2002 ACCESSORIES/SAFETY EQUIPMENT

General Motors Corp. - Air Bag Restraint Systems

DESCRIPTION & OPERATION

WARNING: Accidental air bag deployment is possible. Personal injury may result. To avoid accidental air bag deployment or injury, read and carefully follow all WARNINGS and AIR BAG SAFETY PRECAUTIONS .

Supplemental Inflatable Restraint (SIR) system is designed to supplement protection provided by driver-side and passenger-side seat belts. A frontal collision of sufficient force up to 30 degrees off center line of vehicle will deploy driver-side and passenger-side air bag modules. A side collision of sufficient force will deploy side impact air bag module on side of impact. Steering column and knee bolsters also absorb collision energy.

SIR system consists of Sensing and Diagnostic Module (SDM), driver-side and passenger-side air bag modules, front end discriminating sensor, driver and passenger side impact air bag modules, Side Impact Sensors (SIS), SIR coil assembly and AIR BAG warning light.

AIR BAG MODULES

Air bag modules consist of an inflatable bag and an inflator. When vehicle is in an accident of sufficient force, SDM causes current flow through deployment loops. Current passing through inflators ignites inflator charges, producing gas which rapidly inflates air bags.

AIR BAG WARNING LIGHT

Ignition switch applies battery voltage to AIR BAG warning light. SDM controls AIR BAG warning light operation. When ignition is first turned on, AIR BAG warning light flashes 7 times while SDM checks SIR system for malfunctions. If no malfunctions are found, AIR BAG warning light will turn off. During vehicle operation, AIR BAG warning light warns driver of malfunctions which could potentially affect SIR system operation.

FRONT END DISCRIMINATING SENSOR

Front end discriminating sensor is an auxiliary sensor which assists SDM in determining when deployment should occur by providing an input signal. Front end discriminating sensor is not part of deployment loop.

KNEE BOLSTERS

Knee bolsters are used to absorb energy and control forward movement of front passengers by limiting leg movement during a frontal collision.

SENSING & DIAGNOSTIC MODULE (SDM)

SDM monitors vehicle velocity changes to detect frontal and side collisions which are severe enough to warrant

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air bag module deployment. When a collision of sufficient force is detected, SDM causes current to flow through applicable air bag modules to deploy air bags. SDM also maintains a 23 Volt Loop Reserve (23 VLR) energy supply to provide deployment energy for up to one minute after loss of voltage.

Additionally, SDM provides diagnostic monitoring of SIR system electrical components. When a malfunction is detected, SDM sets a Diagnostic Trouble Code (DTC) which can be retrieved using a scan tool. SDM warns driver of system malfunctions by controlling AIR BAG warning light.

SIDE IMPACT SENSOR (SIS)

Each SIS monitors vehicle side acceleration and velocity changes to detect side impact collisions severe enough to deploy side impact air bag modules.

SIR COIL ASSEMBLY

SIR coil assembly consists of 2 or more current-carrying coils. SIR coil is are attached to steering column and allows rotation of steering wheel, while maintaining continuous continuity of driver-side air bag module deployment loop.

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Component	Location
AIR BAG warning light	Instrument Panel Cluster (IPC)
Driver-side air bag module	On steering wheel
Front end discriminating sensor	Underside of radiator support
Knee bolsters	Driver-side & passenger-side lower instrument panel
Passenger-side air bag module	Passenger-side instrument panel
Sensing & Diagnostic Module (SDM)	Under driver seat
Side impact air bag modules	Driver & passenger front seat outer seat backs
Side Impact Sensors (SIS)	Left & right front door lower side panels
SIR coil assembly	Under steering wheel

SYSTEM OPERATION CHECK

When ignition is turned on, AIR BAG warning light should flash 7 times and then go off. System malfunction is indicated when light does not illuminate at all, light comes on while vehicle is driven, light flashes 7 times and remains on or light does not flash but remains on when ignition is turned on.

AIR BAG SAFETY PRECAUTIONS

Observe the following precautions when working with SIR system:

- SDM maintains sufficient voltage to cause air bag deployment for up to one minute after ignition is

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turned off, battery is disconnected or fuse powering SDM is removed. In order to begin servicing immediately, inflator modules must be removed from deployment loop. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .

- After repairs, ensure AIR BAG warning light is working properly and no system faults are indicated. See **SYSTEM OPERATION CHECK** .
- Always wear safety glasses when servicing or handling an air bag module.
- Air bag modules must be stored in original special containers until used for service. Store in a clean, dry place, away from sources of extreme heat, sparks, or high electrical energy.
- SIR components should not be subjected to temperatures greater than 150°F (65°C).
- SIR components should not be used if they have been dropped from a height of 3 feet (0.9 m) or greater.
- When placing a live air bag module on a bench or other surface, always make certain that trim cover faces up. This will reduce motion of module if accidentally deployed.
- After deployment, air bag surface may contain deposits of sodium hydroxide, which can irritate skin. Always wear safety glasses, rubber gloves and long-sleeved shirt during clean-up and wash hands using mild soap and water. Follow correct disposal procedures. See **DISPOSAL PROCEDURES** .
- At no time should any electrical source be allowed near inflator on back of air bag module.
- DO NOT apply power to SIR system unless all components are connected or a diagnostic chart requests it, as this will set a diagnostic trouble code.
- When carrying a live air bag module, trim cover should be pointed away from body to minimize injury in case of accidental deployment.
- DO NOT attempt to service SIR components. If defective, these parts must be replaced.
- DO NOT probe a wire through insulator. Wire will be damaged and eventually fail due to corrosion.
- When performing electrical tests, prevent accidental shorting of terminals. Such mistakes can damage fuses or components and may cause a second Diagnostic Trouble Code (DTC) to set, making diagnosis of original problem more difficult.
- When performing electrical diagnosis on SIR system, under no circumstances should a volt/ohmmeter, test light or any type of electrical equipment not specified by manufacturer be used.
- If SIR system is not fully functional for any reason, vehicle should not be driven until system is repaired. DO NOT remove bulbs, modules, sensors or other components or in any way disable system from operating normally.

ADJUSTMENTS

CENTERING SIR COIL ASSEMBLY

With Centering Window & Service Lock

Hold SIR coil face up. See **Fig. 1** . While depressing service lock, rotate coil hub clockwise until it stops. Rotate coil hub counterclockwise slowly until centering window appears Yellow and line-up marks are aligned. Release service lock.

With Centering Window & No Service Lock

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Hold SIR coil face up. See **Fig. 1** . Rotate coil hub clockwise until it stops. Rotate coil hub counterclockwise slowly until centering window appears Yellow and both line-up marks are aligned. Prevent coil hub from moving until installed on steering column.

With Service Lock & No Centering Window

Hold SIR coil assembly with rear side facing up. See **Fig. 1** . While depressing service lock, rotate coil hub in direction indicated by directional arrow until it stops. Rotate coil hub in opposite direction 2 1/2 turns. Release service lock.

Without Centering Window Or Service Lock

Hold SIR coil assembly face up. See **Fig. 1** . Rotate coil hub in direction of arrow until it stops. Rotate coil hub in opposite direction 2 1/2 turns. Prevent coil hub from moving until installed on steering column.

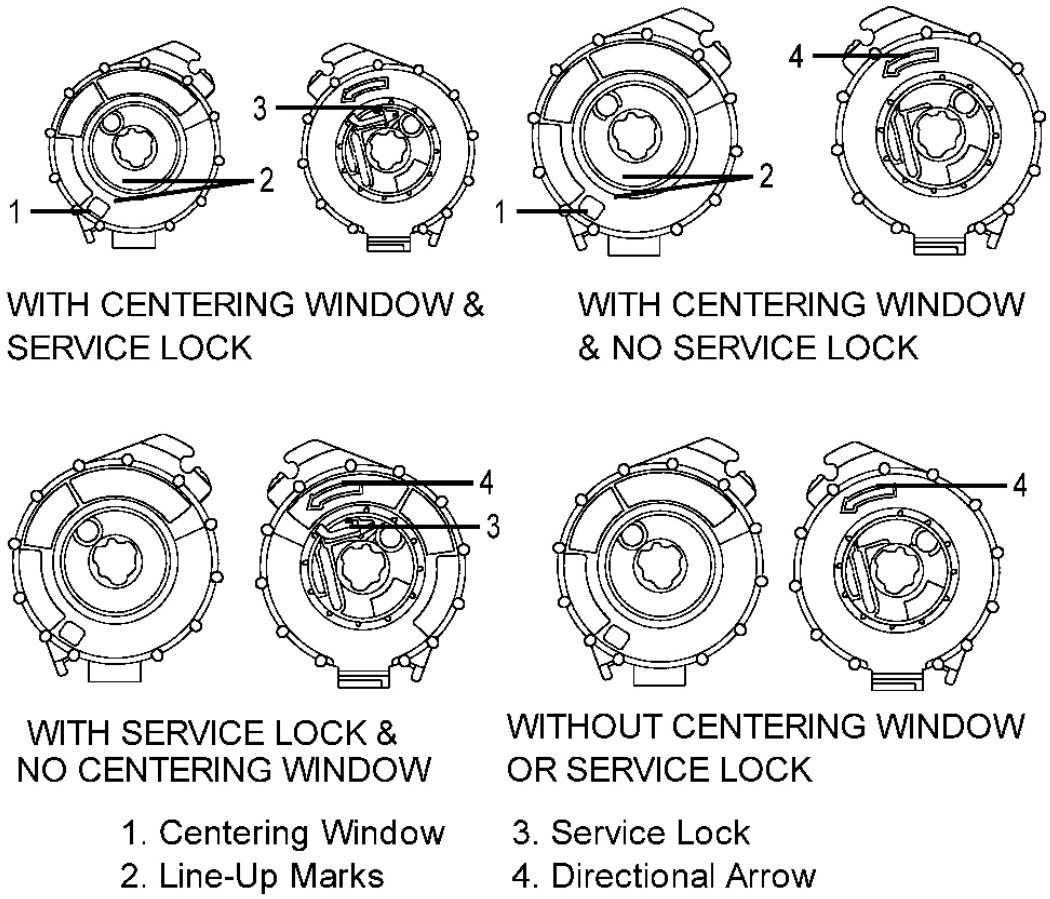

Fig. 1: Identifying SIR Coil Assembly Types

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DISABLING & ACTIVATING AIR BAG SYSTEM

CAUTION: Vehicle computer and memory systems may loose data when battery is disconnected. Driveability problems may result. Vehicle computer may need to complete a relearn cycle. See Computer Relearn Procedures in the Reference Information section.

DISABLING SYSTEM

WARNING: Accidental air bag deployment is possible. Personal injury could result. Read and follow service precautions. See AIR BAG SAFETY PRECAUTIONS .

NOTE: When AIR BAG fuse is removed and ignition is on, AIR BAG warning light will be on. This does not indicate a system malfunction.

1. Turn steering wheel to place vehicle wheels in straight-ahead position. Turn ignition off. Remove key.
2. Remove AIR BAG fuse from instrument panel fuse block, located in lower left side of dash. Remove Connector Position Assurance (CPA) clip from driver-side air bag module Yellow 2-pin connector, located at base of steering column. See **Fig. 2** . Disconnect connector.
3. Open glove box. Press in on sides of glove box to release stops. Allow glove box to open fully. Remove CPA clip from passenger-side air bag module and disconnect connector. See **Fig. 3** .
4. Remove CPA clip from driver side impact air bag module connector, located under driver seat and disconnect connector. See **Fig. 4** . Remove CPA clip from passenger side impact air bag module connector, located under passenger seat and disconnect connector.

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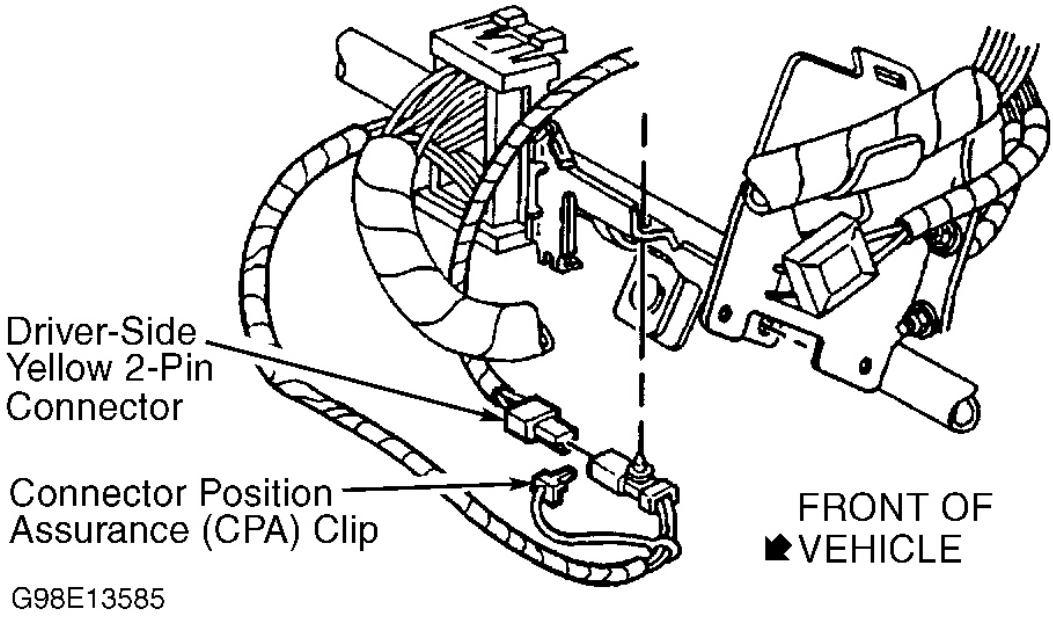

Fig. 2: Locating Driver-side Air Bag Module Yellow 2-pin Connector
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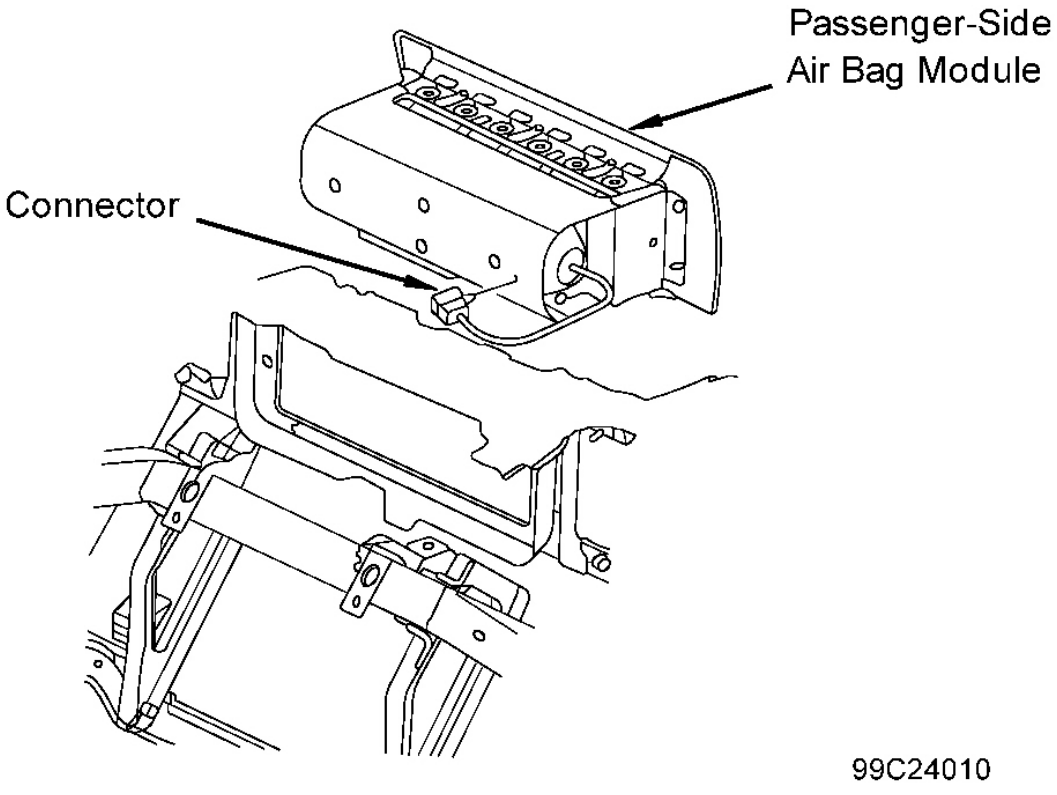

Fig. 3: Locating Passenger-side Air Bag Module Yellow 2-pin Connector
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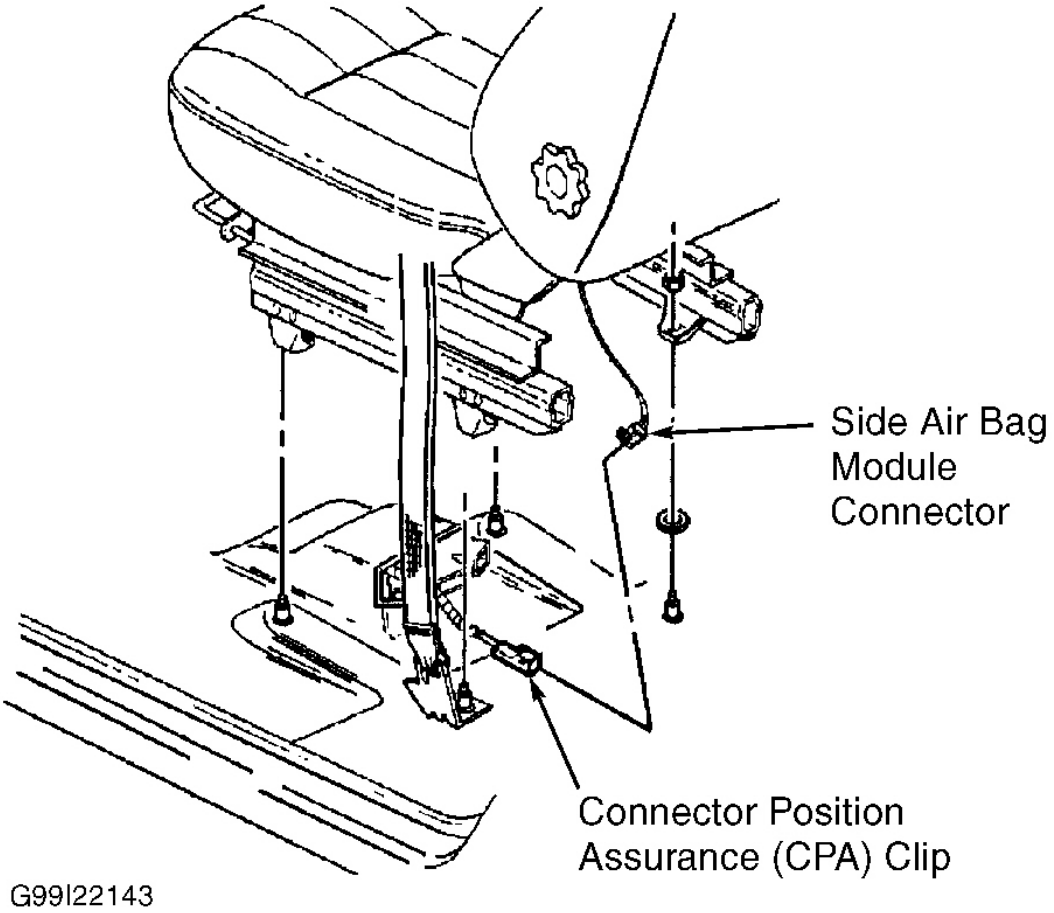

Fig. 4: Locating Side Impact Air Bag Module Yellow 2-pin Connector (Driver Side Shown; Passenger-side Is Similar)
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ACTIVATING SYSTEM

1. Turn ignition off. Remove key. Connect driver and passenger side impact air bag module connectors and install Connector Position Assurance (CPA) clips. See **Fig. 4** . Connect passenger-side air bag module connector and install CPA clip. See **Fig. 3** . Close glove box.
2. Connect driver-side air bag module connector and install CPA clip. See **Fig. 2** . Install AIR BAG fuse in instrument panel fuse block, located in lower left side of dash. Check system for proper operation. See **SYSTEM OPERATION CHECK** .

DISPOSAL PROCEDURES

WARNING: Accidental air bag deployment is possible. Personal injury could result.

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Read and follow service precautions. See AIR BAG SAFETY PRECAUTIONS .

NOTE: If vehicle is to be scrapped, perform on-vehicle air bag deployment procedure. See ON-VEHICLE DEPLOYMENT . If vehicle will remain in service, perform off-vehicle deployment. See OFF-VEHICLE DEPLOYMENT .

ON-VEHICLE DEPLOYMENT

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Turn ignition off and remove key. Put on safety glasses.
2. Disconnect driver-side and passenger-side air bag module Yellow 2-pin connectors. See **Fig. 2** & **Fig. 3** . Disconnect driver and passenger side impact air bag module connectors. See **Fig. 4** . Cut air bag module harness connectors from vehicle leaving at least 6" (152 mm) of wire at each connector. Strip 0.50" (13 mm) of insulation from each wire lead to the connector.
3. Cut 2 deployment wires at least 20 feet (6.1 m) long from 18-gauge multi-strand wire. Strip 0.50" (13 mm) of insulation from each connector wire lead. Twist wires together at one end to short.
4. Twist together one driver-side air bag module connector wire lead to other end of each deployment wire. See **Fig. 5** . Bend twisted connection flat and wrap tightly with electrical tape to insulate. Repeat for remaining connector wire lead.
5. Remove all loose objects from front seats and ensure no one is in vehicle. Connect deployment harness to driver-side air bag module connector. Stretch wires away from vehicle as far as possible.
6. Repeat steps 3 and 4 for passenger-side air bag module and side impact air bag modules. Cover windshield and front door openings with a drop cloth.
7. Separate driver-side air bag module deployment wire ends. Connect wire leads to a 12-volt battery. Driver-side air bag module should deploy. Repeat deployment procedure for remaining SIR components. If any SIR component did not deploy, go to next step. If components did deploy, disconnect wires from battery. DO NOT touch metal surfaces of components for at least 10 minutes due to heat generated during deployment. Wear gloves and safety glasses when handling deployed components. Wash hands with mild soap and water.
8. If any SIR component did not deploy, carefully remove component from vehicle. See **REMOVAL & INSTALLATION** . Temporarily store air bag modules with trim facing up. Contact manufacturer for additional instructions.

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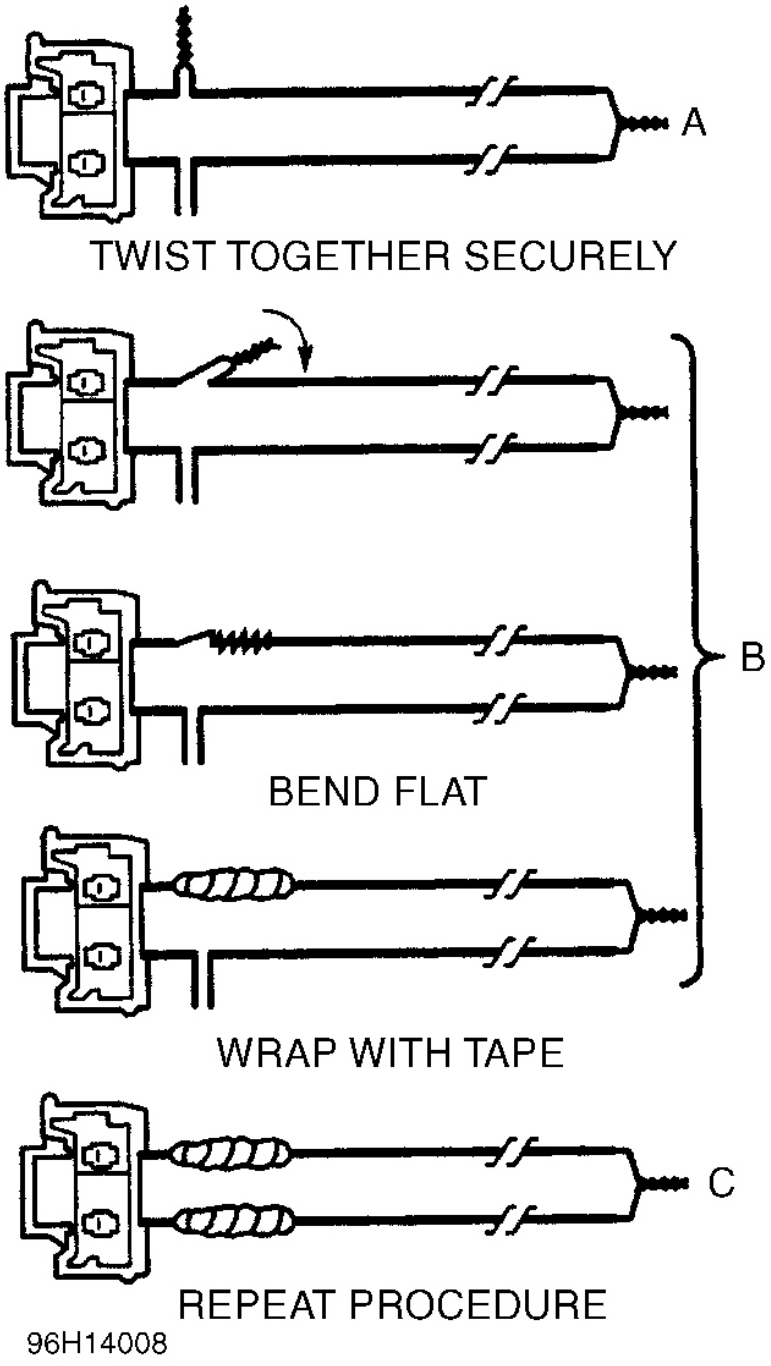

Fig. 5: Preparing Deployment Harness For Driver-side & Passenger-side Air Bag Module On-vehicle Deployment
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OFF-VEHICLE DEPLOYMENT

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Turn ignition off and remove key. Put on safety glasses. Short 2 SIR Deployment Harness (J-38826) leads together by fully seating one banana plug into the other. Connect appropriate pigtail adapter to SIR deployment harness. See **Fig. 6** .
2. Remove driver-side air bag module. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. Place driver-side air bag module on ground (preferably paved outdoor surface) in center of a cleared area at least 6 feet (1.8 m) in diameter. Stretch SIR deployment harness and pigtail adapter from driver-side air bag module to its full length. Place a 12-volt battery near shorted end of SIR deployment harness.
3. Connect driver-side air bag module to pigtail adapter on SIR deployment harness. Ensure area around air bag module is clear of people and objects. Verify that air bag module is resting with trim cover facing up.
4. Separate 2 banana plugs on SIR deployment harness. Connect SIR deployment harness wires to battery. Air bag module should deploy. If air bag module did not deploy, go to step 6 . If driver-side air bag module did deploy, disconnect SIR deployment harness from battery. Short 2 SIR deployment harness leads together. DO NOT touch metal surfaces of air bag module for at least 10 minutes due to heat generated during deployment.
5. Wear gloves and safety glasses when handling deployed air bag module. Wash hands with mild soap and water after handling. Dispose of deployed air bag module like any other part. Inspect pigtail adapter and SIR deployment harness for damage after each use. Using Deployment Fixture (J-39401-B) to mount passenger-side and side impact air bag modules, repeat deployment procedure.
6. Ensure that SIR deployment harness is disconnected from battery and that 2 banana plugs have been shorted together. Disconnect pigtail adapter from component. Temporarily store air bag modules with trim cover facing up. Contact manufacturer for additional instructions.

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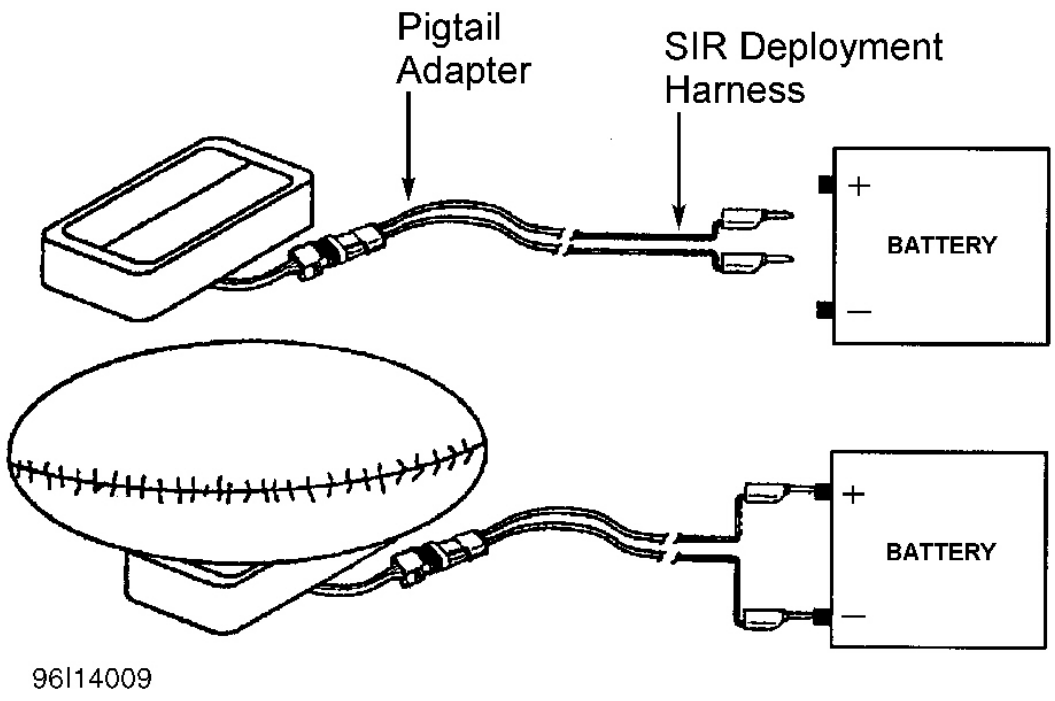

Fig. 6: Preparing Deployment Harness For Off-vehicle Deployment
Courtesy of GENERAL MOTORS CORP.

POST-COLLISION INSPECTION

When a vehicle has been involved in a collision, certain components of the passive restraint system must be inspected or replaced. See **AIR BAG/SRS COMPONENT INSPECTION & REPLACEMENT TABLES** article in the GENERAL INFORMATION section.

REMOVAL & INSTALLATION

WARNING: Accidental air bag deployment is possible. Personal injury may result. Read and follow service precautions. See AIR BAG SAFETY PRECAUTIONS .

AIR BAG MODULES

Removal & Installation (Driver-side)

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Turn steering wheel 90 degrees to gain access to rear steering wheel holes. Insert screw driver into each

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hole and push leaf springs to release air bag module from retaining pins. See **Fig. 7** . Turn steering wheel 180 degrees to access remaining holes. Pull air bag module away from steering wheel. Disconnect air bag wire harness from clips on air bag module and steering wheel. Remove Connector Position Assurance (CPA) clip from air bag module connector and disconnect connector. Remove driver-side air bag module.

3. To install, reverse removal procedure. Ensure driver-side air bag module retaining pins are latched securely on leaf springs. Activate air bag system.

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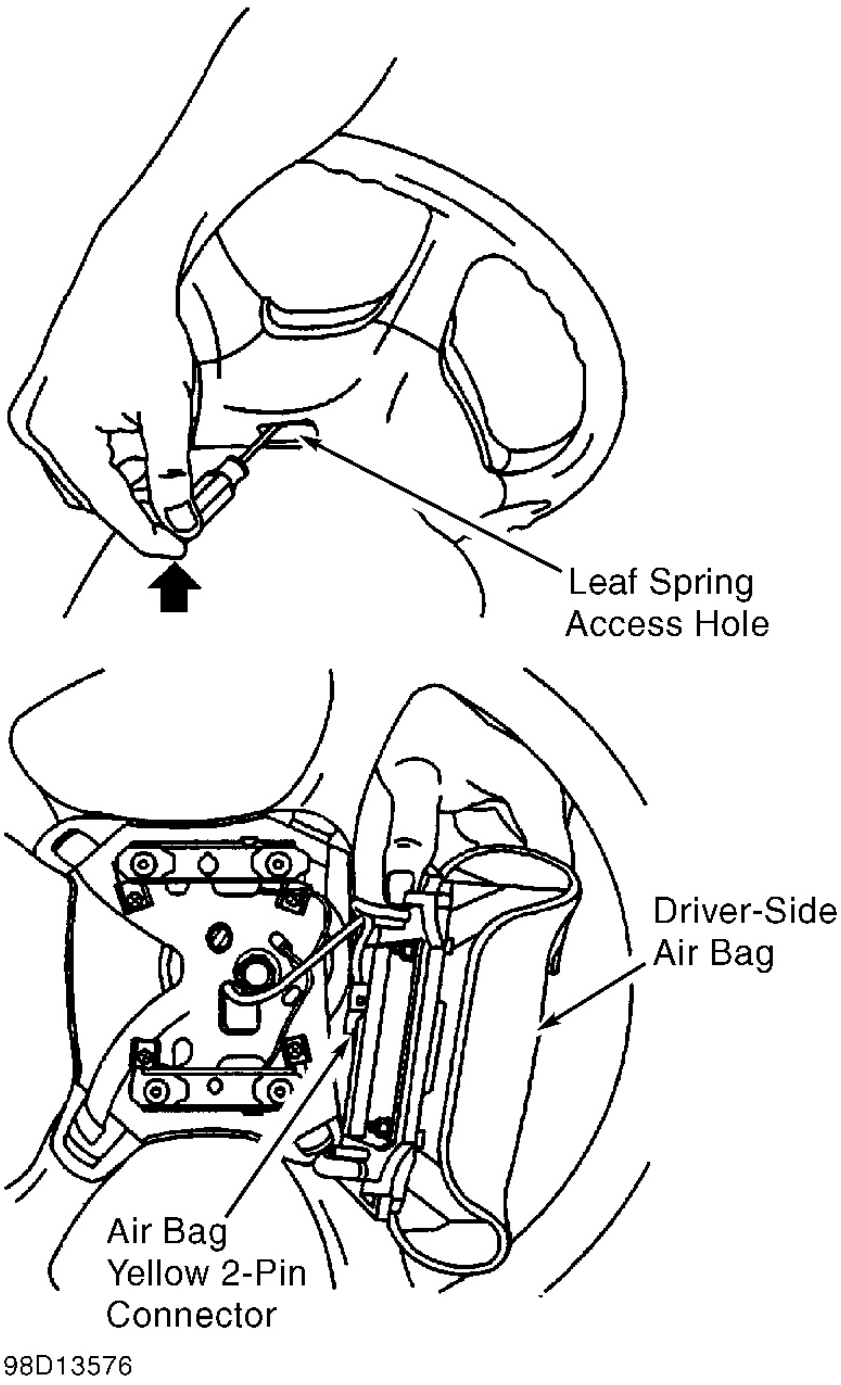

Fig. 7: Identifying Driver-side Air Bag Module
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Removal & Installation (Passenger-side)

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1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove instrument panel upper trim pad. See **INSTRUMENT PANEL UPPER TRIM PAD** . Remove Connector Position Assurance (CPA) clip from air bag module connector and disconnect connector. Remove passenger-side air bag module mounting bolts. Remove passenger-side air bag module from instrument panel. See **Fig. 8** .
3. To install, reverse removal procedure. Tighten passenger-side air bag module mounting bolts and instrument panel upper trim pad screws to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

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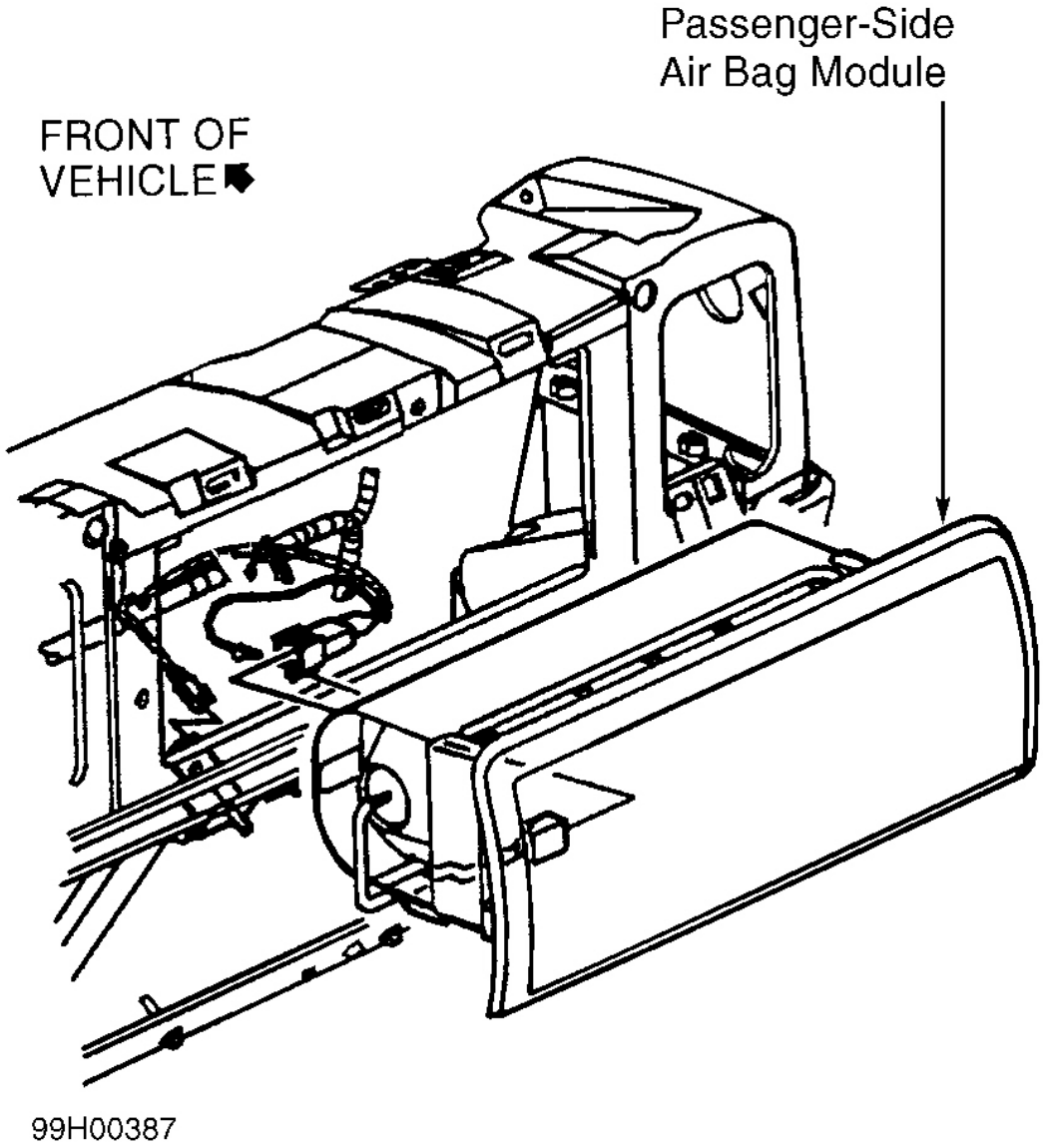

Fig. 8: Identifying Passenger-side Air Bag Module
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Removal & Installation (Side Impact AIR Bag)

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove applicable front seat from vehicle. Remove seat back cover. Remove side impact air bag module mounting bolts. See **Fig. 9** . Remove air bag module retainer. Remove wire harness clips from seat frame. Make note of wire harness positioning in seat frame for use during installation. Remove wire harness

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from seat frame. Remove side impact air bag module.

3. To install, reverse removal procedure. Ensure that wire harness is installed in same position as it was removed from to prevent damage to wires. Tighten side impact air bag module mounting bolts to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

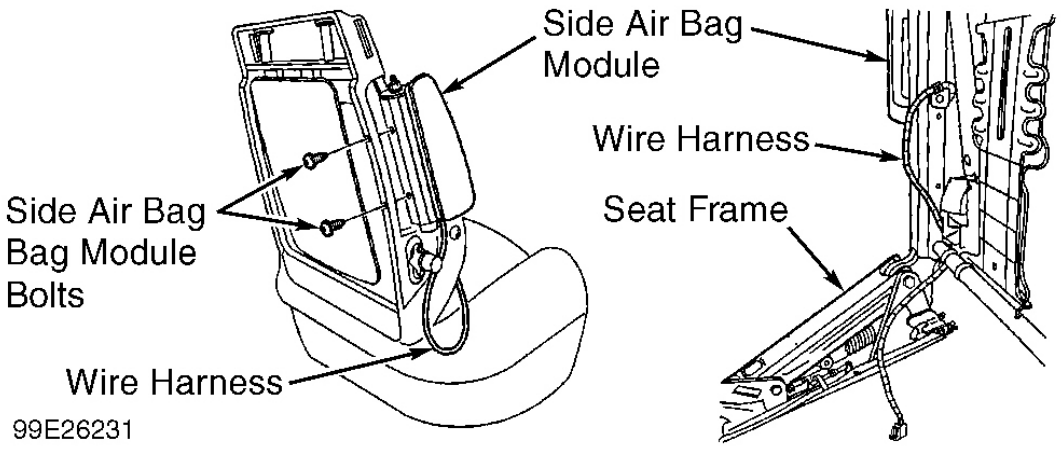

Fig. 9: Identifying Side Impact Air Bag Module
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FRONT END DISCRIMINATING SENSOR

Removal & Installation

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove engine protection plate, if equipped. Remove Connector Position Assurance (CPA) clip from front end discriminating sensor connector and disconnect connector. See **Fig. 10** . Remove front end discriminating sensor mounting bolt. Remove front end discriminating sensor.
3. To install, reverse removal procedure. Ensure arrow on front end discriminating sensor is pointing towards front of vehicle. Tighten front end discriminating sensor mounting bolt to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

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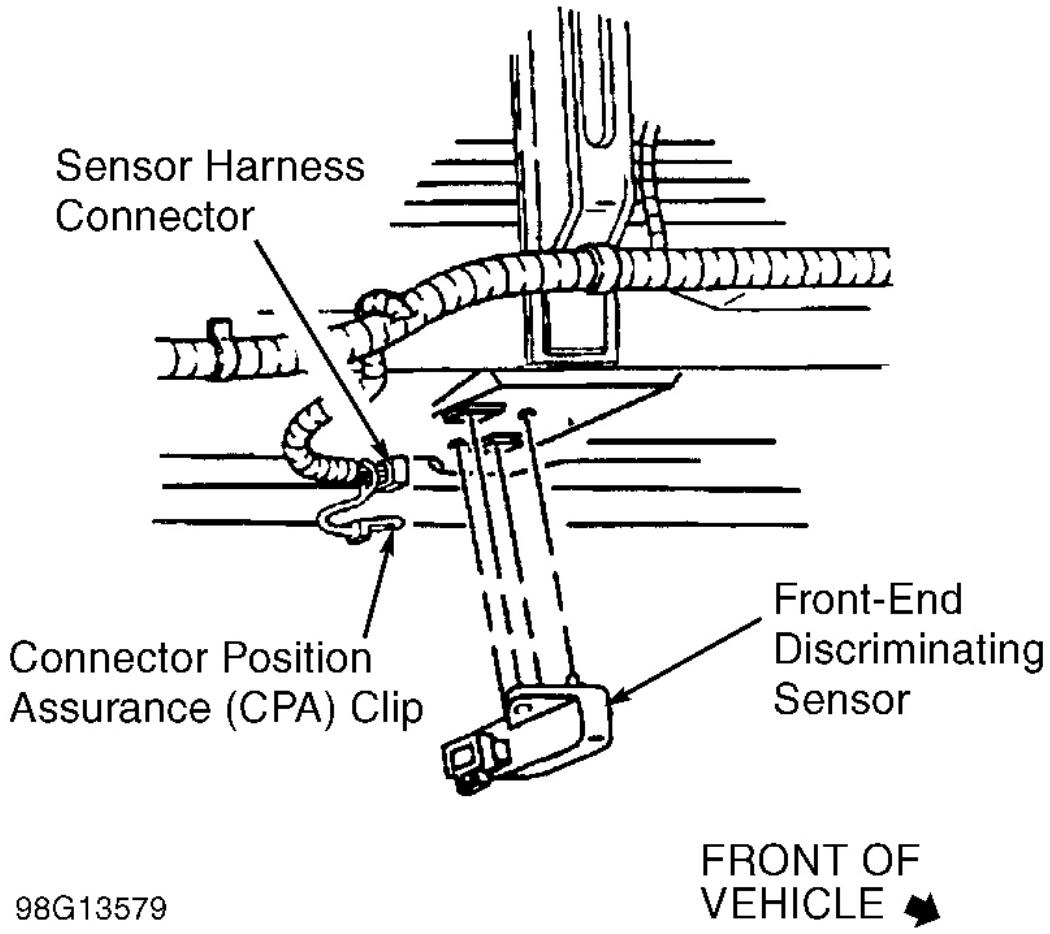

Fig. 10: Identifying Front End Discriminating Sensor
Courtesy of GENERAL MOTORS CORP.

INSTRUMENT PANEL CLUSTER (IPC)

Removal & Installation

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove IPC trim plate. Remove screws from IPC. Remove IPC by tilting bottom of IPC outward. Disconnect IPC harness connector. To install, reverse removal procedure. Tighten IPC screws to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

INSTRUMENT PANEL UPPER TRIM PAD

Removal & Installation

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1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Set parking brake. On models with air conditioning, set air flow control to VENT position. On models with automatic transmission, move shift lever to down most position. On all models, tilt steering wheel to full down position.
3. Remove instrument cluster trim plate. Remove left and right instrument panel end panels. Remove right side air outlets. Remove assist handle by depressing release tabs accessed through air outlet duct holes.
4. Remove left and right A-pillar trim. Remove screws attaching instrument panel upper trim pad to instrument panel. Lift upper trim panel away from instrument panel. Disconnect ambient light sensor electrical connector. Remove upper trim pad from vehicle.
5. To install, reverse removal procedure. Tighten trim pad screws to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

SENSING & DIAGNOSTIC MODULE (SDM)

Removal & Installation

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove driver seat. Remove carpet retaining sill trim molding. Fold back carpet to access SDM. Remove Connector Position Assurance (CPA) clip and disconnect SDM connector from SDM. Remove SDM mounting fasteners. Remove SDM. See **Fig. 11** .
3. To install, reverse removal procedure. Tighten front seat mounting nuts and SDM fasteners to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

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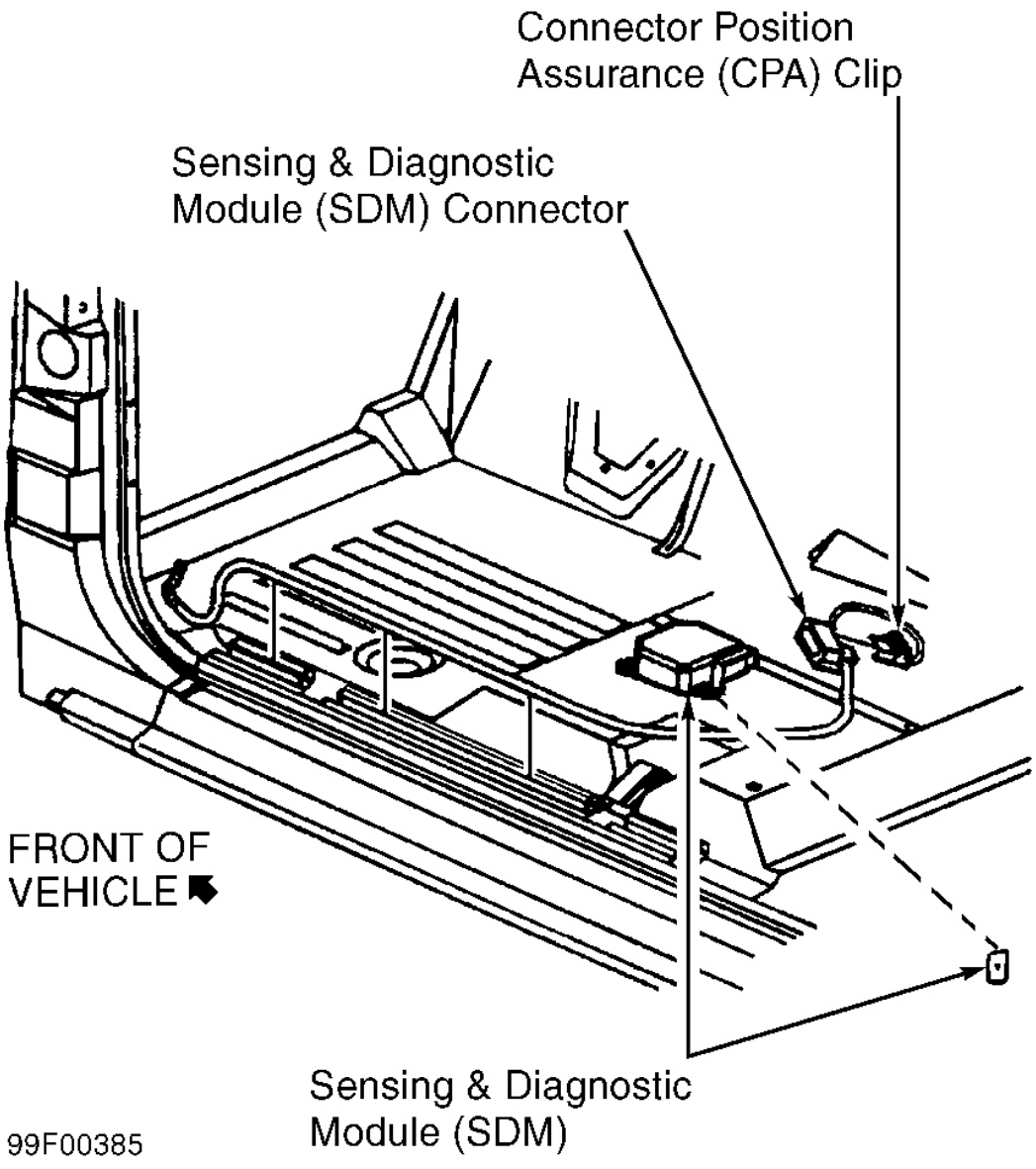

Fig. 11: Identifying Sensing & Diagnostic Module (SDM)
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SIDE IMPACT SENSOR (SIS)

Removal & Installation

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .

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2. Loosen SIS fasteners. See **Fig. 12** . Remove SIS from door. Remove Connector Assurance Protection (CPA) clip and disconnect SIS electrical connector.
3. To install, reverse removal procedure. Using hand tools only, tighten SIS mounting bolts to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

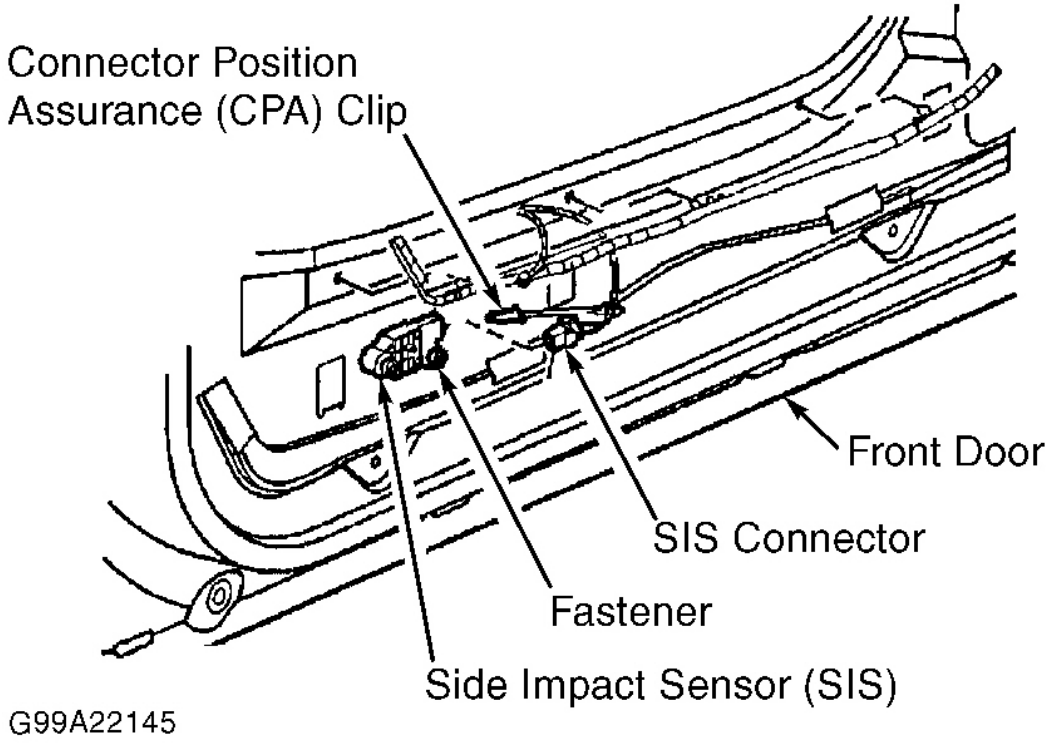

Fig. 12: Identifying Side Impact Sensor (SIS)
Courtesy of GENERAL MOTORS CORP.

SIR COIL ASSEMBLY

NOTE: New coil assemblies are pre-centered and include a centering tab that is removed when coil is installed.

Removal & Installation

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove driver-side air bag module. See **AIR BAG MODULES** . Remove steering wheel. See **STEERING WHEEL** . Remove screws from lower steering column cover. Remove lower steering column cover. Remove screw from upper steering column cover. Remove upper steering column cover.

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3. Remove wire harness from steering column wire harness strap. Remove wire harness straps from wire harness. See **Fig. 13** . Disconnect SIR coil connector. Remove retaining clip. Remove SIR coil assembly. Remove wave washer.
4. To install, reverse removal procedure. Tighten upper and lower trim cover screws and steering wheel nut to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

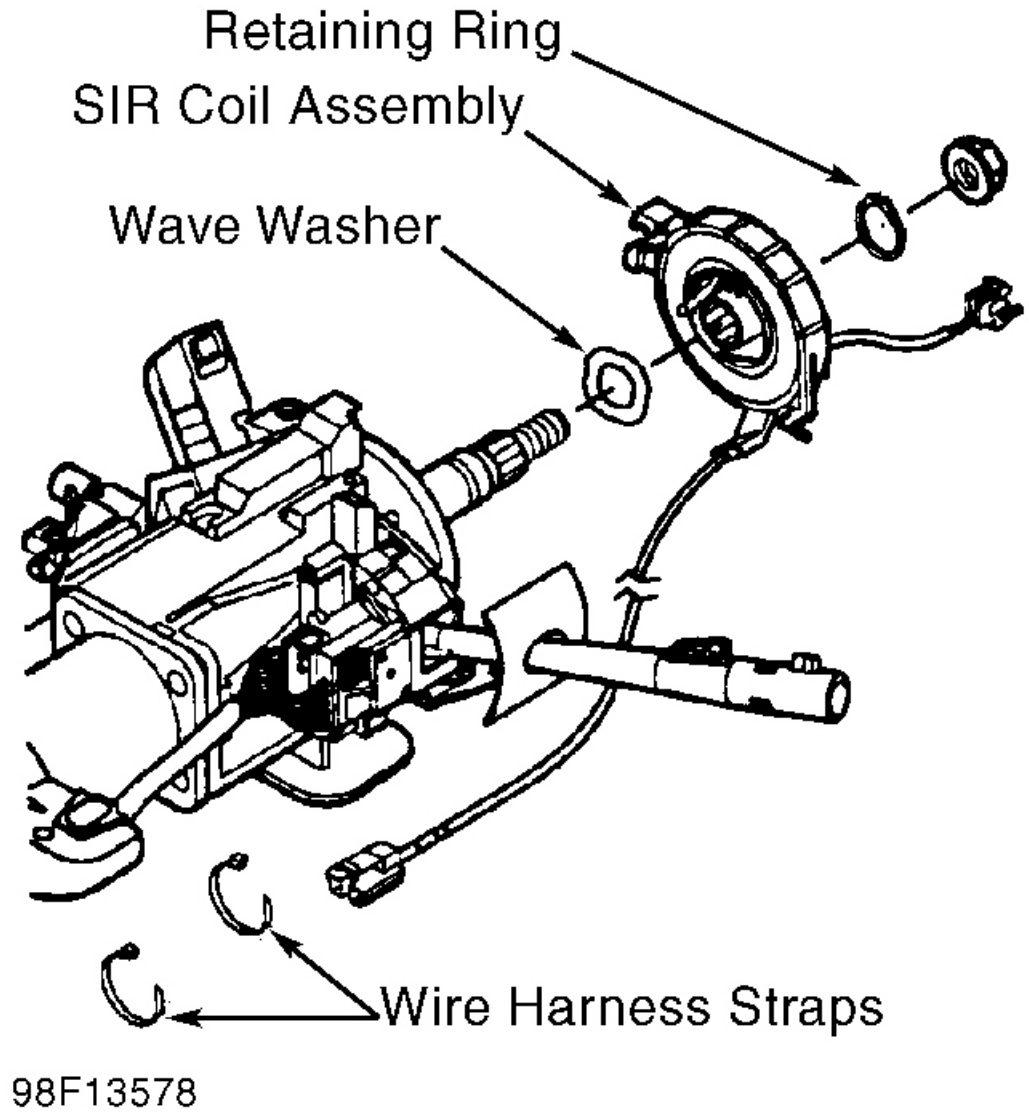

Fig. 13: Identifying SIR Coil Assembly
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STEERING WHEEL

Removal & Installation

1. Before proceeding, see **AIR BAG SAFETY PRECAUTIONS** . Disable air bag system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** .
2. Remove driver-side air bag module. See **AIR BAG MODULES** . Remove horn contact from steering column. Remove steering wheel nut. Scribe a mark on steering wheel and steering shaft for use during assembly. Using Steering Wheel Puller (J-1859-A), remove steering wheel.
3. To install, reverse removal procedure. Tighten steering wheel nut to specification. See **TORQUE SPECIFICATIONS** . Activate air bag system.

DIAGNOSTICS

WARNING: Accidental air bag deployment is possible. Personal injury could result. Read and follow service precautions. See AIR BAG SAFETY PRECAUTIONS .

DIAGNOSTIC TROUBLE CODES (DTC'S)

Sensing & Diagnostic Module (SDM) provides a record of each DTC, stored according to type. SDM performs diagnostic monitoring of SIR system electrical components and sets a DTC when a malfunction is detected. Current DTC's are stored in SDM and are erased when fault is corrected. Current DTC's can be read using a scan tool such as Tech 2.

SCAN TOOL DIAGNOSTICS

Scan Tool (Tech 2) reads and clears current and history DTC's. Ensure scan tool contains correct software cartridge for SIR diagnostics. To use scan tool, connect it to Data Link Connector (DLC), located under left side of instrument panel. Plug in power source. Turn ignition on. Follow scan tool manufacturer instructions for communication with SIR system.

DIAGNOSTIC PROCEDURES

Diagnostic procedures are designed to find and repair SIR malfunctions. It is important to use diagnostic tests and follow sequence listed below.

Perform SIR Diagnostic System Check

SIR diagnostic system check should always be starting point for any SIR diagnostics. It checks for proper AIR BAG warning light operation and SIR DTC's using both flash code and scan tool methods. See **SIR DIAGNOSTIC SYSTEM CHECK** .

Refer To Proper Diagnostic Test

SIR diagnostic system check indicates correct test to diagnose SIR problems. Bypassing procedures may result

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in extended diagnostic time, incorrect diagnosis and incorrect parts replacement.

Repeat SIR Diagnostic System Check

Performing SIR diagnostic system check after all repair or diagnostic procedures ensures that repair has been made correctly and that no other conditions exist.

SIR DIAGNOSTIC SYSTEM CHECK

Diagnostic Procedure

1. Observe AIR BAG warning light when turning ignition on. If AIR BAG warning light flashes 7 times, go to next step. If AIR BAG warning light does not flash 7 times, inspect vehicle for damage to wiring system, visible body damage, faulty or intermittent electrical connections or addition of aftermarket devices which could affect SIR operation. Diagnose AIR BAG warning light malfunction. See **AIR BAG WARNING LIGHT CIRCUIT MALFUNCTION** .
2. Install scan tool to Data Link Connector (DLC), located under left side of instrument panel. If scan tool powers up, go to next step. If scan tool does not power up, inspect and repair data link communication circuits.
3. If scan tool communicates with SDM, go to next step. If scan tool does not communicate with SDM, inspect and repair data link communication circuits.
4. Using scan tool, request SIR DTC display. If scan tool displays any current or history SIR DTC's, go to next step. If scan tool does not display any DTC's, system is normal.
5. If scan tool displays any DTC's that begin with "U", inspect and repair applicable data link communication circuits and components. If no DTC's are displayed that begin with "U", go to next step.
6. If scan tool displays DTC B1000, go to **DTC B1000: SDM MALFUNCTION** . If scan tool displays other SIR DTC's, diagnose and repair applicable SIR DTC's. See **DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION** table.

DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION

Trouble Code	Possible Cause
B0016	Passenger deployment loop resistance low
B0017	Passenger deployment loop resistance high
B0018	Passenger deployment loop short to ground or voltage
B0022	Driver deployment loop resistance low
B0024	Driver deployment loop short to ground or voltage
B0026	Driver deployment loop resistance high
B0028	Passenger side impact deployment loop resistance low
B0029	Passenger side impact deployment loop resistance high
B0030	Passenger side impact deployment loop short to ground or voltage
B0035	Front end discriminating sensor voltage low
B0036	Front end discriminating sensor voltage high
B0040	Driver side impact deployment loop resistance low
B0041	Driver side impact deployment resistance high

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B0045	Driver side impact deployment loop short to ground or voltage
B0051	Deployment commanded
B0053	Deployment commanded with deployment loop malfunction
B0077	Driver-side SIS valid identification message not received
B0078	Passenger-side SIS valid identification message not received
B0079	Driver-side SIS identification not correct
B0080	Driver-side SIS NOK message
B0081	Passenger-side SIS identification not correct
B0082	Passenger-side SIS NOK message
B1000	SDM malfunction
B1001	Option configuration error

CONNECTOR IDENTIFICATION

NOTE: Refer to illustrations to identify SIR connector terminals. See Fig. 14 - Fig. 18 .

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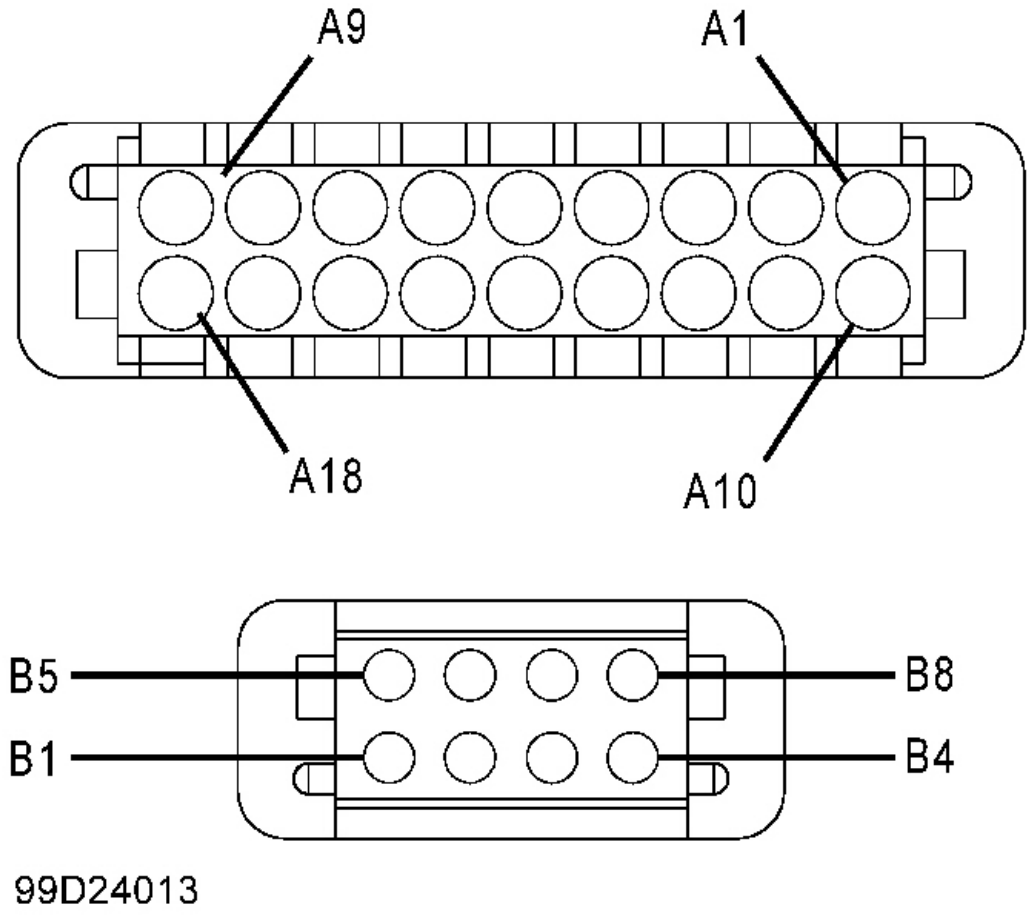

Fig. 14: Identifying SDM Connector Terminals
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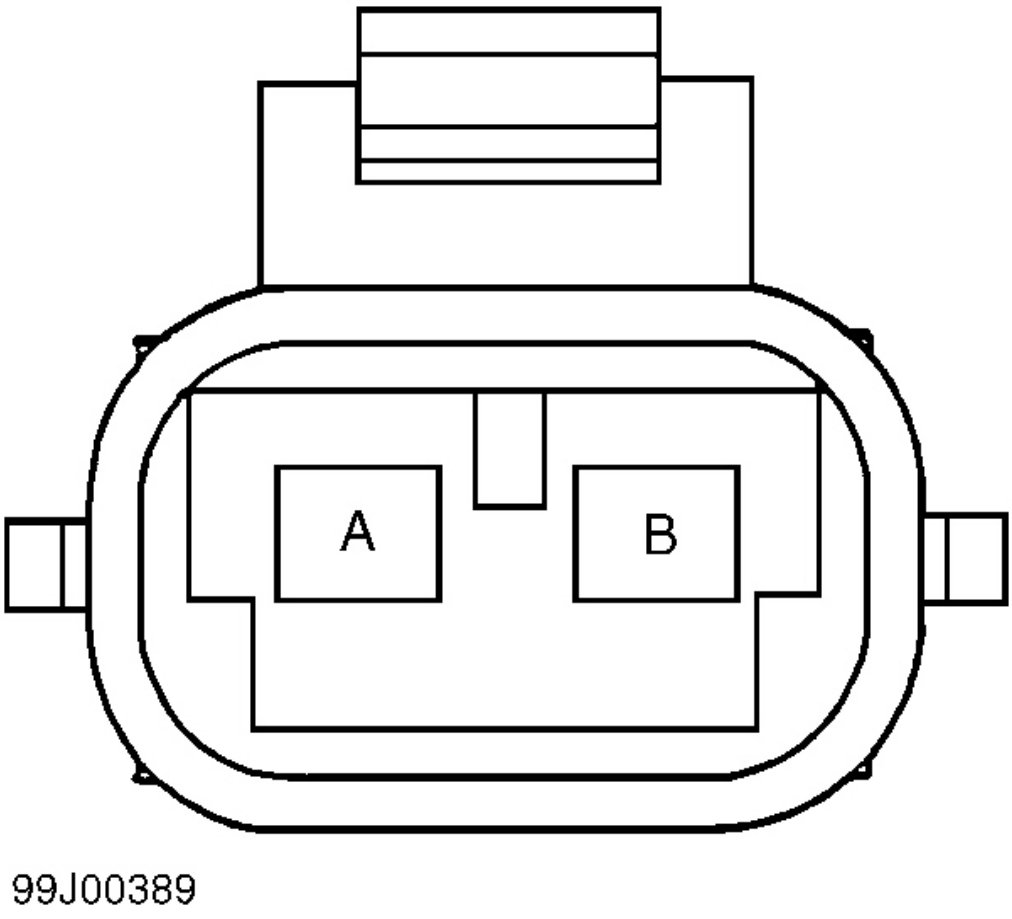

Fig. 15: Identifying Front End Discriminating Sensor Connector Terminals
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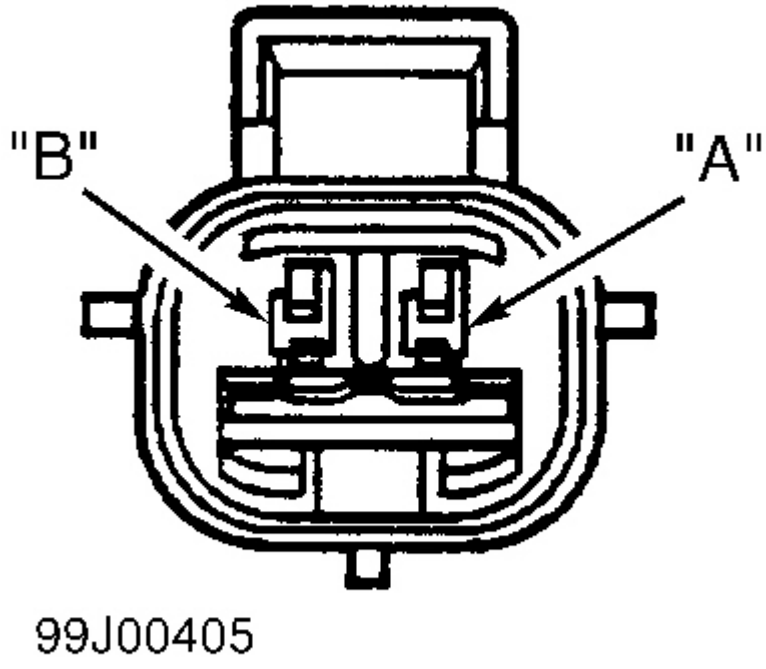

Fig. 16: Identifying Side Impact Sensor (SIS) Connector Terminals
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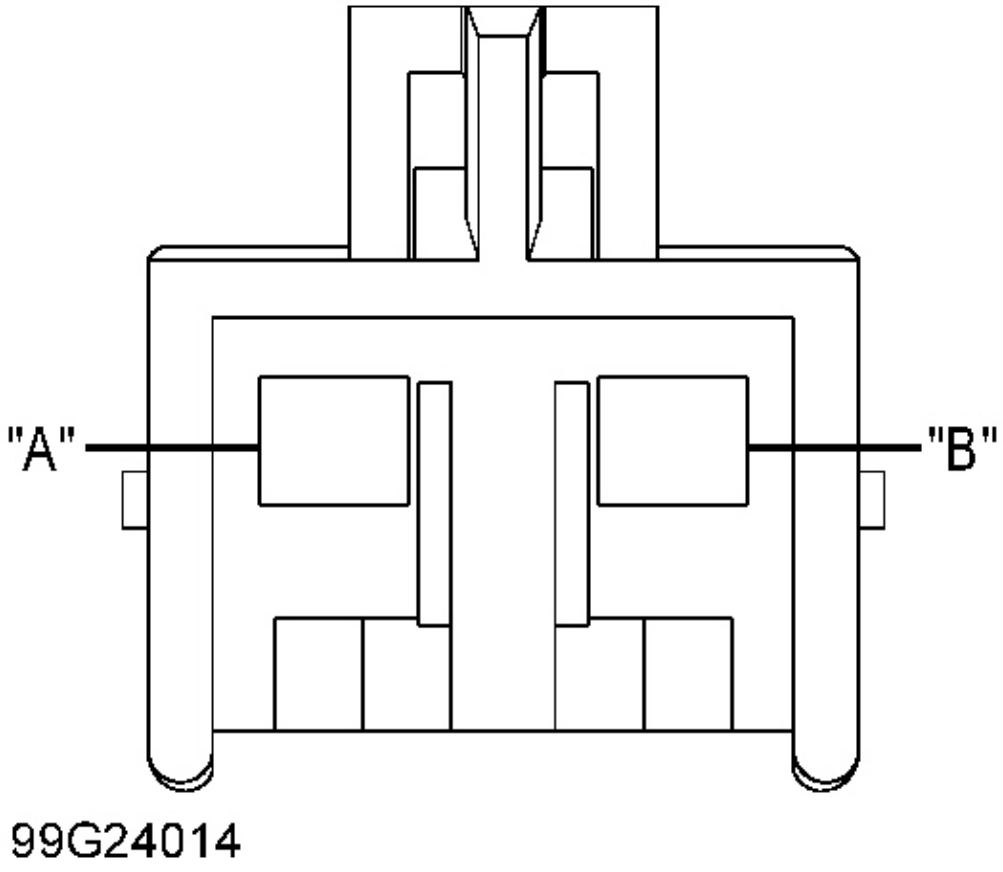

Fig. 17: Identifying Side Impact Air Bag Module Connector Terminals
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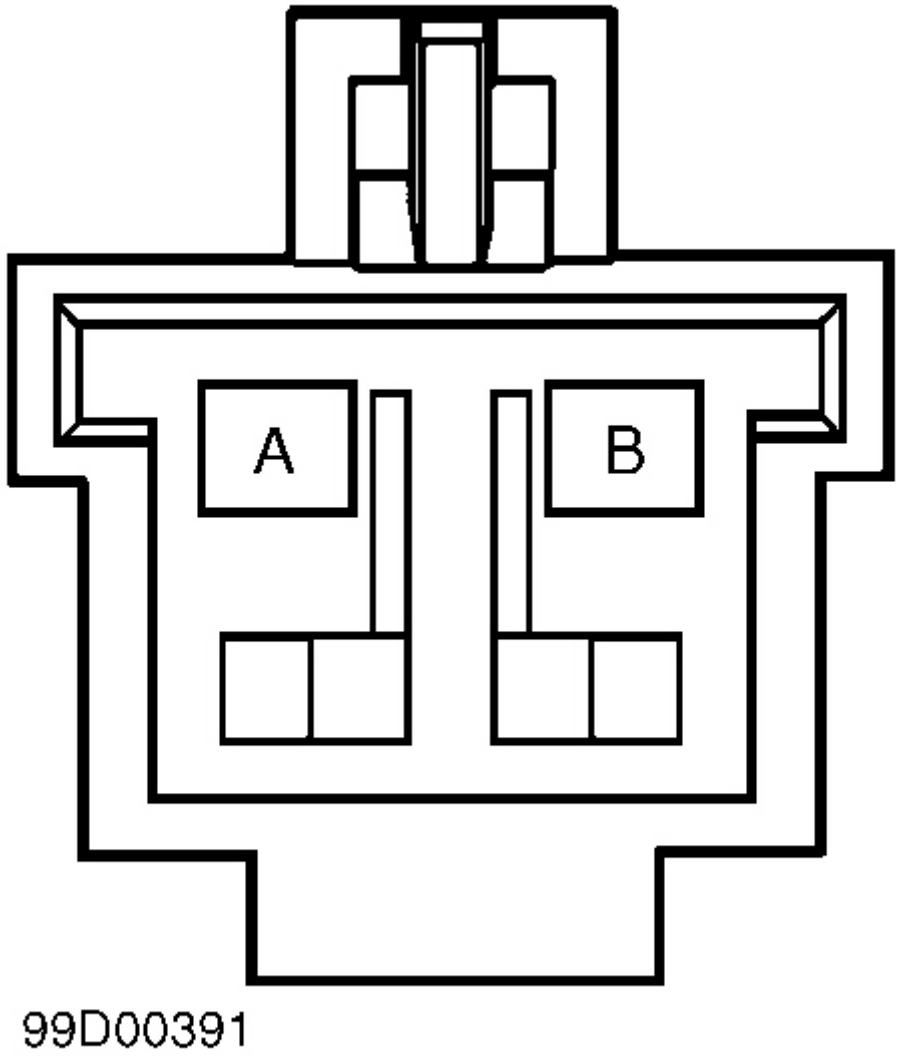

Fig. 18: Identifying Passenger-side Air Bag Module & SIR Coil Connector Terminals
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DIAGNOSTIC TESTS

AIR BAG WARNING LIGHT CIRCUIT MALFUNCTION

Circuit Description

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Ignition switch supplies ignition voltage to Sensing and Diagnostic Module (SDM) connector, terminal A1 via AIR BAG fuse, located under left side of instrument panel. When ignition is turned on, SDM responds by performing tests on SIR system while Instrument Panel Cluster (IPC) flashes AIR BAG warning light 7 times. If no malfunctions are found in SIR system, AIR BAG warning light will turn off.

Diagnostic Aids

If ignition voltage is outside normal operating range, (9-16 volts), AIR BAG warning light will turn on with no DTC's set. Loss of serial data communication between SDM and IPC will also cause AIR BAG warning light to turn on.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Inspect Instrument Panel Cluster (IPC) operation. If IPC is functioning correctly, go to next step. If IPC is not functioning correctly, diagnose and repair IPC.
3. Turn ignition off. Observe AIR BAG warning light when turning ignition on. If AIR BAG warning light flashes 7 times, go to next step. If AIR BAG warning light does not flash 7 times, go to step 10 .
4. Using scan tool, request SIR DATA LIST display. If ignition voltage is more than 9 volts, go to next step. If ignition voltage is 9 volts or less, go to step 6 .
5. If ignition voltage is more than 16 volts, inspect vehicle charging system. If ignition voltage is 16 volts or less, go to step 9 .

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

6. Turn ignition off. Inspect Yellow wire between AIR BAG fuse and SDM connector terminal A1 for an open or high resistance. If an open or high resistance is found and corrected. See **WIRE REPAIR** . Go to step 13 . If an open or high resistance is not found, go to next step.
7. Inspect voltage feed wire between battery and AIR BAG fuse for an open or high resistance. If an open or high resistance is found and corrected, go to step 13 . If an open or high resistance is not found, go to next step.
8. Inspect Black/White wire between SDM connector terminal A18 and ground for an open or high resistance. If an open or high resistance is found and corrected, go to step 13 . If an open or high resistance is not found, go to next step.
9. Disconnect SDM connector. If SDM connector shows signs of damage or corrosion, replace connector. See **WIRE REPAIR** . Go to step 13 . If SDM connector is okay, go to step 11 .
10. Disconnect IPC connector. See **INSTRUMENT PANEL CLUSTER (IPC)** under REMOVAL & INSTALLATION. If IPC connector shows signs of damage or corrosion, replace connector. Go to step 13 . If IPC connectors are okay, go to step 12 .

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11. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to step 13 .
12. Replace Instrument Panel Cluster (IPC). See **INSTRUMENT PANEL CLUSTER (IPC)** under REMOVAL & INSTALLATION. Go to next step.
13. Reconnect all SIR and IPC components. Verify that all components are properly installed. Go to **SYSTEM OPERATION CHECK** .

DTC B0016 , B0017 , B0018 : PASSENGER-SIDE AIR BAG DEPLOYMENT LOOP RESISTANCE LOW/RESISTANCE HIGH/SHORT TO GROUND OR VOLTAGE

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) performs tests on deployment loops to check for circuit continuity and shorts to ground or voltage.

Conditions For Setting DTC

DTC B0016 will set when deployment loop resistance is less than 1.3 ohms for 500 milliseconds. DTC B0017 will set when deployment loop high-side voltage is less than 2.4 volts and deployment loop resistance is more than 6 ohms for 500 milliseconds or when deployment loop resistance is more than 4.8 ohms for 500 milliseconds. DTC B0018 will set when high-side voltage is greater than 6 volts for 500 milliseconds or when high-side circuit voltage is less than 2.4 volts and deployment loop resistance is less than 6 ohms for 500 milliseconds.

Action Taken

SDM turns on AIR BAG warning light and sets DTC.

Conditions For Clearing DTC

Current DTC clears when condition responsible for setting DTC no longer exists and scan tool CLEAR DTC command has been used to clear DTC's. History DTC clears when 255 malfunction-free ignition cycles have occurred.

Diagnostic Aids

Malfunction is likely to be caused by a short between circuits 1403 and 1404 or by an open or high resistance condition or by a short to ground or voltage in either circuit. A malfunctioning electrical connector or SDM could also cause condition.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .

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2. Turn ignition off. Disconnect passenger-side air bag module Yellow 2-pin connector. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. If harness-side of connector is damaged, go to next step. If passenger-side air bag module side of connector is damaged, go to step 7 . If both sides of connector are okay, go to step 4 .
3. Replace harness-side of connector. See **WIRE REPAIR** . Go to step 9 .
4. Install SIR Driver/Passenger Load Tool (J-38715-A) using Load Tool Adapter (J-38715-100) to harness-side of connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0016, B0017 or B0018 is retrieved as a current DTC, go to next step. If DTC B0016, B0017 or B0018 is not retrieved as a current DTC, go to step 7 .
5. Turn ignition off. Remove SIR driver/passenger load tool from harness connector. Disconnect SDM harness connector. See **Fig. 11** . If SDM connector is okay, go to next step. If SDM harness connector shows signs of corrosion or damage, replace SDM connector. See **WIRE REPAIR** . Go to step 9 .

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

6. When diagnosing air bag system:
   - If DTC B0016 is retrieved by scan tool, check for a short between circuits 1403 and 1404. If condition is found and corrected, go to step 9 . If condition is not found, go to step 8 .
   - If DTC B0017 is retrieved, check for an open or high resistance in circuits 1403 or 1404. If condition is found and corrected, go to step 9 . If condition is not found, go to step 8 .
   - If DTC B0018 is retrieved, check for a short to ground or voltage in circuits 1403 or 1404. If condition is found and corrected, go to step 9 . If condition is not found, go to step 8 .
7. Replace passenger-side air bag module. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. Go to step 9 .
8. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to next step.
9. Reconnect all SIR components. Using scan tool, clear all SIR DTC's. Road test vehicle, then check for DTC's. If DTC resets, go to step 2 . If DTC does not reset, system is normal.

DTC B0022 , B0024 , B0026 : DRIVER DEPLOYMENT LOOP RESISTANCE LOW/SHORT TO GROUND OR VOLTAGE/ RESISTANCE HIGH

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) performs tests on deployment loops to check for circuit continuity and shorts to ground or voltage.

Conditions For Setting DTC

DTC B0022 will set when deployment loop resistance is less than 1.3 ohms for 500 milliseconds. DTC B0024 will set when high-side voltage is greater than 6 volts for 500 milliseconds or when high-side voltage is less than 2.4 volts and deployment loop resistance is less than 6 ohms for 500 milliseconds. DTC B0026 will set

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when deployment loop high-side voltage is less than 2.4 volts and deployment loop resistance is more than 6 ohms for 500 milliseconds or when deployment loop resistance is more than 4.8 ohms for 500 milliseconds.

Action Taken

SDM turns on AIR BAG warning light and sets DTC.

Conditions For Clearing DTC

Current DTC clears when condition responsible for setting DTC no longer exists and scan tool CLEAR DTC command has been used to clear DTC's. History DTC clears when 255 malfunction-free ignition cycles have occurred.

Diagnostic Aids

Malfunction is likely to be caused by a short between circuits 347 and 348 or by an open or high resistance condition or by a short to ground or voltage in either circuit. A malfunctioning electrical connector or SDM could also cause condition.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition off. Disconnect driver-side air bag module Yellow 2-pin connector, located at base of steering column. See **Fig. 2** . If harness-side of connector is damaged, go to next step. If SIR coil side of connector is damaged, go to step 9 . If both sides of connector are okay, go to step 4 .
3. Replace harness-side of connector. See **WIRE REPAIR** . Go to step 11 .
4. Install SIR Driver/Passenger Load Tool (J-38715-A) using Load Tool Adapter (J-38715-100) to harness-side of connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0022, B0024 or B0026 is retrieved as a current DTC, go to step 6 . If DTC B0022, B0024 or B0026 is not retrieved as a current DTC, go to next step.
5. Remove SIR driver/passenger load tool from harness-side of connector. Reconnect driver-side air bag module Yellow 2-pin connector. Remove driver-side air bag module. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. Install SIR driver/passenger load tool using Load Tool Adapter (J-38715-30A) to upper SIR coil connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0022, B0024 or B0026 is retrieved as a current DTC, go to 9 . If DTC B0022, B0024 or B0026 is not retrieved as a current DTC, go to 8 .
6. Turn ignition off. Remove SIR driver/passenger load tool from harness connector. Disconnect SDM harness connector. See **Fig. 11** . If SDM connector is okay, go to next step. If SDM harness connector shows signs of corrosion or damage, replace SDM connector. See **WIRE REPAIR** . Go to step 11 .

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

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7. When diagnosing air bag system:
   - If DTC B0022 is retrieved by scan tool, check for a short between circuits 347 and 348. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
   - If DTC B0024 is retrieved, check for a short to ground or voltage in circuits 347 and 348. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
   - If DTC B0026 is retrieved, check for an open or high resistance in circuits 347 and 348. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
8. Replace driver-side air bag module. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. Go to step 11 .
9. Replace SIR coil assembly. See **SIR COIL ASSEMBLY** under REMOVAL & INSTALLATION. Go to step 11 .
10. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to next step.
11. Reconnect all SIR components. Ensure all components are properly mounted. Using scan tool, clear all SIR DTC's. Road test vehicle. If DTC resets, go to step 2 . If DTC does not reset, system is normal.

DTC B0028 , B0029 , B0030 : PASSENGER SIDE IMPACT AIR BAG DEPLOYMENT LOOP RESISTANCE LOW/ RESISTANCE HIGH/SHORT TO GROUND OR VOLTAGE

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) performs tests on deployment loops to check for circuit continuity and shorts to ground or voltage.

Conditions For Setting DTC

DTC B0028 will set when deployment loop resistance is less than 1.3 ohms for 500 milliseconds. DTC B0029 will set when deployment loop high-side voltage is less than 2.4 volts and deployment loop resistance is more than 6 ohms for 500 milliseconds or when deployment loop resistance is more than 4.8 ohms for 500 milliseconds. DTC B0030 will set when deployment loop high-side voltage is greater than 6 volts for 500 milliseconds or when high-side voltage is less than 2.4 volts and deployment loop resistance is less than 6 ohms for 500 milliseconds.

Action Taken

SDM turns on AIR BAG warning light and sets DTC.

Conditions For Clearing DTC

Current DTC clears when condition responsible for setting DTC no longer exists and scan tool CLEAR DTC command has been used to clear DTC's. History DTC clears when 255 malfunction-free ignition cycles have occurred.

Diagnostic Aids

Malfunction is likely to be caused by a short between circuits 2103 and 2104 or by an open or high resistance

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condition or by a short to ground or voltage in either circuit. A malfunctioning electrical connector or SDM could also cause condition.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition off. Disconnect passenger side impact air bag module connector, located under seat. See **Fig. 4** . If either side of connector is damaged, go to next step. If both sides of connector are okay, go to step 4 .
3. If side impact side of connector is damaged, replace side impact air bag module wiring harness. Go to step 11 . If wiring harness side of connector is damaged, replace connector. See **WIRE REPAIR** . Go to step 11 .
4. Install SIR Driver/Passenger Load Tool (J-38715-A) to harness-side of passenger side impact air bag module wire harness connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0028, B0029 or B0030 is retrieved as a current DTC, go to step 6 . If DTC B0028, B0029 or B0030 is not retrieved as a current DTC, go to next step.
5. Turn ignition off. Remove driver/passenger load tool and load tool adapter from connector. Reconnect connector. Disconnect passenger side impact air bag module connector. Install load tool and Load Tool Adapter (J38715-30A) to harness side of connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0028, B0029 or B0030 is retrieved as a current DTC, go to step 9 . If DTC B0028, B0029 or B0030 is not retrieved as a current DTC, go to step 8 .
6. Turn ignition off. Remove load tool and load tool adapter from connector. Disconnect SDM connector. See **Fig. 11** . If SDM connector shows signs of corrosion or damage, replace SDM connector. See **WIRE REPAIR** . Go to step 11 . If SDM connector is okay, go to next step.

   NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

7. When diagnosing air bag system:
   - If DTC B0028 is retrieved by scan tool, check for a short between circuits 2103 and 2104. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
   - If DTC B0029 is retrieved, check for an open or high resistance in circuits 2103 and 2104. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
   - If DTC B0030 is retrieved, check for a short to ground or voltage in circuits 2103 and 2104. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
8. Replace side impact air bag module. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. Go to step 11 .
9. Replace side impact air bag module wiring harness. Go to step 11 .
10. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to next step.

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11. Reconnect all SIR components. Using scan tool, clear all SIR DTC's. Road test vehicle, then check for DTC's. If current DTC is retrieved by scan tool, go to step 2 . If current DTC is not retrieved by scan tool, system is normal.

DTC B0035 : FRONT END DISCRIMINATING SENSOR VOLTAGE LOW

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) performs continuous diagnostic tests on deployment loop to check for proper circuit continuity and for shorts to ground or voltage. Sensing and Diagnostic Module (SDM) monitors front end discriminating sensor circuit for front impact detection. SDM processes this signal to further support deployment of air bags. Front end discriminating sensor is an input only device and is not part of deployment loop.

Conditions For Setting DTC

DTC sets when SDM detects voltage at front end discriminating sensor signal input circuit is 0.5 volts or less for 500 milliseconds.

Action Taken

SDM sets DTC, turns on AIR BAG warning light and disables front end discriminating sensor input.

Conditions For Clearing DTC

Current DTC clears when condition responsible for DTC no longer exists and CLEAR CODES command is issued via scan tool. History DTC clears when 255 malfunction free ignition cycles have occurred.

Diagnostic Aids

Condition could be caused by a broken or chafed wire in circuit 2160.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR Diagnostic System Check has been performed, go to next step. If SIR Diagnostic System Check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition off. Disconnect front end discriminating sensor in-line connector, located next to under hood fuse-relay box. See **Fig. 19** . Inspect both sides of connector for corrosion, poor connections or damage. If either half of connector is damaged, replace applicable connector. See **WIRE REPAIR** . Go to step 8 . If both sides of connector are okay, go to next step.
3. Disconnect front end discriminating sensor connector. See **FRONT END DISCRIMINATING SENSOR** under REMOVAL & INSTALLATION. If harness side of connector shows signs of corrosion, poor connections or damage, replace connector. See **WIRE REPAIR** . Go to step 8 . If front end discriminating sensor side of connector is damaged, replace front end discriminating sensor. Go to step 8 . If connector is okay, go to next step.

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4. Disconnect SDM harness connector. If connector shows signs of corrosion, poor connections or damage, replace connector. See **WIRE REPAIR** . Go to step 8 . If SDM harness connector is okay, go to next step.

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

5. Measure resistance between front end discriminating sensor terminals "A" and "B". See **Fig. 19** . If resistance is 950 ohms or less, go to step 7 . If resistance is more than 950 ohms, go to next step.
6. Measure resistance of between front end discriminating sensor signal circuit and ground. If resistance is infinite, go to next step. If resistance is not infinite, repair short to ground. Go to step 8 .
7. Replace front end discriminating sensor. Go to next step.
8. Reconnect all SIR components. Ensure all components are properly mounted. Using scan tool, clear all SIR DTC's. Road test vehicle, then check for DTC's. If current DTC resets, go to step 2 . If DTC does not reset, system is normal.

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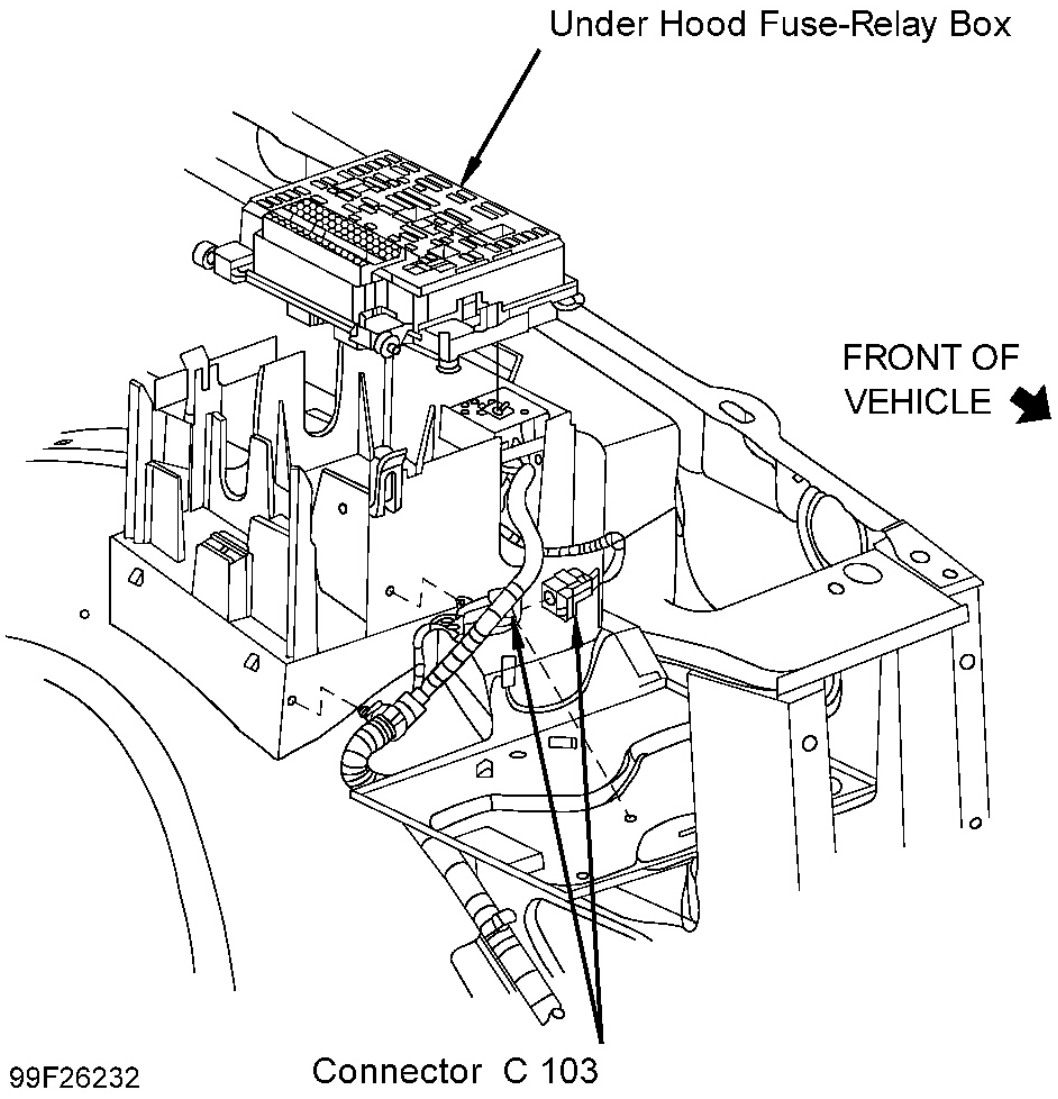

Fig. 19: Identifying Front End Discriminating Sensor In-line Connector
Courtesy of GENERAL MOTORS CORP.

DTC B0036 : FRONT END DISCRIMINATING SENSOR VOLTAGE HIGH

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) performs continuous diagnostic tests on deployment loop to check for proper circuit continuity and for shorts to ground or voltage. Sensing and Diagnostic Module (SDM) monitors front end discriminating sensor circuit for front impact detection. SDM processes this signal to further support deployment of air bags. Front end discriminating sensor is an input only device and is not part of deployment circuit.

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Conditions For Setting DTC

DTC sets when SDM detects voltage in front end discriminating sensor signal circuit is more than 3.65 volts for 500 milliseconds.

Action Taken

SDM sets DTC and turns on AIR BAG warning light.

Conditions For Clearing DTC

Current DTC clears when condition responsible for DTC no longer exists and CLEAR CODES command is issued via scan tool. History DTC clears when 255 malfunction free ignition cycles have occurred.

Diagnostic Aids

Condition could be caused by a broken or chafed wire in circuits 349 or 1751.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR Diagnostic System Check has been performed, go to next step. If SIR Diagnostic System Check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition off. Disconnect front end discriminating sensor in-line connector, located next to under hood fuse-relay box. See **Fig. 19** . Inspect both sides of connector for corrosion, poor connections or damage. If either half of connector is damaged, replace applicable connector. See **WIRE REPAIR** . Go to step 10 . If both sides of connector are okay, go to next step.
3. Disconnect front end discriminating sensor connector. If harness side of connector shows signs of corrosion, poor connections or damage, replace connector. See **WIRE REPAIR** . Go to step 10 . If front end discriminating sensor side of connector signs of corrosion, poor connections or damage, replace front end discriminating sensor. Go to step 10 . If both sides of connector are okay, go to next step.
4. Disconnect SDM connector. If SDM connector shows signs of corrosion, poor connections or damage, replace SDM connector. See **WIRE REPAIR** . Go to step 10 . If SDM connector is okay, go to next step.

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

5. Measure resistance between front end discriminating sensor terminals "A" and "B". See **Fig. 19** . If resistance is more than 1050 ohms, go to step 9 . If resistance is 1050 ohms or less, go to next step.
6. Measure resistance of Yellow wire between SDM connector terminal A11 and front end discriminating sensor connector terminal "A". If an open or high resistance is found and corrected, go to step 10 . If an open or high resistance is not found, go to next step.
7. Measure resistance of Black/White wire between SDM connector terminal A12 and front end discriminating sensor connector terminal "B". If an open or high resistance is found and corrected, go to

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step 10 . If an open or high resistance is not found, go to next step.

8. Disable SIR system. See **DISABLING & ACTIVATING AIR BAG SYSTEM** . Install AIR BAG fuse. Turn ignition on. Check front end discriminating sensor signal circuit for a short to voltage. If short to voltage is found and corrected, go to step 10 . If short to voltage is not found, go to next step.
9. Replace front end discriminating sensor. Go to next step.
10. Reconnect all SIR components. Ensure all components are properly mounted. Using scan tool, clear all SIR DTC's. Road test vehicle. If DTC resets, go to step 2 . If DTC does not reset, system is normal.

DTC B0040 , B0041 , B0045 : DRIVER SIDE IMPACT AIR BAG DEPLOYMENT LOOP RESISTANCE LOW/RESISTANCE HIGH/SHORT TO GROUND OR VOLTAGE

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) performs tests on deployment loops to check for circuit continuity and shorts to ground or voltage.

Conditions For Setting DTC

DTC B0040 will set when deployment loop resistance is less than 1.3 ohms for 500 milliseconds. DTC B0041 will set when deployment loop high-side voltage is less than 2.4 volts and deployment loop resistance is more than 6 ohms for 500 milliseconds or when deployment loop resistance is more than 4.8 ohms for 500 milliseconds. DTC B0045 will set when deployment loop high-side voltage is more than 6 volts for 500 milliseconds or when high-side voltage is less than 2.4 volts and deployment loop resistance is less than 6 ohms for 500 milliseconds.

Action Taken

SDM turns on AIR BAG warning light and sets DTC.

Conditions For Clearing DTC

Current DTC clears when condition responsible for setting DTC no longer exists and scan tool CLEAR DTC command has been used to clear DTC's. History DTC clears when 255 malfunction-free ignition cycles have occurred.

Diagnostic Aids

Malfunction is likely to be caused by a short between circuits 2105 and 2106 or by an open or high resistance condition or by a short to ground or voltage in either circuit. A malfunctioning electrical connector or SDM could also cause condition.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .

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2. Turn ignition off. Disconnect driver side impact air bag module connector, located under seat. See **Fig. 4** . If either side of connector is damaged, go to next step. If both sides of connector are okay, go to step 4 .
3. If side impact side of connector is damaged, replace side impact air bag module wiring harness. Go to step 11 . If wiring harness side of connector is damaged, replace connector. See **WIRE REPAIR** . Go to step 11 .
4. Install SIR Driver/Passenger Load Tool (J-38715-A) to harness-side of driver side impact air bag module wire harness connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0040, B0041 or B0045 is retrieved as a current DTC, go to step 6 . If DTC B0040, B0041 or B0045 is not retrieved as a current DTC, go to next step.
5. Turn ignition off. Remove load tool from connector. Reconnect connector. Install SIR Driver/Passenger Load Tool (J-38715-A) using Load Tool Adapter (J-38715-30A) to harness-side of driver side impact air bag module connector. Turn ignition on. Using scan tool, check for SIR DTC's. If DTC B0040, B0041 or B0045 is retrieved as a current DTC, go to step 9 . If DTC B0040, B0041 or B0045 is not retrieved as a current DTC, go to step 8 .
6. Turn ignition off. Remove load tool from connector. Disconnect SDM connector. See **Fig. 11** . If SDM connector shows signs of corrosion or damage, replace SDM connector. See **WIRE REPAIR** . Go to step 11 . If SDM connector is okay, go to next step.

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

7. When diagnosing air bag system:
   - If DTC B0040 is retrieved by scan tool, check for a short between circuits 2105 and 2106. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
   - If DTC B0041 is retrieved, check for an open or high resistance in circuits 2105 and 2106. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
   - If DTC B0045 is retrieved, check for a short to ground or voltage in circuits 2105 and 2106. If condition is found and corrected, go to step 11 . If condition is not found, go to step 10 .
8. Replace side impact air bag module. See **AIR BAG MODULES** under REMOVAL & INSTALLATION. Go to step 11 .
9. Replace side impact air bag module wiring harness. Go to step 11 .
10. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to next step.
11. Reconnect all SIR components. Using scan tool, clear all SIR DTC's. Road test vehicle, then check for DTC's. If current DTC is retrieved by scan tool, go to step 2 . If current DTC is not retrieved by scan tool, system is normal.

DTC B0051 : DEPLOYMENT COMMANDED

Circuit Description

Sensing and Diagnostic Module (SDM) contains a sensing device which converts vehicle velocity changes into an electrical signal. Signal is processed by SDM and compared to a value stored in memory. When signal

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exceeds stored value, additional signal processing is performed and signals are compared to values stored in memory. When 2 signals exceed stored values, SDM causes current to flow through air bag modules, deploying air bag modules and causing DTC B0051 to set.

Conditions For Setting DTC

DTC sets when ignition voltage is present and SDM has commanded deployment of air bags.

Action Taken

SDM sets DTC, turns on AIR BAG warning light and records crash data.

Conditions For Clearing DTC

DTC B0051 is a latched code and cannot be cleared. Replace SDM only after completion of diagnostic procedure and applicable repairs.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition off. If air bags have deployed, go to step 5 . If air bags have not deployed, go to next step.
3. Inspect vehicle and undercarriage for signs of impact or collision. If no impact or collision has occurred, go to step 5 . If no impact or collision has occurred, go to next step.
4. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to step 6 .
5. Replace components and perform inspections as required following an accident. See **POST-COLLISION INSPECTION** . Go to next step.
6. Reconnect all SIR components. Using scan tool, clear DTC's. Go to **SIR DIAGNOSTIC SYSTEM CHECK** .

DTC B0053 : DEPLOYMENT COMMANDED WITH LOOP MALFUNCTION

Circuit Description

Sensing and Diagnostic Module (SDM) contains a sensing device which converts vehicle velocity changes into an electrical signal. Signal is processed by SDM and compared to a value stored in memory. When signal exceeds stored value, additional signal processing is performed and signals are compared to values stored in memory. When 2 signals exceed stored values, SDM causes current to flow through air bag modules, deploying air bags. DTC B0053 will set instead of DTC B0051 when a deployment occurs while an inflator circuit fault exists that could result in a non-deployment situation in one or both air bag modules.

Conditions For Setting DTC

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DTC will set when SDM has commanded an air bag deployment with deployment loop malfunctions.

Action Taken

SDM sets DTC, turns on AIR BAG warning light and records crash data.

Conditions For Clearing DTC

DTC B0053 is a latched code which cannot be cleared. Replace SDM only after completion of diagnostic procedure and applicable repairs.

Diagnostic Aids

When DTC B0053 is accompanied by additional DTC's, other than DTC B0051, repair malfunctions causing other DTC's before replacing SDM.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Turn ignition off. If air bags have deployed, go to step 5 . If air bags have not deployed, go to next step.
3. Inspect vehicle and undercarriage for signs of impact or collision. If impact or collision has occurred, go to step 5 . If no impact or collision has occurred, go to next step.
4. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to step 6 .
5. Replace components and perform inspections as required following an accident. See **POST-COLLISION INSPECTION** . Go to next step.
6. Reconnect all SIR components. Using scan tool, clear DTC's. Road test vehicle, then check for DTC's. If DTC is retrieved, go to step 2 . If DTC is not retrieved, system is normal.

DTC B0077 , B0078 , B0079 , B0080 , B0081 , B0082 : DRIVER-SIDE SIS VALID IDENTIFICATION MESSAGE NOT RECEIVED/PASSENGER-SIDE SIS VALID IDENTIFICATION MESSAGE NOT RECEIVED/DRIVER-SIDE SIS IDENTIFICATION ERROR/DRIVER-SIDE SIS NOK MESSAGE/PASSENGER-SIDE SIS IDENTIFICATION ERROR/PASSENGER-SIDE SIS NOK MESSAGE

Circuit Description

Side Impact Sensor (SIS) uses a unidirectional 2-wire circuit. SIS modulates current on the interface to send identification, State Of Health (SOH) and deployment commands to Sensing and Diagnostic Module (SDM). SDM provides power and ground to Side Impact Sensor (SIS). When ignition is turned on and power from SDM is detected by SIS, SIS performs internal diagnostics, then sends an identification message to SDM. SDM receives identification message within 5 seconds of power being turned on and determines if message is valid. SIS continually communicates a status message to SDM. When a fault is detected, SDM resets SIS twice by

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removing and reapplying power to SIS. If fault is still present, SDM will set DTC.

Conditions For Setting DTC

DTC B0077 will set when SDM does not receive a valid identification message within 5 seconds of driver-side SIS being powered up, status message is not received or SDM has reset SIS twice without detecting valid identification message. DTC B0078 will set when SDM does not receive a valid identification message within 5 seconds of passenger-side SIS being powered up, status message is not received or SDM has reset SIS twice without detecting valid identification message.

DTC B0079 will set when SDM receives an identification message from driver-side SIS that does not match identification stored in memory or after SDM has tried twice to reset SIS without detecting correct identification message. DTC B0081 will set when SDM receives an identification message from passenger-side SIS that does not match identification stored in memory or after SDM has tried twice to reset SIS without detecting correct identification message.

DTC B0080 will set when SDM has received a Not Okay (NOK) message from driver-side SIS. DTC B0082 will set when SDM has received a Not Okay (NOK) message from passenger-side SIS.

Action Taken

SDM turns on AIR BAG warning light and sets DTC.

Conditions For Clearing DTC

DTC will clear when condition responsible for setting DTC no longer exists and CLEAR DTC command is issued via scan tool. History DTC will clear once 255 malfunction free ignition cycles have occurred.

Diagnostic Aids

Condition could be caused by a short to ground or voltage, high or low resistance in circuits 2161, 2162, 2163 or 2164. A short between circuits 2161 and 2162 or 2163 and 2164 could also cause condition.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR Diagnostic System Check has been performed, go to next step. If SIR Diagnostic System Check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Using scan tool, request SIR DTC display. If DTC B0079, B0080, B0081 or B0082 is retrieved as a current DTC, go to step 12 . If DTC B0079, B0080, B0081 or B0082 is not retrieved as a current DTC, go to next step.
3. Turn ignition off. If DTC B0077 is current, disconnect driver-side SIS connector. See **SIDE IMPACT SENSOR (SIS)** under REMOVAL & INSTALLATION. If DTC B0078 is current, disconnect passenger-side SIS connector. If connector is damaged or corroded, go to next step. If connector is okay, go to step 5 .

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4. If SIS side of connector is damaged, replace SIS. Go to step 13 . If harness side of connector is damaged, replace connector. See **WIRE REPAIR** . Go to step 13 .

NOTE: Use Digital Multimeter (J-39200) and Connector Test Adapter Kit (J-35616-A) or Flat Wire Probe Adapter Kit (J-42675) when performing electrical tests.

5. Disconnect SDM connector. See **Fig. 11** . If SDM connector or SDM terminals show signs of corrosion, poor connections or other damage, replace SDM connector. See **WIRE REPAIR** . Go to step 13 . If SDM connector is okay, go to next step.
6. If DTC B0077 is current, disconnect driver-side SIS connector. If DTC B0078 is current, disconnect passenger-side SIS connector. Test high-side and low-side circuits of applicable SIS for a short to ground or an open or high resistance. If a short to ground or an open or high resistance is found and corrected, go to step 13 . If a short to ground, an open or high resistance is not found, go to next step.
7. Inspect applicable SIS circuits for a short to voltage. If a short to voltage is found and corrected, go to step 13 . If short is not found, go to next step.
8. Turn ignition on. Check applicable SIS circuits for a short to voltage. If short to voltage is found and corrected, go to step 13 . If short to voltage is not found and corrected, go to next step.
9. If DTC B0077 was displayed by scan tool, replace driver-side SIS. Go to next step. If DTC B0078 was displayed by scan tool, replace passenger-side SIS. Go to next step.
10. Reconnect all SIR components. Using scan tool, clear DTC's. Road test vehicle, then check for DTC's. If DTC's are retrieved by scan tool, go to next step. If DTC's are not retrieved by scan tool, system is normal.
11. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to step 13 .
12. If DTC B0079 or B0080 were retrieved by scan tool, replace driver-side SIS. See **SIDE IMPACT SENSOR (SIS)** under REMOVAL & INSTALLATION. Go to next step. If DTC B0081 or B0082 were retrieved by scan tool, replace passenger-side SIS. Go to next step.
13. Reconnect all SIR components. Using scan tool, clear all SIR DTC's. Road test vehicle, then check for DTC's. If DTC's are retrieved, go to step 2 . If DTC's are not retrieved, system is normal.

DTC B1000 : SDM MALFUNCTION

Circuit Description

DTC B1000 indicates an internal SDM malfunction. No external circuits are involved.

Conditions For Setting DTC

DTC sets when SDM detects an internal malfunction.

Action Taken

SDM refuses all additional inputs.

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Conditions For Clearing DTC

Current DTC clears when malfunction is no longer present. History DTC clears when SDM ignition cycle counter reaches the reset threshold, without a repeat of malfunction.

Diagnostic Aids

DTC may be stored as history DTC without affecting operation of SDM. If DTC is retrieved only as a history DTC and not as a current DTC, DO NOT replace SDM. If DTC is retrieved as a history and current DTC, replace SDM.

NOTE: For circuit number and wire color identification, see WIRING DIAGRAMS .

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Using scan tool, request SIR DTC display. If DTC B1000 is retrieved as a current DTC, go to next step. If DTC B1000 is retrieved as a history DTC, go to **DIAGNOSTIC AIDS** .
3. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Reconnect all SIR components. Go to next step.
4. Using scan tool, erase DTC's. Road test vehicle, then check for DTC's. If DTC B1000 is retrieved by scan tool, go to step 2 . If DTC B1000 is not retrieved, system is normal.

DTC B1001 : OPTION CONFIGURATION ERROR

Circuit Description

When ignition is turned on, Sensing and Diagnostic Module (SDM) compares restraints identification stored in SDM to restraints identification stored in Body Control Module (BCM). SDM will then compare VIN stored in SDM to VIN stored in Powertrain Control Module (PCM).

Conditions For Setting DTC

DTC sets when ignition voltage is within normal operating range.

Action Taken

SDM sets DTC, turns on AIR BAG warning light and disables deployment loops.

Conditions For Clearing DTC

DTC clears when restraints identification stored in SDM matches restraints identification stored in DIM.

Diagnostic Aids

DTC is an indication that restraints identification stored in BCM and SDM do not match or that VIN's stored in

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both PCM and SDM do not match. If BCM or SDM were replaced, Vehicle Theft Deterrent (VTD) system will need to be reprogrammed.

Diagnostic Procedure

1. If SIR diagnostic system check has been performed, go to next step. If SIR diagnostic system check has not been performed, go to **SIR DIAGNOSTIC SYSTEM CHECK** .
2. Using scan tool, verify that PCM is programmed with correct VIN. If VIN is not correct, go to next step. If VIN is correct, go to step 4 .
3. Using scan tool, program correct VIN into PCM. Go to step 9 .
4. If BCM was replaced, go to next step. If BCM was not replaced, go to step 6 .
5. Using scan tool, program BCM to learn restraints identification from SDM. Go to step 8 .
6. If SDM was replaced, go to step 9 . If SDM was not replaced, go to next step.
7. Replace SDM. See **SENSING & DIAGNOSTIC MODULE (SDM)** under REMOVAL & INSTALLATION. Go to next step.
8. Using scan tool, reprogram VTD system. Go to next step.
9. Reconnect all SIR components. Using scan tool, clear all DTC's. Turn ignition off for 10 seconds. If no DTC's are retrieved, system is normal.

WIRE REPAIR

SIR system requires special wiring repair procedures due to sensitive nature of circuitry. Wire Repair Kit (J-38125-B) contains special sealed splices for use in repairing SIR wiring. Splices use a heat shrink sleeve with sealing adhesive to produce a sealed splice and a cross-hatched core crimp to produce a positive contact for low energy circuits.

Repair damaged SIR wire harness connectors and terminals (except pigtails) using connector repair assembly packs and splice crimping tool provided. Terminals in SIR system are manufactured from a special metal to provide necessary contact integrity for sensitive, low-energy circuits. These terminals are only available in connector repair assembly packs and no other terminal should be substituted.

If individual terminals on SDM connector are damaged, SDM connector must be replaced using SDM connector pigtail assembly or SDM connector replacement kit. If individual terminals on any other SIR connector are damaged, entire connector must be replaced. Use appropriate connector repair assembly pack. Replace entire SIR wire harness, if necessary to maintain SIR circuit integrity.

DO NOT make wiring, connector or terminal repairs on components with wiring pigtails. If a wiring pigtail is damaged, entire component (including pigtail) should be replaced.

Any wiring other than a pigtail can be repaired by splicing in a new section of wire of same gauge. Sealed splices and crimping tool must be used for these splices. Open wire harness by removing tape as necessary, using a sewing seam ripper. Refer to instructions in kit for wiring repair procedure.

TORQUE SPECIFICATIONS

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TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Front seat mounting nuts	41 (56)
Steering wheel nut	29 (39)
	INCH Lbs. (N.m)
Front end discriminating sensor bolt	89 (10.0)
Instrument Panel Cluster (IPC) screws	18 (2.0)
Instrument panel upper trim pad screws	18 (2.0)
Passenger-side air bag module bolts	89 (10.0)
Sensing & Diagnostic Module (SDM) fasteners	89 (10.0)
Side impact air bag module bolts	89 (10.0)
Side Impact Sensor (SIS) bolts	89 (10.0)
Steering column cover	
Upper screw	15 (1.7)
Lower screws	25 (2.8)

WIRING DIAGRAMS

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2002 Cadillac Escalade

2002 ACCESSORIES/SAFETY EQUIPMENT General Motors Corp. - Air Bag Restraint Systems

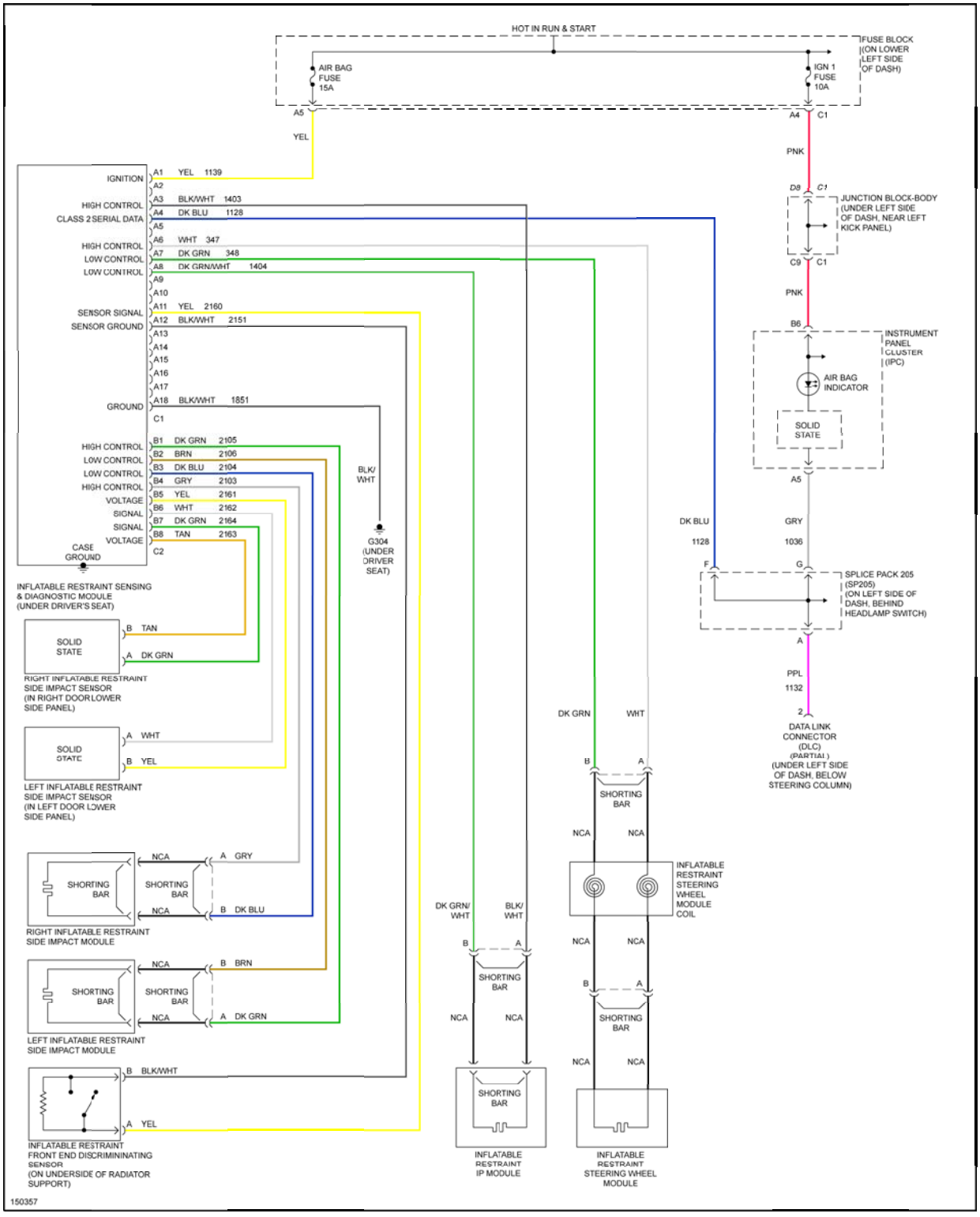

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Fig. 20: SIR System Wiring Diagram (Avalanche, Escalade, Escalade EXT, Suburban, Tahoe, Yukon, Yukon Denali, Yukon XL & Yukon XL Denali)

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