ZL-220A Electronic Thermostat Instruction Manual

1. Features

ZL-220A is an electronic thermostat for cooling. The device is ideally fitted to refrigeration equipment for cold storage.

2. Main Function

- Temperature measurement
- Temperature display
- Temperature calibration
- Compressor delay protection
- Blustering when system warning
- Sensor problem warning
- Defrost control: Periodical defrosting, temperature and time combined criteria, dropping water, and manual forced defrosting

3. Main Specification

- Temperature Sensor: NTC
- Setting Range: -40 ~ 120℃
- Display Range: -50 ~ 130℃
- Working Temperature: -10 ~ 45℃
- Storage Temperature: -30 ~ 70℃
- Humidity: 5 ~ 85%RH (without dewing)
- Power Supply: 185 ~ 245VAC 50/60HZ
- Terminal Wire: <= 2 * 1.5mm^2 or 1 * 2.5mm^2
- Load Current: 3A 250Vac（Resistive load）
- Protection Degree: IP30

4. Operation Instruction

4.1 Display Indication

4.1.1 Panel LED Indication

LED	On	Off	Blinking
MAX TEMP	Set max temperature	Set max temperature (to be set)	
MIN TEMP	Set min temperature	Set min temperature (to be set)	
COOL	Compressor on	Compressor off	Delay protecting now

DEFROST	Defrosting now	Dropping water ends	Dropping water now

4.1.2 Panel Digit Indication

Three red digits display the measured temperature and warning code.

Warning Code:

No.	Display Code	Warning Information
1	E1	Room sensor open circuit
2	-E1	Room sensor short circuit
3	E2	Defrosting sensor open circuit
4	-E2	Defrosting sensor short circuit
5	Hi	Room temperature exceeds the MAX TEMP
6	Lo	Room temperature exceeds the MIN TEMP
7	EE	Data access error
8	Err	Password error or max/min temperature set invalid
9	dEF	Defrosting now
10	Frd	Forced cooling
11	UnL	Restore the default password ”11”

4.2 Keypad Operation

4.2.1 Set Max and Min Temperature

● Press【SET】, MAX TEMP LED will be on, and the digits will show the current max temperature. Press key【▲】or【▼】to change the max temperature setting. Press【SET】again, we can set the min temperature limit. Keeping depressing 【SET】 for 3 seconds, or do not press any key for 30 seconds, the device will leave the temperature testing mode.

● The factory setting: max temperature is -15℃, min temperature is -18℃.

● The MAX TEMP must be higher than the MIN TEMP 1℃, otherwise could not be saved.

Note: Only after the【SET】being depressed for three seconds, will the set data be confirmed and saved.

4.2.2 Set System Parameters

Enter Into System Parameter Setting Mode

Keep depressing 【SET】 for three seconds, digits show “POO”. Input password + 【SET】. If correct, enter into the mode, else return.

After enter into the mode, the display shows “U01”. Press【▲】or【▼】to select the parameter code. Press【SET】 will show the parameter value. Then press 【▲】 or 【▼】 to set this parameters, and press【SET】 to return. The factory setting: password is “11”.

4.2.3 Exit the Mode

Keep depressing “SET” for three seconds, the set parameters will be saved, the mode exits.

Or do not press any key for 30 seconds, the mode exits, and the set parameters are not saved.

4.2.4 Parameter Code and Description Table:

No.	Parameter code	Function	Range	Explain	Factory setting
1	U10	Compressor power on delay time	1 ~ 100min		3
2	U11	Compressor MIN continuous work time	0 ~ 100min		3
3	U12	Compressor run frequency	0 ~ 8	0: Disable	5
4	U20	Room temperature sensor calibration	-9.9 ~ +9.9		0
5	U21	Defrosting sensor calibration	-9.9~+9.9		0
6	U30	Defrosting cycle	0~180 hour	0: Not defrost	12

7	U31	Defrosting（end）time	1 ~ 180min		30
8	U32	Defrosting end temperature	0.5 ~ 50℃		15
9	U33	Dropping water time	0 ~ 180min		5
10	U34	Over temperature warning delay time after defrost ends	0~180 hour	0: Disable	2
11	U35	Defrost when the device starts	0~1	0: Disable 1:Enable	0
12	U36	Defrost delay time when the device start	0 ~ 180min	0: Disable	0
13	U50	High-temperature warning deviation value to Max Temp	0~60℃	0: Disable	0
14	U51	Low-temperature warning deviation value to Min Temp	0~60℃	0: Disable	0
15	U52	Over-temperature warning delay time	1 ~ 180min		30
16	U53	First over-temperature warning delay time after power supply	0~180 hour	0: Disable	2
17	U62	Buzzer warning	0~1	0:Warning off 1:Warning on	
18	U99	Password	0~99		11

5. Control Function Description

5.1 Compressor Control

● When the temperature ≧“MAX TEMP”, and the time that the compressor has stopped ≧“the valve of U10”, the compressor starts.

● When the temperature ≦“MIN TEMP”, and the time that the compressor has run ≧“the valve of U11”, the compressor stops.

● Compressor emergent on

Press and hold “▼”key for five seconds, the compressor will power on if the following meets:

◆controller in non-defrosting status ◆controller in non-dropping water status ◆the compressor stops

In compressor emergent on status, press and hold “▼”key for five seconds, the mode exits.

5.2 Compressor Delay Protection

● After power supply, the compressor is able to start only after the time (U10) has passed.

● After the compressor stops, it is able to restart again only after the time (U10) has passed.

● After the compressor starts, it is able to stop only after the time (U11) has passed.

5.3 Temperature Sensor Failure Protection: Protected Running Mode

●When the room temperature sensor fails, the system will automatically run in the protected running mode. In this mode, the compressor will run and stop with the period of 30 minutes. Compressor works for U12* 3 minutes, stop for ｛30 - (U12* 3)｝minutes.

Note: If U12=0, system stops when sensor fails

5.4 Defrosting Function

5.4.1 Automatic Defrosting

When the compressor continuously running time reaches the time of defrost cycle (U30), the system starts to defrost. When one of the conditions (defrosting end time (U31) and defrosting end

temperature (U32)) meets, the defrosting stops.

5.4.2 Manual Forced Defrosting

● When in non-defrosting stage, press and hole【▲】for 7 seconds, the system starts forced defrosting. When in defrosting stage, press and hole 【▲】 for 7 seconds, the defrosting stops.

5.4.3 Dropping Water Function

System can be set" Dropping water time (U33)". After defrosting, within "Dropping water time", system will not start cooling.

This function will not work when:

◆manual forced defrosting ◆during defrosting, while defrosting sensor fails

5.4.4 Check Defrosting Data

● Check defrosting sensor temperature: When the digit show the room temperature, depress【▲】, the digits will show defrost sensor's temperature. Do not keep depressing for 7 seconds; else the device will launch forced defrosting.

● Check the left time of defrosting or dropping: During automatic defrosting or dropping process, depress 【▼】, the digits show the left time.

5.5 High-temperature and Low-temperature warning

● When the test temperature ≥ "MAX TEMP"+ "U50", and the time reaches to "U52 or U53",high temperature warning starts.

● When the test temperature ≦ "MIN TEMP"+ "U51", and the time reaches to "U52 or U53",low temperature warning starts.

6. Temperature Calibration Function

When there is tolerance between the measured temperature and real temperature, set parameter U20 and u21 to calibrate. The calibration range is ±9.9℃. When set the parameter, the step is 0.1℃ for every key press. Keep pressing, the set data will increase/decrease quickly.

7. Restore the default password

When password forgotten, the following way can restore it:

Press and hold "▲"and "▼"key, turn on the power supply, the device displays "UnL", after three seconds, buzzer sounds, system auto restores the default password"11".

8. Controller Installation

8.1 Warning

Avoid installing the device in the following environment:

● Relative humidity is greater than 90%, or possibly dewing.

● Strong vibration.

● Possibility be dropped, or within fog.

● Exposed to eroding and polluting gases (such as: air containing sulfur and ammonia, salty fog, smoky mist) to prevent erosion and oxidation.

● Under strong electrical and magnetic fields such as under a powerful antenna, or near a huge power motor.

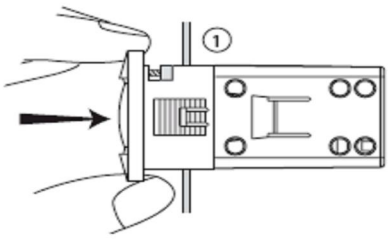
● Ambient temperature changes greatly or quickly, such as before the door of a cold room.

● Ambient containing explosive or inflammable materials/gases.

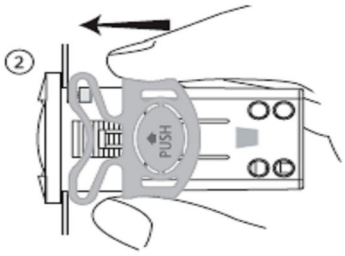
● Exposure to dusty air (possibility be oxidized to form corrosive patina, and reduce the insulating performance)

8.2 Installation Procedure

Insert the controller into hole (step one)



Slide the bracket to fix the device (step two)



9. Electrical Connection

Warning

● Electrical wiring must be manipulated by certified electrician.

● Wrong power supply may damage the device and system seriously.

● Try with effort to layout the sensors and switches line apart from inductive load lines and power supply lines. The sensors and switches lines are not allowed go with the power supply lines and inductive load lines in a same pipeline, and are not allowed to pass near the contactor, breaker and the similar.

● Reduce the length of sensors' wiring as possible, avoid forming a spiral line near the power device. Sensors' line must be shielded cables (per sectional area more than 0.5mm2).

● Avoid direct contact with the internal electronic components.

● **After finish and check the electrical wiring layout, before connect them to the device, please follow this instruction:** Pay attention the "electrical wiring diagram" below, wrong connection possibly damage the device and the system, and may be dangerous to the user. All security and protecting device for the equipments are necessary. They are very important to protect the equipments, and the user's safety.

Electrical wiring diagram: