Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BHUS
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for PHEV Model): P0E2D00; Hybrid/EV Battery Energy Control Module Hybrid/EV Battery Monitor Performance; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P0E2D00**	**Hybrid/EV Battery Energy Control Module Hybrid/EV Battery Monitor Performance**

DESCRIPTION

The battery ECU assembly detects the voltage of each HV battery cell. The battery ECU assembly monitors its internal HV battery cell voltage detection circuits to detect malfunctions. If the battery ECU assembly detects a malfunction it will store this DTC.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0E2D00	Hybrid/EV Battery Energy Control Module Hybrid/EV Battery Monitor Performance	The battery ECU assembly detects a malfunction of its internal HV battery cell voltage detection circuits. (1 trip detection logic)	• Battery voltage sensor • No. 1 HV supply stack sub-assembly • No. 2 HV supply stack sub-assembly • No. 3 HV supply stack sub-assembly	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0E2D

MONITOR DESCRIPTION

The battery ECU assembly monitors its internal HV battery cell voltage detection circuits to detect malfunctions. If the battery ECU assembly detects a malfunction, it will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0E2D (INF P0E2D00): Internal control module Hybrid/EV battery monitor performance
Required sensors/components	Battery ECU assembly
Frequency of operation	Continuous
Duration	TMC's intellectual property
MIL operation	1 driving cycle

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 P0E2D (INF P0E2D00) 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. Turn the ignition switch to ON and wait for 10 seconds or more.[*1]

HINT:

[*1]: Normal judgment procedure.

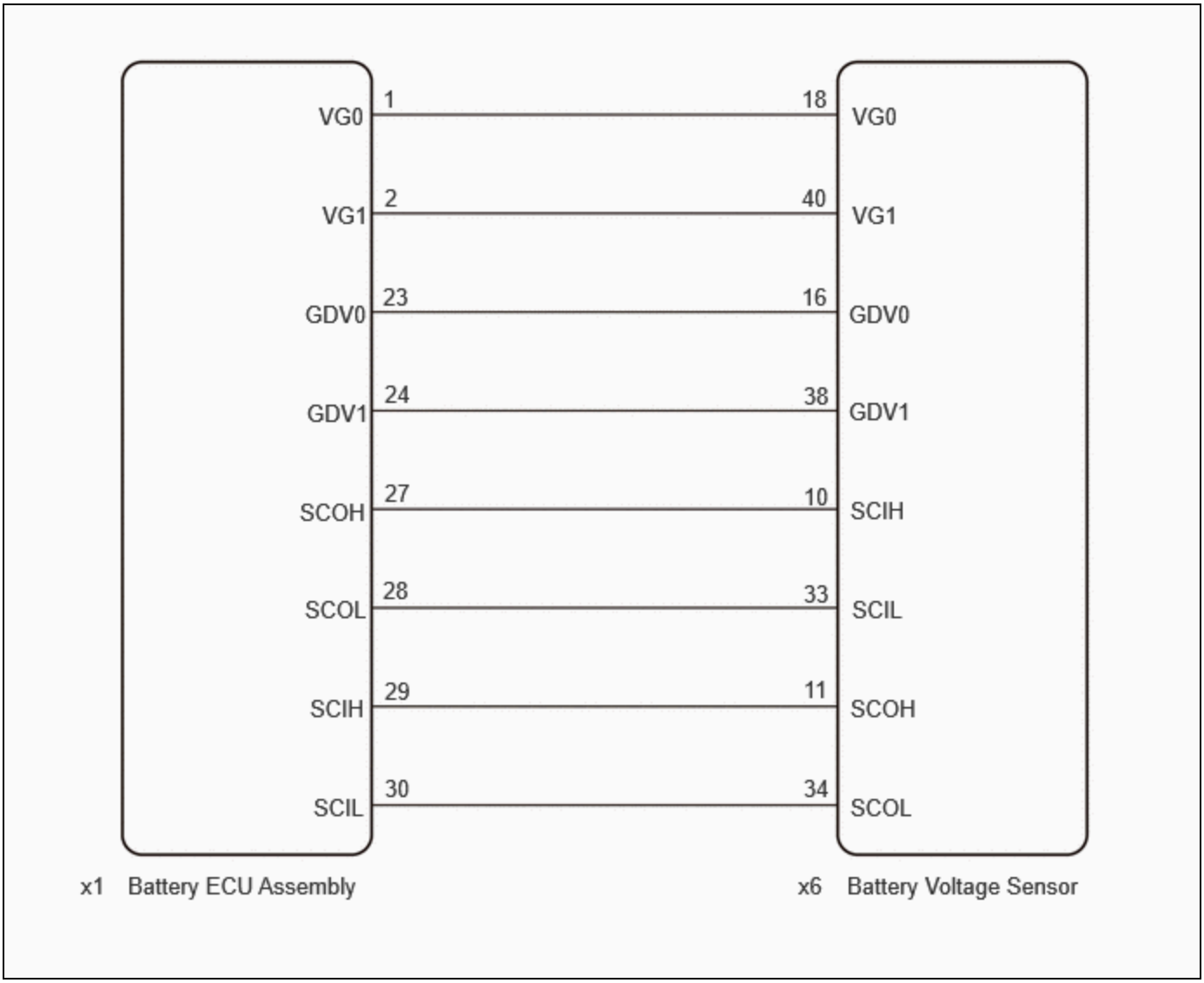
The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

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 or N/A, perform the normal judgment procedure again.

WIRING DIAGRAM



Refer to the wiring diagram for DTC P1A001C.

Click here INFO

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 auxiliary negative (-) 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
"P0E2D00" 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
	P1A001C	Hybrid Battery Stack 2 Cell Voltage Detection Voltage Out of Range
	P1A051C	Hybrid Battery Stack 3 Cell Voltage Detection Voltage Out of Range
	P1A0A1C	Hybrid Battery Stack 4 Cell Voltage Detection Voltage Out of Range
	P1AC413	Hybrid/EV Battery Stack 1 Current Interrupt Device Circuit Open
	P1AC513	Hybrid/EV Battery Stack 2 Current Interrupt Device Circuit Open
	P1AC613	Hybrid/EV Battery Stack 3 Current Interrupt Device Circuit Open
	P1AC713	Hybrid/EV Battery Stack 4 Current Interrupt Device Circuit Open
	P1AC49E	Hybrid/EV Battery Stack 1 Current Interrupt Device Stuck On
	P1AC59E	Hybrid/EV Battery Stack 2 Current Interrupt Device Stuck On
	P1AC69E	Hybrid/EV Battery Stack 3 Current Interrupt Device Stuck On
	P1AC79E	Hybrid/EV Battery Stack 4 Current Interrupt Device Stuck On
	P301A1C	Hybrid Battery Stack 1 Cell Voltage Detection Voltage Out of Range
Hybrid control system	P0AA649	Hybrid/EV Battery Voltage System Isolation Internal Electronic Failure
	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 FREEZE FRAME DATA**

Pre-procedure1

(a) None

Procedure1

(b) Read the value of freeze frame data items "Lost Communication with Hybrid/EV Battery Monitoring IC", "Hybrid/EV Battery Monitoring IC 1 Internal Malfunction (Determinable)" through "Hybrid/EV Battery Monitoring IC 3 Internal Malfunction (Determinable)", "Hybrid/EV Battery Monitoring IC Internal Malfunction (Unidentifiable)", "Hybrid/EV Battery Monitoring IC 1 Power Supply Malfunction" through "Hybrid/EV Battery Monitoring IC 3 Power Supply Malfunction" and "Hybrid/EV Battery Monitoring IC 1 Cell Voltage Detection Malfunction" through "Hybrid/EV Battery Monitoring IC 3 Cell Voltage Detection Malfunction" for DTC P0E2D00 and make a note.

Powertrain > HV Battery > Trouble Codes

RESULT	PROCEED TO
The freeze frame data item "Hybrid/EV Battery Monitoring IC Internal Malfunction (Unidentifiable)" is ON.	A
Either freeze frame data item "Hybrid/EV Battery Monitoring IC 1 Internal Malfunction (Determinable)" through "Hybrid/EV Battery Monitoring IC 3 Internal Malfunction (Determinable)" is ON.	B
Any of the freeze frame data items "Hybrid/EV Battery Monitoring IC 1 Power Supply Malfunction" through "Hybrid/EV Battery Monitoring IC 3 Power Supply Malfunction" is ON.	C
The freeze frame data item "Lost Communication with Hybrid/EV Battery Monitoring IC" is ON.	D
Any of the freeze frame data items "Hybrid/EV Battery Monitoring IC 1 Cell Voltage Detection Malfunction" through "Hybrid/EV Battery Monitoring IC 3 Power Supply Malfunction" is ON.	E

HINT:

- The chart above is listed in inspection order of priority.
- Check items that are ON at the same time by following the listed order.

Post-procedure1

(c) Turn the ignition switch off.

A ▶ **REPLACE BATTERY VOLTAGE SENSOR**

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

D ▶ **GO TO STEP 4**

E ▶ **GO TO STEP 5**

C ▼

3.	**CHECK HARNESS AND CONNECTOR (BATTERY ECU ASSEMBLY - BATTERY VOLTAGE SENSOR)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the voltage of each HV battery cell.

Pre-procedure1

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

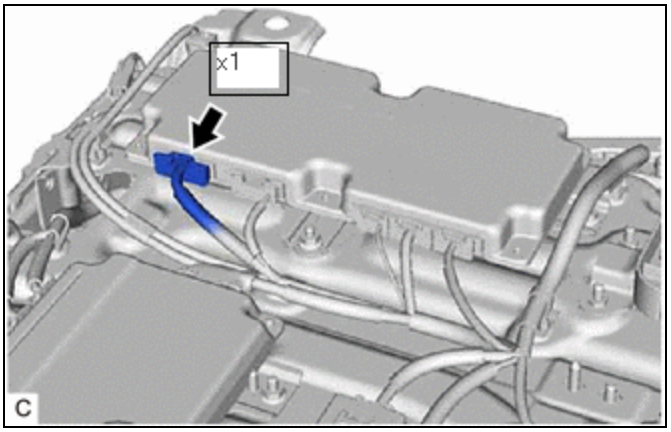
NOTICE:

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 battery ECU assembly connector.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.



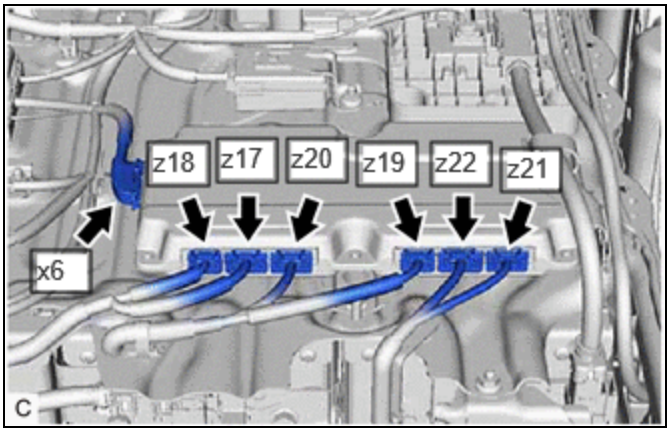
(c) Disconnect the x6 battery voltage sensor connector.

CAUTION:

When disconnecting connector x6 of the battery voltage sensor, first disconnect connectors z17, z18, z19, z20, z21 and z22 from the battery voltage sensor.

NOTICE:

- Insulate each disconnected high-voltage connector with insulating tape. Wrap the connector from the wire harness side to the end of the connector.
- Before disconnecting the connector, check that it is not loose or disconnected.



Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(x1,x6)
Click Connector(x1)
Click Connector(x6)

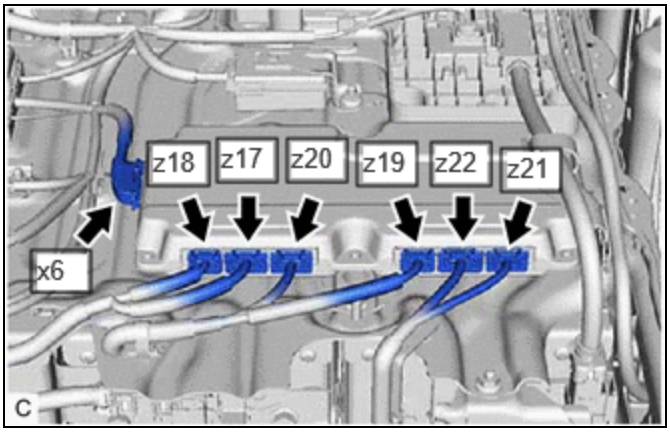
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x1-1 (VG0) - x6-18 (VG0)	Ignition switch off	Below 1 Ω
x1-2 (VG1) - x6-40 (VG1)	Ignition switch off	Below 1 Ω
x1-23 (GDV0) - x6-16 (GDV0)	Ignition switch off	Below 1 Ω
x1-24 (GDV1) - x6-38 (GDV1)	Ignition switch off	Below 1 Ω

Post-procedure1

(e) Reconnect the x6 battery voltage sensor connector.

CAUTION:

When connecting connectors z17, z18, z19, z20, z21 and z22 of the battery voltage sensor, first connect connector x6 to the battery voltage sensor.



(f) Reconnect the battery ECU assembly connector.

OK ▶ **REPLACE BATTERY VOLTAGE SENSOR**

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

4.	**CHECK HARNESS AND CONNECTOR (BATTERY ECU ASSEMBLY - BATTERY VOLTAGE SENSOR)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the voltage of each HV battery cell.

Pre-procedure1

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

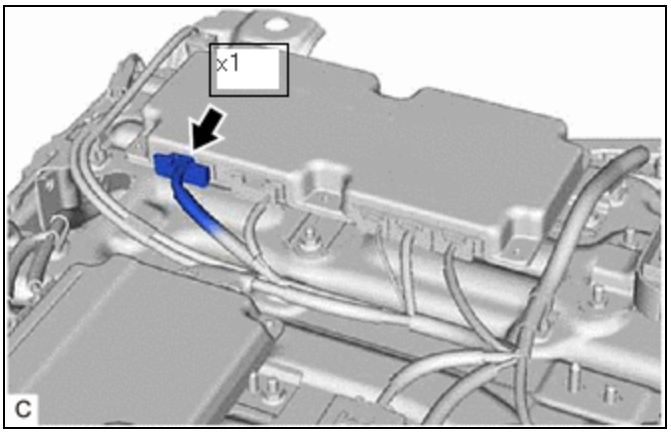
NOTICE:

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 battery ECU assembly connector.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.



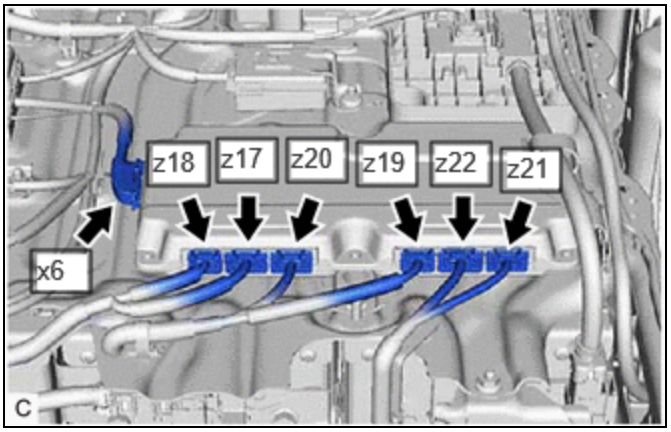
(c) Disconnect the x6 battery voltage sensor connector.

CAUTION:

When disconnecting connector x6 of the battery voltage sensor, first disconnect connectors z17, z18, z19, z20, z21 and z22 from the battery voltage sensor.

NOTICE:

- Insulate each disconnected high-voltage connector with insulating tape. Wrap the connector from the wire harness side to the end of the connector.
- Before disconnecting the connector, check that it is not loose or disconnected.



Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(x1,x6)
Click Connector(x1)
Click Connector(x6)

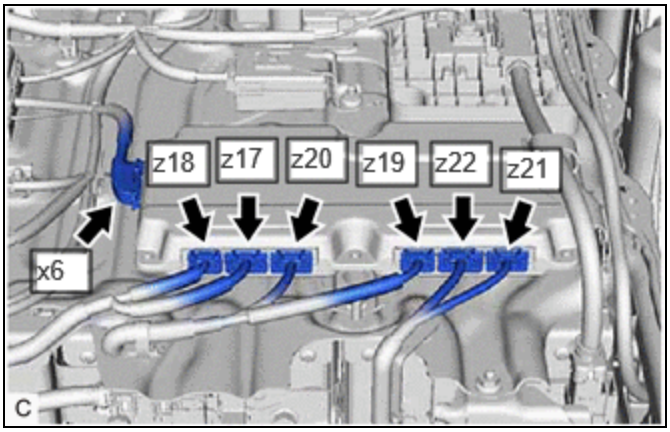
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x1-27 (SCOH) - x6-10 (SCIH)	Ignition switch off	Below 1 Ω
x1-28 (SCOL) - x6-33 (SCIL)	Ignition switch off	Below 1 Ω
x1-29 (SCIH) - x6-11 (SCOH)	Ignition switch off	Below 1 Ω
x1-30 (SCIL) - x6-34 (SCOL)	Ignition switch off	Below 1 Ω

Post-procedure1

(e) Reconnect the x6 battery voltage sensor connector.

CAUTION:

When connecting connectors z17, z18, z19, z20, z21 and z22 of the battery voltage sensor, first connect connector x6 to the battery voltage sensor.



(f) Reconnect the battery ECU assembly connector.

OK ▶ **REPLACE BATTERY ECU ASSEMBLY AND BATTERY VOLTAGE SENSOR**

Battery ECU assembly: Click here INFO

Battery voltage sensor: Click here INFO

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

5.	**CHECK CONNECTOR CONNECTION CONDITION (BATTERY VOLTAGE SENSOR 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 connections of the battery voltage sensor connector.

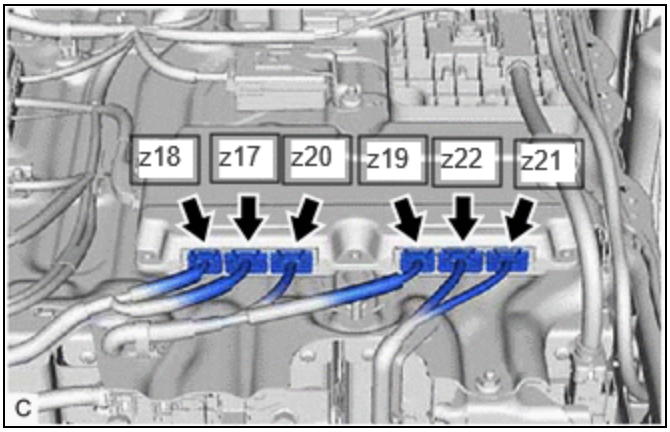
Click here INFO

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
Connector z18 is not connected securely	The terminals are damaged or corroded	C
Connector z17 is not connected securely	The terminals are damaged or corroded	D
Connector z20 is not connected securely	The terminals are damaged or corroded	E
Connector z19 is not connected securely	The terminals are damaged or corroded	F
Connector z22 is not connected securely	The terminals are damaged or corroded	G
Connector z21 is not connected securely	The terminals are damaged or corroded	H



Post-procedure1

(c) None

B ▶ **CONNECT SECURELY**

C ▶ **REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

D ▶ **REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

E ▶ **REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

F ▶ **REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

G ▶ **REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY**

H ▶ **REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY**

A

6.	**CHECK FREEZE FRAME DATA**

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 72 Voltage" for DTC P0E2D00 and make a note if the value of any is 1.6 V or less.

Powertrain > HV Battery > Trouble Codes

RESULT	PROCEED TO
The value of any of the freeze frame data items "Hybrid/EV Battery Cell 1 Voltage" through "Hybrid/EV Battery Cell 24 Voltage" is 1.6 V or less.	A
The value of any of the freeze frame data items "Hybrid/EV Battery Cell 25 Voltage" through "Hybrid/EV Battery Cell 48 Voltage" is 1.6 V or less.	B
The value of any of the freeze frame data items "Hybrid/EV Battery Cell 49 Voltage" through "Hybrid/EV Battery Cell 72 Voltage" is 1.6 V or less.	C
Other than above	D

Post-procedure1

(c) Turn the ignition switch off.

B ▶ **GO TO STEP 10**

C ▶ **GO TO STEP 13**

D ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A

7.	**CHECK NO. 1 HV SUPPLY STACK SUB-ASSEMBLY (HYBRID BATTERY CELL 1 TO 24 VOLTAGE)**

CAUTION:

- Be sure to wear insulated gloves and protective goggles.
- Disconnect only the connector corresponding to the HV battery cell to be checked. Do not disconnect the other connectors.

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the voltage of each HV battery cell.

Pre-procedure1

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

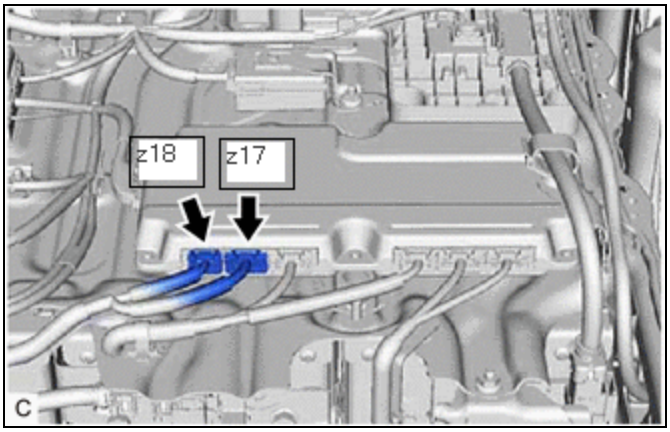
NOTICE:

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 battery voltage sensor connector.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.



Procedure1

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

HINT:

Measure the voltage of the HV battery cells whose value in the freeze frame data was 1.6 V or less only.

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION
1	z18-6 (GA0) (-) - z18-5 (VA1) (+)	Always
2	z18-5 (VA1) (-) - z18-4 (VA2) (+)	Always
3	z18-4 (VA2) (-) - z18-1 (VA3) (+)	Always

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION
4	z18-1 (VA3) (-) - z18-3 (VA4) (+)	Always
5	z18-3 (VA4) (-) - z17-27 (VA5) (+)	Always
6	z17-27 (VA5) (-) - z17-17 (VA6) (+)	Always
7	z17-17 (VA6) (-) - z17-16 (VA7) (+)	Always
8	z17-16 (VA7) (-) - z17-4 (VA8) (+)	Always
9	z17-4 (VA8) (-) - z17-3 (VA9) (+)	Always
10	z17-3 (VA9) (-) - z17-15 (VA10) (+)	Always
11	z17-15 (VA10) (-) - z17-14 (VA11) (+)	Always
12	z17-14 (VA11) (-) - z17-13 (VA12) (+)	Always
13	z17-12 (GA1) (-) - z17-23 (VA13) (+)	Always
14	z17-23 (VA13) (-) - z17-11 (VA14) (+)	Always
15	z17-11 (VA14) (-) - z17-10 (VA15) (+)	Always
16	z17-10 (VA15) (-) - z17-9 (VA16) (+)	Always
17	z17-9 (VA16) (-) - z17-8 (VA17) (+)	Always
18	z17-8 (VA17) (-) - z17-20 (VA18) (+)	Always
19	z17-20 (VA18) (-) - z17-7 (VA19) (+)	Always
20	z17-7 (VA19) (-) - z17-2 (VA20) (+)	Always
21	z17-2 (VA20) (-) - z17-1 (VA21) (+)	Always
22	z17-1 (VA21) (-) - z17-6 (VA22) (+)	Always
23	z17-6 (VA22) (-) - z17-5 (VA23) (+)	Always
24	z17-5 (VA23) (-) - z17-18 (VA24) (+)	Always

CAUTION:

Make sure not to cross the electrodes of an electrical tester measurement terminals.

NOTICE:

Make sure to check the polarity of each terminal (positive (+) or negative (-)) before connecting a tester.

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

Post-procedure1

(d) Reconnect the battery voltage sensor connector.

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A

8.	**CHECK BATTERY VOLTAGE SENSOR (VA1 - VA24)**

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the resistance.

Pre-procedure1

(a) Remove the battery voltage sensor.

HINT:

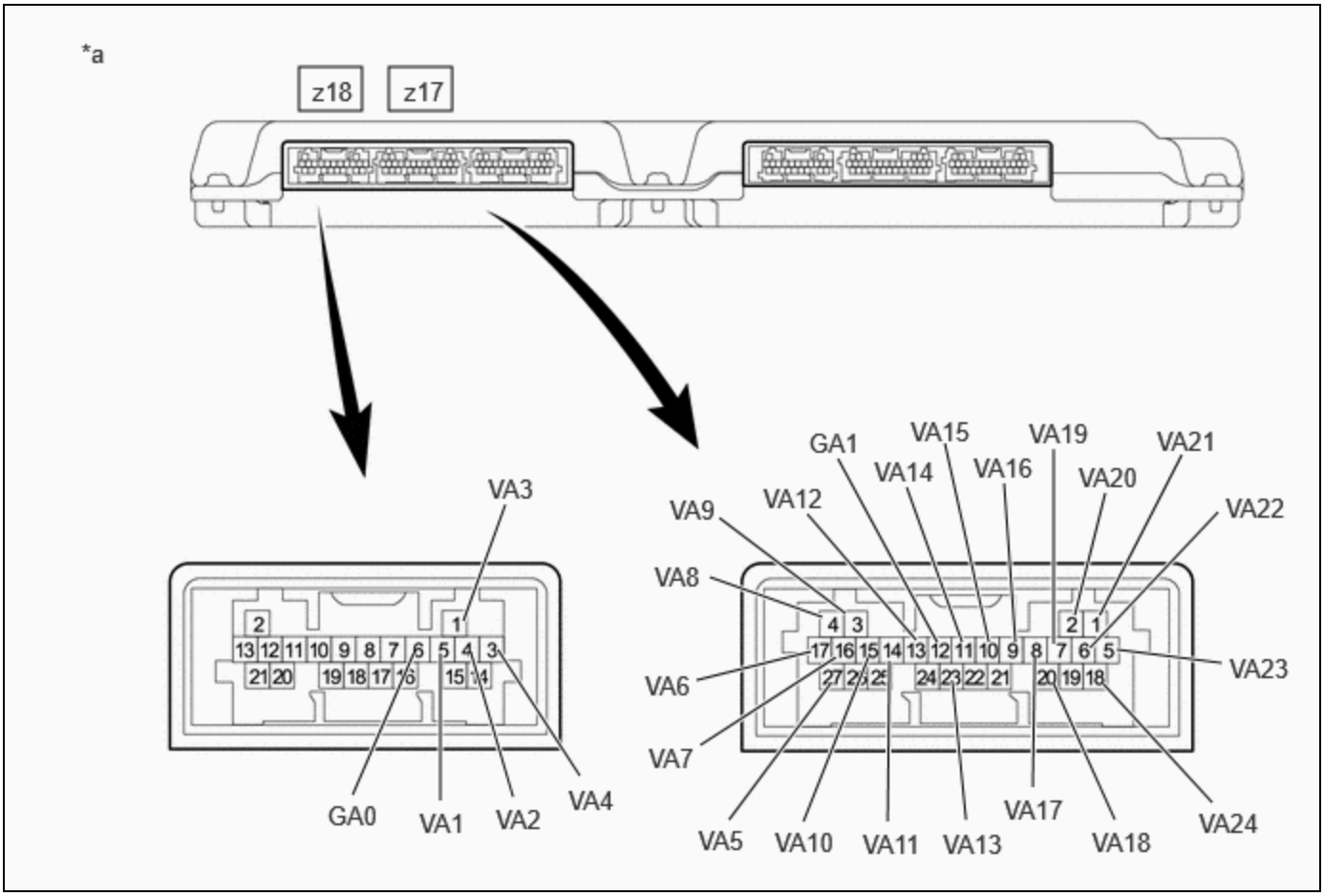
Click here INFO

Procedure1

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

HINT:

Only inspect the terminals of the battery voltage sensor which correspond to the HV battery cells which measured 1.6 V or less in the previous step.



*a	Component without harness connected	-	-

	(Battery Voltage Sensor)		

Standard Resistance:

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION	SPECIFIED CONDITION
1	z18-6 (GA0) (-) - z18-5 (VA1) (+)	Always	50 kΩ or more
2	z18-5 (VA1) (-) - z18-4 (VA2) (+)	Always	50 kΩ or more
3	z18-4 (VA2) (-) - z18-1 (VA3) (+)	Always	50 kΩ or more
4	z18-1 (VA3) (-) - z18-3 (VA4) (+)	Always	50 kΩ or more
5	z18-3 (VA4) (-) - z17-27 (VA5) (+)	Always	50 kΩ or more
6	z17-27 (VA5) (-) - z17-17 (VA6) (+)	Always	50 kΩ or more
7	z17-17 (VA6) (-) - z17-16 (VA7) (+)	Always	50 kΩ or more
8	z17-16 (VA7) (-) - z17-4 (VA8) (+)	Always	50 kΩ or more
9	z17-4 (VA8) (-) - z17-3 (VA9) (+)	Always	50 kΩ or more
10	z17-3 (VA9) (-) - z17-15 (VA10) (+)	Always	50 kΩ or more
11	z17-15 (VA10) (-) - z17-14 (VA11) (+)	Always	50 kΩ or more
12	z17-14 (VA11) (-) - z17-13 (VA12) (+)	Always	50 kΩ or more
13	z17-12 (GA1) (-) - z17-23 (VA13) (+)	Always	50 kΩ or more
14	z17-23 (VA13) (-) - z17-11 (VA14) (+)	Always	50 kΩ or more
15	z17-11 (VA14) (-) - z17-10 (VA15) (+)	Always	50 kΩ or more
16	z17-10 (VA15) (-) - z17-9 (VA16) (+)	Always	50 kΩ or more
17	z17-9 (VA16) (-) - z17-8 (VA17) (+)	Always	50 kΩ or more
18	z17-8 (VA17) (-) - z17-20 (VA18) (+)	Always	50 kΩ or more
19	z17-20 (VA18) (-) - z17-7 (VA19) (+)	Always	50 kΩ or more
20	z17-7 (VA19) (-) - z17-2 (VA20) (+)	Always	50 kΩ or more
21	z17-2 (VA20) (-) - z17-1 (VA21) (+)	Always	50 kΩ or more
22	z17-1 (VA21) (-) - z17-6 (VA22) (+)	Always	50 kΩ or more
23	z17-6 (VA22) (-) - z17-5 (VA23) (+)	Always	50 kΩ or more
24	z17-5 (VA23) (-) - z17-18 (VA24) (+)	Always	50 kΩ or more

NOTICE:

- Make sure to check the polarity of each terminal (positive (+) or negative (-)) before connecting a tester.
- Read the resistance after the value has stabilized.
- In order to avoid damaging the terminals of the battery voltage sensor, make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the resistance of the battery voltage sensor.

RESULT	PROCEED TO
The resistance between the terminals is 50 kΩ or more.	A
Other than above	B

Post-procedure1

(c) Install the battery voltage sensor.

A ▶ **REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

B ▼

9.	**REPLACE NO. 1 HV SUPPLY STACK SUB-ASSEMBLY**

HINT:

Click here INFO

NEXT ▶ **REPLACE BATTERY VOLTAGE SENSOR**

10.	**CHECK NO. 2 HV SUPPLY STACK SUB-ASSEMBLY (HYBRID BATTERY CELL 25 TO 48 VOLTAGE)**

CAUTION:

- Be sure to wear insulated gloves and protective goggles.
- Disconnect only the connector corresponding to the HV battery cell to be checked. Do not disconnect the other connectors.

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the voltage of each HV battery cell.

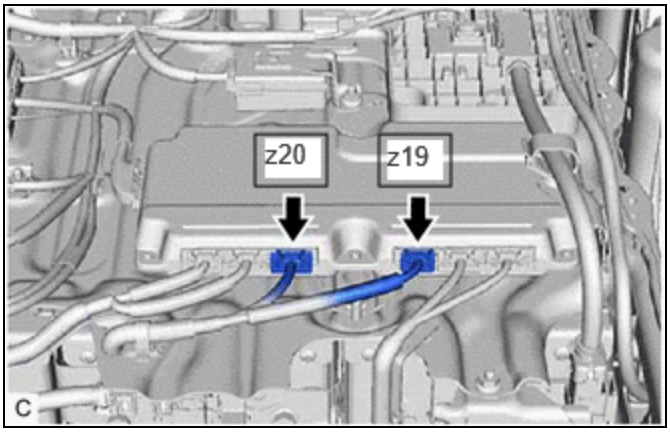
Pre-procedure1

(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 battery voltage sensor connectors.



NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.

Procedure1

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

HINT:

Measure the voltage of the HV battery cells whose value in the freeze frame data was 1.6 V or less only.

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION
25	z20-12 (GA2) (-) - z20-11 (VA25) (+)	Always
26	z20-11 (VA25) (-) - z20-10 (VA26) (+)	Always
27	z20-10 (VA26) (-) - z20-9 (VA27) (+)	Always
28	z20-9 (VA27) (-) - z20-8 (VA28) (+)	Always
29	z20-8 (VA28) (-) - z20-20 (VA29) (+)	Always
30	z20-20 (VA29) (-) - z20-7 (VA30) (+)	Always
31	z20-7 (VA30) (-) - z20-2 (VA31) (+)	Always
32	z20-2 (VA31) (-) - z20-1 (VA32) (+)	Always
33	z20-1 (VA32) (-) - z20-6 (VA33) (+)	Always
34	z20-6 (VA33) (-) - z20-5 (VA34) (+)	Always
35	z20-5 (VA34) (-) - z20-18 (VA35) (+)	Always
36	z20-18 (VA35) (-) - z19-21 (VA36) (+)	Always
37	z19-13 (GA3) (-) - z19-2 (VA37) (+)	Always
38	z19-2 (VA37) (-) - z19-12 (VA38) (+)	Always
39	z19-12 (VA38) (-) - z19-11 (VA39) (+)	Always
40	z19-11 (VA39) (-) - z19-10 (VA40) (+)	Always
41	z19-10 (VA40) (-) - z19-9 (VA41) (+)	Always
42	z19-9 (VA41) (-) - z19-8 (VA42) (+)	Always
43	z19-8 (VA42) (-) - z19-7 (VA43) (+)	Always
44	z19-7 (VA43) (-) - z19-6 (VA44) (+)	Always

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION
45	z19-6 (VA44) (-) - z19-5 (VA45) (+)	Always
46	z19-5 (VA45) (-) - z19-4 (VA46) (+)	Always
47	z19-4 (VA46) (-) - z19-1 (VA47) (+)	Always
48	z19-1 (VA47) (-) - z19-3 (VA48) (+)	Always

CAUTION:

Make sure not to cross the electrodes of an electrical tester measurement terminals.

NOTICE:

Make sure to check the polarity of each terminal (positive (+) or negative (-)) before connecting a tester.

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

Post-procedure1

(d) Reconnect the battery voltage sensor connectors.

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A ▼

11.	**CHECK BATTERY VOLTAGE SENSOR (VA25 - VA48)**

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the resistance.

Pre-procedure1

(a) Remove the battery voltage sensor.

HINT:

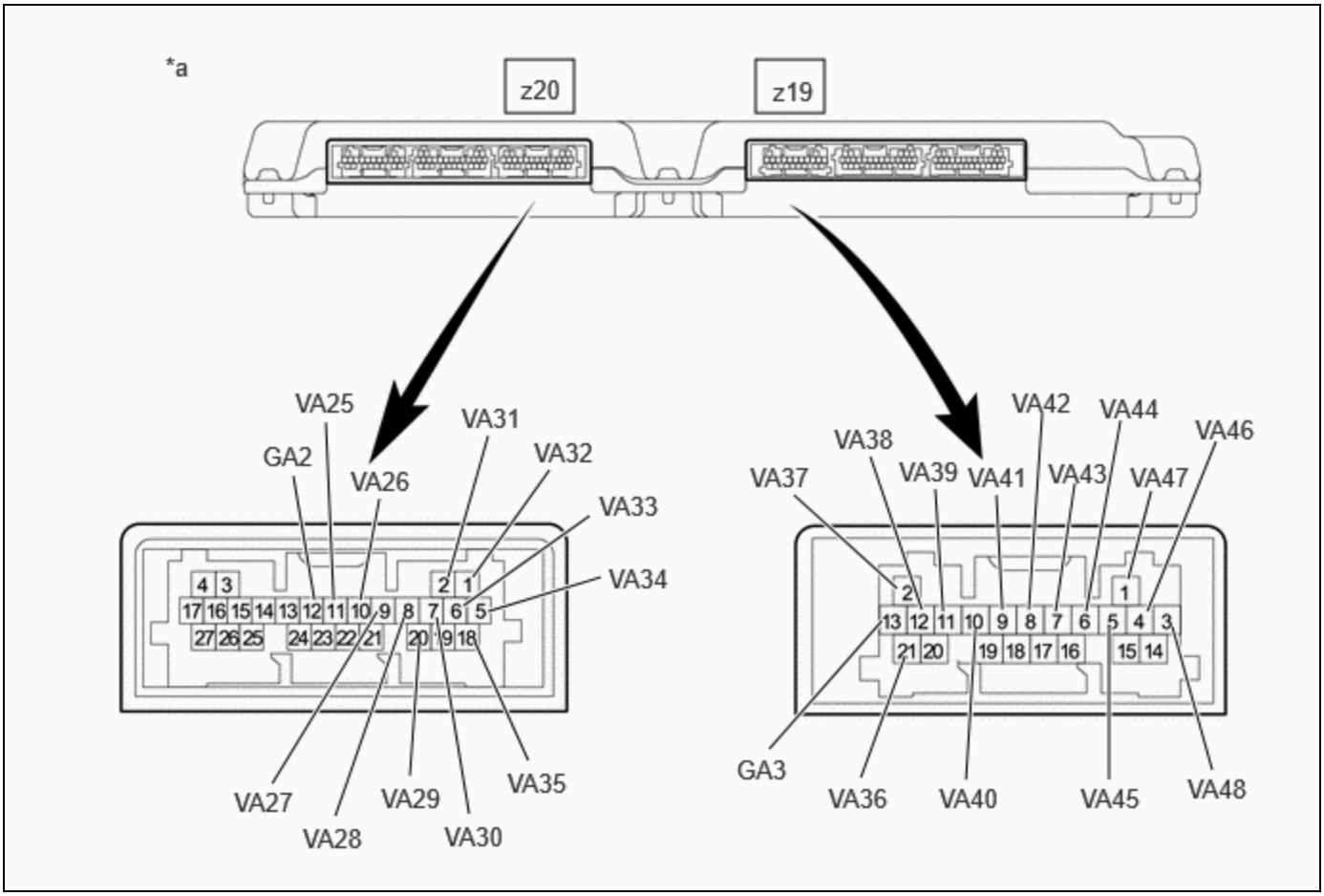
Click here INFO

Procedure1

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

HINT:

Only inspect the terminals of the battery voltage sensor which correspond to the HV battery cells which measured 1.6 V or less in the previous step.



*a	Component without harness connected (Battery Voltage Sensor)	-	-

Standard Resistance:

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION	SPECIFIED CONDITION
25	z20-12 (GA2) (-) - z20-11 (VA25) (+)	Always	50 kΩ or more
26	z20-11 (VA25) (-) - z20-10 (VA26) (+)	Always	50 kΩ or more
27	z20-10 (VA26) (-) - z20-9 (VA27) (+)	Always	50 kΩ or more
28	z20-9 (VA27) (-) - z20-8 (VA28) (+)	Always	50 kΩ or more
29	z20-8 (VA28) (-) - z20-20 (VA29) (+)	Always	50 kΩ or more
30	z20-20 (VA29) (-) - z20-7 (VA30) (+)	Always	50 kΩ or more
31	z20-7 (VA30) (-) - z20-2 (VA31) (+)	Always	50 kΩ or more
32	z20-2 (VA31) (-) - z20-1 (VA32) (+)	Always	50 kΩ or more
33	z20-1 (VA32) (-) - z20-6 (VA33) (+)	Always	50 kΩ or more
34	z20-6 (VA33) (-) - z20-5 (VA34) (+)	Always	50 kΩ or more
35	z20-5 (VA34) (-) - z20-18 (VA35) (+)	Always	50 kΩ or more
36	z20-18 (VA35) (-) - z19-21 (VA36) (+)	Always	50 kΩ or more
37	z19-13 (GA3) (-) - z19-2 (VA37) (+)	Always	50 kΩ or more

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION	SPECIFIED CONDITION
38	z19-2 (VA37) (-) - z19-12 (VA38) (+)	Always	50 kΩ or more
39	z19-12 (VA38) (-) - z19-11 (VA39) (+)	Always	50 kΩ or more
40	z19-11 (VA39) (-) - z19-10 (VA40) (+)	Always	50 kΩ or more
41	z19-10 (VA40) (-) - z19-9 (VA41) (+)	Always	50 kΩ or more
42	z19-9 (VA41) (-) - z19-8 (VA42) (+)	Always	50 kΩ or more
43	z19-8 (VA42) (-) - z19-7 (VA43) (+)	Always	50 kΩ or more
44	z19-7 (VA43) (-) - z19-6 (VA44) (+)	Always	50 kΩ or more
45	z19-6 (VA44) (-) - z19-5 (VA45) (+)	Always	50 kΩ or more
46	z19-5 (VA45) (-) - z19-4 (VA46) (+)	Always	50 kΩ or more
47	z19-4 (VA46) (-) - z19-1 (VA47) (+)	Always	50 kΩ or more
48	z19-1 (VA47) (-) - z19-3 (VA48) (+)	Always	50 kΩ or more

NOTICE:

- Make sure to check the polarity of each terminal (positive (+) or negative (-)) before connecting a tester.
- Read the resistance after the value has stabilized.
- In order to avoid damaging the terminals of the battery voltage sensor, make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the resistance of the battery voltage sensor.

RESULT	PROCEED TO
The resistance between the terminals is 50 kΩ or more.	A
Other than above	B

Post-procedure1

(c) Install the battery voltage sensor.

A ▶ **REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

B ▼

12.	**REPLACE NO. 2 HV SUPPLY STACK SUB-ASSEMBLY**

HINT:

Click here INFO

NEXT ▶ **REPLACE BATTERY VOLTAGE SENSOR**

13.	CHECK NO. 3 HV SUPPLY STACK SUB-ASSEMBLY (HYBRID BATTERY CELL 49 TO 72 VOLTAGE)

CAUTION:

- Be sure to wear insulated gloves and protective goggles.
- Disconnect only the connector corresponding to the HV battery cell to be checked. Do not disconnect the other connectors.

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the voltage of each HV battery cell.

Pre-procedure1

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

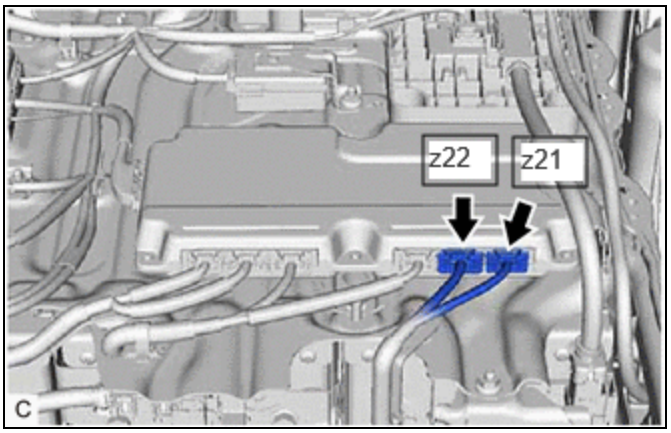
NOTICE:

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 battery voltage sensor connectors.

NOTICE:

Before disconnecting the connector, check that it is not loose or disconnected.



Procedure1

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

HINT:

Measure the voltage of the HV battery cells whose value in the freeze frame data was 1.6 V or less only.

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION
49	z22-11 (GA4) (-) - z22-10 (VA49) (+)	Always
50	z22-10 (VA49) (-) - z22-9 (VA50) (+)	Always
51	z22-9 (VA50) (-) - z22-3 (VA51) (+)	Always
52	z22-3 (VA51) (-) - z22-8 (VA52) (+)	Always
53	z22-8 (VA52) (-) - z22-2 (VA53) (+)	Always
54	z22-2 (VA53) (-) - z22-7 (VA54) (+)	Always
55	z22-7 (VA54) (-) - z22-1 (VA55) (+)	Always

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION
56	z22-1 (VA55) (-) - z22-6 (VA56) (+)	Always
57	z22-6 (VA56) (-) - z21-17 (VA57) (+)	Always
58	z21-17 (VA57) (-) - z21-16 (VA58) (+)	Always
59	z21-16 (VA58) (-) - z21-4 (VA59) (+)	Always
60	z21-4 (VA59) (-) - z21-3 (VA60) (+)	Always
61	z21-15 (GA5) (-) - z21-14 (VA61) (+)	Always
62	z21-14 (VA61) (-) - z21-13 (VA62) (+)	Always
63	z21-13 (VA62) (-) - z21-12 (VA63) (+)	Always
64	z21-12 (VA63) (-) - z21-11 (VA64) (+)	Always
65	z21-11 (VA64) (-) - z21-10 (VA65) (+)	Always
66	z21-10 (VA65) (-) - z21-9 (VA66) (+)	Always
67	z21-9 (VA66) (-) - z21-8 (VA67) (+)	Always
68	z21-8 (VA67) (-) - z21-7 (VA68) (+)	Always
69	z21-7 (VA68) (-) - z21-2 (VA69) (+)	Always
70	z21-2 (VA69) (-) - z21-1 (VA70) (+)	Always
71	z21-1 (VA70) (-) - z21-6 (VA71) (+)	Always
72	z21-6 (VA71) (-) - z21-5 (VA72) (+)	Always

CAUTION:

Make sure not to cross the electrodes of an electrical tester measurement terminals.

NOTICE:

Make sure to check the polarity of each terminal (positive (+) or negative (-)) before connecting a tester.

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

Post-procedure1

(d) Reconnect the battery voltage sensor connectors.

B ▶ **REPLACE BATTERY VOLTAGE SENSOR**

A

14.	CHECK BATTERY VOLTAGE SENSOR (VA49 - VA72)

NOTICE:

Make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the resistance.

Pre-procedure1

(a) Remove the battery voltage sensor.

HINT:

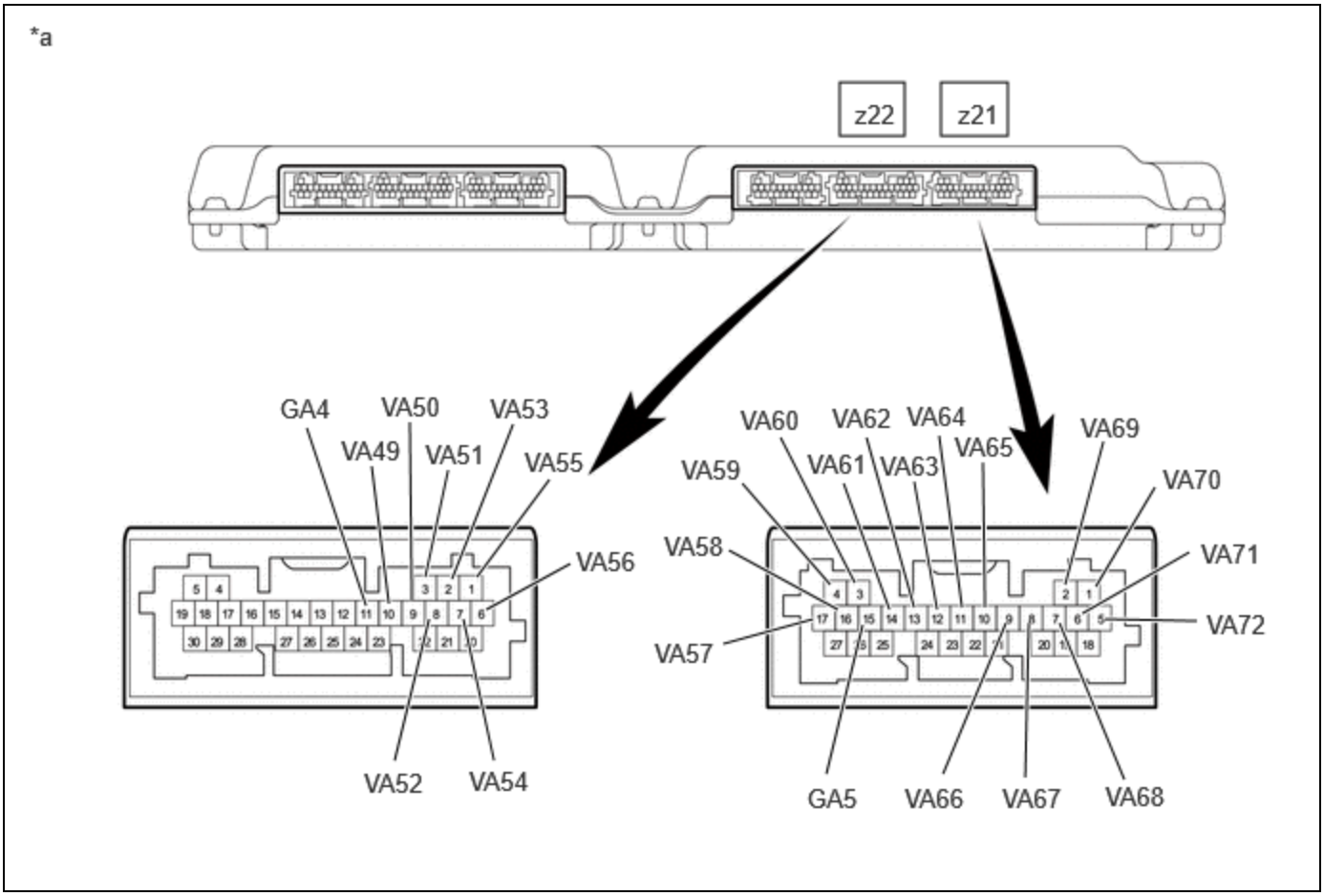
Click here INFO

Procedure1

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

HINT:

Only inspect the terminals of the battery voltage sensor which correspond to the HV battery cells which measured 1.6 V or less in the previous step.



*a	Component without harness connected (Battery Voltage Sensor)	-	-

Standard Resistance:

HYBRID BATTERY CELL	TESTER CONNECTION (TESTER PROBE POLARITY)	CONDITION	SPECIFIED CONDITION
49	z22-11 (GA4) (-) - z22-10 (VA49) (+)	Always	50 kΩ or more
50	z22-10 (VA49) (-) - z22-9 (VA50) (+)	Always	50 kΩ or more
51	z22-9 (VA50) (-) - z22-3 (VA51) (+)	Always	50 kΩ or more
52	z22-3 (VA51) (-) - z22-8 (VA52) (+)	Always	50 kΩ or more
53	z22-8 (VA52) (-) - z22-2 (VA53) (+)	Always	50 kΩ or more
54	z22-2 (VA53) (-) - z22-7 (VA54) (+)	Always	50 kΩ or more
55	z22-7 (VA54) (-) - z22-1 (VA55) (+)	Always	50 kΩ or more
56	z22-1 (VA55) (-) - z22-6 (VA56) (+)	Always	50 kΩ or more
57	z22-6 (VA56) (-) - z21-17 (VA57) (+)	Always	50 kΩ or more
58	z21-17 (VA57) (-) - z21-16 (VA58) (+)	Always	50 kΩ or more
59	z21-16 (VA58) (-) - z21-4 (VA59) (+)	Always	50 kΩ or more
60	z21-4 (VA59) (-) - z21-3 (VA60) (+)	Always	50 kΩ or more
61	z21-15 (GA5) (-) - z21-14 (VA61) (+)	Always	50 kΩ or more
62	z21-14 (VA61) (-) - z21-13 (VA62) (+)	Always	50 kΩ or more
63	z21-13 (VA62) (-) - z21-12 (VA63) (+)	Always	50 kΩ or more
64	z21-12 (VA63) (-) - z21-11 (VA64) (+)	Always	50 kΩ or more
65	z21-11 (VA64) (-) - z21-10 (VA65) (+)	Always	50 kΩ or more
66	z21-10 (VA65) (-) - z21-9 (VA66) (+)	Always	50 kΩ or more
67	z21-9 (VA66) (-) - z21-8 (VA67) (+)	Always	50 kΩ or more
68	z21-8 (VA67) (-) - z21-7 (VA68) (+)	Always	50 kΩ or more
69	z21-7 (VA68) (-) - z21-2 (VA69) (+)	Always	50 kΩ or more
70	z21-2 (VA69) (-) - z21-1 (VA70) (+)	Always	50 kΩ or more
71	z21-1 (VA70) (-) - z21-6 (VA71) (+)	Always	50 kΩ or more
72	z21-6 (VA71) (-) - z21-5 (VA72) (+)	Always	50 kΩ or more

NOTICE:

- Make sure to check the polarity of each terminal (positive (+) or negative (-)) before connecting a tester.
- Read the resistance after the value has stabilized.
- In order to avoid damaging the terminals of the battery voltage sensor, make sure to use tester probes with a diameter of approximately 0.5 mm (0.0197 in.) when measuring the resistance of the battery voltage sensor.

RESULT	PROCEED TO
The resistance between the terminals is 50 kΩ or more.	A
Other than above	B

Post-procedure1

(c) Install the battery voltage sensor.

A ▶ REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY

B ▼

15.	REPLACE NO. 3 HV SUPPLY STACK SUB-ASSEMBLY

HINT:

Click here INFO

NEXT ▶ REPLACE BATTERY VOLTAGE SENSOR