Solis ECO Monoblock
Air to Water Heat Pump
Operation and Installation Manual

Contents

1. Preface

In order to provide customers with high-quality, reliable and versatile products, this heat pump is manufactured by strict design and manufacturing standards.

This manual includes all the necessary information about installation, debugging and maintenance. Please read the manual carefully before you start or maintain the unit.

The manufacturer of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, debugging, unnecessary maintenance which is not in line with this manual.

The unit must be installed by qualified personnel.

It is vital that the below instructions are adhered to at all times to keep the warranty.

—The unit can only be turned on or repaired by a qualified installer or an authorized dealer.

—Maintenance and operation must be carried out according to the recommended time and frequency, as stated in this manual.

—Use standard spare parts only.

Failure to comply with these recommendations will invalidate the warranty.

Inverter air to water heat pump is a high efficiency, energy-saving and environment-friendly equipment, which is mainly used for house heating/cooling and hot water. It can work with indoor units such as fan coils, radiators, or floor heating, for provision of domestic hot water it should be paired with the designated cylinder from Waterford

Stanley which has been tested and approved to the relevant standard to verify compatibility.

2. Safety Instructions

To maintain the safety of the operator and engineers and avoid damage to the unit or to the property it is necessary to use the heat pump properly, please read this manual carefully and understand the following information correctly.

Symbols

Symbol	Meaning
 WARNING	Incorrect operation may lead to death or serious injury to people.
 ATTENTION	Incorrect operation may lead to harm of people or loss of material.
	Prohibition. What is prohibited will be nearby this icon.
	Compulsory implement. The listed action need to be taken.
	ATTENTION (include WARNING) Please pay attention to what is indicated.

Warning

Installation	Meaning
 Professional installer is required.	The heat pump must be installed by qualified personals, to avoid improper installation which may lead to water leakage, electrical shock or fire.
 Earthing is required.	Please make sure that the unit and electrical power supply have good earthing, otherwise may cause electrical shock.

Operation	Meaning
	DO NOT put fingers or others into the fans or evaporator of the unit,

PROHIBITION	otherwise harm may occur.
 Shut off the power.	When there is something wrong or strange smell, the power supply needs to be shut off to stop the unit. To continue running may cause short circuit or fire.

Move and Repair	Meaning
 Entrust	When the heat pump needs to be moved or installed again, please entrust dealer or qualified person to carry it out. Improper installation will lead to water leakage, electrical shock, injury or fire.
 Entrust	It is prohibited to for the user to repair the unit by the user by themselves otherwise electrical shock or fire may occur.
 Prohibit	When the heat pump needs to be repaired, please entrust dealer or qualified person to carry it out. Improper movement or repair on the unit will lead to water leakage, electrical shock, injury or fire.

The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)

ATTENTION

Installation	Meaning
 Installation Place	The unit CANNOT be installed near the flammable gas. Once there is any leakage of the gas, fire may occur.
 Fix the unit.	Make sure that the basement of the heat pump is strong enough, to support the heat pump and will not collapse or deteriorate.
 Need circuit breaker.	Make sure that there is circuit breaker for the unit, lack of circuit breaker may lead to electrical shock or fire.

Operation	Meaning
 Check the installation.	Please check the installation regularly (one month), to avoid any decline or damage to the unit which may hurt people or damage the unit.
 Switch off the power.	Please switch off the power when cleaning or maintenance.
 Prohibition	It is prohibited to use copper or iron as fuse. The correct fuse must be fixed by electrician for the heat pump.
 Prohibition	It is prohibited to spray the flammable gas to the heat pump, as it may cause fire.

3. Features

With new technology of DC Inverter EVI, Solis Eco Monoblock

Series can be used in extremely cold area for heating/cooling, hot water. The Series is featured as follows.

3.1. DC Inverter EVI Heat Pump Technology

a. Ruking Driver Board

Ruking driver board controls the compressor running precisely basing on water temperature and air temperature. And it can work with wide voltage of 456V at maximum.

b. Panasonic Inverter Compressor

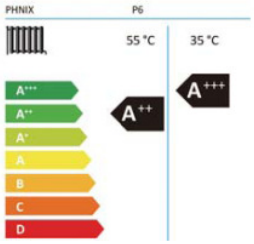
Panasonic inverter EVI compressor is adopted for the units to ensure high stability.

c. DC Fan Motor

DC fan motor with adjustable speed ensures the units' silent running. This makes the units work more efficiently at different conditions.

3.2. A+++ Energy Level

Solis Eco Monoblock DC inverter technology enables the heat pump to adjust its frequency from 30Hz - 90Hz according to real heating requirement. With this technology, Solis Eco Monoblock Series achieve an energy level of A+++ according to ErP directive.



3.3. Certification GuaranT-junctiond

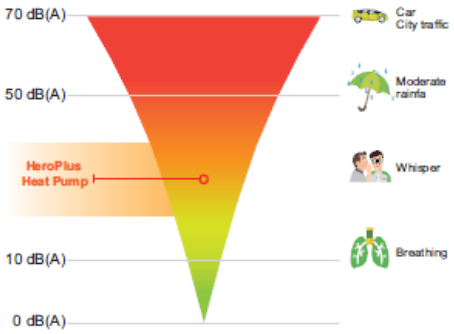
To meet the European market requirement, the series has achieved several certifications such as CE, ErP, MCS.

3.4. R32 Low GWP Gas

Compared with R410A refrigerant heat pumps, Solis Eco Monoblock Series with R32 gas have a GWP of only one-third. It is an environment-friendly choice for reducing CO2 emission. Meanwhile, R32 heat pump needs 30% less amount than R410A heat pump.

3.5. Low Noise of 37dB(A)

With a new internal noise reducing design, Solis Eco Monoblock can realize the lowest noise running of 37dB(A) when testing at 1 meter, so as to provide a silent living environment for users.



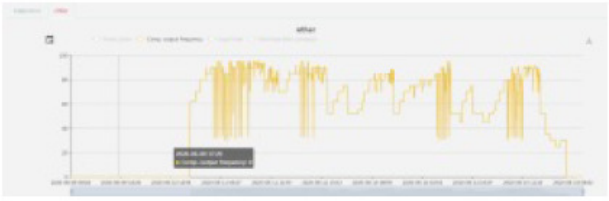
3.6. 5-inch Touch Display

5-inch display has many powerful functions, such as water temperature curve, easy timing, one-key mute, and mute timer.

3.7. APP & IOT

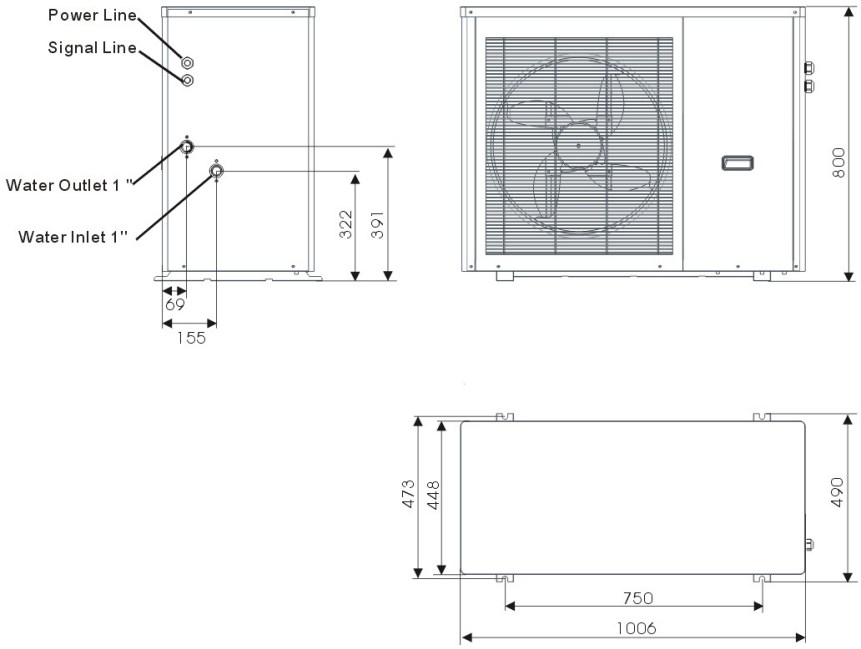
Simplify your life with WarmLink. Via connection by Wi-Fi or 4G, you can take full control of your heat pump from anywhere in your home or office with a single app on your smartphone.

This effectively saves manpower during the after-sales service period. The fault report button allows a direct error reporting channel to the local service provider. When an error has been reported, the service provider can see the error information of the target heat pump from the background system, and contact users immediately to offer help.



4. Unit Dimension (mm)

4.1. Models: Solis Eco Monoblock



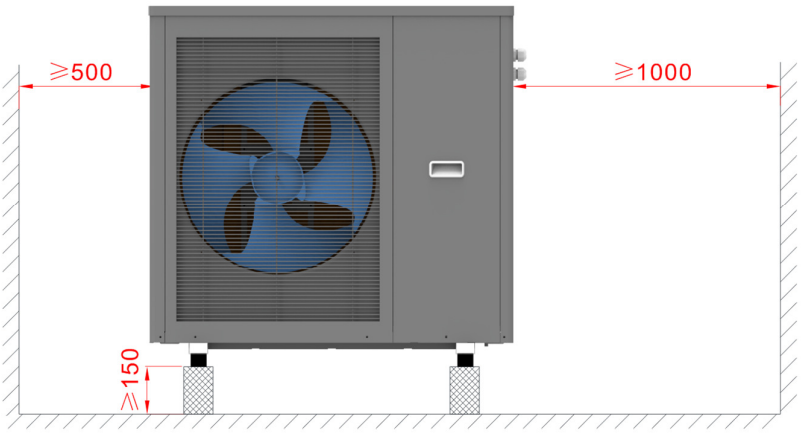
5. Handling & Installation

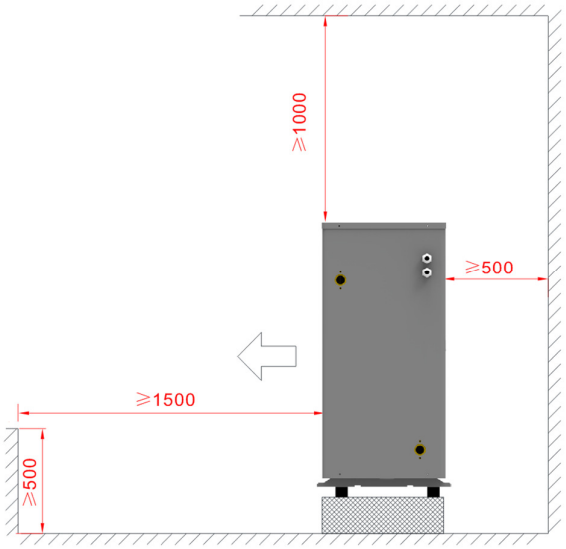
5.1. Packing List

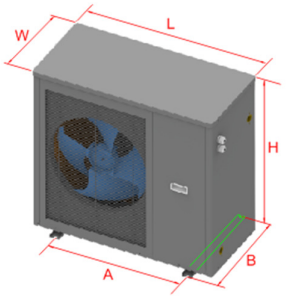
	**Heat Pump Unit × 1**
	**Display Mounting Plate × 1**
	**Rubber Feet × 4**
	**Drain Connection × 1**

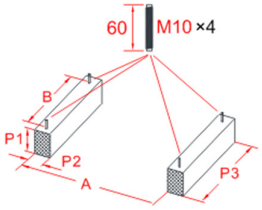
	**Display Connecting Wire × 1**
	**Thermistor × 1** ***optional accessory**

5.2. Installation Site Requirement (Unit: mm)

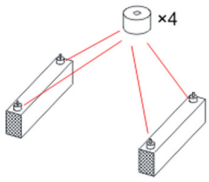








1



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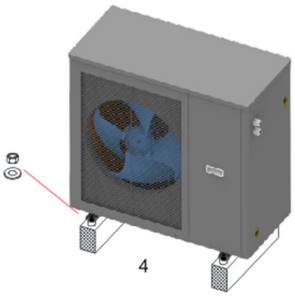
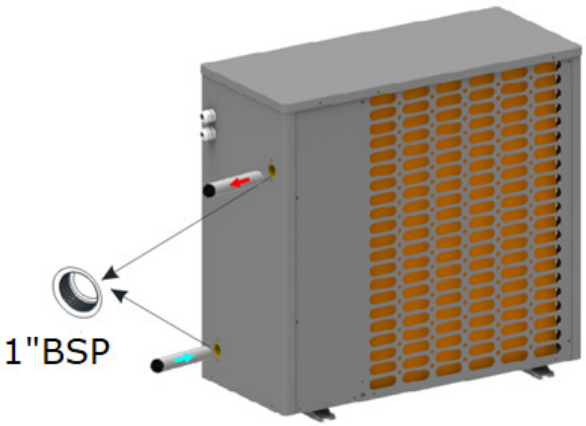
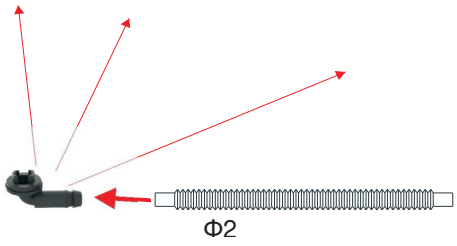
3



4

	Solis Eco
L	1006
H	805
W	442
A	750
B	473
P1	200
P2	150
P3	B+100





5.3. Cable Specification

Nameplate max. current	Phase line	Earth line	MCB	Creepage protector	Signal line
Less than 10A	2×1.5 mm^2	1.5 mm^2	20A	30mA less than 0.1 sec	n×0.5mm^2
10~16A	2×2.5 mm^2	2.5 mm^2	32A	30mA less than 0.1 sec	
16~25A	2×4 mm^2	4 mm^2	40A	30mA less than 0.1 sec	
25~32A	2×6 mm^2	6 mm^2	40A	30mA less than 0.1 sec	
32~40A	2×10 mm^2	10 mm^2	63A	30mA less than 0.1 sec	

6. Parameters

Model		**Solis Eco**
Power Supply	/	230V~/30~90Hz
Moisture Resistance	IPX	IPX4
Electrical Shockproof	I	I
Heating Condition - Ambient Temp. (DB/WB): 7/6°C, Water Temp. (In/Out): 30/35°C		
Heating Capacity Range	kW	2.29~8.25
Heating Power Input Range	kW	0.63~1.81
Heating Current Input Range	A	3.2~8.0
Cooling Condition - Ambient Temp. (DB/WB): 35/24°C, Water Temp. (In/Out): 12/7°C		
Cooling Capacity Range	kW	1.98~6.10
Cooling Power Input Range	kW	0.70~2.22
Heating Current Input Range	A	3.3~9.7
Hot Water Function is available for all the sizes.		
Max. Power Input	kW	2.9
Max. Current Input	A	13.0
Water Flow	m^3/h	1
Refrigerant / Proper Input	kg	R32 / 1.3kg
CO_2 Equivalent	Ton	0.88
Sound Pressure (1m)	dB(A)	37~54
Unit Dimension(L/W/H)	mm	1006×490×800
Shipping Dimension(L/W/H)	mm	1120×515×955
Compressor	Brand	Panasonic

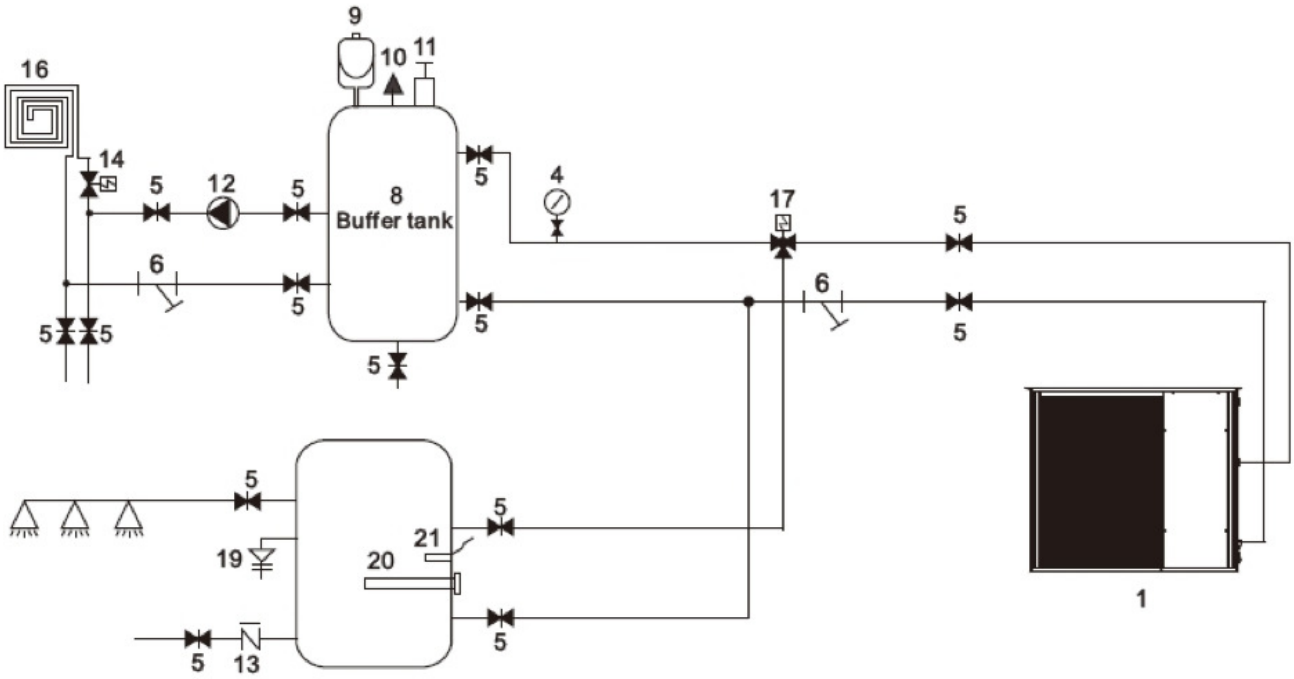
Circulation Pump	Brand	GRUNDFOS
Operating Ambient Temperature	℃	-25~43
Fan Quantity	/	1
Fan Motor Type	/	DC motor
Fan Motor Power Input (Min~Max)	W	30~75
Fan Speed (RPM)	RPM	300~850
Water Connection (Inch)	Inch	1
Water Pressure Drop (max)	kPa	28
Circulation Pump Water Head	m	7.5

7. Hydronic installation

The hydronic system must be completed in accordance with all local requirements.

The heat pump is designed for connection with a central heating system, the inclusion of a domestic hot water cylinder is optional , in come cases it may be preferred to use a separate source of domestic hot water in this case the controller will configured appropriately at commissioning.

Where a cylinder is required it is recommended to pair the unit with a pre-plumbed internal unit from Waterford Stanley that will combine the central heating and buffer tank and many of the essential system components,



1	Heat Pump	9	Expansion Vessel	16	Heat Emitter
4	Pressure Gauge	10	Pressure Relief	17	Diverter valve
5	Shut off valve	11	Air vent.	19	PT Valve
6	Y Strainer	12	Circulation pump.	20	Electrical heater
7	Shut off Valve	14	Floor Heating valve	21	Hot Water Sensor
8	Buffer Tank.	15	Indirect Hot water Cylinder.		

Notes:

Components for High Pressure hot water not shown. Inlet group & Domestic hot water expansion vessel.

Where there are radiators as heat emitters a magnetic filter will be required adjacent to the Y strainer.

8. Maintenance

8.1. Precautions for Daily Use

Before starting up the unit for the first time or after a long-time shutdown, the following preparations must be made: (1) Thoroughly inspect and clean up the unit. (2) Clean the waterway system magnetic filter and strainer. (3) Check water pump, regulating valve and other waterway equipment. (4) Tighten all wire connections.
Do not change the system parameters before consulting the engineer.
Ensure the pressure is correct and and pressure vessel is in working order, otherwise the performance and reliability of the unit will become compromised.
Ensure the waterways are clean and avoid dirt and blockage.
Where heat pump components need to be replaced only use parts provided or recommended by the company, do not use nonstandard parts.
Refrigerant supplement: Each unit has been equipped with sufficient refrigerant when leaving the factory. Do not charge or change the refrigerant. If you need to replenish the refrigerant due to leakage, please contact the engineer or dealer.

8.2. Periodic Maintenance (every 6 months)

Preparation	Before maintenance, please ensure that the unit has stopped running and cut off the power supply.
Inspection and cleaning of fin heat exchanger	In order to ensure that heat exchangers remain in optimum condition for heat exchange, their surfaces must be kept clean.
Inspection and cleaning of plate heat exchanger	Every 6 months or when the capacity of the unit drops by more than 10%, check the water-side heat exchanger for scale and clean the heat exchanger.
Check the electrical wiring	Check if the contact point is loose, oxidized, or blocked by sundries, etc., which causes poor contact of the electronic wiring.

8.3. Inspection and Maintenance

8.3.1. Preparing for inspection and maintenance

Danger!

Risk of death caused by fire or explosion if there is a refrigerant leakage!

Only carry out the work if you are a competent person qualified to work with R32 refrigerant.

The product contains combustible refrigerant R32. In the event of a leak, escaping refrigerant may mix with air to form a flammable atmosphere. There is a risk of fire and explosion.

Ensure that space is sufficiently aerated around the product.

Observe the basic safety rules before carrying out inspection and maintenance work or installing spare parts.

Disconnect the product from the power supply but ensure that the product is still earthed.

8.3.2. Cleaning the product

Do not clean the product with a high-pressure cleaner or a direct jet of water.

Clean the product using a sponge and hot water with a cleaning agent.

Do not use abrasive cleaners. Do not use solvents. Do not use any cleaning agents that contain chlorine or ammonia.

8.3.3. Checking the evaporator, fan, and condensate discharge

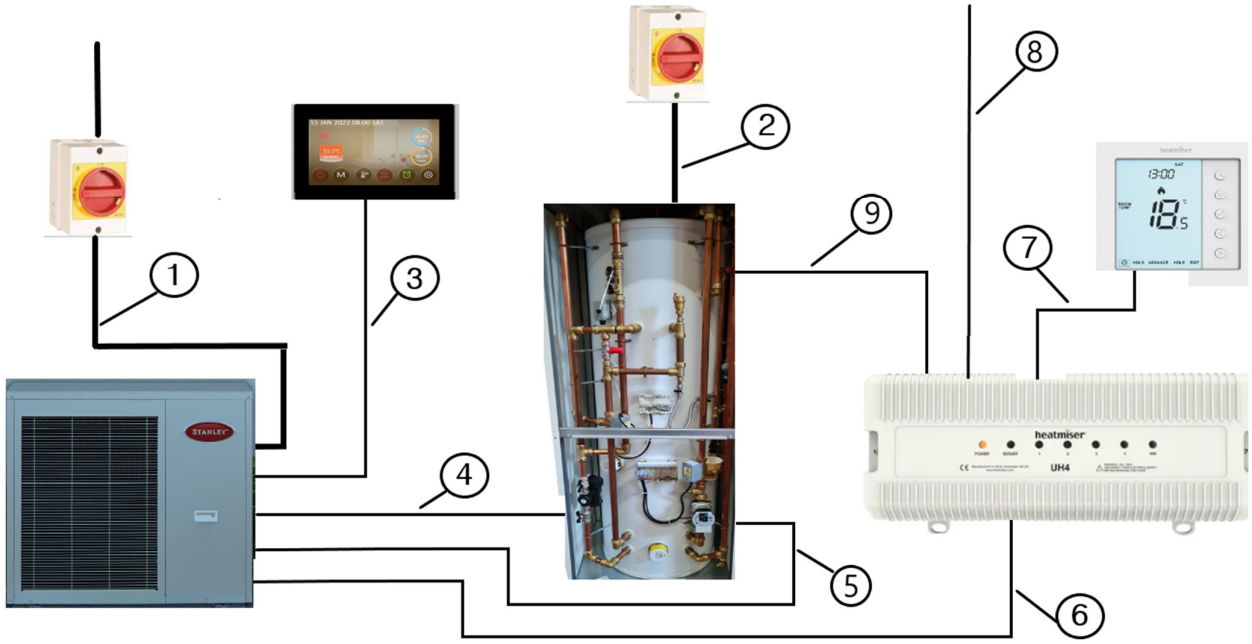
Check whether there is dirt between the fins or whether depositions have adhered to the fins.

Clean the fins using a soft brush, avoid fins from being bent.

Check whether dirt has accumulated on the condensate tray or in the condensate discharge pipe.

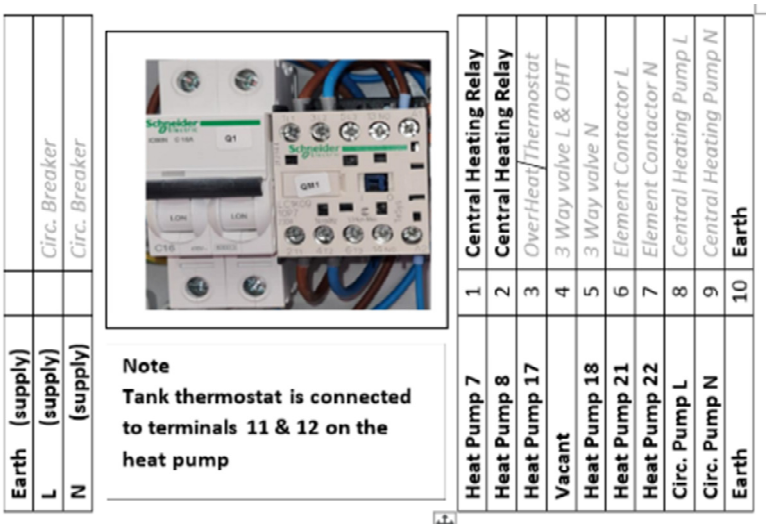
Check that the water can drain freely

9. Wiring (including 200 litre cylinder c/w 50 litre buffer internal Unit)



Wiring Guide		
	Purpose	Specification
1	Supply to External Unit	3 core 16A Supply 4mm^2
2	Supply to Internal Unit	3 core 16A Supply 4mm2
3	Wired Controller.	Supplied 5 core (0.75mm2) - 10 metres
4	Domestic Hot Water Temperature Probe	Supplied 2 core(0.75mm2) - 10 metres
5	Internal to External link cable	5 Core 0.75mm2 (Duct Grade)
6	Call for Heat Signal Cable	2 core shielded twisted pair 0.5m
7	Thermostat Signal	Cat 5 Twisted Pair (Duct Grade)
8	Supply to UH 4/8	3 Core 0.75mm2
9	Wiring Centre to Internal Unit (Pump)	3 Core 0.75mm2

9.1 Wiring layout of Internal Unit

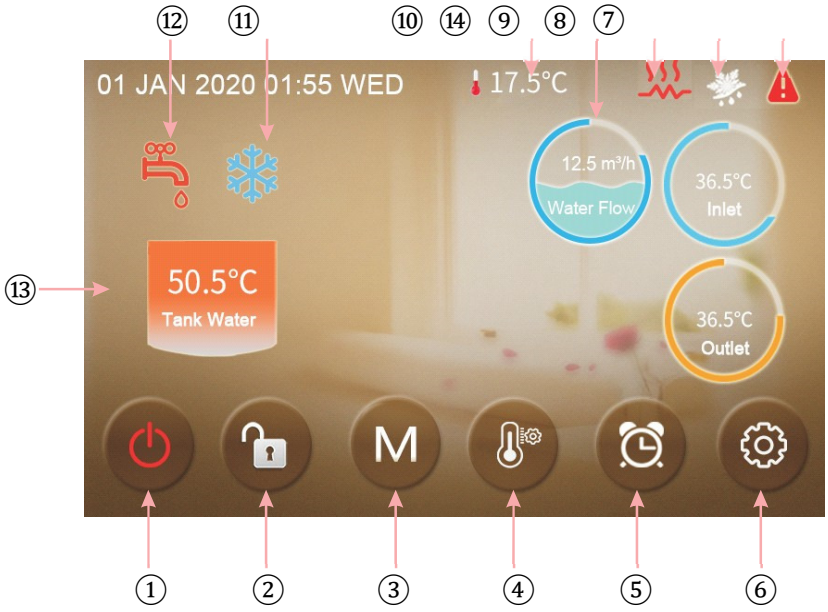


10. Display Operation Guide

10.1. Main Interface Display and Function

(1) Power on Interface

(2) Starting up Interface



Key No.	Key Name	Key Function
①	ON/OFF	Switch the unit ON or OFF. Red represents ON, while grey represents OFF.
②	Lock Screen	Lock the screen. White represents disabled, while green represents enabled.
③	Running Mode	Switch Hot water mode, heating mode, cooling mode, hot water + heating mode or hot water + cooling mode
④	Temperature Setting	Set the target temperature.
⑤	Timer Setting	Set the timer. White represents disabled, while green represents enabled.
⑥	Setup	Check the unit status, time, factory parameter, temperature curve, timer setting and mute setting.
⑦	Fault	This icon will flash when there is an error showing up. The display will enter fault record interface after tapping this icon.
⑧	Defrosting	The unit is in defrosting mode when this icon shows up.
⑨	Electric Heater	The unit is in electric heater mode when this icon shows up.
⑩	Ambient Temperature	It shows the current ambient temperature.
⑪	Cooling Mode	The unit is in cooling mode when this icon shows up.
⑫	Hot Water Mode	The unit is in hot water mode when this icon shows up.
⑬	Tank Water Temperature	The unit is in hot water mode when this icon shows up; Otherwise, this icon is not shown.
⑭	Water Flow (Not available for model P24T)	It shows the current water flow (note: When H31=0, the icon is not displayed).

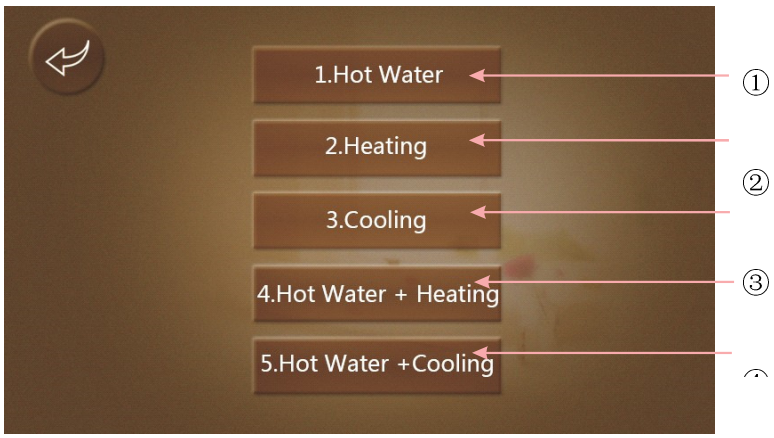
10.2. ON/OFF

As the main interface shows

(1) In the shutting down interface (on/off key is in grey status), press the on/off key can start up the machine.

(2) Note: In starting up interface (on/off key is in red status), press the on/off key can shut down the machine.

10.3. Mode Switch



In the main interface, there are five modes that can be selected after tapping the mode key.

(1)tapping hot water mode icon ①, then the display will change to this mode's interface;

(2)tapping heating mode icon ②, then the display will enter this mode's interface;

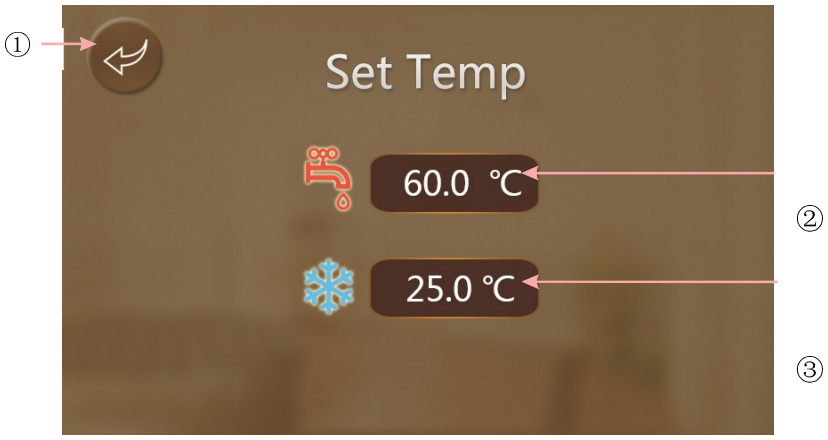
(3)tapping cooling mode icon ③,then the display will switch to this mode's interface;

(4)tapping hot water + heating mode icon ④, then the display will go into the hot water + heating mode's interface;

(5)tapping hot water + cooling mode icon ⑤, then the display will come to the hot water + cooling mode's interface;

Note: If your unit is a heating-only model (without a cooling function), the "cooling" key will show on the interface.

10.4. Set Target Temperature

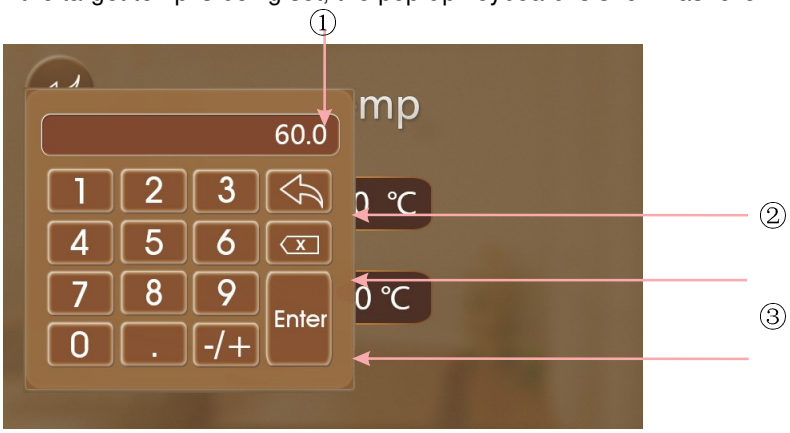


Take hot water + cooling mode for example:

Tapping ①, the wire controller will back to the main interface;

Tapping ②, the target temp of hot water can be set by the pop-up keyboard; Tapping ③, the target temp of cooling mode can be set by the pop-up keyboard.

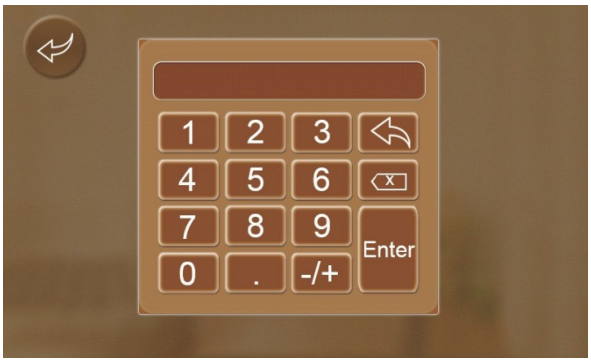
When the target temp is being set, the pop-up keyboard is shown as following:



Key No.	Key Name	Key Function
①	Target temp	the new target temp under the current setting
②	Return key	Tapping this key can back to the main interface.
③	Delete key	Tapping this key to undo the last action.
④	Enter key	Tapping this key can save you action and back to the main interface.

10.5. Unlock Screen

Click the lock screen key again while the screen has been locked, the pop-up keyboard is shown as following:



Note: Input the password of 22 or 022 and click the enter key, the screen will be unlocked.

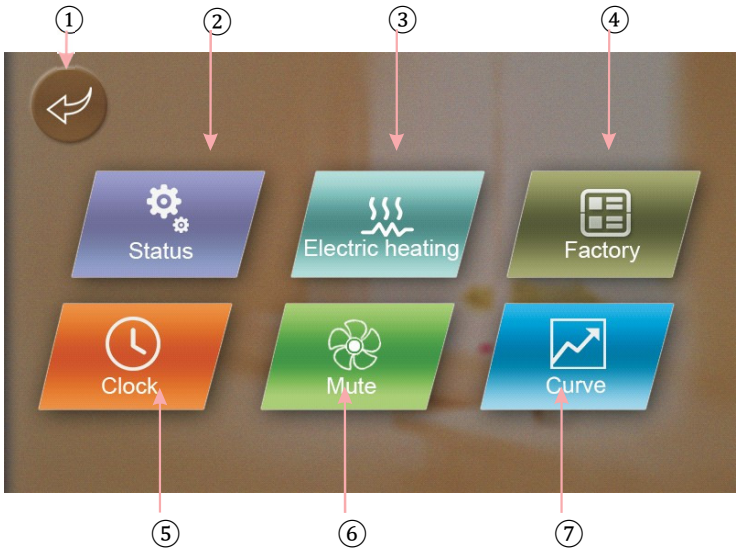
10.6. Timer Setting

Click the timer setting key to enter the timer setting, the interface display is as follows:

Key No.	Key name	Key color	Key function
①	Return key		Click this key to return to the main interface.
②	Enable the timer on/off	Enable: Green ON Disable: Gray OFF	Click this key to start or turn off the timed function
③	Enable the timer off	Enable: Red ON Disable: Gray OFF	Click this key to start or turn off the timed shutdown function
④	Hour of timer on		Click this button to set the timing boot time
⑤	Hour of timer off		Click this button to set the scheduled shutdown time
⑥	Page left		Click this button to turn the page left
⑦	Page right		Click this button to turn page right

10.7. Setup

Click the setup key to enter the setup and the interface display is shown as follows:



Key No.	Key Name	Key Function
①	Return key	Click this key to return to the main interface.
②	Operating mode	Click this key to view the current operating parameters of the unit.
③	Electric heating	Click this key to turn on the unit Electric heating.
④	Factory parameter	Click the key and enter the password to enter the factory parameter settings and status parameters interface.
⑤	System time setting	Click this key to set the system time.
⑥	Mute setting	Click this key to set the unit mute function mode.
⑦	Curve key	Click this key to view the temperature curve.

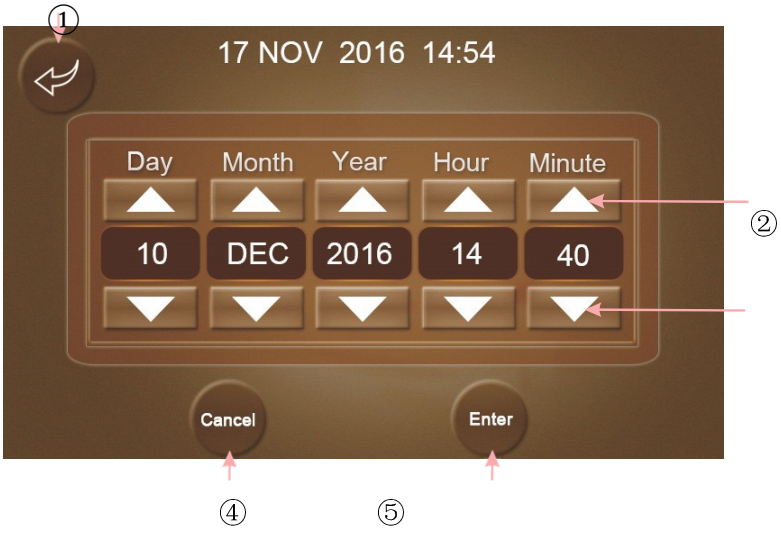
Note:

If the unit has ②, ⑥ or both functions, the corresponding icon will be displayed on the setting interface.

In the setup interface:

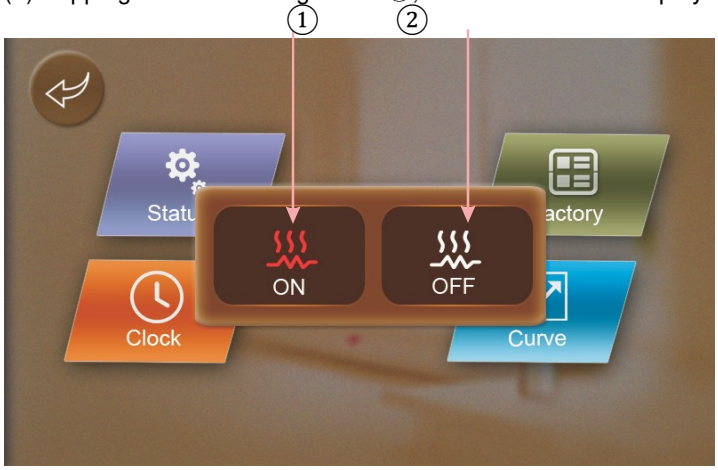
(1)Tapping operating mode button②, then the interface display is shown as follows:

(2)Tapping system time setting button⑤, then the interface display is shown as follows:



Key No.	Key Name	Key Function
①	Return key	Click this key to return to the setup interface.
②	Up key	Click this key to increase the value.
③	Down key	Click this key to decrease the value.
④	Cannel key	Click this key to cancel the current settings and return to the settings page.
⑤	Enter key	Click this key to save the current settings.

(3) Tapping Electric heating button③, then the interface display is shown as follows:



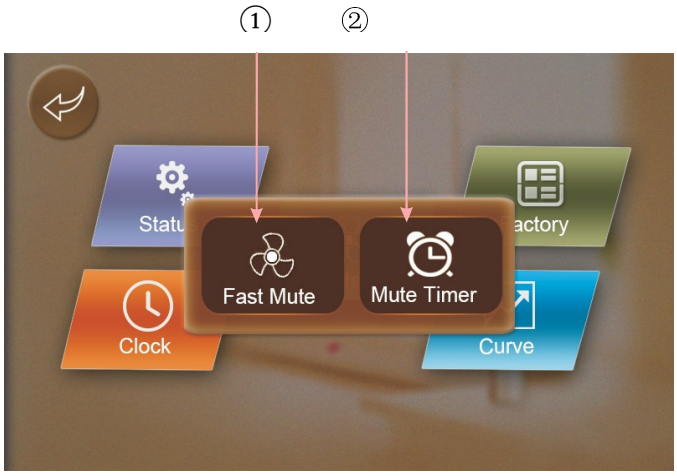
Note:

When the unit starts the electric heating, the icon is displayed as ①; When the unit closes the electric heating, the icon is displayed as ②;

While the unit is in cooling mode, clicking the icon ①, the electric heating will not be turned on;

While the unit is in hot water + cooling mode, if the hot water side is running, the electric heating will be operated and shown; if the cooling side is running, clicking the icon ①, the electric heating will not be turned on.

(4)Tapping Mute setting button⑥, then the interface display is shown as follows:



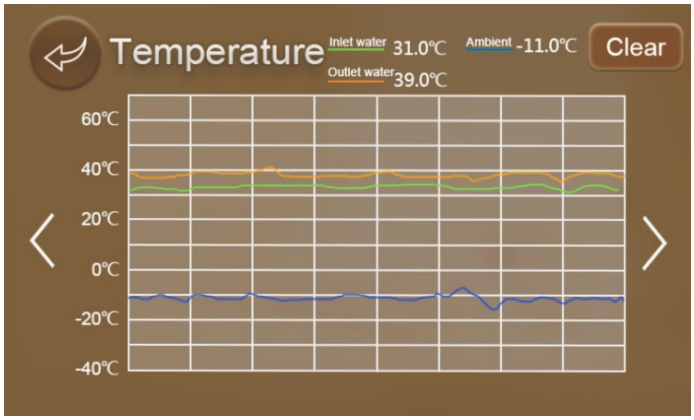
Note: When the unit is enabled to activate the mute function, the icon ① is displayed as ; When the unit is enabled to activate the powerful function, the icon ① is displayed as .

Tapping Mute Timer button ②, then the interface display is shown as follows:

Key No.	Key Name	Key color	Key Function
①	Timing Mute Start Enabled	Enable: Green ON Disable: Gray OFF	Click this key to start or turn off the timed mute start enable

②	Timed mute end enabled	Enable: Red ON Disable: Gray OFF	Click this key to start or turn off the timed mute end enable
③	Timing mute start time		Click this button to set the timing mute start time
④	Timed mute end time		Click this button to set the timed mute end time

(5) Tapping Curve button⑦, then the interface display is shown as follows:



a. This curve function records the water inlet temperature and water outlet temperature;

b. Temperature data is collected every five minutes and the 12 sets of temperature data are saved every hour. Timekeeping is made from the latest data saving, if the power is disrupted when the time is less than 1 hour (12 sets), the data during such period will not be saved.

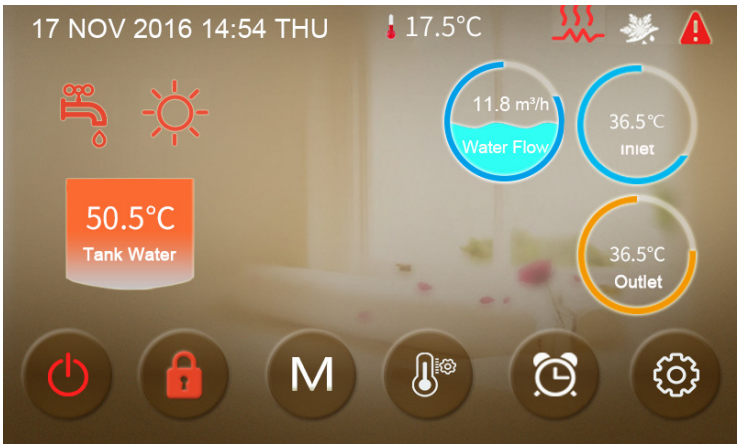
c. Only curve for power-on status is recorded, and that for power-off will not be saved;

d. The value of the abscissa indicates the time from the point on the curve to the current time point. The leftmost point on the first page (0 on the abscissa) is the latest temperature record;

e. Temperature curve record is provided with power-down memory function.

10.8. Locking Window Function

(1) When the main window has been locked, it will show as below:



(2) Unlock the mainboard window

Click the “lock” key to unlock the window, it needs to input the password 22 or 022;

11. Failure List & Troubleshooting

11.1. Failure Handling

Issue	Possible cause	Related components	Solution
Unit tripped when powered on	Short circuit	Terminals Relays Contactors cables	Check all the components’ connection Check relays and contactors whether are broken Disconnect the electronic components one by one and powered on to find the problem
Display cannot get power	Cables has disconnected The power input cable is misconnected	Display cable Power input cable	Check the display cable Check the power cable Check the 3-phase power cable whether connected in right phase sequence
cannot start up the unit	The unit have error Cables has disconnected	Display Cables	Check the display whether shown error Check the cable Reconnect the power cable and check if it works
Display cannot work	The display has been locked The display is broken	Display	Check the display whether shown locked icon Check the cable Reconnect the power cable and check if it works
Heating effect is not good	The compressor running low frequency The fan is not running or speed is too low Leakage problem	Compressor Fan Refrigerant system	Check the compressor frequency Check the fan speed Check the exhaust temperature and low pressure
Shut off while didn’t reach the	Temperature limit (according to ambient temperature)	Control logic	Check the parameters

target temperature			
The evaporator has too much frost and cannot defrosting cleanly	Fan blade or motor issue EEV step is not suitable Refrigerant amount issue Parameters issue	Parameters Fan EEV Refrigerant system	Check the defrosting parameters Check the compressor frequency Check the fan speed Check the exhaust temperature and low pressure
Abnormal noise	Screws issue Fan blade or motor issue Compressor issue Components have collision	Screws Fan Compressor Other components (tubes, cables)	Check the screws Check the fan blade and motor Check the compressor Check other components

11.2. Error Code Instruction

Error code	Error name	Relevant parts information	Review and resolve
E04	Electric heater overheat Protection		1. Check the Electrical heating Overheat protector open or not. 2. Check the Electrical heater.
E08	Communication failure between PCB and display	Communication error between PCB and DISPLAY	1. Check cable connection of PCB and DISPLAY. 2. Check the software version of PCB and DISPLAY.
E11	HP Protection	HP switch is open	1. Check whether showing the error after unit shutdown. 2. Measure the discharge pressure when unit is running. 3. Detect EEV step, suction pressure, inlet/outlet water discharge and suction temp. 4. Release all the gas of the system and refill refrigerant according to the nameplate.

E12	LP Protection	LP switch is open	1. Check whether showing the error after unit shutdown. 2. Measure the suction pressure when unit is running. 3. Detect EEV step, discharge pressure, inlet/outlet water discharge and suction temp. 4. Release all the gas of the system and refill refrigerant according to the nameplate.
E19	Primary Anti-freezing Protection	Ambient temp.≤0℃, A04-2℃ ≤ water inlet≤A04℃	It is the protection in winter. Once the water temperature rises up to A04+4℃ or the ambient temp is higher than 1, the error code disappears.
E29	Secondary Anti-freezing Protection	Ambient temp.≤0℃, water inlet≤A04-2℃	It is the protection in winter. Once the water temperature up to A04+11 ℃ or the ambient temp is higher than 1, the error code disappears.
E19	Primary Anti-freezing Protection	Ambient temp.≤0℃, 2℃ ≤ water inlet≤4℃	It is the protection in winter. Once the water temperature rises up to 8 ℃ or the ambient temp is higher than 1 ℃, the error code disappears.
E29	Secondary Anti-freezing Protection	Ambient temp.≤0℃, water inlet≤2℃	It is the protection in winter. Once the water temperature up to 15 ℃ or the ambient temp is higher than 1 ℃, the error code disappears.
E032	Flow Switch Protection	Flow switch is open	1. Detect the connection of cables. 2. Detect the flow switch. 3. Detect the water valve is opened or opened fully. 4. Detect the water pump and the filter. 5. Maybe there is some air in the water route.
E051	Compressor Overcurrent Shutdown Fault	Compressor Overcurrent	1. Check ambient temp. and inlet/outlet water temp.; 2. Turn on the unit. Record and analyze the changing process of high/low pressure, discharge/suction temp., EEV step, compressor frequency and running current. 3. If they are OK, replace a new compressor driver board.
E065	High water outlet temp. protection		Check if the water flow is too low and the outlet water whether too high
E081	Communication failure between PCB and fan drive board	Communication error between PCB and fan drive board	1. Check the connection between PCB and fan board. All of 12V-12V, GND-GND, A-A, B-B should be closed; 2. If they are closed, turn on the power, then measure the voltage between 12V and GND on fan board, if higher than 15V or lower than 7V, replace a new fan board.

E103	Fan motor overload protection		1. Check if the fan motor running well. 2. Detect the current of fan motor. 3. If the current is more than 1A, it means the motor have problem and need to replace a new one. 4. If the current is less than 1A, it means the motor control module have problem and nee to replace a new one.
E171	Anti-freezing Protection	inlet water ≤A04℃ and the antifreeze temp ≤A04-A05 ℃	1. Check the water flow. 2. Check the outlet water temp sensor. 3. Measure the ambient temp. 4. Detect the connection of cables. 5. Check the record of defrosting, whether the defrosting time is too long or too often.
F01	Compressor activation failure		Restart the unit. 1. Check the changing process of EEV step, high pressure, low pressure, inlet/outlet water temp. 2. Check the connection of U/V/W between compressor and compressor driver board. 3. Check the compressor resistance. 4. Check compressor driver board.
F03	PFC Fault		Restart the unit. 1. Check the power supply connection and voltage supply is stable or not. 2. 2.Replace a new compressor driver board.
F05	DC Bus Overvoltage		1. Check the voltage between DCP-IN and DCN-IN, if lower than 300V, the unit will get this protection. 2. Check the input voltage of R/S/T on compressor driver board, if lower than 210V, the unit will get this protection 3. If they are OK, please replace a new compressor driver board.
F06	DC Bus Undervoltage		1. Check the voltage between DCP-IN and DCN-IN, if lower than 300V, it will get this protection; 2. Check the input voltage of R/S/T on compressor driver board, if lower than 210V, it will get this protection; 3. If they. are OK, please replace a new compressor driver board
F07	AC Input Undervoltage		1. Measure the input voltage of R/S/T of driver board, if lower than 300V, it will get this protection. 2. If it's OK, replace a new compressor driver board.

F08	AC Input Overcurrent		Only in single phase unit. Restart the unit. Check if there is electric leakage. If not, replace a new drive board.
F09	Input voltage sampling fault		1. Make sure power supply not lower than 300V or higher than 500V; 2. If it's OK, please replace a new compressor driver board.
F10	Communication Failure between DSP and PFC		Only in single phase unit. 1. Check the inverter board connection. 2. If no problem, replace a new compressor driver board.
F11	Communication Fault between DSP and Communication board		1. Please check the inverter board connection. 2. If no problem, please replace a new compressor driver board
F12	Communication failure between PCB and driver board		1. Check the connection between main control board and compressor driver board. All of 12V-12V, GND-GND, A-A, B-B should be closed. 2. If they are closed, turn on the power, then measure the voltage between 12V and GND on compressor driver board, if higher than 15V or lower than 7V, please replace a new one compressor driver board.
F13	IPM Overheat Stop		1. Check the fans are running or not. 2. Check the installation distance and space. 3. Leave enough distance and space to make heat pump have a good transfer heating condition. 4. Clean the finned heat exchanger. 5. If they are OK, replace a new compressor driver board.
F15	Input voltage Lacking Phase		1. Check the phase of power supply R/S/T to compressor driver board. 2. If it's OK, replace a new compressor driver board.
F16	Compressor weak magnetic protection alarm		1. Check the refrigeration system. 2. If it's OK, replace a new compressor driver board.
F17	Temperature fault of drive board		1. Check the connection of heat sink temp. sensor. 2. Check the resistance of heat sink temp. sensor. 3. If they are OK, please replace a new heat sink and heat sink temp. sensor.
F18	IPM Current Sampling Fault		1. Check ambient temp. and inlet/outlet water temp. 2. Check high/low pressure and discharge temp. and suction temp.

			3. Check EEV step. 4. Check the compressor frequency and current. 5. If they are OK, replace a new compressor driver board.
F20	IGBT Power Device Overheat Alarm		1. Check the fans are running or not. 2. Check the installation distance and space. 3. If they are OK, please replace a new compressor driver board. 4. Leave enough distance and space to make heat pump have a good transfer heating condition. 5. Clean air to fin heat exchanger.
F22	AC input overcurrent protection alarm		Only in single phase unit. Restart the unit. 1. Check if there is electric leakage. 2. If still have the failure, replace a new drive board.
F23	EEPROM Fault Alarm		1. Check the connection; 2. Replace a new driver board;
F24	Destroyed EEPROM Activation Ban Alarm		
F25	LP 15V Underload Fault		1. Check the power supply is stable or not, and restart unit. 2. If the problem still on, please replace a new drive board.
F26	IGBT Power Device Overheat Fault		1. Check the fans are running or not； 2. Check the installation distance and space; 3. Leave enough distance and space to make heat pump have a good transfer heating condition; 4. Clean the finned heat exchanger. 5. If they are OK, please replace a new driver board;
F031	DC Fan Motor 1 Failure		1. Turn off the unit and check the connection. 2. Restart and check if the motor is running normal or the error happens again. 3. Replace a new fan motor.
F032	DC Fan Motor 2 Failure		
Pp1	Exhaust Pressure Sensor Fault		1. Detect the exhaust pressure sensor connection 2. If the connection is OK, please replace a new one.
Pp2	Suction Pressure Sensor Fault		1. Detect the suction pressure sensor connection 2. If the connection is OK, please replace a new one.

TP	Low Ambient Temp. Protection	Ambient temp ≤-30	1 Check the ambient temp 2. When ambient temp ≥-28℃, the fault will disappear.
P01	Water Inlet Temp. Sensor Fault		1. Detect the connection. 2. Measure the resistance of sensor, if lower than 100Ω or higher than 500kΩ, please replace a new one.
P02	Water Outlet Temp. Sensor Fault		
P04	Ambient Temp. Sensor Fault		
P17	Water Outlet Temp. Sensor Fault		
P032	Hot Water Tank Temp. Sensor Fault		
P42	Room Temp. Sensor Fault		
P101	EVI Inlet Temp. Sensor Fault		
P102	EVI Outlet Temp. Sensor Fault		
P153	Coil Temp. Sensor Fault		
P181	Exhaust Temp. Sensor Fault		
P182	Exhaust Over Temp.	(Exhaust temp.) ⩾ C05 default 110	1. Measure the resistance of sensor, if lower than 100Ω or higher than 500kΩ, please replace a new one. 2. Check the unit find if it has refrigerant leakage.
P191	Antifreeze Temp. Sensor Fault		1. Detect the connection 2. Measure the resistance of sensor, if lower than 100Ω or higher than 500kΩ, please replace a new one.

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