Component Procedures: Air Bag Systems

Table of Contents

Component Procedures: Air Bag Systems

Supplemental Inflatable Restraint System (Article 13272)

SIR System Overview

The supplemental inflatable restraint (SIR) system supplements the protection offered by the seat belt s. The SIR system contains an Inflatable Restraint Sensing and Diagnostic Module (SDM), air bag s, seat belt pretensioner s (retractor), and impact sensor s. The Inflatable Restraint Sensing and Diagnostic Module determines the severity of a collision with the assistance of impact sensors located at strategic points on the vehicle. When the Inflatable Restraint Sensing and Diagnostic Module detects a collision, the Inflatable Restraint Sensing and Diagnostic Module will process the information provided by the sensors to further support air bag or pretensioner deployment. The Inflatable Restraint Sensing and Diagnostic Module 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 air bag deployment, the Inflatable Restraint Sensing and Diagnostic Module may still deploy the seat belt pretensioners. The Inflatable Restraint Sensing and Diagnostic Module contains a sensing device that converts vehicle velocity changes to an electrical signal. The Inflatable Restraint Sensing and Diagnostic Module compares these signals to values stored in memory. If the signals exceed a stored value, the Inflatable Restraint Sensing and Diagnostic Module 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 Inflatable Restraint Sensing and Diagnostic Module continuously monitors the deployment loops for malfunctions and illuminates the SIR system AIR BAG indicator if a fault is detected.The Inflatable Restraint Sensing and Diagnostic Module performs continuous diagnostic monitor ing of the SIR system electrical components. Upon detection of a circuit malfunction, the Inflatable Restraint Sensing and Diagnostic Module will set a DTC and inform the driver by illuminating the SIR system AIR BAG indicator. The steering column and knee bolster s 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.

SIR System AIR BAG Indicator

The SIR system 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 Inflatable Restraint Sensing and Diagnostic Module is supplied with ignition positive voltage. The instrument cluster will momentarily turn on the SIR system AIR BAG indicator. While the indicator is on, the Inflatable Restraint Sensing and Diagnostic Module conducts tests on all SIR system components and circuits. If no malfunctions are detected the Inflatable Restraint Sensing and Diagnostic Module will communicate with the instrument cluster through the serial data circuit and command the SIR system AIR BAG indicator OFF. The Inflatable Restraint Sensing and Diagnostic Module provides continuous monitoring of the air bag circuits by conducting a sequence of checks. If a malfunction is detected the Inflatable Restraint Sensing and Diagnostic Module will store a diagnostic trouble code (DTC) and command the instrument cluster to illuminate the SIR system 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 SIR system 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 Inflatable Restraint Sensing and Diagnostic Module contains internal sensors along with external impact sensors, mounted at strategic locations on the vehicle. In the event of a collision, the Inflatable Restraint Sensing and Diagnostic Module 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 Inflatable Restraint Sensing and Diagnostic Module will cause current to flow through the appropriate deployment loops to deploy the air bags. The Inflatable Restraint Sensing and Diagnostic Module records the SIR system status when a deployment occurs and illuminates the SIR system AIR BAG indicator located in the instrument cluster. The Inflatable Restraint Sensing and Diagnostic Module performs continuous diagnostic monitoring of the SIR system electrical components and circuitry when the ignition is turned ON. If the Inflatable Restraint Sensing and Diagnostic Module detects a malfunction, a DTC will be stored and the Inflatable Restraint Sensing and Diagnostic Module will request the instrument cluster to illuminate the SIR system AIR BAG indicator, notifying the driver that a malfunction exists. In the event that ignition positive voltage is lost during a collision, the Inflatable Restraint Sensing and Diagnostic Module 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.

Air Bags

This vehicle contains 6 air bags. The 6 air bags are located in the driver steering wheel (dual air bags), passenger instrument panel (passenger side) (dual air bags), driver seat side (B-pillar), passenger seat side

(B-pillar), left roof rail, and right roof rail. To view the locations of the air bags refer to Master Electrical Component List . Air bags contain a housing, inflatable air bag, two initiating devices (if dual air bags), canister of gas generating material and, in some cases, stored compressed gas. The deployment loops supply current to deploy the air bags. The steering wheel and passenger instrument panel air bags have two stages of deployment, which varies the amount of restraint to the occupant according to the collision severity. For moderate frontal collisions the air bags deploy at less than full deployment which consists of stage 1 of the air bag. For more severe frontal collisions a full deployment is initiated which consists of stage 1 and stage 2 of the air bag. The current passing through the air bags ignite the material in the canister producing a rapid generation of gas and is 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. A shorting bar (if equipped) is located in the connector.

Seat Belt Pretensioners (Retractor)

The seat belt pretensioners (driver and passenger) consist of a housing, seat belt retractor (located in the B-pillar), seat belt webbing, an initiator, and a canister of gas generating materials. To view the locations of the seat belt pretentioners refer to Master Electrical Component List . The initiator is part of the seat belt pretensioner deployment loop. When the vehicle is involved in a collision of sufficient force, the Inflatable Restraint Sensing and Diagnostic Module 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 front air bags deploying, or they will deploy immediately before the front air bags deploy. A shorting bar (if equipped) is located in the connector.

Impact Sensors

This vehicle contains 4 impact sensors. The 4 impact sensors are located in the front of the vehicle (2, left and right), and 2 in the B-pillars (left and right). To view the locations of the impact sensors refer to Master Electrical Component List . 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 Inflatable Restraint Sensing and Diagnostic Module 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 Inflatable Restraint Sensing and Diagnostic Module will cause current to flow through the deployment loops deploying the appropriate air bags.

Seat Position Sensor

The seat position sensor is used to determine the proximity of a driver seat position with respect to the front air bag. The seat position sensor interfaces with the Inflatable Restraint Sensing and Diagnostic Module (SDM). The state of the seat position sensor allows the Inflatable Restraint Sensing and Diagnostic Module to disable stage 2 of the front air bag for a front seat that is forward of the forward/rearward point in the seat track travel. The seat position sensor is a hall effect sensor that is mounted on the outboard seat track of the seat. The seat track includes a metal bracket that shunts the seat position sensor magnetic circuit creating 2 states of seat position, the shunted state represents a rearward seat position and the non-shunted state represents a forward position. The seat position sensor provides 2 current ranges, one range for the shunted state and a second range for a non-shunted state which are inputs to the Inflatable Restraint Sensing and Diagnostic Module. When the Inflatable Restraint Sensing and Diagnostic Module receives input from a seat position sensor that state 1 threshold is reached (seat is rearward), the Inflatable Restraint Sensing and Diagnostic Module will enable stage 2 deployment. When state 2 threshold is reached (seat is forward), the Inflatable Restraint Sensing and Diagnostic Module will disable stage 2 deployment on the side the seat is forward. The Inflatable Restraint Sensing and Diagnostic Module monitors the seat position sensor circuit and if a fault is detected, the Inflatable Restraint Sensing and Diagnostic Module will set code B0079 and disable stage 2 frontal deployment.

Passenger Presence System and Passenger Air Bag Indicator

The Passenger Presence System (PPS) is used to monitor the type of occupant that is sitting in the front passenger seat and communicate the status to the Inflatable Restraint Sensing and Diagnostic Module (SDM). The Inflatable Restraint Sensing and Diagnostic Module then uses this information to determine whether to enable or suppress the deployment of the passenger instrument panel air bag. The Passenger Presence System consists of an electronic control module, a sensor mat in the seat, a harness, and PASSENGER AIR BAG ON/OFF indicators. The Passenger Presence System 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 passenger presence module will send a serial data signal to the Inflatable Restraint Sensing and Diagnostic Module to disable the passenger instrument

panel air bag. If the measured capacitance is greater than a calibrated value, then the passenger presence module will send a serial data signal to the Inflatable Restraint Sensing and Diagnostic Module to enable the passenger instrument panel air bag. The Inflatable Restraint Sensing and Diagnostic Module will notify the customer of the enable/disable status by illuminating one of the PASSENGER AIR BAG ON/OFF indicator. The Passenger Presence System monitors itself for faults and will displays diagnostic trouble codes (DTCs) on the scan tool. When a fault is detected, the passenger presence module sends out a message to the SDM. The Inflatable Restraint Sensing and Diagnostic Module responds by sending a command message to the Instrument Cluster to illuminate the SIR system 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 .

SIR Schematics (Article 13331)

Figure 1: Power, Ground, Data Communication, and Seat Position Sensors
Figure 2: Front Impact Sensors, Frontal Air Bags, and Seat Belt Pretensioners
Figure 3: Side Impact Sensors, Front Seat and Roof Rail Air Bags
Figure 4: Passenger Presence System

SIR Identification Views (Article 13271)

The Supplemental Inflatable Restraint (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 .
Figure 1: Supplemental Inflatable Restraint Identification Views

Supplemental Inflatable Restraints - Fastener Specifications (Article 13333)

Application Specification
Metric English
Inflatable Restraint Front End Sensor Mounting Bolt 11 Nm 97 lb in
Inflatable Restraint Front Passenger Presence Module Bolt 4 Nm 35 lb in
Inflatable Restraint Front Seat Side Module Nut 3.5 Nm 31 lb in
Inflatable Restraint Sensing and Diagnostic Module Nut 7 Nm 56 lb in
Inflatable Restraint Side Impact Sensor Assembly Bolt 8 Nm 70 lb in
Inflatable Restraint Steering Wheel Module Coil Bolt 0.9 Nm 7.8 lb in
Roof Side Rail Inflatable Restraint Module Electrical Harness Bolt 9 Nm 80 lb in
Roof Side Rail Inflatable Restraint Module Integral Bolts 9 Nm 80 lb in
Seat Shoulder Belt Guide Bolt 47 Nm 35 lb ft
Seat Shoulder Belt Retractor Screw 47 Nm 35 lb ft
Seat Belt Retractor Anchor Plate Nut 47 Nm 35 lb ft

All New Technical Service Bulletins (itype_432)

Tsbs
- Information on Passenger Presence Sensing System (PPS or PSS) Concerns with Custom Upholstery, Accessory Seat Heaters or Other Comfort Enhancing Devices (06-08-50-009J, 2018/12/05)
- N232413120 — Driver Front Airbag Inflator May Rupture (N232413120-02, 2024/05/09)

All Technical Service Bulletins (itype_100)

Tsbs
- Information on Passenger Presence Sensing System (PPS or PSS) Concerns with Custom Upholstery, Accessory Seat Heaters or Other Comfort Enhancing Devices (06-08-50-009J, 2018/12/05)
- Recall 13V463000: Air Bag Label Non-Compliance (NHTSA13V463000, 2013/09/26)
- Recall - Loss of Air Bag Warning Label Adhesion (13284A, 2013/10/30)
- N232413120 — Driver Front Airbag Inflator May Rupture (N232413120-02, 2024/05/09)

Passenger Presence System Programming and Setup (Article 10748)

Diagnostic Instructions
- Perform the Diagnostic System Check prior to using this diagnostic procedure: Diagnostic System Check - Vehicle
- Review the description of Strategy Based Diagnosis: Strategy Based Diagnosis

Programming an Existing or New Control Module

This control module does not require SPS programming but does require the following setup procedures after a new control module is installed: Passenger Presence System Rezeroing

Passenger Presence System Rezeroing (Article 13307)

Introduction

The inflatable restraints passenger presence system is a calibrated system that requires re-zeroing or a zero check anytime the seat cushion trim attachments have been removed or the passenger presence system has been replaced. The procedures below are designed to assist in the re-zeroing of the passenger presence system. Before you start, read these procedures carefully and completely. For further information regarding the passenger presence system refer to Supplemental Inflatable Restraint System Description and Operation .

- Read this procedure carefully and completely.
- The passenger presence system will not function properly if the passenger presence system re-zeroing procedure is not performed.
- Perform the Diagnostic Repair Verification after successfully completing the re-zeroing procedure to ensure the system is functioning properly.

Passenger Presence System Re-zeroing Procedure

- Before the passenger presence system can be re-zeroed the front passenger seat must be completely empty of all items. The presence of any liquid or items on the front passenger seat will affect the calibration and operation of the passenger presence system.
- DTC B0081 will set if the re-zero system test is performed with:
- An aftermarket seat heater located too close to the sensor mat
- A scan tool, laptop, or other electronic device is in the seat
- The seat is damp or wet
- An object or person is in the seat
- Verify that the temperature is between 32°F (0°C) to 100°F (38 °C) before running a re-zero procedure.
- Verify the seat is completely dry.
- Empty the front outboard passenger seat.
- Verify that all SIR and passenger presence system components, connectors, and connector position assurances are properly connected and mounted.
- Install a scan tool.
- Turn ON the ignition, with the engine OFF.
- With a scan tool, perform the Passenger Presence Sensor Learn procedure.
- If the test fails, confirm that the seat is empty and completely dry. Perform the Passenger Presence Sensor Learn test again. If the test fails again, verify DTC B0081 is not set as current, if the DTC is set refer to Diagnostic Trouble Code (DTC) List - Vehicle . If the test successfully completed, cycle the ignition OFF.
- After the passenger presence system has been successfully re-zeroed, perform the Diagnostic Repair Verification .

Inflatable Restraint Passenger Presence System Scan Tool Information (Article 10782)

Parameter Expected Value Definition

Operating Conditions: Ignition ON

Base Model Part Number Varies, 8 Digit Number The scan tool displays the part number of the PPS module which is stored in non volatile memory.

Battery Voltage Volts The scan tool will display battery voltage.

Calibration Part Number Varies, 8 Digit Number The scan tool displays the part number of the calibration file in the PPS module.

End Model Part Number Varies, 8 Digit Number The scan tool displays the part number of the PPS module in production.

Manufacturer's Traceability Number Varies, 16 Digit Number The scan tool displays the 16 digit traceability number in the PPS module.

Passenger Air Bag Enable/Disable Request by Passenger Presence Module Disable The scan tool displays the Passenger Air Bag Enable/Disable Request by Passenger Presence Module.

Passenger Presence Module Primary Key Hex Value The scan tool indicates the primary key Hex value.

Passenger Presence System Reporting DTC(s) Yes/No The PPS module will report if there are DTCs set in the passenger presence module.

Passenger Seat Occupancy Status Empty Seat The scan tool displays Undefined, Empty Seat, Occupied, or Invalid. This is the state of the passenger seat if it is occupied or empty and monitored by the passenger presence system.

Power Mode Off / Accessory / Run / Crank Request The scan tool will display the power mode of the vehicle.

Primary Key Status Valid/Invalid The scan tool displays Valid if the primary key matches what is stored to memory in the PPS module.
Received Primary Key Hex Value The scan tool displays a Hex value indicating the PPS module received primary key data.
Software Part Number Varies, 8 Digit Number The scan tool displays the software part number in the PPS module.

Inflatable Restraint Sensing and Diagnostic Module Scan Tool Information (Article 10783)

Parameter Expected Value Definition
Operating Conditions: Ignition ON
2nd Row Left Seat Belt Reminder Sensor Pad Enable Status Disabled/Enabled The scan tool displays if the left rear seat belt reminder sensor pad is enabled to the SDM .
2nd Row Left Seat Belt Reminder Sensor Pad Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the left rear seat belt reminder sensor pad has been learned by the SDM.
2nd Row Left Seat Belt Status Buckled/Unbuckled The scan tool displays Buckled or Unbuckled. This is the state of the left rear seat belt switch when the seat belt is buckled or unbuckled.
2nd Row Middle Seat Belt Reminder Sensor Pad Enable Status Disabled/Enabled The scan tool displays if the rear middle seat belt reminder sensor pad is enabled to the SDM.
2nd Row Middle Seat Belt Reminder Sensor Pad Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the rear middle seat belt reminder sensor pad has been learned by the SDM.
2nd Row Middle Seat Belt Status Buckled/Unbuckled The scan tool displays Buckled or Unbuckled. This is the state of the middle rear seat belt switch when the seat belt is buckled or unbuckled.
2nd Row Middle Seat Belt Reminder Sensor Pad Enable Status Disabled/Enabled The scan tool displays if the rear right seat belt reminder sensor pad is enabled to the SDM.
2nd Row Middle Seat Belt Reminder Sensor Pad Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the rear right seat belt reminder sensor pad has been learned by the SDM.
2nd Row Right Seat Belt Status Buckled/Unbuckled The scan tool displays Buckled or Unbuckled. This is the state of the right rear seat belt switch when the seat belt is buckled or unbuckled.
Air Bag Malfunction Indicator On/Off/Flashes The scan tool will display On or Flashes if there is a problem with the SIR system. Any problems within the SIR system will illuminate the air bag indicator. The indicator will either flash or stay on.
Base Model Part Number Varies, 8 Digit Number The scan tool displays the part number of the SDM which is stored in non volatile memory.
Calibration Part Number Varies, 8 Digit Number The scan tool displays the part number of the calibration file in the SDM.
Deployment Loop 1-18 Enable Status Enabled/Disabled The scan tool displays Enabled or Disabled. This is the status of the air bag or pretensioner .
Deployment Loop 1-18 Learn Status Learned/Not Learned The scan tool displays Learned or Not learned. Learned is displayed if the SDM has defined the number loop programmed from an air bag or pretensioner.
Deployment Loop 1-18 Resistance 1.44–4.25 Ohms The scan tool displays the resistance of the learned loop of the air bag or pretensioner when connected to the SDM.
Deployment Loop 1-18 Type Varies The scan tool displays the name of the air bag or pretensioner associated with the loop type 1–18.
Driver Seat Belt Reminder Indicator On/Off The scan tool displays On if this indicator is on. If the indicator is on it means the seat belt has not been buckled.
Driver Seat Belt Sensor Enable Status Enabled/Disabled The scan tool displays if the seat belt sensor in the seat belt buckle is enabled to the SDM.
Driver Seat Belt Sensor Learn Status Learned/Not learned The scan tool displays Learned or Not Learned. Learned is displayed if the driver seat belt sensor has been learned by the SDM.
Driver Seat Belt Status Buckled/Unbuckled The scan tool displays Buckled or Unbuckled. This is the state of the driver seat belt switch when the seat belt is buckled or unbuckled.
Driver Seat Position Sensor Rearward/Forward The scan tool will display if the driver seat is forward or rearward of the sensor set position.
Driver Seat Position Sensor Enable Status Enabled/Disabled The scan tool displays if the seat position sensor is enabled to the SDM.
Driver Seat Position Sensor Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the driver seat position sensor has been learned by the SDM.
End Model Part Number Varies, 8 Digit Number The scan tool displays the part number of the SDM in production.
Impact Sensor 1-8 Enable Status Enabled/Disabled The scan tool displays Enabled or Disabled This is the status

of the impact sensor.
Impact Sensor 1-8 Learn Status Learned/Not Learned The scan tool displays Learned or Not learned. Learned is displayed if the SDM has learned and has assigned a number to that impact sensor.
Impact Sensor 1-8 Type Equipped/Not Equipped The scan tool displays the name of the impact sensor associated with the type 1–8.
Inflatable Restraint Sensing and Diagnostic Module Primary Key Hex Value The scan tool indicates the primary key Hex value.
Manufacturer's Traceability Number Varies, 16 Digit Number The scan tool displays the 16 digit traceability number in the SDM.
Module Setup Incomplete/Complete The scan tool indicates if the SDM is set up.
Passenger Air Bag Disabled Switch On/Off The scan tool displays Off when the customer manually turns the passenger airbag off with this switch.
Passenger Air Bag Off Indicator On/Off The scan tool displays Off when the passenger indicator is not illuminated. This indicator is off when the disable switch is in the off position or no one is sitting in the passenger seat.
Passenger Air Bag On Indicator On/Off The scan tool displays On when the passenger indicator is illuminated. This indicator is on when the disable switch is in the on position and someone is sitting in the passenger seat.
Passenger Air Bag Status Enabled/Disabled The scan tool displays if the passenger air bag is enabled to the SDM.
Passenger Air Bag Disable Indicator Enable Status Enabled/Disabled The scan tool displays if the passenger air bag disable indicator is enabled to the SDM.
Passenger Air Bag Disable Indicator Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the status of the passenger air bag disable indicator.
Passenger Air Bag Disable Switch Enable Status Enabled/Disabled The scan tool displays if the passenger air bag disable switch is enabled to the SDM.
Passenger Air Bag Disable Switch Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the status of the passenger air bag disable switch.
Passenger Air Bag Enable Indicator Enable Status Enabled/Disabled The scan tool displays if the passenger air bag enable indicator is enabled to the SDM.
Passenger Air Bag Enable Indicator Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the status of the passenger air bag enable indicator.
Passenger Classification 00–07 The scan tool will display what type of individual is sitting in the passenger seat.
Passenger Presence Detection System Enable Status Enabled/Disabled The scan tool displays if the passenger presence system is enabled to the SDM.
Passenger Presence Detection System Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the SDM has learned the passenger presence system.
Passenger Presence Detection System Reporting DTC(s) Yes/No The SDM will report if there are DTCs set in the passenger presence module .
Passenger Seat Belt Reminder Indicator On/Off The scan tool displays On if this indicator is on. If the indicator is on it means the seat belt has not been buckled.
Passenger Seat Belt Reminder Indicator Enable Status Disabled/Enabled The scan tool displays if the passenger seat belt reminder indicator is enabled to the SDM.
Passenger Seat Belt Reminder Indicator Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt reminder indicator has been learned by the SDM.
Passenger Seat Belt Reminder Sensor Pad Enable Status Disabled/Enabled The scan tool displays if the passenger seat belt reminder sensor pad is enabled to the SDM.
Passenger Seat Belt Reminder Sensor Pad Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt reminder sensor pad has been learned by the SDM.
Passenger Seat Belt Sensor Enable Status Enabled/Disabled The scan tool displays if the seat position sensor is enabled to the SDM.
Passenger Seat Belt Sensor Learn Status Learned/Not learned The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat belt sensor has been learned by the SDM.
Passenger Seat Belt Status Buckled/Unbuckled The scan tool displays Buckled or Unbuckled. This is the state of the passenger seat belt switch when the seat belt is buckled or unbuckled.
Passenger Seat Occupancy Status Empty Seat/Occupied The scan tool displays Occupied if someone is sitting in the passenger seat.
Passenger Seat Position Sensor Rearward/Forward The scan tool will display if the passenger seat is forward or rearward of the sensor set position.

Passenger Seat Position Sensor Enable Status Disabled/Enabled The scan tool displays if the passenger seat position sensor pad is enabled to the SDM.
Passenger Seat Position Sensor Learn Status Learned/Not Learned The scan tool displays Learned or Not Learned. Learned is displayed if the passenger seat position sensor has been learned by the SDM.
Power Mode Off/Accessory/Run/Crank Request The scan tool will display the power mode of the vehicle.
Primary Key Status Valid/Invalid The scan tool displays Valid if the primary key matches what is stored to memory in the SDM.
Primary Key Status Last Ignition Cycle Invalid/Valid The SDM checks to see if the primary key data received is valid.
Received Primary Key Hex Value The scan tool displays a Hex value indicating the SDM received primary key data.
Rollover Sensor Enable Status Disabled/Enabled The scan tool displays if the rollover sensor is enabled to the SDM.
Rollover Sensor Learn Status Learn/Unlearn The scan tool displays Learned or Not Learned. Learned is displayed if the rollover sensor has been learned by the SDM.
Security Code Accepted Yes/No The SDM either accepts the security code or it does not. The scan tool displays Yes if the security code has been accepted by the SDM.
Security Code Lockout Yes/No The scan tool displays Yes if the SDM has been locked out because of the security code not being accepted.
Security Code Lockout Active Timer Random Value The SDM uses a timer before the security code is locked in the SDM.
Security Code Programmed Yes/No The scan tool displays Yes if the SDM has been programmed with the security code.
Security Code Programming Counter Random Value The SDM uses a counter for the value of the security code programming.
Security Code Reset Counter Random Value The SDM uses a counter to reset the value of the security code.
Software Part Number Varies, 8 Digit Number The scan tool displays the software part number in the SDM.
Vehicle Identification Number Varies, 17 Digit Number The VIN number of the vehicle programmed into the SDM.
VIN Programmed Yes/No The scan tool displays Yes if the VIN has been programmed into the SDM.
VIN Programming Counter Random Value The SDM uses this counter while programming the VIN.

Symptoms - SIR (Article 13309)

- 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.
- Review the SIR system description and operation in order to familiarize yourself with the system functions. Refer to Supplemental Inflatable Restraint System Description and Operation .

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the SIR system.
- 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 Airbag Indicator Malfunction in order to diagnose the symptom.

Airbag Indicator Malfunction (Driver) (Article 13274)

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 the driver air bag indicator will illuminate, and then turn OFF after the bulb check is complete. The inflatable restraint sensing and diagnostic module (SDM) performs diagnostic tests on the SIR system during the bulb check. If any malfunction exists the inflatable restraint sensing and diagnostic module 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 inflatable restraint sensing and diagnostic module 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.
- A flashing driver air bag indicator is displayed if the inflatable restraint sensing and diagnostic module was programmed but did not fully complete the programming. For a flashing driver airbag indicator, refer to Inflatable Restraint Sensing and Diagnostic Module Programming and Setup .

Reference Information

Schematic Reference
SIR Schematics
Connector End View Reference
Component Connector End Views
Description and Operation
Supplemental Inflatable Restraint 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

- Verify the air bag indicator turns ON and OFF when commanding the All Indicators ON and OFF with a scan tool.
- If the air bag indicator does not turn ON or OFF Replace the P16 Instrument Cluster.
- If the air bag indicator does turn ON or OFF
- Replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- SIR/SRS Wiring Repairs
- Control Module References for instrument cluster or inflatable restraint sensing and diagnostic module replacement, programming and setup

Airbag Indicator Malfunction (Passenger) (Article 13276)

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 indictor 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 passenger instrument panel air bag. When the ignition is turned ON, the ignition voltage is supplied to the passenger presence module . When the Inflatable Restraint Sensing and Diagnostic Module receives the appropriate serial data message from the passenger presence module the Inflatable Restraint Sensing and Diagnostic Module will then provide voltage to the appropriate indicator.

Diagnostic Aids

Refer to SIR Disabling and Enabling .
Check for an incorrectly seated connector as this can cause an open/high resistance condition.
Thoroughly inspect the wiring and the connectors. An incomplete inspection of the wiring and the connectors may result in a misdiagnosis, causing a part replacement with a reappearance of the malfunction. If an intermittent malfunction exists, refer to Testing for Intermittent Conditions and Poor Connections .

Reference Information

Schematic Reference
SIR Schematics
Connector End View Reference
Master Electrical Component List
Description and Operation
Supplemental Inflatable Restraint 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 .
- Ignition ON.
- Verify no other Inflatable Restraint Sensing and Diagnostic Module DTCs are set.
- If other Inflatable Restraint Sensing and Diagnostic Module DTCs are set Diagnose those DTCs first. Refer to Diagnostic Trouble Code (DTC) List - Vehicle
- If no other Inflatable Restraint Sensing and Diagnostic Module DTCs are set
- Verify the passenger air bag ON indicator and passenger air bag OFF indicators turn ON and OFF when commanded ON and OFF with a scan tool.
- If the passenger air bag indicators do not change Refer to Circuit/System Testing
- If the passenger air bag indicators change
- The condition is not currently present and may be an intermittent fault.
Circuit/System Testing
- Refer to SIR Service Precautions .
- Refer to SIR Disabling and Enabling .
- 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.
- Ignition OFF, disconnect the harness connector at the P14 Passenger Air Bag Disable Indicator.
- Test for less than 10 Ω between the ground circuit terminal 2 and ground.
- If 10 Ω or greater
- Test for less than 2 Ω in the ground circuit end to end.
- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω, repair the open/high resistance in the ground connection.
- If less than 10 Ω
- Ignition ON, command the passenger air bag OFF indictor OFF with a scan tool.
- Test for less than 11 V between the control circuit terminal 3 and ground.
- If 11 V or greater
- Ignition OFF.
- Verify the SIR system is disabled.
- Disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
- Test for less than 1 V between the control circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
- If less than 11 V
- Command the passenger air bag OFF indicator ON with a scan tool.
- Test for greater than 4 V between the control circuit terminal 3 and ground.
- If 4 V or less
- Test for infinite resistance between the control circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- Test for less than 2 Ω in each control circuit end to end.
- If less than 2 Ω, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
- If greater than 4 V
- Command the passenger air bag ON indicator OFF with a scan tool.
- Test for less than 11 V between the control circuit terminal 1 and ground.
- Command the passenger air bag ON indicator ON with a scan tool.
- Test for greater than 4 V between the control circuit terminal 1 and ground.
- Replace the P14 Passenger Air Bag Disable Indicator.

Repair Instructions
Perform the Diagnostic Repair Verification after completing the repair.
Control Module References for Inflatable Restraint Sensing and Diagnostic Module replacement, programming and setup

Safety and Security - Special Tools (Article 13332)

Illustration Tool Number/Description
Click for full-size image EL 38826 J 38826 SIR Deployment Harness
Click for full-size image EL 39401-B J 39401-B SIR Deployment Fixture
Click for full-size image EL 38826–200 SIR Deployment Harness Jumper

Safety (itype_107)

Tsbs
- Recall 13V463000: Air Bag Label Non-Compliance (NHTSA13V463000, 2013/09/26)
- Recall - Loss of Air Bag Warning Label Adhesion (13284A, 2013/10/30)
- N232413120 — Driver Front Airbag Inflator May Rupture (N232413120-02, 2024/05/09)