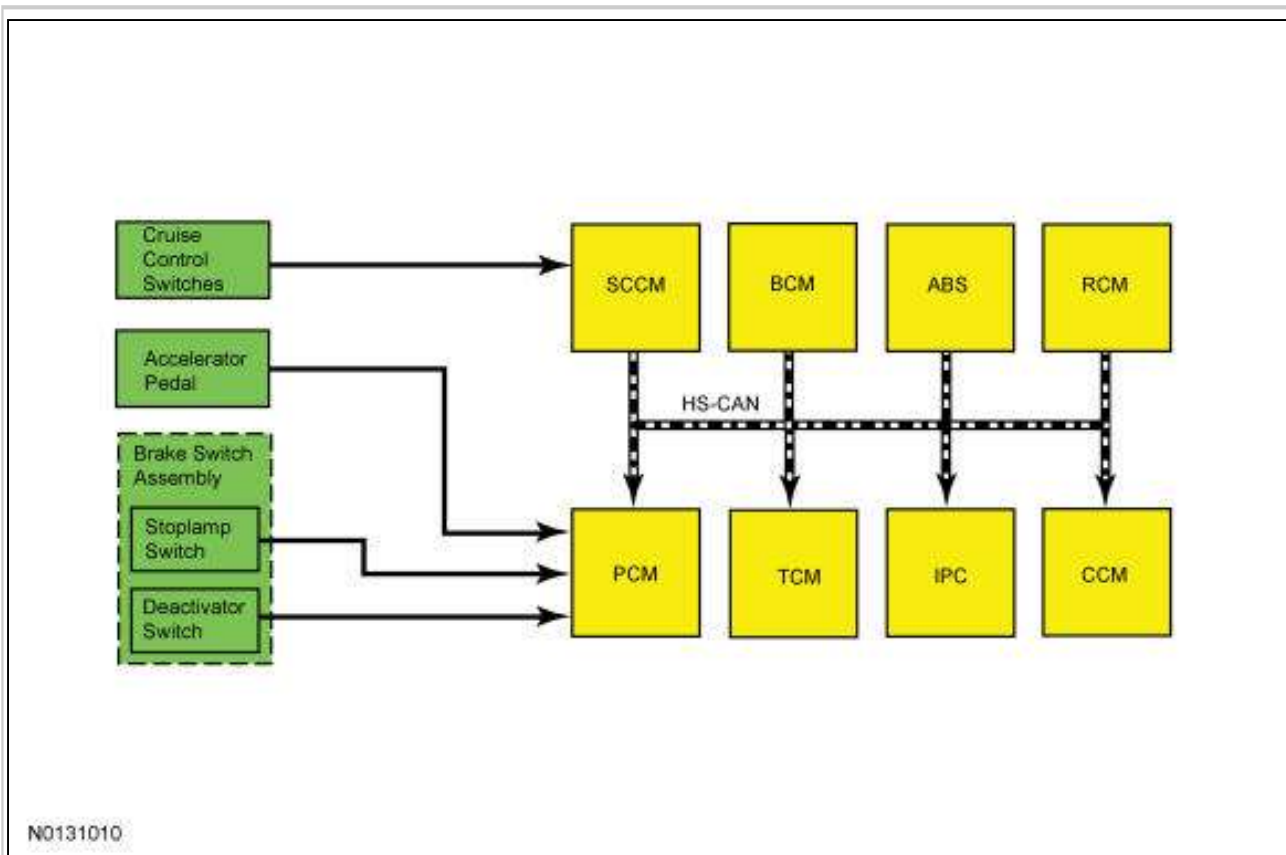


**DESCRIPTION AND OPERATION > CRUISE CONTROL - ADAPTIVE > SYSTEM OPERATION > SYSTEM DIAGRAM**



N0131010

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**DESCRIPTION AND OPERATION > CRUISE CONTROL - ADAPTIVE > SYSTEM OPERATION > NETWORK MESSAGE CHART**

**Module Network Input Messages - ABS Module**

Broadcast Message	Originating Module	Message Purpose
Adaptive cruise control brake deceleration request	C-CM	Used for cruise control automatic braking.
Brake pedal applied	PCM	Used for brake switch input.

**Module Network Input Messages - C-CM**

Broadcast Message	Originating Module	Message Purpose
Accelerator pedal position	PCM	Used for accelerator pedal status.

Vehicle configuration data	BCM	Used for comparison checking adaptive cruise control configuration.
Brake pedal applied	PCM	Used for brake switch input.
Cruise control override	PCM	Deactivates cruise control.
Ignition status	BCM	Used for ignition switch position input.
Steering wheel switch speed control	SCCM ABS module	Used for speed control enable/disable, gap settings and operating mode request. Deactivates cruise control when requested.
Stability control event in progress		
Traction control event in progress	RCM	Deactivates cruise control when requested.
Vehicle lateral acceleration		
Vehicle longitudinal acceleration		
Vehicle yaw rate		

### Module Network Input Messages - IPC

Broadcast Message	Originating Module	Message Purpose
Adaptive cruise control gap setting	C-CM	Data used to generate message center display indicating adaptive cruise control gap setting.
Adaptive cruise control message display	C-CM	Data used to generate message center display indicating adaptive cruise control status.
Cruise control mode	PCM	Toggles between speed control and adaptive cruise control.
Cruise control override	PCM	Driver overriding cruise control with accelerator pedal.
Cruise control status	PCM	Data used for speed control indicator status.

### Module Network Input Messages - PCM

Broadcast Message	Originating Module	Message Purpose
Steering wheel switch speed control	SCCM ABS module	Used for cruise control enable/disable and operating mode request. Deactivates cruise control when requested.
Speed control deactivation request		
Stability control event in progress		
Traction control event in progress	RCM	Deactivates cruise control when

Vehicle lateral acceleration	requested.
Vehicle longitudinal acceleration	
Vehicle roll sense	
Vehicle yaw rate	

## DESCRIPTION AND OPERATION > CRUISE CONTROL - ADAPTIVE > SYSTEM OPERATION > ADAPTIVE CRUISE CONTROL (ACC) OPERATION

**NOTE:** For a complete illustration of the adaptive cruise control indicators and graphic displays, refer to the Owner's Literature.

The adaptive cruise control system functions much like the standard cruise control system. The adaptive cruise control system automatically adjusts the vehicle speed to maintain a set gap distance from the front of the vehicle and the vehicle in the same path of travel. When the adaptive cruise control system is on and is following a vehicle ahead or a vehicle enters the same driving lane, a follow vehicle graphic is displayed in the message center.

The adaptive cruise control system does not function if the vehicle speed is below 29 kmh (18 mph). As the vehicle slows down during automatic braking, the adaptive cruise control system discontinues braking at 29 kmh (18 mph). At that speed, an audible alarm sounds and the automatic braking from the ABS module is released. The driver must take over the vehicle braking control.

The cruise control deactivator switch (which is integral to the stoplamp switch) is an additional safety feature. When the brake pedal is pressed, an electrical signal is sent from the stoplamp switch to the PCM deactivating the cruise control system. Under increased brake pedal effort, the cruise control deactivator switch opens and removes the ground signal from the PCM input circuit, releasing the throttle immediately deactivating the system.

The ABS module monitors the yaw rate signal from the RCM and compares it to the wheel speed and steering wheel angle signals. If the ABS module determines the yaw rate is invalid, the ABS module disables the adaptive cruise control. The message center displays the message COLLISION WARNING MALFUNCTION and/or ADAPTIVE CRUISE MALFUNCTION.

The ABS module estimates brake temperature by monitoring applied brake pressure over a period of time and sends a message to the C-CM when the estimated temperature is above a given threshold. An alarm sounds and the adaptive cruise control system is deactivated until the estimated brake temperature within the ABS module returns to cooler operating conditions. This condition can happen in a hilly or mountainous driving terrain.

### **Cruise Control Indicator**

The adaptive cruise control indicator located in the IPC illuminates gray and the previous gap setting and SET graphic is displayed indicating the system is in standby mode. This notifies the driver that the system is ready and the vehicle can be accelerated to the desired speed.

### **Steering Wheel Switch Function**

The adaptive cruise control steering wheel mounted switches are momentary contact switches that toggle up and down for the cruise control switch state. Pressing and releasing the steering wheel cruise control ON/OFF switch turns the cruise control system on. Pressing up (SET+) and releasing the SET switch sets the vehicle's speed and stores the set speed in memory. The adaptive cruise control indicator illuminates green and the message center displays the set speed and gap setting graphic.

There are 2 ways to change the set speed. The first way is to accelerate or brake to the desired speed and press and release the SET cruise control switch until the desired set speed is shown on the message center. The second way is by tapping the SET+ or the SET- switch while in the set mode, increasing or decreasing the displayed set speed by 1.6 kmh (1 mph) per tap. If the respective button is pressed and held, the displayed set speed continues to increase or decrease until the button is released. The adaptive cruise control system may apply the brakes to slow the vehicle down to the new set speed. The set speed displays continuously in the message center while the adaptive cruise control system is active.

Pressing and releasing the OFF switch, or switching the ignition to OFF, turns the adaptive cruise control system off. The adaptive cruise control set speed memory is erased.

Pressing the brake pedal or pressing the RES/CNCL switch puts the adaptive cruise control system in standby mode and the last set speed is displayed in the message center with a strike through. Pressing the RES/CNCL button when the adaptive cruise control system is in standby mode causes the vehicle to accelerate to the last set speed. The set speed continuously displays in the message center while the adaptive cruise control system is active. The RES/CNCL button does not function if the OFF button is pressed, the ignition is cycled OFF, or if the current vehicle speed is below the minimum operational speed.

The adaptive cruise control system has the capability for the driver to change from adaptive cruise control to standard cruise control. The LH 5 way steering wheel switch is used to switch from the adaptive cruise control system to standard cruise control system within the message center. For information on selecting the standard cruise control in the message center, refer to Owner's Literature. Once the driver has selected the standard cruise control in the message center, the adaptive cruise control indicator is replaced by the standard cruise control indicator. The vehicle no longer responds to lead vehicles or automatic braking. Upon the next vehicle ignition cycle, the vehicle defaults back to the adaptive cruise control system.

### **Gap Setting**

When a vehicle ahead enters the same lane or a slower vehicle is ahead in the same lane, the vehicle speed adjusts automatically to maintain a preset distance gap. A bar graph graphic with 4 preset distance gap settings are displayed in the message center. Pressing up (decrease) or down (increase) on the steering wheel cruise control gap switch increases or decreases the distance from the vehicle ahead. If all of the bars are illuminated, this is the longest gap setting. If only one bar is illuminated that is the shortest gap setting.

The vehicle maintains the distance gap to the vehicle ahead until:

- the vehicle ahead accelerates to a speed above the set speed,
- the vehicle ahead moves out of the lane or out of view,
- the vehicle speed falls below 29 kmh (18 mph),
- or a new gap distance is set.

After each ignition cycle, the previous gap setting is remembered and the system is set to that gap setting.

The distance gap can be overridden by pressing the accelerator pedal. The follow vehicle graphic is not displayed in the message center and the GAP and set speed display turns gray. When the accelerator is released, the adaptive cruise control system returns to normal operation and the vehicle speed decreases to the set speed or a lower speed if following a vehicle ahead.

### **Deceleration Control**

The C-CM commands the ABS module, which controls the brakes, to automatically apply the brakes to slow the vehicle to maintain a safe distance to the vehicle in front.

### **Cruise Control Deactivation Event Parameter Identification (PIDs)**

**NOTE:** *When recording deactivation event PIDs, turn the cruise control OFF immediately after the deactivation event*

*occurs to prevent recording additional deactivation events which do not apply to the fault present.*

The PCM has PIDs available, through the powertrain DataLogger, that indicate the event that caused the last cruise control deactivation. When the cruise control is turned ON, all current deactivation (or non-activation) conditions are recorded. When the cruise control is turned OFF, event recording stops. The recorded events are stored until the ignition is turned OFF.

The PCM has 24 cruise control deactivation event PIDs, identified as CRUISEOFF\_00 through 24. The event PIDs should be read when deactivation or non-activation exists.

## **GENERAL PROCEDURES > CRUISE CONTROL MODULE (C-CM) (WITH SENSOR) ADJUSTMENT > VERTICAL ALIGNMENT**

**NOTE:** *In order to align the Cruise-Control Module (C-CM), which is a radar sensor unit, the vehicle must be in a wheel alignment bay station so that the vehicle is level.*

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

**NOTE:** *If the front bumper cover has already been removed because of module replacement, there is no need to carry-out the first 2 steps.*

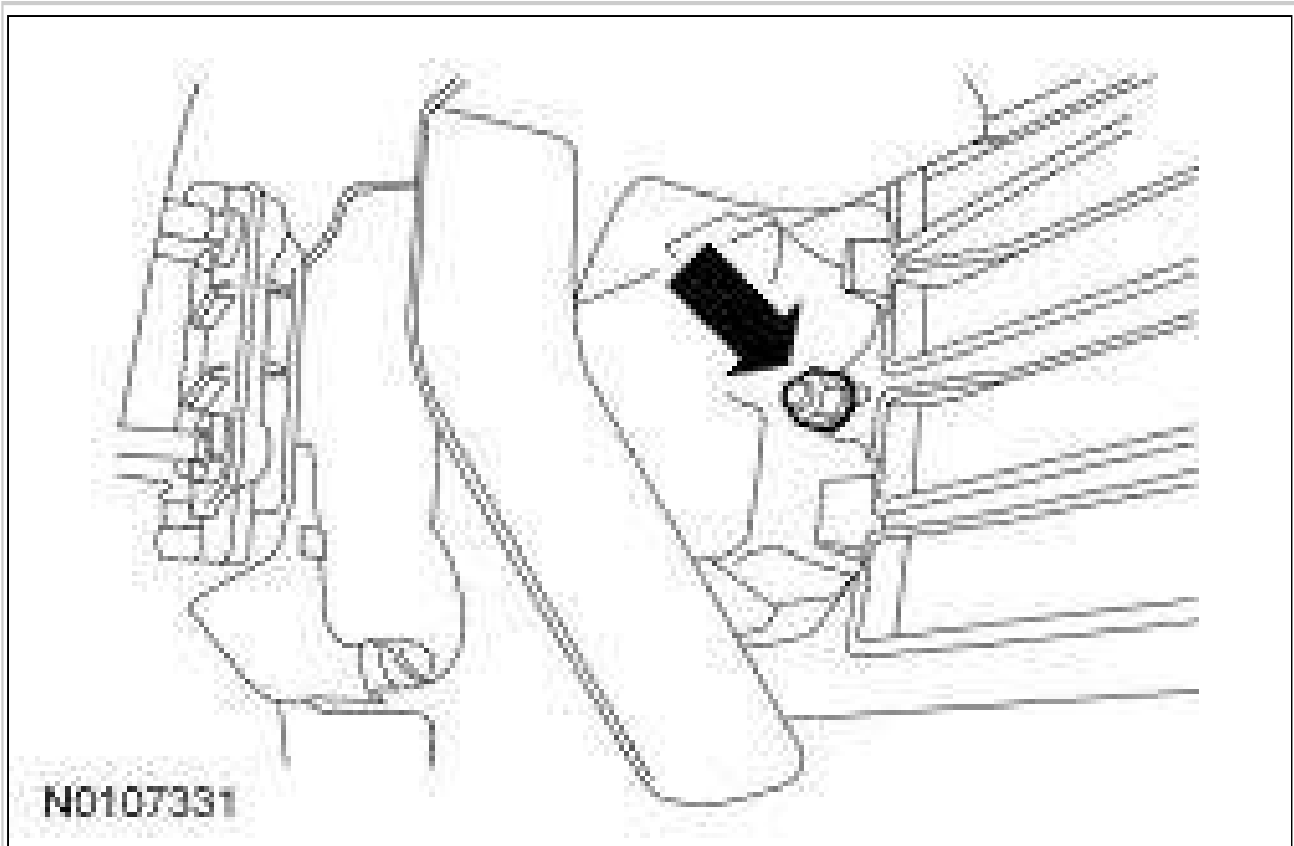
1.

Remove the front lower air deflector. For additional information, refer to Bumper - Exploded View, Front in Bumpers .

2.

**NOTE:** *When removing the C-CM radar sensor fascia cover retaining nut, make sure the cover stud is held with pliers to prevent twisting the stud off the cover.*

Remove the C-CM radar sensor fascia cover retaining nut and cover.



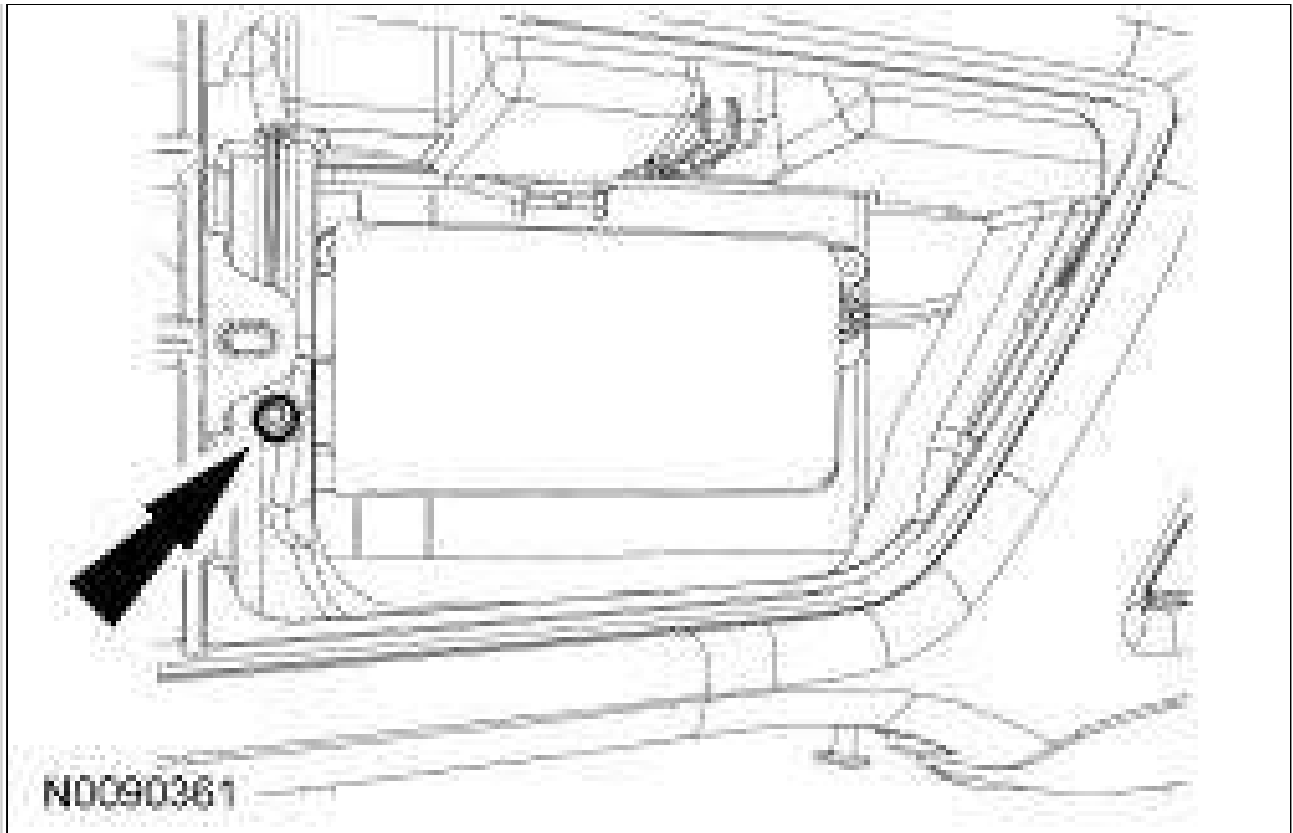
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3.

Place the vehicle on a wheel alignment bay station.

4.

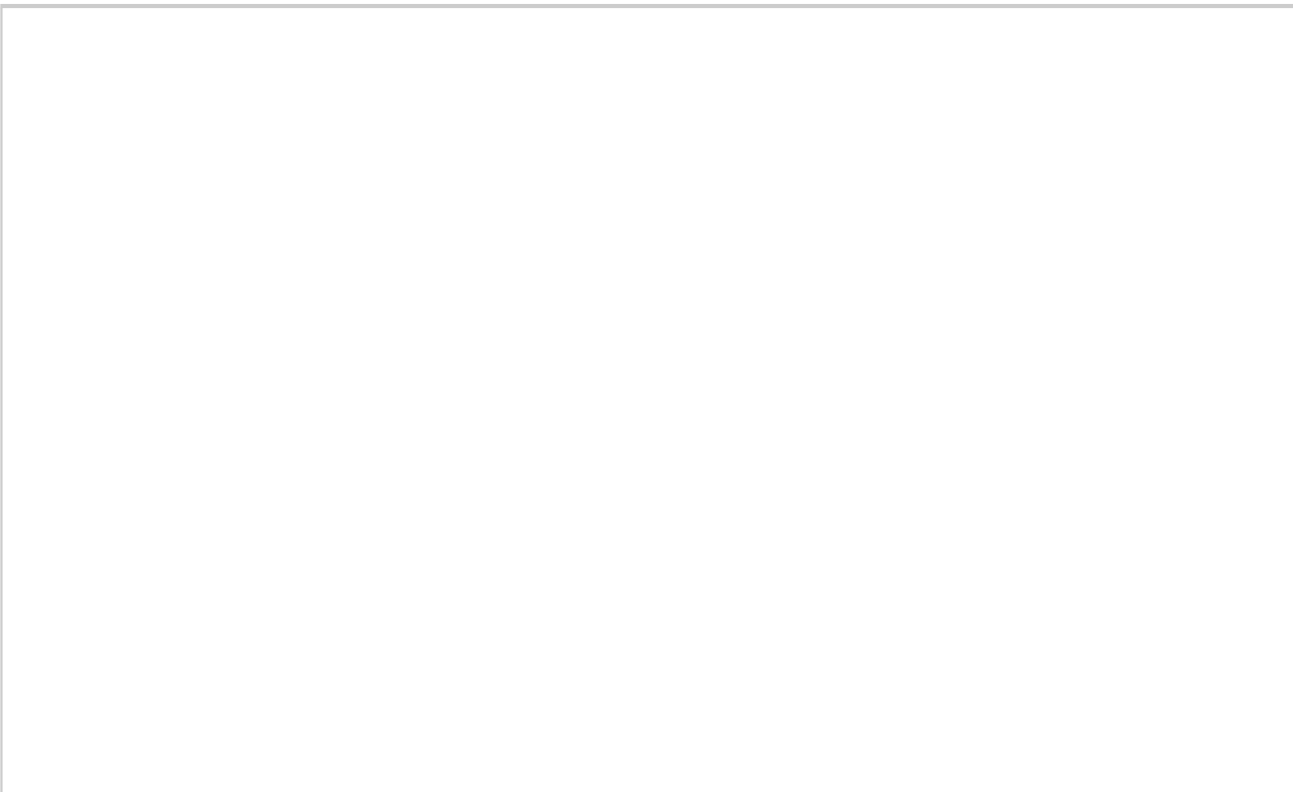
Locate the C-CM radar sensor alignment screw.

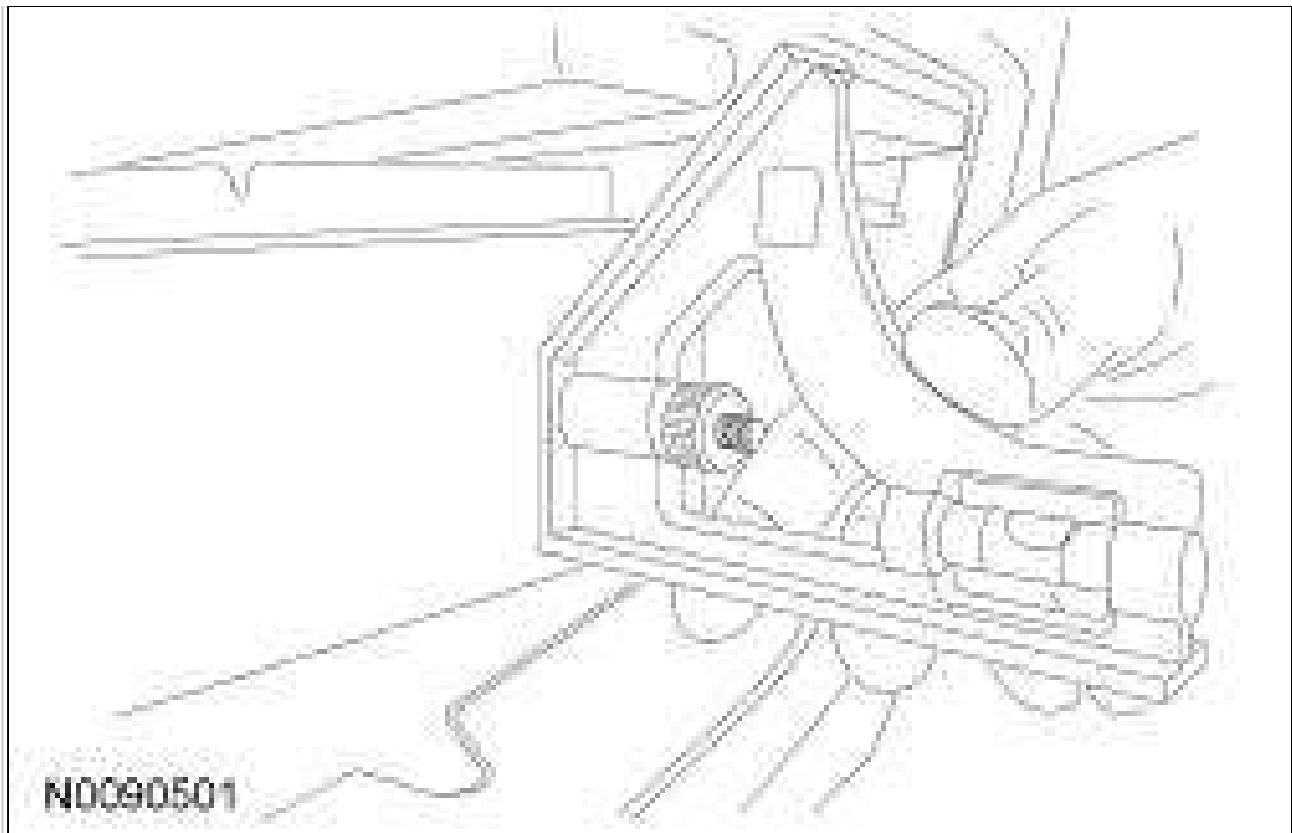


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5.

Place a combination square level on the face of the C-CM radar sensor unit and check alignment.



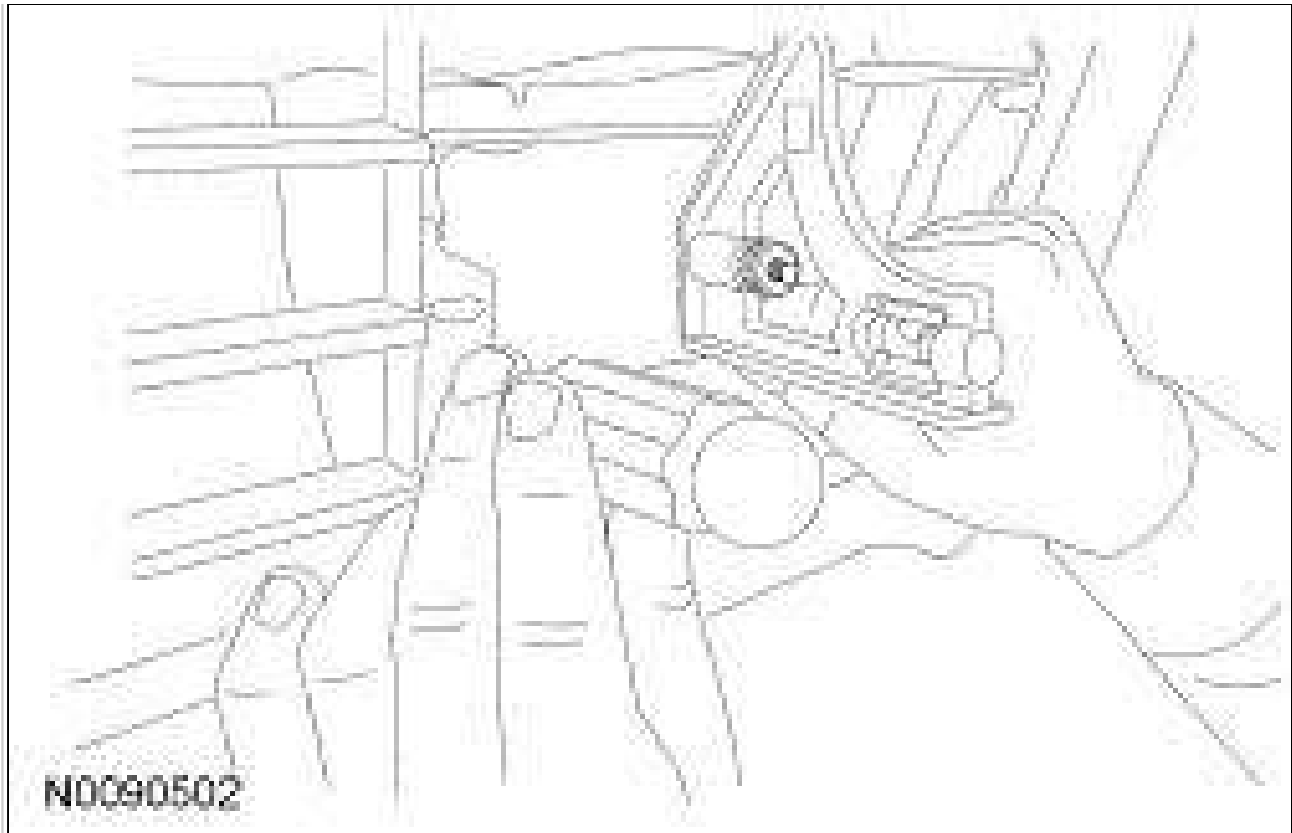


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6.

Keeping the combination square level on the face of the C-CM radar sensor unit, adjust the pitch of the sensor by using an E5 inverted Torx ® bit to adjust the screw until the sensor is vertical and level.





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7.

**NOTE:** *Prior to installing the C-CM radar sensor fascia cover or front bumper cover, clean and remove any debris on the front or back of the cover.*

Install the C-CM radar sensor fascia cover and retaining nut or front bumper cover.

## **GENERAL PROCEDURES > CRUISE CONTROL MODULE (C-CM) (WITH SENSOR) ADJUSTMENT > HORIZONTAL ALIGNMENT**

**NOTE:** *The horizontal alignment for the cruise control sensor is a software calibration. No manual adjustment is needed for this procedure. The scan tool calibrates the C-CM radar sensor unit through the C-CM calibration procedure.*

1.

**NOTE:** *The 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.

2.

Follow the scan tool on-screen instructions to carry-out the C-CM calibration procedure.

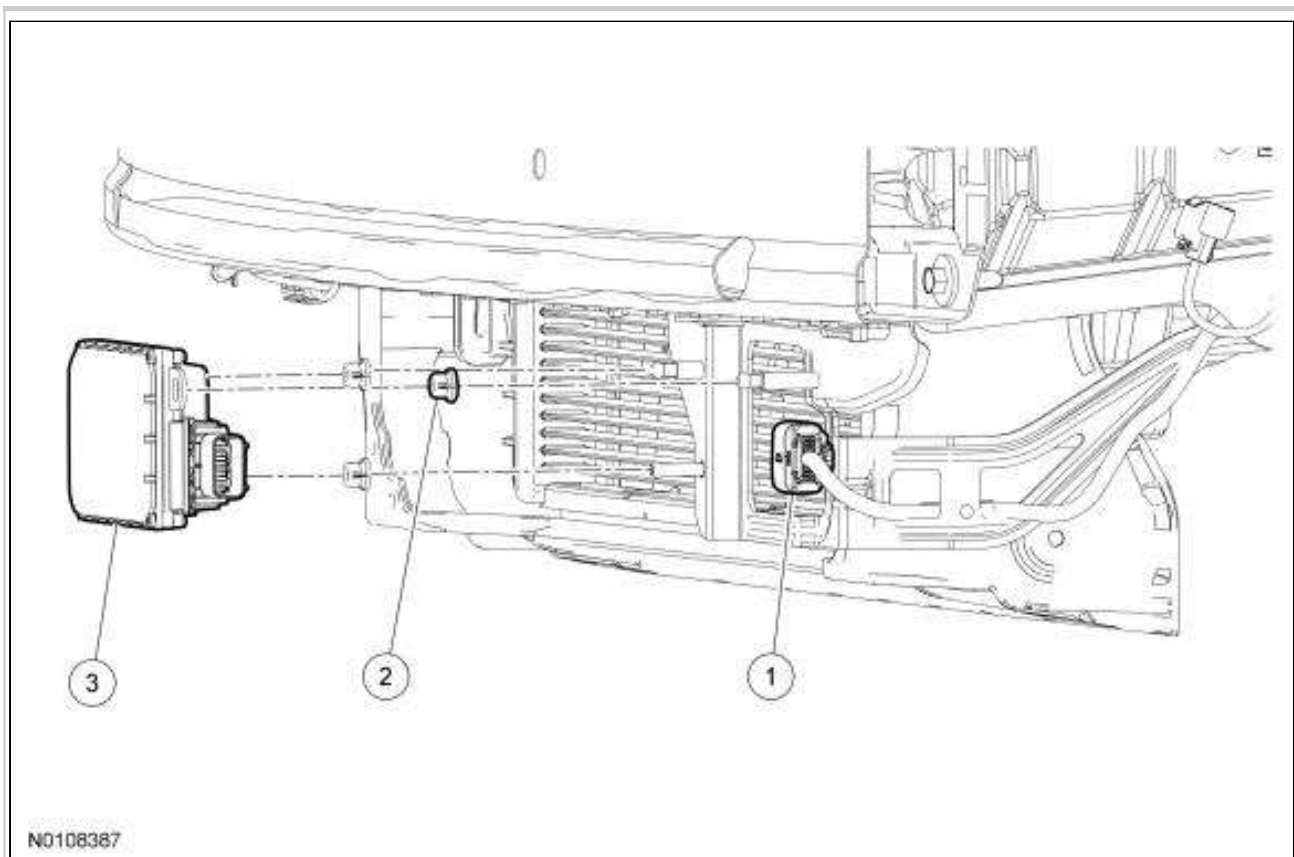
Follow the scan tool on-screen instructions to carry-out the CCM calibration procedure located in IDS under Toolbox > Electrical > Cruise Control > CCM Calibration.

After completion of the test, verify that the test completed successfully.

Follow the prompts to drive the vehicle after successful completion of the test. This may take several minutes.

## REMOVAL AND INSTALLATION > CRUISE-CONTROL MODULE (C-CM)

### Cruise-Control Module (C-CM)

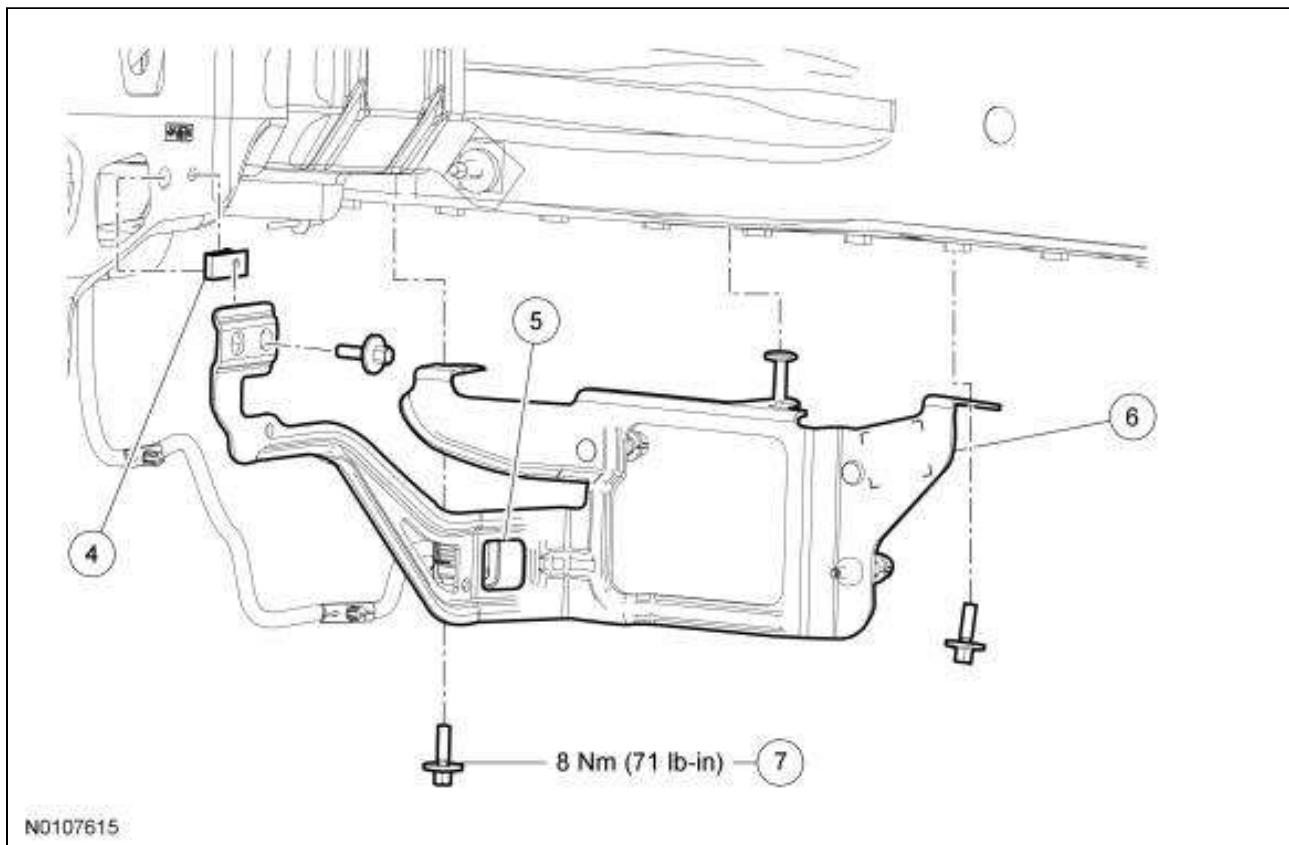


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Item	Part Number	Description
1	-	Cruise-Control Module (C-CM) electrical connector (part of 14290)
2	W790214	C-CM ball socket grommets (3 required)
3	9E731	C-CM

**C-CM Bracket**

Fig 1: Cruise Control Module Bracket With Torque Specifications



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Item	Part Number	Description
4	W520812	Cruise-Control Module (C-CM) bracket U-nut
5	-	C-CM electrical connector (part of 14290)
6	9C736	C-CM bracket

7	W710879	C-CM bracket bolts (3 required)
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