

Last Modified: 12-04-2024	6.11:8.1.0	Doc ID: RM100000028X2J
Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: ELECTRONICALLY CONTROLLED BRAKE SYSTEM: Steering Angle Sensor Wrong Installation (X0455); 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

Steering Angle Sensor Wrong Installation (X0455)

DESCRIPTION

CODE	TESTER DISPLAY	MEASUREMENT ITEM	TROUBLE AREA	OUTPUT ECU
X0455	Steering Angle Sensor Wrong Installation	History of steering angle sensor being installed incorrectly	<ul style="list-style-type: none"> Correct spiral cable with sensor sub-assembly Steering angle sensor 	No. 2 skid control ECU (brake actuator assembly)

CAUTION / NOTICE / HINT

NOTICE:

After performing the inspection, check and clear the vehicle control history (RoB).

HINT:

When Steering Angle Sensor Wrong Installation (X0455) is stored, output control may operate, but this is not a malfunction.

PROCEDURE

1.	CHECK DTC (HEALTH CHECK)
-----------	---------------------------------

(a) Perform the Health Check using the GTS.

RESULT	PROCEED TO
DTCs are not output.	A
DTCs are output.	B

B  **GO TO DIAGNOSTIC TROUBLE CODE CHART**

A



2. ALIGN FRONT WHEELS FACING STRAIGHT AHEAD

NEXT



3. READ VALUE USING GTS (STEERING ANGLE SIGNAL INFORMATION)

(a) Check Data List item "steering angle signal information".

Chassis > Steering Angle Sensor > Data List

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Steering Angle Signal Information	Steering angle value (Rotation to the left side is positive)	Min.: -3072.0 deg Max.: 3070.5 deg	Turning left: 0.0 to 3070.5 deg Turning right: -3072.0 to 0.0 deg	During steering operation: Changes in proportion with steering wheel rotation

Chassis > Steering Angle Sensor > Data List

TESTER DISPLAY
Steering Angle Signal Information

(b) Save the steering angle signal information to the GTS memory.

NOTICE:

- If the value is +/- 360 deg (+/-15 deg), the steering angle sensor was incorrectly installed by 1 rotation.
- If the value is +/- 720 deg (+/-15 deg), the steering angle sensor was incorrectly installed by 2 rotations.
- In situations other than the above, the steering angle sensor may have been incorrectly installed by 3 or more rotations.

In this case, it is possible that the proper installation or removal procedures were not followed, and the steering angle sensor may have been damaged.

RESULT	PROCEED TO
0 +/- 15 deg	A
+/- 360 deg (+/-15 deg) or +/- 720 deg (+/-15 deg)	B
Other than above.	C

B ► GO TO STEP 7**C** ► GO TO STEP 13**A****4. CLEAR VEHICLE CONTROL HISTORY (RoB)**

(a) Using the GTS, clear the Vehicle Control History (RoB).

Chassis > Brake/EPB > Utility

TESTER DISPLAY
Vehicle Control History (RoB)

NEXT**5. PERFORM ZERO POINT CALIBRATION OF STEERING ANGLE SENSOR**

(a) Disconnect cable from negative (-) auxiliary battery terminal.

HINT:

If the cable is not disconnected from the negative (-) auxiliary battery terminal, it may not be possible to obtain an accurate steering angle sensor zero point.

(b) Connect cable to negative (-) auxiliary battery terminal.

(c) Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.

NEXT**6. CHECK VEHICLE CONTROL HISTORY (RoB)**

(a) Based on the Freeze Frame Data and interview with the customer, attempt to reproduce the conditions when the malfunction occurred.

(b) Using the GTS, check for Vehicle Control History (RoB).

Chassis > Brake/EPB > Utility

TESTER DISPLAY
Vehicle Control History (RoB)

RESULT	PROCEED TO
X0455 is not output.	A
X0455 is output.	B

A ▶ END

B ▶ REPLACE STEERING ANGLE SENSOR

Click here [INFO](#)

7. ADJUST SPIRAL CABLE WITH SENSOR SUB-ASSEMBLY

(a) Remove the spiral cable with sensor sub-assembly.

Click here [INFO](#)

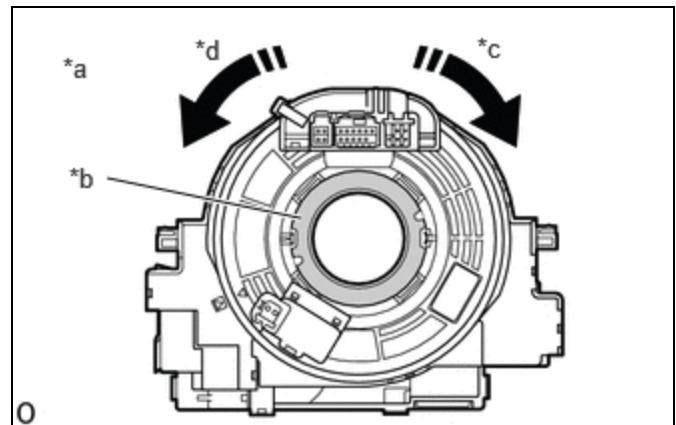
NOTICE:

- Be sure to disconnect the cable from the negative (-) auxiliary battery terminal before removing the spiral cable with sensor sub-assembly.

HINT:

If the cable is not disconnected from the negative (-) auxiliary battery terminal, it may not be possible to obtain an accurate steering angle sensor zero point.

- Do not disconnect the steering angle sensor from the spiral cable.



*a	The shape may vary depending on the vehicle model
*b	Interlock
*c	Clockwise
*d	Counterclockwise

(b) Based on the internal steering angle value that was saved to the GTS memory earlier, rotate the spiral cable with sensor sub-assembly.

NOTICE:

- Rotate the steering angle sensor without disconnecting it from the spiral cable.
- Make sure to follow the adjustment method shown in the table.
- Failure to observe the following precautions may result in damage to the spiral cable with sensor sub-assembly.

- When rotating the spiral cable with sensor sub-assembly, make sure to push on the interlock to release the interlock.
- Do not turn the spiral cable with sensor sub-assembly using the airbag wire harness.
- Do not forcibly rotate the part.
- Make sure to perform the correct number of rotations in the correct direction.

STEERING ANGLE SIGNAL INFORMATION	CORRECTION METHOD
360 deg (+/-15 deg)	Rotate clockwise (to the right), 1 rotation.
-360 deg (+/-15 deg)	Rotate counterclockwise (to the left), 1 rotation.
720 deg (+/-15 deg)	Rotate clockwise (to the right), 2 rotations.
- 720 deg (+/-15 deg)	Rotate counterclockwise (to the left), 2 rotations.

(c) Install the spiral cable with sensor sub-assembly.

Click here [INFO](#)

NEXT



8.	ALIGN FRONT WHEELS FACING STRAIGHT AHEAD
-----------	---

NEXT



9.	READ VALUE USING GTS (STEERING ANGLE SIGNAL INFORMATION)
-----------	---

(a) Check Data List item "steering angle signal information".

Chassis > Steering Angle Sensor > Data List

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Steering Angle Signal Information	Steering angle value (Rotation to the left side is positive)	Min.: -3072.0 deg Max.: 3070.5 deg	Turning left: 0.0 to 3070.5 deg Turning right: -3072.0 to 0.0 deg	During steering operation: Changes in proportion with steering wheel rotation

Chassis > Steering Angle Sensor > Data List

TESTER DISPLAY
Steering Angle Signal Information

RESULT	PROCEED TO
0 deg (+/- 15 deg)	A
None of the above conditions are met	B

B  **REPLACE STEERING ANGLE SENSOR**

Click here [INFO](#)

A



10. CLEAR VEHICLE CONTROL HISTORY (RoB)
--

(a) Using the GTS, clear the Vehicle Control History (RoB).

Chassis > Brake/EPB > Utility

TESTER DISPLAY
Vehicle Control History (RoB)

NEXT



11. PERFORM ZERO POINT CALIBRATION OF STEERING ANGLE SENSOR
--

(a) Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.

NEXT



12. CHECK VEHICLE CONTROL HISTORY (RoB)
--

(a) Based on the Freeze Frame Data and interview with the customer, attempt to reproduce the conditions when the malfunction occurred.

(b) Using the GTS, check for Vehicle Control History (RoB).

Chassis > Brake/EPB > Utility

TESTER DISPLAY
Vehicle Control History (RoB)

RESULT	PROCEED TO
X0455 is not output.	A
X0455 is output.	B

A ▶ END

B ▶ REPLACE STEERING ANGLE SENSOR

Click here [INFO](#)

13. CHECK STEERING WHEEL ASSEMBLY CENTER POSITION

(a) Perform steering wheel assembly center position adjustment.

Click here [INFO](#)

NEXT



14. ADJUST WHEEL ALIGNMENT

(a) Adjust the alignment (toe) of the wheels.

for Front: Click here [INFO](#)

for Rear: Click here [INFO](#)

NEXT



15. CLEAR VEHICLE CONTROL HISTORY (RoB)

(a) Using the GTS, clear the Vehicle Control History (RoB).

Chassis > Brake/EPB > Utility

TESTER DISPLAY
Vehicle Control History (RoB)

NEXT



16. PERFORM ZERO POINT CALIBRATION OF STEERING ANGLE SENSOR

(a) Disconnect cable from negative (-) auxiliary battery terminal.

HINT:

If the cable is not disconnected from the negative (-) auxiliary battery terminal, it may not be possible to obtain an accurate steering angle sensor zero point.

(b) Connect cable to negative (-) auxiliary battery terminal.

(c) Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.

NEXT



17. CHECK VEHICLE CONTROL HISTORY (RoB)

(a) Based on the Freeze Frame Data and interview with the customer, attempt to reproduce the conditions when the malfunction occurred.

(b) Using the GTS, check for Vehicle Control History (RoB).

Chassis > Brake/EPB > Utility

TESTER DISPLAY
Vehicle Control History (RoB)

RESULT	PROCEED TO
X0455 is not output	A

RESULT	PROCEED TO
X0455 is output	B

A ▶ **END**

B ▶ **REPLACE STEERING ANGLE SENSOR**

Click here [INFO](#)

