Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLU2
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P001200; Camshaft Position "A" - Timing Over-Retarded Bank 1; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P001200**	**Camshaft Position "A" - Timing Over-Retarded Bank 1**

DESCRIPTION

Refer to DTC P001001.

Click here INFO

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P001200	Camshaft Position "A" - Timing Over-Retarded Bank 1	With engine warmed up and while driving in urban area (engine speed 4000 rpm or less), intake side valve timing does not change in retarded position, and target and actual valve timing do not match (1 trip detection logic).	• Camshaft timing gear assembly • Cam timing control motor with EDU assembly • ECM	Comes on	Engine	B	SAE Code: P0012

MONITOR DESCRIPTION

This DTC is output when a valve timing stuck condition is detected. With the engine speed at 4000 rpm or less in the retard angle position, if the valve timing does not vary, and there is a large difference in the target and actual valve timing, it is determined that a malfunction has occurred. When this malfunction is detected, the ECM will illuminate the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P0012: Retarded camshaft timing
Required Sensors/Components (Main)	Camshaft timing gear assembly Cam timing control motor with EDU assembly
Required Sensors/Components (Related)	Crankshaft position sensor Camshaft position sensor Engine coolant temperature sensor
Frequency of Operation	Continuous
Duration	Less than 10 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	P0010, P1360, P1362, P1364, P1366, P2614 (Motor drive VVT system control module) P0016 (VVT system - misalignment) P0101, P0102, P0103 (Mass air flow meter) P0107, P0108 (Manifold absolute pressure) P0117, P0118 (Engine coolant temperature sensor) P0125 (Insufficient engine coolant temperature for closed loop fuel control) P0335, P0337, P0338 (Crankshaft position sensor) P0340, P0342, P0343 (Camshaft position sensor) P0365, P0367, P0368 (Exhaust camshaft position sensor)
Auxiliary battery voltage	11 V or higher
Engine speed	500 to 4000 rpm
Engine coolant temperature	75 to 120°C (167 to 248°F)

TYPICAL MALFUNCTION THRESHOLDS

Both of the following conditions are met	-
Deviation of actual valve timing and target valve timing	More than 5°CA (Crankshaft Angle) for 5 seconds or more
Valve timing	No change at retarded valve timing

MONITOR RESULT

Refer to detailed information in Checking Monitor Status.

Click here INFO

P0012: Exhaust Gas Recirculation/VVT / IN VVT STUCK B1

MONITOR ID	TEST ID	SCALING	UNIT	DESCRIPTION
$35	$81	Multiply by 0.01	Second	Forced movement of cam timing control actuator time

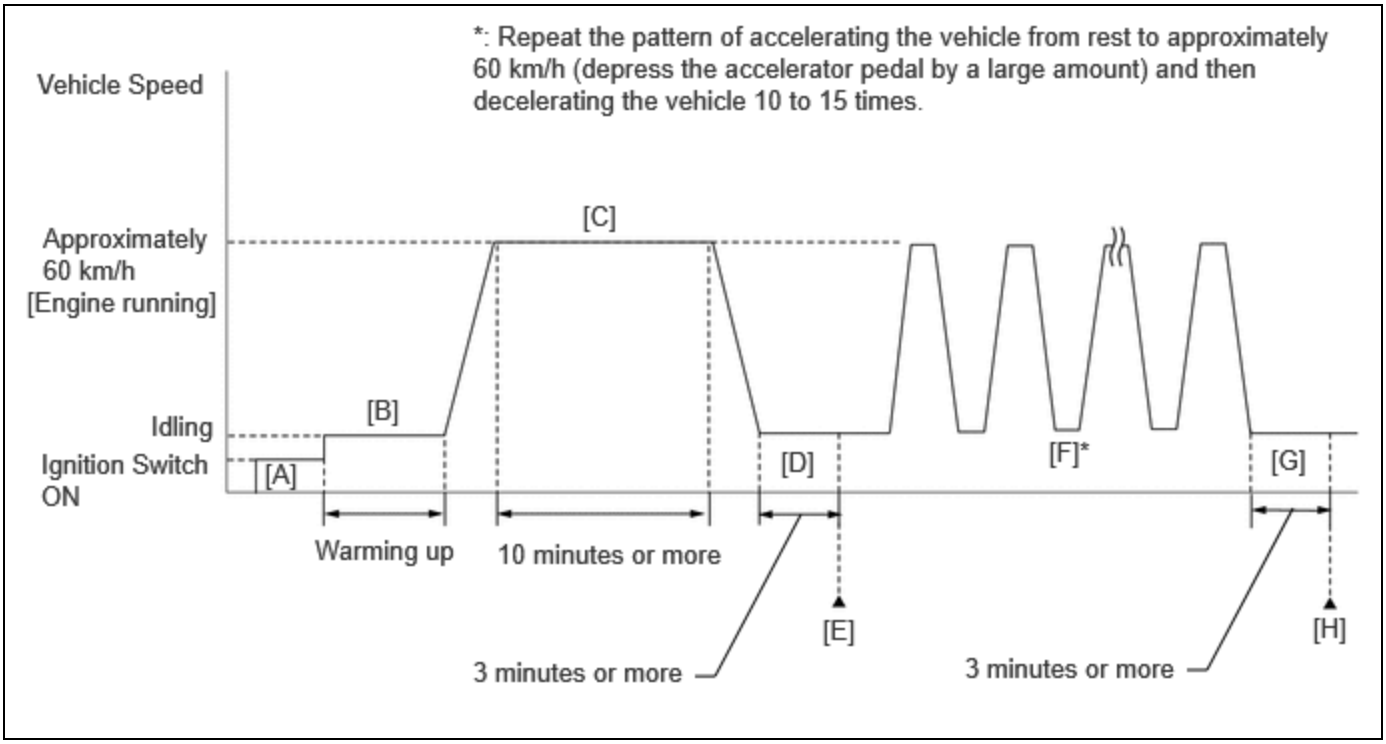
CONFIRMATION DRIVING PATTERN

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. Put the engine in Inspection Mode (Maintenance Mode).

   Click here INFO
5. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher [B].
6. Press the EV/HV mode selection switch to select HV mode. (for PHEV Model)
7. With the engine running, drive the vehicle at approximately 60 km/h (37 mph) for 10 minutes or more [C].

   CAUTION:

   When performing the confirmation driving pattern, obey all speed limits and traffic laws.

   HINT:

   If the engine stops, further depress the accelerator pedal to restart the engine.
8. Idle the engine for 3 minutes or more [D].
9. Enter the following menus: Powertrain / Engine / Trouble Codes [E].
10. 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.
11. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
12. Input the DTC: P001200.
13. 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 [F] through [H].
    - [A] to [E]: 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.

14. With the engine running, repeat the pattern of accelerating the vehicle from rest to approximately 60 km/h (37 mph) and then decelerating the vehicle 10 to 15 times [F].

CAUTION:

When performing the confirmation driving pattern, obey all speed limits and traffic laws.

HINT:

- If the engine stops, further depress the accelerator pedal to restart the engine.
- Depress the accelerator pedal by a large amount.

15. Idle the engine for 3 minutes or more [G].
16. Enter the following menus: Powertrain / Engine / Trouble Codes [H].
17. 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.

18. Check the DTC judgment result again.

HINT:

- If the judgment result is NORMAL, the system is normal.
- If the judgment result is ABNORMAL, the system has a malfunction.
- [A] to [H]: 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.

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:

- The GTS only:

  By using the Control the VVT-iE Opening Angle Bank 1 Active Test, it can be determined if the VVT-iE system is malfunctioning.

a. Clear the DTCs.
b. Turn the ignition switch off and wait for at least 30 seconds.
c. Put the engine in Inspection Mode (Maintenance Mode).

Click here INFO

d. Start the engine and warm it up until the engine coolant temperature reaches 75°C (167°F) or higher.
e. Enter the following menus: Powertrain / Engine / Active Test / Control the VVT-iE Opening Angle Bank 1 / Data List / Intake VVT Change Angle Bank 1 and Intake VVT Target Angle Bank 1.
f. Read the Data List while performing the Active Test with the engine idling.

OK:

ACTIVE TEST MOVEMENT ORDER	DIFFERENCE BETWEEN "INTAKE VVT CHANGE ANGLE BANK 1" AND "INTAKE VVT TARGET ANGLE BANK 1"
0 deg → 10 deg → 20 deg → 40 deg → 0 deg → 10 deg → END	Within 4 DegFR

PROCEDURE

1.	**CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P001200)**

(a) Read the DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
P001200 and other DTCs are output	A
P001200 is output	B

HINT:

If any DTCs other than P001200 are output, troubleshoot those DTCs first.

A ▶ **GO TO DTC CHART**

B ▼

2.	**INSPECT CAMSHAFT TIMING GEAR ASSEMBLY**

Pre-procedure1

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

HINT:

Click here INFO

Procedure1

(b) Check if the eccentric shaft of the camshaft timing gear assembly rotates smoothly.

NOTICE:

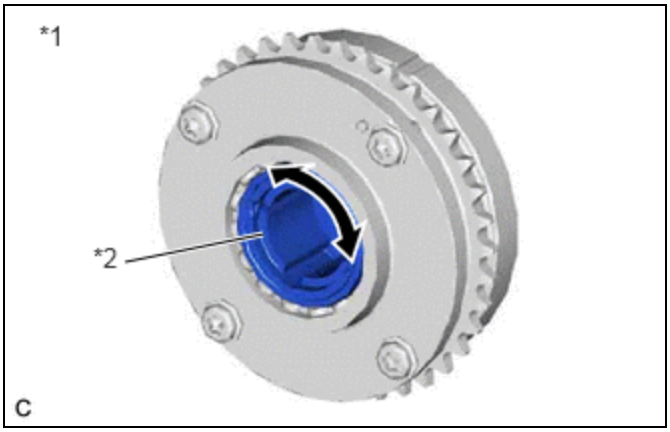
If the camshaft is at a position where a valve is about to open, the eccentric shaft may become difficult to rotate.

OK:

Rotates smoothly.

Result:

PROCEED TO
OK
NG



*1	Camshaft Timing Gear Assembly
*2	Eccentric Shaft

Post-procedure1

(c) Perform "Inspection After Repair" after removing the cam timing control motor with EDU assembly.

HINT:

Click here INFO

NG ▶ **REPLACE CAMSHAFT TIMING GEAR ASSEMBLY**

OK
▼

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

HINT:

Click here INFO

NEXT
▼

4.	**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

5.	**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
P001200 is output	B

Post-procedure1

(c) None

A **END**

B **REPLACE ECM**