8690 User Guide

Main Function and Technique Index

The controller is the special controller for engineering heat pump water heater, it contains 4 temperature sensors (water temperature, exhaust temperature, defrost temperature, heat collector temperature), 4 controlling output (circulation pump, compressor, fan, four-way valve), 1 alarm signal input (used for high and low pressure protection).Main functions:

1 Temp display and control: display tank temp and electrical heating temperature, and the temperature inside the tank is controlled at the set temperature. when environment temp is too low, low pump heating temp.

2 Automatic defrost control: optimize the design of the defrost control logic, and can effectively defrost at low temperatures to ensure evaporator can also work.

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

4 Circulation pump: Control circulation pump according to D-value temperature between heat collector and tank.

5 External alarm: one external switch valve alarm signal input, it can be set to 3 modes: always open, always closed or forbidden, and you can set the times and time of the auto recovery.

6 Overload protection : Input one way current signal, can set overload current value and overload action time.

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 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 .

Main Technique Index:

Range of Temperature Display: -50～150°C

Range of Temperature Set: 0~100 °C, the range can be set

Range of current display: 0~45A

Range of current set: 0~20A

Power Supply: 220V±10%

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

Output Load Capability: Compressor 10A/250VAC, Others 2A/250VAC

Temperature Sensor Type: NTC R25=5kΩ,B(25/50) =3470K

Executive standard: Q/320585 XYK 01

Operating Guide

1 Display

The controller usually displays the temperature in water tank, press “▲”display exhaust temperature, press “▼”display defrost temperature. press the key “▲” and “▼”at the same time to display heat collector temp.

2 On/Off

Press “⏻” to turn on and off the controller, “ON” displays “HEAT’，“STANDBY”, “RETAIN HEAT” or “DEFROST”. The controller will always display current time ,water temperature and water level in spite of on or off.

3 Set water temperature

Press key “S”, and then enter the state of temperature set, flickeringly display setting temperature, 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 key “s” again to exit setting state.

Controller begins to heat when it checks that water temperature is lower than setting temperature -D-value temperature, and stops heating when water temp is higher setting temp.

4 Set time

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

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.

6 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.

7Advanced operation

Long press “S” for 5 seconds or “ UP DOWN UP DOWN UP UP DOWN” to enter the state of value setting, at this time, LCD shows “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 the state of parameter code. Internal parameter code is showing below:

Sort	Code	Parameter name	Range	Factory setting	Unit	Remark
	F11	Setting temperature	-	55	°C	
	F12	D-value temp	1-20	5	°C	
	F13	Max setting temperatur	31-100	60	°C	Controller will obey the

Temperature		e				rule:F14<F13 by force
	F14	Min setting temperature	0-30	10	°C	
	F19	Water temp sensor adjustment	-20-20	0	°C	Adjust the water temperature measurement error
Compressor	F21	Compressor delay time	0-10	3	minute	
Defrosting	F31	Defrost start temperature	-20-20	-3	°C	
	F32	Defrost end temperature	0-50	10	°C	
	F33	Defrost start time	1-999	30	minute	
	F34	Max defrost time	0-99	5	minute	off: no defrost
	F37	Setting the direction of valve	0-1	0	-	0: close when heating, open when defrost 1: open when heating, close when defrost
Defrost protection	F41	Defrost protection starting temp	0-99	3	°C	
	F42	Defrost protection ending temp	0-99	10	°C	

Alarm	F50	external alarm mode	0-2	0	-	0：no external alarm 1: always open, alarm when closed 2: always closed, alarm when open
	F51	The self recovery times of external alarm	0-10	3	times	on the notice
	F52	The resetting time of the self recovery time(external alarm)	0-999	60	minute	
	F55	Overload alarm current	0-20	0	A	
	F56	Overload action time	1-60	3	second	
	F57	Exhaust temperature protection mode	0-2	2	-	0: no protection 1: high temp protection, fan without control 2: high temp protection, fan is controlled
	F58	Exhaust protection temp	50-125	110	℃	
	F59	Exhaust protection temp D-value	1-25	10	℃	
	F90	Display motherboard model number				

X Testing	F91	Display motherboard version number	
	F92	Display panel type	
	F93	Display panel version number	
	F94	Display present working current unit:A	
	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	

Notice:

“F51the self recovery times of outside alarm” means the times that when outside alarm signal goes back to normal, the times of system goes back to normal working state. When it goes beyond the times, the system can’t go on working although outside alarm signal goes back to normal, and the system will come to breakdown state. At this time, the system locks itself and needs turning off manually to recover.

“F52 the resetting time of the self recovery time(outside alarm)” means when the time that outside alarm signal remains in the normal state reaches the parameter setting time, the system will recount the self recovery times if it breaks down next time.

e.g. F51=1, F52=60, it means the system can recover automatically when it breaks

downs for the first time within 60 minutes, and it locks itself and needs recovering manually when it breaks down for the second time within 60 minutes.

8 Alarm

The controller enters the alarm state when the abnormal state below happens:

Alarm name	LCD display	Alarm code	Action	Recovery	Explanation
Outside alarm	Alarm	A11	Stop heating	automatic or manual,（can be set by F51,F52）	Manual recovery: first turn off controller then turns on controller
Water temp sensor alarm	Alarm	A21	Stop heating	automatic	
Defrost temp sensor alarm	Alarm	A22	-	automatic	
Exhaust temp sensor alarm	Alarm	A23	-	automatic	Exhaust protect mode（F57）0: means no alarm
Heat collector temp sensor alarm	Alarm	A24	Water pump stop working	automatic	When temperature switch protection (F71)is set 0, it means no alarm
Communication error with evaporator panel	Drop			automatic	Temp display "---"
Exhaust temp is too high	High temp	A33	Stop heating	Auto recover when exhaust temp drops	
Overload alarm	Alarm	A35	Stop heating	automatic	

Notice:

1、When temperature sensor is alarm, it shows "OPE", which means temperature sensor is open, and "SHr" means temperature sensor is short. Pressing "▲" or "▼" can observe every temp sensor's temperature.

2、Alarm code and the temperature will show alternately when in the alarm state.

3、Automatic recovery means when the alarm disappears, the controller will exit the alarm state automatically.

4、Manual recovery means when the alarm disappears, the controller is still in the alarm state, user needs to first turn off controller, and then turn on controller.

Basic Operating Principle

1、Temperature control

Controlling temperature can be set according to “setting temperature” and “D-value temperature”. Default setting temperature is 55°C and D-value temperature is 5°C. It begins to heat when the water temperature is lower than 50°C and it stops heating when the water temperature is higher than 55°C. Thus temperature can be controlled between 50℃and 55℃.

2、Compressor delay time:

The controller contains a “compressor halt calculagraph” , and it begins to time when compressor stops, the program first check the calculagraph before booting the compressor next time, the program will immediately boot the compressor if the calculagraph reach 3 minutes ,if the calculagraph doesn’t reach 3 minutes, it will boot again when the calculagraph reaches 3 minutes. In addition, the controller doesn’t boot the compressor within 3 minutes after turning on the power supply.

notice: compressor delay time is adjustable(F21)

3、Auto Defrosting：

The controller will supervise the evaporator temperature when heating, decide whether need to defrost according to the time of the evaporator in the continuous low temperature state. when the temperature is lower than “defrost start temperature”, first start defrosting, and start heating after defrosting. In other words, the defrosting calculagraph begins to time when the evaporator temperature is lower than “defrost start time” , and turns on the defrosting when the value of time reaches “defrost start time”. The calculagraph will be cleared if the evaporator temperature is higher than “defrost start temperature”, and it begins to time again when the evaporator temperature is lower than “defrost start temperature” next time. In other words, the value of defrosting calculagraph shows the continuous low temperature time of the evaporator.

The controller can check the defrosting effect with the temperature of evaporator, if the temperature of evaporator goes up to the “defrost end temperature”, the controller will turn off the function of defrosting. If the defrosting time is above “max defrost time”, the controller will turn off defrosting forcibly.

Start circulation pump and electric heating when defrost, and circulation pump starts earlier than compressor and ends later than compressor.

4、Circulation pump controlling

When tank temp is lower than 70°C: if heat collector temp is 10°C higher than tank temp, circulation pump works. If heat collector temp is 2°C higher than tank temp, circulation pump stops working. If tank temp is higher than 70 °C, circulation pump stops working. Circulation pump will not be influenced by economical mode.

5、Running in different periods of time

The controller contains real time clock, and can time accurately. In “ECON MODE”, the controller will ensure that whether need to heat according to water temperature, otherwise the current time is in or not in the setting period of time, if it is not in the setting period of time, then the controller will not heat whether the water temperature is high or low.

5、Overload protection

Check compressor's working current by a current transformer, controller judge whether current value is over setting value(F55), if overload is over setting value for setting time(F56), controller will stop to protect machine set.

6、External alarm

The external alarm is a switching value signal, and usually connected to the high and low voltage protection switch, it can be set to forbidden, always open or always closed (F50). "Always open"means that external alarm signal is in the open state, and it generates alarm when closed. "Always closed"is on the contrary, "forbidden"means external alarm signal.

The system will stop when the external alarm occurs, and start to run when the external alarm becomes normal. But if the external alarm occurs 2 times in one hour, the system will be locked in the alarm state, and it will resume by turning off the controller manually. The times and time can be set, please refer to F51 and F52 for details.

7、**Exhaust temperature protection**

The controller detects the exhaust temperature is higher than the setting, it will enter the alarm state and stop heating. The temperature can be set(parameter F58 and F59), and the temperature can be set : fan no control(F57=1), fan control(F57=2)

For example, F58=100℃，F59=5℃

fan no control(F57=1)：Exhaust temperature is higher than 105℃ ，controller enters alarm state and stop heating. Exhaust temperature is lower than 95℃, controller exit alarm state.

fan control(F57=2)：Exhaust temperature is higher than 100℃ , controller first stops fan, Exhaust temperature is higher than 105℃ , controller enters alarm state and stop heating. Exhaust temperature is lower than 95℃ , controller exit alarm state.

If F57=0，no exhaust temperature protection or exhaust temperature sensor trouble alarm

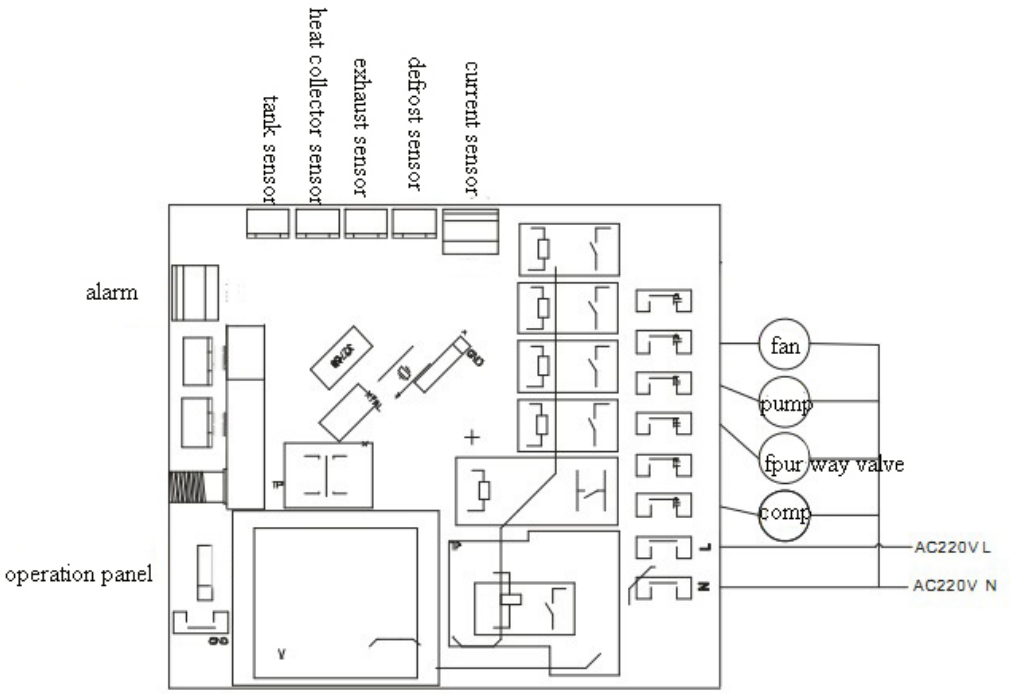
8 Frost protection

If heat collector temp is lower than F41, circulation pump works. Until heat collector temp is higher than F42, circulation pump stops working.

9、Quick add fluorin

Long press key "mode" for 5 seconds, and controller enter quick add fluorin mode.

Wiring Diagram



Notice:

1、Please set the parameter of "F37"correctly, it needs to be consistent with the heat pump valve system, or the system can not run normally.

2、The real time clock depends on the internal super capacitance when power is off, and can only ensure that the time will be correct within 72 hours. If the power is off and over 3 days, you must revise the clock again.

3、The water temperature sensor, the evaporator temperature, the exhaust temperature must be fixed at the correct position.

4、When fixing the outdoor machine panel, please make sure that the END can be connected to the ground reliably.

5、The manual operation controller needs to be installed the indoor, preventing sunshine directly.