Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BM19
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P211900,P211904,P211977,P21199B; Throttle Actuator "A" Control Throttle Body Range/Performance; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P211900**	**Throttle Actuator "A" Control Throttle Body Range/Performance**

DTC	**P211904**	**Throttle Actuator "A" Control Throttle Body Range/Performance System Internal Failure**

DTC	**P211977**	**Throttle Actuator "A" Control Throttle Body Range/Performance Commanded Position Not Reachable**

DTC	**P21199B**	**Throttle Actuator "A" Control Throttle Body High/Excessive Flow**

DESCRIPTION

The electronic throttle control system is composed of the throttle actuator, throttle position sensor, and ECM. The ECM operates the throttle actuator to regulate the throttle valve in response to a request from the hybrid system. The throttle position sensor detects the opening angle of the throttle valve, and provides the ECM with feedback so that the throttle valve can be appropriately controlled by the ECM.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P211900	Throttle Actuator "A" Control Throttle Body Range/Performance	The throttle valve opening angle continues to vary greatly from the target opening angle (1 trip detection logic).	• Electronic throttle control system • Wire harness or connector • ECM	Comes on	Engine	B	SAE Code: P2119
P211904	Throttle Actuator "A" Control Throttle Body Range/Performance System Internal Failure	The throttle valve opening angle continues to vary greatly from the target opening angle (1 trip detection logic).	• Electronic throttle control system • Wire harness or connector • ECM	Comes on	Engine	B	SAE Code: P2119

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P211977	Throttle Actuator "A" Control Throttle Body Range/Performance Commanded Position Not Reachable	The throttle valve opening angle continues to vary greatly from the target opening angle (1 trip detection logic).	• Electronic throttle control system • Wire harness or connector • ECM	Comes on	Engine	B	SAE Code: P2119
P21199B	Throttle Actuator "A" Control Throttle Body High/Excessive Flow	The throttle valve opening angle continues to vary greatly from the target opening angle (1 trip detection logic).	• Electronic throttle control system • Wire harness or connector • ECM	Comes on	Engine	B	SAE Code: P2119

MONITOR DESCRIPTION

The ECM determines the actual opening angle of the throttle valve from the throttle position sensor signal. The actual opening angle is compared to the target opening angle commanded by the ECM. If the difference between these two values is outside the standard range, the ECM interprets this as a malfunction in the electronic throttle control system, illuminates the MIL and stores this DTC.

MONITOR STRATEGY

Related DTCs	P2119: Electronic throttle control system malfunction
Required Sensors/Components (Main)	Throttle actuator (throttle body with motor assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second: Closed 0.6 seconds: Open
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

System guard* judge condition	On

*: System guard is on when the following conditions are met	-
Throttle actuator	On
Throttle actuator duty calculation	Executing

Throttle position sensor fail (P0121, P0122, P0123, P0222, P0223, P2135)	Not detected
Throttle actuator current-cut operation	Not executing
Throttle actuator power supply	4 V or higher
Throttle actuator fail (P2102)	Not detected

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met	1 or 2
1. Difference between commanded closed throttle position and current closed throttle position	0.3 V or higher
2. Difference between commanded open throttle position and current open throttle position	0.3 V or higher

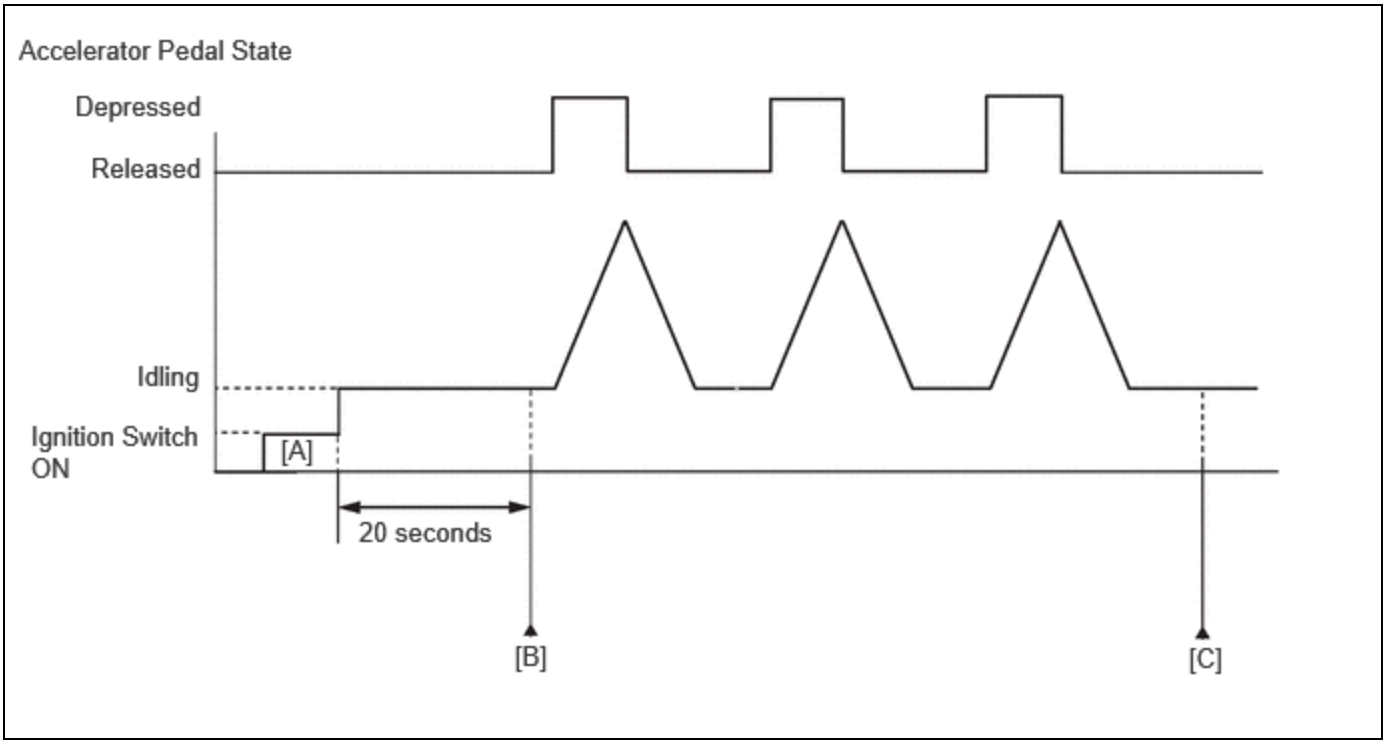
CONFIRMATION DRIVING PATTERN

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.
6. Idle the engine for 20 seconds.
7. Enter the following menus: Powertrain / Engine / Trouble Codes [B].

8. 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.

9. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
10. Input the DTC: P211900, P211904, P211977 or P21199B.
11. 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, fully depress and release the accelerator pedal 3 times, and then check the DTC judgment result [C].
- [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.

FAIL-SAFE

When this DTC is stored, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator, and the throttle valve is returned to a 7.5° throttle valve opening angle by the return spring. The ECM then adjusts the engine output, by controlling the fuel injection (intermittent fuel cut) and ignition timing, in accordance with the engine torque request signal sent from the hybrid vehicle control ECU, to allow the vehicle to continue being driven at a minimal speed. If the accelerator pedal is depressed firmly and gently, the vehicle can be driven slowly.

Fail-safe mode continues until a pass condition is detected, and the ignition switch is then turned off.

WIRING DIAGRAM

Refer to DTC P210018.

Click here INFO

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:

Refer to "Data List / Active Test" [Throttle Position Sensor No.1 Voltage, Throttle Position Sensor No.2 Voltage, Throttle Position Command, Throttle Motor Current, Throttle Motor Duty Ratio (Open) and Throttle Motor Duty Ratio (Close)].

Click here INFO

PROCEDURE

1.	**CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P211900, P211904, P211977 OR P21199B)**

(a) Read the DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
P211900, P211904, P211977 or P21199B and other DTCs are output	A
P211900, P211904, P211977 or P21199B is output	B

HINT:

If any DTCs other than P211900, P211904, P211977 or P21199B are output, troubleshoot those DTCs first.

A ▶ GO TO DTC CHART

B ▼

2.	**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 ▼

3.	**READ VALUE USING GTS (THROTTLE POSITION)**

(a) Read the values displayed on the GTS while fully depressing and releasing the accelerator pedal quickly.

Powertrain > Engine > Data List

TESTER DISPLAY
Throttle Position Sensor No.1 Voltage
Throttle Position Command

HINT:

During charge control, the engine speed is set at idle. Therefore, the engine speed will not increase when the accelerator pedal is depressed. In this case, perform this step after charge control has completed.

RESULT	PROCEED TO
Throttle Position Sensor No.1 Voltage does not change	A
Throttle Position Sensor No.1 Voltage changes even a little	B

HINT:

When a DTC is output, the system changes to fail-safe mode. Therefore, only use the data up until the time the DTC is stored for confirmation.

B ▶ **GO TO STEP 5**

A

▼

4.	**INSPECT THROTTLE BODY WITH MOTOR ASSEMBLY (RESISTANCE OF THROTTLE ACTUATOR)**

Click here INFO

NG ▶ **GO TO STEP 9**

OK

▼

5.	**INSPECT THROTTLE BODY WITH MOTOR ASSEMBLY (VISUALLY CHECK THROTTLE VALVE)**

(a) Check for foreign matter between the throttle valve and housing. If necessary, clean the throttle body with motor assembly. Also, check that the throttle valve moves smoothly.

OK:

Throttle valve is not contaminated with foreign matter and moves smoothly.

HINT:

Perform "Inspection After Repair" after cleaning the throttle body with motor assembly.

Click here INFO

NG ▶ **GO TO STEP 9**

OK ▼

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.	**READ VALUE USING GTS (THROTTLE POSITION)**

(a) Read the values displayed on the GTS while wiggling the ECM wire harness.

Powertrain > Engine > Data List

TESTER DISPLAY
Throttle Position Sensor No.1 Voltage

TESTER DISPLAY
Throttle Position Sensor No.2 Voltage
Throttle Position Command

(b) Read the DTCs.

Powertrain > Engine > Trouble Codes

RESULT	PROCEED TO
Value in Data List changes when wire harness is wiggled, or DTC is output	A
Other than above	B

B ▶ **GO TO STEP 10**

A ▼

8.	**REPAIR OR REPLACE HARNESS OR CONNECTOR (THROTTLE BODY WITH MOTOR ASSEMBLY - ECM)**

(a) As the DTC was stored due to a change in the contact resistance of the connector, repair or replace the wire harness or connector.

HINT:

Click here INFO

NEXT ▶ **END**

9.	**REPLACE THROTTLE BODY WITH MOTOR ASSEMBLY**

HINT:

Click here INFO

NEXT ▼

10.	**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

11.	**CHECK WHETHER DTC OUTPUT RECURS (DTC P211900, P211904, P211977 OR P21199B)**

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
P211900, P211904, P211977 or P21199B is output	B

Post-procedure1

(c) None.

A **END**

B **REPLACE ECM**