Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BHWE
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID BATTERY SYSTEM (for PHEV Model): P0C4211,P0C4215,P0CD511,P0CD515; Hybrid/EV Battery Pack Coolant Temperature Sensor "A" Circuit Low Circuit Short to Ground; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P0C4211**	**Hybrid/EV Battery Pack Coolant Temperature Sensor "A" Circuit Low Circuit Short to Ground**

DTC	**P0C4215**	**Hybrid/EV Battery Pack Coolant Temperature Sensor "A" Circuit High Circuit Short to Auxiliary Battery or Open**

DTC	**P0CD511**	**Hybrid/EV Battery Pack Coolant Temperature Sensor "B" Circuit Low Circuit Short to Ground**

DTC	**P0CD515**	**Hybrid/EV Battery Pack Coolant Temperature Sensor "B" Circuit High Circuit Short to Auxiliary Battery or Open**

DESCRIPTION

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0C4211	Hybrid/EV Battery Pack Coolant Temperature Sensor "A" Circuit Low Circuit Short to Ground	The battery pack coolant temperature sensor is malfunctioning, its output voltage is lower than the specified value (short circuit) and the detected temperature is higher than the specified value. (1 trip detection logic)	• Battery ECU assembly • Wire harness or connector • No. 1 traction battery cooler tube (duct inlet 1)	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C44
P0C4215	Hybrid/EV Battery Pack Coolant Temperature Sensor "A"	The battery pack coolant temperature sensor is malfunctioning, its	• Battery ECU assembly • Wire harness or	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0C45

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
	Circuit High Circuit Short to Auxiliary Battery or Open	output voltage is higher than the specified value (short to +B or open) and the detected temperature is lower than the specified value. (2 trip detection logic)	connector • No. 1 traction battery cooler tube (duct inlet 1)					
P0CD511	Hybrid/EV Battery Pack Coolant Temperature Sensor "B" Circuit Low Circuit Short to Ground	The battery pack coolant temperature sensor is malfunctioning, its output voltage is lower than the specified value (short circuit) and the detected temperature is higher than the specified value. (1 trip detection logic)	• Battery ECU assembly • Wire harness or connector • No. 1 traction battery cooler conductor (duct outlet 1)	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0CD7
P0CD515	Hybrid/EV Battery Pack Coolant Temperature Sensor "B" Circuit High Circuit Short to Auxiliary Battery or Open	The battery pack coolant temperature sensor is malfunctioning, its output voltage is higher than the specified value (short to +B or open) and the detected temperature is lower than the specified value. (2 trip detection logic)	• Battery ECU assembly • Wire harness or connector • No. 1 traction battery cooler conductor (duct outlet 1)	Comes on	Master Warning: Comes on	HV Battery	A	SAE Code: P0CD8

MONITOR DESCRIPTION

If the battery ECU assembly detects a malfunction in a air conditioning thermistor assembly, the battery ECU assembly will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P0C44 (INF P0C4211): Hybrid Battery Pack Coolant Temperature Sensor 1 (Battery Refrigerant Inlet 1) Range check (Low voltage) P0C45 (INF P0C4215): Hybrid Battery Pack Coolant Temperature Sensor 1 (Battery Refrigerant Inlet 1) Range check (High voltage) P0CD7 (INF P0CD511): Hybrid Battery Pack Coolant Temperature Sensor 2 (Battery Refrigerant Inlet 1) Range check (Low voltage) P0CD8 (INF P0CD515): Hybrid Battery Pack Coolant Temperature Sensor 2 (Battery Refrigerant Inlet 1) Range check (High voltage)
Required sensors/components	Air Conditioning Thermistor
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 P0C44 (INF P0C4211) is not detected DTC P0C45 (INF P0C4215) is not detected DTC P0CD7 (INF P0CD511) is not detected DTC P0CD8 (INF P0CD515) 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. Drive the vehicle on urban roads for approximately 10 minutes.[*1]

HINT:

[*1]: Normal judgment procedure.

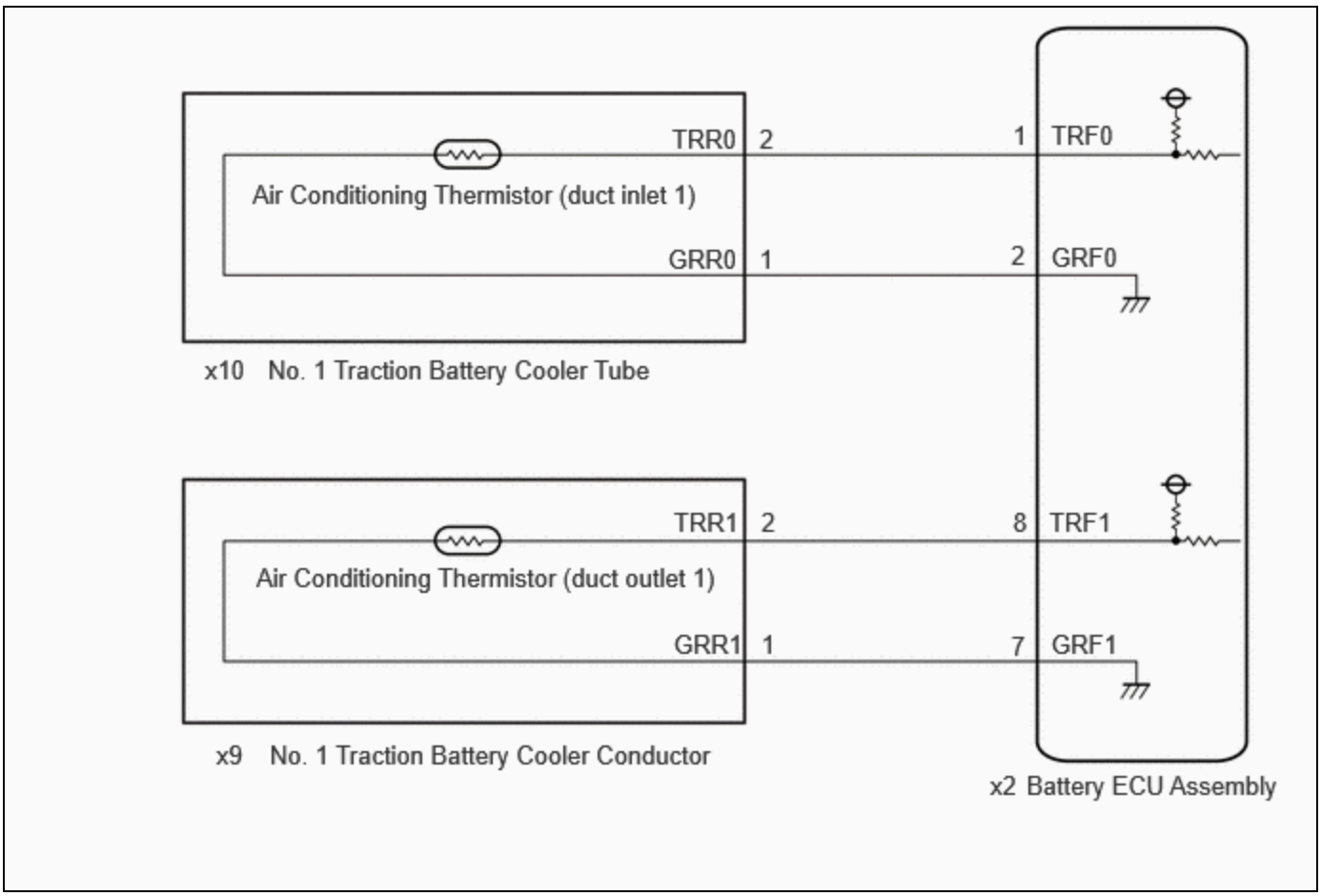
The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

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



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
"P0C4211, P0C4215, P0CD511 or P0CD515" 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 CONNECTOR CONNECTION CONDITION (BATTERY ECU ASSEMBLY)

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 ECU assembly connector.

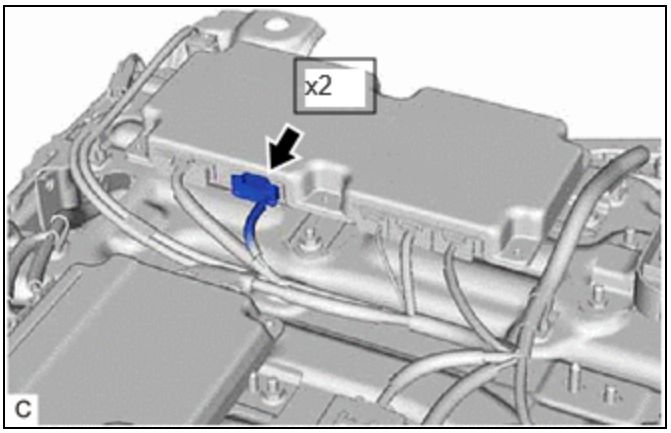
HINT:

Click here INFO

OK:

The connectors are connected securely and there are no contact pressure problems.

Result:



PROCEED TO
OK
NG

Post-procedure1

(c) None

NG ▶ **CONNECT SECURELY**

OK

3.	CHECK DTC

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

RESULT	PROCEED TO
"P0C4211 or P0C4215" is also output.	A
"P0CD511 or P0CD515" is also output.	B

B ▶ **GO TO STEP 6**

A ▼

4.	**CHECK NO. 1 TRACTION BATTERY COOLER TUBE (DUCT INLET 1)**

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.

(b) Connect the SST.

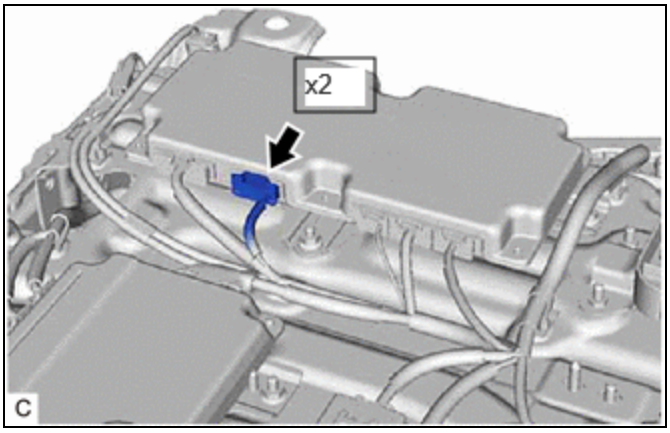
HINT:

Click here INFO

(c) Disconnect the battery ECU assembly connector.

NOTICE:

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



Procedure1

(d) Measure the resistance of the circuit for the malfunctioning sensor.

Tester Connection:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	AIR CONDITIONING THERMISTOR
X2-1 (TRF0) - x2-2 (GRF0)	Duct Inlet 1

Standard Resistance:

THERMISTOR TEMPERATURE	CONDITION	SPECIFIED CONDITION
0 to 10°C (32 to 50°F)	Ignition switch off	3.876 to 6.059 kΩ
10 to 20°C (50 to 68°F)	Ignition switch off	2.574 to 3.957 kΩ
20 to 30°C (68 to 86°F)	Ignition switch off	1.752 to 2.660 kΩ
30 to 40°C (86 to 104°F)	Ignition switch off	1.222 to 1.831 kΩ
40 to 50°C (104 to 122°F)	Ignition switch off	0.869 to 1.285 kΩ

Procedure2

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

Standard Resistance:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-1 (TRF0) - Body ground and other terminals (except x2-2 (GRF0))	Ignition switch off	10 kΩ or higher
x2-2 (GRF0) - Body ground and other terminals (except x2-1 (TRF0))	Ignition switch off	10 kΩ or higher

Pre-procedure2

(f) Connect the cable to the negative (-) auxiliary battery terminal.

(g) Turn the ignition switch to ON.

Procedure3

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

Standard Voltage:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-1 (TRF0) - Body ground	Ignition switch ON	Below 1 V

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-2 (GRF0) - Body ground	Ignition switch ON	Below 1 V

NOTICE:

- Turning the ignition switch to ON with the service plug grip removed causes other DTCs to be stored. Clear the DTCs after performing this inspection.
- If the ignition switch is turned to ON with the connectors disconnected, other DTCs will be stored. Be sure to clear the DTCs after the inspection.

Post-procedure1

(i) Turn the ignition switch off.

(j) Reconnect the battery ECU assembly connector.

(k) Disconnect the cable from the negative (-) auxiliary battery terminal.

(l) Disconnect the SST.

OK ▶ **REPLACE BATTERY ECU ASSEMBLY**

NG ▼

5.	**CHECK HARNESS AND CONNECTOR (NO. 1 TRACTION BATTERY COOLER TUBE (DUCT INLET 1) - BATTERY ECU ASSEMBLY)**

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.

(b) Connect the SST.

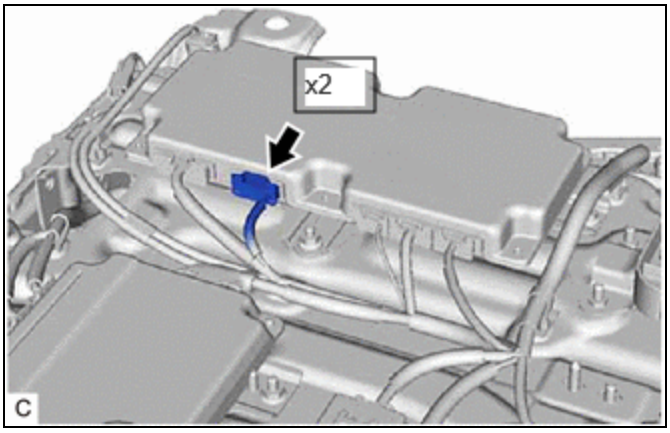
HINT:

Click here INFO

(c) Disconnect the battery ECU assembly connector.

NOTICE:

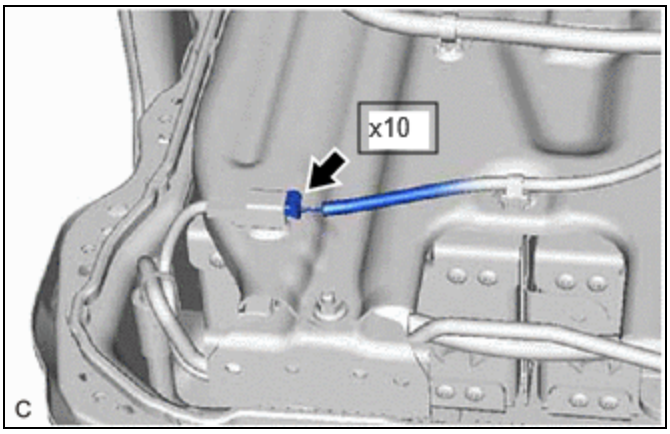
Before disconnecting the connector, check that it is not loose or disconnected.



(d) Disconnect the No. 1 traction battery cooler tube connector.

NOTICE:

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



Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(x10,x2)
Click Connector(x10)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x10-2 (TRR0) - x2-1 (TRF0)	Ignition switch off	Below 1 Ω
x10-1 (GRR0) - x2-2 (GRF0)	Ignition switch off	Below 1 Ω
x10-2 (TRR0) or x2-1 (TRF0) - Body ground and other terminals	Ignition switch off	10 kΩ or higher
x10-1 (GRR0) or x2-2 (GRF0) - Body ground and other terminals	Ignition switch off	10 kΩ or higher

Pre-procedure2

(f) Connect the cable to the negative (-) auxiliary battery terminal.

(g) Turn the ignition switch to ON.

Procedure2

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

Standard Voltage:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-1 (TRF0) - Body ground	Ignition switch ON	Below 1 V
x2-2 (GRF0) - Body ground	Ignition switch ON	Below 1 V

NOTICE:

- Turning the ignition switch to ON with the service plug grip removed causes other DTCs to be stored. Clear the DTCs after performing this inspection.
- If the ignition switch is turned to ON with the connectors disconnected, other DTCs will be stored. Be sure to clear the DTCs after the inspection.

Post-procedure1

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) auxiliary battery terminal.

(k) Reconnect the No. 1 traction battery cooler tube connector.

(l) Reconnect the battery ECU assembly connector.

(m) Disconnect the SST.

OK ▶ **REPLACE NO. 1 TRACTION BATTERY COOLER TUBE**

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

6.	**CHECK NO. 1 TRACTION BATTERY COOLER CONDUCTOR (DUCT OUTLET 1)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

Pre-procedure1

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

NOTICE:

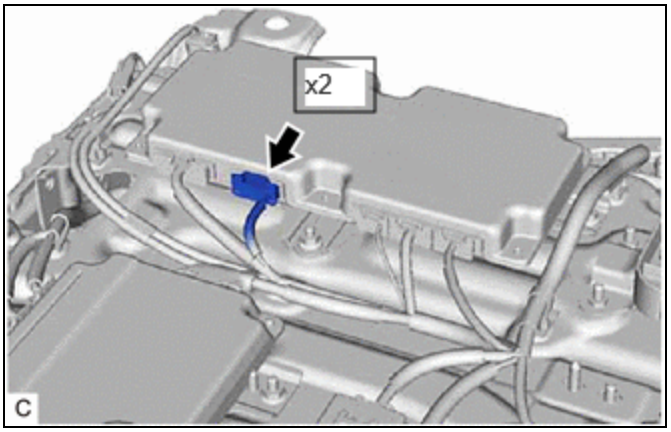
After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

(b) Connect the SST.

HINT:

Click here INFO

(c) Disconnect the battery ECU assembly connector.



NOTICE:

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

Procedure1

(d) Measure the resistance of the circuit for the malfunctioning sensor.

Tester Connection:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	AIR CONDITIONING THERMISTOR
x2-8(TRF1) - x2-7(GRF1)	Duct Inlet 1

Standard Resistance:

THERMISTOR TEMPERATURE	CONDITION	SPECIFIED CONDITION
0 to 10°C (32 to 50°F)	Ignition switch off	3.876 to 6.059 kΩ
10 to 20°C (50 to 68°F)	Ignition switch off	2.574 to 3.957 kΩ
20 to 30°C (68 to 86°F)	Ignition switch off	1.752 to 2.660 kΩ
30 to 40°C (86 to 104°F)	Ignition switch off	1.222 to 1.831 kΩ
40 to 50°C (104 to 122°F)	Ignition switch off	0.869 to 1.285 kΩ

Procedure2

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

Standard Resistance:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-8 (TRF1) - Body ground and other terminals (except x2-7 (GRF1))	Ignition switch off	10 kΩ or higher

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-7 (GRF1) - Body ground and other terminals (except x2-8 (TRF1))	Ignition switch off	10 kΩ or higher

Pre-procedure2

(f) Connect the cable to the negative (-) auxiliary battery terminal.

(g) Turn the ignition switch to ON.

Procedure3

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

Standard Voltage:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-8 (TRF1) - Body ground	Ignition switch ON	Below 1 V
x2-7 (GRF1) - Body ground	Ignition switch ON	Below 1 V

NOTICE:

- Turning the ignition switch to ON with the service plug grip removed causes other DTCs to be stored. Clear the DTCs after performing this inspection.
- If the ignition switch is turned to ON with the connectors disconnected, other DTCs will be stored. Be sure to clear the DTCs after the inspection.

Post-procedure1

(i) Turn the ignition switch off.

(j) Disconnect the cable from the negative (-) auxiliary battery terminal.

(k) Reconnect the battery ECU assembly connector.

(l) Disconnect the SST.

OK ▶ **REPLACE BATTERY ECU ASSEMBLY**

NG ▼

7.	**CHECK HARNESS AND CONNECTOR (NO. 1 TRACTION BATTERY COOLER CONDUCTOR (DUCT OUTLET 1) - BATTERY ECU ASSEMBLY)**

CAUTION:

Be sure to wear insulated gloves and protective goggles.

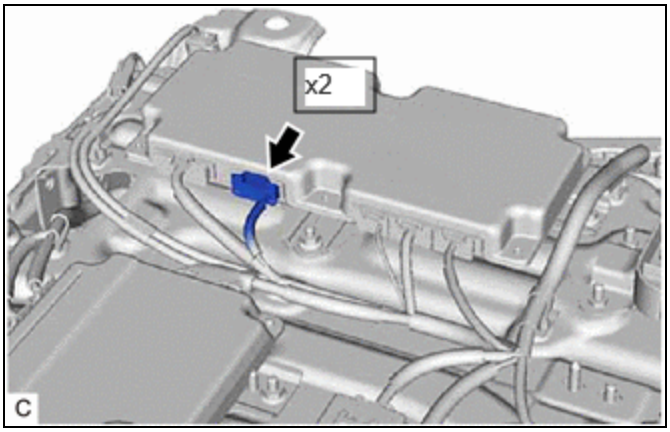
Pre-procedure1

(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.

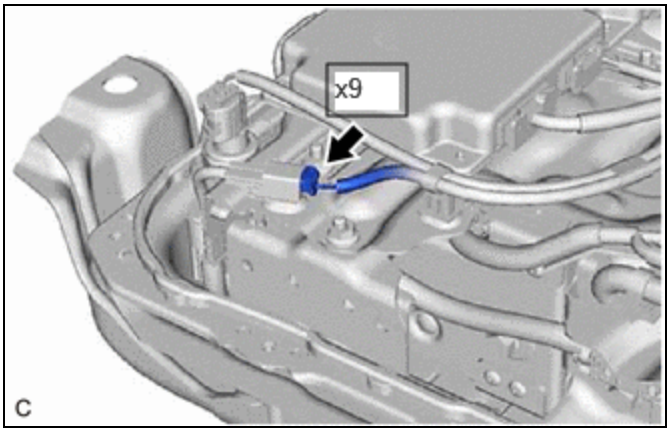
(b) Disconnect the battery ECU assembly connector.



NOTICE:

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

(c) Disconnect the No. 1 traction battery cooler tube connector.



NOTICE:

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(x9,x2)
Click Connector(x9)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x9-2 (TRR1) - x2-8 (TRF1)	Ignition switch off	Below 1 Ω
x9-1 (GRR1) - x2-7 (GRF1)	Ignition switch off	Below 1 Ω
x9-2 (TRR1) or x2-8 (TRF1) - Body ground and other terminals	Ignition switch off	10 kΩ or higher
x9-1 (GRR1) or x2-7 (GRF1) - Body ground and other terminals	Ignition switch off	10 kΩ or higher

Pre-procedure2

(e) Connect the cable to the negative (-) auxiliary battery terminal.

(f) Turn the ignition switch to ON.

Procedure2

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

Standard Voltage:

EWD INFO

Click Location & Routing(x2)
Click Connector(x2)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
x2-8 (TRF1) - Body ground	Ignition switch ON	Below 1 V
x2-7 (GRF1) - Body ground	Ignition switch ON	Below 1 V

NOTICE:

- Turning the ignition switch to ON with the service plug grip removed causes other DTCs to be stored. Clear the DTCs after performing this inspection.
- If the ignition switch is turned to ON with the connectors disconnected, other DTCs will be stored. Be sure to clear the DTCs after the inspection.

Post-procedure1

(h) Turn the ignition switch off.

(i) Disconnect the cable from the negative (-) auxiliary battery terminal.

(j) Reconnect the No. 1 traction battery cooler tube connector.

(k) Reconnect the battery ECU assembly connector.

(l) Disconnect the SST.

OK ▶ **REPLACE NO. 1 TRACTION BATTERY COOLER CONDUCTOR**

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