Service manual

WELLEA M DF HT

Air to Water heat pump

EN

25.AW.BDHX.SM.R290.EN.14.01

Dear Customer,

Thank you for purchasing this device.
We invite you to read this manual carefully before using your appliance. Keep this document in a safe place for future reference.
To ensure safe and efficient operation, we recommend that you carry out the necessary maintenance operations regularly. Our After-Sales service can help you with these operations.
We hope that you will be satisfied with our services for many years.

AIRWELL

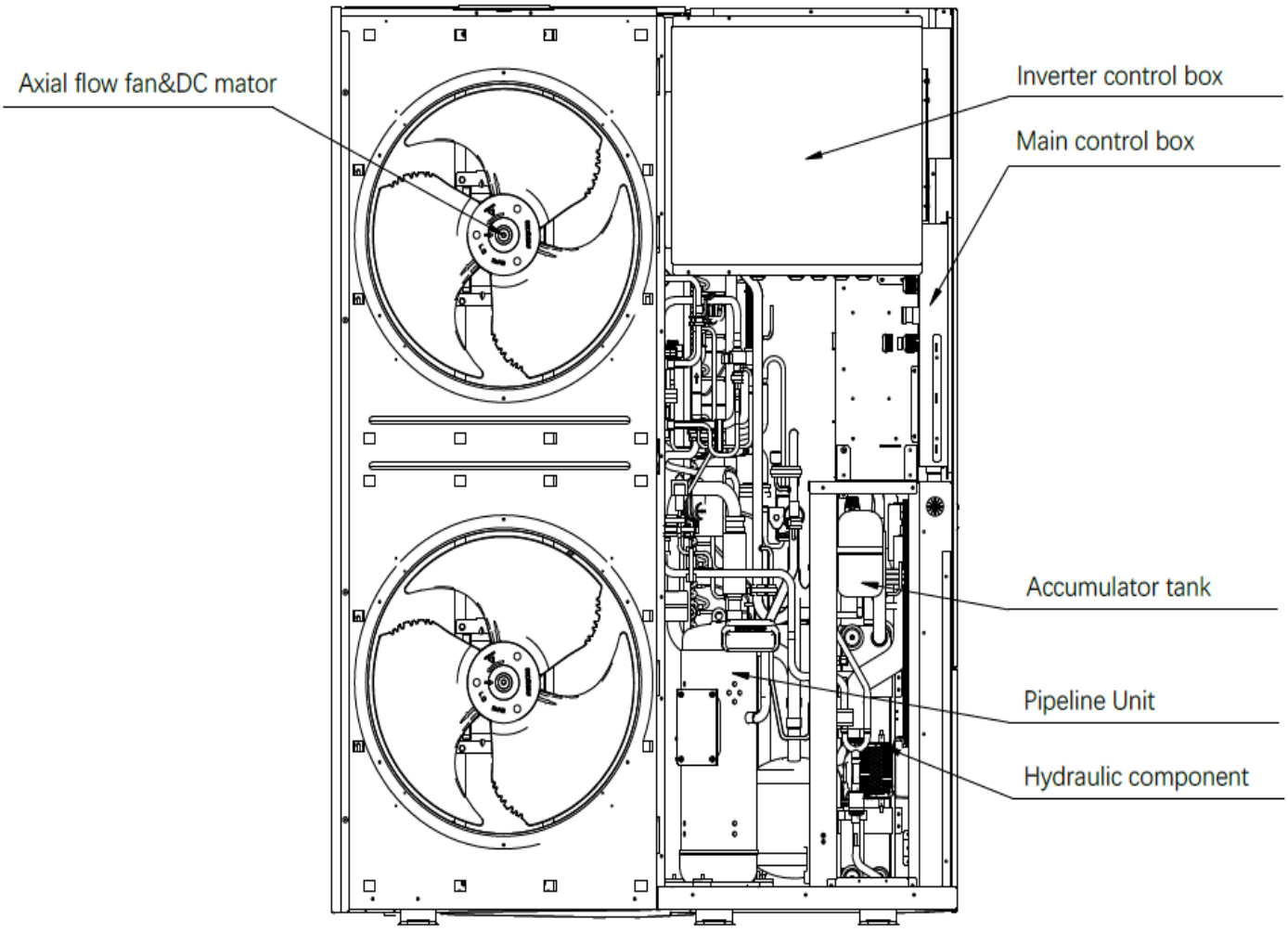
This manual is referring to the following unit :

Designation	Code
BDHW-040R-04M25	
BDHW-060R-04M25	
BDHW-080R-04M25	
BDHW-100R-04M25	

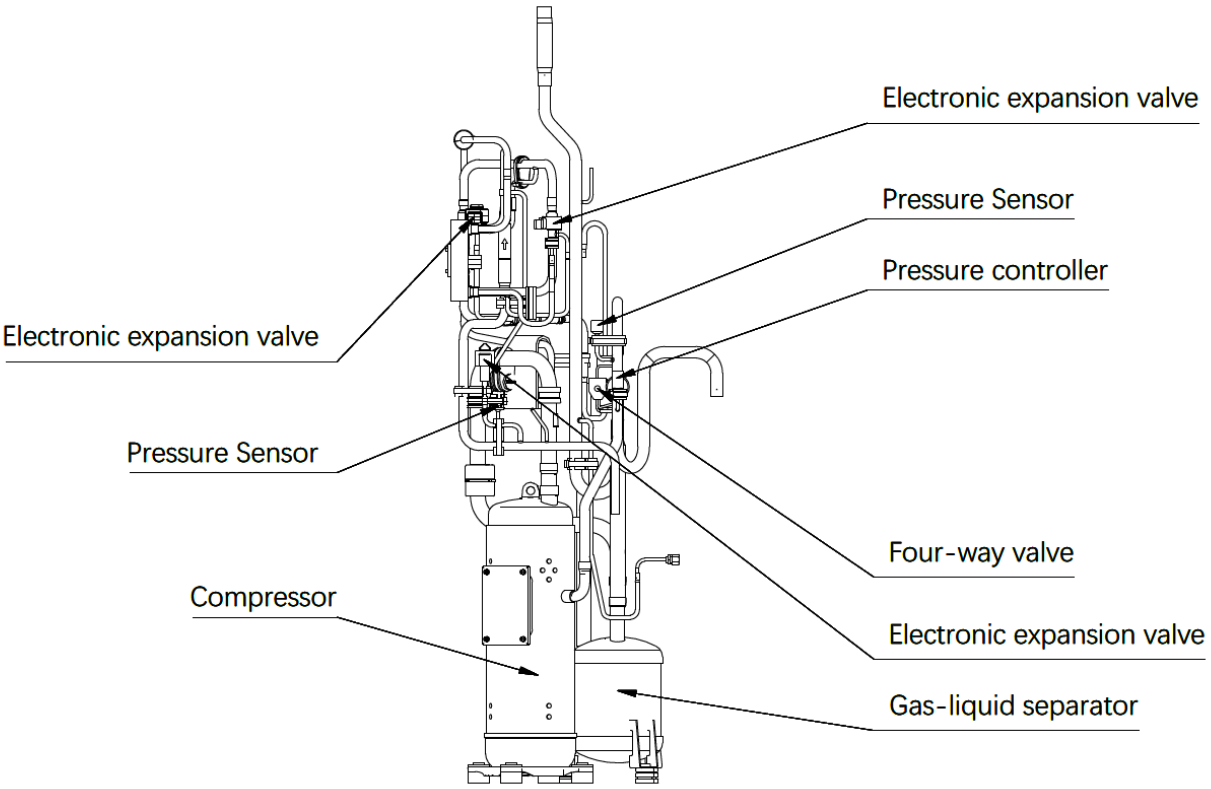
The data contained in this manual are not binding and may be modified by the manufacturer without prior notice.

SUMMARY

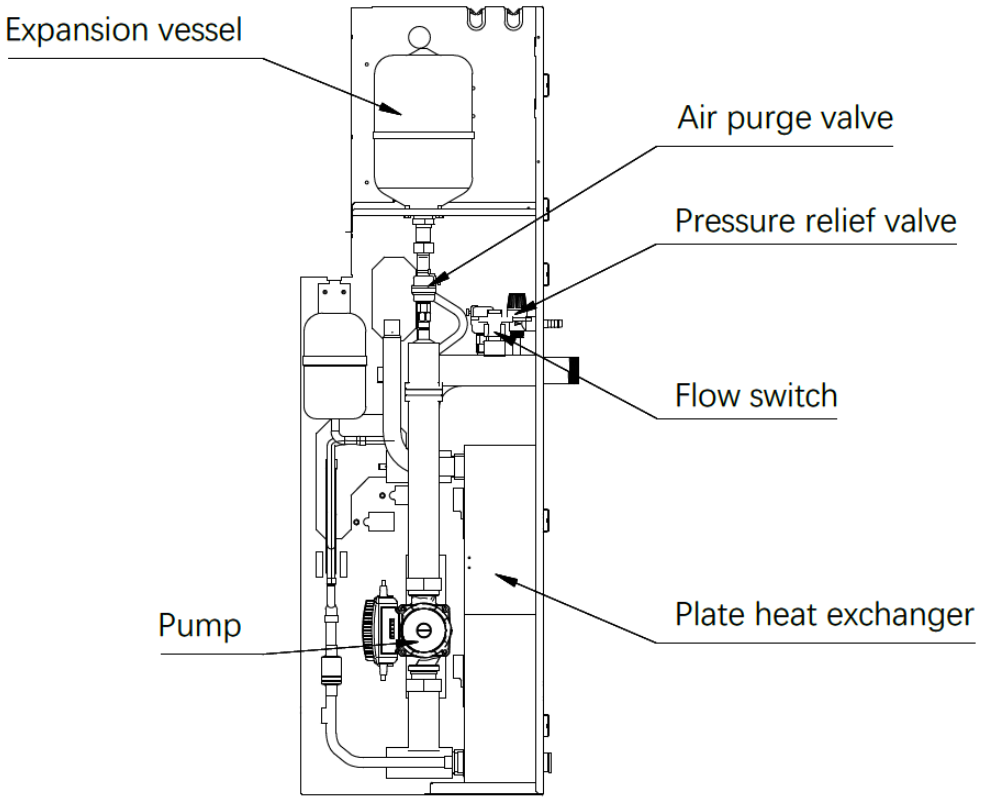
1. COMPONENT LAYOUT



outdoor unit



Pipeline Unit



Hydraulic component

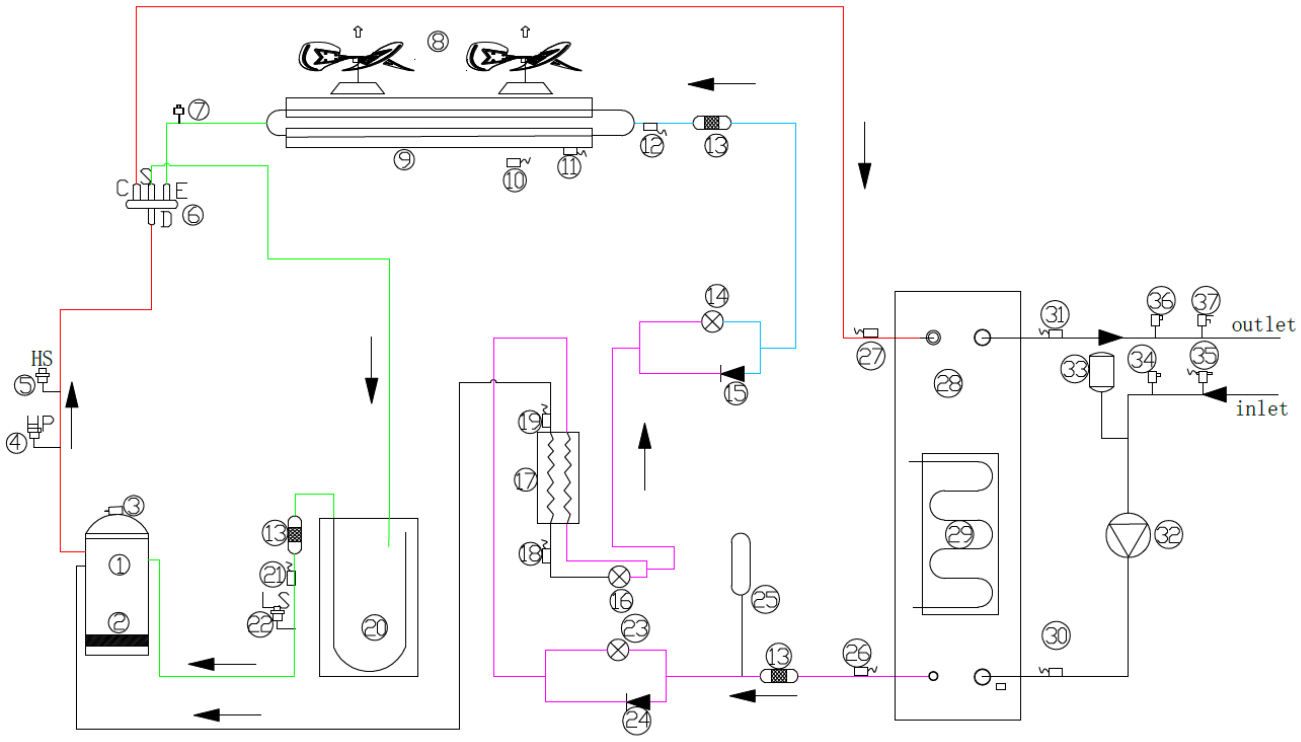
2. PIPING DIAGRAM

Refrigerant piping graphic example:

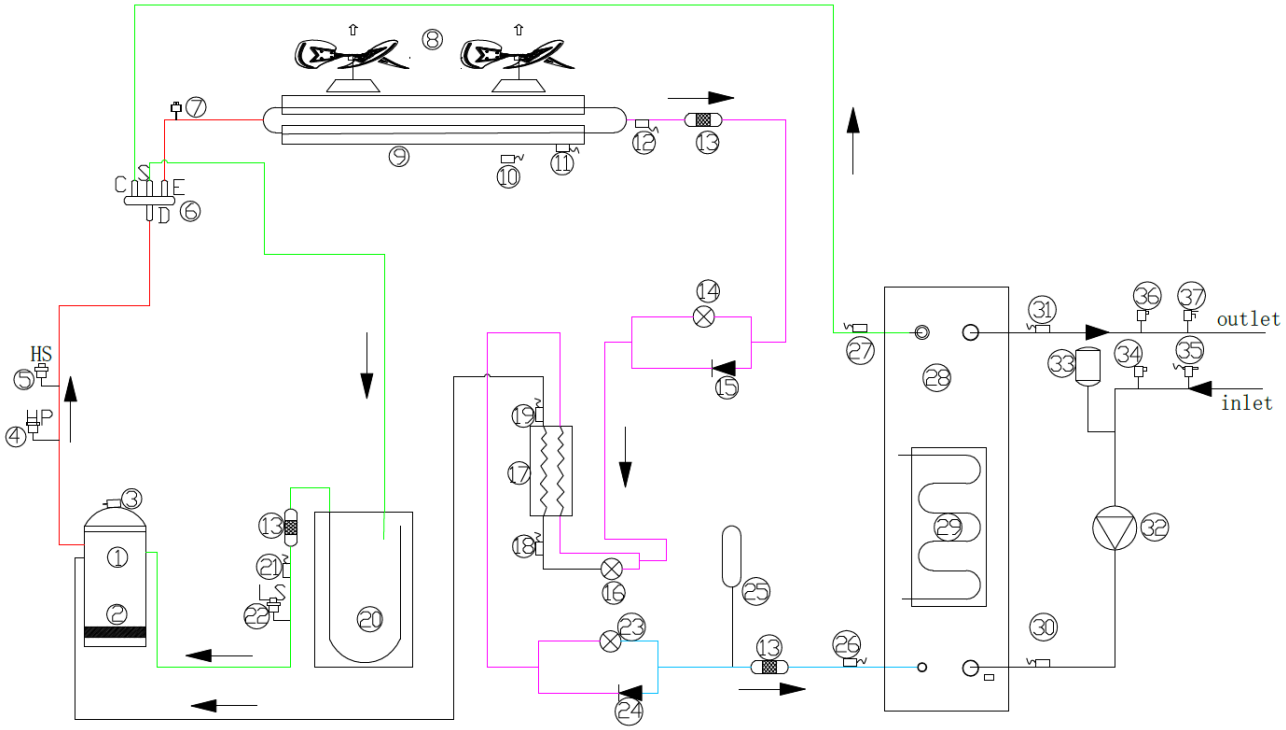
High-temperature, high-pressure gas
High-temperature, high-pressure liquid
Low-temperature, low-pressure gas liquid mixture
Low-temperature, low-pressure gas
Medium-temperature, medium-pressure gas

Note: Direction of refrigerant flow depicted in diagram represents main refrigerant flow and is for illustration purposes only.

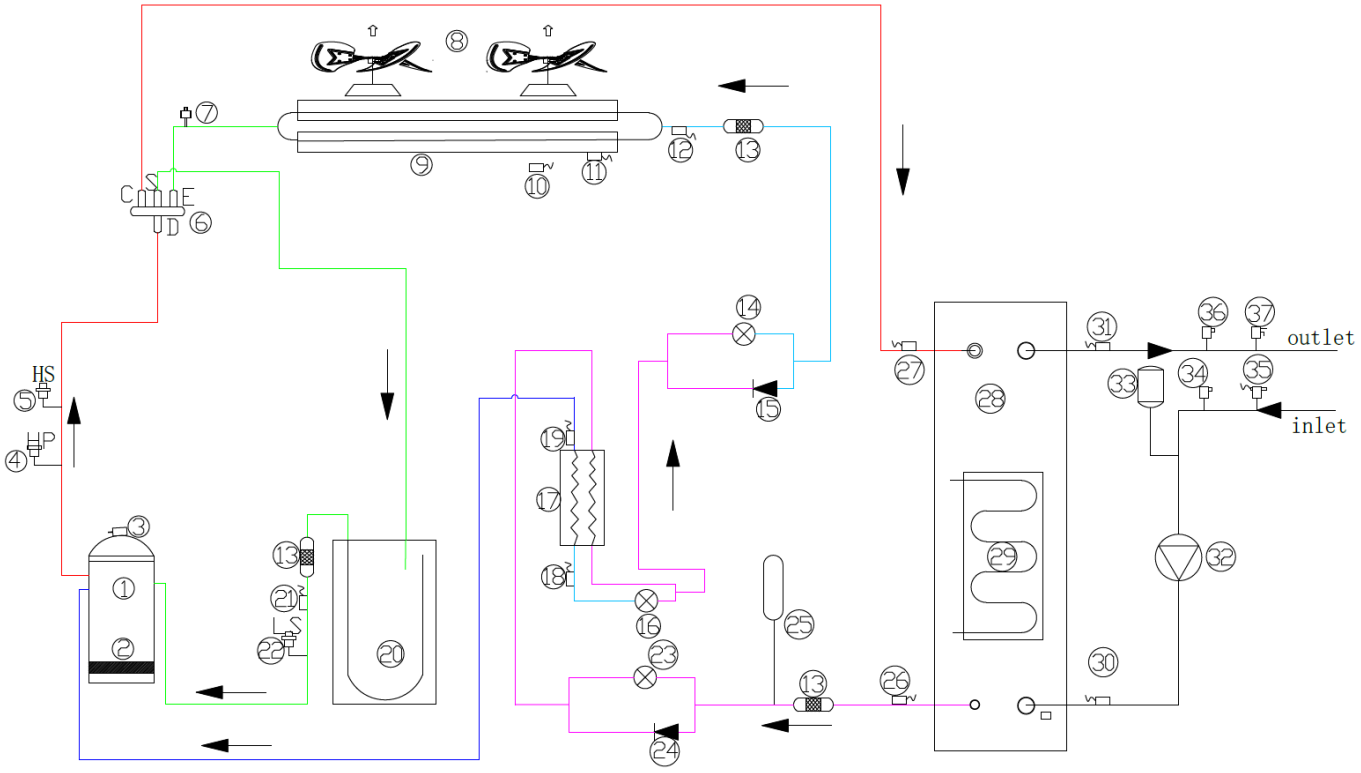
2.1.Heating mode (EVI off)



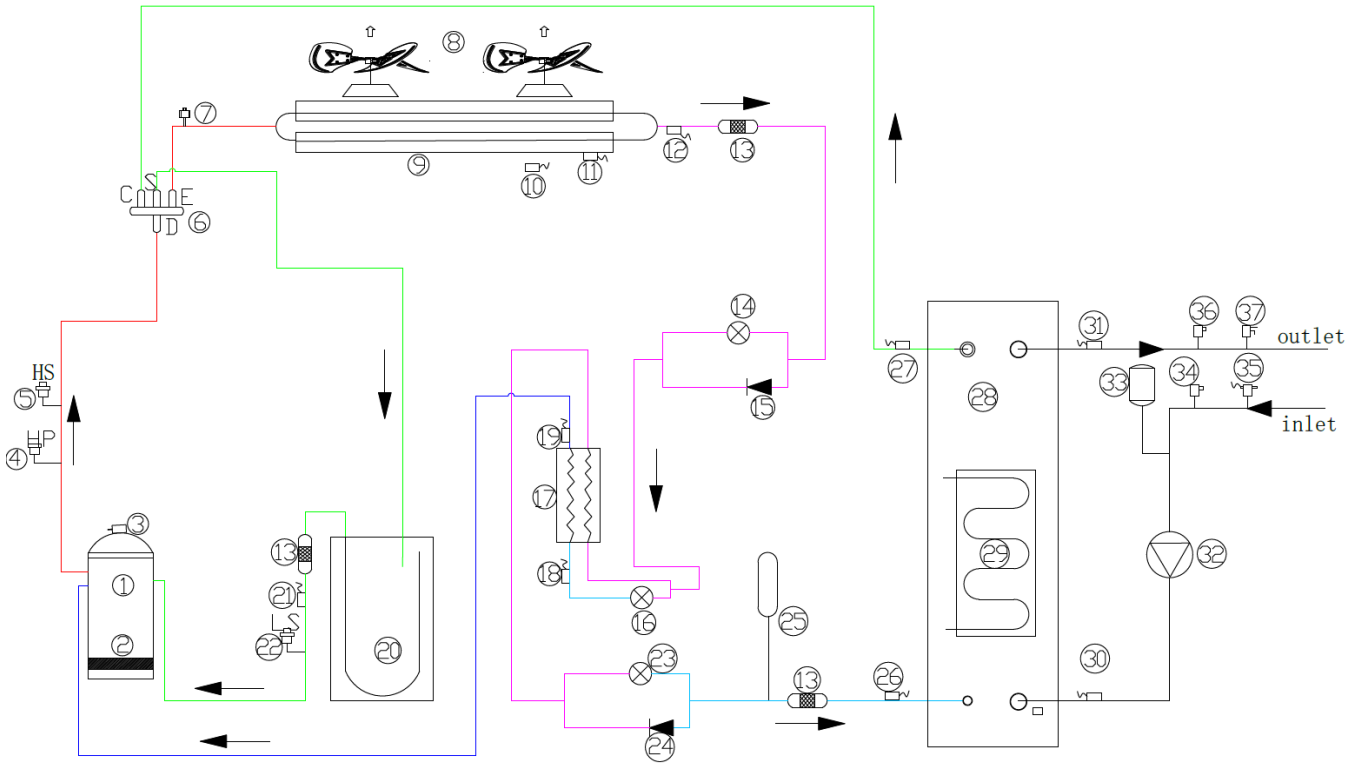
2.2.Cooling mode (EVI off)



2.3.Heating mode (EVI on)



2.4.Cooling mode (EVI on)



2.5.Components

Item	Symbol	Description	Item	Symbo	Description
1	COMP	DC inverter compressor	20	/	Gas-liquid separator
2	HEAT3	Crankcase heater	21	Th	Compressor suction temperature sensor
3	Tp	Discharge temperature sensor	22	LS	Low-pressure sensor
4	HP	High-pressure switch	23	EEV2	Cooling electronic expansion valve
5	HS	High-pressure sensor	24	/	One-way valve
6	ST1	4-way valve	25	/	Accumulator tank
7	/	Pin valve (discharge side)	26	T2	Plate heat exchanger temperature sensor
8	FAN A/B	DC fan A / DC fan B	27	T2B	Plate heat exchanger temperature sensor
9	/	Finned tube Heat exchanger	28	/	Plate heat exchanger
10	T4	Ambient temperature sensor	29	/	Plate heat exchanger heat tape
11	T3	Outdoor unit heat exchanger bottom temperature sensor	30	TW_in	Inlet water temperature sensor
12	TL	Outdoor unit heat exchanger outlet temperature sensor	31	TW_out	Outlet water temperature sensor
13	/	Filter	32	/	Water pump
14	EEV1	Heating electronic expansion valve	33	/	Expansion vessel
15	/	One-way valve	34	/	Automatic air vent valve
16	EEV3	EVI electronic expansion valve	35	FS	Water flow switch
17	/	Plate heat exchanger (economizer)	36	/	Automatic air vent valve
18	T9I	Economizer inlet temperature sensor	37	/	Safety valve
19	T9O	Economizer outlet temperature sensor			

- **Compressor:**

The refrigerant is compressed which also raise its temperature. The refrigerant enters the compressor as a low-pressure, low-temperature gas and exits the compressor as a high-pressure, high-temperature gas.

- **4-way valve:**

To better control refrigerant flow, WELLEA M DF HT series features an upgraded 4-way valve default position which remains closed in heating mode (no electrical signal) and open in cooling mode. When closed, the air-side heat exchanger functions as an evaporator and water side heat exchanger functions as a condenser; when open, the air side heat exchanger functions as a condenser and water side heat exchanger function as an evaporator.

- **High pressure switch:**

A high-pressure switch regulates system pressure by shutting off the compressor in the event the refrigerant-system pressure exceeds the upper limit.

- **Air side heat exchanger(Finned tube heat exchanger):**

Heat is transferred from the refrigerant into the surrounding air by first passing through the tube coils where the heat is transferred to the fins via conduction. It then dissipates into the air forced through the heat exchanger.

- **Filter:**

An air filter traps incoming dust, pet dander, fibers and other airborne contaminants, helping to protect interior heat pump components.

- **Electronic expansion valve (EXV):**

Controls refrigerant flow and reduces refrigerant pressure as necessary.

- **Liquid reservoir:**

Stores excess fluid refrigerant during system operation.

- **Plate heat exchanger:**

Facilitates transfer of heat between two fluids. This type of exchange offers a significant advantage over conventional heat exchangers as fluids are exposed to a much larger surface area which better facilitates the transfer of heat while greatly accelerating temperature increase.

- **Water pump (Circulating pump):**

Circulates water throughout the water circuit.

- **Automatic air purge valve:**

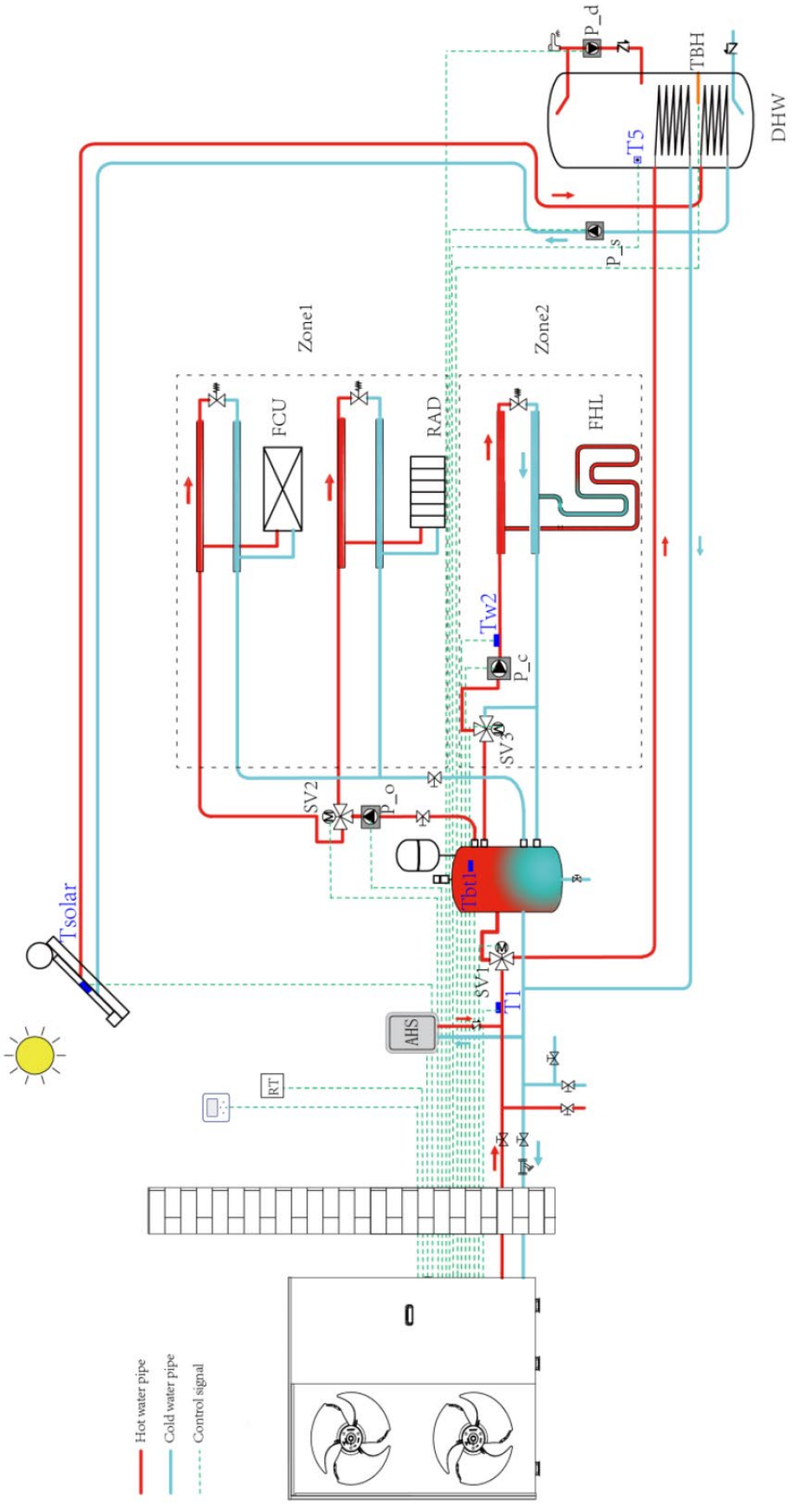
Automatically removes air from the water circuit.

- **Water flow switch:**

Monitors the flow rate of water to detect insufficient flow to the compressor, preventing potential damage.

3. CONTROL LOGIC

3.1.Reference diagram



3.2.Stop operation

The stop operation occurs for one of the following reasons:

•System abnormality: to protect the compressor, a thermal sensor will automatically shut the system off if it detects any abnormality that could potentially cause damage. An error code will show on both the outdoor unit PCB digital display and the user interface.

•Set temperature has been reached: system will shut off

3.3.Standby Control

3.3.1.Crankcase heater control

A crankcase heater is used to prevent refrigerant from mixing with compressor oil during compressor shutdown. The crankcase heater operation is determined by outdoor ambient temperature and whether the compressor is on or off. When outdoor ambient temperature is above 10°C or the compressor is running, the crankcase heater is off. When outdoor ambient temperature is at or below 8°C and the compressor has either been off for more than 3 hours or the unit has recently been powered on (either manually or following a power outage), the crankcase heater will activate.

3.3.2.Water pump control

•HMI set “Water temperature” control type: If heating or cooling mode =ON, When unit in standby state, the internal and external circulator pumps keep running continuously.

•HMI set “Room temperature” control type: If heating or cooling mode =ON, When unit in standby state, the internal and external circulator pumps will stop running.

•HMI set “Water temperature” control type and “Tbt=YES”: If heating or cooling mode =ON, When unit in standby state, the internal circulator pump will stop running and external circulator pumps keep running continuously.

3.4.Startup Control

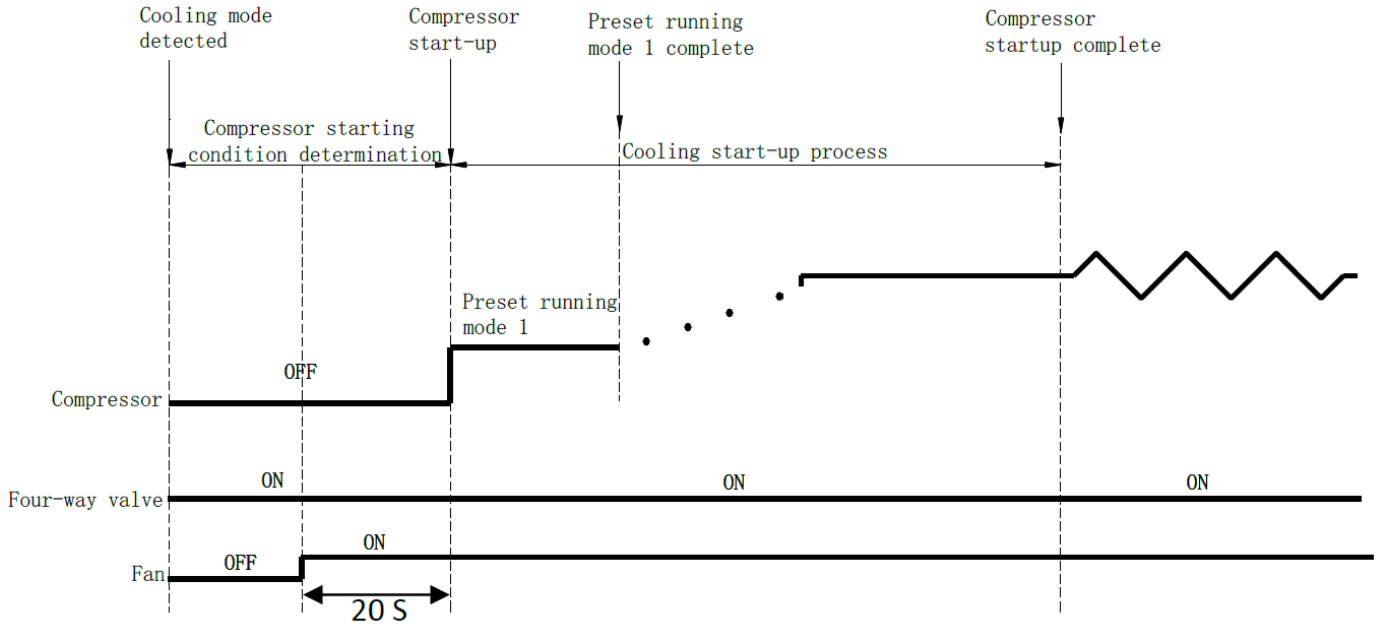
3.4.1.Compressor startup delay control

Startup control and restart control delay compressor startup by three minutes from the last stoppage in order to prevent the potentially harmful effects of frequent compressor on/off cycling and also ensures that pressure within the refrigerant system remains equalized. (Note: this feature will not affect oil return or defrosting operation)

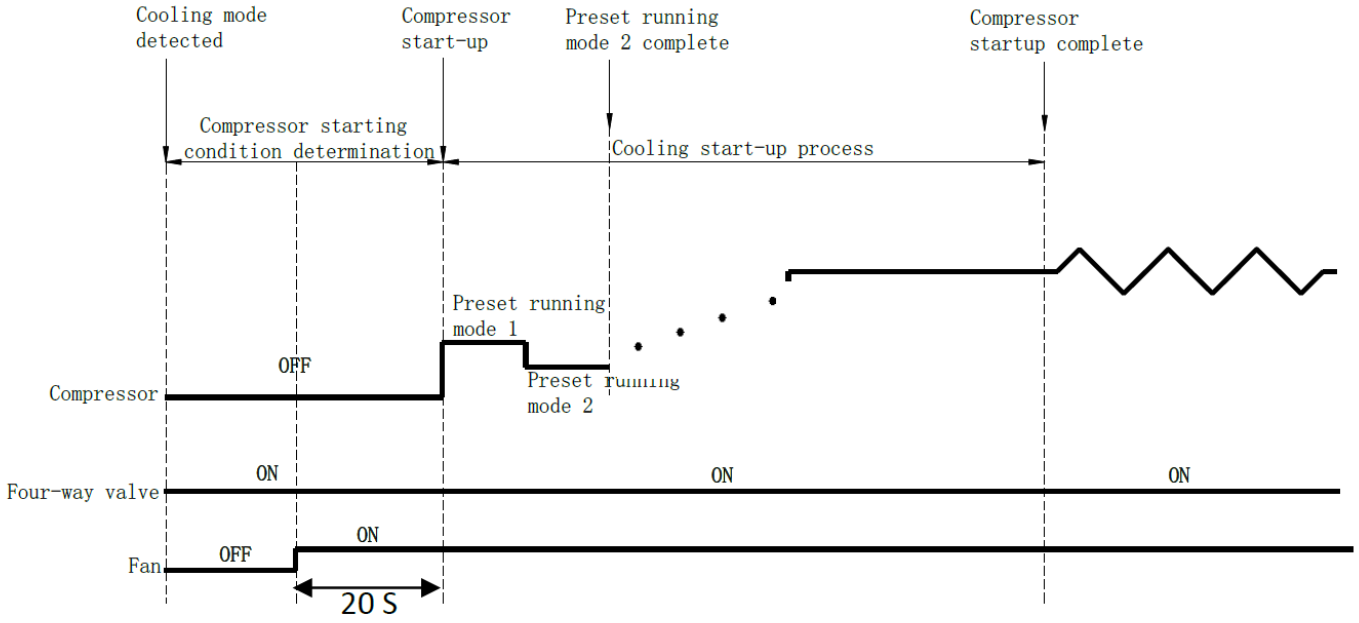
3.4.2.Compressor startup program

In initial startup or restart control, compressor startup is determined by outdoor ambient temperature and parameters input into one of two startup programs in order to reach the target rotation speed.

Cooling start mode 1
Compressor startup program when cooling mode ambient temperature is above 12°C



Cooling start mode 2
Compressor startup program when cooling mode ambient temperature is below 12°C

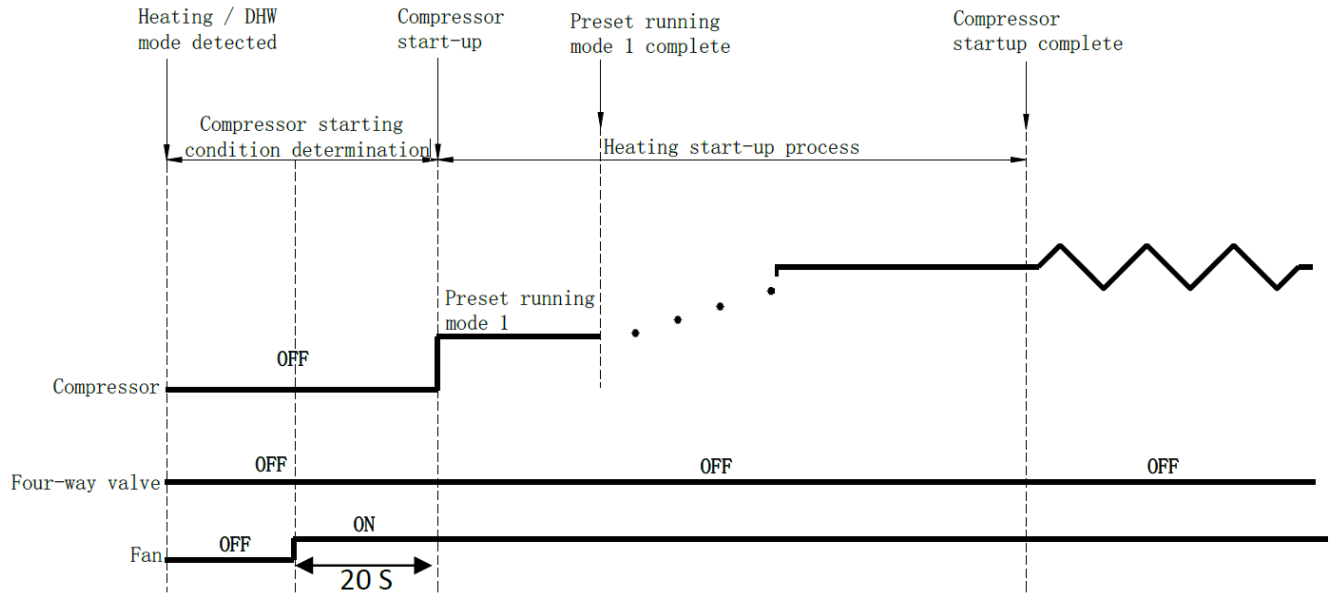


Note: Preset running mode 1 and Preset running mode 2 are the two frequencies at which the compressor operates

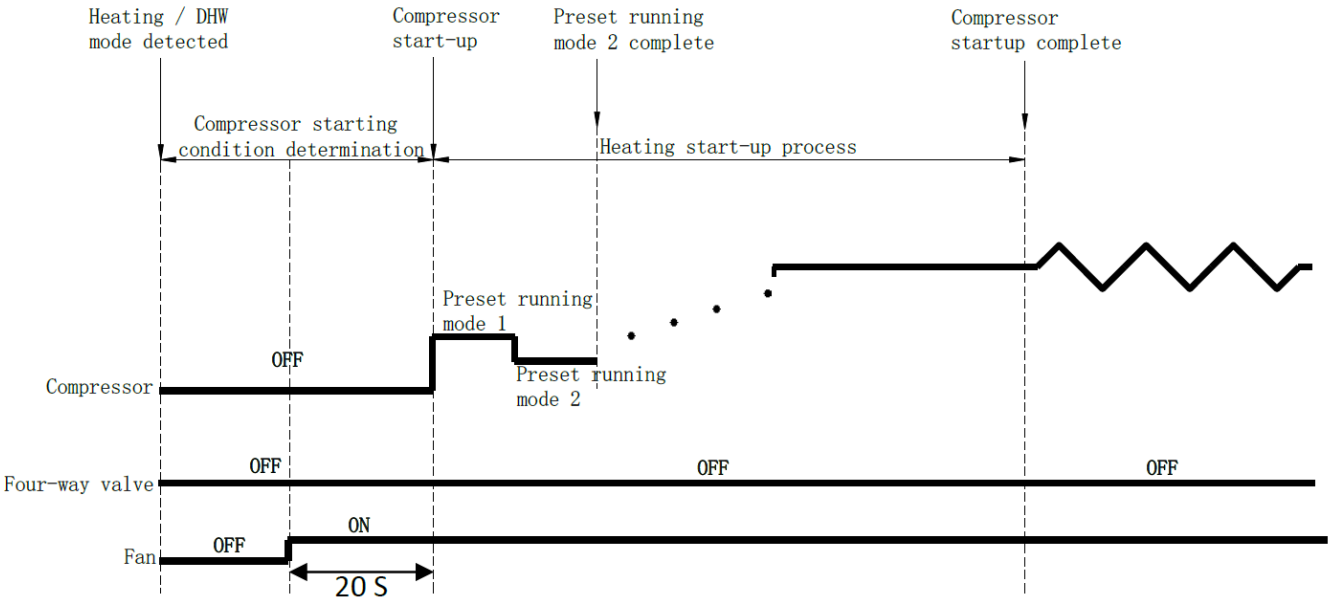
Component control during startup in cooling mode

Component	Wiring diagram label	26-40kW	Control functions and states
Inverter compressor	*COMP*	•	*Compressor startup program selected according to ambient temperature[1]*
DC fan motor	*FAN*	•	*Fan run at maximum speed[2]*
Electronic expansion valve	*EXV*	•	*Increments from 0 (fully closed) to 480 (fully open), controlled according to outdoor ambient temperature, discharge temperature, suction superheat, compressor speed and refrigerant system pressure*
Four-way valve	*4-WAY*	•	*OFF*
Notes: *1 Refer to "Startup Control - Unit Startup".* *2 Refer to "Nomal Operation Control - Outdoor Fan Control"*			

Heating start mode 1
Compressor startup program when heating mode ambient temperature is above 0°C

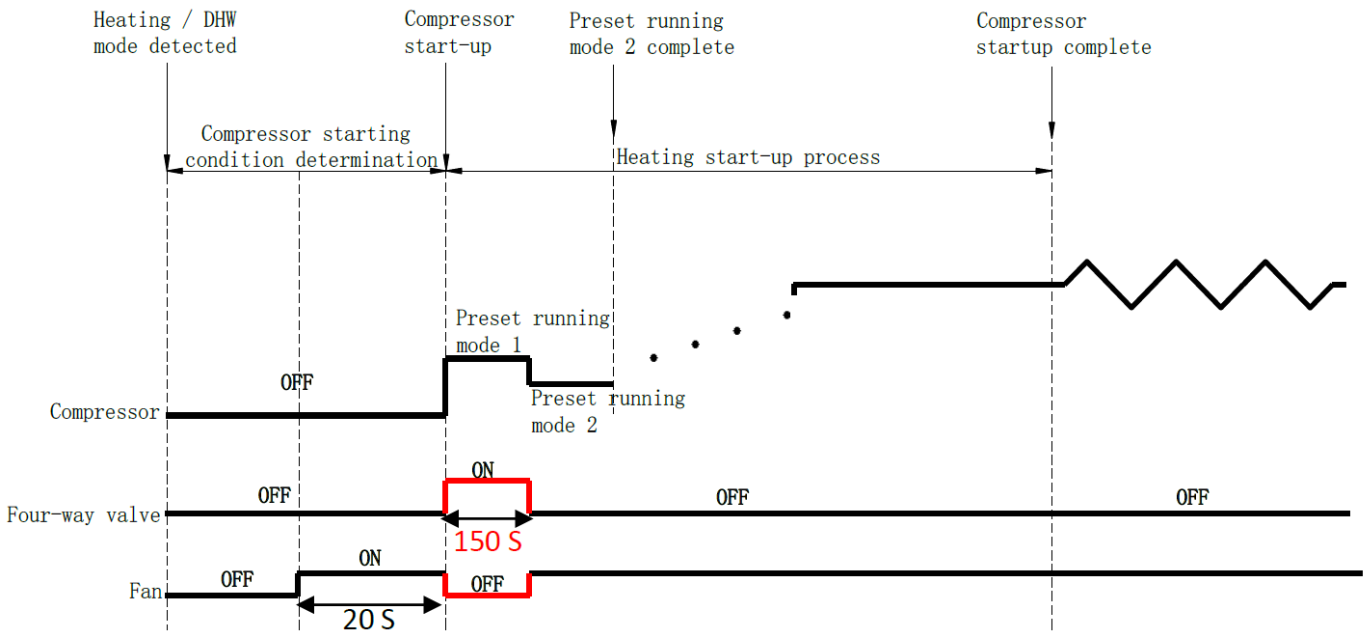


Heating start mode 2
Compressor startup program when heating mode ambient temperature is below 0°C



Heating start mode 3

Compressor startup program when heating mode ambient temperature is below -20°C and discharge temperature is below 5°C



Note: Preset running mode 1 and Preset running mode 2 are the two frequencies at which the compressor operates

Component control during startup in heating and domestic hot water modes

Component	Wiring diagram label	26-40kW	Control functions and states
Inverter compressor	*COMP*	•	*Compressor startup program selected according to ambient temperature[1]*
DC fan motor	*FAN*	•	*Fan run at maximum speed[2]*
Electronic expansion valve	*EXV*	•	*Increments from 0 (fully closed) to 480 (fully open), controlled according to outdoor ambient temperature, discharge temperature, suction superheat, compressor speed and refrigerant system pressure*
Four-way valve	*4-WAY*	•	*OFF*

3.5.Normal operation control

3.5.1.Component control during normal operation

Component control during heating and domestic hot water operations

Component	Wiring diagram label	26-40kW	Control functions and states
Inverter compressor	*COMP*	•	*Controlled according to load requirement from temperature set and outlet water temperature*
DC fan motor	*FAN*	•	*Controlled according to outdoor heat exchanger pipe temperature*
Electronic expansion valve	*EXV*	•	*Position (steps) from 0 (fully closed) to 480 (fully open), controlled according to outdoor ambient temperature, discharge temperature, suction superheat, compressor speed , refrigerant system pressure and temperature*
Four-way valve	*4-WAY*	•	*OFF*

Component control during cooling operation

Component	Wiring diagram label	26-40kW	Control functions and states
Inverter compressor	*COMP*	•	*Controlled according to load requirement from set temperature and outlet water temperature*
DC fan motor	*FAN*	•	*Controlled according to outdoor heat exchanger pipe temperature*
Electronic expansion valve	*EXV*	•	*Position (steps) from 0 (fully closed) to 480 (fully open), controlled according to outdoor ambient temperature, discharge temperature, suction superheat, compressor speed and refrigerant system pressure*
Four-way valve	*4-WAY*	•	*ON*

3.5.2.Compressor Output Control

The compressor rotation speed is influenced by the load requirement. Before compressor startup, the outdoor unit calculates the target speed based on the outdoor ambient temperature, set leaving water temperature, and actual leaving water temperature. It then runs the appropriate compressor startup program. (Refer to Part 3.2 “Compressor Startup Program”). After completion of the startup program, the compressor operates at the specified rotation speed. During operation, compressor speed is modulated based rate of water temperature change, refrigerant system pressure and the refrigerant temperature.

3.5.3.Compressor Frequency Control

The running speed of a four-pole compressor, measured in rotations per second (rps), is one third of the electrical input frequency in hertz (Hz) to the motor. The frequency of the electrical input to the compressor can be altered at a rate of 1Hz per second.

3.5.4.Four-way Valve Control

A four-way valve is employed to change the direction of the refrigerant flow through the water-side heat exchanger which enables switching between cooling and heating/DHW operations. The valve is open during cooling but closed during heating and DHW production.

3.5.5.Electronic Expansion Valve Control

Heating / Cooling electronic expansion valve (EEV1/EEV2)

The electronic expansion valve (EEV) is controlled in increments from 0 (fully closed) to 480 (fully open).

- At power-on:
  - The EEV first closes fully, then moves to the standby at the 480 increments position. After the compressor activates, the EEV control is determined by suction superheat discharge temperature, pressure, discharge temperature and compressor speed.
- When the outdoor unit is in standby mode:
  - The EEV is at the 480 increment.
- When the outdoor unit shut offs:
  - The EEV first moves to the 480 increment where it remains for 30 seconds. It then closes fully before moving to the standby position at the 480 increment.

EVI electronic expansion valve (EEV3)

The EVI electronic expansion valve is a control valve that controls the middle air supply of the compressor.

EEV3 controls the opening of the outlet superheat through the ECO board. EEV3 controls the outlet superheat between 2 °C and 5 °C. Efficient and reliable control through Proportion Integration Differentiation (PID) control. Determine that the compressor frequency is greater than 56 Hz and the exhaust superheat is greater than 15 °C, open the EEV3 valve. Close the EEV3, when the compressor frequency is low or the exhaust superheat is low.

3.5.6.Outdoor Fan Control

The outdoor unit fan speed can be adjusted in a series of incremental steps as shown below.

Fan speed control during operation

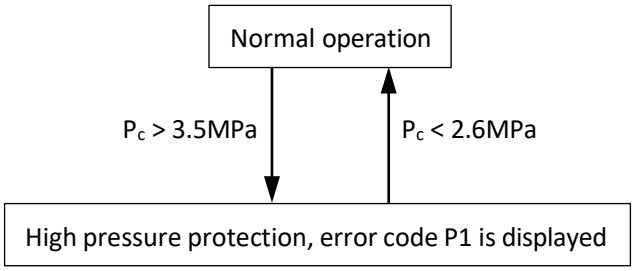
Fan speed control during operation					
Fan speed index	Upper Fan speed (rpm)	Lower Fan speed (rpm)	Fan speed index	Upper Fan speed (rpm)	Lower Fan speed (rpm)
W0	0	0	W17	460	460
W1	130	0	W18	490	490
W2	160	0	W19	520	520
W3	180	0	W20	550	550
W4	200	0	W21	580	580
W5	230	0	W22	610	610
W6	130	130	W23	640	640
W7	170	170	W24	670	670
W8	190	190	W25	700	700
W9	220	220	W26	730	730
W10	250	250	W27	760	760
W11	280	280	W28	790	790
W12	310	310	W29	810	810
W13	340	340	W30	850	850
W14	370	370	W31	880	880
W15	400	400	W32	920	920
W16	430	430	/	/	/

4. PROTECTION CONTROL

4.1.High pressure protection control

This control protects the refrigerant system from abnormally high pressure and protects the compressor from transient spikes in pressure.

High pressure protection control



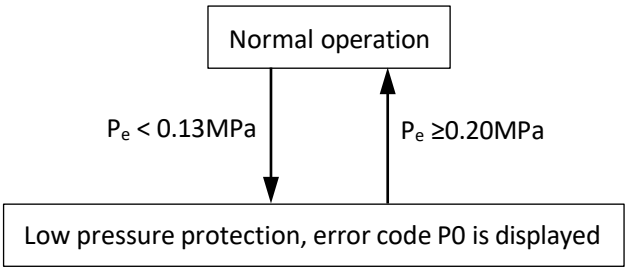
Notes:
1. P_c: Discharge pressure

When the discharge pressure rises above 3.5MPa the system displays P1 protection and the unit stops running. When the discharge pressure drops below 2.6MPa, the compressor enters re-start control.

4.2.Low pressure protection control

This control protects the refrigerant system from abnormally low pressure and protects the compressor from transient drops in pressure.

Low pressure protection control



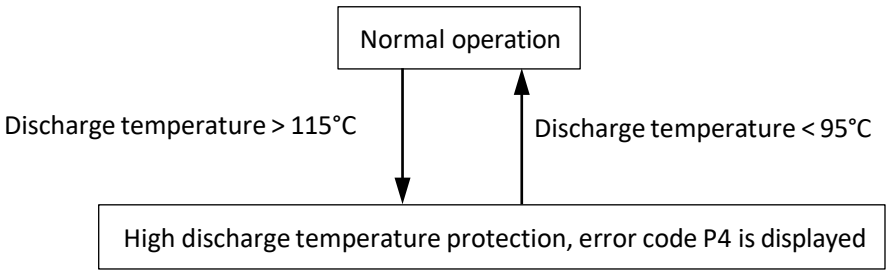
Notes:
1. P_e: Suction pressure

When the suction pressure drops below 0.13MPa the system displays P0 protection and the unit stops running. When the suction pressure rises above 0.2MPa, the compressor enters re-start control.

4.3.Discharge temperature protection control

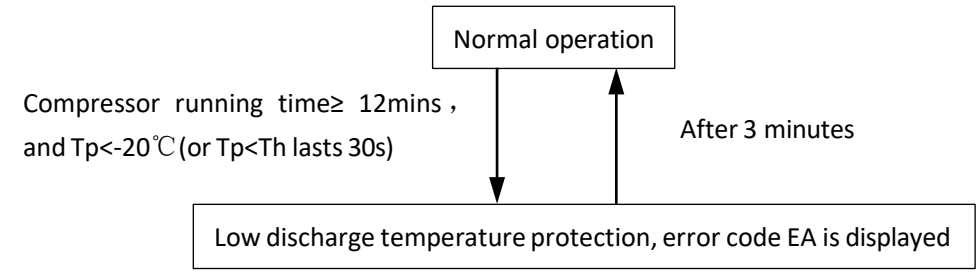
This control protects the compressor from abnormally high temperatures and transient spikes in temperature.

High discharge temperature protection control



When the discharge temperature rises above 115°C the system displays P4 protection and the unit stops running. When the discharge temperature drops below 95°C, the compressor enters re-start control.

Low discharge temperature protection control



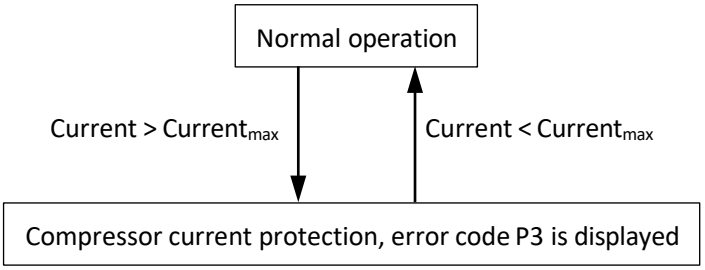
When the discharge temperature(Tp) is below suction temperature(Th) for more than 12 minutes after compressor operates, the system displays EA protection and the unit stops running. After 3 mins the compressor enters re-start control.

Note: EA protection occurs 3 times within 2 hours, the outdoor unit cannot be restarted unless it is powered on again.

4.4.Compressor current protection control

This control protects the compressor from abnormally high currents.

Compressor current protection control



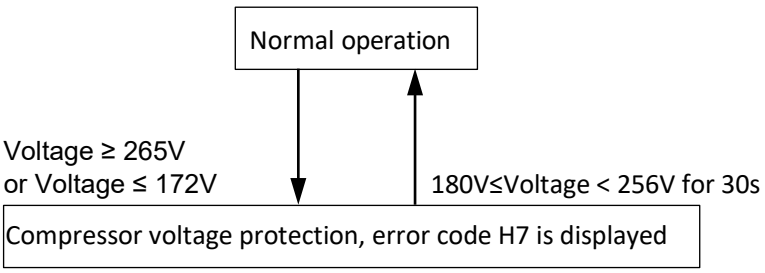
Current limitation for ODU

Model		*26-40kW*
Current$_{max}$	*Cool mode*	*33 A*
	Heat or DHW mode	*35 A*

When the compressor current rises above Current$_{max}$ the system displays P3 protection and the unit stops running. When the compressor current drops below Current$_{max}$, the compressor enters re-start control.

4.5.Voltage protection control

This control protects the Wellea M HT from abnormally high or abnormally low voltages.



When the phase voltage of AC power supply is at or above 265V, the system displays the error code H7 and the unit shuts down. When the phase voltage drops below 265V for more than 30 seconds, the refrigerant system restarts once the compressor re-start delay has elapsed. When the phase voltage is below 172V, the system displays the error code H7 and the unit shuts down. When the AC voltage rises to more than 180V, the refrigerant system restarts once the compressor re-start delay has elapsed.

4.6.DC fan motor protection control

This control protects the DC fan motors from strong winds and abnormal power supply. DC fan motor protection occurs when any one of the following conditions are met:

- Fan speed continues to be less than 50rpm more than 40S from the set fan step＞0
- Fan speed is lower than 50rpm for 3S,during normal operation

When DC fan motor protection control occurs the system displays the H6 error code and the unit stops running. After 30S, the unit restarts automatically. When H6 protection occurs 10 times in 120 minutes, the HH error is displayed. When an HH error occurs, a manual system restart is required before the system can resume operation.

4.7.Anti-freezing Protection Control

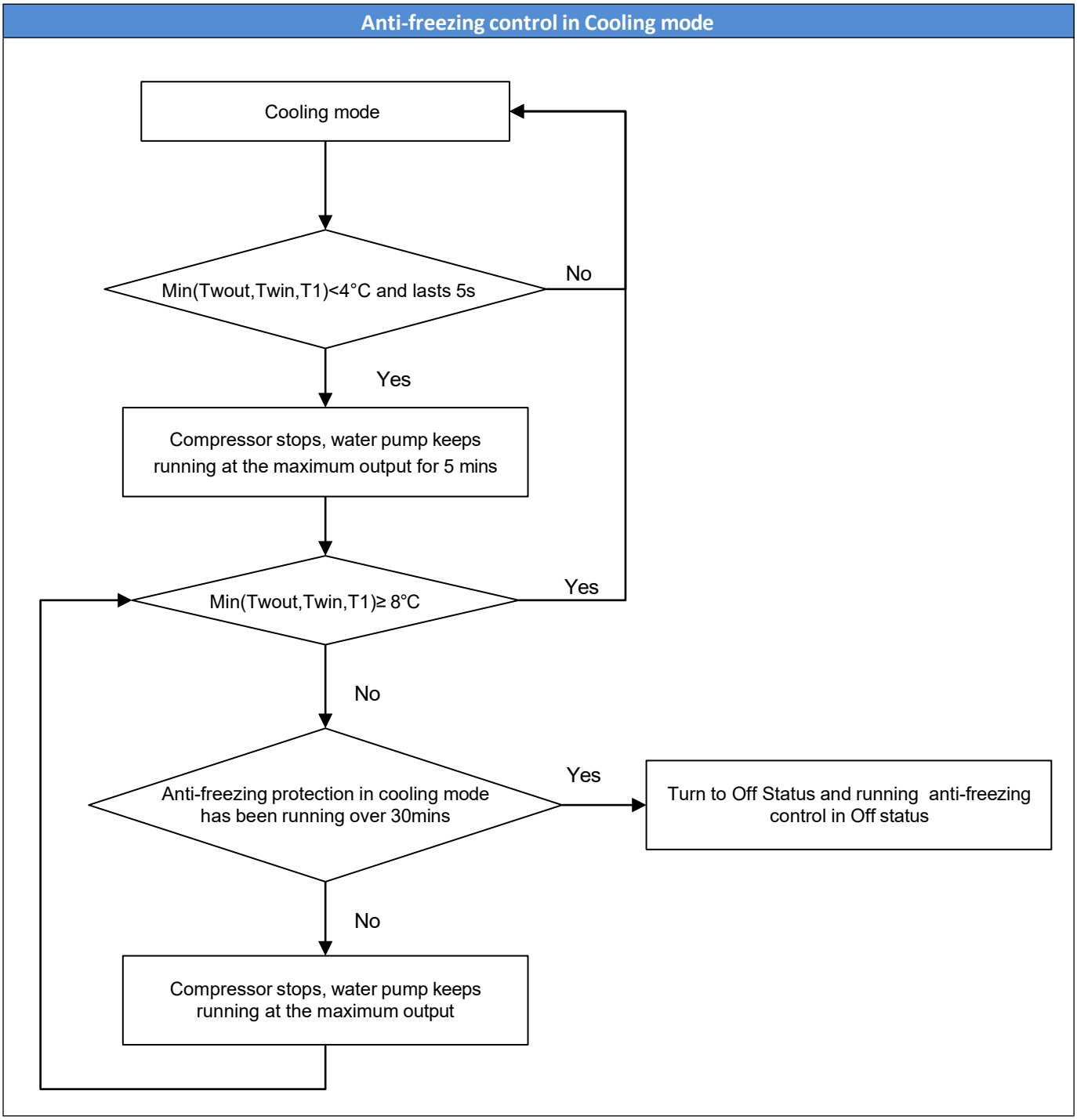
This control protects the water side heat exchanger from ice formation. The water side heat exchanger electric heater is controlled according to outdoor ambient temperature, water side heat exchanger water inlet temperature and water side heat exchanger water outlet temperature.

In cooling mode, if inlet water temperature or leaving water temperature or auxiliary heat source leaving water temperature is below 4°C, the anti-freeze protection actions. In heating/DHW mode, if ambient temperature is below 3°C and inlet water temperature or leaving water temperature or auxiliary heat source leaving water temperature is below 4°C, the anti-freeze protection actions. In heating/DHW mode, leaving water temperature is below 2°C, the anti-freeze protection actions.

When water side heat exchanger anti-freeze protection occurs the system displays error code Pb and the unit stops running.

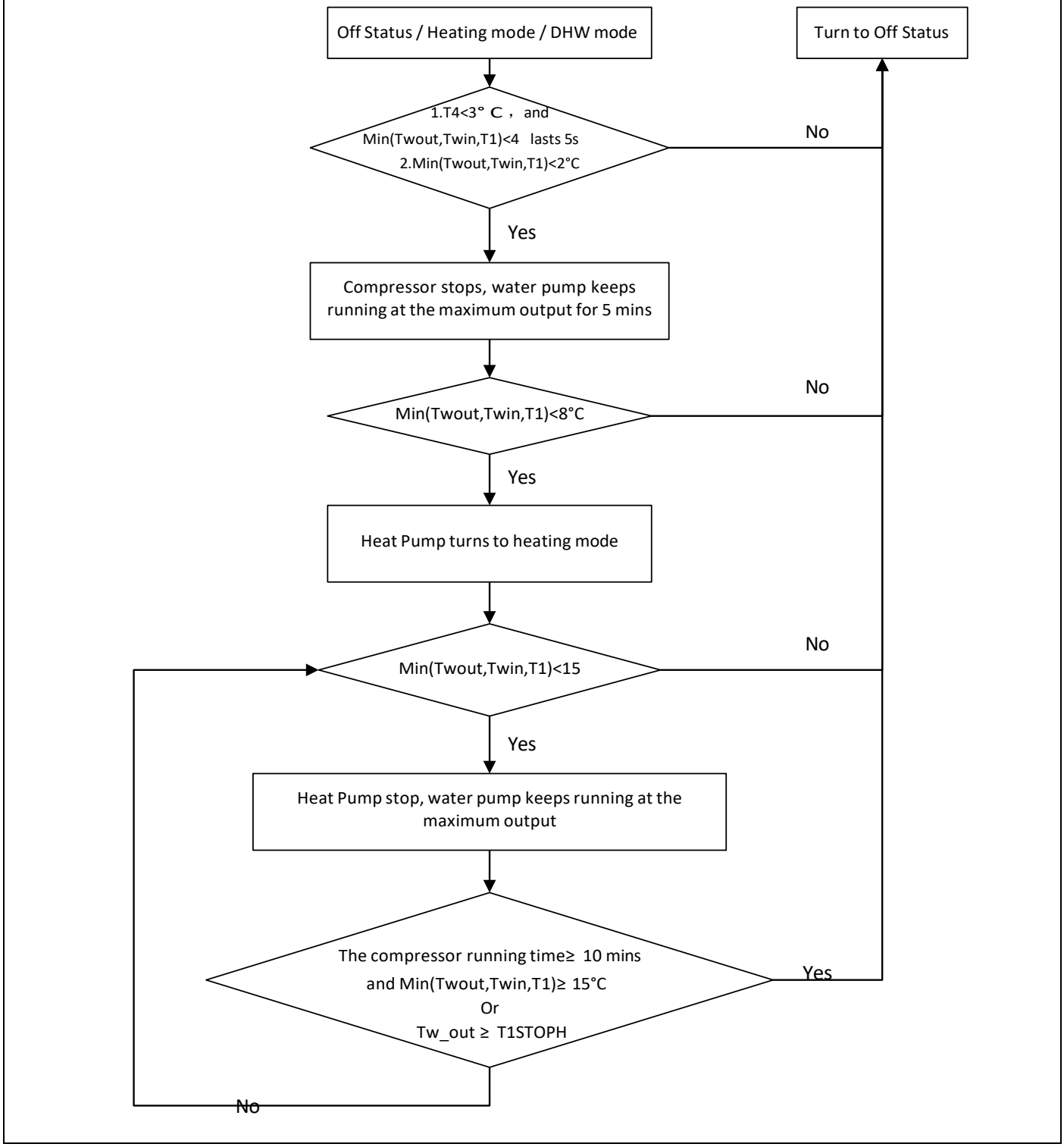
Note: For the clear and concise understanding of anti-freeze protection control, the diagram is illustrated as below.

Anti-freezing control in Cooling mode



Tw_out: Plate heat exchanger outlet water temperature
Tw_in: Plate heat exchanger inlet water temperature
T1: Electric Heater/AHS water outlet temperature

Anti-freezing control in Off status/ Heating mode/ DHW mode



T4: Ambient temperature
Tw_out: Plate heat exchanger outlet water temperature
Tw_in: Plate heat exchanger inlet water temperature
T1: Electric Heater/AHS water outlet temperature
T1STOPH: The maximum temperature to stop compressor in heating mode

5. SPECIAL CONTROL

5.1.Defrosting Operation

In order to recover heating capacity, the defrosting operation is conducted when the outdoor unit air side heat exchanger is performing as a condenser. The defrosting operation is controlled according to outdoor ambient temperature, air side heat exchanger refrigerant outlet temperature and the compressor running time.

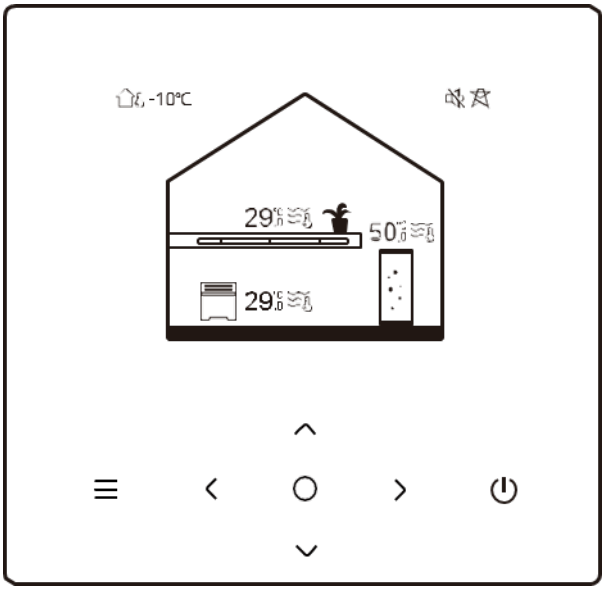
Component control during defrosting operation

Component	Wiring diagram label	26-40kW	Control functions and states
Inverter compressor	*COMP*	●	*Runs at defrosting operation rotation speed*
DC fan motor	*FAN*	●	*Off*
Electronic expansion valve	*EXV*	●	*Fully open*
Four-way valve	*4-WAY*	●	*ON*

6. USER INTERFACE FIELD SETTINGS

6.1.Introduction

During installation, the parameters setting should be configured by the installer to suit the installation configuration, climate conditions and end-user preferences. The relevant settings are accessible and programmable through the **FOR SERVICEMAN** menu on the user interface. The user interface menus and settings can be navigated using the touch-sensitive keys.



Icon	Name	Function
≡	*Menu*	*Press to access the menu page (from the home page)* *Return to the previous page(from a page other than the home page)*
	Return	*Hold for 2 seconds to return to the main page.*
○	*Confirm*	*Confirm a selection* *Save settings* *Access the next page*
⏻	*ON/OFF*	*Turn on/off zone 1/zone 2/DHW* *Press and hold for 3 seconds to turn on/off zone 1 / zone 2 / DHW*
‹ ^ › v	*Navigation*	*Press to navigate the cursor to adjust settings (holding it for 1 second can start quick adjustment)*

Combinations of buttons：

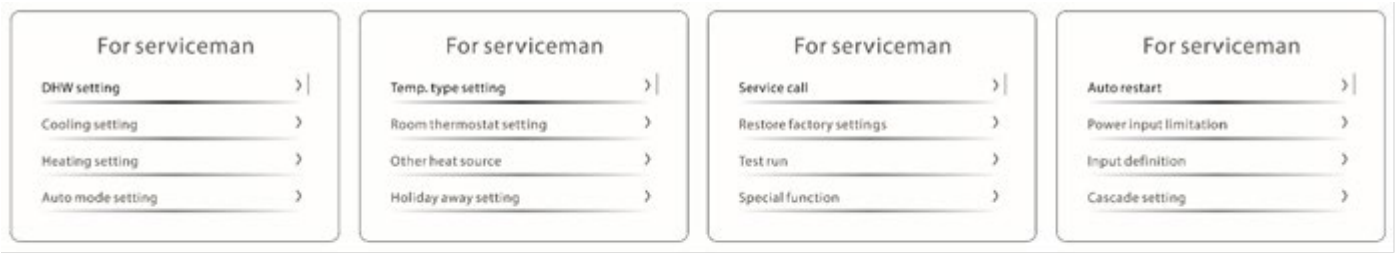
Press ≡ and › simultaneously for 3 seconds to enter the **For serviceman** menu.

6.2.For Serviceman menu

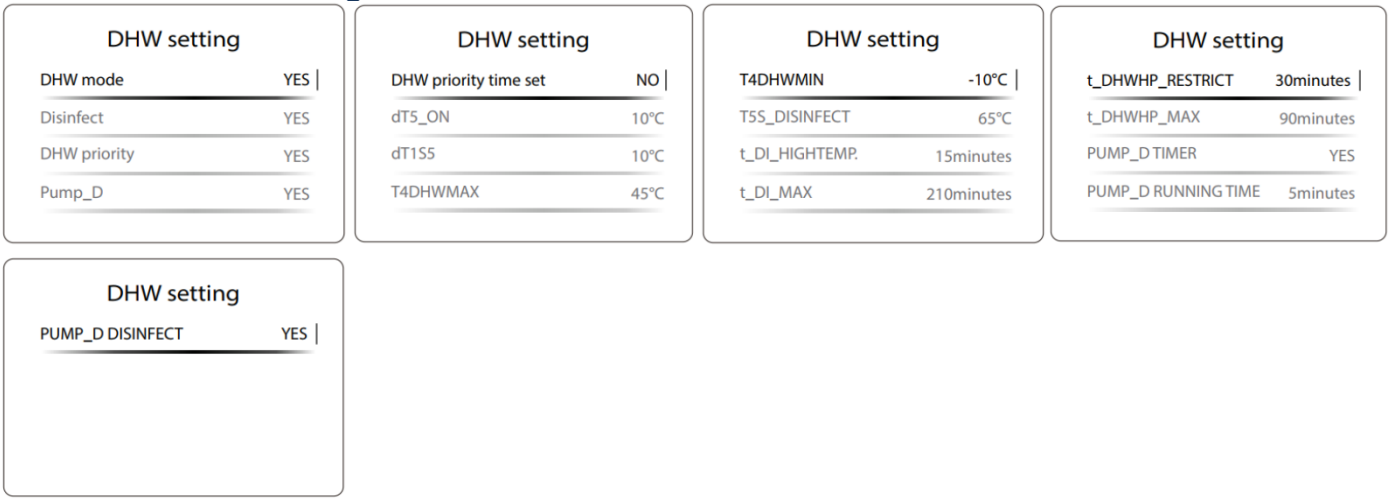
For serviceman allows installers to input the system configuration and set the system parameters. Press ≡ and › simultaneously for 3 seconds to enter the authorization page.

Press ‹ › to navigate cursor and press ◇ to adjust the numerical values. The password is 234. Press ○ to enter **For serviceman** menu.

Then the following pages will be displayed:



6.2.1.DHW setting



6.2.1.1.DHW mode

DHW mode defines whether hot water demand is needed.

Setting	Description
YES	Enable DHW mode if DHW tank is installed.
NO	Disable DHW mode if DHW tank is not installed. In this case, no need to define other settings in DHW setting.

6.2.1.2.Disinfect, T5S_DISINFECT, t_DI_HIGHTEMP, t_DI_MAX

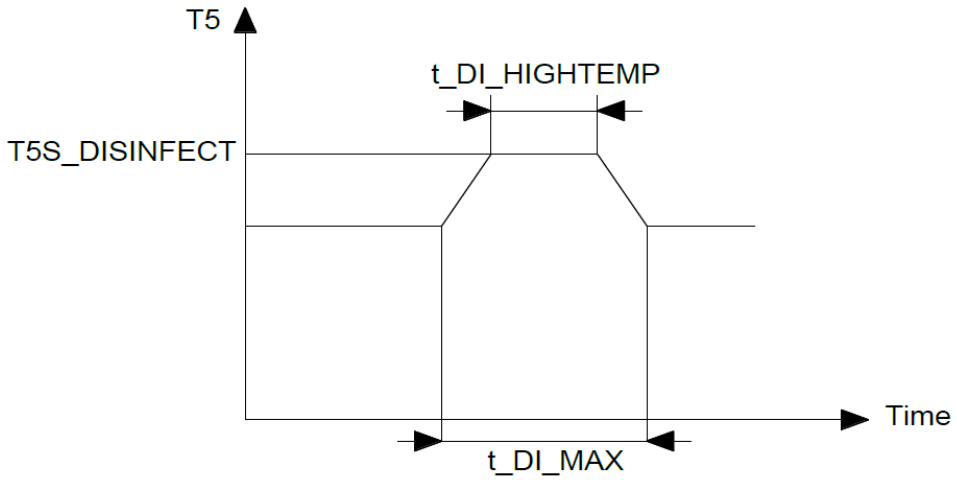
Disinfect defines whether disinfection function is activated.

Setting	Description
YES	Enable DHW tank disinfection function.
NO	Disable DHW tank disinfection function.

T5S_DISINFECT defines the target water temperature of water tank for disinfection function.

t_DI_HIGHTEMP defines Period that disinfection water target temperature maintains.

t_DI_MAX defines duration of disinfection mode.



Abbreviations:
T5: DHW tank water temperature

6.2.1.3.DHW priority, DHW priority time set, t_DHWHP_RESTRICT, t_DHWHP_MAX

DHW priority defines whether domestic hot water or space heating /cooling takes priority.

Setting	Description
YES	When DHW demand and space heating/cooling demand both exist, heat pump will heat the water according to the setting of **DHW priority time set, t_DHWHP_RESTRICT, t_DHWHP_MAX**
NO	When DHW demand and space heating/cooling demand both exist, heat pump will heat the water after space heating/cooling demand is satisfied.

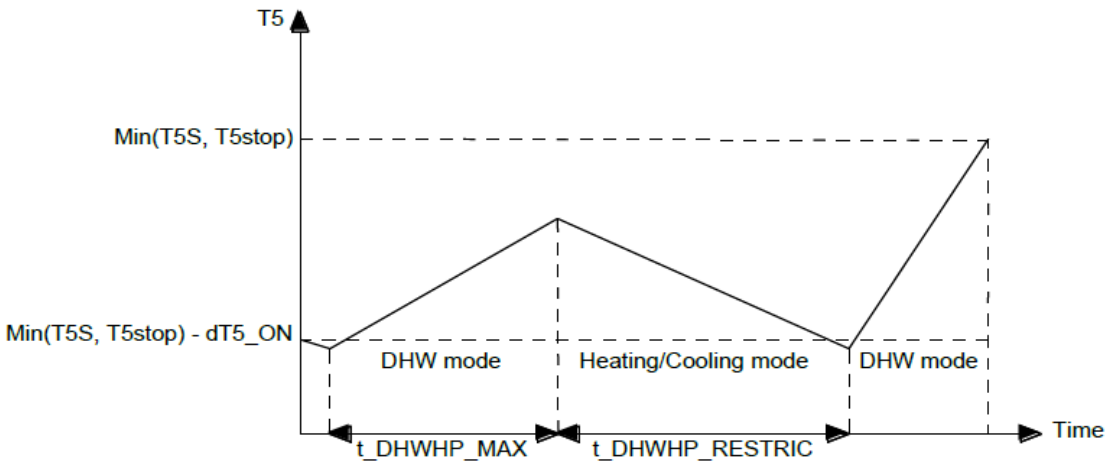
DHW priority time set defines whether **t_DHWHP_RESTRICT** (the_operation time of heating/cooling mode) is to be considered before switching to DHW mode and whether **t_DHWHP_MAX** (the operation time of DHW mode) is to be considered before switching to heating/cooling mode.

Setting	Description
YES	Enable the setting of **t_DHWHP_RESTRICT, t_DHWHP_MAX**
NO	Disable the setting of **t_DHWHP_RESTRICT, t_DHWHP_MAX**

t_DHWHP_RESTRICT defines the period that heat pump runs in space heating/cooling mode before switching to DHW mode if DHW requirement exists.

t_DHWHP_MAX defines the period that heat pump runs in DWH mode before switching to space heating/cooling mode if space heating/cooling requirement exists.

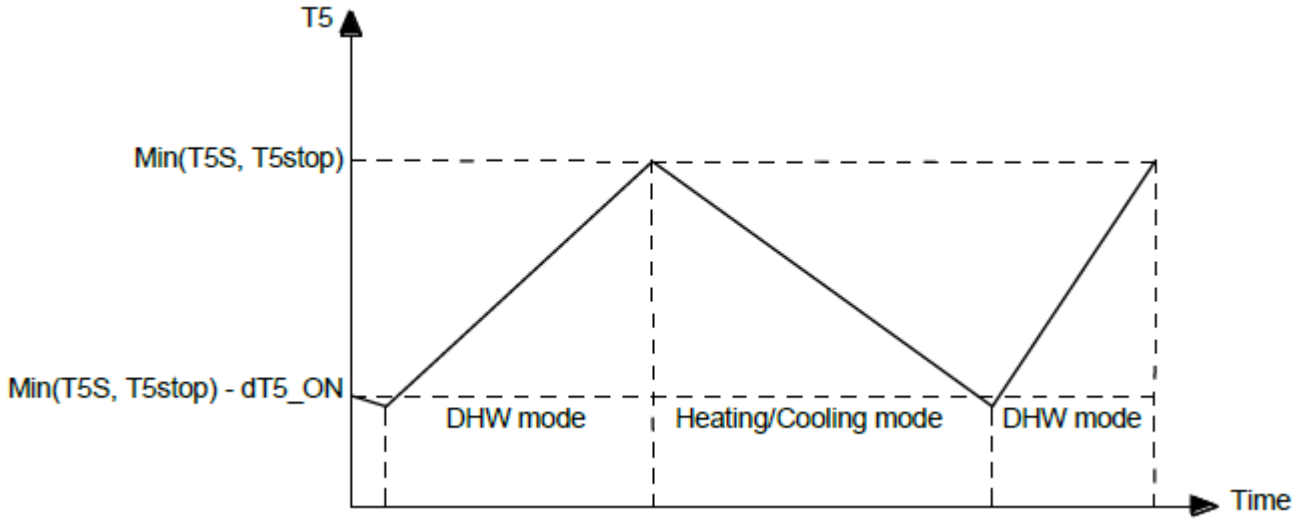
Diagram below illustrates the effects of **t_DHWHP_MAX** and **t_DHWHP_RESTRICT** when DHW PRIORITY and DHW priority time set are enabled.



Abbreviations:
T5: DHW tank water temperature
T5S: DHW tank set temperature
T5stop: Leaving water temperature operating limit of DHW mode

DHW PRIORITY	DHW PRIORITY TIME SET	t_DHWHP_RESTRICT	t_DHWHP_MAX	Heating/Cooling turns to DHW	DHW turns to Heating/Cooling
YES	YES	A min	B min	DHW mode ON & T5<MIN(T5S,T5STOP)-dT5_ON & Heating/Cooling mode operates for A mins	DHW mode OFF or T5≥MIN(T5S, T5STOP) or DHW mode operates for B mins & Heating/Cooling mode ON
YES	NO	-	-	DHW mode ON & T5<MIN(T5S,T5STOP)-dT5_ON	DHW mode OFF or T5≥MIN(T5S, T5STOP) & Heating/Cooling mode ON
NO	-	-	-	DHW mode ON & T5<MIN(T5S, T5STOP)-1 & Heating/Cooling mode OFF	Heating/Cooling mode ON

Diagram below illustrates the effects when **DHW priority** time set is disabled.



Abbreviations:
T5: DHW tank water temperature
T5S: DHW tank set temperature
T5stop: Leaving water temperature operating limit of DHW mode

6.2.1.4.Pump_D, PUMP_D TIMER, PUMP_D RUNNING TIME, PUMP_D DISINFECT

DHW pump (**Pump_D**) is installed to circulate the water in the DHW pipe network.

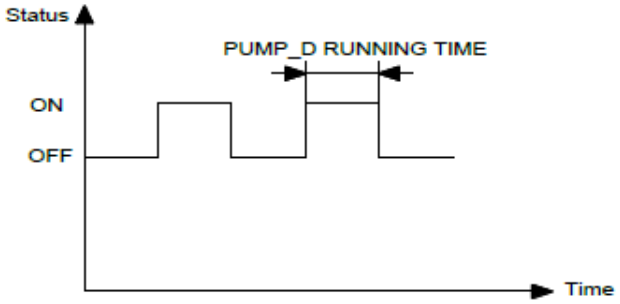
Setting	Description
YES	Installation with DHW pump.
NO	Installation without DHW pump.

PUMP_D TIMER defines whether DHW pump operation schedule which is defined in the user menu is activated.

Setting	Description
YES	Enable DHW pump run in timer.
NO	Disable DHW pump run in timer.

PUMP_D RUNNING TIME defines the period that DHW pump operates for each timer

Diagram below illustrates the effects of **PUMP_D RUNNING TIME** when **Pump_D** is installed and **PUMP_D TIMER** is enable.

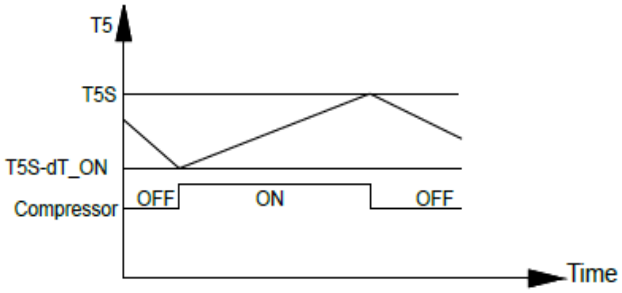


PUMP_D DISINFECT defines whether DHW pump operation is activated in disinfection mode.

Setting	Description
YES	When heat pump is in disinfection mode and T5S_DISINFECT - T5≤2, DHW pump operates **PUMP_D RUNNING TIME**+5minutes T5S_DISINFECT: DHW tank disinfection set temperature T5S: DHW tank set temperature
NO	Disable the DHW pump operates when heat pump is in disinfection mode

6.2.1.5.dT5_ON

dT5_ON defines water temperature hysteresis of activating heat pump.
When T5S - T5 ≥ dT5_ON and heat pump is within operating ambient temperature range, heat pump provides hot water to the DHW tank.



Abbreviations:
T5: DHW tank water temperature
T5S: DHW set temperature

6.2.1.6.dT1S5

dT1S5: Temperature difference between leaving water set temperature and tank water temperature modification value.

Leaving water set temperature (T1S) for DHW mode is calculated by formula:

T1S = T5 + △dT1S5 + dT1S5

T1S: Leaving water set temperature
T5: DHW tank water temperature
△dT1S5: Temperature modification value related to DHW tank water temperature(T5)

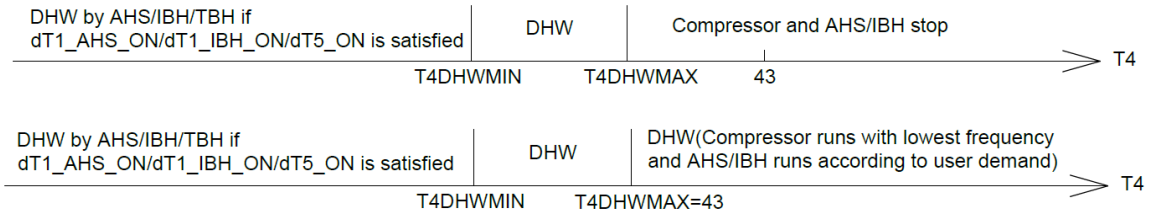
T5	T5<30℃	30℃≤T5<43℃	43℃≤T5
△dT1S5	6	4	0

6.2.1.7.T4DHWMAX, T4DHWMIN

T4DHWMAX defines the ambient temperature above which the heat pump will operate in DHW mode with lowest compressor frequency.

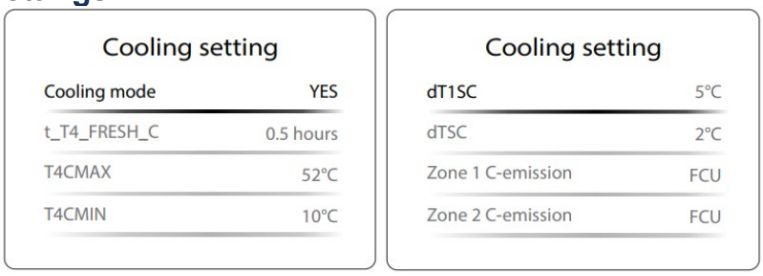
T4DHWMIN defines the ambient temperature below which the heat pump will not operate in DHW mode.

Diagram below illustrates the effects of **T4DHWMAX** and **T4DHWMIN.**



Abbreviations:
TBH: DWH tank immersion heater
AHS: Auxiliary heating source
IBH: Electric heater

6.2.2.Cooling settings



6.2.2.1.Cooling mode

Cooling mode defines whether space cooling demand is needed.

Setting	Description
YES	Enable cooling mode if space cooling terminals are installed.
NO	Disable cooling mode if space cooling terminals are not installed. In this case, no need to define other settings in **Cooling mode**.

6.2.2.2.t_T4_FRESH_C

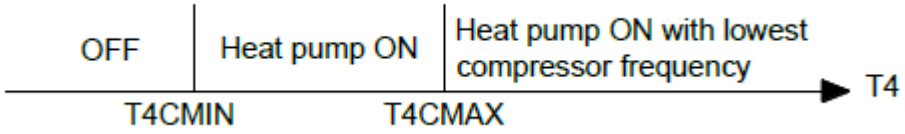
t_T4_FRESH_C defines the refresh cycle of detecting ambient temperature for climate curve.

6.2.2.3.T4CMAX, T4CMIN

T4CMAX defines ambient temperature above which heat pump operates with lowest compressor frequency.

T4CMIN defines ambient temperature below which heat pump not operates.

Diagram below illustrates the effects of **T4CMAX** and **T4CMIN.**

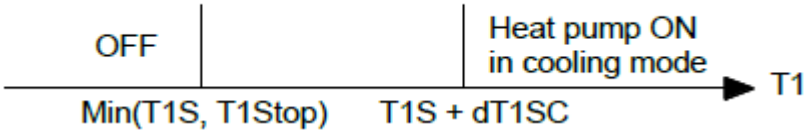


Abreviations:
T4: Outdoor ambient temperature

6.2.2.4.dT1SC

dT1SC defines water temperature hysteresis of activating heat pump.

When T1 – T1S ≥ dT1SC and heat pump is within operating ambient temperature range, heat pump provides chilled water to space cooling terminals.



Abreviations:
T1: Leaving water temperature
T1S: Leaving water set temperature
T1Stop: Leaving water temperature operating limit of cooling mode

6.2.2.5.dTSC

dTSC define room temperature hysteresis of activating heat pump. **dTSC** is only applicable if **1** is selected for **Room temp.** in the **1.5.3 Temp. type setting**.
When Ta – TS ≥ dTSC and heat pump is within operating ambient temperature range, heat pump provides chilled water to space cooling terminals.

Abreviations:
Ta: Actual room temperature
TS: Room setting temperature

6.2.2.6.Zone 1 C-emission, Zone 2 C-emission

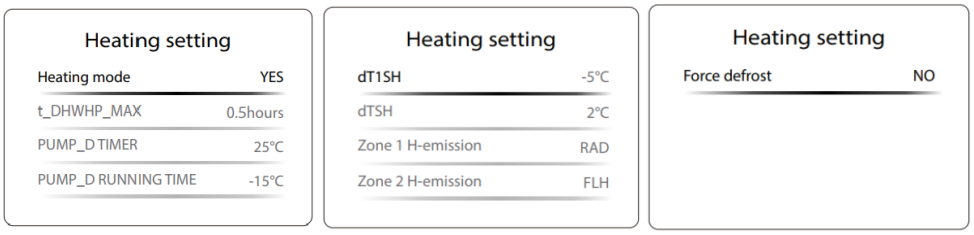
Zone 1 C-emission defines the terminal type of zone 1.

Setting	Description
FCU	Fan coil unit
FLH	Floor heating loop
RAD	Radiator

Zone 2 C-emission defines the terminal type of zone 2.

Setting	Description
FCU	Fan coil unit
FLH	Floor heating loop
RAD	Radiator

6.2.3.Heating setting



6.2.3.1.Heating mode

Heating mode defines whether space heating demand is needed.

Setting	Description
YES	Enable heating mode if space heating terminals are installed.
NO	Disable heating mode if space heating terminals are not installed. In this case, no need to define other settings in Heating mode.

6.2.3.2.t_T4_FRESH_H

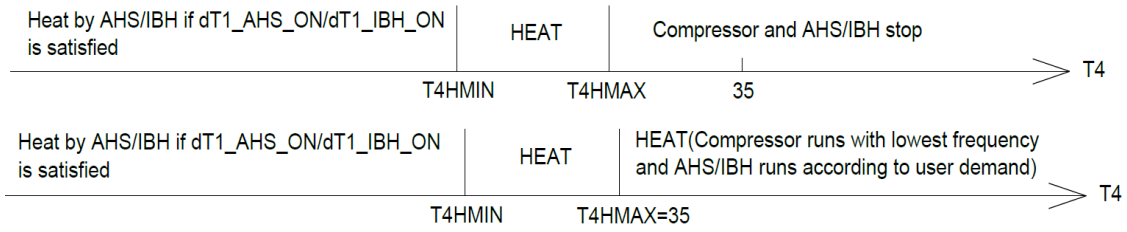
t_T4_FRESH_H defines the refresh time of heating mode climate temperature curve.

6.2.3.3.T4HMAX, T4HMIN

T4HMAX sets the ambient temperature above which the heat pump will operate heating mode with lowest compressor frequency.

T4HMIN sets the ambient temperature below which the heat pump will not operate in heating mode.

Diagram below illustrates the effects of **T4HMAX** and **T4HMIN.**

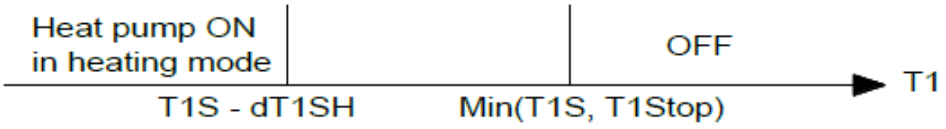


Abreviations:
T4: Outdoor ambient temperature

6.2.3.4.dT1SH

dT1SH defines water temperature hysteresis of activating heat pump.

When T1≤T1S - dT1SH and heat pump is within operating ambient temperature range, heat pump provides hot water to the space heating terminals.



Abreviations:
T1: Leaving water temperature
T1S: Leaving water set temperature
T1Stop: Leaving water temperature operating limit of cooling mode

6.2.3.5.dTSH

dTSH defines room temperature hysteresis of activating heat pump. **dTSH** is only applicable if **1** is selected for **Room temp.** in the **Temp. type setting**.
When TS – Ta ≥ dTSH and heat pump is within operating ambient temperature range, heat pump provides hot water to the space heating terminals

Abreviations:
Ta: Actual room temperature
TS: Room setting temperature

6.2.3.6.Zone 1 H-emission, Zone 2 H-emission

Zone 1 H-emission defines the terminal type of zone 1.

Setting	Description
FCU	Fan coil unit
FLH	Floor heating loop
RAD	Radiator

Zone 2 H-emission defines the terminal type of zone 2.

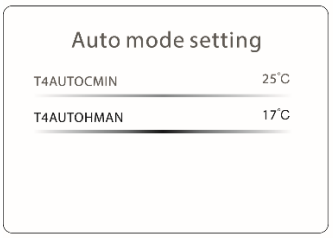
Setting	Description
FCU	Fan coil unit
FLH	Floor heating loop
RAD	Radiator

6.2.3.7.Force defrost

Force defrost enable heat pump enters defrost mode by manual operation when heat pump runs for 10min and air side heat exchanger outlet temperature T3<0℃ lasts for more than 6min.

Setting	Description
YES	Disable Force defrost function
NO	Enable Force defrost function

7. AUTO MODE SETTING

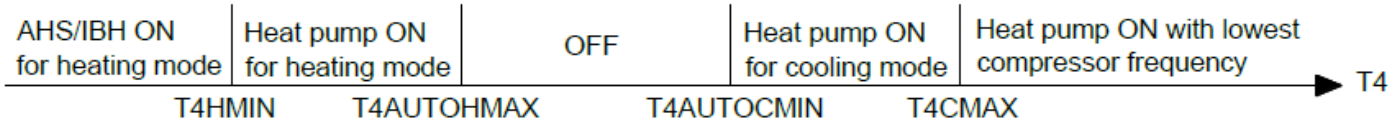


7.1.1.1.T4AUTOCMIN, T4AUTOHMAX

T4AUTOCMIN defines the ambient temperature below which the heat pump will not provide chilled water for space cooling in auto mode.

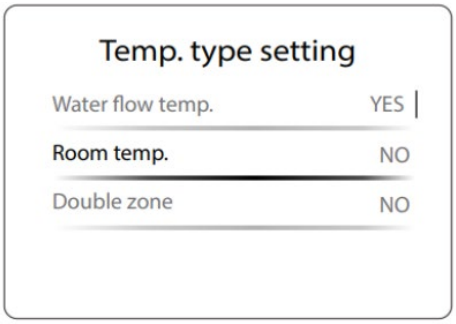
T4AUTOHMAX defines the ambient temperature above which the heat pump will not provide hot water for space heating in auto mode.

Diagram below illustrates the effects of **T4AUTOCMIN**, **T4AUTOHMAX, T4CMAX and T4HMIN.**

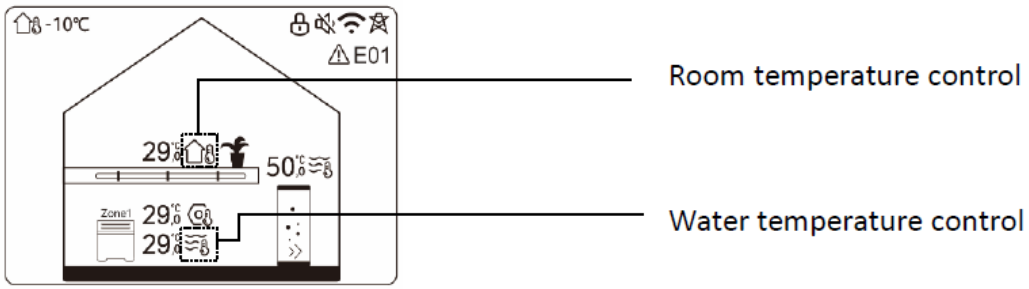


Abreviations:
AHS: Additional heating source
IBH: Backup electric heater
T4CMAX: The ambient temperature above which heat pump operates with lowest compressor frequency.
T4HMIN: The ambient temperature below which the heat pump will not operate in heating mode.

7.1.2.Temp. type setting



The **TEMP. TYPE SETTING** is used for selecting whether the water flow temperature or room temperature is used to control the ON/OFF of the heat pump. In this case, **7.3.6 Room thermostat setting** should be defined as NO.



7.1.2.1.Water flow temp.

Water flow temp. defines whether heat pump is controlled by leaving water temperature.

Setting	*Description*
YES	Heat pump is controlled by leaving water temperature.
NO	Heat pump is not controlled by leaving water temperature.

7.1.2.2.Room temp.

Room temp. defines whether heat pump is controlled by room temperature detected by the temperature sensor inside the wired controller.

Setting	*Description*
YES	Heat pump is controlled by room temperature no matter what is the setting of **7.3.5.1 Water flow temp.** In this case, the target water flow temperature will be calculated from climate curves.
NO	Heat pump is not controlled by room temperature.

7.1.2.3.Double zone

Double zone defines the number of zones.

Setting	*Description*
YES	Double zones control
NO	Single zone control

Figure below illustrates the effects of different combinations in **Temp. type setting.**

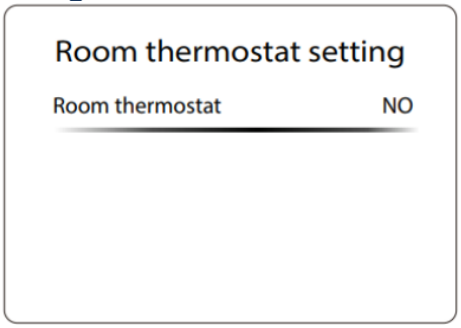
For single zone control

WATER FLOW TEMP.	*ROOM TEMP.*	*DOUBLE ZONE*	*Zones control*
YES	NO	NO	Zone 1: Water temperature control
NO	YES	NO	Zone 1: Room temperature control

For double zone control

WATER FLOW TEMP.		*ROOM TEMP.*	*DOUBLE ZONE*		*Zones control*
YES		YES	YES	NO	Zone 1: Water temperature control
					Zone 2: Room temperature control
YES	NO	NO	YES		Zone 1: Water temperature control
					Zone 2: Water temperature control
YES	NO	YES	YES		Zone 1: Water temperature control
					Zone 2: Room temperature control

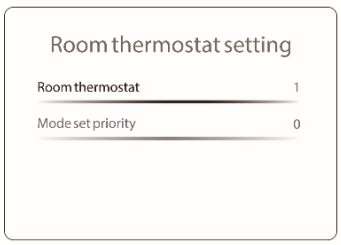
7.1.3.Room thermostat setting



Room thermostat can be as an alternative solution to control heat pump.

Setting	*Description*	*Wired controller is used to*
NO	• NON • Without room thermostats(means **7.1.2 Temp. type setting** is valid)	• Control heat pump ON/OFF • Define water temperature • Define mode(heating/cooling/auto mode)
MODE SET	• MODE SET • Room thermostat provides separate heating/cooling switch signal to control heat pump ON/OFF • One zone control • All timers are invalid except DHW timers.	• Define water temperature
ONE ZONE	• ONE ZONE • Room thermostat provides switch signal to control heat pump ON/OFF • One zone control • All timers are invalid except DHW timers.	• Define water temperature • Define mode(heating/cooling mode)
DOUBLE ZONE	• DOUBLE ZONE • Room thermostat provides switch signal to control heat pump ON/OFF • Double zones control • All timers are invalid except DHW timers.	• Define water temperature • Define mode(Only for heating mode)

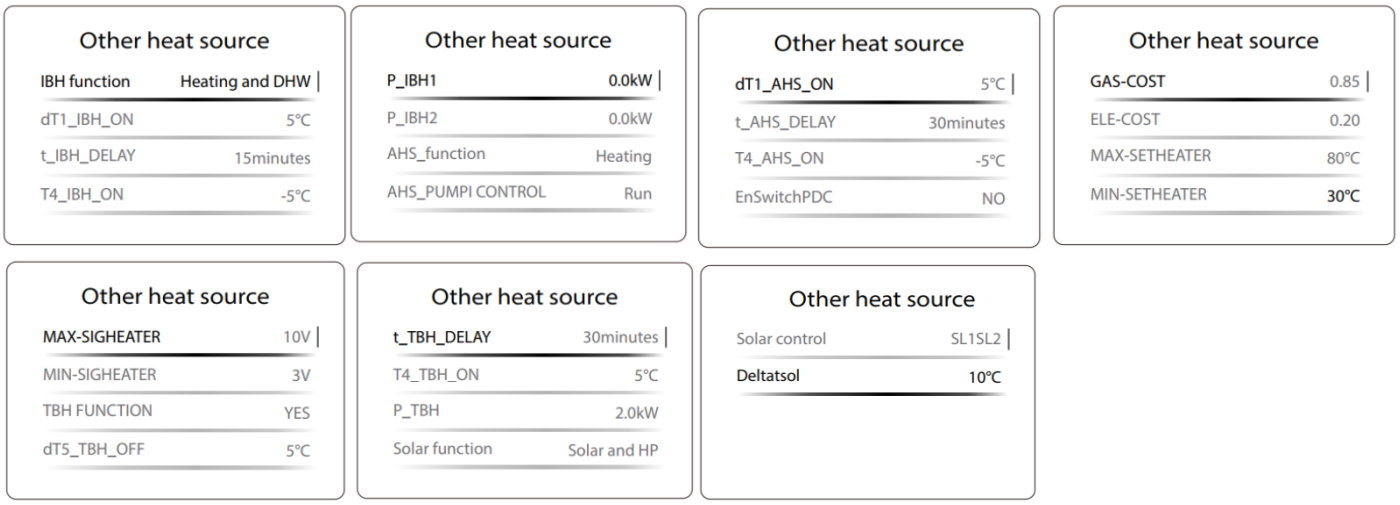
If **Room thermostat setting** is defined as MODE SET, the interface appears:



Mode set priority defines whether cooling mode or heating mode takes priority.

Setting	*Description*
Heating	When heating and cooling switch signal are closed simultaneously, heat pump runs in heating mode.
Cooling	When heating and cooling switch signal are closed simultaneously, heat pump runs in cooling mode.

7.1.4.Other Heat Source Menu



7.1.4.1.IBH FUNCTION, IBH LOCATE, dT1_IBH_ON, t_IBH_DELAY, T4_IBH_ON, P_IBH1, P_IBH2

IBH FUNCTION defines backup heater function.

Setting	*Description*
YES	IBH is used for heating mode and DHW mode
NO	IBH is used for heating mode

dT1_IBH_ON defines water temperature hysteresis of activating electric heater.

When T1S - T1 ≥ dT1_IBH_ON the backup electric heater is on.

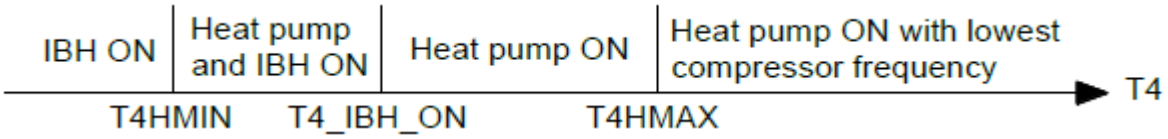
T1S: Heat pump leaving water set temperature
T1: Heat pump leaving water temperature

t_IBH_DELAY defines the delayed start-up time of electric heater. Electric heater will turn on **t_IBH_DELAY** minutes later after compressor starts.

T4_IBH_ON defines the ambient temperature below which the backup electric heater is on.

Note: Only when dT1_IBH_ON, t_IBH_DELAY and T4_IBH_ON are met at the same time then electric heater turns on.

Diagram below illustrates the effects of **T4_IBH_ON, T4HMIN** and **T4HMAX.**



Abreviations:
T4: Outdoor ambient temperature IBH: Electric heater
T4HMIN: The ambient temperature below which the heat pump will not operate in heating mode.
T4HMAX: The ambient temperature above which the heat pump will operate heating mode with lowest compressor frequency.

P_IBH1 defines heating capacity of IBH1, which is used for energy consumption statistics.

P_IBH2 defines heating capacity of IBH2, which is used for energy consumption statistics.

7.1.4.2.AHS FUNCTION, AHS_PUMP_I CONTROL, dT1_AHS_ON, t_AHS_DELAY, T4_AHS_ON

AHS FUNCTION defines auxiliary heating source function.

Setting	*Description*
NO	Without Auxiliary heating source
Heating	Auxiliary heating source is used for heating mode
Heating and DHW	Auxiliary heating source is used for heating mode and DHW mode

AHS_PUMP_I CONTROL select the Pump_I operating status when only auxiliary heating source runs.

Setting	*Description*
RUN	Pump_I runs when auxiliary heating source runs only.
NOT RUN	Pump_I does not run when auxiliary heating source runs only. In this case, please confirm there is an additional pump running for auxiliary heating source.

dT1_AHS_ON defines water temperature hysteresis of activating auxiliary heating source.

When T1S - T1 ≥ dT1_AHS_ON the additional heating source is on.

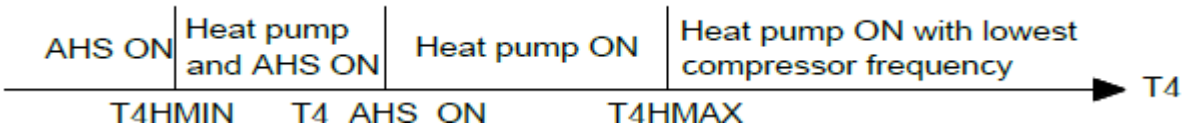
T1S: Heat pump leaving water set temperature
T1: Heat pump leaving water temperature

t_AHS_DELAY defines the delayed start-up time of auxiliary heating source. Auxiliary heating source will turn on **t_AHS_DELAY** minutes later after compressor starts.

T4_AHS_ON defines the ambient temperature below which the auxiliary heating source is on.

Note: Only when dT1_AHS_ON, t_AHS_DELAY and T4_AHS_ON are met at the same time then auxiliary heating source turns on.

Diagram below illustrates the effects of **T4_AHS_ON, T4HMIN** and **T4HMAX.**



Abreviations:
T4: Outdoor ambient temperature AHS: Auxiliary heating source
T4HMIN: The ambient temperature below which the heat pump will not operate in heating mode.
T4HMAX: The ambient temperature above which the heat pump will operate heating mode with lowest compressor frequency.

7.1.4.3.EnSWITCHPDC, GAS_COST, ELE_COST

EnSWITCHPDC defines whether heat pump and additional heating source switch automatically based on economic performance and system high efficiency.

Setting	*Description*
NO	Disable EnSWITCHPDC function, T4_AHS_ON need to be defined manually. Additional heating source may work with heat pump depends on the water temperature and heat pump status.
YES	Enable EnSWITCHPDC function, T4_AHS_ON is calculated according to price of gas and electricity and the efficiency of boiler and heat pump. Only Additional heating source works at ambient temperature of T4_AHS_ON because of the economic performance and system high efficiency.

GAS_COST defines gas price

ELE_COST defines electricity price

7.1.4.4.MAX_SETHEATER, MIN_SETHEATER, MAX_SIGHEATER, MIN_SIGHEATER

When “AHS1” port and “AHS2” port of main control PCB are connected with auxiliary heating source “ON/OFF” signal, auxiliary heating source leaving water temperature automatically change as voltage changes.

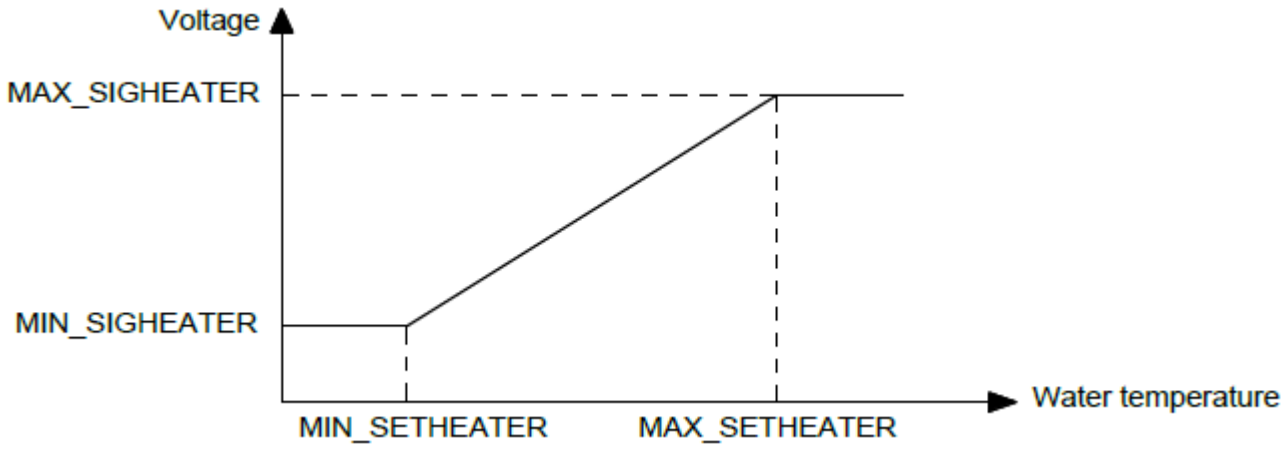
MAX_SETHEATER sets the maximum water temperature of auxiliary heating source.

MIN_SETHEATER sets the minimum water temperature of auxiliary heating source.

MAX_SIGHEATER sets the voltage corresponding to the maximum water set temperature of auxiliary heating source.

MIN_SIGHEATER sets the voltage corresponding to the minimum water set temperature of auxiliary heating source.

Diagram below illustrates the effects of **MAX_SETHEATER, MIN_SETHEATER, MAX_SIGHEATER** and **MIN_SIGHEATER.**



7.1.4.5.TBH FUNCTION, dT5_TBH_OFF, t_TBH_DELAY, T4_TBH_ON, P_TBH

TBH FUNCTION defines whether tank booster heater function is activated.

Setting	*Description*
YES	Disable tank booster heater function
NO	Enable tank booster heater function

dT5_TBH_OFF defines water temperature hysteresis of inactivating tank booster heater when heat pump malfunctions. When T5 > Min(T5S+dT5_TBH_OFF, 70°C), the tank booster heater is off.

T5S: Domestic hot water tank set temperature

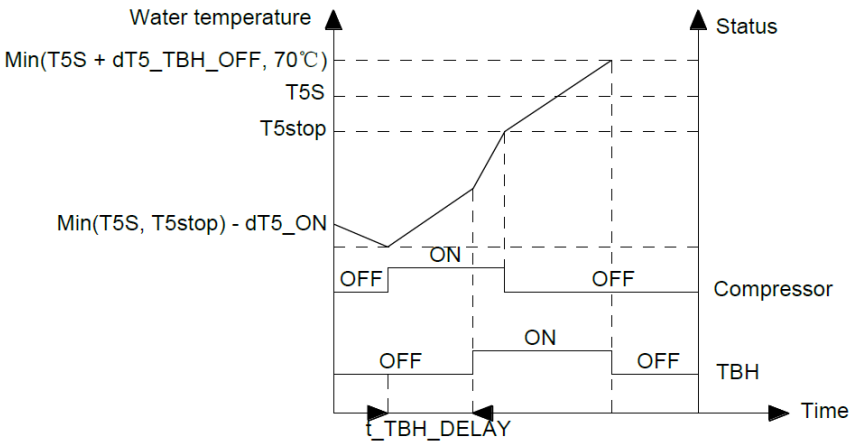
t_TBH_DELAY defines the delayed start-up time of tank booster heater. Tank booster heater will turn on **t_TBH_DELAY** minutes later after compressor starts.

T4_TBH_ON defines the ambient temperature below which the tank booster heater is on.

Note: Only when t_TBH_DELAY, T4_TBH_ON are met at the same time then tank booster heater turns on.

P_TBH defines the power input of tank booster heater.

Diagram below illustrates the operation of heat pump and tank booster heater of DHW mode.



Abbreviations:
T5S: DHW set temperature
T5stop: DHW mode leaving water temperature operating limit TBH: Immersion heater

7.1.4.6.Solar function, Solar control, Deltasol

Solar function defines whether the heating system is equipped with solar function.

Setting	*Description*
NO	Without solar function.
Solar and HP	With only solar function.
Only solar	With solar function and heat pump.

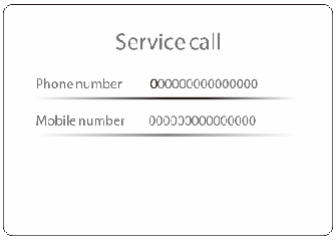
Solar control defines the control type of solar pump

Setting	*Description*
Tsolar	Solar pump(Pump_S) is controlled by solar temperature sensor
SL1SL2	Solar pump(Pump_S) is controlled by SL1SL2 signal

Deltasol defines temperature hysteresis of activating solar pump(Pump_s).

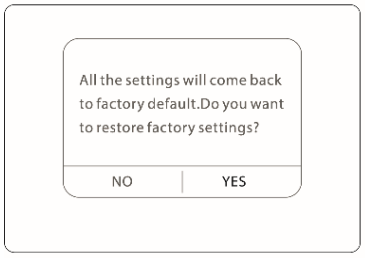
When Tsolar > T5 + **Deltasol**, T5 < 79℃ and DHW mode is ON, then solar pump activates.

7.1.5.Service call



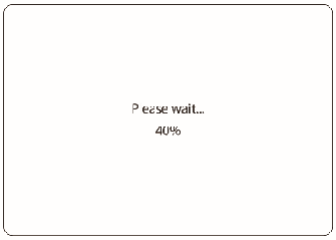
Phone number and **Mobile number** define after-sales service contact numbers. Press ‹ › to navigate cursor and press ^ ˇ to adjust the numerical values. The maximum length of the phone numbers is 15 digits.

7.1.6.Restore factory settings

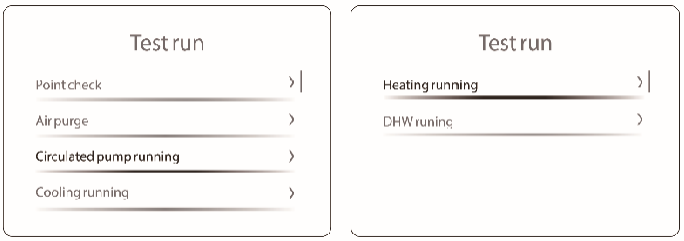


Restore factory settings is used to restore all the parameters set in the user interface to factory defaults.

On selecting YES, the process of restoring all settings to factory defaults begins and progress is displayed as a percentage.

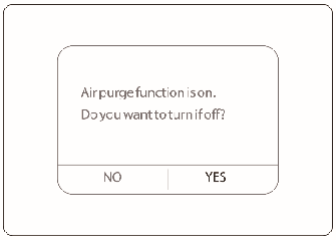


7.1.7.Test run

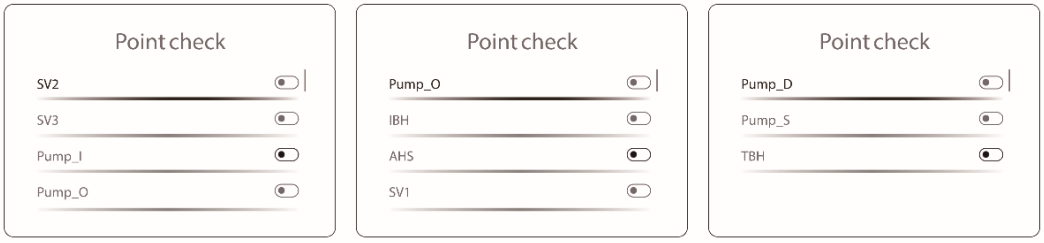


Test run is used to do the point check and check that air purge function, circulation pump, cooling mode, heating mode and DHW mode are all operating correctly. If any error code is displayed during the test run operation, the cause should be investigated.

During test run, all buttons except ○ are invalid. If you want to turn off the test run, please press ○. For example, when the unit is in air purge mode, after you press ○, the following page will be displayed:

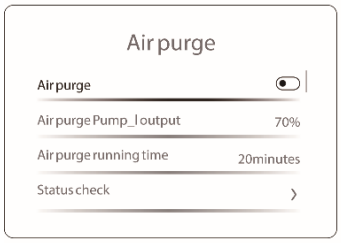


7.1.7.1.Point check



The **POINT CHECK** menu is used to check the operation of individual components. Use ∧ ∨ to scroll to the components you want to check and press ○ to toggle the on/off state of the component. If a valve does not turn on/off or a pump/heater does not operate when their on/off state is toggled, please check the connection between component and main PCB and make sure components' status is normal.

7.1.7.2.Air purge

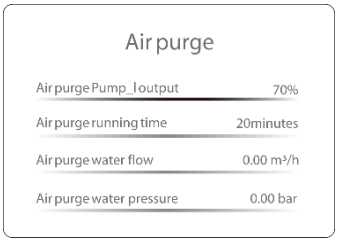


Once installation is complete, it is important to run the air purge function to remove any air which may be present in the water piping and which could cause malfunctions during operation. Before running **Air purge** mode, make sure that the air purge valve is open. Pump_I will run according to the output and running time that has been set.

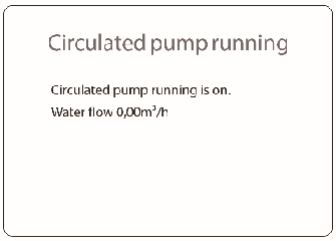
Air purge defines whether the function is activated.

Air purge Pump_I output defines the Pump_I output capacity.**Air purge running time** defines the period that Pump_I operates during the air purge process.

Status check allows installers to check the real-time operation parameters of air purge operation.



7.1.7.3.Circulated pump running



Circulated pump running operation is used to check the operation of the circulation pump.

When circulation pump running is turned on, all running components will stop.

Circulated pump running operation is used to check the operation of the circulation pump.

When circulation pump running is turned on, all running components will stop.

When the unit received signal that indicates Circulated pump running =ON:

- SV1 will turn on after 30 secs;
- Pump_I will turn on after 60 secs.
- Pump_I will turn off after 240 secs.
- SV1 will turn off and the SV2 will turn on after 270 secs.
- Pump_I & pump_O will turn on after after 30 secs

If E8 occurs during these processes, the unit will stop Circulated pump running mode immediately.

7.1.7.4.Cooling running

The **Cooing running** operation is used to check the operation of the system in space cooling mode.

During the **Cooing running** operation, the leaving water set temperature is 7°C. The current actual leaving water temperature is displayed on the user interface. The unit operates until the leaving water temperature drops to the set temperature or the next command is received.

7.1.7.5.Heating running

The **Heating running** operation is used to check the operation of the system in space heating mode.

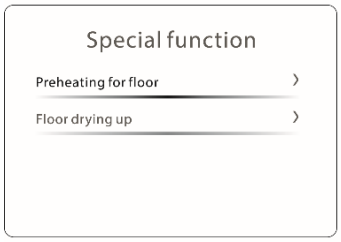
During **Heating running** test running, the default target outlet water temperature is 35°C. The IBH (backup heater) will turn on after the compressor runs for 10 min. After the IBH runs for 3 minutes, the IBH will turn off. Heat pump will operate until the water temperature increase to a certain value or the next command is received.

7.1.7.6.DHW running

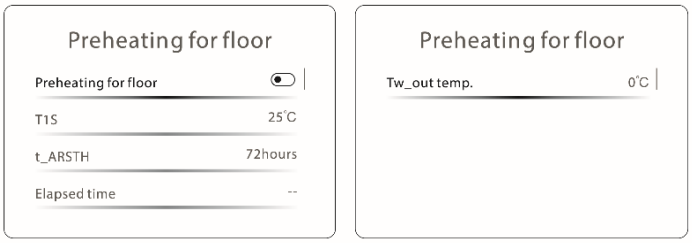
The **DHW running** operation is used to check the operation of the system in DHW mode.

During **DHW running** test running, the default target temperature of the domestic water is 55°C. The TBH(tank boost heater) will turn on after the compressor runs for 10min. The TBH will turn off 3 minutes later. Heat pump will operate until the water temperature increase to a certain value or the next command is received.

7.1.8.Special Function



7.1.8.1.Preheating for floor



Preheating for floor function provides mild heat to the underfloor water piping for the first time during seasonal heating, diminish the risk of damage to the floor and piping system.

Setting	*Description*
0	Disable preheating for floor function
1	Enable preheating for floor function

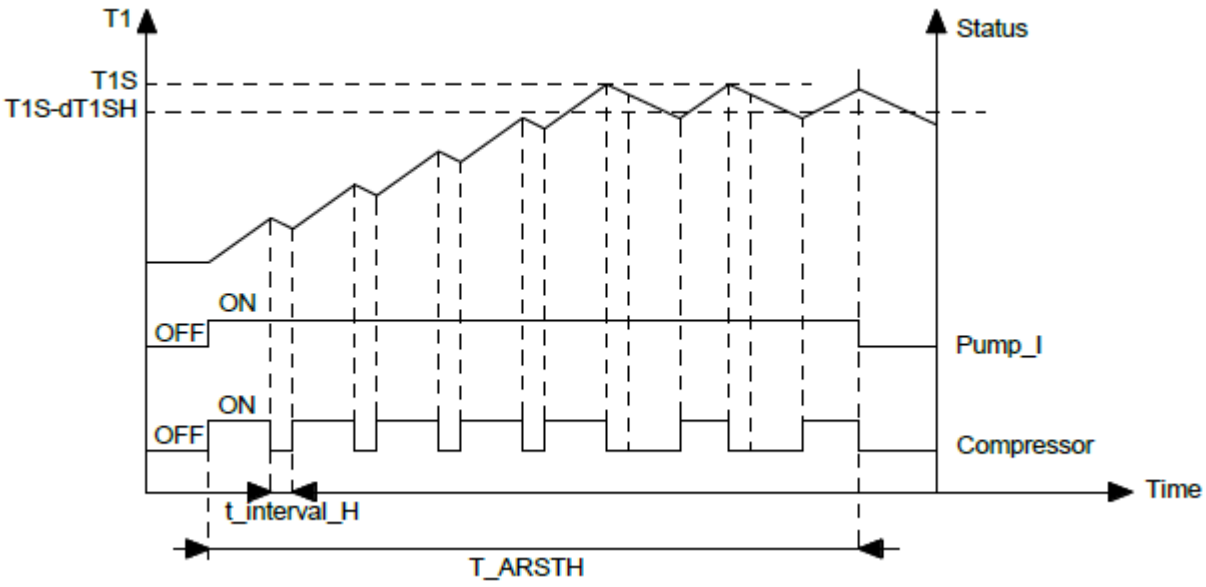
T1S defines heat pump leaving water temperature in preheating.

T_ARSTH defines running time for first preheating of the floor.

Elapsed time is the period that **Preheating for floor function** had run.

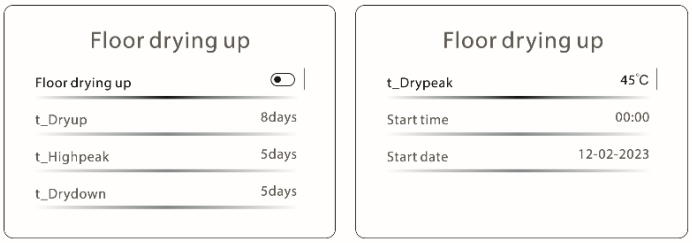
Tw_out temp. is the current leaving water temperature

Diagram below illustrates the operation of **Preheating for floor** function.



Abbreviations:
T1: Leaving water temperature
dT1SH: Water temperature hysteresis of activating heat pump.
t_interval_H: The delayed start-up time of compressor in heating mode.

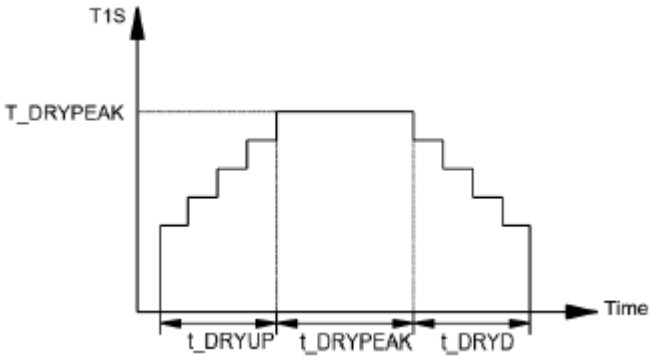
7.1.8.2.Floor drying up



For newly-installed under-floor heating systems, floor drying up is necessary to remove moisture from the floor slab and subfloor to prevent warping or rupture of the floor. Heat pump provides mild heat to the concrete or other structural material around the underfloor water piping in a certain period of time, accelerate the process of getting rid of moisture. During floor drying up operation, the temperature of the floor would be increased gradually. In the event of a heat pump malfunction, floor drying up mode will continue if a backup electric heater and/or auxiliary heating source is available and configured to support space heating mode.

There are three phases to the floor drying up operation:

- Phase 1: gradual temperature increase to the peak temperature
- Phase 2: maintain peak temperature
- Phase 3: gradual temperature decrease from the peak temperature



Floor drying up

Setting	*Description*
0	Disable floor draying up function
1	Enable floor draying up function

t_Dryup defines the duration of Phase 1.

t_Highpeak defines the duration of Phase 2.

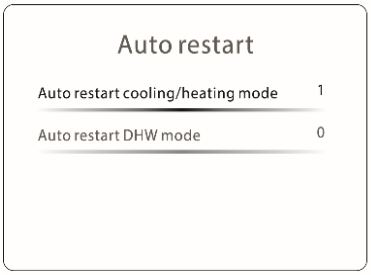
t_Drydown defines the duration of Phase 3.

t_Drypeak defines the heat pump leaving water temperature of Phase 2.

Start time defines the floor drying up operation start time.

Start date defines the floor drying up operation start date.

7.1.9.Auto restart



Auto restart sets whether or not the unit re-applies the mode and unit status settings when the power returns following a power failure.

If **7.3.6 Room thermostat setting** is defined as not 0, **Auto restart function** will not be applicable.

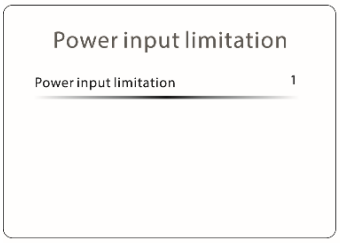
Auto restart cooling/heating mode

Setting	*Description*
NO	Disable auto restart cooling/heating mode
YES	Enable auto restart cooling/heating mode

Auto restart DHW mode

Setting	*Description*
NO	Disable auto restart DHW mode
YES	Enable auto restart DHW mode

7.1.10.Power input limitation

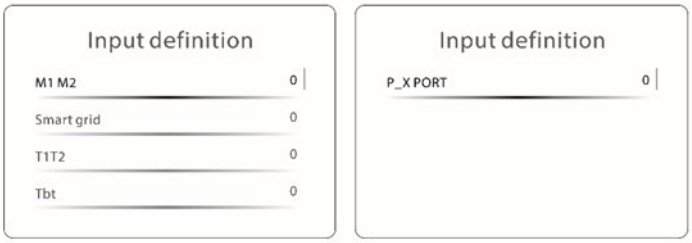


Power input limitation makes the machine suitable for a variety of current supplies. There are 8 configurations for user to choose according to the maximum allowable access current. If the unit will operate at larger current input, 1 should be selected. If the unit will operate at a lower current input, 2-8 should be selected and the power input and capacity will decrease.

Power limitation function

Setting	*Model*			
	26kW	*30kW*	*35kW*	*40kW*
1	23A	26A	29A	29A
2	22A	25A	28A	28A
3	21A	24A	27A	27A
4	20A	23A	26A	26A
5	19A	22A	25A	25A
6	18A	21A	24A	24A
7	17A	20A	23A	23A
8	16A	19A	22A	22A

7.1.11.Input definition



INPUT DEFINE defines sensors and functions to fulfill with installation.

M1 M2 defines the function of M1M2 port

Setting	*Description*
0	Remote ON/OFF control of heat pump
1	Remote ON/OFF control of tank booster heater
2	Remote ON/OFF control of auxiliary heating source

Smart grid defines whether SMART GRID control signal is connected to hydronic PCB.

Setting	*Description*
0	Disable Smart grid function
1	Enable Smart grid function

T1T2 defines control options of Port T1T2

Setting	*Description*
0	Installation with MH-kit
1	Installation without MH-kit

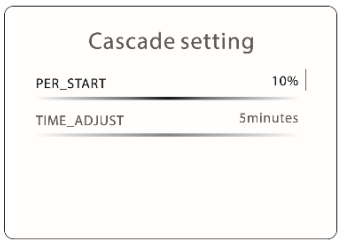
Tbt defines whether balance tank temperature sensors are installed in the balance tank.

Setting	*Description*
0	Installation with balance tank temperature sensor(Tbt)
1	Installation without balance tank temperature sensor(Tbt)

P_X PORT can be defined as defrosting signal or alarm signal according to customers' demand.

Setting	*Description*
0	Defrosting signal
1	Alarm signal

7.1.12.Cascade setting

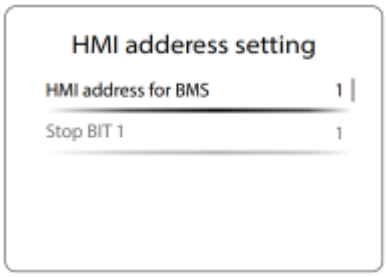


PER_START sets the start-up percentage of multiple units for the first time start-up after power on. For example:

Total units	*PER_START*	*Starting units*
6	50%	3
6	30%	2

TIME_ADJUST sets the judgment period of adding and subtracting units

7.1.13.HMI address setting

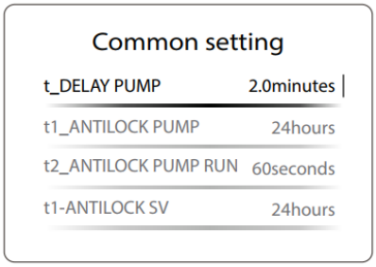


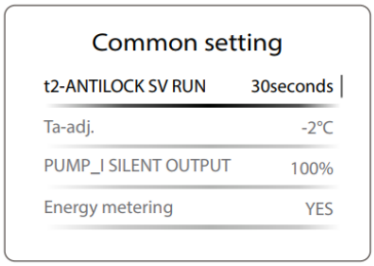
HMI ADDRESS FOR BMS sets the HMI address code for BMS.(only valid for master controller)

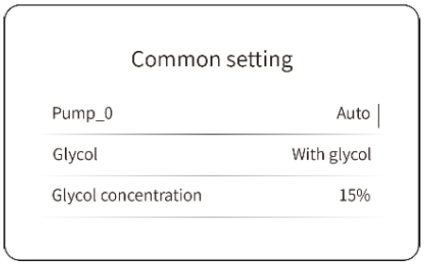
STOP BIT set upper computer stop bit(1: STOP BIT1; 2:STOP BIT2)

Setting	*Description*
1	Stop bit 1
2	Stop bit 2

7.1.14.Common setting







7.1.14.1.t_DELAY PUMP

t_DELAY PUMP defines the delayed stop time of Pump_I. Pump_I will stop **t_DELAY PUMP** minutes later after compressor stops base on system temperature equalization consideration.

7.1.14.2.t1_ANTILOCK PUMP, t2_ANTILOCK PUMP RUN, t1_ANTILOCK SV, t2_ANTILOCK SV RUN

Antilock operation prevent components from sticking to result in system fail.

t1_ANTILOCK PUMP defines the interval time that Pump_I, Pump_O and Pump_C runs in order to antilock

t2_ANTILOCK PUMP RUN defines the running time for Pump_I, Pump_O and Pump_C antilock operation

t1_ANTILOCK SV defines the interval time that SV1, SV2 and SV3 valve works in order to antilock

t2_ANTILOCK SV RUN defines the running time for SV1, SV2 and SV3 valve antilock operation

7.1.14.3.Ta-adj

Ta-adj is an correction value for room temperature sensor(Ta) which is inside the wired controller. The display room temperature value is equal to Ta + **Ta-adj.**

7.1.14.4.PUMP_I_SLIENT OUTPUT

PUMP_I_SLIENT OUTPUT can decrease water pump maximum output in order to decrease the noise of heat pump.

7.1.14.5.Energy metering

Energy metering allows user to check energy data of day, week, month and year.

Setting	*Description*
NO	Disable energy metering function
YES	Enable energy metering function

7.1.14.6.Pump_O

Pump_O defines Zone 1 pump(**Pump_O**) control type.

Setting	*Description*
ON	Pump_O keeps running
Auto	Pump_O operation is controlled by heat pump

7.1.14.1.Glycol, Glycol concentration

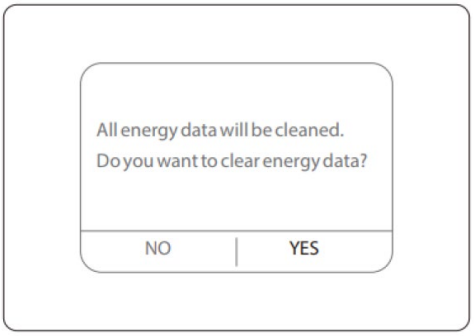
Glycol defines whether the unit has added glycol.

Setting	*Description*
0	Without glycol
1	With glycol

Glycol concentration Define the concentration of glycol added to the unit.

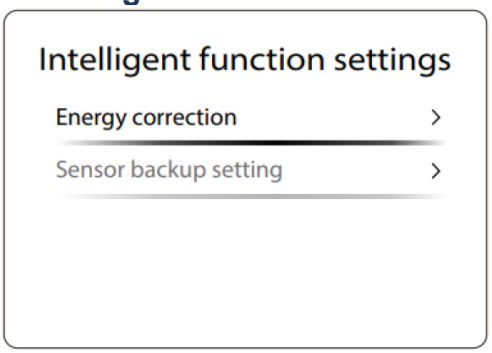
The concentration setting of glycol will affect the correction of the water flow of the unit.

7.1.15.Clear energy data

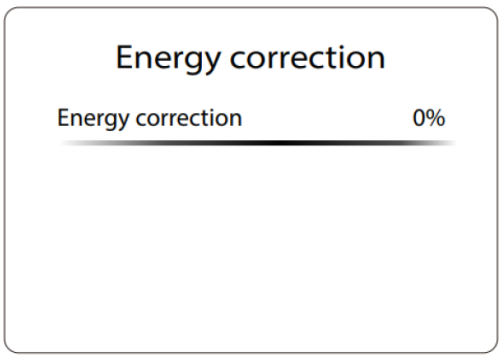


Once selecting YES, All energy metering data is clear.

7.1.16.Intelligent function settings



7.1.17.Energy correction

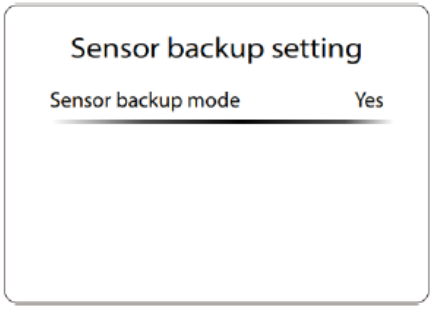


The actual installation scenario would be different from one to another. The energy metering calculation of the unit could deviate slightly due to the actual installation.

Energy correction is to offset the deviation of the energy metering calculation of the unit. Value from -50% to 50%, default is 0. It is applied for Heating, Cooling and DHW.

The final energy data = original data * (1+ **Energy correction**)

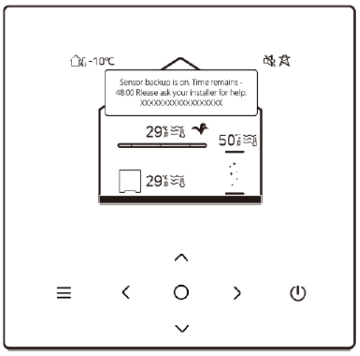
7.1.18.Sensor backup setting



Sensor backup setting defines whether the sensor backup function is active or not.

Setting	*Description*
NO	Disable Sensor backup setting function
YES	Enable Sensor backup setting function

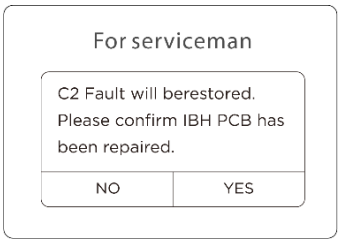
When Sensor backup setting function is activated, a bubble with text jumps out in the home page, in which the timer indicates for how long the unit can run normally before it shuts down.



If Sensor backup setting function is stopped, the bubble will hide automatically. If the timer runs out, the bubble hides and unit will shut down due to the existed error.

In cascade installation, Sensor backup setting function is available for master unit only.

7.1.19.C2 fault restore



For the unit with IBH(internal backup heater), when C2 error occurs, please follow C2 troubleshooting guide of Part4 Diagnosis and Troubleshooting. If necessary, select YES to restore C2 code.

7.2.Operation parameter

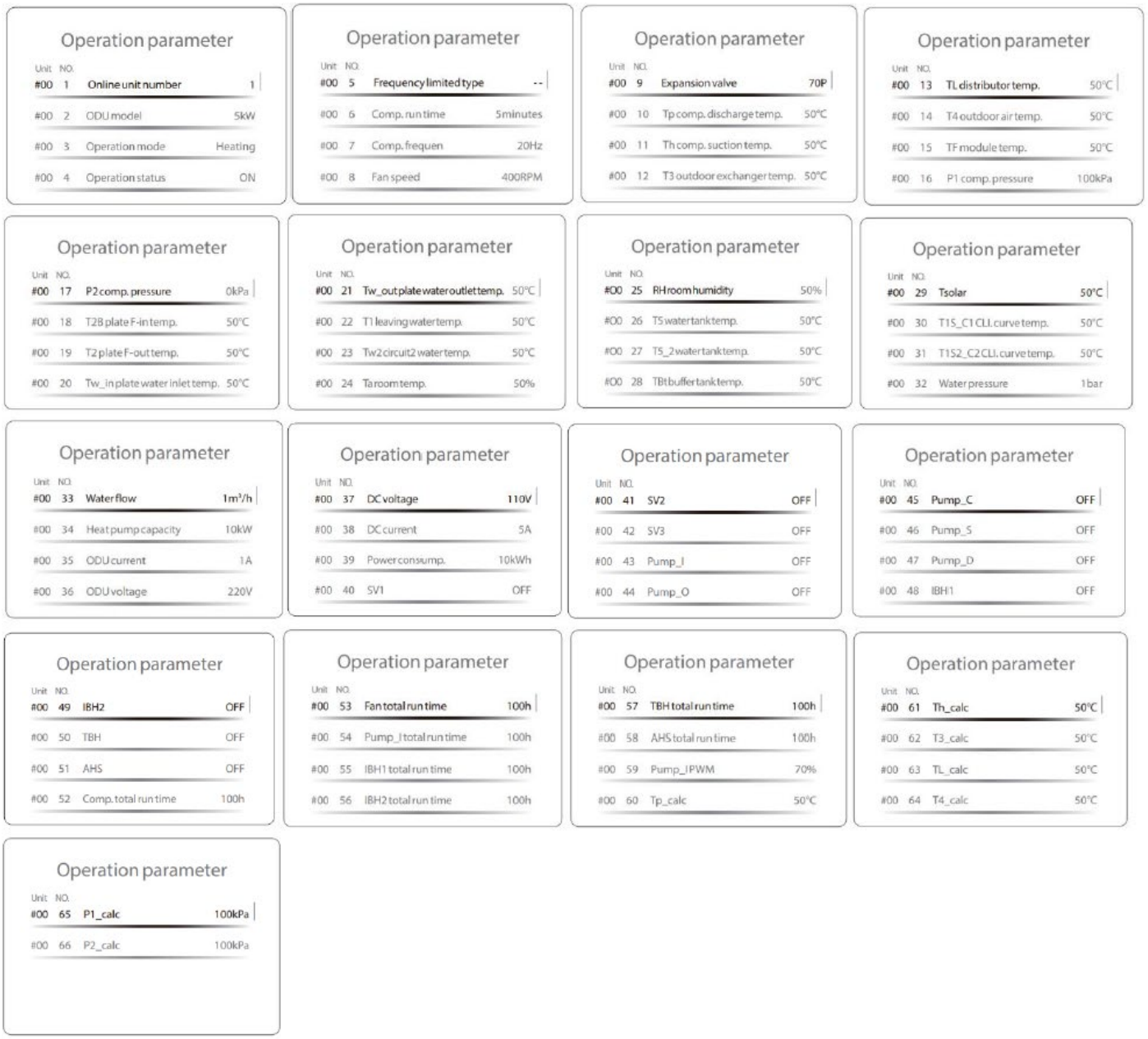
Operation parameter is for reviewing the operation parameters. The interface below is for reference and different units' state correspond to different parameter values.

Operation for entering Operation parameter：

Step 1: Home page Step 2: Press " "

Step 3: Select "Unit status"

Step 4: Select "Operation parameter" Step 5: Press

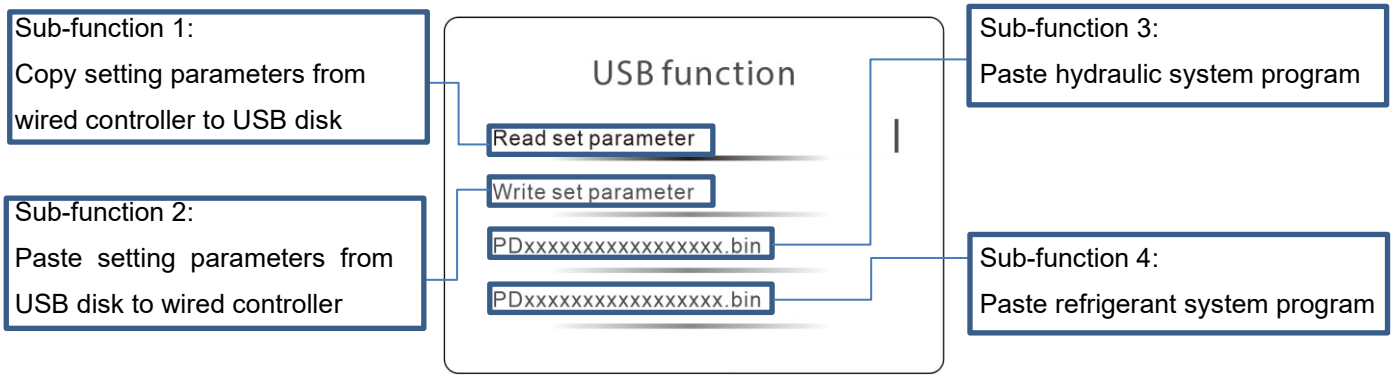


7.3.USB function field settings

USB function helps you to transmit parameters and program easily. When USB disk connect to CN4 port of main control PCB, the USB function interface appears automatically on the wired controller.

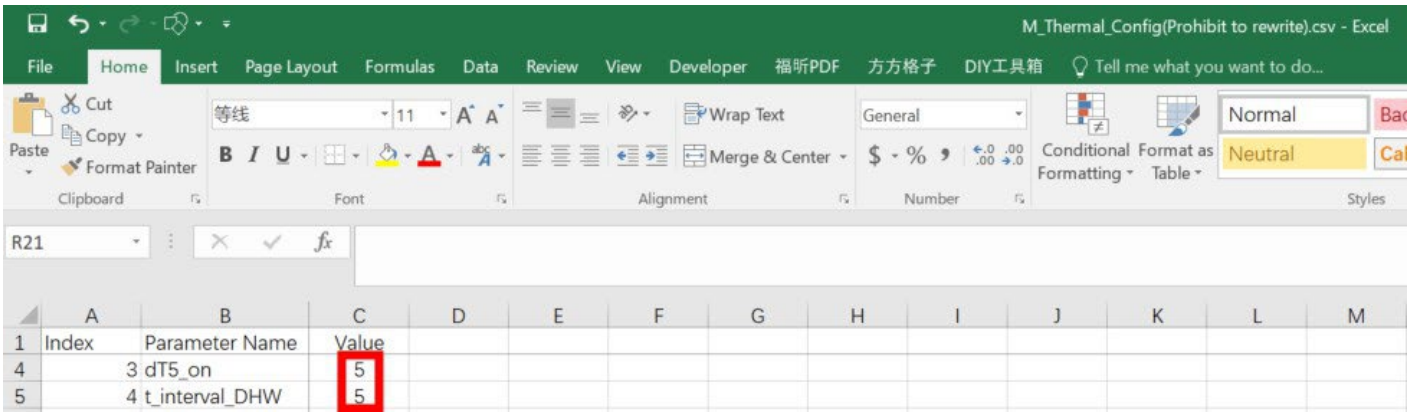
Main control PCB

USB function interface



Sub-function 1:

Once the process finishes successfully, the parameter file “M_Thermal_Config(Prohibit to rewrite).csv” will be generated in the USB disk. If you want to change the parameter on computer, please remember only change the value of column C(red frame below) is allowed and do not change any other content or the file name.

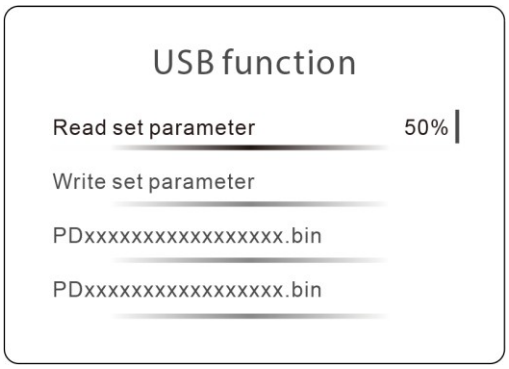


Sub-function 2:
Please make sure there is only one parameter file in the USB disk before using this function.

Sub-function 3:
Please make sure there is only one applicable hydraulic system program in the USB disk before using this function.

Sub-function 4:
Please make sure there is only one applicable refrigerant system program in the USB disk before using this function.

Press ∧ ∨ to choose the item and press ○ to confirm your choice, then the rate of process appears like below:



During the process, all the buttons are invalid.

When the process finishes, pop-up window with “Success” cue word appears briefly and unit stops. Please remove the USB disk and restart the unit.

When the process fails, pop-up window with “Fail” cue word appears briefly. The system program remains unchanged.

If the stalled process happens, please remove the USB disk and try to insert the USB disk according to operation above.

8. SERVICE INFORMATION

DANGER !

- These instructions are exclusively intended for qualified contractors and authorized installers
- Work on the refrigerant circuit with flammable refrigerant in safety group A2L may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with EN 378 Part 4 or IEC 60335-2-40, Section HH. The certificate of competence from an industry accredited body.
- Brazing/soldering work on the refrigerant circuit may only be carried out by contractors certified in accordance with ISO 13585 and AD 2000, Datasheet HP 100R. And only by contractors qualified and certified for the processes to be carried out. The work must fall within the range of applications purchased and be carried out in accordance with the prescribed procedures. Soldering/brazing work on accumulator connections requires certification of personnel and processes by a notified body according to the Pressure Equipment Directive (2014/68/EU).
- Work on electrical equipment may only be carried out by a qualified electrician.
- Before initial commissioning, all safety relevant points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

8.1.Label for Refrigerant Presence

Equipment should be provided with a label stating that it has been de-commissioned and emptied of refrigerant. The label should be dated and signed. Ensure that proper labels are pasted on the equipment stating the equipment contains flammable refrigerant

8.2.Leak Detection Methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants. An electronic leak detector should be used to detect flammable refrigerants, but its sensitivity may not be adequate, or the detector may need re-calibration. (Detection equipment should be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant. Leak detection equipment should be set at a percentage of the LFL of the refrigerant and should be calibrated to be suitable for the refrigerant employed. The appropriate percentage of gas (25% maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but detergents containing chlorine should not be used as the chlorine may react with the refrigerant and corrode the copper pipes. If a leak is suspected, all naked flames should be removed or extinguished. If a leakage of refrigerant is found and brazing is required, all of the refrigerant should be recovered from the system, or isolated (by means of shut off valves) in a part of the system that is remote from the leak. Oxygen free nitrogen (OFN) should then be purged through the system both before and during the brazing process.

8.3.Check of Refrigeration Equipment

Where electrical components are to be changed, they should be fit for the intended purpose and comply with the correct specifications. Always follow the manufacturer's maintenance and service guidelines. In case of any doubt, consult the manufacturer's technical department for assistance. Check installations using flammable refrigerants.

- The amount of refrigerant to be charged depends on the size of the room where the refrigerant-containing parts are installed.
- The ventilation machinery and outlets should work adequately and be not obstructed.
- If an indirect refrigerating circuit is used, the secondary circuits should be checked for any refrigerant; Markings on the equipment should be visible and legible.
- Illegible markings and signs should be corrected.
- Refrigeration pipes or components should be installed in positions where they are unlikely to be exposed to any substance that may corrode refrigerant-containing components, unless the components are constructed of materials that are inherently resistant to corrosion or are suitably protected from corrosion

8.4.Check of Electrical Devices

Repair and maintenance of electrical components should include initial safety checks and component inspection procedures. If a fault exists and could compromise safety, no electrical supply should be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution should be adopted. This should be reported to the owner of the equipment so all parties are advised. Repair and maintenance of electrical components should include initial safety checks and component inspection procedures. If a fault exists and could compromise safety, no electrical supply should be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution should be adopted. This should be reported to the owner of the equipment so all parties are advised. Initial safety checks should include the following:

- The capacitors should be discharged in a safe manner to avoid sparking risks
- No live electrical components and wiring can be exposed during the system charging, recovery or purging.
- Earth bonding should be continuous

8.5.Repair of Sealed Components

- During repair of sealed components, all electrical supplies should be disconnected from the equipment being worked upon prior to any removal of sealed covers. If it is absolutely necessary to have an electrical supply connected with the equipment during servicing, a permanently operating form of leak detection should be located at the most critical point to warn of a potentially hazardous situation.
- Particular attention should be paid to the following to ensure that, by working on electrical components, the casing is not altered in such a way that Protection is compromised. This should include damage to cables, an excessive number of connections, terminals not made as per original specifications, damage to seals, and incorrect fitting of glands.

- Ensure that all apparatuses are mounted securely.
- Ensure that seals or sealing materials have not degraded such that they can no longer prevent the ingress of flammable atmospheres. Parts for replacement should be in accordance with the manufacturer s specifications.
- The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

8.6.Repair of Intrinsically Safe Components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that such loads will not exceed the permissible voltage or current permitted for the equipment in use. Intrinsically safe components are the only types that can be worked on when the components live in a flammable atmosphere. The test apparatus should be provided with the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere caused by a leak.

8.7.Transportation and Marking

Transport the equipment containing flammable refrigerants in accordance with the transport regulations. Mark the equipment with signs in compliance with local regulations.

8.8.Disposal

8.8.1.General

- Components and accessories of the unit are not ordinary domestic wastes.
- The unit, compressors, and motors, etc. can only be disposed of by qualified specialists.
- This unit uses hydrofluorocarbon that can only be disposed of by qualified specialists

8.8.2.Packaging

- Dispose of the packaging properly.
- Observe all relevant regulations

8.8.3.Refrigerant Removal, Evacuation, Charge, Recovery, and Unit Decommissioning

WARNING !

Due to the feature of the R290 refrigerant, only carry out work when you have specific expert refrigeration knowledge and are competent for handling R290 refrigerant.

Work on the refrigerant circuit with flammable refrigerant in safety group A3 may only be carried out by authorized heating contractors.

8.8.3.1.Removal and evacuation

When breaking into the refrigerant circuit for repair or any other purpose, follow the conventional procedures. However, it is important to follow the best practice since flammability should be considered. Operate as per the following procedure:

- Remove refrigerant;
- Purge the circuit with inert gas;
- Evacuate;
- Purge the circuit again with inert gas;
- Open the circuit by cutting or brazing

The refrigerant charged should be recovered and put in correct recovery cylinders. The system should be flushed with OFN to guarantee the unit safety. This process may need to be repeated several times. Compressed air or oxygen should not be used.

Flushing should be achieved by filling the system with OFN until the working pressure is achieved before venting to the atmosphere, and recovering the system to a vacuum. This process should be repeated until no refrigerant exists in the system. Upon the final OFN charge, the system should be vented down to reach the atmospheric pressure to start the work.

This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet of the vacuum pump is not closed to any ignition sources and adequate ventilation is available.

8.8.3.2.Charging procedures

In addition to conventional charging procedures, the following requirements should be followed:

- Ensure that contamination of different refrigerants does not occur when charging equipment is used. Hoses or lines should be as short as possible to minimize the amount of refrigerant contained in them.
- Earth the refrigeration system prior to charging the system with refrigerant.
- Label the system upon completion of the charging (if the system has not been labeled).
- Extreme care should be taken not to overfill the refrigeration system.
- Prior to recharging the system, test it with OFN. The system should be leak tested upon completion of charging but prior to commissioning. Carry out a follow-up leak test before leaving the site.

8.8.3.3.Recovery

When removing refrigerant from the system, either for service or decommissioning, we recommend you remove all refrigerants safely by following the best practice.

When transferring refrigerant into cylinders, only use appropriate refrigerant recovery cylinders. Ensure that a proper number of cylinders are available for accommodating all the refrigerant. All cylinders to be used are designated and labeled for the recovered refrigerant (i.e., special cylinders for the recovery of refrigerant). The cylinders should be complete with pressure relief valves and associated shut-off valves that work properly.

Empty recovery cylinders should be evacuated and, if possible, cooled before the recovery starts.

The recovery equipment should work properly with a set of instructions concerning the equipment at hand, and should be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighting scales should be available and work properly. Hoses should be complete with leak-free disconnection couplings and in good conditions. Before

using the recovery equipment, check and verify that it works properly and has been properly maintained, and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant leakage. Consult the manufacturer in case of any doubt.

The recovered refrigerant should be returned to the refrigerant supplier in correct recovery cylinders, with the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units, especially in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to ensure that flammable refrigerant does not remain within the lubricant. Carry out the evacuation process before returning the compressor to the suppliers. To accelerate this process, you can only heat the compressor body electrically. Safety drain oil from the system.

8.8.3.4.Decommissioning

Prior to this procedure, the technician should be completely familiar with the equipment and all its details. It is recommended that all refrigerants be recovered safely. Prior to the recovery, an oil and refrigerant sample should be taken for case analysis before re-use of reclaimed refrigerant. Electrical power should be available before the task is commenced.

- Be familiar with the equipment and its operation.
- Isolate the system electrically
- Before attempting the procedure ensure that:
    - Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
    - All personal protective equipment should be available and used correctly.
    - The recovery process should be supervised at all time by a competent person.
    - Recovery equipment and cylinders should conform to the appropriate standards.
- Pump down the refrigerant system, if possible.
- If a vacuum is not possible, provide a manifold to remove the refrigerant from various parts of the system.
- Make sure that the cylinders are situated on the scales before the recovery starts.
- Start the recovery machine and operate it in accordance with the manufacturer's instructions.
- Do not overfill the cylinders (for no more than 80% of the volume).
- Do not exceed the maximum working pressure of the cylinders, even temporarily.
- When the cylinders have been filled correctly and the process is completed, immediately remove the cylinders and the equipment from the site and close all isolation valves on the equipment.
- The recovered refrigerant should not be re-used in any other refrigeration system unless it has been cleaned and checked.

8.9.R290 System Service

When repairing systems that use R290 refrigerant, the following warnings and operating requirements should be noted.

9. WARNING ABOUT THE R290 REFRIGERANT

⚠ WARNING

The following information indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

The following applies to R290 refrigerant systems.

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized.

For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapour being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.

Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.

All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.

Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

- the charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures.

If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:
-that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
-that no live electrical components and wiring are exposed while charging, recovering or purging the system;
-that there is continuity of earth bonding.

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres.

Replacement parts shall be in accordance with the manufacturer's specifications.

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of ageing or continual vibration from sources such as compressors or fans.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, it is important that best practice is followed.

Since flammability is a consideration. The following procedure shall be adhered to:

- remove refrigerant;
- purge the circuit with inert gas;
- evacuate;
- purge again with inert gas;
- open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.

Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.

This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available. Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as

short as possible to minimize the amount of refrigerant contained in them. Prior to recharging the system it shall be pressure tested with OFN.

DD.12 Decommissioning:

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure ensure that:
   - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
   - all personal protective equipment is available and being used correctly;
   - the recovery process is supervised at all times by a competent person;
   - recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.

f) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

h) Do not overfill cylinders. (No more than 80 % volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder, even temporarily.

j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Warning: disconnect the appliance from its power source during service and when replacing parts.

These units are partial unit air conditioners, complying with partial unit requirements of this International Standard, and must only be connected to other units that have been confirmed as complying to corresponding partial unit requirements of this International Standard.

9.1.Qualification requirements for maintenance personnel

⚠ DANGER

The following information indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

These instructions are exclusively intended for qualified contractors and authorized installers

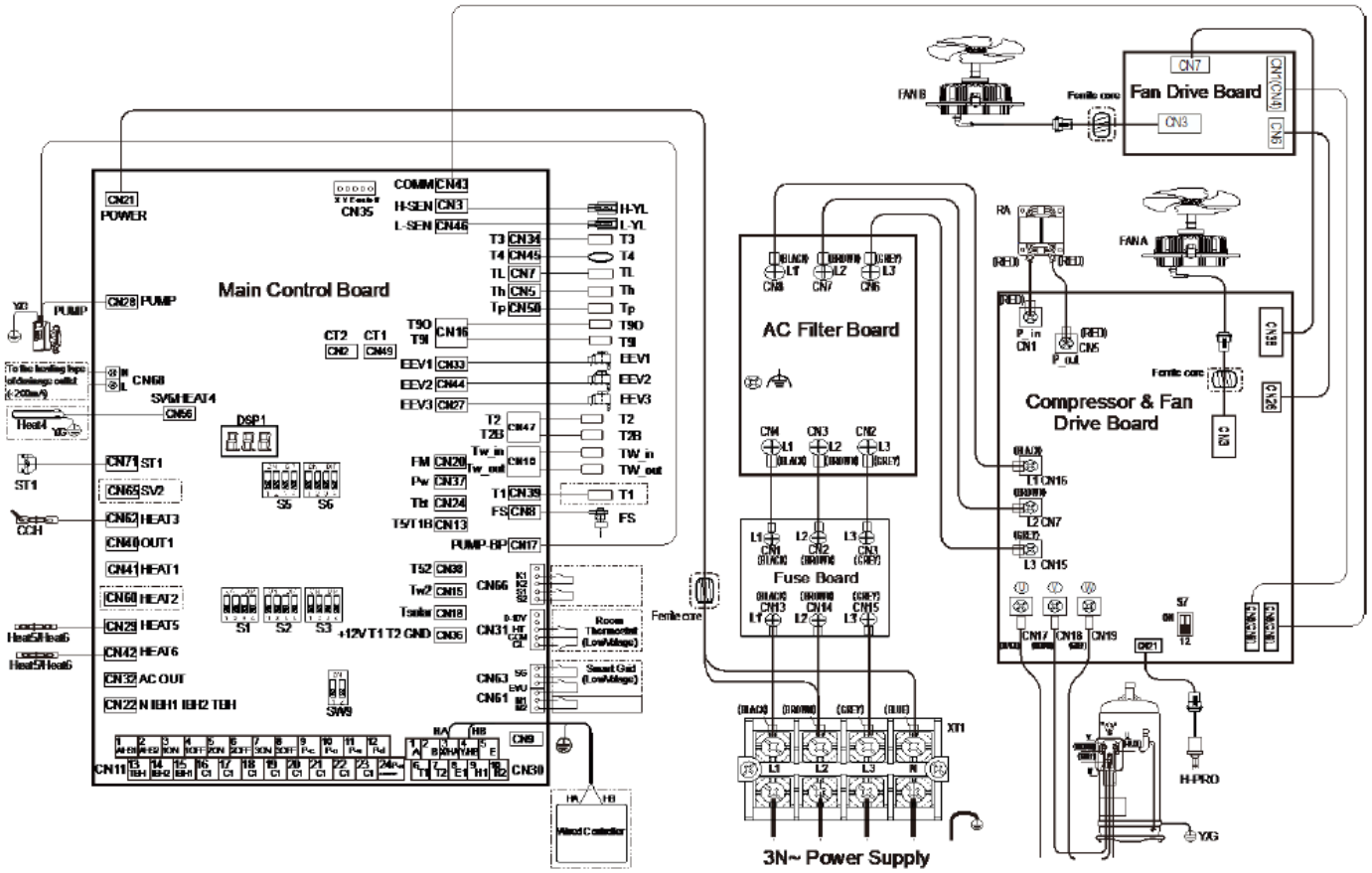
Work on the refrigerant circuit with flammable refrigerant in safety group A3 may only be carried out by authorized heating contractors. These heating contractors must be trained in accordance with EN 378 Part 4 or IEC 60335-2-40, Section HH. The certificate of competence from an industry accredited body.

Brazing/soldering work on the refrigerant circuit may only be carried out by contractors certified in accordance with ISO 13585 and AD 2000, Datasheet HP 100R. And only by contractors qualified and certified for the processes to be carried out. The work must fall within the range of applications purchased and be carried out in accordance with the prescribed procedures. Soldering/brazing work on accumulator connections requires certification of personnel and processes by a notified body according to the Pressure Equipment Directive (2014/68/EU).

Work on electrical equipment may only be carried out by a qualified electrician.
Before initial commissioning, all safety relevant points must be checked by the particular certified heating contractors. The system must be commissioned by the system installer or a qualified person authorized by the installer.

10.ELECTRIC WIRING DIAGRAM

26-40kW



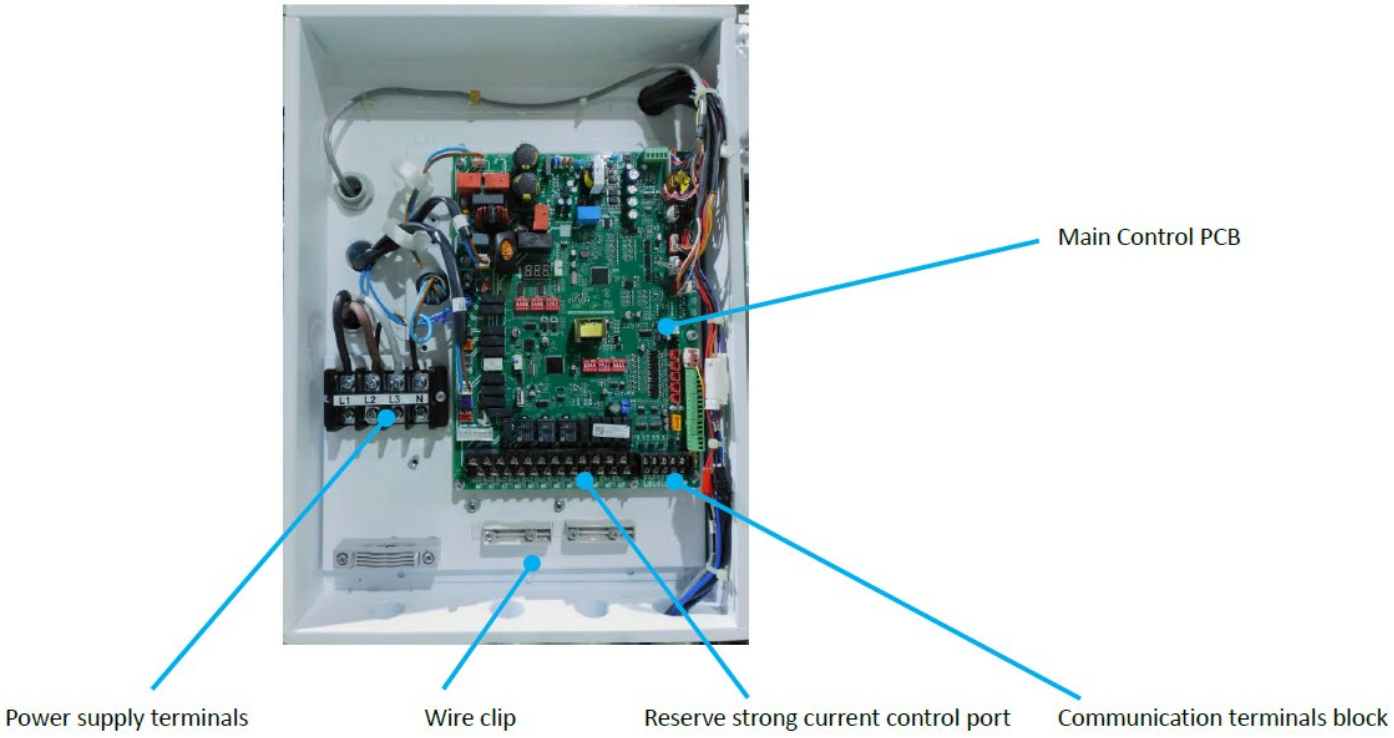
CN11

1	2	3	4	5	6	7	8	9	10	11	12	
AHS		SV1		SV2		SV3		P_c	P_o	P_s	P_d	⚠

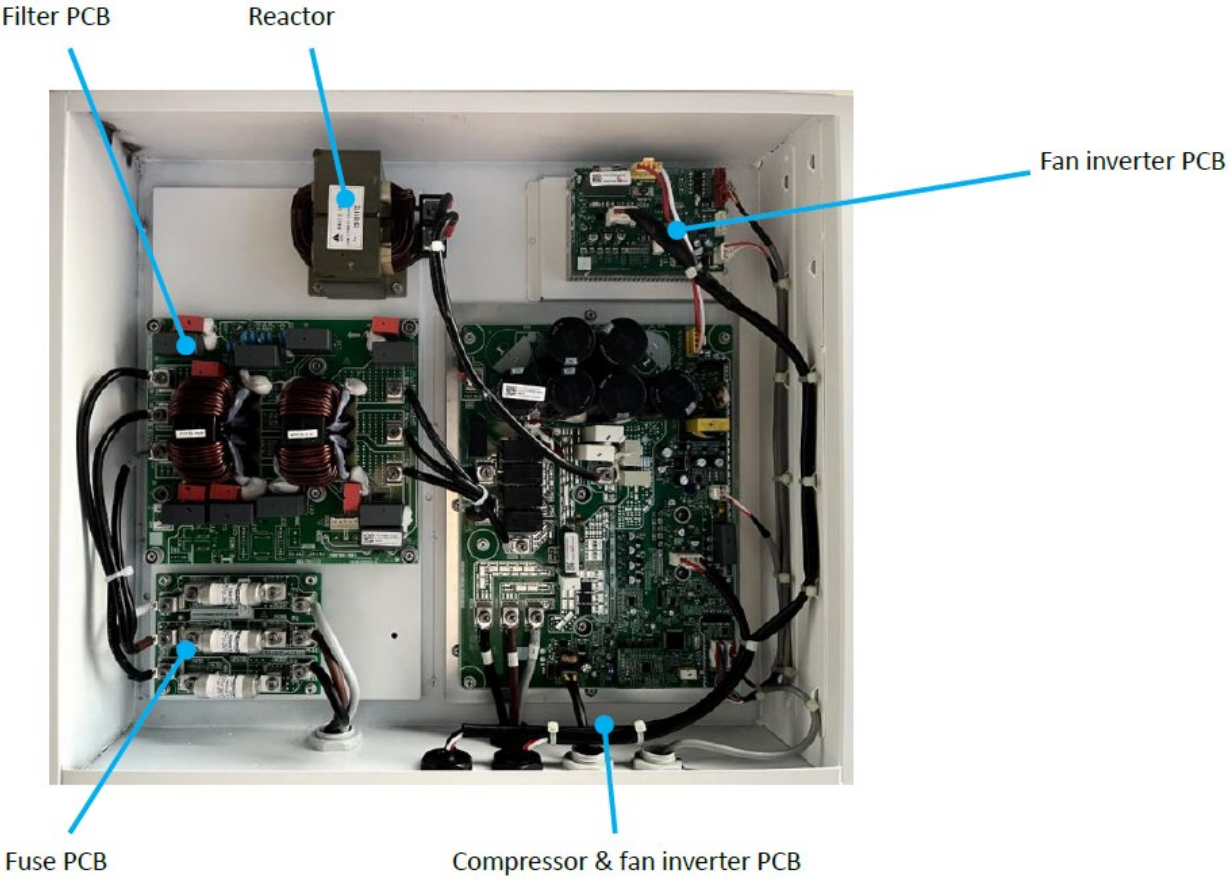
⚠	13	14	15	16	17	18	19	20	21	22	23	24
	TBH	IBH2	IBH1	C1 (TBH) (IBH2)	C1 (IBH1) (SV1)	C1 (SV2)	C1 (SV3)	C1 (P_c)	C1 (P_o)	C1 (P_s)	C1 (P_d)	P-x ALARM DEF

11.ELECTRIC BOX

11.1.Low voltage box

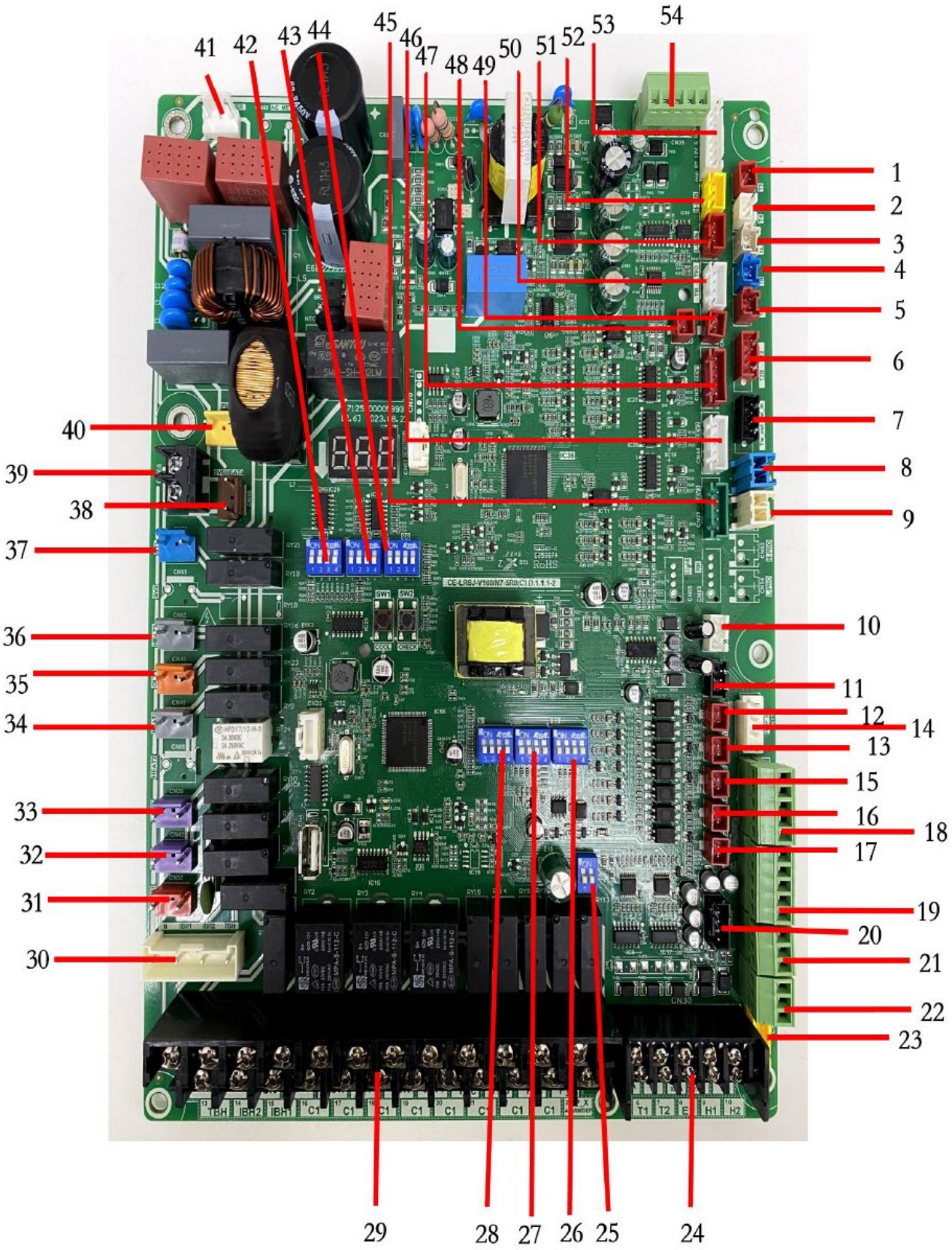


11.2.High voltage box



12.WELLEA M DF HT PCBS

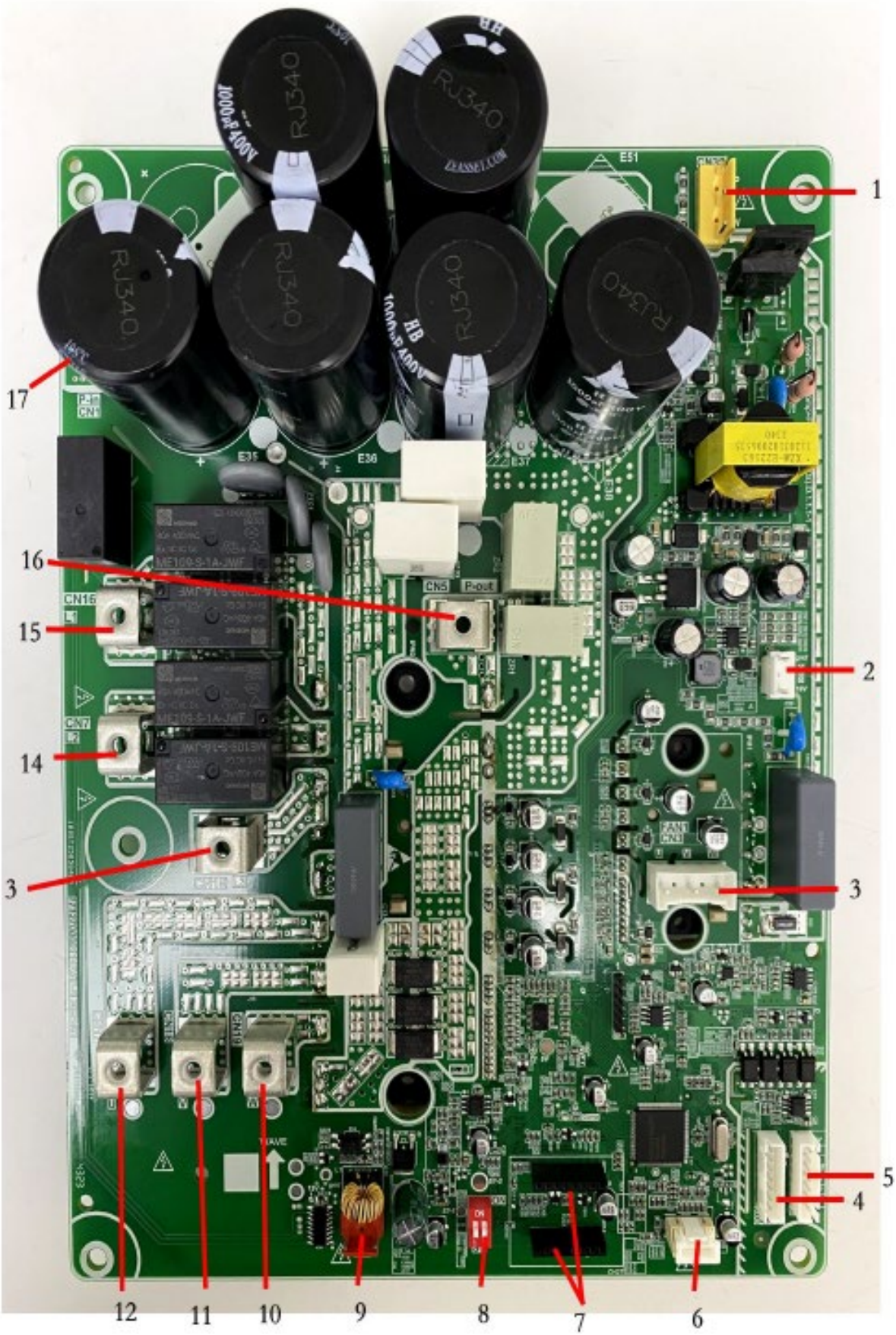
12.1.Main Control PCB



Label	Code	Port	Content	Rated Voltage
1	CN34	T3	Port for T3 temp. sensor	DC 3.3V
2	CN45	T4	Port for T4 temp. sensor	DC 3.3V
3	CN7	TL	Port for TL temp. sensor	DC 3.3V
4	CN5	Th	Port for Th temp. sensor	DC 3.3V
5	CN50	Tp	Port for Tp temp. sensor	DC 3.3V
6	CN47	T2B/T2	Port for T2,T2B temp. sensor	DC 5V
7	CN10	Tw_out/Tw_in	Port for Tw_in,Tw_out temp. sensor	DC 5V
8	CN39	T1	Port for T1 temp. sensor	DC 5V
9	CN8	FS	Port for flow switch	DC 12 V
10	CN20	FM	Reserved	DC 5V
11	CN37	PW	Port for temperature sensor of water pressure	DC 5V
12	CN24	Tbt	Port for Tbt temp. sensor	DC 5V
13	CN13	T5/T1B	Port for T5/T1B temp. sensor	DC 5V
14	CN17	PUMP_BP	Port for internal pump	/
15	CN38	T52	Port for T5/2 temp. sensor	DC 5V
16	CN15	Tw2	Port for Tw2 temp. sensor	DC 5V
17	CN18	Tsolar	Port for Tsolar temp. sensor	DC 5V
18	CN66	S2 S1 K2 K1	Switch input K1/K2,solar energy input S1/S2	DC 5V
19	CN31	CL COM HT 0-10V	(0-10V) - Output port for 0-10V (HT) - Control port for room thermostat (heating mode) (COM) - Power port for room thermostat (CL) - Control port for room thermostat (cooling mode)	DC 5V
20	CN36	12V T1 T2 GND	Port for thermostat transfer board	DC 12 V
21	CN63	SG EVU	(SG) - Port for smart grid (photovoltaic signal) (EVU) - Port for smart grid (grid signal)	DC 12 V
22	CN61	M1 M2	Port for remote switch	DC 12 V
23	CN9	IB IA GND IBH2 IBH1	Control port for internal backup heater1/2	DC 12 V
24	CN30	AB X/HA Y/HB E T1 T2 E1 H1 H2	(Port,3,4) - Port for communication with the User Interface (Port 6.7) - Port for thermostat transfer board (Port 8,9,10) - Port for Internal machine Parallel	AB:12VDC X/HA Y/HB:18VDC T1 T2 E1 H1 H2: 0-5VDC
25	SW9	SW9	Dip switch	DC 5V
26	S3	S3	Dip switch	DC 5V
27	S2	S2	Dip switch	DC 5V
28	S1	S1	Dip switch	DC 5V
29	CN11	/	(Port1,2) - Additional heat source (Port3,4) - Port for SV1(3-way valve) (Port5,6) - Port for SV2(3-way valve) (Port7,8) - Port for SV3(3-way valve) (Port9,10,11,12) - Port for zone 2 pump(P_c) / zone 1 pump(P_o) / solar energy pump(P_s) / pipe pump(P_d) (Port13) - Control port for tank booster heater (Port14) - Control port for internal backup heater 1 (Port15) - Control port for internal backup heater (Port24) - Reserved	AC 230 V
30	CN22	N IBH1 BH2 TBH	Control port for backup heater/booster heater	AC 230 V
31	CN32	AC OUT	Port for transformer power input	AC 230 V
32	CN42	HEAT6	Port for anti-freeze electric heating tape of plate heat exchanger	AC 230 V
33	CN29	HEAT5	Port for anti-freeze electric heating tape	AC 230 V

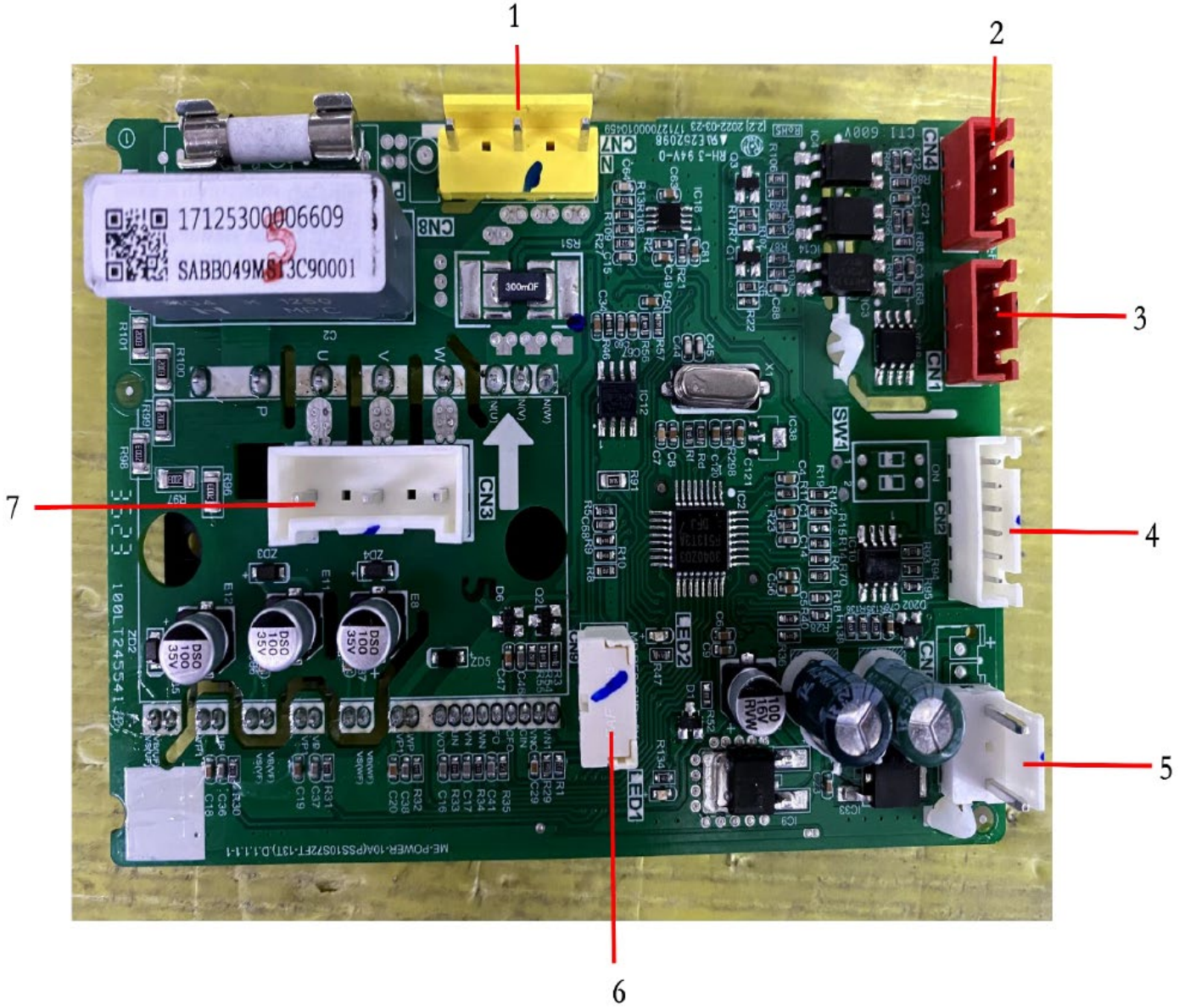
34	CN41	HEAT1	Reserved	AC 230 V
35	CN40	OUT1	Reserved	AC 230 V
36	CN62	HEAT3	Port for anti-freeze electric heating tape	DC 12V
37	CN71	ST1	Port for 4-way valve	AC 230 V
38	CN56	SV6	Port for the heating tape of drainage outlet	AC 230 V
39	CN68	HEAT4	Port for the heating tape of drainage outlet	AC 230 V
40	CN28	PUMP	Port for the water pump	AC 230 V
41	CN21	POWER	Port for power supply	AC 230 V
42	S4	S4	Dip switch	DC 3.3V
43	S5	S5	Dip switch	DC 3.3V
44	S6	S6	Dip switch	DC 3.3V
45	CN27	EEV3	Port for electrical expansion valve 3	DC 12V
46	CN44	EEV2	Port for electrical expansion valve 2	DC 12V
47	CN33	EEV1	Port for electrical expansion valve 1	DC 12V
48	CN2	CT2	Port for power supply monitor	DC 3.3V
49	CN49	CT1	Port for power supply monitor	DC 3.3V
50	CN16	T9I/T9O	Port for T9I/T9O temp. sensor	DC 3.3V
51	CN46	L-SEN	Port for low pressure sensor	DC 5V
52	CN3	H-SEN	Port for high pressure sensor	DC 5V
53	CN43	COMM	Port for communication with Inverter module	DC 5V
54	CN35	RS485, on/off	Reserved	DC 5V

12.2.Compressor and fan inverter pcb



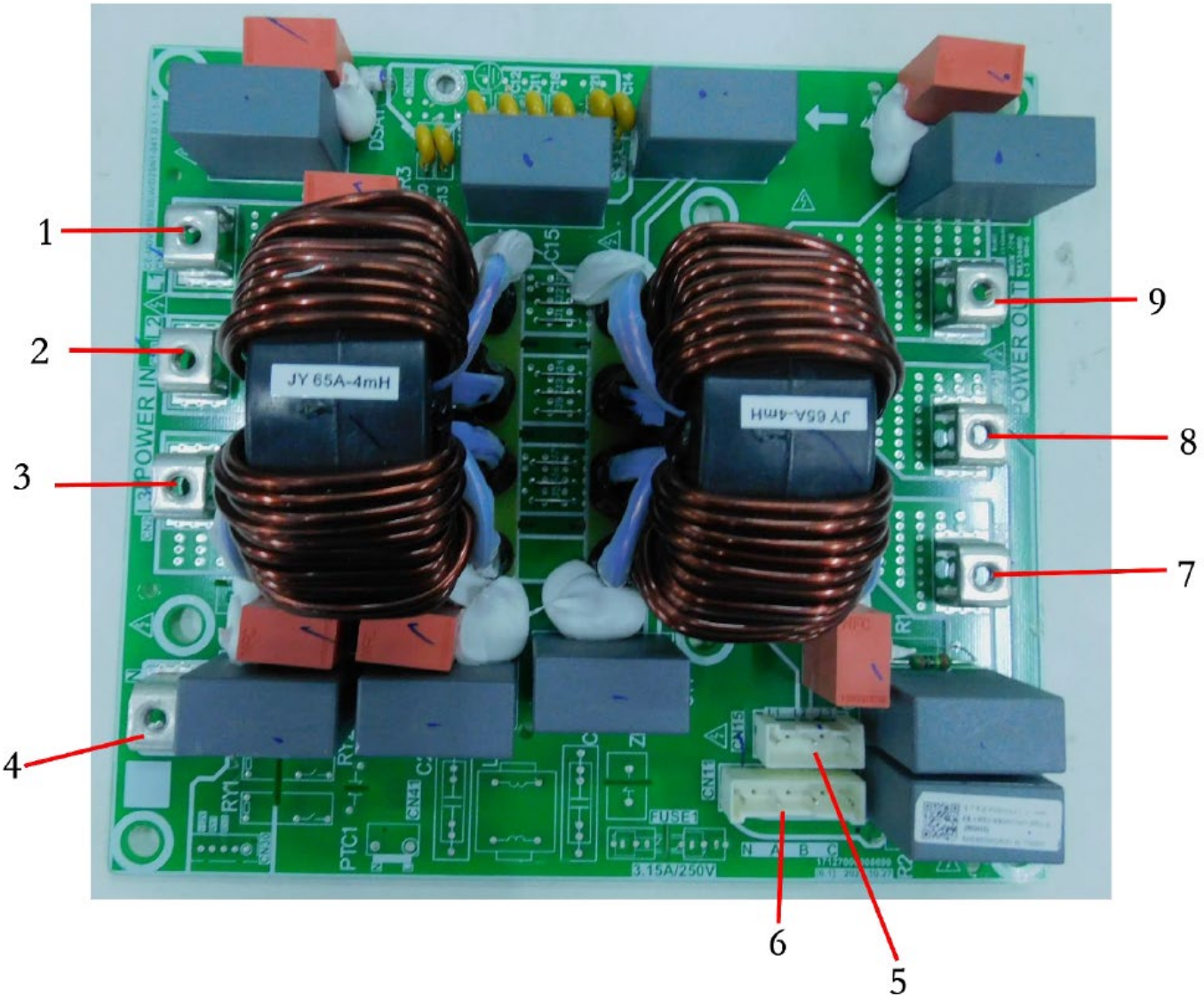
Label	Code	Port	Content	Voltage
1	CN38	P N	DC fan power output port	DC 565 V
2	CN26	19V GND	Fan module board power supply port	DC 19 V
3	CN3	UVW	Port output for fan	Phase to phase voltage AC 46-460 V
4	CN8	O-Motor	PTC relay control port / communication port	DC 12 V / DC 5V
5	CN9	O-Motor	PTC relay control port / communication port	DC 12 V / DC 5V
6	CN25	/	/	/
7	CN27	/	PED board socket	/
8	S7	/	Module address DIP switch	/
9	CN21	H-Pro	High pressure switch	/
10	CN19	W	Power output for compressor	Phase to phase voltage AC 46-460 V
11	CN18	V		Phase to phase voltage AC 46-460 V
12	CN17	U		Phase to phase voltage AC 46-460 V
13	CN15	L3	Power input port	Phase to phase voltage AC 380V
14	CN7	L2		Phase to phase voltage AC 380V
15	CN16	L1		Phase to phase voltage AC 380V
16	CN5	P-out	Output for reactor	/
17	CN1	P-in	Input from reactor	/

12.3.Fan inverter PCB



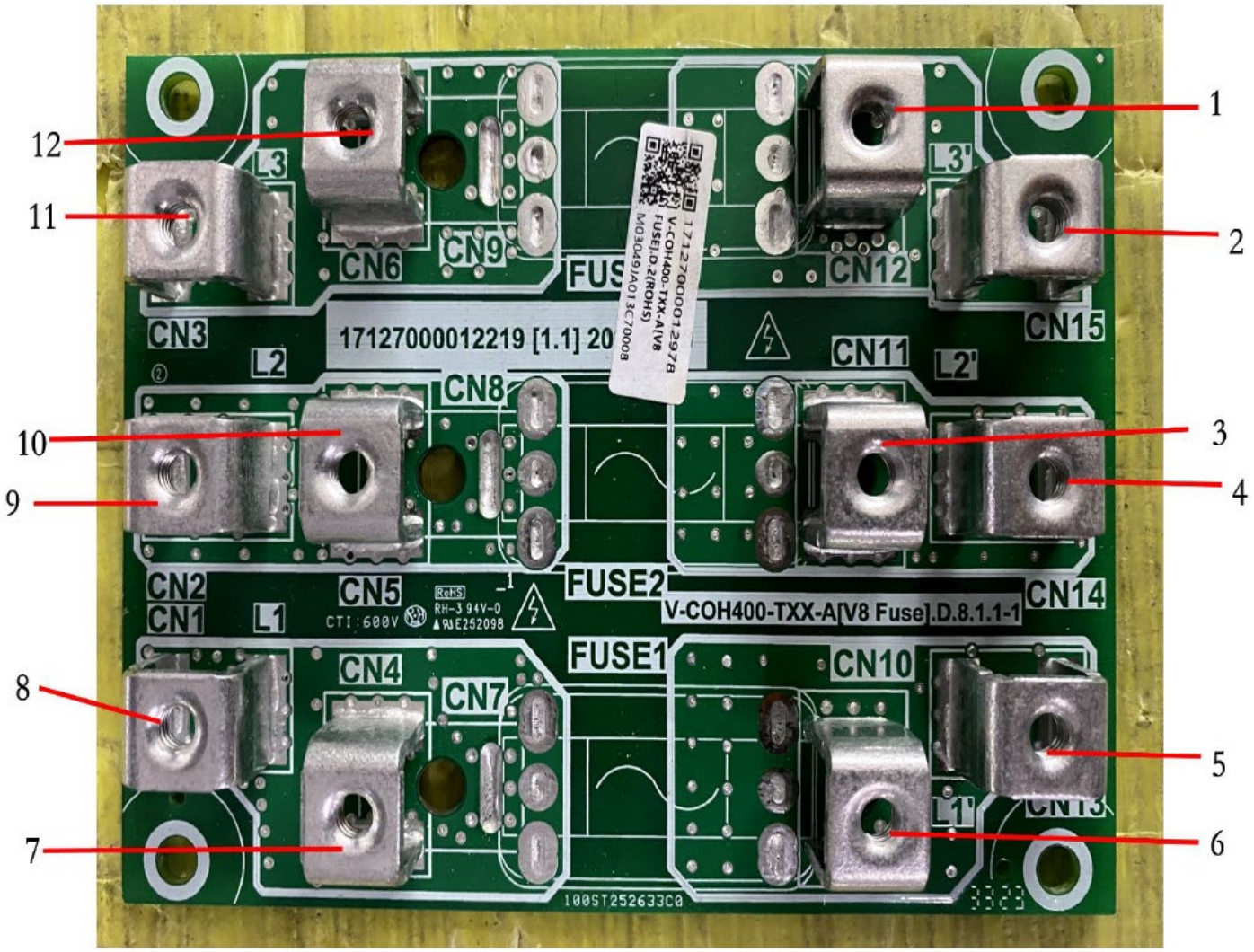
Label	Code	Port	Content	Voltage
1	CN7	/	Port for power supply	DC 565 V
2	CN4	/	Fan module communication port	DC 5 V
3	CN1	/	Fan module communication port	DC 5 V
4	CN2	/	EEPROM programming port	DC 5 V
5	CN6	/	Port for fan inverter PCB power supply	DC 19 V
6	CN9	DEBUG	Programming port	DC 5 V
7	CN3	U V W	DC fan power ports	Phase to phase voltage AC 46-460 V

12.4.Filter PCB



Label	Code	Port	Content	Voltage
1	CN4	L1	Power input L1	AC 380-415 V
2	CN3	L2	Power input L2	
3	CN2	L3	Power input L3	
4	CN1	N	Reserved	/
5	CN15	L1L2L3	Reserved	AC 380-415 V
6	CN11	N A B C	Reserved	AC 380-415 V
7	CN6	L3’	Output power L3’	AC 380-415 V
8	CN7	L2’	Output power L2’	
9	CN8	L1’	Output power L1’	

12.5.Fuse PCB



Label	Code	Port	Content	Voltage
1	CN12	/	Fuse 1-1	AC 230 V
2	CN15	L3’	Input power L3’	AC 230 V
3	CN11	/	Fuse 2-1	AC 230 V
4	CN14	L2’	Input power L2’	AC 230 V
5	CN13	L1’	Input power L1’	AC 230 V
6	CN10	/	Fuse 3-1	AC 230 V
7	CN4	/	Fuse 3-2	AC 230 V
8	CN1	L1	Output power L1	AC 230 V
9	CN2	L2	Output power L2	AC 230 V
10	CN5	/	Fuse 2-2	AC 230 V
11	CN3	L3	Output power L3	AC 230 V
12	CN6	/	Fuse 1-2	AC 230 V

12.6.Digital Display Output

Digital display output in different operating states

Outdoor unit state	Parameters displayed on Main Control PCB DSP1
On standby	0
Normal operation	The current frequency of compressor
Error or protection	Error or protection code

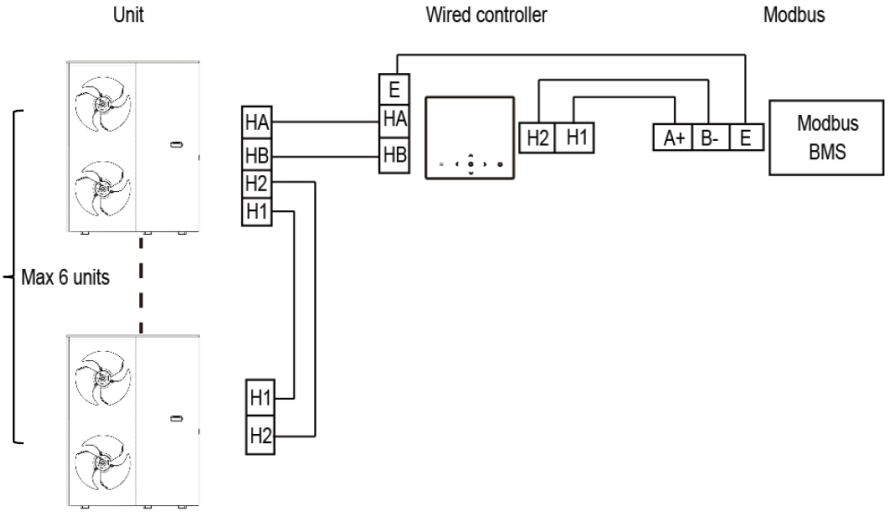
12.7.DIP Switch Settings

The DIP switch S3 on the Main Control PCB is used for setting the Modbus address. By defaulting the units have this DIP switch positioned=0/0/0

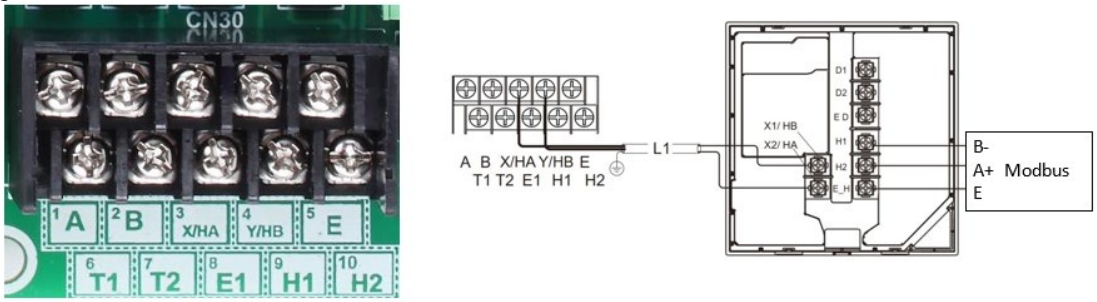
Dip switch

Dip switch ON=1 OFF=0			Factory settings
S3	1/2/3	0/0/0=address 0#(master unit) 1/0/0=address 1#(slave unit) 1/0/0=address 2#(slave unit) 1/0/0=address 3#(slave unit) 1/0/0=address 4#(slave unit) 1/0/0=address 5#(slave unit)	1:OFF 2:OFF 3:OF F
	4	Reserved	4:OFF

Modbus Connection



Modbus Wiring



13.ERROR CODE

Water circuit error		
Error code	**Description**	**Displayed on**
E0	Water flow failure (10 times of E8)	User Interface and Main Control PCB
E8	Water flow protection	User Interface and Main Control PCB
Communication error		
Error code	**Description**	**Displayed on**
E2	Communication fault between User Interface and Main Control PCB	User Interface and Main Control PCB
H0	Communication error of Main Control PCB	User Interface and Main Control PCB
H1	Communication error between Main Control PCB and inverter PCB	User Interface and Main Control PCB
Hd	Communication fault between master unit and slave unit.	User Interface and Main Control PCB
Sensor error		
Error code	**Description**	**Displayed on**
E3	T1 Electric Heater/AHS water outlet temperature sensor error	User Interface and Main Control PCB
E4	T5 Water tank temperature sensor error	User Interface and Main Control PCB
E5	T3 Outdoor unit heat exchanger bottom temperature sensor error	User Interface and Main Control PCB
E6	T4 Ambient temperature sensor error	User Interface and Main Control PCB
E7	Tbt Balance tank temperature sensor/ Final outlet water temperature of cascade system sensor error	User Interface and Main Control PCB
E9	Th Return-air temperature sensor error	User Interface and Main Control PCB
EA	Tp Discharge temperature sensor error	User Interface and Main Control PCB
Eb	Tsolar Solar panel temperature sensor error	User Interface and Main Control PCB
EC	T5_2 Water tank temperature sensor error (Reserved)	User Interface and Main Control PCB
Ed	Tw_in Plate heat exchanger inlet water temperature sensor error	User Interface and Main Control PCB
FC1	TL Outdoor unit heat exchanger outlet temperature sensor error	User Interface and Main Control PCB
H2	T2 Plate heat exchanger outlet refrigerant temperature sensor error	User Interface and Main Control PCB
H3	T2B Plate heat exchanger inlet refrigerant temperature sensor error	User Interface and Main Control PCB
H5	Ta room temperature sensor error	User Interface and Main Control PCB
H8	H-SEN High pressure sensor error	User Interface and Main Control PCB
H9	Tw2 Zone 2 water flow temperature sensor error	User Interface and Main Control PCB
HA	Tw_out Plate heat exchanger outlet water temperature sensor error	User Interface and Main Control PCB
P21	L-SEN Low pressure sensor error	User Interface and Main Control PCB
P27	H-SEN and L-SEN connected reversely (Detect when compressor is off)	User Interface and Main Control PCB
F51	Temperature sensor(T9O) fault	
F31	Temperature sensor(T9I) fault	
F6	EXV1 fault	
F61	EXV2 fault	
F62	EXV3 fault	
Voltage error		
Error code	**Description**	**Displayed on**
E1	Phase loss or phase reversal	User Interface and Main Control PCB
H7	Power overvoltage and Power under-voltage protection	User Interface and Main Control PCB
FE	Lack of L2 phase fault.	User Interface and Main Control PCB

Protection code		
Error code	**Description**	**Displayed on**
P0	Low pressure protection	User Interface and Main Control PCB
P1	High pressure switch protection	User Interface and Main Control PCB
P3	Overcurrent protection	User Interface and Main Control PCB
P4	Compressor protection against excessively-high discharge temperature	User Interface and Main Control PCB
Pd	Protection for over-high condensing temperature in cooling mode	User Interface and Main Control PCB
HP	Low pressure protection in cooling mode	User Interface and Main Control PCB
bA	T4 sensor out of operation range protection	User Interface and Main Control PCB
PP	Protection for abnormal temperature difference between outlet water and inlet water	User Interface and Main Control PCB
Hb	PP occurs 3 times in heating/DHW mode	User Interface and Main Control PCB
P5	The big temperature difference between outlet water temp. and inlet water temp.	User Interface and Main Control PCB
Inverter module error/ protection		
Error code	**Description**	**Displayed on**
C7	Over-high temperature protection for IPM module	User Interface and Main Control PCB
H4	3 times of “L1*” in 60 mins	User Interface and Main Control PCB
L1E	Hardware overcurrent protection	Main Control PCB
L11	Phase current instantaneous overcurrent protection	Main Control PCB
L12	Phase current continuous 30s overcurrent protection	Main Control PCB
L2E	Over-temperature protection	Main Control PCB
L3E	Bus voltage too low error	Main Control PCB
L31	Bus voltage too high error	Main Control PCB
L32	Bus voltage excessively high error	Main Control PCB
L34	Phase loss error of three-phase power supply	Main Control PCB
L35	L2 phase mismatch fault	Main Control PCB
L43	Abnormal phase current sampling bias	Main Control PCB
L45	Fan motor code mismatch error	Main Control PCB
L46	IPM protection (FO)	Main Control PCB
L47	Module type mismatch	Main Control PCB
L5E	Motor failed to start	Main Control PCB
L52	Motor stalling protection	Main Control PCB
L6E	Phase loss protection	Main Control PCB
L61	compressor terminals short circuit protection	Main Control PCB
L65	IPM short circuit protection	Main Control PCB
LBE	Action of high pressure switch	Main Control PCB
LB7	PED bH error	Main Control PCB
H6	Fan 1 failure	User Interface and Main Control PCB
H61	Fan 2 failure	User Interface and Main Control PCB
HH	10 times of H6 in 120mins	User Interface and Main Control PCB
J1E	Hardware overcurrent protection	Main Control PCB
J11	Phase current instantaneous overcurrent protection	Main Control PCB
J12	Phase current continuous 30s overcurrent protection	Main Control PCB
J2E	Over-temperature protection	Main Control PCB

J3E	Bus voltage too low error	Main Control PCB
J31	Bus voltage too high error	Main Control PCB
J32	Bus voltage excessively high error	Main Control PCB
J43	Abnormal phase current sampling bias	Main Control PCB
J45	Fan motor code mismatch error	Main Control PCB
J46	IPM Protection (FO)	Main Control PCB
J47	Module type mismatch (after module resistance tested)	Main Control PCB
J5E	Motor failed to start	Main Control PCB
J52	Motor stalling protection	Main Control PCB
J6E	Phase loss protection	Main Control PCB
J61	Fan terminals short circuit protection	Main Control PCB
J65	IPM short circuit protection	Main Control PCB
HF	Outdoor unit EEPROM error	User Interface and Main Control PCB
Error code	***Description***	***Displayed on***
Pb	Pb is the indicator that shows the system is running in anti-freezing control	Main Control PCB

14.TROUBLESHOOTING

14.1.Warning

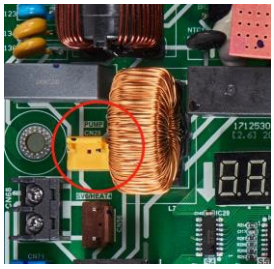
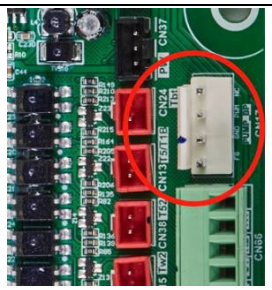
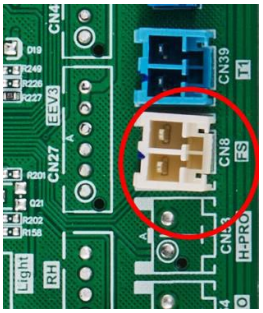
WARNING !

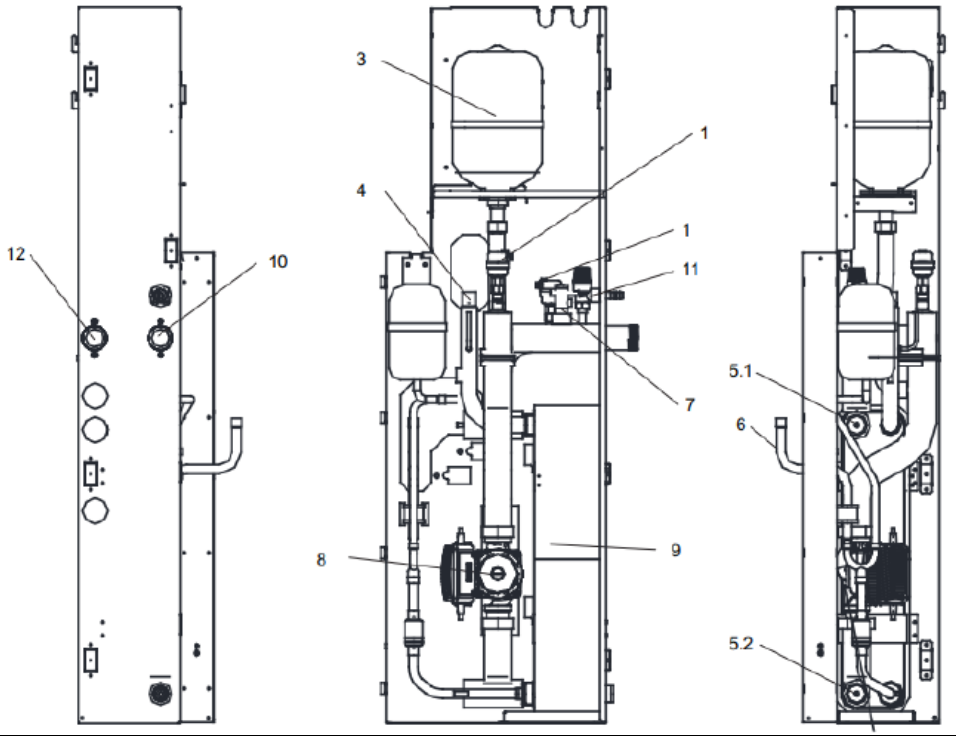
- All electrical work must be carried out by competent and suitably qualified, certified and accredited professionals and in accordance with all applicable legislation (all national, local and other laws, standards, codes, rules, regulations and other legislation that apply in a given situation).
- Power-off 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.

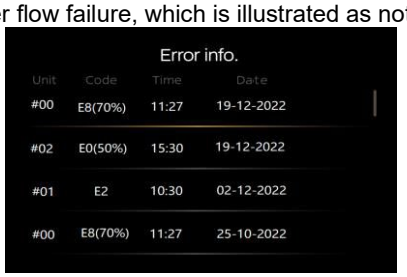
14.2.E0, E8 Troubleshooting

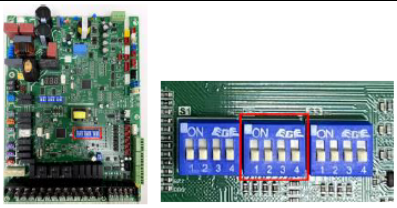
14.2.1.Digital display output

14.2.2.Description

Error code		*E0*	*E8*
Description		water flow failure	water flow protection
Triggering		5 times of No-water detection failures in a row before pump on Or 10 times of E8 in a row when do running- water detection after pump on	No-water detection failures before pump on or water flow switch breaks after pump on within 10 times
Relative ports and locations	CN28 PUMP (To supply power for water pump)	 	
	CN17 PUMP BP (feedback signal of water pump)	 	
	CN8 FS (signal of water flow switch)	 	

<table>
<tr><td></td><td>Layout of main component</td><td>


<table>
<tr><th>Code</th><th>Name</th><th>Code</th><th>Name</th></tr>
<tr><td>1</td><td>Automatic air purge valve</td><td>7</td><td>Flow switch</td></tr>
<tr><td>2</td><td>Backup heater</td><td>8</td><td>Pump</td></tr>
<tr><td>3</td><td>Expension vessel</td><td>9</td><td>Plate heat exchanger</td></tr>
<tr><td>4</td><td>Refrigerant gas pipe</td><td>10</td><td>Water outler pipe</td></tr>
<tr><td>5</td><td>Temperature sensor</td><td>11</td><td>Pressure relief valve</td></tr>
<tr><td>6</td><td>Refrigerent liquid pipe</td><td>12</td><td>Water inlet pipe</td></tr>
</table>
</td></tr>
<tr><td>User Interface</td><td colspan="2">E0(**%) /E8(**%) is displayed on the User Interface. The percentage indicates possible cause of water flow failure, which is illustrated as note 1.


</td></tr>
<tr><td>Correct Dip switch</td><td colspan="2">

<table>
<tr><td rowspan="2">S2</td><td>1/2</td><td>Reserved</td><td>1:OFF
2:OFF</td></tr>
<tr><td>3/4</td><td>0/0=variable speed pump 1
0/1=variable speed pump 2
1/0=Fixed speed pump
1/1=Reserved</td><td>3:OFF
4:OFF</td></tr>
</table>
</td></tr>
</table>

14.2.3.Procedure

E0 / E8: Water flow failure

Yes

No water flow before the pump starts

Yes → No water flow before the pump starts

No

Check the error code E0(**%) /E8(**%) displayed on the User Interface, and the percentage is between 5%-80%

No → Check the details of Note 1

Yes

Check the water pump indicator lights, and it shows water pump is normal (Willo water pump green light indicates normal ; Xinjie water pump 5 lights all on indicates normal)

No → Check the details of Note 2

Yes

Check the water circuit, and it is abnormal:

1.The ball valve which is connected to the unit is not opened

2.Water inlet and outlet pipe connected reversely.

3.Y-type filter is dirty block

4.The power cable(CN28) or feedback signal cable(CN17) is not connected properly

5.The water circuit was not filled first and not released air completely.

Yes →

1.Open the waterway ball valve which is connected to the unit

2.Make sure water inlet and outlet pipe connected correctly.

3.Clean the filter.

4.Connect the power cable or feedback signal cable correctly.

5.Fill the water circuit first and then release the air. If necessary, we can quickly release the air from the air purge valve by unscrewing black nut.

No

Check the Water flow switch, and it is damaged

1.Flow switch FS plug (CN8) is not connected properly.

2.The water flow in the pipe is not consistent with arrow on the flow switch.

3.Remove the water flow switch from the pipeline, manually dial the water flow switch rake to closed status, and use a digital multimeter with buzzer to measure. if it does not beep, the water flow switch damaged.

Yes →

1.Insert the plug of the water flow switch correctly

2.Adjust the direction of water flow in the pipe to be the same as the arrow on the flow switch

3.When you manually dial the water flow switch to the closed status, use a digital multimeter with buzzer to measure. If buzzer sounds, the water flow switch is normal.

Otherwise, it's damaged and replace with a new water flow switch.

No

For more error information of water pump and flow switch, check the note 3/4 to solve the problem.

If the error still occurs, request aftersales service

Note 1 :

The meaning of percentage of water pump output(displayed on the user interface)			
Percentage	**Water pump model**	**Brand**	**Description**
0-70%	APF25-12-130E FPWM1	SHIMGE	Pump works normally, feedbacks 0-4.0m³ /h flow information (Q=0.057PWMout, Q: m3/h, PWMout: %)
85%	APF25-12-130E FPWM1	SHIMGE	Alarm (Undervoltage 160V or Phase loss or Overcurrent or Overheat), and pump stops running
90%	APF25-12-130E FPWM1	SHIMGE	Alarm (Motor stalling protection), and pump stops running
95%	APF25-12-130E FPWM1	SHIMGE	Pump Standby

Note 2 – Indicator lights on Xinjie water pump :

Indicator lights on Xinjie water pump		
Name	**Indicator lights**	**Description**
Motor stalling protection		When the electric pump rotor shaft is stuck, the electric pump displays a fault code, feedback 90% positive duty cycle and attempts to restart. It restarts every 1 second and stops after restarting 255 times.
Undervoltage protection		When the input voltage is less than 160V, the electric pump shuts down for protection, feedback 85% positive duty cycle, the panel displays a fault code, and shuts down for protection.
Phase loss protection		When the electric pump phase failure occurs, the electric pump displays a fault code, feedback 85% positive duty cycle and attempts to restart. It restarts every 1 second and stops after restarting 255 times.
Overcurrent (Short circuit) protection		When a short-circuit fault occurs in the electric pump, the electric pump is shut down for protection, feedback is 85% positive duty cycle, the panel displays a fault code, and the machine shuts down without restarting.
Overheat protection		When the power module overheats, the electric pump shuts down for protection, feedback 85% positive duty cycle, the panel displays a fault code, and shuts down for protection.

Note 3: The possible error and solutions of water pump

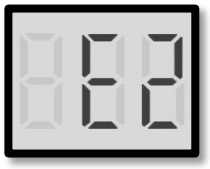
The possible causes of water pump failure and solutions		
Description	**Possible cause**	**Solution**
Error occurs at the first time running	Water pump leak	Replace the sealing ring
	Water inlet and outlet pipe connected reversely.	Connect the pipe correctly.
	The power cable (CN28) is not connected properly	Connect the power cable correctly.
	The feedback signal cable (CN17) is not connected properly	Connect the feedback signal cable correctly.
	The dip switch is not correct.	Correct the dip switch as the illustration above
Error occurs at the first time running or after running for a while	Pump idling	Fill the water circuit first and then release ;the air
	Pump stalling	Remove the water pump, Rotate the impeller manually until it can move freely. And then install it back. (If it's too hard to rotate the impeller manually, replace the water pump)
	Power supply is abnormal	Check the power supply
Error occurs after running for a while	E8 occurs after water pump running for a while	Fill the water circuit first and then release the air.
Error occurs at the first time running or after running for a while	Motor stall, and it can not be rotated manually	Replace water pump
Error occurs at the first time running	Water pump connection is correct, the water pump icon on the User Interface is lit, while no indicator lights on water pump is lit.	Replace water pump

Note 4: The possible error and solutions of water flow switch failure

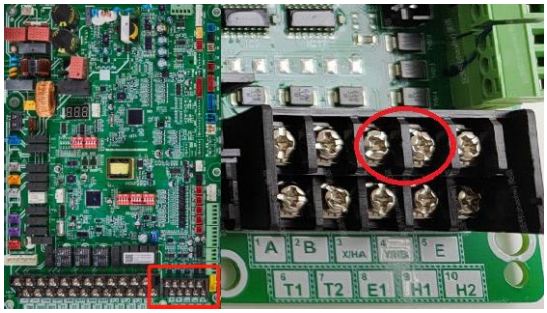
The possible causes of water flow switch failure and solutions		
Description	**Possible cause**	**Solution**
Error occurs at the first time running	The water flow in the pipe is not consistent with arrow on the flow switch.	Adjust the direction of water flow in the pipe to be the same as the arrow on the flow switch
	Flow switch FS plug (CN8) is not connected properly.	Insert the plug of the water flow switch correctly
	External pump starts before internal pump (PUMPI) starts	Start internal pump first, make sure water flow is sufficient for external pump
Error occurs at the first time running or after running for a while	Flow switch not installed properly	Reinstall the flow switch correctly
	Flow switch leak	Replace the sealing ring
	flow switch rake blocked	Clean the obstacles
	flow switch rake damaged	Replace the flow switch
	The flow switch contact can not be completely closed	Replace the flow switch
	The flow switch contact can not be completely open	Replace the flow switch
	The flow switch model did not match	Replace the flow switch

14.3.E2 Troubleshooting

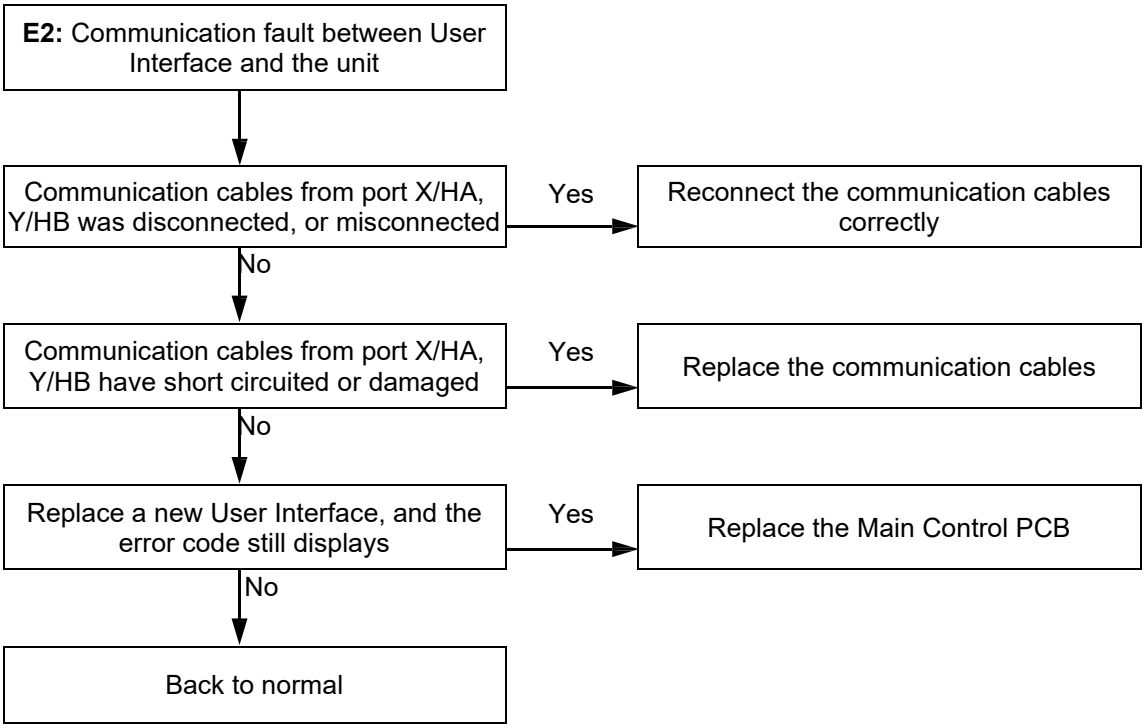
14.3.1.Digital display output



14.3.2.Description

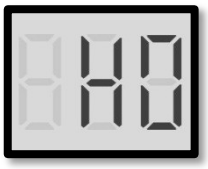
Error code		*E2*
Description		Communication fault between User Interface and Main Control PCB
Triggering		Main Control PCB side: Communication failure with User Interface lasts 2 mins Or User Interface side: No communication reply from Main Control PCB for 1 min
Relative ports and locations	X/HA、Y/HB	

14.3.3.Procedure



14.4.H0 Troubleshooting

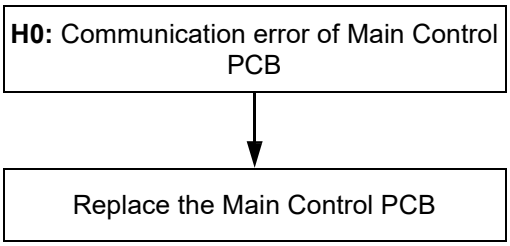
14.4.1.Digital display output



14.4.2.Description

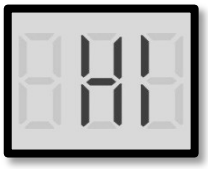
Error code	*H0*
Description	Communication error of Main Control PCB
Triggering	Communication failure lasts 1 min

14.4.3.Procedure

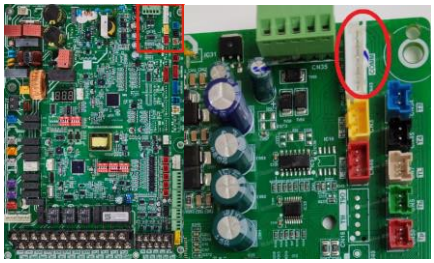
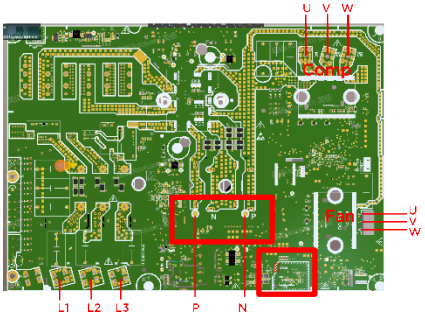
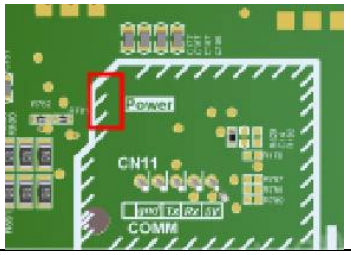


14.5.H1 Troubleshooting

14.5.1.Digital display output

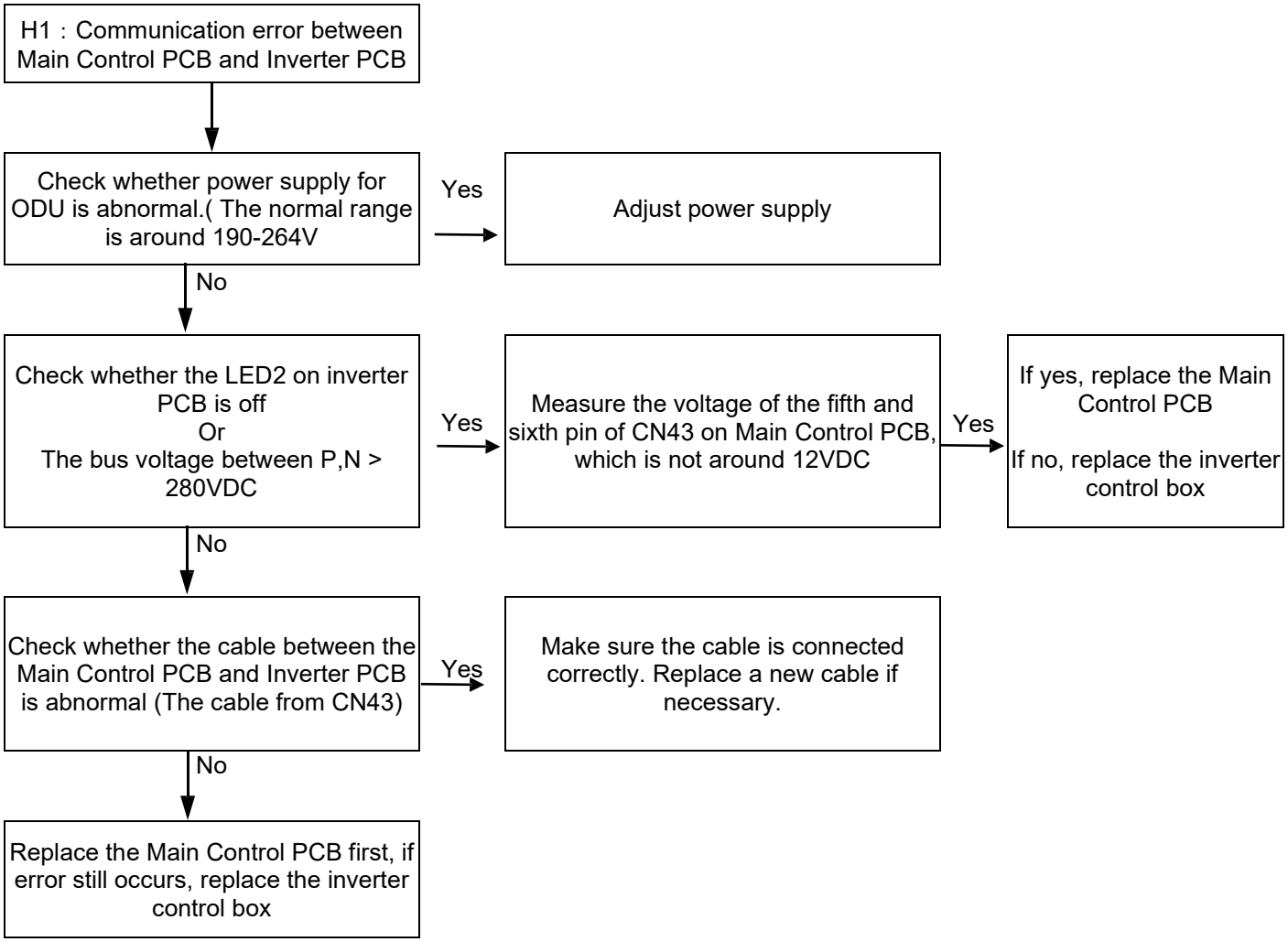


14.5.2.Description

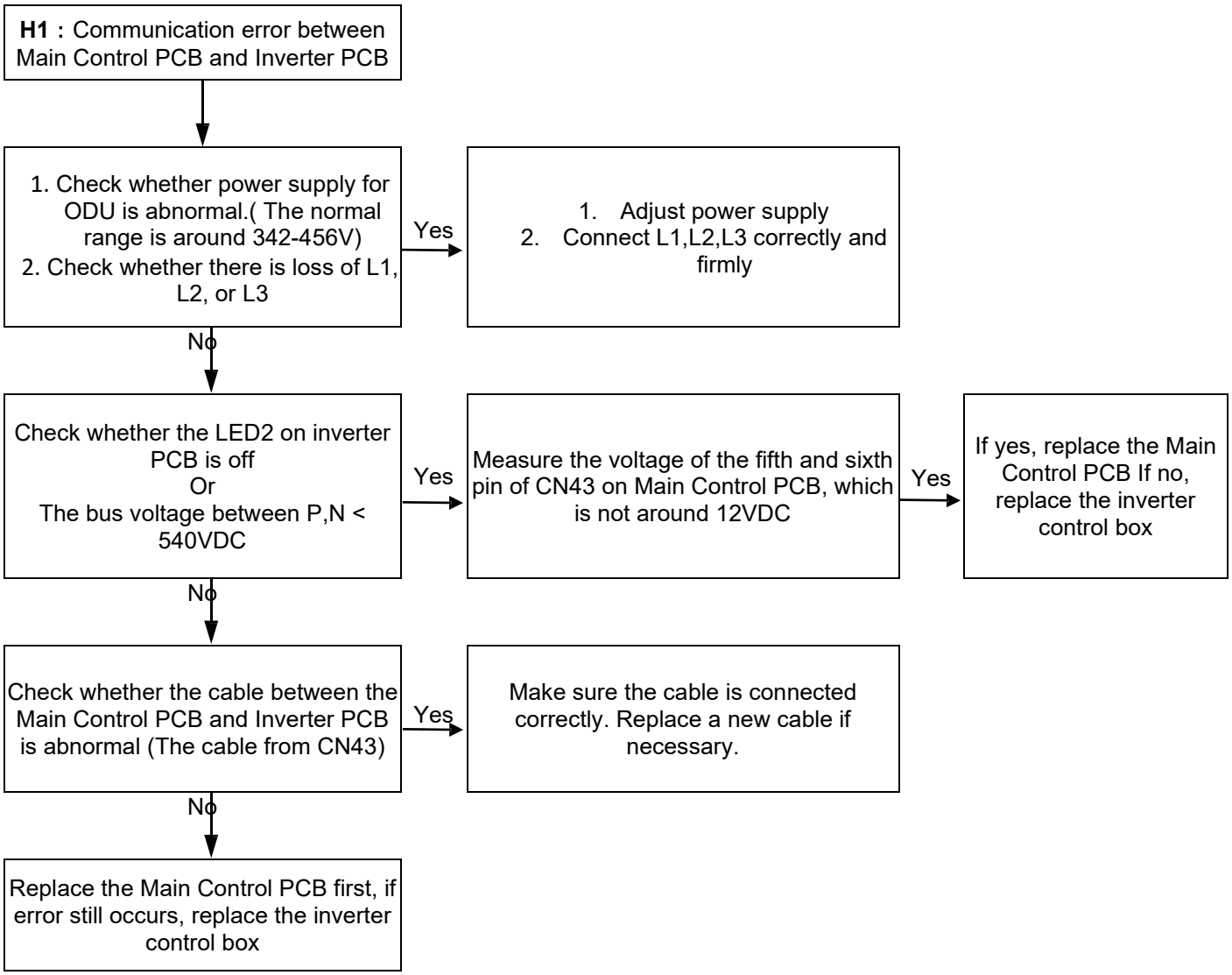
Error code		H1
Description		Communication error between Main Control PCB and inverter PCB
Triggering		Communication failure occurs after powering on the unit for 2 mins
Relative ports and locations	CN43 COMM (Main Control PCB)	
	LED2 & BUS voltage(P-N) (1 Ph Inverter PCB)	
	LED2 & BUS voltage(P-N) (3 Ph inv*erter PCB)*	 You can see the slim light of LED2 through the gap at the back of inverter PCB 

15.PROCEDURE

For 1Ph models

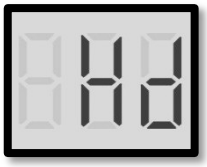


For 3Ph models

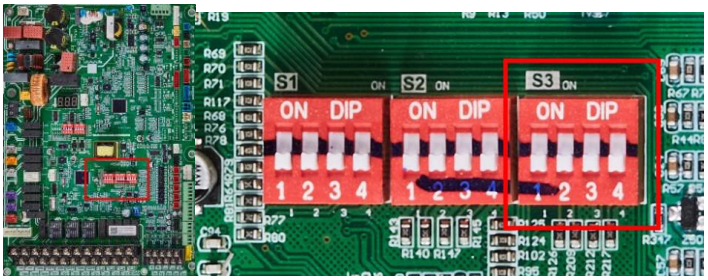
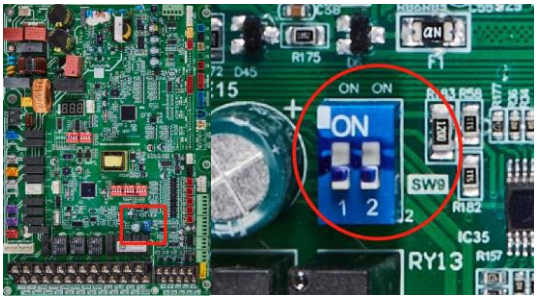


16.HD TROUBLESHOOTING

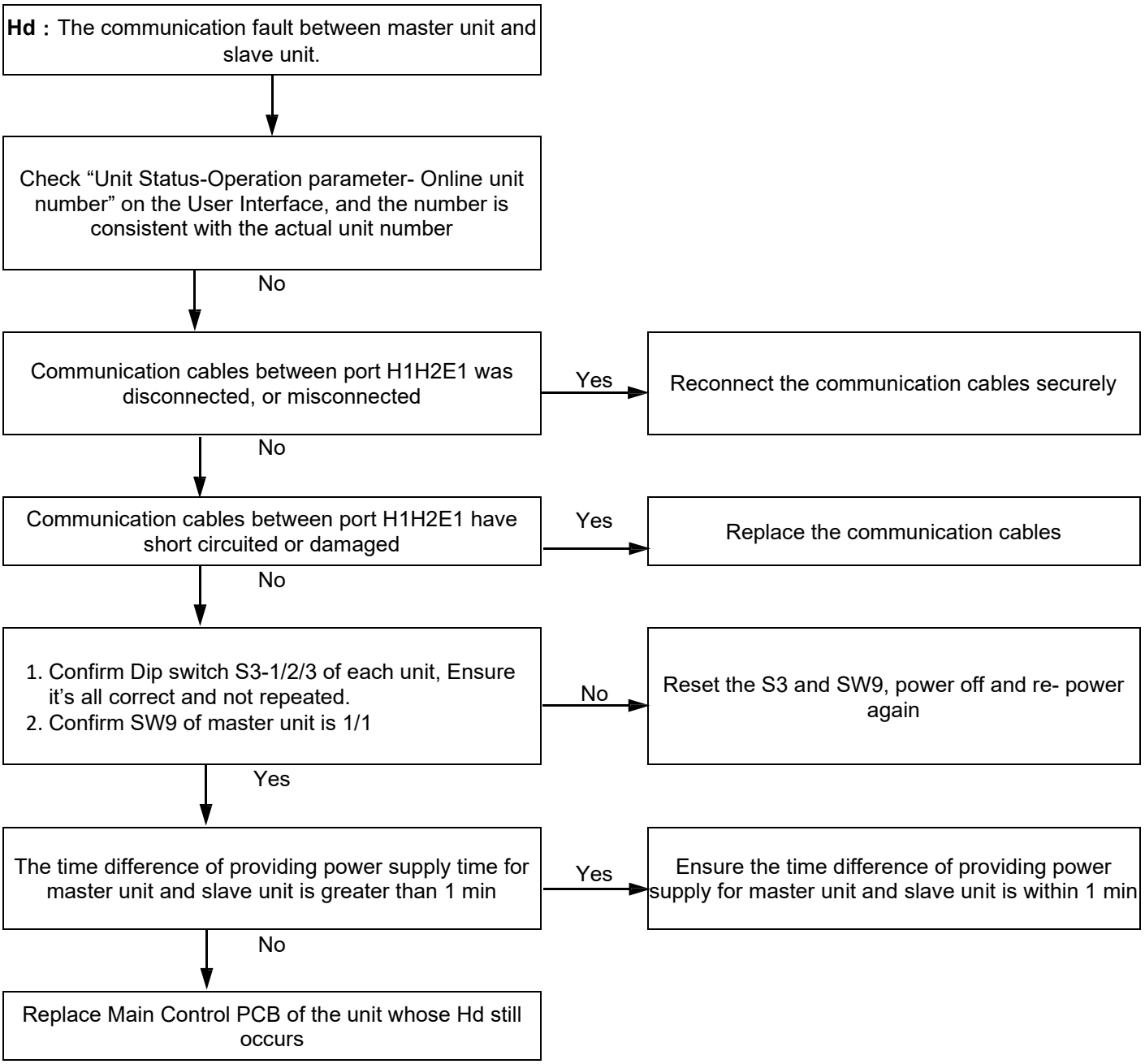
17.DIGITAL DISPLAY OUTPUT



18.DESCRIPTION

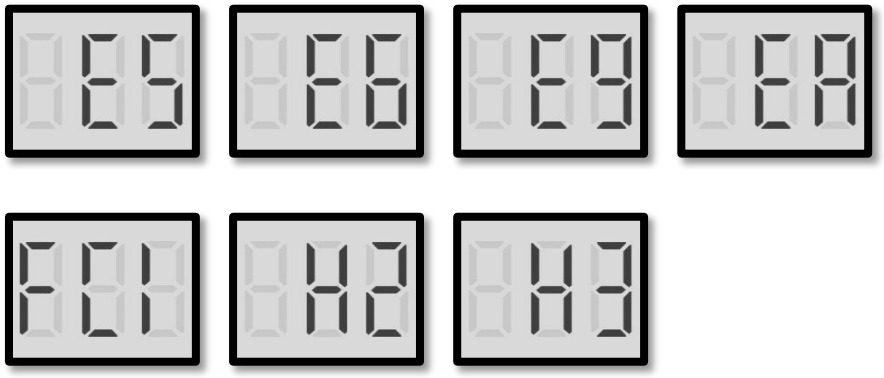
Error code		Hd
Description		Communication fault between master unit and slave unit.
Triggering		For cascade system, the communication failure between master unit and slave unit lasts 2mins and above
Relative ports and locations	Communication port E1/H1/H2	
	Dip switch S3-1/2/3 0/0/0=address 0#（Master) 1/0/0=address 1#（Slave) 0/1/0=address 2#（Slave) 0/0/1=address 3#（Slave) 1/1/0=address 4#（Slave) 1/0/1=address 5#（Slave) 0/1/1=address 6#（Slave) 1/1/1=address 7#（Slave)	
	SW9 1/1=master unit 0/0=slave unit	

19.PROCEDURE

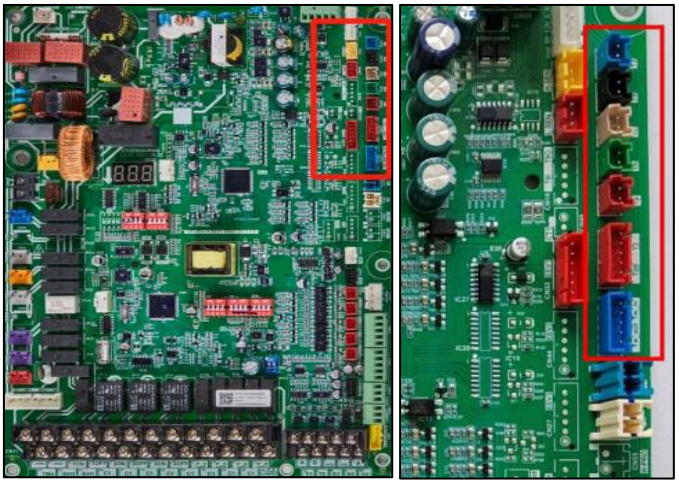


20.E5, E6, E9, EA, FC1, H2, H3 TROUBLESHOOTING

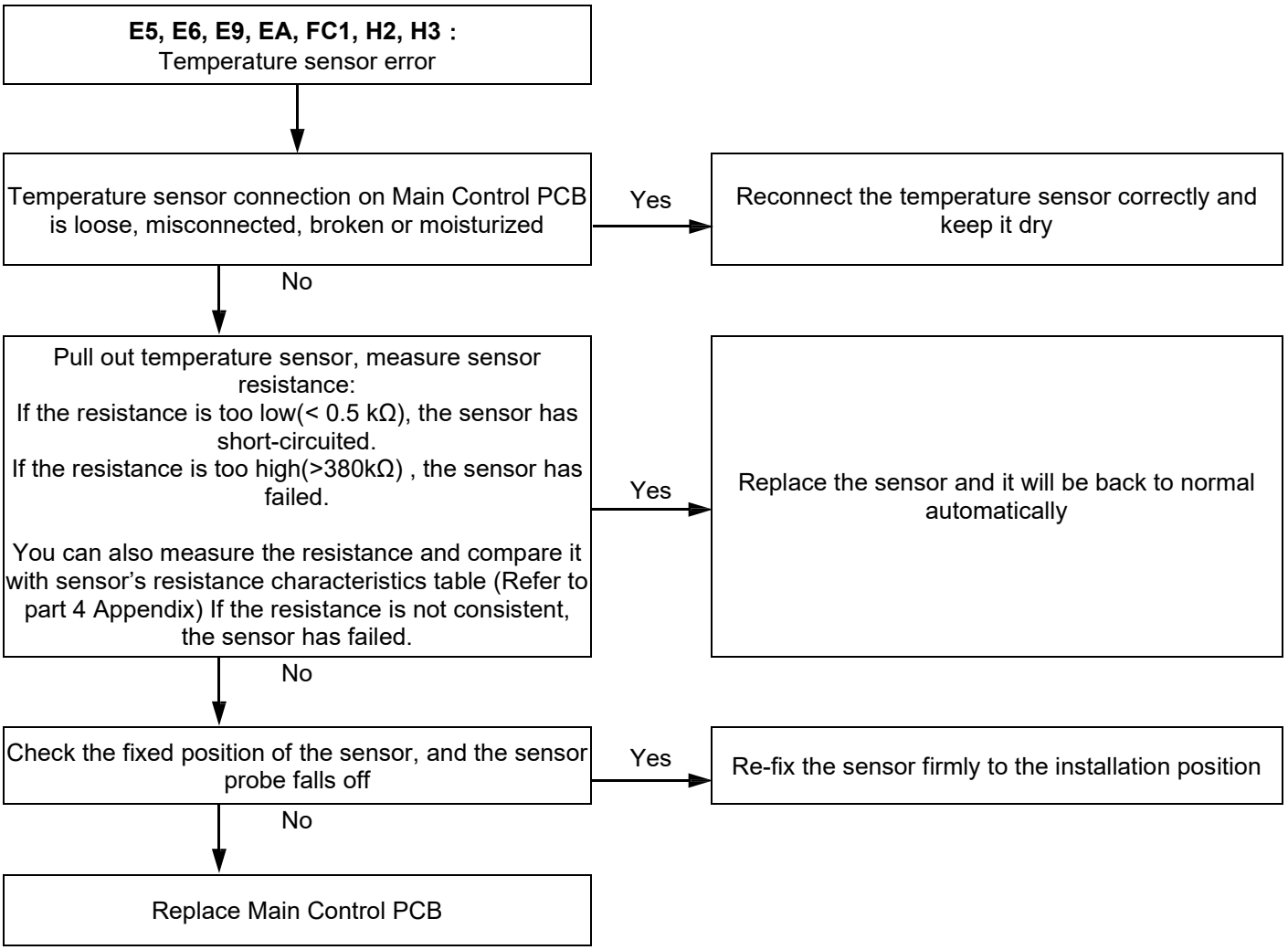
21.DIGITAL DISPLAY OUTPUT



22.DESCRIPTION

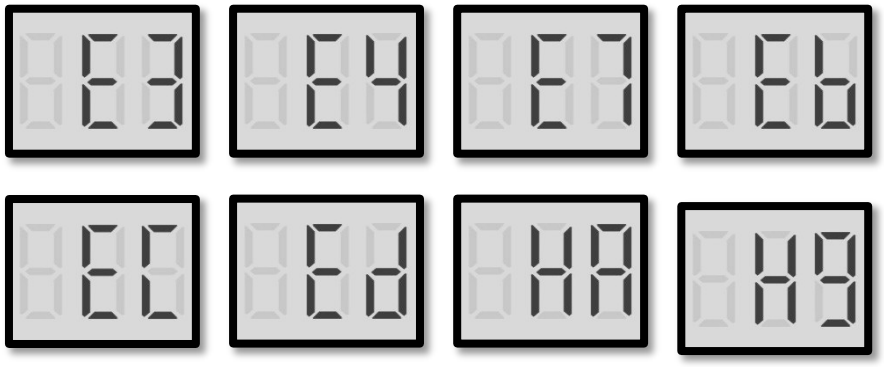
Code	Description	Port	Location
E5	T3 Outdoor unit heat exchanger bottom temperature sensor error	CN34	
E6	T4 Ambient temperature sensor error	CN45	
E9	Th Return-air temperature sensor error	CN5	
EA	Tp Discharge temperature sensor error	CN50	
FC1	TL Outdoor unit heat exchanger outlet temperature sensor error	CN7	
H2	T2 Plate heat exchanger outlet refrigerant temperature sensor error	CN47	
H3	T2B Plate heat exchanger inlet refrigerant temperature sensor error		

23.PROCEDURE

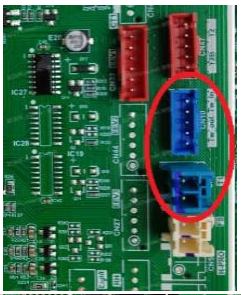
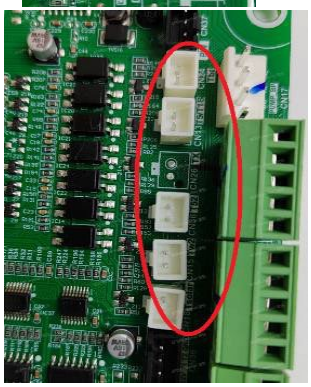
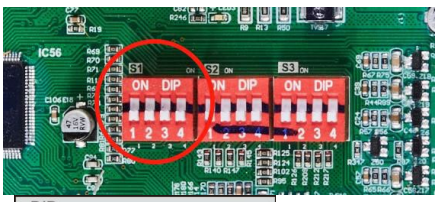


24.E3, E4, E7, EB, EC, ED, HA, H9 TROUBLESHOOTING

25.DIGITAL DISPLAY OUTPUT



26.DESCRIPTION

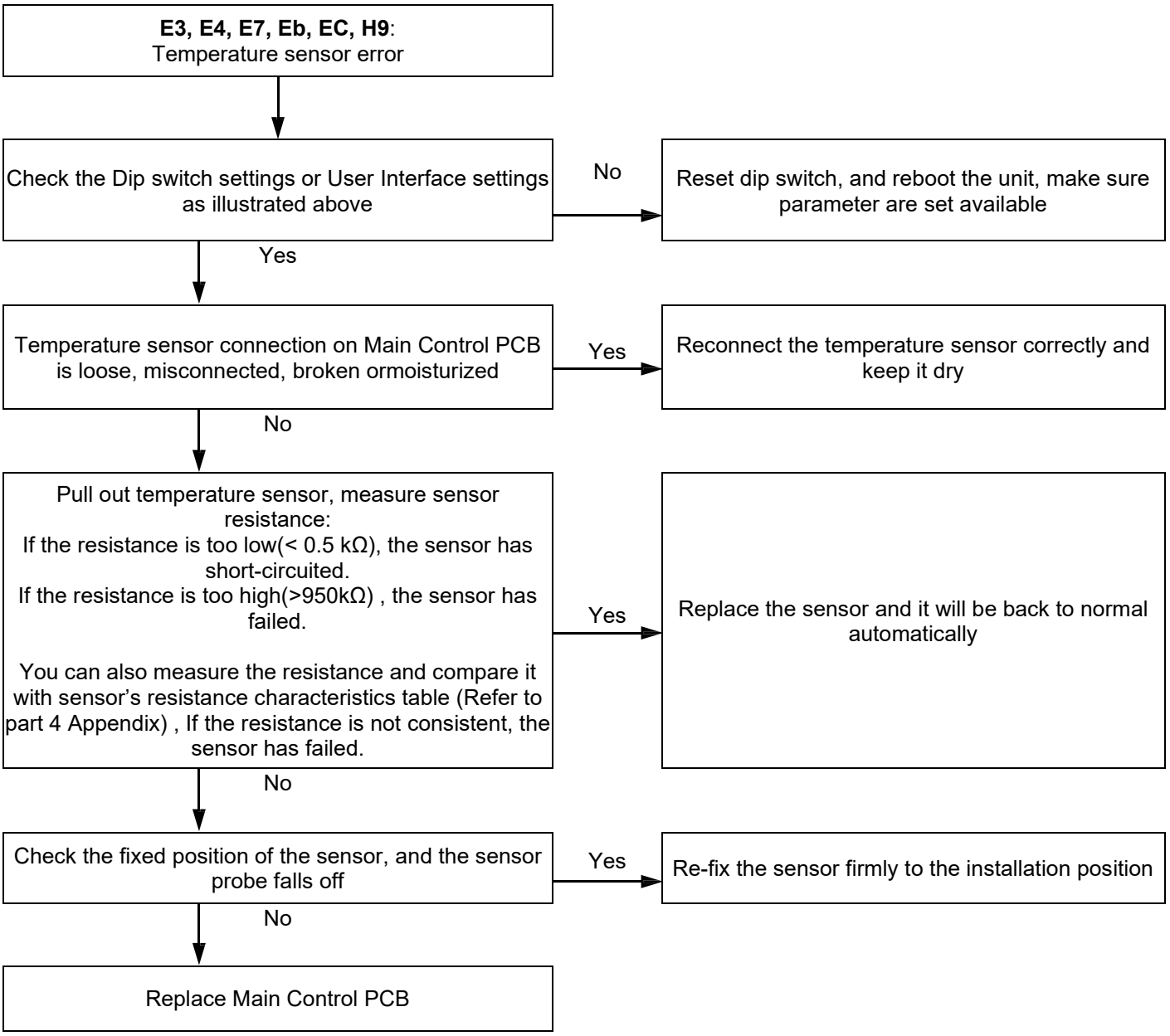
Code	Description	Port	Location (Main Control PCB)
E3	T1 Electric Heater/AHS water outlet temperature sensor error	CN39	  
E4	T5 Water tank temperature sensorerror	CN13	
E7	Tbt Balance tank temperature sensor/ Final outlet water temperature of cascade system sensor error	CN24	
Eb	Tsolar Solar panel temperature sensor error	CN18	
EC	T5_2 Water tank temperature sensor error (Reserved)	CN38	
Ed	Tw_in Plate heat exchanger inlet water temperature sensor error	CN10	
HA	Tw_out Plate heat exchanger outlet water temperature sensor error		
H9	Tw2 Zone 2 water flow temperature sensor error	CN15	
Dip Switch S1	IBH Dip switch		 

DIP switch		ON=1 OFF=0	FACTORY SETTINGS
S1	1/2	0/0= Model 1 1/0= Model 2 0/1= Model 3 1/1= Model 4	1:OFF 2:OFF
	3/4	0/0=Without crankcase heater IBH 0/1=With crankcase heater IBH(One-step control) 1/0=With crankcase heater IBH(Two-step control) 1/1=With crankcase heater IBH(Three-step control)	3:OFF 4:OFF

Note 1: DIP switch settings or User Interface settings

Code	Description
Ed	Main Control PCB can not detect the right sensor value.
HA	
E3	IBH function is on(Dip switch S1-3/4 is set IBH available, and User Interface- For Serviceman - Other heat source – IBH function=1) ,while Main Control PCB can not detect the right T1 sensor value. AHS function is on (User Interface- For Serviceman - Other heat source - AHS function=1), while Main Control PCB can not detect the right T1 sensor value.
E4	DHW mode is on (User Interface- For Serviceman – DHW setting- DHW mode=1), while Main Control PCB can not detect the right T5 sensor value.
E7	Tbt is on (User Interface- For Serviceman- Input definition- Tbt=1), while Main Control PCB can not detect the right Tbt sensor value.
Eb	Solar function is on and Solar control is on (User Interface- For Serviceman - Other heat source - Solar function=1 & Solar control=1),while Main Control PCB can not detect the right Tsolar sensor value.
EC	T5_2 is on (User Interface- For Serviceman- Input definition- Tbt=1), while Main Control PCB can not detect the right T5_2 sensor value. (Reserved)
H9	Double zone is on(User Interface- For Serviceman –Temp. type setting – Double zone=1),while Main Control PCB can not detect the right Tw2 sensor value.

27.PROCEDURE



28.H5 TROUBLESHOOTING

29.DIGITAL DISPLAY OUTPUT

30.DESCRIPTION

Code	Description	Location
H5	Ta room temperature sensor error	Inserted on PCB of User Interface

31.PROCEDURE

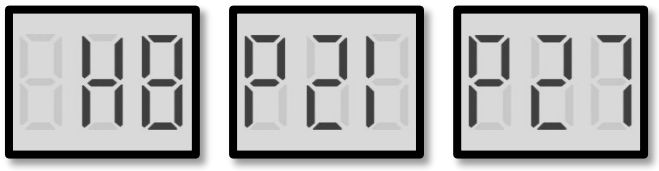
H5：Ta Temperature sensor error

↓

Replace User Interface

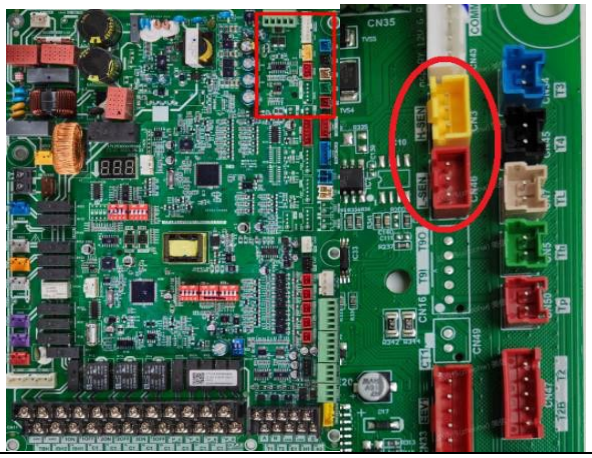
32.H8, P21, P27 TROUBLESHOOTING

33.DIGITAL DISPLAY OUTPUT

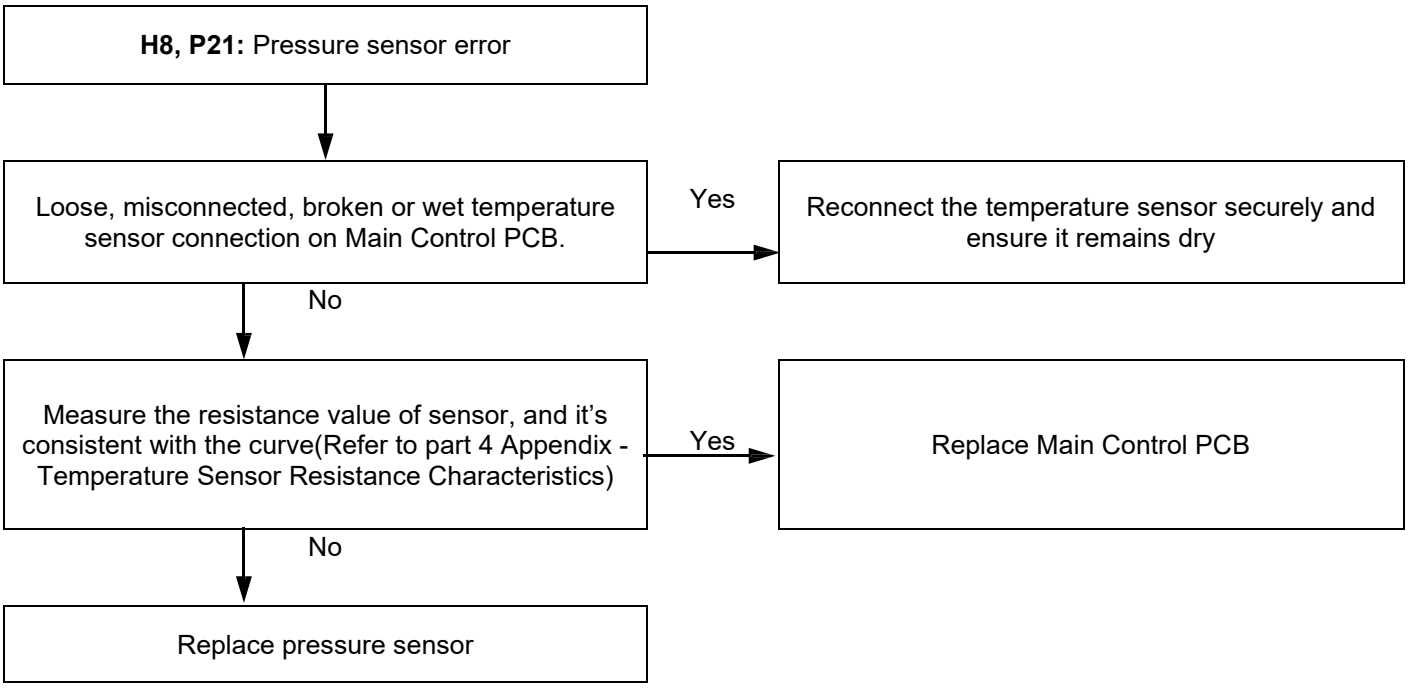


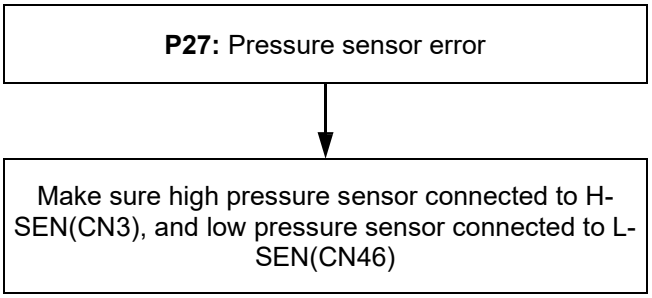
34.DESCRIPTION

Code	Description	Port	Location(Main Control PCB)
H8	H-SEN High pressure sensor error	CN3	
P21	L-SEN Low pressure sensor error	CN46	

P27	H-SEN and L-SEN connected reversely (Detect when compressor is off)	CN3/ CN46	

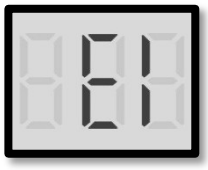
35.PROCEDURE





36.E1 TROUBLESHOOTING

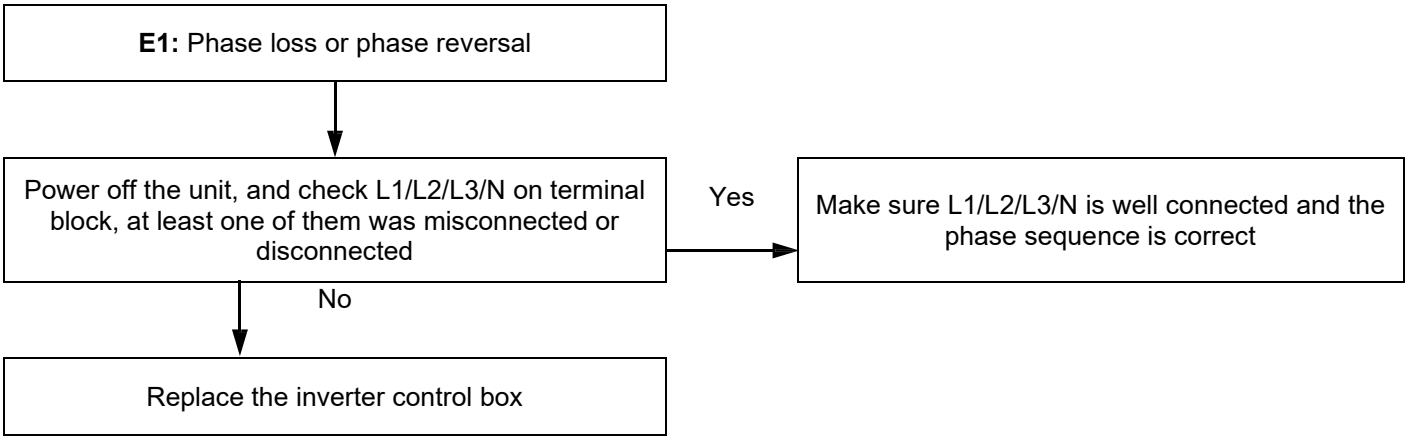
37.DIGITAL DISPLAY OUTPUT



38.DESCRIPTION

Error code		*E1 (For 3Ph units)*
Description		Phase loss or phase reversal
Triggering		At least one of L1/L2/L3/N misconnected or disconnected
Relative ports and locations	Terminal blocks	

39.PROCEDURE



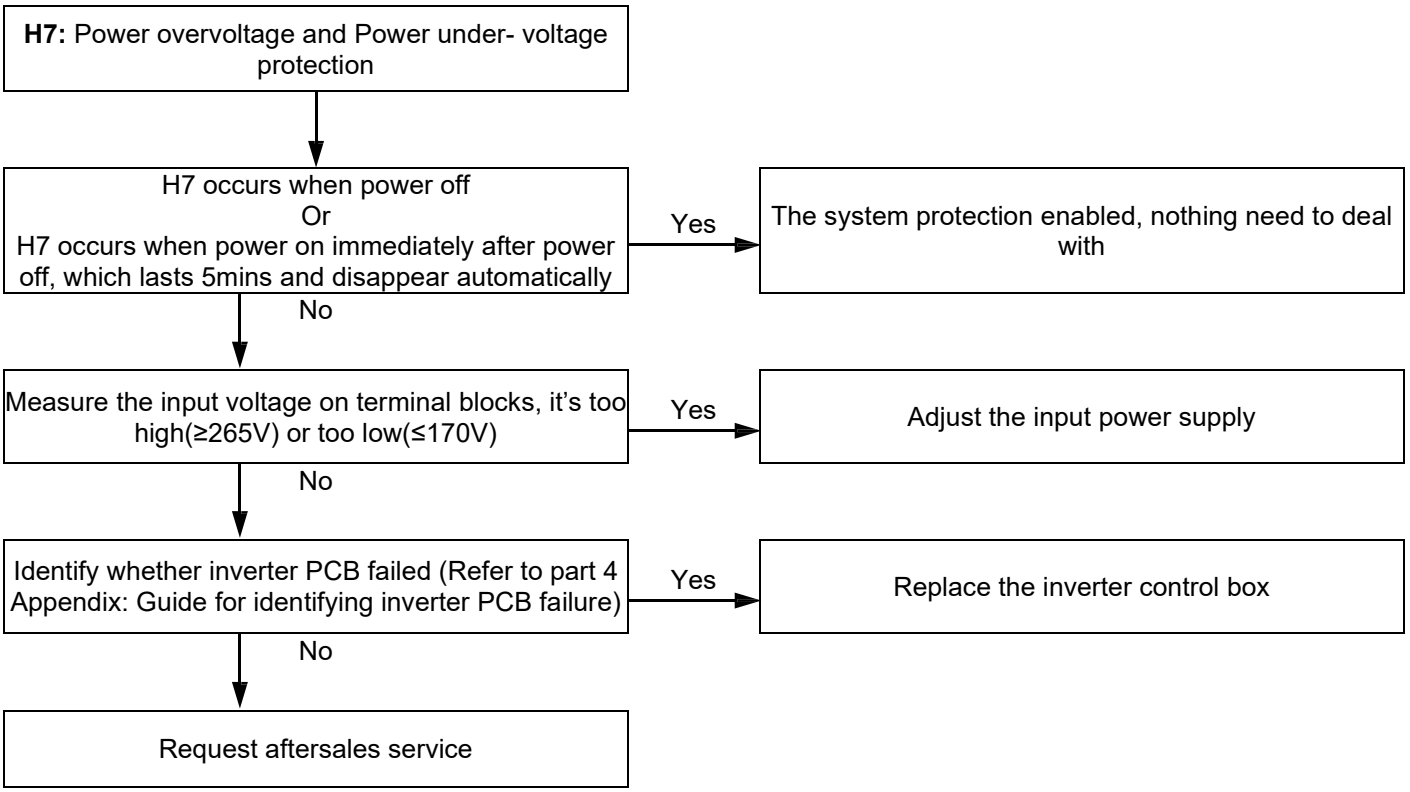
40.H7 TROUBLESHOOTING

41.DIGITAL DISPLAY OUTPUT

42.DESCRIPTION

Error code	*H7*
Description	Power overvoltage and Power under-voltage protection
Triggering	Input voltage<170V or Input voltage≥265V (The unit operating normally if 250V≥input voltage≥180V)

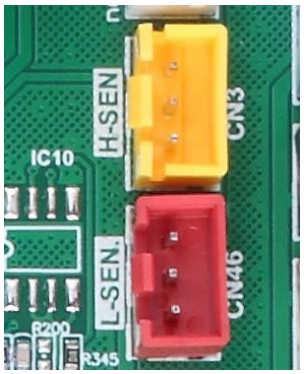
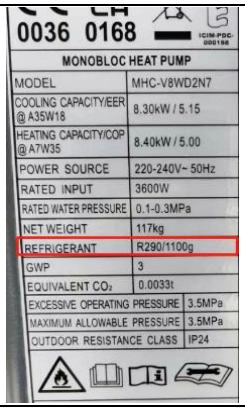
43.PROCEDURE



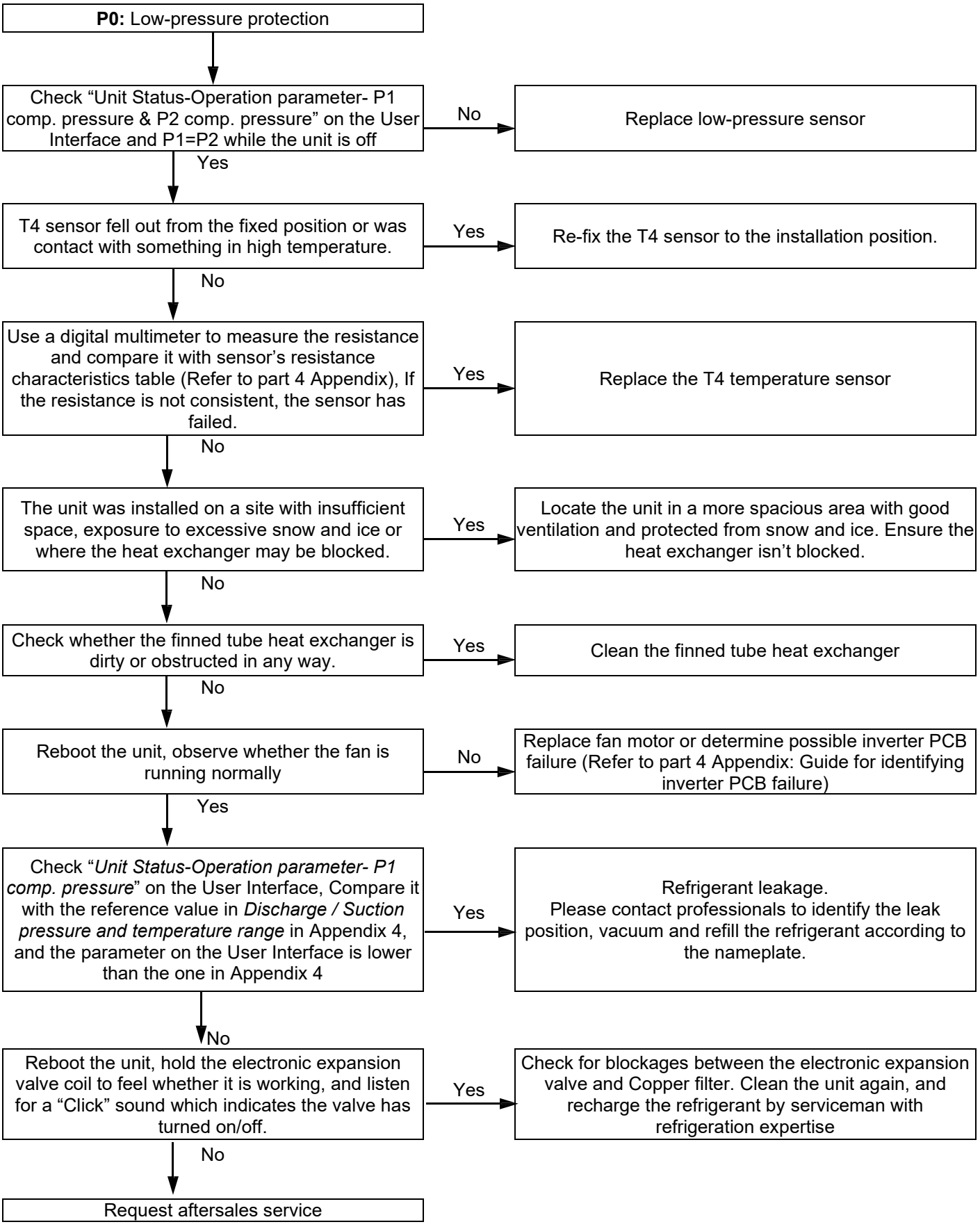
44.P0 TROUBLESHOOTING

45.DIGITAL DISPLAY OUTPUT

46.DESCRIPTION

Error code	*P0*	
Description	Low pressure protection	
Triggering	Main Control PCB detected that the low pressure <0.12MPa lasting more than 30 mins Main Control PCB detected that low pressure <0.13MPa & compressor shutting off more than 2 mins at the same time. Main Control PCB detected that low pressure <0.13MPa & compressor is running (T4≥-10℃ ambient condition) except defrost and forced cooling operation status	
Low pressure sensor	  	
Nameplate		Refer to Nameplate for rated refrigerant charge volume. The picture is for reference only. The actual product may vary.

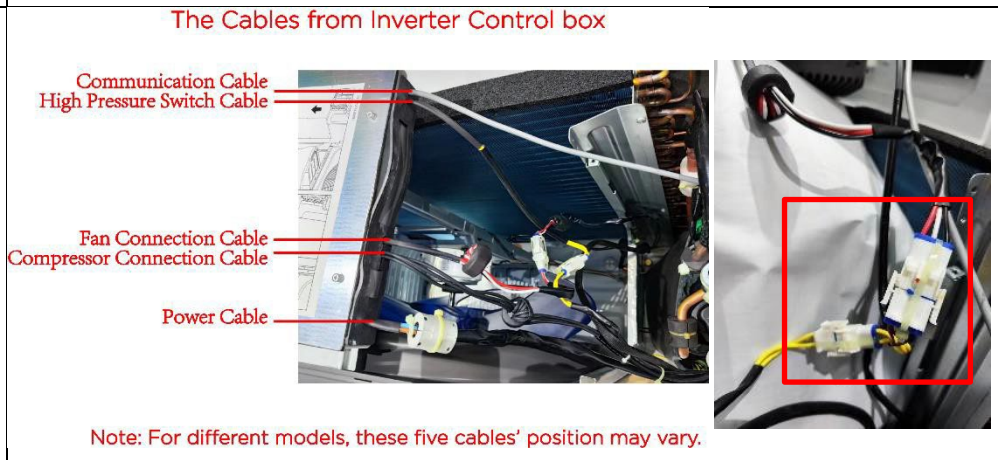
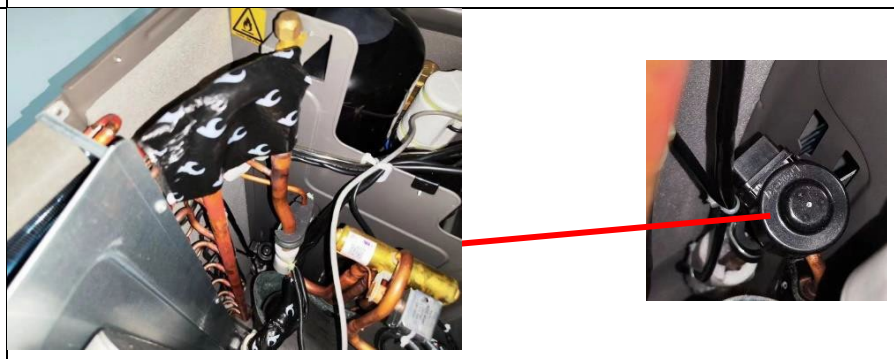
47.PROCEDURE

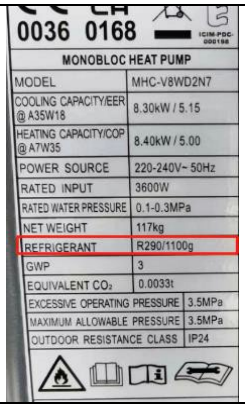


48.P1 TROUBLESHOOTING

49.DIGITAL DISPLAY OUTPUT

50.DESCRIPTION

Error code	*P1*
Description	High pressure switch protection
Triggering	The Main Control PCB detected that the high pressure was ≥ 3.5 Mpa
High pressure switch location	The location of high pressure switch refer to Part 2 Component Layout and Refrigerant Circuits
High pressure switch plug	
Electric expansion valve	

Nameplate		Refer to Nameplate for rated refrigerant charge volume. The picture is for reference only. The actual product may vary.

51.PROCEDURE

P1 occurs in Cooling mode

High-pressure switch plug from the inverter control box is loose or misconnected

Yes → Reconnect high-pressure switch securely

↓

Power off and power on again , P1 error still occurs

Yes → Use a digital multimeter to measure high- pressure switch with buzzer.
If buzzer doesn't sound, replace high-pressure switch.
If buzzer sounds, replace inverter control box.

↓

Reboot the unit and check "*Unit Status-Operation parameter-P1 comp. pressure*" on the User Interface. Confirm *P1 comp. pressure* >*3.5*MPa when the P1 error occurred.

Yes → Replace the high-pressure switch

↓

The unit was installed on a site with insufficient space, exposure to high temperatures or where the heat exchanger may be blocked.

Yes → Locate the unit in a more spacious area with good ventilation and moderate temperatures. Ensure the heat exchanger isn't blocked.

No ↓

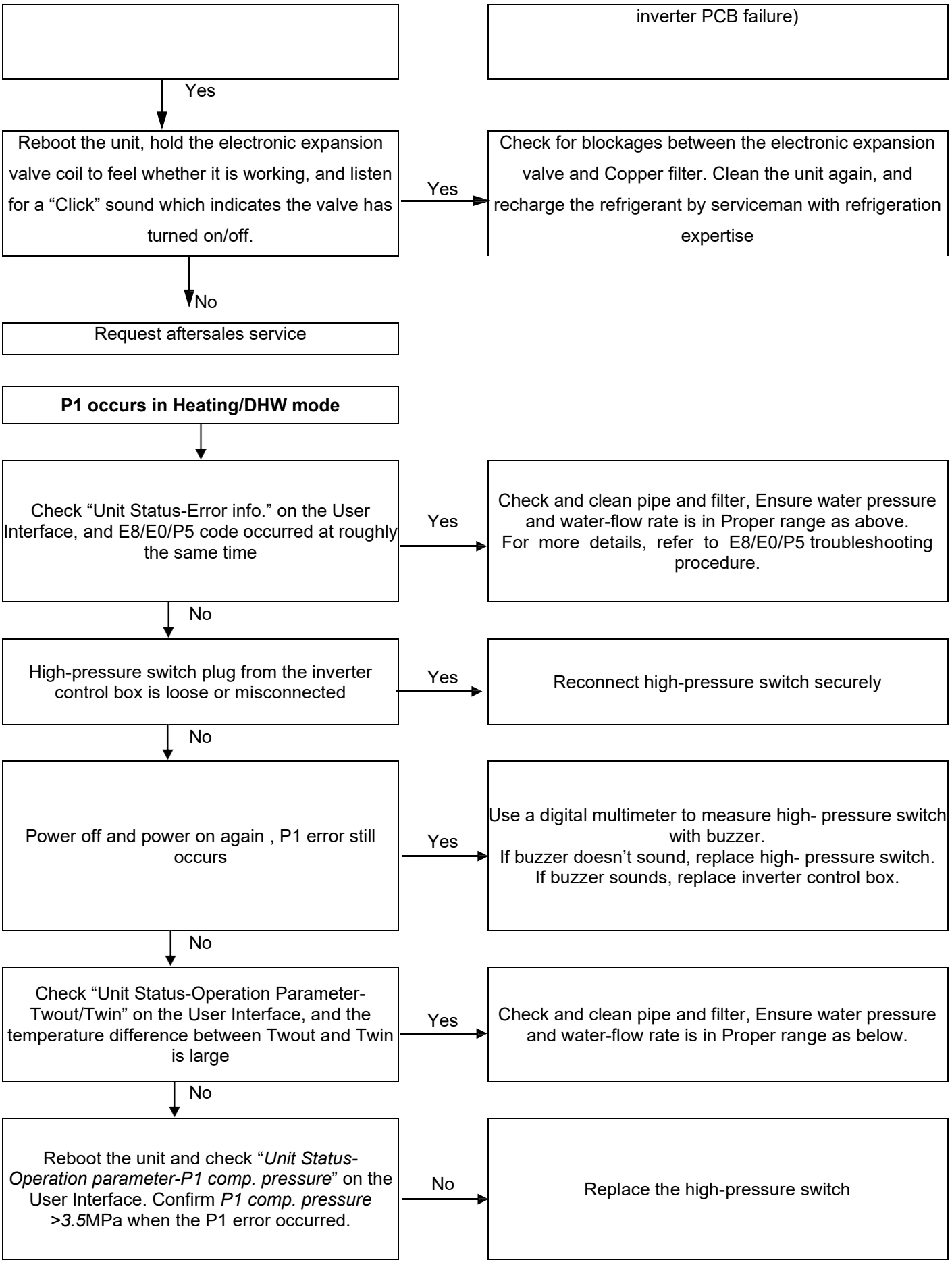
Check whether the finned tube heat exchanger is dirty or obstructed in any way.

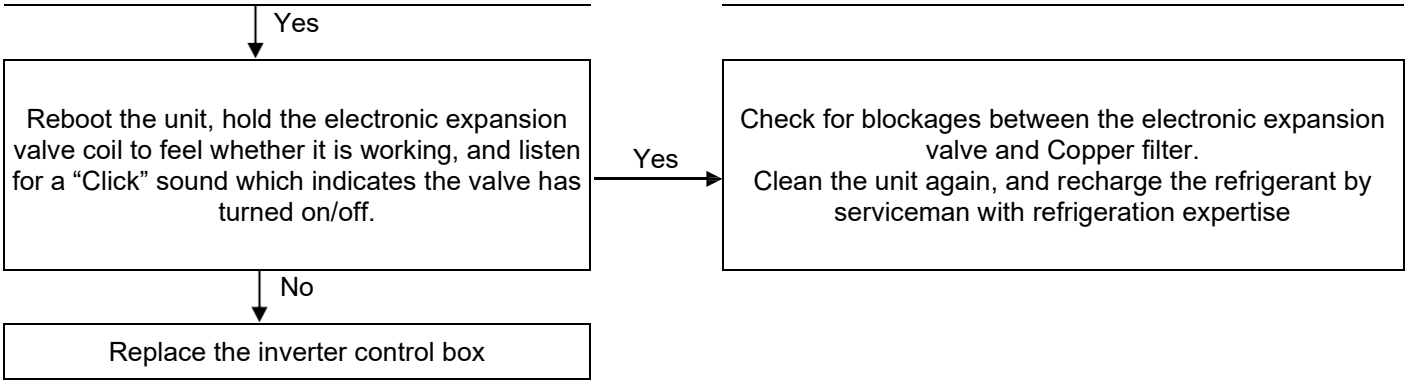
Yes → Clean the finned tube heat exchanger

No ↓

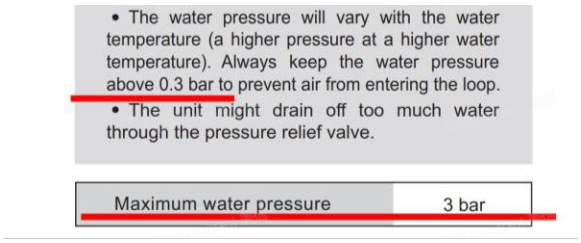
Reboot the unit, observe whether the fan is running normally

No → Replace fan motor or determine possible inverter PCB failure (Refer to part 4 Appendix: Guide for identifying


inverter PCB failure)
Yes
Reboot the unit, hold the electronic expansion valve coil to feel whether it is working, and listen for a “Click” sound which indicates the valve has turned on/off.
Yes
Check for blockages between the electronic expansion valve and Copper filter. Clean the unit again, and recharge the refrigerant by serviceman with refrigeration expertise
No
Request aftersales service
P1 occurs in Heating/DHW mode
Check “Unit Status-Error info.” on the User Interface, and E8/E0/P5 code occurred at roughly the same time
Yes
Check and clean pipe and filter, Ensure water pressure and water-flow rate is in Proper range as above.
For more details, refer to E8/E0/P5 troubleshooting procedure.
No
High-pressure switch plug from the inverter control box is loose or misconnected
Yes
Reconnect high-pressure switch securely
No
Power off and power on again , P1 error still occurs
Yes
Use a digital multimeter to measure high- pressure switch with buzzer.
If buzzer doesn’t sound, replace high- pressure switch.
If buzzer sounds, replace inverter control box.
No
Check “Unit Status-Operation Parameter-Twout/Twin” on the User Interface, and the temperature difference between Twout and Twin is large
Yes
Check and clean pipe and filter, Ensure water pressure and water-flow rate is in Proper range as below.
No
Reboot the unit and check “*Unit Status-Operation parameter-P1 comp. pressure*” on the User Interface. Confirm *P1 comp. pressure* >*3.5*MPa when the P1 error occurred.
No
Replace the high-pressure switch


Yes
Reboot the unit, hold the electronic expansion valve coil to feel whether it is working, and listen for a “Click” sound which indicates the valve has turned on/off.
Yes
Check for blockages between the electronic expansion valve and Copper filter.
Clean the unit again, and recharge the refrigerant by serviceman with refrigeration expertise
No
Replace the inverter control box

The proper water pressure range:(0.3bar-3bar)



The proper water flow rate range

Unit	Flow rate range
4kW	0.40 - 0.90 m^3/h
6kW	0.40 - 1.25 m^3/h
8kW	0.40 - 1.65 m^3/h
10kW	0.40 - 2.10 m^3/h
12kW	0.70 - 2.50 m^3/h
14kW	0.70 - 2.75 m^3/h
16kW	0.70 - 3.00 m^3/h

P1 occurs in Off status

↓

Check “Unit Status-Operation parameter- P1 comp. pressure & P2 comp. pressure” on the User Interface, and P1&P2<3.5MPa

No → Request aftersales service

Yes ↓

Check whether high-pressure switch plug was disconnected, or misconnected

Yes → Re-connect the high-pressure witch plug

No ↓

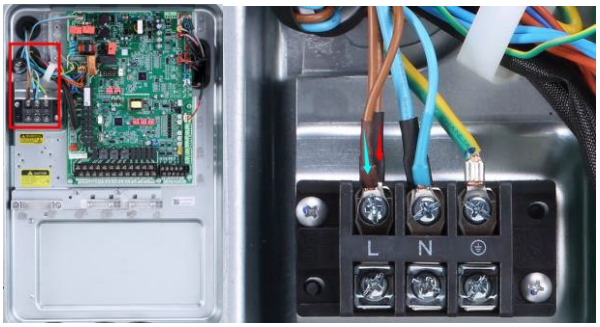
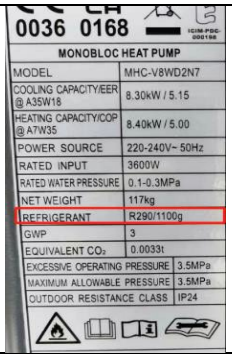
Measure the high-pressure switch to check whether it keeps closed

Yes → Replace high-pressure switch

52.P3 TROUBLESHOOTING

53.DIGITAL DISPLAY OUTPUT

54.DESCRIPTION

Error code	*P3*	
Description	Overcurrent protection	
Triggering	The Main Control PCB detected that the input current is higher than protection value	
Terminal block		
Nameplate		Refer to Nameplate for rated refrigerant charge volume. *The picture is for reference only. The actual product may vary.*

55.PROCEDURE

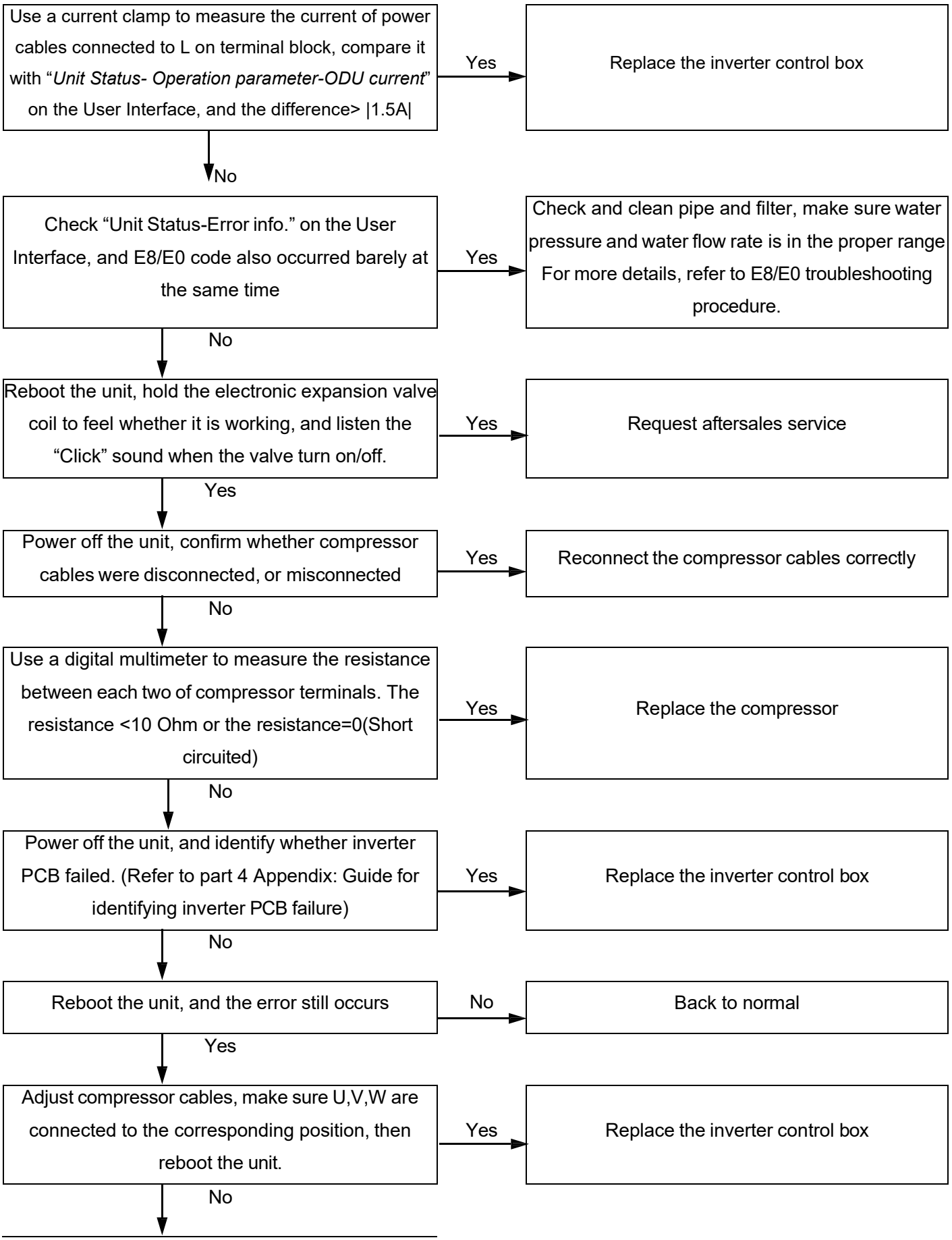
P3 occurs in heating/DHW mode

↓

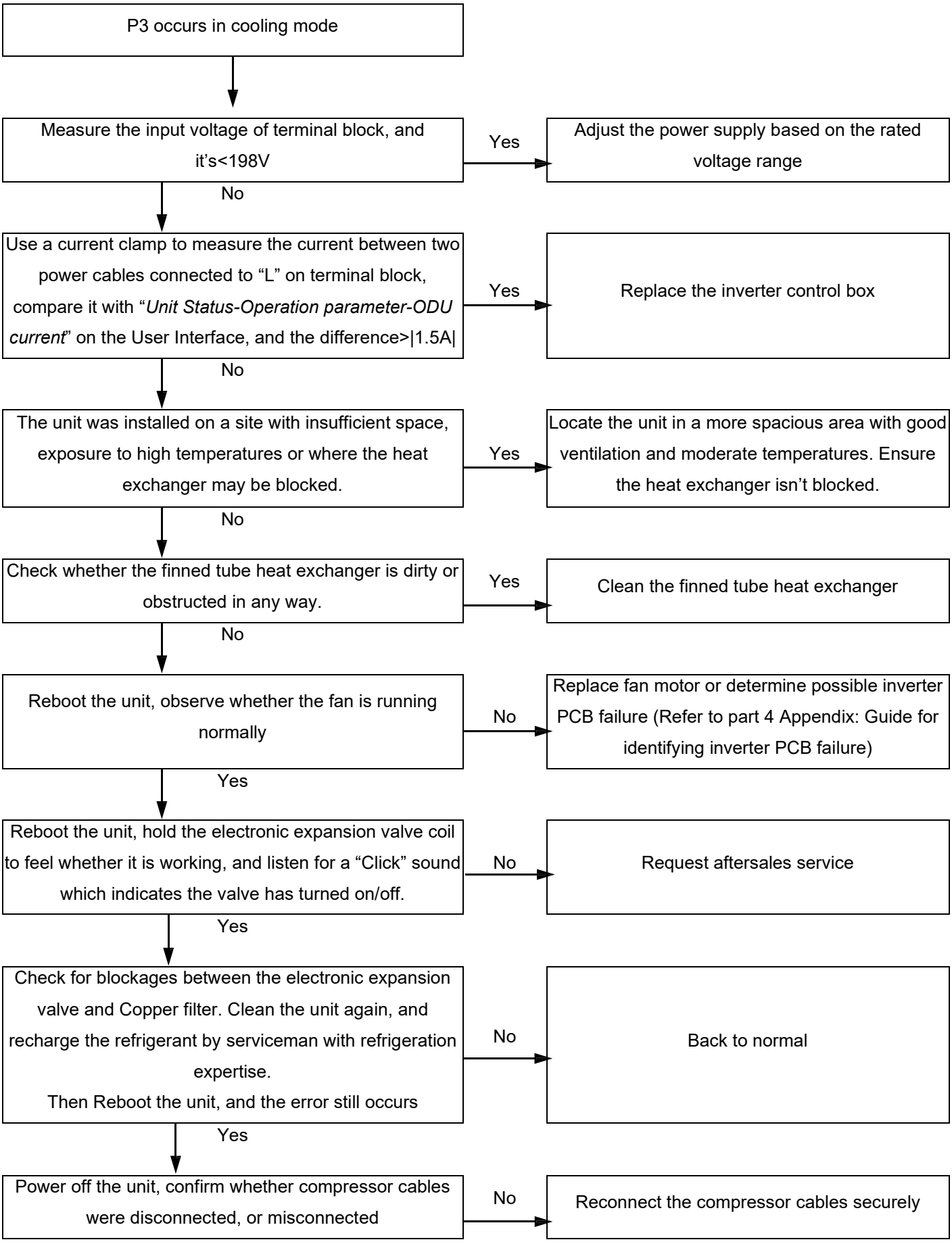
Measure the input voltage of terminal block, and it's<198V

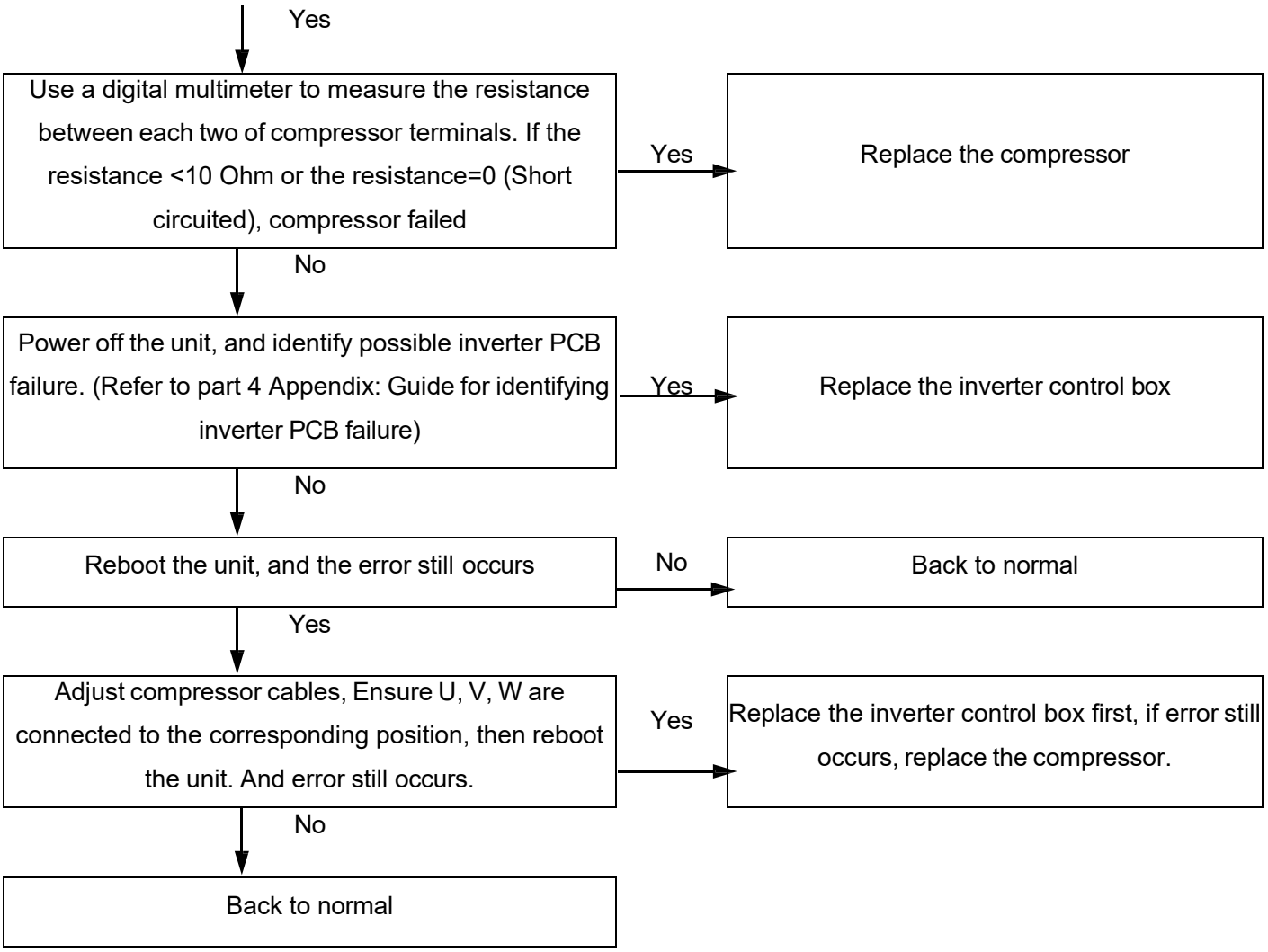
Yes → Adjust the power supply based on the rated voltage range

No ↓


Use a current clamp to measure the current of power cables connected to L on terminal block, compare it with "Unit Status- Operation parameter-ODU current" on the User Interface, and the difference> |1.5A|
Yes
Replace the inverter control box
No
Check "Unit Status-Error info." on the User Interface, and E8/E0 code also occurred barely at the same time
Yes
Check and clean pipe and filter, make sure water pressure and water flow rate is in the proper range For more details, refer to E8/E0 troubleshooting procedure.
No
Reboot the unit, hold the electronic expansion valve coil to feel whether it is working, and listen the "Click" sound when the valve turn on/off.
Yes
Request aftersales service
Yes
Power off the unit, confirm whether compressor cables were disconnected, or misconnected
Yes
Reconnect the compressor cables correctly
No
Use a digital multimeter to measure the resistance between each two of compressor terminals. The resistance <10 Ohm or the resistance=0(Short circuited)
Yes
Replace the compressor
No
Power off the unit, and identify whether inverter PCB failed. (Refer to part 4 Appendix: Guide for identifying inverter PCB failure)
Yes
Replace the inverter control box
No
Reboot the unit, and the error still occurs
No
Back to normal
Yes
Adjust compressor cables, make sure U,V,W are connected to the corresponding position, then reboot the unit.
Yes
Replace the inverter control box
No

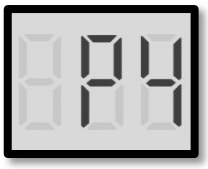
Replace the compressor


P3 occurs in cooling mode
Measure the input voltage of terminal block, and it's<198V
Yes
Adjust the power supply based on the rated voltage range
No
Use a current clamp to measure the current between two power cables connected to "L" on terminal block, compare it with "*Unit Status-Operation parameter-ODU current*" on the User Interface, and the difference>|1.5A|
Yes
Replace the inverter control box
No
The unit was installed on a site with insufficient space, exposure to high temperatures or where the heat exchanger may be blocked.
Yes
Locate the unit in a more spacious area with good ventilation and moderate temperatures. Ensure the heat exchanger isn't blocked.
No
Check whether the finned tube heat exchanger is dirty or obstructed in any way.
Yes
Clean the finned tube heat exchanger
No
Reboot the unit, observe whether the fan is running normally
No
Replace fan motor or determine possible inverter PCB failure (Refer to part 4 Appendix: Guide for identifying inverter PCB failure)
Yes
Reboot the unit, hold the electronic expansion valve coil to feel whether it is working, and listen for a "Click" sound which indicates the valve has turned on/off.
No
Request aftersales service
Yes
Check for blockages between the electronic expansion valve and Copper filter. Clean the unit again, and recharge the refrigerant by serviceman with refrigeration expertise.
Then Reboot the unit, and the error still occurs
No
Back to normal
Yes
Power off the unit, confirm whether compressor cables were disconnected, or misconnected
No
Reconnect the compressor cables securely

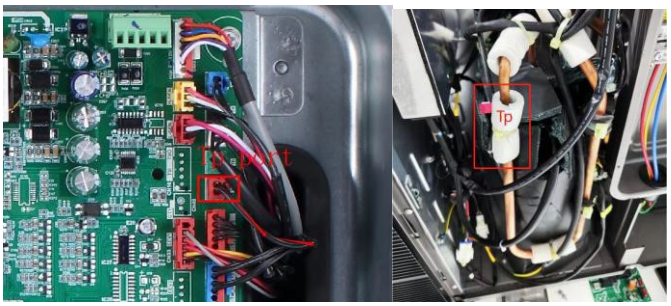
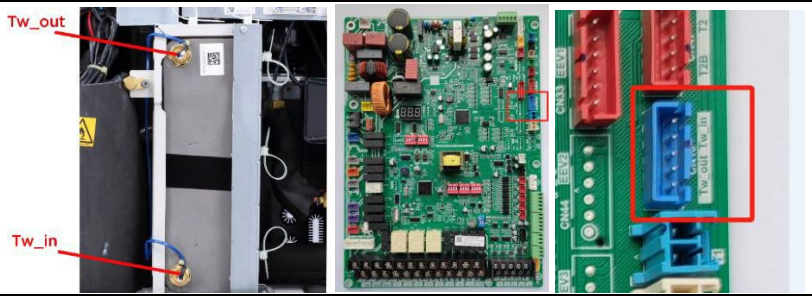

Yes
Use a digital multimeter to measure the resistance between each two of compressor terminals. If the resistance <10 Ohm or the resistance=0 (Short circuited), compressor failed
Yes
Replace the compressor
No
Power off the unit, and identify possible inverter PCB failure. (Refer to part 4 Appendix: Guide for identifying inverter PCB failure)
Yes
Replace the inverter control box
No
Reboot the unit, and the error still occurs
No
Back to normal
Yes
Adjust compressor cables, Ensure U, V, W are connected to the corresponding position, then reboot the unit. And error still occurs.
Yes
Replace the inverter control box first, if error still occurs, replace the compressor.
No
Back to normal

56.P4 TROUBLESHOOTING

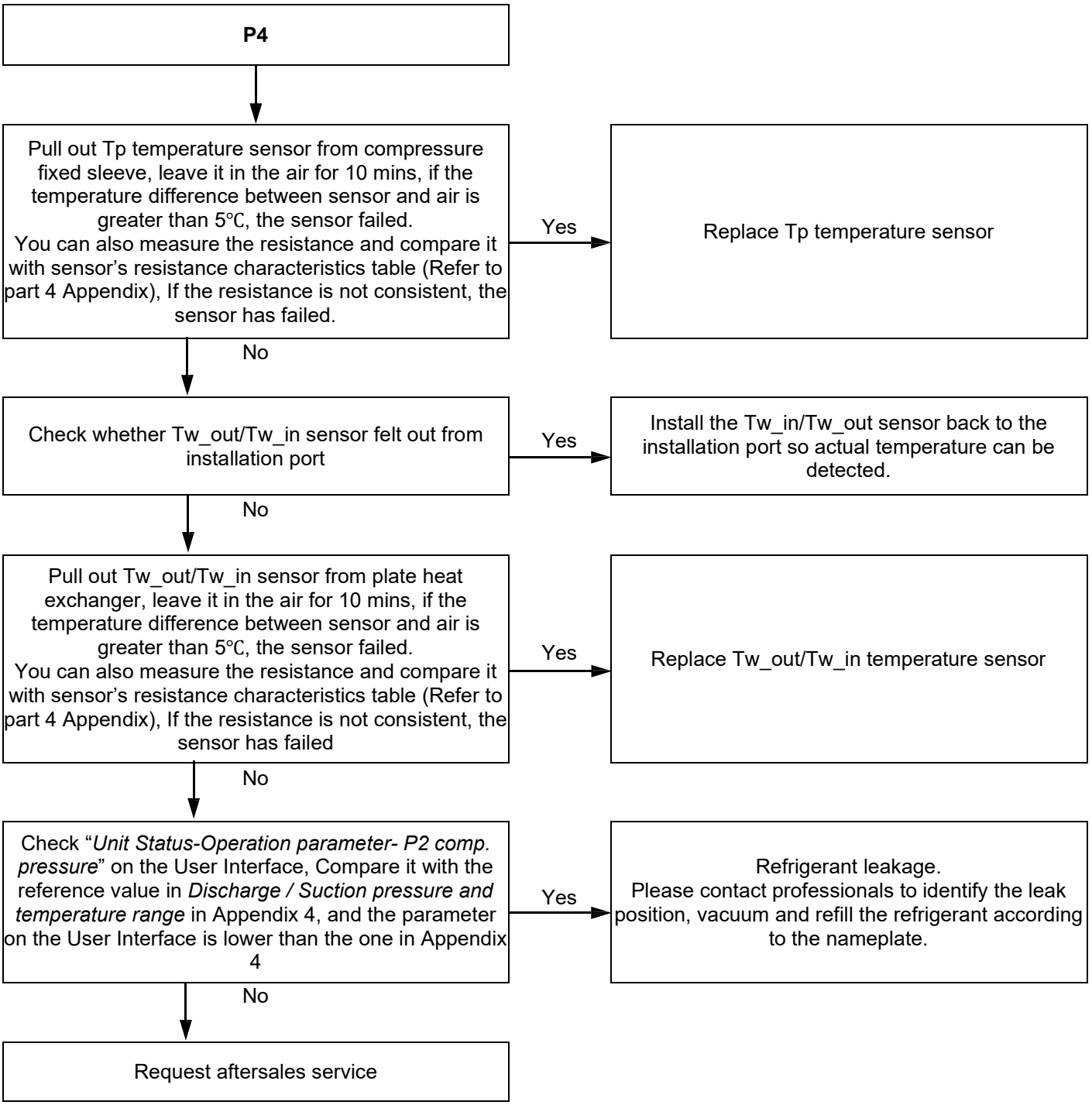
57.DIGITAL DISPLAY OUTPUT



58.DESCRIPTION

Error code		*P4*
Description		Compressor protection against excessively-high discharge temperature
Triggering		The Main Control PCB detected that the compressor discharge temperature was ≥115℃
Relative ports and locations	Tp discharge temp. sensor	
	Tw_in Tw_out	

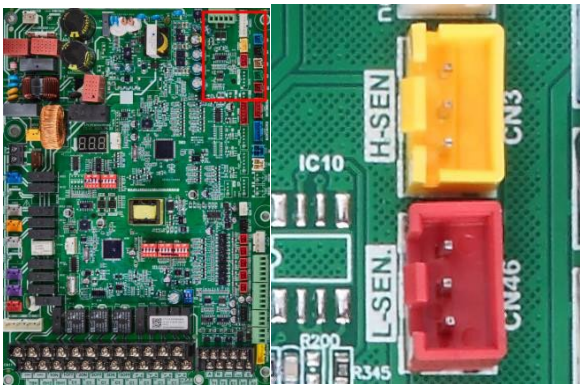
59.PROCEDURE



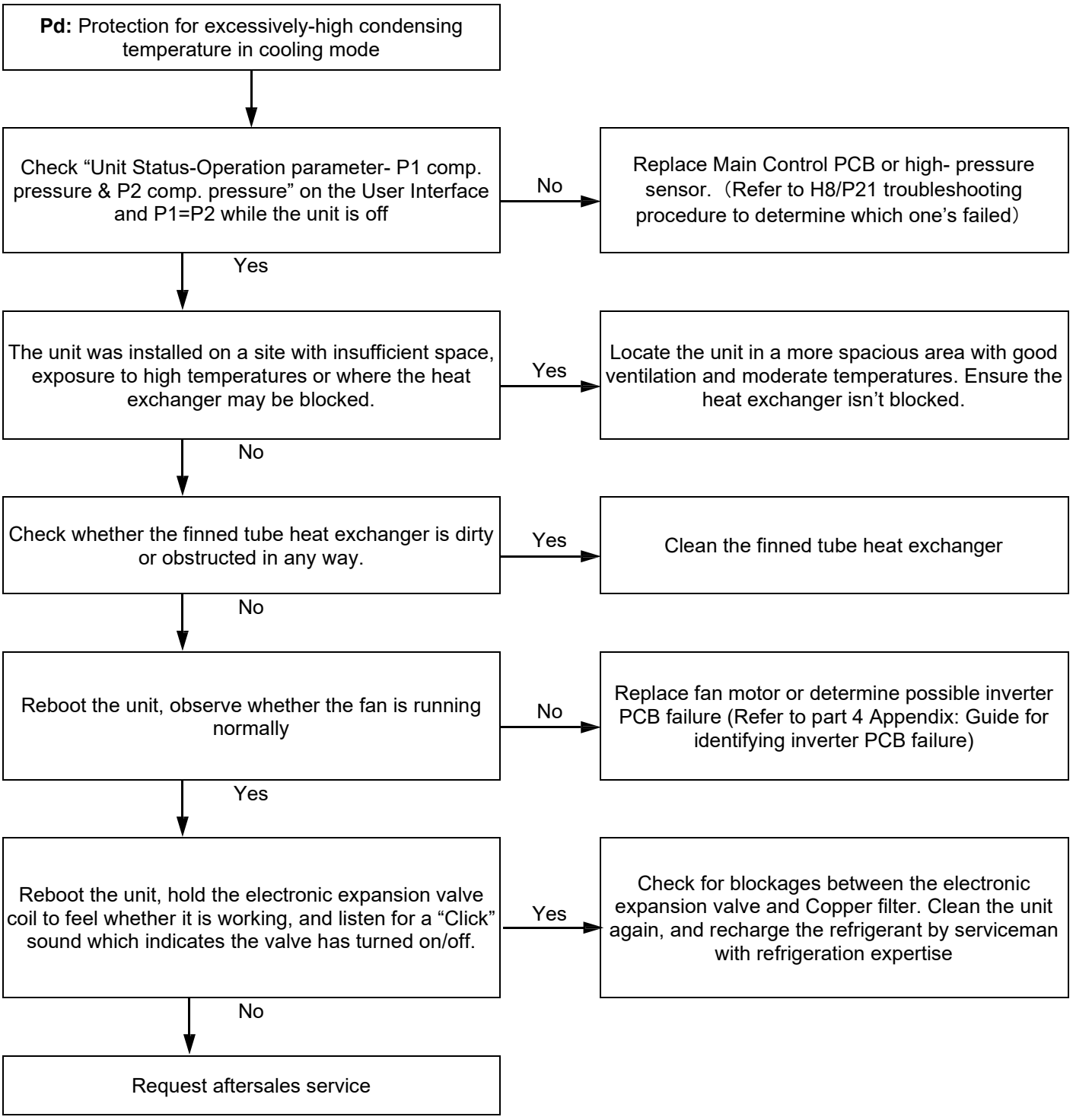
60.PD TROUBLESHOOTING

61.DIGITAL DISPLAY OUTPUT

62.DESCRIPTION

Error code	*Pd*	
Description	Protection for excessively-high condensing temperature in cooling mode	
Triggering	Main Control PCB detected that the condensing temperature was ≥65℃ in cooling mode	
Relative ports and locations		
Nameplate		Refer to Nameplate for rated refrigerant charge volume. The picture is for reference only. The actual product may vary.

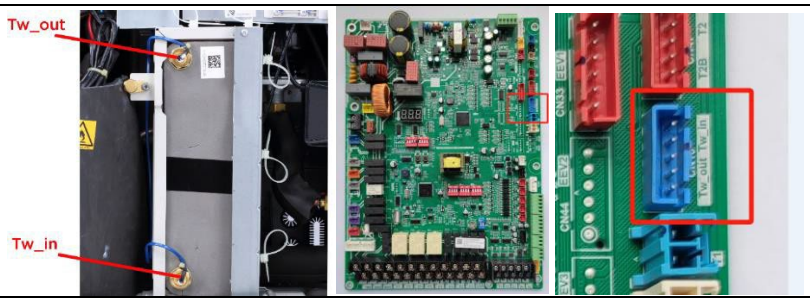
63.PROCEDURE



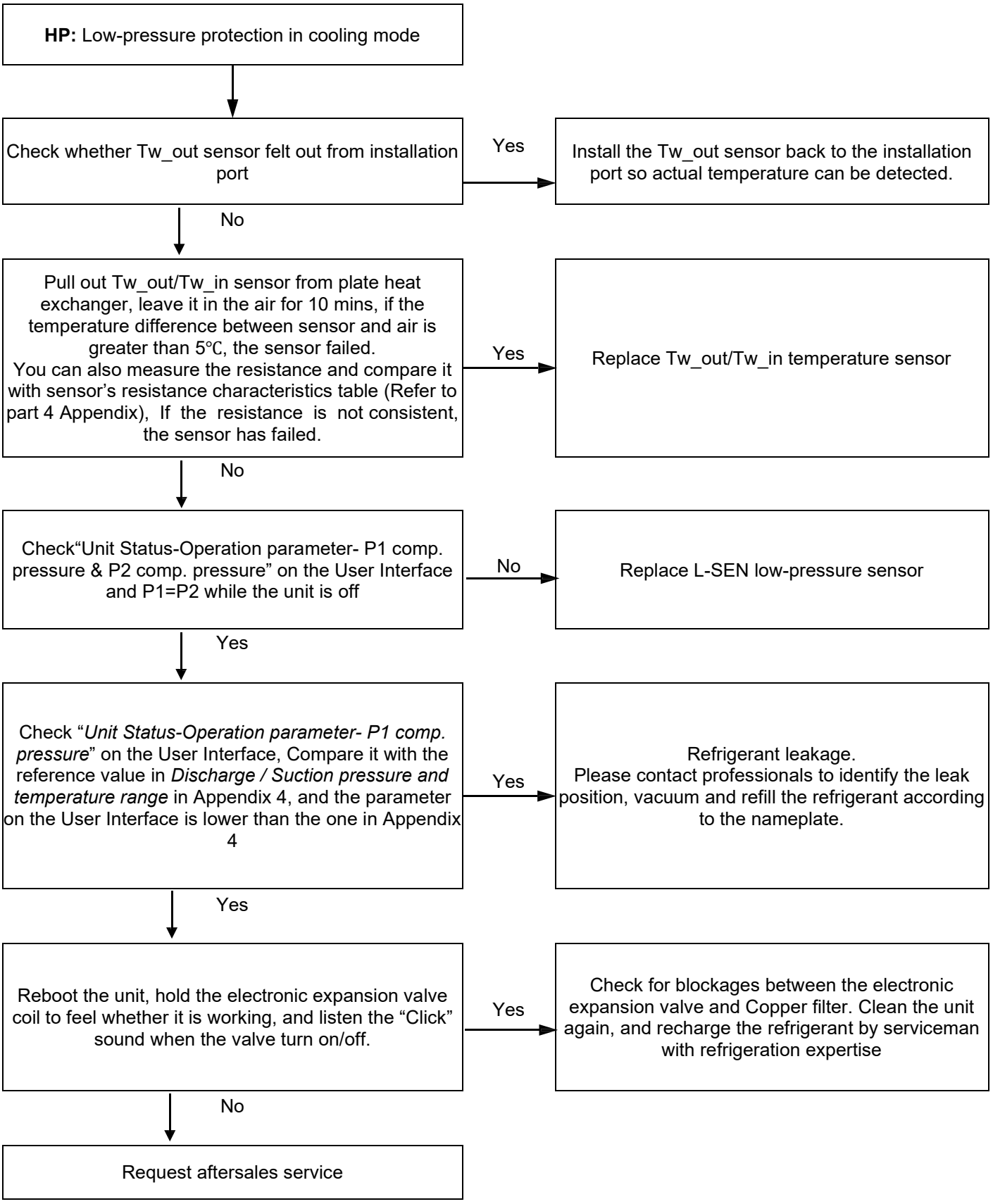
64.HP TROUBLESHOOTING

65.DIGITAL DISPLAY OUTPUT

66.DESCRIPTION

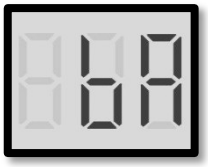
Error code	*HP*
Description	Low pressure protection in cooling mode
Triggering	Main Control PCB detected that the suction pressure P2<0.35Mpa for 5 seconds in cooling mode and compressor running over 300 seconds.
Tw_in Tw_out	

67.PROCEDURE



68.BA TROUBLESHOOTING

69.DIGITAL DISPLAY OUTPUT



70.DESCRIPTION

Error code	*bA*
Description	T4 sensor out of operation range protection
Triggering	In heating/ DHW mode, the error occurs when T4≥65℃ or T4<-25℃ In cooling mode, the error occurs when T4≥65℃ or T4<-5℃
T4	 

71.PROCEDURE

bA: T4 sensor out of operation range protection

The actual ambient temperature ≥65℃ or <-25℃ in heating mode; or the actual ambient temperature≥65℃ or <-5℃ in cooling mode

Yes → The actual ambient temperature is out of range, so Protection program activated. Nothing need to do.

No

T4 sensor fell out from the fixed position or was contact with something in high/low temperature.

Yes → Re-fix the T4 sensor to the installation position.

No

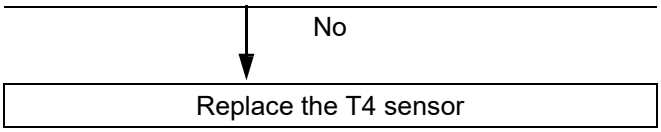
The outdoor unit was in a high temperature place or exposed to sunlight

Yes → Move the outdoor unit to a ventilation place far away from the high temperature heat source and do a good job of shading treatment.

No

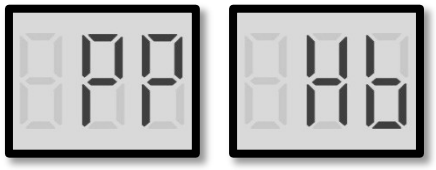
Take out T4 sensor from the fixed position, hold it in hand in 5 mins. Check "*Unit Status-Operation parameter-T4 outdoor air temp.*" on the User Interface, and it's close to body temperature.

Yes → The actual ambient temperature is out of range, so Protection program activated. Nothing need to do.

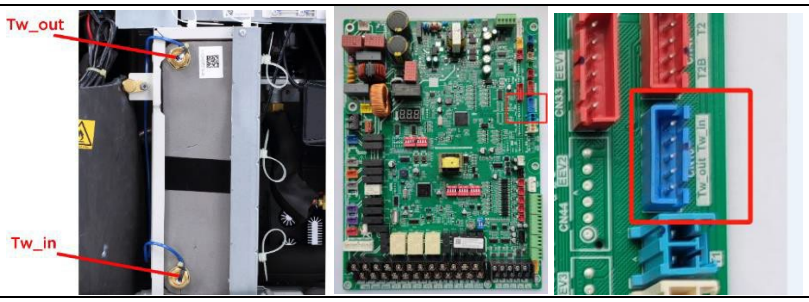

No
Replace the T4 sensor

72.PP, HB TROUBLESHOOTING

73.DIGITAL DISPLAY OUTPUT



74.DESCRIPTION

Error code	*PP*	*Hb*
Description	Protection for abnormal temperature difference between outlet water and inlet water	PP occurs 3 times in heating/DHW mode
Triggering	Twout-Twin≥3℃ and lasts 15 mins in cooling mode Twin-Twout≥3℃ and lasts 15 mins in heating/DHW mode	PP occurs 3 times in heating/DHW mode; When Twout<7℃ occurs, the number of PP failures increases by one
Outlet pipe and inlet pipe		
Tw_in Tw_out		
CN71 ST1 Port for 4-way valve		

For-way valve E S C	 

75.PROCEDURE

PP in cooling mode

Outlet pipe and inlet pipe connected reversely
- Yes → Re-connect the pipes securely
- No ↓

Tw_in sensor and Tw_out sensor connected reversely on plate heat exchanger or on Main control PCB
- Yes → Re-connect the sensors securely
- No ↓

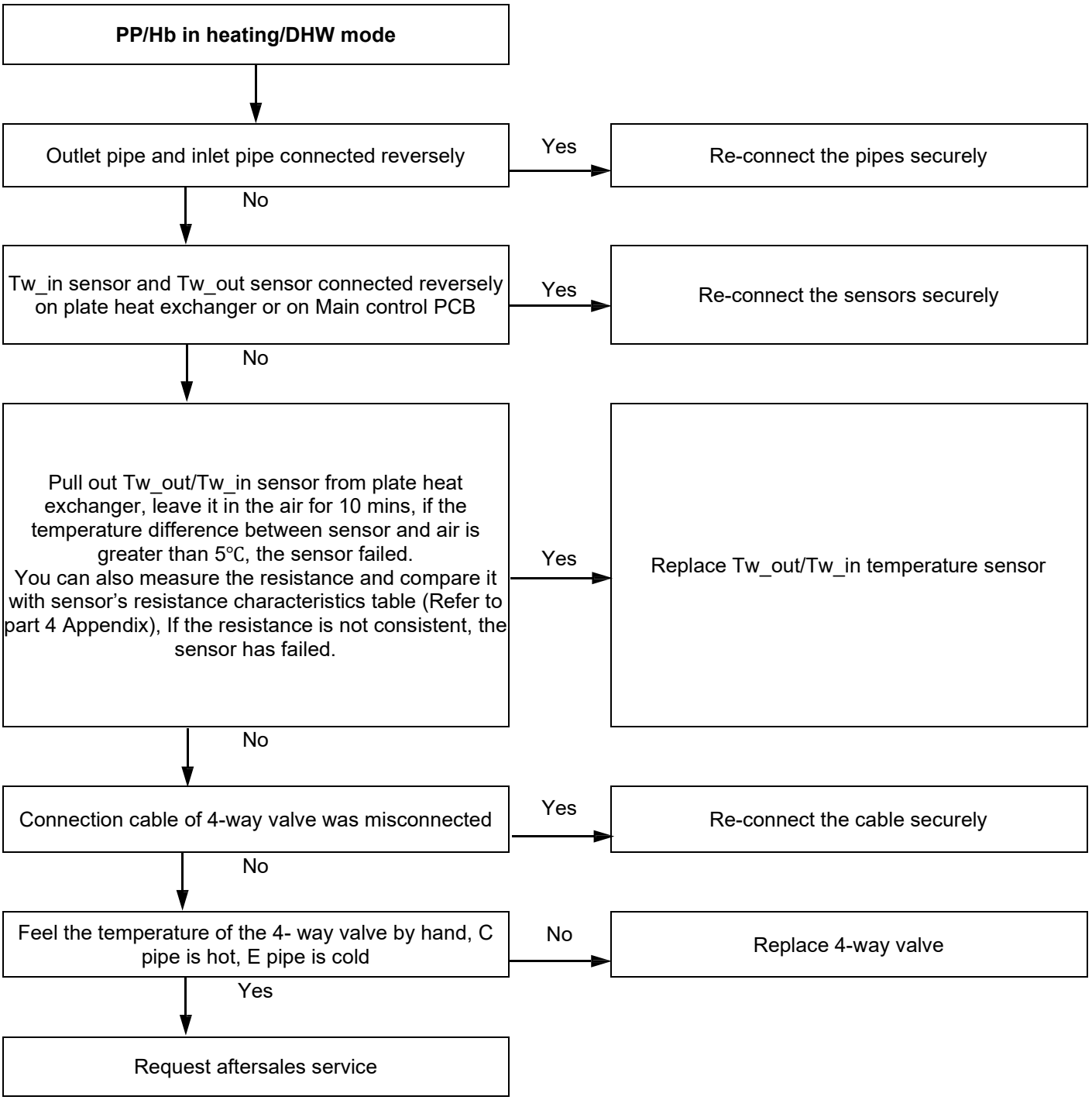
Pull out Tw_out/Tw_in sensor from plate heat exchanger, leave it in the air for 10 mins, if the temperature difference between sensor and air is greater than 5℃, the sensor failed.
You can also measure the resistance and compare it with sensor's resistance characteristics table (Refer to part 4 Appendix), If the resistance is not consistent, the sensor has failed.
- Yes → Replace Tw_out/Tw_in temperature sensor
- No ↓

Connection cable of 4-way valve was disconnected, or misconnected
- Yes → Re-connect the cable securely
- No ↓

Measure the voltage of port for 4-way valve, and it's 200-240V
- No → Replace the Main Control PCB
- Yes ↓

Feel the temperature of the 4- way valve by hand, C pipe is hot, E pipe is cold
- Yes → Replace 4-way valve
- No ↓

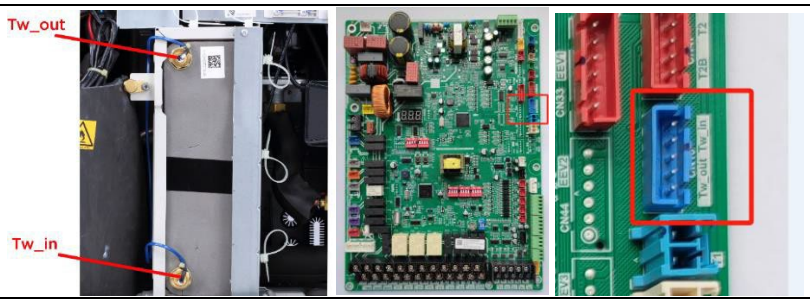
Request aftersales service


PP/Hb in heating/DHW mode
Outlet pipe and inlet pipe connected reversely
Yes
Re-connect the pipes securely
No
Tw_in sensor and Tw_out sensor connected reversely on plate heat exchanger or on Main control PCB
Yes
Re-connect the sensors securely
No
Pull out Tw_out/Tw_in sensor from plate heat exchanger, leave it in the air for 10 mins, if the temperature difference between sensor and air is greater than 5℃, the sensor failed.
You can also measure the resistance and compare it with sensor's resistance characteristics table (Refer to part 4 Appendix), If the resistance is not consistent, the sensor has failed.
Yes
Replace Tw_out/Tw_in temperature sensor
No
Connection cable of 4-way valve was misconnected
Yes
Re-connect the cable securely
No
Feel the temperature of the 4- way valve by hand, C pipe is hot, E pipe is cold
No
Replace 4-way valve
Yes
Request aftersales service

76.P5 TROUBLESHOOTING

77.DIGITAL DISPLAY OUTPUT

78.DESCRIPTION

Error code	*P5*
Description	The big temperature difference between outlet water temp. and inlet water temp.
Triggering	Twout-Twin≥30℃ in heating/DHW mode Twout-Twin≥17℃ in cooling mode
Tw_in Tw_out	

79.PROCEDURE

P5 : The big temperature difference between outlet water temp. and inlet water temp.

↓

Check “Unit Status-Error info.” on the User Interface, and E8/E0 code occurred at roughly the same time

Yes → Check and clean pipe and filter, Ensure water pressure and water-flow rate is in Proper range For more details, refer to E8/E0 troubleshooting procedure.

No ↓

Check ”Unit Status-Operation Parameter- water flow” is smaller than normal

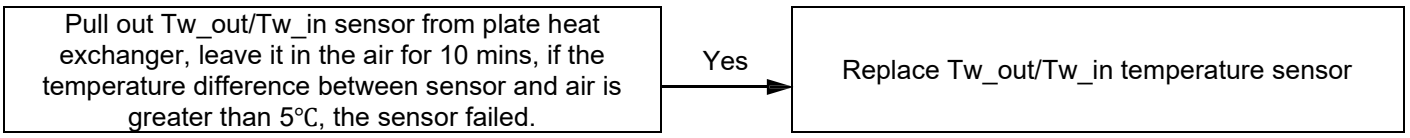
Yes → Check and clean pipe and filter, Ensure water pressure and water-flow rate is in proper range

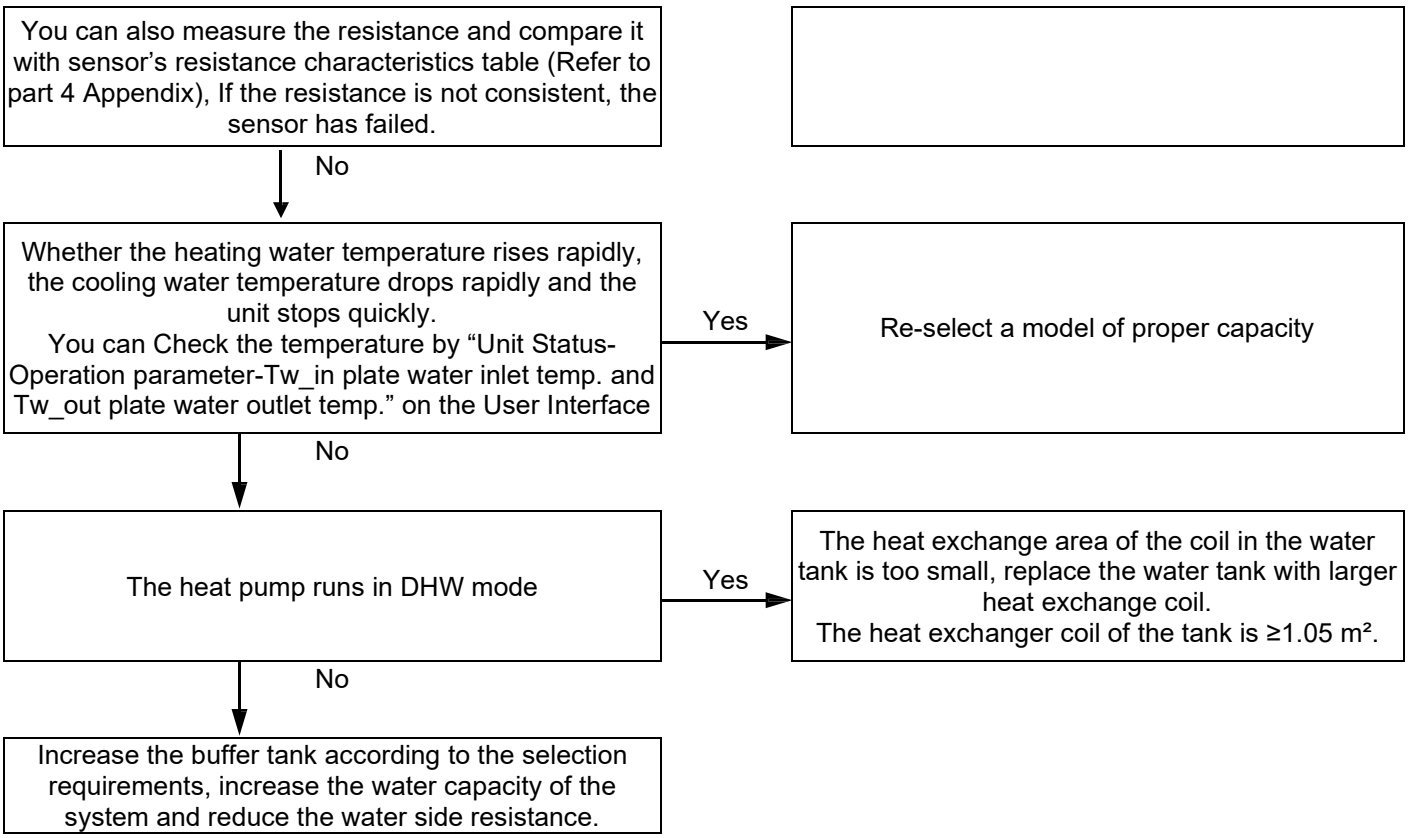
No ↓

Check whether Twout/Twin sensor fell out from the fixed position

Yes → Re-fix the Twout/Twin sensor to the installation position.

No ↓

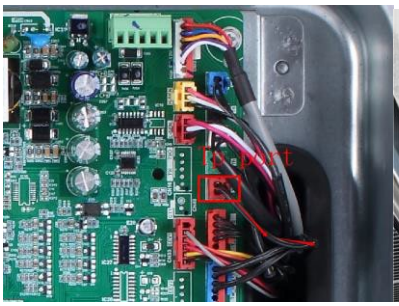
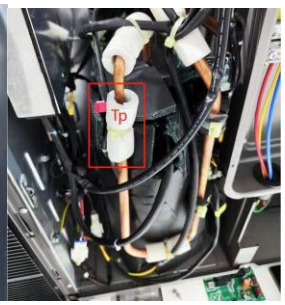

Pull out Tw_out/Tw_in sensor from plate heat exchanger, leave it in the air for 10 mins, if the temperature difference between sensor and air is greater than 5℃, the sensor failed.
Yes
Replace Tw_out/Tw_in temperature sensor


You can also measure the resistance and compare it with sensor's resistance characteristics table (Refer to part 4 Appendix), If the resistance is not consistent, the sensor has failed.
No
Whether the heating water temperature rises rapidly, the cooling water temperature drops rapidly and the unit stops quickly.
You can Check the temperature by "Unit Status-Operation parameter-Tw_in plate water inlet temp. and Tw_out plate water outlet temp." on the User Interface
Yes
Re-select a model of proper capacity
No
The heat pump runs in DHW mode
Yes
The heat exchange area of the coil in the water tank is too small, replace the water tank with larger heat exchange coil.
The heat exchanger coil of the tank is ≥1.05 m².
No
Increase the buffer tank according to the selection requirements, increase the water capacity of the system and reduce the water side resistance.

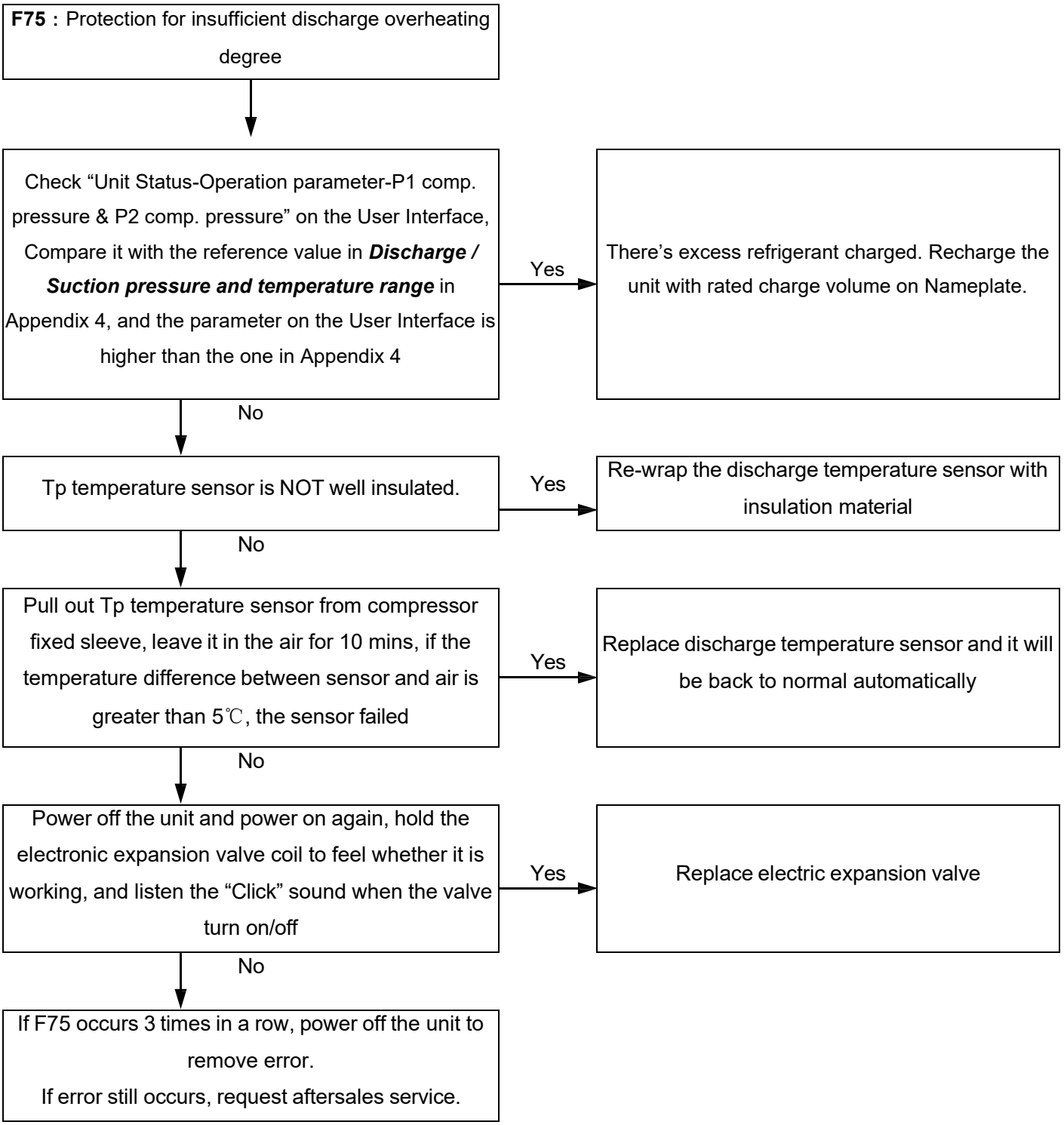
80.F75 TROUBLESHOOTING

81.DIGITAL DISPLAY OUTPUT

82.DESCRIPTION

Error code	*F75*	
Description	Protection for insufficient discharge overheating degree.	
Triggering	Tp-Tc < 0℃ and last 10 mins	
Tp discharge temp. sensor	 	
Nameplate		Refer to Nameplate for rated refrigerant charge volume. The picture is for reference only. The actual product may vary.

83.PROCEDURE



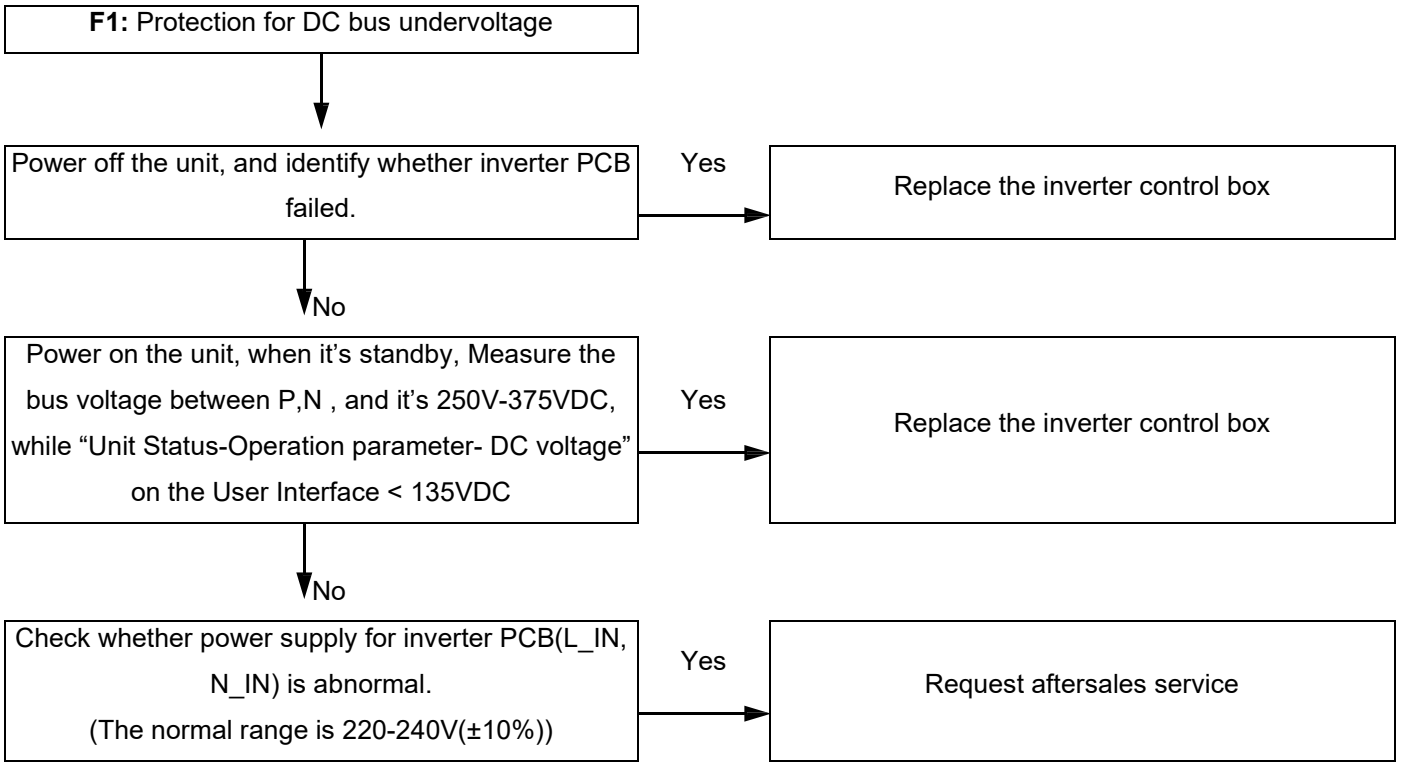
84.F1 TROUBLESHOOTING

85.DIGITAL DISPLAY OUTPUT

86.DESCRIPTION

Error code	*F1*
Description	Protection for DC bus undervoltage
Triggering	For single phase inverter PCB, the DC bus voltage≤200VDC
BUS voltage(P-N) (Inverter PCB)	

87.PROCEDURE

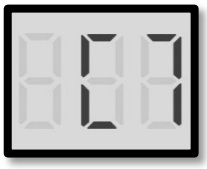


No

Adjust the power supply

88.C7 TROUBLESHOOTING

89.DIGITAL DISPLAY OUTPUT



90.DESCRIPTION

Error code	*C7*
Description	Over-high temperature protection for IPM module
Triggering	IPM module temperature ≥ 95℃

91.PROCEDURE

C7：Over-high temperature protection for IPM module

The unit was installed in a site that is narrow, with bad ventilation, or in a high temperature. Or the heat exchanger was blocked.

Yes → Place the unit somewhere broad, with good ventilation, or in a medium temperature. Make sure the heat exchanger be not blocked.

No

Check whether the finned tube heat exchanger is dirty block

Yes → Clean the finned tube heat exchanger

No

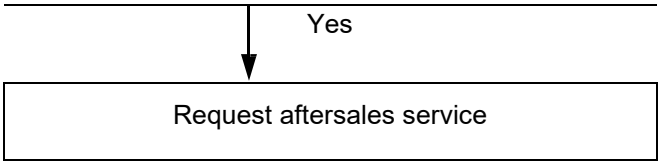
Check whether the inverter control box is dirty block or with some obstacles

Yes → Remove the obstacle

No

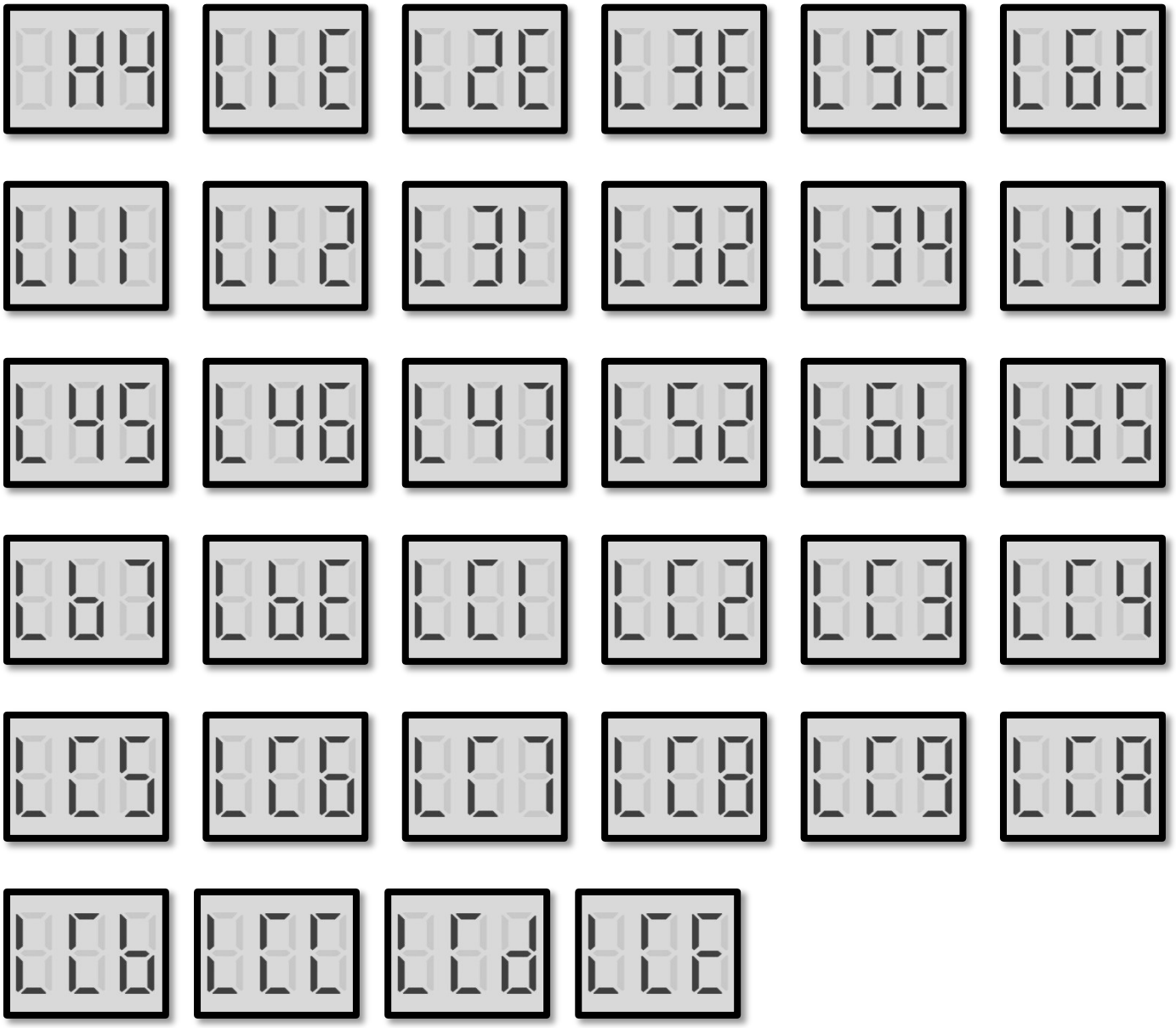
Reboot the unit, observe whether the fan is running normally

No → Replace fan motor or identify whether inverter PCB failed (Refer to part 4 Appendix: Guide for identifying inverter PCB failure)


Yes
Request aftersales service

92.H4, L** TROUBLESHOOTING

93.DIGITAL DISPLAY OUTPUT



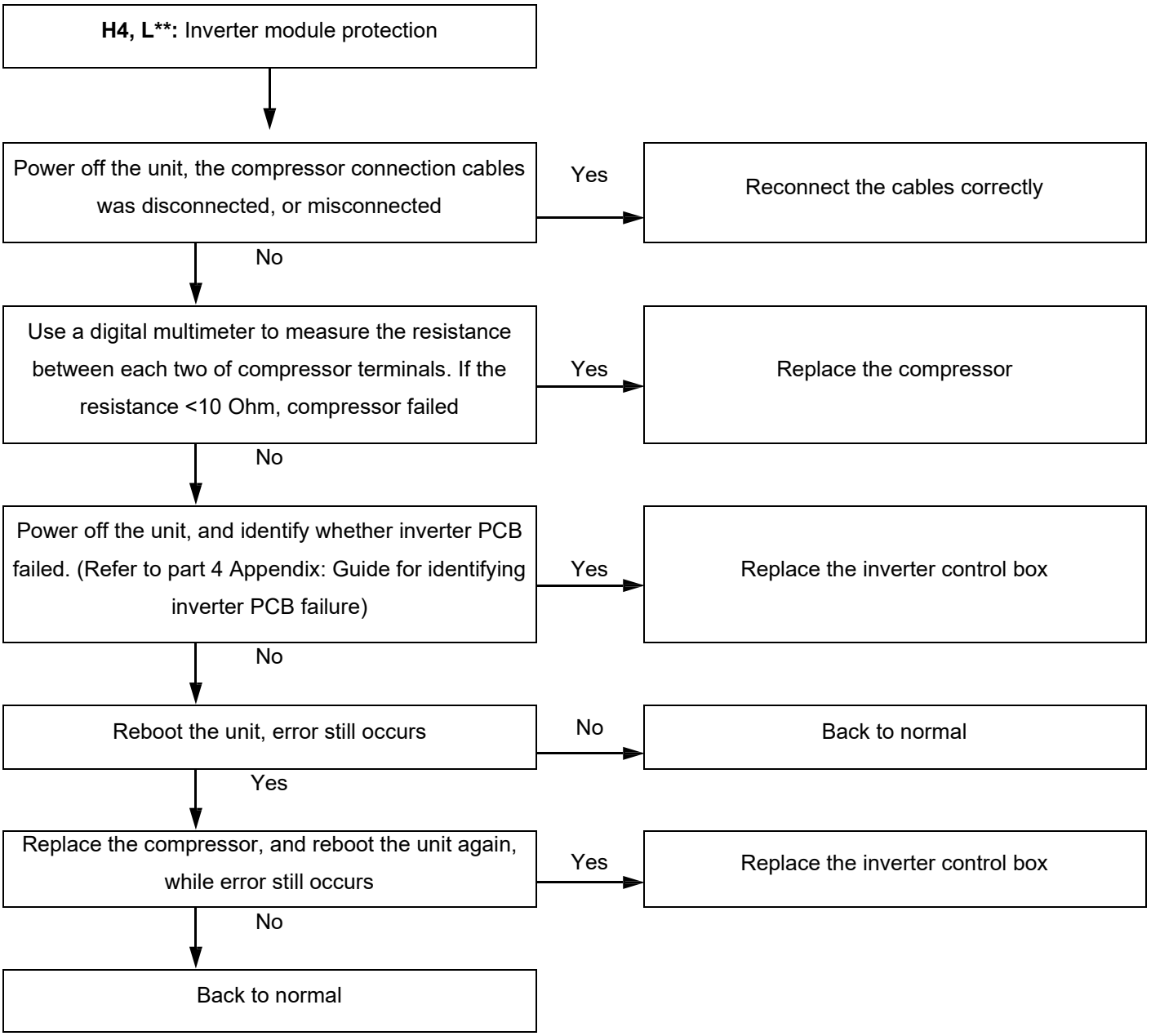
94.DESCRIPTION

Error code	*Description*	*Note*
H4	3 times of “L1*” in 60 mins	
L**	Inverter module protection	Check the specific code on digital display panel on the Main Control PCB

*The specific L** code table:*

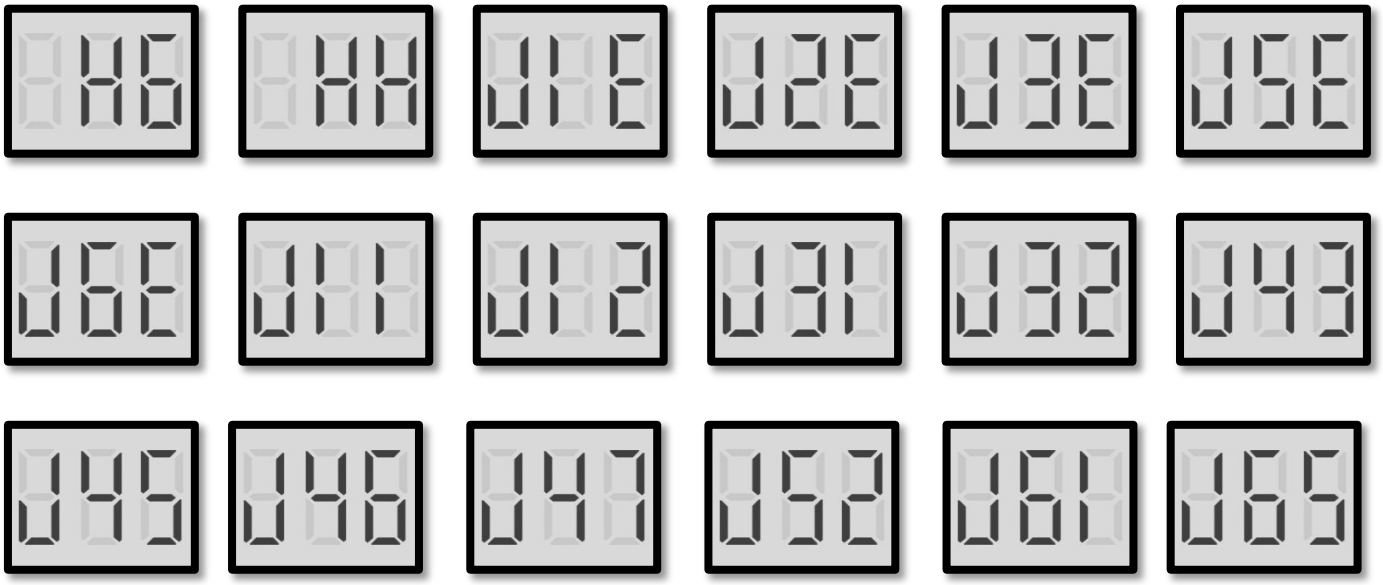
Error code	Description	Note
L1E	Hardware overcurrent protection	
L11	Phase current instantaneous overcurrent protection	
L12	Phase current continuous 30s overcurrent protection	
L2E	Over-temperature protection	
L3E	Bus voltage too low error	
L31	Bus voltage too high error	
L32	Bus voltage excessively high error	
L34	Phase loss error of three-phase power supply	For 3Ph units
L43	Abnormal phase current sampling bias	
L45	Fan motor code mismatch error	
L46	IPM protection (FO)	
L47	Module type mismatch	
L5E	Motor failed to start	
L52	Motor stalling protection	
L6E	Phase loss protection	
L61	Compressor terminals short circuit protection	
L65	IPM short circuit protection	
LBE	Action of high pressure switch	
LB7	PED bH error	
LCE	PFC HARDWARE OVERCURRENT PROTECTION	For 3Ph units
LC1	Instantaneous overcurrent of PFC software protection	For 3Ph units
LC2	PFC software continuous 30 s overcurrent protection	For 3Ph units
LC3	PFC low voltage protection	For 3Ph units
LC4	PFC power factor is less than 0.8	For 3Ph units
LC5	PFC valid value overcurrent protection	For 3Ph units
LC6	PFC1 channel hardware overcurrent protection	For 3Ph units
LC7	PFC2 channel hardware overcurrent protection	For 3Ph units
LC8	PFC3 channel hardware overcurrent protection	For 3Ph units
LC9	Over-temperature protection of PFC module	For 3Ph units
LCA	PFC module CBC overcurrent error protection	For 3Ph units
LCB	Overvoltage of PFC bus or PFC half bus	For 3Ph units
LCC	Short circuit of PFC IGBT	For 3Ph units
LCD	Abnormal PFC Ad sampling bias	For 3Ph units

95.PROCEDURE



96.H6, HH, J** TROUBLESHOOTING

97.DIGITAL DISPLAY OUTPUT



98.DESCRIPTION

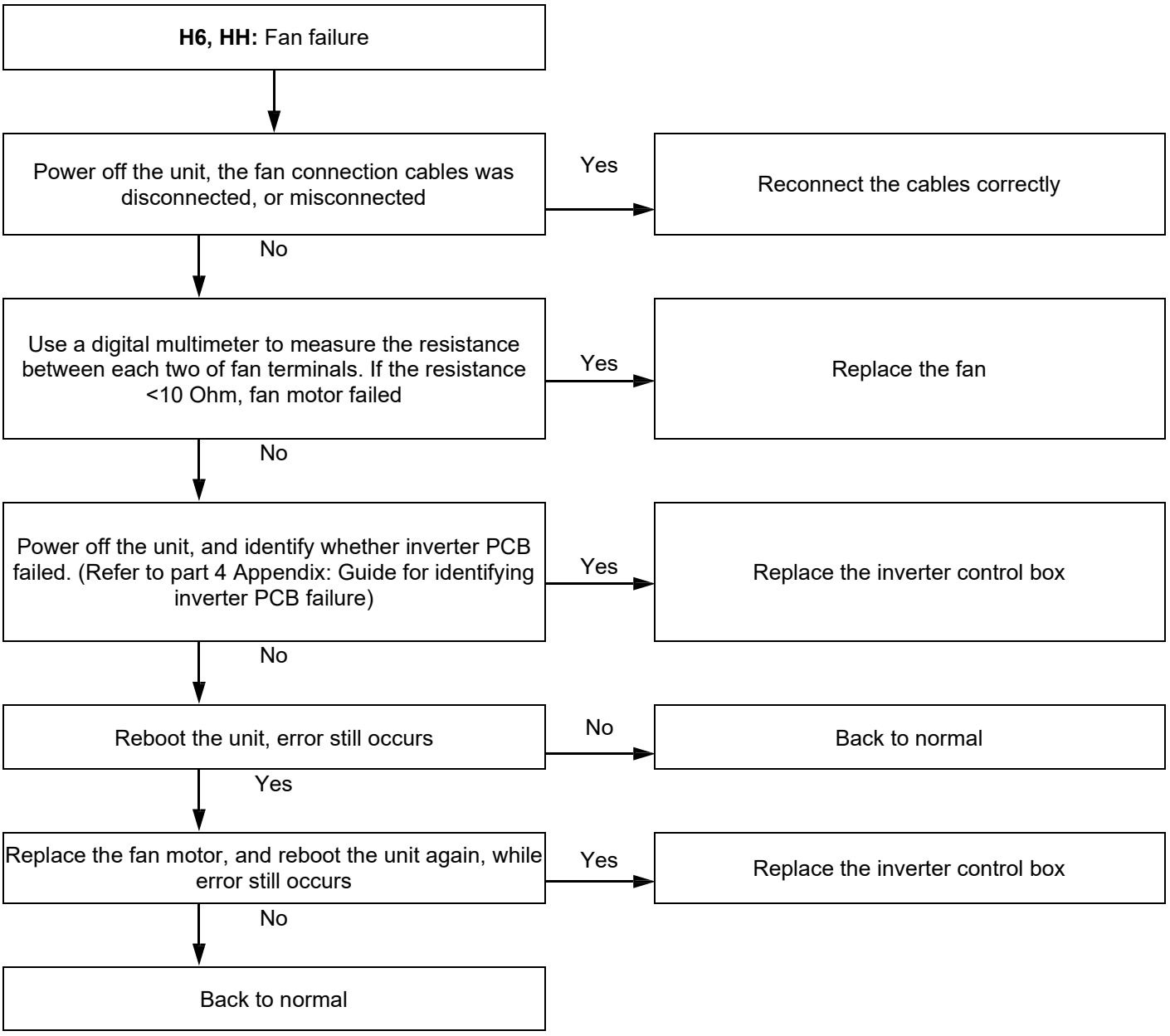
Error code	*Description*	*Note*
H6	Fan failure	
HH	10 times of H6 in 120mins	
J**	Fan module failure	Check the specific code on digital display panel on the Main Control PCB

*The specific J** code table:*

Error code	*Description*
J1E	Hardware overcurrent protection
J11	Phase current instantaneous overcurrent protection
J12	Phase current continuous 30s overcurrent protection
J2E	Over-temperature protection
J3E	Bus voltage too low error
J31	Bus voltage too high error
J32	Bus voltage excessively high error
J43	Abnormal phase current sampling bias
J45	Fan motor code mismatch error
J46	IPM protection (FO)
J47	Module type mismatch (after module resistance tested)
J5E	Motor failed to start
J52	Motor stalling protection
J6E	Phase loss protection
J61	Fan terminals short circuit protection

J65	IPM short circuit protection

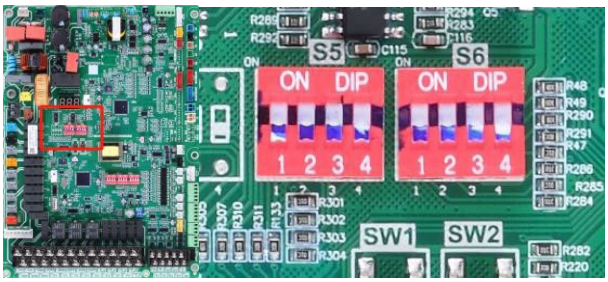
99.PROCEDURE



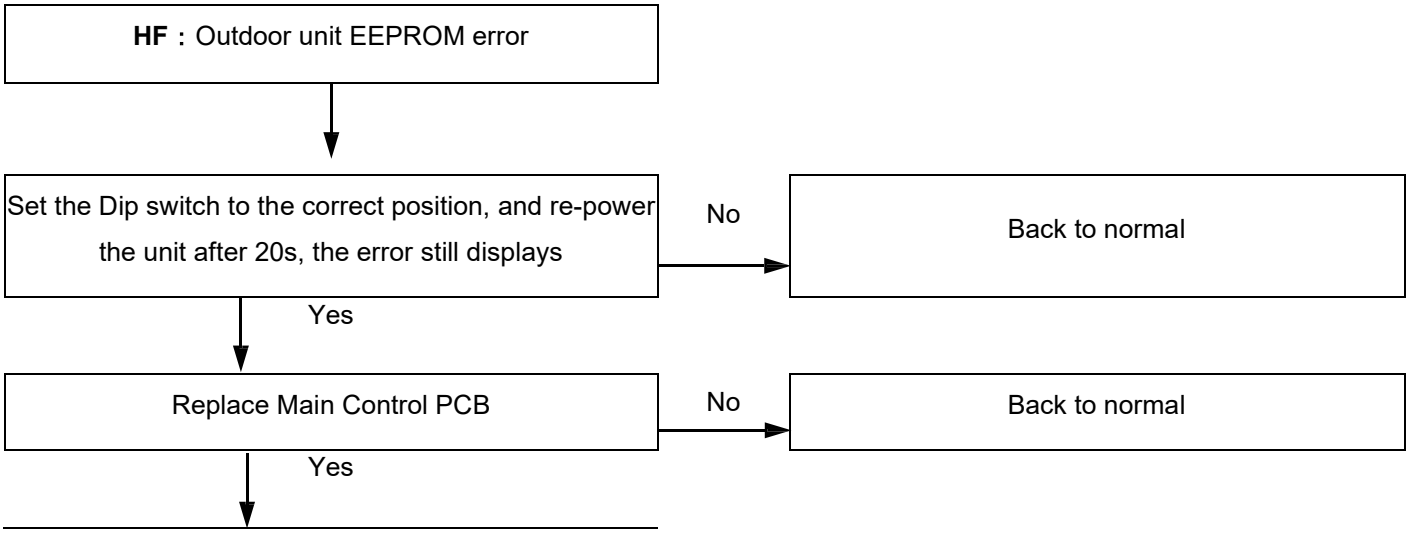
100.HF TROUBLESHOOTING

101.DIGITAL DISPLAY OUTPUT

102.DESCRIPTION

Error code		*HF*
Description		Outdoor unit EEPROM error
Triggering		The driving program of inverter PCB is detected as being mismatched with Dip switch
Relative ports and locations	Dip switch S5 S6	
Correct Dip switch	S5	0/0/0/0
	S6 (4-16kW 1Ph)	0/0/0/1-4kW、0/0/1/0-6kW、0/0/1/1-8kW、0/1/0/0-10kW、0/1/0/1-12kW、 0/1/1/0-14kW、0/1/1/1-16kW
	S6 (12-16kW 3Ph)	1/1/0/1-12kW、1/1/1/0-14kW、1/1/1/1-10kW、

103.PROCEDURE

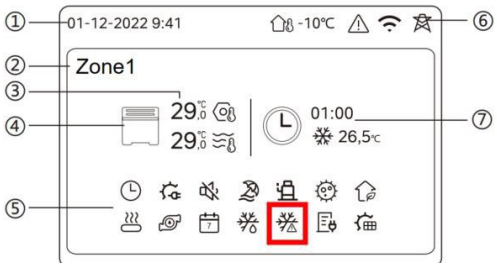


Replace the inverter control box

104.PB TROUBLESHOOTING

105.DIGITAL DISPLAY OUTPUT

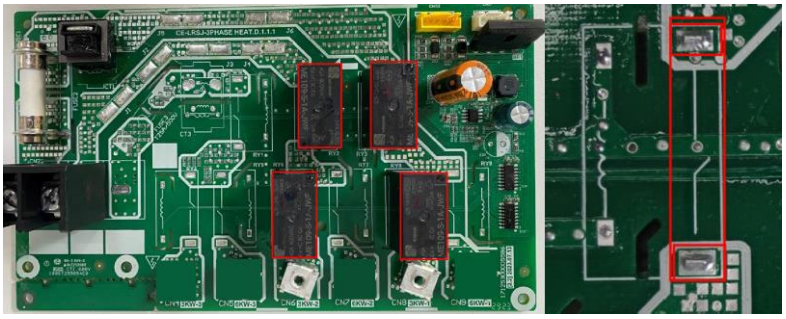
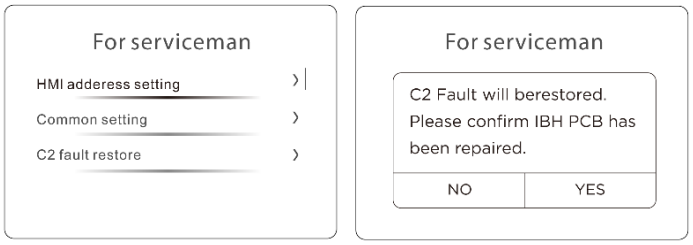
106.DESCRIPTION

Error code	*Pb*
Description	Pb is the indicator that shows the system is running in anti-freezing control
Triggering	Refer to Part 3 - Protection control – Anti-freezing protection control
User Interface	 It shows anti-freezing icon on the User Interface

107.C2 TROUBLESHOOTING

108.DIGITAL DISPLAY OUTPUT

109.DESCRIPTION

Error code		*C2*
Description		Relay adhesion on IBH PCB
Triggering		Relay: Poor contact, relay deformation, relay aging, etc. External factors : overcurrent, over high ambient temperature, etc.
Relative ports and locations	Relays and pins of a relay	
	User interface -For Serviceman- C2 restore	

110.PROCEDURE

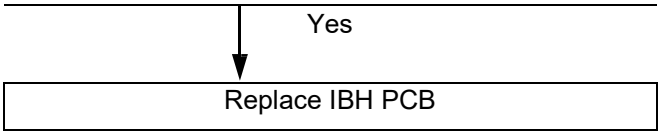
C2：Relay adhesion on IBH PCB

↓

Power off the unit and remove IBH PCB. Use a digital multimeter to measure the resistance between the pins of a relay on the back of IBH PCB. If the resistance is valid, relay adhesion happened.

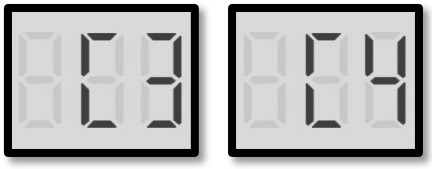
No →

Restore C2 error on the user interface. (User Interface- For Serviceman –C2 Restore)

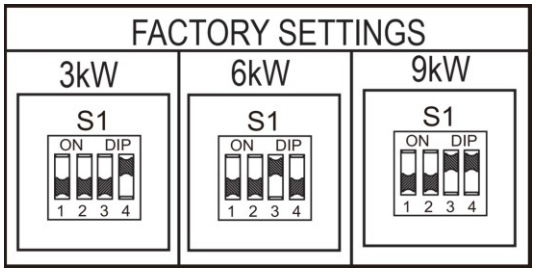
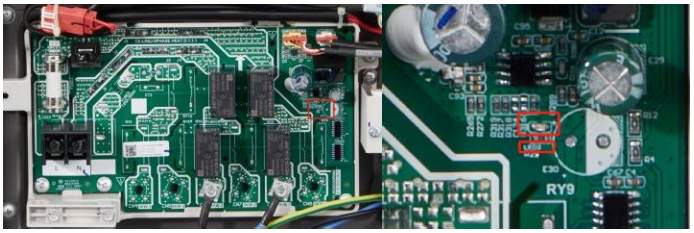
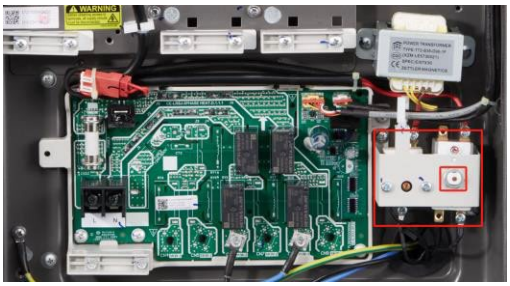
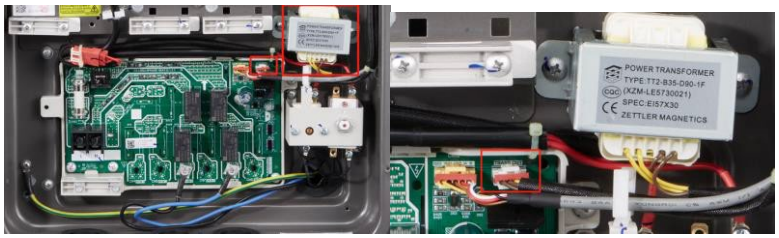

Yes
Replace IBH PCB

111.C3, C4 TROUBLESHOOTING

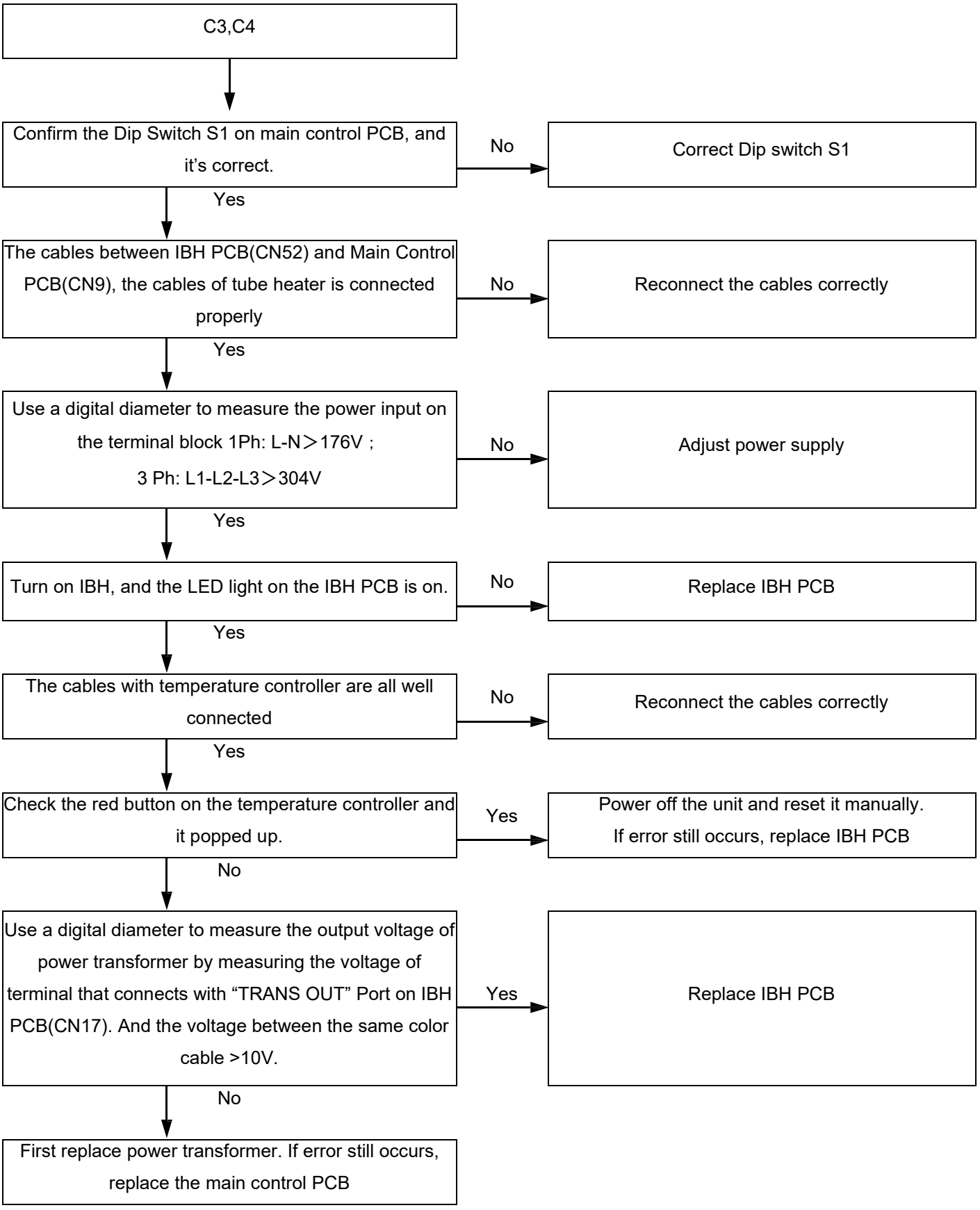
112.DIGITAL DISPLAY OUTPUT



113.DESCRIPTION

Error code	*C3*	*C4*
Description	Current transformer failure or circuit failure of IBH PCB	C3≥3 times
Triggering	Incorrect Dip switch S1, cables with IBH connected improperly; Overvoltage, IBH failure etc.	
Correct Dip switch S1		
IBH PCB LED light		
Temperature controller		
Power transformer And “TRANS OUT” port		

114.PROCEDURE



115.DISCHARGE / SUCTION PRESSURE AND TEMPERATURE RANGE

The following parameter ranges are used to roughly determine whether the system is running properly:

Discharge temperature(Tp) on heating/DHW mode	
T4＜-10℃	Twout+10＜Tp＜Twout+30
-10℃≤T4＜10℃	Twout+10＜Tp＜Twout+30
10℃≤T4＜25℃	Twout+10＜Tp＜Twout+25
T4≥25℃	Twout+10＜Tp＜Twout+25
Note: T4: ambient temperature Tw_out: leaving water temperature.	

Discharge temperature(Tp) on cooling mode				
Tp (℃)	Fx＜44Hz	44Hz≤Fx＜62Hz	62Hz≤Fx＜72Hz	Fx≥72Hz
T4＜25℃	50±10	55±10	60±10	65±10
25℃≤T4＜30℃	55±10	60±10	65±10	70±10
30℃≤T4＜35℃	60±10	65±10	70±10	75±10
35℃≤T4＜40℃	65±10	70±10	75±10	80±10
40℃≤T4＜46℃	70±10	75±10	80±10	85±10
T4≥46℃	70±10	75±10	80±10	85±10
Note: T4: ambient temperature Fx: compressor frequency				

Discharge pressure(P1) for heating/DHW mode						
Tw_out(℃)	25	30	35	40	45	50
P1（kPa）	1000±100	1150±100	1300±100	1450±100	1600±100	1800±100
Tw_out(℃)	55	60	65	70	75	
P1（kPa）	2000±150	2200±150	2450±150	2700±150	3000±150	
Note: P1 is absolute pressure.						

Suction pressure(P2) for cooling mode							
Tw_out(℃)	5～7	8～10	11～13	14～16	17～19	20～22	23～25
P2（kPa）	520±50	570±50	610±50	670±50	740±50	780±50	830±50
Note: P2 is absolute pressure.							

116.APPENDIX

117.TEMPERATURE SENSOR RESISTANCE CHARACTERISTICS

Applied to

T3 Outdoor unit heat exchanger bottom temperature sensor T4 Ambient temperature sensor
Th Return-air temperature sensor
T2 Plate heat exchanger outlet refrigerant temperature sensor T2B Plate heat exchanger inlet refrigerant temperature sensor TL Outdoor unit heat exchanger outlet temperature sensor

R25=10KΩ±3%, B25/50=4100K±3%

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R (t) Normal	Rmin		Rmax	R (t) Normal	Rmin
-40	433.108	383.315	336.854	-8	57.649	53.458	49.492
-39	404.038	358.094	315.212	-7	54.456	50.575	46.899
-38	377.08	334.677	295.088	-6	51.456	47.862	44.455
-37	352.071	312.924	276.365	-5	48.636	45.308	42.15
-36	328.859	292.709	258.939	-4	45.984	42.903	39.977
-35	307.306	273.916	242.714	-3	43.49	40.638	37.927
-34	287.285	256.435	227.599	-2	41.144	38.504	35.992
-33	268.678	240.17	213.514	-1	38.935	36.492	34.165
-32	251.38	225.029	200.382	0	36.857	34.596	32.44
-31	235.291	210.929	188.133	1	34.898	32.807	30.81
-30	220.32	197.792	176.705	2	33.055	31.12	29.271
-29	206.384	185.547	166.037	3	31.317	29.528	27.815
-28	193.407	174.131	156.075	4	29.681	28.026	26.44
-27	181.317	163.481	146.768	5	28.138	26.608	25.14
-26	170.049	153.543	138.071	6	26.682	25.268	23.909
-25	159.543	144.266	129.939	7	25.31	24.003	22.745
-24	149.745	135.601	122.333	8	24.016	22.808	21.644
-23	140.602	127.507	115.216	9	22.794	21.678	20.601
-22	132.067	119.941	108.555	10	21.641	20.61	19.614
-21	124.098	112.867	102.318	11	20.553	19.601	18.68
-20	116.539	106.732	96.92	12	19.525	18.646	17.794
-19	110.231	100.552	91.451	13	18.554	17.743	16.955
-18	103.743	94.769	86.328	14	17.636	16.888	16.16
-17	97.673	89.353	81.525	15	16.769	16.079	15.406
-16	91.99	84.278	77.017	16	15.949	15.313	14.691
-15	86.669	79.521	72.788	17	15.174	14.588	14.014
-14	81.684	75.059	68.815	18	14.442	13.902	13.372
-13	77.013	70.873	65.083	19	13.748	13.251	12.762
-12	72.632	66.943	61.574	20	13.093	12.635	12.183
-11	68.523	63.252	58.274	21	12.471	12.05	11.634
-10	64.668	59.784	55.169	22	11.883	11.496	11.112
-9	61.048	56.524	52.246	23	11.327	10.971	10.617

Continue on next page…

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R (t) Normal	Rmin		Rmax	R (t) Normal	Rmin
24	10.8	10.473	10.147	66	2.004	1.883	1.766
25	10.3	10	9.7	67	1.934	1.816	1.702
26	9.848	9.551	9.255	68	1.867	1.752	1.641
27	9.418	9.125	8.834	69	1.802	1.69	1.582
28	9.01	8.721	8.434	70	1.74	1.631	1.525
29	8.621	8.337	8.055	71	1.68	1.574	1.471
30	8.252	7.972	7.695	72	1.622	1.519	1.419
31	7.9	7.625	7.353	73	1.567	1.466	1.369
32	7.566	7.296	7.029	74	1.514	1.416	1.321
33	7.247	6.982	6.721	75	1.463	1.367	1.275
34	6.944	6.684	6.428	76	1.414	1.321	1.23
35	6.656	6.401	6.15	77	1.367	1.276	1.188
36	6.381	6.131	5.886	78	1.321	1.233	1.147
37	6.119	5.874	5.634	79	1.277	1.191	1.108
38	5.87	5.63	5.395	80	1.235	1.151	1.07
39	5.631	5.397	5.167	81	1.195	1.113	1.034
40	5.404	5.175	4.951	82	1.156	1.076	0.999
41	5.188	4.964	4.745	83	1.118	1.041	0.966
42	4.982	4.763	4.549	84	1.082	1.007	0.934
43	4.785	4.571	4.362	85	1.047	0.974	0.903
44	4.596	4.387	4.183	86	1.014	0.942	0.874
45	4.417	4.213	4.014	87	0.982	0.912	0.845
46	4.246	4.046	3.851	88	0.951	0.883	0.818
47	4.082	3.887	3.697	89	0.921	0.855	0.791
48	3.925	3.735	3.55	90	0.892	0.828	0.766
49	3.776	3.59	3.409	91	0.864	0.802	0.742
50	3.632	3.451	3.274	92	0.838	0.777	0.719
51	3.495	3.318	3.146	93	0.812	0.753	0.696
52	3.363	3.191	3.023	94	0.787	0.73	0.675
53	3.237	3.069	2.905	95	0.763	0.708	0.654
54	3.116	2.952	2.793	96	0.74	0.686	0.634
55	3.001	2.841	2.685	97	0.718	0.666	0.615
56	2.89	2.734	2.582	98	0.697	0.646	0.597
57	2.784	2.632	2.484	99	0.677	0.627	0.579
58	2.682	2.534	2.39	100	0.657	0.609	0.562
59	2.585	2.44	2.299	101	0.638	0.591	0.546
60	2.491	2.35	2.213	102	0.62	0.574	0.53
61	2.401	2.264	2.13	103	0.602	0.558	0.515
62	2.315	2.181	2.051	104	0.585	0.542	0.501
63	2.233	2.102	1.975	105	0.569	0.527	0.485
64	2.154	2.026	1.903				
65	2.077	1.953	1.833				

End

Applied to

Tp Discharge temperature sensor

R90℃=5KΩ±3%，B25/50=3950K±3%

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R（t）Normal	Rmin		Rmax	R（t）Normal	Rmin
-40	2002.628	1642.059	1281.49	-8	318.604	271.634	224.664
-39	1881.964	1544.968	1207.972	-7	302.08	257.867	213.653
-38	1769.292	1454.213	1139.134	-6	286.483	244.857	203.232
-37	1664.009	1369.32	1074.631	-5	271.757	232.561	193.365
-36	1565.57	1289.862	1014.154	-4	257.852	220.937	184.022
-35	1473.481	1215.451	957.421	-3	244.717	209.945	175.173
-34	1387.282	1145.725	904.168	-2	232.309	199.55	166.79
-33	1306.554	1080.355	854.156	-1	220.585	189.716	158.848
-32	1230.918	1019.042	807.166	0	209.504	180.412	151.321
-31	1160.015	961.505	762.994	1	199.029	171.607	144.186
-30	1093.521	907.487	721.452	2	189.125	163.273	137.422
-29	1031.137	856.752	682.368	3	179.759	155.383	131.007
-28	972.588	809.086	645.583	4	170.899	147.911	124.923
-27	917.615	764.281	610.947	5	162.517	140.835	119.152
-26	865.981	722.152	578.323	6	154.585	134.13	113.675
-25	817.469	682.528	547.586	7	147.077	127.778	108.478
-24	771.875	645.245	518.616	8	139.97	121.757	103.544
-23	729.009	610.156	491.303	9	133.239	116.049	98.859
-22	688.698	577.121	465.544	10	126.864	110.638	94.411
-21	650.778	546.012	441.246	11	120.825	105.505	90.185
-20	615.097	516.708	418.318	12	115.103	100.636	86.17
-19	581.515	489.096	396.678	13	109.679	96.017	82.354
-18	549.899	463.073	376.247	14	104.537	91.633	78.728
-17	520.129	438.542	356.955	15	99.662	87.471	75.28
-16	492.089	415.411	338.733	16	95.038	83.52	72.001
-15	465.672	393.595	321.518	17	90.652	79.767	68.882
-14	440.779	373.014	305.25	18	86.489	76.202	65.915
-13	417.316	353.595	289.874	19	82.539	72.815	63.091
-12	395.197	335.268	275.339	20	78.789	69.596	60.404
-11	374.34	317.967	261.594	21	75.228	66.537	57.845
-10	354.669	301.632	248.595	22	71.846	63.627	55.409
-9	336.113	286.206	236.298	23	68.633	60.86	53.088

Continue on next page…

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R (t) Normal	Rmin		Rmax	R (t) Normal	Rmin
24	65.58	58.228	50.877	66	11.858	11.134	10.411
25	62.678	55.724	48.77	67	11.432	10.749	10.066
26	59.919	53.34	46.762	68	11.024	10.38	9.735
27	57.295	51.071	44.847	69	10.632	10.024	9.416
28	54.8	48.91	43.021	70	10.255	9.682	9.109
29	52.426	46.853	41.279	71	9.894	9.354	8.814
30	50.167	44.892	39.617	72	9.546	9.038	8.53
31	48.016	43.024	38.031	73	9.213	8.734	8.255
32	45.969	41.243	36.517	74	8.892	8.442	7.992
33	44.019	39.546	35.072	75	8.584	8.161	7.737
34	42.162	37.927	33.692	76	8.288	7.89	7.492
35	40.392	36.383	32.373	77	8.003	7.629	7.256
36	38.706	34.91	31.113	78	7.729	7.379	7.028
37	37.098	33.504	29.909	79	7.466	7.137	6.809
38	35.566	32.162	28.758	80	7.213	6.905	6.597
39	34.104	30.881	27.657	81	6.969	6.681	6.393
40	32.709	29.657	26.605	82	6.735	6.466	6.196
41	31.379	28.488	25.598	83	6.509	6.258	6.006
42	30.109	27.372	24.634	84	6.292	6.058	5.823
43	28.896	26.304	23.712	85	6.084	5.865	5.646
44	27.739	25.284	22.829	86	5.883	5.679	5.476
45	26.633	24.309	21.984	87	5.689	5.5	5.311
46	25.577	23.376	21.174	88	5.502	5.327	5.152
47	24.568	22.483	20.399	89	5.323	5.161	4.998
48	23.603	21.629	19.656	90	5.15	5	4.85
49	22.681	20.812	18.943	91	4.996	4.845	4.694
50	21.799	20.03	18.261	92	4.847	4.696	4.545
51	20.956	19.281	17.606	93	4.703	4.552	4.4
52	20.149	18.563	16.978	94	4.564	4.412	4.261
53	19.377	17.876	16.375	95	4.43	4.278	4.127
54	18.638	17.218	15.797	96	4.3	4.149	3.997
55	17.931	16.587	15.243	97	4.175	4.024	3.872
56	17.254	15.982	14.71	98	4.054	3.903	3.752
57	16.606	15.402	14.199	99	3.937	3.787	3.636
58	15.984	14.846	13.708	100	3.824	3.674	3.524
59	15.389	14.313	13.236	101	3.715	3.565	3.416
60	14.819	13.801	12.783	102	3.609	3.46	3.312
61	14.272	13.31	12.348	103	3.507	3.359	3.211
62	13.748	12.839	11.929	104	3.409	3.261	3.114
63	13.246	12.387	11.527	105	3.313	3.167	3.02
64	12.764	11.952	11.14	106	3.221	3.075	2.929
65	12.302	11.535	10.768	107	3.131	2.987	2.842

Continue on next page…

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R (t) Normal	Rmin		Rmax	R (t) Normal	Rmin
108	3.045	2.901	2.758	132	1.625	1.511	1.397
109	2.962	2.819	2.676	133	1.586	1.473	1.36
110	2.881	2.739	2.597	134	1.548	1.436	1.324
111	2.802	2.662	2.521	135	1.511	1.401	1.29
112	2.727	2.587	2.448	136	1.475	1.366	1.257
113	2.653	2.515	2.377	137	1.44	1.332	1.225
114	2.582	2.445	2.308	138	1.407	1.3	1.193
115	2.514	2.378	2.242	139	1.374	1.268	1.163
116	2.447	2.313	2.178	140	1.342	1.238	1.133
117	2.383	2.249	2.116	141	1.311	1.208	1.105
118	2.32	2.188	2.056	142	1.281	1.179	1.077
119	2.26	2.129	1.998	143	1.252	1.151	1.051
120	2.201	2.072	1.942	144	1.224	1.124	1.024
121	2.145	2.016	1.888	145	1.196	1.098	0.999
122	2.09	1.963	1.836	146	1.169	1.072	0.975
123	2.037	1.911	1.785	147	1.143	1.047	0.951
124	1.985	1.86	1.736	148	1.118	1.023	0.928
125	1.935	1.812	1.689	149	1.093	0.999	0.905
126	1.887	1.765	1.643	150	1.069	0.977	0.884
127	1.84	1.719	1.598				
128	1.794	1.675	1.555				
129	1.75	1.632	1.514				
130	1.707	1.59	1.473				
131	1.665	1.55	1.434				

End

Applied to

TW_in Plate heat exchanger inlet water temperature sensor

TW_out Plate heat exchanger outlet water temperature sensor

T5 Water tank temperature sensor

TW2 Zone 2 water flow temperature sensor

R50=17.6KΩ±3%，B0/100=3970K±2%

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R（t）Normal	Rmin		Rmax	R（t）Normal	Rmin
-40	1822.916	1608.351	1393.786	-8	263.273	242.131	220.989
-39	1705.939	1507.271	1308.602	-7	249.357	229.593	209.828
-38	1596.976	1412.994	1229.013	-6	236.255	217.774	199.293
-37	1495.47	1325.058	1154.647	-5	223.915	206.63	189.345
-36	1400.897	1243.025	1085.152	-4	212.289	196.119	179.949
-35	1312.771	1166.486	1020.2	-3	201.332	186.201	171.07
-34	1230.637	1095.061	959.485	-2	191.001	176.84	162.678
-33	1154.07	1028.393	902.717	-1	181.258	168.001	154.744
-32	1082.675	966.151	849.626	0	172.066	159.653	147.24
-31	1016.084	908.023	799.962	1	163.391	151.766	140.141
-30	953.957	853.724	753.491	2	155.2	144.311	133.422
-29	896.053	802.986	709.918	3	147.466	137.264	127.062
-28	842.002	755.557	669.113	4	140.159	130.599	121.038
-27	791.53	711.21	630.889	5	133.253	124.293	115.332
-26	744.384	669.728	595.072	6	126.725	118.326	109.926
-25	700.328	630.913	561.498	7	120.554	112.679	104.803
-24	659.144	594.58	530.015	8	114.715	107.33	99.945
-23	620.629	560.556	500.483	9	109.191	102.265	95.338
-22	584.595	528.683	472.771	10	103.963	97.466	90.969
-21	550.871	498.814	446.757	11	99.013	92.918	86.822
-20	519.295	470.812	422.328	12	94.327	88.607	82.888
-19	489.718	444.548	399.379	13	89.887	84.519	79.152
-18	462.003	419.907	377.812	14	85.679	80.642	75.604
-17	436.022	396.779	357.537	15	81.692	76.963	72.234
-16	411.657	375.063	338.468	16	77.911	73.471	69.032
-15	388.797	354.662	320.527	17	74.326	70.157	65.989
-14	367.343	335.492	303.641	18	70.925	67.011	63.097
-13	347.198	317.47	287.743	19	67.699	64.023	60.347
-12	328.275	300.521	272.767	20	64.636	61.184	57.731
-11	310.495	284.576	258.658	21	61.729	58.486	55.243
-10	293.78	269.569	245.359	22	58.967	55.921	52.875
-9	278.06	255.439	232.818	23	56.345	53.483	50.621

Continue on next page…

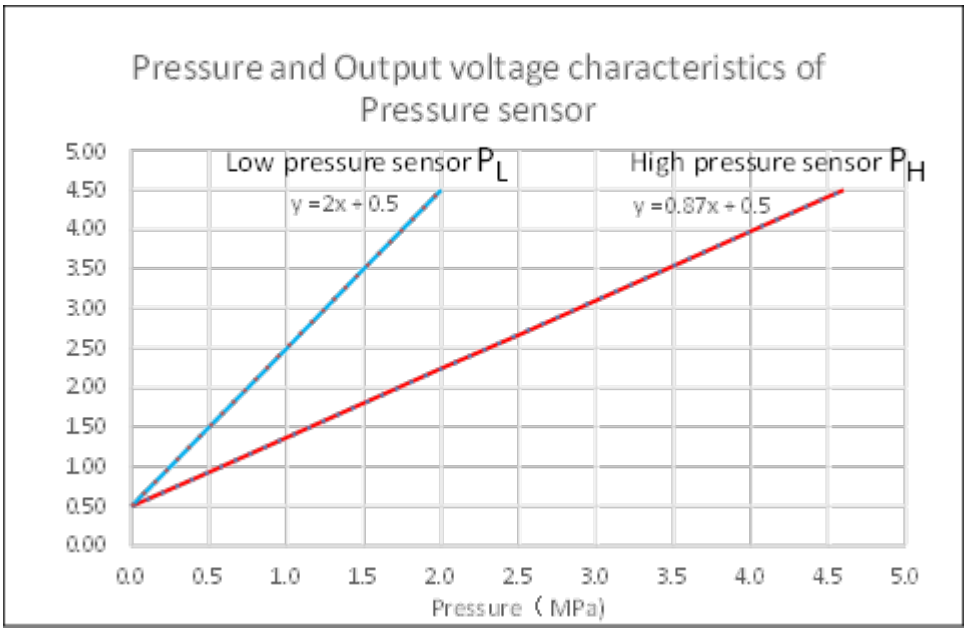
Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R（t）Normal	Rmin		Rmax	R（t）Normal	Rmin
24	53.854	51.165	48.476	66	10.231	9.818	9.405
25	51.485	48.959	46.432	67	9.887	9.481	9.075
26	49.234	46.86	44.486	68	9.556	9.157	8.758
27	47.094	44.863	42.632	69	9.237	8.846	8.454
28	45.058	42.961	40.865	70	8.932	8.547	8.163
29	43.121	41.151	39.181	71	8.637	8.259	7.882
30	41.278	39.427	37.575	72	8.354	7.983	7.613
31	39.524	37.784	36.044	73	8.08	7.717	7.354
32	37.854	36.219	34.583	74	7.818	7.461	7.105
33	36.263	34.726	33.189	75	7.565	7.215	6.866
34	34.748	33.304	31.86	76	7.322	6.978	6.635
35	33.305	31.947	30.59	77	7.087	6.75	6.414
36	31.929	30.653	29.378	78	6.861	6.531	6.201
37	30.617	29.419	28.22	79	6.643	6.319	5.995
38	29.367	28.241	27.114	80	6.433	6.115	5.798
39	28.174	27.115	26.057	81	6.23	5.919	5.608
40	27.036	26.042	25.048	82	6.035	5.73	5.425
41	25.949	25.015	24.082	83	5.847	5.548	5.249
42	24.913	24.036	23.159	84	5.666	5.372	5.079
43	23.924	23.1	22.276	85	5.491	5.204	4.916
44	22.979	22.206	21.432	86	5.323	5.041	4.759
45	22.076	21.35	20.624	87	5.16	4.884	4.608
46	21.213	20.532	19.85	88	5.003	4.732	4.462
47	20.389	19.749	19.11	89	4.852	4.587	4.322
48	19.602	19.001	18.401	90	4.706	4.446	4.186
49	18.848	18.285	17.722	91	4.565	4.31	4.056
50	18.128	17.6	17.072	92	4.429	4.179	3.929
51	17.466	16.944	16.422	93	4.298	4.053	3.809
52	16.831	16.316	15.801	94	4.172	3.932	3.692
53	16.223	15.714	15.206	95	4.049	3.814	3.579
54	15.641	15.139	14.638	96	3.932	3.701	3.471
55	15.081	14.586	14.092	97	3.817	3.591	3.365
56	14.545	14.058	13.571	98	3.708	3.486	3.265
57	14.03	13.55	13.07	99	3.601	3.384	3.167
58	13.537	13.064	12.591	100	3.499	3.286	3.073
59	13.063	12.597	12.132	101	3.4	3.191	2.983
60	12.608	12.15	11.692	102	3.303	3.098	2.894
61	12.171	11.721	11.27	103	3.21	3.009	2.809
62	11.752	11.309	10.866	104	3.12	2.923	2.727
63	11.349	10.913	10.478	105	3.032	2.84	2.647
64	10.962	10.533	10.105	106	2.948	2.759	2.571
65	10.589	10.168	9.748	107	2.866	2.681	2.497

Continue on next page…

Temp. (°C)	Resistance (kΩ)			Temp. (°C)	Resistance (kΩ)		
	Rmax	R（t）Normal	Rmin		Rmax	R（t）Normal	Rmin
108	2.787	2.606	2.425	132	1.477	1.364	1.251
109	2.711	2.533	2.356	133	1.44	1.329	1.219
110	2.637	2.463	2.288	134	1.405	1.296	1.187
111	2.565	2.394	2.224	135	1.37	1.264	1.157
112	2.496	2.328	2.161	136	1.337	1.232	1.127
113	2.428	2.264	2.1	137	1.304	1.202	1.099
114	2.363	2.202	2.041	138	1.273	1.172	1.071
115	2.3	2.142	1.985	139	1.242	1.143	1.044
116	2.239	2.084	1.93	140	1.212	1.115	1.018
117	2.179	2.028	1.876	141	1.183	1.088	0.993
118	2.122	1.973	1.825	142	1.155	1.061	0.968
119	2.066	1.92	1.775	143	1.127	1.036	0.944
120	2.012	1.869	1.726	144	1.101	1.011	0.921
121	1.96	1.82	1.68	145	1.075	0.986	0.898
122	1.909	1.772	1.634	146	1.05	0.963	0.876
123	1.86	1.725	1.59	147	1.025	0.94	0.855
124	1.812	1.68	1.548	148	1.001	0.918	0.834
125	1.765	1.636	1.506	149	0.978	0.896	0.814
126	1.72	1.593	1.466	150	0.955	0.875	0.794
127	1.677	1.552	1.428				
128	1.634	1.512	1.39				
129	1.593	1.473	1.354				
130	1.553	1.436	1.318				
131	1.515	1.399	1.284				

End

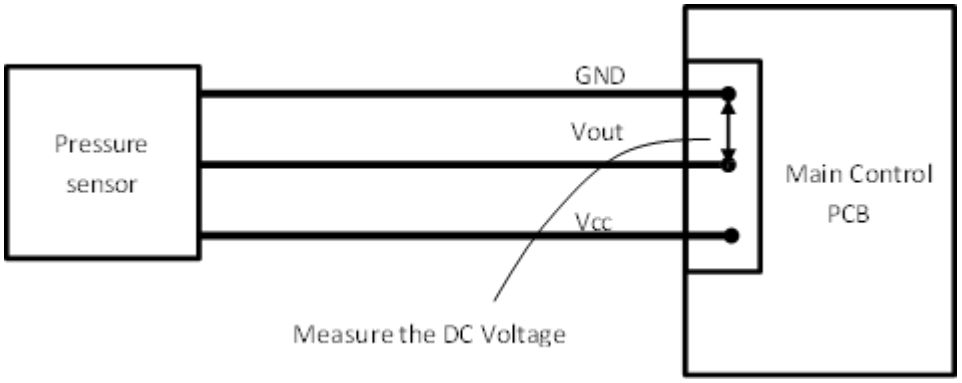
118.PRESSURE AND OUTPUT VOLTAGE CHARACTERISTICS OF PRESSURE SENSOR



Output voltage formula of high pressure sensor：Vout(H)=0.87×P_H+0.5

Output voltage formula of low pressure sensor：Vout(L)=2×P_L+0.5

Measure the output voltage of pressure sensor



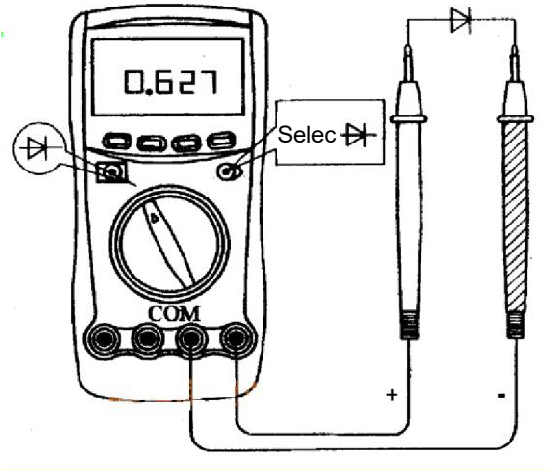
119.GUIDE FOR IDENTIFYING INVERTER PCB FAILURE

Before measuring the inverter PCB, please confirm steps below in advance :

- Cut off the power supply ;
- Wait for 10 mins for capacitor discharging in order to avoid the electric shock
- Remove all connections wires
- To identify whether inverter PCB of 1Ph models failed, follow the guide to test inverter circuit. If any one of test value abnormal, the 1 Ph inverter PCB failed.
- To identify whether inverter PCB of 3Ph models failed, follow the guide to test inverter circuit and three phase bridge rectifiler.

If any one of test value abnormal, the 3 Ph inverter PCB failed.

Preparing tools : multimeter (secondary tube is available)

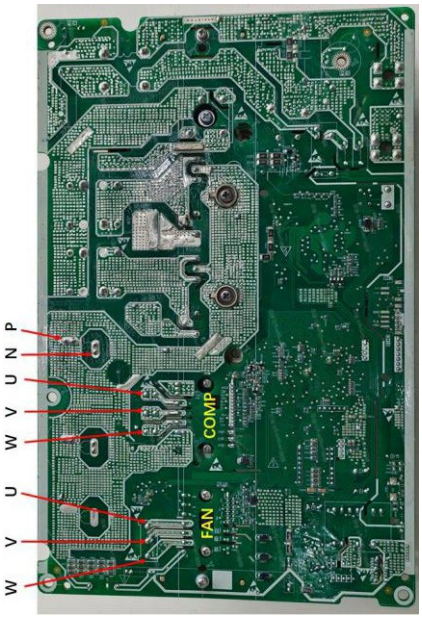


Inverter circuit (Fan module/ Compressor module):

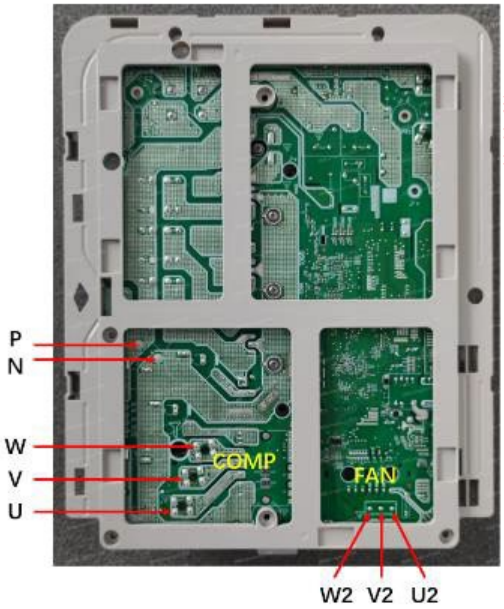
Order	Test point		Normal	Abnormal
	+(Red)	- (Black)		
1	U	P	0.3-0.7V	0 /infinite
2	V	P		
3	W	P		
4	N	U		
5	N	V		
6	N	W		

Note:

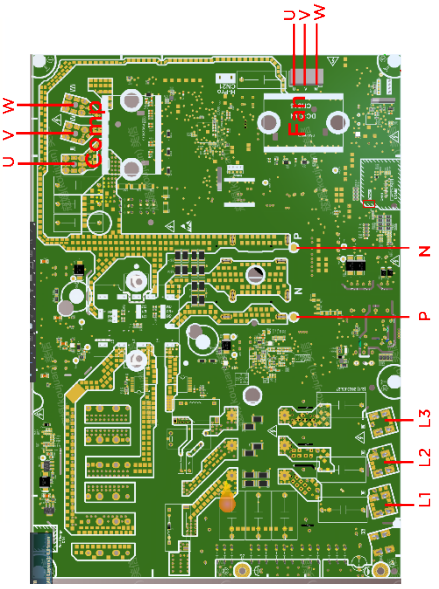
If any one of test value abnormal, the inverter PCB failed. Request aftersales service and replace the inverter control box.



4-10KW



1Ph 12-16kW



3Ph 12-16kW

Three phase bridge rectifiler:

Order	Test point		Normal	Abnormal
	+(Red)	- (Black)		
1	L1	P	0.3-0.7V	0 /infinite
2	L2	P		
3	L3	P		
4	N	L1		
5	N	L2		
6	N	L3		

Note:

If any one of test value is abnormal, the inverter PCB failed. Request aftersales service and replace the inverter control box.

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