ZL-7901A Intelligent temperature and humidity controller
Instruction Manual A1.0

Feature

ZL-7901A is an industrial intelligent temperature and humidity controller. It can connect SSR expire output and adopt PID to control temp with high precision. It use easy touched button and big LCD display, convenient operation and easy installation. Applicable for control of incubator, climate chamber, warehouse, and so on.

Main function

1.Temperature control, three combination output, PID high precision control is chosen.

2.Humidify and dehumidify control

3.Time air exchange control

4.Time egg turning control

5.Illumination control

6.Node alarm output

7.Auto restart function

8.Temperature/humidity over limit warning and protection function

9.Temperature/humidity sensor fault warning and protection function

Specification

◇Power supply: 100-240V, 50-60Hz

◇Controller:

| Relay output(8 ways)	Analog quantity input(2 ways)
Main temp. control relay(250VAC/7.5A resistive load)	NTC temperature sensor 5K/3470
Ancillary temp. relay(250VAC/7.5A resistive load)	Humidity sensor SHR04
Humidity control relay(250VAC/7.5A resistive load)	
Lamp relay(250VAC/7.5A resistive load)	
Air exchange relay(250VAC/7.5A resistive load)	
Egg turning relay(250VAC/7.5A resistive load)	
Alarm output relay(250VAC/7.5A resistive load)	
SSR（20mA/10VDC MAX）	

◇Setting range: humidity 0～100RH, temperature 0～100℃

◇Measuring accuracy: temperature 1%, humidity 5%

◇Working environment: -20～45℃,10～90RH no dewing

◇Size: 137*89*56(mm)

◇Hole size:122*75(mm)

Keys and display
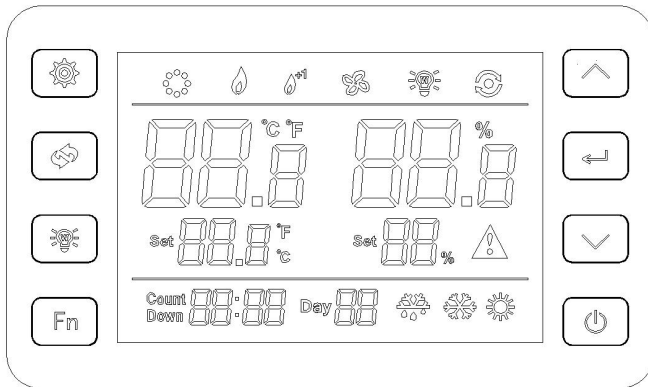
Keys	Meaning	Function
⏻	Power	Keep press for 3 seconds to turn on/off.
⚙	Set	Short press to set humidity and temperature Extended press to set parameters
∧	+	Extended press to Increase fast
∨	-	Extended press to reduce fast
↵	Enter	Press Enter to confirm parameters
⟳	Backup	Press for 3 seconds, Incubation days will cleaned
☀	Light	Turn off/on the light
Fn	Fn	To combine with other keys

Display signal indication

Icon	Function	On	Off	Blinking
⚬	Humidify/dehumidify state	On	Off	
◊	Main heater	On	Off	
◊⁺¹	Ancillary heater	On	Off	
✿	Air exchange	On	Off	
↻	Egg turning motor right turn	On	Off	
↺	Egg turning motor left turn	On	Off	
⚠	Warning	---	No warning	Warning
E01	Humidity sensor fault	Warning	No warning	
E02	Temperature sensor fault	Warning	No warning	
tHi	Temperature exceed up limit	Warning	No warning	
tLo	Temperature exceed down limit	Warning	No warning	
HHi	Humidity exceed up limit	Warning	No warning	
HLo	Humidity exceed down limit	Warning	No warning	
UnL	Regeneration default values	Regeneration default values		

Key operation

Temperature/ humidity setting

Press ⚙ to set temp. and humidity in cycle(blinking), press ︿ and ﹀ to adjust the value.

Press to save parameters.

Press ◈ or no operation for 30 seconds, auto exist and not saving parameters.

Parameters	Range	Unit	Default
Up limit set temperature	T24 ~ 100	℃	37.8
Up limit set humidity	H21~100	%	50

System parameters setting

Keep pressing ⚙ and ↵ for 3 seconds to enter parameters setting, LCD shows "Psd 000", Press ︿ and ﹀ enter passwords(default "000") press ↵ to confirm. Passwords correct enter parameters setting, wrong passwords exist setting mode.

Press ⚙ to select parameters code, press ︿ and ﹀ to adjust setting, press ↵ to save parameters.

Press ◈ or no operation for 30 seconds, auto exist and not saving parameters.

Parameters indication

Code	Function	Range	Unit	Indication	Default
T10	Temperature control(R1,R2,SSR)	0 ~2		0=Main temp. control(R1)+auxiliary temp. control(R2); 1=External SSR main temp. control(up and down limit temp. control) 2=External SSR main temp. Control(PID control)	0
T11	Up limit temperature	T12 ~ T23	℃/℉		37.8
T12	Down limit temperature	T24 ~ T11	℃/℉		37.6
T13	Auxiliary temp. Control(R2) start temperature	T24 ~ T23	℃/℉		37.5
T14	Main temperature control (R1)mini stop time	0 ~999	sec		1
T15	Auxiliary temperature control (R2)mini stop time	0 ~999	sec		1
T16	SSR temperature control mini stop time	0 ~999	sec		1
T20	Temperature correction	-9.9~+9.9	℃/℉		0
T21	High temp. warning	0~100	℃/℉		40
T22	Low temp. warning	0~100	℃/℉		30
T23	Temperature setting up limit	T24 ~ 100	℃/℉	Max temp. Control set limit	40
T24	Temperature down limit	0 ~ T23	℃/℉	Min temp. Control set limit	30
T30	Proportion of PID(SSR heating)	0.1~5000		PID control parameters	39.3
T31	Integration of PID(SSR heating)	0~5000		PID control parameters	12.5
T32	Differential of PID(SSR heating)	0~5000		PID control parameters	318.1
H10	Humidify/ dehumidify set	0 ~1		0=humidify；1=dehumidify	0
H20	Up limit humidity setting	H21~99	%		50

H21	Down limit humidity setting	0~H20	%		45
H22	Humidity correction	-9.9~+9.9	%		0
H23	Min humidity load stop time	0~ 30	min		3
H24	Humidity up protection limit	0 ~ 100	%		100
H25	Humidity down protection limit	0 ~ 100	%		0
U10	Left turn (R6) time unit	1~2		1=min；2=hour	1
U11	Left turn (R6) time	1 ~ 999			120
U12	Left turn (R7) time unit	1~2		1=min；2=hour	1
U13	Left turn (R7) time	1 ~ 999			120
U14	Turning times	0 ~ 999		0 = keep turning	0
U15	Hatch days	0~ 999	days	0 = disabled hatch days function	21
U20	Air exchange control mode(R5)	0~3		0=Air exchange mode 1=Air exchange+humidity/temperature over limit protection 2=Air exchange+temperature over limit protection 3=Air exchange+humidity over limit protection	1
U21	Air exchange period unit(R5)	0 ~2		0=second；1=minute；2=hour	1
U22	Air exchange period time(R5)	1 ~999			120
U23	Air exchange time unit(R5)	0 ~2		0=second；1=minute；2=hour	1
U24	Air exchange time(R5)	1 ~999			5
U30	Lighting relay function(R4)	0 ~4		0 = illumination control 1 = time switch control 2 = temperature over limit protection 3 = Temperature over limit protection 4 = humidity over limit protection	0
U31	Time period unit(R4)	0 ~2		0=second；1=minute；2=hour	1
U32	Time period time(R4)	1 ~999			120
U33	Time unit(R4)	0 ~2		0=second；1=minute；2=hour	1
U34	Timer time(R4)	1 ~999			5
U40	Alarm relay function(R8,R9)	0 ~4		0 = alarm output(Node) 1 = time switch mode 2 = temperature and humidity over limit protection 3 = temperature over limit protection 4 = humidity over limit protection	0
U41	Time period unit(R8)	0 ~2		0=second；1=minute；2=hour	1
U42	Time period time(R8)	1 ~999			120
U43	Time unit(R8)	0 ~2		0=second；1=minute；2=hour	1
U44	Timer time(R8)	1 ~999			5

U90	Passwords	000~999		000 = no passwords	0
End					

Control function

On/off: Controller is off, press ⏻ for 3 seconds, controller working. Controller is on, press ⏻ for 3 seconds, controller off.

Temperature control
1.**Main control(R1)+Auxiliary control(R2)   (T10 = 0)**
a. Main temperature control work:

Measuring temperature ≤【Down limit temperature】T12, and main temperature control R1 stop time over【Main temperature control (R1)mini stop time】T14, main control R1 working.

b Main temperature control off:

Measuring temperature ≥【Up limit temperature】T11, off main temp. Control R1.

c. Auxiliary temp. Control work:

Measuring temperature ≤【Auxiliary temp. Control(R2) start temperature】T13, and auxiliary control R2 stop time over【Auxiliary temperature control (R2)mini stop time】T15, auxiliary control R2 working.

b Auxiliary temperature control off:

Measuring temperature ≥【Auxiliary temp. Control(R2) start temperature】T13 + 0.1 degree, auxiliary control R2 off.

2.**External SSR temp. Control up and down limit(T10=1)**
Temperature node control mode.

Measuring temperature ≤【Down limit temperature】T12, and SSR temp. Control stop time over【SSR temperature control mini stop time】T16，SSR is on.

Measuring temperature ≥【Up limit temperature】T11, SSR is off.

3.**External SSR PID temperature control(T10=2)**
When external SSR main temperature control choose PID mode. Temp. Control will follow PID algorithm.

4. **PID procedure:(If with PID control, it is better to tuning the PID parameters, if the default the setting is not ideal.)**
a. Be sure that the equipment inside temp. has been cooled to same to environment temp.
b.Press ⟨Fn⟩ and ⟨∨⟩ simultaneously for 5 seconds to enter into tuning set mode. LCD display"Pid tun",
c.Press ⟨↵⟩ start external SSR, output power is locked, 🔥 is on. Controller start turning PID.
d.After PID turning finished, 🔥 is off.
e.When the heating temperature over 100℃, controller will end this turning, and display "Pid E03" warning with fail turning(press any key will cancel E03)
f.If self turning dont finished in 60 minutes, controller will display"Pid E04"warning with fail turning(press any key will cancel E04)
g.Press ⟨↵⟩ can cancel warning E03/E04, and restart turning. During turning press ⟨⟳⟩ can exist.

Humidity control(R3)
Humidify control(H10 = 0)
When measuring humidity ≤【Down limit humidity setting】H21, and humidity load stop time over【Min humidity load stop time】H23, humidify is on.

When measuring humidity ≥【Up limit humidity setting】H20, humidify is off.

Dehumidify control(H10 = 1)
When measuring humidity ≥【Up limit humidity setting】H20, and humidity load stop time over【Min humidity load stop time】H23, dehumidify is on.

When measuring humidity ≤【Down limit humidity setting】H21, dehumidify is off.

Egg-turning control(R6, R7)

Left turning time meet, R6 start, R7 is off.

Right turning time meet, R7 start, R6 is off.

Egg turning cycle times:
R6 start once+R7 start once as a cycle, when egg turning times=U14, stop turning.
Set U14=0, keep turning.

Air exchange control(R5)
Air exchange control mode:(U20=0)
When system running time meet【Air exchange period time(R5)】U22, start air exchange relay. Air exchange time meet【Air exchange time(R5)】U24, air exchange relay is off.

Air exchange control mode+temperature and humidity over limit protection mode(U20=1)
No temperature/humidity over limit warning, controller work at air exchange mode.
When temperature/humidity over limit warning, high temp. Or high humidity air exchange relay work. When no warning, controller back to air exchange control mode.

Air exchange mode+temperature over limit protection mode:(U20=2)
No temperature over limit warning, work at air exchange mode.
When temperature over limit warning, high temperature air exchange relay work. When no warning, controller back to air exchange control mode.

Air exchange mode+humidity over limit protection mode:(U20=3)
No humidity over limit warning, work at air exchange mode.
When humidity over limit warning, high humidity air exchange relay work. When no warning, controller back to air exchange control mode.

Lighting control(R4)
Lighting control mode(U30=0): press【※】, light on/off.
Time switch mode(U30=1):Time period(U32), R4 off. Timer time(U34), R4 is on.
Temperature and humidity over limit protection mode(U30=2):If temperature or humidity over limit warning, high temperature or high humidity, R4 is on, when warning stop, R4 is off.
Temperature over limit protection mode(U30=3): If temperature over limit warning, high temperature, R4 is on, when warning stop, R4 is off.
Humidity over limit protection mode(U30=4): If humidity over limit warning, high humidity, R4 is on, when warning stop, R4 is off.

Warning output control(R8, R9)
Warning output mode(U40=0):
Warning node output: R8: Close when failure, open when no failure. R9 Open when failure, closed when no failure.
When temperature or humidity sensor failure, warning output is on, temperature or humidity control output off. Other outputs keep working.
When temperature or humidity over limit, warning output start, all control outputs keep working.

Timer switch mode(U40=1): Timer period time(U42), R8 is off. Timer time(U44) R8 is on.
Temperature and humidity over limit protection mode(U40=2): temperature or humidity over limit protection, high temperature or high humidity, R8 is on. When no alarm, R8 closed.
Temperature over limit protection(U40=3): temperature over limit protection, high temperature, R8 is on. When no alarm, R8 closed
Humidity over limit protection mode(U40=2): humidity over limit protection, high humidity, R8 is on. When no alarm, R8 closed.
Auto restart function: Power off, if power back, controller will back to work with previously setting parameters.

Incubation days cancel: keep press【◎】for 3 seconds, days will be zero.

Factory setting: controller is on, press【Fn】and【↵】 at the same time for 3 seconds shows 『UnL』. Than press【∨】 twice, controller will restore factory setting.

Fahrenheit temperature/ degrees Celsius switching: press【Fn】and【※】 for 3 seconds.

Manual system adjustment: press【Fn】for 3 seconds, LCD display"CCC"press twice【∨】 to enter manual adjustment. Now the LCD codes display, all outputs stop, press【∧】and【∨】 can turn R1-R7 in turns, SSR is on.

Warning control instruction

No.	Instruction	condition	delay	duration	reset	Action

1	Temperature sensor faulty	Real time	0s	6s	Auto	Alarm output on, off temperature control, the other remains.
2	Humidity sensor faulty	Real time	0s	6s	Auto	Alarm output on, off humidity control, the other remains.
3	High temp. Over limit alarm	Real time	0s	5s	Auto	Alarm output on, high temperature over limit protection on, the other remains.
4	low temp. Over limit alarm	Real time	0s	5s	Auto	Alarm output on, the other remains.
5	High humidity Over limit alarm	Real time	0s	5s	Auto	Alarm output on, high humidity over limit protection on, the other remains.
6	Low humidity Over limit alarm	Real time	0s	5s	Auto	Alarm output on, the other remains.
7	Touched IC communication faulty	Real time	0s	5s	Auto	

Notes:

1. Read the instruction carefully, Electrical wiring must be manipulated by certified electrician.Wrong power supply may damage the device and system seriously.

2. Use this product should be avoided in humid environments or with corrosive gases and strong magnetic field applications, in these occasions may affect the use of the normal operation of the thermostat.

3.This product has been strictly tested before leaving the factory, as a result of quality problems The company warranty for one year, the responsibility is limited to the sale of the product itself. Damage caused by improper use is not covered by warranty.

Wiring diagram: