NA8634 Heat Pump Water Heater Controller Operation Instruction (v5.1)

➢ Main Function and Technique Index

The controller is the special controller for heat pump water heater, it contains three temperature sensors (water temperature, outdoor temperature, exhaust temperature,), one alarm signal input (used for high and low pressure protection).

Main function as below:

- 1. **Temperature Display and Controlling:** It can display water tank temperature and outdoor machine temperature, and it can also control the temperature of water in water tank at the set temperature.
- 2. **Auto Defrosting Controlling**: It has defrosting controlling logic of heat pump optimization design, and can defrost effectively in order to ensure that the outdoor machine can run normally even at low temperature.
- 3. **Exhaust temperature protection:** When the exhaust temperature is too high, the controller turns off the unit and generates alarm signal, and it can control the outdoor fan according to the exhaust temperature.
- 4. **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.
- 5. **Running in different period of time:** The controller has two modes: "Auto" and "Econ", in "Econ" mode, the controller can set 3 periods of time, it can only heat in these periods of time.
- 6. **Others**: Real Time Clock, On-off State Memory When the power is off (adjustable), Direction of cross valve can be set, Compressor start delay protection, Sensor Error Alarm, High Temperature Alarm, Add Fluorin, Test and so on.

Main Technique Index:

- **Range of Temperature Display:** -50~150°C
- ∂ Range of Temperature Set: 0~100°C
- ▶ Power Supply: 220V±10% AC
- ⓑ **Operation Environment:** Temperature -10° C ~ 50 °C, humidity ≤85%.
- Dutput Load Capability: Compressor 10A/250VAC, Others 2A/250VAC
- **Temperature Sensor Type:** NTC R25=5k Ω ,B(25/50)=3470K
- **Executive standard:** Q/320585 XYK 01 (NA8634-HTDX)

Operating Guide

I Display

The controller usually displays the water temperature in water tank. Press the key " \checkmark ", it will display the exhaust temperature. Press the key " \checkmark ", it will display the temperature of outdoor machine.

$\amalg \ \textbf{On-off}$

Press" ③" to turn on and off the controller. It can display "Heat", "heat preservation" or "defrost" in on state. The controller will always display current time and water temperature in spite of on or off.

III Water Temperature Set

Press the key "S", and then enter the state of temperature set, the LCD shows "upper limit temperature". use the key " \checkmark " or " \checkmark " to change the setting value (The key " \checkmark " adds 1°C, the key " \checkmark " minuses 1°C, press and hold them over 0.5 seconds can add or minus rapidly). Press the key of "S" again and then set the lower limit temperature in the same way, in the end, you can press the key of "S" again to exit the setting state.

The controller begins to heat when it detect that the water temperature is below "lower limit temperature", and stop heating when the water temperature is higher than "upper limit temperature", thus the water temperature can be controlled between "lower limit temperature" and "upper limit temperature".

The adjustable range for lower/upper limit temperature can be set, refer to advanced set (F13 and F14).

IV Time Set

Press the key " \oplus ", the hour part of the time display is flashing. Then press the key " \checkmark " or " \checkmark " to

adjust the hour. Press the key " $^{\oplus}$ " again after adjusting, then you can adjust the minute in the same way, finally you can press the key " $^{\oplus}$ " to exit the state of time setting.

V Run Mode Set

Press the key "M" to select the "Auto Mode" and "Econ Mode". In "Auto Mode", the controller controls the heat pump to heat according to the setting temperature. In "Econ Mode", the controller can only heat in the 3 start periods of time.

$\ensuremath{\mathrm{VI}}$ Time of economical mode Set

Press the key " \oplus " and hold it for 2 seconds, the controller can enter the state of heat period of time setting, you can set 3 heat periods of time in turn according to the display of LCD. (The key " \oplus " switches setting items, the key " \bigstar " or" \checkmark " changes its value)

The controller can be set 3 heat periods of time at most, if you don't need some 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.

VII Advanced Set

Press the key "S" 5 seconds or "up-down-up-down-up-up-down", enter the state of parameter setting, the LCD show "Fxx" ,the number "xx" means parameter code. Use "▲" or "▼" to select the parameter code, after select one parameter code press the key "S" show the value of it, use" ▲ " or "▼" to set the parameter, then press the key "S" to return to the state of showing parameter code after finishing setting. Internal parameter code is showing below:

Sort	Code	Parameter Name	Range	Facto ry Settin g	Unit	Remark		
Temperature Control	F11	upper limit temperature	F12-F13	55	°C			
	F12	lower limit temperature	F14-F11	50	°C	F14 <f12<f11<f13, once<="" td=""></f12<f11<f13,>		
	F13	upper setting temperature	0 - 100	60	°C	please check the parameter whether according this rule		
	F14	Lower setting temperature	0 - 100	10	°C			
	F19	Water sensor revise	-20 - 20	0	°C			
Compressor	F21	Compressor delay time	0 - 10	3	min			
	F31	Defrost start temperature	-20 - 20	-2	°C			
	F32	Defrost end temperature	0-50	10	°C			
	F33	Defrost start time	1 – 999	30	min			
Defrosting	F34	Max defrost time	off 1 – 99	5	min	Off: no defrost		
	F37	Defrost cross valve	0 – 1	0	-	0: closed when heating, open when defrosting 1: open when heating, closed when defrosting		
Alarm	F50	external Alarm	0-2	0	-	0: no alarm 1:always close, alarm when close 2:aways open, alarm when open		
	F51	External alarm auto resume times	0-10	3	times	Refer to: annotations		
	F52	Reset time of external alarm auto resume times	0 – 999	60	min			
	F57	exhaust temperature protect mode	0-2	2	_	0: no protect 1:high protect, fan out of control 2:high protect, fan control		
	F58	exhaust protect temperature	50-125	110	°C			
	F59	exhaust protect temperature return difference	0.1 – 20	10	°C			

System Set	F61	whether memorize the on-off state after power off	Yes / No	Yes	-	Yes: memorize No: not memorize	
	F63	Background light delay	Off 1-99 on	30	S	Off: light always close 1-99: light delay close On: light always open	
Test	F90	Showing model and software version	Show panel and main-board model and software version				
	F97	Test input signal	Test input alarm signal				
	F98	Add fluorin	The controller shows "AdF" after entering this function, turn on compressor and fan, turn on cross valve(When F62=0)or shut off cross valve(When F62=1). Press any key to exit or exit automatically after 20 minutes.				
	F99	Check	The controller shows "CCC" after entering this function and attracts all relay in turn, used as outdoor machine panel, please don't use it when the controller is running! Press any key to exit or exit automatically after 30 seconds.				
	End	Exit					

*Annotation:

"F51 External alarm auto resume times" : It means the times of system becoming normal automatically when external alarm signal becomes normal, if it is above the times, the system can not run even if the external alarm signal becomes normal and it is in the error state, and only can resume by turning off the controller manually.

"F52 Reset time of external alarm auto resume times" : If only the time of external alarm signal being normal reaches the set time, the controller will count the auto resume times again when the error occurs next time.

For example, F51=1, F52=60, then within 60 minutes, the external alarm signal can resume automatically when the error occurs for the first time, when it occurs for the second time, the system is locked, and it can be resume manually.

VII Alarm

Abnormal status	Alarm indication	Alarm Code	Action	Resume way	Explanation
External alarm	Error	A11	Stop heating	Auto or Manual, it can be set (F51, F52)	Manual resume way: turn off the controller then turn on
Water temp sensor error	Error	A21	Stop heating	Auto	
Outdoor sensor error	Error	A22	-	Auto	
Exhaust sensor error	Error	A23	-	Auto	Exhaust temp protect mode (F57), 0: no alarm
Interrupt with the outdoor panel	Offline		Stop heating	Auto	Temp display""
Exhaust temp too high	ust temp High high temperature		Stop heating	Resume automatically after the exhaust temp fell	

Explanation:

1. When the sensor is error, "OPE" means open, and "SHr" means short. You can press the key "▲" "▼" to view the temperature of each sensor.

2. "Alarm Code" It displays alternately with temperature.

3. "Auto Resume" The controller exits the alarm state when the abnormal state disappears.

4. "Manual Resume" When the abnormal state disappears, the controller is still in the alarm state, it can only resume by turning off the controller first then turning on.

* Basic Operating Principle

G. <u>Temperature controlling</u>

Controlling temperature can set according to "Upper limit" and "Lower limit". If "Upper limit" is 55° C, "Lower limit" is 50° 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° C and 55° C.

G. <u>Compressor Delay Time</u>

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. The compressor can be protected. (*Annotation: the time of boot delay protection can be adjusted, it sets to 3 minutes above.)

GSAuto Defrosting

The controller first detects the temperature of outdoor machine when it begins to heat. If it is lower than "defrost start temperature", the controller will first turn on defrosting, then turn on heating after defrosting ends. In addition, the controller will supervise the temperature of outdoor machine when heating normally, and decide whether need to defrost according to the time of the outdoor machine in the continuous low temperature state. In other words, the defrosting calculagraph begins to time when the outdoor machine temperature is lower than "defrost start temperature", and turns on the defrosting when the value of time reaches "defrost start temperature" when timing, and it begins to time again when the outdoor machine 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 outdoor machine.

The controller will turn on the compressor and turn off the fan after defrosting, the state of cross valve rests with "F62" (on when F62=0, and off when F62=1), the heat pump is used for defrosting. The controller can check the defrosting effect with the temperature of outdoor machine, if the temperature of outdoor machine 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 and touch off the defrosting failure alarm, so the system will enter the alarm state.

The process above can only run in heating state, in other words, the controller will not turn on defrosting in non-heating state.

G. <u>Running in different period of time</u>

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.

G♪<u>External alarm</u>

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 on 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.

Outer alarm signal do not check within 3 minutes after compressor work normally or defrost stopping.

GS <u>Exhaust temperature protection</u>

When the exhaust temperature too high, occur alarm, stop heating. The alarm temperature can set (F58 and F59), and the external fan can be set out of controlled (F57=1) and controlled (F57=2). For example: $F58=100^{\circ}C$, $F59=5^{\circ}C$:

When the exhaust temperature is too high, the controller enters the alarm state and stops heating. The alarm temperature can set (F58 and F59), and the external fan can be set out of controlled (F57=1) and controlled (F57=2).For example: F58=100°C(temperature), F59=5°C(temperature difference) :

external fan out of controlled (F57=1): exhaust temperature >105°C, occurs alarm, stop heating

exhaust temperature < 95°C, renew

external fan controlled (F57=2): exhaust temperature >100°C, stop external fan

exhaust temperature >105°C, occurs alarm, stop heating exhaust temperature < 95°C, renew

F57=0, no external temperature protection function, no external temperature sensor alarm.



Wiring Diagram:

\bigcirc Notice:

- 1. Please set the parameter of "F37" correctly, it must be consistent with the heat pump system, or the system can't 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. Water sensor, outdoor machine sensor, exhaust sensor must install at the right position.
- 4. When fixing the outdoor machine panel, please make sure that the GND of the outdoor machine panel can be connected to the ground reliably.
- 5. Please install the operate panels indoors and avoid sunlight.