

2018 ACCESSORIES & EQUIPMENT

Parking Assistance Systems - Traverse

SPECIFICATIONS

FASTENER SPECIFICATIONS

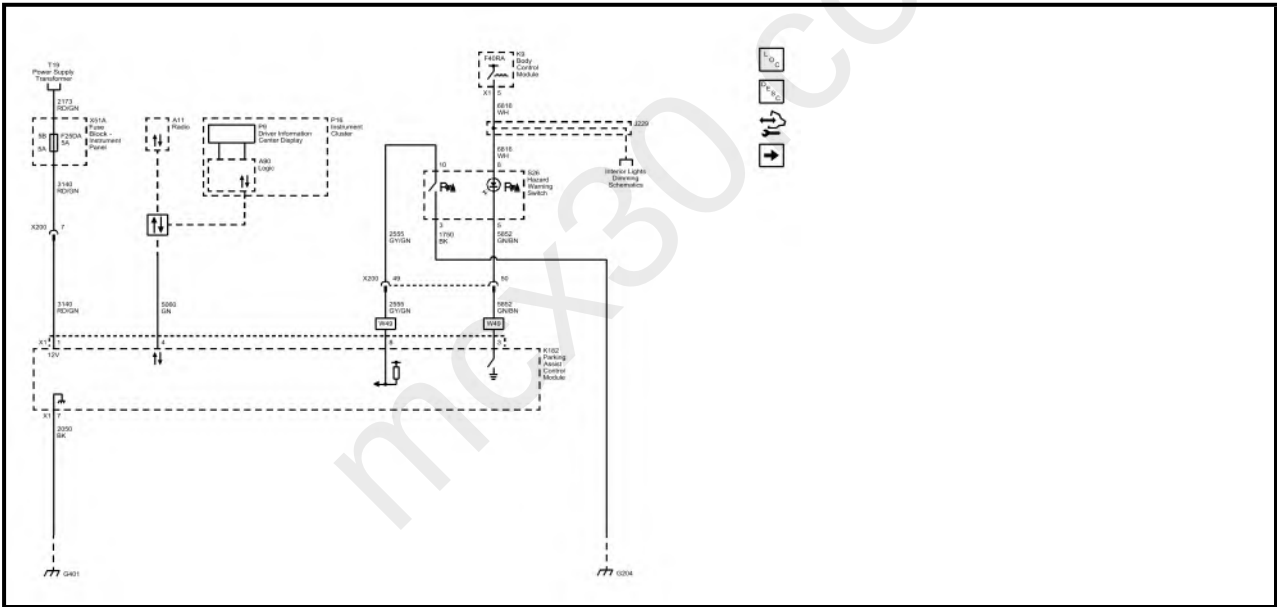
Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Parking Assist Alarm Control Module Nut	4.5 N.m (40 lb in)

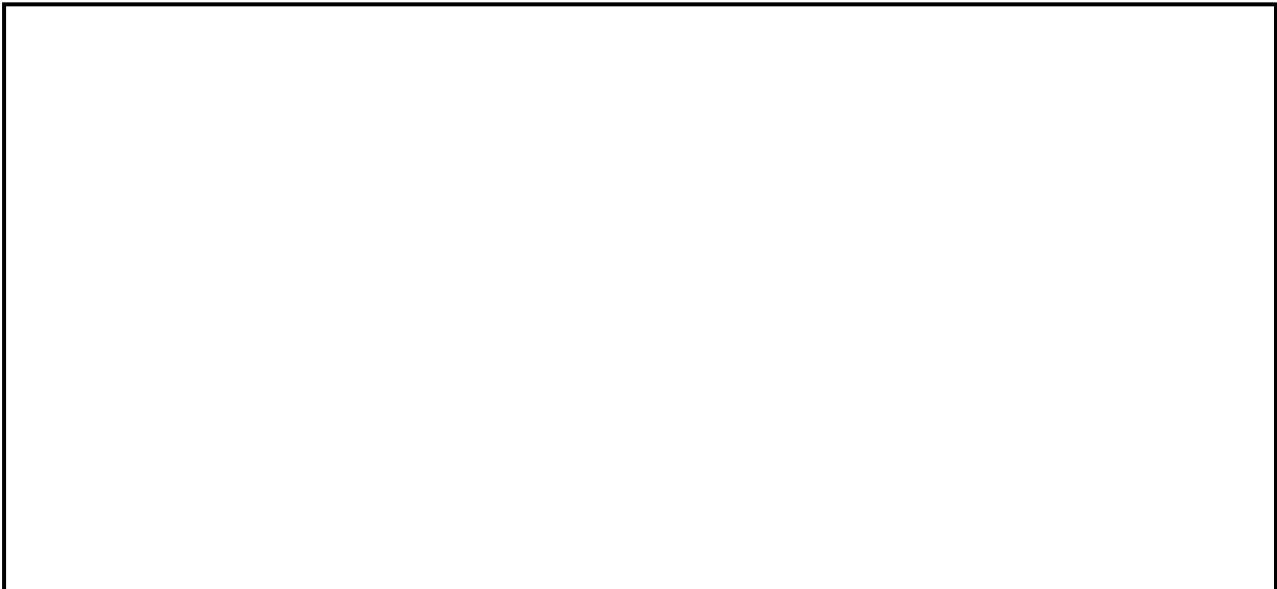
SCHEMATIC WIRING DIAGRAMS

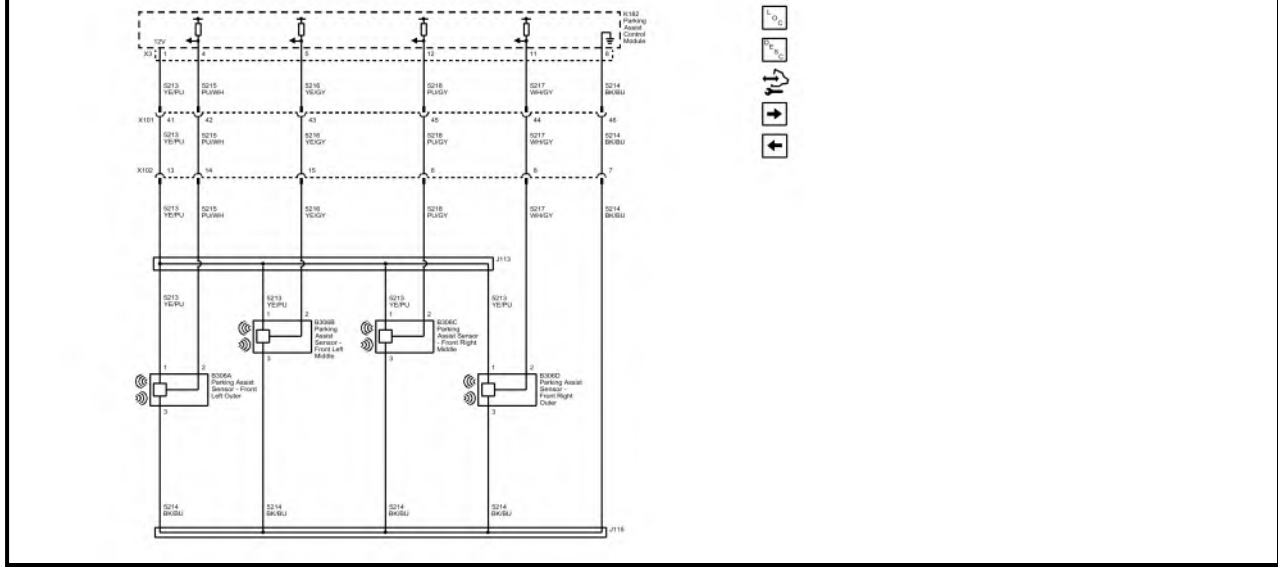
PARKING ASSISTANCE SYSTEMS WIRING SCHEMATICS

Park Assist - Power, Ground, and Serial Data

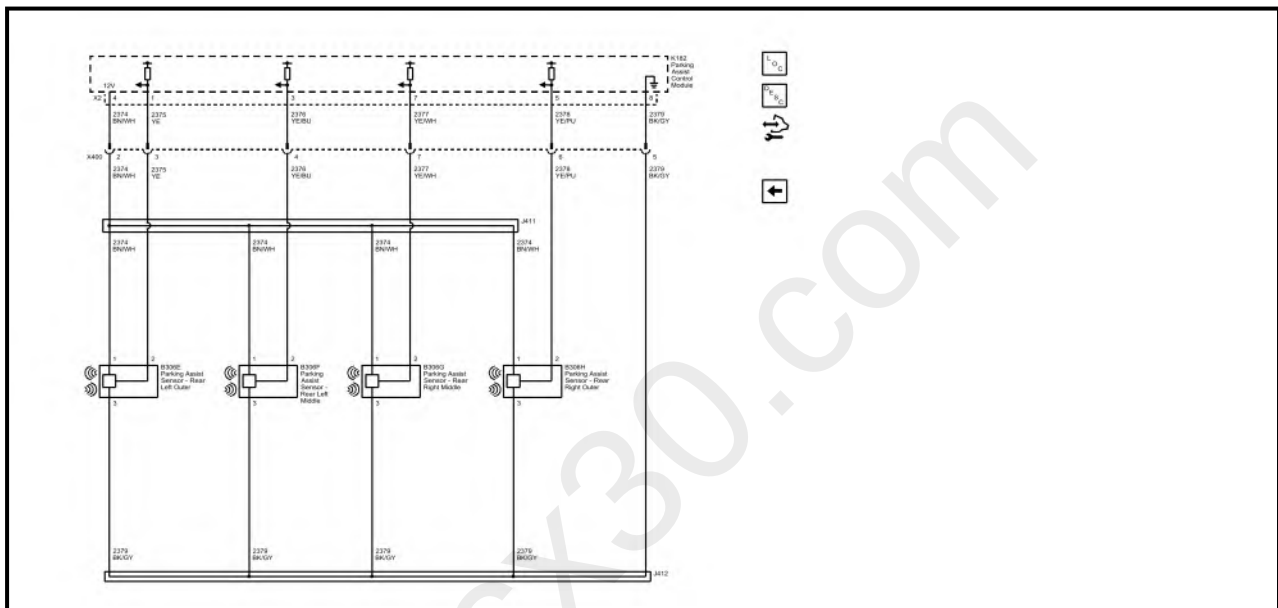


Park Assist - Front Sensors (UD5)





Park Assist - Rear Sensors



DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B0958, B0959, B0960, OR B0961

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](#)

DTC Descriptor

DTC B0958

Parking Assist Rear Sensor Left Corner Circuit

DTC B0959

Parking Assist Rear Sensor Left Middle Circuit

DTC B0960

Parking Assist Rear Sensor Right Middle Circuit

Parking Assist Rear Sensor Right Corner Circuit

Symptom Byte Information: [Symptom Byte List](#)

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
9 V Reference - Terminal 4 X2 @ K182 Parking Assist Control Module	B1405 02	B0958 04, B0959 04, B0960 04, B0961 04	B1405 01	-
Signal - Terminal 1 X2 @ K182 Parking Assist Control Module	B0958 02	B0958 04	B0958 01	B0958 08, F1
Signal - Terminal 3 X2 @ K182 Parking Assist Control Module	B0959 02	B0959 04	B0959 01	B0959 08, F1
Signal - Terminal 7 X2 @ K182 Parking Assist Control Module	B0960 02	B0960 04	B0960 01	B0960 08, F1
Signal - Terminal 5 X2 @ K182 Parking Assist Control Module	B0961 02	B0961 04	B0961 01	B0961 08, F1
Low Reference - Terminal 8 X2 @ K182 Parking Assist Control Module	-	B0958 01, B0959 01, B0960 01, B0961 01	-	-

Circuit/System Description

Circuit	Description
9 V Reference	Regulated voltage supplied by the control module.
Signal	The control module input circuit has an internal resistance connected to 9 V.
Low Reference	Grounded through the control module.

Component	Description
K182 Parking Assist Control Module	The assembly has several functions: • {If equipped} Front Parking Assist • Rear Parking Assist
B306 Parking Assist Sensor	The sensors can send and receive ultrasonic sounds. First a short sound is emitted. If there is an obstacle in front of the sensor, the obstacle will reflect the sound back to the sensor. The time difference between sending and receiving is the measure for the distance to the obstacle.

Conditions for Running the DTC

Ignition = On

Conditions for Setting the DTC

B0958 01, B0959 01, B0960 01, B0961 01

Signal circuit = Short to Voltage

B0958 02, B0959 02, B0960 02, B0961 02

Signal circuit = Short to Ground

B0958 04, B0959 04, B0960 04, B0961 04

- 9 V Reference circuit = Open
- Signal circuit = Open

B0958 08, B0959 08, B0960 08, B0961 08

Parking Assist Sensors = Performance - Signal Invalid

B0958 22, B0959 22, B0960 22, B0961 22

Parking Assist Sensors = Too Short Low-Time

B0958 39, B0959 39, B0960 39, B0961 39

Parking Assist Sensors = Internal Malfunction

B0958 3A, B0959 3A, B0960 3A, B0961 3A

Parking Assist Sensors = Incorrect Component Installed

B0958 F0, B0959 F0, B0960 F0, B0961 F0

Parking Assist Sensors = Too Few Pulses

B0958 F1, B0959 F1, B0960 F1, B0961 F1

Parking Assist Sensors = Erratic

Actions Taken When the DTC Sets

Parking Assist = Disabled

Conditions for Clearing the DTC

The conditions for setting the DTC no longer exist.

Reference Information

Schematic Reference

Parking Assistance Systems Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Parking Assist Description and Operation (UD7)Parking Assist Description and Operation (UD5)

Electrical Information Reference

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

Scan Tool Reference

Control Module References

Circuit/System Testing

1. Ignition/Vehicle & All vehicle systems - Off
2. Disconnect the appropriate electrical connector:
 - B306E Parking Assist Sensor - Rear Left Outer
 - B306F Parking Assist Sensor - Rear Left Middle
 - B306G Parking Assist Sensor - Rear Right Middle
 - B306H Parking Assist Sensor - Rear Right Outer
3. Ignition/Vehicle - On
4. Verify a test lamp turns On between the test points: Low Reference circuit terminal 3 & B+
 - **If the test lamp does not turn On**
 1. Disconnect the electrical connector: X2 @ K182 Parking Assist Control Module
 2. Test for less than 2 ohms between the test points: Low Reference circuit terminal 3 @ Component harness & Low Reference circuit terminal 8 @ Control module harness
 - If 2 ohms or greater - Repair the open/high resistance in the circuit.
 - If less than 2 ohms - Replace the component: K182 Parking Assist Control Module
 - **Go to next step: If the test lamp turns On**
5. Ignition - On/Vehicle - In Service Mode
6. Test for 7.0 to 10.0 V between the test points: 9 V Reference circuit terminal 1 & Ground
 - **If greater than 12.2 V**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: X2 @ K182 Parking Assist Control Module
 3. Ignition - On/Vehicle - In Service Mode
 4. Test for less than 1 V between the test points: 9 V Reference circuit terminal 1 @ Component harness & Ground
 - If 1 V or greater - Repair the short to voltage on the circuit.
 - If less than 1 V - Replace the component: K182 Parking Assist Control Module
 - **If less than 7.0 V**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: X2 @ K182 Parking Assist Control Module
 3. Test for infinite resistance between the test points: 9 V Reference circuit terminal 1 @ Component harness & Ground
 - If less than infinite resistance - Repair the short to ground on the circuit.
 - Go to next step: If infinite resistance
 4. Test for less than 2 ohms between the test points: 9 V Reference circuit terminal 1 @ Component harness & 9 V Reference circuit terminal 4 @ Control module harness
 - If 2 ohms or greater - Repair the open/high resistance in the circuit.
 - If less than 2 ohms - Replace the component: K182 Parking Assist Control Module
 - **Go to next step: If between 7.0 and 12.2 V**
7. Test for 1.5 to 12.0 V between the test points: Signal circuit terminal 2 & Ground
 - **If greater than 12.0 V**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: X2 @ K182 Parking Assist Control Module
 3. Ignition - On/Vehicle - In Service Mode
 4. 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 - Replace the component: K182 Parking Assist Control Module
 - **If less than 1.5 V**
 1. Ignition/Vehicle - Off
 2. Disconnect the electrical connector: X2 @ K182 Parking Assist Control Module

3. 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.
 - Go to next step: If infinite resistance
4. Test for less than 2 ohms between the test points: Signal circuit terminal 2 @ Component harness & The other end of the circuit @ Control module harness
 - If 2 ohms or greater - Repair the open/high resistance in the circuit.
 - If less than 2 ohms - Replace the component: K182 Parking Assist Control Module
- **Go to next step: If between 1.5 and 12.0 V**
8. Replace the appropriate component: B306 Parking Assist Sensor

Repair Instructions

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

- [Rear Parking Assist Alarm Sensor Replacement](#)
- For control module replacement, programming, and setup refer to: [Control Module References](#)

DTC B096B

Diagnostic Instructions

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

DTC Descriptor

DTC B096B 02

Parking Assist Switch Parallel Parking Circuit Short to Ground

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Parallel Park Assist Switch Signal	B096B 02	1	-	-
Parallel Parking Assist Switch Ground	-	1	-	-
1. Parallel Parking Assist Switch Malfunction				

Circuit/System Description

The parallel parking assist can be activated/deactivated by pressing the parallel parking assist switch.

Conditions for Running the DTC

- Ignition ON
- The parallel parking assist is activated. The activation takes place through pressing the parallel parking assist switch.

Conditions for Setting the DTC

The Parking Assist Control Module has detected a short to ground.

Action Taken When the DTC Sets

- The parallel parking assist is disabled.
- A message is displayed in the driver information center that parking assist is not available.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

Parking Assistance Systems Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Parking Assist Description and Operation (UD7)Parking Assist Description and Operation (UD5)

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Activate and deactivate the parallel park assist switch and verify the scan tool Advanced Park Assist Switch parameter changes between Active and Inactive.
 - **If the parameter does not change between Active and Inactive**
Refer to Circuit/System Testing.
 - **Go to next step: If the parameter change between Active and Inactive**
3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S107 Parking Assist On/Off Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify the scan tool parallel park assist switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the X1 harness connector at the K182 Parking Assist Control Module.
 2. Test for infinite resistance between the signal circuit terminal 10 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.

- If infinite resistance, replace the K182 Parking Assist Control Module.
 - **Go to next step: If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 6 and the ground circuit terminal 10.
 6. Verify the scan tool parallel parking assist parameter is Active.
 - **If not Active**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K182 Parking Assist Control 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.
 - Go to next step: If less than 1 V
 3. Test for less than 2 Ω in the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K182 Parking Assist Control Module.
 - **Go to next step: If Active**
 7. Test or replace the S107 Parking Assist On/Off Switch.

Repair Instructions

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

- [Control Module References](#) for control module replacement, setup and programming.

DTC B1015

Diagnostic Instructions

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

DTC Descriptor

DTC B1015 00

Vehicle Identification Number Information Malfunction

Circuit/System Description

When the ignition is turned ON, the parking assist control module, frontview camera module, radar sensor modules and active safety control module receive the vehicle identification number (VIN) from the body control module. The modules will compare the VIN received to the VIN stored in memory.

Conditions for Running the DTC

Ignition voltage is between 9 - 16 V.

Conditions for Setting the DTC

The stored VIN does not match the received VIN.

Action Taken When the DTC Sets

- The parking assist system, lane departure warning system, forward collision alert system, and/or active safety system is disabled.
- The driver information center displays SERVICE PARK ASSIST or SERVICE LANE DEPARTURE SYSTEM or SERVICE DRIVER ASSIST.

Conditions for Clearing the DTC

The stored VIN matches the VIN stored in the body control module.

Reference Information

Schematic Reference

Parking Assistance Systems Wiring Schematics

Connector End View Reference

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

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify DTC B1015 is not.
 - **If DTC B1015 is set**
 1. Program the control module the DTC originally set in.
 2. Verify the DTC does not set.
 - If the DTC is sets, replace the control module the DTC set in.
 - Go to next step: If the DTC does not set
 3. All OK
 - **Go to next step: If DTC B1015 is not set**
3. All OK

Repair Instructions

Perform the Diagnostic Repair Verification after completing the repair

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

DTC B1405

Diagnostic Instructions

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

DTC Descriptors

DTC B1405

Control Module Voltage Reference Output 2 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
12 V Reference	B1405 02	B0954 04, B0955 04, B0956 04, B0957 04, B0958 04, B0959 04, B0960 04, B0961 04, B096C 04, B096D 04	-	-

Circuit/System Description

The parking assist sensors are 3-wire ultrasonic sensors that are used to determine the distance between the vehicle and an object. The Parking Assist Control Module supplies 12 V to the parking assist sensors via the 12 V reference circuit and provides ground via the low reference circuit. The Parking Assist Control Module triggers the sensors in a sequential loop. After each sensor transmits, the Parking Assist Control Module uses the sensor echo received through the signal circuit to calculate the distance and position of an object.

Conditions for Running the DTC

Ignition ON

Conditions for Setting the DTC

B1405 01

The Parking Assist Control Module has detected the 12 V reference circuit is shorted to voltage.

B1405 02

The Parking Assist Control Module has detected the 12 V reference circuit is shorted to ground.

B1405 03

The Parking Assist Control Module has detected the 12 V reference circuit is less than 7.2 V.

B1405 07

The Parking Assist Control Module has detected the 12 V reference circuit is shorted to voltage.

Action Taken When the DTC Sets

- Parking assist is disabled.
- The driver information center may display a system service message.

Conditions for Clearing the DTC

The condition for setting the DTC is no longer present.

Reference Information

Schematic Reference

Parking Assistance Systems Wiring Schematics

Connector End View Reference

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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

Rear Park Assist (UD7)

1. Ignition OFF, disconnect the X2 harness connector at the K182 Parking Assist Control Module.
2. Test for infinite resistance between the 12 V reference circuit terminal 4 X2 and ground.
 - **If less than infinite resistance**
 1. Ignition OFF, disconnect the harness connector at each of the B306 Rear Parking Assist Sensors.
 2. Test for infinite resistance between the 12 V reference circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If less than 2 Ω , replace the appropriate B306 Rear Object Sensor.
 - **Go to next step: If infinite resistance**
3. Ignition ON.
4. Test for less than 1 V between the 12 V reference circuit terminal 4 and ground.
 - **If 1 V or greater**

Repair the short to voltage on the circuit.
 - **Go to next step: If less than 1 V**
5. Replace the K182 Parking Assist Control Module.

Front and Rear Park Assist (UD5) and Advanced Park Assist (UFQ)

1. Ignition OFF, disconnect X2 and X3 harness connectors at the K182 Parking Assist Control Module, ignition ON.
2. Test for less than 1 V between the 12 V reference circuit terminals listed below and ground.
 - X2 Terminal 4
 - X3 Terminal 1
 - **If 1 V or greater**

Repair the short to voltage on the circuit.
 - **Go to next step: If less than 1 V**
3. Ignition OFF.
4. Test for infinite resistance between 12 V reference circuit terminals listed below and ground.
 - X2 Terminal 4
 - X3 Terminal 1
 - **If not infinite resistance**

Repair the short to ground on the circuit.
 - **Go to next step: If infinite resistance**
5. Replace the K182 Parking Assist Control Module.

Repair Instructions

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

- [Control Module References](#) for Control Module replacement, programming, and setup.

DTC P18CB

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](#)

DTC Descriptor

Parking Assist System Performance

Circuit/System Description

The control module communicates with the engine control module via serial data.

Conditions for Running the DTC

Ignition = On

Conditions for Setting the DTC

K20 Engine Control Module = Invalid Data Received From Parking Assist Control Module

Actions Taken When the DTC Sets

DTCs listed in the DTC Descriptor Category = Type B DTC

Conditions for Clearing the DTC

DTCs listed in the DTC Descriptor Category = Type B DTC

Reference Information

Schematic Reference

Parking Assistance Systems Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

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

DTC Type Reference

Powertrain Diagnostic Trouble Code (DTC) Type Definitions

Scan Tool Reference

Control Module References

Circuit/System Verification

1. Ignition - On/Vehicle - In Service Mode

2. Verify no other DTCs are set.

- **If other DTCs are set**

Refer to: [Diagnostic Trouble Code \(DTC\) List - Vehicle](#)

- **Go to next step: If no other DTCs are set**

3. Replace the component: K182 Parking Assist Control Module

4. Verify the DTC does not set.

- **If the DTC sets**

Replace the component: K20 Engine Control Module

- **Go to next step: If the DTC does not set**

5. All OK.

Repair Instructions

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

For control module replacement, programming, and setup refer to: [Control Module References](#)

SYMPTOMS - PARKING ASSISTANCE SYSTEMS

NOTE: The following steps must be completed before using the symptom tables:

1. Perform the [Diagnostic System Check - Vehicle](#) before using the Symptom Tables in order to verify that all of the following are true:

- There are no DTCs set.
- The control modules can communicate via the serial data link.

Note: The rear vision camera does not communicate on the serial data bus.

2. Review the system operation in order to familiarize yourself with the system functions. Refer to [Parking Assist Description and Operation \(UD7\)](#) [Parking Assist Description and Operation \(UD5\)](#).

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the system. Refer to [Checking Aftermarket Accessories](#).
- Inspect the easily accessible or visible system components for obvious damage or conditions which may cause the symptom.
- This system can use various sensors that need to be clean in order to function properly. Make sure to check the following sensors for obstructions:
 - parking assist sensors located in the front and rear bumper covers.
 - rear vision camera lens.
 - front camera line of vision.
 - side object sensor module areas at sides of rear bumper fascia.

Intermittent

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

Symptom List

- [Parking Assist System Malfunction](#)
- [Parallel Parking Assist System Malfunction](#)

PARKING ASSIST SYSTEM MALFUNCTION

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 parking assist system is enabled and disabled through the driver information center using vehicle personalization.

The Parking Assist Control Module supplies a reference voltage and a low reference to the parking assist sensors. The sensors will return a signal based on the reflections from objects within range of the sensors.

When an object is detected, the Parking Assist Control Module will send serial data to the radio and memory seat module to provide either an audible alert or haptic feedback through the Active Safety Seat. The driver can select between audible or haptic alerts in the vehicle personalization menu.

Diagnostic Aids

The scan tool Park Assist Disable History parameters are a list of the seven previous reasons the parking assist system was disabled. These parameters may help in the diagnosis of an intermittent concern or a customer concern which is the result of normal system operation. The following is a brief description of potential causes which may aid in diagnosis:

- Manual Disable - The parking assist system has been disabled through the parking assist switch or audio system personalization menu.
- Hitch/Object Attached - The parking assist control module is detecting an object that is attached to the vehicle. Common items such as a hitch receiver, trailer, or a bicycle rack may cause this concern. Additionally, damage to the rear of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 mph).
- Reverse Overspeed - The vehicle is travelling too fast in reverse at speeds of greater than 8 km/h (5 mph).
- Inhibit - The parking assist control module has lost or received invalid GMLAN signal(s).
- Sensor Disturbance - An outside interference is causing sensor movement. Such interference may be caused a heavy pounding, like that of a nearby jackhammer, or large changes in pressure, such as a large truck air brakes.
- Sensor Ring Time - If the sensor fails its own diagnostic initialization the parking assist control module will set this error. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 mph). The following is a list of reasons this cause may have set:
 - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
 - Silicone insulator surrounding sensor maybe missing, cut, or twisted.
 - Improperly installed sensor, sensor maybe be crooked due to a tight wire harness.
 - One or more of the sensors may be scratched or the paint maybe chipped.
 - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.

Reference Information

Schematic Reference

[Parking Assistance Systems Wiring Schematics](#)

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Parking Assist Description and Operation (UD7)**Parking Assist Description and Operation (UD5)**

Electrical Information Reference

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

Scan Tool Reference

Control Module References for scan tool information.

Circuit/System Verification

1. Ignition ON.
 - **Go to next step: If the indicator does turn ON and OFF**
2. Transmission in R, verify the Engine Control Module (ECM) scan tool Reverse Position Switch parameter is Active.
 - **If the parameter is not Active**
Refer to **Backup Lamps Malfunction** .
 - **Go to next step: If the parameter is Active**
3. Transmission in R, verify the scan tool Park Assist System Status parameter displays Enable.
 - **If the parameter is not Enabled**
Refer to Diagnostic Aids to determine the cause.
 - **Go to next step: If the parameter is Enabled**
4. All OK.

Repair Instructions

Perform the **Diagnostic Repair Verification** after completing the repair.

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

PARALLEL PARKING ASSIST SYSTEM MALFUNCTION

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 parallel parking assist is activated/deactivated by pressing the parking assist switch at speeds below 30 km/h (18 mph). The activated parallel parking assist then searches for an appropriate parking spot. If a spot is detected, feedback is given to the driver through the indicator in the driver information center. The driver accepts the decision by stopping the vehicle. The system calculates the optimal path into the parking lot and will then guide the vehicle into the chosen spot by taking over the steering control from the driver. The driver only needs to shift gears, brake and accelerate following the instructions given on the driver information center.

The system consists of the 8 parking assist sensors from the normal parking assist located in the front and rear bumper, and two additional parallel parking assist sensors on the side of the vehicle. The additional parallel parking assist sensors are used to measure the parking lot size. The parallel parking assist system uses the 8 parking assist sensors to identify objects in the vehicle's path when moving into the parking lot.

Diagnostic Aids

The following is a brief description of potential causes which may aid in diagnosis:

- Possible disengagement reasons:
 - Steering input by driver. The driver must not interfere with the steering function during a parking maneuver.
 - Vehicle speed. The vehicle is travelling at speeds of greater than 10 km/h (6 MPH) while performing a parking maneuver.
 - Electronic stability control or anti-lock brakes are activated.
 - Failure within the system - check for DTCs.
- Manual Disable - The parking assist system has been disabled through the parking assist switch or audio system personalization menu.
- Hitch/Object Attached - The parking assist control module is detecting an object that is attached to the vehicle. Common items such as a hitch receiver, trailer, or a bicycle rack may cause this concern. Additionally, damage to the rear of the vehicle or a misaligned sensor may cause this concern. If the vehicle is damaged in a manner that causes the sensor to detect the bumper itself, the parking assist control module will interpret this as an attached object and disable the system. Carefully inspect the bumper, bumper mounting surface, and sensor retainers before continuing with normal diagnosis. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH).
- Sensor Disturbance - An outside interference is causing sensor movement. Such interference may be caused a heavy pounding, like that of a nearby jackhammer, or large changes in pressure, such as a large truck's air brakes.
- Sensor Ring Time - If the sensor fails its own diagnostic initialization the parking assist control module will set this error. After the detected cause has been addressed the vehicle must be driven at speed greater than 40 km/h (25 MPH). The following is a list of reasons this cause may have set:
 - One or more of the sensors may be blocked by snow, mud, ice, or other debris. This might happen after going through a car wash in cold weather.
 - Silicone insulator surrounding sensor maybe missing, cut, or twisted.
 - Improperly installed sensor, sensor maybe be crooked due to a tight wire harness.
 - One or more of the sensors may be scratched or the paint maybe chipped.
 - Excessive paint thickness on a sensor may cause an excessive sensor ring time. When replacing or refinishing a sensor, do not apply an excessive amount of paint or clear coat.

Reference Information

Schematic Reference

Parking Assistance Systems Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Parking Assist Description and Operation (UD7)Parking Assist Description and Operation (UD5)

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

- [Wiring Repairs](#)

Scan Tool Reference

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

Circuit/System Verification

1. Verify the correct operation of the parking assist system.
 - **If the parking assist system malfunctions**
Refer to [Parking Assist System Malfunction](#).
 - **Go to next step: If the parking assist system functions properly**
2. Ignition ON.
3. Verify the scan tool Advanced Parking Assist Switch parameter changes between Active and Inactive while pressing and releasing the parallel parking assist switch.
 - **If the parameter does not change**
Refer to [DTC B096B](#).
 - **Go to next step: If the parameter changes**

NOTE: After completing the next step the vehicle might need to be driven in the forward direction at speed greater than 40 km/h (25 MPH).

4. Verify the scan tool Park Assist System Status parameter is Enable.
 - **If the parameter is not Enable**
Refer to Diagnostic Aids to determine the cause of the inhibit.
 - **Go to next step: If the parameter is Enable**
5. All OK.

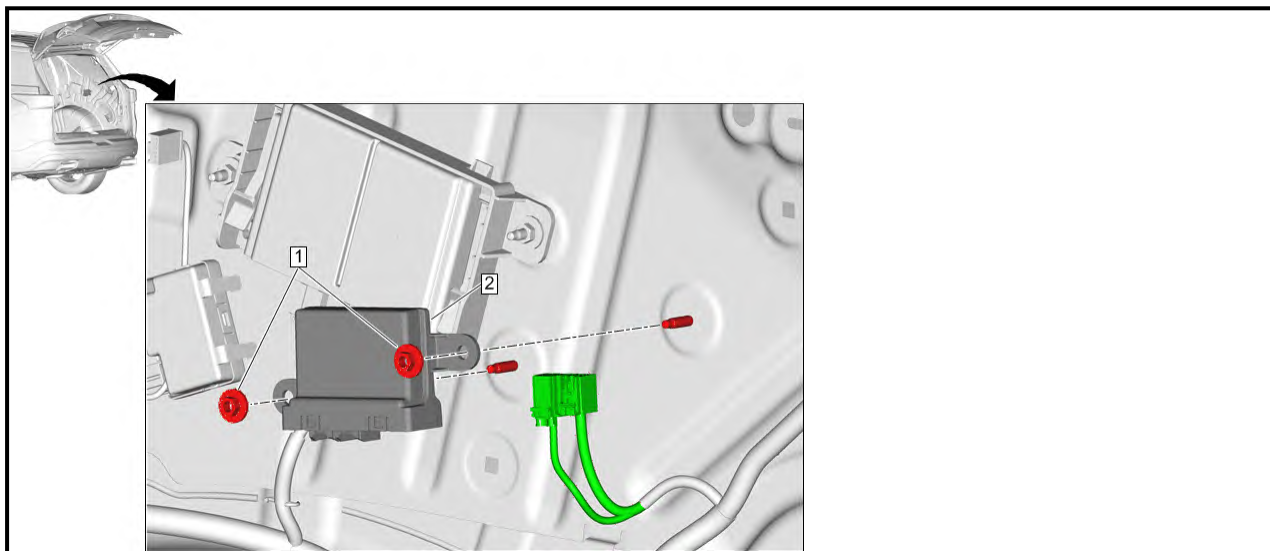
Repair Instructions

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

[Control Module References](#) for control module replacement, programming and setup.

REPAIR INSTRUCTIONS

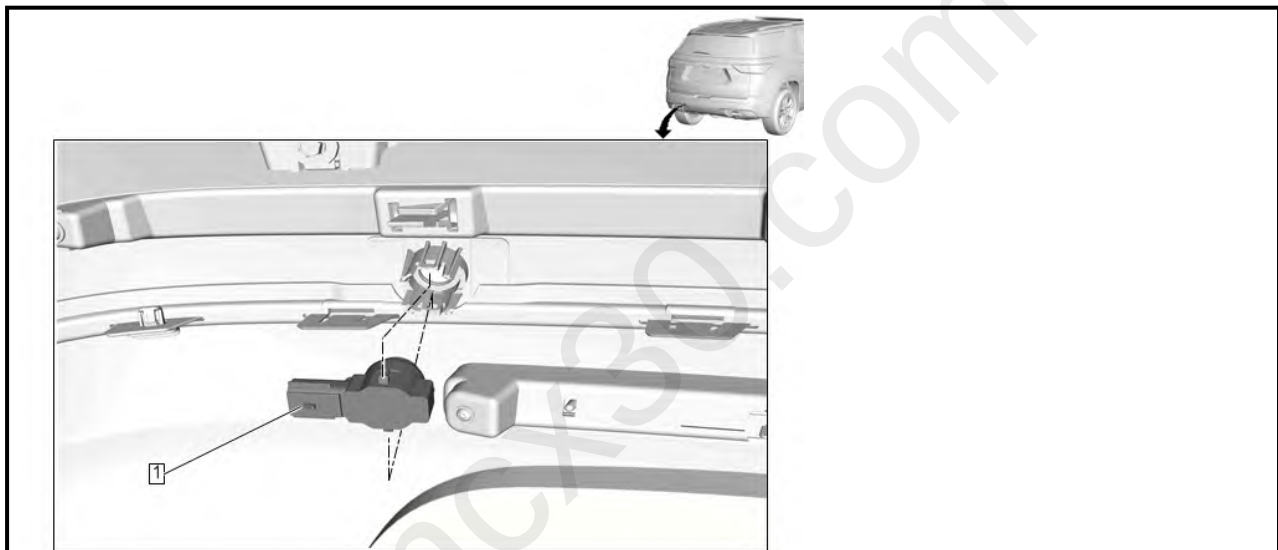
PARKING ASSIST CONTROL MODULE REPLACEMENT



Callout	Component Name

Callout	Component Name
Preliminary Procedure <u>Quarter Lower Rear Trim Panel Replacement (Right Side)</u>	
1	Parking Assist Alarm Control Module Nut [2x] CAUTION: <u>Fastener Caution</u> Tighten 4.5 N.m (40 lb in)
2	Parking Assist Control Module Procedure 1. Disconnect the electrical connectors. 2. Perform the necessary programming and setup procedure: <u>Control Module References</u>

REAR PARKING ASSIST ALARM SENSOR REPLACEMENT



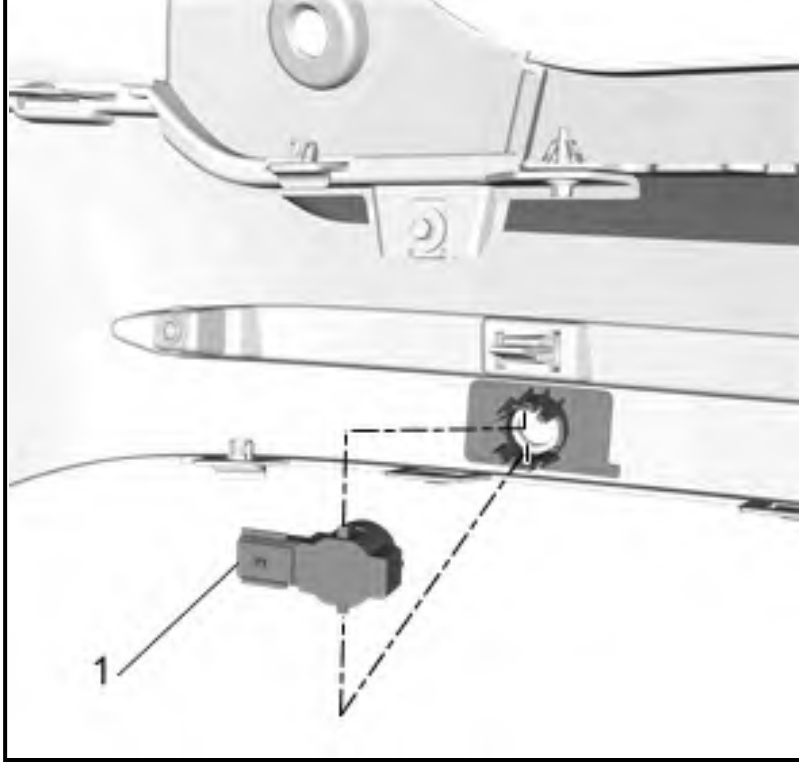
Callout	Component Name
Preliminary Procedure <u>Rear Bumper Fascia Energy Absorber Replacement</u>	
1	Rear Parking Assist Alarm Sensor Procedure 1. Disconnect the electrical connector. 2. Release the locking tab from the rear parking assist alarm sensor bracket. 3. Perform the necessary programming and setup procedure: <u>Control Module References</u> NOTE: Do not refinish previously painted sensors. Excess paint build up will cause the sensor to be inoperative.

REAR PARKING ASSIST ALARM SENSOR BRACKET REPLACEMENT

Removal Procedure

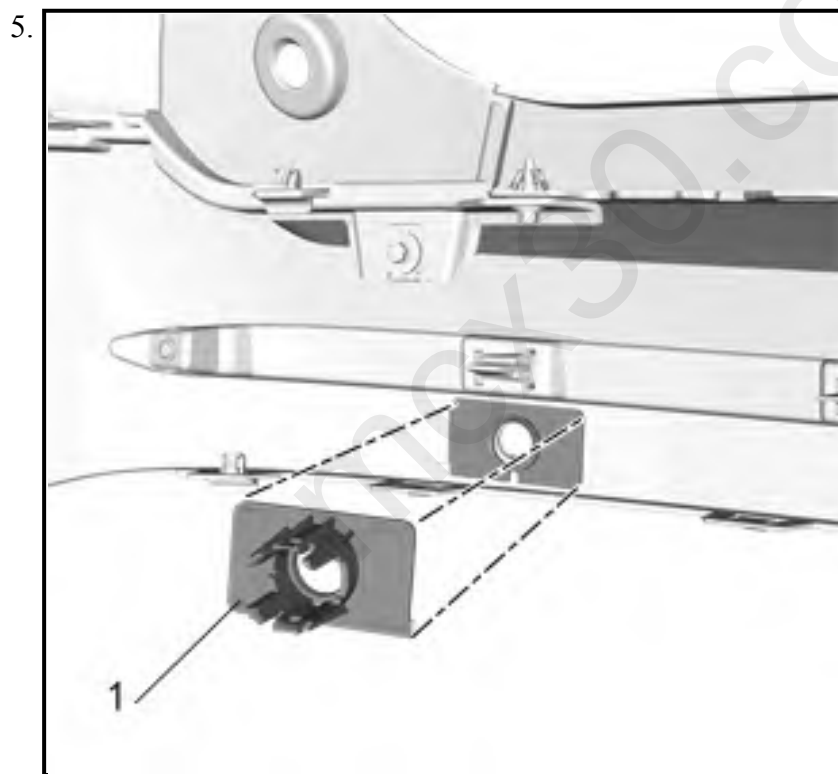
1.





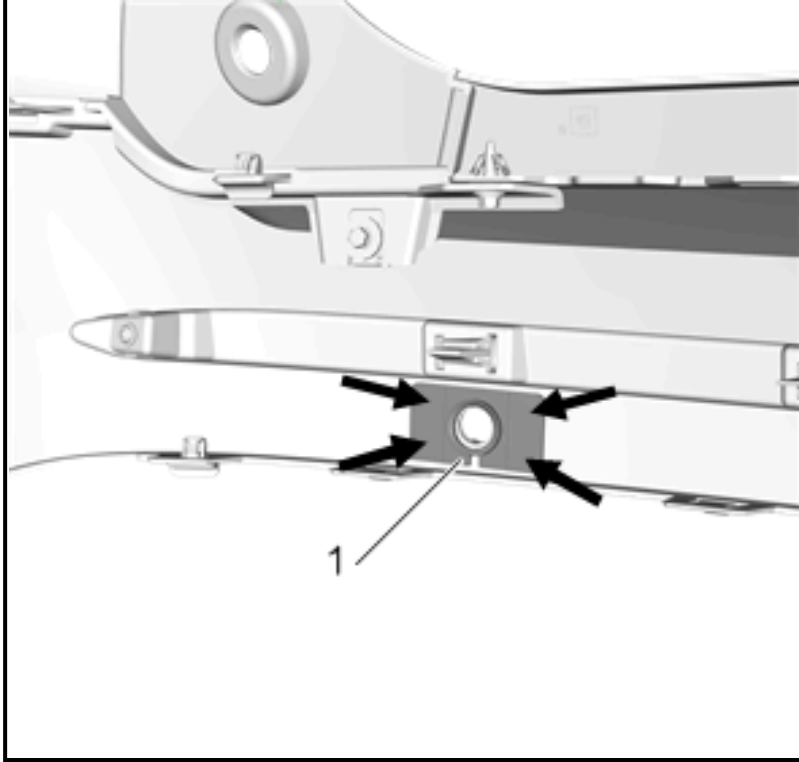
Disconnect and reposition harness as necessary.

4. Remove the sensor (1) from the sensor bracket.



Using a flat bladed tool carefully remove the bracket (1) from the fascia.



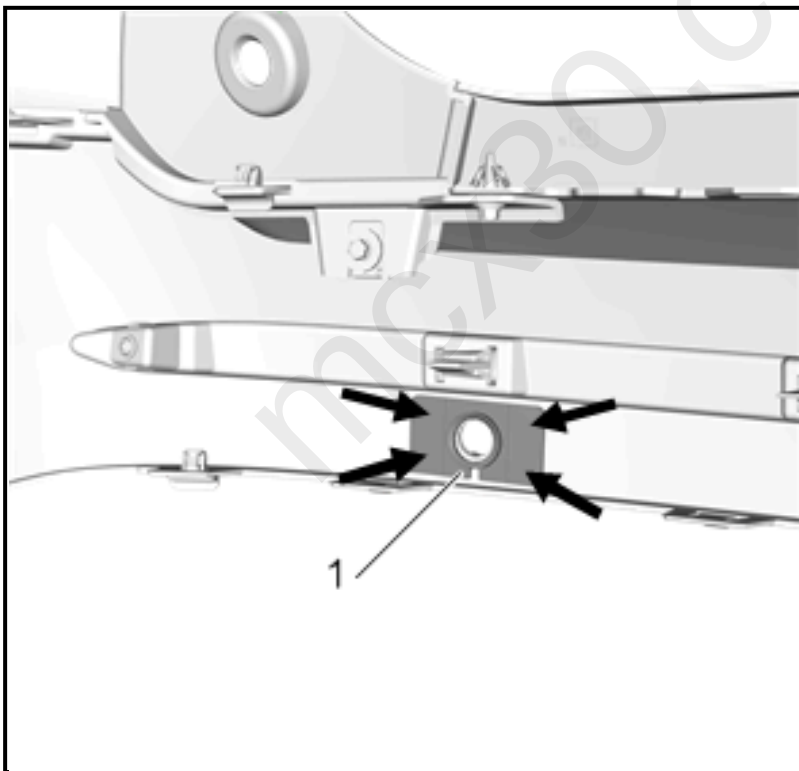


NOTE: Do Not sand off alignment tabs/outline.

Sand sonic weld plastic residue (1) from the fascia.

Installation Procedure

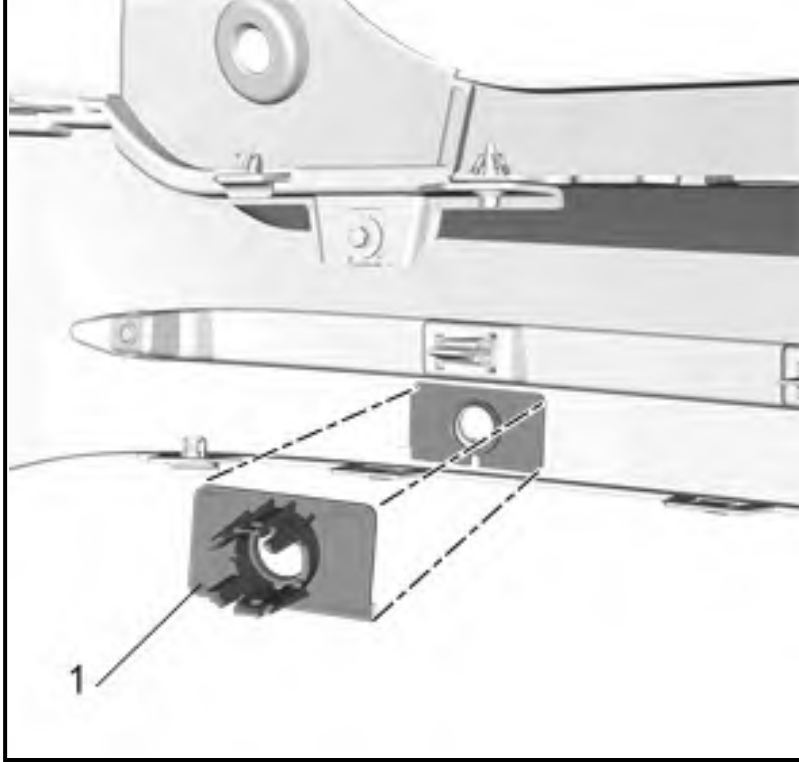
1.



Apply structural adhesive epoxy, Lord Fusor™ 127EZ or equivalent, to fascia at mating surface (1) according to manufacturer's directions.

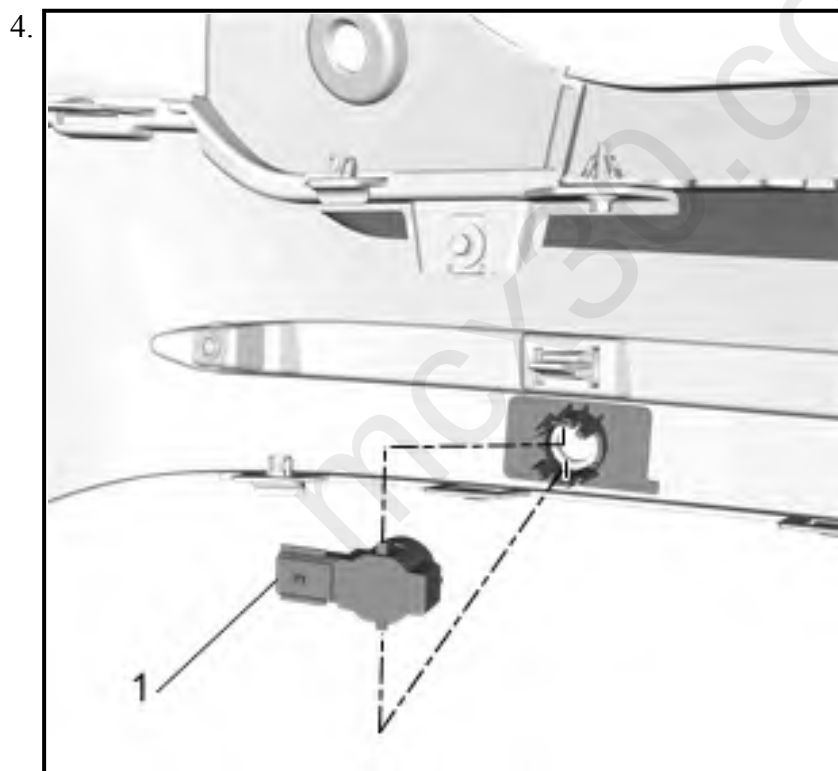
2.





Using the alignment tabs and outline, install the sensor bracket (1) to the fascia.

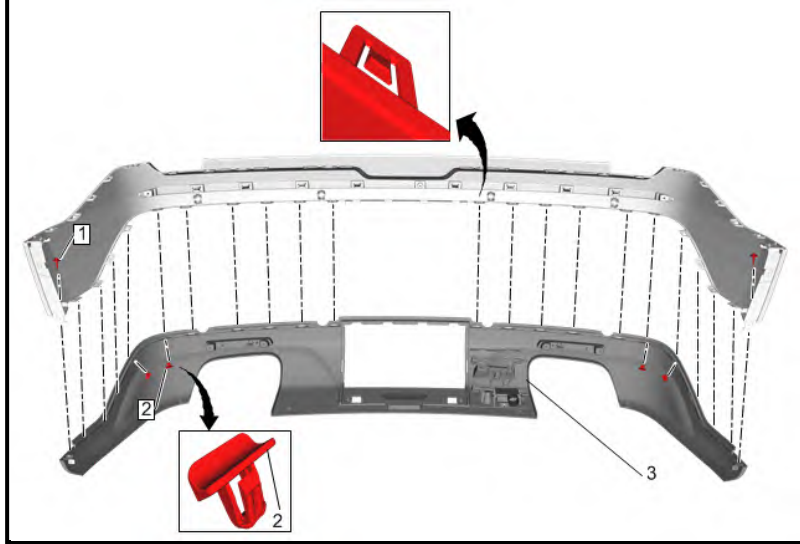
3. Allow adhesive to cure according to manufacturer's directions.



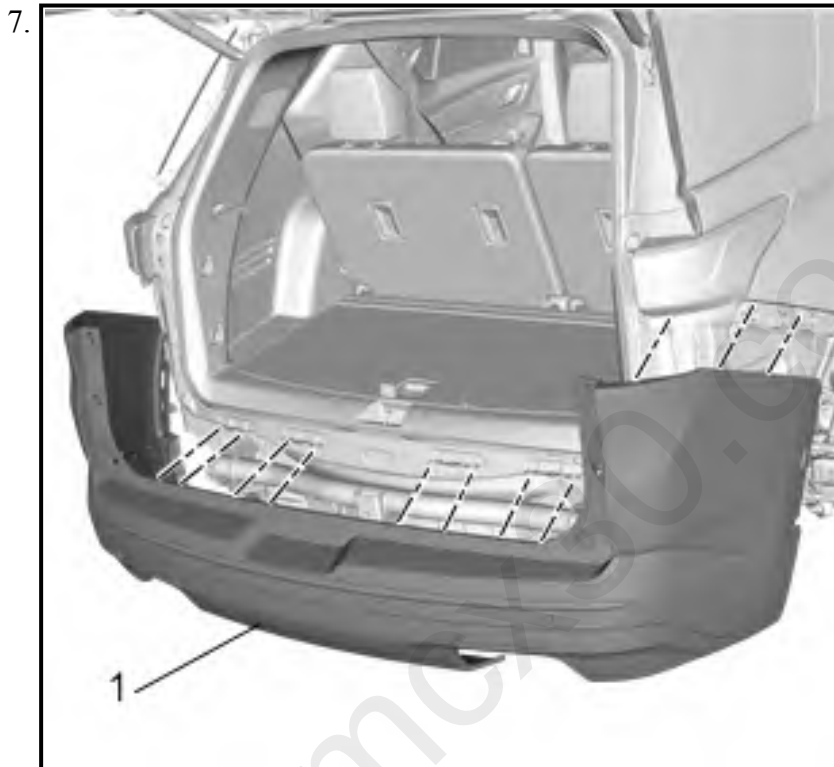
Install the sensor (1) to the sensor bracket.

5. Attach the wiring harness and connect the electrical connectors as necessary.



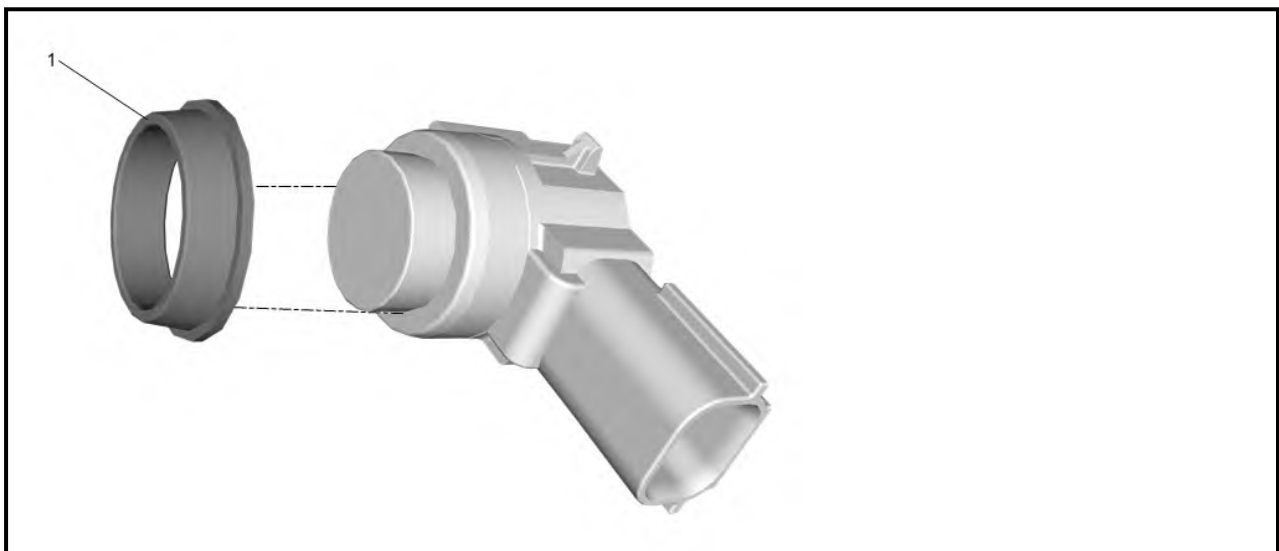


Rear Bumper Valance Panel (3) - Install [Rear Bumper Valance Panel Replacement](#)



Rear Bumper Fascia (1) - Install [Rear Bumper Fascia Replacement](#)

PARKING ASSIST ALARM SENSOR RING REPLACEMENT



Callout	Component Name

Callout	Component Name
Preliminary Procedure <u>Rear Parking Assist Alarm Sensor Replacement</u>	
1	Parking Assist Alarm Sensor Ring Procedure Pull the parking assist alarm sensor ring from the sensor.

DESCRIPTION AND OPERATION

PARKING ASSIST DESCRIPTION AND OPERATION (UD7)

The parking assist system is designed to identify and notify the driver of an object in the vehicle path when reversing at speeds of less than 8 km/h (5 MPH). The distance and location of the object is determined by four Parking Assist sensors located in the rear fascia. The parking assist system will notify the driver using audible beeps through the infotainment system.

The parking assist system is made up of the following components:

- Parking assist control module
- Parking Assist sensors
- Parking assist switch
- Parking assist switch indicator
- Infotainment system

Parking Assist Control Module

The Parking Assist Control Module provides a reference voltage and a low reference to the four Parking Assist sensors. The Parking Assist Control Module receives individual signals from each of the four sensors and determines the location and distance of an object based on these inputs. When an object is detected, The Parking Assist Control Module will send a message via serial data to the infotainment system requesting an audible alert.

Parking Assist Sensors

The Parking Assist sensors are located in the rear fascia. The sensors are used to determine the distance between an object and the rear of the vehicle. Each sensor emits an ultrasonic frequency which is reflected off an object behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time, it is used to determine the distance to the object. The sensors report this information to The Parking Assist Control Module.

Parking Assist Switch

The parking assist system can be activated and deactivated by pressing the parking assist switch. The Parking Assist Control Module applies voltage and monitors the parking assist switch signal circuit. The parking assist switch is a normally open switch. With the switch open, voltage seen at The Parking Assist Control Module is high. When the parking assist switch is pressed, the switch is closed and the signal circuit is pulled to ground. With the switch closed, voltage seen at The Parking Assist Control Module is low. The Parking Assist Control Module will respond to this by activating or deactivating the parking assist function.

Parking Assist Switch Indicator

When the parking assist system is enabled, The Parking Assist Control Module will illuminate the indicator on the switch. The indicator receives voltage through a high control circuit from the body control module (BCM) and is controlled through a low control circuit by The Parking Assist Control Module.

Infotainment System

The infotainment system controls the audible alert for the park assist alert. If the an object is detected the infotainment system will command beeps as an audible alert to the driver.

Parking Assist Operation

When an object is within the measuring range of the sensor, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to The Parking Assist Control Module. The Parking Assist Control Module evaluates the received sensor signals. As soon as an object is within the measuring range, The Parking Assist Control Module sends a message via serial data to the infotainment system to provide an alert signal.

The parking assist system can detect objects greater than 7.6 cm (3 in) wide and 25.4 cm (10 in) tall. The system cannot detect objects below the bumper or underneath the vehicle.

The parking assist system can be activated and deactivated by pressing the parking assist switch. When the transmission is in R, park assist is automatically activated, unless disabled by the switch.

The Parking Assist Control Module carries out a self test and monitors the sensors for electrical and mechanical faults. Monitored is the power supply of each sensor and the sensor signals. Mud, ice and snow may cause obstruction of the function of the sensors. The Parking Assist Control Module also determines if the correct type of sensor is installed. If any of these tests fails, a DTC with corresponding symptom is set and the parking assist system is deactivated.

Parking Assist System Driver Information Center Messages

SERVICE PARK ASSIST

The driver information center displays SERVICE PARK ASSIST when The Parking Assist Control Module detects a malfunction in the parking assist system and the system is disabled. The driver information center also displays SERVICE PARK ASSIST when a loss of communication occurs with The Parking Assist Control Module.

PARK ASSIST OFF

The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The Parking Assist Control Module requests the driver information center display PARK ASSIST OFF when it detects that one of the following conditions:

- The parking assist system is manually disabled using the parking assist switch.
- An object is attached to the rear of the vehicle, such as a trailer, bicycle rack, trailer hitch receiver, or tow bar. Also, an object extending beyond a lowered tailgate will disable the system.
- The Parking Assist sensors are covered by snow, mud, dirt, slush, or ice.
- The rear fascia is damaged.
- Excessive paint thickness on a replacement parking assist sensor.
- The Parking Assist sensors are disrupted by vibrations, like those caused by a large nearby vehicle or from heavy equipment such as a jackhammer.

PARKING ASSIST DESCRIPTION AND OPERATION (UD5)

The parking assist system is designed to identify and notify the driver of an object in the vehicle path when moving forward or reversing at speeds of less than 8 km/h (5 MPH). The distance and location of the object is determined by four Parking Assist sensors located in the rear fascia and four Parking Assist sensors located in the front fascia. The parking assist system will notify the driver using audible beeps through the infotainment system or haptic pulses through the driver's seat (if equipped).

The parking assist system is made up of the following components:

- Parking Assist Control Module
- Front Parking Assist sensors
- Rear Parking Assist sensors
- Parking assist switch

- Parking assist indicator
- Infotainment system
- Safety alert seat, if equipped.

Parking Assist Control Module

The Parking Assist Control Module provides a reference voltage and a low reference to the eight Parking Assist sensors. The Parking Assist Control Module receives individual signals from each of the eight sensors and determines the location and distance of an object based on these inputs. When an object is detected, the Parking Assist Control Module will send a serial data message to the infotainment system requesting an audible alert.

Parking Assist Sensors

The Parking Assist sensors are located in the fascias of the vehicle. The sensors are used to determine the distance between an object and the bumper. Each sensor emits an ultrasonic frequency which is reflected off any object located in front of or behind the vehicle. These reflections are received by the sensors. The time difference between the emission of the frequency and when the reflection is received is known as sensor echo time, it is used to determine the distance to the object. The sensors report this information to the Parking Assist Control Module.

Parking Assist Switch (All except Cadillac with UGN)

The parking assist system can be activated and deactivated by pressing the parking assist switch. The Parking Assist Control Module applies voltage and monitors the parking assist switch signal circuit. The parking assist switch is a normally open switch. With the switch open, voltage seen at the Parking Assist Control Module is high. When the parking assist switch is pressed, the switch is closed and the signal circuit is pulled to ground. With the switch closed, voltage seen at the Parking Assist Control Module is low. The Parking Assist Control Module will respond to this by activating or deactivating the parking assist function.

Parking Assist Switch (Cadillac with UGN)

The parking assist system can be activated and deactivated by pressing the parking assist switch. The active safety control module applies voltage and monitors the parking assist switch signal circuit. The parking assist switch is a normally open switch. With the switch open, voltage seen at the active safety control module is high. When the parking assist switch is pressed, the switch is closed and the signal circuit is pulled to ground. With the switch closed, voltage seen at the active safety control module is low. The active safety control module will respond to this by sending a serial data message to the Parking Assist Control Module requesting the activation or deactivation of the parking assist system.

Parking Assist Indicator (All except Cadillac with UGN)

When the parking assist system is enabled, the Parking Assist Control Module will illuminate the indicator on the switch. The indicator receives voltage through a high control circuit from the body control module (BCM) and is controlled through a low control circuit by the Parking Assist Control Module.

Parking Assist Indicator (Cadillac with UGN)

When the parking assist system is enabled, the active safety control module will illuminate the indicator on the switch. The indicator receives voltage through a high control circuit from the body control module (BCM) and is controlled through a low control circuit by the active safety control module.

Infotainment System

The infotainment system controls the audible alert for the park assist alert. If the an object is detected the infotainment system will command beeps as an audible alert to the driver.

Safety Alert Seat

The memory seat module controls the haptic alert provided by the seats. If an object is detected, the memory seat module will command pulses to the driver's seat.

When an object is within the measuring range of the sensor, the ultrasonic pulse is reflected and is received by the sending or a neighboring sensor. The sensor converts this signal into a voltage signal and sends this signal to the Parking Assist Control Module. The Parking Assist Control Module evaluates the received sensor signals. As soon as an object is within the measuring range, the Parking Assist Control Module sends a message via serial data to the infotainment system to provide an alert signal.

The parking assist system can detect objects greater than 7.6 cm (3 in) wide and 25.4 cm (10 in) tall. The system cannot detect objects below the bumper or underneath the vehicle.

The parking assist system can be activated and deactivated by pressing the parking assist switch. When the transmission is in R, park assist is automatically activated, unless disabled by the switch.

The Parking Assist Control Module carries out a self test and monitors the sensors for electrical and mechanical faults. Monitored is the power supply of each sensor and the sensor signals. Mud, ice and snow may cause obstruction of the function of the sensors. The Parking Assist Control Module also determines if the correct type of sensor is installed. If any of these tests fails, a DTC with corresponding symptom is set and the parking assist system is deactivated.

Parking Assist System Driver Information Center Messages

SERVICE PARK ASSIST

The driver information center displays SERVICE PARK ASSIST when the Parking Assist Control Module detects a malfunction in the parking assist system and the system is disabled. The driver information center also displays SERVICE PARK ASSIST when a loss of communication occurs with the Parking Assist Control Module.

PARK ASSIST OFF

The PARK ASSIST OFF message is displayed in the driver information center when the parking assist system is disabled due to conditions that disable or inhibit the system. The Parking Assist Control Module requests the driver information center display PARK ASSIST OFF when it detects that one of the following conditions:

- The parking assist system is manually disabled using the parking assist switch.
 - An object is attached to the rear of the vehicle, such as a trailer, bicycle rack, trailer hitch receiver, or tow bar. Also, an object extending beyond a lowered tailgate will disable the system.
 - The parking assist sensors are covered by snow, mud, dirt, slush, or ice.
 - The vehicle bumper is damaged.
 - Excessive paint thickness on a replacement parking assist sensor.
 - The parking assist sensors are disrupted by vibrations, like those caused by a large nearby vehicle or from heavy equipment such as a jackhammer.
-