

# ZL-7860A Constant Humidity and Constant Temperature Controller

Version 1.0b

## 1 Feature

ZL-7860A is able to control both temperature and humidity to fixed settings.

For temperature control, it either can control a compressor, or a heater plus a cooler with dual outputs for temperature and humidity each.

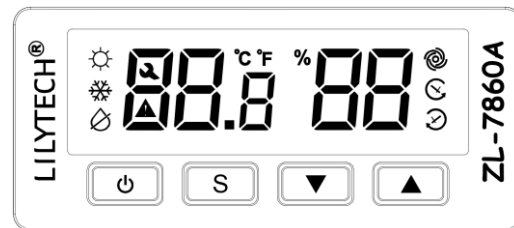
Rich information display, IP65 level front panel protection, convenient operation and easy installation.

## 2 Specification

<b>Sensor ZL-SHr05J:</b>	0-80%RH;	<b>Sensor ZL-SHr05P:</b>	0-99%RH
<b>Power supply:</b>	100 ~ 240Vac, 50/60Hz		
<b>Input:</b>	One humidity and temperature sensor, provided wire length 2 meters		
<b>Sensor precision:</b>	Humidity $\pm 5\%$ , temperature $\pm 1\%$ @ 25°C		
<b>Setting range:</b>	Humidity 0 ~ 99%RH, temperature 0 ~ 65°C		
<b>Output:</b>	Temp. Outputs (R1, R3) $\leq 5A$ , Fan Output (R2) $\leq 1A$ , Humidify Output (R4) $\leq 5A$ , De-humidify Output (R5) $\leq 1A$		
<b>Working environment:</b>	-10 ~ 45°C; $\leq 90\%$ RH without dew		
<b>Case dimension:</b>	L78 x W34.5 x D71 (mm)	<b>Drilling size:</b>	L 71 x W29 (mm)
<b>Case materials:</b>	PC + ABS, fireproof	<b>Protection level:</b>	IP65 (Front panel only)

## 3 Function

- Heat/cool fixed temperature control
- Humidify/de-humidify fixed humidity control
- Compressor delay protection
- Temperature and humidity calibration
- Temperature and humidity limits alarm
- Alarm when sensor fails
- Restore control when power supply returns



## 4 Display

Icon	Function	On	Blink	Icon	Function	On	Blink
	Cool	Cooling	Delay protecting		Failure		Sensor fails
	Heat	Heating	Delay protecting		Warn		High temperature
	Humidify	Humidifying			Warn		Low temperature
	De-humidify	De-humidifying			Warn		High humidity
	Fan	Fan on			Warn		Low humidity
	Defrost		Timer defrosting		Hint	Restoring	
	Warn	----	Warning		Failure	----	Failure

## 5 Setting

### 5.1 Turn on/off

Keep [Power] depressed for 3 second to switch the controller on and off. When offline, display "OFF".

### 5.2 Temperature and humidity setting

Press [S] to enter into temperature and humidity setting status.

Press [S] again to select between temperature or humidity setting, the selected will blink.

Press [▲] or [▼] to set the value (keeping depressed makes fast set).

Keep [S] depressed for 3 second to **Save**, and exit the setting status.

Note: The status will exit if no key operation for 15 seconds, and the settings **will not be saved**.

The temperature setting range 0 ~ 65°C (factory setting is 20.0°C).

The humidity setting range 0 ~ 99%RH (factory setting is 50%RH).

### 5.3 Parameter setting

Keep [S] depressed for 3 seconds to enter into parameter setting status.

Press [S] or [⏏] to select the parameter code.

Press [▲] or [▼] to set the value of the code (keeping depressed makes fast set).

Keep [S] depressed for 3 second to **Save**, and exit the setting status.

Note: The status will exit if no key operation for 30 seconds, and the setting **will not be saved**.

### 5.4 Parameter code

Code	Function	Range	Remark	Factory set
t0	Temperature control mode	0 ~ 2	0: constant, 1: cool, 2: heat	0
t1	Heat method	0 ~ 1	0: compressor, 1: heater	0
t2	Temperature hysteresis	0.1 ~ 20°C		0.2
t3	Temperature calibration	-9.9 ~ 9.9°C		0.0
t4	Compressor delay protection	0 ~ 30 min		3
t5	High temperature warning point	0.0 ~ 65.0°C, OFF	If temp. ≥ t5, warning If t5 = OFF, disable high warning	OFF
t6	Low temp. warning point	0.0 ~ 65.0°C, OFF	If temp. ≤ t6, warning If t6 = OFF, disable low warning	OFF
t7	Defrost period <sup>(1)</sup>	0 ~ 600 min	0: disable defrost	30
t8	Defrost time	0 ~ 60 min		4
h0	Humidity Control mode	0 ~ 2	0: constant, 1: humidify, 2: de-humidify	0
h1	Humidify hysteresis	1 ~ 20%RH		5
h2	Humidify calibration	-20 ~ +20%RH		0
h3	High humidity warning point	0 ~ 100%, OFF	If humidity ≥ h3, warning If h3 = OFF, disable high warning	OFF
h4	Low humidity warning point	0 ~ 100%, OFF	If humidity ≤ h4, warning If H4 = OFF, disable low warning	OFF
u1	Buzzer warning	ON/OFF	ON: enable, OFF: disable	OFF

<sup>(1)</sup> The continuous energized time of compressor during heating by compressor.

## 6 Control

### 6.1 Temperature control

#### 6.1.1 Cooling control 【t0】 = 1

Output R1 is always de-energized.

If Room temp. ≥ 【Set temp.】 + 【t2】, and Temp. Output (R3) has stopped for 【t4】, R3 energized.

If Room temp. ≤ 【Set temp.】, R3 de-energized.

#### 6.1.2 Heating control 【t0】 = 2

##### 6.1.2.1 Heating by compressor 【t1】 = 0

Output R1 is always energized.

If Room temp. ≤ 【Set temp.】 - 【t2】, and compressor (R3) has stopped for 【t4】, R3 energized.

If Room temp. ≥ 【Set temp.】, compressor de-energized.

Note: After compressor energized, the fan (R2) will be on 10 seconds later.

After compressor de-energized, the fan will be off 5 seconds later.

### 6.1.2.2 Heating by heater **【t1】 = 1**

If **Room temp.**  $\leq$  **【Set temp.】 - 【t2】** , heater (**R1**) energized.

If **Room temp.**  $\geq$  **【Set temp.】** , heater de-energized.

### 6.1.3 Fixed temperature control **【t0】 =0**

#### 6.1.3.1 Heating by compressor **【t1】 = 0**

If **Room temp.**  $\geq$  **【Set temp.】 + 【t2】** , and **compressor (R3)** has stopped for **【t4】** , **R3** energized.

If **Room temp.**  $\leq$  **【Set temp.】** , **compressor** de-energized.

If **Room temp.**  $\leq$  **【Set temp.】 - 【t2】** , and **compressor (R3)** has stopped for **【t4】** , **R3** energized.

If **Room temp.**  $\geq$  **【Set temp.】** , **compressor** de-energized.

Note: After **compressor** energized, the fan (R2) will be on 10 seconds later.

After **compressor** de-energized, the fan will be off 5 seconds later.

**Four way valve (R1)** will be on for heating, off for cooling. When cooling heating switching, the **compressor** will be energized after **four way valve** has been switched for 15 seconds.

#### 6.1.3.2 Heating by heater **【t1】 = 1**

If **Room temp.**  $\geq$  **【Set temp.】 + 【t2】** , and **cool output (R3)** has stopped for **【t4】** , **R3** energized.

If **Room temp.**  $\leq$  **【Set temp.】** , **cool output** de-energized.

If **Room temp.**  $\leq$  **【Set temp.】 - 【t2】** , and **heater (R1)** energized.

If **Room temp.**  $\geq$  **【Set temp.】** , **heater** de-energized.

Note: After **cool output** energized, the fan (R2) will be on 10 seconds later.

After **cool output** de-energized, the fan will be off 5 seconds later.

If cooling by compressor, **t4** normally set to 3 (minutes), else 0 (minute).

### 6.1.4 Defrost

When heating by compressor, and if the outdoor evaporator has ice, it needs defrost.

#### 6.1.4.1 Timer defrost

When the compressor has been heating for **【t7】** continuously, start defrost.

Defrost will last for **【t8】** .

#### 6.1.4.2 Forced defrost

Keep **【▲】** and **【▼】** depressed simultaneously for 3 second, start defrost immediately for **【t8】** .

#### 6.1.4.3 Procedure of defrost

Compressor (R3) de-energized.

After 30 seconds, four way valve (R1) de-energized.

After 30 seconds, compressor energized to heat the outdoor evaporator for **【t8】** ,

Compressor de-energized.

After 30 seconds, four way valve energized.

After 30 seconds, compressor can heat the room again.

Note: During up process, the fan (F2) is de-energized.

### 6.1.5 Over limit warning

If **Room temp.**  $\geq$  **【t5】** , and **【t5】 > 【Set temp.】** , warning:

“tHi” and room temperature displays alternatively, buzzing at the same time.

If **Room temp.**  $\leq$  **【t6】** , and **【t6】 < 【Set temp.】** , warning:

“tLo” and room temperature displays alternatively, buzzing at the same time.

## 6.2 Humidity control

### 6.2.1 Fixed humidify control **【h0】 = 0**

When **Room humidity**  $\leq$  **【Set humidity】 - 【h1】** , **Humidity Output (R4)** energized.

When **Room humidity**  $\geq$  **【Set humidity】** , **Humidity Output (R4)** de-energized.

When **Room humidity**  $\geq$  **【Set humidity】** + **【h1】** , **De-humidity Output (R5)** energized.

When **Room humidity**  $\leq$  **【Set humidity】** , **De-humidity Output (R5)** de-energized.

### 6.2.2 Humidify control **【h0】** = 1

When **Room humidity**  $\leq$  **【Set humidity】** - **【h1】** , **Humidity Output (R4)** energized.

When **Room humidity**  $\geq$  **【Set humidity】** , **Humidity Output (R4)** de-energized.

### 6.2.3 De-humidify control **【h0】** = 2

When **Room humidity**  $\geq$  **【Set humidity】** + **【h1】** , **De-humidity Output (R5)** energized.

When **Room humidity**  $\leq$  **【Set humidity】** , **De-humidity Output (R5)** de-energized.

### 6.2.4 Over limit warning

If **Room humidity**  $\geq$  **【h3】** , and **【h3】**  $>$  **【Set humidity】** , warning:

“HH” and room humidity displays alternatively, buzzing at the same time.

If **Room humidity**  $\leq$  **【h4】** , and **【h4】**  $<$  **【Set humidity】** , warning:

“HL” and room humidity displays alternatively, buzzing at the same time.

## 6.3 Sensor calibration

The **Room temp.** can be calibrated. If **Room temp.** is 0.2°C lower than real temp., set **【t3】** = 0.2.

The **Room humi.** can be calibrated. If **Room humi.** is 2%RH higher than real value, set **【h3】** = -2.

## 6.4 Sensor failure

When the sensor temperature function fails, outputs R1, R2 and R3 will be de-energized, blinking display “Et”, warning buzzing.

When the sensor humidity function fails, outputs R4 and R5 will be de-energized, blinking display “Eh”, warning buzzing.

## 6.5 Buzzing warning

If parameter **【u1】** = ON, buzzing warning is enable, else disable.

When the buzzing warning is triggered, the buzzing can be stopped by pressing any key.

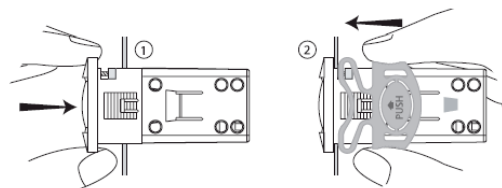
## 6.6 Restore to factory default settings

Keep and depressed simultaneously for 3 seconds, “UnL” displays.

Then press twice, all parameters will restore to **Factory set** values.

## 7 Installation

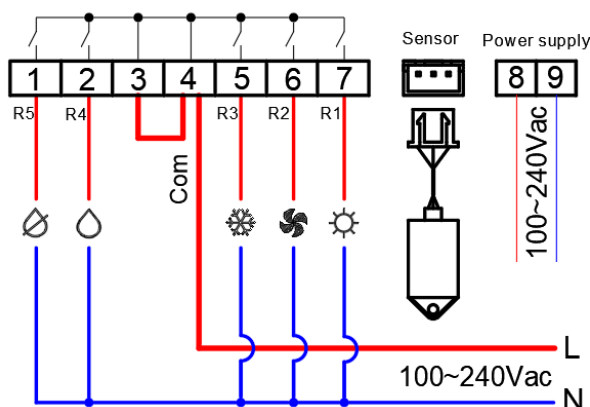
1. Insert the controller into hole  
(step one)
2. Slide the bracket to fix the device (step two)



## 8 Wiring Diagram

### Heating by heater

R1: heat 5A / 250Vac      R4: humidify 5A / 250Vac  
R2: fan 1A / 250Vac      R5: de-humidify 1A / 250Vac  
R3: cool 5A / 250Vac



### Heating by compressor

R1: valve 5A / 250Vac      R4: humidify 5A / 250Vac  
R2: fan 1A / 250Vac      R5: de-humidify 1A / 250Vac  
R3: compressor 5A / 250Vac

