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Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: ELECTRONICALLY CONTROLLED BRAKE SYSTEM: C12BF96; Electronic Brake Booster Motor "A" Drive Circuit Component Internal Failure; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**C12BF96**	**Electronic Brake Booster Motor "A" Drive Circuit Component Internal Failure**

DESCRIPTION

The pump motor is built into the No. 1 skid control ECU (brake booster with master cylinder assembly). The No. 1 skid control ECU (brake booster with master cylinder assembly) monitors the motor power supply circuit of the pump motor.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
C12BF96	Electronic Brake Booster Motor "A" Drive Circuit Component Internal Failure	Internal malfunction in motor power supply circuit	No. 1 skid control ECU (brake booster with master cylinder assembly)	Comes on	Brake/EPB	A	• SAE Code: C12BF (Case 1 to 4) • Output ECU: Both skid control ECUs

MONITOR DESCRIPTION

Case 1:

The pump motor is built into the No. 1 skid control ECU (brake booster with master cylinder assembly).

With the vehicle power source voltage normal, voltage applied normally to the motor power source terminal and the No. 1 skid control ECU (brake booster with master cylinder assembly) started, if a motor power source circuit ON operation command is output but the status cannot be switched to ON, the No. 2 skid control ECU (brake actuator assembly) determines that there is a pump motor drive circuit malfunction, the MIL is illuminated and a DTC is stored.

Case 2:

The pump motor is built into the No. 1 skid control ECU (brake booster with master cylinder assembly).

With voltage applied normally to the motor power source terminal and during the ECU self-check immediately after the No. 1 skid control ECU (brake booster with master cylinder assembly) starts, if the internal voltage of the motor power source circuit is low, the No. 2 skid control ECU (brake actuator assembly) determines that there is a pump motor drive circuit malfunction, the MIL is illuminated and a DTC is stored.

Case 3:

The pump motor is built into the No. 1 skid control ECU (brake booster with master cylinder assembly).

With voltage applied normally to the motor power source terminal and during the ECU self-check immediately before the No. 1 skid control ECU (brake booster with master cylinder assembly) stops, if the internal voltage of the motor power source circuit is high, the No. 2 skid control ECU (brake actuator assembly) determines that there is a pump motor drive circuit malfunction, the MIL is illuminated and a DTC is stored.

Case 4:

The pump motor is built into the No. 1 skid control ECU (brake booster with master cylinder assembly).

During the ECU self-check immediately before the No. 1 skid control ECU (brake booster with master cylinder assembly) stops, if the internal voltage of the motor power source circuit is high, the No. 2 skid control ECU (brake actuator assembly) determines that there is a pump motor drive circuit malfunction, the MIL is illuminated and a DTC is stored.

MONITOR STRATEGY

Related DTCs	C12BF (Case 1 to 4): Brake booster motor performance (motor upper circuit)
Required Sensors/Components(Main)	No. 2 skid control ECU (brake actuator assembly) Brake booster with master cylinder assembly
Required Sensors/Components(Related)	-
Frequency of Operation	Continuous
Duration	4.002 seconds: Case 2 and 4 0.204 seconds: Case 3 0.072 seconds: Case 1
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Case 1

Monitor runs whenever the following DTCs are not stored	C129B: Rotation angle sensor range/performance C12B4 (Case 2): Brake booster motor performance (motor current) C12BF (Case 1 to 4): Brake booster motor performance (motor upper circuit) C12BF (Case 5 to 9): Brake booster motor performance (motor drive circuit) C13BB: Brake booster motor range/performance C14C8: Brake system voltage circuit high
All of the following conditions are met	A, B, C, D and E
A. Both of the following conditions are met	More than 0.198 seconds
+BS cut MOS	Valid
+BS cut MOS voltage	Below 23.2 V

B. All of the following conditions are met	More than 0.198 seconds
+BS cut MOS	Valid
+BS cut MOS voltage	Higher than 7.4 V
C. Following condition is met	More than 0.198 seconds
BM voltage	7.1 V or higher
D. Command to motor failsafe relay	On
E. +BS cut MOS voltage	Higher than 7.8 V

Case 2

Monitor runs whenever the following DTCs are not stored	None
All of the following conditions are met	-
ECU status	Premain
Command to motor failsafe relay	Off
Command to reverse battery protection MOS	On
Precharge for capacitor	Completed
BS (linear) voltage	Higher than 9.4 V
BM voltage	7.1 V or higher

Case 3

All of the following conditions are met	-
ECU status	Final check
Command to motor failsafe relay	Off
Command to reverse battery protection MOS	Off
BM voltage	7.1 V or higher

Case 4

Monitor runs whenever the following DTCs are not stored	None
All of the following conditions are met	-
ECU status	Final check
Command to motor failsafe relay	On
Command to reverse battery protection MOS	On
ASIC output permission	Off
Discharge for capacitor	Completed

TYPICAL MALFUNCTION THRESHOLDS

Case 1

Either of the following conditions is met	A, B, C or D
A. F_MROC	On
B. F_MRSUV	On
C. F_MRM	On
D. Both of the following conditions are met	-
Absolute value of (Motor power circuit voltage - (Inverter upper voltage - Inverter lower voltage))	Higher than BM voltage x 0.25 V
Inverter non-drive flag	On

Case 2

Either of the following conditions is met	-
Motor power circuit voltage	Below BM voltage x 0.25 V
Inverter upper voltage	Below BM voltage x 0.25 V

Case 3 and 4

Motor power circuit voltage	BM voltage x 0.25 V or higher

COMPONENT OPERATING RANGE

All

Either of the following conditions is met	A, B, C or D
A. All of the following conditions are met	a, b, c, d and e
a. Both of the following conditions are met	More than 0.198 seconds
+BS cut MOS	Valid
+BS cut MOS voltage	Below 23.2 V
b. Both of the following conditions are met	More than 0.198 seconds
+BS cut MOS	Valid
+BS cut MOS voltage	Higher than 7.4 V
c. Following condition is met	More than 0.198 seconds
BM voltage	7.1 V or higher
d. Command to motor failsafe relay	On
e. All of the following conditions are met	More than 1 second
F_MROC	Off
F_MRSUV	Off
F_MRM	Off
Absolute value of (Motor power circuit voltage - (Inverter upper voltage - Inverter lower voltage))	BM voltage x 0.25 V or less
Inverter non-drive flag	On

B. All of the following conditions are met	-
ECU status	Premain
BM voltage	6 V or higher
Command to motor failsafe relay	Off
Command to reverse battery protection MOS	On
Precharge for capacitor	Completed
Motor power circuit voltage	BM voltage x 0.25 V or higher
Inverter upper voltage	BM voltage x 0.25 V or higher
C. All of the following conditions are met	-
ECU status	Final check
BM voltage	6 V or higher
Command to motor failsafe relay	Off
Command to reverse battery protection MOS	Off
Motor power circuit voltage	Below BM voltage x 0.25 V
D. All of the following conditions are met	-
ECU status	Final check
Command to motor failsafe relay	On
Command to reverse battery protection MOS	On
ASIC output permission	Off
Discharge for capacitor	Completed
Motor power circuit voltage	Below BM voltage x 0.25 V

CONFIRMATION DRIVING PATTERN

NOTICE:

When performing the normal judgment procedure, make sure that the driver door is closed and is not opened at any time during the procedure.

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.
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.

1. Connect the GTS to the DLC3.
2. Turn the ignition switch to ON and turn the GTS on.
3. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
4. Turn the ignition switch off.
5. Turn the ignition switch to ON (READY) and turn the GTS on.
6. Wait for 5 seconds or more. [*]

HINT:

[*]: Normal judgment procedure.

The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

7. Enter the following menus: Chassis / Brake/EPB* / Utility / All Readiness.

*: Electric Parking Brake System

8. Check the DTC judgment result.

HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows INCOMPLETE, perform driving pattern again.

PROCEDURE

1.	**REPLACE BRAKE BOOSTER WITH MASTER CYLINDER ASSEMBLY**

HINT:

Click here INFO

NEXT END