Part 6
Diagnosis and Troubleshooting

1 Error Code Table

Table 6-1.1: Errar code table

Error code[1]	Content	Remarks	Manual re-start required[2]
E0	Communication error between outdoor units	Only displayed on the slave unit with the error	No
E1	Phase sequence error	Displayed on the unit with the error	Yes
E2	Communication error between indoor and master unit	Only displayed on the master unit	No
E4	Outdoor heat exchanger temperature sensor (T3) error or outdoor ambient temperature sensor (T4) error	Displayed on the unit with the error	No
E5	Abnormal power supply voltage	Displayed on the unit with the error	No
E7	Compressor top or discharge pipe temperature sensor (T7C1/2) error	Displayed on the unit with the error	Yes
E8	Outdoor unit address error	Displayed on the unit with the error	Yes
xE9	EEPROM mismatch	Displayed on the unit with the error	Yes
xF1	DC bus voltage error	Displayed on the unit with the error	No
F3	Plate heat exchanger cooling refrigerant outlet temperature sensor (T6B) error	Displayed on the unit with the error	No
F5	Plate heat exchanger cooling refrigerant inlet temperature sensor (T6A) error	Displayed on the unit with the error	No
F6	Electronic expansion valve connection error	Displayed on the unit with the error Refer to Note 3	Yes
xH0	Communication error between main control chip and inverter driver chip	Displayed on the unit with the error	No
H2	Number of slave units detected by master unit has decreased	Only displayed on the master unit	No
H3	Number of slave units detected by master unit has increased	Only displayed on the master unit	No
xH4	Inverter module protection	Displayed on the unit with the error	Yes
H5	P2 protection appears three times in 60 minutes	Displayed on the unit with the error	Yes
H6	P4 protection appears three times in 100 minutes	Displayed on the unit with the error	Yes
H7	Number of indoor units detected by master unit not same as number set on main PCB	Only displayed on the master unit	No
H8	High pressure sensor error	Displayed on the unit with the error	No
H9	P9 protection appears ten times in 120 minutes	Displayed on the unit with the error	Yes
yHd	Slave unit malfunction	Only displayed on the master unit	No
C7	PL protection appears three times in 100 minutes	Displayed on the unit with the error	Yes
P1	Discharge pipe high pressure protection	Displayed on the unit with the error	No
P2	Suction pipe low pressure protection	Displayed on the unit with the error	No
xP3	Compressor current protection	Displayed on the unit with the error	No
P4	Discharge temperature protection	Displayed on the unit with the error	No
P5	Outdoor heat exchanger temperature protection	Displayed on the unit with the error	No
P9	Fan module protection	Displayed on the unit with the error	No

Table continued on next page ...

Table 6-1.1: Error code table (continued)

Error code[1]	Content	Remarks	Manual re-start required[2]
PL	Inverter module temperature protection	Displayed on the unit with the error	No
PP	Compressor discharge insufficient superheat protection	Displayed on the unit with the error	No
xL0	Inverter module protection	Displayed on the unit with the error	Yes
xL1	DC bus low voltage protection	Displayed on the unit with the error	Yes
xL2	DC bus high voltage protection	Displayed on the unit with the error	Yes
xL4	MCE error	Displayed on the unit with the error	Yes
xL5	Zero speed protection	Displayed on the unit with the error	Yes
xL7	Phase sequence error	Displayed on the unit with the error	Yes
xL8	Compressor frequency variation greater than 15Hz within one second protection	Displayed on the unit with the error	Yes
xL9	Actual compressor frequency differs from target frequency by more than 15Hz protection	Displayed on the unit with the error	Yes

Notes:

1. 'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B. 'y' is a placeholder for the address (1 or 2) of the slave unit with the error.
2. For some error codes, a manual restart is required before the system can resume operation.
3. Once the EXV has been connected properly, the error code will flash to indicate that the connection has been re-established. A manual restart is then required before the system can resume operation.

2 Troubleshooting

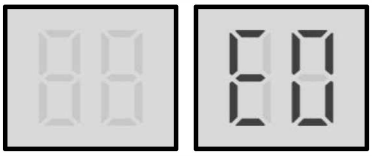
2.1 Warning

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 EO: Communication error between outdoor units

2.2.1 Digitaldisplayoutput



2.2.2 Description

- Communication error between outdoor units.
- All units stop running.
- Error code is only displayed on the slave unit with the error.

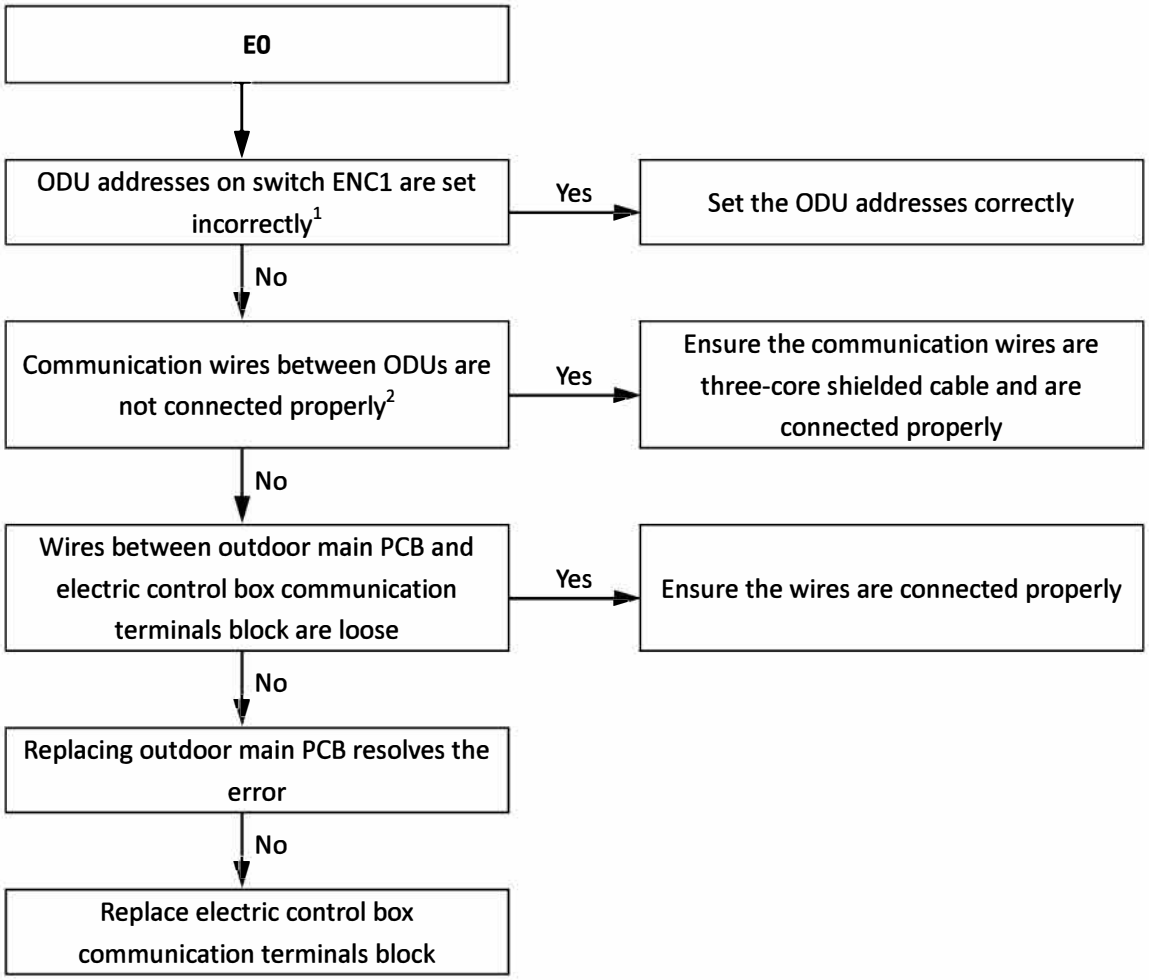
2.2.3 Trigger / recover condition

- Trigger condition: Slave unit cannot receive signal from master unit for 60s.
- Recover condition: Slave unit can receive signal from master unit.
- Reset method: Resume automatically.

2.2.4 Possible causes

- Incorrect outdoor unit address setting.
- Communication wires between outdoor units not connected properly.
- Loosened wiring within electric control box.
- Damaged main PCB or electric control box communication terminals block.

2.2.5 Procedure

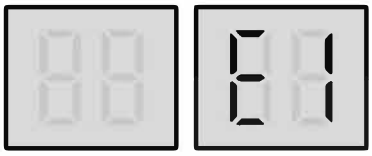


Notes:

1. The master unit address should be set as 0, slave units addresses should be set from 1 to 2, and the addresses should not be repeated within one system.
2. All the wires for H1, H2, E connections should be three-core shielded cable, the wiring should be connected according to polarity (H1 to H1, etc), the wiring should not be open or short circuited.

2.3 El: Phase sequence error

2.3.1 Digitaldisplayoutput



2.3.2 Description

- Phase sequence error.
- All units stop running.
- Error code is only displayed on the unit with the error.

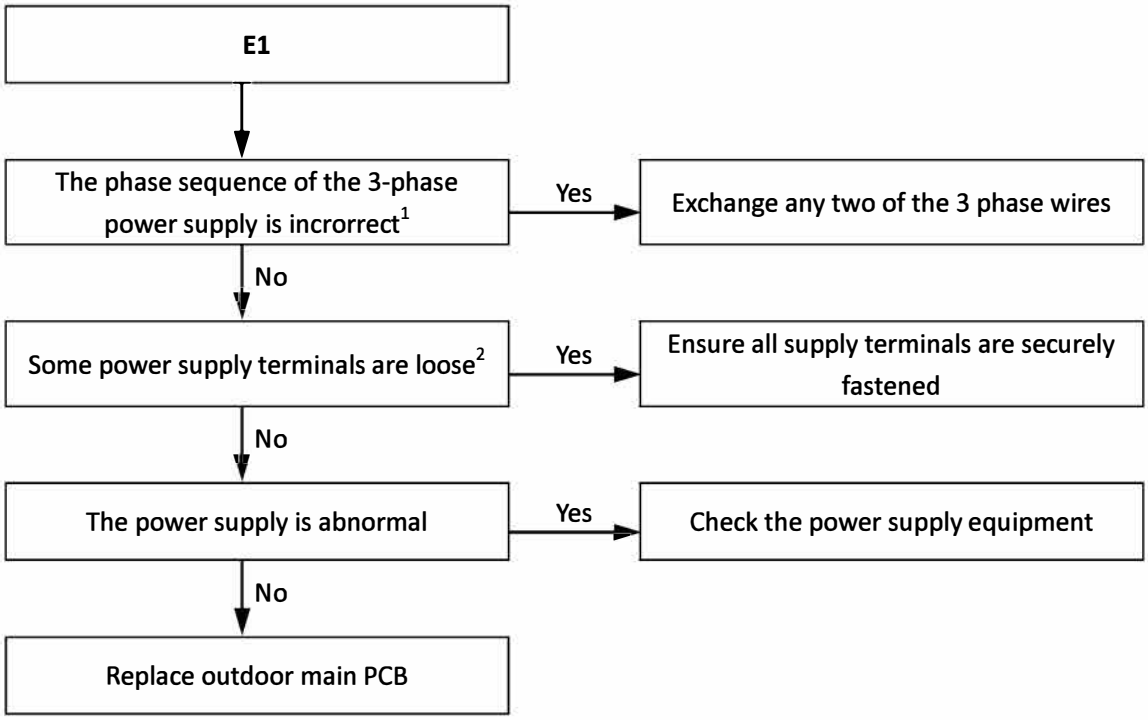
2.3.3 Trigger / recover condition

- Trigger condition: Wrong phase connection for 1.6s or phase missing for 48s.
- Recover condition: Correct phase connection.
- Reset method: Manually restart.

2.3.4 Possible causes

- Power supply phases not connected in correct sequence.
- Power supply terminals loose.
- Power supply abnormal.
- Main PCB damaged.

2.3.5 Procedure

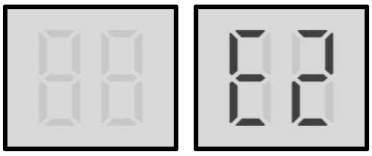


Notes:

1. The A, B, C terminals of the 3-phase power supply should match compressor phase sequence requirements. If the phase sequence is inverted, the compressor will operate inversely. If the wiring connection of each outdoor unit is in A, B, C phase sequence, and multiple units are connected, the current difference between C phase and A, B phases will be very large as the power supply load of each outdoor unit will be on C phase. This can easily lead to tripped circuits and terminal wiring burnout. Therefore if multiple units are to be used, the phase sequence should be staggered, so that the current is distributed among the three phases equally.
2. Loose power supply terminals can cause the compressors to operate abnormally and compressor current to be very large.

2.4 E2: Communication error between indoor and master unit

2.4.1 Digitaldisplayoutput



2.4.2 Description

- Communication error between indoor and master unit.
- All units stop running.
- Error code is only displayed on the master unit.

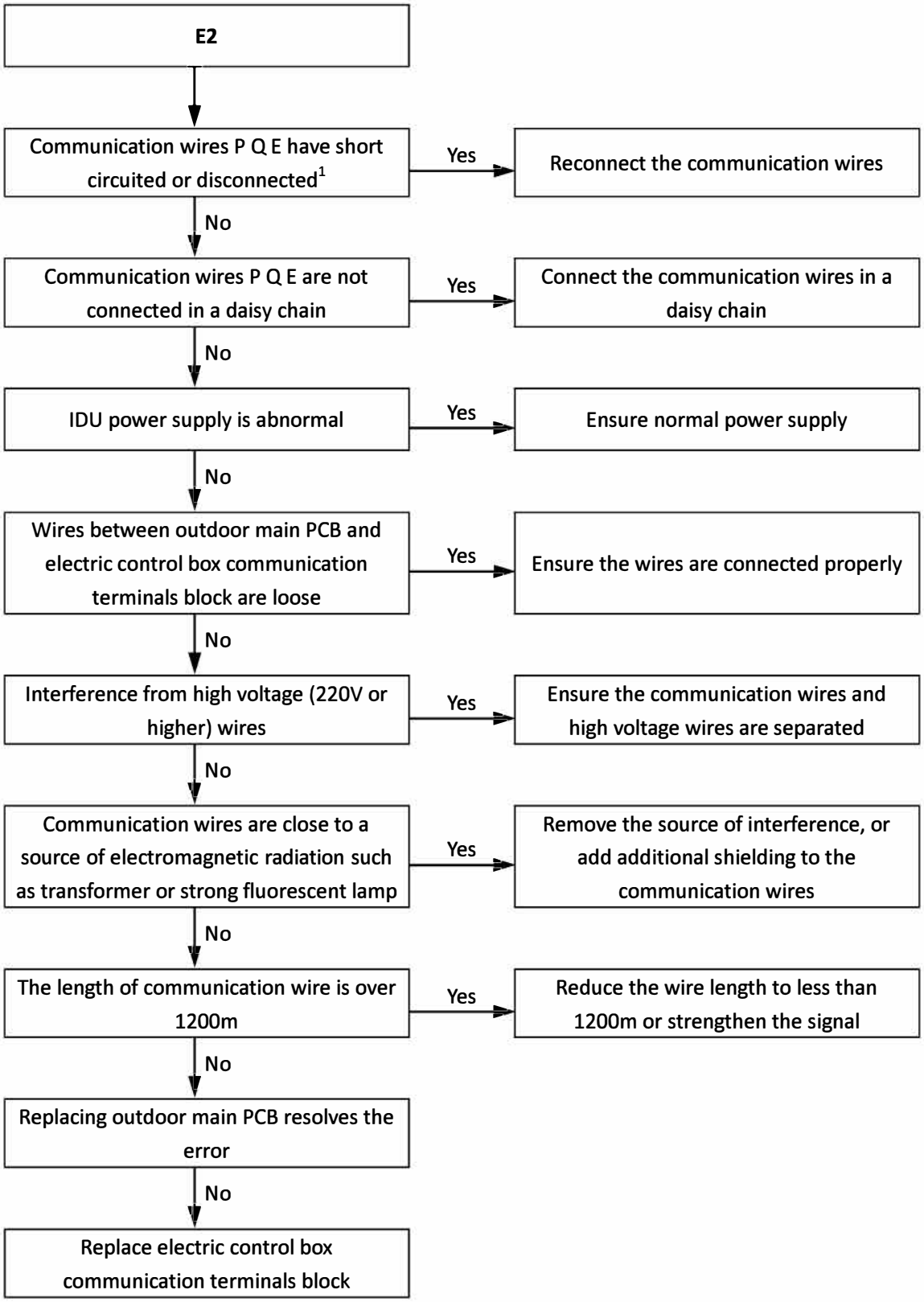
2.4.3 Trigger / recover condition

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

2.4.4 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.

2.4.5 Procedure

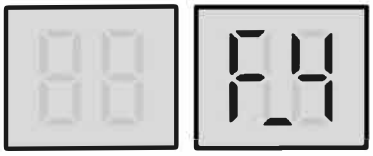


Notes:

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.

2.5 E4: Temperature sensor (T3/T4) error

2.5.1 Digital display output



2.5.2 Description

- Outdoor heat exchanger temperature sensor (T3) error or outdoor ambient temperature sensor (T4) error.
- All units stop running.
- Error code is only displayed on the unit with the error.

2.5.3 Trigger / recover condition

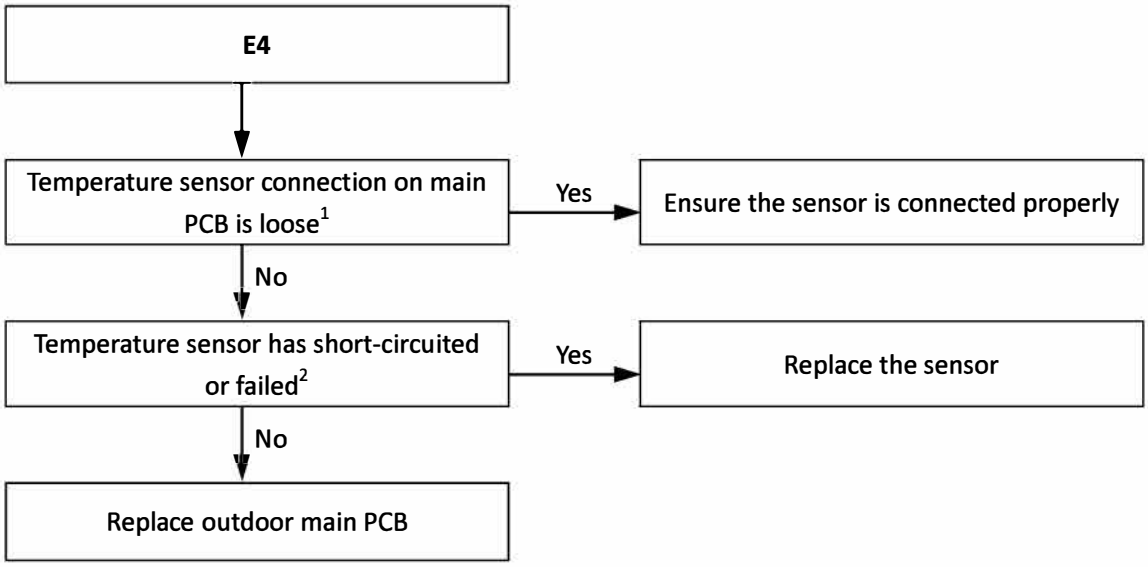
- Trigger condition: The main control board cannot receive the feedback signal of temperature sensor T3 or T4.
- Recover condition: The main control board can receive the feedback signal of temperature sensor T3 or T4.
- Reset method: Resume automatically.

;.4 Possible causes

Temperature sensor not connected properly or has malfunctioned.

Damaged main PCB.

2.5.5 Procedure

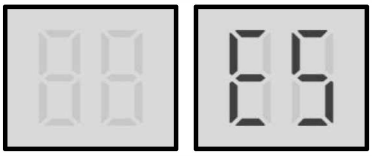


Notes:

1. Outdoor ambient temperature sensor (T4) and heat exchanger temperature sensor (T3) connection is port CN1 on the main PCB (labeled 11 in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.1 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics".

2.6 ES: Abnormal power supply voltage

2.6.1 Digitaldisplayoutput



2.6.2 Description

- Abnormal power supply voltage.
- All units stop running.
- Error code is only displayed on the unit with the error.

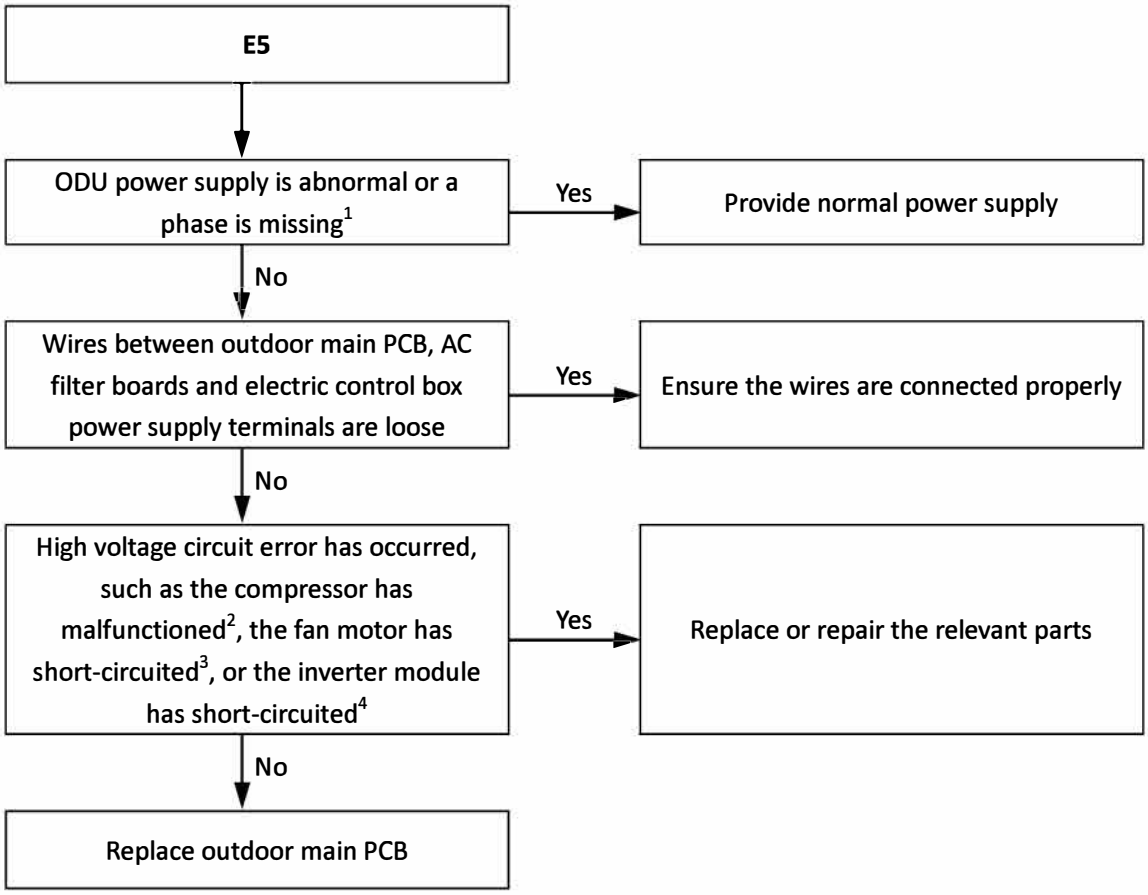
2.6.3 Trigger / recover condition

- Trigger condition: Outdoor unit power supply phase voltage < 165V.
- Recover condition: Outdoor unit power supply phase voltage is > 180V.
- Reset method: Resume automatically.

2.6.4 Possible causes

- Outdoor unit power supply voltage is abnormal or a phase is missing.
- Loosened wiring within electric control box.
- High voltage circuit error.
- Main PCB damaged.

2.6.5 Procedure



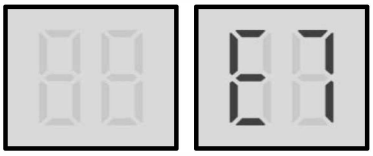
Notes:

1. The normal voltage between A and N, B and N, and C and N is 198-242V.
2. The normal resistances of the inverter compressor are 0.7-1.5Ω 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.
3. The normal resistances of the fan motor coil among U V W are less than 10Ω. If a measured resistance is 0Ω, the fan motor has short-circuited.
4. 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.

Figure 6-2.1: Inverter module terminals

2.7 E7: Temperature sensor (T7C1/2) error

2.7.1 Digitaldisplayoutput



2.7.2 Description

- A compressor top temperature sensor or discharge pipe temperature sensor (T7C1/2) error.
- All units stop running.
- Error code is only displayed on the unit with the error.

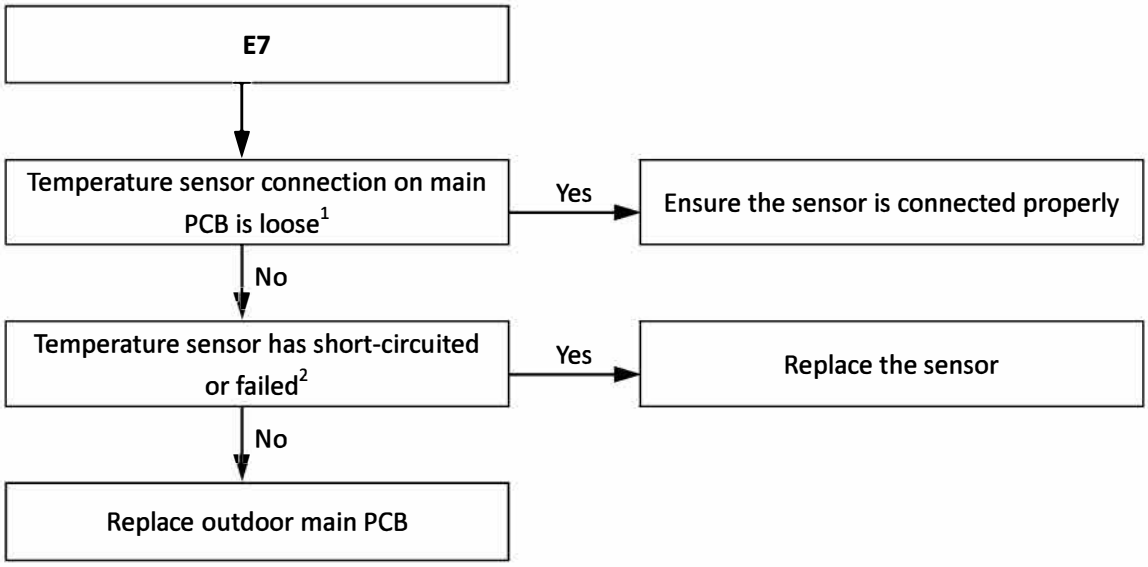
2.7.3 Trigger / recover condition

- Trigger condition: Discharge pressure ≥ 3MPa and discharge temperature < 15°C for 2 minutes.
- Recover condition: Discharge pressure and 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

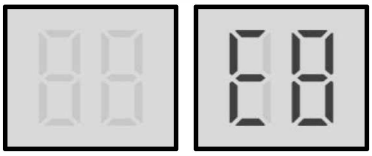


Notes:

1. Compressor top temperature sensor and discharge pipe temperature sensor connections are ports CN4 and CN5 on the main PCB (labeled 3 and 4, respectively, in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.2 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics".

2.8 ES: Outdoor unit address error

2.8.1 Digitaldisplayoutput



2.8.2 Description

- Outdoor unit address error.
- All units stop running.
- Error code is only displayed on the unit with the error.

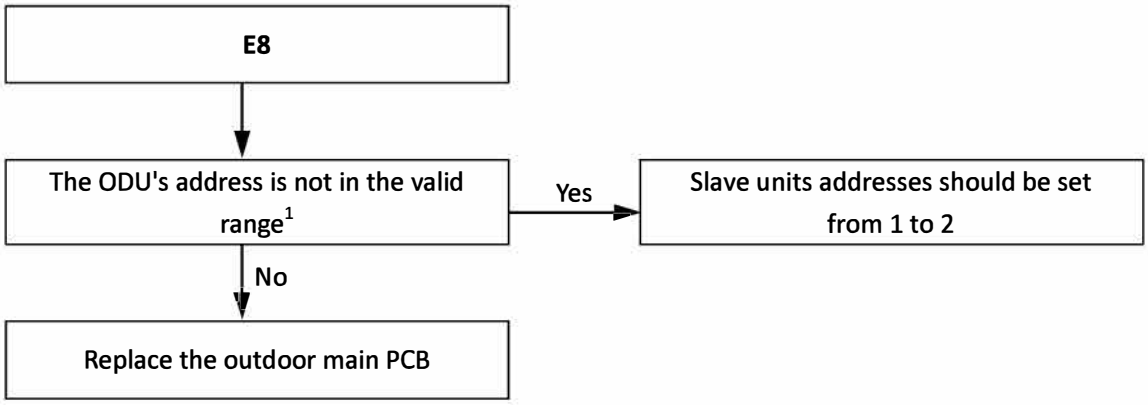
2.8.3 Trigger / recover condition

- Trigger condition: Outdoor unit address is set more than 2.
- Recover condition: Outdoor unit addresses are set from 0 to 2.
- Reset method: Manually restart.

2.8.4 Possible causes

- Invalid outdoor unit address.
- Main PCB damaged.

2.8.5 Procedure

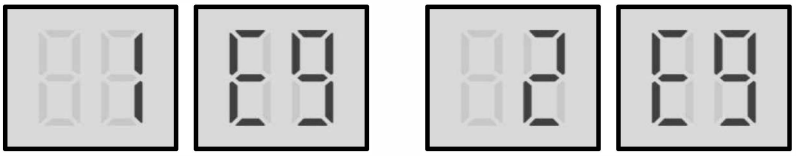


Notes:

1. The master unit address should be set as 0, slave units addresses should be set from 1 to 2, and the addresses should not be repeated within one system.

2.9 xE9: EEPROM mismatch

2.9.1 Digital display output



In the error code, 'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

2.9.2 Description

- 1E9 indicates a compressor A EEPROM mismatch.
- 2E9 indicates a compressor B EEPROM mismatch.
- All units stop running.
- Error code is only displayed on the unit with the error.

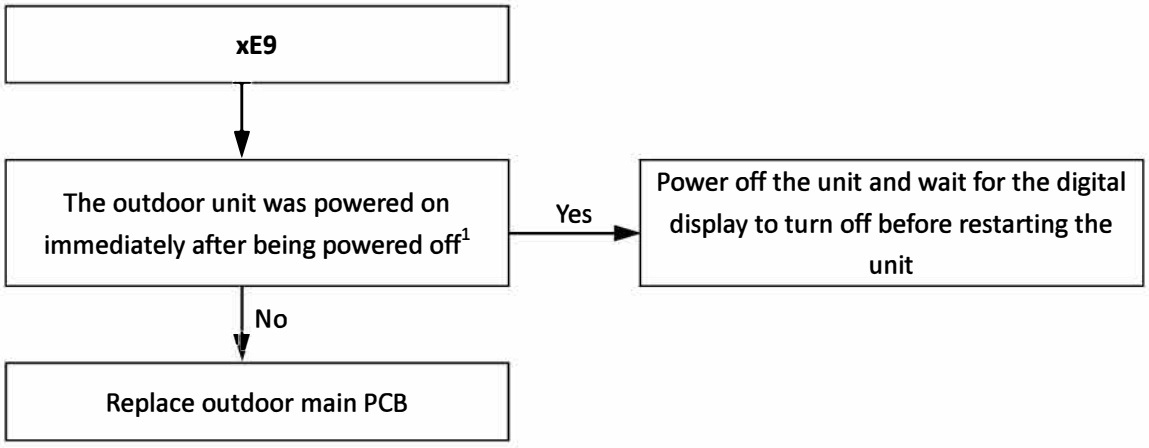
2.9.3 Trigger / recover condition

- Trigger condition: Compressor drive parameter is mismatch.
- Recover condition: Compressor drive parameter is match.
- Reset method: Manually restart.

2.9.4 Possible causes

- Outdoor unit was powered on immediately after being powered off.
- Main PCB damaged.

2.9.5 Procedure

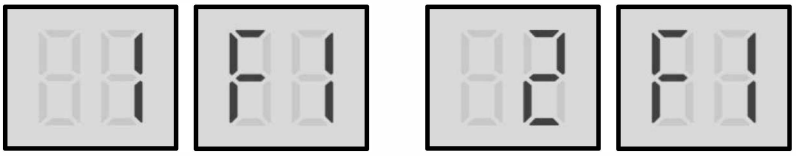


Notes:

1. When performing a manual restart of an outdoor unit, once the unit has been powered off it should not be powered on again until the digital display has turned off.

2.10 xFl: DC bus voltage error

2.10.1 Digital display output



'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

2.10.2 Description

- 1F1 indicates compressor A DC bus voltage error; 2F1 indicates compressor B DC bus voltage error.
- All units stop running.
- Error code is only displayed on the unit with the error.

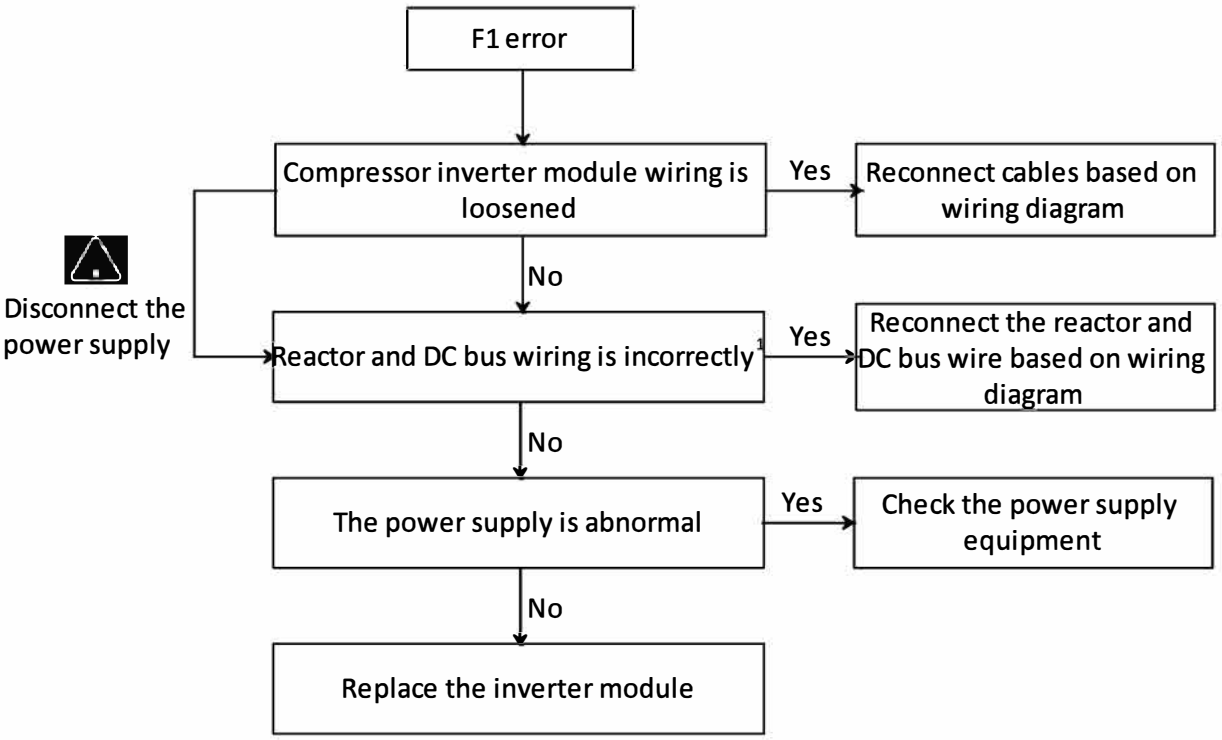
2.10.3 Trigger / recover condition

- Trigger condition: DC bus voltage < 350V or DC bus voltage > 700V continuously for 10 seconds.
- Recover condition: DC bus voltage goes back to normal.
- Reset method: Restart automatically.

2.10.4 Possible causes

- Loosened wiring of the compressor inverter module.
- Incorrect wiring of the reactor and DC bus wire.
- Abnormal power supply.
- Inverter module damaged.

2.10.5 Procedure



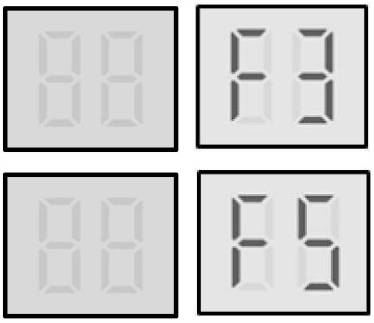
Note:

1. The DC bus wire should run from the N_in terminal on the inverter module, through the current sensor (in the direction indicated by the arrow on the current sensor), and end at the N_out terminal on the inverter module.

Figure 6-2.2: DC detection wire connection method

2.11 F3, FS: Temperature sensor (T6B/T6A) error

2.11.1 Digital display output



2.11.2 Description

- F3 indicates plate heat exchanger cooling refrigerant outlet temperature sensor (T6B) error.
- F5 indicates plate heat exchanger cooling refrigerant inlet temperature sensor (T6A) error.
- All units stop running.
- Error code is only displayed on the unit with the error.

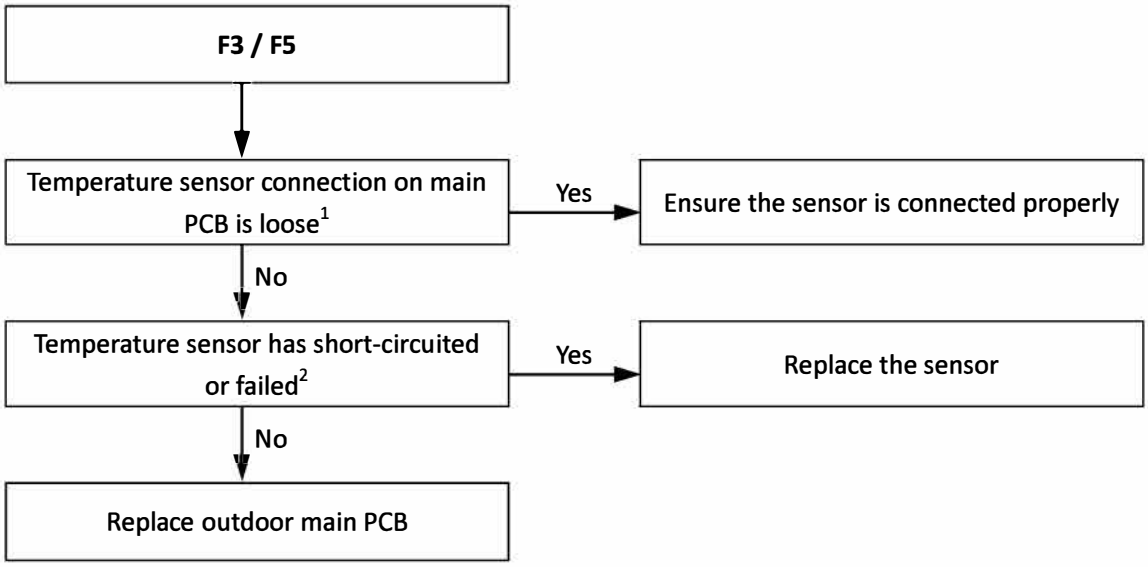
2.11.3 Trigger / recover condition

- Trigger condition: Temperature sensor T6A(B) is open or short-circuit.
- Recover condition: Temperature sensor T6A(B) connection ports can detect load.
- Reset method: Resume automatically.

2.11.4 Possible causes

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

2.11.5 Procedure

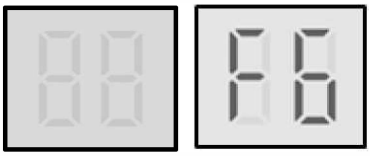


Notes:

1. Plate heat exchanger cooling refrigerant inlet temperature sensor (T6A) and plate heat exchanger cooling refrigerant outlet temperature sensor (T6B) connection are port CN8 and CN8_1 on the main PCB (labeled 10 and 12, respectively, in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.1 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics".

2.12 FG: Electronic expansion valve connection error

2.12.1 Digital display output



2.12.2 Description

- Electronic expansion valve connection error.
- All units stop running.
- Error code is only displayed on the unit with the error.

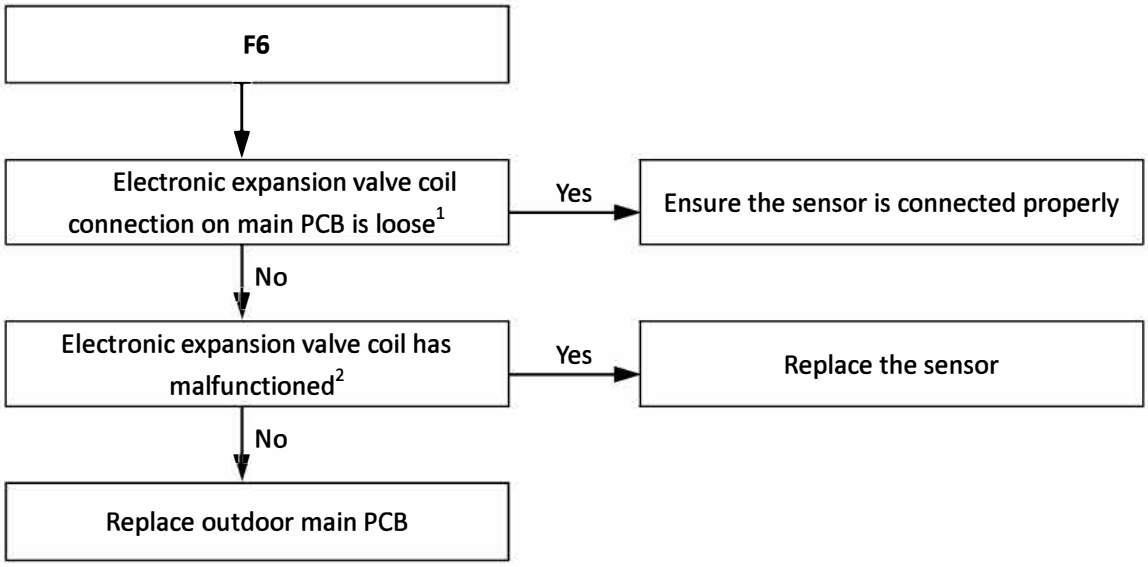
2.12.3 Trigger / recover condition

- Trigger condition: The main control board cannot receive the feedback signal of EXV.
- Recover condition: The main control board can receive the feedback signal of EXV.
- Reset method: When the main control board can receive the feedback signal of EXV, F6 flashes, a manual system restart id required before the system can resume operation.

2.12.4 Possible causes

- Electronic expansion valve coil not connected properly or has malfunctioned.
- Damaged main PCB.

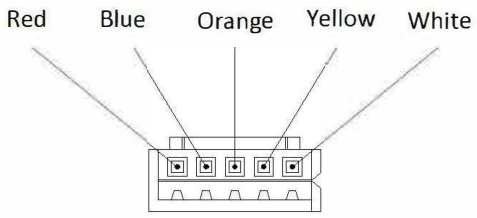
2.12.5 Procedure



Notes:

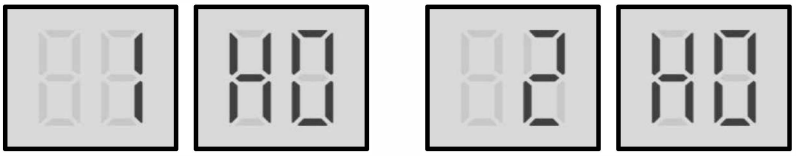
1. Electronic expansion valve coil connections are port CN70, CN71 and CN72 on the main PCB (labeled 18, 19 and 20, respectively, in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. The normal resistances between EXV coil wiring terminals RED and white / yellow / orange / blue are 40-50Ω. If any of the resistances differ from the value, the EXV coil has malfunctioned.

Figure 6-2.3: EXV coil wiring terminals



2.13 xHO: Communication error

2.13.1 Digital display output



In the error code, 'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

2.13.2 Description

- 1H0 indicates a communication error between the main control chip and the compressor A inverter driver chip.
- 2H0 indicates a communication error between the main control chip and the compressor B inverter driver chip.
- All units stop running.
- Error code is only displayed on the unit with the error.

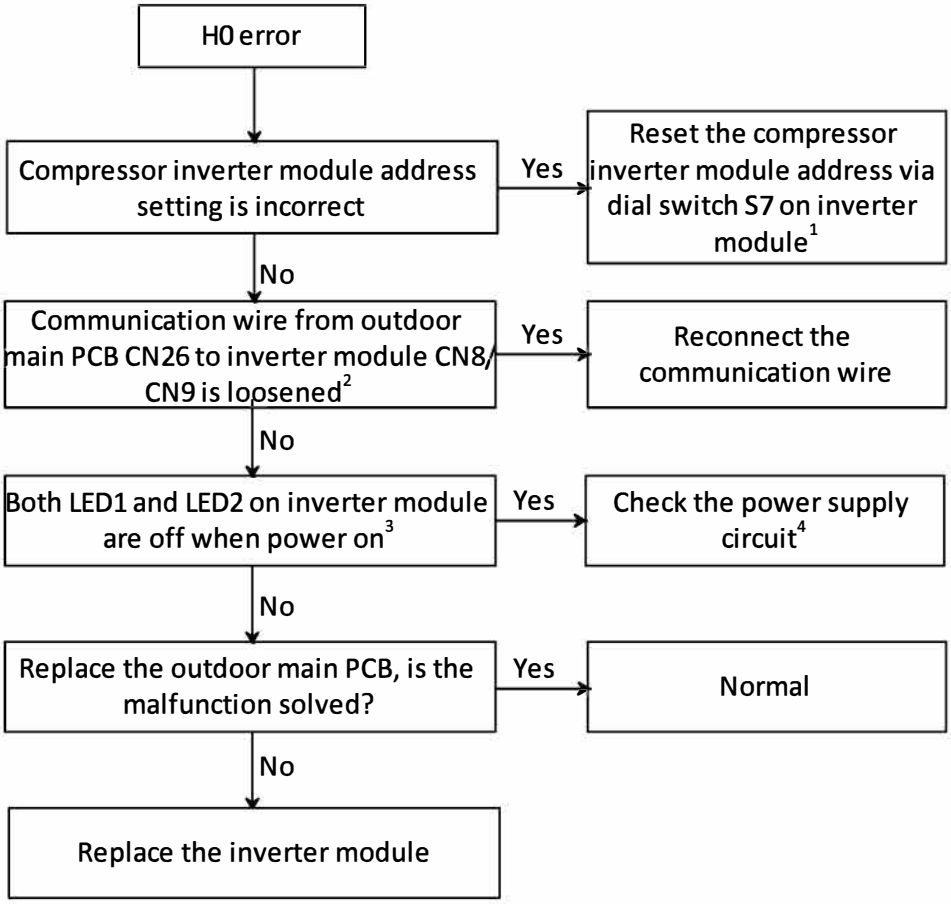
2.13.3 Trigger / recover condition

- Trigger condition: Main control chip and inverter driver chip cannot communication for 2 minutes.
- Recover condition: Communication go back to normal.
- Reset method: Resume automatically.

2.13.4 Possible causes

- Incorrect compressor inverter module address setting.
- Loosened communication wiring from the main PCB to the inverter module.
- Bridge rectifier damaged.
- Main PCB damaged.
- Compressor inverter module damaged.

2.13.5 Procedure

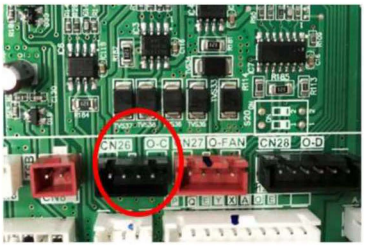
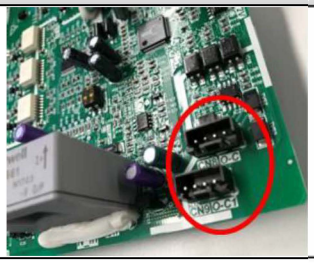


Notes:

1. Compressor inverter module address is set through dial switch S7 on the inverter module. The compressor inverter module A/B location refers to the wiring diagram.

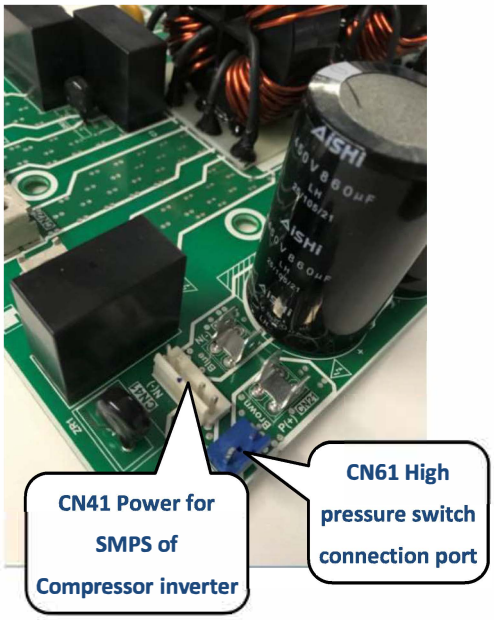
S7 on inverter module	Inverter module address
	0 for compressor inverter module A
	1 for compressor inverter module B

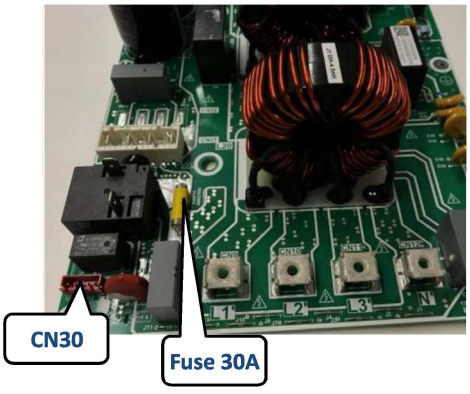
2. Communication wire from outdoor main PCB CN26 to inverter module CN8/CN9.

Communication port CN26 on main PCB	Communication port CN8/CN9 on inverter module
	

3. LED1/2 on inverter module

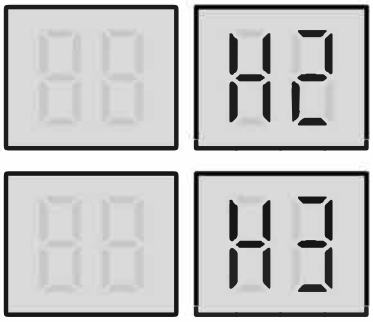
4. Check the power supply for the compressor inverter module, port CN41 on filter board, the normal voltage should be DC310V; check the high pressure switch connection port CN61 on filter board, the normal resistance should be zero; Check the single phase bridge and fuse on filter board; check the connection cable from ODU main PCB port CN82 to filter board port CN30 which is DC310V power control port.





2.14 H2, H3: Slave units decreased/increased

2.14.1 Digital display output



2.14.2 Description

- H2 indicates that the number of slave units detected by master unit has decreased.
- H3 indicates that the number of slave units detected by master unit has increased.
- All units stop running.
- Error code is only displayed on the master unit.

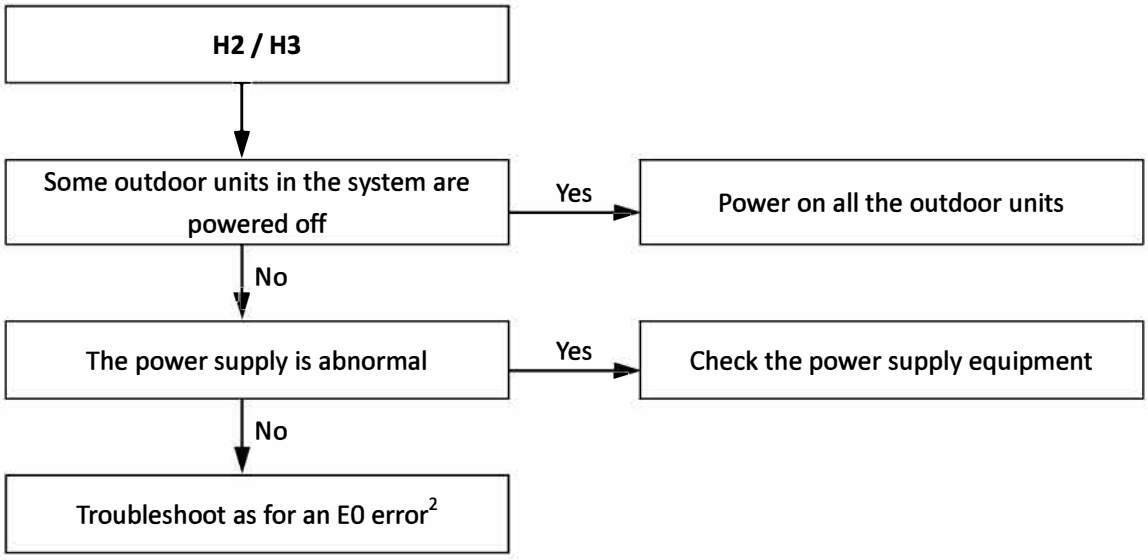
2.14.3 Trigger / recover condition

- Trigger condition: Number of slave units detected by master unit has decreased or increased.
- Recover condition: Number of slave units detected by master unit goes back to normal.
- Reset method: Resume automatically.

2.14.4 Possible causes

- Some outdoor units are powered off.
- Power supply abnormal.
- Incorrect outdoor unit address setting.
- Communication wires between outdoor units not connected properly.
- Loosened wiring within electric control box.
- Damaged main PCB or electric control box communication terminals block.

2.14.5 Procedure

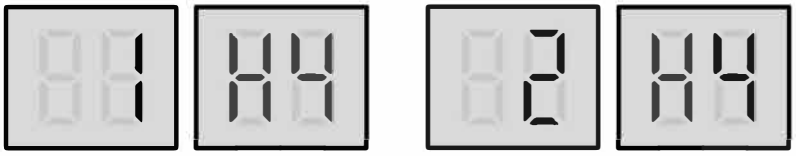


Notes:

1. See “E0 Troubleshooting”.

2.15 xH4: Inverter module protection

2.15.1 Digital display output



In the error code, 'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

2.15.2 Description

- 1H4 indicates compressor A inverter module protection.
- 2H4 indicates compressor B inverter module protection.
- All units stop running.
- Error code is only displayed on the unit with the error.

2.15.3 Trigger / recover condition

- Trigger condition: Compressor appears three inverter module protections.
- Recover condition: Inverter module goes back to normal.
- Reset method: Manually restart.

2.15.4 Possible causes

- Inverter module protection.
- DC bus low or high voltage protection.
- MCE error.
- Zero speed protection.
- Phase sequence error.
- Excessive compressor frequency variation.
- Actual compressor frequency differs from target frequency.

2.15.5 Specific error codes for xH4 inverter module protection

If an xH4 error code is displayed, enter menu mode “n31” (refer to Part 5, 2.2.3 “menu mode”) to check the history error code to check the following specific error code: xL0, xL1, xL2, xL4, xL5, xL7, xL8, xL9.

Table 6-2.1: Specific error codes for error xH4

Specific error code[1]	Content
xL0	Inverter module protection
xL1	DC bus low voltage protection
xL2	DC bus high voltage protection
xL4	MCE error
xL5	Zero speed protection
xL7	Phase sequence error
xL8	Compressor frequency variation greater than 15Hz within one second protection
xL9	Actual compressor frequency differs from target frequency by more than 15Hz protection

Notes:

1. 'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

The specific error codes xL0, xL1, xL2 and xL4 can also be obtained from the inverter module LED indicators. If an inverter module error has occurred, LED2 is continuously on and LED1 flashes.

Figure 6-2.4: LED indicators LED1 and LED2 on inverter module

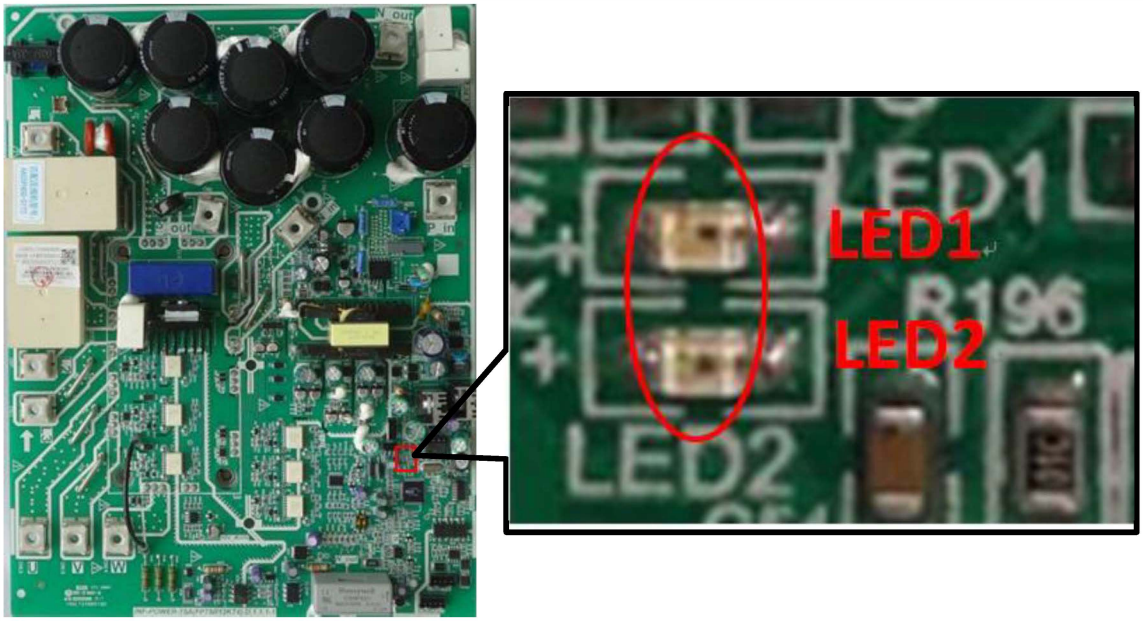
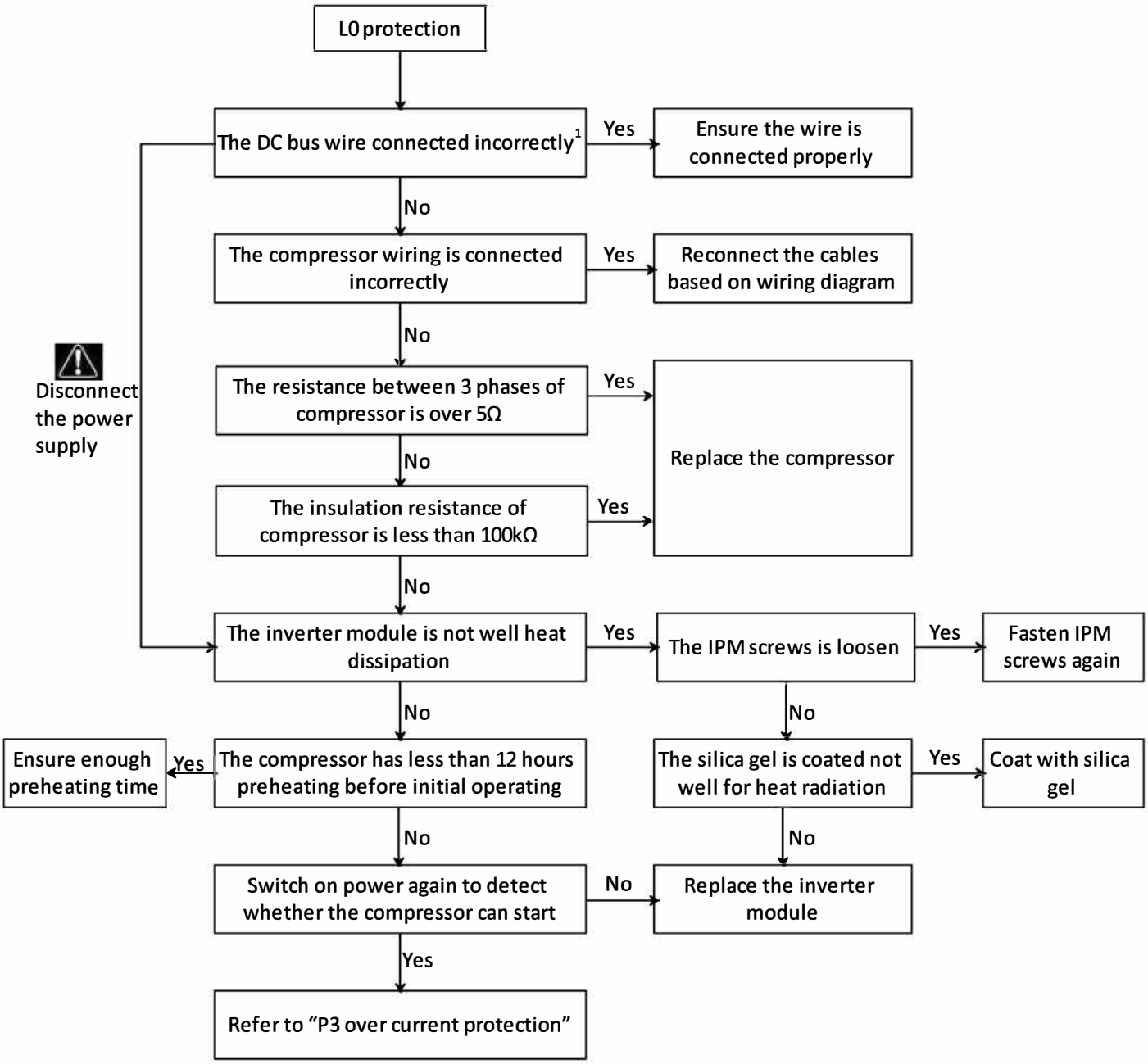


Table 5-3.2: Errors indicated on LED1

LED1 flashing pattern	Corresponding error
Flashes 8 times and stops for 1 second, then repeats	xL0 - Inverter module protection
Flashes 9 times and stops for 1 second, then repeats	xL1 - DC bus low voltage protection
Flashes 10 times and stops for 1 second, then repeats	xL2 - DC bus high voltage protection
Flashes 12 times and stops for 1 second, then repeats	xL4 - MCE error

2.15.6 LO: Inverter module protection

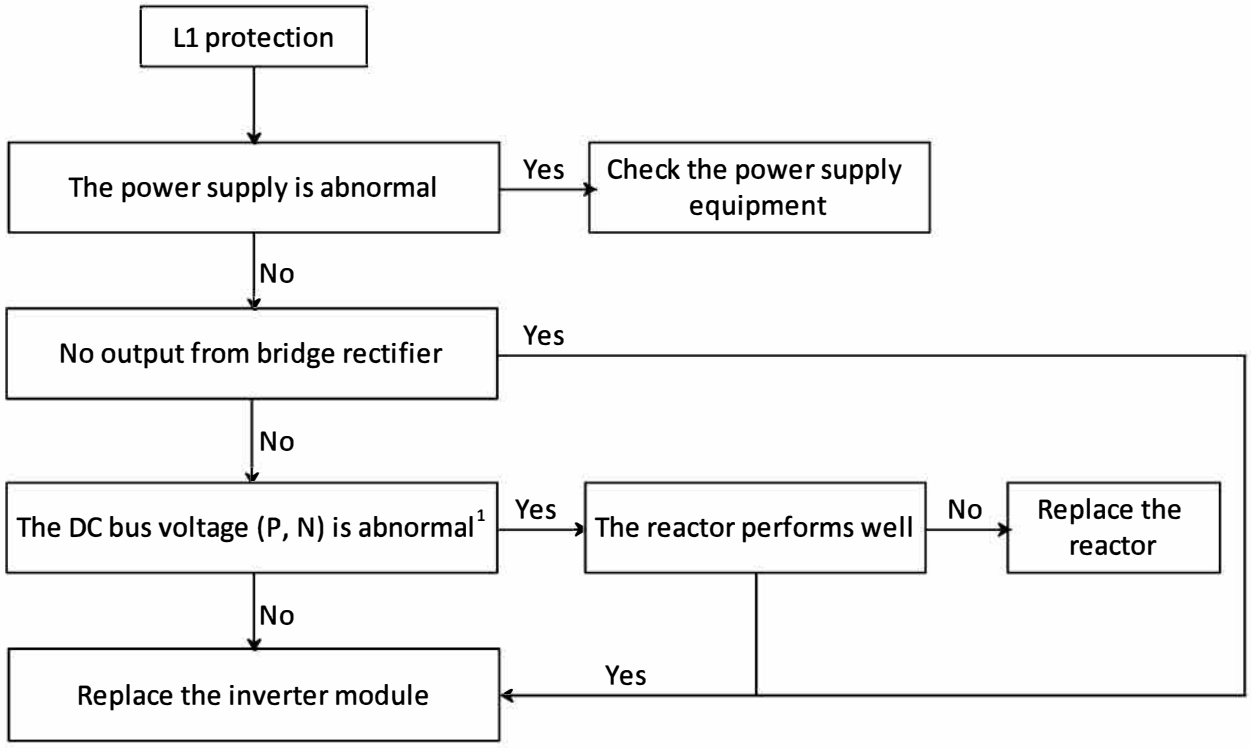


Note:

2. The DC bus wire should run from the N_in terminal on the inverter module, through the current sensor (in the direction indicated by the arrow on the current sensor), and end at the N_out terminal on the inverter module.

Figure 6-2.5: DC detection wire connection method

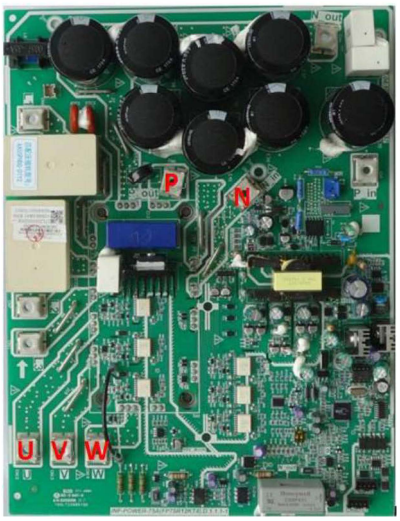
2.15.7 L1: DC bus low voltage protection



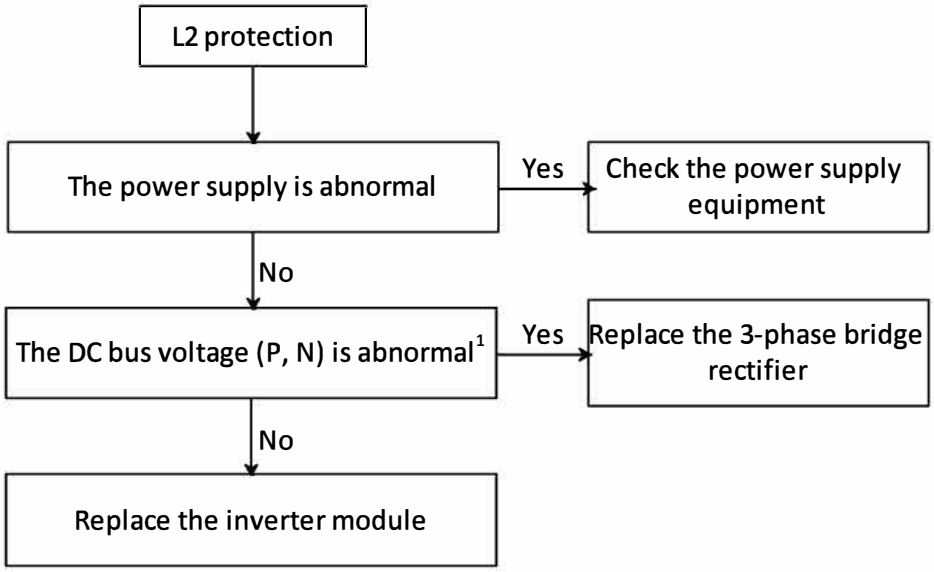
Note:

1. The normal DC voltage between terminals P and N on inverter module should be 450-650V. When the voltage is lower than 350V, L1 protection will be appeared.

Figure 6-2.6: Inverter module terminals



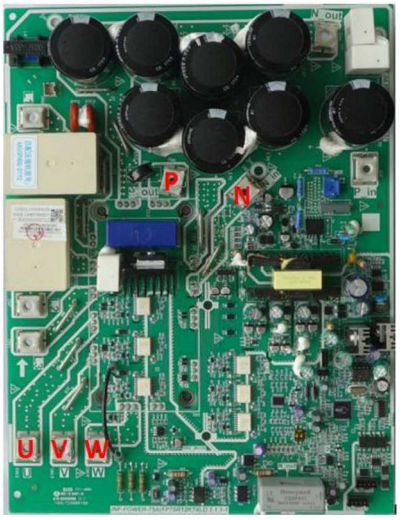
2.15.8 L2: DC bus high voltage protection



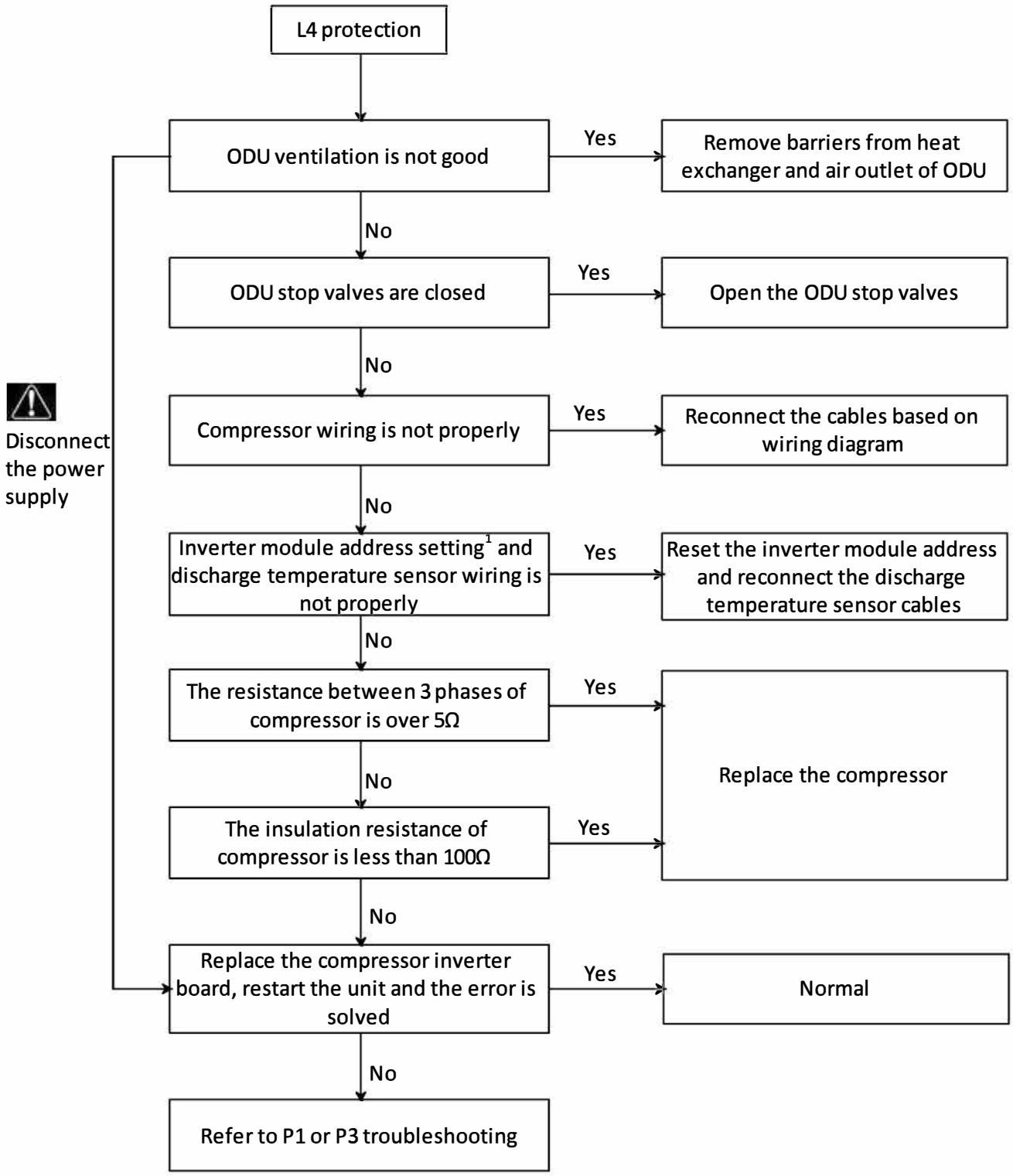
Note:

1. The normal DC voltage between terminals P and N on inverter module should be 450-650V. When the voltage is higher than 700V, L2 protection will be appeared.

Figure 6-2.7: Inverter module terminals



2.15.9 L4: MCE error

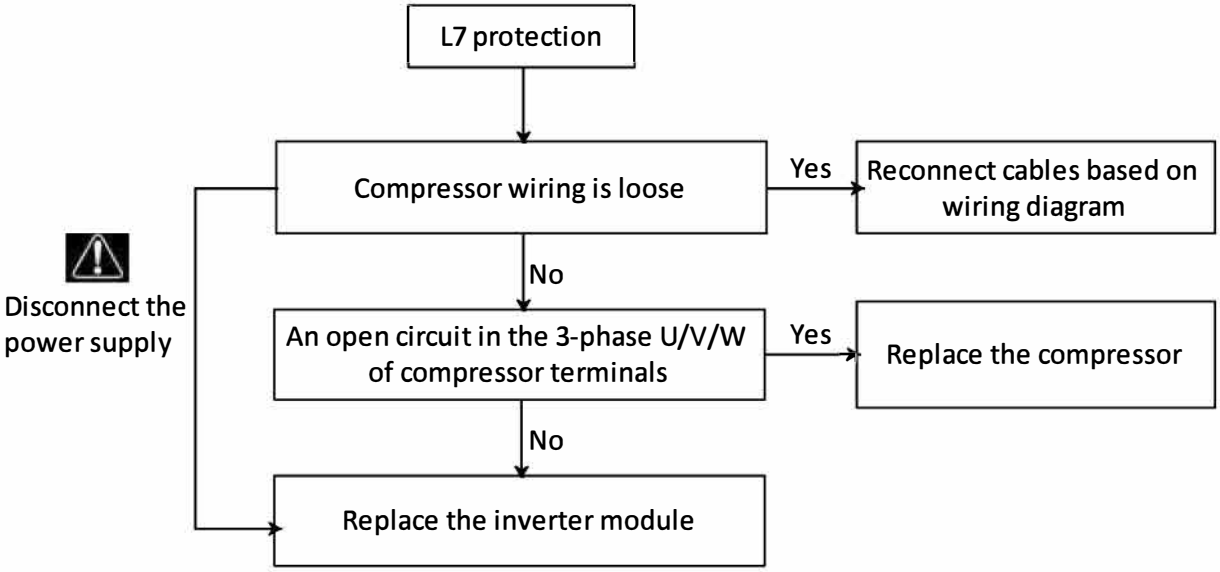


Notes:

1. Compressor inverter module address is set through dial switch S7 on the inverter module. The compressor inverter module A/B location refers to the wiring diagram.

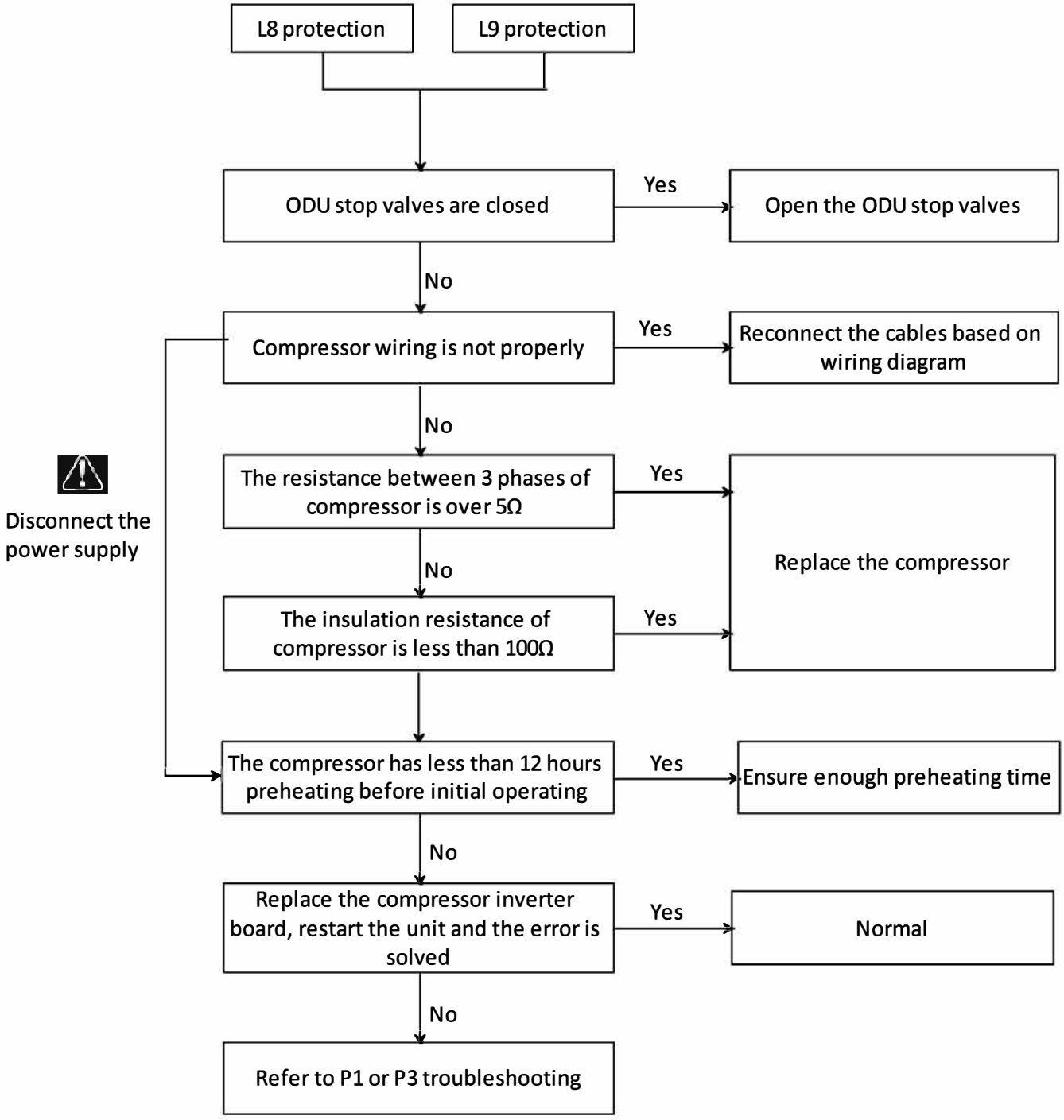
S7 on inverter module	Inverter module address
	0 for compressor inverter module A
	1 for compressor inverter module B

2.15.10 L7: Phase sequence error



2.15.11 L8: Compressor frequency variation greater than 15Hz within one second protection

L9: Actual compressor frequency differs from target frequency by more than 15Hz protection



2.15.12 Compressor replacement procedure

Figure 6-2.8: Draining oil from a compressor

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.

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 5-4.16 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 only lightly spoiled, go to Step 4.
- If the oil drained from the faulty compressor is heavily spoiled, check the oil in the other compressors in the system. Drain the oil from any compressors where the oil has been spoiled. Go to Step 4.

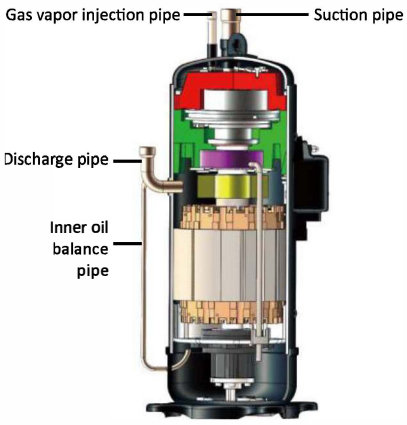
Step 4: Replace oil separator(s) and accumulator(s)

- 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.

Figure 6-2.9: Compressor piping



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 compressors in Step 3, use clean oil to clean them before re-fitting them into the units. 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.)

Step 7: Add compressor oil

- Add 1.2L of oil to the new compressor through the discharge pipe, using a funnel.
- Add 1.2L of oil to each of the compressors from which oil was drained in Step 3.
- Only use FV68H oil. Different compressors require different types of oil. Using the wrong type of oil leads to various problems.
- Add additional oil to the accumulators such that the total amount of oil is 5L in 8-12HP units, 6L in 14-16HP units 7L in 18-22HP units, 9L in 24-28HP units and 10L in 30-32HP units.

Step 8: Vacuum drying and refrigerant charging

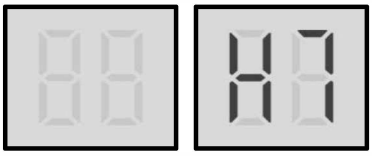
- Once all the compressors and other components have been fully connected, vacuum dry the system and recharge refrigerant. Refer to the V6 Engineering Data Book, Part 3.

Figure 6-2.10: Inspecting compressor oil

Figure 6-2.11: Effects of spoiled compressor oil

2.16 H7: Unmatched total number of indoor units

2.16.1 Digital display output



2.16.2 Description

- Number of indoor units detected by master unit not same as number set on main PCB.
- All units stop running.
- Error code is only displayed on the master unit.

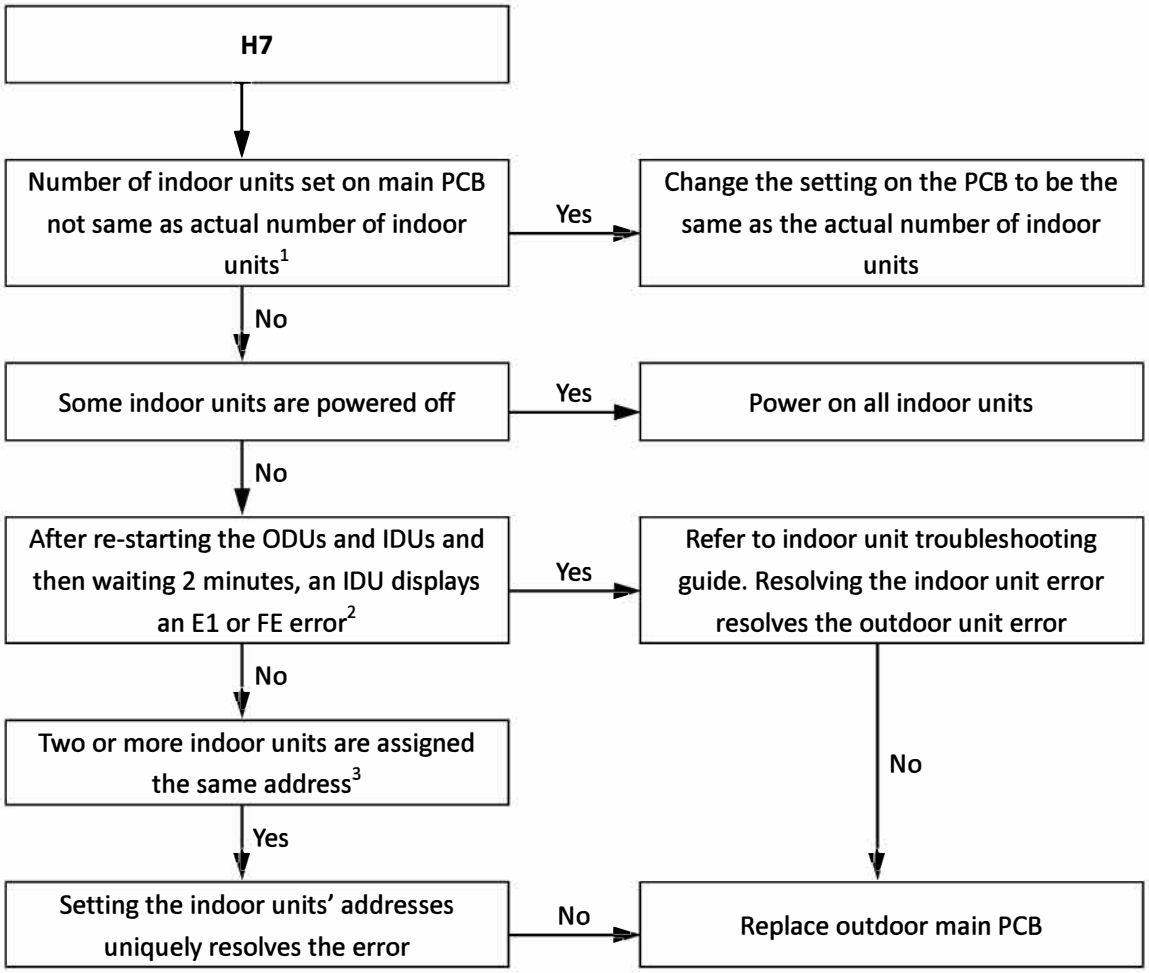
2.16.3 Trigger / recover condition

- Trigger condition: Only one indoor unit cannot be detected by master unit for 8 hours or more than one indoor unit cannot be detected by master unit for 3 minutes.
- Recover condition: Number of indoor units detected by master unit is same as number set on main PCB.
- Reset method: Resume automatically.

2.16.4 Possible causes

- Number of indoor units set on main PCB not same as actual number of indoor units.
- Some indoor units are powered off.
- Communication wires between indoor and outdoor units not connected properly.
- Indoor unit PCB damaged.
- Indoor unit without address or indoor unit address duplicated.
- Main PCB damaged.

2.16.5 Procedure

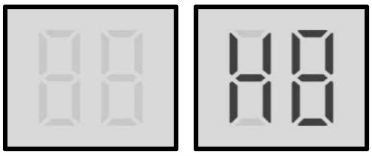


Notes:

1. The number of indoor units can be set on switches EN3 and S12 on the main PCB.
2. Indoor unit error code E1 indicates a communication error between indoor and master unit. Indoor unit error code FE indicates that an indoor unit has not been assigned an address.
3. Indoor unit addresses can be checked and manually assigned using indoor unit remote/wired controllers. Alternatively, indoor unit addresses can be automatically assigned by the master outdoor unit.

2.17 H8: High pressure sensor error

2.17.1 Digital display output



2.17.2 Description

- High pressure sensor error.
- All units stop running.
- Error code is only displayed on the unit with the error.

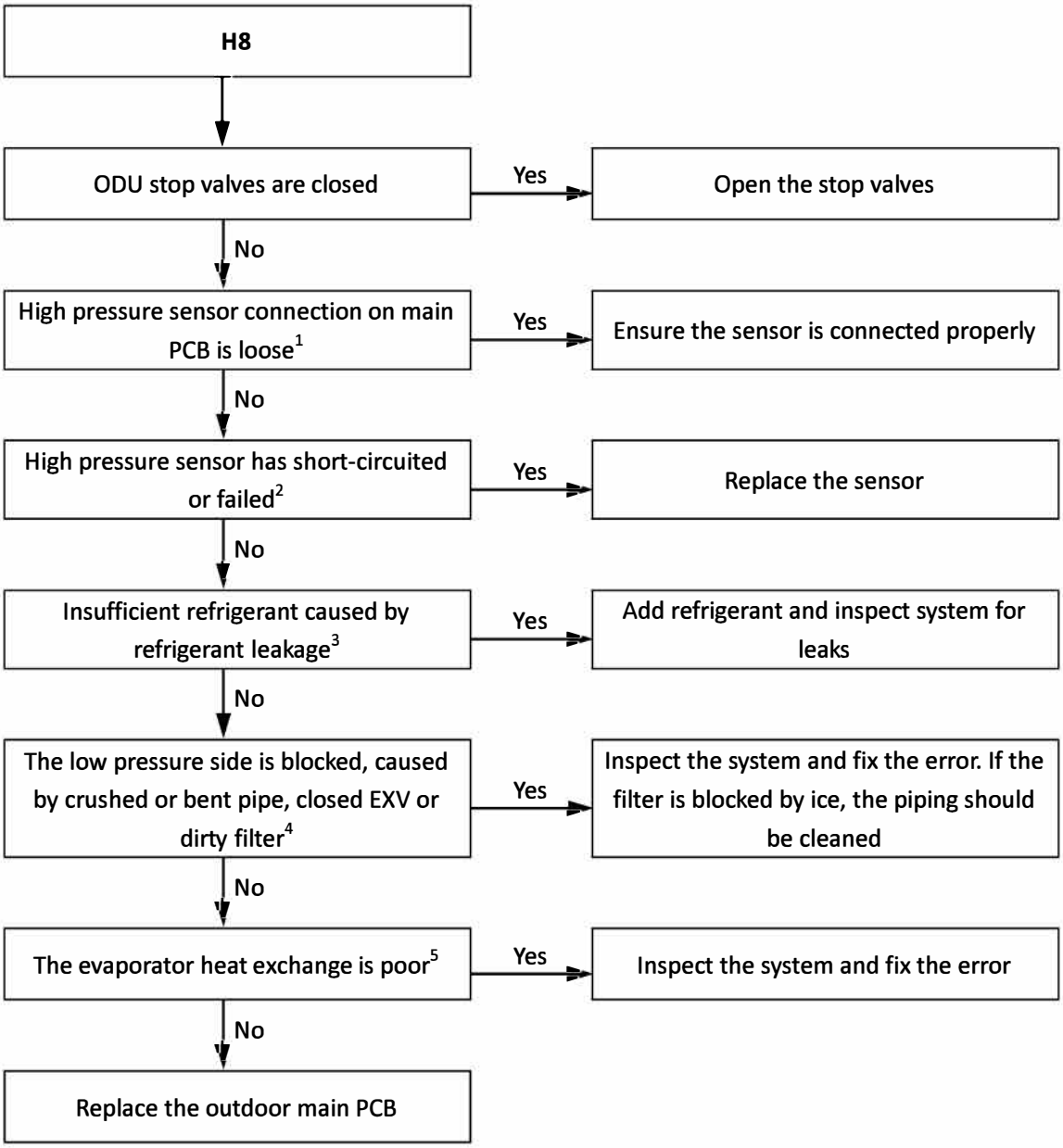
2.17.3 Trigger / recover condition

- Trigger condition: Discharge pressure ≤ 0.3MPa.
- Recover condition: Discharge pressure > 0.3MPa.
- Reset method: Resume automatically.

2.17.4 Possible causes

- Outdoor unit stop valves are closed.
- Pressure sensor not connected properly or has malfunctioned.
- Insufficient refrigerant.
- Low pressure side blockage.
- Poor evaporator heat exchange.
- Main PCB damaged.

2.17.5 Procedure

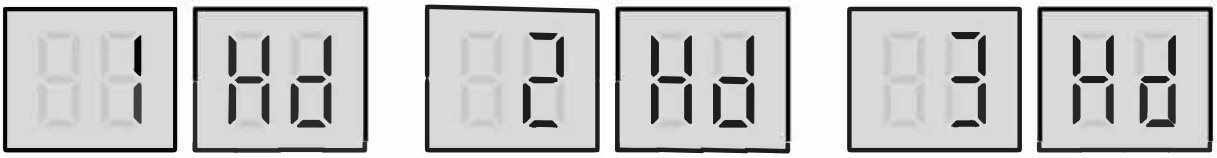


Notes:

1. High pressure sensor connection is port CN17 on the main PCB (labeled 7 in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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.
3. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
4. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
5. 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.

2.18 yHd: Slave unit malfunction

2.18.1 Digital display output



In the error code, 'y' is a placeholder for the address (1, 2 or 3) of the slave unit with the error.

2.18.2 Description

- 1Hd indicates an error on the slave unit with address 1.
- 2Hd indicates an error on the slave unit with address 2.
- 3Hd indicates an error on the slave unit with address 3.
- All units stop running.
- Error code is only displayed on the master unit.

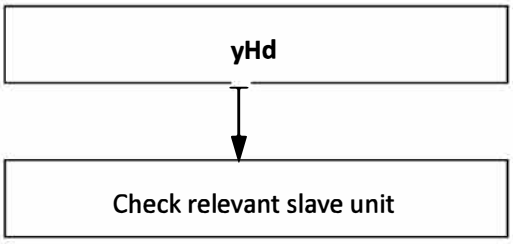
2.18.3 Trigger / recover condition

- Trigger condition: Slave unit is malfunction.
- Recover condition: Slave unit goes back to normal.
- Reset method: Resume automatically.

2.18.4 Possible causes

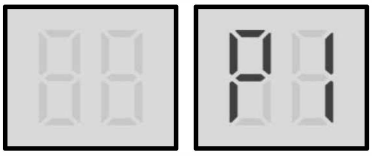
- Slave unit malfunction.

2.18.5 Procedure



2.19 P1: Discharge pipe high pressure protection

2.19.1 Digital display output



2.19.2 Description

- Discharge pipe high pressure protection. If the system has a 3-phase protector and the 3-phase protector is connected with the high pressure switch, the system will display P1 protection when initially powered on, and P1 protection will disappear once the system reaches a steady state.
- All units stop running.
- Error code is only displayed on the unit with the error.

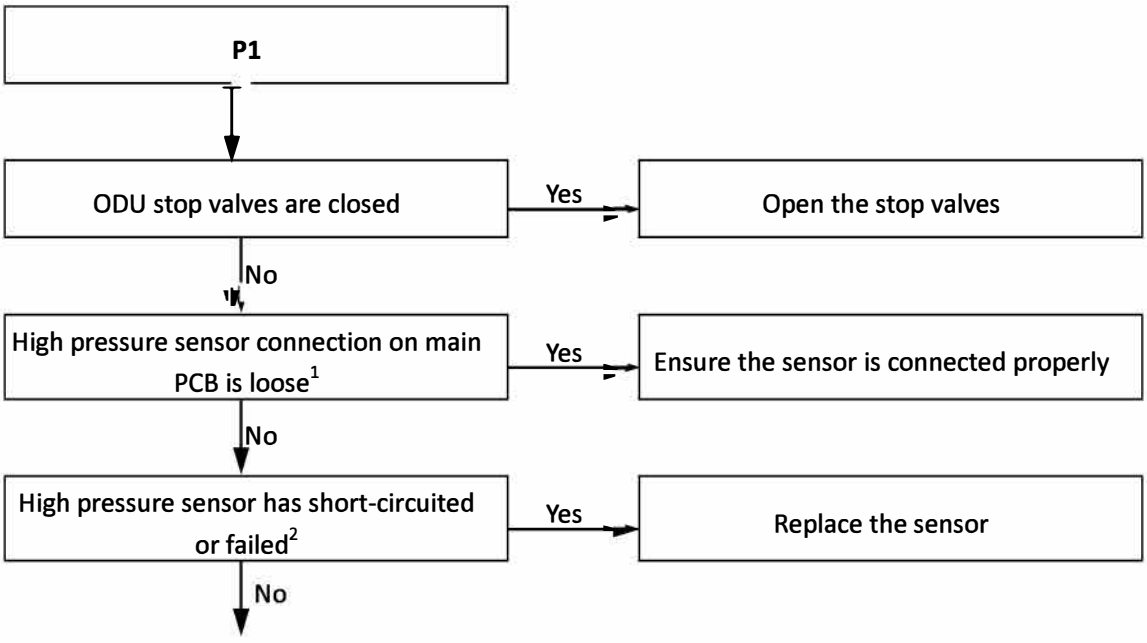
2.19.3 Trigger / recover condition

- Trigger condition: Discharge pressure ≥ 4.4MPa.
- Recover condition: Discharge pressure ≤ 3.2MPa.
- Reset method: Resume automatically.

2.19.4 Possible causes

- Outdoor unit stop valves are closed.
- 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.

2.19.5 Procedure



Flowchart continued on next page ...

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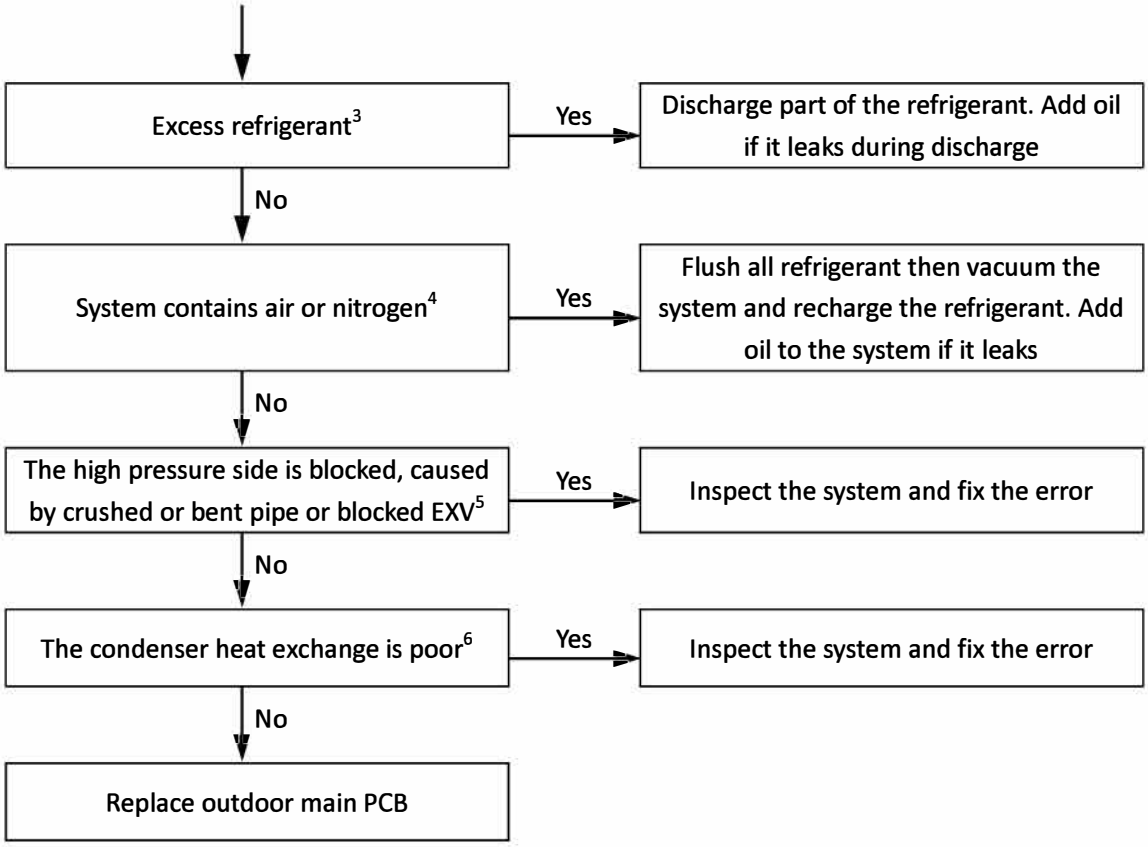
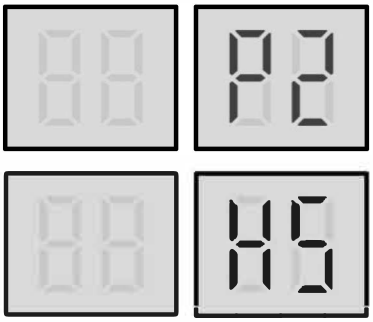


Notes:

1. The high pressure sensor connection is port CN17 on the main PCB (labeled 7 in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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.
3. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
4. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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.

2.20 P2, H5: Suction pipe low pressure protection

2.20.1 Digital display output



2.20.2 Description

- Suction pipe low pressure protection. If the system has a 3-phase protector and the 3-phase protector is connected to the low pressure switch, the system will display P2 protection when initially powered on, and P2 protection will disappear once the system reaches a steady state.
- All units stop running.
- Error code is only displayed on the unit with the error.

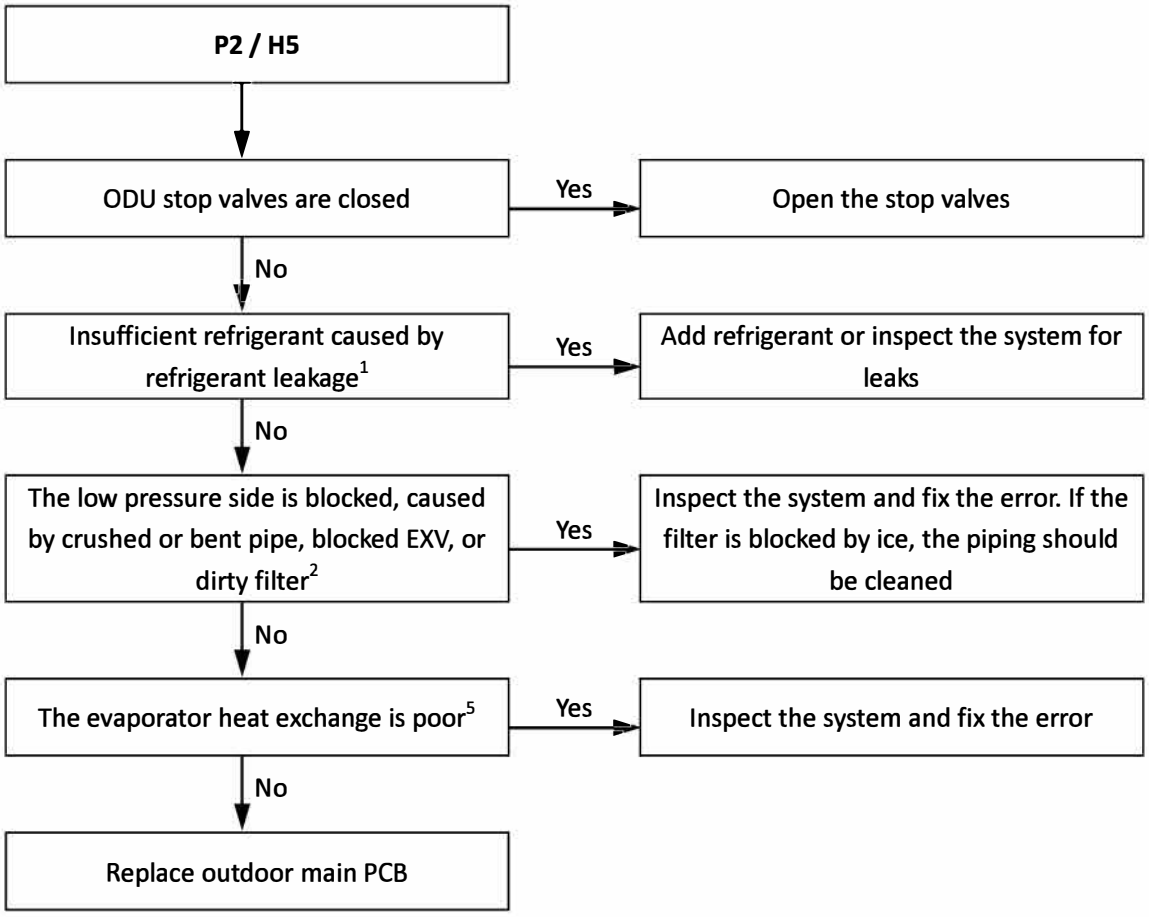
2.20.3 Trigger / recover condition

- Trigger condition:
  For P2 protection: Suction pressure ≤ 0.05MPa.
  For H5 protection: P2 protection appears three times in 60 minutes.
- Recover condition: Suction pressure ≥ 0.15MPa.
- Reset method:
  For P2 protection: Resume automatically.
  For H5 protection: Manually restart.

2.20.4 Possible causes

- Outdoor unit stop valves are closed.
- Insufficient refrigerant.
- Low pressure side blockage.
- Poor evaporator heat exchange.
- Main PCB damaged.

2.20.5 Procedure

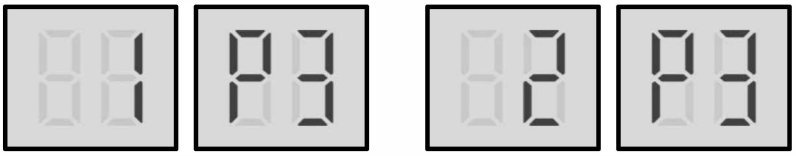


Notes:

1. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 “Normal Operating Parameters of Refrigerant System”.
2. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 “Normal Operating Parameters of Refrigerant System”.
3. 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.

2.21 xP3: Compressor current protection

2.21.1 Digital display output



'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

2.21.2 Description

- 1P3 indicates current protection on compressor A; 2P3 indicates current protection on compressor B.
- All units stop running.
- Error code is only displayed on the unit with the error.

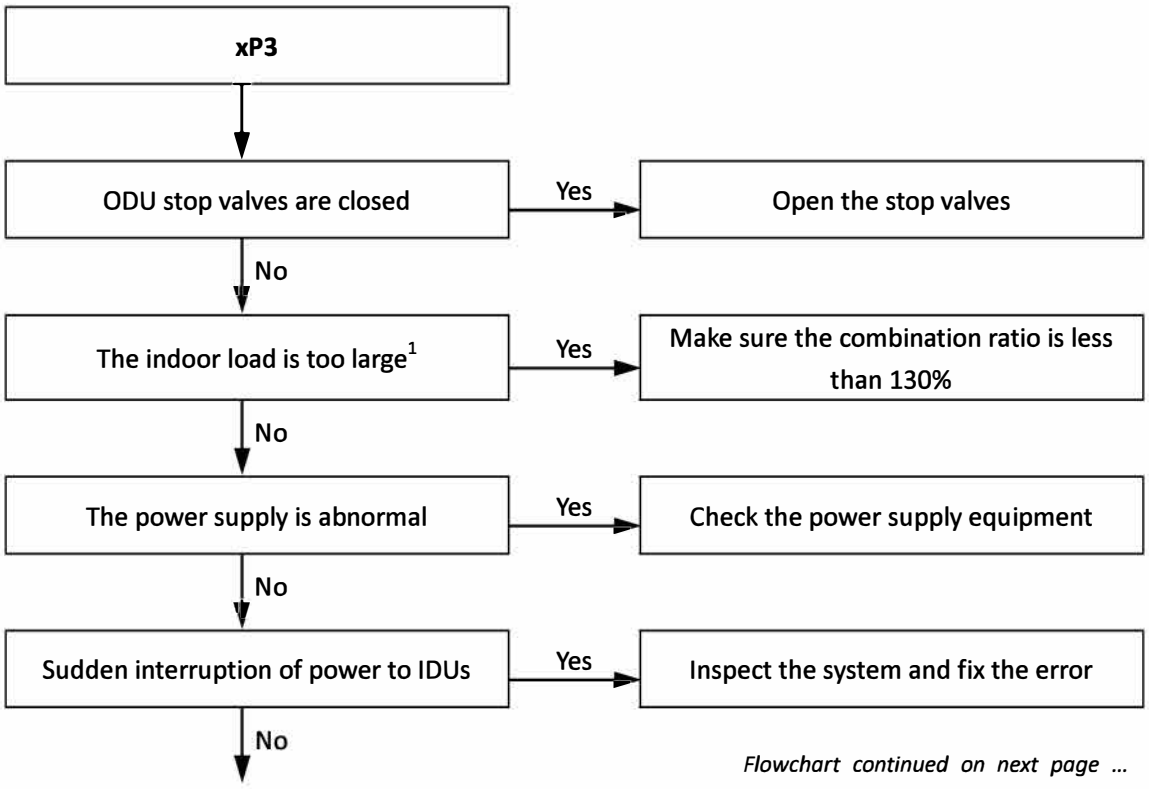
2.21.3 Trigger / recover condition

- Trigger condition: Current of compressor AA55PHDG –D1YG ≥ 24.6A or DC80PHDG –D1YG ≥ 33A.
- Recover condition: Current of compressor AA55PHDG –D1YG < 24.6A or DC80PHDG –D1YG < 33A.
- Reset method: Resume automatically.

2.21.4 Possible causes

- Outdoor unit stop valves are closed.
- 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.

2.21.5 Procedure



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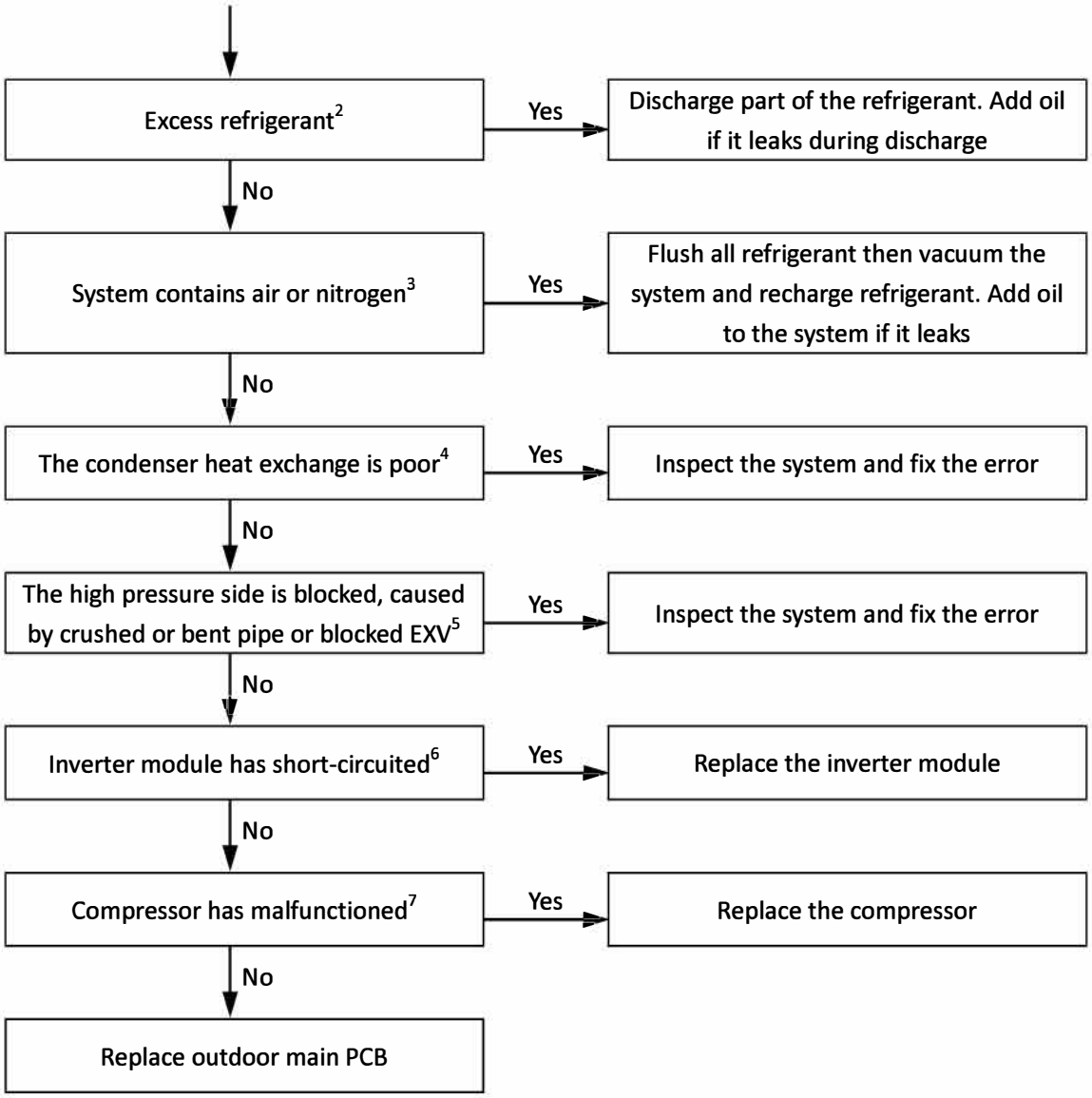
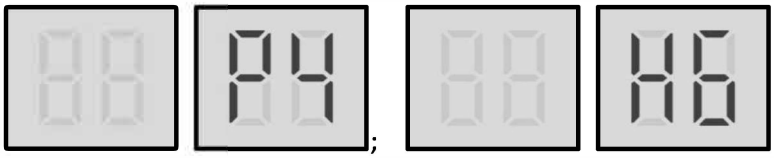


Notes:

1. An indoor load that is too large causes suction and discharge temperatures to be higher than normal. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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 0.7-1.5Ω 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.

2.22 P4, H6: Discharge temperature protection

2.22.1 Digital display output



2.22.2 Description

- Discharge temperature protection.
- All units stop running.
- Error code is only displayed on the unit with the error.

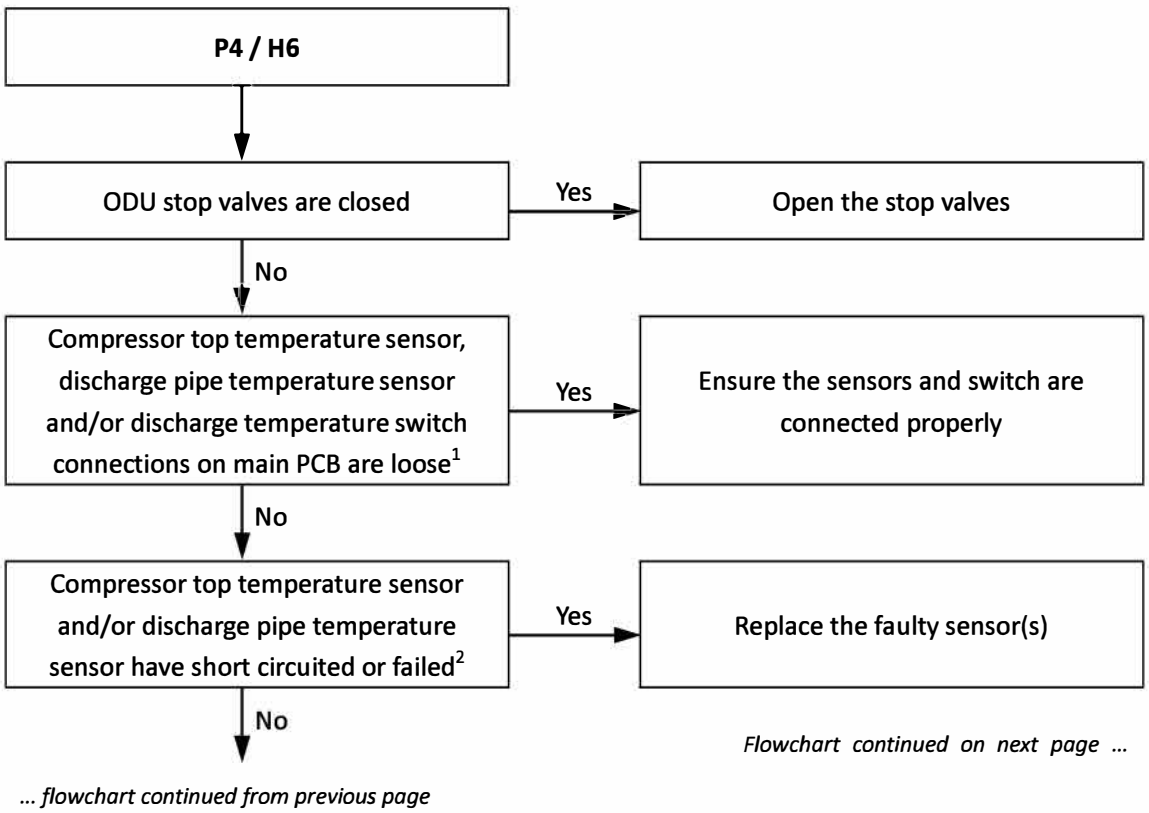
2.22.3 Trigger / recover condition

- Trigger condition:
  For P4 protection: Discharge temperature (T7C1/2) ≥ 120°C.
  For H6 protection: P4 protection appears three times in 100 minutes.
- Recover condition: Discharge temperature (T7C1/2) ≤ 90 °C.
- Reset method:
  For P4 protection: Resume automatically.
  For H6 protection: Manually restart.

2.22.4 Possible causes

- Outdoor unit stop valves are closed.
- 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.

2.22.5 Procedure



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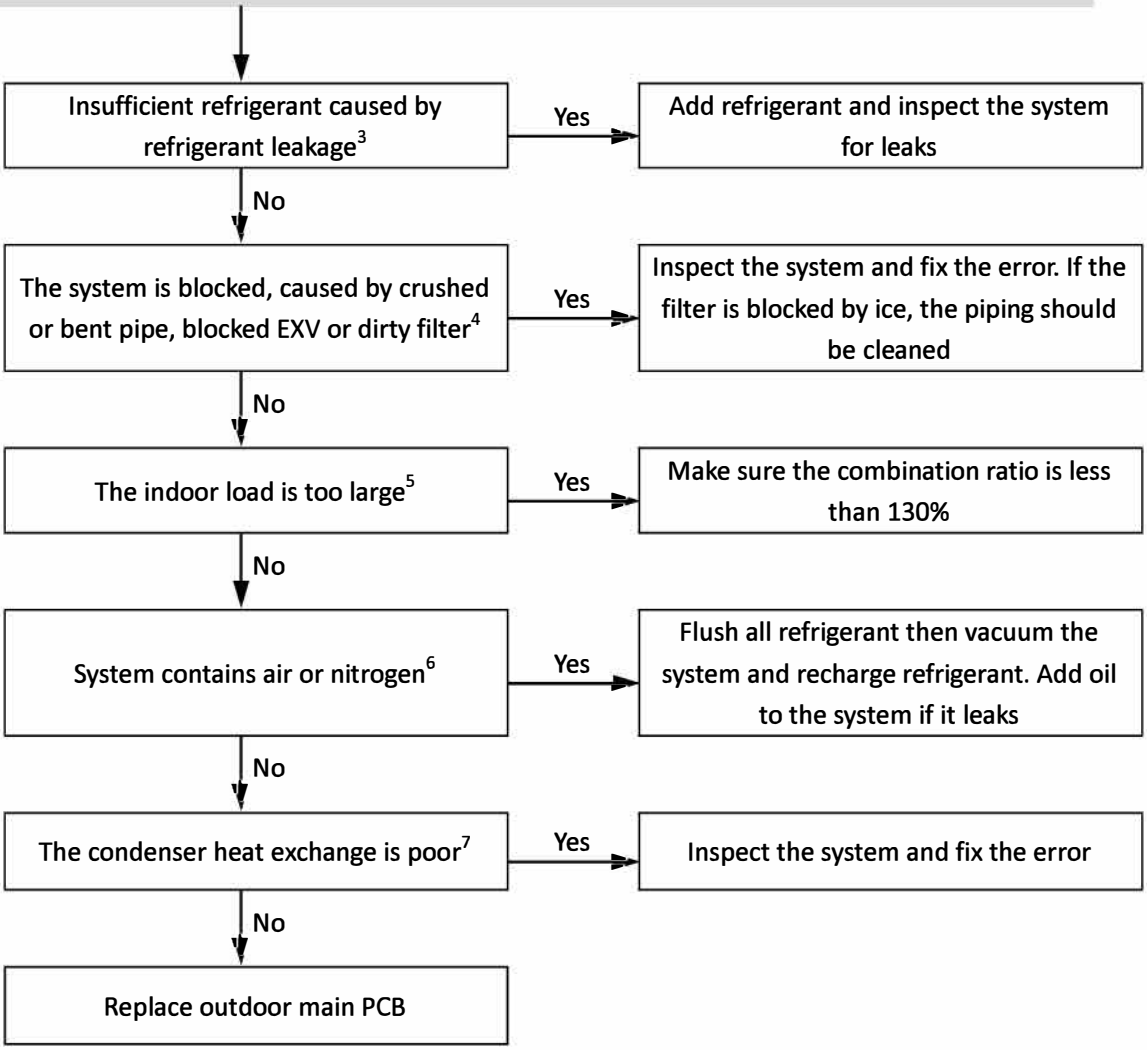
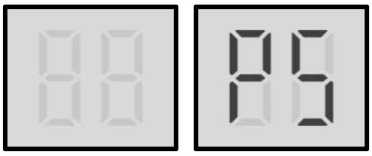


Notes:

1. Compressor top temperature sensor and discharge pipe temperature sensor connections are ports CN4 and CN5 on the main PCB (labeled 3 and 4, respectively, in Figure 5-2.1 in Part 5, 2.1 "Ports"). The discharge temperature switch connection is port CN19 on the main PCB (labeled 2 in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.2 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics".
3. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
4. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
5. An indoor load that is too large causes suction and discharge temperatures to be higher than normal. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
6. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
7. 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.

2.23 P5: Outdoor heat exchanger temperature protection

2.23.1 Digital display output



2.23.2 Description

- Outdoor heat exchanger temperature protection.
- All units stop running.
- Error code is only displayed on the unit with the error.

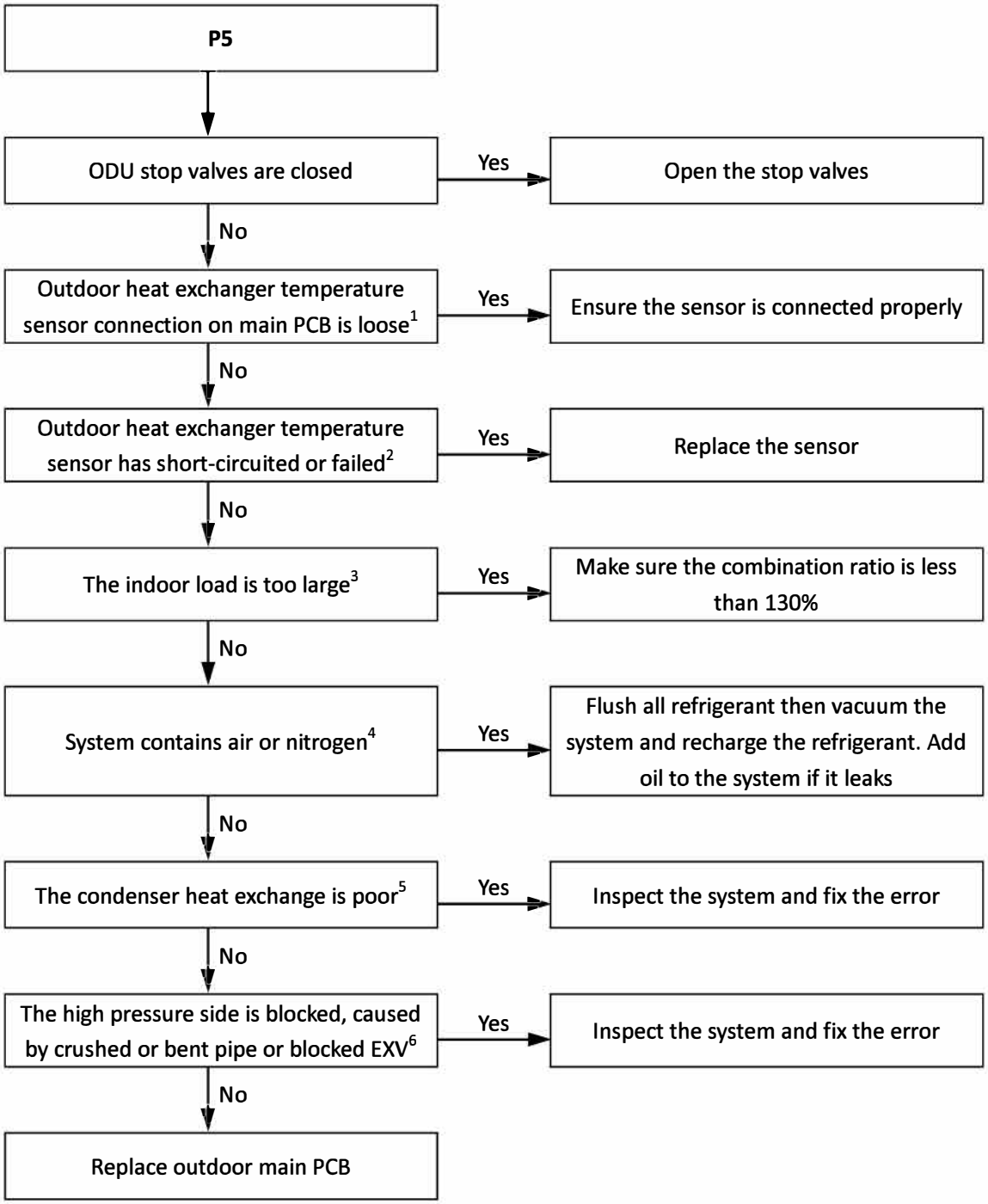
2.23.3 Trigger / recover condition

- Trigger condition: Outdoor heat exchanger temperature (T3) ≥ 65°C.
- Recover condition: Outdoor heat exchanger temperature (T3) < 55 °C.
- Reset method: Resume automatically.

2.23.4 Possible causes

- Outdoor unit stop valves are closed.
- 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.

2.23.5 Procedure

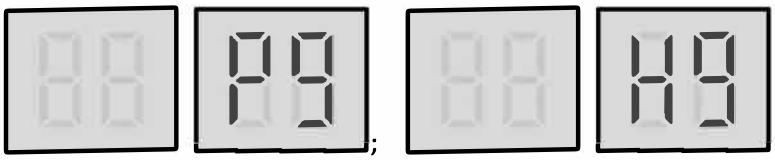


Notes:

1. Outdoor heat exchanger temperature sensor connection is port CN1 on the main PCB (labeled 11 in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.1 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics"
3. An indoor load that is too large causes suction and discharge temperatures to be higher than normal. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
4. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
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.
6. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".

2.24 P9, H9: Fan module protection

2.24.1 Digital display output



2.24.2 Description

- Fan module protection.
- All units stop running.
- Error code is only displayed on the unit with the error.

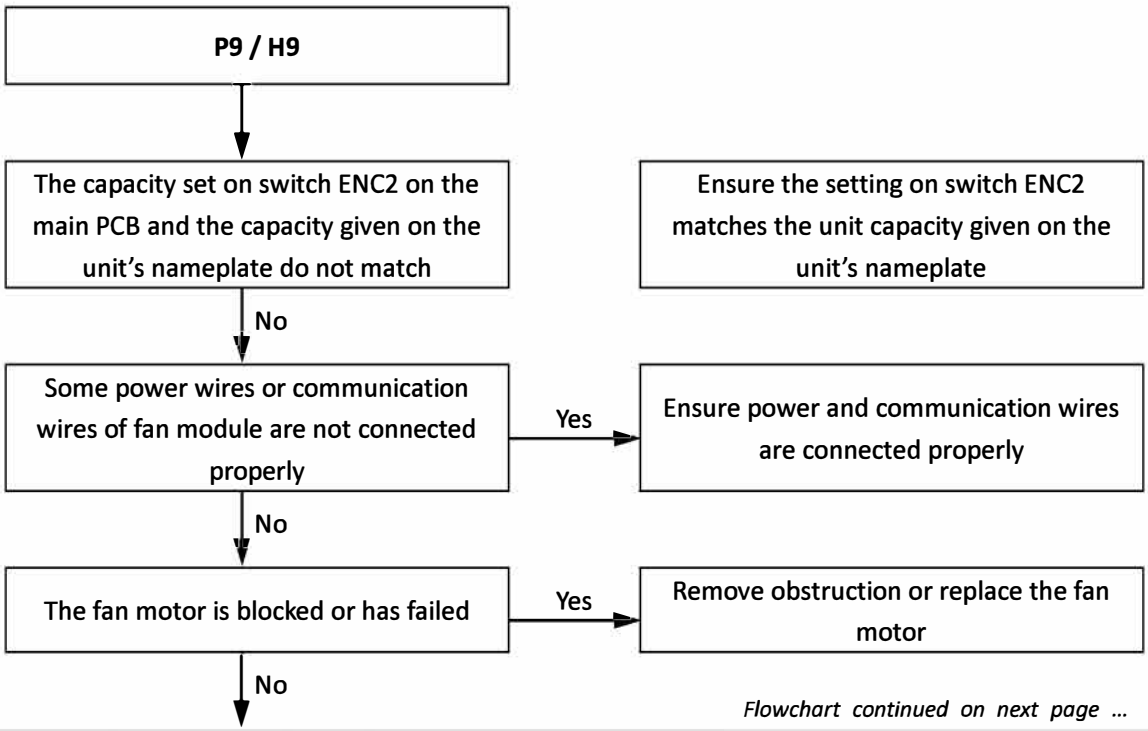
2.24.3 Trigger / recover condition

- Trigger condition:
  For P9 protection: Fan speed is too low.
  For H9 protection: P9 protection appears ten times in 120 minutes.
- Recover condition: Fan speed go back to normal.
- Reset method:
  For P9 protection: Resume automatically; For H9 protection: Manually restart.

2.24.4 Possible causes

- Switch ENC2 incorrectly set.
- Power or communication wires not connected properly.
- Fan motor blocked or has failed.
- Power supply abnormal.
- AC filter board damaged.
- Fan module damaged.
- Main PCB damaged.

2.24.5 Procedure



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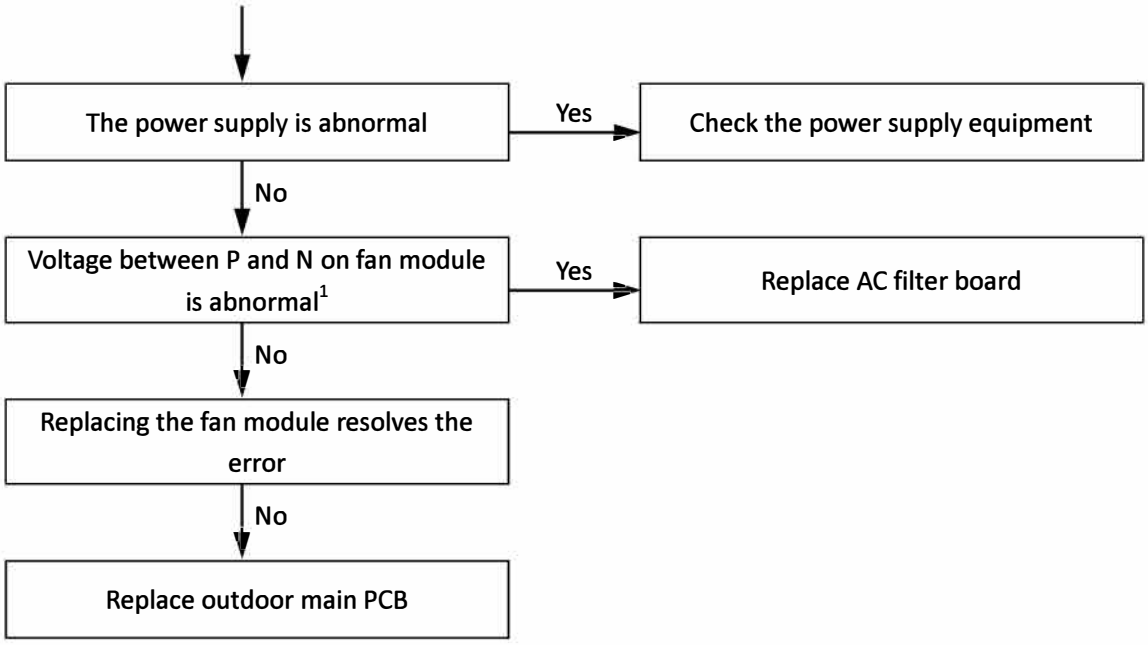
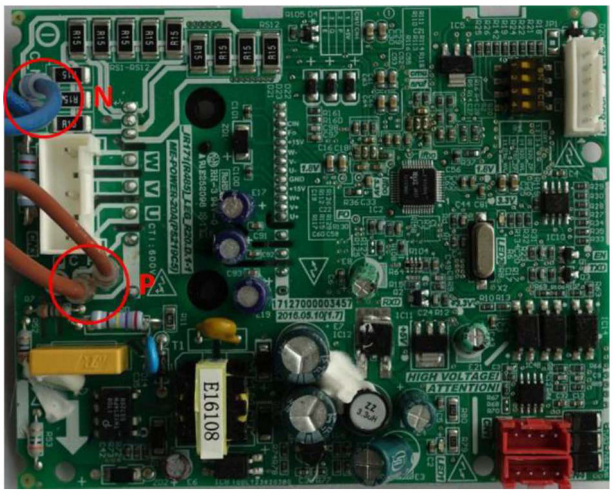


Notes:

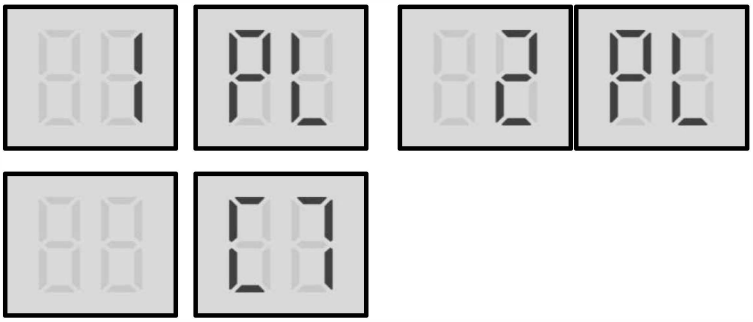
1. The normal voltage between P and N on the fan module is 310V DC.

Figure 6-2.12: Fan module P N terminals



2.25 PL, C7: Inverter module temperature protection

2.25.1 Digital display output



'x' is a placeholder for the compressor system (compressor and related electrical components), with 1 representing compressor system A and 2 representing compressor system B.

2.25.2 Description

- 1PL indicates inverter module A temperature protection.
- 2PL indicates inverter module B temperature protection.
- All units stop running.
- Error code is only displayed on the unit with the error.

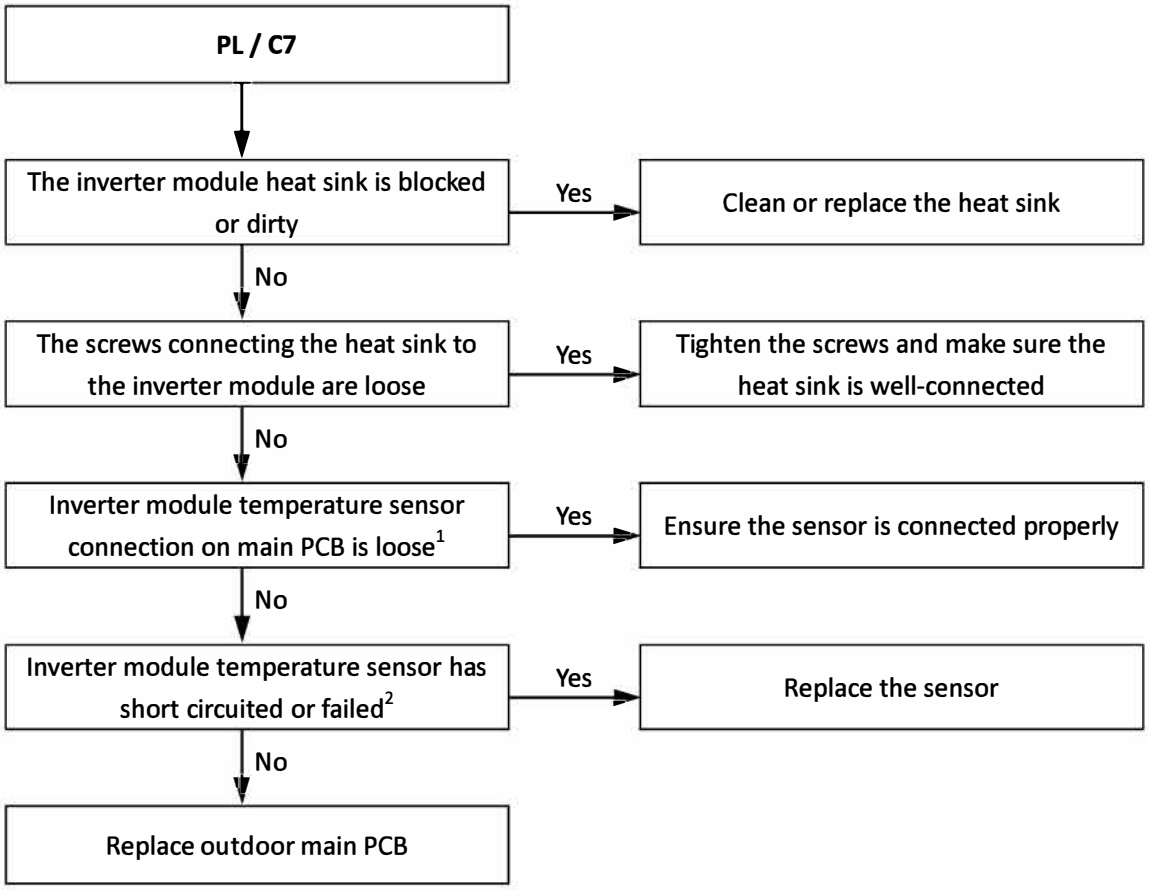
2.25.3 Trigger / recover condition

- Trigger condition:
  For PL protection: Inverter module heat sink temperature (TF1/2) ≥ 80°C.
  For C7 protection: PL protection appears three times in 100 minutes.
- Recover condition: Inverter module heat sink temperature (TF1/2) < 65°C
- Reset method:
  For PL protection: Resume automatically.
  For C7 protection: Manually restart.

2.25.4 Possible causes

- Blocked, dirty or loose heat sink.
- Temperature sensor not connected properly or has malfunctioned.
- Main PCB damaged.

2.25.5 Procedure

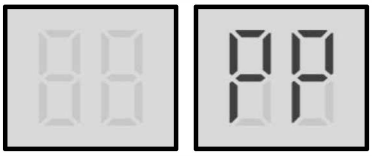


Notes:

1. Inverter module temperature sensor connection is port CN3 and CN3_1 on the main PCB (labeled 5 and 6, respectively, in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.3 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics".

2.26 PP: Compressor discharge insufficient superheat protection

2.26.1 Digital display output



2.26.2 Description

- Compressor discharge insufficient superheat protection.
- All units stop running.
- Error code is only displayed on the unit with the error.

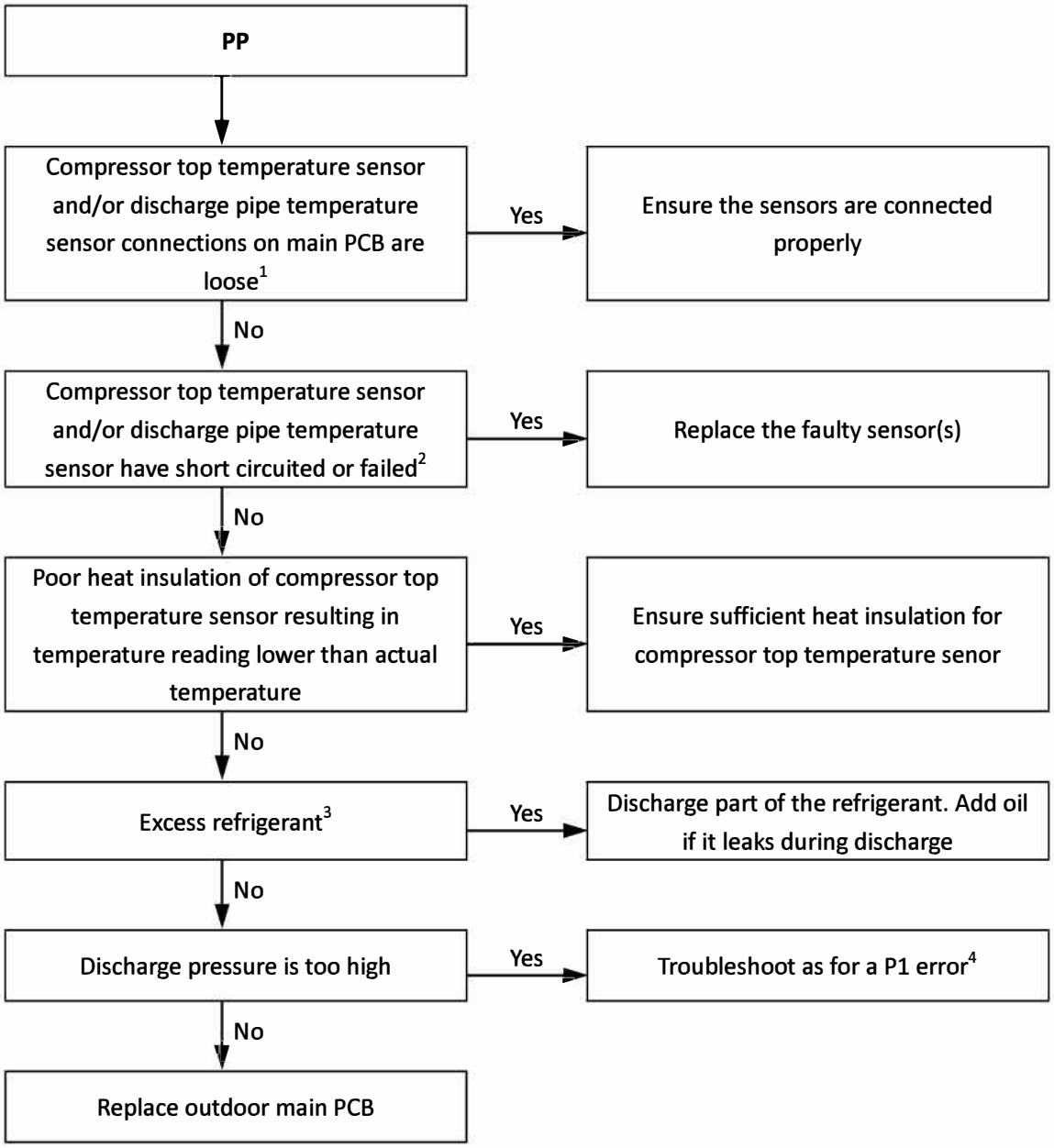
2.26.3 Trigger / recover condition

- Trigger condition: Discharge gas superheat is ≤ 0°C for 20 minutes or ≤ 5°C for 60 minutes.
- Recover condition: Discharge gas superheat go back to normal value.
- Reset method: Resume automatically.

2.26.4 Possible causes

- Temperature sensor not connected properly or has malfunctioned.
- Poor temperature sensor heat insulation.
- Excess refrigerant.
- Discharge pressure too high.
- Main PCB damaged.

2.26.5 Procedure



Notes:

1. Compressor top temperature sensor and discharge pipe temperature sensor connections are ports CN4 and CN5 on the main PCB (labeled 3 and 4, respectively, in Figure 5-2.1 in Part 5, 2.1 "Ports").
2. 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. Refer to Table 6-3.2 in Part 6, 3.1 "Temperature Sensor Resistance Characteristics".
3. 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. For normal system parameters refer to Table 6-3.4 and 6-3.5 in Part 6, 3.2 "Normal Operating Parameters of Refrigerant System".
4. See "P1 Troubleshooting".