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Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: HYBRID / BATTERY CONTROL: HYBRID CONTROL SYSTEM (for M20A-FXS): Rear Motor High-voltage Circuit; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

Rear Motor High-voltage Circuit

DESCRIPTION

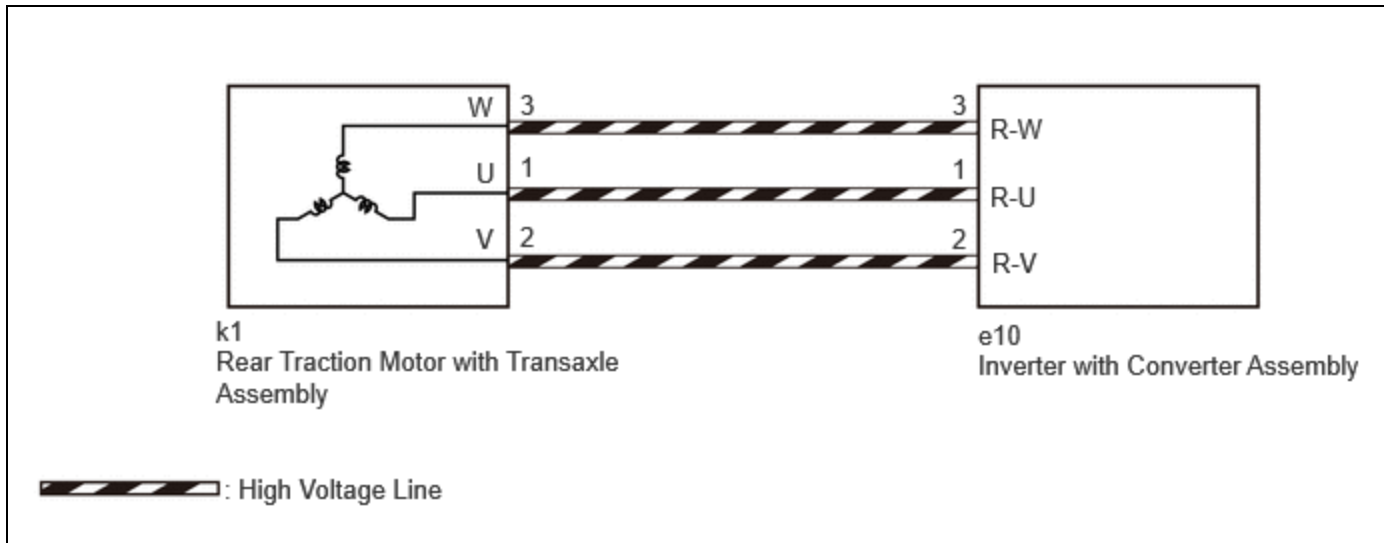
The cause of the malfunction may be the high-voltage circuit of the rear motor.

Check the rear motor internal resistance and the connection condition of the high-voltage line between the inverter and rear motor to check whether there is an open or short circuit.

Related Parts Check

AREA	INSPECTION
HV floor under wire (rear traction motor cable) connection check	Check for open or short circuit in the connection condition of the cable from the inverter to the rear motor.
Rear motor or HV floor under wire (rear traction motor cable)	Check the rear motor (including cable) internal resistance and the insulation resistance with body ground to check for an open or short circuit.

WIRING DIAGRAM



CAUTION / NOTICE / HINT

This diagnostic procedure is referenced to in the diagnostic procedure of several DTCs.

If the result of this diagnostic procedure is normal, proceed as directed in the procedure for the DTC.

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 INVERTER WITH CONVERTER ASSEMBLY (HV FLOOR UNDER WIRE (REAR TRACTION MOTOR CABLE) CONNECTION CONDITION)
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CAUTION:

Be sure to wear insulated gloves.

Pre-procedure1

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

NOTICE:

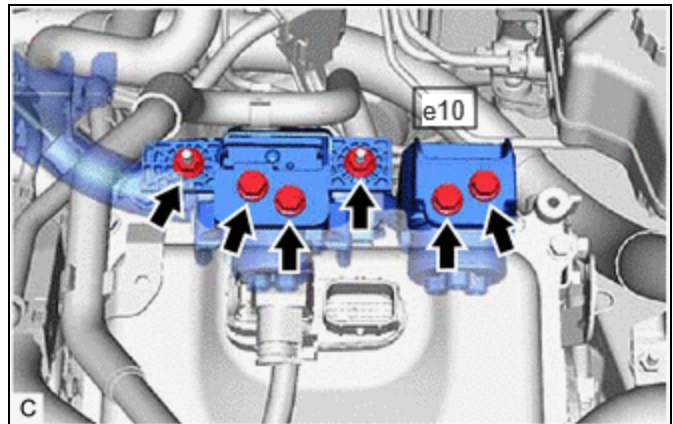
After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

Procedure1

- (b) Check that the bolts for the HV floor under wire (rear traction motor cable) are tightened to the specified torque, the HV floor under wire (rear traction motor cable) is connected securely, and there are no contact problems.

Specified Condition:

$T = 8.0 \text{ N*m (82 kgf*cm, 71 in.*lbf)}$



- (c) Disconnect the HV floor under wire (rear traction motor cable) from the inverter with converter assembly.

- (d) Check for arc marks at the terminals for the HV floor under wire (rear traction motor cable).

RESULT		PROCEED TO
The terminals are connected securely and there are no contact problems.	There are no arc marks.	A

RESULT		PROCEED TO
The terminals are not connected securely and there is a contact problem.	There are arc marks.	B
The terminals are not connected securely and there is a contact problem.	There are no arc marks.	C
The terminals are connected securely and there are no contact problems.	There are arc marks.	B

Post-procedure1

(e) Reconnect the HV floor under wire (rear traction motor cable).

B ▶ REPLACE MALFUNCTIONING PARTS

C ▶ CONNECT SECURELY

A
▼

2.	CHECK REAR TRACTION MOTOR WITH TRANSAXLE ASSEMBLY (REAR MOTOR (MGR))
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CAUTION:

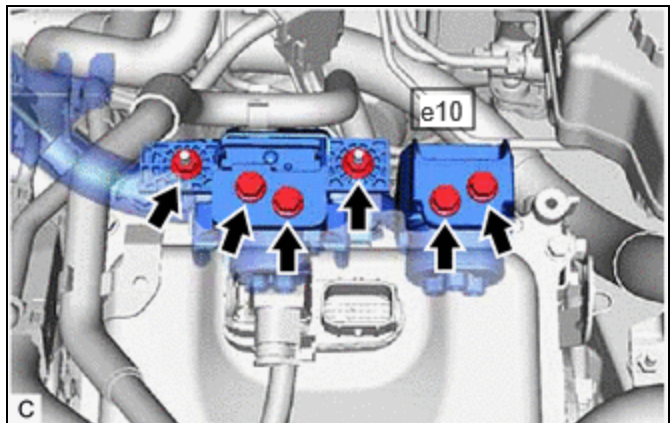
Be sure to wear insulated gloves.

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) Disconnect the HV floor under wire (rear traction motor cable) from the inverter with converter assembly.

Procedure1

(c) Using a milliohmmeter, measure the resistance according to the value(s) in the table below.

HINT:

If the rear motor (MGR) temperature is high, the resistance will vary greatly from the specification. Therefore, measure the resistance at least 8 hours after the vehicle is stopped.

Standard Resistance:



[Click Location & Routing\(e10\)](#)

[Click Connector\(e10\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
e10-2 (R-V) - e10-1 (R-U)	Ignition switch off	90.3 to 100.9 mΩ	mΩ
e10-1 (R-U) - e10-3 (R-W)	Ignition switch off	90.3 to 100.9 mΩ	mΩ
e10-3 (R-W) - e10-2 (R-V)	Ignition switch off	90.5 to 101.1 mΩ	mΩ

HINT:

To correct the variation of the measured resistance due to temperature, use the following formula to calculate the resistance at 20°C (68°F).

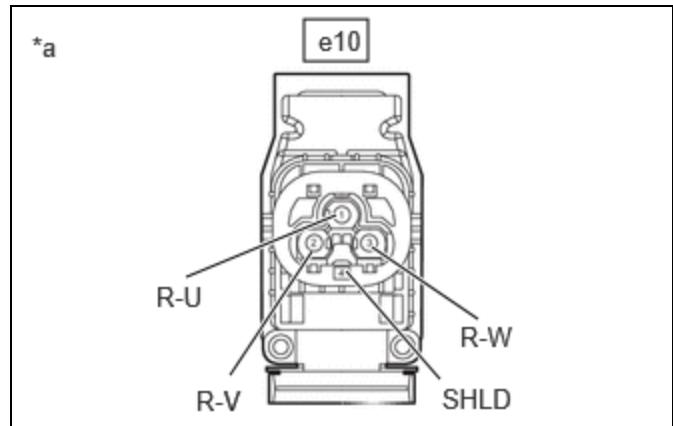
$$R_{20} = R_t / \{1 + 0.00393 \times (T - 20)\}$$

The calculation is based on the following:

R20: Resistance at 20°C (68°F) (mΩ)

Rt: Measured resistance (mΩ)

T: Temperature when the resistance is measured (°C (°F).)



*a	HV Floor Under Wire (Rear Traction Motor Cable) (Inverter with Converter Assembly Side)
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(d) Using a megohmmeter set to 500 V, measure the resistance according to the value(s) in the table below.

NOTICE:

Be sure to set the megohmmeter to 500 V when performing this test. Using a setting higher than 500 V can result in damage to the component being inspected.

Standard Resistance:



[Click Location & Routing\(e10\)](#)

[Click Connector\(e10\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
e10-2 (R-V) - Body ground and shield ground	Ignition switch off	100 MΩ or higher	MΩ
e10-1 (R-U) - Body ground and shield ground	Ignition switch off	100 MΩ or higher	MΩ
e10-3 (R-W) - Body ground and shield ground	Ignition switch off	100 MΩ or higher	MΩ

Post-procedure1

(e) Reconnect the HV floor under wire (rear traction motor cable).

OK ► **REAR MOTOR HIGH-VOLTAGE CIRCUIT NORMAL
(PERFORM NEXT STEP FOR REFERENCED DTC)**

NG

3.	CHECK REAR TRACTION MOTOR WITH TRANSAXLE ASSEMBLY (HV FLOOR UNDER WIRE (REAR TRACTION MOTOR CABLE) CONNECTION CONDITION)
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CAUTION:

Be sure to wear insulated gloves.

Pre-procedure1

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

NOTICE:

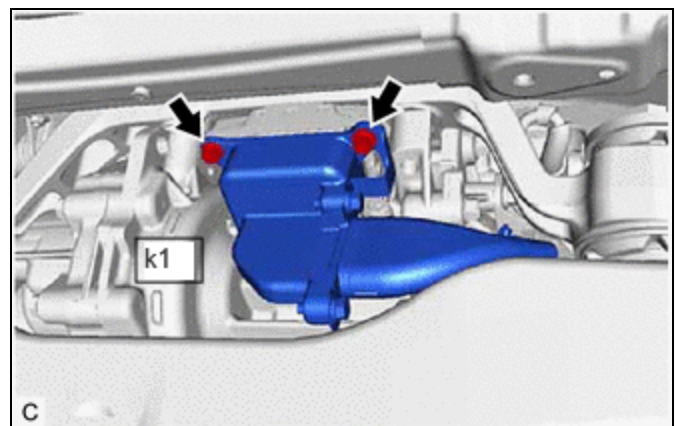
After removing the service plug grip, do not turn the ignition switch to ON (READY), unless instructed by the repair manual because this may cause a malfunction.

Procedure1

(b) Check that the bolts for the HV floor under wire (rear traction motor cable) are tightened to the specified torque, the HV floor under wire (rear traction motor cable) is connected securely, and there are no contact problems.

Specified Condition:

T=8.0 N*m (82 kgf*cm, 71 in.*lbf)



(c) Disconnect the HV floor under wire (rear traction motor cable) from the rear traction motor with transaxle assembly.

(d) Check for arc marks at the terminals for the HV floor under wire (rear traction motor cable).

RESULT		PROCEED TO
The terminals are connected securely and there are no contact problems.	There are no arc marks.	A
The terminals are not connected securely and there is a contact problem.	There are arc marks.	B
The terminals are not connected securely and there is a contact problem.	There are no arc marks.	C
The terminals are connected securely and there are no contact problems.	There are arc marks.	B

Post-procedure1

(e) Reconnect the HV floor under wire (rear traction motor cable).

B ▶ REPLACE MALFUNCTIONING PARTS

C ▶ CONNECT SECURELY

A
▼

4.	CHECK FLOOR UNDER WIRE (REAR TRACTION MOTOR CABLE)
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CAUTION:

Be sure to wear insulated gloves.

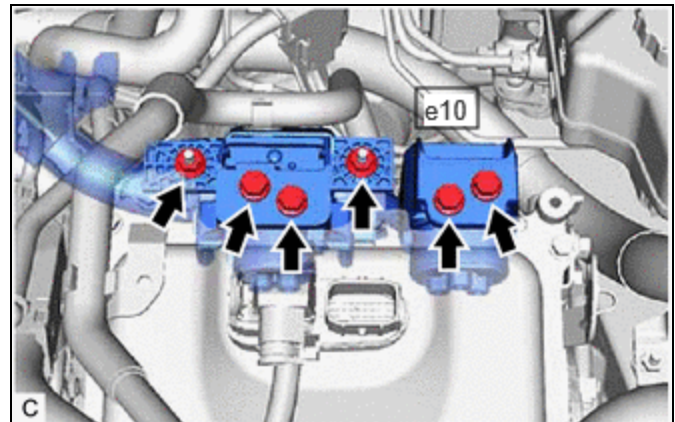
Pre-procedure1

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

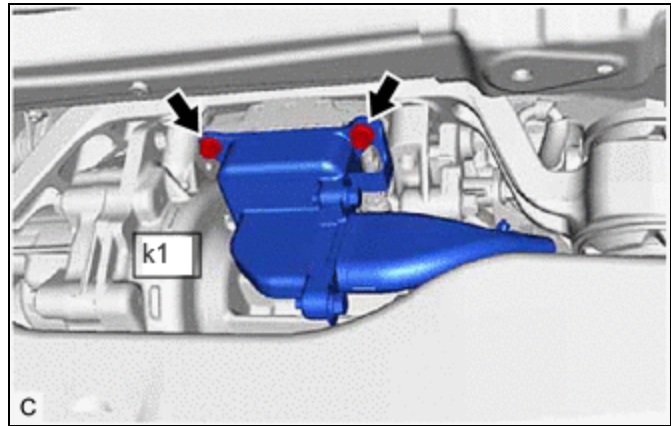
NOTICE:

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) Disconnect the HV floor under wire (rear traction motor cable) from the inverter with converter assembly.



(c) Disconnect the HV floor under wire (rear traction motor cable) from the rear traction motor with transaxle assembly.



Procedure1

(d) Using a megohmmeter set to 500 V, measure the resistance according to the value(s) in the table below.

NOTICE:

Be sure to set the megohmmeter to 500 V when performing this test. Using a setting higher than 500 V can result in damage to the component being inspected.

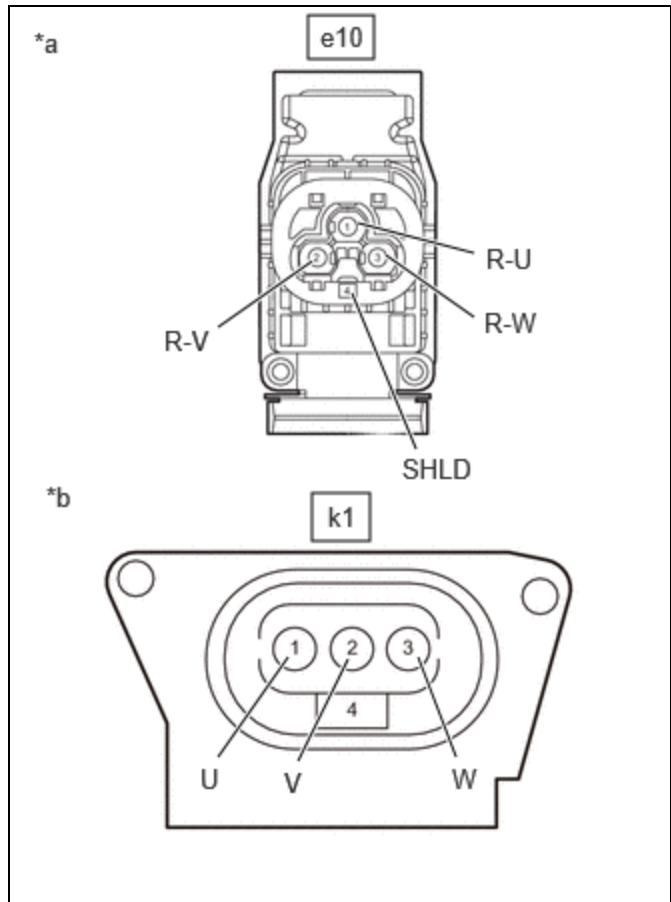
Standard Resistance:



[Click Location & Routing\(e10,k1\)](#)

[Click Connector\(e10\)](#)

[Click Connector\(k1\)](#)



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
e10-3 (R-W) or k1-3 (W) - Shield ground	Ignition switch off	100 MΩ or higher	MΩ
e10-2 (R-V) or k1-2 (V) - Shield ground	Ignition switch off	100 MΩ or higher	MΩ
e10-1 (R-U) or k1-1 (U) - Shield ground	Ignition switch off	100 MΩ or higher	MΩ

NOTICE:

Wrap the terminals of the motor cable with insulating tape to prevent them from coming into contact with body ground.

*a	HV Floor Under Wire (Rear Traction Motor Cable) (Inverter with Converter Assembly Side)
*b	HV Floor Under Wire (Rear Traction Motor Cable) (Rear Traction Motor with Transaxle Assembly Side)

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

Standard Resistance:



[Click Location & Routing\(e10,k1\)](#)

[Click Connector\(e10\)](#)

[Click Connector\(k1\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
e10-3 (R-W) - k1-3 (W)	Ignition switch off	Below 1 Ω	Ω
e10-2 (R-V) - k1-2 (V)	Ignition switch off	Below 1 Ω	Ω
e10-1 (R-U) - k1-1 (U)	Ignition switch off	Below 1 Ω	Ω
e10-3 (R-W) - k1-1 (U)	Ignition switch off	100 M Ω or higher	M Ω
e10-2 (R-V) - k1-3 (W)	Ignition switch off	100 M Ω or higher	M Ω
e10-1 (R-U) - k1-2 (V)	Ignition switch off	100 M Ω or higher	M Ω

Post-procedure1

(f) Reconnect the HV floor under wire (rear traction motor cable) to the rear traction motor with transaxle assembly.

(g) Reconnect the HV floor under wire (rear traction motor cable) to the inverter with converter assembly.

OK ► **REPLACE REAR TRACTION MOTOR WITH TRANSAXLE ASSEMBLY**

NG ► **REPLACE FLOOR UNDER WIRE**

