

ZL-7860A

ZL-7860A Intelligent Constant Temperature Humidity Controller User Manual

Version 1.0b

1. INTRODUCTION AND FEATURES

The ZL-7860A is an intelligent constant temperature and humidity controller designed for precise environmental management. It is capable of controlling both temperature and humidity to fixed settings, making it suitable for various applications.

This controller offers a range of powerful functions, including:

- Heat and cool fixed temperature control.
- Humidify and dehumidify fixed humidity control.
- Compressor delay protection.
- Temperature and humidity calibration.
- Temperature and humidity limits alarm function.
- Alarm notification upon sensor failure.
- Restore control when power supply resumes.

The device features a rich information display, IP65 level front panel protection, convenient operation, and easy installation.

2. SPECIFICATIONS

Parameter	Detail
Power Supply	100~240V AC, 50/60Hz
Input	One humidity and temperature sensor, provided wire length 2 meters
Sensor Precision	Humidity $\pm 5\%$, Temperature $\pm 1\%$ @ 25°C
Setting Range	Humidity 0~99%RH, Temperature 0~65°C
Output	Temp. Outputs (R1, R3) $\leq 5A$, Fan Output (R2) $\leq 1A$, Humidify Output (R4) $\leq 5A$, De-humidify Output (R5) $\leq 1A$

Parameter	Detail
Working Environment	-10~45°C; ≤ 90% RH without dew
Case Dimensions	L78 x W34.5 x D71 (mm)
Drilling Size	L71 x W29 (mm)
Case Materials	PC + ABS, fireproof
Protection Level	IP65 (Front panel only)
Sensor Options	ZL-SHr05J (0-80%RH) or ZL-SHr05P (0-99%RH)

Sensor Options

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 Buzzer warning

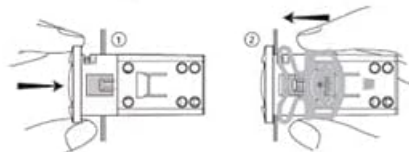
If parameter **【u1】** = ON, buzzing warning is enable, else disable.
 When the buzzing warning is triggered, the buzzing can be stopped by pressing any key.

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

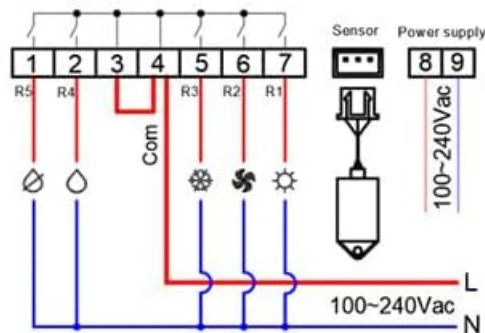
1. Insert the controller into hole (step one)
2. Slide the bracket to fix the device (step two)



8 Wiring Diagram

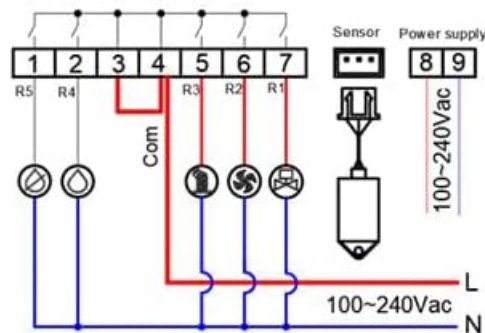
Heating by heater

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



Heating by compressor

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



This image illustrates the two available sensor options: the ZL-SHr05J, which measures humidity from 0-80%RH, and the ZL-SHr05P, which measures humidity from 0-99%RH. Each sensor's range and basic wiring (VCC, GND, SDA) are shown.

3. DISPLAY AND ICONS

The controller features a clear digital display with various icons to indicate its current status and functions. Below is a table explaining each icon:

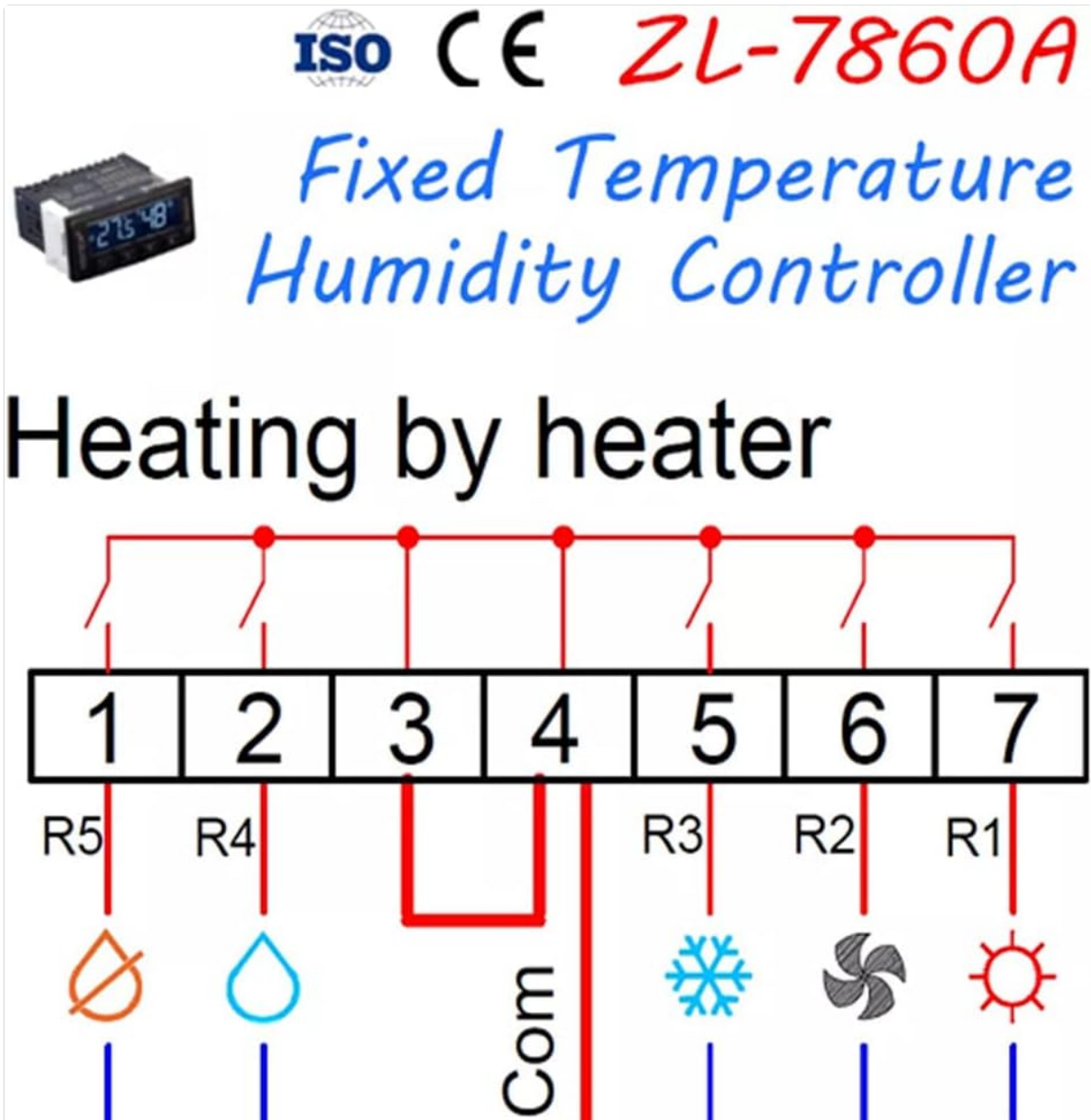
Icon	Function	On	Blink	Icon	Function	On	Blink
*	Cool	Cooling	Delay protecting	E_S	Failure	Sensor fails	

Icon	Function	On	Blink	Icon	Function	On	Blink
★	Heat	Heating	Delay protecting	tHi	Warn	High temperature	
☂	Humidify	Humidifying		tLo	Warn	Low temperature	
☂	De-humidify	De-humidifying		HH	Warn	High humidity	
☺	Fan	Fan on		HL	Warn	Low humidity	
❄	Defrost		Timer defrosting	UnL	Hint	Restoring	
⚠	Warn	---	Warning		Failure	---	Failure

4. INSTALLATION

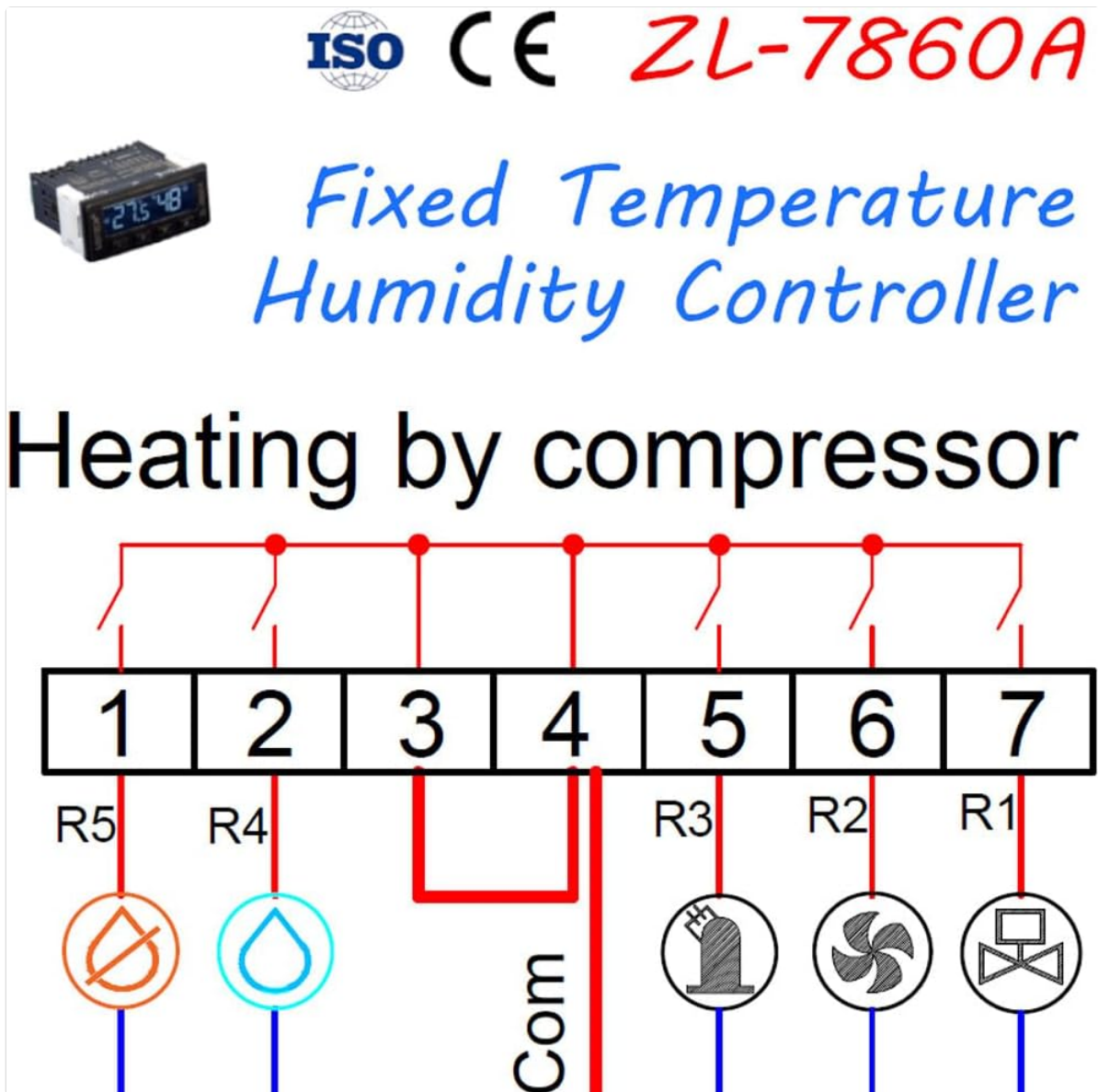
Follow these steps to properly install the ZL-7860A controller:

1. **Insert the controller into the hole:** Carefully slide the controller into the designated opening in your panel or enclosure.



This image depicts the initial step of installation, where the ZL-7860A controller is being inserted into a pre-cut opening in a panel.

2. **Slide the bracket to fix the device:** Once the controller is in place, slide the provided mounting brackets onto the sides of the controller from the rear, securing it firmly against the panel.



This image illustrates the second installation step, showing how to slide the mounting brackets into place to secure the controller within the panel opening.

5. OPERATION

5.1 Turn On/Off

Keep the [▼] depressed for 3 seconds to switch the controller on and off. When offline, the display will show "OFF".

5.2 Temperature and Humidity Setting Status

- Press [S] to enter into temperature and humidity setting status.
- Press [S] again to select between temperature or humidity setting; the selected item will blink.
- Press [▲] or [▼] to set the value (keeping depressed makes fast set).
- Keep [S] depressed for 3 seconds 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 is 0 ~ 65°C (factory setting is 20.0°C).

The humidity setting range is 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 seconds 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 Codes

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 (1)	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	Humidity 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

(1) The continuous energized time of compressor during heating by compressor.

5.5 Control Logic

5.5.1 Temperature Control (t0)

5.5.1.1 Cooling control (t0 = 1)

- Output R1 is always energized.
- If Room temp. \geq {Set temp.} + {t2}, and Temp. Output (R3) has stopped for {t4}, R3 energized.
- If Room temp. \leq {Set temp.}, R3 de-energized.

5.5.1.2 Heating control (t0 = 2)

5.5.1.2.1 Heating by compressor (t1 = 0)

- Output R1 is always 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.

5.5.1.2.2 Heating by heater (t1 = 1)

- If Room temp. \leq {Set temp.} - {t2}, heater (R1) energized.
- If Room temp. \geq {Set temp.}, heater de-energized.

5.5.1.3 Fixed temperature control (t0 = 0)

5.5.1.3.1 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.

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.

5.5.1.3.2 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).

5.5.2 Defrost

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

5.5.2.1 Timer defrost

When the compressor has been heating for {t7} continuously, start defrost. Defrost will last for {t8}.

5.5.2.2 Forced defrost

Keep [▲] and [▼] depressed simultaneously for 3 seconds, start defrost immediately for {t8}.

5.5.2.3 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.

5.5.3 Over limit warning

If Room temp. $\geq \{t5\}$, and $\{t5\} > \{\text{Set temp.}\}$, warning: "Hi" and room temperature displays alternatively, buzzing at the same time.

If Room temp. $\leq \{t6\}$, and $\{t6\} < \{\text{Set temp.}\}$, warning: "Lo" and room temperature displays alternatively, buzzing at the same time.

5.6 Humidity Control (h0)

5.6.1 Fixed humidity control (h0 = 0)

- When Room humidity $\leq \{\text{Set humidity}\} - \{h1\}$, Humidity Output (R4) energized.
- When Room humidity $\geq \{\text{Set humidity}\}$, Humidity Output (R4) de-energized.
- When Room humidity $\geq \{\text{Set humidity}\} + \{h1\}$, De-humidity Output (R5) energized.
- When Room humidity $\leq \{\text{Set humidity}\}$, De-humidity Output (R5) de-energized.

5.6.2 Humidify control (h0 = 1)

- When Room humidity $\leq \{\text{Set humidity}\} - \{h1\}$, Humidity Output (R4) energized.
- When Room humidity $\geq \{\text{Set humidity}\}$, Humidity Output (R4) de-energized.

5.6.3 De-humidify control (h0 = 2)

- When Room humidity $\geq \{\text{Set humidity}\} + \{h1\}$, De-humidity Output (R5) energized.
- When Room humidity $\leq \{\text{Set humidity}\}$, De-humidity Output (R5) de-energized.

5.6.4 Over limit warning

If Room humidity $\geq \{h3\}$, and $\{h3\} > \{\text{Set humidity}\}$, warning: "HH" and room humidity displays alternatively, buzzing at the same time.

If Room humidity $\leq \{h4\}$, and $\{h4\} < \{\text{Set humidity}\}$, warning: "HL" and room humidity displays alternatively, buzzing at the same time.

6. WIRING DIAGRAM

Proper wiring is crucial for the safe and correct operation of the ZL-7860A controller. Refer to the diagrams below for connections based on your heating method.

6.1 Heating by Heater

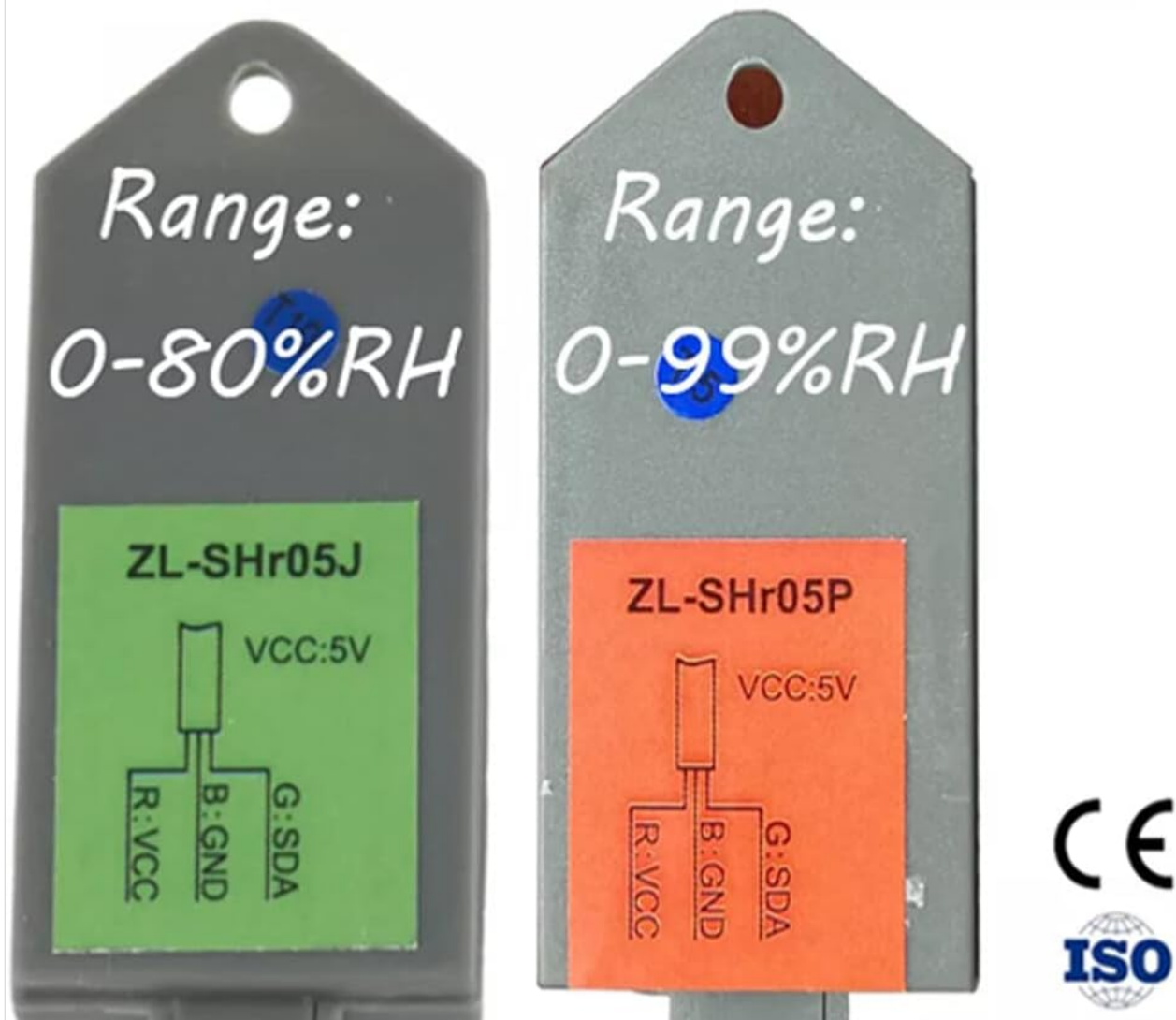
ZL-7860A



This diagram illustrates the wiring connections for the ZL-7860A controller when a heater is used for temperature control. It shows connections for R5 (de-humidify), R4 (humidify), Common, R3 (cool), R2 (fan), R1 (heater), and power supply (100-240VAC).

6.2 Heating by Compressor

Sensor Option:



This diagram shows the wiring connections for the ZL-7860A controller when a compressor is used for temperature control. It details connections for R5 (de-humidify), R4 (humidify), Common, R3 (compressor), R2 (fan), R1 (four-way valve), and power supply (100-240VAC).

General Wiring Notes:

- Always ensure power is disconnected before performing any wiring.
- Connect the power supply (100-240V AC) to terminals 8 and 9.
- Connect the temperature/humidity sensor to the designated sensor terminals.
- Ensure all connections are secure and properly insulated.

7. MAINTENANCE AND TROUBLESHOOTING

7.1 Sensor Calibration

The room temperature 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 {h2} = -2.

7.2 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.

7.3 Buzzing Warning

If parameter {u1} = ON, buzzing warning is enabled, else disabled. When the buzzing warning is triggered, the buzzing can be stopped by pressing any key.

7.4 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**.