

ZL-7863A Temperature and Humidity Controller

V2.0b

Feature

ZL-7863A has 2 timer outputs for illumination, ventilation, air inlet or exhaustion.

Timer 1's on/off period could have different temperature and humidity, to **simulate day and night**.

It could be applied to control **climate for green house, reptile**, and so on.

Heat hump (compressor) can save energy. **Beside simple heating R6/cooling R7 outputs control**, the controller provides optional heat pump control. Cooling only by compressor, driving by R6 only. Constant temperature control by compressor, driving by R6, R7 and R2.

Function

Heating, cooling, or constant temperature control

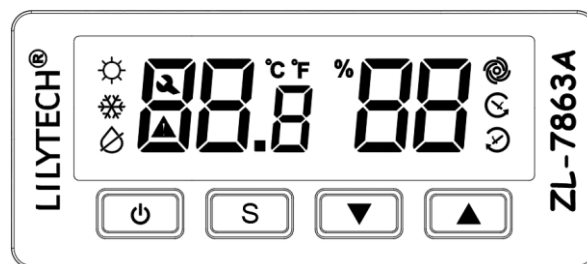
Humidifying, de-humidifying, or constant wet level control

Two timer outputs

Over temperature or wet level warning

Restart after power supply comes back

Compressor delay protection (if heating or/and cooling by compressor)



Specification

Power supply: 100 ~ 240Vac, 50/60Hz.

Output: 3A@250Vac, for all 7 outputs.

To drive bigger loads, use intermediate relay 10A~ 40A, SSR-XXAA, or magnetic contactor.

Input: One humidity sensor, provided cable length 2 meters.

One temperature sensor, R10K@ °C25/B3470@25/50 °C, cable length 2 meters.

Humidity sensor: If humidity lower than 80%RH, select ZL-SHr05J.

If humidity higher than 80%RH, select ZL-SHr05P.

Setting range: Humidity 0 ~ 99%RH, temperature 0 ~ 65 °C.

Sensor precision: Humidity ±2%(ZL-SHr05P), ±3%(ZL-SHr05J), temperature ±1% @ 25 °C.

Control resolution: Humidity 1%RH, temperature 0.1 °C.

Working environment: -10 ~ 45 °C; ≤ 90%RH without dew.










Case dimension: L78 x W34.5 x D71 (mm).

Drilling size: L 71 x W29 (mm).

Case materials: PC + ABS, fireproof.

Protection level: IP65 (Front panel only).

Display


| Icon | Function | On | Blink | Icon | Function | On | Blink |
|---|-------------|----------------|------------------|---|----------|-----------|------------------|
|  | Cool | Cooling | Delay protecting | E_S | Failure | | Sensor fails |
|  | Heat | Heating | Delay protecting | tHi | Warn | | High temperature |
|  | Humidify | Humidifying | | tLo | Warn | | Low temperature |
|  | De-humidify | De-humidifying | | HH | Warn | | High humidity |
|  | Fan | Fan running | | HL | Warn | | Low humidity |
|  | Timer 1 | | R5 energized | UnL | Hint | Restoring | |
|  | Timer 2 | | R1 energized |  | Failure | ---- | Failure |
|  | Warn | ---- | Warning | | | | |

Note: During defrosting,  and  blinks together.

Key Operation

On/offline set

Keep  depressed for 3 seconds to switch between online and offline.

Attention: click  will show the current time for 3 seconds.

Fast Set Temperature (L4 or L6) and Set Humidity (L5 or L7) of current moment

Press **[S]** to enter into fast setting status. The current setpoints will display.


Press **[S]** again to switch between set temperature and humidity setting. The selected will blink.


Press **^** or **v** to set the blinking value (keeping depressed could set fast).

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


The setting status will exit **without saving the settings** if there is no key operation for 15 seconds.



Note:



During the de-energized moment of timer1 output R5,  does not display, the up operation sets the setpoints (L4 and L5) for “night”.

During the energized moment of timer1 output R5,  blinks, the up operation sets the setpoints (L6 and L7) for “day”.

Parameter Setting

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

Press  or  to select the parameter code.

Press  or  to set the value of the code (keeping depressed could set fast).

Keep  depressed for 3 seconds to **save the setting**, and exit the setting status.


The setting status will exit **without saving the setting** if there is no key operation for 30 seconds.


Parameter Table

| Code | Function | Range | Remark | Factory Set |
|------|--|-------------------|---|-------------|
| t0 | Temperature control mode | 0 ~ 2 | 0: constant temperature, 1: cooling, 2: heating | 0 |
| t1 | Heating mode | 0 ~ 1 | 0: heat by compressor, 1: heat by heater | 0 |
| t2 | Temperature hysteresis | 0.1 ~ 20.0℃ | | 2.0 |
| t3 | Temperature calibration | -9.9 ~ 9.9℃ | | 0.0 |
| t4 | Delay protection time for compressor | 0 ~ 30 min | | 3 |
| t5 | High temperature warning | 0 ~ 65.0℃, OFF | When temperature ≥ t5, warning If set t5 = OFF, disable warning | OFF |
| t6 | Low temperature warning | 0 ~ 65.0℃, OFF | When temperature ≤ t6, warning If set t6 = OFF, disable warning | OFF |
| t7 | Timer defrost period ⁽¹⁾ | 0 ~ 600 min | If set t7 = 0, disable defrost function | 30 |
| t8 | Defrost time | 0 ~ 60 min | | 4 |
| h0 | Humidity control mode | 0 ~ 2 | 0: constant humidity, 1: humidify, 2: de-humidify | 0 |
| h1 | Humidity hysteresis | 1 ~ 20% | | 5 |
| h2 | Humidity calibration | -20 ~ +20% | | 0 |
| h3 | High humidity warning | 0 ~ 99%, OFF | When humidity ≥ h3, warning If set h3 = OFF, disable warning | OFF |
| h4 | Low humidity warning | 0 ~ 99%, OFF | When humidity ≤ h4, warning If set h4 = OFF, disable warning | OFF |
| L0 | Time 1, 24 hours real time clock. | 0 ~ 23 hour | Clock stops when without power supply. The clock is saved every 15 minutes. | 12 |
| L1 | | 0 ~ 59 min | | 0 |
| L2 | Timer 1 output R5 energized from | 0 ~ 23 hour | Day, with sunshine (lamp is on) | 8 |
| L3 | | 0 ~ 59 min | | 0 |
| L4 | Timer 1 output R5 de-energized from | 0 ~ 23 hour | Night, lamp is off | 17 |
| L5 | | 0 ~ 59 min | | 0 |
| L6 | Temperature setpoint for night | 0 ~ 65℃ | Temperature setpoint during Timer 1 output R5 deenergized | 18 |
| L7 | Humidity setpoint for night | 0 ~ 99%RH | Humidity setpoint during Timer 1 output R5 de-energized | 55 |
| L8 | Temperature setpoint for day | 0 ~ 65℃ | Temperature setpoint during Timer 1 output R5 energized | 30 |
| L9 | Humidity setpoint for day | 0 ~ 99%RH | Humidity setpoint during Timer 1 output R5 energized | 35 |
| F0 | Timer 2 will delay to F0:F1 moment to run after turned online. | 0 ~ 23 hour | If F0:F1 is earlier than L0:L1, the timer will start to run from the F0:F1 moment of the 2 nd day. | 12 |
| F1 | | 0 ~ 59 min | | 0 |
| F2 | Time unit for timer 2 period | 0 ~ 2 | 0: second, 1: minute, 2: hour | 1 |
| F3 | Timer 2 output R1 de-energized time | 0 ~ 900 | | 120 |
| F4 | Time unit for timer 2 output R1 energized time | 0 ~ 2 | 0: second, 1: minute, 2: hour | 0 |
| F5 | Timer 2 output R1 energized time | 0 ~ 900 | | 30 |

Note for ⁽¹⁾: the time (period t7) is the time for compressor continuously working time without any stop.

Control Function
1 Temperature Control

When timer 1 output R5 de-energized,  is not shown, setpoint will be the setpoint of night (L6).

When timer 1 output R5 energized,  blinks, setpoint will be the setpoint of day (L8).

1.1 Cooling control (t0 = 1, R7 de-energized)

If **Room temperature** ≥ setpoint (L6 or L8) + t2, and R6 has stopped for t4, R6 energized.

If **Room temperature** ≤ setpoint (L6 or L8), R6 de-energized.

Note: if cool by compressor, t4 should be 3 minutes. Else t4 could be 0.

Note: R2 (fan) will be energized 10 seconds after R6 is energized, de-energized 5 seconds after R6 is de-energized.

1.2 Heating control (t0 = 2)

1.2.1 Heating by heater

If **Room temperature** \leq setpoint(L6 or L8) - t2, heater R7 energized.

If **Room temperature** \geq setpoint(L6 or L8), heater R7 de-energized.

1.2.2 Heating by compressor

Note: R7 controls 4-way-valve, R7 keeps energized.

If **Room temperature** \leq setpoint (L6 or L8) - t2, and compressor R6 has stopped for t4, compressor R6 energized.

If **Room temperature** \geq setpoint(L6 or L8), compressor R6 de-energized.

Note: R2 (fan) will be energized 10 sec. after R6 is energized, de-energized 5 sec. after R6 is de-energized.

1.3 Constant temperature control (t0 = 0)

1.3.1 Heating by heater (t1 = 1)

If **Room temperature** \geq setpoint(L6 or L8) + t2, and R6 has stopped for t4, cooling output R6 energized, heater R7 de-energized.

If **Room temperature** \leq setpoint(L6 or L8), R6 de-energized.

If **Room temperature** \leq setpoint(L6 or L8) - t2, heater R7 energized.

If **Room temperature** \geq setpoint(L6 or L8), heater R7 de-energized.

Note: R2 (fan) will be energized 10 sec. after R6 is energized, de-energized 5 sec. after R6 is de-energized.

Note: If not cooling by compressor, we could set t4 = 0 (protection delay time is unnecessary).

1.3.2 Heating by compressor (t1 = 0)

If **Room temperature** \geq setpoint(L6 or L8) + t2, and R6 has stopped for t4, compressor cooling (R6 energized, R7 de-energized).

If **Room temperature** \leq setpoint(L6 or L8), compressor stops (R6 de-energized).

If **Room temperature** \leq setpoint(L6 or L8) - t2, and R6 has stopped for t4, compressor heating (R6 energized, R7 energized).

If **Room temperature** \geq setpoint(L6 or L8), compressor stops (R6 de-energized).

Note: R2 (fan) will be energized 10 sec. after R6 is energized, de-energized 5 sec. after R6 is de-energized.

Note: R7 controls 4-way-valve. When switching between compressor heating and cooling, compressor will be energized 15 seconds later after 4-way-valve has been switched.

1.4 Defrost (only during heating by compressor)

Only during heating by compressor. Only necessary when evaporator is covered by ice.

1.4.1 Timer defrost

When the compressor has been heating for t7 time continuously, start defrost.

Defrost will last for t8 time, then stop and exit defrost status.

1.4.2 Forced defrost

Keep \wedge and \vee depressed simultaneously for 3 seconds, start forced defrost immediately for t8 time.

1.4.3 Defrosting procedure

Compressor R6 de-energized \rightarrow 4-way-valve R7 de-energized 30 sec. later \rightarrow 30 sec. later, compressor R6 energized to heat the outdoor evaporator for t8 time to melt the ice \rightarrow compressor R6 de-energized \rightarrow 4-way-valve energized 30 sec. later \rightarrow 30 sec. later, compressor R6 energized to heat again.

Note: During up process, fan R2 de-energized, so the evaporator could reach higher temperature.

And \otimes and \odot blinks simultaneously.

1.5 Over limit warning

If **Room temperature** \geq t5, and t5 > setpoint(L6 or L8), warning: "tHi" and room temperature displays alternatively.

If **Room temperature** \leq t6, and t6 < setpoint(L6 or L8), warning: "tLo" and room temperature displays alternatively.

2 Humidity Control

When timer 1 output R5 de-energized, \odot is not shown, setpoint will be the setpoint of night (L7).

When timer 1 output R5 energized, \odot blinks, setpoint will be the setpoint of day (L9).

2.1 Constant humidity control (h0 = 0)

If **Room humidity** \leq Setpoint(L7 or L9) - h1, Humidify Output R4 energized.

If **Room humidity** \geq Setpoint(L7 or L9), Humidify Output R4 de-energized.

If **Room humidity** \geq Setpoint(L7 or L9) + h1, De-humidify Output R3 energized.

If **Room humidity** \leq Setpoint(L7 or L9), De-humidify Output R3 de-energized.

2.2 Humidify control (h0 = 1)

If **Room humidity** \leq Setpoint(L7 or L9) - h1, Humidify Output R4 energized.

If **Room humidity** \geq Setpoint(L7 or L9), Humidify Output R4 de-energized.

2.3 De-humidify control (h0 = 2)

If **Room humidity** \geq Setpoint(L7 or L9) + h1, De-humidify Output R3 energized.

If **Room humidity** \leq Setpoint(L7 or L9), De-humidify Output R3 de-energized.

2.4 Over limit warning

If **Room humidity** $\geq h3$, and $h3 > \text{Setpoint (L7 or L9)}$, warning: “HH” and room humidity displays alternatively.

If **Room humidity** $\leq h4$, and $h4 < \text{Setpoint (L7 or L9)}$, warning: “HL” and room humidity displays alternatively.

3 Timer Control

3.1 Clock time (Timer 1) set

The clock time factory set is 12:00. It stops run when without power supply. The clock is saved every 15 minutes.

Fast check clock time by click \odot .

Set parameter L0 and L1 to revise the clock.

3.2 Timer 1 Output R5 control

The period of timer 1 is 24 hours.

From L2: L3, the timer 1 output R5 will be energized.

Form L4: L5, the timer 1 output R5 will be de-energized.

3.3 Timer 2 Output R1 control

After power supplied **online**, or turned **online** by key \odot ,

if F0:F1 is later than L0:L1, timer 2 will not start to run till F0: F1 moment,

if F0:F1 is earlier than L0:L1, timer 2 will start to run from F0:F1 moment of the 2nd day.

Timer 2 working in this way: output R1 will keep energized for F5 time, keep de-energized for F3 time, repeatedly.

4 Sensor Calibration

The **Room temperature** can be calibrated. If **Room temperature** is 0.2°C lower than real value, set t3 = 0.2.

The **Room humidity** can be calibrated. If **Room humidity** is 2%RH higher than real value, set h2 = -2.

5 Sensor Failure

When temperature sensor fails, outputs R6, R7 and R2 will be de-energized, blinking display “Et”.

When humidity sensor fails, outputs R3 and R4 will be de-energized, blinking display “Eh”.

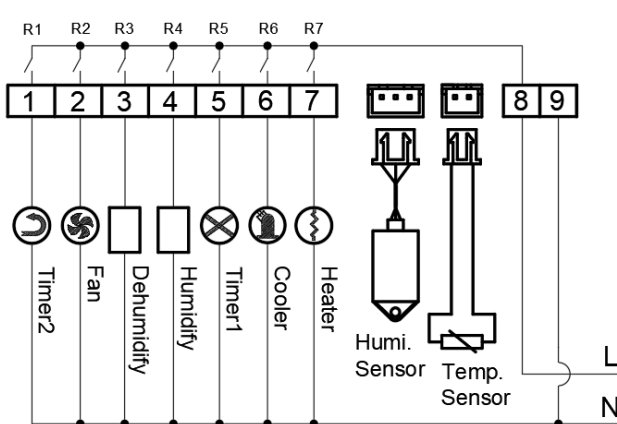
6 Restore to Factory Set

Keep $\llbracket S \rrbracket$ and \wedge depressed simultaneously for 3 seconds, “UnL” displays.

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

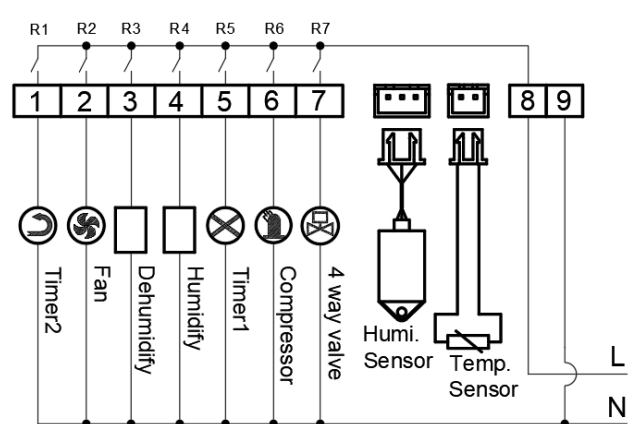
Wiring Diagram

R1 ~ R7: 3A / 250Vac



Heating by heater

R1 ~ R7: 3A / 250Vac



Heating by compressor

Attention

1. Please read this instruction carefully. Electrical wiring must be manipulated by certified electrician. Wrong wiring may damage the device and system seriously.
2. Avoid humid environment, or with corrosive gases, or strong electric-magnetic field. The device is possible abnormal in such condition.
3. This product has been strictly tested before shipping. The company warranty is one year, the responsibility is limited to the sale of the product itself. Damage caused by improper usage is not covered by the warranty.