Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002QLTI
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: PLUG-IN CHARGE CONTROL SYSTEM (for PHEV Model): P0D4C36; Hybrid/EV Battery Charger Hybrid/EV Battery Input Voltage Sensor Signal Frequency Too Low; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P0D4C36**	**Hybrid/EV Battery Charger Hybrid/EV Battery Input Voltage Sensor Signal Frequency Too Low**

DTC SUMMARY

MALFUNCTION DESCRIPTION

The charge control ECU built into the electric vehicle charger assembly monitors the direct current voltage by the VCHG sensor. If it detects a VCHG sensor malfunction or an external malfunction of the electric vehicle charger assembly, it illuminates the MIL and stores a DTC.

The cause of this malfunction may be one of the following:

Low-voltage circuit (12 V) malfunction

- Charge control ECU failure (CPU malfunction, VCHG sensor malfunction)
- Hybrid vehicle control ECU assembly malfunction (open circuit/temporary interruption)
- SMR relay operation command circuit malfunction (between the battery ECU assembly and the No. 1 traction battery device box)

High voltage system malfunction

- Charging circuit malfunction
  - High voltage fuse malfunction in No. 1 traction battery device box
  - High voltage circuit malfunction in the electric vehicle charger assembly (open circuit/temporary interruption)
  - Electric vehicle charger assembly - No. 1 traction battery device box
- Traction battery device box malfunction
  - SMR relay malfunction (open circuit/temporary interruption)
  - High voltage circuit between the HV battery and the No. 1 traction battery device box (open circuit/temporary interruption)

DESCRIPTION

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0D4C36	Hybrid/EV Battery Charger Hybrid/EV Battery Input Voltage Sensor Signal	When charging or supplying power, the frequency of the VCHG sensor is more	• AC charging fuse (high voltage fuse) (No. 1 traction battery device box)	Comes on	Master Warning: Comes on	Plug-in Control	B	SAE Code: P0D4E

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
	Frequency Too Low	than the threshold (1 trip detection logic)	• No. 1 traction battery device box • Electric vehicle charger assembly • Wire harness or connector					

MONITOR DESCRIPTION

The charge control ECU built into the electric vehicle charger assembly monitors the direct current voltage by the VCHG sensor. If it detects a VCHG sensor malfunction, it illuminates the MIL and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0D4E: Battery Charger Hybrid/EV Battery Output Voltage Sensor "A" Circuit Low/High
Required sensors/components	Electric vehicle charger assembly
Frequency of operation	Continuous
Duration	TMC's intellectual property
MIL operation	1 charging cycle 1 discharging 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

Electric vehicle charger assembly	DTC P0D4C36 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. Enter the following menus: Powertrain / Hybrid Control / Data List.
3. Check that "Hybrid/EV Battery SOC" shows 70% or less.
4. Turn the ignition switch off and wait for 2 minutes or more.
5. Connect the electric vehicle charger cable assembly, plug-in charge the vehicle for 30 seconds or more. [*1]
6. Disconnect the electric vehicle charger cable assembly and wait for 10 seconds or more. [*2]

HINT:

[*1] to [*2]: 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: Powertrain / Plug-in Control / 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 or N/A, perform the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for DTC P19CC19.

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CAUTION / NOTICE / HINT

CAUTION:

Refer to the precautions before inspecting high voltage circuit.

Click here INFO

NOTICE:

- If the DTCs are cleared or the cable is disconnected from and reconnected to the negative (-) auxiliary battery terminal before performing repairs, connecting the electric vehicle charger cable assembly connector may cause a malfunction. Do not connect the electric vehicle charger cable assembly connector.
- 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 (HYBRID CONTROL, HV BATTERY, PLUG-IN CONTROL)

Pre-procedure1

(a) Enter the following menus.

Powertrain > Hybrid Control > Trouble Codes
Powertrain > HV Battery > Trouble Codes
Powertrain > Plug-in Control > Trouble Codes

Procedure1

(b) Check for DTCs.

RESULT	PROCEED TO
P0D4C36 only is output, or DTCs except the ones in the table below are also output	A
DTCs of Hybrid Control System in the tables below are output	B
DTCs of Hybrid Battery System in the tables below are output	C
DTCs of Plug-in Charge Control System in the tables below are output	D

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
Microcomputer malfunction	Hybrid Control System	P060647	Hybrid/EV Powertrain Control Module Processor Watchdog / Safety MCU Failure
		P060694	Hybrid/EV Powertrain Control Module Processor Unexpected Operation
		P060A29	Hybrid/EV Powertrain Control Module Monitoring Processor Signal Invalid
		P060A44	Hybrid/EV Powertrain Control Module Monitoring Processor Data Memory Failure
		P060A45	Hybrid/EV Powertrain Control Module Monitoring Processor Program Memory Failure
		P060A47	Hybrid/EV Powertrain Control Module Monitoring Processor Watchdog / Safety MCU Failure
		P060A49	Hybrid/EV Powertrain Control Module Monitoring Processor Internal Electronic Failure
		P060A94	Hybrid/EV Powertrain Control Module Monitoring Processor Unexpected Operation
	Hybrid Battery System	P060687	Hybrid/EV Battery Energy Control Module Processor to Monitoring Processor Missing Message
		P060A47	Hybrid/EV Battery Energy Control Module Monitoring Processor Watchdog / Safety MCU Failure

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
		P060A87	Hybrid/EV Battery Energy Control Module Processor from Monitoring Processor Missing Message
		P060B49	Hybrid/EV Battery Energy Control Module A/D Processing Internal Electronic Failure
	Plug-in Charge Control System	P168749	AC Onboard Charger Module A/D Processing Internal Electronic Failure
Power source circuit malfunction	Hybrid Control System	P06881F	ECM/PCM Power Relay Sense Circuit Intermittent
	Hybrid Battery System	P056014	System Voltage (BATT) Circuit Short to Ground or Open
		P1CBB12	Hybrid/EV Battery Current Sensor Power Supply Circuit Short to Auxiliary Battery
		P1CBB14	Hybrid/EV Battery Current Sensor Power Supply Circuit Short to Ground or Open
Communication system malfunction	Hybrid Control System	P060687	Hybrid/EV Powertrain Control Module Processor to Monitoring Processor Missing Message
		P060A87	Hybrid/EV Powertrain Control Module Processor from Monitoring Processor Missing Message
		U011187	Lost Communication with Hybrid/EV Battery Energy Control Module "A" Missing Message
		U019B87	Lost Communication with Hybrid/EV Battery Charger Control Module Missing Message
	Hybrid Battery System	U029387	Lost Communication with Hybrid/EV Powertrain Control Module Missing Message
	Plug-in Charge Control System	U01BB87	Lost Communication with Battery Charger Control Module "B" Missing Message
		U117B87	Lost Communication with Hybrid/EV Battery Energy Control Module "A" (ch2) Missing Message
Sensor and actuator circuit malfunction	Hybrid Battery System	P0ABF11	Hybrid/EV Battery Current Sensor "A" Circuit Short to Ground
		P0ABF15	Hybrid/EV Battery Current Sensor "A" Circuit Short to Auxiliary Battery or Open
		P0ABF28	Hybrid/EV Battery Current Sensor "A" Signal Bias Level Out of Range / Zero Adjustment Failure
		P0ABF2A	Hybrid/EV Battery Current Sensor "A" Signal Stuck In Range
		P0B0E11	Hybrid/EV Battery Current Sensor "B" Circuit Short to Ground
		P0B0E15	Hybrid/EV Battery Current Sensor "B" Circuit Short to Auxiliary Battery or Open
		P0B1362	Hybrid/EV Battery Current Sensor "A"/"B" Signal Compare Failure

MALFUNCTION CONTENT	SYSTEM	RELEVANT DTC	
	Plug-in Charge Control System	P0D4C37	Hybrid/EV Battery Charger Hybrid/EV Battery Input Voltage Sensor Signal Frequency Too High
System malfunction	Hybrid Control System	P0A0A92	High Voltage System Interlock Performance or Incorrect Operation
		P0A1F94	Hybrid/EV Battery Energy Control Module Unexpected Operation
	Hybrid Battery System	P1AC413	Hybrid/EV Battery Stack 1 Current Interrupt Device Circuit Open
		P1AC49E	Hybrid/EV Battery Stack 1 Current Interrupt Device Stuck On
		P1AC513	Hybrid/EV Battery Stack 2 Current Interrupt Device Circuit Open
		P1AC59E	Hybrid/EV Battery Stack 2 Current Interrupt Device Stuck On
		P1AC613	Hybrid/EV Battery Stack 3 Current Interrupt Device Circuit Open
		P1AC69E	Hybrid/EV Battery Stack 3 Current Interrupt Device Stuck On
	Plug-in Charge Control System	P1C2617	Hybrid/EV Battery Charger Hybrid/EV Battery Input Voltage Sensor Circuit Voltage Above Threshold

HINT:

- P0D4C36 may be output as a result of the malfunction indicated by the DTCs above.

  a. The chart above is listed in inspection order of priority.
  b. Check DTCs that are output at the same time by following the listed order. (The main cause of the malfunction can be determined without performing unnecessary inspections.)

Post-procedure1

(c) Turn the ignition switch off.

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

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

D ▶ **GO TO DTC CHART (PLUG-IN CHARGE CONTROL SYSTEM)**

A

2.	**CHECK CONNECTOR CONNECTION CONDITION (ELECTRIC VEHICLE CHARGER 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, unless instructed by the repair manual because this may cause a malfunction.

Procedure1

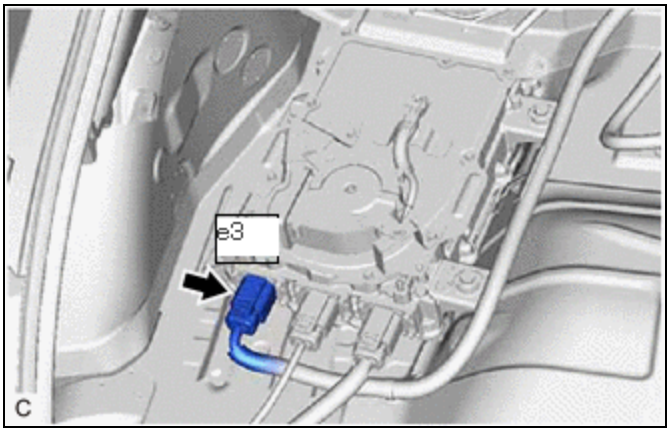
(b) Check the electric vehicle charger assembly connector is connected securely, and there are no contact problems.

(c) Check the contact pressure of each terminal of the electric vehicle charger assembly connector and check for foreign matter or arc marks on the terminals.

Click here INFO

Result:

RESULT		PROCEED TO
The terminals are connected securely and there are no contact problems.	There is neither foreign matter nor arc marks.	A
The terminals are not connected securely and there is a contact problem.	There is any of foreign matter or arc marks.	B
The terminals are not connected securely and there is a contact problem.	There is neither foreign matter nor arc marks.	C
The terminals are connected securely and there are no contact problems.	There is any of foreign matter or arc marks.	B



Post-procedure1

(d) None

B ▶ **REPLACE MALFUNCTIONING PARTS**

C ▶ **CONNECT SECURELY**

A

3.	INSPECT ELECTRIC VEHICLE CHARGER ASSEMBLY

CAUTION:

Be sure to wear insulated gloves.

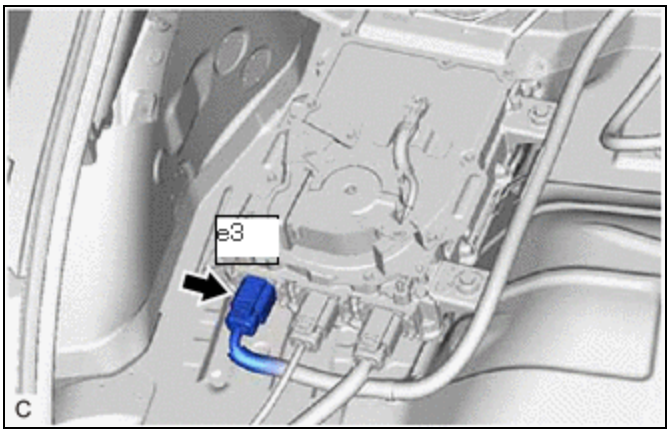
Pre-procedure1

(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 electric vehicle charger assembly connector.



Procedure1

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

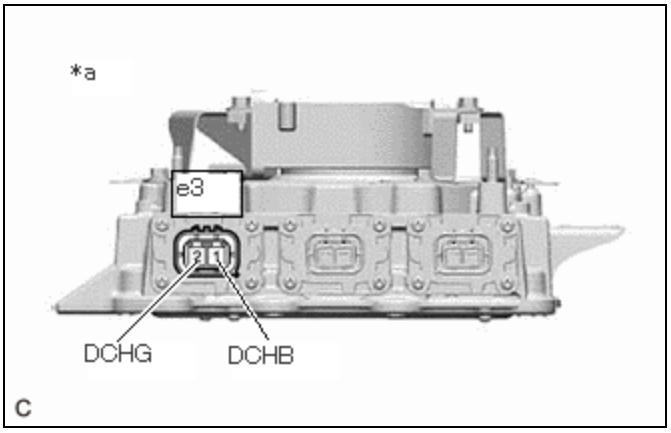
NOTICE:

As there is a condenser in the charger and the value does not stabilize, wait a certain period of time for the value to settle when using the tester.

Standard Resistance:

EWD INFO

Click Location & Routing(e3)
Click Connector(e3)



*a	Component without harness connected (Electric Vehicle Charger Assembly)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
e3-1 (DCHB) - e3-2 (DCHG)	Ignition switch off	Less than 500 kΩ

Result:

PROCEED TO
OK
NG

Post-procedure1

(d) Reconnect the electric vehicle charger assembly connector.

NG ▶ **REPLACE ELECTRIC VEHICLE CHARGER ASSEMBLY**

OK ▼

4.	CHECK CONNECTOR CONNECTION CONDITION (FLOOR UNDER WIRE 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, unless instructed by the repair manual because this may cause a malfunction.

Procedure1

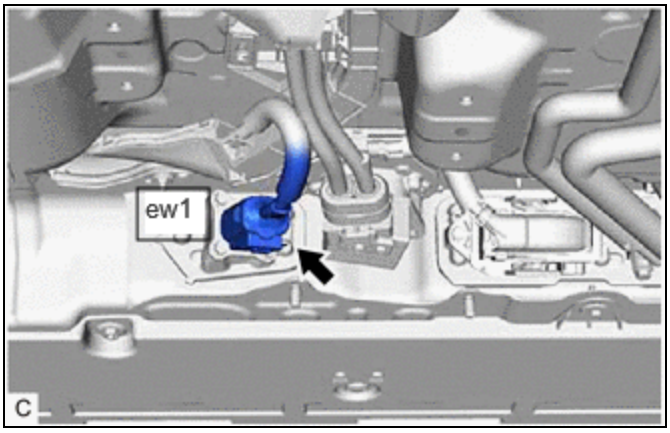
(b) Check the floor under wire connector is connected securely, and there are no contact problems.

(c) Check the contact pressure of each terminal of the floor under wire connector and check for foreign matter or arc marks on the terminals.

Click here INFO

Result:

RESULT		PROCEED TO
The terminals are connected securely and there are no contact problems.	There is neither foreign matter nor arc marks.	A
The terminals are not connected securely and there is a contact problem.	There is any of foreign matter or arc marks.	B
The terminals are not connected securely and there is a contact problem.	There is neither foreign matter nor arc marks.	C
The terminals are connected securely and there are no contact problems.	There is any of foreign matter or arc marks.	B



Post-procedure1

(d) None

B ▶ **REPLACE MALFUNCTIONING PARTS**

C ▶ **CONNECT SECURELY**

A ▼

5.	**CHECK HARNESS AND CONNECTOR (ELECTRIC VEHICLE CHARGER ASSEMBLY - HV SUPPLY BATTERY ASSEMBLY)**

CAUTION:

Be sure to wear insulated gloves.

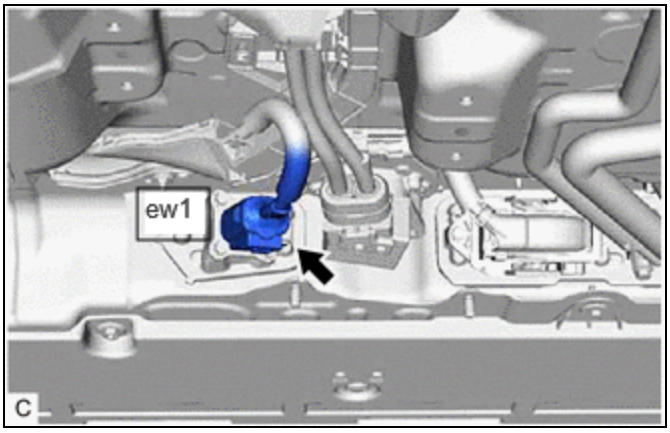
Pre-procedure1

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

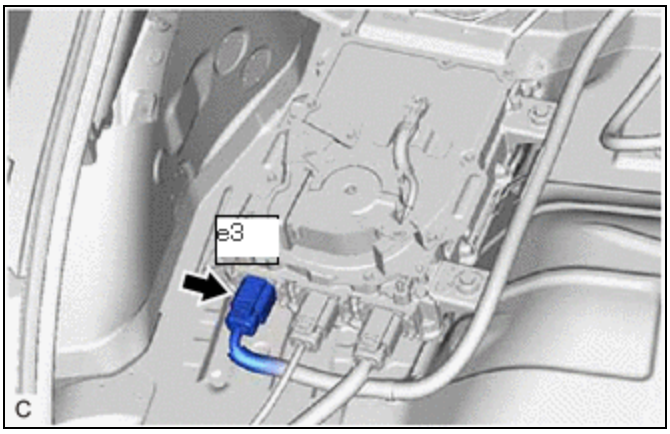
NOTICE:

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 floor under wire connector.



(c) Disconnect the electric vehicle charger assembly connector.



Pre-procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(e3,ew1)
Click Connector(e3)
Click Connector(ew1)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
e3-1 (DCHB) - ew1-2	Ignition switch off	Below 1 Ω
e3-2 (DCHG) - ew1-1	Ignition switch off	Below 1 Ω

Post-procedure1

(e) Reconnect the floor under wire connector.

(f) Reconnect the electric vehicle charger assembly connector.

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6.	**CHECK CONNECTOR CONNECTION CONDITION (NO. 1 TRACTION BATTERY DEVICE BOX 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, unless instructed by the repair manual because this may cause a malfunction.

Procedure1

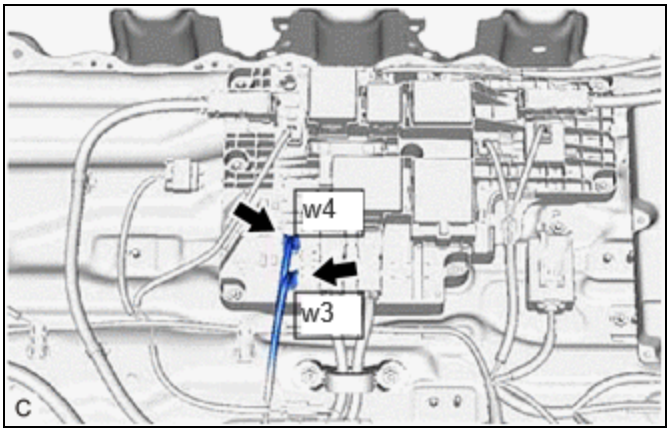
(b) Check the HV battery high voltage connectors is connected securely, and there are no contact problems.

(c) Check the contact pressure of each terminal of the HV battery high voltage connectors and check for foreign matter or arc marks on the terminals.

Click here INFO

Result:

RESULT		PROCEED TO
The terminals are connected securely and there are no contact problems.	There is neither foreign matter nor arc marks.	A
The terminals are not connected securely and there is a contact problem.	There is any of foreign matter or arc marks.	B
The terminals are not connected securely and there is a contact problem.	There is neither foreign matter nor arc marks.	C
The terminals are connected securely and there are no contact problems.	There is any of foreign matter or arc marks.	B



Post-procedure1

(d) None

B ▶ **REPLACE MALFUNCTIONING PARTS**

C ▶ **CONNECT SECURELY**

A

▼

7.	**INSPECT NO. 1 TRACTION BATTERY DEVICE BOX (AC CHARGING FUSE (HIGH VOLTAGE FUSE))**

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) Remove the No. 1 traction battery device box.

Click here INFO

Procedure1

(c) Check the AC charging fuse (high voltage fuse) from the No. 1 traction battery device box.

OK:

There is no open circuit in the AC charging fuse (high voltage fuse).

Post-procedure1

(d) Install the No. 1 traction battery device box.

NG ▶ **REPLACE NO. 1 TRACTION BATTERY DEVICE BOX**

OK

▼

8.	**CHECK HARNESS AND CONNECTOR (NO. 1 TRACTION BATTERY DEVICE BOX - HV SUPPLY BATTERY ASSEMBLY)**

CAUTION:

Be sure to wear insulated gloves.

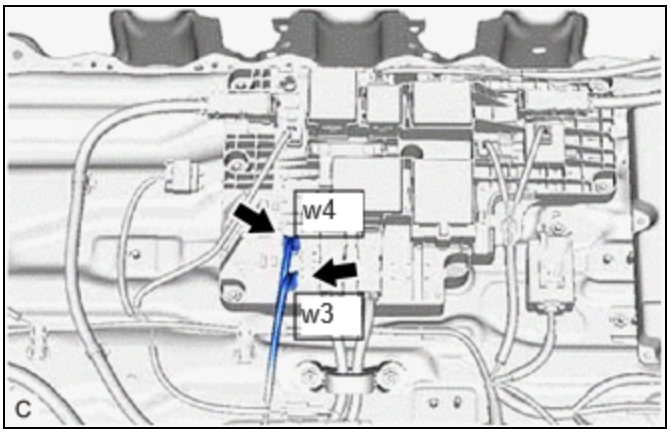
Pre-procedure1

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

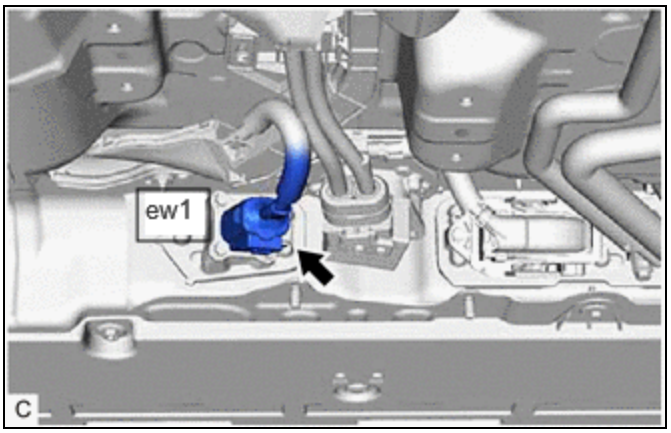
NOTICE:

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 HV battery high voltage connectors.



(c) Disconnect the floor under wire connector.



Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(ew1,w3,w4)
Click Connector(ew1)
Click Connector(w3)
Click Connector(w4)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
ew1-2 - w3-1	Ignition switch off	Below 1 Ω
ew1-1 - w4-1	Ignition switch off	Below 1 Ω

Post-procedure1

(e) Reconnect the HV battery high voltage connector.

(f) Reconnect the floor under wire connector.

OK ▶ **REPLACE ELECTRIC VEHICLE CHARGER ASSEMBLY**

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