Last Modified: 12-04-2024	6.11:8.1.0	**Doc ID:** RM100000002BI1E
Model Year Start: 2023	**Model:** Prius Prime	**Prod Date Range:** [03/2023 -]
Title: HYBRID / BATTERY CONTROL: HYBRID CONTROL SYSTEM (for PHEV Model): P314A31; Motor Electronics Coolant Pump "A" No Signal; 2023 - 2024 MY Prius Prime [03/2023 -]		

DTC	**P314A31**	**Motor Electronics Coolant Pump "A" No Signal**

DESCRIPTION

Refer to the description for DTC P0C7396.

Click here INFO

The inverter water pump assembly sends the inverter water pump speed (measured value) signal to the hybrid vehicle control ECU.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	WARNING INDICATE	DTC OUTPUT FROM	PRIORITY	NOTE
P314A31	Motor Electronics Coolant Pump "A" No Signal	The inverter water pump speed signal is not sent to the hybrid vehicle control ECU when the ignition switch is turned to ON (READY).* (1 trip detection logic)	• Wire harness or connector • Hybrid vehicle control ECU • Inverter water pump assembly • IGCT-MAIN NO.2 • INV W/PMP NO. 2	Comes on	Master Warning: Comes on	Hybrid Control	A	SAE Code: P314A

***: Any of the following conditions is met.**

- A malfunction (communication error) in the speed signal line from the inverter water pump assembly to the hybrid vehicle control ECU is detected.
- A malfunction in the +B line is detected.
- A malfunction in the inverter water pump assembly power source circuit is detected.
- A malfunction in hybrid vehicle control ECU power source circuit is detected.

MONITOR DESCRIPTION

The hybrid vehicle control ECU monitors the speed of the inverter water pump assembly. If the inverter water pump speed signal is not sent to the hybrid vehicle control ECU, the hybrid vehicle control ECU will illuminate the MIL and store a DTC.

MONITOR STRATEGY

Related DTCs	P314A (INF P314A31): Inverter water pump malfunction
Required sensors/components	Inverter Water Pump Assembly
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

Hybrid vehicle control ECU	DTC P314A (INF P314A31) 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 (READY) and wait for 2 minutes 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 / 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 the normal judgment procedure again.

WIRING DIAGRAM

Refer to the wiring diagram for Cooling System.

Click here INFO

PROCEDURE

1.	**CLEAR DTC**

Pre-procedure1

(a) Read and record the DTCs and Freeze Frame Data.

Powertrain > Hybrid Control > Trouble Codes

Procedure1

(b) Clear the DTCs and Freeze Frame Data.

Powertrain > Hybrid Control > Clear DTCs

Post-procedure1

(c) Turn the ignition switch off and wait for 2 minutes or more.

NEXT

2.	**PERFORM ACTIVE TEST USING GTS (ACTIVATE THE INVERTER WATER PUMP)**

NOTICE:

- Make sure that the HV coolant level is above the low line of the inverter reserve tank.
- Be sure to perform the inspection with the auxiliary battery voltage at 11 V or more.

HINT:

- When the auxiliary battery voltage is low, the inverter water pump assembly may not operate.
- When the inverter water pump assembly signal line (SWP - IWP) is open or its connection is faulty, the inverter water pump assembly is operated forcibly.

Pre-procedure1

(a) Perform the "Activate the Inverter Water Pump" Active Test.

Powertrain > Hybrid Control > Active Test

TESTER DISPLAY
Activate the Inverter Water Pump

Procedure1

(b) Touch the inverter water pump assembly and check that it is operating (vibrating).

OK:

The inverter water pump is operating (vibrating).

HINT:

Perform the Active Test with the inverter coolant temperature between -15 and 65°C (5 to 149°F).

Post-procedure1

(c) Turn the ignition switch off.

NG ▶ **GO TO STEP 9**

OK ▼

3.	**CHECK CONNECTOR CONNECTION CONDITION (HYBRID VEHICLE CONTROL ECU CONNECTOR)**

Click here INFO

NG ▶ **CONNECT SECURELY**

OK ▼

4.	**CHECK CONNECTOR CONNECTION CONDITION (INVERTER WATER PUMP ASSEMBLY CONNECTOR)**

Click here INFO

NG ▶ **CONNECT SECURELY**

OK ▼

5.	**CHECK HARNESS AND CONNECTOR (HYBRID VEHICLE CONTROL ECU - INVERTER WATER PUMP ASSEMBLY)**

Pre-procedure1

(a) Disconnect the hybrid vehicle control ECU connector.

(b) Disconnect the inverter water pump assembly connector.

Procedure1

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

Standard Resistance (Check for Open):

EWD INFO

Click Location & Routing(A57,A26)
Click Connector(A57)
Click Connector(A26)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A57-33 (NIWP) - A26-2 (NWP)	Ignition switch off	Below 1 Ω	Ω

Standard Resistance (Check for Short):

EWD INFO

Click Location & Routing(A57,A26)
Click Connector(A57)
Click Connector(A26)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A57-33 (NIWP) or A26-2 (NWP) - Body ground and other terminals	Ignition switch off	10 kΩ or higher	kΩ

HINT:

Check the condition (looseness, deterioration, etc.) of the wire to body ground for the inverter water pump assembly.

Post-procedure1

(d) Reconnect the inverter water pump assembly connector.

(e) Reconnect the hybrid vehicle control ECU connector.

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

OK ▼

6.	**CHECK HYBRID VEHICLE CONTROL ECU**

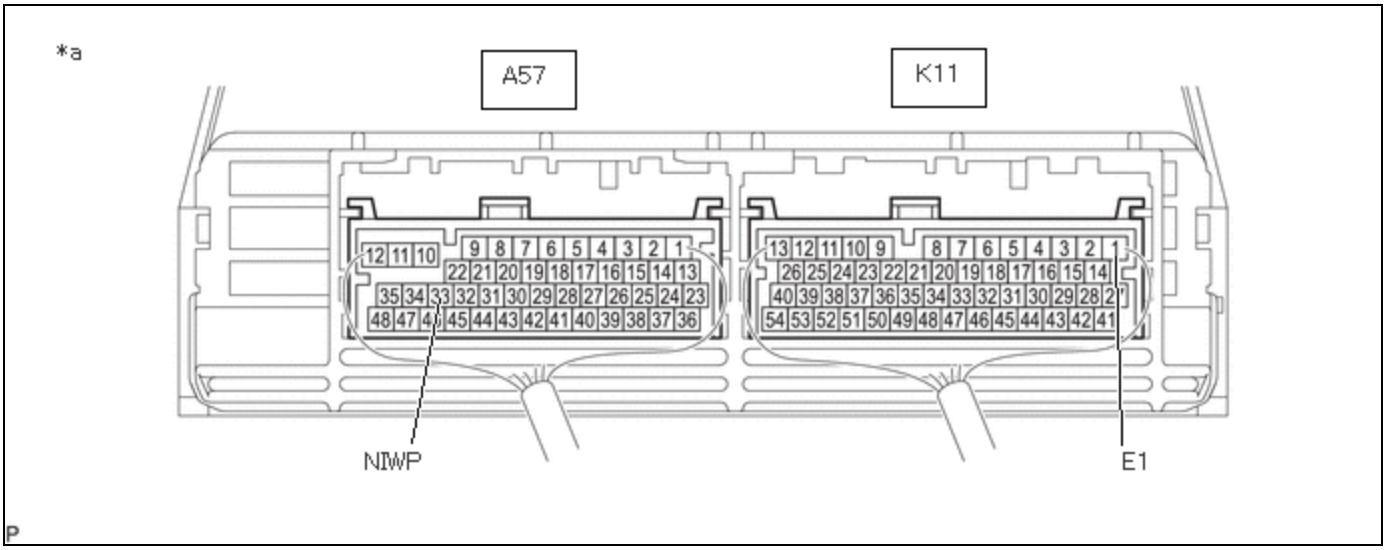
Pre-procedure1

(a) Disconnect the inverter water pump assembly connector.

(b) Turn the ignition switch to ON.

Procedure1

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



*a	Component with harness connected (Hybrid Vehicle Control ECU)	-	-

Standard Voltage:

EWD INFO

Click Location & Routing(A57,K11)
Click Connector(A57)
Click Connector(K11)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A57-33 (NIWP) - K11-1 (E1)	Ignition switch ON	11 to 14 V	V

Post-procedure1

(d) Turn the ignition switch off.

(e) Reconnect the inverter water pump assembly connector.

NG ▶ **REPLACE HYBRID VEHICLE CONTROL ECU**

OK
▼

7.	**CLEAR DTC**

Click here INFO

NEXT
▼

8.	PERFORM ACTIVE TEST USING GTS (ACTIVATE THE INVERTER WATER PUMP)

NOTICE:

Be sure to perform the inspection with the auxiliary battery voltage at 11 V or more.

HINT:

When the auxiliary battery voltage is low, the inverter water pump assembly may not operate.

Pre-procedure1

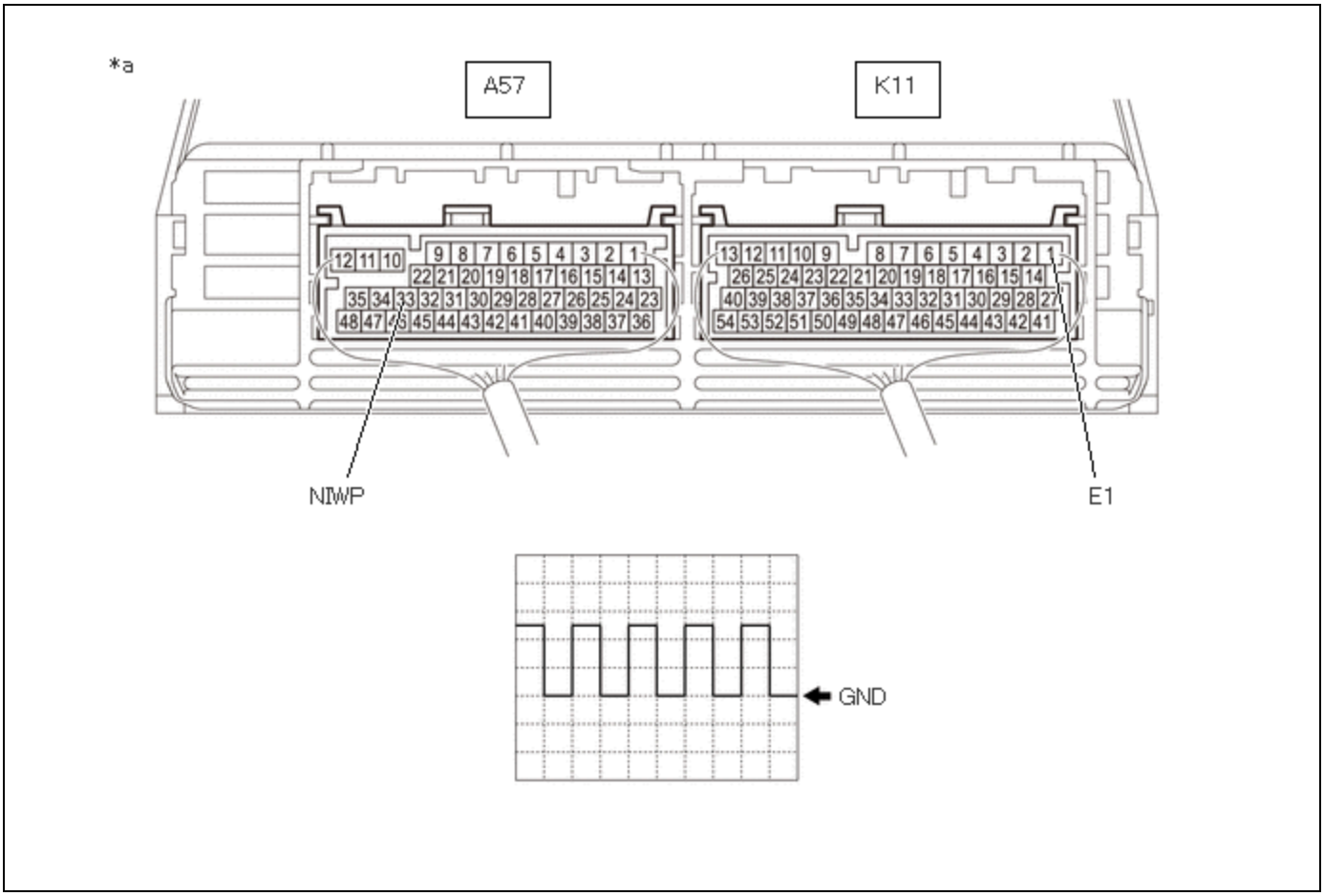
(a) Perform the "Activate the Inverter Water Pump" Active Test.

Powertrain > Hybrid Control > Active Test

TESTER DISPLAY
Activate the Inverter Water Pump

Procedure1

(b) Connect an oscilloscope between the hybrid vehicle control ECU terminals specified in the table below, and measure the waveform.



*a	Component with harness connected (Hybrid Vehicle Control ECU)	-	-

ITEM	CONTENT
Terminal	A57-33 (NIWP) - K11-1 (E1)
Equipment Setting	5 V/DIV., 5 ms./DIV.
Condition	Ignition switch ON, during Active Test

OK:

The period of the wavelength is 13 msec or less.

Post-procedure1

(c) Turn the ignition switch off.

OK ▶ **REPLACE HYBRID VEHICLE CONTROL ECU**

NG ▶ **GO TO STEP 24**

9.	**CHECK CONNECTOR CONNECTION CONDITION (INVERTER WATER PUMP ASSEMBLY CONNECTOR)**

Click here INFO

NG ▶ **GO TO STEP 14**

OK ▼

10.	**CHECK HARNESS AND CONNECTOR (INVERTER WATER PUMP ASSEMBLY - IGCT-MAIN NO.2 RELAY)**

Pre-procedure1

(a) Remove the IGCT-MAIN NO.2 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Disconnect the inverter water pump assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A26)
Click Connector(A26)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A26-4 (+BWP) - IGCT-MAIN NO.2 relay terminal 5	Power switch off	Below 1 Ω	Ω

NOTICE:

Do not apply excessive force when using the probes of the tester to perform the inspection. If excessive force is used, the terminals will be damaged.

HINT:

- Connectors

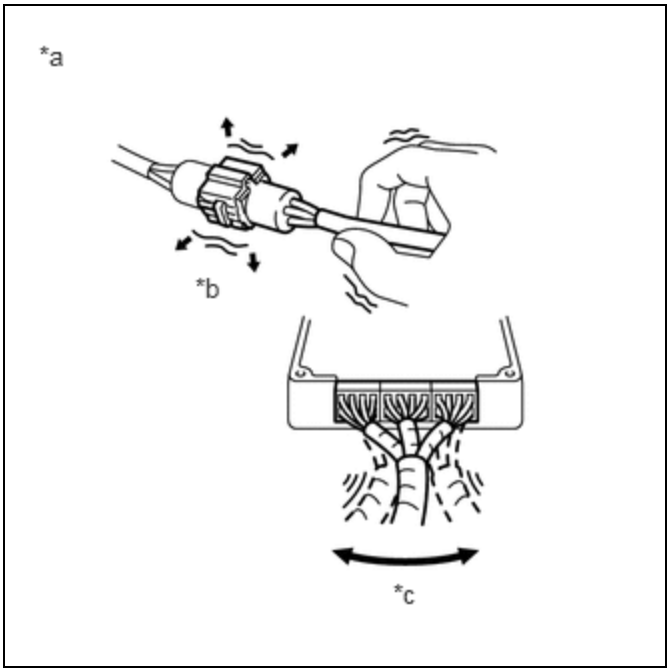
  Slightly shake the connector vertically and horizontally.
- Wire Harness

  Slightly shake the wire harness vertically and horizontally.

  The connector joint and fulcrum of the vibration are the major areas that should be checked thoroughly.
- No. 1 Engine Room Relay Block and No. 1 Junction Block Assembly

  Apply slight vibration with a finger to the No. 1 engine room relay block and No. 1 junction block assembly and check whether a malfunction occurs.
- IGCT-MAIN NO.2 relay

  Apply slight vibration with a finger to the IGCT relay and check whether a malfunction occurs.



*a	Example
*b	Shake Slightly
*c	Vibrate Slightly

Post-procedure1

(d) Reconnect the inverter water pump assembly connector.

(e) Install the IGCT-MAIN NO.2 relay.

NG ▶ **GO TO STEP 15**

OK

11.	**CHECK HARNESS AND CONNECTOR (INVERTER WATER PUMP ASSEMBLY - BODY GROUND)**

Pre-procedure1

(a) Disconnect the inverter water pump assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A26)
Click Connector(A26)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A26-1 (GND) - Body ground	Ignition switch OFF	Below 1 Ω	Ω

Post-procedure1

(c) Reconnect the inverter water pump assembly connector.

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

OK

12.	**REPLACE INVERTER WATER PUMP ASSEMBLY**

HINT:

Click here INFO

NEXT

13.	**ADD HV COOLANT AND PERFORM AIR BLEEDING**

(a) After replacing the inverter water pump assembly, add HV coolant and perform air bleeding.

HINT:

Click here INFO

NEXT ▶ REPLACE FUSE (INV W/PMP NO. 2)

14.	**CHECK FUSE (INV W/PMP NO. 2)**

Pre-procedure1

(a) Remove the INV W/PMP NO. 2 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
INV W/PMP NO. 2 fuse	Always	Below 1 Ω	Ω

Post-procedure1

(c) Install the INV W/PMP fuse.

OK ▶ CONNECT SECURELY (INVERTER WATER PUMP ASSEMBLY CONNECTOR)

NG ▶ GO TO STEP 18

15.	**CHECK INSTALLATION CONDITION (INV W/PMP NO. 2 FUSE)**

(a) Check installation condition of the INV W/PMP NO. 2 fuse.

OK:

INV W/PMP NO. 2 fuse is installed correctly.

NG ▶ GO TO STEP 19

OK ▼

16.	**CHECK HARNESS AND CONNECTOR (INVERTER WATER PUMP ASSEMBLY CIRCUIT)**

Pre-procedure1

(a) Remove the INV W/PMP NO. 2 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

(b) Remove the IGCT-MAIN NO.2 relay from the No. 1 engine room relay block and No. 1 junction block assembly.

(c) Disconnect the inverter water pump assembly connector.

Procedure1

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

Standard Resistance:

Click Location & Routing(A26)
Click Connector(A26)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
IGCT-MAIN NO.2 relay terminal 5 - A26-4 (+BWP)	Power switch off	Below 1 Ω	Ω
2 (INV W/PMP fuse terminal) - IGCT relay terminal 3	Power switch off	Below 1 Ω	Ω
IGCT-MAIN NO.2 relay terminal 5 or A26-4 (+BWP) - Body ground and other terminals	Power switch off	10 kΩ or higher	kΩ

NOTICE:

Do not apply excessive force when using the probes of the tester to perform the inspection. If excessive force is used, the terminals will be damaged.

Post-procedure1

(e) Reconnect the inverter water pump assembly connector.

(f) Install the IGCT-MAIN NO.2 relay.

(g) Install the INV W/PMP NO. 2 fuse.

NG ▶ **GO TO STEP 21**

OK ▼

17.	**CHECK FUSE (INV W/PMP NO. 2)**

Pre-procedure1

(a) Remove the INV W/PMP NO. 2 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
INV W/PMP NO. 2 fuse	Always	Below 1 Ω	Ω

Post-procedure1

(c) Install the INV W/PMP fuse.

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (INV W/PMP NO. 2 FUSE HOLDER TERMINAL)**

NG ▶ **GO TO STEP 22**

18.	**CONNECT SECURELY**

(a) Connect the inverter water pump assembly connector securely.

NEXT ▶ **REPLACE FUSE (INV W/PMP NO. 2)**

19.	**CHECK FUSE HOLDER TERMINAL (INV W/PMP NO. 2 FUSE)**

(a) Check the terminals of the INV W/PMP NO. 2 fuse holder.

OK:

The terminals of the INV W/PMP NO. 2 fuse holder are not bent, loose or corroded.

NG ▶ **GO TO STEP 26**

OK ▼

20.	**CHECK FUSE (INV W/PMP NO. 2)**

Pre-procedure1

(a) Remove the INV W/PMP NO. 2 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
INV W/PMP NO. 2 fuse	Always	Below 1 Ω	Ω

Post-procedure1

(c) Install the INV W/PMP fuse.

OK ▶ **CONNECT SECURELY (INV W/PMP NO. 2 FUSE)**

NG ▶ **REPLACE FUSE (INV W/PMP NO. 2)**

21.	**CHECK FUSE (INV W/PMP NO. 2)**

Pre-procedure1

(a) Remove the INV W/PMP NO. 2 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
INV W/PMP NO. 2 fuse	Always	Below 1 Ω	Ω

Post-procedure1

(c) Install the INV W/PMP fuse.

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

NG ▶ **GO TO STEP 27**

22.	**CHECK HARNESS AND CONNECTOR (INVERTER WATER PUMP ASSEMBLY - BODY GROUND)**

Pre-procedure1

(a) Disconnect the inverter water pump assembly connector.

Procedure1

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

Standard Resistance:

EWD INFO

Click Location & Routing(A26)

Click Connector(A26)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A26-1 (GND) - Body ground	Ignition switch OFF	Below 1 Ω	Ω

Post-procedure1

(c) Reconnect the inverter water pump assembly connector.

NG ▶ **GO TO STEP 27**

OK ▼

23.	**CHECK FUSE HOLDER TERMINAL (INV W/PMP NO. 2 FUSE)**

(a) Check the terminals of the INV W/PMP NO. 2 fuse holder.

OK:
The terminals of the INV W/PMP NO. 2 fuse holder are not bent, loose or corroded.

NG ▶ **GO TO STEP 28**

OK ▼

24.	**REPLACE INVERTER WATER PUMP ASSEMBLY**

HINT:

Click here INFO

NEXT ▼

25.	**ADD HV COOLANT AND PERFORM AIR BLEEDING**

(a) After replacing the inverter water pump assembly, add HV coolant and perform air bleeding.

HINT:

Click here INFO

NEXT ▶ **END**

26.	**CHECK FUSE (INV W/PMP NO. 2)**

Pre-procedure1

(a) Remove the INV W/PMP NO. 2 fuse from the No. 1 engine room relay block and No. 1 junction block assembly.

Procedure1

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

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
INV W/PMP NO. 2 fuse	Always	Below 1 Ω	Ω

Post-procedure1

(c) Install the INV W/PMP fuse.

OK ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR (INV W/PMP NO. 2 FUSE HOLDER TERMINAL)**

NG ▶ **GO TO STEP 28**

27.	**REPAIR OR REPLACE HARNESS OR CONNECTOR**

NEXT ▶ **REPLACE FUSE (INV W/PMP NO. 2)**

28.	**REPAIR OR REPLACE HARNESS OR CONNECTOR (INV W/PMP NO. 2 FUSE HOLDER TERMINAL)**

NEXT ▶ **REPLACE FUSE (INV W/PMP NO. 2)**