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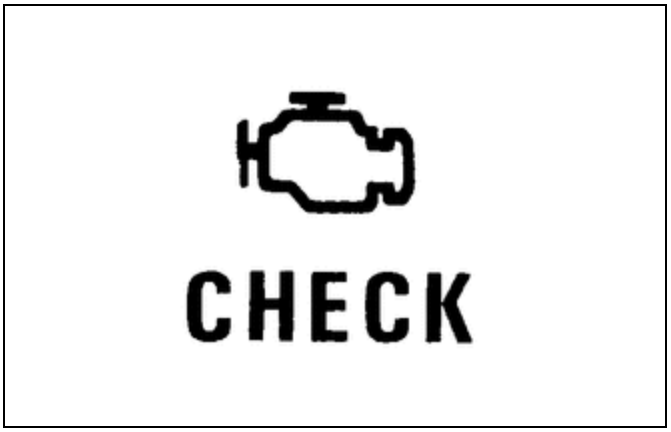
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: M20A-FXS (ENGINE CONTROL): SFI SYSTEM: DIAGNOSIS SYSTEM; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DIAGNOSIS SYSTEM

OBD II



When troubleshooting OBD II (On-Board Diagnostics) vehicles, the GTS (complying with SAE J1978) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle's ECM (Engine Control Module) can be then read.

OBD II regulations require that the vehicle's on-board computer illuminates the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

1. The emission control system and components.
2. The powertrain control components (which affect vehicle emissions).
3. The computer itself.

In addition, the applicable DTCs prescribed by SAE J2012 are stored in the ECM memory. If the malfunction does not recur in 3 consecutive trips, the MIL turns off automatically but the DTCs remain stored in the ECM memory.

To check the DTCs, connect the GTS to the DLC3. The GTS displays output DTCs, Freeze Frame Data, and a variety of engine data. The DTCs and Freeze Frame Data can be cleared with the GTS. In order to enhance OBD function on vehicles and develop the Off-Board diagnosis system, Controller Area Network (CAN) communication is used in this system. CAN is a network which uses a pair of data transmission lines spanning multiple computers and sensors. It allows for high speed communications between the systems and simplification of the wire harness connections.

NORMAL MODE AND CHECK MODE

The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for duplicating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (GTS only).

2 TRIP DETECTION LOGIC

When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the subsequent drive cycle, the MIL is illuminated (2nd trip).

DLC3 (Data Link Connector 3)

(a) Check the DLC3.

Click here INFO

FREEZE FRAME DATA

The ECM records vehicle and driving condition information as Freeze Frame Data the moment a DTC is stored. When troubleshooting, Freeze Frame Data can be helpful in determining whether the vehicle was moving or stationary, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, and other data from the time the malfunction occurred.

AUXILIARY BATTERY VOLTAGE

Standard voltage:
11 to 16 V

If the voltage is less than 11 V, recharge or replace the auxiliary battery.

MIL (Malfunction Indicator Lamp)

(a) The MIL is illuminated when the ignition switch is turned to ON (with the engine not running).

(b) The MIL will turn off when the ignition switch is turned to ON (READY). If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

HINT:

If the MIL does not illuminate when the ignition switch is turned to ON, check the MIL circuit.

Click here INFO

ALL READINESS

HINT:

- With "All Readiness", you can use the GTS to check whether or not DTC judgment has been completed.
- You should check "All Readiness" after simulating malfunction symptoms or for validation after finishing repairs.

(a) Clear the DTCs.

Powertrain > Engine > Clear DTCs

(b) Turn the ignition switch off and wait for at least 30 seconds.

(c) Perform the DTC judgment driving pattern to run the DTC judgment.

(d) Enter the following menus: Powertrain / Engine / Utility / All Readiness.

Powertrain > Engine > Utility

TESTER DISPLAY
All Readiness

(e) Input the DTCs to be confirmed.

(f) Check the DTC judgment result.

GTS DISPLAY	DESCRIPTION
NORMAL	• DTC judgment completed • System normal

GTS DISPLAY	DESCRIPTION
ABNORMAL	• DTC judgment completed • System abnormal
INCOMPLETE	• DTC judgment not completed • Perform the driving pattern after confirming DTC enabling conditions

DIAGNOSIS RELATED INFORMATION

HINT:

- If the detection conditions of certain DTCs are met before a malfunction can be confirmed, the ECM will store Diagnosis Related Information. Vehicle condition information from when the detection conditions were met can be checked using the Diagnosis Related Information. Diagnosis Related Information should be used as a reference only, and should not be relied upon solely when determining whether a part is faulty or not.
- Clearing DTCs will also clear Diagnosis Related Information.
- DTCs and Diagnosis Related Information are saved in the GTS at the same time.

(a) Enter the following menus: Powertrain / Engine / Utility / Diagnosis Related Information.

Powertrain > Engine > Utility

TESTER DISPLAY
Diagnosis Related Information

(b) Select a Diagnosis Related Information item to display its details.