

Last Modified: 12-04-2024	6.11:8.1.0	Doc ID: RM100000028X3G
Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: ELECTRONICALLY CONTROLLED BRAKE SYSTEM: C051D00; Multi-axis Acceleration Sensor Module "A"; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	C051D00	Multi-axis Acceleration Sensor Module "A"
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DESCRIPTION

The airbag ECU assembly has a built-in yaw rate and acceleration sensor.

The No. 2 skid control ECU (brake actuator assembly) receives signals from the yaw rate and acceleration sensor (airbag ECU assembly) via CAN communication.

HINT:

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor (airbag ECU assembly) and the CAN communication system, DTC U012587 is output. When DTC U012587 is output together with C051D00, inspect and repair the trouble areas indicated by U012587 first.

This DTC is also output when the calibration has not been completed.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
C051D00	Multi-axis Acceleration Sensor Module "A"	When the vehicle speed is 40 km/h (25 mph) or more, the acceleration sensor zero point is not calibrated.	<ul style="list-style-type: none"> Acceleration sensor zero point not calibrated Acceleration sensor (airbag ECU assembly) installation Acceleration sensor (airbag ECU assembly) No. 2 skid control ECU (brake actuator assembly) 	Comes on	Brake/EPB	A	<ul style="list-style-type: none"> SAE Code: C051D Output ECU: No. 2 skid control ECU (brake actuator assembly)

MONITOR DESCRIPTION

The No. 2 skid control ECU (brake actuator assembly) monitors the acceleration sensor zero point calibration for successful completion. When the vehicle is being driven, if the acceleration sensor 1 or acceleration sensor 2 zero point range is outside the normal range, the No. 2 skid control ECU (brake actuator assembly) judges that the acceleration sensor zero point calibration is abnormal and illuminates the MIL and stores this DTC.

MONITOR STRATEGY

Related DTCs	C051D: Acceleration sensor missing calibration
Required Sensors/Components(Main)	No. 2 skid control ECU (brake actuator assembly)
Required Sensors/Components(Related)	Speed sensor No. 2 skid control ECU (brake actuator assembly)
Frequency of Operation	Continuous
Duration	-
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

C051D (Case 1)

Monitor runs whenever the following DTCs are not stored	U0125: Lost communication with multi-axis acceleration sensor module
All of the following conditions are met	A, B, C and D
A. Dealer mode	Off
B. Command to acceleration sensor zero position learning	Off
C. Vehicle speed	40 km/h (24.85 mph) or more
D. Following condition is met	More than 0.012 seconds
IGR voltage	3.5 V or higher

C051D (Case 2)

Monitor runs whenever the following DTCs are not stored	U0125: Lost communication with multi-axis acceleration sensor module
All of the following conditions are met	A, B, C and D
A. Zero position learning	Completed
B. Following condition is met	More than 0.012 seconds
IGR voltage	3.5 V or higher

C051D (Case 3)

Monitor runs whenever the following DTCs are not stored	U0125: Lost communication with multi-axis acceleration sensor module
All of the following conditions are met	A, B and C
A. Zero position learning	Completed
B. Last zero position learning	Not completed
C. Following condition is met	More than 0.012 seconds

IGR voltage	3.5 V or higher
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TYPICAL MALFUNCTION THRESHOLDS

C051D (Case 1)

Zero position learning	Not complete
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C051D (Case 2 and 3)

Either of the following conditions is met	-
Absolute value of GL1 sensor memorized zero position	0.9022118 m/s ² or higher
Absolute value of GL2 sensor memorized zero position	0.9022118 m/s ² or higher

COMPONENT OPERATING RANGE

All

All of the following conditions are met	-
Absolute value of GL1 sensor zero position	Less than 0.9022118 m/s ²
Absolute value of GL2 sensor zero position	Less than 0.9022118 m/s ²
Absolute value of GL1 sensor memorized zero position	Less than 0.9022118 m/s ²
Absolute value of GL2 sensor memorized zero position	Less than 0.9022118 m/s ²
Zero position learning	Completed

CONFIRMATION DRIVING PATTERN

NOTICE:

When performing the normal judgment procedure, make sure that the driver door is closed and is not opened at any time during the procedure.

HINT:

- After repair has been completed, clear the DTC and then check that the vehicle has returned to normal by performing the following All Readiness check procedure.
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.
 - Connect the GTS to the DLC3.
 - Turn the ignition switch to ON and turn the GTS on.
 - Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
 - Turn the ignition switch off.
 - Turn the ignition switch to ON (READY) and turn the GTS on.
 - Drive the vehicle at a speed of 40 km/h (24.85 mph) or more for 5 seconds or more. [*]

HINT:

[*]: Normal judgment procedure.

The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

- Enter the following menus: Chassis / Brake/EPB* / Utility / All Readiness.

*: Electric Parking Brake System

8. Check the DTC judgment result.

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows INCOMPLETE, perform driving pattern again.

PROCEDURE

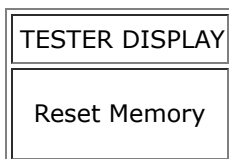
1. CLEAR ZERO POINT VALUE FOR YAW RATE AND ACCELERATION SENSOR

(a) Clear the zero point value for the yaw rate and acceleration sensor.

HINT:

[Click here](#) 

Chassis > Brake/EPB > Utility



NEXT



2. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR

(a) Perform zero point calibration of the yaw rate and acceleration sensor.

HINT:

[Click here](#) 

Chassis > Brake/EPB > Utility



NEXT



3. CLEAR DTC

Pre-procedure1

(a) None

Procedure1

(b) Clear the DTCs.

Chassis > Brake/EPB > Clear DTCs

Post-procedure1

(c) Turn the ignition switch off.

NEXT



4. RECONFIRM DTC

Pre-procedure1

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

Procedure1

(b) Check if the same DTC is output.

Chassis > Brake/EPB > Trouble Codes

RESULT	PROCEED TO
C051D00 is not output	A
C051D00 is output	B

Post-procedure1

(c) None

A **USE SIMULATION METHOD TO CHECK**

B



5. CHECK AIRBAG ECU ASSEMBLY INSTALLATION

Pre-procedure1

(a) Turn the ignition switch off.

Procedure1

(b) Check that the yaw rate and acceleration sensor (airbag ECU assembly) has been installed properly.

HINT:

[Click here](#) 

OK:

The yaw rate and acceleration sensor (airbag ECU assembly) is tightened to the specified torque.

The yaw rate and acceleration sensor (airbag ECU assembly) is not installed in a tilted position.

Post-procedure1

(c) None

NG  **INSTALL AIRBAG ECU ASSEMBLY**

OK



6. READ VALUE USING GTS (ACCELERATION SENSOR)

(a) Check the acceleration sensor output value displayed on the GTS.

Chassis > Brake/EPB > Data List

TESTER DISPLAY	MEASUREMENT ITEM	RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Lateral G	Lateral G	Min.: -25.105 m/s ² Max.: 24.908 m/s ²	Turning right: -25.105 to 0.000 m/s ² Turning left: 0.000 to 24.908 m/s ²	During turning: Changes in proportion with lateral acceleration
Forward and Rearward G	Forward and rearward G	Min.: -25.105 m/s ² Max.: 24.908 m/s ²	During deceleration: -25.105 to 0.000 m/s ² During acceleration: 0.000 to 24.908 m/s ²	During acceleration/deceleration: Changes in proportion with acceleration

Chassis > Brake/EPB > Data List

TESTER DISPLAY
Lateral G
Forward and Rearward G

OK:

The acceleration sensor output value is normal.

OK ▶ REPLACE BRAKE ACTUATOR ASSEMBLY [INFO](#)

NG ▶ REPLACE AIRBAG ECU ASSEMBLY [INFO](#)

