Библиотека СОК

R410A

Service Manual

King Plus Series





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Part 1

General Information

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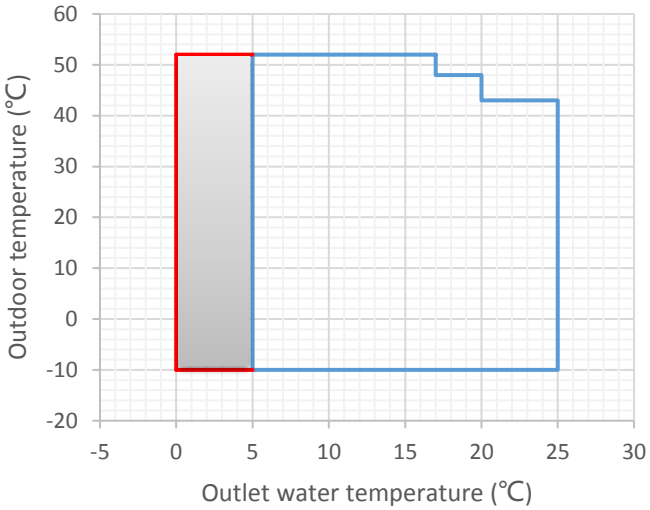
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1 Product lineup

Model	MDVM-130BR1-KS	MDGBL- F185W/RN1	MDVM-260BR1-KS
Power supply	380-415V/3Ph/50Hz	380-415V/3Ph/50Hz	380-415V/3Ph/50Hz
Appearance			

2 Operating Limits

2.1 Cooling operating range



Notes:

① Normal mode

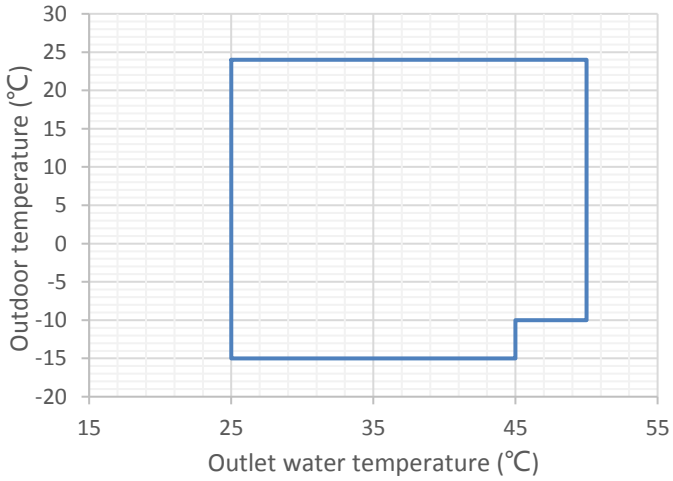
② Low leaving water temperature mode

Low leaving water temperature mode can be set through wired controller, please refer to the Operation Manual for details. If low leaving water temperature function is effective, the operation range will extend to the red frame above. When the set temperature is less than 5℃, antifreeze liquid (concentration above 15%) should be added in the water system, otherwise the unit will be damaged.

③ Customization is required to achieve water outlet temperature 0℃.

④ Part of models cannot reach, please refer to the Specifications.

2.2 Heating operating range



① Part of models cannot reach, please refer to the Specifications.

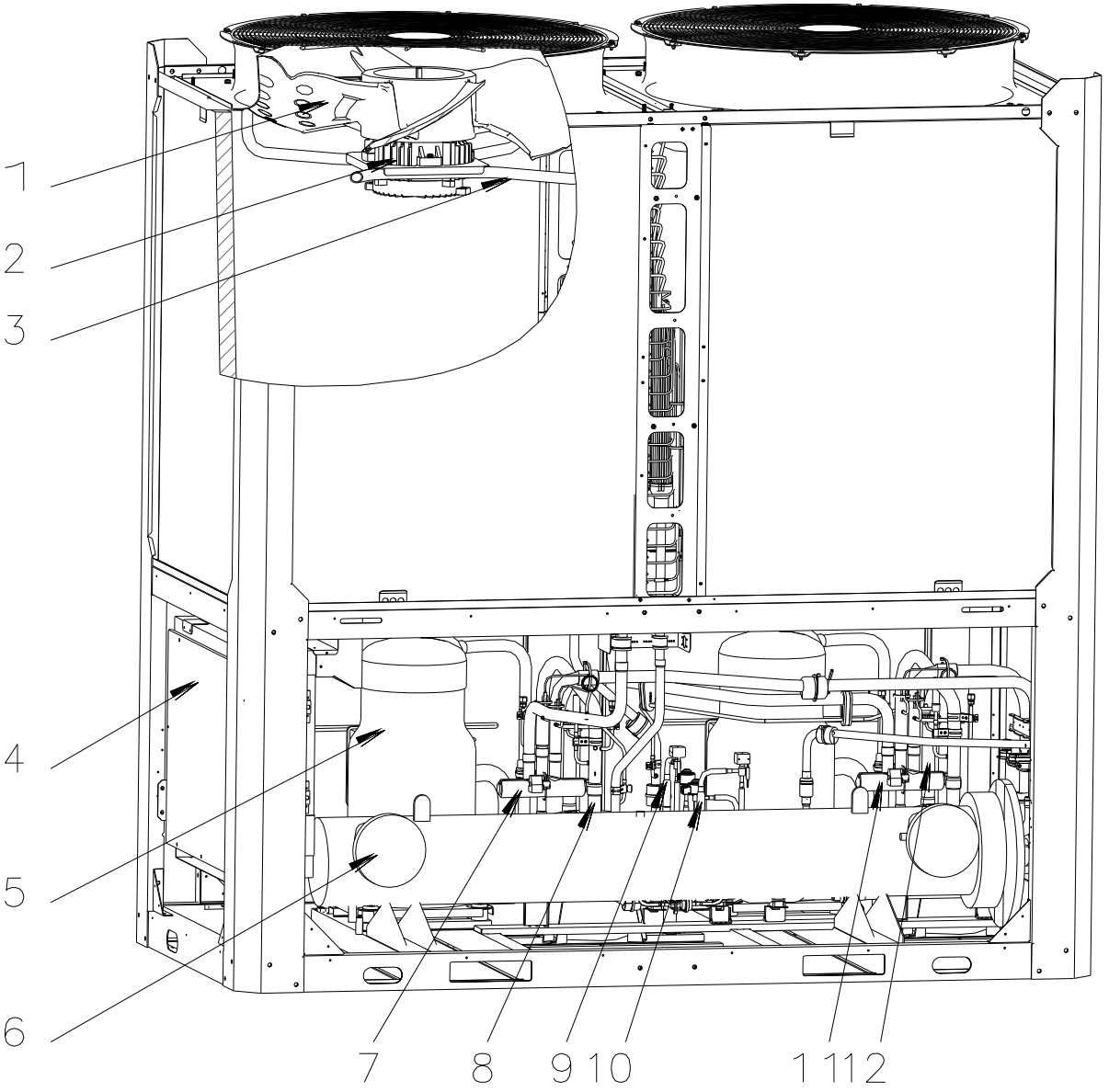
Part 2

Component Layout and Refrigerant Circuits

1 Layout of Functional Components 8

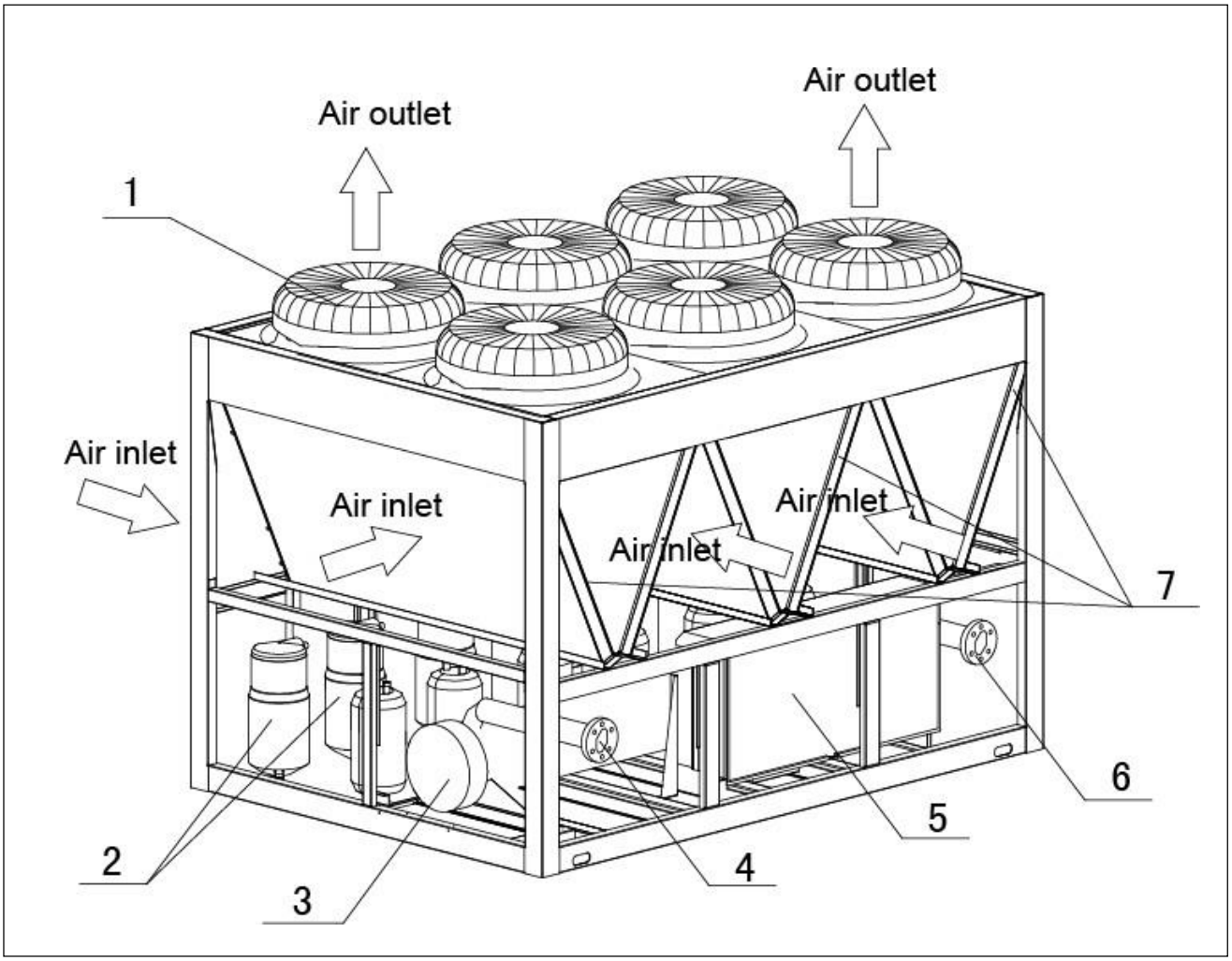
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130kW

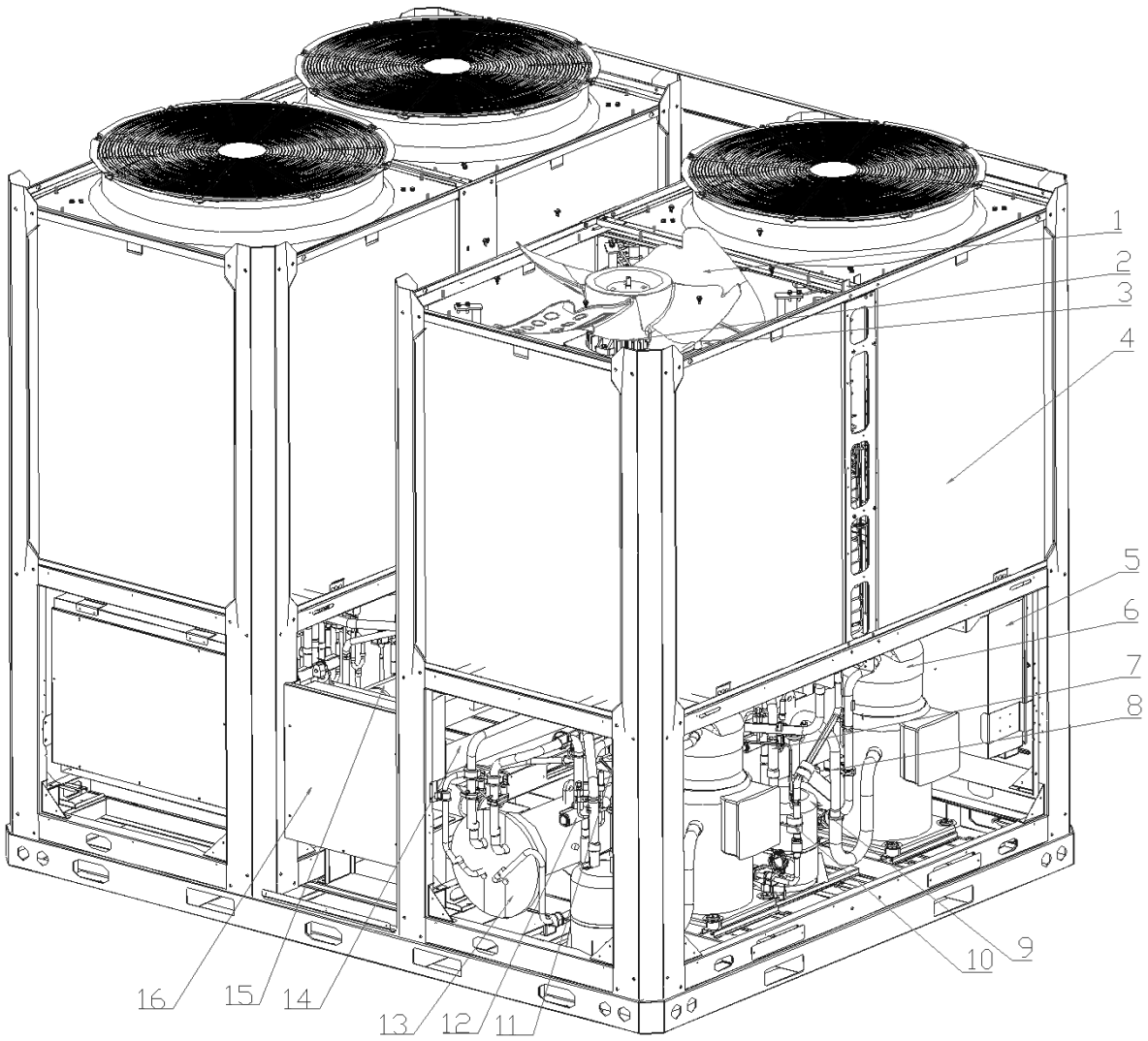


Component list	
1	Axial flow fan
2	Brushless DC Motor
3	Motor holder assembly
4	Electric control box assembly
5	Compressor(fixed)
6	Shell and tube exchanger
7	Four-way valve assembly
8	Gas-liquid separator
9	Input pipe assembly
10	Input pipe assembly
11	Four-way valve assembly
12	Suction pipe assembly

185kW



No.	Name
1	Top cover
2	Compressor
3	Evaporator
4	Water outlet
5	Electric control box
6	Water inlet
7	Condenser



Component list	
1	Axial flow fan
2	Brushless DC Motor
3	Motor holder assembly
4	Condenser part
5	Electric control box assembly
6	Fixed speed scroll compressor
7	Four-way valve assembly
8	Suction pipe assembly
9	Gas-liquid separator
10	Input pipe assembly
11	Input pipe assembly
12	Four-way valve assembly
13	Shell and tube exchanger
14	Water outlet pipe assembly
15	Water inlet pipe assembly
16	Electric control box assembly

2 Piping Diagrams

130kW & 260Kw

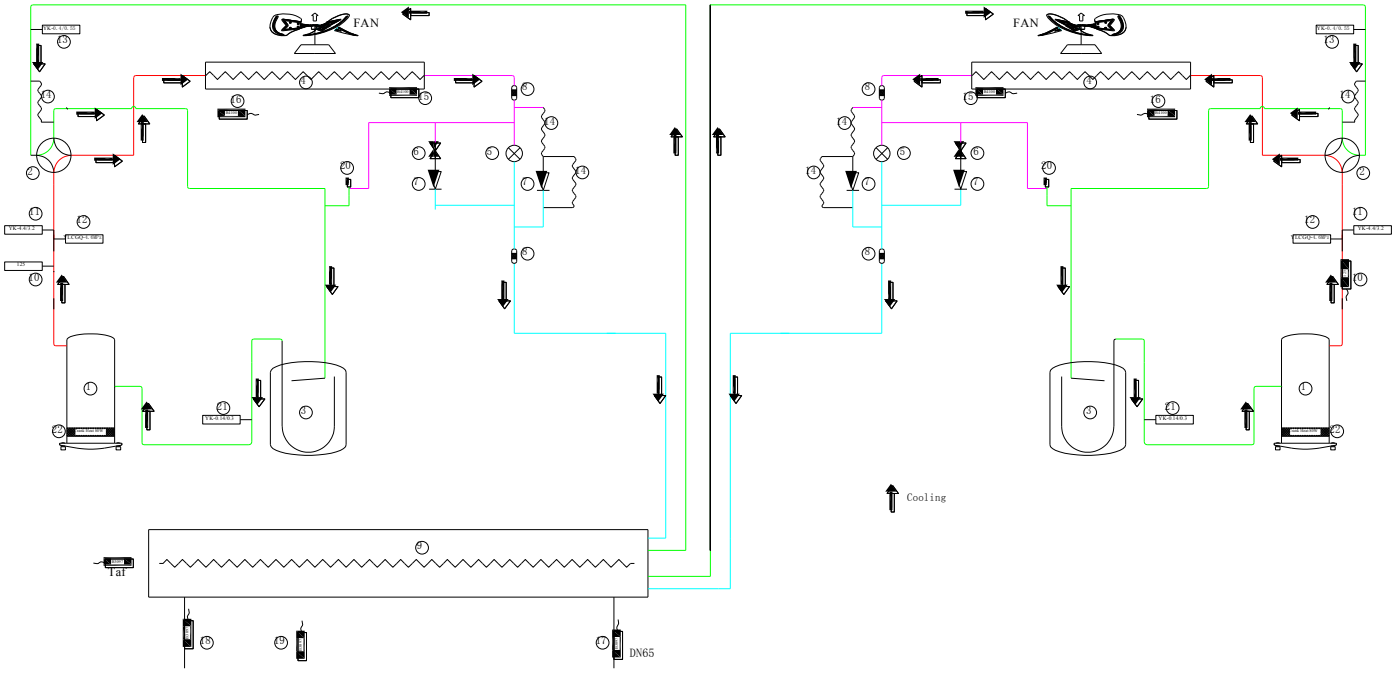
High temperature - high press gas

Low temperature - high press liquid

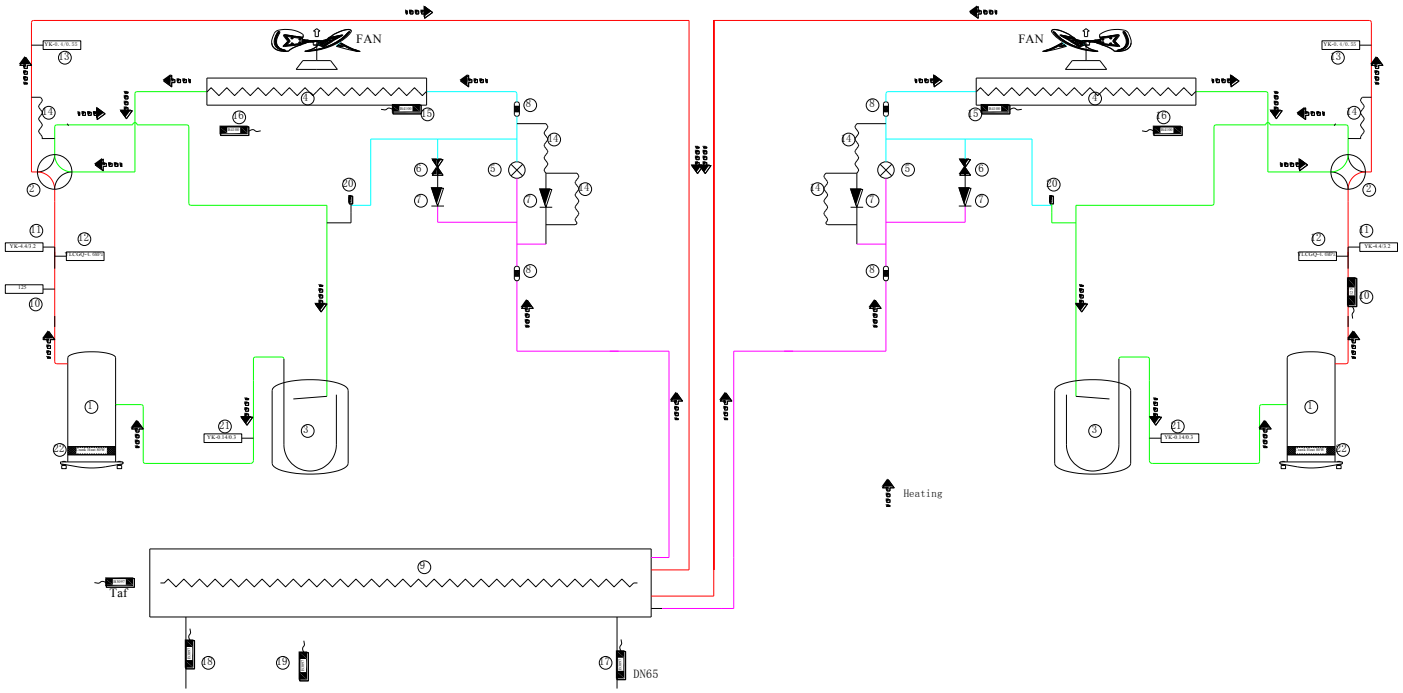
Low temperature - low press gas liquid mixture

Low temperature - low press gas

Cooling and defrosting operation



Heating operation



Legend			
1	Compressor	12	High Pressure sensor
2	4-Way Valve	13	Antifreeze low pressure switch
3	Gas-Liquid separator	14	Capilary
4	Air side heat exchanger	15	Evaporation sensor in heating(Condenser sensor in cooling)
5	Electronic expansion Valve	16	Outdoor temperature sensor
6	Single-way electromagnetic valve	17	Water inlet temp. sensor
7	Single-way valve	18	Water outlet temp. sensor
8	Strainer	19	Total water outlet temperature
9	Water Side Heat Exchanger	20	Unloading valve
10	Discharge temperature switch	21	Low pressure switch
11	High Pressure Switch	22	Crankcase heater

Key components:

Compressor:

Maintains pressure differential between high and low pressure sides of the refrigerant system.

Fan:

Ventilates the air side heat exchanger.

Air side heat exchanger:

In the cooling mode, the heat of the refrigerant from the water side heat exchanger can be released into the air.

In the heating mode, the refrigerant can absorb the heat in the air and provide it to the water side heat exchanger.

Water side heat exchanger:

In cooling mode, the refrigerant can absorb heat from the water and reduce the temperature of the water.

In heating mode, the refrigerant can release heat into the water and increase the temperature of the water.

Four-way valve:

Controls refrigerant flow direction. Closed in cooling mode and open in heating mode. When closed, the air side heat exchanger functions as a condenser and water side heat exchanger functions as an evaporator; when open, the air side heat exchanger functions as an evaporator and water side heat exchanger function as a condenser.

Vapor-liquid separator:

Stores liquid refrigerant to protect the compressor from liquid hammering.

Electronic expansion valve:

Controls refrigerant flow and reduces refrigerant pressure.

Unloading valve:

Reduce condenser pressure in cooling mode under high ambient temperature.

High and low pressure switch:

Regulate refrigerant system pressure. When the refrigerant system pressure rises above the upper limit or falls below the lower limit, the high or low pressure switches turn off, stopping the compressor.

Discharge temperature switch:

Protects the compressor from abnormally high temperatures and transient spikes in temperature.

High pressure sensor:

Measures compressor discharge side pressure of refrigerant.

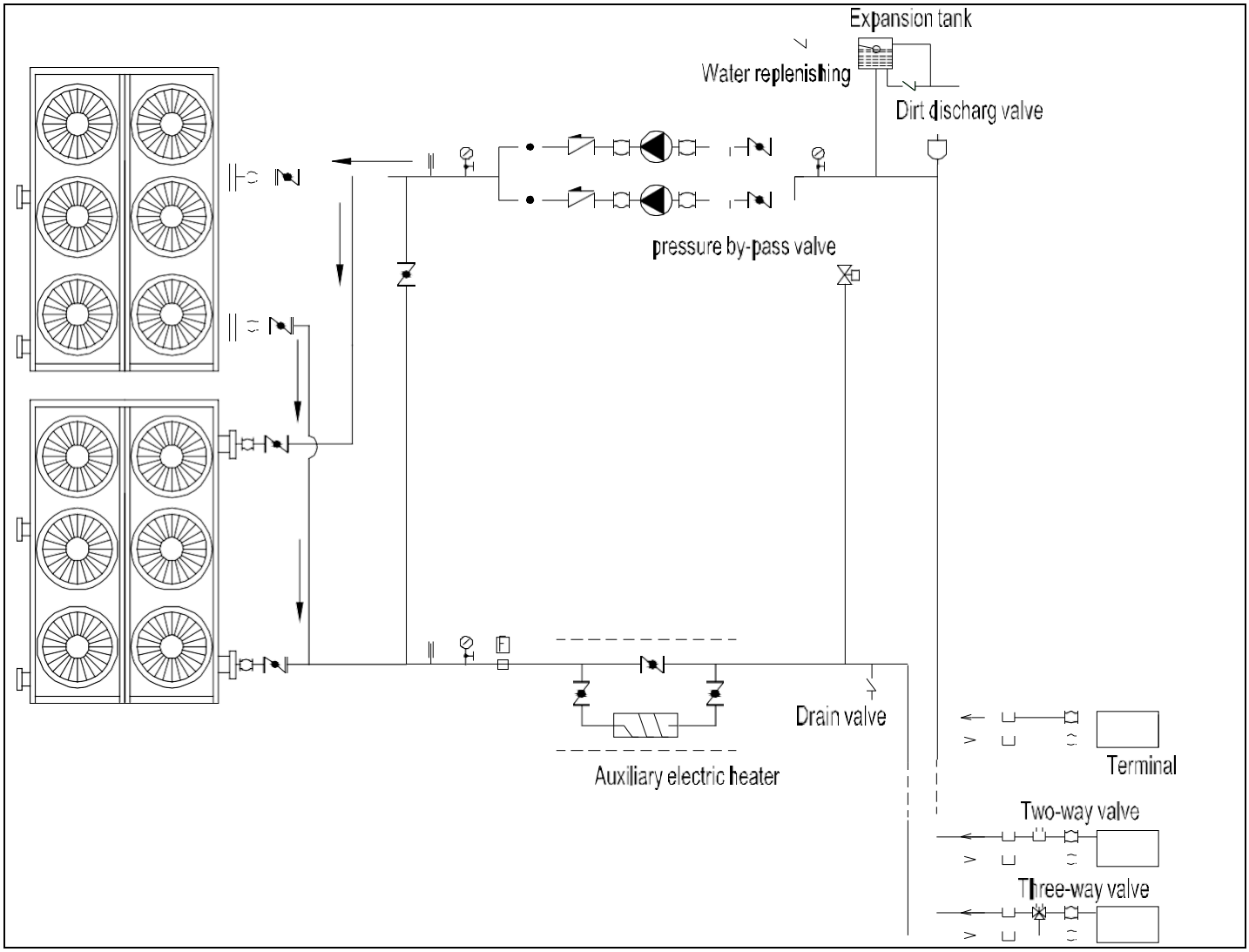
Crankcase heater:

Prevents refrigerant from mixing with compressor oil when the compressors are stopped.

Capillary:

Throttling or expansion of refrigerant flow

185Kw



The table below describes the symbols.

Symbol	Symbol explanation	Symbol	Symbol explanation
	Stop valve		Y-shaped filter
	Pressure gauge		Thermometer
	Water flow switch		Circulating pump
	Gate valve		Check valve
	Flexible joint		Automatic discharge valve

Part 3

Control

For MDVM-130BR1-KS & MDVM-260BR1-KS

1 General Control Scheme Flowchart 21

2 Stop Operation 22

3 Standby Control 22

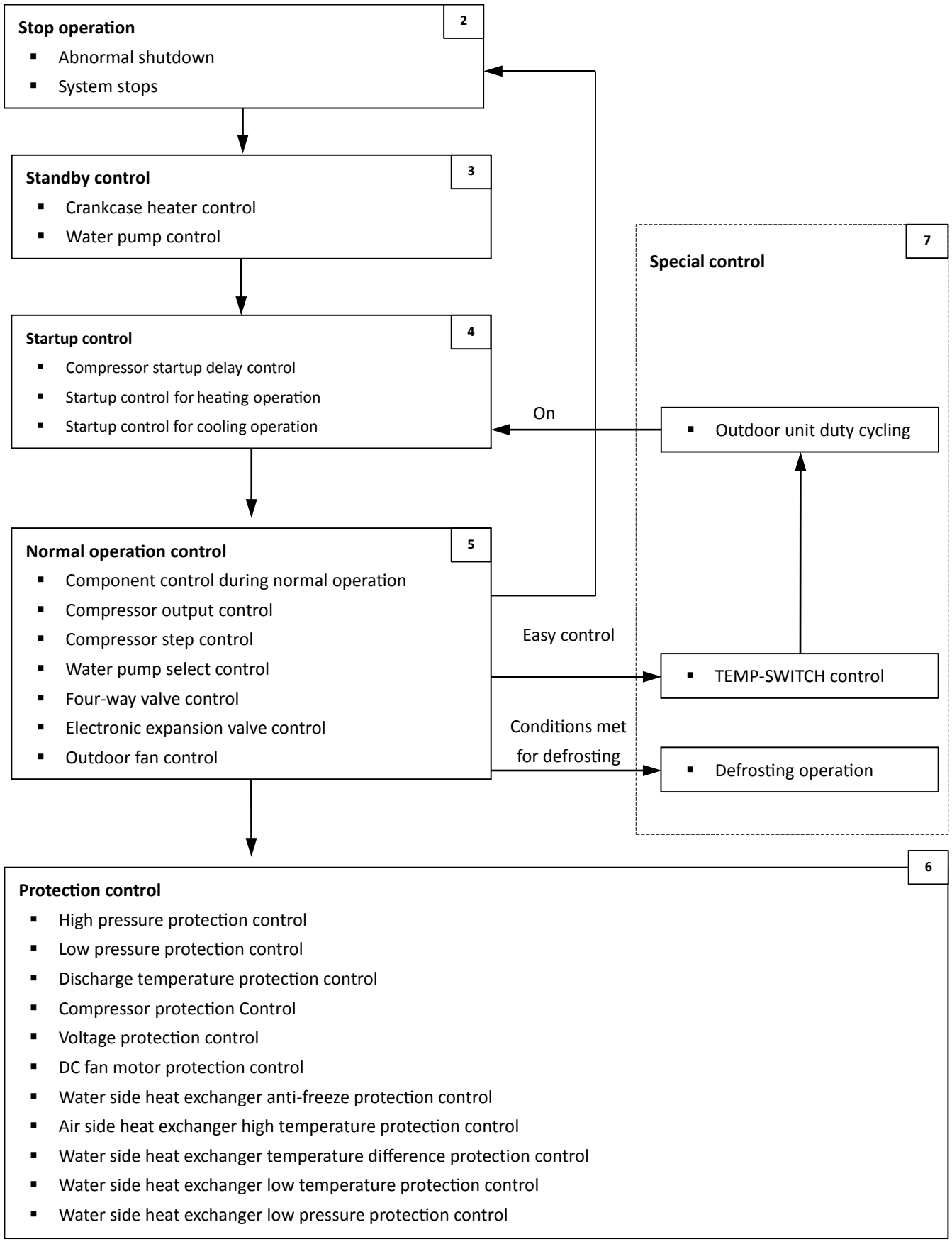
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1 General Control Scheme Flowchart



Note:

1. Numbers in the top right-hand corners of boxes indicate the relevant section of text on the following pages.

2 Stop Operation

The stop operation occurs for one of the following reasons:

Abnormal shutdown: in order to protect the compressors, if an abnormal state occurs the system makes a stop with thermo off operation and an error code is displayed on the unit PCB digital displays and on the user interface.

The system stops when the set temperature has been reached.

3 Standby Control

3.1 Crankcase Heater Control

The crankcase heater is used to prevent refrigerant from mixing with compressor oil when the compressors are stopped. The crankcase heater is controlled according to outdoor ambient temperature and the compressor on/off state.

Condition	Crankcase heater
Ambient temperature ＞ 40℃	OFF
2℃ ＜ Ambient temperature ＜ 40℃ Compressor is on	OFF
Ambient temperature ＜ 2℃ Compressor is turned on Leaving water temperature ＜ 40℃	OFF
Compressor stops	ON
Compressor is turned on Leaving water temperature ＞ 40℃	ON

3.2 Water Pump Control

When the unit is in standby, the external circulator pumps run continuously.

4 Startup Control

4.1 Compressor Startup Delay Control

In initial startup control and in restart control, compressor startup is delayed such that a minimum of the set re-start delay time has elapsed since the compressor stopped, in order to prevent frequent compressor on/off and to equalize the pressure within the refrigerant system.

4.2 Startup Control for Heating Operation

Component	Wiring diagram label	130kW	260kW	Control functions and states
Compressor	COMP	●	●	On
DC fan motor	FAN	●	●	The fan is turned on according to the maximum wind speed corresponding to the ambient temperature.
Electronic expansion valve	EXV	●	●	Position (step) from 0 (full off) to 480 (full on), controlled according to outdoor ambient temperature, outlet water temperature, evaporator inlet temperature
Four-way valve	4-WAY	●	●	On

4.3 Startup Control for Cooling Operation

Component	Wiring diagram label	130kW	260kW	Control functions and states
Compressor	COMP	•	•	On
DC fan motor	FAN	•	•	The fan is turned on according to the initial wind speed corresponding to the ambient temperature.
Electronic expansion valve	EXV	•	•	Position (step) from 0 (full off) to 480 (full on), controlled according to outdoor ambient temperature and outlet water temperature
Four-way valve	4-WAY	•	•	Off

5 Normal Operation Control

5.1 Component Control during Normal Operation

Component	Wiring diagram label	130kW	260kW	Control functions and states
Compressor	COMP	•	•	On
DC fan motor	FAN	•	•	After the fan is turned on for 120S, the wind speed is adjusted according to the condensation pressure.
Electronic expansion valve	EXV	•	•	Position (step) from 0 (full off) to 480 (full on), controlled according to outdoor ambient temperature, outlet water temperature, evaporator inlet temperature
Four-way valve	4-WAY	•	•	On

5.2 Component Control during Normal Operation

Component	Wiring diagram label	130kW	260kW	Control functions and states
Compressor	COMP	•	•	On
DC fan motor	FAN	•	•	After the fan is turned on for 120S, adjust the wind speed according to the condensation pressure.
Electronic expansion valve	EXV	•	•	Position (step) from 0 (full off) to 480 (full on), controlled according to outdoor ambient temperature and outlet water temperature
Four-way valve	4-WAY	•	•	Off

5.3 Compressor Output Control

Control the compressor on and off according to the outlet water temperature

5.4 Four-way Valve Control

The four-way valve is used to change the direction of refrigerant flow through the water side heat exchanger in order to switch between cooling and heating operations.

During heating operations, the four-way valve is on; during cooling and defrosting operations, the four-way valve is off.

5.5 Electronic Expansion Valve Control

The position of the electronic expansion valve (EXV) is controlled in steps from 0 (fully closed) to 480 (fully open).

At power-on: The EXV is first fully closed and then moved to the standby position (480 (steps)). Within 1min after the compressor is turned on, the EXV maintains the standby opening; 1min after the compressor is turned on, the EXV moves to the initial operating position, which is determined according to the outdoor ambient temperature, outlet water temperature, and evaporator inlet temperature. After that, the EXV opening is adjusted every 60S according to the ambient temperature, outlet water temperature, and evaporator inlet temperature.

When the unit is in standby: The EXV is at position 480 (steps).

When the unit stops: The EXV first moves to -40 (steps), then closes fully, then moves to the standby position (480 (steps)).

5.6 Outdoor Fan Control

Component control during cooling operation

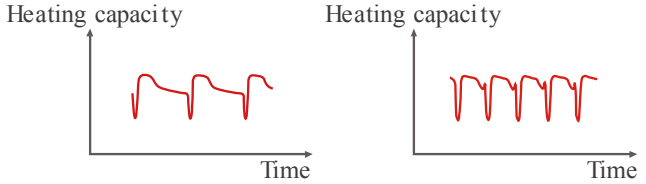
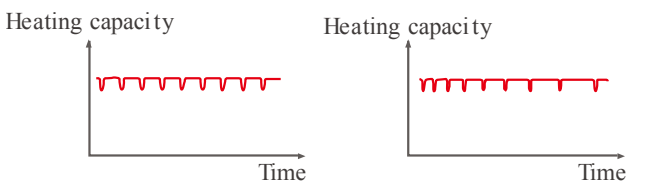
Fan speed index	0	1	2	3	4	5	6	7	8	9	10	11
Fan1	0	150	150	170	190	210	230	250	270	290	310	330
Fan2	0	0	150	150	170	190	210	230	250	270	290	310
Fan speed index	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**
Fan1	350	370	400	430	470	510	550	580	600	630	650	680
Fan2	330	350	370	400	430	470	510	550	580	600	630	650
Fan speed index	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Fan1	700	730	750	780	810	840	860	880	900	930	950	980
Fan2	680	700	720	750	780	820	840	860	880	900	920	950

6 Special Control

6.1 Intelligent defrosting

In order to recover heating capacity, the intelligent defrosting operation is conducted when the 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, frost forming speed etc. to reduce capacity attenuation and fluctuation of water temperature.

Component	Wiring diagram label	130kW	260kW	Control functions and states
Compressor	COMP	•	•	On
DC fan motor	FAN	•	•	Off
Electronic expansion valve	EXV	•	•	Fully open
Four-way valve	4-WAY	•	•	Off

Normal defrost	Intelligent defrost
	

Under high humidity condition, the frosting speed is fast and frost is thick. Unit enters defrosting mode in time to ensure high capacity.

Under low humidity condition, the frosting speed is slow and frost is thin. Normal operation time is extended and defrost time is decreased to avoid fluctuation of water temperature.

6.2 Duty cycling

In cascade system, outdoor unit duty cycling is used to balance the compressor running time. The master unit controls the start and stop of slave units according to the total leaving water temperature. The 0# master unit will turn on first and then 1#~15# slave unit turns on in order.

For offloading process, the basic logic is that unit loaded first will offload first, and units loaded later will offload later.

For loading process, the basic logic is that unit offloaded first will load first, and unit offloaded later will load later.

6.3 Anti-snow function

In snowy weather, with the help of Anti-snow mode, units intermittently turns on fans to stop snow from accumulating on the top of units to guarantee normal operation next time. The anti-snow function will active under standby status and off status according to ambient temperature T4.

When T4 < 2℃, the fan will run at speed index 7 for 2min. If the ambient temperature continues below 2℃, the fan will run at speed index 7 for 2 minutes every half hour. When T4≥3℃, the timer is cleared.

6.4 Antilocking function of water pump

The pump will operate regularly for 2min according to the ambient temperature.

Ambient temperature	T4 < -14	-14 ≤ T4 < -7	-7 ≤ T4 < 0	0 ≤ T4 <7	7 ≤ T4
Length of pump stop time	0.5h	1h	2h	4h	12h

7 Control software for 185kW



1） The LOGIN window as above picture.

2） User need to input the name and password (default name: Admin, default password: Admin); user's name and password could be changed after login.

3） Select the computer serial port. The system default selection is COM1 (the software will checkout the available serial ports in the computer automatically, and will list them at the Optional Table).

4） When login on, you must insert the Softdog provided by manufacturer to the computer, otherwise, cannot be login the system and the window as Fig.4-1 ,and the Softdog Error would show as follows

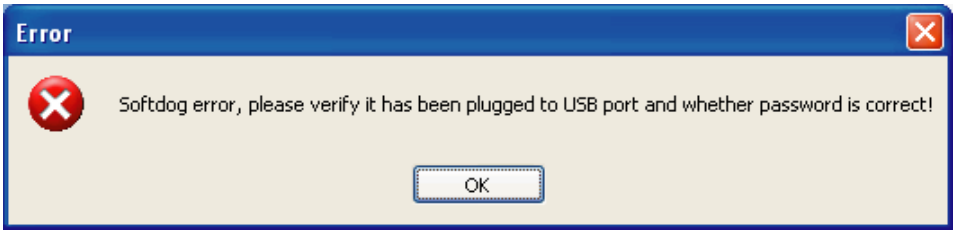


Fig.4-1

5） Be sure the softdog has been inserted to USB port all the time while the software is running, otherwise the softdog error dialogs displays as Fig.4-2.

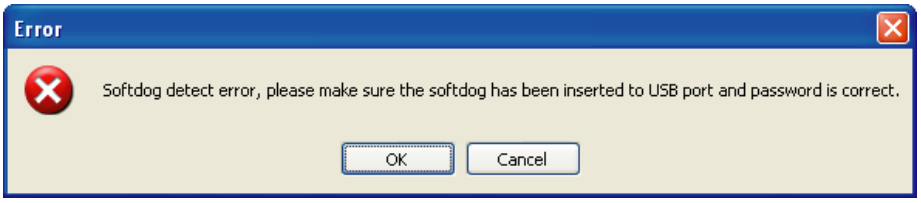


Fig.4-2

6） When provide a wrong USERE'S NAME, the window as Fig.4-3 will be display, while PASSWORD error, the window shows as Fig.4-4.

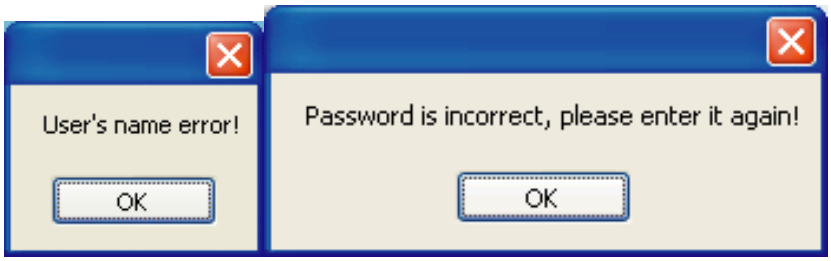


Fig.4-3 & Fig.4-4

7） In case the password error time exceed 6 times (i.e. the 7th times password error), the window show as Fig.4-5, and then click OK, it will exit the program.

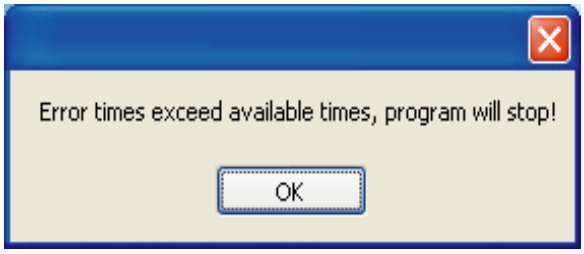


Fig.4-5

8） In case the selected serial port is unavailable, the window as Fig.4-6 will be display.

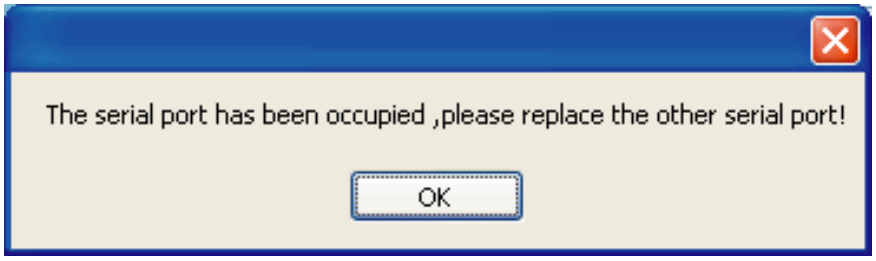


Fig.4-6

Detail application manual

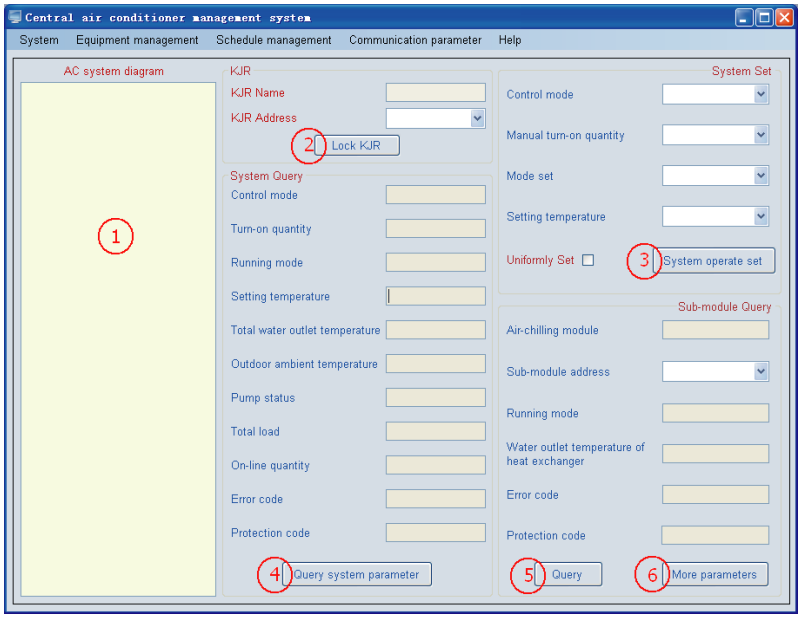


Fig.4-7

Main interface of this software as Fig.4-7, detail as follows:

1） Menu includes：System”、Equipment management”、Schedule management”、Communication parameter”、Help”。

2） System configuration illustration (The ① as Fig.4-7): Not more than16 wired controllers could be connected to the computer. This kind of wired controller could be connected to the module group of : 25KW、30KW、60KW、65KW、120KW、180KW etc. Total 16 sub-modules could be jointed to a wired controller. (For the Maximum sub-module quantity could be jointed to a wired controller, the quantity conversion between module group and sub-module, please refer to “Software application”.

Wired controller：

 Module

group：

Sub-module：

For the meaning of the different color represent, please see below picture. AC system diagram in Software Application”

No.	Color	Status	Equipment
1		OFF-LINE	CONTROLLER()、SUB-MODULE()
2		NORMAL	CONTROLLER()、SUB-MODULE()
3		ON-LINEERROR	SUB-MODULE()

Fig.4-8

1） ”Lock KJR” (The ② in Fig.4-7): To lock or unlock the current selected wired controller to limit the wired controller setting the refrigeration system.

2） ”System operate set” (The ③ in Fig.4-7): To set the operation of the selected refrigeration system.

3） ”Query system parameter” (The ④ in Fig.4-7), Press this key to query the selected refrigeration system, the current operating parameter will be display.

4） ”Query” (The ⑤ in Fig.4-7): Press this key to query the selected sub-module, the current operating parameter will be display.

5） ”More parameters” (The ⑥ in Fig.4-7): More operating parameter will be display.

If the software has been configured, then will automatic scan the configured system while open the software, the scan interface display as Fig.4-9.

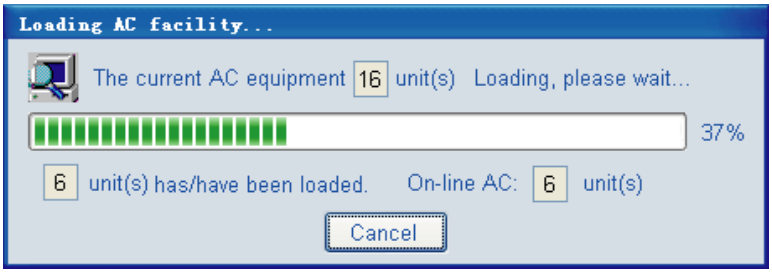


Fig.4-9

Provided that malfunction occur, window as Fig.4-10.

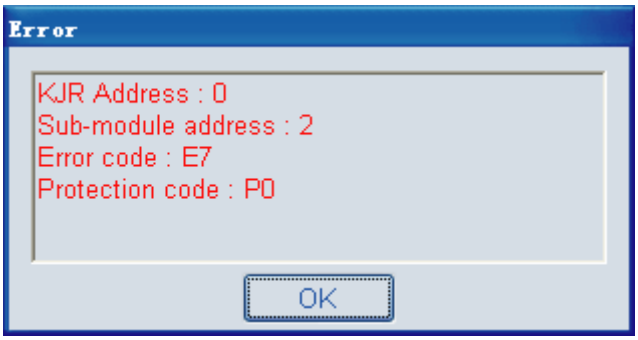


Fig.4-10

Menu application

1）“System” includes：“Password Modification”、“Re-login”、“Exit the program”.

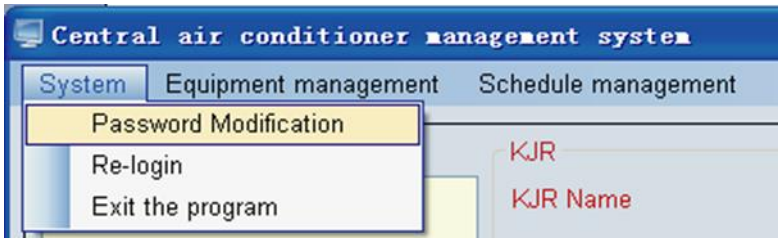


Fig.4-11

① Click “Password Modification” will display window as Fig.4-12 input old password as requirement, and then reset a new password, click “OK” or “Modify”, window as Fig.4-13t will show that new password has been already successful set;



Fig.4-12

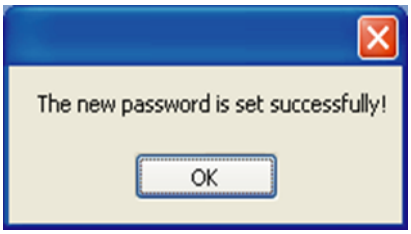


Fig.4-13

If input an old password error, window as Fig.4-14 will show; if the new passwords be input do not match, the message box as Fig.4-15 will display.



Fig.4-14



Fig.4-15

②Click “Re-login”, window as Fig. 4-16 will display that interface ask user whether re-login the system, if yes, please click “OK Click “Re-login”, system will close the main interface and enter to the login interface again



Fig.4-16

③Click “Exit the program” to quit the program, while click “Cancel”, system will not quit，as Fig. 4-17.

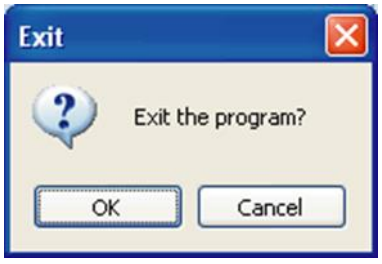


Fig.4-17

2） “Equipment management” includes：“KJR Setting”、“Module parameter setting”、“Outdoor module setting”,as Fig. 4-18.

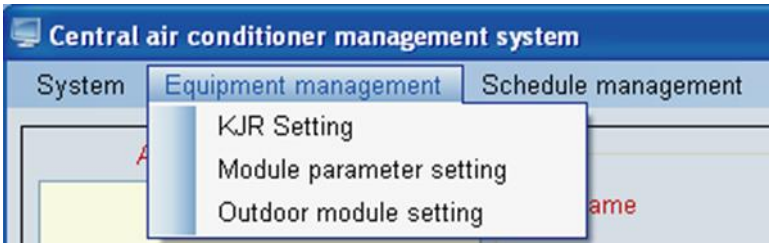


Fig.4-18

① Click "KJR Setting", the window as Fig. 4-20 will be display——add wired controller to the system to be monitored.

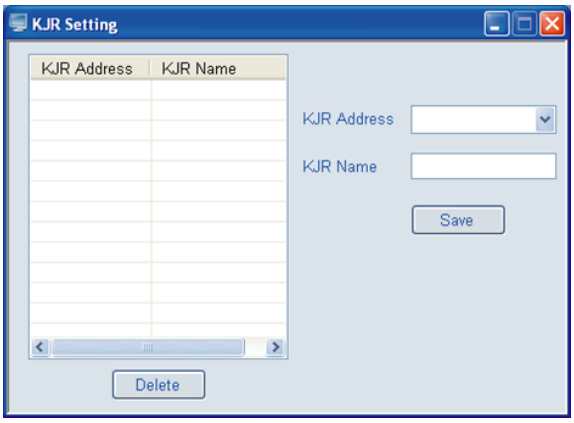


Fig.4-20

Detail operation procedure as follows:

a、 Add a wired controller: Select the wired controller address (0-15) at the "KJR Address", fill the wired controller name at "KJR Name" and click "Save".

b、Modify wired controller: Select an existing wired controller (by click the drop down list of the KJR Address at the left Chart or by click the drop down list of the KJR Address at the right), and re-fill the wired controller name and click "Save" to finish the wired controller modification(see Fig. 4-21). KJR Name could not empty or pure blank character string (pure blank charter string is composed by space and tab)

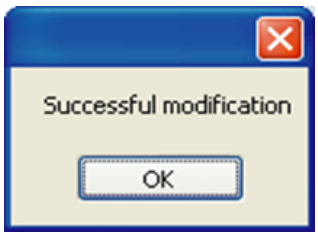


Fig.4-21

c、Delete wired controller: Select an existing wired controller (as above method), and click "Delete", if there is no outdoor module controlled by any wired controller (see Fig. 4-22), the one could be deleted; if there are outdoor modules controlled by wired controller (see Fig. 4-23), a failed delete message box would pop up (see Fig. 4-24). As long as delete all modules under connect the wired controller, the wired controller could be deleted.



Fig.4-22

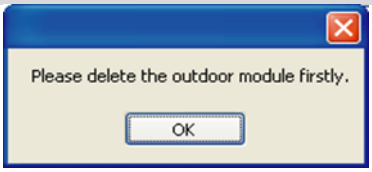


Fig.4-23



Fig.4-24

Note: Please select wired controller according to actual system condition.

② Click the "Module parameter setting", a window as Fig.4-25 will pop up: add module group under connect with the wired controller

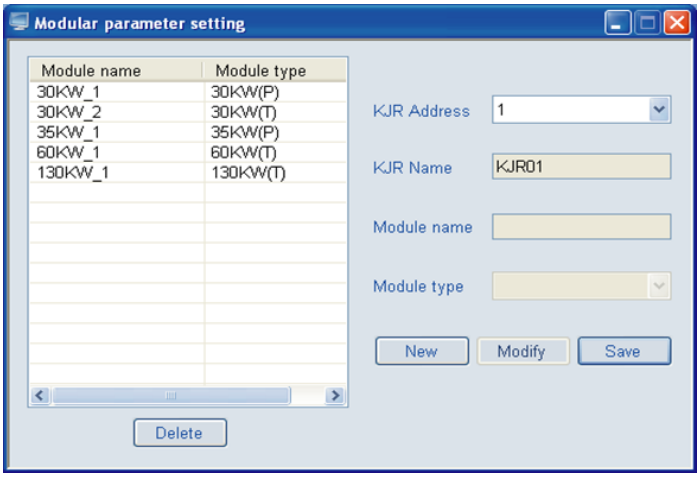


Fig.4-25

a、Add sub-module: Select the existing wired controller address from the "KJR Address", and select the configured module group at the drop-down box of "Module name", select the sub-module address in the drop-down box of the configured "Sub-module address", and then click "Add". The sub-module would not be configured, if the sub-module address without configured in this wired controller; if sub-module is exists, a message box would pop up as Fig. 4-26 to note you, the sub-module cannot be configured. If the sub-module quantity exceeds than the maximum module under connect with wired controller, the message box as Fig. 4-27 will pop up.

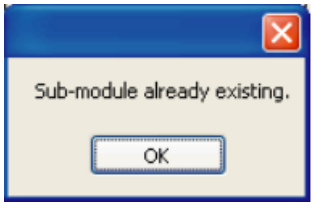
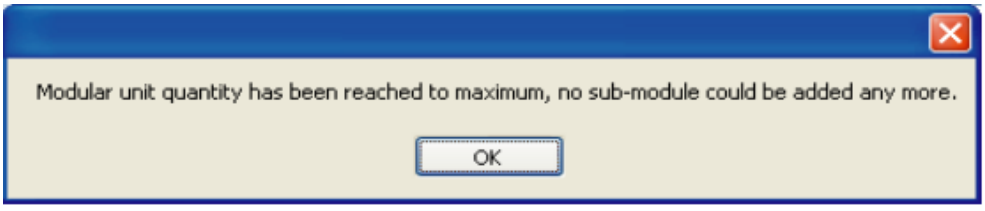


Fig.4-26



drop-down box of “Sub-module address”), and click “Delete” to finish this operation.

3）“Schedule management” includes: “Weekly timing setting” and “Error record”. See Fig. 4-28

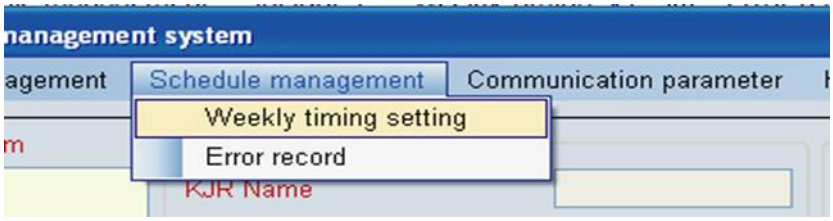


Fig.4-28

① Click “Weekly timing set” a window as Fig. 4-29 would pop up——finish the weekly schedule management setting, each wired controller represents a refrigeration system; and the existing wired controller is a wired controller has already been configured in the system.

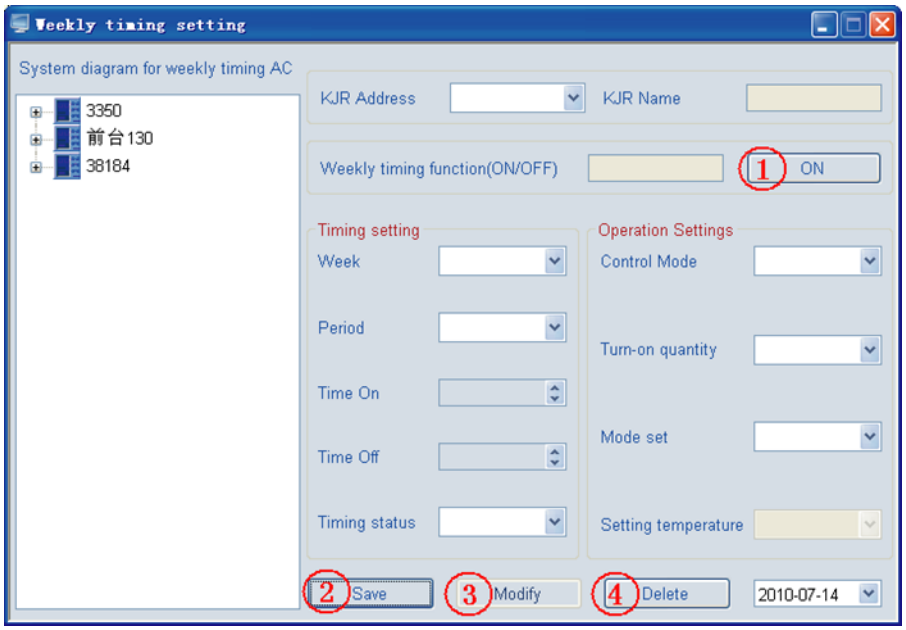


Fig.4-29

Wired controller icons： 

(1) Gray color represents Weekly Timing without set in this wired controller.

(2) Light green represents at less one Weekly Timing schedule has been set in this wired controller, without schedule in activating.

(3) Blue color represents at less one Weekly Timing schedule has been set in this wired controller as well as at less one of this schedule in activating.

a、KJR Address——Wired controller address, each wired controller represents one refrigeration system.

b、Weekly timing function——Display the weekly set status in the current wired controller is ON or OFF (ON or OFF could display as long as at least one weekly schedule has been set, otherwise, nothing would display.)

c、Detail weekly timing parameter—— Week, Period, Time On, Time Off, Timing Status, Control Mode, Turn-on quantity, Mode set and Setting temp.

d、Timing ON/OFF key for controlling the weekly timing wired controller (See the ① key in the figure) —— when Weekly Timing Function is ON, the key shows OFF (see Fig. 4-30), once click the key, all weekly timing function would be turned off, and then the Weekly Timing Function displays OFF, while the key shows ON （see Fig. 4-31）; when Weekly Timing Function is OFF, the key shows ON (see Fig. 4-38), once click the key, all weekly timing function would be turned on, and

then the Weekly Timing Function displays ON, while the key shows OFF （see Fig. 4-32）.

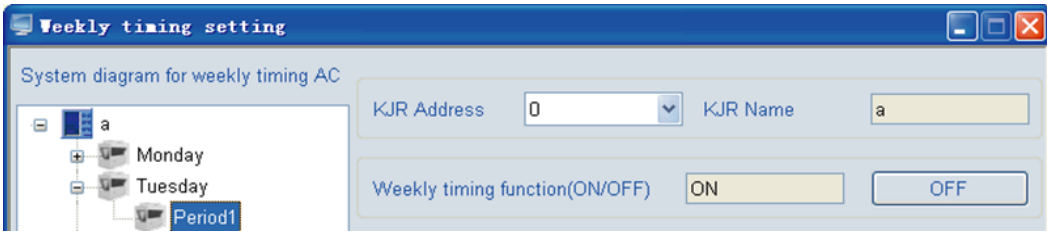


Fig.4-30

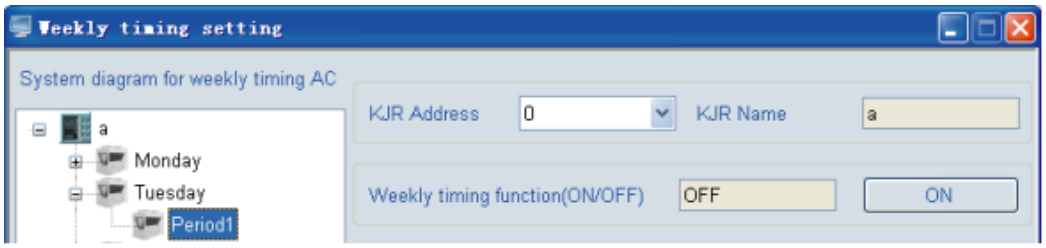


Fig.4-31

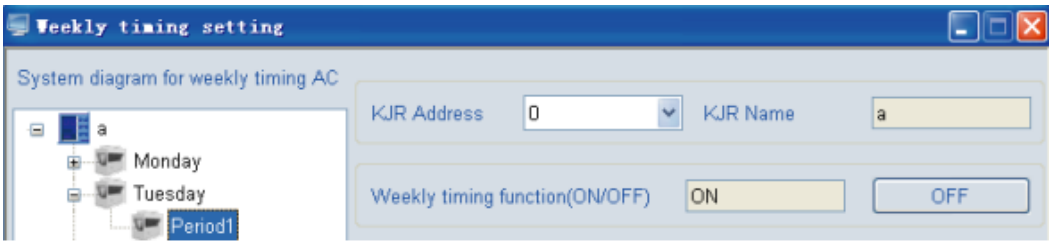


Fig.4-32

e、Save（See the ② key in the Fig.4-29）—— Save the current settings or the modified settings

f、Modify(See the ③ key in the Fig.4-29) ——Press this key the parameter of selected period become changeable, and then click “ Save ” . Press the key again, all parameters in this period become unchangeable. See Fig. 4-33.

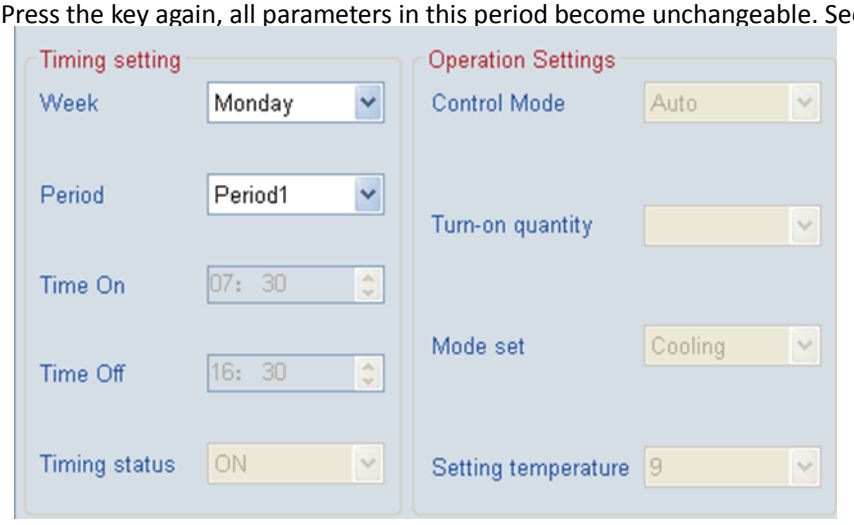


Fig.4-33

Select the setting Period, click “Modify”, all parameter will become changeable status, see Fig. 4-34.

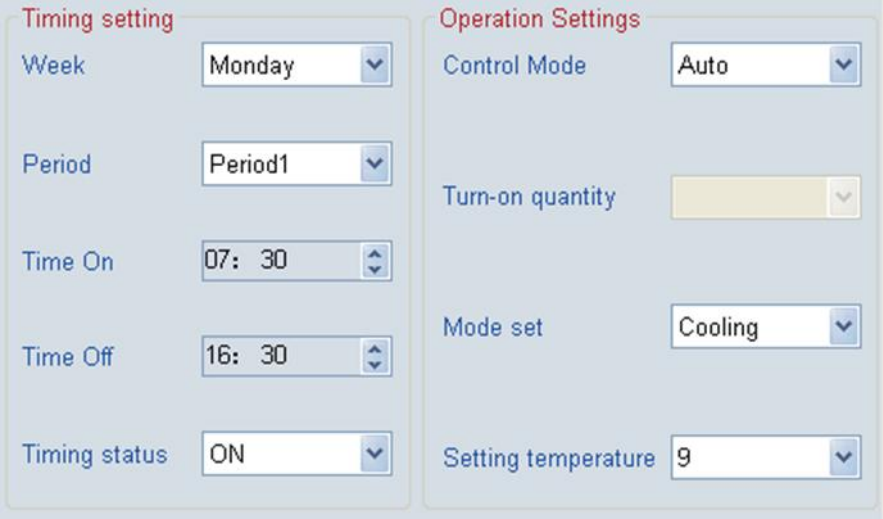


Fig.4-34

g、Delete key (See the ④ key in the figure) ——select a Period and click the key, the current selected Weekly Timing setting period could be deleted. Click the key, window as Fig. 4-35 shows, click "OK" to delete Period. Successful delete the Period, message box as Fig. 4-36 will show.

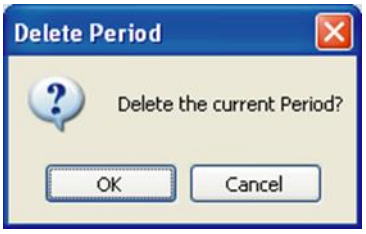


Fig.4-35

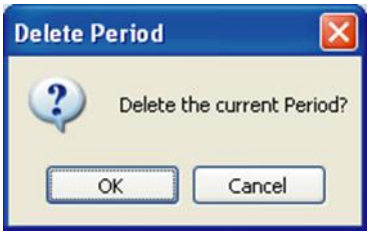


Fig.4-36

(1) Detail procedures of add a new Weekly Timing Schedule:

a、 Select a wired controller: By clicking the "System diagram for weekly timing AC" wired controller icon at the left side in the wired controller, or by selecting the wired controller at the drop-down box of "KJR Address".

b、Detail parameter for setting weekly timing schedule:

Week：Day（Monday、Tuesday、Wednesday、Thursday、Friday、Saturday、Sunday） Period：Period 1、Period 2，set two Period per day.

Time On：Turn on time, when Time On selecting "--：--" , then means do not turn on the unit , display as Fig 4-37.



Fig.4-37

Time Off：Turn off time, when Time Off selecting"--：--" , then means do not turn off the unit , display as Fig 4-38.

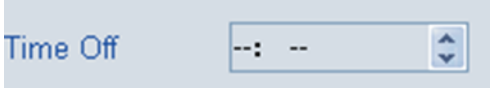


Fig.4-38

Timing Status：Drive up the weekly timing function in the current period or not.

Control Mode：Automatically drive-up mode

Mode set： Operation mode: Cooling, Heating, Water Pump

Setting temp.： Setting temp.

Note: The ON/OFF time of the weekly timing can not be at the same time point, the following will be not allowed for example if the ON time was 8:00 of Period1 and the OFF time was 8:00; and the OFF time of Period1 was 10:00 and the ON time of Period2 was 10:00. If there is error and then will pops-up prompt dialog box display as Fig. 4-39:

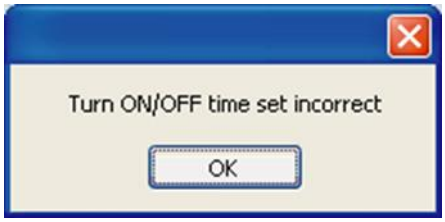


Fig.4-39

If no Timing Status has been set, a message box as Fig. 4-40 would pop up.



Fig.4-40

If no Control Mode has been set, a message box as Fig. 4-41 would pop up.

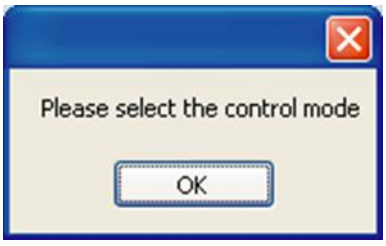


Fig.4-41

If no Mode set has been set, a message box as Fig. 4-42 would pop up.

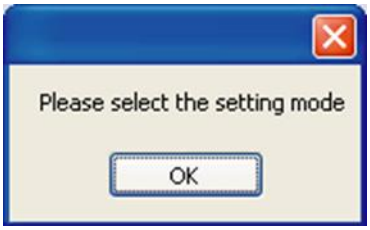


Fig.4-42

If no Setting temp. has been set, a message box as Fig. 4-43 would pop up.

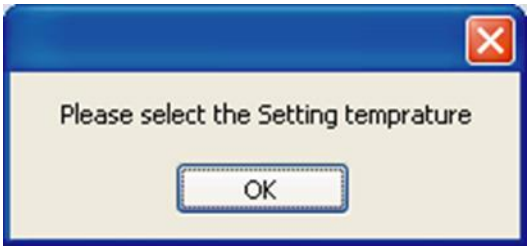


Fig.4-43

(2) Detail procedures of modify a Weekly Timing Schedule:

a、Select a wired controller: By clicking the “System diagram for weekly timing AC” wired controller icon at the left side in the wired controller, or by selecting the wired controller at the drop-down box of “KJR Address”.

b、Select a wired controller: By clicking the Period of the “System diagram for weekly timing AC” at the left side in the wired controller, or by selecting the wanted modified Period at the drop-down box of “Period”.

c、Detail parameter for modifying weekly timing schedule:

Time On：Turn on time, when Time On selecting”--：--“ , then means do not turn on the unit , display as Fig 4-44.

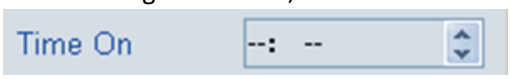


Fig.4-44

Time Off：Turn off time, when Time Off selecting”--：--“ , then means do not turn off the unit , display as Fig 4-45.



Fig.4-45

Timing Status：Drive up the weekly timing function in the current period or not.

Control Mode：Automatically drive-up mode

Mode set：Heating、Cooling、Water Pump

Setting temp.：Setting temp.

If other parameters have been set, click “Save” key, a message box as the same as above” (1) Detail procedures of add a new Weekly Timing Schedule” will pop up.

Once the setting time is reach, system will set according to the setting parameter, window as Fig. 4-46 will display. When finish the set up, message box will close automatically.

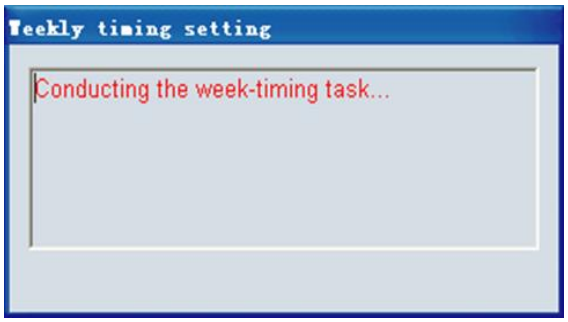
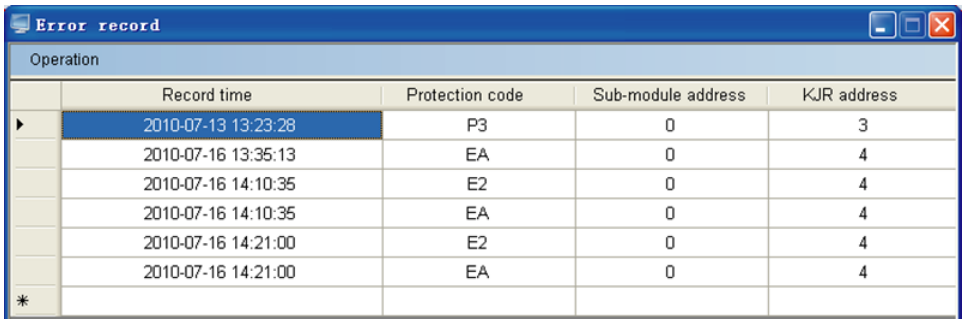


Fig.4-46

②“Error record”——Save the system operation error record, includes: Record time, Error prevented cord, Sub-module address and KJR address (see Fig. 4-47); click the “Record time”、”Protection code”、” Sub-module address”、”KJR address” can proceed ordering(see Fig 4-48) ;“Clear all record ”in the Menu (See Fig. 4-49) could be used to delete all error records.



	Record time	Protection code	Sub-module address	KJR address
▸	2010-07-13 13:23:28	P3	0	3
	2010-07-16 13:35:13	EA	0	4
	2010-07-16 14:10:35	E2	0	4
	2010-07-16 14:10:35	EA	0	4
	2010-07-16 14:21:00	E2	0	4
	2010-07-16 14:21:00	EA	0	4
*				

Fig.4-47

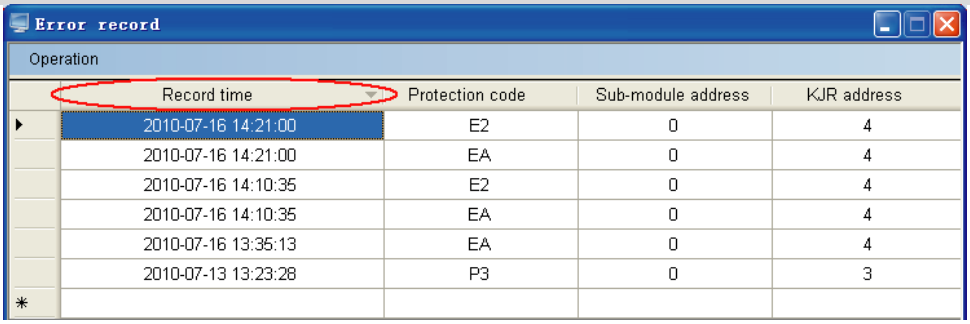


Fig.4-48



Fig.4-49

4) "Communication parameter" includes: "Serial port set" and "History set". See Fig.4-50.

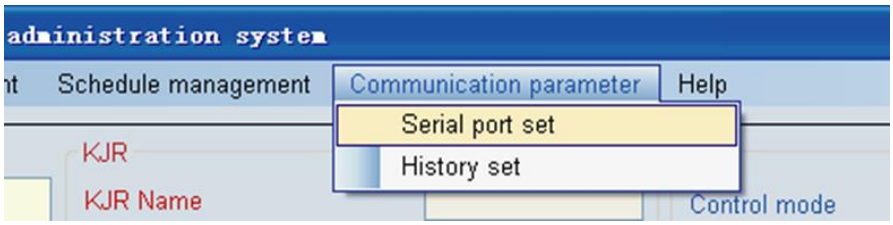


Fig.4-50

① Click "Serial port set", window as Fig. 4-51 will pop up—— modify or select the serial port in computer. The available serial port source is captured by software, and saved at the optional list for user to select. Provided that the selected serial port has been occupied, once click "Apply" or "Enter", a message box as Fig. 4-52 will pop up; if the serial port as is the current applying port, once click "Apply" or "Enter", a message box as Fig. 4-53 will pop up.

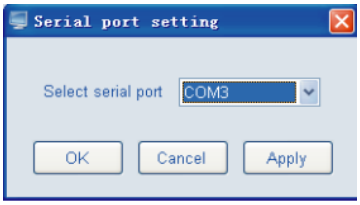


Fig.4-51

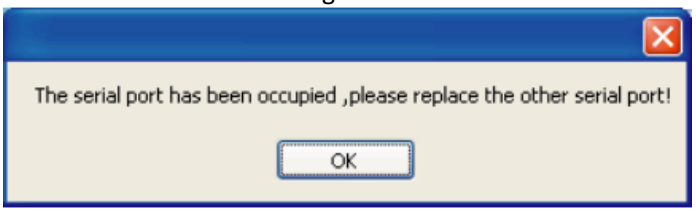


Fig.4-52



Fig.4-53

② Click "History set", an interface as Fig. 4-54 displays ———to modify or select the history error saving duration.

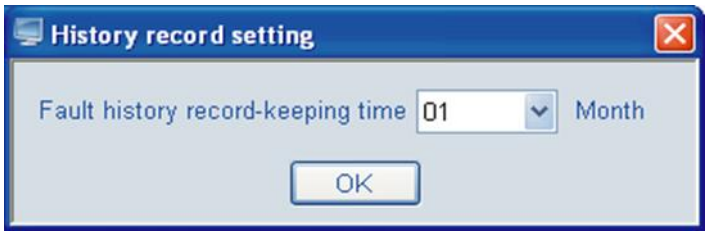


Fig.4-54

5) “Help” includes：“User guidance” and “About”. See Fig. 4-55.

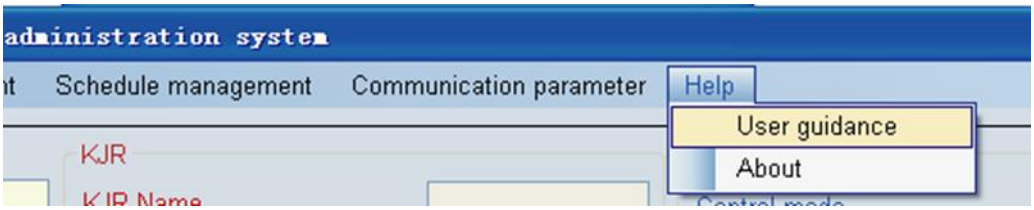


Fig.4-55

① Owner’s manual——Software application manual, i.e. this manual.

② About——some relevant software information.

Wired controller lock/unlock

Provided that the selected wired controller in unlock status, the key would display “Lock KJR”(see Fig. 4-56), once successful lock the wired controller, the message box (see Fig. 4-57) would display, tells user that the setting is successful, then the key displays “Unlock KJR”(see Fig. 4-58); If the set failed, message box (Fig. 4-59) would display. If without select wired controller, message box as Fig. 4-60 will display.

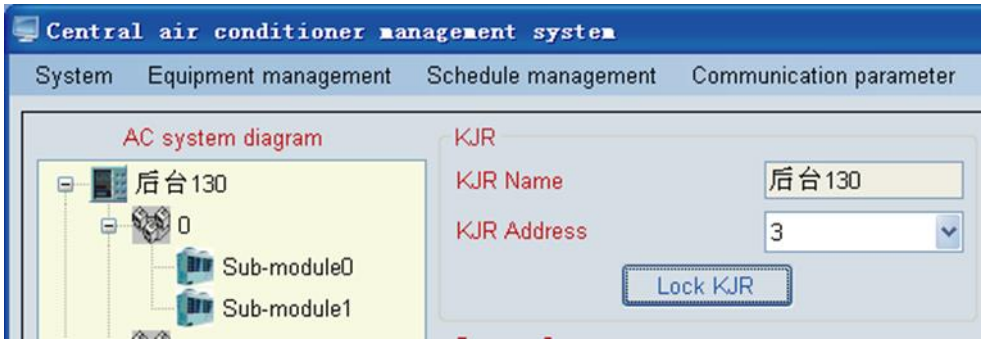


Fig.4-56



Fig.4-57

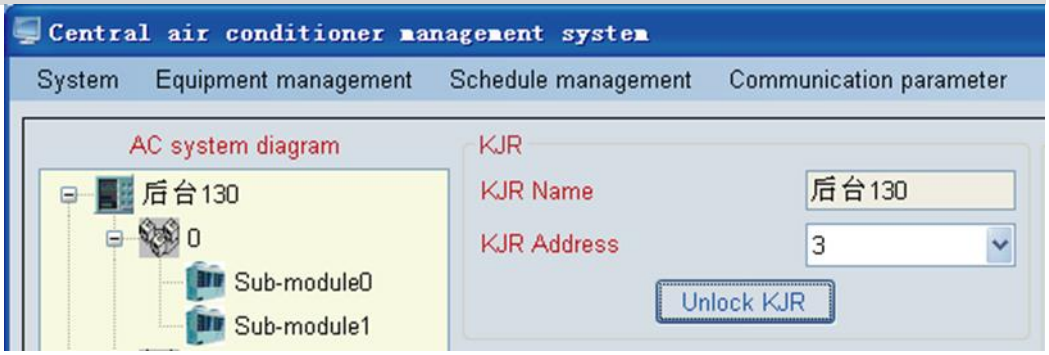


Fig.4-58

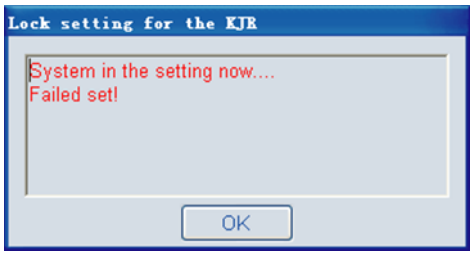


Fig.4-59



Fig.4-60

Provided that the selected wired controller in lock status, the key would display “Unlock KJR”(see Fig. 4-61), once successful unlock the wired controller, the message box (see Fig. 4-62) would display, then the key displays “Lock KJR”(see Fig. 4-63); If the set failed, message box (Fig. 4-64) would display, tells user that set failed because of timeout.

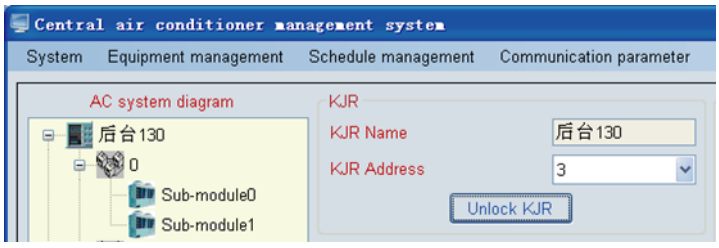


Fig.4-61



Fig.4-62

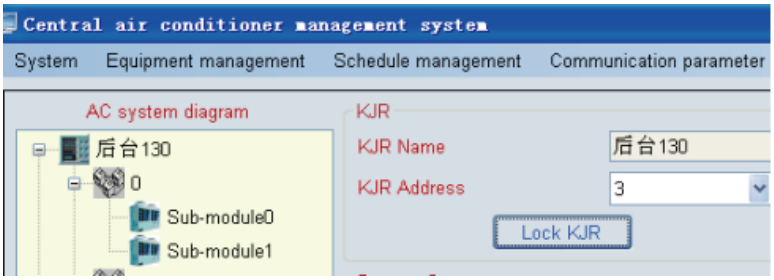


Fig.4-63

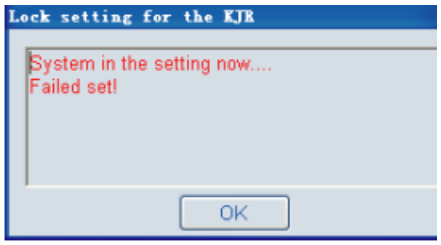


Fig.4-64

Query system parameter

Click “Query system parameter”, system will query the operating status (display the sub-module of 0 address’s operation status) and display the operative interface according to the selected wired controller (refrigeration system). In the querying, a message box (see Fig. 4-65) would pop up.

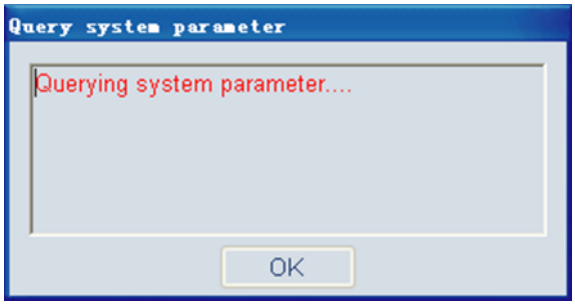


Fig.4-65

If successful query the system, a message box (see Fig. 4-66) will pop up and note you query success, and system parameter interface will update according to the query result. (Fig. 4-67)

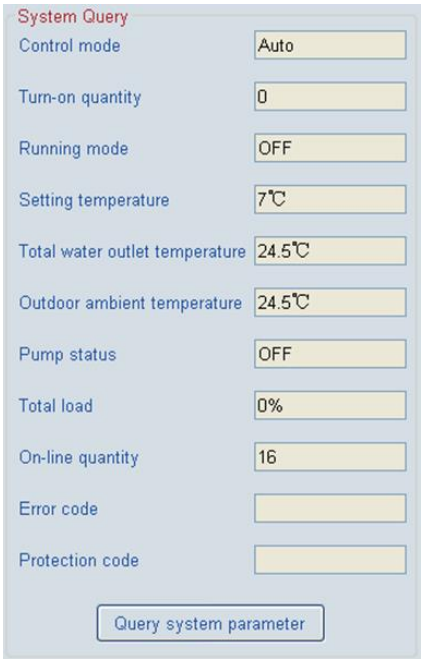


Fig.4-66

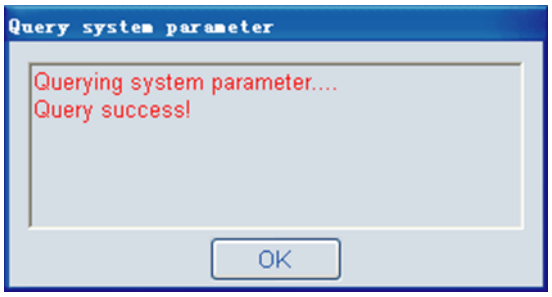


Fig.4-67

Whereas, “Query overtime” would display (see Fig. 4-68). Provided that the wired controller hasn’t been selected, namely the wired controller address is empty, a message box as Fig 4-69 would pop up. The query performance failed

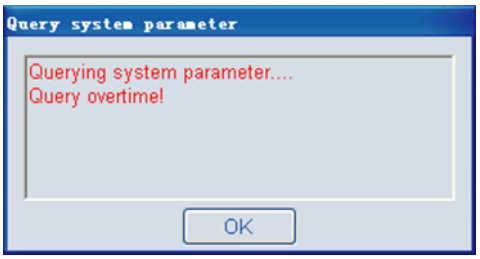


Fig.4-68

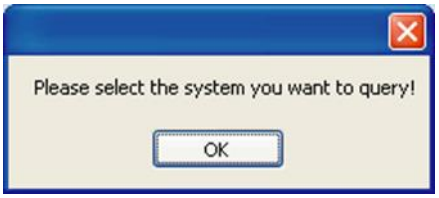


Fig.4-69

Provided that malfunction occur, the corresponding error code will show in the System Query; Provided that protection function perform, the corresponding protection code will show in the System Query; if move the mouse arrow to the these codes, a floating window as the follows Fig. 4-70 and 4-71 will appearance to giving the specific error or protection information.

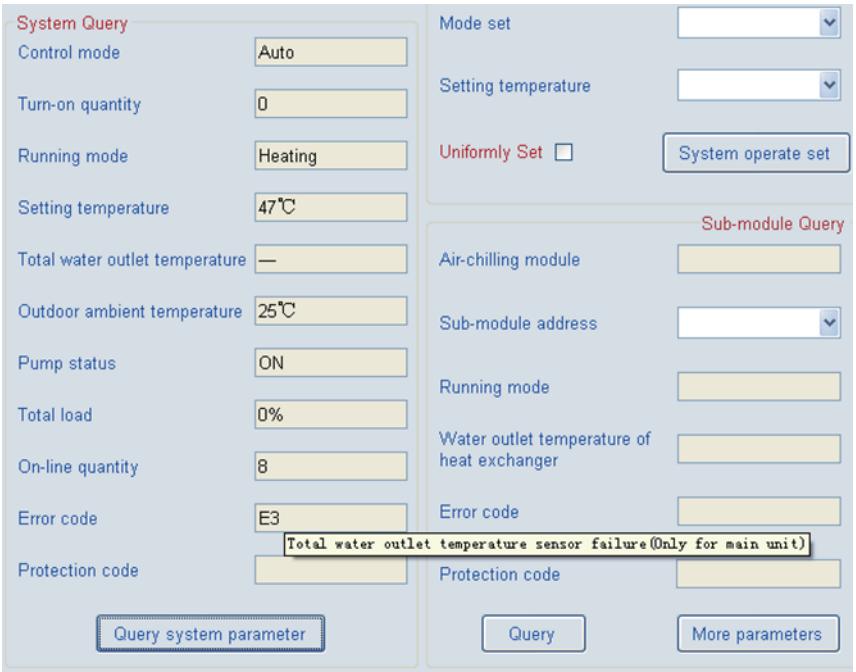


Fig.4-70

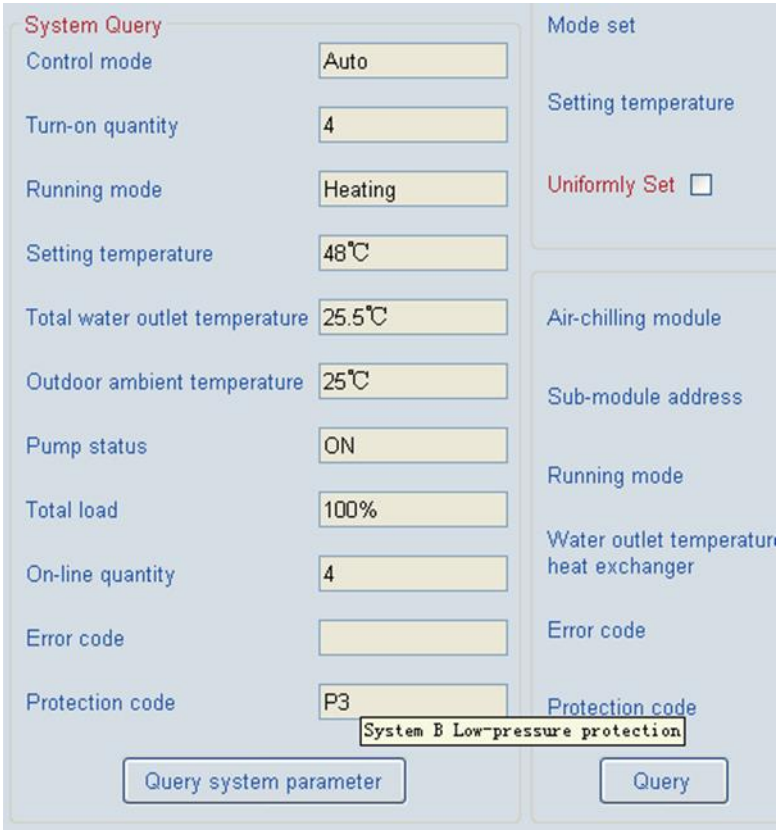


Fig.4-71

Sub-module Query

Click the “Query”, system will query the operative status and display the information in the operation interface according to the current selected sub-module. In the querying, a message box (see Fig. 4-72) would pop up: “Query success” (see Fig. 4-73) to note you the query is successful and update the parameter interface (see Fig. 4-74) base on the query result; whereas, “Query overtime” (see Fig. 4-75) would display. Provided that sub-module hasn’t been selected, namely the sub-module address and the corresponding name are empty, a message box (see Fig. 4-76) would pop up. The query performance failed.

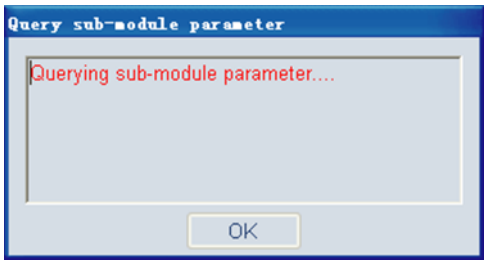


Fig.4-72

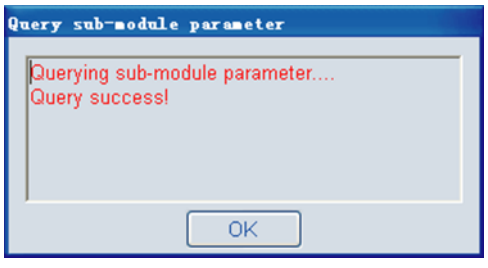


Fig.4-73

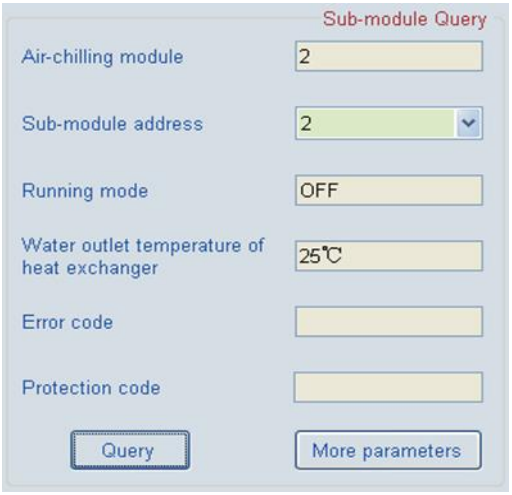


Fig.4-74

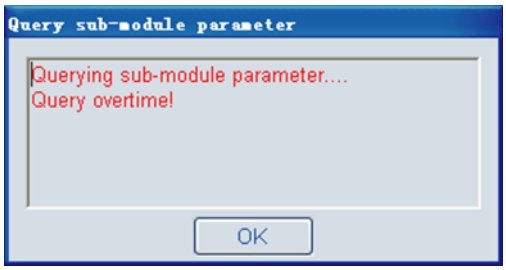


Fig.4-75

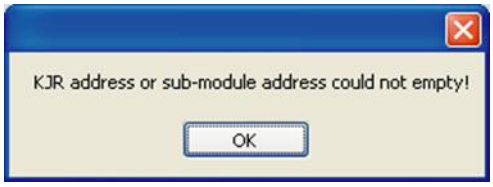


Fig.4-76

Provided that malfunction occur, the corresponding error code will show in the Sub-module query; Provided that protection function perform, the corresponding protection code will show in the Sub-module query; if move the mouse arrow to the these codes, a floating window as the follows Fig. 4-77 and 4-78 will appearance to giving the specific error or protection information.

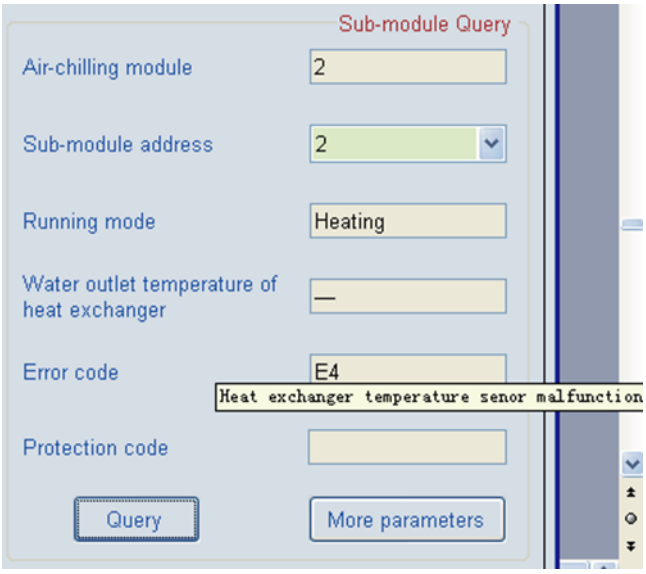


Fig.4-77

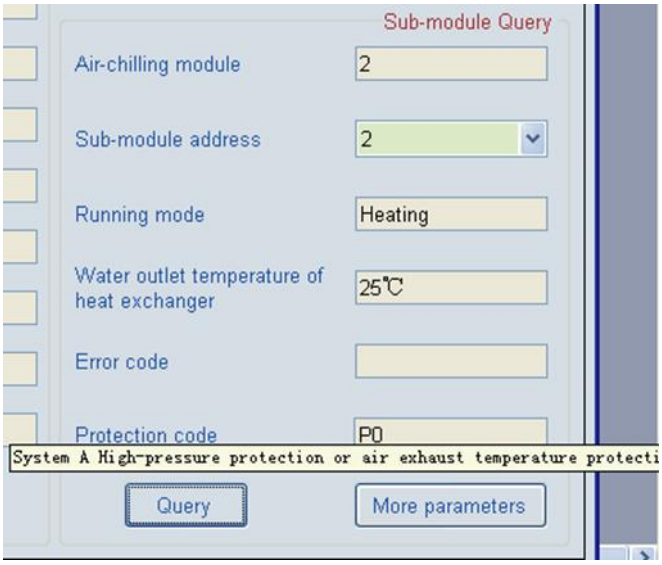


Fig.4-78

More parameters

Click More Parameters, you could query more data (See Fig.4-79). If the sub-module hasn't been selected, a message box as Fig. 4-80 would show. You must click a certain sub-module firstly, and then to click the "More parameters" key, more parameter could be queried; a message box (See Fig.4-81) will display informing more parameters are empty.

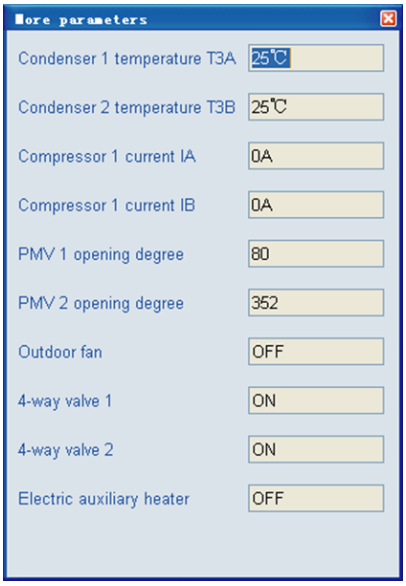


Fig.4-79

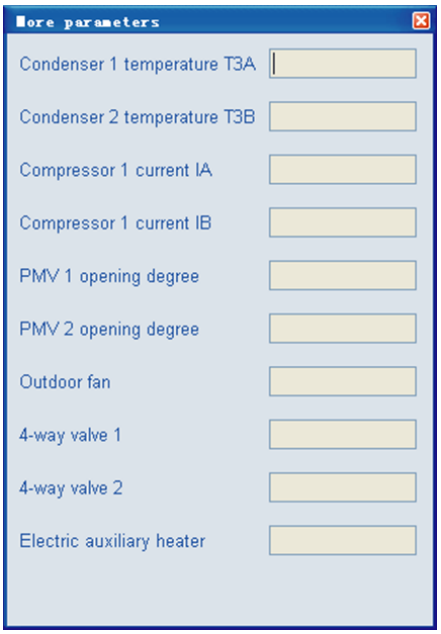


Fig.4-80

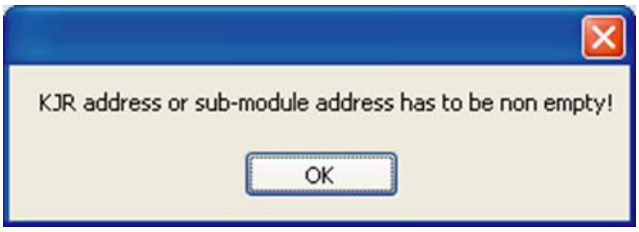


Fig.4-81

System operate set

1）During setting, message boxes as following might display.

Click the "System operate set" in the conditioner of without wired controller has been selected, a message box as Fig. 4-82 would show.

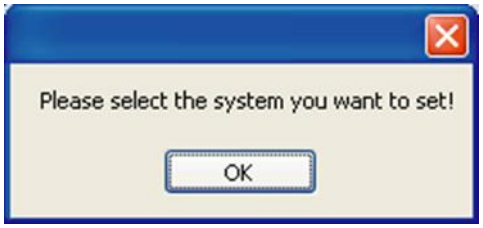


Fig.4-82

Click the "System operate set" in the conditioner of although the wired controller has been set, all options in the System Set are empty (See Fig. 4-83), a message box as Fig. 4-84 would show.

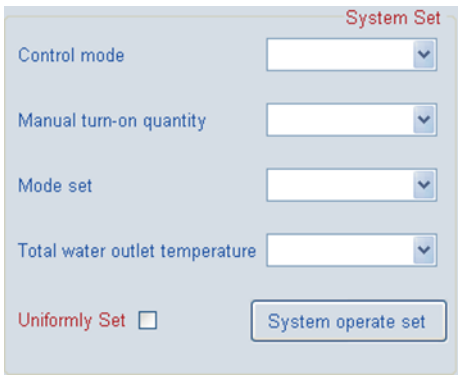


Fig.4-83

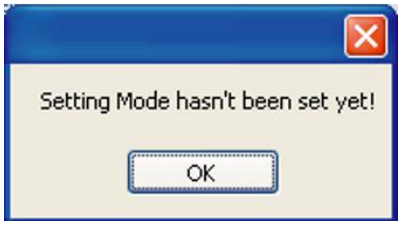


Fig.4-84

Click the “System operate set” in the conditioner of without Control Mode has been selected, a message box as Fig. 4-85 would show.

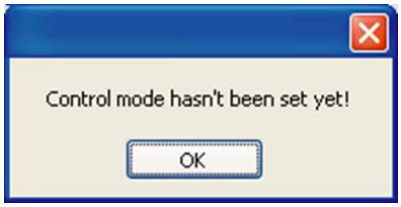


Fig.4-85

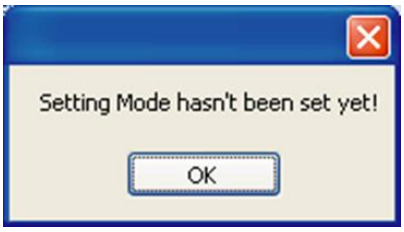


Fig.4-86

Click the “System operate set” in the conditioner of without Mode set has been selected, a message box as Fig. 4-86 would show.

Click the “System operate set” in the conditioner of without Setting temp. has been selected, a message box as Fig. 4-87 would show.



Fig.4-87

2) Set wired controller separately: Do not tick the “Uniformly Set”. Select the wanted set wired controller (refrigeration system) from the wired controller address column and select the corresponding set parameters, which include control Mode (Auto), Mode set (cooling/heating/Water pump/turn-off), Setting temp. (Cooling: 5~17℃; Heating:45~50℃). After set up all above parameters (See Fig. 4-88), please click the “System operate set”, system begins to set up. A message box (See Fig. 4-89) will pop up. Once successful setting, a message box as Fig. 4-90 will display to inform you Successful System Set, whereas, Failed System set as Fig. 4-91 will display.

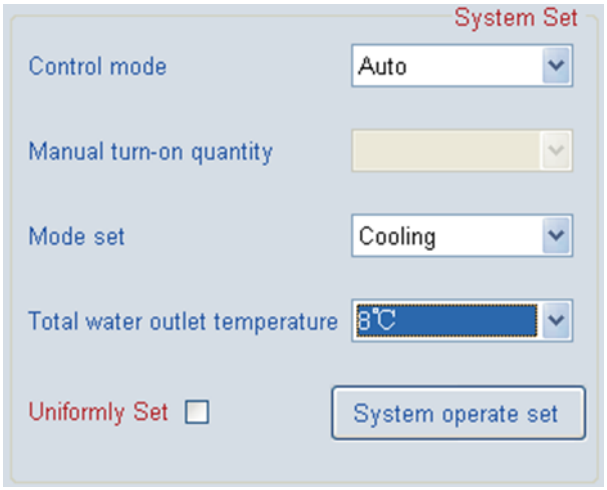


Fig.4-88

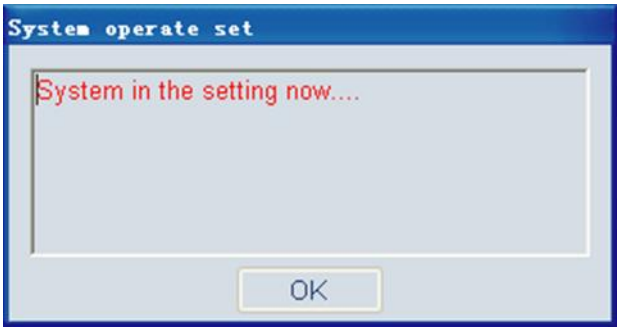


Fig.4-89

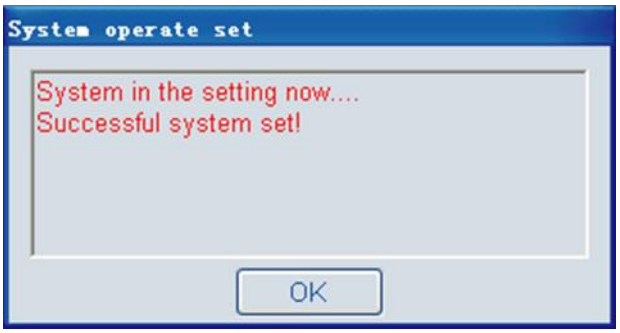


Fig.4-90

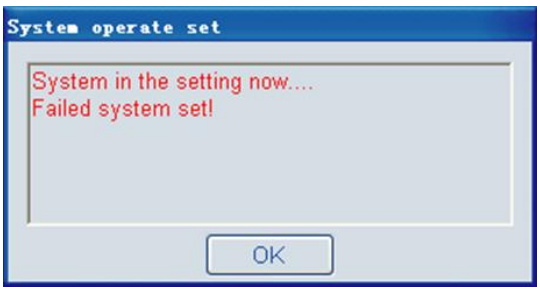


Fig.4-91

3) Uniformly set all wired controllers: Tick Uniformly Set as Fig. 4-92, and then select the corresponding parameters, click the System Operate Set, system starts to set up. A message box as Fig. 4-93 will display during the setting. Once successful setting, a message box as Fig. 4-94 will display to inform you Successful System Set, whereas, Failed System set as Fig. 4-95 will display. After all setting done, a message box (see Fig. 4-96) will display informing “Setting Finish”.

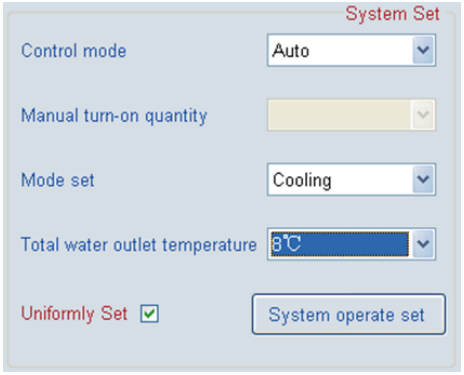


Fig.4-92

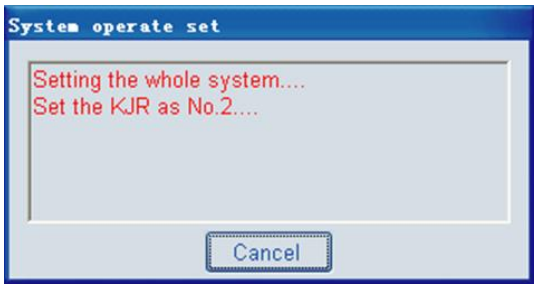


Fig.4-93

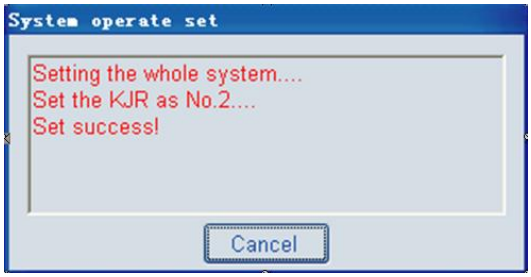


Fig.4-94

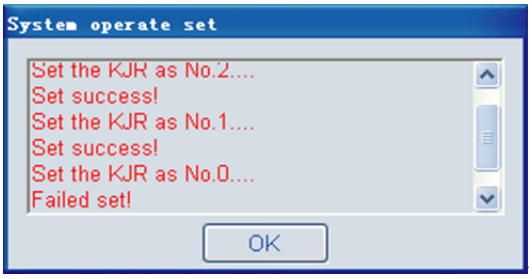


Fig.4-95

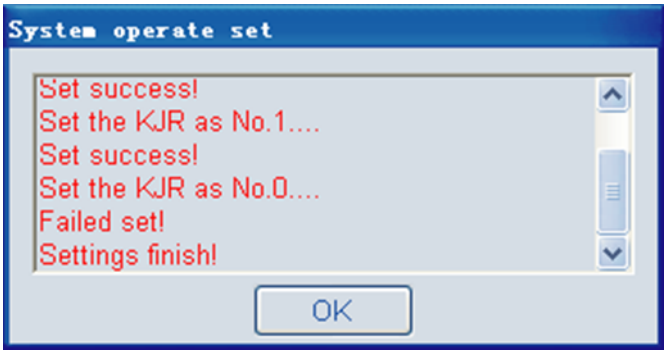


Fig.4-96

Remark

The computer can use the names of serial ports for querying:

1、Right-click the “My Computer” and select the “Properties” as Fig. 4-97.

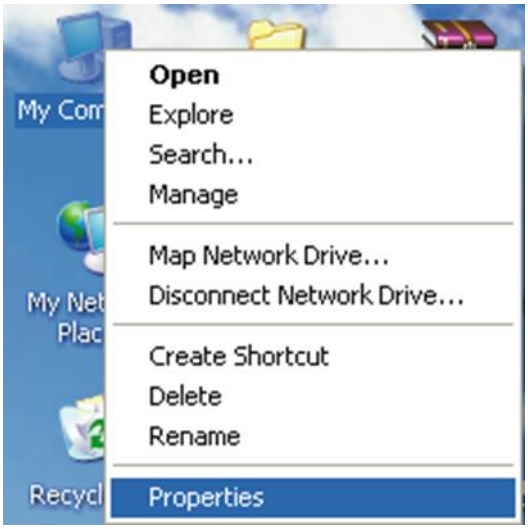


Fig.4-97



Fig.4-98

2、The window “System Properties” will be popped-up after selecting the “Properties”, and then select the “Device Manager” in the “Hardware” as Fig. 4-98

3、The window “Device Manager” will be showed up after clicking the “Device Manager, as Fig. 4-99.

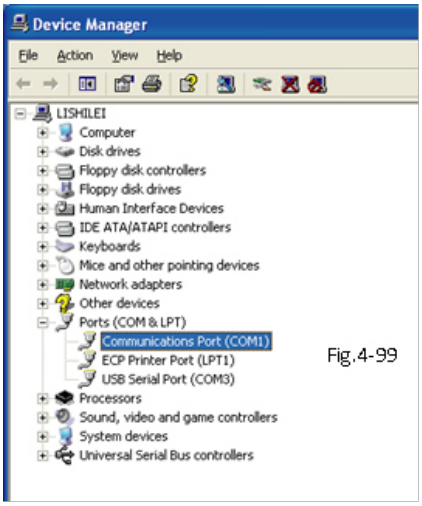


Fig.4-99

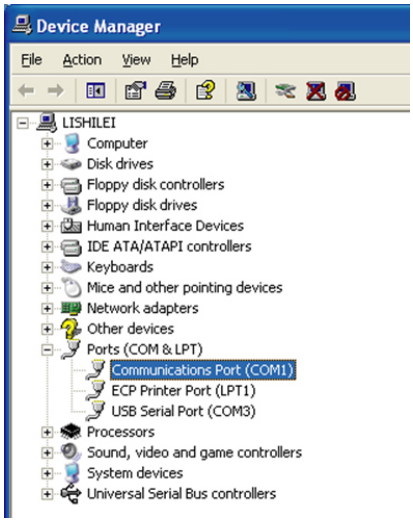


Fig.4-100

4、Click the icon “ ” in front of the “Ports（COM&LPT）”, then can view the port names by the format as “COM” +number, these names are the usable serial port names for the computer (Note: the computer may has more serial ports or no ports), as Fig. 4-100.

Part 4

Diagnosis and Troubleshooting

1 Electric wiring diagram 53

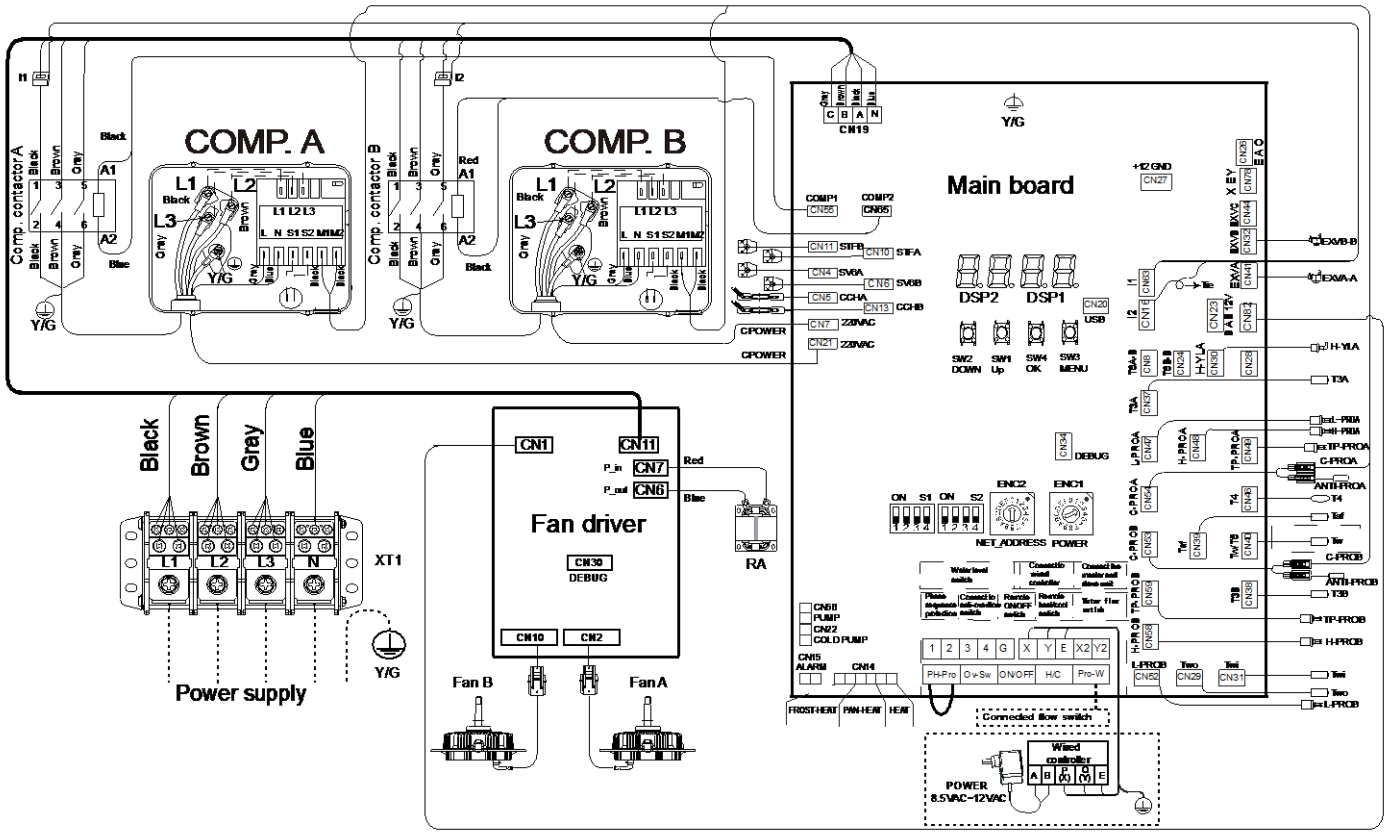
2 Electric Control Box Layout 59

3 PCB Introduction 66

4 Error Code Table 91

5 Troubleshooting 96

6 Temperature Sensor Resistance Characteristics 123

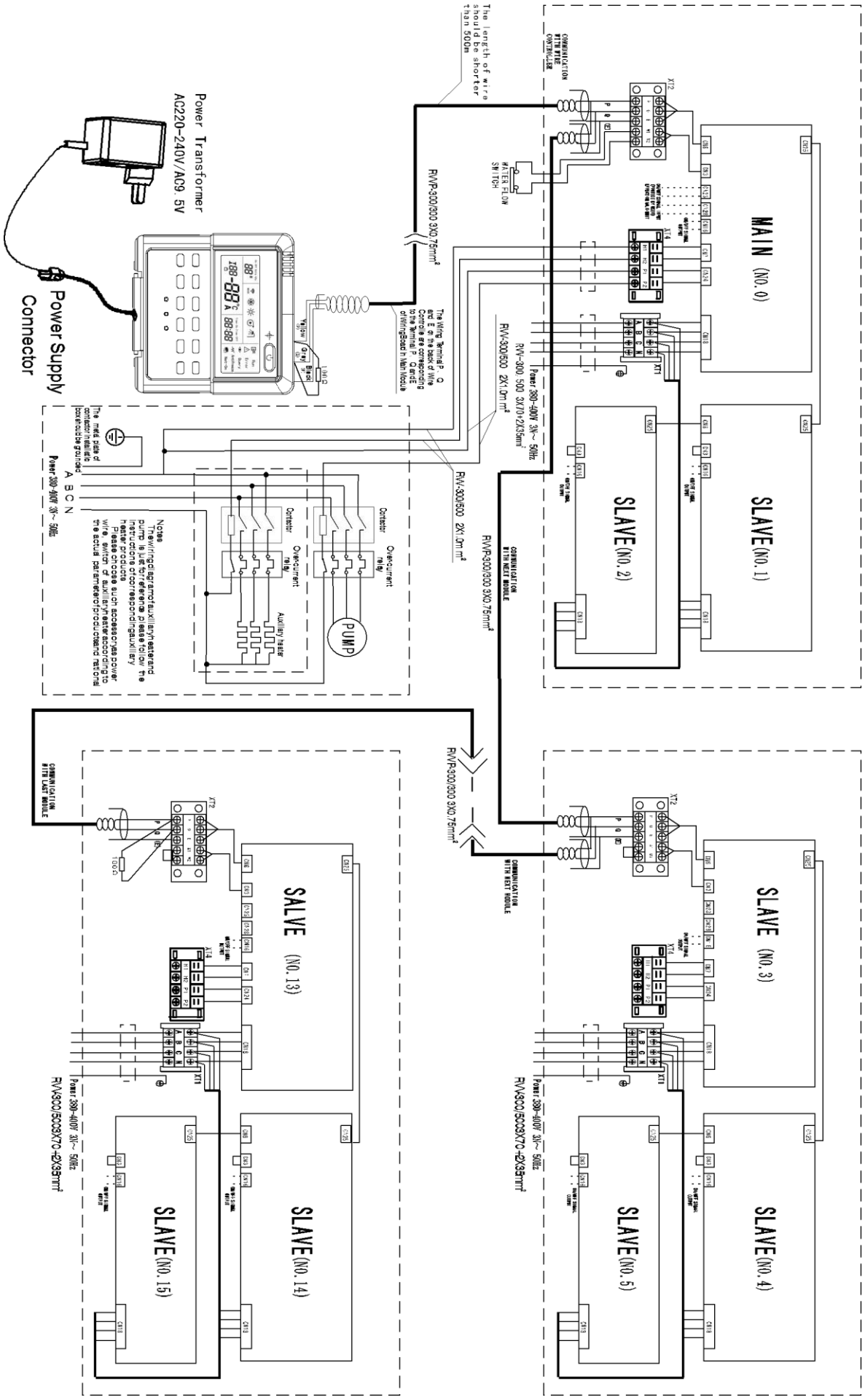


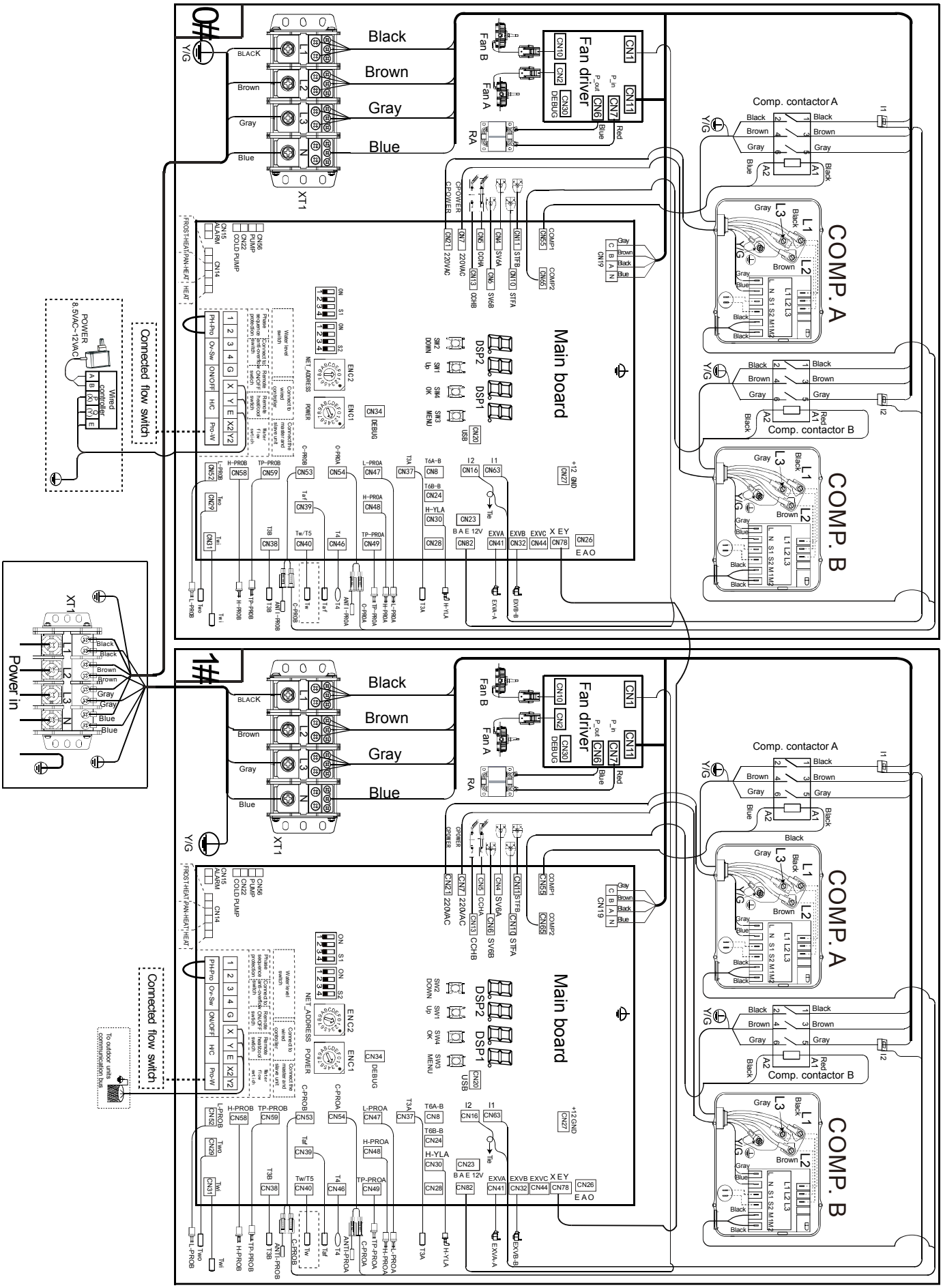
Version: C

DIP switch	ON	OFF(Default)
S1-1	Reserved	Reserved
S1-2	Reserved	Reserved
S1-3	Low leaving water temperature mode	Normal leaving water temperature mode
S1-4	Reserved	Reserved
S2-1	Remote on/off, heating/cooling is effective	Remote on/off, heating/cooling is invalid
S2-2	Smart defrosting is effective	Smart defrosting is invalid
S2-3	Normal ambient temperature cooling function	Low ambient temperature cooling function
S2-4	Reserved	Reserved

Note: Remote on/off, heating/cooling function are only available for master unit.

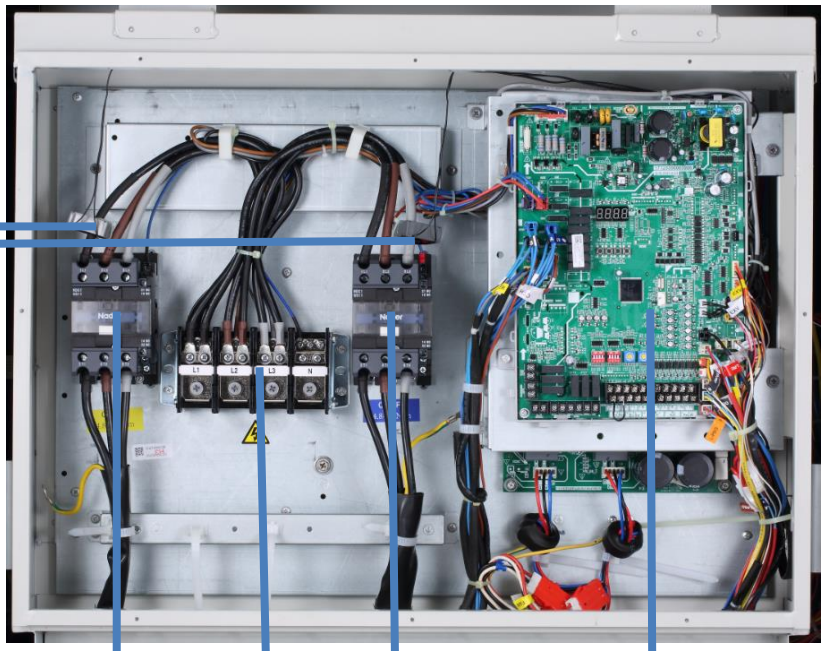
Attached picture (III) Networking Communication Schematic of Main Unit and Auxiliary Unit For MGBL-F200W/RN1



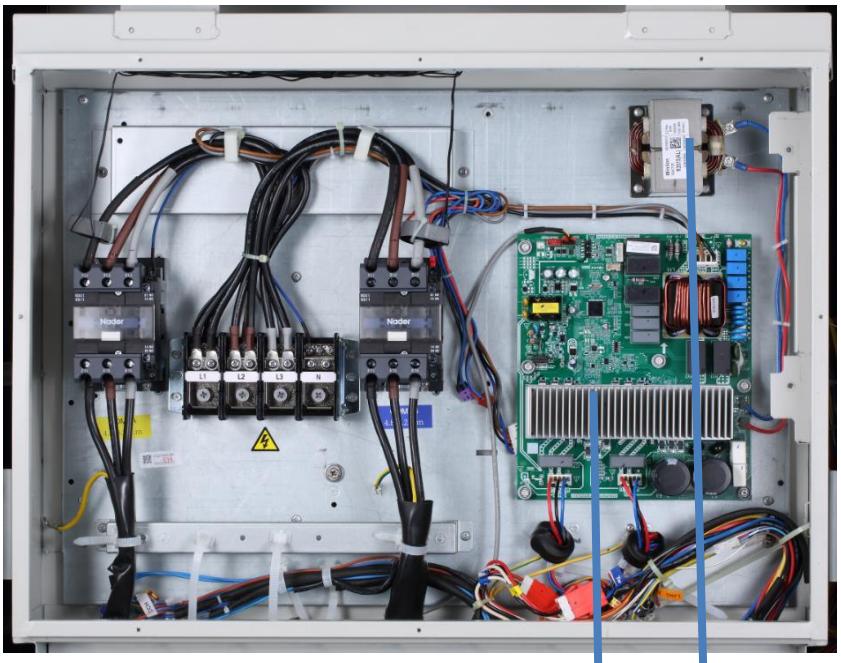


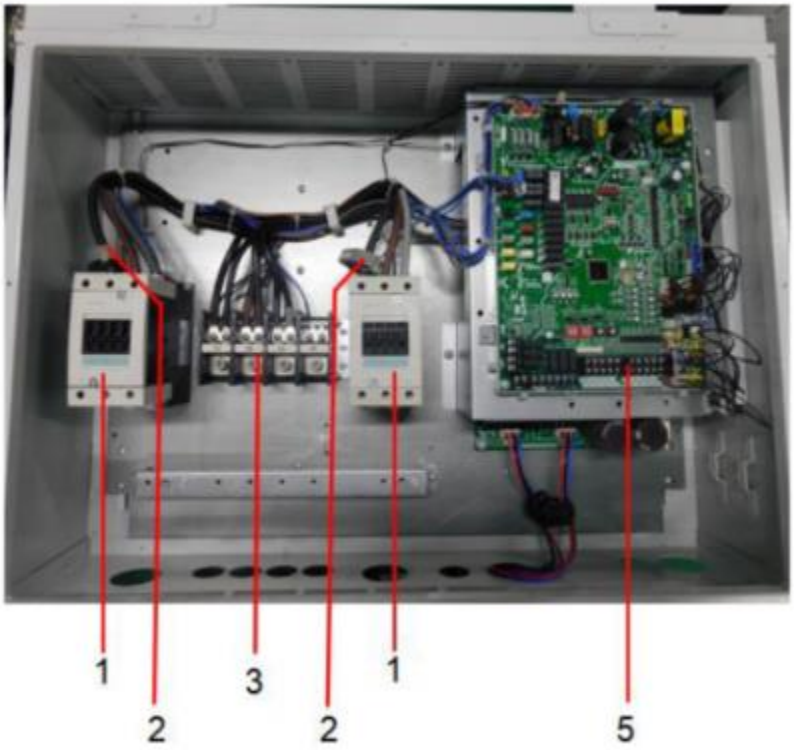
MDV King Plus Service Manual

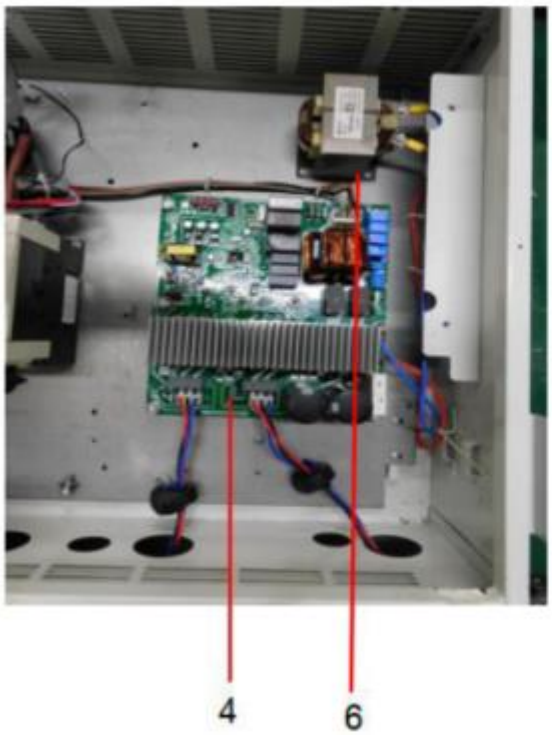
First layer of control box

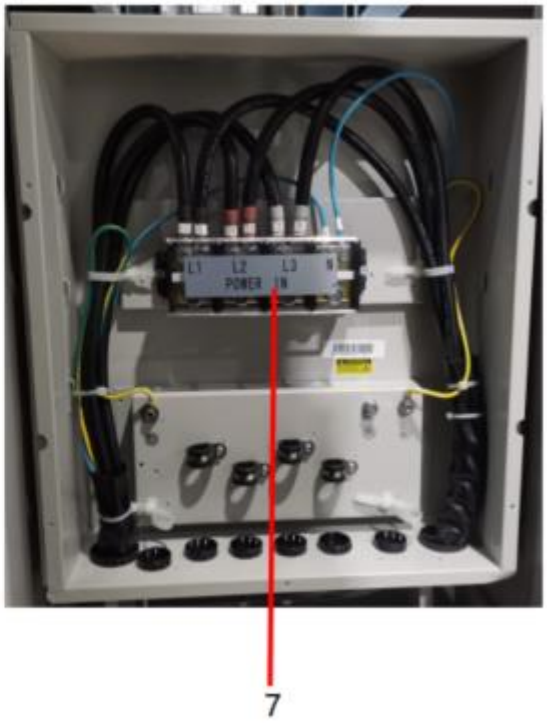


Second layer of control box







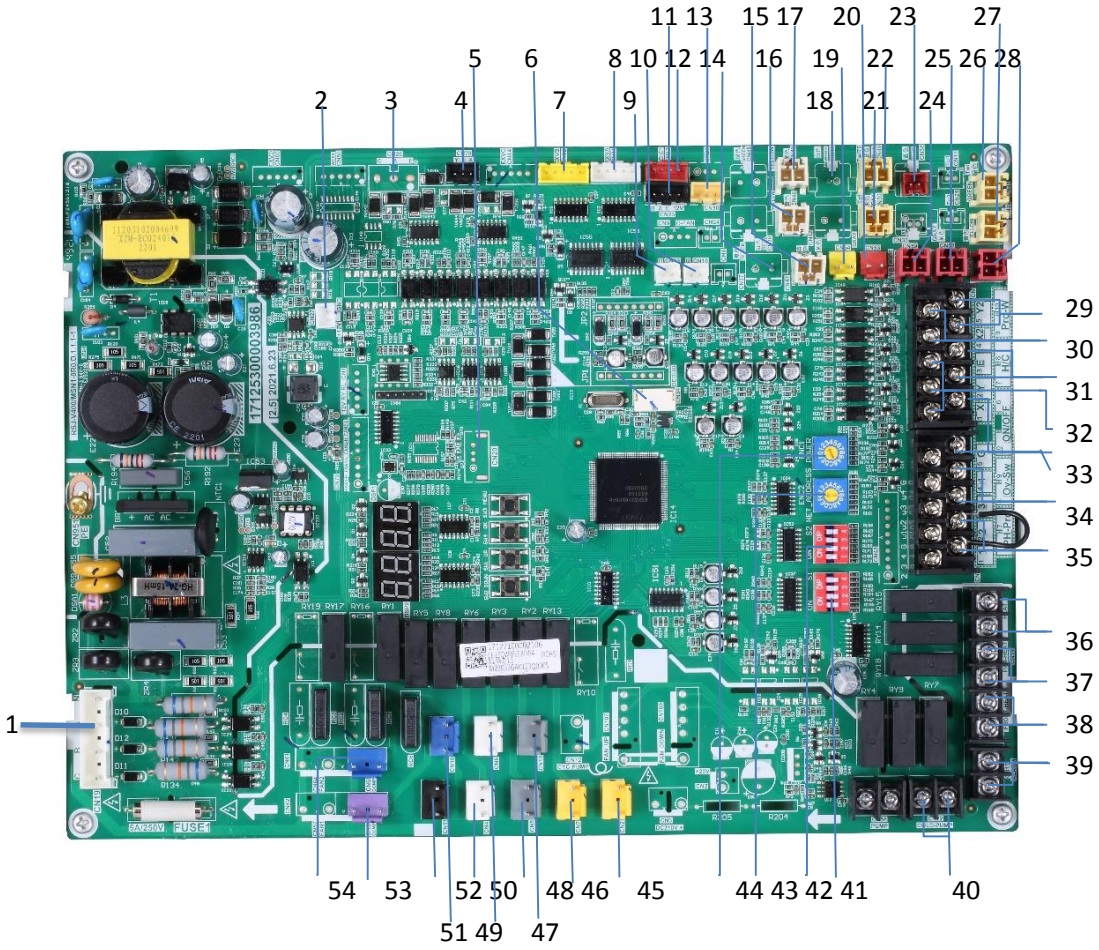


Label	components and parts
1	AC contactor
2	Current transformer
3	Wire joint
4	Module board assembly
5	Main control board assembly
6	Reactor
7	Wire joint

3 PCB Introduction

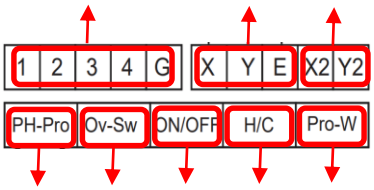
3.1 Main PCB for 130/260kW

3.1.1 Main PCB component



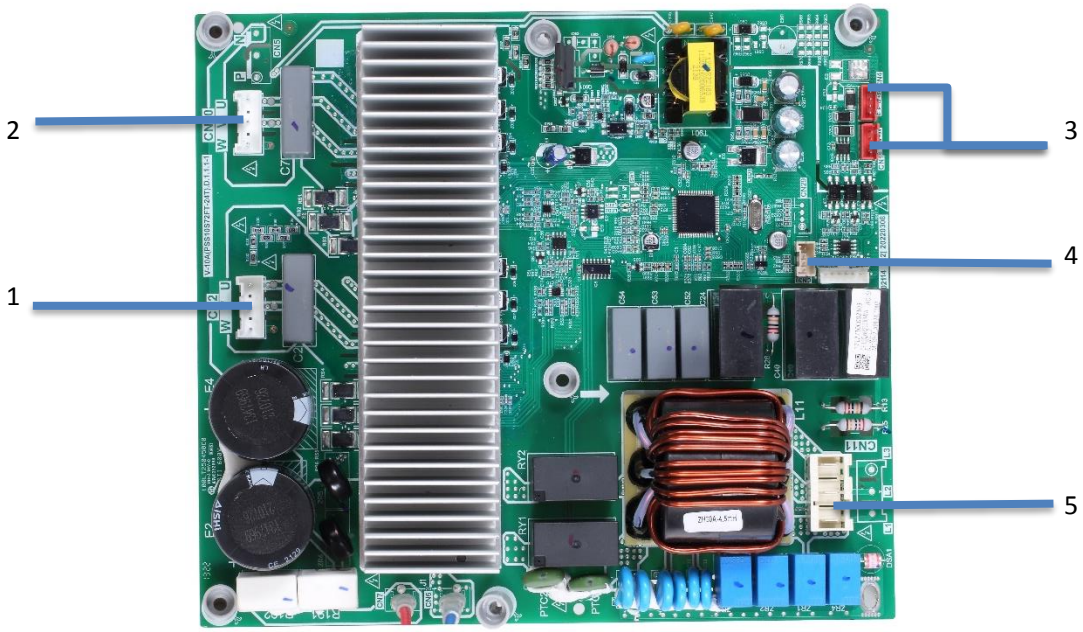
Label	Code	Explanation	Voltage
1	CN19	Power supply	380VAC
2	CN27	Weak current power supply (+12VDC)	12VDC
3	CN26	Metering ports	5VDC
4	CN78	XYE interface of wire controller	5VDC
5	CN20	USB programming port	5VDC
6	CN34	Main chip program firing port	5VDC
7	CN32	Electronic expansion valve B control	12VDC
8	CN41	Electronic expansion valve A control	12VDC
9	CN63	Compressor A current detection port	5VDC
10	CN16	Compressor B current detection port	5VDC
11	CN23	Communication port of upper computer	12VDC
12	CN82	Fan Module communication	5VDC
13	CN30	High pressure transducer	5VDC
14	CN37	Evaporator temperature PORT A	5VDC
15	CN47	A System low voltage protection port	5VDC
16	CN48	A System high voltage protection port	5VDC

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<table>
<tr><td>17</td><td>CN49</td><td colspan="6">A System exhaust protection port</td><td>5VDC</td></tr>
<tr><td>18</td><td>CN46</td><td colspan="6">Port for detecting ambient temperature</td><td>5VDC</td></tr>
<tr><td>19</td><td>CN54</td><td colspan="6">A System compressor protection</td><td>12VDC</td></tr>
<tr><td>20</td><td>CN53</td><td colspan="6">B System compressor protection</td><td>12VDC</td></tr>
<tr><td>21</td><td>CN39</td><td colspan="6">Port for the antifreeze temperature sensor</td><td>5VDC</td></tr>
<tr><td>22</td><td>CN40</td><td colspan="6">Total water temperature sensor interface</td><td>5VDC</td></tr>
<tr><td>23</td><td>CN38</td><td colspan="6">Evaporator temperature B port</td><td>5VDC</td></tr>
<tr><td>24</td><td>CN59</td><td colspan="6">B System exhaust protection port</td><td>5VDC</td></tr>
<tr><td>25</td><td>CN58</td><td colspan="6">B System high voltage protection port</td><td>5VDC</td></tr>
<tr><td>26</td><td>CN31</td><td colspan="6">General inlet water temperature sensor interface</td><td>5VDC</td></tr>
<tr><td>27</td><td>CN29</td><td colspan="6">Total outlet water temperature sensor interface</td><td>5VDC</td></tr>
<tr><td>28</td><td>CN52</td><td colspan="6">B System low voltage protection port</td><td>5VDC</td></tr>
<tr><td rowspan="4">29,30,31,32
33,34,35</td><td rowspan="4">CN35
CN51</td><td rowspan="4">1 2 3

4 5 6 7 8</td><td>No.</td><td>Description</td><td>No.</td><td>Description</td><td rowspan="4">5V DC
/12VDC</td></tr>
<tr><td>1</td><td>Water level switch</td><td>5</td><td>Connect to anti-overflow switch</td></tr>
<tr><td>2</td><td>Connect to wired controller</td><td>6</td><td>Remote ON/OFF switch</td></tr>
<tr><td>3</td><td>Connect the master and slave unit</td><td>7</td><td>Remote heat/cool switch</td></tr>
<tr><td>36
37
38</td><td>CN14</td><td colspan="6">Electric auxiliary heat control port</td><td>/</td></tr>
<tr><td>39</td><td>CN15</td><td colspan="6">Alarm control port</td><td>/</td></tr>
<tr><td>40</td><td>CN22</td><td colspan="6">Circulating pump control port</td><td>/</td></tr>
<tr><td>41</td><td>S1</td><td colspan="6">DIP switch setting (Refer to 1 Electric wiring diagram)</td><td>/</td></tr>
<tr><td>42</td><td>S2</td><td colspan="6">DIP switch setting(Refer to 1 Electric wiring diagram)</td><td>/</td></tr>
<tr><td>43</td><td>ENC2</td><td colspan="6">Address DIP switch, 0 for the host and 1-F for the slave (default: 0)</td><td>/</td></tr>
<tr><td>44</td><td>ENC1</td><td colspan="6">Capability dip switch (3 represents 130KW</td><td>/</td></tr>
<tr><td>45</td><td>CN21</td><td colspan="6">Compressor A control port</td><td>220VAC</td></tr>
<tr><td>46</td><td>CN7</td><td colspan="6">Compressor B control port</td><td>220VAC</td></tr>
<tr><td>47</td><td>CN13</td><td colspan="6">Compressor B electric heating belt</td><td>220VAC</td></tr>
<tr><td>48</td><td>CN5</td><td colspan="6">Compressor A electric heating belt</td><td>220VAC</td></tr>
<tr><td>49</td><td>CN6</td><td colspan="6">B System solenoid valve</td><td>220VAC</td></tr>
<tr><td>50</td><td>CN4</td><td colspan="6">A System solenoid valve</td><td>220VAC</td></tr>
<tr><td>51</td><td>CN10</td><td colspan="6">A system four-way valve</td><td>220VAC</td></tr>
<tr><td>52</td><td>CN11</td><td colspan="6">B system four-way valve</td><td>220VAC</td></tr>
<tr><td>53</td><td>CN55</td><td colspan="6">Compressor A power control port</td><td>220VAC</td></tr>
<tr><td>54</td><td>CN65</td><td colspan="6">Compressor B power control port</td><td>220VAC</td></tr>
</table>

3.2 Fan Module Board

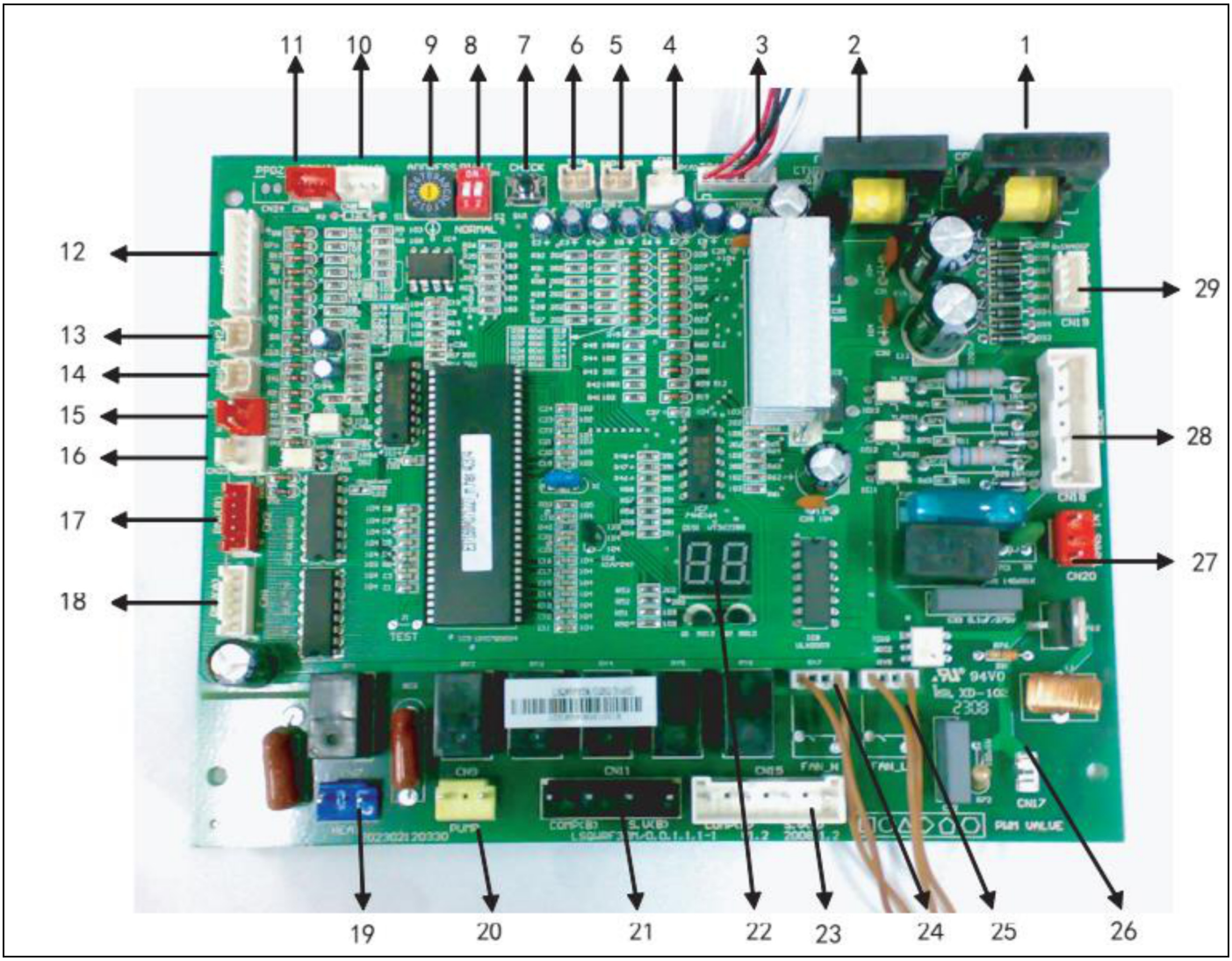
3.2.1 Fan Module Board component



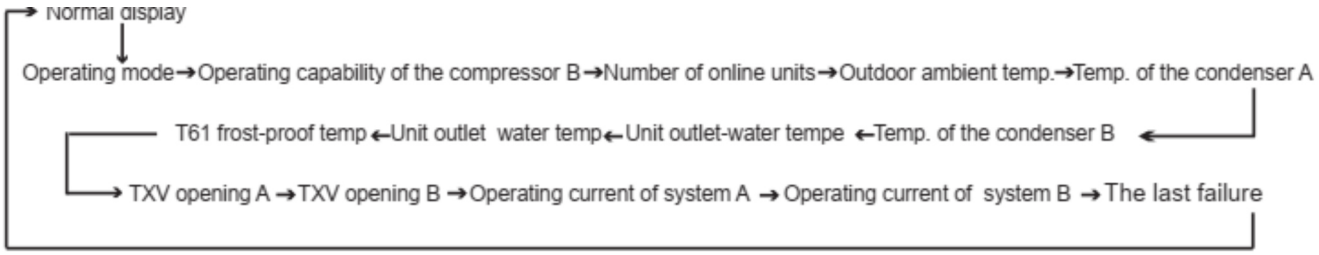
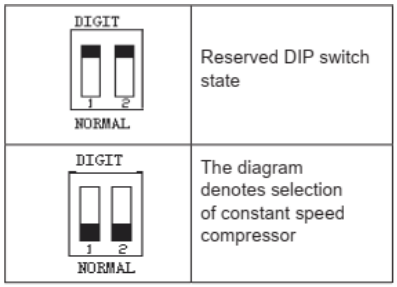
Label	Code	Explanation	Voltage
1	CN2	Fan 1 Power UVW port	AC high voltage
2	CN10	Fan 2 Power UVW port	AC high voltage
3	CN1/CN4	Fan module communication port	5VDC
4	CN30	Master chip program burner	5VDC
5	CN11	Fan module power supply L1L2L3 port	380VAC

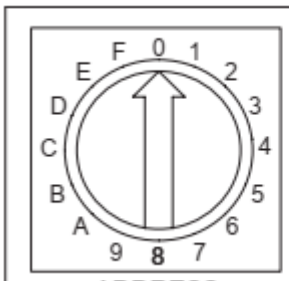
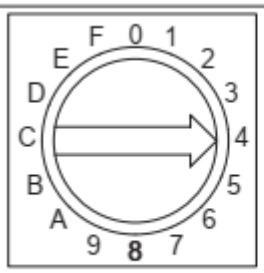
3.3 PCB Outline and Description for 60kW

3.3.1 PCB outlook view



No.	Detail information
1	Detection of current of the compressor B (protection code P5)
2	Detection of current of the compressor A (protection code P4) Current is not detected within the initial 5 seconds after the compressor is started up. When the current of the compressor is detected to exceed protective value set (33A for constant speed compressor), it will be shut down and re-started after 3 min.

3	T4: outdoor ambient temperature sensor (fault code E7) T3B: pipe temperature sensor of the condenser B (fault code E6 and protection code P7) T3A: pipe temperature sensor of the condenser A (fault code E5 and protection code P6) 1) T4: if there is one system that requires starting outdoor fans, the fans are started through electric control of the unit. Start outdoor fan A only, start A and B gears, and control the unit through T4. 2) T3B and T3A: when the electric control of the scroll unit detects the temperature of the outdoor pipe T3A or T3B of the system exceeds the protective temperature 65。 C, the corresponding system will be shut down. And it will be re-started up, after the temperature drops below the recovery temperature 60 。 C. Another system will be not affected. 3) T4, T3B and T3A: when the temperature sensor is detected to suffer open circuit or short circuit, fault alarm will occur. ● When the main unit suffer fault of temperature sensor: the main unit and subordinate units will be shut down. ● When the subordinate unit suffer fault of temperature sensor: the unit will be shut down, but other subordinate units will not be affected.
4	/
5	Unit outlet water temperature sensor (fault code E4) Under refrigeration mode and heating mode, conduct adjustment according to the magnitude of unit outlet water temperature. Adjustment range of constant speed capability: ON and OFF.
6	Total outlet water temperature sensor (fault code E3) Only the main unit is valid, and the subordinate units are invalid. Under refrigerating mode and heating mode, conduct adjustment according to the magnitude of total outlet water temperature. Adjustment range: Load, stabilize, unload, Emergency Stop.
7	Spot check. The operating status of outdoor system can be observed through spot check, and specific display contents are as shown in the following figure:  • Display contents of "operating mode": 1. cooling; 2. heating; 4. pump; 8. Stand-by • Display contents of "number of online units": the main unit can display the number of online units, and the subordinate unit displays 0.
8	Selection code of the compressor 

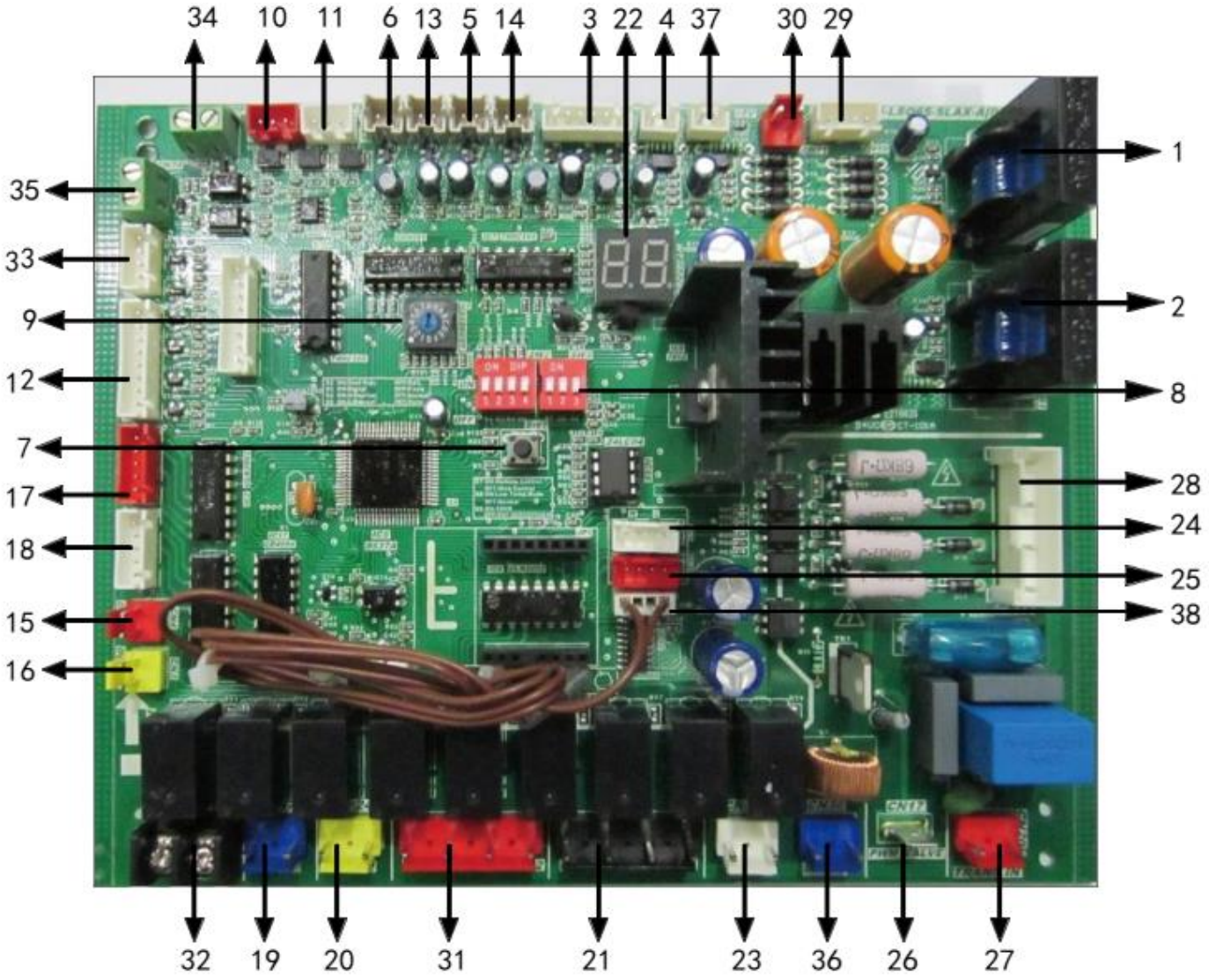
9	Each scroll part of scroll unit has the same electric control function, and the main unit and subordinate units can be set through address code on the electric control board. The address code 0 # is provided as the main unit. The priority of being the main unit is given to the unit with digital compressor, and other addresses are subordinate units. Only the unit is chosen as the main unit, its electric control can activate such functions as direct communication with the wired controller, refrigerating and heating capability adjustment, pump control, auxiliary electric heater control, total effluent temperature detection and water flow switch detection.
	 When the address is 0, it serves as the main unit.
	 When the address is 1,2,3.....F, it serves as the subordinate unit 1,2,3.....15.
10	COM (O) 485 communication port (fault code E2)
11	COM (I) 485 communication port (fault code E2) COM (O) is interconnected with P, Q and E of COM (I), used for RS-485 communication. 1) If faults occur between the wired controller and the main unit module, all modules will be shut down. 2) If faults occur between the main unit and subordinate units, the subordinate unit module suffering communication fault will be shut down. Less units will be detected by the wired controller, which may display EA, and in the meanwhile, the indicator lamp of the wired controller will flash. estart 3 minutes later after malfunction be removed.
12	high-pressure protection of the system A and discharge temperature switch protection (protection code P0); high-pressure protection of the system B and discharge temperature switch protection (protection code P2); low-pressure protection of the system A (protection code P1); low-pressure protection of the system B (protection code P3); Constant speed compressor: connection of discharge temperature switch and high-pressure switch of the system in series.
13	Inlet water temperature sensor T62 (TBH2) (fault code EF)
14	Shell and tube low-temperature ant-freeze sensor T61 (TBH1) (fault code Eb)
15	Water flow detection (fault code of the main unit E0) is only valid for the main unit but invalid for subordinate units. 1) Main unit: if abnormal water flow occurs for the first and second time, the main unit board will display fault code E9. If abnormal water flow occurs the third time, the main unit board will display fault code E0 (off-power recovery is needed), and the wired controller will display fault code E0 (fault is displayed only after 3 detection).

	2) Subordinate unit: (water flow detection will not be done).
16	Control port (reserved)
17	Electronic expansion valve of the system B
18	Electronic expansion valve of the system A Electronic expansion valve is used to control refrigerant flow under different operating modes and different loads.
19	Auxiliary electric heater Attention: the control port value of auxiliary electric heater actually detected is ON/OFF but not 220-230V control power supply, so special attention should be paid when installing the auxiliary electric heater. Attention! Under heating mode, when the main unit board detects total water outlet temperature to be lower than 45℃, the switch will be closed, and the auxiliary electric heater will begin to work; when the total water outlet temperature is higher than 50℃, the switch will be opened, and the auxiliary electric heater will stop working.
20	PUMP. Attention: the control port value of the pump actually detected is ON/OFF but not 220-230V control power supply, so special attention should be paid when installing the pump. 1) After receiving start-up instruction, the pump will be started up instantly, and will maintain start-up state always in the process of operation. 2) In case of refrigerating or heating shutdown, the pump will be shut down 2 minutes after all modules stop operating. 3) In case of shutdown under the pump mode, the pump can be directly shut down.
21	Compressor of the system B; Neutral wire; Four-way valve of the system B; Neutral wire.
22	Numerical code tube. 1) In case of stand-by, the address of the module is displayed; 2) In case of normal operation, 10. is displayed (10 is followed by dot). 3) In case of fault or protection, fault code or protection code is displayed
23	Compressor of the system A; Neutral wire; Four-way valve of the system A; Neutral wire.
24	Outdoor fan A, controlled by T4.
25	Outdoor fan B, controlled by T4.
26	/

27	Input of transformer, 220-230V AC current. (only valid for the main unit)
28	Input of three-phase four-wire power supply (fault code E1) Three phases A, B and C of power supply should exist simultaneously, and the difference of phase angle should be 120º among them. If the conditions are not met, fault of phase sequence or phase lack may occur, and fault code will be displayed. When the power supply returns to normal condition, fault is removed. Attention: phase lace and phase dislocation of power supply are detected only in the early period after the power supply is connected, and they are not detected while the unit is in operation.
29	Output of transformer

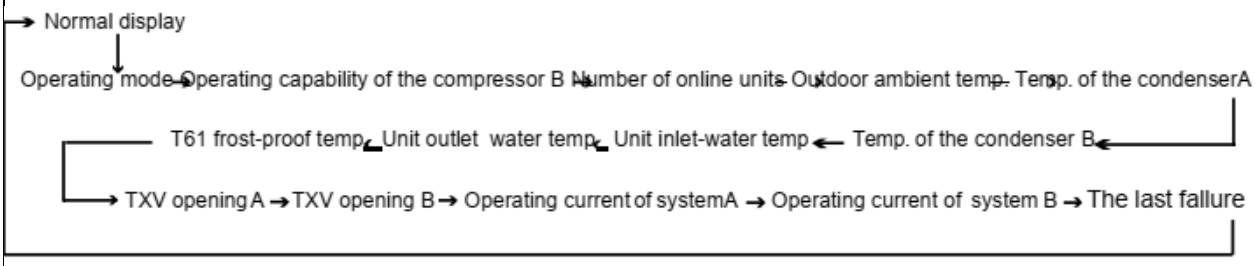
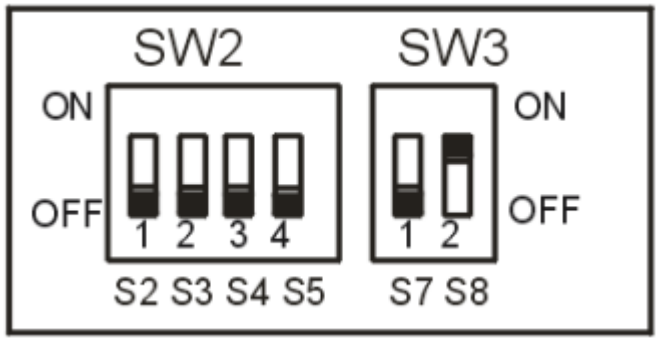
3.6 PCB Outline and Description for 185kW

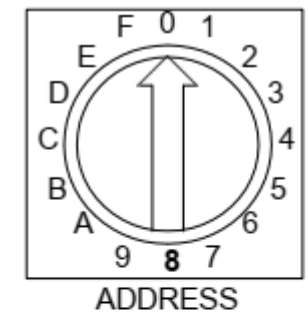
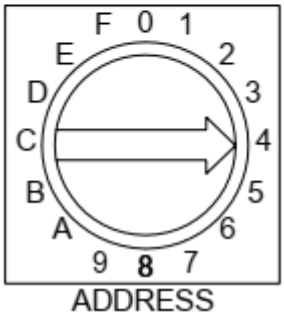
3.6.1 PCB outlook view



3.6.2 Components description

No.	Detail information
1	Detection of current of the compressor A1 (Protection code P4).
2	Detection of current of the compressor B1 (Protection code P5). Current is not detected within the initial 5 seconds after the compressor is started up. When the current of the compressor is detected to exceed protective value set (18A for constant speed compressor), it will be shut down and re-started after 3 min.
3	T4: outdoor ambient temperature sensor (Fault code E7). T3B: pipe temperature sensor of the condenser B (Fault code E6 and protection code P7). T3A: pipe temperature sensor of the condenser A (Fault code E5 and protection code P6). T4: if there is one system that requires starting outdoor fans, the fans are started through electric control of the unit. Start outdoor fan A only, start A and B gears, and control the unit through T4. T3B and T3A: when the electric control of the unit detects the temperature of the outdoor pipe T3A or T3B of the system exceeds the protective temperature 65˚C, the corresponding system will be shut down. And it will be re-

	started up, after the
	temperature drops below the recovery temperature 60°C. Another system will be not affected. 3) T4, T3B and T3A: when the temperature sensor is detected to suffer open circuit or short circuit, fault alarm will occur. When the main unit suffer fault of temperature sensor: the main unit and subordinate units will be shut down. When the subordinate unit suffer fault of temperature sensor: the unit will be shut down, but other subordinate units will not be affected.
4	Detection of current of the compressor A2 (protection code P4)
5	Unit outlet water temperature sensor (fault code E4) Under refrigeration mode and heating mode, conduct adjustment according to the magnitude of unit outlet water temperature. Adjustment range of constant speed capability: ON and OFF.
6	Total outlet water temperature sensor (fault code E3) Only the main unit is valid, and the subordinate units are invalid. Under refrigerating mode and heating mode, conduct adjustment according to the magnitude of total outlet water temperature. Adjustment range: Load, stabilize, unload, Emergency Stop.
7	Spot check. The operating status of outdoor system can be observed through spot check, and specific display contents are as shown in the following figure:  ● Display contents of "operating mode": 1. cooling; 2. heating; 4. pump; 8. Stand-by ● Display contents of "number of online units": the main unit can display the number of online units, and the subordinate unit displays 0.
8	Factory setting 

9	Each modular part of modular unit has the same electric control function, and the main unit and subordinate units can be set through address code on the electric control board. The address code 0 # is provided as the main unit. The priority of being the main unit is given to the unit with digital compressor, and other addresses are subordinate units. Only the unit is chosen as the main unit, its electric control can activate such functions as direct communication with the wired controller, refrigerating and heating capability adjustment, pump control, auxiliary electric heater control, total effluent temperature detection and water flow switch detection.
	 When the address is 0, it serves as the main unit.  When the address is 1,2,3……F, it serves as the subordinate unit 1,2,3……15.
10	COM (O) 485 communication port (fault code E2)
11	COM (I) 485 communication port (fault code E2) COM (O) is interconnected with P, Q and E of COM (I), used for RS-485 communication. If faults occur between the wired controller and the main unit module, all modules will be shut down. If faults occur between the main unit and subordinate units, the subordinate unit module suffering communication fault will be shut down. Less units will be detected by the wired controller, which may display EC, and in the meanwhile, the indicator lamp of the wired controller will flash. restart 3 minutes later after malfunction be removed.
12	high-pressure protection of the system A and discharge temperature switch protection (protection code P0); high-pressure protection of the system B and discharge temperature switch protection (protection code P2); low-pressure protection of the system A (protection code P1); low-pressure protection of the system B (protection code P3); Constant speed compressor: connection of discharge temperature switch and high-pressure switch of the system in series.
13	Inlet water temperature sensor (fault code EF)
14	Shell and tube low-temperature ant-freeze sensor (fault code Eb)
15	Water flow detection (fault code of the main unit E9) is only valid for the main unit but invalid for subordinate units. Main unit: if abnormal water flow occurs , the main unit board and the wired controller will display fault code E9. Subordinate unit: (water flow detection will not be done).
16	Power phase detection(fault code E8)
17	Electronic expansion valve of the system B
18	Electronic expansion valve of the system A

	Electronic expansion valve is used to control refrigerant flow under different operating modes and different loads.
19	Auxiliary electric heater Attention: the control port value of auxiliary electric heater actually detected is ON/OFF but not 220-230V control power supply, so special attention should be paid when installing the auxiliary electric heater. Attention! Under heating mode, when the main unit board detects total water outlet temperature to be lower than 45˚C, the switch will be closed, and the auxiliary electric heater will begin to work; when the total water outlet temperature is higher than 50˚C, the switch will be opened, and the auxiliary electric heater will stop working.
20	PUMP. Attention: the control port value of the pump actually detected is ON/OFF but not 220-230V control power supply, so special attention should be paid when installing the pump. 1) After receiving start-up instruction, the pump will be started up instantly, and will maintain start-up state always in the
	process of operation. In case of refrigerating or heating shutdown, the pump will be shut down 2 minutes after all modules stop operating. In case of shutdown under the pump mode, the pump can be directly shut down.
21	One compressor of the system B(B1); Neutral wire; One compressor of the system A(A1); Neutral wire.
22	Numerical code tube. In case of stand-by, the address of the module is displayed; In case of normal operation, 10. is displayed (10 is followed by dot). In case of fault or protection, fault code or protection code is displayed.
23	Four-way valve of the system B; Neutral wire.
24	Outdoor fan A, controlled by T4.
25	Outdoor fan B, controlled by T4.
26	PWM pressure relif valve control(for digital compressor)
27	Input of transformer, 220-230V AC current. (only valid for the main unit)
28	Input of three-phase four-wire power supply (fault code E1) Three phases A, B and C of power supply should exist simultaneously, and the difference of phase angle should be 120º among them. If the conditions are not met, fault of phase sequence or phase lack may occur, and fault code will be displayed. When the power supply returns to normal condition, fault is removed. Attention: phase lace and phase dislocation of power supply are detected only in the early period after the power supply is connected, and they are not detected while the unit is in operation.
29	Output of transformer
30	Power port for the current board
31	One compressor of the system B(B2); Neutral wire; One compressor of the system A(A2) ; Neutral wire.
32	The alarm signal output of the unit(ON/OFF signal)
33	Anti-freezing pressure protection of the system A(protection code Pc) Anti-freezing pressure protection of the system B(protection code Pd)

34	Remote control port(ON/OFF signal, effect on NO.0 unit) 1、Dial the code S7 in the main control board to the “ON” position and enter to the remote control mode (the wire controller is invalid) 2、If the port is closed, the unit is turned on, else,the unit is turned off.
35	Remote mode control port(ON/OFF signal,effect on NO.0 unit) 1、Dial the code S7 in the main control board to the “ON” position and enter to the remote control mode (the wire controller is invalid) 2、First, the ON/OFF port is closed, second,if this port is closed, the unit enters the heating mode, else,the unit enters the cooling mode.
36	Four-way valve of the system A; Neutral wire.
37	Detection of current of the compressor B2 (protection code P5)
38	Plate heat exchanger heater/Pump heater port(DC 12V signal).

3.6.3 Faults

When the main unit suffers faults, the main unit stops operating, and all other units also stop running; when the subordinate unit suffers faults, only the unit stops operating, and other units are not affected.

3.6.4 Protection

When the main unit is under protection, only the unit stops operating, and other units keep running;
When the subordinate unit is under protection, only the unit stops operating, and other units are not affected.

4 Error Code Table

4.2 MDVM-130BR1-KS

Code	Content
E1	Power phase sequence error
E2	Communication error
E3	Total water outlet temperature sensor error
E4	Outlet water temp sensor error
E5	Pipe temperature sensor error in condenser A
E6	Pipe temperature sensor error in condenser B
E7	Outdoor ambient temperature sensor error
E8	Power protector output error
E9	Water flow detection error(manual recovery)
EA	(Reserved failure code)
Eb	Anti-freezing temperature sensor error in shell pipe exchanger
Ec	Wired controller detected that the units on-line have decreased
EF	Inlet water temperature sensor error
F3	Fan module communication error
F6	EXV protection
H0	Outlet water temperature too low protection
H7	Voltage protection
H8	High pressure sensor error
PU	Fan protection, 1PU: fan A protection, 2PU: fan B protection (for 10 consecutive times in one hour, press the button or power on again to restore)
P0	High pressure or air discharge temperature protection in system A (manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P1	Low pressure protection in system A (manual recovery) (Once locked, press the button or power on again to restore)
P2	High pressure or air discharge temperature protection in system B (manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P3	Low pressure protection in system B (manual recovery) (Once locked, press the button or power on again to restore)
P4	Current protection in system A (manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P5	Current protection in system B(manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P8	Reserved
P9	Protection of outlet and inlet water temperature difference
PA	Low ambient temperature drive-up protection
Pb	System anti-freezing protection
PC	Anti-freezing pressure protection in system A (manual recovery) (Once locked, press the button or power on again to restore)
Pd	Anti-freezing pressure protection in system B (manual recovery) (Once locked, press the button or power on again to restore)
PE	Low-temperature protection of evaporator (manual recovery) (Once locked, press the button or power on again to restore)
PH	Inlet and outlet water difference protection (Once locked, press the button or power on again to restore)

4.4 MDGBL- F185W/RN1

No	Code	Trouble
1	E0	Error of outdoor EEPROM
2	E1	Power phase sequence error
3	E2	Communication error
4	E3	Total water outlet temperature sensor error (Be valid for main unit)
5	E4	Unit outlet water temperature sensor error
6	E5	Pipe temperature sensor error in condenser A
7	E6	Pipe temperature sensor error in condenser B
8	E7	Outdoor ambient temperature sensor error
9	E8	Output of the power protector error
10	E9	Water flow detection error(Manual recovery)
11	EA	(Reserved failure code)
12	Eb	Anti-freezing temperature sensor error in shell and tube exchanger
13	EC	Wired controller detected that the units on-line have decreased.
14	Ed	(Reserved failure code)
15	EF	Inlet water temperature sensor error
16	P0	High pressure or air discharge temperature protection in system A(Manual recovery)
17	P1	Low pressure protection in system A(Manual recovery)
18	P2	High pressure or air discharge temperature protection in system B(Manual recovery)
19	P3	Low pressure protection in system B(Manual recovery)
20	P4	Current protection in system A(Manual recovery)
21	P5	Current protection in system B(Manual recovery)
22	P6	Condenser high pressure protection in system A
23	P7	Condenser high pressure protection in system B
24	P8	(Reserved failure code)
25	P9	Outlet and inlet water temperature difference protection
26	PA	Low ambient temperature drive-up protection
27	Pb	System anti-freezing protection
28	Pc	Anti-freezing pressure protection in system A(Manual recovery)
29	Pd	Anti-freezing pressure protection in system B(Manual recovery)
30	PE	Low-temperature protection of evaporator(Manual recovery)

4.5 MDVM-260BR1-KS

Code	Content
E1	Power phase sequence error
E2	Communication error
E3	Total water outlet temperature sensor error
E4	Outlet water temp sensor error
E5	Pipe temperature sensor error in condenser A
E6	Pipe temperature sensor error in condenser B
E7	Outdoor ambient temperature sensor error
E8	Power protector output error
E9	Water flow detection error(manual recovery)
EA	(Reserved failure code)
Eb	Anti-freezing temperature sensor error in shell pipe exchanger
Ec	Wired controller detected that the units on-line have decreased
EF	Inlet water temperature sensor error
F3	Fan module communication error
F6	EXV protection
H0	Outlet water temperature too low protection
H7	Voltage protection
H8	High pressure sensor error
PU	Fan protection, 1PU: fan A protection, 2PU: fan B protection (for 10 consecutive times in one hour, press the button or power on again to restore)
P0	High pressure or air discharge temperature protection in system A (manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P1	Low pressure protection in system A (manual recovery) (Once locked, press the button or power on again to restore)
P2	High pressure or air discharge temperature protection in system B (manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P3	Low pressure protection in system B (manual recovery) (Once locked, press the button or power on again to restore)
P4	Current protection in system A (manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P5	Current protection in system B(manual recovery) (for 3 consecutive times in one hour, press the button or power on again to restore)
P8	Reserved
P9	Protection of outlet and inlet water temperature difference
PA	Low ambient temperature drive-up protection
Pb	System anti-freezing protection
PC	Anti-freezing pressure protection in system A (manual recovery) (Once locked, press the button or power on again to restore)
Pd	Anti-freezing pressure protection in system B (manual recovery) (Once locked, press the button or power on again to restore)
PE	Low-temperature protection of evaporator (manual recovery) (Once locked, press the button or power on again to restore)
PH	Inlet and outlet water difference protection (Once locked, press the button or power on again to restore)

5 Troubleshooting

5.1 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.

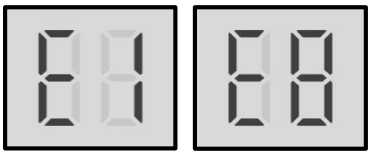
5.2 How to judge whether the temperature sensor is normal

Measure sensor resistance.

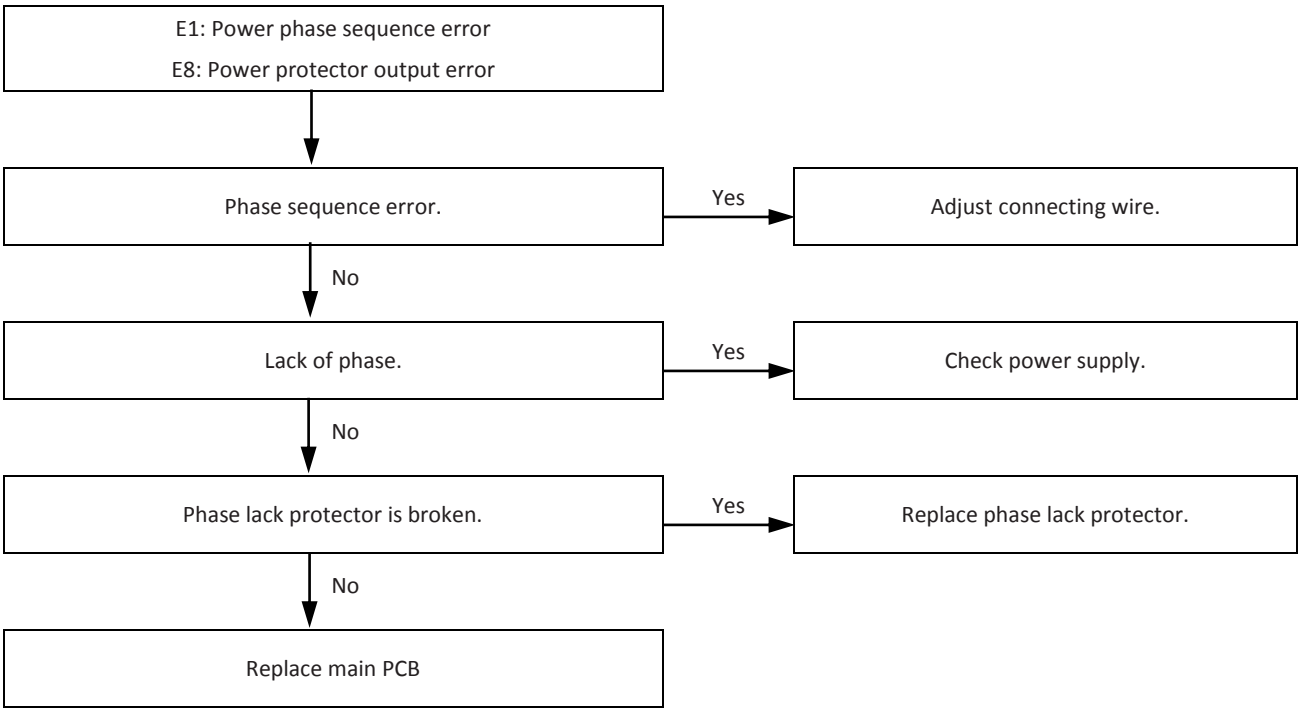
If the resistance is not consistent with the sensor resistance characteristics table, the sensor has failed. Please refer to "6 Temperature Sensor Resistance Characteristics" for more details.

5.3 E1, E8 Troubleshooting

5.3.1 Digital display output



5.3.2 Procedure

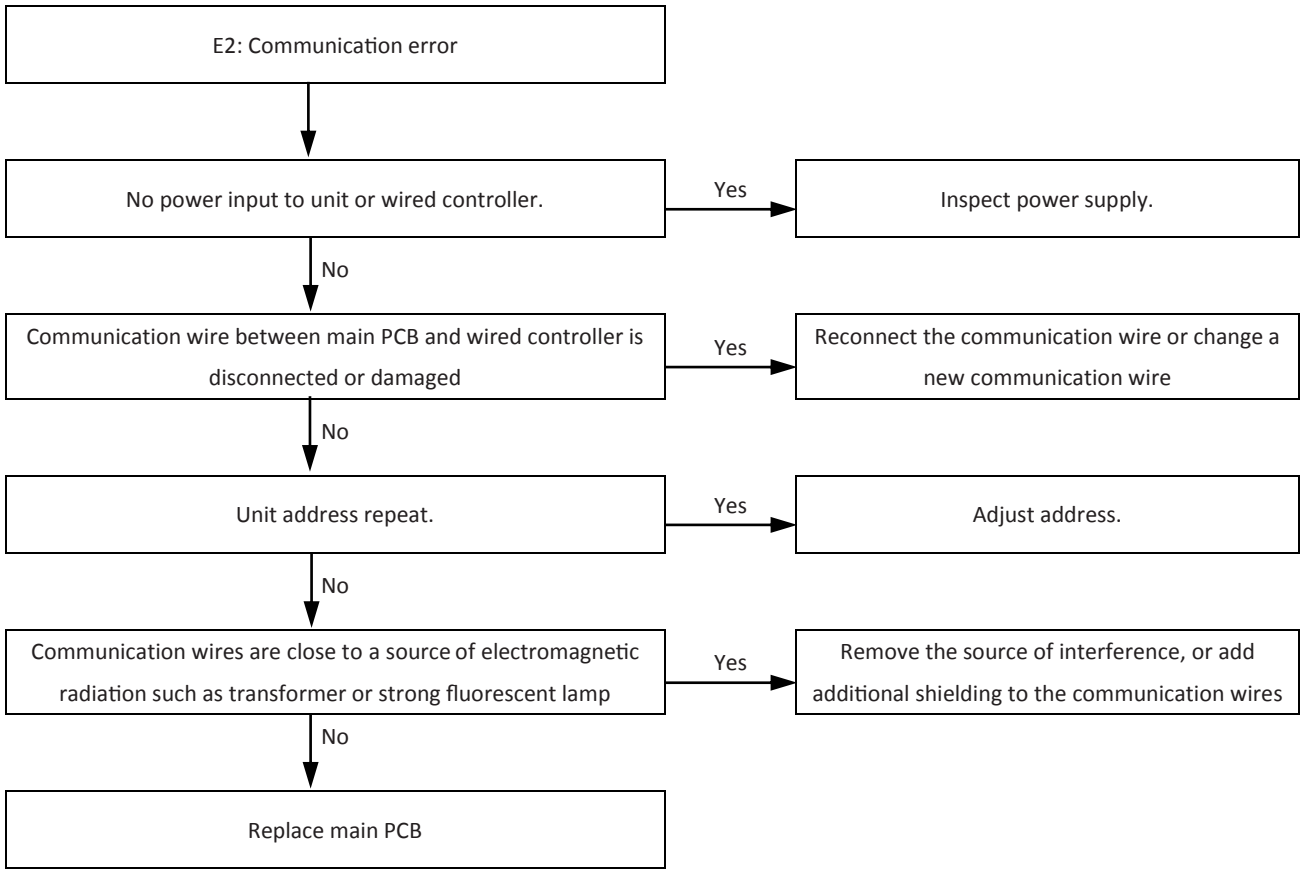


5.4 E2 Troubleshooting

5.4.1 Digital display output



5.4.2 Procedure



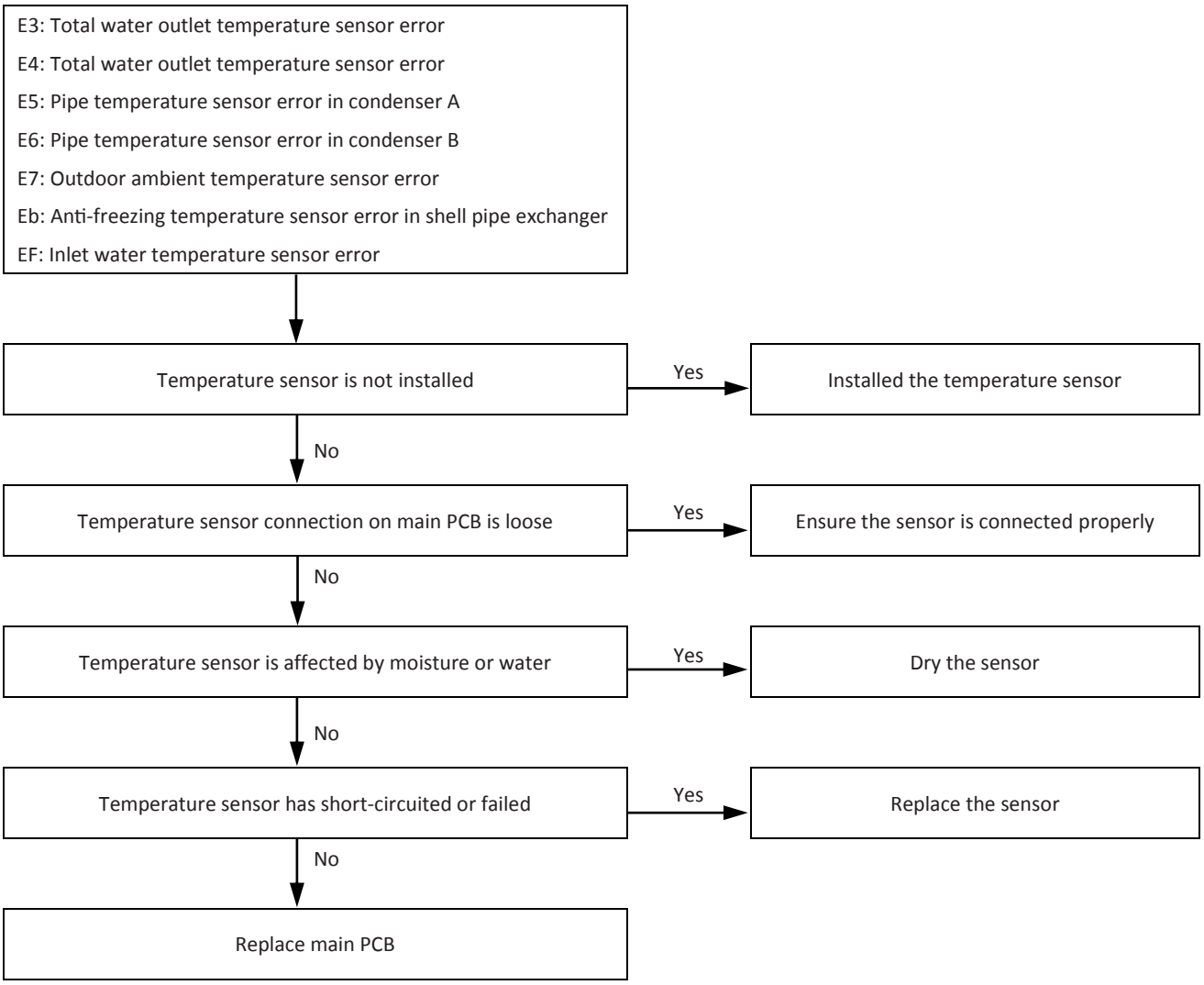
5.5 E3, E4, E5, E6, E7, Eb, EF Troubleshooting

5.5.1 Digital display output



5.5.2 Procedure

E3: Total water outlet temperature sensor error
E4: Total water outlet temperature sensor error
E5: Pipe temperature sensor error in condenser A
E6: Pipe temperature sensor error in condenser B
E7: Outdoor ambient temperature sensor error
Eb: Anti-freezing temperature sensor error in shell pipe exchanger
EF: Inlet water temperature sensor error



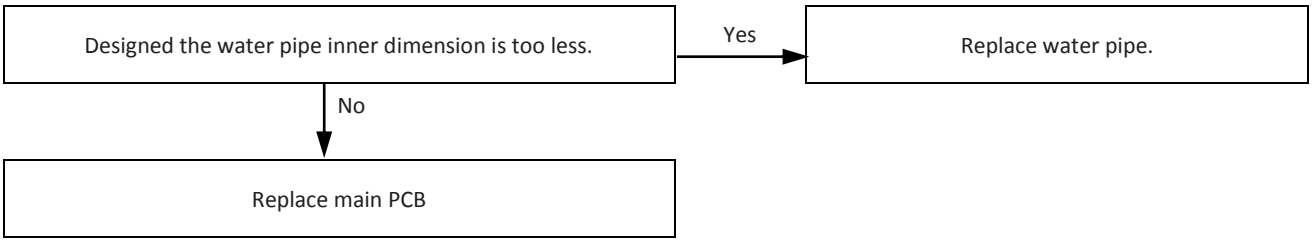
5.6 E9 Troubleshooting

5.6.1 Digital display output



5.6.2 Procedure



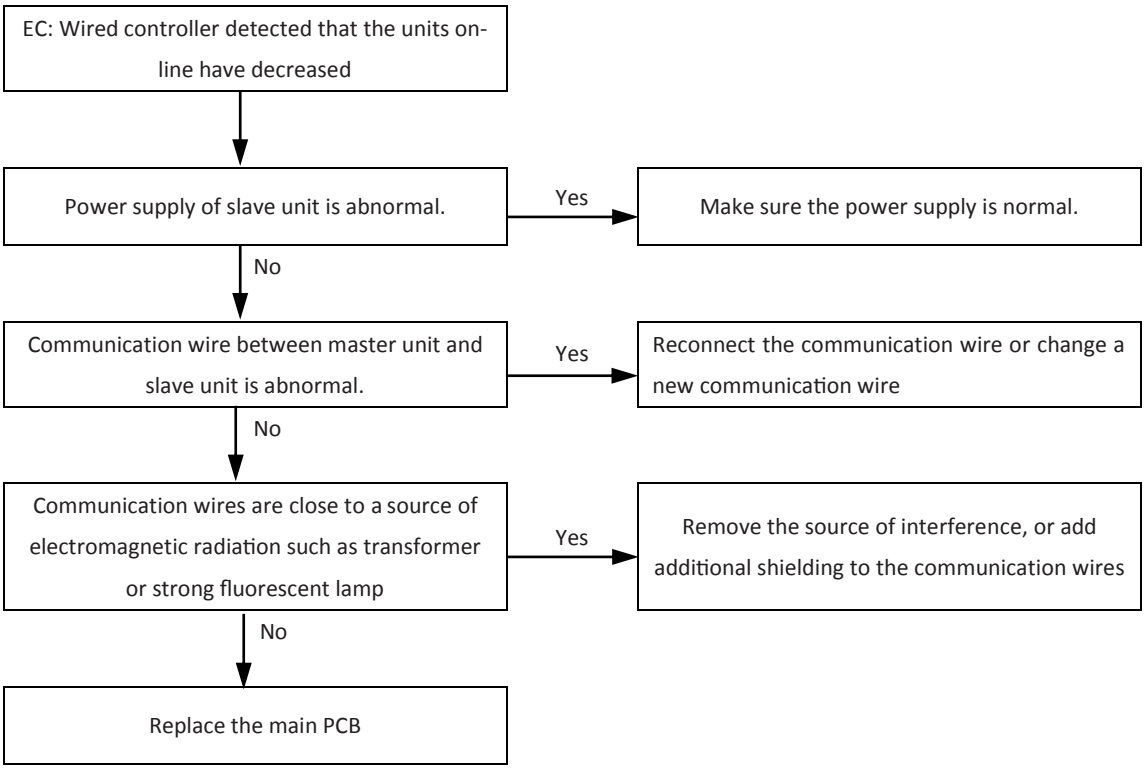

Designed the water pipe inner dimension is too less.
Yes
Replace water pipe.
No
Replace main PCB

5.7 EC Troubleshooting

5.7.1 Digital display output



5.7.2 Procedure

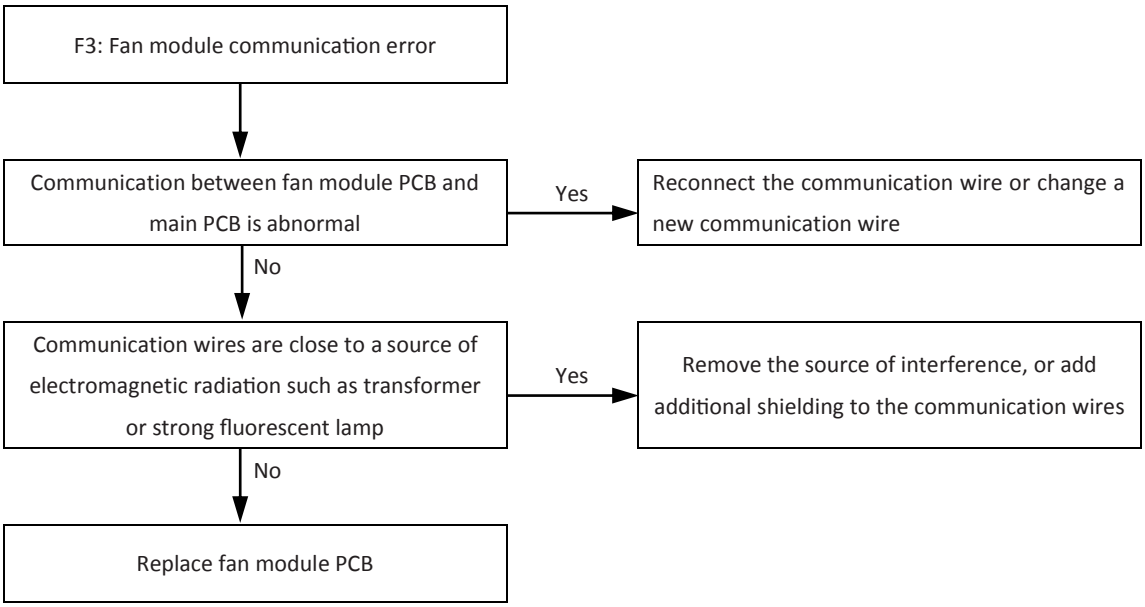


5.8 F3 Troubleshooting

5.8.1 Digital display output

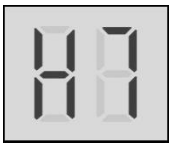


5.8.2 Procedure

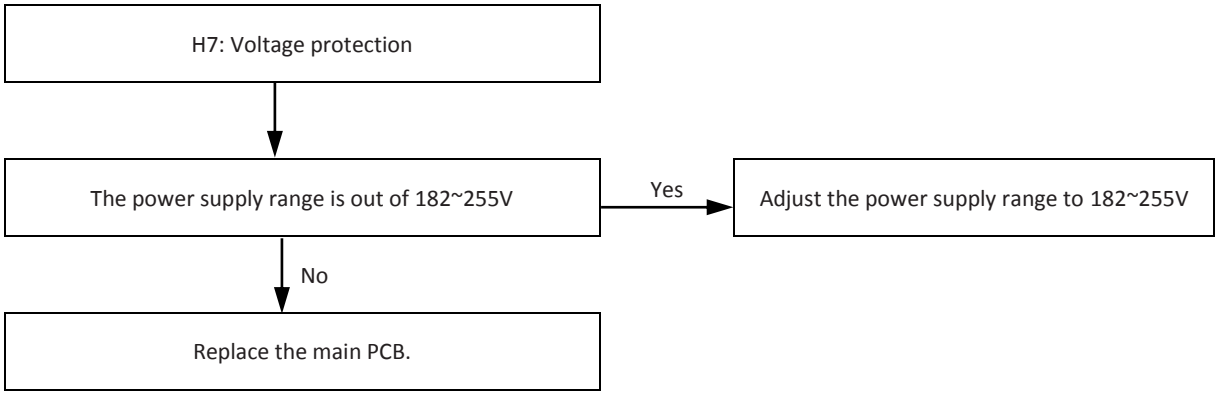


5.9 H7 Troubleshooting

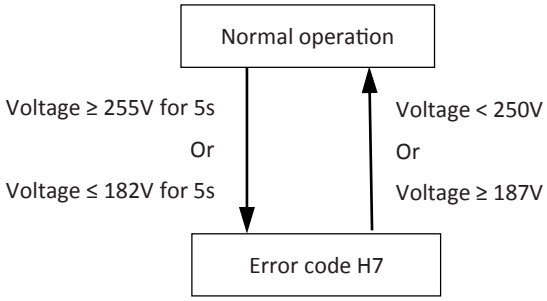
5.9.1 Digital display output



5.9.2 Procedure

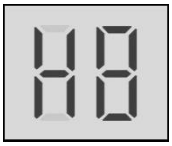


5.9.3 Protection logic

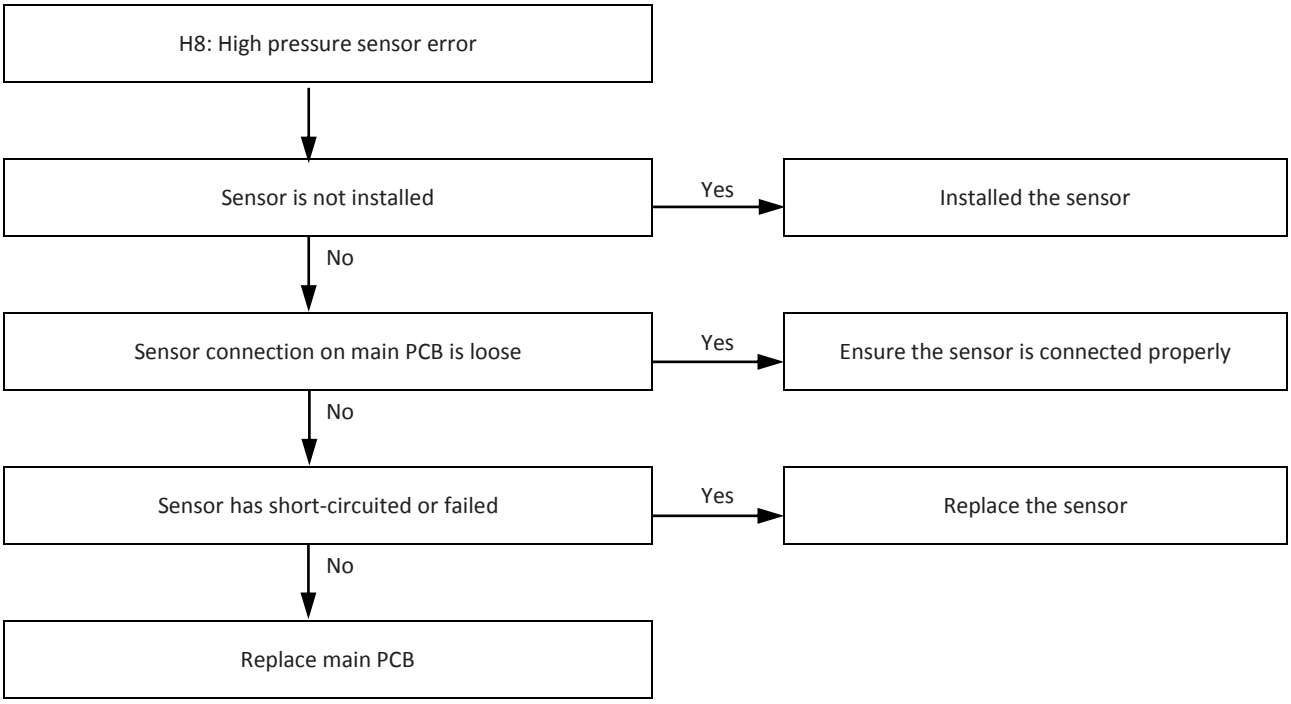


5.10 H8 Troubleshooting

5.10.1 Digital display output

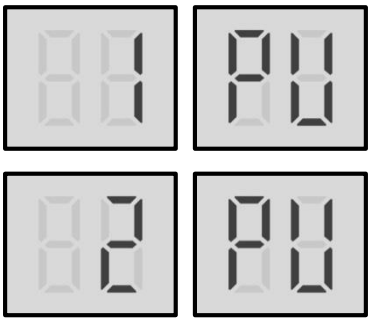


5.10.2 Procedure

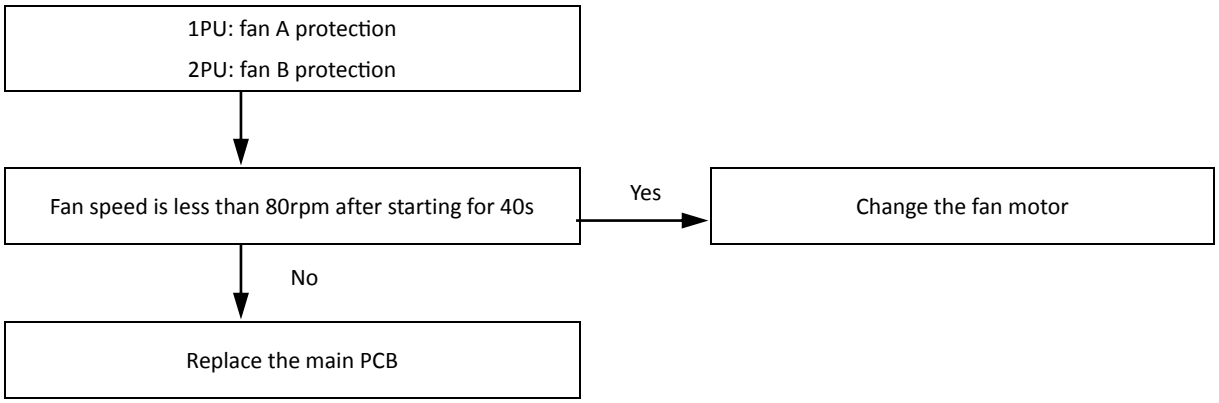


5.11 1PU, 2PU Troubleshooting

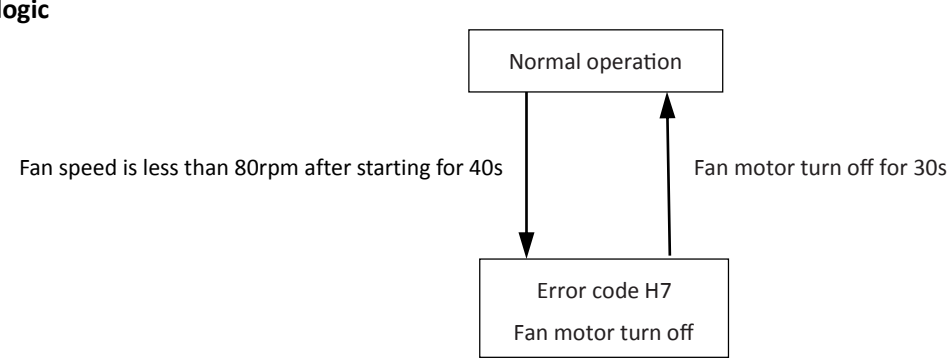
5.11.1 Digital display output



5.11.2 Procedure

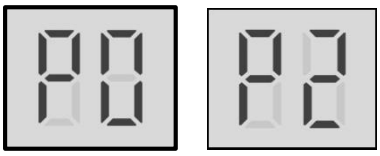


5.11.3 Protection logic

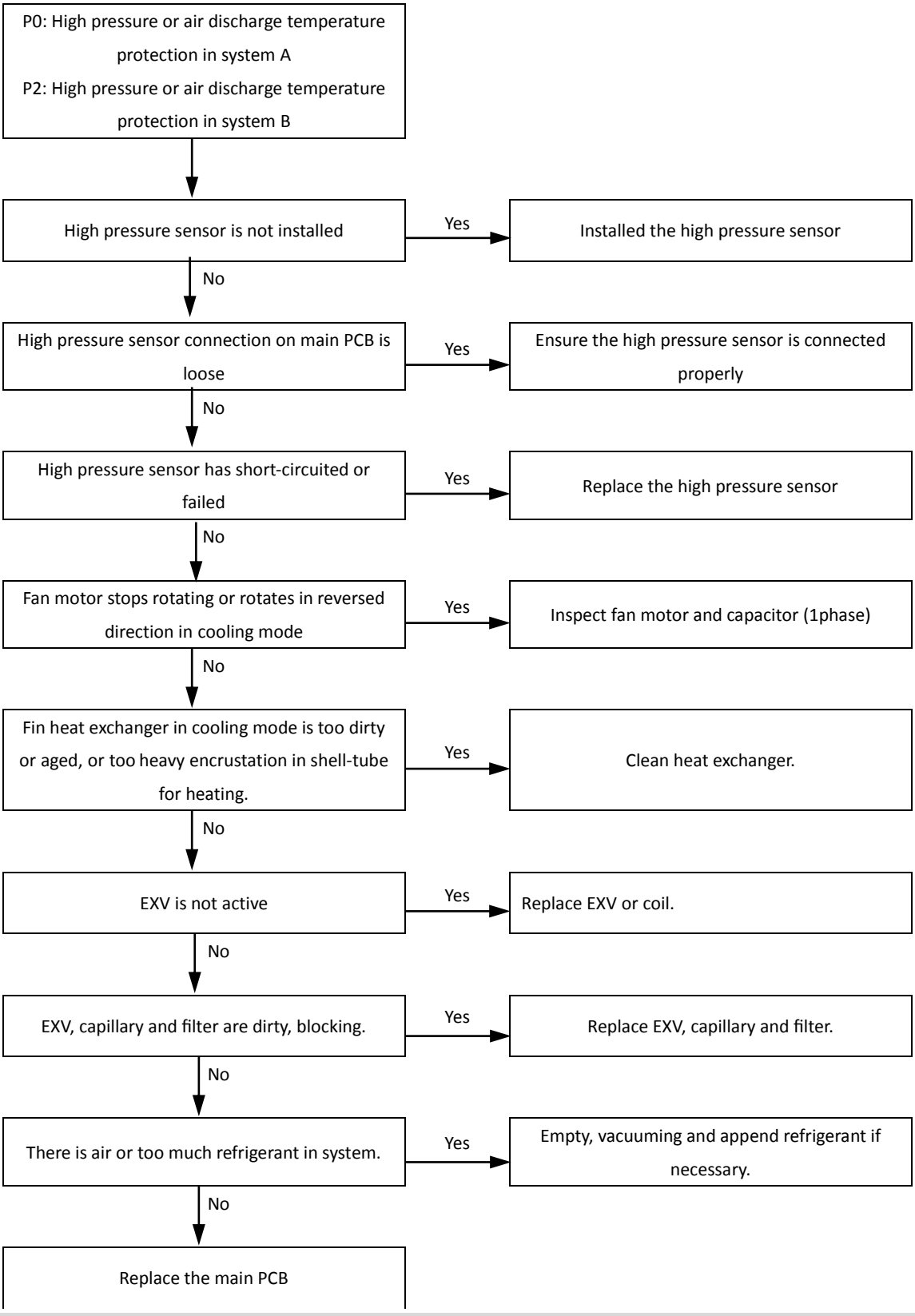


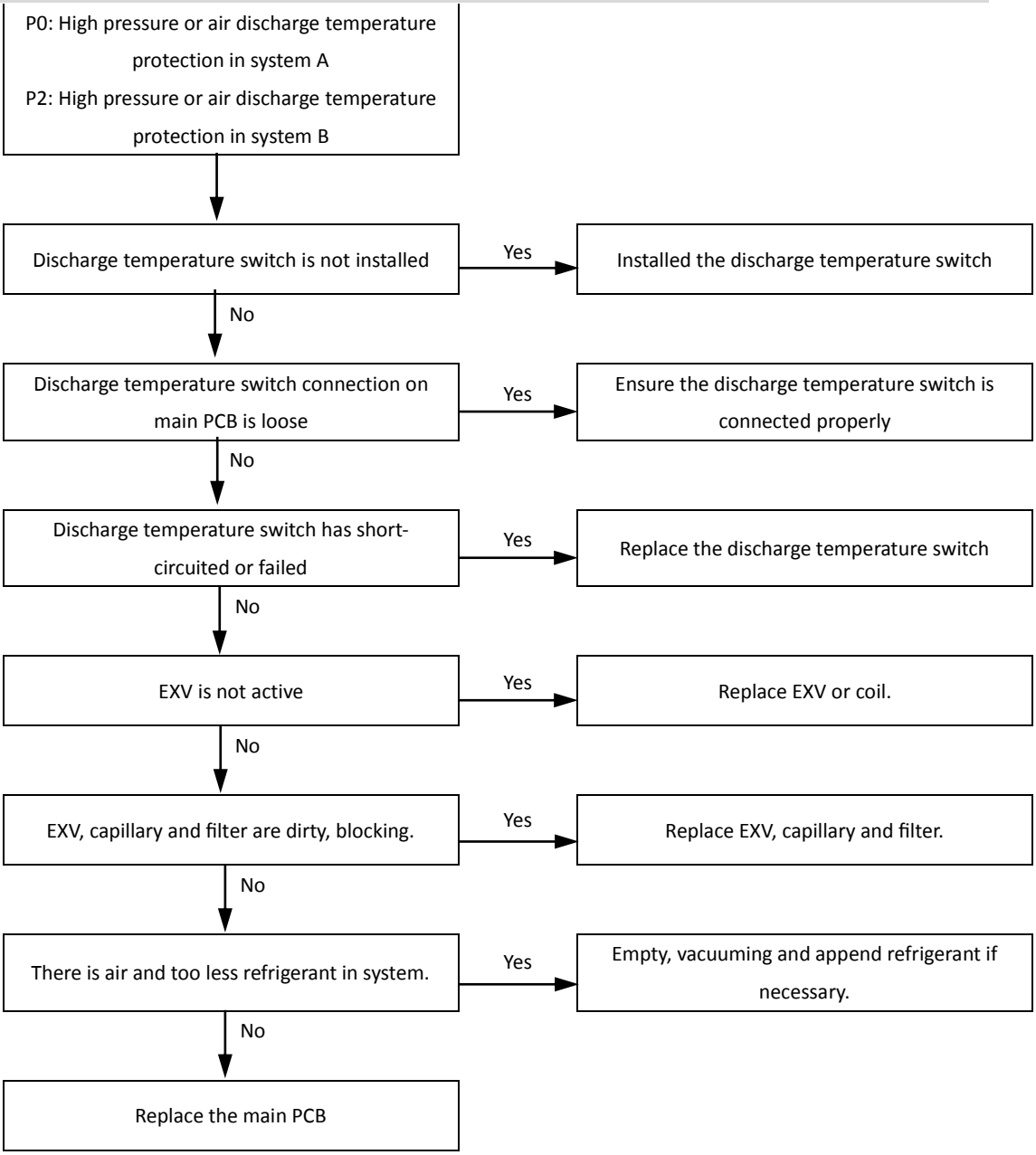
5.12 P0, P2 Troubleshooting

5.12.1 Digital display output

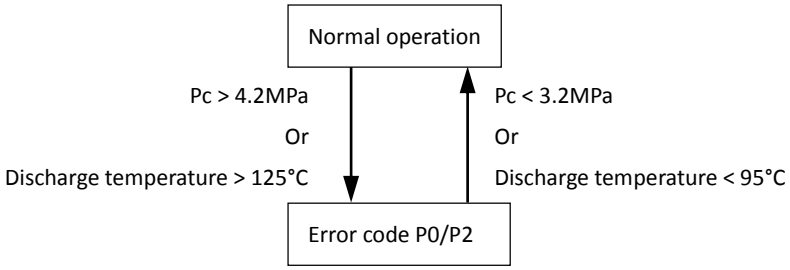


5.12.2 Procedure





5.12.3 Protection logic

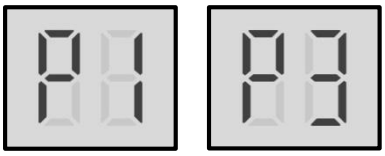


Note:

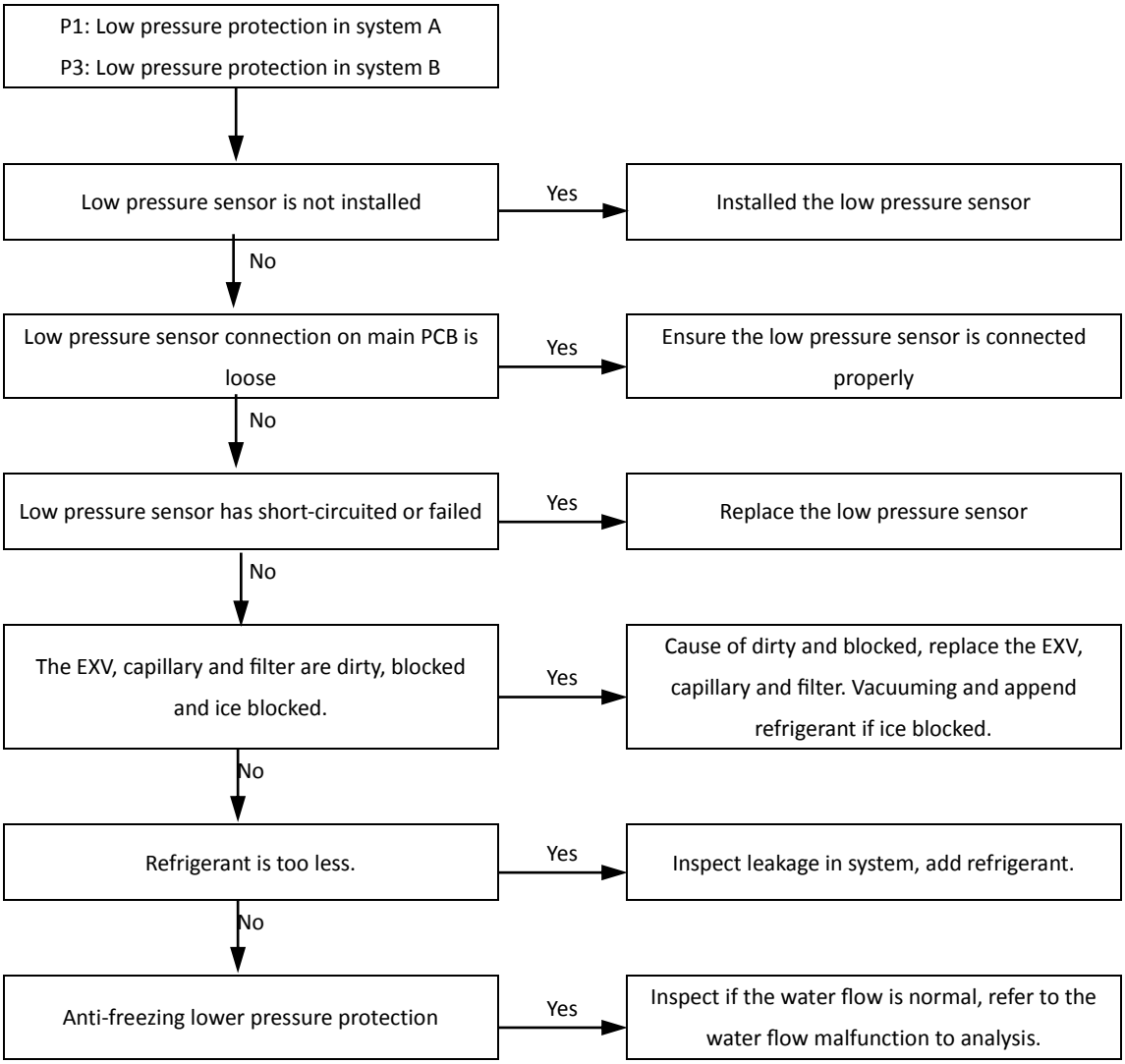
Pc: Discharge pressure

5.13 P1, P3 Troubleshooting

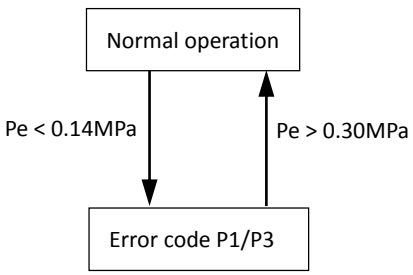
5.13.1 Digital display output



5.13.2 Procedure



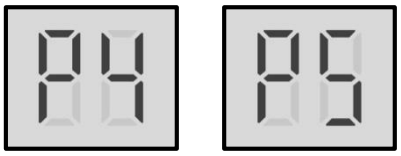
5.13.3 Protection logic



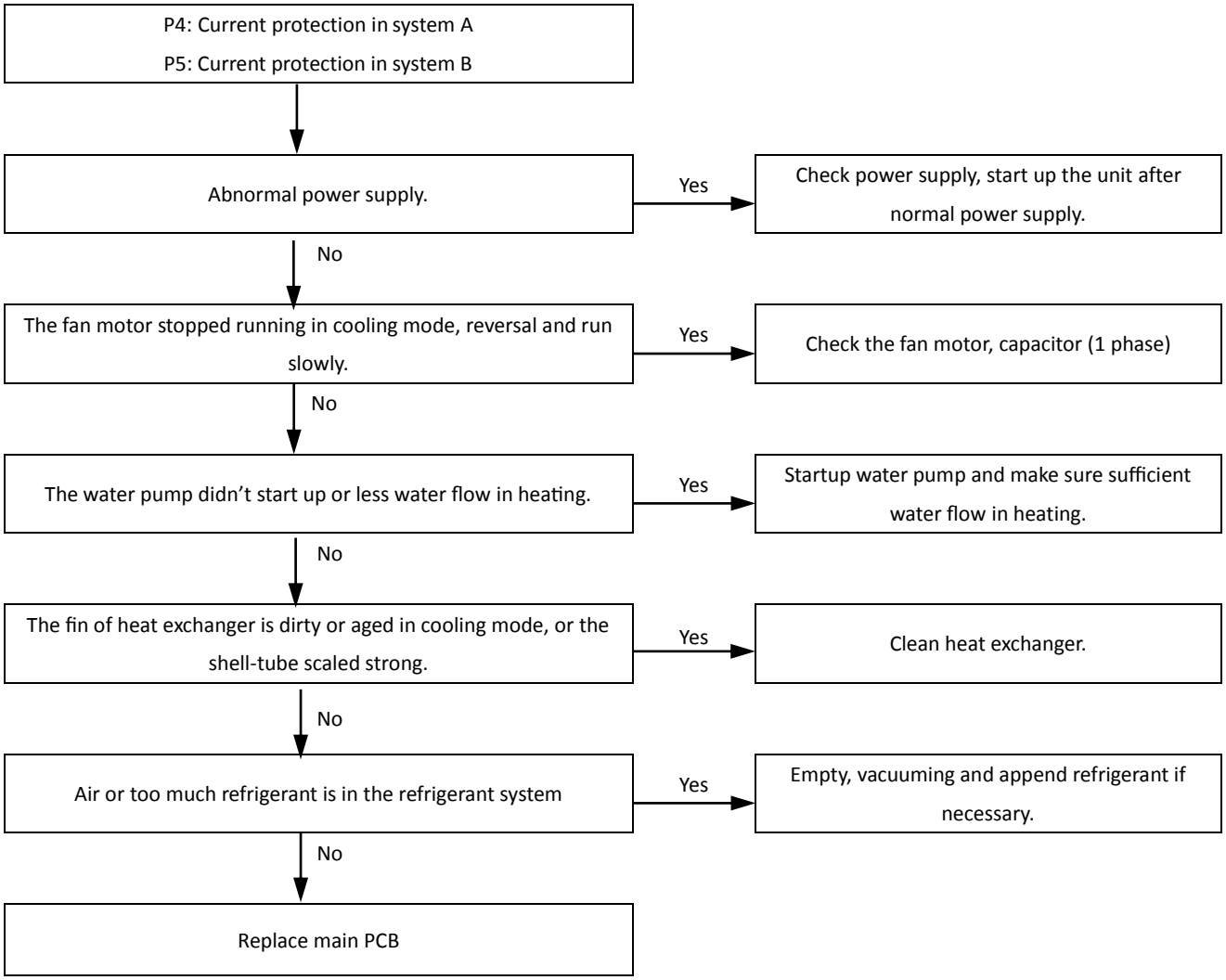
Note:
Pe: Suction pressure

5.14 P4, P5 Troubleshooting

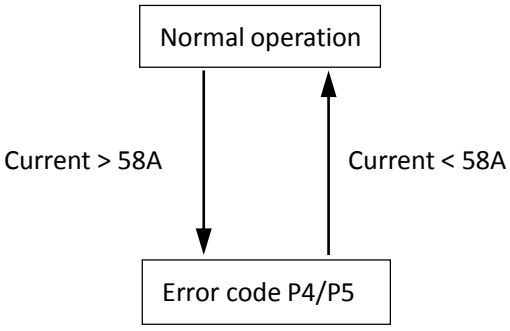
5.14.1 Digital display output



5.14.2 Procedure



5.14.3 Protection logic

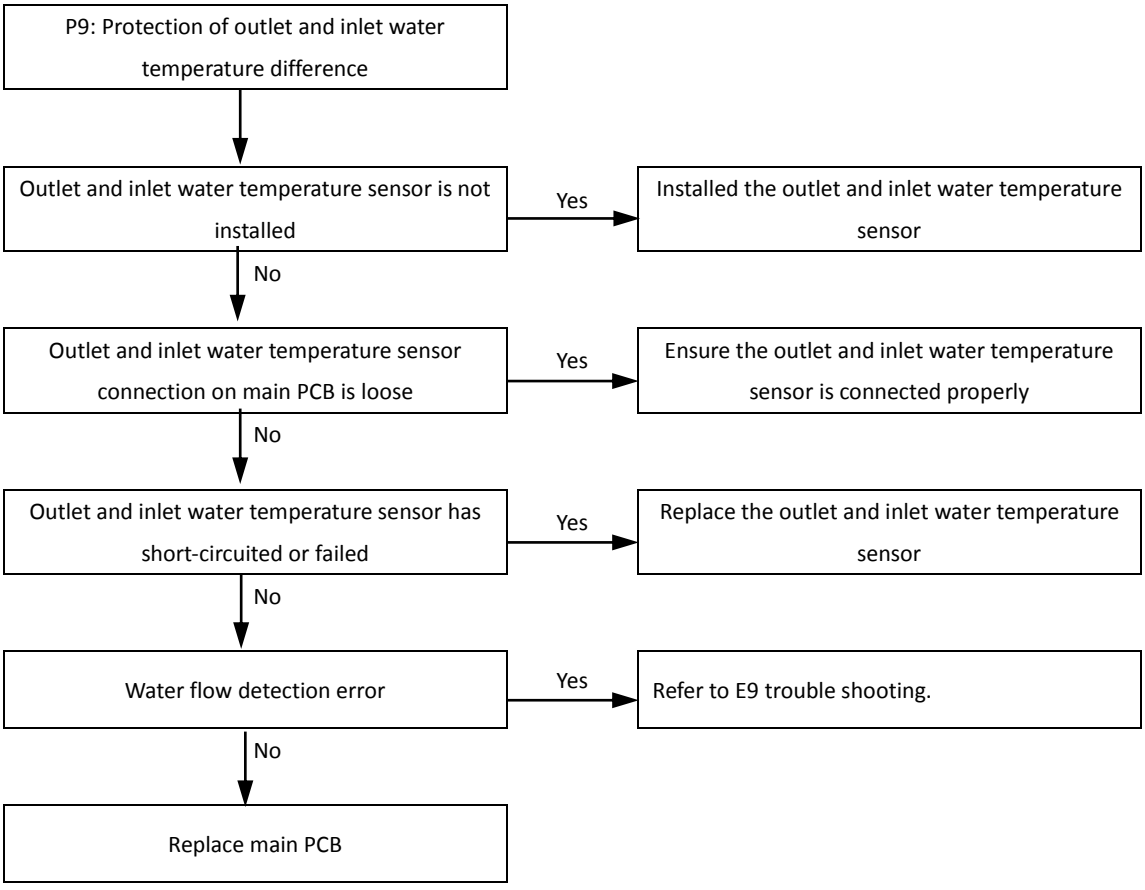


5.15 P9 Troubleshooting

5.15.1 Digital display output



5.15.2 Procedure

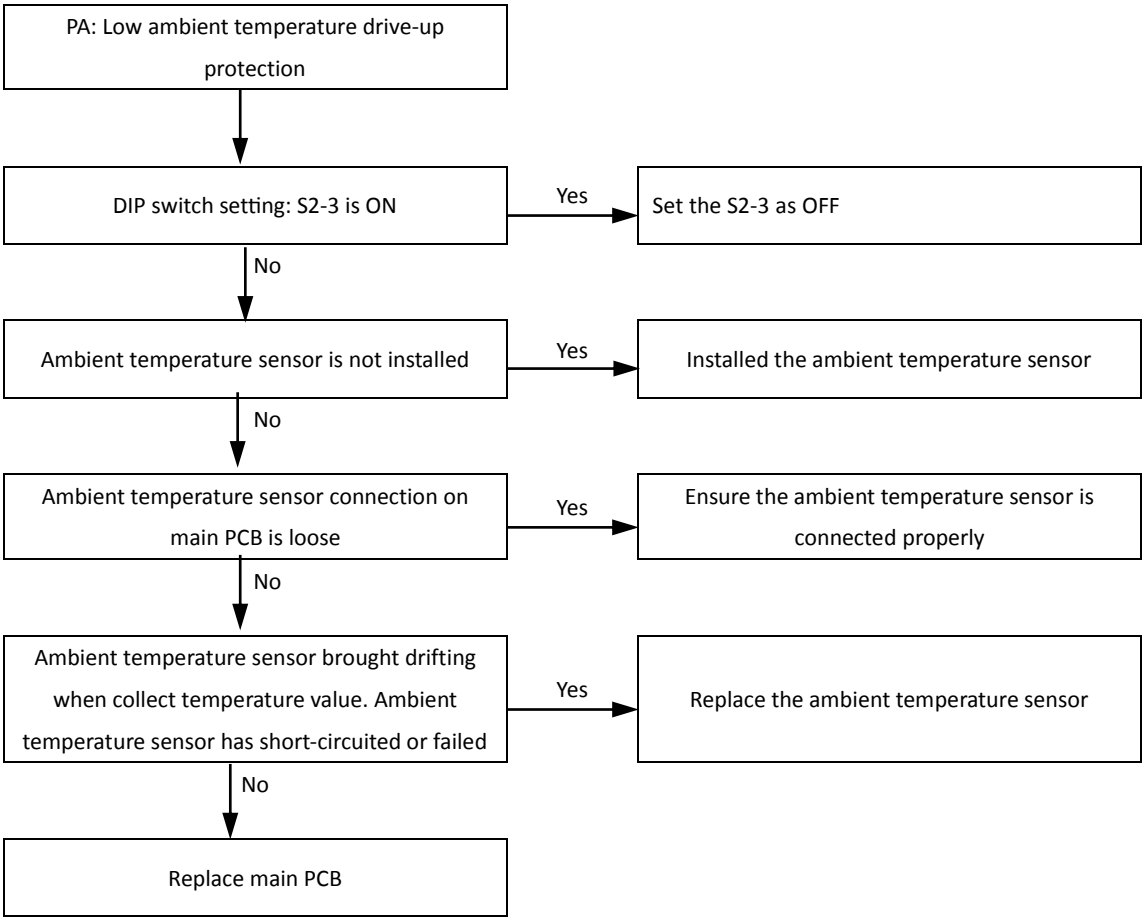


5.16 PA Troubleshooting

5.16.1 Digital display output



5.16.2 Procedure



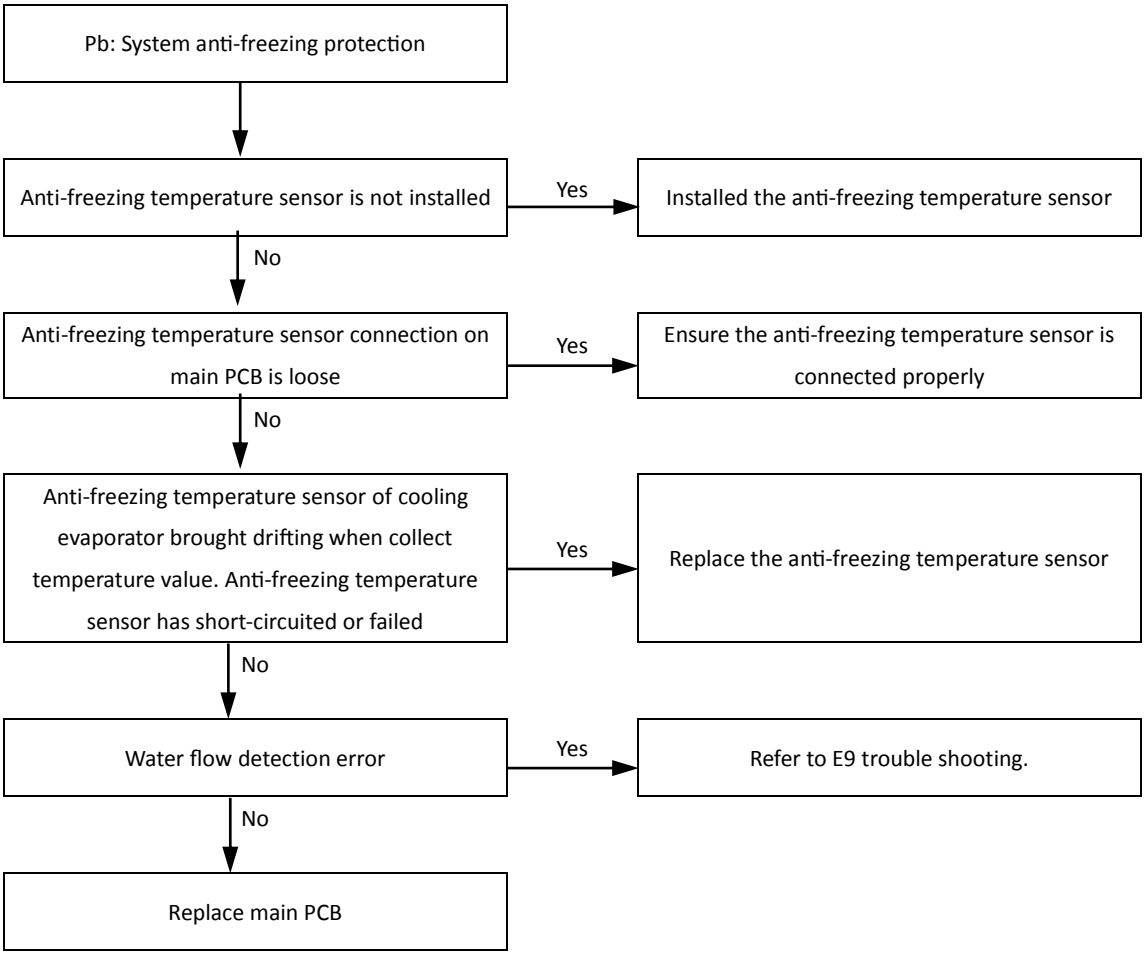
5.17 Pb Troubleshooting

5.17.1 Digital display output



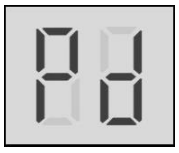
System in standby mode, total outlet water temperature below 2℃, triggers Pb anti-freeze.

5.17.2 Procedure

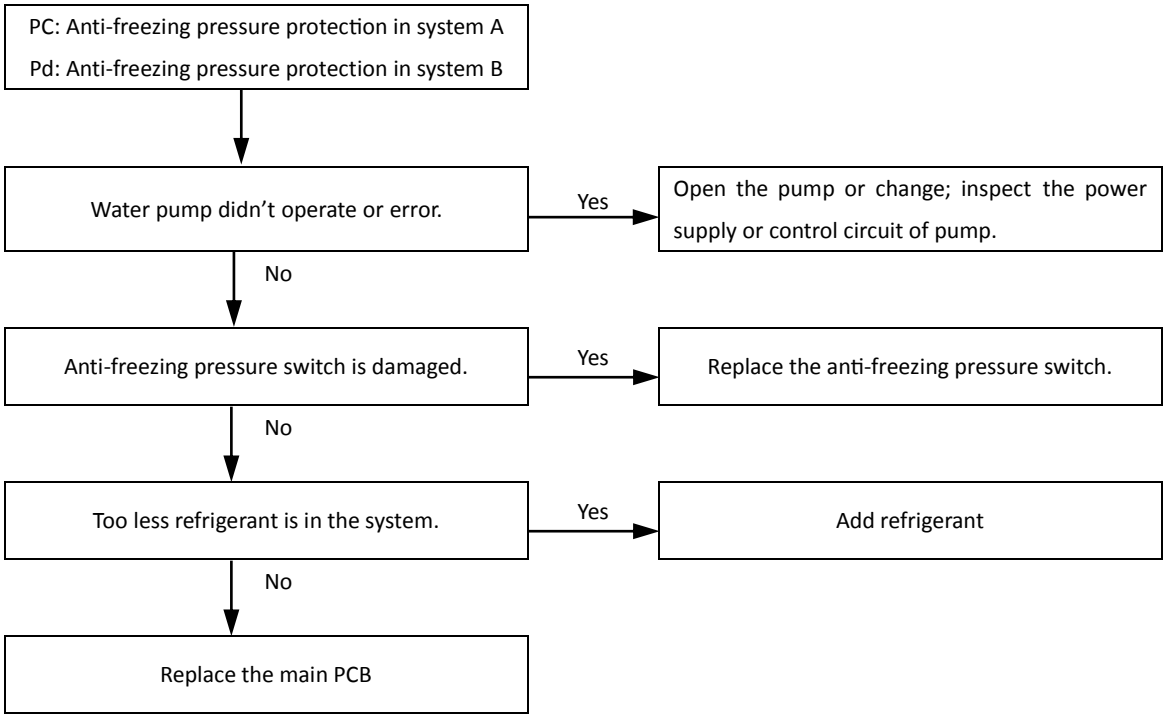


5.18 PC, Pd Troubleshooting

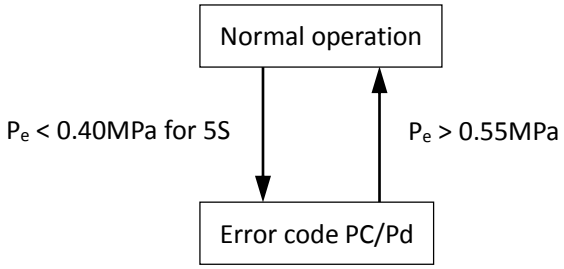
5.18.1 Digital display output

5.18.2 Procedure



5.18.3 Protection logic



Note:

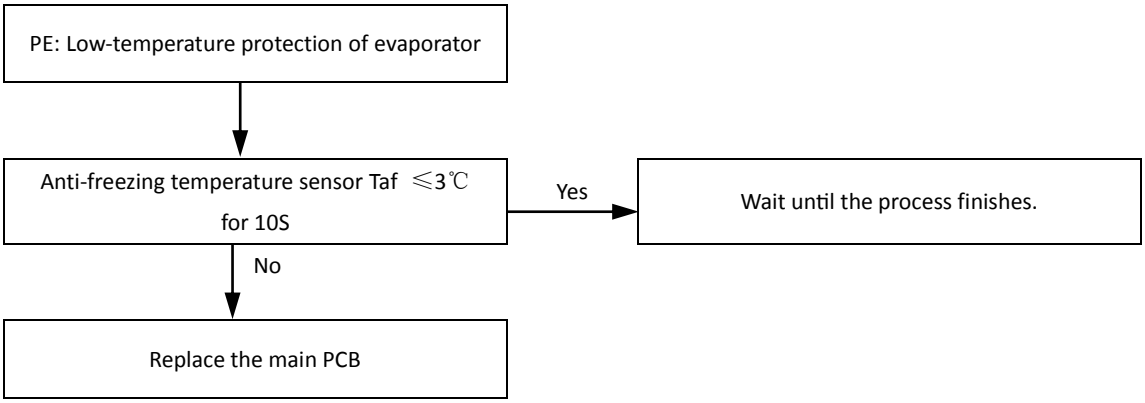
Pe: Water side heat exchanger pressure

5.19 PE Troubleshooting

5.19.1 Digital display output



5.19.2 Procedure

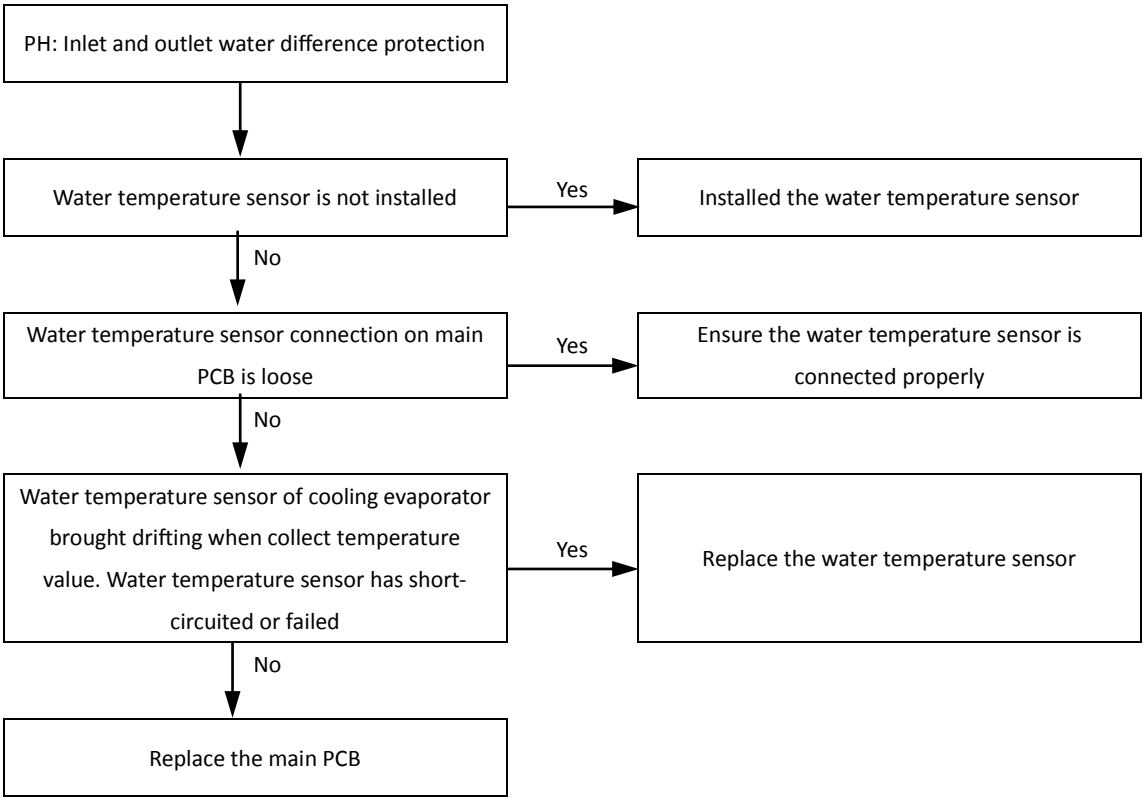


5.20 PH Troubleshooting

5.20.1 Digital display output

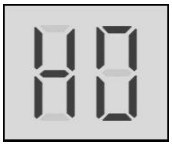


5.20.2 Procedure

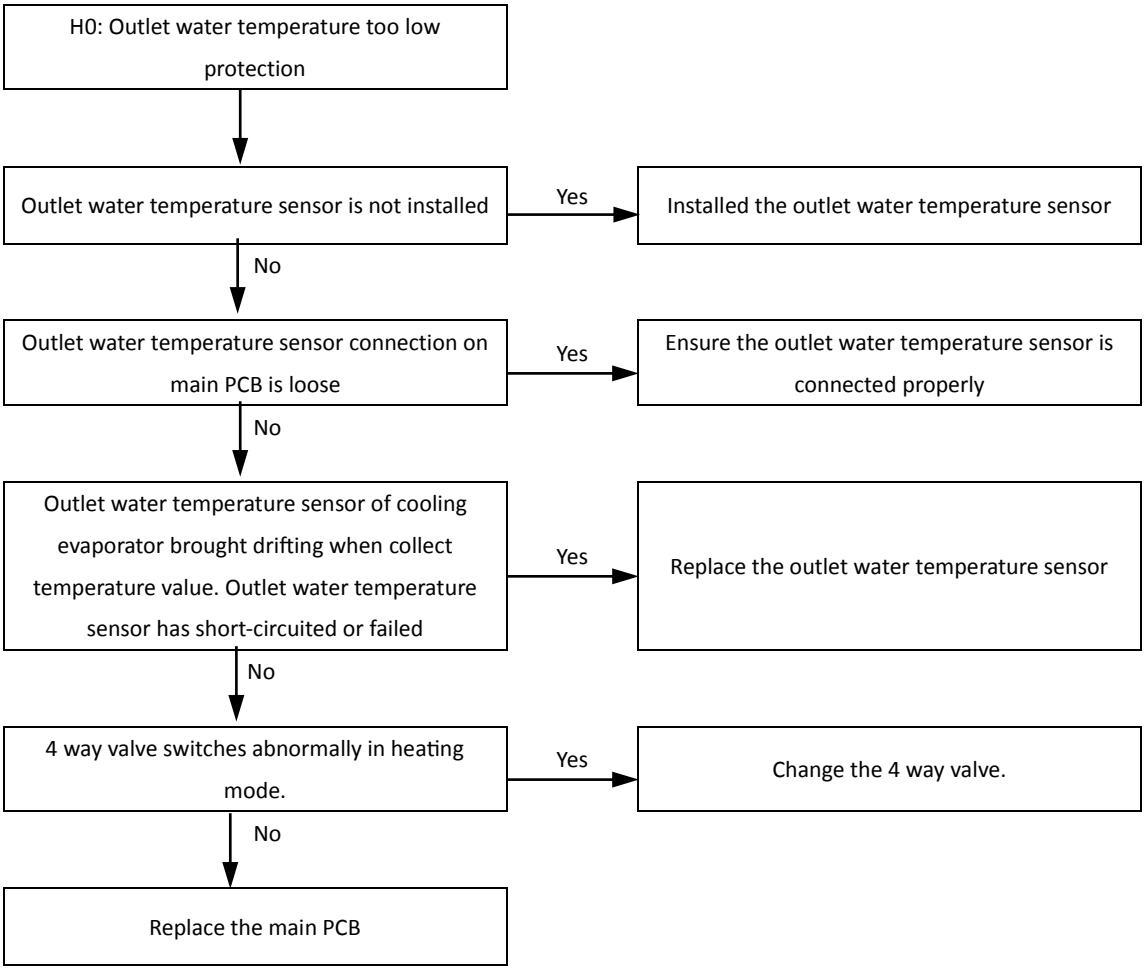


5.21 H0 Troubleshooting

5.21.1 Digital display output

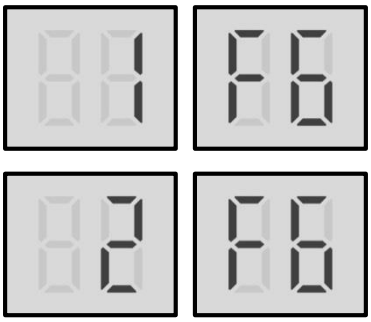


5.21.2 Procedure

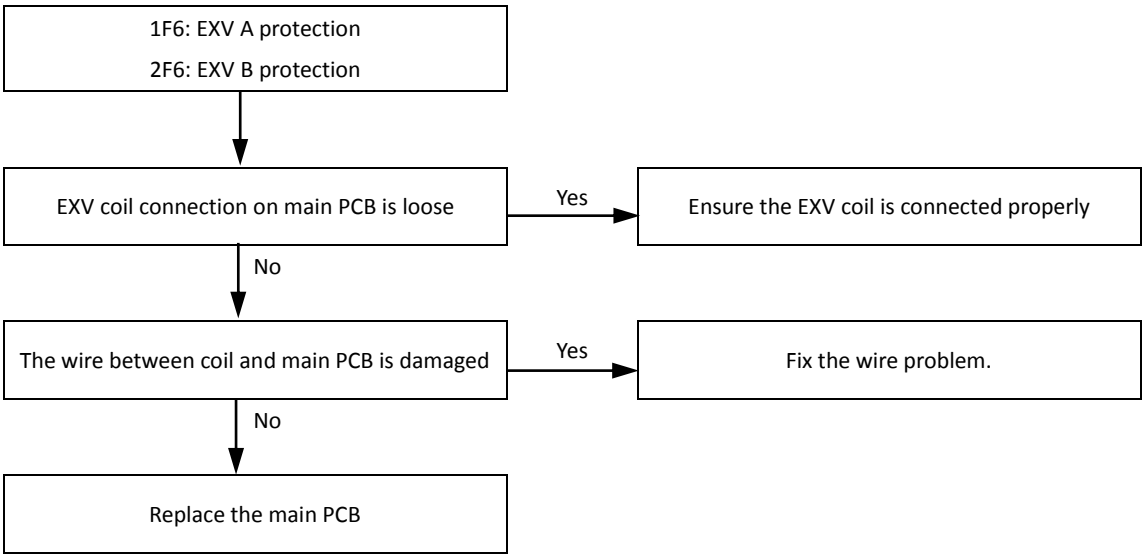


5.22 1F6, 2F6 Troubleshooting

5.22.1 Digital display output



5.22.2 Procedure



5.23 Troubles and Solutions for 185kW

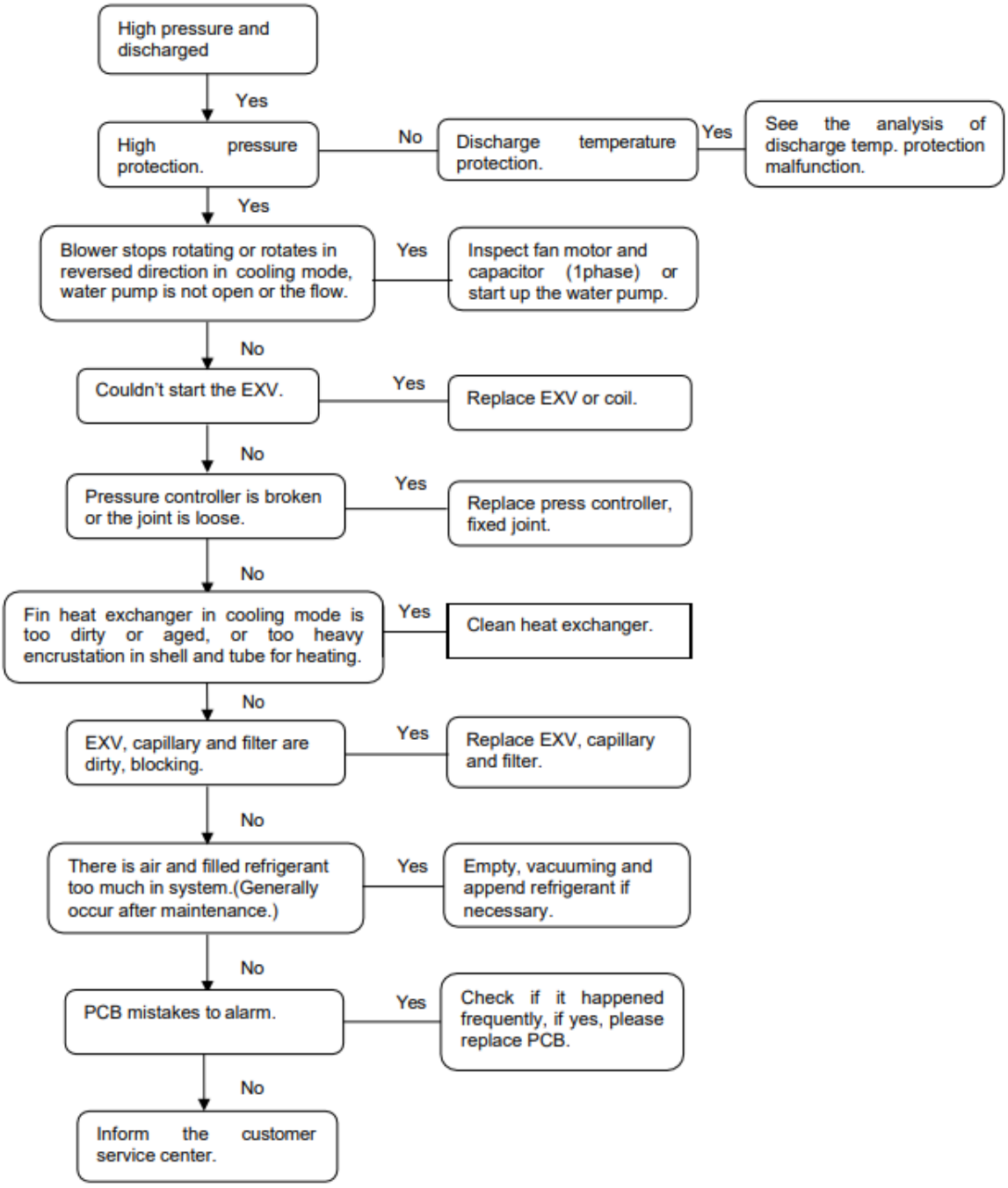
5.23.1 Troubles and Solutions

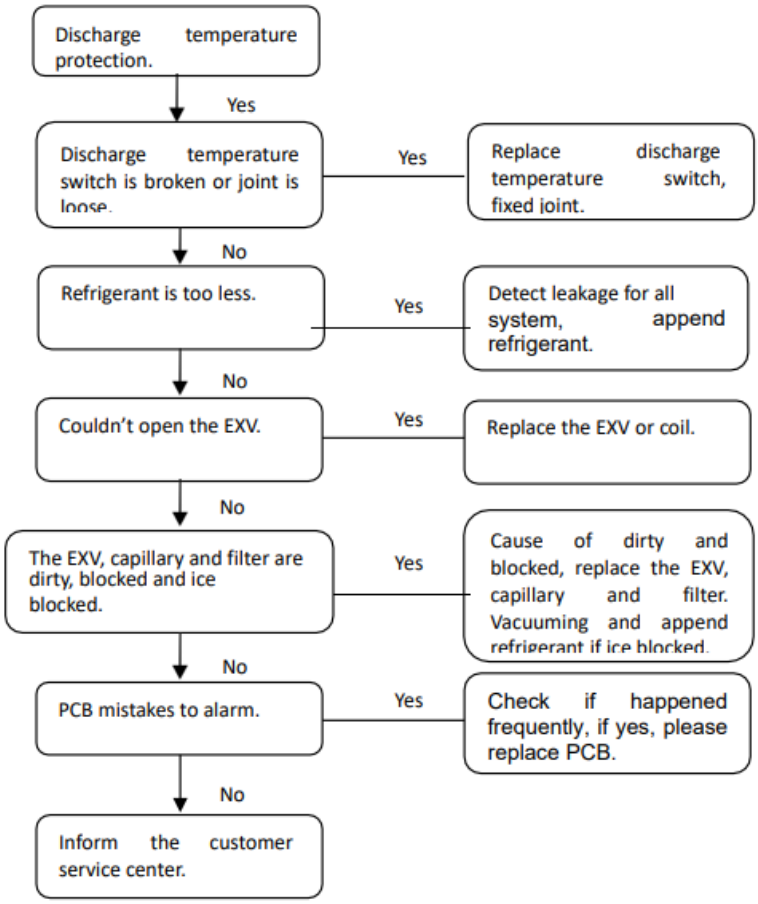
Troubles	Possible reasons	Solutions
Over high air discharge pressure (Cooling operation).	Air or other non-condensing gas still in the system.	Discharge gas from refrigerant charging inlet. Re-vacuum the system if necessary.
	Fins in the condenser are dirty or foreign substance blocking fins.	Clean condenser fins.
	Insufficient chilling air volume or condenser fan error.	Check and repair the condenser fan, recover the normal operation.
	Excessive high air suction pressure.	See “Excessive high air suction pressure”.
	Excessive refrigerant charging volume.	Discharge the excessive refrigerant.
	Over high ambient temperature.	Check ambient temperature.
Over low air discharge pressure (Cooling operation).	Surrounding temperature is lower.	Measure the surrounding temp.
	Refrigerant leak or insufficient.	Leak-hunting or recharging.
	Low suction pressure.	Refer to the “low suction pressure”.
Over high air suction pressure (Cooling operation).	Refrigerant over-charged.	Discharge the additional refrigerant.
	High temperature of the inlet chilled-water.	Check the heat insulation of water pipeline.
Over low air suction pressure (Cooling operation).	Insufficient water flow.	Measure the Temp difference between inlet and outlet water, adjust the water flow.
	Low temperature of inlet chilled-water.	Check installation.
	Refrigerant leak or insufficient.	Leak-hunting or recharging.
	Scaling in the evaporator.	Descaling.
Over high air discharge pressure (Heating operation).	Insufficient water flow.	Check temperature difference at water inlet and outlet, and adjust the water flow volume.
	Air or other non-condensing gas still in the system.	Discharge gas from refrigerant charging inlet. Re-vacuum the system if necessary.
	Scaling in water side of heat exchanger.	Descaling.
	Over high temperature in chilling water inlet.	Check water temperature.
	Excessive high air suction pressure.	See “Excessive high air suction pressure”.
Over low air discharge pressure (Heating operation).	Over low temperature of chilling water.	Check chilling water temperature.
	Refrigerant leakage or insufficient refrigerant volume.	Test leakage or charge sufficient refrigerant to the system.
	Excessive low air suction pressure.	See “Excessive low air suction pressure”.
Over high air suction pressure (Heating operation).	Over heat air in the side of air heat exchanger.	Check ambient temperature around it.
	Excessive refrigerant charging volume.	Discharge the excessive refrigerant.
Over low air suction pressure (Heating operation).	Insufficient refrigerant charging volume.	Charge sufficient refrigerant to the system.
	Insufficient air flow volume.	Check fan rotating direction.
	Air loop short-circuit.	Reason about remove air short-circuit.
	Insufficient frost-removal operation.	Error comes out from 4-way valve or thermal resistor. Replace a new one if necessary.
Compressor stops because of freeze-proof protection (Cooling operation).	Insufficient chilling water flow volume.	Error comes from pump or flow-type water volume control. Check and repaired or replace a new one.
	Gas still in water loop.	Discharge air.
	Thermal resistor error.	Upon error have been confirmed, please replace a new

		one.
Compressor stops because of high pressure protection.	Over high air expelling pressure.	See “Over high air expelling pressure”.
	High pressure switch error.	Upon error have been confirmed, please replace a new one.
Compressor stops because of motor overload.	Over high air expelling pressure and air suction pressure.	See “Over high air expelling pressure” and “Over high air suction pressure”.
	High voltage or low voltage, signal phase or phase unbalance.	Confirm voltage not higher or lower than the rated voltage 10%.
	Short circuit comes out from motor or connecting interface.	Confirm resistors at motor are connected corresponding to terminals.
	Overload assembly error.	Replace a new one.
Compressor stops because of integrate temperature sensor or air discharge temperature protection.	Over high or over low voltage.	Confirm voltage not higher or lower than the rated voltage 10%.
	Over high air expelling pressure or excessive low air suction pressure.	See “Over high air expelling pressure” and “excessive low air suction pressure ”.
	Component error.	Check the integrated temperature sensor after motor is cool down.
Compressor stops because of low pressure protection.	Filter in front (or rear) of expanding valve is blocked.	Replace a new filter.
	Low voltage switch error.	If the switch is defective, please replace a new one.
	Excessive low air suction pressure.	See “Excessive low air suction pressure”.
Abnormal noise comes from compressor.	Liquid refrigerant flows into compressor from evaporator result in liquid slugging.	Adjust refrigerant charge volume.
	Aging of compressor.	Replace a new compressor.
Compressor can’t start.	Over current relay trip up, fuse burnt out.	Replace damaged assembly.
	Control circuit without power though.	Check the wring of control system.
	High voltage or low voltage protection.	Reference to mention in above the parts of air suction and discharge pressure error.
	Coils in contactor are burnt out.	Replace damaged assembly.
	Wrong connection of phase sequence.	Re-connect and adjust the any 2 wires among 3 phases.
	Water system error and flow type volume controller short connection.	Check water system.
	Error signal delivered from wired controller.	Find out the error type and carry out the corresponding measure to settle.
Air side heat exchanger excessive frost.	4-way valve or thermal resistor error.	Check the running state. Replace a new one if necessary.
	Air loop short-circuit.	Settle the short-circuit of air discharge.
With noise.	Fixing screws at panel are loosen.	Fix up all assemblies.

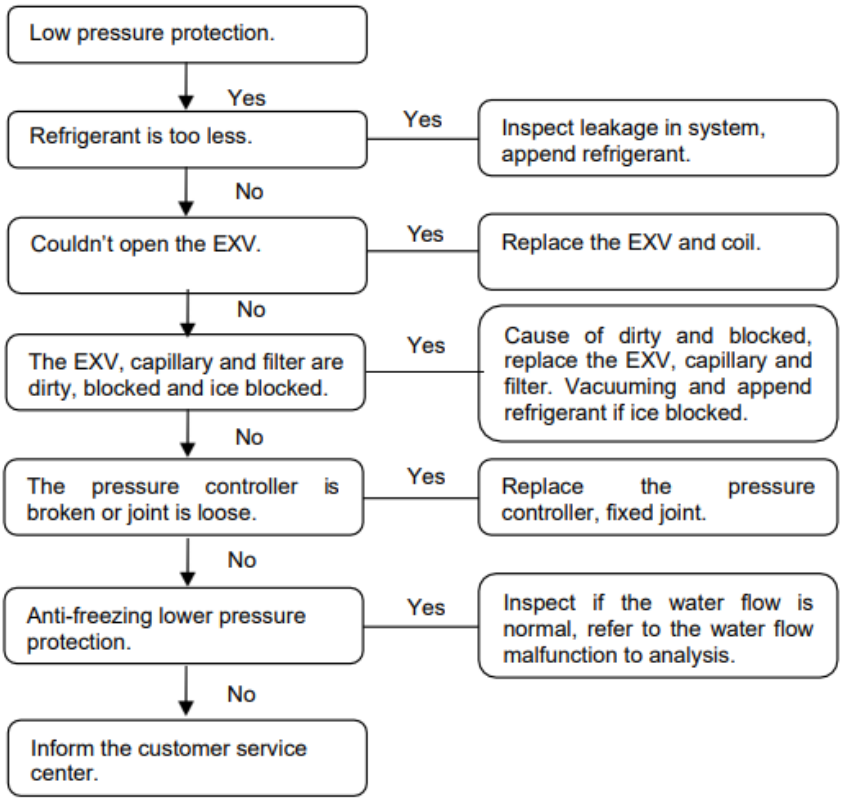
5.23.2 Typical malfunction solutions

1) High pressure and discharged temperature protection

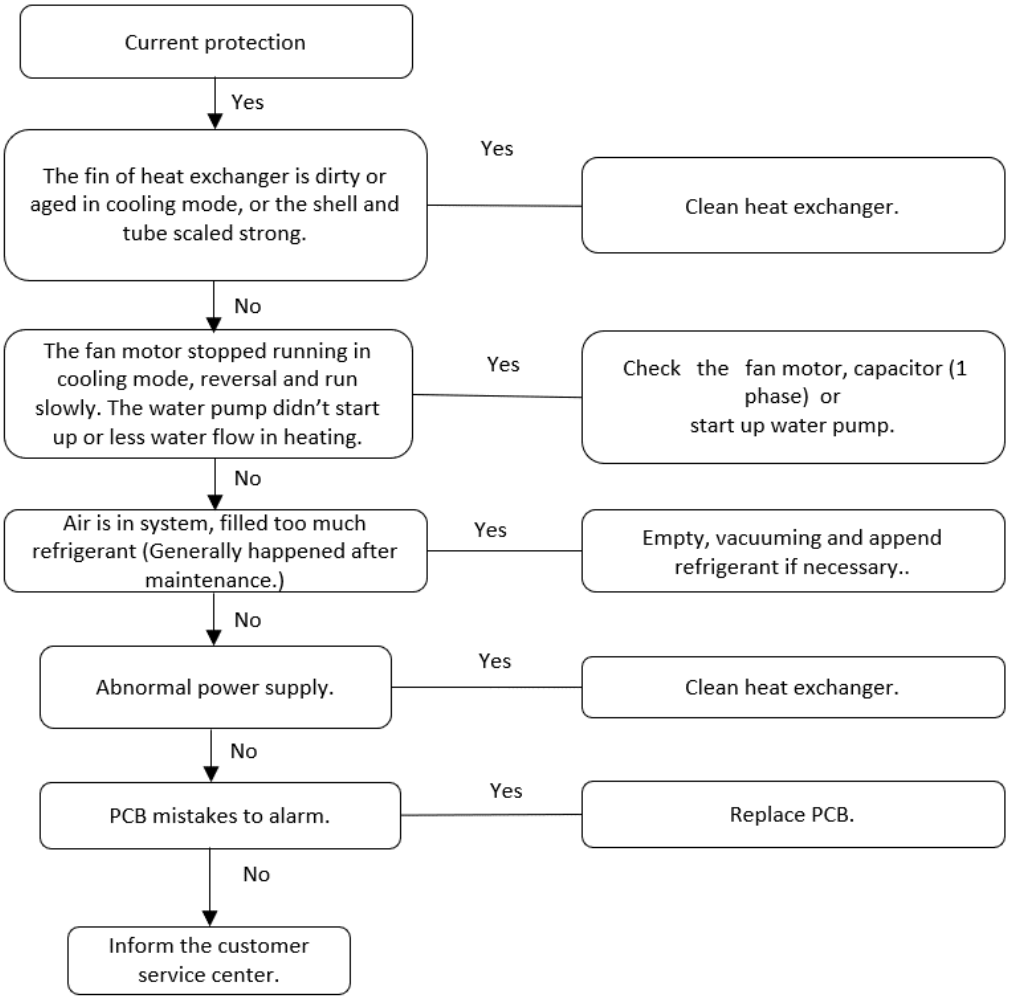

High pressure and discharged
Yes
High pressure protection.
No
Discharge temperature protection.
Yes
See the analysis of discharge temp. protection malfunction.
Yes
Blower stops rotating or rotates in reversed direction in cooling mode, water pump is not open or the flow.
Yes
Inspect fan motor and capacitor (1phase) or start up the water pump.
No
Couldn't start the EXV.
Yes
Replace EXV or coil.
No
Pressure controller is broken or the joint is loose.
Yes
Replace press controller, fixed joint.
No
Fin heat exchanger in cooling mode is too dirty or aged, or too heavy encrustation in shell and tube for heating.
Yes
Clean heat exchanger.
No
EXV, capillary and filter are dirty, blocking.
Yes
Replace EXV, capillary and filter.
No
There is air and filled refrigerant too much in system.(Generally occur after maintenance.)
Yes
Empty, vacuuming and append refrigerant if necessary.
No
PCB mistakes to alarm.
Yes
Check if it happened frequently, if yes, please replace PCB.
No
Inform the customer service center.



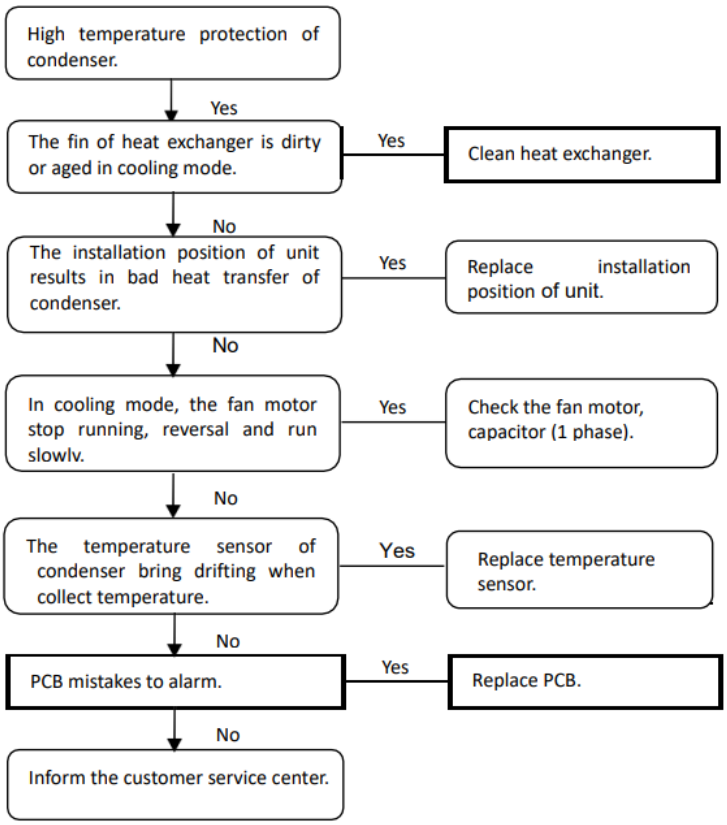
2) Low pressure protection



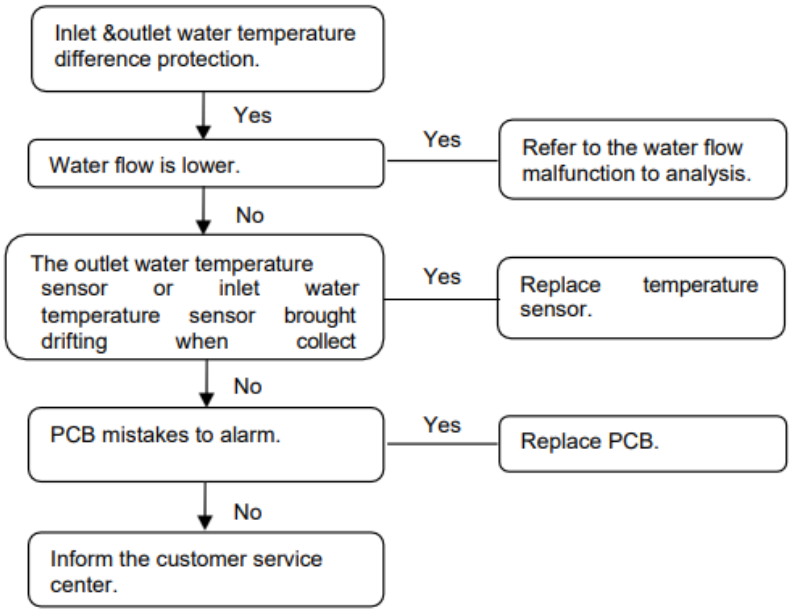
3) Current protection



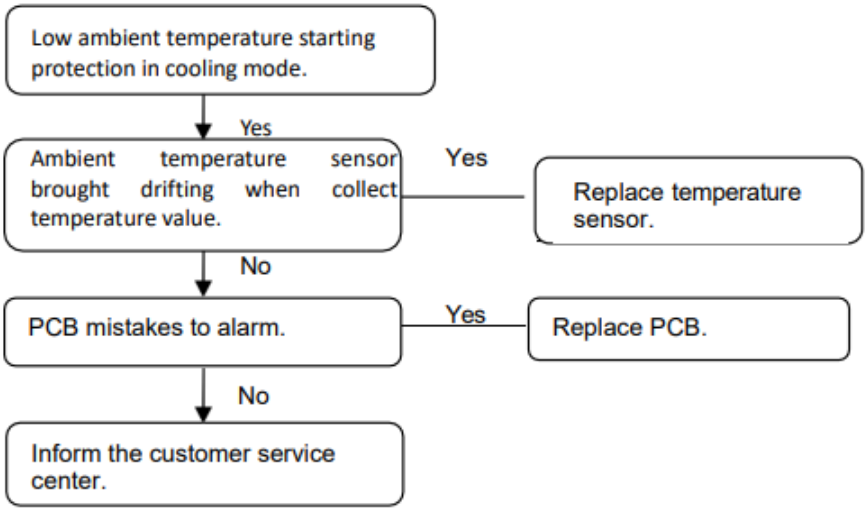
4) High temperature protection of condenser



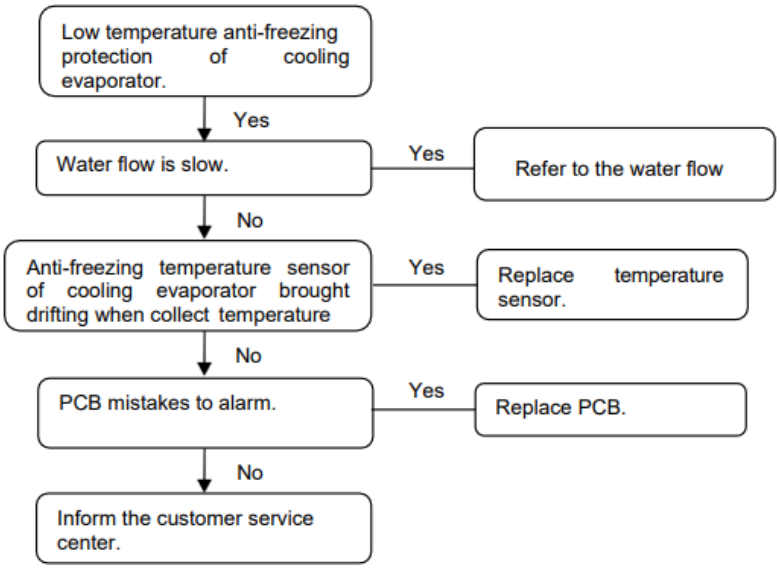
5) Inlet &outlet water temperature difference protection



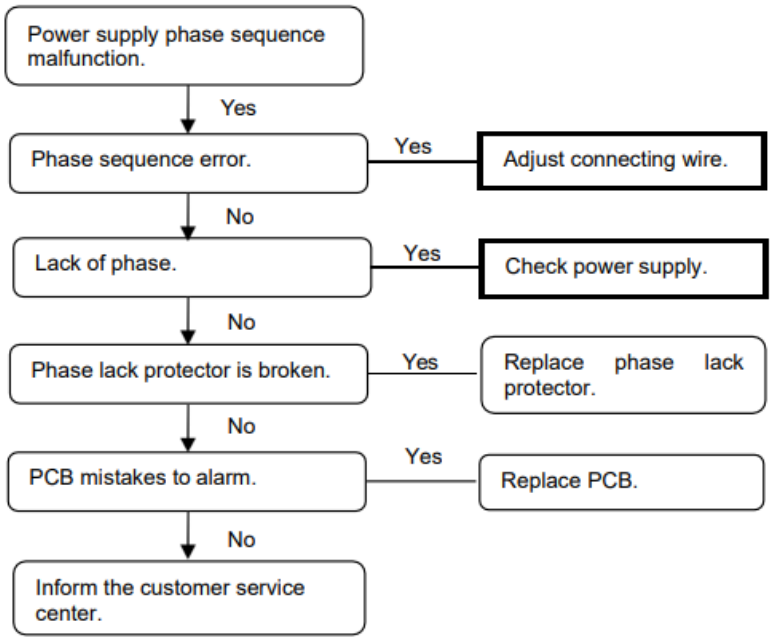
6) Low ambient temperature starting up protection



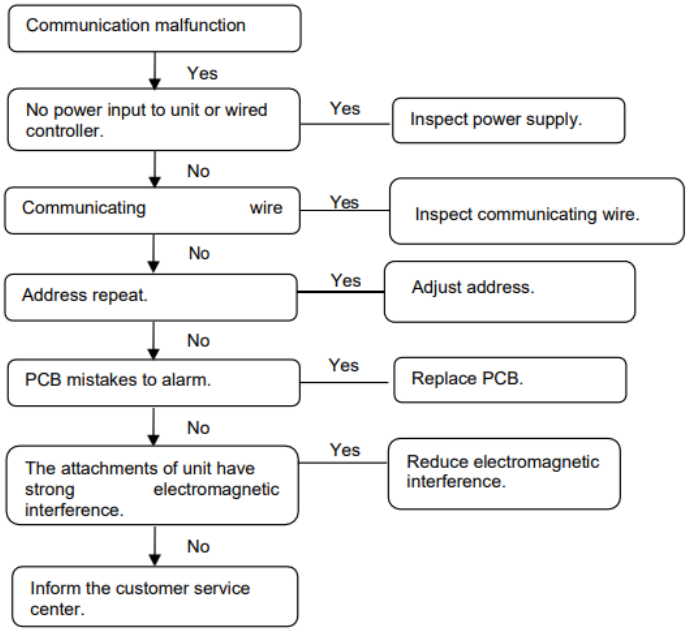
7) Low temperature anti-freezing protection of cooling evaporator



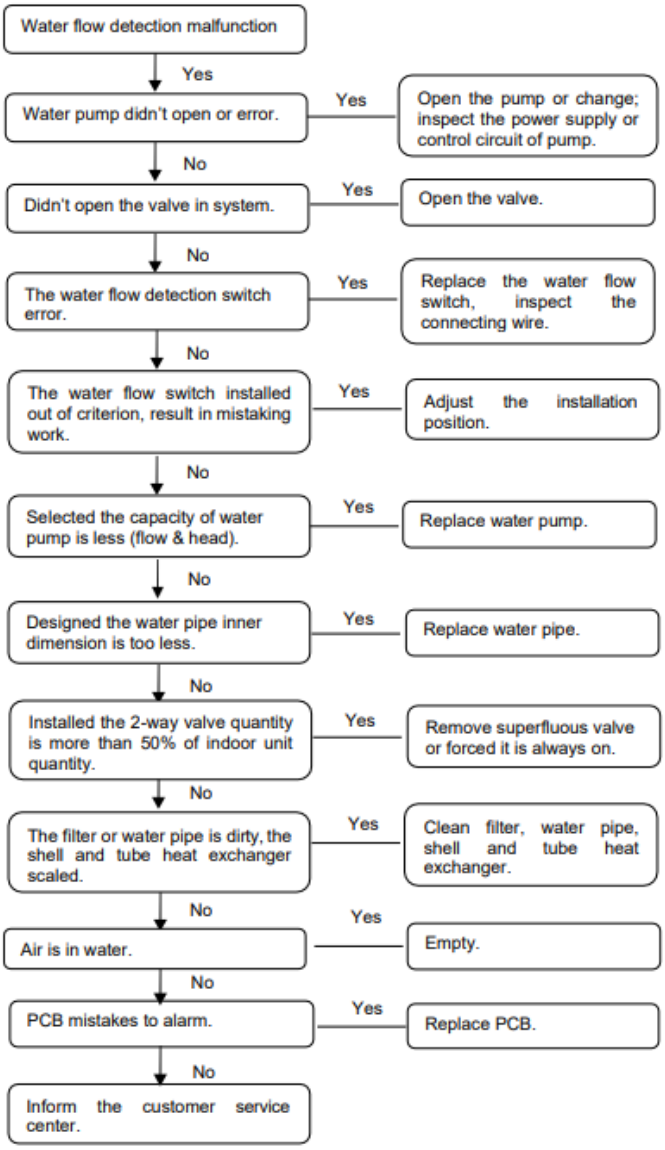
8) Power supply phase sequence malfunction



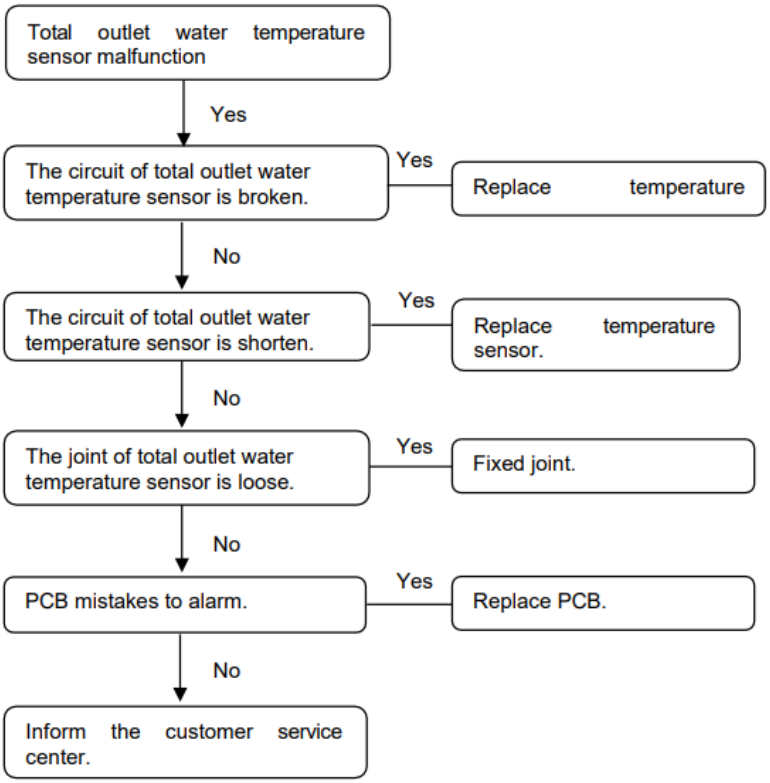
9) Communication malfunction



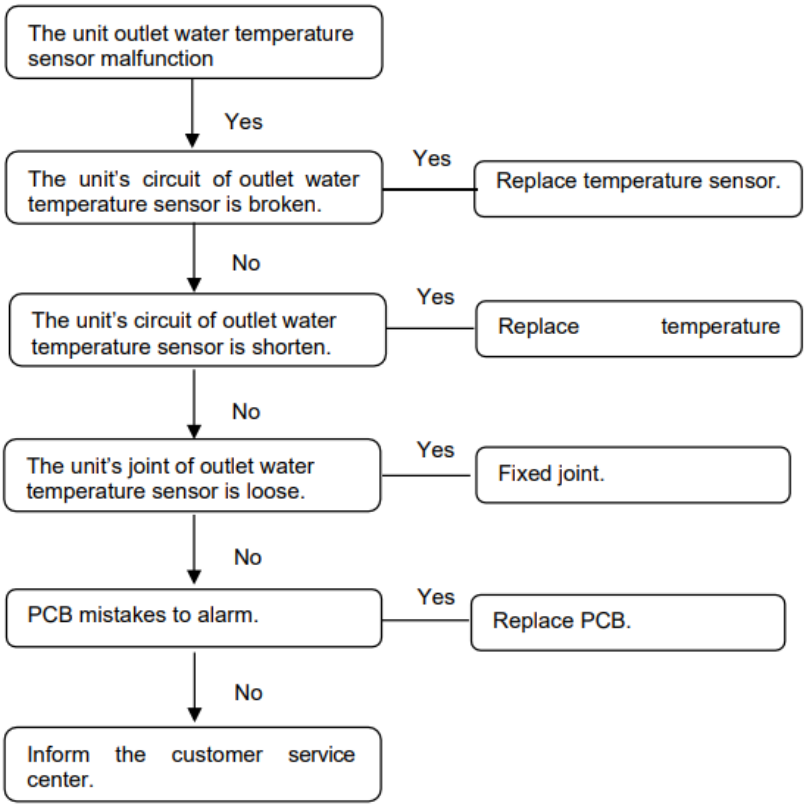
10) Water flow detection malfunction



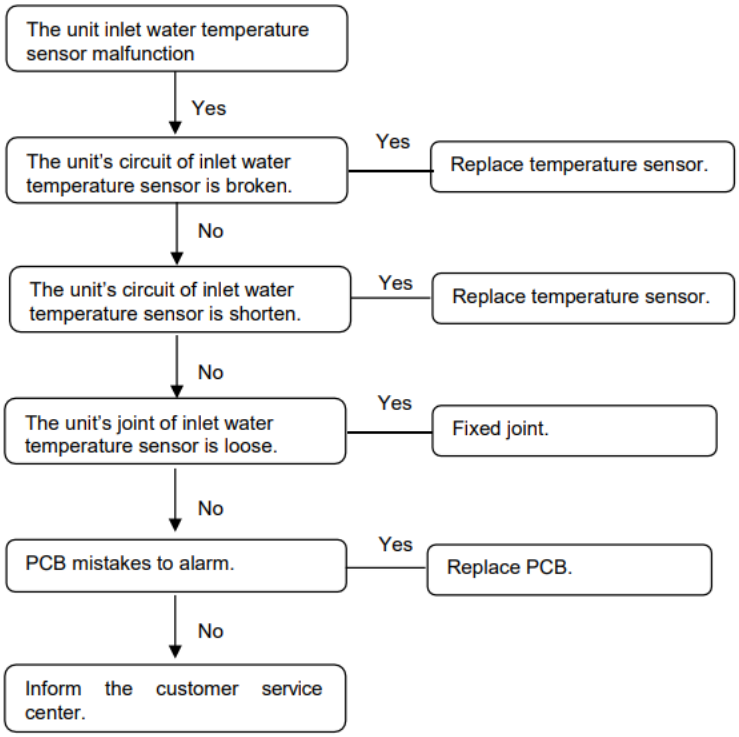
11) Total outlet water temperature sensor malfunction



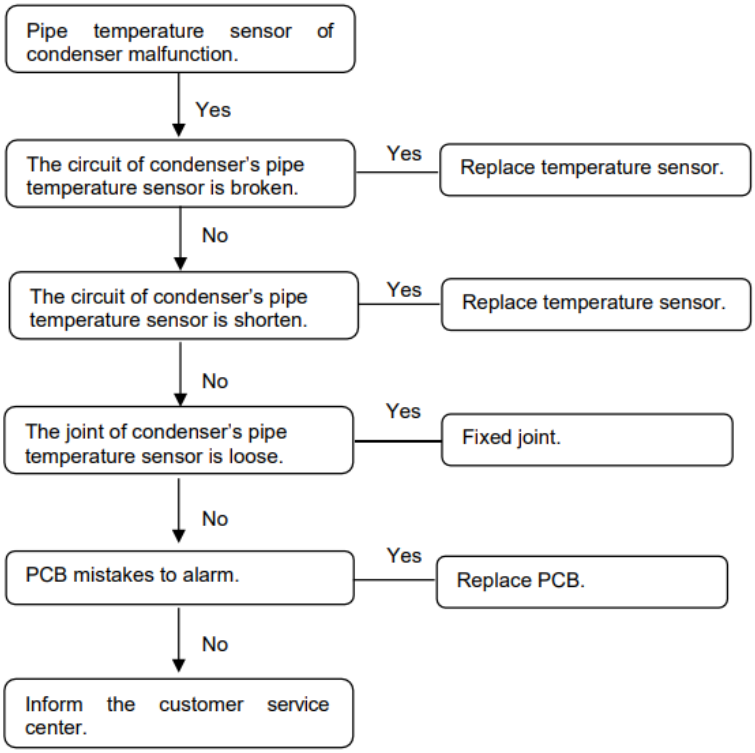
12) **The unit outlet water temp. sensor malfunction**



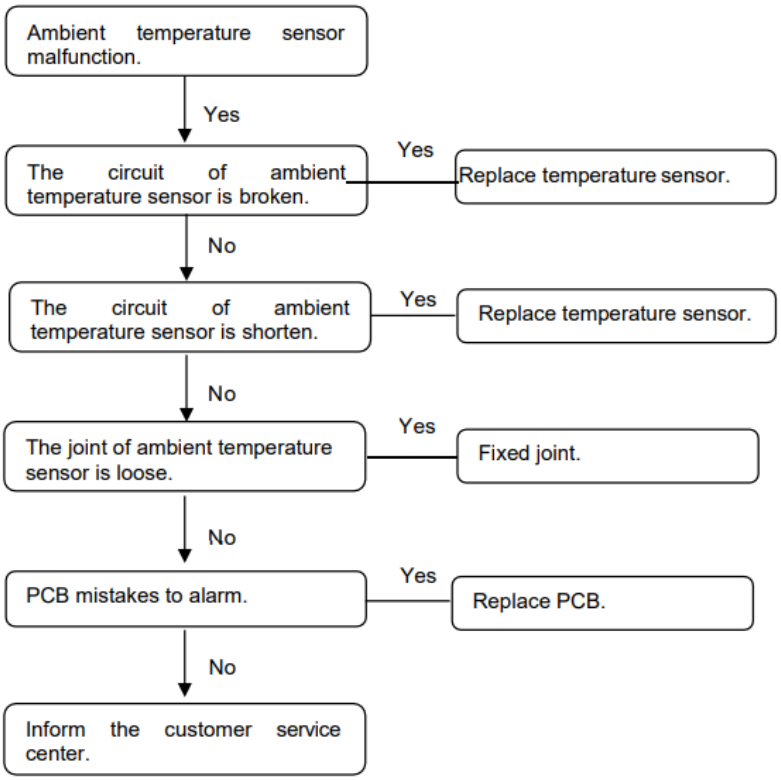
13) The unit inlet water temperature sensor malfunction



14) Pipe temp. sensor of condenser malfunction



15) Ambient temperature sensor malfunction



5.24 Trouble shooting for 60/120/180

5.24.1 Troubles and Solutions for 60/120/180

Troubles	Possible reasons	Solutions
Over high air discharge pressure(Cooling operation).	Air or other non-condensing gas still in the system.	Discharge gas from refrigerant charging inlet. Re-vacuum the system if necessary.
	Fins in the condenser are dirty or foreign substance blocking fins.	Clean condenser fins.
	Insufficient chilling air volume or condenser fan error.	Check and repair the condenser fan, recover the normal operation.
	Excessive high air suction pressure.	See “Excessive high air suction pressure”.
	Excessive refrigerant charging volume.	Discharge the excessive refrigerant.
	Over high ambient temperature.	Check ambient temperature.
Over low air discharge pressure (Cooling operation).	Surrounding temperature is lower.	Measure the surrounding temp.
	Refrigerant leak or insufficient.	Leak-hunting or recharging.
	Low suction pressure.	Refer to the “low suction pressure”.
Over high air suction pressure (Cooling operation).	Refrigerant over-charged.	Discharge the additional refrigerant.
	High temperature of the inlet chilled-water.	Check the heat insulation of water pipeline.
Over low air suction pressure (Cooling operation).	Insufficient water flow.	Measure the Temp difference between inlet and outlet water, adjust the water flow.
	Low temperature of inlet chilled-water.	Check installation.
	Refrigerant leak or insufficient.	Leak-hunting or recharging.
	Scaling in the evaporator.	Descaling.
Over high air discharge pressure (Heating operation).	Insufficient water flow.	Check temperature difference at water inlet and outlet, and adjust the water flow volume.
	Air or other non-condensing gas still in the system.	Discharge gas from refrigerant charging inlet. Re-vacuum the system if necessary.
	Scaling in water side of heat exchanger.	Descaling.
	Over high temperature in chilling water inlet.	Check water temperature.
	Excessive high air suction pressure.	See “Excessive high air suction pressure”.
Over low air discharge pressure (Heating operation).	Over low temperature of chilling water.	Check chilling water temperature.
	Refrigerant leakage or insufficient refrigerant volume.	Test leakage or charge sufficient refrigerant to the system.
	Excessive low air suction pressure.	See “Excessive low air suction pressure”.
Over high air suction pressure (Heating operation).	Over heat air in the side of air heat exchanger.	Check ambient temperature around it.
	Excessive refrigerant charging volume.	Discharge the excessive refrigerant.
Over low air suction pressure (Heating operation).	Insufficient refrigerant charging volume.	Charge sufficient refrigerant to the system.
	Insufficient air flow volume.	Check fan rotating direction.
	Air loop short-circuit.	Reason about remove air short-circuit.
	Insufficient frost-removal operation.	Error comes out from 4-way valve or thermal resistor. Replace a new one if necessary.
Compressor stops because of freeze-proof protection (Cooling operation).	Insufficient chilling water flow volume.	Error comes from pump or flow-type water volume control. Check and repaired or replace a new one.
	Gas still in water loop.	Discharge air.
	Thermal resistor error.	Upon error have been confirmed, please replace a new

		one.
Compressor stops because of high pressure protection.	Over high air expelling pressure.	See “Over high air expelling pressure”.
	High pressure switch error.	Upon error have been confirmed, please replace a new one.
Compressor stops because of motor overload.	Over high air expelling pressure and air suction pressure.	See “Over high air expelling pressure” and “Over high air suction pressure”.
	High voltage or low voltage, signal phase or phase unbalance.	Confirm voltage not higher or lower than the rated voltage 10%.
	Short circuit comes out from motor or connecting interface.	Confirm resistors at motor are connected corresponding to terminals.
	Overload assembly error.	Replace a new one.
Compressor stops because of integrate temperature sensor or air discharge temperature protection.	Over high or over low voltage.	Confirm voltage not higher or lower than the rated voltage 10%.
	Over high air expelling pressure or excessive low air suction pressure.	See “Over high air expelling pressure” and “excessive low air suction pressure ”.
	Component error.	Check the integrated temperature sensor after motor is cool down.
Compressor stops because of low pressure protection.	Filter in front (or rear) of expanding valve is blocked.	Replace a new filter.
	Low voltage switch error.	If the switch is defective, please replace a new one.
	Excessive low air suction pressure.	See “Excessive low air suction pressure”.
Abnormal noise comes from compressor.	Liquid refrigerant flows into compressor from evaporator result in liquid slugging.	Adjust refrigerant charge volume.
	Aging of compressor.	Replace a new compressor.
Compressor can’t start.	Over current relay trip up, fuse burnt out.	Replace damaged assembly.
	Control circuit without power though.	Check the wring of control system.
	High voltage or low voltage protection.	Reference to mention in above the parts of air suction and discharge pressure error.
	Coils in contactor are burnt out.	Replace damaged assembly.
	Wrong connection of phase sequence.	Re-connect and adjust the any 2 wires among 3 phases.
	Water system error and flow type volume controller short connection.	Check water system.
	Error signal delivered from wired controller.	Find out the error type and carry out the corresponding measure to settle.
Air side heat exchanger excessive frost.	4-way valve or thermal resistor error.	Check the running state. Replace a new one if necessary.
	Air loop short-circuit.	Settle the short-circuit of air discharge.
With noise.	Fixing screws at panel are loosen.	Fix up all assemblies.

6 Temperature Sensor Resistance Characteristics

Outdoor ambient temperature sensor, air side heat exchanger pipe temperature sensor resistance characteristics

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-20	106.732	20	12.635	60	2.35	100	0.609
-19	100.552	21	12.05	61	2.264	101	0.591
-18	94.769	22	11.496	62	2.181	102	0.574
-17	89.353	23	10.971	63	2.102	103	0.558
-16	84.278	24	10.473	64	2.026	104	0.542
-15	79.521	25	10	65	1.953	105	0.527
-14	75.059	26	9.551	66	1.883		
-13	70.873	27	9.125	67	1.816		
-12	66.943	28	8.721	68	1.752		
-11	63.252	29	8.337	69	1.69		
-10	59.784	30	7.972	70	1.631		
-9	56.524	31	7.625	71	1.574		
-8	53.458	32	7.296	72	1.519		
-7	50.575	33	6.982	73	1.466		
-6	47.862	34	6.684	74	1.416		
-5	45.308	35	6.401	75	1.367		
-4	42.903	36	6.131	76	1.321		
-3	40.638	37	5.874	77	1.276		
-2	38.504	38	5.63	78	1.233		
-1	36.492	39	5.397	79	1.191		
0	34.596	40	5.175	80	1.151		
1	32.807	41	4.964	81	1.113		
2	31.12	42	4.763	82	1.076		
3	29.528	43	4.571	83	1.041		
4	28.026	44	4.387	84	1.007		
5	26.608	45	4.213	85	0.974		
6	25.268	46	4.046	86	0.942		
7	24.003	47	3.887	87	0.912		
8	22.808	48	3.735	88	0.883		
9	21.678	49	3.59	89	0.855		
10	20.61	50	3.451	90	0.828		
11	19.601	51	3.318	91	0.802		
12	18.646	52	3.191	92	0.777		
13	17.743	53	3.069	93	0.753		
14	16.888	54	2.952	94	0.73		
15	16.079	55	2.841	95	0.708		
16	15.313	56	2.734	96	0.686		
17	14.588	57	2.632	97	0.666		
18	13.902	58	2.534	98	0.646		
19	13.251	59	2.44	99	0.627		

Leaving water temperature sensor, entering water temperature and total leaving water temperature sensor resistance characteristics

Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)
-20	470.8	20	61.2	60	12.2	100	3.3
-19	444.5	21	58.5	61	11.7	101	3.2
-18	419.9	22	55.9	62	11.3	102	3.1
-17	396.8	23	53.5	63	10.9	103	3.0
-16	375.1	24	51.2	64	10.5	104	2.9
-15	354.7	25	49.0	65	10.2	105	2.8
-14	335.5	26	46.9	66	9.8	106	2.8
-13	317.5	27	44.9	67	9.5	107	2.7
-12	300.5	28	43.0	68	9.2	108	2.6
-11	284.6	29	41.2	69	8.8	109	2.5
-10	269.6	30	39.4	70	8.5	110	2.5
-9	255.4	31	37.8	71	8.3	111	2.4
-8	242.1	32	36.2	72	8.0	112	2.3
-7	229.6	33	34.7	73	7.7	113	2.3
-6	217.8	34	33.3	74	7.5	114	2.2
-5	206.6	35	31.9	75	7.2	115	2.1
-4	196.1	36	30.7	76	7.0	116	2.1
-3	186.2	37	29.4	77	6.8	117	2.0
-2	176.8	38	28.2	78	6.5	118	2.0
-1	168.0	39	27.1	79	6.3	119	1.9
0	159.7	40	26.0	80	6.1	120	1.9
1	151.8	41	25.0	81	5.9	121	1.8
2	144.3	42	24.0	82	5.7	122	1.8
3	137.3	43	23.1	83	5.5	123	1.7
4	130.6	44	22.2	84	5.4	124	1.7
5	124.3	45	21.4	85	5.2	125	1.6
6	118.3	46	20.5	86	5.0	126	1.6
7	112.7	47	19.7	87	4.9	127	1.6
8	107.3	48	19.0	88	4.7	128	1.5
9	102.3	49	18.3	89	4.6	129	1.5
10	97.5	50	17.6	90	4.4	130	1.4
11	92.9	51	16.9	91	4.3		
12	88.6	52	16.3	92	4.2		
13	84.5	53	15.7	93	4.1		
14	80.6	54	15.1	94	3.9		
15	77.0	55	14.6	95	3.8		
16	73.5	56	14.1	96	3.7		
17	70.1	57	13.6	97	3.6		
18	67.0	58	13.1	98	3.5		
19	64.0	59	12.6	99	3.4		

6.1 Temperature-Resistance characteristic sheet for pipe temperature sensor， ambient temperature sensor， inlet water temperature sensor and outlet water temperature sensor for 185kW

Sensor characteristic sheet Unit：Temp：℃--K, Ratio：KΩ

Temp.	Ratio	Temp.	Ratio	Temp.	Ratio	Temp.	Ratio
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.219	25	10	65	1.96532	105	0.54448
-14	79.311	26	9.55074	66	1.89627	106	0.52912
-13	74.536	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.486
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44	36	6.13059	76	1.34105	116	0.4006
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.2133	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.5705	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.3239
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.8795	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.2777
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.918	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

6.2 Temperature-Resistance characteristic sheet for discharge temperature sensor of digital compressor for 200kW

Sensor characteristic sheet Unit: temp: ℃--K, Ratio: KΩ

Temp	Ratio	Temp	Ratio	Temp	Ratio	Temp.	Ratio	Temp.	Ratio
-40	2889.60000	13	148.39300	66	17.29460	119	3.45032	172	0.97524
-39	2704.61400	14	141.59040	67	16.70980	120	3.35400	173	0.95632
-38	2532.87200	15	135.14040	68	16.13360	121	3.26198	174	0.93826
-37	2373.34200	16	129.00000	69	15.59180	122	3.17340	175	0.92020
-36	2225.07800	17	123.17780	70	15.06720	123	3.08740	176	0.90214
-35	2087.22000	18	117.65660	71	14.55980	124	3.00484	177	0.88494
-34	1957.44600	19	112.41060	72	14.07820	125	2.92400	178	0.86774
-33	1836.70200	20	107.43980	73	13.60520	126	2.85090	179	0.85054
-32	1724.38600	21	102.70120	74	13.15800	127	2.78038	180	0.83420
-31	1619.72400	22	98.19480	75	12.72800	128	2.71158	181	0.81614
-30	1522.20000	23	93.92060	76	12.30660	129	2.64450	182	0.79808
-29	1430.54120	24	89.86140	77	11.91100	130	2.58000	183	0.78088
-28	1345.07440	25	86.00000	78	11.52400	131	2.51636	184	0.76454
-27	1265.35240	26	82.31060	79	11.15420	132	2.45444	185	0.74820
-26	1190.94520	27	78.81040	80	10.79300	133	2.39424	186	0.73358
-25	1121.45720	28	75.47360	81	10.44900	134	2.33576	187	0.71982
-24	1056.14020	29	72.30020	82	10.12220	135	2.27900	188	0.70606
-23	995.10600	30	69.28160	83	9.80400	136	2.22396	189	0.69230
-22	938.04500	31	66.39200	84	9.49440	137	2.17150	190	0.67940
-21	884.66480	32	63.64860	85	9.20200	138	2.11990		
-20	834.71600	33	61.02560	86	8.91820	139	2.07002		
-19	787.65680	34	58.53160	87	8.64300	140	2.02100		
-18	743.58180	35	56.15800	88	8.37640	141	1.97370		
-17	702.29320	36	53.88760	89	8.11840	142	1.92812		
-16	663.59320	37	51.72040	90	7.86900	143	1.88340		
-15	627.28400	38	49.65640	91	7.64110	144	1.83954		
-14	593.03020	39	47.69560	92	7.40460	145	1.79740		
-13	560.88340	40	45.81220	93	7.18530	146	1.75354		
-12	530.71460	41	44.00620	94	6.97288	147	1.71140		
-11	502.36900	42	42.29480	95	6.76820	148	1.67012		
-10	475.74340	43	40.65220	96	6.57126	149	1.62970		
-9	450.57120	44	39.07840	97	6.38120	150	1.59100		
-8	426.90400	45	37.58200	98	6.19716	151	1.54886		
-7	404.64720	46	36.14580	99	6.02000	152	1.50844		
-6	383.70620	47	34.76120	100	5.84800	153	1.46888		
-5	363.98640	48	33.44540	101	5.68632	154	1.43018		
-4	345.31580	49	32.18980	102	5.52980	155	1.39320		
-3	327.73740	50	30.98580	103	5.37930	156	1.36224		
-2	311.16520	51	29.83340	104	5.23310	157	1.33214		
-1	295.55620	52	28.72400	105	5.09120	158	1.30290		
0	280.82440	53	27.66620	106	4.95360	159	1.27452		
1	266.85800	54	26.65140	107	4.82030	160	1.24700		

2	253.68280	55	25.67960	108	4.69216	161	1.21948		
3	241.24720	56	24.75080	109	4.56660	162	1.19368		
4	229.49960	57	23.85640	110	4.44620	163	1.16788		
5	218.40560	58	23.00500	111	4.32322	164	1.14208		

Ver. 2025-05

MDV
Professional Equipment
Midea Group

Add.: Midea Headquarters Building, 6 Midea Avenue, Shunde, Foshan, Guangdong, China

Postal code: 528311

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