

2017 ACCESSORIES & EQUIPMENT

Pedestrian Protection - CT6

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Active Hood Hinge Actuator Bolt	9 N.m (80 lb in)

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B0099: DEPLOYMENT COMMANDED CIRCUIT

Diagnostic Instructions

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

DTC Descriptor

B0099 00

Deployment Commanded Circuit

Circuit/System Description

The pedestrian impact detection system senses and discriminates vehicle impacts and deploys the pedestrian hood hinge actuators in a timely manner to help reduce pedestrian head injuries. The Pedestrian Impact Detection Sensors provides force information to the Inflatable Restraint Sensing and Diagnostic Control Module. The Inflatable Restraint Sensing and Diagnostic Control Module uses force information from the sensor to determine those events when the deployment of the hood hinge actuator is expected. The pedestrian hood actuators deploy only when a valid signal whose energy is capable of triggering deployment of the hood is present. During a frontal pedestrian impact of sufficient force, the Inflatable Restraint Sensing and Diagnostic Control Module will allow current to flow through the deployment loop in order to deploy the hood hinge actuator. The Inflatable Restraint Sensing and Diagnostic Control Module provides a minimum of 1.2 amps and a maximum of 1.95 amps of current for a minimum of 2 ms when an actuator deployment is commanded. The Inflatable Restraint Sensing and Diagnostic Control Module performs continuous diagnostic tests on the deployment loops to check for proper circuit continuity. The Inflatable Restraint Sensing and Diagnostic Control Module sets this DTC in the current ignition cycle when a hood hinge actuator deployment has been commanded. After a deployment, the hood hinge actuators and the Inflatable Restraint Sensing and Diagnostic Control Module need to be replaced.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

- The Inflatable Restraint Sensing and Diagnostic Control Module detects a frontal impact to warrant deployment of the hood hinge actuators.
- The Inflatable Restraint Sensing and Diagnostic Control Module provides a minimum of 1.2 amps and a maximum of 1.95 amps of current for a minimum of 2 ms to command deployment of the hood hinge actuators

Action Taken When the DTC Sets

- The Inflatable Restraint Sensing and Diagnostic Control Module commands the DIC to display Reset Hood See Owners Manual for the following two ignition cycles.
- The Inflatable Restraint Sensing and Diagnostic Control Module commands the DIC to display Service Pedestrian Protection System at the third ignition cycle after the hood hinge actuators have been deployed until service is performed.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 40 malfunction-free ignition cycles have occurred.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Pedestrian Impact Detection 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 Testing

Ignition ON, verify DTC B0099 is not set.

- If DTC is set, replace the Inflatable Restraint Sensing and Diagnostic Control Module and the active hood hinge actuators.

Repair Instructions

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

- **Active Hood Hinge Actuator Replacement**
- **Control Module References** for control module replacement, setup and programming.

DTC B009A OR B00A1: HOOD DEPLOYMENT LOOP SHORT TO BATTERY

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

B00A1 01

Hood Latch Actuator Deployment Loop Short to Battery

B009A 01

Left Hood Hinge Deployment Loop Short to Battery

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Hood Latch Actuator - Low Control Circuit	B00A1 02, B00A1 0E	B00A 04	B00A1 0D	B00A1 01	-
Hood Latch Actuator - High Control Circuit	B00A1 02, B00A1 0E	B00A1 04	B00A1 0D	B00A1 01	-
Left Hood Hinge Actuator - Low Control Circuit	B009A 02, B009A 0E	B009A 04	B009A 0D	B009A 01	-
Left Hood Hinge Actuator - High Control Circuit	B009A 02, B009A 0E	B009A 04	B009A 0D	B009A 01	-

Circuit/System Description

The pedestrian hood actuators deploy only when a valid signal whose energy is capable of triggering deployment of the hood is present. The pedestrian hood actuators only deploys in those events where the activation of the hood is expected. The hood actuator is not expected to deploy in low severity event where the risk of injury is low or in a high severity event like a car to car crash. During a frontal pedestrian impact of sufficient force the pedestrian impact detection module will allow current to flow through the deployment loop in order to deploy the hood actuators. The pedestrian impact detection module performs continuous diagnostic tests on the deployment loops to check for proper circuit continuity, shorts to ground and shorts to voltage. There are 2 shorting bars used within the hood hinge actuator connector which will short together both high and low control circuits, when the hood hinge connector is disconnected. This helps to prevent unwanted deployment of the actuator during servicing.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

B00A1 01 or B009A 01

The pedestrian impact detection module deployment loop resistance leakage is less than 3.5 k ohms for 2.5 seconds.

B00A1 02 or B009A 02

The pedestrian impact detection module deployment loop resistance leakage is less than 3.5 k ohms for 2.5 seconds.

B00A1 04 or B009A 04

The pedestrian impact detection module deployment loop resistance is greater than 7.2 ohms for 2.5 seconds.

B00A1 0D or B009A 0D

The pedestrian impact detection module deployment loop resistance is greater than 3.1 ohms for 2.5 seconds.

B00A1 0E or B009A 0E

The pedestrian impact detection module deployment loop resistance is less than 1.6 ohms for 2.5 seconds.

Action Taken When the DTC Sets

- The pedestrian impact detection module commands the DIC to display Service Pedestrian Protection System.
- The pedestrian impact detection module stores DTC in memory.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 40 malfunction-free ignition cycles have occurred.

Diagnostic Aid

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

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

- Left Hood Hinge Actuators
- Hood Latch Actuator (if equipped)
- Inline harness connectors
- Pedestrian Impact Detection Control Module connector

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

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Pedestrian Impact Detection Description and Operation

Electrical Information Reference

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

[Control Module References](#) for scan tool information

Circuit/System Verification

NOTE: Refer to [SIR Service Precautions](#) .

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

- F100L Hood Hinge Actuator - Left
- F125 Hood Latch Actuator
- Pedestrian Impact Detection Sensor - Right Front
- Pedestrian Impact Detection Sensor - Left Front
- Wiring harness connectors
- K36 Inflatable Restraint Sensing and Diagnostic Module wiring harness connector

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

1. Verify the appropriate scan tool Hood Hinge Deployment Loop Resistance parameters stay consistently between 2.1 and 4.0 Ω without any spikes or dropouts while moving the harness near each connector listed below:

NOTE: If the condition is intermittent or cannot be duplicated, disconnect the connectors and add dielectric grease/lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087). This procedure will correct the high resistance condition due to terminal fretting corrosion.

- F100L Hood Hinge Actuator - Left
- F125 Hood Latch Actuator
- Any inline harness connector
- K36 Inflatable Restraint Sensing and Diagnostic Module
- **If less than 2.1 or greater than 4.0 Ω**

Refer to Circuit/System Testing.

- **If there are spikes or dropouts, perform the following**
- Inspect each connector terminal and harness for damage or corrosion and repair as necessary
- Apply dielectric grease/lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to each connector terminal
- Insure each connector and CPA is correctly seated.
- **If within 2.1 and 4.0 Ω without any spikes or dropouts**

2. All OK

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector listed below at the appropriate actuator:
 - F100L Hood Hinge Actuator - Left connector
 - F125 Hood Latch Actuator
2. Test for greater than 25 Ω between the control circuit terminal 1 and the control circuit terminal 2.

- **If 25 Ω or less**

1. Disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for infinite resistance between the two control circuits.

NOTE:

Some connectors may be equipped with shorting bars as a safety component to prevent accidental deployment. When testing on a connector with shorting bars, the shorting bars must be disabled to ensure accurate test results. Insert an appropriate pick from EL-38125-580 and depress the shorting bars above the appropriate terminals. This will lift the shorting bar from the terminal and allow accurate test results. Take care not to damage the connector, shorting bar or terminal when depressing the shorting bar.

- If less than infinite resistance, repair the short between the two circuits.
- If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

- **If greater than 25 Ω**

3. Ignition ON.

4. Test for less than 11 V between the following control circuits and ground:

- Control circuit terminal 1
- Control circuit terminal 2

- **If 11 V or greater**

1. Ignition OFF, disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module, ignition ON.
2. Test for less than 1 V between the appropriate 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**

5. Ignition OFF.

6. Test for greater than 25 Ω resistance between each control circuit terminal listed below and ground:

- Control circuit terminal 1
- Control circuit terminal 2

- **If 25 Ω or less**

1. Disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for infinite resistance between the appropriate control circuit and ground.

NOTE:

Some connectors may be equipped with shorting bars as a safety component to prevent accidental deployment. When testing on a connector with shorting bars, the shorting bars must be disabled to ensure accurate test results. Insert an appropriate pick from EL-38125-580 and depress the shorting bars above the appropriate terminals. This will lift the shorting bar from the terminal and allow accurate test results. Take care not to damage the connector, shorting bar or terminal when depressing the shorting bar.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

- **If greater than 25 Ω**

7. Install a 3 A fused jumper wire between the control circuit terminals 1 and 2. Ignition ON.

8. Verify the appropriate scan tool Hood Hinge Deployment Loop Resistance parameter is less than 2 Ω .

- **If 2 Ω or greater**

1. Ignition OFF. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for less than 2 Ω in each control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

- **If less than 2 Ω**

9. Ignition OFF, connect the harness connector at the appropriate Hood Hinge Actuator, press in the CPA (if equipped) until an audible and/or tactile click is heard.
10. Ignition ON, clear DTCs. Operate the vehicle within the Conditions for Running the DTC.
11. Verify DTC B00A1 or B009A is not set.

- **If DTC B00A1 or B009A is set**

Replace the appropriate actuator.

- **If DTC B00A1 or B009A is not set**

12. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the diagnostic procedure.

- [Active Hood Hinge Actuator Replacement](#)
- [Control Module References](#) for Pedestrian Impact Detection Control Module replacement, setup and programming.

DTC B009B: RIGHT HOOD HINGE DEPLOYMENT LOOP

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

B009B 01

Right Hood Hinge Deployment Loop Short to Battery

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Right Hood Hinge Actuator - Low Control Circuit	B009B 02, B009B 0E	B009B 04	B009B 0D	B009B 01	-
Right Hood Hinge Actuator - High Control Circuit	B009B 02, B009B 0E	B009B 04	B009B 0D	B009B 01	-

Circuit/System Description

The pedestrian hood actuators deploy only when a valid signal whose energy is capable of triggering deployment of the hood is present. The pedestrian hood actuators only deploy in those events where the activation of the hood is expected. The hood actuator is not expected to deploy in low severity event where the risk of injury is low or in a high severity event like a car to car crash. During a frontal pedestrian impact of sufficient force the pedestrian impact detection module will allow current to flow through the deployment loop in order to deploy the hood actuators. The pedestrian impact detection module performs continuous diagnostic tests on the deployment loops to check for proper circuit continuity, shorts to ground and shorts to voltage. There are 2 shorting bars used within the hood hinge actuator connector which will short together both high and low control circuits, when the hood hinge connector is disconnected. This helps to prevent unwanted deployment of the actuator during servicing.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC

B009B 01

The pedestrian impact detection module deployment loop resistance leakage is less than 3.5 k ohms for 2.5 seconds.

B009B 02

The pedestrian impact detection module deployment loop resistance leakage is less than 3.5 k ohms for 2.5 seconds.

B009B 04

The pedestrian impact detection module deployment loop resistance is greater than 7.2 ohms for 2.5 seconds.

B009B 0D

The pedestrian impact detection module deployment loop resistance is greater than 3.1 ohms for 2.5 seconds.

B009B 0E

The pedestrian impact detection module deployment loop resistance is less than 1.6 ohms for 2.5 seconds.

Action Taken When the DTC Sets

- The pedestrian impact detection module commands the DIC to display Service Pedestrian Protection System.
- The pedestrian impact detection module stores DTC in memory.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 40 malfunction-free ignition cycles have occurred.

Diagnostic Aid

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

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

- Right Hood Hinge Actuators
- Inline harness connectors

- Pedestrian Impact Detection Control Module connector

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

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

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- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

NOTE: Refer to SIR Service Precautions .

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

- F100R Hood Hinge Actuator - Right
- Pedestrian Impact Detection Sensor - Right Front
- Pedestrian Impact Detection Sensor - Left Front
- Wiring harness connectors
- K36 Inflatable Restraint Sensing and Diagnostic Module wiring harness connector

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

1. Verify "Deployment Loop 20 Type" Resistance parameter stays consistently between 2.1 and 4.0 Ω without any spikes or dropouts while moving the harness near each connector listed below:

NOTE: If the condition is intermittent or cannot be duplicated, disconnect the connectors and add dielectric grease/lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087). This procedure will correct the high resistance condition due to terminal fretting corrosion.

- F100R Hood Hinge Actuator - Right

- Any inline harness connector
- K36 Inflatable Restraint Sensing and Diagnostic Module

NOTE: Deployment Loop 20 Type may have a value of "Not Equipped" and still have a value in the Resistance field. This loop is the Right Hood Hinge Deployment loop.

- If less than 2.1 or greater than 4.0 Ω

Refer to Circuit/System Testing.

- If there are spikes or dropouts, perform the following
- Inspect each connector terminal and harness for damage or corrosion and repair as necessary
- Apply dielectric grease / lubricant (Nyogel 760G or equivalent, meeting GM specification 9986087) to each connector terminal
- Insure each connector and CPA is correctly seated.
- If within 2.1 and 4.0 Ω without any spikes or dropouts

2. All OK

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector listed below at the F100R Hood Hinge Actuator - Right.
2. Test for greater than 25 Ω between the control circuit terminal 1 and the control circuit terminal 2.

- If 25 Ω or less

1. Disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for infinite resistance between the two control circuits.

NOTE: Some connectors may be equipped with shorting bars as a safety component to prevent accidental deployment. When testing on a connector with shorting bars, the shorting bars must be disabled to ensure accurate test results. Insert an appropriate pick from EL-38125-580 and depress the shorting bars above the appropriate terminals. This will lift the shorting bar from the terminal and allow accurate test results. Take care not to damage the connector, shorting bar or terminal when depressing the shorting bar.

- If less than infinite resistance, repair the short between the two circuits.
- If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

- If greater than 25 Ω

3. Ignition ON.

4. Test for less than 11 V between the following control circuits and ground:

- Control circuit terminal 1
- Control circuit terminal 2

- If 11 V or greater

1. Ignition OFF, disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module, ignition ON.
2. Test for less than 1 V between the appropriate 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

5. Ignition OFF.

6. Test for greater than 25 Ω resistance between each control circuit terminal listed below and ground:

- Control circuit terminal 1
- Control circuit terminal 2
- **If 25 Ω or less**

1. Disconnect the X1 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for infinite resistance between the appropriate control circuit and ground.

NOTE:

Some connectors may be equipped with shorting bars as a safety component to prevent accidental deployment. When testing on a connector with shorting bars, the shorting bars must be disabled to ensure accurate test results. Insert an appropriate pick from EL-38125-580 and depress the shorting bars above the appropriate terminals. This will lift the shorting bar from the terminal and allow accurate test results. Take care not to damage the connector, shorting bar or terminal when depressing the shorting bar.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

- **If greater than 25 Ω**

7. Install a 3 A fused jumper wire between the control circuit terminals 1 and 2. Ignition ON.
8. Verify the "Deployment Loop 20 Type" Resistance parameter is less than 2 Ω .

NOTE:

Deployment Loop 20 Type may have a value of "Not Equipped" and still have a value in the Resistance field. This loop is the Right Hood Hinge Deployment loop.

- **If 2 Ω or greater**

1. Ignition OFF. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for less than 2 Ω in each control circuit end to end.

- If 2 Ω or greater, repair the open/high resistance in the circuit.
- If less than 2 Ω , replace the K36 Inflatable Restraint Sensing and Diagnostic Module.

- **If less than 2 Ω**

9. Ignition OFF, connect the harness connector at the F100R Hood Hinge Actuator - Right, press in the CPA (if equipped) until an audible and/or tactile click is heard.
10. Ignition ON, clear DTCs. Operate the vehicle within the Conditions for Running the DTC.
11. Verify DTC B009B is not set.

- **If DTC B009B is set**

Replace the F100R Hood Hinge Actuator - Right.

- **If DTC B009B is not set**

12. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the diagnostic procedure.

- [Active Hood Hinge Actuator Replacement](#)
- [Control Module References](#) for Pedestrian Impact Detection Control Module replacement, setup and programming.

DTC B009C OR B00A0: PEDESTRIAN IMPACT DETECTION SENSOR

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

B009C 01

Pedestrian Impact Detection Sensor - Upper Beam Front Left Short to Battery

B009C 02

Pedestrian Impact Detection Sensor - Upper Beam Front Left Short to Ground

B009C 04

Pedestrian Impact Detection Sensor - Upper Beam Front Left Open

B009C 05

Pedestrian Impact Detection Sensor - Upper Beam Front Left High Voltage/Open

B009C 08

Pedestrian Impact Detection Sensor - Upper Beam Front Left Signal Invalid

B009C 39

Pedestrian Impact Detection Sensor - Upper Beam Front Left Internal Electronic Failure

B009C 3A

Pedestrian Impact Detection Sensor - Upper Beam Front Left Incorrect Component Installed

B009C 3B

Pedestrian Impact Detection Sensor - Upper Beam Front Left Internal Self Test Failed

B00A0 01

Pedestrian Impact Detection Sensor - Upper Beam Front Right Short to Battery

B00A0 02

Pedestrian Impact Detection Sensor - Upper Beam Front Right Short to Ground

B00A0 04

Pedestrian Impact Detection Sensor - Upper Beam Front Right Open

B00A0 05

Pedestrian Impact Detection Sensor - Upper Beam Front Right High Voltage/Open

B00A0 08

Pedestrian Impact Detection Sensor - Upper Beam Front Right Signal Invalid

B00A0 39

Pedestrian Impact Detection Sensor - Upper Beam Front Right Internal Electronic Failure

B00A0 3A

Diagnostic Fault Information

Circuit	Short to Ground	High Resistance	Open	Short to Voltage	Signal Performance
Pedestrian Impact Detection Sensor - Upper Beam Front Left Sensor High Signal Circuit	B009C 02	B009C 08	B009C 04, B009C 05, B009C 08	B009C 01, B009C 05	B009C 39, B009C 3A, B009C 3B
Pedestrian Impact Detection Sensor - Upper Beam Front Left Sensor Low Reference Circuit	B009C 02	B009C 08	B009C 04, B009C 05, B009C 08	B009C 01, B009C 05	B009C 39, B009C 3A, B009C3B
Pedestrian Impact Detection Sensor - Upper Beam Front Right Sensor High Signal Circuit	B00A0 02	B00A0 08	B00A0 04, B00A0 05, B00A0 08	B00A0 01, B00A0 05	B00A0 39, B00A0 3A
Pedestrian Impact Detection Sensor - Upper Beam Front Right Sensor Low Reference Circuit	B00A0 02	B00A0 08	B00A0 04, B00A0 05, B00A0 08	B00A0 01, B00A0 05	B00A0 39, B00A0 3A

Circuit/System Description

The pedestrian impact detection system senses and discriminates vehicle impacts and deploys the pedestrian hood hinge actuators in a timely manner to help reduce pedestrian head injuries. The Pedestrian Impact Detection Sensor provides discrete force information to the Inflatable Restraint Sensing and Diagnostic Module. The Inflatable Restraint Sensing and Diagnostic Module uses force information from the Pedestrian Impact Detection Sensors to determine those events when the deployment of the hood hinge actuator is expected. The pedestrian impact detection module provides a two wire current loop interface to the Pedestrian Impact Detection Sensors. This loop also powers the sensor. The Inflatable Restraint Sensing and Diagnostic Module monitors the Pedestrian Impact Detection Sensors for any system malfunction and when a malfunction is detected, a DTC will be stored in non volatile memory.

B82F Pedestrian Impact Detection Sensor - Upper Beam Front consists of two sensors connected together by a tube. If either sensor needs to be replaced they must be replaced as a complete assembly. Also verify there are no cracks or other damage to the front fascia or front bumper fascia energy absorber.

Conditions for Running the DTC

Ignition voltage is between 9-16 volts.

Conditions for Setting the DTC**B009C 01**

The sensor has been shorted to voltage.

B009C 02

The sensor has been shorted to ground.

B009C 04

The sensor is open.

B009C 05

The sensor has been shorted to voltage or is open.

B009C 08

The sensor high and/or low circuit is open or no new data received. An open circuit indicates as no new data received.

B009C 39

The sensor sent an error message or invalid data to the Inflatable Restraint Sensing and Diagnostic Module.

B009C 3A

Invalid sensor ID data received by the Inflatable Restraint Sensing and Diagnostic Module.

B009C 3B

Sensor internal self-test failed.

B00A0 01

The sensor has been shorted to voltage.

B00A0 02

The sensor has been shorted to ground.

B00A0 04

The sensor is open.

B00A0 05

The sensor has been shorted to voltage or is open.

B00A0 08

The sensor high and/or low circuit is open or no new data received. An open circuit indicates as no new data received.

B00A0 39

The sensor sent an error message or invalid data to the Inflatable Restraint Sensing and Diagnostic Module.

B00A0 3A

Invalid sensor ID data received by the Inflatable Restraint Sensing and Diagnostic Module.

Action Taken When the DTC Sets

- The Inflatable Restraint Sensing and Diagnostic Module commands the DIC to display Service Pedestrian Protection System.
- The Inflatable Restraint Sensing and Diagnostic Module stores DTC in memory.

Conditions for Clearing the DTC

- The condition responsible for setting the DTC no longer exists.
- A history DTC will clear once 40 malfunction-free ignition cycles have occurred.

Reference Information

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Pedestrian Impact Detection Description and Operation

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)
- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

NOTE:

- [SIR Service Precautions](#)
- **Inspect all terminals for damage or corrosion when disconnecting connectors. Damage or corrosion in the following requires repair or replacement of the affected component/connector.**
 - Pedestrian Impact Detection Sensors
 - Inflatable Restraint Sensing and Diagnostic Module
 - Inflatable Restraint Sensing and Diagnostic Module wiring harness connector

1. Ignition ON.

2. Verify that DTC B009C symptom byte 08, 39 or 3B or DTC B00A0 08 or 39 is not set as current.

- **If DTC B009C symptom byte 08, 39 or 3B or DTC B00A0 08 or 39 is set as current**

Replace the B82F Pedestrian Impact Detection Sensor - Upper Beam Front.

- **If DTC B009C or B009C symptom byte 08, 39 or 3B or DTC B00A0 08 or 39 is not set as current**

3. Verify that DTC B009C or B00A0 symptom byte 3A is not set as current.

- **If DTC B009C or B00A0 symptom byte 3A is set as current**

Replace the B82F Pedestrian Impact Detection Sensor - Upper Beam Front.

- **If DTC B009C or B00A0 symptom byte 3A is not set as current**

4. Verify that DTC B009C or B00A0 symptom byte 01, 02 or 05 is not set as current.

- **If DTC B009C or B00A0 symptom byte 01, 02, 04 or 05 is set as current**

Refer to Circuit/System Testing.

- **If DTC B009C or B00A0 symptom byte 01 or 02 is not set as current**

5. All OK.

Circuit/System Testing

1. Ignition OFF. Disconnect the harness connector at the appropriate Pedestrian Impact Detection Sensor. It may take up to 2 minutes for all vehicle systems to power down.

2. Test for less than 10 Ω between the low reference circuit terminal 2 and ground.

- **If 10 Ω or greater**

1. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
- **If less than 10 Ω**
3. Ignition ON.
4. Test for less than 1 V between the signal circuit and ground.
 - **If 1 V or greater**
 1. Ignition OFF. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module. Ignition ON.
 2. 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 K36 Inflatable Restraint Sensing and Diagnostic Module.
 - **If less than 1 V**
5. Ignition OFF.
6. Test for greater than 50 k Ω between the signal circuit and ground.
 - **If 50 k Ω or less**
 1. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
 2. 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 K36 Inflatable Restraint Sensing and Diagnostic Module.
 - **If greater than 50 k Ω**
7. Disconnect the X2 harness connector at the K36 Inflatable Restraint Sensing and Diagnostic Module.
8. Test for less than 2 Ω between the Pedestrian Impact Detection Sensor signal circuit terminal 1 and the appropriate K36 Inflatable Restraint Sensing and Diagnostic Module signal circuit terminal listed below:
 - Right front impact sensor terminal 31 X2
 - Left front impact sensor terminal 52 X2
- **If 2 Ω or greater**

Repair the short to voltage or an open/high resistance in the circuit.
- **If less than 2 Ω**
9. Ignition OFF, reconnect all harness connectors.
10. Ignition ON, clear DTCs. Operate the vehicle within the Conditions for Running the DTC.
11. Verify DTC B009C or B00A0 does not set.
 - **If the DTC sets**
 1. Replace the B82F Pedestrian Impact Detection Sensor - Upper Beam Front.
 2. Verify the DTC does not set.
 - If the DTC sets, replace the K36 Inflatable Restraint Sensing and Diagnostic Module.
 - If the DTC does not set.
 - 3. All OK.
- **If the DTC does not set**
12. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

- [Pedestrian Impact Detection Sensor Replacement - Front Upper Beam](#)
- [Control Module References](#) for pedestrian impact detection module replacement, setup and programming.

PEDESTRIAN IMPACT DETECTION SYSTEM DISABLING AND ENABLING

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

Condition	Action
If the vehicle was involved in an accident with a hinge deployment.	Disconnect the negative battery cable(s). Refer to Repairs and Inspections Required After a Collision .
When performing PIDS diagnostics.	Follow the appropriate PIDS service manual diagnostic procedure(s)
When removing or replacing a PIDS component or a component attached to a PIDS component.	Disconnect the negative battery cable(s)
If the vehicle is suspected of having shorted electrical wires.	Disconnect the negative battery cable(s)
When performing electrical diagnosis on components other than the PIDS.	Remove the PIDS fuse(s) when indicated by the diagnostic procedure to disable the system

Pedestrian Impact Detection System (PIDS) Service Precautions

WARNING: When performing service on or near the pedestrian impact detection system (PIDS) components or the PIDS wiring, the PIDS must be disabled. Failure to observe the correct procedure could cause deployment of the PIDS components. Serious injury can occur. Failure to observe the correct procedure could also result in unnecessary PIDS repairs

The pedestrian impact detection system (PIDS) maintains a reserve energy supply. The PIDS reserve energy supply provides deployment power for the hood hinge actuators if the PIDS loses battery power during a collision. Deployment power is available for as much as 1 minute after disconnecting the vehicle power. Waiting 1 minute before working on the system after disabling the system prevents deployment of the hood hinge actuators from the reserved energy supply.

General Service Instructions

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

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

Discard any of the following components if it has been dropped from a height of 100 cm (3 feet) or greater:

- Pedestrian impact detection system module
- Pedestrian impact detection system sensors
- Pedestrian impact detection system hood hinge actuators

Disabling Procedure - Pedestrian Impact Detection System (PIDS) Fuse

1. Place the ignition in the OFF position.

2. Locate and remove the fuse supplying power to the PIDS. Refer to [Electrical Center Identification Views Electrical Center Identification Views](#) . With all PIDS fuses removed and the ignition switch in the ON position, the PIDS warning indicator illuminates. This is normal operation and does not indicate a PIDS system malfunction.
3. Wait 1 minute before working on the system.

Enabling Procedure - Pedestrian Impact Detection System (PIDS) Fuse

1. Place the ignition in the OFF position.
2. Install the fuse supplying power to the PIDS. Refer to [Electrical Center Identification Views Electrical Center Identification Views](#) .
3. Turn the ignition switch to the ON position. The PIDS indicator will flash then turn OFF.
4. Perform the Diagnostic System Check - Vehicle if the PIDS warning indicator does not operate as described. Refer to [Diagnostic System Check - Vehicle](#) .

Disabling Procedure - Negative Battery Cable

1. Place the ignition in the OFF position.
2. Disconnect the negative battery cable from the battery. Refer to [Battery Negative Cable Disconnection and Connection](#) .
3. Wait 1 minute before working on system.

Enabling Procedure - Negative Battery Cable

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

REPAIR INSTRUCTIONS

PEDESTRIAN IMPACT DETECTION SENSOR REPLACEMENT - FRONT UPPER BEAM

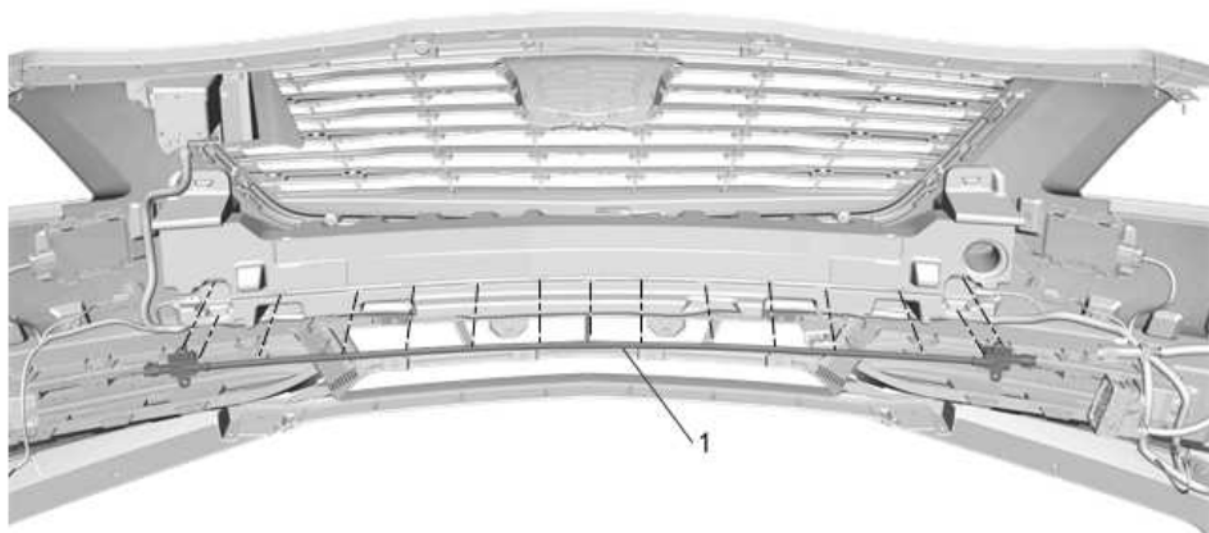


Fig. 1: Pedestrian Impact Detection Sensor - Front Upper Beam
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Disable the system. Refer to Pedestrian Impact Detection System Disabling and Enabling 2. Front Bumper Fascia Replacement (Without UV3) Front Bumper Fascia Replacement (With UV3)	
1	Pedestrian Impact Detection Sensor Procedure 1. Disconnect the electrical connector. 2. Carefully remove the pedestrian impact detection sensor from the front bumper fascia energy absorber. 3. Enable the system. Refer to Pedestrian Impact Detection System Disabling and Enabling NOTE: • Inspect the absorber / EA foam for any cracks or damage and inspect pedestrian sensor tube for any cuts or puncture holes. • Replace front bumper fascia or sensor system if any damage is found. This can cause faulty readings with the pedestrian impact sensor. • The pedestrian sensor is a press fit into the absorber.

ACTIVE HOOD HINGE ACTUATOR REPLACEMENT

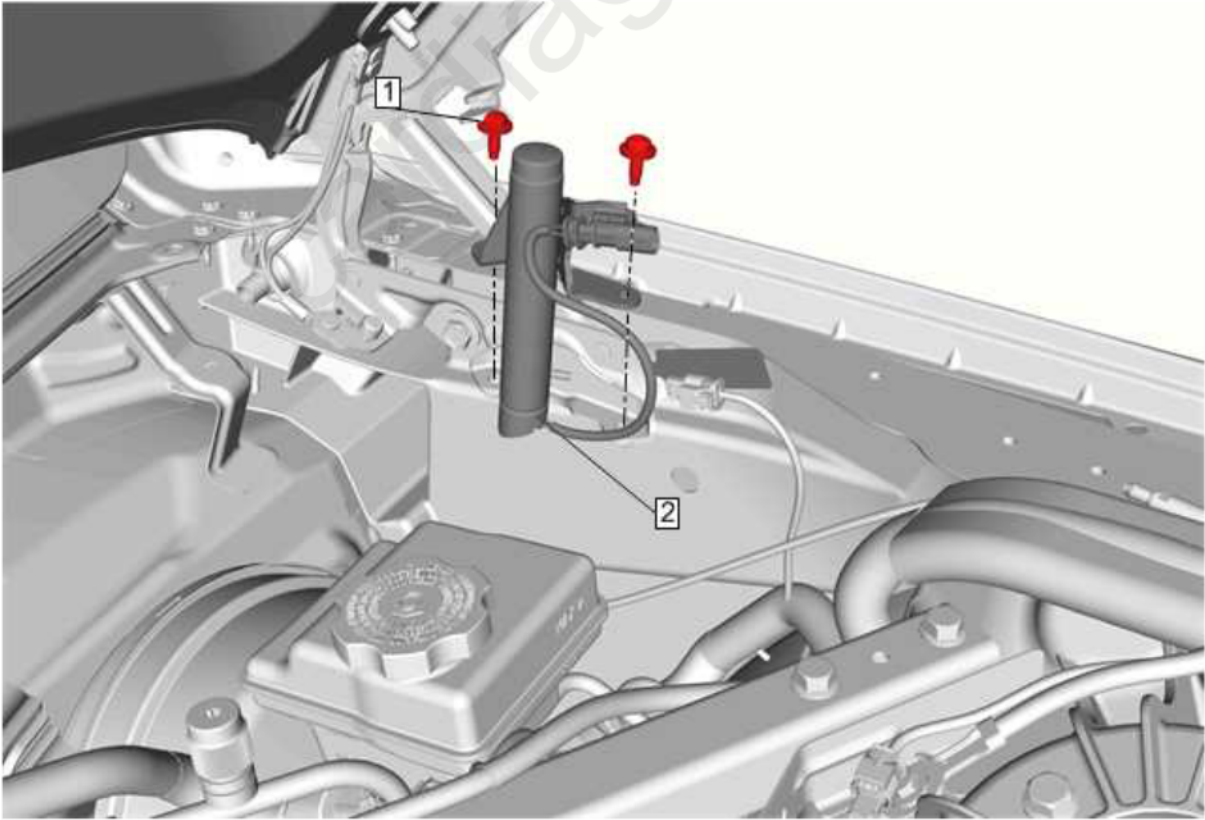


Fig. 2: Active Hood Hinge Actuator
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedure Disable the system. Refer to Pedestrian Impact Detection System Disabling and Enabling	
1	Active Hood Hinge Actuator Bolt [2x] CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Active Hood Hinge Actuator Procedure 1. Disconnect the electrical connector. 2. If deployed, replace the following parts: • Left and right actuator • Left and right hood hinge • Hood 3. Inspect the hood latch and subsequent replacement if functionality or appearance is compromised. 4. Enable the system. Refer to Pedestrian Impact Detection System Disabling and Enabling

PEDESTRIAN IMPACT DETECTION SYSTEM HANDLING AND SCRAPPING

Special Tools

- **J38826-1** SIR Deployment Harness
- **J38826-45** PIDS Actuator Adapter

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

Live and Undeployed Pedestrian Impact Detection System Actuator

Take special care when handling or storing an undeployed Pedestrian Detection Impact System (PIDS) Actuator. A PIDS Actuator deployment produces a rapid generation of gas. This may cause the PIDS Actuator or an object in front of the PIDS Actuator, to project through the air in the event of an unlikely deployment.

Scrapping Procedure

During the course of a vehicles useful life, certain situations may arise which will require the disposal of a live and undeployed PIDS Actuator. Do NOT dispose a live and undeployed PIDS Actuator through normal disposal channels until the PIDS Actuator has been deployed.

Do not deploy the PIDS Actuator in the following situations:

1. After replacement of a PIDS Actuator under warranty the PIDS Actuator may need to be returned undeployed to the manufacturer.
2. If the vehicle is the subject of a Product Liability report, GM-1241 or Special Field Investigation (SFI), related to the PIDS system and is subject to a preliminary investigation do NOT alter the PIDS Actuator system in any manner.
3. If the vehicle is involved in a campaign affecting the PIDS Actuator follow the instructions in the Campaign Service Bulletin for proper PIDS Actuator handling procedures.

Deployment Procedures

Deploy the PIDS Actuators outside of the vehicle.

Deployment Outside Vehicle

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

- Using the PIDS diagnostics, you determine that the PIDS Actuator is malfunctioning.
- The PIDS Actuator is cosmetically damaged, scratched or broken.
- The PIDS Actuator pigtail is damaged.
- The PIDS Actuator connector is damaged.
- The PIDS Actuator connector terminals are damaged.

Deployment and disposal of a malfunctioning PIDS Actuator is subject to any required retention period.

WARNING: In order to prevent accidental deployment and the risk of personal injury, do not dispose of an undeployed Pedestrian Impact Detection System (PIDS) Actuator as normal shop waste. Undeployed PIDS Actuators contain substances that could cause severe illness or personal injury if their sealed containers are damaged during disposal. Use the following deployment procedures to safely dispose of an undeployed PIDS Actuators. Failure to observe the following disposal methods may be a violation of Federal law.

1. Turn OFF the ignition.
2. Remove the ignition key.
3. Put on safety glasses.
4. Remove the PIDS Actuator.
5. Place the PIDS Actuator on a work bench, with connector side facing up and away from the surface.
6. Clear a space on the ground about 1.85 m (6 ft) in diameter for deployment of the PIDS Actuator. If possible, use a paved, outdoor location free of activity. Otherwise, use a space free of activity on the shop floor. Ensure you have sufficient ventilation.
7. Clear the area of loose or flammable objects.
8. Place PIDS Actuator in the center.
9. Inspect the SIR deployment harness and the PIDS Actuator adapter for damage. Replace as needed.
10. Short the 2 SIR deployment harness leads together using one banana plug seated into the other.
11. Connect the appropriate pigtail adapter to the SIR deployment harness.
12. Extend the SIR deployment harness and adapter to the full length of 5 m from the deployment area.
13. Connect the PIDS actuator to the adapter on the SIR deployment harness.
14. Place a 12 volt minimum/4 amp minimum power source, such as a vehicle battery, near the shorted end of the harness.
15. Clear the area of people.

NOTE: The rapid expansion of gas involved with deploying a PIDS Actuator is very loud. Notify all the people in the immediate area that you intend to deploy the PIDS Actuator.

16. Separate the 2 banana plugs on the PIDS deployment harness that were shorted together earlier in the procedure.
17. Connect the SIR deployment harness wires to the power source. Deployment of the PIDS Actuator will occur when contact is made.
18. Disconnect the SIR deployment harness from the power source after the PIDS Actuator deploys.

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

REPAIRS AND INSPECTIONS REQUIRED AFTER A COLLISION

Special Tools

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- **J38826-45** PIDS Actuator Adapter

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DESCRIPTION AND OPERATION

PEDESTRIAN IMPACT DETECTION DESCRIPTION AND OPERATION

Pedestrian Impact Detection System Description and Operation

The pedestrian impact detection systems primary function is to provide supplemental protection to vulnerable road users involved in vehicle impacts. The pedestrian impact detection system is also known as the active pedestrian protection system. The pedestrian impact detection system is a functional system for raising the hood to provide sufficient vertical deformation space under the hood. In Europe and Japan an active pedestrian impact detection system is necessary for vehicles which do not provide the required deformation space under the hood. The pedestrian impact detection system includes the following components

- Inflatable Restraint Sensing and Diagnostic Module
- Pedestrian Impact Detection Sensor - Upper Beam Front Left
- Pedestrian Impact Detection Sensor - Upper Beam Front Right
- Two Hood Hinge Actuators

The pedestrian impact detection system will sense and discriminate vulnerable road user impacts and deploy the hood hinge actuators to lift the rear section of the hood in a timely manner to help reduce pedestrian head injuries. The term "deployment" applies to the activation of the hood via the hood actuators. The pedestrian impact detection system is designed to sense and discriminate road user impacts (eg. pedestrian, cyclist) from other types of impacts in order to properly deploy the hood actuators. No actions or inputs are required from the driver or passenger to trigger this device. The Inflatable Restraint Sensing and Diagnostic Module uses two Pedestrian Impact Detection Sensors connected together by a tube to get force information needed for the deployment of the hood hinge actuators. The Inflatable Restraint Sensing and Diagnostic Module deploys the hood actuators using two deployment loops. The pedestrian impact detection system only operates at vehicles speeds between 22 km/h (14 mph) to 50 km/h (31 mph). The Inflatable Restraint Sensing and Diagnostic Module detects internal and interface faults and commands the Service Pedestrian Protection System message in the driver information center to indicate a system fault.

After a deployment event, the vehicle operator is able to reset the hood to its normal driving position. Refer to the Owner's Manual for more information. After resetting the hood, the pedestrian impact detection system is not required to be fully functional. For full functionality, it is necessary to replace system component(s) at an approved service facility.

Pedestrian Impact Detection Sensors

The K36 Inflatable Restraint Sensing and Diagnostic Module provides a two wire current loop interface to the Pedestrian Impact Detection Sensor - Right Front and Pedestrian Impact Detection Sensor - Left Front. The Inflatable Restraint Sensing and Diagnostic Module also provides power and ground to the sensors over the same two wire discrete interface. The two sensors are connected together by a tube and are serviced as an assembly.

If the sensors are replaced, visually inspect the front fascia and front bumper fascia energy absorber for cracks or other damage that may interfere with proper operation of the system. Replace any damaged parts.

Hood Hinge Actuators

The pedestrian hood actuators deploy only when a valid signal whose energy is capable of triggering deployment of the hood is present. The pedestrian hood actuators only deploy in those events where the activation of the hood is expected. The hood actuator is not expected to deploy in low severity event where the risk of injury is low or in a high severity event like car to car crash. During a frontal pedestrian impact of sufficient force, the Inflatable Restraint Sensing and Diagnostic Module will allow current to flow through the deployment loops in order to deploy the hood hinge actuators. The Inflatable Restraint Sensing and Diagnostic Module also performs continuous diagnostic tests on the deployment loops to check for proper circuit continuity, shorts to ground and shorts voltage. In order to prevent unwanted deployment of the actuator during service, the hood hinge actuator contains 2 shorting bars that will short both high and low circuit pins when disconnected. The Inflatable Restraint Sensing and Diagnostic Module only issues a deployment command when a valid Pedestrian Impact Detection Sensor signal or confirmation has been generated. No inadvertent deployments will occur in any deployment loop due to a single point fault.

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