

ACCESSORIES & EQUIPMENT

Object Detection and Pedestrian Protection - Repair Instructions - CTS Sedan

REPAIR INSTRUCTIONS

FRONT SEAT LANE DEPARTURE WARNING ACTUATOR REPLACEMENT

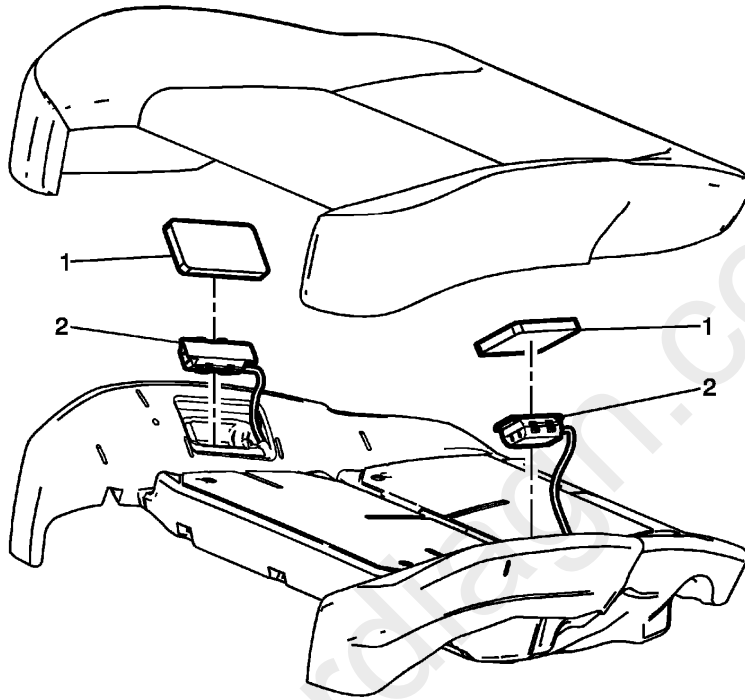


Fig. 1: Front Seat Lane Departure Warning Actuator
Courtesy of GENERAL MOTORS COMPANY

Front Seat Lane Departure Warning Actuator Replacement

Callout	Component Name
WARNING: Refer to <u>SIR Warning</u> .	
Preliminary Procedure	
1. Remove the front seat. Refer to <u>Driver or Passenger Seat Removal and Installation</u> .	
2. Remove the front seat cushion cover and pad. Refer to <u>Front Seat Cushion Cover and Pad Replacement</u> .	
	Front Seat Lane Departure Warning Actuator Topper Pad (Qty: 2)
	Procedure

1	1. Gently peel away the topper pad from the seat cushion pad. 2. When removing the topper pad be careful not to damage the motor. NOTE: The topper pad must be replaced every time the motor is replaced.
2	Front Seat Lane Departure Warning Actuator Motor (Qty: 2) Procedure 1. Disconnect the actuator electrical connector. 2. Remove the original actuator and discard it. 3. Note the routing of the original wire and harness location for installation.

FORWARD RANGE RADAR MODULE REPLACEMENT

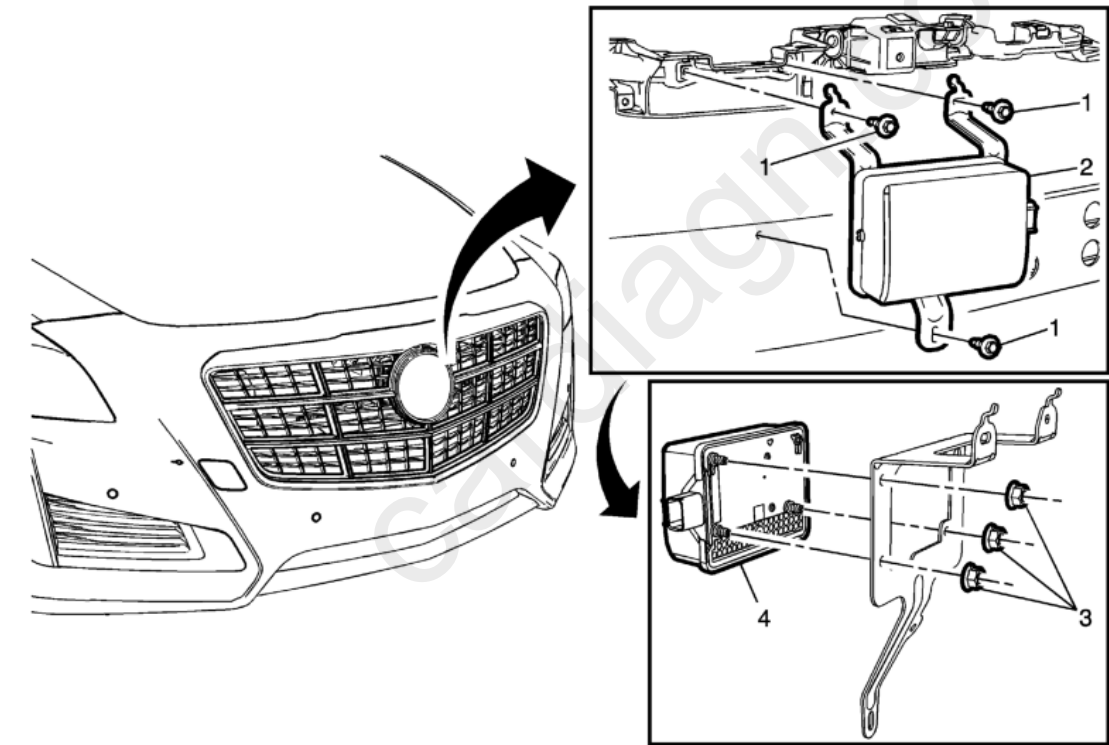


Fig. 2: Forward Range Radar Module
 Courtesy of GENERAL MOTORS COMPANY

Forward Range Radar Module Replacement

Callout	Component Name
Preliminary Procedure	
Remove the front bumper fascia. Refer to <u>Front Bumper Fascia Replacement</u> .	
	Forward Range Radar Module Bracket Fasteners (Qty: 3)

1	CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (80 lb in)
2	Forward Range Radar Module Bracket
3	Forward Range Radar Module Fasteners (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> .
4	Forward Range Radar Module Procedure 1. Disconnect the electrical connector. 2. For programming and set up, refer to <u>Control Module References</u> .

SHORT RANGE RADAR SENSOR REPLACEMENT

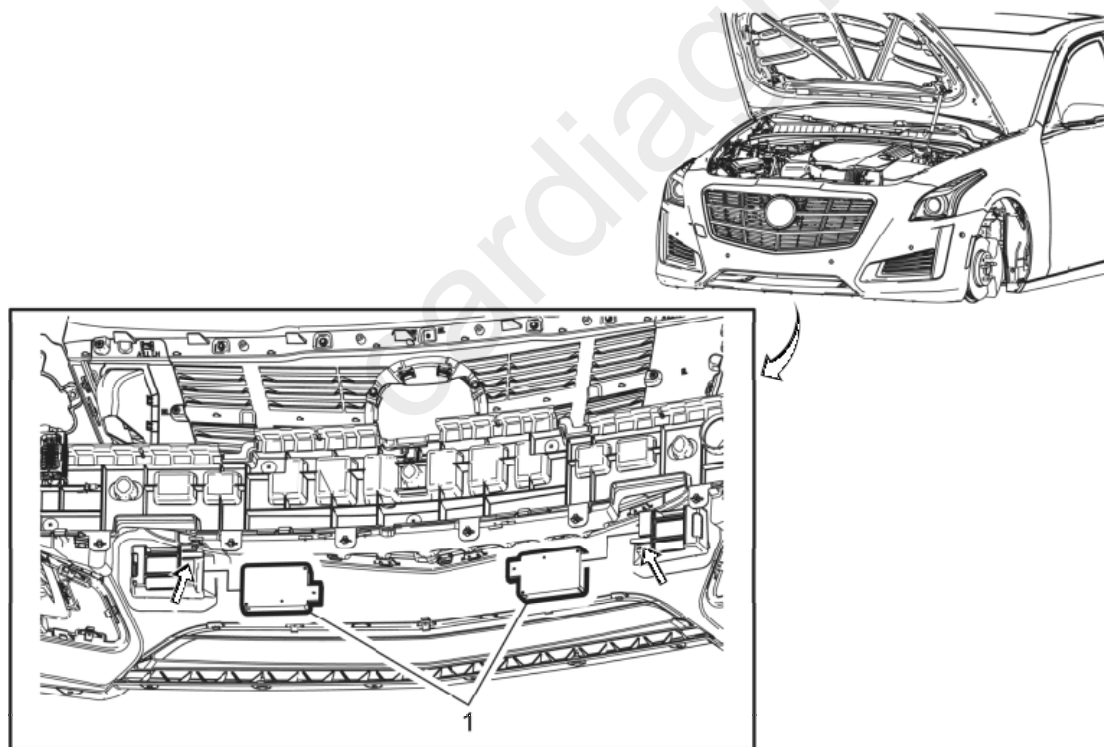


Fig. 3: Short Range Radar Sensor
Courtesy of GENERAL MOTORS COMPANY

Short Range Radar Sensor Replacement

Callout	Component Name
Preliminary Procedure Remove the front bumper fascia. Refer to <u>Front Bumper Fascia Replacement</u> .	
1	Short Range Radar Sensor (Qty 2)
	Procedure 1. Place the front bumper fascia face down on a clean protected surface. 2. Disconnect the electrical connector. 3. Release the tab retainer (arrow) and slide the left hand side object sensor to the right or slide the right hand side object sensor the left and remove. 4. For programming and set up, refer to <u>Control Module References</u> .

PEDESTRIAN IMPACT DETECTION SENSOR - FRONT UPPER BEAM

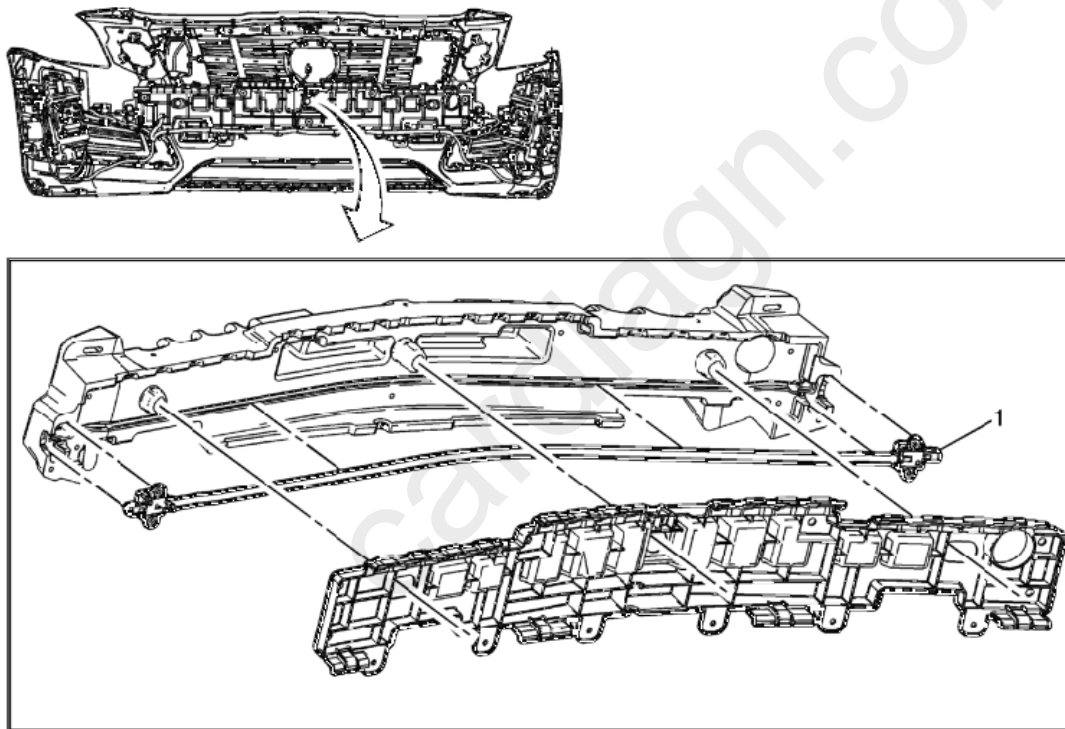


Fig. 4: Pedestrian Impact Detection Sensor Replacement - Front Upper Beam
Courtesy of GENERAL MOTORS COMPANY

Pedestrian Impact Detection Sensor Replacement - Front Upper Beam

Callout	Component Name
Preliminary Procedures	
1	Disable the pedestrian impact detection system. Refer to <u>Pedestrian Impact Detection System Disabling and Enabling</u> .

2. Remove the front bumper fascia energy absorber. Refer to **Front Bumper Fascia Energy Absorber Replacement** .
3. Separate the two halves of the front bumper fascia energy absorber.

1	Pedestrian Impact Detection Sensor Procedure Carefully remove the pedestrian impact detection sensor from the front half of the front bumper fascia energy absorber. NOTE: • Inspect the absorber / EA foam for any cracks or damage and inspect pedestrian sensor tube for any cuts or puncture holes. • Replace absorber or sensor system if any damage is found. This can cause faulty readings with the pedestrian impact sensor. • The pedestrian sensor is a press fit into the front half of the absorber.
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ACTIVE HOOD HINGE ACTUATOR REPLACEMENT

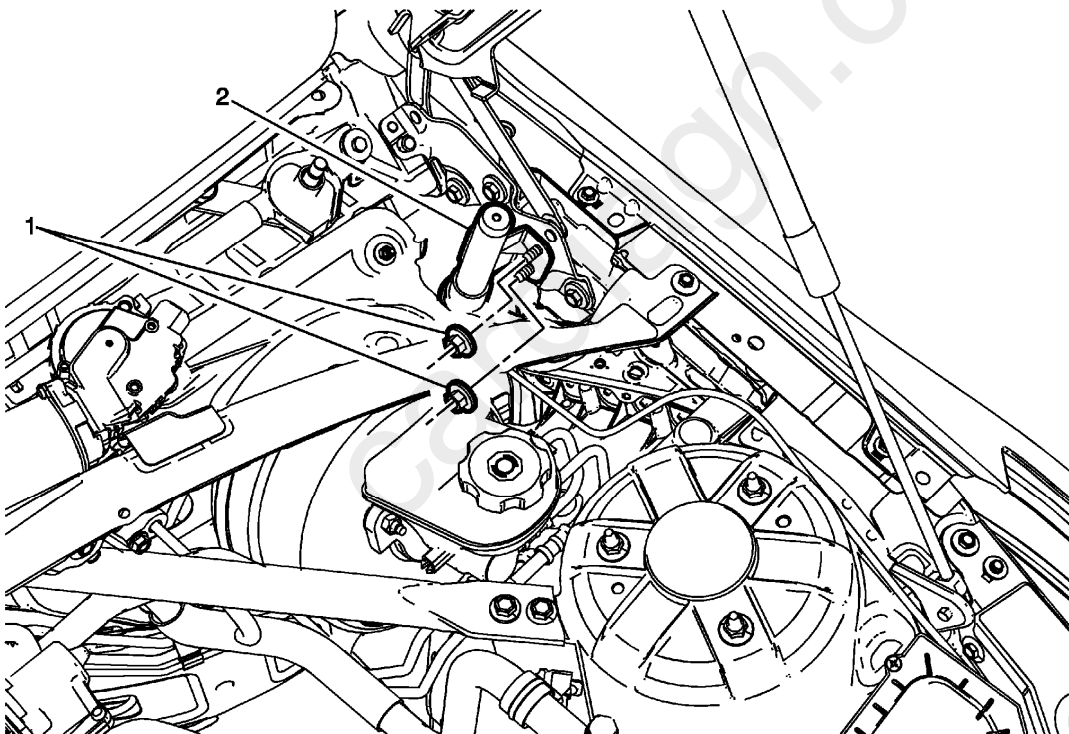


Fig. 5: Active Hood Hinge Actuator
 Courtesy of GENERAL MOTORS COMPANY

Active Hood Hinge Actuator Replacement

Callout	Component Name
Preliminary Procedure Disable the pedestrian impact detection system. Refer to <u>Pedestrian Impact Detection System</u>	

Disabling and Enabling .

1	Active Hood Hinge Actuator Bolt (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 22 (16 lb ft)
2	Active Hood Hinge Actuator Procedure 1. Disconnect any electrical connectors. 2. If deployed, replace the following parts: • Left and right actuator • Left and right hood hinge • Hood 3. Inspect the hood latch and subsequent replacement if functionality or appearance is compromised.

ACTIVE SAFETY CONTROL MODULE REPLACEMENT

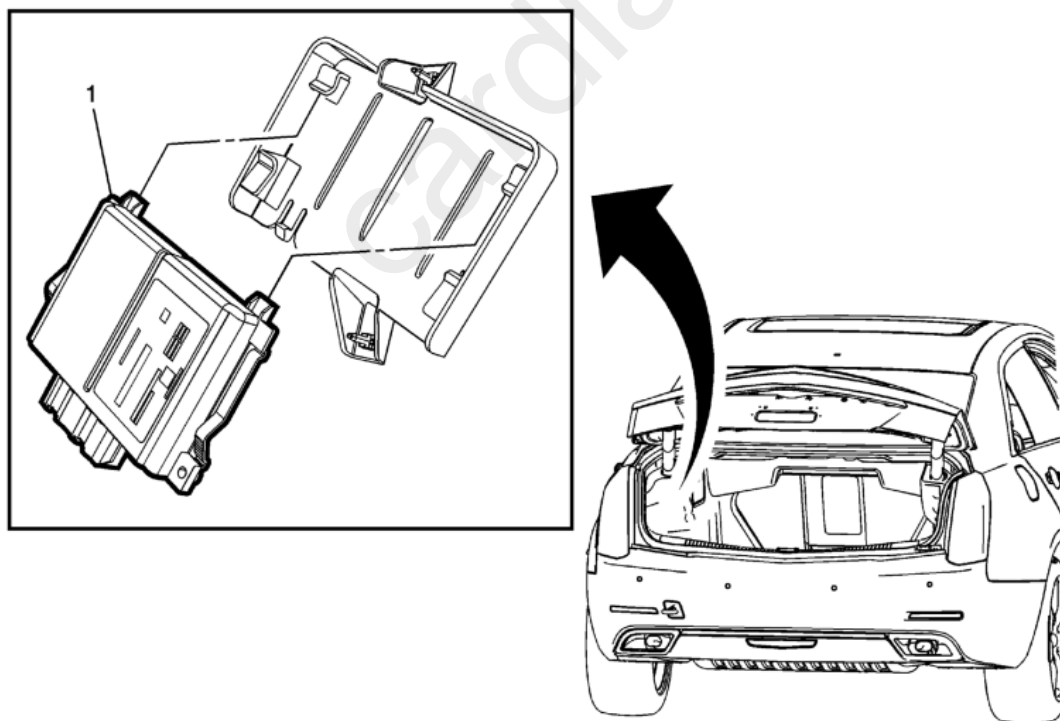


Fig. 6: Active Safety Control Module

Courtesy of GENERAL MOTORS COMPANY

Active Safety Control Module Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment side trim panel - left side. Refer to <u>Rear Compartment Side Trim Replacement - Left Side</u> .	
1	Active Safety Control Module Procedure 1. Release the locking retainer from the active safety control module bracket. 2. Disconnect the electrical connectors. 3. For programming and set up, refer to <u>Control Module References</u> .

FORWARD COLLISION ALERT DISPLAY REPLACEMENT

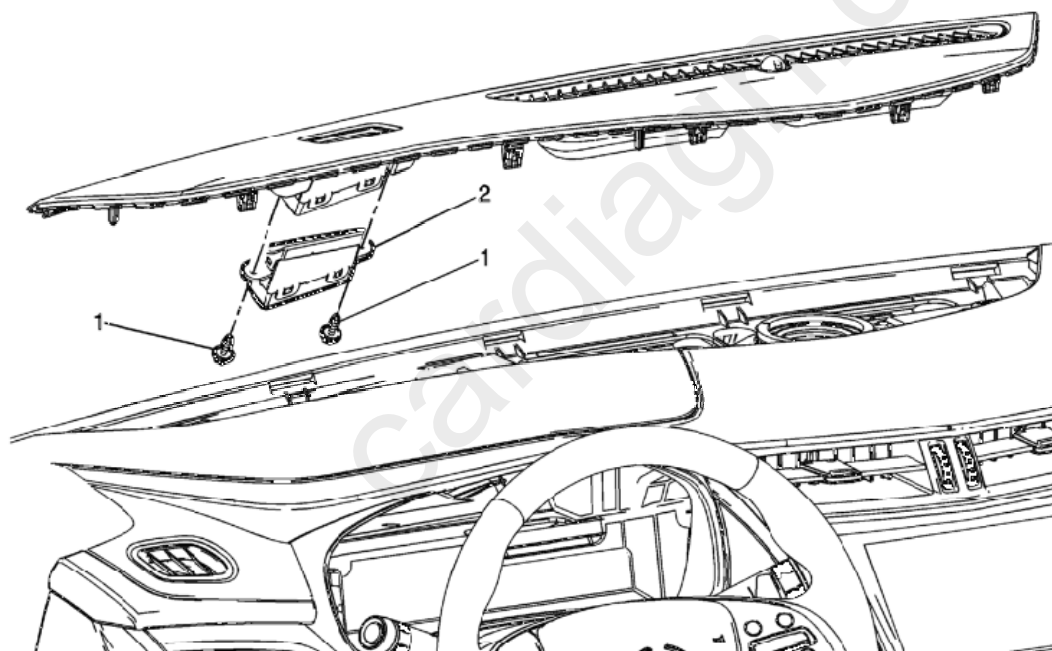


Fig. 7: Forward Collision Alert Display
Courtesy of GENERAL MOTORS COMPANY

Forward Collision Alert Display Replacement

Callout	Component Name
Preliminary Procedure Remove the instrument panel extension. Refer to <u>Instrument Panel Extension Replacement</u> .	

1	Forward Collision Alert Display Fastener (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 2.5 N.m (22 lb in)
2	Forward Collision Alert Display

PEDESTRIAN IMPACT DETECTION MODULE REPLACEMENT

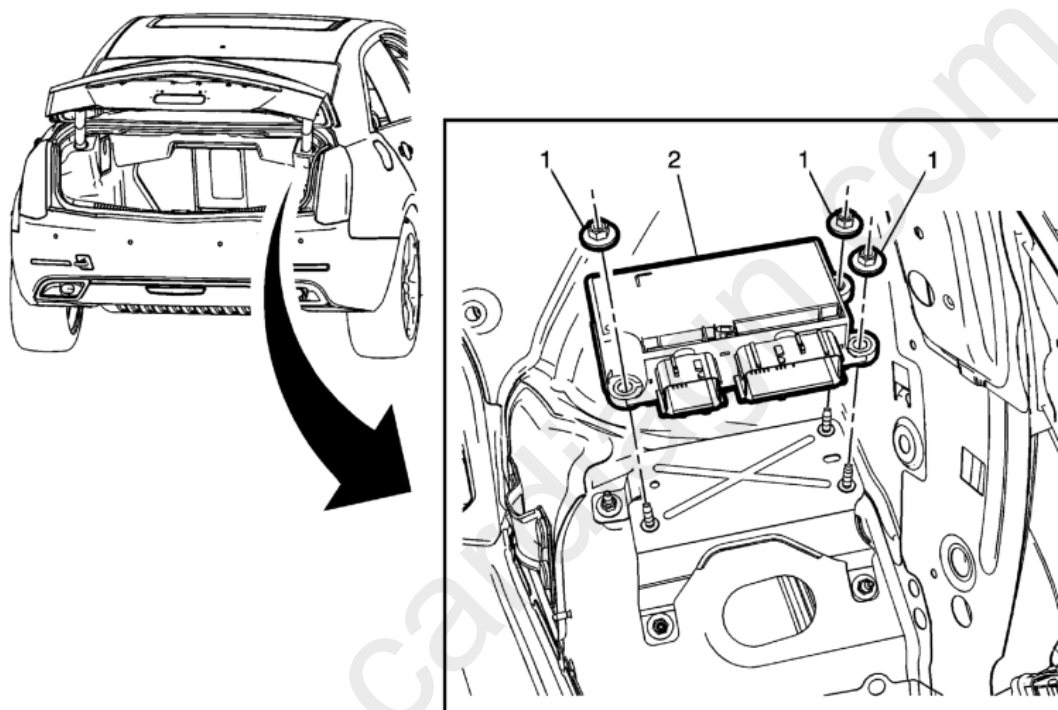


Fig. 8: Pedestrian Impact Detection Module
Courtesy of GENERAL MOTORS COMPANY

Pedestrian Impact Detection Module Replacement

Callout	Component Name
Preliminary Procedure Remove the rear compartment side trim panel - right. Refer to <u>Rear Compartment Side Trim Replacement - Right Side</u> .	
1	Pedestrian Impact Detection Module Fasteners (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> .

	Tighten 9 N.m (80 lb in)
2	Pedestrian Impact Detection Module Procedure 1. Disconnect the electrical connectors. 2. For programming and set up information, refer to <u>Control Module References</u> .

PEDESTRIAN IMPACT DETECTION SYSTEM HANDLING AND SCRAPPING

Special Tools

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

For equivalent regional tools, refer to **Special Tools** .

Live and Undeployed Pedestrian Impact Detection System Actuator

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

Scrapping Procedure

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

Do not deploy the PIDS Actuator in the following situations:

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

Deployment Procedures

Deploy the PIDS Actuators outside of the vehicle.

Deployment Outside Vehicle

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

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

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

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

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

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

15. Clear the area of people.
16. Separate the 2 banana plugs on the PIDS deployment harness that were shorted together earlier in the procedure.
17. Connect the SIR deployment harness wires to the power source. Deployment of the PIDS Actuator will occur when contact is made.
18. Disconnect the SIR deployment harness from the power source after the PIDS Actuator deploys.
19. If the PIDS Actuator did not deploy, disconnect the adapter and discontinue the procedure and contact the Technical Assistance Group. If deployment was successful, proceed to the following steps.
20. Seat one banana plug into the other in order to short the deployment harness leads.
21. Put on a pair of shop gloves.
22. Disconnect the pigtail adapter from the PIDS actuator as soon as possible.
23. . Inspect the pigtail adapter and the SIR deployment harness. Replace as needed.
24. Dispose of the deployed PIDS Actuator through normal refuse channels.
25. Wash your hands with a mild soap.

REAR OBJECT ALARM CONTROL MODULE REPLACEMENT

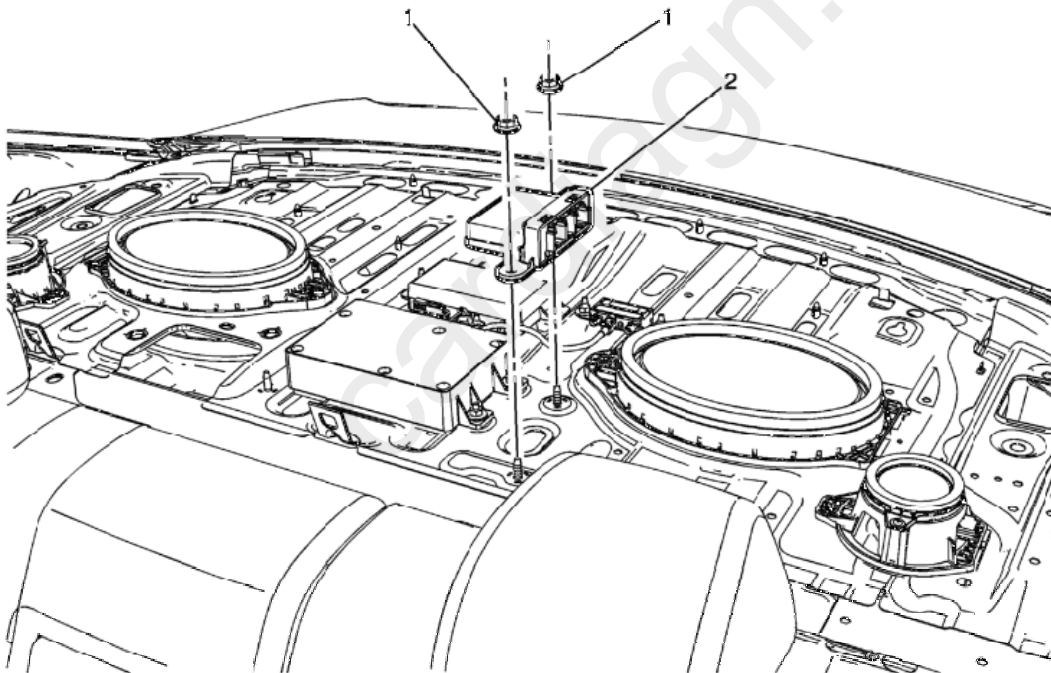


Fig. 9: Rear Object Alarm Control Module
Courtesy of GENERAL MOTORS COMPANY

Rear Object Alarm Control Module Replacement

Callout	Component Name
Preliminary Procedure	

Remove the rear window panel trim. Refer to **Rear Window Panel Trim Replacement (With DB3)** , **Rear Window Panel Trim Replacement (Without DB3)** .

1	Rear Object Alarm Control Module Fastener (Qty: 2) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 4.5 N.m (40 lb in)
2	Rear Object Alarm Control Module Procedure 1. Disconnect the electrical connectors. 2. For programming and set up, refer to <u>Control Module References</u> .

ADVANCE PARKING ASSIST ALARM SENSOR REPLACEMENT

Removal Procedure

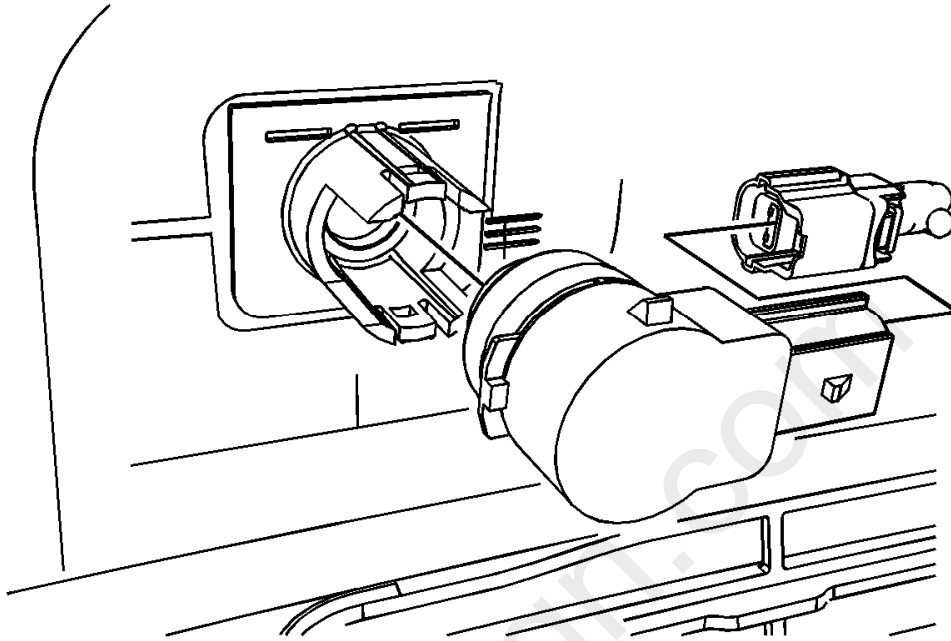


Fig. 10: Identifying Rear Object Sensor Housing
Courtesy of GENERAL MOTORS COMPANY

1. Remove front bumper fascia. Refer to **Front Bumper Fascia Replacement** .
2. Disconnect electrical from the front object alarm sensor.
3. Lift the locking tabs on the housing and remove the front object alarm sensor.

Installation Procedure

NOTE: **Do not refinish previously painted sensors. Excess paint build up will cause the sensor to be inoperative**

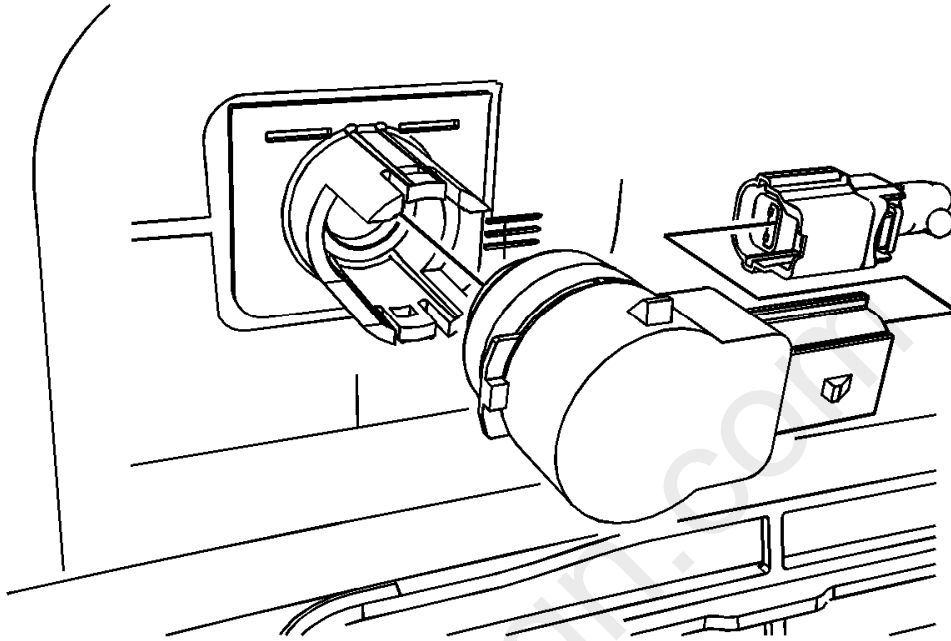


Fig. 11: Identifying Rear Object Sensor Housing
Courtesy of GENERAL MOTORS COMPANY

1. Insert the sensor into the housing.
2. Connect the electrical connector to the front object alarm sensor.
3. Install the front bumper fascia. Refer to **Front Bumper Fascia Replacement** .

SIDE OBJECT SENSING ALERT MODULE REPLACEMENT

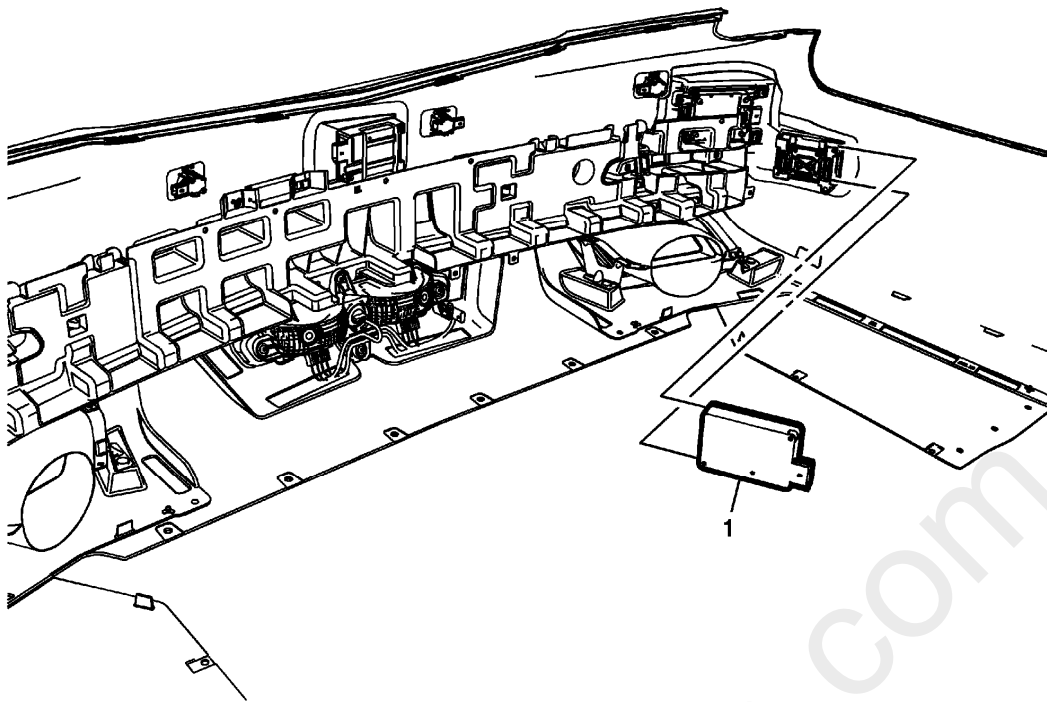


Fig. 12: Side Object Sensing Alert Module
 Courtesy of GENERAL MOTORS COMPANY

Side Object Sensing Alert Module Replacement

Callout	Component Name
Preliminary Procedure	
Remove the rear bumper fascia. Refer to <u>Rear Bumper Fascia Replacement</u> .	
1	Side Object Sensor Module Procedure 1. Disconnect the electrical connector. 2. Slide the module out of the retaining bracket. 3. For programming and set up, refer to <u>Control Module References</u>

REAR PARKING ASSIST ALARM SENSOR REPLACEMENT

Removal Procedure

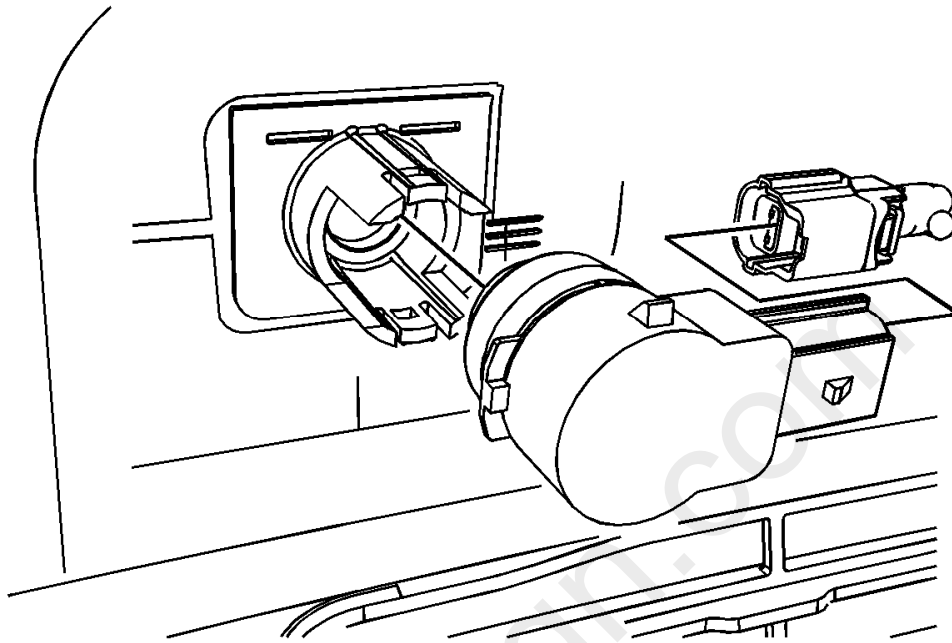


Fig. 13: Identifying Rear Object Sensor Housing
Courtesy of GENERAL MOTORS COMPANY

1. Remove rear bumper fascia. Refer to . **Rear Bumper Fascia Replacement**
2. Disconnect electrical from the rear object sensor.

NOTE: The rear object sensor is a one piece design. Do NOT twist the sensor cap to try and remove the painted cap. Replacement sensor requires painting to match fascia/bumper body color.

3. Lift the locking tabs on the housing and remove the rear object sensor.

Installation Procedure

NOTE: Do not refinish previously painted sensors. Excess paint build up will cause the sensor to be inoperative.

1. Paint the rear object sensor. Refer to **Basecoat/Clearcoat Paint Systems** .

2. Ensure the paint does not exceed 6 mils. Use a paint thickness gauge suitable for non-ferrous metals. Refer to **Paint Gauges** .

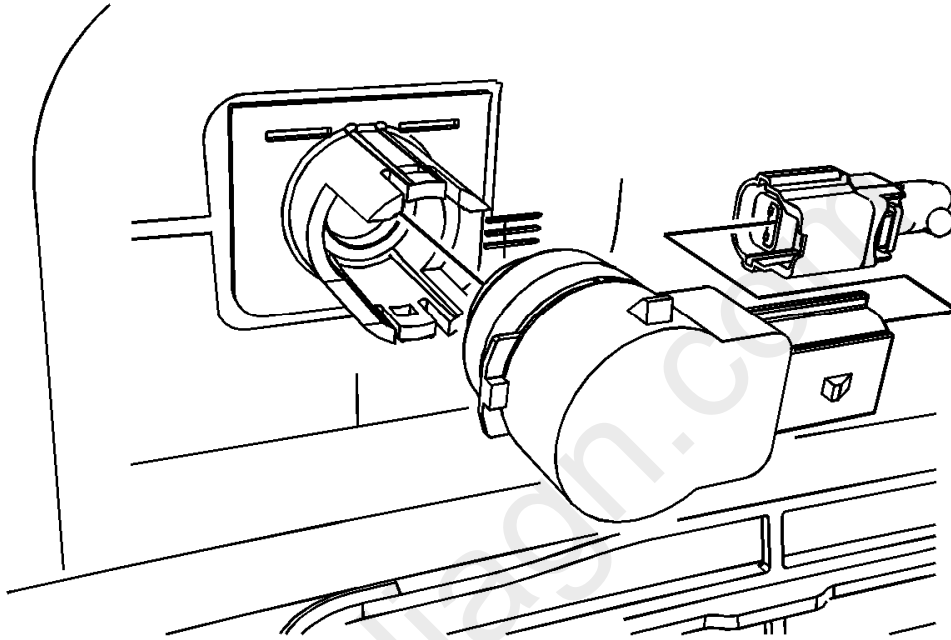


Fig. 14: Identifying Rear Object Sensor Housing
Courtesy of GENERAL MOTORS COMPANY

NOTE: Ensure the silicone decoupling ring is installed on the sensor to avoid sensor failure.

3. Insert the sensor into the housing.
4. Connect the electrical connector to the rear object sensor.
5. Install the rear bumper fascia. Refer to **Rear Bumper Fascia Replacement** .

MULTIFUNCTION RELAY MODULE BRACKET REPLACEMENT

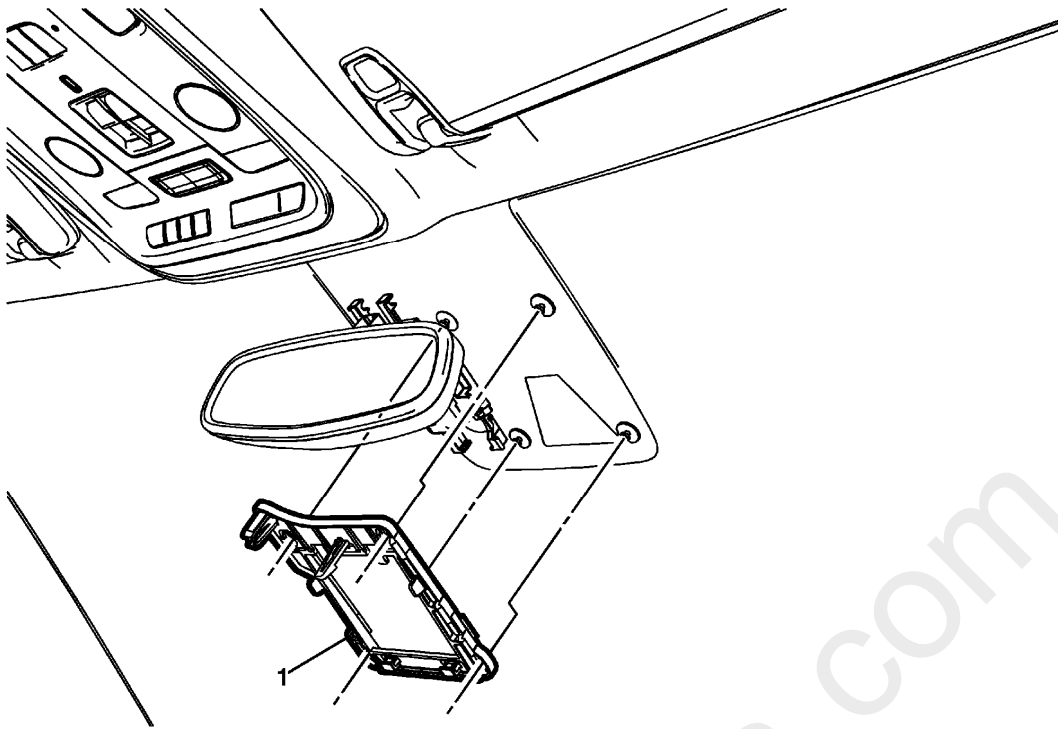


Fig. 15: Multifunction Relay Module Bracket
 Courtesy of GENERAL MOTORS COMPANY

Multifunction Relay Module Bracket Replacement

Callout	Component Name
Preliminary Procedure Remove the front view camera. Refer to <u>Front View Camera Replacement (With UGN)</u> , <u>Front View Camera Replacement (With UFL)</u> .	
1	Multifunction Relay Module Bracket Procedure Slide the bracket upward to disengage tabs, gently pull from windshield.

FRONT VIEW CAMERA REPLACEMENT (WITH UGN)

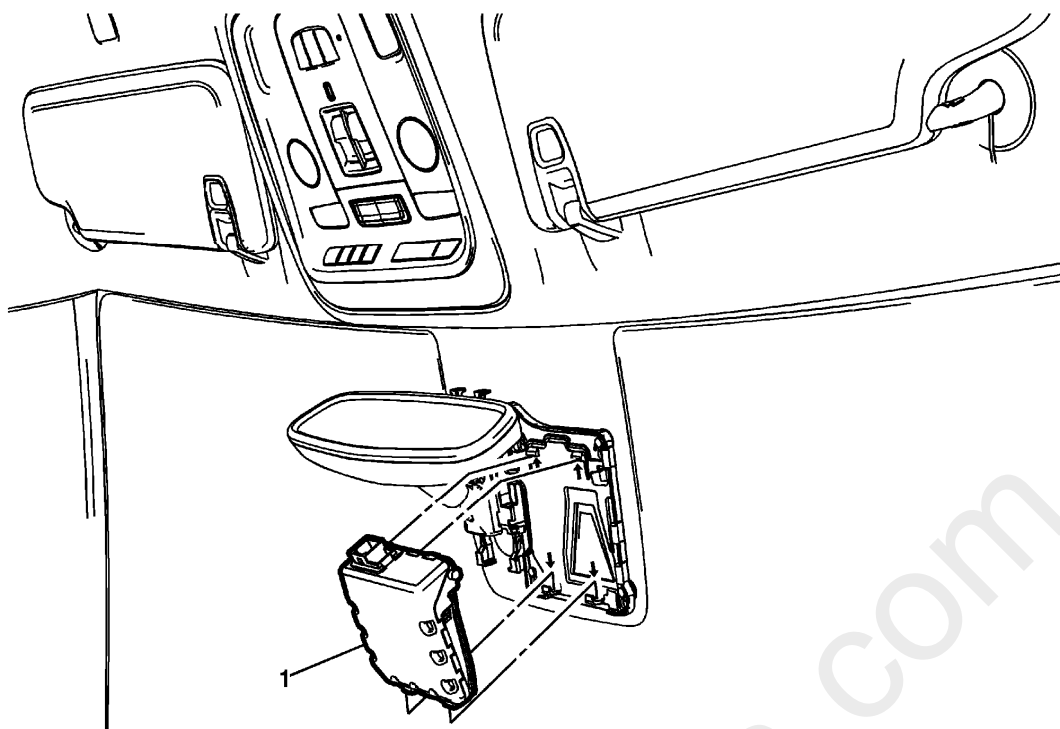


Fig. 16: Front View Camera (With UGN)
Courtesy of GENERAL MOTORS COMPANY

Front View Camera Replacement (With UGN)

Callout	Component Name
Preliminary Procedure Remove the windshield multifunction sensor mounting bracket cover Refer to <u>Windshield Multifunction Sensor Mount Bracket Cover Replacement (With UEU, UFL)</u> , <u>Windshield Multifunction Sensor Mount Bracket Cover Replacement (Without UEU, UFL)</u> .	
1	Front View Camera Procedure 1. Using a suitable plastic tool, insert the tool between the edge of the front view camera retainers, turn the tool to release the retainers and the camera and rotate downward. 2. Disconnect the electrical connector. 3. Program and calibrate the front view camera. For programming and set up, refer to <u>Front View Camera Module Programming and Setup</u> .

FRONT VIEW CAMERA REPLACEMENT (WITH UFL)

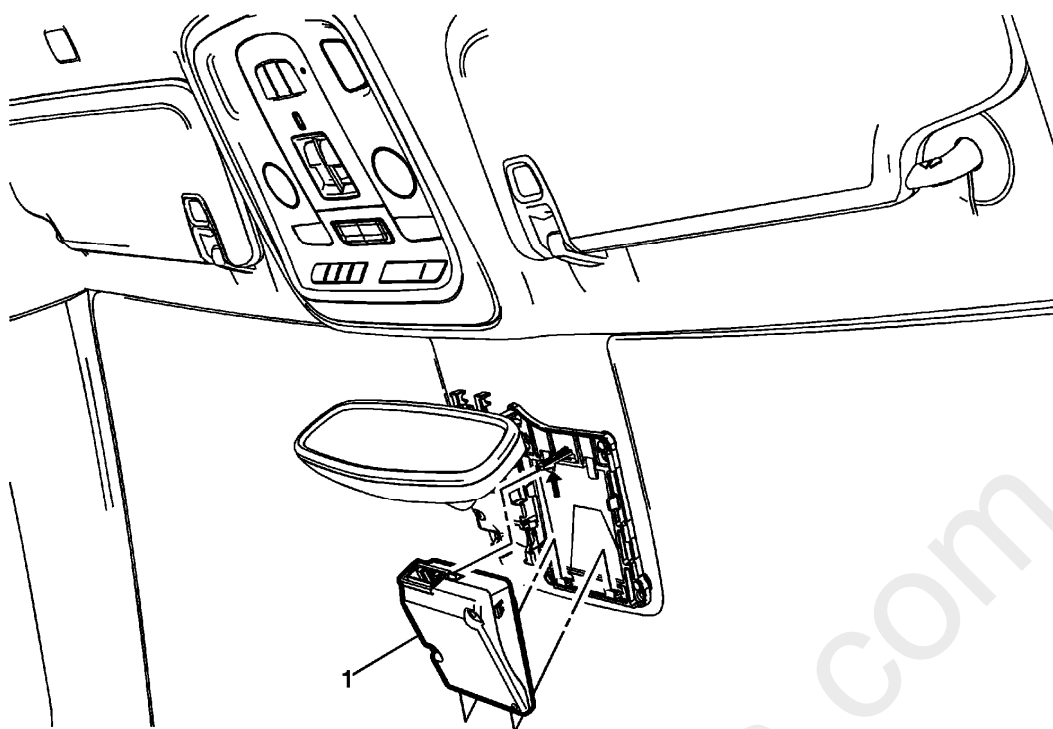


Fig. 17: Front View Camera (With UFL)
Courtesy of GENERAL MOTORS COMPANY

Front View Camera Replacement (With UFL)

Callout	Component Name
Preliminary Procedure Remove the windshield multifunction sensor mounting bracket cover Refer to <u>Windshield Multifunction Sensor Mount Bracket Cover Replacement (With UEU, UFL)</u> , <u>Windshield Multifunction Sensor Mount Bracket Cover Replacement (Without UEU, UFL)</u> .	
1	Front View Camera Procedure 1. Gently depress top center tab on bracket to release camera. 2. Disconnect the electrical connector. 3. Program and calibrate the front view camera. For programming and set up, refer to <u>Front View Camera Module Programming and Setup</u> .

REARVIEW DRIVER INFORMATION CAMERA REPLACEMENT

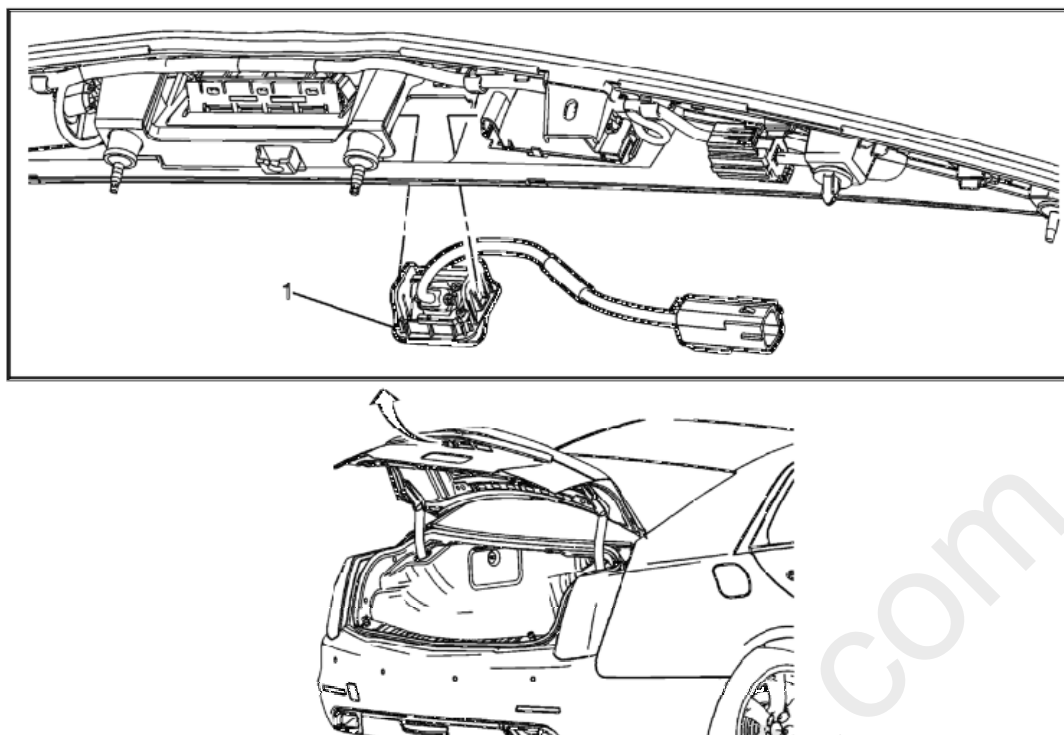


Fig. 18: Rearview Driver Information Camera
 Courtesy of GENERAL MOTORS COMPANY

Rearview Driver Information Camera Replacement

Callout	Component Name
Preliminary Procedure	
Remove the rear closure center applique. Refer to <u>Rear Closure Center Applique Replacement</u> .	
1	Rearview Camera Procedure 1. Disconnect the electrical connector. 2. Depress the clip fingers and push outward to remove the rearview camera from the applique.

FRONT VIEW CAMERA MODULE CALIBRATION

Calibration (without UGN)

The calibration process for the front view camera system is necessary when a front view camera module is replaced by a new one. This process shall not be required when only replacing the windshield and the front view camera module has been mounted again properly. This process shall be completed within 3-5 minutes when the correct driving conditions are met. If conditions are not met correct, the front view camera module shall continuously run the service point calibration until successfully completed. This process shall work across ignition cycles and shall not be required to be re-initialized at start up. If the Lane Departure Warning Switch is

pressed during calibration, the indicator will flash momentarily and then stay out - this is normal operation.

The calibration procedure will start automatically after SPS programming is complete. During this time the Lane Departure Warning amber indicator will illuminate.

To calibrate the front camera, operate the vehicle in the following conditions until the calibration is complete:

- Clean windshield.
- Avoid lane changes.
- Maintain vehicle speeds between 56-90 km/h (35-56 MPH).
- Ensure the road contains visible references (well defined lane markings, curbs, etc.).

Once the procedure is complete, the amber indicator will turn off. Shortly after the green ready to assist light should turn on as long as all conditions are met for normal operation. The system is then ready to assist.

Calibration (with UGN)

The calibration process for the front view camera system is necessary when a front view camera module is replaced by a new one. This process shall not be required when only replacing the windshield and the front view camera module has been mounted again properly. This process shall be completed within 10-30 minutes when the correct driving conditions are met. If the Lane Departure Warning Switch is pressed during calibration, the indicator will flash momentarily and then stay out - this is normal operation.

NOTE: Calibration is not required if the existing module was reprogrammed. This procedure only needs to be conducted if the module was replaced.

Once SPS programming is complete, it is necessary to initiate the calibration using a scantool. During this time the "Service Driver Assist" service message will be displayed.

NOTE: It is necessary to have the scantool connected during the entire process. Do not back out of the screen or press any other buttons.

To calibrate the front camera, operate the vehicle in the following conditions until the calibration is complete:

- Clean windshield.
- Avoid lane aggressive and frequent lane changes. Occasional lane changes are preferred.
- Maintain vehicle speeds between 56-120 km/h (35-75 MPH).
- Ensure the road contains visible references (well defined lane markings, etc.).

Once the procedure is complete, the service message will turn off and normal operation will resume. Shortly after the green ready to assist light should turn on as long as all conditions are met for normal operation. The system is then ready to assist.

If Slow to Calibrate

The ideal calibration condition is driving on a 2 lane divided highway with markings on both sides of the lane. One or more of the following conditions may increase the length of time required to complete the self-calibration procedure:

- Heavy traffic
- Stop and go traffic
- Mountain roads
- Curves in roadway
- Poor contrast lane markings
- Botts' Dots type lane markings
- Operating the vehicle at speeds greater than recommended
- Driving through snow or fog, or driving directly into the sun
- Camera not properly installed. Verify it is snapped into tabs and is secure. Refer to **Front View Camera Replacement (With UGN)**, **Front View Camera Replacement (With UFL)** .

No Calibration

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

- Dirty windshield glass or obstruction on windshield
- Operating the vehicle with speed less than 56 km/h (35 MPH)
- No visible lane markings
- Severe weather where lane markings cannot be seen
- Camera not properly installed. Verify it is snapped into tabs and is secure. Refer to **Front View Camera Replacement (With UGN)**, **Front View Camera Replacement (With UFL)** .

RADAR SENSOR MODULE - LONG RANGE CALIBRATION

After replacing and programming the Long Range Radar Sensor Module, it is necessary to perform a calibration procedure to align the radar. This is indicated to the technician by DTC B101E 4B. Calibration is performed while driving the vehicle with the scantool connected. Calibration is initialized using a scantool and the scantool must remain connected until calibration is complete. During this time the "Service Driver Assist" service message will be displayed. Once the procedure is complete, the service message will turn off and normal operation will resume.

Calibration is not required if the existing module was reprogrammed only. Calibration needs to be conducted if the module was replaced or removed and re-secured.

If calibration is not successful, it could be due to improper driving environment, module and bracket assembly bent out of position or incorrect module mounting. A typical driving environment is usually sufficient to calibrate the module within 10-30 minutes. The module needs to be mounting properly in the bracket and aimed straight ahead within +/- 3 degrees.

Calibration Procedure

1. Verify no other DTCs except for B101E 4B Electronic Control Unit Software are present.

- **If other DTCs are present**

Refer to service information and repair as necessary.

- **If no other DTCs are present**

2. Prior to driving the vehicle make sure the surface in front of the radar (Cadillac emblem) is clean. Also verify the mounting area is not damaged and allows the module to face the intended direction.
3. Prepare scantool to be mobile for Long Range Radar Calibration driving phase. The scantool needs to stay connected during the driving phase of the calibration.
4. Engine running.
5. Initiate calibration using Long Range Radar Sensor Module Learn in the scantool. The driver information display will display "Service Driver Assist" message during calibration.

NOTE: **Do not back out of screen or press any other buttons until the calibration is complete.**

6. Drive the vehicle within the following conditions for 10-30 minutes or until calibration is complete. The "Service Driver Assist" message will turn off when calibration is complete.
 - Drive at speeds greater than 56 kph (35 mph)
 - Minimize tight curves
 - Avoid extreme acceleration or deceleration
 - Follow one or multiple vehicles. (typical vehicle traffic is sufficient, but vehicles 30m - 50m (100 - 165ft) away are most effective at decreasing the calibration time)
 - Drive in an environment that has stationary objects on the side of the road (street signs, guard rails, mail boxes, fences, etc)
7. Verify proper calibration by observing that the "Service Driver Assist" message turns off within 10-30 minutes of normal driving.

- **If "Service Driver Assist" message fails to turn off**

1. Verify correct operating conditions were met
 - If incorrect driving environment, refer to If Slow to Calibrate and repeat calibration procedure following recommended operating conditions.
 - If correct driving environment
2. Verify DTC B390C 66 Incorrect Mounting is not set
 - If B390C 66 is set

Refer to **DTC B390C** .

- If B390C 66 is not set

- **If "Service Driver Assist" message turns off**

8. Drive at speeds greater than 40 kph (25 mph) and verify engagement of Adaptive Cruise Control (cruise control icon will change from white to green)

- **If Adaptive Cruise Control will not engage**

Check vehicle for DTCs and correct as required.

- **If Adaptive Cruise Control engages**

9. All OK.

If Slow to Calibrate

The ideal calibration condition is driving on a freeway or two lane road with medium traffic. One or more of the following conditions may increase the length of time required to complete the self-calibration procedure:

- Heavy traffic - following too close behind vehicles for long periods (more than 40 min)
- Stop and go or very slow traffic
- Mountain roads
- Constant sharp curves in roadway
- No traffic - if no traffic is available, may need to add vehicle ahead to support calibration
- Limited or no stationary structures on side of the road - need structures such as street signs, guard rails, mail boxes, parked cars, etc.
- Driving in tunnels