ZL-R100A Air Source Heater Pump Controller Instruction

1. Main Function

- Automatic defrost
- Temperature measurement
- Temperature display
- Temperature calibration
- Compressor delay protection
- Buzzing when system warning
- Exhaust temperature protection
- Different time period to run
- Sensor problem warning
- External warning input

2. Main Specification

Temperature Sensor	NTC
Setting Range	0~90℃(can be limited)
Display Range	-40~130℃
Working Temperature	0~50℃
Storage Temperature	-10~60℃
Humidity	20~85%RH (without dewing)
Power Supply	185~245VAC 50HZ
Load Current	15A/250Vac (compressor)
	5A /250Vac (resistive load)
Case	ABS Fire Proof
Protection Degree	IP52

3. Operation Instruction

3.1 Display Instruction
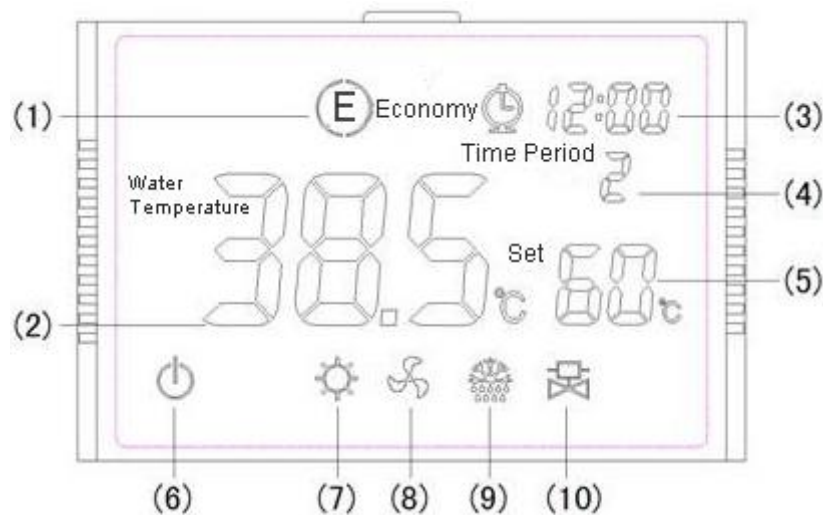
(1) Working Mode

(2) Measurement Temperature

(3) Clock

(4) Working Time Periods

(5) Set Temperature

⑹ Off Symbol

⑺ Heat Symbol, blinking compressor delay protection

⑻ Outdoor Fan Symbol

⑼ Defrost Symbol

⑽ Four-way Valve Symbol

3.2 LCD Display Code Instructions

NO.	Code	Instruction
1	E11	External warning input
2	E21	Water temperature sensor failure
3	E22	Exhaust temperature sensor failure
4	E23	Outdoor sensor failure
5	E33	Exhaust temperature is overheated
6	EEE	EEPROM data access error
7	AdF	Fluoride
8	UnL	Restore the default password "11"
9	--:--	Need to re- set the clock or clock failure

3.3 Button Operation

Power ⏻ Clock 🕒 Mode Ⓜ Set Ⓢ ▲Up ▼Down

The main function of every button as below:

Power: On/Off

Clock: Use to change the system clock and set the time periods programming

Mode: Use to select the working mode

Set: Use to change the set temperature and the set parameter values

Up: Use to check the measurement data and adjust the set parameter

Down: Use to check the measurement data and adjust the set parameter

3.4 On/Off

In the normal display state, press POWER key to switch the controller be ON or OFF. In the ON state, the controller normally controls the water temperature; In the OFF state, the OFF SYMBOL will light, the controller stops controlling the water temperature. It will normally show the time and temperature whenever it is ON/OFF.

3.5 Water Temperature Set

Press SET button once to enter into the temperature setting state. The LCD blinks show the set temperature, use the UP/Down button to adjust the temperature value (Depress it continuously，it will adjust quickly.) After the adjusting, press SET button to confirm the set temperature currently.

3.6 Clock Set

Press the CLOCK button, the hour part of the CLOCK will blink, press UP/DOWN to adjust the hour value. Press CLOCK button when finish adjusting. Use the same way to adjust the minute value, then press CLOCK button again to exit the time period programming state.

3.7 Economy Mode Working Period Set

● In the ON state, depress CLOCK button for 3 seconds to enter into the heating period setting state. You can set 3 heating periods according to the LCD indication. (Press CLOCK button to

switch the set program, UP/DOWN to change the value) You can set maximum 3 heating periods. If do not need so many periods, you can set others to be "00:00".

● After finish setting the time period, press SET button for 3 seconds to exit the set parameter state and return to the temperature measurement stat. This time the set will be saved. If do not press any button within 20 seconds, the system will exit the parameter setting state and this time the set is invalid, the controller will work with the working periods before.

● If the finishing time of one period is earlier than the starting time, it will regard the finishing time as the next day. For example:

"23:00" to "01:30", the working periods will be 23:00pm to the next day's 01:30am.

3.8 System Parameter Set

3.8.1 System parameter set

Use the password to enter into the system parameter setting state, the factory password is "11". Depress the SET button for 3 seconds, the LCD shows "POO". Press UP/DOWN to input the password, then press SET button to confirm. If the password is error, the buzzer will beep 3 times then return to the temperature measurement state. If the password is right, the buzzer will beep one time and enter into the parameter setting state. The LCD shows "F12". Press UP/Down button to select the parameter code, then press SET button, it will show the setting parameter value. Press UP/DOWN button again to set the parameter, then press SET button, it will return to the parameter code showing state after finish the setting.

3.8.2 System parameter set mode exiting

After finish setting, depress SET button for 3 seconds, the system will exit the parameter setting state then return to the temperature measurement state. This time the setting will be saved. If you do not press any button within 20 seconds, the system will exit the parameter setting state. This time the parameter setting is invalid, the controller will work with the parameter before.

Working parameter code and set instruction as below:

NO	Code	Function	Range	Instruction	Factory Value
1	F12	Temperature hysteresis	1～10℃		5
2	F13	Maximum temperature set range	30～90℃		60
3	F14	Minimum temperature set range	0～29℃		10
4	F19	Water TEMP sensor correction	-20～20℃		0
5	F21	Compressor power on delay time	1～10min		3
6	F22	Compressor power off delay time	0～10min		0
7	F31	Defrost start temperature	-20～20℃		-3
8	F32	Defrost stop temperature	0～50℃		10
9	F33	Defrost start time	0～180min		30
10	F34	Maximum defrost time	0～30min		8
11	F37	Defrost four-way valve mode	0～1	0：Heat off、defrost on 1：Heat on、defrost off	0
12	F50	External warning mode	0～2	0：Disable 1：Warning on Waning closed 2：Warning closed Warning disconnect	0

13	F51	External warning auto recovery times	1～10times		3
14	F52	Reset time of F51	0～180min		30
15	F57	Exhaust TEMP protection mode	0～2	0：Disable 1：High TEMP protection, Fan uncontrolled 2：High TEMP protection, Fan controlled.	0
16	F58	Exhaust protection temperature	50～125℃		110
17	F59	Exhaust protection temperature hysteresis	1～20℃		10
18	F61	Auto restart function	0～1	0：Disable	1
19	F70	Buzzer warning function	0～1	0：Disable 1：On	1
20	F98	Fluoride			
21	P01	Password	0-99		11

4. Control Function Instruction

4.1 Temperature Control

Temperature control is according to the set temperature and Temperature hysteresis, the factory set temperature is 50℃, temperature hysteresis is 5℃. When the water temperature is lower than 45℃, it will start heating. When the water temperature is higher than 50℃, it will stop heating. The temperature will be controlled from 45℃ to 50℃.

4.2 Compressor delay protection

Compressor power on delay protection: Here is one "Compressor stop timer" in the controller. When the compressor stops, it starts counting. Before the next power on, it will check the timer first, if reaches 3 minutes it will start the compressor immediately. If does not reach 3 minutes, it will wait for reaching 3 minutes then start. Within 3 minutes when the controller power on, it will not start the compressor. (Note: The compressor power on delay protection time can be adjusted, parameter F21, the above is assumed set to be 3 minutes.)

The principle of compressor stop delay protection is the same.

4.3 Auto Defrost

● The controller will detect the temperature of outdoor machine when start heating, if lower than "Defrost starting temperature", it will start defrosting. After finish defrosting, it will start heating. During the normal heating, it will continuously monitor the temperature of the outside machine, then judge if need to defrost according to the time of the outdoor machine low temperature state. When the outdoor machine temperature is lower than "Defrost starting temperature", the defrost timer will start to count, when the count value reaches "Defrost starting time", it will start defrosting. During the timer counting, if the outdoor machine temperature is higher than "Defrost starting temperature", then it will clear the timer and restart to count till the outdoor temperature is lower than "Defrost starting temperature". It is to say, the count value of the defrost timer reflects the time of the outdoor machine continuously low temperature.

● After starting the defrost, the controller will check the defrost result through the outdoor machine. If the outdoor machine temperature up to "Defrost stopping temperature", it will stop defrosting. If

the defrost time is too long, longer than "Maximum defrost time", the controller will emergency stop defrosting.

● All the above will run when heating, it will not start defrosting if the controller is not in the heating state.

4.4 Economy Mode Time Period Operation

Real time clock is in the controller, it is capable of accurate timing. In the ECONOMY mode, except according to water temperature to confirm whether need to heat, it is also according to the currently time whether within the set running time. If not in the set running time period, it will not start heating whatever the water temperature is.

4.5 External Warning

● External warning is signal of external switch, generally used to connect the high and low pressure protection switch. It can set be normally open, normally closed or disabled (parameter F50).

●"Normally open" means generally the external warning signal is disconnected, if closed it will do external warning.

●"Normally closed" means does not use the external warning signal. When external warning happens, the system will stop working. After the external warning return to normal, it will auto return to the normal working state. But if continuously do 3 times external warning within 30 minutes, the system will lock the warning state. It will need you to take off the controller then return to normal.

● The times and time can be set, please refer to parameter F51 and F52. (The above is regarding F51=3, F52=30)

● External warning signal will not detect after the compressor normally work within 3 minutes, or it is in the defrost state.

4.6 Exhaust temperature protection

When the controller detects the temperature is overheat, it will enter into the warning state and stop heating. This temperature value can be set (parameter F58 and F59). Also, exhaust temperature protection can set be outdoor fan uncontrolled mode (F57=1) or outdoor fan controller mode (F57=2). If F58=100℃，F59=5℃（hysteresis）， then:

Outdoor fan uncontrolled mode (F57=1):

Exhaust temperature higher than 105℃, it will enter into the warning state and stop heating;

Exhaust temperature lower than 95℃, it will recovery.

Outdoor fan controlled mode (F57=2):

Exhaust temperature higher than 100℃, outdoor fan closed;

Exhaust temperature higher than 105℃, it will enter into the warning state and stop heating;

Exhaust temperature lower than 95℃, it will recovery.

If F57=0, no exhaust temperature protection function, exhaust temperature overheat warning will not happens.

4.7 Refrigerant Charging and Recovery

Enter into parameter setting and select "F98" press SET button. The LCD will show "AdF" then enter into refrigerant charging and recovery operation;

In the refrigerant charging and recovery mode, external warning and exhaust temperature protection function will be invalid.

4.8 Default Password Recovery

Depress UP and DOWN buttons at the same time for 5 seconds, the LCD shows "UnL", the controller will recover the default password "11" after 5 seconds.

5. Electric Wiring Diagram
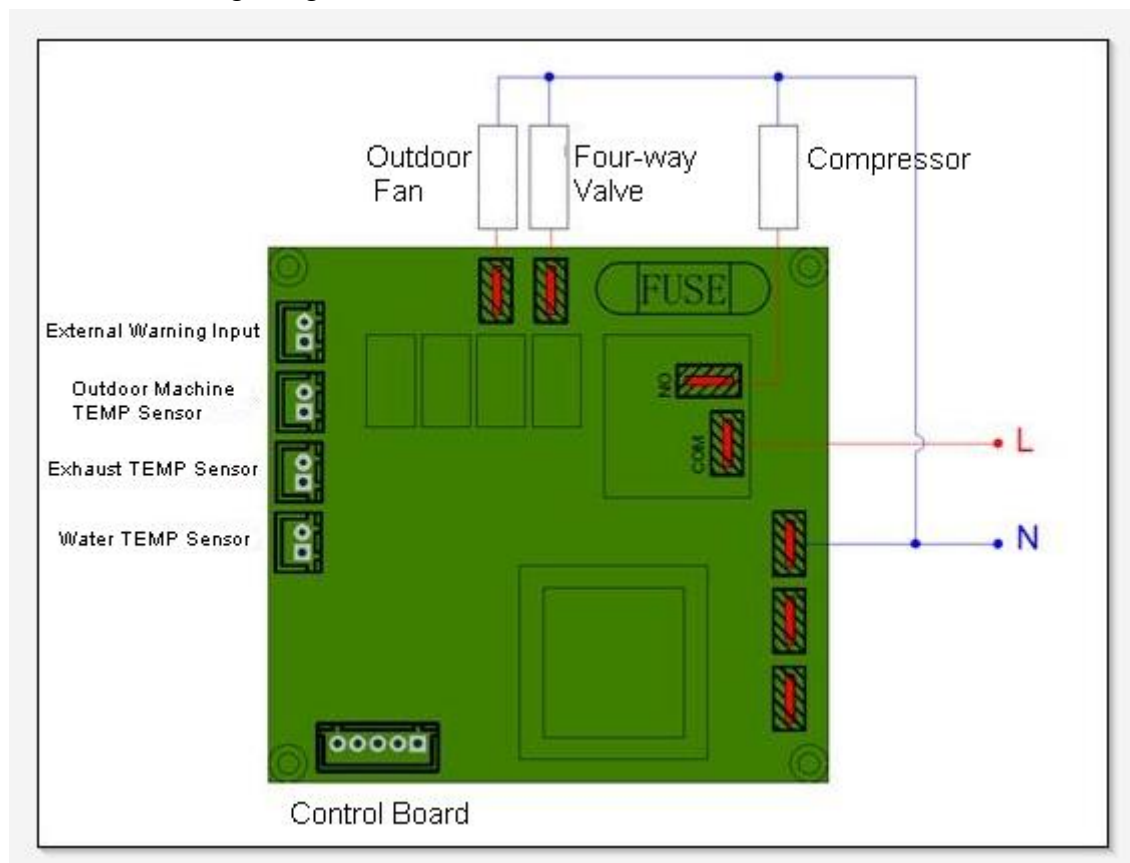
Please note:

● Please set the parameter "F37" correctly, it needs to be the same with the direction of controlled four-way valve. Or the system will not work normally.

● The real clock in the controller supply power depends on the inside super capacitor when power off, only make sure the clock accurate within 72 hours. If power off more than 3 days, the clock will need to be readjusted.

● Water temperature sensor, outdoor machine sensor and exhaust sensor need to be installed on the right place.

● Be sure the outside board ground terminal and the outside ground terminal reliable connection.

● Do not pull the main board and the display when power on, it will lead to clock error.

● Please install the operation board in the room, and avoid direct sunshine.