Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BM15
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P210018,P210019; Throttle Actuator "A" Control Motor Circuit Current Below Threshold; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P210018**	**Throttle Actuator "A" Control Motor Circuit Current Below Threshold**

DTC	**P210019**	**Throttle Actuator "A" Control Motor Circuit Current Above Threshold**

DESCRIPTION

The throttle actuator is operated by the ECM and opens and closes the throttle valve using gears.

The opening angle of the throttle valve is detected by the throttle position sensor, which is mounted on the throttle body with motor assembly. The throttle position sensor provides feedback to the ECM. This feedback allows the ECM to appropriately control the throttle actuator and monitor the throttle opening angle as the ECM responds to a request from the hybrid system.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P210018	Throttle Actuator "A" Control Motor Circuit Current Below Threshold	Both of the following conditions are met for 2 seconds or more (1 trip detection logic): • The throttle actuator drive duty cycle is 80% or higher. • The throttle actuator current is less than 0.5 A.	• Open or short in throttle actuator circuit • Throttle actuator • ECM	Comes on	Engine	A	SAE Code: P2102

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P210019	Throttle Actuator "A" Control Motor Circuit Current Above Threshold	Either of the following conditions is met (1 trip detection logic): • A motor driver IC high current limiter monitor input malfunction is detected. • A motor driver IC high current inhibit signal is received.	• Open or short in throttle actuator circuit • Throttle actuator • Throttle valve • Throttle body with motor assembly • ECM	Comes on	Engine	A	SAE Code: P2103

MONITOR DESCRIPTION

The ECM monitors the electrical current through the electronic actuator, and detects malfunctions and open circuits in the throttle actuator based on this value. If the current is outside the standard range, the ECM determines that there is a malfunction in the throttle actuator. In addition, if the throttle valve does not operate properly (for example, it is stuck open), the ECM will determines there is a malfunction, illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P2102: Electronic throttle actuator control motor range check (low current) P2103: Electronic throttle actuator control motor range check (high current)
Required Sensors/Components (Main)	Throttle actuator (throttle body with motor assembly)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2 seconds: P2102 0.1 seconds: P2103 (case 1) 0.6 seconds: P2103 (case 2)
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All

Monitor runs whenever the following DTCs are not stored	None

P2102

All of the following conditions are met	-
Command to electronic throttle actuator	On
Output duty cycle	80% or higher
Electronic throttle actuator power supply voltage	8 V or higher
Motor current change during last 0.016 seconds	Less than 0.2 A

P2103

Both of the following conditions are met	-
Command to electronic throttle actuator	On
Either of the following conditions is met	1 or 2
1. Electronic throttle actuator power supply voltage	8 V or higher
2. Command to electronic throttle actuator power	On

TYPICAL MALFUNCTION THRESHOLDS

P2102

Throttle actuator current	Less than 0.5 A

P2103: (Case 1)

Motor driver IC high current limiter monitor input	Fail

P2103: (Case 2)

Motor driver IC high current inhibit signal	On

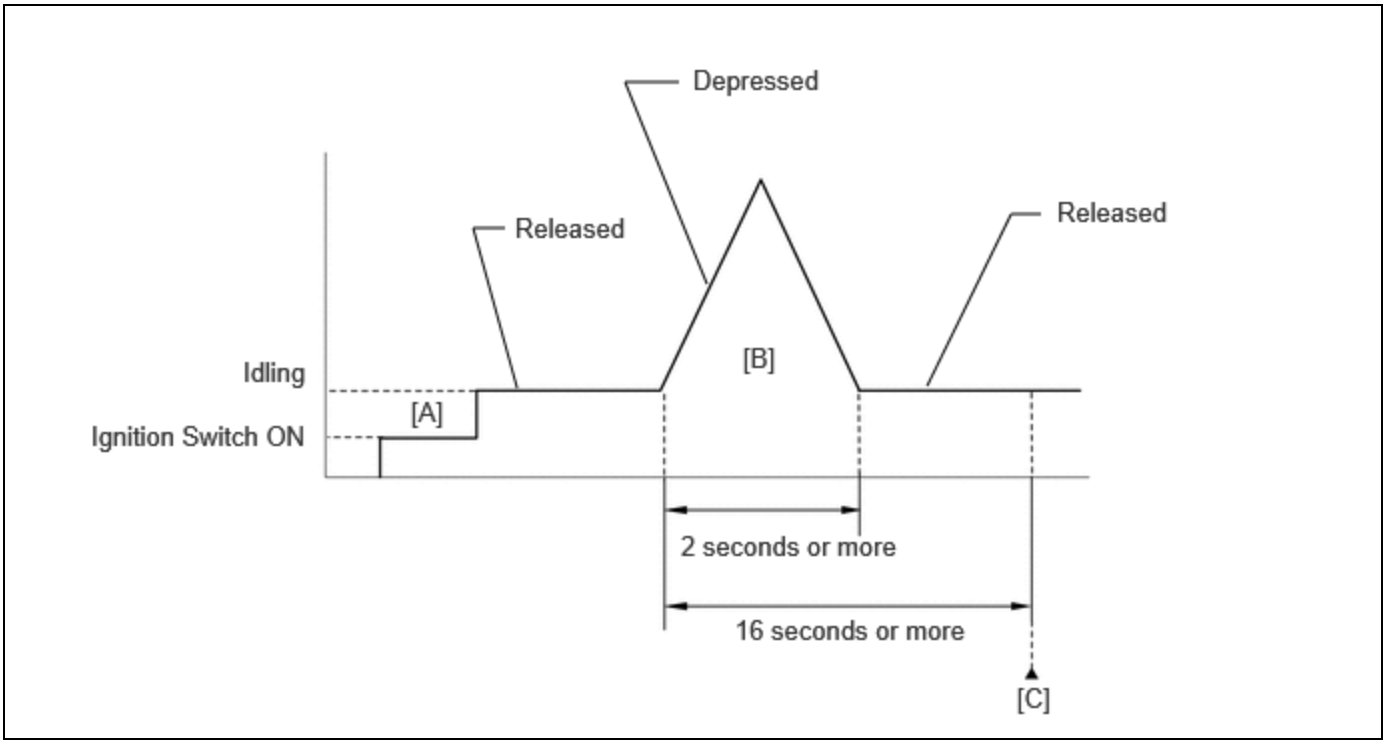
CONFIRMATION DRIVING PATTERN

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. With the vehicle stationary, fully depress the accelerator pedal and quickly release it [B].

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 step [B] after charge control has completed.

7. Check that 16 seconds or more have elapsed since the accelerator pedal was first depressed.
8. Enter the following menus: Powertrain / Engine / Trouble Codes [C].
9. 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.

10. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
11. Input the DTC: P210018 or P210019.
12. 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 [C] again.
- [A] to [C]: Normal judgment procedure.

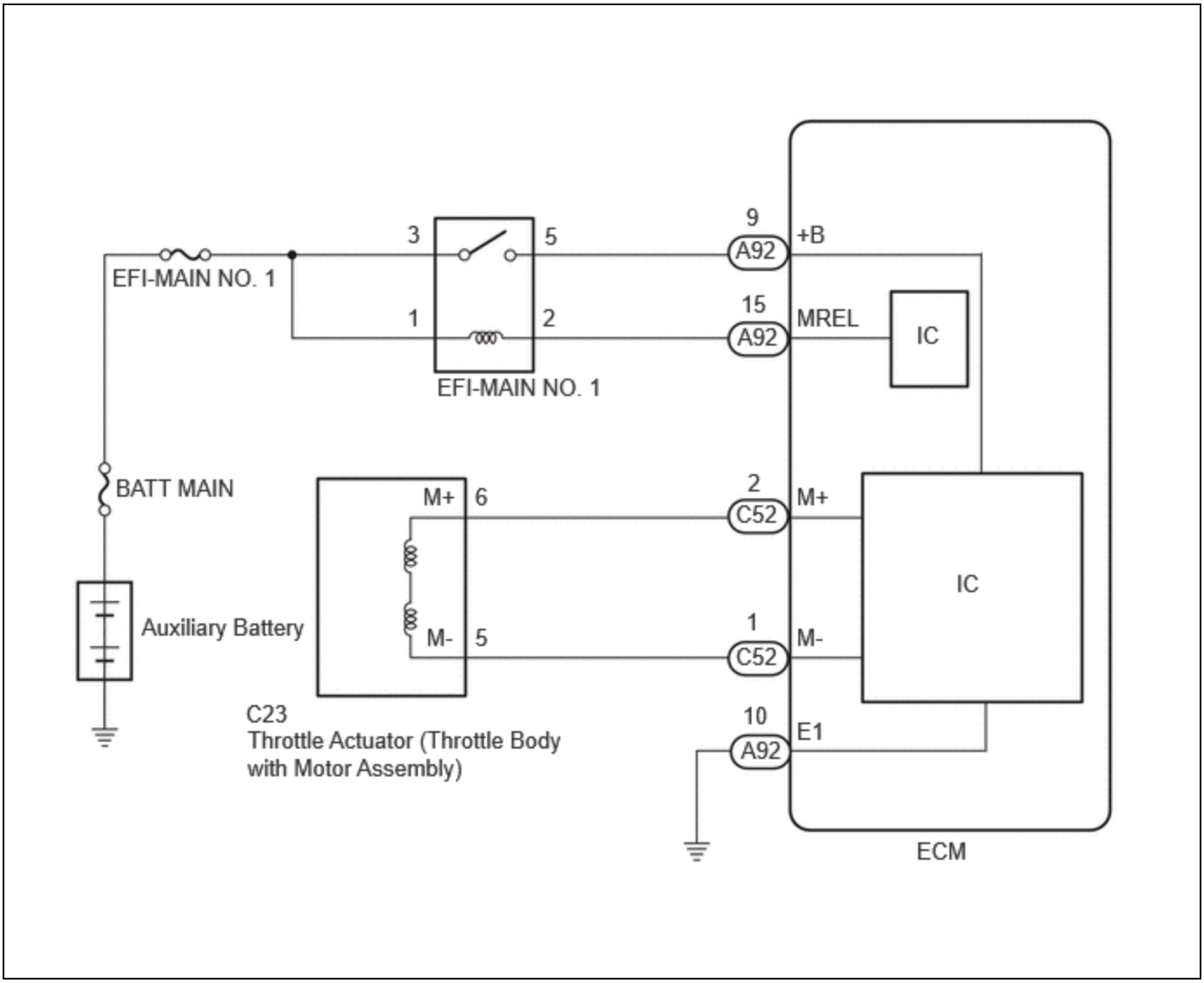
  The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
- When clearing the permanent DTCs, do not disconnect the cable from the auxiliary battery terminal or attempt to clear the DTCs during this procedure, as doing so will clear the universal trip 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



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 throttle actuator current (Throttle Motor Current) and the throttle actuator duty ratio (Throttle Motor Duty Ratio (Open) / Throttle Motor Duty Ratio (Close)) can be read using the GTS. However, the ECM shuts off the throttle actuator current when the electronic throttle control system malfunctions.

PROCEDURE

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

Click here INFO

NG ▶ **REPLACE THROTTLE BODY WITH MOTOR ASSEMBLY**

OK ▼

2.	**CHECK HARNESS AND CONNECTOR (THROTTLE BODY WITH MOTOR ASSEMBLY - ECM)**

Pre-procedure1

(a) Disconnect the throttle body with motor 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(C23,C52)
Click Connector(C23)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C23-6 (M+) - C52-2 (M+)	Always	Below 1 Ω	Ω

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C23-5 (M-) - C52-1 (M-)	Always	Below 1 Ω	Ω
C23-6 (M+) or C52-2 (M+) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C23-5 (M-) or C52-1 (M-) - Body ground and other terminals	Always	10 kΩ or higher	kΩ

Post-procedure1

(d) None.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ▼

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

(a) Check for foreign matter between the throttle valve and the housing.

OK:

No foreign matter between the throttle valve and housing.

HINT:

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

Click here INFO

NG ▶ **REMOVE FOREIGN MATTER AND CLEAN THROTTLE BODY WITH MOTOR ASSEMBLY**

OK ▼

4.	**INSPECT THROTTLE BODY WITH MOTOR ASSEMBLY (THROTTLE VALVE)**

(a) Check if the throttle valve opens and closes smoothly.

OK:

Throttle valve opens and closes smoothly.

OK ▶ **REPLACE ECM**

NG ▶ **REPLACE THROTTLE BODY WITH MOTOR ASSEMBLY**