TOYOTA Service bulletin

Section:	Engine
Ref. No.:	EG-5109
Date:	Dec.,2015
Page:	1 of 10

Area Application : All Countries
Model Name : PRIUS, PRIUS PLUG-IN HYBRID, AVENSIS, CAMRY, CAMRY HV, AURION, REIZ, MARK X, AVALON, CROWN, VENZA, SIENNA, LAND CRUISER, HIGHLANDER, HIGHLANDER HV, KLUGER, LAND CRUISER PRADO, LAND CRUISER 100, PRIUS V, PRIUS +, AVALON HV, MIRAI
Model Code : ALL MODELS

Subject : GUIDANCE FOR ADJUSTMENT OF MILLIMETER WAVE RADAR SENSOR ASSEMBLY USING DIGITAL ANGLE GAUGE

This document provides guidance on how to use the digital angle gauge and SST (digital angle gauge attachment A) during the adjustment procedure, which is to be performed after removal and installation or replacement of the millimeter wave radar sensor assembly. In addition, as the millimeter wave radar sensor assembly installed to vehicles with Toyota Safety Sense may differ, the adjustment procedure may not be applicable.

UNSUPPORTED ELEMENT: applicable-vehicle (PARENT: servicebulletin)

Part No. Information :

New Part No.	New Part Name	Qty
NA	NA	NA

Production Effective :

VIN	Production Date
-	-

Applicable Procedure:
The steps provided in this Service Bulletin can be used to adjust the millimeter wave radar sensor assembly in lieu of steps (a) and (c) in the existing repair manual.

1. ADJUST MILLIMETER WAVE RADAR SENSOR ASSEMBLY

(a) Confirm the levelness of the floor surface.
(b) Before adjusting the radar beam axis, prepare the vehicle.
(c) Check and adjust the vertical direction of the radar sensor.
(d) Adjust the reflector height.
(e) Place the reflector.
(f) Check the radar beam axis.
(g) After adjusting the radar beam axis, return the vehicle to its original condition.

PREPARATION

CRUISE CONTROL

SST

	09989-00010	Digital Angle Gauge Attachment A	-

EQUIPMENT

Level	
Digital Angle Gauge	All required specifications must be met

Required specification
Range
+/- 180 degrees
Resolution
0.1 degrees
Accuracy
+/- 0.2 degrees
Size
59 mm (2.32 in.) x 59 mm (2.32" in.) x 28 mm (1.10" in.) or smaller
Other
Has a magnetic base that enables secure attachment to SST.
HINT:
SST has an attachment area of 35 mm (1.40 in.) x 26 mm (1.04 in.).

CRUISE CONTROL

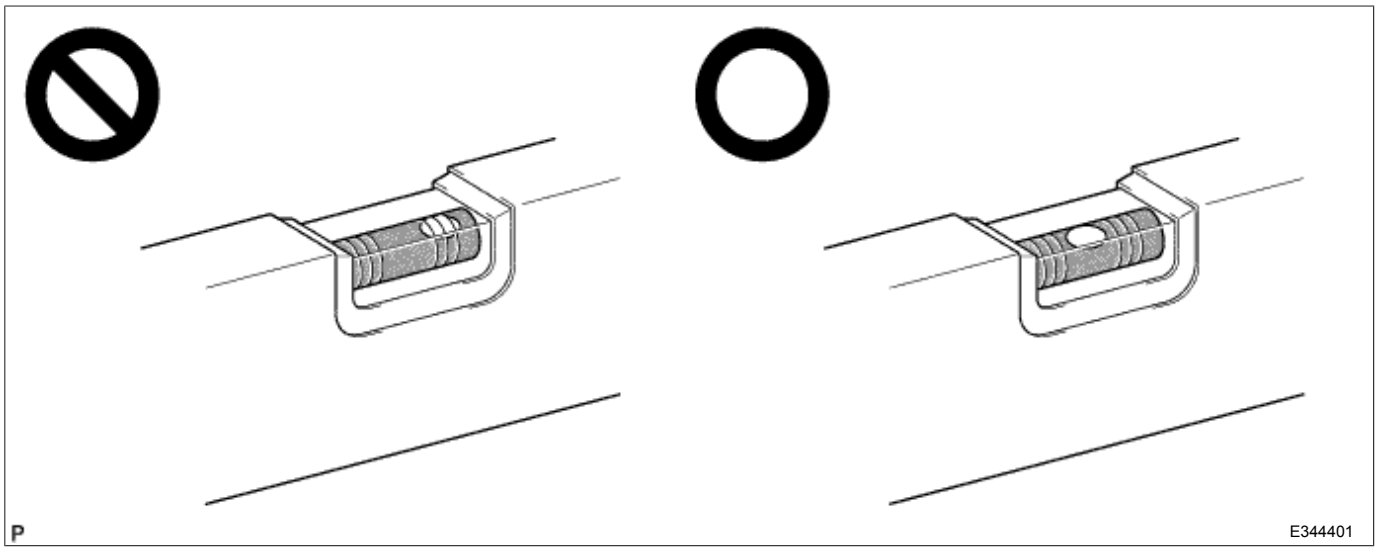
MILLIMETER WAVE RADAR SENSOR

ADJUSTMENT

1. PREPARATION FOR MILLIMETER WAVE RADAR SENSOR ASSEMBLY ADJUSTMENT

(a) Confirm levelness of floor surface.

(1) Place a bubble level on a level surface and confirm that the bubble is centered.



NOTICE :

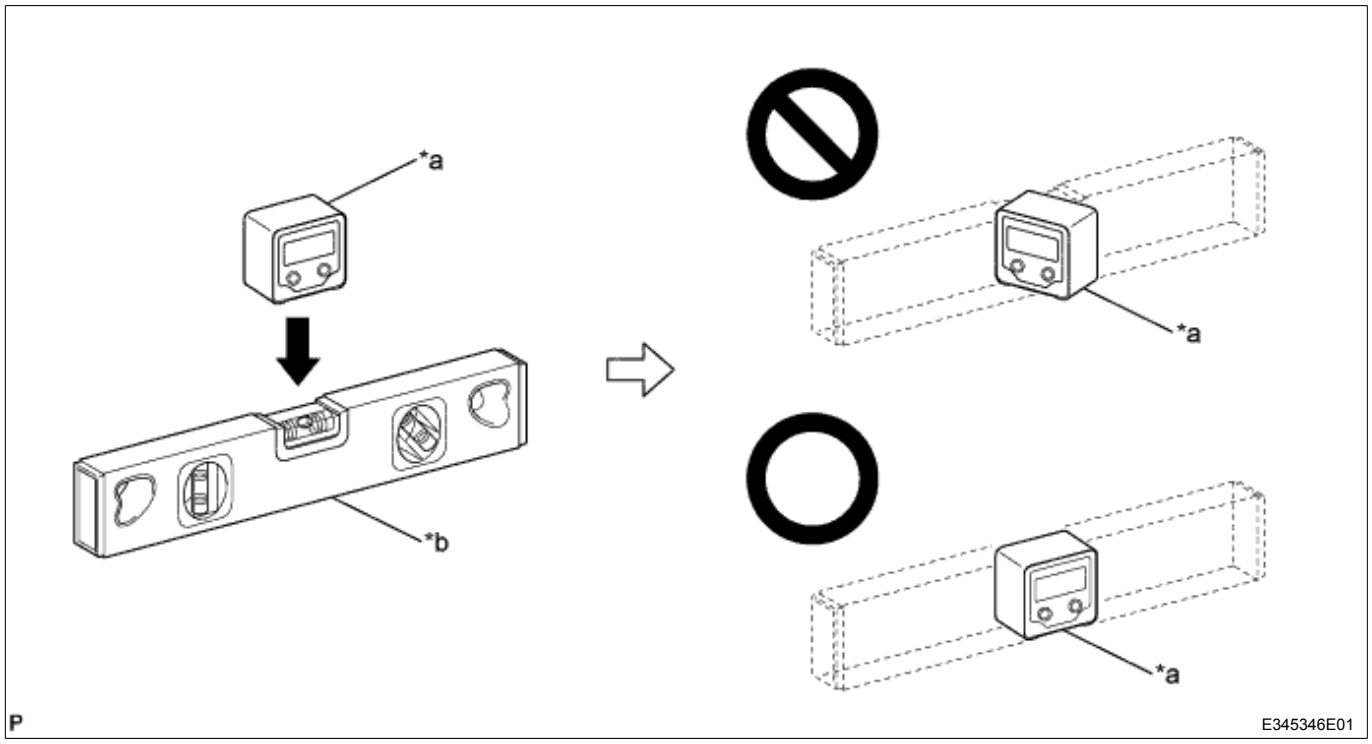
Make sure that there is no gravel, sand, etc., and that the surface is not undulating.

HINT :

By adjusting the direction of the bubble level, it is possible to find a position where the bubble is centered.

(2) Turn on the digital angle gauge.

(3) Place the digital angle gauge in the same location and direction as that of the bubble level where the levelness of the surface was confirmed.



Text in Illustration

*a	Digital Angle Gauge	*b	Level

NOTICE :

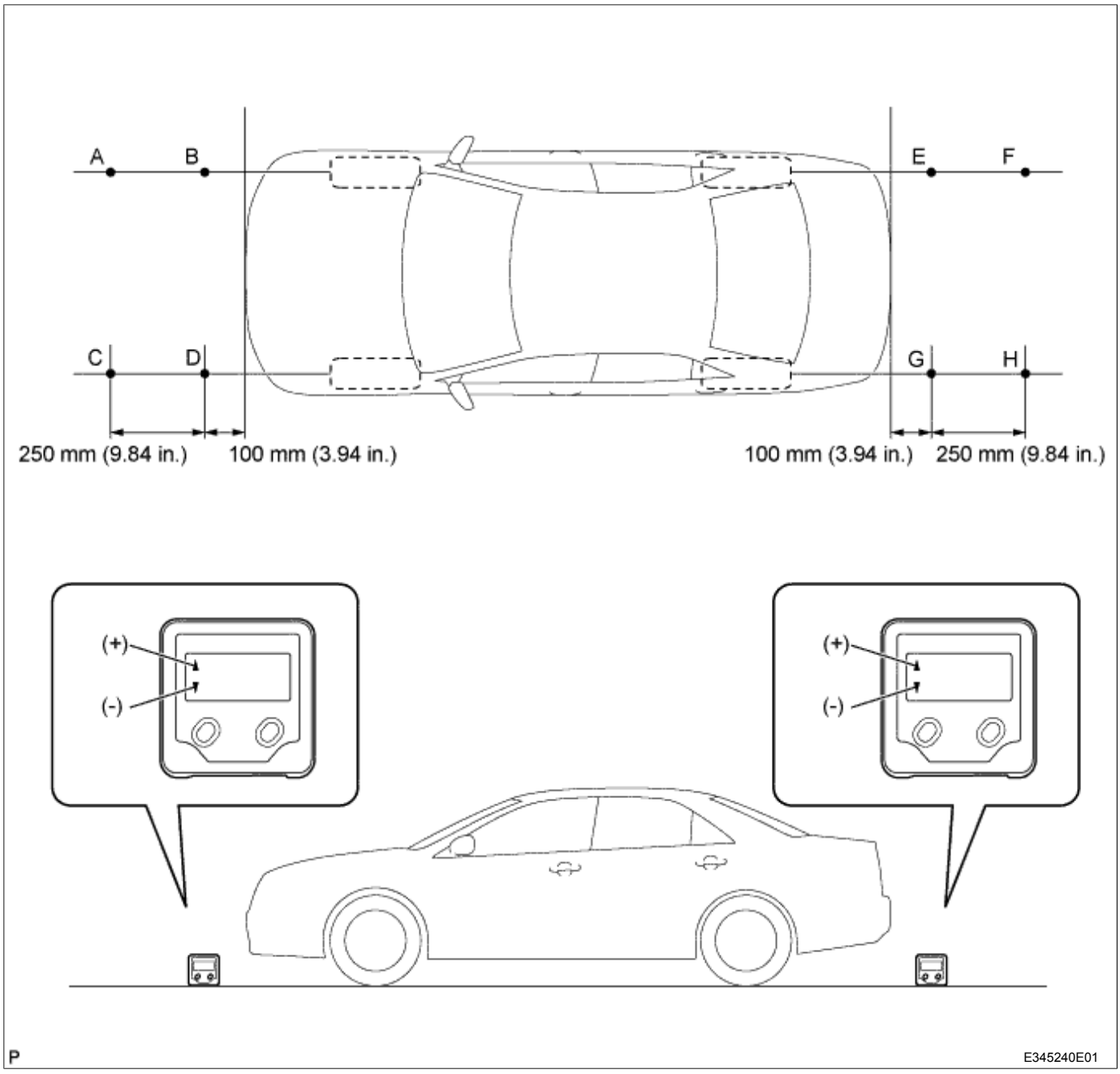
Confirm that the location and direction is exactly the same as that of the bubble level.

(4) Press the "ZERO" switch to memorize the zero point (perfectly level).

NOTICE :

Make sure that the digital angle gauge does not move when pressing the switch. If the digital angle gauge moves when the switch is pressed, an incorrect zero point may be memorized and it will not be possible to accurately check for levelness.

(5) Using the digital angle gauge in which the zero point (perfectly level) has been memorized, measure the angle of the floor surface at the 4 positions at the front of the vehicle and the 4 positions at the rear of the vehicle as shown in the illustration.



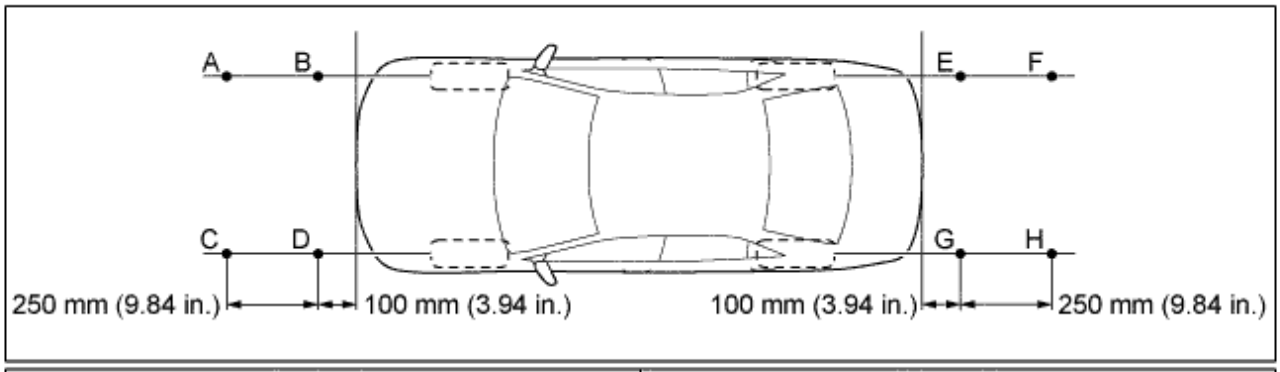
NOTICE :

- **Always position the digital angle gauge in the direction shown in the illustration.**
- **Make sure that there is no gravel, sand, etc., and that the floor surface is not undulating.**
- **When measuring the angle of the floor surface, avoid uneven areas such as joints between tiles.**
- **Make sure to confirm if the value is positive or negative when reading the digital angle gauge.**

HINT :
If there is any joint or equivalent on the floor surface for positions A, C, F and H, the digital angle meter can be placed anywhere within 50 mm in the longitudinal direction to avoid the joint or equivalent.

(6) Using the following worksheet, calculate the average of the measurements taken at the 4 positions in front of the vehicle, and calculate the average of the measurements taken at the 4 positions behind the vehicle.

Worksheet:



Front side		Rear side	
A	B	E	F
+ / −	+ / −	+ / −	+ / −
C	D	G	H
+ / −	+ / −	+ / −	+ / −
(A + B + C + D) / 4 = Front measurement average		(E + F + G + H) / 4 = Rear measurement average	
+ / −		+ / −	

Both of the following conditions are met:

- The difference between the front measurement average and the rear measurement average is less than 0.2 degrees.
- The front measurement average and the rear measurement average are not more than approximately 0.37 degrees.

OK: Proceed to the next step. NG: Choose another work area.

(Front measurement average + Rear measurement average) / 2 = Floor surface inclination

After calculating the floor surface inclination, proceed to "Calibrate the digital angle gauge".

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(7) Confirm that the front measurement average and the rear measurement average are not more than approximately 0.37 degrees. Also, confirm that the difference between the front measurement average and the rear measurement average is less than 0.2 degrees.

NOTICE :

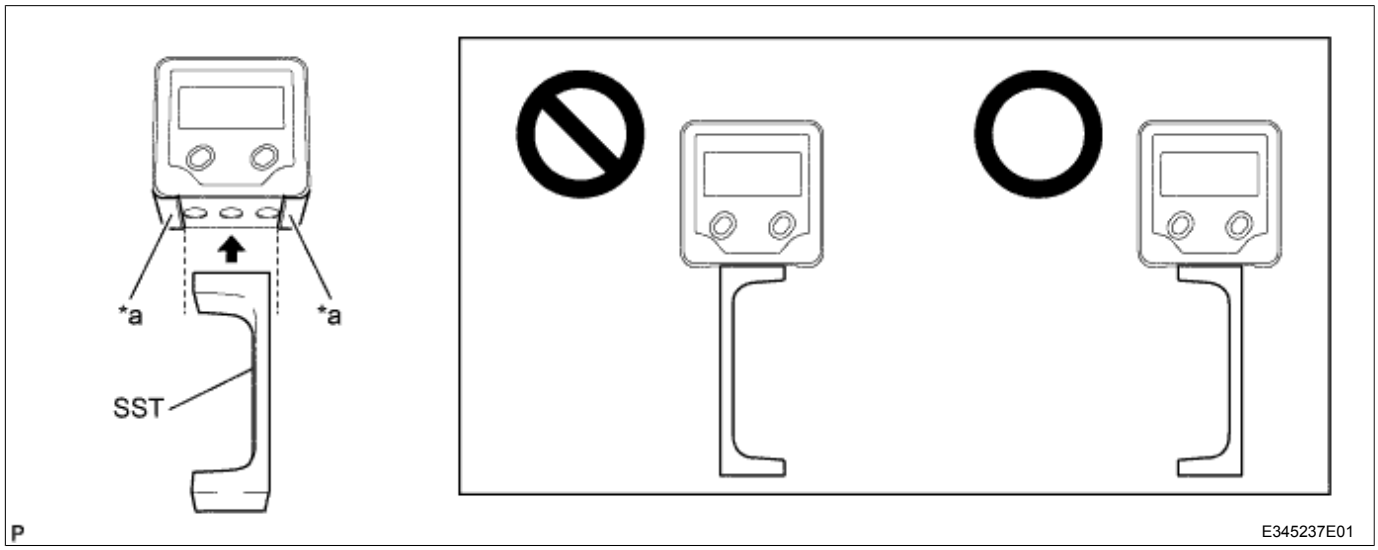
If either the front measurement average or the rear measurement average is more than approximately 0.37 degrees or the difference between the front measurement

average and the rear measurement average is more than 0.2 degrees, choose another work area as it is not possible to accurately check for levelness.

(8) Average the front measurement average and the rear measurement average, then round the answer to 1 decimal place (E.g. 0.0927 degrees is rounded to 0.1 degrees) to obtain the floor surface inclination value.

(b) Prepare the digital angle gauge.

(1) Attach the SST to the bottom of digital angle gauge as shown in the illustration.



Text in Illustration

*a	Protruding Part	-	-

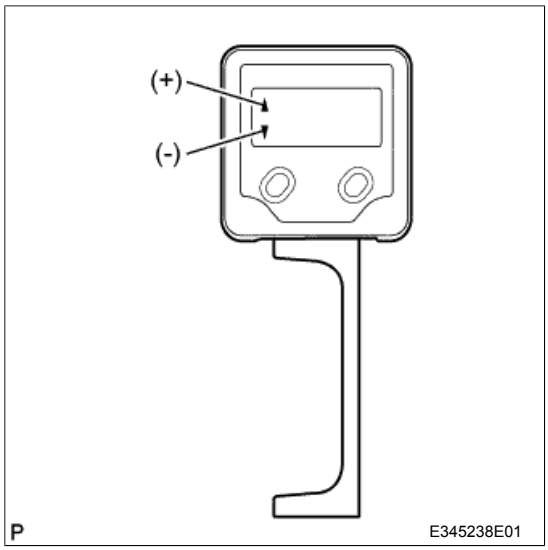
SST 09989-00010

NOTICE :

- **Make sure to attach SST to the digital angle gauge as it is not possible to set the digital angle meter to the millimeter wave radar sensor assembly without doing so.**
- **Do not allow the SST to overlap the protruding parts of the digital angle gauge.**
- **Be sure that the fitting direction of the SST is Correct.**

(c) Calibrate the digital angle gauge.

(1) Adjust the angle of the digital angle gauge until it reads the same value of floor surface inclination, then press the "ZERO" switch to memorize the zero point (level with floor surface).

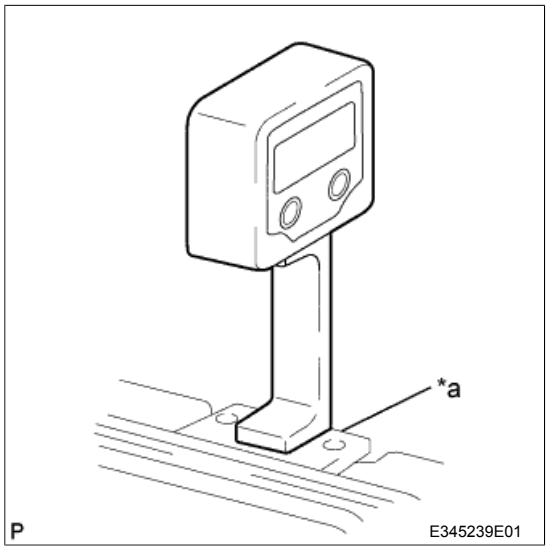


NOTICE :
Make sure to confirm if the value is positive or negative when reading the digital angle gauge.

(d) Perform the preparation procedure in the repair manual for the corresponding vehicle.

2. ADJUST MILLIMETER WAVE RADAR SENSOR ASSEMBLY

(a) Check and adjust the vertical direction of the millimeter wave radar sensor assembly.
  (1) Ensure that the millimeter wave radar sensor assembly level rack is free from dust, oil and foreign matter.
  (2) Set the SST and digital angle gauge onto the level rack of millimeter wave radar sensor assembly.



Text in Illustration

*a	Level Rack

SST 09989-00010

NOTICE :

Set the digital angle gauge and SST perpendicular to the top surface of the millimeter wave radar sensor assembly so that the front bumper or radiator grille does not interfere with the digital angle gauge or SST.

(3) While checking the value of the digital angle gauge, turn the bolt to adjust the vertical direction of the millimeter wave radar sensor assembly.

Standard

+0.2°

HINT :

As the location and direction to turn the bolt to adjust the vertical direction of the millimeter wave radar sensor varies depending on the vehicle model, refer to the repair manual of the corresponding vehicle.