

# Component Procedures: Instrument Panel, Gauges and Warning Indicators

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# Component Procedures: Instrument Panel, Gauges and Warning Indicators

## Parts and Labor (itype\_189)

### Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Instruments & Gauges > Instrument Cluster, R&?	B	0.4	0.2
Remove & Replace	Instruments & Gauges > Instrument Cluster, R&?	B	0.8	0.6
Remove & Install	Instrument Panel > Instrument Panel, R&I	B	5.3	0.0

### Auxiliary Gauges (Article 11007)

#### Engine Oil Pressure Gauge

The auxiliary gauge module displays the engine oil pressure as determined by the engine control module (ECM). The ECM sends the engine oil pressure information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil pressure. The engine oil pressure gauge defaults to 0 kPa (0 PSI) if:

- The ECM detects a malfunction in the engine oil pressure sensor circuit.
- The BCM detects a loss of serial data communications with the ECM.
- The auxiliary gauge module detects a loss of serial data communications with the BCM.

#### Engine Oil Temperature Gauge

The auxiliary gauge module displays the engine oil temperature based on the information from the ECM. The ECM converts the data from the engine oil temperature sensor to a engine oil temperature signal. The ECM sends the engine oil temperature signal via a High Speed CAN-Bus signal to the BCM. The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil temperature. The engine oil temperature gauge defaults to 40°C (100°F) if:

- The ECM detects a malfunction in the engine oil temperature sensor circuit.

#### Transmission Fluid Temperature Gauge

The auxiliary gauge module displays the transmission fluid temperature based on the information from the transmission control module (TCM) on an automatic transmission vehicle or from the engine control module (ECM) on an manual transmission vehicle. The ECM or the TCM sends the transmission fluid temperature information via serial data to the BCM. The BCM then sends the transmission fluid temperature information via serial data to the auxiliary gauge module in order to display the transmission fluid temperature. The transmission fluid temperature gauge defaults to 0°C (30°F) if:

- The ECM or the TCM detects a malfunction in the transmission fluid temperature sensor circuit.
- The BCM detects a loss of serial data communications with the ECM or the TCM.

#### Volt Gauge

The auxiliary gauge module displays the battery voltage. This gauge shows the condition of the charging system. The vehicle charging system regulates voltage based on the state of charge of the battery. It is normal for the volt gauge to fluctuate. Readings between the low and high warning zones indicate the normal operating range. Readings in the low warning zone can occur when a large number of electrical accessories are operating in the vehicle and the engine is left idling for an extended period. If there is a problem with the battery charging system, a message appears in the driver information center display and/or the charging system telltale comes on.

### Indicator/Warning Message (Article 11010)

#### INDICATOR LIGHT ON

Refer to the OWNER'S MANUAL for the descriptions and explanations of all indicator lights .

For diagnosis and repair information related to an indicator light refer to the System Diagnosis and the Description of Operation that the message relates to.

#### MESSAGE DISPLAYED

Refer to the OWNER'S MANUAL for descriptions and explanations of all messages displayed.

For diagnosis and repair information related to a displayed message refer to the System Diagnosis and the Description of Operation that the message relates to.

### Instrument Cluster Schematics (Article 11051)

Figure 1: Gauges

Figure 2: Indicators

Figure 3: Auxiliary Gages (SRK, SRM or UMZ)

Figure 4: Driver Information Center

## **Head-Up Display Schematics (Article 11050)**

Figure 1: UV6

## **Audible Warnings Schematics (Article 11049)**

Figure 1: Audible Warnings

## **Instrument Cluster - Head-Up Display Circuit (Article 10091)**

Instrument Cluster - Head-Up Display Circuit  
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## **Instrument Cluster - Instrument Cluster Circuit (Article 10097)**

Instrument Cluster - Instrument Cluster Circuit  
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## **Warning Systems (Article 11293)**

Warning Systems  
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## **Displays and Gauges - Fastener Specifications (Article 11053)**

Application Specification  
Metric English  
Instrument Panel Cluster Fasteners 2.5 Nm 22 lb in  
Instrument Panel Cluster Head Up Display Fasteners 2.5 Nm 22 lb in  
Multifunction Auxiliary Gauge Fasteners 2.5 Nm 22 lb in

## **All New Technical Service Bulletins (itype\_432)**

Tsbs  
- Odometer Servicing When Odometer Cannot Be Set to Actual Mileage (25-NA-167, 2025/06/25)  
- Information on Engine Oil Life Monitor Operation Calculation (18-NA-125, 2025/07/15)  
- Normal Characteristic - Clock Does Not Update or Slow to Update (PIC5839D, 2017/12/06)

## **All Technical Service Bulletins (itype\_100)**

Tsbs  
- Verifying Odometer Accuracy (PIC3100G, 2019/03/06)  
- Information on Inappropriate Warranty Claims Submitted for Damaged Radios and Instrument Panel Clusters (IPCs) (08-08-44-015H, 2016/12/19)  
- White Film/Residue on Vehicle Interior, Door Trim Panels and/or Instrument Panel (IP) (PI0799A, 2015/10/22)  
- Hiss Noise Or Gurgle Noise From Dash - Reduced Heater Performance (PIC5984B, 2016/03/18)  
- Normal Characteristic - Instrument Panel Red Brake Light Intermittently Comes On (PI1410B, 2017/05/19)  
- Tire Monitor System - TPMS Lamp On, No Tire Pressures Displayed (PI1241, 2014/05/16)  
- Inaccurate or Slow Response of Outside Air Temperature Display (PI0233E, 2015/06/26)  
- Normal Characteristic - Clock Does Not Update or Slow to Update (PIC5839D, 2017/12/06)  
- Fuel System - GM Fuel System Treatment PLUS(R) Info. (05-00-89-078C, 2012/04/19)  
- Collision Avoidance - Blind Spot Detection Stops Working (16-NA-069, 2016/03/03)  
- Odometer Servicing When Odometer Cannot Be Set to Actual Mileage (25-NA-167, 2025/06/25)  
- Information on Engine Oil Life Monitor Operation Calculation (18-NA-125, 2025/07/15)  
- IPC Odometer Programming Method Quick Reference Guide (07-08-49-020R, 2023/09/21)  
- HUD - Head Up Display Information - Multiple Conditions or Questions (PIC3379D, 2012/11/27)

## **Customer Interest Bulletins (itype\_109)**

Tsbs  
- Collision Avoidance - Blind Spot Detection Stops Working (16-NA-069, 2016/03/03)

## **Repair Tips (itype\_110)**

Tsbs  
- Fuel System - GM Fuel System Treatment PLUS(R) Info. (05-00-89-078C, 2012/04/19)

- Tire Monitor System - TPMS Lamp On, No Tire Pressures Displayed (P11241, 2014/05/16)

## **Malfunction Indicator Lamp (MIL) Diagnosis (OBD II Emissions) (Article 11390)**

### 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

The malfunction indicator lamp (MIL) illuminates to inform the driver that an emission system fault has occurred and the engine control system requires service. Ignition voltage is supplied directly to the MIL. The engine control module (ECM) turns the MIL ON by grounding the MIL control circuit when the emission system fault occurs. Under normal operating conditions, the MIL should be ON only when the ignition is ON and the engine is OFF.

### Diagnostic Aids

If the condition is intermittent, move the related harnesses and connectors while monitoring the scan tool MIL control circuit status parameters. Perform this test with the ignition ON and the engine OFF, and with the engine running. The MIL control circuit status parameters will change from OK or Not Run to Malfunction. If there is a condition with the circuit or a connection.

### Reference Information

#### Schematic Reference

- Engine Controls Schematics
- Instrument Cluster Schematics

#### Connector End View Reference

#### Component Connector End Views

#### Electrical Information Reference

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

#### Scan Tool Reference

#### Control Module References for scan tool information

#### Circuit/System Verification

- Ignition ON, command the MIL ON and OFF with a scan tool. The MIL should turn ON and OFF as commanded.
- Command the MIL ON and OFF with a scan tool while observing the control circuit status parameters listed below:
- The MIL Control Circuit Low Voltage Test Status
- The MIL Control Circuit Open Test Status
- The MIL Control Circuit High Voltage Test Status Each parameter should display OK or Not Run.
- Engine running, command the MIL ON and OFF with a scan tool while observing the following control circuit status parameters:

#### Circuit/System Testing

- Ignition OFF, disconnect the X1 harness connector at the K20 Engine Control Module.
- Ignition ON, the MIL should not illuminate.
- If the MIL is illuminated, test the MIL control circuit terminal X1 46 for a short to ground. If the circuit tests normal, replace the P16 instrument panel cluster .
- Connect a 3 A fused jumper wire between the MIL control circuit terminal X1 46 and ground. The MIL should illuminate.
- If the MIL illuminates, replace the K20 Engine Control Module.
- If the MIL does not illuminate, test the MIL control circuit terminal X1 46 for a short to voltage or an open/high resistance. If the MIL control circuit tests normal, test the instrument cluster ignition voltage circuit for a short to ground or open/high resistance. If the circuit tests normal, replace the P16 instrument panel cluster/bulb.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Instrument Cluster Replacement
- Control Module References for replacement, programming, and setup.

## **Instrument Cluster Scan Tool Information (Article 10784)**

Parameter Expected Value Description

Operating Conditions: Ignition ON

Battery Voltage 12–14 V The scan tool displays Volts. This is the current battery voltage signal.

Key in Ignition Status Active/Inactive The scan tool displays Active or Inactive. This is the state of the key in ignition switch.

Driver Information Center Switch Varies The scan tool displays Volts. This is the current driver information center switch input voltage.

Driver Information Center Switch Inactive The scan tool displays either Inactive, Up, Down, or Menu. This is the state of the driver information center switch.

Reset Switch Active/Inactive The scan tool displays Active or Inactive. This is the state of the reset switch.

Ambient Air Temperature 15°C The scan tool displays outside temperature in °C.

Coolant Level Switch Open The scan tool displays either Open, Closed, or Not Available.

Washer Fluid Level Switch Open The scan tool displays either Open, Closed, or Not Available.

Odometer Lock Status Active/Inactive The scan tool displays Active or Inactive depending on the state of the odometer.

Engine Speed 0 RPM The scan tool displays the filtered value of engine speed.

Vehicle Speed 0 km/h The scan tool displays the filtered vehicle speed value.

Fuel Level Sensor — The scan tool displays the filtered value of the fuel level.

Engine Coolant Temperature — The scan tool displays the filtered value of the engine coolant temperature.

Engine Oil Pressure — The scan tool displays the filtered value of the engine oil pressure.

Output Control Description

Instrument Cluster Gauge Sweep This function is used to command the gauges to sweep from minimum to maximum.

Driver Information Center Dimming This function is used to command the dimming of the driver information display to Increase or Decrease by 10%.

Instrument Panel Dimmer Switch This function is used to command the dimming of the instrument cluster to Increase or Decrease by 10%.

Driver Information Center Segments This function is used to command the driver information center segments ON and OFF.

All Indicators This function is used to command all the indicators ON or OFF.

Driver Information Center Options This function is used to command the driver information center buttons using the scan tool.

Odometer Programming This function is used to command the odometer to reset.

CAN Bus Configuration Learn This function is used to Reset the source ID for low speed CAN Bus communications.

## **Hood Ajar Indicator/Message Malfunction (Article 10107)**

Diagnostic Instructions

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

DTC Descriptors

Hood Ajar Circuit

For symptom byte information, refer to Symptom Byte List .

Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance

Signal B3006 02 B3006 01, B3006 04 B3006 01 —

Ground — B3006 01, B3006 04 — —

Circuit/System Description

The body control module (BCM) applies B+ to the hood ajar signal circuit and monitors the voltage to determine the position of the hood. When the hood is closed, the switch is open and voltage remains high. When the hood is open, the switch is closed and the voltage is pulled low.

Conditions for Running the DTC

The BCM continuously monitors for this DTC

Conditions for Setting the DTC

B3006 01

The BCM detects that the hood ajar switch signal circuit is shorted to battery.

B3006 02

The BCM detects that the hood ajar switch signal circuit is shorted to ground.

B3006 04

The BCM detects that the hood ajar switch signal circuit is open.

Action Taken When the DTC Sets

- The hood ajar switch input will be ignored as a content theft deterrent trigger.

- Remote vehicle start (if equipped) will be disabled.

#### Conditions for Clearing the DTC

- A current DTC will clear when the conditions for setting the DTC are no longer present.

- A history DTC will clear after 40 malfunction free ignition cycles.

#### Reference Information

##### Schematic Reference

##### Immobilizer Schematics

##### Connector End View Reference

##### Master Electrical Component List

##### Description and Operation

##### Keyless Entry 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

- Ignition ON.

- Verify the scan tool Hood Ajar Switch parameter is Open when the hood is open and Closed when the hood is closed.

- If the parameter does not change Refer to Circuit/System Testing.

- If the parameter changes

- All OK.

##### Circuit/System Testing

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B55 Hood Ajar Switch. It may take up to 2 min for all vehicle systems to power down.

- Test for less than 10  $\Omega$  between the ground circuit terminal C and ground.

- If 10  $\Omega$  or greater

- Ignition OFF

- Test for less than 2  $\Omega$  in the ground circuit end to end.

- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

- If less than 10  $\Omega$

- Test for greater than 10 V between the signal circuit terminal B and ground.

- If 10 V or less

- Ignition OFF, disconnect the harness connector at the K9 Body Control Module.

- Test for infinite resistance between the signal circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.

- If Infinite resistance.

- Test for less than 2  $\Omega$  in the signal circuit end to end.

- If less than 2  $\Omega$ , replace the K9 Body Control Module.

- If greater than 10 V

- Ignition OFF, disconnect the X4 and X7 harness connector at the K9 Body Control Module, ignition ON.

- Test for less than 1 V between the signal circuit terminal B and ground.

- If 1 V or greater Repair the short to voltage on the circuit.

- If less than 1 V

- Test or replace the B55 Hood Ajar Switch.

##### Component Testing

- Ignition OFF, disconnect the harness connector at the B55 Hood Ajar Switch.

- Test for 2738–3350  $\Omega$  between the signal terminal A and the signal terminal B with the hood latch in the closed position.

- If not between 2738–3350  $\Omega$  Replace the B55 Hood Ajar Switch.

- If between 2738–3350  $\Omega$

- Test for 658–806  $\Omega$  between the signal terminal A and the ground terminal C with the hood latch in the closed position.

- If not between 658–806  $\Omega$  Replace the B55 Hood Ajar Switch.

- If between 658–806  $\Omega$

- Test for 2080–2545  $\Omega$  between the signal terminal B and the ground terminal C with the hood latch in the

closed position.

- If not between 2080–2545  $\Omega$  Replace the B55 Hood Ajar Switch.
- If between 2080–2545  $\Omega$
- Test for 2738–3350  $\Omega$  between the signal terminal A and the signal terminal B with the hood latch in the open position.
- Test for 2080–2545  $\Omega$  between the signal terminal A and the ground terminal C with the hood latch in the open position.
- Test for 658–806  $\Omega$  between the signal terminal B and the ground terminal C with the hood latch in the open position.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Hood Primary and Secondary Latch Replacement
- Control Module References for body control module replacement, programming, and setup.

## Seat Belt Indicator Malfunction - Driver (Article 13257)

### 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

Signal 1 2 2 —

Low Reference — 2 — —

1. Indicator will remain ON with seat belt buckled. 2. Indicator will illuminate only for the bulb check.

### Circuit/System Description

The driver seat belt switch is a 2-wire switch wired to the inflatable restraint sensing and diagnostic module (SDM) using a signal circuit and a low reference circuit. When the seat belt is unbuckled the switch is closed, and when the seat belt is buckled the switch is open. The SDM sends the status of the driver seat belt via serial data to the instrument panel cluster . After receiving the message, the instrument panel cluster controls the illumination of the driver seat belt indicator.

### Reference Information

Schematic Reference

Seat Belt Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

Seat Belt 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 .

- Command the instrument cluster all indicators ON and OFF with a scan tool. The driver seat belt indicator should turn ON and OFF as commanded.
- If the driver seat belt indicator does not turn ON and OFF as commanded Replace the P16 instrument cluster.
- If the driver seat belt indicator does turn ON and OFF as commanded
- Monitor the scan tool Driver Seat Belt Switch parameter while buckling and unbuckling the seat belt. The parameter should display Buckled and Unbuckled when changing seat belt states.
- If the scan tool Driver Seat Belt Switch parameter does not display Buckled and Unbuckled when changing seat belt states Refer to Circuit/System Testing.
- If the scan tool Driver Seat Belt Switch parameter does display Buckled and Unbuckled when changing seat belt states
- 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 .

- B88D seat belt switch-driver
- Seat belt switch harness connector
- K36 inflatable restraint sensing and diagnostic module
- SDM wiring harness connector
- Ignition OFF. Disconnect the harness connector at the B88D seat belt switch-driver.
- Test for less than 5  $\Omega$  between the low reference circuit terminal B and ground.
- If 5  $\Omega$  or greater
- Verify the SIR system is disabled.
- Disconnect the X2 harness connector at the K36 inflatable restraint sensing and diagnostic module.
- Test for less than 2  $\Omega$  in each control circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , replace the K36 inflatable restraint sensing and diagnostic module.
- If less than 5  $\Omega$
- Ignition ON.
- Verify the scan tool Driver Seat Belt Status parameter displays Buckled.
- If the scan tool Driver Seat Belt Status parameter does not display Buckled
- Ignition OFF.
- Test for infinite resistance between the seat belt switch signal circuit terminal A and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If the scan tool Driver Seat Belt Status parameter does display Buckled
- Install a 3 A fused jumper wire between the signal circuit terminal A and the low reference circuit terminal B.
- Verify the scan tool Driver Seat Belt Status parameter displays Unbuckled.
- If the scan tool Driver Seat Belt Status parameter does not display Unbuckled
- Ignition ON, vehicle in service mode.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- Test for less than 2  $\Omega$  in each circuit end to end.
- If the scan tool Driver Seat Belt Status parameter does display Unbuckled
- Test or replace the B88D seat belt switch-driver.

#### Component Testing

- Ignition OFF. Disconnect the harness connector at the B88D seat belt switch-driver. The B88D seat belt switch-driver in the open position.
- Test for infinite resistance between the signal circuit terminal A and the low reference terminal B at the B88D seat belt switch-driver.
- If there is not infinite resistance Replace the B88D seat belt switch-driver.
- If there is infinite resistance
- The B88D seat belt switch-driver in the closed position.
- Test for less than 1  $\Omega$  between the signal circuit terminal A and the low reference terminal B at the B88D seat belt switch-driver.
- If 1  $\Omega$  or greater Replace the B88D seat belt switch-driver.
- If less than 1  $\Omega$
- All OK.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair .

- Front Seat Belt Buckle Replacement
- Control Module References for SDM or instrument panel cluster replacement, programming and setup

## Seat Belt Indicator Malfunction - Driver (Article 13259)

### 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
- An overview of each diagnostic category can be found here: Diagnostic Procedure Instructions

### Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance

Signal — Terminal 2 @ B153D Seat Belt Buckle - Driver 1 2 2 —

Low Reference — Terminal 1 @ B153D Seat Belt Buckle - Driver — 2 — —

Seat Belt Reminder Indicator = Always On Seat Belt Reminder Indicator = Always Off

- Seat Belt Reminder Indicator = Always On

- Seat Belt Reminder Indicator = Always Off

#### Circuit/System Description

For an overview of the component/system, refer to: Seat Belt System Description and Operation

#### Circuit Description

Signal The control module input circuit has an internal resistance connected to 12 V.

Low Reference Grounded through the control module.

#### Component Description

B88D Seat Belt Switch - Driver When the seat belt is unbuckled the switch is closed, and when the seat belt is buckled the switch is open.

K36 Inflatable Restraint Sensing and Diagnostic Module The control module monitors several sensors that can detect a collision. When a collision is detected, the control module will trigger certain air bags and seat belt pretensioners, depending on the angle and severity of the impact.

#### Reference Information

#### Schematic Reference

#### Seat Belt Schematics

#### Connector End View Reference

#### Component Connector End Views

#### Electrical Information Reference

- Circuit Testing

- Connector Repairs

- Testing for Intermittent Conditions and Poor Connections

- Wiring Repairs

- Electrical Relay Replacement

#### Scan Tool Reference

#### Control Module References

#### Circuit/System Verification

- Ignition » On / Vehicle » In Service Mode

- Perform the appropriate scan tool control function: All Indicators @ P16 Instrument Cluster » On and Off

Verify the component turns On and Off: Seat Belt Reminder Indicator

- If the component does not turn On and Off Replace the appropriate component: P16 Instrument Cluster

- If the component turns On and Off

- Operate the component: B153D Seat Belt Buckle - Driver » Buckled Verify the scan tool parameter: Driver Seat Belt Status = Buckled

- If not the specified state Refer to: Circuit/System Testing

- If the specified state

- Operate the component: B153D Seat Belt Buckle - Driver » Unbuckled Verify the scan tool parameter: Driver Seat Belt Status = Unbuckled

- All OK.

#### Circuit/System Testing

- Ignition/Vehicle » Off — For greater than 10 min

- Disconnect the electrical connector: B153D Seat Belt Buckle - Driver

- Test for less than 5  $\Omega$  between the test points: Low Reference terminal 1 & Ground

- If 5  $\Omega$  or greater

- Disconnect the electrical connector: K36 Inflatable Restraint Sensing and Diagnostic Module

- Test for less than 2  $\Omega$  between the test points: Low Reference circuit terminal 1 @ B153D Seat Belt Buckle - Driver & The other end of the circuit

- If 2  $\Omega$  or greater » Repair the open/high resistance in the circuit.

- If less than 2  $\Omega$  » Replace the component: K36 Inflatable Restraint Sensing and Diagnostic Module

- If less than 5  $\Omega$

- Verify the scan tool parameter: Driver Seat Belt Status = Buckled

- If not the specified state

- Ignition/Vehicle » Off

- Test for infinite resistance between the test points: Signal circuit terminal 2 @ Component harness & Ground

- If less than infinite resistance » Repair the short to ground on the circuit.

- If infinite resistance » Replace the component: K36 Inflatable Restraint Sensing and Diagnostic Module

- Connect a 3 A fused jumper wire between the test points: Signal circuit terminal 2 & Low Reference circuit terminal 1

- Verify the scan tool parameter: Driver Seat Belt Status = Unbuckled

- Ignition/Vehicle » Off & Remove » Jumper wire(s)

- Test for less than 1 V between the test points: Signal circuit terminal 2 @ Component harness & Ground

- If 1 V or greater » Repair the short to voltage on the circuit.
  - If less than 1 V
  - Test for less than 2 Ω between the test points: Signal circuit terminal 2 @ Component harness & The other end of the circuit
  - Test or replace the component: B153D Seat Belt Buckle - Driver
- Repair Instructions
- Perform the Diagnostic Repair Verification after completing the repair: Diagnostic Repair Verification
- Front Seat Belt Buckle Replacement
  - For control module replacement, programming, and setup refer to: Control Module References

## Seat Belt Indicator Malfunction - Passenger (Article 13261)

### 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

Signal 1 2 2 —

Low Reference — 2 — —

1. Indicator will remain ON with seat belt buckled. 2. Indicator will illuminate only for the bulb check.

### Circuit/System Description

When an individual is sitting in the passenger seat the passenger presence sensor detects the individual. A signal to the SDM indicates a person is in the passenger seat. The SDM will turn the passenger seat belt indicator. The passenger seat belt switch is a 2-wire switch wired to the inflatable restraint sensing and diagnostic module (SDM) using a signal circuit and a low reference circuit. When the seat belt is unbuckled the switch is closed, and when the seat belt is buckled the switch is open. The SDM sends the status of the passenger seat belt via a hard wire to the passenger air bag disable indicator. After receiving the message, the passenger air bag disable indicator controls the illumination of the passenger seat belt indicator.

### Diagnostic Aids

Objects on the passenger seat can cause the passenger seat belt reminder to be commanded on. Depending on the sensing technology used, a conductive object (computers, MP3 players, cell phones, diagnostic scan tool, wires, a hand, etc.) placed on the passenger seat may cause the Passenger Presence Detection Module to command the passenger air bag indicator ON and/or command the passenger seat belt indicator ON. The fasten seat belt chime will also sound.

### Reference Information

Schematic Reference

Seat Belt Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Seat Belt 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

- Command the instrument cluster all indicators ON and OFF with a scan tool. The passenger seat belt indicator should turn ON and OFF as commanded.
- If the passenger seat belt indicator does not turn ON and OFF as commanded Replace the P16 instrument cluster .
- If the passenger seat belt indicator does turn ON and OFF as commanded
- Monitor the scan tool Passenger Seat Belt Switch parameter while buckling and unbuckling the seat belt. The parameter should display Buckled and Unbuckled when changing seat belt states.
- If the scan tool Passenger Seat Belt Switch parameter does not display Buckled and Unbuckled when changing seat belt states Refer to Circuit/System Testing.
- If the scan tool Passenger Seat Belt Switch parameter does display Buckled and Unbuckled when changing seat belt states

- All OK.

#### Circuit/System Testing

##### Passenger Seat Belt Switch Malfunction

- Ignition OFF. Disconnect the harness connector at the B88P seat belt switch-passenger.
- Test for less than 5  $\Omega$  between the low reference circuit terminal B and ground.
- If 5  $\Omega$  or greater
- Disconnect the X2 harness connector at the K36 inflatable restraint sensing and diagnostic module.
- Test for less than 2  $\Omega$  in each control circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , replace the K36 inflatable restraint sensing and diagnostic module.
- If less than 5  $\Omega$
- Ignition ON, verify the scan tool Passenger Seat Belt Status parameter listed below is Buckled.
- If the scan tool Passenger Seat Belt Status parameter does not display Buckled
- Test for infinite resistance between the seat belt switch signal circuit terminal A and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If the scan tool Passenger Seat Belt Status parameter does display Buckled
- Install a 3 A fused jumper wire between the signal circuit terminal A and the low reference circuit terminal B.
- Verify the scan tool Passenger Seat Belt Status parameter is Unbuckled.
- If the scan tool Passenger Seat Belt Status parameter does not display Unbuckled
- Ignition OFF. Disconnect the X2 harness connector at the K36 inflatable restraint sensing and diagnostic module. Ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- Test for less than 2  $\Omega$  in each circuit end to end.
- If the scan tool Passenger Seat Belt Status parameter does display Unbuckled
- Test or replace the B88P seat belt switch-passenger.

##### Passenger Seat Belt Indicator Malfunction

- Ignition OFF. Disconnect the harness connector at the P14 passenger air bag disable indicator.
- Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.
- If 10  $\Omega$  or greater Repair the open/high resistance in the circuit.
- If less than 10  $\Omega$
- Ignition ON. With a scan tool, command the Passenger Seat Belt Reminder Indicator OFF.
- Test for less than 11 V between the control circuit terminal 5 and ground.
- If 11 V or greater
- Ignition OFF. Disconnect the X1 harness connector at the K36 inflatable restraint sensing and diagnostic module. Ignition ON.
- Test for less than 1 V between the control circuit terminal 5 and ground.
- If less than 1 V, replace the K36 inflatable restraint sensing and diagnostic module.
- If less than 11 V
- With a scan tool, command the Passenger Seat Belt Reminder Indicator ON.
- Test for greater than 4 V between the control circuit terminal 5 and ground.
- If 4 V or less
- Ignition OFF. Disconnect the X 1 harness connector at the K36 inflatable restraint sensing and diagnostic module.
- Test for infinite resistance between the control circuit terminal 5 and ground.
- Test for less than 2  $\Omega$  between the control circuit terminal 5 and ground.
- If 2  $\Omega$  or greater repair the open/high resistance in the circuit.
- If less than 2  $\Omega$  replace the K36 inflatable restraint sensing and diagnostic module.
- If greater than 4 V
- Replace the P14 passenger air bag disable indicator.

##### Component Testing

- Ignition OFF. Disconnect the harness connector at the B88P seat belt switch-passenger. Buckle the B88P seat belt switch-passenger.
- Test for infinite resistance between the signal circuit terminal A and the low reference terminal B at the B88P seat belt switch-passenger.
- If there is not infinite resistance Replace the B88P seat belt switch-passenger.
- If there is infinite resistance
- Unbuckle the B88P seat belt switch-passenger.
- Test for less than 1  $\Omega$  between the signal circuit terminal A and the low reference terminal B at the B88P

seat belt switch-passenger.

- If 1  $\Omega$  or greater Replace the B88P seat belt switch-passenger.
- If less than 1  $\Omega$

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Instrument Panel Airbag Arming Status Display Replacement
- Front Seat Belt Buckle Replacement
- Front Seat Cushion Cover and Pad Replacement
- Control Module References for SDM Passenger Presence System, and Instrument Panel Cluster replacement, programming and setup

## **Low Tire Pressure Indicator Malfunction (Article 13623)**

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

The tire pressure monitor system has a radio frequency transmitting pressure sensor in each wheel/tire assembly. As vehicle speed increases, centrifugal force puts the sensor into Drive mode. The sensors send the tire pressure data to the remote control door lock receiver (RCDLR), using radio frequency (RF) transmissions. The RCDLR then decodes the RF data and passes it to the body control module (BCM). In turn, the BCM translates the data contained in the tire pressure sensor radio frequency transmissions into sensor presence, sensor mode, and tire pressure. Once vehicle speed is greater than 40 km/h (25 MPH), the BCM waits for the sensors to go into Drive mode.

Each sensor has its own unique identification (ID) code, which it transmits as part of each RF message, that must be learned into the BCM memory. Once all 4 IDs have been learned and vehicle speed is greater than 40 km/h (25 mph), the BCM continuously compares IDs and pressure data in the received transmissions to the learned IDs and vehicle placard pressures to determine if all 4 sensors are present and if one or more tires are low. If the BCM detects a low tire pressure condition or a malfunction in the system, it will send a serial data message to the instrument cluster requesting the appropriate tire pressure monitor indicator illumination and also to display the appropriate data message on the driver information center , if equipped.

Diagnostic Aids

- If unsure about the condition, cycle the ignition and observe the tire pressure monitor indicator icon. If the tire pressure monitor indicator icon is continuously illuminated after the instrument cluster bulb check is completed, a low tire pressure condition is present. Check the tires for damage or leaks and inflate to the tire placard specifications. Refer to Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label . If the tire pressure monitor indicator icon flashes for 1 min after the instrument cluster bulb check is completed and then remains illuminated, a tire pressure monitor system DTC is set. Perform the Diagnostic System Check - Vehicle to proceed with the proper diagnosis.
- Temperature can greatly effect tire pressures. Low tire pressure on a cold morning may cause the tire pressure monitor indicator icon to turn ON. The air pressure in the tire increases as the ambient temperature rises or as the tire warms up while the vehicle is driven. The pressure may increase enough to exceed the predetermined low pressure threshold which will turn OFF the tire pressure monitor indicator icon .
- Some aftermarket wheel valve stem holes are located further from the wheel rim than original equipment wheels. When using the tire pressure monitor special tool to activate a sensor, ensure the tool antenna is no further than 15 cm (6 in) from the sensor and is aiming upward.
- Aftermarket wheel valve stem locations can cause a sensor to not function correctly.
- A sensor may have been damaged due to a previous wheel/tire service or flat tire event. This is a courtesy item as it is not covered by warranty.
- The use of other than GM approved tire sealants can obstruct the sensor pressure sensing port and cause inaccurate tire pressure readings. If this condition is verified, remove the sealer from the tire and replace the sensor. Refer to Tire Pressure Indicator Sensor Replacement .
- The sensor activation procedure may have to be repeated up to 3 times before determining a sensor is malfunctioning. In the event a particular sensor's information is displayed on the special tool upon activation but the horn does not chirp, it may be necessary to rotate the wheel valve stem to a different position due to the RF signal is being blocked by another component.
- Occasionally sensor transmissions are not received by the BCM due to vehicle level RF interference from items such as but not limited to aftermarket ignition systems, DVD players, CB radios, or metallic type window tinting.
- The Hit Rate of the sensor will help confirm the success rate at which the sensor transmission is being

received. A low Hit Rate will signal that there may be interference from aftermarket items.

#### Reference Information

#### Description and Operation

#### Tire Pressure Monitor Description and Operation

#### Scan Tool Reference

#### Control Module References for scan tool information

#### Circuit/System Verification

- Adjust all tire pressures to the correct pressure. Refer to Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label .
- Drive the vehicle over 40 km/h (25 mph) for greater than 2 min.
- Verify the low tire pressure indicator is OFF.
- If the low tire pressure indicator is ON
- Perform the Tire Pressure Indicator Sensor Learn .
- Record all 4 Tire Pressure Parameters values from the scan tool.
- Check and record the tire pressures with a known accurate hand held tire pressure gauge.
- Verify that the scan tool Tire Pressure parameters do not differ more than 27.6 kPa (4 psi) from the actual tire pressure readings.
- If the scan tool Tire Pressure parameters differ more than 27.6 kPa (4 psi), replace the appropriate B2 Tire Pressure Sensor then perform the Tire Pressure Indicator Sensor Learn .
- If the scan tool Tire Pressure parameters do not differ more than 27.6 kPa (4 psi)
- Verify the BCM Tire Type and Pressure selections are setup correctly with a scan tool. Refer to the Vehicle Certification, Tire Placard, Anti-Theft, and Service Parts ID Label .
- If the BCM Tire Type and Pressure selections are incorrect, input the proper placard values for the vehicle with the scan tool then drive the vehicle over 40 km/h (25 mph) for greater than 2 min.
- If the BCM Tire Type and Pressure selections are correct
- Ignition On/Vehicle in Service Mode..
- Verify the low tire pressure monitor indicator icon turns ON and OFF when commanding All Indicators ON and OFF with a scan tool.
- If the low tire pressure monitor icon does not turn ON and OFF, replace the P16 Instrument Cluster.
- If the low tire pressure monitor icon turns ON and OFF
- All OK
- If the tire pressure indicator is OFF

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Tire Pressure Indicator Sensor Replacement
- Tire Pressure Indicator Sensor Learn
- Control Module References for control module replacement, programming, and setup.

## **Theft Deterrent (Article 13341)**

#### Non Standards

- Security Indicator Malfunction (13342)

## **Brake Warning Indicator Malfunction (Article 10660)**

#### 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

Brake Fluid Level Signal 1 C0267 00 1 —

Park Brake Signal 1 1 1 —

Ground — 1 — —

#### 1. Brake Warning Indicator Malfunction

#### Circuit/System Description

The instrument cluster turns ON the brake warning indicator for 5 s after ignition ON. The body control module monitors the parking brake switch and will request the instrument cluster via serial data to turn the brake warning indicator ON when the parking brake is applied. When the electronic brake control module detects a fault, it sends a serial data message to the instrument cluster commanding the indicator ON.

#### Reference Information

## Schematic Reference

### Hydraulic Brake Schematics

### Connector End View Reference

### Component Connector End Views

### Description and Operation

### Hydraulic Brake 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

### Brake Fluid Level Switch

- Verify that the brake fluid has the proper level. The fluid level should be above minimum level.
- If low Refer to Brake Fluid Loss .
- If above minimum level
- Refer to Brake Fluid Level Switch Malfunction Circuit/System Testing.

### Park Brake Switch

- Verify the scan tool Body Control Module, Park Brake Switch parameter changes between Active and Inactive while applying and releasing the parking brake.
- If the parameter does not change Refer to Park Brake Switch Malfunction.
- If the parameter changes
- Verify the brake warning indicator turns ON and OFF, when commanding the instrument cluster All Indicators ON and OFF with a scan tool.
- If the brake warning indicator does not turn ON and OFF Replace the P16 Instrument Cluster.
- If the brake warning indicator turns ON and OFF
- All OK.

### Circuit/System Testing

### Brake Fluid Level Switch Malfunction

- Ignition OFF, disconnect the harness connector at the B20 Brake Fluid Level Switch.
- Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.
- If 10  $\Omega$  or greater
- Ignition OFF.
- Test for less than 2  $\Omega$  in the ground circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- If less than 10  $\Omega$
- Ignition ON.
- Test for 8–13 V between the signal circuit terminal 1 and ground.
- If less than 8 V
- Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module.
- Test for infinite resistance between signal circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance
- Test for less than 2  $\Omega$  in the signal circuit end to end.
- If less than 2  $\Omega$ , replace the K17 Electronic Brake Control Module.
- If greater than 13 V
- Ignition OFF, disconnect the harness connector at the K17 Electronic Brake Control Module, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, replace the K17 Electronic Brake Control Module.
- If between 8–13 V
- Test or replace the B20 Brake Fluid Level Switch.

### Park Brake Switch Malfunction

- Ignition OFF, disconnect the harness connector at the B80 Park Brake Switch.
- Verify that the B80 Park Brake Switch has no physical damage or incorrect installation.
- If physical damage or incorrect installation is found Test or replace the B80 Park Brake Switch.
- If the inspection is OK

- Verify the scan tool Body Control Module, Park Brake Switch parameter is Inactive.
- If the parameter is Active
- Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
- Test for infinite resistance between the signal circuit terminal 1 and ground.
- If infinite resistance, replace the K9 Body Control Module.
- If the parameter is Inactive
- Install a 3 A fused jumper wire between the signal circuit terminal 1 and ground.
- Verify the scan tool Body Control Module, Park Brake Switch parameter is Active.
- Ignition OFF, disconnect the harness connector at the K9 Body Control Module, ignition ON.
- If less than 1 V.
- If less than 2  $\Omega$ , replace the K9 Body Control Module.
- Test or replace the B80 Park Brake Switch.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Brake Master Cylinder Reservoir Replacement for brake fluid level switch replacement.
- Parking Brake Indicator Switch Replacement
- Control Module References for Control Module replacement, programming and setup.

## Cruise Control Indicator Malfunction (Article 11064)

#### 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

The instrument cluster illuminates the cruise control engaged indicator based on serial data messages received from the engine control module (ECM). The indicator is commanded ON when the cruise control system is controlling vehicle speed, and turned OFF with the system disengaged.

#### Reference Information

##### Schematic Reference

##### Cruise Control Schematics

##### Connector End View Reference

##### Component Connector End Views

##### Description and Operation

##### Cruise Control 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

- Verify the cruise control indicator turns ON and OFF when commanding the All Indicators ON and OFF with a scan tool.
- If the indicator does not turn ON and OFF Replace the P16 Instrument Cluster .
- If the indicator turns ON and OFF
- All OK.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for instrument cluster replacement, programming and setup.

## Symptoms - Displays and Gauges (Article 11040)

- Before using the symptom diagnostic tables, perform the Diagnostic System Check - Vehicle .
- Review the system operation in order to understand the system functions. Refer to the following description and operations:
- Instrument Cluster Description and Operation
- Indicator/Warning Message Description and Operation
- Driver Information Center (DIC) Description and Operation
- Audible Warnings Description and Operation

- Auxiliary Gauges Description and Operation
- Head-Up Display Description and Operation
- Visual/Physical Inspection
- Inspect for aftermarket devices which can affect the operation of the instrument panel cluster or the audible warning systems. Refer to Checking Aftermarket Accessories .
- Inspect the accessible system components or the visible system components for obvious damage or for obvious conditions which can cause the symptom.
- Inspect for the proper fluid levels.

#### Intermittent

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

#### Symptom List

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

#### Gauges and Odometer

- Auxiliary Gauges Malfunction
- Boost Gauge Malfunction
- Fuel Gauge Malfunction - DTC P0461-P0464 or P2066-P2068
- Instrument Cluster Gauges Malfunction
- Transmission Fluid Temperature Gauge Malfunction
- Speedometer and/or Odometer Malfunction
- Volt Gauge Malfunction
- Engine Oil Temperature Gauge Malfunction

#### Indicators

- ABS Indicator Malfunction
- Airbag Indicator Malfunction
- Brake Warning Indicator Malfunction
- Charge Indicator Malfunction
- Cruise Control Indicator Malfunction
- Door Ajar Indicator Malfunction
- Park Brake System Diagnosis
- Engine Oil Pressure Indicator Malfunction
- Front Fog Lamps Malfunction
- Headlamps Malfunction
- Low Tire Pressure Indicator Malfunction
- Malfunction Indicator Lamp (MIL) Diagnosis
- Seat Belt Indicator Malfunction - Driver
- Security Indicator Malfunction
- Traction Control/Stability Control Indicator Malfunction
- Turn Signal Lamps and/or Indicators Malfunction

#### Driver Information Center

- Driver Information Center Switch Malfunction
- Head-Up Display Malfunction

#### Audible Warnings

Chime Malfunction

## **Auxiliary Gauges Malfunction (Article 11012)**

#### 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

The Auxiliary Gauge Module contains four gauges that can display voltage, engine oil temperature, engine oil pressure, and either transmission fluid temperature or boost pressure based on the information from the Engine Control Module (ECM) or Transmission Control Module (TCM). The ECM reads the information from various sensors and sends the information via serial data to the Body Control Module (BCM). The BCM then sends the information via serial data to the Auxiliary Gauge Module to display the information.

#### Reference Information

#### Schematic Reference

#### Instrument Cluster Schematics

#### Connector End View Reference

## Component Connector End Views

### Description and Operation

### Auxiliary Gauges 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

- Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify all auxiliary gauges sweep from the low to high positions.
- If none of the auxiliary gauges sweep properly Refer to Circuit/System Testing.
- If one, two, or three of the auxiliary gauges sweep properly Replace the P26 Auxiliary Gauge Module.
- If all auxiliary gauges sweep properly
- All OK.

#### Circuit/System Testing

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the P26 Auxiliary Gauge Module. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 10  $\Omega$  between the ground circuit terminal 2 and ground.
- If 10  $\Omega$  or greater
- Ignition OFF.
- Test for less than 2  $\Omega$  in the ground circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- If less than 10  $\Omega$
- Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
- If the test lamp does not illuminate and the circuit fuse is OK
- Test for less than 2  $\Omega$  in the B+ circuit end to end.
- If less than 2  $\Omega$ , verify the fuse is OK and there is voltage at the fuse.
- If the test lamp does not illuminate and the circuit fuse is open
- Test for infinite resistance between the B+ circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the P26 Auxiliary Gauge Module.
- If the test lamp illuminates
- Connect the harness connector at the P26 Auxiliary Gauge Module. Ignition ON.
- Verify scan tool communicates with the Auxiliary Gauge Module.
- If scan tool does not communicate with the Auxiliary Gauge Module Refer to Scan Tool Does Not Communicate with Low Speed GMLAN Device .
- If scan tool communicates with the Auxiliary Gauge Module
- Replace the P26 Auxiliary Gauge Module.

### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Auxiliary Gauge Module replacement, programming, and setup

## **Boost Gauge Malfunction (Article 11013)**

### 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

The auxiliary gauge module displays the boost pressure based on the information from the Engine Control Module (ECM). The ECM converts the data from the Manifold Absolute Pressure (MAP) sensor to a boost pressure signal. The ECM sends the boost pressure signal via serial data to the Body Control Module (BCM). The BCM then sends the information via serial data to the Auxiliary Gauge Module to display the boost pressure.

### Reference Information

#### Schematic Reference

#### Instrument Cluster Schematics

#### Connector End View Reference

## Component Connector End Views

### Description and Operation

### Auxiliary Gauges 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

- Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify all auxiliary gauges sweep from the low to high positions.
- If none of the auxiliary gauges sweep properly Refer to Auxiliary Gauges Malfunction .
- If one, two, or three of the auxiliary gauges sweep properly Replace the P26 Auxiliary Gauge Module.
- If all auxiliary gauges sweep properly
- Verify the Boost Gauge display matches the scan tool Boost Pressure parameter.
- If the Boost Gauge does not match the scan tool parameter Replace the P26 Auxiliary Gauge Module.
- If the Boost Gauge matches the scan tool parameter
- Verify the scan tool boost pressure parameter is between –100 and +100 kPa (30 in Hg and 15 psi) and changes with engine load changes.
- If the scan tool parameter is not between –100 and +100 kPa (30 in Hg and 15 psi) or does not change with engine load changes Refer to DTC P0107 or P0108 .
- If the scan tool parameter is between –100 and +100 kPa (30 in Hg and 15 psi) and changes with engine load changes
- All OK.

### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Auxiliary Gauge Module replacement, programming, and setup

## **Charge Indicator Malfunction (Article 11014)**

### 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

The engine Control Module (ECM) uses the generator turn ON signal circuit to control the load of the generator on the engine. A high side driver in the ECM applies voltage to the voltage regulator. This signals the voltage regulator to turn the field circuit ON and OFF. The ECM monitors the state of the generator turn ON signal circuit. The ECM should detect low voltage on the generator turn on signal circuit when the ignition is ON and the engine is OFF, or when the charging system malfunctions. With the engine running, the ECM should detect high voltage on the generator turn on signal circuit. The ECM performs key ON and RUN tests to determine the status of the generator turn on signal circuit. If a malfunction is detected the ECM will illuminate the charge indicator in the instrument cluster .

### Reference Information

### Schematic Reference

### Instrument Cluster Schematics

### Connector End View Reference

### Master Electrical Component List

### Description and Operation

### Indicator/Warning Message 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

- Ignition ON, engine running.

- Verify the scan tool Battery Voltage parameter is between 12.5–15.5 V.
- If not 12.5–15.5 V Refer to Charging System Test .
- If 12.5–15.5 V
- Verify the charge indicator turns on and off when commanding the All Indicators test ON and OFF with the scan tool.
- If the charge indicator always stays on or always stays off Replace the P16 Instrument Cluster .
- If the charge indicator turns on and off as commanded
- All OK.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Instrument Cluster replacement, programming, and setup

## Chime Malfunction (Article 11016)

### 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

The radio generates the audible warnings. The instrument cluster , the body control module (BCM), the inflatable restraint sensing and diagnostic module (SDM) or the object alarm module request audible warnings via serial data.

### Reference Information

#### Schematic Reference

#### Instrument Cluster Schematics

#### Connector End View Reference

#### Master Electrical Component List

#### Description and Operation

#### Audible Warnings 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

- Ignition ON.
- Verify all the radio speakers operate by adjust the radio balance and fade to each speaker.
- If any speaker does not operate properly Refer to Speaker Malfunction .
- If the speakers operate properly
- Verify the scan tool Driver Seat Belt Status and Passenger Seat Belt Status parameters are Buckled when both front seat belts are buckled.
- If not Buckled Refer to Seat Belt Indicator Malfunction - Driver .
- If buckled
- Verify the scan tool Headlamp On Switch parameter is Inactive when the headlamps are OFF.
- If not Inactive Refer to Headlamps Malfunction .
- If Inactive
- Verify the scan tool Park Lamps Switch parameter is Inactive when the park lamp switch is OFF.
- If not Inactive Refer to Park, License, and/or Tail Lamps Malfunction .
- Verify the scan tool Left Turn Signal Switch and Right Turn Signal Switch parameters are Inactive while the turn signal switch is OFF.
- If not Inactive Refer to Turn Signal Lamps and/or Indicators Malfunction .
- Verify the scan tool Park Brake Switch parameter is Inactive when the park brake is OFF.
- If not Inactive Refer to Park Brake System Diagnosis .
- Verify that all scan tool parameters listed below are Inactive when all the doors are closed.
- Driver Door Ajar Switch
- Passenger Door Ajar Switch
- Left Rear Door Ajar Switch
- Right Rear Door Ajar Switch
- If not Inactive Refer to Door Ajar Indicator Malfunction .

- Verify the scan tool Key in Ignition Status parameter is Inactive when the key is out of the ignition.
  - If not Inactive Refer to Circuit/System Testing.
  - If Active
  - All OK
- Circuit/System Testing
- Ignition ON, disconnect the harness connector at the S39 Ignition Switch while the ignition is ON.
  - Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.
  - If the test lamp does not illuminate and the circuit fuse is good Test for less than 2  $\Omega$  in the B+ circuit end to end.
  - If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
  - If less than 2  $\Omega$ , verify the fuse is not open and there is voltage at the fuse.
  - If the test lamp does not illuminate and the circuit fuse is open
  - Test for infinite resistance between the B+ circuit and ground.
  - If less than infinite resistance, repair the short to ground on the circuit.
  - If infinite resistance
  - Test for infinite resistance between the signal circuit and ground.
  - If infinite resistance, replace the K9 Body Control Module.
  - If the test lamp illuminates
  - Verify the scan tool Key in Ignition Status parameter is Inactive.
  - If not Inactive
  - Disconnect the X3 harness connector at the K9 Body Control Module.
  - Test for less than 1 V between the signal circuit terminal 4 and ground.
  - If 1 V or greater, repair the short to voltage on the circuit.
  - If less than 1 V, replace the K9 Body Control Module.
  - Install a 3 A fused jumper wire between the signal circuit terminal 4 and the B+ circuit terminal 2.
  - Verify the scan tool Key in Ignition Status parameter is Active.
  - If not Active
  - Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module.
  - Test for less than 2  $\Omega$  in the signal circuit end to end.
  - If less than 2  $\Omega$ , replace the K9 Body Control Module.
  - Test or replace the S39 Ignition Switch.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for BCM or Radio replacement, programming and setup

## Engine Oil Pressure Indicator Malfunction (Article 11027)

#### 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

The engine oil pressure sensor changes voltage based on the engine oil pressure. The engine oil pressure sensor is a 3-wire sensor comprised of the signal circuit, the low reference circuit and the 5V reference circuit. The engine control module (ECM) supplies 5V to the engine oil pressure sensor via the 5-V reference circuit and provides ground via the engine oil pressure sensor low reference circuit. The ECM monitors the signal circuit of the engine oil pressure sensor to determine the engine oil pressure sensor voltage is within the normal operating range of approximately 1–4V. When the engine oil pressure is high, the engine oil pressure sensor voltage is high and the sensor senses a high signal voltage. When the engine oil pressure is low, the engine oil pressure sensor voltage is low and the ECM senses a low signal voltage. The ECM sends the engine oil pressure sensor information via serial data to the body control module (BCM). The BCM then sends the engine oil pressure sensor information via serial data to the instrument cluster .

#### Reference Information

#### Schematic Reference

#### Instrument Cluster Schematics

#### Connector End View Reference

#### Component Connector End Views

#### Description and Operation

#### Indicator/Warning Message 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
- Ignition ON.
  - Verify the engine oil pressure indicator turns on & off when commanding the All Indicators ON and OFF with a scan tool.
  - If the engine oil pressure Indicator does not turn on and off. Replace the P16 Instrument Cluster .
  - If the engine oil pressure Indicator turns on and off
  - Verify the scan tool Engine Oil Pressure Switch parameter is Low.
  - If not Low Refer to DTC P0521, P0522, or P0523 .
  - If Low
  - Engine running.
  - Verify the scan tool Engine Oil Pressure Sw itch parameter is OK.
  - If not OK Refer to DTC P0521, P0522, or P0523 .
  - If OK
  - All OK.
- Repair Instructions
- Perform the Diagnostic Repair Verification after completing the repair.
- Control Module References for Instrument Cluster or ECM replacement, programming, and setup.

## **Engine Oil Temperature Gauge Malfunction (Article 11028)**

### 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

The auxiliary gauge module displays the engine oil temperature based on the information from the engine control module (ECM). The ECM converts the data from the engine oil temperature sensor to a engine oil temperature signal. The ECM sends the engine oil temperature signal via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the auxiliary gauge module to display the engine oil temperature.

### Reference Information

#### Schematic Reference

#### Instrument Cluster Schematics

#### Connector End View Reference

#### Component Connector End Views

#### Description and Operation

#### Auxiliary Gauges 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

- Engine operating.
- Verify the scan tool Engine Oil Temperature Sensor parameter is between –40 to +150°C (–40 to +302°F) and changes with engine temperature.
- If not between –38 to +148°C (–36 to +298°F) or does not change Refer to Circuit/System Testing.
- If between –38 to +148°C (–36 to +298°F) and changes
- All OK.

#### Circuit/System Testing

- Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify that the engine oil temperature gauge sweeps from its low to high position.
- If the engine oil pressure gauge does not sweep Replace the P26 Auxiliary Gauge Module.
- If the engine oil temperature gauge does sweep

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B35C Engine Oil Level and Temperature Sensor. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 10  $\Omega$  between the low reference circuit terminal C and ground.
- If 10  $\Omega$  or greater
- Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
- Test for less than 2  $\Omega$  in the low reference circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , replace the K20 Engine Control Module.
- If less than 10  $\Omega$
- Ignition ON.
- Verify the scan tool Engine Oil Temperature Sensor parameter is warmer than 148°C (298°F).
- If 148°C (298°F) or less
- Test for infinite resistance between the signal circuit terminal B and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K20 Engine Control Module.
- If warmer than 148°C (298°F)
- Install a 3A fused jumper between the signal circuit terminal B and the low reference circuit terminal C.
- Verify the scan tool Engine Oil Temperature Sensor parameter is colder than -38°C (-36°F).
- If -38°C (-36°F) or colder
- Ignition OFF, disconnect the harness connector at the K20 Engine Control Module, ignition ON.
- Test for less than 1V between the signal circuit and ground.
- If 1V or greater, repair the short to voltage on the circuit.
- If less than 1V
- Ignition OFF.
- Test for less than 2  $\Omega$  in the signal circuit end to end.
- If warmer than -38°C (-36°F)
- Test or replace the B35C Engine Oil and Temperature Sensor.

#### Component Testing

- Ignition OFF, remove the B35C Engine Oil Level and Temperature Sensor.
- Test the B35C Engine Oil Level and Temperature Sensor by varying the sensor temperature while monitoring the sensor resistance. Compare the readings with the Temperature Versus Resistance table and verify that the resistance is within 5% of the specification.
- If not within the specified range Replace the B35C Engine Oil Level and Temperature Sensor.
- If within the specified range
- Temperature Sensor OK

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Engine Oil Level Sensor and/or Switch Replacement
- Control Module References for Auxiliary Gauge Module or ECM replacement, programming, and setup

## Door Ajar Indicator Malfunction (Article 10458)

#### 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

Driver Door Ajar Switch Signal 1 2 2 —

Passenger Door Ajar Switch Signal 1 2 2 —

Driver Door Latch Assembly Ground — 2 — —

Passenger Door Latch assembly Ground — 2 — —

1. Door Ajar Indicator Always Illuminated 2. Door Ajar Indicator Inoperative

#### Circuit/System Description

The driver window motor supplies a reference voltage to the driver door ajar switch and the passenger window motor supplies a reference voltage to the passenger door ajar switch. The door ajar switches are normally open when the doors are fully closed. When a door is opened, the door ajar switch contacts close providing a path to ground. The respective window motor detects the drop in the reference voltage and will send a serial data message to the body control module (BCM) indicating the door is ajar, the BCM in turn sends a serial data message to the driver information center which displays the appropriate door ajar message.

#### Reference Information

## Schematic Reference

Door Lock/Indicator Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Power Door Locks 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

- Ignition ON.
- Verify the scan tool Driver Door Ajar Switch parameter changes between Inactive and Active when opening and closing the driver door.
- If the parameter does not change Refer to Circuit/System Testing — Driver Door Ajar Switch
- If the parameter changes
- Verify the scan tool Passenger Door Ajar Switch parameter changes between Inactive and Active when opening and closing the passenger door.
- If the parameter does not change Refer to Circuit/System Testing — Passenger Door Ajar Switch
- All OK.

Circuit/System Testing

Driver Door Ajar Switch

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A23D door latch assembly-driver. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 10  $\Omega$  between the ground circuit terminal 8 and ground.
- If 10  $\Omega$  or greater
- Ignition OFF.
- Test for less than 2  $\Omega$  in the ground circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.
- If less than 10  $\Omega$
- Verify the scan tool Driver Door Ajar Switch parameter is Inactive.
- If not Inactive
- Ignition OFF, disconnect the harness connector at the M74D window motor-driver
- Test for infinite resistance between the signal circuit terminal 6 and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the M74D window motor-driver.
- If Inactive
- Install a 3 A fused jumper wire between the signal circuit terminal 6 and the ground circuit terminal 8.
- Verify the scan tool Driver Door Ajar Switch parameter is Active.
- If not Active
- Ignition OFF, disconnect the harness connector at the M74D window motor-driver, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V
- Test for less than 2  $\Omega$  in the signal circuit end to end.
- If less than 2  $\Omega$ , replace the M74D window motor-driver.
- If Active
- Test or replace the A23D door latch assembly-driver.

Passenger Door Ajar Switch

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A23P door latch assembly-passenger. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 10  $\Omega$  between the ground circuit terminal 3 and ground.
- Verify the scan tool Passenger Door Ajar Switch parameter is Inactive.
- Ignition OFF, disconnect the harness connector at the M74P window motor-passenger.
- If infinite resistance, replace the M74P window motor-passenger.
- Install a 3 A fused jumper wire between the signal circuit terminal 1 and the ground circuit terminal 3.

- Verify the scan tool Passenger Door Ajar Switch parameter is Active.
- Ignition OFF, disconnect the harness connector at the M74P window motor-passenger, ignition ON.
- If less than 2  $\Omega$ , replace the M74P window motor-passenger.
- Test or replace the A23P door latch assembly-passenger.

#### Component Testing

- Ignition OFF, disconnect the harness connector at the appropriate A23 door latch assembly.
- Test for infinite resistance between the signal terminal 4 and the ground terminal 2 with the switch in the open position.
- Signal terminal 6 and ground terminal 8 — A23D door latch assembly-driver
- Signal terminal 1 and ground terminal 3 — A23P door latch assembly-passenger
- If less than infinite resistance Replace the A23 door latch assembly.
- If infinite resistance
- Test for less than 3  $\Omega$  between the signal and the ground terminal listed below with the switch in the closed position.
- If 3  $\Omega$  or greater Replace the A23 door latch assembly.
- If less than 3  $\Omega$
- All OK

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Front Side Door Latch Replacement
- Front Side Door Window Regulator Motor Replacement

## Head Up Display Malfunction (Article 11036)

#### 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

Head-up Display B+ 1 1 — —

Head-up Display Switch Signal B3619 02 B3619 05 B3619 05 B3619 61

Head-up Display Dimming Signal B3634 02 — — —

Head-up Display Switch Low Reference — 1 1 —

Head-up Display Ground — 1 1 —

#### 1. Head-up Display Malfunction

##### Circuit/System Description

The head-up display is a secondary display system capable of reflecting important vehicle information onto the windshield. The vehicle information is displayed using virtual imaging and is reflected on the windshield in front of the driver. Battery positive voltage is the power source to the head-up display. The head-up display can only be enabled when the ignition is active and in RUN position. The head-up display receives vehicle information for display via the serial data circuit. The head-up display switch signal circuit is pulled up to battery voltage in the head-up display. The head-up display also provides the head-up display switch with a low reference. The head-up display switch is a momentary contact switch that connects a series of resistors in a resistor ladder format. The head-up display monitors the head-up display switch signal circuit to determine the head-up display switch inputs. Each switch state PAGE, UP, DOWN corresponds to a certain resistance value. The head-up display determines the switch pressed by the voltage drop across the resistors. The head-up display intensity can be changed by using the head-up display dimming switch. The head-up display is turned OFF using the dimming switch. The head-up display does not have a separate Off switch.

##### Reference Information

##### Schematic Reference

##### Head-Up Display Schematics

##### Connector End View Reference

##### Component Connector End Views

##### Description and Operation

##### Head-Up Display 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

## Special Tools

J 33431-C - Signal Generator and Instrument Panel Tester

## Circuit/System Testing

### Head-Up Display Inoperative

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the P29 Head-Up Display. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 30  $\Omega$  between the Head-Up Display ground circuit terminal 6 and ground.
- If 30  $\Omega$  or greater Test the ground circuit for an open/high resistance.
- If less than 30  $\Omega$
- Ignition ON.
- Verify a test lamp illuminates between the B+ circuit terminal 4 and ground.
- If the test lamp does not illuminate and the circuit fuse is OK
- Ignition OFF.
- Test for less than 2  $\Omega$  in the B+ circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , verify the fuse is OK and there is voltage at the fuse.
- If the test lamp does not illuminate and the circuit fuse is open
- Test for infinite resistance between the B+ circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the P29 Head-Up Display
- If the test lamp illuminates
- Ignition OFF, reconnect the P29 Head-Up Display. Disconnect the S27 head-up display switch.
- Connect a 3A fused jumper wire between the signal circuit terminal 3 and ground.
- Verify the scan tool Dim Select Switch parameter displays Short.
- If scan tool does not display Short
- Ignition OFF, disconnect the harness connector at the P29 Head-Up Display, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V
- Test for less than 2  $\Omega$  in the signal circuit end to end.
- If less than 2  $\Omega$ , replace the P29 Head-Up Display.
- If scan tool displays Short
- Connect the J 33431-C - Signal Generator and Tester or a similar variable resistance tool.
- Verify the scan tool Dim Select Switch parameter changes from 1 through 12 while changing resistance from 30–920 $\Omega$ .
- If scan tool parameter does not change properly Replace the P29 Head-Up Display.
- If scan tool parameter changes properly
- Verify all pixels on Head-Up Display are turned On or Off while performing the scan tool Info Display Pattern 1 Check test.
- If pixels do not turn On or Off properly Replace the P29 Head-Up Display.
- If all pixels turn On and Off properly
- Test or replace the S27 Head-Up Display Switch.

## Component Testing

### Static Test

- Ignition OFF, disconnect the harness connector at the S27 Head-Up Display Switch.
- Test for 8.7–9.1k $\Omega$  between the signal terminal 6 and the low reference circuit terminal 1.
- If less than 8.7k $\Omega$  or more than 9.1k $\Omega$  Replace the S27 Head-Up Display Switch.
- If 8.7–9.1k $\Omega$
- Test for 550–650  $\Omega$  between the signal terminal 6 and the low reference circuit terminal 1 while pressing the Page switch.
- If less than 550 $\Omega$  or more than 650 $\Omega$  Replace the S27 Head-Up Display Switch.
- If 550–650  $\Omega$
- Test for 1.5–1.7k $\Omega$  between the signal terminal 6 and the low reference circuit terminal 1 while pressing the Up switch.
- If less than 1.5k $\Omega$  or more than 1.7k $\Omega$  Replace the S27 Head-Up Display Switch.
- If 1.5–1.7k $\Omega$
- Test for 2.4–2.6k $\Omega$  between the signal terminal 6 and the low reference circuit terminal 1 while pressing the Down switch.

- If less than 2.4kΩ or more than 2.6kΩ Replace the S27 Head-Up Display Switch.
  - If 2.4–2.6kΩ
  - All OK.
- Repair Instructions
- Perform the Diagnostic Repair Verification after completing the repair.
- Head-Up Display Replacement
  - Head-Up Display Switch Replacement
  - Control Module References for instrument cluster replacement, programming and setup

## **Instrument Cluster Gauges Malfunction (Article 11037)**

### 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

The instrument cluster displays the engine coolant temperature, fuel level, vehicle speed and the engine speed based on the information from the engine control module (ECM). The ECM sends information via a serial data to the instrument cluster to display the engine coolant temperature, fuel level, the engine speed, the vehicle speed and the distance travelled, either in kilometers or miles, based on the vehicle requirements.

### Reference Information

#### Schematic Reference

#### Instrument Cluster Schematics

#### Connector End View Reference

#### Master Electrical Component List

#### Description and Operation

#### Instrument Cluster 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

- Verify no DTC is set.
- If any DTC is set Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If no DTCs are set
- Ignition ON, perform the Instrument Cluster Gauge Sweep test with the scan tool (if equipped), verify that all gauges sweep from their low to high position.
- If any gauge does not sweep Replace the P16 Instrument Cluster.
- If all gauges sweep
- Drive the vehicle, verify the gauge values matches the associated values on the Instrument Cluster scan tool data display.
- If the values do not match Replace the P16 Instrument Cluster.
- If the values match the scan tool
- All OK.

### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for control module replacement, programming, and setup.

## **Trunk Ajar Indicator Malfunction (Article 10472)**

### 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
- An overview of each diagnostic category can be found here: Diagnostic Procedure Instructions

### Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance

Signal 1 2 2 —

Ground — 3 — —

Trunk Open Display Message = Always On Trunk Open Display Message = Disabled Rear Compartment Lid Latch = Disabled

- Trunk Open Display Message = Always On
- Trunk Open Display Message = Disabled
- Rear Compartment Lid Latch = Disabled

Circuit/System Description

For an overview of the component/system, refer to: Luggage Compartment Description and Operation

Circuit Description

Signal The control module input circuit has an internal resistance connected to 12 V.

Ground Chassis Ground

Component Description

M40 Rear Compartment Lid Latch The switch has a normally open contact. When the switch is activated, the signal circuit to the control module is grounded.

K9 Body Control Module The module controls various vehicle functions like lighting, central door locking, power windows, etc.

Reference Information

Schematic Reference

Release Systems Schematics

Connector End View Reference

Master Electrical Component List

Electrical Information Reference

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

Scan Tool Reference

Control Module References

Circuit/System Verification

- Ignition » On / Vehicle » In Service Mode
- Operate the component: Close the rear compartment lid. Verify the scan tool parameter: Rear Closure Ajar Switch = Inactive
- If not the specified state Refer to: Circuit/System Testing
- If the specified state
- Operate the component: Open the rear compartment lid. Verify the scan tool parameter: Rear Closure Ajar Switch = Active
- All OK.

Circuit/System Testing

- Ignition/Vehicle » Off
  - Disconnect the electrical connector: M40 Rear Compartment Lid Latch
  - Verify the scan tool parameter: Rear Closure Ajar Switch = Inactive
  - If not the specified state
  - Disconnect the electrical connector: K9 Body Control Module
  - Test for infinite resistance between the test points: Signal circuit terminal 4 @ Component harness & Ground
  - If less than infinite resistance » Repair the short to ground on the circuit.
  - If infinite resistance » Replace the component: K9 Body Control Module
  - Connect a 3 A fused jumper wire between the test points: Signal circuit terminal 4 & Ground circuit terminal 2
  - Verify the scan tool parameter: Rear Closure Ajar Switch = Active
  - Ignition/Vehicle » Off & Remove » Jumper wire(s)
  - Test for less than 1 V between the test points: Signal circuit terminal 4 @ Component harness & Ground
  - If 1 V or greater » Repair the short to voltage on the circuit.
  - If less than 1 V
  - Test for less than 2  $\Omega$  between the test points: Signal circuit terminal 4 @ Component harness & Terminal 5 X6 @ Control module harness
  - If 2  $\Omega$  or greater » Repair the open/high resistance in the circuit.
  - If less than 2  $\Omega$  » Replace the component: K9 Body Control Module
  - Test or replace the component: M40 Rear Compartment Lid Latch
- Component Testing
- Test for infinite resistance between the test points: Signal terminal 4 & Ground terminal 2 — The switch is

in the open position.

- If less than infinite resistance Replace the component: M40 Rear Compartment Lid Latch
- If infinite resistance
- Test for less than 3  $\Omega$  between the test points: Signal terminal 4 & Ground terminal 2 — The switch is in the closed position.
- If 3  $\Omega$  or greater Replace the component: M40 Rear Compartment Lid Latch
- If less than 3  $\Omega$

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair: Diagnostic Repair Verification

- Rear Compartment Lid Latch Replacement
- For control module replacement, programming, and setup refer to: Control Module References

## **Speedometer and/or Odometer Malfunction (Article 11039)**

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

The instrument cluster displays the engine coolant temperature, fuel level, vehicle speed and the engine speed based on the information from the engine control module (ECM). The ECM sends information via a High Speed CAN-Bus signal to the body control module (BCM). The BCM then sends the information via a Low Speed CAN-Bus signal to the instrument cluster to display the engine coolant temperature, fuel level, the engine speed, the vehicle speed and the distance travelled, either in kilometers or miles, based on the vehicle requirements. The instrument cluster will display dashes when its VIN does not match the VIN received from the BCM.

Diagnostic Aids

If the VIN mismatch is corrected the odometer will once again be displayed in the instrument cluster. If the vehicle is driven for a calibrated distance with a VIN mismatch, it will cause the instrument cluster odometer to enter into an error mode and lock itself. When this occurs the dashes will remain on the display even after correcting the VIN mismatch. The vehicle odometer status data display on the scan tool can be used to identify a locked odometer. The only way to unlock the instrument cluster (clear the dashes from the display) is to perform an SPS programming event. Failure to follow the diagnostic and programming procedures may result in either an improper odometer value or a module replacement.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Master Electrical Component List

Description and Operation

Instrument Cluster 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

- Verify no DTC is set.
- If any DTC is set Diagnose DTCs first. Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If no DTCs are set
- Ignition ON, perform the Speedometer Sweep Test with the scan tool, verify the speedometer sweeps from low to high position.
- If speedometer does not sweep Replace the P16 Instrument Cluster.
- If speedometer sweeps properly
- Drive the vehicle, verify the speedometer gauge value matches the Vehicle Speed parameter on the scan tool.
- If the values do not match Replace the P16 Instrument Cluster.
- If the speedometer value matches the scan tool parameter
- Drive the vehicle, verify the odometer display and the displayed distance counts up while driving.
- If the odometer displays only "----" (dashes) Refer to Circuit/System Testing.
- If the odometer display does not count up Replace the P16 Instrument Cluster.

- If speedometer sweeps and displays the correct value, and the odometer display counts up
- All OK.
- Circuit/System Testing
- Circuit/System Verification must be performed before proceeding with Circuit/System Testing.
- If there are multiple modules not original to the vehicle and are not new correctly configured service parts, SPS may not be able to properly read or recover the vehicle odometer value. Follow government rules and documentation (including vehicle identification) regarding inaccurate/unknown odometer values.
- Instrument Cluster is Showing "----" (Dashes)
- Correcting VIN mismatch – odometer is still Inactive.
- Verify the vehicle odometer status with a scan tool. The reading should be Inactive.
- If the reading is Active Refer to correcting VIN mismatch – odometer Active.
- If the reading is Inactive
- Using the scan tool, verify the BCM VIN matches the vehicle VIN placard.
- If the VIN does not match Reprogram the BCM, then proceed to Step 3.
- If the VIN matches
- Using the scan tool, verify the instrument cluster VIN matches the vehicle VIN placard.
- If the VIN does not match Reprogram the instrument cluster. Then proceed with step 4.
- Ignition ON, verify the instrument cluster is displaying the correct value.
- If the instrument cluster is still displaying "----" (dashes) Replace the P16 Instrument Cluster.
- Correcting VIN mismatch – odometer is Active.
- If the reading is Inactive Refer to Correcting VIN mismatch – odometer Inactive.
- If the reading is Active
- Using the scan tool, verify the instrument cluster VIN matches the vehicle's VIN placard.
- If the VIN does not match Reprogram the Instrument Cluster. Then proceed with step 3.
- Perform the BCM setup procedure in SPS.
- If instrument cluster is displaying the correct value
- Repair Instructions
- Perform the Diagnostic Repair Verification after completing the repair.
- Control Module References for instrument cluster, BCM or ECM replacement, programming, and setup

## **Transmission Fluid Temperature Gauge Malfunction (Article 11041)**

- 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
- The auxiliary gauge module displays the transmission fluid temperature based on the information either from the engine control module (ECM) or the transmission control module (TCM). The ECM or the TCM converts the data from the transmission oil temperature sensor to a transmission fluid temperature signal. The ECM or the TCM sends the transmission oil temperature signal via serial data to the body control module (BCM). The BCM then sends the information via serial data to the Auxiliary Gauge Module to display the transmission fluid temperature.
- Reference Information
- Schematic Reference
- Instrument Cluster Schematics
- Connector End View Reference
- Component Connector End Views
- Description and Operation
- Auxiliary Gauges 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
- Manual Transmission
- Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify all auxiliary gauges sweep from the low to high positions.

- If none of the auxiliary gauges sweep properly Refer to Auxiliary Gauges Malfunction .
- If one, two, or three of the auxiliary gauges sweep properly Replace the P26 Auxiliary Gauge Module.
- If all auxiliary gauges sweep properly
- Verify the Transmission Temperature Gauge display matches the Auxiliary Gage Module scan tool Transmission Fluid Temperature parameter.
- If the transmission fluid temperature gauge does not match the scan tool parameter Replace the P26 Auxiliary Gauge Module.
- If the transmission fluid temperature gauge matches the scan tool parameter
- Verify the scan tool Transmission Fluid Temperature parameter is between  $-74$  and  $+174^{\circ}\text{C}$  ( $-101$  and  $+345^{\circ}\text{F}$ ) and changes with transmission temperature changes.
- If parameter is not between  $-74$  and  $+174^{\circ}\text{C}$  ( $-101$  and  $+345^{\circ}\text{F}$ ) or changes with transmission temperature changes Refer to Circuit/System Testing- Manual Transmission.
- If parameter is between  $-74$  and  $+174^{\circ}\text{C}$  ( $-101$  and  $+345^{\circ}\text{F}$ ) and changes with transmission temperature changes
- All OK.

#### Automatic Transmission

- Verify the Transmission Temperature Gauge display matches the Transmission Control Module scan tool Transmission Fluid Temperature parameter.
- If parameter is not between  $-74$  and  $+174^{\circ}\text{C}$  ( $-101$  and  $+345^{\circ}\text{F}$ ) or changes with transmission temperature changes Refer to DTC P0711-P0713 .

#### Circuit/System Testing

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B173 Manual Transmission Fluid Temperature Sensor. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 1 V between the low reference circuit terminal A and ground.
- If 1 V or greater repair the short to voltage on the circuit.
- If less than 1 V
- Test for less than  $10\ \Omega$  between the low reference circuit terminal A and ground.
- If  $10\ \Omega$  or greater
- Ignition OFF, disconnect the harness connector at the K20 Engine Control Module.
- Test for less than  $2\ \Omega$  in the low reference circuit end to end.
- If  $2\ \Omega$  or greater, repair the open/high resistance in the circuit.
- If less than  $2\ \Omega$ , replace the K20 Engine Control Module.
- If less than  $10\ \Omega$
- Ignition ON.
- Verify the scan tool Transmission Fluid Temperature parameter is greater than 155 degrees C.
- If 155 degrees C or less
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K20 Engine Control Module.
- If greater than 155 degrees C
- Install a 3 A fused jumper wire between the signal circuit terminal B and the low reference circuit terminal A.
- Verify the scan tool Transmission Fluid Temperature parameter is less than 5 degrees C.
- If 5 degrees C or greater
- Ignition OFF, disconnect the harness connector at the K20 Engine Control Module, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- Ignition OFF
- Test for less than  $2\ \Omega$  in the signal circuit end to end.
- If less than 5 degrees C
- Test or replace the B173 Manual Transmission Fluid Temperature Sensor.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Auxiliary Gauge Module, TCM or ECM replacement, programming, and setup

## **Volt Gauge Malfunction (Article 11042)**

#### 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

The auxiliary gauge module displays the battery voltage measured at the B+ input circuit.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Auxiliary Gauges 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

- Ignition ON, perform the Auxiliary Gauge Sweep test with the scan tool, verify all auxiliary gauges sweep from the low to high positions.
- If none of the auxiliary gauges sweep properly Refer to Auxiliary Gauges Malfunction .
- If one, two, or three of the auxiliary gauges sweep properly Replace the P26 Auxiliary Gauge Module.
- If all auxiliary gauges sweep properly
- Verify that DTC B1420 is not set.
- If the DTC B1420 is set Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If the DTC B1420 is not set
- Replace the P26 Auxiliary Gauge Module.

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for Auxiliary Gauge Module replacement, programming, and setup

## **Airbag Indicator Malfunction (Driver) (Article 13273)**

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 13275)**

### Diagnostic Instructions

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

- Review Strategy Based Diagnosis for an overview of the diagnostic approach.

- Diagnostic Procedure Instructions provides an overview of each diagnostic category.

### Diagnostic Fault Information

Circuit Short to Ground Open/High Resistance Short to Voltage Signal Performance

Passenger Air Bag OFF Indicator Control 2 2\* 4 —

Passenger Air Bag ON Indicator Control 3 3\* 5 —

Passenger Air Bag Disable Indicator Ground — 1 1 —

1. Both indicators always OFF 2. The OFF indicator will not illuminate 3. The ON indicator will not illuminate

4. The OFF indicator always ON 5. The ON indicator always ON \* High resistance may cause the appropriate indicator to illuminate less bright than normal

### Circuit/System Description

The passenger air bag ON/OFF indicators are used to notify the driver when the passenger presence system has enabled or disabled the 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  $\Omega$  between the ground circuit terminal 2 and ground.

- If 10  $\Omega$  or greater

- Test for less than 2  $\Omega$  in the ground circuit end to end.

- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

- If less than 10  $\Omega$

- Ignition ON, command the passenger air bag OFF indicator 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  $\Omega$  in each control circuit end to end.

- If less than 2  $\Omega$ , 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

## **ABS Indicator Malfunction (Article 10529)**

### 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

The instrument cluster turns ON the ABS indicator for 5 seconds after the ignition is turned ON, or when the electronic brake control module detects a fault and sends a serial data message to the instrument cluster commanding the indicator ON.

### Reference Information

#### Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

## ABS 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

- Ignition ON.
- Verify that no DTCs are set.
- If any DTCs are set Refer to Diagnostic Trouble Code (DTC) List - Vehicle .
- If no DTCs are set
- Verify the instrument cluster ABS indicator turns ON and OFF when commanding All Indicators ON and OFF with a scan tool.
- If the ABS indicator does not turn ON and OFF Replace the P16 instrument cluster.
- If the ABS indicator turns ON and OFF
- Verify the ABS indicator turns OFF 5 seconds after the ignition is turned ON.
- If the ABS indicator does not turn OFF Replace the K17 electronic brake control module.
- If the ABS indicator turns OFF
- All OK.

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

Control Module References for electronic brake control module or instrument cluster replacement, programming and setup

## **Traction Control/Stability Control Indicator Malfunction (w/ F55) (Article 10567)**

### 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

Signal B2745 02 1 1 —

Ground — 1 — —

1. The traction control switch is inoperative.

#### Circuit/System Description

The Instrument Cluster illuminates the Traction/stability Control, Traction Control Off, and the Stability Control Off indicator for five seconds after ignition ON. The Electronic Brake Control Module will request the Instrument Cluster via serial data to turn the Traction/stability Control, Traction Control Off, and the Stability Control Off indicator ON when a fault is set or when the vehicle is entering the performance traction mode. When the Electronic Brake Control Module detects a fault it sends a serial data message to the Instrument Cluster commanding the Traction/stability Control indicator ON.

The Body Control Module monitors the traction control switch. When the traction control switch is pressed once, the Body Control Module will request the Electronic Brake Control Module via serial data to disable the traction control. When the Traction Control Switch is pressed twice within five seconds the performance traction mode is available and enters the Performance Traction Control Mode 2–Dry. The Electronic Brake Control Module will request the Instrument Cluster via serial data to turn the Traction Control Off indicator and Stability Control Off indicator ON to notify the driver of the deactivation.

#### Reference Information

#### Schematic Reference

#### Antilock Brake System Schematics

#### Connector End View Reference

#### Component Connector End Views

#### Description and Operation

#### ABS 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

- Ignition ON.

- Verify the Instrument Cluster indicators listed below turn ON and OFF when commanding the All Indicators ON and OFF with a scan tool.

- Traction/stability Control indicator

- Traction Control Off indicator

- Stability Control Off indicator

- If any indicator does not turn ON and OFF Replace the P16 Instrument Cluster.

- If all indicators turn ON and OFF

- Verify the scan tool Body Control Module Traction Control Switch parameter changes between Active and Inactive when pressing and releasing the S48E Multifunction Switch-Center Console.

- If the parameter does not change Refer to Circuit/System Testing.

- If the parameter changes

- All OK.

Circuit/System Testing

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S48E Multifunction Switch-Center Console. It may take up to 2 minutes for all vehicle systems to power down.

- Test for less than 5  $\Omega$  between the ground circuit terminal 2 and ground.

- If 5  $\Omega$  or greater

- Ignition OFF.

- Test for less than 2  $\Omega$  in the ground circuit end to end.

- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.

- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

- If less than 5  $\Omega$

- Verify the scan tool Body Control Module Traction Control Switch parameter is Inactive.

- If not Inactive

- Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module.

- Test for infinite resistance between the signal circuit and ground.

- If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance, replace the K9 Body Control Module.

- If Inactive

- Install a 3 A fused jumper wire between the signal circuit terminal 7 and ground.

- Verify the scan tool Traction Control Switch parameter is Active.

- If not Active

- Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

- Test for less than 1 V between the signal circuit and ground.

- If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V

- Test for less than 2  $\Omega$  in the signal circuit end to end.

- If less than 2  $\Omega$ , replace the K9 Body Control Module.

- If Active

- Test or replace the S48E Multifunction Switch-Center Console.

Component Testing

- Ignition OFF, disconnect the harness connector at the S48E Multifunction Switch-Center Console.

- Test for infinite resistance between the signal circuit terminal 4 and the ground circuit terminal 2 with the switch in the open position.

- If less than infinite resistance Replace the S48E Multifunction Switch-Center Console.

- Test for less than 2  $\Omega$  between the signal circuit terminal 4 and the ground circuit terminal 2 with the switch in the closed position.

- If 2  $\Omega$  or greater Replace the S48E Multifunction Switch-Center Console.

- If less than 2  $\Omega$

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Electronic Traction Control Switch Replacement

- Control Module References for Body Control Module replacement or Instrument Cluster, programming and setup

## Traction Control/Stability Control Indicator Malfunction (w/o F55) (Article 10569)

### 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

Signal B2745 02 1 1 —

Ground — 1 — —

1. The traction control switch is inoperative.

### Circuit/System Description

The instrument cluster illuminates the traction control/stability control-active indicator for 5 seconds after ignition ON. The electronic brake control module will request the instrument cluster via serial data to turn the traction control/stability control-active indicator ON (flashing) when the system is in traction control or stability control mode. When the electronic brake control module detects a fault it sends a serial data message to the instrument cluster commanding the traction control/stability control-active indicator ON. The body control module monitors the stability control switch. When the traction control switch is pressed once, the body control module will request the electronic brake control module via serial data to disable the traction control. When the traction control switch is pressed for 5 seconds, the body control module will request the electronic brake control module to disable the stability control. The electronic brake control module will request the instrument cluster via serial data to turn the traction control off indicator and stability control off indicator ON to notify the driver of the deactivation.

### Reference Information

#### Schematic Reference

Antilock Brake System Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

ABS 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

- Ignition ON.
- Verify the instrument cluster indicators listed below turn ON and OFF when commanding the All Indicators ON and OFF with a scan tool.
- Traction control/stability control-active indicator
- Traction control off indicator
- Stability control off indicator
- If any indicator does not turn ON and OFF Replace the P16 instrument cluster.
- If all indicators turn ON and OFF
- Verify the scan tool Body Control Module, Traction Control Switch parameter changes between Active and Inactive when pressing and releasing the traction control switch.
- If the parameter does not change Refer to Circuit/System Testing.
- If the parameter changes
- All OK.

#### Circuit/System Testing

- Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S75 traction control switch. It may take up to 2 minutes for all vehicle systems to power down.
- Test for less than 5  $\Omega$  between the ground circuit terminal 2 and ground.
- If 5  $\Omega$  or greater
- Ignition OFF.
- Test for less than 2  $\Omega$  in the ground circuit end to end.
- If 2  $\Omega$  or greater, repair the open/high resistance in the circuit.
- If less than 2  $\Omega$ , repair the open/high resistance in the ground connection.

- If less than 5  $\Omega$
- Verify the scan tool Body Control Module, Traction Control Switch parameter is Inactive.
- If not Inactive
- Ignition OFF, disconnect the X2 harness connector at the K9 body control module.
- Test for infinite resistance between the signal circuit and ground.
- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K9 body control module.
- If Inactive
- Install a 3 A fused jumper wire between the signal circuit terminal 7 and ground.
- Verify the scan tool Traction Control Switch parameter is Active.
- If not Active
- Ignition OFF, disconnect the X2 harness connector at the K9 body control module, ignition ON.
- Test for less than 1 V between the signal circuit and ground.
- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V
- Test for less than 2  $\Omega$  in the signal circuit end to end.
- If less than 2  $\Omega$ , replace the K9 body control module.
- If Active
- Test or replace the S75 traction control switch.

#### Component Testing

- Ignition OFF, disconnect the harness connector at the S75 traction control switch.
- Test for infinite resistance between the signal circuit terminal 7 and the ground circuit terminal 2 with the switch in the open position.
- If less than infinite resistance Replace the S75 traction control switch.
- Test for less than 2  $\Omega$  between the signal circuit terminal 7 and the ground circuit terminal 2 with the switch in the closed position.
- If 2  $\Omega$  or greater Replace the S75 traction control switch.
- If less than 2  $\Omega$

#### Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair.

- Electronic Traction Control Switch Replacement
- Control Module References for body control module replacement or instrument cluster, programming and setup

### **False instrument warning light/gauges (itype\_136)**

#### Tsbs

- Normal Characteristic - Instrument Panel Red Brake Light Intermittently Comes On (PI1410B, 2017/05/19)

### **Noise (itype\_156)**

#### Tsbs

- Hiss Noise Or Gurgle Noise From Dash - Reduced Heater Performance (PIC5984B, 2016/03/18)

### **Out of specification (itype\_158)**

#### Tsbs

- White Film/Residue on Vehicle Interior, Door Trim Panels and/or Instrument Panel (IP) (PI0799A, 2015/10/22)

### **Poor performance (itype\_162)**

#### Tsbs

- Inaccurate or Slow Response of Outside Air Temperature Display (PI0233E, 2015/06/26)
- Normal Characteristic - Clock Does Not Update or Slow to Update (PIC5839D, 2017/12/06)

### **Miscellaneous Information (itype\_111)**

#### Tsbs

- Verifying Odometer Accuracy (PIC3100G, 2019/03/06)

### **Warranty Information (itype\_119)**

#### Tsbs

- Information on Inappropriate Warranty Claims Submitted for Damaged Radios and Instrument Panel Clusters (IPCs) (08-08-44-015H, 2016/12/19)