Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BM0O
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: P123513; High Pressure Fuel Pump Circuit Open; 2023 - 2024 MY Prius Prius Prime [03/2023 -]		

DTC	**P123513**	**High Pressure Fuel Pump Circuit Open**

DESCRIPTION

The high-pressure direct injection fuel system consists of a spill control valve, check valve, fuel relief valve, fuel pressure sensor (for high pressure side), fuel (engine room side) pump assembly (for high pressure side) and direct fuel injector assemblies. The spill control valve adjusts the return volume of the high-pressure fuel. The check valve mechanically opens and closes the paths to the fuel delivery pipes. The relief valve releases the fuel back to the fuel tank if the high-pressure fuel system malfunctions. The fuel (engine room side) pump assembly (for high pressure side) is installed to the cylinder head cover and operated by a cam installed to the end of the exhaust camshaft. Rotation of the camshaft moves the pump plunger inside the fuel (engine room side) pump assembly (for high pressure side) up and down, pressurizing the fuel. The pressurized fuel opens the check valve and is pumped into the fuel delivery pipe.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
P123513	High Pressure Fuel Pump Circuit Open	Open or short in fuel (engine room side) pump assembly (for high pressure side) circuit detected 60 times or more (1 trip detection logic).	• Open or short in fuel (engine room side) pump assembly (for high pressure side) circuit • Fuel (engine room side) pump assembly (for high pressure side) • ECM	Comes on	Engine	A	SAE Code: P1235

MONITOR DESCRIPTION

If an open or short in the fuel (engine room side) pump assembly (for high pressure side) circuit is detected after the engine is started, the ECM will illuminate the MIL and store this DTC.

MONITOR STRATEGY

Related DTCs	P1235: Fuel pump (for high pressure side) circuit/open
Required Sensors/Components (Main)	Fuel (engine room side) pump assembly (for high pressure side)
Required Sensors/Components (Related)	Injector driver (ECM)
Frequency of Operation	Continuous

Duration	-
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not stored	None
All of the following conditions are met	-
Time after engine start	5 seconds or more
Command to injector driver relay	On
Output duty cycle	5 to 95%
Auxiliary battery voltage	10.5 V or higher
Ignition switch	ON
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met	1, 2, 3, 4 or 5
1. Both of the following conditions are met	-
Following condition is met	60 time or more
High pressure fuel pump voltage detected by injector driver IC	4.8 V or higher
2. Both of the following conditions are met	-
Following condition is met	60 time or more
High pressure fuel pump voltage detected by injector driver IC	1.2 V or less
3. Both of the following conditions are met	-
Following condition is met	60 time or more
High pressure fuel pump current detected by injector driver IC	140 A or higher
4. Both of the following conditions are met	-
Following condition is met	60 time or more
High pressure fuel pump drive MOSFET current detected by injector driver IC	12 A or higher
5. Both of the following conditions are met	-
Following condition is met	60 time or more
High pressure fuel pump drive MOSFET voltage detected by injector driver IC	0.02 V or less

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. Put the engine in Inspection Mode (Maintenance Mode).

   Click here INFO
4. Start the engine [A].
5. Idle the engine for 10 seconds [B].
6. Enter the following menus: Powertrain / Engine / Trouble Codes [C].
7. Read the pending DTCs.

   HINT:

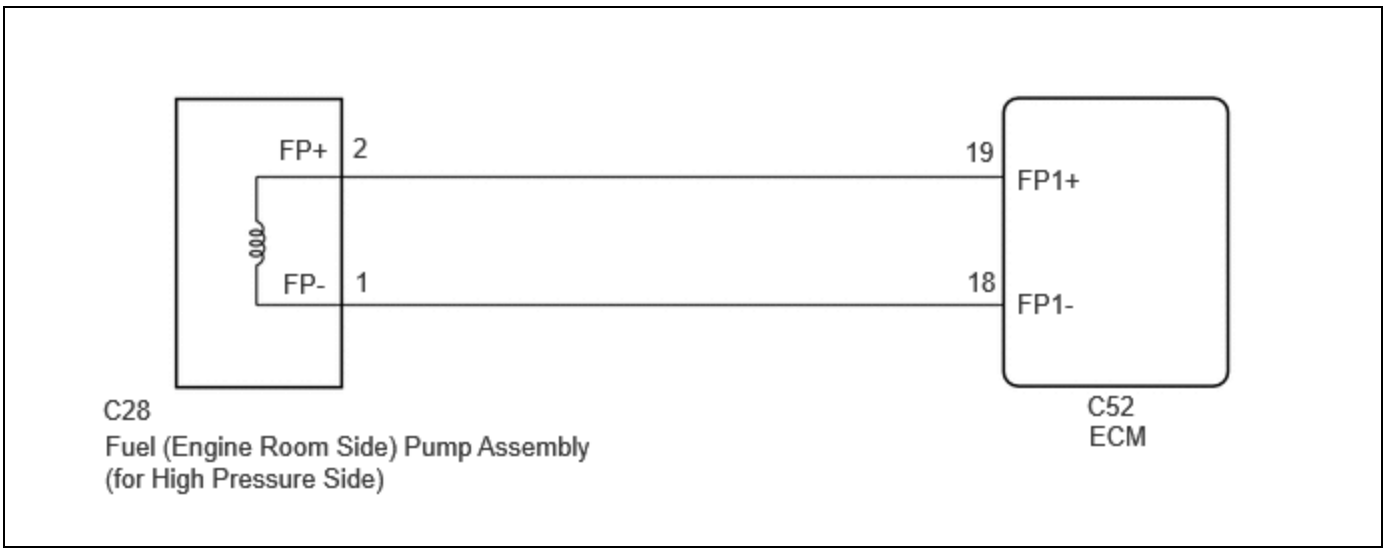
   - If a pending DTC is output, the system is malfunctioning.
   - If a pending DTC is not output, perform the following procedure.
8. Enter the following menus: Powertrain / Engine / Utility / All Readiness.
9. Input the DTC: P123513.
10. Check the DTC judgment result.

    HINT:

    - If the judgment result is NORMAL, the system is normal.
    - If the judgment result is ABNORMAL, the system has a malfunction.
    - 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.

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:

If the current from the D-INJ relay is cut because DTC P062D13 is stored, DTC P123513 will be stored even if the fuel (engine room side) pump assembly (for high pressure side) is normal.

PROCEDURE

1.	**INSPECT FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (FOR HIGH PRESSURE SIDE)**

Click here INFO

NG ▶ **REPLACE FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (FOR HIGH PRESSURE SIDE)**

OK
▼

2.	**CHECK HARNESS AND CONNECTOR (FUEL (ENGINE ROOM SIDE) PUMP ASSEMBLY (FOR HIGH PRESSURE SIDE) - ECM)**

Pre-procedure1

(a) Disconnect the fuel (engine room side) pump assembly (for high pressure side) 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(C28,C52)
Click Connector(C28)
Click Connector(C52)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
C28-2 (FP+) - C52-19 (FP1+)	Always	Below 1 Ω	Ω
C28-1 (FP-) - C52-18 (FP1-)	Always	Below 1 Ω	Ω
C28-2 (FP+) or C52-19 (FP1+) - Body ground and other terminals	Always	10 kΩ or higher	kΩ
C28-1 (FP-) or C52-18 (FP1-) - 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**