Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BLVB
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P012F62; Engine Coolant Temperature/Engine Oil Temperature Signal Compare Failure; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P012F62**	**Engine Coolant Temperature/Engine Oil Temperature Signal Compare Failure**

DESCRIPTION

The engine is equipped with an engine coolant temperature sensor and an engine oil temperature sensor (engine oil pressure and temperature sensor). The engine coolant temperature sensor and engine oil temperature sensor (engine oil pressure and temperature sensor) each have a built-in thermistor. As the temperature decreases, the thermistor resistance increases and as the temperature increases, the thermistor resistance decreases. The voltages at the respective terminals of the ECM change in accordance with the changes in the resistance of the thermistors. The ECM performs control based on these voltages.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P012F62	Engine Coolant Temperature/Engine Oil Temperature Signal Compare Failure	All of the following conditions are met (2 trip detection logic): 1. The auxiliary battery voltage is higher than 8 V. 2. 5 hours or more have elapsed since the engine stopped on the previous trip. 3. The engine oil temperature is -10°C (14°F) or higher. 4. The engine coolant temperature is -10°C (14°F) or higher. 5. The difference	• Engine coolant temperature sensor • Engine oil temperature sensor (engine oil pressure and temperature sensor) • ECM	Comes on	Engine	B	SAE Code: P012F

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
		between the readings of the engine coolant temperature and engine oil temperature is higher than 20°C (36°F).					

MONITOR DESCRIPTION

After the engine has stopped for 5 hours or more, the ECM monitors the voltage of the engine coolant temperature sensor and engine oil temperature sensor (engine oil pressure and temperature sensor). If the difference between the readings of the engine coolant temperature and engine oil temperature is higher than 20°C (36°F), the ECM determines that there is a malfunction in the engine coolant temperature sensor circuit or engine oil temperature sensor (engine oil pressure and temperature sensor) circuit, and stores a DTC and illuminates the MIL.

MONITOR STRATEGY

Related DTCs	P012F: Engine coolant temperature sensor / Engine oil temperature sensor rationality
Required Sensors/Components (Main)	Engine coolant temperature sensor Engine oil temperature sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle
Duration	Within 60 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All of the following conditions are met	-
Time after ignition switch off	5 hours or more
Engine coolant temperature	-10°C (14°F) or higher
Engine oil temperature	-10°C (14°F) or higher
Time after ECM started by soak timer	0.5 seconds or more
Ignition switch	Off
Auxiliary battery voltage	Higher than 8 V
Engine coolant temperature sensor circuit fail (P0117, P0118)	Not detected

Engine oil temperature sensor circuit fail (P0197, P0198)	Not detected
Soak timer fail (P2610)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

Deviated engine coolant temperature and engine oil temperature	Less than -20°C (-36°F), or higher than 20°C (36°F)

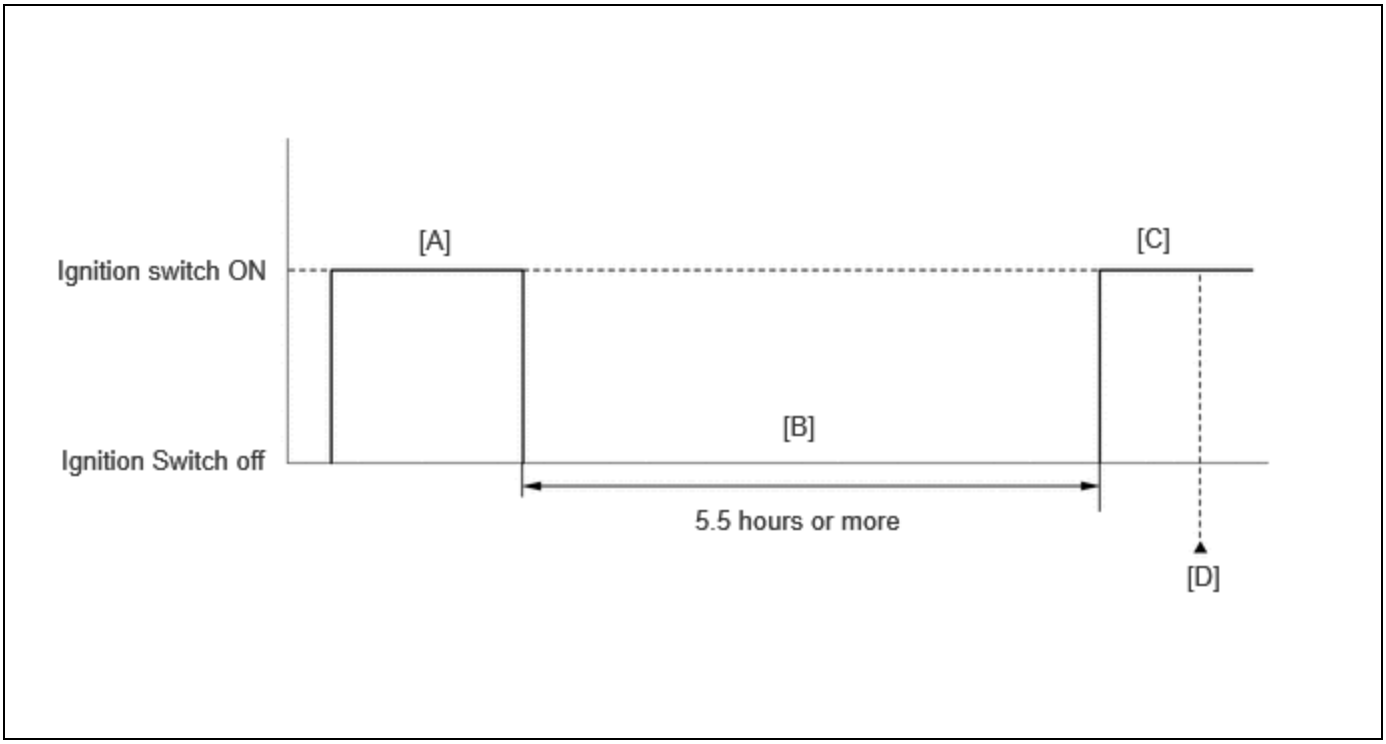
CONFIRMATION DRIVING PATTERN

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. Turn the ignition switch to ON [A].
2. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
3. Turn the ignition switch off.
4. With the engine stopped, leave the vehicle as is for 5.5 hours or more [B].
5. Turn the ignition switch to ON [C].
6. Enter the following menus: Powertrain / Engine / Trouble Codes [D].
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: P012F62.

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 is malfunctioning.
- If the judgment result is INCOMPLETE, perform steps [B] through [D] again.
- [B] to [D]: 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

PROCEDURE

1.	**CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P012F62)**

(a) Read the DTCs and record the Freeze Frame Data.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
P012F62 and other DTCs are output	A
P012F62 is output	B

HINT:

If any DTCs other than P012F62 are output, troubleshoot those DTCs first.

A ▶ **GO TO DTC CHART**

B

2.	**CHECK FREEZE FRAME DATA (COOLANT TEMPERATURE AND INTAKE AIR TEMPERATURE)**

(a) Using the GTS, read the values displayed in the Freeze Frame Data recorded in step 1.

Powertrain > Engine > DTC(P012F62) > Freeze Frame Data

TESTER DISPLAY
Coolant Temperature
Intake Air Temperature

(b) Read the value displayed on the GTS.

HINT:

- When the engine is cold, the value of the engine coolant temperature, engine oil temperature and intake air temperature should be approximately the same.
- If the result is not as specified, check that there are no heat sources such as a block heater in the engine compartment.

RESULT	PROCEED TO
The difference between the value of Coolant Temperature and Intake Air Temperature is 15 or less	A
None of the above conditions are met	B

HINT:

15°C (27°F)

B **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

A

3.	**CHECK FREEZE FRAME DATA (ENGINE OIL TEMPERATURE SENSOR AND INTAKE AIR TEMPERATURE)**

(a) Using the GTS, read the values displayed in the freeze frame data recorded in step 1.

Powertrain > Engine > DTC(P012F62) > Freeze Frame Data

TESTER DISPLAY
Engine Oil Temperature Sensor
Intake Air Temperature

(b) Read the value displayed on the GTS.

HINT:

When the engine is cold, the value of the engine coolant temperature, engine oil temperature and intake air temperature should be approximately the same.

RESULT	PROCEED TO
The difference between the value of Engine Oil Temperature Sensor and Intake Air Temperature is 15 or less	A
None of the above conditions are met	B

HINT:

15°C (27°F)

A ▶ **REPLACE ECM**

B ▶ **REPLACE ENGINE OIL TEMPERATURE SENSOR (ENGINE OIL PRESSURE AND TEMPERATURE SENSOR)**