

Parking Assistance Systems

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Description and Operation

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Parking Assist Description and Operation

Object Detection Description and Operation (Parking Assist)

The ultrasonic parking assist system is designed to identify and notify the driver of an object in the vehicle's path when reversing. The distance and location of the object is determined by 4 object sensors located in the rear bumper. The parking assist system will notify the driver using an audible beep signal through the radio.

Object Detection Components

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

- Object alarm module
- Rear object alarm sensors

Object Alarm Module

The object alarm module provides an 8V reference and a low reference to the four object alarm sensors. The object alarm 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 object alarm module will send a data message via CAN-Bus to the radio requesting an audible alert.

Object Alarm Sensors

The object alarm sensors are located in the rear bumper 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 ring time, it is used to determine the distance to the object. The sensors report this information to the object alarm module.

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 object alarm module. The object alarm module evaluates the received sensor signals. As soon as an object is within the measuring range, the object alarm module sends a message via CAN-Bus to the radio in order to give out the acoustic distance signal. The measuring range is between 40" (101.6cm) to 120" (304.8cm). From a distance of 120" (304.8cm), the acoustic signal is active. The frequency of the beep sound increases with decreasing distance. From a distance less than 40" (101.6cm), the sound becomes continuous.

The parking assist can be activated and deactivated by engaging the reverse gear.

The object alarm 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, which need to alter when the vehicle moves. If this is not the case, the sensor is acoustically blocked or faulty. Mud, ice and snow may cause obstruction of the function of the sensors. Besides that the object alarm module checks whether the correct type of sensor is installed.

Diagnostic Information and Procedures

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Symptoms - Parking Assistance Systems

Note :

The following steps must be completed before using the symptom lists.

1. In order to verify that all of the following conditions are fulfilled before using the symptom lists perform the Diagnostic System Check:
[Diagnostic System Check - Vehicle](#)
2.
 - No DTCs Stored
 - The control modules can communicate via the serial data link.
3. Review the system description and operation in order to familiarize yourself with the system functions. Refer to: [Parking Assist Description and Operation](#)

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the system.
- Inspect the easily accessible or visible system components, for obvious damage or conditions, which may cause the symptom.

Intermittent

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

Symptom List

For more information see: [Parking Assist System Malfunction](#)

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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 rear object sensor control module is supplied ignition voltage from the I/P fuse block. When the transmission is in reverse, the system is turned ON, ignition voltage is supplied through the reverse lamp switch. The object alarm sensors are supplied with signal circuits referenced from 8V by the rear object sensor control module and low reference circuits. The object alarm module is supplied with an 8V power supply and low reference from the module. The alarm control circuit is an 8V circuit that is pulse width modulated low to activate the alarm.

Reference Information

Schematic Reference

[Parking Assistance Systems Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

Description and Operation

[Parking Assist Description and Operation](#)

Electrical Information Reference

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

Diagnostic Aids

The park assist system is capable of performing an object detection sensor self test. While in the sensor self test mode the park assist module will verify inputs from the object detection sensors. The park assist module indicates sensor status using the system alarm. If both sensor signals are being received by the rear park assist, module a single short tone will be activated. When one or both sensor signals are not received, the module will respond by activating the alarm with 1 tone repeated for a left sensor fault, and 2 tones repeated for a right sensor fault. If both sensors are faulted, the module will respond by activating the alarm with 3 tones continuously.

To enter the object sensor self test, complete the following steps:

1. Turn the ignition ON.
2. Shift the transmission to Reverse.
3. The system will be in the Object Sensor Self Test mode.
4. To exit the Object Detection Sensor Self Test mode, turn the ignition OFF.

Circuit/System Verification

1. Ignition ON, with the area behind the vehicle clear of any objects which may activate the park assist alarm, shift the transmission to reverse. The object alarm should sound 1 short tone.

2.
 - If not the specified value, refer to Object Alarm System Circuit test.
3. Perform the Object Detection Sensor Self Test procedure in order to verify the sensor inputs to the module. Refer to Diagnostic Aids.
4.
 - If the Self Test mode indicates that either sensor input has failed, refer to Object Alarm Sensor Circuit test.

Circuit/System Testing

Object Alarm System Circuit Test

1. Ignition OFF, disconnect the harness connector at the rear object sensor control module.
2. Test for less than 1.0 Ω between the ground circuit terminal 16 and ground.
3.
 - If greater than the specified value, test the ground circuit for an open/high resistance.
4. Ignition ON, verify that a test lamp illuminates between the ignition circuit terminal 8 and ground.
5.
 - If the test lamp does not illuminate, test the ignition circuit for a short to ground or an open/high resistance.
6. Park brake applied, transmission in reverse, verify that a test lamp illuminates between the backup lamp control circuit terminal 5 and ground.
7.
 - If the test lamp does not illuminate, test the backup lamp control circuit for a short to ground or an open/high resistance.
8. Ignition OFF, connect the harness connector at the rear object sensor control module.
9. Disconnect the harness connector at the object alarm module.
10. Test for less than 1.0 Ω between the low reference circuit terminal 3 and ground.
11.
 - If greater than the specified value, test the low reference circuit for an open/high resistance.
12. Ignition ON, test for 7.5 $\sim$ 8.2V between the 8V reference circuit terminal 1 and ground.
13.
 - If less than the specified range, test the 8V reference circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the rear object sensor control module.
 - If greater than the specified range, test the 8V reference circuit for a short to voltage. If the circuit tests normal, replace the rear object sensor control module.
14. Connect a test lamp between the signal circuit terminal 2 and ground. The test lamp should not illuminate.
15.
 - If the test lamp illuminates, test the signal circuit for a short to voltage. If the circuit tests normal, replace the rear object sensor control module.
16. Test for infinite resistance between the signal circuit terminal 2 and ground.
17.
 - If less than the specified value, test the signal circuit for a short to ground. If the circuit tests normal, replace the rear object sensor control module.
18. Ignition OFF, place an object less than 0.4m away from the rear bumper.

19. Connect a test lamp between the 8V reference circuit terminal 1 and the signal circuit terminal 2.
20. Ignition ON, park brake applied, transmission in reverse, the test lamp should illuminate.
21.
 - If the test lamp does not illuminate, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the rear object sensor control module.
22. If all circuits test normal, replace the object alarm module.

Object Alarm Sensor Circuit Test

1. Ignition OFF, disconnect the harness connectors at the object alarm sensor.
2. Test for less than 1.0Ω between the low reference circuit terminal 2 and ground.
3.
 - If greater than the specified value, test the appropriate low reference circuit for an open/high resistance.
4. Ignition ON, park brake applied, transmission in reverse, test for 7.5~8.2V between the object alarm sensor signal circuit terminal 1 and ground.
5.
 - If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the rear object sensor control module.
 - If greater than the specified range, test the signal circuit for a short to voltage. If the circuit tests normal, replace the rear object sensor control module.
6. If all circuits test normal, replace the appropriate object alarm sensor.

Repair Instructions

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

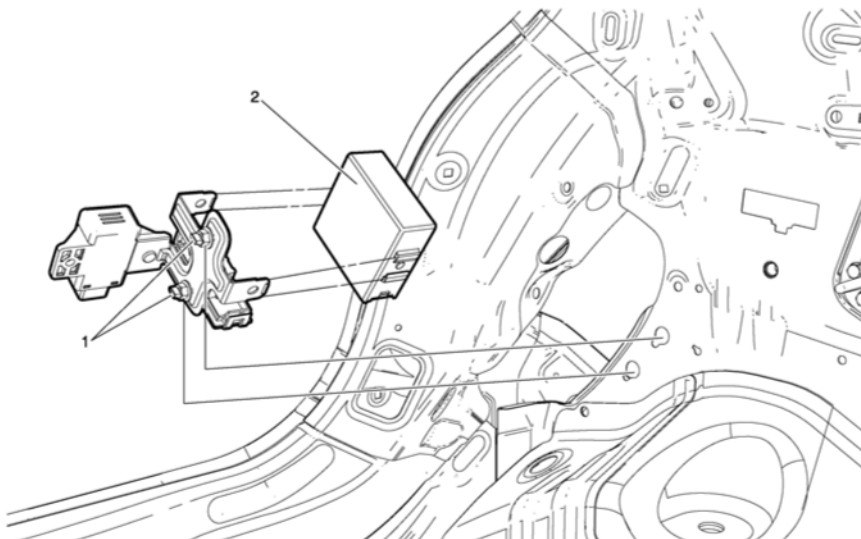
- [Parking Assist Control Module Replacement](#)
- [Rear Parking Assist Alarm Sensor Replacement](#)

Repair Instructions

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Parking Assist Control Module Replacement (Hatchback)





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Callout	Component Name
Preliminary Procedure	
Remove the rear wheelhouse trim finish. Refer to Rear Wheelhouse Trim Finish Panel Replacement .	
1	Rear Object Alarm Module Bolt Caution: Refer to Fastener Caution . Tighten 6â€%N-m (53â€%lbâ€%in)

Callout	Component Name
2	Rear Object Alarm Module Procedure 1. Loosen the bolts and remove the rear object alarm and module assembly. 2. Disconnect the electrical connector. 3. Remove the module from the bracket. Tip The bolt is integral to the sensor assembly, DO NOT remove separately.

Related Part Information

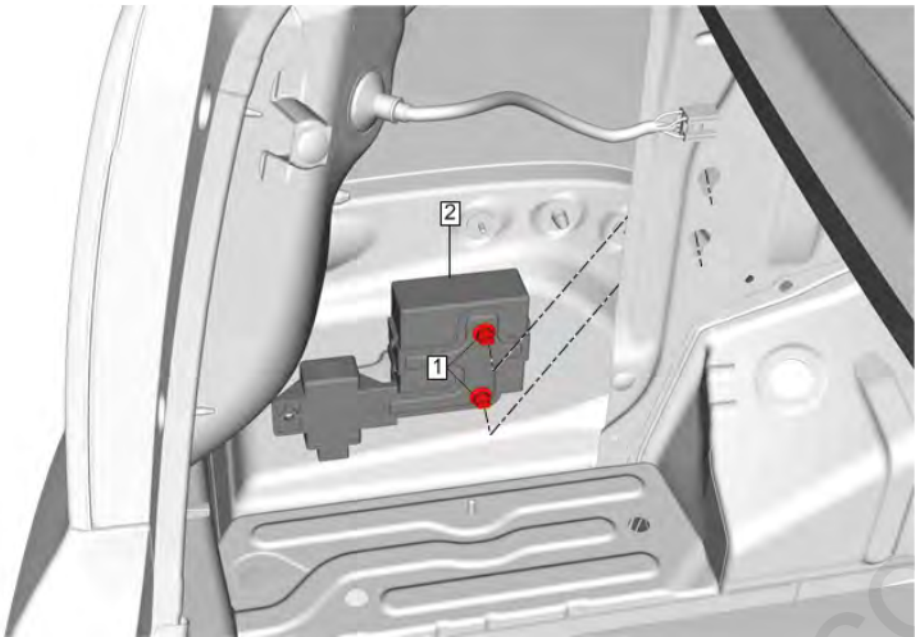
Part Name	Catalog Name	Part Code
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Parking Assist Control Module	MODULE,PARK ASST CONT	7255A
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Parking Assist Control Module Replacement (Notchback)



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Callout	Component Name
Preliminary Procedure	
Rear Compartment Side Trim Panel - Left Side >> Remove - Rear Compartment Side Trim Panel Replacement	
1	Rear Object Alarm Module Nut [2>x] Caution : Fastener Caution Tighten 6>N-m (53 lb in)
2	Rear Object Alarm Module Procedure 1. Loosen the nuts and remove the rear object alarm and module assembly. 2. Disconnect the electrical connector. 3. Remove the module from the bracket. Note: The bolt is integral to the sensor assembly, DO NOT remove separately.

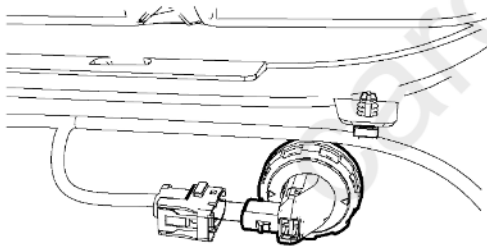
Related Part Information

Part Name	Catalog Name	Part Code
Parking Assist Control Module	MODULE,PARK ASST CONT	7255A

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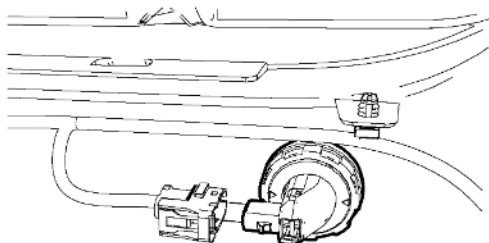
Rear Parking Assist Alarm Sensor Replacement

Removal Procedure



1. [Click here for full size](#)
2. Remove the rear bumper fascia. Refer to [Rear Bumper Fascia Replacement](#).
3. Disconnect electrical connector from the rear object sensor.
4. Rotate the housing counterclockwise and remove the rear object sensor.

Installation Procedure



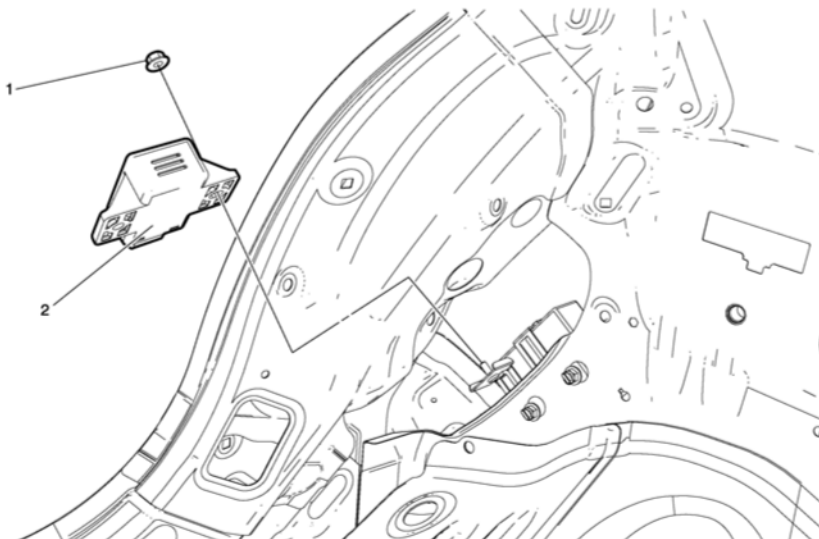
1. [Click here for full size](#)
2. Insert the sensor into the housing and lock the sensor by rotating the housing clockwise.
3. Connect the electrical connector to the rear object sensor.
4. Install the rear bumper fascia. Refer to [Rear Bumper Fascia Replacement](#).

Related Part Information

Part Name	Catalog Name	Part Code
Rear Parking Assist Alarm Sensor	SENSOR PKG,RR PARK ASST ALARM	7249Y
Parking Assist Alarm Sensor	SENSOR KIT,PARK ASST ALARM	7249Z
Parking Assist Alarm Sensor	SENSOR,PARK ASST ALARM	7250A

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Rear Object Alarm Replacement





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Callout	Component Name
Preliminary Procedure	
Remove the rear wheelhouse trim finish. Refer to Rear Wheelhouse Trim Finish Panel Replacement .	
1	Rear Object Alarm Nut Caution: Refer to Fastener Caution . Tighten 4.5â€‰N-m (40â€‰lbâ€‰in)
2	Rear Object Alarm Procedure 1. Disconnect the electrical connector. 2. Remove the rear object alarm.

Related Part Information

Part Name	Catalog Name	Part Code
Rear Object Alarm ALARM,RR OBJECT 7335A		

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Specifications

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Fastener Specifications

Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)
Note:	
All fasteners listed in this table can be reused after removal.	
Rear Object Alarm Module Bolt	6â€‰N-mâ€‰(53â€‰lbâ€‰in)
Rear Object Alarm Module Nut	6â€‰N-mâ€‰(53â€‰lbâ€‰in)
Rear Object Alarm Nut	4.5â€‰N-mâ€‰(40â€‰lbâ€‰in)

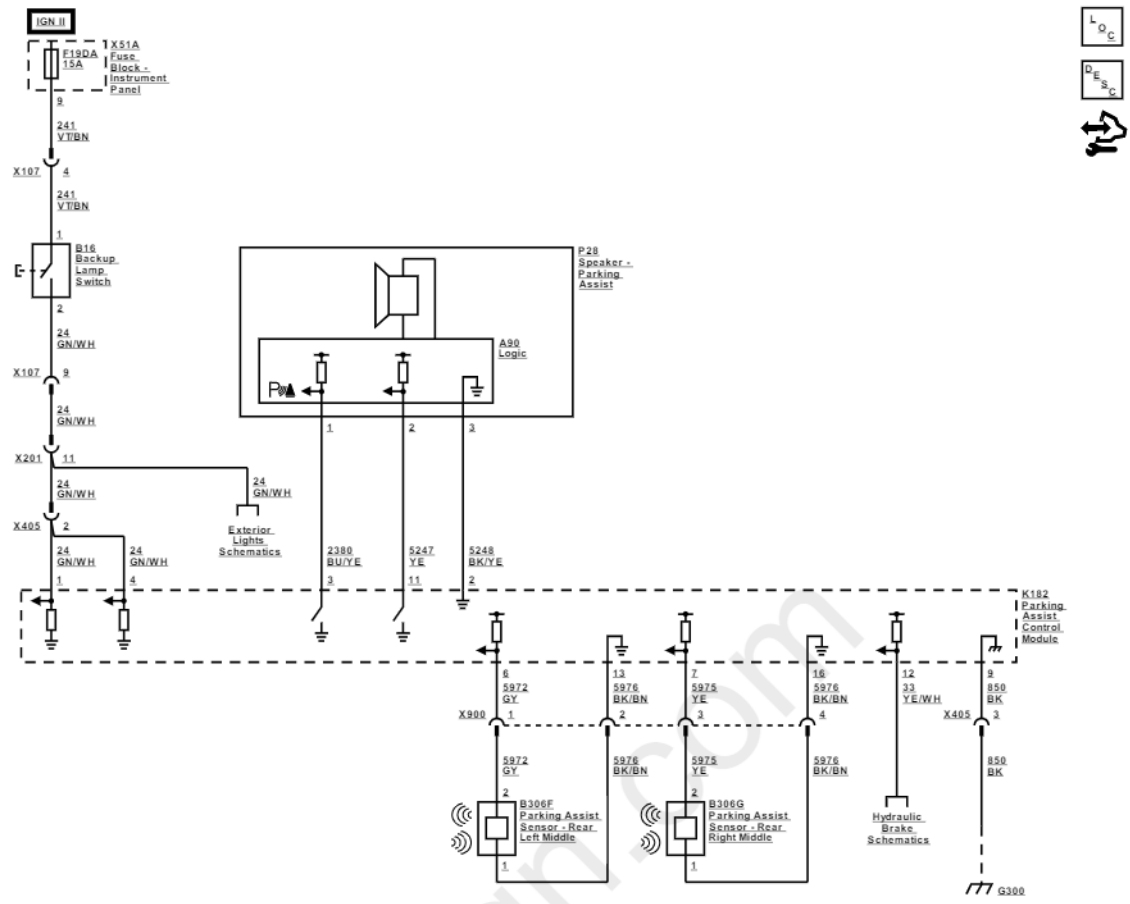
Schematic and Routing Diagrams

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Parking Assistance Systems Schematics

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Rear Park Assist Controls (UD7)



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