

2018 ACCESSORIES & EQUIPMENT

Parking Assistance Systems - Equinox, Terrain

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE:

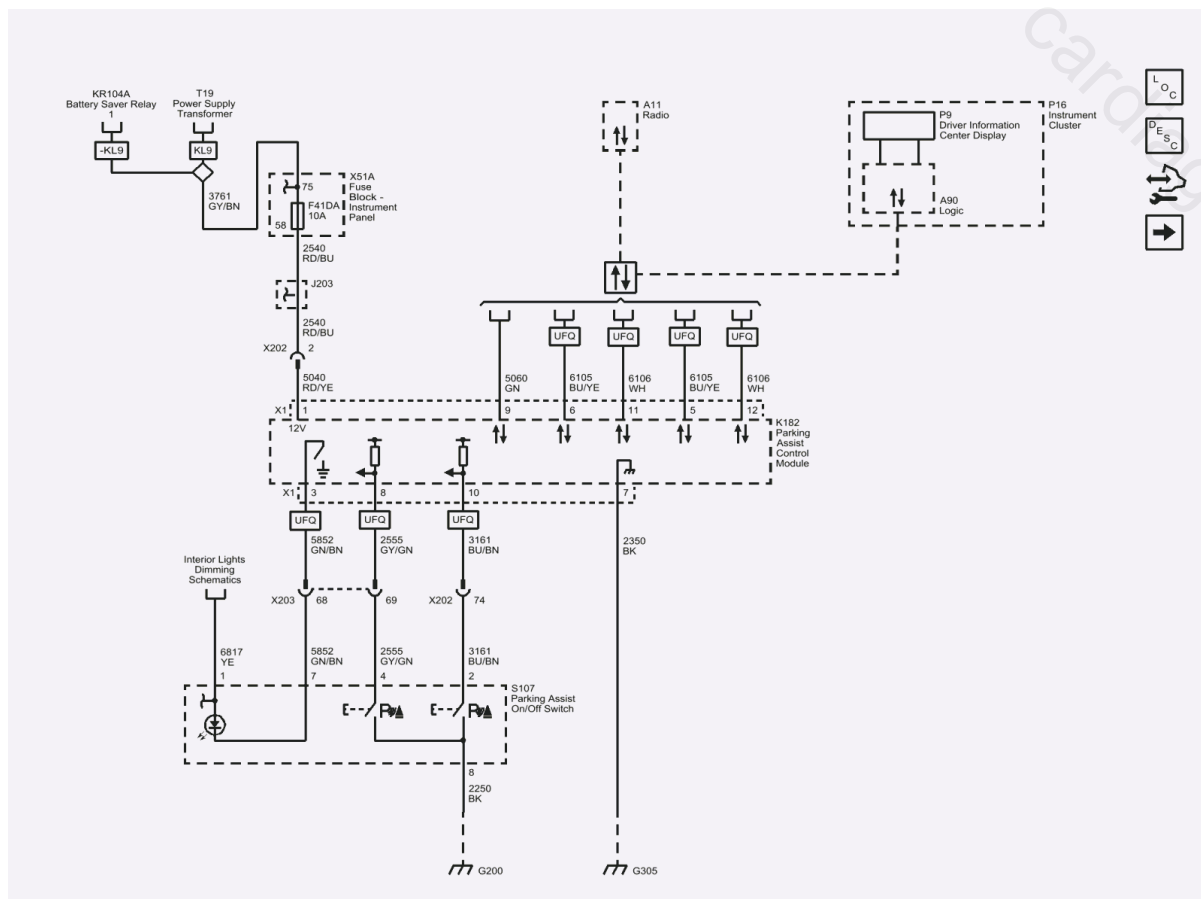
All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Parking Assist Alarm Control Module Nut	6 N.m (53 lb in)

SCHEMATIC WIRING DIAGRAMS

PARKING ASSISTANCE SYSTEMS WIRING SCHEMATICS

Park Assist - Module Power, Ground, Serial Data and Controls



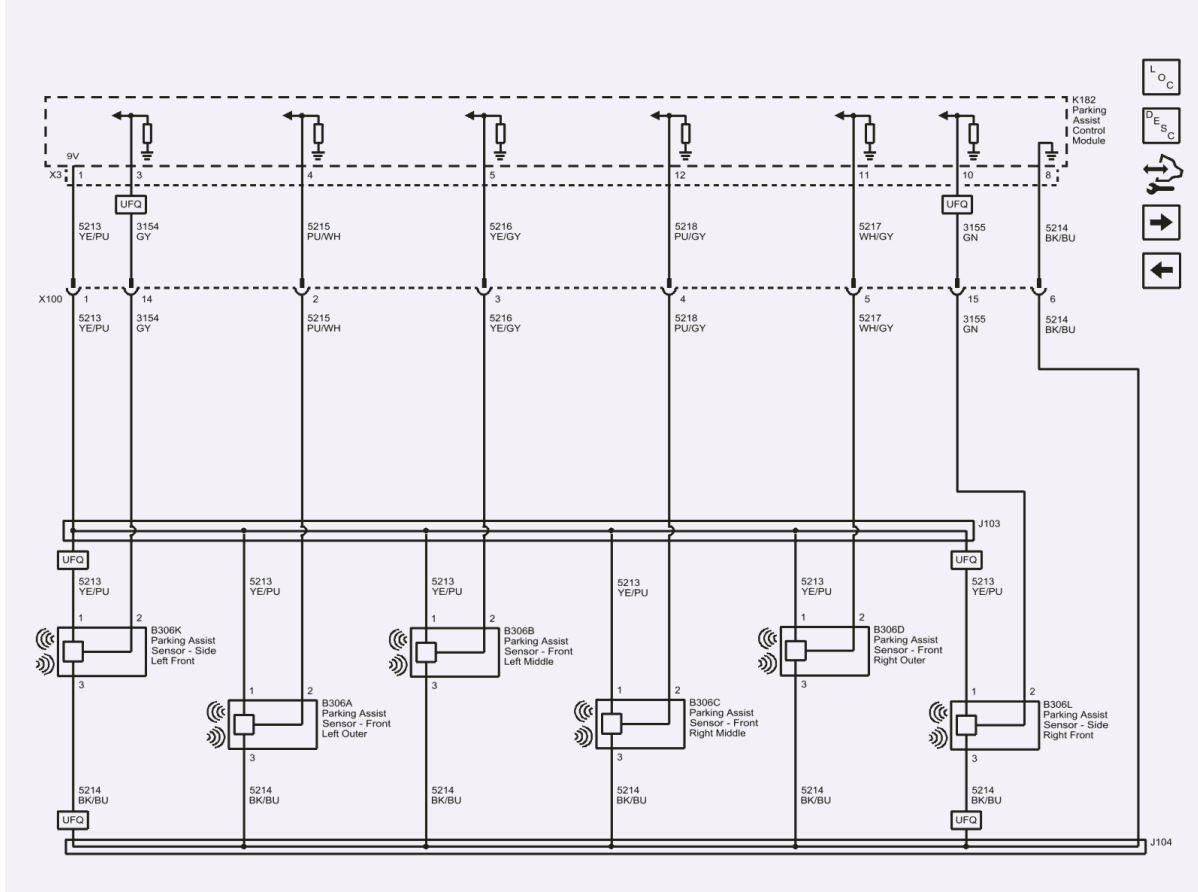


Fig. 2: Park Assist - Front and Front Side Parking Assist Sensors (UD5 or UFQ).
 Courtesy of GENERAL MOTORS COMPANY

Park Assist - Rear Parking Assist Sensors (UD7)

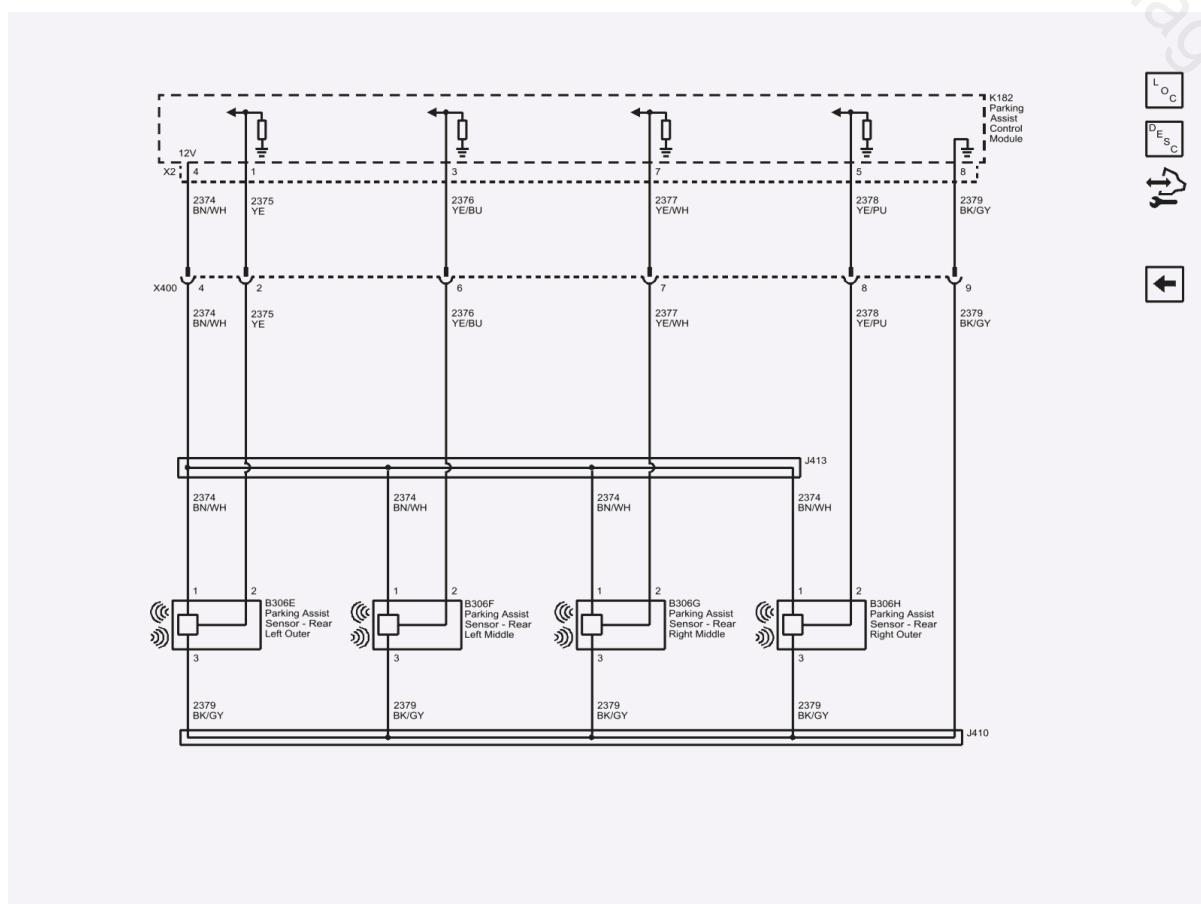


Fig. 3: Park Assist - Rear Parking Assist Sensors (UD7).
 Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B0954, P0955, P0956, P0957, P0958, P0959, P0960, B0961, B096C OR B096D: PARKING ASSIST SENSOR 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 Descriptors

DTC B0954

Parking Assist Front Sensor Left Corner Circuit

DTC B0955

Parking Assist Front Sensor Left Middle Circuit

DTC B0956

Parking Assist Front Sensor Right Middle Circuit

DTC B0957

Parking Assist Front Sensor Right Corner Circuit

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

DTC B0961

Parking Assist Rear Sensor Right Corner Circuit

DTC B096C

Parking Assist Side Sensor Left Front Circuit

DTC B096D

Parking Assist Side Sensor Right Front 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
8 V Reference	B1405 02	B0954 06, B0955 06, B0956 06, B0957 06, B0958 06, B0959 06, B0960 06, B0961 06	B1405 07	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Parking Assist Front Sensor Left Corner Circuit	B0954 02, B0954 06	B0954 04, B0954 06	B0954 01	B0954 08, B0954 21
Parking Assist Front Sensor Left Middle Circuit	B0955 02, B0955 06	B0955 04, B0955 06	B0955 01	B0955 08, B0955 21
Parking Assist Front Sensor Right Middle Circuit	B0956 02, B0956 06	B0956 04, B0956 06	B0956 01	B0956 08, B0956 21
Parking Assist Front Sensor Right Corner Circuit	B0957 02, B0957 06	B0957 04, B0957 06	B0957 01	B0957 08, B0957 21
Parking Assist Rear Sensor Left Corner Circuit	B0958 02, B0958 06	B0958 04, B0958 06	B0958 01	B0958 08, B0958 21
Parking Assist Rear Sensor Left Middle Circuit	B0959 02, B0959 06	B0959 04, B0959 06	B0959 01	B0959 08, B0959 21
Parking Assist Rear Sensor Right Middle Circuit	B0960 02, B0960 06	B0960 04, B0960 06	B0960 01	B0960 08, B0960 21
Parking Assist Rear Sensor Right Corner Circuit	B0961 02, B0961 06	B0961 04, B0961 06	B0961 01	B0961 08, B0961 21
Parking Assist Side Sensor Left Front Circuit	B096C 02, B096C 06	B096C 04, B096C 06	B096C 01	B096C 08, B096C 21
Parking Assist Side Sensor Right Front Circuit	B096D 02, B096D 06	B096D 04, B096D 06	B096D 01	B096D 08 B096D 21
Low Reference	-	B0954 01, B0955 01, B0956 01, B0957 01, B0958 01, B0959 01, B0960 01, B0961 01, B096C 01, B096D 01	-	-

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 8 V to the parking assist sensors via the 8 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
- Parking assist is activated.

Conditions for Setting the DTC

B0954 01, B0955 01, B0956 01, B0957 01, B0958 01, B0959 01, B0960 01, B0961 01, B096C 01 or B096D 01

The parking assist control module has determined the voltage at the sensor circuit is high or the parking assist sensor is not grounded.

B0954 02, B0955 02, B0956 02, B0957 02, B0958 02, B0959 02, B0960 02, B0961 02, B096C 02 or B096D 02

The parking assist control module has determined the sensor signal circuit is shorted to ground

B0954 04, B0955 04, B0956 04, B0957 04, B0958 04, B0959 04, B0960 04, B0961 04, B096C 04 or B096D 04

The parking assist control module has determined the sensor signal circuit is open

B0954 06, B0955 06, B0956 06, B0957 06, B0958 06, B0959 06, B0960 06, B0961 06, B096C 06 or B096D 06

The parking assist control module has determined the sensor signal circuit is shorted to ground or open

B0954 08, B0955 08, B0956 08, B0957 08, B0958 08, B0959 08, B0960 08, B0961 08, B096C 08 or B096D 08

The parking assist control module has received an invalid signal.

B0954 18, B0955 18, B0956 18, B0957 18, B0958 18, B0959 18, B0960 18, B0961 18, B096C 18 or B096D 18

The parking assist control module has received a low signal amplitude.

B0954 21, B0955 21, B0956 21, B0957 21, B0958 21, B0959 21, B0960 21, B0961 21, B096C 21 or B096D 21

The parking assist control module determines no change in the position of an object while the vehicle is in motion.

B0954 22, B0955 22, B0956 22, B0957 22, B0958 22, B0959 22, B0960 22, B0961 22, B096C 22 or B096D 22

The parking assist control module determines no change in the position of an object while the vehicle is in motion.

B0954 3A, B0955 3A, B0956 3A, B0957 3A, B0958 3A, B0959 3A, B0960 3A, B0961 3A, B096C 3A or B096D 3A

The parking assist control module determines the wrong sensor type is installed.

B0954 3B, B0955 3B, B0956 3B, B0957 3B, B0958 3B, B0959 3B, B0960 3B, B0961 3B, B096C 3B or B096D 3B

The parking assist control module determines the sensor failed a self test.

Action Taken When the DTC Sets

- The parking assist system is disabled.
- A service message may be displayed on the driver information center.

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

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. Verify that DTC B1405 is not set.
 - **If the DTC is set**

Refer to [DTC B1405](#)
 - **Go to next step: If the DTC is not set**
3. Verify that DTC B0954 01, B0955 01, B0956 01, B0957 01 B0954 21, B0955 21, B0956 21 or B0957 21 is not set.
 - **If the DTC is set**
 1. Verify the B306 Parking Assist Sensors are not contaminated with snow, mud, dirt, slush or ice.
 - If contaminated, clean the B306 Parking Assist Sensors.
 - If there is no contamination
 2. Refer to Circuit/System Testing below.
 - **Go to next step: If the DTC is not set**
4. Verify that DTC B0954 3A, B0955 3A, B0956 3A or B0957 3A is not set.
 - **If the DTC is set**

Replace the appropriate B306 Parking Assist Sensor with the correct sensor type.
 - **Go to next step: If the DTC is not set**
5. Ignition ON, transmission in R.
6. Verify the scan tool Parking Assist System Status parameter is Enabled.
 - **If the parameter is Disabled**

Refer to Circuit/System Testing below.
 - **Go to next step: If the parameter is Enabled**
7. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness at the appropriate B306 Parking Assist Sensor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 15 Ω between the low reference circuit terminal 3 and ground.
 - **If 15 Ω or greater**
 1. Ignition OFF, disconnect the appropriate harness connector at the K182 Parking Assist Control 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 K182 Parking Assist Control Module.
 - **Go to next step: If less than 15 Ω**
3. Ignition ON.
4. Test for at least 6 V between the 8 V reference circuit terminal 1 and ground.
- **If less than 6 V**
 1. Ignition OFF, disconnect the appropriate harness connector at the K182 Parking Assist Control Module.
 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 infinite resistance
 3. Test for less than 2 Ω in the 8 V 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 K182 Parking Assist Control Module.
 - **Go to next step: If 6 V or greater**
5. Test for 4.0 - 12.0 V between the signal circuit terminal 2 and ground.
- **If less than 4.0 V**
 1. Ignition OFF, disconnect the appropriate harness connector at the K182 Parking Assist Control 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
 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.
 - **If greater than 12.0 V**
 1. Ignition OFF, disconnect the appropriate 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.
 - If less than 1 V, replace the K182 Parking Assist Control Module.
 - **Go to next step: If between 4.0 - 12.0 V**
6. Test or replace the appropriate B306 Parking Assist Sensor.

Repair Instructions

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

- [Front Parking Assist Alarm Sensor Replacement \(Equinox\)](#)[Front Parking Assist Alarm Sensor Replacement \(Terrain\)](#)
- [Rear Parking Assist Alarm Sensor Replacement \(Equinox\)](#)[Rear Parking Assist Alarm Sensor Replacement \(Terrain\)](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC B0967 OR B0968: PARKING ASSIST ON/OFF SWITCH

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 B0967 02

Parking Assist On/Off Switch Circuit Short to Ground

DTC B0968 01

Parking Assist On/Off Switch Indicator Circuit Short to Battery

DTC B0968 06

Parking Assist On/Off Switch Indicator Circuit Low Voltage/Open

DTC B0968 0B

Parking Assist On/Off Switch Indicator Circuit High Current

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Parking Assist Switch Indicator Ignition	B0968 06, 2	B0968 06, 2	1	-
Parking Assist Switch Signal	B0967 02, 1	1	-	-
Parking Assist Switch Indicator Control	B0968 06, 2	B0968 06, B0968 0B, 2	B0968 01, B0968 0B	-
Parking Assist Switch Ground	-	1	-	-
1. Parking Assist Switch Malfunction 2. Parking Assist Switch Indicator Malfunction				

Circuit/System Description

The parking assist can be enabled/disabled by pressing the parking assist switch. If the parking assist is enabled, engaging the reverse gear activates the parking assist feature. By subsequently pressing the parking assist switch the parking assist can be disabled.

The indicator in the parking assist switch shows the status of the parking assist. If the lamp is ON, parking assist is enabled.

For vehicles without UGN the indicator and switch are connected to the Park Assist Module and the system operates as a stand-alone feature.

With UGN, the indicator and switch are connected to the Active Safety Control Module. The Active Safety Control Module received input from several modules including the park assist module to provide additional features. The park assist alerts and DTCs originate from the Park Assist Module with the exception of the indicator DTCs which are set by the Active Safety Control Module. There are no switch DTCs for vehicles with the Active Safety Control Module.

Conditions for Running the DTC

- Ignition ON
- The parking assist is activated. The activation takes place by putting in the reverse gear while the system is enabled.

Conditions for Setting the DTC

B0967 02

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

B0968 01

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

B0968 06

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

B0968 0B

The Active Safety Module has detected a short to ground or open in the control circuit.

Action Taken When the DTC Sets

Without UGN

- The parking assist is disabled.
- The driver information center displays "Service Park Assist".

With UGN

- The driver assist system is disabled.
- The driver information center displays "Service Driver Assist".

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. Verify the scan tool Park Assist Switch parameter changes between Active and Inactive when cycling the parking assist switch.
 - **If the Parking Assist Switch parameter does not change between Active and Inactive**

Refer to Parking Assist Switch Malfunction.

- **Go to next step: If the Parking Assist Switch parameter changes between Active and Inactive**

3. Verify the Park Assist Switch Indicator turns ON and OFF when cycling the parking assist switch.

- **If the indicator does not turn ON and OFF**

Refer to Parking Assist Indicator Malfunction.

- **Go to next step: If the indicator turns ON and OFF**

4. All OK.

Circuit/System Testing (without UFQ)

Parking Assist Switch Malfunction

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 minutes 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 Park Assist Switch parameter is Inactive.

- **If not Inactive**

1. Ignition OFF, disconnect the harness connector X1 at the K182 Parking Assist Control Module.

2. Test for infinite resistance between the signal circuit terminal 8 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 5 and ground.

6. Verify the scan tool Park Assist Switch parameter is Active.

- **If not Active**

1. Ignition OFF, 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.
- 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.

Parking Assist Switch Indicator Malfunction

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 minutes for all vehicle systems to power down. Ignition ON.

2. Test for less than 1 V between the control circuit terminal 7 and ground.

- **If greater than 1 V**

1. Ignition OFF. Disconnect the K182 Parking Assist Control Module X1 harness connector, ignition ON.
2. Test for less than 1 V between the control circuit terminal 3 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Replace the K182 Parking Assist Control Module
 - **Go to next step: If less than 1 V**
3. Ignition OFF.
4. Test for greater than 90 Ω between the control circuit terminal 7 and ground.
 - **If less than 90 Ω**
 1. Disconnect the K182 Parking Assist Control Module X1 harness connector.
 2. Test for infinite resistance between the control circuit terminal 3 and ground.
 - If less than infinite, repair the short to ground on the circuit.
 - If infinite
 3. Replace the K182 Parking Assist Control Module
 - **Go to next step: If greater than 90 Ω**
5. Test or replace the S107 Parking Assist On/Off Switch.

Circuit/System Testing (with UFQ)

Parking Assist Switch Malfunction

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 minutes 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 Park Assist Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the harness connector X1 at the K124 Active Safety Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K124 Active Safety Control Module.
 - **Go to next step: If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 5 and ground.
6. Verify the scan tool Park Assist Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, disconnect the harness connector at the K124 Active Safety 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.
 - 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 K124 Active Safety Control Module.

- **Go to next step: If Active**

7. Test or replace the S107 Parking Assist On/Off Switch.

Parking Assist Switch Indicator Malfunction

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 minutes for all vehicle systems to power down. Ignition ON.
2. Test for less than 1 V between the control circuit terminal 7 and ground.
 - **If greater than 1 V**
 1. Ignition OFF. Disconnect the K124 Active Safety Control Module X1 harness connector, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 2 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Replace the K124 Active Safety Control Module
 - **Go to next step: If less than 1 V**
3. Ignition OFF.
4. Test for greater than 90 Ω between the control circuit terminal 7 and ground.
 - **If less than 90 Ω**
 1. Disconnect the K124 Active Safety Control Module X1 harness connector.
 2. Test for infinite resistance between the control circuit terminal 2 and ground.
 - If less than infinite, repair the short to ground on the circuit.
 - If infinite
 3. Replace the K124 Active Safety Control Module
 - **Go to next step: If greater than 90 Ω**
5. Test or replace the S107 Parking Assist On/Off Switch.

Repair Instructions

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

- [Front Parking Assist Alarm Sensor Replacement \(Equinox\)](#)[Front Parking Assist Alarm Sensor Replacement \(Terrain\)](#)
- [Rear Parking Assist Alarm Sensor Replacement \(Equinox\)](#)[Rear Parking Assist Alarm Sensor Replacement \(Terrain\)](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC B096B: PARKING ASSIST SWITCH PARALLEL PARKING 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

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

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 below.

- **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.
 - 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.

- [Front Parking Assist Alarm Sensor Replacement \(Equinox\)](#)[Front Parking Assist Alarm Sensor Replacement \(Terrain\)](#)
- [Rear Parking Assist Alarm Sensor Replacement \(Equinox\)](#)[Rear Parking Assist Alarm Sensor Replacement \(Terrain\)](#)
- [Control Module References](#) for control module replacement, programming and setup.

DTC B1015: VEHICLE IDENTIFICATION NUMBER 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.

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

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. 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.
 - 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: CONTROL MODULE VOLTAGE REFERENCE OUTPUT 2 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 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

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 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: PARKING ASSIST SYSTEM PERFORMANCE

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

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

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.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Parking Assist Switch Signal	B0967 02, 1	1	-	-
Parking Assist Switch Indicator Control	B0968 06, 2	B0968 06, 2	B0968 01, B0968 0B	-
Parallel Park Assist Switch Signal	B096B 02	1	-	-
1. Parallel Parking Assist Switch Malfunction				

Circuit/System Description

The ultrasonic parking assist system is designed to identify and notify the driver of an object in the vehicle's path when moving revers 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 an audible signal through the radio. For more information on Parking Assist, refer to [**Parking Assist Description and Operation \(UD7\)**](#)[**Parking Assist Description and Operation \(UD5\)**](#).

Diagnostic Aids

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).
- **Vehicle 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

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. Verify the scan tool Park Assist Switch parameter changes between Active and Inactive when cycling the parking assist switch.
 - **If the Parking Assist Switch parameter does not change between Active and Inactive**
Refer to [DTC B0967 or B0968](#)
 - **Go to next step: If the Parking Assist Switch parameter changes between Active and Inactive**
3. Verify the Park Assist Switch Indicator turns ON and OFF when cycling the parking assist switch.
 - **If the indicator does not turn ON and OFF**
Refer to [DTC B0967 or B0968](#)
 - **Go to next step: If the indicator turns ON and OFF**
4. 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 [DTC B096B](#)
 - **Go to next step: If the parameter change between Active and Inactive**
5. Transmission in REVERSE.
6. Verify the scan tool Park Assist System Status parameter is Enable.
 - **If the parameter is not Enabled**
Refer to [Diagnostic Aids](#) to determine the cause of the inhibit.
 - **Go to next step: If the parameter is Enabled**
7. All OK.

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.

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- 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**

4. Verify the scan tool Park Assist System Status parameter is Enable.

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).

- **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 (EQUINOX)

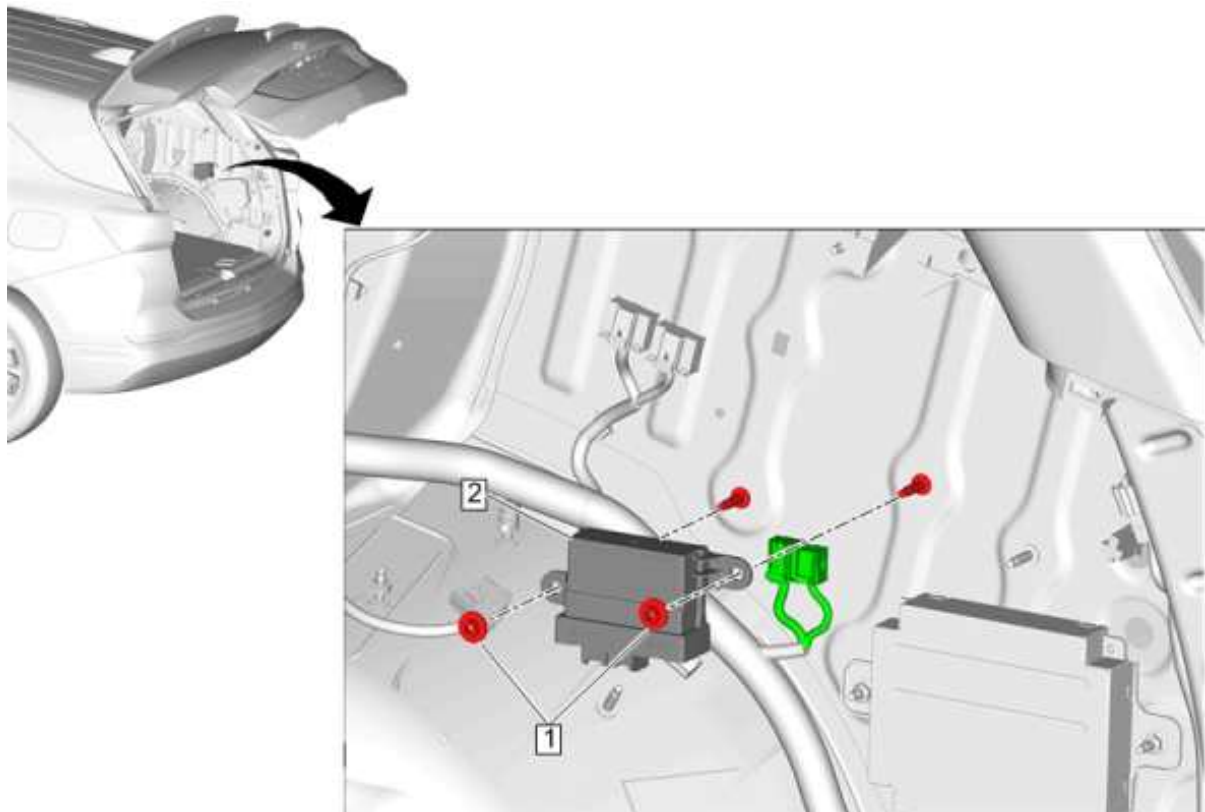


Fig. 4: Parking Assist Control Module (Equinox)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedure <u>Quarter Lower Rear Trim Panel Replacement (Left Side)</u> <u>Quarter Lower Rear Trim Panel Replacement (Right Side)</u>	
1	Parking Assist Alarm Control Module Nut [2x] CAUTION: <u>Fastener Caution</u> 6 N.m (53 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>

PARKING ASSIST CONTROL MODULE REPLACEMENT (TERRAIN)

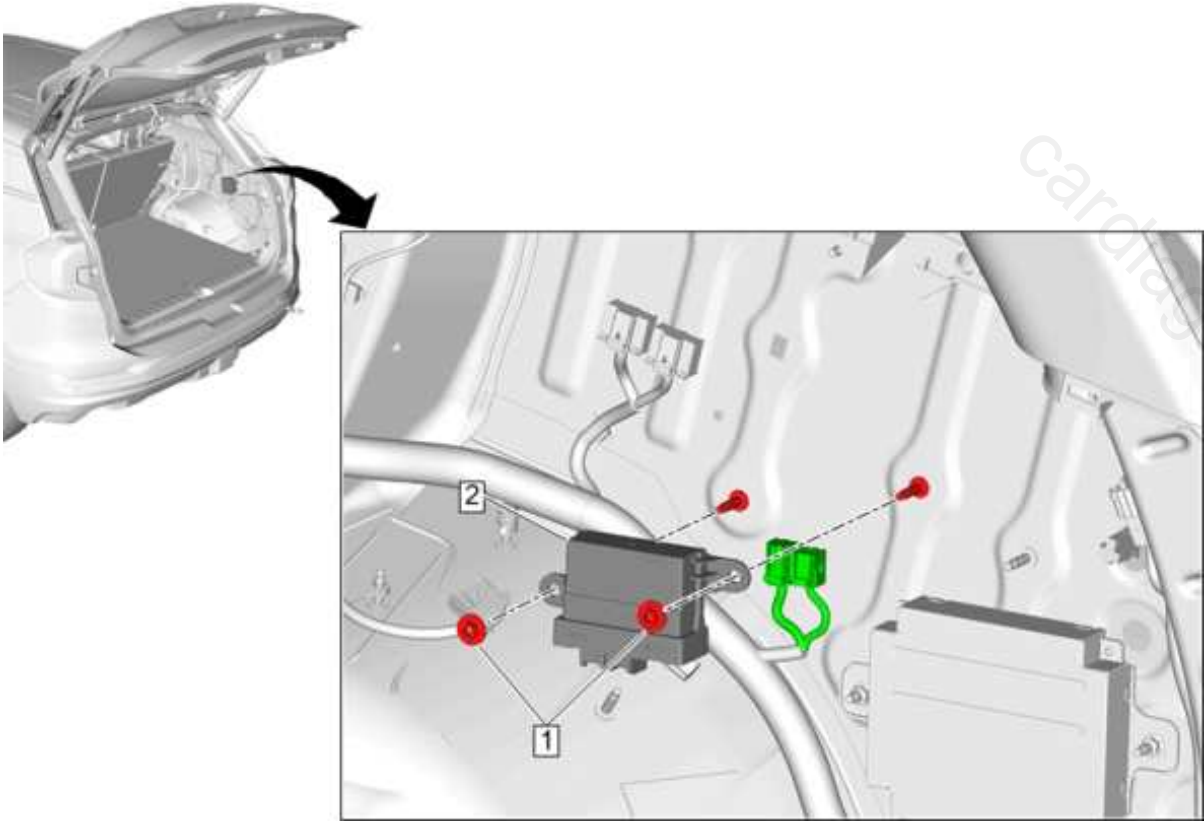


Fig. 5: Parking Assist Control Module (Terrain)
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Quarter Lower Rear Trim Panel Replacement (Left Side)</u> <u>Quarter Lower Rear Trim Panel Replacement (Right Side)</u>	
1	Parking Assist Alarm Control Module Nut [2x] CAUTION: <u>Fastener Caution</u> 6 N.m (53 lb in)

Callout	Component Name
2	Parking Assist Control Module Procedure 1. Disconnect the electrical connectors. 2. Perform the necessary programming and setup procedure: Control Module References

FRONT PARKING ASSIST ALARM SENSOR REPLACEMENT (EQUINOX)

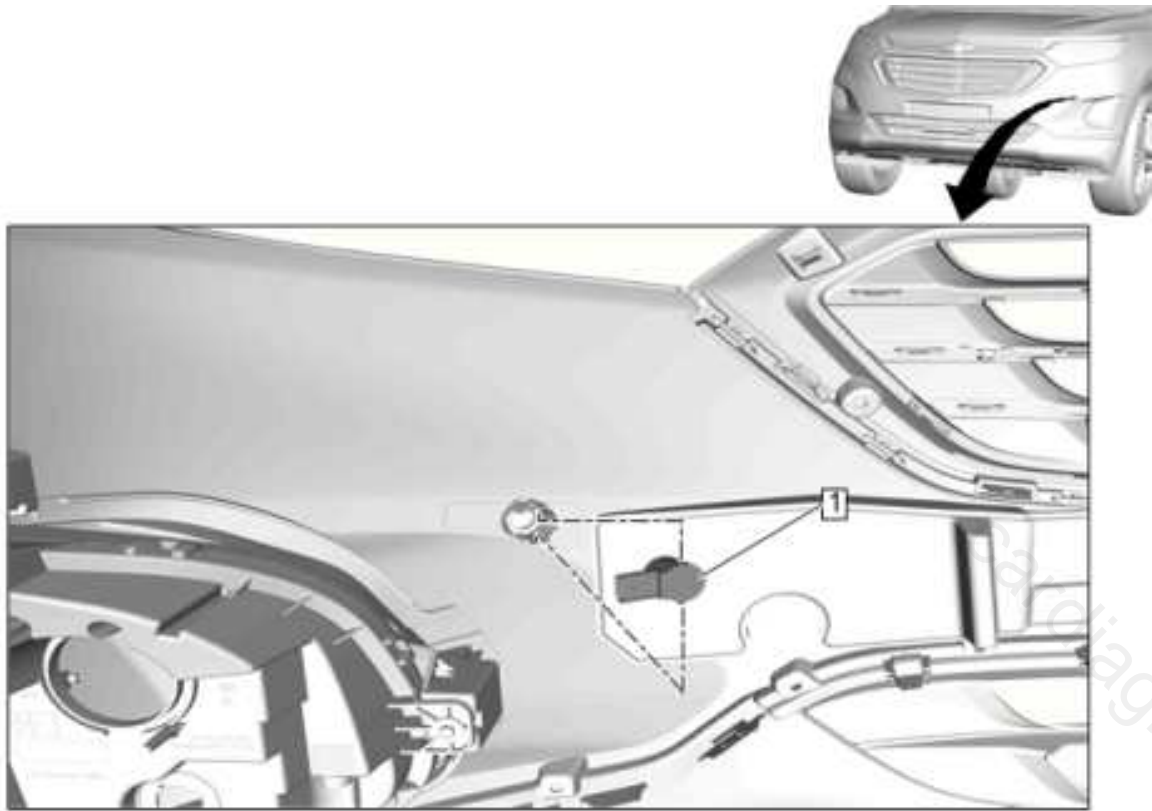


Fig. 6: Front Parking Assist Alarm Sensor (Equinox).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Front Bumper Fascia Replacement (Equinox)	
1	Front Parking Assist Alarm Sensor Procedure 1. Disconnect the electrical connector. 2. Release the locking tab from the front parking assist alarm sensor bracket. 3. When the replacement is completed, use a scan tool to perform the appropriate reset functions. Refer to Parking Assist Sensor Learn Calibration

FRONT PARKING ASSIST ALARM SENSOR REPLACEMENT (TERRAIN)

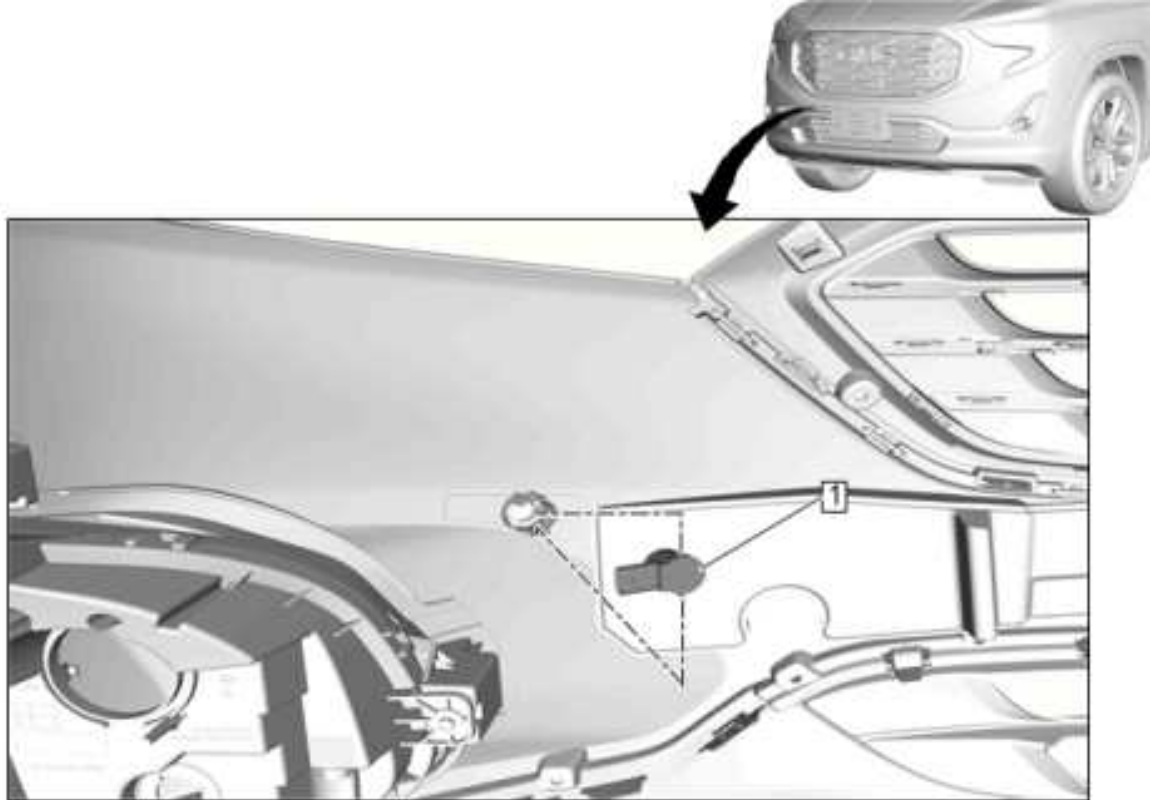


Fig. 7: Front Parking Assist Alarm Sensor (Terrain)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Front Bumper Fascia Replacement (Terrain)</u>	
1	Front Parking Assist Alarm Sensor Procedure 1. Disconnect the electrical connector. 2. Release the locking tab from the front parking assist alarm sensor bracket. 3. When the replacement is completed, use a scan tool to perform the appropriate reset functions. Refer to <u>Parking Assist Sensor Learn Calibration</u>

ADVANCED PARKING ASSIST ALARM SENSOR REPLACEMENT (EQUINOX)

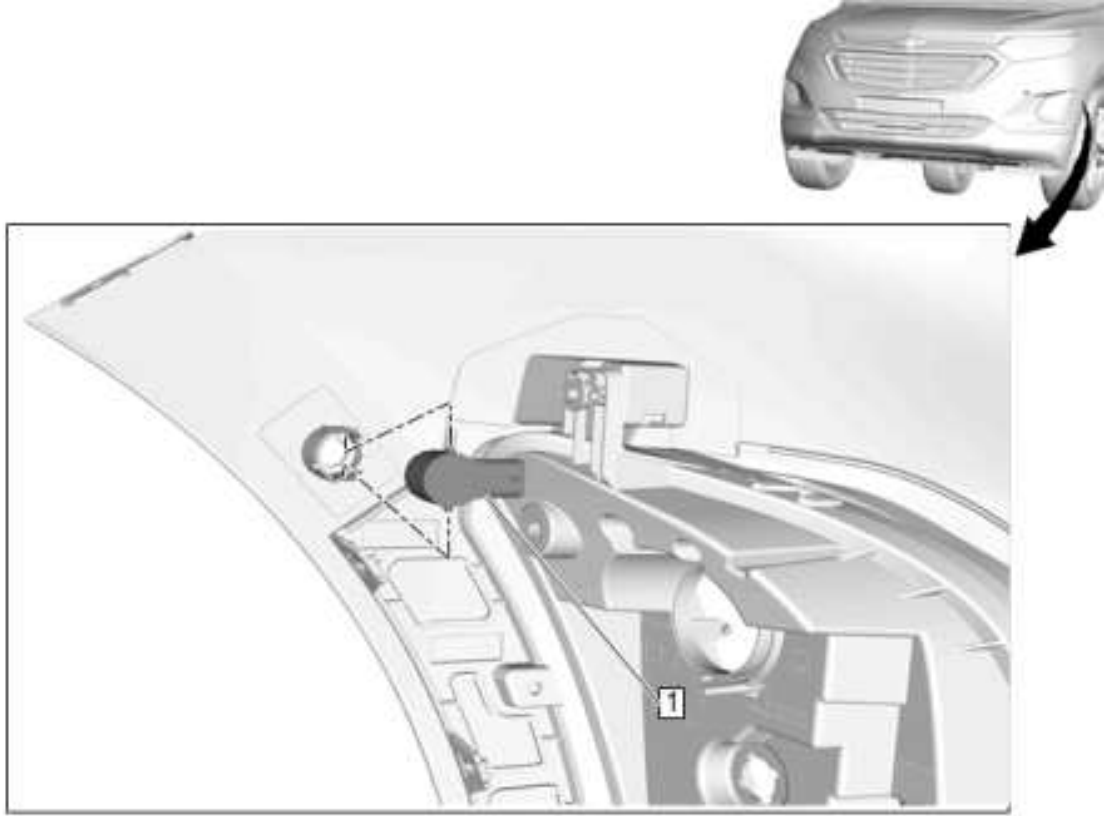


Fig. 8: Advanced Parking Assist Alarm Sensor (Equinox).

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Front Bumper Fascia Replacement (Equinox)</u>	
1	Advance Parking Assist Alarm Sensor Procedure 1. Disconnect the electrical connector. 2. Release the locking tab from the front parking assist alarm sensor bracket. 3. When the replacement is completed, use a scan tool to perform the appropriate reset functions. Refer to <u>Parking Assist Sensor Learn Calibration</u>

ADVANCED PARKING ASSIST ALARM SENSOR REPLACEMENT (TERRAIN)

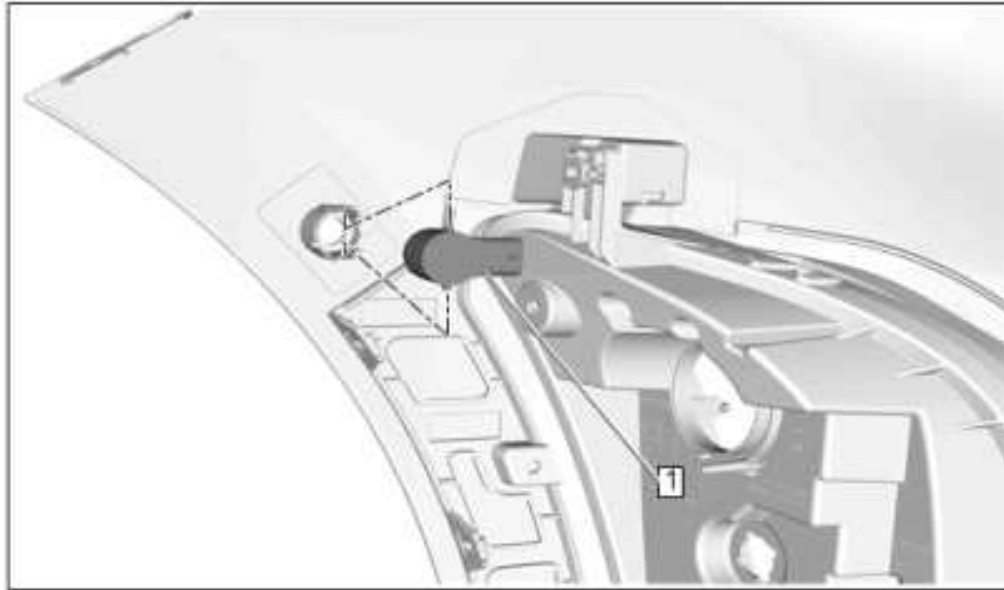


Fig. 9: Advanced Parking Assist Alarm Sensor (Terrain)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Front Bumper Fascia Replacement (Terrain)</u>	
1	Advance Parking Assist Alarm Sensor Procedure 1. Disconnect the electrical connector. 2. Release the locking tab from the front parking assist alarm sensor bracket. 3. When the replacement is completed, use a scan tool to perform the appropriate reset functions. Refer to <u>Parking Assist Sensor Learn Calibration</u>

REAR PARKING ASSIST ALARM SENSOR REPLACEMENT (EQUINOX)

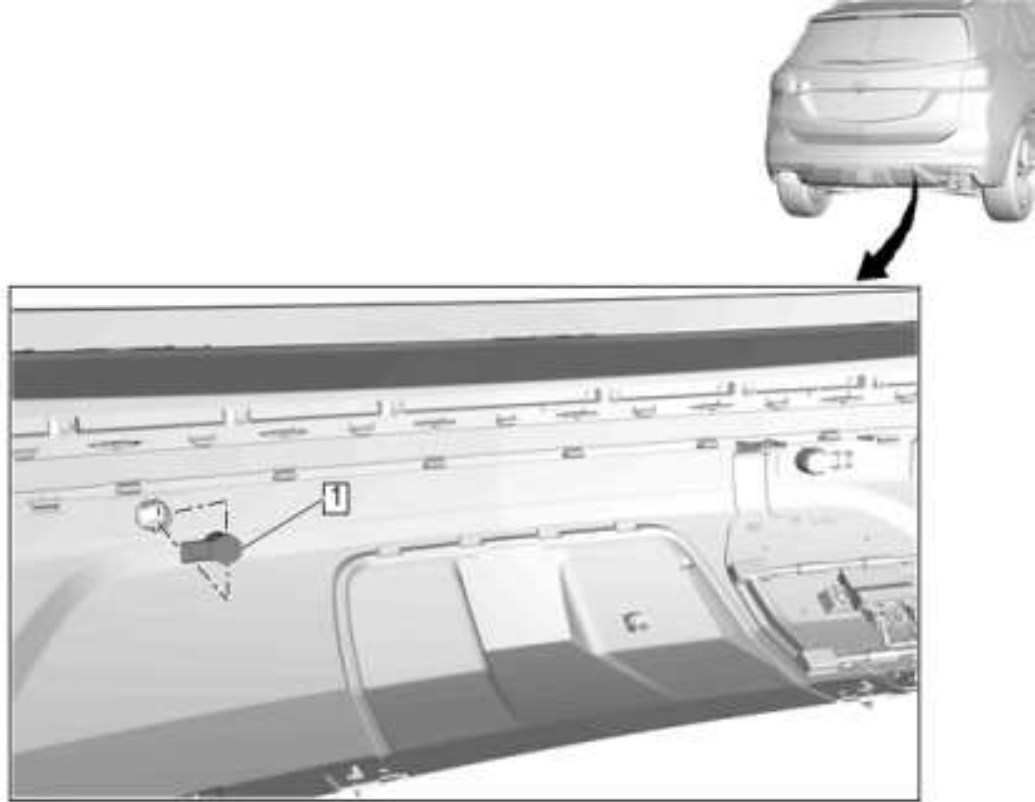


Fig. 10: Rear Parking Assist Alarm Sensor (Equinox)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Rear Bumper Fascia Energy Absorber Replacement (Equinox)</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. When the replacement is completed, use a scan tool to perform the appropriate reset functions. Refer to <u>Parking Assist Sensor Learn Calibration</u>

REAR PARKING ASSIST ALARM SENSOR REPLACEMENT (TERRAIN)

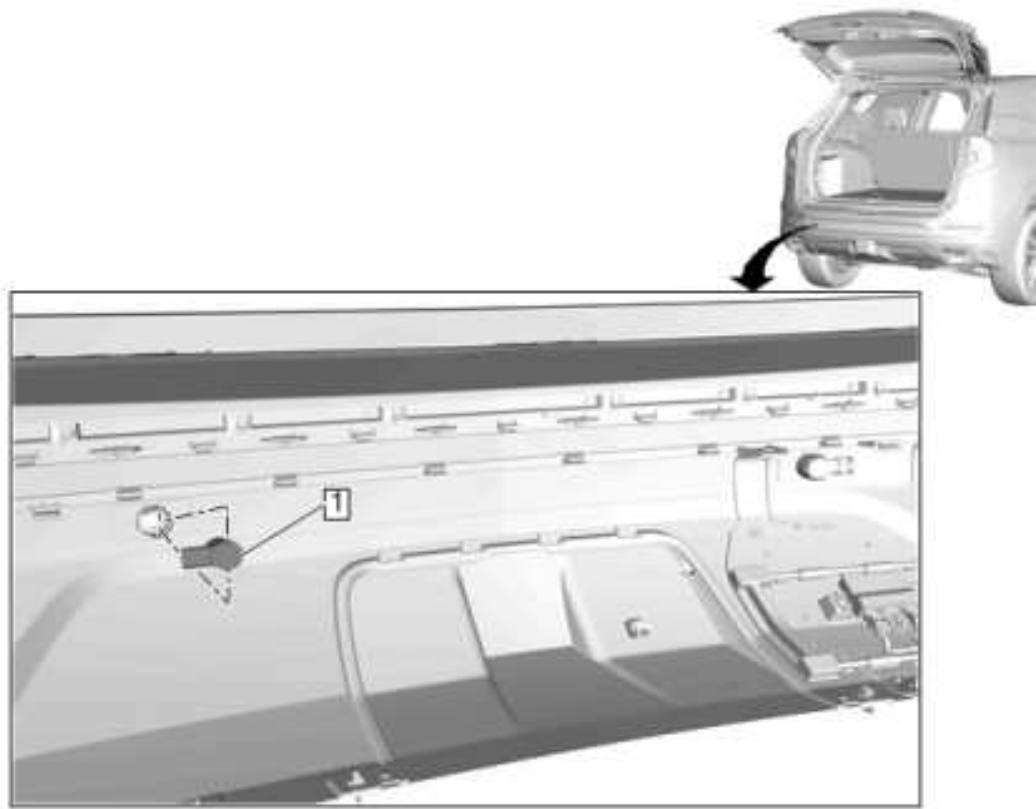


Fig. 11: Rear Parking Assist Alarm Sensor (Terrain)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Rear Bumper Fascia Energy Absorber Replacement (Terrain).</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. When the replacement is completed, use a scan tool to perform the appropriate reset functions. Refer to <u>Parking Assist Sensor Learn Calibration</u>

PARKING ASSIST ALARM SENSOR RING REPLACEMENT (FRONT)

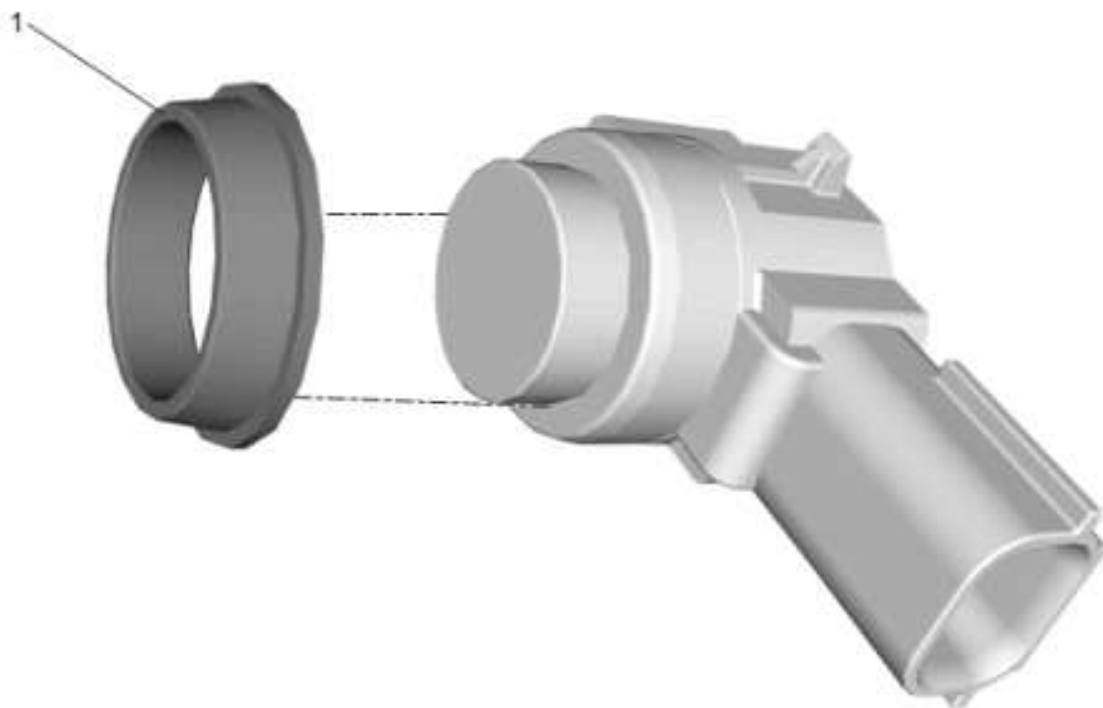


Fig. 12: Parking Assist Alarm Sensor Ring (Front)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Front Parking Assist Alarm Sensor Replacement (Equinox)Front Parking Assist Alarm Sensor Replacement (Terrain)	
1	Parking Assist Alarm Sensor Ring Procedure Pull the parking assist alarm sensor ring from the sensor.

PARKING ASSIST ALARM SENSOR RING REPLACEMENT (REAR)

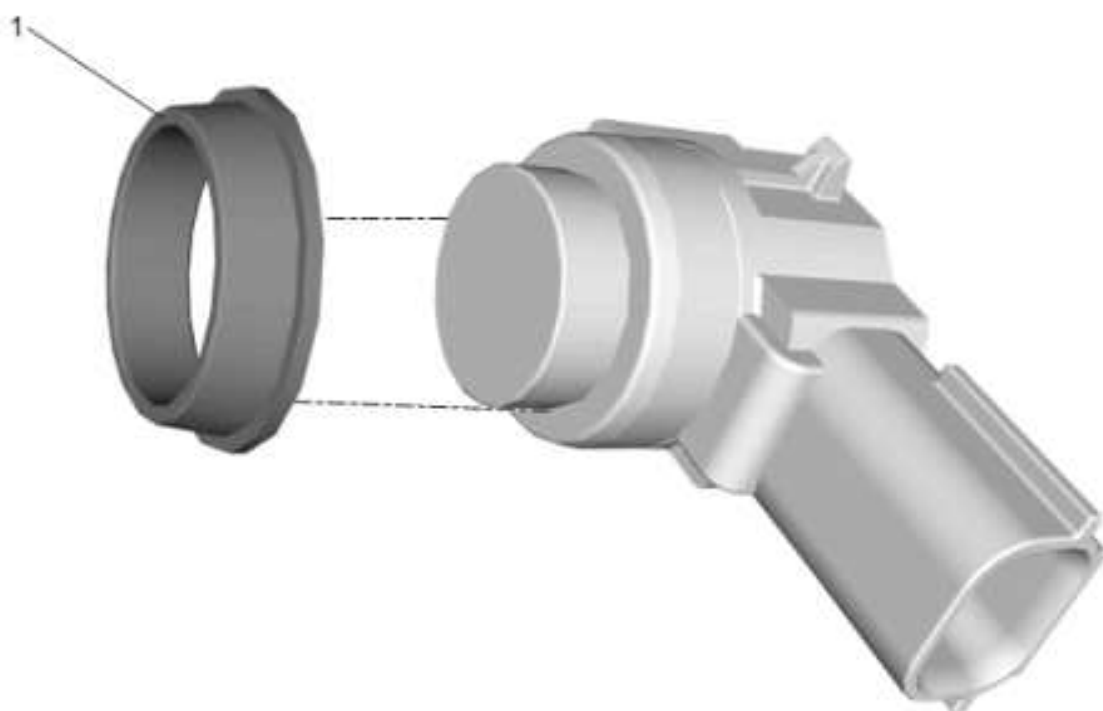


Fig. 13: Parking Assist Alarm Sensor Ring (Rear)
 Courtesy of GENERAL MOTORS COMPANY

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

PARKING ASSIST SENSOR LEARN CALIBRATION

Calibration

The calibration process for the Parking Assist system is necessary when a parking assist sensor has been replaced or improperly learned.

To calibrate the Parking Assist sensors:

NOTE: Parking Assist Sensors should be at or near room temperature

1. Select **Parking Assist Sensor Learn** in the scan tool
2. Operate the vehicle in the following conditions until the calibration is complete:
 - Nothing is within 50cm of the parking assist sensors
 - Ensure the parking assist sensors are clean
3. Vehicle OFF, scan tool disconnected, all doors closed, all accessories OFF, open and close driver door. It may take up to 2 min for all vehicle systems to power down.
4. Verify Parking Assist system is operating correctly and there are no DTCs set.

No Calibration

Conditions that will prevent completion of the self-calibration procedure:

- Dirty or contaminated obstruction on the parking assist sensor
- Objects are within 50cm of the parking assist sensors

Repair Instructions

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

Control Module References for control module replacement, programming and setup

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 disable 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 sensor 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.

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.

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Parking Assist System Driver Information Center Messages

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 - The vehicle bumper is damaged.
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 - The parking assist sensors are disrupted by vibrations, like those caused by a large nearby vehicle or from heavy equipment such as a jackhammer.
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