8901N-1 User Guide

1 Main functions:

The controller is the controller for special engineering heat pump water heater, suitable for single / dual compressor air-cooled heat pump water heaters. It contains 8 temperature sensors (tank temperature, outdoor machine temperatures 1, exhaust temperature 1, outdoor machine temperature 2, exhaust temperature 2,environment temperature, water outlet temperature sensor, return water temperature sensor), 9-ways switch input signal (High pressure switch 1, low pressure switch 1, high pressure switch 2, low pressure switch 2,water flow switch, high water level switch, low water level switch, water pressure switch, emergency switch), 12 control output (compress 1,compressorress 2, the four-way valve, high-speed fan, low-speed fan, circulating pumps, circulation solenoid valve, water replenishing valve(can be connected to water inlet solenoid valve), water inlet pump, supply-water pumps, backwater valve, auxiliary electric heating).

Main functions:

1 Temperature display and control: display the temperature of the water tank, and control the water temperature in the tank at the setting D-value temperature. Query function, you can view each temperature sensor and a variety of related parameters.

2 Electric expansion valve function

3 Automatic defrost control: Optimize the design of the heat pump defrost control logic, to effectively defrost to ensure that outside the machine can work at low temperature.

4 Automatic replenishment feature: Intelligent replenishment program, just need one water level switch signal, as far as possible to ensure replenishment process does not affect the water temperature to ensure that as much hot water in tank, and to ensure that the units in the replenishment process as smooth running as possible, to reduce unnecessary unit starts and stops.

5 Exhaust temp protection: When the exhaust temp is too high, the controller turns off the unit and generates alarm signal, and it can control the outdoor fan according to the exhaust temp.

6 High and low pressure alarm functions: two-way high-pressure alarm signal input, two low-pressure alarm signal input, and normally closed contacts.

7 Running in different period of time: The controller has two modes: “Auto” and “Econ”, in “Econ” mode, the controller can set 3 period of time; it can only heat in these periods of time.

8 Dunning: You can set a trial time and 6 passwords, controller cumulative work time exceeds the setting of the trial time to stop working, and password is required to lift the time limit on the trial to continue working.

9 Phase lack protection and phase sequence protection: when the three-phase power supply phase loss or when the three-phase power supply phase sequence error, it will stop the unit operation and generate an alarm

signal.

10 Current view and over current protection functions: to view the operating current of the compressor, and each compressor has over current protection function.

11 The compressor is timesharing started: In order to avoid the high-power devices starting and stopping at the same time to have a strong effect on the power grid, the controller set the start and stop time sharing control in accordance with the order.

12 Winter frost protection: In order to prevent water pipes, water circulating pump freezing, the unit also do frost protection when the unit is on shutdown, standby state.

13 Emergency operation functions: when the operation panel host communication failure or malfunction, automatic operation will set parameters by internally.

14 When power is off, it will automatically remember various of parameters.

15 It has three different timing switch.

16 Can be set through the motherboard with a variety of models, the general purpose of a board.

17 Others: Real Time Clock, On-off Memory when the power is off (Can be set), Direction of four-way valve can be set, compressor start delay protection, Sensor Error Alarm, High Temperature Alarm, Add Fluorin, and so on .

2 Main Technique Index:

Range of Temperature Display： -50～150℃

Range of Temperature Set： 0～100℃, the range can be set.

Power Supply： 220V±10%

Operation Environment：Temperature -10℃～50℃,humidity ≤85%.

Output Load Capability： Circulating pump:30A/220VAC
Fan: 2x10A/220VAC
Auxiliary electric heating : 5A(Relay contact)
Water inlet pump: 5A/220VAC(Relay contact)
compressorressor1: 5A/220VAC
compressorressor2: 5A/220VAC
Four-way valve: 5A/220VAC
Circulating water solenoid valve: 5A/220VAC
Water replenishing valve: 5A/220VAC
Supply-water pump: 5A/220VAC(Relay contact)
Backwater valve: 5A/220VAC

Temperature Sensor：NTCR25=5kΩ,B(25/50)=3470K

Executive standard：Q/320585 XYK01

3 Parameter Set

Long press “S” for 5 seconds to enter the state of value setting. If set password(F80 and F81), LCD will show “PAS” to prompt you to key password, use “▲▼” to key password. If password is right, LCD will show “Fxx”, “xx” is a double-digit number, which represents parameter code. You can use “▲” or “▼” to choose parameter code. Choose one code and then press “S”, it can display corresponding parameter value. At this time you can use “▲” or “▼”

again to set parameter value, press “S” again after finishing setting, return to the state of parameter code. Internal parameter code is showing below:

Sort	Code	Parameter name	Range	Factory setting	Unit	Remark
Temperature	F12	Tank D-value temperature	1-10	5	°C	
	F13	Max setting temperature	30-100	55	°C	
	F14	Min setting temperature	0-29	10	°C	
	F19	Temp sensor adjustment	-20-20	0	°C	Adjust the water temperature measurement error
Compressor	F21	Compressor delay time	0-10	3	minute	
	F22	Comp losting-phase and phase sequence protection	0-1	1		0: without protection 1: with protection
	F23	Comp type	0-2	1		0: 3ph 1: 5ph 2: 10ph Single compressor power
	F24	The number of compressor (notice 1)	1-2	2		1: one compressor 2: two compressors
	F25	Current protection	0-1	0		0: without current protection 1: with current protection

	F26	Comp low temp limit protection	-20-5	-20		-20: no limit
Defrosting	F31	Defrost start temperature	-10-10	-4	°C	
	F32	Defrost end temperature	5-25	12	°C	
	F33	Defrost start time	10-120	30	minute	
	F34	Max defrost time	3-20	10	minute	
	F35	Start defrost environment temp when outdoor machine temp sensor is broken	-10-20	7	°C	
	F37	Setting the direction of valve	0-1	0	-	0: four-way valve open when heat, closed when defrost 1: four-way valve closed when heat, open when defrost
Fan	F41	low-speed fan starting environment setting temp	5-35	25	°C	Choose to use high-speed or low-speed fan temp according to environment
	F42	Fan stopping exhaust temp	80-110	100	°C	Fan stopping exhaust temp
	F43	Fan stopping exhaust D-value temp	5-15	10	°C	
	F45	Exhaust temp	90-135	120	°C	Comp stopping exhaust temp

		protection				
Electric expansion valve	F50	Machine set 1 setting superheating temp	-10-10	0	°C	
	F51	Machine set 2 setting superheating temp	-10-10	0	°C	
	F52	Electric expansion valve choice	0-1	1	-	0: without electric expansion valve 1: with electric expansion valve
System	F53	Liquid level	0-2	2		direct heating: 2 circulating: 0: no liquid level 1: one liquid level 2: high and low liquid levels
	F54	Pump	0-1	1		1：water inlet pump and circulating pump use one water pump together 0: water inlet pump and circulating pump stand alone
	F55	Whether to test water switch or not	0-1	1		1: test 0: no test
	F56	Tank electric heating	0-1	0		0: without auxiliary electric heating 1：with auxiliary electric heating

	F57	Supply-water pump	0-1	0		0: without Supply-water pump 1:with Supply-water pump
	F58	Backwater valve	0-1	0		0: without Backwater valve(you can choose not to connect it to backwater temp) 1:with backwater valve
	F71	Auto tank electric heating starting mode at the setting environment temp	-10-20	12	°C	
Function Set	F72	Out of water temp is too high protection	60-99	70	°C	
	F73	Setting backwater temp	0-99	38	°C	
	F80	Password	0-999	0	-	F80,F81=0. Mean no password
System set	F81	Password	0-999	0	-	
	F85	Display controller's working time	-	-	X10 hour	
	F86	Clean up controller's working time	-	-	-	
						When controller's accumulative working time is more than trial

	F87	Trial time	0-999	OFF	X10 hour	time, controller will stop, and display alarm code “A99” 0: no trial time limit
	F90	Display motherboard type				
Testing	F91	Display motherboard version number				
	F92	Display panel type				
	F93	Display panel version number				
	F94	Display motherboard ID number	Use hexadecimal number			
	F97	Reserved				
	F98	Add fluorin	The controller shows “AdF” after entering this function, turn on compressor and fan, four-way valve state is in connection with freeze mode(more details are available on “ automatic defrosting principles”). Press key “s” to exit or exit test automatically after 25 minutes.			
	F99	Test output signal	After entering the function, the controller displays “CCC”, and attracts all relays in turn, in order to be used for outer plate testing, and please don’t use it when the controller is running! Press key “s” to exit or exit test automatically after 30 seconds.			
	F00	Exit				

Notice1: if F24=1, it means single compressor system, at this time outdoor machine temp sensor2, exhaust temp sensor2 and air admission temp sensor2 can be not connected. Ignore high pressure switch2, low pressure

switch2 signal, there will not exist alarm A12 A13 A22 A24 A26

4 Function description:

heating and circulating heat preservation mode

4.1. start heating process

Requirement of starting: tank temp＜(setting temp- D-value temp).compressor stopping time≥ compressor starting delay timeF21

1. Turn on, test whether the actual water tank temp meet the requirement of starting or not.

If not, test high water level switch, if it is closed, machine set will enter standby state. If it is open, turn on water replenishing valve replenish water.

If it meets the requirement, test water level(test whether low water level switch is closed), if it is open, turn on water replenishing valve to replenish water until low water level switch is closed.

2. start circulating pump after low water level switch is closed, test whether water flow switch is closed or not after 30 seconds, if it is not closed, turn off and alarm.

3 after water flow switch is closed, start high-speed fan andcompressor1 10 seconds later, startcompressor2 10 seconds later.

4. start electric heating or not according to electric heating requirement.

5. water replenishing valve runs according to water replenishing valve controlling logic.

4.2. stop heating process

Turn off, closecompressorressor1, then closecompressorressor2 and fan 5 seconds later, then close circulating pump 30 seconds later, then close circulating solenoid valve 5 seconds later.

4.3 defrost

4.3.1 enter defrost state

1. when accumulated heating running time or defrost interval time reach “defrost starting time” and outdoor heat-exchange facility’s copper pipe temp is lower than “defrost starting temp”

2.compressor run for 15 minutes

if one of the two compressors meets the two defrost requirements, it enter defrost state, and the other compressor enter defrost ,too.

When in circulating mode, turn off compressor 1,2. After 5 seconds, close fan. then stop selector valve 30 seconds later. 20 seconds later,compressorressor1,2 are electrified, and start to defrost.

4.3.2 exist defrost state

(1) outdoor machine temp goes up to “defrost stopping temp”

(2) defrost time is more than “max defrost time”

Compressor meet either of the two requirements will stop working and wait for other compressors stop. When all the compressor meet exist defrost state requirement, they exist defrost state together and enter heating mode.

When controller test that pipe T≥“defrost stopping temp” or after working for “max defrost time”, related compressor stop working, wait for the other

compressor meet exist defrost state requirement.
When meet exist requirement, stop compressor, after 20 seconds, start outdoor high-speed fan, change selector valve's direction 40 seconds later. 20 seconds later compressors are electrified, and start to heat, and time defrost interval time again.
Notice: when one outdoor temp sensor is broken, take the other outdoor temp sensor as standard.

When both two outdoor temp sensors are broken, test environment temp, if environment temp is lower than F35 and accumulative heating time(or defrost interval time) reaches "defrost starting time", start defrost. If defrost time is more than "max defrost time", stop defrosting.

4.4 water level control

1. when low water level switch is open, turn off main engine, after low water level switch is closed, circulating pump, compressor and fan can start working.
2. when low water level switch is open, water inlet solenoid valve is electrified and begin to replenish water, and supply-water pump stops working at the same time.

4.5 machine set circulating pump

When machine set is running, circulating pump starts 40 seconds earlier than compressor. when machine set is closed, circulating pump stops 30 seconds earlier than compressor.

4.6. backwater valve

If tank temp≥ setting backwater temp, start backwater function.
If backwater temp sensor's temp reaches setting backwater temp, close backwater valve, if backwater temp sensor's temp is lower than setting backwater temp-8°C, open backwater valve again to make sure that supply-water pipe always has hot water.

4.7 supply-water valve

If tank temp≥ setting backwater temp and low water level switch is closed, supply-water pump can be open.
If tank temp< setting backwater temp-5°C， or low water level switch is open, close supply-water pump.

4.8 Four-way valve (Associated with parameter F37, more details refer to F37)

4.9 Auxiliary electric heating

4.9.1 electric heating working condition

If environment temp≤15°C, begin to test electric heating ON/OFF condition

1. tank T setting temp- tank T actual temp≥5°C, begin electric heating
2. 5°C> tank T setting temp- tank T actual temp>1°C， keep on
3. tank T setting temp- tank T actual temp≤1°C, stop electric heating
4. compressorressor work for more than 3 minutes
5. low water level switch is closed. If circulating mode doesn't have or only have one water level switch, it will not judge whether to electric heating or not.

The difference between auto mode and manual mode

Auto mode: if environment >15°C, it forbidden electric heating

Manual mode: if environment >15°C, press key “electric heating” to enter electric heating mode by force(no need testing environment temp)

electric heating will not be restricted by rule 4(compressor work for more than 3 minutes) when defrosting.

4.9.2 electric heating stopping condition

1. tank T actual temp≥ tank T setting temp-1°C
2. tank temp sensor is broken

4.9.3 when electric heating is on, operation panel will display the “electric heating” signal and the signal will disappear when stop electric heating.

4.9.4 if it is impossible for machine set to recover from breakdown state, press key “electric heating” to enter electric heating mode by force, start auxiliary electric heating. When meet electric heating stopping condition, or press key “electric heating”, exist forced electric heating state and stop auxiliary electric heating.

4.11. water inlet selector valve control

1. If setting parameter is set as 0, there is no need to control water inlet selector valve, it is always closed.
2. If setting parameter is set as 1, use high water level switch. When high water level switch is open, start water inlet selector valve. When high water level switch is closed, close water inlet selector valve.
3. If setting parameter is set as 2, use high and low water level switch. When high water level switch is closed, close water inlet selector valve.

   When high water level switch is closed and

. When high water level switch is open and tank actual temp> tank setting temp-5°C, or low water level switch is open, open water inlet selector valve.

When low water level switch is closed and high water level switch is closed or actual temp< tank setting temp-10°C, close water inlet selector valve.

4.12. outdoor fan working condition

(1) fan is closed when compressor is closed and defrosting.

(2)when fan is running:

If environment temp≥F41 and both two compressors’ temp≥F42-8°C, machine set run in low –speed fan.

If environment temp≤F41-5°C or either of the two compressors’ temp ≤F42-16°C, machine set run in high –speed fan.

When any machine set is broken, run in low –speed fan.

(3) if both of the two compressor’ temp ≥F42, close outdoor fan.

If environment temp≤F41-5°C or either of the two compressors’ temp ≤F42-16°C, machine set run in high –speed fan.

4.13 Electric expansion valve

5. system protection

5.1.compressor delay time protection(compressor starting delay time is adjustable(F21), take 3 minutes as example)

There is a compressor stopping timer in controller, it begins to time when compressor stops. Next time before compressor start, check the timer first, if it has got to 3 minutes, start compressor immediately. If it is less than 3 minutes, compressor will start until it reaches 3 minutes. Besides, the first 3 minutes controller is electrified, compressor will not start either.

5.2. losting-phase and fault phase protection

When three-phase power is in losting-phase and fault phase, machine set stops running and display code A91

5.3.compressor current overload protection(when F30=1)

Test current after compressor start for 3seconds, when current is more than setting current for 2 seconds(3ph: setting current is 9A, 5ph: setting current is 16A, 10ph: setting current is 33A),compressor stop and alarm, and display alarm code “A93”

5.4 forbidden compressor running in low temp: if environment temp<F26, can’t start compressor, you can only start electric heating

5.5 water flow switch protection

Check water flow switch after circulating pump run for 30 seconds. If check that water flow switch is open for 10 seconds, machine set stops running and display alarm code A14

5.6 high pressure protection

Use always-closed switch. When controller checks that high pressure signal is open for 10 seconds, system stops working until high pressure signal comes back to normal and meet the requirement that compressor stopping protection time is more than 10 minutes. But if 3 alarms appear in one hour, system will be locked and remain in alarm state and display alarm code. It will not recover until you close manually.

5.7. low pressure protection

Use always-closed switch. Controller will not check low pressure signal in defrosting or stop defrosting for 3 minutes. Controller will not check low pressure signal when start heating for 3 minutes either.

When controller checks that low pressure signal is open for 10 seconds, system stops working until low pressure signal comes back to normal and meet the requirement that compressor stopping protection time is more than 10 minutes. But if 3 alarms appear in one hour, system will be locked and remain in alarm state and display alarm code. It will not recover until you close manually.

5.8 overtop exhaust temp protection

When controller checks that exhaust temp is higher than F45, stop

heating and display alarm code. When exhaust temp drops to (F45-10°C) and compressor stopping protection time is more than 10 minutes, it begins to heat and cancel alarm code.

If F45=110°C, when exhaust temp is higher than 110°C, controller will enter alarm and stop heating. When exhaust temp is lower than 100°C, it will recover.

But if 3 alarms appear in one hour, system will be locked and remain in alarm state and display alarm code. It will not recover until you close manually.

5.9. overtop water outlet temperature **protection**

If tank water outlet temperature≥F72 for 20 seconds, start overtop water outlet temperature protection And machine set stop running. If water outlet temperature≤(F72-5°C) and compressor stopping protection time is more than 10 minutes, machine set recover to work.

But if 3 overtop water outlet temperature protection alarms appear in one hour, system will be locked and remain in alarm state and display alarm code.

5.10. frost protection in winter

In order to prevent water pipe and circulation pump frost, machine set can enter frost protection state when it is closed, standby and stopped. If machine set meet the following requirements, it will enter frost protection state:

When environment temp>3°C, machine set will not do frost protection Circulation pump stop for 20 minutes

When environment temp≤3°C: if machine set is closed or standby, water outlet temperature≤4°C, enter frost protection

When enter frost protection, circulation pump start working, 60 seconds later, if water outlet temperature≥6°C, close circulation pump and exit frost protection state. If water outlet temperature < 6°C, start machine set to heat until tank temp goes up to 15°C, stop heating, and exit frost protection state.

5.11. The treatment of the special conditions

When in frost protection, tank temp sensor doesn't replenish.

If environment temp sensor is broken, cancel environment temp conditions of frost protection.

If water outlet temperature sensor is broken, only judge according to environment temp. when environment temp ≤3°C, circulating pump and circulation solenoid valve run for 2 minutes every 20 minutes.

If tank temp sensor is broken, machine set will not heat to protect frost.

If water outlet temperature sensor and environment temp sensor are both broken, circulating pump and circulation solenoid valve run for 2 minutes every 20 minutes.

5.12 emergency operation function

when the operation panel host communication failure or malfunction,

close emergency switch automatic operation will set parameters by internally. When emergency switch is open, main engine will be turned off.

5.13 temp sensor error protection

When outdoor machine sensor1, exhaust sensor1, machine sensor1, exhaust sensor 2 are broken, they will not affect the other system operation, and display different codes to distinguish different systems.
When tank temp sensor is broken, machine set will stop running.
When temp sensor error disappeared, machine set will restart.

6. system error and codes

Alarm sort	Alarm name	Alarm code	Cause	Measure
Outside alarm	Low pressure1 protection	A11	Low pressure1 protection switch signal is abnormal	a. 1＃machine set stop running b. Display alarm code
	High pressure 1 protection	A12	High pressure1 protection switch signal is abnormal	a. 1＃machine set stop running b. Display alarm code
	Low pressure2 protection	A13	Low pressure2 protection switch signal is abnormal	a. 2＃machine set stop running b. Display alarm code
	High pressure 2 protection	A14	High pressure2 protection switch signal is abnormal	a. 2＃machine set stop running b. Display alarm code
	Water flow switch protection	A15	Water flow switch signal is abnormal	a. Stop b. Display alarm code
	Water pressure switch	A16		a. Stop b. Display alarm code

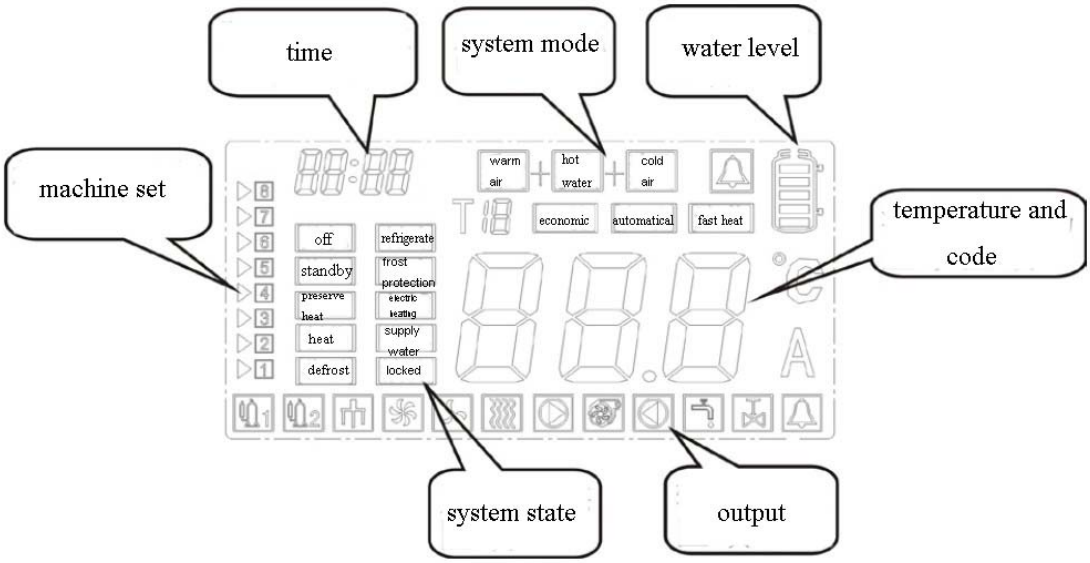
Sensor alarm	Tank temp sensor alarm	A21	Tank temp sensor is open or short circuit	a. Stop b. Display alarm code
	Defrost temp sensor1 alarm	A22	Defrost temp sensor1 is open or short circuit	a. Cancel related function and protection b. Display alarm code
	Defrost temp sensor2 alarm	A23	Defrost temp sensor2 is open or short circuit	a. Cancel related function and protection b. Display alarm code
	Exhaust sensor 1 alarm	A24	Exhaust sensor 1 is open or short circuit	a. Cancel related function and protection b. Display alarm code
	Exhaust sensor 2 alarm	A25	Exhaust sensor 2 is open or short circuit	a. Cancel related function and protection b. Display alarm code
	air admission sensor 1 alarm	A26	air admission sensor 1 is open or short circuit	a. Cancel related function and protection b. Display alarm code
	air admission sensor 2 alarm	A27	air admission sensor 2 is open or short circuit	c. Cancel related function and protection d. Display alarm code
	Environment sensor alarm	A28	Environment sensor is open or short circuit	a. Cancel related function and protection b. Display

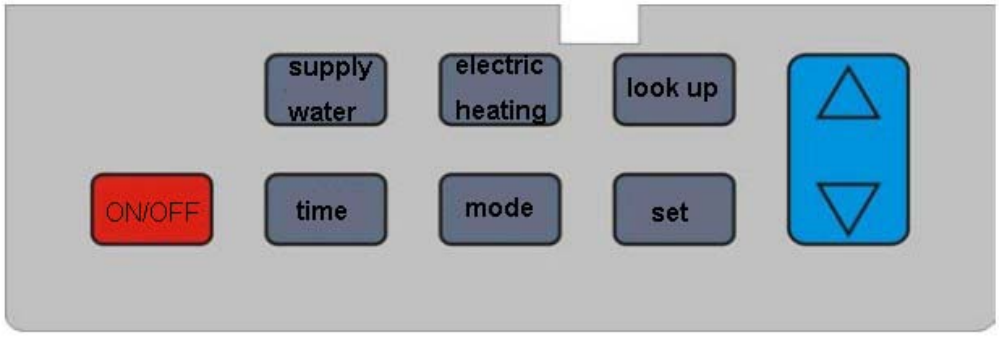
				alarm code
	water outlet temperature sensor alarm	A29	water outlet temperature sensor is open or short circuit	a. Cancel related function and protection b. Display alarm code
	Backwater sensor alarm	A30	Backwater sensor is open or short circuit	a. Cancel related function and protection b. Display alarm code
System protection	Overtop water temp protection	A41	Tank temp is 10°C more than setting temp	a. Stop b. Display alarm code
	Overtop exhaust sensor 1 temp protection	A42	exhaust sensor 1 temp is too high	a. 1＃machine set stop running b. Display alarm code c. Recover automatically when exhaust temp come down
	Overtop exhaust sensor 2 temp protection	A43	exhaust sensor 2 temp is too high	a. 2＃machine set stop running b. Display alarm code c. Recover automatically when exhaust temp come down
	Overtop water outlet temperature sensor temp protection	A44	water outlet temperature is too high	a. Stop b. Display alarm code
	Pipe freeze protection	A45	water outlet temperature is too low	a. Start circulating water pump b. Display alarm code

				c. Recover automatically when water outlet temperature goes up
	Environment temp is lower than compressor temp setting low temp	A46		a. Stop b. Display alarm code
	Water level switch alarm	A47		a. Stop b. Display alarm code
Others	Losing phase and phase sequence protection	A91		a. Stop b. Display alarm code
	Comp1 over current protection	A93		a. 1＃machine set stop running b. Display alarm code
	Comp2 over current protection	A94		c. 2＃machine set stop running d. Display alarm code
	Reach restrictive running time	A99		a. Stop b. Display alarm code
Communication	Communication alarm	---	Communication between operation and mother board	a. Display alarm code and icon b. Recover automatically when alarm disappear

Notice: when there is alarm protection, display alarm code and flicker

Operation panel Wiring Diagram





Display function

Controller always display real time, temp in water tank, system mode, system state and machine set output state.

1.1 On/off

Press key On/off to turn on or turn off

1.2. set water temp

Press key set to enter temp setting state. use the key “▲” and “▼” to change the setting value(“▲”adds 1°C and “▼”minuses 1°C, press and hold it over 0.5 seconds can add or minus rapidly) Press “S” again to exit the setting state.

1.3. Set time

Press “◷”, year part of the time display is coruscating, use “▲” and “▼” to adjust the year, press “◷” again after adjusting, then you can adjust the hour, minute, second in the same way, finally you can press “◷” exit the state of time setting.

1.4. Set working mode

Press key “M” to change two modes between “auto mode” and “economical mode”. Can control the heat pump whether to heat or not according to setting temperature in “auto mode”. Controller only heats in the three setting periods

of time when it is in “economical mode”, and in other time it doesn’t work.

1.5. Set time of economical mode

Long press “🕒” for 2 seconds, the controller can enter the state of heat period of time, you can set 3 heat periods of time in turn according to the display of LCD.(press “🕒” to switch setting items, press “▲” or “▼” to change its value)

The controller can be set 3 heat periods of time at most, if you don’t need so many periods of time, you can set the starting time and ending time which you don’t need as “00:00”.

In addition, if the ending time is earlier than starting time, the controller considers this ending time is

next day. For example, the period of time is “22:00” to “03:30”, the controller considers it as 22:00 at night to 03:30 next day.

1.6. inquire temp

Press key inquire to enter temp inquiring state, use “▲” and “▼” to inquire each temp sensor’s temp, andcompressorressor1 andcompressorressor2’s current. It display tank temp in usual time.

T1	T2	T3	T4	T5
Tank temp	Outdoor machine temp1	Exhaust temp 1	air admission temp 1	Outdoor machine temp2
T6	T7	T8	T9	T10
Exhaust temp 2	air admission temp 2	Environment temp	water outlet temperature temp	universal use temp
T11	T12	T13	T14	
Electronic expansion valve 1	Electronic expansion valve 2	Compressor1 current	Compressor2 current	

1.7. press key to lock itself

Press key “▲” and “▼” together for 5 seconds will lock button and the operation panel’s keyboard, display locked, all the key will be ineffective. And press key “▲” and “▼” together for 5 seconds again will unlock.

1.8. manual auxiliary electric heating

Press key electric heating to start or stop auxiliary electric heating

1.9. manually supply water

Press key supply water to start or stop auxiliary supplying water

Wiring Diagram