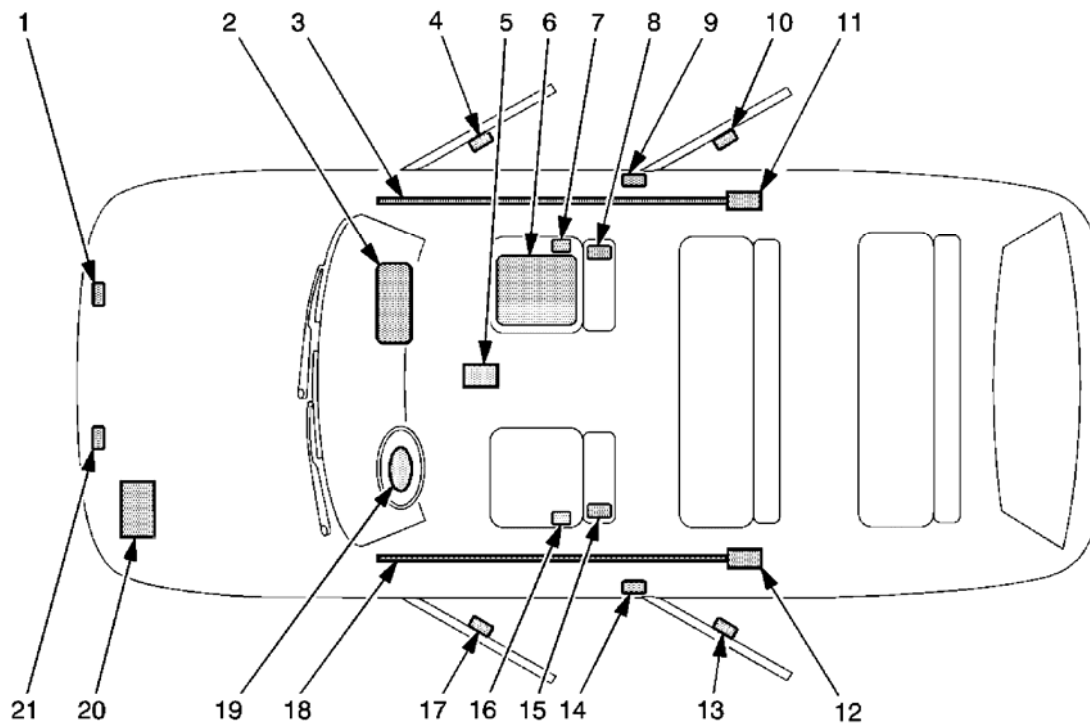


Fig. 4: Identifying SIR Components
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
1	Front End Sensor - Right-Located under the front hood in the engine compartment
2	Instrument Panel Air Bag-Located at the top right under the instrument panel
3	Roof Rail Air Bag - Right-Located under the headliner, extending from the passenger front windshield pillar to the passenger rear windshield pillar
4	Right Front Side Impact Sensor-Located under the right front door trim near the lower rear of the door frame
5	Inflatable Restraint Sensing and Diagnostic Module (SDM)-Located underneath the vehicle carpet under the center console
6	Passenger Presence Detection System-Located under the front passenger seat trim cover (if equipped)
7	Right Front Seat Belt Anchor Tensioner-Located on the outboard side of the passenger seat (if equipped)
8	Passenger Side Seat Impact Air Bag-Located on the seat back of passenger seat (if equipped)
9	Right Front Seat Belt Retractor Pretensioner-Located under the trim near the bottom of the center pillar
10	Right Rear Side Impact Sensor-Located under the right rear door trim near the lower rear of the door frame
11	Right Roof Rail Module-Located behind the garnish molding on the upper rear

	pillar
12	Left Roof Rail Module-Located behind garnish molding on the upper rear pillar
13	Left Rear Side Impact Sensor-Located under the left rear door trim near the lower rear of the door frame
14	Left Front Seat Belt Retractor Pretensioner-Located under the trim near the bottom of the center pillar
15	Driver Side Seat Impact Air Bag-Located on the seat back of the driver seat
16	Left Front Seat belt Anchor Tensioner-Located on the outboard side of the driver seat
17	Left Front Side Impact Sensor-Located under the left front door trim near the lower rear of the door frame
18	Left Roof Rail Air Bag-Located under the headliner, extending from the driver front windshield pillar to the driver rear windshield pillar
19	Steering Wheel Air Bag-Located on the steering wheel
20	Vehicle Battery-Located at the front left of the engine compartment.
21	Left Front End Sensor-Located under the front hood in the engine compartment

DIAGNOSTIC INFORMATION AND PROCEDURES

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
<u>DTC B0012 or B0013</u>	B0012 01: Driver Frontal Deployment Loop Stage 1 Short to Battery B0012 02: Driver Frontal Deployment Loop Stage 1 Short to Ground B0012 04: Driver Frontal Deployment Loop Stage 1 Open B0012 0D: Driver Frontal Deployment Loop Stage 1 High Resistance B0012 0E: Driver Frontal Deployment Loop Stage 1 Low Resistance B0013 01: Driver Frontal Deployment Loop Stage 2 Short to Battery B0013 02: Driver Frontal Deployment Loop Stage 2 Short to Ground B0013 04: Driver Frontal Deployment Loop Stage 2 Open B0013 0D: Driver Frontal Deployment Loop Stage 2 High Resistance B0013 0E: Driver Frontal Deployment Loop Stage 2 Low Resistance
<u>DTC B0014-B0045</u>	B0014 01: Driver Side Deployment Loop Short to Battery - Seat Air Bag B0014 02: Driver Side Deployment Loop Short to Ground - Seat Air Bag B0014 04: Driver Side Deployment Loop Open - Seat Air Bag B0014 0D: Driver Side Deployment Loop High Resistance - Seat Air Bag B0014 0E: Driver Side Deployment Loop Low Resistance - Seat Air Bag B0015 01: Driver Seat Belt Retractor Pretensioner Deployment Loop Short to Battery B0015 02: Driver Seat Belt Retractor Pretensioner Deployment Loop Short to Ground B0015 04: Driver Seat Belt Retractor Pretensioner Deployment Loop Open

	Open B001A 0D: Driver Seat Belt Anchor Pretensioner Deployment Loop High Resistance B001A 0E: Driver Seat Belt Anchor Pretensioner Deployment Loop Low Resistance B001B 01: Passenger Seat Belt Anchor Pretensioner Deployment Loop Short to Battery B001B 02: Passenger Seat Belt Anchor Pretensioner Deployment Loop Short to Ground B001B 04: Passenger Seat Belt Anchor Pretensioner Deployment Loop Open B001B 0D: Passenger Seat Belt Anchor Pretensioner Deployment Loop High Resistance B001B 0E: Passenger Seat Belt Anchor Pretensioner Deployment Loop Low Resistance
<u>DTC B0052</u>	B0052 00: Deployment Commanded Malfunction B0052 56: Deployment Commanded Too Many Transitions
<u>DTC B0074</u>	B0074 00: Passenger Occupant Classification Sensor Circuit Malfunction B0074 0D: Passenger Occupant Classification Sensor Resistance Above Threshold B0074 0E: Passenger Occupant Classification Sensor Resistance Below Threshold B0074 0F: Passenger Occupant Classification Sensor Erratic (Wet Seat)
<u>DTC B0081 (SDM)</u>	B0081 00: Passenger Presence System Malfunction B0081 3A: Passenger Presence System Incorrect Component Installed
<u>DTC B0081 (Passenger Presence Detection Module)</u>	B0081 11: Passenger Presence Module High Input B0081 4B: Passenger Presence Module Calibration Not Learned
<u>DTC B0083-B0088</u>	B0083 01: Front Impact Sensor 1 Short to Battery (Driver) B0083 02: Front Impact Sensor 1 Short to Ground (Driver) B0083 04: Front Impact Sensor 1 Open (Driver) B0083 05: Front Impact Sensor 1 Voltage High/Open (Driver) B0083 0C: Front Impact Sensor 1 Low Current (Driver) B0083 39: Front Impact Sensor 1 Internal Electronic Failure (Driver) B0083 3A: Front Impact Sensor 1 Incorrect Component Installed (Driver) B0083 71: Front Impact Sensor 1 Invalid Serial Data Received (Driver) B0084 01: Front Impact Sensor 2 Short to Battery (Passenger) B0084 02: Front Impact Sensor 2 Short to Ground (Passenger) B0084 04: Front Impact Sensor 2 Open (Passenger) B0084 05: Front Impact Sensor 2 Voltage High/Open (Passenger) B0084 0C: Front Impact Sensor 2 Low Current (Passenger) B0084 39: Front Impact Sensor 2 Internal Electronic Failure (Passenger) B0084 3A: Front Impact Sensor 2 Incorrect Component Installed (Passenger) B0084 71: Front Impact Sensor 2 Invalid Serial Data Received (Passenger)

	B0085 01: Left Front Side Impact Sensor Short to Battery B0085 02: Left Front Side Impact Sensor Short to Ground B0085 04: Left Front Side Impact Sensor Open B0085 05: Left Front Side Impact Sensor Voltage High/Open B0085 0C: Left Front Side Impact Sensor Low Current B0085 39: Left Front Side Impact Sensor Internal Malfunction B0085 3A: Left Front Side Impact Sensor Incorrect Component Installed B0085 71: Left Front Side Impact Sensor Invalid Serial Data Received B0086 01: Right Front Side Impact Sensor Short to Battery B0086 02: Right Front Side Impact Sensor Short to Ground B0086 04: Right Front Side Impact Sensor Open B0086 05: Right Front Side Impact Sensor Voltage High/Open B0086 0C: Right Front Side Impact Sensor Low Current B0086 39: Right Front Side Impact Sensor Internal Malfunction B0086 3A: Right Front Side Impact Sensor Incorrect Component Installed B0086 71: Right Front Side Impact Sensor Invalid Serial Data Received B0087 01: Left Rear Side Impact Sensor Short to Battery B0087 02: Left Rear Side Impact Sensor Short to Ground B0087 04: Left Rear Side Impact Sensor Open B0087 05: Left Rear Side Impact Sensor Voltage High/Open B0087 0C: Left Rear Side Impact Sensor Low Current B0087 39: Left Rear Side Impact Sensor Internal Malfunction B0087 3A: Left Rear Side Impact Sensor Incorrect Component Installed B0087 71: Left Rear Side Impact Sensor Invalid Data B0088 01: Right Rear Side Impact Sensor Short to Battery B0088 02: Right Rear Side Impact Sensor Short to Ground B0088 04: Right Rear Side Impact Sensor Open B0088 05: Right Rear Side Impact Sensor Voltage High/Open B0088 0C: Right Rear Side Impact Sensor Low Current B0088 39: Right Rear Side Impact Sensor Internal Malfunction B0088 3A: Right Rear Side Impact Sensor Incorrect Component Installed B0088 71: Right Rear Side Impact Sensor Invalid Data
<u>DTC B1001</u>	B1001 00: Option Configuration
<u>DTC B1019</u>	B1019 00: System Configuration Error

DTC B0012 OR B0013

Diagnostic Instructions

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

DTC Descriptors

DTC B0012 01

Driver Frontal Deployment Loop Stage 1 Short to Battery

DTC B0012 02

Driver Frontal Deployment Loop Stage 1 Short to Ground

DTC B0012 04

Driver Frontal Deployment Loop Stage 1 Open

DTC B0012 0D

Driver Frontal Deployment Loop Stage 1 High Resistance

DTC B0012 0E

Driver Frontal Deployment Loop Stage 1 Low Resistance

DTC B0013 01

Driver Frontal Deployment Loop Stage 2 Short to Battery

DTC B0013 02

Driver Frontal Deployment Loop Stage 2 Short to Ground

DTC B0013 04

Driver Frontal Deployment Loop Stage 2 Open

DTC B0013 0D

Driver Frontal Deployment Loop Stage 2 High Resistance

DTC B0013 0E

Driver Frontal Deployment Loop Stage 2 Low Resistance

Diagnostic Fault Information

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Steering Wheel Module Stage 1 High Control	B0012 02, B0012 0E	B0012 0D	B0012 04	B0012 01	-
Steering Wheel Module Stage 1	B0012 02,				

Low Control	B0012 0E	B0012 0D	B0012 04	B0012 01	-
Steering Wheel Module Stage 2 High Control	B0013 02, B0013 0E	B0013 0D	B0013 04	B0013 01	-
Steering Wheel Module Stage 2 Low Control	B0013 02, B0013 0E	B0013 0D	B0013 04	B0013 01	-

Circuit/System Description

During a frontal crash of sufficient force the inflatable restraint sensing and diagnostic module (SDM) will allow current to flow through the deployment loop in order to deploy the steering wheel air bag. The SDM performs continuous diagnostic tests on the deployment loops to check for proper circuit continuity and for shorts to ground or voltage. There are 2 shorting bars used within the steering wheel air bag coil connector which will short together both steering wheel air bag stage 1 high circuit and steering wheel air bag stage 1 low circuit and both steering wheel air bag stage 2 high circuit and steering wheel air bag stage 2 low circuit when the connector is disconnected. This will help to prevent unwanted deployment of the air bag during servicing.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

B0012 01 stage 1 or B0013 01 stage 2

The steering wheel module control circuit is shorted to voltage for 2 seconds.

B0012 02 stage 1 or B0013 02 stage 2

The steering wheel module control circuit is shorted to ground for 2 seconds.

B0012 04 stage 1 or B0013 04 stage 2

The steering wheel module control circuit is open for 2 seconds.

B0012 0D stage 1 or B0013 0D stage 2

The steering wheel module deployment loop resistance is more than 5.5 ohms for 2 seconds.

B0012 0E stage 1 or B0013 0E stage 2

The steering wheel module deployment loop resistance is less than 1.7 ohms for 2 seconds.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG indicator.
- The SDM will store a DTC, however if an event occurs the system will still attempt deployment.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aids

NOTE: **The following diagnostic aids apply for both current and history DTCs.**

A worn steering wheel air bag coil can cause a repeated history DTC to set with symptom byte 04 or 0D. To verify this condition, turn the steering wheel 360 degrees in one direction then back 360 degrees in the other direction, multiple times, while viewing the scan tool Deployment Loop Resistance 1 and 2 parameters.

An incorrectly installed CPA or incorrectly seated connector can cause a shorting bar to short both control circuits together. Check the connectors and CPAs if a DTC with symptom byte 02 or 0E is set, to ensure the shorting bars are not causing the circuits to be shorted together. Shorting bars are used in the locations listed below:

- Steering wheel air bag assembly
- Steering wheel air bag coil assembly
- Inline connectors - on the steering wheel air bag side of the harness connector
- Harness side of the SDM connector

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Refer to **SIR Service Precautions**.

Inspect all terminals for damage or corrosion when disconnecting connectors. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- Air bag
- Steering wheel air bag coil.
- SDM
- Air bag wiring harness connector.
- SDM wiring harness connector.

NOTE: **The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click. The CPA isolates the shorting-bars within the connector allowing the deployment circuit to operate properly. Replace any CPA that is damaged or missing.**
If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

1. Observe the scan tool Deployment Loop Resistance 1 and 2 parameters while turning the steering wheel 360 degrees in one direction then back 360 degrees in the other direction. The reading should stay consistently between 2.1 and 4.0 ohms without any spikes or dropouts.
2. Observe the scan tool Deployment Loop Resistance 1 and 2 parameters while moving the harness near each connector listed below. The reading should stay consistently between 2.1 and 4.0 ohms without any drop outs or spikes.
 - X85 Steering wheel air bag coil
 - F107 Steering wheel air bag.
 - Any harness inline
 - K36 SDM
 - If the reading is erratic while moving the harness, perform the following;
 - Inspect each connector terminal for damage or corrosion and repair as necessary.
 - Apply Nyogel lubricant 760G to each connector terminal.
 - Ensure each connector and CPA is correctly seated.

Circuit/System Testing

Refer to **SIR Service Precautions**.

Inspect all terminals for damage or corrosion when disconnecting connectors. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- Air bag
- Steering wheel air bag coil.
- SDM
- Air bag wiring harness connector.
- SDM wiring harness connector.

NOTE: The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click. The CPA isolates the shorting-bars within the connector allowing the deployment circuit to operate properly. Replace any CPA that is damaged or missing.

If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

1. Ignition OFF, disconnect the harness connector at the appropriate F107 steering wheel air bag.
2. Ignition OFF, disconnect the scan tool, wait 120 seconds, test for greater than 25 ohms between the control circuit terminal 1 and the control circuit terminal 2.
 - If less than the specified range, test for a short between the control circuits, check each connector and CPA to ensure the shorting bars are lifted. If the circuits and shorting bars tests normal, replace the K36 SDM.
3. Ignition ON, verify the scan tool Deployment Loop Resistance parameter is greater than 25 ohms.
 - If less than the specified range, test the control circuit terminal 1 for a short to ground. If the circuit tests normal, replace the K36 SDM.
4. Install a 3 A fused jumper wire between the control circuit terminal 1 and the control circuit terminal 2.
5. Observe the scan tool Deployment Loop Resistance parameter while turning the steering wheel 360 degrees in one direction then back 360 degrees in the other direction. Verify the scan tool Deployment Loop Resistance parameter is consistently less than 2 ohms.
 - If the reading is erratic while turning the steering wheel, replace the X85 steering wheel airbag coil.
 - If greater than the specified value, test the steering wheel airbag coil for an open/high resistance and the control circuit terminals 1 and 2 for a short to voltage or an open/high resistance. If the steering wheel airbag coil and the circuits test normal, replace the K36 SDM.
6. If all circuits test normal, replace the F107 steering wheel air bag.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Steering Wheel Inflatable Restraint Module Coil Replacement**
- **Steering Wheel Inflatable Restraint Module Replacement**
- **SIR/SRS Wiring Repairs**
- **Control Module References** for SDM replacement, setup, and programming

DTC B0014-B0045

Diagnostic Instructions

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

DTC Descriptors

DTC B0014 01

Driver Side Deployment Loop Short to Battery - Seat Air Bag

DTC B0014 02

Driver Side Deployment Loop Short to Ground - Seat Air Bag

DTC B0014 04

Driver Side Deployment Loop Open - Seat Air Bag

DTC B0014 0D

Driver Side Deployment Loop High Resistance - Seat Air Bag

DTC B0014 0E

Driver Side Deployment Loop Low Resistance - Seat Air Bag

DTC B0015 01

Driver Seat Belt Retractor Pretensioner Deployment Loop Short to Battery

DTC B0015 02

Driver Seat Belt Retractor Pretensioner Deployment Loop Short to Ground

DTC B0015 04

Driver Seat Belt Retractor Pretensioner Deployment Loop Open

DTC B0015 0D

Driver Seat Belt Retractor Pretensioner Deployment Loop High Resistance

DTC B0015 0E

Driver Seat Belt Retractor Pretensioner Deployment Loop Low Resistance

DTC B0016 01

Left Roof Rail Deployment Loop 1 Short to Battery

DTC B0016 02

Left Roof Rail Deployment Loop 1 Short to Ground

DTC B0016 04

Left Roof Rail Deployment Loop 1 Open

DTC B0016 0D

Left Roof Rail Deployment Loop 1 High Resistance

DTC B0016 0E

Left Roof Rail Deployment Loop 1 Low Resistance

DTC B0019 01

Passenger Frontal Deployment Loop Stage 1 Short to Battery

DTC B0019 02

Passenger Frontal Deployment Loop Stage 1 Short to Ground

DTC B0019 04

Passenger Frontal Deployment Loop Stage 1 Open

DTC B0019 0D

Passenger Frontal Deployment Loop Stage 1 High Resistance

DTC B0019 0E

Passenger Frontal Deployment Loop Stage 1 Low Resistance

DTC B0020 01

Passenger Frontal Deployment Loop Stage 2 Short to Battery

DTC B0020 02

Passenger Frontal Deployment Loop Stage 2 Short to Ground

DTC B0020 04

Passenger Frontal Deployment Loop Stage 2 Open

DTC B0020 0D

Passenger Frontal Deployment Loop Stage 2 High Resistance

DTC B0020 0E

Passenger Frontal Deployment Loop Stage 2 Low Resistance

DTC B0021 01

Passenger Side Deployment Loop Short to Battery - Seat Air Bag

DTC B0021 02

Passenger Side Deployment Loop Short to Ground - Seat Air Bag

DTC B0021 04

Passenger Side Deployment Loop Open - Seat Air Bag

DTC B0021 0D

Passenger Side Deployment Loop High Resistance - Seat Air Bag

DTC B0021 0E

Passenger Side Deployment Loop Low Resistance - Seat Air Bag

DTC B0022 01

Passenger Seat Belt Retractor Pretensioner Deployment Loop Short to Battery

DTC B0022 02

Passenger Seat Belt Retractor Pretensioner Deployment Loop Short to Ground

DTC B0022 04

Passenger Seat Belt Retractor Pretensioner Deployment Loop Open Circuit

DTC B0022 0D

Passenger Seat Belt Retractor Pretensioner Deployment Loop High Resistance

DTC B0022 0E

Passenger Seat Belt Retractor Pretensioner Deployment Loop Low Resistance

DTC B0023 01

Right Roof Rail Deployment Loop 1 Short to Battery

DTC B0023 02

Right Roof Rail Deployment Loop 1 Short to Ground

DTC B0023 04

Right Roof Rail Deployment Loop 1 Open

DTC B0023 0D

Right Roof Rail Deployment Loop 1 High Resistance

DTC B0023 0E

Right Roof Rail Deployment Loop 1 Low Resistance

Diagnostic Fault Information

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Driver Side Impact Module - High Control	B0014 02, B0014 0E	B0014 0D	B0014 04, B0014 0D	B0014 01	-
Driver Side Impact Module - Low Control	B0014 02, B0014 0E	B0014 0D	B0014 04, B0014 0D	B0014 01	-
Driver Seat Belt Retractor Pretensioner - High Control	B0015 02, B0015 0E	B0015 0D	B0015 04, B0015 0D	B0015 01	-
Driver Seat Belt Retractor Pretensioner - Low Control	B0015 02, B0015 0E	B0015 0D	B0015 04, B0015 0D	B0015 01	-
Left Roof Rail Module - High Control	B0016 02, B0016 0E	B0016 0D	B0016 04, B0016 0D	B0016 01	-
Left Roof Rail Module - Low Control	B0016 02, B0016 0E	B0016 0D	B0016 04, B0016 0D	B0016 01	-
Instrument Panel Module - Stage 1 - High Control	B0019 02, B0019 0E	B0019 0D	B0019 04, B0019 0D	B0019 01	-
Instrument Panel Module - Stage 1 - Low Control	B0019 02, B0019 0E	B0019 0D	B0019 04, B0019 0D	B0019 01	-

Instrument Panel Module - Stage 2 - High Control	B0020 02, B0020 0E	B0020 0D	B0020 04, B0020 0D	B0020 01	-
Instrument Panel Module - Stage 2 - Low Control	B0020 02, B0020 0E	B0020 0D	B0020 04, B0020 0D	B0020 01	-
Passenger Side Impact Module - High Control	B0021 02, B0021 0E	B0021 0D	B0021 04, B0021 0D	B0021 01	-
Passenger Side Impact Module - High Control	B0021 02, B0021 0E	B0021 0D	B0021 04, B0021 0D	B0021 01	-
Passenger Seat Belt Retractor Pretensioner - High Control	B0022 02, B0022 0E	B0022 0D	B0022 04, B0022 0D	B0022 01	-
Passenger Seat Belt Retractor Pretensioner - Low Control	B0022 02, B0022 0E	B0022 0D	B0022 04, B0022 0D	B0022 01	-
Right Roof Rail Module - High Control	B0023 02, B0023 0E	B0023 0D	B0023 04, B0023 0D	B0023 01	-
Right Roof Rail Module - Low Control	B0023 02, B0023 0E	B0023 0D	B0023 04, B0023 0D	B0023 01	-

Circuit/System Description

During a side or frontal crash of sufficient force the inflatable restraint sensing and diagnostic module (SDM) will allow current to flow through the deployment loop in order to deploy an inflatable restraint module. There are 2 shorting bars used within the module connector which will short together control circuits, when the connector is disconnected. This will help to prevent unwanted deployment of the air bag or pretensioner during servicing.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

B0014 01, B0015 01, B0016 01, B0019 01, B0020 01, B0021 01, B0022 01, B0023 01

The inflatable restraint module or pretensioner control circuit is shorted to voltage for 2 seconds.

B0014 02, B0015 02, B0016 02, B0019 02, B0020 02, B0021 02, B0022 02, B0023 02

The inflatable restraint module or pretensioner control circuit is shorted to ground for 2 seconds.

B0014 04, B0015 04, B0016 04, B0019 04, B0020 04, B0021 04, B0022 04, B0023 04

The inflatable restraint module or pretensioner control circuit is open for 2 seconds.

B0014 0D, B0015 0D, B0016 0D, B0019 0D, B0020 0D, B0021 0D, B0022 0D, B0023 0D

The inflatable restraint module or pretensioner deployment loop resistance is greater than 4.2 ohms for 2 seconds.

B0014 0E, B0015 0E, B0016 0E, B0019 0E, B0020 0E, B0021 0E, B0022 0E, B0023 0E

The inflatable restraint module or pretensioner deployment loop resistance is less than 1.4 ohms for 2 seconds.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG indicator.
- The SDM will store a DTC, however if an event occurs the system will still attempt deployments.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aid

NOTE: **The following diagnostic aids apply for both current and history DTCs.**

An incorrectly installed CPA or incorrectly seated connector can cause a shorting bar to short both control circuits together. Check the connectors and CPAs if a DTC with symptom byte 02 or 0E is set, to ensure the shorting bars are not causing the circuits to be shorted together. Shorting bars are used in the locations listed below:

- Passenger instrument panel air bag
- Driver and passenger side airbags
- Left and right roof rail airbags
- Driver and passenger pretensioners
- Inline connectors - on the side of the harness connector
- Harness side of the SDM connector

Terminal fretting or incorrectly seated connector can cause an open/high resistance condition. Check the circuit terminals for fretting or incorrectly seated connector if a DTC with symptom byte 04 or 0D is set. If DTCs of deployment loops which are in the seat DTC B0014 and B0021, can occur because of stress or damage to the harness due to seat movement. Move the seat to the full extend of travel while using the scan tool to observe deployment type loop parameters.

If the pretensioner, passenger instrument panel or side air bag has inflated under unexpected conditions and/or DTC with symptom byte 01 is set, check both control circuits for a short to voltage.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Refer to SIR Service Precautions.
Inspect all terminals for damage or corrosion when disconnecting connectors.
Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- Seat belt pretensioner
- Passenger instrument panel airbag
- Side air bag
- Roof rail airbag
- SDM
- SDM wiring harness connector

NOTE: The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click. The CPA isolates the shorting-bars within the connector allowing the deployment circuit to operate properly.
If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

Observe the scan tool Deployment Loop Resistance parameters while moving the harness near each connector listed below. The reading should stay consistently between 1.7 and 4.2 ohms without any drop outs or spikes.

- F105 Passenger instrument panel, Roof rail air bag
- F106 Side air bag

- F112 Seat belt pretensioner
 - Any inline harness
 - K36 SDM
- If the reading is erratic while moving the harness, perform the following;
- Inspect each connector terminal for damage or corrosion and repair as necessary.
 - Apply Nyogel lubricant 760G to each connector terminal.
 - Insure each connector and CPA is correctly seated.

Circuit/System Testing

DTC B0014-B0018 or B0021-B0045

1. Ignition OFF, disconnect the scan tool and disconnect the harness connector at the appropriate F105, F106 airbags or F112 seat belt pretensioner.
2. Wait for 120 seconds and then test for greater than 25 ohms between the control circuit terminals listed below.
 - F105 Left roof rail airbag terminal 1 and 2
 - F105 Right roof rail airbag terminal 1 and 2
 - F106 Left side airbag terminal 1 and 2
 - F106 Right side airbag terminal 1 and 2
 - F112 Driver seat belt retractor pretensioner terminal 1 and 2
 - F112 Passenger seat belt retractor pretensioner terminal 1 and 2
 - If less than the specified range, test for a short between the control circuits, check each connector and CPA to ensure that the shorting bars are lifted. If the circuits and shorting bars tests normal, replace the K36 SDM.
3. Ignition ON, test for less than 11 V between the control circuit terminals listed below and ground:
 - F105 or F106 airbag control circuit terminal 1
 - F105 or F106 airbag control circuit terminal 2
 - F112 pretensioner control circuit terminal 1
 - F112 pretensioner control circuit terminal 2
 - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the K36 SDM.
4. Ignition OFF, test for greater than 25 ohms between the control circuit terminals listed below and ground:
 - F105 or F106 airbag control circuit terminal 1
 - F105 or F106 airbag control circuit terminal 2
 - F112 pretensioner control circuit terminal 1
 - F112 pretensioner control circuit terminal 2
 - If less than the specified range, test the control circuit for a short to ground. If the circuit tests normal, replace the K36 SDM.

5. Install a 3 A fused jumper wire between the control circuit terminals listed below.
 - F105 Left roof rail airbag terminal 1 and 2
 - F105 Right roof rail airbag terminal 1 and 2
 - F106 Left side airbag terminal 1 and 2
 - F106 Right side airbag terminal 1 and 2
 - F112 Driver seat belt retractor pretensioner terminal 1 and 2
 - F112 Passenger seat belt retractor pretensioner terminal 1 and 2
6. Verify the scan tool Deployment Loop Resistance parameter is less than 2 ohms.
 - If greater than the specified range, test both control circuits terminals for an open/high resistance. If the circuits test normal, replace the K36 SDM.
7. If all circuits test normal, replace the F105, F106 airbags or F112 seat belt pretensioner.

DTC B0019-B0020

1. Ignition OFF, disconnect the scan tool and disconnect harness connector X203.
2. Wait for 120 seconds and then test for greater than 25 ohms between the appropriate control circuit terminals listed below on the SDM side of the connector:
 - F105 Passenger instrument panel airbag stage 1 terminal 1 and 2 X1
 - F105 Passenger instrument panel airbag stage 2 terminal 1 and 2 X2
 - If less than the specified range, test for a short between the control circuits, check each connector and CPA to ensure that the shorting bars are lifted. If the circuits and shorting bars tests normal, replace the K36 SDM.
3. Ignition ON, test for less than 11 V between the control circuit terminals listed below and ground:
 - Control circuit terminal 1 X1
 - Control circuit terminal 2 X1
 - Control circuit terminal 1 X2
 - Control circuit terminal 2 X2
 - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the K36 SDM.
4. Ignition OFF, test for greater than 25 ohms between the control circuit terminals listed below and ground:
 - Control circuit terminal 1 X1
 - Control circuit terminal 2 X1
 - Control circuit terminal 1 X2
 - Control circuit terminal 2 X2
 - If less than the specified range, test the control circuit for a short to ground. If the circuit tests normal, replace the K36 SDM.
5. Install a 3 A fused jumper wire between the control circuit terminals listed below.
 - F105 Passenger instrument panel airbag stage 1 terminal 1 and 2 X1
 - F105 Passenger instrument panel airbag stage 2 terminal 1 and 2 X2
6. Verify the scan tool Deployment Loop Resistance parameter is less than 2 ohms.

- If greater than the specified range, test both control circuits terminals for an open/high resistance. If the circuits test normal, replace the K36 SDM.
- 7. Disconnect the F105 airbag harness connectors X1 and X2.
- 8. Ignition ON, test for less than 11 V between the control circuit terminals listed below and ground:
 - Control circuit terminal 1 X1
 - Control circuit terminal 2 X1
 - Control circuit terminal 1 X2
 - Control circuit terminal 2 X2○ If greater than the specified range, test the control circuit for a short to voltage.
- 9. Ignition OFF, test for greater than 25 ohms between the control circuit terminals listed below and ground:
 - Control circuit terminal 1 X1
 - Control circuit terminal 2 X1
 - Control circuit terminal 1 X2
 - Control circuit terminal 2 X2○ If less than the specified range, test the control circuit for a short to ground.
- 10. Ignition OFF, test for less than 5 ohms between the control circuit terminals listed below:
 - X203 control circuit terminal A1 and F105 airbag harness connector control circuit terminal 1 X1
 - X203 control circuit terminal A2 and F105 airbag harness connector control circuit terminal 2 X1
 - X203 control circuit terminal B1 and F105 airbag harness connector control circuit terminal 1 X2
 - X203 control circuit terminal B2 and F105 airbag harness connector control circuit terminal 2 X2○ If greater than the specified range, test the control circuit for an open/high resistance.
- 11. If all circuits test normal, replace the F105 airbag.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver or Passenger Seat Side Inflatable Restraint Module Replacement**
- **Driver or Passenger Seat Retractor Side Belt Replacement**
- **Instrument Panel Inflatable Restraint Module Replacement (Equinox)** or **Instrument Panel Inflatable Restraint Module Replacement (Terrain)**
- **Roof Side Rail Inflatable Restraint Module Replacement**
- **SIR/SRS Wiring Repairs**
- **Control Module References** for SDM replacement, setup, and programming

DTC B001A OR B001B

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.

- **Diagnostic Procedure Instructions** provide an overview of each diagnostic category.

DTC Descriptors

DTC B001A 01

Driver Seat Belt Anchor Pretensioner Deployment Loop Short to Battery

DTC B001A 02

Driver Seat Belt Anchor Pretensioner Deployment Loop Short to Ground

DTC B001A 04

Driver Seat Belt Anchor Pretensioner Deployment Loop Open

DTC B001A 0D

Driver Seat Belt Anchor Pretensioner Deployment Loop High Resistance

DTC B001A 0E

Driver Seat Belt Anchor Pretensioner Deployment Loop Low Resistance

DTC B001B 01

Passenger Seat Belt Anchor Pretensioner Deployment Loop Short to Battery

DTC B001B 02

Passenger Seat Belt Anchor Pretensioner Deployment Loop Short to Ground

DTC B001B 04

Passenger Seat Belt Anchor Pretensioner Deployment Loop Open

DTC B001B 0D

Passenger Seat Belt Anchor Pretensioner Deployment Loop High Resistance

DTC B001B 0E

Passenger Seat Belt Anchor Pretensioner Deployment Loop Low Resistance

Diagnostic Fault Information

	Short to	High		Short to	Signal
--	----------	------	--	----------	--------

Circuit	Ground	Resistance	Open	Voltage	Performance
Driver Seat Belt Anchor Pretensioner Low Control	B001A 02, B001A 0E	B001A 0D	B001A 04	B001A 01	-
Driver Seat Belt Anchor Pretensioner High Control	B001A 02, B001A 0E	B001A 0D	B001A 04	B001A 01	-
Passenger Seat Belt Anchor Pretensioner Low Control	B001B 02, B001B 0E	B001B 0D	B001B 04	B001B 01	-
Passenger Seat Belt Anchor Pretensioner High Control	B001B 02, B001B 0E	B001B 0D	B001B 04	B001B 01	-

Circuit/System Description

During a side or frontal crash of sufficient force the inflatable restraint sensing and diagnostic module (SDM) will allow current to flow through the deployment loop in order to deploy the appropriate seat belt anchor pretensioner. The SDM performs continuous diagnostic tests on the deployment loops to check for proper circuit continuity and for shorts to ground or voltage.

A shorting bar used within the seat belt anchor pretensioner connector will short together both seat belt anchor pretensioner high and low control circuits when the connector is disconnected, this will help to prevent unwanted deployment of the air bag during servicing.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

B001A 01, B001B 01

The seat belt anchor pretensioner control circuit is shorted to voltage for 120 milliseconds.

B001A 02, B001B 02

The seat belt anchor pretensioner control circuit is shorted to ground for 120 milliseconds.

B001A 04, B001B 04

The seat belt anchor pretensioner control circuit is open for 120 milliseconds.

B001A 0D, B001B 0D

The seat belt anchor pretensioner deployment loop resistance is more than 4.2 ohms for 120 milliseconds.

B001A 0E, B001B 0E

The seat belt anchor pretensioner deployment loop resistance is less than 1.7 ohms for 120 milliseconds.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG indicator.
- The SDM will store a DTC, however if an event occurs the system will still attempt deployments.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aid

NOTE: **The following diagnostic aids apply for both current and history DTCs.**

An incorrectly installed CPA or incorrectly seated connector can cause a shorting bar to short both control circuits together. Check the connectors and CPAs if a DTC with symptom byte 02 or 0E is set, to ensure that the shorting bars are not causing the circuits to be shorted together. Shorting bars locations are listed below:

- Inline connectors - on the seat belt anchor pretensioner side of the harness connector
- Harness side of the SDM connector

Terminal fretting, an incorrectly installed CPA, or incorrectly seated connector can cause an open/high resistance condition. Check the circuit terminals for fretting, incorrectly installed CPAs, or incorrectly seated connectors if a DTC with symptom byte 04 or 0D is set.

If the seat belt anchor pretensioner has deployed under unexpected conditions and/or DTC with symptom byte 01 is set, check both control circuits for a short to voltage.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Refer to **SIR Service Precautions**.

NOTE: **Inspect all terminals for damage or corrosion when disconnecting connectors. Damage or corrosion in the following requires repair or replacement of the affected component/connector.**

- **Seat belt anchor pretensioners**
- **SDM module**
- **SDM wiring harness connector**

NOTE: **The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click. The CPA isolates the shorting-bars within the connector allowing the deployment circuit to operate properly. Replace any CPA that is damaged or missing.**
If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

1. Observe the scan tool Deployment Loop Resistance parameters. The reading should be between 2.1 and 4.0 ohms.
 - If not within the specified range, refer to Circuit/System Testing.
2. Observe the scan tool Deployment Loop Resistance parameters while moving the harness near each connector listed below. The reading should stay consistently between 2.1 and 4.0 ohms without any drop outs or spikes.
 - F113 Seat belt anchor pretensioner
 - Any harness inline
 - K36 SDM
 - If the reading is erratic while moving the harness, perform the following;
 - Inspect each connector terminal for damage or corrosion and repair as necessary.
 - Apply Nyogel lubricant 760G to each connector terminal.
 - Insure each connector and CPA is correctly seated.

Circuit/System Testing

Refer to **SIR Service Precautions**.

NOTE: **Inspect all terminals for damage or corrosion when disconnecting connectors. Damage or corrosion in the following requires repair or replacement of the affected component/connector.**

- **Seat belt anchor pretensioners**
- **SDM module**
- **SDM wiring harness connector**

NOTE: **The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click. The CPA isolates the shorting-bars within the connector allowing the deployment circuit to operate properly. Replace any CPA that is damaged or missing.**

If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

1. Ignition OFF, disconnect the scan tool and then disconnect the harness connector at the appropriate F113 seat belt anchor pretensioner.
2. Wait for 120 seconds and then test for greater than 25 ohms between the seat belt anchor pretensioner control circuits terminal 1 and terminal 2.
 - If less than the specified range, test for a short between the control circuits, check each connector and CPA to ensure that the shorting bars are lifted. If the circuits and shorting bars tests normal, replace the K36 SDM.
3. Ignition ON, test for less than 11 V between each of the seat belt anchor pretensioner control circuit terminals 1 and 2 and ground.
 - If greater than the specified range, test the control circuit for a short to voltage. If the circuit tests normal, replace the K36 SDM.
4. Ignition OFF, test for greater than 25 ohms between each of the seat belt anchor pretensioner control circuit terminals 1 and 2 and ground.
 - If less than the specified range, test the control circuit for a short to ground. If the circuit tests normal, replace the K36 SDM.
5. Install a 3 A fused jumper wire between the seat belt anchor pretensioner control circuits terminal 1 and terminal 2.
6. Verify the scan tool Deployment Loop Resistance parameter is less than 2 ohms.
 - If greater than the specified range, test the control circuit terminals 1 and 2 for an open/high resistance. If the circuits test normal, replace the K36 SDM.
7. If all circuits test normal, replace the F113 seat belt anchor pretensioner.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Driver or Passenger Seat Belt Tensioner Replacement**
- **SIR/SRS Wiring Repairs**
- **Control Module References** for SDM replacement, setup, and programming

DTC B0052

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using the diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B0052 00

Deployment Commanded Malfunction

DTC B0052 56

Deployment Commanded Too Many Transitions

Circuit/System Description

The inflatable restraint sensing and diagnostic module (SDM) senses vehicle impacts and provides deployment signals to the air bags and anchor and/or retractor pretensioners when warranted. The SDM sets DTC B0052 after each command for deployment. DTC B0052 will latch and not clear until after 3 commanded deployments by the SDM. And therefore the SDM has to be replaced using end of life disposal procedure.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

- The SDM detects a frontal impact of sufficient force to warrant deployment of the frontal air bags.
- The SDM detects a side impact or rollover (if equipped) of sufficient force to warrant deployment of a seat side air bag and/or roof rail air bag.

Action Taken When the DTC Sets

The SDM requests the instrument cluster to illuminate the AIR BAG indicator.

Conditions for Clearing the DTC

- DTC B0052 00 is a clearable DTC and may be cleared with a scan tool without replacing the SDM.

- DTC B0052 56 is a latched DTC. The DTC cannot be cleared with the scan tool. Replacement of the SDM is required.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Verify that DTC B0052 00 is not set.
 - If DTC is set, clear the DTC.
2. Verify that DTC B0052 56 is not set.
 - If DTC is set, replace the K36 SDM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for SDM replacement, setup, and programming

DTC B0074

Diagnostic Instructions

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

DTC Descriptors

DTC B0074 00

Passenger Occupant Classification Sensor Circuit Malfunction

DTC B0074 0D

Passenger Occupant Classification Sensor Resistance Above Threshold

DTC B0074 0E

Passenger Occupant Classification Sensor Resistance Below Threshold

DTC B0074 0F

Passenger Occupant Classification Sensor Erratic (Wet Seat)

Circuit/System Description

The passenger presence system module monitors the sensor status continually. Whenever the sensor mat has an internal malfunction, the passenger presence system will set DTC B0074.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

B0074 00

The passenger presence module has detected a disconnection from the sensor mat.

B0074 0D

The passenger presence detection module has detected a resistance above threshold.

B0074 0E

The passenger presence detection module has detected a resistance below threshold.

B0074 0F

The passenger presence detection module has detected a wet seat fault.

Action Taken When the DTC Sets

The SDM requests the instrument panel cluster to illuminate the AIR BAG indicator.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aids

- If either the SDM or PPS were replaced verify that the correct part numbers were used for the vehicle application.
- If this DTC is set as either current or history it may have been caused by an electronic device. If an electronic device (Computers, MP3 Players, Cell Phones, Diagnostic Scan Tool, etc.) was placed on the passenger seat the passenger presence module may command the passenger air bag indicator to turn on and/or command the passenger seat belt indicator to turn on. Make sure there are no objects on the passenger seat and clear the DTCs. If this DTC resets then perform this diagnostic. If the DTC does not reset there is no further work needed on the passenger presence system.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: This system is serviced as a kit (seat foam, module and/or sensing mat). Perform a Passenger Presence System Preload whenever a component is replaced, refer to Passenger Presence System Preload Test. Inspect component

connectors for damage or corrosion. Repair or replace the affected component/connector:

- **Passenger presence detection module**
- **Passenger presence detection module harness connector**
- **Seat wiring harness to vehicle harness connector**

The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click.

1. Observe with the scan tool if the fault changes status while moving the passenger seat forward and backward through its full range of motion. The status should stay consistent.
 - If the status changes this could be indication of a seat to vehicle harness connection issue, refer to Circuit/System Testing.
2. Observe with the scan tool if the fault changes status while moving the harness near each connector listed below. The status should stay consistent.
 - Passenger presence detection module
 - Passenger presence detection sensor
 - Any seat harness inline
 - If the reading is erratic while moving the harness, perform the following:
 - Inspect each connector terminal for damage or corrosion and repair as necessary.
 - Insure each connector and CPA is correctly seated.

Circuit/System Testing

NOTE: **This system is serviced as a kit (seat foam, module and/or sensing mat). Perform a Passenger Presence System Preload whenever a component is replaced, refer to Passenger Presence System Preload Test. Inspect component connectors for damage or corrosion. Repair or replace the affected component/connector:**

1. Confirm that all Passenger presence detection system connectors are fully seated.
2. Verify that DTC B0074 0F is not set.
 - If the DTC is set, verify there are no electronic devices on the passenger seat. If not, then verify the seat is dry by removing the trim from the seat bottom frame. If the seat is wet, allow 24-48 hours dry time. If the DTC is history, do not replace passenger presence detection. Clear passenger presence detection codes.
3. Verify DTC B0074 00, B0074 0D & B0074 0E is not set.
 - If the DTC is set, replace the B60 passenger presence detection sensor.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Inflatable Restraint Front Passenger Presence Sensor Replacement

DTC B0081 (SDM)

Diagnostic Instructions

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

DTC Descriptors

DTC B0081 00

Passenger Presence System Malfunction

DTC B0081 3A

Passenger Presence System Incorrect Component Installed

Circuit/System Description

When the ignition is turned ON, the inflatable restraint sensing and diagnostic module (SDM) and the passenger presence module perform tests to diagnose critical malfunctions. Upon a successful power-up mode the SDM will illuminate both PASSENGER AIRBAG ON/OFF indicators located in the overhead center console. If the SDM detects a fault in the passenger presence module, it may disable the passenger instrument panel air bag deployment loop, set DTC B0081 00 or DTC B0081 3A and illuminate the AIRBAG indicator.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

B0081 00

The SDM has received a fault present message from the passenger presence module.

B0081 3A

The SDM has received a message from the passenger presence module indicating a vehicle and passenger presence module mismatch.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG indicator.
- The passenger instrument panel air bag deployment loop will be disabled.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aids

- If either the SDM or PPS were replaced verify that the correct part numbers were used for the vehicle application.
- If this DTC is set as either current or history it may have been caused by an electronic device. If an electronic device (Computers, MP3 Players, Cell Phones, Diagnostic Scan Tool, etc.) was placed on the passenger seat the passenger presence module may command the passenger air bag indicator to turn on and/or command the passenger seat belt indicator to turn on. Make sure there are no objects on the passenger seat and clear the DTCs. If this DTC resets then perform this diagnostic. If the DTC does not reset there is no further work needed on the passenger presence system.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE:

- This system is serviced as a kit (seat foam, module and/or sensing mat). Perform a **Passenger Presence System Preload** procedure whenever a component is replaced. Refer to **Passenger Presence System Preload Test**.
- Both SDM and Passenger Presence Module set DTC B0081 but with different symptom bytes. Therefore it is important to identify which module has set the DTC B0081. Use the symptom bytes as a way of identify the correct module to diagnose.

1. Verify that DTC B1001 is not set in the SDM.
 - If the DTC is set in the SDM, refer to **DTC B1001**.
2. Verify that DTC B0074, B101D, or B101E is not set in the passenger presence module.
 - If any of the DTCs are set in the passenger presence module, refer to **Diagnostic Trouble Code (DTC) List - Vehicle**.

NOTE: The SDM sets a redundant B0081 00 DTC when the passenger presence module sets a DTC B0081 11 or B0081 4B.

3. Verify that DTC B0081 00 is not set in the SDM
 - If DTC B0081 00 is set in the SDM, then the passenger presence module has set a B0081 11 or a B0081 4B. Refer to B0081 (Passenger Presence Module) for diagnosis.

NOTE: The SDM sets a B0081 3A when an incorrect passenger presence module is installed.

4. Verify that DTC B0081 3A is not set in the SDM.
 - If DTC B0081 3A is set in the SDM, replace the K85 passenger presence module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for passenger presence module and SDM replacement, setup, and programming

DTC B0081 (PASSENGER PRESENCE DETECTION MODULE)**Diagnostic Instructions**

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

DTC Descriptors

DTC B0081 11

Passenger Presence Module High Input

DTC B0081 4B

Passenger Presence Module Calibration Not Learned

Circuit/System Description

When the ignition is turned ON, the inflatable restraint sensing and diagnostic module (SDM) and the passenger presence module perform tests to diagnose critical malfunctions. Upon a successful power-up mode the SDM will illuminate both PASSENGER AIRBAG ON/OFF indicators located in the overhead center console. If the SDM detects a fault in the passenger presence module, it may disable the passenger instrument panel air bag deployment loop, set DTC B0081 and illuminate the AIRBAG indicator.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

Any of the following conditions must exist for 5 seconds.

B0081 11

The passenger presence module has failed preload procedure.

B0081 4B

The passenger presence system is not calibrated.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG indicator.
- The passenger instrument panel air bag deployment loop will be disabled.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aids

- If either the SDM or PPS were replaced verify that the correct part numbers were used for the vehicle application.
- If this DTC is set as either current or history it may have been caused by an electronic device. If an electronic device (Computers, MP3 Players, Cell Phones, Diagnostic Scan Tool, etc.) was placed on the

passenger seat the passenger presence module may command the passenger air bag indicator to turn on and/or command the passenger seat belt indicator to turn on. Make sure there are no objects on the passenger seat and clear the DTCs. If this DTC resets then perform this diagnostic. If the DTC does not reset there is no further work needed on the passenger presence system.

Reference Information

Description and Operation

SIR System Description and Operation

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE:

- This system is serviced as a kit (seat foam, module and sensing mat). Perform a Passenger Presence System Preload procedure whenever a component is replaced. Refer to Passenger Presence System Preload Test.
- Both SDM and passenger presence module set DTC B0081 but with different symptom bytes. Therefore it is important to identify which module has set the DTC B0081. Use the symptom bytes as a way of identify the correct module to diagnose.
- The SDM sets a B0081 3A when an incorrect passenger presence module is installed.

1. Verify that DTC B0081 3A is not set in the SDM.
 - If DTC B0081 3A is set in the SDM, replace the K85 passenger presence module.

NOTE: The SDM sets a redundant B0081 00 DTC when the passenger presence module sets a DTC B0081 11 or B0081 4B.

2. Verify that DTC B0081 11 or DTC B0081 4B is not set in the passenger presence module.
 - If DTC B0081 11 or DTC B0081 4B is set in the passenger presence module, perform the Passenger Presence System Preload procedure. Refer to Passenger Presence System Preload Test.

Repair Procedures

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Control Module References for passenger presence module and SDM replacement, setup, and programming

DTC B0083-B0088

Diagnostic Instructions

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

DTC Descriptors

DTC B0083 01

Front Impact Sensor 1 Short to Battery (Driver)

DTC B0083 02

Front Impact Sensor 1 Short to Ground (Driver)

DTC B0083 04

Front Impact Sensor 1 Open (Driver)

DTC B0083 05

Front Impact Sensor 1 Voltage High/Open (Driver)

DTC B0083 0C

Front Impact Sensor 1 Low Current (Driver)

DTC B0083 39

Front Impact Sensor 1 Internal Electronic Failure (Driver)

DTC B0083 3A

Front Impact Sensor 1 Incorrect Component Installed (Driver)

DTC B0083 71

Front Impact Sensor 1 Invalid Serial Data Received (Driver)

DTC B0084 01

Front Impact Sensor 2 Short to Battery (Passenger)

DTC B0084 02

Front Impact Sensor 2 Short to Ground (Passenger)

DTC B0084 04

Front Impact Sensor 2 Open (Passenger)

DTC B0084 05

Front Impact Sensor 2 Voltage High/Open (Passenger)

DTC B0084 0C

Front Impact Sensor 2 Low Current (Passenger)

DTC B0084 39

Front Impact Sensor 2 Internal Electronic Failure (Passenger)

DTC B0084 3A

Front Impact Sensor 2 Incorrect Component Installed (Passenger)

DTC B0084 71

Front Impact Sensor 2 Invalid Serial Data Received (Passenger)

DTC B0085 01

Left Front Side Impact Sensor Short to Battery

DTC B0085 02

Left Front Side Impact Sensor Short to Ground

DTC B0085 04

Left Front Side Impact Sensor Open

DTC B0085 05

Left Front Side Impact Sensor Voltage High/Open

DTC B0085 0C

Left Front Side Impact Sensor Low Current

DTC B0085 39

Left Front Side Impact Sensor Internal Malfunction

DTC B0085 3A

Left Front Side Impact Sensor Incorrect Component Installed

DTC B0085 71

Left Front Side Impact Sensor Invalid Serial Data Received

DTC B0086 01

Right Front Side Impact Sensor Short to Battery

DTC B0086 02

Right Front Side Impact Sensor Short to Ground

DTC B0086 04

Right Front Side Impact Sensor Open

DTC B0086 05

Right Front Side Impact Sensor Voltage High/Open

DTC B0086 0C

Right Front Side Impact Sensor Low Current

DTC B0086 39

Right Front Side Impact Sensor Internal Malfunction

DTC B0086 3A

Right Front Side Impact Sensor Incorrect Component Installed

DTC B0086 71

Right Front Side Impact Sensor Invalid Serial Data Received

DTC B0087 01

Left Rear Side Impact Sensor Short to Battery

DTC B0087 02

Left Rear Side Impact Sensor Short to Ground

DTC B0087 04

Left Rear Side Impact Sensor Open

DTC B0087 05

Left Rear Side Impact Sensor Voltage High/Open

DTC B0087 0C

Left Rear Side Impact Sensor Low Current

DTC B0087 39

Left Rear Side Impact Sensor Internal Malfunction

DTC B0087 3A

Left Rear Side Impact Sensor Incorrect Component Installed

DTC B0087 71

Left Rear Side Impact Sensor Invalid Data

DTC B0088 01

Right Rear Side Impact Sensor Short to Battery

DTC B0088 02

Right Rear Side Impact Sensor Short to Ground

DTC B0088 04

Right Rear Side Impact Sensor Open

DTC B0088 05

Right Rear Side Impact Sensor Voltage High/Open

DTC B0088 0C

Right Rear Side Impact Sensor Low Current

DTC B0088 39

Right Rear Side Impact Sensor Internal Malfunction

DTC B0088 3A

Right Rear Side Impact Sensor Incorrect Component Installed

DTC B0088 71

Right Rear Side Impact Sensor Invalid Data

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Front Impact Sensor 1 High Signal	B0083 02, B0083 0C	B0083 04, B0083 05	B0083 01	B0083 3A
Front Impact Sensor 1 Low Reference	B0083 02, B0083 0C	B0083 04, B0083 05	B0083 01	B0083 3A
Front Impact Sensor 2 High Signal	B0084 02, B0084 0C	B0084 04, B0084 05	B0084 01	B0084 3A
Front Impact Sensor 2 Low Reference	B0084 02, B0084 0C	B0084 04, B0084 05	B0084 01	B0084 3A
Left Front Side Impact Sensor High Signal	B0085 02, B0085 0C	B0085 04, B0085 05	B0085 01	B0085 39
Left Front Side Impact Low Reference	B0085 02, B0085 0C	B0085 04, B0085 05	B0085 01	B0085 39
Right Front Side Impact Sensor High Signal	B0086 02, B0086 0C	B0086 04, B0086 05	B0086 01	B0086 39
Right Front Side Impact Sensor Low Reference	B0086 02, B0086 0C	B0086 04, B0086 05	B0086 01	B0086 39
Left Rear Side Impact Sensor High Signal	B0087 02, B0087 0C	B0087 04, B0087 05	B0087 01	B0087 39
Left Rear Side Impact Low Reference	B0087 02, B0087 0C	B0087 04, B0087 05	B0087 01	B0087 39
Right Rear Side Impact Sensor High Signal	B0088 02, B0088 0C	B0088 04, B0088 05	B0088 01	B0088 39
Right Rear Side Impact Sensor Low Reference	B0088 02, B0088 0C	B0088 04, B0088 05	B0088 01	B0088 39

Circuit/System Description

The impact sensors are equipped on vehicles to supplement the supplemental inflatable restraint (SIR) system performance. The impact sensors are electronic and are not part of the deployment loops, but instead provide inputs to the sensing and diagnostic module (SDM). The impact sensors can assist in determining the severity of some frontal and side collisions. The SDM uses the input from the impact sensors to assist in determining the severity of a collision further supporting air bag deployment. If the SDM determines a deployment is warranted, the SDM will cause current to flow through the deployment loops deploying the frontal air bags.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

Any of the following conditions exist for 10 seconds:

B0083 01, B0084 01, B0085 01, B0086 01, B0087 01, B0088 01

The sensor has been shorted to voltage.

B0083 02, B0084 02, B0085 02, B0086 02, B0087 02, B0088 02

- The sensor has been shorted to ground.
- The sensor current is greater than 23 mA for greater than 5 milliseconds.

B0083 04, B0084 04, B0085 04, B0086 04, B0087 04, B0088 04

- The sensor circuit is open.
- The SDM has not received a message from the sensor for greater than 375 milliseconds.

B0083 05, B0084 05, B0085 05, B0086 05, B0087 05, B0088 05

- The sensor circuit is open.
- The SDM has not received a message from the sensor for greater than 375 milliseconds.

B0083 0C, B0084 0C, B0085 0C, B0086 0C, B0087 0C, B0088 0C

- The sensor has been shorted to ground.
- The sensor current is greater than 23 mA for greater than 5 milliseconds.

B0083 39, B0084 39, B0085 39, B0086 39, B0087 39, B0088 39

- The SDM has received a Not OK message from the sensor.
- The SDM has not received a message.

B0083 3A, B0084 3A, B0085 3A, B0086 3A, B0087 3A, B0088 3A

- The SDM has received identification message from the sensor, which does not match the identification stored in the SDM memory.
- The SDM has reset the sensor twice without detecting the correct identification message.

B0083 71, B0084 71, B0085 71, B0086 71, B0087 71, B0088 71

The SDM has received invalid serial data from the sensor.

Action Taken When the DTC Sets

The SDM requests the instrument panel cluster to illuminate the AIR BAG indicator.

Conditions for Clearing the DTC

- The condition for setting the DTC no longer exists.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.
- An ignition cycle is required for the DTC to go from current to history.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Refer to **SIR Service Precautions**.

Inspect all terminals for damage or corrosion when disconnecting connectors. Damage or corrosion in the following requires repair or replacement of the affected component/connector.

- Air bag module
- Steering wheel inflatable restraint module coil
- SDM module
- Air bag wiring harness connector

- SDM wiring harness connector

NOTE: The connector and connector position assurance (CPA) may seat independent of each other. Both the connector and CPA should seat with an audible and/or tactile click. The CPA isolates the shorting-bars within the connector allowing the deployment circuit to operate properly. Replace any CPA that is damaged or missing.

If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

1. Verify that DTC B0083-B0088 symptom byte 39 or 71 is not set as current.
 - If symptom byte 39 or 71 is set as current, replace the appropriate B59 or B63 impact sensor.
2. Verify that the SDM calibrations match the VIN data, software part number, and calibration part number.
 - If not the correct data or part number, program the SDM.
3. Verify the correct impact sensors have the correct part numbers, matching the label part numbers with the parts book.
 - If the part numbers do not match, replace the incorrect B59 or B63 impact sensor
4. Verify that DTC B0083-B0088 symptom byte 01, 02 04, 05, or 0C is not set as current.
 - If symptom byte 01, 02, 04, 05, or 0C is set as current, refer to Circuit/System Testing.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the appropriate B59 or B63 impact sensor.
2. Ignition OFF, disconnect the scan tool, wait 120 seconds, test for less than 10 ohms between the low reference circuit terminal 2 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance. If the circuit tests normal, replace the K36 SDM.
3. Test for greater than 50k ohms between the signal circuit terminal 1 and ground.
 - If less than the specified value, test the signal circuit for a short to ground. If the circuit tests normal, replace the K36 SDM.
4. Disconnect the harness connector at the SDM.
5. Test for less than 1 ohms between the impact sensor signal circuit terminal 1 and the SDM terminal listed below.
 - Left front side impact sensor terminal 19 X2
 - Left front end impact sensor terminal 23 X2
 - Right front side impact sensor terminal 27 X2
 - Right front end impact sensor terminal 26 X2
 - Left rear side impact sensor terminal 22 X2
 - Right rear side impact sensor terminal 30 X2
 - If greater than the specified range, test the circuit for an open/high resistance.
6. If all circuits test normal, replace the B59 or B63 sensor. The DTC should not be set as current.

- If the DTC resets as current, replace the K36 SDM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Inflatable Restraint Side Impact Sensor Replacement - Front Side Door**
- **Inflatable Restraint Side Impact Sensor Replacement - Rear Side Door**
- **Front End Inflatable Restraint Discriminating Sensor Replacement**
- **Control Module References** for SDM replacement, setup, and programming

DTC B1001

Diagnostic Instructions

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

DTC Descriptor

DTC B1001 00

Option Configuration

Circuit/System Description

The inflatable restraint sensing and diagnostic module (SDM) stores a primary data key, which is a 4-digit number. When the ignition is turned ON, the SDM compares this information to the information stored in the body control module (BCM) over the serial data communication circuit. If there is a mismatch between the information stored in the SDM and BCM, DTC B1001 will set.

Conditions for Running the DTC

System voltage is between 9-16 V.

Conditions for Setting the DTC

The 4-digit Primary Data Key stored in the SDM does not match the 4 digits stored in the BCM.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG indicator.
- The SDM disables all deployments.

Conditions for Clearing the DTC

The last 4-digit Primary Data Key in the SDM matches the last 4 digits stored in the BCM.

Diagnostic Aids

This DTC is an indication that an incorrect SDM is installed in the vehicle, or that the SDM and/or the BCM was replaced without reprogramming the BCM with the new information.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

Verify the scan tool SDM Primary Key Status is Valid in the BCM.

NOTE: **Cycle the ignition after performing the Setup SDM Primary Key procedure in the BCM. This enables the BCM to read the new SDM primary Key value.**

- If the SDM Primary Key Status is Invalid, perform the Setup SDM Primary Key procedure in the BCM.

DTC B1019

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

DTC Descriptor

DTC B1019 00

System Configuration Error

Circuit/System Description

The inflatable restraint sensing and diagnostic module (SDM) monitors the number of safety components installed on the vehicle. When the ignition is turned ON, the SDM evaluates the number of safety components installed and compares it to the number of components the SDM expects to see on the vehicle with its current calibration. If there is a mismatch between detected components and the components programmed with the SDM calibration, DTC B1019 will set. The components (if equipped) that the SDM will detect include inflatable restraint deployment loops, impact sensors, passenger presence system components, seat position sensors, disable switches, and seat belt switches.

Conditions for Running the DTC

Ignition voltage is between 9-16 V.

Conditions for Setting the DTC

The setup for the SDM has not been completed and the SDM does not detect the correct number of sensors or deployment loops than is expected with this calibration.

Action Taken When the DTC Sets

- The SDM requests the instrument cluster to illuminate the AIR BAG warning indicator.
- The DTC must be cleared before running the setup SDM.
- Air bag indicator will continue to flash until SDM setup procedure is complete.

Conditions for Clearing the DTC

- The condition for setting the DTC is no longer present.
- A history DTC will clear once 100 malfunction-free ignition cycles have occurred.

Diagnostic Aids

The SDM scan tool deployment loop and impact sensor data will match what the SDM has been programmed to expect to see on the vehicle. B1019 DTC will set if a deployment loop or impact sensor is added or removed from the system.

DTC B1019 will set when an open/high resistance DTC sets for a deployment loop or impact sensor. This causes mismatch between the learned and actual components connected to the SDM.

DTC B1019 can set with no other DTCs if an unused deployment loop or impact sensor circuit is shorted to ground. This causes a mismatch between the learned and actual components connected to the SDM.

Reference Information

Schematic Reference

- Seat Belt Schematics
- SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

- Seat Belt System Description and Operation
- SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: DTC B1019 can set after SDM has been replaced and/or reprogrammed before the setup procedure is completed. The setup procedure cannot be completed if DTC B1019 is set as current or history. If a short or open is detected in a deployment circuit prior to the setup procedure being performed the SDM will set DTC B1019.

1. Ignition ON, verify no other SDM DTC are set.
 - If another SDM DTC is set, diagnose those DTCs first. Refer to Diagnostic Trouble Code (DTC) List - Vehicle
2. With the scan tool observe the SDM impact sensor configuration scan tool data list. Verify the impact sensors called out in the scan tool data list match the number of actual impact sensors the vehicle is built with.
 - If the number of impact sensors do not match verify the correct SDM calibration file is loaded in

the SDM.

- If the SDM calibration file is correct, the vehicle contains less/more sensors than it is supposed to. Modify the vehicle to match the SDM impact sensor calibration scan tool data list.
3. With the scan tool observe the SDM enabled deployment loop configuration scan tool data list. Verify the enabled deployment loops called out in the scan tool data list match the deployment loops the vehicle is built with.
- If the number of enabled deployment loops do not match verify the correct SDM calibration file is loaded in the SDM.
 - If the SDM calibration file is correct, modify the vehicle to match the SDM enabled deployment loop calibration scan tool data list.
4. If the SDM impacts sensor and enabled deployment loops match the vehicle build and the DTC is still current, replace the K36 SDM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **SIR/SRS Wiring Repairs**
- **Control Module References** for SDM replacement, setup, and programming

PASSENGER PRESENCE SYSTEM PRELOAD TEST

The passenger presence detection system consists of an electronic control module, a conductive based sensor mat, wiring harness, and PASSENGER AIR BAG ON/OFF indicators. The sensor mat is made up of several flexible conductive metal strips placed underneath the seat cushion trim. These sensor strips transmit and receive a low level electric field. The weight of the occupant sitting in the front passenger seat is measured as a change in current flow within the sensor mat. If the passenger seat bottom cushion, seat bottom trim, or heater pad has been serviced, reinstalled, or removed for any reason, the procedure below will check for any preloads on the passenger presence detection system. A service replacement passenger presence detection system module does not require an unlock procedure prior to an initial preload test.

NOTE:

- **Before the passenger presence detection system can be checked for preloads the front passenger seat must be completely empty of all items. The presence of any items on the front passenger seat will affect the calibration and operation of the passenger presence detection system. When the preload test is performed, the instrument cluster and dash lights will begin illuminating at varying intensity. This is normal operation during the Passenger Presence Sensor Learn procedure and does not indicate additional system faults.**
- **The Diagnostic System Check - Vehicle must be performed after successfully completing the preload test procedure to ensure the system is functioning properly.**

1. Empty the front outboard passenger seat (this system is susceptible to conductive material).
2. With the scan tool, perform the Passenger Presence Sensor Learn procedure.
3. Using the scan tool, check for DTC B0081 in history. If the Passenger Presence Sensor Learn procedure fails or DTC B0081 is current, confirm that there is no conductive material on the seat. Perform the Passenger Presence Sensor Learn again. If the test fails again, for heated seats, ensure that the sensor pad is on top of the heater element. Once the test successfully completes, cycle the ignition OFF.
4. Perform the **Diagnostic System Check - Vehicle** after successfully completing the preload test procedure to ensure the system is functioning properly.

SYMPTOMS - SIR

IMPORTANT: Complete the following steps before using the symptom tables:

1. Perform **Diagnostic System Check - Vehicle** before using the symptom tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The inflatable restraint sensing and diagnostic module (SDM) can communicate via the serial data link.
2. Review the SIR system description and operation in order to familiarize yourself with the system functions. Refer to **SIR System Description and Operation**.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the SIR system. Refer to **Checking Aftermarket Accessories**.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Symptom List

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

Air Bag Indicator Circuit Malfunction (Driver) or **Air Bag Indicator Circuit Malfunction (Passenger)** in order to diagnose the symptom.

AIR BAG INDICATOR CIRCUIT MALFUNCTION (DRIVER)

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

When the ignition is turned ON, during the bulb check, the driver air bag indicator will flash, and then turn OFF after the bulb check. The inflatable restraint sensing and diagnostic module (SDM) performs diagnostic tests on the SIR system during the bulb check. If any malfunction exists the SDM will request the instrument cluster to illuminate the air bag indicator steady, via serial data. If a preexisting malfunction exists, the air bag indicator will illuminate steady immediately after the ignition is turned ON. If the ignition 1 voltage is outside of the normal operating voltage range of 9-16 V, the SDM will command the instrument cluster to illuminate the air bag indicator ON, even with no DTCs present, and then disable all deployment loops.

Diagnostic Aids

A DTC B1370 may set if the ignition 1 circuit is outside the 9-16 V range.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Testing

1. Verify SDM DTCs are not set.
 - If any DTCs are set, refer to **Diagnostic Trouble Code (DTC) List - Vehicle** .

- 2. With a scan tool command the Instrument Cluster to turn all instrument cluster indicators ON and OFF. The air bag indicator should turn ON and OFF as commanded.
 - o If the air bag indicator does not turn ON and OFF as expected, replace the P16 instrument cluster.
- 3. If all circuits test normal, replace the K36 SDM.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **SIR/SRS Wiring Repairs**
- **Control Module References** for instrument cluster and SDM replacement, setup, and programming

AIR BAG INDICATOR CIRCUIT MALFUNCTION (PASSENGER)

Diagnostic Instructions

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

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Passenger Air Bag OFF Indicator Control	2	2*	4	-
Passenger Air Bag ON Indicator Control	3	3*	5	-
Passenger Air Bag Disable Indicator Ground	-	1	1	-
1. Both indicators always OFF 2. The OFF indicator will not illuminate 3. The ON indicator will not illuminate 4. The OFF indicator always ON 5. The ON indicator always ON * High resistance may cause the appropriate indicator to illuminate less bright than normal				

Circuit/System Description

The passenger air bag ON/OFF indicators are used to notify the driver when the passenger presence system has enabled or disabled the instrument panel inflator module. When the ignition is turned ON, the ignition voltage is supplied to the passenger presence system module. When the sensing and diagnostic module (SDM) receives the appropriate serial data message from the passenger presence system the SDM will then provide voltage to the appropriate indicator.

Reference Information

Schematic Reference

SIR Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

SIR System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: The passenger air bag ON and OFF indicators may not operate as expected if there are supplemental inflatable restraint (SIR) DTCs. Repair all SIR DTCs before proceeding with this diagnostic.

1. Ignition ON, with the passenger seat unoccupied, verify the scan tool Passenger Seat Occupancy Status parameter is Empty.
2. With the passenger seat unoccupied, verify the passenger air bag OFF indicator is illuminated.
3. With the passenger seat occupied, verify the scan tool Passenger Seat Occupancy Status parameter is Occupied.
4. With the passenger seat occupied, verify the passenger air bag ON indicator is illuminated.

Circuit/System Testing

NOTE: removing connectors inspect for damage or corrosion. Damage or corrosion in the following requires repair or replacement of the affected.

- Inflatable restraint passenger air bag on/off indicator.
- Inflatable restraint passenger air bag on/off indicator wiring harness.

1. Ignition OFF, disconnect the harness connector at the P14 inflatable restraint instrument panel module

indicator.

2. Test for less than 5 ohms between the ground circuit terminal 2 and ground.
 - If greater than the specified range, test the ground circuit for an open/high resistance.
3. Ignition ON, with the passenger seat occupied, verify that a test lamp does not illuminate between the control circuit terminal 3 and ground.
 - If the test lamp is illuminated, test the control circuit for a short to voltage. If the circuit tests normal, replace the K36 SDM
4. With the passenger seat unoccupied, verify that a test lamp illuminates between the control circuit terminal 3 and ground.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal replace the K36 SDM.
5. With the passenger seat unoccupied verify that a test lamp does not illuminate between the control circuit terminal 1 and ground.
 - If the test lamp is illuminated, test the control circuit for a short to voltage. If the circuit tests normal, replace the K36 SDM.
6. With the passenger seat occupied verify that a test lamp illuminates between the control circuit terminal 1 and ground.
 - If the test lamp does not illuminate, test the control circuit for a short to ground or an open/high resistance. If the circuit tests normal replace the K36 SDM.
7. If all circuits test normal, replace the P14 inflatable restraint instrument panel module indicator. Refer to **Inflatable Restraint Instrument Panel Module Indicator Replacement**.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for SDM replacement, setup, and programming

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 <u>Repairs and Inspections Required After a Collision</u> .
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 air bags to temperatures above 65°C (149°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 92 cm (3 feet) or greater:

- Inflatable restraint sensing and diagnostic module (SDM)
- Any air bag
- Driver steering wheel air bag coil
- Any impact sensor
- Seat belt anchor and/or retractor pretensioners
- Passenger presence module and/or occupant sensor

Disabling Procedure - Air Bag Fuse

1. Turn the steering wheel so that the vehicles wheels are pointing straight ahead.
2. 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.

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

Enabling Procedure - Air Bag Fuse

1. Place the ignition in the OFF position.
2. Install the fuse(s) supplying power to the SDM. Refer to SIR Schematics or Electrical Center Identification Views .
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 .

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 .

REPAIR INSTRUCTIONS

SIR SERVICE PRECAUTIONS

WARNING: 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.

NOTE: The inflatable restraint sensing and diagnostic module (SDM) maintains a reserved energy supply. The reserved energy supply provides deployment power for the SIR air bags. Deployment power may be available for up to 60 seconds after disconnecting the vehicle power. Disabling the SIR system prevents deployment of the SIR air bags from the reserved energy supply.

NOTE: 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 air bags to temperatures above 65°C (149°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

NOTE: Discard any of the following components if it has been dropped from a height of 962 cm (3 ft) or greater:

- SDM
- Passenger instrument panel air bag
- Driver steering wheel air bag
- Driver steering wheel air bag coil
- Roof rail air bags
- Front and /or side impact sensors
- Seat belt anchor and/or retractor pretensioners
- Front seat side air bag

FRONT END INFLATABLE RESTRAINT DISCRIMINATING SENSOR REPLACEMENT

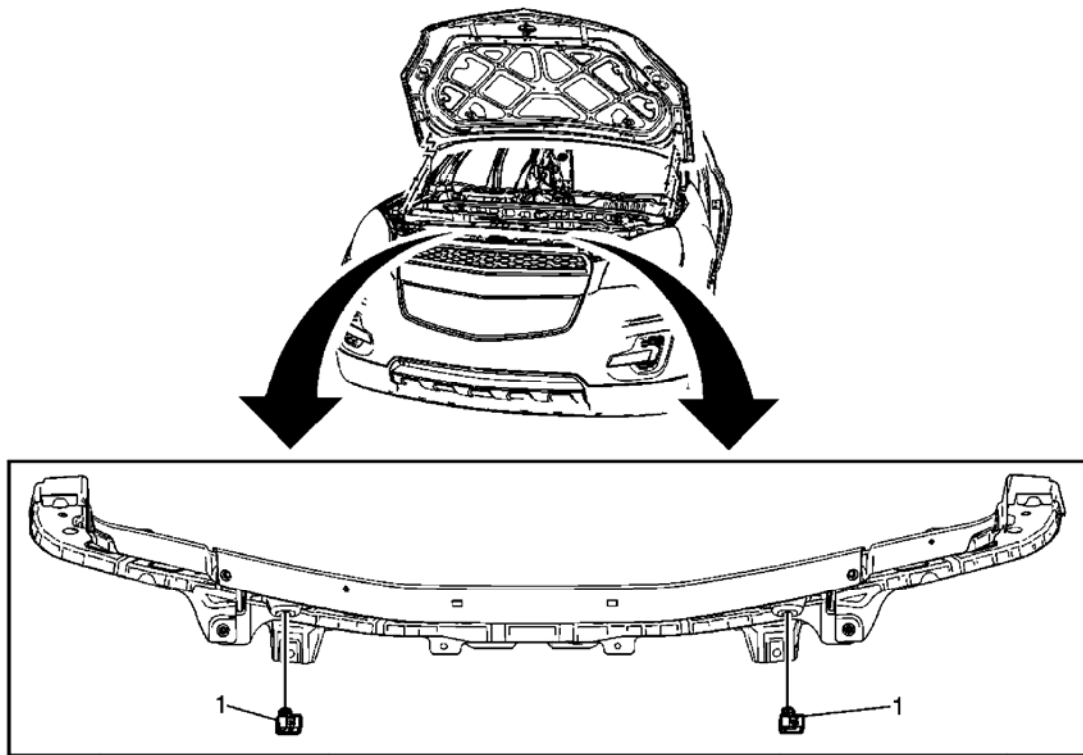


Fig. 5: Front End Inflatable Restraint Discriminating Sensor
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Refer to <u>SIR Warning</u> .	
Preliminary Procedures: Disable the supplemental inflatable restraint (SIR) system. Refer to <u>SIR Disabling and Enabling</u> .	
1	Front End Inflatable Restraint Discriminating Sensor Assembly CAUTION: Refer to <u>Fastener Caution</u> . Procedure 1. Loosen the bolts and slide the sensor out of the keyhole slots. 2. The bolts are integral to the sensor assembly and DO NOT remove separately. 3. Disconnect the electrical connector. Tighten: 7.5 N.m (66 lb in)

INFLATABLE RESTRAINT SENSING AND DIAGNOSTIC MODULE REPLACEMENT

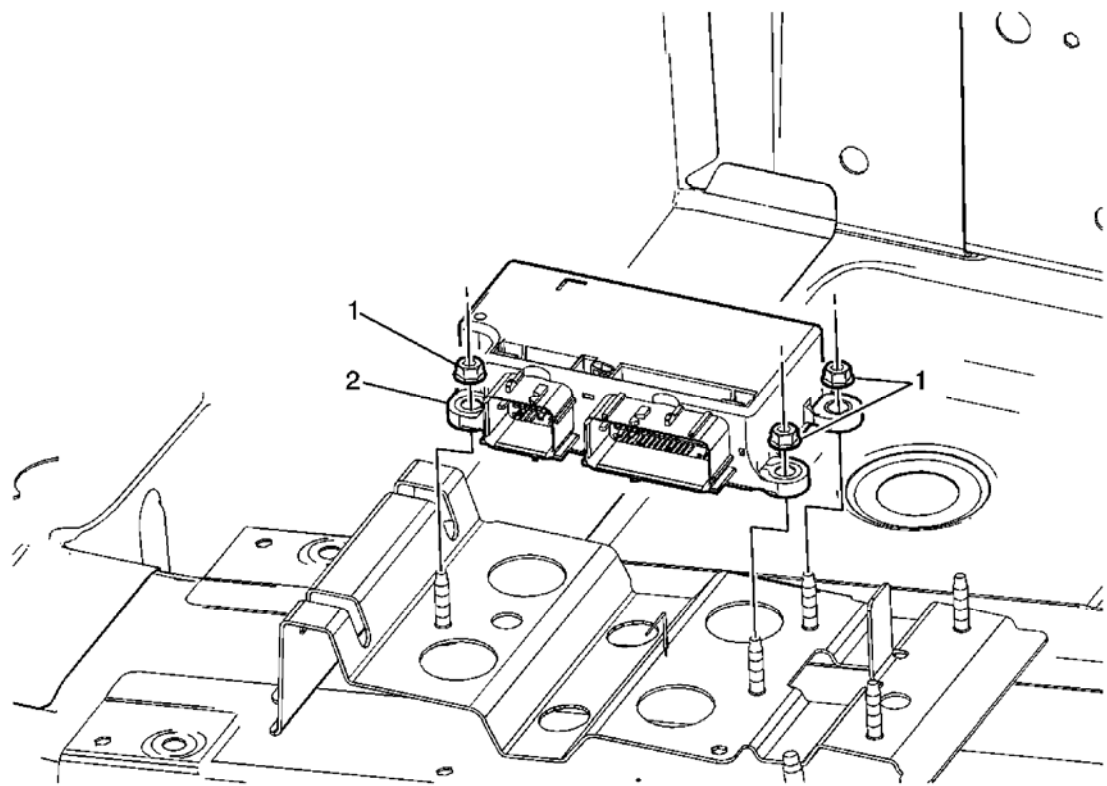


Fig. 6: Inflation Restraint Sensing & Diagnostic Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Do not strike or jolt the inflatable restraint sensing and diagnostic module (SDM). Before applying power to the SDM, make sure that it is securely fastened with the arrow facing toward the front of the vehicle. Failure to observe the correct installation procedure could cause SIR deployment, personal injury, or unnecessary SIR system repairs. WARNING: Refer to <u>SIR Warning</u> . Preliminary Procedures 1. Disable the supplemental inflatable restraint (SIR) system. Refer to <u>SIR Disabling and Enabling</u>. 2. Remove the drivers seat. Refer to <u>Driver or Passenger Seat Replacement</u> . 3. Remove the front floor console trim plate. Refer to <u>Front Floor Console Trim Plate Replacement</u> . 4. Access the SDM module through the console structure opening.	

5. Disconnect the electrical connector.	
1	Inflatable Restraint Sensing and Diagnostic Module Fastener (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 10 N.m (89 lb in)
2	Inflatable Restraint Sensing and Diagnostic Module Assembly Tip: - When installing, ensure the arrow on the module is pointed towards the front of the vehicle. - If installing a replacement module, program the module. Refer to <u>Control Module References</u> .

STEERING WHEEL INFLATABLE RESTRAINT MODULE REPLACEMENT

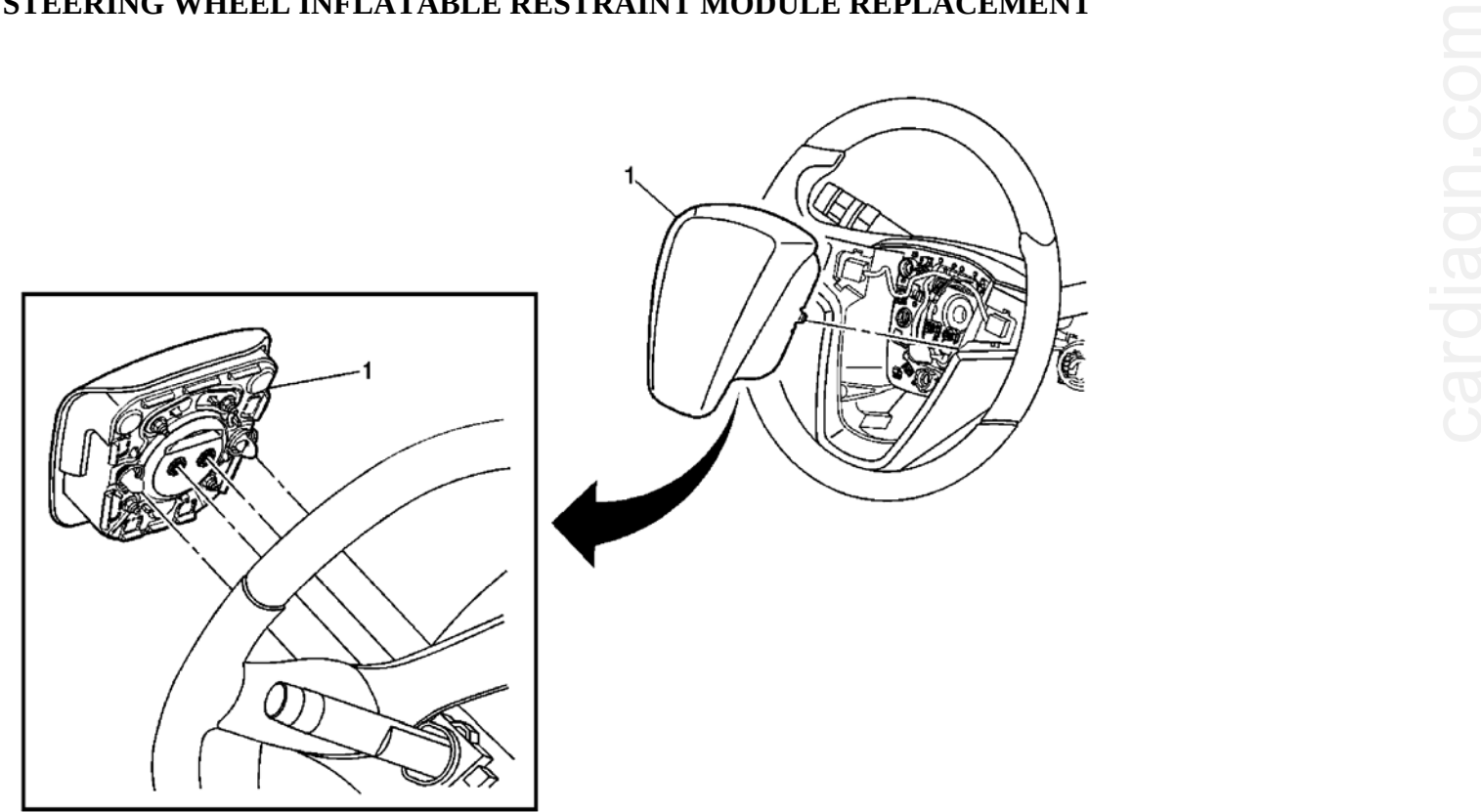


Fig. 7: Steering Wheel Inflatable Restraint Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING:	

Refer to SIR Inflator Module Handling and Storage Warning .

WARNING:

Refer to SIR Warning .

Preliminary Procedures

1. Disable the supplemental inflatable restraint (SIR) system. Refer to SIR Disabling and Enabling.
2. On back side of the steering wheel are 2 circular openings, place the wheel so that one opening is on top.
3. Using a blunt-ended tool, push the spring fastener inward through the access hole. Repeat the step for the other opening.

	Steering Wheel Inflatable Restraint Module
1	Procedure 1. Release the connector position assurance (CPA) retainer. 2. Disconnect the electrical connectors. 3. Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module after the required retention period. Refer to <u>Inflatable Restraint Module Handling and Scrapping</u>.

STEERING WHEEL INFLATABLE RESTRAINT MODULE COIL REPLACEMENT

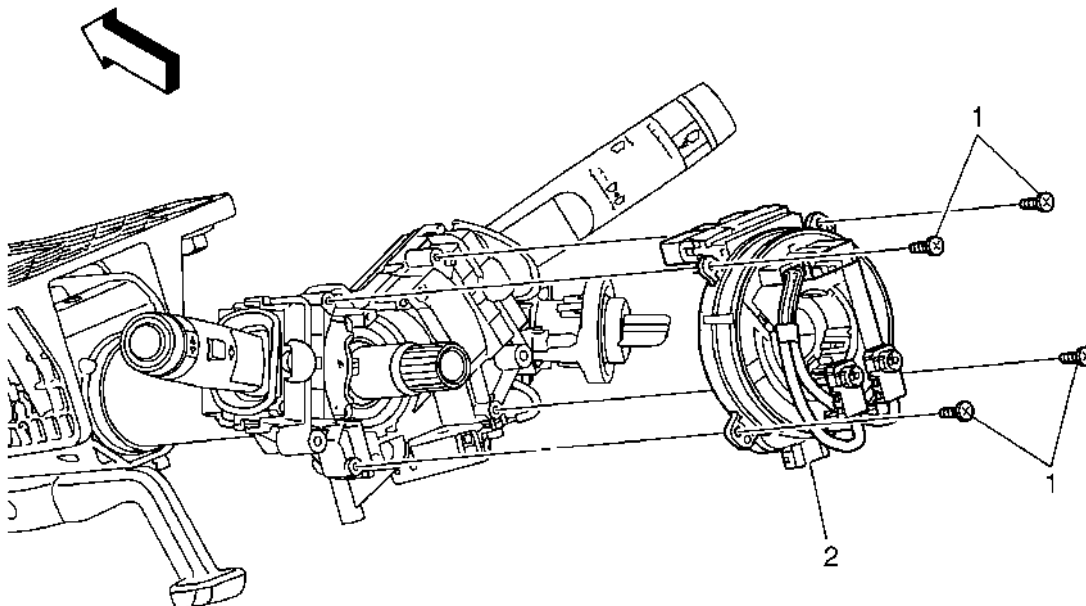


Fig. 8: Steering Wheel Inflatable Restraint Module Coil
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures 1. Remove the steering wheel. Refer to <u>Steering Wheel Replacement</u> . 2. Remove the steering column shroud. Refer to <u>Steering Column Shroud Replacement</u> .	
1	Inflatable Restraint Steering Wheel Module Coil Bolt (Qty: 4) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 3 N.m (27 lb in)
2	Inflatable Restraint Steering Wheel Module Coil Procedure 1. Disconnect any electrical connectors as necessary. 2. Transfer the steering angle sensor. Refer to <u>Steering Angle Sensor Replacement</u> . 3. Ensure the coil is centered during installation. If you are installing a NEW coil, remove the centering tab AFTER the coil is on the steering column. Refer to <u>Inflatable Restraint Steering Wheel Module Coil Centering</u> .

INFLATABLE RESTRAINT STEERING WHEEL MODULE COIL CENTERING

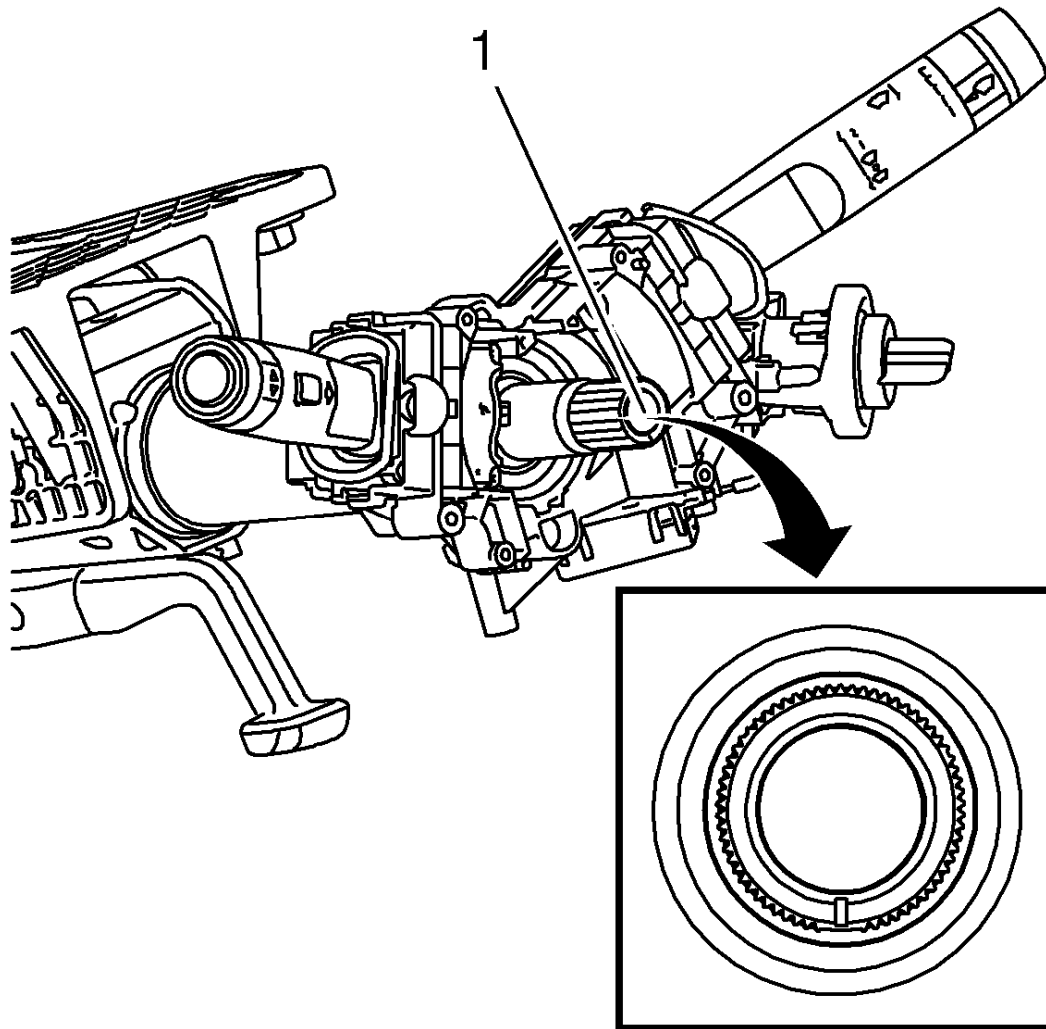


Fig. 9: Inflatable Restraint Steering Wheel Module Coil
Courtesy of GENERAL MOTORS CORP.

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.

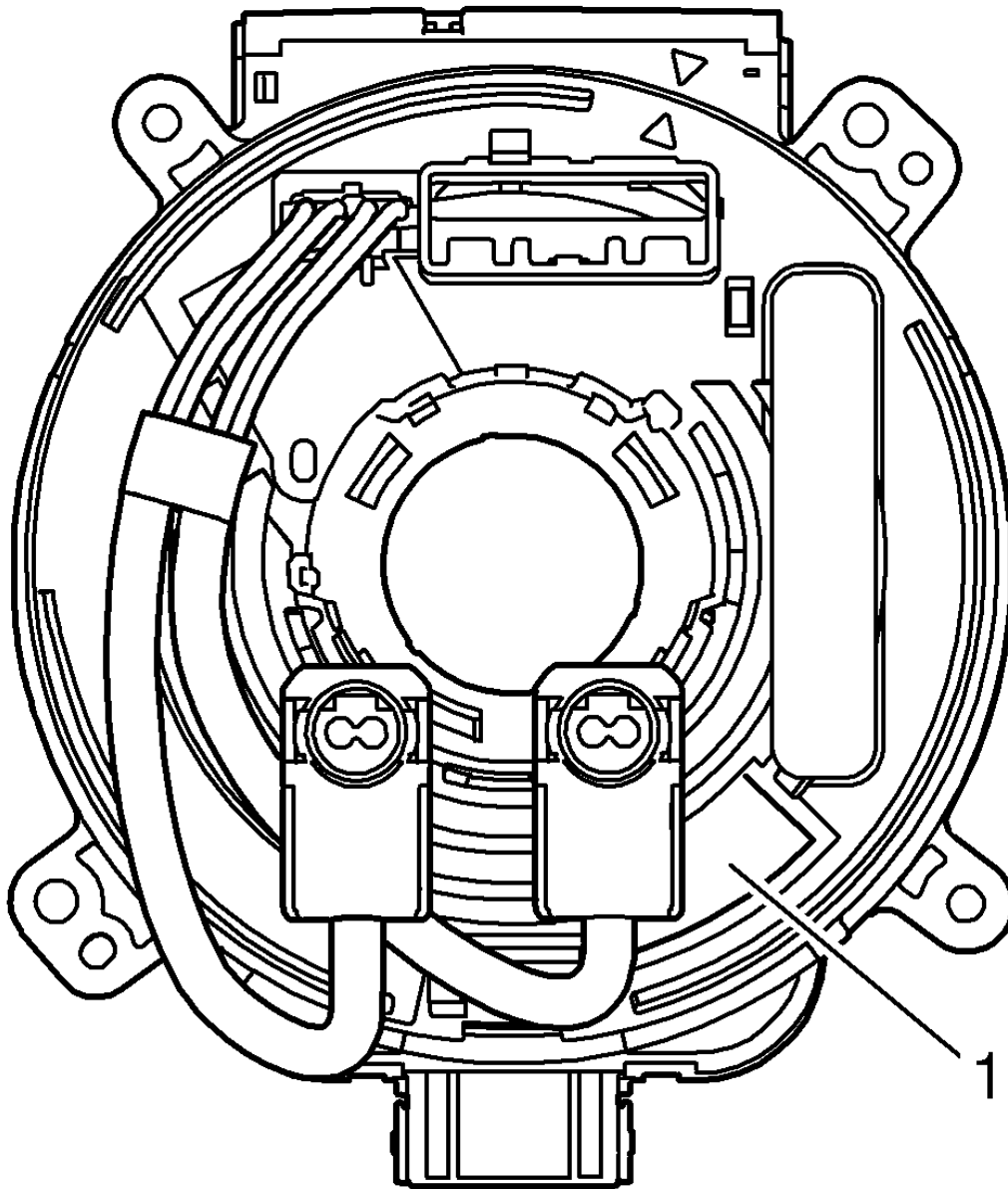


Fig. 10: Centering Window
Courtesy of GENERAL MOTORS CORP.

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

INSTRUMENT PANEL INFLATABLE RESTRAINT MODULE REPLACEMENT (EQUINOX)

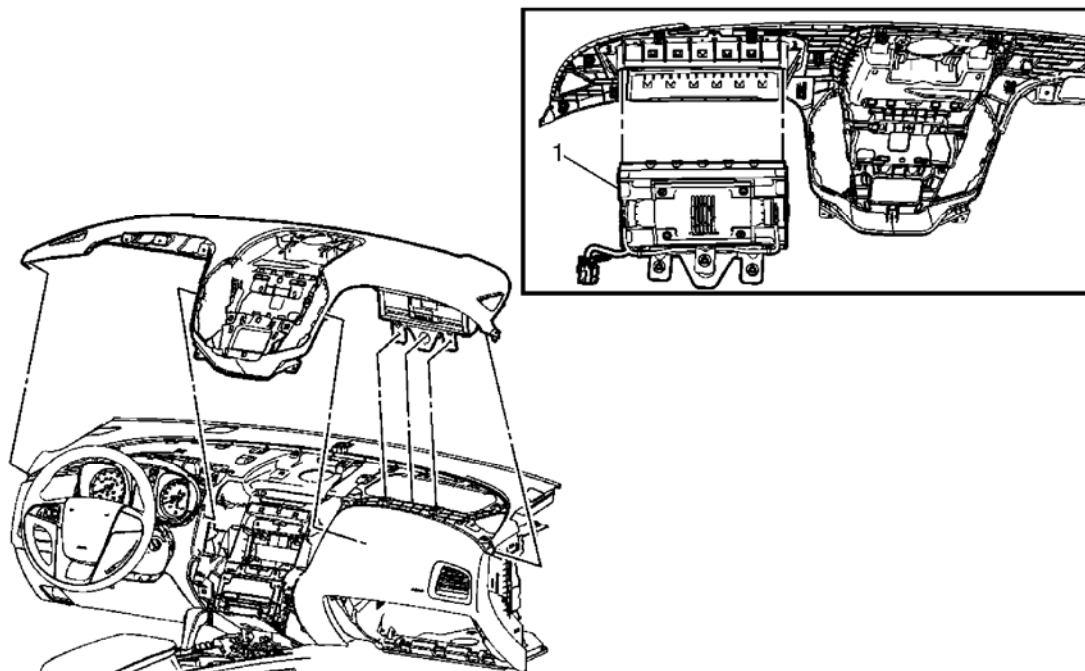


Fig. 11: Instrument Panel Inflatable Restraint Module (Equinox)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Refer to <u>SIR Inflator Module Handling and Storage Warning</u> . WARNING: Refer to <u>SIR Warning</u> . Preliminary Procedures 1. Disable the SIR system. Refer to <u>SIR Disabling and Enabling</u> . 2. Remove the instrument panel upper trim panel. Refer to <u>Instrument Panel Upper Trim Panel Replacement (Equinox)</u> or <u>Instrument Panel Upper Trim Panel Replacement (Terrain)</u> .	
1	Instrument Panel Inflatable Restraint Module Procedure: Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module, after the required retention period. Refer to <u>Inflatable Restraint Module Handling and Scrapping</u> .

INSTRUMENT PANEL INFLATABLE RESTRAINT MODULE REPLACEMENT (TERRAIN)

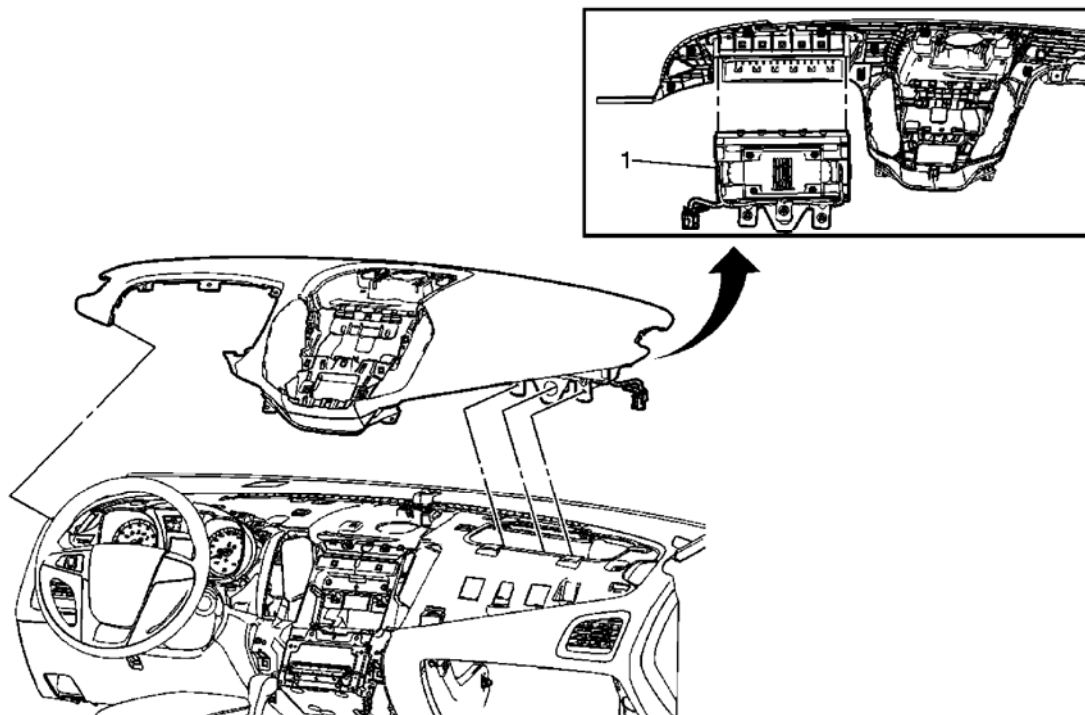


Fig. 12: Instrument Panel Inflatable Restraint Module (Terrain)
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Refer to <u>SIR Inflator Module Handling and Storage Warning</u> .	
WARNING: Refer to <u>SIR Warning</u> .	
Preliminary Procedures	
1. Disable the SIR system. Refer to <u>SIR Disabling and Enabling</u> . 2. Remove the instrument panel upper trim panel. Refer to <u>Instrument Panel Upper Trim Panel Replacement (Equinox)</u> or <u>Instrument Panel Upper Trim Panel Replacement (Terrain)</u> .	
1	Instrument Panel Inflatable Restraint Module Procedure: Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module, after the required retention period. Refer to <u>Inflatable Restraint Module Handling and Scrapping</u> .

INFLATABLE RESTRAINT FRONT PASSENGER PRESENCE SENSOR REPLACEMENT

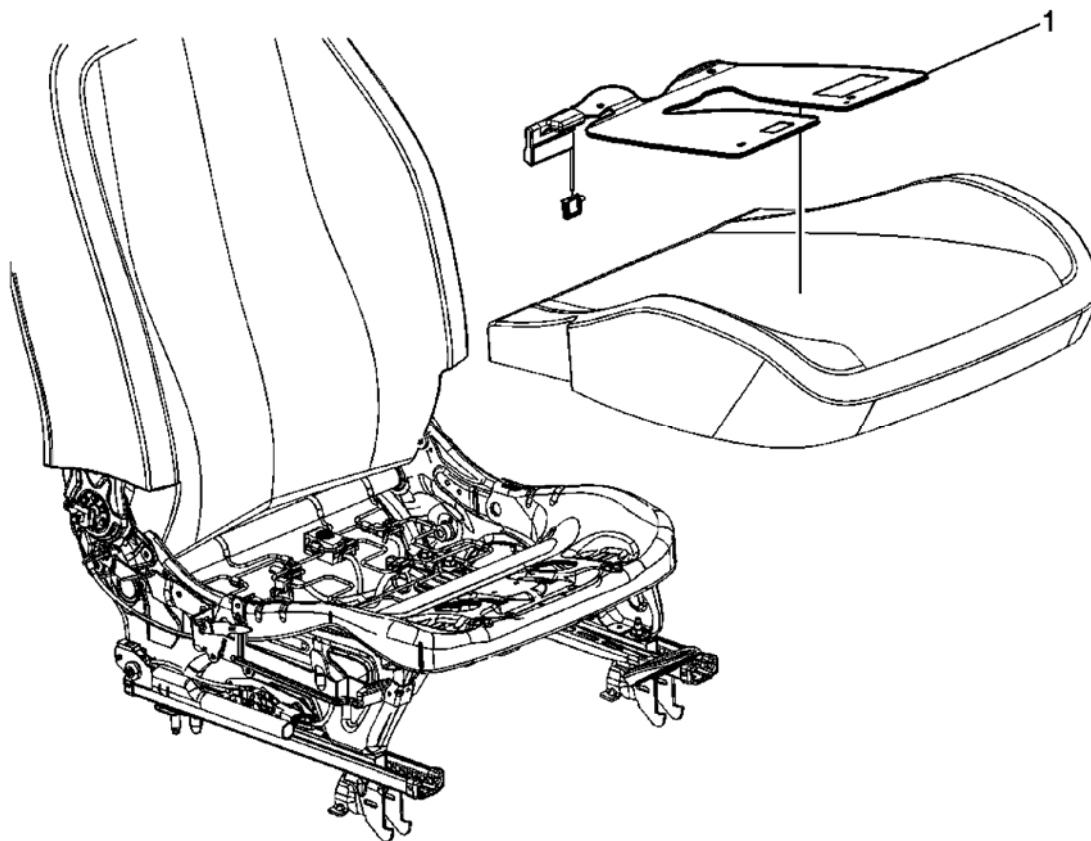


Fig. 13: Inflatable Restraint Front Passenger Presence Sensor
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Replace the passenger presence system as a complete assembly to prevent possible injury to the occupant. All the components in the service kit are assembled and calibrated as a unit. Using only some of the components in the service kit will cause the passenger presence system to operate improperly. WARNING: To avoid personal injury, perform a preload test on the passenger presence system whenever you remove or replace the seat cushion trim. Failure to do so may cause the system to malfunction. Preliminary Procedure 1. Remove the passenger front seat. Refer to <u>Driver or Passenger Seat Replacement</u> . 2. Remove the front seat cushion cover and pad. Refer to <u>Front Seat Cushion Cover and Pad Replacement</u> .	
Inflatable Restraint Front Passenger Presence System Assembly	

Procedures

1

1. Preload Test the inflatable restraint passenger presence system whenever the seat cushion or any component of the passenger presence system is removed. Refer to **Passenger Presence System Preload Test**.
2. Program the inflatable restraint passenger presence system after replacement. Refer to **Control Module References**.
3. Disengage the passenger presence system assembly from the seat cushion by sliding the sensor belt through the cushion pad.

Tip:

- The passenger presence system is an integral part of the pad on the passenger seat cushion.
- The sensor, module and seat cushion pad must be replaced as a unit.
- Note the routing of the wiring harness and connector location for installation.

DRIVER OR PASSENGER SEAT SIDE INFLATABLE RESTRAINT MODULE REPLACEMENT

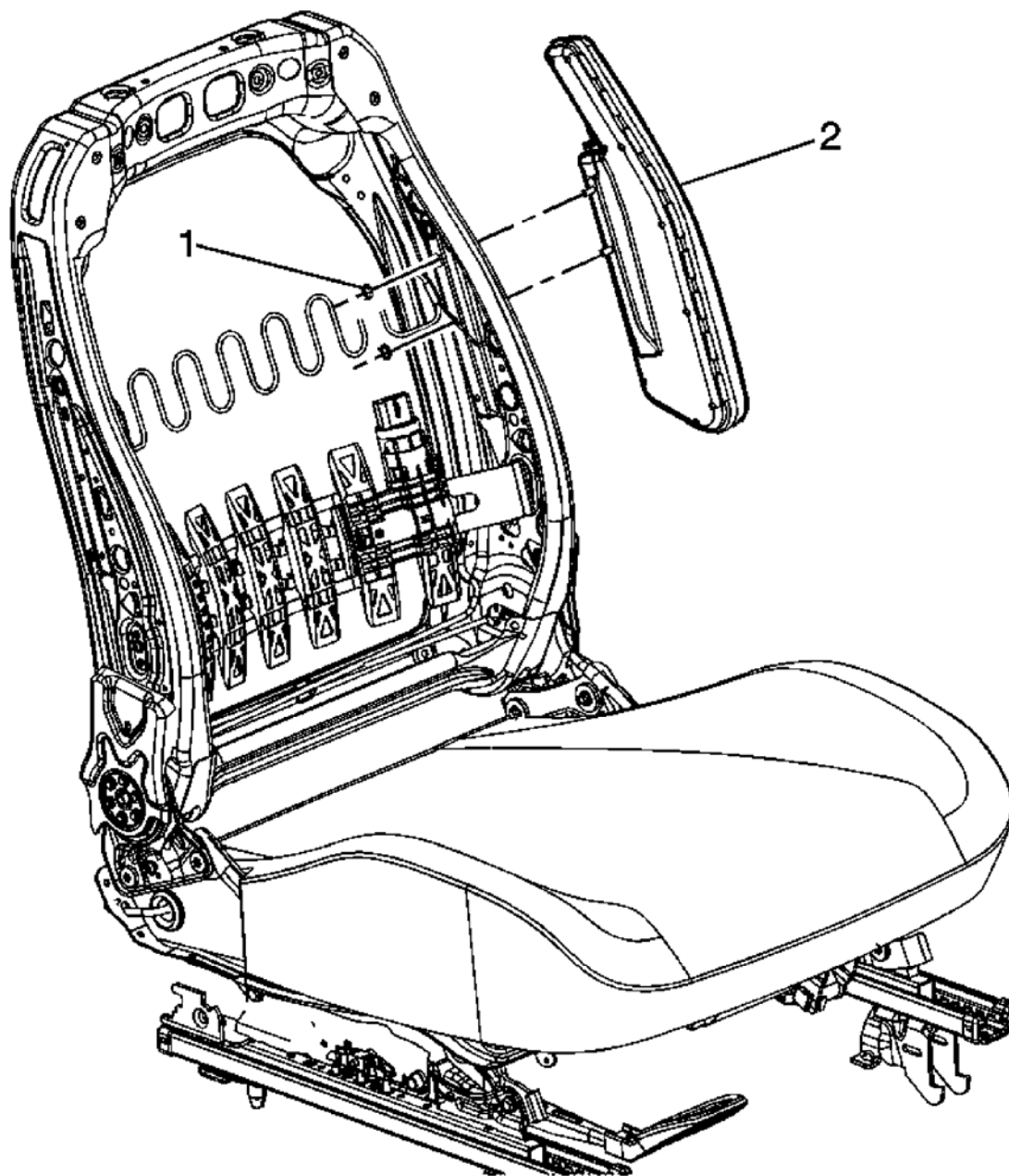


Fig. 14: Driver Or Passenger Seat Side Inflatable Restraint Module
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Following the deployment of a side impact air bag, inspect the following parts for damage. Replace these parts if necessary: • The seat cushion frame	

- The seat recliner, if equipped
- The seat adjuster
- The seat back frame

Failure to do so may cause future personal injury.

WARNING:

Do not strike or jolt the inflatable restraint side impact sensor (SIS). Before applying power to the SIS make sure that it is securely fastened. Failure to observe the correct installation procedures could cause SIR deployment, personal injury, or unnecessary SIR system repairs.

WARNING:

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

Preliminary Procedure

1. Disable the SIR system. Refer to **SIR Disabling and Enabling**.
2. Remove the driver or passenger seat. Refer to **Driver or Passenger Seat Replacement** .
3. Remove the driver or passenger seat back cushion cover and pad. Refer to **Driver or Passenger Seat Back Cushion Cover and Pad Replacement** .

1	Driver or Passenger Seat Side Inflatable Restraint Module Nut (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Driver or Passenger Seat Side Inflatable Restraint Module Procedure 1. Remove the connector position assurance (CPA) from the module electrical connector. 2. Disconnect the electrical connector. 3. Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module after the required retention period. Refer to <u>Inflatable Restraint Module Handling and Scrapping</u>.

INFLATABLE RESTRAINT SIDE IMPACT SENSOR REPLACEMENT - FRONT SIDE DOOR

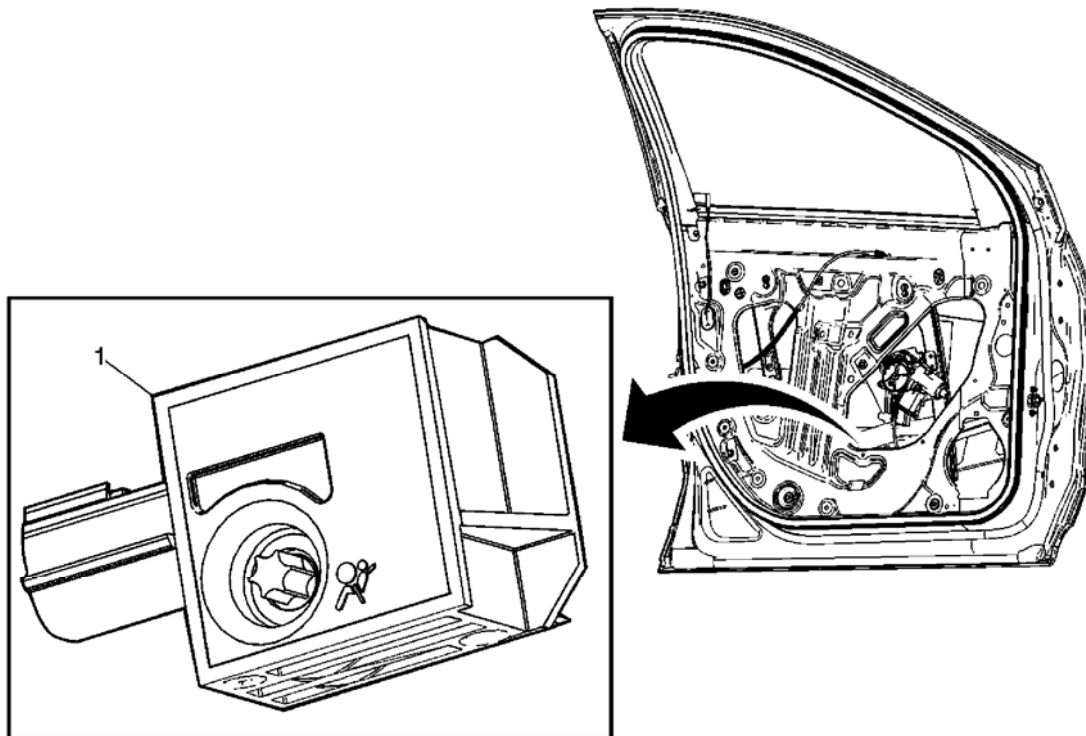


Fig. 15: Inflatable Restraint Side Impact Sensor - Front Side Door
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: 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. WARNING: Do not strike or jolt the inflatable restraint side impact sensor (SIS). Before applying power to the SIS make sure that it is securely fastened. Failure to observe the correct installation procedures could cause SIR deployment, personal injury, or unnecessary SIR system repairs. Preliminary Procedures 1. Disable the supplemental inflatable restraint (SIR) system. Refer to <u>SIR Disabling and Enabling</u>. 2. Remove the front side door trim panel. Refer to <u>Front Side Door Trim Panel Replacement</u>.	
	Inflatable Restraint Side Impact Sensor Assembly CAUTION: Refer to <u>Fastener Caution</u>.

Procedure

1

1. Loosen the fastener and slide the sensor out of the keyhole slot.
2. The bolt is integral to the sensor assembly, DO NOT remove separately.

Tip: The sensor is located on the inside of the front door inner panel.

Tighten: 7.5 N.m (66 lb in)

INFLATABLE RESTRAINT SIDE IMPACT SENSOR REPLACEMENT - REAR SIDE DOOR

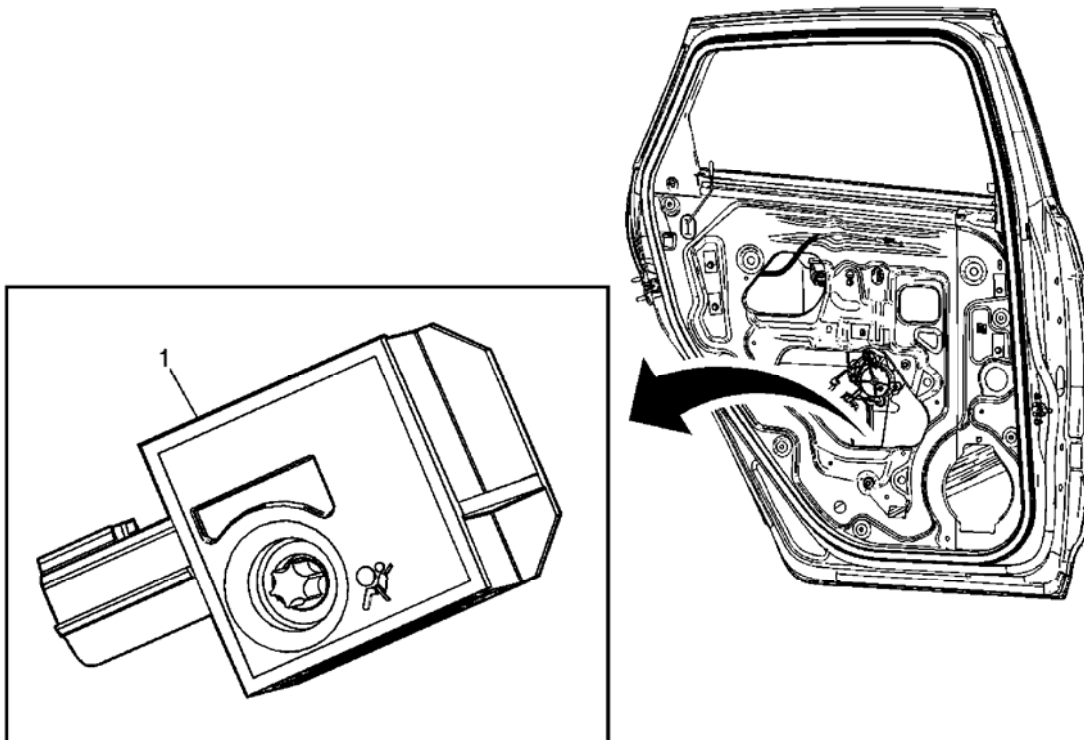


Fig. 16: Inflatable Restraint Side Impact Sensor - Rear Side Door
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: 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.	
WARNING: Do not strike or jolt the inflatable restraint side impact sensor (SIS). Before applying power to the	

SIS make sure that it is securely fastened. Failure to observe the correct installation procedures could cause SIR deployment, personal injury, or unnecessary SIR system repairs.

Preliminary Procedures

- 1. Disable the supplemental inflatable restraint (SIR) system. Refer to **SIR Disabling and Enabling**.
- 2. Remove the rear side door trim panel. Refer to **Rear Side Door Trim Panel Replacement**.

1	Inflatable Restraint Rear Side Door Impact Sensor Assembly CAUTION: Refer to Fastener Caution. Procedure 1. Loosen the fastener and slide sensor out of key hole slot. 2. The bolt is integral to the sensor assembly, DO NOT remove separately. Tip: The sensor is located on the inside of the rear door inner panel. Tighten: 7.5 N.m (66 lb in)
---	---

INFLATABLE RESTRAINT INSTRUMENT PANEL MODULE INDICATOR REPLACEMENT

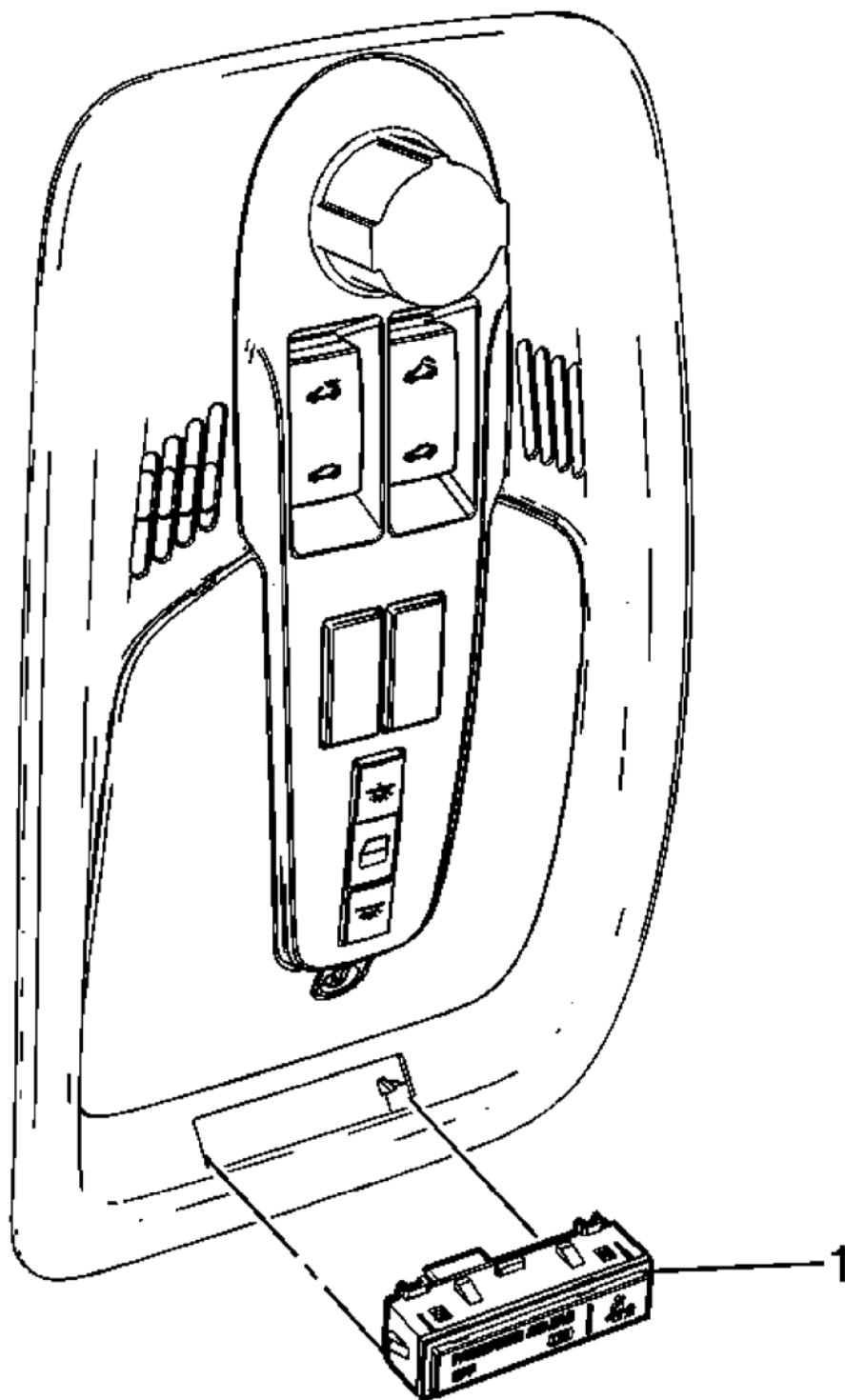


Fig. 17: Inflatable Restraint Instrument Panel Module Indicator
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name

Preliminary Procedure:

Remove the roof console. Refer to **Roof Console Replacement** .

1	Inflatable Restraint Instrument Panel Module Indicator
---	--

ROOF SIDE RAIL INFLATABLE RESTRAINT MODULE REPLACEMENT

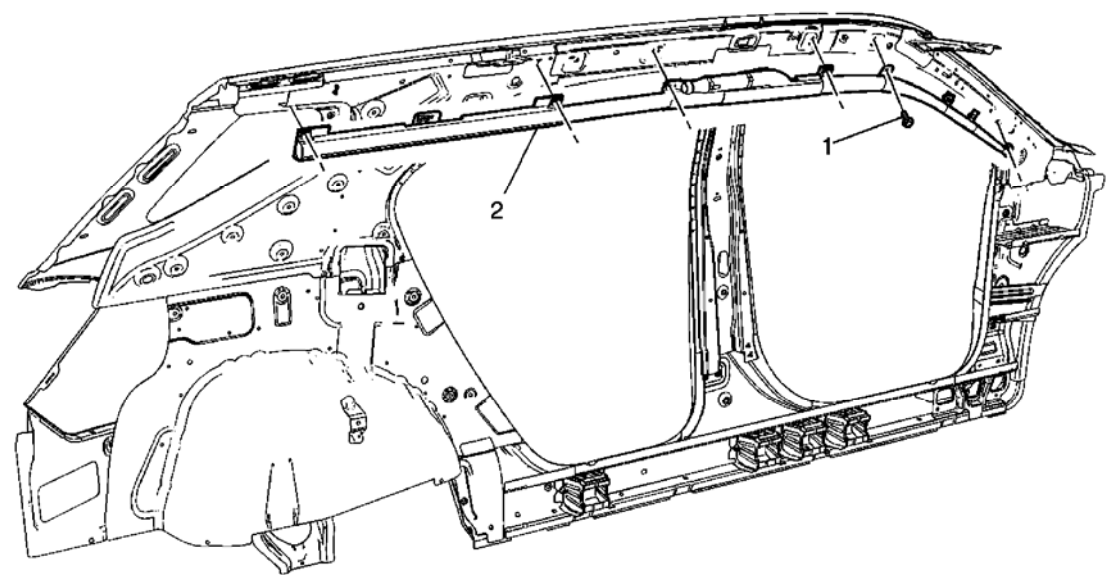


Fig. 18: Roof Side Rail Inflatable Restraint Module
Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: 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. WARNING: Refer to SIR Warning . WARNING: Refer to SIR Inflator Module Handling and Storage Warning . Preliminary Procedures 1. Disable the SIR system. Refer to SIR Disabling and Enabling. 2. It is only necessary to lower the headliner. Only do those steps in headliner replacement that will lower the headliner enough to gain access to the part. Refer to Headlining Trim Panel Replacement .	

1	Roof Side Rail Inflatable Restraint Module Fastener (Qty: 6) CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 9 N.m (80 lb in)
2	Roof Side Rail Inflatable Restraint Module Assembly Procedure 1. Disconnect the electrical connector. 2. Remove the 3 push in retainers securing the roof side rail inflatable restraint module to the vehicle. 3. Remove the roof side rail inflatable restraint module from the vehicle. 4. Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module after the required retention period. Refer to <u>Pretensioner Handling and Scrapping</u>. Tip: The bolts and the push in fasteners are an integral part of the module and should remain with the module.

DRIVER OR PASSENGER SEAT BELT TENSIONER REPLACEMENT

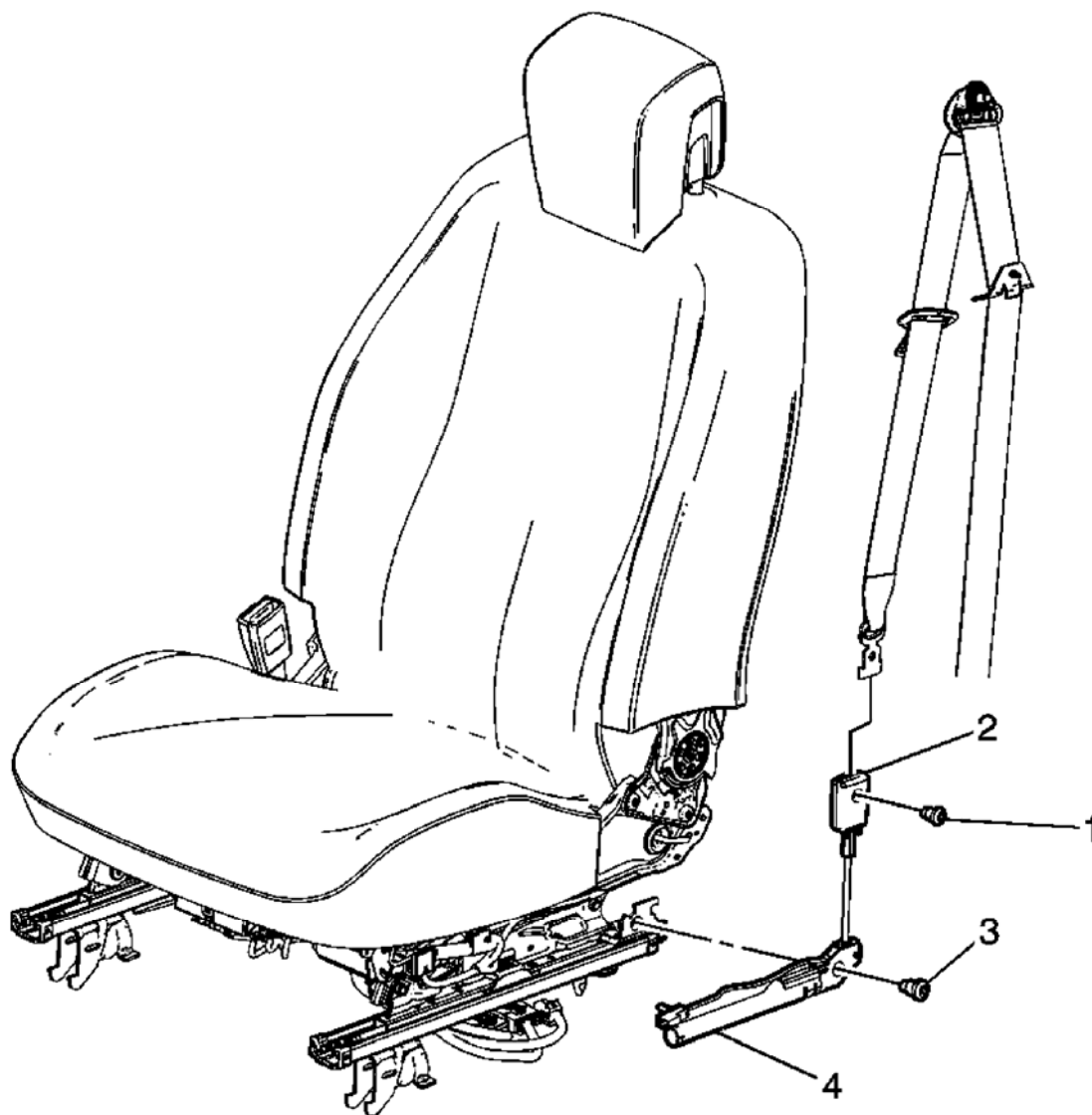


Fig. 19: Driver Or Passenger Seat Belt Tensioner
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: Refer to <u>SIR Warning</u> . WARNING: 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.	

Preliminary Procedures

- 1. Move the front seat to the full forward and full up position.
- 2. Disable the SIR. Refer to **SIR Disabling and Enabling**.
- 3. Remove the seat outer adjuster finish cover. Refer to **Driver or Passenger Seat Outer Adjuster Finish Cover Replacement** .
- 4. For pretensioner handling and scrapping, refer to **Pretensioner Handling and Scrapping**.

1	Driver or Passenger Seat Belt Tensioner Fastener CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 7.5 N.m (66 lb in)
2	Driver or Passenger Seat Belt Tensioner Cover Assembly
3	Driver or Passenger Seat Belt Tensioner Assembly Fastener Tighten: 45 N.m (33 lb ft)
4	Driver or Passenger Seat Belt Tensioner Assembly Procedure 1. Disconnect the electrical connector. 2. Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module after the required retention period. Refer to <u>Pretensioner Handling and Scrapping</u>.

DRIVER OR PASSENGER SEAT RETRACTOR SIDE BELT REPLACEMENT

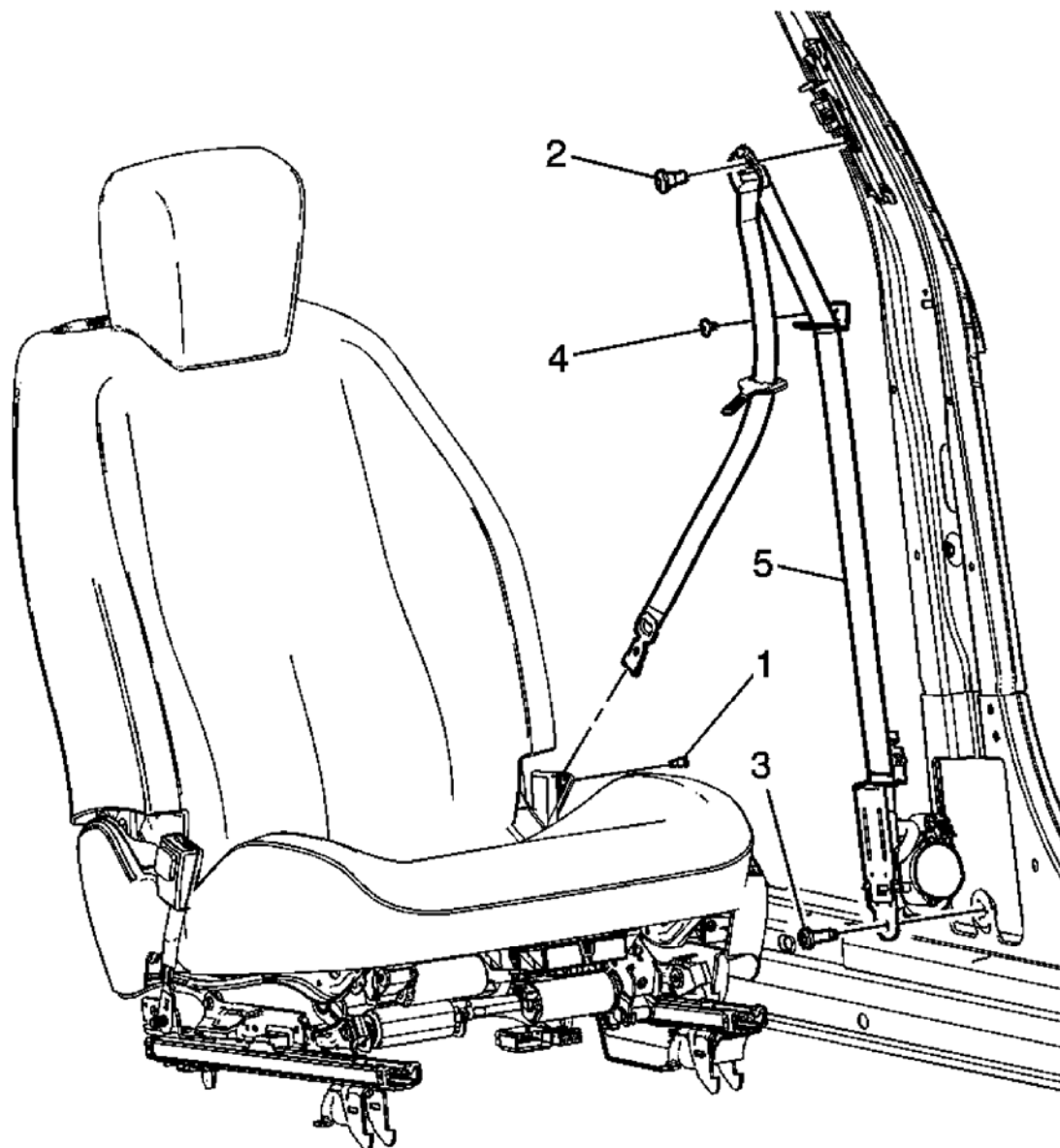


Fig. 20: Driver Or Passenger Seat Retractor Side Belt
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
WARNING: 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.	

WARNING:
Refer to SIR Warning .

WARNING:
Refer to SIR Inflator Module Handling and Storage Warning .

Preliminary Procedures

- 1. Move the front seat to a full forward and full up position.
- 2. Disable the SIR. Refer to SIR Disabling and Enabling.
- 3. Remove the upper and lower center pillar trim panel. Refer to Center Pillar Upper Trim Panel Replacement and Center Pillar Lower Trim Panel Replacement .

1	Front Seat Belt Tensioner Fastener CAUTION: Refer to <u>Fastener Caution</u> . Tighten: 7.5 N.m (66 lb in)
2	Driver or Passenger Seat Shoulder Belt Guide Fastener Tighten: 45 N.m (33 lb ft)
3	Driver or Passenger Seat Shoulder Belt Retractor Fastener Tighten: 45 N.m (33 lb ft)
4	Driver or Passenger Seat Belt Push On Retainer Procedure: Use a flat-bladed tool to remove locking pin in retainer.
5	Driver or Passenger Seat Retractor Side Belt Assembly Procedure 1. Disconnect the electrical connector. 2. Fully deploy the module before disposal. If the module was replaced under warranty, fully deploy and dispose of the module after the required retention period. Refer to <u>Pretensioner Handling and Scrapping</u>.

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.

- Passenger instrument panel air bag
- Driver steering wheel air bag
- Inflatable restraint sensing and diagnostic module (SDM)
- Front and/or side impact sensors
- Driver/Passenger seat side air bag, if deployed
- Seat back cover on if side seat air bag is deployed
- Driver/Passenger seat belt anchor and/or retractor pretensioners

Perform additional inspections on the following components.

- Steering wheel air bag 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 air bag, steering wheel air bag, SDM, seat side air bag (if deployed) and seat belt anchor and/or retractor pretensioners-Inspect for any damage and repair or replace each component as needed.

Accident With Side Seat Air Bag Deployment - Component Replacement and Inspections

After a collision involving driver/passenger side seat air bag deployment, replace the following components.

- Left/right side impact sensors on the side of the impact.
- Left/right roof rail air bag on the side of the impact.
- Inflatable restraint sensing and diagnostic module (SDM), if SDM has DTC B0052 56.
- Inflatable restraint seat belt anchor and/or retractor pretensioner.
- Driver or passenger seat back cushion cover replacement.

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 driver/passenger side seat air bags 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 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 anchor and/or retractor 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

Impact Sensor Replacement Guidelines

The 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 impact sensor mounted forward of the radiator, it must be replaced.

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

Impact 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 SIR system. Do not try to determine whether the impact sensor is undamaged, replace the impact sensor. Also, if you follow a diagnostic trouble code (DTC) procedure and a malfunctioning impact sensor is indicated, replace the 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 Air Bag

WARNING: Refer to SIR Inflator Module Handling and Storage Warning .

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

Dual Stage Air Bags

Dual stage air bags have two deployment stages. If stage 1 was used to deploy a dual stage air bag, stage 2 may still be active. Therefore, a deployed dual stage air bag must be treated as an active air bag. If disposal of a dual stage air bag 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 air bag. Do NOT dispose a live and undeployed air bag through normal disposal channels until the air bag has been deployed.

Do not deploy the air bag in the following situations:

- After replacement of an air bag under warranty-the air bag 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 air bags - follow the instructions in the campaign service bulletin for proper SIR handling procedures.

Deployment Procedures

You can deploy the air bag 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 Air Bag, Instrument Panel Air Bag, and Roof Rail Air Bag

Deploy the air bag 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 air bag is malfunctioning.
- The air bag is cosmetically damaged, scratched, or ripped.
- The air bag pigtail is damaged.
- The air bag connector is damaged.
- The air bag connector terminals are damaged.

Deployment and disposal of a malfunctioning air bag is subject to any required retention period.

WARNING: Refer to SIR Inflator Module Disposal Warning .

1. Turn OFF the ignition.

WARNING: Refer to SIR Inflator Module Handling and Storage Warning .

2. Remove the air bag.

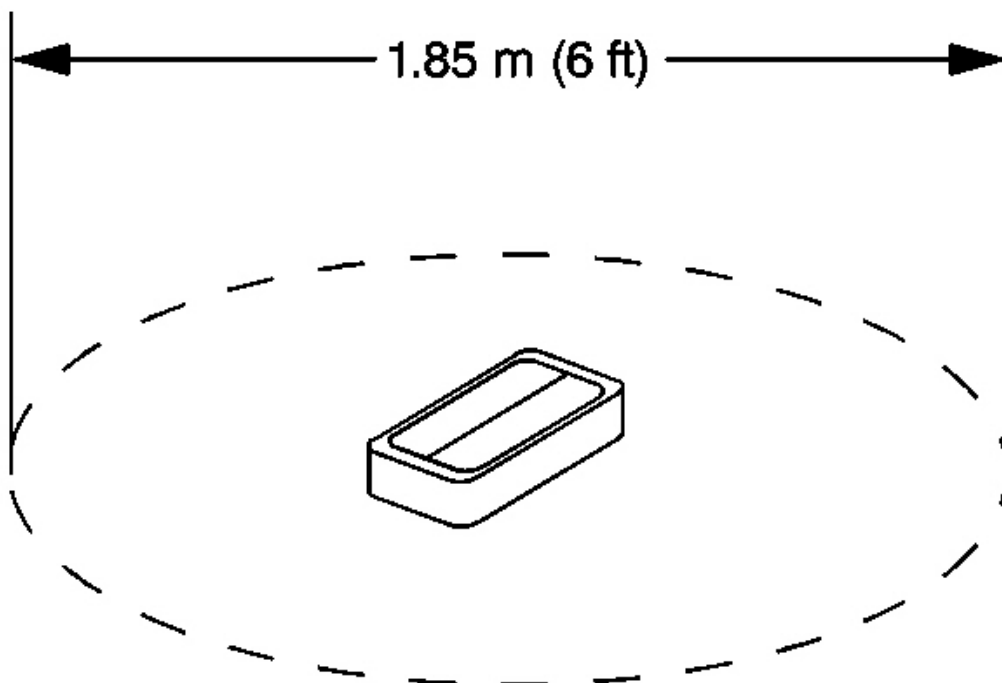


Fig. 21: Identifying Clearance For Deployment Of Inflator Module
Courtesy of GENERAL MOTORS CORP.

3. Clear a space on the ground about 1.85 m (6 ft) in diameter for deployment of the air bag 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.

NOTE: **Dual stage deployments are only used in steering wheel and instrument panel air bags. If stage 1 was used to deploy a dual stage air bag, stage 2 may still be active. If disposal of a dual stage air bag is required, both deployment loops must be energized to deploy the air bag.**

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

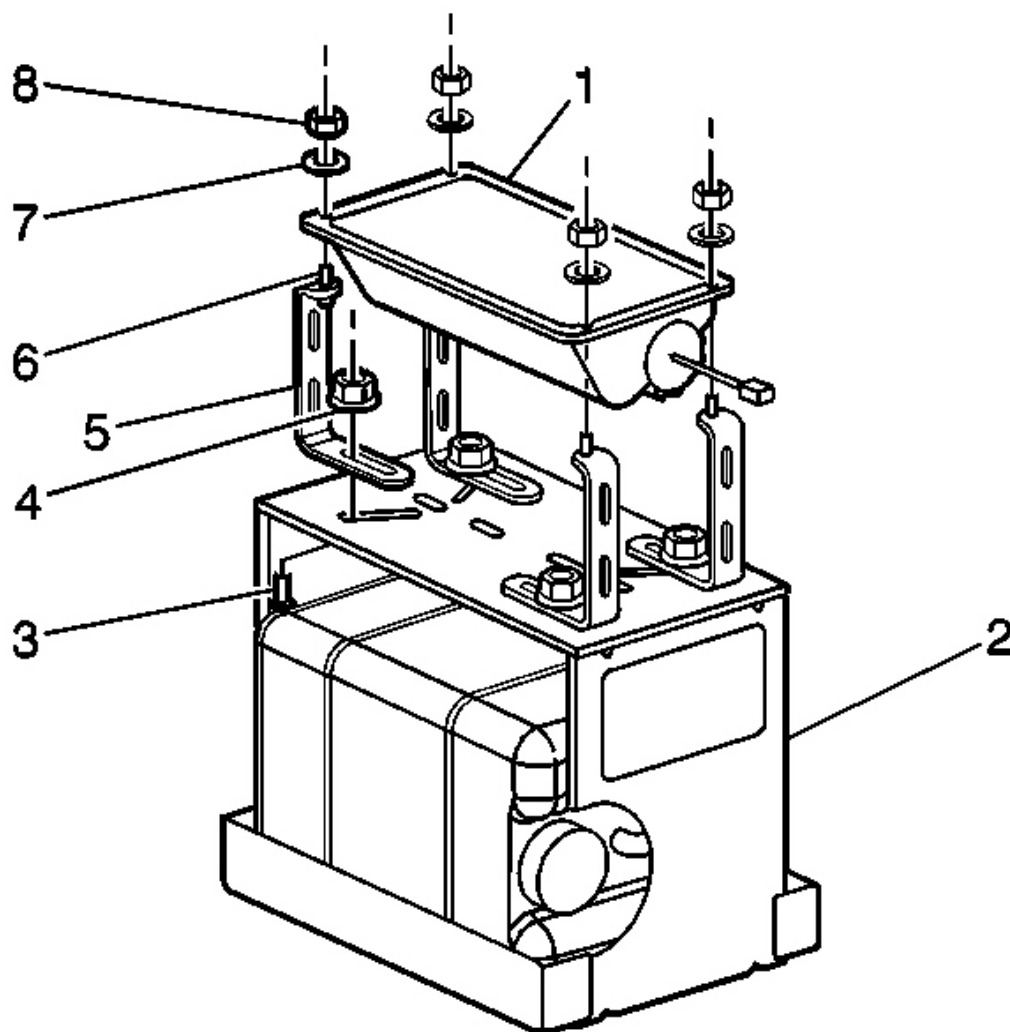


Fig. 22: Identifying I/P Module Components
Courtesy of GENERAL MOTORS CORP.

6. When deploying an instrument panel air bag, perform the following instructions:
 1. Place the **EL-39401-B:** fixture in the center of the cleared area.
 2. Fill the deployment fixture with water or sand.
 3. Using the proper nuts and bolts, mount the instrument panel air bag (1) to the deployment fixture (2), with the vinyl trim facing up.
 4. Securely tighten all fasteners that hold the instrument panel air bag (1) to the deployment fixture (2).

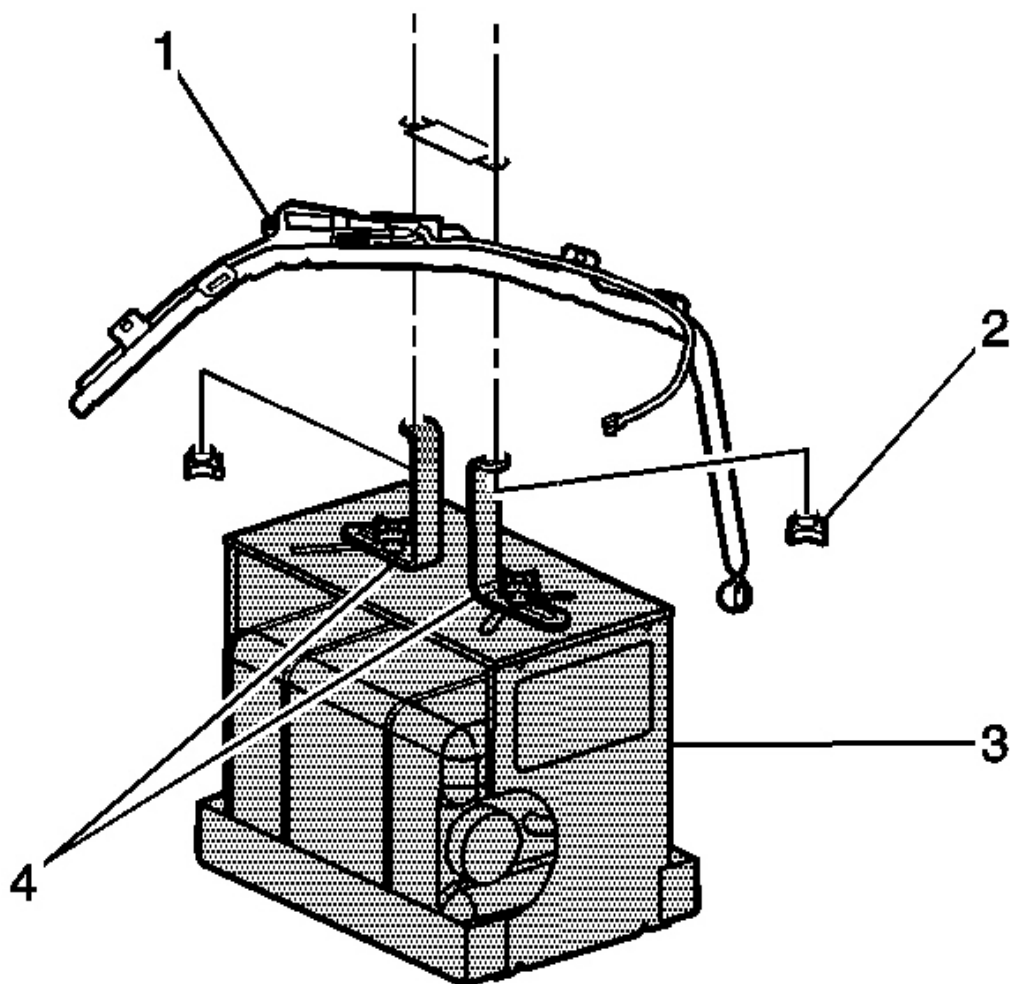


Fig. 23: Identifying Fasteners Holding Side Impact Module To Deployment Fixture
Courtesy of GENERAL MOTORS CORP.

7. When deploying a roof rail air bag, perform the following instructions:
 1. Place the **EL-39401-B:** fixture (3) in the center of the cleared area.
 2. Fill the deployment fixture with water or sand to provide sufficient stabilization of fixture during deployment.
 3. Adjust and secure the fixture arms (4) to the deployment fixture (3), using the proper nuts and bolts.
 4. Attach the roof rail air bag in the deployment fixture and securely tighten all fasteners.

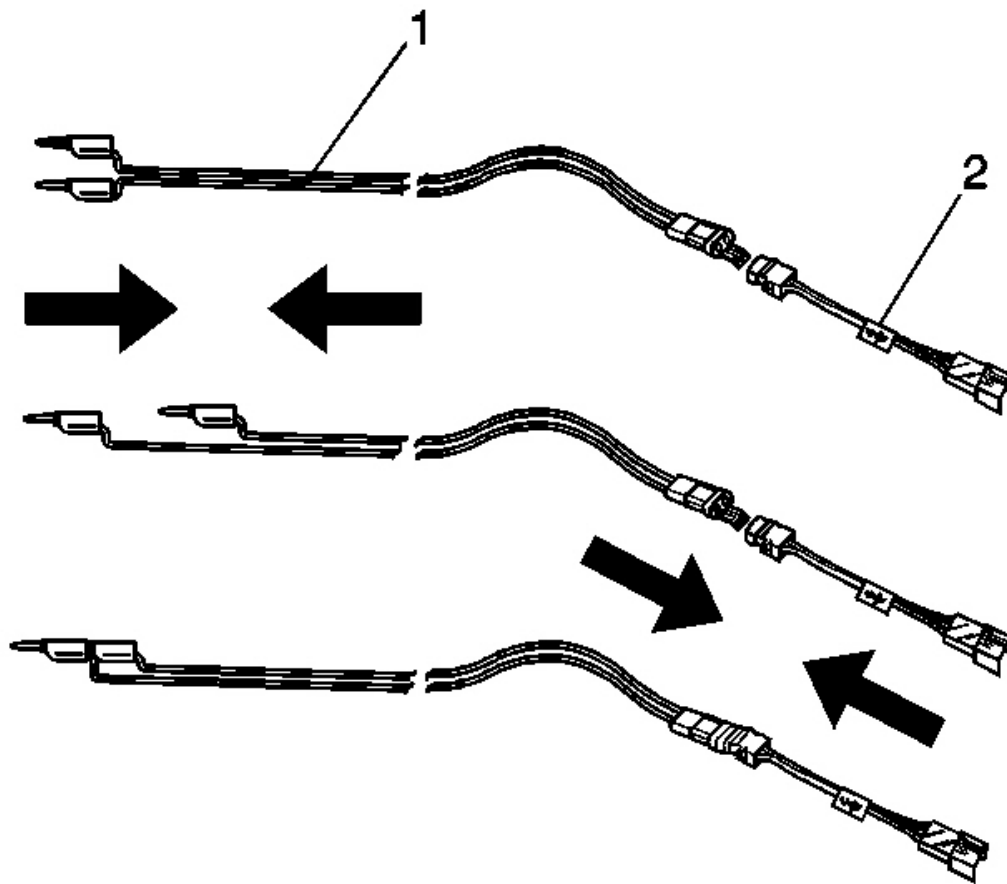


Fig. 24: Identifying SIR Deployment Harness & Adapter
Courtesy of GENERAL MOTORS CORP.

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).

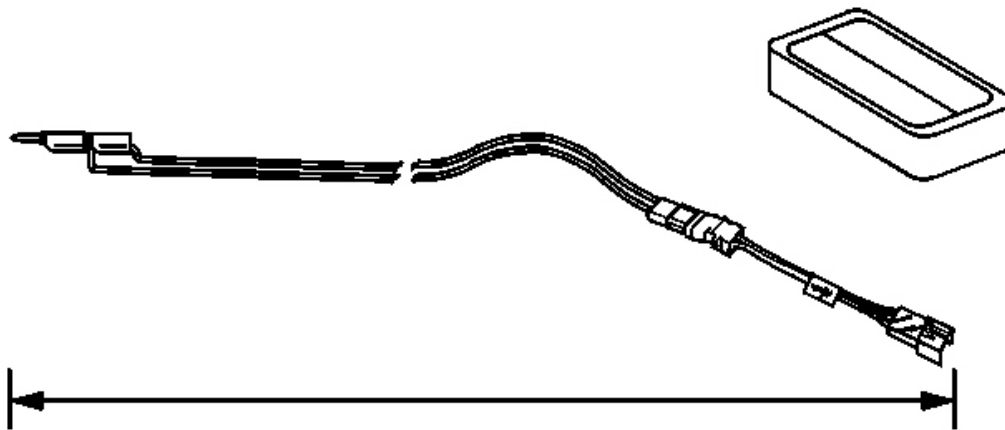


Fig. 25: Extending SIR Deployment Harness & Adapter
 Courtesy of GENERAL MOTORS CORP.

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

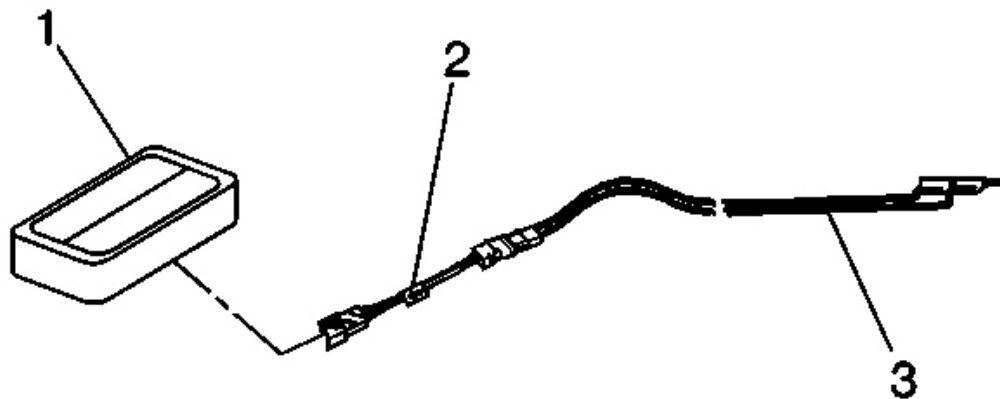


Fig. 26: Inflator Module & SIR Deployment Harness Adapter
 Courtesy of GENERAL MOTORS CORP.

NOTE: On a dual stage air bag, 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 air bag (1) to the adapter (2) on the SIR deployment harness (3).

NOTE:

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

13. Clear the area of people.

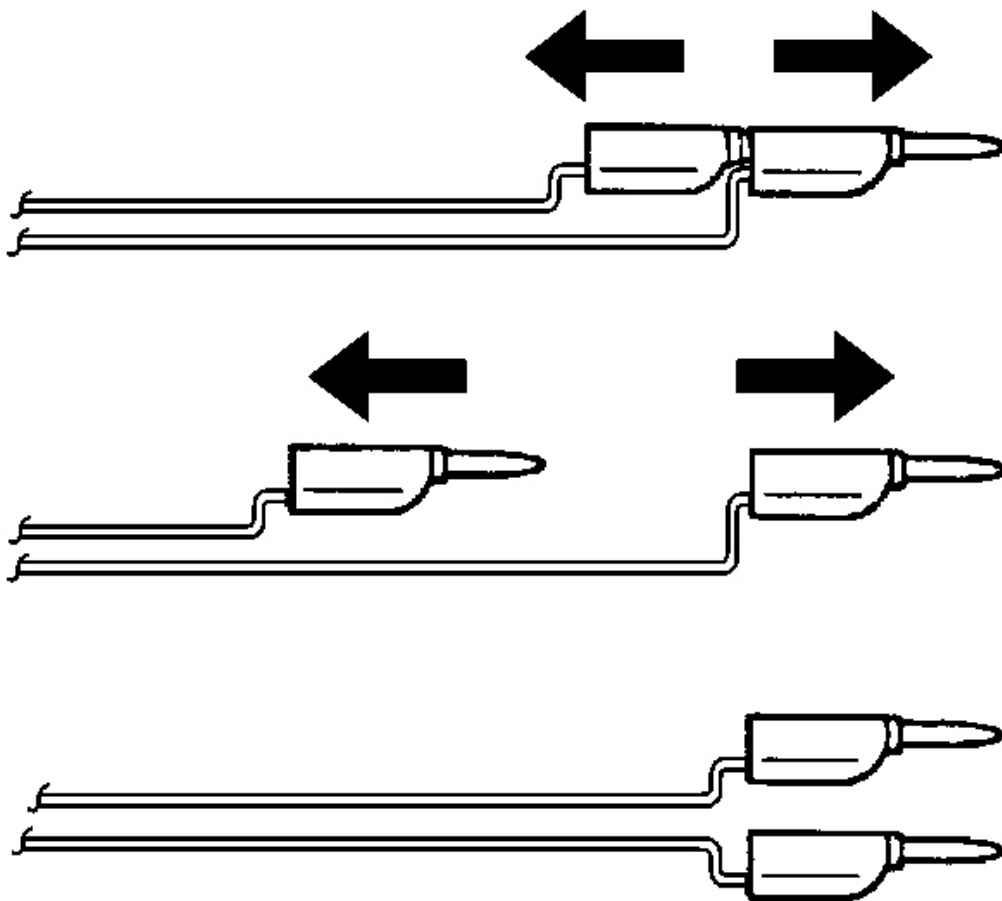


Fig. 27: Separating Banana Plugs
Courtesy of GENERAL MOTORS CORP.

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

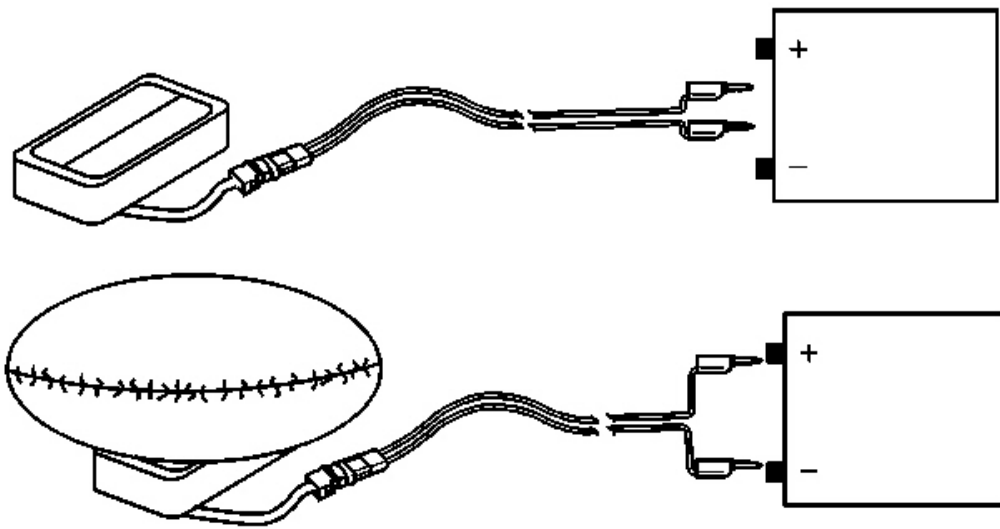


Fig. 28: Connecting SIR Deployment Harness Wires To Power Source
Courtesy of GENERAL MOTORS CORP.

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 air bag will occur when contact is made.

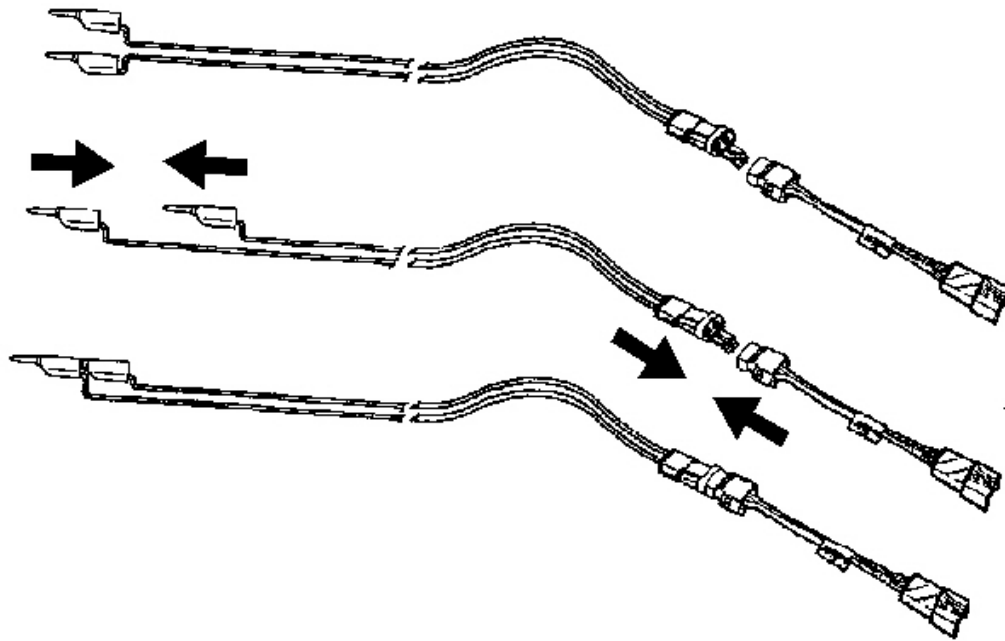


Fig. 29: View Of Deployment Harness Leads
Courtesy of GENERAL MOTORS CORP.

17. Disconnect the SIR deployment harness from the power source after the air bag deploys.
18. If the air bag 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 .

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 air bag as soon as possible.
22. Inspect the pigtail adapter and the SIR deployment harness. Replace as needed.
23. Dispose of the deployed air bag through normal refuse channels.
24. Wash your hands with a mild soap.

Deploy the air bags 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 .

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 air bags which will be deployed are mounted securely.
4. Remove all loose objects from the front seats.

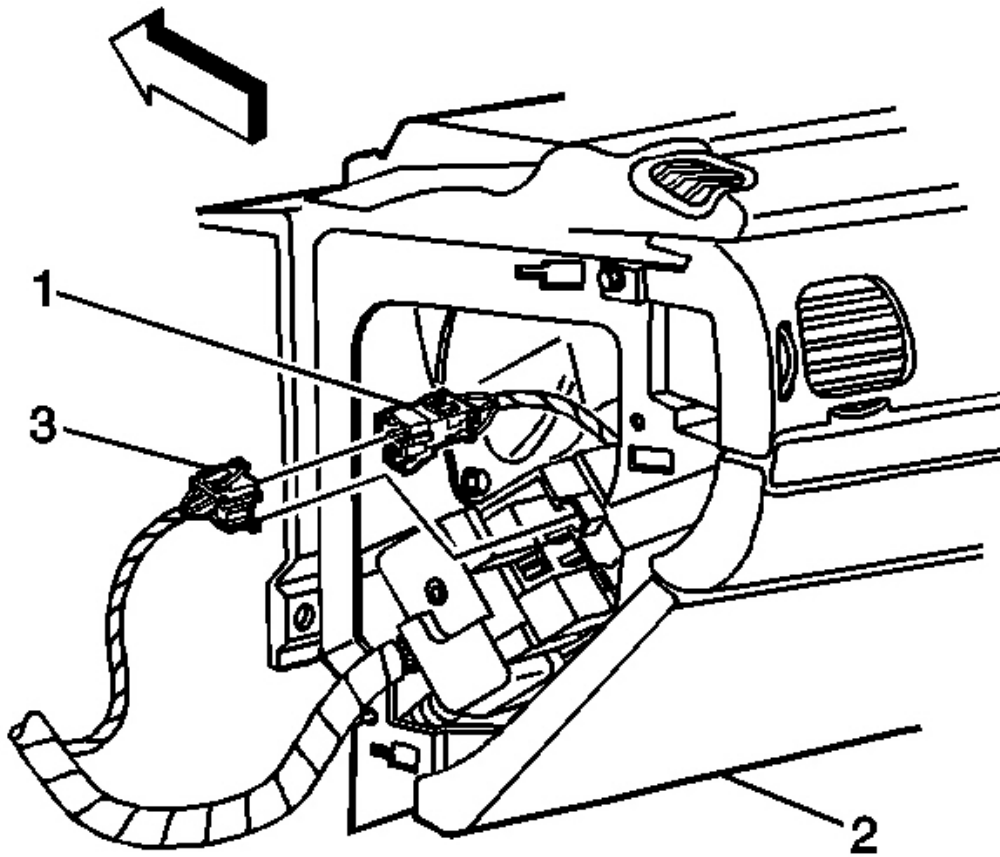


Fig. 30: Identifying Steering Wheel Module & Vehicle Harness Connector
Courtesy of GENERAL MOTORS CORP.

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 air bag yellow connector (1) from vehicle harness yellow connector (3).

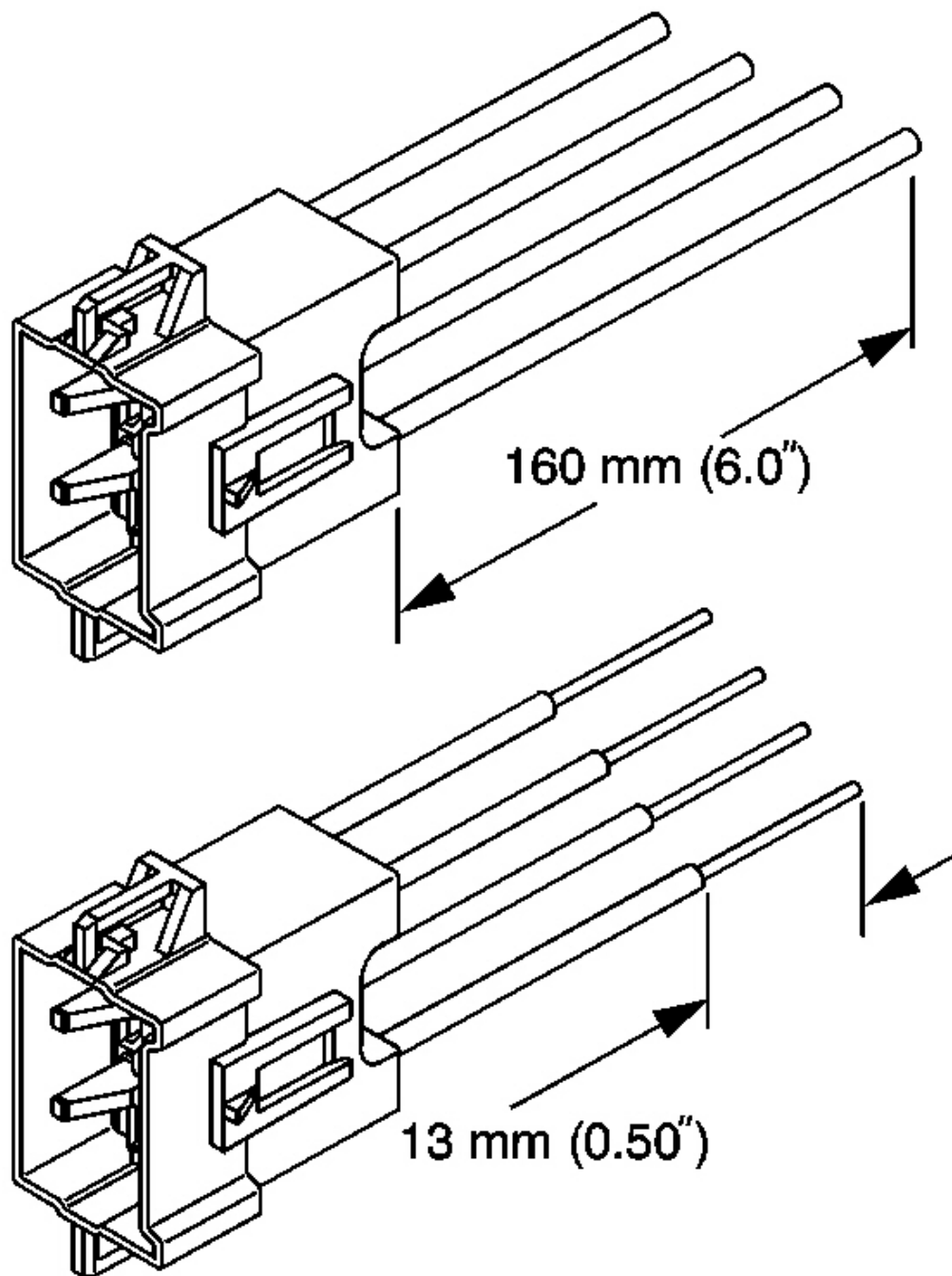


Fig. 31: Stripping SIR Wires
Courtesy of GENERAL MOTORS CORP.

NOTE: If the vehicle is equipped with dual stage air bags the steering wheel air bag and instrument panel air bag 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.

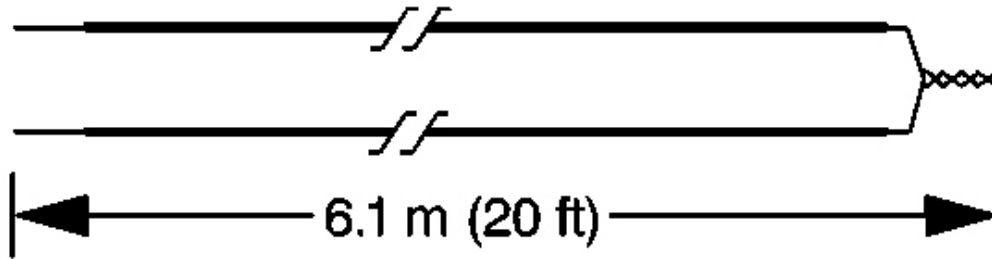


Fig. 32: Fabricating 20 Ft. Deployment Harness
Courtesy of GENERAL MOTORS CORP.

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 air bag.

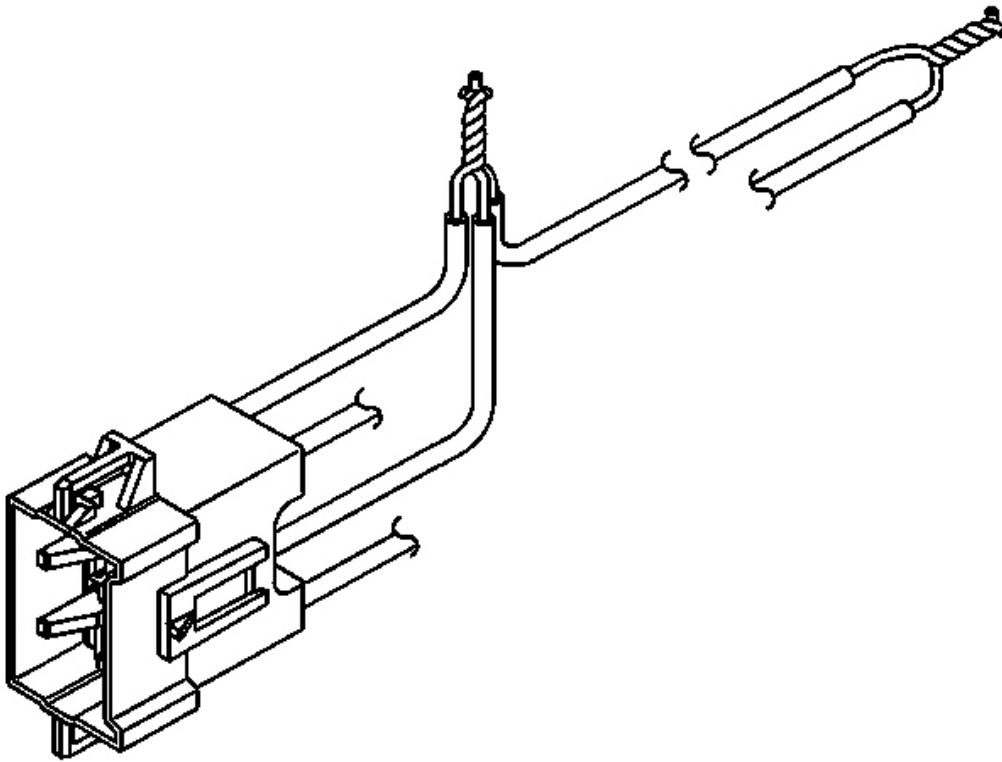


Fig. 33: Twisting Connector Wire Leads (High Circuits) To Deployment Harness Wire
Courtesy of GENERAL MOTORS CORP.

11. Twist together the 2 connector wire leads from the high circuits from both stages of the steering wheel air bag, 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.

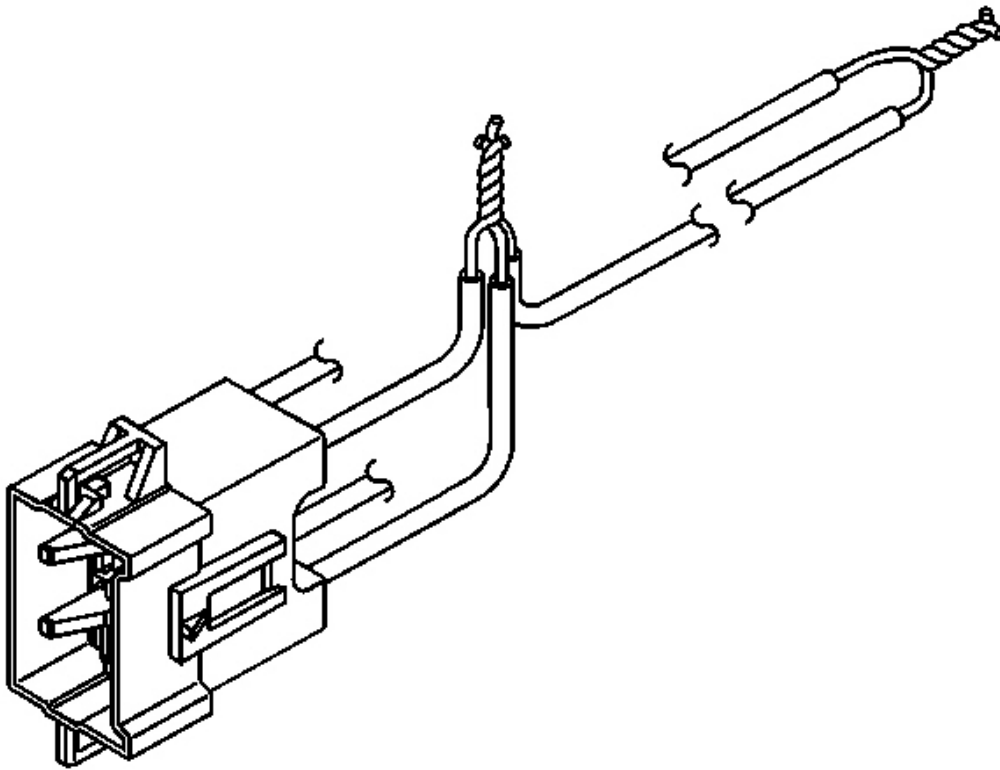


Fig. 34: Twisting Connector Wire Leads (Low Circuits) To Deployment Harness Wire
Courtesy of GENERAL MOTORS CORP.

14. Twist together the 2 connector wire leads from the low circuits from both stages of the steering wheel air bag, 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 air bag.
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 air bag.
29. Route the deployment harness out of the driver side of the vehicle.

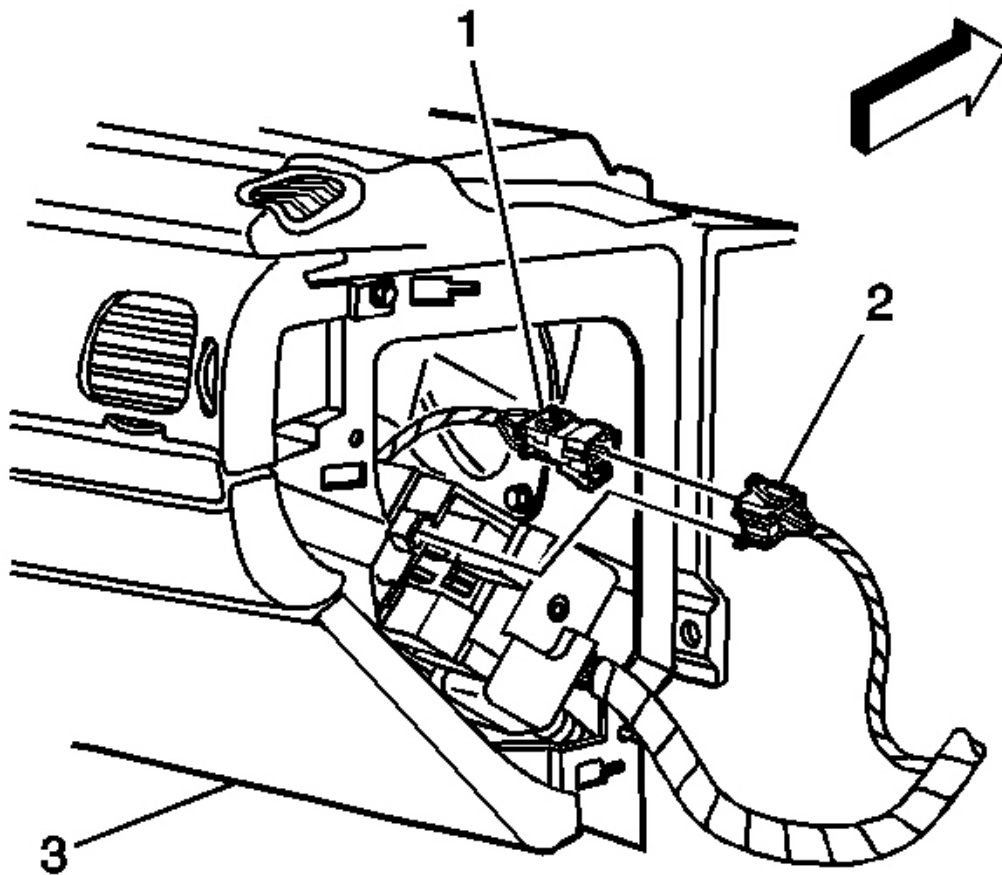


Fig. 35: Identifying I/P Module Connector & Vehicle Harness Connector
Courtesy of GENERAL MOTORS CORP.

30. Disconnect the instrument panel air bag yellow harness connector (1) from the vehicle harness connector (2).

NOTE: If the vehicle is equipped with dual stage air bags the steering wheel air

bag and instrument panel air bag 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.
33. 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.
34. Strip 13 mm (0.5 in) of insulation from both ends of the wires.
35. Twist together one end from each of the wires in order to short the wires.
36. Twist together the 2 connector wire leads from the high circuits from both stages of the instrument panel air bag to one set of deployment wires. Refer to **Component Connector End Views** in order to determine the correct circuits.
37. Inspect that the 3-wire connection is secure.
38. Secure and insulate the 3-wire connection to the deployment harness using electrical tape.
39. Twist together the 2 connector wire leads from the low circuits from both stages of the instrument panel air bag to one set of deployment wires. Refer to **Component Connector End Views** in order to determine the correct circuits.
40. Inspect that the 3-wire connection is secure.
41. Secure and insulate the 3-wire connection to the deployment harness using electrical tape.
42. Connect the deployment harness to the instrument panel air bag in-line connector.
43. Route the deployment harness out of the passenger side of the vehicle.
44. Disconnect the yellow harness connector to the right roof rail air bag from the vehicle harness connector.
45. Cut the harness connector out of the vehicle, leaving at least 16 cm (6 in) of wire at the connector.
46. Strip 13 mm (0.5 in) of insulation from each of the connector wire leads.
47. 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.
48. Strip 13 mm (0.5 in) of insulation from both ends of the wires.
49. Twist together one end from each of the wires in order to short the wires.
50. Twist together one connector wire lead to one deployment wire.
51. Secure and insulate the connection using electrical tape.
52. Twist together and tape the remaining connector wire lead to the remaining deployment wire.
53. Connect the deployment harness to the roof rail air bag yellow connector.
54. Route the deployment harness out of the passenger side of the vehicle.
55. Completely cover the windshield and the front door window openings with a drop cloth.
56. Stretch to the full length all of the deployment harness wires on the right side of the vehicle.
57. Deploy each deployment loop one at a time.
58. Place a power source, 12 V minimum/2A minimum, such as a vehicle battery, near the shorted end of the harnesses.
59. Separate one set of wires and touch the wire ends to the power source in order to deploy the selected air bag.

60. Disconnect the deployment harness from the power source and twist the wire ends together.
61. Continue the same process with the remaining deployment harnesses.
62. Disconnect all harnesses from the vehicle.
63. Discard the harnesses.
64. Scrap the vehicle in the same manner as a non-SIR equipped vehicle.
65. If one or all of the air bags did not deploy, remove the undeployed air bags from the vehicle.

PRETENSIONER HANDLING AND SCRAPPING

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.

Special Tools

- **J 39401-B** SIR Deployment Fixture. See **Special Tools**.
- **J 38826** SIR Deployment Harness. See **Special Tools**.

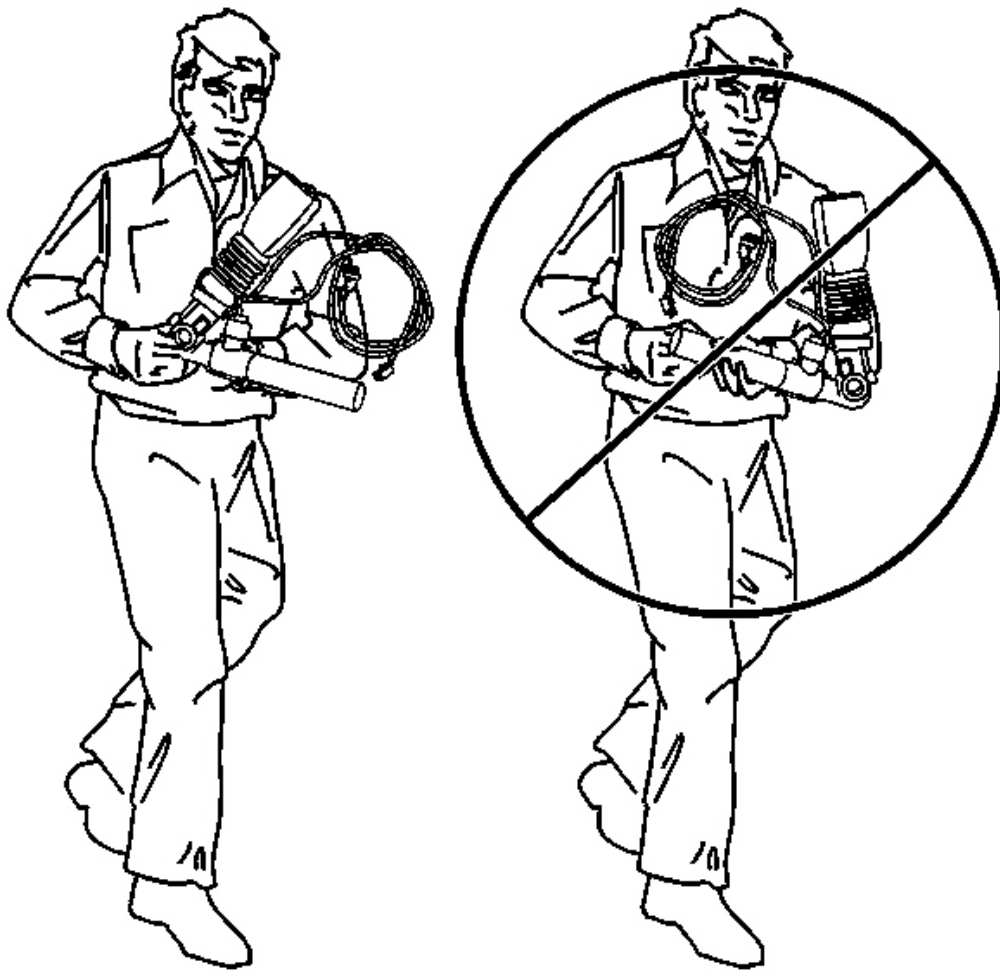


Fig. 36: Proper Pretensioner Carrying
Courtesy of GENERAL MOTORS CORP.

1. Turn the ignition switch to the OFF position.
2. Remove the ignition key.
3. Put on safety glasses.
4. Remove the seat belt pretensioner from the vehicle.
5. When carrying a pretensioner to the deployment area keep the open end of pretensioner pointed away from the body.

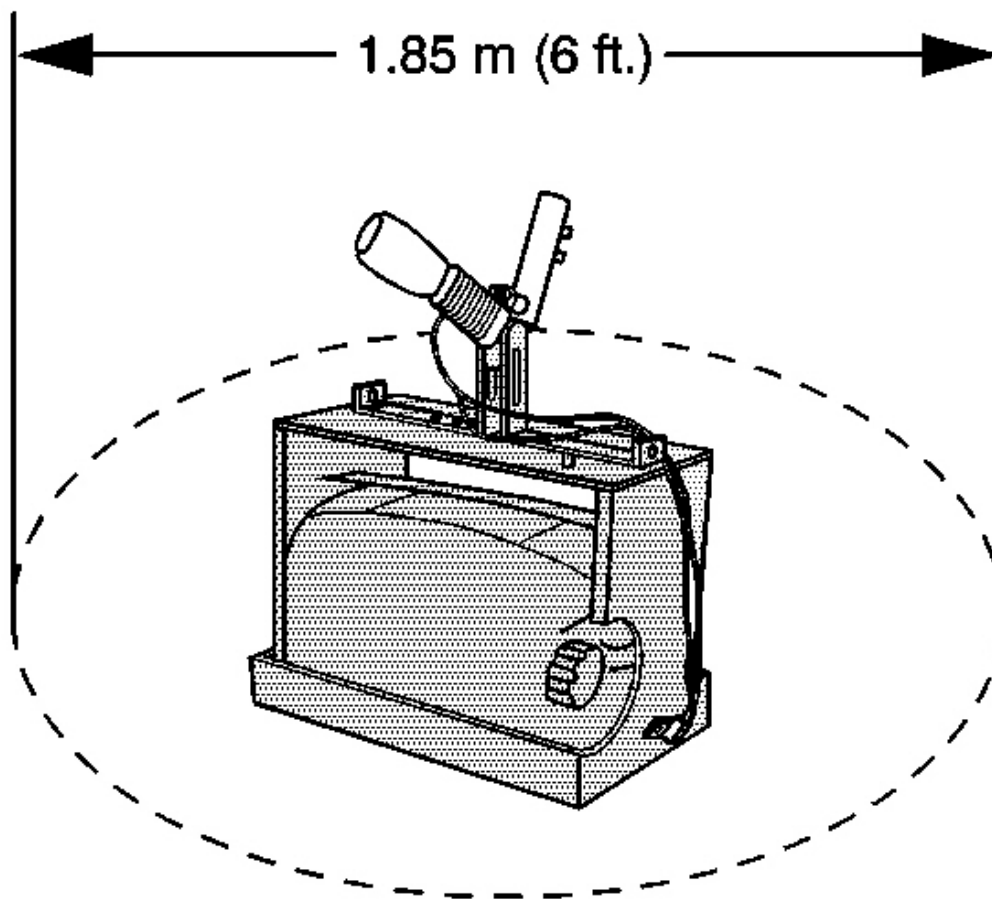


Fig. 37: Pretensioner Deployment Area
Courtesy of GENERAL MOTORS CORP.

6. 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.
7. Make sure no loose or flammable objects are in the area.
8. Place the **J 39401-B** SIR Deployment Fixture in the center of the cleared area. See **Special Tools**.
9. Fill the fixture plastic reservoir with water or sand.

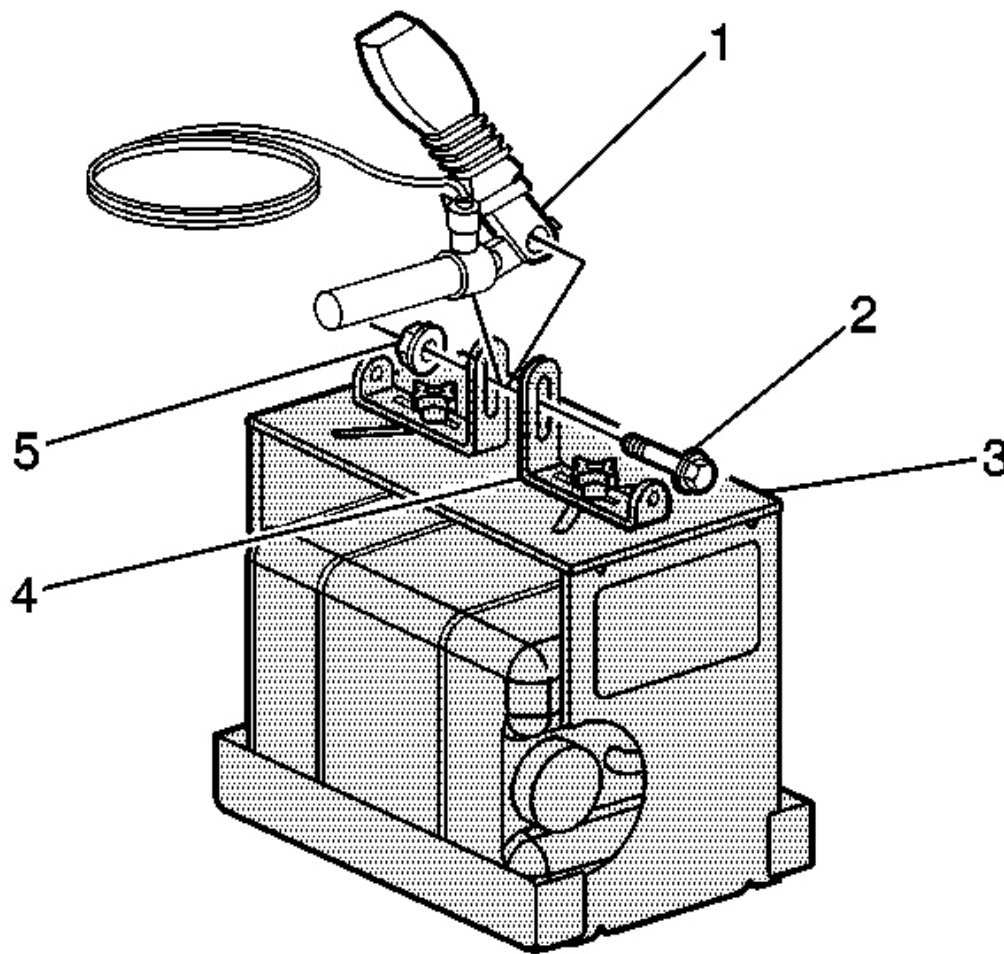


Fig. 38: Mounting Pretensioner In SIR Deployment Fixture
Courtesy of GENERAL MOTORS CORP.

10. Mount the pretensioner (1) in the SIR deployment fixture (3) with the open end facing up using the following mounting method.
 1. Adjust and secure the **J 39401-B** arms (4) to the deployment fixture (3). See **Special Tools**.
 2. 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).
 3. Securely tighten all fasteners prior to deployment.

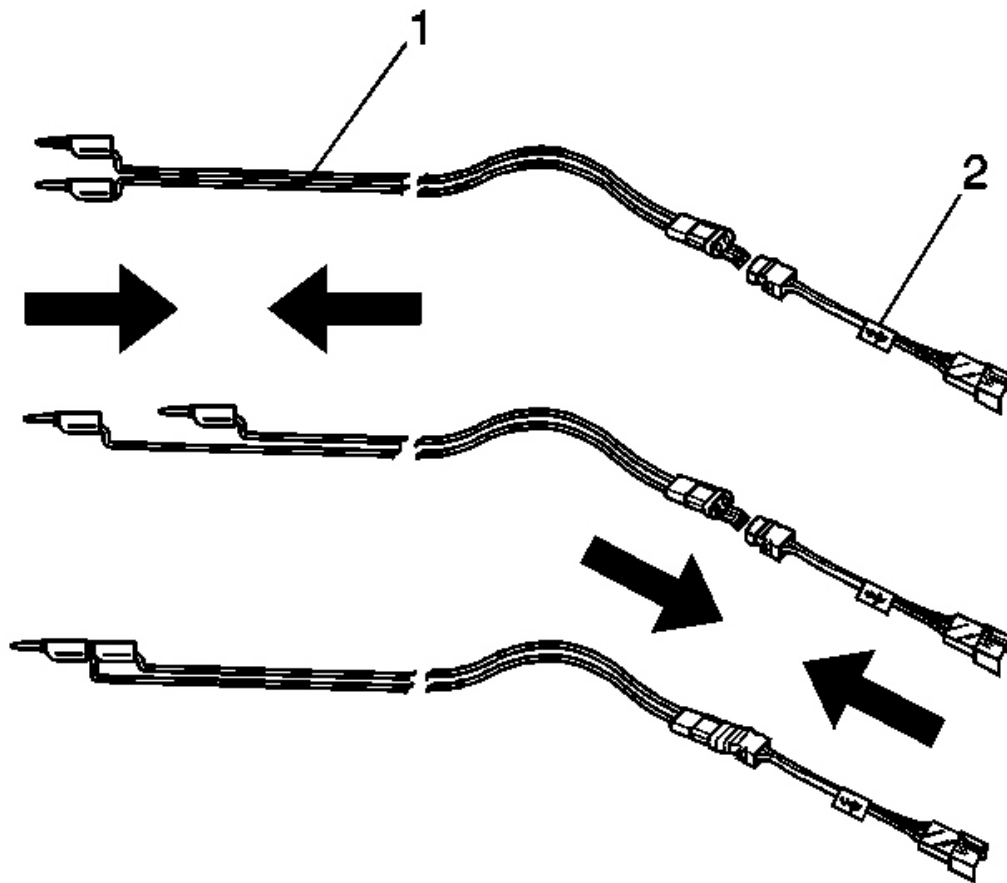


Fig. 39: Identifying SIR Deployment Harness & Adapter
Courtesy of GENERAL MOTORS CORP.

11. Inspect the **J 38826** SIR Deployment Harness and the appropriate pigtail adapter for damage. See **Special Tools**. Replace as needed.
12. Short the 2 SIR deployment harness (1) leads together using one banana plug seated into the other.
13. Connect the appropriate pigtail adapter (2) to the SIR deployment harness (1).

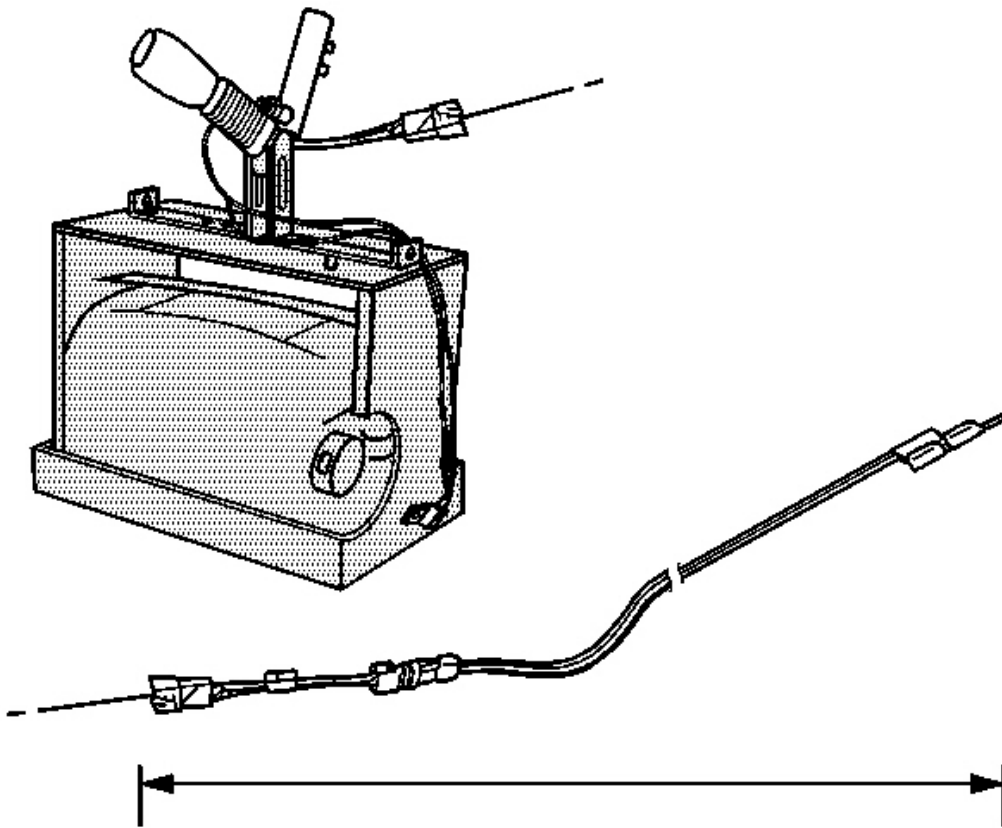


Fig. 40: Extending SIR Deployment Harness & Adapter
Courtesy of GENERAL MOTORS CORP.

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

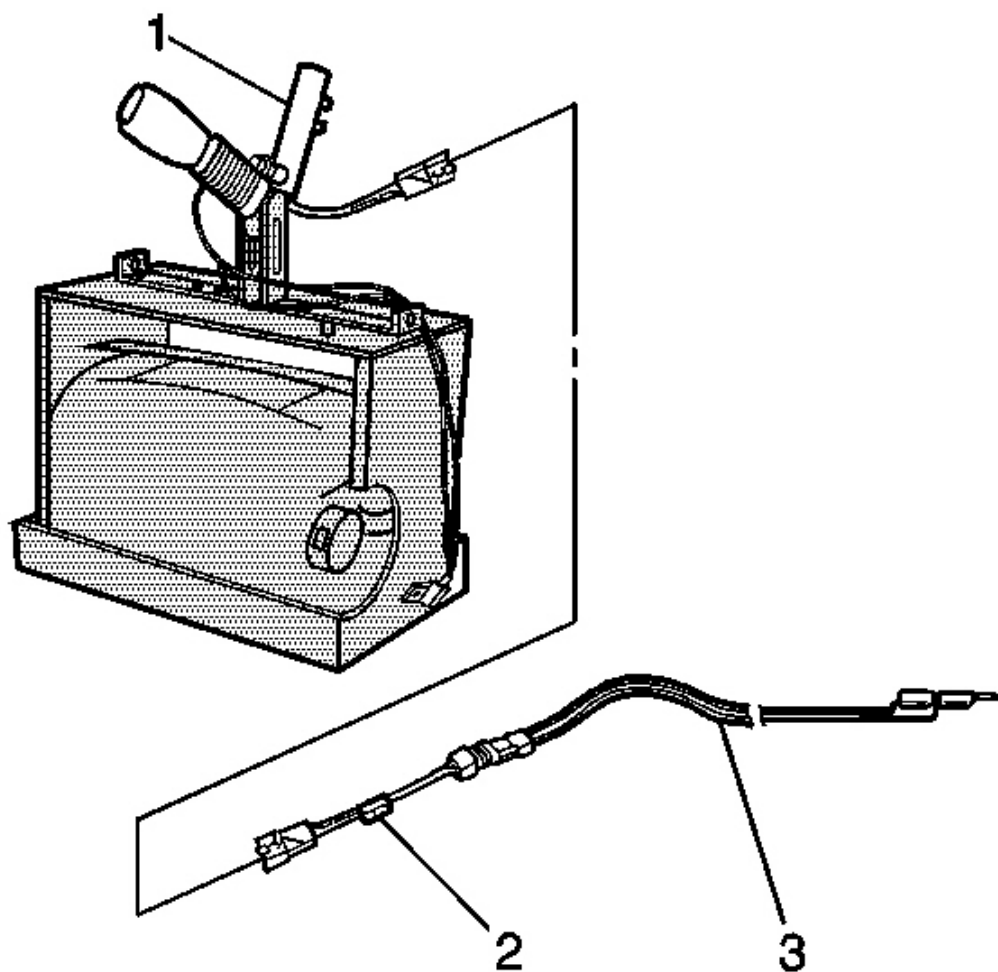


Fig. 41: Connecting Pretensioner To Adapter
Courtesy of GENERAL MOTORS CORP.

15. 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.

16. Clear the area of people.

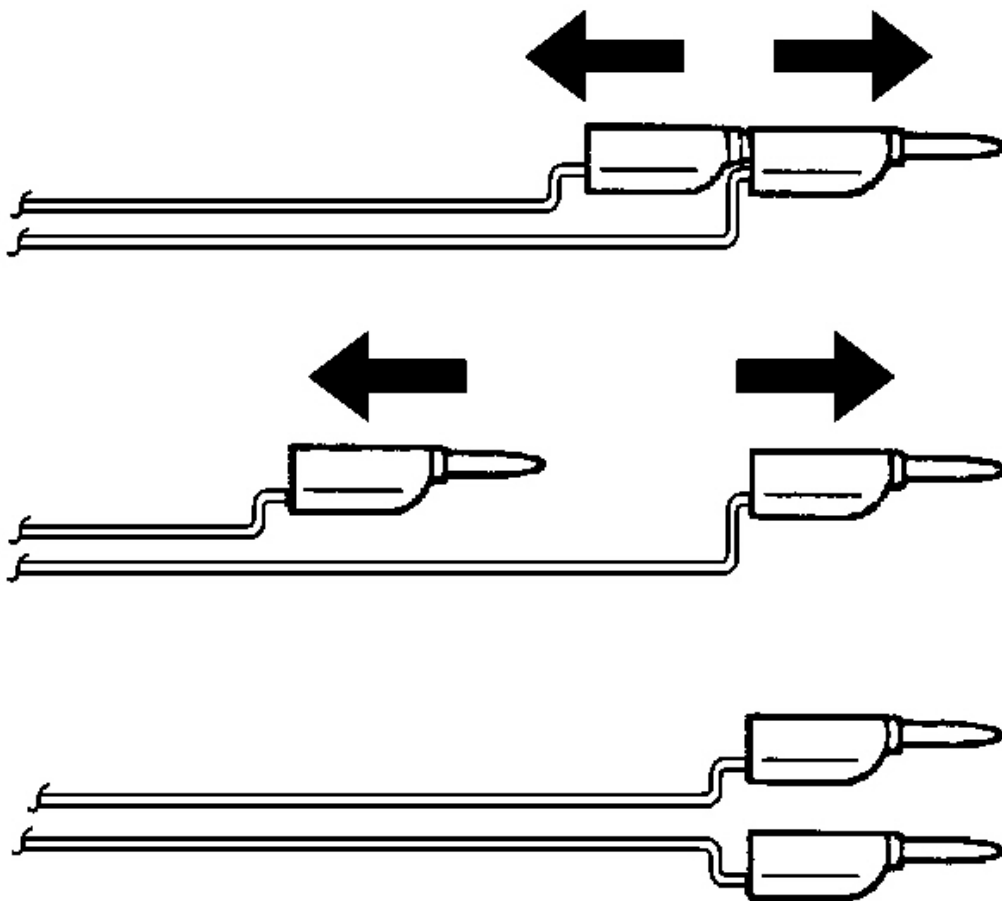


Fig. 42: Separating Banana Plugs
Courtesy of GENERAL MOTORS CORP.

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.

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

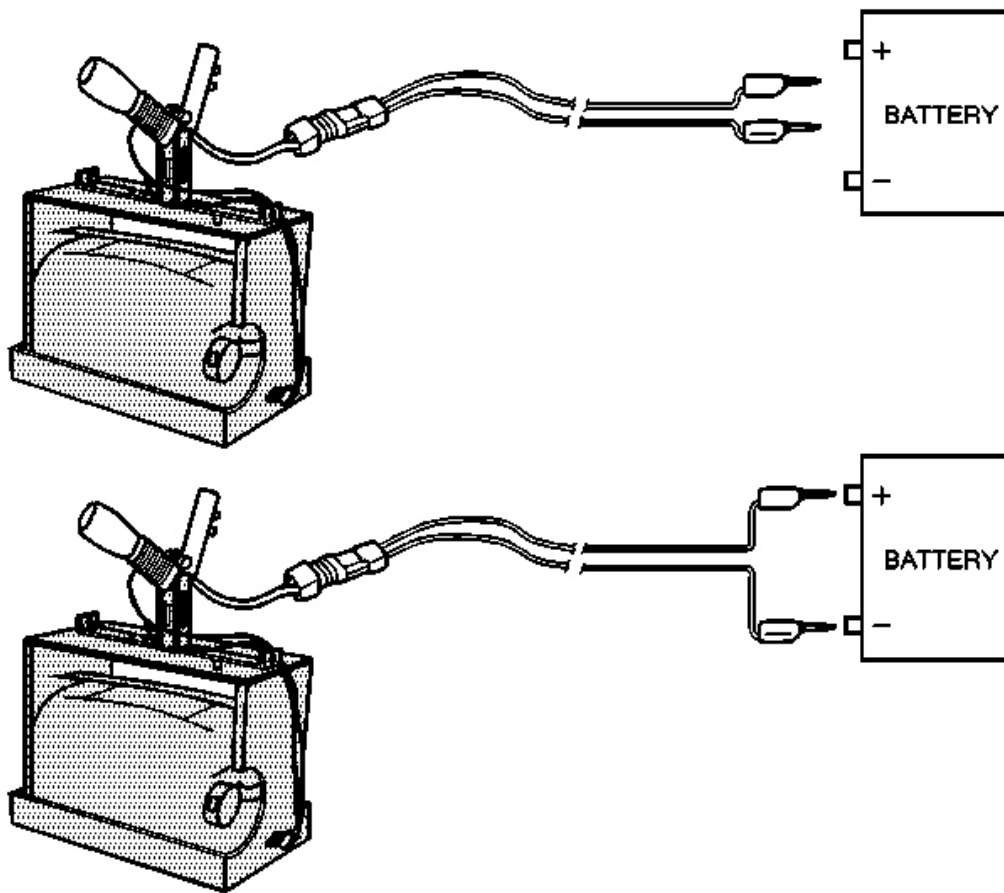


Fig. 43: Deploying Pretensioner
Courtesy of GENERAL MOTORS CORP.

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.

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

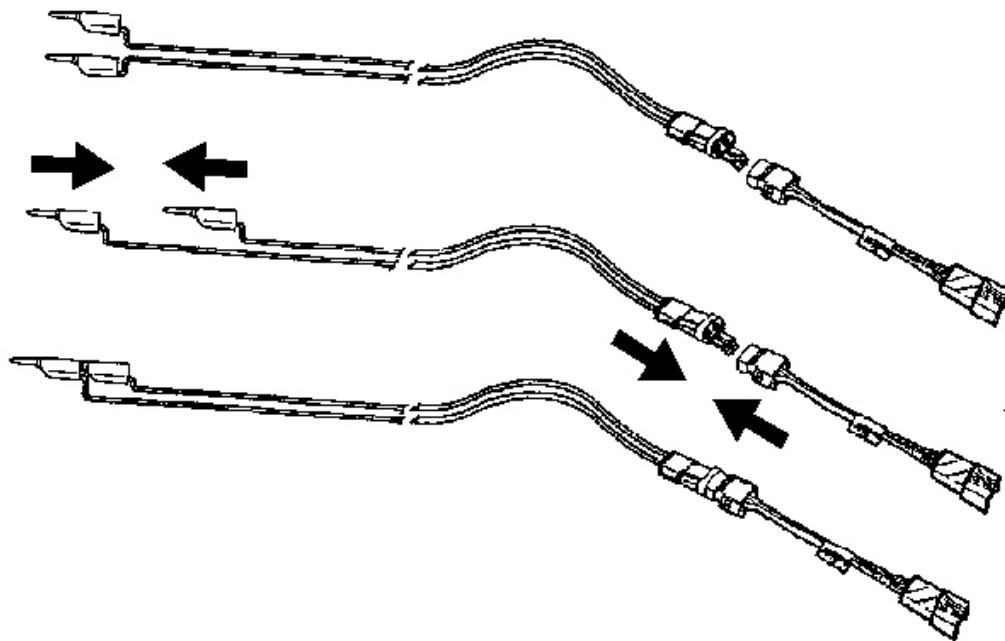


Fig. 44: View Of Deployment Harness Leads
Courtesy of GENERAL MOTORS CORP.

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

DESCRIPTION AND OPERATION

SIR SYSTEM DESCRIPTION AND OPERATION

SIR System Overview

The supplemental inflatable restraint (SIR) system supplements the protection offered by the seat belts. The SIR system contains an inflatable restraint sensing and diagnostic module (SDM), inflator modules, seat belt pretensioners (anchor and retractor), and impact sensors. The SDM determines the severity of a collision with

the assistance of side impact sensors located at strategic points on the vehicle. When the SDM detects a collision, the SDM will process the information provided by the sensors to further support air bag or pretensioner deployment. The SDM will deploy the 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 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 continuously monitors the deployment loops for malfunctions and illuminates the AIR BAG indicator if a fault is detected. 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 and knee bolsters 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.

AIR BAG Indicator (Driver)

The AIR BAG indicator, located in the instrument cluster, 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 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.

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 external impact sensors, mounted at strategic locations on the vehicle. In the event of a collision, the SDM compares the signals from the internal and external impact 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.

Inflator Modules (Air Bags)

This vehicle contains 6 inflator modules. The 6 inflator modules are located in the steering wheel (dual

inflators), instrument panel (passenger side) (dual inflators), driver side (B-pillar), passenger side (B-pillar), left roof rail, and right roof rail. To view the locations of the inflator modules refer to **SIR Identification Views**. Inflator modules contain a housing, inflatable air bag, two initiating devices (if dual inflator), canister of gas generating material and, in some cases, stored compressed gas. The deployment loops supply current through the inflator modules to deploy the air bags. The steering wheel and instrument panel passenger side 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 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 inflator modules 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 inflator module 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.

Seat Belt Pretensioners (Anchor and Retractor)

The seat belt pretensioners (driver and passenger) consist of a housing, seat belt retractor (located in the B-pillar), seat belt anchor (located on the floor), seat belt webbing, an initiator, and a canister of gas generating materials. To view the locations of the seat belt pretensioners refer to **SIR Identification Views**. The initiator is part of the seat belt pretensioner deployment loop. When the vehicle is involved in a collision of sufficient force, the 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 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.

Impact Sensors

This vehicle contains 6 impact sensors. The 6 impact sensors are located in the front of the vehicle (2, left and right), and the 4 doors. To view the locations of the impact sensors refer to **SIR Identification Views**. The impact sensors contain a sensing device which monitors vehicle acceleration and velocity changes to detect side collisions that are severe enough to warrant air bag deployment. The impact sensors are not part of the deployment loop, but instead provide input to the 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 appropriate impact module air bags.

Passenger Presence Detection System and Air Bag Indicator (Passenger)

NOTE: The passenger presence system (PPS) is a calibrated unit. When replacing the assembly all parts in the service kit must remain together. Do not mix any of the old parts with the new parts. After repairing or replacing the PPS, the preload test must be performed in order to function properly.

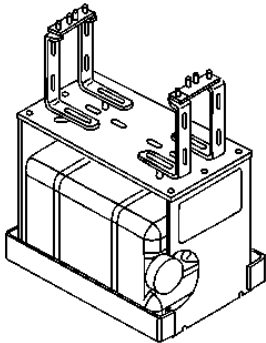
The passenger presence detection system (PPS) is used to monitor the type of occupant that is sitting in the front outboard passenger seat and communicate the status to the inflatable restraint sensing and diagnostic module (SDM). The SDM then uses this information to determine whether to enable or suppress the deployment of the passenger frontal instrument panel inflator module. The PPS consists of an electronic control module, a sensor mat in the seat, a harness, and PASSENGER AIR BAG ON/OFF indicators. The PPS transmits and receives a low-level electric field. The measured capacitance value of this field is used to determine the type of occupant sitting in the front passenger seat. If the measured capacitance is less than a calibrated value, then the PPS module will send a serial data signal to the SDM to disable the passenger airbag module. If the measured capacitance is greater than a calibrated value, then the PPS module will send a serial data signal to the SDM to enable the passenger airbag module. The SDM will notify the customer of the enable/disable status by illuminating one of the PASSENGER AIR BAG ON/OFF indicator. The PPS monitors itself for faults and will displays diagnostic trouble codes (DTCs) onthe scan tool. When a fault is detected, the PPS module sends out a message to the SDM. The SDM responds by sending a command message to the IPC to illuminate the AIR BAG indicator.

Seat Belt Indicators

The seat belt indicators are controlled through the inflatable restraint sensing and diagnostic module (SDM). For further information on seat belt indicators refer to **Seat Belt System Description and Operation** .

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description
	J 38826 SIR Deployment Harness
	J 39401-B SIR Deployment Fixture