

Installation and service instructions

Applicable models: TFT-008CCH2E1-M

TFT-010CCH2E1-M

TFT-012CCH2E1-M

TFT-014CCH2E1-M

TFT-016CCH2E1-M



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1. Unit information

1.1 Unit detail

Table 1			
Model	Power Supply	Refrigerant	Unit Appearance
TFT-008CCH2E1-M	220-240V 50Hz	R290	
TFT-010CCH2E1-M			
TFT-012CCH2E1-M			
TFT-014CCH2E1-M			
TFT-016CCH2E1-M			

1.3 Product feature

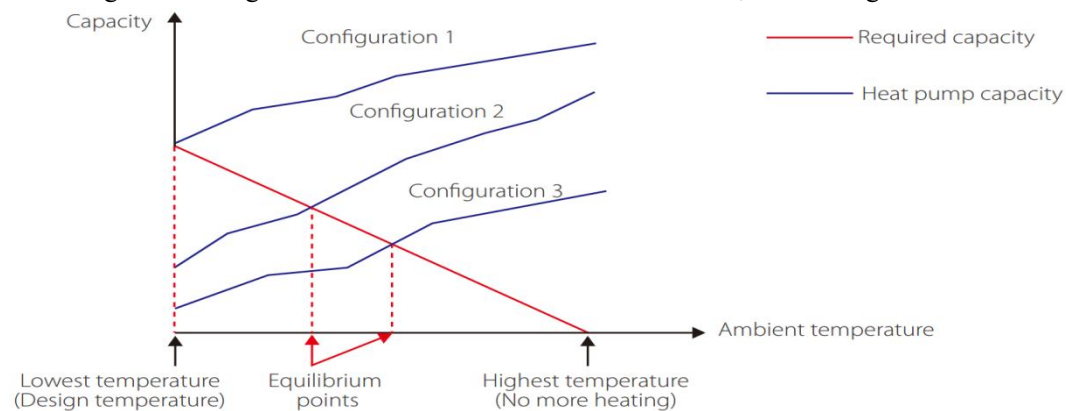
Smeta integrated heat pump provides a complete set of household solutions integrating heating, cooling and domestic hot water, which can be widely applied to villa, commercial building, rural self-built house, office area, hotel, places in beauty industry and so on. This heat pump can meet users' needs that including heating in winter, cooling in summer and domestic hot water production throughout the year. It can run heating mode, cooling mode and heating water mode separately, and can also run the mixed mode of heating and cooling, cooling and heating water. In mixed mode, the unit automatically switches between the two sub-modes of heating or heating water (cooling or heating water), and it will complete the set function temperature one by one according to the priority set by the user. The heating water function requires the user to provide heating water tank.

Examples of mixed mode priorities: Such as heating and heating water mode, which defaults balanced operation, when the water temperature meets the set conditions or the operation time reaches up, it will automatically switch the mode; Heating mode can be set as priority, and only when the heating water temperature meets the conditions can it be automatically switched to heating water mode; Heating water mode can be set as priority, and only when the hot water temperature meets the conditions can it be automatically switched to heating mode.

1.4 Product application recommendation

Smeta heat pump unit internally installs standard auxiliary electric heating, the user can choose to enable or disable the function (enabled by default), when the function is enabled, and the ambient temperature is low as well as the unit capacity is insufficient, the unit will automatically determine whether to turn on the auxiliary electric heating, in order to make up for user needs.

Model selection for the user should be based on the required capacity of heating or cooling to choose the size of the unit, and according to the most unfavorable conditions to meet the year-round application needs. Taking the heating model selection as an example, the capacity of the unit will decay with the decrease of the ambient temperature, and the following three configuration model selections are recommended, refer to Figure 1.



Configuration 1: Heat pump only

- ♣ The heat pump covers the required capacity and no extra heating capacity is necessary.
- ♣ Requires selection of larger capacity heat pump and implies higher initial investment.
- ♣ Ideal for new construction in projects where energy efficiency is paramount.

Configuration 2: Heat pump and backup electric heater

- ♣ Heat pump covers the required capacity until the ambient temperature drops below the point at which the heat pump is unable to provide sufficient capacity. When the ambient temperature is below this equilibrium point (as shown in Figure 2), the backup electric heater supplies the required additional heating capacity.

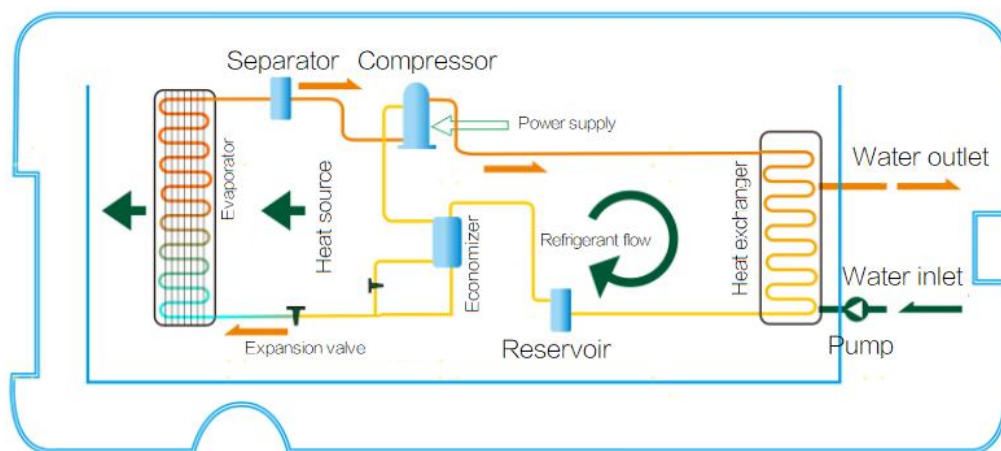
- ♣ Best balance between initial investment and running costs, results in lowest lifecycle cost.

- ♣ Ideal for new construction.

Configuration 3: Heat pump with auxiliary heat source

- ♣ Heat pump covers the required capacity until the ambient temperature drops below the point at which the heat pump is unable to provide sufficient capacity (Even the backup electric heater effected). When the ambient temperature is below this equilibrium point (as shown in Figure 2), depending on the system settings, either the auxiliary heat source supplies the required additional heating capacity or the heat pump does not run and the auxiliary heat source covers the required capacity.
- ♣ Enables selection of lower capacity heat pump.
- ♣ Ideal for refurbishments and upgrades.

1.5 Operating principle



The basic operating principle of heat pump hot water heater is mainly composed of compressor, heat exchanger, axial flow fan, water pump, reservoir, filter, throttle device, electronic controller, etc. After the unit is connected to the power supply, the axial flow fan begins to operate, and the outdoor air is transferred through the evaporator; The cryogenic air is forced by fan to discharge out of the unit; At the same time, the refrigerant inside the evaporator absorbs heat to vaporize, and then is sucked into the compressor, the compressor compresses this low-pressure gaseous refrigerant into high temperature and high pressure gaseous refrigerant, which is discharged into the condenser; Water pump forces water in the condenser, circulating water conducts heat exchange with high temperature and high pressure gaseous refrigerant through the condenser, circulating water is heated, and then it is provided heat dissipation terminal for user use, high temperature and high pressure gaseous refrigerant is cooled into a liquid, after the expansion valve cooling and then back to the evaporator. This repeated cycle of operation makes the heat in the air constantly absorbed by the water, and the water temperature gradually rises until the set water temperature is reached.

1.6 Introduction to engineering application

Smeta heat pump can be matched with different terminal applications such as floor heating pipe, fan coil unit, radiator, domestic hot water tank, etc. The following figure is a recommendation of the application integration diagram, which does not mean that users

need to configure all applications, and users should perform engineering installation according to actual usage requirements.

Figure 2 Engineering application integration diagram

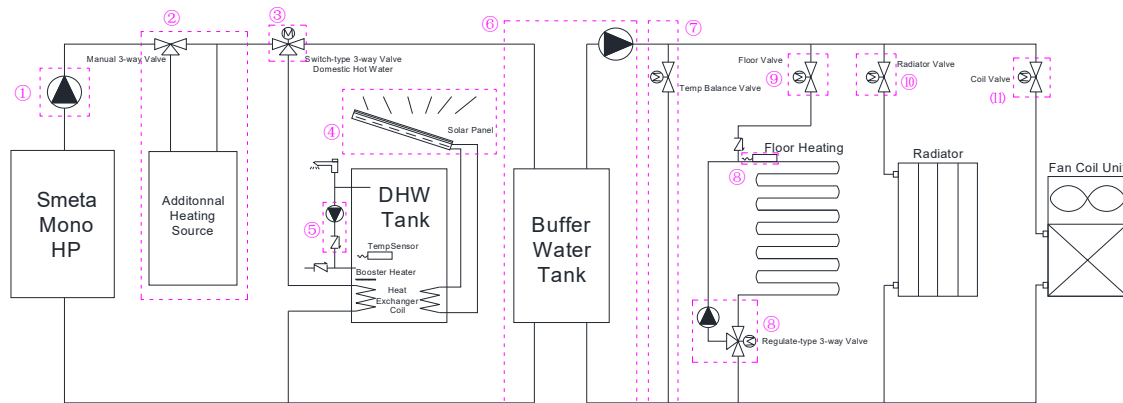


Table 2

No.	Function name/description	Configuration	Remark
①	Water pressure booster pump	User configuration	Only provide 220V water pump control ports, which are required to configure when the user's water system is complex and the water discharge is insufficient
②	Additional heating source 3-way valve	User configuration	Only provide 220V control ports and signal feedback ports
③	Domestic hot water	User configuration	Only provide 220V 3-way valve control ports, and the user need to configure the domestic water tank synchronously
④	Solar hot water	User configuration	Users control by themselves
⑤	Zero cold water pump	User configuration	Only provide 220V water pump control ports
⑥	Secondary circulation pump and buffer water tank	User configuration	Only provide 220V water pump control ports or the user control individually
⑦	Temperature balance valve	User configuration	Only provide 220V water pump control ports (It must be configured when heating water and cooling are needed in summer)
⑧	Dual water temperature partitioned regulating system	User configuration	Only provide water pump, regulate-type 3-way valve, mixed water temperature sensor ports
⑨	Floor solenoid valve	User configuration	Only provide 220V control ports, floor heat exchange applications
⑩	Radiator solenoid valve	User configuration	Only provide 220V control ports, radiator heat exchange applications
⑪	Fan coil solenoid valve	User configuration	Only provide 220V control ports, fan coil unit heat exchange applications

Engineering application 1: Basic application

The unit is connected to water and electricity without the additional configuration of the figure above and the table above.

Engineering application 2: Having different types of heating and cooling terminal applications

When the unit has different terminals (such as floor heating pipe, radiator, fan coil unit, domestic water tank, etc.), which are used for both heating and cooling (or have heating water function),

configure the water and solenoid valve should be turned off according to the terminal type (as shown in Figure 1), then connect the floor solenoid valve, radiator solenoid valve, fan coil solenoid valve to the corresponding control port of the unit respectively, and set the cooling terminal application (default fan coil unit, namely following table Cooling 1), heating terminal application (default floor heating, namely following table Heating 2), and heating water terminal application (default no heating water function, namely Heating water 2) on the control display panel. In general, the terminal type application only needs to be set up once in the engineering installation.

Table 3					
Mode	Terminal application setting	Valves' response under the terminal application setting			
		Fan coil unit solenoid valve	Floor solenoid valve	Radiator solenoid valve	Hot water 3-way valve
Cooling	Cooling 1(Fan coil unit, setting 0)	ON	OFF	OFF	OFF
	Cooling 2(Floor, setting 1)	OFF	ON	OFF	OFF
	Cooling 3(Radiator, setting 2)	OFF	OFF	ON	OFF
	Cooling 4(Fan coil unit+Floor, setting 3)	ON	ON	OFF	OFF
	Cooling 5(Fan coil unit+radiator, setting 4)	ON	OFF	ON	OFF
	Cooling 6(Floor+radiator, setting 5)	OFF	ON	ON	OFF
	Cooling 7(Fan coil unit+Floor+radiator, setting 6)	ON	ON	ON	OFF
	Cooling 8(No application, setting 7)	OFF	OFF	OFF	OFF
Heating	Heating 1(Fan coil unit, setting 0)	ON	OFF	OFF	OFF
	Heating 2(Floor, setting 1)	OFF	ON	OFF	OFF
	Heating 3(radiator, setting 2)	OFF	OFF	ON	OFF
	Heating 4(Fan coil unit+Floor, setting 3)	ON	ON	OFF	OFF
	Heating 5(Fan coil unit+radiator, setting 4)	ON	OFF	ON	OFF
	Heating 6(Floor+radiator, setting 5)	OFF	ON	ON	OFF
	Heating 7(Fan coil unit+Floor+radiator, setting 6)	ON	ON	ON	OFF
	Heating 8(No application, setting 7)	OFF	OFF	OFF	OFF
Heating water	Heating water 1(Heating water function, setting 1)	OFF	OFF	OFF	ON
	Heating water 2(No heating water function, setting 0)	OFF	OFF	OFF	OFF

Note: If the user set the terminal application including floor cooling function, the user should equip by themselves with dehumidification equipment because Floor cooling does not have dehumidification function, and note that the ground may be slippery due to condensation made from refrigeration.

Engineering application 3: Dual water temperature partitioned setting application

When the user needs to set different heating (or cooling) water temperatures in two areas, it is necessary to use the dual water temperature setting function. Under this function, the user needs to set to enable the second water temperature function and set the second water temperature on the control display panel (the first water temperature is the water temperature normally set on the display panel), and the user needs to configure the mixed water pump, mixed water 3-way regulating valve, mixed water temperature sensor and connect the control wiring to the unit (Serial number 8 in Figure 1).

1.7 Technical parameter table

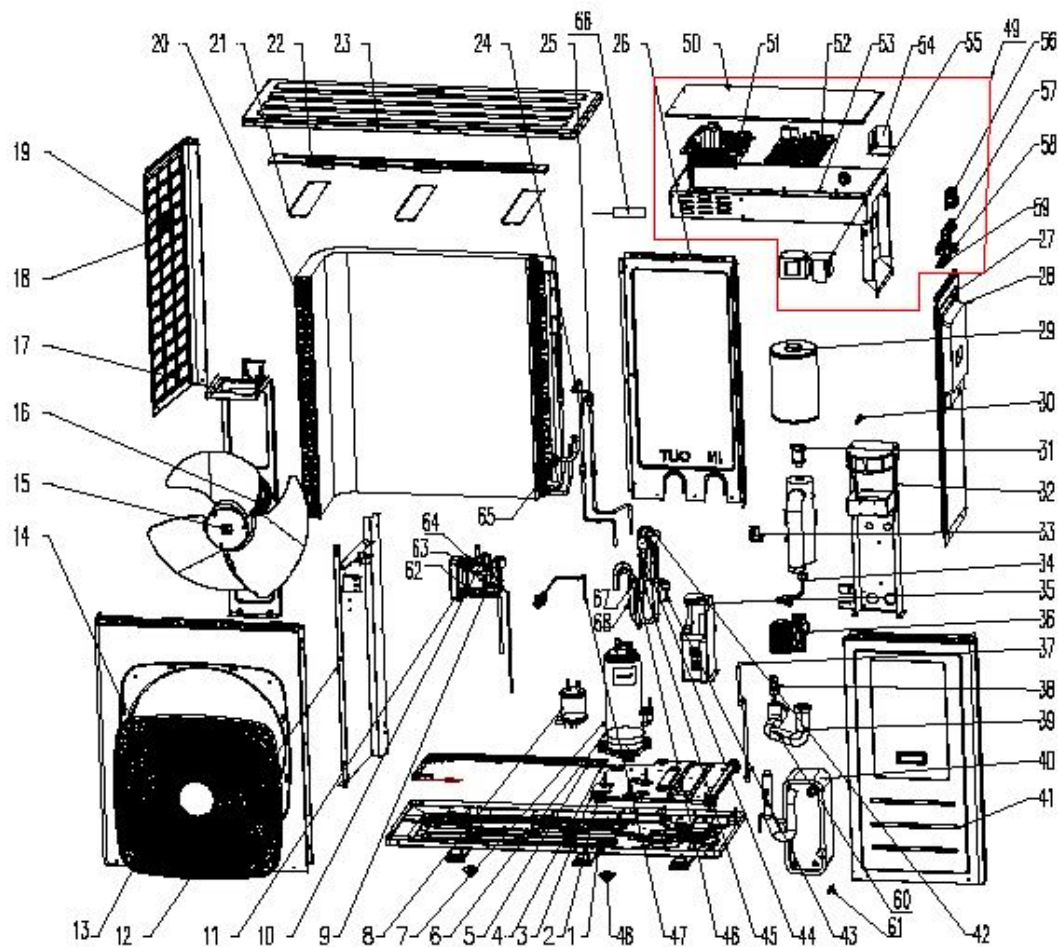
Table 4							
Model			TFT-008CCH2E1-M	TFT-010CCH2E1-M	TFT-012CCH2E1-M	TFT-014CCH2E1-M	TFT-016CCH2E1-M
Unit application type			Low and middle temperature application				
Power source		V / Ph / Hz	220~240/1/50				
Heating (AT7/6 WT30/35)	Heating capacity	kW	8.00	10.00	12.00	14.00	16.00
	Input power	kW	1.62	2.08	2.45	2.74	3.25
	COP	kW/kW	4.95	4.80	4.90	5.11	4.92
Heating (AT7/6 WT47/55)	Heating capacity	kW	8.00	10.00	12.00	14.00	16.00
	Input power	kW	2.42	3.03	3.63	4.24	5.00
	COP	kW/kW	3.30	3.30	3.30	3.30	3.20
Cooling (AT35 WT23/18)	Cooling capacity	kW	8.00	10.00	11.40	14.00	16.00
	Input power	kW	1.63	2.15	2.78	2.74	3.33
	EER	kW/kW	4.90	4.65	4.10	5.11	4.80
Cooling (AT35 WT12/7)	Cooling capacity	kW	8.00	10.00	11.40	14.00	16.00
	Input power	kW	2.50	3.33	4.07	4.52	5.51
	EER	kW/kW	3.20	3.00	2.80	3.10	2.90
SCOP	Average climate type	35℃	4.90	4.90	4.90	5.20	4.90
		55℃	3.85	3.85	3.85	3.90	3.90
Seasonal space heating energy efficiency	Average climate type	35℃	A+++	A+++	A+++	A+++	A+++
		55℃	A+++	A+++	A+++	A+++	A+++
SEER	Fan coil unit application	7℃	4.50	4.50	4.50	5.1	5.1
	Cooling floor application	18℃	6.30	6.50	6.20	7.0	7.0
Refrigerant	Type	-	R290				
	Charge	kg	1.3	1.3	1.35	1.95	1.95
Electric heater input power		kW	3.0	3.0	3.0	6.0	6.0
Sound power level (EN12102-1)		dB	66.0	66.0	68.0	67.5	68.0
Water pump	Rated discharge	m3/h	1.38	1.72	2.06	2.41	2.75
	Total lift	m	12.5	12.3	12.0	11.5	11.1
	The available lift outside the unit	m	9. 0	8.8	8.5	8.0	7.6
Maximum working pressure on suction and exhaust side		Mpa	0.85/3.2				
Maximum working pressure on water side		Mpa	0.6	0.6	0.6	0.6	0.6
Maximum power and maximum current		kW/A	7.20/32.73	8.20/37.27	8.70/39.55	15.00/68.00	16.00/73.00
Waterproofing grade		/	IPX4				
Water interface size		in	1	1	1	1	1
Net size		D×W×H	mm1312×470×990			1312×470×1370	
Packaging size		D×W×H	mm1362×567×1167			1362×567×1560	
Ambient temperature range	Cooling	℃	10~48				
	Heating	℃	-30~35				
	Domestic hot water	℃	-30~43				
Water outlet temperature range	Cooling	℃	5~25				
	Heating	℃	24~75				
	Domestic hot water	℃	30~60				

1.8 Introduction to the components of the unit

Table 5				
N0.	Components name	Appearance	Model	Specification
1	Compressor		H420D7KZAAJ6 (TFT-008/010CCH2E1-M) H550D7VZABJ6 (TFT-012CCH2E1-M) H650D7KZAAJ6 (TFT-014/016CCH2E1-M)	
2	Heat exchanger		b3 - 40 - 64 TDFT-008/010/012CCH2E1-M) /	
3.	Water pump		APF25-12-130E FPWM1	AC 230V 50Hz
4	4-way valve		SHF -9H -35U -P(TFT-008/010CCH2E1-M) -2291(TFT-012/014/016CCH2E1-M)	AC 230V 50Hz
5	Electronic expansion valve		/	12V
6	Electric heater		/	AC 230V 50Hz TFT-008/010/012CCH2E1-M 3kW TFT-014/016CCH2E1-M 6kW
7	Economizer		/	/
8	Expansion tank		/	5L
9	Safety valve		/	>6 bar, Open
10	Exhaust valve		/	/
11	Filter		/	50 meshes

1.9 Exploded view and list of parts

1.9.1 TFT-008CCH2E1-M



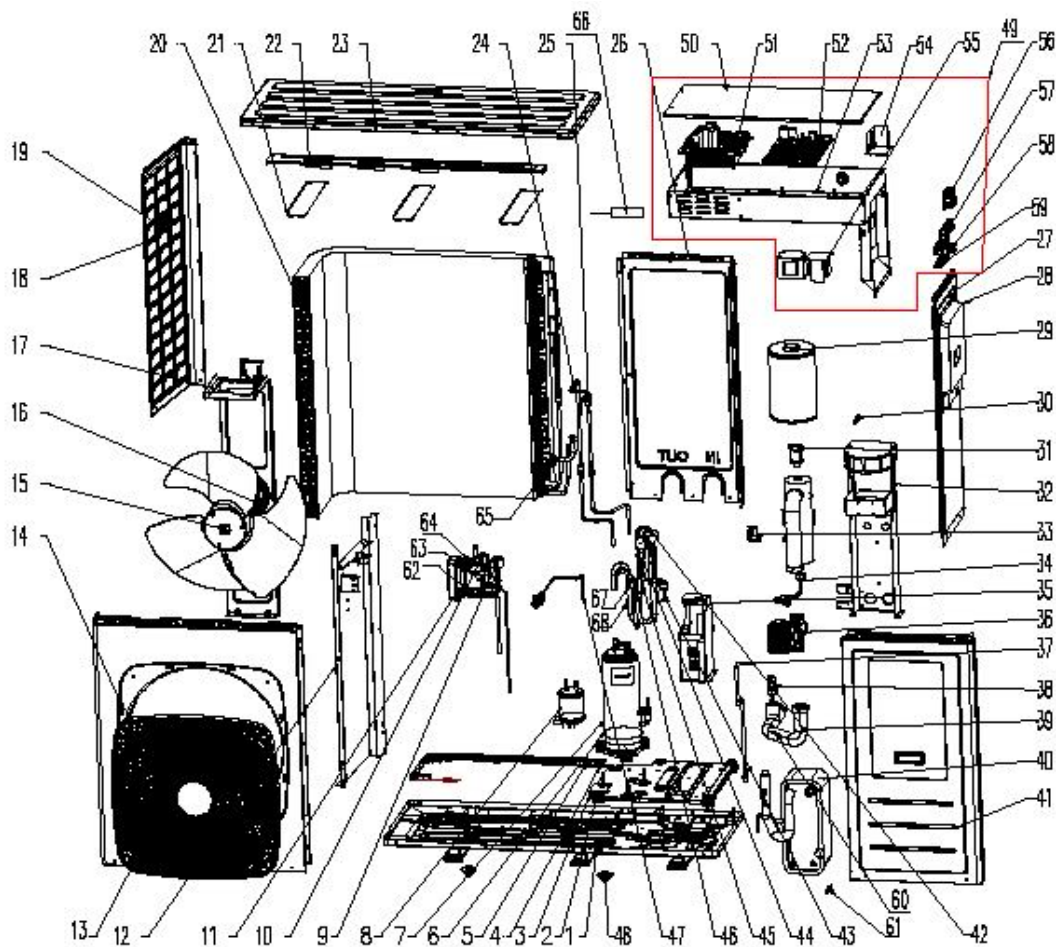
TFT-008CCH2E1-M list of parts

Table 6			
No.	Spare parts code	Spare parts description in English	Qty
1	0040817665	Chassis	1
2	0040111114	Platen	1
3	0040817664	Compressor Chassis	1
4	0040403339	Deicing electric heating belt	1
5	0040110945	M type clamp	5
6	0040403337	Compressor heating strip	1
7	0040703630	Compressor	1
8	0040703632	Reservoir	1
9	0040701054	Auxiliary circuit electronic expansion valve	1
10	0040701371	Main circuit electronic expansion valve	1
11	0040703952	Economizer	1
12	0040111535	Partition	1
13	0040207366	Grille	1
14	0040817659	Front cover	1

15	0040205900	Fan	1
16	0040403198	Motor	1
17	0040110837	Motor Bracket	1
18	0040817663	Protective net	1
19	0040203295A	Handle	1
20	0040703737	Evaporator	1
21	0040110993	Bracket	1
22	0040111530	Platen	1
23	0040817637	Cover	1
26	0040817660	Rear panel	1
27	0040817662	Right panel	1
28	0040206920	Terminal box cover	1
29	0040815767	Expansion tank	1
30	0040402999	Water outlet temperature sensor	1
31	0040110790	Exhaust valve	1
32	0040111529	Heat Exchanger Bracke	1
33	0040816382	Safety Valve	1
34	0040703851	Copper tube	1
35	0040206919	Pump foam	1
36	0040403141	Pump	1
37	0040800455A	Drain-pipe	1
38	0040403338	Water flow switch	1
39	0040703854	Outlet pipe	1
40	0040703631	Heat Exchanger	1
41	0040817661	Front panel	1
42	0010757602E	4-Way Valve	1
43	0040401812	Low pressure switch	1
44	0040703949	High pressure sensor	1
45	0040403411	High pressure switch	1
46	0040703948	Low pressure sensor	1
47	0010705987B	2-Way Valve	1
48	0040205894	Drainage elbow	2
49	0040816154	Electric control box assembly	1
50	0040817667	Electric control box cover	1
51	0041801478A	Drive board	1
52	0041801506A	Main control board	1
53	0040817668	Electric control box sheet Metal	1
54	0040402741	Reactor	2
55	0040402616	Terminal Block	1
56	0150402224	Terminal Block	2
57	001A5745116	Clamp	3
58	0040206646	Clamp	1
59	0040403410	Reactor	1

60	0040403395	Water outlet 2 temperature sensor	1
61	0040402999	Water inlet temperature sensor	1
62	0040402641	Auxiliary circuit inlet temperature sensor	1
63	0040403397	Condensation temperature sensor	1
64	0040402642	Auxiliary circuit outlet temperature sensor	1
65	0040402518	Defrost temperature sensor	1
66	0040401467A	Ambient Temperature Sensor	1
67	0040402668C	Discharge Temperature Sensor	1
68	0040402671D	Suction temperature sensor	1

1.9.2 TFT-010CCH2E1-M



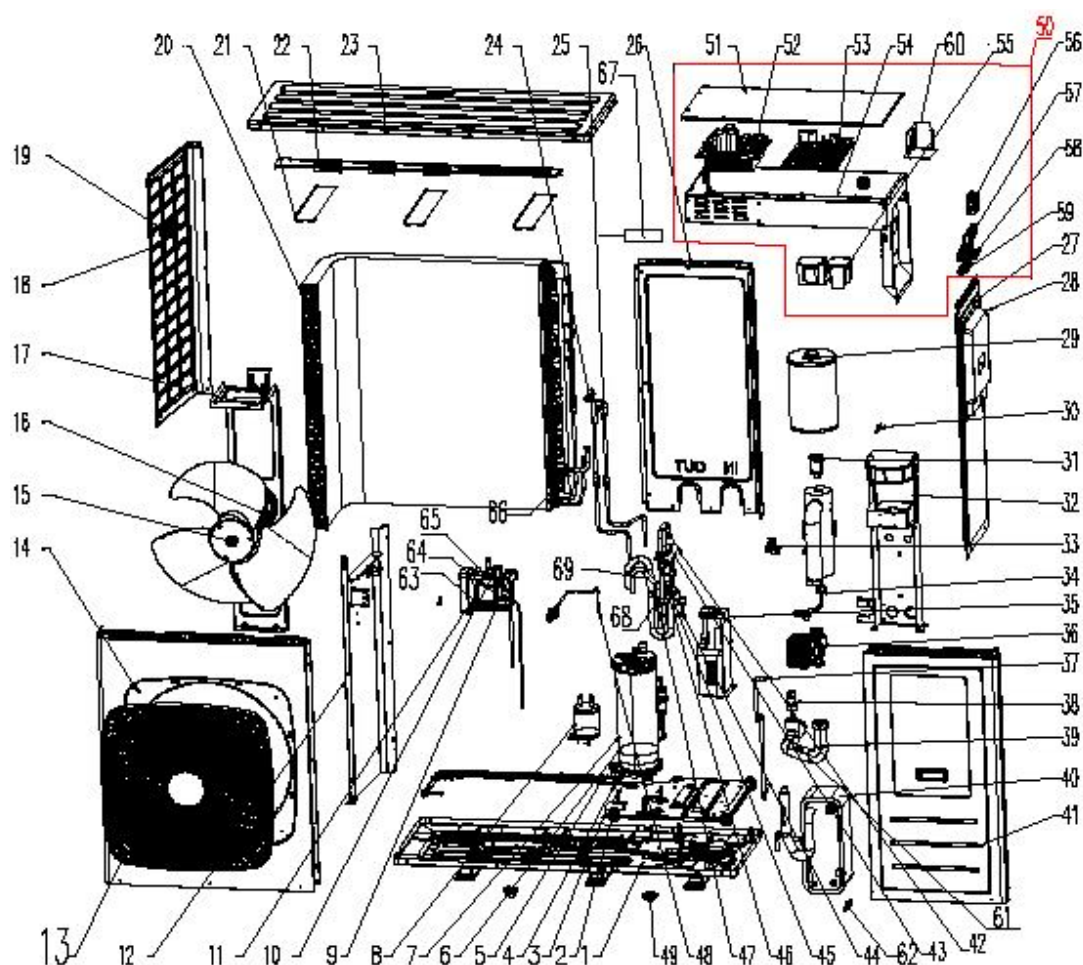
TFT-010CCH2E1-M list of parts

Table 7			
No.	Spare parts code	Spare parts description in English	Qty
1	0040817665	Chassis	1
2	0040111114	Platen	1
3	0040817664	Compressor Chassis	1
4	0040403339	Deicing electric heating belt	1
5	0040110945	M type clamp	5
6	0040403337	Compressor heating strip	1
7	0040703630	Compressor	1

8	0040703632	Reservoir	1
9	0040701054	Auxiliary circuit electronic expansion valve	1
10	0040701371	Main circuit electronic expansion valve	1
11	0040703952	Economizer	1
12	0040111535	Partition	1
13	0040207366	Grille	1
14	0040817659	Front cover	1
15	0040205900	Fan	1
16	0040403198	Motor	1
17	0040110837	Motor Bracket	1
18	0040817663	Protective net	1
19	0040203295A	Handle	1
20	0040703737	Evaporator	1
21	0040110993	Bracket	1
22	0040111530	Platen	1
23	0040817637	Cover	1
26	0040817660	Rear panel	1
27	0040817662	Right panel	1
28	0040206920	Terminal box cover	1
29	0040815767	Expansion tank	1
30	0040402999	Water outlet temperature sensor	1
31	0040110790	Exhaust valve	1
32	0040111529	Heat Exchanger Bracke	1
33	0040816382	Safety Valve	1
34	0040703851	Copper tube	1
35	0040206919	Pump foam	1
36	0040403141	Pump	1
37	0040800455A	Drain-pipe	1
38	0040403338	Water flow switch	1
39	0040703854	Outlet pipe	1
40	0040703631	Heat Exchanger	1
41	0040817661	Front panel	1
42	0010757602E	4-Way Valve	1
43	0040401812	Low pressure switch	1
44	0040703949	High pressure sensor	1
45	0040403411	High pressure switch	1
46	0040703948	Low pressure sensor	1
47	0010705987B	2-Way Valve	1
48	0040205894	Drainage elbow	2
49	0040816154	Electric control box assembly	1
50	0040817667	Electric control box cover	1
51	0041801478A	Drive board	1
52	0041801506A	Main control board	1

53	0040817668	Electric control box sheet Metal	1
54	0040402741	Reactor	2
55	0040402616	Terminal Block	1
56	0150402224	Terminal Block	2
57	001A5745116	Clamp	3
58	0040206646	Clamp	1
59	0040403410	Reactor	1
60	0040403395	Water outlet 2 temperature sensor	1
61	0040402999	Water inlet temperature sensor	1
62	0040402641	Auxiliary circuit inlet temperature sensor	1
63	0040403397	Condensation temperature sensor	1
64	0040402642	Auxiliary circuit outlet temperature sensor	1
65	0040402518	Defrost temperature sensor	1
66	0040401467A	Ambient Temperature Sensor	1
67	0040402668C	Discharge Temperature Sensor	1
68	0040402671D	Suction temperature sensor	1

1.9.3 TFT-012CCH2E1-M



TFT-012CCH2E1-M list of parts

Table 8			
No.	Spare parts code	Spare parts description in English	Qty
1	0040817665	Chassis	1
2	0040111114	Platen	1
3	0040817664	Compressor Chassis	1
4	0040403339	Deicing electric heating belt	1
5	0040110945	M type clamp	5
6	0040403337	Compressor heating strip	1
7	0040703630	Compressor	1
8	0040703632	Reservoir	1
9	0040701054	Auxiliary circuit electronic expansion valve	1
10	0040701371	Main circuit electronic expansion valve	1
11	0040703952	Economizer	1
12	0040111535	Partition	1
13	0040207366	Grille	1
14	0040817659	Front cover	1
15	0040205900	Fan	1
16	0040403198	Motor	1
17	0040110837	Motor Bracket	1
18	0040817663	Protective net	1
19	0040203295A	Handle	1
20	0040703737	Evaporator	1
21	0040110993	Bracket	1
22	0040111530	Platen	1
23	0040817637	Cover	1
26	0040817660	Rear panel	1
27	0040817662	Right panel	1
28	0040206920	Terminal box cover	1
29	0040815767	Expansion tank	1
30	0040402999	Water outlet temperature sensor	1
31	0040110790	Exhaust valve	1
32	0040111529	Heat Exchanger Bracke	1
33	0040816382	Safty Valve	1
34	0040703851	Copper tube	1
35	0040206919	Pump foam	1
36	0040403141	Pump	1
37	0040800455A	Drain-pipe	1
38	0040403338	Water flow switch	1
39	0040703854	Outlet pipe	1
40	0040703631	Heat Exchanger	1
41	0040817661	Front panel	1
42	0010757602E	4-Way Valve	1

43	0040401812	Low pressure switch	1
44	0040703949	High pressure sensor	1
45	0040403411	High pressure switch	1
46	0040703948	Low pressure sensor	1
47	0010705987B	2-Way Valve	1
48	0040205894	Drainage elbow	2
49	0040816153	Electric control box assembly	1
50	0040817667	Electric control box cover	1
51	0041801478A	Drive board	1
52	0041801506A	Main control board	1
53	0040817668	Electric control box sheet Metal	1
54	0040402741	Reactor	2
55	0040402616	Terminal Block	1
56	0150402224	Terminal Block	2
57	001A5745116	Clamp	3
58	0040206646	Clamp	1
59	0040403410	Reactor	1
60	0040403395	Water outlet 2 temperature sensor	1
61	0040402999	Water inlet temperature sensor	1
62	0040402641	Auxiliary circuit inlet temperature sensor	1
63	0040403397	Condensation temperature sensor	1
64	0040402642	Auxiliary circuit outlet temperature sensor	1
65	0040402518	Defrost temperature sensor	1
66	0040401467A	Ambient Temperature Sensor	1
67	0040402668C	Discharge Temperature Sensor	1
68	0040402671D	Suction temperature sensor	1

1.9.4 TFT-014CCH2E1-M

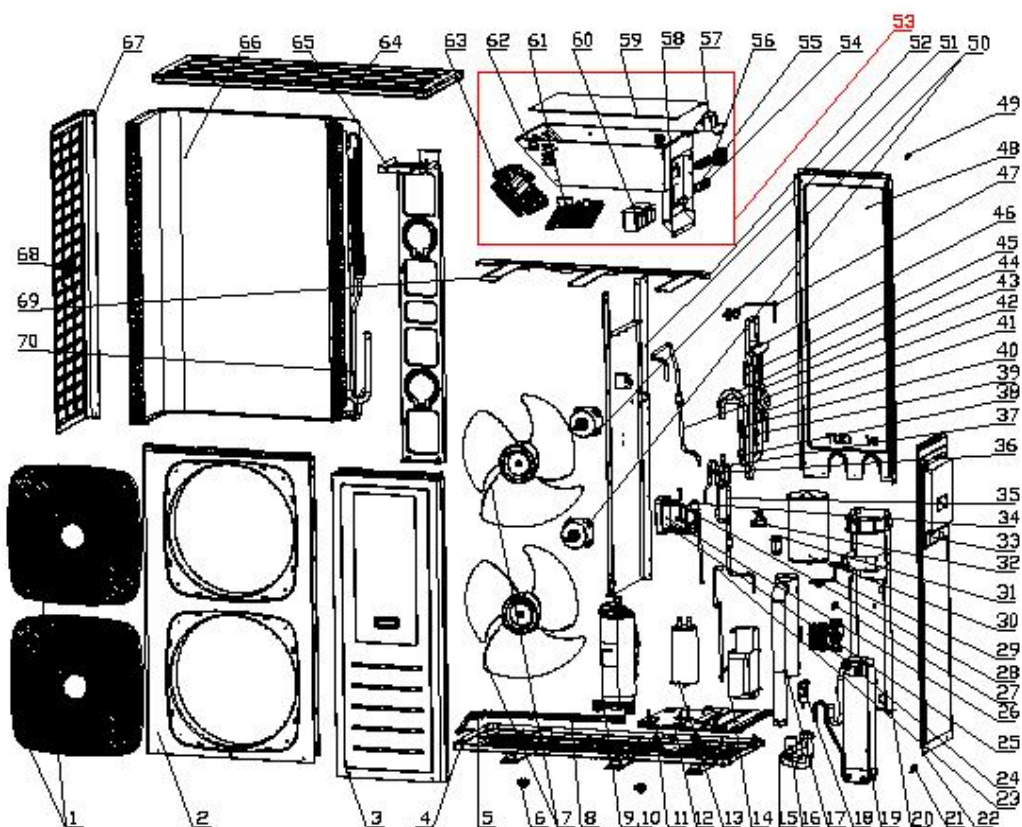


Table 9

No.	Spare parts code	Spare parts description in English	Qty
1	0040207365	Grille	1
2	0040817726	Front cover	1
3	0040817727	Front panel	1
4	0040817665	Chassis	1
5	0040403339	Deicing electric heating belt	1
6	0040205894	Drainage elbow	2
7	0040205893	Fan	2
8	0040110945	M type clamp	5
9	0040402899	Compressor heating strip	1
10	0040703950	Compressor	1
11	0040111114	Platen	1
12	0040817666	Compressor Chassis	1
13	0040703931	Reservoir	1
14	0040206919	Pump foam	1
15	0040703854	Outlet pipe	1
16	0040403395	Water outlet 2 temperature sensor	1
17	0040403326	Electric heating of pipes	1
18	0040403352	Water flow switch	1
19	0040703951	Heat Exchanger	1
20	0040111580	Heat Exchanger Bracke	1

21	0040402999	Water inlet temperature sensor	1
22	0040817728	Right panel	1
23	0040800455A	Drain-pipe	1
24	0040403141	Pump	1
25	0040402641	Auxiliary circuit inlet temperature sensor	1
26	0040703952	Economizer	1
27	0040402999	Water outlet temperature sensor	1
28	0040402642	Auxiliary circuit outlet temperature sensor	1
29	0040703851	Copper tube	1
30	0040815767	Expansion tank	1
31	0040110790	Exhaust valve	1
32	0040816382	Safety Valve	1
33	0040206920	Terminal box cover	1
34	0040701731A	Auxiliary circuit electronic expansion valve	1
35	0040704258	One-way flow control valve	1
36	0040403397	Condensation temperature sensor	1
37	0040700293	Main circuit electronic expansion valve	1
38	0040703949	High pressure sensor	1
39	0040703948	Low pressure sensor	1
40	0040403411	High pressure switch	1
41	0040401812	Low pressure switch	1
42	0040704261	Reservoir tube assembly	1
43	0040402668C	Discharge Temperature Sensor	1
44	0040402671D	Suction temperature sensor	1
45	0040703997	Service valve	2
46	0040703094	4-Way Valve	1
47	0010705987B	2-Way Valve	1
48	0040817730	Rear panel	1
49	0040401467A	Ambient Temperature Sensor	1
50	0040403324	Motor	2
51	0040111581	Partition	1
52	0040111530	Platen	1
53	0040816495	Electric control box assembly	1
54	0040206646	Clamp	1
55	0150402224	Terminal Block	2
56	0040402616	Terminal Block	1
57	0040403410	Reactor	1
58	001A5745116	Clamp	3
59	0040817732	Electric control box cover	1
60	0040402741	Reactor	2
61	0041801506	Main control board	1
62	0040111232	Electric control box sheet Metal	1
63	0041801478	Drive board	1

64	0040817637	Cover	1
65	0040111231	Motor Bracket	1
66	0040703966	Evaporator	1
67	0040817733	Protective net	1
68	0040203295A	Handle	1
69	0040110993	Bracket	3
70	0040402518	Defrost temperature sensor	1

1.9.5 TFT-016CCH2E1-M

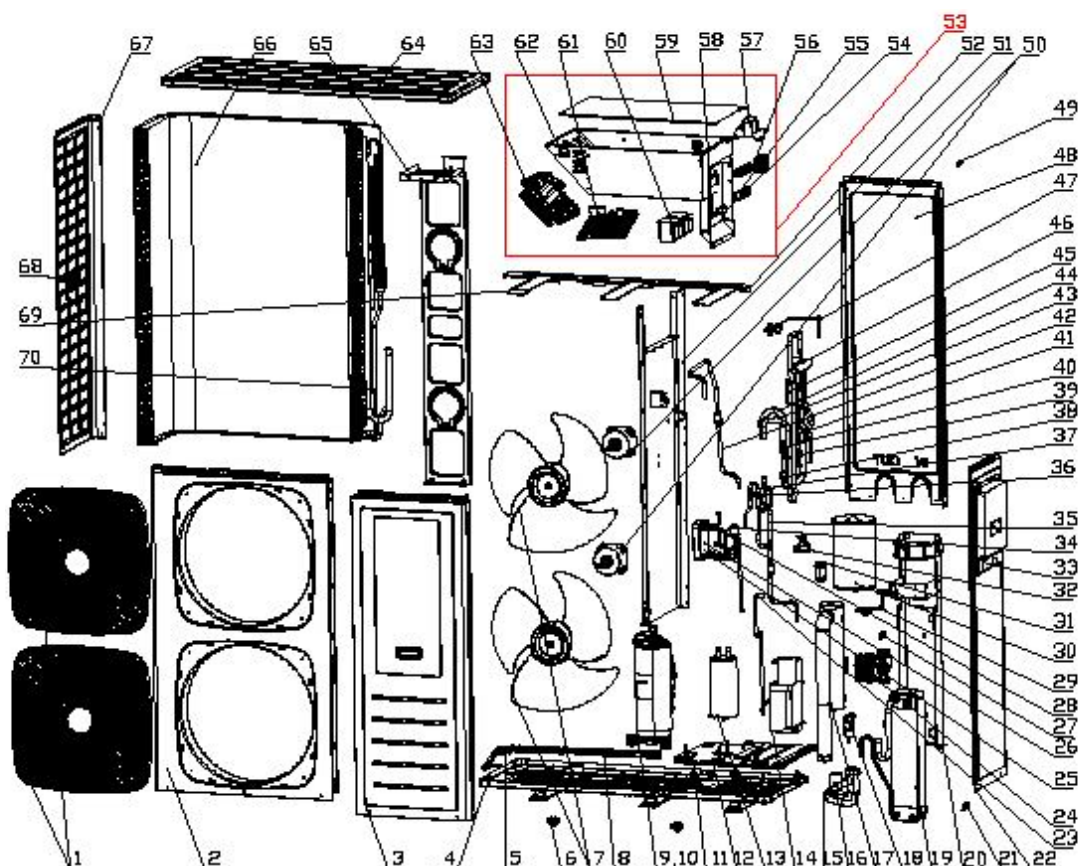


Table 10			
No.	Spare parts code	Spare parts description in English	Qty
1	0040207365	Grille	1
2	0040817726	Front cover	1
3	0040817727	Front panel	1
4	0040817665	Chassis	1
5	0040403339	Deicing electric heating belt	1
6	0040205894	Drainage elbow	2
7	0040205893	Fan	2

8	0040110945	M type clamp	5
9	0040402899	Compressor heating strip	1
10	0040703950	Compressor	1
11	0040111114	Platen	1
12	0040817666	Compressor Chassis	1
13	0040703931	Reservoir	1
14	0040206919	Pump foam	1
15	0040703854	Outlet pipe	1
16	0040403395	Water outlet 2 temperature sensor	1
17	0040403326	Electric heating of pipes	1
18	0040403352	Water flow switch	1
19	0040703951	Heat Exchanger	1
20	0040111580	Heat Exchanger Bracke	1
21	0040402999	Water inlet temperature sensor	1
22	0040817728	Right panel	1
23	0040800455A	Drain-pipe	1
24	0040403141	Pump	1
25	0040402641	Auxiliary circuit inlet temperature sensor	1
26	0040703952	Economizer	1
27	0040402999	Water outlet temperature sensor	1
28	0040402642	Auxiliary circuit outlet temperature sensor	1
29	0040703851	Copper tube	1
30	0040815767	Expansion tank	1
31	0040110790	Exhaust valve	1
32	0040816382	Safty Valve	1
33	0040206920	Terminal box cover	1
34	0040701731A	Auxiliary circuit electronic expansion valve	1
35	0040704258	One-way flow control valve	1
36	0040403397	Condensation temperature sensor	1
37	0040700293	Main circuit electronic expansion valve	1
38	0040703949	High pressure sensor	1
39	0040703948	Low pressure sensor	1
40	0040403411	High pressure switch	1
41	0040401812	Low pressure switch	1
42	0040704261	Reservoir tube assembly	1
43	0040402668C	Discharge Temperature Sensor	1
44	0040402671D	Suction temperature sensor	1
45	0040703997	Service valve	2
46	0040703094	4-Way Valve	1
47	0010705987B	2-Way Valve	1
48	0040817730	Rear panel	1
49	0040401467A	Ambient Temperature Sensor	1
50	0040403324	Motor	2

51	0040111581	Partition	1
52	0040111530	Platen	1
53	0040816495	Electric control box assembly	1
54	0040206646	Clamp	1
55	0150402224	Terminal Block	2
56	0040402616	Terminal Block	1
57	0040403410	Reactor	1
58	001A5745116	Clamp	3
59	0040817732	Electric control box cover	1
60	0040402741	Reactor	2
61	0041801506D	Main control board	1
62	0040111232	Electric control box sheet Metal	1
63	0041801478	Drive board	1
64	0040817637	Cover	1
65	0040111231	Motor Bracket	1
66	0040703966	Evaporator	1
67	0040817733	Protective net	1
68	0040203295A	Handle	1
69	0040110993	Bracket	3
70	0040402518	Defrost temperature sensor	1

1.10 Unit capacity data table

1.10.1 Unit heating capacity correction (Practical heating capacity = Nominal heating capacity× Heating capacity correction coefficient)

Table 11																						
TFT-008CCH2E1-M																						
Ambient temperature/ °C	Water outlet temperature °C																					
	25		30		35		40		45		50		55		60		65		70		75	
	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP
-30	5.03	2.50	5.00	2.30	4.97	2.10	4.94	1.88	4.91	1.66	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
-25	5.83	2.73	5.80	2.55	5.77	2.36	5.74	2.14	5.71	1.91	5.70	1.80	5.69	1.68	NG	NG	NG	NG	NG	NG	NG	NG
-20	6.63	2.97	6.60	2.79	6.57	2.62	6.54	2.39	6.51	2.16	6.51	1.99	6.51	1.82	6.28	1.76	6.06	1.69	NG	NG	NG	NG
-15	7.43	3.20	7.40	3.04	7.37	2.88	7.34	2.65	7.31	2.41	7.29	2.19	7.26	1.96	7.23	1.88	7.20	1.80	6.97	1.63	6.57	1.40
-10	7.99	3.77	7.96	3.55	7.93	3.33	7.90	3.03	7.87	2.73	7.84	2.47	7.82	2.22	7.70	2.08	7.58	1.95	7.24	1.73	6.90	1.51
-7	8.32	4.11	8.29	3.85	8.26	3.60	8.24	3.26	8.21	2.92	8.18	2.65	8.15	2.37	7.98	2.20	7.80	2.03	7.45	1.81	7.09	1.58
-5	8.55	4.34	8.52	4.06	8.49	3.78	8.46	3.41	8.43	3.04	8.40	2.76	8.37	2.48	8.16	2.28	7.95	2.09	7.59	1.86	7.22	1.63
0	9.10	4.90	9.08	4.56	9.05	4.22	9.02	3.79	8.99	3.36	8.96	3.05	8.93	2.74	8.63	2.49	8.33	2.24	7.94	1.99	7.55	1.74
2	9.33	5.13	9.30	4.77	9.27	4.40	9.24	3.94	9.21	3.48	9.18	3.16	9.16	2.84	8.82	2.57	8.48	2.29	8.08	2.04	7.68	1.79
5	9.66	5.47	9.63	5.07	9.61	4.67	9.58	4.17	9.55	3.67	9.52	3.34	9.49	3.00	9.10	2.69	8.71	2.38	8.29	2.12	7.87	1.85
7	10.00	5.70	9.97	5.28	9.94	4.85	9.91	4.33	9.89	3.80	9.86	3.45	9.83	3.10	9.34	2.77	8.86	2.44	8.43	2.17	8.00	1.90
10	10.28	6.91	10.24	6.35	10.21	5.80	10.18	5.05	10.15	4.30	10.11	3.86	10.08	3.41	9.54	3.03	9.01	2.66	8.56	2.33	8.11	2.00
15	10.74	8.93	10.70	8.15	10.66	7.37	10.62	6.26	10.58	5.14	10.54	4.53	10.50	3.92	9.88	3.47	9.25	3.02	8.78	2.60	8.30	2.18
20	11.20	10.96	11.15	9.95	11.11	8.95	11.06	7.46	11.02	5.98	10.97	5.21	10.93	4.43	10.21	3.91	9.50	3.38	8.99	2.87	8.48	2.35
25	11.66	12.98	11.60	11.75	11.55	10.52	11.50	8.67	11.45	6.81	11.40	5.88	11.35	4.95	10.55	4.35	9.75	3.75	9.21	3.14	8.67	2.53
30	NG	NG	12.06	13.55	12.00	12.10	11.94	9.88	11.89	7.65	11.83	6.56	11.77	5.46	10.89	4.79	10.00	4.11	9.43	3.41	NG	NG
35	NG	NG	NG	NG	12.45	13.68	12.38	11.08	12.32	8.49	12.26	7.23	12.19	5.97	11.22	5.22	10.25	4.47	NG	NG	NG	NG
TFT-010CCH2E1-M																						
Ambient temperature	Water outlet temperature °C																					
	25		30		35		40		45		50		55		60		65		70		75	

ature/ °C	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP
-30	6.29	2.38	6.25	2.19	6.21	2.00	6.18	1.79	6.14	1.58	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
-25	7.29	2.60	7.25	2.42	7.21	2.24	7.18	2.03	7.14	1.81	7.13	1.71	7.11	1.60	NG	NG	NG	NG	NG	NG	NG	NG
-20	8.29	2.82	8.25	2.65	8.21	2.49	8.18	2.27	8.14	2.05	8.14	1.89	8.14	1.73	7.85	1.67	7.57	1.61	NG	NG	NG	NG
-15	9.29	3.04	9.25	2.89	9.21	2.74	9.18	2.51	9.14	2.29	9.11	2.08	9.07	1.86	9.04	1.79	9.00	1.71	8.71	1.55	8.21	1.33
-10	9.98	3.58	9.95	3.37	9.91	3.16	9.88	2.88	9.84	2.59	9.81	2.35	9.77	2.11	9.62	1.98	9.47	1.85	9.05	1.64	8.62	1.44
-7	10.40	3.90	10.37	3.66	10.33	3.42	10.30	3.09	10.26	2.77	10.22	2.51	10.19	2.26	9.97	2.09	9.75	1.93	9.31	1.72	8.86	1.50
-5	10.68	4.12	10.65	3.85	10.61	3.59	10.57	3.24	10.54	2.89	10.50	2.62	10.47	2.35	10.20	2.17	9.94	1.99	9.48	1.77	9.03	1.55
0	11.38	4.66	11.34	4.34	11.31	4.01	11.27	3.60	11.24	3.19	11.20	2.90	11.17	2.60	10.79	2.36	10.41	2.12	9.92	1.89	9.43	1.65
2	11.66	4.88	11.62	4.53	11.59	4.18	11.55	3.75	11.52	3.31	11.48	3.00	11.45	2.70	11.02	2.44	10.60	2.18	10.10	1.94	9.59	1.70
5	12.08	5.20	12.04	4.82	12.01	4.44	11.97	3.96	11.94	3.49	11.90	3.17	11.86	2.85	11.37	2.55	10.88	2.26	10.36	2.01	9.84	1.76
7	12.50	5.42	12.46	5.01	12.43	4.61	12.39	4.11	12.36	3.61	12.32	3.28	12.29	2.95	11.68	2.63	11.07	2.32	10.54	2.06	10.00	1.81
10	12.85	6.57	12.80	6.04	12.76	5.51	12.72	4.80	12.68	4.09	12.64	3.66	12.60	3.24	11.93	2.88	11.26	2.52	10.70	2.21	10.14	1.90
15	13.42	8.49	13.37	7.75	13.32	7.00	13.27	5.94	13.23	4.88	13.18	4.30	13.13	3.72	12.35	3.30	11.57	2.87	10.97	2.47	10.37	2.07
20	13.99	10.41	13.94	9.45	13.88	8.50	13.83	7.09	13.77	5.68	13.71	4.94	13.66	4.21	12.77	3.71	11.88	3.21	11.24	2.72	10.61	2.23
25	14.57	12.33	14.50	11.16	14.44	10.00	14.38	8.23	14.31	6.47	14.25	5.59	14.19	4.70	13.19	4.13	12.19	3.56	11.51	2.98	10.84	2.40
30	NG	NG	15.07	12.87	15.00	11.50	14.93	9.38	14.86	7.27	14.79	6.23	14.71	5.19	13.61	4.55	12.50	3.90	11.79	3.23	NG	NG
35	NG	NG	NG	NG	15.56	12.99	15.48	10.53	15.40	8.06	15.32	6.87	15.24	5.67	14.03	4.96	12.81	4.25	NG	NG	NG	NG
TFT-012CCH2E1-M																						
Ambie nt temper ature/ °C	Water outlet temperature °C																					
	25		30		35		40		45		50		55		60		65		70		75	
	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP	Heating capacit y	COP
-30	7.54	2.44	7.50	2.24	7.46	2.05	7.41	1.83	7.37	1.62	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
-25	8.74	2.66	8.70	2.48	8.66	2.30	8.61	2.08	8.57	1.86	8.55	1.75	8.54	1.64	NG	NG	NG	NG	NG	NG	NG	NG
-20	9.94	2.89	9.90	2.72	9.86	2.55	9.81	2.33	9.77	2.11	9.77	1.94	9.76	1.77	9.42	1.71	9.09	1.65	NG	NG	NG	NG
-15	11.14	3.12	11.10	2.96	11.06	2.81	11.01	2.58	10.97	2.35	10.93	2.13	10.89	1.91	10.84	1.83	10.80	1.76	10.46	1.59	9.86	1.37
-10	11.98	3.67	11.94	3.46	11.89	3.24	11.85	2.95	11.81	2.66	11.77	2.41	11.72	2.16	11.54	2.03	11.36	1.90	10.85	1.69	10.34	1.48

-7	12.48	4.01	12.44	3.76	12.40	3.51	12.35	3.17	12.31	2.84	12.27	2.58	12.23	2.32	11.96	2.15	11.70	1.98	11.17	1.76	10.64	1.54
-5	12.82	4.23	12.78	3.95	12.73	3.68	12.69	3.32	12.65	2.97	12.60	2.69	12.56	2.42	12.25	2.23	11.93	2.04	11.38	1.81	10.83	1.59
0	13.66	4.78	13.61	4.45	13.57	4.12	13.53	3.70	13.48	3.27	13.44	2.97	13.40	2.67	12.95	2.42	12.49	2.18	11.91	1.94	11.32	1.70
2	13.99	5.00	13.95	4.65	13.91	4.29	13.86	3.84	13.82	3.40	13.78	3.08	13.73	2.77	13.23	2.50	12.72	2.24	12.12	1.99	11.51	1.74
5	14.49	5.34	14.45	4.94	14.41	4.55	14.37	4.07	14.32	3.58	14.28	3.25	14.24	2.92	13.65	2.62	13.06	2.32	12.43	2.07	11.81	1.81
7	15.00	5.56	14.96	5.14	14.91	4.73	14.87	4.22	14.83	3.71	14.79	3.36	14.74	3.02	14.01	2.70	13.29	2.38	12.64	2.12	12.00	1.85
10	15.41	6.74	15.37	6.20	15.32	5.65	15.27	4.92	15.22	4.19	15.17	3.76	15.12	3.32	14.32	2.96	13.51	2.59	12.84	2.27	12.17	1.95
15	16.10	8.71	16.05	7.95	15.99	7.19	15.93	6.10	15.87	5.01	15.81	4.42	15.76	3.82	14.82	3.38	13.88	2.95	13.16	2.53	12.45	2.12
20	16.79	10.68	16.73	9.70	16.66	8.72	16.59	7.28	16.52	5.83	16.46	5.07	16.39	4.32	15.32	3.81	14.26	3.30	13.49	2.80	12.73	2.29
25	17.48	12.65	17.41	11.46	17.33	10.26	17.25	8.45	17.18	6.64	17.10	5.73	17.02	4.82	15.83	4.24	14.63	3.65	13.82	3.06	13.01	2.46
30	NG	NG	18.09	13.21	18.00	11.80	17.91	9.63	17.83	7.46	17.74	6.39	17.66	5.32	16.33	4.67	15.00	4.01	14.14	3.32	NG	NG
35	NG	NG	NG	NG	18.67	13.33	18.58	10.80	18.48	8.28	18.39	7.05	18.29	5.82	16.83	5.09	15.37	4.36	NG	NG	NG	NG
TFT-014CCH2E1-M																						
Ambient temperature/ °C	Water outlet temperature °C																					
	25		30		35		40		45		50		55		60		65		70		75	
	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP
-30	8.80	2.50	8.75	2.30	8.70	2.10	8.65	1.88	8.60	1.66	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
-25	10.20	2.73	10.15	2.55	10.10	2.36	10.05	2.14	10.00	1.91	9.98	1.80	9.96	1.68	NG	NG	NG	NG	NG	NG	NG	NG
-20	11.60	2.97	11.55	2.79	11.50	2.62	11.45	2.39	11.40	2.16	11.40	1.99	11.39	1.82	11.00	1.76	10.60	1.69	NG	NG	NG	NG
-15	13.00	3.20	12.95	3.04	12.90	2.88	12.85	2.65	12.80	2.41	12.75	2.19	12.70	1.96	12.65	1.88	12.60	1.80	12.20	1.63	11.50	1.40
-10	13.98	3.77	13.93	3.55	13.88	3.33	13.83	3.03	13.78	2.73	13.73	2.47	13.68	2.22	13.47	2.08	13.26	1.95	12.66	1.73	12.07	1.51
-7	14.56	4.11	14.51	3.85	14.46	3.60	14.41	3.26	14.36	2.92	14.31	2.65	14.26	2.37	13.96	2.20	13.65	2.03	13.03	1.81	12.41	1.58
-5	14.95	4.34	14.90	4.06	14.85	3.78	14.80	3.41	14.75	3.04	14.70	2.76	14.65	2.48	14.29	2.28	13.92	2.09	13.28	1.86	12.64	1.63
0	15.93	4.90	15.88	4.56	15.83	4.22	15.78	3.79	15.73	3.36	15.68	3.05	15.63	2.74	15.10	2.49	14.58	2.24	13.89	1.99	13.21	1.74
2	16.32	5.13	16.27	4.77	16.22	4.40	16.17	3.94	16.12	3.48	16.07	3.16	16.02	2.84	15.43	2.57	14.84	2.29	14.14	2.04	13.43	1.79
5	16.91	5.47	16.86	5.07	16.81	4.67	16.76	4.17	16.71	3.67	16.66	3.34	16.61	3.00	15.92	2.69	15.24	2.38	14.50	2.12	13.77	1.85
7	17.50	5.70	17.45	5.28	17.40	4.85	17.35	4.33	17.30	3.80	17.25	3.45	17.20	3.10	16.35	2.77	15.50	2.44	14.75	2.17	14.00	1.90

10	17.98	6.91	17.93	6.35	17.87	5.80	17.81	5.05	17.76	4.30	17.70	3.86	17.64	3.41	16.70	3.03	15.76	2.66	14.98	2.33	14.20	2.00
15	18.79	8.93	18.72	8.15	18.65	7.37	18.58	6.26	18.52	5.14	18.45	4.53	18.38	3.92	17.29	3.47	16.20	3.02	15.36	2.60	14.52	2.18
20	19.59	10.96	19.51	9.95	19.43	8.95	19.36	7.46	19.28	5.98	19.20	5.21	19.12	4.43	17.88	3.91	16.63	3.38	15.74	2.87	14.85	2.35
25	20.40	12.98	20.31	11.75	20.22	10.52	20.13	8.67	20.04	6.81	19.95	5.88	19.86	4.95	18.46	4.35	17.07	3.75	16.12	3.14	15.17	2.53
30	NG	NG	21.10	13.55	21.00	12.10	20.90	9.88	20.80	7.65	20.70	6.56	20.60	5.46	19.05	4.79	17.50	4.11	16.50	3.41	NG	NG
35	NG	NG	NG	NG	21.78	13.68	21.67	11.08	21.56	8.49	21.45	7.23	21.34	5.97	19.64	5.22	17.94	4.47	NG	NG	NG	NG
TFT-016CCH2E1-M																						
Ambient temperature/ °C	Water outlet temperature °C																					
	25		30		35		40		45		50		55		60		65		70		75	
	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP	Heating capacity	COP
-30	10.06	2.44	10.00	2.24	9.94	2.05	9.89	1.83	9.83	1.62	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
-25	11.66	2.66	11.60	2.48	11.54	2.30	11.49	2.08	11.43	1.86	11.41	1.75	11.38	1.64	NG	NG	NG	NG	NG	NG	NG	NG
-20	13.26	2.89	13.20	2.72	13.14	2.55	13.09	2.33	13.03	2.11	13.02	1.94	13.02	1.77	12.57	1.71	12.11	1.65	NG	NG	NG	NG
-15	14.86	3.12	14.80	2.96	14.74	2.81	14.69	2.58	14.63	2.35	14.57	2.13	14.51	1.91	14.46	1.83	14.40	1.76	13.94	1.59	13.14	1.37
-10	15.97	3.67	15.92	3.46	15.86	3.24	15.80	2.95	15.75	2.66	15.69	2.41	15.63	2.16	15.39	2.03	15.15	1.90	14.47	1.69	13.79	1.48
-7	16.64	4.01	16.59	3.76	16.53	3.51	16.47	3.17	16.42	2.84	16.36	2.58	16.30	2.32	15.95	2.15	15.61	1.98	14.89	1.76	14.18	1.54
-5	17.09	4.23	17.03	3.95	16.98	3.68	16.92	3.32	16.86	2.97	16.81	2.69	16.75	2.42	16.33	2.23	15.91	2.04	15.17	1.81	14.44	1.59
0	18.21	4.78	18.15	4.45	18.09	4.12	18.04	3.70	17.98	3.27	17.92	2.97	17.87	2.67	17.26	2.42	16.66	2.18	15.88	1.94	15.09	1.70
2	18.65	5.00	18.60	4.65	18.54	4.29	18.48	3.84	18.43	3.40	18.37	3.08	18.31	2.77	17.64	2.50	16.96	2.24	16.16	1.99	15.35	1.74
5	19.33	5.34	19.27	4.94	19.21	4.55	19.15	4.07	19.10	3.58	19.04	3.25	18.98	2.92	18.20	2.62	17.41	2.32	16.58	2.07	15.74	1.81
7	20.00	5.56	19.94	5.14	19.89	4.73	19.83	4.22	19.77	3.71	19.71	3.36	19.66	3.02	18.69	2.70	17.71	2.38	16.86	2.12	16.00	1.85
10	20.55	6.74	20.49	6.20	20.42	5.65	20.36	4.92	20.29	4.19	20.23	3.76	20.16	3.32	19.09	2.96	18.01	2.59	17.12	2.27	16.22	1.95
15	21.47	8.71	21.39	7.95	21.32	7.19	21.24	6.10	21.16	5.01	21.09	4.42	21.01	3.82	19.76	3.38	18.51	2.95	17.55	2.53	16.60	2.12
20	22.39	10.68	22.30	9.70	22.21	8.72	22.12	7.28	22.03	5.83	21.94	5.07	21.85	4.32	20.43	3.81	19.01	3.30	17.99	2.80	16.97	2.29
25	23.31	12.65	23.21	11.46	23.10	10.26	23.00	8.45	22.90	6.64	22.80	5.73	22.70	4.82	21.10	4.24	19.50	3.65	18.42	3.06	17.34	2.46
30	NG	NG	24.11	13.21	24.00	11.80	23.89	9.63	23.77	7.46	23.66	6.39	23.54	5.32	21.77	4.67	20.00	4.01	18.86	3.32	NG	NG
35	NG	NG	NG	NG	24.89	13.33	24.77	10.80	24.64	8.28	24.51	7.05	24.39	5.82	22.44	5.09	20.50	4.36	NG	NG	NG	NG

1.10.2 Unit cooling capacity correction

Practical cooling capacity = Nominal cooling capacity × Cooling capacity correction coefficient

Table 12 TFT-008CCH2E1-M														
2														
Ambient temperature °C	Water outlet temperature °C													
	5		7		10		15		18		20		25	
	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER
10	6.86	6.04	7.22	6.28	7.77	6.75								
15	7.20	5.41	7.58	5.63	8.16	6.03	9.13	6.82						
20	7.54	4.78	7.94	4.97	8.54	5.30	9.55	5.96	10.00	6.36	10.63	6.70		
25	7.89	4.14	8.31	4.31	8.93	4.58	9.97	5.11	10.42	5.70	10.99	5.97	11.60	5.95
30	8.23	3.51	8.67	3.65	9.32	3.85	10.38	4.26	10.84	5.03	11.35	5.24	11.89	5.38
35	8.57	2.88	9.03	2.99	9.70	3.13	10.80	3.40	11.26	4.37	11.71	4.51	12.17	4.80
40	7.80	2.68	8.09	4.21	8.49	2.99	9.12	3.32	9.40	3.84	9.64	4.09	9.96	4.61
43	7.34	2.56	7.53	2.70	7.77	2.92	8.11	3.26	8.29	3.52	8.40	3.85	8.63	4.49
48	6.57	2.36	6.59	4.21	6.69	2.78	6.86	3.17	7.03	2.98	7.14	3.43	7.37	4.29
TFT-010CCH2E1-M														
Ambient temperature °C	Water outlet temperature °C													
	5		7		10		15		18		20		25	
	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER
10	8.57	5.92	9.02	6.16	9.71	6.62								
15	9.00	5.30	9.48	5.51	10.19	5.91	11.41	6.68						
20	9.43	4.68	9.93	4.87	10.68	5.19	11.94	5.84	12.38	6.10	13.15	6.24		
25	9.86	4.06	10.38	4.22	11.16	4.48	12.46	5.01	12.89	5.47	13.60	5.56	14.21	5.53
30	10.29	3.44	10.83	3.58	11.64	3.77	12.98	4.17	13.41	4.83	14.05	4.87	14.56	5.01
35	10.71	2.82	11.29	2.93	12.13	3.06	13.50	3.33	13.93	4.20	14.50	4.19	14.91	4.47
40	9.75	2.63	10.11	4.13	10.62	2.93	11.40	3.25	11.63	3.68	11.93	3.81	12.20	4.29

43	9.17	2.51	9.41	2.65	9.71	2.86	10.14	3.19	10.25	3.38	10.40	3.58	10.57	4.18
48	8.21	2.32	8.23	4.13	8.36	2.73	8.57	3.11	8.70	2.86	8.84	3.19	9.03	3.99
TFT-012CCH2E1-M														
Ambient temperat ure °C	Water outlet temperature °C													
	5		7		10		15		18		20		25	
	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER
10	10.29	5.44	10.83	5.61	11.65	5.96								
15	10.80	4.87	11.37	5.02	12.23	5.32	13.70	5.96						
20	11.31	4.30	11.91	4.43	12.81	4.68	14.32	5.21	14.55	5.50	15.31	5.74		
25	11.83	3.73	12.46	3.84	13.39	4.04	14.95	4.47	15.16	4.93	15.83	5.11	16.70	5.04
30	12.34	3.16	13.00	3.26	13.97	3.40	15.11	3.72	15.77	4.35	16.35	4.48	17.12	4.56
35	12.60	2.59	13.27	2.64	14.12	2.76	15.71	2.98	16.38	3.78	16.87	3.86	17.53	4.07
40	11.47	2.42	11.89	3.72	12.36	2.64	13.27	2.90	13.68	3.32	13.89	3.50	14.34	3.90
43	10.79	2.31	11.06	2.39	11.30	2.57	11.81	2.85	12.06	3.04	12.10	3.29	12.43	3.80
48	9.65	2.13	9.68	3.72	9.73	2.46	9.98	2.77	10.23	2.58	10.29	2.94	10.61	3.64
TFT-014CCH2E1-M														
Ambient temperat ure °C	Water outlet temperature °C													
	5		7		10		15		18		20		25	
	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER
10	12.00	6.30	12.63	6.55	13.60	7.04								
15	12.60	5.64	13.27	5.87	14.27	6.29	15.98	7.11						
20	13.20	4.98	13.90	5.18	14.95	5.53	16.71	6.22	17.50	6.63	18.60	6.99		
25	13.80	4.32	14.53	4.49	15.63	4.77	17.44	5.33	18.23	5.94	19.23	6.23	20.30	6.20
30	14.40	3.66	15.17	3.81	16.30	4.02	18.17	4.44	18.97	5.25	19.87	5.46	20.80	5.61
35	15.00	3.00	15.80	3.12	16.98	3.26	18.90	3.55	19.70	4.56	20.50	4.70	21.30	5.01
40	13.65	2.80	14.16	4.40	14.86	3.12	15.96	3.46	16.45	4.00	16.88	4.27	17.43	4.81

43	12.84	2.67	13.17	2.82	13.59	3.04	14.20	3.40	14.50	3.67	14.70	4.01	15.10	4.68
48	11.49	2.47	11.53	4.40	11.70	2.90	12.00	3.31	12.30	3.11	12.50	3.58	12.90	4.48
TFT-016CCH2E1-M														
Ambient temperat ure °C	Water outlet temperature °C													
	5		7		10		15		18		20		25	
	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER	Cooling capacity	EER
10	13.71	5.92	14.44	6.16	15.54	6.62								
15	14.40	5.30	15.16	5.51	16.31	5.91	18.26	6.68						
20	15.09	4.68	15.89	4.87	17.09	5.19	19.10	5.84	20.00	6.23	21.26	6.57		
25	15.77	4.06	16.61	4.22	17.86	4.48	19.93	5.01	20.84	5.58	21.98	5.85	23.20	5.82
30	16.46	3.44	17.33	3.58	18.63	3.77	20.77	4.17	21.68	4.93	22.71	5.13	23.77	5.27
35	17.14	2.82	18.06	2.93	19.41	3.06	21.60	3.33	22.51	4.28	23.43	4.41	24.34	4.71
40	15.60	2.63	16.18	4.13	16.99	2.93	18.24	3.25	18.80	3.76	19.29	4.01	19.91	4.51
43	14.67	2.51	15.05	2.65	15.53	2.86	16.23	3.19	16.57	3.45	16.80	3.77	17.26	4.40
48	13.13	2.32	13.18	4.13	13.37	2.73	13.71	3.11	14.06	2.92	14.29	3.36	14.74	4.20

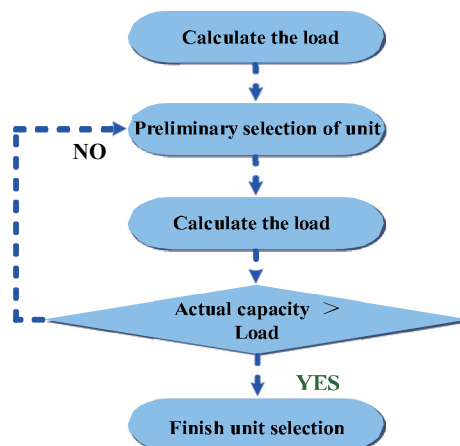
2. Model selection calculation

2.1 Design model selection

2.1.1 Calculating conditions of design model selection

Table 13	
Unit capacity and input power calculation under the condition of floor heating or cooling	
a.Cooling conditions	b.Heating conditions
Indoor water temperature 23°C/18°C;	Indoor water temperature 30°C/35°C;
Outdoor air temperature 35°C DB/24°C WB	Outdoor air temperature 7°C DB/6°C WB
Fan coil unit or radiator	
a.Cooling conditions	b.Heating conditions
Indoor water temperature 12°C/7°C;	Indoor water temperature 40°C/45°C;
Outdoor air temperature 35°C DB/24°C WB	Outdoor air temperature DB 7°C / WB 6°C

2.1.2 Unit model selection flow diagram



2.1.3 Design principles

- The cooling capacity of the unit $\geq$ Cooling load
- The heating capacity of the unit $\geq \max\{\text{heating load, floor heating load, hot water heating load}\}$
- Water tank: It should be selected according to the sanitary appliances or the quantity of users. Each unit can only accommodate a water tank.

2.2 Design and model selection of floor coil pipe

2.2.1 Calculation of unit load for floor heating

Table 14 Experience value of floor heating load per square meter	
House	
Dining Room	100 ~ 120 W/m ²
Mater Room	100 ~ 110 W/m ²
Guest Room	110 ~ 130 W/m ²
Study Room	90 ~ 110 W/m ²

Villa	
Dining Room	110 ~ 140 W/m ²
Mater Room	100 ~ 120 W/m ²
Guest Room	100 ~ 130 W/m ²
Study Room	100 ~ 120 W/m ²

Notes

- Villas of which the load is generally larger than that of the ho uses should take the value between the middle
- The top layer of which the load is generally larger than the middle or bottom layer should take the maximum empirical value.
- The guest room of which the load is generally much larger should take the value between the intermediate and the maximum empirical values listed above.
- For those of which the external walls or glass areas are large, it is recommended to take the load calculation.
- The heating load for the bathroom is generally 500W/room.

2.2.2 Selection for the pitch of underfloor coil tube

The pitch of underfloor coil tube depends on the tube material, the indoor design temperature, the supply water temperature and the material of the floor, which will directly affect the heat dissipation of the floor.

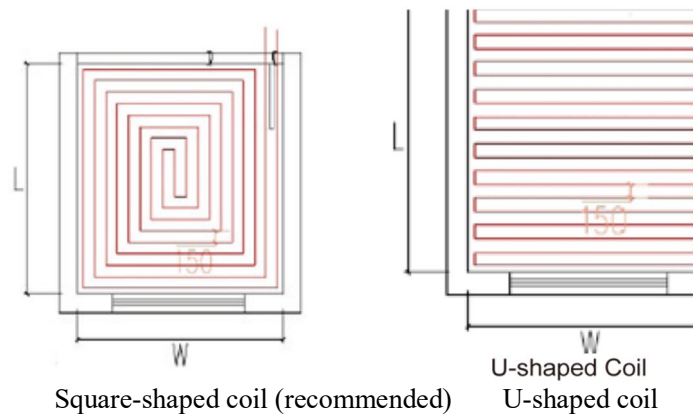
Table 15 Heat dissipation of commonly used coil tube (Tube material :PE-X, Indoor temperature:18°C, Average water temperature:45°C)					
Material of floor	Thermal resistance m ² ·K/W	Tube pitch mm	Heat dissipation W/m ²	Tube pitch mm	Heat dissipation W/m
Stone	0.02	200	147.0	150	159.8
Wood	0.075	200	111.2	150	117.8

The heat dissipation of underfloor coil tube should be greater than the load of the floor heating system; But the deviation value cannot be larger than 10%.

2.2.3 Selection of coil turns in each room

2.2.3.1 Type of underfloor coil tube

When selecting the floor coil, it is necessary to consider both its comfort and heating capacity. The most commonly used coil is shown below.



The computational method of coil tube length as follows:

Square-shaped coil tube: $= L \times W / \text{tube pitch} = \text{Area} / \text{tube pitch}$

U-shaped coil tube: $= L - 1 + L \times W / \text{tube pitch} = L - 1 + \text{Area} / \text{tube pitch}$

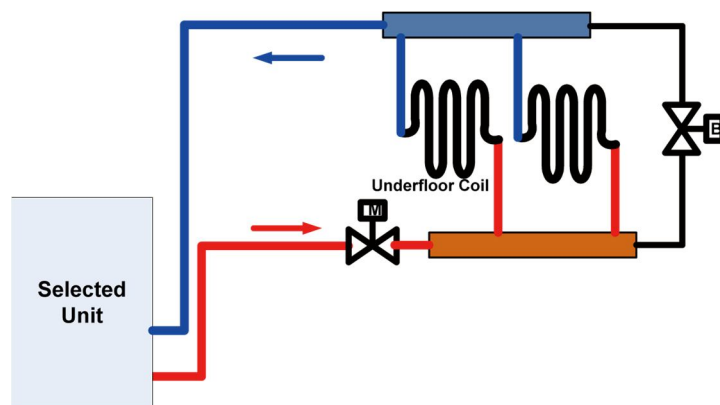
Square-shaped coil tube are recommended because they maintain an even temperature distribution.

In special cases, it can be satisfied by adjusting the tube pitch.

The length of room to manifold main tube should be estimated according to the actual situation of the project, generally not more than 30 meters.

2.2.3.2 Selection of loops quantity in rooms

■ The length of the single loop should not exceed 100 meters. If it exceeds 100 meters, it should be divided into multiple loops.



■ The area of the single loop = Tube length $\times$ Tube pitch = 100m $\times$ 150mm = 15m

It is recommended that the length of underfloor coil tube be less than 100 meters, and the length of each branch should remain consistent as much as possible.

2.3 Quantity and position of the manifold

The manifold is a device that divides or collects water for the water supply tube.

2.3.1 Design requirements for the quantity of the circulating water loop

■ A manifold generally allows to connect with 8 circulation loops. When the quantity of loops is more than 12, two manifold should be used, otherwise uneven water distribution will occur.

■ The maximum velocity of the manifold should be less than 0.8m/s.

■ The inlet and outlet of each loop shall be connected to manifold, the inner diameter of the manifold should be greater than or equal to the inner diameter of the main supply/backwater tube.

The quantity of circulating water loops can be calculated according to the following formula:

$$N = A / A1$$

N, Quantity of circulation

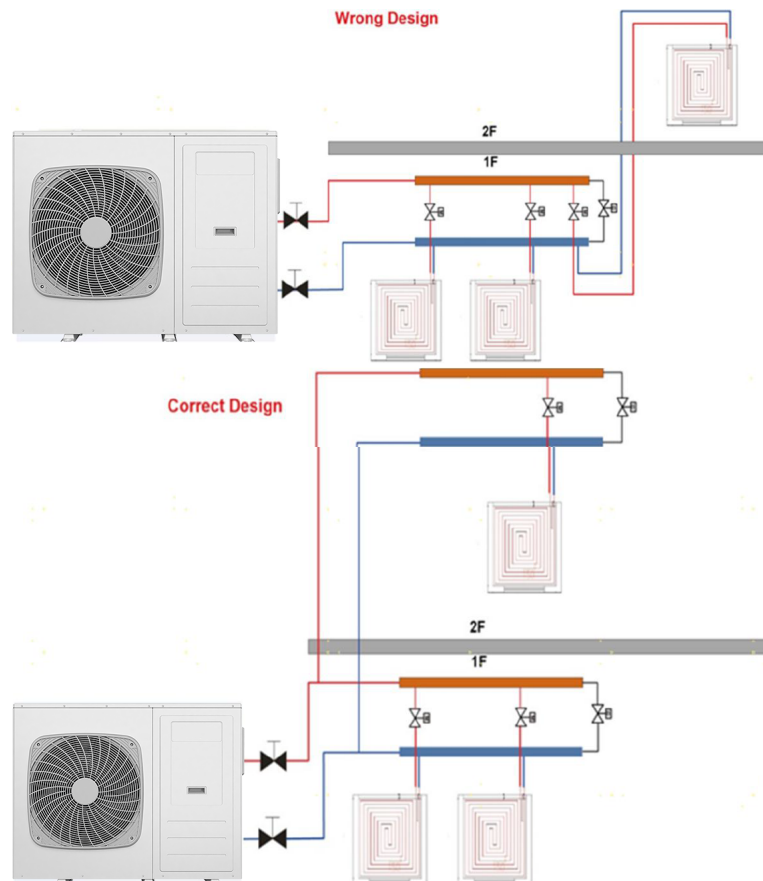
A——Total floor heating area (unit: m²)

A1——Floor heating area of the single loop (unit: m²)

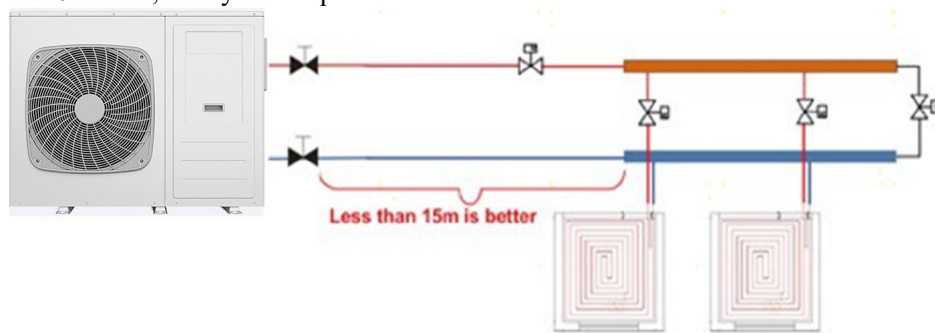
An example of how to calculate the floor heating area of the single loop: The tube length is 120m, and the tube pitch is 200mm, While the floor heating area of the single loop is 120 $\times$ 0.2 = 24m².

■ A steam trap (thermal collector) can not be used for different floors, otherwise it will cause

uneven water distribution.

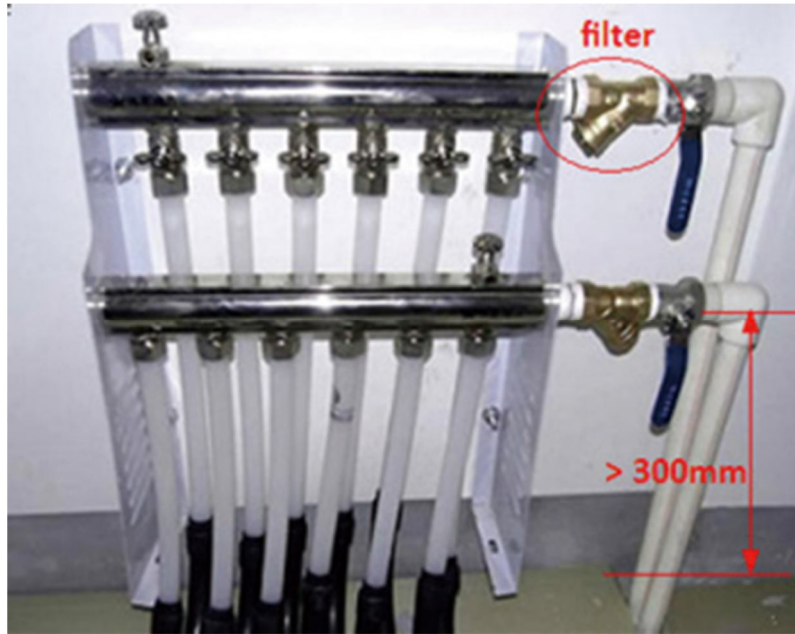


- The distance between the unit and the manifold should be within 15 meters. If the distance is more than 20 meters, the hydraulic power needs to be calculated.



2.3.2 Installation requirements of manifold main tube

- The manifold should be installed on the wall or in the special cabinet. For house construction, it is generally installed in the kitchen.
- The backwater valve should be installed horizontally and at least 300mm away from the ground.
- The feed valve should be installed on the upstream of the manifold main tube, the backwater valve should be installed on the downstream of the manifold main tube.
- Filters should be installed on both upstream and downstream of the manifold.



2.4 Model selection of the fan coil unit

2.4.1 Type of the fan coil unit

Air - water fan coil is available for Smeta fan.

2.4.2 Capacity matching of the fan coil unit

The load of the fan coil unit is recommended to be between 70% and 120% of the Smeta unit. Note:

- When the load of the fan coil unit is too small, the unit swithes frequently between turn on and turn off, which is not conducive to oil return.
- When the load of the fan coil unit is too large, the unit will consistently operate at high frequency, which may result in wasted energy.

Table 16				
Type	Air quantity (m ³ /h)	Cooling capacity (kW)	Heating capacity (kW)	Static pressure (Pa)
Wall mounted type	166~1020	2.1~5.4	3.15~8.5	/
Concealed ceiling type	213~2380	1.85~12.8	3.1~21	12.30
Floor ceiling type	213~2040	1.9~10.8	2.8~16.2	/
Cassette type	480~700	4.5~9	6.8~13.7	/

2.5 Model selection calculation of the expansion tank

$$V = \frac{C \times e}{1 - \frac{P_1}{P_2}}$$

C = Water capacity of the system (including host of the heat pump, tube, terminals, etc.) is about 1/15 to 1/20 of the system circulating water discharge;

e = The thermal expand coefficient of water (The difference of water expansion rate between water temperature during system cooling and the maximum water temperature when the unit is operating, see the table below), and e=0.0359 (90°C) in the standard device.

P1 = Precharge pressure of expansion tank (absolute pressure)

P2 = The maximum pressure of system operation (absolute pressure)

V = The volume of the expansion tank

Table 17					
Temperature (°C)	e	Temperature (°C)	e	Temperature (°C)	e
0	0.00013	45	0.0099	75	0.0258
4	0	50	0.0121	80	0.029
10	0.00027	55	0.0145	85	0.0324
20	0.00177	60	0.0171	90	0.0359
30	0.00435	65	0.0198	95	0.0398
40	0.00782	70	0.0227	100	0.0434

2.6 Calculation of buffer water tank

It is necessary to consider the influence of system water capacity on system stability of water heating system. For air source heat pump floor heating system, the biggest influencing factor is unit defrosting in winter. The defrosting time of air source heat pump unit is 3 to 8 minutes. The fourth minute of defrosting time is used to calculate the volume of the energy storage tank.

Requirements for system heat stability: In winter operation, the defrosting time remains in 4 minutes, and the supply water temperature is allowed to decrease by no more than 3°C.

The minimum system water capacity:

$$M1: = Q \times T / (C \times 3)$$

In the formula: Q —— Host heating capacity, kW;

T —— Defrosting time, S ;

C —— Specific heat of water is 4.2 KJ/kg·°C;

System water capacity: $M2 = 0.15 \times L$

L —— Total length of system piping, m;

The effective volume of energy storage tank M: = M1-M2

2.7 Calculation of domestic hot water tank

Domestic hot water tank should consider the actual number of water users and water habits, and match the heating capacity of the unit, refer to the following table for the recommended configuration of the heat pump unit water tank and available water supply:

Table 18					
Model	TFT-008	TFT-010	TFT-012	TFT-014	TFT-016
Water capacity (L)	150	200	300	400	500
Auxiliary electric heating power (kW)	1.5	1.5	2.5	3	4
Minimum heat exchange area of coil tube (m ²)	1.3	1.5	1.8	2.5	3.3
Minimum inner diameter of coil tube (mm)	26				
Minimum water discharge of coil tube (L/h)	450	515	620	800	920
Maximum pressure drop of coil tube (mbar)	90	130	215	550	1200
Recommended set water temperature (°C)	60				

Heating time(min) (Calculating in the initial temperature of 10°C)	70	75	95	110	120
Recommended quantity of users (people)	1~2	2~3	3~5	4~6	5~8

Note:

- The heating time calculated in the above table is the theoretical heating time when the ambient temperature is higher than -15°C and the auxiliary electric heating is not enabled, which will fluctuate depending on the use environment and the heat exchange capacity of the internal coil tube of the water tank;
- When the ambient temperature is lower than -15°C, the maximum water outlet temperature of the unit will be reduced and the heating time will be extended; When the ambient temperature is -30°C, the maximum water temperature of the unit is 52°C, and the maximum supply water temperature of the heat pump is 47°C. If 60°C hot water is needed, electric auxiliary heating should be enabled.
- When the outlet water temperature of the unit is greater than or equal to 60°C, the heating capacity of the unit will decrease;
- If the unit model is selected and the tank capacity is less than the recommended capacity, the heating time will be shortened, however, due to the limited heat exchange capacity of the small water tank's coil tube, the frequency of the unit may be reduced in advance, affecting the heating energy efficiency of the unit, but it will not shorten the service life of the unit; If the unit is equipped with a larger water tank, the hot water production time will be extended, but the energy saving effect is more prominent, and the service life of the unit will not be affected.

2.8 Model selection of water pump

- The working flow rate of the pump when meeting the functional requirements
The selected unit without considering the simultaneous utilization rate can be selected according to the value provided by the product sample multiplied by a factor of 1.1 ~ 1.2 times. If the simultaneous utilization rate is taken into account, the following formula is recommended for calculation:

$$L = Q \times 0.86 / \Delta T$$

L —— Circulating water discharge, m³/h;

Q —— Total load, kW;

ΔT —— Difference of inlet water and backwater temperature °C (Heating system is 10°C, cooling and heating system is 5°C)

Pump discharge = (1.1~1.2) × system circulating water capacity

Remark: Q in the formula is the total load without taking into account simultaneous utilization:

- The lift that the water pump needs to reach on working flow rate
The lift of water pump: should be the total water pressure drop of the worst loop in the water supply and backwater tube network.

Calculation experience formula of the worst loop resistance as follows:

$$H_{\max} = \Delta P + 0.05 \times L \times (1 + K)$$

ΔP —— The maximum of one (or part) of the water pressure drop of water pressure loss of each end device in parallel, mH₂O;

L —— Total tube length, m;

K —— The ratio of the sum of the equivalent length of local resistance in the pipeline to the total length of the straight tube. When the pipeline is long, K is 0.2 ~ 0.3; When the pipeline is short, K is 0.4 ~ 0.6.

$$\text{Water pump lift (mH}_2\text{O)} = (1.1 \sim 1.2) \times H_{\max}$$

2.9 Calculation of system pipe

2.9.1 The calculation formula of pipe diameter is as follows:

$$D = \sqrt{4Q_v / 3.14 \times 1000 \times V}$$

In formula: Q——Water discharge flowing through the pipe-segment, L/s;

D ——Pipe inner diameter, mm;

V ——Assumed water velocity, m/s;

The recommended water velocity in the pipe table is as follows, Unit:m/s;

Table 19					
Pipe diameter (mm)	15	20	25	32	40
Recommended flow velocity (m/s)	0.4~0.5	0.5~0.6	0.6~0.7	0.7~0.9	0.8~1.0
Pipe diameter (mm)	50	65	80	100	125
Recommended flow velocity (m/s)	0.9~1.2	1.1~1.4	1.2~1.6	1.3~1.8	1.5~2.0

2.9.2 Empirical selection method of pipe diameter - System water discharge and resistance loss per unit length table

Table 20				
Pipe inner diameter (mm)	Close-type system		Open-type system	
	Flow rate m ³ /h	kPa/100m	Flow rate m ³ /h	kPa/100m
15	0~0.5	0~60	/	/
20	0.5~1.0	10~60	/	/
25	1.0~2.0	10~60	0~1.3	0~43
32	2.0~4.0	10~60	1.3~2.0	11~40
40	4.0~6.0	10~60	2.0~4.0	10~40
50	6.0~11.0	10~60	4.0~8.0	10~40
65	11.0~18.0	10~60	8.0~14.0	10~40
80	18.0~32.0	10~60	14.0~22.0	10~40
100	32.0~65.0	10~60	22.0~45.0	10~40
125	65.0~115.0	10~60	45.0~82.0	10~40

3. Safety requirements

Please strictly follow these safety instructions to prevent accidents and material loss.

3.1 Safety instructions



Warning:

This sign warns of the danger of injury.



Warning:

It indicates wrong operations that can cause a personal or equipment accident.

Depending on the degree, it can lead to other, more serious consequences.



Forbidden:

It indicates operations that may cause damage to the machine or endanger the personal safety of the user.

3.2 Target group

- The unit uses Class A3 combustible refrigerants and the refrigerant system can only be operated and serviced by authorized contractors. These contractors must be trained in accordance with EN 378 Part 4 or IEC 60335-2-40 HH Section and have obtained a certificate of competence issued by an industry recognized body.
- Brazing/welding of refrigerant systems should only be performed by contractors who are certified according to ISO 13585 and AD 2000 and who are qualified and certified for the required operation. The operation must be carried out within the scope of the application and in accordance with the prescribed procedures.
- Work on electrical equipment should only be carried out by qualified electricians.
- Prior to initial commissioning, all safety-related points must be inspected by a specially certified contractor.

Only authorized and qualified system installation personnel or installation personnel can debug the system operation.

3.3 Regulations to be followed

- National installation regulations
- Statutory regulations of preventing accidents
- Statutory regulations of environmental protection
- Statutory requirement for pressure equipment: Pressure Equipment Directive 2014/68/EU
- Operation specification of relevant industry association
- Safety regulations of relevant country
- Applicable regulations and guidelines for the operation, service, maintenance, repair and safety of air conditioning and heat pump systems, cooling containing flammable and explosive refrigerants.

3.4 Safety instructions of working on the system

The unit contains flammable refrigerant R290(propane C₃H₈). If a leak occurs, the escaping refrigerant may form a flammable or explosive atmosphere in the surrounding air. A safety zone has been demarcated near the outdoor unit and special rules apply when handling appliances in this area.

3.5 Working in the safety zone



Danger

Explosion hazard: The escaping refrigerant may form flammable or explosive gases in the surrounding air.

The following measures should be taken to prevent fires and explosions in safe zones:

- Keep away from fire sources, such as open flames, hot surfaces, electrical equipment without fire sources, mobile devices with integrated batteries (such as mobile phones, fitness watches, etc.)

- Tools allowed:

All tools operating in the safe zone must meet the applicable standards and regulations for refrigerants in the A2L and A3 safety groups for design and explosion protection., eg.

brushless machines (cordless screwdrivers), extraction equipment, disposal containers, installation aids, vacuum pumps, conductive hoses, mechanical tools of non-sparking material, etc.

Attention please

The tool must be suitable for the pressure range used

Tools must be in good maintenance condition.

- Electrical equipment must meet the requirements of Zone 2 explosion hazard zone.
- Flammable materials such as sprays or other flammable gases are prohibited.
- Static discharge: Before starting work, contact ground objects, such as heating or water pipes.
- Do not remove, block or bridge safety equipment.
- Do not make any changes: Do not modify outdoor units, inlet/outlet wires, electrical connections/cables, or the surrounding environment. Do not remove any components or seals.

3.6 Working on the system

- Cut off the power supply of the unit and check whether the system is energized.

Attention please

In addition to the control circuit, there may be several power circuits.



Danger

- Contact with live parts may result in serious injury. Devices on the circuit board may remain charged even after the power is turned off. After the unit is powered off, wait at least 4 minutes until the voltage is completely released.

- Wear appropriate personal protective equipment when performing any work.



Danger

Hot surfaces and liquids can cause burns or scalds. Cold surfaces can lead to frostbite.

- Before a repair or maintenance task, turn off the power and allow the device to cool or warm up.
- Do not touch hot or cold surfaces on appliances, fittings, or pipes.

3.7 Working on the refrigerant circuit

R290/R290 refrigerant (propane) is a colorless, odorless, flammable gas that forms an explosive mixture with air.

The refrigerant must be disposed of properly by the authorized contractor after discharge.

Before starting work on the refrigerant circuit, the following measures should be taken:

- Check the refrigerant circuit for leaks.
- Ensure good ventilation, especially in floor areas, and maintain good ventilation during work.
- Ensure the safety of the area around the work area.
- Inform the following personnel of the types of work to be performed:

-All maintenance personnel

-All personnel in the vicinity of the system.

- Check the area around the heat pump for combustible substances and ignition sources; Remove all flammable materials and ignition sources.

- Before, during and after work, use an explosion-proof refrigerant detector for R290 to check the surrounding area for any escape of refrigerant.

The refrigerant detector must not produce any sparks and must be properly sealed.

Carbon dioxide or powder fire extinguishers must be provided in the following cases:

- Refrigerant is being discharged.

- Refrigerant is being charged.

- Welding or welding work in progress.

- Place no smoking signs.



Danger

The escape of refrigerant can cause fire and explosion, which can result in serious injury or death.

- Do not drill or heat refrigerant circuit filled with refrigerant.

- Do not operate 2-way valves unless connected to filling or recovery equipment.

- Take measures to prevent static electricity.

- No smoking! Prevent open flames and sparks. Do not turn lights or appliances on or off.

- Components that contain refrigerants must be labeled and stored and transported in a well-ventilated area in accordance with applicable regulations and standards.

Danger



Direct contact with liquid and gaseous refrigerants can cause serious damage to health, such as frostbite and/or burns. If inhaled, there is a choking hazard.

- Prevent direct contact with liquid and gaseous refrigerants.

- Wear personal protective equipment when handling liquid and gaseous refrigerants.

- Do not inhale refrigerant vapor.



Danger

The refrigeration system has positive pressure: mechanical damage to pipelines and

components can lead to refrigerant leakage.



Danger

If skin comes into contact with hot or cold metal surfaces of refrigeration systems, burns or frostbite may occur. Personal protective equipment should be worn to prevent burns or frostbite.

Attention please

The hydraulic components may freeze when the refrigerant is released or recovered. The hydraulic components may freeze when the refrigerant is released or recovered. The added water in the unit needs to be drained first.



Danger

Damage to the refrigeration system may cause refrigerant to enter the water system.

Once the work is done, exhaust the water system properly and ensure that the area is adequately ventilated.

3.8 Antifreezing protection

Freezing will cause damage to the water system of the unit.

- All water system pipelines should be insulated and antifreeze.



Warning:

Auxiliary components, spare parts and wearing parts

The use of unauthorized spare parts and wearing parts may compromise unit functionality.

Installing unauthorized parts and making unapproved modifications or refits may compromise safety and may void warranties.

For replacement, please use only the original spare parts provided or approved by Smeta.

Safety instructions of operating system

What if the refrigerant escapes



Danger

Escape of refrigerant can cause fire and explosion, resulting in very serious injury or death. If inhaled, there is a choking hazard.

- Ensure good ventilation, especially in the floor area of the outdoor unit.
- No smoking! Prevent open flames and sparks. Don't turn lights or appliances on or off.
- Evacuate all personnel from the danger area.
- Cut power to all systems from a safe position.
- Remove ignition sources from danger areas.
- Inform the user that no ignition source shall be brought into the Danger area during maintenance.
- Maintenance work must be carried out by an authorized contractor.
- The system can't be debugged until it's fixed.



Danger

Direct contact with liquid and gaseous refrigerants can cause serious damage to health, such as frostbite and/or burns. If inhaled, there is a choking hazard.

- Prevent direct contact with liquid and gaseous refrigerants.
- Do not inhale refrigerant vapor.

If water escapes from the appliance



Danger

If water escapes from the appliance, there is a danger of electric shock. Turn off the external isolator of the heating system (e.g. fuse box, domestic switchboard).



Danger

If water escapes from the appliance, there is a danger of scalding.

Do not touch hot water.

What if the outdoor unit freezes

Ice in the condensate pan and outdoor unit fan area may damage the device.

Pay attention to the following please:

- Do not use mechanical objects/auxiliary tools to remove ice.
- Check the refrigerant circuit for leakage with a suitable measuring device before using the heating appliance.
- Heating appliances should not be used as ignition sources.
- Heating appliances must meet the requirements of EN 60335-2-30.

3.9 Safety instructions of outdoor unit storage

The outdoor unit is charged with refrigerant R290(propane).



Danger

The escape of refrigerant can cause fire and explosion, which can result in serious injury or death. If inhaled, there is a choking hazard.

Store outdoor units under the following conditions:

- Storage must be taken measurements for protecting against explosion.
- Make sure the storage location has adequate ventilation.
- Storage temperature range :-30°C to 50°C
- Ensure the integrity of outdoor unit packaging.
- Protect the outdoor unit from external damage.
- The maximum number of outdoor units that can be stored depends on local conditions.

3.10 Handling of packaging

Please dispose of packaging waste in accordance with legal requirements.

3.11 Intended use

The appliance is intended only for installation and operation in a sealed heating system without ventilation in accordance with EN 12828, with due attention to the relevant installation, servicing and operating instructions.

Depending on different versions, the appliance can only be used for the following purposes:

- Space heating
- Space cooling
- Domestic hot water

The range of functionality can be extended by additional components and accessories.

4. Unit installation

4.1 Transportation

Danger



Outdoor unit charges refrigerant R290(Propane): Mechanical loading can cause leakage of refrigerant circuit. Where a refrigerant leak occurs, there is a risk of explosion or suffocation.

- Prevent vibration during transportation.
- Fix the unit during transportation.
- During transportation, the evaporator on the back of the outdoor unit is protected from mechanical external forces, such as using the cardboard or bubble wrap to package.
- Equipment damaged during transportation should not be used.



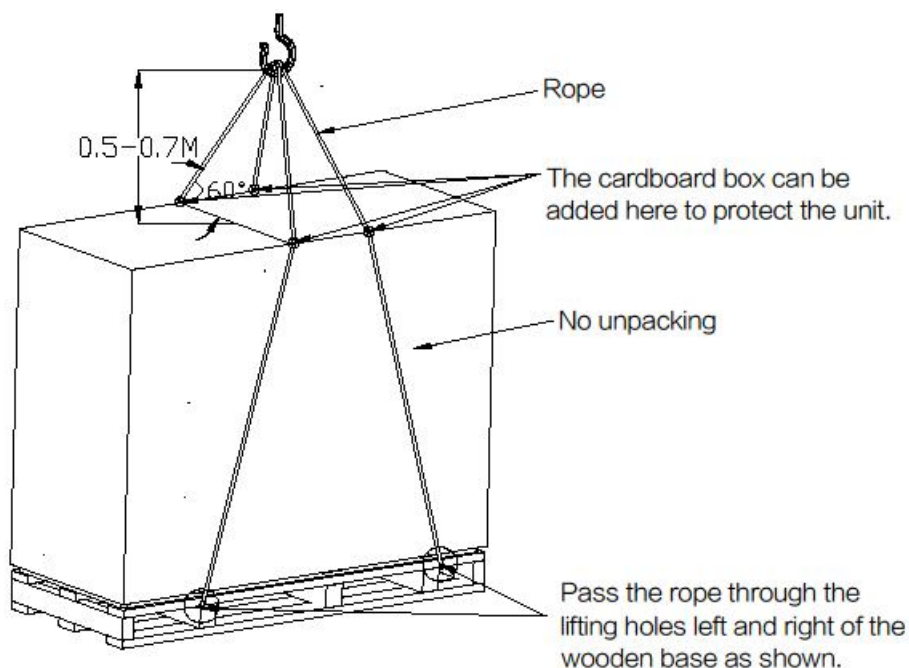
Danger

If the transport auxiliary equipment is damaged, it may cause the unit to fall. If damage to the refrigeration system occurs, there is a danger of explosion or suffocation.

- Check the tools of transport for damage before handling.

4.2 Lifting and transportation

- Please check the package of the unit for damage before installation. If there is damage, please contact the dealer;
- Before unpacking, transport the unit as close to the installation site as possible;
- Do not remove the unit package before lifting. It is used to protect the unit during lifting.



Note

- Lifting with packing, ensure that the Angle between the rope and the top surface of the unit is greater than 60 degrees;

■ Ensure that the unit is lifted horizontally, the center of gravity falls between the two slings, and is lifted slowly.

■ When lifting an outdoor unit, use two ropes of equal length. The weight of a single lift should not be less than 500KG. You are advised to use a flat sling to prevent the unit from being strangled.

■ When lifting, cloth, cardboard and other appropriate protective materials should be used between the rope and the unit.

■ Only a single unit can be transported at a time, and multiple units cannot be lifted at the same time.

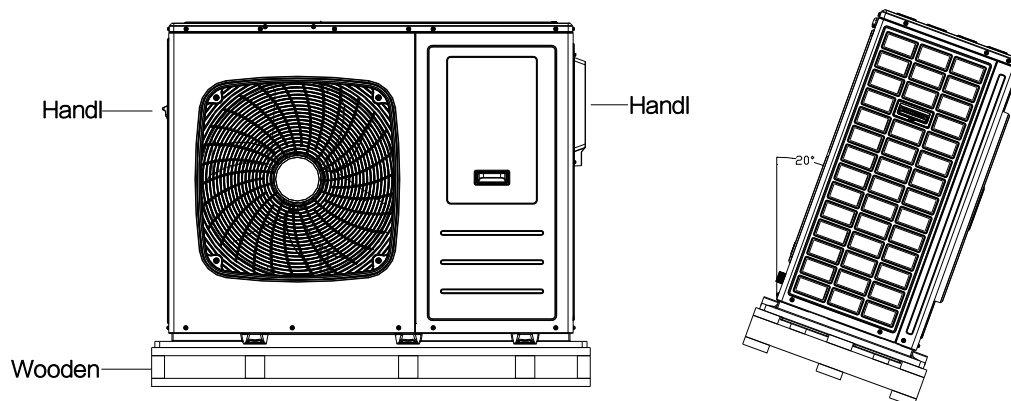
4.3 Handling manually

Note

Before installation and commissioning, do not place any foreign matter inside the outdoor unit and ensure that there is no debris inside the unit. Otherwise, fire or accidents may occur.

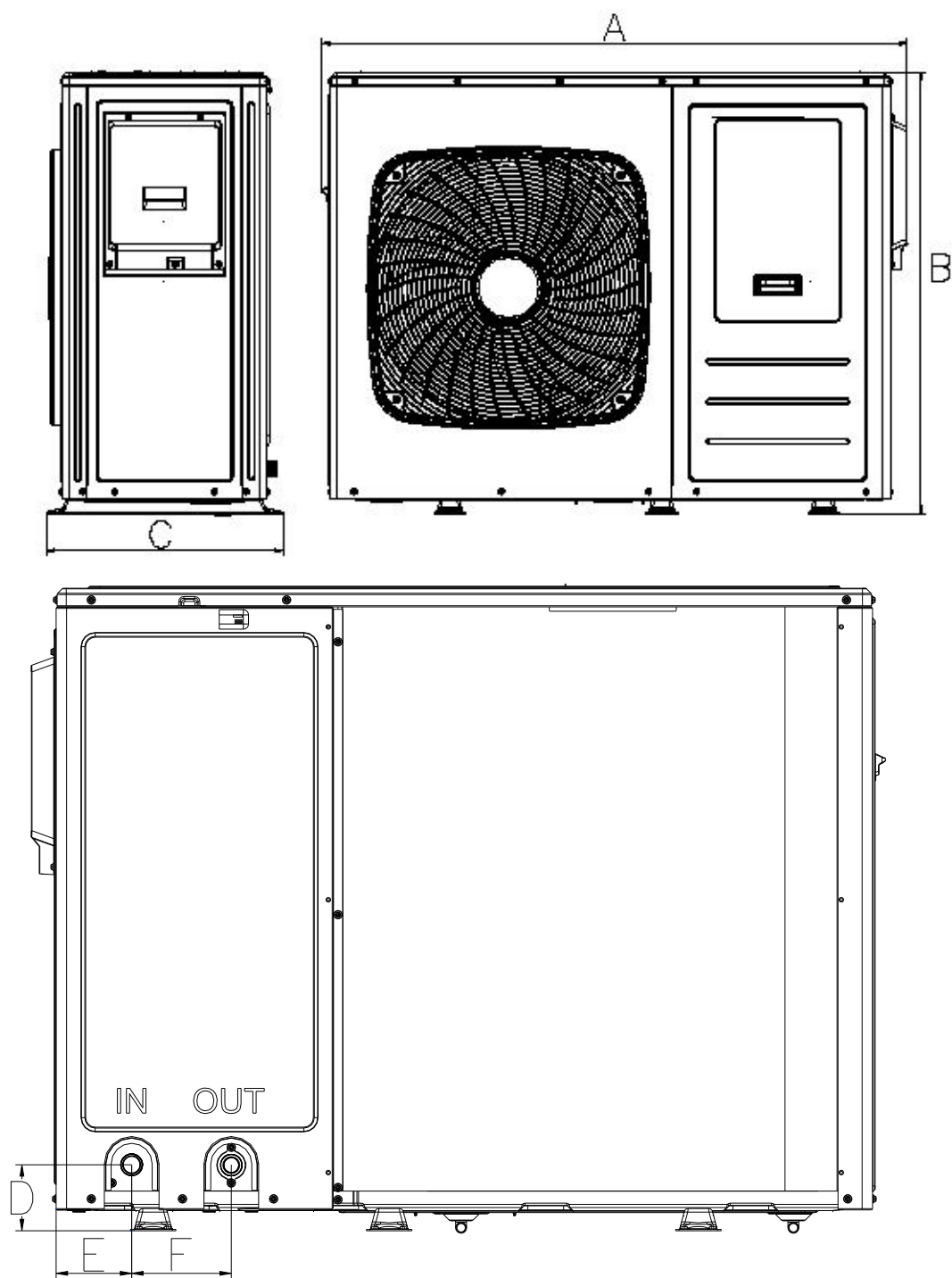
When handling equipment manually, pay attention to the following points:

- Do not remove the wooden base.
- To prevent the outdoor unit from tipping over, the unit tilt should not exceed 20°.
- The outdoor unit should be carried by two or more people.



4.4 Overall dimensions of the unit

4.4.1 Overall dimensions of the unit TFT-008CCH2E1-M ,TFT-010CCH2E1-M ,TFT-012CCH2E1-M



4.4.2 External dimensions of the unit TFT-014CCH2E1-M ,TFT-016CCH2E1-M

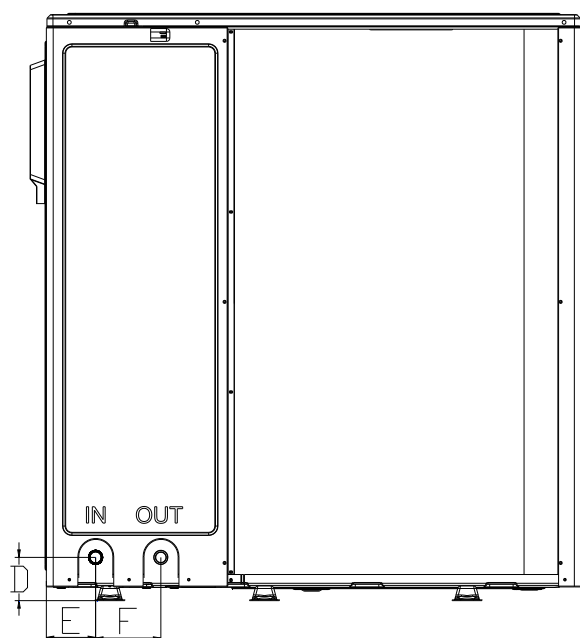
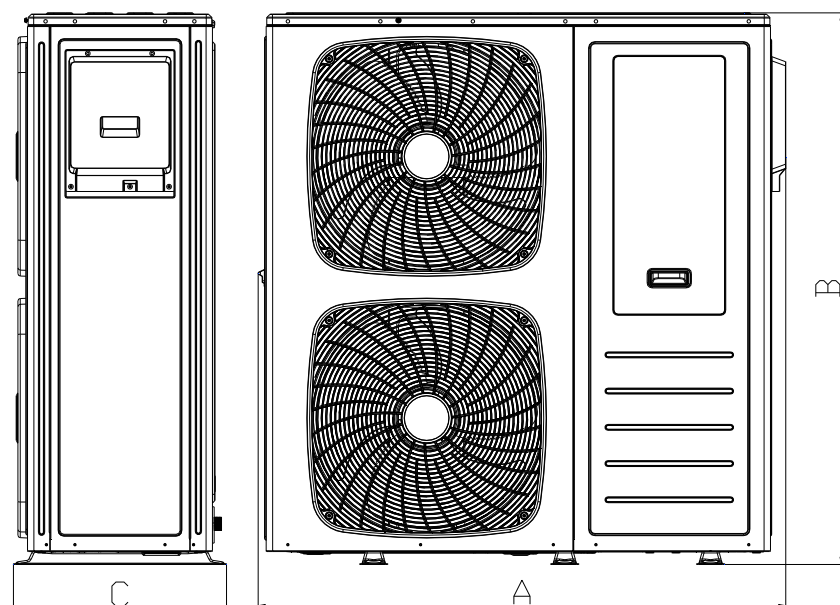


Table 21						
Model	A	B	C	D	E	F
TFT-008CCH2E1-M	1312	992	530	102	116	153
TFT-010CCH2E1-M	1312	992	530	102	116	153
TFT-012CCH2E1-M	1312	992	530	102	116	153
TFT-014CCH2E1-M	1312	1370	530	102	116	153
TFT-016CCH2E1-M	1312	1370	530	102	116	153

4.5 Installation methods

4.5.1 Bracket installation

In harsh climates (sub-zero, snowy and humid), the distance from the ground is at least $> 130\text{mm}$.

■ Use shock-proof feet (accessories) to install an outdoor unit on a concrete foundation $\geq 130\text{mm}$ high.

If the outdoor unit is installed under a snow free canopy (such as a garage), a lower bracket or base can be used.

■ Ensure that condensate can be discharged freely.

4.5.2 Wall-mounted installation

■ Use a wall-mounted bracket to install.

■ The weight of the outdoor unit should be taken into account: see the table below

Table 22	
Model of the unit	Unit of weight: kg
TFT-008CCH2E1-M	162
TFT-010CCH2E1-M	162
TFT-012CCH2E1-M	169
TFT-014CCH2E1-M	195
TFT-016CCH2E1-M	195

■ The wall must meet the structural requirements.

According to the wall structure, choose the appropriate fixed material.

■ Ensure that condensate can be discharged freely.

4.5.3 Flat-roof installation

Attention please

Because flat roof installations require higher static loads (roof/wind loads) and higher acoustic requirements, structural load bearing and noise impacts need to be checked computation by professional design engineers.

If an outdoor unit is to be installed on a flat roof, the following planning measures need to be considered in addition to floor and wall installation requirements:

■ Because the outdoor unit is installed on a flat roof at a higher position, the operating noise propagation is more intense than when the unit is installed on the ground. Roof surfaces usually have greater reverberation than ground areas.

In order to prevent noise nuisance, outdoor units should be installed at a sufficient distance from adjacent buildings. Appropriate noise reduction measures should be provided if necessary.

When analyzing sound transmission, the sound reflection of the building surface should be considered

■ Provide on-site windproof measures, such as screens and walls, if necessary.

- Check that the outdoor unit installation height does not exceed the permitted building height, for example, the height specified in the planning restrictions.
- In order to facilitate the maintenance and repair of the unit, adequate maintenance areas should be reserved.
- It is not allowed to be installed on flat roofs with low weight per unit area (for example, roofs made of wood rafters or trapezoidal metal sheets).
- When installed on a flat roof, considerable wind loads may be generated, depending on the relevant wind zone and the height of the building. The underlying structure was designed by professional design engineers according to DIN 1991-1-4.
- The structural calculation and fixed design of outdoor unit installation must take into account the high roof and wind loads.
- Condensate should not be discharged to the roof surface at will, as this may lead to the formation of ice. The ice on the roof may prevent further condensation from discharging freely, resulting in increased roof load.

4.5.4 Selection of installation position

- According to EN 378-3:2016, outdoor units can only be installed in the open air.
- According to ANSI/ASHRAE Standard 34, the refrigerant circuit in the outdoor unit contains the flammable refrigerant in the safety group A3.

Therefore, a safety zone is defined near the outdoor unit, with special requirements: See the section of "Safety operation zone".

- Observation of noise level information must comply with the regulations on noise emission.
- When installing the heat pump, the distance to adjacent properties should always be taken into account in accordance with local building codes.
- Do not place the exhaust face toward the wall of the building or the main wind direction.
- During the heating process, cold steam escapes from the exhaust hole of the outdoor unit. This steam emission must be taken into account during installation (selecting the installation position and the orientation of the unit).
- Provides equipment to protect outdoor units from mechanical damage, such as impact damage from soccer balls.
- Environmental and weather impacts, such as flooding, wind, snow, ice damage, etc. should be considered when selecting the installation position. Install appropriate protective equipment if necessary.

Located in garages, multi-storey car parks and cars

Car parks:

- Before installation, it must be determined whether the situation involved complies with the regulations of the local garages and car parks.
- The unit shall be provided with effective shock-proof protection facilities, which must be designed to ensure that the unit will not be damaged by vehicle impact at the maximum applicable speed.
- A prohibition notice should be marked in the outdoor unit safety zone to identify the ignition source.
- Car parks are not allowed to be sited underground.

Sited along coastal area: The distance < 1000 meters

- Salt and sand particles in the air in coastal areas increase the likelihood of corrosion:

Install the heat pump in a position that is not directly affected by onshore wind.

- Provide windproof entrances on site if required. Note the minimum spacing with the heat pump.

Vibration isolation of structure noise between building and outdoor unit

- It is only allowed to install on the wall with a large weight per unit area (> 250kg /m²); Can not

be installed on light wall, roof structure, etc.

■ When installing outdoor units on the roof surface, there is a risk of structure noise transmission and vibration transmission into the building.

If the outdoor unit is installed on a freestanding garages, separating structure noise and insufficient vibration isolation may produce excessive noise due to resonance amplification.

■ Do not install in recesses or between walls. This can lead to an "air short circuit" between the outgoing air and the inhaled air.



Note: Avoid "air short circuit".

Air short circuit in heating mode will cause the air that comes out after cooling to re-enter the unit for heat exchange, which can lead to reduced efficiency of the heat pump and defrost problems.

Air short circuit in cooling mode will cause the air that comes out after heating to re-enter the unit for heat exchange, which may result in a high voltage failure of the unit.

The air flows through the evaporator.

■ Choose an installation position where an evaporator will not be blocked by leaves, snow, etc.

■ The selection of the installation position should fully consider the physical laws of sound propagation and reflection.

■ Do not install above cellar shafts or floor slots.

■ Do not install near windows or bedrooms.

■ In order to avoid increasing wind load, a distance of 1 meter should be maintained from the edges and corners of the building.

■ Maintain a clearance of at least 3 meters from passageways, downspouts or sealing surfaces.

When the outdoor temperature is below 10 °C, the cooling air in the exhaust zone is in danger of freezing.

4.5.5 Safety operation zone

According to ISO 817 and ANSI/ASHRAE standard 34, the refrigerant circuit of the outdoor unit contains a flammable refrigerant with a safety group of A3.

Therefore, a safety zone is defined near the outdoor unit, which should have special requirements.

The following situations shall not appear or occur in the safety zone:

■ Building openings, such as windows, doors, light wells, flat-top windows, etc.

■ Outdoor air and exhaust holes for ventilation and air conditioning systems.

■ Property boundaries, near properties, sidewalks and driveways

■ Pump wells, sewage system inlets, downspouts and sewage wells, etc.

■ Other slopes, troughs, depressions and shafts

■ House power connection

■ Electrical systems, sockets, lamps, light switches

Do not introduce fire sources into the safety zone;

■ Open flame or burner gauze assembly

■ Gridiron

■ Tools that generated sparks

■ Electrical equipment without ignition source, mobile devices with integrated batteries (e.g. mobile phones, fitness watches, etc.)

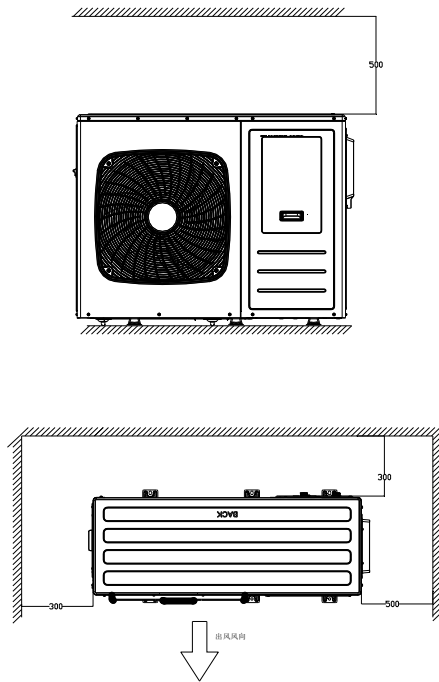
■ Objects with a temperature above 360 °C

4.6 Minimum installation space

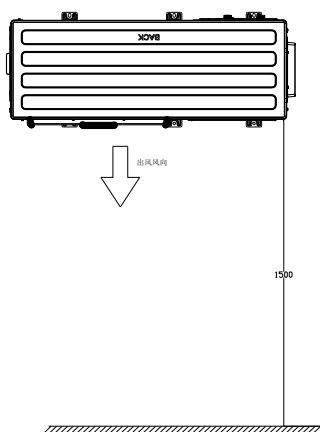
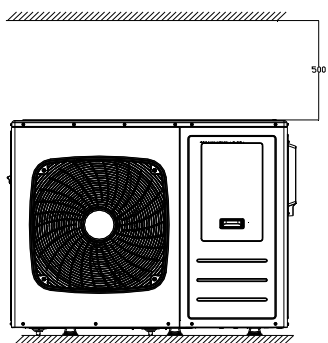
4.6.1 Minimum installation space requirements for the single unit

Reserve 500mm maintenance space on the top of the unit and on the side of the terminal box of the unit

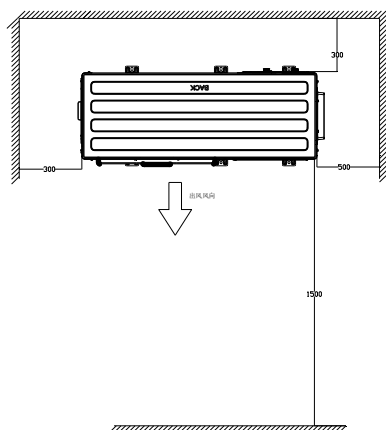
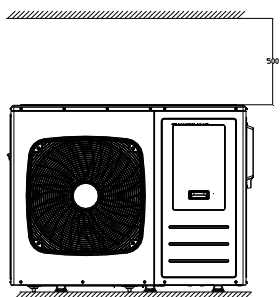
Situation of that there are walls on the side of the unit (The unit below is only for illustration, and the actual machine model purchased shall prevail)



Situation of that there are walls in front of the unit (The unit below is only for illustration, and the actual machine model purchased shall prevail)



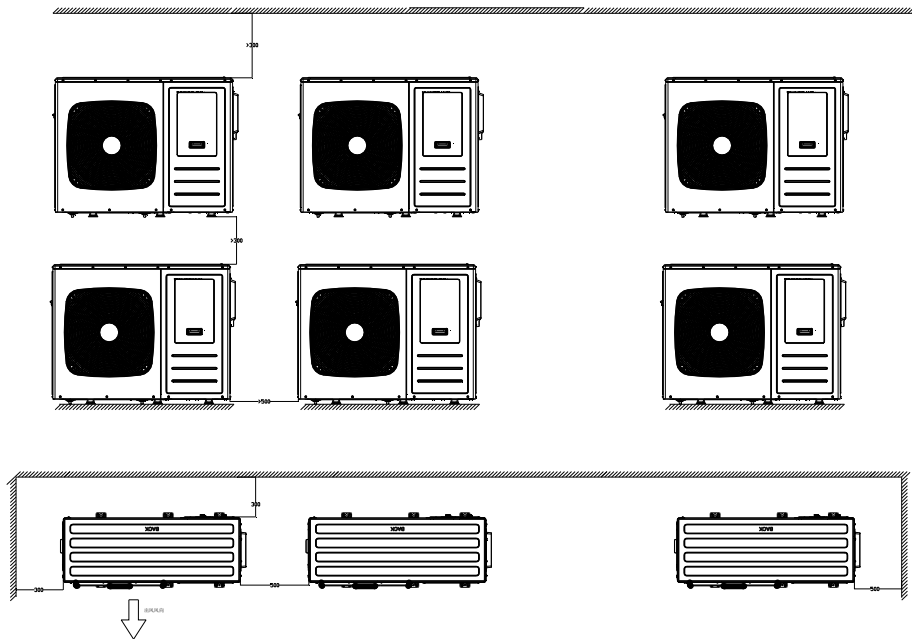
Situation of that there are walls both in front of and behind the unit (The unit below is only for illustration, and the actual machine model purchased shall prevail)



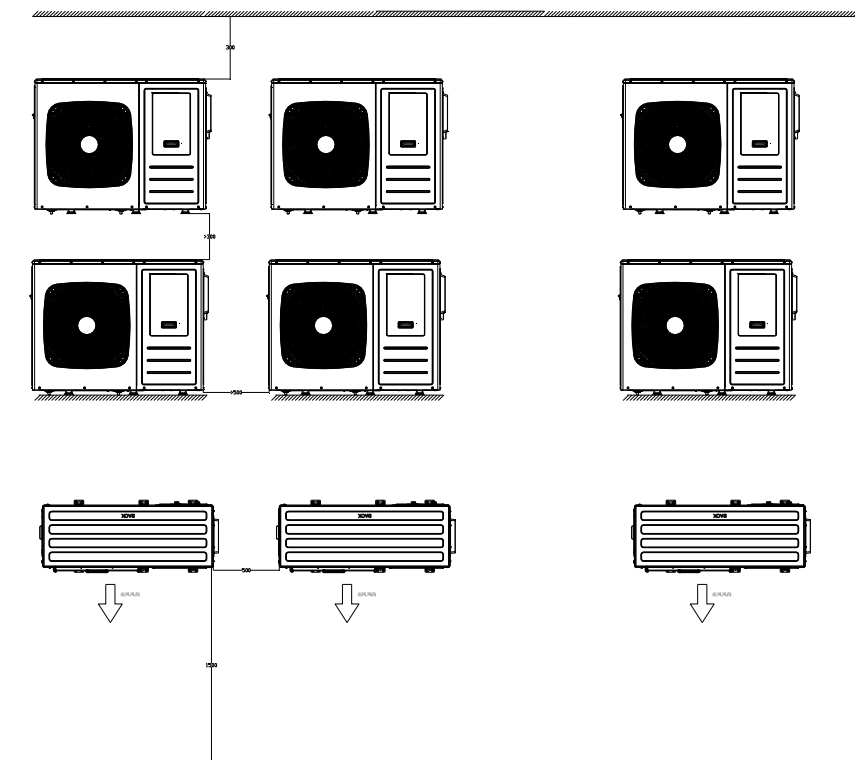
4.6.2 Multiple unit installation (The unit below is only for illustration, and the actual machine model purchased shall prevail)

It needs to reserve 300mm maintenance space on the top of the unit, and also needs to reserve 500mm on the side of the unit's terminal box.

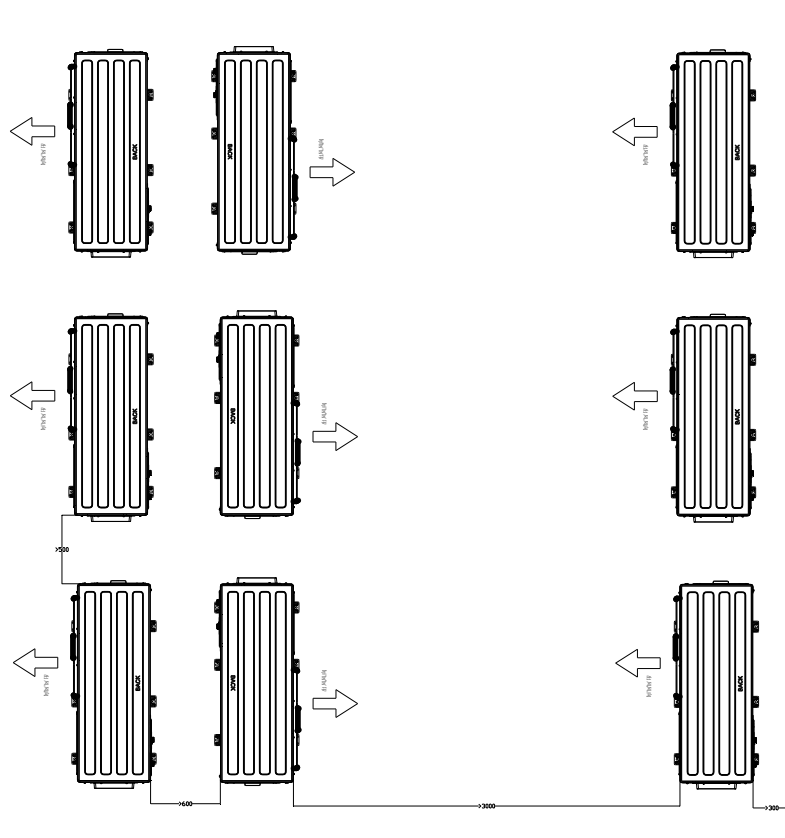
Situation of that there are walls on the side of the unit



Situation of that there are walls in front of the unit (The unit below is only for illustration, and the actual machine model purchased shall prevail)



Flat matrix type placement in multi-row



4.7 Foundation of installation

Outdoor unit of foundation structure design should consider the following factors:

- The base protects against excessive vibration and noise. The outdoor unit base should be built on solid ground, or the structure should be strong enough to support the weight of the unit.
- The foundation shall be at least 130mm high and 90mm wide, and the foundation shall have drainage channels to prevent water from entering the chassis, either steel foundation or concrete foundation.
- The device is firmly fixed on the foundation, and the bolts extend 20 ~ 22mm high from the foundation surface.

Diagram of steel foundation

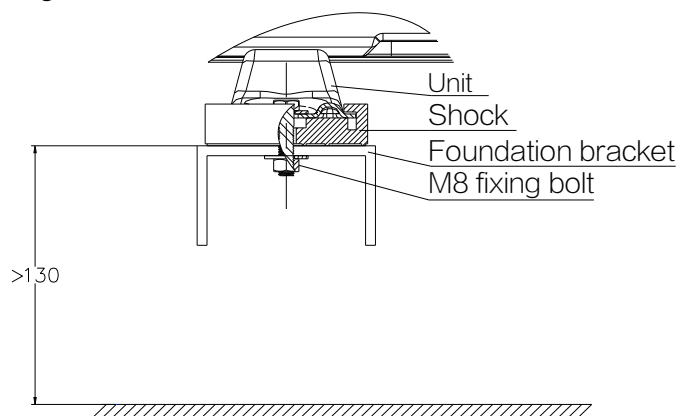
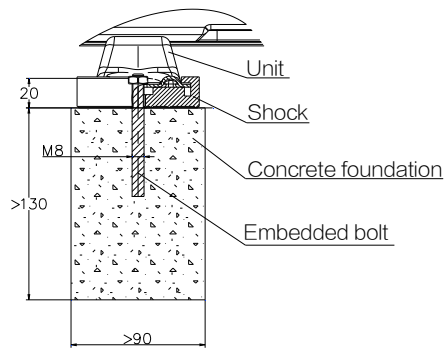
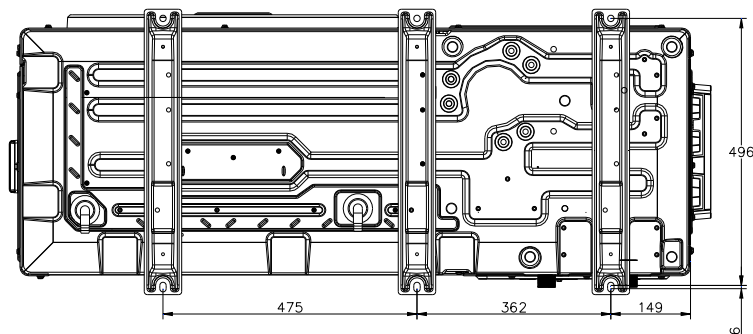


Diagram of concrete foundation



Installation dimension

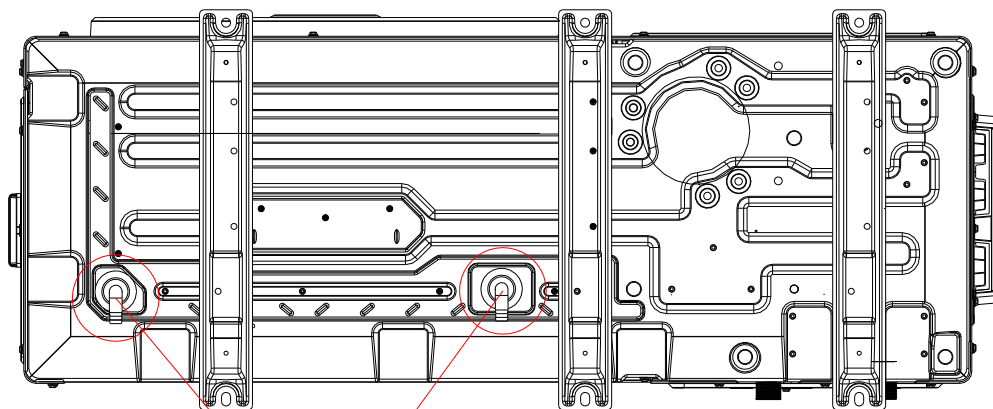


4.8 Drainage requirements

When the unit is running in heating mode, condensate may form on the air side heat exchanger, and the unit installation foundation should be provided with drainage ditches so that the condensate can be smoothly discharged when the unit is running in heating mode. Drainage should be ensured that condensate is directed away from roads and sidewalks, especially where condensation may freeze in climatic conditions.

If your outdoor unit requires drainage, follow these guidelines.

- The accessories of this unit are equipped with two drainage elbows. Customers who need to do centralized drainage can assemble them on site (drainage hose is provided on site).
- In cold areas, do not drain away water centralized in concentrate the drain elbow and hose. Otherwise, the drainage may freeze and clog the drain-pipe.
- If centralized drainage is necessary, it is recommended to install heating belts to facilitate smooth drainage and prevent ice formation in the drain-pipes and units.



Installation positions of drain elbows

5. System installation

5.1 Single unit installation schematic diagram

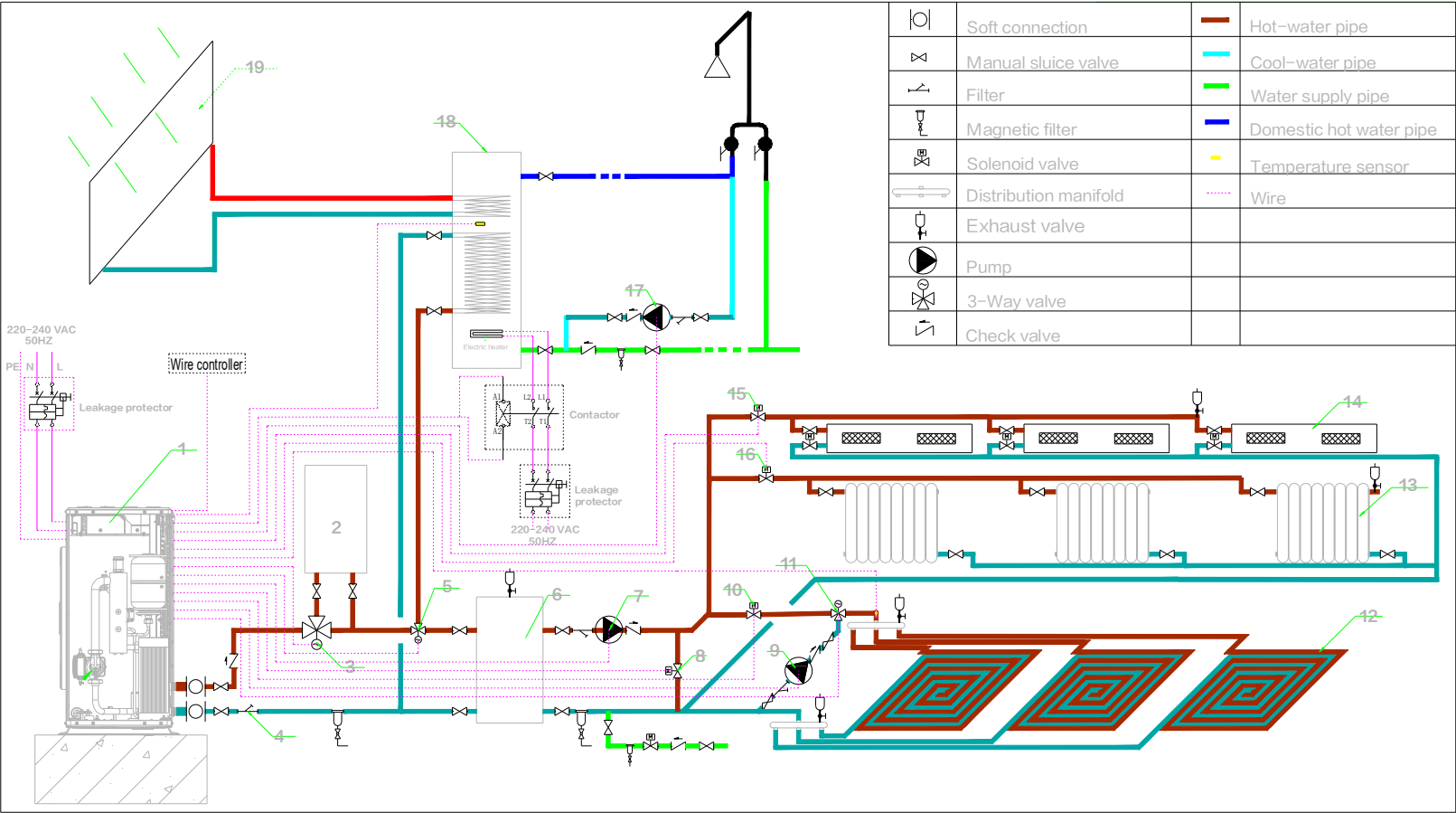
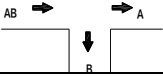
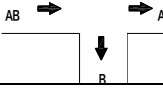
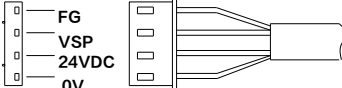


Table 23				
No.	Components	Type	Specification	Remark
1	Heat pump unit	/	/	/
2	Additional heat source feedback	Shield cable	24 vdc, 2-d	Max.length: 100
3	Additional heating source 3-way valve	L-type	AC 230V, 2-d	Max.length: 50m 
4	Filter	Accessory	50 meshes	/
5	Hot water 3-way valve	L-type	AC 230V, 2-d	Max.length: 50m 
6	Buffer water tank	Boost	/	Min. volume>80L
7	Secondary pump	Circulating pump	AC 230V, 3-d	Max.length: 50m
8	Temperature balance valve	Pilot solenoid valve	AC 230V, 2-d	Max.length: 50m
9	Mixing pump	Circulating pump	AC 230V, 3-d	Max.length: 50m
10	Bottom valve	Pilot solenoid valve	AC 230V, 2-d	Max.length: 50m
11	Water mixing 3-way valve	Proportional 3-way valve	DC24VDC 4-d	Electrical specifications: 
12	Floor heating	/	/	/
13	Radiator	/	/	/
14	Fan coil unit	/	/	/
15	Coil tube valve	Pilot solenoid valve	AC 230V, 2-d	Max.length: 50m
16	Radiator valve	Pilot solenoid valve	AC 230V, 2-d	Max.length: 50m
17	Zero cold water circulating pump	Circulating pump	AC 230V, 3-d	Max.length: 50m
18	Domestic water tank	Pressure-bearing water tank	/	
19	Domestic water tank electric heating	Internal heater	AC 230V, 3-d or AC 380V, 5-d	/
20	/	Booster pump	AC 230V, 3-d	Max.length: 50m

5.2 Module parallel connection unit installation schematic diagram

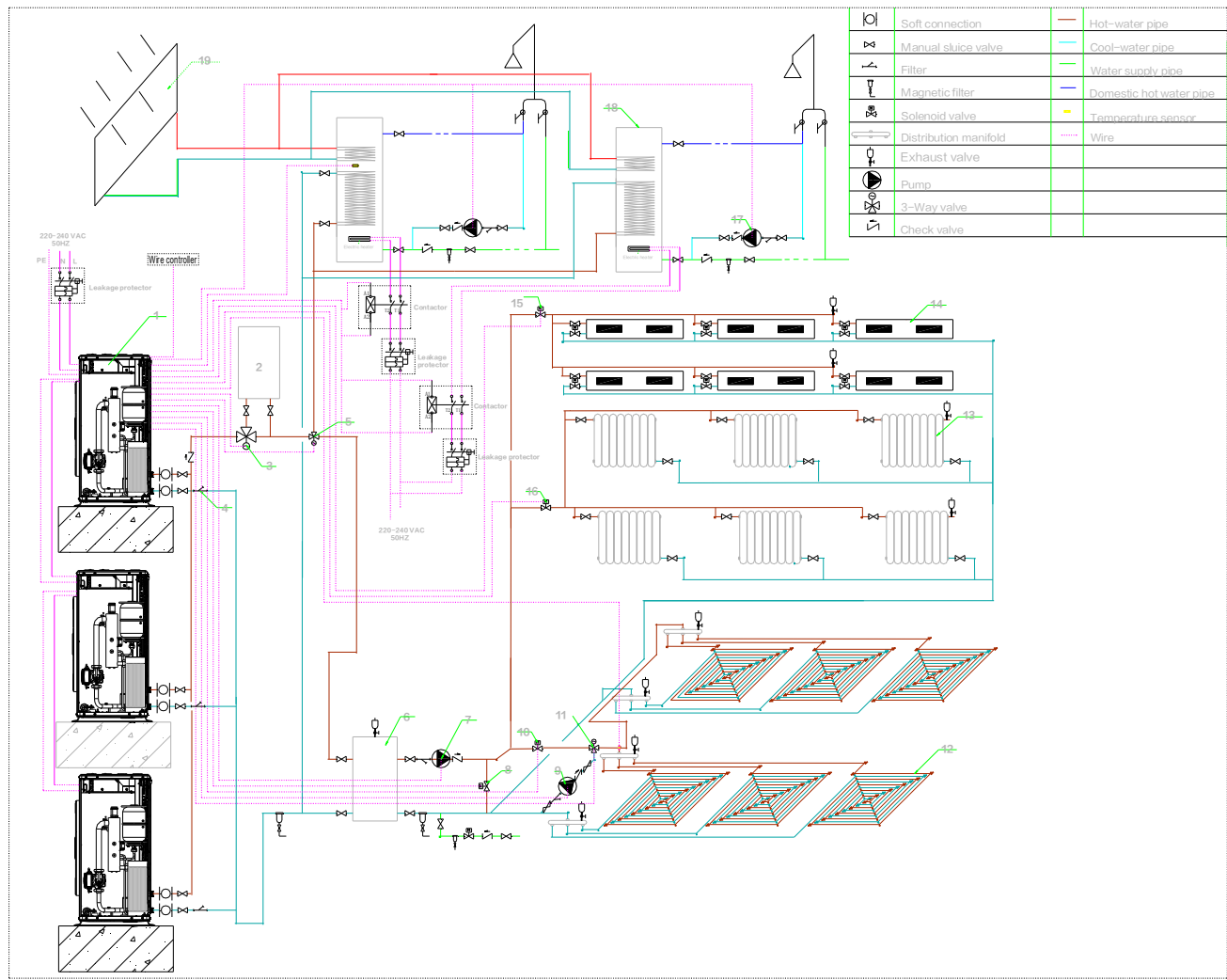
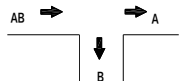
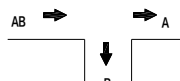
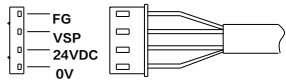


Table 24				
No.	Components	Type	Specification	Remark
1	Heat pump unit'	/	/	/
2	Additional heat source feedback	Shield cable	24 vdc, 2-wire	Max.length: 100
3.	Additional heating source 3-way valve	L-type	AC230V, 2-wire	Max.length: 50m 
4	Filter	Accessory	50 meshes	/
5	Hot water 3-way valve	L-type	AC230V, 2-wire	Max.length: 50m 
6	buffer water tank	Boost	/	Min. volume>80L
7	Secondary pump	Circulating pump	AC230V, 3-wire	Max.length: 50m
8	Temperature balance valve	Pilot solenoid valve	AC230V, 2-wire	Max.length: 50m
9	Mixing pump	Circulating pump	AC230V, 3-wire	Max.length: 50m
10	Bottom valve	Pilot solenoid valve	AC230V, 2-wire	Max.length: 50m
11	Water mixing 3-way valve	Proportional 3-way valve	DC24V, 4-wire	Wiring requirements for water mixing 3-way valve: 
12	Floor heating	/	/	/
13	Radiator	/	/	/
14	Fan coil unit	/	/	/
15	Coil tube valve	Pilot solenoid valve	AC230V, 2-wire	Max.length: 50m
16	Radiator valve	Pilot solenoid valve	AC230V, 2-wire	Max.length: 50m
17	Zero cold water circulating pump	Circulating pump	AC230V, 3-wire	Max.length: 50m
18	Domestic water tank	Boost	/	
19	Domestic water tank electric heating	Internal heater	AC230V, 3-wire or AC380V, 5-wire	
20		Booster pump	AC230V, 3-wire	Max.length: 50m

6. Electrical connection

6.1 General inspection

■ Ensure that the electrical system components used on site (main power switch, breaker, electric wire, conduit and terminal, etc.) are correctly selected and comply with European electrical standards.

■ Check whether the power supply voltage is within the range of rated voltage $\pm 10\%$, and whether the power cable contains a ground wire. Otherwise, electrical components may be damaged.

■ Check whether the power supply capacity meets the requirements. Otherwise, the compressor cannot start due to the low voltage.

■ Check that the ground wire is securely connected.

■ Measure the insulation resistance between the electrical component grounding and the terminal and ensure that the insulation resistance is greater than $1\text{ M}\Omega$; Otherwise, the unit cannot be started.

6.2 Wiring

■ Connect the power wire and ground wire to the terminal block of the unit electric box.

■ Do not connect cables to the fastening screw in front of the maintenance panel

■ Power wire must use copper tube. Onsite wiring must comply with IEC60245 requirements

■ The power cable length is required to be no more than 15m, and the specification needs to be strengthened.

■ The power cable must be securely secured by a round terminal with an insulation protection cover. Do not touch or squeeze the sheet metal component to avoid cutting the wire sheath and causing a fire.

■ Select the air switch based on 1.25 times the running current (Current below 50A).

Power supply configuration and wire diameter specifications

Table 25						
Model	Voltage operating range	Minimum cross-sectional area of the power supply cable (mm ²)			Maximum cable length (m)	Air switch capacity in the unit (A)
		L-wire	N-wire	Ground wire		
TFT-008CCH2E1-M TFT-010CCH2E1-M TFT-012CCH2E1-M	(198~264)V 50Hz	6.0	6.0	4.0	15	40
TFT-014CCH2E1-M TFT-016CCH2E1-M	(198~264)V 50Hz	16.0	16.0	10.0	15	80

6.3 Unit wiring diagram

Wiring diagram of TFT-008CCH2E1-M , TFT-010CCH2E1-M and TFT-012CCH2E1-M

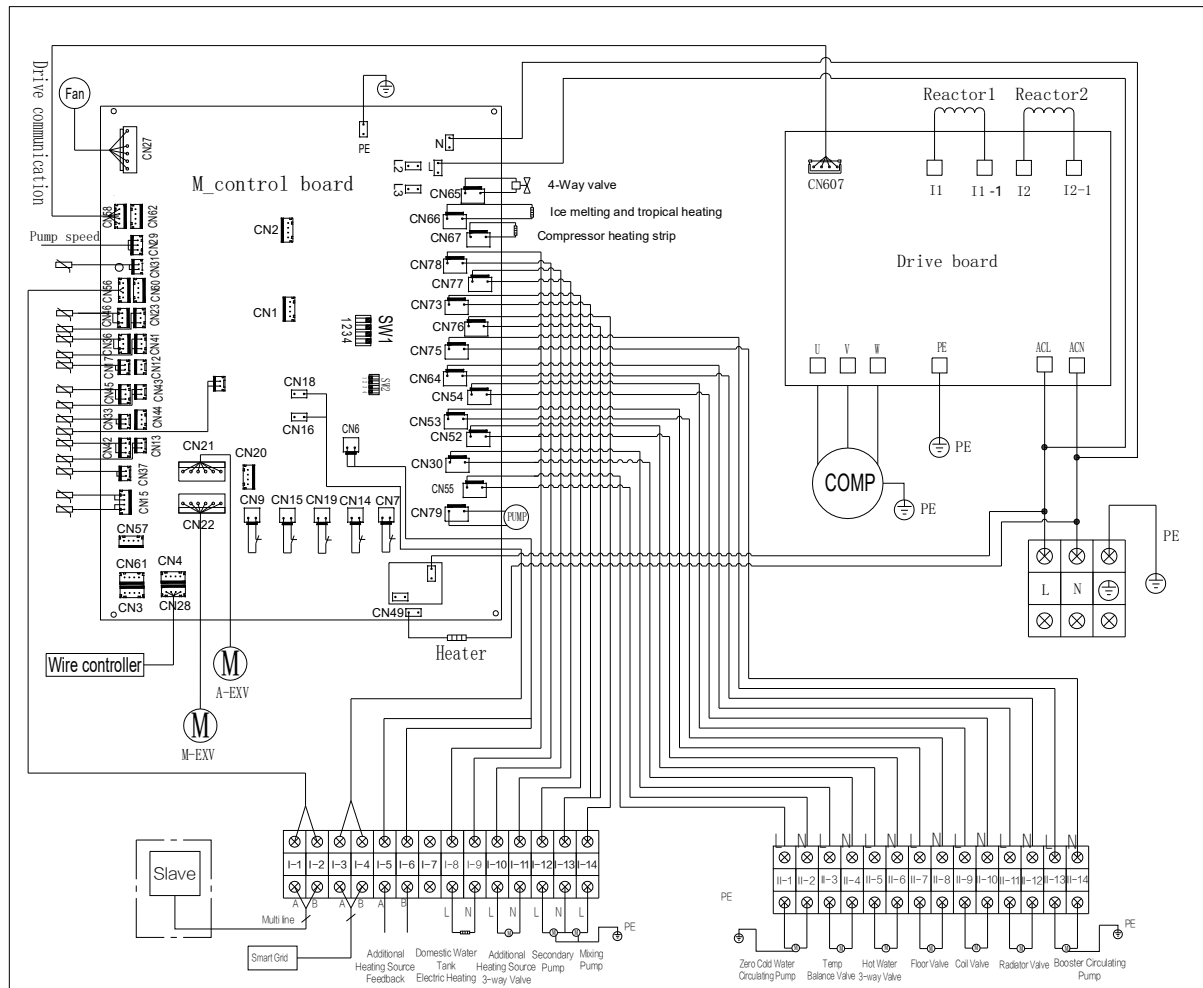


Table 26

Marking	Name	Marking	Name
CN3\ CN61	Telecommunication	CN9	Low pressure switch
CN4 \ CN28	Wire controller communication	CN15	High pressure switch
CN21	Auxiliary circuit electronic expansion valve	CN19	Remote switch
CN22	Main circuit electronic expansion valve	CN14	Linked switch
CN51	Water inlet and outlet temperature sensor(Twi/Two)	CN7	Water flow switch
CN37	Suction temperature sensor(Ts)	CN49	Electric heating 1
CN42	Discharge temperature sensor(Td)	CN18 / CN16	Smart grid
CN13	Condensation temperature sensor(Tl)	CN6	Additional heating source feedback
CN33	Defrost temperature sensor(Tdf)	CN79	Water pump
CN44	Antifreezing temperature sensor	CN55	Zero cold water circulating pump

CN45	Ambient temperature sensor(Ta)	CN30	Temperature balance valve
CN43	Water tank temperature sensor(Tdwh)	CN52	Hot water 3-way valve
CN32	Water outlet temperature 2 sensor(Two2)	CN53	Floor heating solenoid valve
CN17	Total water outlet temperature sensor	CN54	Fan coil unit solenoid valve
CN36	Economizer inlet temperature sensor(Tei)	CN64	Radiator solenoid valve
CN41	Economizer outlet temperature sensor(Teo)	CN75	Booster pump
CN46	High pressure sensor(Pd)	CN76	Mixing pump
CN23	Low pressure sensor(Ps)	CN73	Secondary pump
CN29	Water pump speed control	CN77	Additional heating source 3-way valve
CN26	Fan motor	CN78	Domestic water tank electric heating
CN56 \ CN60	Multi-link communication	CN67	Compressor electric heating strip
CN58 \ CN62	Inverter communication	CN66	Chassis deicing electric heating belt
CN20	Water mixing 3-way valve	CN65	4-way valve
CN31	Water mixing temperature sensor(Tm)	/	/

Wiring diagram of TFT-014CCH2E1-M and TFT-016CCH2E1-M

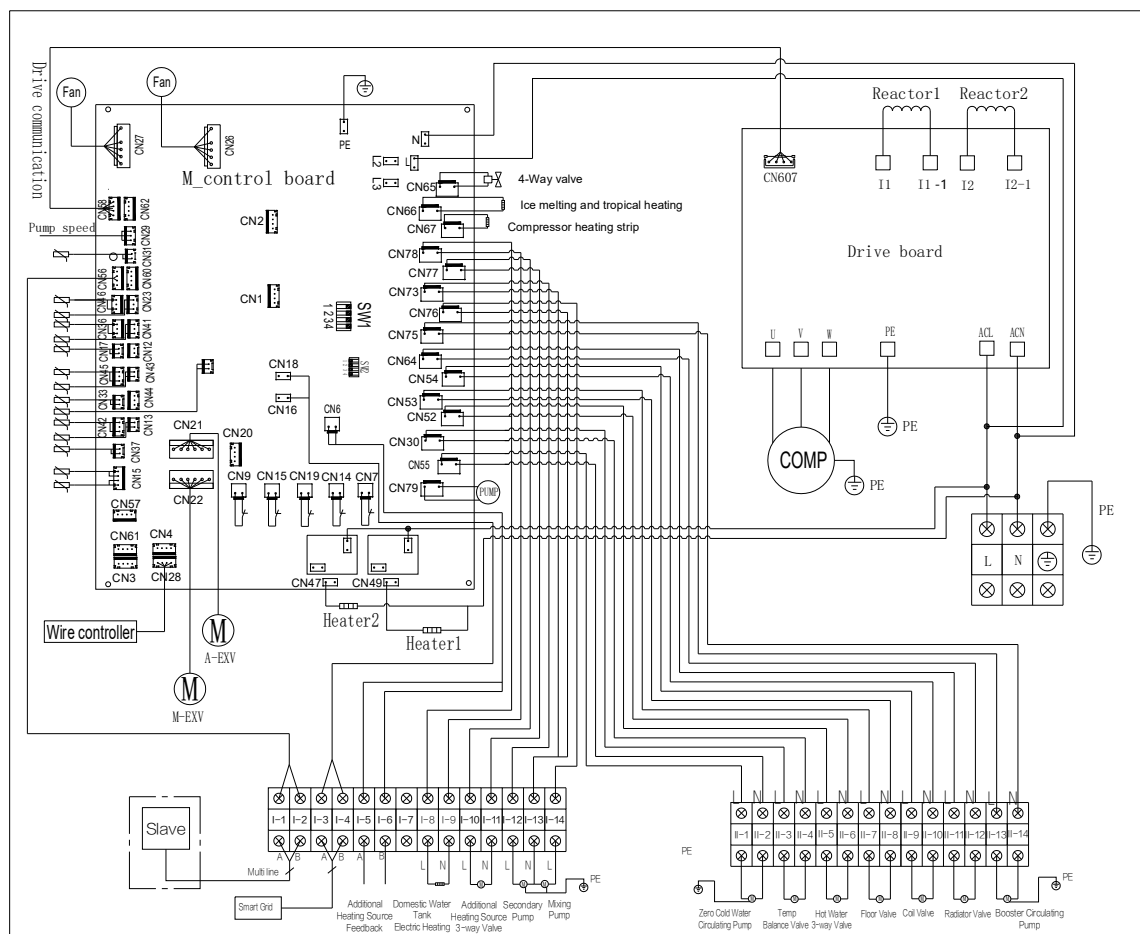


Table 27			
Marking	Name	Marking	Name
CN3 \ CN61	Telecommunication	CN9	Low pressure switch
CN4 \ CN28	Wire controller communication	CN15	High pressure switch
CN21	Auxiliary circuit electronic expansion valve	CN19	Remote switch
CN22	Main circuit electronic expansion valve	CN14	Linked switch
CN51	Water inlet and outlet temperature sensor(Twi/Two)	CN7	Water flow switch
CN37	Suction temperature sensor(Ts)	CN47	Electric heating 2
CN42	Discharge temperature sensor(Td)	CN49	Electric heating 1
CN13	Condensation temperature sensor(Tl)	CN18 / CN16	Smart grid
CN33	Defrost temperature sensor(Tdf)	CN6	Additional heating source feedback
CN44	Antifreezing temperature sensor	CN79	Water pump
CN45	Ambient temperature sensor(Ta)	CN55	Zero cold water circulating pump
CN43	Water tank temperature sensor(Tdwh)	CN30	Temperature balance valve
CN32	Water outlet temperature 2 sensor(Two2)	CN52	Hot water 3-way valve
CN17	Total water outlet temperature sensor	CN53	Floor heating solenoid valve
CN36	Economizer inlet temperature sensor(Tei)	CN54	Fan coil unit solenoid valve
CN41	Economizer outlet temperature sensor(Teo)	CN64	Radiator solenoid valve
CN46	High pressure sensor(Pd)	CN75	Booster pump
CN23	Low pressure sensor(Ps)	CN76	Mixing pump
CN29	Water pump speed control	CN73	Secondary pump
CN26 \ CN27	Fan motor	CN77	Additional heating source 3-way valve
CN56 \ CN60	Multi-link communication	CN78	Water tank electric heating
CN58 \ CN62	Inverter communication	CN67	Compressor electric heating strip
CN20	Water mixing 3-way valve	CN66	Chassis deicing electric heating belt
CN31	Water mixing temperature sensor(Tm)	CN65	4-way valve

6.4 Electrical connection operation



Danger

Incorrect electrical installation can result in serious electric shock injuries and lead to unit damage.

It should be followed the following regulations to connect the power supply and implement all safety measures:

- IEC 60364-4-41

■ VDE specification

■ TAR low pressure VDE-AR-N-4100



Danger

Incorrect electrical installation can result in serious electric shock injuries and lead to unit damage.

■ In outdoor areas, power cable should not be lighter than polychloroprene sheathed cable. Use only cables labeled with ID 60245 IEC 57#.



Danger

If there is not a reliable grounding in the electrical system, once electrical failure, it may cause serious damage or injury to the unit and personnel.

Appliances and pipes must be connected to the equipotential joints of the building.



Danger

Incorrect power wire configuration can cause serious injury to the current and cause electric appliance damage.

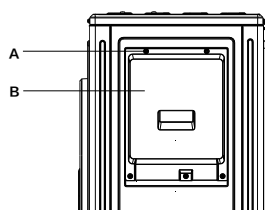
Do not switch the "L" and "N" wiring positions.

■ Explosion danger: Electrical components may produce sparks and may ignite due to the escape of refrigerant.

Before performing power operation, disconnect the power supply of the unit.

Check whether the system is powered off.

6.5 Connection wiring diagram

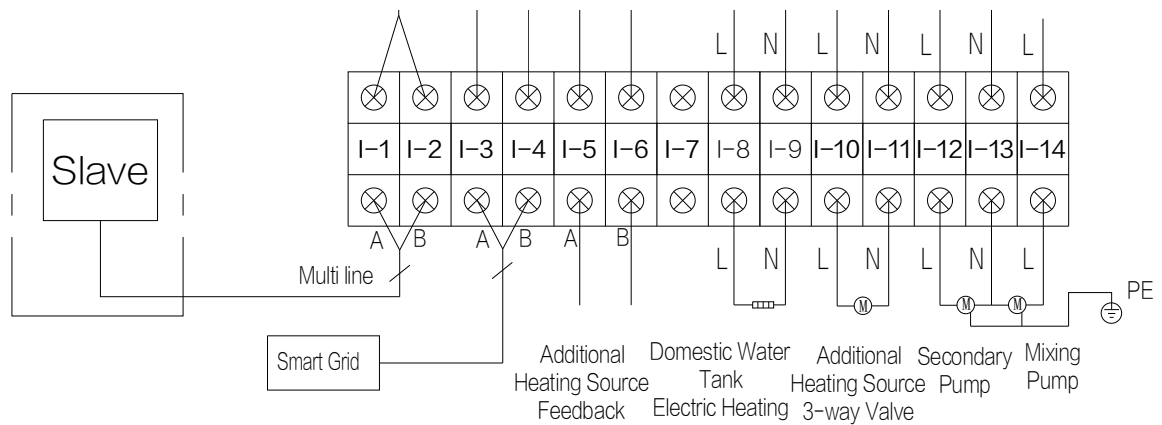


A: Screw B: Electric control box cover

■ Remove five screws with a screwdriver;

■ Move the electric control box cover down and remove it.

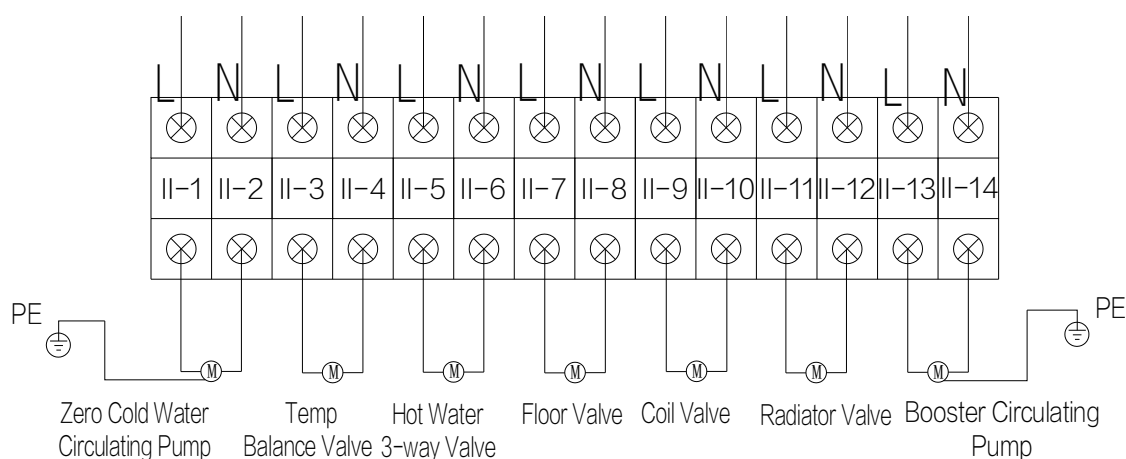
6.5.1 External control signal wiring diagram



Unit output or input connection cable and load specification table

Table 28		
Wiring terminal No.	Components/Functions	Specification
I-1 and I-2	Multi-link communication	Recommended connection cable: Shielded date cable: ■ Shielded date cable: $2 \times 0.34 \text{ mm}^2$ ■ Max. cable length:100米 ■ Voltage: 24VDC
I-3 and I-4	Smart grid communication	
I-5 and I-6	Auxiliary heating source feedback communication	
I-7	Don't connect anything here!	
I-8 and I-9	Water tank electric heating	■ Output: 230W ■ Voltage: 230v ~ ■ Max. allowable current:1A Recommended connection cable: ■ $3 \times 1.5 \text{ mm}^2$ ■ Max. cable length:50 m
I-10 and I-11	Auxiliary heating source 3-way valve	■ Output: 230w ■ Voltage:230v ~ ■ Max. allowable current:1A Recommended connection cable: ■ $2 \times 1.5 \text{ mm}^2$ ■ Max. cable length:50 m

I-12 and I-13	Secondary pump: Circulating water pump between buffer water tank and radiator (such as floor heating, radiator, and fan coil unit)	Configurable connections ■ Output:230w ■ Voltage:230v ~ ■ Max. allowable current:1A Recommended to use flexible cable: ■ $3 \times 1.5 \text{ mm}^2$ ■ Max. cable length:50 m
I-13 and I-14	Mixing pump: Circulating pump is connected between the main inlet and outlet of the floor heating system, which is used for room temperature zoning control and regulation(for example, achieve different water temperatures between the floor heating and the radiator or between the floor heating and the fan coil unit.)	



Unit output or input connection cable and load specification table

Table 29		
Wiring terminal No.	Components/Functions	Specification
II1 and II2	Zero cold water circulating pump: Circulation pump for domestic hot water tank to faucet and shower room	Configurable connections ■ Output power:460w ■ Voltage:230v ~ ■ Max. allowable current:2A Recommended to use flexible connection wire: ■ 3 × 1.5 mm ² ■ Max. cable length:50 m
II 3 and II 4	Temperature balance valve: The valve connected between the main inlet and outlet of the floor heating is used to achieve room temperature partition control and regulation (such as the floor heating and the radiator or the floor heating and the fan coil unit to achieve different water temperatures).	■ Output:460w ■ Voltage:230v ~ ■ Max. allowable current:2A Recommended connection cable: ■ 2x 1.5 mm ² ■ Max. cable length:50 m
II 5 and II 6	Hot water 3-way valve	■ Output:460w ■ Voltage:230v ~ ■ Max. allowable current:2A Recommended connection cable: ■ 2x 1.5 mm ² ■ Max. cable length:50 m
II 7 and II 8	Floor heating solenoid valve: used to control the on-off of the floor heating water system	
II 9 and II -10	Fan coil unit solenoid valve: used to control the on-off of the fan coil unit water system	
II -11, II -12	Heating solenoid valve: used to control the on-off of radiator water system	

II-13, II-14	Booster pump circulation: When the water flow of the built-in water pump in the unit cannot meet the actual installation requirements, it is used as an auxiliary spare water pump	Configurable connections ■ Output:230w ■ Voltage:230v ~ ■ Max. allowable current: 1A Recommended to use flexible connection wire : ■ $3 \times 1.5 \text{ mm}^2$ ■ Max. cable length:50 m
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Note

If the Max. working power of the output load exceeds the allowable value in the table above, use an AC contactor for conversion; To avoid damage to the unit. Such as: electric heating, water pump, etc.

6.5.2 Connection of controller and sensor

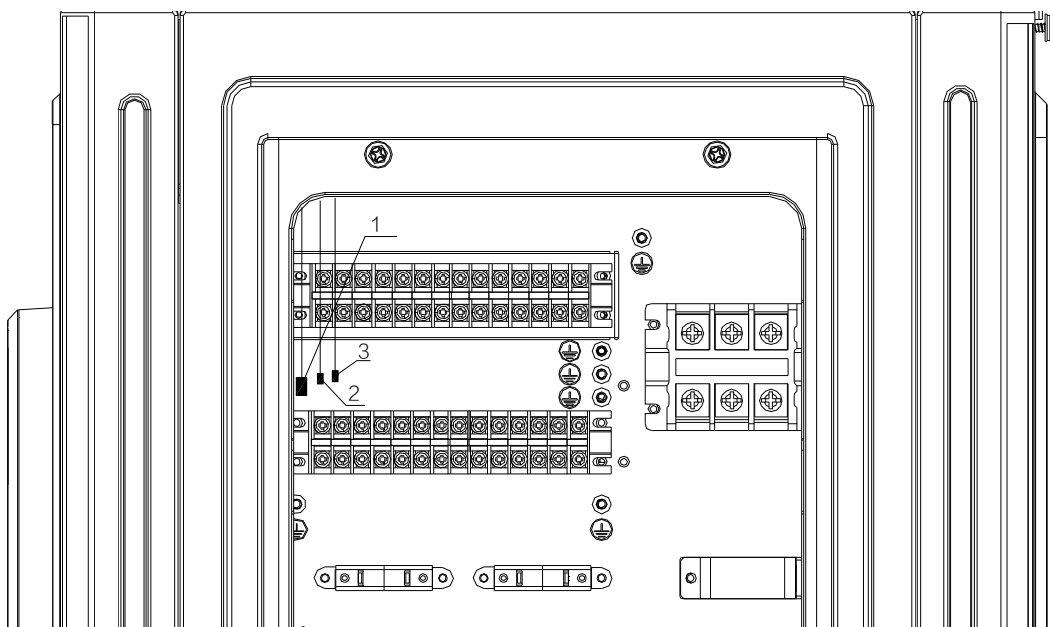


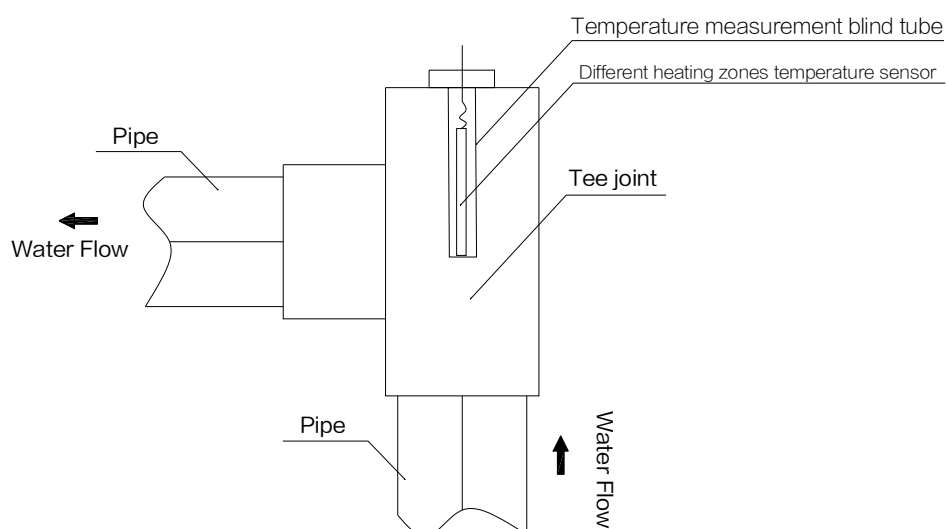
Table 30

No.	Butted line name	Butted line specification
1	Wire controller butted line	4-d wire, Butted line, Color: White
2	DHW tank temperature sensor butted line	2-d wire, Butted line, Tag: Tdhw
3	Butted line of temperature sensors in different heating zones	2-d wire, Butted line, Tag: TM

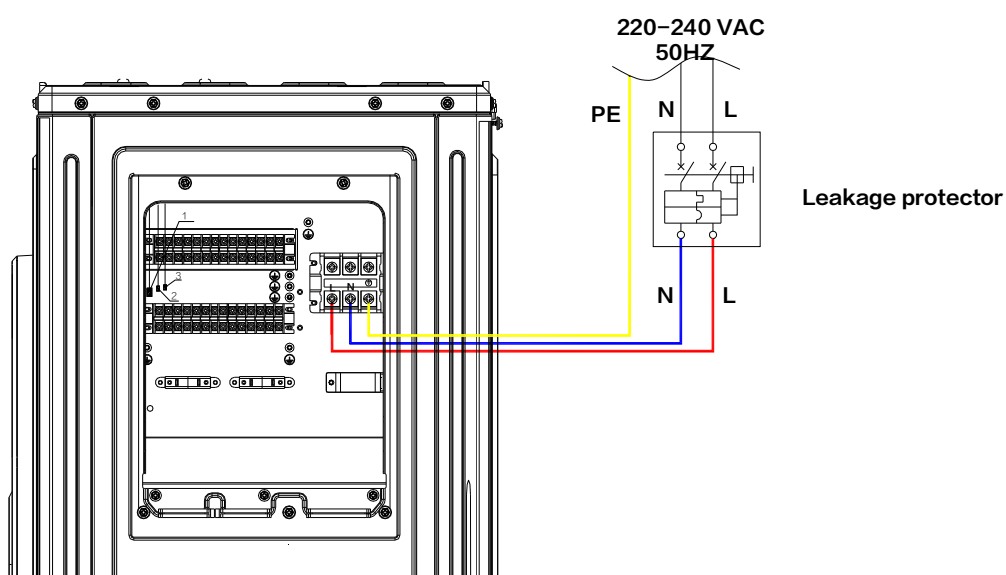
■ The wire controller (accessory) is connected with "1".

■ The sensor (accessory) is connected with "2", and the temperature probe is placed in the temperature measurement blind tube of the domestic water tank; Sensors for measuring water temperature in domestic water tanks.

■ The sensor (accessory) is connected with "3". The sensor is installed in the temperature measurement blind tube on the main water inlet pipe of the floor heating system. The installation position is shown as follows.

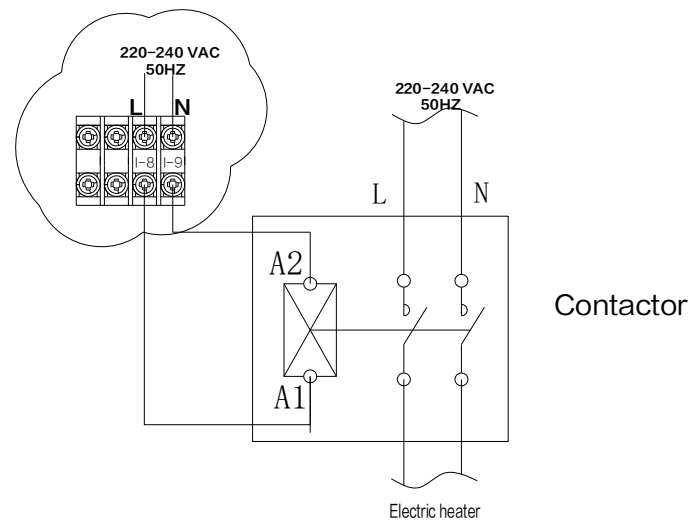


6.5.3 Unit power connection



- Recommended power wire: H07RN-F. PVC cables are not allowed.
- The PE ground wire must be longer than both the L and N wires.
- Protect the power wire from direct sunlight.
- Do not exchange "L" and "N" cores.
- Unit input power supply please install qualified leakage protector and switch, input power wire diameter should meet the requirements: see power supply configuration and wire diameter specifications
- The Max. length of a power cable should not exceed 15m.

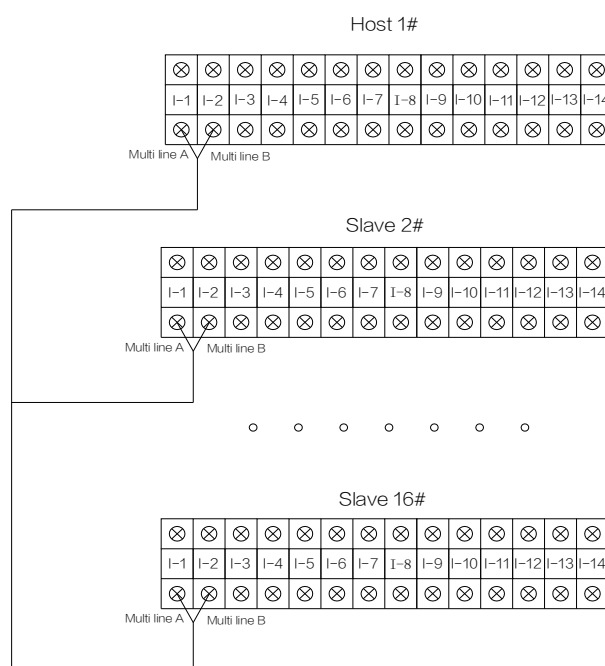
6.5.4 Connection of electric heater of domestic water tank



- Do not connect the DWH water tank electric heater directly to the terminal block of the unit;
- Please use AC contactor when converting connections;
- If the power or current of other output loads exceeds the requirements (see "Table 14"), please convert through AC contactor.

6.5.5 Module parallel wiring diagram

- A Max. of 16 units of the same specifications and models can be installed in parallel in this manual. Units of different specifications are not allowed to be installed in parallel;
- When the modules are connected in parallel, the wire controller and external temperature sensor are connected to the host, and all other control signals, such as the wire controller, circulating pump, external auxiliary electric heater, etc., do not need to be connected to the slave, they must be connected to the host; The communication lines of the host and slave are shown as follows:



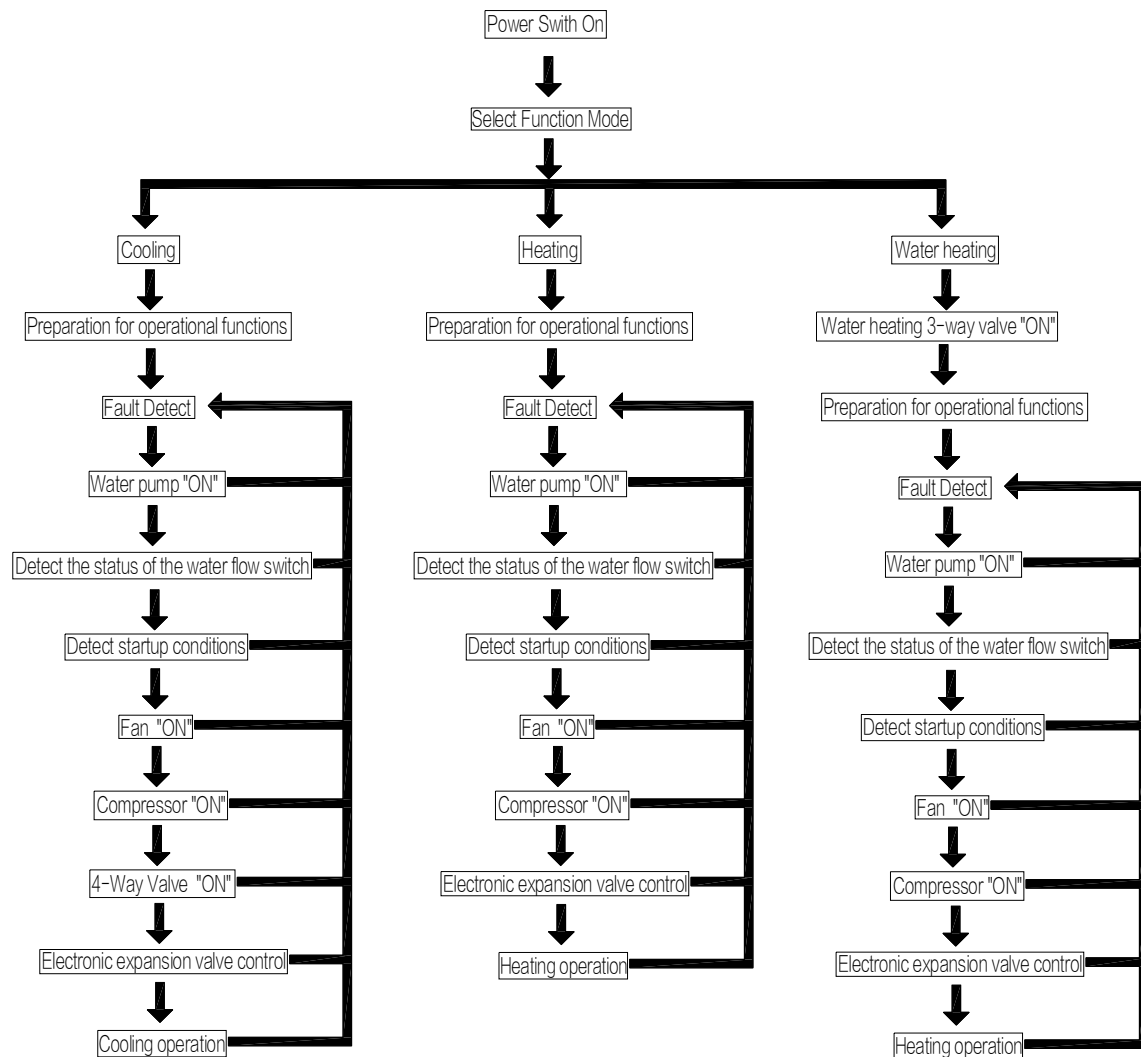
Note: Communication lines between units need to be purchased before installation; Recommended specifications and material: 2-d, RVVP, recommended wire diameter :1.0~1.5, Max. length<50m.

6.5.6 Dial code setting of unit

Table 31						
Dial code	Address				Unit No.	Explanation
	1	2	3	4		
SW1	ON	ON	ON	ON	1#	When the lever is moved to ON, it is ON, and the opposite direction is OFF
	OFF	ON	ON	ON	2#	
	ON	OFF	ON	ON	3#	
	OFF	OFF	ON	ON	4#	
	ON	ON	OFF	ON	5#	
	OFF	ON	OFF	ON	6#	
	ON	OFF	OFF	ON	7#	
	OFF	OFF	OFF	ON	8#	
	ON	ON	ON	OFF	9#	
	OFF	ON	ON	OFF	10#	
	ON	OFF	ON	OFF	11#	
	OFF	OFF	ON	OFF	12#	
	ON	ON	OFF	OFF	13#	
	OFF	ON	OFF	OFF	14#	
	ON	OFF	OFF	OFF	15#	
	OFF	OFF	OFF	OFF	16#	

7. Unit control function

7.1 Unit control flow diagram



7.2 Main components control logic

7.2.1 Secondary pump

The heat pump unit operates, the secondary pump operates; The heat pump unit stops, and the secondary pump delays

7.2.2 Zero cold water circulating pump

Zero cold water pump runs for 20 seconds and stops for 60 minutes; Works only in hot water mode.

7.2.3 Mixing pump and mixing 3-way valve control

In heating mode or cooling mode, when the user needs two different end water temperature control (defined as high temperature zone and low temperature zone), the user additional configuration of water mixing pump, proportional water mixing 3-way valve, water mixing temperature sensor, to achieve the purpose of adjusting the temperature of the low temperature zone. The wire controller sets the second water temperature function as "1" (0 is not enabled, 1 is enabled), and sets the second target water temperature (table ub(range from 20 to 50°C) to meet the heating mode, $T_{sub} \leq (T_{set} - 2)$; In cooling mode, $T_{sub} \geq (T_{set} + 2)$.

7.2.4 Compressor control

After powering on, the wire controller starts and detects the outdoor ambient temperature.

When the compressor startup conditions are met, the unit starts running.

7.2.5 Unit deicing heater band control

During defrosting of the unit, turn on the defrosting heating of the chassis, and judge after defrosting:

- a. When the ambient temperature is greater than -5°C , turn off after defrosting is completed;
- b. $-15^{\circ}\text{C} < T_a \leq -5^{\circ}\text{C}$, turn off 15 minutes after defrosting is completed;
- c. Ambient temperature $T_a \leq -15^{\circ}\text{C}$, continuously on.

7.2.6 Auxiliary electric heating control

Auxiliary electric heating can be turned on or off by selecting the function on the wire controller (0 is off, 1 is on, the default is 0), after setting off, the electric heating will not be turned on except for entering the automatic antifreeze function; the auxiliary electric heating function is only effective in the heating mode.

After meeting the condition for turning on auxiliary electric heating, turn on the auxiliary electric heating for 1 ~ 5 minutes first. If the conditions for turning on auxiliary electric heating are still met, then turn on the auxiliary electric heating for 2 minutes; After the conditions for turning off the auxiliary electric heating are met, turn off the auxiliary electric heating for 1 ~ 3 minutes. If the conditions for turning off the auxiliary electric heating are still met, then turn off the auxiliary electric heating for 2 minutes.

- TFT-008\ TFT-010\ TFT-012 equipped with a set of electric heating;
- TFT-014\ TFT-016 equipped with two sets of electric heating.

7.2.7 Temperature balance valve control

The water temperature balance valve is mainly used for switching between hot water and cooling mode, to avoid users blowing hot air during the cooling process. If the following adjustments are met simultaneously, it is considered that the opening conditions for the water temperature balance valve are met, and the water temperature balance valve is immediately energized to open:

1. When the unit operation mode of the unit changes from hot water mode to cooling mode.
2. The outlet water temperature is greater than 28°C .

If any of the following conditions are met, it is considered that the conditions for closing the water temperature balance valve are met, and the water temperature balance valve is closed after a delay of 10 seconds:

1. Continuous 30 seconds, with outlet water temperature $\leq 25^{\circ}\text{C}$;
2. The opening time of the water temperature balance valve exceeds 20 minutes;
3. The unit mode is non cooling mode.

7.2.8 Auxiliary heat source three-way valve control

When the feedback signal connection of external heat source is detected, the external heat source 3-way/2-way valve port output on the control board is connected, otherwise the control board port is disconnected.

7.2.9 Electric heating control for domestic water tank control

Users can set the electric heating of the water tank to non electric auxiliary, energy-saving mode or rapid heating mode through the wire controller (set by the wire controller, 0 is non electric auxiliary, 1 is energy-saving mode, 2 is fast heating mode, and the default is 0).

1. Non electric auxiliary mode, electric heating is not turned on, (maximum heating temperature 65°C)
2. Water tank electric heating energy-saving mode

Water tank electric heating is turned on when the following conditions are simultaneously met:

- a. The actual temperature of the water tank $\leq$ set temperature of the water tank -4°C (parameters are set by the wire controller, default to 4°C)
- b. The actual temperature of the water tank is greater than the heating shutdown water temperature -14°C
- d. The current mode is hot water mode

If any of the following conditions are met, turn off the electric heating of the water tank:

- a. The actual temperature of the water tank is greater than the set temperature
- b. Shutdown
- c. After powering off and on, turn off and rejudge based on the powering on situation
- d. Exit hot water mode

3. Rapid heating method for water tank electric heating

Turn on the electric heating of the water tank when the following conditions are met:

- a. Actual temperature of water tank $\leq$ set temperature - regenerative difference
- b. The current mode is hot water mode

Turn off the electric heating of the water tank when any of the following conditions are met:

- a. Actual temperature of water tank $>$ set temperature
- B. Shutdown
- c. After powering off and on, turn off and rejudge based on the powering on situation
- d. Exit hot water mode.

7.2.10 Solenoid valve control

The terminal application controller can be set with a total of 8 settings (0-7, default setting 0) for cooling terminal application, 8 settings (0-7, default setting 1) for heating terminal application, and 2 settings (0-1, default setting 0) for hot water terminal application. When the unit is at the corresponding setting in the table below, the solenoid valves/three-way valves under the corresponding terminal application setting are energized to turn on, and the other solenoid valves/three-way valves are de-energized to turn off.

Mode	Terminal application setting	Valves' response under the terminal application setting			
		Fan coil solenoid valve	Floor solenoid valve	Radiator solenoid valve	Hot water 3-way valve
Cooling	Cooling 1(Fan coil unit, setting 0)	ON	OFF	OFF	OFF
	Cooling 2(Floor, setting 1)	OFF	ON	OFF	OFF
	Cooling 3(Radiator, setting 2)	OFF	OFF	ON	OFF
	Cooling 4(Fan coil unit+Floor, setting 3)	ON	ON	OFF	OFF
	Cooling 5(Fan coil unit+radiator, setting 4)	ON	OFF	ON	OFF
	Cooling 6(Floor+radiator, setting 5)	OFF	ON	ON	OFF
	Cooling 7(Fan coil unit+Floor+radiator, setting 6)	ON	ON	ON	OFF
	Cooling 8(No application, setting 7)	OFF	OFF	OFF	OFF
Heating	Heating 1(Fan coil unit, setting 0)	ON	OFF	OFF	OFF
	Heating 2(Floor, setting 1)	OFF	ON	OFF	OFF
	Heating 3(radiator, setting 2)	OFF	OFF	ON	OFF
	Heating 4(Fan coil unit+Floor, setting 3)	ON	ON	OFF	OFF
	Heating 5(Fan coil unit+radiator, setting 4)	ON	OFF	ON	OFF
	Heating 6(Floor+radiator, setting 5)	OFF	ON	ON	OFF

	Heating 7(Fan coil unit+Floor+radiator, setting 6)	ON	ON	ON	OFF
	Heating 8(No application, setting 7)	OFF	OFF	OFF	OFF
Heating water	Heating water 1(Heating water function, setting 1)	OFF	OFF	OFF	ON
	Heating water 2(No heating water function, setting 0)	OFF	OFF	OFF	OFF

7.2.11 Automatic antifreeze control

When the unit is in standby, shutdown or fault shutdown state for heating/hot water production, the following conditions should be used for judgment;

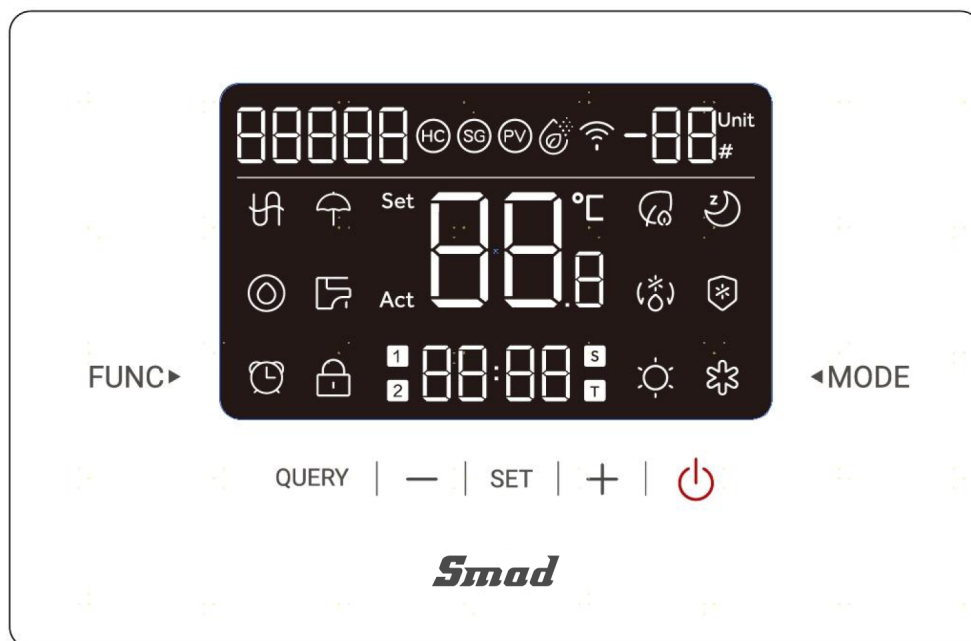
- a) Ambient temperature $\leq 2^{\circ}\text{C}$;
- b) The shutdown time of the water pump is greater than 30 minutes;
- c) Antifreeze temperature $\leq 5^{\circ}\text{C}$;

Antifreeze temperature $\leq 3^{\circ}\text{C}$, third level antifreeze, follow normal heating operation

Antifreeze temperature $\leq 4^{\circ}\text{C}$, secondary anti freezing, start the circulating water pump and assist in electric heating;

Antifreeze temperature $\leq 5^{\circ}\text{C}$, once anti freezing, start the circulating water pump to run.

7.3 Functions and settings of the wire controller



7.3.1 Key functions

Table 33			
Serial Number	Icon	Name	Function
1		ON/OFF Key	Turnon/off function. Display clock, actual water temperature and number of connection units after powering off, and display working mode after powering on.
2	+/-	+ , - Key	Adjust temperature or set parameters. Press the+, - keys directly to adjust the set temperature when turned on.
3	QUERY	Query Key	Query the parameters
4	◀MODE	Mode Key	Hold down for 3 seconds to switch modes.
5	FUNC▶	Function Key	(Timing) Function setting
6	SET	Set Key	Set parameters/time, confirm the temperature and time

7.3.2 Turn ON/OFF Key

The state of Turn Off displays clock, actual water temperature, number of connection units; After powering on, it displays the working mode icon, working status, clock, actual water temperature, and set temperature. In the case of effective power, pressing the "ON/OFF" key under the case of power off, it will be immediately powered on, on the contrary, then powered off.

7.3.3 "+/-" Key

In the case of power on, the temperature can be adjusted. The temperature can be adjusted to desired temperature only by pressing the "+/-" key on the main interface after the current mode icon is lit. It will stop blinking if no pressing key operation within 6 seconds later, exit the temperature setting and return to the main interface. The temperature can be adjusted within a certain range:

1. When the reference temperature is set to the outlet temperature 2, the water temperature ranges from 5 °C to 25°C (7 °C by default) in cooling mode and from 25°C to 75°C (40°C by default) in heating mode.
2. When the reference temperature is set to the return water control, the water temperature ranges from 10°C to 25°C (12°C by default) in cooling mode and from 25°C to 70°C (35°C by default) in heating mode.
3. When the reference temperature is set to the indoor temperature control, the indoor temperature ranges from 15°C to 30°C (27°C by default) in cooling mode and from 15°C to 30°C (20°C by default) in heating mode.
4. When the reference temperature is set to the water tank temperature control, the water temperature ranges from 25°C to 65°C (45°C by default) in non electric auxiliary mode and from 25°C to 75°C (45°C by default) in energy-saving and rapid heating modes. Mode selection wire controller parameters can be set.

7.3.4 "QUERY" Key

For querying running states parameters of the unit.

7.3.5 "FUNC" Key

Pressing the "FUNC" key in the state of turn off is invalid;

Several states are involved in the timing process: In the state of turn on, press the "FUNC" key to enter timing X state, press the "SET" key to enter timing X ON/OFF time preview state, and then press the "SET" key to enter timing X ON/OFF time and temperature setting state.

In the state of turn on, press the "FUNC" key to enter timing 1 state, at this point the interface only displays timing icon  and  flashing display 01 (indicating that timing 1 is set); Press the "SET" key, 01 keeps on,  flashing display,  keeps on displaying time (timing 1 ON time preview state), press the "+/-" key,  turns off,  flashing display,  keeps on displaying time (timing 1 OFF time preview state), press the "+/-" key to switch (timing 1 ON time preview state) and (timing 1 OFF time preview state); If it is in (timing 1 ON time preview state), press the "SET" key to enter (timing 1 ON clock setting state),  keeps on, clock position flashing display, press the "+/-" key to adjust the clock, press the "SET" key to confirm the clock, entering (timing 1 ON minute setting state), the clock keeps on, minute position flashing display, press the "+/-" key to adjust the minute, press the "SET" key to confirm the minute, entering (timing 1 OFF clock setting state),  turns off,  keeps on displaying, the clock position flashing display, press the "+/-" key to adjust the clock, press the "SET" key to confirm the clock, entering (timing 1 OFF minute setting state), the clock keeps on, minute position flashing display, press the "+/-" key to adjust the minute, press the "SET" key to confirm the minute, at the same time automatically saves the time of timing 1 ON and OFF, "SET" next to temperature display keeps on, set temperature flashing, press the "+/-" key to adjust timing 1 set temperature, press the "SET" key to confirm the temperature and return to the main interface.  keeps on on the main interface. The timing 1 setting has taken effect. In the whole process, press the "QUERY" key and the "ON/OFF" key continuously to return to the state of the upper level until exit the timing setting and return to the main interface. If there is no pressing key operation for 50 seconds, it will exit to the main interface.

After timing 1 takes effect and returns to the main interface, press the "FUNC" key to enter timing 2 state directly, at this point the interface only displays timing icon  and  flashing display 02 (indicating that timing 2 is set), press the "-" key can change the timing 2 to timing 1 state,  flashing displaying 02 becomes flashing display 01 (At this time, if pressing the "SET" key, it will enter the timing 1 ON/OFF time preview state, and then press the "SET" key to reset the time of the timing 1), press the "+" key to change the state of timing 1 to timing 2,

0000 flashing displaying 01 becomes flashing display 02; Press the "SET" key, 02 keeps on, [S] flashing display, 0000 keeps on displaying time (timing 2 ON time preview state), press the "+/-" key, [S] turns off, [S] flashing display, 0000 keeps on displaying time (timing 2 OFF time preview state), press the "+/-" key to switch (timing 2 ON time preview state) and (timing 2 OFF time preview state); If it is in (timing 2 ON time preview state), press the "SET" key to enter (timing 2 ON clock setting state), [S] keeps on, clock position flashing display, press the "+/-" key to adjust the clock, press the "SET" key to confirm the clock, entering (timing 2 ON minute setting state), the clock keeps on, minute position flashing display, press the "+/-" key to adjust the minute, press the "SET" key to confirm the minute, entering (timing 2 OFF clock setting state), [S] turns off, [S] keeps on displaying, the clock position flashing display, press the "+/-" key to adjust the clock, press the "SET" key to confirm the clock, entering (timing 2 OFF minute setting state), the clock keeps on, minute position flashing display, press the "+/-" key to adjust the minute, press the "SET" key to confirm the minute, at the same time automatically saves the time of timing 2 ON and OFF, "SET" next to temperature display keeps on, set temperature flashing, press the "+/-" key to adjust timing 2 set temperature, press the "SET" key to confirm the temperature and return to the main interface, [S] keeps on on the main interface. At this time, timing 1 and 2 will take effect simultaneously.

When timing 1 and 2 take effect at the same time, press the "FUNC" key on the main interface to directly enter the timing 3 state. The following settings are the same. A maximum of nine timing periods can be set.

In the state of turn on, hold down the "FUNC" key for 6 seconds to remove all timing, time and temperature in all timing periods are removed, timings failure, [S] turns off.

All timing cycles take effect every day unless holding down the "FUNC" key for 6 seconds or switching modes, all timing is removed.

It automatically saves the settings when power off, and the timing can keep the state before the power off when power on again, automatically starting the previous timing settings.

After the timing setting is completed, switch modes, time and temperature in all timing periods are removed, timings failure, [S] turns off.

7.3.6 "MODE" Key

In the display interface of power on, hold down the "MODE" Key for 3 seconds to switch mode display icons successively. Hot water mode and mixing mode are valid only when parameter 52 (hot water terminal selection) is set to 1. When the selected mode is set to single mode, the selected mode icon keeps on and the mode is enabled. When the mode is set to mixing mode, the mixing mode icon is lit up at the same time, and the current running sub-mode in mixing mode flashing for every 10 seconds and displays for every 3 seconds. In the mixing mode, press the "QUERY" key to pop up the interface for setting water temperature of the current mode, the current mode and setting water temperature flashing display, and then pressing the "QUERY" key again can switch to another sub-mode, on the flashing interface of sub-mode and set temperature, press the "+/-" key to adjust the set temperature of the current mode. After the temperature is set completely, pressing the "SET" key to confirm and return to the main interface of mixing mode.

Mode icon selection comparison table

Table 34		
Serial Number	Model Mode Type	Icon Display Type (① is factory default)
0	Hot Water - 0	① Hot Water 
1	Heating - 2	① Heating 
2	Cooling - 3	① Cooling 
3	Heating +Cooling - 1	① Heating  ② Cooling 
4	Hot Water+Heating - 4	① Heating  ② Hot Water 
5	Hot Water+Cooling - 5	① Hot Water  ② Cooling 
6	Hot Water+Cooling - 6	① Hot Water  ② Cooling  ③ Hot Water + Cooling 
7	Hot Water+Heating +Cooling - 7	① Heating  ② Hot Water  ③ Cooling 

8	Hot Water+Heating +Cooling - 8	① Heating  ② Hot Water  ③ Cooling  ④ Heating + Hot Water  ⑤ Hot Water + Cooling 
9	Reserved	
10	Reserved	

Note: 0 represents models with only hot water mode, and only the hot water icon  can be lit up; 3 represents models with only heating and cooling modes, and only the heating icon  and cooling icon  can be lit up separately.

7.3.7 Display content

Table 35	
Icon	Definition
	Displays the current time and timing state
	Displays the set temperature (Set) and the actual temperature (Act). The actual temperature includes the actual outlet water temperature, inlet water temperature, water tank temperature, or indoor ambient temperature
	Entering into the heat pump hot water mode, this icon lights up.
	Entering into the heat pump heating mode, this icon lights up.
	Entering into the heat pump cooling mode, this icon lights up.
	When the electric auxiliary turns on, this icon lights up.
	When timing starts, this icon lights up.
	Displays the number of connection units and machine numbers.
	Entering into antifreezing operation, this icon lights up.
	Entering into defrosting, this icon lights up.
	When the return water function starts, this icon lights up.
	After the press or the electric auxiliary turns on, this icon stretches and dynamically displays
	After connecting WiFi hot spot, this icon lights up (reserved)
	When the child lock function turns on, this icon lights up
	When the vacation function starts, this icon lights up (reserved)

	When the energy-saving function starts, this icon lights up (reserved)
	When the mute mode starts, this icon lights up (reserved)
	When the high cool mode starts, this icon lights up (reserved)
	when connecting into the smart grid, this icon lights up
	When connecting into the photo voltaic mode, this icon lights up
	When sterilizing in hot water mode, this icon lights up (reserved)
	The position of middle double 8 displays Yr, which represents the preheating function of the press

7.3.8 Daily use setting operation

7.3.8.1 Power on

When the wire controller is powered on for the first time, the buzzer sounds “drip”, followed by two short sounds of “drip, drip”; After 3 seconds of all patterns displayed on the display screen, the system will enter the shutdown state (when in the memorizing shutdown). Power off displays actual water temperature or real-time indoor temperature, clock, number of connection units.

7.3.8.2 Turn ON/OFF

In the state of turn off, press the "⏻" key to turn on the unit, in the state of turn on, press the "⏻" key to turn off the unit. The upper and middle bright line of the display board is dynamically displayed under the state of power on when the press or electric auxiliary heat is working, displaying the working mode and state icon, set and actual temperature and clock.

7.3.8.3 Fault Query

If a fault happening under the state of power on, in the case of non-modular installation, the fault code is displayed directly on the main display area while "01#" in the upper right corner of the wire controller flashes to display the fault code, and if there are multiple faults existing, it will flash one by one in the sequence of the fault; In the case of modular installation, "***#" flashing is displayed in the first system and "-***#" flashing is displayed in the second system at the upper right corner of the wire controller, the two digital tubes in the middle display fault codes flashing, in the case of multiple connection with the unit occurring faults, it will flash one by one in the sequence of the fault.

In the state of dual-8 displaying fault, hold down the "SET" key for 6 second to mask the dual-8 fault display, which only flashing on "#" in the upper right corner. In this state, all functions of the wire controller are vaild. Press the "ON/OFF" key to restore the dual-8 fault display.

Regardless of the state of power on or power off, hold down the "+" and "-" keys for 6seconds to enter into the fault query function. The first three digits "8" of the five digits "8" in the upper left corner displays "Err", and the last two digits "8" display serial number, if no fault occurs, the main area will display "E0"; And if fault occurs, it will display the serial number of the faulty unit and "#", if the second system occurs fault, it will add "-" before the numbers, the main display area diasplays fault code, the clock position displays the year, date and time of the fault occurring in an alternate loop of 3 seconds, if occurring fault, it will start with the most recent display, querying fault by pressing the "+" and "-" keys in turn for a total of 80 times. No operation for 60 second after querying or pressing the "ON/OFF" key to exit the fault query function. Entering into the fault query function, and then hold down the "+" and "-" keys for 6 seconds to clear historial fault code.

In the state of fault locked, pressing the "ON/OFF" key can clear the locked state.

7.3.8.4 Running Parameter Query

Under the state of power on and in the case of the wire controller under the main inreface, press the "QUERY" key for 6 seconds to enter the parameter query function, of the five digits "8" in the upper left corner, the first digit "8" displays "d" and the last two digits "8" display the parameter serial numbers, the corresponding parameter values are displayed at the clock position, the unit number and "#" are displayed in the upper right corner, switching to the corresponding parameter by pressing the "+" and "-" keys.

In the case of multiple connection with units, press the "MODE" key on the parameter query interface to switch the unit number and query parameters of other units. Press the "QUERY" key or the "🔌" key or no operation for 60 seconds constantly, the system automatically exits the query interface.

Table 36 Comparison Table of the Unit Running Parameter			
Query Code	Corresponding Parameter	Query Code	Corresponding Parameter
01	Communication protocol version number	29*	Water pump feedback
02	Temperature of outlet water thermometer bulb	30	Remote switch
03	Temperature of inlet water thermometer bulb	31	Interlock switch
04	Temperature of outdoor ambient thermometer bulb	32*	Cooling electronic expansion valve (reserved)
05	Temperature of air suction thermometer bulb	33*	Heating electronic expansion valve (reserved)
06	Temperature of outdoor coil thermometer bulb	34*	Jet electronic expansion valve (reserved)
07	Temperature of air exhaust thermometer bulb	35	Tmax
08	Temperature of thermometer bulb of water temperature in water tank	36*	Pressure relief switch
09	Temperature of defrosting thermometer bulb	37	Compressor current
10*	Temperature of refrigerant gas pipe thermometer bulb	38*	Relative ambient temperature
11	Temperature of refrigerant liquid pipe thermometer bulb	39*	Flow sensor value
12	Fan 1 speed	40	Busbar voltage
13	Fan 2 speed	41	Crankcase heating
14	Opening of the main electronic expansion valve	42	Circulating water pump
15	Frequency of the press	43	Chassis heating
16*	Temperature of returning water thermometer bulb of client	44	4-way valve
17	User set temperature	45*	Compressor overload
18*	Reserved	46*	Auxiliary heat overload
19	Economizer air intake sensor temperature	47*	Coil in the system
20	Economizer air exhaust sensor temperature	48	Input current

21	Opening of auxiliary electronic expansion valve	49	Input voltage
22	Temperature of total return water thermometer bulb	50	State of frequency limiting and frequency decreasing
23	Temperature of total outlet water thermometer bulb	51	Temperature of outlet water 2 thermometer bulb
24	High pressure sensor	52	Temperature of indoor ambient temperature sensor
25	Low pressure sensor	53	Item special number of the main control board
26	Water flow switch	54	Program version number of the main control board
27	High voltage switch	55	Item special number of the display panel
28	Low voltage switch	56	Program version number of the display panel

7.3.8.5 Setup Menu

In the case of power off, the wire controller is on the main interface, hold down the "SET" key for 6 seconds to enter the parameter setting interface, the first three digits of "8" in the upper left corner display "Fun", and the last two digits display the parameter number, the corresponding parameter value is displayed on the clock position, and the unit number and "#" are displayed on the upper right corner, switching to the corresponding parameter by pressing the "+" and "-" keys. If necessary to change the parameters of the current display interface, press the "SET" key again to enter the setting interface of the parameters, at this point the parameter flashing display, press the "+" and "-" keys to set the parameter and then press the "SET" key to save the setting after setting finished.

Press a key other than the "+", "-" or "SET" key to exit the menu directly, and the corresponding parameters are not retained. If no key pressing operation for 60 seconds, the system automatically exits the main interface.

Table 37			
Serial Number	Parameter Name	Parameter Setting	
00	Clock setting	Set current time	
01	Return difference setting ($T_{\text{return different}}$)	2°C ~ 15°C (4°C by default)	
02	Control temperature selection	0/1/2/3(0-inlet water, 1-outlet water, 2-water tank, 3-indoor ambient temperature, 1 by default)	
03	Turn ON/OFF memory function setting	1 (Function ON by default)	0 (Function OFF)
04	Manual circulating pump ON	1(Function ON, automatically turning off after 1 hour)	0 (Function OFF by default)
05	Manual electric auxiliary ON	1 (Function ON)	0 (Function OFF by default)
06	Forced defrosting ON	Unit 1-16 can be set to turn on forced defrosting, press the "SET" key to enter forced defrosting, press other keys do not enter forced defrosting.	
07	Defrosting cycle	30 ~ 120min, 50min by default	
08	Defrosting run time	5 ~ 15min, 10min by default	
09	Ambient temperature setting for electric heating on	Ambient temperature setting for electric heating on, -25 ~ 20°C, default -4°C	
10	Antifreezing temperature setting	3 ~ 10°C (3°C by default)	
11	Water pump operational	0 (Standby and non-stop water pump by default)	

	mode	1 (Function ON, water pump turns off in standby) 2 (Intermittent ON, turn on standby for 5 minutes every 5 minutes seeing Pump Parameter Settings)	
12*	/	/	/
13	Test mode	0 (Function OFF by default) 1 to 50 correspond to the test mode content dividedly	
14*	/	/	/
15	Restore factory setting	0 (Default, do not restore factory setting)	1 (Restore factory setting)
16*	Model type selection	0 Heating and cooling machine	1 Single heating (B5)
17*	Outlet water controls Tr return difference (Drop temperature of inlet water temperature in downtime)	2°C by default (1-5°C is adjustable)	
18*	Set Temperature - Reference temperature	10°C by default (5-15°C is adjustable)	
19*	Snow protection function	1 (Function ON by default)	0 (Function OFF)
20*	Water temperature parameter for electric heating ON	35 ~ 60°C. The default value is 40°C	
21*	Water temperature parameter for electric heating OFF	40 ~ 70°C. The default value is 55°C	
22	Initial value of temperature difference between inlet and outlet water in cooling	The default value is 5°C (0-15°C is adjustable)	
23	Initial value of temperature difference between inlet and outlet water in heating	The default value is 5°C (0-15°C is adjustable)	
24*	Sensor control mode	1 (Temperature sensor control)	0 (Pressure sensor control by default)
25*	Constant temperature function setting	1 (Function ON by default)	0 (Function OFF)
26	Water flow switch mode	1 (Each machine comes with it by default)	0 (Shared, machine without it, installing on the sence)
27*	Modbus address setting	1-255	
28*	Backwater timing setting	0 by default, 0-10 is adjustable	
29*	Backwater temperature setting	Backwater opening temperature 20~50 is adjustable, 35 by default	
30*	Backwater pump interval time setting	Backwater pump interval time setting, 3~60min is settabl, 12min by default	
31*	Backwater pump duration setting	Backwater pump duration setting, 3~30min is settable, 6min by default	
32*	Backwater function setting	1 (Function ON by default)	0 (Function OFF)
33*	Humidity sensor setting	1 (Function ON by default)	0 (Function OFF)
34*	Water flow sensor	1 (Function ON)	0 (Function OFF by default)
35	Preheating function	1 (Function ON by default)	0 (Function OFF)
36*	Water emptying function	1 (Function ON)	2 (Function OFF by default)
37*	Variable water temperature energy-saving function	1 (Function ON by default)	0 (Function OFF)
38	Water pump run time	Water pump energy-saving mode 1~20min is settable, 5min by default	
39	Water pump stop time	Water pump energy-saving mode 1~20min is settable, 5min by default	
40	Compressor preheating time	(3~72)×10min is settable, 12×10min by default	

41	Display mode	1 (Only display the set temperature)	2 (Display the set temperature and the actual temperature, 2 by default)
42	Shutdown mode	1 (Return difference shutdown by default)	2 (Shutdown as soon as the temperature reaching)
43	Defrosting exit and temperature correction	0-20°C, 0°C by default	
44	Mute control mode	0 (OFF by default)	1 (ON)
45	Secondary pump delay disconnection time	0-120min, 0 by default	
46	Zero cold water pump opening time	0-60s, 20s by default	
47	Zero cold water pump turn-off time	0-360min, 60min by default	
48	Secondary water temperature function	0 (Not enabled by default)	
49	Auxiliary electric heating function	0 (OFF by default)	1 (Function ON)
50	Cooling terminal selection	0 (Fan coil by default), 1 (Underfloor heating), 2 (Radiator), 3 (Fan coil + Floor), 4 (Fan coil + Radiator), 5 (Floor + Radiator), 6 (Fan coil + Floor + Radiator), 7 (No application)	
51	Heating terminal selection	0 (Fan coil), 1 (Underfloor heating by default), 2 (Radiator), 3 (Fan coil + Floor), 4 (Fan coil + Radiator), 5 (Floor + Radiator), 6 (Fan coil + Floor + Radiator), 7 (No application)	
52	Hot water terminal selection	0 (No hot water function by default)	1 (Hot water function)
53	Self-adapting function of heating water temperature	0 (Not enabled by default)	1 (Enabled)
54	Self-adapting function of cooling water temperature	0 (Not enabled by default)	1 (Enabled)
55	Priority of cooling+hot water mode	0 (Even running by default), 1 (Cooling priority), 2 (Hot water priority)	
56	Priority of heating+hot water mode	0 (Even running by default), 1 (Heating priority), 2 (Hot water priority)	
57	Running mode enabled by ECO	0 (OFF by default), 1 (Hot water ON), 2 (Heating ON), 3 (Cooling ON), 4 (Cooling + Hot water ON), 5 (Heating + Hot water ON)	
58	Hot water energy storage temperature	65°C by default, setting in the state of ECO signal in valid	
59	Heating energy storage temperature	55°C by default, setting in the state of ECO signal in valid	
60	Cooling energy storage temperature	10°C by default, setting in the state of ECO signal in valid	
61	Domestic water tank electric heating control	0 (Automatic by default), 1 (Rapid heating)	
62	Secondary target water temperature Tsub	20-50°C, 40°C by default	
63	Set the day of the week	1 (Monday), 2 (Tuesday), 3 (Wednesday), 4 (Thursday), 5 (Friday), 6 (Saturday), 7 (Sunday)	
64	Defrosting exit and detection time correction	0-20s, 0 by default	
65	ECO mode selection	0 (OFF by default), 1 (high cool), 2 (Smart grid), 3 (Photovoltaic)	
66	Test mode frequency	Frequency range 0-120Hz 0Hz by default	
67	/	/	/
68	Floor heating maximum water temperature	25-75°C, 50°C by default	
69	Floor cooling Minimum water temperature	5-25°C, 12°C by default	
70	Hot water temperature	0-20°C, 4°C by default	

	return change	
--	------------------	--

The functional item marked with * does not involve this function in the functional book.

Note: When the turn-on memory function is enabled, if the unit is in the state of turn off before power off, it will be turned off after power on; if it is in the state of turn on before power off, it will memorize the last running state after power off. Memory contents include on/off state, setting parameters, setting water temperature, etc.

7.3.8.6 System parameter function setting

Set the parameters of each system of each slave through the wire controller connected to the host, the parameters are directly set to the main control board of each slave and any system can be set. In the state of turn on, hold down the "SET" and "QUERY" key for 6 seconds, the first digits "8" of the five digits "8" in the upper left corner of the wire controller display "HS", and the last two digits "8" display parameter serial number, the corresponding parameter value is displayed on the clock position, the unit number and "#" are displayed on the upper right corner. Press the "+" and "-" keys to switch to the corresponding parameter.

When setting the parameter function of the multi connection system, press the "MODE" key to switch the unit number and set the parameters of other units.

Press the "SET" key to confirm the selection. In this case, the parameter value of the clock position flashing. Adjust the parameters by pressing the "+" and "-" key, pressing the "SET" key to save the setting after setting finished.

Press other keys than the "+", "-", "SET", "FUNC" and "MODE" keys to exit the menu directly, and the corresponding parameters are not retained. If no key operation is performed for 60 seconds, the system automatically exits the main screen.

Table 38		
Serial Number	Parameter Name	Parameter setting
1	Manual defrosting	0:OFF; 1:ON; Any system can be controlled. 0 by default
*2	Failure lock function	0:OFF; 1:ON; Any system can be controlled. 0 by default

The functional item marked with * does not involve this function in the functional book.

8. Debugging, inspection and repair

8.1 Power on

Power on

8.2 Starting the heat pump

Wire controller ON/OFF key to turn on the unit switch

Please note

Icing can cause damage to the heat pump and system.

Keep the power and wire controller ON/OFF switch permanently on.

Turn off the power and ON/OFF switch only for short periods of time.

8.3 System debugging

Debugging requirements

- Connect all water system pipelines to the heat pump and check for leaks.
- Whether the system is filled with heating water.
- All electrical components of the system have been connected.
- The outdoor unit has been connected to the mains.

Please note

Debugging the outdoor unit immediately after installation may cause damage to units.

The installation of outdoor units and the debugging of heat pumps should be separated by at least 30 minutes.



Danger

Contact with live parts can result in serious injury from electric current. Some components on the pcb remain live even after the power is turned off.

- Do not touch the electrical terminal areas.

- When working on an outdoor unit, isolate the system from the power supply, for example at a separate circuit breaker/fuse or main power supply isolator.

Check if the system has been powered off. Prevent unauthorized reconnection.



- Wait at least 4 minutes until voltage is fully restored before using the appliance.

Danger

In the event of an electrical fault, failure to ground system components may result in current and component damage, causing serious injury.

All grounding conductors must be reconnected.

Instruments and pipelines must be connected to the equipotential junction of the building.

Please note

When working on refrigerant circuits, refrigerant may escape.

- Always observe the regulations and guidelines for handling such refrigerants.

Work on refrigerant circuits should only be carried out by certified contractors (according to regulations (EU) No 517/2014 and 2015/2067).

8.4 Checking expansion tank and system pressure

- Check that the installed expansion tank is sufficient for the water volume of the system by carrying out calculations according to DIN 4807-2.

If the installed expansion tank is insufficient, provide an additional expansion tank for the secondary circuit on site.

- Check the precharge pressure of the expansion tank once a year.

Perform this test on cooling system.

1. Purge the air from the water system.

2. When the expansion tank precharge pressure is lower than the system static pressure: charge nitrogen at the diaphragm expansion tank valve until the precharge pressure is 0.1-0.2 bar (10 - 20kpa) above the system static pressure.

Please note

Do not allow the precharge pressure to fall below 0.7 bar (70 kPa) (boiling noise).

- *Factory precharge pressure: 1.2 - 1.8 bar (120 -180 kPa), rated pressure 1.5 bar*

3. When the water system is filled with water, the water system pressure should be not less than 1.9 bar (0.19 MPa) and 0.3 - 0.5 bar (30- 50kpa) higher than the expansion tank precharge pressure.

Maximum allowable working pressure of the water system: 6 bar (0.6 MPa).

8.5 Charging and exhaust the domestic hot water system

1. Open all water point valves of domestic hot water system;

2. Open the tap water valve for water system charging;
3. Once air stops exhausting from the water point of domestic hot water system, the exhaust of domestic hot water system is complete.

8.6 Inspection and protection of magnesium anode

We recommend replacing the magnesium rods when their diameter is reduced to 10 - 15 mm.

Please note

The protection of the magnesium rods fails and this can lead to corrosion damage in the domestic hot water tank or the inner coil heat exchanger.

8.7 Checking all connections of the heating, cooling, and domestic hot water systems for leaks



Danger

There is a risk of electric shock due to leakage from hot water or DHW.

During debugging and after maintenance work, check all water side connections for leaks.

Please note

Water system leakage may cause damage to the unit.

- Check for leaks in internal and on-site water connections.
- If there is a leak, the unit should be immediately shut down, the water in the system should be drained, the sealing gasket should be checked and replaced.

8.8 Recommended annual maintenance

Visual Inspection:

- Check all components for damage.
- Check all components and pipelines for corrosion.
- Check for oil residue inside the outdoor unit.
- Check all screw connections for looseness.
- Check all water-bearing components for leaks.
- Check all electrical components and connections for damage, deterioration and sealing.
- Check all damping and brackets.
- Check for compliance with safety zone requirements.

Cleaning:

- Clean the filters in the water system of the outdoor unit.
- Clean the external shelter and the inside of the outdoor unit.
- Cleaning the evaporator: See "Cleaning the heat exchanger (evaporator) of the outdoor unit".
- Ensure that condensate can be drained freely.

Maximum service life 12 years

Due to the refrigerant R290, specialized testing and servicing of pressure and safety equipment is required after 12 years. This test may require components replacement.

Please note

Use in a commercial environment may be subject to special regulations containing the above

maintenance work and pressure equipment directives.

- Replace the high pressure switch at least every 12 years.

- Replace the leakage protector at least every 12 years.

8.9 Checking whether the fan of the outdoor unit can operate freely



Danger

Touching a running fan can result in serious cuts.

- Disconnect the outdoor unit from the power supply to prevent unauthorized repowering.

- Do not turn on the appliance until the fan stops rotating.

8.10 Cleaning the heat exchanger (evaporator) of the outdoor unit



Danger

If you touch live parts or they come into contact with water, you could be seriously injured by electric shock.

- Disconnect the outdoor unit from the power supply to prevent unauthorized repowering.

- Avoid getting the outdoor unit circuit system wet.



Danger

Flammable liquids and materials can cause deflagration and fire; for example, naphtha/gasoline, solvents, cleaning agents, paints, or paper.

- Do not use substances containing acids or solvents such as vinegar cleaning agents, cellulose or synthetic resin thinner, nail polish remover, ethanol, aerosol sprays.

- Do not use substances containing chlorides or ammonia.

Please note

Commercially available cleaning agents and special cleaning agents can damage the heat exchanger (evaporator).

- Clean the heat exchanger (evaporator) fins on the back of the outdoor unit with a hand brush with long brush.

- Use only mild, water-based household cleaning agents.

- Do not use substances containing abrasive particles, such as polishing agents, detergents, dirt wipes, or wash pads.

Cleaning with compressed air

1. Open the outdoor unit hull.



Danger

Sharp edges of heat exchangers (evaporators) can cause injury and direct contact should be avoided.

2. Use compressed air to clean the heat exchanger from the inside out.

Please note

Excessive air pressure at the front and sides can cause deformation of the aluminum fins of the heat exchanger.

Only aim the compressed air gun at the heat exchanger from the front and sides at a sufficient distance.

3. Check the heat exchanger aluminum fins for deformation and scratches. If necessary, repair with suitable tools.

4. Close the outdoor unit hull.

8.11 Checking whether the electrical connection of the outdoor unit is secure



Danger

Contact with live parts may cause serious electrical injury. Some components on the PCB remain live even after the power is turned off.

- When working on an outdoor unit, isolate the system from the power supply, check that the system is no longer live and prevent reconnection.
- Before using the device, wait for at least 4 minutes until the voltage on the charging capacitor completely drops.
- Check if the residual current device is working properly

8.12 Turn off the heat pump



Danger

In the event of an electrical fault, failure to ground system components may result in current and component damage, causing serious injury.

- Before shutting down the indoor unit, restore the connection of all protective conductors.
- Check if the equipment and pipeline connections are connected to the equipotential bonding of the building. If necessary, the connection should be restored.

Please note

If the hull door does not close securely, damage may result from condensation, vibration and excessive noise.

- Check the full seal of the front panel for damage.
- Turn off the appliance correctly.
- At duct and hose outlets, make sure the insulation is properly installed.

Instructing the system user

The system installer should give the operating instructions to the system user to guide them in operating the system.

9. Failure information

Please note

The possible faults may vary depending on the system equipment. Therefore, not every system will display all fault messages.

Please note

When working on a refrigeration system, refrigerant may escape.

- Always comply with the regulations and guidelines regarding refrigerant handling.

The operation and maintenance of the refrigeration system can only be carried out by certified contractors (according to regulations (EU) No 517/2014 and 2015/2067).

- The operation and maintenance of refrigeration systems using flammable refrigerants must be carried out by qualified and certified professionals.

9.1 Failure code table

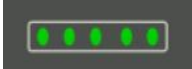
Table 39				
Fault Code	Type	Alarm Content	Remarks	Release
EA	Communication problems	Control board memory chip failure	Wrong address dialing code setting	Automatic recovery after fault elimination
E2	Sensors	Over-temperature protection of heating outlet	Temperature sensor damaged, miswired	
E2	Sensors	Low temperature protection of cooling outlet	Temperature sensor damaged, miswired	
E3	Sensors	Water tank temperature sensor failure	Temperature sensor damaged, miswired	
E4	Sensors	Ambient temperature sensor failure	Temperature sensor damaged, miswired	
E5	Sensors	Defrosting temperature sensor failure	Temperature sensor damaged, miswired	
E6	Sensors	Exhaust temperature sensor failure	Temperature sensor damaged, miswired	
E7	Communication problems	Wire controller communication failure	Communication circuit terminal is loose, broken or miswired	
E8	Heating system	High pressure switch protection, high pressure protection		Repowering or switching on and off to release
Eb	Sensors	Inlet temperature sensor failure	Temperature sensor damaged, miswired	Automatic recovery after fault elimination
EC	Communication problems	Module communication failure (no communication between the main board in case of multi-connection)	Wrong address dialing code setting, disconnected and miswired	
Ed	Sensors	Suction temperature sensor failure	Temperature sensor damaged, miswired	
EF	Sensors	Condenser (coil) temperature sensor failure	Temperature sensor damaged, miswired	
H1	Sensors	Refrigerant gas pipe temperature sensor failure	Temperature sensor damaged, miswired	
H2	Sensors	Liquid pipe temperature sensor failure	Temperature sensor damaged, miswired	
H4	Communication problems	Start-up failure and loss of synchronism H4	Input voltage imbalance	Repowering or switching on and off to release
F1	Heating system	4-way valve reversal failure		Automatic recovery after fault elimination
F3	Heating system	Over-temperature protection of compressor exhaust		Repowering or switching on and off to release
F5	Sensors	High temperature of outdoor coil outlet (defrosting) temperature sensor		Automatic recovery after fault elimination
F6	Compressor	Compressor overcurrent protection	Overload operation, abnormal compressor	Repowering or switching on and off to release
F9	Heating system	Low pressure switch protection / low pressure protection	Insufficient refrigerant, clogged refrigerant piping, dislodged expansion valve	
L0	Unit protection	Antifreeze protection	Antifreeze operation code, non-fault	Automatic recovery after fault elimination
L3	Sensors	Outlet temperature sensor failure	Refrigerant gas pipe temperature sensor failure	
L4	Sensors	Economizer inlet temperature sensor failure	Refrigerant gas pipe temperature sensor failure	
L5	Sensors	Economizer outlet temperature sensor failure	Refrigerant gas pipe temperature sensor failure	
L6	Fan	Fan 2 feedback failure	Fan motor connection line disconnection, miswiring, fan motor abnormalities, fan blade stalling	
L7	Fan	Fan 1 feedback failure		
LA	Water circuit anomaly	Flow switch failure	Water pump failure, water system leakage	
LC	Unit protection	Antifreeze protection abnormal	Low temperature leads to prolong without defrosting	
LE	Water circuit anomaly	Over-temperature difference protection of inlet and outlet	Water pump mismatch, dirty and blocked water system	

LF	Drive board	Three-phase electric abnormal protection	Abnormal input voltage	
P1	Drive board	Output short-circuit protection or output instantaneous overcurrent	Overload operation, abnormal compressor	Repowering or switching on and off to release
P3	Drive board	Over-temperature protection of IPM module radiator	Abnormal fan motor, blocked vent	
P4	Drive board	Output overload, overcurrent, or three-phase imbalance		
P5	Drive board	DC bus under-voltage protection	DC bus under-voltage protection	Input voltage anomaly
P6	Drive board	DC bus over-voltage protection	DC bus over-voltage protection	
P7	Drive board	No communication of driver	Communication error, disconnecting, miswiring	Automatic recovery after fault elimination
P8	Drive board	Driver current and voltage sampling circuit failure	The sampling circuit of the drive board is damaged	
PA	Drive board	AC input undervoltage, open phase protection, input power abnormal or	Abnormal compressor wiring, abnormal input voltage	
PB	Drive board	Loss of synchronism detection (ID number mismatch)	Mismatch between main control board and drive board	
PC	Drive board	Radiator sensor failure	Radiator sensor abnormal	
PD	Drive board	Driver input overcurrent	Abnormal input voltage, overload operation	
PF	Drive board	Input instantaneous overcurrent or short circuit protection		Repowering or switching on and off to release
U2	Sensors	Low pressure sensor failure	Pressure sensor disconnection, short circuit, unwired, miswired	Automatic recovery after fault elimination
U5	Sensors	High pressure sensor failure		
F0	Communication problems	WiFi module configuration failure	No communication between Wi-Fi chip and mainboard	
F7	Heating system	System fluoride deficiency protection	Insufficient refrigerant, blocked refrigerant piping, dislodged expansion valve	
H5	Sensors	Total backwater failure	Pressure sensor disconnection, short circuit, unwired, miswired	
H6	Sensors	Total outlet water failure		
UE	Sensors	Outlet 2 temperature sensor failure	Temperature sensor damaged, miswired	
UF	Sensors	Mixed water temperature sensor fault	Temperature sensor damaged, miswired	
L8	Water circuit system	Inverter circulating water pump failure	Inverter circulating water pump fault	
UA	Heating system	Discharge superheat protection	Discharge superheat protection	
E9	Sensors	Protection over ambient temperature range	Temperature sensor damaged	

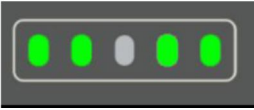
9.2 Status display, internal circulating pump

When the water pump has no PWM signal input, it operates at maximum constant power. When there is a PWM signal input, it operates according to the PWM speed control logic.

Mode display

Table 40	
Water pump status	Display light status
No PWM signal	
PWM signal speed control	

Fault indication

Table 41		
Protection Type	Description	Code
Run-dry protection	When the water pump runs dry for 1 minute, it stops and reports a fault. After 10 minutes, it restarts, and then restarts 5 times in this cycle and then stops.	
Rotation-clogging protection	When the rotor shaft of the electric pump is stuck, the electric pump attempts to restart every 5 seconds. When attempting to restart, the electric pump reports a blocking error and the panel displays fault code. The pump restarts 5 times in this cycle and then stops.	
Open phase protection	When the electric pump occurs phase loss fault, it attempts to restart every 1 second. When attempting to restart, the electric pump reports an electrical error and the panel displays fault code. The pump restarts 5 times in this cycle and then stops.	
Over-voltage protection	Abnormal conditions, when the input voltage is higher than 265V, the electric pump will enter a protective state shutdown, and report electrical faults and panel display fault code, so as to avoid over-range use, resulting in damage. When the voltage is restored to 160V-265V, the electric pump resumes running.	
Under-voltage protection	Abnormal conditions, when the input voltage is lower than 160V, the electric pump will enter a protective state shutdown, and report electrical faults and panel display fault code, so as to avoid over-range use, resulting in damage. When the voltage is restored to 160V-265V, the electric pump resumes running.	
Over-current (short circuit) protection	When electric pump short-circuit, overheating and other faults occur, the pump attempts to restart every 1 second. When attempting to restart, the electric pump reports an electrical error and the panel displays a fault code. The pump restarts 5 times in this cycle and then stops.	
Over-temperature protection	IPM module over-temperature protection	

9.3 Troubleshooting mechanisms

1. Ambient temperature sensor failure "E4"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

2. Inlet temperature sensor failure "Eb"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

3. Outlet temperature sensor failure "L3"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

4. Outlet 2 temperature sensor failure "UE"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

5. Water tank temperature sensor failure "E3"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

6. Defrosting temperature sensor failure "E5"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

7. Exhaust temperature sensor failure "E6"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

8. Suction temperature sensor failure "Ed"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

9. Economizer inlet temperature sensor failure "L4"

Status: open or short circuit for more than 30 seconds

Troubleshooting: shutdown, display the fault.

Fault recovery: replace the temperature sensor, recover after it is normal.

10. Economizer outlet temperature sensor failure "L5"
 Status: open or short circuit for more than 30 seconds
 Troubleshooting: shutdown, display the fault.
 Fault recovery: replace the temperature sensor, recover after it is normal.
11. Liquid pipe temperature sensor failure "H2"
 Status: open or short circuit for more than 30 seconds
 Troubleshooting: shutdown, display the fault.
 Fault recovery: replace the temperature sensor, recover after it is normal.
12. Mixed water temperature sensor fault "UF"
 Status: open or short circuit for more than 30 seconds
 Troubleshooting: shutdown, display the fault.
 Fault recovery: replace the temperature sensor, recover after it is normal.
13. Water temperature sensor drift "U7"
 Working condition: The water pump is running, and the compressor is turned off for more than 10 minutes. The absolute value of $|\text{inlet temperature} - \text{outlet temperature}| > 3^{\circ}\text{C}$ or $|\text{inlet temperature} - \text{outlet temperature 2}| > 3^{\circ}\text{C}$ or $|\text{outlet temperature} - \text{outlet temperature 2}| > 3^{\circ}\text{C}$ is detected for 10 consecutive seconds.
 Troubleshooting: Only report faults without affecting normal startup and operation;
 Fault recovery: The compressor is off and has been continuously detected for 10 seconds| $|\text{Inlet temperature} - \text{outlet temperature}| \leq 3^{\circ}\text{C}$ or $|\text{Inlet temperature} - \text{outlet temperature 2}| \leq 3^{\circ}\text{C}$ or $|\text{Outlet temperature} - \text{outlet temperature 2}| \leq 3^{\circ}\text{C}$; or the compressor can be started. Faults can be eliminated automatically, regardless of frequency.
14. High pressure sensor failure "U5"
 Status: open or short circuit for more than 30 seconds
 Troubleshooting: shutdown, display the fault.
 Fault recovery: replace the temperature sensor, recover after it is normal.
15. Low pressure sensor failure "U2"
 Status: open or short circuit for more than 30 seconds
 Troubleshooting: shutdown, display the fault.
 Fault recovery: replace the temperature sensor, recover after it is normal.
16. Flow switch failure "LA"
 Status: 20 seconds after the water pump is started, the input signal of the flow switch is continuously disconnected for 10 seconds;
 Troubleshooting: Immediately alarm and stop the water pump, stop the machine; After stopping the water pump for 30 seconds, restart the water pump and retest the water flow switch protection based on the determining conditions. If the water flow switch is judged to be faulty after three consecutive starts, and the fault cannot be automatically eliminated by the fifth time, manually reset or power off to restart
 Fault recovery: Automatic recovery for the first to second time, manual reset or power off to restart for the third time.
17. High pressure switch protection "E8"

Status: The high-voltage switch is in a disconnected state, lasting for more than 3 seconds;
Troubleshooting: shutdown;

Fault recovery: The high-voltage switch signal is closed, lasting for more than 60 seconds to recover; The first to second automatic recovery occurs within 1 hour, and the third requires manual reset or power off restart.

18. Low pressure switch protection "F9"

Status: The low-voltage switch is in a disconnected state, lasting for more than 3 seconds;
Troubleshooting: shutdown;

Fault recovery: The high-voltage switch signal is closed, lasting for more than 60 seconds to recover; The first to second automatic recovery occurs within 1 hour, and the third requires manual reset or power off restart.

19. Exhaust temperature protection "F3"

Fault recovery: Recovery when exhaust temperature is $\leq 60\text{ }^{\circ}\text{C}$; The first to second automatic recovery occurs within 1 hour, and the third requires manual reset or power off restart.

20. Lack of refrigerant protection "F7"

Determining conditions: In standby mode, the compressor stops for more than 3 minutes and meets any of the following conditions:

- ◆ High or low pressure $\leq 0.4\text{ BarG}$, lasting for 10 seconds;
- ◆ The saturation temperature corresponding to high pressure or the saturation temperature corresponding to low pressure is lower than $\text{min}^{\circ}\text{C}$ (ambient temperature, water temperature), lasting for 10 seconds.

21. Temperature difference protection of inlet and outlet "LE"

Determining conditions: After the compressor starts, start the inspection. In cooling mode, when the inlet temperature minus the outlet temperature is greater than $10\text{ }^{\circ}\text{C}$, or in heating/hot water mode, when the ambient temperature is less than or equal to $10\text{ }^{\circ}\text{C}$, if the outlet temperature minus the inlet temperature is greater than $10\text{ }^{\circ}\text{C}$ and the ambient temperature is greater than $10\text{ }^{\circ}\text{C}$, if the outlet temperature minus the inlet temperature is greater than the temperature difference, the protection value is 12 and lasts for 60 seconds;
Troubleshooting: Immediately shut down the corresponding module;

Fault recovery: In cooling mode, if the inlet temperature minus the outlet temperature is less than or equal to $5\text{ }^{\circ}\text{C}$, fault recovery occurs; In the heating/hot water mode, if the inlet temperature minus the outlet temperature is less than or equal to $5\text{ }^{\circ}\text{C}$, fault recovery occurs.

22. Low temperature protection of cooling outlet "E2"

Determining conditions: After the compressor is started in cooling mode, the outlet water temperature is less than or equal to $3\text{ }^{\circ}\text{C}$ for 30 seconds;

Troubleshooting: Immediately shut down the corresponding module;

Fault recovery: shut down, no fault is displayed, faults can be automatically eliminated, and the number of times is unlimited.

23. Over-temperature protection of heating outlet "E2"

Determining conditions: After the compressor is started in heating/hot water mode, the outlet temperature is greater than $76\text{ }^{\circ}\text{C}$ for 30 seconds;

Troubleshooting: Immediately shut down the corresponding module;

Fault recovery: shut down, no fault is displayed, faults can be automatically eliminated, and the number of times is unlimited.

24. Protection over ambient temperature range "E9"

Determining conditions: Cooling mode, ambient temperature $\leq 5\text{ }^{\circ}\text{C}$, or ambient temperature $>55\text{ }^{\circ}\text{C}$, lasting for 60 seconds;

Heating/hot water mode (when the compressor is not started and the ambient temperature is $\leq -30^{\circ}\text{C}$, or the ambient temperature is $>43^{\circ}\text{C}$), lasting for 60 seconds

Troubleshooting: No startup, no shutdown; record history faults, no display.

Fault recovery: After shutdown, if the cooling temperature is 5°C , or heating temperature is $-30^{\circ}\text{C} < \text{ambient temperature} \leq 55^{\circ}\text{C}$, or heating temperature is 43°C , the fault can be eliminated automatically without any frequency limitation.

25. Wire controller communication failure "E7"

Determining conditions: The communication between mainboard and wire control is disconnected for 120 seconds

Troubleshooting: Immediately shut down all units;

Failure recovery: The communication between mainboard and wire control is normal; Failure recovery can be automatically eliminated without limitation of the number of times.

26. Fan 1 feedback failure "L7"

Determining conditions: No feedback for fan 1.

Troubleshooting: Shutdown

The above protection shuts down and reports faults; After recovery, automatically eliminate the fault and restart. After locking the fault 3 times within 1 hour, stop the machine and report an error.

27. Fan 2 feedback failure "L6"

Determining conditions: No feedback for fan 2.

Troubleshooting: Shutdown

The above protection shuts down and reports faults; After recovery, automatically eliminate the fault and restart. After locking the fault 3 times within 1 hour, stop the machine and report an error.

28. Output short-circuit protection (P1)

Determining conditions: MCU detects a vil to the FO port or the bus current is greater than the 65 Apeak threshold set by the MCU internal comparator (90% of the EE demagnetization current or the maximum allowable current, whichever is the smallest).

Troubleshooting: Shut down and transmit the fault code to the host according to the communication protocol;

Failure recovery: after 60s, the FO pin is no longer vil and the bus current is less than 65Apeak (90% of the EE demagnetization current and the maximum allowable current, whichever is the smallest), then it will automatically return to standby mode.

29. Output instantaneous overcurrent (P1)

Determining conditions: Instantaneous output current value greater than 50A, cumulative 2 times

Troubleshooting: shutdown

Fault recovery: after 60 seconds, if the current is less than the set protection value and there is no other fault, it will automatically return to the standby mode.

30. Over-temperature protection of IPM module "P3"

Determining conditions: IPM module temperature $>102^{\circ}\text{C}$

Troubleshooting: shutdown

Failure recovery: After 60 seconds, the MCU detects that the temperature of the IPM module is lower than 102°C , and automatically returns to standby mode

31. Output overload, overcurrent, or three-phase imbalance "P4"

- Determining conditions: Output current exceeds specified value based on time integration
 Troubleshooting: shutdown
 Failure recovery: Automatic recovery after power off
32. DC bus under-voltage protection "P5"
 Determining conditions: $V_{DC} < 200V$ (single phase) for 5ms
 Troubleshooting: shutdown
 Fault recovery: Shutdown for 20 seconds, $V_{DC} \geq 210V$ (single phase) to recover the fault.
33. DC bus over-voltage protection "P6"
 Determining conditions: $V_{DC} > 400V$ (single phase) for 3ms
 Troubleshooting: shutdown
 Fault recovery: Shutdown for 60 seconds, $\leq 390V$ (single phase) to recover the fault.
34. No communication of driver "P7"
 Determining conditions: The main control board cannot receive data from the driver or there is a data error, or the drive board cannot receive data from the main control board or there is a data error, lasting for 30 seconds.
 Troubleshooting: shutdown
 Failure recovery: Automatically recovers after receiving communication from the other party.
35. Driver current and voltage sampling circuit failure "P8"
 Determining conditions: driver voltage and current sampling circuit failure, module hardware damage
 Troubleshooting: shutdown
 AC input undervoltage or open phase protection PA or compressor circuit sequence error
 ① AC input undervoltage
 Determining conditions: AC input voltage $< 150V$ (single-phase), AC input circuit voltage $< 260V$ (three-phase), continuous shutdown for 5 seconds.
 Troubleshooting: shutdown and report the fault code.
 Fault recovery: AC input voltage $> 165V$ (single-phase), AC input circuit voltage $> 286V$ (three-phase) recovery.
 ② Open phase protection
 Determining conditions: Given the output voltage, the MCU cannot detect any phase current from the compressor.
 Troubleshooting: Shutdown
 Failure recovery: Automatically return to standby mode after 60 seconds.
 ③ Abnormal input power voltage
 Determining conditions: Detect if the three live wires of the input power supply are missing one phase or if the input circuit voltage is unbalanced by more than 15V.
 Troubleshooting: shutdown
 Failure recovery: Automatically return to standby mode after 60 seconds.
36. Module sensor failure "PC"
 Determining conditions: The radiator temperature sensor is open or shorted for more than 30

seconds, or the MCU detects that the output voltage of the temperature sensor detected inside the IPM module is less than 10mV;

Troubleshooting: shutdown

Fault recovery: After 60 seconds, if it is detected that the temperature transmission is normal or the voltage is greater than 10mV, it will automatically return to standby mode.

37. Driver input overcurrent "PD"

Determining conditions: The input current of the driver is $\geq 35A$, lasting for 5 seconds;

Troubleshooting: shutdown

Fault recovery: After 60 seconds, if the current is less than 35A, it will automatically return to standby mode.

38. Input instantaneous overcurrent or short circuit protection "PF"

① Input instantaneous overcurrent

② Determining conditions: ① The instantaneous value of input current is greater than 75A, accumulated once;

Troubleshooting: shutdown

Fault recovery: After 60 seconds, if the current is less than 75A and there are no other faults, it will automatically return to standby mode.

② Input short-circuit protection

Determining conditions: The instantaneous value of input current is greater than 90A;

Troubleshooting: Shutdown

Fault recovery: After 60 seconds, if the current is less than 90A, it will automatically return to standby mode.

39. Start-up failure and loss of synchronism H4

Determining conditions: During the compressor startup stage, the MCU failed to correctly determine the position of the compressor rotor;

Troubleshooting: shut down and send the fault code to the master control according to the communication protocol.

Fault recovery: After 60 seconds, it will automatically return to standby mode.

40. Compressor input overcurrent "F6"

Determining conditions: Compressor input current $\geq 33A$ for 5 seconds.

Troubleshooting: Shutdown

Fault recovery: current less than 33A after 60 seconds

41. Wire controller communication failure "E7"

Determining conditions: Wire control without communication and duration greater than 10 seconds.

Troubleshooting: shut down and report the fault code.

Failure recovery: Automatically recover after after normal data communication with the remote control.

9.4 Troubleshooting logic

Fault code	E2 Over-temperature protection of water	
Fault cause	1. Inaccurate sensor position 2. Sensor malfunction 3. Heating relay sticking 4. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solution
<pre> graph TD Q1[Is the sensor position accurate?] -- No --> S1[Insert the sensor into the specified position] Q1 -- Yes --> Q2[Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range.] Q2 -- No --> S2[Replace the sensor] Q2 -- Yes --> Q3[Check electric heating relay for sticking.] Q3 -- Yes --> S3[Replace the main control board] Q3 -- No --> Q4[The sampling circuit of the control board is damaged.] </pre> The flowchart starts with the question 'Is the sensor position accurate?'. If 'No', the solution is 'Insert the sensor into the specified position'. If 'Yes', it proceeds to 'Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range.'. If 'No', the solution is 'Replace the sensor'. If 'Yes', it proceeds to 'Check electric heating relay for sticking.'. If 'Yes', the solution is 'Replace the main control board'. If 'No', the final diagnosis is 'The sampling circuit of the control board is damaged.'.		Insert the sensor into the specified position
		Replace the sensor
		Replace the main control board

Fault code	E3 Water tank temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board. Yes → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range. Yes → The sampling circuit of the control board is damaged.		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	E4 Ambient temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	E5 Defrost temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
<pre> graph TD A[Check if the sensor is accurately and securely plugged into the control board] -- No --> B[Reconnect the sensor securely] A -- Yes --> C[Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range] C -- No --> D[Replace the sensor] C -- Yes --> E[Replace the control board] </pre> Check if the sensor is accurately and securely plugged into the control board No Yes Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range No Yes The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	L3 Outlet temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
<pre> graph TD A[Check if the sensor is accurately and securely plugged into the control board] -- No --> B[Reconnect the sensor securely] A -- Yes --> C[Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range] C -- No --> D[Replace the sensor] C -- Yes --> E[Replace the control board] </pre> Check if the sensor is accurately and securely plugged into the control board No Yes Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range No Yes The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	E6 Exhaust temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes No → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes No → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	L4 Economizer inlet temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes No → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes No → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	L5 Economizer outlet temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range No → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	H1 Refrigerant gas pipe temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board No → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	H2 Refrigerant liquid pipe temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	H5 Heating total backwater temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	H6 Heating total outlet water temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board No →		Reconnect the sensor securely
Yes ↓ Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range No →		Replace the sensor
Yes ↓ The sampling circuit of the control board is damaged		Replace the control board

Fault code	U5 High pressure sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board No →		Reconnect the sensor securely
Yes ↓ Measure whether the voltage value of pin 2 and pin 3 in the high-voltage sensor socket at the control board side is normal ($0.2 \leq X \leq 4.8$); No →		Replace the control board
No ↓ Pressure sensor tooling can be used to connect to the high-pressure access port and the mainboard high pressure sensor socket. Power on and run the machine to observe if there is a malfunction, which is used to confirm the failure of the high pressure sensor. →		Replace the pressure sensor

Fault code	U2 Low pressure sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board No →		Reconnect the sensor securely
↓ Yes Measure whether the voltage value of pin 2 and pin 3 in the high-voltage sensor socket at the control board side is normal ($0.2 \leq X \leq 4.8$); Yes →		Replace the control board
↓ No Pressure sensor failure; Pressure sensor tooling can be used to connect to the high-pressure access port and the mainboard high pressure sensor socket. Power on and run the machine to observe if there is a malfunction, which is used to confirm the failure of the high pressure sensor. →		Replace the pressure sensor

Fault code	E7 communication failure	
Fault cause	Abnormal communication between the display panel(wire controller) and the main control board (Heating - abnormal communication between the display panel and the mainboard of the indoor unit board)	
Troubleshooting	Automatic recovery after fault elimination.	
Diagnosis		Solutions
<pre> graph TD A[Check if the private numbers and dial codes of the display panel and control board are correct] -- No --> S1[Adjust the dial code or replace the correct panel board or control board.] A -- Yes --> B[Check whether the checkerboard terminal and connection terminal are correctly inserted and in place;] B -- No --> S2[Reconnect correctly and in place] B -- Yes --> C[Use a multimeter to measure the communication line for short or open circuits; Check if the communication line has been extended without permission.] C -- Yes --> S3[Replace the communication line] C -- No --> D[Replace the display panel or control board] D --> S4[Communication circuit failure of display panel or control board] </pre>		Adjust the dial code or replace the correct panel board or control board.
		Reconnect correctly and in place
		Replace the communication line
		Communication circuit failure of display panel or control board

Fault code	E8 Over-pressure protection for system high pressure
Fault cause	1. Pressure switch off or failure; 2. control board failure; 3 .Electronic expansion valve poor contact or failure; 4. Water curcuit is not through the water or blocked; 5. System clogging; 6. Refrigerant overcharging.
Troubleshooting	Automatic recovery after fault elimination, locked for three times.
Diagnosis procedures	
<pre> graph TD A[Whether to continuously report faults during startup and operation.] -- Yes --> B[1. Confirm if the pressure switch wiring is disconnected. 2. Short circuit the pressure switch port of the control board to confirm if the control board is abnormal.] A -- No --> C[Check if the electronic expansion valve of the main circuit is normal.] B --> D[1. Reinsert and unplug the pressure switch wiring. 2. If the control board is damaged, replace it.] C -- No --> E[1. Confirm if the main valve wiring is loose. 2. Confirm if the main valve coil is off. 3. Confirm whether the main valve slides smoothly during startup and reset.] C -- Yes --> F[1. Confirm whether the water curcuit system is functioning properly and whether the water pump is operating normally. 2. Does the water pump lift meet the requirements?] E --> G[1. Reinsert and unplug the wiring of the electronic expansion valve. 2. Replace the electronic expansion valve.] F -- No --> H[1. Check if the pipeline is dirty and blocked, or if welding is blocked. 2. Replace the high-lift water pump.] F -- Yes --> I[Connect the high and low pressure gauges to start operation, and record the compressor frequency, main and auxiliary valve opening, fan speed, inlet and outlet water temperature, high and low pressure, suction temperature, and exhaust temperature.] I --> J[Check whether the system is blocked and the refrigerant is over charging.] J -- Yes --> K[Replace the main control board.] </pre>	

Fault code	F9 Under-pressure protection for system low pressure
Fault cause	Low pressure switch action or low pressure sensor detection of low system pressure
Troubleshooting	Automatic recovery after fault elimination, locked for three times.


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graph TD
    A[Whether to continuously report faults during startup and operation.] -- Yes --> B["1. Confirm if the pressure switch wiring is disconnected.  
2. Short circuit the pressure switch port of the control board to confirm if the control board is abnormal."]
    A -- No --> C[Check if the electronic expansion valve of the main circuit is normal.]
    B --> D["1. Reinsert and unplug the pressure switch wiring.  
2. If the control board is damaged, replace it."]
    C -- No --> E["1. Confirm if the main valve wiring is loose.  
2. Confirm if the main valve coil is off.  
3. Confirm whether the main valve slides smoothly during startup and reset.  
4. Reverse connection of main and auxiliary valves"]
    C -- Yes --> F["1. Confirm whether the water circuit system is functioning properly and whether the water pump is operating normally.  
2. Does the water pump lift meet the requirements?"]
    E --> G["1. Reinsert and unplug the wiring of the electronic expansion valve.  
2. Replace the electronic expansion valve."]
    F -- No --> H["1. Check if the pipeline is dirty and blocked, or if welding is blocked.  
2. Replace the high-lift water pump."]
    F -- Yes --> I["Connect the high and low pressure gauges to start operation, and record the compressor frequency, main and auxiliary valve opening, fan speed, inlet and outlet water temperature, high and low pressure, suction temperature, and exhaust temperature."]
    I --> J[Check whether the system is blocked and the refrigerant is under charging.]
    J -- Yes --> K[Replace the main control board.]
  
```

Fault code	EA Memory chip failure	
Fault cause	EEPROM failure	
Troubleshooting	Automatic recovery after fault elimination.	
Diagnosis		Solutions
After powering off and rewriting the EE program, power on and start the machine. Check if EA fault is still reported. Yes →		EE chips or circuit components are missing or damaged, replace the control board.

Fault code	Eb Inlet temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board No → ↓ Yes Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range No → ↓ Yes The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	EC Communication failure	
Fault cause	Commercial - abnormal communication between the mainboard of the multi-connection; Inverter - abnormal communication between the main control board and the inverter board; Heating - abnormal communication between the outdoor unit board and the indoor unit board	
Troubleshooting	Automatic recovery after fault elimination.	
Diagnosis		Solutions
<pre> graph TD A[Check if the private number of the control board is correct.] -- No --> S1[Replace the correct control board.] A -- Yes --> B[Check whether the checkerboard terminal and connection terminal are correctly inserted and in place;] B -- No --> S2[Reconnect correctly and in place] B -- Yes --> C[Use a multimeter to measure whether the communication line is short circuited or open circuited] C -- Yes --> S3[Replace communication line] C -- No --> D[Check if the drive board is powered on.] D -- No --> S4[Confirm that the neutral line, live wire and reactance wire are connected normally] D -- Yes --> E[Internal circuit failure of control board] E --> S5[Replace the main control board or drive board] </pre>		Replace the correct control board.
		Reconnect correctly and in place
		Replace communication line
		Confirm that the neutral line, live wire and reactance wire are connected normally
		Replace the main control board or drive board

Fault code	Ed Suction temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes No → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes No → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	EF Coil temperature sensor failure	
Fault cause	1. The sensor has a short circuit or open circuit 2. The sampling circuit of the control board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the sensor is accurately and securely plugged into the control board Yes No → Measure the resistance value of the sensor and determine whether the sensor is normal based on its resistance range Yes No → The sampling circuit of the control board is damaged		Reconnect the sensor securely
		Replace the sensor
		Replace the control board

Fault code	LE Excessive difference in inlet and outlet water temperature	
Fault cause	Detected that the difference between (outlet temperature minus inlet temperature) is greater than 7 °C (adjusted according to the project)	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the probe position of the water temperature sensor is normal; Is there any detachment or poor insulation. Yes →		Reconnect the probe or perform insulation treatment
↓ No Use a multimeter to measure the accuracy of the inlet and outlet water temperature sensor. No →		Replace the sensor
↓ Check whether the lift of the water pump, flow rate and other parameters meet the requirements of the manual, and check whether the diameter of the water pipe meets the requirements; and whether water circuit is dirty and clogged. No →		Replace water pumps and water pipes that meet the requirements; Clean the filter screen and water circuit, and remove scale.

Fault code	L6 L7 Fan 1 and 2 stall failure	
Fault cause	No fan feedback or fan blocking	
Troubleshooting	Automatic recovery after fault elimination, , three alarms per hour failure lockout	
Diagnosis		Solutions
Is the fan cable connected properly? No →		Reinsert and unplug the fan cable
↓ Yes Whether the fan blades are stuck. Yes →		According to the on-site situation, handle the icing on the fan blades, motor brackets, air guiding loops, sheet metal, and machine bottom.
↓ No In the case of dual fans, the wiring of the main control boards of fans 1 and 2 can be switched to determine whether the fan motor is normal. No →		Replace the fan motor
↓ Yes Main control board failure		Replace the main control board

Fault code	LA Abnormal water flow switch	
Fault cause	Water flow switch feedback off state	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the checkerboard terminal is correctly inserted and in place. No		Reconnect correctly and in place
Yes Check if there is water or if the water circuit ball valve is fully open. No		Adjust the installation direction of the water flow switch
Yes Check if the installation direction of the water flow switch is correct. No		Open the water valve and fully open the ball valve
Yes Check if the position of the water flow switch paddle is correct. No		Adjust the position of the paddle to be in the center of the pipeline and not touch the pipe wall.
Yes Check the selection model of the water pump to see if the water flow rate is low and the water flow cannot flush the paddle. Yes		Replace the water pump that meets the parameters specified in the manual
No Check if the water flow switch is intact. Normally disconnected, toggle the paddle to close. No		Replace the water flow switch
Yes Short circuit the board terminal and check if the water flow switch is still malfunctioning during startup and operation. Yes		The control board detects circuit failure, replace the control board

Fault code	F3 Exhaust high temperature protection	
Fault cause	Detected exhaust temperature $\geq 115^{\circ}\text{C}$ for 3 consecutive minutes (adjusted according to project)	
Troubleshooting	Automatic recovery after fault elimination, locked for three times.	
Diagnosis		Solutions
Check if the installation environment is abnormal, such as short circuit of air outlet, poor ventilation etc. Yes →		Improve installation environment
No ↓ Measure the accuracy of the exhaust temperature sensor with a multimeter. No →		Replace the exhaust temperature sensor
Yes ↓ Is the electronic expansion valve off or stuck? Yes →		Reinsert or replace the electronic expansion valve
No ↓ The pressure gauge detects static pressure, checks whether the high and low pressures are normal during operation, and confirms whether there is a lack of fluorine: Yes →		Check for leaks and recharge refrigerant
No ↓ Start up and run, check the operating parameters, and confirm if the electronic expansion valve control is abnormal due to abnormal temperature parameters detected, resulting in excessive exhaust Yes →		Identify problem temperature sensors and rectify or replace
No ↓ The control board detects circuit failure. →		Replace the control board
No ↓ Determine whether the compressor is demagnetized based on the difference in inlet and outlet water temperature →		Replace the compressor

Fault code	F7 Fluorine deficiency protection failure	
Fault cause	Commercial: T outdoor ambient temperature - T frosting ≤ 1 °C	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the relevant sensors are normal. No → Yes ↓		Replace the sensor
Check if the control board is normal. No → Yes ↓		Replace the control board
Check if the pipelines, capillaries, and expansion valves are dirty or blocked. Yes → No ↓		Clear dirty and clogged pipelines, capillary tubes, expansion valves
Is the refrigerant volume of the machine normal?		Release refrigerant and recharge

Fault code	P1 Instantaneous overcurrent of hardware on the inverter side	
Fault cause	Instantaneous overcurrent of hardware on the inverter side	
Troubleshooting	Automatic recovery, locked 3 times, no failure reported in the first 2 times, failure retained	
Diagnosis		Solutions
<pre> graph TD Q1[Is the input voltage normal?] -- No --> S1[Adjust the input voltage or phase line] Q1 -- Yes --> Q2[Check if the wiring of the compressor is normal.] Q2 -- No --> S2[Recrimp the power cord of the compressor] Q2 -- Yes --> Q3[Whether the system pressure is normal.] Q3 -- No --> S3[Troubleshooting according to E8 failure logic tree] Q3 -- Yes --> Q4[Whether the drive board is normal.] Q4 -- No --> S4[Replace the drive board] Q4 -- Yes --> Q5[Compressor failure.] Q5 --> S5[Replace the compressor] </pre>		Adjust the input voltage or phase line
		Recrimp the power cord of the compressor
		Troubleshooting according to E8 failure logic tree
		Replace the drive board
		Replace the compressor

Fault code	P3 Abnormal radiator temperature	
Fault cause	Abnormal radiator temperature	
Troubleshooting	Auto-recovery, no failures reported, failure history retained	
Diagnosis		Solutions
Whether the ambient temperature of the air inlet is too high (above 45°C) after the machine is running. No → ↓ Yes Is the coil or defrost sensor plugged in properly? No → ↓ Yes Is the coil or defrost sensor normal? No → ↓ Yes drive board failure.		Improve ventilation environment Reinsert and unplug the sensor Replace the sensor Replace the drive board

Fault code	P8 Abnormal current detection circuit on the inverter side	
Fault cause	1. Power on the capacitor before fully discharging after power outage 2. The voltage and current detection circuit of the drive board is damaged	
Troubleshooting	Lock at once	
Diagnosis		Solutions
Failure reported during machine operation. Yes → ↓ Yes Failure can be recovered by powering off for 3 minutes and powering on again. No → ↓ Yes Machine returns to normal operation.		Replace the drive board. Replace the drive board.

Fault code	P5 Under voltage	
Fault cause	Undervoltage detection	
Troubleshooting	Auto-recovery, no failures reported, failure history retained	
Diagnosis		Solutions
<pre> graph TD Q1[Is the input voltage normal?] -- No --> S1[Adjust input voltage] Q1 -- Yes --> Q2[Is the PFC circuit AC contactor working properly?] Q2 -- No --> S2[Replace the AC contactor] Q2 -- Yes --> S3[Replace the drive board.] </pre>		Adjust input voltage
		Replace the AC contactor

Fault code	P6 Over voltage	
Fault cause	Overvoltage detection	
Troubleshooting	Auto-recovery, no failures reported, failure history retained	
Diagnosis		Solutions
<pre> graph TD Q1[Is the input voltage normal?] -- Yes --> S1[Adjust input voltage] Q1 -- No --> Q2[Is the input voltage fluctuation within the normal range?] Q2 -- No --> S2[Add voltage regulator or adjust input power supply] Q2 -- Yes --> S3[Replace the drive board.] </pre>		Adjust input voltage
		Add voltage regulator or adjust input power supply

Fault code	P7 No communication between main control board and drive board	
Fault cause	Abnormal communication between main control board and drive board	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
Check if the private number of the control board is correct. No → Yes ↓		Replace the correct control board.
Check whether the checkerboard terminal and connection terminal are correctly inserted and in place; No → Yes ↓		Reconnect correctly and in place
Use a multimeter to measure whether the communication line is short circuited or open circuited Yes → No ↓		Replace communication line
Check if the drive board is powered on. No → Yes ↓		Confirm that the neutral line, live wire and reactance wire are connected normally
Internal circuit failure of control board		Replace the main control board or drive board

Fault code	P9 Instantaneous power failure detection	
Fault cause	1. Power on the capacitor before fully discharging after power outage 2. The voltage and current detection circuit of the drive board is damaged	
Troubleshooting	Lock at once	
Diagnosis		Solutions
Failure reported during machine operation. Yes → ↓ Yes Failure can be recovered by powering off for 3 minutes and powering on again. No → ↓ Yes Machine returns to normal operation.		Replace the drive board. Replace the drive board.

Fault code	PD AC input overcurrent	
Fault cause	1. Instantaneous drop in power supply leads to instantaneous increase in input current 2. Sudden increase in load, resulting in an instantaneous increase in input current	
Troubleshooting	Auto-recovery, no failures reported, failure history retained	
Diagnosis		Solutions
Check whether the power supply voltage fluctuates during machine operation for a long time or multiple times. Yes → ↓ No Measure whether the dynamic and static fluorine pressure of the machine are normal? →		Adjust the supply voltage to the normal voltage range. Troubleshooting according to E8 failure.

Fault code	PA Abnormal control board power supply or compressor phase loss	
Fault cause	1. Input voltage is lower than the protection value 2. Compressor line phase loss	
Troubleshooting	Auto-recovery, no failures reported, failure history retained (Commodity inspection mode will report a failure)	
Diagnosis		Solutions
<pre> graph TD A[Failure can be recovered by powering off for 3 minutes and powering on again.] -- Yes --> S1[The machine is normal and the power outage time is too short.] A -- No --> B[Check if the compressor power cord is broken or off?] B -- Yes --> S2[Replace the damaged power cord or recrimp it.] B -- No --> C[Check if the power supply voltage is below 160V during machine operation for a long time or multiple times.] C -- Yes --> S3[Adjust the power supply voltage to the normal voltage range.] C -- No --> D[Machine returns to normal operation.] </pre> The flowchart starts with a decision box: "Failure can be recovered by powering off for 3 minutes and powering on again." If "Yes", it leads to the solution "The machine is normal and the power outage time is too short." If "No", it leads to another decision box: "Check if the compressor power cord is broken or off?" If "Yes", it leads to "Replace the damaged power cord or recrimp it." If "No", it leads to a third decision box: "Check if the power supply voltage is below 160V during machine operation for a long time or multiple times." If "Yes", it leads to "Adjust the power supply voltage to the normal voltage range." If "No", it leads to the final outcome: "Machine returns to normal operation."		
		The machine is normal and the power outage time is too short.
		Replace the damaged power cord or recrimp it.
		Adjust the power supply voltage to the normal voltage range.
Machine returns to normal operation.		

Fault code	PB Loss of synchronism detection (ID number mismatch)	
Fault cause	1. The pressure models of the main control board and the drive board do not match	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
<pre> graph TD A[Check if the main control board dials the code correctly.] -- No --> S1[Follow the instructions to set the dial code to the correct position.] A -- Yes --> B[Check if the compressor model matches the entire machine.] B -- No --> S2[Replace the correct compressor.] B -- Yes --> C[Check if the private numbers for the main control board and drive board are correct.] C -- No --> S3[Replace the correct main control board or drive board.] C -- Yes --> D[Confirm if the main control board and drive board programs are correct, and update if they are not correct.] </pre>		Follow the instructions to set the dial code to the correct position.
		Replace the correct compressor.
		Replace the correct main control board or drive board.

Fault code	PC Abnormal module temperature	
Fault cause	1. Open circuit of temperature sensor on the drive board 2. The internal temperature sensor of the drive board is damaged	
Troubleshooting	Automatic recovery after fault elimination	
Diagnosis		Solutions
<pre> graph TD A[Check if there is an external temperature sensor on the drive board.] -- No --> S1[The temperature sensing components inside the drive board are damaged, replace the drive board.] A -- Yes --> B[Check if the sensor is securely plugged in.] B -- No --> S2[Reconnect the sensor firmly.] B -- Yes --> C[Did the failure recover after replacing the temperature sensor?] C -- No --> S3[Replace the drive board.] C -- Yes --> D[Machine returns to normal operation.] </pre>		The temperature sensing components inside the drive board are damaged, replace the drive board.
		Reconnect the sensor firmly.
		Replace the drive board.

Fault code	PE Abnormal rectifier side current detection circuit	
Fault cause	1. Power on the capacitor before fully discharging after power outage 2. The voltage and current detection circuit of the drive board is damaged	
Troubleshooting	Lock at once	
Diagnosis		Solutions
<pre> graph TD A[Failure reported during machine operation.] -- Yes --> S1[Replace the drive board.] A -- No --> B[Failure can be recovered by powering off for 3 minutes and powering on again.] B -- No --> S2[Replace the drive board.] B -- Yes --> C[Machine returns to normal operation.] </pre>		Replace the drive board.
		Replace the drive board.

Fault code	PF Rectifier side software and hardware instantaneous overcurrent	
Fault cause	1. Instantaneous drop in power supply leads to an instantaneous increase in input current 2. Sudden increase in load leads to an instantaneous increase in input current	
Troubleshooting	Auto-recovery, lock for the three times, first 2 failures not reported, failures retained	
Diagnosis		Solutions
Check whether the power supply voltage fluctuates during machine operation for a long time or multiple times. Yes → No ↓ Measure whether the dynamic and static fluorine pressure of the machine are normal? →		Adjust the supply voltage to the normal voltage range. Troubleshooting according to E8 failure.

Fault code	H4 IPM protection, module drive failure protection and loss of synchronism	
Fault cause	1. IPM protection: The compressor phase current exceeds the hardware current value of IPM; 2. Loss of synchronism: After the compressor is started, the target frequency is not reached within a certain period of time	
Troubleshooting	3 locks per hour	
Diagnosis		Solutions
Check if the heating strip of the crankcase is fixed properly and whether it is heating normally. Check if the ambient temperature sensor detects it properly. No → Yes ↓ Check if there is a sudden increase in compressor current when measuring with a current clamp meter, and if there is abnormal noise in the compressor. Yes → No ↓ Check if the machine's set temperature and actual temperature are greater than 55 degrees Celsius. Yes → No ↓ Measure whether the dynamic and static fluorine pressure of the machine are normal. No →		Replace or refix the crankcase heating strip and ambient temperature sensor. The compressor is worn or stuck, replace the compressor. Adjust the set temperature to 55 degrees to run and check the status. Troubleshooting according to E8 failure.

9.5 Checking the temperature sensor

Table 27		
Name	Quantity	Resistance and B value
Water inlet temperature sensor	1	R25 k = 49.12Ω B (0/100) = 3970 k±2%±2%
Water outlet temperature sensor	1	R25 k = 49.12Ω B (0/100) = 3970 k±2%±2%
Auxiliary circuit intake air temperature sensor	1	R25 = 10 kΩ B (25/50) = 3700 k±3%±3%
Auxiliary circuit outlet temperature sensor	1	R25 = 10 kΩ B (25/50) = 3700 k±3%±3%
Ambient temperature sensor	1	R25 = 10 kΩ B (25/50) = 3700 k±3%±3%
Exhaust temperature sensor	1	R80 = 50 kΩ B (25/80) = 4450 k±3%±3%
Defrost temperature sensor	1	R25 = 10 kΩ B (25/50) = 3700 k±3%±3%
Suction temperature sensor	1	R25 = 10 kΩ B (25/50) = 3700 k±3%±3%
Total outlet water temperature sensor	1	R25 = 10 kΩ B (25/50) = 3700 k±3%±3%
Condensing temperature sensor	1	R25 k = 49.12Ω B (0/100) = 3970 k±2%±2%
Water tank temperature sensor	1	R25 k = 49.12Ω B (0/100) = 3970 k±2%±2%
Zone temperature sensor	1	R25 k = 49.12Ω B (0/100) = 3970 k±2%±2%

Table 28			
R25°C= 10 kΩ B(25/50)= 3700 k±3%±3%			
Temperature	Resistance (KΩ)	Temperature	Resistance (KΩ)
-40°C	229.239	33°C	7.255
-39°C	217.183	34°C	6.976
-38°C	205.809	35°C	6.71
-37°C	195.075	36°C	6.454
-36°C	184.942	37°C	6.21
-35°C	175.375	38°C	5.976
-34°C	166.339	39°C	5.753
-33°C	157.803	40°C	5.538
-32°C	149.738	41°C	5.333
-31°C	142.114	42°C	5.136

-30°C	134.907	43°C	4.947
-29°C	127.675	44°C	4.767
-28°C	121.081	45°C	4.593
-27°C	114.849	46°C	4.427
-26°C	108.958	47°C	4.268
-25°C	103.388	48°C	4.115
-24°C	98.123	49°C	3.968
-23°C	93.144	50°C	3.829
-22°C	88.435	51°C	3.692
-21°C	83.982	52°C	3.562
-20°C	79.529	53°C	3.438
-19°C	75.785	54°C	3.318
-18°C	72.015	55°C	3.203
-17°C	68.447	56°C	3.093
-16°C	65.071	57°C	2.987
-15°C	61.874	58°C	2.885
-14°C	58.848	59°C	2.787
-13°C	55.983	60°C	2.693
-12°C	53.269	61°C	2.602
-11°C	50.699	62°C	2.515
-10°C	48.264	63°C	2.431
9°C	45.957	64°C	2.35
8°C	43.77	65°C	2.273
7°C	41.697	66°C	2.198
6°C	39.731	67°C	2.126
5°C	37.868	68°C	2.057
4°C	36.1	69°C	1.99
3°C	34.423	70°C	1.926
2°C	32.832	71°C	1.864
1°C	31.322	72°C	1.805
0°C	29.92	73°C	1.748
1°C	28.527	74°C	1.692
2°C	27.234	75°C	1.639
3°C	26.006	76°C	1.588
4°C	24.84	77°C	1.538
5°C	23.731	78°C	1.491

6°C	22.678	79°C	1.445
7°C	21.676	80°C	1.4
8°C	20.723	81°C	1.357
9°C	19.817	82°C	1.316
10°C	18.955	83°C	1.276
11°C	18.135	84°C	1.238
12°C	17.354	85°C	1.2
13°C	16.611	86°C	1.165
14°C	15.903	87°C	1.131
15°C	15.229	88°C	1.097
16°C	14.587	89°C	1.065
17°C	13.975	90°C	1.034
18°C	13.392	91°C	1.004
19°C	12.836	92°C	0.975
20°C	12.306	93°C	0.947
21°C	11.801	94°C	0.92
22°C	11.319	95°C	0.894
23°C	10.858	96°C	0.869
24°C	10.419	97°C	0.844
25°C	10	98°C	0.821
26°C	9.6	99°C	0.798
27°C	9.217	100°C	0.776
28°C	8.852	101°C	0.755
29°C	8.503	102°C	0.734
30°C	8.17	103°C	0.715
31°C	7.851	104°C	0.695
32°C	7.546	105°C	0.677

Table 29			
R25°Ck = 49.12Ω B(0/100)= 3970 k±2%±2%			
Temperature	Resistance (KΩ)	Temperature	Resistance (KΩ)
-40°C	1624.249	56°C	14.069
-39°C	1521.974	57°C	13.559
-38°C	1426.597	58°C	13.071
-37°C	1337.646	59°C	12.602

-36°C	1254.676	60°C	12.153
-35°C	1177.274	61°C	11.722
-34°C	1105.053	62°C	11.308
-33°C	1037.65	63°C	10.912
-32°C	974.729	64°C	10.53
-31°C	915.976	65°C	10.164
-30°C	861.099	66°C	9.812
-29°C	809.827	67°C	9.474
-28°C	761.905	68°C	9.149
-27°C	717.102	69°C	8.837
-26°C	675.199	70°C	8.537
-25°C	635.994	71°C	8.248
-24°C	599.3	72°C	7.971
-23°C	564.943	73°C	7.704
-22°C	532.761	74°C	7.448
-21°C	502.607	75°C	7.201
-20°C	474.339	76°C	6.963
-19°C	447.83	77°C	6.734
-18°C	422.962	78°C	6.514
-17°C	399.623	79°C	6.302
-16°C	377.71	80°C	6.098
-15°C	357.128	81°C	5.901
-14°C	337.789	82°C	5.712
-13°C	319.611	83°C	5.529
-12°C	302.516	84°C	5.353
-11°C	286.436	85°C	5.184
-10°C	271.304	86°C	5.021
9°C	257.057	87°C	4.864
8°C	243.64	88°C	4.712
7°C	231.001	89°C	4.566
6°C	219.088	90°C	4.425
5°C	207.856	91°C	4.289
4°C	197.264	92°C	4.158
3°C	187.27	93°C	4.032
2°C	177.838	94°C	3.91

1°C	168.934	95°C	3.792
0°C	160.524	96°C	3.679
1°C	152.579	97°C	3.569
2°C	145.071	98°C	3.464
3°C	137.974	99°C	3.362
4°C	131.262	100°C	3.264
5°C	124.913	101°C	3.168
6°C	118.906	102°C	3.077
7°C	113.221	103°C	2.988
8°C	107.837	104°C	2.903
9°C	102.738	105°C	2.821
10°C	97.909	106°C	2.742
11°C	93.332	107°C	2.664
12°C	88.995	108°C	2.591
13°C	84.881	109°C	2.519
14°C	80.98	110°C	2.45
15°C	77.28	111°C	2.383
16°C	73.767	112°C	2.318
17°C	70.434	113°C	2.256
18°C	67.27	114°C	2.196
19°C	64.265	115°C	2.138
20°C	61.41	116°C	2.081
21°C	58.697	117°C	2.027
22°C	56.119	118°C	1.974
23°C	53.668	119°C	1.923
24°C	51.337	120°C	1.873
25°C	49.12	121°C	1.825
26°C	47.011	122°C	1.779
27°C	45.004	123°C	1.735
28°C	43.093	124°C	1.691
29°C	41.274	125°C	1.649
30°C	39.542	126°C	1.608
31°C	37.891	127°C	1.569
32°C	36.318	128°C	1.53
33°C	34.819	129°C	1.492
34°C	33.391	130°C	1.456

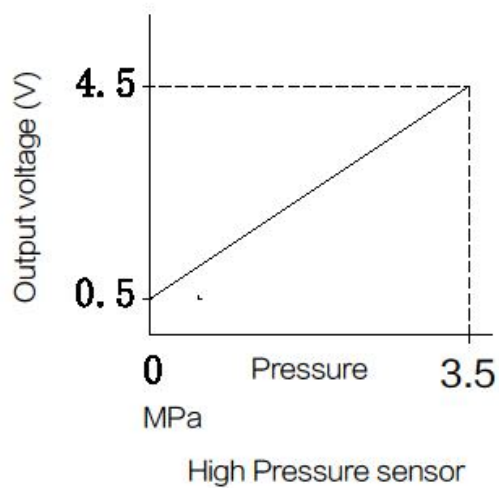
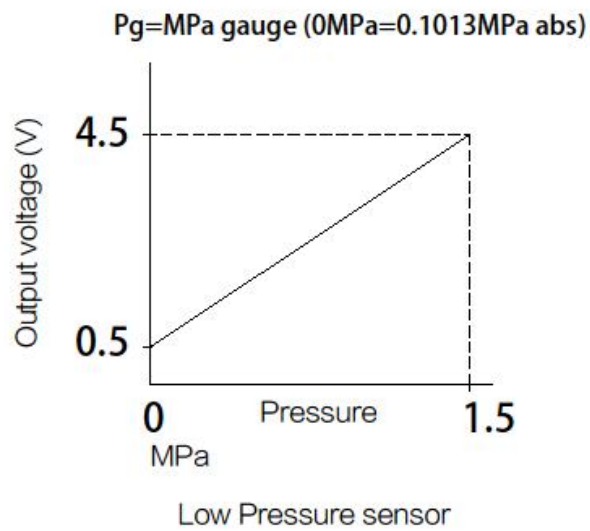
35°C	32.028	131°C	1.421
36°C	30.728	132°C	1.386
37°C	29.489	133°C	1.353
38°C	28.306	134°C	1.32
39°C	27.176	135°C	1.289
40°C	26.098	136°C	1.257
41°C	25.068	137°C	1.227
42°C	24.085	138°C	1.198
43°C	23.145	139°C	1.168
44°C	22.247	140°C	1.14
45°C	21.389	141°C	1.111
46°C	20.568	142°C	1.084
47°C	19.783	143°C	1.056
48°C	19.032	144°C	1.03
49°C	18.313	145°C	1.003
50°C	17.625	146°C	0.977
51°C	16.967	147°C	0.951
52°C	16.336	148°C	0.925
53°C	15.732	149°C	0.9
54°C	15.155	150°C	0.874
55°C	14.599	/	/

Table 30			
R80°C= 50 kΩ B (25/50) = 4450 k±3%±3%			
Temperature	Resistance (KΩ)	Temperature	Resistance (KΩ)
-40°C	21280.977	33°C	349.201
-39°C	19890.917	34°C	333.349
-38°C	18599.155	35°C	318.295
-37°C	17398.211	36°C	303.995
-36°C	16281.212	37°C	290.407
-35°C	15241.843	38°C	277.493
-34°C	14274.298	39°C	265.216
-33°C	13373.234	40°C	253.541
-32°C	12533.735	41°C	242.437
-31°C	11751.273	42°C	231.873

-30°C	11021.678	43°C	221.82
-29°C	10343.407	44°C	212.252
-28°C	9710.234	45°C	203.142
-27°C	9118.935	46°C	194.467
-26°C	8566.532	47°C	186.204
-25°C	8050.276	48°C	178.333
-24°C	7567.624	49°C	170.832
-23°C	7116.224	50°C	163.682
-22°C	6693.901	51°C	156.866
-21°C	6298.642	52°C	150.367
-20°C	5928.583	53°C	144.168
-19°C	5586.374	54°C	138.255
-18°C	5265.313	55°C	132.613
-17°C	4964.004	56°C	127.229
-16°C	4681.148	57°C	122.089
-15°C	4415.539	58°C	117.181
-14°C	4166.054	59°C	112.494
-13°C	3931.647	60°C	108.018
-12°C	3711.346	61°C	103.741
-11°C	3504.244	62°C	99.654
-10°C	3309.498	63°C	95.748
9°C	3126.321	64°C	92.014
8°C	2953.98	65°C	88.443
7°C	2791.79	66°C	85.028
6°C	2639.114	67°C	81.761
5°C	2495.357	68°C	78.636
4°C	2359.962	69°C	75.645
3°C	2232.412	70°C	72.781
2°C	2112.221	71°C	70.04
1°C	1998.938	72°C	67.415
0°C	1921.993	73°C	64.901
1°C	1813.265	74°C	62.493
2°C	1711.646	75°C	60.185
3°C	1616.593	76°C	57.973
4°C	1527.611	77°C	55.852

5°C	1444.25	78°C	53.82
6°C	1366.096	79°C	51.87
7°C	1292.773	80°C	50
8°C	1223.935	81°C	48.206
9°C	1159.265	82°C	46.484
10°C	1098.474	83°C	44.832
11°C	1041.293	84°C	43.246
12°C	987.477	85°C	41.723
13°C	936.799	86°C	40.26
14°C	889.052	87°C	38.856
15°C	844.042	88°C	37.506
16°C	801.59	89°C	36.209
17°C	761.533	90°C	34.962
18°C	723.717	91°C	33.764
19°C	688.001	92°C	32.612
20°C	654.254	93°C	31.504
21°C	622.355	94°C	30.439
22°C	592.189	95°C	29.413
23°C	563.651	96°C	28.427
24°C	536.644	97°C	27.478
25°C	511.076	98°C	26.564
26°C	486.862	99°C	25.685
27°C	463.922	100°C	24.838
28°C	442.182	101°C	24.023
29°C	421.572	102°C	23.237
30°C	402.028	103°C	22.481
31°C	383.489	104°C	21.752
32°C	365.898	105°C	21.049

9.6 Checking the pressure sensor



9.7 Checking the fuse

- FUSE1 located next to the input power on the main control board
- FUSE2 located next to the two fan input ports on the main control board
- FUSE3 & FUSE4 & FUSE5 close to the relay under the main control board
- FUSE6&FUSE7 close to the input power on the drive board

FUSE1&FUSE3&FUSE4&FUSE5 model:

- 30A/250V AC
- Maximum power loss $\leq 4400\text{w}$

FUSE2 model:

- 6.3A/ 250 V AC
- Maximum power loss $\leq 1000\text{w}$



Danger

Incorrect or improperly installed fuses can lead to an increased risk of fire.

- Do not use excessive force when insulting the fuse. Place the fuse correctly.
- Only use fuses of the same type of structure with the same response characteristics.

9.8 Maintenance work checklist

■ Everyone working on the refrigerant circuit must be able to present a certificate of competence issued by industry-recognized organizations.

The certificate confirms their ability to handle refrigerants safely through standard industry procedures.

Maintenance work can only be carried out in accordance with the manufacturer's specifications. If maintenance and repair work requires the assistance of additional personnel, it must be supervised continuously by personnel trained in handling combustible refrigerants.

■ In order to minimize the risk of fire, safety checks must be carried out before appliances using flammable refrigerants start working. Before interfering with the refrigerant circuit, the following measures should be taken:

Table 31			
Measurement		Completion	Comment
1	General work environment ■ Inform the following personnel of the types of work to be carried out: -All maintenance personnel -All personnel in the vicinity of the system. ■ Isolate the area around the outdoor unit. ■ Check whether combustible materials and ignition sources exist around the outdoor unit; Remove all flammable materials and ignition sources.		
2	Check for the presence of refrigerant ■ For timely identification of combustible gases: Before, during, and after work, use an explosion-proof refrigerant detector for R290 to check the surrounding area for any escape of refrigerant. This refrigerant detector must not produce any sparks and must be properly sealed.		
3	Fire extinguisher Carbon dioxide or powder fire extinguishers must be turned in if: ■ Discharging refrigerants. ■ Filling up refrigerants. ■ Welding or brazing/welding work in progress.		
4	Ignition source		

	■ Do not use ignition sources that may ignite the refrigerant when working on a refrigerant circuit that contains or has previously contained flammable refrigerant. Remove all possible ignition sources, including cigarettes, that may cause escape of refrigerant from the area where installation, maintenance, disassembly or disposal work is being carried out. ■ Before working, check for flammable materials and ignition sources around the equipment: Remove all flammable materials and ignition sources. Place no smoking sign.		
5	Workplace ventilation ■ Provide adequate ventilation to the workplace before carry out maintenance outside or interfering with refrigerant circuits or starting any welding or brazing/welding work. ■ Ventilation must be maintained throughout the working process. Ventilation should dilute any refrigerant that may escape, ideally should discharging it into the surrounding atmosphere.		
6	Check the refrigerating system ■ Any replacement electrical components must be suitable for the application and must meet the manufacturer's specifications. Perform the following checks: ■ The refrigerant charge shall not be greater than the amount specified in the technical data. ■ If use hydraulic separation system, check the secondary circuit for refrigerant. ■ Labels and symbols must always be clearly visible and legible. Replace any illegible information. ■ Refrigerant pipelines and components must be installed to avoid contact with substances that may cause corrosion. Exceptions: Refrigerant pipelines are made of corrosion-resistant materials or have reliable corrosion protection.		
7	Check the electrical component ■ Maintenance and repair work of electrical components must be checked for safety: see below. ■ When a safety-related failure occurs, do not connect to the system until the failure is fixed. If immediate troubleshooting is not possible, a suitable		

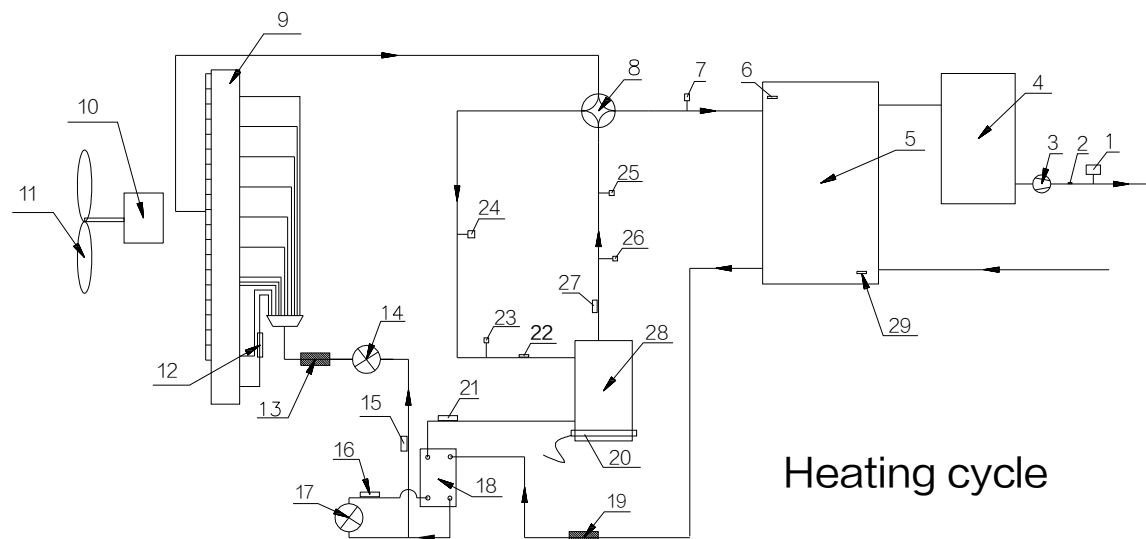
	temporary solution should be provided for the operation of the system as needed. Notify the system operator. Perform the following safety checks: ■ Discharging capacitor: Make sure there are no sparks when discharging. ■ Do not place live electrical components or cables near outdoor units when charging, pumping refrigerant or flushing refrigerant circuit. ■ Check the grounding.		
8	Maintenance of sealed hull ■ When working on sealing components, the device should also be completely isolated from the power supply before dismantling the sealing cover plate. ■ If power is absolutely need at work: Place a continuously operating refrigerant detector in the most critical location to provide warning of any potentially hazardous situation. ■ Special care is taken to ensure that any work on the electrical components does not result in any changes to the hull that would affect its protective performance. This includes damage to lead wires, excessive connections on a single terminal, connections that do not meet manufacturer specifications, seal damage and incorrect installation of cable inlets. ■ Make sure appliances are installed correctly. ■ Check whether the seal is fastened. Check whether the seal is reliable to prevent combustible gas from entering. Replace defective seals. Attention please Silica gel as a sealant will affect the function of the leak detecting device. Do not use silicone as a sealant. ■ Spare parts must meet the manufacturer's specifications. ■ Work on components suitable for flammable environment: These components do not have to be isolated from the power supply.		
9	Maintenance of components suitable for flammable environment ■ Do not connect any continuous capacitive or inductive load to the appliance unless ensure that the permitted voltage and current are not exceeded. ■ In areas where a flammable environment exists, voltage is applied only to components suitable for flammable environment.		
10	Wiring ■ Check the wiring for abrasion, corrosion, tension,		

	vibration, sharp edges or other adverse environmental effects. ■ When checking, the effect of aging and continuous vibration on compressors and fans should also be taken into account.		
11	Refrigerant detector ■ Never use possible ignition sources for refrigerant detection or leak detection. ■ Flame leak detectors or other leak detectors with open fire are strictly prohibited.		
12	Leak detection The following leak detection procedures apply to appliances that use flammable refrigerants: Use electronic refrigerant detectors for leak detection: ■ Electronic refrigerant detectors may not have the required sensitivity or may need to be calibrated to the relevant range. Calibration in a refrigerant-free environment. ■ The refrigerant detector must apply to the R290 refrigerant to be tested. ■ The refrigerant detector must not contain any potential ignition source. Calibrate the refrigerant detector to the refrigerant used. Set the response thresholds to < 3g /a for propane. Leak detection with a liquid leak detector: ■ Liquid leak detectors are suitable for most refrigerants. Attention please Liquid leak detectors containing chlorine may react with refrigerants. This can lead to corrosion. Do not use liquid leak detectors that contain chlorine. Measures to be taken when the refrigerant circuit leaks or is suspected of leaking: ■ Extinguish all open fires near the heat pump immediately. ■ If brazing/welding work is required to repair the leak, be sure to remove all refrigerants from the refrigerant circuit. Clean the parts to be brazed/welded with oxygen-free nitrogen before and during brazing/welding work.		
13	Marking(label the heat pump) If the heat pump is no longer in use, attach a label to the outdoor unit in a clearly visible location that contains the following information, with date and signature: ■ The outdoor unit uses combustible refrigerant		

	R290(propane). ■ The system is no longer in use. ■ The refrigerant has been pumped out. ■ The outdoor unit contains nitrogen. ■ The outdoor unit may contain residual combustible refrigerant.		
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10. Refrigerant circuit flow circuit diagram

10.1 Refrigerant flow circuit diagram of heating system



10.2 Refrigerant flow circuit diagram of cooling system

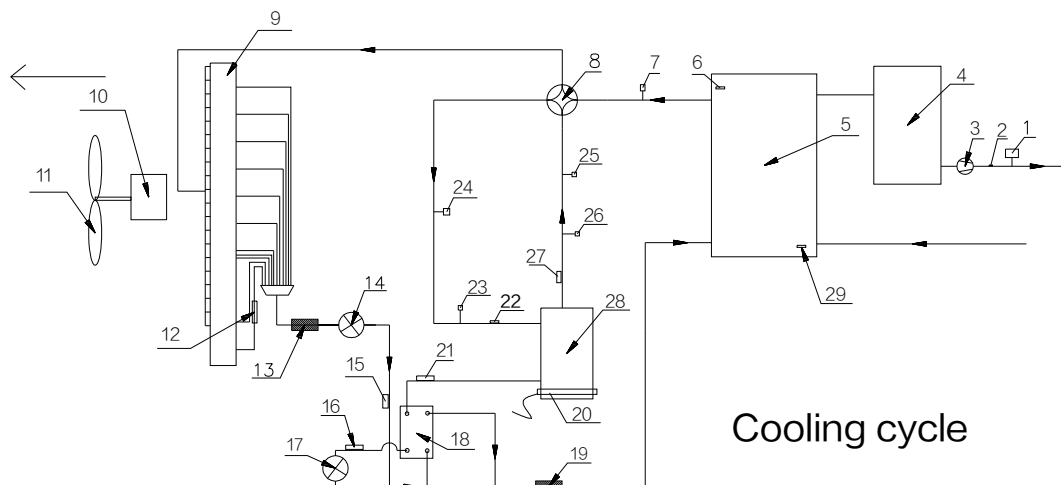


Table 32			
Number	Part name	Number	Part name
1	Water flow switch	16	Auxiliary circuit inlet temperature sensor
2	Total water outlet temperature sensor	17	Auxiliary circuit electronic expansion valve
3	Water pump	18	Auxiliary circuit plate heat exchanger
4	Pipe electric heating	19	Filter
5	Heat exchanger	20.	Compressor electric heating strip
6	Water outlet temperature sensor	21	Auxiliary circuit outlet temperature sensor
7	Service valve	22	Suction temperature sensor
8	4-way valve	23	Low pressure switch
9	Evaporator	24	Low pressure sensor
10	Electric motor	25	High pressure sensor
11	Fan	26	High pressure switch
12	Defrost temperature sensor	27	Discharge temperature sensor
13	Filter	28	Compressor
14	Main circuit electronic expansion valve	29	Water inlet temperature sensor
15	Condensation temperature sensor	30	/

10.3 Refrigerant recovery



Warning:

Consider the following:

■ Only R290(propane) authorized extraction device that has been regularly inspected should be used.

Check the condition of the extraction device, including usage records.

■ Use only refrigerant bottles suitable for R290, such as special recovery bottles. The refrigerant bottle must be labeled accordingly.

The refrigerant bottle must be equipped with a safety valve and a fastened service valve.

■ Check that a sufficient number of recovery bottles are available.

■ Do not mix different refrigerants in one recovery bottle.

■ Prepare suitable transportation equipment for refrigerant bottles (if required).

■ Check the availability of personal protective equipment and its proper use.

■ Ensure that the refrigerant circuit and all used connections are free of leaks.

■ Calibrated scales are provided to determine the amount of refrigerant to be extracted.

1. Check the heat pump status. Check that maintenance intervals are observed.
2. Isolate the system from the power supply. Prevent unauthorized connections.



Danger

A refrigerant leak may cause an explosion, resulting in serious injury.

Do not bring any power or ignition sources in the safety area.

3. Check that the refrigerant circuit complies with the safe operating instructions.
4. Place the refrigerant bottle on the scale.

5. Connect the refrigerant bottle to the extraction equipment. Connect the extraction device to the refrigerant circuit Schrader valve via the manifold.

6. Pump all parts of the refrigerant pipeline with pumping equipment.

Attention please

■ *Refrigerant extraction must be continuously monitored by an authorized contractor.*

■ *Do not fill the refrigerant to the top at most. Exceeds 80% of allowable capacity.*

■ *Do not exceed the allowable design pressure of the refrigerant bottle.*

■ *Do not mix the refrigerant with other refrigerants.*

■ *Comply with the following technical regulations on operational reliability and hazardous substances: TRGS 510、TRBS 3145、TRGS 745*

7. Separate the refrigerant bottle from the refrigerant circuit. Close the connection firmly. Label refrigerant bottles in accordance with statutory requirements.

Dispose of refrigerant bottles in a suitable disposal/recovery facility.

8. Purge the refrigerant circuit with oxygen-free nitrogen at least twice for 5 min each time.

■ Never use air or compressed air.

■ Observe the allowable working pressure of the refrigerant circuit.

9. Release positive pressure.

10. Evacuate the refrigerant circuit.

Absolute pressure of vacuum according to en378: < 2.7 mbar (< 270 Pa)



Danger

A refrigerant leak may cause an explosion, resulting in serious injury.

Make sure the vacuum pump outlet is outside the safety zone.

11. Perform static vacuum test: The absolute pressure must not exceed 10 mbar (1kpa) for at least 30min.

If vacuum is not maintained, repeat step 8.

12. Repeat steps 8 ~ 10 until there is no refrigerant in the refrigerant circuit.

Attention please

During the final decontamination, release positive pressure down to atmospheric pressure. Do not evacuate further.

This is especially important if brazing/welding work is to be done on the refrigerant circuit.

13. Once the refrigerant has been completely discharged, close the 2-way valve so that they are airtight.

To do this, the valve body needs to be reset.

Dust cap union nut torque: 15 Nm

14. Attach a label to the outdoor unit in a clearly visible location, containing the following information with date and signature:

■ The outdoor unit uses flammable refrigerant R290(propane).

■ The system is no longer in use.

■ The refrigerant has been pumped out.

■ The outdoor unit contains nitrogen.

■ Outdoor unit

10.4 High-voltage insulation test



Danger

Excessive pressure can cause damage to the system and be dangerous due to high pressure and escaping refrigerant. Observe the allowable test pressure.

1. Connect the test device on the 2-way valve.

2. Pressure test with nitrogen:

Test pressure: 1.5 x allowable operating pressure allowable operating pressure.

Charging refrigerant circuit

In contrast to non-combustible refrigerants, additional attention must be paid to the following points when charging combustible refrigerants:

■ Do not use the same charging valve for different refrigerants.

■ Place the refrigerant bottle vertically.

1. Check that the refrigerant circuit complies with the safe operating instructions.

2. Ground the refrigerant circuit.

3. Ensure that the filling complies with the following conditions:

■ Refrigerant circuit drained and evacuated: see section “Refrigerant recovery”.

■ Absolute pressure before charging: < 2.7 mbar (< 270 Pa)

■ If any parts have been replaced, follow all the information in the separate installation instructions.

After any repair (e.g. welding/brazing, replacement of components), first carry out a high-voltage insulation test: see section “High-voltage insulation test”.

4. The refrigerant circuit is charged with R290 refrigerant (propane) via a 2-way valve.



Danger

Oxygen in the refrigerant circuit can cause fire or explosion during operation.

When charging the refrigerant circuit, make sure that neither air nor oxygen can enter the refrigerant circuit.



Danger

Excessive refrigerant charge can lead to an explosion hazard.

Refrigerant pipelines can not be overcharged:

■ Weigh the refrigerant bottle before charging.

■ The refrigerant charge is equal to the reduced weight of the refrigerant bottle.

Max. refrigerant.

5. Close the 2-way valve to make it airtight.

Dust cap union nut torque: 15 Nm

Valve body torque: 0.25 Nm

6. Attach a label to the heat pump in a clearly visible location, containing the following information with date and signature:

■ Type of refrigerant to be filled

■ The amount of refrigerant to be charged

7. Leak test with explosion-proof refrigerant detector for R290 (propane).

Final decommissioning and disposal

Complete units and compressors can only be disposed of by qualified disposal specialists.

Decommissioning:

■ The positioning requirements apply only if the outdoor unit is filled with refrigerant

Decommissioning should only be carried out by qualified contractors who are familiar with the equipment used for refrigerant handling.

■ For decommissioning and disposal, work on refrigerant circuits should only be carried out by qualified and certified personnel.

■ Extraction of refrigerant: see section “Refrigerant recovery”.

Frost protection:

■ To avoid frost damage, please completely remove the heating water from the connection pipes and condenser (not necessary for frost-free storage).

Intermediate storage:

■ The center storage room is just above the floor with natural ventilation holes to the outside

■ Ensure adequate air circulation during intermediate storage.

■ The following steps must be performed for disassembled and disposed outdoor units that are not stored in accordance with the positioning requirements:

■ Extraction of refrigerant: see section “Refrigerant recovery”.

Transportation:

■ Observe transportation information.

Comply with all applicable regulations and requirements.

Attention please

The transport of complete sets with flammable refrigerants less than 12 kg is exclusively regulated according to article 291 of the European Agreement concerning the Carriage of Dangerous Goods by Road (ADR) and does not need to follow special transport requirements.

■ Transportation in upright position only

■ Use the appropriate transportation bracket.

■ Ensure adequate air circulation during transportation.

■ Keep away from ignition sources such as flying sparks, smoking, etc.