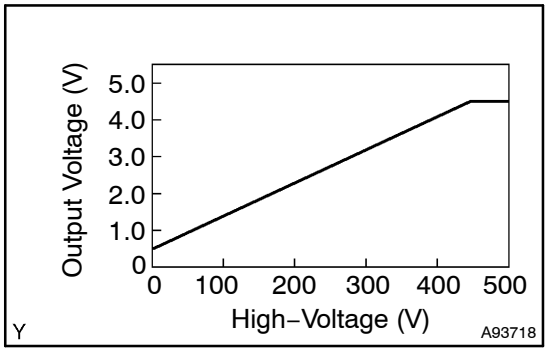
DTC	P0A94/589	DC/DC CONVERTER PERFORMANCE

DTC	P0A94/590	DC/DC CONVERTER PERFORMANCE

CIRCUIT DESCRIPTION

See the description of the boost converter on page 05–477.



The HV control ECU uses a voltage sensor, which has been built into the boost converter, to detect the high voltage before it is boosted and for boost control.

The boost converter voltage sensor outputs a voltage that varies between 0 and 5 V in accordance with the changes in the high voltage. The higher the high voltage, the higher the output voltage, and the lower the high voltage, the lower the output voltage.

The HV control ECU monitors a signal line of the boost converter voltage sensor and detects malfunction.

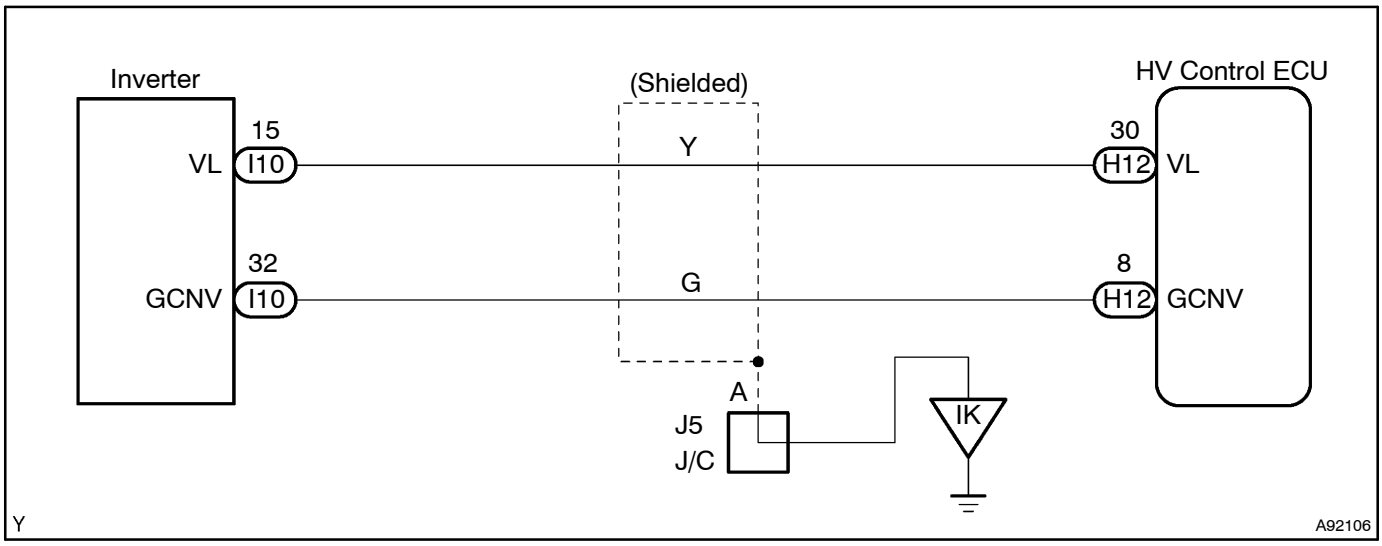
DTC No.	INF Code	DTC Detection Condition	Trouble Area
P0A94	589	Open or GND short in boost converter voltage (VL) sensor circuit	• Wire harness or connector • w/ converter inverter assembly • HV control ECU
P0A94	590	+B short in boost converter voltage (VL) sensor circuit	• Wire harness or connector • w/ converter inverter assembly • HV control ECU

HINT:

After confirming DTC P0A94 (INF 589 or 590), confirm VL–Voltage before Raise in Powertrain / Hybrid Control / Data List using the intelligent tester II.

Voltage Displayed	Malfunction
510 V	+B short circuit
0 V	Open or GND short circuit

WIRING DIAGRAM



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 at least for 5 minutes before touching any of the high–voltage connectors or terminals.**

HINT:

At least 5 minutes is required to discharge the high–voltage condenser inside the inverter.

1	**READ VALUE OF INTELLIGENT TESTER II (VL–VOLTAGE BEFORE RAISE)**

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) On the intelligent tester II, enter the following menus: Powertrain / Hybrid Control / Data List.
(e) Read the VL–Voltage before Raise value on the intelligent tester II.

Result:

Voltage Displayed	Proceed to
510 V	A
0 V	B
1 to 509 V	C

HINT:

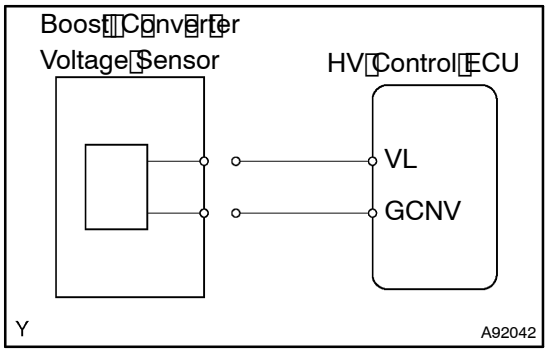
- If there is a +B short circuit, the intelligent tester II indicates 510 V.
- If there is an open GND short circuit, the intelligent tester II indicates 0 V.

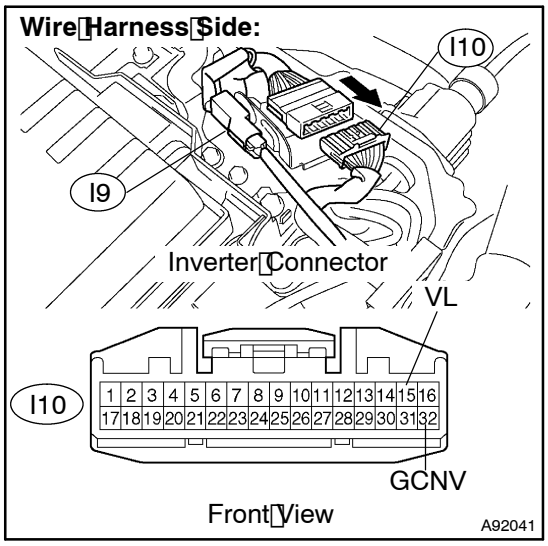
B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–232)**

A

2	READ VALUE OF INTELLIGENT TESTER II (CHECK FOR +B SHORT IN WIRE HARNESS)





CAUTION:
Wear insulated gloves before performing the following operation.

(a) Turn the power switch OFF.
(b) Remove the service plug grip (see page 21–120).

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 21–25).
(d) Disconnect the I10 inverter connector.
(e) Turn the power switch ON (IG).

HINT:
DTCs for the interlock switch system are output when turning the power switch ON (IG) with both service plug grip and inverter cover removed.

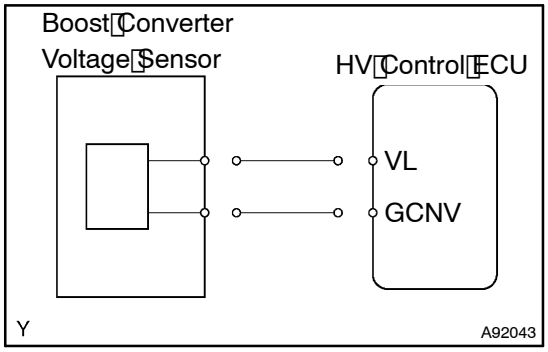
(f) On the intelligent tester II, enter the following menus: Powertrain / Hybrid Control / Data List.
(g) Read the VL–Voltage before Raise value on the intelligent tester II.
Standard: 0 V
(h) Turn the power switch OFF.
(i) Reconnect the inverter connector.
(j) Reinstall the inverter cover (see page 21–25).
(k) Reinstall the service plug grip (see page 21–120).

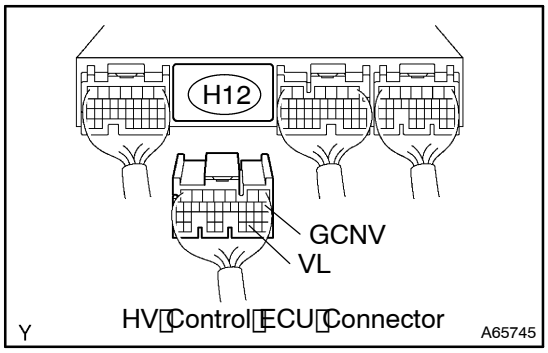
NG → **Go to step 3**

OK

REPLACE W/CONVERTER INVERTER ASSY (See page 21–25)

3	READ VALUE OF INTELLIGENT TESTER II (CHECK FOR +B SHORT IN HYBRID VEHICLE CONTROL ECU)





(a) Disconnect the H12 HV control ECU connector.
(b) Turn the power switch ON (IG).

HINT:

DTCs for the interlock switch system are output when turning the power switch ON (IG) with both service plug grip and inverter cover removed.

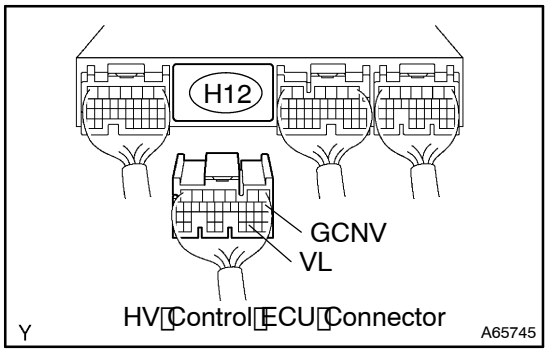
(c) On the intelligent tester II, enter the following menus: Powertrain / Hybrid Control / Data List.
(d) Read the VL–Voltage before Raise value on the intelligent tester II.
Standard: 0 V
(e) Reconnect the HV control ECU connector.

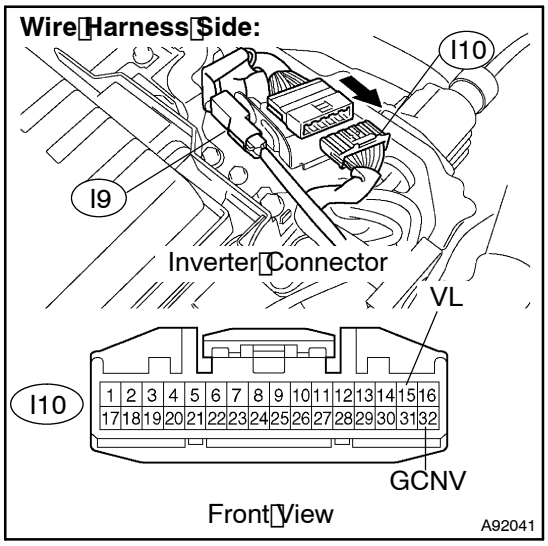
NG	REPLACE HYBRID VEHICLE CONTROL ECU (See page 21–128)

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

4	CHECK HARNESS AND CONNECTOR(HYBRID VEHICLE CONTROL ECU – INVERTER)





CAUTION:
Wear insulated gloves before performing the following operation.

(a) Turn the power switch OFF.

(b) Remove the service plug grip (see page 21–120).

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 21–25).

(d) Disconnect the H12 HV control ECU connector.

(e) Disconnect the I10 inverter connector.

(f) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VL (H12–30) – VL (I10–15)	Below 1 Ω
GCNV (H12–8) – GCNV (I10–32)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VL (H12–30) or VL (I10–15) – Body ground	10 kΩ or higher
GCNV (H12–8) or GCNV (I10–32) – Body ground	10 kΩ or higher

(g) Reconnect the inverter connector.

(h) Reconnect the HV control ECU connector.

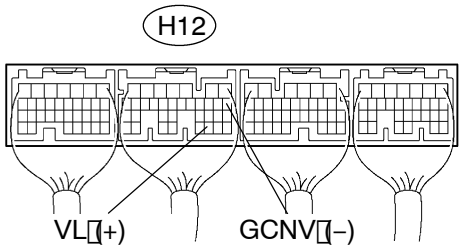
(i) Reinstall the inverter cover (see page 21–25).

(j) Reinstall the service plug grip (see page 21–120).

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5	INSPECT HYBRID VEHICLE CONTROL ECU (VL VOLTAGE)



(a) Turn the power switch ON (READY).

HINT:

DTCs for the interlock switch system are output when turning the power switch ON (IG) with both service plug grip and inverter cover removed.

(b) Measure the voltage between the terminals of the H12 HV control ECU connector.

Standard:

Tester Connection	Specified Condition
VL (H12–30) – GCNV (H12–8)	1.9 to 3.4 V

NG → **REPLACE W/CONVERTER INVERTER ASSY (See page 21–25)**

OK

REPLACE HYBRID VEHICLE CONTROL ECU (See page 21–128)