

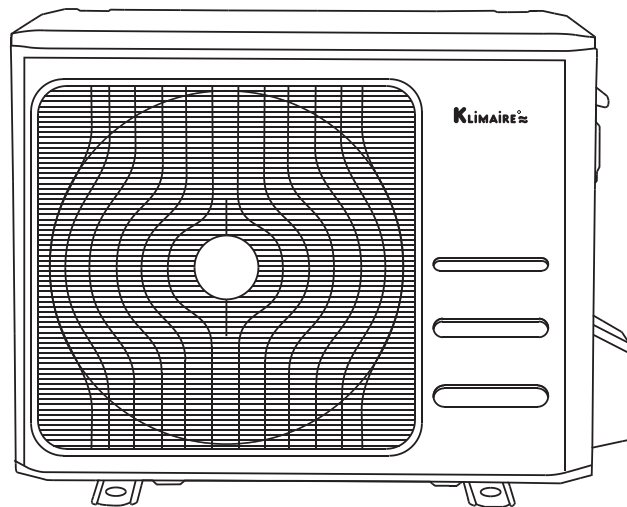
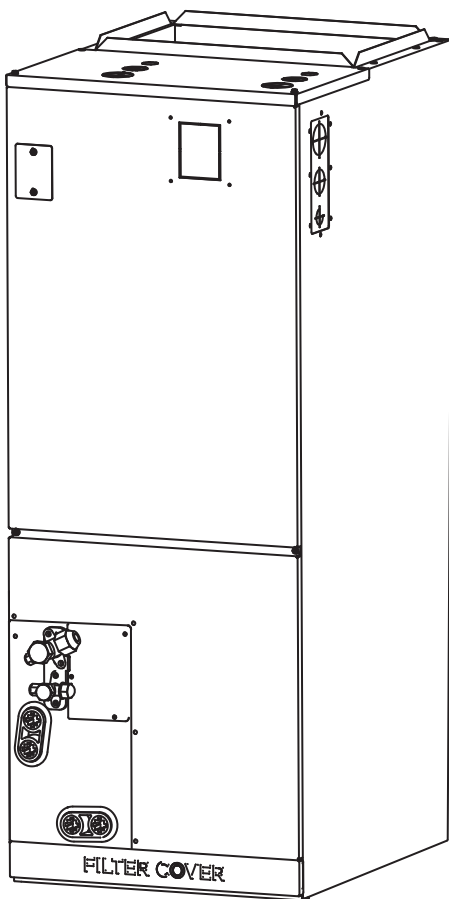
# KIDF/KOIF FIT PRO SERIES

AIR-HANDLER

AIR CONDITIONER

EN

# Handbook



# KLIMAIRE®



North America Products

# Troubleshooting

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## 1. Safety Caution

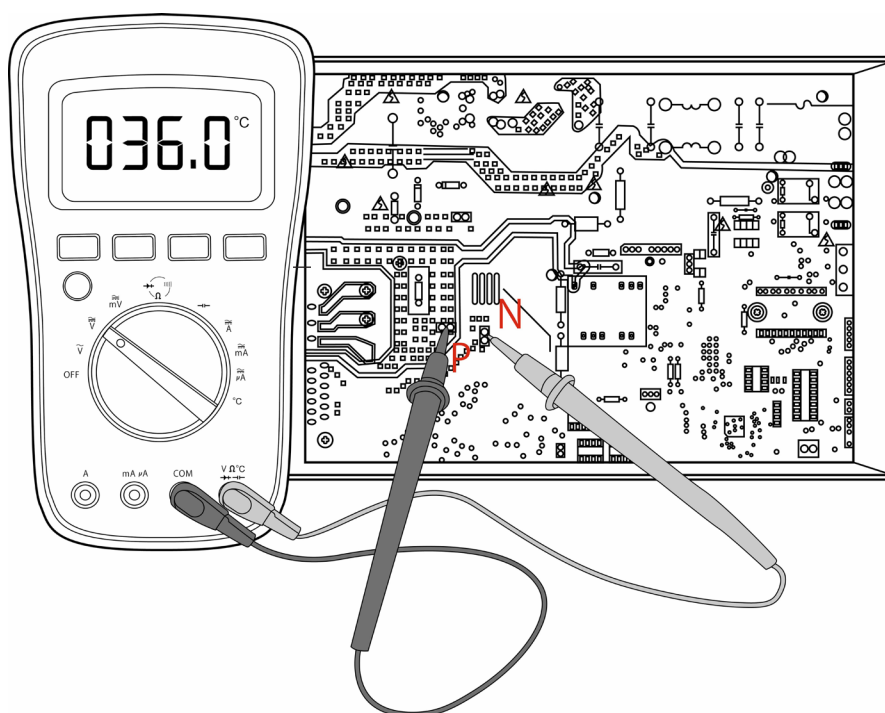
### ⚠ WARNING

Be sure to turn off all power supplies or disconnect all wires to avoid electric shock. While checking indoor/outdoor PCB, please equip oneself with antistatic gloves or wrist strap to avoid damage to the board.

### ⚠ WARNING

Electricity remains in capacitors even when the power supply is off. Ensure the capacitors are fully discharged before troubleshooting.

Test the voltage between P and N on back of the main PCB with multimeter. If the voltage is lower than 36V, the capacitors are fully discharged. For models that cannot be measured, wait 5 minutes after the power supply is off to ensure that the capacitors are fully discharged.



**Note:** This picture is for reference only. Actual appearance may vary.

## 2. General Troubleshooting

### 2.1 Error Display (Indoor Unit)

When the indoor unit encounters a recognized error, the operation lamp will flash in a corresponding series, the timer lamp may turn on or begin flashing, and an error code will be displayed. These error codes are described in the following table:

Display	Error Information	Solution
E400	Indoor unit EEPROM parameter error	TS21
E401	Indoor / outdoor unit communication error	TS22
E416	Communication malfunction between adapter board and outdoor main board	TS47
E403	The indoor fan speed is operating outside of the normal range(for some models)	TS23
E460	Indoor room temperature sensor T1 is in open circuit or has short circuited	TS25
E461	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	TS25
E462	Evaporator coil temperature sensor T2B is in open circuit or has short circuited	TS25
E465	Evaporator coil temperature sensor T2A is in open circuit or has short circuited	TS25
E40C	Refrigerant Leakage Detection	TS26
E40b	Communication error between indoor two chips	TS46
E40E	Water-level alarm malfunction	TS27
E453	Outdoor room temperature sensor T4 is in open circuit or has short circuited	TS25
E452	Condenser coil temperature sensor T3 is in open circuit or has short circuited	TS25
E454	Compressor discharge temperature sensor TP is in open circuit or has short circuited	TS25
E456	Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited(for free-match indoor units)	TS25
E451	Outdoor unit EEPROM parameter error	TS21
E407	The outdoor fan speed is operating outside of the normal range(for some models)	TS23
P400	IPM malfunction or IGBT over-strong current protection	TS28
P401	Over voltage or over low voltage protection	TS29
P402	Top temperature protection of compressor or High temperature protection of IPM module	TS32
P404	Inverter compressor drive error	TS30

<b>PC03</b>	Low pressure protection (for some models)	TS31
<b>EC0d</b>	Outdoor unit malfunction	TS33
<b>PC0L</b>	Low ambient temperature protection	TS40
<b>Fl09</b>	Mismatch between the new and old platforms	TS47

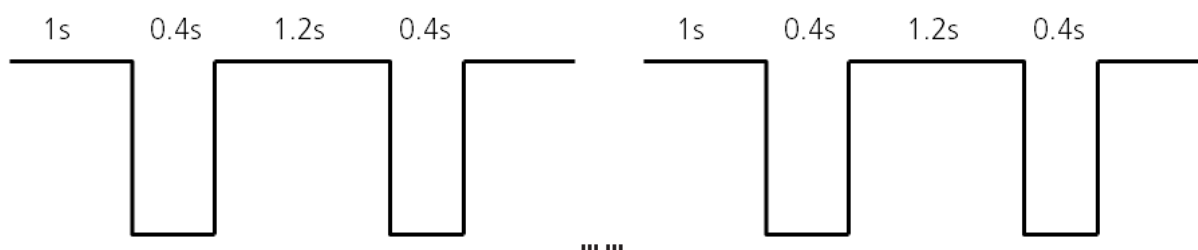
**For other errors:**

The display board may show a garbled code or a code undefined by the service manual. Ensure that this code is not a temperature reading.

**Troubleshooting:**

Test the unit using the remote control. If the unit does not respond to the remote, the indoor PCB requires replacement. If the unit responds, the display board requires replacement.

**LED flash frequency:**



## 2.2 Error Display on Two Way Communication Wired Controller

Display	Malfunction or Protection	Solution
<b>EHb3</b>	Communication error between wire controller and indoor unit	TS48

The other error codes displayed on the wire controller are same from those on the unit.

## 2.3 Error Display (For Some Outdoor Unit)

Display	Malfunction or Protection	Solution
EE 51	Outdoor EEPROM malfunction	TS21
EL 01	Indoor / outdoor units communication error	TS22
EL 16	Communication malfunction between adapter board and outdoor main board	TS47
PC 00	IPM module protection	TS28
PC 02	Top temperature protection of compressor or High temperature protection of IPM module	TS32
PC 06	Temperature protection of compressor discharge	TS45
PC 08	Outdoor overcurrent protection	TS35
PC 0A	High temperature protection of condenser	TS44
PC 0F	PFC module protection	TS37
PC 10	Outdoor unit low AC voltage protection	TS29
PC 11	Outdoor unit main control board DC bus high voltage protection	TS29
PC 12	Outdoor unit main control board DC bus high voltage protection /341 MCE error	TS29
PC 30	High pressure protection	TS42
PC 31	Low pressure protection	TS31
PC 40	Communication malfunction between IPM board and outdoor main board	TS34
PC 41	Outdoor compressor current sampling circuit failure	TS48
PC 43	Outdoor compressor lack phase protection	TS39
PC 44	Outdoor unit zero speed protection	TS35
PC 45	Outdoor unit IR chip drive failure	TS40
PC 46	Compressor speed has been out of control	TS35
PC 49	Compressor overcurrent failure	TS35
EE 52	Condenser coil temperature sensor T3 is in open circuit or has short circuited	TS25
EE 53	Outdoor room temperature sensor T4 is in open circuit or has short circuited	TS25
EE 54	Compressor discharge temperature sensor TP is in open circuit or has short circuited	TS25
EE 57	Refrigerant pipe temperature sensor error	TS25
EE 5C	High pressure sensor is in open circuit or has short circuited	TS25
EE 71	Over current failure of outdoor DC fan motor	TS25
EE 72	Lack phase failure of outdoor DC fan motor	TS38
EE 73	Zero-speed failure of outdoor DC fan motor	TS23
EE 07	Outdoor fan speed has been out of control	TS23
PC 0L	Low ambient temperature protection	TS40
LC 06	High temperature protection of IPM module	TS32
EE 55	Outdoor IPM module temperature sensor fault	TS41
PH 90	High temperature protection of evaporator	--
PH 91	Low temperature protection of evaporator	--

### 3. Outdoor Unit Point Check Function

- A check switch is included on the outdoor PCB.
- Push SW1 to check the unit's status while running. The digital display shows the following codes each time the SW1 is pushed.

Number of Presses	Display	Remark
00	Normal display	Displays running frequency, running state, or malfunction code Defrosting mode: "dF" or alternative displays between running frequency and "dF" (each appears for 0.5s.) Forced cooling mode: the LED displays "FC" or alternative displays between running frequency and "FC" (each appears for 0.5s).
01	Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "5.0",it means the capacity demand is 15. the digital display tube show "60",it means the capacity demand is 6.0) GA algorithm models display "--"
02	The frequency after the capacity requirement adapter	If the value is higher than 99, the digital display tube will show single digit and tens digit.
03	Room temperature (T1)	If the temp. is lower than 0 degree, the digital display tube will show "0".If the temp. is higher than 70 degree, the digital display tube will show "70".
04	Indoor unit evaporator temperature (T2)	If the temp. is lower than -9 degree, the digital display tube will show "-9".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "--"
05	Condenser pipe temp.(T3)	
06	Outdoor ambient temp.(T4)	
07	Compressor discharge temp. (TP)	The display value is between 0~199 degree. If the temp. is lower than 0 degree, the digital display tube will show "0". If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "0.5",it means the compressor discharge temp. is 105 degree. the digital display tube show "1.6",it means the compressor discharge temp. is 116 degree)
08	AD value of current	The display value is a hex number.
09	AD value of voltage	For example, the digital display tube shows "Cd", it means AD value is 205.
10	Indoor unit running mode code	Standby:0,Cooling:1, Heating:2, Fan only 3, Drying:4, Forced cooling:6, Defrost:7
11	Outdoor unit running mode code	
12	EXV open angle	Actual data/4. If the value is higher than 99, the digital display tube will show single digit and tens digit. For example, the digital display tube show "2.0",it means the EXV open angle is 120×4=480p.)



<b>13</b>	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is a hex number. For example, the digital display show 2A, then Bit5=1, Bit3=1, and Bit1=1.  This means that a frequency limit may be caused by T4, T3, or the current.
		Bit6	Reserved	
		Bit5	Reserved	
		Bit4	Frequency limit caused by low temperature of T2.(LH00)	
		Bit3	Frequency limit caused by T3.(LC01)	
		Bit2	Frequency limit caused by TP.(LC02)	
		Bit1	Frequency limit caused by current(LC03)	
		Bit0	Frequency limit caused by voltage (LC05)	
<b>14</b>	Outdoor unit fan speed	If it is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "2.0",it means the fan speed is 120.) This value is multiplied by 8, and it is the current fan speed: 120*8=960		
<b>15</b>	The average value of the temperature values detected by the high and low pressure sensors in the last 10 seconds of the compressor frequency calculation period	The displayed value is the actual value plus 60 (that is, when the displayed value is 10, the actual value is -50). When the displayed value is higher than 99, the digital display tube will show single digit and tens digit. (if it displays 2.0, it means 120)		
<b>16</b>	The temperature value detected by the high and low pressure sensor	When there is no pressure sensor, it is displayed as --		
<b>17</b>	AD value detected by the high and low pressure sensor	The display value is a hex number. For example, the digital display tube shows "Cd", it means AD value is 205. When there is no pressure sensor, it is displayed as --		
<b>18</b>	The currently running communication protocol version	00-99		

## 4. Information Inquiry

- To enter engineer mode, in power-on or standby mode, and in non-locked state, press the key combination "ON/OFF + Air Speed" for 7s:
- After entering the engineer mode, the remote control will display icons of "Auto, Cool, Dry, Heat", and the Battery icon; at the same time, it will also display the numeric code of the current engineer mode (for the initial engineer mode, the numeric code displayed is 0), and all other icons are inactive.
- In engineer mode, the value of the current numeric code can be adjusted circularly through the Up/Down key, with the setting range of 0 to 30. Each time the current numeric code is adjusted, the special code of the engineer mode will be transmitted with a delay of 0.6s. The code can also be transmitted by pressing "OK", and the special code of the engineer mode sent contains information of the currently displayed numeric code (if the numeric code is 0, the code to enter the engineer mode will be transmitted).
- In engineer mode, other keys or operations are invalid except for the On/Off key, the Up/Down key, the OK key or executing the operation to exit the engineer mode.

Code	Query Content	Advanced Function Setting
0	Error code	
1	T1 temperature	press "On/Off" for 2s to enter the Power Down Memory Selector, the code displayed is "Ch", press "OK" to send the Query Power Down Memory Selector code; press the Up/Down key to select 1 or 0 and press "OK" to confirm, 1 indicates that the power down memory exists, and 0 indicates that no power down memory exists; and press "On/Off" for 2s to exit.(Set within 1 minute after power on)
2	T2 temperature	press "On/Off" for 2s to enter the Internal Fan Control Selector after the pre-set temperature is reaches, the code displayed is "Ch", press "OK" to send the Query Internal Fan Control Selector code; press the Up/Down key to select 1 to 11: 1 - Stop the fan, 2 - Min. air speed, 3 - Set the air speed, 4 - Termal running for 5min, press "OK" to confirm, and press "On/Off" for 2s to exit. (Set within 1 minute after power on)
3	T3 temperature	press "On/Off" for 2s to enter the Mode Selector, press the Up/Down key to select CH (cool and heat, Auto + Cool + Dry + Heat + Fan), CC (Cool only without Auto, Cool + Dry + Fan) , press "OK" to confirm, and the mode selected can be memorized when the remote control is powered down and powered on; and press "On/Off" for 2s to exit. When the remote control does not burn any parameters, the mode setting will not be memorized. (Set within 1 minute after power on)
4	T4 temperature	press the "On/Off" for 2s to enter the Min. Set Temperature Selector, press the Up/Down key to select "16°C~24°C", press "OK" to confirm, and the Min. Set Temperature can be memorized when the remote control is powered on and power lost; and press "On/Off" for 2s to exit. When the remote control does not burn any parameters, the min. set temperature will not be memorized.(Set within 1 minute after power on)
5	TP temperature	press "On/Off" for 2s to enter the Max. Set Temperature Selector, press the Up/Down key to select "25°C~30°C", press "OK" to confirm, and the Max. Set Temperature can be memorized when the remote control is powered on and power lost; and press "On/Off" for 2s to exit. When the remote control does not burn any parameters, the max. set temperature will not be memorized.(Set within 1 minute after power on)
6	Compressor Target Frequency FT	/

7	Compressor Running Frequency Fr	press "On/Off" for 2s to enter Twins Selector, the code displayed is "Ch", press "OK" to send the Query Twins Selector code; press the Up/Down key to select, 0 indicates that there is no Twins, 1 indicates the host, and 2 indicates the slave. Press "OK" to confirm, and press "On/Off" for 2s to exit.
8	Current dL	/
9	Current AC Voltage Uo	/
10	Current indoor capacity test state Sn	/
11	/	press "On/Off" for 2S to enter the Min. Desired Cooling Frequency Selector, the code displayed is Ch, press "OK" to send the Query Min. Desired Cooling Frequency Selector code; press the Up/Down key to select the minimum cooling frequency desired and press "OK" to confirm; press "On/Off" for 2s to exit.(for some models)
12	Set Speed Pr of the outdoor fan	press "On/Off" for 2s to enter the Min. Desired Heating Frequency Selector, the code displayed is "Ch", press "OK" to send the Query Min. Desired Heating Frequency Selector code; press the Up/Down key to select the min. desired heating frequency value, press "OK" to confirm; and press the "On/Off" for 2s to exit.(for some models)
13	Opening Lr of EEV	press "On/Off" for 2s to enter the Max. Running Frequency Selector of the restricted area 6 in the cooling mode T4, the code displayed is "Ch", press "OK" to send the Query Max. Running Frequency Selector code of the restricted area 6 in the cooling mode T4; press the Up/Down key to select the limit, then press "OK" to confirm; and press "On/Off" for 2s to exit.(for some models)
14	Actual Running Speed ir of the indoor fan	/
15	Indoor Humidity Hu	press "On/Off" for 2s to enter the Outdoor Forced Running Frequency Selector, the code displayed is "Ch", press "OK" to send the Query Outdoor Forced Running Frequency Selector code; press the Up/Down key to select the outdoor forced running frequency, then press "OK" to confirm; and press "On/Off" for 2s to exit.(for some models)
16	Set Temperature TT after compensation	press "On/Off" for 2s to enter One-Key Recovery, the code displayed is "rS", then press "OK" to send the One-Key Recovery code, the mode selector of the remote control will recover to "Cooling and heating", the min. temperature recovers to 16°C, and the max. temperature recovers to 30°C; and press "On/Off" for 2s to exit.(for some models)
17	/	nA
18	/	/
19	DC bus voltage	press "On/Off" for 2s to enter the Cooling Frequency Threshold Settings; press the Up/Down key to select the cooling frequency threshold, press "OK" to confirm; and press the "On/Off" for 2s to exit. (Set within 1 minute after power on)
20	Indoor Target Frequency oT	press "ON/OFF" for 2s to enter the Heating Frequency Threshold Settings; press the Up/Down key to select the heating frequency threshold, press "OK" to confirm; and press "On/Off" for 2s to exit. (Set within 1 minute after power on)

21		press "On/Off" for 2s to enter the Cooling Temperature Compensation Value Settings, the code displayed is "Ch", then press "OK" to send the Query Cooling Temperature Compensation Value code; press the Up/Down key to select the cooling temperature compensation value, then press "OK"; and press "On/Off" for 2s to exit.
22		press "On/Off" for 2s to enter the Heating Temperature Compensation Value Settings, the code displayed is "Ch", press "OK" to send the Query Heating Temperature Compensation Value code; press the Up/Down key to select the heating temperature compensation value, then press "OK"; and press "On/Off" for 2s to exit.
23	Reserved	/
24		
25		
26		
27		
28		
29		
30		

- In Channel 1~30 settings of the engineer mode, long press the On/off key to return the previous engineer mode.

Exit of engineer mode:

- 1) In engineer mode, press the key combination of "On/Off + Air speed" for 2s;
- 2) The engineer mode will be exited if there are no valid key operations for continuous 60s.

Error code of engineer mode

Display	Error Information
Eh 00	Indoor unit EEPROM parameter error
El 01	Indoor / outdoor unit communication error
El 16	Communication malfunction between adapter board and outdoor main board
Eh 03	The indoor fan speed is operating outside of the normal range
Ec 51	Outdoor unit EEPROM parameter error
Ec 52	Condenser coil temperature sensor T3 is in open circuit or has short circuited
Ec 53	Outdoor room temperature sensor T4 is in open circuit or has short circuited
Ec 54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
Ec 55	IGBT temperature sensor TH is in open circuit or has short circuited
Ec 56	Evaporator coil outlet temperature sensor T2B is in open circuit or has short circuited(for free-match indoor units)
Ec 0d	Outdoor unit malfunction
Eh 60	Indoor room temperature sensor T1 is in open circuit or has short circuited
Eh 61	Evaporator coil temperature sensor T2 is in open circuit or has short circuited
Eh 62	Evaporator coil temperature sensor T2B is in open circuit or has short circuited
Eh 65	Evaporator coil temperature sensor T2A is in open circuit or has short circuited
Ec 07	The outdoor fan speed is operating outside of the normal range(
Eh 0b	Communication error between indoor two chips
El 0c	Refrigerant leak detected
Eh 0e	Water-level alarm malfunction
Pl 09	Mismatch between the new and old platforms
Pc 00	IPM malfunction or IGBT over-strong current protection
Pc 01	Over voltage or over low voltage protection
Pc 02	Top temperature protection of compressor or High temperature protection of IPM module
Pc 04	Inverter compressor drive error
Pc 08	Outdoor current protection
Pc 03	Pressure protection
Pc 0L	Outdoor low ambient temperature protection
Ph 90	Evaporator coil temperature over high protection
Ph 91	Evaporator coil temperature over low Protection
Pc 0R	Condenser high temperature protection

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## 5. Error Diagnosis and Troubleshooting Without Error Code

### WARNING

Be sure to turn off unit before any maintenance to prevent damage or injury.

#### 5.1 Remote maintenance

**SUGGESTION:** When troubles occur, please check the following points with customers before field maintenance.

No.	Problem	Solution
1	Unit will not start	TS15 - TS16
2	The power switch is on but fans will not start	TS15 - TS16
3	The temperature on the display board cannot be set	TS15 - TS16
4	Unit is on but the wind is not cold(hot)	TS15 - TS16
5	Unit runs, but shortly stops	TS15 - TS16
6	The unit starts up and stops frequently	TS15 - TS16
7	Unit runs continuously but insufficient cooling(heating)	TS15 - TS16
8	Cool can not change to heat	TS15 - TS16
9	Unit is noisy	TS15 - TS16

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## 5.2 Field maintenance

	Problem	Solution
1	Unit will not start	TS17 - TS18
2	Compressor will not start but fans run	TS17 - TS18
3	Compressor and condenser (outdoor) fan will not start	TS17 - TS18
4	Evaporator (indoor) fan will not start	TS17 - TS18
5	Condenser (Outdoor) fan will not start	TS17 - TS18
6	Unit runs, but shortly stops	TS17 - TS18
7	Compressor short-cycles due to overload	TS17 - TS18
8	High discharge pressure	TS17 - TS18
9	Low discharge pressure	TS17 - TS18
10	High suction pressure	TS17 - TS18
11	Low suction pressure	TS17 - TS18
12	Unit runs continuously but insufficient cooling	TS17 - TS18
13	Too cool	TS17 - TS18
14	Compressor is noisy	TS17 - TS18

1.Remote Maintenance	Electrical Circuit					Refrigerant Circuit								
Possible causes of trouble	Power failure	The main power tripped	Loose connections	Faulty transformer	The voltage too high or too low	The remote control is powered off	Broken the remote control	Dirty air filter	Dirty condenser fins	The setting temperature is higher/lower than the room's (cooling/heating)	The ambient temperature is too high/low when the mode is cooling/heating	Fan mode	SILENCE function is activated(Optional function)	Frosting and defrosting frequently
Unit will not start	☆	☆	☆	☆										
The power switch is on but fans will not start			☆	☆	☆									
The temperature on the playboard cannot be setted						☆	☆							
Unit is on but the wind is not cold(hot)										☆	☆	☆		
Unit runs, but shortly stops					☆					☆	☆			
The unit startup and stop frequently					☆						☆			☆
Unit runs continuously but insufficient cooling(heating)								☆	☆	☆	☆		☆	
Cool can not change to heat														
Unit is noisy														
Test method / remedy	Test voltage	Close the power switch	Inspect connections - tighten	Change the transformer	Test voltage	Replace the battery of the remote control	Replace the remote control	Clean or replace	Clean	Adjust the setting temperature	Turn on the AC later	Adjust to cool mode	Turn off the SILENCE function	Turn on the AC later



1.Remote Maintenance	Others					
Possible causes of trouble	Heavy load condition	Loosen hold down bolts and / or screws	Bad airproof	The air inlet or outlet of either unit is blocked	Interference from cell phone towers and remote boosters	Shipping plates remain attached
Unit will not start						
The power switch is on but fans will not start					☆	
The temperature on the display board cannot be set						
Unit is on but the wind is not cold(hot)						
Unit runs, but shortly stops						
The unit starts up and stops frequently				☆		
Unit runs continuously but insufficient cooling(heating)	☆		☆	☆		
Cool can not change to heat						
Unit is noisy		☆				☆
Test method / remedy	Check heat load	Tighten bolts or screws	Close all the windows and doors	Remove the obstacles	Reconnect the power or press <b>ON/OFF</b> button on remote control to restart operation	Remove them

2.Field Maintenance	Refrigerant Circuit														Others									
Possible causes of trouble	Compressor stuck	Shortage of refrigerant	Restricted liquid line	Dirty air filter	Dirty evaporator coil	Insufficient air through evaporator coil	Overcharge of refrigerant	Dirty or partially blocked condenser	Air or incompressible gas in refrigerant cycle	Short cycling of condensing air	High temperature condensing medium	Insufficient condensing medium	Broken compressor internal parts	Inefficient compressor	Expansion valve obstructed	Expansion valve or capillary tube closed completely	Leaking power element on expansion valve	Poor installation of feeler bulb	Heavy load condition	Loosen hold down bolts and / or screws	Shipping plates remain attached	Poor choices of capacity	Contact of piping with other piping or external plate	
Unit will not start																								
Compressor will not start but fans run	☆																							
Compressor and condenser (outdoor) fan will not start																								
Evaporator (indoor) fan will not start																								
Condenser (Outdoor) fan will not start																								
Unit runs, but shortly stops		☆	☆				☆	☆								☆	☆							
Compressor short-cycles due to overload		☆					☆	☆																
High discharge pressure							☆	☆	☆	☆	☆	☆												
Low discharge pressure		☆												☆										
High suction pressure							☆							☆				☆	☆					
Low suction pressure		☆	☆	☆	☆	☆								☆	☆	☆								
Unit runs continuously but insufficient cooling		☆	☆	☆	☆	☆		☆	☆	☆				☆					☆			☆		
Too cool																								
Compressor is noisy							☆						☆							☆	☆		☆	
Test method / remedy	Replace the compressor	Leak test	Replace restricted part	Clean or replace	Clean coil	Check fan	Change charged refrigerant volume	Clean condenser or remove obstacle	Purge, evacuate and recharge	Remove obstruction to air flow	Remove obstruction in air or water flow	Remove obstruction in air or water flow	Replace compressor	Test compressor efficiency	Replace valve	Replace valve	Replace valve	Fix feeler bulb	Check heat load	Tighten bolts or screws	Remove them	Choose AC of larger capacity or add the number of AC	Rectify piping so as not to contact each other or with external plate	

2.Field Maintenance	Electrical Circuit														
Possible causes of trouble	Possible causes of trouble														
	Power failure	Blown fuse or varistor	Loose connections	Shorted or broken wires	Safety device opens	Faulty thermostat / room temperature sensor	Wrong setting place of temperature sensor	Faulty transformer	Shorted or open capacitor	Faulty magnetic contactor for compressor	Faulty magnetic contactor for fan	Low voltage	Faulty stepping motor	Shorted or grounded compressor	Shorted or grounded fan motor
Unit will not start	☆	☆	☆	☆	☆			☆							
Compressor will not start but fans run				☆		☆			☆	☆				☆	
Compressor and condenser (outdoor) fan will not start				☆		☆				☆					
Evaporator (indoor) fan will not start				☆					☆		☆				☆
Condenser (Outdoor) fan will not start				☆		☆			☆		☆				☆
Unit runs, but shortly stops										☆		☆			
Compressor short-cycles due to overload										☆		☆			
High discharge pressure															
Low discharge pressure															
High suction pressure															
Low suction pressure															
Unit runs continuously but insufficient cooling															
Too cool						☆	☆								
Compressor is noisy															
Test method / remedy	Test method / remedy														
	Test voltage	Inspect fuse type & size	Inspect connections - tighten	Test circuits with tester	Test continuity of safety device	Test continuity of thermostat / sensor & wiring	Place the temperature sensor at the central of the air inlet grille	Check control circuit with tester	Check capacitor with tester	Test continuity of coil & contacts	Test continuity of coil & contacts	Test voltage	Replace the stepping motor	Check resistance with multimeter	Check resistance with multimeter

## 6. Quick Maintenance by Error Code

If you do not have the time to test which specific parts are faulty, you can directly change the required parts according to the error code.

You can find the parts to replace by error code in the following table.

Part requiring replacement	Error Code									
	E400	E401	E403	E460	E461	E462	E465	E40C	E40E	EC53
Indoor PCB	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
Outdoor PCB	x	✓	x	x	x	x	x	x	x	✓
Indoor fan motor	x	x	✓	x	x	x	x	x	x	x
T1 sensor	x	x	x	✓	x	x	x	x	x	x
T2 Sensor	x	x	x	x	✓	x	x	x	x	x
T2B Sensor	x	x	x	x	x	✓	x	x	x	x
T2A Sensor	x	x	x	x	x	x	✓	x	x	x
T3 Sensor	x	x	x	x	x	x	x	x	x	x
T4 Sensor	x	x	x	x	x	x	x	x	x	✓
Reactor	x	✓	x	x	x	x	x	x	x	x
Compressor	x	x	x	x	x	x	x	x	x	x
Additional refrigerant	x	x	x	x	x	x	x	✓	x	x
Water-level switch	x	x	x	x	x	x	x	x	✓	x
Water pump	x	x	x	x	x	x	x	x	✓	x

Part requiring replacement	EC54	EC51	EC5C	EC52	EC 01/11 /12/13	PC00	PC01	PC02	PC04	PC03
Indoor PCB	x	x	x	x	x	x	x	x	x	x
Outdoor PCB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Outdoor fan motor	x	x	x	x	✓	✓	x	✓	✓	x
T3 Sensor	x	x	x	✓	x	x	x	x	x	x
TP Sensor	✓	x	x	x	x	x	x	x	x	x
Pressure sensor	x	x	✓	x	x	x	x	x	x	x
Reactor	x	x	x	x	x	x	✓	x	x	x
Compressor	x	x	x	x	x	✓	x	x	✓	x
IPM module board	x	x	x	x	x	✓	✓	✓	✓	x
Low pressure protector	x	x	x	x	x	x	x	x	x	✓
Additional refrigerant	x	x	x	x	x	x	x	x	x	✓

Part requiring replacement	EU 16	EM0b	PC 06	PC 08/44/49	PC 0A	PC 0F
Indoor PCB	x	✓	x	x	x	x
Outdoor PCB	✓	x	✓	✓	✓	✓
Outdoor fan motor	x	x	x	✓	✓	x
T3 Sensor	x	x	x	x	✓	x
TP Sensor	x	x	✓	x	x	x
Pressure sensor	x	x	x	x	x	x
Reactor	x	x	x	✓	x	✓
Compressor	x	x	x	x	x	x
IPM module board	x	x	x	✓	x	x
Data adapter board	✓	✓	x	x	x	x
High pressure valve assy	x	x	✓	x	x	x
High pressure protector	x	x	x	x	x	x
Low pressure protector	x	x	x	x	x	x
Additional refrigerant	x	x	✓	x	✓	x

Part requiring replacement	PC 41	PC 43	PC 10/11/12	PC 30	PC 31	PC 40
Indoor PCB	x	x	x	x	x	x
Outdoor PCB	✓	✓	✓	✓	✓	✓
Outdoor fan motor	x	x	x	✓	x	x
T3 Sensor	x	x	x	x	x	x
TP Sensor	x	x	x	x	x	x
Pressure sensor	x	x	x	x	x	x
Reactor	x	x	✓	x	x	x
Compressor	x	✓	x	x	x	x
IPM module board	x	x	✓	x	x	✓
Data adapter board	x	x	x	x	x	x
High pressure valve assy	x	x	x	x	x	x
High pressure protector	x	x	x	✓	x	x
Low pressure protector	x	x	x	x	✓	x
Additional refrigerant	x	x	x	x	✓	x
Electric control box	x	x	x	x	x	✓

**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

## 7. Troubleshooting by Error Code

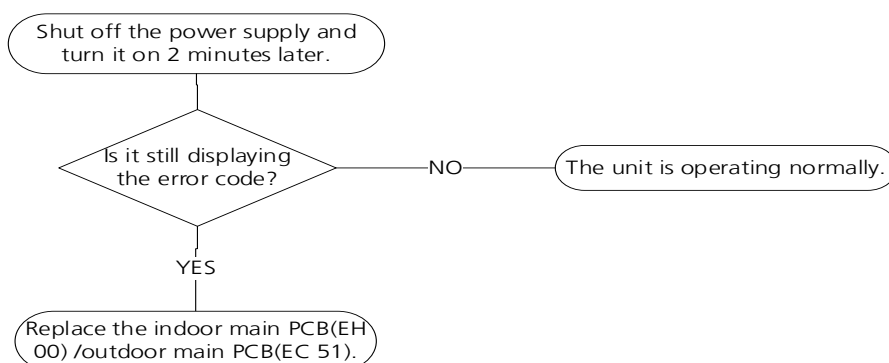
### 7.1 EH 00 / EC 51 (EEPROM Parameter Error Diagnosis and Solution)

**Description:** Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.

**Recommended parts to prepare:**

- Indoor PCB
- Outdoor PCB

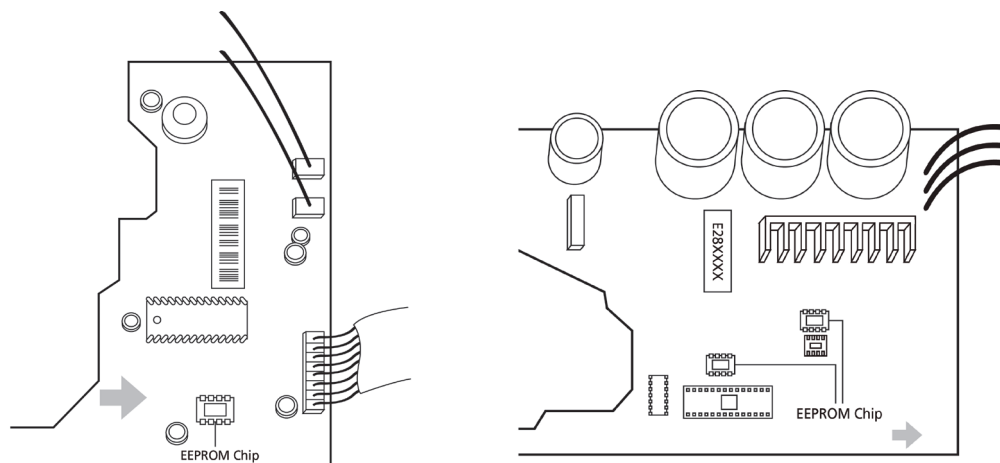
**Troubleshooting and repair:**



**Remarks:**

**EEPROM:** A read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

The location of the EEPROM chip on the indoor and outdoor PCB is shown in the following two images:



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole. This pictures are only for reference, actual appearance may vary.

Troubleshooting and repair of compressor driven chip EEPROM parameter error and communication error between outdoor main chip and compressor driven chip are same as EC 51.

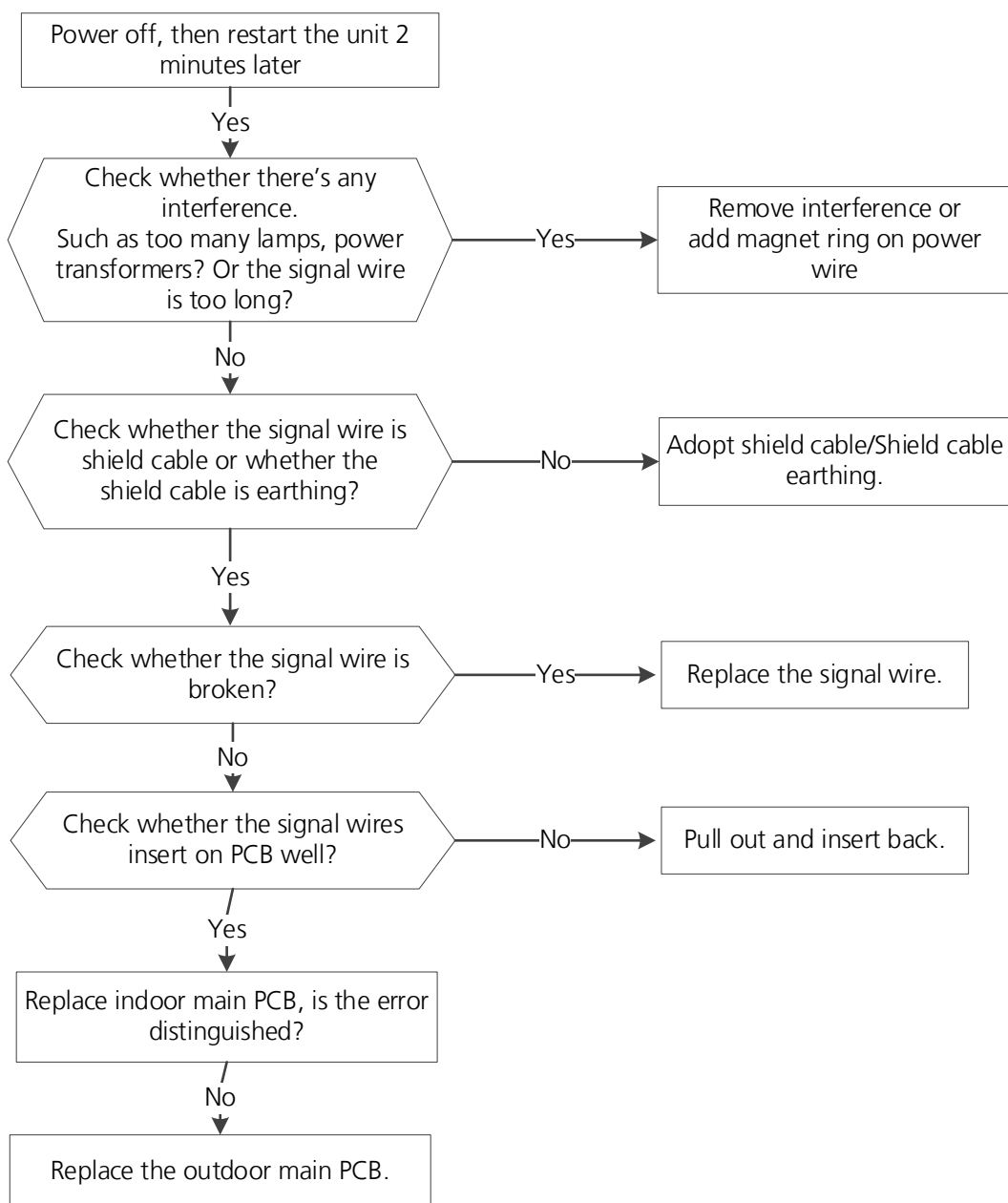
## 7.2 EL 01 (Indoor and Outdoor Unit Communication Error Diagnosis and Solution)

**Description:** Indoor unit can not communicate with outdoor unit

**Recommended parts to prepare:**

- Signal wires
- Magnet ring
- Indoor PCB
- Outdoor PCB

**Troubleshooting and repair:**



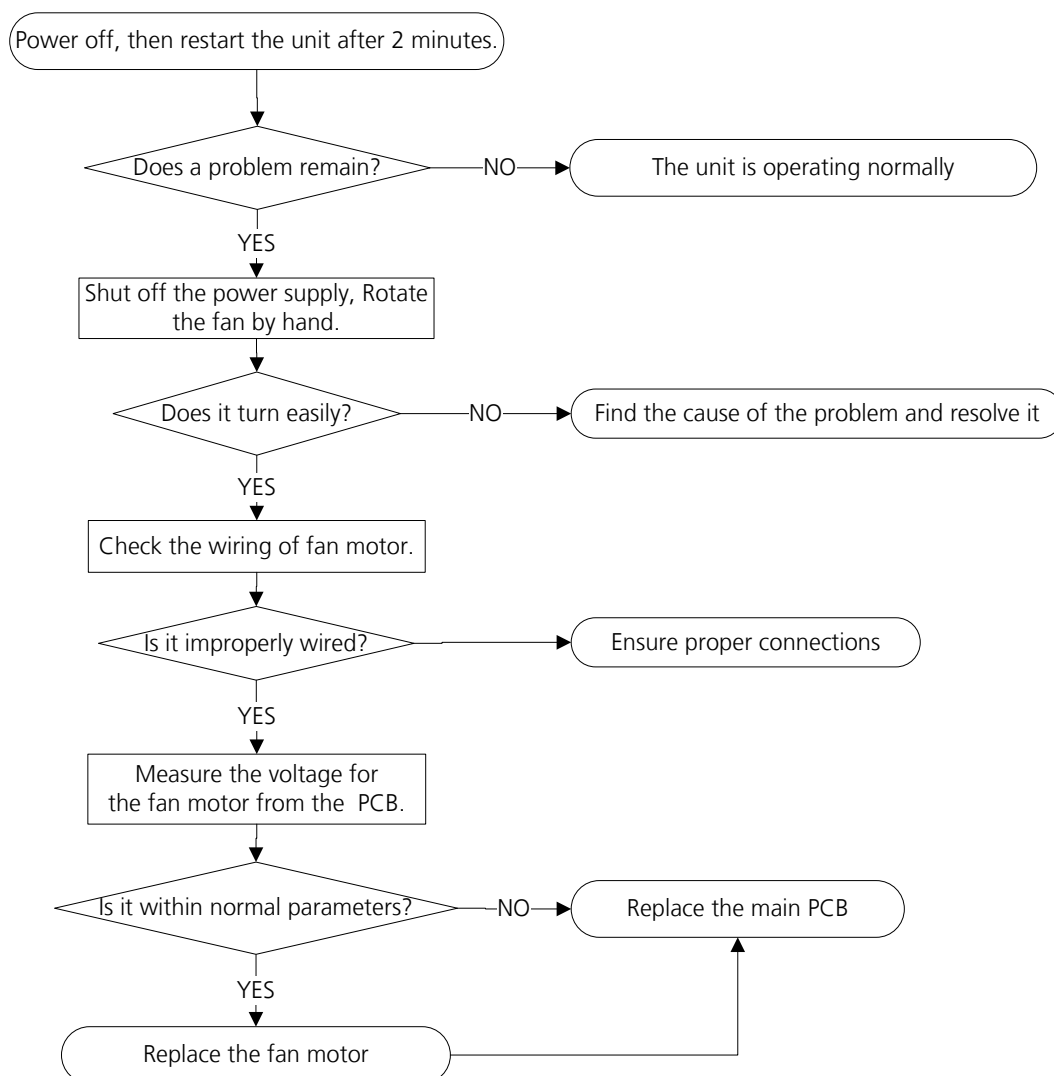
### 7.3 EH 03 / EC 07 (Fan Speed Is Operating Outside of Normal Range)/EC 71(Over Current Failure of Outdoor DC Fan Motor)/ EC73(Zero-speed failure of outdoor DC fan motor) Diagnosis and Solution

**Description:** When indoor / outdoor fan speed keeps too low or too high for a certain time, the unit ceases operation and the LED displays the failure.

**Recommended parts to prepare:**

- Connection wires
- Fan assembly
- Fan motor
- PCB

**Troubleshooting and repair:**



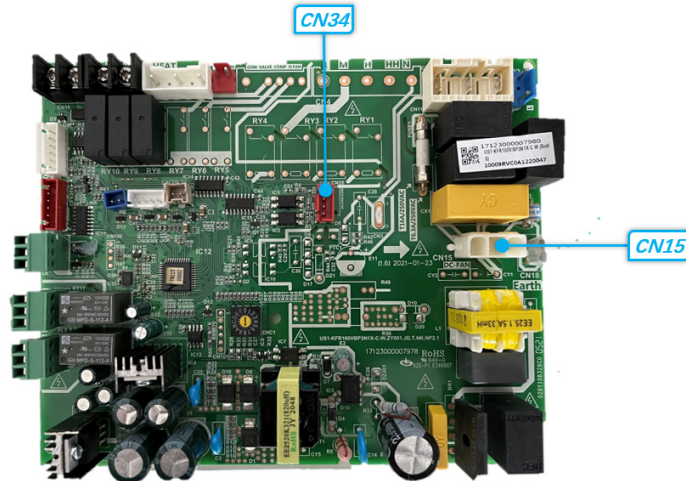
**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.



## Index:

### 1. Indoor DC Fan Motor(control chip is in fan motor)

Power on and when the unit is in standby, measure the voltage of pin1&pin2 of CN15, pin3 of CN34 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must has problems and need to be replaced.



#### CN34

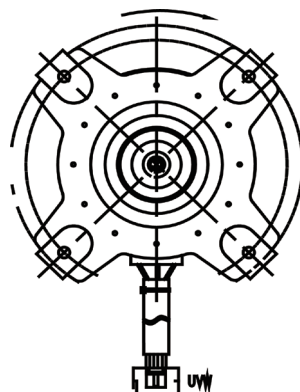
NO.	Color	Signal	Voltage
1	/	/	
2	Black	GND	
3	Orange	PWM	5-12VDC
4	Blue	FG	0-12VDC

#### CN15

NO.	Color	Signal	Voltage
1	Yellow		208/230VAC
2	Black		208/230VAC
3	Yellow-Green	GND	

### 2. Outdoor DC Fan Motor (control chip is in outdoor PCB)

Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor must has problems and need to be replaced. otherwise the PCB must has problems and need to be replaced.



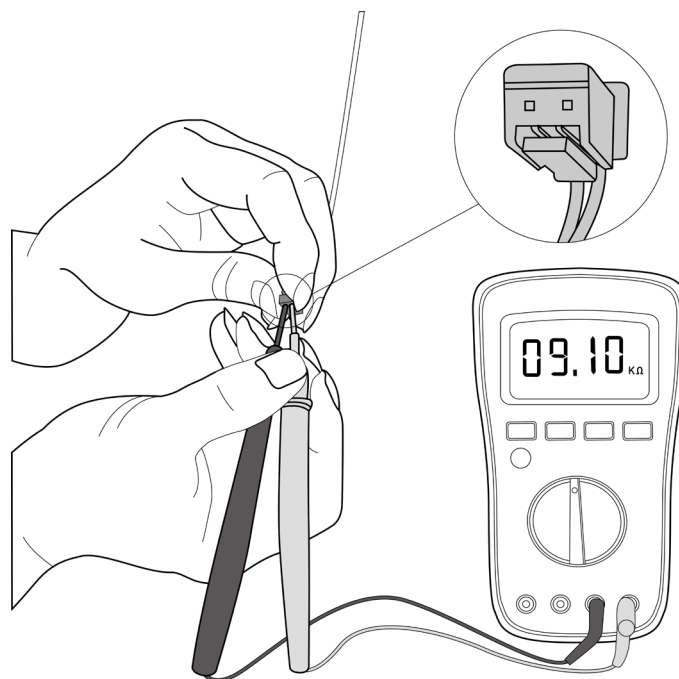
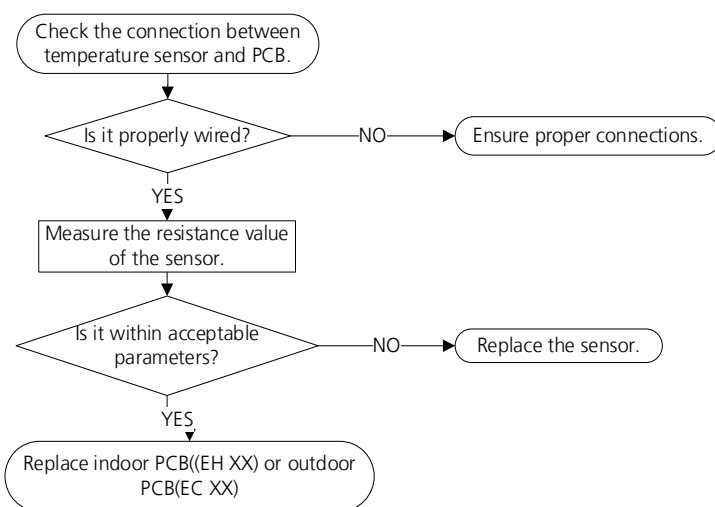
## 7.4 EH 60/EH 61/EH 62/ EH 65/ EC 53/EC 52/EC 54/EC 56/EC 57/EC 50/EC 5C (Open Circuit or Short Circuit of Temperature Sensor Diagnosis and Solution)

**Description:** If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays the failure.

**Recommended parts to prepare:**

- Connection wires
- Sensors
- PCB

**Troubleshooting and repair:**



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole. This picture and the value are only for reference, actual appearance and value may vary

## 7.5 EL 0C (Refrigerant Leakage Detection Diagnosis and Solution)

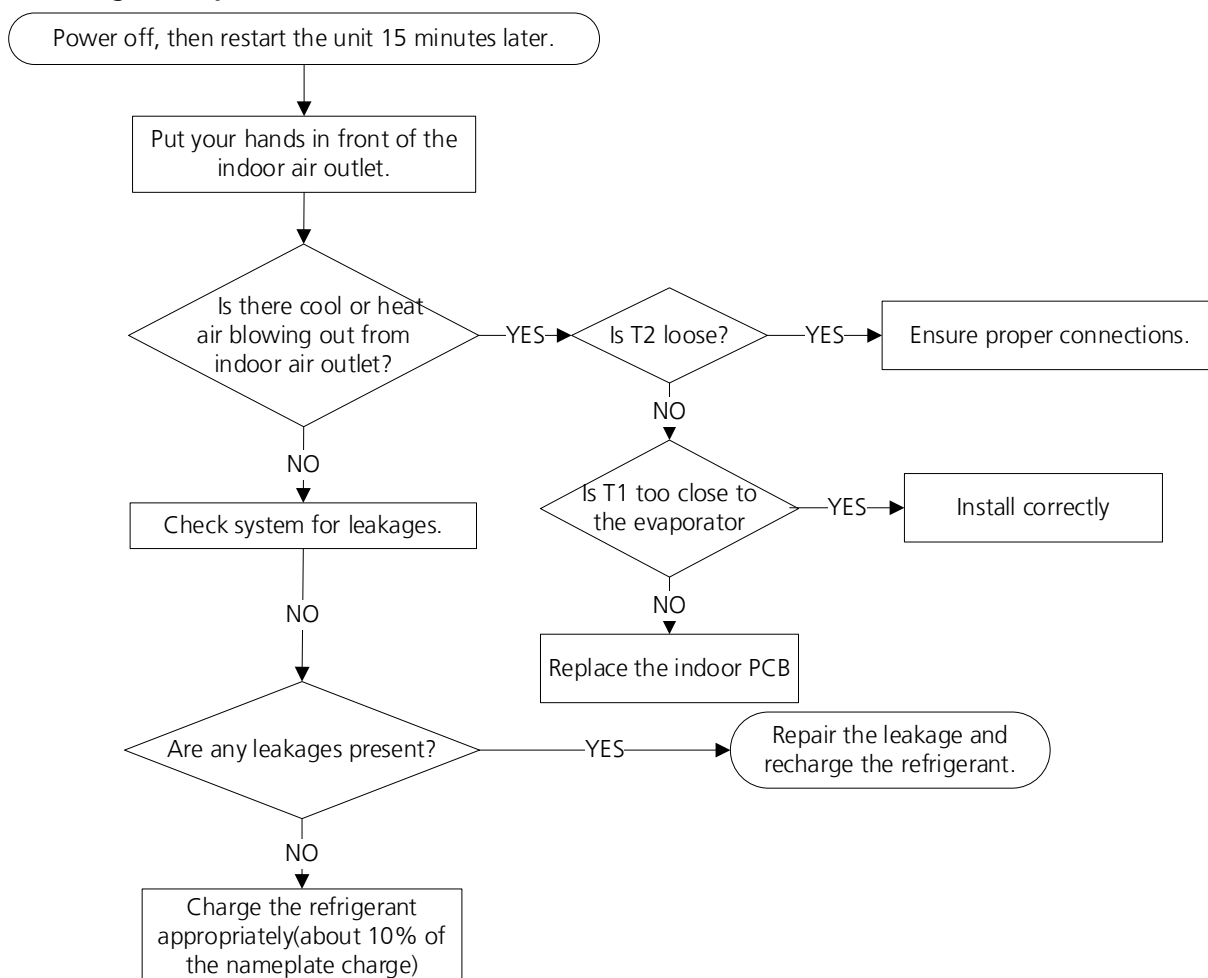
### Description:

Judging the abnormality of the refrigeration system according to the number of compressor stops and the changes in operating parameters caused by excessive exhaust temperature.

### Recommended parts to prepare:

- Indoor PCB
- Additional refrigerant

### Troubleshooting and repair:



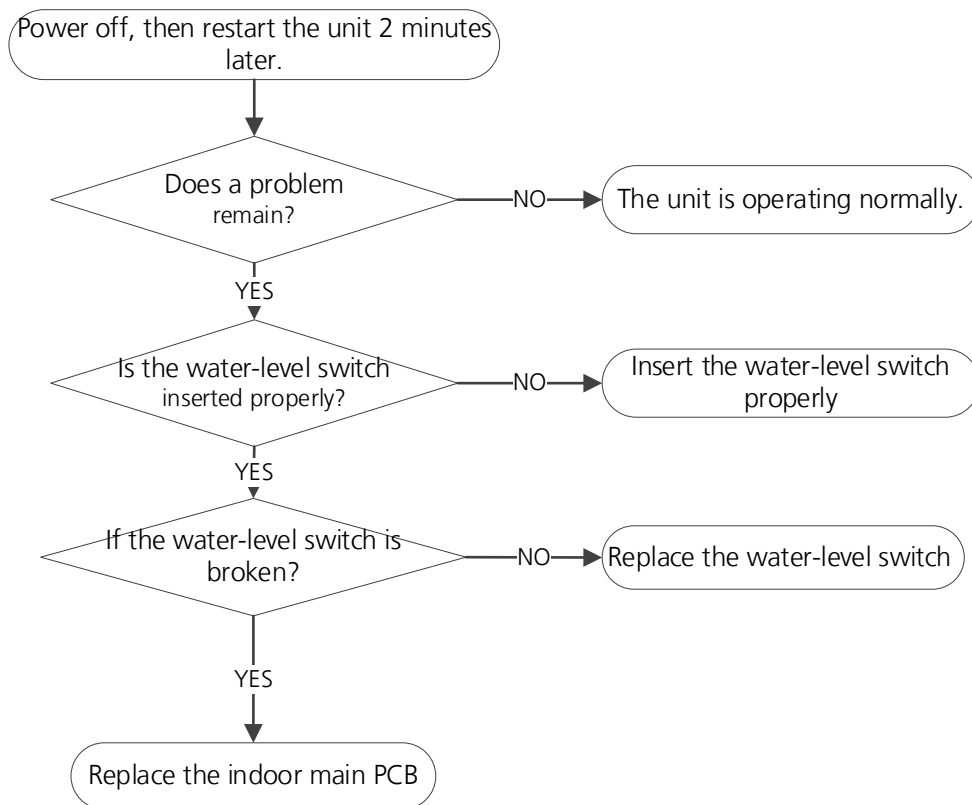
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## 7.6 EH 0E(Water-Level Alarm Malfunction Diagnosis and Solution)

**Description:** If the sampling voltage is not 5V, the LED displays the failure code.

**Recommended parts to prepare:**

- Connection wires
- Water-level switch
- Indoor PCB



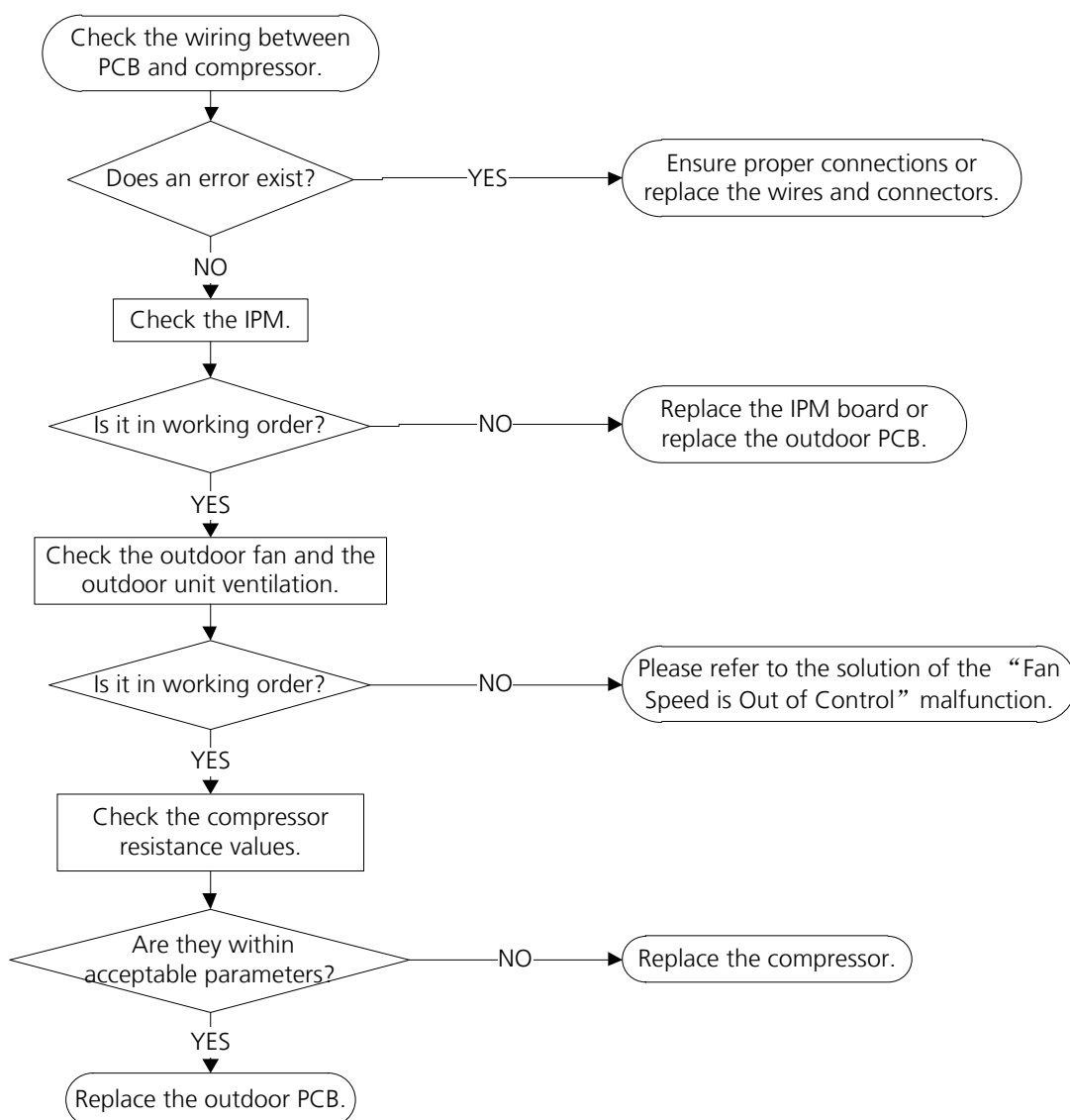
## 7.7 PC 00(IPM malfunction or IGBT over-strong current protection Diagnosis and Solution)

**Description:** When the voltage signal the IPM sends to the compressor drive chip is abnormal, the display LED shows “PC 00” and the AC turn off.

### Recommended parts to prepare:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

### Troubleshooting and repair:



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

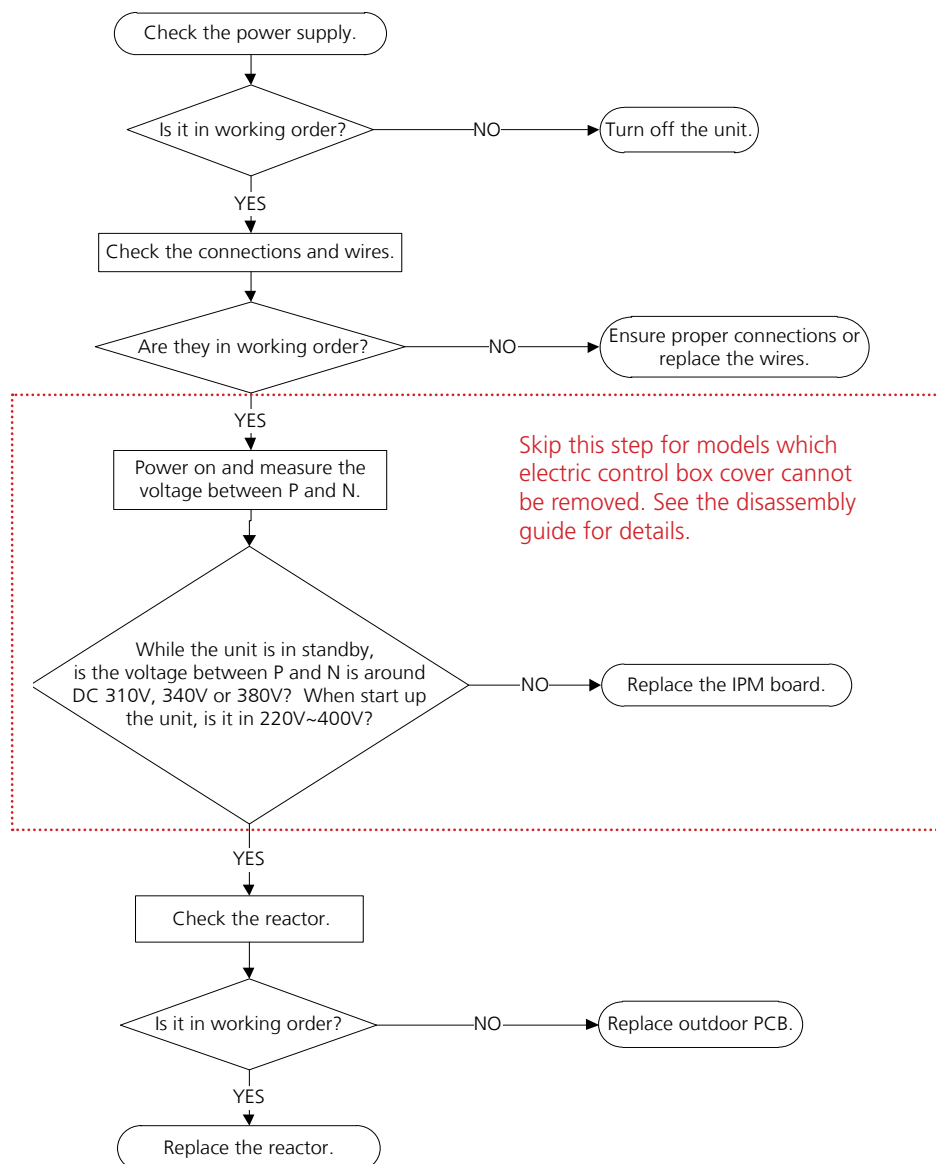
## 7.8 PC 01(Over voltage or too low voltage protection)/PC 10(Outdoor unit low AC voltage protection)/PC 11(Outdoor unit main control board DC bus high voltage protection)/PC 12(Outdoor unit main control board DC bus high voltage protection /341 MCE error) Diagnosis and Solution

**Description:** Abnormal increases or decreases in voltage are detected by checking the specified voltage detection circuit.

### Recommended parts to prepare:

- Power supply wires
- IPM module board
- PCB
- Reactor

### Troubleshooting and repair:



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

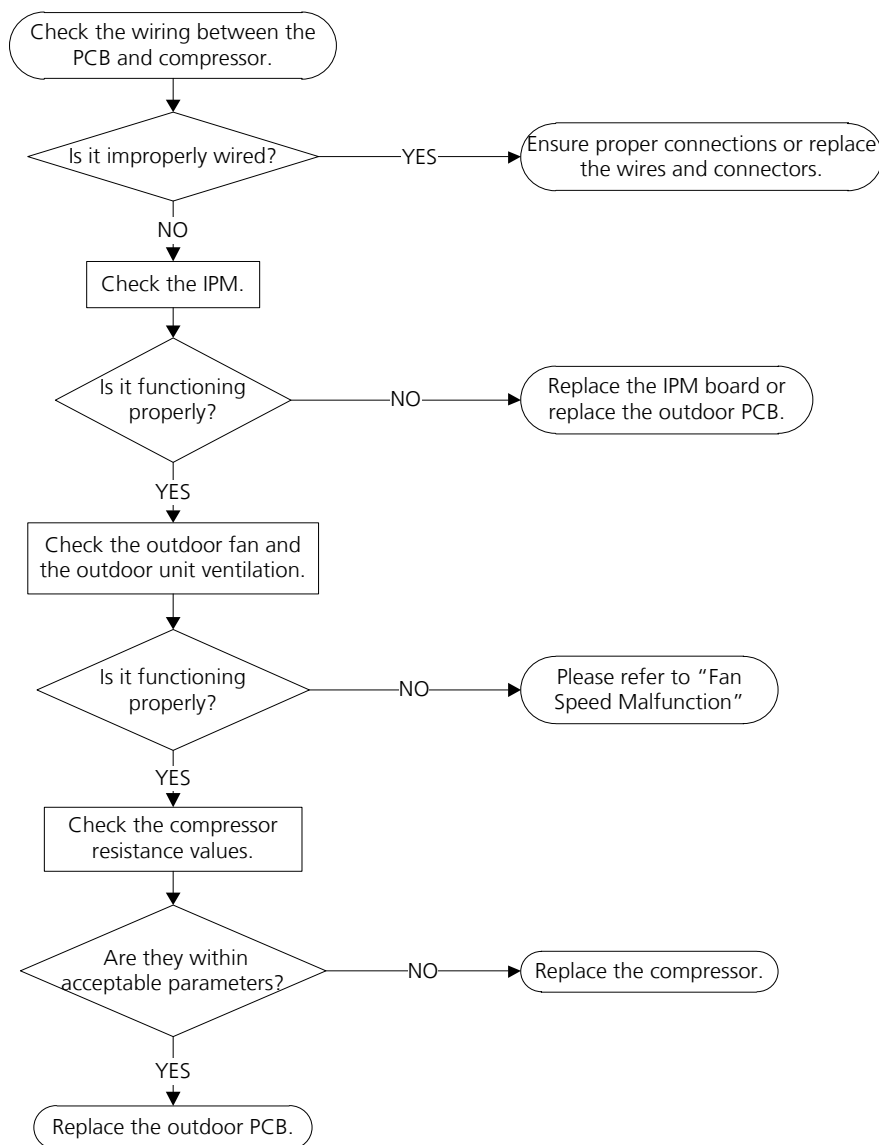
## 7.9 PC 04(Inverter compressor drive error Diagnosis and Solution)

**Description:** An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.

### Recommended parts to prepare:

- Connection wires
- IPM module board
- Outdoor fan assembly
- Compressor
- Outdoor PCB

### Troubleshooting and repair:



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

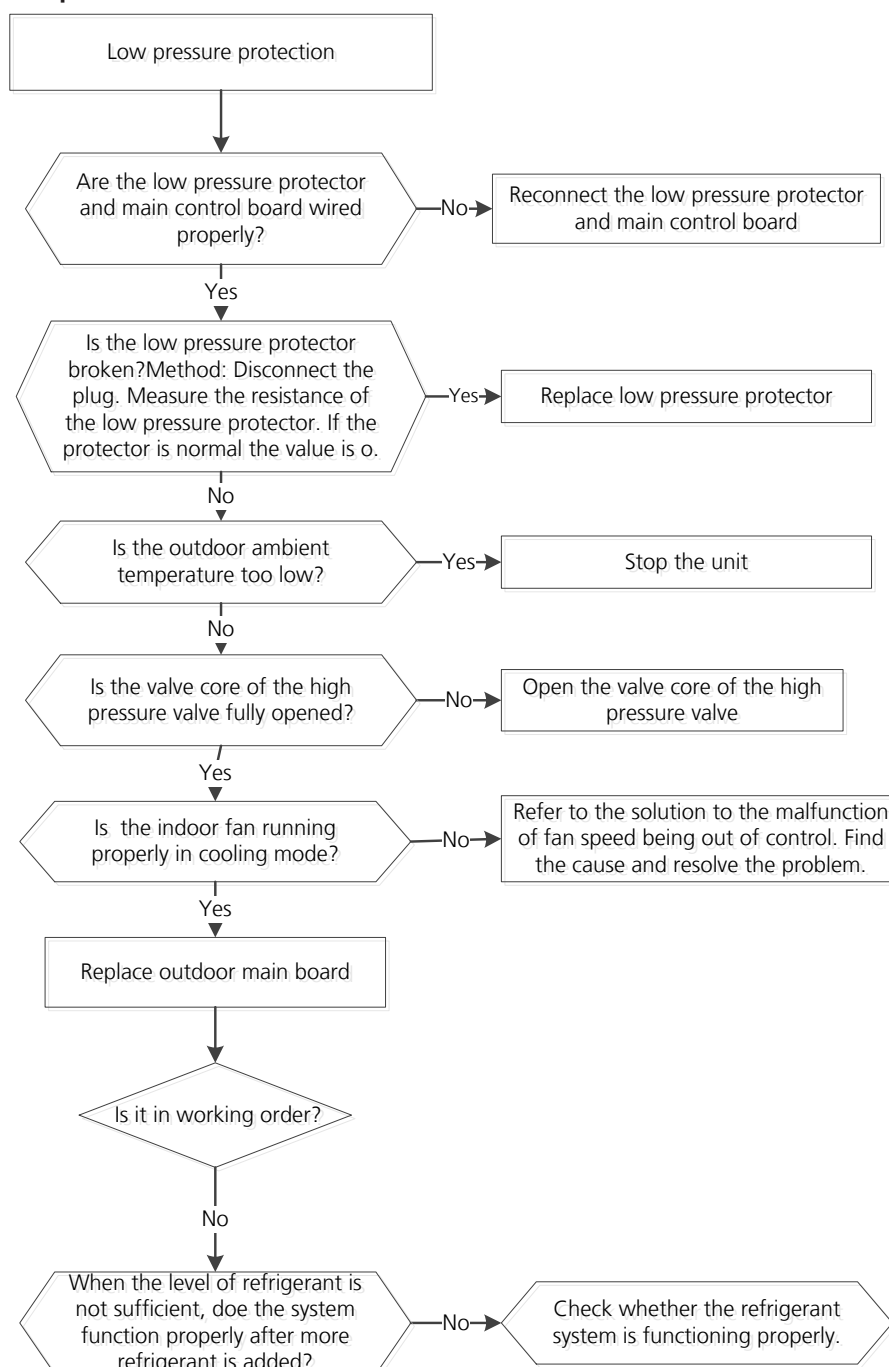
## 7.10 PC 03/PC 31(Low Pressure Protection Diagnosis and Solution)

**Description:** If the sampling voltage is not 5V, the LED displays a failure code.

### Recommended parts to prepare:

- Connection wires
- Low pressure protector
- Indoor fan assembly
- Outdoor PCB

### Troubleshooting and repair:



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.



## 7.11 PC 02/LC 06(Top temperature protection of compressor or High temperature protection of IPM module diagnosis and solution)

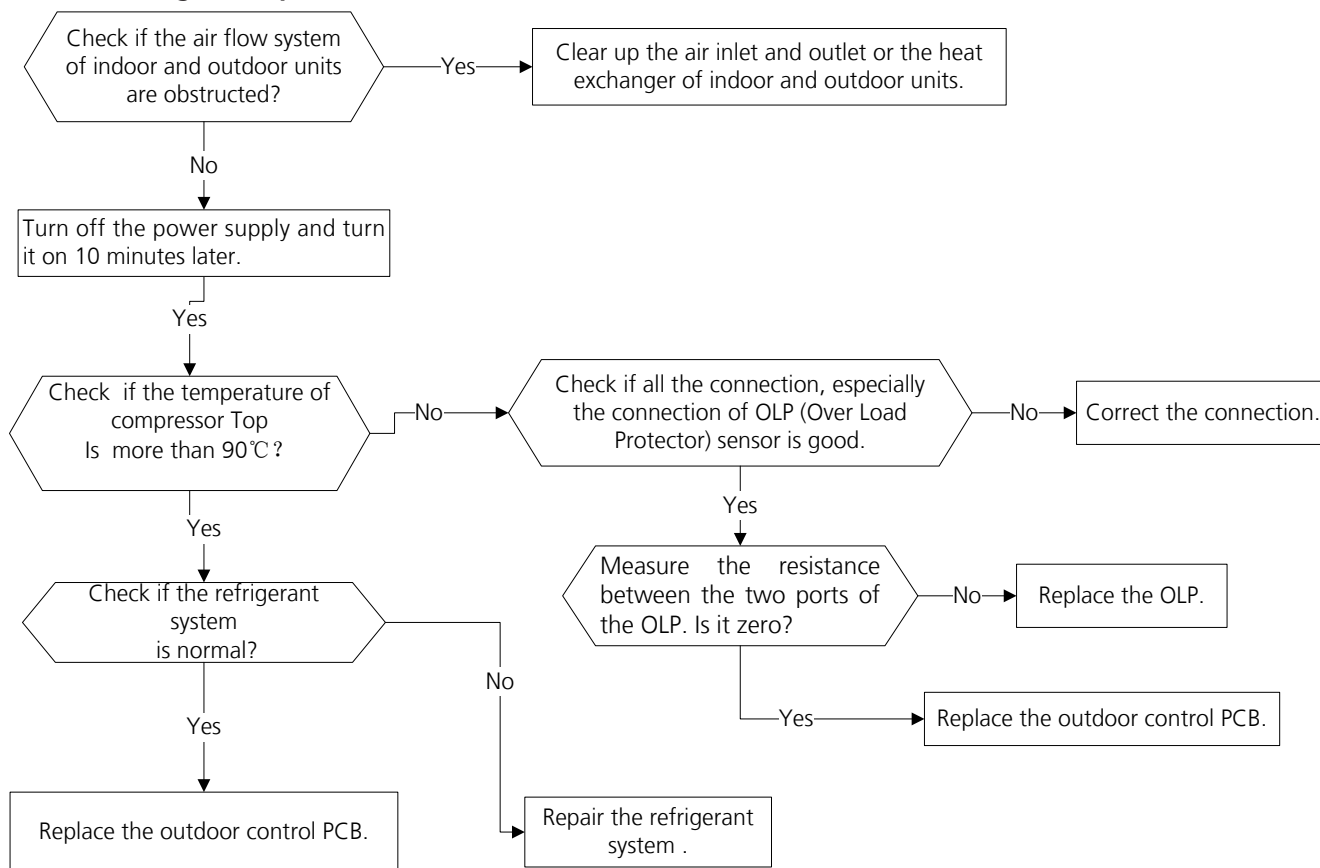
**Description:** For some models with overload protection, If the sampling voltage is not 5V, the LED will display the failure.

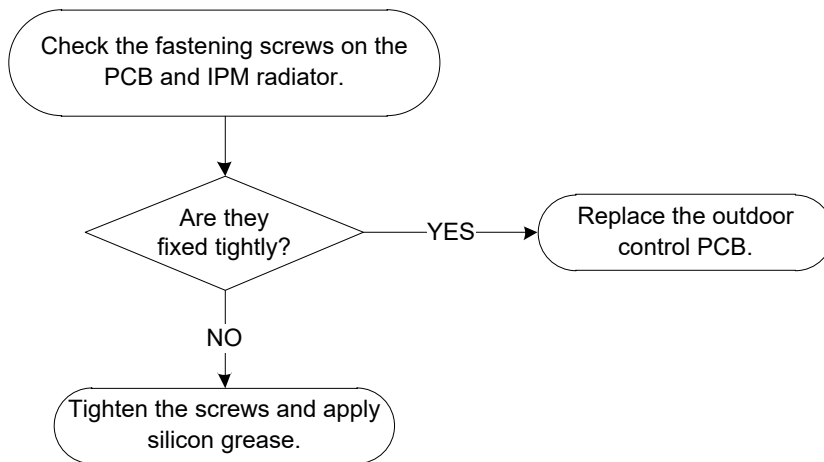
If the temperature of IPM module is higher than a certain value, the LED displays the failure code.

### Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- IPM module board
- High pressure protector
- System blockages

### Troubleshooting and repair:





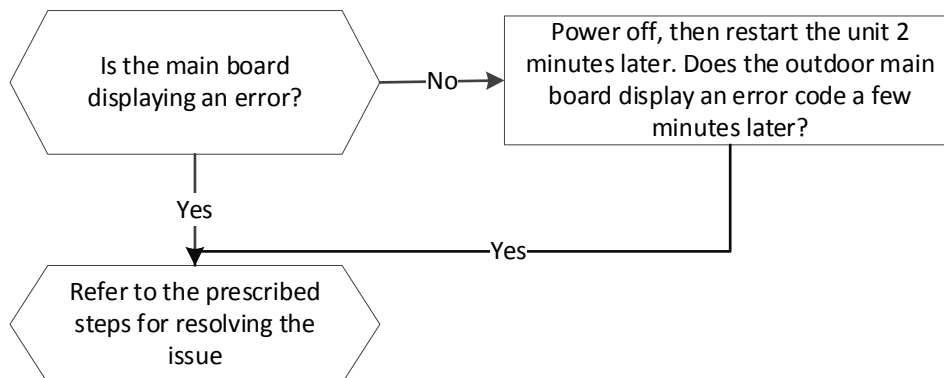
## 7.12 EC 0d(Outdoor unit malfunction Diagnosis and Solution)

**Description:** The indoor unit detect the outdoor unit is error.

**Recommended parts to prepare:**

- Outdoor unit

**Troubleshooting and repair:**



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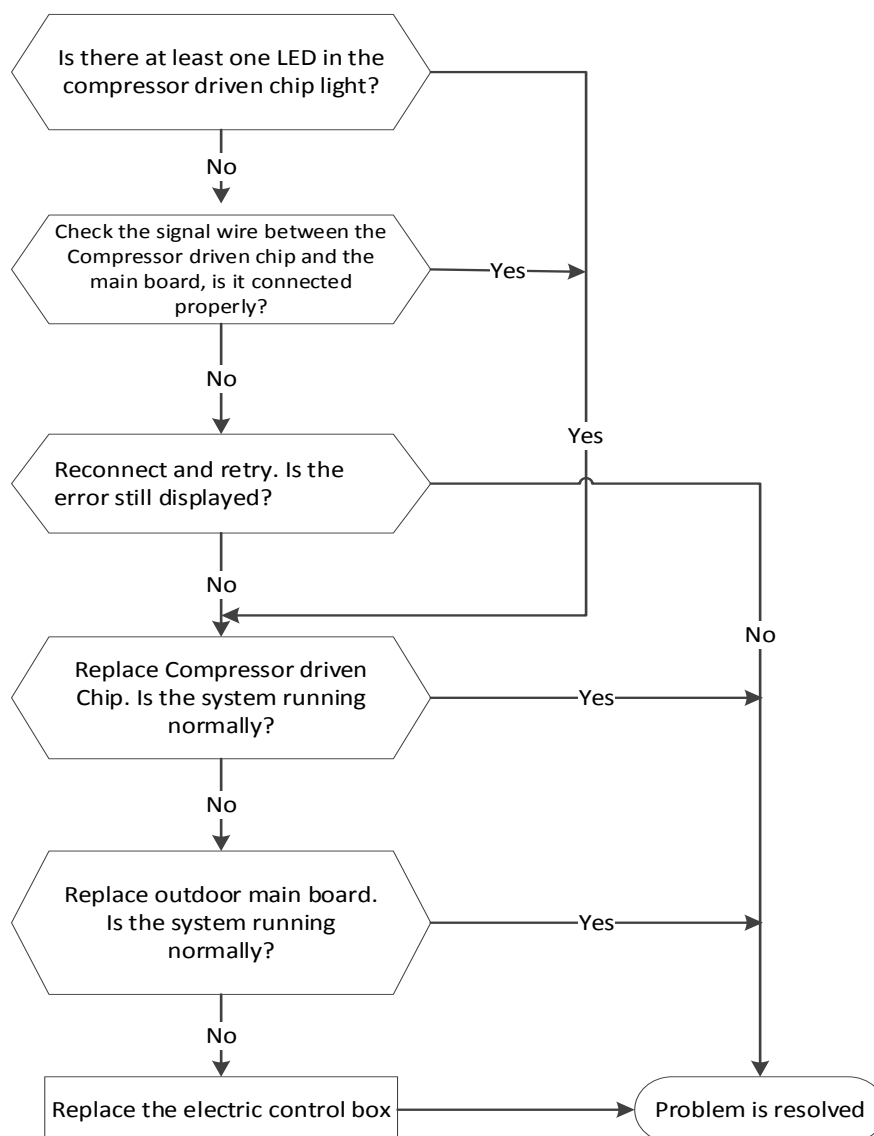
## 7.13 PC 40(Communication error between outdoor main PCB and IPM board diagnosis and solution)

**Description:** The main PCB cannot detect the IPM board.

**Recommended parts to prepare:**

- Connection wires
- IPM board
- Outdoor main PCB
- Electric control box

**Troubleshooting and repair:**



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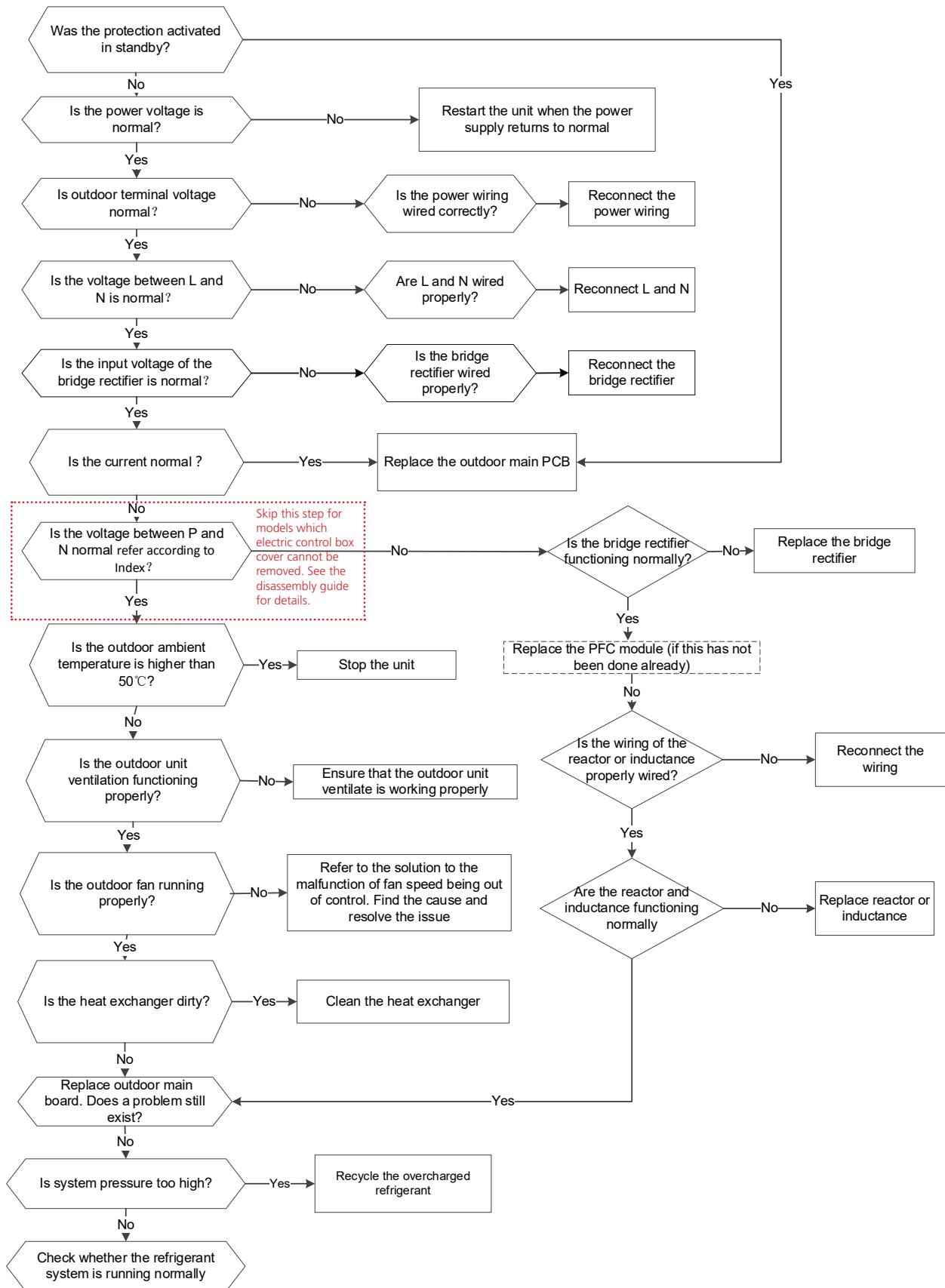
## 7.14 PC 08(Current overload protection)/PC 44(Outdoor unit zero speed protection)/ PC 46(Compressor speed has been out of control)/PC 49(Compressor overcurrent failure) diagnosis and solution

**Description:** An abnormal current rise is detected by checking the specified current detection circuit.

**Recommended parts to prepare:**

- Connection wires
- Rectifier
- PFC circuit or reactor
- Blocked refrigeration piping system
- Pressure switch
- Outdoor fan
- IPM module board
- Outdoor PCB

**Troubleshooting and repair:**



**Note:** For certain models, outdoor PCB could not be removed separately. In this case, the outdoor electric control box should be replaced as a whole.

## 7.15 PC 0F(PFC module protection diagnosis and solution)

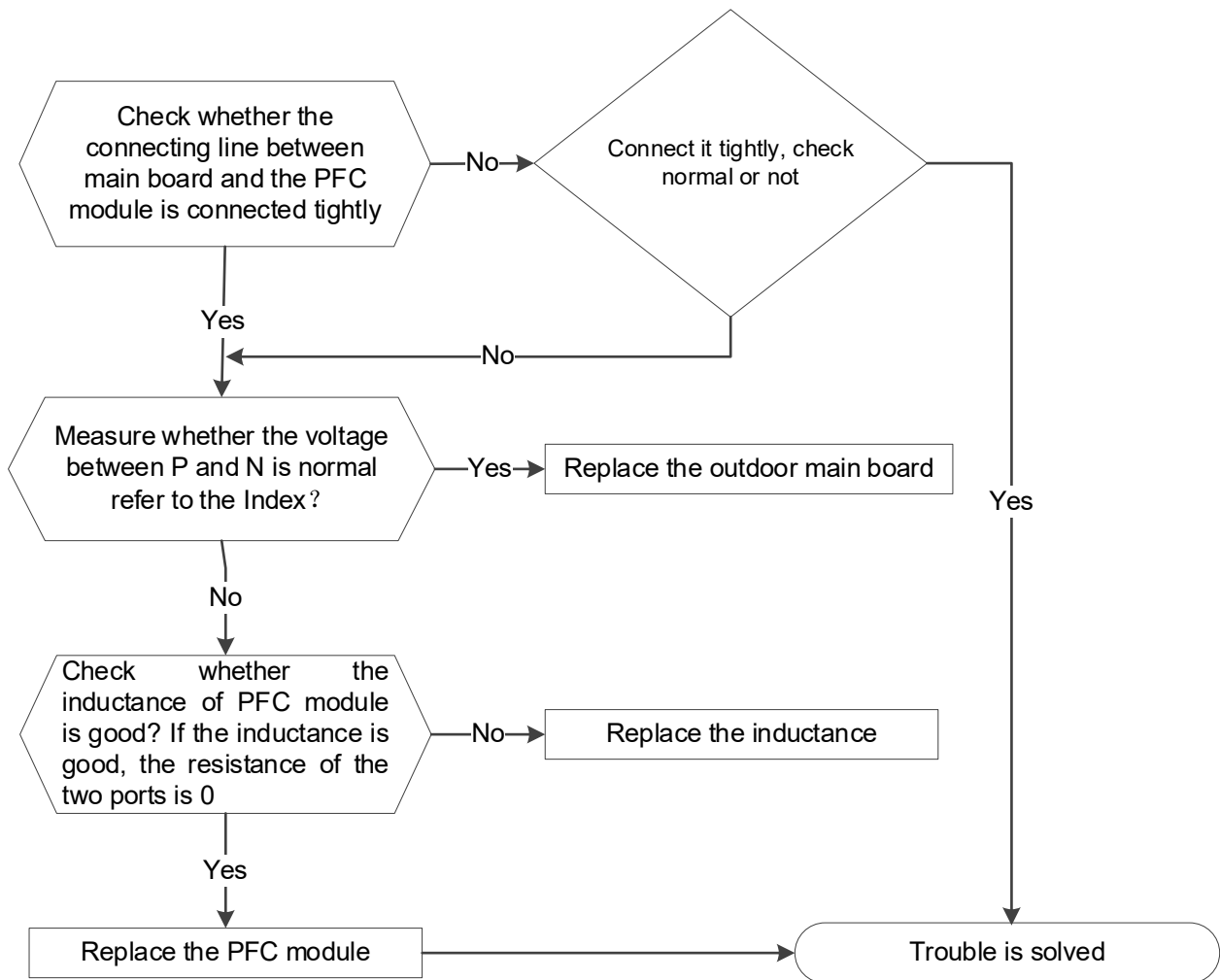
**Description:** When the voltage signal that IPM send to compressor drive chip is abnormal, the LED displays the failure code and the AC turns off.

### Recommended parts to prepare:

- Connection wires
- Inductance
- Outdoor main PCB
- PFC module

### Troubleshooting and repair:

At first test the resistance between every two ports of U, V, W of IPM and P, N. If any result of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below:



---

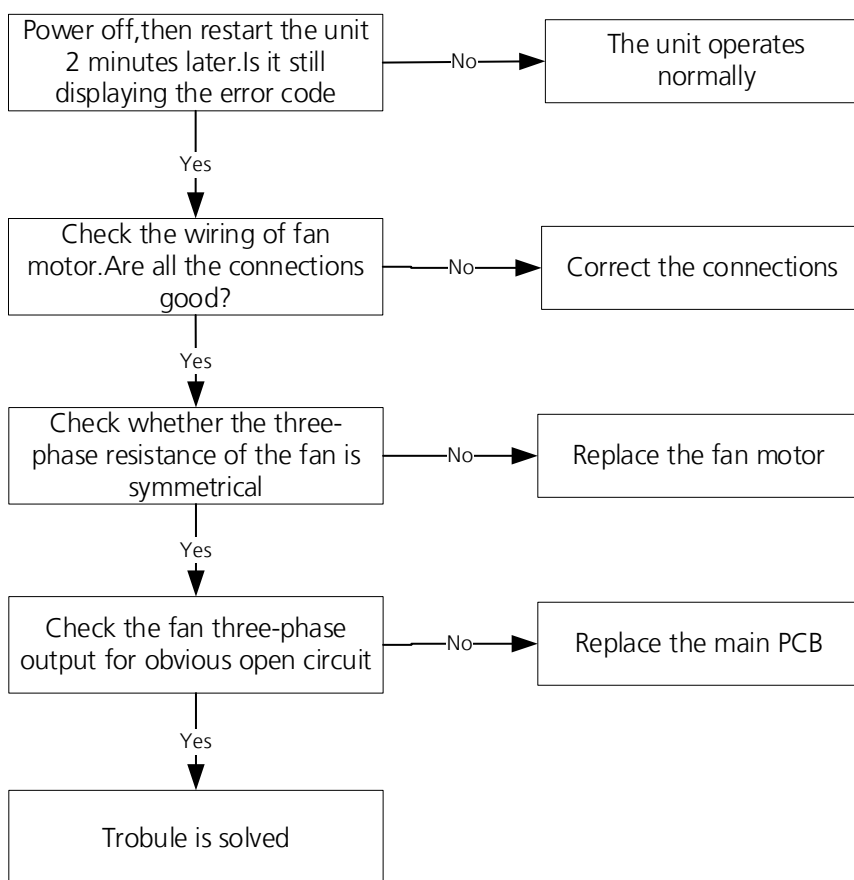
## 7.16 EC 72 (Lack phase failure of outdoor DC fan motor diagnosis and solution)

**Description:** When the three-phase sampling current of the DC motor is abnormal, especially when the current of one or more phases is always small and almost 0, the LED displays the failure code.

### Recommended parts to prepare:

- Connection wire
- Fan motor
- Outdoor PCB

### Troubleshooting and repair:



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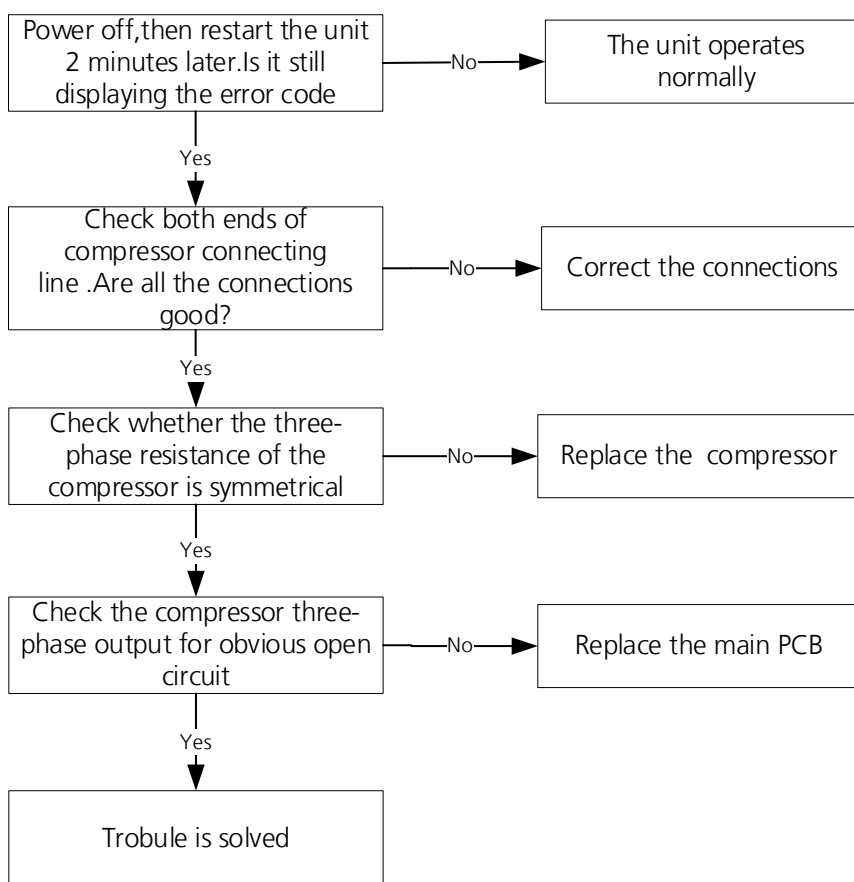
## 7.17 PC 43 (Outdoor compressor lack phase protection diagnosis and solution)

**Description:** When the three-phase sampling current of the compressor is abnormal, especially when the current of one or more phases is always small and almost 0, the LED displays the failure code

### Recommended parts to prepare:

- Connection wire
- Compressor
- Outdoor PCB

### Troubleshooting and repair:





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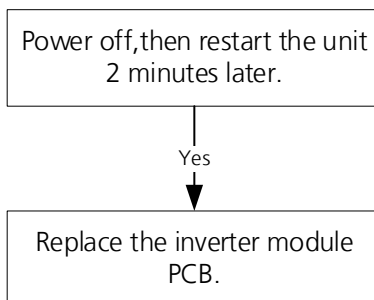
## 7.18 PC 45 (Outdoor unit IR chip drive failure) diagnosis and solution

**Description:** When the IR chip detects its own parameter error, the LED displays the failure code when power on.

**Recommended parts to prepare:**

- Inverter module PCB.

**Troubleshooting and repair:**



## 7.19 PC 0L (Low ambient temperature protection)

**Description:** It is a protection function. When compressor is off, outdoor ambient temperature(T4) is lower than -35°C. for 10s, the AC will stop and display the failure code.

When compressor is on, outdoor ambient temperature(T4) is lower than -40°C. for 10s, the AC will stop and display the failure code.

When outdoor ambient temperature(T4) is no lower than -32°C. for 10s, the unit will exit protection.

## 7.20 EC55 (Outdoor IPM module temperature sensor fault) diagnosis and solution

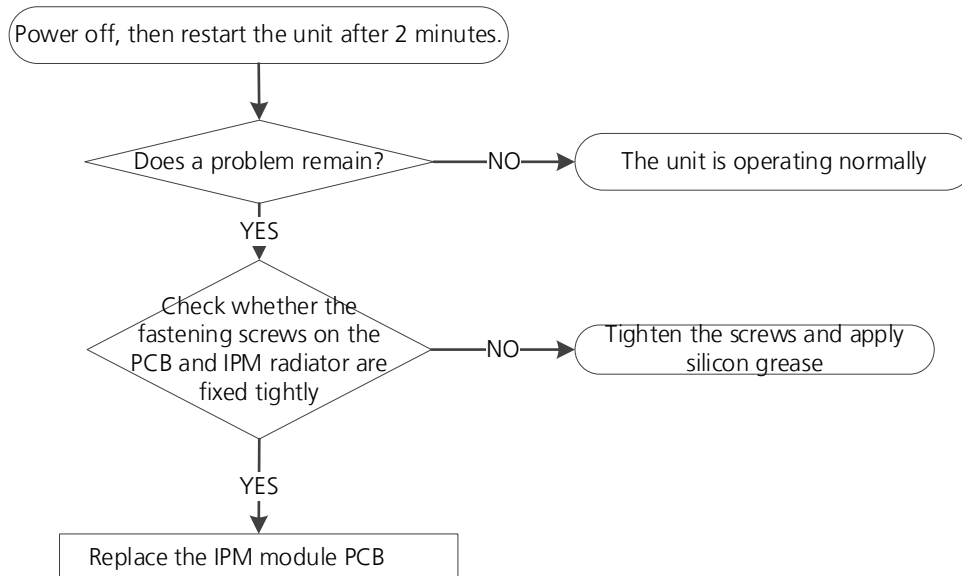
**Description:** If the sampling voltage is 0V or 5V, the LED displays the failure code.

### Recommended parts to prepare:

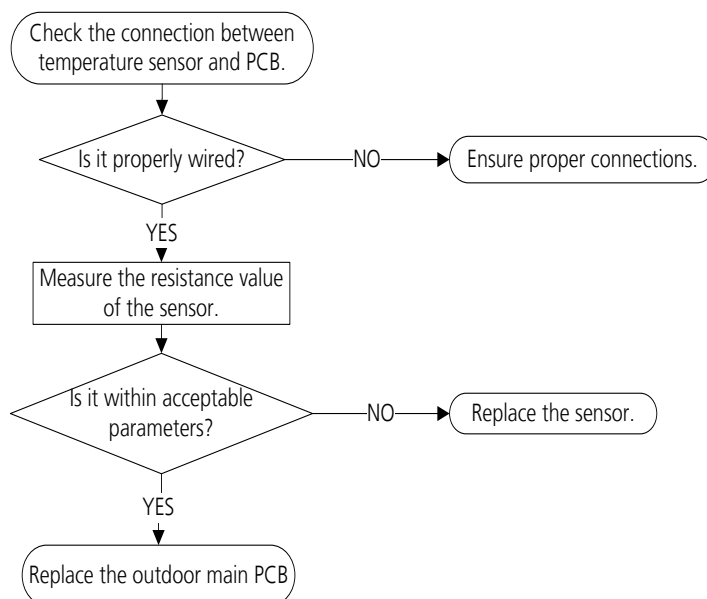
- IPM module PCB
- Connection wires
- Sensors
- Outdoor main PCB

### Troubleshooting and repair:

If the radiator has no sensor, follow the steps below to resolve,



If the radiator has a sensor(TH), follow the steps below to resolve,



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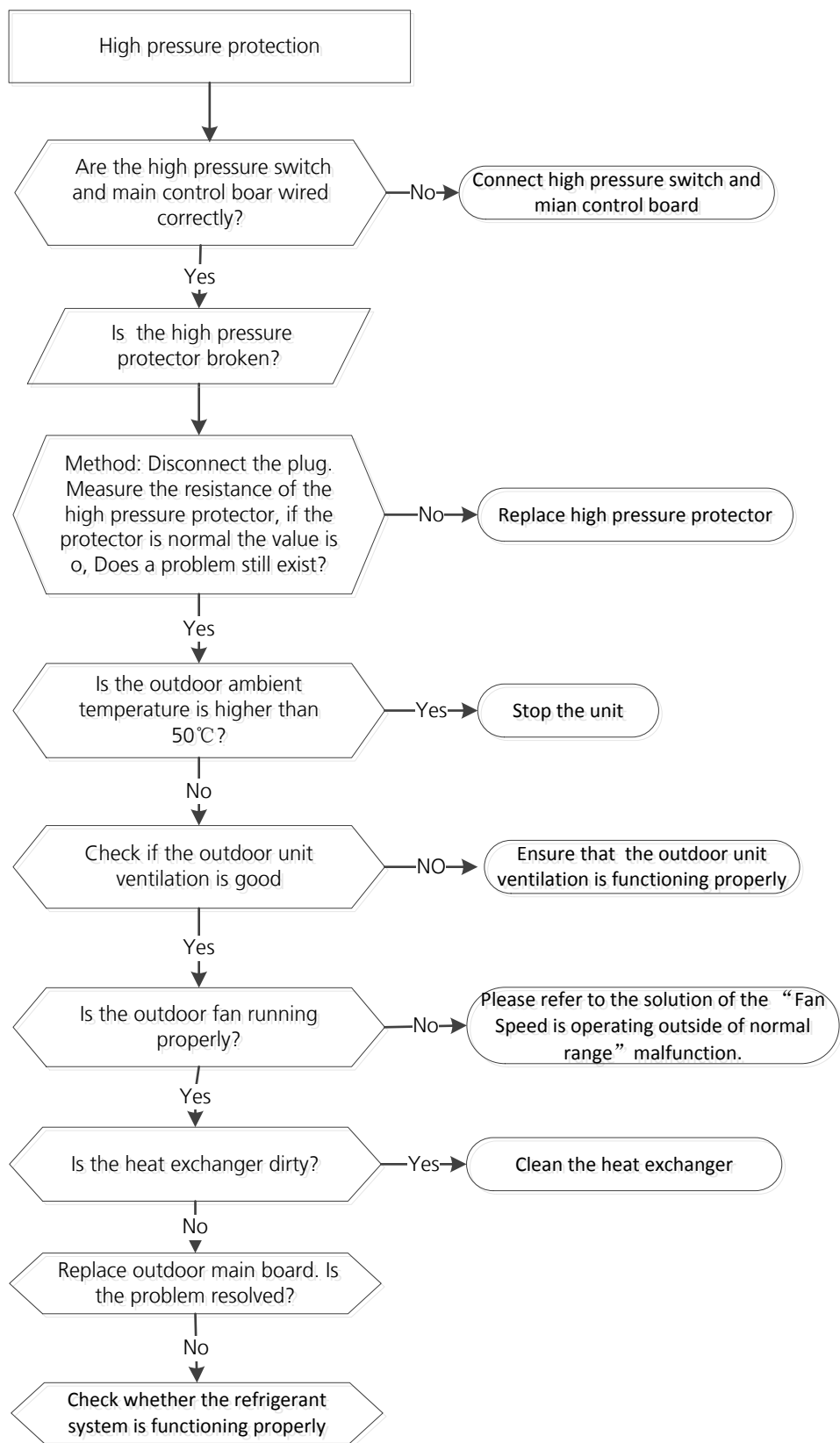
## 7.21 PC 30 (High pressure protection diagnosis and solution)

**Description:** Outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa

**Recommended parts to prepare:**

- Connection wires
- Pressure switch
- Outdoor fan
- Outdoor main PCB

**Troubleshooting and repair:**



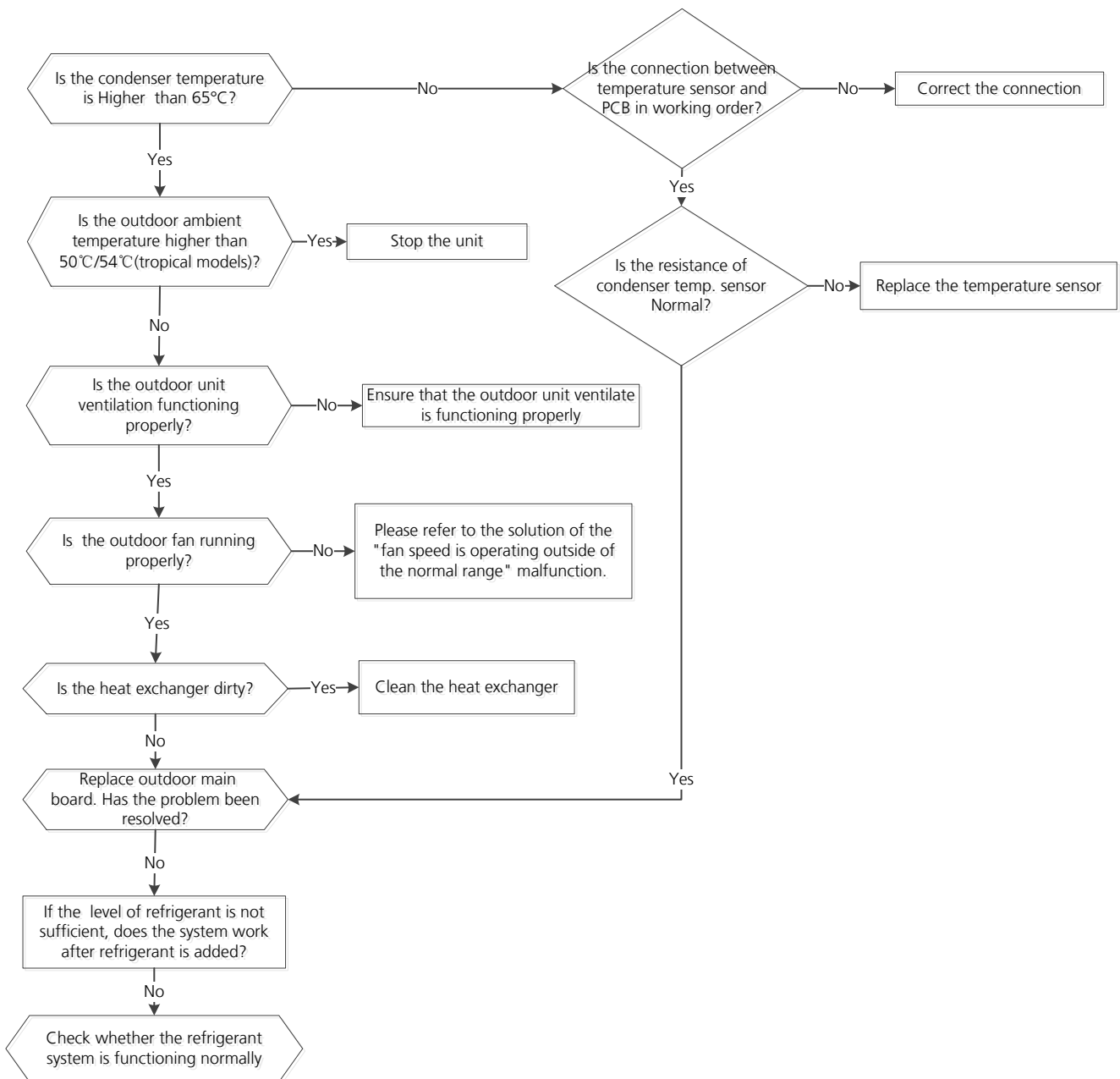
## 7.22 PC 0A (High temperature protection of condenser diagnosis and solution)

**Description:** When the outdoor pipe temperature is more than 65°C, the unit stops. It starts again only when the outdoor pipe temperature is less than 52°C.

### Recommended parts to prepare:

- Connection wires
- Condenser temperature sensor
- Outdoor fan
- Outdoor main PCB
- Refrigerant

### Troubleshooting and repair:



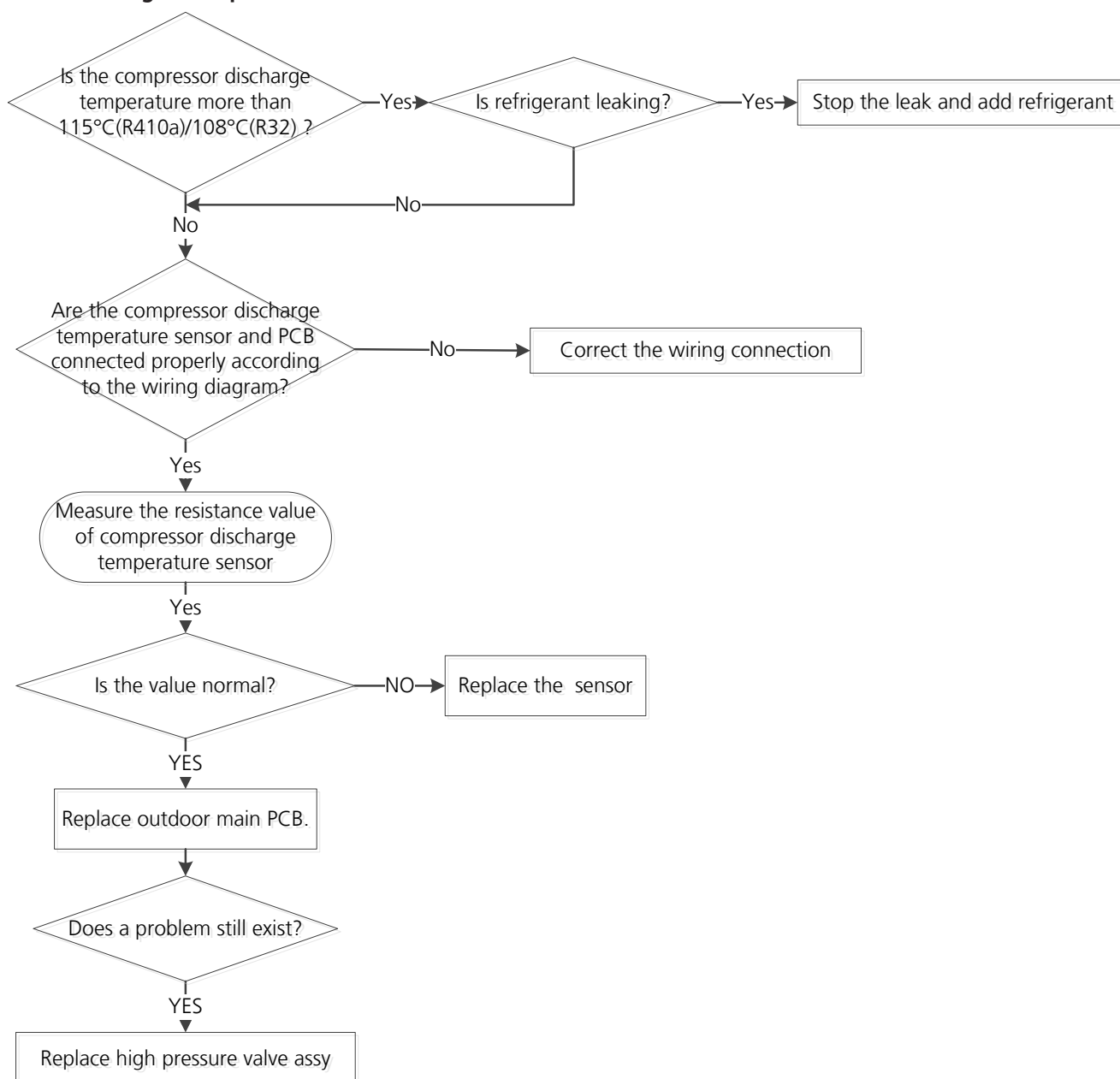
## 7.23 PC 06 (Discharge temperature protection of compressor diagnosis and solution)

**Description:** If the compressor discharge temperature exceeds a certain level for nine seconds, the compressor ceases operation, the LED displays the failure code

### Recommended parts to prepare:

- Connection wires
- Discharge temperature sensor
- Additional refrigerant
- Outdoor main PCB

### Troubleshooting and repair:



**Note:** For certain models, outdoor unit uses combination sensor, T3,T4 and TP are the same of sensor. This picture and the value are only for reference, actual appearance and value may vary.

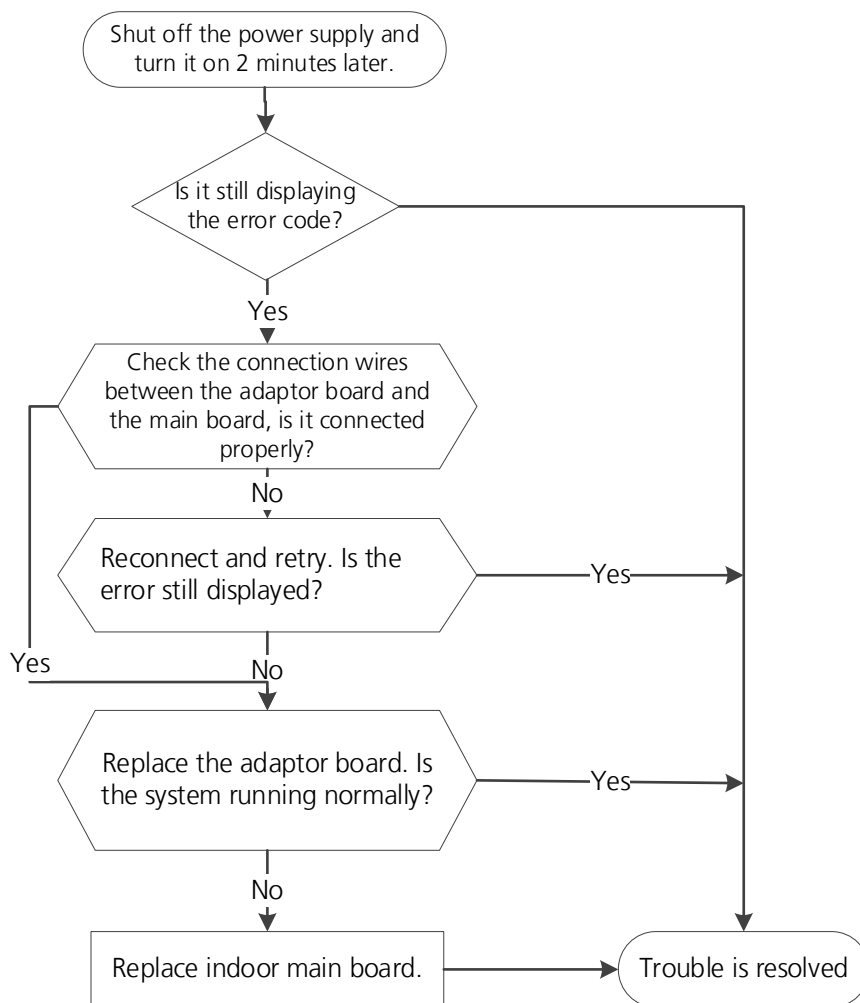
## 7.24 EH 0b(Communication error between indoor two chips diagnosis and solution)

**Description:** Indoor PCB main chip does not receive feedback from another chip.

**Recommended parts to prepare:**

- Indoor main board
- Adapter board

**Troubleshooting and repair:**



---

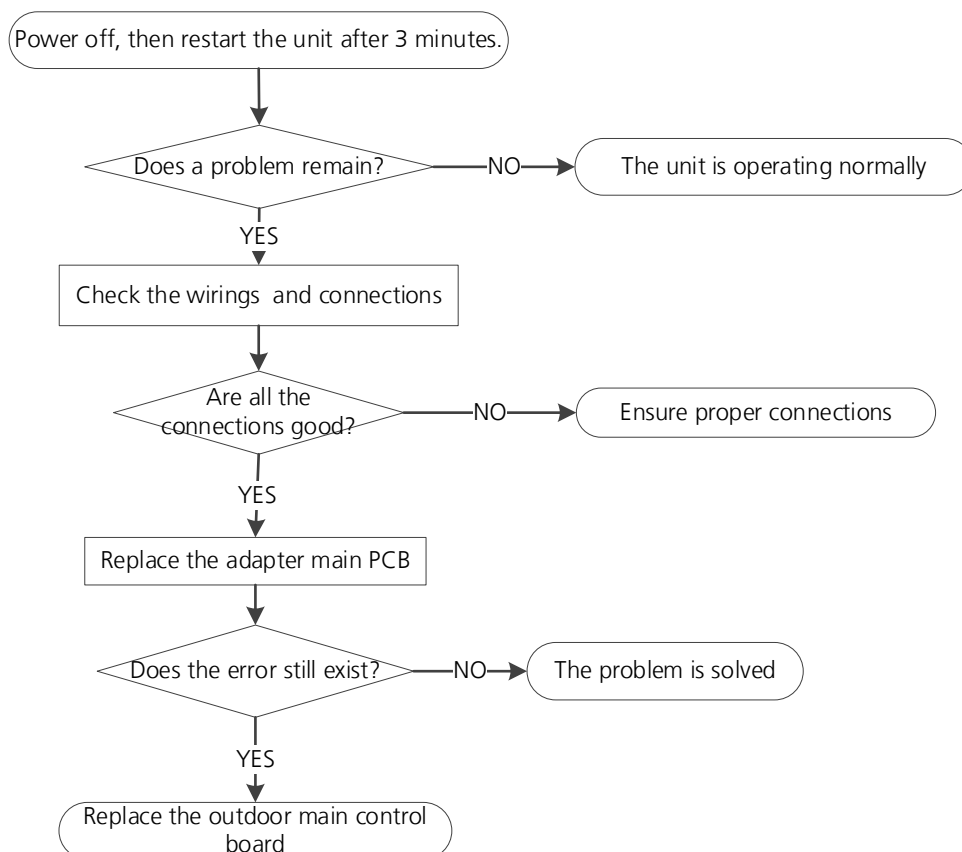
## 7.25 EL 16(Communication malfunction between adapter board and outdoor main board diagnosis and solution)

**Description:** The adapter PCB cannot detect the main control board.

**Recommended parts to prepare:**

- Connection wires
- Adapter board
- Outdoor main PCB

**Troubleshooting and repair:**



## 7.26 Indoor and outdoor mismatch malfunction diagnosis and solution

**Description:** Indoor and outdoor units are mismatched, the LED displays this code. Please replace the matching indoor or outdoor unit.



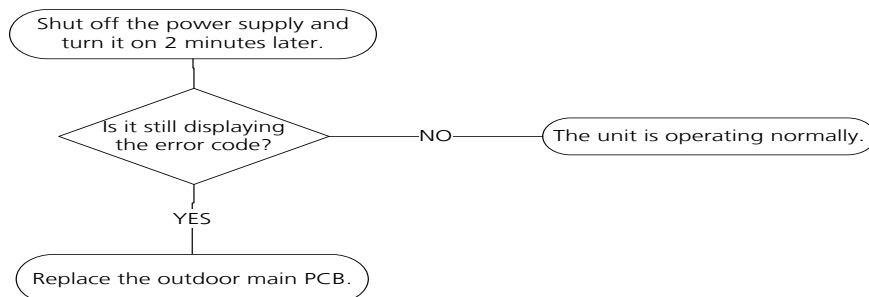
## 7.27 PC 41(Outdoor compressor current sampling circuit failure diagnosis and solution)

**Description:** Three-phase sampling offset voltage error, the static bias voltage is normally 2.5V

**Recommended parts to prepare:**

- Outdoor main PCB

**Troubleshooting and repair:**



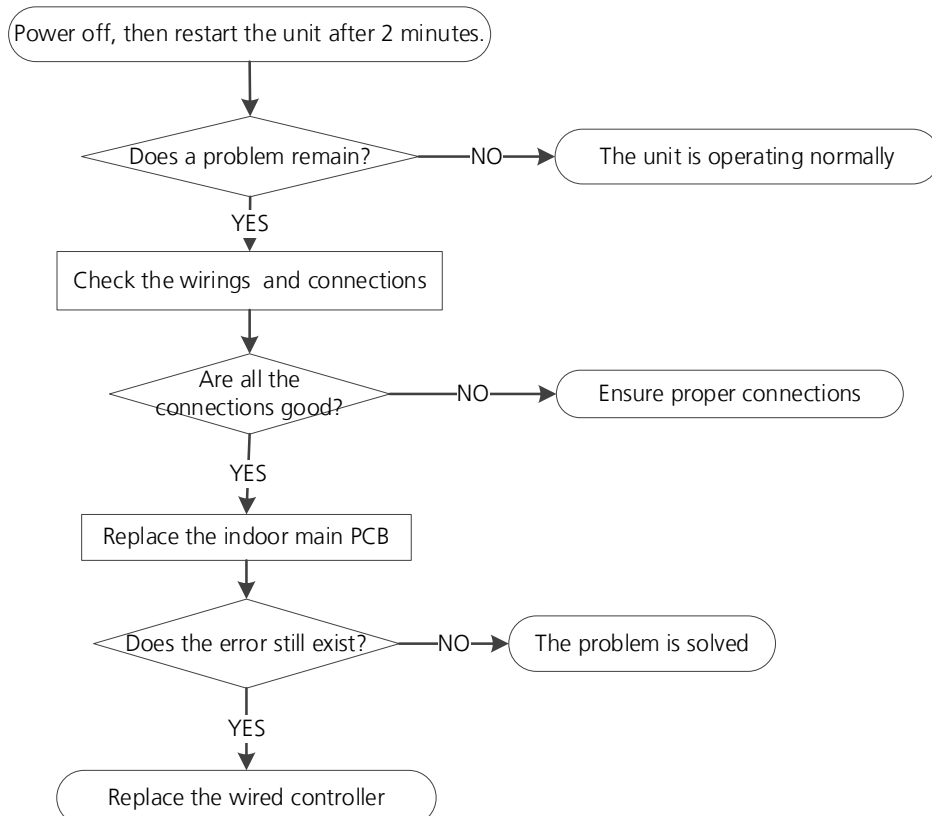
## 7.28 EH b3 (Communication error between wired controller and indoor unit Diagnosis and Solution)

**Description:** If Indoor PCB does not receive feedback from wired controller, the error displays on the wired controller

**Recommended parts to prepare:**

- Connection wires
- Indoor PCB
- Wired controller

**Troubleshooting and repair:**



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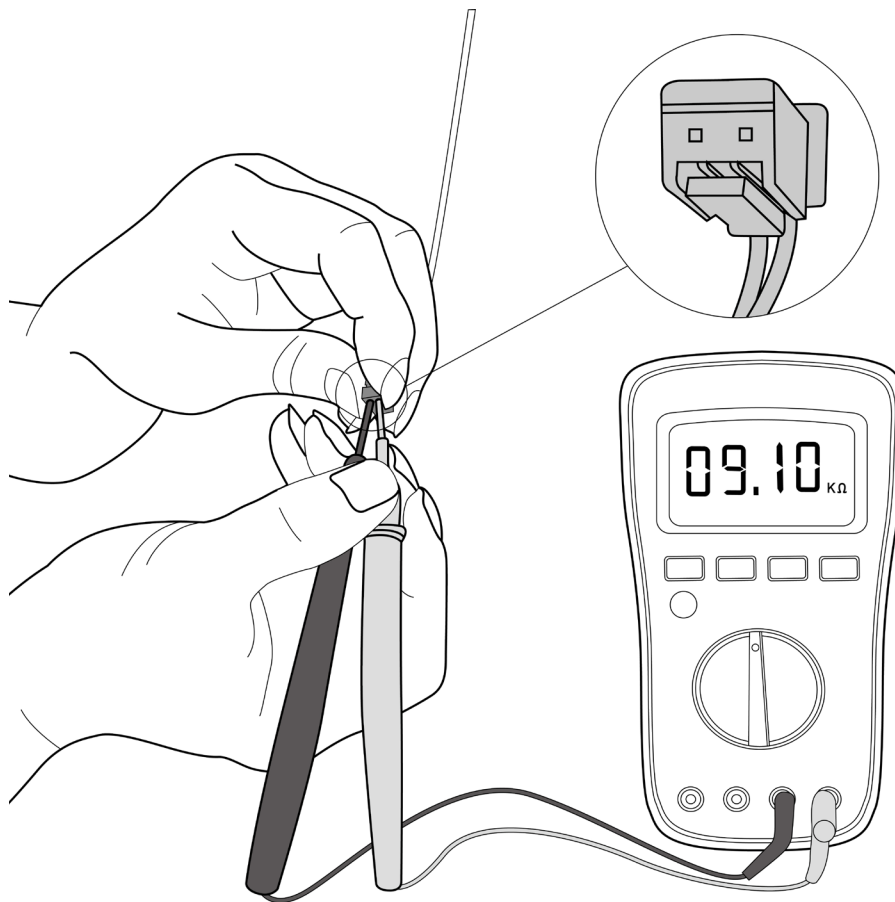
## 8. Check Procedures

### 8.1 Temperature Sensor Check

#### WARNING

**Be sure to turn off all power supplies or disconnect all wires to avoid electric shock. Operate after compressor and coil have returned to normal temperature in case of injury.**

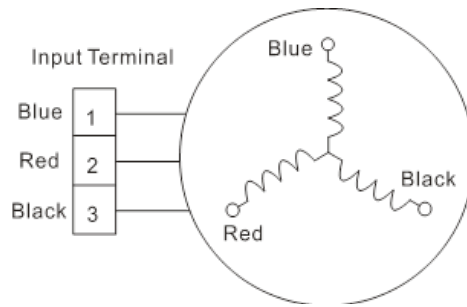
1. Disconnect temperature sensor from PCB (Refer to Chapter 5. Indoor Disassembly and Chapter 6. Outdoor Disassembly).
2. Measure the resistance value of the sensor using a multi-meter.
3. Check corresponding temperature sensor resistance value table (Refer to Chapter 8. Appendix).



**Note: The picture and the value are only for reference, actual condition and specific value may vary.**

### 8.2 Compressor Check

1. Disconnect the compressor power cord from outdoor PCB (Refer to Chapter 6. Outdoor Unit Disassembly).
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.

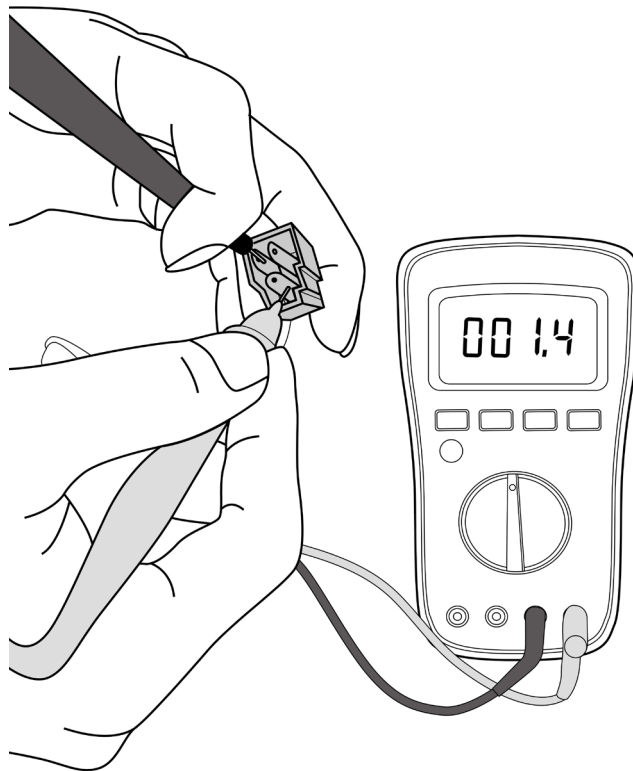


Resistance Value	ASM135D23UFZ	ATM115D43UFZ2	ASN98D22UFZ	ATQ360D1UMU
Blue-Red	1.75Ω	1.87Ω	1.57Ω	0.37Ω
Blue-Black				
Red-Black				

Resistance Value	ATF235D22UMT ATF250D22UMT KTF250D22UMT	ATF310D43UMT	KSK103D33UEZ3	ASM98D32UFZ
Blue-Red	0.75Ω	0.65Ω	2.13Ω	2.2Ω
Blue-Black				
Red-Black				

Resistance Value	ASN140D21UFZ KSN140D21UFZ	ASK89D29UEZD	KTM240D57UMT	KSN140D58UFZ
Blue-Red	1.28Ω	1.99Ω	0.62Ω	1.86Ω
Blue-Black				
Red-Black				

Resistance Value	KTF310D43UMT		ATN150D30UFZA KTM240D43UKT	KTM240D46UKT2	KTQ420D1UMU ATQ420D1SN5A1 EAPQ420D1UMUA EAPQ440D1UMUA
Blue-Red	0.65Ω	Ω	1.03Ω	1.04Ω	0.37Ω
Blue-Black					
Red-Black					



**Note:** The picture and the value are only for reference, actual condition and specific value may vary.

### 8.3 IPM Continuity Check

#### **!** WARNING

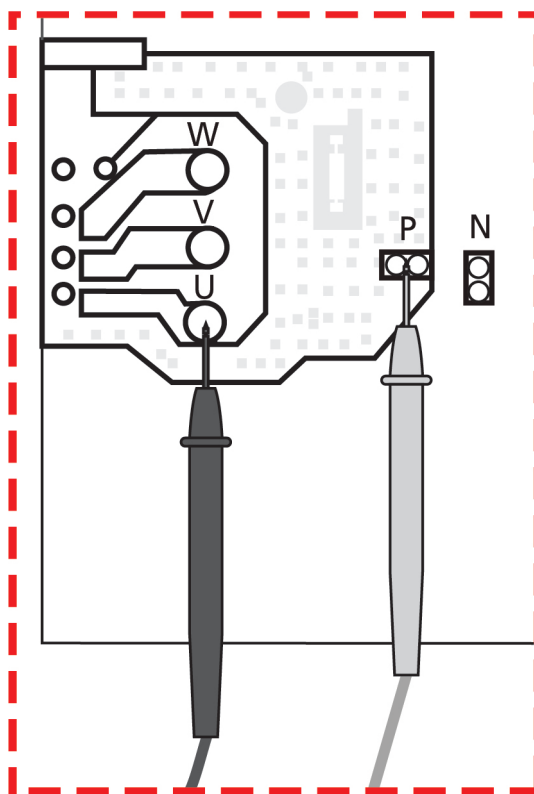
**Electricity remains in capacitors even when the power supply is off.  
Ensure the capacitors are fully discharged before troubleshooting.**

1. Turn off outdoor unit and disconnect power supply.
2. Discharge electrolytic capacitors and ensure all energy-storage unit has been discharged.
3. Disassemble outdoor PCB or disassemble IPM board.
4. Measure the resistance value between P and U(V, W, N); U(V, W) and N.

Digital tester		Resistance value	Digital tester		Resistance value
(+)Red	(-)Black	$\infty$ (Several M $\Omega$ )	(+)Red	(-)Black	$\infty$ (Several M $\Omega$ )
P	N		N	U	
	U			V	
	V			W	
	W			-	

Or test the conductivity of IPM with diode mode.

Needle-type Tester		Normal Value	Needle-type Tester		Normal Value
Red	Black		Red	Black	
P	U	Open-circuit	N	U	0.3-0.5V
	V			V	
	W			W	
Needle-type Tester		Normal Value	Needle-type Tester		Normal Value
Black	Red		Black	Red	
P	U	0.3-0.5V	N	U	Open-circuit
	V			V	
	W			W	



Note: The picture and the value are only for reference, actual condition and specific value may vary.

## 8.4 Normal voltage of P and N

	208-240V(1-phase)
In standby	
	around 310VDC
In operation	
	>310VDC

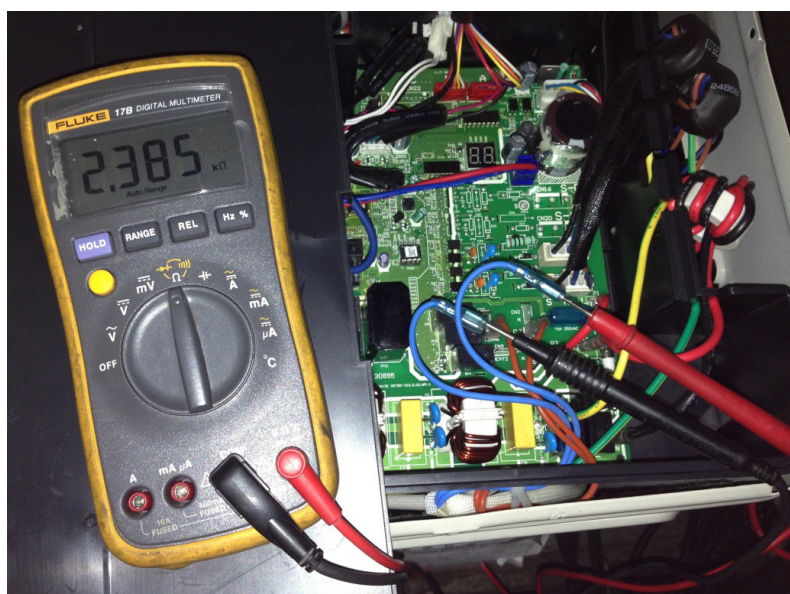
## 8.5 4-way Valve Check

1. Power on, use a digital tester to measure the voltage, when the unit operates in cooling, it is 0V. When the unit operates in heating, it is about 230VAC.

If the value of the voltage is not in the range, the PCB must have problems and need to be replaced.



2 Turn off the power, use a digital tester to measure the resistance. The value should be 1.8~2.5 KΩ.

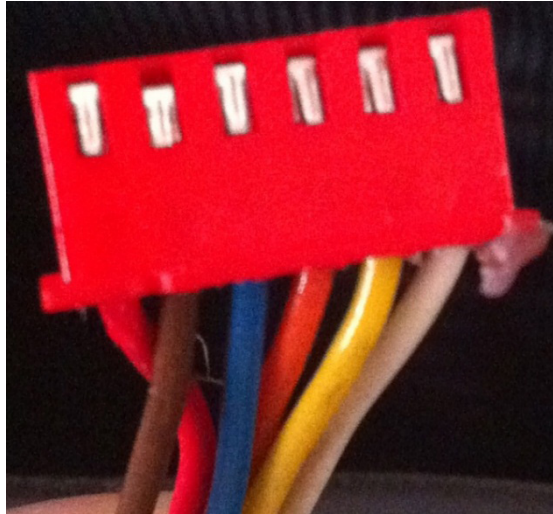


## 8.6 EEV Check

## **!** WARNING

**Electricity remains in capacitors even when the power supply is off.  
Ensure the capacitors are fully discharged before troubleshooting.**

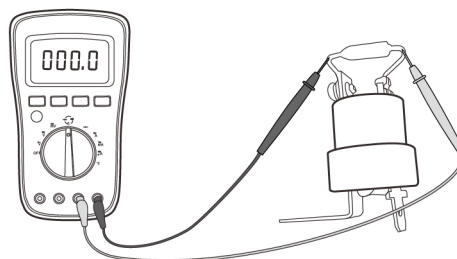
1. Disconnect the connector from outdoor PCB.
2. Measure the resistance value of each winding using a multi-meter.
3. Check the resistance value of each winding in the following table.



Color of lead winding	Normal Value
Red- Blue	About 50Ω
Red - Yellow	
Brown-Orange	
Brown-White	

### **8.7 Fuse of Electric Auxiliary Heat Module Check(Optional)**

1. Disassemble the fuse from electric auxiliary heat module.
2. Use the multimeter signal gear to check whether there is a signal, if not, fuse is broken.





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2190 NW 89 Place, Doral, FL 33172 - USA

Tel: (305)593-8358

Fax (305) 675-2212

[www.klimaïre.com](http://www.klimaïre.com)

[sales@klimaïre.com](mailto:sales@klimaïre.com)

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