Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM1000000029A48
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for M20A-FXS): P1A001C,P301A1C; Hybrid Battery Stack 2 Cell Voltage Detection Voltage Out of Range; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	**P1A001C**	**Hybrid Battery Stack 2 Cell Voltage Detection Voltage Out of Range**

DTC	**P301A1C**	**Hybrid Battery Stack 1 Cell Voltage Detection Voltage Out of Range**

DESCRIPTION

The HV battery is composed of 60 cells (3.7 V each) in series. The battery ECU assembly monitors the voltage of each HV battery cell to detect malfunctions of the HV battery.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P1A001C	Hybrid Battery Stack 2 Cell Voltage Detection Voltage Out of Range	An open is detected in the HV battery cell voltage detection circuits of the No. 2 HV supply stack sub-assembly. (1 trip detection logic)	• HV battery • Battery ECU assembly	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P1A00
P301A1C	Hybrid Battery Stack 1 Cell Voltage Detection Voltage Out of Range	An open is detected in the HV battery cell voltage detection circuits of the No. 1 HV supply stack sub-assembly. (1 trip detection logic)	• HV battery • Battery ECU assembly	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P301A

MONITOR DESCRIPTION

If the voltage of an HV battery cell is abnormal, the battery ECU assembly will determine that a malfunction has occurred. When the malfunction detection condition is satisfied, the battery ECU assembly will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P1A00 (INF P1A001C), P301A (INF P301A1C): Battery voltage detection circuits malfunction
Required sensors/components	Battery ECU assembly
Frequency of operation	Continuous
Duration	TMC's intellectual property
MIL operation	Immediately
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	-

COMPONENT OPERATING RANGE

Battery ECU assembly	DTC P1A00 (INF P1A001C) is not detected DTC P301A (INF P301A1C) is not detected

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. With ignition switch ON and wait for 10 seconds or more.[*1]

   HINT:

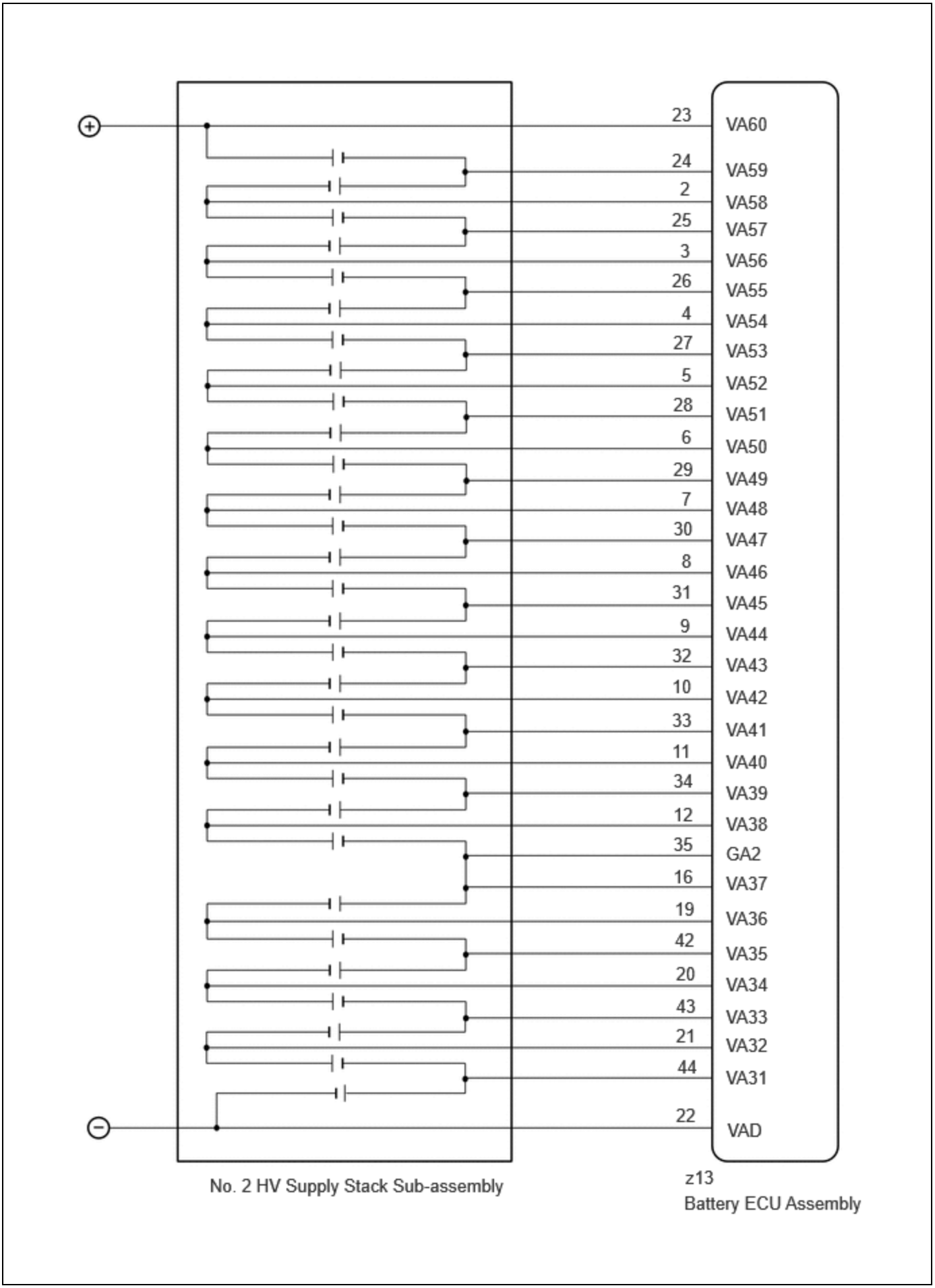
   [*1]: Normal judgment procedure.

   The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.
4. Enter the following menus: Powertrain / HV Battery / Utility / All Readiness.
5. 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 the normal judgment procedure again.

WIRING DIAGRAM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VA31
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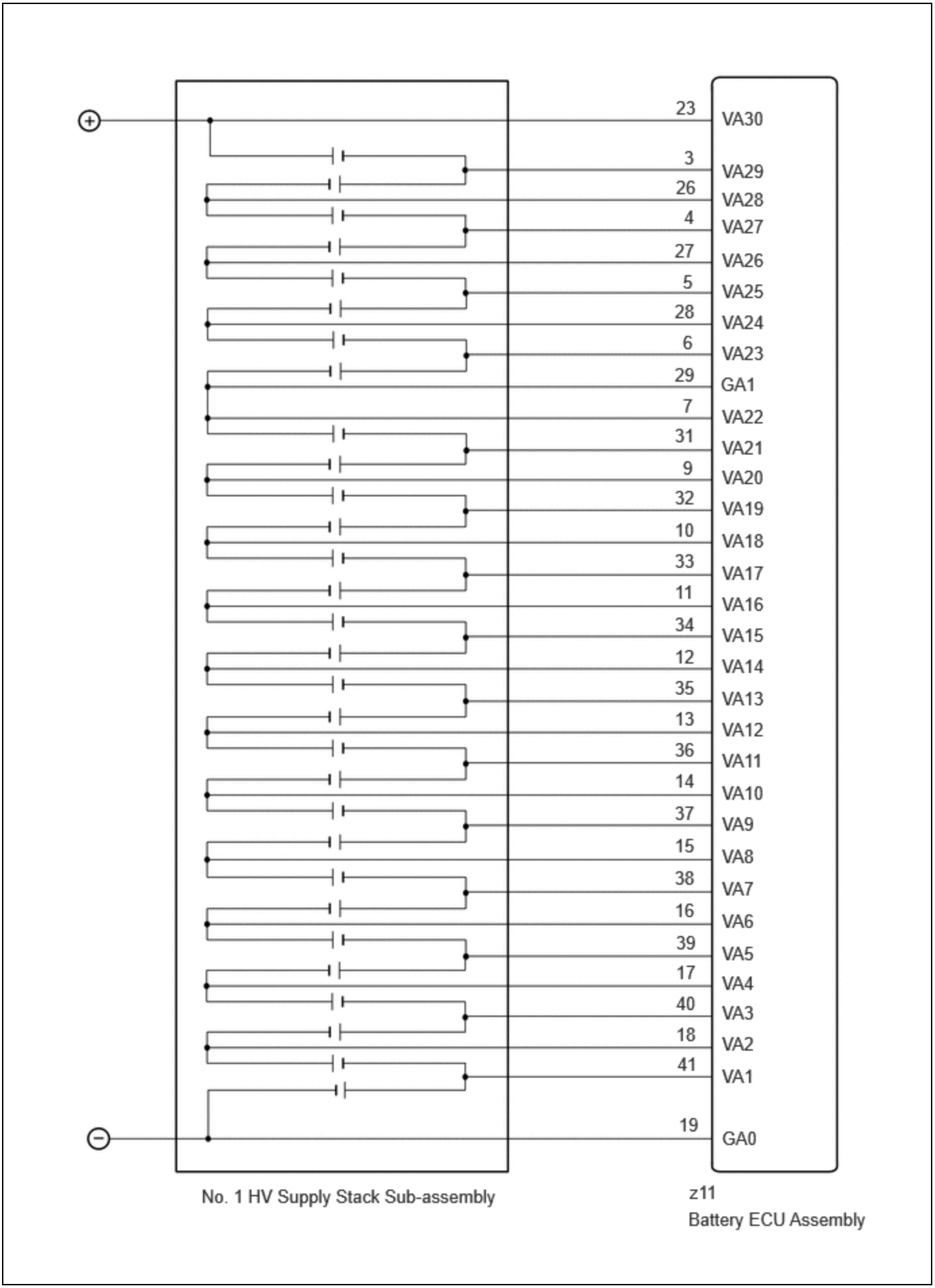
VAD
No. 2 HV Supply Stack Sub-assembly
z13
Battery ECU Assembly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VA5
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VA4
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VA3
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VA2
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VA1
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GA0
No. 1 HV Supply Stack Sub-assembly
z11
Battery ECU Assembly

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 INFO

PROCEDURE

1.	**CHECK DTC OUTPUT (HV BATTERY, HYBRID CONTROL)**

Pre-procedure1

(a) None

Procedure1

(b) Check for DTCs.

Powertrain > HV Battery > Trouble Codes
Powertrain > Hybrid Control > Trouble Codes

RESULT	PROCEED TO
"P1A001C or P301A1C" only is output, or DTCs except the ones in the table below are also output.	A
DTCs of hybrid battery system in the table below are output.	B
DTCs of hybrid control system in the table below are output.	C

SYSTEM	RELEVANT DTC	
Hybrid battery system	P060A47	Hybrid/EV Battery Energy Control Module Monitoring Processor Watchdog / Safety MCU Failure
	P060B49	Hybrid/EV Battery Energy Control Module A/D Processing Internal Electronic Failure
	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
Hybrid control system	P0A1F94	Hybrid/EV Battery Energy Control Module Unexpected Operation

Post-procedure1

(c) Turn the ignition switch off.

B ▶ **GO TO DTC CHART (HYBRID BATTERY SYSTEM)**

C ▶ **GO TO DTC CHART (HYBRID CONTROL SYSTEM)**

A

2.	**CHECK DTC**

(a) Check the DTCs that were output when the vehicle was brought to the workshop.

RESULT	PROCEED TO
"P1A001C" is also output.	A
"P301A1C" is also output.	B

B ▶ **GO TO STEP 6**

A

3.	**CHECK CONNECTOR CONNECTION CONDITION (BATTERY ECU ASSEMBLY CONNECTOR)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

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 connector connections and contact pressure of the relevant terminals for the battery ECU assembly.

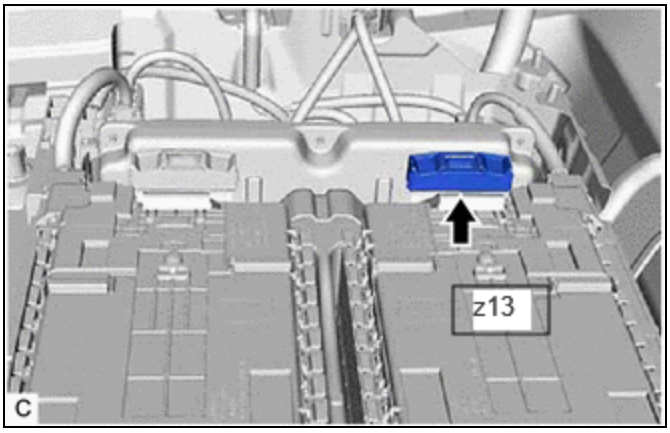
HINT:

Click here INFO

OK:

The connector is connected securely and there are no contact problems.

Result:



RESULT		PROCEED TO
OK		A
Not connected securely	The terminals are not damaged or corroded	B
Not connected securely	The terminals are damaged or corroded	C

Post-procedure1

(c) None

B ▶ **CONNECT SECURELY**

C ▶ **REPLACE HV BATTERY**

A

4.	CHECK FREEZE FRAME DATA (HYBRID/EV BATTERY CELL VOLTAGE)

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Hybrid/EV Battery Cell 31 Voltage" through "Hybrid/EV Battery Cell 60 Voltage" for DTC P1A001C and make a note if the value of any is 1.6 V or less.

Powertrain > HV Battery > Trouble Codes

Post-procedure1

(c) Turn the ignition switch off.

NEXT

5.	**CHECK HV BATTERY (HV BATTERY CELL VOLTAGE 31 - 60)**

Click here INFO

RESULT	PROCEED TO
The voltage between the terminals is 1.6 V or less.	A
Other than above	B

A ▶ **REPLACE HV BATTERY**

B ▶ **REPLACE BATTERY ECU ASSEMBLY**

6.	**CHECK CONNECTOR CONNECTION CONDITION (BATTERY ECU ASSEMBLY CONNECTOR)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

Pre-procedure1

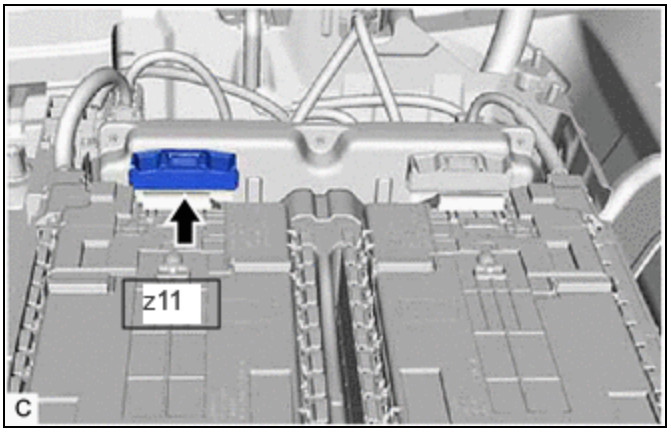
(a) Check that the service plug grip is not installed.

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 connector connections and contact pressure of the relevant terminals for the battery ECU assembly.



HINT:

Click here INFO

OK:

The connector is connected securely and there are no contact problems.

Result:

RESULT		PROCEED TO
OK		A
Not connected securely	The terminals are not damaged or corroded	B

RESULT		PROCEED TO
Not connected securely	The terminals are damaged or corroded	C

Post-procedure1

(c) None

B ▶ **CONNECT SECURELY**

C ▶ **REPLACE HV BATTERY**

A

7.	CHECK FREEZE FRAME DATA (HYBRID/EV BATTERY CELL VOLTAGE)

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Hybrid/EV Battery Cell 1 Voltage" through "Hybrid/EV Battery Cell 30 Voltage" for DTC P301A1C and make a note if the value of any is 1.6 V or less.

Powertrain > HV Battery > Trouble Codes

Post-procedure1

(c) Turn the ignition switch off.

NEXT

8.	CHECK HV BATTERY (HV BATTERY CELL VOLTAGE 1 - 30)

Click here INFO

RESULT	PROCEED TO
The voltage between the terminals is 1.6 V or less.	A

RESULT	PROCEED TO
Other than above	B

A ▶ **REPLACE HV BATTERY**

B ▶ **REPLACE BATTERY ECU ASSEMBLY**