

LOW AMBIENT HEAT PUMP WATER HEATER

Installation & Instruction Manual

MODEL:

SWBM-10.5H-B/P-S

SWBM-17.5H-B/P-S

SWBM-35.0H-B-S

CONTENTS

I .To our customers-----	1
II .Product Introducing-----	2
III .Work principle-----	3
IV .Performance Data-----	4
V .Dimension-----	5
VI .Operation introductions-----	8
VII .Wire Circuit Diagram-----	14
VIII .Installation instructions-----	16
IX .Maintenance-----	20

Dear Sir:

In order to use this machine safely, please read this INSTRUCTION MANUAL carefully before using and installation. Heat pump water heater is a professional machine, it may cause damage or hazard when wrong installed, it should be installed by a competent person in accordance with the relevant standards for the country of use.

WARNING:***ELECTRICAL POWER MUST BE SWITCHED OFF
BEFORE STARTING ANY WORK ON JUNCTION BOXES***

- 1.Before installing the heat pump, please ensure that the electrical supply corresponds to the specification indicated on the unit's rating label before proceeding with the connection in accordance with the wiring diagram supplied. Please check carefully on the rating label and the wiring diagrams that pasted on each heat pump unit.**
- 2.The unit must be EARTHED to avoid any risks caused by insulation defects. It is forbidden to start any work on the electrical components without switching off the electrical supply to the unit. Electric leakage switch protection device MUST be installed.**
- 3.It is forbidden to start any work on the electrical components if water or high humidity is present on the installation site.**
- 4.When the unit is being connected, ensure that no impurities are introduced into the pipe work and the water circuits.**
- 5.All maintenance or repair of the heat pump must be performed by competent technicians.**
- 6.It could be hurtful when generated hot water reaches 52 °C, please mix with cold water before using.**
- 7. To prevent any damage to the fan or any accidents, it is forbidden to put your fingers or any other objects into the air outlet. Kids or children should be kept away from the heat pump.**
- 8. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.**
- 9.Children should be supervised to ensure that they do not play with the appliance.**

Product Introducing

☉ **Safe and Reliable**

Unlike traditional electric water heater, heat pump water heater do not directly generate heat by electricity , it use less electricity to move heat from one place to another , electric circuit is separated from water circuit ,which is also not easy for electric shock, inflammable , explosion and poisoning ! Safer and more reliable!

☉ **Highly efficient & Energy saving**

Heat pump water heater absorb plenty of heat from free ambient air, and can supply same hot water volume as electric heater. Electricity consumption is only 1/4 compared to electric heater, very energy saving!

☉ **Environmental Friendly**

Heat pump not only use less electricity to get heat from ambient air , but are also able to combine using with solar equipment , will not cause pollution and no poison gas exhausting .

☉ **All Round The Year Hot Water**

Heat pump water heaters are not affected by seasonal climate, provide hot water all year round even in cloudy or rainy days!

☉ **Durable and long-lasting time**

Heat pump spare parts such as compressor and 4-way-valve are made by famous brand manufacturer , and casing panel is corrosion resistance, very durable and long-lasting time .

☉ **Convenient Installation**

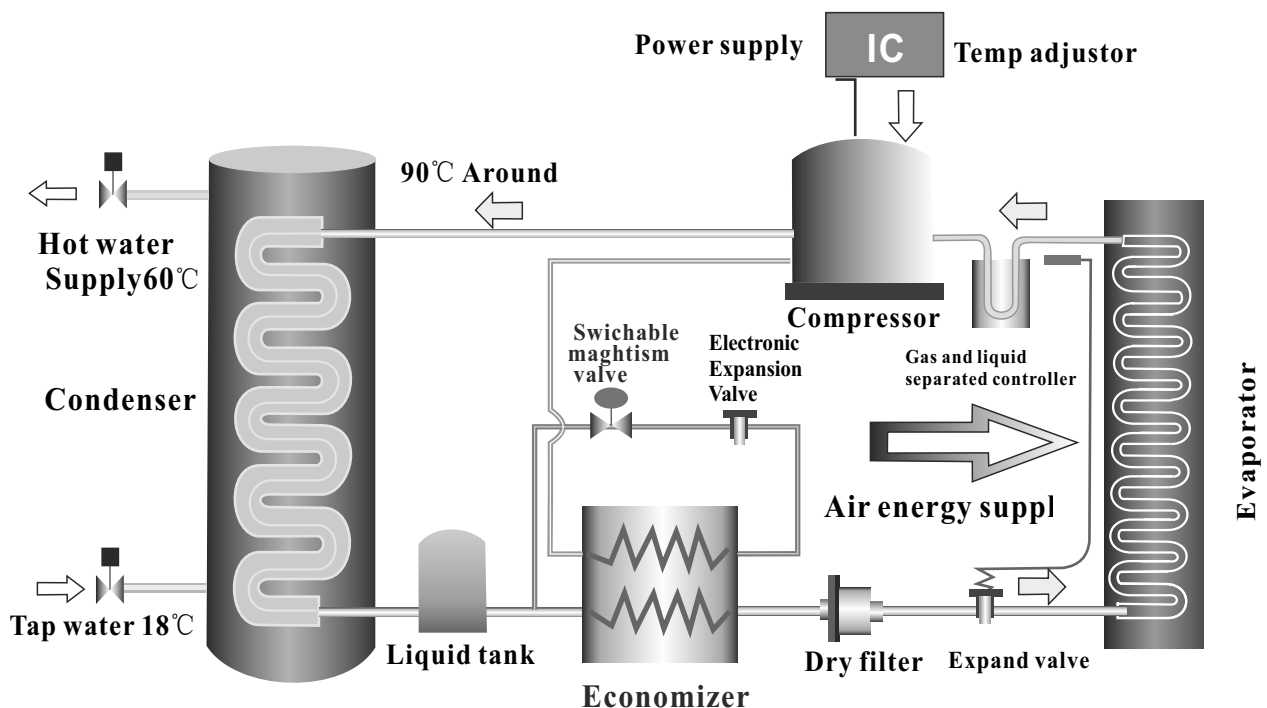
Installation site for heat pump can be the roof, the garage , the kitchen, the storing room , the basement and so on, very convenient on installation .

☉ **Wide Application**

Heat pump water heaters are applicable for family, factory, school, hotel , hospital , and laundry ,etc. Wide application for different using request.

Work principle

The low temperature and low pressure refrigerant gas come from the evaporator to the compressor, After the compressor compress it , the refrigerant gas became high temperature and high pressure. Then the gas come into the water condensation into liquid, emit a lot of condensation heat, condensing heat absorbed by water, making the water temperature increased, and then the liquid refrigerant come through the expansion valve, with a fan , the evaporator heat in the air, after all evaporation , the low pressure compressor refrigerant gas inhalation in the compressor, after working through the compressor, a high temperature and high pressure of the refrigerant gas from the compressor to exhaust emissions, such reciprocating cycle.



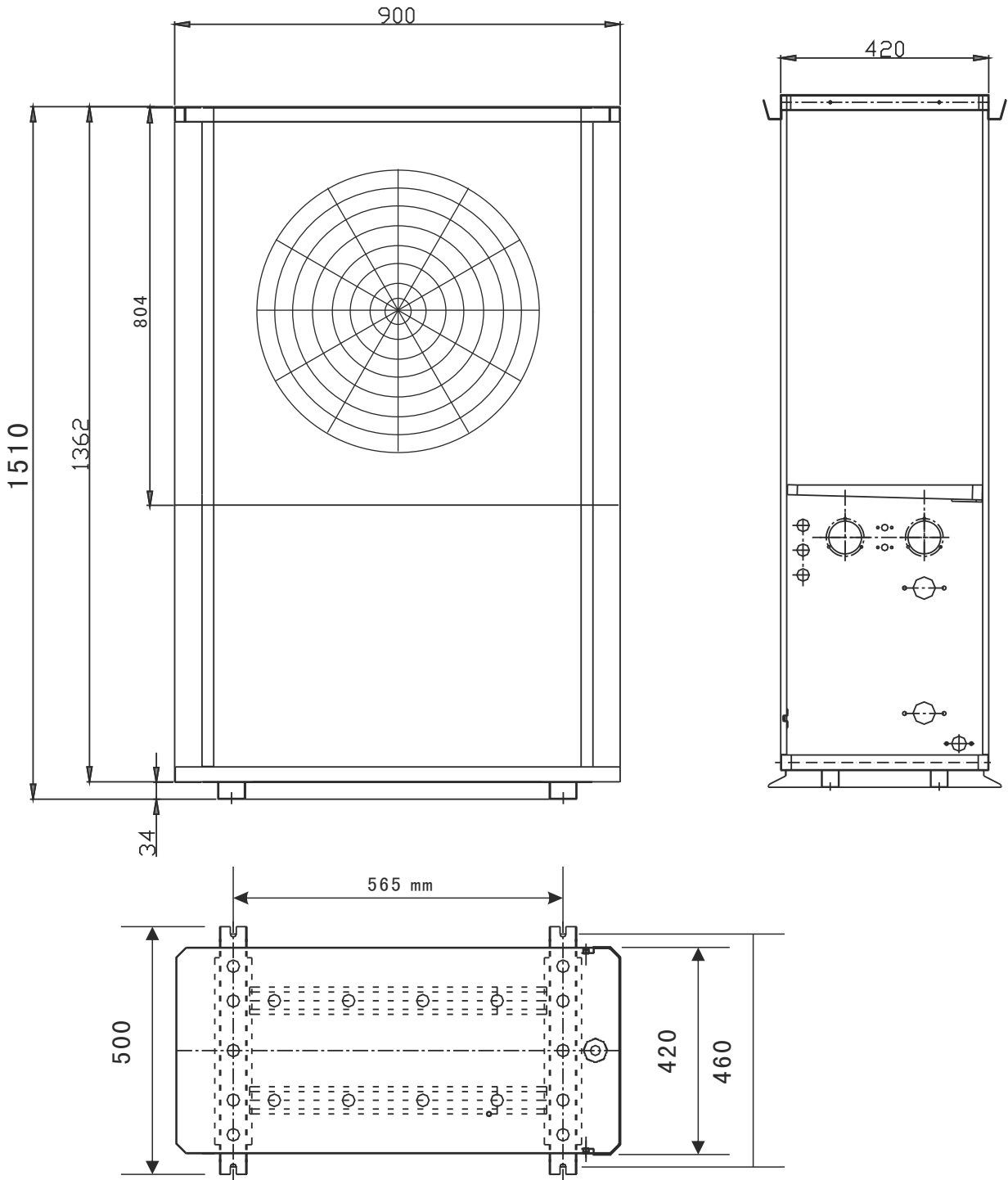
Performance Data

Model		SWBM-10.5H-B/P-S	SWBM-17.5H-B/P-S	SWBM-35.0H-B-S
Rated Heating Capacity	KW	10.5	17.5	35
	BTU/h	36000	60000	120000
Heating Input Power	W	2800	4800	9700
Running Current Heating	A	4.5×3	7.6×3	15.3×3
COP	W/W	3.7	3.7	3.6
Power Supply	V/PH/Hz	380/3/50	380/3/50	380/3/50
Compressor Type		Scroll		
Compressor Nos.		1	1	2
Fan Motor Nos.		1	2	4
Fan Motor Input	W	180	360	720
Fan Speed	RPM	1380	1380	1380
Noise	dB(A)	54	56	58
Water Connections	inch	1"	1"	1.5"
Water Flow Volume	m ³ /h	2.3	4.5	10
Water Pressure Drop	Kpa	34	34	34
Water pump	Power	KW	0.5	1.0
	Head	M	16	20
Unit Dimension	L	mm	900	1300
	W		500	500
	H		1510	1370
Paking Dimension	L	mm	1070	1440
	W		590	570
	H		1700	1550
Weight	Net Weight	kg	100	160
	Gross Weight		130	215
			215	325

Measuring conditions:

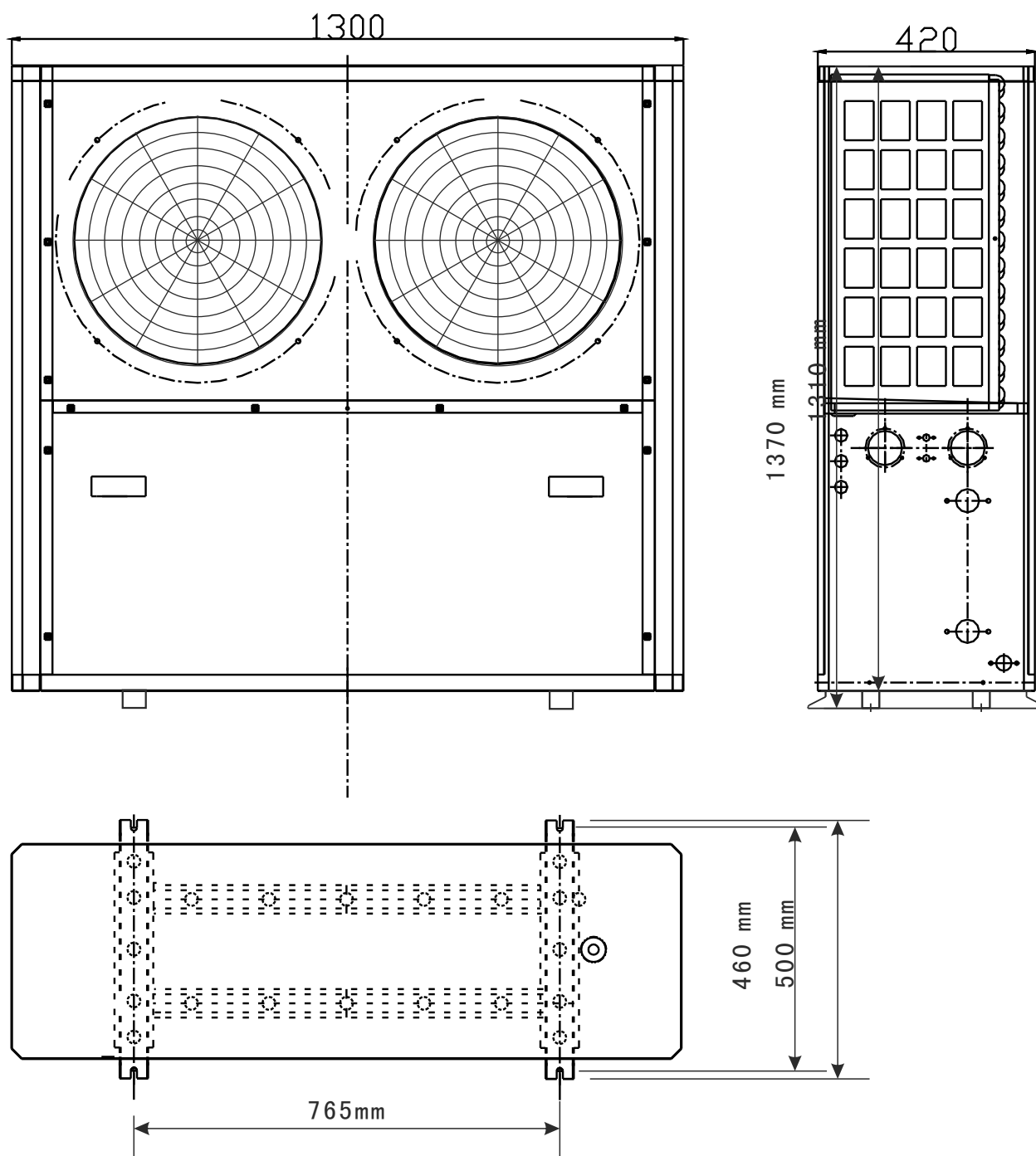
Heating: dry bulb 7℃, wet bulb 6℃, water inlet 40℃, water outlet 45℃ .

The dimension for air source heat pump water heater
SWBM-10.5H-B/P-S



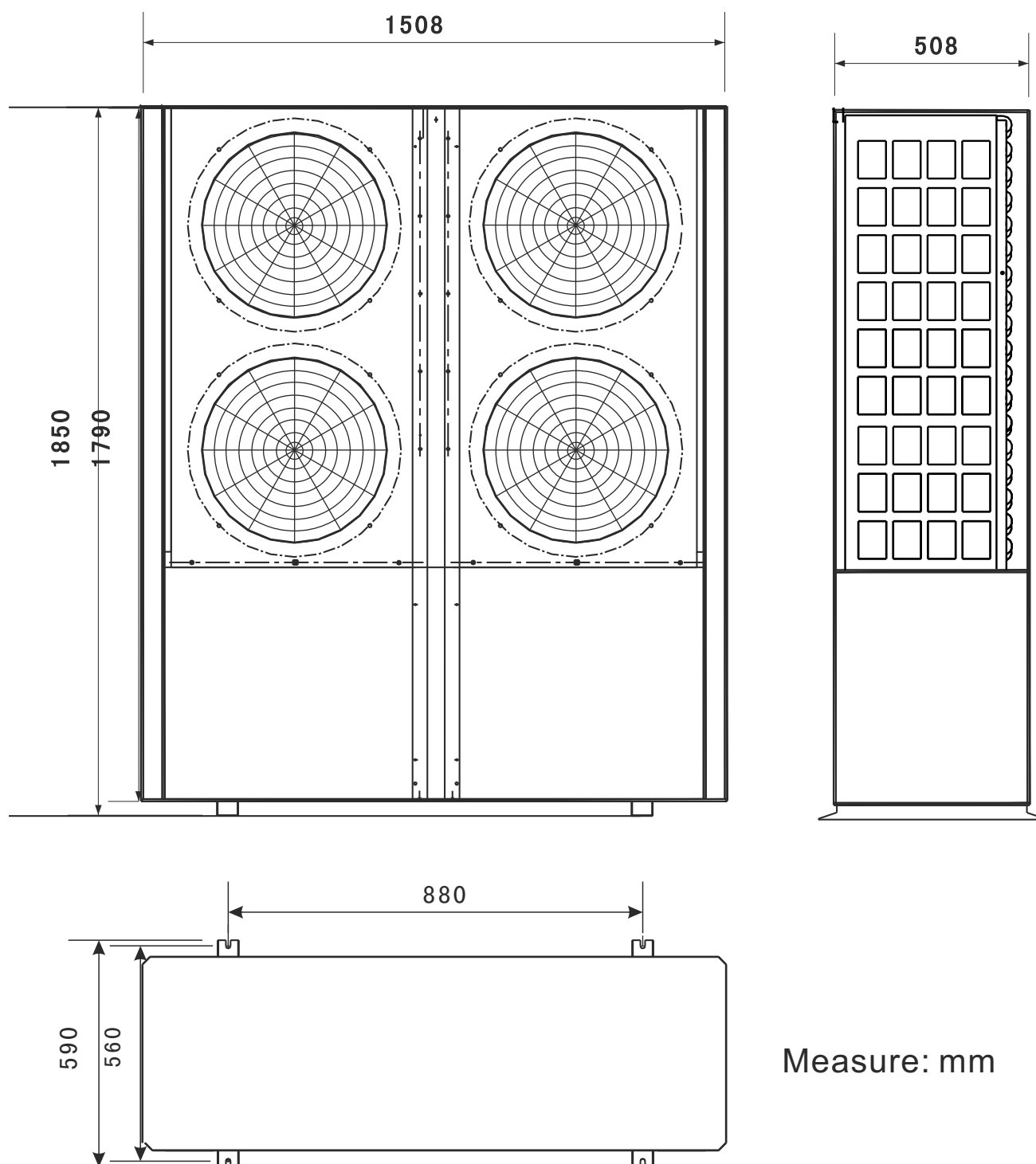
Measure: mm

**The dimension for low ambient air source heat pump water heater
SWBM-17.5H-B/P-S**



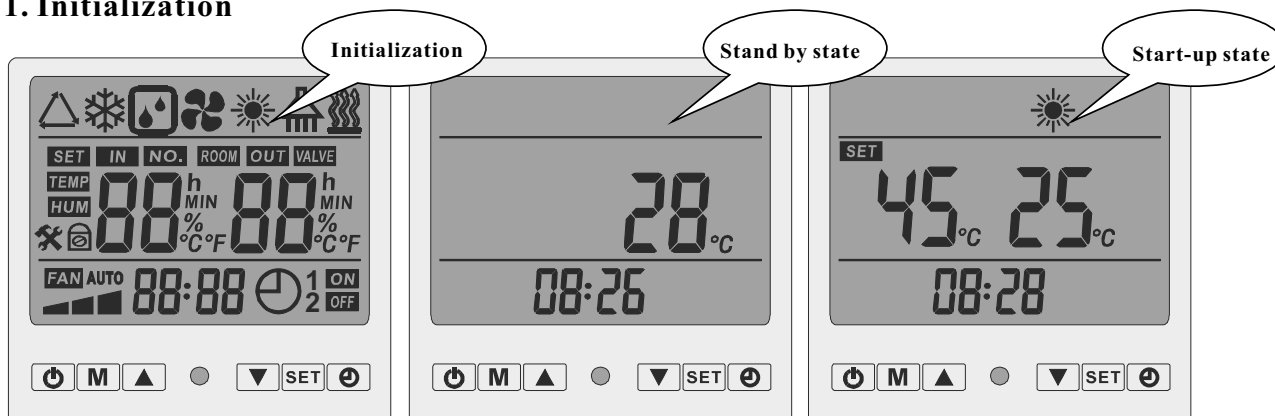
Measure: mm

The dimension for low ambient air source heat pump water heater
SWBM-35.0H-B-S



Operation introductions

1. Initialization



- ◎ Under start-up state, LCD screen left side displays the water inlet setting temperature, right side displays the actual water inlet temperature ; Under stand-by state, LCD main interface only displays the actual water inlet temperature on the right side .
- ◎ Under start-up state, LCD screen displays heating symbol ☀ ; Stand-by state , LCD screen does not display heating symbol ; Defrosting state, ☀ flashes
- ◎ When setting the time of Timer On / Timer Off , LCD screen displays timer symbol "ON""OFF".

2. Definition of LCD Controller Buttons.

2.1 "☰" for ON /OFF and Return

- 2.1.1 On main interface, Press “☰” to turn on or turn off the heat pump.
- 2.1.2 After entering parameter or clock setting, press “☰” once to return to main interface.

2.2 "M" for Status Inquiry

- 2.2.1 Press “M” once to enter parameter inquiry,
- 2.2.2 Long press "M" for 5 seconds to enter parameter setting status inquiry.

2.3 "▲" & "▼" for Up and Down

- 2.3.1 Under start-up state, press “▲” and “▼” to directly adjust/set the hot water temperature .
- 2.3.2 Press “M” and “▲” / “▼” to check and adjust the parameters.

2.4 "SET" for Clock and Auxiliary Heater setting

- 2.4.1 Press “SET” once to enter Clock setting, meanwhile press “▲” / “▼” to adjust the time.
- 2.4.2 Long press “SET” for 5 seconds to switch on or off the auxiliary heater function . When Auxiliary heater symbol “🔥” is displayed, system allows to start the Auxiliary heater function.

Operation introductions

2.5 " "for Timer

2.5.1 Press to enter the setting of Timer On and Timer Off (Totally you may set 3 sets of different Timer On and Timer Off), and press “▲” / “▼” may change the time, details see Timer On/Off setting.

3. Wire Controller Operation

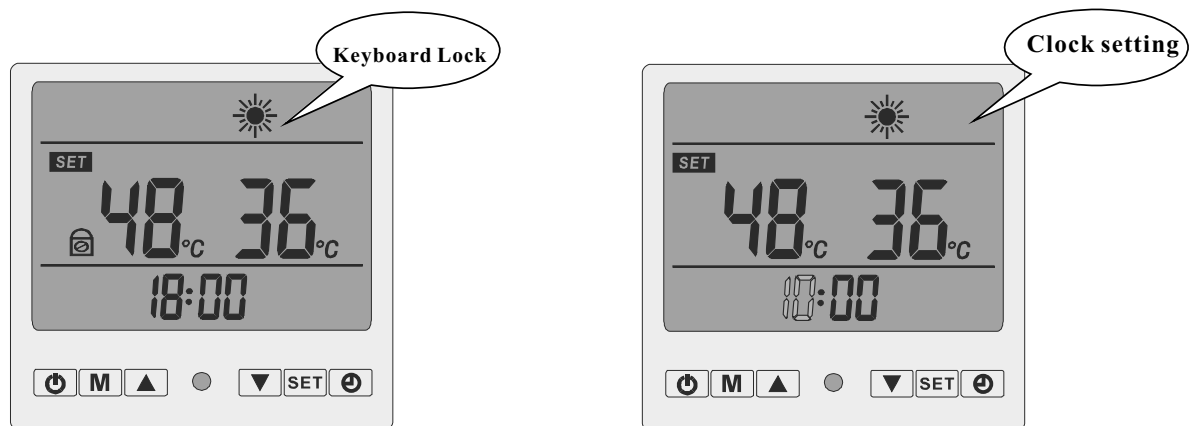
3.1 Turn on and turn off the heat pump

3.1.1 Press “ ” once to turn on or turn off the heat pump.

3.2 Keyboard Lock & Unlock

3.2.1 Under unlocked state, press both “▲” and “▼” at the same time for 5 seconds, after “Dee —” sound, keyboard is locked.

3.2.2 Under locked state, press both “▲” and “▼” at the same time for 5 seconds, after “Dee —” sound, keyboard is unlocked.



3.3 Clock Setting

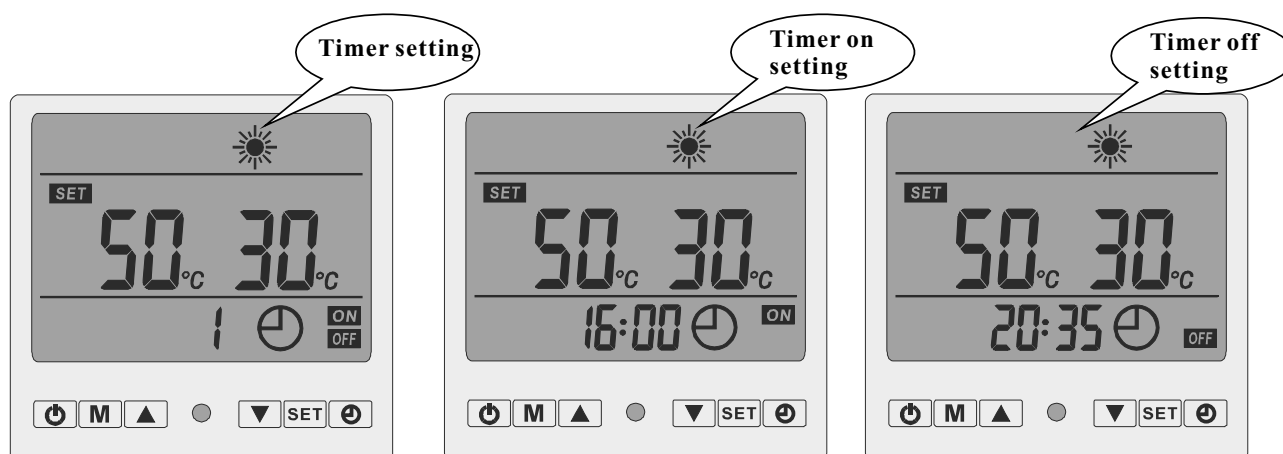
3.3.1 On main interface, press “SET” once, to enter clock setting interface, at this moment, the hour time for clock setting shows and flashes.

3.3.2 press “▲” and “▼” can set the hour time for clock.















3.3.3 After setting hour time, press “SET” once, then only minute time shows and flashes, then you can press “▲” and “▼” to set the minute time for the clock.

3.3.4 After setting the minute time, press “SET” once to confirm and save all the setting to current live clock time, meanwhile to exit the setting interface and return the main interface.

Operation introductions



3.4 Timer On & Timer Off Setting

- 3.4.1 On main interface, press “” to switch among 3 sets of Timer setting.
- 3.4.2 After entering the Timer On setting interface, press “” once to enter current Timer On setting interface, at this moment, the hour time of clock shows and flashes, press “” or “” to roll up or down to set/adjust the Timer On hour time.
- 3.4.3 After setting hour time for the Timer, press “” once, only minute of the clock shows and flashes, then press “” or “” to roll up or down to set the timer on minute.
- 3.4.4 After setting the minutes, press “” once to confirm and save all the Timer On setting, and switch to Timer Off setting interface. At this moment, the hour of clock shows and flashes, press “” or “” to roll up or down to set the Timer Off hour.
- 3.4.5 After setting Timer Off hour, press “” once, only minute of the clock shows and flashes, then press “” and “” to roll up and down to set the timer Off minute.
- 3.4.6 After setting the Timer Off Minutes, press “” once, to confirm and save all the setting for Timer On/Off and return to 3 sets Timer switching interface.
- 3.4.7 When the time for current set of Timer On and Timer Off is the same, system will automatically cancel the Timer On /Timer Off function.

Operation introductions

3.5 System Parameter & Status Inquiry



On main interface, press “**M**” to enter the inquiry interface of temperature sensor and electric expansion status, press “**▲**” and “**▼**” can check each parameter status.

Parameter	Content	Range	Default value	Remark
00	Water in temperature sensor	-20 ~ 99	Actual testing value	Display also even system is not start up
01	Water out temperature sensor	-20 ~ 99	Actual testing value	
02	System 1- Economizer outlet temperature sensor	-20 ~ 99	Actual testing value	
03	System 1- Economizer inlet temperature sensor	-20 ~ 99	Actual testing value	
04	Ambient temperature sensor	-20 ~ 99	Actual testing value	
05	System 1- coil tube temperature sensor	-20 ~ 90	Actual testing value	
06	System 1- air exhausting temperature sensor	0 ~ 125	Actual testing value	
07	System 2- air exhausting temperature sensor	0 ~ 125	Actual testing value	
08	Electrical expansion valve current steps	150 ~ 450	Actual testing value	
09	Reserved	0		
10	Model parameter	0/1/2/3 0 :for single phase power single system, 1: for single phase power dual system , 2: for 3 phase power single system, 3: for 3 phase power dual system	Actual testing value	


3.5.1 Press “**M**” for 5 seconds to check parameter setting value, press “**▲**” or “**▼**” to check each system's parameter setting value.




Control Parameter	Meaning of Setting parameter	Range	Default	Remark
20	Return water setting temperature	20 ~ 60	40	
21	Heating temperature difference (heat pump)	1 ~ 20	5	
22	Auxiliary heater starting delay time	15 ~ 90min	30min	
23	Auxiliary heater return temperature difference	1 ~ 20	5	
24	Temperature to enter defrosting	-30 ~ 0	-3	
25	Temperature to exit defrosting	1 ~ 30	14	
26	defrosting period	30 ~ 90min	45min	
27	Max defrosting time	1 ~ 12min	8min	
28	electric expansion valve initiate value	15 ~ 45	25	Actual impulsion = setting value*10
29	Air exhausting protection temperature value	100 ~ 125	110	
30	Memory record for power disconnection	0 ~ 1	1	1 means record the memory if any power disconnection
31	Second set point (mamimum setting temp range)	50 ~ 60	60	Only validity when S1 switch connected
32	Second set point (minimum setting temp range)	20 ~ 40	35	Only validity when S1 switch connected


Operation introductions

3.5.2 On the interface of Parameter and Status inquiry , if not pressing any button within 10 seconds, system automatically exit the inquiry interface and return to main interface, To press directly “” ON/OFF or “” button also return to main interface.

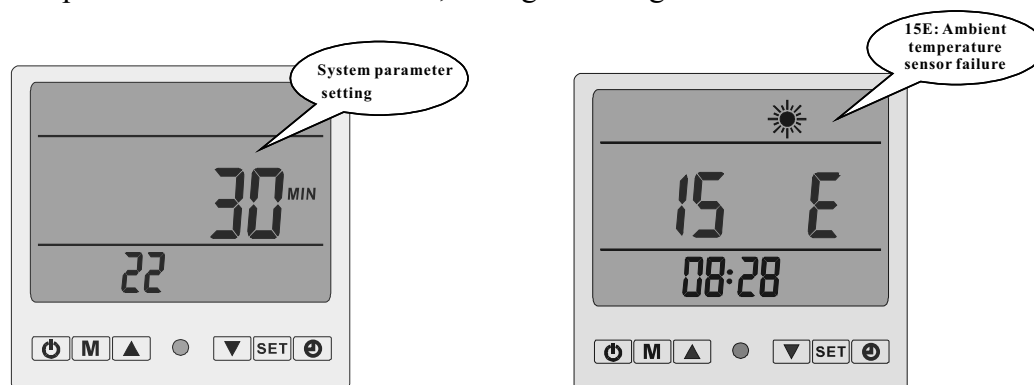
3.6 System parameter setting

3.6.1 Under stand-by state, to check the Inquiry interface(see3.5.2), if current displayed parameter are system parameter, press “” may enter to current parameter setting interface.

3.6.2 On the interface of parameter setting, press “” or “” to adjust the current system parameter setting value. After parameter value is set, press “” again to save current setting value, and exit current parameter setting interface.

3.6.3 During the parameter setting , if not pressing any button within 10 seconds, system automatically save current setting value , exit setting interface and return to main interface. To press directly “” button also return to main interface.

3.7 Any pressing on the LCD controller will lighten the background light, if no any other operation within 10 seconds, background light will be off.



3.8 Setting about S1 & S2 switch

S1 Switch---Second Set Point

S2 Switch----Long distance demand

3.8.1 Second Set Point available when S1 switch has well connected.

At the same time, water temp set point setting decided by ambient temp, Parameter 31 and Parameter 32. (Both 31 & 32 Parameter would be adjusted)

Parameter 31 (maximum setting range 50~60 ° C)

Parameter 32 (minimum setting range 20~40 ° C)

A. When ambient temp < 5° C, set point temp refer to the data of Parameter 31

B. When ambient temp > 15° C, set point temp refer to the data of Parameter 32

C. When 5° C ≤ ambient temp ≤ 15° C, Set point temp = Data of Parameter 31- (Data of parameter 31- data of parameter of 32)/(15-5)*(Ambient temp -5)

For example, when ambient temp is 18 deg c, Parameter 31 data is 60 deg c, Parameter 32 data is 20 deg c. Then set point temp = 60 - (60 - 20) / (15 - 5) * (18 - 5)

Operation introductions

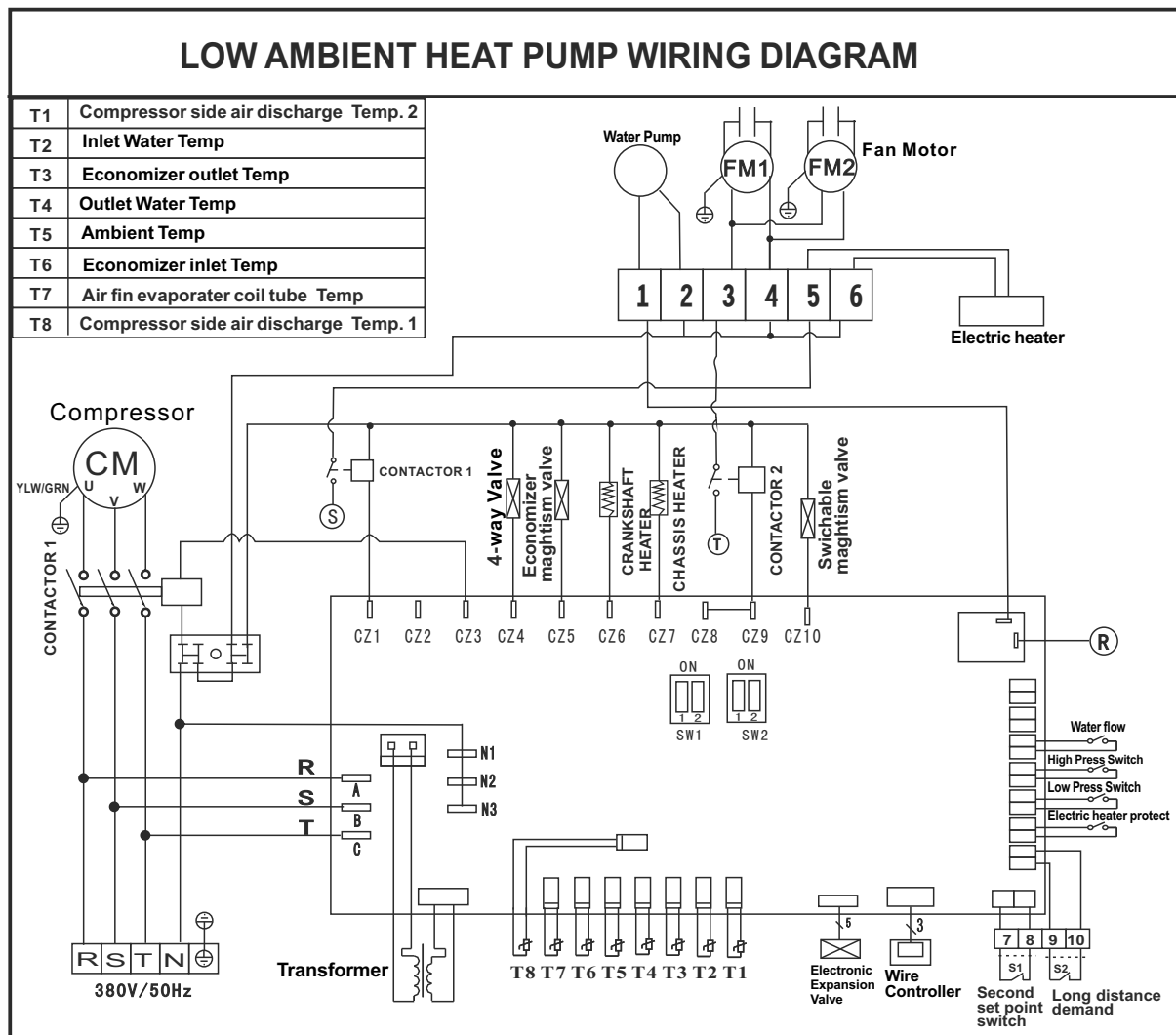
- 3.8.2 When S1 disconnected, set point temp control by LCD controller. (Refer to the setting of Parameter 20 (default setting 40 deg c).
- 3.8.3 Heat pump will turn on when S2 switch has well connected. However, S2 well connected, and suddenly press the off button on the LCD controller. Heat pump will stop for 3 minutes. After 3 minutes heat pump continue to turn on if S2 Still has been connected.
- 3.8.4 The timer function is out of validity when S2 switch is connected.
- 3.8.5 Heat pump turns off when S2 switch is disconnected. Meanwhile, need to use LCD controller to switch on/off the heat pump.

3.9 Failure code and parameter tables

Error code	Content	Remark
00E	Communication failure	Main board(PCB)and wire controller continuously lose signal connection for 1 minute, error code shows but unit non stop.
01E	Water flow failure	
02E	System 1 compressor high pressure failure	
03E	System 1 compressor low pressure failure	
04E	System 1 compressor air exhausting temperature too high	
05E	power phase failure	Single phase model excluded
06E	Auxiliary heater temperature too high protection	
07E	System 2 compressor high pressure failure	Single system unit excluded
08E	System 2 compressor low pressure failure	Single system unit excluded
09E	System 2 compressor air exhausting temperature too high	Single system unit excluded
10E	First class anti-freezing protection	
11E	Second class anti-freezing protection	
12E	System 1- cold water out temperature sensor failure	
13E	System 1-cold water in temperature sensor failure	
14E	System 2- air exhausting temperature sensor failure	Single system unit excluded
15E	Ambient temperature sensor failure	
16E	Water outlet sensor failure	
17E	Return water temperature sensor failure	
18E	System 1- coil tube temperature sensor failure	
19E	System 1-air exhausting temperatures sensor failure	

Wire Circuit Diagram

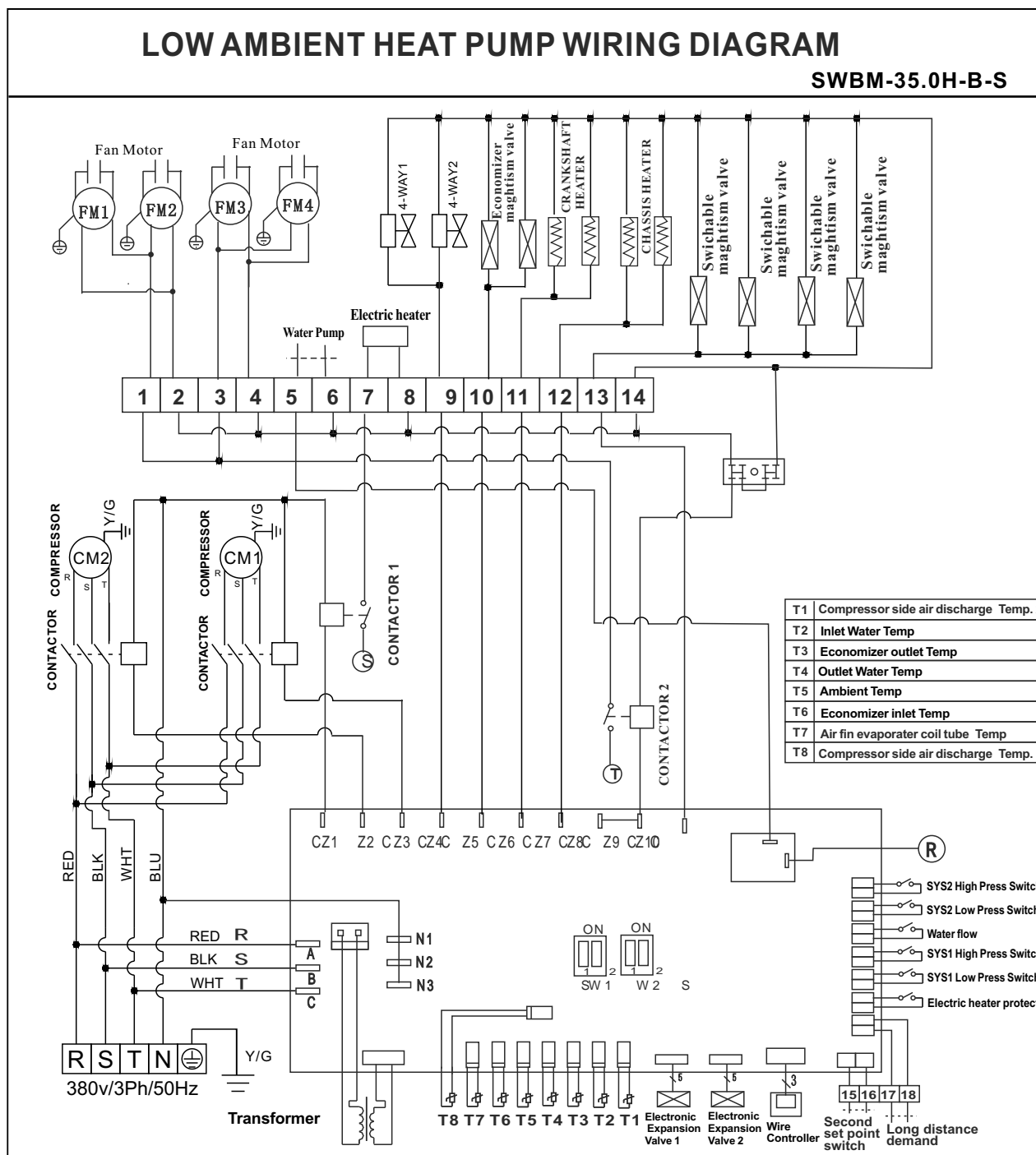
Applicable model: SWBM-10.5H-B/P-S SWBM-17.5H-B/P-S



Note: crank heaters marked in diagram are optional parts according to customer request!

Wire Circuit Diagram

Applicable model: SWBM-35.0H-B-S



Note: crank heaters marked in diagram are optional parts according to customer request!

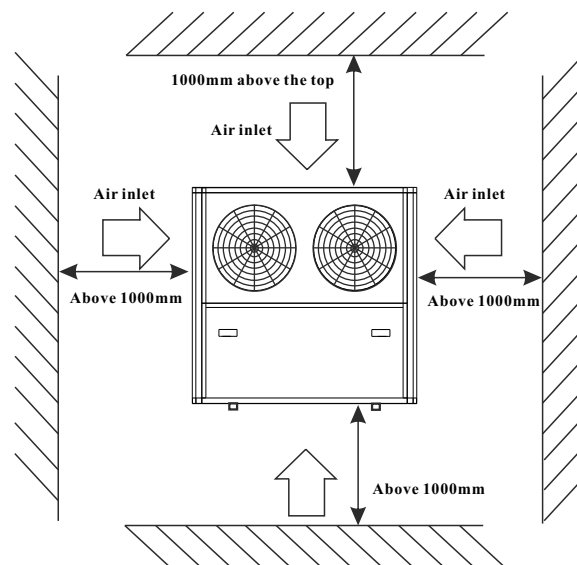
Installation instructions

1. Unit installation

1). Installation location

Host unit

- ☐ Should be installed in a larger & well-ventilated place.
- ☐ Installation location should ensure unhindered access outlet (inlet & outlet shown as below).
- ☐ Install gutter or set up positions near the outfall, to facilitate the drainage.
- ☐ The installation base or bracket should be a steady, to ensure the smooth operation of generating units.
- ☐ Make sure the unit is vertical after installation, and no incline.
- ☐ Make sure not to install the host unit in the any conditioner of pollution, corrosive gases, sun and fallen leaves, etc.
- ☐ Installation location must not next to place of incensive , easy-explosion and fire .
- ☐ Installation must pay attention to the distance between the barriers shown in below picture (pay attention to arrow direction).



Water tank

- ☐ Water tanks should be placed where ambient temperature is above 0°C .
- ☐ Can be installed outdoors or the top of the building (based on the size of water tanks and the load-bearing capacity of the building and so on).
- ☐ Do not have water tanks installed in the pollution, corrosive gases place.

2). Unit installation

- ☐ Units base can be installed as cement concrete structures, steel brackets can also be used, add the shockproof rubber pads , make the base surface flat.
- ☐ Units can be designed based on the working performance.
(See Table of technical performance parameters)
- ☐ Unit should have drain or drainage inlets.
- ☐ Normally required to install in the place where setted cement concrete base.

Installation instructions

2. Pipeline connecting

Installation notes:

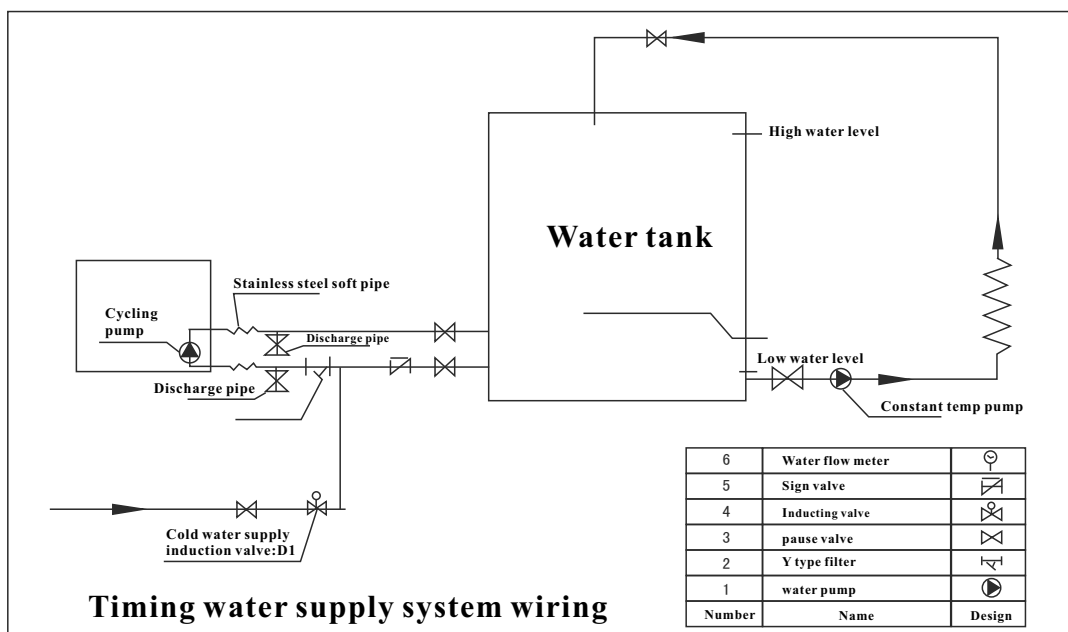
- ❏ Water drain pipes, overflow pipes should be installed next to the drainage inlets to facilitate drainage, vent valve should be installed on vent pipes.
- ❏ Repair valve should be installed in front of the electromagnetic valve on the pipeline system, which is convenient for future repair.
- ❏ User water pressure should less than 0.6 Mpa.
- ❏ All pipelines should choose metal pipe (such as stainless steel, with Lining Plastic and lining stainless steel and thin-walled copper pipe or, etc.). The use of plastic pipe (such as the PP-R, ABS, etc.) should consider the pipeline expansion between the host unit and water tanks.
- ❏ Water supply and pause valves may need to keep warm in the winter (according to the local winter temperature) to avoid the broken of water supply and pause valve.

Water system installation

- ❏ All the pipeline tubing should be matched as shown on the manual, and in accordance with national corresponding construction standards.
- ❏ Installation of water pipes should be straight and flat, pipeline collocation should be rational, ensure to minimize bending; reduce the resistance loss of the water system.
- ❏ Pipeline and connecting parts are not allowed a leakage phenomenon.
- ❏ After the installation of circulating pipe between tap water pipes, host unit and water tanks, should carry out water leakage testing, and eject the sewage to ensure the system's cleanness.
- ❏ If no water leakage, keep the hot water pipe warm.

3. Project example:

Application of heat pump water heater engineering systems have different forms. Here are two kinds of stand-alone group water heating system, only for your reference.



Running Test and operation**1. Preparatory work before the running test.****a) Inspection of heat pump water heater units:**

- ☐ Check if the unit appearance and the pipeline system were damaged during transport.
- ☐ Check if there is air exist in the water pipes, if yes, should empty all the air inside by the manual exhaust valve and the exhaust valve on the water pumps.
- ☐ Check if the fan motor interference the fan fixing board and fan protection net.

b) Check the electricity distribution System

- ☐ Check if the power supply same as shown on manual and rating label.
- ☐ Check if all the power supply and control wiring are all well connected, check if the wiring is connected as wiring diagram and reliability of earth wiring.

c) Check Pipeline system

- ☐ Check the pipeline system, make sure the water supply pipes, water return pipes, pressure gauges, thermometers, valves, water flow switch are safe and correct.
- ☐ Check if having opened all the valves that should be opened, and having closed all valves that should be closed.
- ☐ Check if all necessary attemperators are good.

Running Test and operation

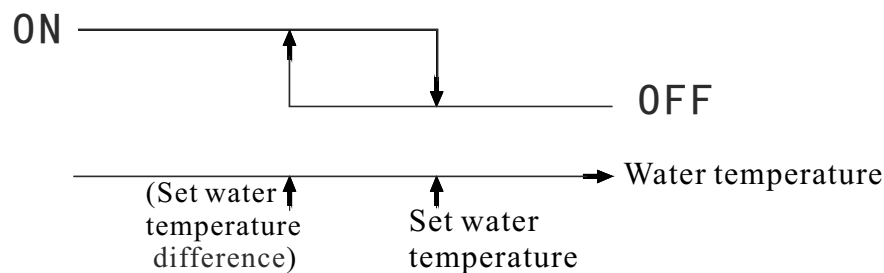
2. Running test

This running test must be performed by professional staff!

- ☐ Overall test can be run if the entire system inspection is conformed to regulations.
- ☐ Connected to power, start the heat pump, host unit delays three minutes then auto-start. For three-phase power supply unit, first check whether the fans and pumps' rotary direction correct or not, if not, immediately shut down the power and adjust phase sequence. Measure the compressor operation current, and if any abnormal noise, Check whether the unit conform to the requirements, run for a period of time (general 3 days), after that, the unit can be used normally.

3. Normal operation

- ☐ Heating process: start - up - water pumps runs - water flow switch inspection --- Fan operation compressor operation (when the low water level cut off, water supply induction valve opens
- ☐ Operation Control:



- ☐ Water level control: When the low level switch disconnect, open the water supply induction valve to supply enough water, meanwhile stop the water supply pump. Open the water supply pump when high level switch closed, After high-level switch closed for two minutes, open water supply induction valve (at least 2 minutes).
- ☐ When water pump is on and the high level switch cut off, if water temperature $< (\text{set Temperature} - 5 \text{ degrees})$, shut down water supply for tanks, If water tank temperature $> (\text{temperature} - 2 \text{ degrees})$ then open the water supply induction valve, after high-level switch closed for two minutes stop the water supply induction valve. When water pumps stopped, whatever conditions, should supply enough water. (Water supply switch on at 2 minutes).
- ☐ For the first power-on boot, the circulating water pump, compressor, fan motor runs after low level switch closed.
- ☐ During the unit operation, circulating pump open. When the unit stopped, the circulating pump will be delayed 30 seconds then stop functioning.
- ☐ When water pumps open, meanwhile open water return induction valve, 10 minutes later, test the return water temperature, when the return water temperature $> (\text{water temperature} - 5 \text{ degrees})$, the return water induction valve stops. If the return water temperature $< (\text{tank water temperature} - 10 \text{ degrees})$, open the water return valve so that the water supply pump constantly store the hot water. When water supply pump closed, shut down the water return valve at the same time.
- ☐ For normal start-up, the 4-way valve cut off, only when defrosting, the unit will work in normal.

Maintenance

Heat pump water heater is a high automatic equipment, please perform regular inspection termly. If the unit can be long-term and efficiently maintenance, the operating reliability and service life will have an unexpected increase.

1. The extra water filters should be cleaned regularly to ensure clean water quality of the system, and to avoid damage caused by dirty water filter blocking.
2. Users should pay attention for usage and maintenance to below : all units' protection devices are set up before leaving factory, do not make any adjustment by yourself.
3. Frequently check the power supply and electrical wiring system is solid or not, whether electrical components are abnormally working, if yes, should timely maintenance and change for a new one.
4. Perform regular checks of the water supply system, check whether the tank safety valve, liquid level controller and exhaust devices work properly, so as to avoid air into the system, and reduce the water cycle volume, thus affect the heating function and operation reliability.
5. Check whether pumps and water valves are normal working or not, whether water tubing and water pipes connector are leakage or not.
6. The unit and around should remain clean, well-ventilated. Regularly clean (1-2 month) the side air heat exchanger to maintain a good effect of heat exchange.
7. Frequently check whether each part of the unit work normal or not, check whether there is oil on the pipeline joints and charging valve to ensure that no refrigerant leakage.
8. Do not piling up debris around the unit, so as not to block from air inlet and outlet, the unit around should be kept clean the dry, well-ventilated.
9. If the unit stops for a longer time, should drain all the water in the pipeline, cut off power supply, and sets the protective equipment. When re-run the unit, complete inspection is a must before reboot.
10. When unit failure, and the user can not resolve the problem, please call our Company in local maintenance department, in order to promptly send people for maintenance.
11. Host condenser cleaning. We propose to use 50℃-60℃, and 15% hot phosphoric acid for condenser cleaning, launch the circulating pump of the host unit for three hours' cleaning, finally rinse with water three times. (Propose to back up a 3-way connector when installing the pipeline, block one joint), in order to clear the connection pipe. Do not use corrosive cleaning fluid for condenser cleaning.
12. Water tanks need to remove the Water scale after some time (normally two months, according to the water quality of local place).

Air Source Heat Pump-Water Heater

