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Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID CONTROL SYSTEM (for PHEV Model): P0A0A13,P0A0A92; High Voltage System Interlock Circuit Open; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	P0A0A13	High Voltage System Interlock Circuit Open
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DTC	P0A0A92	High Voltage System Interlock Performance or Incorrect Operation
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DTC SUMMARY

MALFUNCTION DESCRIPTION

The hybrid vehicle control ECU detects that a safety device (interlock) is operated or that there is an open circuit in the detection circuit. (Even if an open circuit occurs while the vehicle is stopped, the system determines that the safety device was operated.)

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

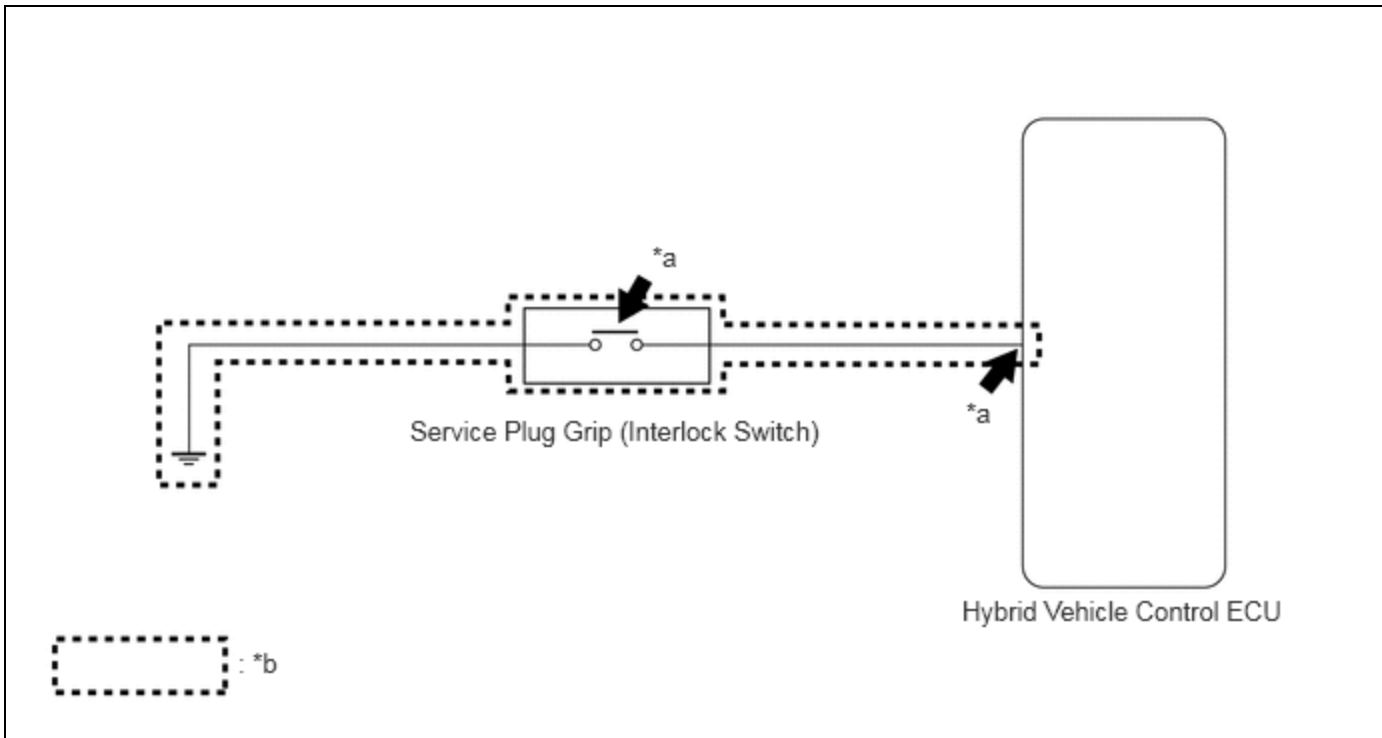
Detection switch system malfunction

- Service plug malfunction

Low-voltage system malfunction

- Hybrid vehicle control ECU malfunction
- Service plug malfunction
- Wire harness malfunction
- Connector malfunction

INSPECTION DESCRIPTION



SYSTEM DIAGRAM LOCATION	INSPECTION CONTENT	REASON
*a	<ul style="list-style-type: none"> • Check whether the safety device (interlock) is connected securely and installed properly (service plug grip, etc.). • Check the connection condition of the hybrid vehicle control ECU connector. 	DTC output due to improper connection or forgetting to install parts.
*b	Inspect the detection circuit.	DTC output due to an open circuit or improper connection (dirt, foreign matter, etc.).

DESCRIPTION

When the hybrid vehicle control ECU detects that a safety device (interlock) is operated, such as when the service plug grip or inverter cover is removed, it will prohibit hybrid system operation or shut off the system main relay. The 2 safety devices are located as follows; 1 in the service plug grip, 1 on the inverter cover for the terminals of the inverter with converter assembly motor cable and generator cable, that is connected to the inverter with converter assembly. If the service plug grip, inverter cover is removed, the interlock signal line will be open. If the vehicle is being driven, this condition will be determined to be an open circuit and the system main relays will not be shut off. When the safety devices are re-installed correctly, the system will return to normal when the ignition switch is turned to ON.

The system main relay will be turned off from the next trip after the open is detected until the condition returns to normal.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P0A0A13	High Voltage System Interlock Circuit Open	Interlock signal line opens while the vehicle is being driven (at 5 km/h (3 mph) or more) (1 trip detection logic)	<ul style="list-style-type: none"> Wire harness or connector Hybrid vehicle control ECU Service plug grip 	Does not come on	Master Warning: Comes on	Hybrid Control	A	SAE Code: P0A0D
P0A0A92	High Voltage System Interlock Performance or Incorrect Operation	Either of the following conditions is met: <ul style="list-style-type: none"> With the vehicle stopped, the service plug grip with a safety device was removed. With the vehicle stopped, the interlock signal line became open. (1 trip detection logic)	<ul style="list-style-type: none"> Wire harness or connector Hybrid vehicle control ECU Service plug grip 	Does not come on	Master Warning: Comes on	Hybrid Control	A	SAE Code: P0A0D

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](#)

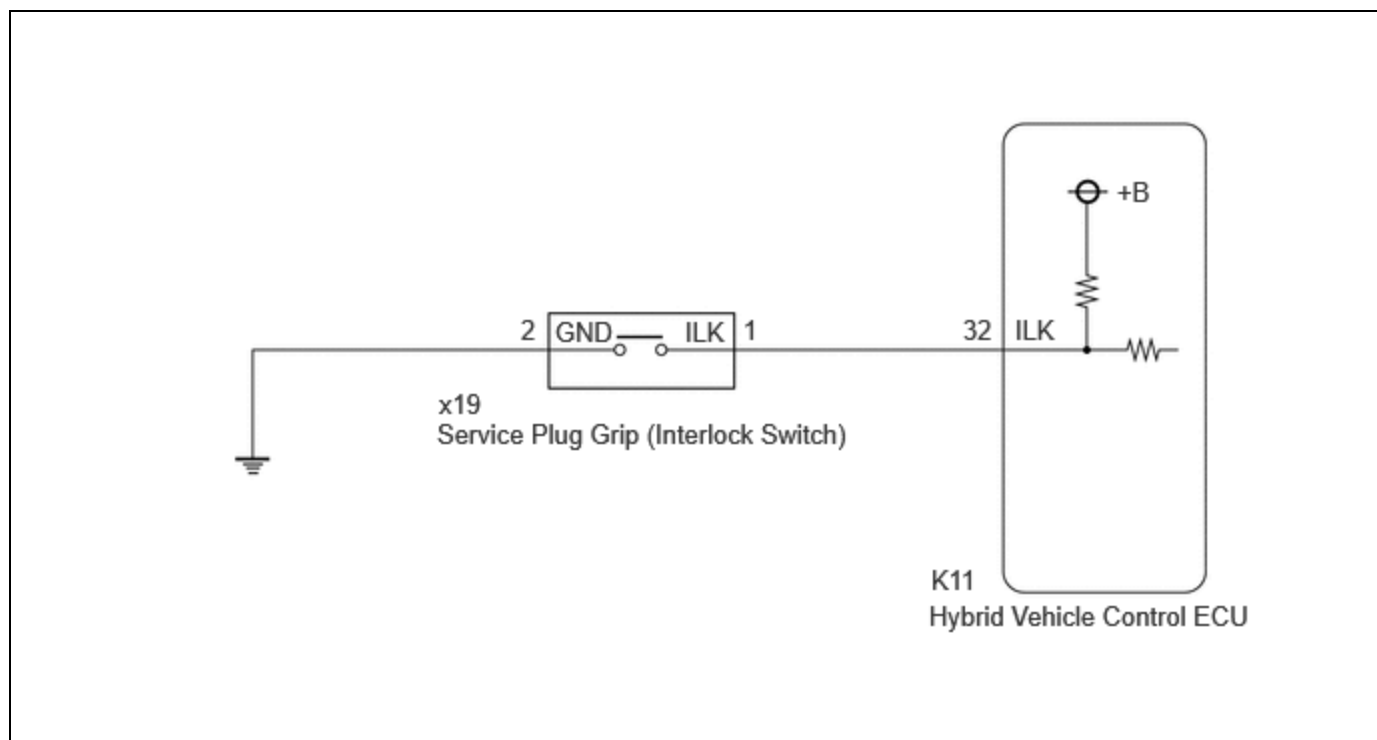
1. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
2. Turn the ignition switch off and wait for 2 minutes or more.
3. With ignition switch ON and wait for 5 seconds or more.
4. Enter the following menus: Powertrain / Hybrid Control / Utility / All Readiness.
5. Check the 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 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 [INFO](#)

- 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.
- As interlock circuit DTCs or other DTCs may be stored when the ignition switch is turned to ON in the following procedure, make sure to clear the DTCs after inspection.

HINT:

- P0A0A13 or P0A0A92 may be output as a result of the malfunction indicated by the DTCs in table below.
 - 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.)

MALFUNCTION CONTENT	RELEVANT DTC	
Microcomputer malfunction	P060647	Hybrid/EV Powertrain Control Module Processor Watchdog / Safety MCU Failure
	P060687	Hybrid/EV Powertrain Control Module Processor to Monitoring Processor Missing Message
	P060A47	Hybrid/EV Powertrain Control Module Monitoring Processor Watchdog / Safety MCU Failure
	P060A87	Hybrid/EV Powertrain Control Module Processor from Monitoring Processor Missing Message
	P060B49	Hybrid/EV Powertrain Control Module A/D Processing Internal Electronic Failure
	P060B71	Hybrid/EV Powertrain Control Module A/D Processing Actuator Stuck
	P060B1C	Hybrid/EV Powertrain Control Module A/D Processing Voltage Out of Range
	P1CE349	Hybrid/EV Powertrain Control Module Monitoring Processor A/D Processing Internal Electronic Failure
	P1CE371	Hybrid/EV Powertrain Control Module Monitoring Processor A/D Processing Actuator Stuck
	P1CE31C	Hybrid/EV Powertrain Control Module Monitoring Processor A/D Processing Voltage Out of Range
	P060A45	Hybrid/EV Powertrain Control Module Monitoring Processor Program Memory Failure
	P060A44	Hybrid/EV Powertrain Control Module Monitoring Processor Data Memory Failure
	P060A29	Hybrid/EV Powertrain Control Module Monitoring Processor Signal Invalid
P060A49	Hybrid/EV Powertrain Control Module Monitoring Processor Internal Electronic Failure	
Power source circuit malfunction	P06881F	ECM/PCM Power Relay Sense Circuit Intermittent
System malfunction	P1C9E9F	Hybrid/EV System Reset Stuck Off

PROCEDURE

1.	CLEAR DTC
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Click here [INFO](#)

NEXT



2.	CHECK DTC OUTPUT (HYBRID CONTROL)
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Pre-procedure1

(a) None.

Procedure1

(b) Check if DTCs are output.

Powertrain > Hybrid Control > Trouble Codes

RESULT	PROCEED TO
P0A0A13 or P0A0A92 is output	A
P0A0A13 or P0A0A92 is not output	B

Post-procedure1

(c) Turn the ignition switch off.

B  **GO TO STEP 9**

A



3.	CHECK SERVICE PLUG GRIP
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CAUTION:

Be sure to wear insulated gloves.

(a) Check if the service plug grip is installed correctly.

NOTICE:

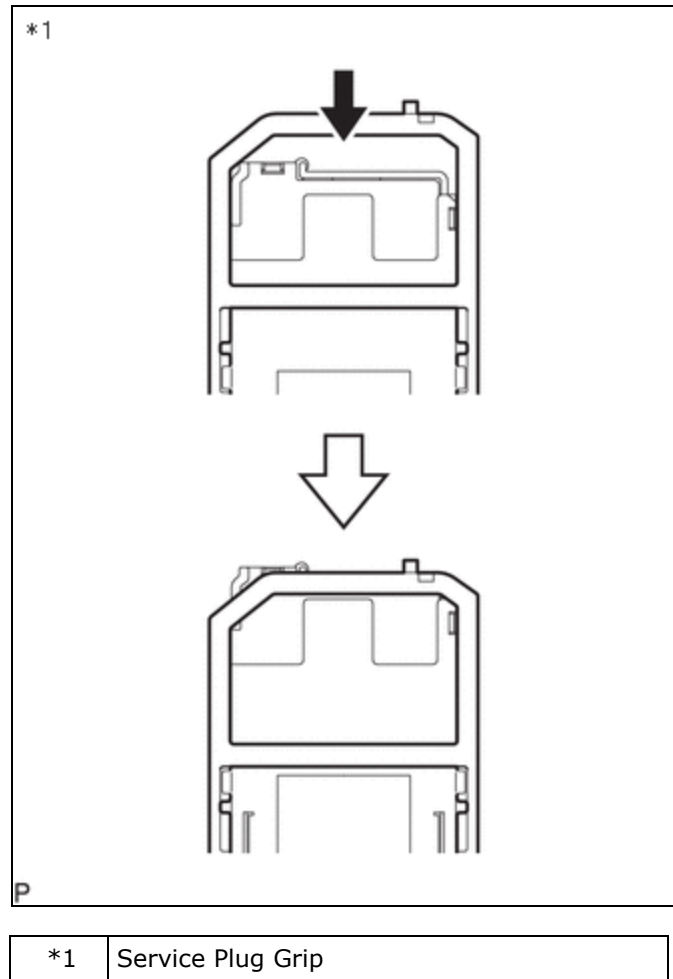
Insert the service plug grip until a click sound is heard.

HINT:

- For the removal and installation procedures.

Click here 

- P0A0A92 is also set if the ignition switch is turned to ON with the service plug grip removed. Confirm the conditions when the malfunction occurred.



NG ▶ **INSTALL PARTS CORRECTLY**

OK
▼

4. CHECK CONNECTOR CONNECTION CONDITION (INTERLOCK 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.

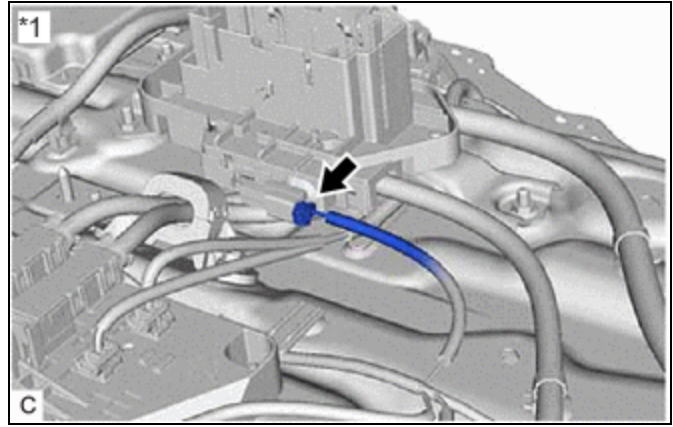
Procedure1

(b) Check that the interlock connector at the service plug grip installation socket is connected correctly.

OK:

The connector is connected correctly.

Result:



*1	Interlock Connector
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PROCEED TO
OK
NG

Post-procedure1

(c) None.

NG ▶ INSTALL PARTS CORRECTLY

OK



5.	CHECK CONNECTOR CONNECTION CONDITION (HYBRID VEHICLE CONTROL ECU CONNECTOR)
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Click here [INFO](#)

NG ▶ CONNECT SECURELY

OK



6.	CHECK HYBRID VEHICLE CONTROL ECU
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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) Connect the SST.

HINT:

Click here [INFO](#)

(c) Disconnect the service plug grip (interlock switch) connector.

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

(e) Turn the ignition switch to ON.

Procedure1

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

Standard Voltage:



[Click Location & Routing\(x19\)](#)

[Click Connector\(x19\)](#)

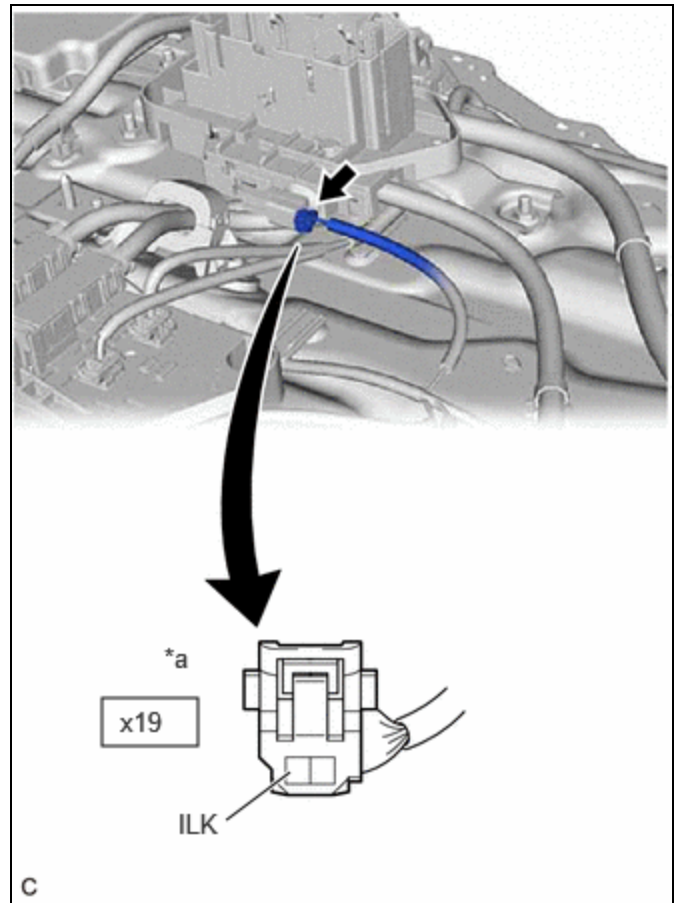
TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
x19-1 (ILK) - Body ground	Ignition switch ON	11 to 14 V	V

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.

Result:

PROCEED TO
OK
NG



*a Rear view of wire harness connector (to Service Plug Grip (Interlock Switch))

Post-procedure1

(g) Turn the ignition switch off.

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

(i) Reconnect the service plug grip (interlock switch) connector.

(j) Disconnect the SST.

NG  **GO TO STEP 10**

OK



7.	CHECK SERVICE PLUG GRIP
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CAUTION:

Be sure to wear insulated gloves.

Pre-procedure1

(a) Remove the service plug grip.

HINT:

Click here 

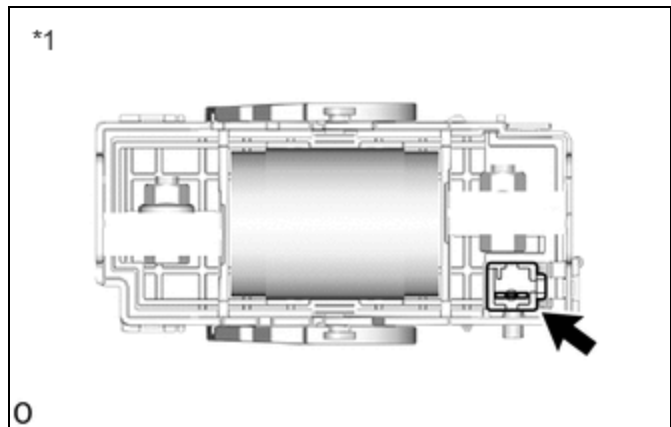
Procedure1

(b) Check the condition of the service plug grip interlock.

OK:

Dirt or foreign matter has not entered the connectors, and there is no evidence of contamination.

Result:



*1	Service Plug Grip
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PROCEED TO
OK
NG

Post-procedure1

(c) None.

NG  **REPLACE SERVICE PLUG GRIP**

OK



8.	CHECK HARNESS AND CONNECTOR (SERVICE PLUG GRIP - BODY GROUND)
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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) Connect the SST.

HINT:

Click here [INFO](#)

(c) Disconnect the service plug grip (interlock switch) connector.

Procedure1

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

Standard Resistance:



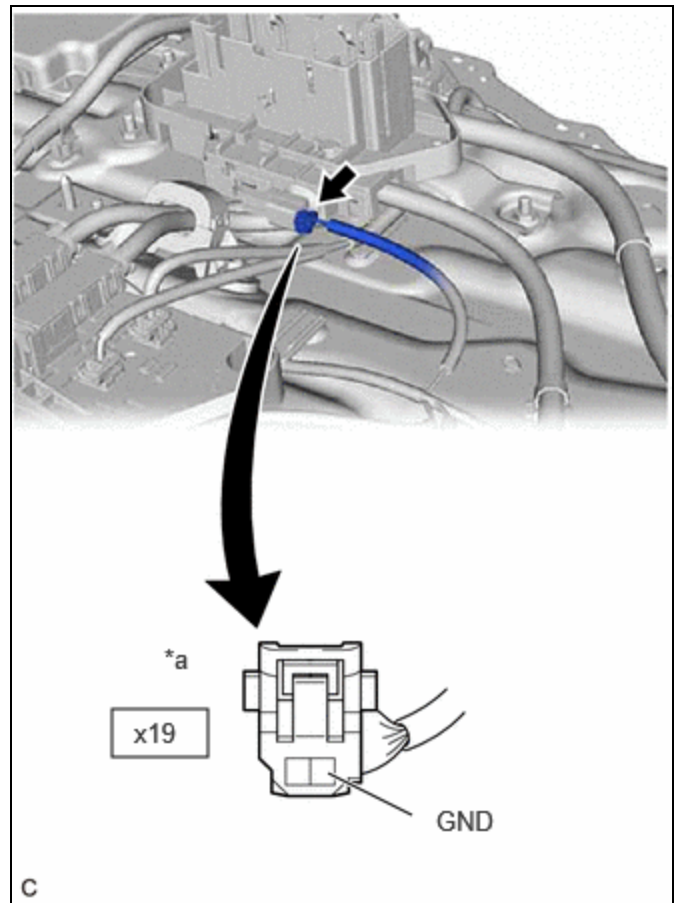
[Click Location & Routing\(x19\)](#)

[Click Connector\(x19\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
x19-2 (GND) - Body ground	Ignition switch off	Below 1 Ω	Ω

Result:

PROCEED TO
OK
NG



*a Rear view of wire harness connector (to Service Plug Grip (Interlock Switch))

Post-procedure1

(e) Reconnect the service plug grip (interlock switch) connector.

(f) Disconnect the SST.

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR****OK****9. CHECK CONNECTOR CONNECTION CONDITION (INTERLOCK CIRCUIT)**

(a) Check the connections of each connector.

OK:

Dirt or foreign matter has not entered the connectors, and there is no evidence of contamination.

OK  **REPLACE HYBRID VEHICLE CONTROL ECU****NG**  **REPAIR OR REPLACE CONNECTOR****10. CHECK HARNESS AND CONNECTOR (HYBRID VEHICLE CONTROL ECU - SERVICE PLUG GRIP)****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 hybrid vehicle control ECU connector.

(c) Connect the SST.

HINT:Click here 

(d) Disconnect the service plug grip (interlock switch) connector.

Procedure1

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

Standard Resistance:

[Click Location & Routing\(K11,x19\).](#)[Click Connector\(K11\).](#)[Click Connector\(x19\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
K11-32 (ILK) - x19-1 (ILK)	Ignition switch off	Below 1 Ω	Ω

Post-procedure1

- (f) Reconnect the service plug grip (interlock switch) connector.
- (g) Reconnect the hybrid vehicle control ECU connector.
- (h) Disconnect the SST.

OK ► **REPLACE HYBRID VEHICLE CONTROL ECU**

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

