Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BM0Y
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P136411,P136415; "C" Camshaft Position Actuator Bank 1 Circuit Short to Ground; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P136411**	**"C" Camshaft Position Actuator Bank 1 Circuit Short to Ground**

DTC	**P136415**	**"C" Camshaft Position Actuator Bank 1 Circuit Short to Battery or Open**

DESCRIPTION

Refer to DTC P001001.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P136411	"C" Camshaft Position Actuator Bank 1 Circuit Short to Ground	While engine is running, short in VTM terminal of cam timing control motor with EDU assembly is detected for 3 seconds (1 trip detection logic).	• Cam timing control motor with EDU assembly • Short in cam timing control motor with EDU assembly circuit • VVT relay • ECM	Comes on	Engine	A	SAE Code: P1364
P136415	"C" Camshaft Position Actuator Bank 1 Circuit Short to Battery or Open	While engine is running, open or short in VTM and VTP terminals of cam timing control motor with EDU assembly is detected for 3 seconds (1 trip detection logic).	• Cam timing control motor with EDU assembly • Open or short in cam timing control motor with EDU assembly circuit • VVT relay • ECM	Comes on	Engine	A	SAE Code: P1364

MONITOR DESCRIPTION

These DTCs are stored when a power supply malfunction, diagnostic signal malfunction or motor operation signal malfunction is detected in the cam timing control motor with EDU assembly. The cam timing control motor with EDU assembly is equipped with a self diagnostic function, which is used to send diagnostic a signal (VTM) to the ECM. If the ECM receives a VTP or VTM open or short signal, a DTC is output immediately (1 trip detection logic).

MONITOR STRATEGY

Related DTCs	P1364: Motor drive VVT system control module range check
Required sensors/Components (Main)	Cam timing control motor with EDU assembly
Required sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	3 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	None
All of the following conditions are met	-
Auxiliary battery voltage	11 V or higher
Ignition switch	ON
Engine speed	100 rpm or higher

TYPICAL MALFUNCTION THRESHOLDS

Range Check (Low Voltage)

VVT driver communication terminal voltage level	Low

Range Check (High Voltage)

Either of the following conditions is met	A or B
A. VVT driver communication terminal voltage level	High
B. "VVT actuator circuit error" from motor drive VVT system control module	Received

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: P136411 or P136415.
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 has a malfunction.
    - 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 P136001.

Click here INFO

CAUTION / NOTICE / HINT

NOTICE:

- Inspect the fuses for circuits related to this system before performing the following procedure.
- 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

PROCEDURE

1.	**CHECK TERMINAL VOLTAGE (POWER SOURCE OF CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY)**

Pre-procedure1

(a) Disconnect the cam timing control motor with EDU assembly 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(C20)
Click Connector(C20)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C20-2 (VB1) - Body ground	Ignition switch ON	11 to 14 V	V

Post-procedure1

(d) None.

NG ▶ **GO TO STEP 8**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY - BODY GROUND)**

Pre-procedure1

(a) Disconnect the cam timing control motor with EDU assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(C20)
Click Connector(C20)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C20-3 (GND) - Body ground	Always	Below 1 Ω	Ω

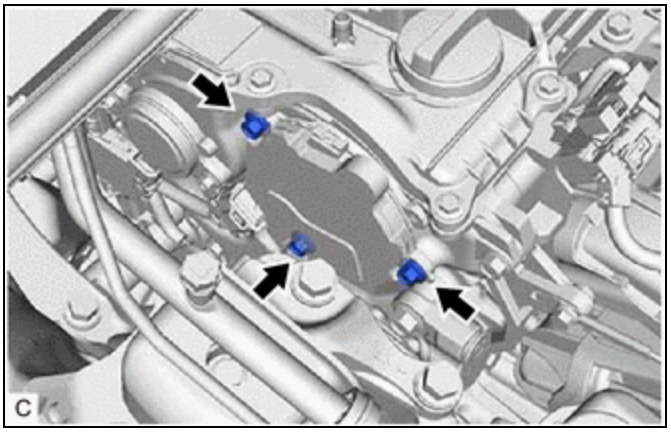
Post-procedure1

(c) None.

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

OK ▼

3.	INSPECT CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY (BODY GROUND)



(a) Check installation condition.

1. Check that the 3 installation bolts of the cam timing control motor with EDU assembly are tightened to the specified torque.

Standard:

SPECIFIED CONDITION	RESULT
21 N*m 214 kgf*cm 15 ft.*lbf	N*m kgf*cm ft.*lbf

NG ▶ **TIGHTEN TO SPECIFIED TORQUE**

OK ▼

4.	**CHECK HARNESS AND CONNECTOR (CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY - ECM)**

Pre-procedure1

(a) Disconnect the cam timing control motor with EDU assembly 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(C20,C52)
Click Connector(C20)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C20-4 (VTM) - C52-72 (EMD1)	Always	Below 1 Ω	Ω
C20-1 (VTP) - C52-28 (EDT1)	Always	Below 1 Ω	Ω
C20-4 (VTM) or C52-72 (EMD1) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C20-1 (VTP) or C52-28 (EDT1) - Body ground and other terminals	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None.

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

OK
▼

5.	**REPLACE CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY**

HINT:

Click here INFO

NEXT
▼

6.	**CLEAR DTC**

Pre-procedure1

(a) None.

Procedure1

(b) Clear the DTCs.

Powertrain > Engine > Clear DTCs

Post-procedure1

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

NEXT

7.	**CONFIRM WHETHER MALFUNCTION HAS BEEN SUCCESSFULLY REPAIRED**

Pre-procedure1

(a) Drive the vehicle in accordance with the driving pattern described in Confirmation Driving Pattern.

Procedure1

(b) Read the DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
DTCs are not output	A
P136411 or P136415 is output	B

Post-procedure1

(c) None.

A **END**

B **REPLACE ECM**

8.	**INSPECT VVT RELAY**

Click here INFO

NG ▶ **REPLACE VVT RELAY**

OK ▼

9.	**CHECK HARNESS AND CONNECTOR (VVT RELAY - CAM TIMING CONTROL MOTOR WITH EDU ASSEMBLY)**

Pre-procedure1

(a) Remove the VVT relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Disconnect the cam timing control motor with EDU assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(C20)
Click Connector(C20)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
5 (VVT relay) - C20-2 (VB1)	Always	Below 1 Ω	Ω
5 (VVT relay) or C20-2 (VB1) - Body ground and other terminals	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None.

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

OK ▼

10.	**CHECK HARNESS AND CONNECTOR (POWER SOURCE OF VVT RELAY)**

Pre-procedure1

(a) Remove the VVT relay from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Voltage:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
3 (VVT relay) - Body ground	Always	11 to 14 V	V

Post-procedure1

(c) None.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (AUXILIARY BATTERY - VVT RELAY)**

OK ▼

11.	CHECK HARNESS AND CONNECTOR (POWER SOURCE OF VVT RELAY)

Pre-procedure1

(a) Remove the VVT relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Turn the ignition switch to ON.

Procedure1

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

Standard Voltage:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION	RESULT
1 (VVT relay) - Body ground	Ignition switch ON	11 to 14 V	V

Post-procedure1

(d) None.

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (VVT RELAY - BODY GROUND)**

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (EFI-MAIN NO. 1 RELAY - VVT RELAY)**