DTC P3009–611 HIGH VOLTAGE POWER SHORT CIRCUIT

CIRCUIT DESCRIPTION

The DTC is output if there is insulation trouble with the high–voltage circuits in the air conditioning system. Insulation trouble with the electric inverter compressor or A/C inverter assy may be the cause. Any oil other than ND–OIL 11 may have entered the refrigeration cycle.

The motor driven with high–voltage is built into the electrical compressor and is cooled directly with refrigerant. Compressor oil (ND–OIL 11) with high insulation performance is used because a leakage of electrical power may occur if regular compressor oil (ND–OIL 8) is used.

NOTICE:

- **Electrical insulation performance may decrease significantly if even a small amount of oil other than ND–OIL 11 is used (or enters) in the refrigeration cycle, causing the DTC to be output.**
- **If other is accidentally used and a DTC is output, collect the oil in the refrigeration cycle into the compressor and replace it with ND–OIL 11 to increase the ND–OIL 11 ration amount.**
- **Replace the main components (evaporator, condenser, and compressor) if a large amount of oil other than ND–OIL 11 enters the system. Failing to do so may cause electrical insulation performance to remain low, causing the DTC to be output.**

CAUTION:

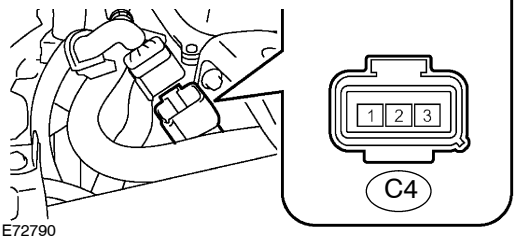
Wear insulated gloves and pull out the service plug grip before inspection as procedures may require disconnecting high–voltage connectors.

DTC No.	Detection item	Trouble Area
P3009–611	High voltage system insulation malfunction.	• Electric inverter compressor (w/motor compressor assy) • A/C inverter (w/converter inverter assy) • Compressor oil

INSPECTION PROCEDURE

1	INSPECT A/C INVERTER

Electric Inverter Compressor Connector Wire Harness View:



(a) Remove the service plug grip.

CAUTION:

Because the compressor has a high–voltage circuit, wear insulated gloves and pull out the service plug to cut the high–voltage circuit before inspection.

(b) Disconnect the electric inverter compressor connector.

(c) Measure the resistance according to the value(s) in the table below immediately after the compressor is stopped.

Standard:

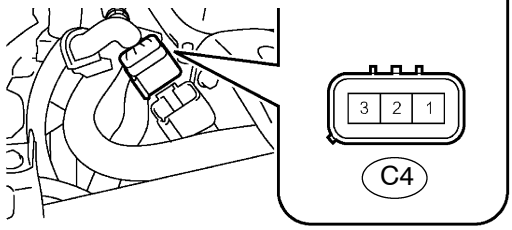
Tester connection	Condition	Specified condition
C4–1 – Body ground	Always	2 MΩ or higher
C4–2 – Body ground	Always	2 MΩ or higher
C4–3 – Body ground	Always	2 MΩ or higher

NG → **REPLACE A/C INVERTER**

OK

2 INSPECT ELECTRIC INVERTER COMPRESSOR

Electric Inverter Compressor Connector Front View:



(a) Remove the service plug grip.

CAUTION:

Because the compressor has a high–voltage circuit, wear insulated gloves and pull out the service plug to cut the high–voltage circuit before inspection.

(b) Disconnect the electric inverter compressor connector.

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

Standard:

Tester connection	Condition	Specified condition
C4–1 – Body ground	Always	2 MΩ or higher
C4–2 – Body ground	Always	2 MΩ or higher
C4–3 – Body ground	Always	2 MΩ or higher

NG → **REPLACE ELECTRIC INVERTER COMPRESSOR**

NOTICE:

The A/C inverter is integrated with the inverter assy. It is necessary to replace the PCU box assy if the A/C inverter (inverter assy) needs to be replaced because the A/C inverter (inverter assy) cannot be replaced alone.

OK

3 INSPECT ELECTRIC INVERTER COMPRESSOR

(a) Connect the electric inverter compressor connector
(b) Install the service plug grip.

CAUTION:
Because the compressor has a high–voltage circuit, wear insulated gloves and pull out the service plug to cut the high–voltage circuit before inspection.

(c) Turn the power switch on.
(d) Set the A/C setting temperature to 25°C (77°F) and the blower switch LO and then operate the compressor for 10 minutes to circulate the refrigerant cycle with refrigerant and collect as much compressor oil remaining in each component into the compressor as possible.

HINT:
Inspect with sufficient oil in the compressor since the insulation resistance of the compressor changes depending on the amount of oil in the compressor.

(e) Turn the power switch off, and leave the vehicle for a night to cool down the compressor's internal temperature.

NOTICE:
Do not operate the compressor before inspection.

HINT:
- Leave the vehicle until the compressor temperature decreases below ambient temperature. (As the compressor temperature decreases below the temperature of the condenser and evaporator, more oil can be stored in the compressor.)
- If there is significant difference in temperature between day and night time, it will take approximately 4 hours to cool down the compressor.

(f) Remove the service plug grip.

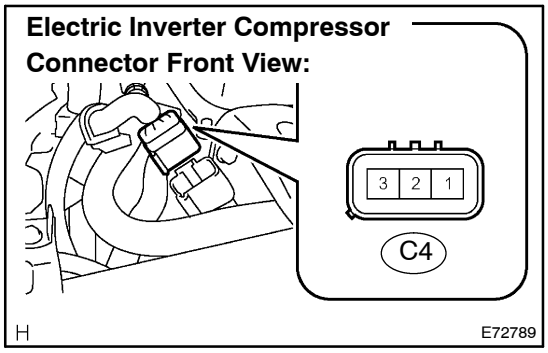
CAUTION:
Because the compressor has a high–voltage circuit, wear insulated gloves and pull out the service plug to cut the high–voltage circuit before inspection.

(g) Disconnect the electric inverter compressor connector.
(h) Measure the resistance according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified condition
C4–1 – Body ground	Always	3 MΩ or higher
C4–2 – Body ground	Always	3 MΩ or higher
C4–3 – Body ground	Always	3 MΩ or higher

NOTICE:
If the results are out of the specified range, replace the compressor without operating.



NG → **REPLACE ELECTRIC INVERTER COMPRESSOR**

NOTICE:
The A/C inverter is integrated with the inverter assy. It is necessary to replace the PCU box assy if the A/C inverter (inverter assy) needs to be replaced because the A/C inverter (inverter assy) cannot be replaced alone.

OK

SYSTEM OK