

# **Operation and Installation Manual**

---

Air Source Heat Pump

>> KRS-450E/SN2

# CONTENTS

1. Features / Benefits .....	1
2. Notes / Precautions .....	1
3. Model Number Nomenclature .....	2
4. Technical data .....	2
4.1 Parameter table .....	2
4.2 Dimension .....	3
4.3 Performance Curves .....	4
4.4 System Diagram .....	5
4.5 Components .....	6
5. Installation .....	7
5.1 Heat Pump unit Installation .....	7
5.2 Water System Installation .....	9
5.2.1 Water Tank Installation .....	9
5.2.2 Water Piping Installation .....	9
5.3 Power Source Installation .....	11
5.4 Wire controller installation .....	12
6. Commissioning .....	13
6.1 Preparation Before Commissioning .....	13
6.2 Commissioning .....	13
7. Heat pump controller .....	14
7.1 Operating buttons and display .....	14
7.2 Operation .....	15
7.2.1 Lock and unlock .....	15
7.2.2 ON/OFF switch .....	15
7.2.3 Water temperature setting .....	15
7.2.4 Mode switch .....	15
7.2.5 Manual defrosting .....	15
7.2.6 Manual electric heater .....	16
7.2.7 Erase history errors .....	17
7.2.8 Clock setting .....	17
7.2.9 ON/OFF timer setting .....	19
7.2.10 Timer cancelling .....	19
8. Circuit drawing .....	20
9. Maintenance and Trouble Shooting .....	21
9.1 Maintenance .....	21
9.2 Failure code checking .....	22
9.3 Common failures code .....	22
9.4 Parameter checking and adjustment .....	23
9.5 Parameter number and description table .....	23
9.5.1 User Parameter .....	23
9.5.2 Factory parameter list .....	25
9.5.3 Unit status checking .....	28
9.6 The manometer instruction .....	28
9.7 Trouble Shooting .....	29

# 1 Features/Benefits

## Wide Application Ranges

The domestic hot water heat pump is designed for offering central hot water for bigger houses, as well as commercial buildings such as hotels, offices, schools, hospitals, apartments etc. The hot water outlet range is wide from 20°C to 60°C, meeting demands for most hot water project. The performance is at wide ambient temperature range from -10~43°C. Modular control system is available to meet the demand of huge hot water projects.

**Assuring You Get Grants from Your Government**  
Designed for high efficiency performance over a lifetime of operation. The annual average COP is good. The water pipes and refrigerant pipes are well insulated to minimize the heat loss.

## Durable and Long Life

High efficiency compressor for all units, with durable features against high temperature and high pressure for long life. The coaxial coil heat exchangers are durable for anti-corrosion, hard water, high pressure and unexpected freeze caused by power cut-off.

## Strong Cabinet

Standard unit fabrication consists of heavy gage galvanized sheet metal cabinet construction that provides maximum strength. All interior sheet metal surfaces are powder-painted for maximum corrosion protection to ensure resilience for long term vitality. Compact, stackable cabinets are designed to minimize installation space.

## Full Consideration for Noise Control

Compressor rubber feet are specially selected for reducing vibration. Specially, compressor sound jacket is available for every unit. Well-balanced fans and fan motors, with the optimized fan holder, contributes to the low noise operation. The cabinet inside is insulated to reduce noise transmission.

## Reliable Design and Strict Quality Control

Standard safety features for the refrigerant circuit include high-pressure switch and low-pressure switch to detect loss of refrigerant, as well as deficient water flow. Equipment safety features include water loop temperature monitoring, voltage protection, water coil freeze protection. All safety features are tested and run at the factory to assure proper operation of all components and safety switches. All components are carefully designed and selected for endurance, durability, and carefree day-to-day operation. Each unit is fully tested in performance and safety before exit factory.

## Simple Maintenance and Serviceability

Full access for maintenance or service is provided from the maintenance panel, for better flexibility in confined space. Easy removal of the control box from the unit provides access to all refrigerant components. The refrigerant circuit is easily tested and serviced through the use of high and low pressure ports integral to the refrigerant

# 2 Notes/Precautions

■ The installation, commissioning and maintenance of the system should only be done by qualified technician with adequate knowledge of the relevant standards and local regulations as well as experience with similar systems.

■ Please make sure the water flow is sufficient all the time.

■ All ground line connections must be prepared in accordance with relevant local regulations.

■ To reduce the risk of electrical insulation faults, you first make the connection of the protective conductor of the heat pump safe according to local regulations.

■ When installation, make sure that the inside

wires are apart from hot or moving parts [eg: compressor, fan] of the system to avoid damage to the wires.

■ Anti-freezing measures must be well done to avoid damage to the water system and the heat pump water heat exchanger.

■ Please make sure the lifting and transportation are safely done according to the heat pump size and weight.

■ It is very dangerous work done at the facility without previously cutting off the electricity from the main power source.

■ When installing the system, please ensure that no contaminants enter the water cycle.

### 3 Model Number Nomenclature

**KRS-450E/SN2**

	Refrigerant Type	N2 - R410a
	Power Supply	S - 3 phase    Omit - Single phase
	Case Structure	E - vertical fan discharge
	<b>Heating Capacity</b>	450-12 HP
	Heat Pump Type	KRS - air to water

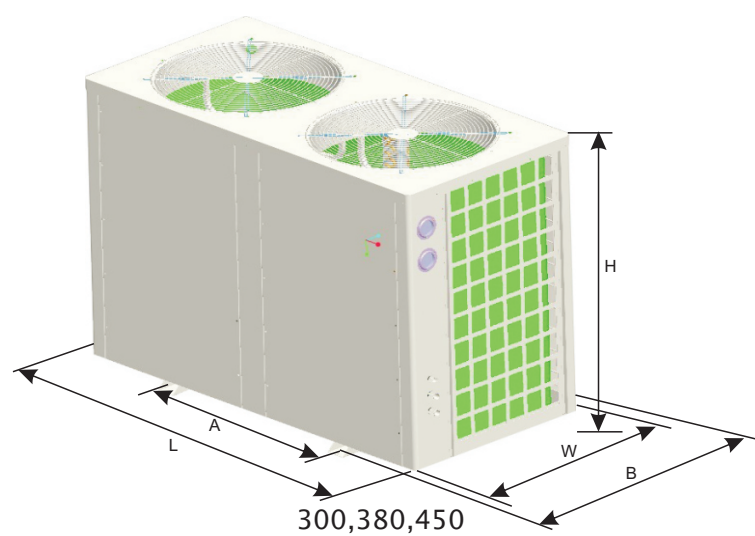
### 4. Technical data

#### 4.1 Parameter table

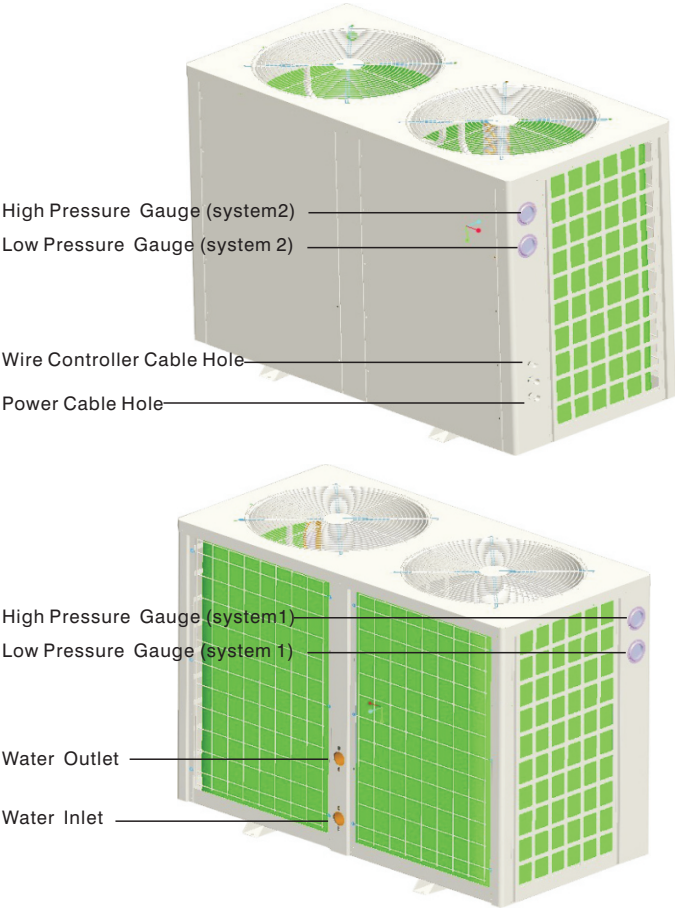
KRS-450E/SN2		
Heating Capacity	kW	45
Power Supply	V/Ph/Hz	380/3/50
Input Power	kW	10.8
Running Current	A	18.6
Max. Input Power	kW	16.2
Max. Running Current	A	27.89
Refrigerant		R410a
Compressor		Panasonic
Compressor Type		Scroll
Compressor Quantity		2
Outlet Water Temp	°C	55
Max. Outlet Water Temp	°C	60
Hot Water Yield	L/h	967
Water Flow	m³/h	9.7
Condenser		Tube in shell
Water Pressure Drop	Kpa	55
Water Connection Tube	mm	Dn40
Noise	dB(A)	<61
Electric Protection		I
Mechanical Protection		IPX4
Net/Gross Weight	kg	268/316
Dimension	mm	1450x730x1266
Packing Dimension	mm	1525x805x1420

Measuring condition: Dry/wet bulb temp 20°C/15°C; Water inlet/outlet temp 15°C/55°C.

4.2 Dimension



Model	Length(mm)	Wide(mm)	Height(mm)	A(mm)	B(mm)
KRS-450E/SN2	1450	702	1266	755	708

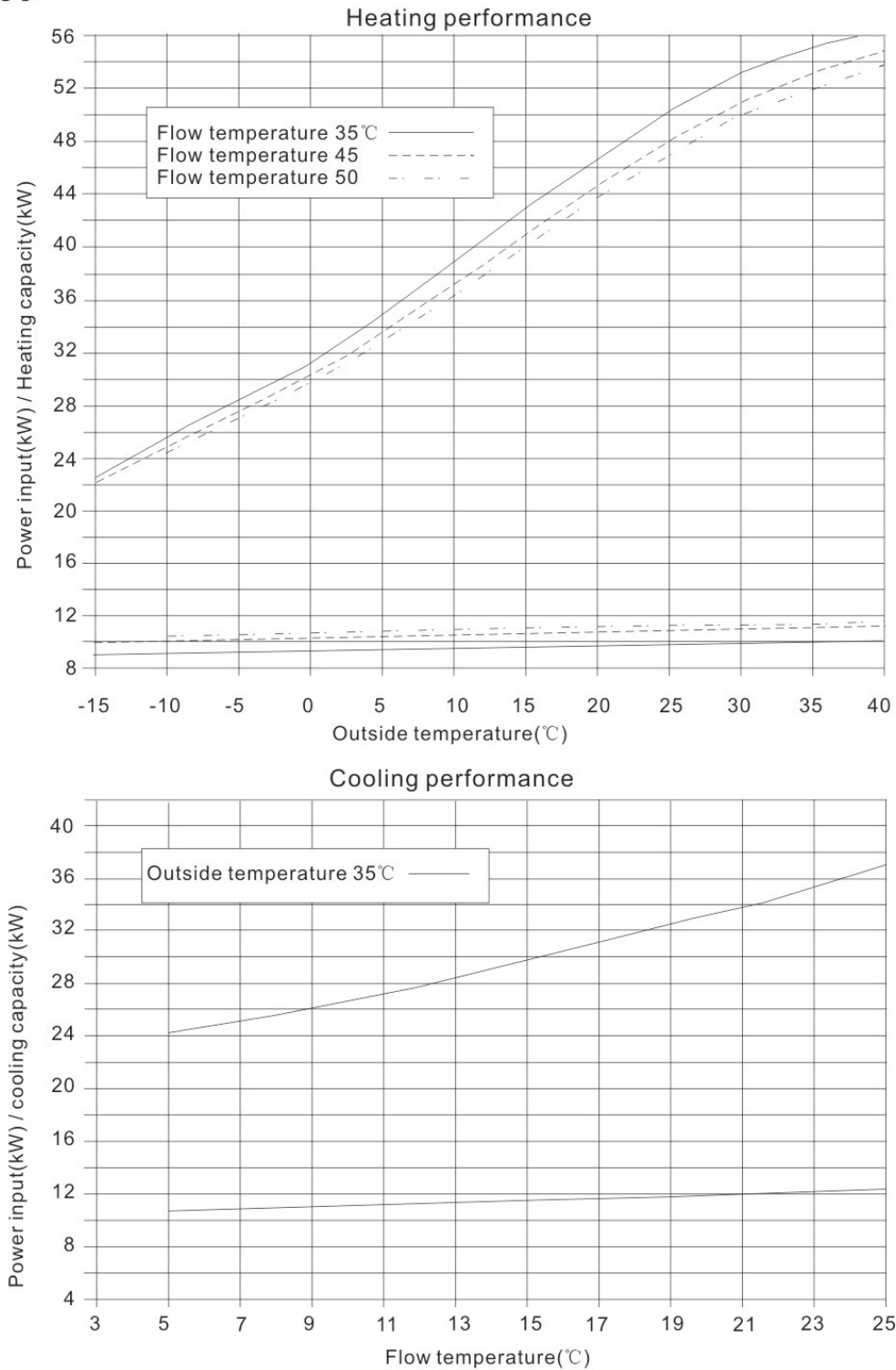


## 4.3 Performance Curves

Model: KRS-450E/SN2

### Performance curve

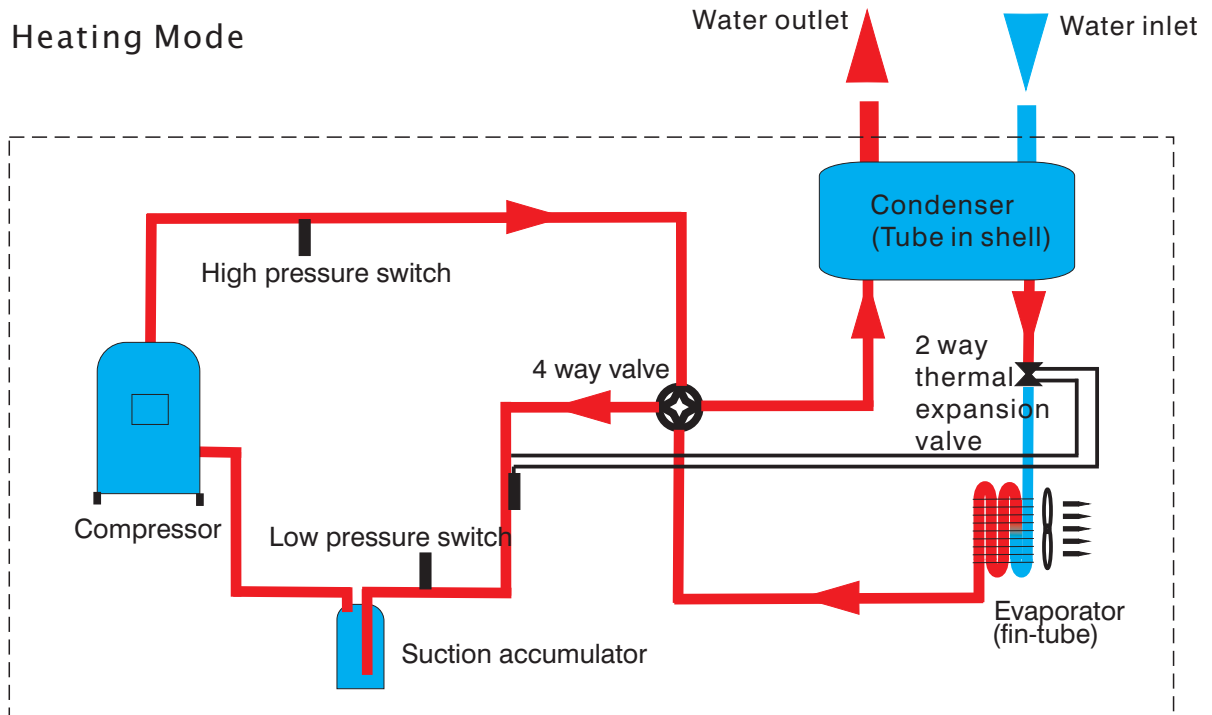
450



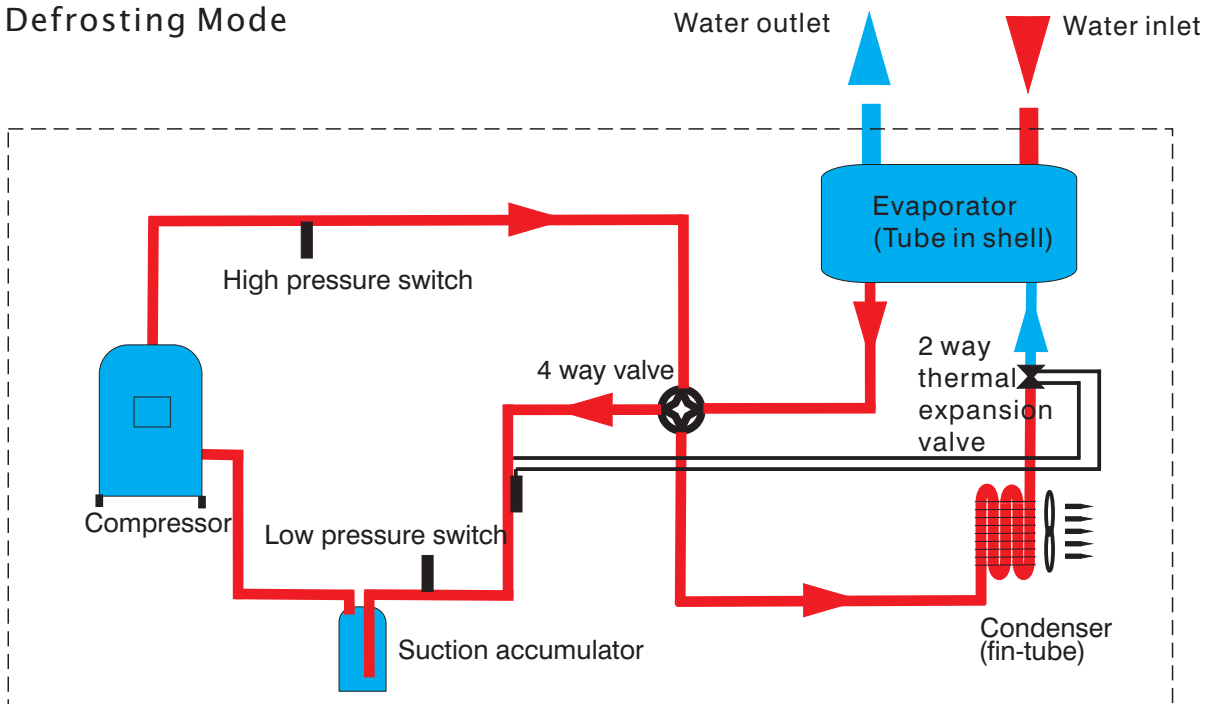
Note: the power of circulation pump is not calculated in the above data

## 4.4 System Diagram

Heating Mode



Defrosting Mode



## 4.5 Components

Components	Photo	Features/Advantages
Compressor		The dependable flexible compressor, with optimized R410a system, can achieve high water temperature up to 60°C, while ensures long life of the compressor.
4-Way valve		The reliable 4 way valve can avoid gas mixing, and ensure stable defrosting.
Condenser		The Tube in shell heat exchanger as condenser, with bigger heat exchanging area and higher efficiency.
Thermal expansion valve		The 2 way thermostatic expansion valve ensures high efficiency when heating, moreover, ensures high efficiency when defrosting.
Evaporator		The hydrophilic fin-tube heat exchanger has big heat exchanging area and rational fin distance, thus significantly improves heating and defrosting efficiency.
Fan		The exterior motor fan, with 5 fan blades, is strictly balanced. The 5 fan blades run slower, and make sure high air volume, thus largely brings down the noise.



## 5. Installation

### 5.1 Heat Pump unit Installation

1. The heat pump unit should be installed in a ventilated place, with enough space for air inlet and outlet, while without thermal radiation or other heat source. Besides, the air outlet should not be against the wind.

2. Generally, the vertical air flow type heat pump does not need anything for sheltering. The motor and other internal components have been all waterproof. A shelter is required to avoid snow burying onto the heat pump in heavily snowy area.

3. Please make sure the rated voltage 380V or 400V is stably accessible to the heat pump, otherwise the performance would be influenced.

4. The foundation of the heat pump can be cement or steel structure. Anti-vibration rubber and a flat foundation should be taken into account. The foundation structure can be flexibly designed according to the working weight of the heat pump (Please see the technical data in this manual.)

5. Water drainage should be available near the installation location for draining water in an effective way.

6. Do not install the heat pump in a place where there is polluting or corrosive material like oil, flammable and explosive gas and sulfide etc. Keep it far away from sands, falling leaves and area with high-frequency equipment.

7. The foundation should be heightened to avoid the water inflow in rainy season and snow burying in winter if it is installed in the open air.

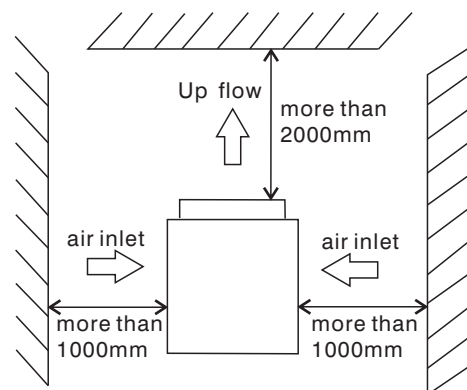
8. Installation in balcony or on roof-top must be accordance with the allowable stress of the building structure.

9. The heat pump should be fixed firmly on the base. The bearing capability of the frame should

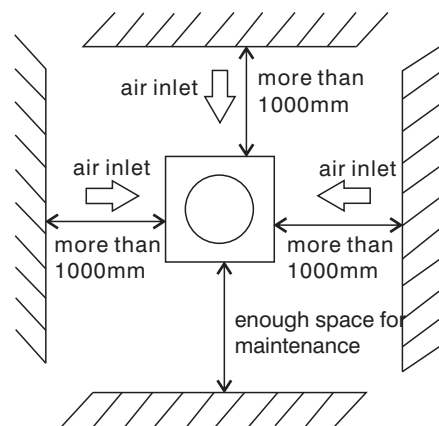
be as three times of weight as the heat pump unit. Reliable measures should be taken to keep the fastener stable. The unit base should be fixed firmly by expansion bolts to ensure the entire unit stand erectly after installation.

10. The unit location should avoid typhoon and earthquake damage. The heat pump should not be installed in the air in case of crash accident.

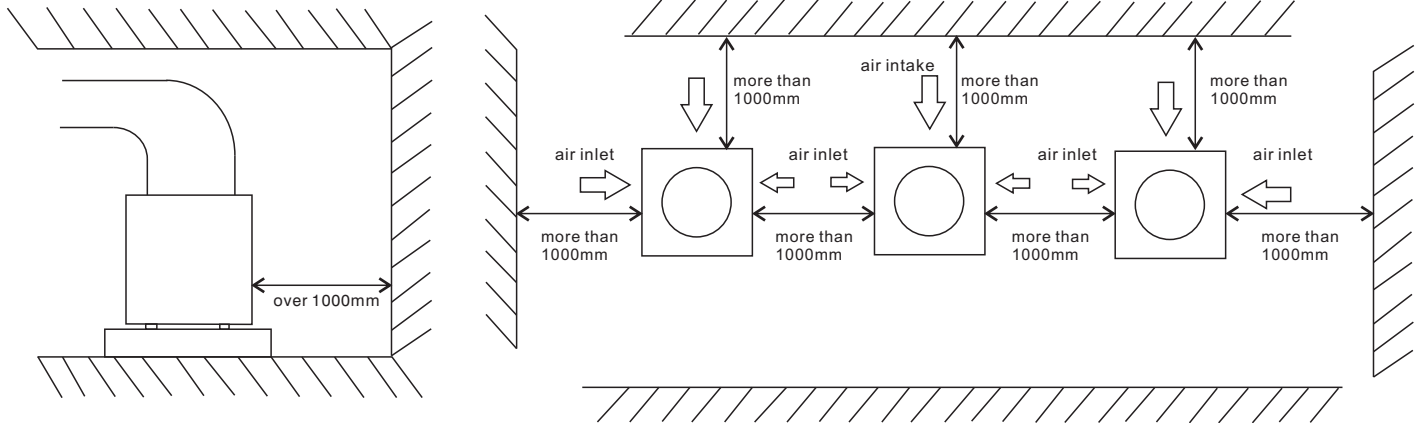
11. The installation should be carried out at the place of unobstructed ventilation of the air outlet. (The inlet and outlet of the air blower are illustrated in the following diagram). The installation space should be referred as follows:



Horizontal View



Vertical View



▲ An exhaust duct should be connected to the heat pump air outlet if there is a barrier above the air outlet.

▲ A certain distance should be kept among the heat pumps and it should be at least 1 meter when several heat pumps are installed side by side.

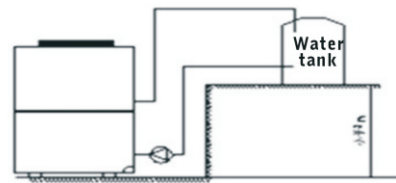
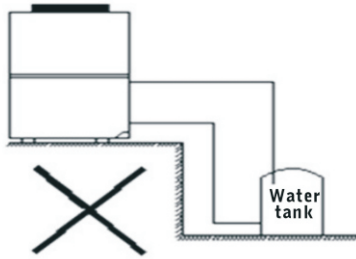
## 5.2 Water System Installation

### 5.2.1 Water Tank Installation

1. The water tank should be put in a place where ambient temperature is higher than 0°C.
2. It can be installed either outdoors or on the roof-top (some elements such as the size of water tank and the bearing capability of the building should be considered). Installation on roof-top should be based on support such as crossbeam or pillar.
3. The water tank should not be installed lower than the foundation of the heat pump; It is suggested to install the heat pump, the water tank and the circulation pump at the same level. Besides, the height difference between the heat

pump and the water tank should be no more than 2 meters, when water tank position is higher than that of the heat pump.

4. Do not install the water tank in a pollutive or corrosive area.
5. The reasonable allocation of the heat pump and water tank volume should deploy by 1/0.6 as maximum. Please refer to the following:



Model	450
Tank volume	8000L








### 5.2.2 Water Piping Installation

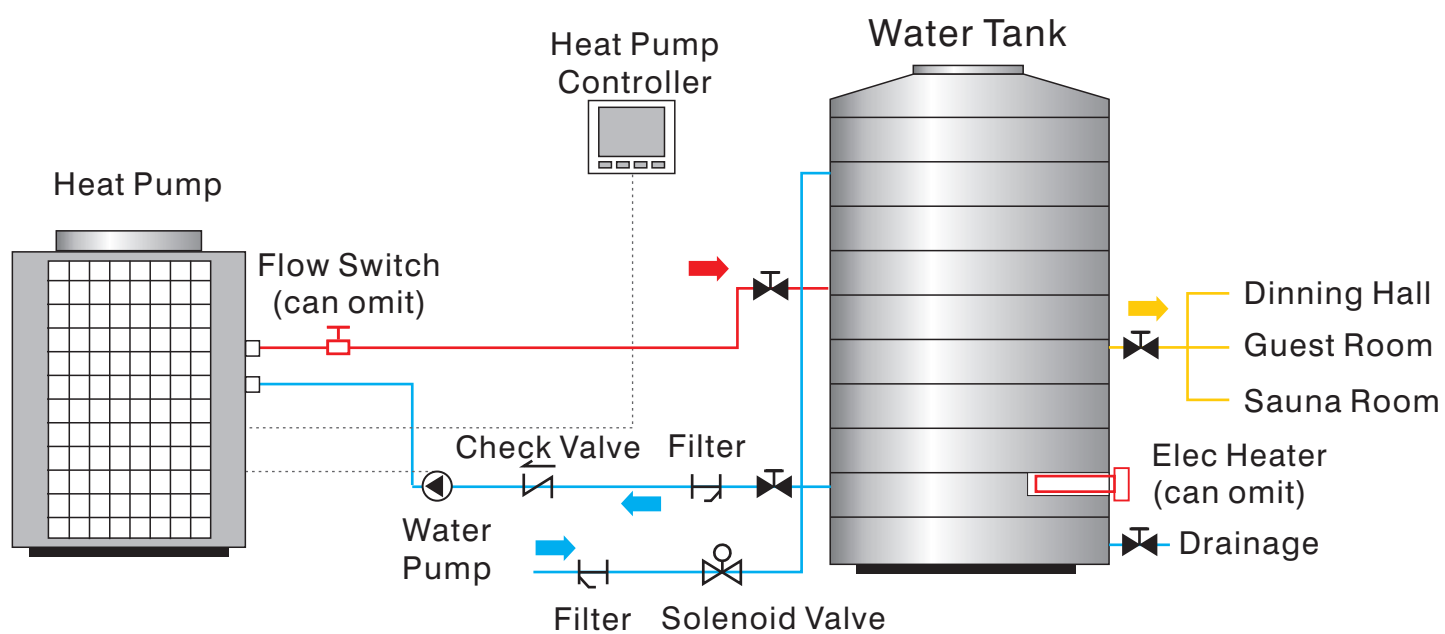
1. Drainpipe and overflow pipe should be installed near the gutter or the sinkhole for draining water more efficiently. Discharge valve is necessary on the drainpipe.
2. Service valve needs to be installed before the magnet-valves on the system pipeline for further inspection.
3. The pressure of the water outlet should be between 0.3MPa and 0.6MPa.
4. It is recommended to use metal pipeline such as stainless steel pipes, internal-plastic pipes, internal stainless steel pipes or copper pipes etc; Telescopic issue of the pipeline between heat pump unit and water tank should be considered if plastic pipeline such as PPR pipe and ABS pipe etc. is used.
5. In winter, heat preservation may need to be

carried out for the water supply valve and the stop valve of the system (according to local ambient temperature) for avoiding icing of the water supply pipe and the valves.

6. Keep the water pipes straight and the pipeline allocation reasonable; Reduce pipe turnings as many as possible to reduce water resistance.
7. Prevent the pipeline and the connectors from water leakage.
8. The water pressure bearing capability of each part of the piping system should be tested after the installation is finished; Drainage should be done to create a clean interior system.
9. Measures of heat preservation for the hot water pipeline need to be conducted after assuring no water leakage.

## Heat pump Installation

Check Valve		Y-Shape Filter	
Solenoid Valve		Water Pump	
Shut-Off Valve		Elec Heater	
Flow Switch			



## 5.3 Power Source Installation

### Recommended wire specification

Model	Power Cable	Water Pump	Solenoid Valve	Sensor
KRS-450E/SN2	5x6mm <sup>2</sup>	3x1.5mm <sup>2</sup>	3x1.0mm <sup>2</sup>	2x0.35mm <sup>2</sup>

Note: the above specification is the lowest one we recommend. Please choose bigger wires if additional power is required under installation.

## 5.4. Wire control installation

The wired controller is originally fixed on the maintenance door of the machine; please refer to below steps if you want to install it on the wall:

1. Take down the controller from the machine. Please pay attention that the communication wire is connected with

The circuit board, separate them from where they match.

2. Use a screwdriver to open the clip as picture 1, separate the controller as 2 parts, as picture 2

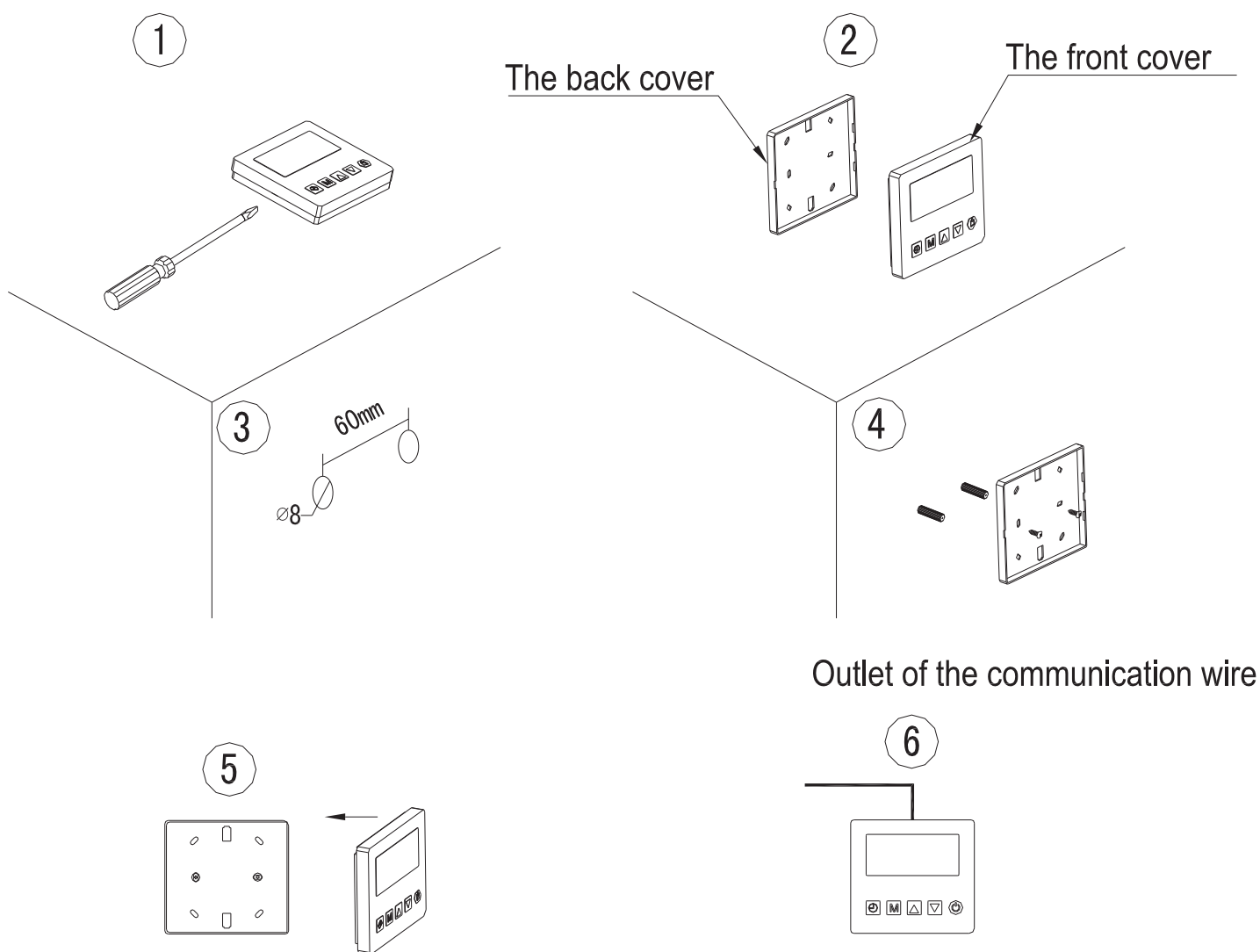
3. On the wall that you are going to install the controller, drill 2 holes at a level parallel to the sight line as picture 3.

The hole distance is 60mm, diameter is 8mm.

4. Place the plastic screws of the enclosure into the hole, and use the tapping screw (ST4\*16 D-1) enclosed to fix the back cover of controller on the wall, as picture 4

5. Match the front and back covers perfectly, as picture 5, make sure that it is fixed firmly on the wall.

6. Connect the communication wire well.



### Attention:

Please don't use keen-edged things to hit the controller face and keys, or it may cause damage.

When the controller is fixed on the wall, don't pull the communication wire, or it may cause poor contact.

## 6 Commissioning

### 6.1 Preparation Before Commissioning

#### Inspection on the heat pump

Check if the outside case and the inside system of the heat pump have been damaged during the transportation.

Check if there is still air inside the water system.

If yes, use the air vents on the water system and the circulation pumps, to discharge the air out.

#### Inspection on the power source system

Make sure the power source is accordance with the specification in the manual or on the heat pump nameplate.

Make sure all power connections and control circuit are in place. Make sure the wiring , grounding and all terminals are strong and reliable.

#### Inspection on the piping system

check if the water piping system, including water supply pipe, return water pipe, pressure gauge, thermometer, valves, water level switch are installed correctly. Please open all the valves

which should be opened, and close all that should be closed before the commissioning. Make sure the heat preservation of the water system is in good condition.

### 6.2 Commissioning

The commissioning should be carried out by profession.

Comprehensive inspection of the entire system should be identified as meeting the requirements, and the water level inside the tank is higher than the cycling heating outlet and the water outlet, before the commissioning.

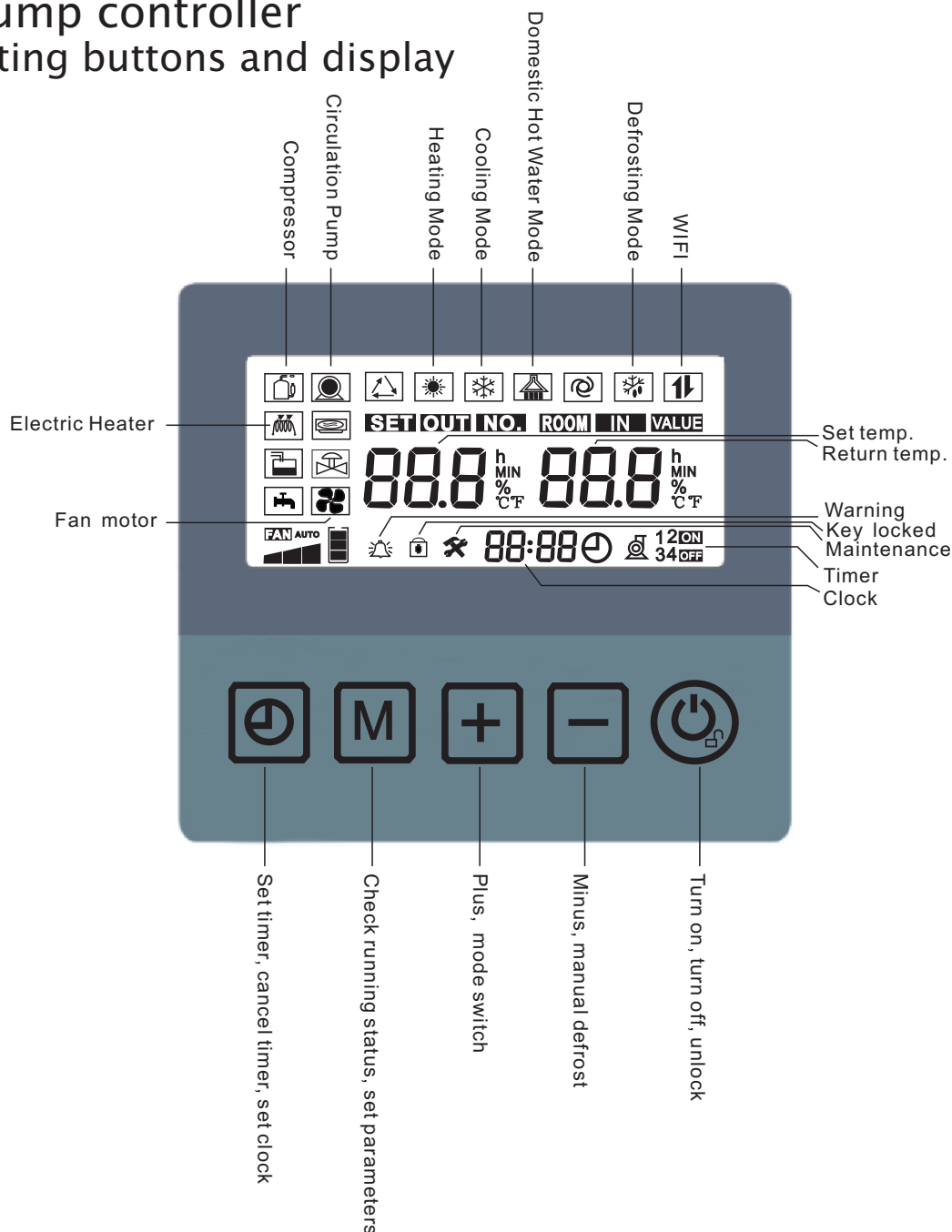
After power on the electricity, turn on the heat pump by pressing the on/off key on the wire control panel. Please check if the fan and the circulation pump are running in the right direction. If not, shut down the power supply and adjust the phase-order. Make sure the compressor current is in normal range, without

abnormal sound.

Check the circulation pump and all other parts meet the requirement. The whole system can be put into use after the pre-operation for a period of time.

## 7. Heat pump controller

### 7.1 Operating buttons and display



#### ON/OFF

Press the key for 1 second to turn on or turn off the unit as the controller is unlocked. Press the key to return the main interface as in any other settings. Press the key for 5 seconds to unlock as the controller is locked.



#### Function

In the main interface, the key is for status query.



#### Up and Down

Page up and down, check or modify parameters.



Check or set parameters together with "Function" key.

Press "+" and "-" to set the water temperature of current mode as the unit is turned on.



#### Clock and timer Key

Press "timer" for 5 seconds to set clock.

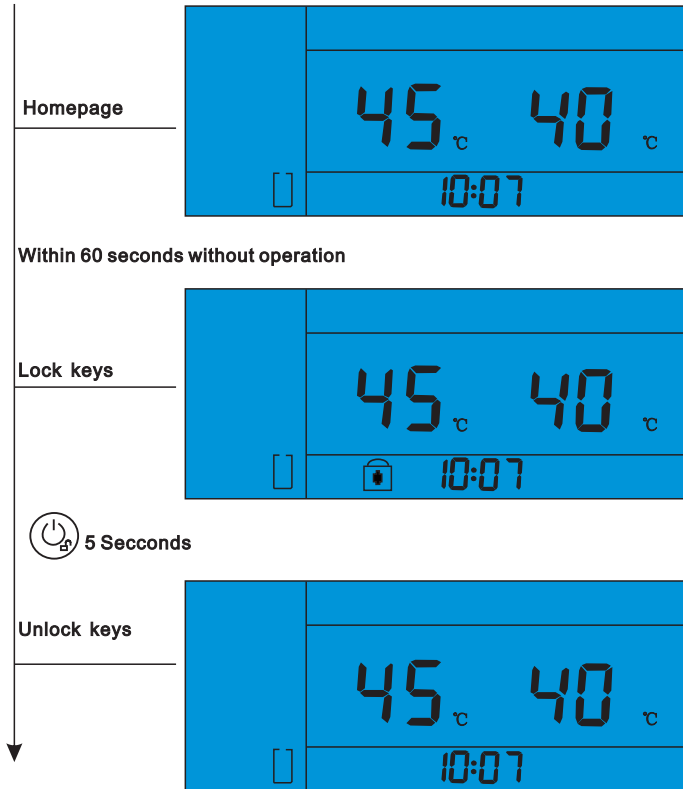
Long press "time" key to enter timer setting, together with "+" and "-" to set ON/OFF timer, totally two ON/OFF Timers can be set.



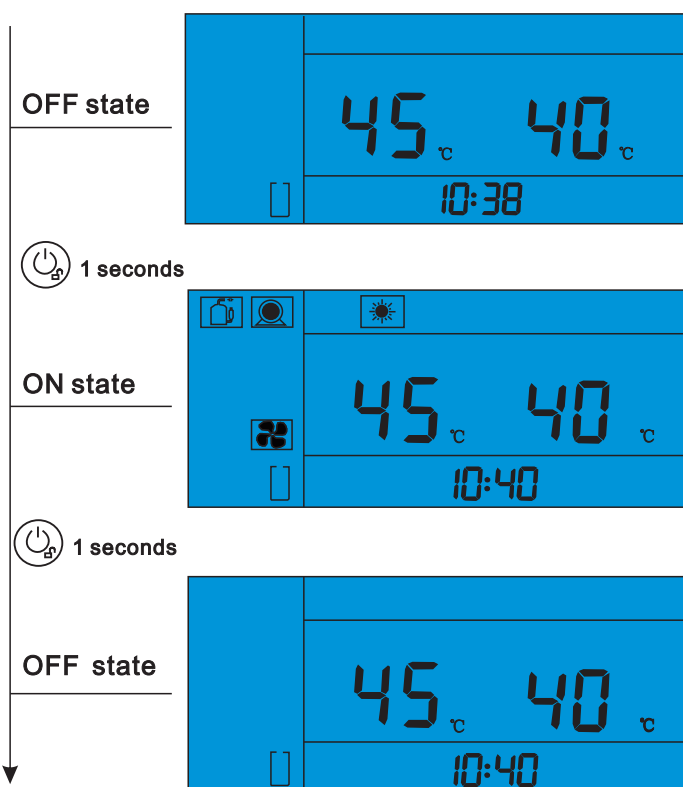
## 7.2 Operation

### 7.2.1 Lock and unlock

Press “ON/OFF” key for 5 seconds to unlock the controller after a beep of the buzzer.  
Lock automatically after 60 seconds without operation.



### 7.2.2 ON/OFF switch

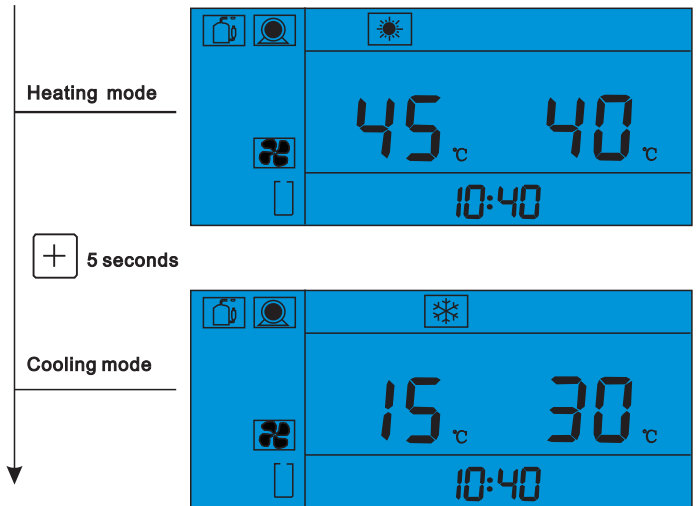


### 7.2.3 Water temperature setting

When the heat pump is switched on, Press “+” and “-” to set the water temperature of current mode as the unit is turned on.

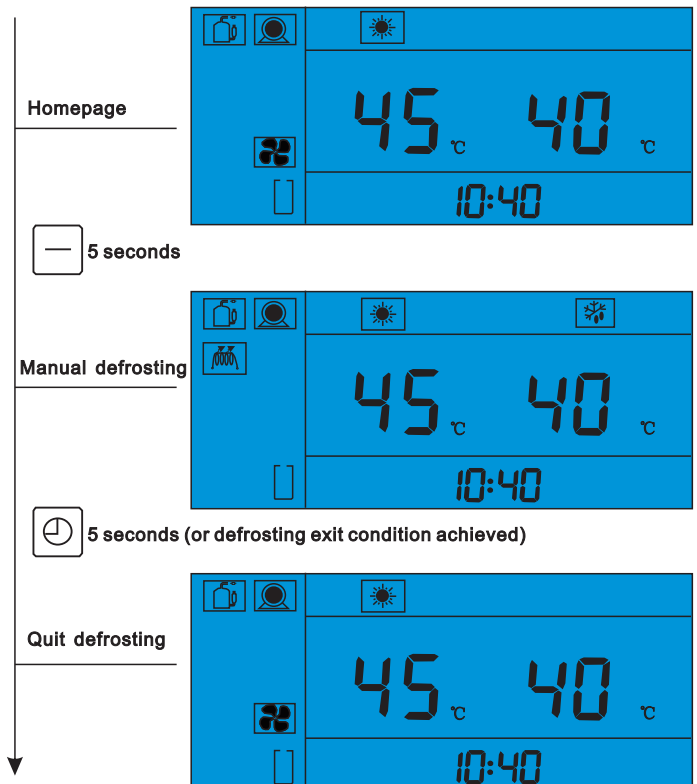
### 7.2.4 Mode switch

Press “+” for 5 seconds to switch the mode.



### 7.2.5 Manual defrosting

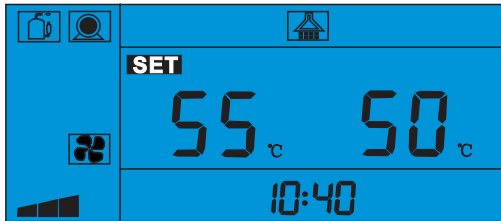
Press “-” for 5 seconds to enter manual defrosting (coil temp > defrosting quit temp (H6))  
To quit manual defrosting, long Press “ON/OFF” key or wait till the defrosting time reaches the maximum defrosting duration (parameter H5)



## 7.2.6 Manual electric heater

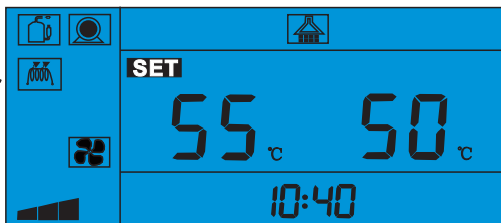
Press “time” & “ON/OFF” together for 3 seconds to turn on or turn off electric heater manually.

Homepage



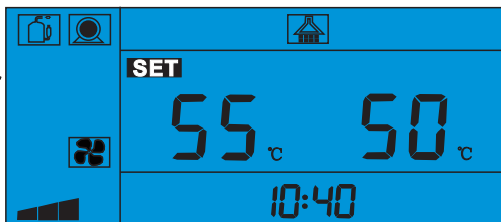
3 seconds

turn on  
electric heater



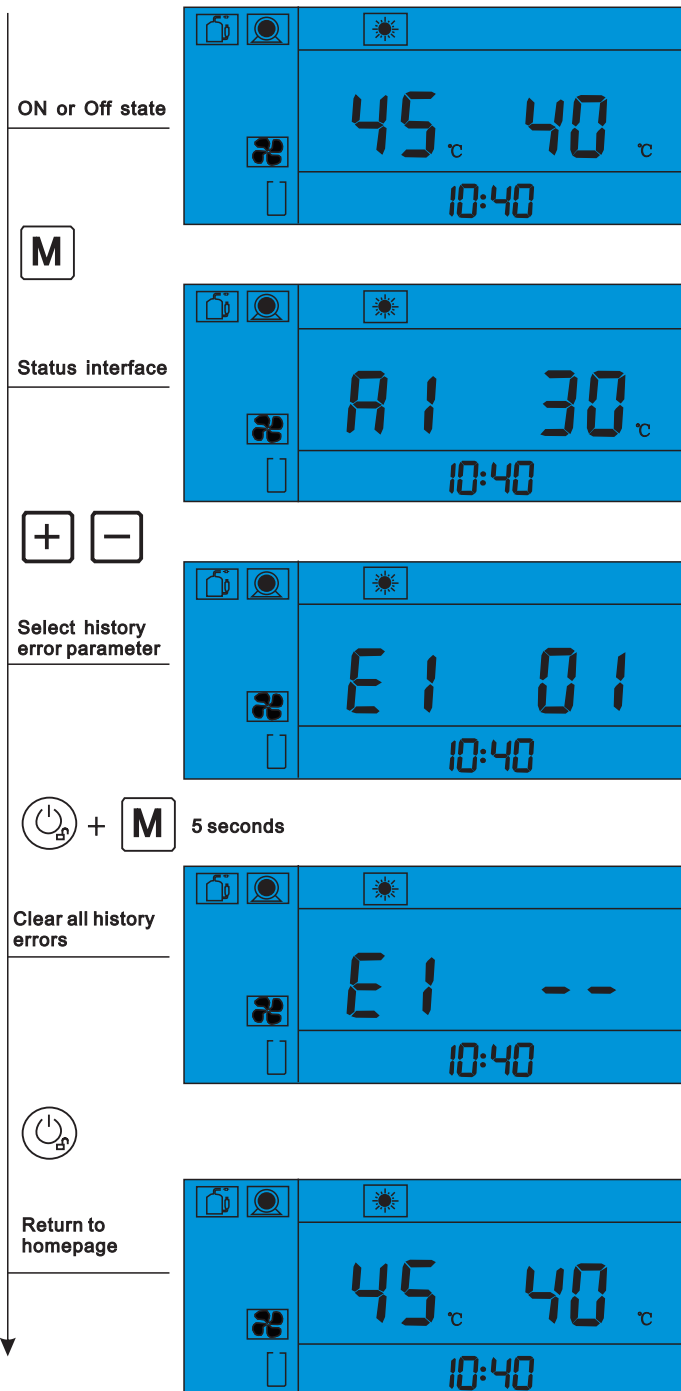
3 seconds

turn off  
electric heater



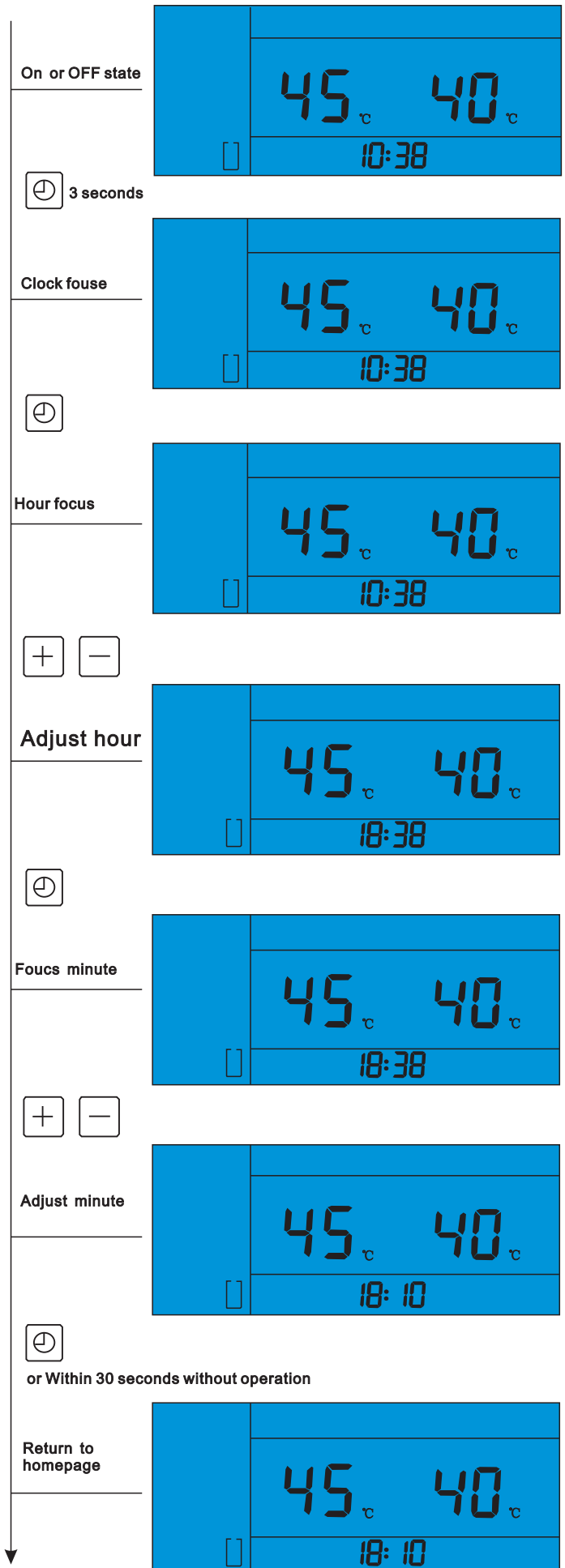
### 7.2.7 Erase history errors

In the query history errors interface, Press “ON/OFF” and “Function” together for 5 seconds to erase all recorded history errors.



### 7.2.8 Clock setting

At the first time, the time should be defined according to local time zone; Otherwise, the accuracy of “Timer on/Timer off” would be influenced



### 7.2.9 ON/OFF timer setting

If you want to use the function of “Timer on/Timer off”, the system time has to be detected whether it is correct in advance. The setting method is referred to “Clock setting”.

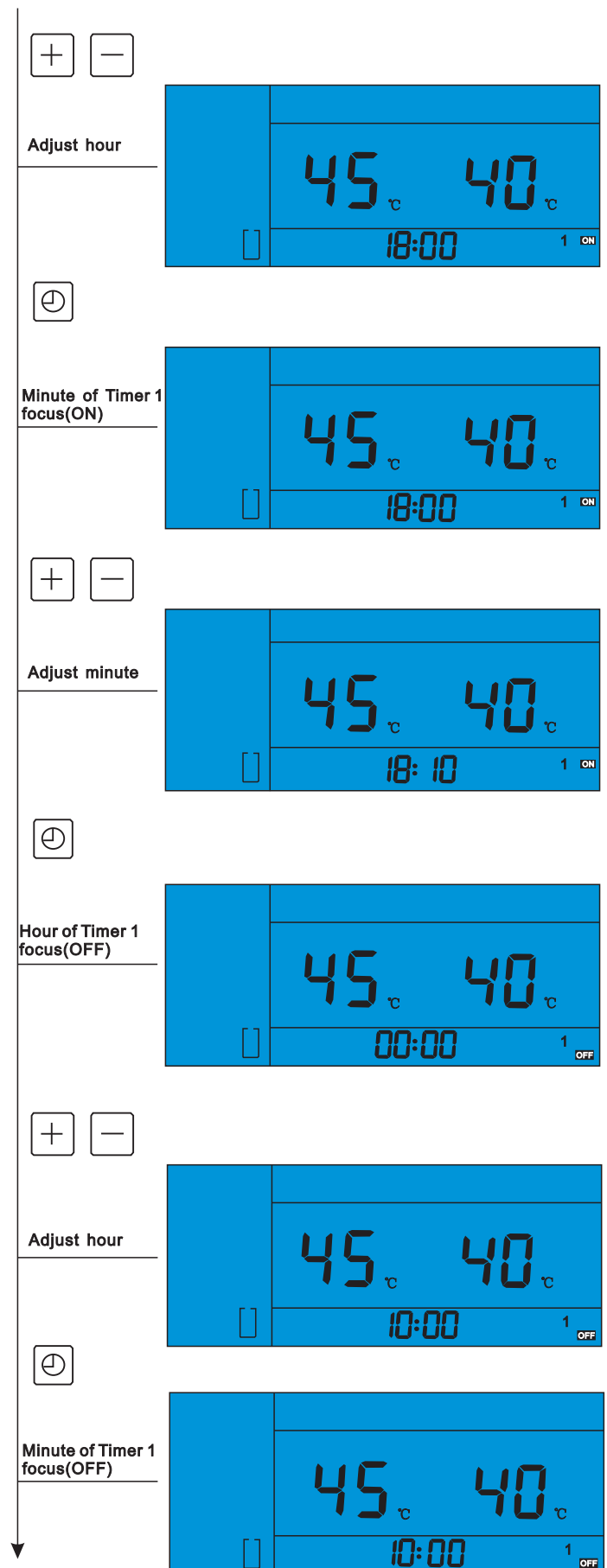
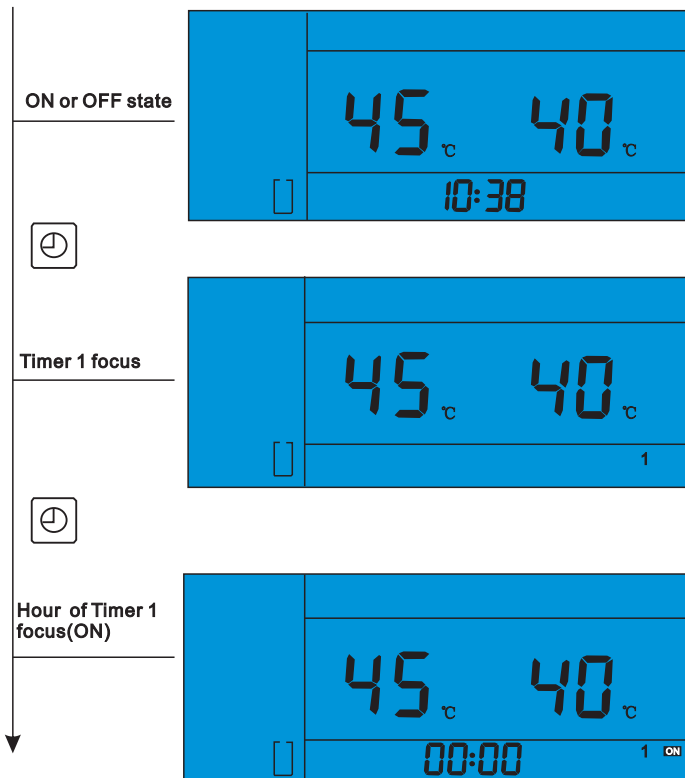
With this function, the heat pump can turn on or turn off automatically at the set time.

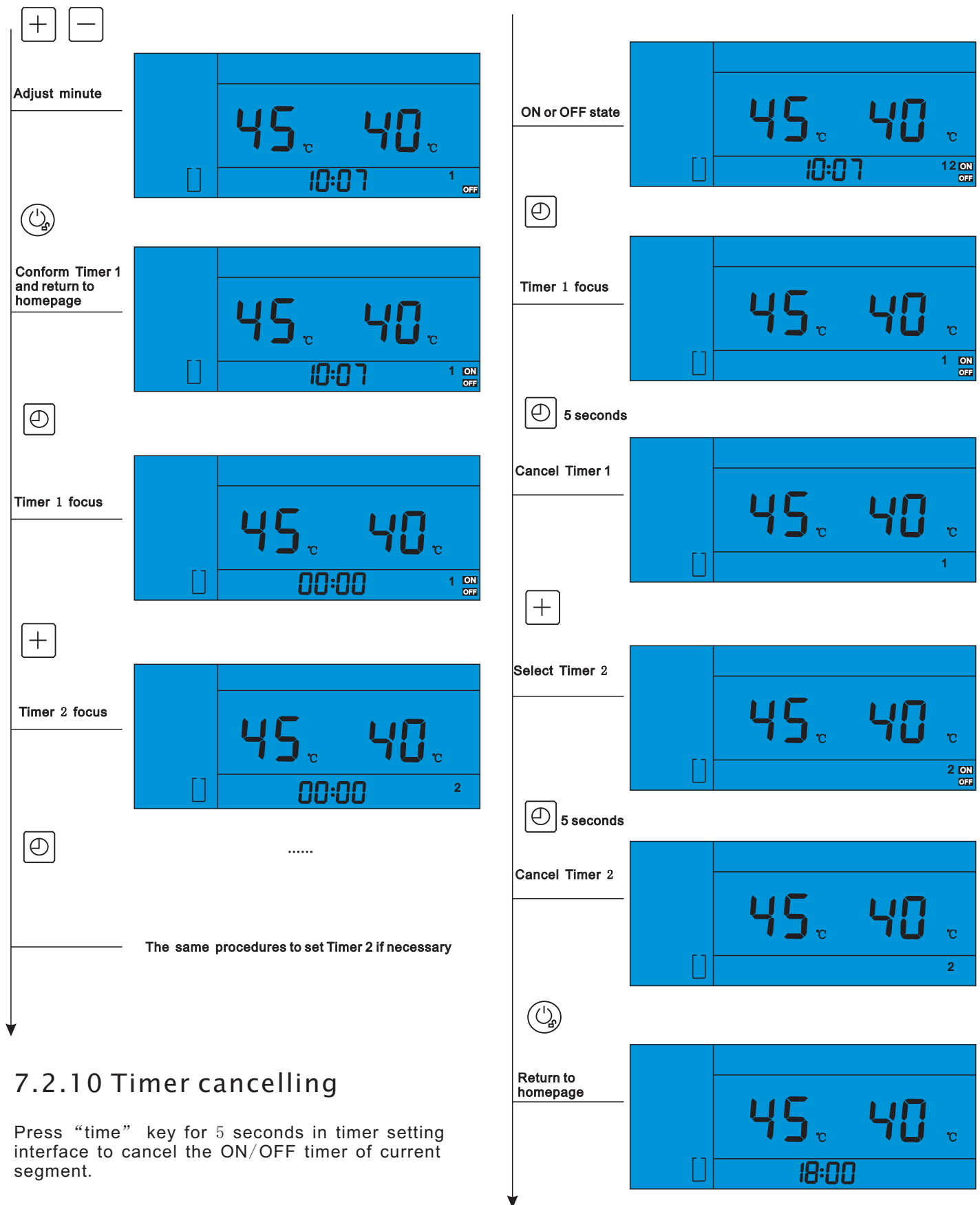
When the time point of “Timer on” is arrived, the heat pump starts; thereafter, the “on/off” could be controlled automatically based on the setting temperature.

When the time point of “Timer off” is arrived, the heat pump is shut down; subsequently, the machine could no longer be controlled automatically based on the setting temperature; it will be restarted until the next time point of “Timer on” is arrived or the key is pressed.

Totally 2 ON/OFF timers can be set. And they can be applied to use for every day or only one day. In timer setting status, the figure below NO represents the timer sequence. If it shows “--:--” on bottom, it means timer invalid.

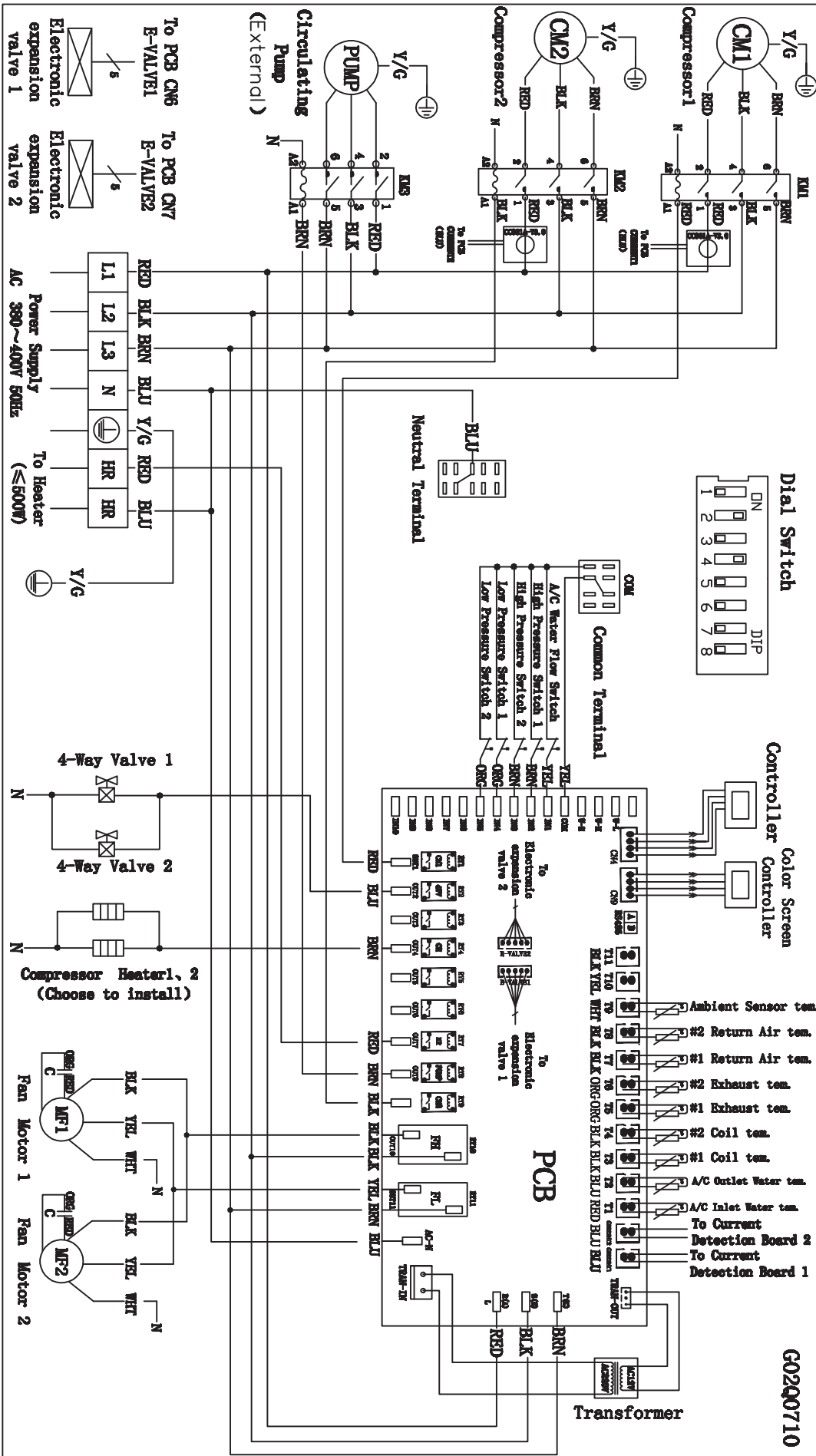
Below examples show how to set the heat pump to switch on at 18:10 and switch off at 10:07.





## 8. Circuit diagram

Model: KRS-450E/SN2



In case the power of the heater is higher than 500W, HR can not be connected to the heater directly, an AC contactor or relay is required.

## 9. Maintenance and Trouble Shooting

### 9.1 Maintenance

The heat pump water heater is an advanced equipment with high automization. The reliability and operation life of the heat pump can be expectedly guaranteed and even increased by regular inspection and effective maintenance.

The external water filter should be cleaned regularly to ensure the cleanness of the water in the system and avoid damage caused by blockage in the filter.

All protective settings in the unit have been set before ex-factory. Users must not adjust it when the heat pump unit is in use.

Regular inspection is required for the power source and the wiring connection of the electric system. Loose wiring connection and electric components should be repaired in time.

The water supply system, relief valve of the water tank, water level control device and air discharge device need to be checked regularly in case of low circulation water volume caused by air entering the system, to ensure enough capacity and reliability of the heat pump.

Check the water pump and the valves on the pipes if they work well, and make sure there is no

leakage from connectors.

Keep the surrounding of the heat pump dry, clean and ventilated. Regularly clean the evaporator to keep high heat exchanging efficiency.

Check the inside pipe connectors and refrigerant service port is dirty with oil. Make sure there is no refrigerant leakage.

Before stopping the heat pump for long time, drain out all water in the pipes, and shut off the power supply, and put it into a shield. Full inspection of the system is required before next operation.

Users should call the installer or the seller every time when there is an error on the heat pump controller.

Clean the condenser with phosphoric acid of 15% consistence under temperature of 50C-60C. Run the circulation pump for 3 hours, and then flush with fresh water for 3 times. When installing the pipes, add a 3 way valve on the pipes and closed on outlet of it, for cleaning use. Corrosive washing liquid is forbidden to clean the condenser.

## 9.2 Failure code Checking

When a failure occurs, it will show failure symbol on the screen.

Failure code display area, “ E- “ means no failure. If another failure code, please refer to the bottom of this page in [Common failures and maintenance], the corresponding failure to understand the cause and solutions.

## 9.3 Common failures code

Code	Description
Er 01	Phase fault
Er 02	Phase missing
Er 03	Water flow failure (DHW)
Er 04	Water flow failure (Heating/Cooling)
Er 05	1# High pressure protection
Er 06	1# Low pressure protection
Er 07	2# High pressure protection
Er 08	2# Low pressure protection
Er 09	Communication failure
Er 10	DHW temperature sensor failure
Er 11	Countdown lock
Er 12	1# High compressor discharge temperature protection
Er 13	2# High compressor discharge temperature protection
Er 16	1# Coil temperature sensor failure
Er 17	2# Coil temperature sensor failure
Er 18	1# Compressor discharge temperature sensor failure
Er 19	2# Compressor discharge temperature sensor failure
Er 20	Ambient temperature sensor failure
Er 21	Heating/Cooling inlet water temperature sensor failure
Er 22	DHW outlet temperature sensor failure
Er 23	1# Compressor suction temperature sensor failure
Er 24	1# Compressor discharge temperature sensor failure
Er 29	1# Compressor Over-current protection
Er 30	2# Compressor Over-current protection
Er 32	Low ambient temperature protection
Er 33	Heating/Cooling outlet water temperature sensor failure
Er 34	Low outlet water temperature protection in Cooling mode
Er 37	Too big water temperature difference between inlet and outlet during Heating /Cooling
Er 99	Communication failure



## 9.4 Parameter checking and Setting

The system parameters can be checked and adjusted via the controller. But they should not be changed casually, especially by house owners.

### ! Warning !

This operation is reserved to facilitate future service and maintenance. All parameters should not be changed casually, especially by house owners!

How to check and adjust parameters:

User parameter checking and settings (avail in both ON and OFF state)

In the main interface, press “function” key for 3 seconds to enter user parameter checking and settings interface; press “+” or “-” to check each parameter.

Press “function” to enter current user parameter settings interface, press “+” or “-” to modify the value, again press “function” key to return to query status.

Under parameter checking or setting interface, if no operation to the controller within 30 seconds, the controller will return to main interface automatically. The controller also can back to main interface via pressing ON/OFF key.

Factory parameter checking and settings (avail in both ON and OFF state)

In the main interface, together press “ON/OFF” and “+” keys for 3 seconds to enter factory parameter password interface. In this interface, press “time” to switch code digits, press “+” or “-” to modify the value of each digit, and press “function” key to input your password, if the password is correct, the controller will enter factory parameter check interface. (factory check password: 0814)

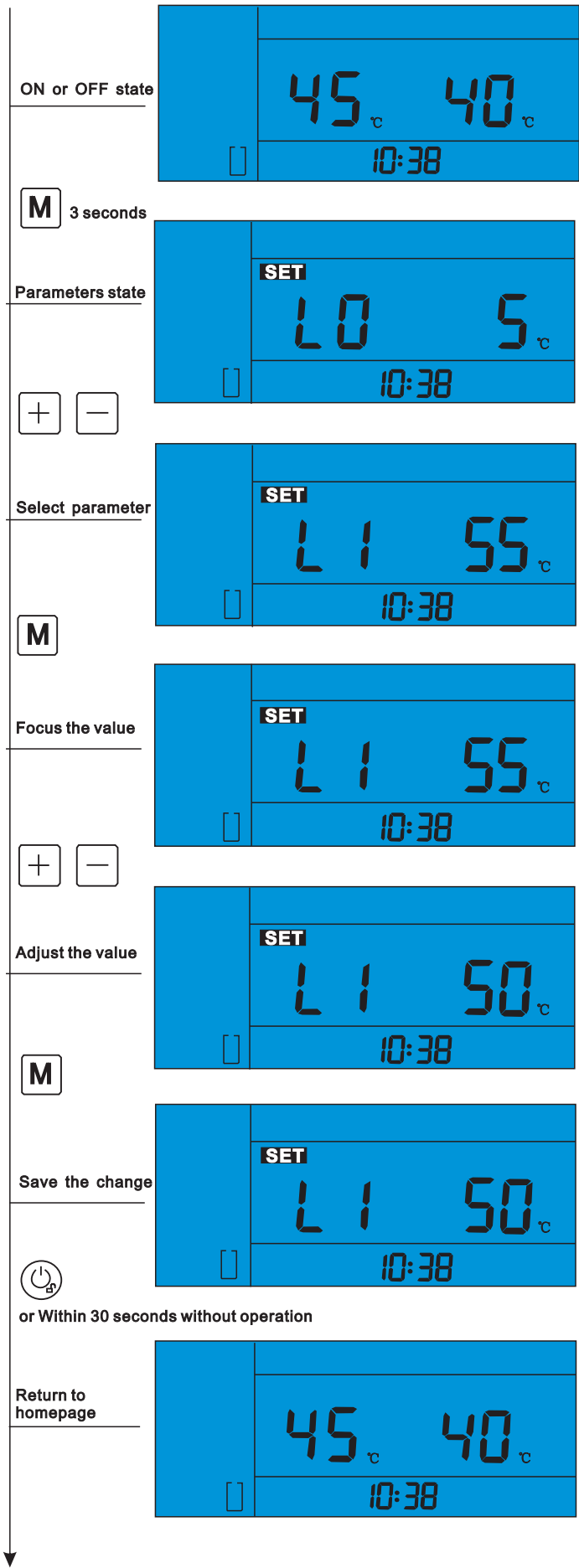
In the factory checking interface, press “function” to enter current factory parameter settings, press “+” or “-” to modify the value of the parameter, and press “function” to return to query status.

Under factory parameter query or setting interface, if no operation to the controller within 30 seconds, the controller will return to main interface automatically. The controller also can return to main interface via pressing ON/OFF key.

## 9.5 Parameter number and description are listed in the following table.

### 9.5.1 User Parameter (Available for end users)

Parameter code	Parameters description	Setting range	Default value	Notes
L0	Water temp hysteresis (DHW)	2~18℃	5℃	Machine stops when water temp $\geq$ set temp + hysteresis, machine restarts when water temp $\leq$ set temp - hysteresis
L1	Setting water temp (DHW)	20℃~Parameter F1	55℃	Default DHW water temp
L2	Water temperature hysteresis(Heating/Cooling)	2℃ ~ 18℃	3℃	Machine stops when water temp $\geq$ set temp + hysteresis, machine restarts when water temp $\leq$ set temp - hysteresis
L3	Setting water temperature of Heating mode	20℃ ~ Parameter F1	50℃	Default water temp for Heating
L4	Setting water temperature of Cooling mode	7℃ ~ 30℃	12℃	Default water temp for Cooling
L5	The ambient temperature to start auxiliary electrical heater	-30℃ ~ 35℃	0℃	When ambient temp < set value, turn on the auxiliary electrical heater
L6	Compressor current protection value	0~40A	100:23A 200:13A 300:10A 380:13A 450:15A 550:13A 630:15A	If set to 0, means ignore this value



## 9.5.2 Factory parameter list

(Warning: these parameters must be set by professionals)

Parameter code	Parameters description	Setting range	Default value	Note
H2	Limited working ambient temp of the heat pump	-30℃～0℃	-20℃	When ambient temp< set value, machine stops automatically, when ambient recover > set value, machine restarts.
H3	Defrosting interval	20min～90min	45min	Minimum interval time from last defrosting
H4	Maximum coil temperature to access defrosting	-15℃～-1℃	-3℃	Defrosting can be access only when coil temp is <set value
H5	Maximum duration time of defrosting	5min～20min	8min	Defrosting would quit automatically when time's up
H6	Coil temperature to quit defrosting	1℃～40℃	15℃	Quit defrosting when coil temp>=set value
H7	Minimum temperature difference between ambient temp and coil temp to allow defrosting	0℃～15℃	8℃	
H8	Maximum ambient temperature to allow defrosting	0～20℃	15℃	No defrosting if ambient temp > =set value
P1	Regulating interval of EEV	20s～90s	45s	
P2	Target overheat of main EEV control	-5℃～10℃	0℃	
P3	When discharge temperature is higher than this value , EEV open steps will go up to prevent discharge temperature not to high	60℃～115℃	88℃	
P4	Open steps of EEV during defrosting	2～45	45	Open step= display value *10
P5	Minimum open steps of EEV	5～20	12	Open step= display value *10
P6	Control method of main EEV	0/1	1	0: Manual /1 Automatic
P7	Initial open steps of EEV by manual control	2～50	40	
F1	Maximum setting temperature	20℃～99℃	55℃	
F2	Circulation pump ON or OFF when auxiliary electrical heater starts	0/1	0	0=OFF/1=ON
F3	Compensation value between water tank temperature and display temperature	-5℃～15℃	2℃	
F4	Water flow switch installation choice (for central control)	0～1	0	0=individual / 1=common
F5	Circulation pump mode	0/1	1	0=normal / 1=special

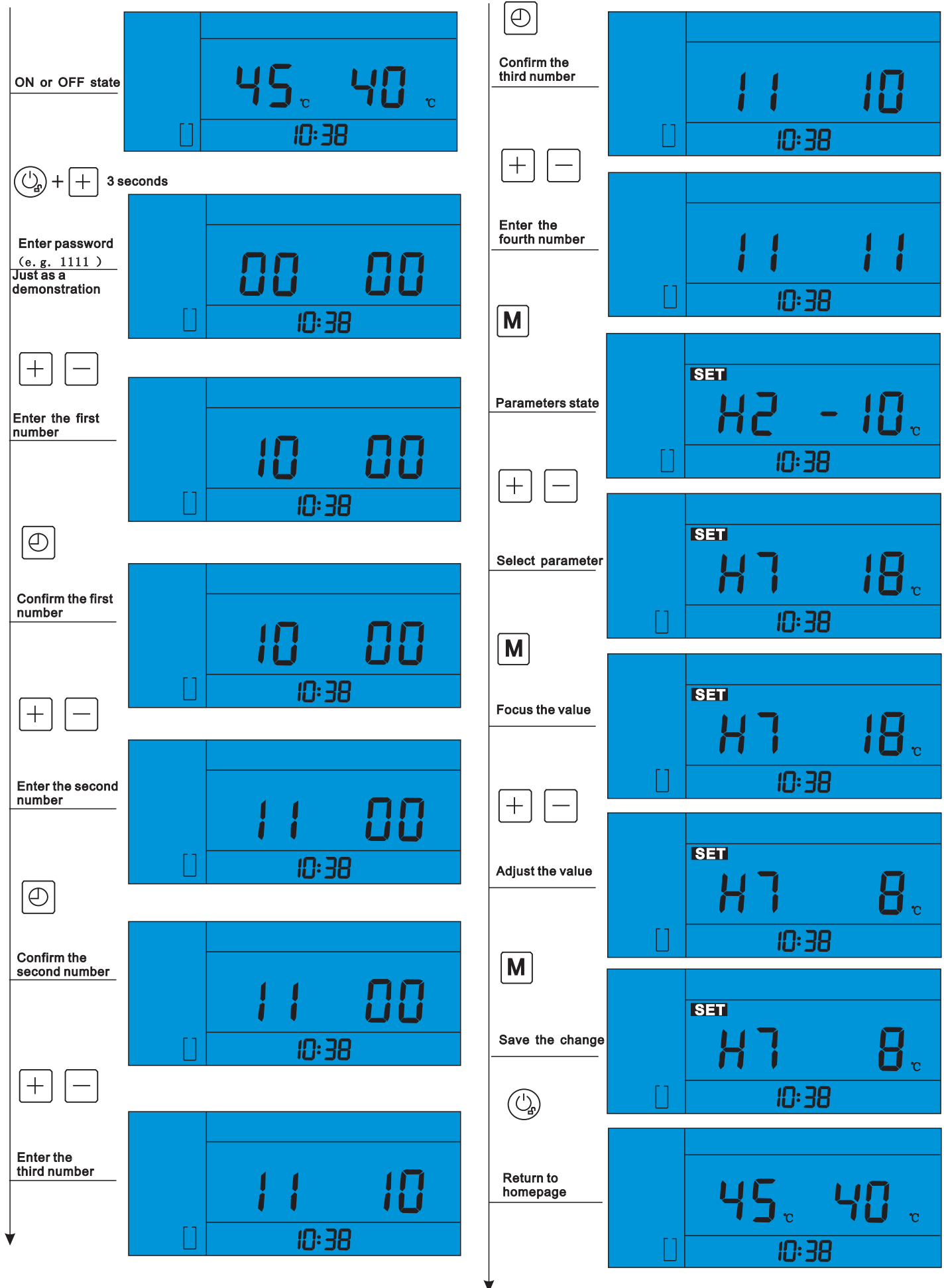
F5 Mode selection of water circulation pump :

F5=0 (normal): When the unit power on, circulation pump will run all the time;

F5=1 (special): circulation pump will run follow the compressor;

Heat Pump For Heating And Cooling Series

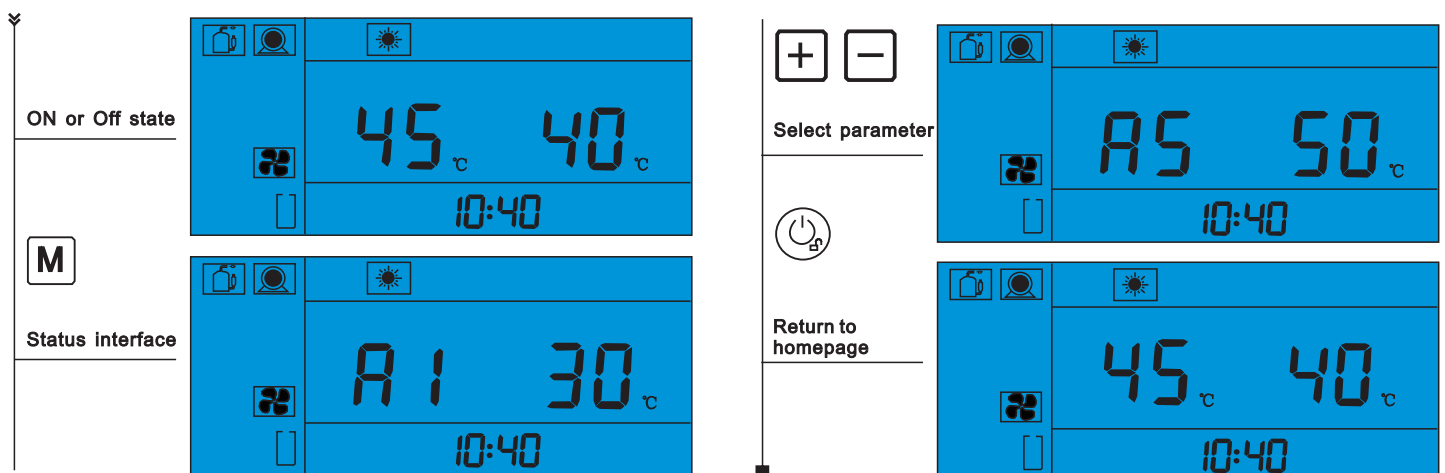
Parameter code	Parameters description	Setting range	Default value	Note
F6	which mode is the auxiliary electrical heater used for?	0/1	0	0=hot water / 1=heating
F7	Number of refrigeration system in one unit	1/2	100,200:1 300,380,450:2 550,650:2	1= single system, 2= double systems
F8	Overheat compensation?	0/1	1	0=No / 1=Yes
F9	Energy step control within one unit	0/1	0	0=ON / 1=OFF
F10	Energy step control for cascade(central control)	0/1	0	0=ON / 1=OFF
F11	Routing inspection interval for cascade control	1~15min	15min	
F12	Unit quantity of start after first power on or mode switch (for central control)	25%~100%	25%	Total unit quantity * F12 (round-off number)



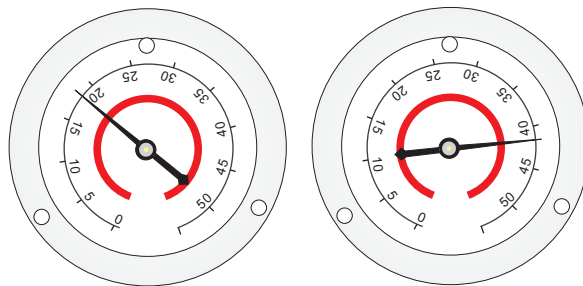
### 9.5.3 Unit status checking

1# means System 1, 2# means System2

Code	Description
A1	1# Coil temperature
A2	1# Compressor suction temperature
A3	1# Compressor discharge temperature
A4	Ambient temperature
A5	DHW outlet temperature
A6	Heating/Cooling outlet water temperature
A7	Reserved
A8	1# Compressor current
A9	1# Open steps of EEV
A10	Reserved
b1	2# Coil temperature (double-system unit only)
b2	2# Compressor suction temperature (double-system unit only)
b3	2# Compressor discharge temperature (double-system unit only)
b8	2# Compressor current (double-system unit only)
b9	2# Open steps of EEV (double-system unit only)
E1	History record of error code
E2	History record of error code
E3	History record of error code
E4	History record of error code
E5	History record of error code
E6	History record of error code



### 9.6 The manometer instruction



The manometer is a kind of high pressure equipment, when the heat pump is on, the manometer pointer would point to the pressure value of refrigerant, the max. value of protection is 42kg/Cm<sup>2</sup>. When the heat pump is off, the pointer would point to the same value as actual ambient temperature (e.g. 28°C) and related air pressure (e.g. 18kg/ Cm<sup>2</sup>).

Please check the manometer when you restart the heat pump after not using for a long time, if it shows ambient temperature value is smaller than 2°C (When the ambient temp. is higher than 2°C), it means that refrigerant has leaked a lot, and you need to confirm with professional engineer as soon as possible.

## 9.7 Trouble Shooting

Users should contact with the professional maintenance staff when there is a problem with the heat pump. Maintenance stuff may need to refer to the following table for troubleshooting.

Malfunction	Possible Problems	Disposing Methods
Heat pump unit is out of operation.	<ol style="list-style-type: none"> <li>1. Power source fault.</li> <li>2. Loose connection of power wire.</li> <li>3. Power fuse burnt out.</li> <li>4. Low water level switch is not on.</li> </ol>	<ol style="list-style-type: none"> <li>1. Cut off the power source and check.</li> <li>2. check the power wire connection.</li> <li>3. Check the fuse.</li> <li>4. Supply water until the water level switch is on.</li> </ol>
Water pump is running but no water circulation or much noise made by water pump	<ol style="list-style-type: none"> <li>1. Few water in the system.</li> <li>2. Air exists in the water system.</li> <li>3. Some valves are not opened.</li> <li>4. The water filters is blocked up.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill water into the water supply system.</li> <li>2. Discharge air from the water system.</li> <li>3. Open all the valves in the system.</li> <li>4. Clean the water filter.</li> </ol>
Low heating capacity.	<ol style="list-style-type: none"> <li>1. Lack of refrigerant.</li> <li>2. Bad water system heat preservation.</li> <li>3. Low evaporator heat transferring.</li> <li>4. Low water flow volume.</li> </ol>	<ol style="list-style-type: none"> <li>1. leakage hunting and fix it, discharge all the refrigerant and inject the right amount.</li> <li>2. improve the heat preservation.</li> <li>3. Wash the evaporator.</li> <li>4. Clean the water filter.</li> </ol>
Heavy frosting, low heating capacity.	<ol style="list-style-type: none"> <li>1. The evaporator is too dirty.</li> <li>2. Defrost sensor fault.</li> <li>3. The 4 way valve can not change direction.</li> <li>4. Over long defrosting duration.</li> </ol>	<ol style="list-style-type: none"> <li>1. Wash the evaporator.</li> <li>2. Change a new defrost sensor.</li> <li>3. Check the solenoid if it is energized.</li> <li>4. Change the temperature for entering defrost and the duration.</li> </ol>
High noise of compressor.	<ol style="list-style-type: none"> <li>1. Liquid refrigerant into the compressor.</li> <li>2. Interior component of the compressor is faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if the thermostatic expansion valve is faulty.</li> <li>2. Change the compressor.</li> </ol>

Compressor is out of operation.	<ol style="list-style-type: none"> <li>1. Power source fault.</li> <li>2. Compressor AC contactor damaged.</li> <li>3. Loosen wire connection.</li> <li>4. Over-heat protection.</li> <li>5. Over-high water temp.</li> <li>6. Low water flow volume.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the power source and change faulty components.</li> <li>2. Change the contactor.</li> <li>3. Check every wire connection of compressor.</li> <li>4. Check refrigerant leakage.</li> <li>5. Bring down the water temp. set value.</li> <li>6. Clean the filter and check if there is air inside the water system.</li> </ol>
Fan is out of operation.	<ol style="list-style-type: none"> <li>1. Fan motor wire loosen.</li> <li>2. Fan motor burnt.</li> <li>3. Fan AC contactor fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check every wire of the fan connection.</li> <li>2. change the motor.</li> <li>3. change the AC contactor.</li> </ol>
Low water flow volume protection.	<ol style="list-style-type: none"> <li>1. Circulation pump fault.</li> <li>2. Circulation pump is too small.</li> <li>3. Water filter blockage.</li> <li>4. Flow volume control device restore.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the operation of the circulation pump and fix it.</li> <li>2. Change a bigger pump.</li> <li>3. Wash the water filter.</li> <li>4. Adjust or change the flow volume control device.</li> </ol>
Over-high compressor discharge pressure	<ol style="list-style-type: none"> <li>1. Low water flow volume.</li> <li>2. Thermostatic expansion valve openings is not correct, or blockage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the circulation pump, and the water filter.</li> <li>2. Check and adjust the openings, or directly change the expansion valve.</li> </ol>
Over-low compressor suction pressure.	<ol style="list-style-type: none"> <li>1. Not enough refrigerant.</li> <li>2. Over-big pressure drop through the heat exchanger.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check refrigerant leakage.</li> <li>2. Check and adjust the expansion valve openings.</li> </ol>
Shortage of oil in compressor.	Shortage of lubricant oil.	Find out the suitable kind of oil for the compressor and inject some amount.
Thermostatic throttle valve can not start.	<ol style="list-style-type: none"> <li>1. The switch for it is not open.</li> <li>2. Low water pressure, over-small water pipe diameter, over-long pipe.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect the power source of the solenoid valve.</li> <li>2. Check if there is blockage in the pipes, and add boosting pump when necessary.</li> </ol>



