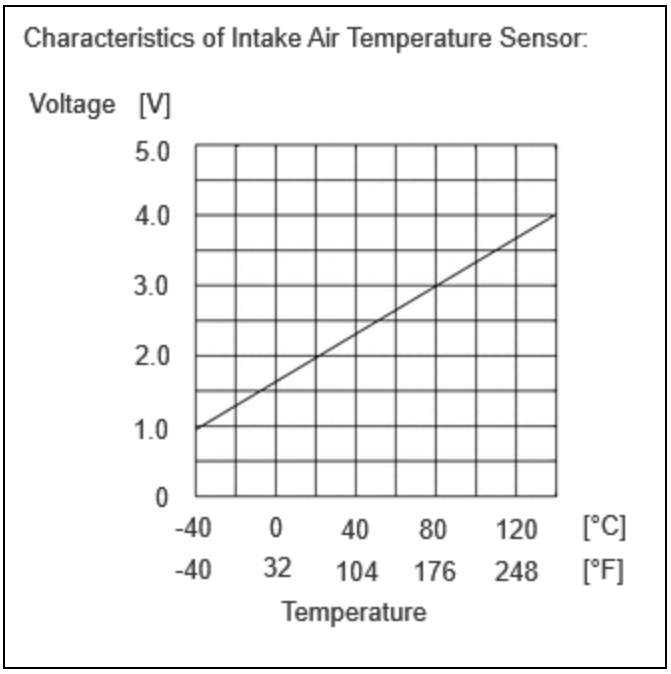
Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLUQ
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P011011; Intake Air Temperature Sensor 1 Bank 1 Circuit Short to Ground; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P011011**	**Intake Air Temperature Sensor 1 Bank 1 Circuit Short to Ground**

DESCRIPTION



The intake air temperature sensor, mounted on the mass air flow meter sub-assembly, monitors the intake air temperature. The intake air temperature sensor has a built-in thermistor with a resistance that varies according to the temperature of the intake air. When the intake air temperature is low, the resistance of the thermistor increases. When the temperature is high, the resistance drops. These variations in resistance are transmitted to the ECM as voltage changes.

The intake air temperature detected by the inlet air temperature sensor is converted to a voltage value inside the intake airflow meter assembly, and the voltage value is then output to the ECM. Based on this signal, the ECM increases the fuel injection volume when the engine is cold to improve driveability.

HINT:

When DTC P011011 is stored, the ECM enters fail-safe mode. During fail-safe mode, the intake air temperature is estimated to be 20°C (68°F) by the ECM. Fail-safe mode continues until a pass condition is detected, and the ignition switch is then turned off.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P011011	Intake Air Temperature Sensor 1 Bank 1	The intake air temperature sensor output voltage is less than 0.663 V for 0.5	• Short in intake air temperature sensor circuit	Comes on	Engine	A	SAE Code: P0112

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
	Circuit Short to Ground	seconds or more (1 trip detection logic).	• Intake air temperature sensor (mass air flow meter sub-assembly) • ECM				

HINT:

When this DTC is output, check the intake air temperature in the Data List. Enter the following menus: Powertrain / Engine / Data List / Intake Air Temperature.

DTC NO.	INTAKE AIR TEMPERATURE	MALFUNCTION
P011011	-40°C (-40°F)	Short to ground in THA circuit

If the Data List values are normal, it may be due to a temporary recovery from the malfunction condition. Check for intermittent problems.

Click here INFO

MONITOR DESCRIPTION

The ECM monitors the sensor voltage and uses this value to calculate the intake air temperature. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a malfunction in the intake air temperature sensor (mass air flow meter sub-assembly) circuit, illuminates the MIL and stores a DTC.

Example:

If the intake air temperature sensor output voltage is less than 0.663 V for 0.5 seconds or more, the ECM will illuminates the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P0112: Intake air temperature sensor range check (low voltage)
Required Sensors/Components (Main)	Intake air temperature sensor (mass air flow meter sub-assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	None
Both of the following conditions are met	-
Auxiliary battery voltage	8 V or higher
Ignition switch	ON

TYPICAL MALFUNCTION THRESHOLDS

Intake air temperature sensor voltage [Intake air temperature]	Less than 0.663 V [Less than -55°C (-67°F)]

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 0.5 seconds or more [B].
5. Enter the following menus: Powertrain / Engine / Trouble Codes [C].
6. Read the pending DTCs.

   HINT:

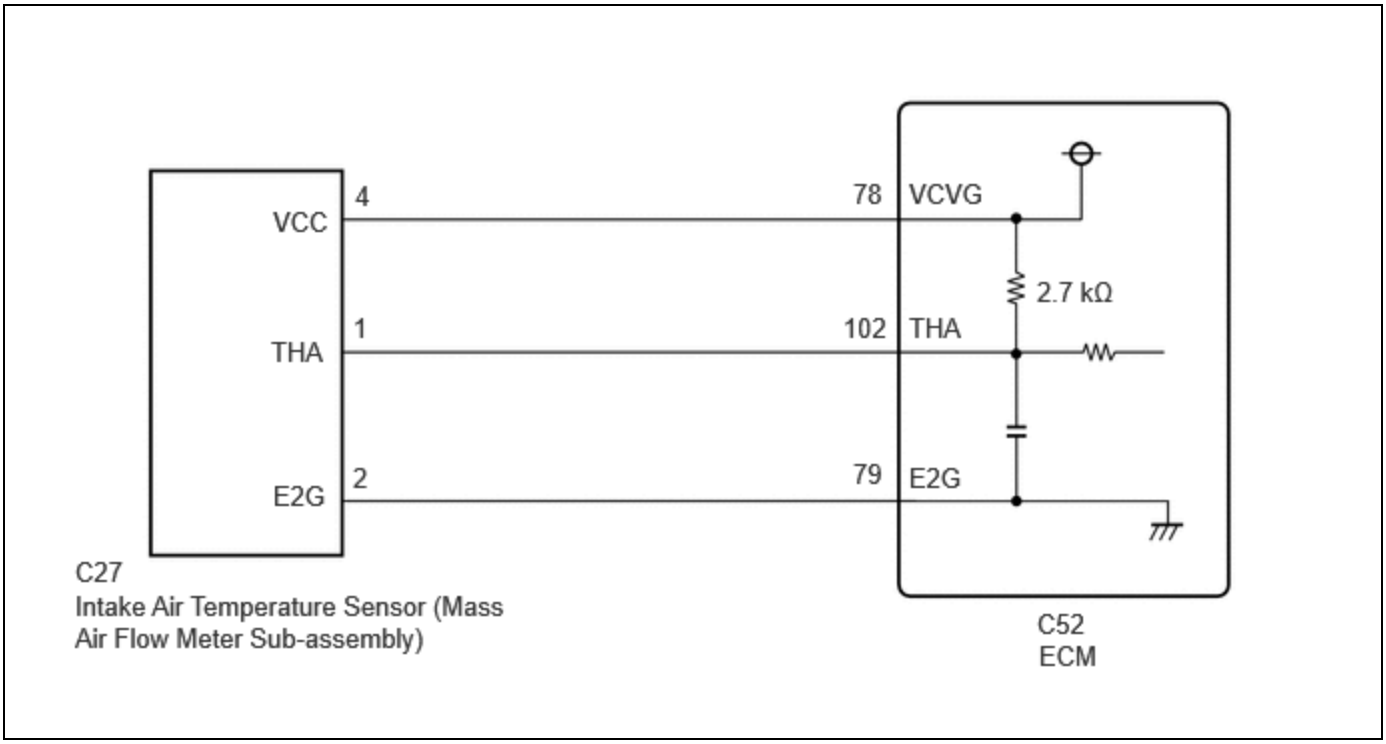
   - If a pending DTC is output, the system is malfunctioning.
   - If a pending DTC is not output, perform the following procedure.
7. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
8. Input the DTC: P011011.
9. Check the DTC judgment result.

   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 mass air flow meter sub-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(C27)
Click Connector(C27)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C27-4 (VCC) - C27-2 (E2G)	Ignition switch ON	4.8 to 5.2 V	V
C27-1 (THA) - C27-2 (E2G)	Ignition switch ON	4.8 to 5.2 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(C27)
Click Connector(C27)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C27-4 (VCC) - C27-1 (THA)	Ignition switch off	2.565 to 2.835 kΩ	kΩ

Post-procedure2

(g) None.

OK ▶ **REPLACE MASS AIR FLOW METER SUB-ASSEMBLY**

NG ▼

2.	**CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER SUB-ASSEMBLY - ECM)**

Pre-procedure1

(a) Disconnect the mass air flow meter sub-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(C27,C52)
Click Connector(C27)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C27-4 (VCC) - C52-78 (VCVG)	Always	Below 1 Ω	Ω
C27-1 (THA) or C52-102 (THA) - 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**