Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLWE
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P03652A,P036531; Camshaft Position Sensor "B" Bank 1 Signal Stuck in Range; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P03652A**	**Camshaft Position Sensor "B" Bank 1 Signal Stuck in Range**

DTC	**P036531**	**Camshaft Position Sensor "B" Bank 1 No Signal**

DESCRIPTION

Refer to DTC P036511.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P03652A	Camshaft Position Sensor "B" Bank 1 Signal Stuck in Range	No camshaft position sensor (for exhaust camshaft) signal to ECM while the engine is cranking (1 trip detection logic).	• Open or short in camshaft position sensor (for exhaust camshaft) circuit • Camshaft position sensor (for exhaust camshaft) • Exhaust camshaft • ECM	Comes on	Engine	A	SAE Code: P0365
P036531	Camshaft Position Sensor "B" Bank 1 No Signal	No camshaft position sensor (for exhaust camshaft) signal for 5 seconds at an engine speed of 600 rpm or higher (1 trip detection logic).	• Open or short in camshaft position sensor (for exhaust camshaft) circuit • Camshaft position sensor (for exhaust camshaft) • Exhaust camshaft • ECM	Comes on	Engine	A	SAE Code: P0365

Reference: Inspection using an oscilloscope.

Click here INFO

MONITOR DESCRIPTION

If no pulse signal is transmitted by the camshaft position sensor (for exhaust camshaft) despite the camshaft rotating, or the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction of the sensor.

MONITOR STRATEGY

Related DTCs	P0365: Exhaust camshaft position sensor verify pulse input
Required Sensors/Components (Main)	Camshaft position sensor (for exhaust camshaft)
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All of the following conditions are met	-
Engine speed	600 rpm or higher
Exhaust camshaft position sensor range check fail (P0367, P0368)	Not detected
Ignition switch	ON
Auxiliary battery voltage	8 V or higher
Exhaust camshaft position sensor voltage	0.3 to 4.7 V
Hybrid control module judge	Engine running
Lost communication with hybrid vehicle control ECU (U0293)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

Exhaust camshaft position sensor signal	No signal

CONFIRMATION DRIVING PATTERN

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.

  Click here INFO
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.

  Click here INFO

1. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off and wait for at least 30 seconds.
3. Put the engine in Inspection Mode (Maintenance Mode).

Click here INFO

4. Start the engine [A].
5. Idle the engine for 10 seconds or more [B].
6. Enter the following menus: Powertrain / Engine / Trouble Codes [C].
7. Read the pending DTCs.

HINT:

- If a pending DTC is output, the system is malfunctioning.
- If a pending DTC is not output, perform the following procedure.

8. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
9. Input the DTC: P03652A or P036531.
10. Check the DTC judgment result.

HINT:

- If the judgment result is NORMAL, the system is normal.
- If the judgment result is ABNORMAL, the system is malfunctioning.
- If the judgment result is INCOMPLETE, perform steps [B] through [C] again.
- [A] to [C]: Normal judgment procedure.

  The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
- When clearing the permanent DTCs, do not disconnect the cable from the auxiliary battery terminal or attempt to clear the DTCs during this procedure, as doing so will clear the universal trip and normal judgment histories.

WIRING DIAGRAM

Refer to DTC P036511.

Click here INFO

CAUTION / NOTICE / HINT

NOTICE:

- Vehicle Control History may be stored in the hybrid vehicle control ECU if the engine is malfunctioning. Certain vehicle condition information is recorded when Vehicle Control History is stored. Reading the vehicle conditions recorded in both the freeze frame data and Vehicle Control History can be useful for troubleshooting.

  for HEV Model: Click here INFO

  for PHEV Model: Click here INFO

  (Select Powertrain in Health Check and then check the time stamp data.)
- If any "Engine Malfunction" Vehicle Control History item has been stored in the hybrid vehicle control ECU, make sure to clear it. However, as all Vehicle Control History items are cleared simultaneously, if any Vehicle Control History items other than "Engine Malfunction" are stored, make sure to perform any troubleshooting for them before clearing Vehicle Control History.

  for HEV Model: Click here INFO

  for PHEV Model: Click here INFO

HINT:

If no problem is found through this diagnostic troubleshooting procedure, there may be a mechanical problem with the engine.

PROCEDURE

1.	**CHECK HARNESS AND CONNECTOR**

HINT:

Make sure that the connector is properly connected. If it is not, securely connect it and check for DTCs again.

Pre-procedure1

(a) Disconnect the camshaft position sensor (for exhaust camshaft) connector.

(b) Turn the ignition switch to ON.

Procedure1

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

EWD INFO

Click Location & Routing(C58)
Click Connector(C58)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C58-3 (VC2) - Body ground	Ignition switch ON	4.5 to 5.5 V	V
C58-1 (VVE+) - Body ground	Ignition switch ON	3.0 to 5.0 V	V

Post-procedure1

(d) Turn the ignition switch off and wait for at least 30 seconds.

Pre-procedure2

(e) None

Procedure2

(f) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

EWD INFO

Click Location & Routing(C58)
Click Connector(C58)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C58-3 (VC2) - C58-1 (VVE+)	Ignition switch off	1.425 to 1.575 kΩ	kΩ
C58-2 (VVE-) - Body ground	Ignition switch off	Below 1 Ω	Ω

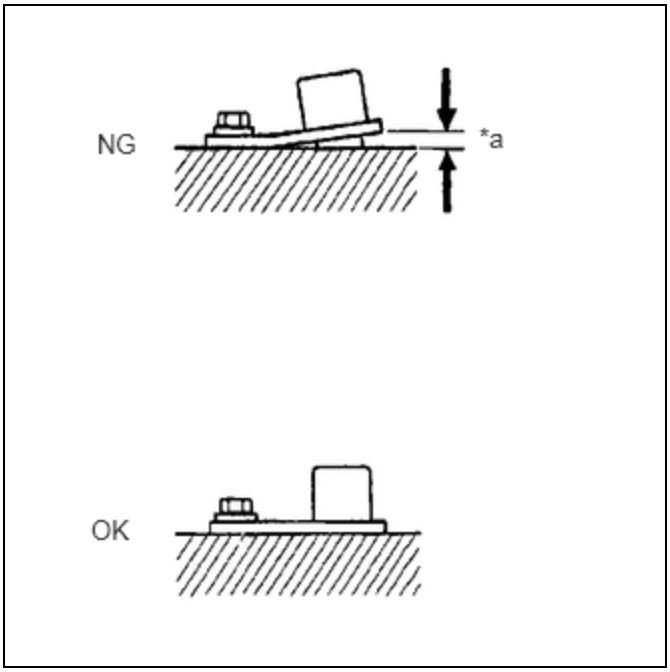
Post-procedure2

(g) None

NG ▶ **GO TO STEP 4**

OK

2.	**CHECK SENSOR INSTALLATION AND CONDUCT VISUAL INSPECTION (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT))**



*a	Clearance

(a) Visually check the camshaft position sensor (for exhaust camshaft) for damage.

(b) Check the camshaft position sensor (for exhaust camshaft) installation condition.

OK:

The camshaft position sensor (for exhaust camshaft) does not have any damage and is installed properly.

NG ▶ **SECURELY REINSTALL CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT)**

OK

3.	**INSPECT EXHAUST CAMSHAFT (TIMING ROTOR)**

(a) Check the timing rotor of the exhaust camshaft.

OK:

Camshaft timing rotor does not have any cracks or deformation.

OK ▶ **REPLACE CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT)**

NG ▶ **REPLACE EXHAUST CAMSHAFT**

4.	**CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) - ECM)**

Pre-procedure1

(a) Disconnect the camshaft position sensor (for exhaust camshaft) connector.

(b) Disconnect the ECM connector.

Procedure1

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

EWD INFO

Click Location & Routing(C58,C52)
Click Connector(C58)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C58-1 (VVE+) - C52-91 (EV1+)	Always	Below 1 Ω	Ω
C58-2 (VVE-) - C52-114 (EV1-)	Always	Below 1 Ω	Ω
C58-3 (VC2) - C52-113 (VCE1)	Always	Below 1 Ω	Ω
C58-1 (VVE+) or C52-91 (EV1+) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C58-2 (VVE-) or C52-114 (EV1-) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C58-3 (VC2) or C52-113 (VCE1) - Body ground and other terminals	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None

OK ▶ **REPLACE ECM**

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**