

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 tables:

Operation Lamp	Timer Lamp	Display	Error Information	Solution
1 time	OFF	E0	Indoor unit EEPROM parameter error	TS19
2 times	OFF	E1	Indoor / outdoor unit communication error	TS20
3 times	OFF	E2	Zero-crossing signal detection error(for some models)	TS22
4 times	OFF	E3	The indoor fan speed is operating outside of the normal range	TS23
5 times	OFF	E4	Indoor room temperature sensor T1 is in open circuit or has short circuited	TS26
6 times	OFF	E5	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	TS26
9 times	OFF	E7	Indoor PCB / Display board communication error(for some models)	TS27
7 times	OFF	E8	Refrigerant leak detected	TS28
1 times	ON	F0	Current overload protection	TS29
2 times	ON	F1	Outdoor room temperature sensor T4 is in open circuit or has short circuited	TS26
3 times	ON	F2	Condenser coil temperature sensor T3 is in open circuit or has short circuited	TS26
4 times	ON	F3	Compressor discharge temperature sensor TP is in open circuit or has short circuited	TS26
5 times	ON	F4	Outdoor unit EEPROM parameter error	TS19
6 times	ON	F5	The outdoor fan speed is operating outside of the normal range(for some models)	TS23
1 times	FLASH	P0	IPM malfunction or IGBT over-strong current protection	TS30
2 times	FLASH	P1	Over voltage or over low voltage protection	TS31
3 times	FLASH	P2	High temperature protection of IPM module or High pressure protection	TS32
5 times	FLASH	P4	Inverter compressor drive error	TS34
7 times	FLASH	P6	Low pressure protection(for some models)	TS35

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.

For some models

Operation Lamp	Timer Lamp	LED Display	Error Information	Solution
1 time	OFF	E400	Indoor unit EEPROM parameter error	TS19
2 times	OFF	E401	Indoor / outdoor unit communication error	TS20
3 times	OFF	E402	Zero-crossing signal detection error(for some models)	TS22
4 times	OFF	E403	The indoor fan speed is operating outside of the normal range	TS23
5 times	OFF	E451	Outdoor unit EEPROM parameter error(for some models)	TS19
5 times	OFF	E452	Condenser coil temperature sensor T3 is in open circuit or has short circuited	TS26
5 times	OFF	E453	Outdoor room temperature sensor T4 is in open circuit or has short circuited	TS26
5 times	OFF	E454	Compressor discharge temperature sensor TP is in open circuit or has short circuited	TS26
6 times	OFF	E460	Indoor room temperature sensor T1 is in open circuit or has short circuited	TS26
6 times	OFF	E461	Evaporator coil temperature sensor T2 is in open circuit or has short circuited	TS26
12 times	OFF	E407	The outdoor fan speed is operating outside of the normal range(for some models)	TS23
9 times	OFF	E40b	Indoor PCB / Display board communication error(for some models)	TS27
8 times	OFF	E40c	Refrigerant leak detected	TS28
7 times	FLASH	P400	IPM malfunction or IGBT over-strong current protection	TS30
2 times	FLASH	P401	Over voltage or over low voltage protection	TS31
3 times	FLASH	P402	High temperature protection of IPM module or High pressure protection	TS32
5 times	FLASH	P404	Inverter compressor drive error	TS34
1 time	FLASH	P408	Current overload protection(for some models)	TS29
7 times	FLASH	P403	Low pressure protection(for some models)	TS35

LED flash frequency:



2.2 Error Display (For 18K And Above 18K Outdoor Unit)

There are 2 LED lights (RED color and GREEN color) welded in outdoor main board. After power on, LED show different actions when encounter different problems.

No.	Problem	LED(GREEN)	LED(RED)	Solution
1	Standby normally	ON	OFF	-
2	Operate normally	OFF	ON	-
3	Compressor driven chip EEPROM parameter error	ON	FLASH	TS19
4	IPM malfunction or IGBT over-strong current protection	FLASH	OFF	TS30
5	Over voltage or too low voltage protection	ON	ON	TS31
6	Inverter compressor drive error	OFF	FLASH	TS34
7	Inverter compressor drive error	FLASH	LIGHT	TS34
8	Communication error between outdoor main chip and compressor driven chip	FLASH	FLASH	TS19

7. Troubleshooting by Error Code

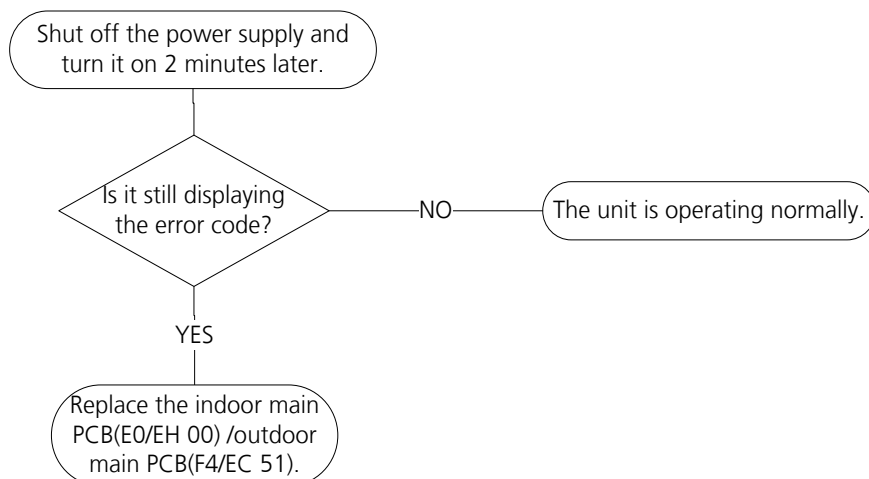
7.1 E0/EH 00 / F4/EC 51 (EEPROM parameter error diagnosis and solution)

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

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB

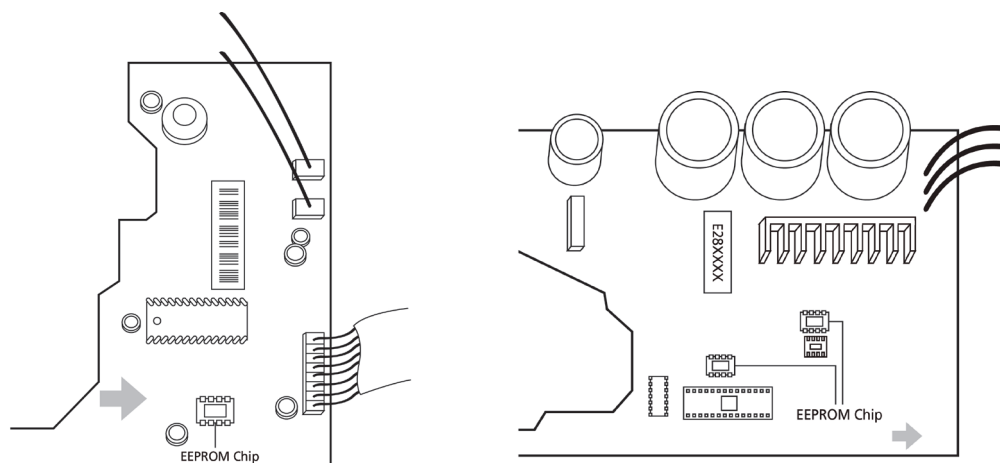
Troubleshooting and repair:



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 F4/EC 51.

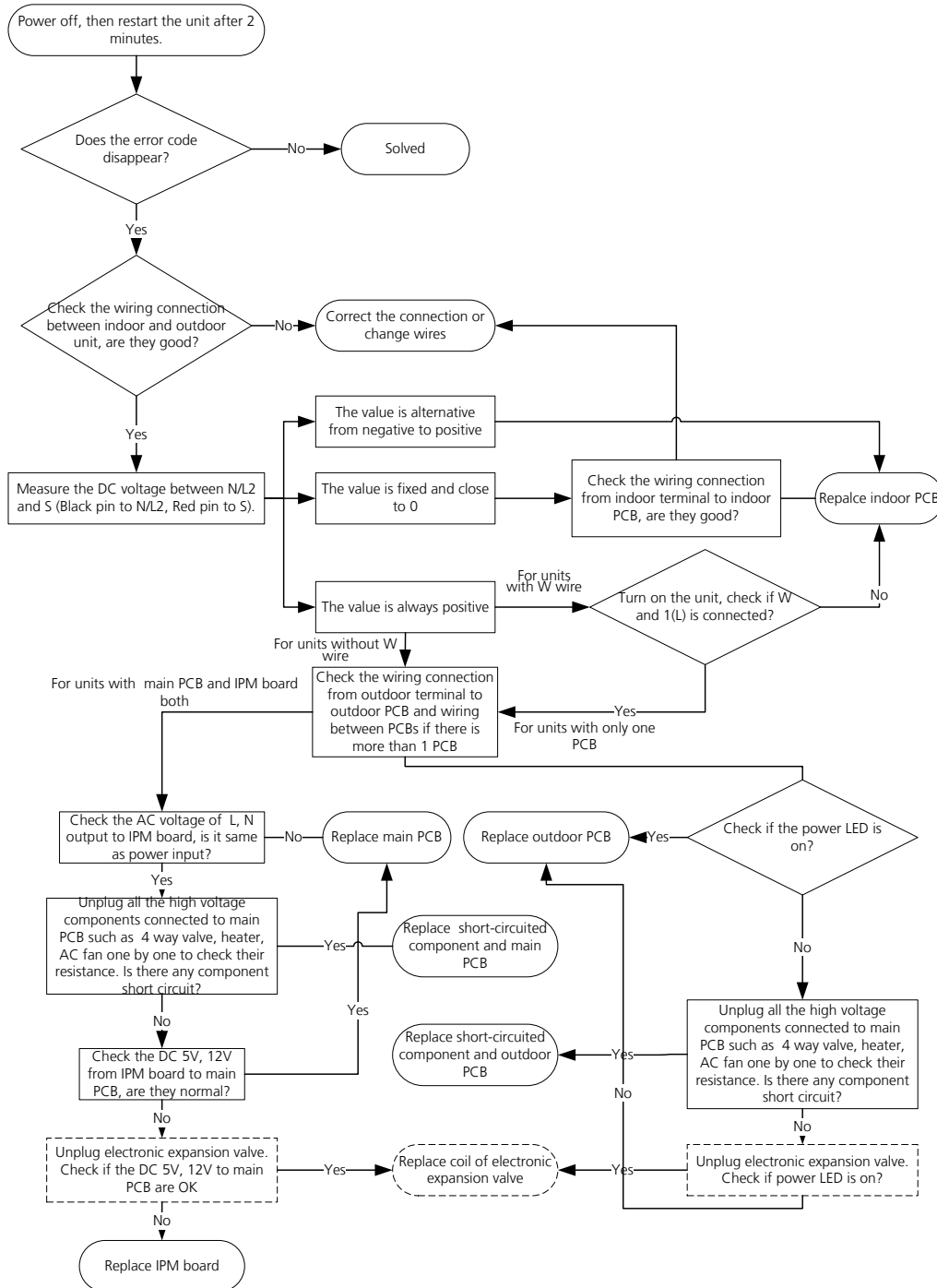
7.2 E1/EL 01 (Indoor and outdoor unit communication error diagnosis and solution)

Description: Indoor unit can not communicate with outdoor unit

Recommended parts to prepare:

- Indoor PCB
- Outdoor PCB
- Short-circuited component

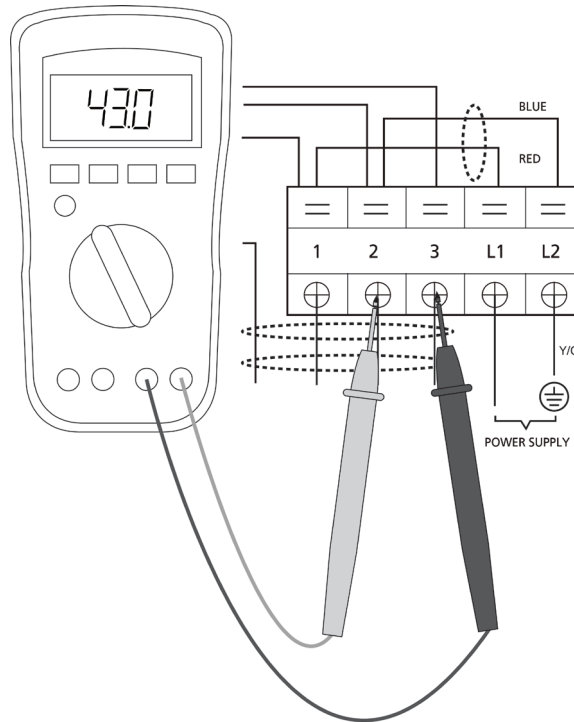
Troubleshooting and repair:



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.

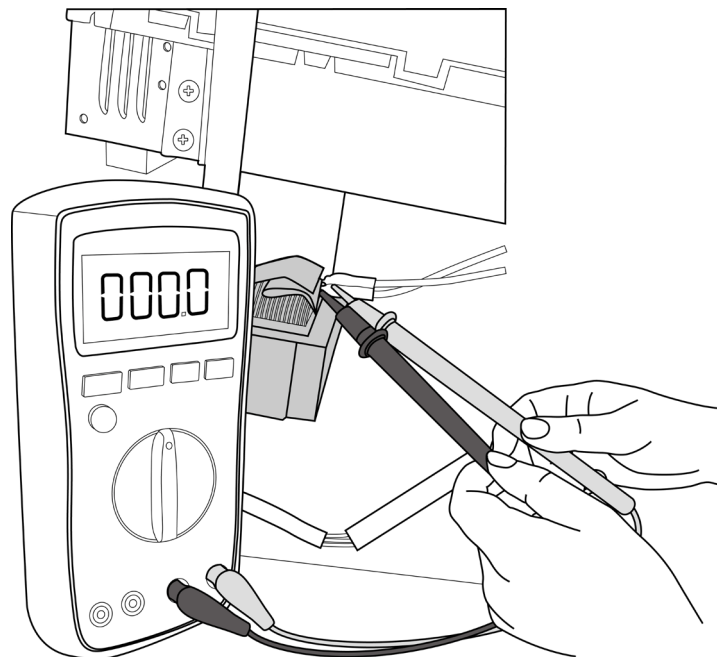
Remarks:

- Use a multimeter to test the DC voltage between 2 port(or S or L2 port) and 3 port(or N or S port) of outdoor unit. The red pin of multimeter connects with 2 port(or S or L2 port) while the black pin is for 3 port(or N or S port).
- When AC is normal running, the voltage is moving alternately as positive values and negative values
- If the outdoor unit has malfunction, the voltage has always been the positive value.
- While if the indoor unit has malfunction, the voltage has always been a certain value.



**S and N
or
L2 and S
or
2 and 3**

- Use a multimeter to test the resistance of the reactor which does not connect with capacitor.
- The normal value should be around zero ohm. Otherwise, the reactor must have malfunction.



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

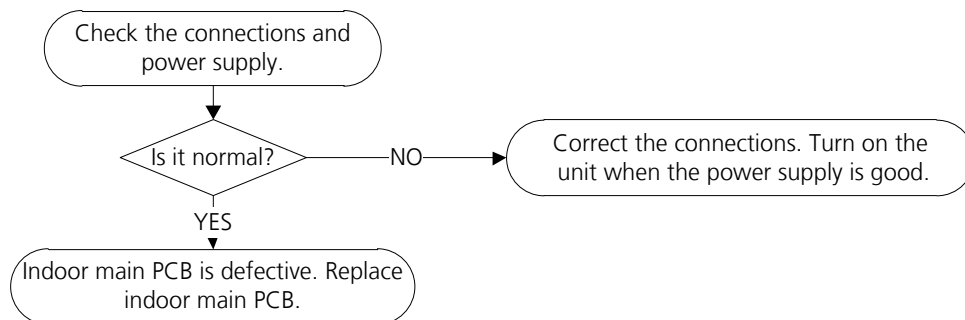
7.3 E2/EH 02 (Zero crossing detection error diagnosis and solution)

Description: When PCB does not receive zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.

Recommended parts to prepare:

- Connection wires
- PCB

Troubleshooting and repair:



Note: E2/EH 02 zero crossing detection error is only valid for the unit with AC fan motor, for other models, this error is invalid.

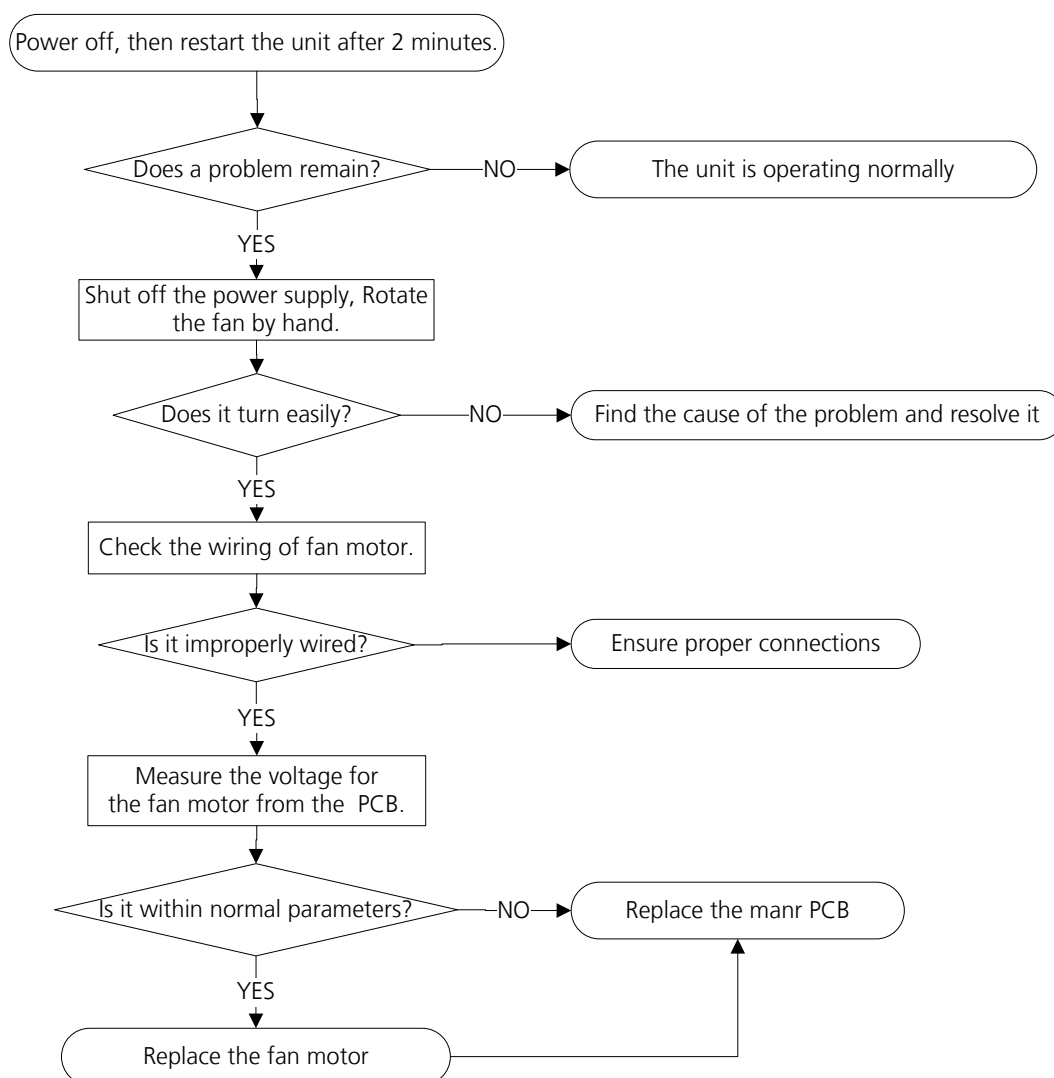
7.4 E3/EH 03 / F5/EC 07 (Fan speed is operating outside of normal range diagnosis and solution)

Description: When indoor / outdoor fan speed keeps too low or too high for a certain time, the LED displays the failure code and the AC turns off.

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 or Outdoor DC Fan Motor(control chip is in fan motor)

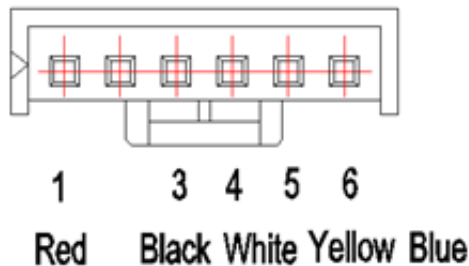
Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must has problems and need to be replaced.

- DC motor voltage input and output (voltage: 220-240V~):

No.	Color	Signal	Voltage
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V

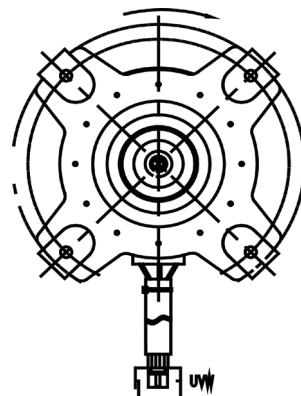
- DC motor voltage input and output (voltage: 115V~):

No.	Color	Signal	Voltage
1	Red	Vs/Vm	140V~190V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V



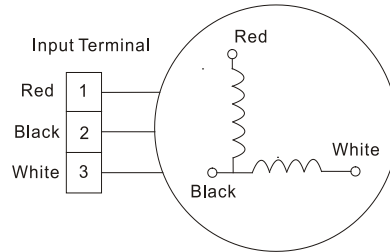
2. Outdoor DC Fan Motor (control chip is in outdoor PCB)

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.



3. Indoor AC Fan Motor

Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 100V(208~240V power supply) or 50V (115V power supply), the PCB must has problems and need to be replaced.



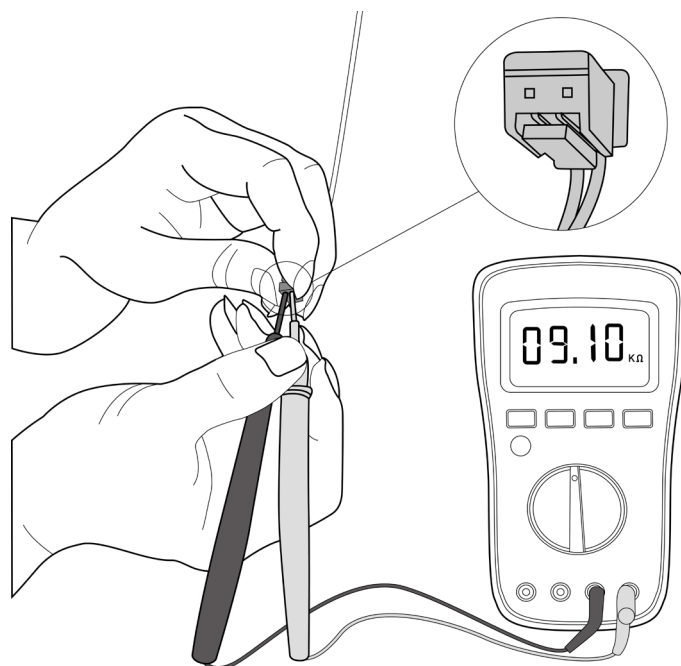
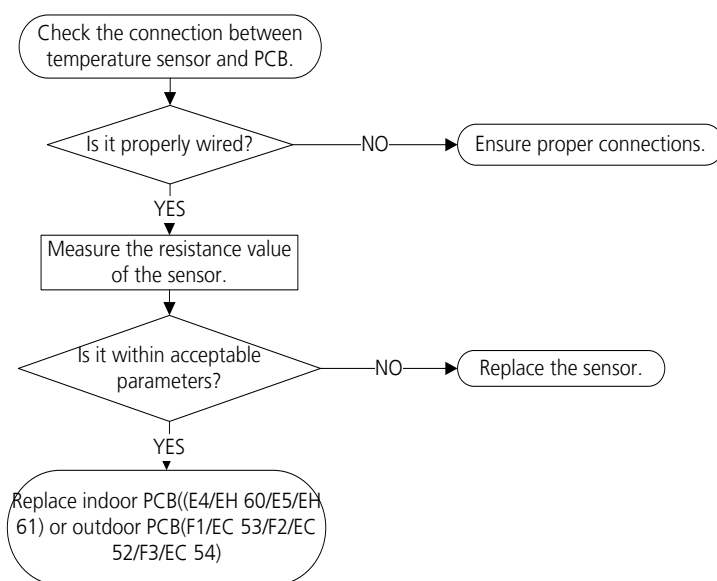
7.5 E4/EH 60/E5/EH 61/F1/EC 53/F2/EC 52/F3/EC 54 (Open circuit or short circuit of temperature sensor diagnosis and solution)

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

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. For certain models, outdoor unit uses combination sensor, T3, T4 and TP are the same of sensor.

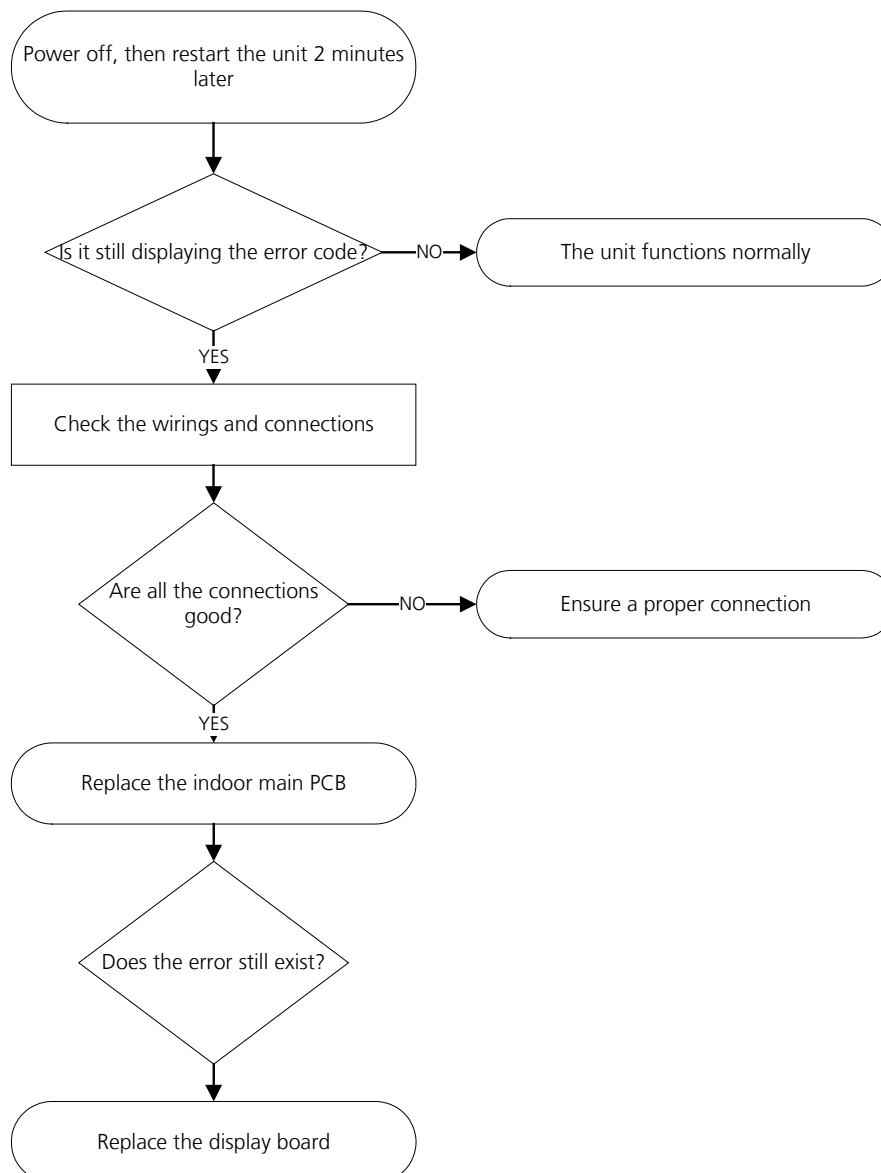
7.6 E7/EH 0b (Indoor PCB / Display board communication error diagnosis and solution)

Description: Indoor PCB does not receive feedback from the display board.

Recommended parts to prepare:

- Communication wire
- Indoor PCB
- Display board

Troubleshooting and repair:



7.7 EC/EL 0C (Refrigerant Leakage Detection diagnosis and solution)

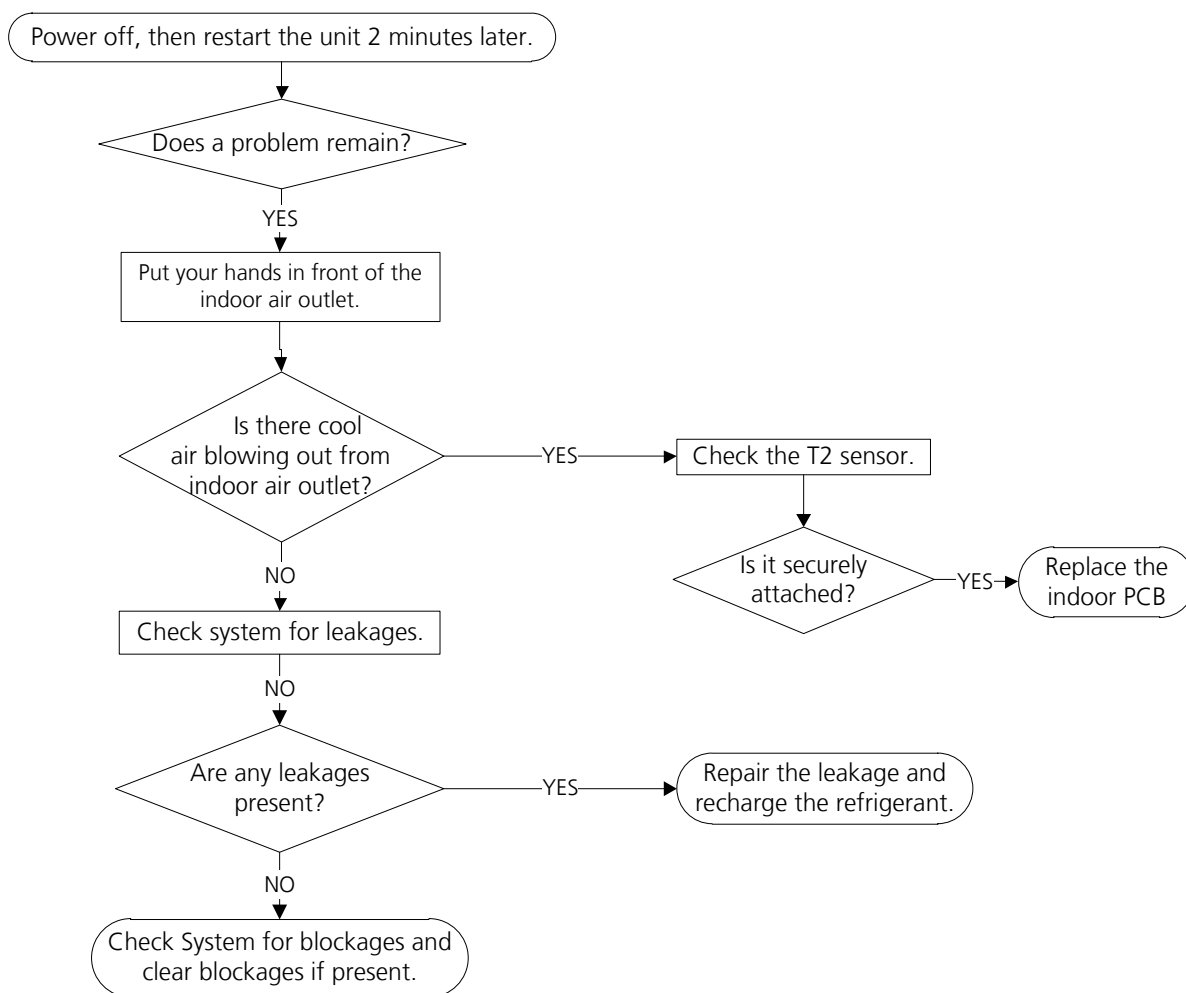
Description: Define the evaporator coil temperature T2 of the compressor just starts running as Tcool.

In the beginning 5 minutes after the compressor starts up, if $T2 < T_{cool} - 1^{\circ}\text{C}$ (1.8°F) does not keep continuous 4 seconds and compressor running frequency higher than 50Hz does not keep for 3 minutes, and this situation happens 3 times, the LED displays the failure code and the AC turns off.

Recommended parts to prepare:

- T2 sensor
- Indoor PCB
- Additional refrigerant

Troubleshooting and repair:



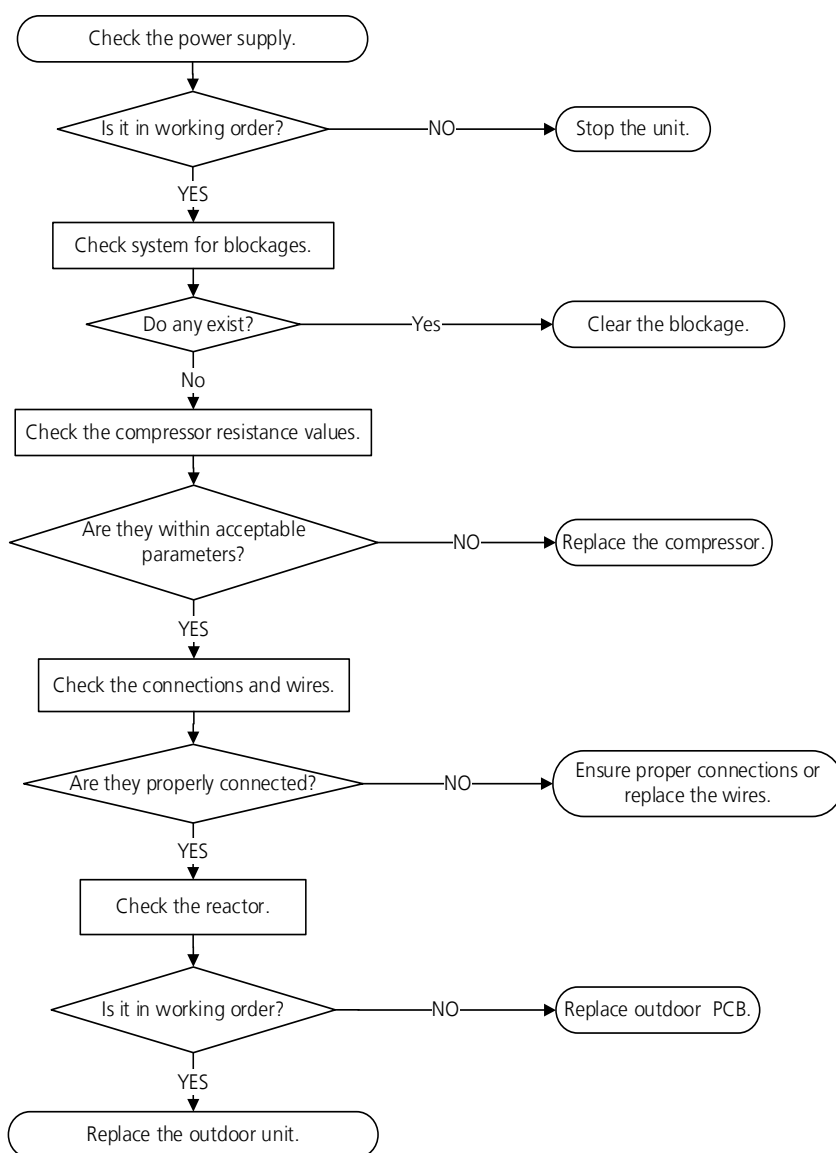
7.8 F0/PC 08 (Overload current protection diagnosis and solution)

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

Recommended parts to prepare:

- Outdoor PCB
- Connection wires
- Compressor

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.

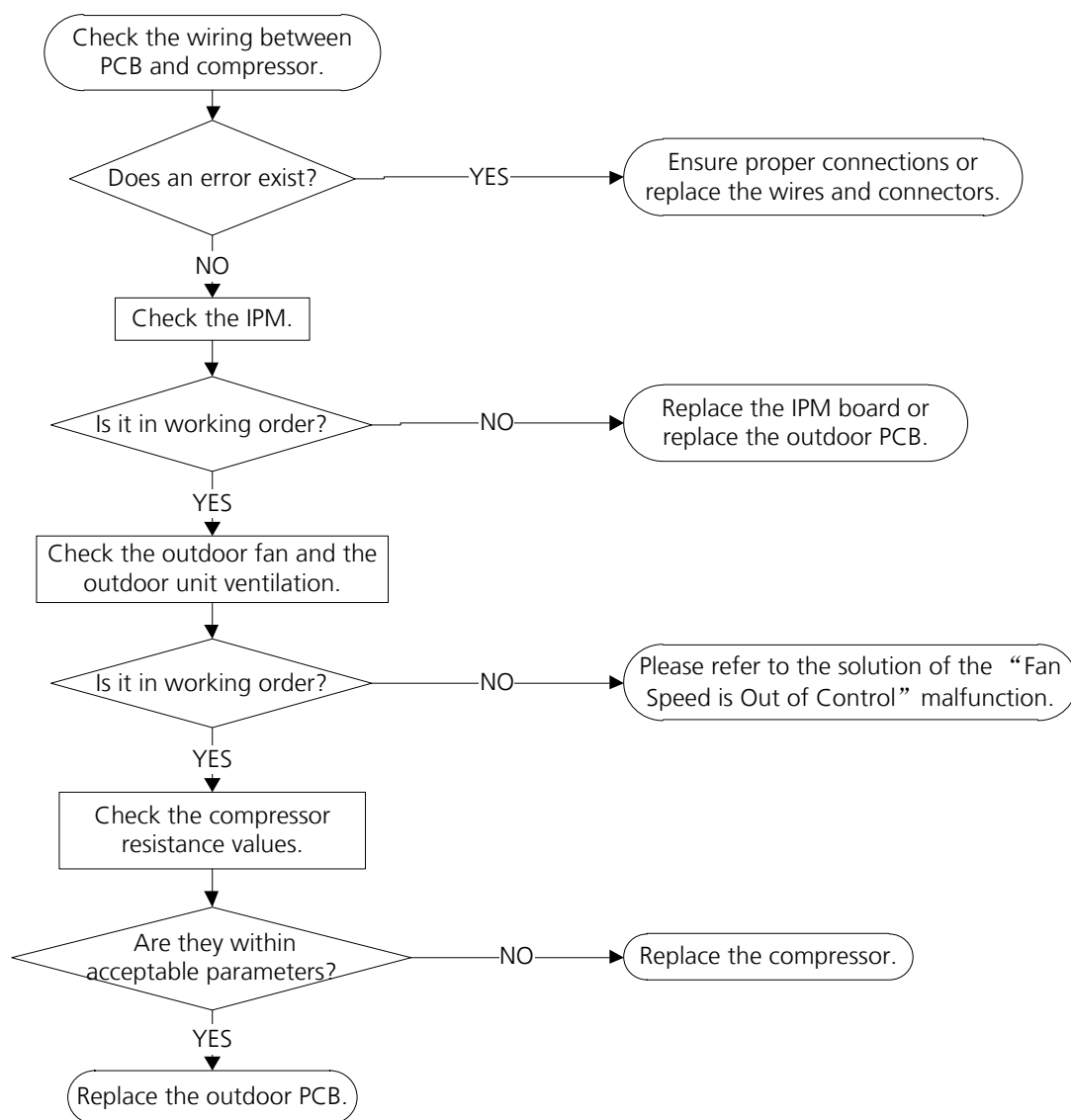
7.9 P0/PC 00(IPM malfunction or IGBT over-strong current protection diagnosis and solution)

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

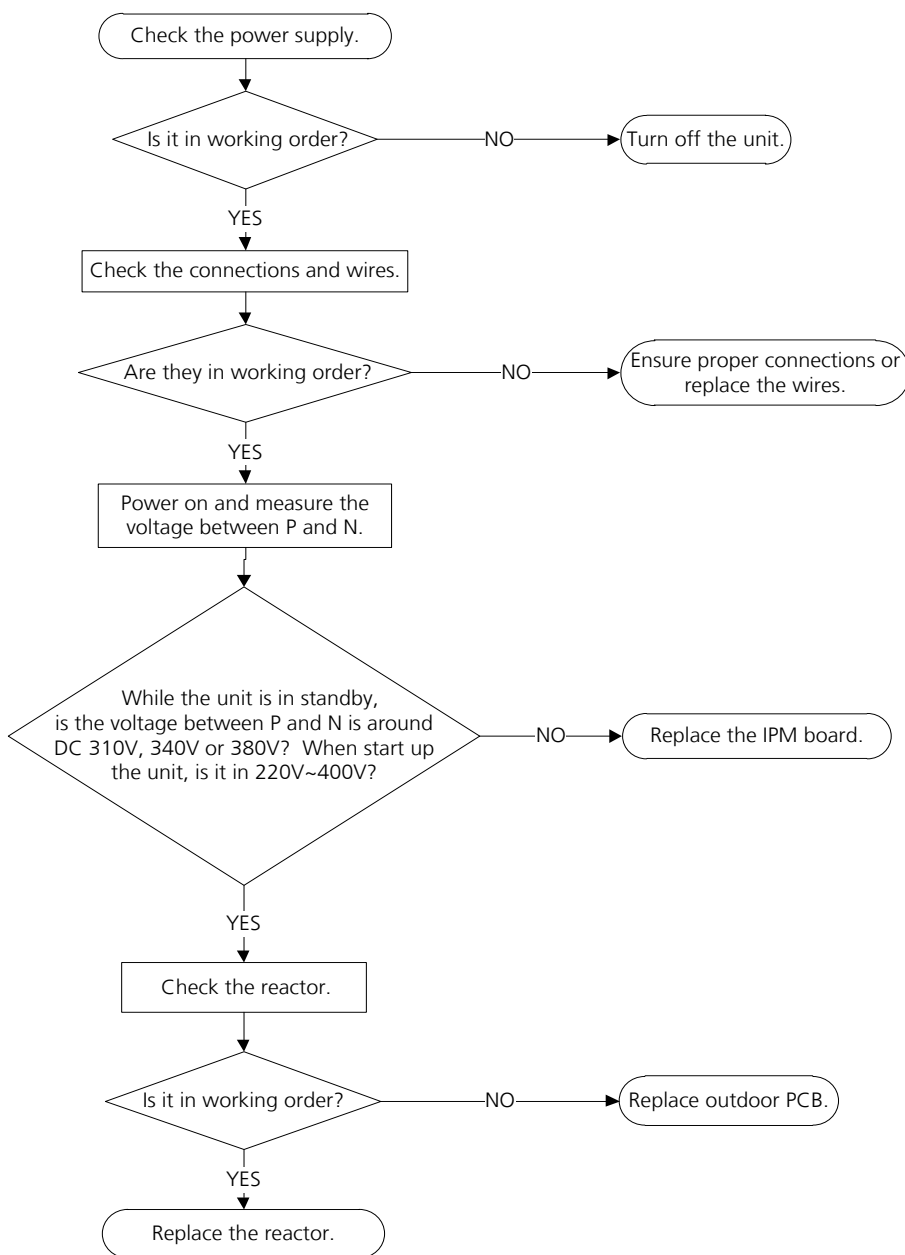
7.10 P1/PC 01(Over voltage or too low voltage protection diagnosis and solution)

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.

7.11 P2/PC 02(High temperature protection of IPM module or High pressure protection diagnosis and solution)

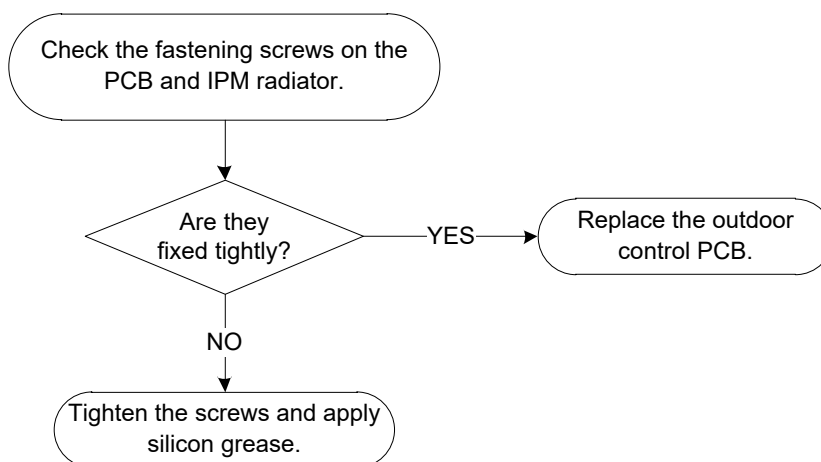
Description: If the temperature of IPM module is higher than a certain value, the LED displays the failure code.

For some models with high pressure switch, outdoor pressure switch cut off the system because high pressure is higher than 4.4 MPa, the LED displays the failure code.

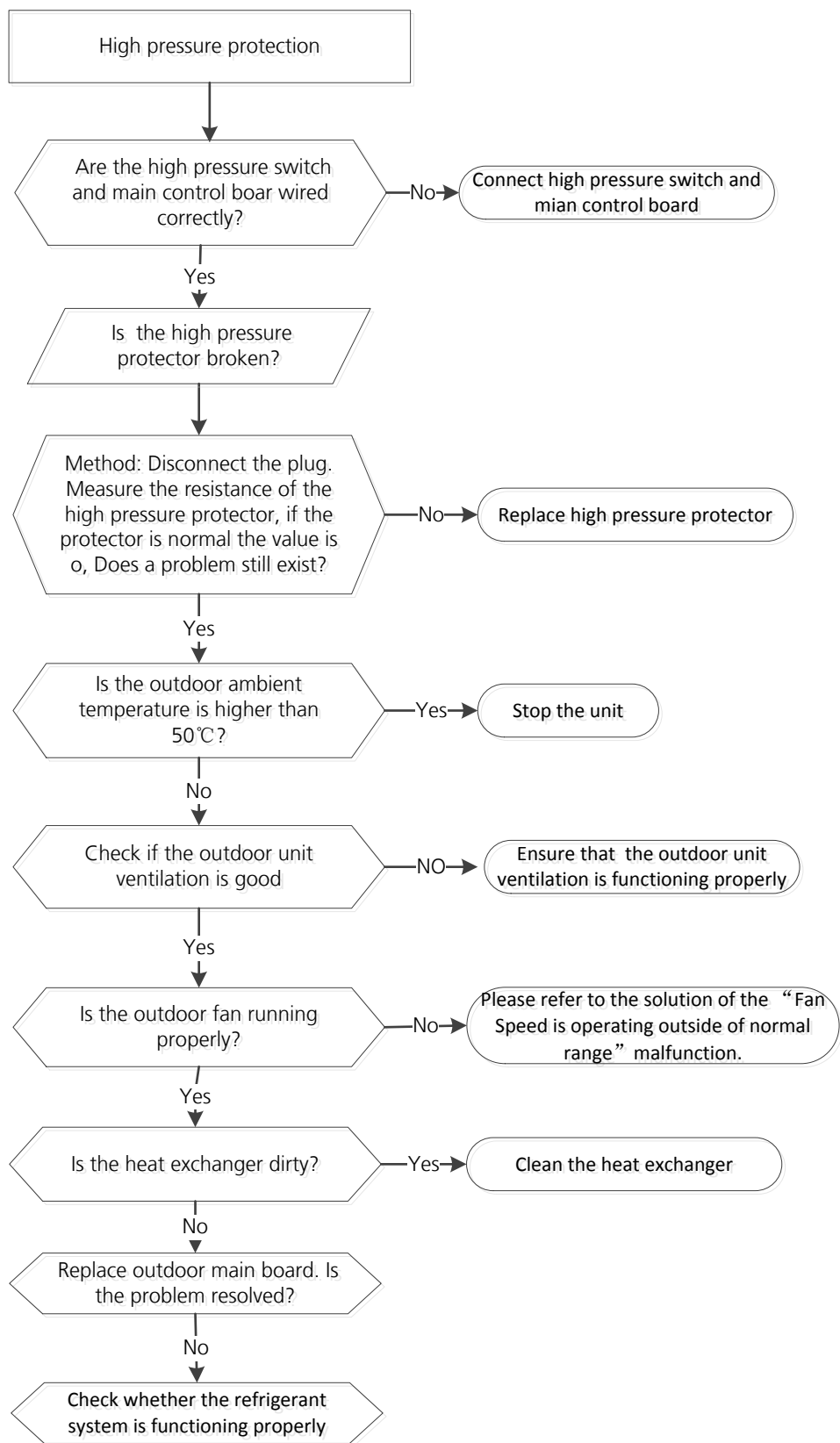
Recommended parts to prepare:

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

Troubleshooting and repair:



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.



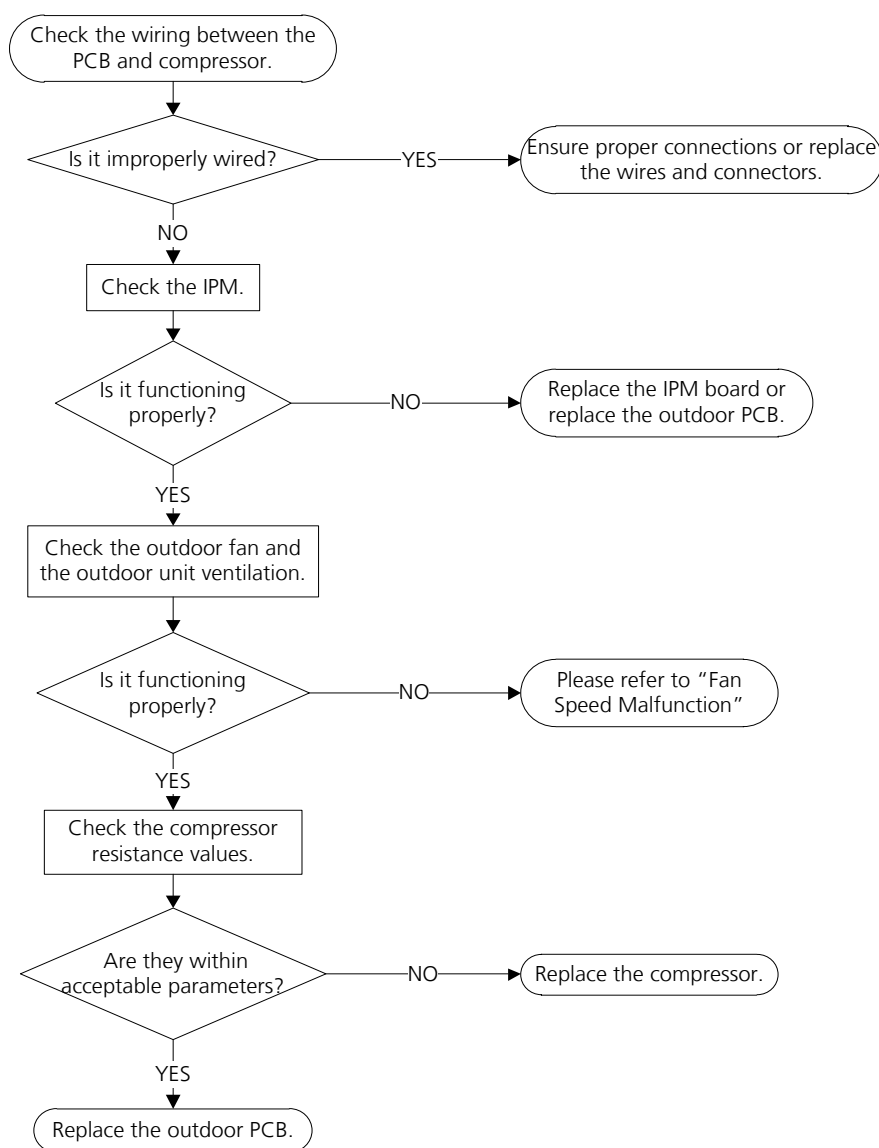
7.12 P4/PC 04(Inverter compressor drive error diagnosis and solution)

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.

7.13 PC 03(Low pressure protection diagnosis and solution)

Description: Outdoor pressure switch cut off the system because low pressure is lower than 0.13 MPa, the LED displays the failure code.

Recommended parts to prepare:

- Connection wires
- Outdoor PCB
- Low pressure protector
- Refrigerant

Troubleshooting and repair:

