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<b>Model Year Start:</b> 2023	<b>Model:</b> Prius Prime	<b>Prod Date Range:</b> [03/2023 - ]
<b>Title:</b> M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P036511,P036515; Camshaft Position Sensor "B" Bank 1 Circuit Short to Ground; 2023 - 2024 MY Prius Prius Prime [03/2023 - ]		

<b>DTC</b>	<b>P036511</b>	<b>Camshaft Position Sensor "B" Bank 1 Circuit Short to Ground</b>
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<b>DTC</b>	<b>P036515</b>	<b>Camshaft Position Sensor "B" Bank 1 Circuit Short to Battery or Open</b>
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## DESCRIPTION

The camshaft position sensor (for exhaust camshaft) (EV1 signal) consists of a magnet and MRE (Magneto-Resistive Element).

The exhaust camshaft has a timing rotor for the camshaft position sensor. When the exhaust camshaft rotates, changes occur in the air gaps between the timing rotor and MRE, which affects the magnetic field. As a result, the resistance of the MRE material fluctuates. The camshaft position sensor converts the camshaft rotation data to pulse signals, uses the pulse signals. The ECM uses the pulse signals to determine the camshaft angle. Then the ECM uses this data to control fuel injection duration, injection timing and the Variable Valve Timing (VVT) system.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P036511	Camshaft Position Sensor "B" Bank 1 Circuit Short to Ground	The camshaft position sensor (for exhaust camshaft) output voltage is less than 0.3 V for 4 seconds or more (1 trip detection logic).	<ul style="list-style-type: none"> <li>Open or short in camshaft position sensor (for exhaust camshaft) circuit</li> <li>Camshaft position sensor (for exhaust camshaft)</li> <li>ECM</li> </ul>	Comes on	Engine	A	SAE Code: P0367
P036515	Camshaft Position Sensor "B" Bank 1 Circuit Short to Battery or Open	The camshaft position sensor (for exhaust camshaft) output voltage is higher than 4.7 V for 4 seconds or more (1 trip detection logic).	<ul style="list-style-type: none"> <li>Open or short in camshaft position sensor (for exhaust camshaft) circuit</li> <li>Camshaft position sensor (for exhaust camshaft)</li> <li>ECM</li> </ul>	Comes on	Engine	A	SAE Code: P0368

Reference: Inspection using an oscilloscope.

Click here [INFO](#)

## MONITOR DESCRIPTION

If the output voltage transmitted by the camshaft position sensor (for exhaust camshaft) remains low or high, the ECM interprets this as a malfunction in the sensor circuit, illuminates the MIL and stores a DTC.

## MONITOR STRATEGY

Related DTCs	P0367: Exhaust camshaft position sensor range check (low voltage) P0368: Exhaust camshaft position sensor range check (high voltage)
Required Sensors/Components (Main)	Camshaft position sensor (for exhaust camshaft)
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	4 seconds
MIL Operation	Immediate
Sequence of Operation	None

## TYPICAL ENABLING CONDITIONS

All of the following conditions are met	-
Ignition switch	ON
Time after ignition switch off to ON	2 seconds or more
Auxiliary battery voltage	8 V or higher
Exhaust camshaft position sensor pulse input fail while starter off (P0365)	Not detected

## TYPICAL MALFUNCTION THRESHOLDS

### **P0367: Range Check (Low Voltage)**

Exhaust camshaft position sensor voltage	Less than 0.3 V
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### **P0368: Range Check (High Voltage)**

Exhaust camshaft position sensor voltage	Higher than 4.7 V
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## 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. Turn the ignition switch to ON [A].
4. Wait for 5 seconds or more [B].
5. Enter the following menus: Powertrain / Engine / Trouble Codes [C].
6. 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.

7. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
8. Input the DTC: P036511 or P036515.
9. Check the DTC judgment result.

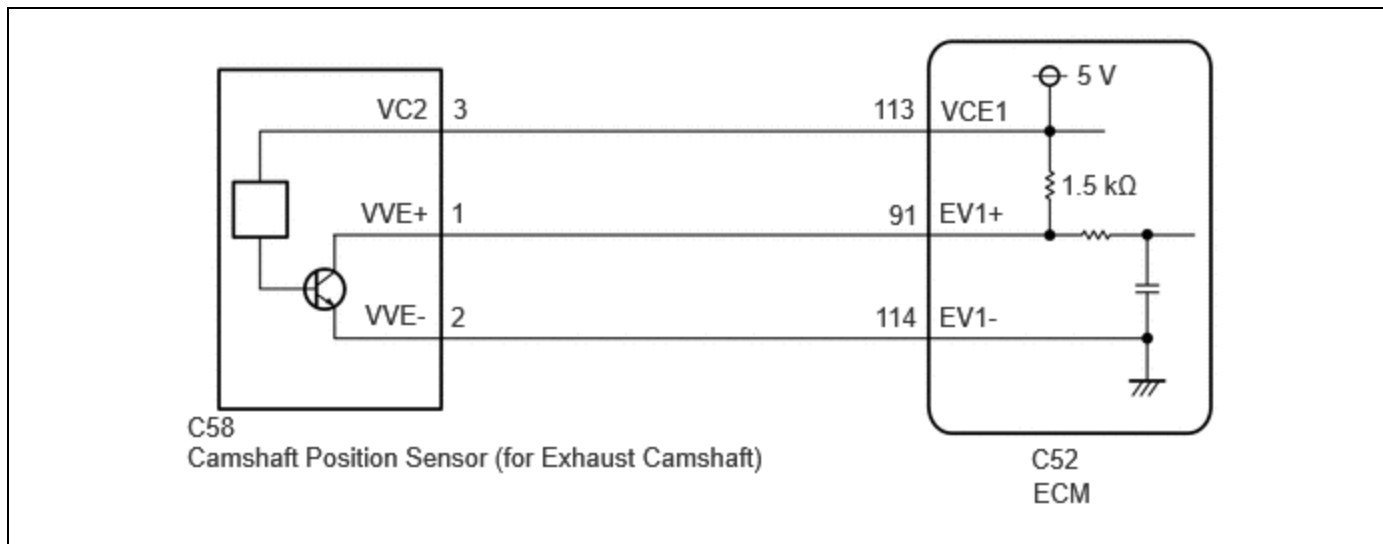
**HINT:**

- If the judgment result is NORMAL, the system is normal.
- If the judgment result is ABNORMAL, the system is malfunctioning.
- [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



## 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](#) 

for PHEV Model: [Click here](#) 

## 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:



[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:



[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

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C58-2 (VVE-) - Body ground	Ignition switch off	Below 1 $\Omega$	$\Omega$

Post-procedure2

(g) None

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

**NG**



<b>2.</b>	<b>CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR EXHAUST CAMSHAFT) - ECM)</b>
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Pre-procedure1

(a) Disconnect the C58 camshaft position sensor (for exhaust camshaft) connector.

(b) Disconnect the C52 ECM connector.

Procedure1

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

Standard Resistance:



[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 $\Omega$	$\Omega$
C58-2 (VVE-) - C52-114 (EV1-)	Always	Below 1 $\Omega$	$\Omega$
C58-3 (VC2) - C52-113 (VCE1)	Always	Below 1 $\Omega$	$\Omega$
C58-1 (VVE+) or C52-91 (EV1+) - Body ground and other terminals	Always	10 k $\Omega$ or higher	k $\Omega$
C58-2 (VVE-) or C52-114 (EV1-) - Body ground and other terminals	Always	10 k $\Omega$ or higher	k $\Omega$
C58-3 (VC2) or C52-113 (VCE1) - Body ground and other terminals	Always	10 k $\Omega$ or higher	k $\Omega$

Post-procedure1

(d) None

**OK**  **REPLACE ECM**

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

