

# Part 6

## Diagnosis and Troubleshooting

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SYSVRF 080 AIR EVO C HP Q #318169  
SYSVRF 120 AIR EVO C HP Q #318181

# 1 Error Code Table

Table 6-1.1: Error code table

Error code	Content	Note
C0	Communication fault between main control board and communicate converter board	100/120 model
EE	Abnormal shutdown of compressor inverter module board	80 model
E2	Communication fault between outdoor unit and indoor units	All models
E4	T3 or T4 temperature sensor fault	All models
E5	Input voltage protection	All models
E6	DC fan protection	All models
E7	Discharge temperature (T5) sensor fault	80 model
E9	EEPROM Error	All models
E.9.	Compressor parameters mismatch	All models
Eb	E6 fault occurs more than six times in an hour.	All models
EF	PFC fault	100~160 model
EH	Refrigerant radiator temperature sensor fault	All models
EP	Cooling ambient temperature lower than -5℃	All model
F1	DC generatrix voltage protection	100~160 model
H0	Communication malfunction between inverter module board and main control board	All models
H4	L (L0/L1) fault occurs three times in one hour.	All models
H7	Number of indoor unit detected is increase or decrease.	All models
L0	IPM module protection	All models
L1	DC generatrix low voltage protection	All models
L2	DC generatrix high voltage protection	All models
L4	MCE malfunction	100~160 model
L5	Zero speed protection	100~160 model
L7(reserved)	Compressor phase lost protection	All models
L8	Frequency difference in one second >15Hz protection	100~160 model
L9	Protection for the difference between the set speed and the running speed of the compressor > 15Hz	100~160 model
LA	Compressor over-current protection	80 model
PL	Radiator surface temperature protection	All models
P1	System high pressure protection	100~160 model
P2	System low pressure protection	All models
P3	Overcurrent protection	All models
P4	Discharge temperature protection	All models
P5	Outdoor condenser temperature T3 protection	All models
P8	Typhoon protection	All models
PE	IDU evaporator temperature T2 protection	All models

## 2 Troubleshooting

### 2.1 Warning

#### Warning



- All electrical work must be carried out by competent and suitably qualified, certified and accredited professionals and in accordance with all applicable legislation (all national, local and other laws, standards, codes, rules, regulations and other legislation that apply in a given situation).
- Power-off the outdoor units before connecting or disconnecting any connections or wiring, otherwise electric shock (which can cause physical injury or death) may occur or damage to components may occur.

### 2.2 C0: Communication fault between main board and communicate converter board (Only for 100/120 model)

#### 2.2.1 Digital display output

## C0

#### 2.2.2 Description

- Communication fault between main board and communicate converter board.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

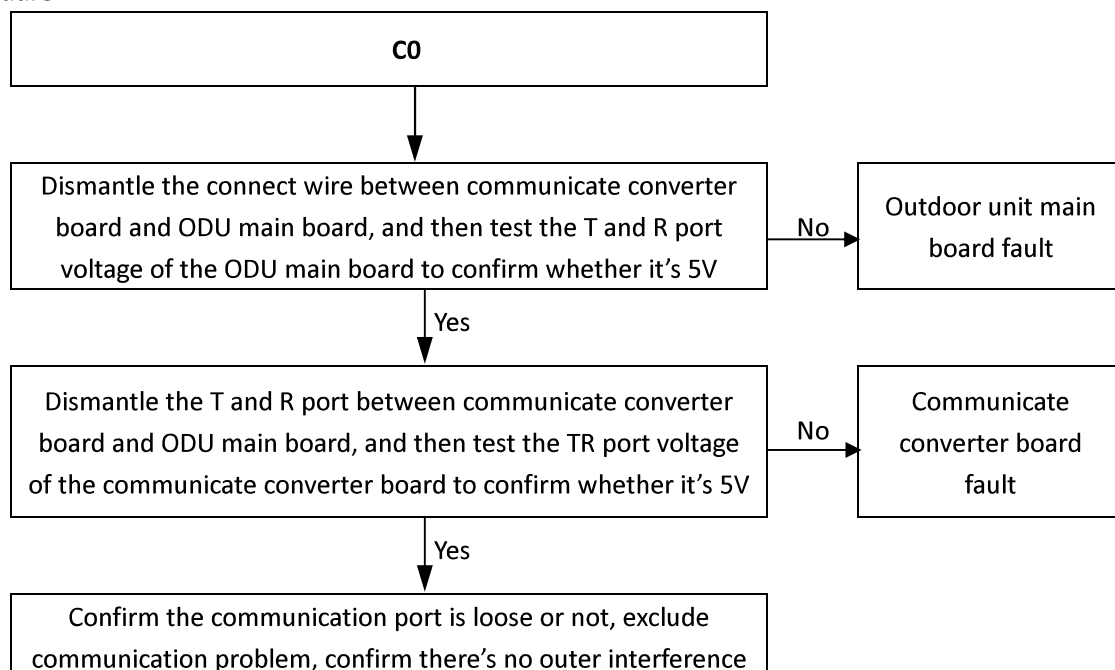
#### 2.2.3 Trigger / recover condition

- Trigger condition: Communicate converter board and ODU main control board cannot communicate.
- Recover condition: Communication go back to normal.
- Reset method: Resume automatically.

#### 2.2.4 Possible causes

- Interference from high voltage wires or other sources of electromagnetic radiation.
- Communicate converter board is damage.
- Communicate wire port is loose or connector surface is corrosive, or water drop lead to poor contact.
- Communicate wire break or poor contact for reasons (such as rat beat, or bond and connection).

#### 2.2.5 Procedure



## 2.3 E2: Communication error between indoor and outdoor unit (For all models)

### 2.3.1 Digital display output

# E2

### 2.3.2 Description

- Communication error between indoor and outdoor unit.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

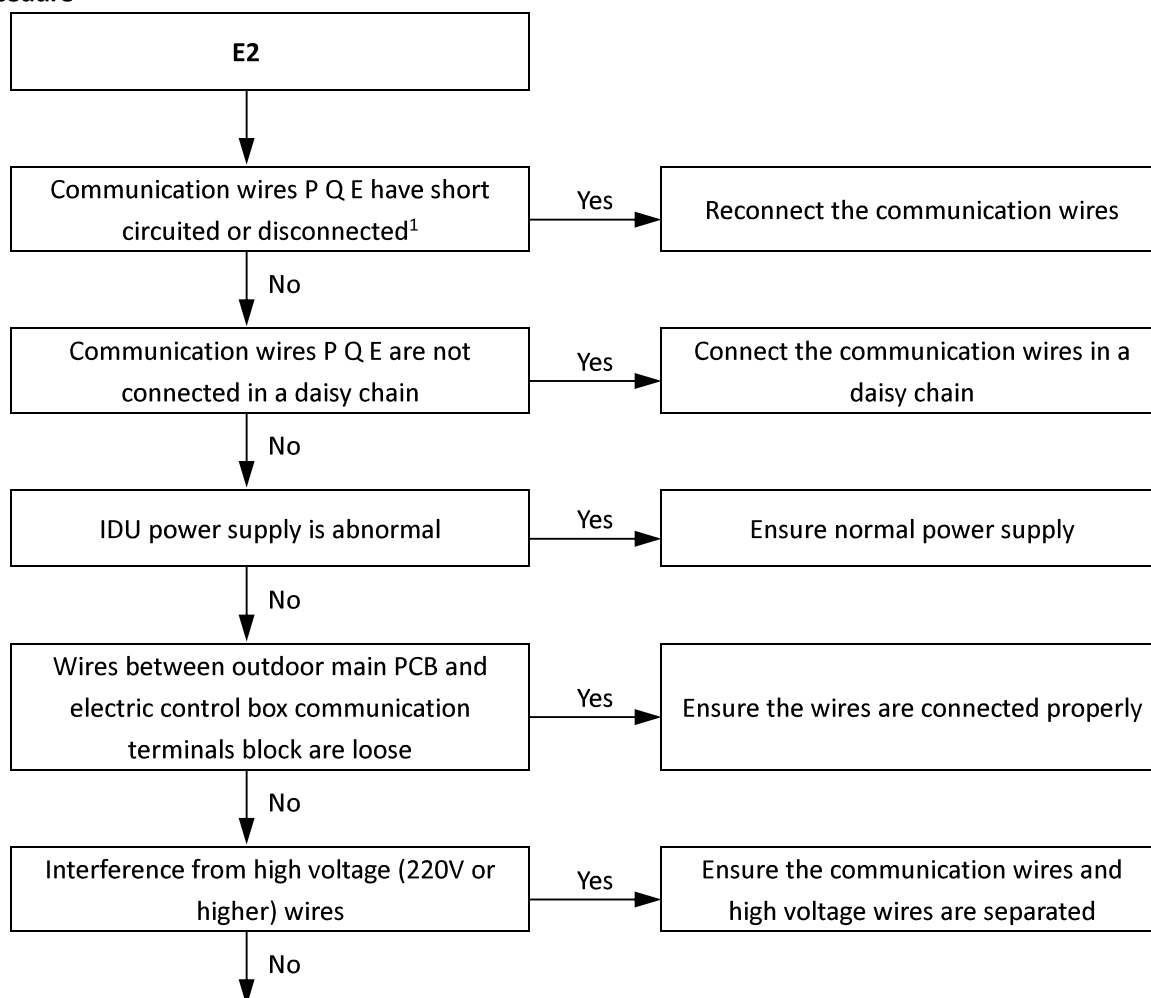
### 2.3.3 Trigger / recover condition

- Trigger condition: Indoor units and the outdoor unit cannot communicate for 2 minutes after the system is powered on for 20 minutes.
- Recover condition: Communication go back to normal.
- Reset method: Resume automatically.

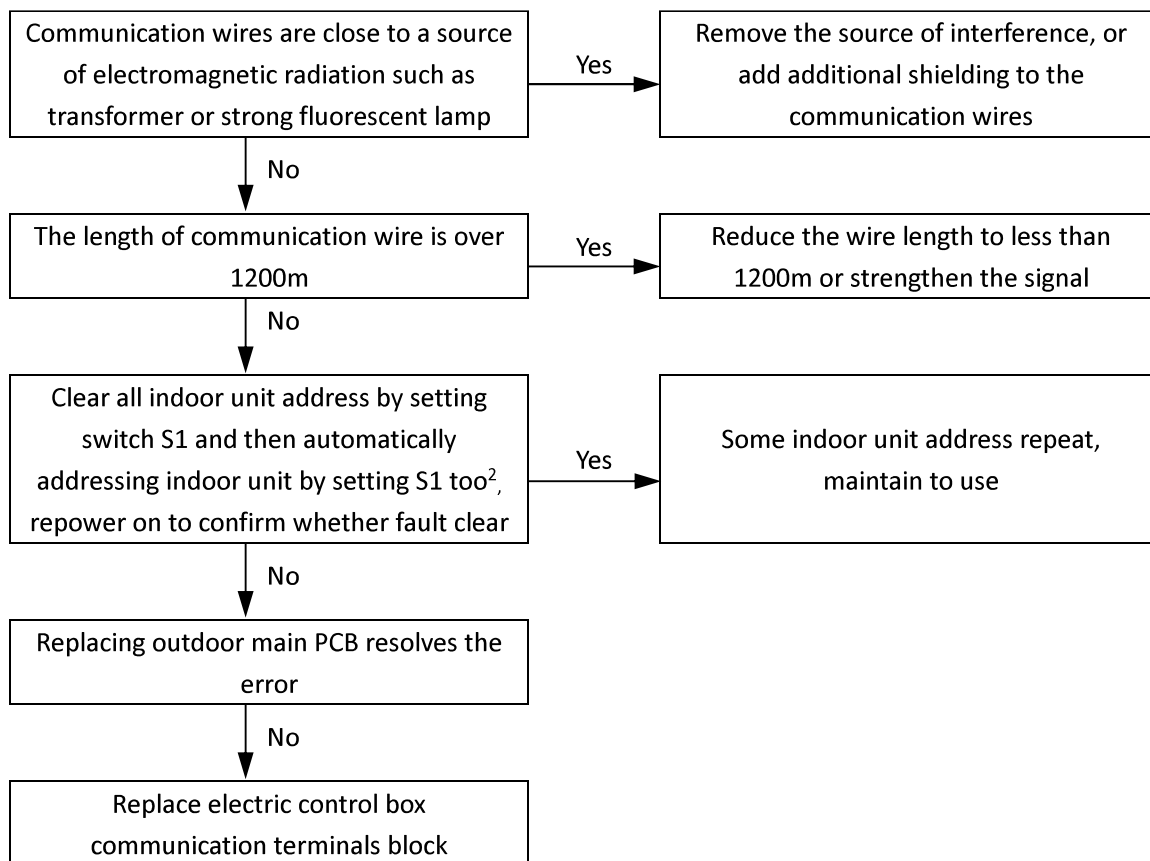
### 2.3.4 Possible causes

- Communication wires between indoor and outdoor units not connected properly.
- Indoor unit power supply abnormal.
- Loosened wiring within electric control box.
- Interference from high voltage wires or other sources of electromagnetic radiation.
- Communication wire too long.
- Damaged main PCB or electric control box communication terminals block.
- Communication wire break or poor contact for reasons (such as rat beat, or bond and connection).

### 2.3.5 Procedure









## Notes:

1. Measure the resistance among P, Q and E. The normal resistance between P and Q is 120Ω, between P and E is infinite, between Q and E is infinite.
2. S1 switch setting as below table, the switch is different for 80 model and 100-160 model; for every times setting, you need to repower on to make the switch dial function works.

Switch	model	Switch positions	Description
S1	80		S1-1 is ON, indicating Clearing of indoor unit address S1-1 is OFF, indicating automatic addressing (OFF by factory default)
	100-160		S1-2 is ON, indicating forced implementation of old indoor unit protocol S1-2 is OFF, indicating automatically adapting to indoor unit protocol

- Press indoor unit's receiver button for 5 seconds, the indoor unit's communication address code is displayed.

Table 6-2.1: Communication address code

Director light	Running	Timer	Fan/defend cold fan	Warning
Code	8	4	2	1

- Press it for 10 seconds, power code is displayed. Check each unit's address code.

Table 6-2.2: Power code

Address	0	1	2	3	4	5	6	7	8	9
Capacity (×100W)	22	28	36	45	56	71	80	90	112	140
HP	0.8	1.0	1.2	1.6	2.0	2.5	3.0	3.2	4.0	5.0

**For example:**

Press the button for 5 seconds:

If the “running” and “warning” lights are normally on, that means the address code is  $9=(8+1)$

If the lights are blink, the address code should plus 16, so the address code is  $25=16+(8+1)$

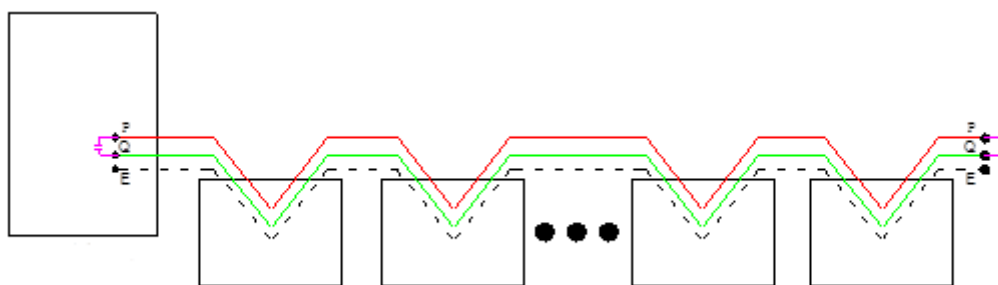
Press the button for 10 seconds:

If the “timer” and “warning” lights are normally on, that means the capacity code is  $5=(4+1)$  and the capacity of indoor unit is  $71 \times 100W(2.5HP)$ .

- If the signal is weak, connect a 120Ω resistor between P and Q of the farthest indoor unit, or connect a 0.5-1.5uF

capacitor between P and Q of outdoor unit. Installation refers to Figure 6-2.1:

Figure 6-2.1: Indoor unit installation



Notes:

1. Communication wires should be shield wire and indoor units should be connected in series.

## 2.4 E4: Temperature sensor (T3/T4) fault (For all models)

### 2.4.1 Digital display output

# E4

### 2.4.2 Description

- Outdoor heat exchanger temperature sensor (T3) error or outdoor ambient temperature sensor (T4) error.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

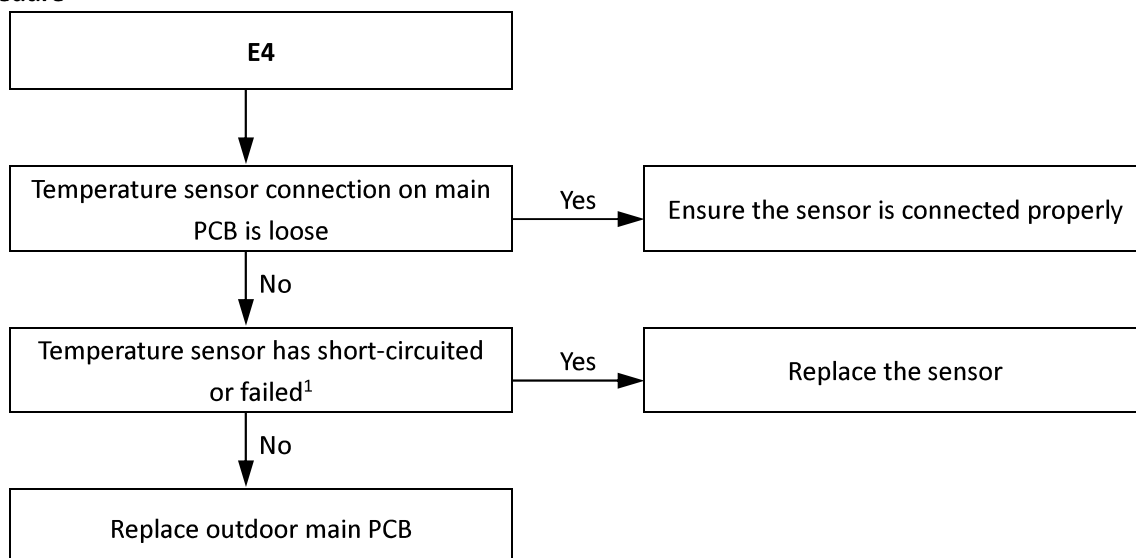
### 2.4.3 Trigger / recover condition

- Trigger condition: The main control board cannot receive the feedback signal of temperature sensor T3 or T4.
- Recover condition: The main control board can receive the feedback signal of temperature sensor T3 or T4.
- Reset method: Resume automatically.

### 2.4.4 Possible causes

- Temperature sensor not connected properly or has malfunctioned.
- Temperature sensor port connect to the main board connector is loose.
- Damaged main PCB.

### 2.4.5 Procedure



Notes:

1. Measure sensor resistance. If the resistance is too low, the sensor has short-circuited. If the resistance is not consistent with the sensor's resistance characteristics table, the sensor has failed.

## 2.5 E5: Abnormal power supply voltage (For all models)

### 2.5.1 Digital display output

# E5

### 2.5.2 Description

- Abnormal power supply voltage.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

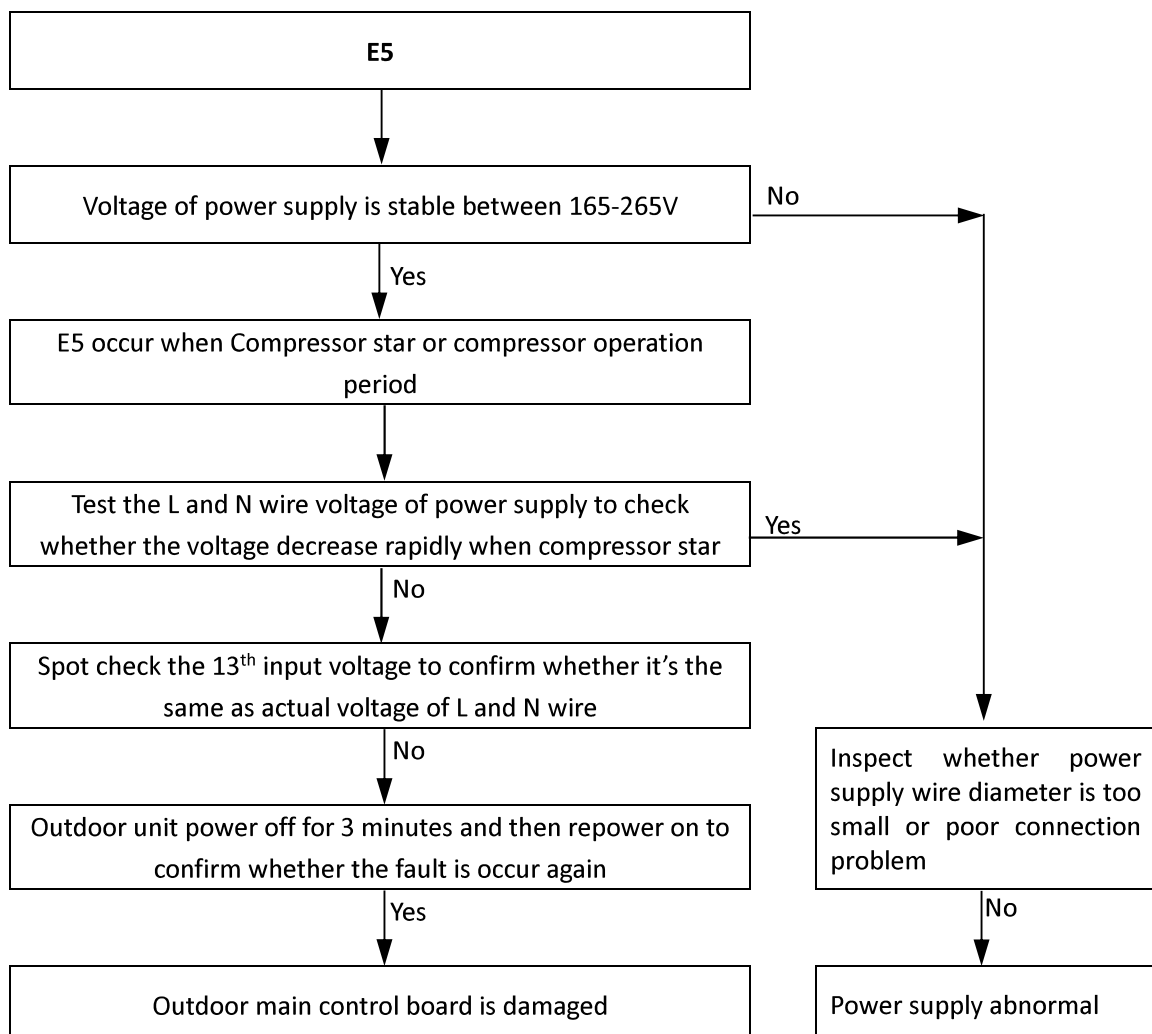
### 2.5.3 Trigger / recover condition

- Trigger condition: Outdoor unit power supply phase voltage < 165V or > 265V.
- Recover condition: Outdoor unit power supply phase voltage is within 198V ~265V.
- Reset method: Resume automatically.

### 2.5.4 Possible causes

- Outdoor unit power supply voltage is abnormal.
- Loosened wiring within electric control box.
- Power wire or air switch selection is too small.
- Main PCB damaged.

### 2.5.5 Procedure



## 2.6 E6: DC fan motor error; Eb: E6 protection appears 6 times in one hour (For all models)

### 2.6.1 Digital display output

## E6 or Eb

### 2.6.2 Description

- E6:DC fan motor error; Eb: E6 protection appears 6 times in one hour
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

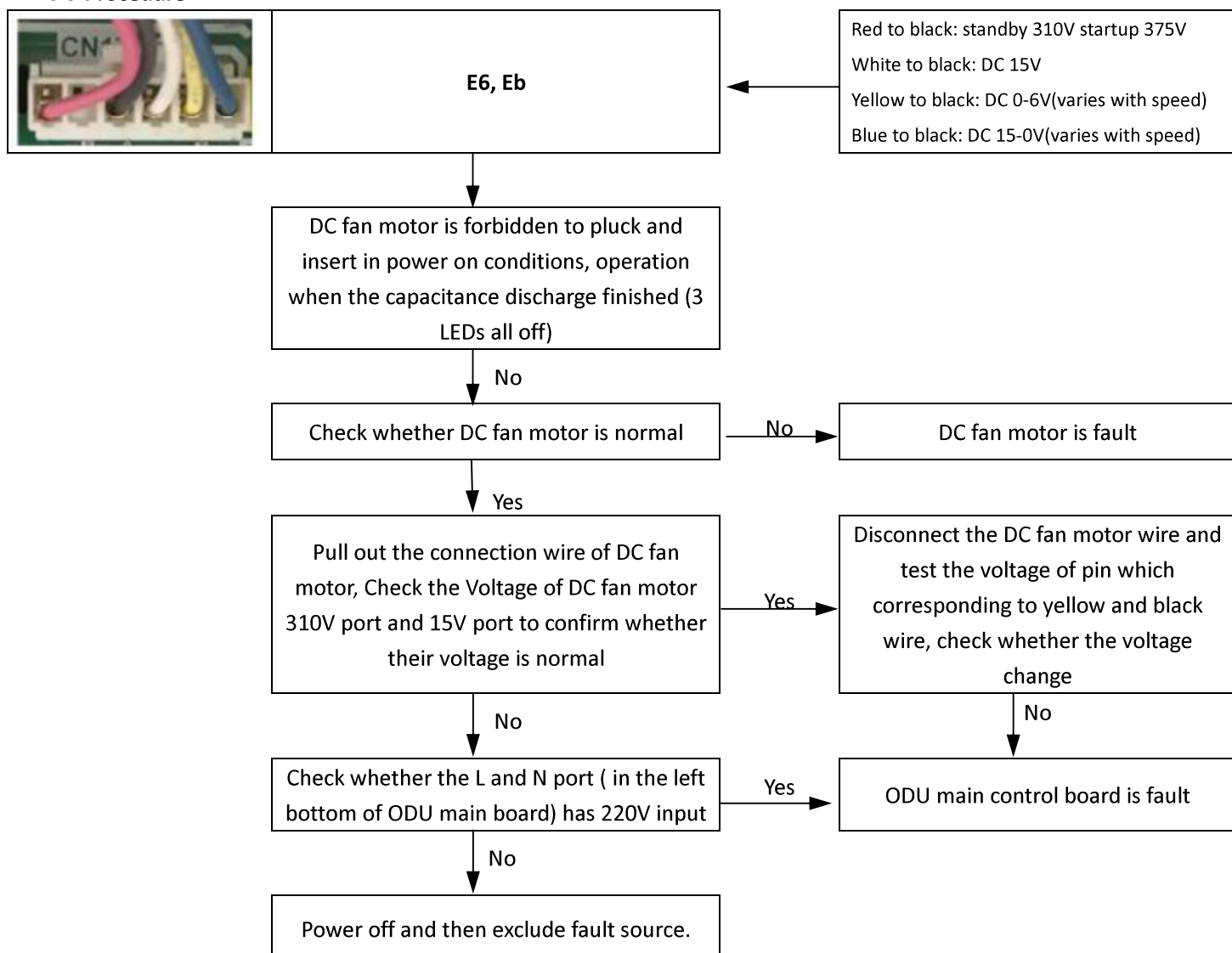
### 2.6.3 Trigger / recover condition

- Trigger condition:  
For E6 protection: Main control board can't receive the fan speed feedback signal.  
For Eb protection: E6 protection appears 6 times in one hour.
- Recover condition: The fan speed feedback signal is normal.
- Reset method:For E6 protection, Resume automatically; For Eb protection, Manually restart.

### 2.6.4 Possible causes

- Loosened wiring within electric control box.
- DC fan motor damaged.
- Main PCB damaged.

### 2.6.5 Procedure



## 2.7 E7: Discharge temperature sensor (T5) error (only for 80 model)

### 2.7.1 Digital display output

E7

### 2.7.2 Description

- A compressor discharge pipe temperature sensor (T5) error.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

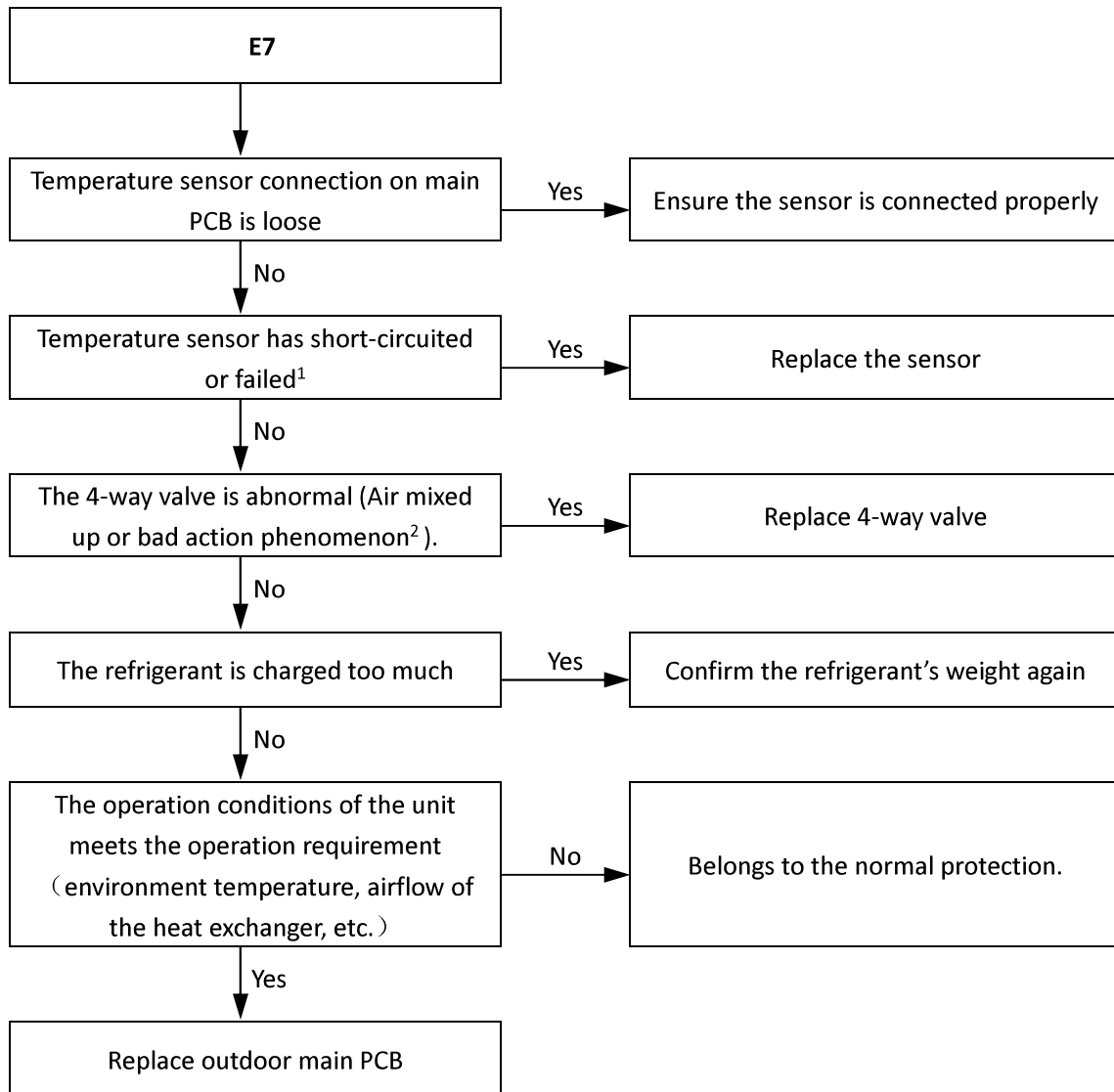
### 2.7.3 Trigger / recover condition

- Trigger condition: Discharge temperature < 10°C for 5 minutes after compressor startup for 15 minutes.
- Recover condition: Discharge temperature go back to normal.
- Reset method: Manually restart.

### 2.7.4 Possible causes

- Temperature sensor not connected properly or has malfunctioned.
- Damaged main PCB.

### 2.7.5 Procedure



#### Notes:

1. Measure sensor resistance. If the resistance is too low, the sensor has short-circuited. If the resistance is not consistent with the sensor's resistance characteristics table, the sensor has failed.
2. Air or nitrogen in the system causes discharge pressure to be higher than normal, compressor current to be higher than normal, discharge temperature to be higher than normal, compressor makes noise, pressure meter do not display steady.

## 2.8 E9: EEPROM error (For all models)

### 2.8.1 Digital display output

# E9

### 2.8.2 Description

- EEPROM error
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

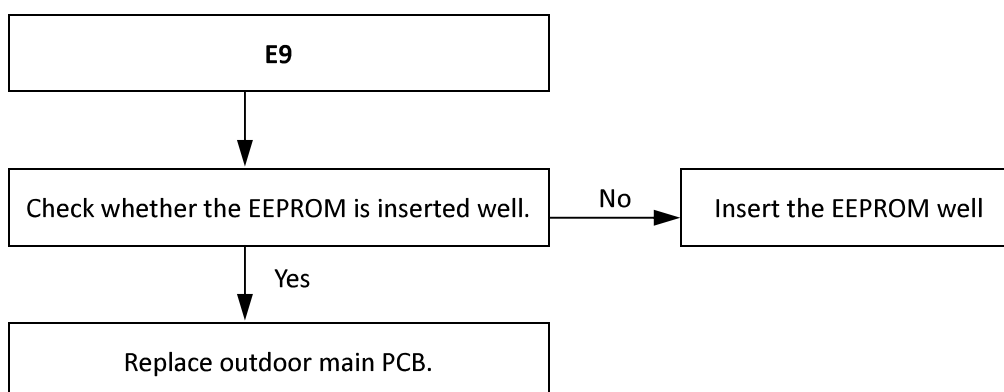
### 2.8.3 Trigger / recover condition

- Trigger condition: Unable to read the EEPROM when startup.
- Recover condition: EEPROM goes back to normal.
- Reset method: Manually restart.

### 2.8.4 Possible causes

- The EEPROM is not inserted well
- Damaged main PCB.

### 2.8.5 Procedure



## 2.9 E.9.: Compressor parameters mismatch (For all modes)

### 2.9.1 Digital display output

# E.9.

### 2.9.2 Description

- Main control chip detect the power setting number mismatch the model, the unit will display E.9. error.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

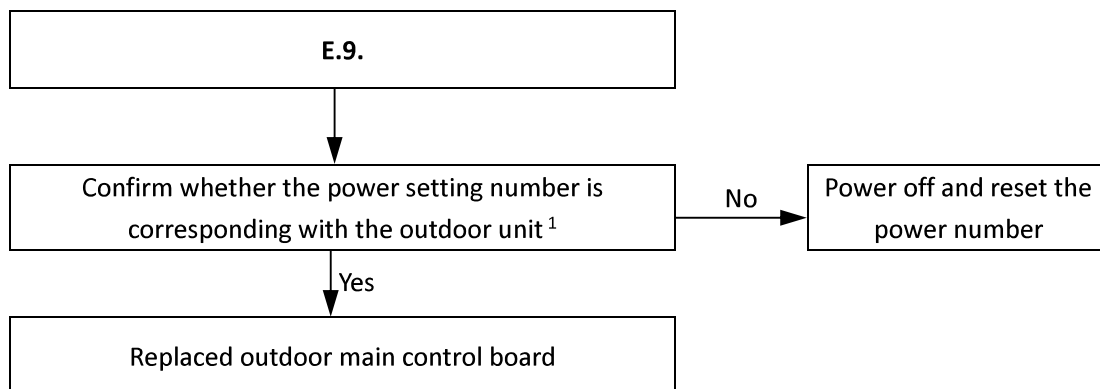
### 2.9.3 Trigger / recover condition

- Trigger condition: Main control chip detect the power setting number mismatch the model.
- Recover condition: Main control chip detect the power setting number match the model.
- Reset method: Manually restart.

### 2.9.4 Possible causes

- Power number setting mistake.
- Damaged main PCB.

### 2.9.5 Procedure



Notes:

1. Power setting switch is only for 100-160 model, 80 model don't need to setting  
 Power setting switch for 100/120 mode is S3, S3=100 is corresponding to 100 model and S3=010 is corresponding to 120 model.  
 Power setting switch for 140/160 mode is ENC2, ENC2=3 is corresponding to 140 model and ENCE=3 is corresponding to 160 model.

## 2.10 EF: PFC fault (Only for 100~160 model)

### 2.10.1 Digital display output

# EF

### 2.10.2 Description

- PFC fault protection.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

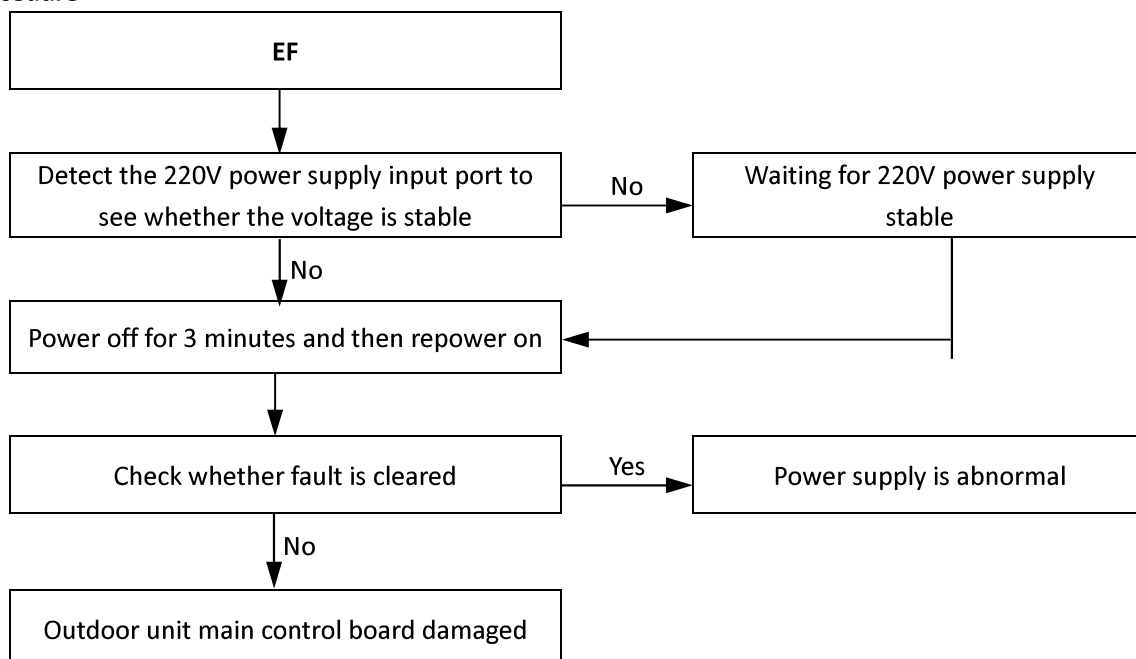
### 2.10.3 Trigger / recover condition

- Trigger condition: if DC generatrix voltage is over 450V for continue 3 S or over 500V in the first 5 s in PFC star period.
- Recover condition: DC generatrix voltage is normal in the first 5 s in PFC star period.
- Reset method: Manually restart.

### 2.10.4 Possible causes

- DC fan motor damaged.
- Main PCB damaged.

### 2.10.5 Procedure



## 2.11 EH: Refrigerant radiator temperature sensor error (For all models)

### 2.11.1 Digital display output

# EH

### 2.11.2 Description

- Refrigerant radiator temperature TL sensor error.
- The system stops running.
- Error code is displayed on outdoor unit PCB.

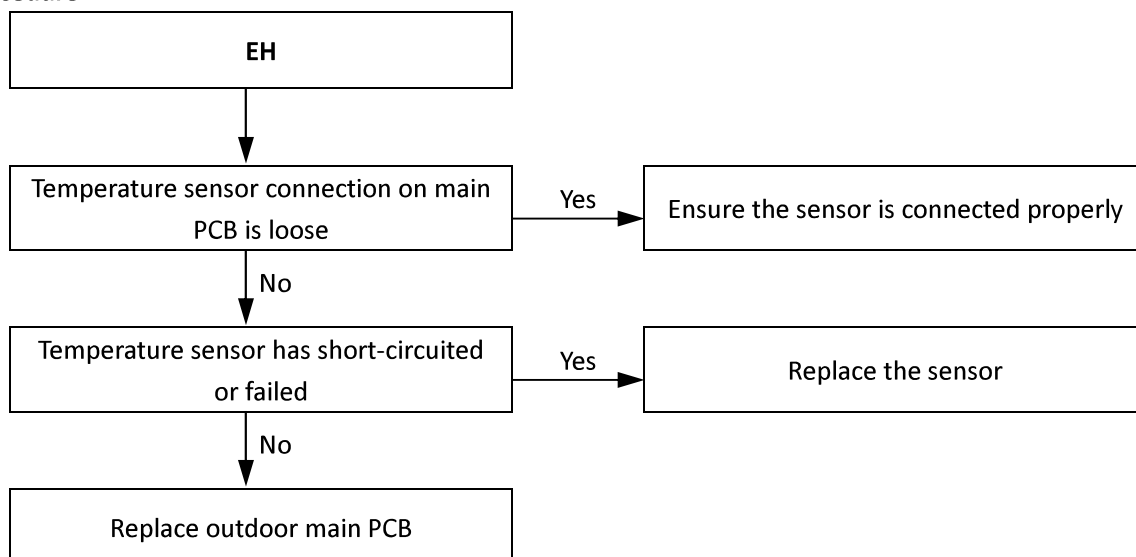
### 2.11.3 Trigger / recover condition

- Trigger condition: TL temperature sensor is open circuited (or connector loose) or short circuited.
- Recover condition: The main control board can receive a normal feedback signal of TL sensor.
- Reset method: Resume automatically.

### 2.11.4 Possible causes

- TL temperature sensor damaged.
- TL temperature sensor connect to the main control board is loose.
- Main PCB damaged.

### 2.11.5 Procedure



## 2.12 EP: Outdoor ambient temperature is lower than -5℃ in cooling operation (For all models)

### 2.12.1 Digital display output

# EP

### 2.12.2 Description

- Outdoor ambient temperature is lower than -5℃ in cooling operation.
- The system stops running.
- Error code is displayed on outdoor unit PCB.

### 2.12.3 Trigger / recover condition

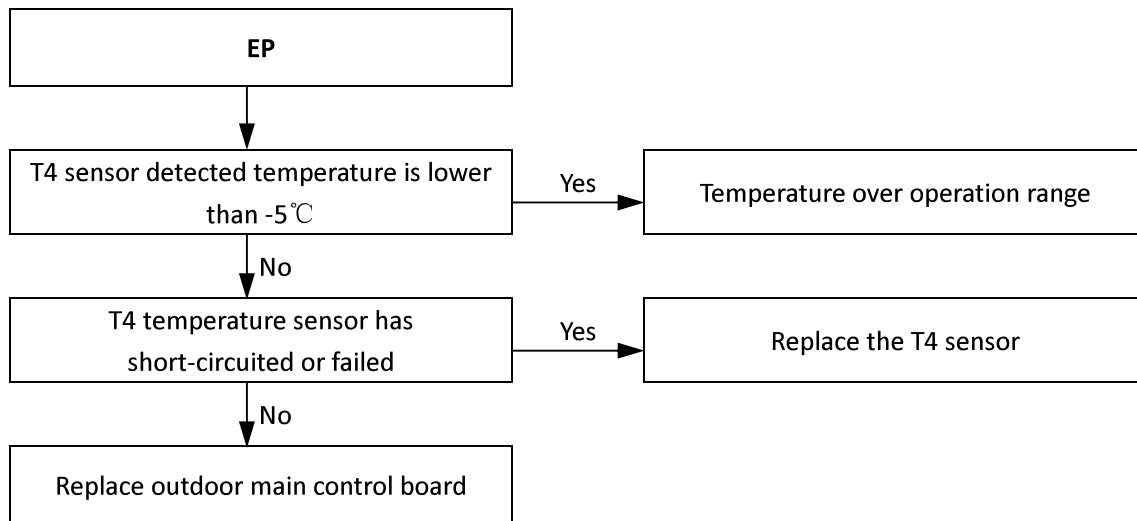
- Trigger condition: Outdoor ambient temperature is lower than -5℃ in cooling operation.
- Recover condition: Outdoor ambient temperature is over -5℃.
- Reset method: Resume automatically.

### 2.12.4 Possible causes



- TL temperature sensor damaged.
- TL temperature sensor connect to the main control board is loose.
- Main PCB damaged.

#### 2.12.5 Procedure



### 2.13 F1: DC bus voltage protection (Only for 100~160 model)

#### 2.13.1 Digital display output

## F1

#### 2.13.2 Description

- F1 indicates DC bus voltage protection.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

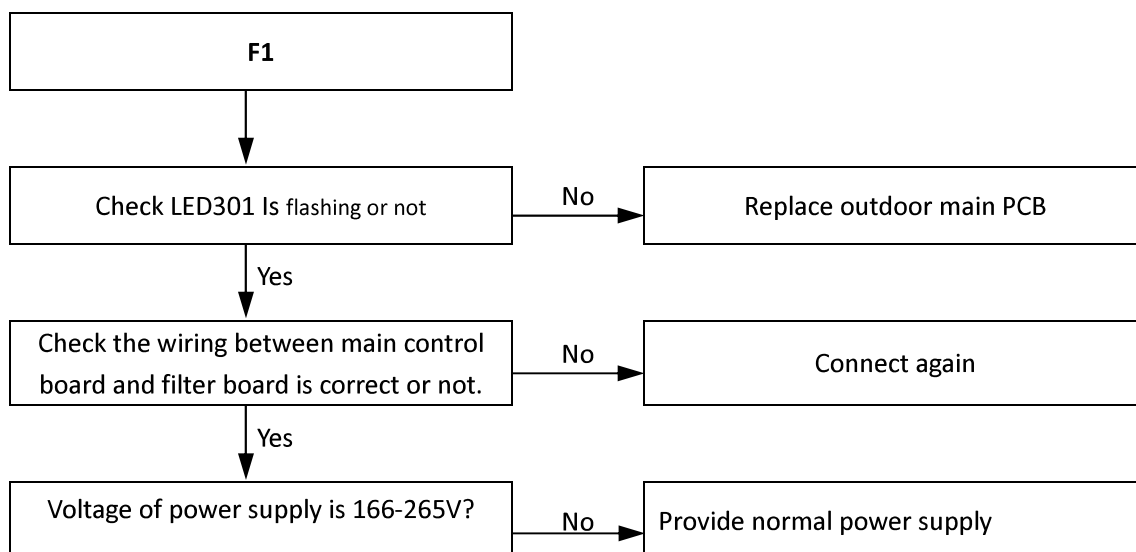
#### 2.13.3 Trigger / recover condition

- Trigger condition: If IC55 main chip couldn't receive the DC generatrix voltage detection signal or the voltage less than 200VDC in the first 5 seconds period when power on, it would report F1 and the big relay is forbid to close.
- Recover condition: IC55 main chip can receive the DC generatrix voltage detection signal and the voltage over 200VDC .
- Reset method: Resume automatically.

#### 2.13.4 Possible causes

- DC fan motor damaged.
- The wire connect CN52 with CN53 is loose (100/120 model can ignore this reason for there's not this wire connection).
- Main control board damaged.
- Filter board damaged (100/120 model can ignore this reason for they don't have a filter board).

### 2.13.5 Procedure



## 2.14 H0: Communicate malfunction between inverter module board and main control board (for all models)

### 2.14.1 Digital display output

# H0

### 2.14.2 Description

- Communicate malfunction between inverter module board and main control board protection.
- The system stops running.
- Error code is displayed on the unit with the error.

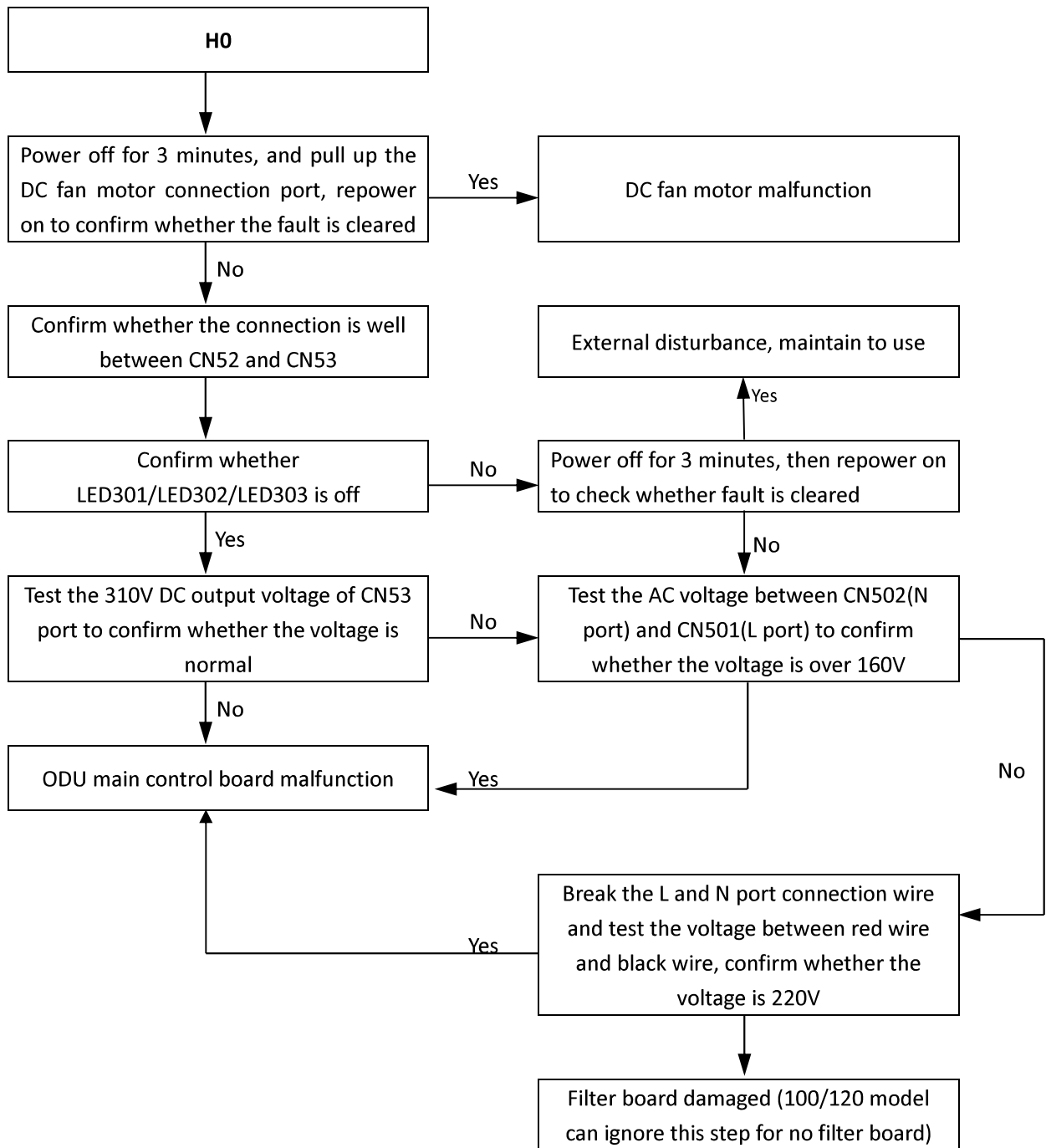
### 2.14.3 Trigger / recover condition

- Trigger condition: Communicate malfunction between inverter module board and main control board.
- Recover condition: Communicate between inverter module board and main control board is normal.
- Reset method: Resume automatically.

### 2.14.4 Possible causes

- DC fan motor damaged.
- The wire connect CN52 with CN53 is loose (100/120 model can ignore this reason for there's not this wire connection).
- Main control board damaged.
- Filter board damaged (100/120 model can ignore this reason for they don't have a filter board).

#### 2.14.5 Procedure



### 2.15 H7: Number of indoor unit detected is increase or decrease (For all models)

#### 2.15.1 Digital display output

# H7

#### 2.15.2 Description

- Number of indoor unit detected is increase or decrease protection.
- The system stops running.
- Error code is displayed on the unit with the error.

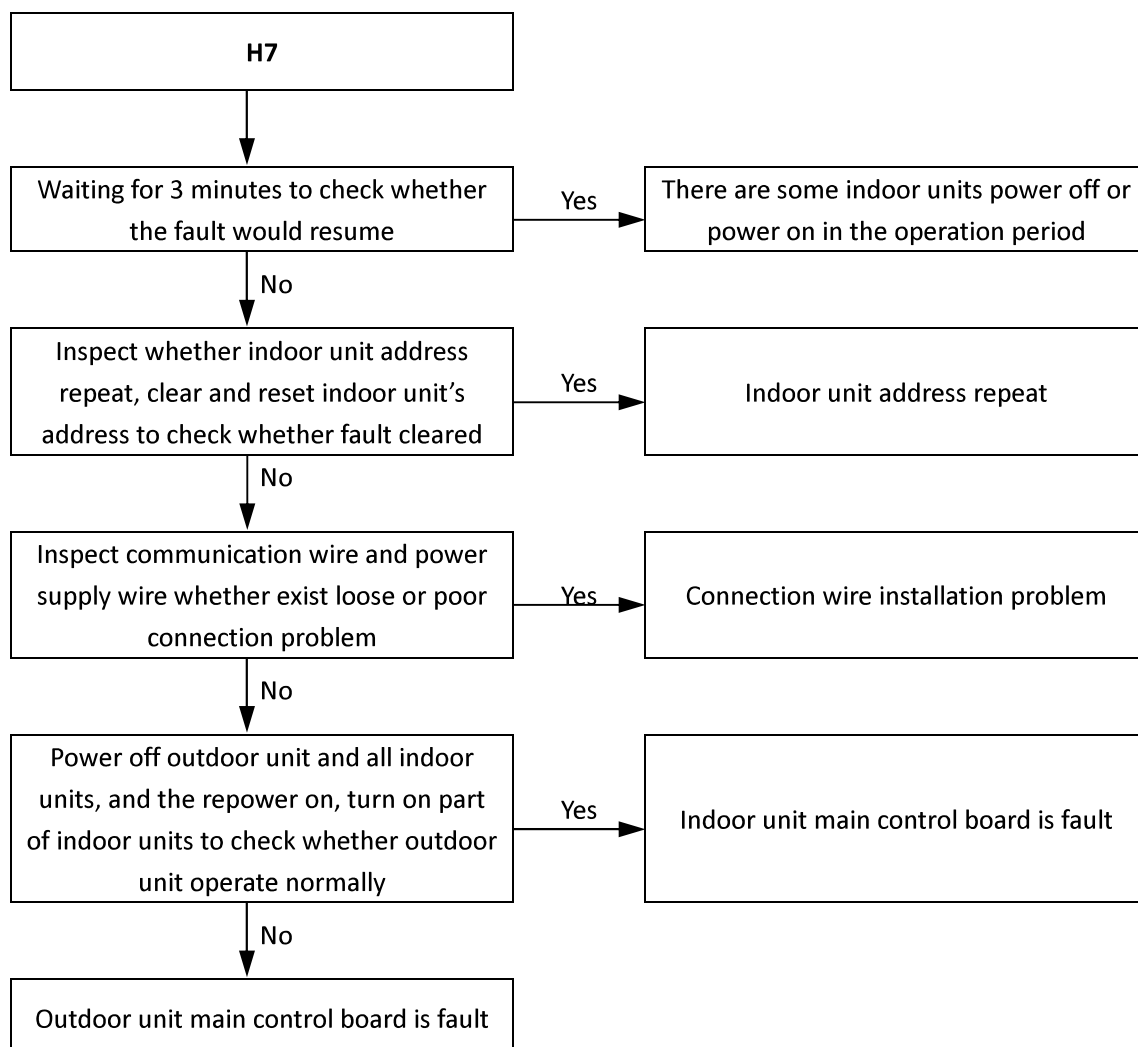
#### 2.15.3 Trigger / recover condition

- Trigger condition: Number of indoor unit detected is increase or decrease.
- Recover condition: Number of indoor unit detected is the same as first power on.
- Reset method: Resume automatically.

#### 2.15.4 Possible causes

- Communication wire or power supply wire connection problem.
- Indoor unit main control board damaged.
- Outdoor unit main control board damaged.

#### 2.15.5 Procedure



### 2.16 P1: Discharge pipe high pressure protection (for 100~160 model)

#### 2.16.1 Digital display output

## P1

#### 2.16.2 Description

- Discharge pipe high pressure protection.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

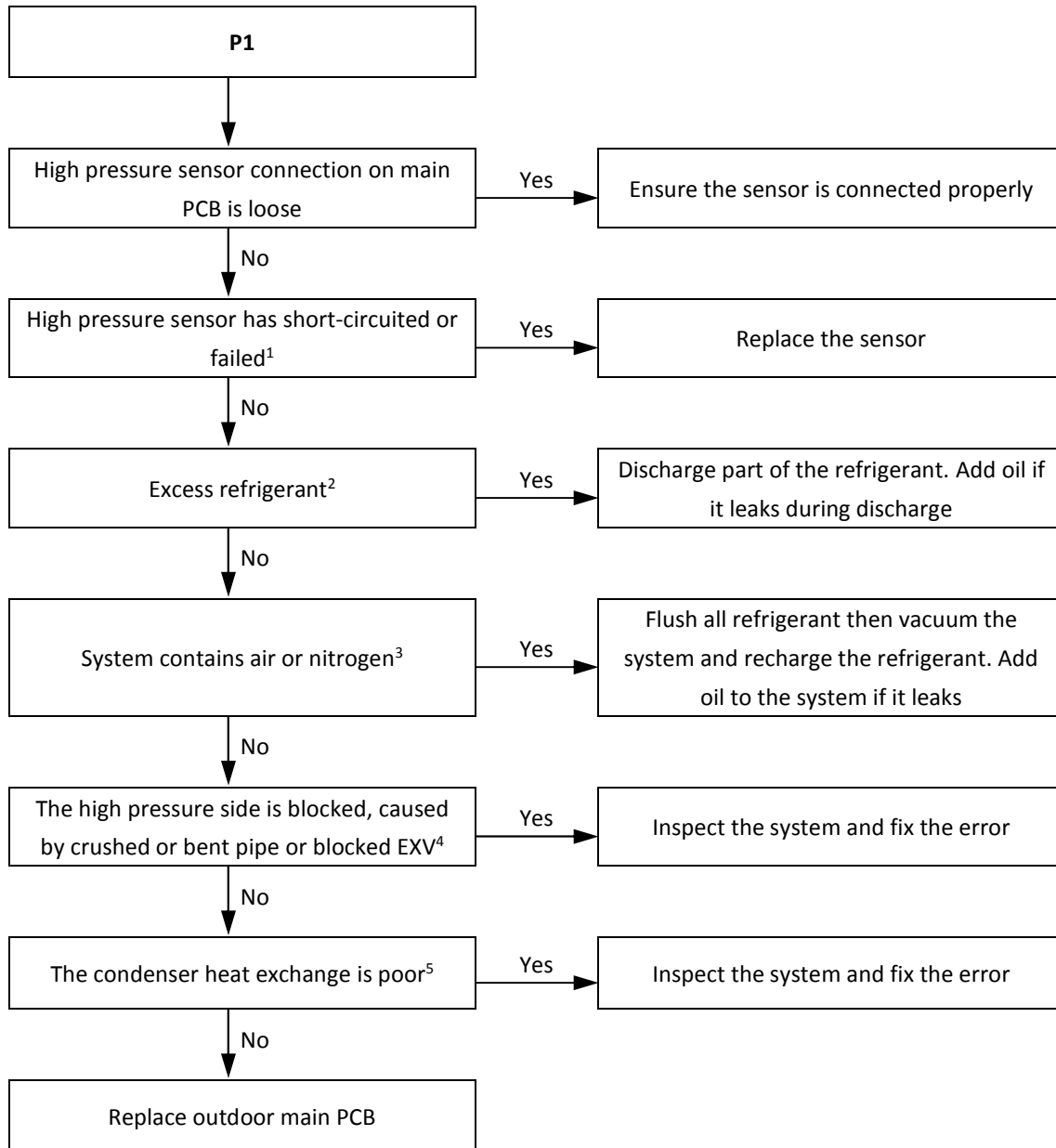
#### 2.16.3 Trigger / recover condition

- Trigger condition: Discharge pressure  $\geq 4.4\text{MPa}$ .
- Recover condition: Discharge pressure  $\leq 3.2\text{MPa}$ .
- Reset method: Resume automatically.

#### 2.16.4 Possible causes

- Pressure sensor/switch not connected properly or has malfunctioned.
- Excess refrigerant.
- System contains air or nitrogen.
- High pressure side blockage.
- Poor condenser heat exchange.
- Main PCB damaged.

#### 2.16.5 Procedure



#### Notes:

1. Measure the resistance among the three terminals of the pressure sensor. If the resistance is of the order of mega Ohms or infinite, the pressure sensor has failed.
2. Excess refrigerant causes discharge temperature to be lower than normal, discharge pressure to be higher than normal and suction pressure to be higher than normal.
3. Air or nitrogen in the system causes discharge temperature to be higher than normal, discharge pressure to be higher than normal, compressor current to be higher than normal, abnormal compressor noise and an unsteady pressure meter reading.
4. High pressure side blockage causes discharge temperature to be higher than normal, discharge pressure to be higher than normal and suction pressure to be lower than normal.
5. In cooling mode check outdoor heat exchangers, fans and air outlets for dirt/blockages. In heating mode check indoor heat exchangers, fans and air outlets for dirt/blockages.

## 2.17 P2: Suction pipe low pressure protection (For all models)

### 2.17.1 Digital display output

# P2

### 2.17.2 Description

- Suction pipe low pressure protection.
- The system stops running.
- Error code is displayed on outdoor unit PCB.

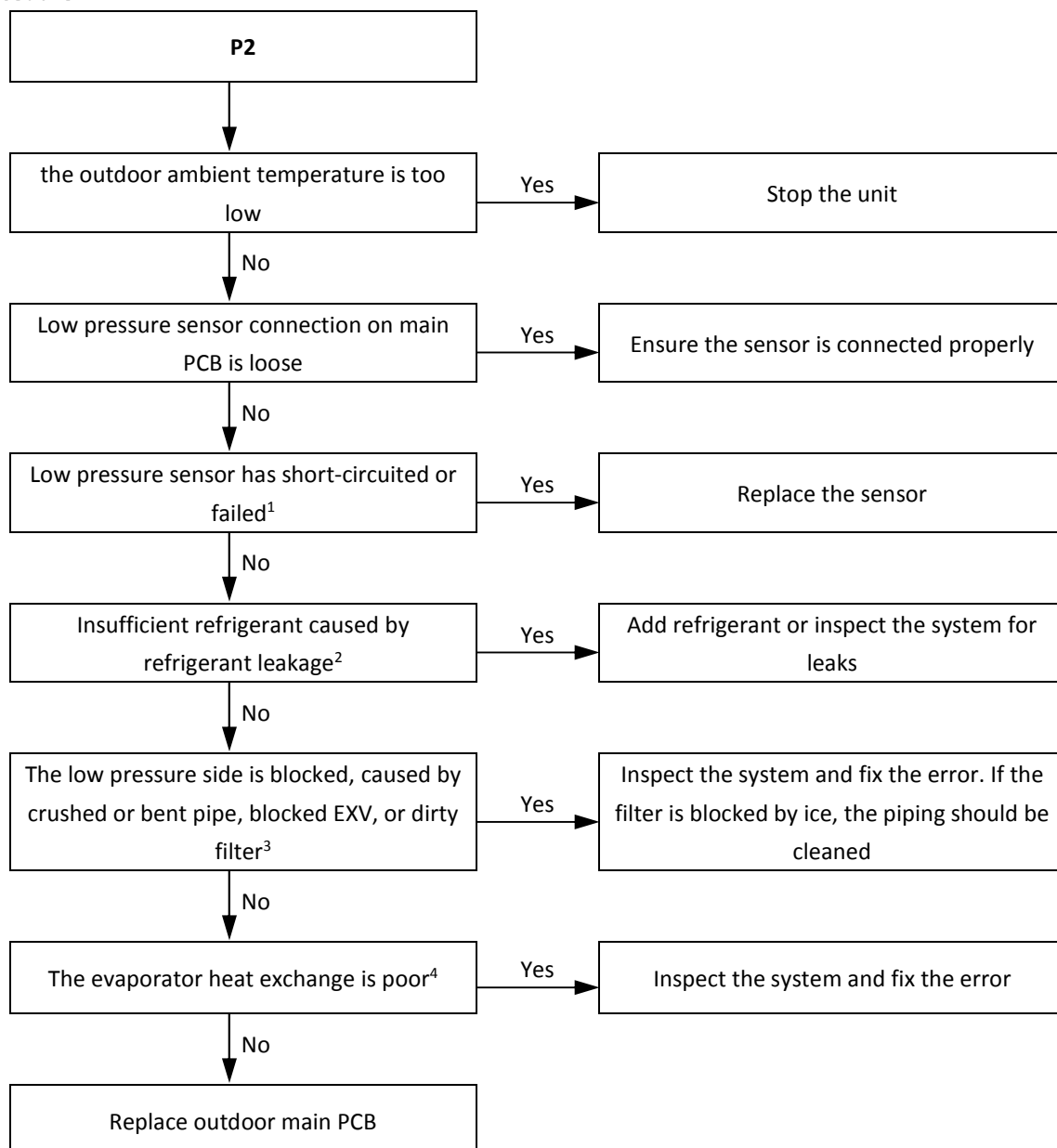
### 2.17.3 Trigger / recover condition

- Trigger condition: Suction pressure  $\leq 0.05\text{MPa}$ .
- Recover condition: Suction pressure  $\geq 0.15\text{MPa}$ .
- Reset method: Resume automatically.

### 2.17.4 Possible causes

- Insufficient refrigerant.
- Low pressure side blockage.
- Poor evaporator heat exchange.
- Main PCB damaged.

### 2.17.5 Procedure



#### Notes:

1. Measure the resistance among the three terminals of the pressure sensor. If the resistance is of the order of mega Ohms or infinite, the pressure sensor has failed.
2. An insufficiency of refrigerant causes compressor discharge temperature to be higher than normal, discharge and suction pressures to be lower than normal and compressor current to be lower than normal, and may cause frosting to occur on the suction pipe. These issues disappear once sufficient refrigerant has been charged into the system.
3. A low pressure side blockage causes compressor discharge temperature to be higher than normal, suction pressure to be lower than normal and compressor current to be lower than normal, and may cause frosting to occur on the suction pipe.
4. In cooling mode check indoor heat exchangers, fans and air outlets for dirt/blockages. In heating mode check outdoor heat exchangers, fans and air outlets for dirt/blockages.

## 2.17 P3: Compressor current protection (For all models)

### 2.17.6 Digital display output

# P3

#### 2.17.7 Description

- P3 indicates current protection on compressor.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

#### 2.17.8 Trigger / recover condition

- Trigger condition: Current of compressor  $\geq C^1$ .
- Recover condition: Current of compressor  $< C^1$ .
- Reset method: Resume automatically.

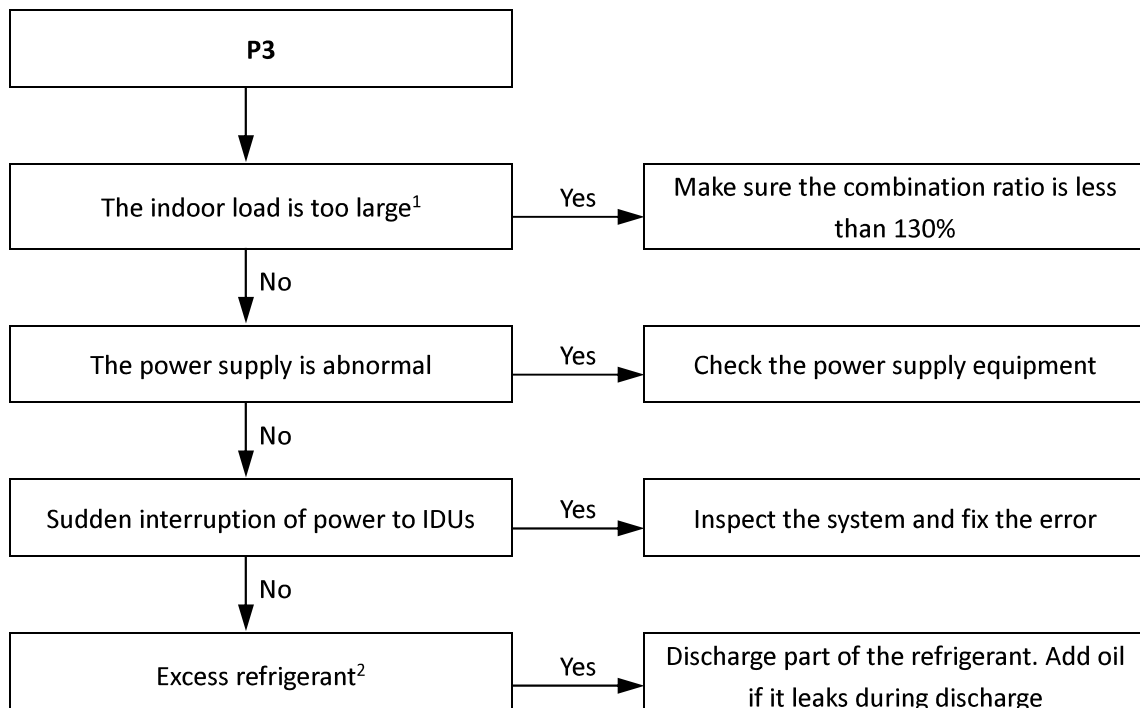
#### Notes:

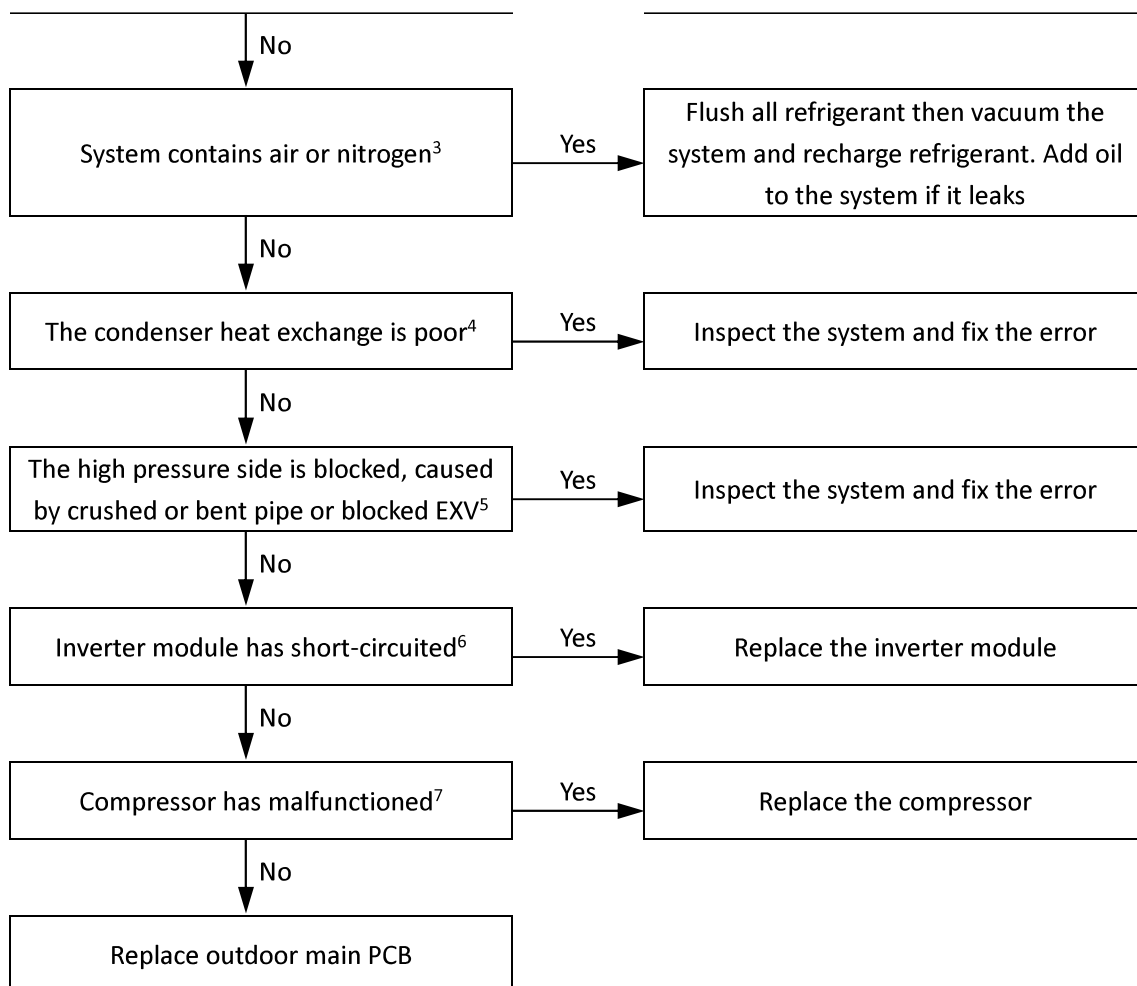
1. 80 model in cooling mode  $C=19A$ , 80 model in heating mode  $C=20A$ ; 100 model  $C=24A$ ; 120 model  $C=29A$ ; 140-160 model  $C=33A$

#### 2.17.9 Possible causes

- Indoor load too large.
- Power supply abnormal.
- Sudden interruption of power to IDUs.
- Excess refrigerant.
- System contains air or nitrogen.
- Poor condenser heat exchange.
- High pressure side blockage.
- Inverter module damaged.
- Compressor damaged.
- Main PCB damaged.

#### 2.17.10 Procedure





#### Notes:

1. An indoor load that is too large causes suction and discharge temperatures to be higher than normal.
2. Excess refrigerant causes discharge temperature to be lower than normal, discharge pressure to be higher than normal and suction pressure to be higher than normal.
3. Air or nitrogen in the system causes discharge temperature to be higher than normal, discharge pressure to be higher than normal, compressor current to be higher than normal, abnormal compressor noise and an unsteady pressure meter reading.
4. In cooling mode check outdoor heat exchangers, fans and air outlets for dirt/blockages. In heating mode check indoor heat exchangers, fans and air outlets for dirt/blockages.
5. High pressure side blockage causes discharge temperature to be higher than normal, discharge pressure to be higher than normal and suction pressure to be lower than normal.
6. Set a multi-meter to buzzer mode and test any two terminals of P N U V W of the inverter module. If the buzzer sounds, the inverter module has short-circuited.
7. The normal resistances of the inverter compressor are 0.5-1.5Ω among U V W and infinite between each of U V W and ground. If any of the resistances differ from these specifications, the compressor has malfunctioned.

## 2.18 P4: Discharge temperature protection (For all models)

### 2.18.1 Digital display output

# P4

### 2.18.2 Description

- Discharge temperature protection.
- The system stops running.
- Error code is displayed on the unit with the error.

### 2.18.3 Trigger / recover condition

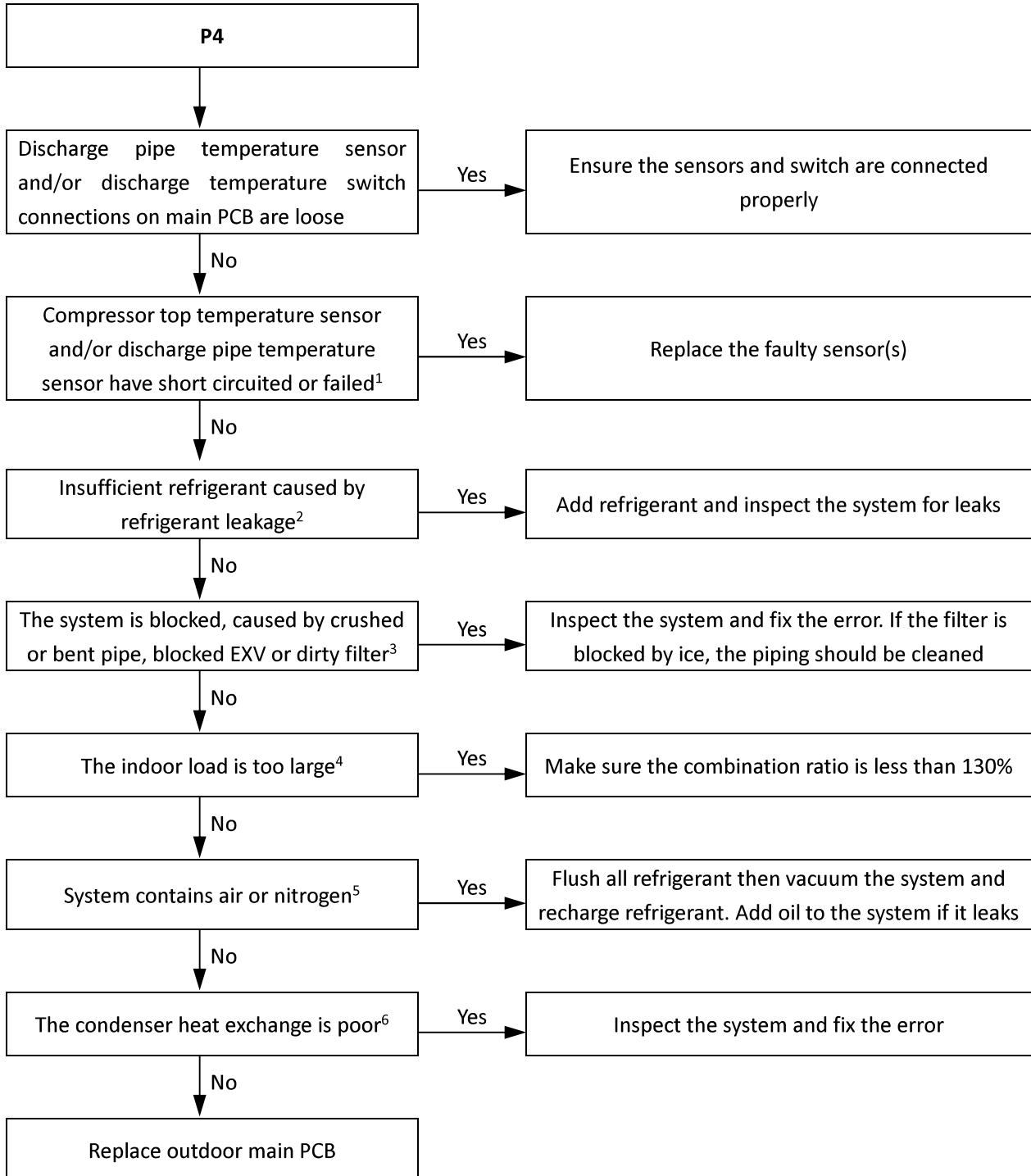
- Trigger condition: Discharge temperature (T5) > 115°C.
- Recover condition: Discharge temperature (T5) < 90°C.
- Reset method: Resume automatically.



#### 2.18.4 Possible causes

- Temperature sensor/switch not connected properly or has malfunctioned.
- Insufficient refrigerant.
- System blockage.
- Indoor load too large.
- System contains air or nitrogen.
- Poor condenser heat exchange.
- Main PCB damaged.

#### 2.18.5 Procedure



#### Notes:

1. Measure sensor resistance. If the resistance is too low, the sensor has short-circuited. If the resistance is not consistent with the sensor's resistance characteristics table, the sensor has failed.
2. An insufficiency of refrigerant causes compressor discharge temperature to be higher than normal, discharge and suction pressures to be lower than normal and compressor current to be lower than normal, and may cause frosting to occur on the suction pipe. These issues disappear once sufficient refrigerant has been charged into the system..
3. A low pressure side blockage causes compressor discharge temperature to be higher than normal, suction pressure to be lower than normal and compressor current to be lower than normal, and may cause frosting to occur on the suction pipe.
4. An indoor load that is too large causes suction and discharge temperatures to be higher than normal.
5. Air or nitrogen in the system causes discharge temperature to be higher than normal, discharge pressure to be higher than normal, compressor current to

be higher than normal, abnormal compressor noise and an unsteady pressure meter reading.

6. In cooling mode check outdoor heat exchangers, fans and air outlets for dirt/blockages. In heating mode check indoor heat exchangers, fans and air outlets for dirt/blockages.

## 2.19 P5: Outdoor heat exchanger temperature protection (For all models)

### 2.19.1 Digital display output

# P5

### 2.19.2 Description

- Outdoor heat exchanger temperature protection.
- The system stops running.
- Error code is displayed on the unit with the error.

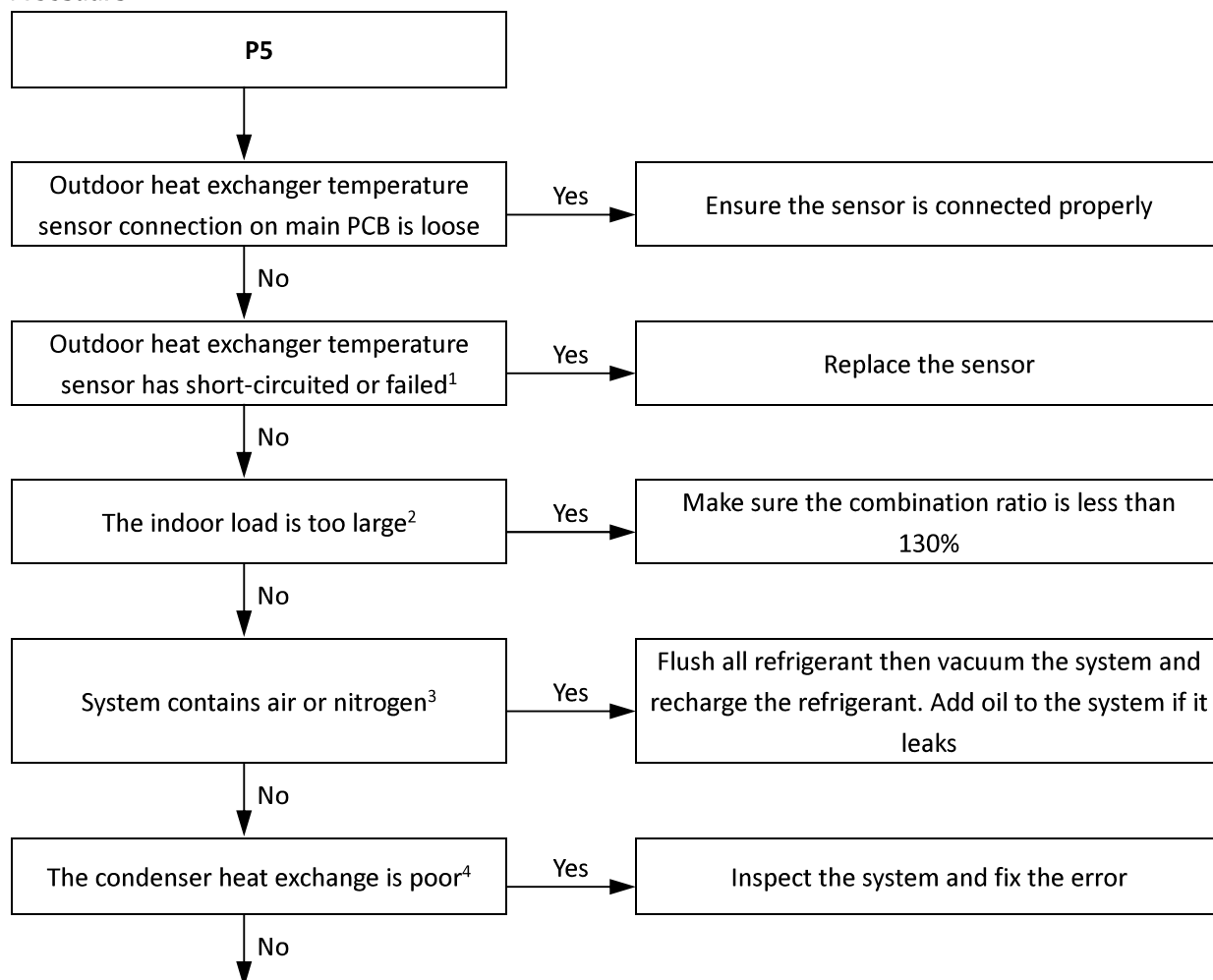
### 2.19.3 Trigger / recover condition

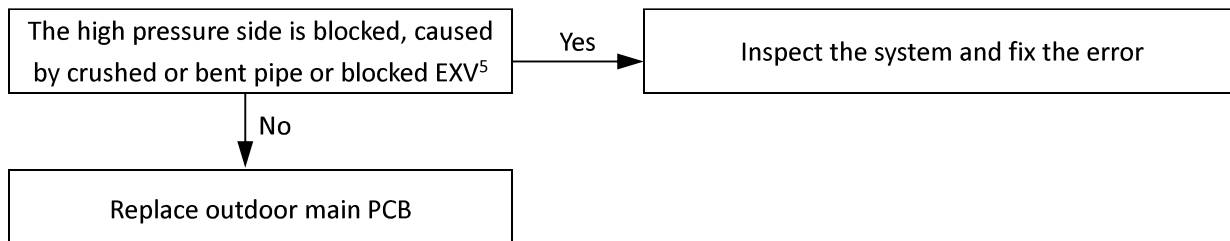
- Trigger condition: Outdoor heat exchanger temperature (T3)  $\geq 62^{\circ}\text{C}$ .
- Recover condition: Outdoor heat exchanger temperature (T3)  $< 52^{\circ}\text{C}$ .
- Reset method: Resume automatically.

### 2.19.4 Possible causes

- Temperature sensor not connected properly or has malfunctioned.
- Indoor load too large.
- System contains air or nitrogen.
- Poor condenser heat exchange.
- High pressure side blockage.
- Main PCB damaged.

### 2.19.5 Procedure





Notes:

1. Measure sensor resistance. If the resistance is too low, the sensor has short-circuited. If the resistance is not consistent with the sensor's resistance characteristics table, the sensor has failed.
2. An indoor load that is too large causes suction and discharge temperatures to be higher than normal.
3. Air or nitrogen in the system causes discharge temperature to be higher than normal, discharge pressure to be higher than normal, compressor current to be higher than normal, abnormal compressor noise and an unsteady pressure meter reading.
4. In cooling mode check outdoor heat exchangers, fans and air outlets for dirt/blockages. In heating mode check indoor heat exchangers, fans and air outlets for dirt/blockages.
5. High pressure side blockage causes discharge temperature to be higher than normal, discharge pressure to be higher than normal and suction pressure to be lower than normal.

## 2.20 P8: Typhoon protection (For all models)

### 2.20.1 Digital display output

# P8

### 2.20.2 Description

- P8 indicates strong wind protection.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

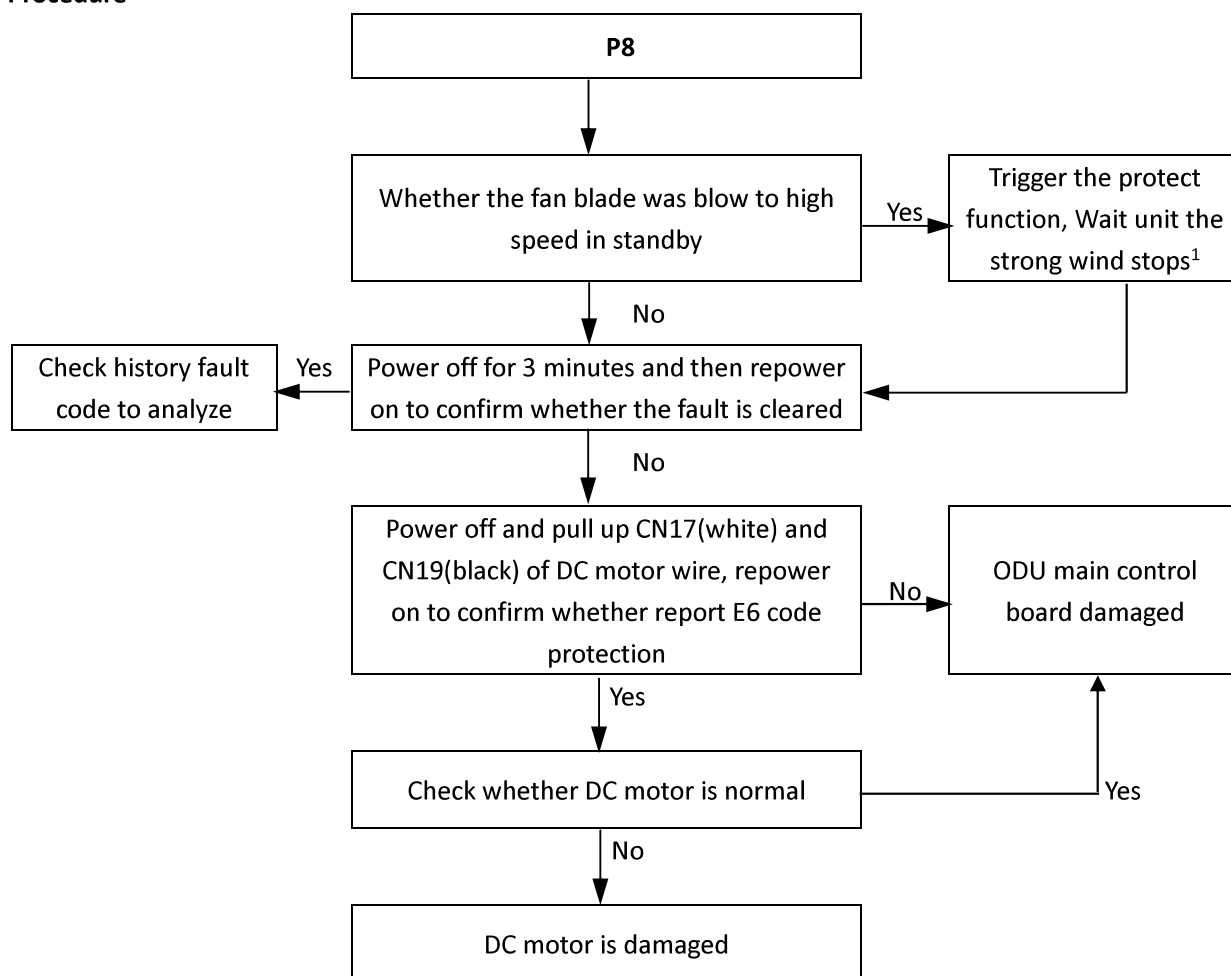
### 2.20.3 Trigger / recover condition

- Trigger condition:  
Fan speed  $\geq 400$ rps when the outdoor unit is not start up. Or fan speed over 400rps for 90S when outdoor unit stop for malfunction.
- Recover condition: Detect the fan speed  $< 400$ rps for more than 120S.
- Reset method: Resume automatically.

### 2.20.4 Possible causes

- There is strong wind around the outdoor unit.
- DC fan motor is damaged.
- Main PCB damaged.

## 2.20.5 Procedure



Notes:

1. P8 protection recovers in 2 minutes when the strong wind stops.

## 2.21 PE: Evaporator high temperature protection (For all models)

### 2.21.1 Digital display output

# PE

### 2.21.2 Description

- Evaporator high temperature protection
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

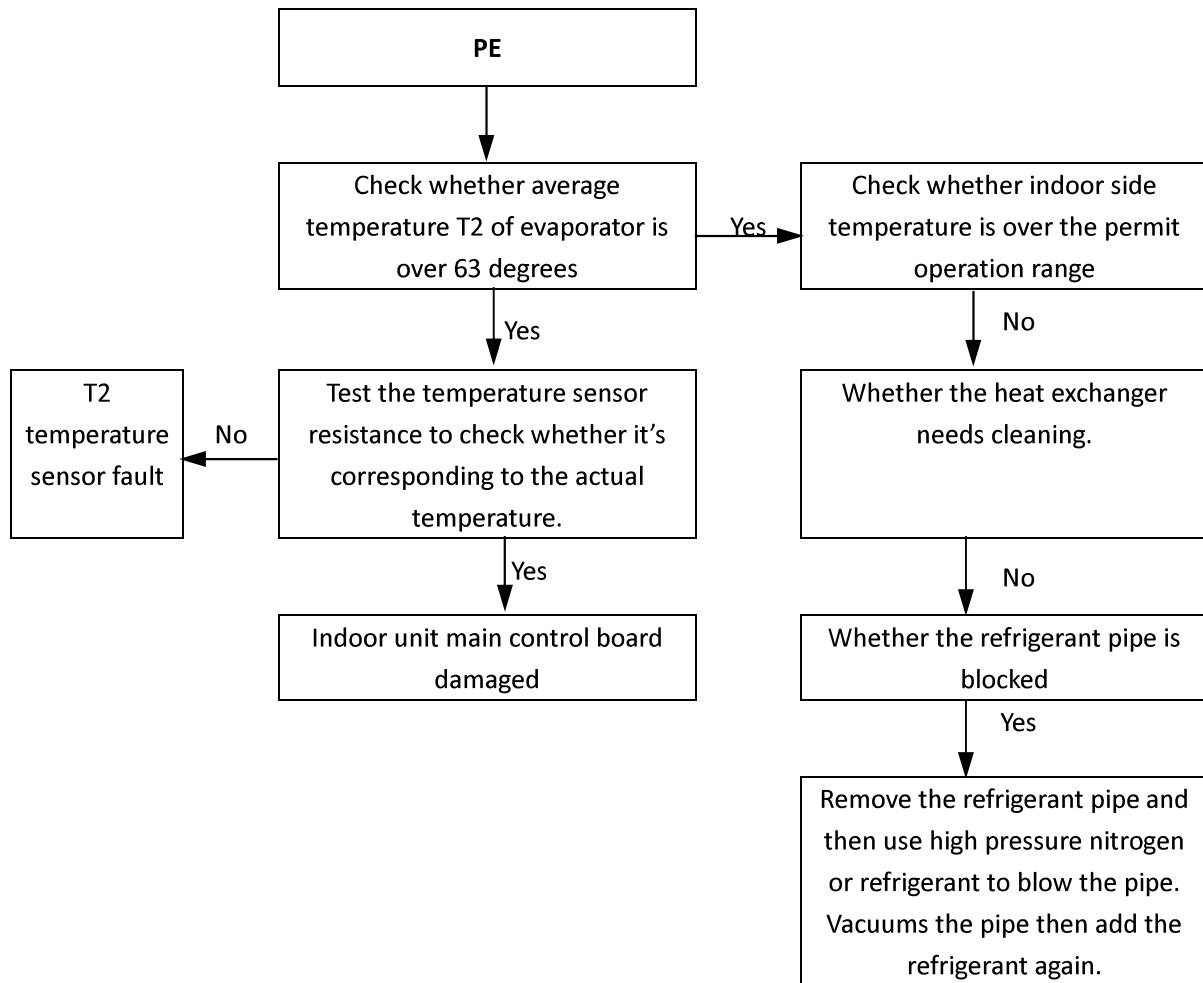
### 2.21.3 Trigger / recover condition

- Trigger condition:  
The middle average temperature of the evaporator is higher than 63°C for 50 seconds
- Recover condition: Pipe temperature < 50°C.
- Reset method: Resume automatically.

### 2.21.4 Possible causes

- Indoor temperature is too high.
- Temperature sensor not connected properly or has malfunctioned.
- System blockage.
- Poor condenser heat exchange.
- Indoor unit Main PCB damaged

### 2.21.5 Procedure



## 2.22 PL: Radiator surface high temperature protection (For all models)

### 2.22.1 Digital display output

# PL

### 2.22.2 Description

- Radiator surface high temperature protection.
- The system stops running.
- Error code is displayed on outdoor unit PCB.

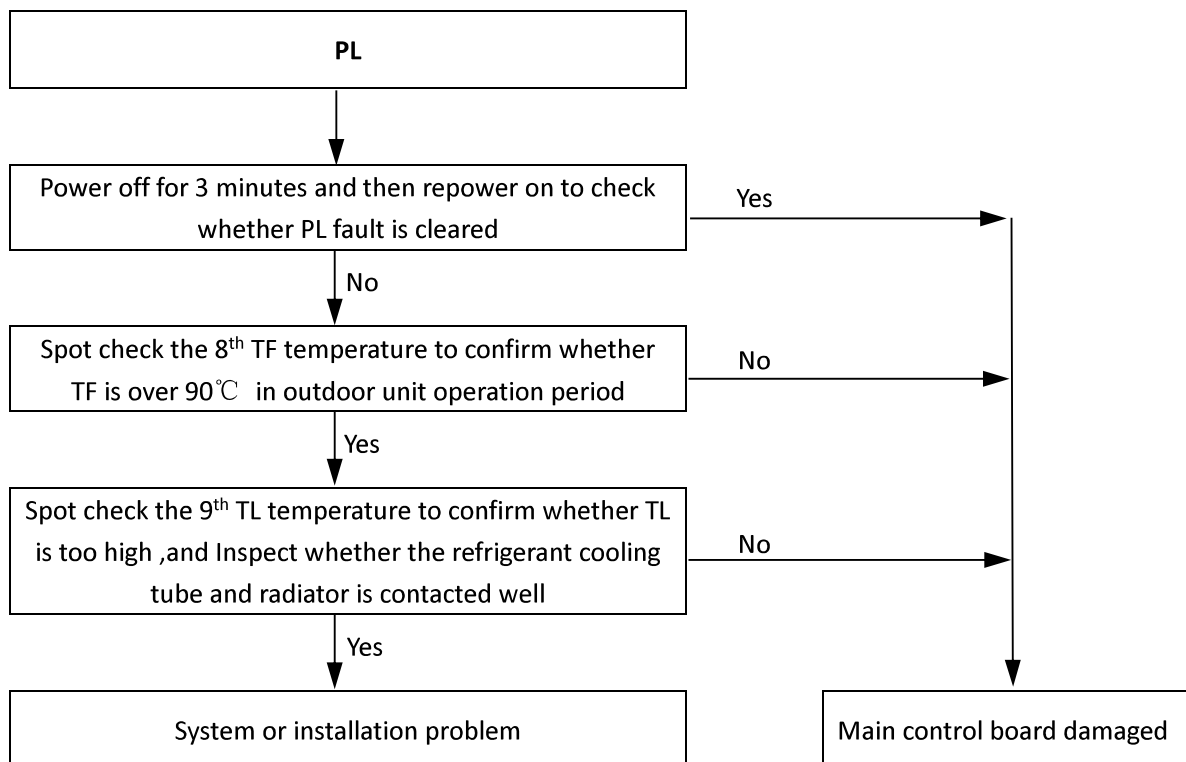
### 2.22.3 Trigger / recover condition

- Trigger condition: Radiator surface temperature  $TF \geq 90^{\circ}\text{C}$ .
- Recover condition: Radiator surface temperature  $TF \leq 84^{\circ}\text{C}$ .
- Reset method: Resume automatically.

### 2.22.4 Possible causes

- Refrigerant leakage/ Poor condenser heat exchange/ System blockage.
- The connection between refrigerant cooling tube and radiator is loose.
- Main PCB damaged.

### 2.22.5 Procedure



### 2.23 L0/L4/L5/L8/L9: L category of inverter module protection (L0 for all models, L4/L5/L8/L9 for 100-160 model)

#### 2.23.1 Digital display output

## L0/L4/L5/L8/L9

#### 2.23.2 Description

- Compressor inverter module protection.
- The system stops running.
- Error code is displayed on the outdoor unit PCB.

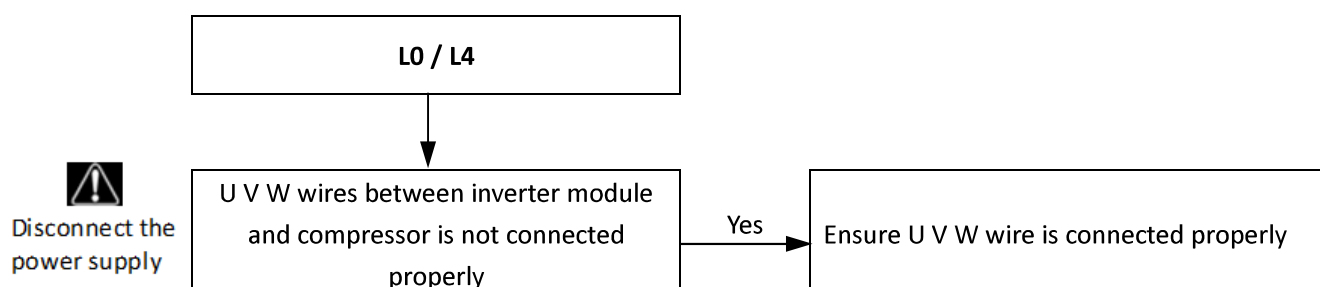
#### 2.23.3 Trigger / recover condition

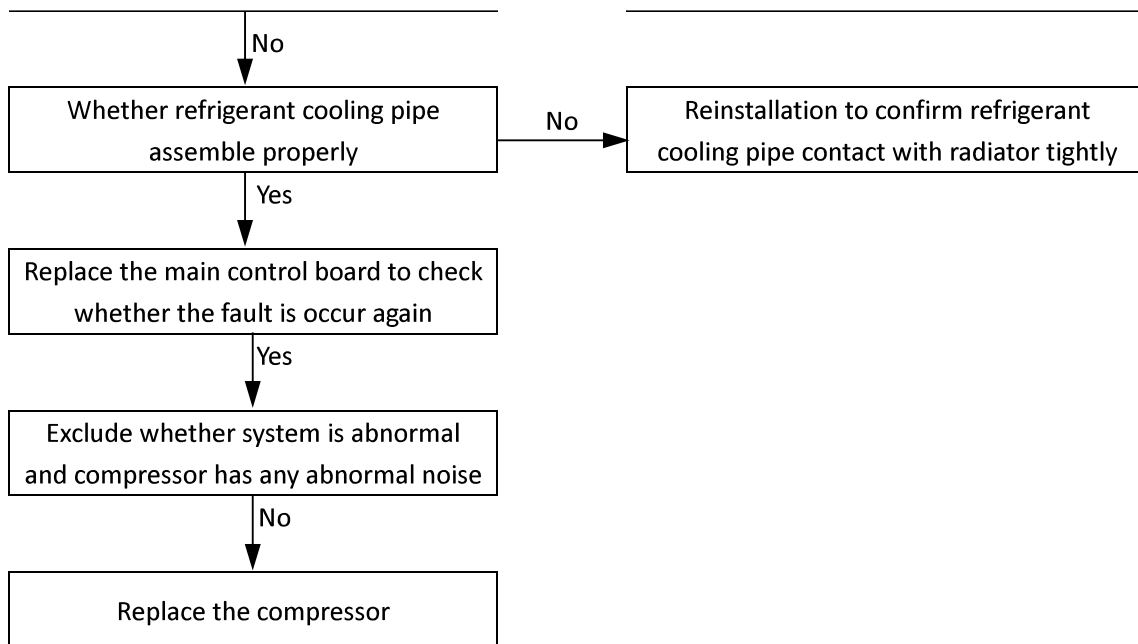
- Trigger condition: Inverter module or compressor is abnormal.
- Recover condition: Inverter module and compressor goes back to normal.
- Reset method: Manually restart.

#### 2.23.4 Possible causes

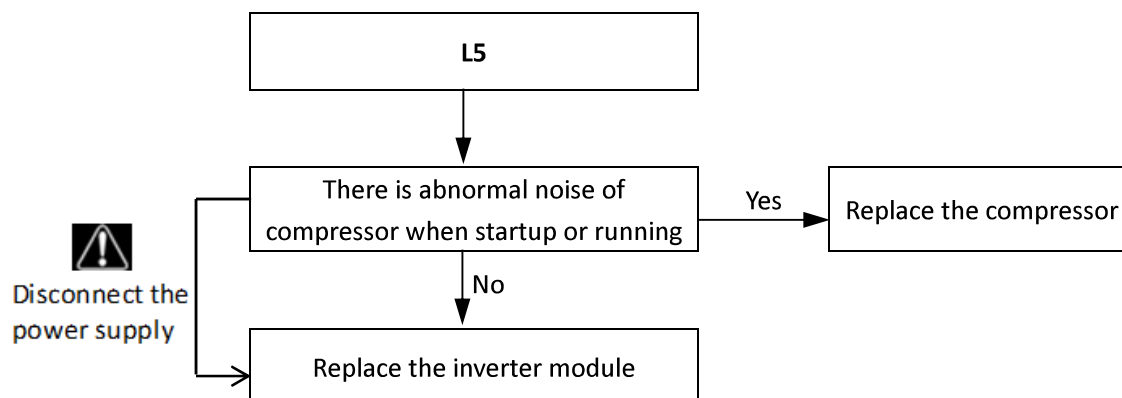
- Power supply is abnormal.
- Refrigerant cooling module is abnormal.
- Compressor is abnormal.
- Outdoor unit main control board damaged.

#### 2.23.5 L0/L4: Procedure

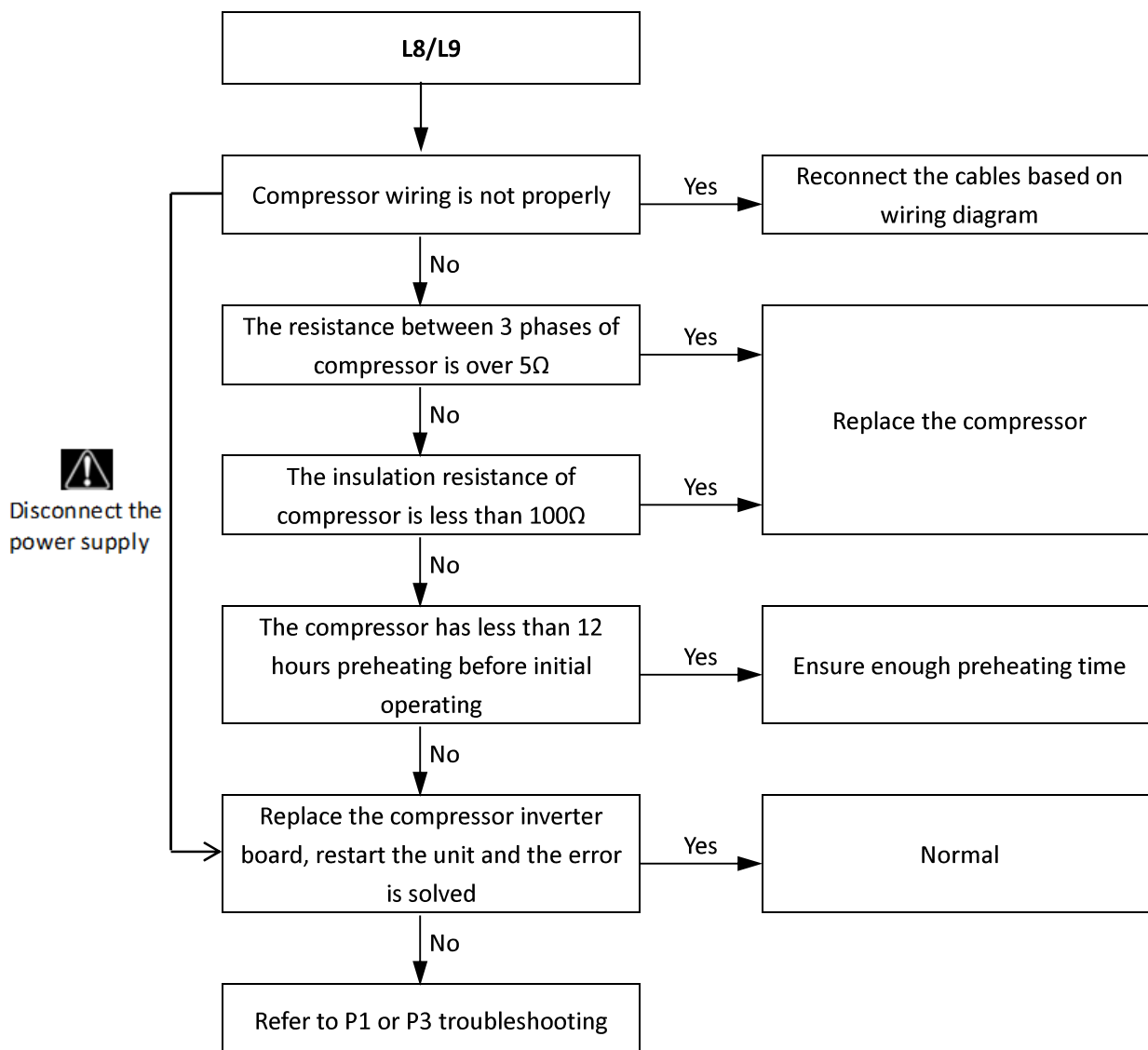




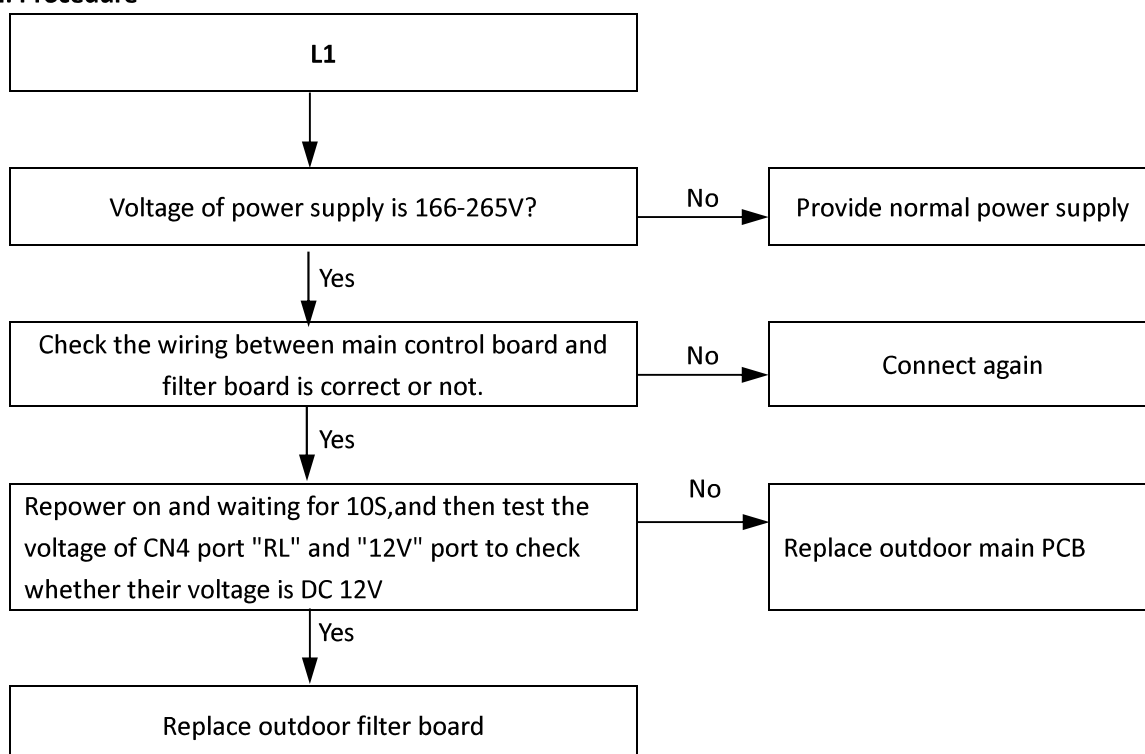
#### 2.23.6 L5: Zero speed protection



### 2.23.7 L8 / L9 troubleshooting

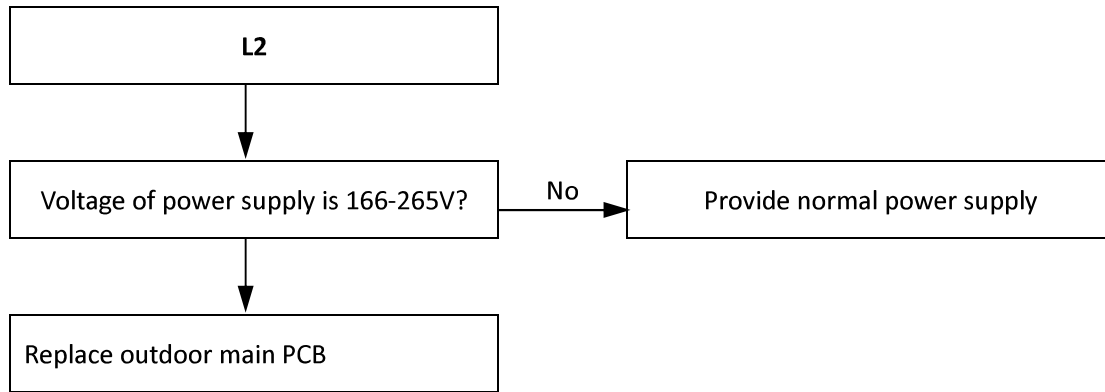


### 2.23.8 L1: Procedure





### 2.23.9 L2 : Procedure



### 2.23.10 Compressor replacement procedure

#### Step 1: Remove faulty compressor and remove oil

- Remove the faulty compressor from the outdoor unit.
- Before removing the oil, shake the compressor so as to not allow impurities to remain settled at the bottom.
- Drain the oil out of the compressor and retain it for inspection. Normally the oil can be drained out from the compressor discharge pipe.

Figure 6-2.5: Draining oil from a compressor



#### Step 2: Inspect oil from faulty compressor

- The oil should be clear and transparent. Slightly yellow oil is not an indication of any problems. However, if the oil is dark, black or contains impurities, the system has problems and the oil needs to be changed. Refer to Figure 6-2.7 for further details regarding inspecting compressor oil. (If the compressor oil has been spoiled, the compressor will not be being lubricated effectively. The scroll plate, crankshaft and bearings will wear. Abrasion will lead to a larger load and higher current. More electric energy will get dissipated as heat and the temperature of the motor will become increasingly high. Finally, compressor damage or burnout will result.)

#### Step 3: Check oil in other compressors in the system

- If the oil drained from the faulty compressor is clean, go to Step 6.
- If the oil drained from the faulty compressor is spoiled (lightly or heavily), go to Step 4.

#### Step 4: Replace oil separator and accumulator

- If the oil from a compressor is spoiled (lightly or heavily), drain the oil from the oil separator and accumulator in that unit and then replace them.

#### Step 5: Check filters(s)

- If the oil from a compressor is spoiled (lightly or heavily), check the filter between the gas stop valve and the 4-way valve in that unit. If it is blocked, clean with nitrogen or replace.

**Step 6: Replace the faulty compressor and re-fit the other compressors**

- Replace the faulty compressor.
- If the oil had been spoiled and was drained from the non-faulty compressor in Step 3, use clean oil to clean them before re-fitting it into the unit. To clean, add oil into the compressor through the discharge pipe using a funnel, shake the compressor, and then drain the oil. Repeat several times and then re-fit the compressors into the units. (The discharge pipe is connected to the oil pool of the compressor by the inner oil balance pipe.)

*Figure 6-2.6: Compressor piping***Step 7: Add compressor oil**

- Add oil to each of the compressors from which oil was drained in Step 3.
- Only use RB75EA oil. Different compressors require different types of oil. Using the wrong type of oil leads to various problems.
- Add oil to the accumulator from which oil was drained in Step 4.

**Step 8: Vacuum drying and refrigerant charging**

- Once all the compressors and other components have been fully connected, vacuum dry the system and recharge refrigerant.