Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLW7
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P034011,P034015; Camshaft Position Sensor "A" Bank 1 or Single Sensor Circuit Short to Ground; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P034011**	**Camshaft Position Sensor "A" Bank 1 or Single Sensor Circuit Short to Ground**

DTC	**P034015**	**Camshaft Position Sensor "A" Bank 1 or Single Sensor Circuit Short to Battery or Open**

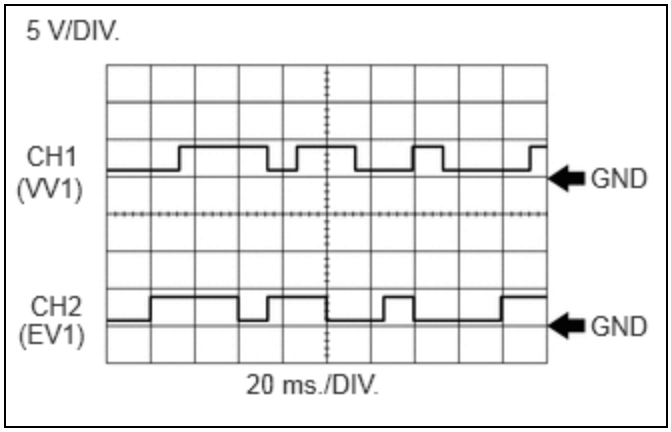
DESCRIPTION

The camshaft position sensor (for intake camshaft) (VV1 signal) consists of a magnet and MRE (Magneto-Resistive Element).

The intake camshaft has a timing rotor for the camshaft position sensor. When the intake 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 and injection timing.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P034011	Camshaft Position Sensor "A" Bank 1 or Single Sensor Circuit Short to Ground	The camshaft position sensor (for intake camshaft) output voltage is less than 0.3 V for 4 seconds or more (1 trip detection logic).	• Open or short in camshaft position sensor (for intake camshaft) circuit • Camshaft position sensor (for intake camshaft) • ECM	Comes on	Engine	A	SAE Code: P0342
P034015	Camshaft Position Sensor "A" Bank 1 or Single Sensor Circuit Short to Battery or Open	The camshaft position sensor (for intake camshaft) output voltage is higher than 4.7 V for 4 seconds or more (1 trip detection logic).	• Open or short in camshaft position sensor (for intake camshaft) circuit • Camshaft position sensor (for	Comes on	Engine	A	SAE Code: P0343

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
			intake camshaft) • ECM				



Reference: Inspection using an oscilloscope.

HINT:

- The correct waveform is as shown.
- VV1 stands for the camshaft position sensor signal (for intake camshaft), and EV1 stands for the camshaft position sensor signal (for exhaust camshaft).

ECM Terminal Name	CH1: Between VV1+ and VV1- CH2: Between EV1+ and EV1-
Tester Range	5 V/DIV., 20 ms./DIV.
Condition	Idling with warm engine

MONITOR DESCRIPTION

If the output voltage transmitted by the camshaft position sensor (for intake 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	P0342: Camshaft position sensor range check (low voltage) P0343: Camshaft position sensor range check (high voltage)
Required Sensors/Components (Main)	Camshaft position sensor (for intake 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
Camshaft position sensor pulse input fail (P0340)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

P0342: Range Check (Low Voltage)

Camshaft position sensor voltage	Less than 0.3 V

P0343: Range Check (High Voltage)

Camshaft position sensor voltage	Higher than 4.7 V

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:

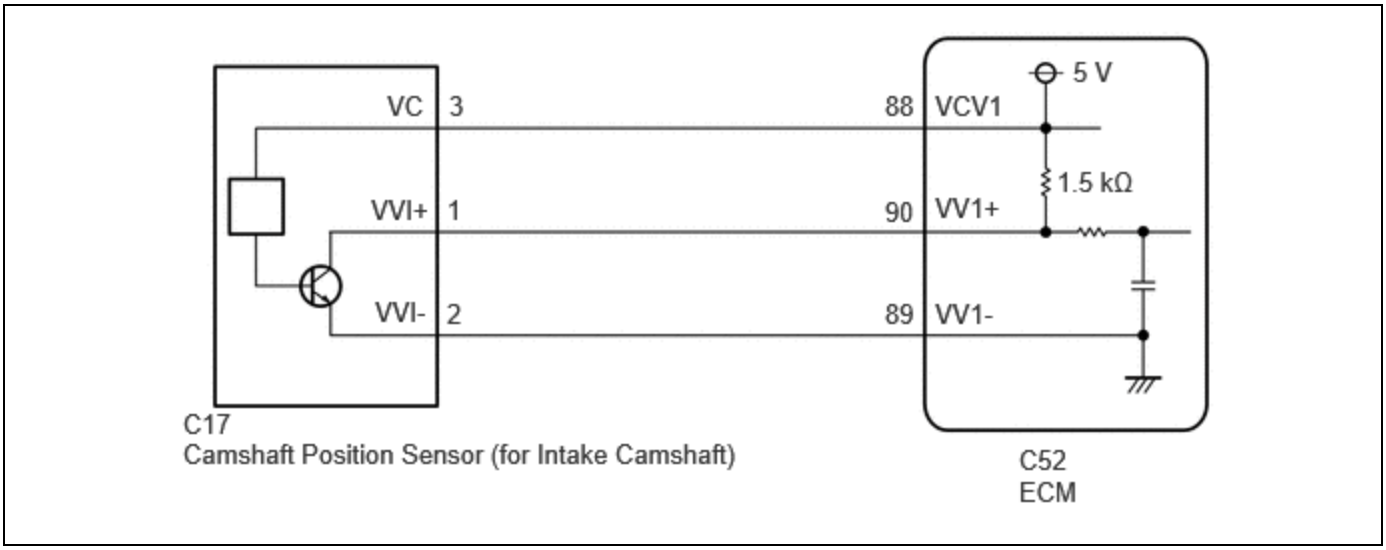
   - If a pending DTC is output, the system is malfunctioning.
   - If a pending DTC is not output, perform the following procedure.
7. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
8. Input the DTC: P034011 or P034015.
9. Check the DTC judgment result.

   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 INFO

  for PHEV Model: Click here INFO

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 intake 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(C17)
Click Connector(C17)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C17-3 (VC) - Body ground	Ignition switch ON	4.5 to 5.5 V	V
C17-1 (VVI+) - 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(C17)
Click Connector(C17)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C17-3 (VC) - C17-1 (VVI+)	Ignition switch off	1.425 to 1.575 kΩ	kΩ
C17-2 (VVI-) - Body ground	Always	Below 1 Ω	Ω

Post-procedure2

(g) None

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

NG ▼

2.	**CHECK HARNESS AND CONNECTOR (CAMSHAFT POSITION SENSOR (FOR INTAKE CAMSHAFT) - ECM)**

Pre-procedure1

(a) Disconnect the camshaft position sensor (for intake 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(C17,C52)
Click Connector(C17)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C17-1 (VVI+) - C52-90 (VV1+)	Always	Below 1 Ω	Ω
C17-2 (VVI-) - C52-89 (VV1-)	Always	Below 1 Ω	Ω
C17-3 (VC) - C52-88 (VCV1)	Always	Below 1 Ω	Ω
C17-1 (VVI+) or C52-90 (VV1+) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C17-2 (VVI-) or C52-89 (VV1-) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C17-3 (VC) or C52-88 (VCV1) - 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**