



Cruise Control Radar Alignment

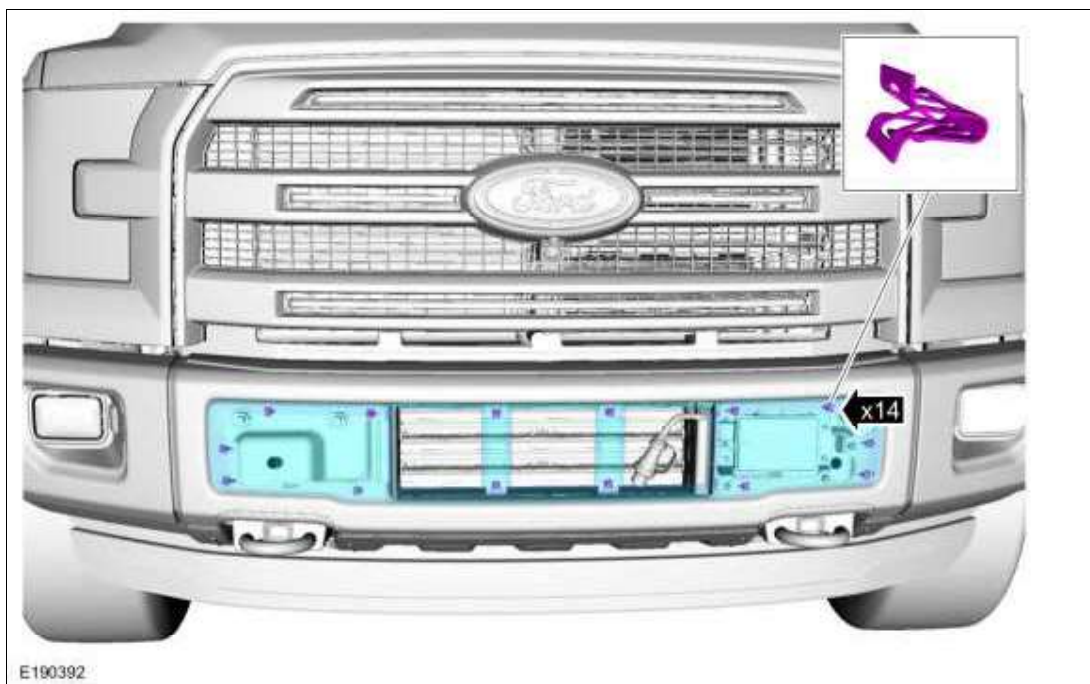
Adjustment

Vertical Alignment

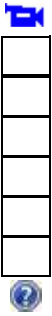
NOTE: In order to align the CCM, the front bumper trim panel must be removed to access the sensor and the vehicle must be in a wheel alignment bay station so that the vehicle is level.

NOTE: Damage to the CCM bracket may affect correct alignment. When aligning the CCM, inspect the CCM bracket for damage and repair as necessary before carrying out the alignment procedure.

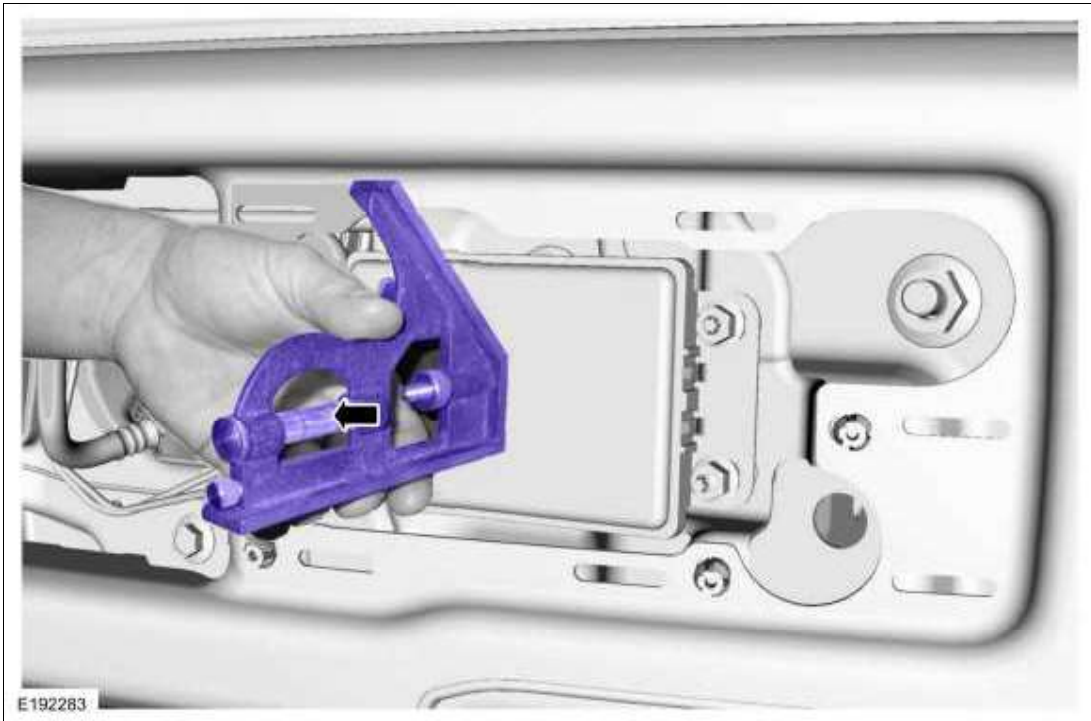
1. Remove the front bumper trim panel.



2. Place the vehicle on a wheel alignment bay station.
3. Locate the CCM alignment screw.



4. Place a combination square level on the face of the CCM and check the alignment.



5. Keeping the combination square level on the face of the CCM, adjust the pitch by using an E15 Torx® socket to adjust the screw until the CCM is vertical and level.



6. Install the front bumper trim panel.

Horizontal Alignment

NOTE: The horizontal alignment for the CCM is a software calibration that checks that the radar is pointed straight. No manual adjustment is needed for this procedure. The scan tool calibrates the CCM through the CCM procedure in programmable parameters.

7. **NOTICE:** The vehicle's engine must be running during the horizontal alignment procedure. Failure to leave the engine running throughout the entire procedure results in the cancellation of the alignment procedure and the system remains non-functional.

Start the engine.

8. **NOTE:** DTCs in the ABS and PCM modules can prevent the calibration from completing.

Follow the scan tool on-screen instructions to carry-out the CCM calibration procedure located in IDS under Toolbox > Electrical > Cruise Control > CCM Calibration.



Cruise Control Module (CCM)

Materials

Name	Specification
Threadlock 262 TA-26	WSK-M2G351-A6

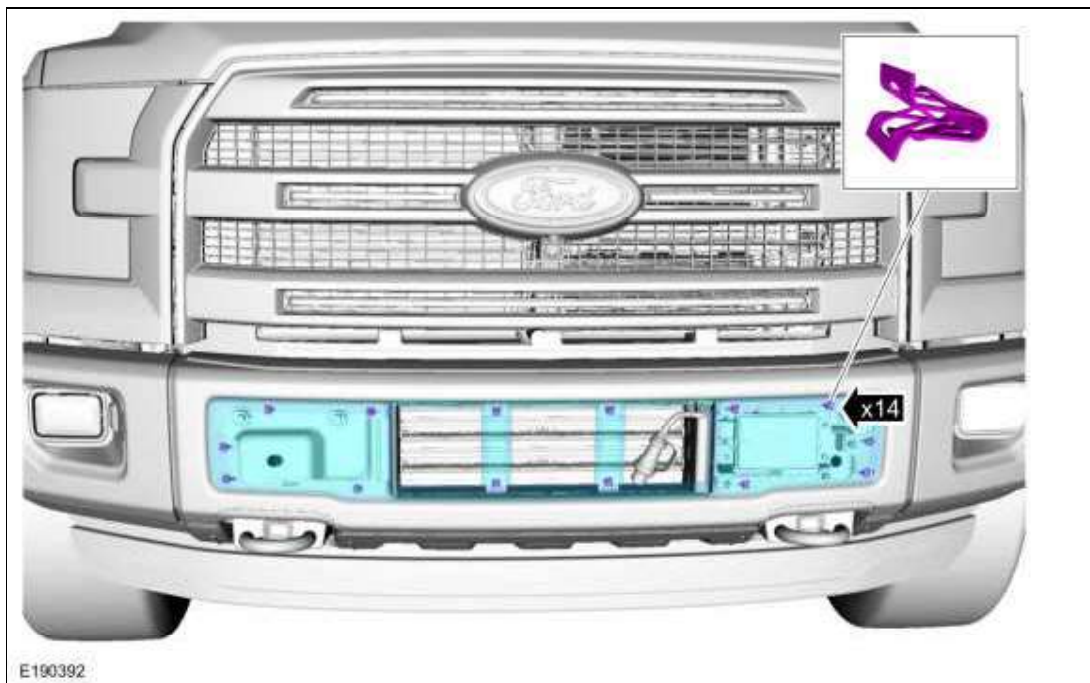
Removal

Cruise control module

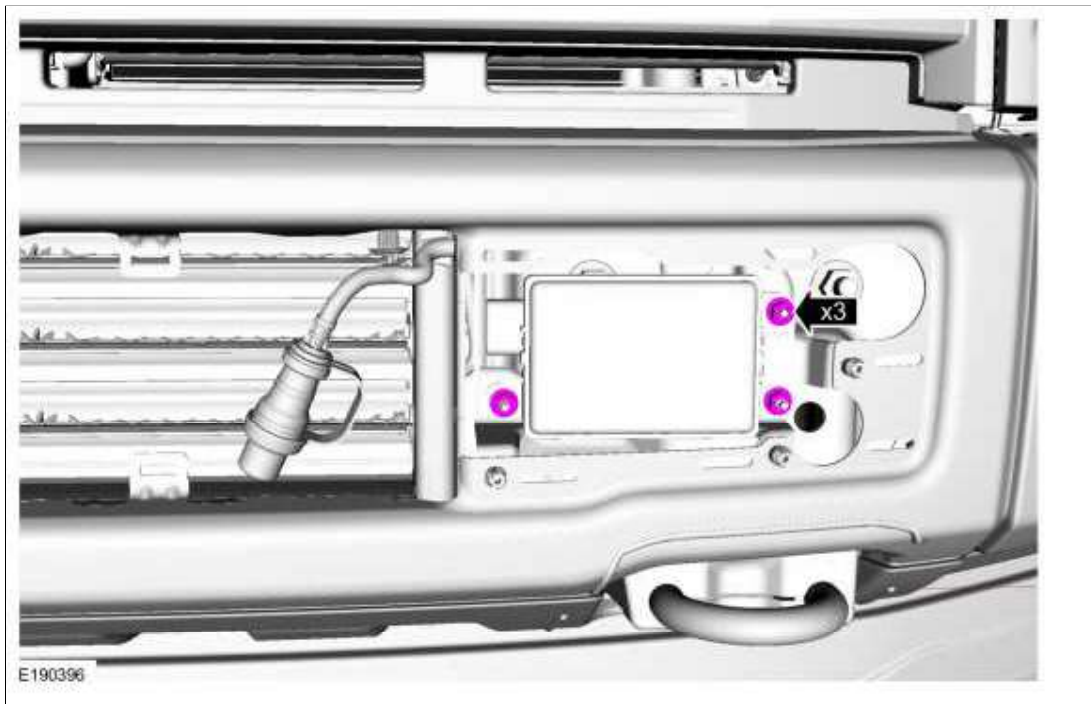
1. **NOTE:** If installing a new CCM, it is necessary to upload the module configuration information to the scan tool prior to removing the module. This information must be downloaded into the new CCM after installation.

Using a diagnostic scan tool, begin the PMI process for the CCM following the onscreen instructions.

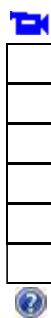
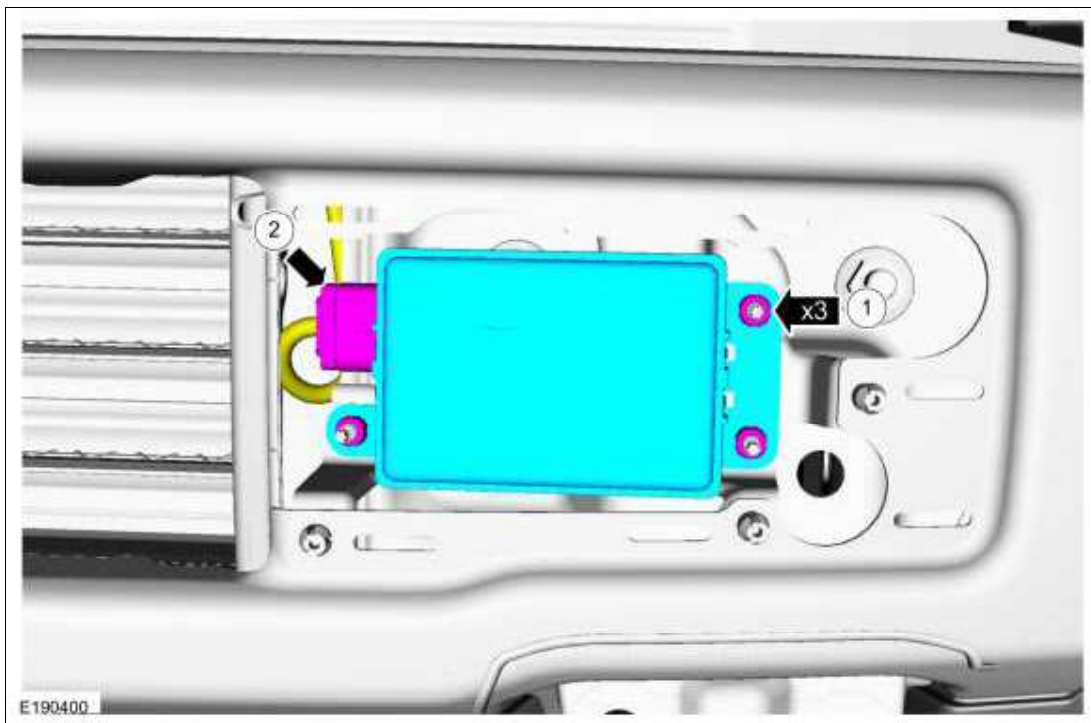
2. Remove the front bumper trim panel.



3. Remove the CCM nuts.

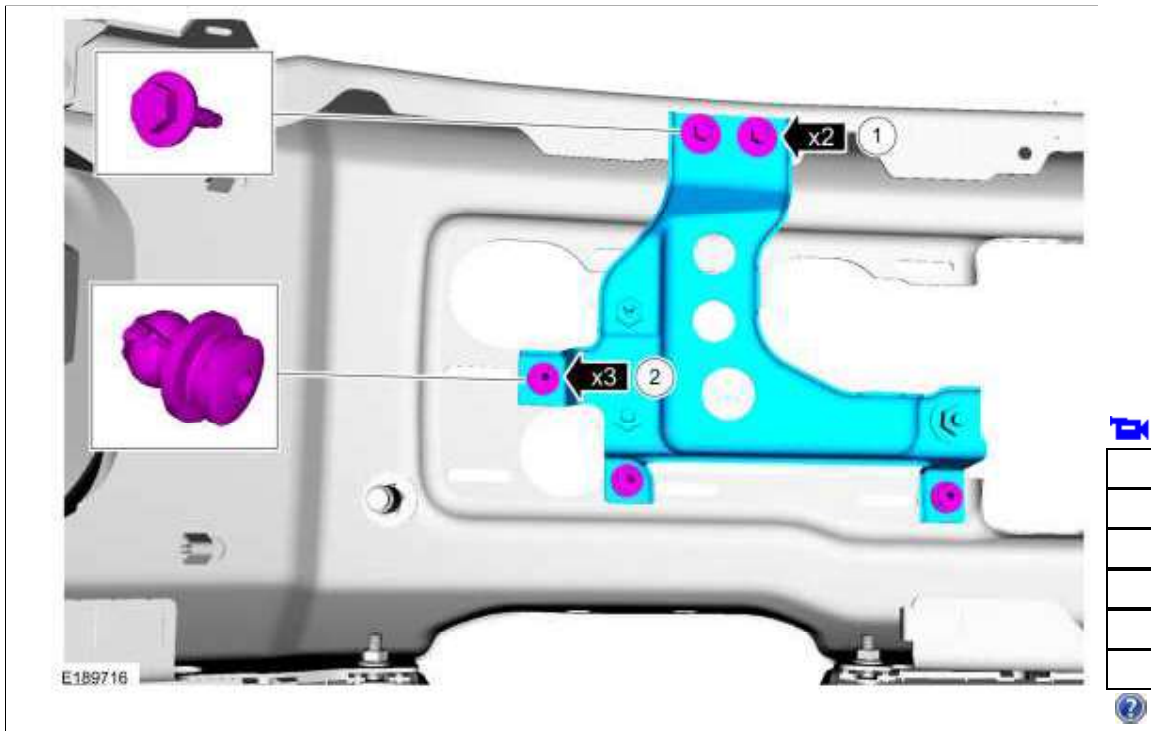


4. Remove the CCM.
 1. Release the CCM grommets from the ball studs.
 2. Disconnect the CCM electrical connector.



Cruise control module bracket

5. Remove the front bumper.
Refer to: [Front Bumper](#) (501-19 Bumpers, Removal and Installation).
6. Remove the CCM bracket.
 1. Remove the CCM bracket bolts.
 2. Remove the CCM bracket scrivenets.

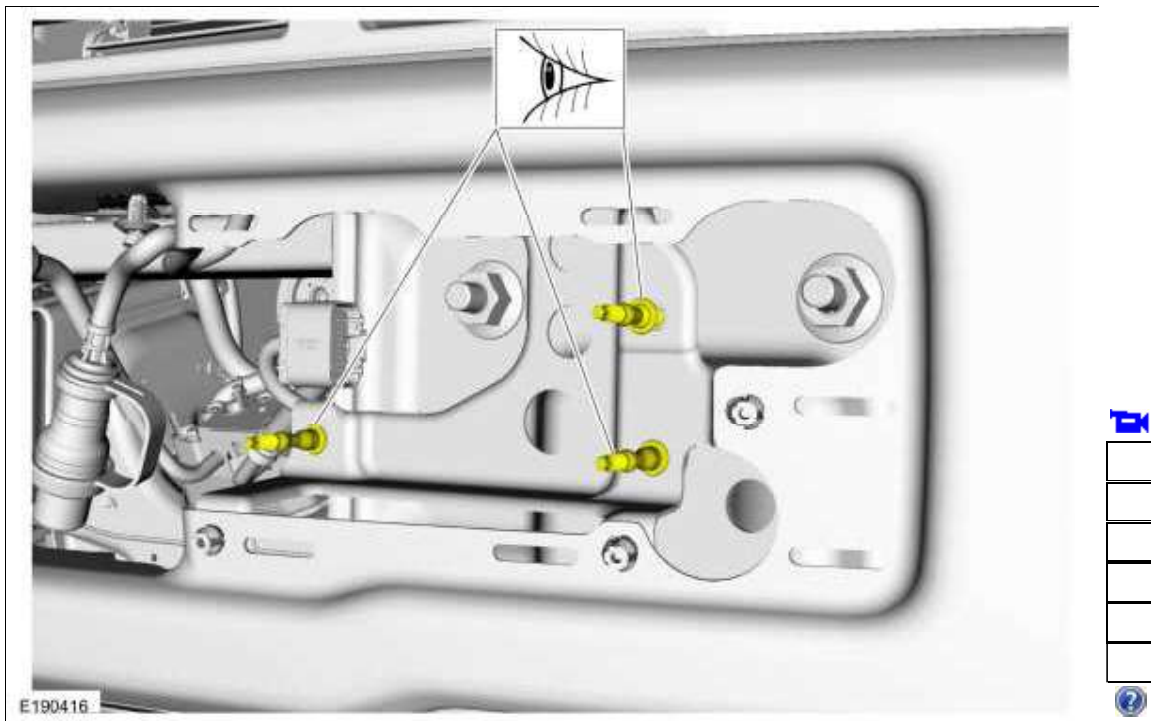


Installation

Cruise control module

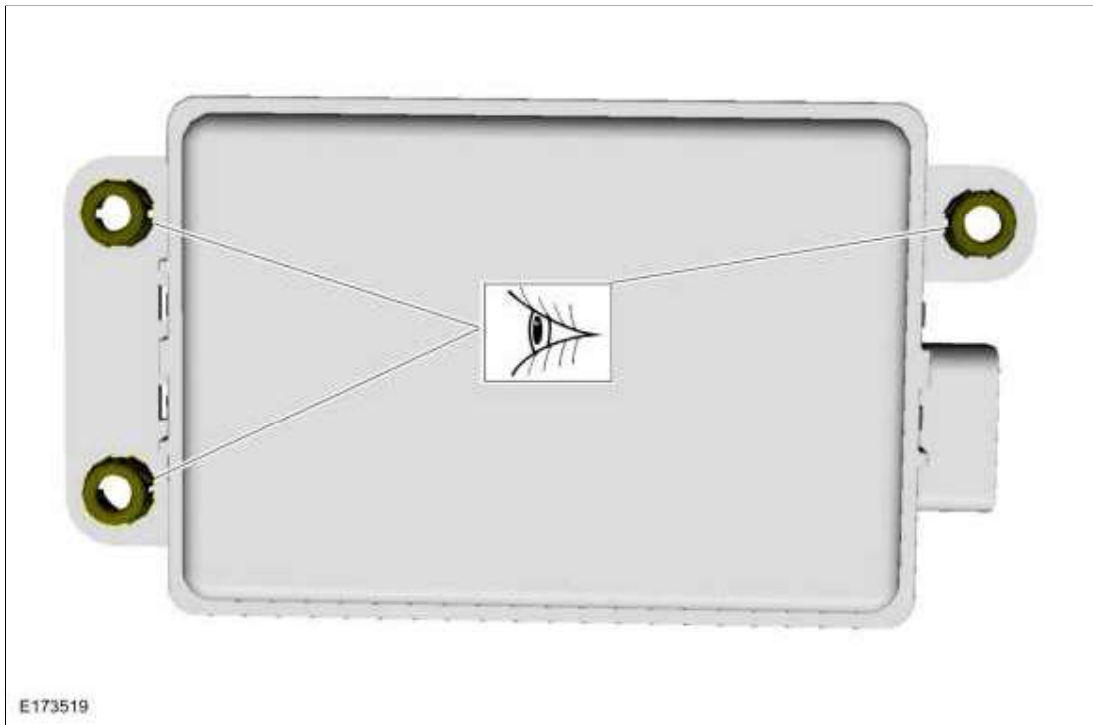
1. **NOTE:** Replace any damaged CCM ball studs.

Inspect the CCM ball studs for damage.



2. **NOTE:** Replace any damaged CCM grommets.

Inspect the CCM grommets for damage.

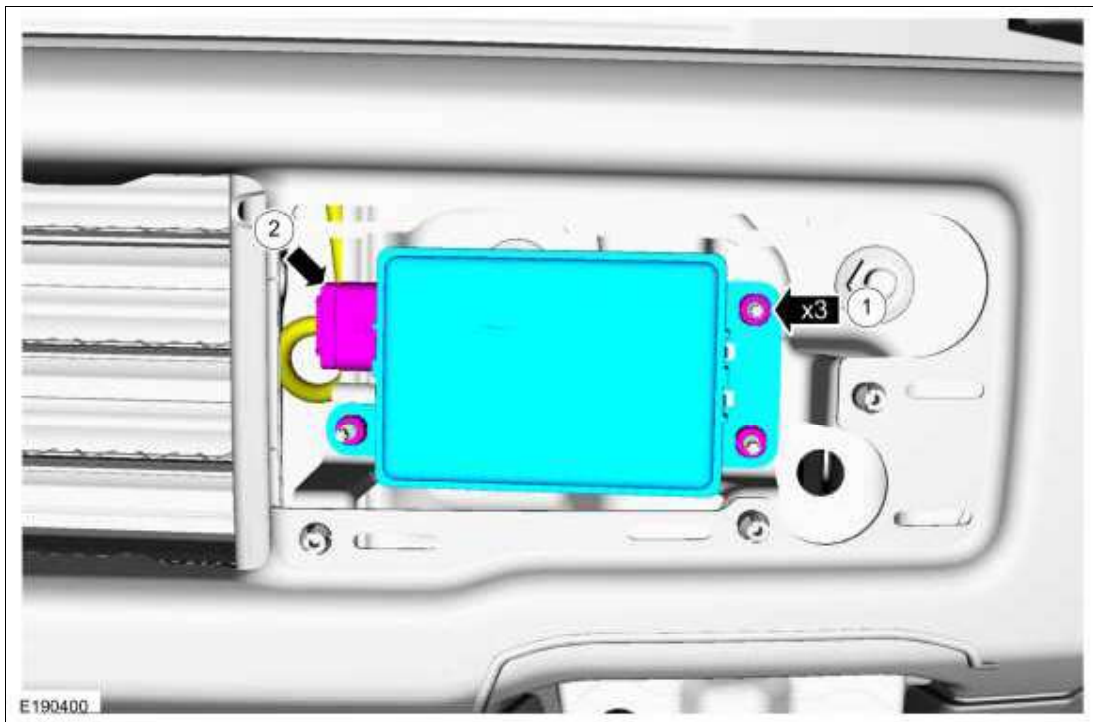


3. Install the CCM.

1. Connect the CCM electrical connector.

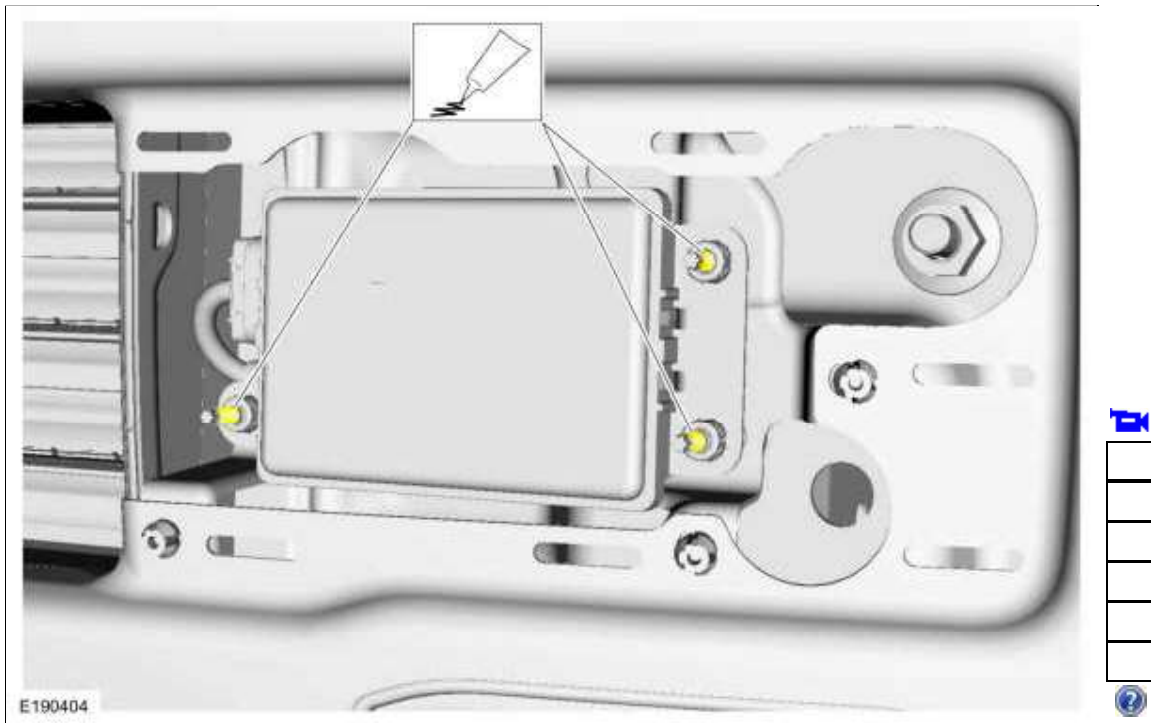
2. **NOTE:** Do not seat the grommets, they will be seated when the nuts are installed and torqued.

Position the CCM grommets on the ball studs.

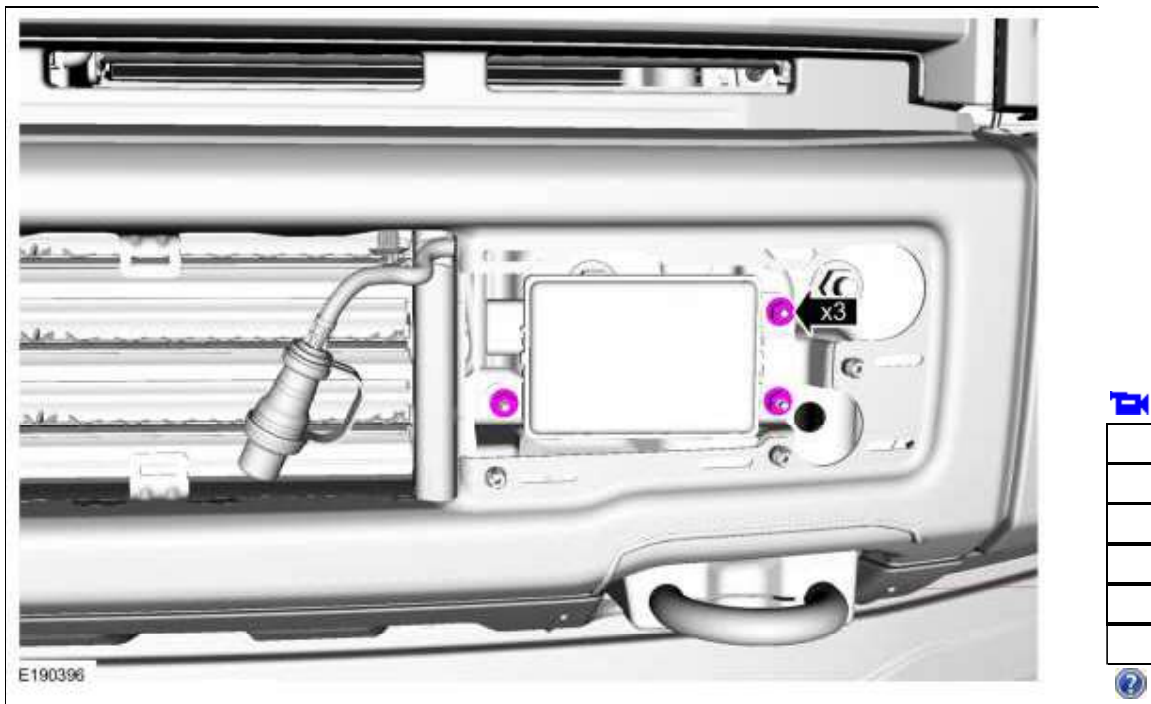


4. Apply thread locker to the CCM ball stud threads.

Material: Threadlock 262 / TA-26 (WSK-M2G351-A6)



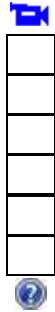
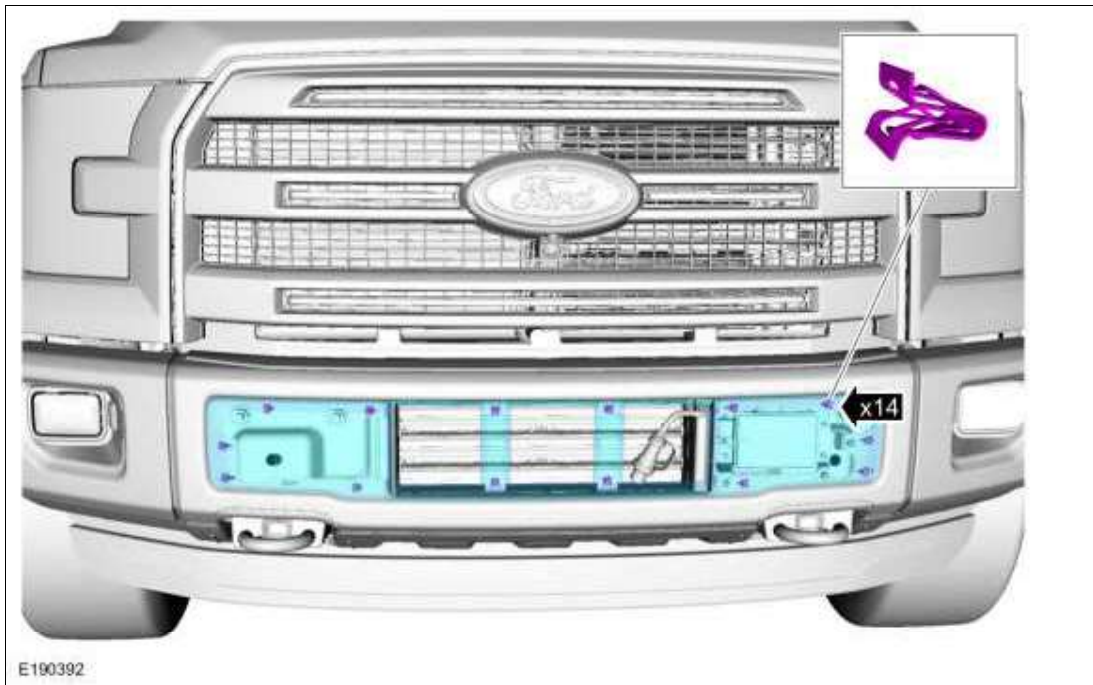
5. Install the CCM nuts.
Torque: 9 lb.in (1 Nm)



6. **NOTE:** This step is only necessary when installing a new component.

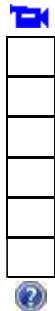
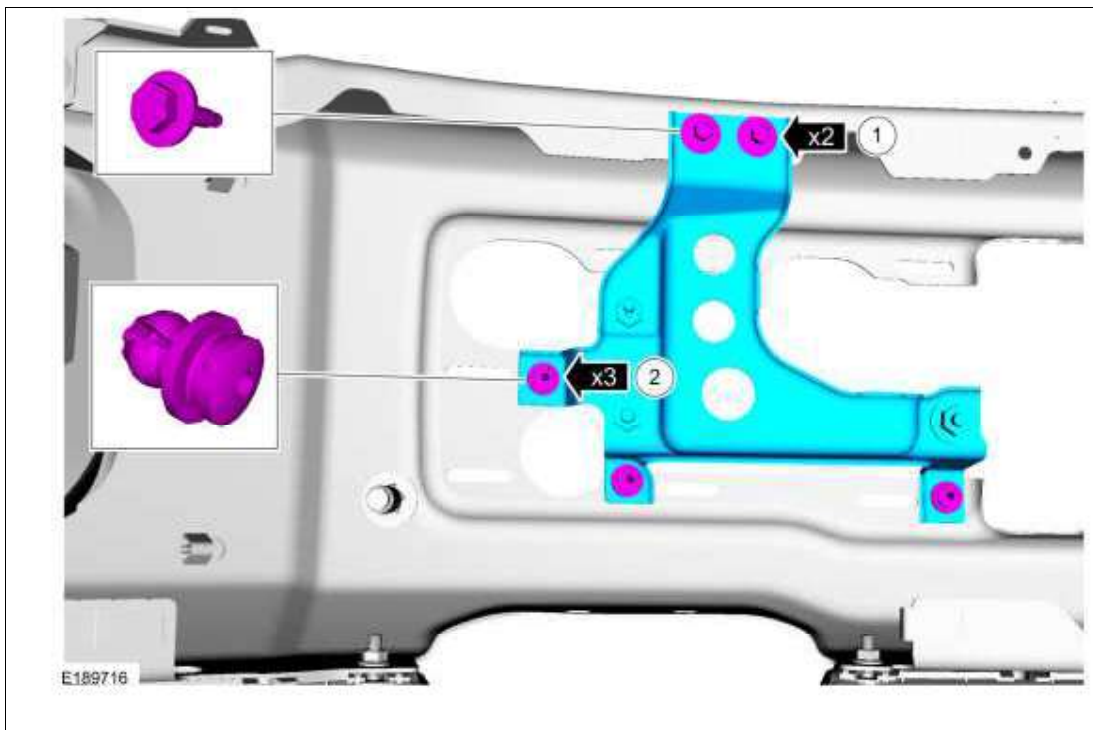
Using a diagnostic scan tool, complete the PMI process for the CCM following the on-screen instructions.

7. Align the CCM.
Refer to: [Cruise Control Radar Alignment](#) (419-03B Cruise Control - Vehicles With: Adaptive Cruise Control, General Procedures).
8. Install the front bumper trim panel.



Cruise control module bracket

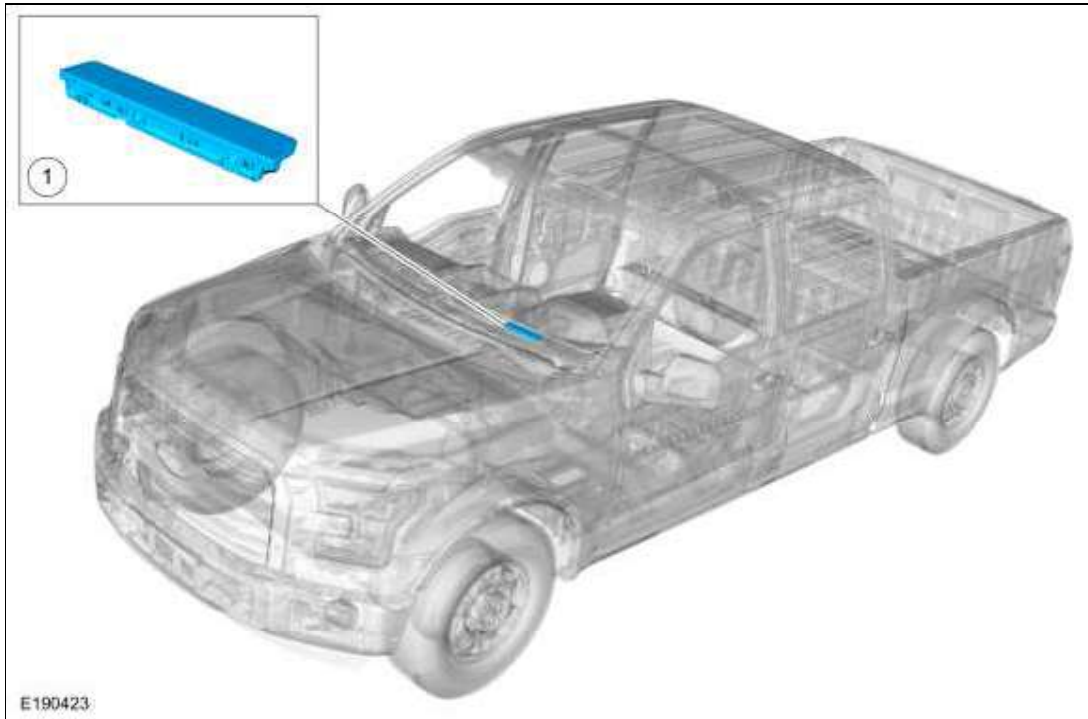
9. Install the CCM bracket.
 1. Install the CCM bracket bolts.
Torque: 42 lb.in (4.8 Nm)
 2. Install the CCM bracket scrivenets.



10. Install the front bumper.
Refer to: [Front Bumper](#) (501-19 Bumpers, Removal and Installation).



Collision Warning and Collision Avoidance System - Component Location



Item	Description
1	HUD module



Collision Warning and Collision Avoidance System - Overview

Overview

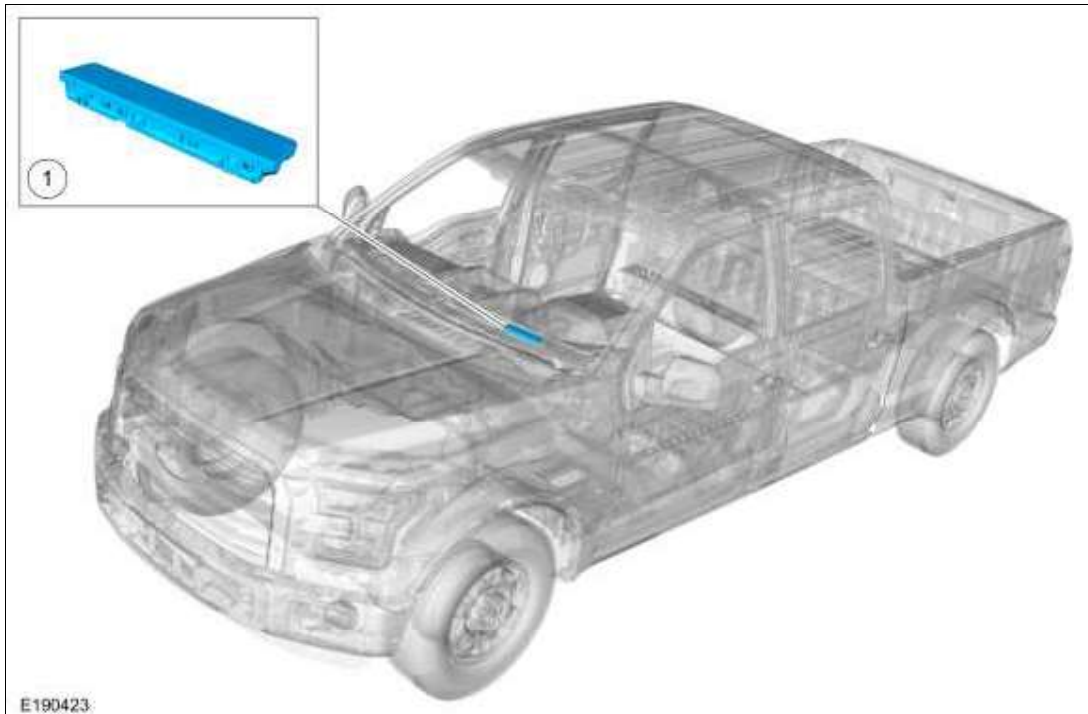
The forward collision warning system alerts the driver of a collision risk with a red warning LED indicator bar (which is part of the HUD module) located above the instrument panel and an audible warning chime from the IPC.

Forward Collision Warning System Operation The forward collision warning system works in conjunction with the adaptive cruise control system. During a possible collision event, the CCM commands: • the HUD to flash red warning Light Emitting Diodes (LEDs). • the IPC to activate a chime and commands. • the ACM to mute audio volume. The forward collision warning system is activated when the vehicle is moving forward at a speed greater than 8 kmh (5 mph). The CCM determines the distance and relative speed of the vehicle that is in the path of travel, utilizing a radar sensor (integral to the CCM) to detect other vehicles that are moving in the same direction. If the CCM determines that a collision is possible, the CCM commands the HUD module Light Emitting Diodes (LEDs) to flash and the IPC to chime. The forward collision warning system and audible warning chime can be enabled and disabled through the message center display in the IPC. The system remembers the last setting. Snow plows, or similar equipment, installed on the front of the vehicle can confuse the radar mounted in the front bumper, causing erratic behavior. The forward collision warning system should be disabled while the equipment is installed. There are three levels of sensitivity detection (HIGH, NORMAL and LOW) that are changed in the message center display. If a MyKey® restricted key is in use, the MyKey® turns on the forward collision warning and will not allow the MyKey® user to disable the audio or visual forward collision warning system. However, the MyKey® user is able to adjust the forward collision warning sensitivity. When a system fault is detected with the forward collision warning system, the message COLLISION WARNING NOT AVAILABLE, COLLISION WARNING NOT AVAILABLE SENSOR BLOCKED SEE MANUAL, or COLLISION WARNING MALFUNCTION is displayed in the IPC message center.

Component Description

CCM The CCM contains a radar sensor unit that determines the distance and relative speed of the vehicle that is in the path of travel.

HUD The HUD contains the red Light Emitting Diodes (LEDs) that warn the driver of a possible collision event when commanded by the CCM.



Item	Description
1	HUD (Head UP Display) Module

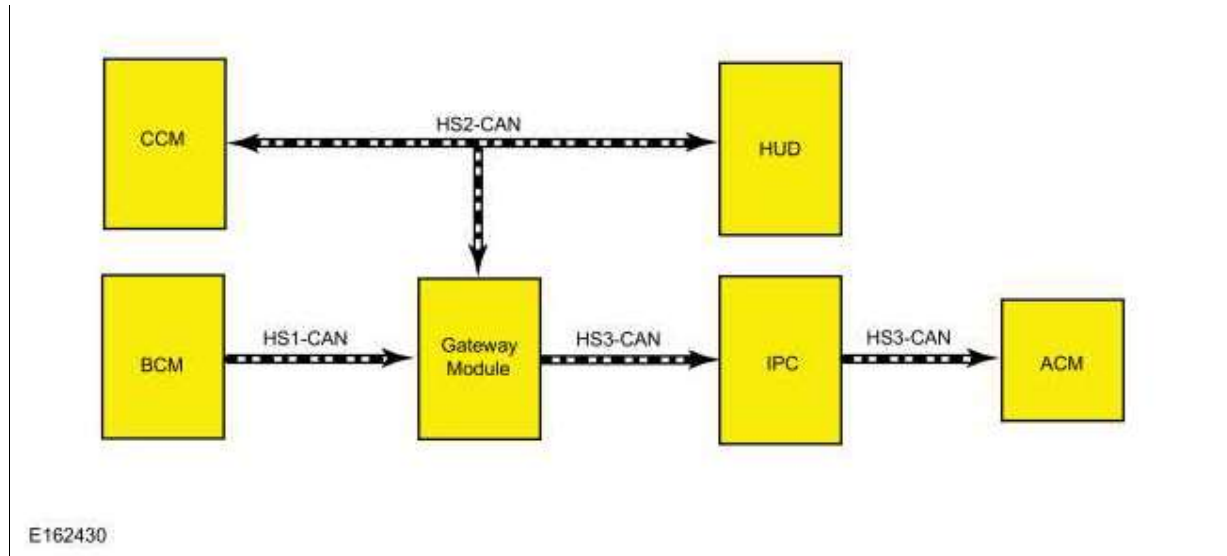
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Collision Warning and Collision Avoidance System - System Operation and Component Description

System Operation

System Diagram



Network Message Chart

Network Input Messages - ACM

Broadcast Message	Originating Module	Message Purpose
<u>IPC</u> chime	<u>IPC</u>	Data used to command a warning chime during possible collision event and audio mute so that the warning chime can be heard.

Network Input Messages - CCM

Broadcast Message	Originating Module	Message Purpose
<u>HUD</u> active	<u>HUD</u> module	Used for <u>HUD</u> module active status.
<u>HUD</u> fault	<u>HUD</u> module	Used for <u>HUD</u> module fault status.

Network Input Messages - HUD

Broadcast Message	Originating Module	Message Purpose
<u>HUD</u> flash command	<u>CCM</u>	Flashes the <u>HUD</u> module <u>LED</u> array when commanded.
Ignition status	<u>BCM</u>	Used for ignition switch position input.

Network Input Messages - IPC

Broadcast Message	Originating Module	Message Purpose
Forward collision chime request	<u>CCM</u>	Data used to command warning chime during possible collision event. When this message is received, the <u>IPC</u> sends the audio mute message to the <u>ACM</u> .
Forward collision warning message request	<u>CCM</u>	Data used to command warning chime and messages during possible collision event.

Forward Collision Warning System Operation

The forward collision warning system works in conjunction with the adaptive cruise control system. During a possible collision event, the CCM commands:

- the HUD to flash red warning Light Emitting Diodes (LEDs).
- the IPC to activate a chime and commands.
- the ACM to mute audio volume.

The forward collision warning system is activated when the vehicle is moving forward at a speed greater than 8 kmh (5 mph). The CCM determines the distance and relative speed of the vehicle that is in the path of travel, utilizing a radar sensor (integral to the CCM) to detect other vehicles that are moving in the same direction. If the CCM determines that a collision is possible, the CCM commands the HUD module Light Emitting Diodes (LEDs) to flash and the IPC to chime.

The forward collision warning system and audible warning chime can be enabled and disabled through the message center display in the IPC. The system remembers the last setting.

Snow plows, or similar equipment, installed on the front of the vehicle can confuse the radar mounted in the front bumper, causing erratic behavior. The forward collision warning system should be disabled while the equipment is installed.

There are three levels of sensitivity detection (HIGH, NORMAL and LOW) that are changed in the message center display.

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Component Description

CCM

The CCM contains a radar sensor unit that determines the distance and relative speed of the vehicle that is in the path of travel.

HUD

The HUD contains the red Light Emitting Diodes (LEDs) that warn the driver of a possible collision event when commanded by the CCM.

There are certain situations when the warning Light Emitting Diodes (LEDs) cannot be seen, such as strong

sunlight or when wearing sunglasses. The HUD module has a temperature sensor circuit that is integral to the module that senses the temperature of the Light Emitting Diodes (LEDs) internal to the module. When a high passenger compartment temperature such as strong sunlight is sensed by the temperature sensor, the warning Light Emitting Diodes (LEDs) can be temporarily disengaged. If this occurs, only the audible warning chime is used.

Warnings may not appear if there is little distance to the vehicle ahead or abrupt steering wheel and pedal movements are made.