

DTC	P0AA6-526	Hybrid Battery Voltage System Isolation Fault
DTC	P0AA6-611	Hybrid Battery Voltage System Isolation Fault
DTC	P0AA6-612	Hybrid Battery Voltage System Isolation Fault
DTC	P0AA6-613	Hybrid Battery Voltage System Isolation Fault
DTC	P0AA6-614	Hybrid Battery Voltage System Isolation Fault

DESCRIPTION

DTC No.	INF Code	DTC Detection Condition	Trouble Area
P0AA6	526*1	Insulation resistance of high voltage circuit and body is low	<ul style="list-style-type: none"> • Frame wire • System main relay • System main resistor • HV battery assembly • Electric inverter compressor • Battery ECU • HV transaxle assembly • Inverter with converter assembly • Main battery cable • No. 2 main battery cable • Battery plug • No. 2 frame wire • Junction block
P0AA6	611*2	Insulation resistance of A/C compressor motor or A/C inverter is low	<ul style="list-style-type: none"> • Electric inverter compressor • Inverter with converter assembly
P0AA6	612*2	Insulation resistance of HV battery, battery ECU, system main relay, or system main resistor is low	<ul style="list-style-type: none"> • HV battery assembly • Battery ECU • System main relay • System main resistor • Main battery cable • No. 2 main battery cable • Battery plug • No. 2 frame wire • Junction block
P0AA6	613*2	Insulation resistance of HV transaxle or motor and generator inverters is low	<ul style="list-style-type: none"> • HV transaxle assembly • Inverter with converter assembly
P0AA6	614*2	Insulation resistance of motor and generator inverters, A/C inverter, system main relay, system main resistor, or frame wire is low	<ul style="list-style-type: none"> • Frame wire • System main relay • System main resistor • HV battery assembly • Inverter with converter assembly • Main battery cable • No. 2 main battery cable • Battery plug • No. 2 frame wire • Junction block

HV

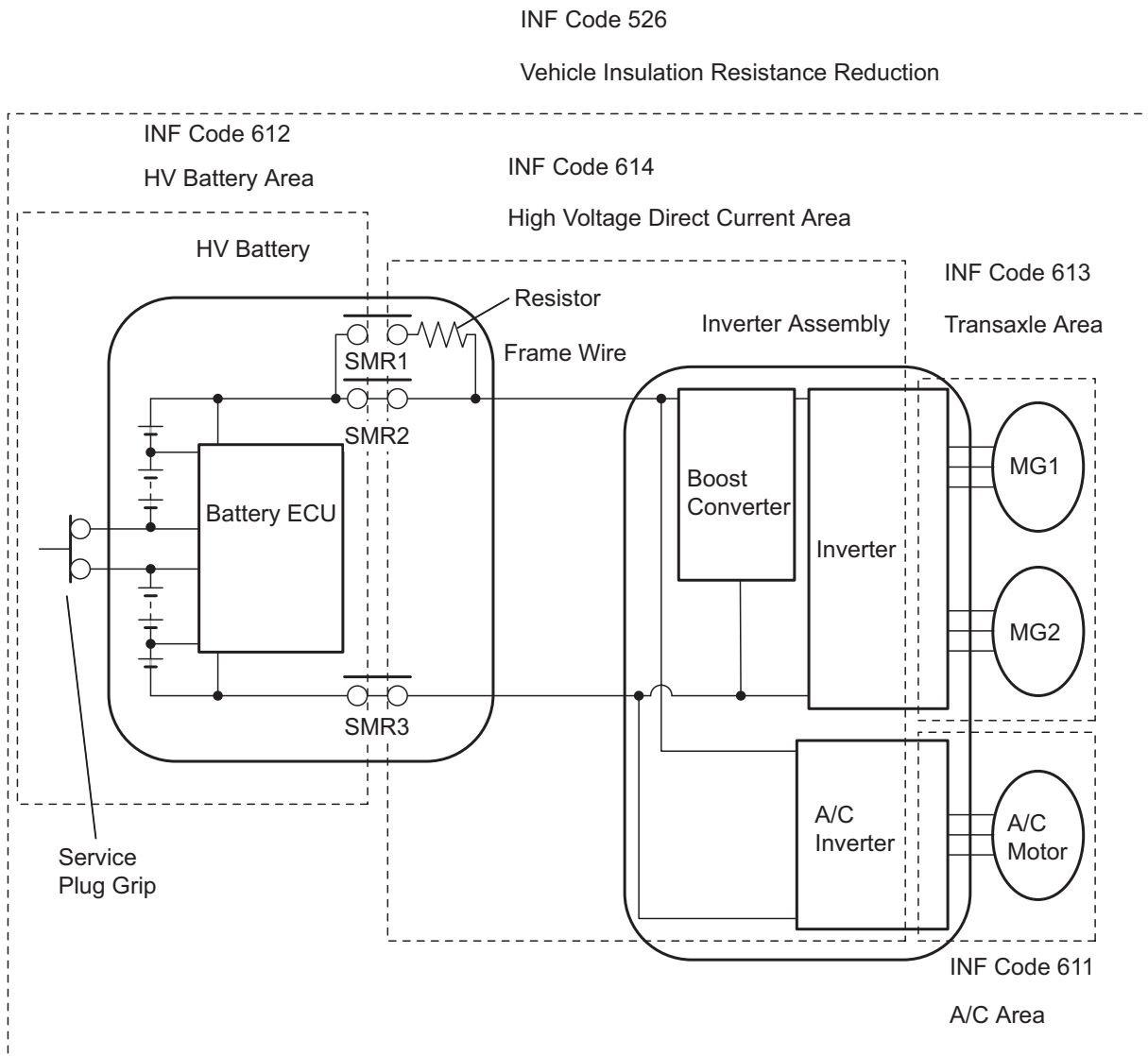
HINT:

*1: Stored simultaneously when DTC P0AA6 is set.

*2: Stored when a malfunction has been isolated after INF code 526 was set. INF code 611 to 614 are set next trip.

WIRING DIAGRAM

Outline of High-Voltage Circuit and Areas:



HV

INSPECTION PROCEDURE

CAUTION:

- Before inspecting the high-voltage system, take safety precautions to prevent electrical shocks, such as wearing insulated gloves and removing the service plug grip. After removing the service plug grip, put it in your pocket to prevent other technicians from reconnecting it while you are servicing the high-voltage system.
- After disconnecting the service plug grip, wait for at least 5 minutes before touching any of the high-voltage connectors or terminals.

HINT:

At least 5 minutes are required to discharge the high-voltage condenser inside the inverter.

1	READ OUTPUT DTC (HV ECU)
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- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the power switch ON (IG).
- (c) Turn the intelligent tester ON.
- (d) Enter the following menus: DIAGNOSIS / OBD/MOBD / HV ECU / DTC INFO / CURRENT CODES.
- (e) Read DTCs.

Result:

Display (DTC Output)	Proceed to
DTC P0AA6	A
DTCs P0AA6 and P0A1D (HV control ECU malfunction)	B
DTCs P0AA6 and P0A1F (Battery ECU malfunction)	C

B → GO TO DTC CHART. FIND DTC P0A1D TO PROCEED TO ITS TROUBLE SHOOTING FLOWCHART

C → GO TO DTC CHART. FIND DTC P0A1F TO PROCEED TO ITS TROUBLESHOOTING FLOWCHART

A

2	READ OUTPUT INF CODE
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- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the power switch ON (IG).
- (c) Turn the intelligent tester ON.
- (d) Enter the following menus: DIAGNOSIS / OBD/MOBD / HV ECU / DTC INFO / CURRENT CODES.
- (e) Display the freeze frame data for DTC P0AA6 and check its information (INF) code.

NOTICE:

If only INF code 526 is present, recheck INF code after waiting for 30 seconds with the power switch OFF.

Result:

Display (INF Code Output)	Proceed to
Only 526 (Insulation resistance of high voltage circuit and body is low)	A
526 and 611 (Insulation resistance of A/C area is low)	AC-134

HV

Display (INF Code Output)	Proceed to
526 and 612 (Insulation resistance of HV battery area is low)	B
526 and 613 (Insulation resistance of transaxle area is low)	C
526 and 614 (Insulation resistance of high voltage direct current area is low)	D

B	Go to step 5
C	Go to step 18
D	Go to step 19

A

3 CHECK ELECTRIC INVERTER COMPRESSOR

CAUTION:
Wear insulated gloves before performing the following operation.

- (a) Turn the power switch OFF.
- (b) Remove the service plug grip (see page HB-154).

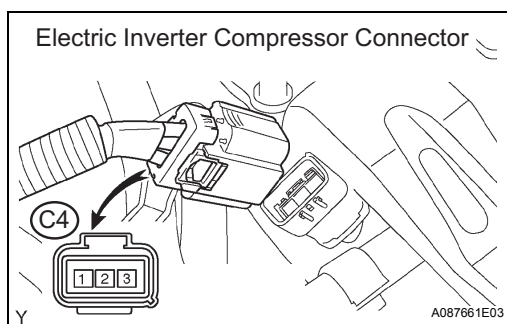
NOTICE:

Turning the power switch ON (READY) with the service plug grip removed could cause malfunction. Therefore, never turn the power switch ON (READY) in this state.

- (c) Disconnect the C4 electric inverter compressor connector.
- (d) Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the electric inverter compressor connector and the body ground.

Standard resistance

Tester Connection	Specified Condition
C4-1 - Body ground	3.0 MΩ or higher
C4-2 - Body ground	3.0 MΩ or higher
C4-3 - Body ground	3.0 MΩ or higher



HV

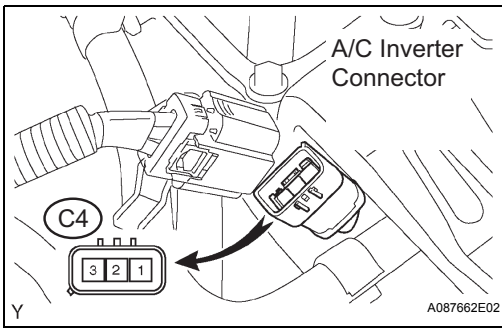
NG **REPLACE ELECTRIC INVERTER COMPRESSOR**

OK

4 CHECK INSULATION RESISTANCE (INVERTER, TRANSAXLE AND FRAME WIRE)

CAUTION:
Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.



- (b) Check that the electric inverter compressor connector has been disconnected.
- (c) Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the A/C inverter connector and the body ground.

Standard resistance

Tester Connection	Specified Condition
C4-1 - Body ground	2.0 MΩ or higher
C4-2 - Body ground	2.0 MΩ or higher
C4-3 - Body ground	2.0 MΩ or higher

NG

Go to step 15

OK

5 CHECK HV BATTERY AREA

CAUTION:

Wear insulated gloves before performing the following operation.

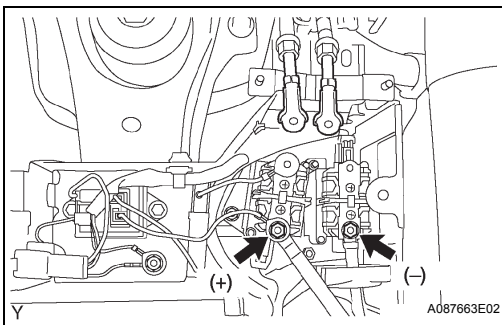
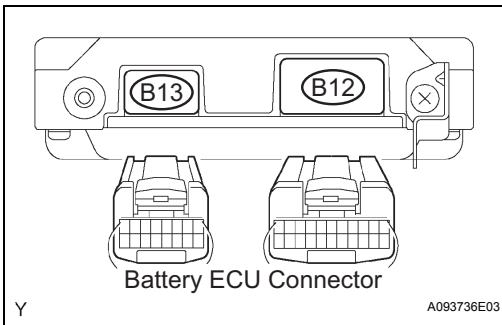
- (a) Turn the power switch OFF.
- (b) Check that the service plug grip has been detached. If not, remove the service plug grip (see page [HB-154](#)).

NOTICE:

Turning the power switch ON (READY) with the service plug grip removed could cause malfunction. Therefore, never turn the power switch ON (READY) in this state.

- (c) Disconnect the B12 and B13 battery ECU connectors.

HV



- (d) Disconnect the main battery cables from the system main relays.
- (e) Using a megohmmeter, measure the insulation resistance between the positive terminal on the HV battery side of the system main relay and the body ground.

Standard resistance:

10 MΩ or higher

- (f) Using a megohmmeter, measure the insulation resistance between the negative terminal on the HV battery side of the system main relay and the body ground.

Standard resistance:

10 MΩ or higher

OK

REPLACE BATTERY ECU ASSEMBLY

NG

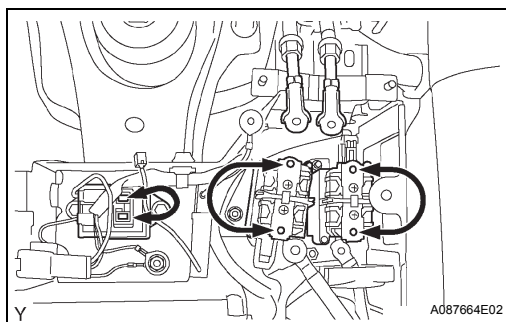
6 CHECK SYSTEM MAIN RELAYS FOR STICKING**CAUTION:**

Wear insulated gloves before performing the following operation.

- Check that the service plug grip has been detached.
- Disconnect all the high-voltage terminals of the system main relays.
- Measure the resistance at the switch side of the system main relays.

Standard resistance:

Below 1 Ω



NG

GO TO "CHECK INSULATION RESISTANCE" PROCEDURE AFTER REPLACING STUCK SYSTEM MAIN RELAY

OK

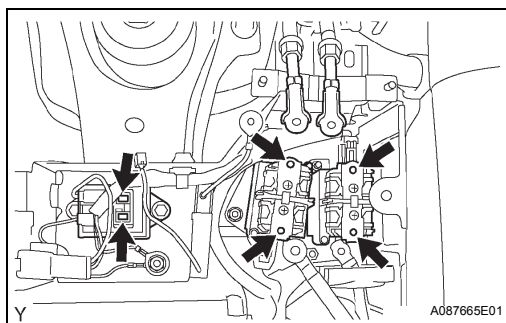
7 CHECK SYSTEM MAIN RELAYS FOR INSULATION**CAUTION:**

Wear insulated gloves before performing the following operation.

- Check that the service plug grip has been detached.
- Check that all the high-voltage terminals of the system main relays have been disconnected.
- Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the system main relays and the body ground.

Standard resistance:

10 M Ω or higher



NG

REPLACE SYSTEM MAIN RELAY WITH REDUCED INSULATION RESISTANCE

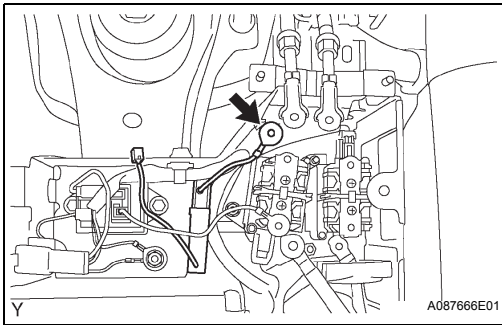
OK

8 CHECK SYSTEM MAIN RESISTOR FOR INSULATION**CAUTION:**

Wear insulated gloves before performing the following operation.

- Check that the service plug grip has been detached.

HV



- (b) Check that both terminals of the system main resistor have been disconnected.
- (c) Using a megohmmeter, measure the insulation resistance between the high-voltage terminal of the system main resistor and the body ground.

Standard resistance:
10 MΩ or higher

NG → **REPLACE SYSTEM MAIN RESISTOR**

OK

9 INSPECT MAIN BATTERY CABLE

CAUTION:

Wear insulated gloves and goggles before performing the following operation.

- (a) Remove the HV battery assembly (see page HB-92).
- (b) Remove the battery cover (see page HB-93).
- (c) Check if the main battery cable cover is not damaged or internal electrical leads are not in contact with the battery case or body.

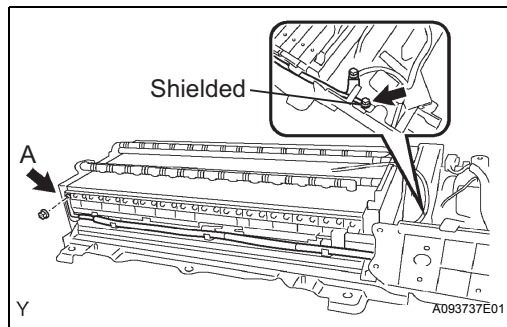
OK:

Electrical leads are not in contact with the battery case or body

- (d) Remove the terminal (A in the illustration) on the battery module side of the main battery cable only.
- (e) Using a megohmmeter, measure the insulation resistance between each terminal of the main battery cable and the shielded ground.

Standard resistance:
10 MΩ or higher

NG → **REPLACE MAIN BATTERY CABLE**



HV

OK

10 INSPECT NO. 2 MAIN BATTERY CABLE

CAUTION:

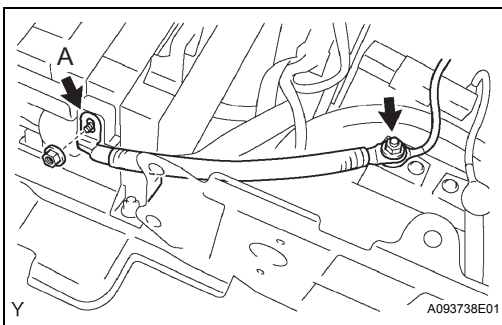
Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, check if the No. 2 main battery cable cover is not damaged or internal electrical leads are not in contact with the battery case or body.

OK:

Electrical leads are not in contact with the battery case or body

- (b) Remove the terminal (A in illustration) on the battery module side of the No. 2 main battery cable only.
- (c) Using a megohmmeter, measure the insulation resistance between each terminal of the No. 2 main battery cable and the shielded ground.



OK

Standard resistance:
10 MΩ or higher

NG

REPLACE NO. 2 MAIN BATTERY CABLE

OK

11 INSPECT BATTERY PLUG

CAUTION:

Wear insulated gloves and goggles before performing the following operation.

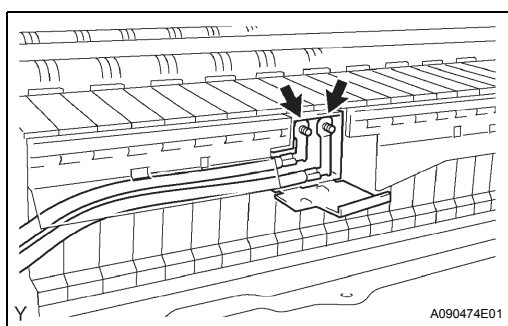
- (a) Following the previous step, disconnect only the connecting terminal of the battery plug.

NOTICE:

Do not reinstall the service plug grip.

- (b) Using a megohmmeter, measure the insulation resistance between each terminal of the battery plug wire harness and body ground.

Standard resistance:
10 MΩ or higher



NG

REPLACE BATTERY PLUG

OK

12 INSPECT NO. 2 FRAME WIRE

CAUTION:

Wear insulated gloves and goggles before performing the following operation.

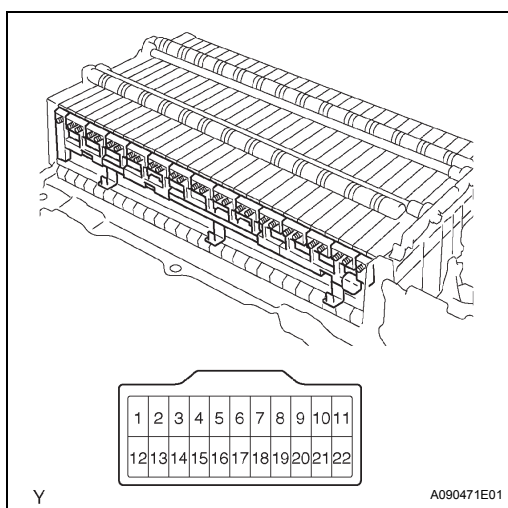
- (a) Following the previous step, check if the No. 2 frame wire cover is not damaged or internal electrical leads are not in contact with the battery case or body.

OK:

Electrical leads are not in contact with the battery case or body.

- (b) Remove all the terminals on the battery module side of the No. 2 frame wire.
- (c) Using a megohmmeter, measure the insulation resistance between each terminal of the No. 2 frame wire connector and the battery case.

Standard resistance:
10 MΩ or higher



NG

REPLACE NO. 2 FRAME WIRE

OK

HV

13 INSPECT JUNCTION BLOCK

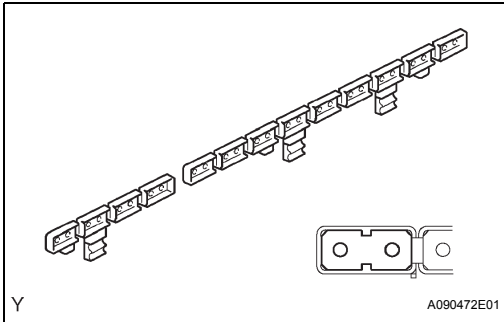
CAUTION:

Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, remove the junction block.
- (b) Visually check the junction block for any damage.

OK:

No cracks or damage



NG → **REPLACE JUNCTION BLOCK**

OK

14 INSPECT HV BATTERY ASSEMBLY

CAUTION:

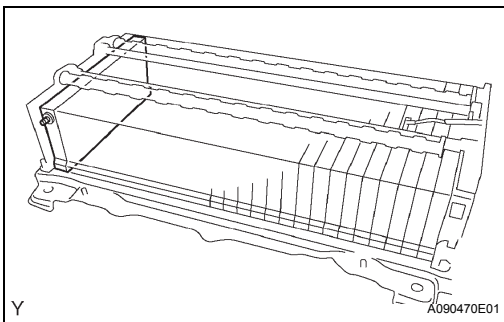
Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, measure the insulation resistance between each terminal (positive and negative side) of each battery module of the HV battery assembly and the battery case using a megohmmeter.

Standard resistance:

Some of the battery modules have continuity of below 10 MΩ

HV



NG → **REPLACE BATTERY ECU ASSEMBLY**

OK

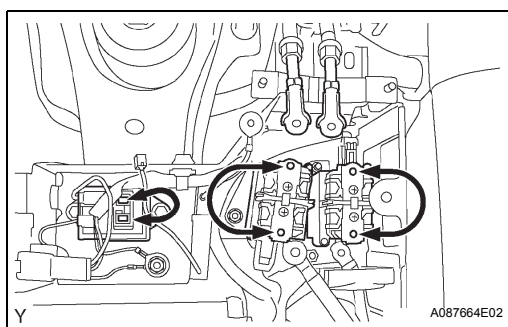
REPLACE HV SUPPLY BATTERY ASSEMBLY

15 CHECK SYSTEM MAIN RELAYS FOR STICKING

CAUTION:

Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.



- (b) Disconnect all the high-voltage terminals of the system main relays.
- (c) Measure the resistance at the switch side of the system main relays.

Standard resistance:

Below 1 Ω

NG →

GO TO "CHECK INSULATION RESISTANCE" PROCEDURE AFTER REPLACING STUCK SYSTEM MAIN RELAY

OK

16 CHECK FRAME WIRE FOR INSULATION

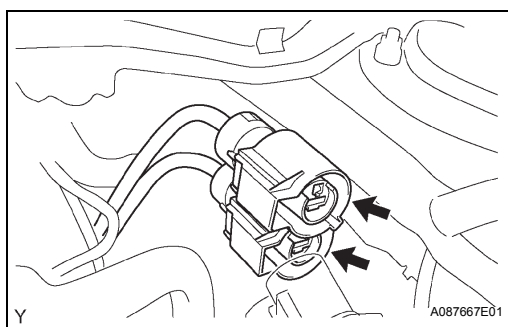
CAUTION:

Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.
- (b) Disconnect the frame wire from the inverter.
- (c) Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the frame wire and the body ground.

Standard resistance:

10 MΩ or higher



NG →

REPLACE FRAME WIRE

OK

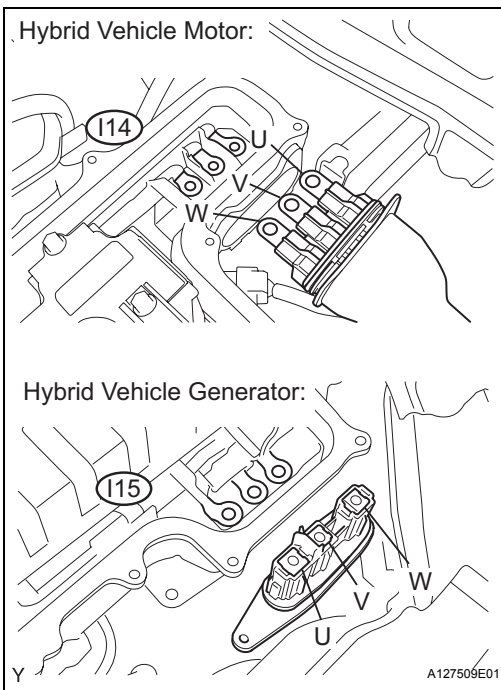
HV

17 CHECK HV TRANSAXLE ASSEMBLY FOR INSULATION

CAUTION:

Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.
- (b) Remove the inverter cover (see page HV-531).



- (c) Disconnect the three-phase alternating current cables for the motor and generator from the inverter.
- (d) Using a megohmmeter, measure the insulation resistance between the 6 terminals of the three-phase alternating current cables on the transaxle side and the body ground.

Standard resistance

Tester Connection	Specified Condition
U (I14-1) - Body ground	10 MΩ or higher
V (I14-2) - Body ground	10 MΩ or higher
W (I14-3) - Body ground	10 MΩ or higher
U (I15-1) - Body ground	10 MΩ or higher
V (I15-2) - Body ground	10 MΩ or higher
W (I15-3) - Body ground	10 MΩ or higher

NG → **REPLACE HYBRID VEHICLE TRANSAXLE ASSEMBLY**

OK

REPLACE INVERTER WITH CONVERTER ASSEMBLY

18 CHECK HV TRANSAXLE AREA FOR INSULATION

HV

CAUTION:

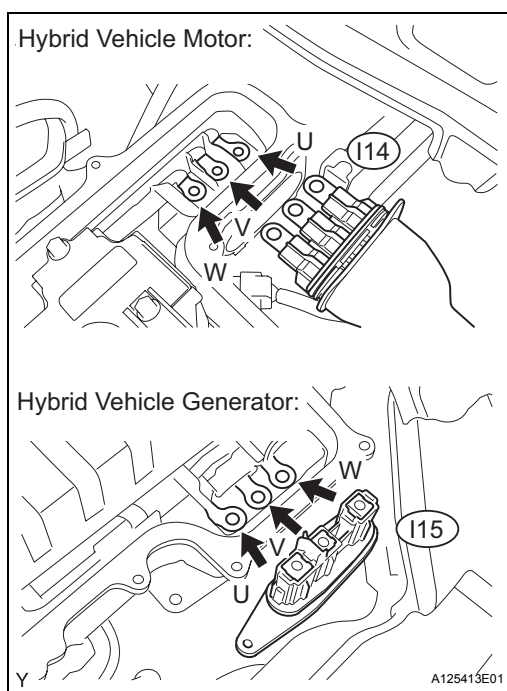
Wear insulated gloves before performing the following operation.

- (a) Turn the power switch OFF.
- (b) Remove the service plug grip (see page [HB-154](#)).

NOTICE:

Turning the power switch ON (READY) with the service plug grip removed could cause malfunction. Therefore, never turn the power switch ON (READY) in this state.

- (c) Remove the inverter cover (see page [HV-531](#)).



- (d) Disconnect the three-phase alternating current cables for the motor and generator from the inverter.
- (e) Using a megohmmeter, measure the insulation resistance between the 6 terminals of the three-phase alternating current cables on transaxle side and the body ground.

Standard resistance

Tester Connection	Specified Condition
U (I14-1) - Body ground	10 MΩ or higher
V (I14-2) - Body ground	10 MΩ or higher
W (I14-3) - Body ground	10 MΩ or higher
U (I15-1) - Body ground	10 MΩ or higher
V (I15-2) - Body ground	10 MΩ or higher
W (I15-3) - Body ground	10 MΩ or higher

OK → **REPLACE INVERTER WITH CONVERTER ASSEMBLY**

NG

REPLACE HYBRID VEHICLE TRANSAXLE ASSEMBLY

19 CHECK HIGH VOLTAGE DIRECT CURRENT AREA FOR INSULATION

CAUTION:
Wear insulated gloves before performing the following operation.

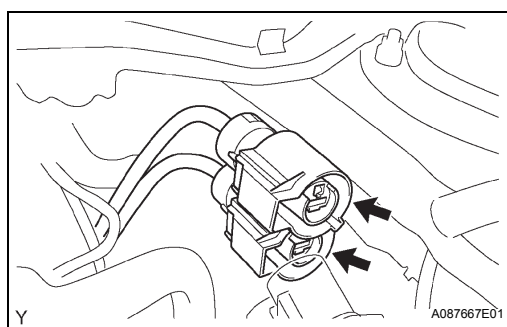
- (a) Turn the power switch OFF.
- (b) Remove the service plug grip (see page [HB-154](#)).

NOTICE:
Turning the power switch ON (READY) with the service plug grip removed could cause malfunction. Therefore, never turn the power switch ON (READY) in this state.

- (c) Disconnect the frame wire from the inverter.
- (d) Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the frame wire and the body ground.

Standard resistance:
10 MΩ or higher

OK → **REPLACE INVERTER WITH CONVERTER ASSEMBLY**



NG

HV

20 CHECK FRAME WIRE FOR INSULATION

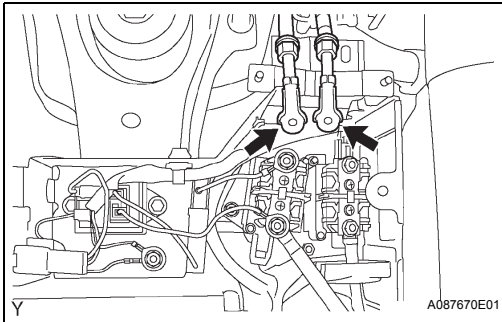
CAUTION:

Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.
- (b) Disconnect the frame wire from the system main relays.
- (c) Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the frame wire and the body ground.

Standard resistance:

10 MΩ or higher



NG → **REPLACE FRAME WIRE**

OK

21 CHECK SYSTEM MAIN RELAYS FOR STICKING

CAUTION:

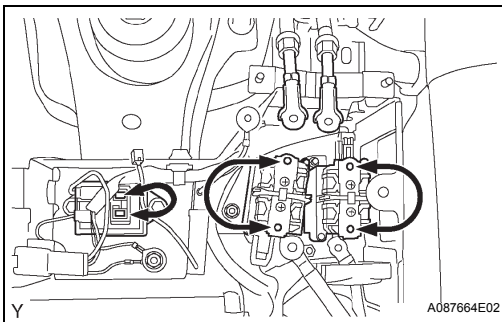
Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.
- (b) Disconnect all the high-voltage terminals of the system main relays.
- (c) Measure the resistance at the switch side of the system main relays.

Standard resistance:

Below 1 Ω

HV



NG → **GO TO "CHECK INSULATION RESISTANCE" PROCEDURE AFTER REPLACING STUCK SYSTEM MAIN RELAY**

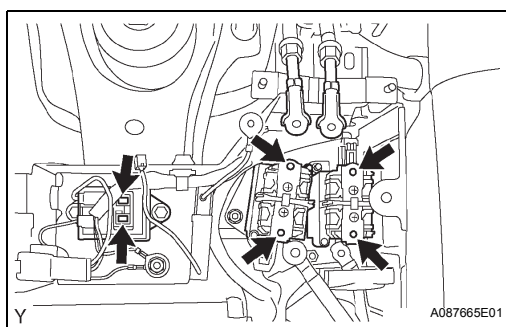
OK

22 CHECK SYSTEM MAIN RELAYS FOR INSULATION

CAUTION:

Wear insulated gloves before performing the following operation.

- (a) Check that the service plug grip has been detached.
- (b) Check that all the high-voltage terminals of the system main relays have been disconnected.



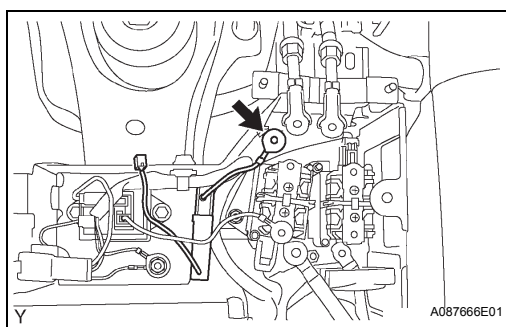
- (c) Using a megohmmeter, measure the insulation resistance between the high-voltage terminals of the system main relays and the body ground.
Standard resistance:
10 MΩ or higher

NG → **REPLACE SYSTEM MAIN RELAY WITH REDUCED INSULATION RESISTANCE**

OK

23 CHECK SYSTEM MAIN RESISTOR FOR INSULATION

CAUTION:
Wear insulated gloves before performing the following operation.



- (a) Check that the service plug grip has been detached.
- (b) Check that both terminals of the system main resistor have been disconnected.
- (c) Using a megohmmeter, measure the insulation resistance between the high-voltage terminal of the system main resistor and the body ground.
Standard resistance:
10 MΩ or higher

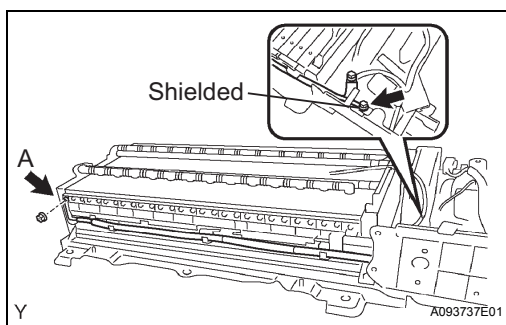
NG → **REPLACE SYSTEM MAIN RESISTOR**

OK

HV

24 INSPECT MAIN BATTERY CABLE

CAUTION:
Wear insulated gloves and goggles before performing the following operation.



- (a) Remove the HV battery assembly (see page [HB-92](#)).
- (b) Remove the battery cover (see page [HB-93](#)).
- (c) Check if the main battery cable cover is not damaged or internal electrical leads are not in contact with the battery case or body.

OK:
Electrical leads are not in contact with the battery case or body

- (d) Remove the terminal (A in the illustration) on the battery module side of the main battery cable only.
- (e) Using a megohmmeter, measure the insulation resistance between each terminal of the main battery cable and the shielded ground.

Standard resistance:
10 MΩ or higher

NG → REPLACE MAIN BATTERY CABLE

OK

25 INSPECT NO. 2 MAIN BATTERY CABLE

CAUTION:

Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, check if the No. 2 main battery cable cover is not damaged or internal electrical leads are not in contact with the battery case or body.

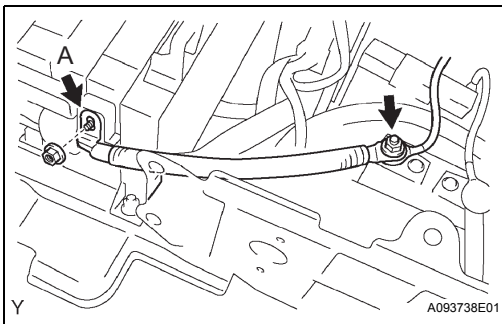
OK:

Electrical leads are not in contact with the battery case or body

- (b) Remove the terminal (A in illustration) on the battery module side of the No. 2 main battery cable only.
- (c) Using a megohmmeter, measure the insulation resistance between each terminal of the No. 2 main battery cable and the shielded ground.

Standard resistance:

10 MΩ or higher



NG → REPLACE NO. 2 MAIN BATTERY CABLE

OK

HV

26 INSPECT BATTERY PLUG

CAUTION:

Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, disconnect only the connecting terminal of the battery plug.

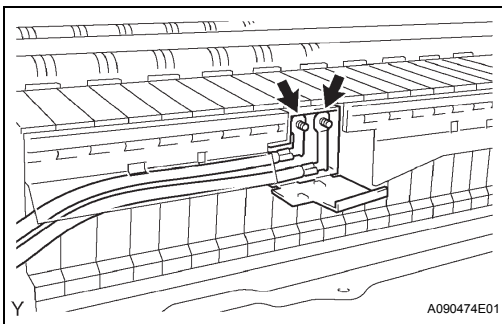
NOTICE:

Do not reinstall the service plug grip.

- (b) Using a megohmmeter, measure the insulation resistance between each terminal of the battery plug wire harness and the body ground.

Standard resistance:

10 MΩ or higher



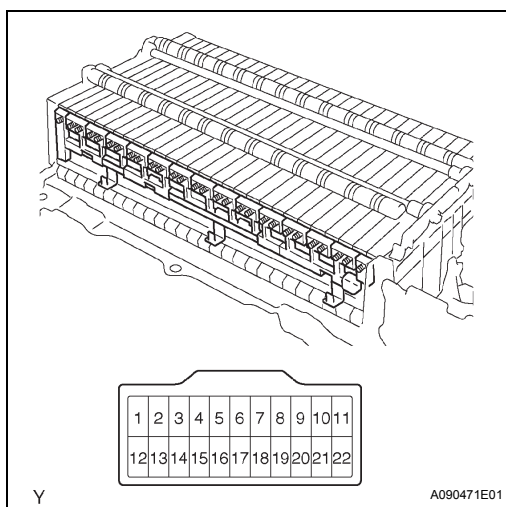
NG → REPLACE BATTERY PLUG

OK

27 INSPECT NO. 2 FRAME WIRE

CAUTION:

Wear insulated gloves and goggles before performing the following operation.



- (a) Following the previous step, check if the No. 2 frame wire cover is not damaged or internal electrical leads are not in contact with the battery case or body.

OK:

Electrical leads are not in contact with the battery case or body.

- (b) Remove all the terminals on the battery module side of the No. 2 frame wire.
- (c) Using a megohmmeter, measure the insulation resistance between each terminal of the No. 2 frame wire connector and the battery case.

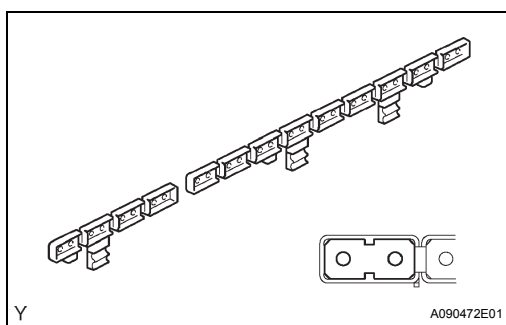
Standard resistance:

10 MΩ or higher

NG → **REPLACE NO. 2 FRAME WIRE**

OK

28 INSPECT JUNCTION BLOCK



CAUTION:

Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, remove the junction block.
- (b) Visually check the junction block for any damage.

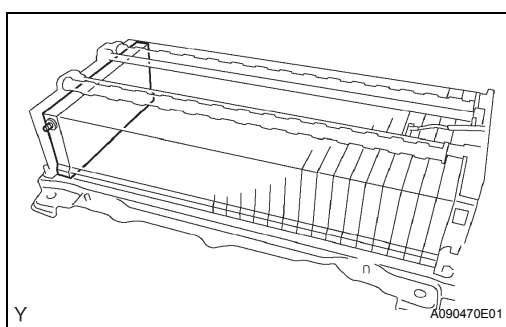
OK:

No cracks or damage

NG → **REPLACE JUNCTION BLOCK**

OK

29 INSPECT HV BATTERY ASSEMBLY



CAUTION:

Wear insulated gloves and goggles before performing the following operation.

- (a) Following the previous step, measure the insulation resistance between each terminal (positive and negative side) of each battery module of the HV battery assembly and the battery case using a megohmmeter.

Standard resistance:

Some of the battery modules have continuity of below 10 MΩ

NG → **REPLACE BATTERY ECU ASSEMBLY**

HV

HV-440

P112 HYBRID VEHICLE CONTROL – HYBRID CONTROL SYSTEM

OK

REPLACE HV SUPPLY BATTERY ASSEMBLY

HV