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# **Part 5**

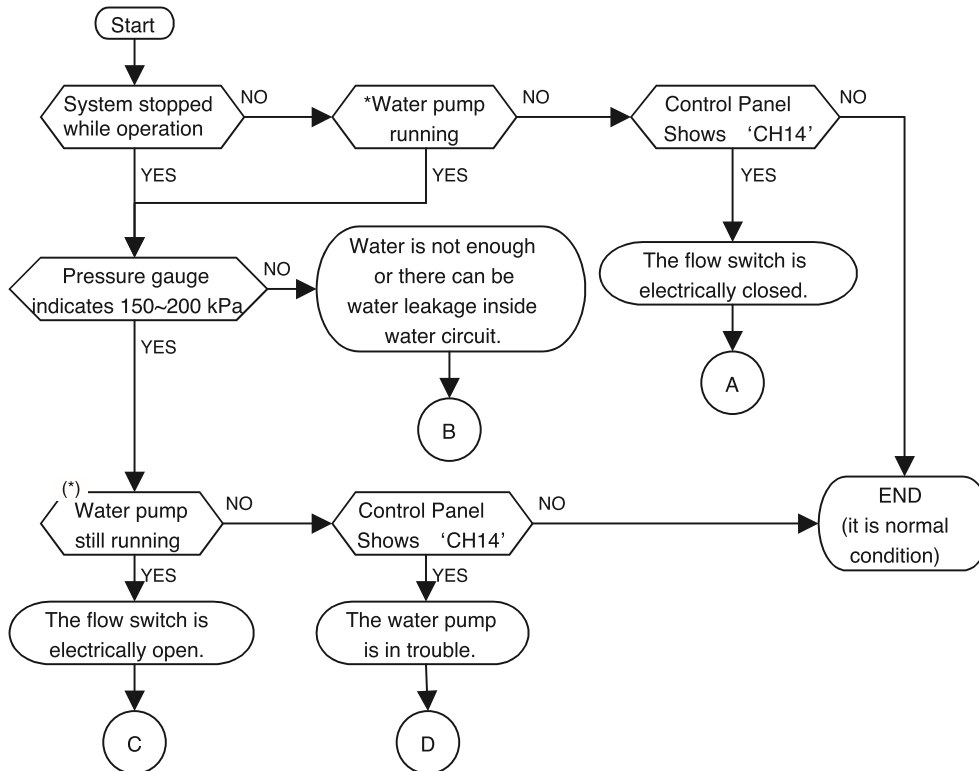
## **Trouble Shooting**

# Trouble Shooting

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# 1. Checking Key Components of Unit

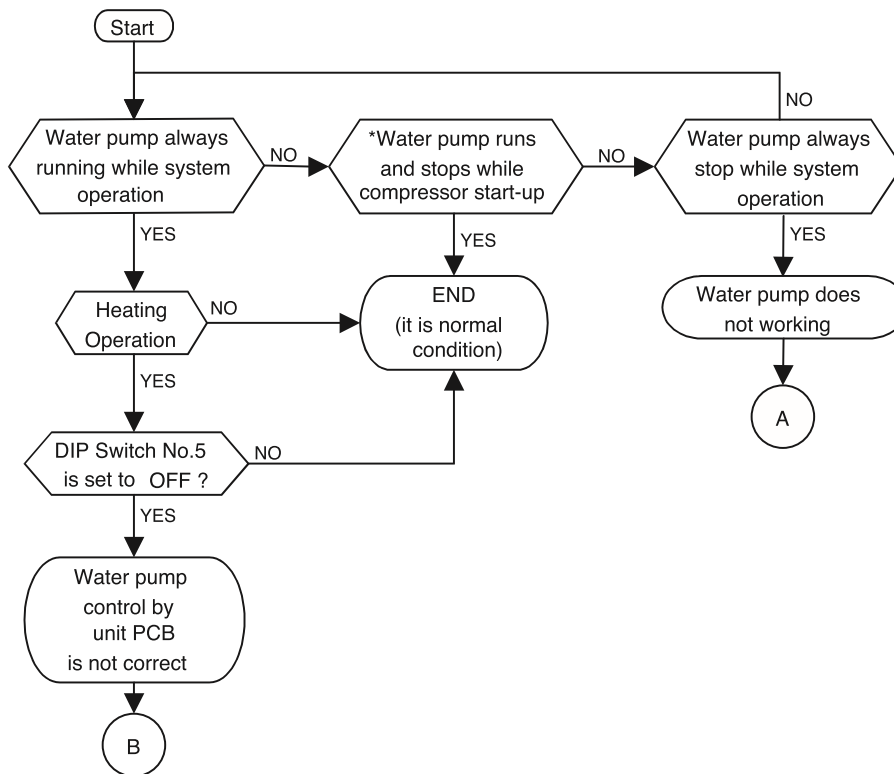
## 1.1 Flow Switch



\*: How to identify? - Touch the terminal box (black plastic box at the water pump) of water pump and feel if the water pump is vibrating. If no vibration, the water pump is not operating. Also, you can see 'Water Pump Operating' at control panel.

- (A)
  - Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
  - Contact official After Service Center and replace the flow switch.
  - Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.
- (B)
  - Check if water inside water circuit is fully charged. Pressure gauge at the unit should indicate 150~200 kPa.
  - Also, as the hand of the pressure gauge is not react so fast according to water charging, check the pressure gauge again.
  - Otherwise, there can be water leakage inside water circuit. Examine if water circuit is completely sealed.
- (C)
  - Although water is well flowing, the flow switch can not detect water flow. It is due to electrically open of flow switch or the contact of flow switch is mechanically broken.
  - Contact official After Service Center and replace the flow switch.
- (D)
  - Read 'Checking Key Components of Unit – Water Pump' carefully to get more detail information.
  - Contact official After Service Center and replace the water pump.
  - Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.
  - Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.

## 1.2 Water Pump



\* : It is normal condition that water pump runs or stops during system operation (including compressor start-up) due to specific control logic.

(A)

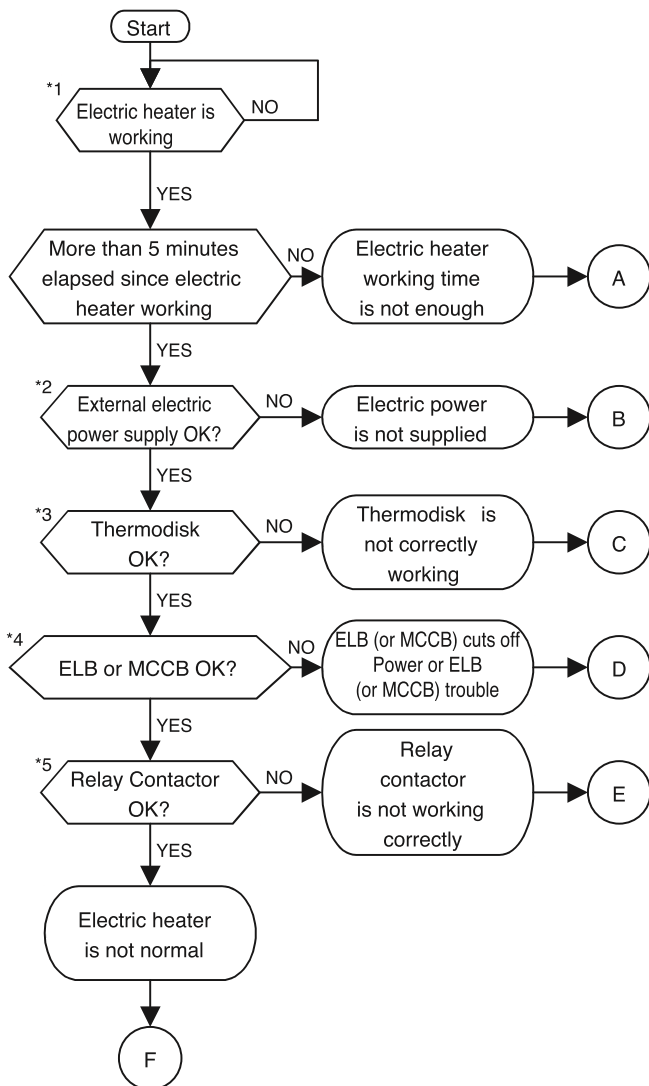
- Water pump does not because of mechanical defects of water pump or wrong wiring at the water pump.
- To correct mechanical defects, contact official After Service Center and replace the water pump.
- To correct wrong wiring, check if wires 'CN\_MOTOR1' connector on the unit PCB and water pump terminal box (black plastic box at the water pump) are connected firmly. Also, check wires are electrically connected by measuring resistance of each wires (if electrically connected exactly, resistance should be 0 ohm).

(B)

- Unit PCB can not make control signal or wrong wiring at the water pump.
- To correct unit PCB's making control signal, first check the signal level. Use electric voltage meter and measure voltage at 'CN\_MOTOR1' connector on the unit PCB. If measured value is not 220-240 V~ while 'Water Pump Operating' is displayed at control panel, the unit PCB is in trouble. In this case, contact official After Service Center and replace the unit PCB.
- To correct wrong wiring, please refer (A).



## 1.3 Electric Heater



\*1 : When electric heater is working, 'Electric Heater Operating' is displayed at control panel

\*2 : For single-phase model : Measure electric voltage at port 3 (Live) and port 4 (Neutral) of Terminal Block 3 with voltage meter. The measured value should be 220-240 V~ . To identify the location of Terminal Block 3, please refer circuit diagram of unit at 'Installation Manual' or backside of front cover of the unit.

\*2 : For three-phase model : Measure electric voltage at two port of 3 (R), 4 (S), and 5 (T) of Terminal Block 3 with voltage meter. The measured value should be 220-240 V~ or 380-415 V~ . To identify the location of Terminal Block 3, please refer circuit diagram of unit at 'Installation Manual' or backside of front cover of the unit.

\*3 : For single-phase model : Find cover of thermodisk which is located beside air vent. Air vent is on the top of the electric heater tank. Uncover the cover by unscrewing bolts. Find two copper leads located both left and right side of the thermodisk core. Check resistance of both leads. The measured resistance should be 0 ohm. After then, check if voltage is transmitted to the thermodisk correctly. Measure electric voltage between one of the lead (Live) of the thermodisk and port 3 (Neutral) of ELB (A). The measured value should be 220-240 V~ .

\*3 : For three-phase model : Find cover of thermodisk which is located side of electric heater tank. Uncover the cover by unscrewing bolts. Find two copper leads located both left and right side of two thermodisk core. Check resistance of both leads of each thermodisks. The measured resistance should be 0 ohm.



While uncovering the cover of the thermodisk, be careful for electric shock.

\*4 : For single-phase model : Resistance between port 1 and port 2 should be 0 ohm. Also, port 3 and port 4 should be 0 ohm, too. Finally, measure electric voltage at port 2 (Live) and port 4 (Neutral) with voltage meter. The measured value should be 220-240 V~ .

\*4 : For three-phase model : Resistance between port 1-to-port 2, port 3-to-port 4, and port 5-to-port 6 of MCCB (A) should be 0 ohm. Port number and location of MCCB (A) can be found circuit diagram of the unit(back side of front cover).

\*5 : For single-phase model : At Relay Contactor (A), measure electric voltage at port 2 (Live) and port 6 (Neutral) with voltage meter. The measured value should be 220-240 V~ . Also, at Relay Contactor (B), measure electric voltage at port 2 (Live) and port 6 (Neutral) with voltage meter. The measured value should be 220-240 V~ .

\*5 : For three-phase model : At Magnet Contact (C) or Magnet Contact (B), resistance between port L1-to-port T1, port L2-to-port T2, and port L3-to-port T3 should be 0 ohm.

- (A) • Wait for 5 minutes to heat water inside electric heater tank. If capacity of electric heater is 6kW, at least 2 centigrade will be increased.
- (B) • For single-phase model : Check if external electricity power supply is breakout. If not, check wiring between external electricity power supply and port 3 and port 4 of Terminal Block 3. You can identify the location of Terminal Block 3 at the circuit diagram of unit.
- For three-phase model : Check if external electricity power supply is breakout. If not, check wiring between external electricity power supply and port 3, port 4, and port 5 of Terminal Block 3. You can identify the location of Terminal Block 3 at the circuit diagram of unit.
- (C) • Thermodisk is mechanically defected. In this case, contact official After Service Center and replace the thermodisk.
- Check the insulation resistance of Electric Heater.
- (D) • If the insulation resistance has improper, remove the cause of the problem and then reset the ELB (or MCCB).
- Replace the ELB (or MCCB) when the insulation resistance is suitable.
- (E) • Relay contactor is is mechanically defected. In this case, contact official After Service Center and replace the relay contactor.
- Heating coil of electric heater can be damaged or wiring inside the electric heater is problem. Before replacing the electric heater, in this case, contact official After Service Center and do diagnosis about electric heater and related parts including the capacity of external electric power source. If the reason of malfunction is clearly proved as the defect of the electric heater itself, then replace it with new one.
- (F)

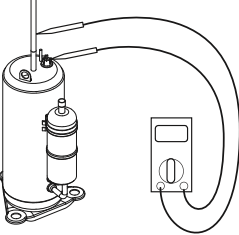
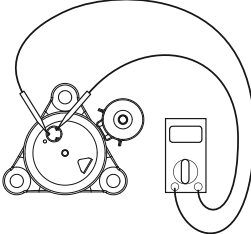
## 1.4 Remote Controller

To solve various troubles while using control panel, please read following FAQ (Frequently Asked Questions). For your convenience, all questions are classified according to topics.

No	Topic	Question	Answer
1	Power button does not bright	System installation is finished. Also, all wirings including power connection is all right. But when the power button in front of the control panel is pushed, it does not bright.	<ul style="list-style-type: none"> <li>• There can be a problem in wiring between PCB and control panel. Open control box and find 'CN_REMO' connector at the PCB. If the connector is empty or nothing is connected, please connect it with end of wire which is from control panel then restart the system.</li> <li>• Check if external controller is connected like thermostat. If thermostat is connected to the system and it is configured exactly, you can see 'Thermostat' text at the display of the control panel. It is normal condition that power button of control panel does not work when thermostat is installed.</li> </ul>
2	Some texts are displayed automatically	Although nobody touched control panel, sometimes it displays specific texts and the system operates automatically.	<ul style="list-style-type: none"> <li>• It is normal condition. Basically, two features can be operated without user's decision – one is system protective operation, the other is 'background water tank heating operation', which is heating inside the water tank while space heating is not used or the system is not working. System protective operation is, as letter says, for the purpose of securing the system from worse condition. Anti-freezing operation, for example, is one of the protective operation. It is essential to start protective operation to prevent potential malfunction and to keep possible accidents. On the other hand, background water tank heating operation is not protective operation but to supply warm water to end-user. The background water tank heating operation is only started when the water tank temperature is under the specific temperature.</li> </ul>
3	Water tank heating or related features are not permitted	Setting water tank temperature is not permitted although the water tank is installed.	<p>Following two conditions should be satisfied.</p> <ul style="list-style-type: none"> <li>• Check if 'Water tank enable/disable' is correctly displayed or not. To use water tank, end-user must push On/Off button focused on hot.</li> <li>• Also, check if DIP switch setting is correct or not. To identify the DIP switch setting, open the control box inside the unit. Unless 2nd and 3rd pin of DIP switch setting is 01 (OFF-ON) or 10 (ON-OFF), the water tank heating will not be configured.</li> </ul>

## 1.5 Compressor

Check and ensure in following order when error related with the compressor or error related with power occurs during operation:

No.	Checking Item	Symptom	Countermeasure
1	Is how long power on during operation?	1) Power on for 12 hours or more	• Go to No.2.
		2) Power on for 12 hours or less	• Go to No.2 after applying power for designated time (12 hours).
2	Does failure appears again when starting operation?	1) The compressor stops and same error appears again.	• Check IPM may fail.
	Method to measure insulation resistance 	2) If output voltage of the inverter is stable.	• Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor. • Insulation resistor: 2 MΩ or more • Coil resistor: Please refer to Page 68
	Method to measure coil resistance 	3) If output voltage of the inverter is unstable or it is 0 V. (When incapable of using a digital tester)	• Check the IPM. If the IPM is normal, replace the inverter board. • Check coil resistor and insulation resistor.

### [Cautions when measuring voltage and current of inverter power circuit]

Measuring values may be different depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no same waveform.

Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.

In addition, measuring values appear largely different depending on measuring tools.

#### Note

- 1) If using a portable tester when checking the output voltage of the inverter is constant (when comparing relative voltage between lines), always use an analog tester. Especially exercise particular caution if the output frequency of the inverter is low, when using a movable tester, where change of measured voltage values is large between other lines, when virtually same values appear actually or where there is danger to determine that failure of the inverter occurred.
- 2) You can use rectification voltmeter (→|←) if using commercial frequency tester when measuring output values of the inverter (when measuring absolute values). Accurate measuring values cannot be obtained with a general portable tester (For analog and digital mode).

## 1.6 Fan Motor

Checking Item	Symptom	Countermeasure
<p>(1) The fan motor does not operate. Does failure appears again when starting operation?</p> <p>(2) Vibration of the fan motor is large.</p>	1) When power supply is abnormal	<ul style="list-style-type: none"> <li>• Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.</li> <li>• Modify the power supply voltage is beyond specified scope.</li> </ul>
	2) For wrong wiring	<ul style="list-style-type: none"> <li>• For following wiring.               <ol style="list-style-type: none"> <li>1. Check connection status.</li> <li>2. Check contact of the connector.</li> <li>3. Check that parts are firmly secured by tightening screws.</li> <li>4. Check connection of polarity.</li> <li>5. Check short circuit and grounding.</li> </ol> </li> </ul>
	3) For failure of motor	<ul style="list-style-type: none"> <li>• Measure winding resistance of the motor coils.</li> </ul>
	4) For failure of circuit board	<p>Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.)</p> <ol style="list-style-type: none"> <li>1. Replace only fan control boards. If starting is done, it means that the fan control board has defect.</li> <li>2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect.</li> <li>3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.</li> </ol>

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## 2. Self-Diagnosis Feature

### 2.1 Concept of 'Classified Trouble'

- **Definition of terms**

- Trouble : a problem which can stop system operation, and can be resumed temporarily under limited operation without certificated professional's assist.
- Error : a problem which can stop system operation, and can be resumed ONLY after certificated professional's check.
- Emergency mode : temporary heating operation while system met Trouble

- **Objective of introducing 'Trouble'**

- Not like airconditioning product, Air-to-Water heat pump is generally operating in whole winter season without any system stopping.
- If system found some problem, which is not critical to system operating for yielding heating energy, the system can temporarily continue operating in emergency mode with enduser's decision.

- **Classified trouble**

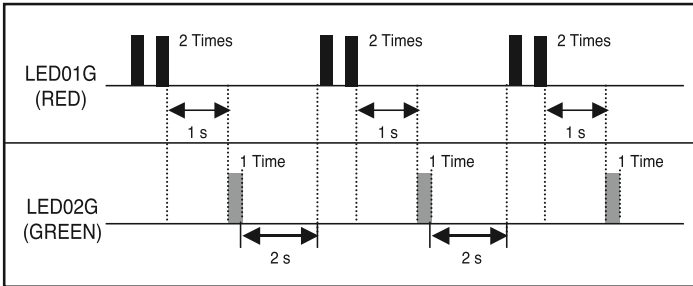
- Trouble is classified two levels according to the seriousness of the problem : Slight trouble and heavy trouble
- Slight trouble : In most case, this trouble is concerned with sensor problems. The outdoor unit is operating under emergency mode operation condition which is configured by DIP switch No. 4 of the Main PCB Assembly 1.
- Heavy trouble : As the outdoor unit has problem, the emergency mode operation is performed by electric heater.
- Option trouble : a problem is found for option operation such as water tank heating. In this trouble, the troubled option is assumed as if it is not installed at the system.

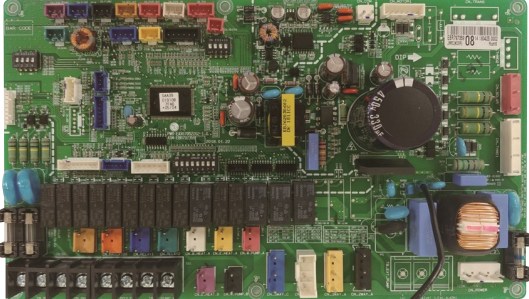
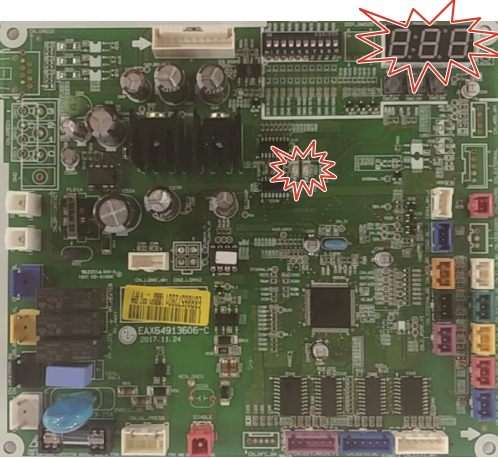
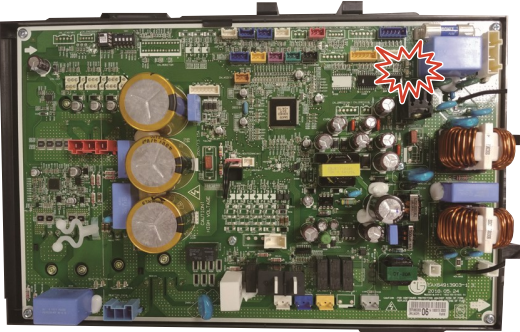

- **Emergency operation is not automatically restarted after main electricity power is reset.**

- In normal condition, the product operating information is restored and automatically restarted after main electricity power is reset.
- But in emergency operation, automatic re-start is prohibited to protect the product.
- Therefore, user must restart the product after power reset when emergency operation has been running.



## 2.2 Error Indicator



Model	1Ø, 5kW / 7kW / 9kW	1Ø, 12kW / 14kW / 16kW 3Ø, 12kW / 14kW / 16kW
Main PCB		
Inverter PCB		

If abnormal voltage is supplied, the protection circuits will turn off the product in order to prevent the component damage. The product will automatically restart after 3 minutes.

## 2.3 Error Code List

### Main PCB assembly(Heater)

Error Code	Description	Main Reasons
01 *	Problem in Remote Room Air sensor	Remote room air sensor disconnection or short circuit
02 *	Problem in Refrigerant (Inlet side) sensor	Refrigerant Inlet side sensor disconnection or short circuit
03 ****	Bad communication between control panel and unit	Connector connection error or connection wire break
05 **	Bad communication between Indoor unit and Main PCB assembly(Inverter) and Main PCB assembly(Heater)	PCB(Heater) Unit does not receive signal from PCB(Inverter)
06 *	Problem in Refrigerant (Outlet side) sensor	Refrigerant Outlet side sensor disconnection or short circuit
08 ***	Problem in Water Tank sensor	Water tank sensor disconnection or short circuit
09 ****	PCB Program (EEPROM) Fault	Electrical or mechanical damage at the EEPROM
13 ***	Problem in Solar-thermal sensor	Solar-thermal sensor disconnection or short circuit
14 ****	Problem in Flow Switch	Folw switch is open while internal water pump is working
15 ****	Water pipe overheated	Leaving water temperature is above 57°C
16 ****	Problems in sensors	An error cord 17,18,19 error has occurred at the same time.
17 *	Problem in Water-inlet sensor	Water-Inlet sensor disconnection or short circuit
18 *	Problem in Water-outlet sensor	Water-outlet sensor disconnection or short circuit
19 *	Problem in Elec/Heater Water-outlet sensor	Problem in Elec/Heater Water-outlet sensor
20 ****	Electric heater overheated	Leaving water temperature is above 80°C

#### • Notice of error code

- Slight / Heavy / Option Troubles : lowercases 'ch' + code no.
- Errors : capital letters 'CH' + code no.
- Slight Trouble: \*
- Heavy Trouble: \*\*
- Option Trouble: \*\*\*
- Error: \*\*\*\*



#### CAUTION

#### Precaution in service or check

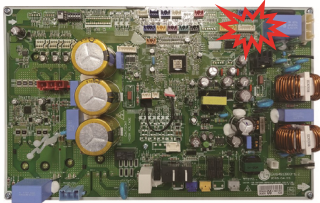
Even after stopping the operation of product, it takes some time to discharge the remaining electricity of the electrolytic capacitor that was charged early. Before conducting a checking or repairing job, pull out the plug out of the outlet and make sure that the lamp on the control board outdoor unit is off.

## Main PCB assembly(Inverter)

- Red LED means error no. 10's digit, and green LED means 1's digit, and when red and green simultaneously blink, it means 100's unit.

Ex) Inverter compressor IPM defect Error : error number 21

Error Code	Description	LED 1 (Red)	LED 2 (Green)
21	Inverter compressor IPM defect	2times ●	1time ●



1Ø, 5kW / 7kW / 9kW



1Ø, 12kW / 14kW / 16kW



3Ø, 12kW / 14kW / 16kW

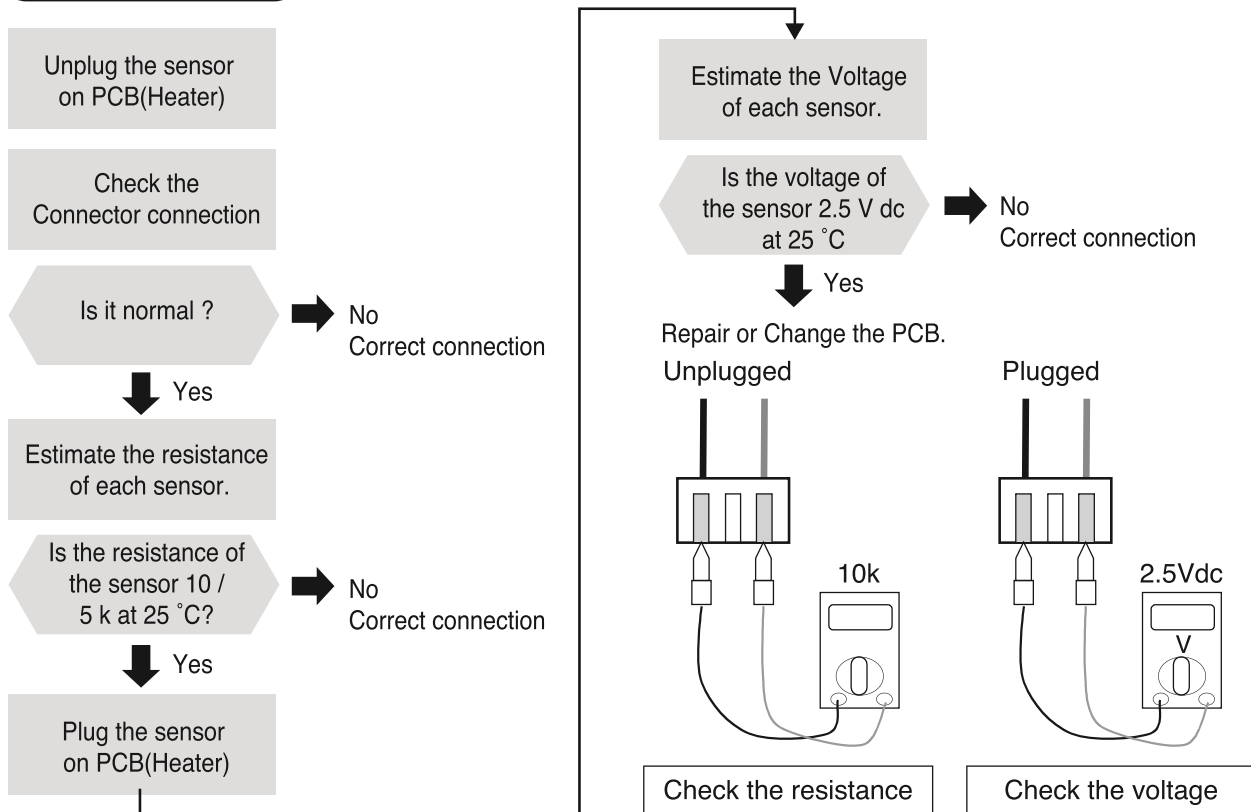
Error Code	Description	Main Reasons
21**	DC Peak(IPM Fault)	Inverter compressor drive IPM defect / inverter compressor defect
22**	Max. CT(CT2)	Increase of inverter compressor CT value
23**	DC Link Low Volt.	After inverter activation relay is ON, DC voltage recharge defect
24**	High Pressure Error	High pressure exceeds the limit of high pressure switch
26**	DC Comp Position Error	Inverter compressor error, causing initial activation failure
27**	PFC Fault Error	Error by overcurrent at inverter input
28	DC Link High Volt	After inverter activation relay is ON, DC voltage recharge defect
29**	Comp Over Current	Inverter compressor activation failure or increase of CT value
32**	D-Pipe High(Inv.)	Excessive rise of inverter compressor discharge temperature, causing compressor OFF
35**	Low Pressure Error	Excessive decrease of low pressure
41**	Inv. D-Pipe Th Error(Open/Short)	Inverter compressor discharge temperature sensor disconnection or short circuit
43**	High Pressure Sensor(Open/Short)	High pressure sensor disconnection or short circuit of inverter compressor
44**	Outdoor air Th Error(Open/Short)	Air temperature sensor disconnection or short circuit
45**	Cond. Middle Pipe Th Error (Open/Short)	Condenser Middle Pipe sensor disconnection or short circuit
46**	Suction Pipe Th Error(Open/Short)	Inverter compressor suction temperature sensor disconnection or short circuit
47	Const-D-Pipe Sensor Error	Const-D-Pipe Sensor disconnection or short circuit
52****	PCB Communication Error	Checking the communication state between Main PCB and Inverter PCB
53**	Communication Error(PCB(Heater) ↔ PCB(Inverter))	PCB(Heater) unit does not receive signal from PCB(Inverter)
54*	Open and Reverse Phase Error	Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor
60**	EEPROM Error(Outdoor)	PCB(Inverter) EEPROM error
61**	Cond. Middle Pipe High	EEV connector displaced/poor EEV assembly
62**	Heatsink Error(High)	PCB(Inverter) heat generation, causing the rise of heatsink temperature
67**	Fan Lock Error	Outdoor BLDC Fan lock
73**	AC Input Instant over Current Error	Error by overcurrent detection at inverter input
114**	Injection In TH Error (Open/Short)	Injection In sensor disconnection or short circuit
115**	Injection Out TH Error (Open/Short)	Injection Out sensor disconnection or short circuit



# 3. Trouble shooting Guide

Display code	Title	Cause of error	Check point & Normal condition
01	Remote room air sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 10 KΩ / at 25 °C (Unplugged) Normal voltage : 2.5 V dc / at 25 °C (Plugged) Refer to sensor resistance table.
02	Refrigerant inlet pipe sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 KΩ / at 25 °C(Unplugged) Normal voltage : 2.5 V dc / at 25 °C(Plugged) Refer to sensor resistance table.
06	Refrigerant outlet pipe sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 KΩ / at 25 °C (Unplugged) Normal voltage : 2.5 V dc / at 25 °C (Plugged) Refer to sensor resistance table.

## Check Flow Chart

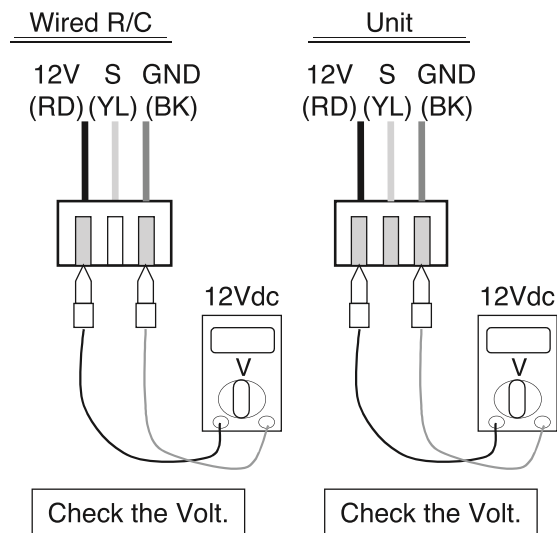
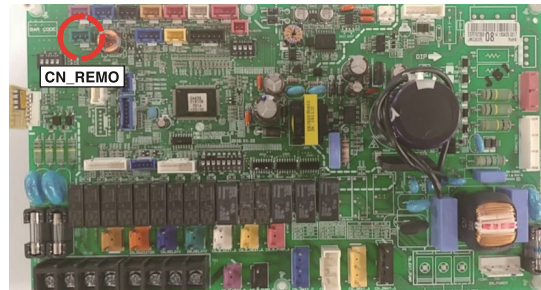
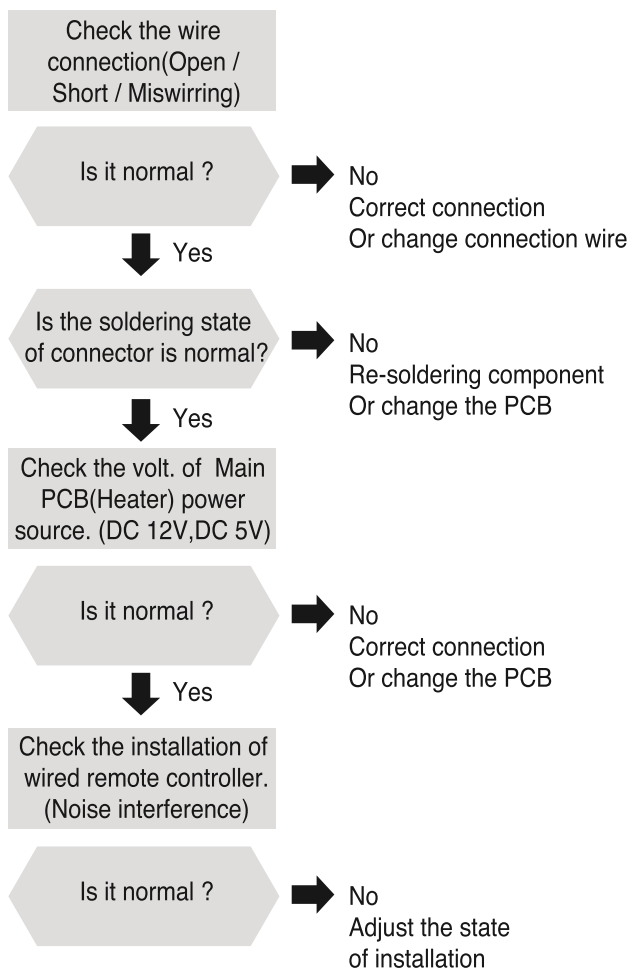


## Check Point

1. Unplug the sensor on PCB(Heater).
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 10 KΩ / 5 KΩ at 25°C, then sensor is normal.
4. If the resistance of the sensor is 0 KΩ or ∞, then sensor is abnormal. → Change the sensor.
5. Plug the sensor on PCB(Heater) and Power ON.
6. Estimate the voltage of each sensor.
7. If the voltage of the sensor is 2.5Vdc at 25°C, then sensor is normal.
8. If the resistance of the sensor is 0 or 5Vdc, then sensor is abnormal. → Repair or Change the PCB(Heater).

Display code	Title	Cause of error	Check point & Normal condition
03	Communication Error (Wired remote controller)	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater) / Remote controller</li> <li>• Connection wire break</li> </ul>	<ul style="list-style-type: none"> <li>• Connection of wire</li> <li>• Main PCB(Heater) Volt. DC 12 V</li> <li>• Noise interference</li> </ul>

### Check Flow Chart

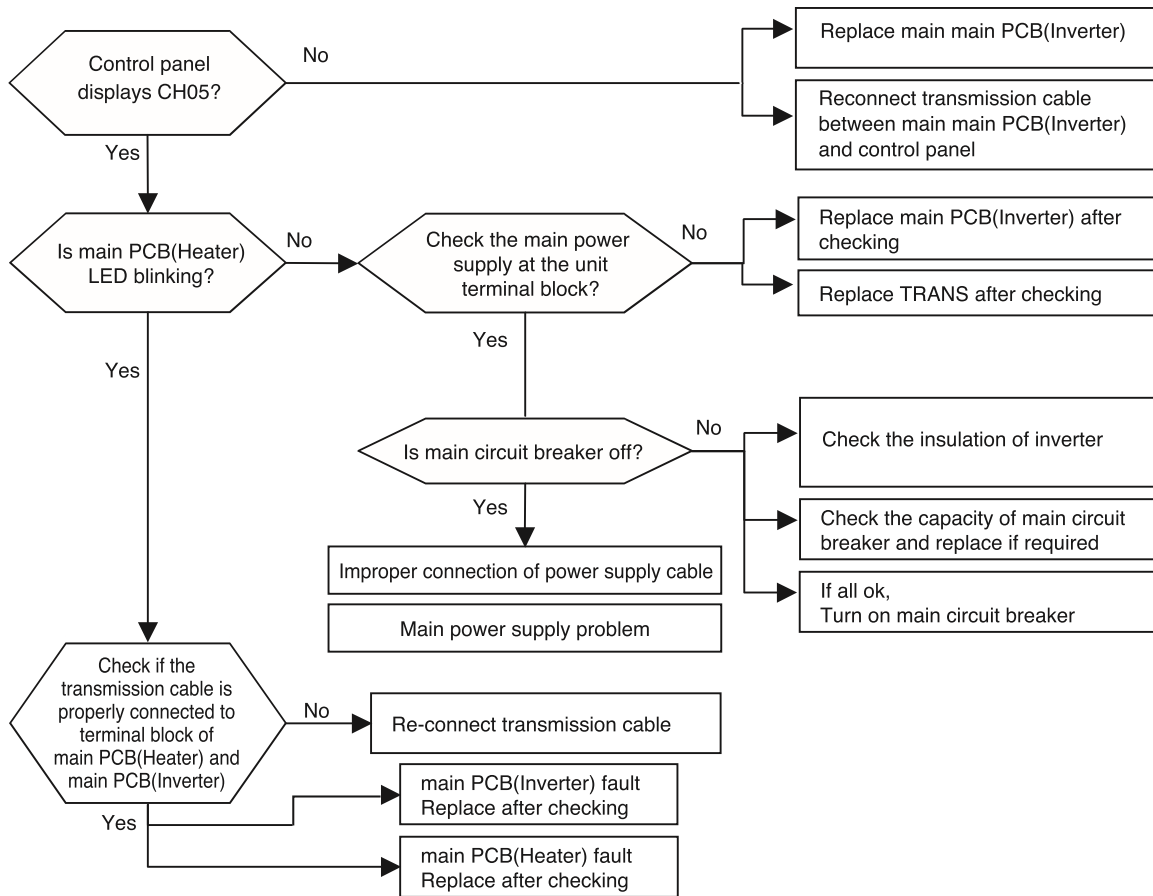


### Check Point

1. Check the wire connection. (Open / Short) → Repair the connection
2. Check the soldering state of connector. (Soldered poorly) → Repair or Change the PCB(Heater).
3. Check the volt. Of Main PCB(Heater) power source. (DC 12 V) → Repair or Change the Main PCB(Heater).
4. Check the installation of wired remote controller. (Noise interference) → Adjust the state of installation

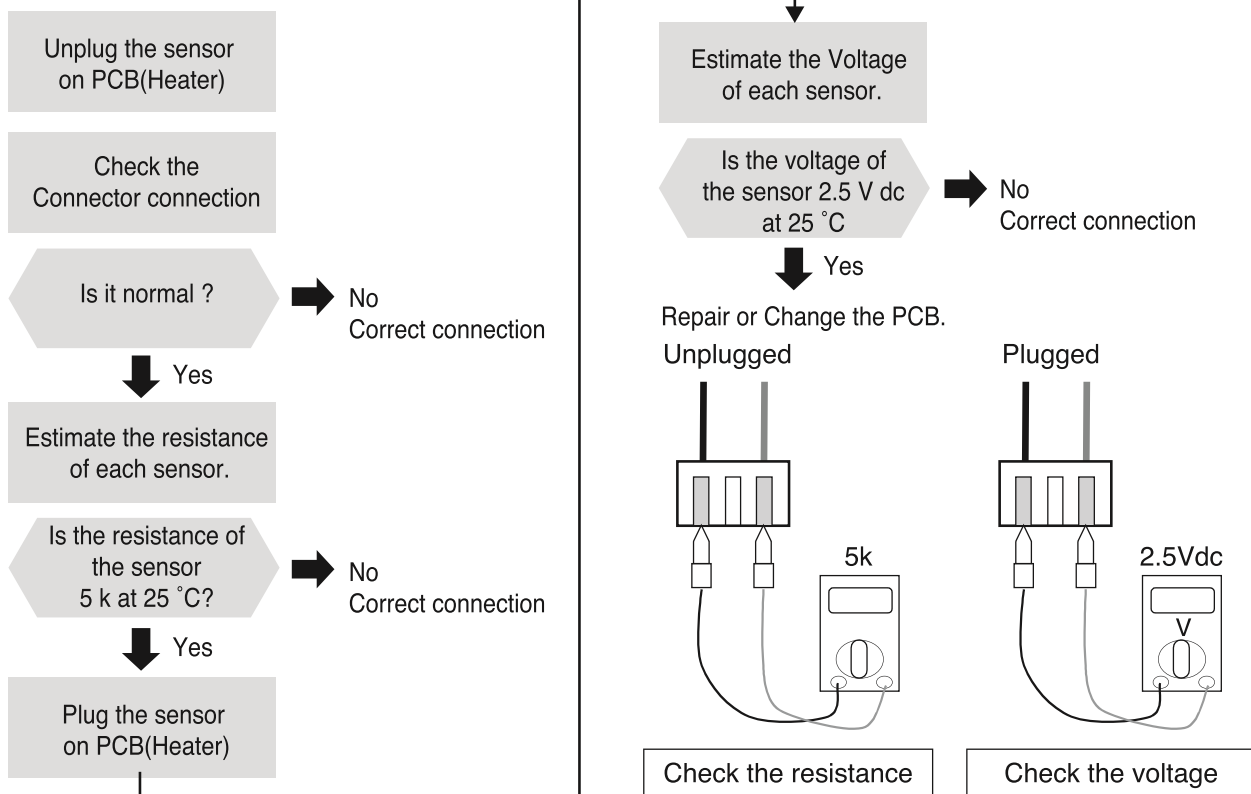
Code No.	Description	Cause	Normal Condition
05	Bad communication between main PCB assembly(Inverter) and main PCB assembly(Heater)	<ul style="list-style-type: none"> <li>The connector for transmission is disconnected</li> <li>The connecting wires are misconnected</li> <li>The communication line is broken</li> <li>main PCB(Heater) is abnormal</li> <li>main PCB(Inverter) is abnormal</li> </ul>	<ul style="list-style-type: none"> <li>Wire connection between control panel and main PCB 2 should be tight</li> </ul>
53			

### ■ Error diagnosis and countermeasure flow chart



Display code	Title	Cause of error	Check point & Normal condition
08	Problem in Water Tank sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 K $\Omega$ / at 25 °C (Unplugged) Normal voltage : 2.5 V dc / at 25 °C (Plugged) Refer to sensor resistance table.
13	Problem in Solar-thermal sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 K $\Omega$ / at 25 °C (Unplugged) Normal voltage : 2.5 V dc / at 25 °C (Plugged) Refer to sensor resistance table

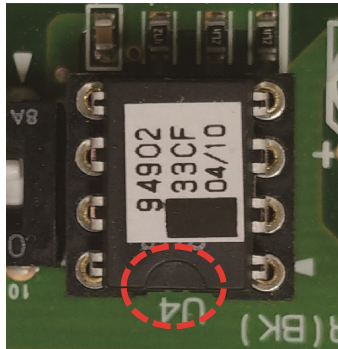
### Check Flow Chart



### Check Point

1. Unplug the sensor on PCB(Heater).
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 5 K $\Omega$  at 25°C, then sensor is normal.
4. If the resistance of the sensor is 0 K $\Omega$  or  $\infty$ , then sensor is abnormal. → Change the sensor.
5. Plug the sensor on PCB(Heater) and Power ON.
6. Estimate the voltage of each sensor.
7. If the voltage of the sensor is 2.5Vdc at 25°C, then sensor is normal.
8. If the resistance of the sensor is 0 or 5Vdc, then sensor is abnormal. → Repair or Change the PCB.

Code No.	Description	Cause	Normal Condition
09	PCB(Heater) EEPROM Check Sum Error	• Check sum error	1. Check the poor soldering 2. Check the insertion condition of the EEPROM 3. Check the PCB Connection



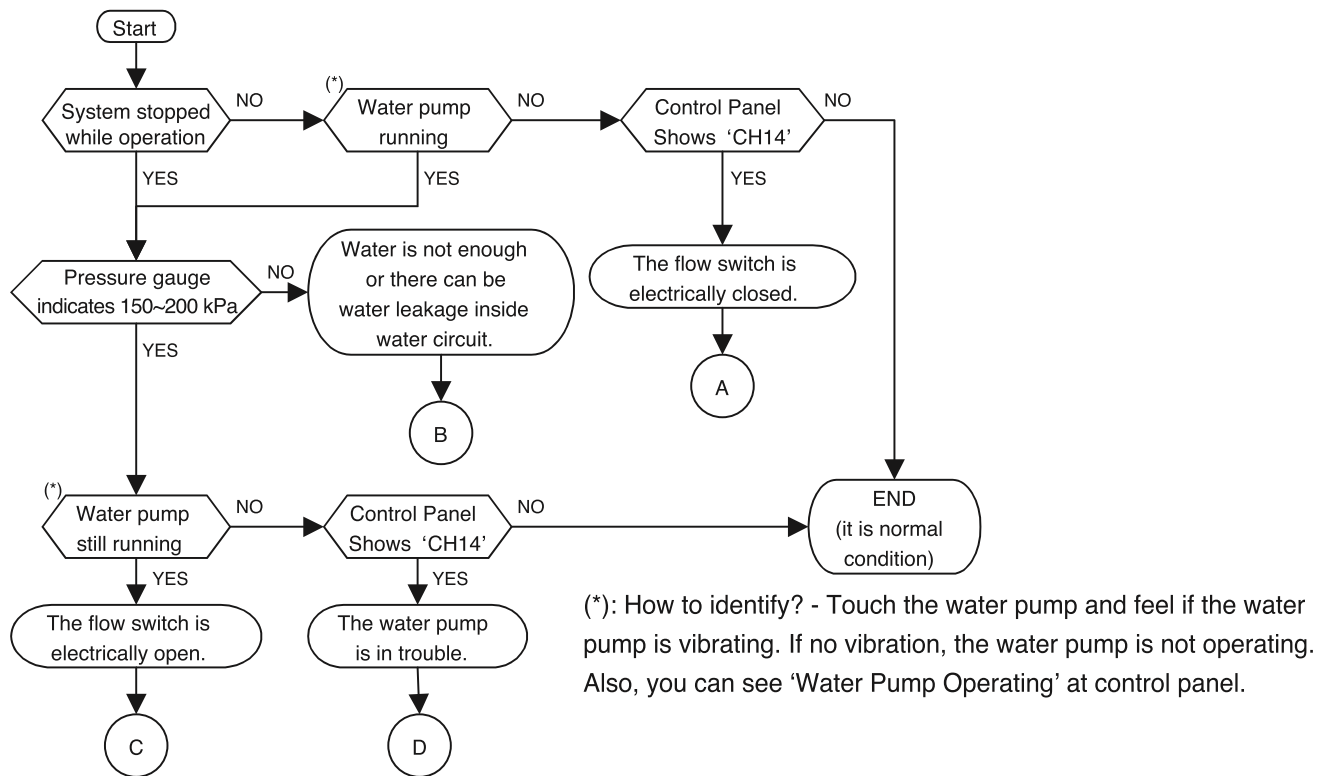
<EEPROM Direction Check Point>

## Check Point

1. Check the EEPROM Direction
2. If the EEPROM value & the Program value are not matched, the Code is Displayed
3. After Checking the connection and Insertion, replace the PCB or Option PCB

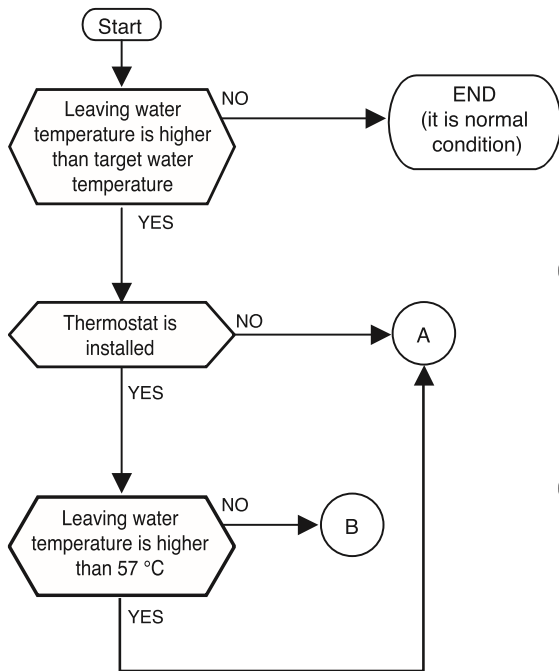
Code No.	Description	Cause	Normal Condition
14	Problem in Flow Switch	<ul style="list-style-type: none"> <li>Flow switch is open while internal water pump is working</li> <li>Flow switch is closed while internal water pump is not working</li> <li>Flow switch is open while DIP switch No. 5 of main PCB(Heater) is set as ON</li> </ul>	<ul style="list-style-type: none"> <li>Flow switch should be closed while internal water pump is working or DIP switch No. 5 of main PCB(Heater) is set as ON</li> <li>Flow switch should be open while internal water pump is not working</li> </ul>

### ■ Error diagnosis and countermeasure flow chart



- (A)
  - Although there is not water flow inside water circuit, the flow switch detects as if water is flowing. It is due to electrically closed (or short) of flow switch or the contact of flow switch is mechanically stuck.
  - Contact official After Service Center and replace the flow switch.
  - Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.
- (B)
  - Check if water inside water circuit is fully charged. Pressure gauge at the unit should indicate 150~200 kPa.
  - Also, as the hand of the pressure gauge is not so fast according to water charging, check the pressure gauge again.
  - Otherwise, there can be water leakage inside water circuit. Examine if water circuit is completely sealed.
- (C)
  - Although water is well flowing, the flow switch can not detect water flow. It is due to electrically open of flow switch or the contact of flow switch is mechanically broken.
  - Contact official After Service Center and replace the flow switch.
- (D)
  - Read 'Checking Key Components of unit – Water Pump' carefully to get more detail information.
  - Contact official After Service Center and replace the water pump.
  - Also, check the water quality if there are particles that can yield locking at the shaft of the water pump.
  - Check the air vent. If there is air in the unit, it can display "CH14". Please remove the air by using the air vent.

Code No.	Description	Cause	Normal Condition
15	Water pipe overheated	<ul style="list-style-type: none"> <li>Abnormal operation of electric heater</li> <li>Leaving water temperature is above 57 °C</li> </ul>	<ul style="list-style-type: none"> <li>Possible maximum leaving water temperature is 57 °C.</li> </ul>



- A**
- This is unexpected case.
  - Turn off the system and call service center.
  - If the system is not turned off before it yields error code (CH15), very hot leaving water will be generated and it is harmful to human.

- B**
- Room air is not fully heated by under floor heating.
  - Wait while room air is heated by target temperature of thermostat.

Code No.	Description	Cause	Normal Condition
16	Problem in Sensors	<ul style="list-style-type: none"> <li>• It is occur when error 17,18,19 is happend at the same time.</li> </ul>	<ul style="list-style-type: none"> <li>• It isn't occur when error 17,18,19 is happend at the same time.</li> </ul>

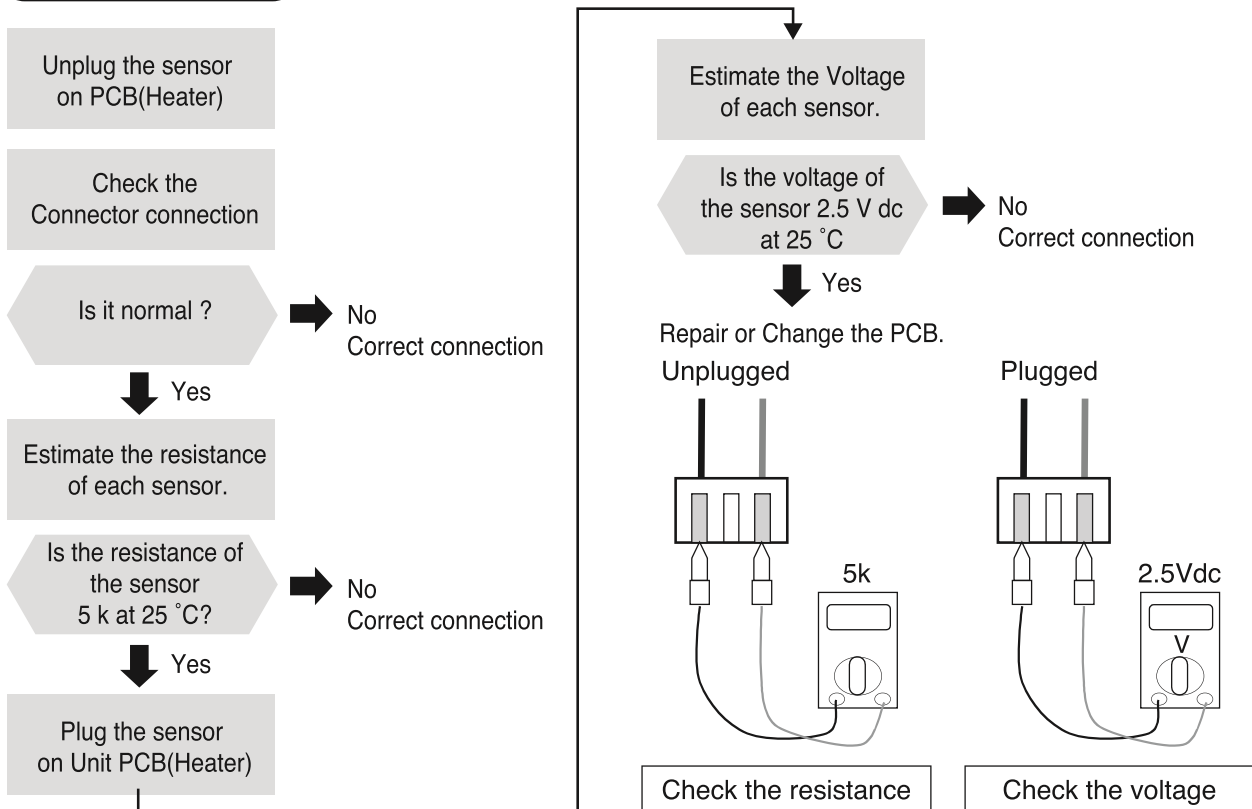
### ■ Error diagnosis and countermeasure flow chart

- Refer to error code 17/18/19 Trouble shooting Guide.



Display code	Title	Cause of error	Check point & Normal condition
17	Problem in Water-inlet sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 K $\Omega$ / at 25 °C (Unplugged) Normal voltage : 2.5 V dc / at 25 °C (Plugged) Refer to sensor resistance table.
18	Problem in Water-outlet sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 K $\Omega$ / at 25 °C(Unplugged) Normal voltage : 2.5 V dc / at 25 °C(Plugged) Refer to sensor resistance table
19	Problem in Elec/Heater Water-Outlet Sensor	<ul style="list-style-type: none"> <li>• Connector connection error</li> <li>• Faulty PCB(Heater)</li> <li>• Faulty sensor (Open / Short)</li> </ul>	Normal resistor : 5 K $\Omega$ / at 25 °C (Unplugged) Normal voltage : 2.5 V dc / at 25 °C (Plugged) Refer to sensor resistance table.

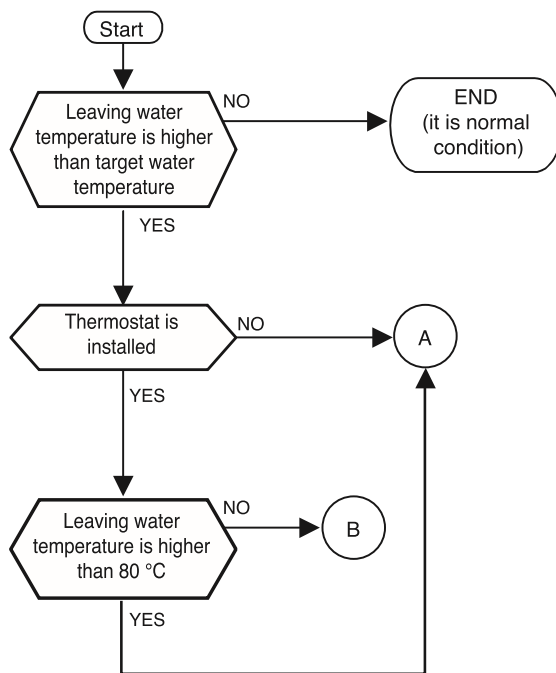
### Check Flow Chart



### Check Point

1. Unplug the sensor on PCB(Heater).
2. Estimate the resistance of each sensor.
3. If the resistance of the sensor is 5K $\Omega$  at 25°C, then sensor is normal.
4. If the resistance of the sensor is 0 K $\Omega$  or  $\infty$ , then sensor is abnormal. → Change the sensor.
5. Plug the sensor on PCB(Heater) and Power ON.
6. Estimate the voltage of each sensor.
7. If the voltage of the sensor is 2.5Vdc at 25°C, then sensor is normal.
8. If the resistance of the sensor is 0 or 5Vdc, then sensor is abnormal. → Repair or Change the PCB.

Code No.	Description	Cause	Normal Condition
20	Electric Heater Overheated	<ul style="list-style-type: none"> <li>Abnormal operation of electric heater</li> <li>Leaving water temperature is above 80 °C</li> </ul>	<ul style="list-style-type: none"> <li>If there is no problem in electric heater control, possible maximum leaving water temperature is 80 °C.</li> </ul>



- A**
- This is unexpected case.
  - Turn off the system and call service center.
  - If the system is not turned off before it yields error code (CH20), very hot leaving water will be generated and it is harmful to human.
  - If Error Code (CH20) is occurred, please check thermostat, electric heater, power supply and others. Also, it is recommended to check air vent which is located on the top of the electric heater tank.
- B**
- Room air is not fully heated by under floor heating.
  - Wait while room air is heated by target temperature of thermostat.

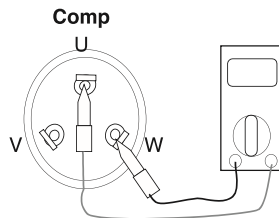
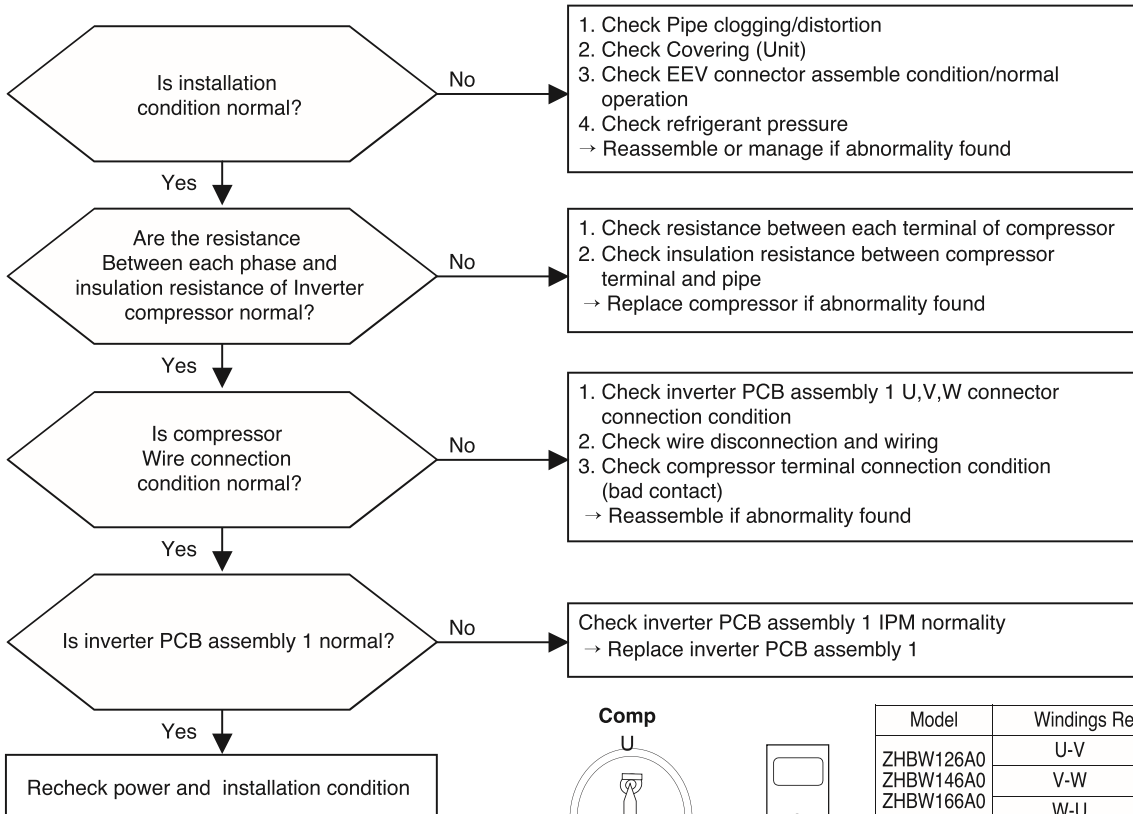
Display code	Title	Cause of error	Check point & Normal condition
21	DC PEAK (IPM Fault)	<ul style="list-style-type: none"> <li>Instant over current</li> <li>Over Rated current</li> <li>Poor insulation of IPM</li> </ul>	<ul style="list-style-type: none"> <li>An instant over current in the U,V,W phase <ul style="list-style-type: none"> <li>Comp lock</li> <li>The abnormal connection of U,V,W</li> </ul> </li> <li>Over load condition <ul style="list-style-type: none"> <li>Overcharging of refrigerant Pipe length.</li> <li>Outdoor Fan is stop</li> </ul> </li> <li>Poor insulation of compressor</li> </ul>



## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

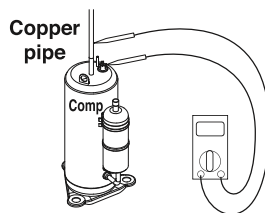
## ■ Error Diagnosis and Countermeasure Flow Chart



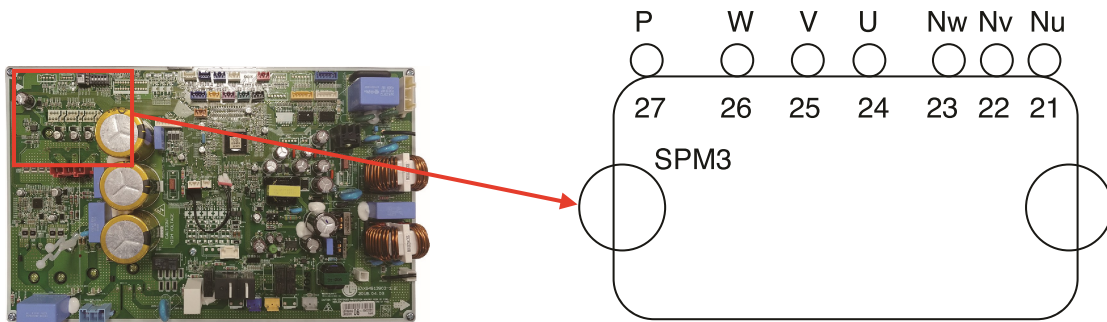
Model	Windings Resistance (at 75 °C)	
ZHBW126A0	U-V	0.845 Ohms
ZHBW146A0	V-W	0.859 Ohms
ZHBW166A0	W-U	0.864 Ohms

Terminal	Insulation Resistance
U-panel	≥ 10MΩ
V-panel	≥ 10MΩ
W-panel	≥ 10MΩ

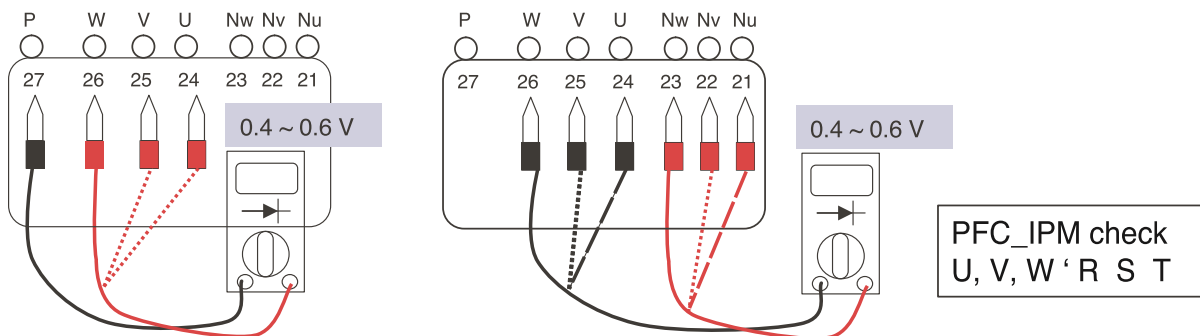
## ■ Comp checking method



► 1Ø, 5kW / 7kW / 9kW

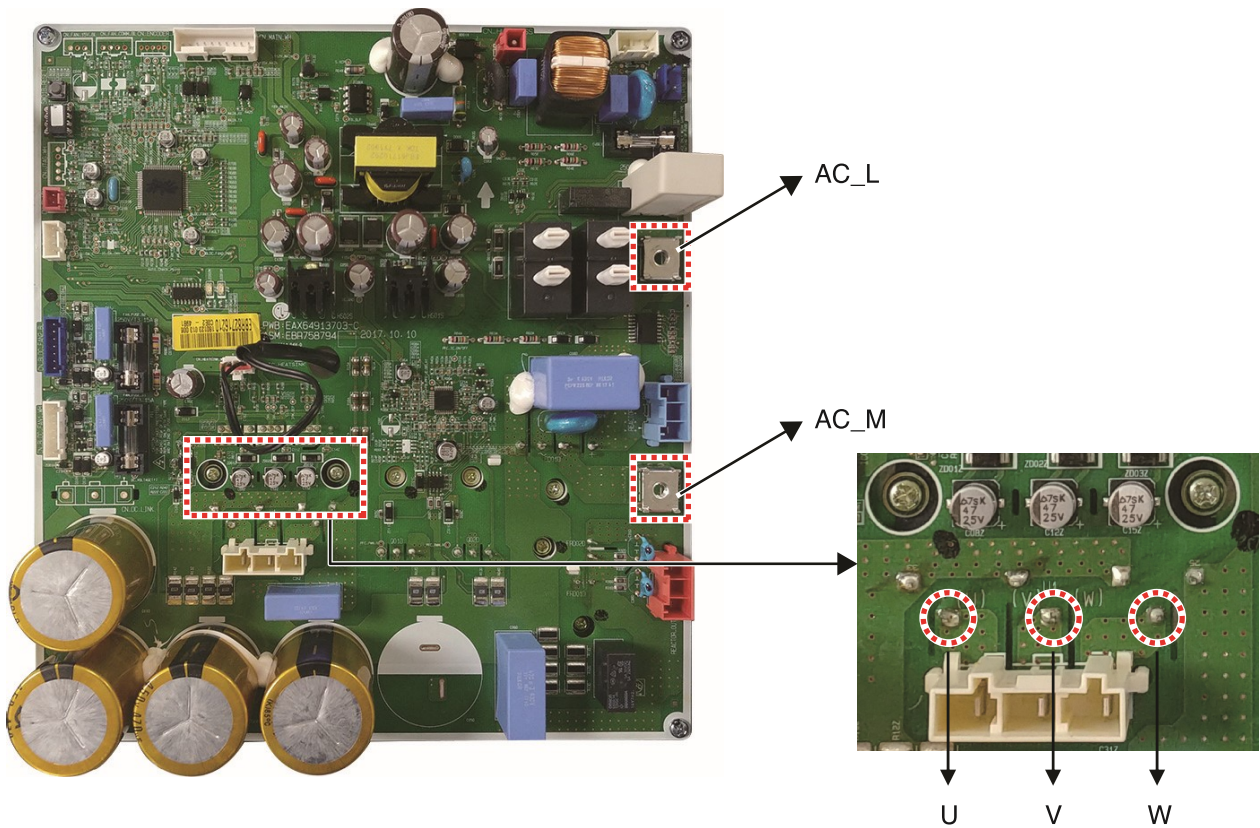


1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out U, V, W COMP connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB(Inverter) needs to be replaced.(IPM damaged)
5. Set the multi tester to diode mode.
6. In case measured value is different from the table, PCB(Inverter) needs to be replaced. (PCB(Inverter) damaged).

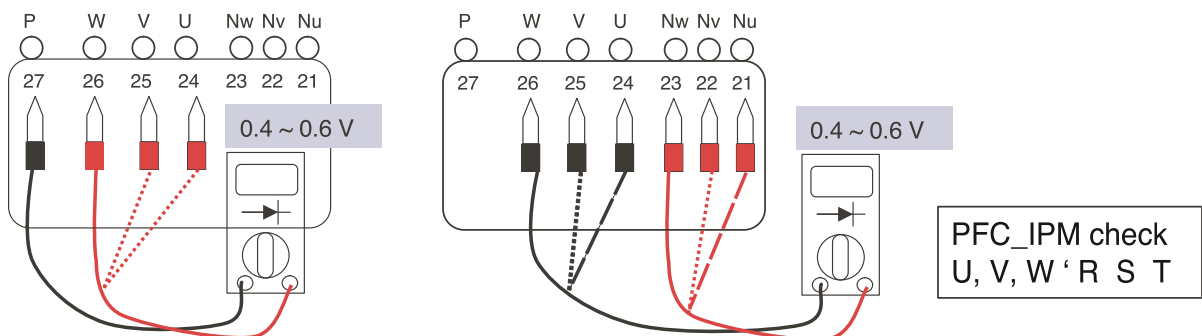


Model Name		Resistance(Ω) at 20°C	
Phase	Capacity		
1Ø	5kW / 7kW / 9kW	U-V	0.628(at 25°C)
		V-W	0.628(at 25°C)
		W-U	0.628(at 25°C)
	12kW / 14kW / 16kW	U-V	0.438(at 25°C)
		V-W	0.438(at 25°C)
		W-U	0.438(at 25°C)
3Ø	12kW / 14kW / 16kW	U-V	0.845Ω(at 25°C)
		V-W	0.845Ω(at 25°C)
		W-U	0.845Ω(at 25°C)

▶ 1Ø, 12kW / 14kW / 16kW

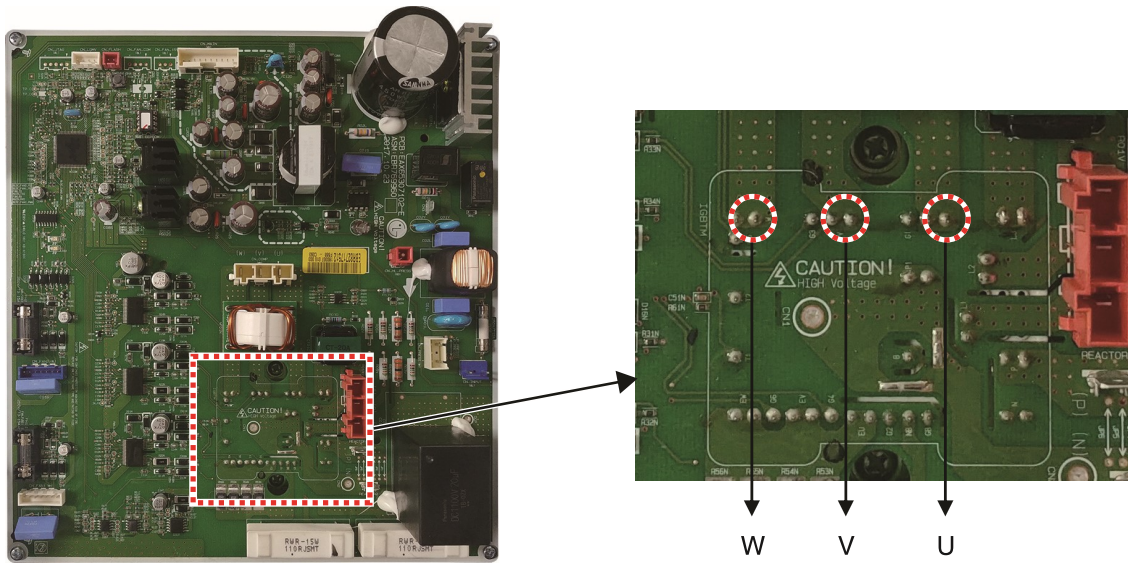


1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out AC(L), AC(N) connectors and U,V,W COMP Connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB needs to be replaced.(IPM damaged)
5. Set the multi tester to diode mode.
6. In case measured value is different from the table, PCB(Inverter) needs to be replaced.(PCB damaged).

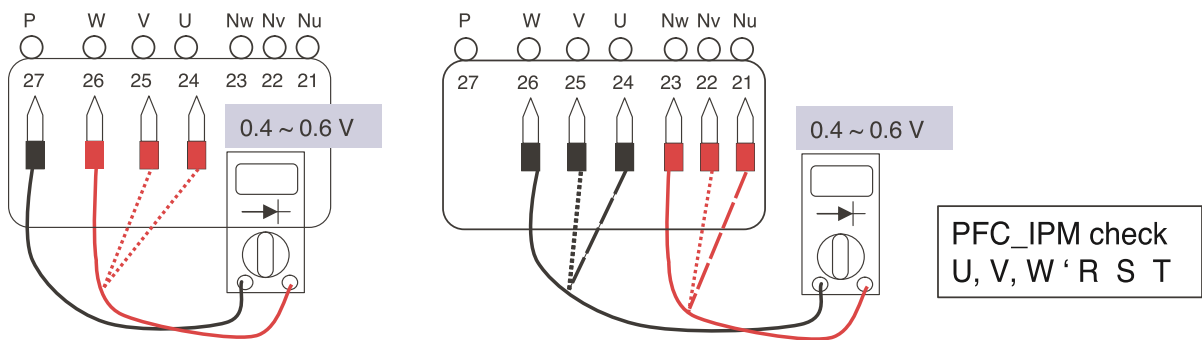




▶ 3Ø, 12kW / 14kW / 16kW



1. Wait PCB(Inverter) DC voltage is discharged after main power off.
2. Pull out AC(L), AC(N) connectors and U,V,W COMP Connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short( $0\Omega$ ) or open(hundreds  $M\Omega$ ), PCB needs to be replaced.(IPM damaged)
5. Set the multi tester to diode mode.
6. In case measured value is different from the table, PCB(Inverter) needs to be replaced.(PCB damaged).



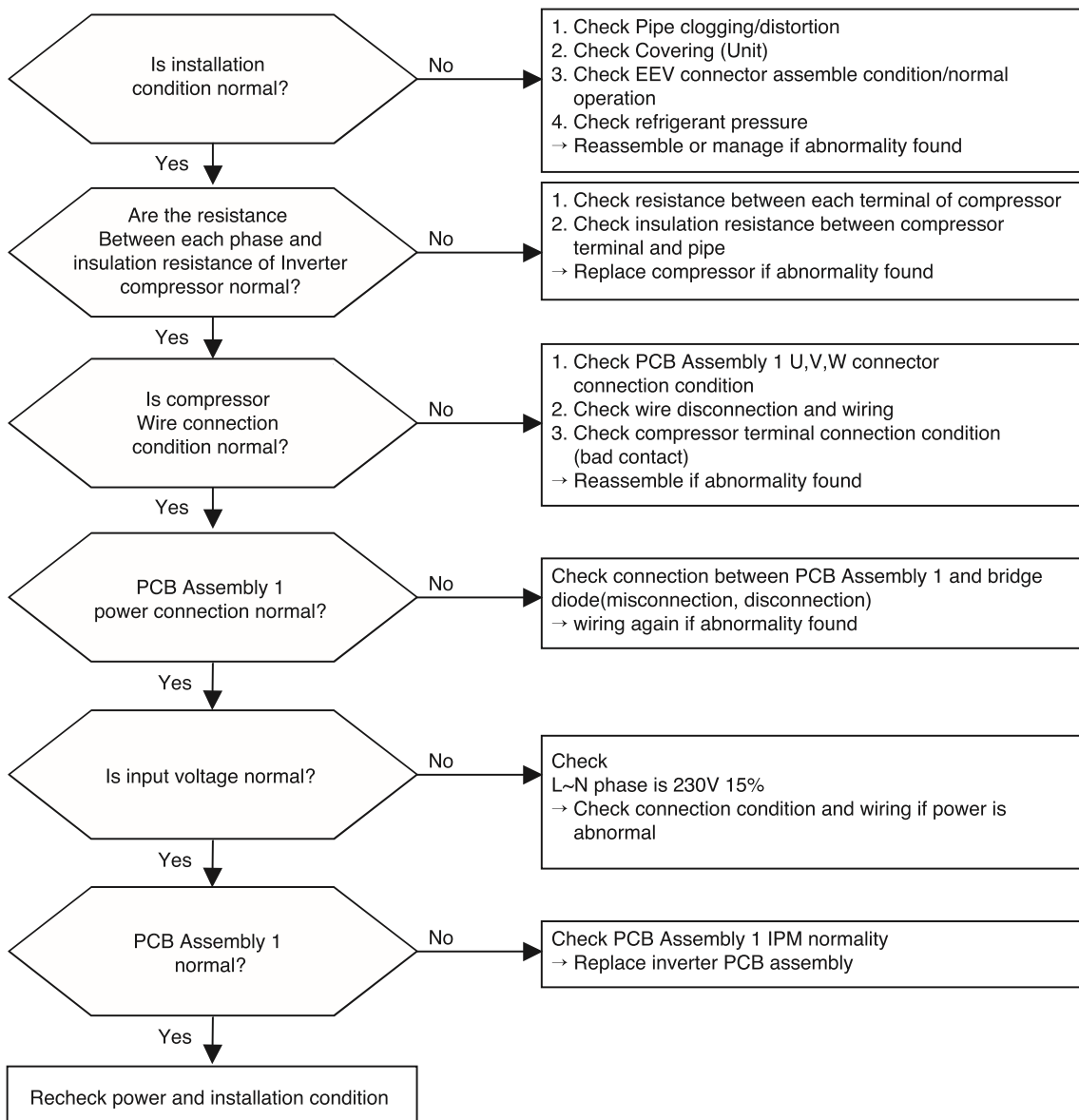
Display code	Title	Cause of error	Check point & Normal condition
22	Max. C/T	Input Over Current	1. Malfunction of Compressor 2. Blocking of Pipe 3. Low Voltage Input 4. Refrigerant, Pipe length, Blocked...



## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

## ■ Error Diagnosis and Countermeasure Flow Chart

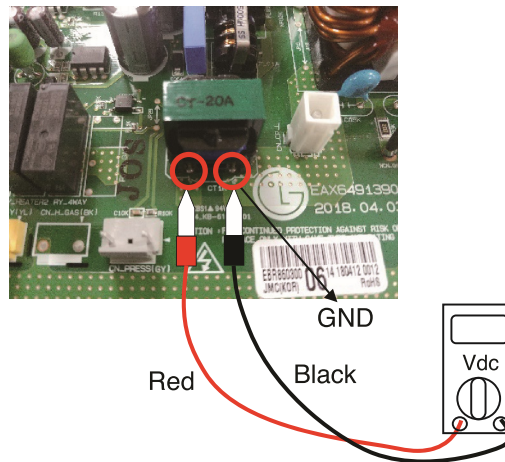
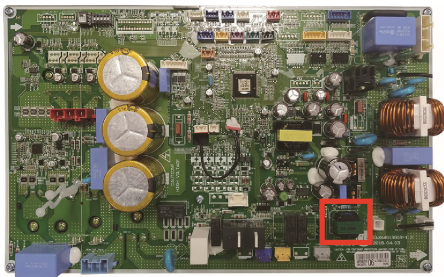


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## Check Point

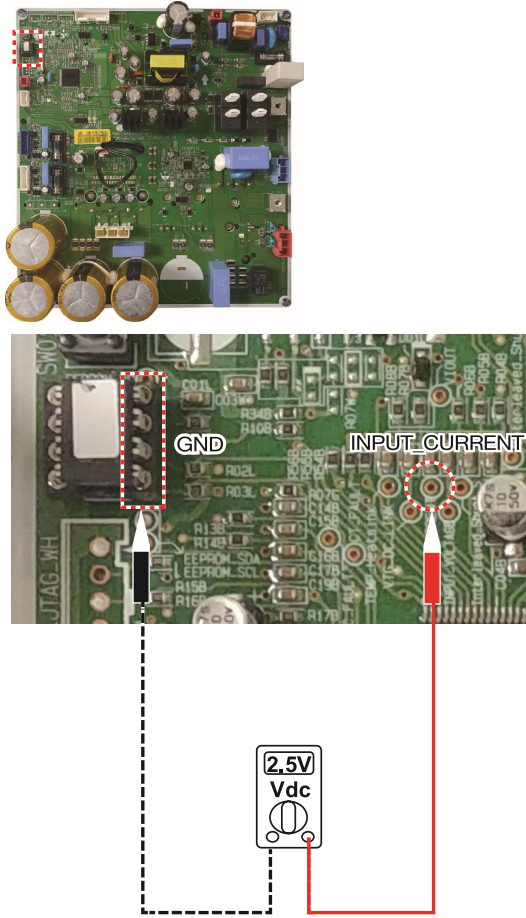
1. Check the power source. (230V  $\pm$ 15%)
2. Check the fan operation is right.
3. Check the current.
4. Check the install condition.
5. Check the CT Sensor Output signal  
(1Ø, 5kW / 7kW / 9kW - Check output the CT Sensor : DC 2.5 $\pm$ 0.2V  
1Ø, 12kW / 14kW / 16kW- Check output pin 2.3 of the CT Sensor : DC 2.5 $\pm$ 0.2V  
3Ø, 12kW / 14kW / 16kW - Check input\_current of the CT sensor : DC 2.5 $\pm$ 0.2V)

### ▶ 1Ø, 5kW / 7kW / 9kW

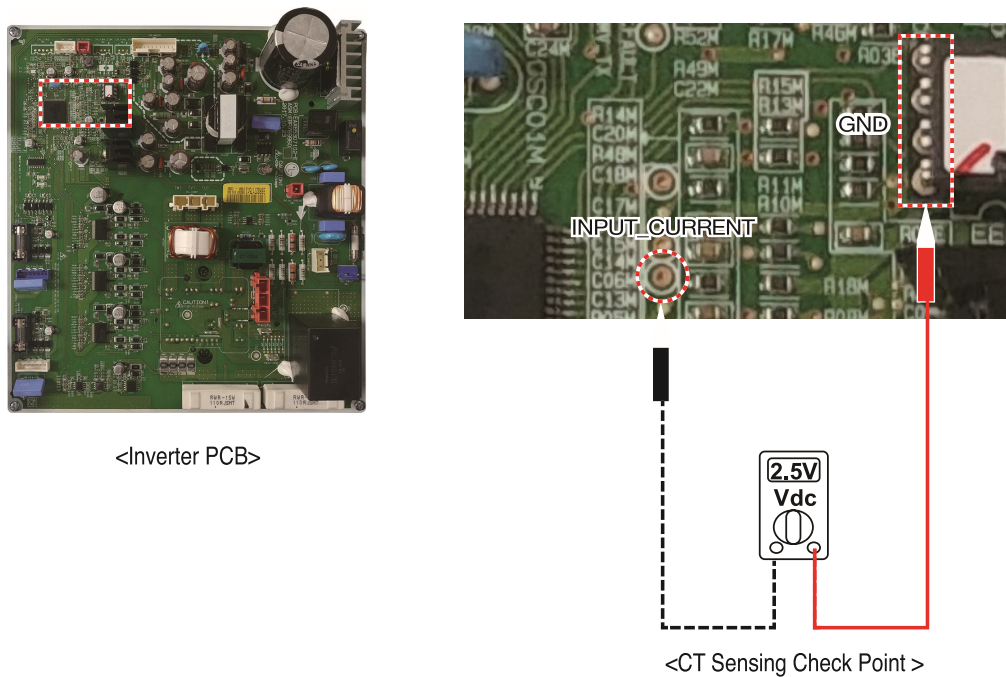




▶ 1Ø, 12kW / 14kW / 16kW



▶ 3Ø, 12kW / 14kW / 16kW



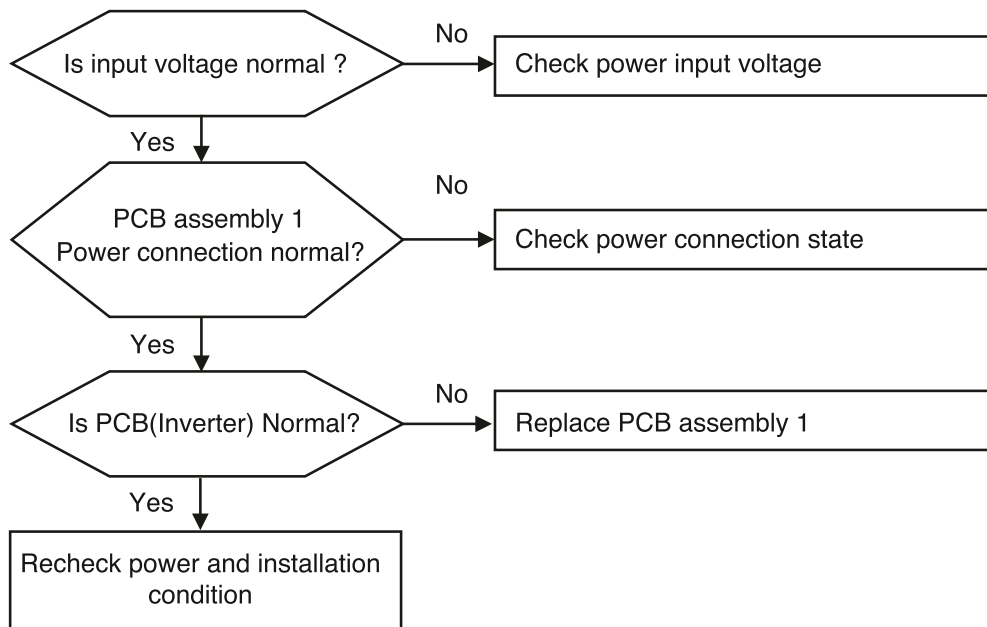
Display code	Title	Cause of error	Check point & Normal condition
23	DC Link Low Volt	• DC Link Voltage is below 140 V DC	• Check CN_(L), CN_(N) Connection • Check Input Voltage • Check PCB DC Link voltage sensor parts
28	DC Link High Volt	• DC Link Voltage is above 420 V DC	• Check CN_(L), CN_(N) Connection • Check Input Voltage • Check PCB DC Link voltage sensor parts



## WARNING

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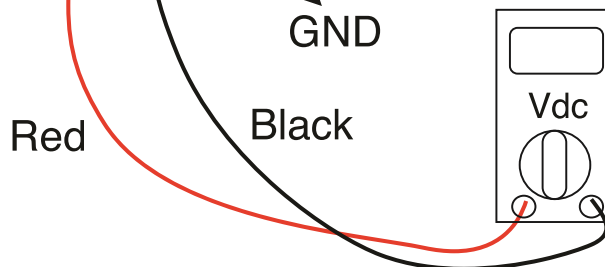
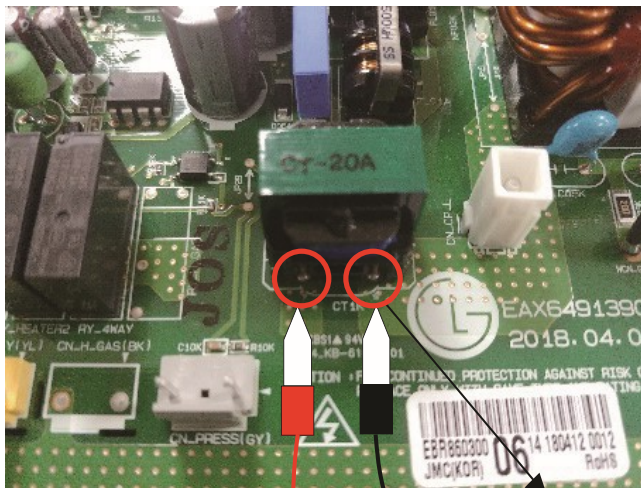
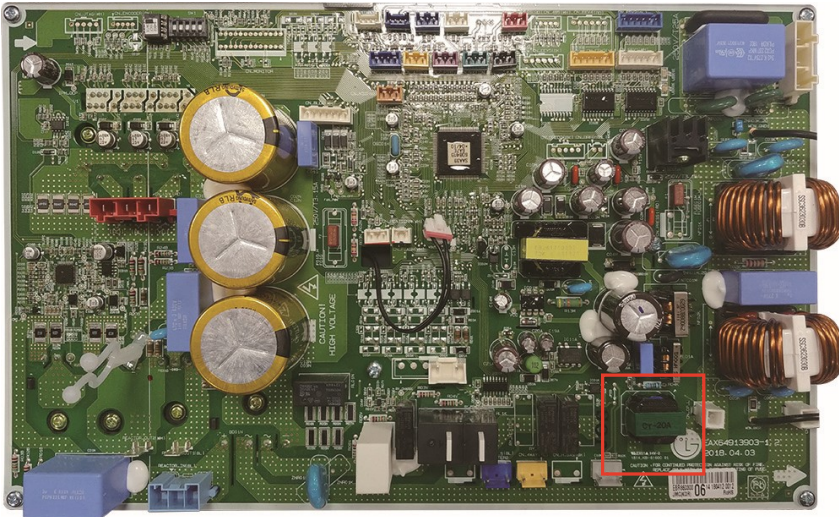
### ■ Error Diagnosis and Countermeasure Flow Chart



## Check Point

1. Check the WCN\_P(L),P(N) Connection condition at the main PCB(Heater). (Refer to wiring diagram)
2. Check the DC Link voltage at not operating(280V ↑)
3. Check the DC Link voltage at Comp operating(340V ↑)
4. Check DC Link Sensing Signal(ZHBW\*\*6A0) :2.4~2.8V (Refer the Picture)
5. Check DC Link Sensing Signal(ZHBW\*\*8A0) :0.4~0.6V (Refer the Picture)

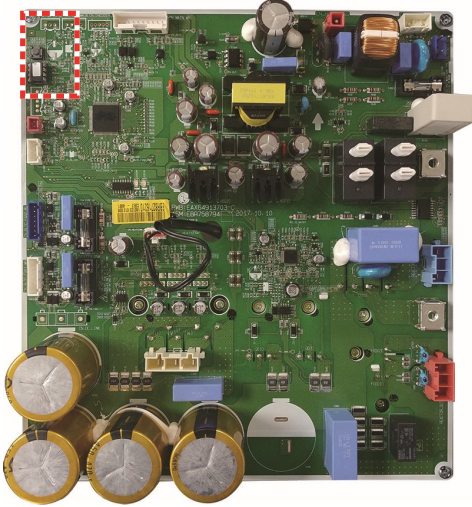
\* 1Ø, 5kW / 7kW / 9kW



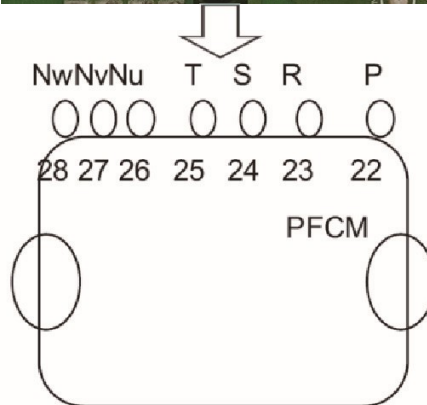
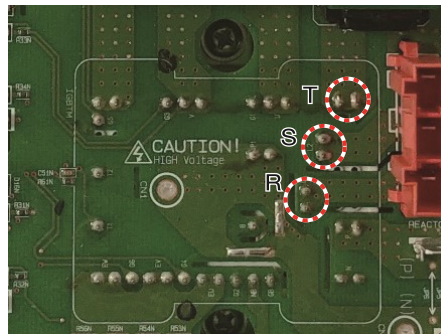
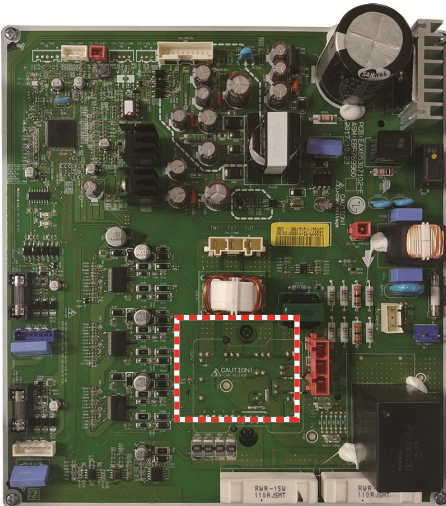
<CT Sensing Check Point>



▶ 1Ø, 12kW / 14kW / 16kW



▶ 3Ø, 12kW / 14kW / 16kW



[PFCM Pin Arrangement and Pin Numbers]

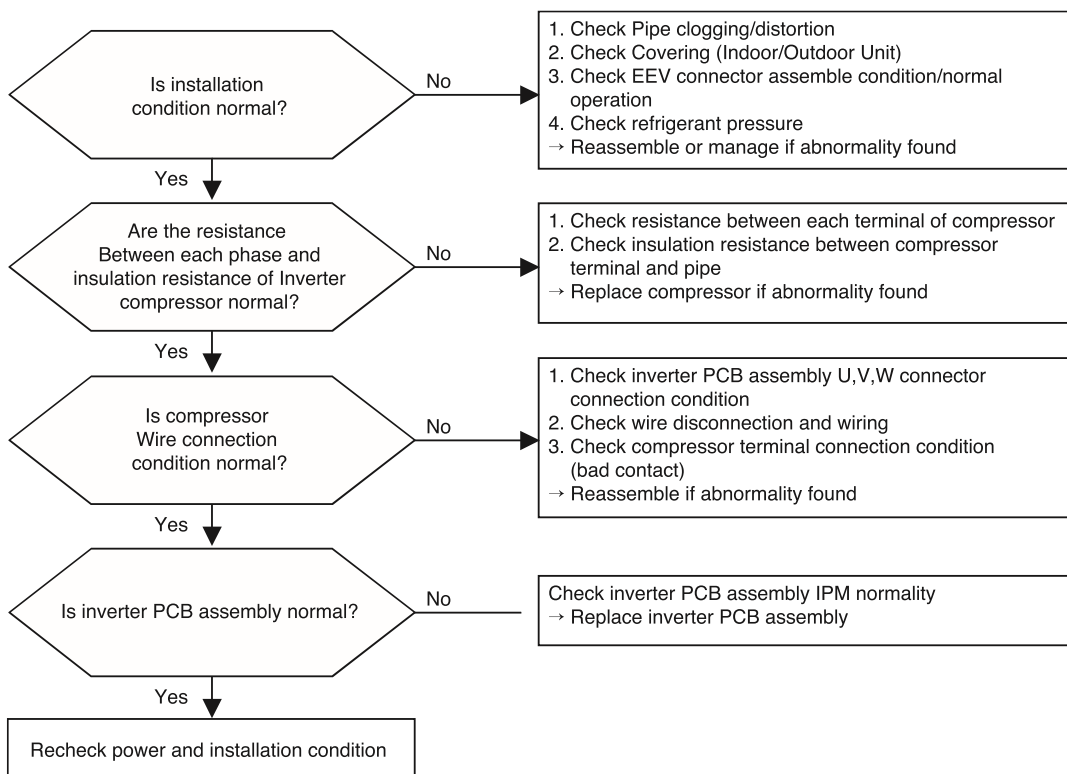
Display code	Title	Cause of error	Check point & Normal condition
26	DC Comp Position Error, LOCKING Detection	<ul style="list-style-type: none"> <li>Compressor Starting fail error</li> </ul>	<ul style="list-style-type: none"> <li>Check the connection of comp wire "U,V,W"</li> <li>Malfunction of compressor</li> <li>Check the component of "IPM", detection parts.</li> </ul>



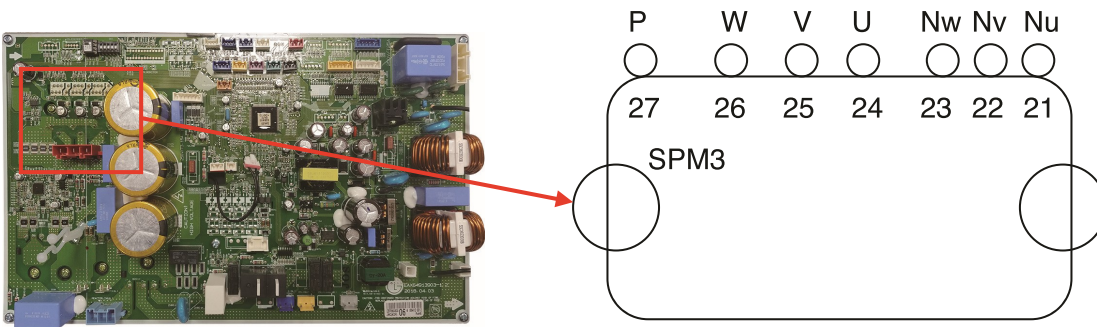
## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

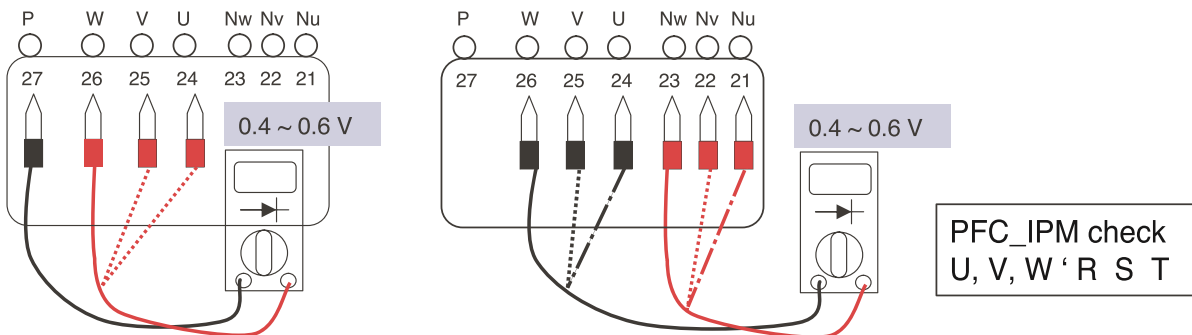
## ■ Error Diagnosis and Countermeasure Flow Chart



# 1. IPM Check



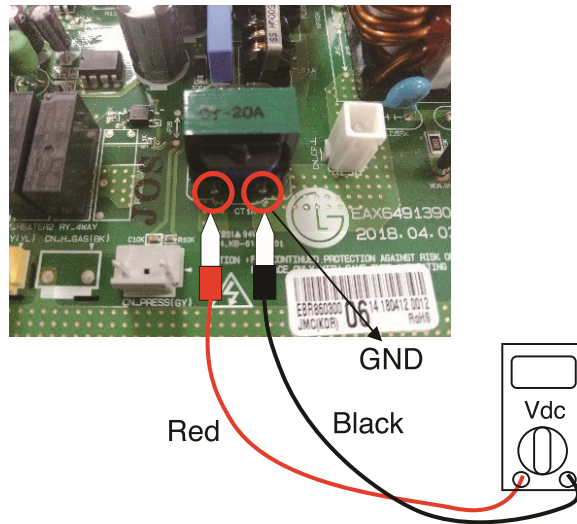
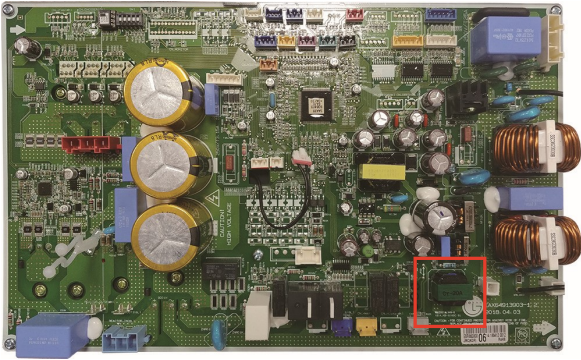
1. Wait PCB DC voltage is discharged after main power off.
2. Pull out V, V, W COMP connector.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short( $0\Omega$ ) or open(hundreds  $M\Omega$ ), PCB needs to be replaced.(IPM damaged)
5. Set the multi tester to diode mode.
6. In case measured value is different from the table, PCB needs to be replaced. (PCB damaged).



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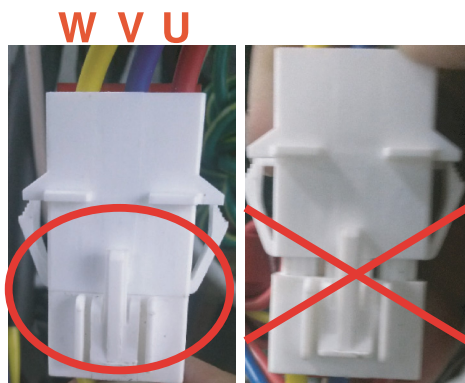
## 2. CT Sensing Check

- Inspecting PCB phase current sensing circuit
1. Set Multi-tester DC voltage measurement mode.
  2. Measure the below measuring point DC voltages at Power-on standby state.
  3. If the measurements are outside  $DC\ 2.5V \pm 0.2V$ , the parts are decided as burned.



<CT Sensing Check Point>

## 3. Connector Check



<WVC connector check>

Display code	Title	Cause of error	Check point & Normal condition
29	Inverter compressor over current	(ZHBW**6A0) Inverter Compressor input current is 30A. (ZHBW**8A0) Inverter Compressor input current is 24A.	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. over-charge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. ODU PCB assembly 1 damage

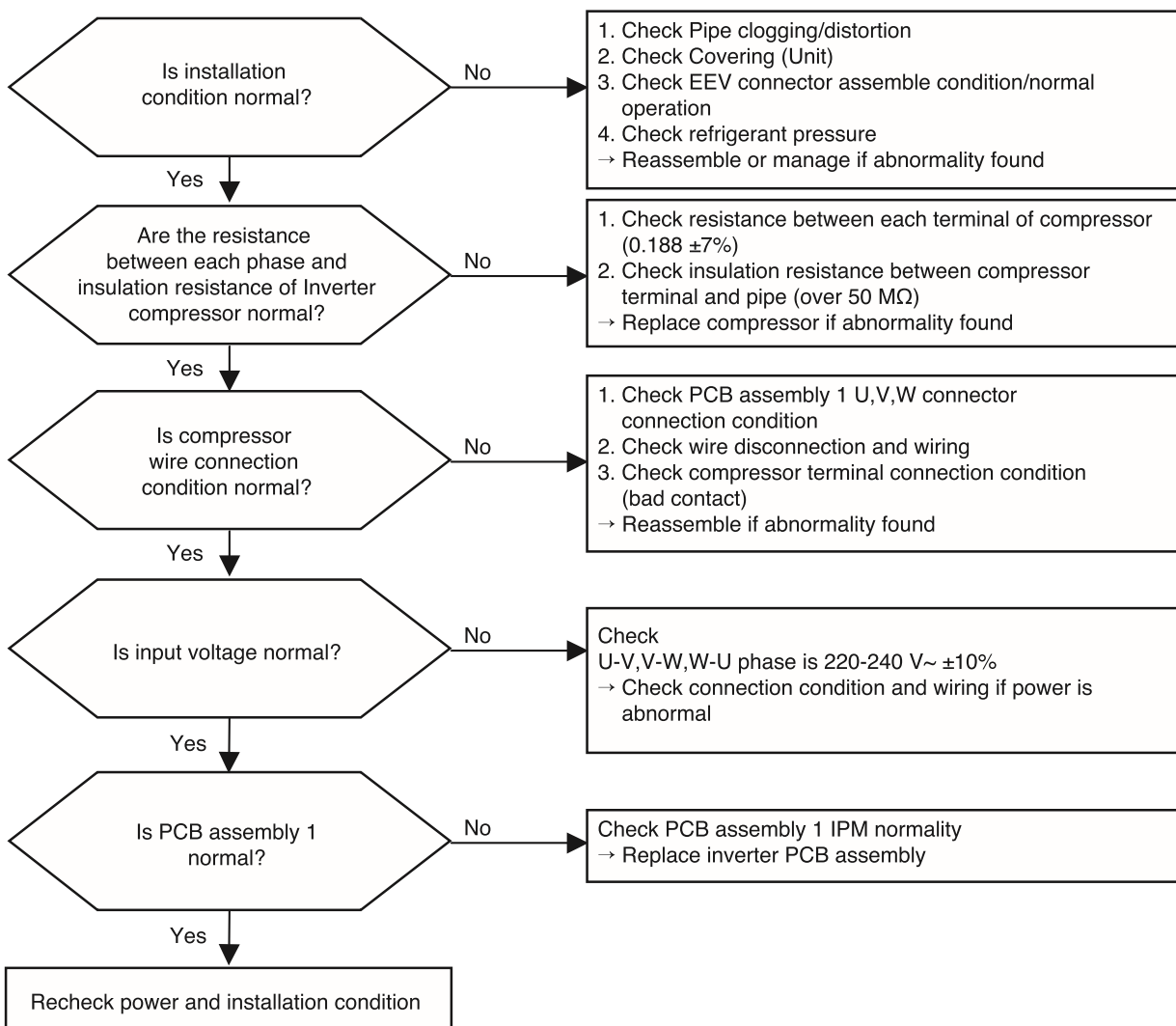


## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

## ■ Error Diagnosis and Countermeasure Flow Chart

### Check Flow Chart



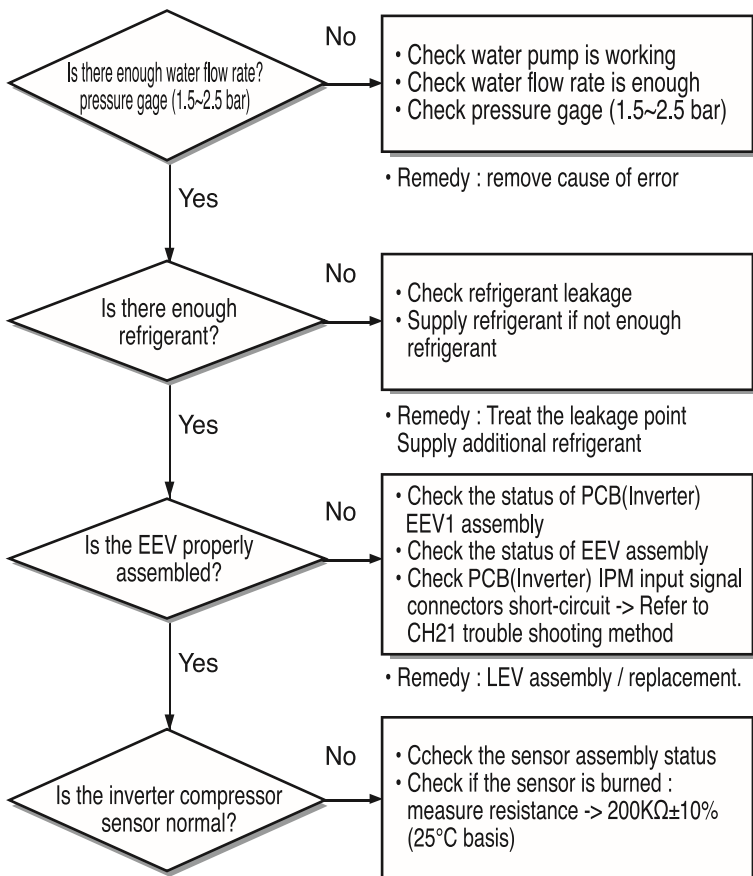


Display code	Title	Cause of error	Check point & Normal condition
32	High temperature in Discharge pipe of the inverter compressor	<ul style="list-style-type: none"> <li>• Overload operation (Outdoor fan constraint, screened, blocked)</li> <li>• Refrigerant leakage (insufficient)</li> <li>• Poor INV Comp Discharge sensor</li> <li>• LEV connector displaced / poor LEV assembly</li> </ul>	<ul style="list-style-type: none"> <li>• Check outdoor fan constraint/ screened/ flow structure</li> <li>• Check refrigerant leakage</li> <li>• Check if the sensor is normal</li> <li>• Check the status of EEV assembly</li> </ul>



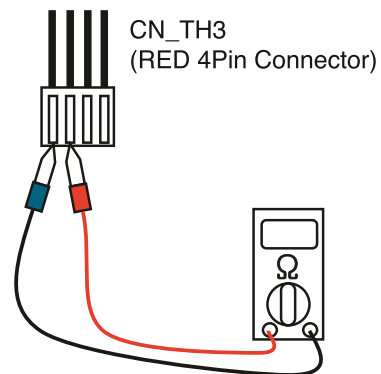
## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.



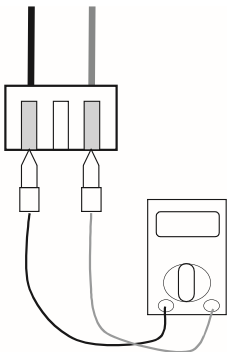
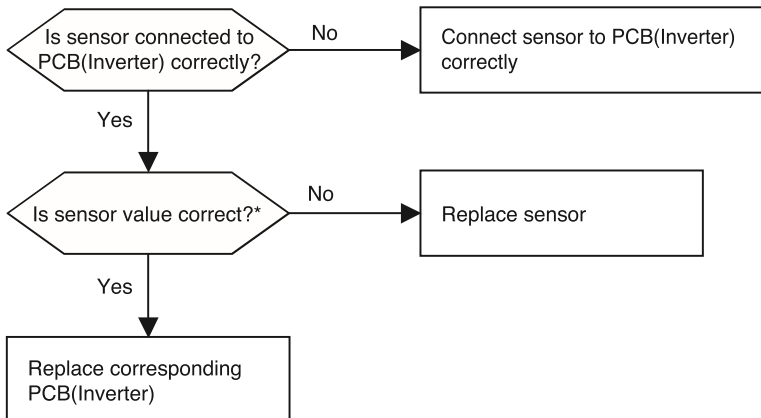
### • Inspecting Inverter Compressor Discharge Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between inverter discharge sensor connector pins.
3. Measure resistance value of  $200K\Omega \pm 10\%$ ,  $25^\circ\text{C}$  basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. ( $1M\Omega$  or more)



Display code	Title	Cause of error	Check point & Normal condition
41	D-pipe sensor (Inverter)	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
44	Air sensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
45	Condenser Mid pipe sensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
46	Suction Pipe sensor	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
47	Const-D-Pipe Sensor Error	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
114	Injection In Sensor Error	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>
115	Injection Out Sensor Error	<ul style="list-style-type: none"> <li>• Open / Short</li> <li>• Soldered poorly</li> <li>• Internal circuit error</li> </ul>	<ol style="list-style-type: none"> <li>1. Bad connection of thermistor connector</li> <li>2. Defect of thermistor connector (Open/Short)</li> <li>3. Defect of outdoor PCB(Inverter)</li> </ol>

## ■ Error Diagnosis and Countermeasure Flow Chart

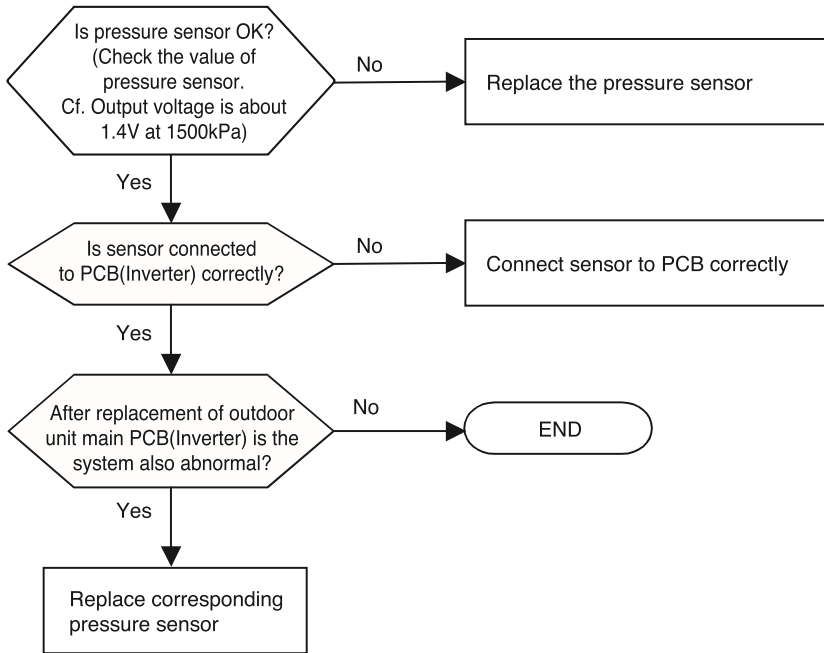


### Check Point

1. Estimate the resistance of each sensor.(Unplugged)
2. Check the value of the resistor of thermistor.
 

D-pipe sensor (Inverter)	: Normal Value of the resistor is 200kΩ at 25°C
Air sensor	: Normal Value of the resistor is 10kΩ at 25°C
Cond. Mid-pipe sensor	: Normal Value of the resistor is 5kΩ at 25°C
Suction pipe sensor	: Normal Value of the resistor is 5kΩ at 25°C
Condenser Out-pipe sensor	: Normal Value of the resistor is 5kΩ at 25°C

Display code	Title	Cause of error	Check point & Normal condition
43	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	<ul style="list-style-type: none"> <li>• Bad connection of connector PCB(Inverter)</li> <li>• Bad connection high pressure connector</li> <li>• Defect of high pressure connector (Open/Short)</li> <li>• Defect of connector PCB(Inverter) (Open/Short)</li> <li>• Defect of PCB(Inverter)</li> </ul>



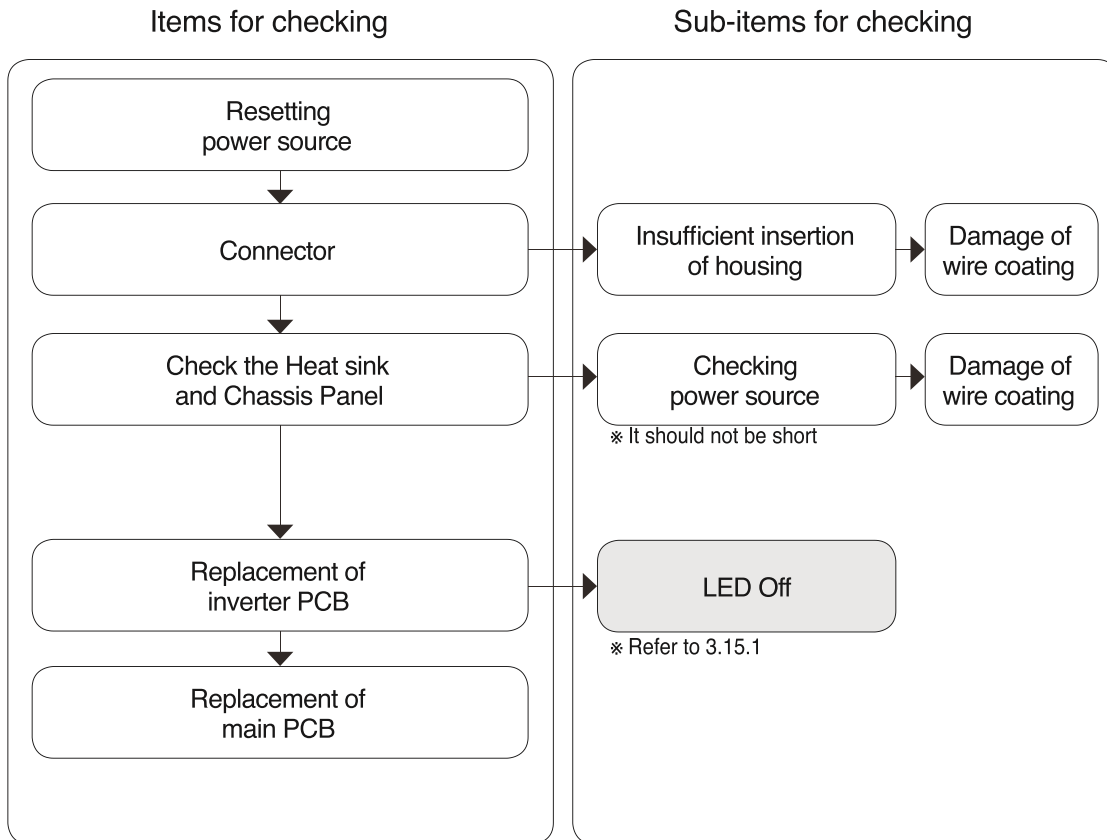
Display code	Title	Cause of error	Check point & Normal condition
52	Communication Error (Inverter PCB Main PCB)	Checking the communication state between Main PCB and Inverter PCB	• Generation of noise source interfering with communication



## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

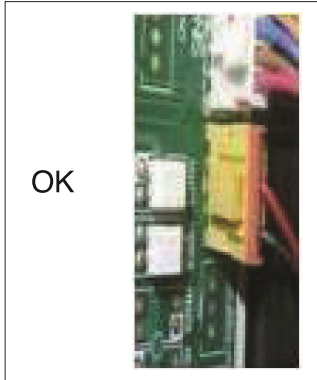
- Resetting power source: Wait for 3 minutes after turning the power of the product off.



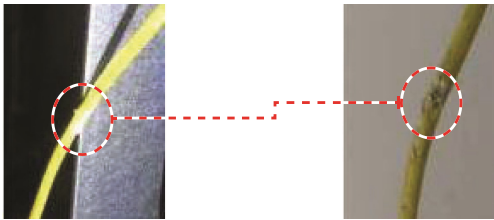
▶ 3Ø, 12kW / 14kW / 16kW

Purpose	Installation environment interfering the communication	Items for checking	Checking method of afulty points
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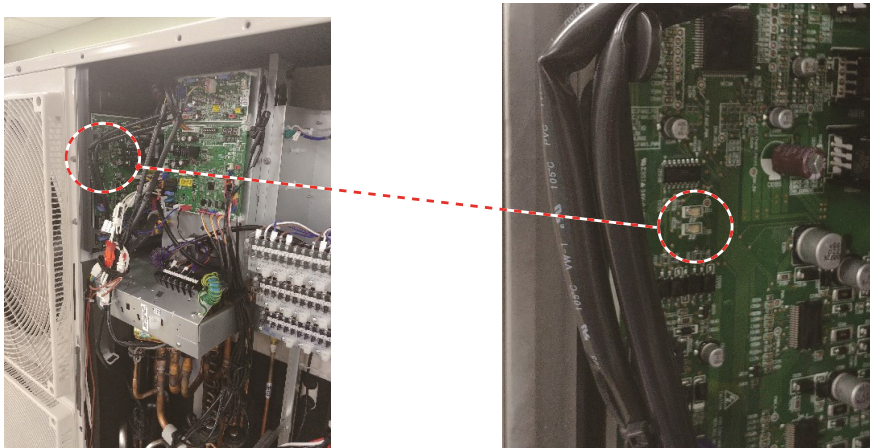
① Insufficient insertion of wires



② Damage of wire coating  
: Interference with wires or wire coating damage with chopping



③ Inverter PCB LED  
: Replacement of inverter PCB during LED Off after resetting



Display code	Title	Cause of error	Check point & Normal condition
53	Title Communication (PCB(Heater) → PCB(Inverter))	• Communication poorly	<ul style="list-style-type: none"> <li>• Power input AC 230V.</li> <li>• The connector for transmission is disconnected.</li> <li>• The connecting wires are misconnected.</li> <li>• The communication line is shorted at GND.</li> <li>• Transmission circuit of PCB(Inverter) is abnormal.</li> <li>• Transmission circuit of PCB(Heater) is abnormal.</li> </ul>



## WARNING

Before checking PCB(Inverter) or each outdoor electric parts, wait for 3 minutes after the power is off. When measuring at standby state of power supply, after checking the measurement mode of the meter, be careful of the short-circuits with other parts.

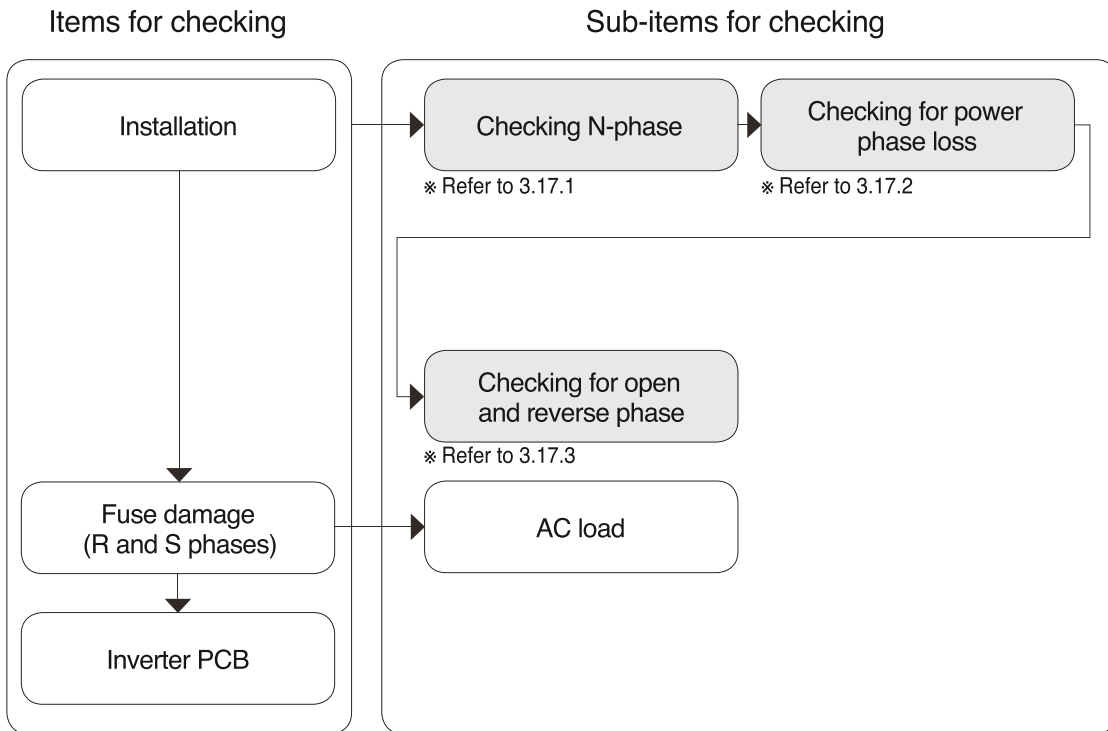
## Check Point

1. Check the input power AC 230 V.
2. Check the communication wires are correctly connected.  
Adjust the connection of wire Confirm the wire of "Live", "Neutral"
3. Check the resistance between communication line and GND. (Normal : Over 2MΩ)
4. Check the connector for communication is correctly connected.
5. Make sure you have connected to the communication line soldering  
(If you do not connect by soldering, a communication error(CH05/CH53) occurs by noise)



Display code	Title	Cause of error	Check point & Normal condition
54	RST Reverse Phase Detection Error	Prevention of phase unbalance and prevention of reverse rotation of constant-rate compressor	Main power wiring fault

■ Error diagnosis and countermeasure flow chart

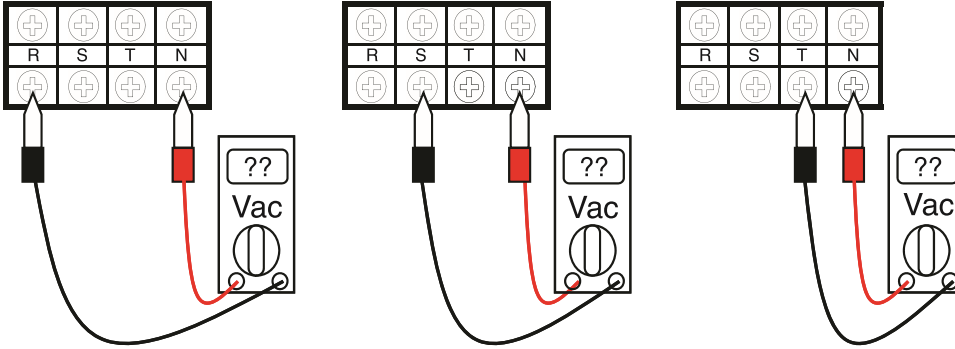


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▶ 3Ø, 12kW / 14kW / 16kW

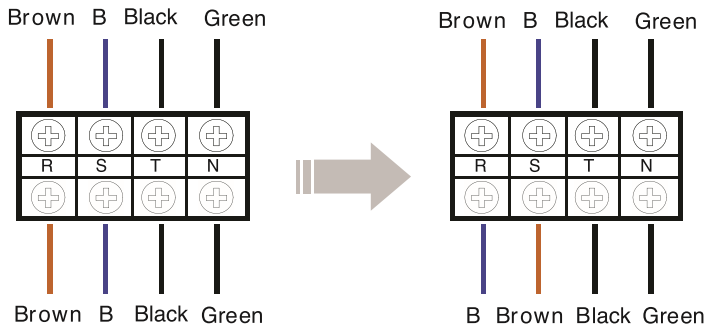
■ Judgment Method of R,S,T phase loss

- Set the tester in AC voltage measurement mode (The part having wave pattern)
- The part that does not generate voltage was upgraded.
- Power module requires checking.



■ Judgment method of open and reverse phase of R,S,T

- Operation with replacement of R and S phases only

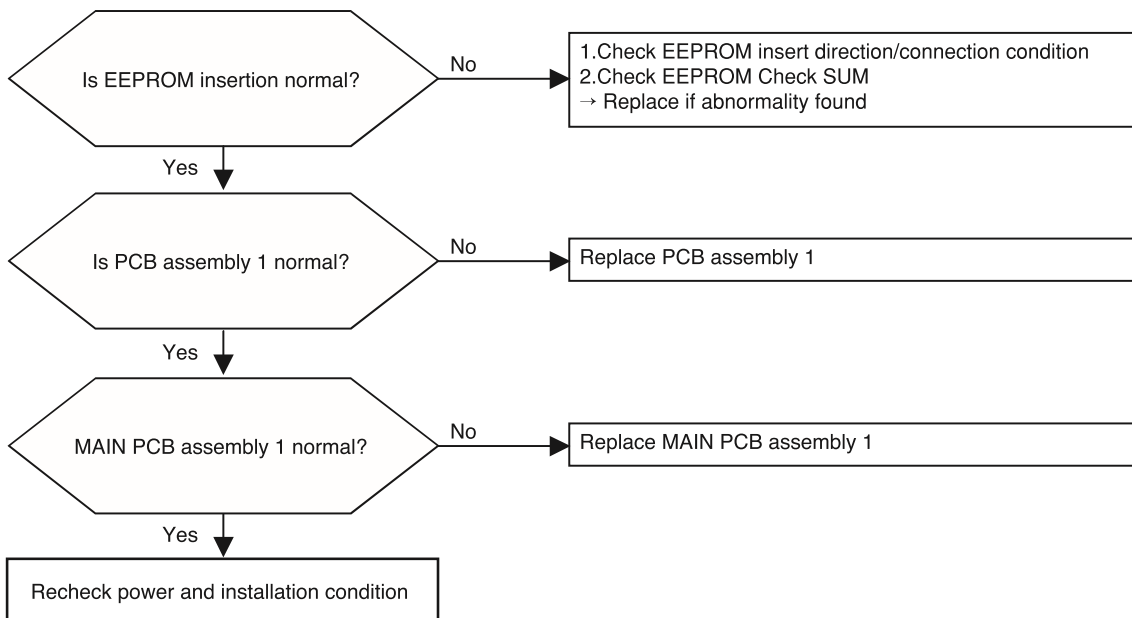


Display code	Title	Cause of error	Check point & Normal condition
60	PCB(Inverter) & Main EEPROM check sum error	EEPROM Access error and Check SUM error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. ODU Inverter & Main PCB assembly 1 damage

## WARNING

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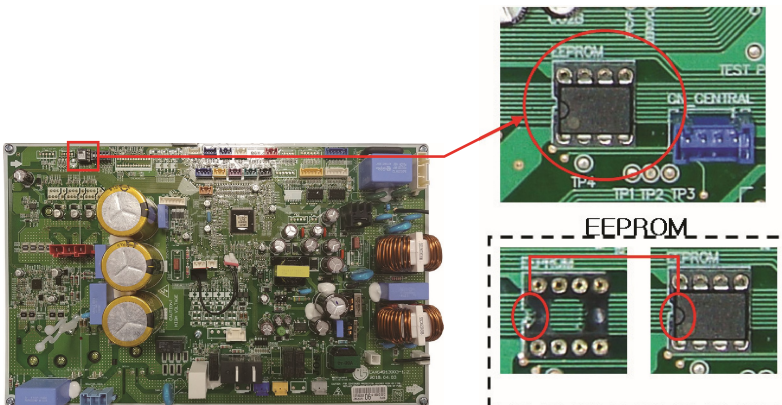
### ■ Error Diagnosis and Countermeasure Flow Chart



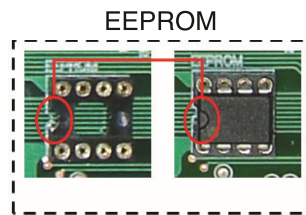
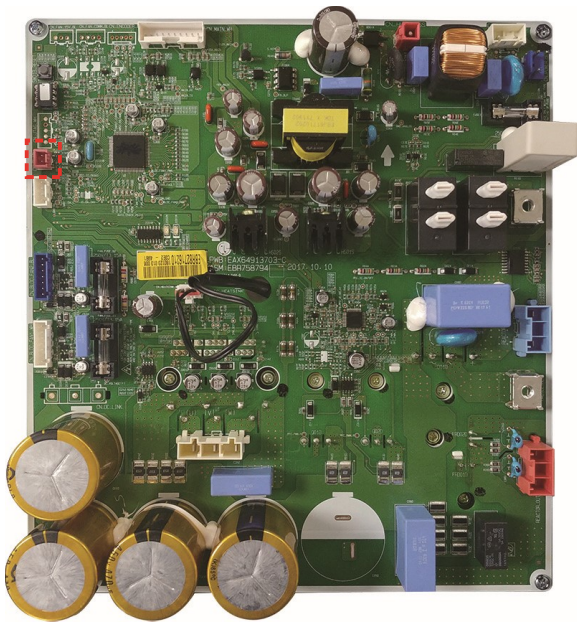
### Check Point

- Check the EEPROM Check sum & Direction

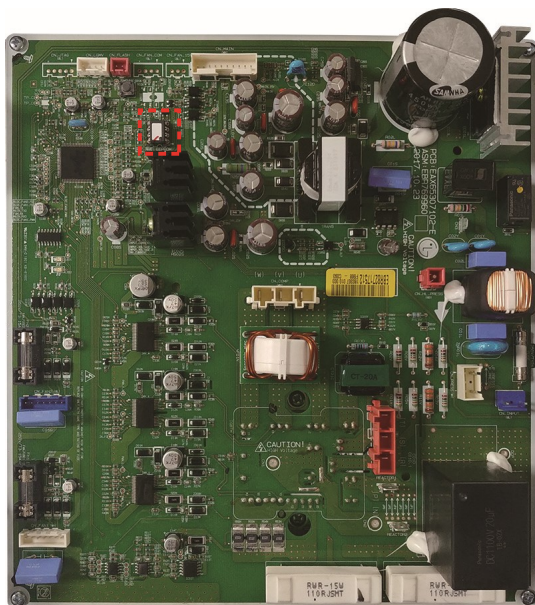
▶ 1Ø, 5kW / 7kW / 9kW



▶ 1Ø, 12kW / 14kW / 16kW



▶ 3Ø, 12kW / 14kW / 16kW

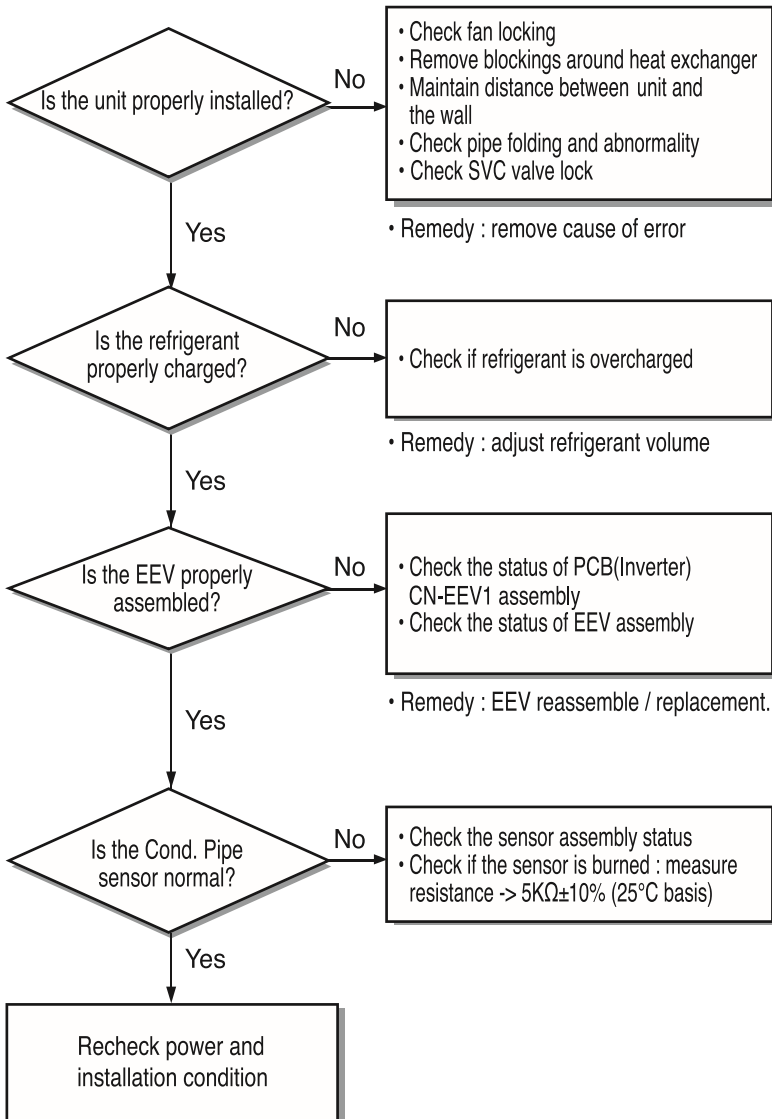


Display code	Title	Cause of error	Check point & Normal condition
61	High temperature in Cond. Pipe	<ul style="list-style-type: none"> <li>• Overload operation (Outdoor fan constraint, screened, blocked)</li> <li>• Unit heat exchanger contaminated</li> <li>• EEV connector displaced / poor EEV assembly</li> <li>• Poor Cond. Pipe sensor assembly / burned</li> </ul>	<ul style="list-style-type: none"> <li>• Check outdoor fan constraint / screened / flow structure</li> <li>• Check if refrigerant overcharged</li> <li>• Check the status of EEV assembly</li> <li>• Check the status of sensor assembly / burn</li> </ul>



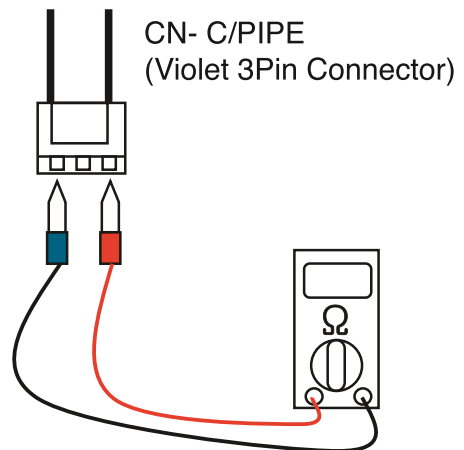
## WARNING

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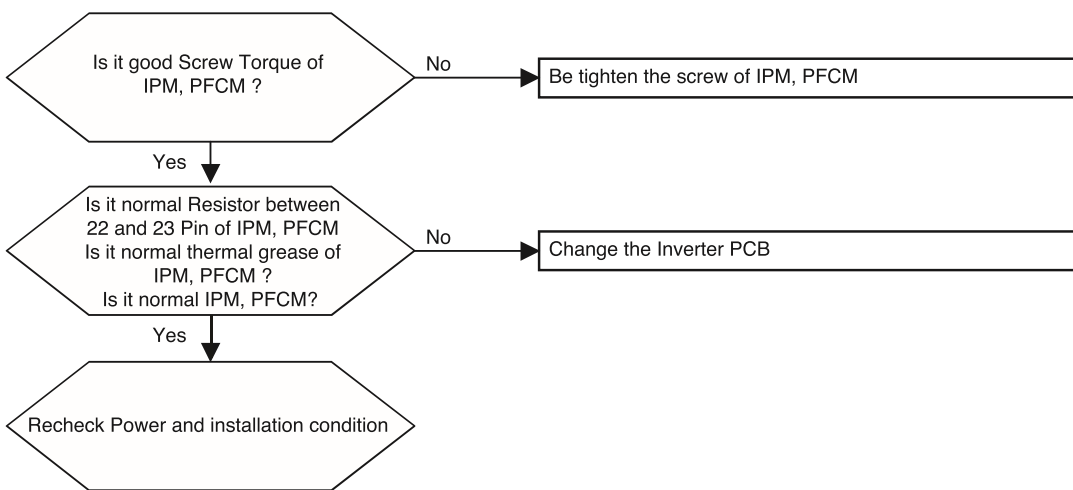
### • Inspecting Cond. Pipe Sensor

1. Set Multi-tester as resistance measurement mode.
2. Measure the resistance between rated speed Comp Discharge sensor connector pins.
3. Measure resistance value of  $5k\Omega \pm 10\%$ ,  $25^{\circ}\text{C}$  basis
4. Check if the sensor insulation is damaged. -> measure the resistance between sensor connector pin and unit assembly pipe. ( $1M\Omega$  or more)



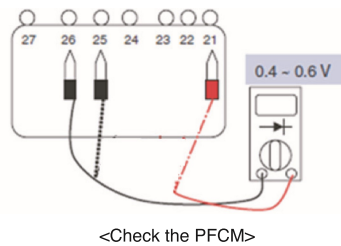
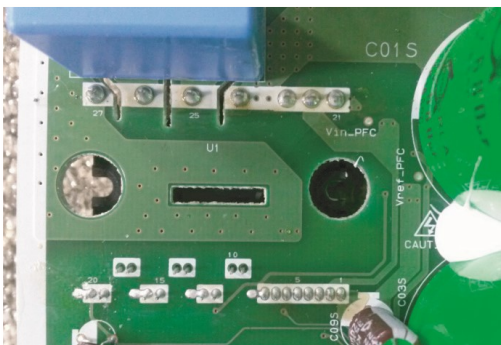
Display code	Title	Cause of error	Check point & Normal condition
62	Heat sink Temp, High error	Heatsink sensor detected high temp.(85°C)	1. Part no. : EBR37798101~09 - Check the heatsink sensor : 10kΩ/at 25°C(Unplugged) - Check the outdoor fan is driving rightly 2. Part no. : EBR37798112~21 - Check the soldered condition in the 22,23 pin of IPM, PFCM - Check the screw torque of IPM, PFCM - Check the spreadable condition of thermal grease on IPM, PFCM - Check the outdoor fan is driving rightly

### ■ Error Diagnosis and Countermeasure Flow Chart



### Check Point

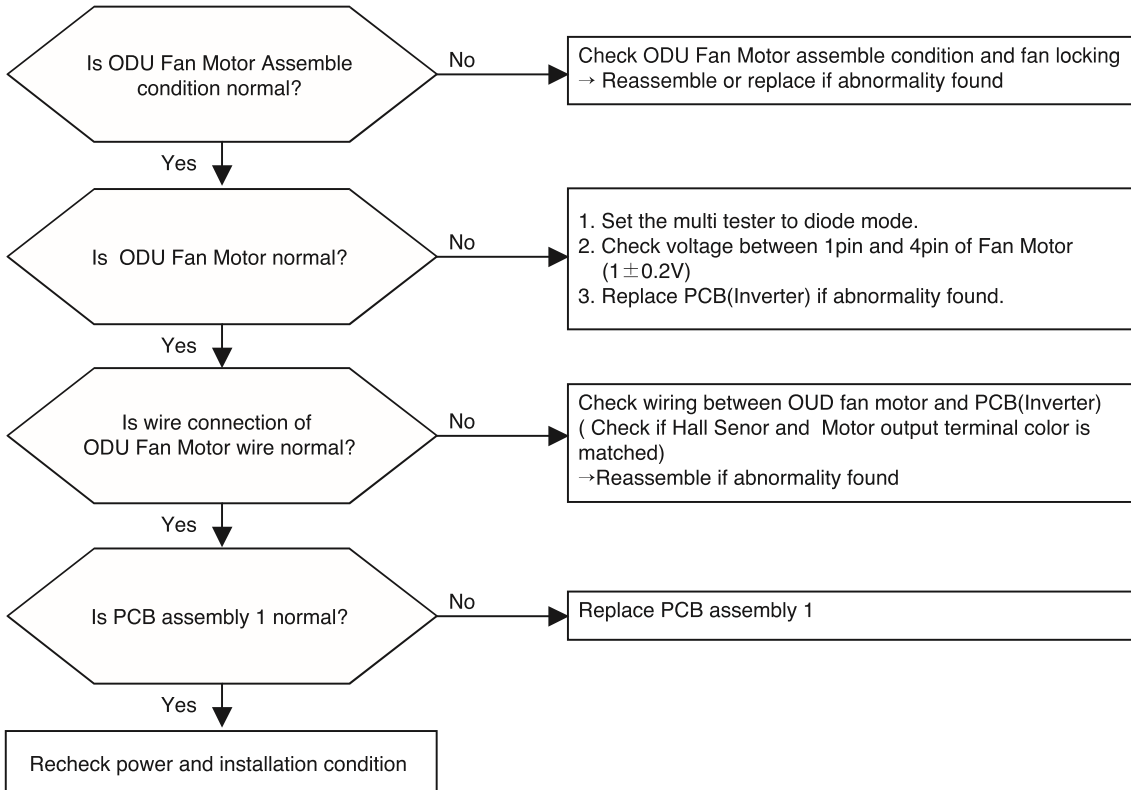
1. Check resistance between No.19 pin and NO.20 pin of PCB PFC module
2. Resistance value should be in  $7k\Omega \pm 10\%$ .(at 25°C).





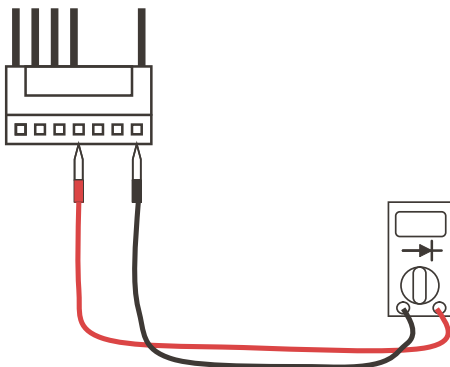
Display code	Title	Cause of error	Check point & Normal condition
67	Fan Lock Error	Fan RPM is 10RPM or less for 5 seconds when ODU fan starts or 40 RPM or less after fan starting.	1. ODU fan locking 2. Heatsink assembly of PCB assembly 1 condition abnormal 3. Defect of temperature sensing circuit part defect of PCB(Inverter)

### ■ Error Diagnosis and Countermeasure Flow Chart

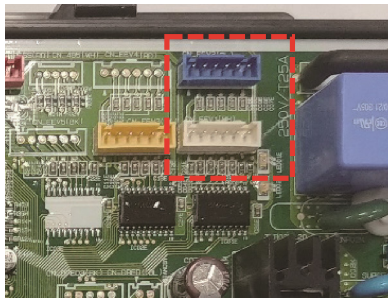
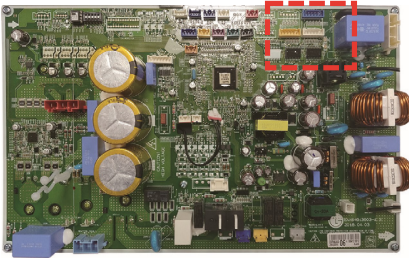


### Check Point

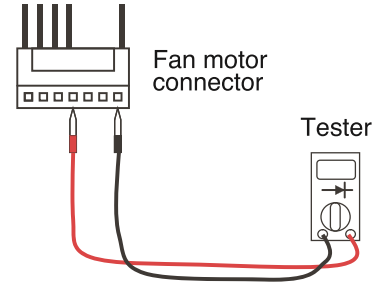
1. Check voltage between 1pin and 4pin of Fan Mortor connector (Tester diode mode)
2. Voltage value should be in  $1V \pm 0.2V$ .
3. Do not replacing all of fan motor and 220-240 V~ at once.  
Check error code again, after replacing the abnormal part (Fan Motor or PCB) first.



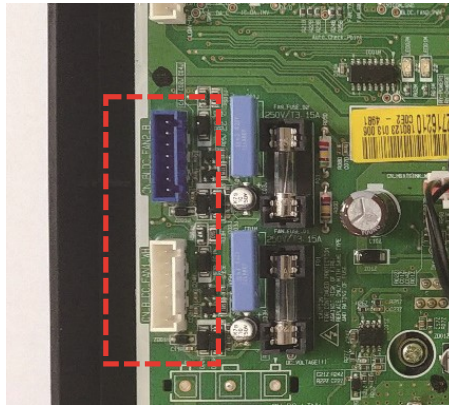
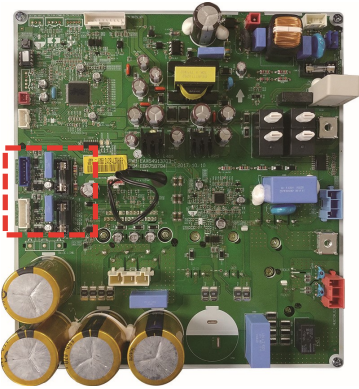
► 1Ø, 5kW / 7kW / 9kW



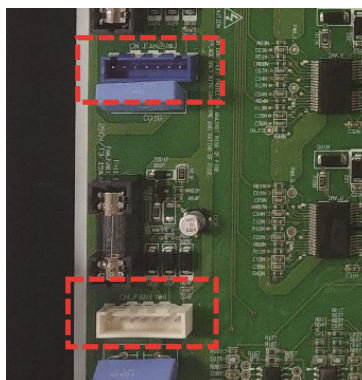
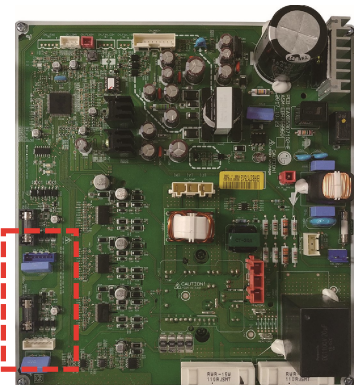
Check voltage between  
1pin and 4pin of fan motor



► 1Ø, 12kW / 14kW / 16kW



► 3Ø, 12kW / 14kW / 16kW



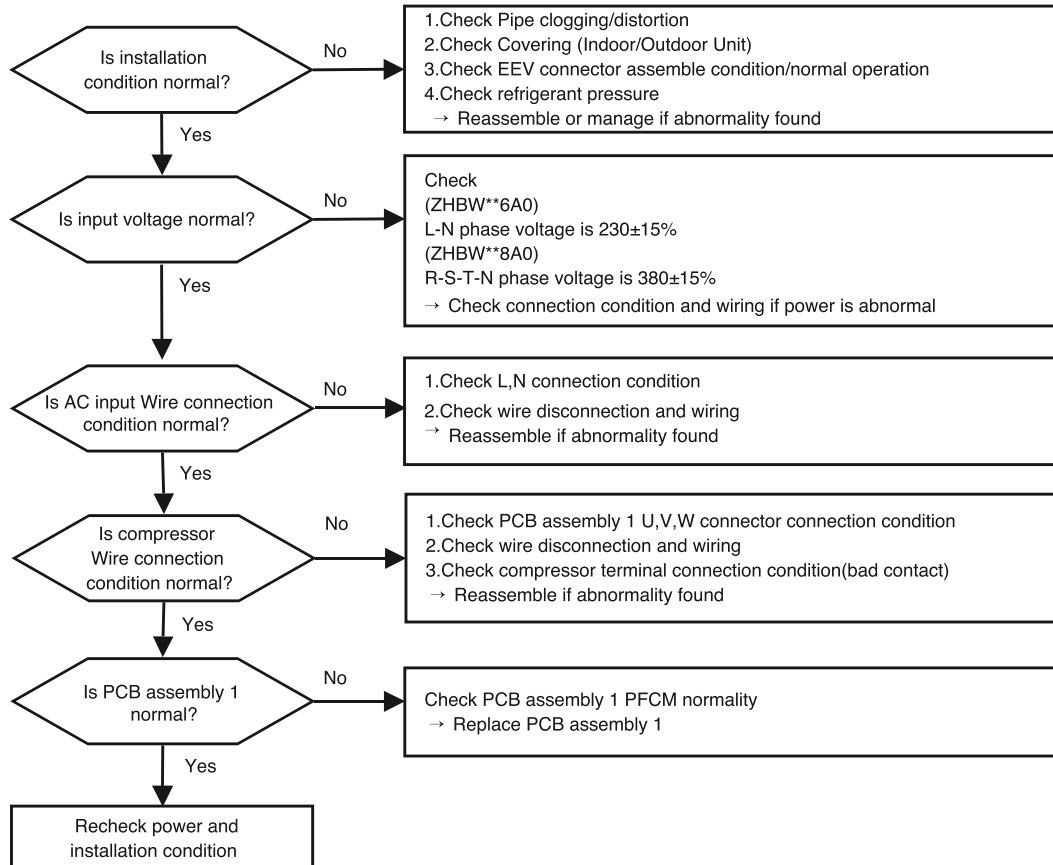
Display code	Title	Cause of error	Check point & Normal condition
73	AC Input Instant over Current Error	PCB(Inverter) input current is over 100A(peak) for 2us	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Input voltage abnormal (L,N) 4. Power line assemble condition abnormal 5. PCB assembly 1 Damage (input current sensing part)



## WARNING

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## ■ Error Diagnosis and Countermeasure Flow Chart



※ PFCM Module checking method

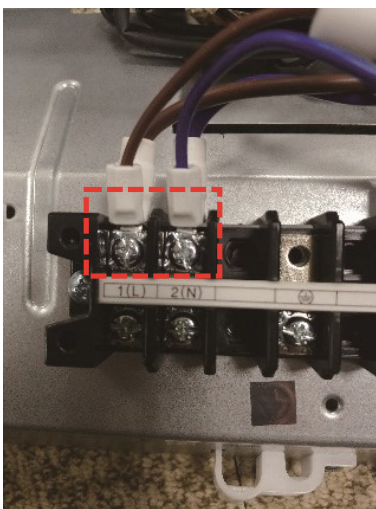
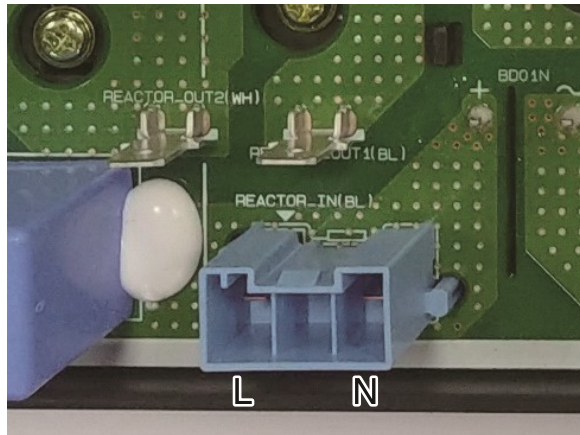
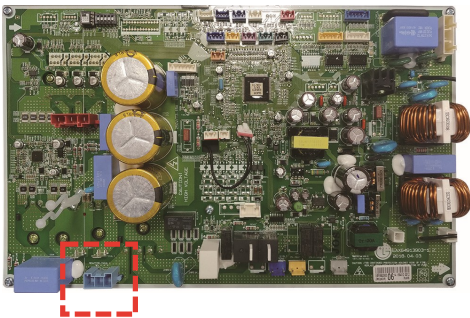
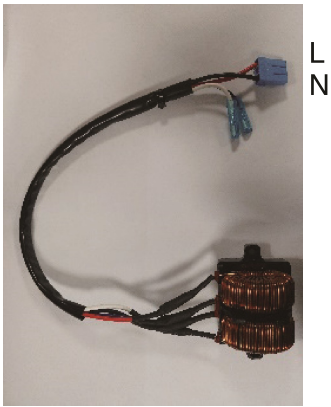
- ① Set the multi tester to diode mode.
- ② Check short between input signal pin which are placed below PFC Module
- ③ Replace PCB assembly 1 if it is short between pins except No.4,5 pins.



## CAUTION

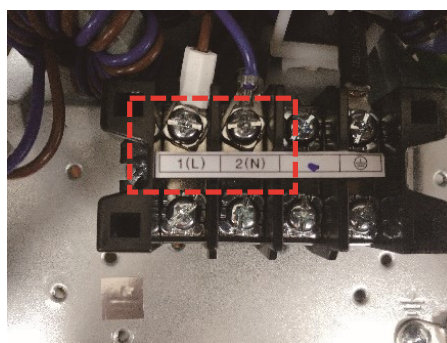
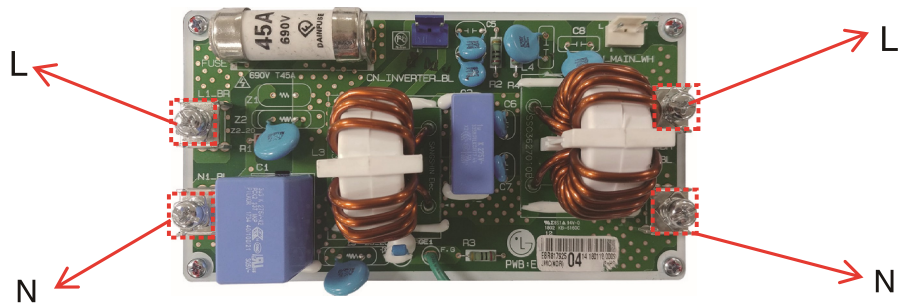
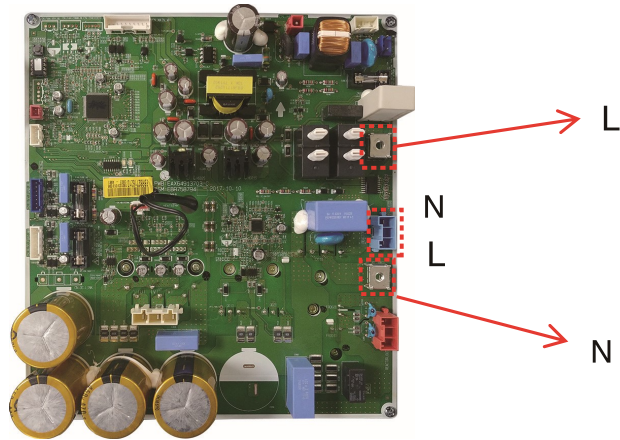
PFCM module No.4,5 pins are internal short state.

▶ 1Ø, 5kW / 7kW / 9kW

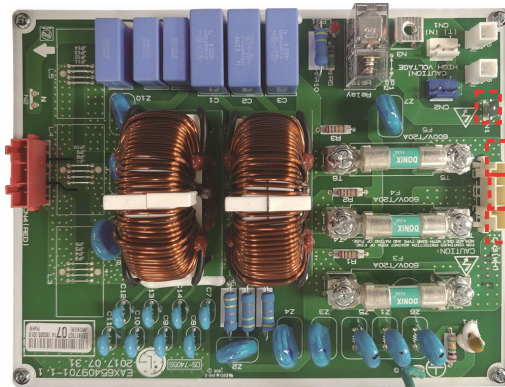
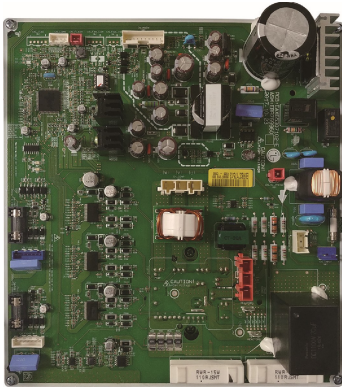




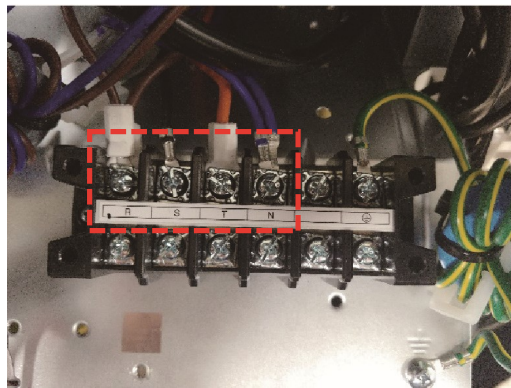
▶ 1Ø, 12kW / 14kW / 16kW



▶ 3Ø, 12kW / 14kW / 16kW



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