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<b>Model Year Start:</b> 2023	<b>Model:</b> Prius Prime	<b>Prod Date Range:</b> [12/2022 - ]
<b>Title:</b> HYBRID / BATTERY CONTROL: MOTOR GENERATOR CONTROL SYSTEM (for M20A-FXS): P033506,P033562; Crankshaft Position Sensor "A" Algorithm Based Failure; 2023 - 2024 MY Prius Prius Prime [12/2022 - ]		

<b>DTC</b>	<b>P033506</b>	<b>Crankshaft Position Sensor "A" Algorithm Based Failure</b>
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<b>DTC</b>	<b>P033562</b>	<b>Crankshaft Position Sensor "A" Signal Compare Failure</b>
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## DESCRIPTION

The motor generator control ECU (MG ECU) (built into the inverter with converter assembly) compares the engine speed value calculated based on the crankshaft position signal input from the ECM versus the engine speed value received from the ECM via CAN communication, and when it has frequently judged that the engine speed is high and the deviation between the engine speed values is large, it will store DTC P033506 or P033562.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P033506	Crankshaft Position Sensor "A" Algorithm Based Failure	When the engine is running, the deviation between the engine speed calculated based on the crankshaft position signal and the engine speed received via CAN communication exceeds the specified value for 1.5 seconds or more.  (2 trip detection logic)	<ul style="list-style-type: none"> <li>SFI system</li> <li>Inverter with converter assembly</li> <li>ECM</li> <li>Wire harness or connector</li> </ul>	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0336
P033562	Crankshaft Position Sensor "A" Signal Compare Failure	When the engine is running, the deviation between the engine speed calculated based on the crankshaft position signal and the engine speed received via CAN communication exceeds the	<ul style="list-style-type: none"> <li>SFI system</li> <li>Inverter with converter assembly</li> <li>ECM</li> <li>Wire harness or connector</li> </ul>	Comes on	Master Warning: Comes on	Motor Generator	A	SAE Code: P0336

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
		specified value for 1.5 seconds or more.  (2 trip detection logic)						

## MONITOR DESCRIPTION

Calculated engine speed is calculated from the time interval of crankshaft position signals. Fail counter is counted up when difference between engine speed and calculated engine speed is over the criteria. Malfunction is detected when fail counter value is over the criteria.

## MONITOR STRATEGY

Related DTCs	P0336 (INF P033506/P033562): Crankshaft Position Sensor "A" Circuit Range/Performance
Required sensors/components	Crankshaft position sensor
Frequency of operation	Engine running
Duration	1.5 seconds or more
MIL operation	2 driving cycles
Sequence of operation	None

## TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not stored	TMC's intellectual property
Other conditions belong to TMC's intellectual property	-

## TYPICAL MALFUNCTION THRESHOLDS

TMC's intellectual property	-
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## COMPONENT OPERATING RANGE

Motor generator control ECU	DTC P0336 (INF P033506/P033562) is not detected
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## 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.

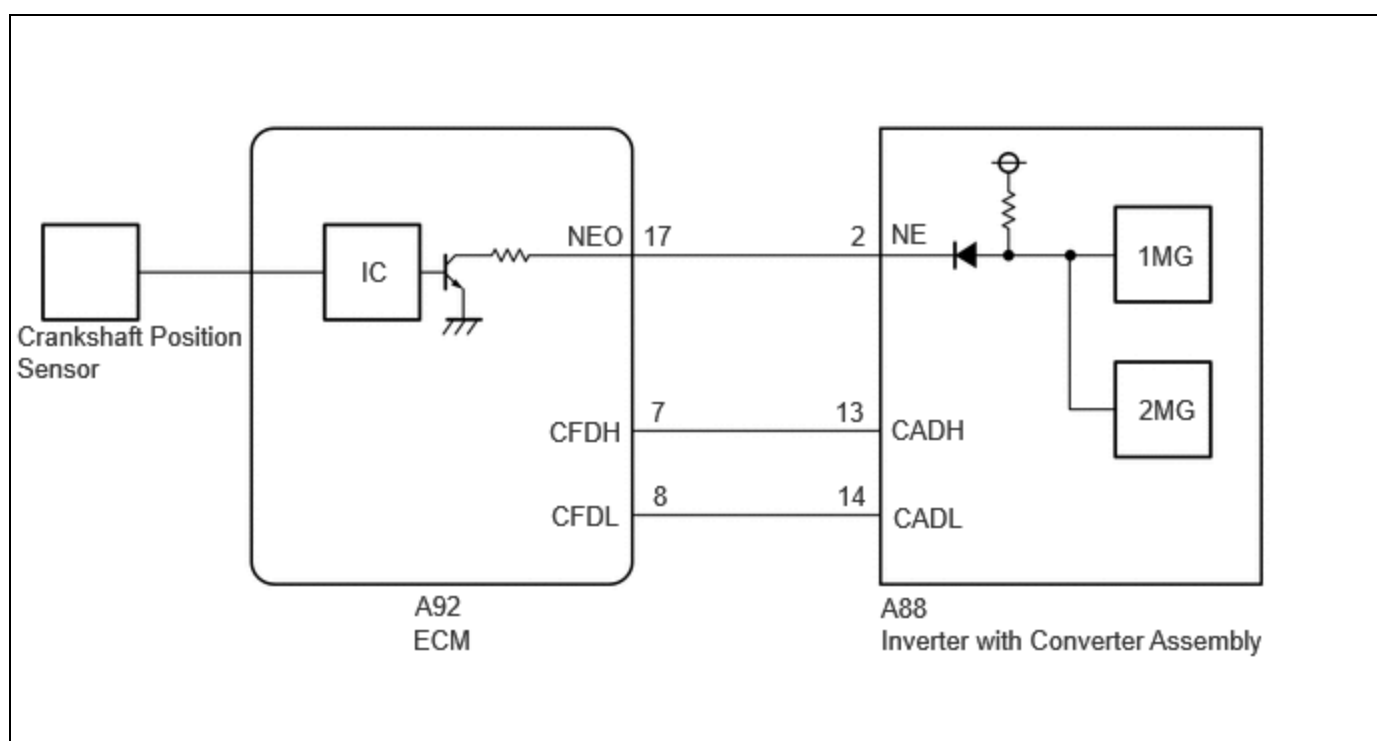
[Click here](#) **INFO**

1. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off and wait for 2 minutes or more.
3. Turn the ignition switch to ON (IG) and wait for 5 seconds or more.
4. Turn the ignition switch to ON (READY) and wait for 5 seconds or more.
5. Depress the accelerator pedal to start the engine.
6. Keep the engine running for 20 seconds.
7. Enter the following menus: Powertrain / Motor Generator / Utility / All Readiness.
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.

## WIRING DIAGRAM



## CAUTION / NOTICE / HINT

**CAUTION:**

Refer to the precautions before inspecting high voltage circuit.

[Click here](#) **INFO**

**NOTICE:**

- After the ignition switch is turned off, there may be a waiting time before disconnecting the negative (-) auxiliary battery terminal.

[Click here](#) **INFO**

- When disconnecting and reconnecting the auxiliary battery.

**HINT:**

When disconnecting and reconnecting the auxiliary battery, there is an automatic learning function that completes learning when the respective system is used.

[Click here](#) 

## PROCEDURE

### 1. CHECK DTC OUTPUT (HEALTH CHECK)

Pre-procedure1

(a) None

Procedure1

(b) According to the display on the GTS, select "Health Check".

(c) Check for DTCs.

RESULT	PROCEED TO
No DTCs are output.	A
DTCs are output.	B

Post-procedure1

(d) Turn the ignition switch off.

**B**  **GO TO DTC CHART**

**A**



### 2. CHECK CONNECTOR CONNECTION CONDITION (ECM CONNECTOR)

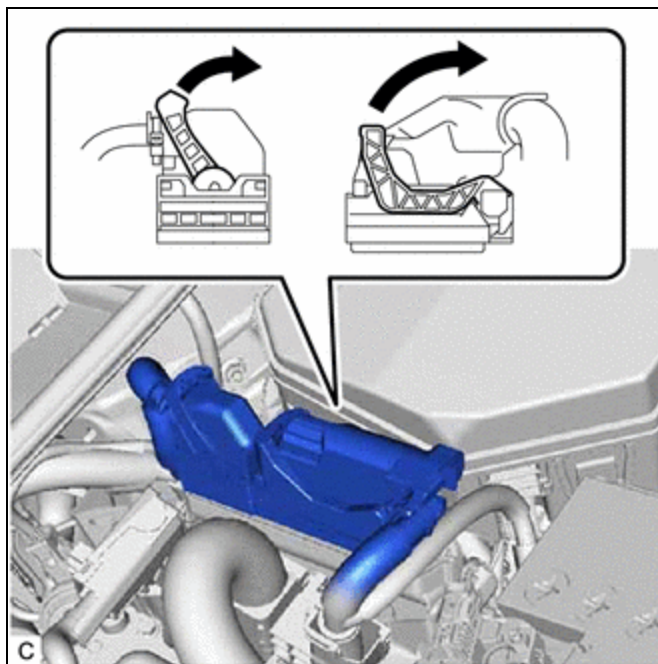
(a) Check the connector connections and contact pressure of the relevant terminals for the ECM connectors.

#### **HINT:**

[Click here](#) 

#### **NOTICE:**

Before disconnecting the connector, confirm that it is properly connected by checking that the locking claws are engaged and that the connector cannot be pulled off.



OK:

- The connector is connected securely.
- The terminals are not deformed and are connected securely.
- No water or foreign matter in the connector.

RESULT	PROCEED TO
OK	A
NG (The connector is not connected securely.)	B
NG (The terminals are not making secure contact or are deformed, or water or foreign matter exists in the connector.)	C

**HINT:**

When connecting each connector, connect it with the lock lever raised. Rotate the lock lever downward and make sure that the connector is securely connected. When the lock lever is fully lowered, a click will be heard as its claw engages. After the click is heard, pull up on the connector to confirm that it is securely connected.

**B** ► CONNECT SECURELY

**C** ► REPAIR OR REPLACE HARNESS OR CONNECTOR

**A**  
▼

**3. CHECK CONNECTOR CONNECTION CONDITION (INVERTER WITH CONVERTER ASSEMBLY CONNECTOR)**

**CAUTION:**

Be sure to wear insulated gloves.

Pre-procedure1

(a) Check that the service plug grip is not installed.

**NOTICE:**

After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

Procedure1

(b) Check the connection condition of the low voltage connectors of the inverter with converter assembly and the contact pressure of each terminal. Check the terminals for deformation, and the connector for water and foreign matter.

**HINT:**

Click here [INFO](#)

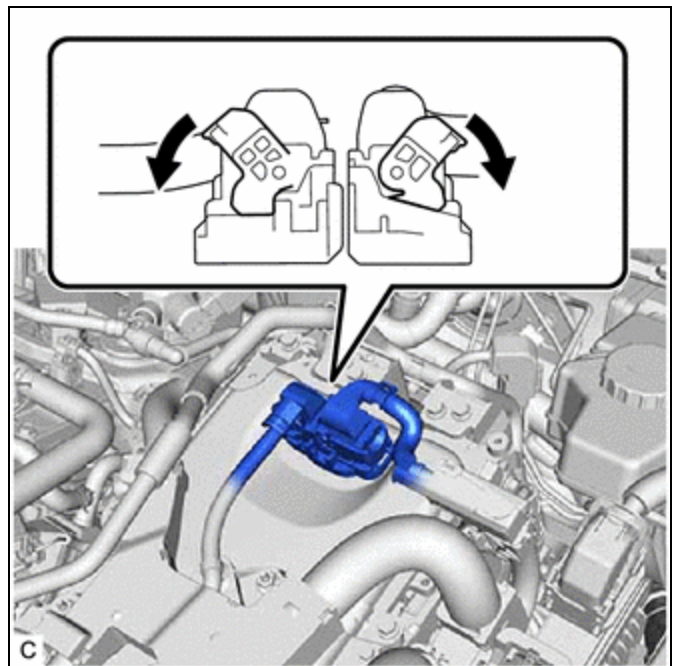
**NOTICE:**

Before disconnecting the connector, confirm that it is properly connected by checking that the claws of the lock levers are engaged and that the connector cannot be pulled off.

OK:

- The connector is connected securely.
- The terminals are not deformed and are connected securely.
- No water or foreign matter in the connector.

Result:



RESULT	PROCEED TO
OK	A
NG (The connector is not connected securely.)	B
NG (The terminals are not making secure contact or are deformed, or water or foreign matter exists in the connector.)	C

**HINT:**

When connecting the connector, connect it with the lock levers raised. Rotate each lock lever downward and make sure that the connector is securely connected. When a lock lever is fully lowered, a

click will be heard as its claw engages. After the click is heard, pull up on the connector to confirm that it is securely connected.

Post-procedure1

(c) None

**B** ▶ CONNECT SECURELY

**C** ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

**A**



**4. CHECK HARNESS AND CONNECTOR (INVERTER WITH CONVERTER ASSEMBLY - ECM)**

**CAUTION:**

Be sure to wear insulated gloves.

Pre-procedure1

(a) Check that the service plug grip is not installed.

**NOTICE:**

After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

(b) Disconnect the inverter with converter assembly connector.

(c) Disconnect the ECM connector.

(d) Turn the ignition switch off.

Procedure1

(e) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):



[Click Location & Routing\(A88,A92\).](#)

[Click Connector\(A88\).](#)

[Click Connector\(A92\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-2 (NE) - A92-17 (NEO)	Ignition switch off	Below 1 Ω	Ω
A88-13 (CADH) - A92-7 (CFDH)	Ignition switch off	Below 1 Ω	Ω
A88-14 (CADL) - A92-8 (CFDL)	Ignition switch off	Below 1 Ω	Ω

Standard Resistance (Check for Short):



[Click Location & Routing\(A88,A92\)](#)

[Click Connector\(A88\)](#)

[Click Connector\(A92\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A88-2 (NE) or A92-17 (NEO) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ
A88-13 (CADH) or A92-7 (CFDH) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ
A88-14 (CADL) or A92-8 (CFDL) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ

Post-procedure1

(f) Reconnect the ECM connector.

(g) Reconnect the inverter with converter assembly connector.

**NG** ► REPAIR OR REPLACE HARNESS OR CONNECTOR

**OK**



<b>5.</b>	<b>CHECK INVERTER WITH CONVERTER ASSEMBLY (NE SIGNAL)</b>
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Pre-procedure1

(a) Disconnect the ECM connector.

(b) Turn the ignition switch to ON.

Procedure1

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:



[Click Location & Routing\(A92\)](#)

[Click Connector\(A92\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A92-17 (NEO) - Body ground	Ignition switch ON	11 to 14 V	V



Post-procedure1

- (d) Turn the ignition switch off.
- (e) Reconnect the ECM connector.

**NG**  **REPLACE INVERTER WITH CONVERTER ASSEMBLY**

**OK**  


**6. CHECK INVERTER WITH CONVERTER ASSEMBLY (CAN COMMUNICATION LINE)**

Pre-procedure1

- (a) Disconnect the ECM connector.

Procedure1

- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



[Click Location & Routing\(A92\)](#)

[Click Connector\(A92\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A92-7 (CFDH) - A92-8 (CFDL)	Ignition switch off	80 to 170 Ω	Ω

Post-procedure1

- (c) Reconnect the ECM connector.

**OK**  **REPLACE ECM**

Click here 

**NG**  **REPLACE INVERTER WITH CONVERTER ASSEMBLY**

