Kalstein

Series YR0173-1

Natural Convection Oven

Instruction Manual

Thank you very much for purchasing our Natural Convection Oven YR0173-1 Series.

Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the “Warranty” at a hand place for future reference.

 Warning: Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

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Table of contents

I. Sketch:


Test hole
Air outlet
Kalstein
Control panel
Power switch
Fuse
Power
socket

II. Scope of application

Apply to the drying, braking, wax melting and sterilization of the articles in industrial and mining enterprises, colleges and universities, scientific research and medical units, labs, etc.

III. Technical indexes:

Drying oven			
Model:	YR0173-1	YR0173-2	YR0173-3
Temperature Range:	RT-10~200℃		
Temperature Uniformity:	2.50%		
Power Consumption:	600W	900W	1200W
Electrical Requirement:	220V 50HZ		
Interior Dimension (W×D×H, mm):	280*280*350	350*350*460	430*430*520
Chamber Volume:	27L	56L	96L
Shelves:	1(PCS)	1(PCS)	2(PCS)
Remark:	Natural convection		

IV. Structural description

YR series of natural convection oven consist of the box, temperature control system, electric heating system.

Liner 304 stainless steel, semi-circular arc corners transition; shelf bracket height adjustable and free handling, easy to clean the work room; insulation layer using ultra-fine glass wool for filling. Temperature control system is the main component of intelligent temperature controller. Pt100 platinum resistance as a temperature sensing element, the use of PID control heating system. Controller also has timing control, temperature error correction, deviation alarm protection and other functions.

Natural convection drying oven, electric heating system for the resistance wire heating tube, no fan.

This series of products has the advantages of high temperature control precision, small overshoot, small fluctuation and deviation over-temperature protection. In addition, it can according to the needs of users to increase matching an independent over-temperature protection system, can improve product safety performance

V. Method of use

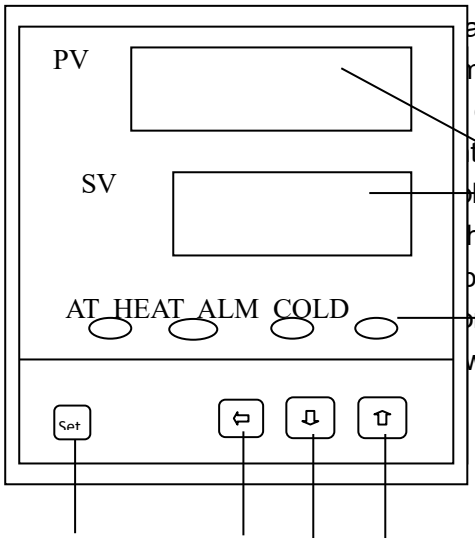
1. Put the articles to be dried into the drying cabinet, close well the door and turn the air door adjusting knob to " ㄙ" position.
2. Move the power switch to "ON". The power indicator light lights up and figures appear on the temperature control instrument.
3. Select the required set temperature, the numeric temperature displayed at the moment is the temperature in the cabinet and the heating indicator light lights up, showing that the instrument has been in the heating and temperature-rising state. After a period of time, when the displayed temperature is near to the set temperature, the heating indicator light is flickering for many times. Under usual conditions, after heating for 90 minutes, the temperature control will be the constant temperature state.4. When the required working temperature is lower, adopt the two-stage set method. For example, if the required temperature is 80℃, first set 70℃ and after the overshoot temperature starts to drop back, then set 80℃, which can reduce and even eliminate the phenomenon of overshoot temperature, thus enable the inside cabinet to attain the temperature-constant state as early as possible.
5. Select the different drying times according to the different humidity of different articles, e.g., the articles to be dried are more humid, turn the air door adjusting knob to " 三 " position so as to vent the humid air in the cabinet.
6. When the drying process being over, if not to immediately take the articles out, first turn the air door adjusting knob to close the air door, or let open the air door and move the power switch to "OFF", then opening the cabinet door immediately to take out articles, but take care not to be scalded.

VI. Precautions:

1. The shell of the drying cabinet shall be well grounded to guarantee the safe use.
2. The drying cabinet shall be placed inside one well-ventilated room, surrounding which no inflammable and explosive articles are available.
3. The drying cabinet has no explosion-proof device, so never place inflammable and explosive articles inside for drying.
4. The articles in the cabinet shall not be too crowded. Certain space shall be left so as to facilitate the circulation of hot air.
5. Always keep the internal and external of the cabinet clean. In case it will not be used for a long time, please cover it with a plastic thin film dirt shroud and put it in a drying room.

II. Operating methods

1. Energization to start up



ay unit(Red)
neasured value or the various
depending the statue of the
t
lay unit(Green)
he set value or the timing
parameters
rs
working incubator (green)and TIME of light,when ST=0and lignt is o
n,mean not use timing;flashes during auto-
turning execution or ST=0mean self-turning
HEAT heating output lamp (green) It shines when
working for output.

④ ⑤ ⑥ ⑦· ALM alarming indicator(Red),turned on

(Note: COLD cooling function)

④Function key

·Used for displaying the change and confirm of the parameters

⑤shift key

shifting the set value or observing

⑥and ⑦ Add or Subtract key for changing the digital code and/or the key to express entering the auto-tuning state

·Used for adjusting the digital code displayed or entering the auto-tuning state

1.1 Layout of temperature controller panel

1.2 The box door is shut properly with the handle downward vertically;

1.3 The throttle is adjusted to a suitable position in line with the dampness of articles. Counterclockwise to the end, the open angle will be the smallest while clockwise to the end, the open angle will be the largest（regulation range of 60 degree）.

1.4 Power pilot lamp is turned on and forced convection drying oven can hear the sound of blower operation;

1.5 The temperature controller will enter the operating mode after self-inspection procedure for 4 seconds or so, namely, PV screen will display the measurement temperature and SV screen the set temperature. When PV＜SV，OUT lamp should be on, indicating the temperature controller has entered the temperature rise operating state.

1.6 **Check of temperature control accuracy**

1.6.1 Digital thermoscope with a resolution of 0.1℃ that is found qualified in the verification within the validity term serves as a standard and is placed into the working room. Make sure the **temperature sensing head** of the sensor is in the **geometrical center of the working room.**

1.6.2 One point is chosen within the range of the product temperature control to set up SV temperature control value. When PV measured value is equal to the set value, keep it under constant temperature for another 1～2 hours or so （depending upon the specification of the product）to observe if the measured temperature value by the standard thermoscope and the measured value displayed by the temperature controller PV differ by ≤±1℃.

2. Setup of temperature and timing

2.1 Under working mode, press SET key once， PV screen will display "SP"character， press or key so that SV screen may display the required temperature value; （refer to Appendix 2 for call-out flow of functions）

2.2 Click and press SET key once more and PV screen will display "ST"character, press or key so that SV screen may display the required time value; （refer to Appendix 2 for call-out flow of functions）

2.2.1 When ST is set to 0， the controller will cancel the timing function and keeps operating; When ST is not set to 0， the controller will perform the timing function. When the operating time of the controller is up, SV screen will display "END"， the buzzer will buzz and the controller will stop working. The buzzer will be silenced by pressing any key and simultaneously press key and key for 4 seconds for restarting.

2.2.2 When the controller is under working mode, so long as you click and press the shift key , PV screen will display "TIME" and SV screen the running time of controller. If you press the shift key again, the controller will return to the working mode.

3.3 Press SET key once more and the unit will return to the working mode to enter operating state.

3． Setup of upper deviation alarm

Rational setup of upper deviation will protect the system from error in temperature control or out of control and it must be implemented when the product is in operation.

3.1 Upon delivery of the product, AL=10～15，namely, alarm temperature is（SV+AL）℃

3.2 Press SET key for 4 seconds or so. When PV screen displays "AL"character, release at once （indicating the temperature controller has entered the parameter menu），**but revision of relevant parameters with、key is possible only after electronic lock "Lk" is opened.**

3.3 Procedure for unlocking: after entering parameter menu, press SET key several times. When PV screen displays "LK"character, change SV screen value from "0" to "18"with key and then unlock （if afterwards no key is pressed,

temperature controller will return to the working mode automatically one minute later）；

3.4 Press SET key several times. When PV screen displays "AL"character, rational upper deviation value（AL）should be set up with ↑、↓key；

3.5 Press SET key several times once more to call out "LE"character and change "18" to "0" with key, namely, close the electronic lock（**Note: electronic lock can be closed after all the parameters that have to be revised are done so**）

4. Methods to improve temperature control accuracy

4.1 After the product is used for some time, temperature control accuracy should be checked out as described in 2.6. If it exceeds ±1℃，revision can be made by the following methods:

4.1.1 Enter the temperature controller parameter menu （refer to 4.2）

4.1.2 Open electronic lock （refer to 4.3）

4.1.3 Press SET key several times to find "PK"character.

$$\text{press PK} = 4000 \frac{(\text{measured value PV} - \text{standard table value})}{\text{Standard}}$$

After calculation by the above formula, revision is made with key on the basis of the original PK value before delivery （Note; if one revision cannot serve the purpose, it can be repeated till accuracy is achieved）；

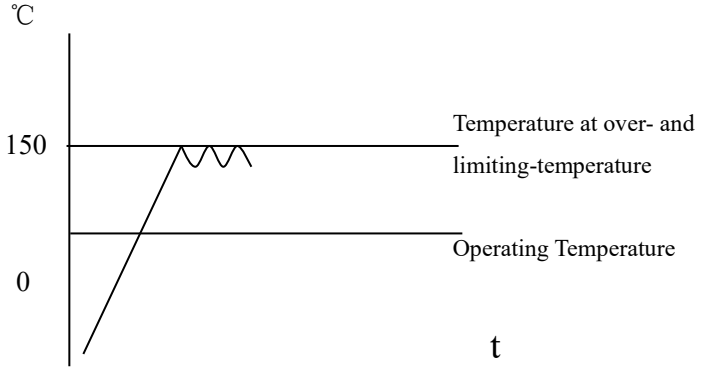
4.1.4 Close the electronic lock （refer to 4.5）

5. Operation of over-temperature protector as an optional component

Over-temperature protector is an independent protective system. When temperature is out of control due to failure of the controller or the temperature in the working room reaches the set value for temperature limit on the over-temperature dial, the protector will cut off heating automatically and give an alarm sound. （as is shown in the right figure）when temperature in the working room is lower than the limit value, the protective system will be

cancelled and the instrument resumes work. Such circulation will continue till fault is removed. Specific operation is done as follows：

5.1 The set value of temperature limit should be bigger than or equal to（SV+AL）+（10～15）℃



5.2 As is shown in Figure 2, the required limit temperature is set by the ＋ and — buttons on the over-temperature dial on the panel.

For example：SV=130℃， AL=10

Then 150℃ should be set up.

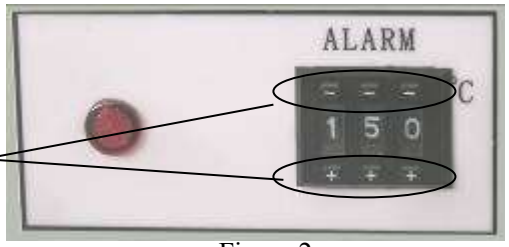
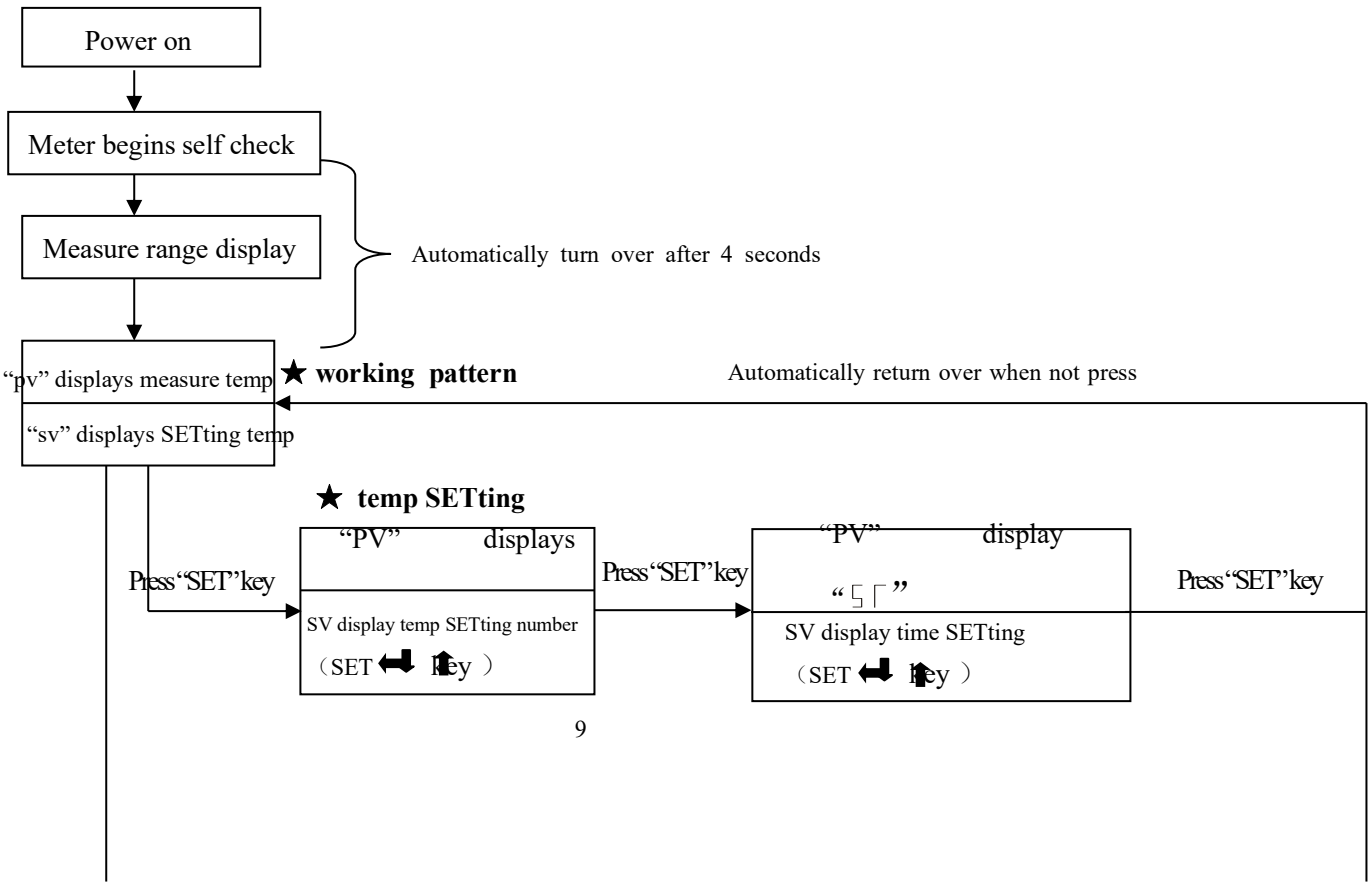


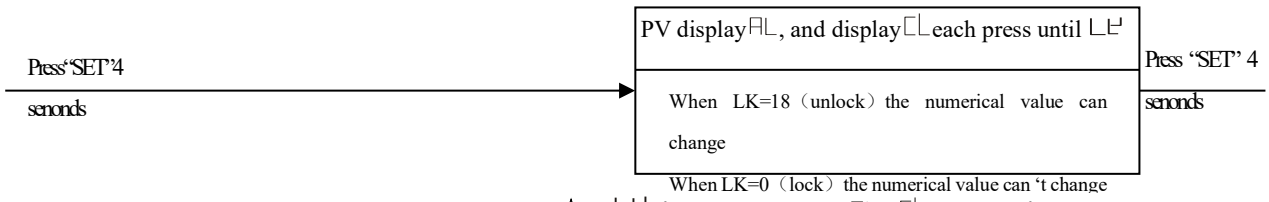
Figure 2

6. Maintenance and Instructions

1. Upon completion of each operation, first switch off the power. Open the box door and wait till the temperature is cooled down in the box before taking out the cultivated goods.
2. In case of keeping the product idle for a long period of time, it is necessary to clean the product in and out. Pull out the power plug and cover it with the plastic anti-dust cap.
3. If the environment for storage has a high humidity, it is necessary to regularly (about 1 month) power on for heating to dehumidify.
4. Before using it again or in case of any change in technical requirement, it is necessary to check the accuracy of thermal control (see the relevant sections).
5. Except for change of such parameters as **SV, AL, Pk, Lk**, to change other control parameters, it is necessary to obtain consent from our Service Center or such parameters can be adjusted by the special personages.

7. Sequence to pick up the functions of the instrument



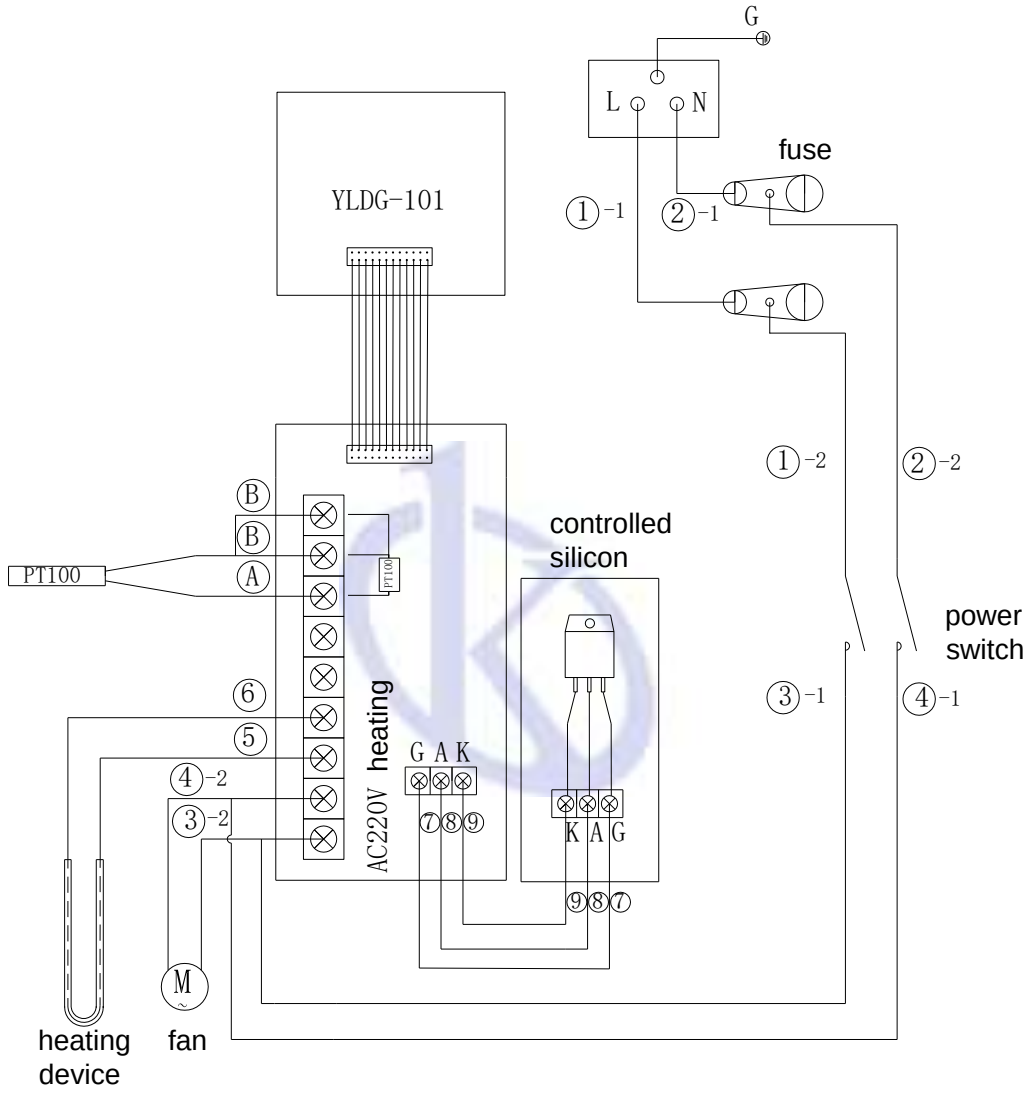


★ **is code lock， ⋯meanings please check sheet "**Table 2**"**

8. Following table lists the function parameters:

Symbol	Name	Setting range	Description	Factory set value
AL/AL	Alarming setting	0-Full Range 0.0-Full Range	When temperature is beyond SP+AL, the ALM indicator turns on. The buzzer sounds and the heating power turn off.	
CL/CL	Refrigeration control setting	0-Full Range 0.0-Full Range	When the temperature less than SP+COL, the refrigeration point is turn on to drive the compressor.	**without this function**
CT/CT	Refrigeration control delay	（0～3600）s	When measured value reaches to alarm value, the alarm relay will not output before it passes CT time.	**without this function**
P/P	Proportional Band	1-Full Range 1.0-Full Range	Proportional control action. If P is larger, then the gain of system is lower. It only use on the heating side.	
I/I	Integral Time	0-3600 seconds	Integrated time constant. I larger, then the integrated action is smaller.	
d/d	Derivative Time	0-3600 seconds	Derivative time constant. D larger, then the derivative action is also larger D can overcome overshoot. I=0and D=0 is called half proportional control.	
Ar/Ar	Overshoot Control(re-setting)	1-100%	At on-off PID control, the value of Ar is a constant which equals 1.5-2times of the ratio of on time to the on-off period in the equilibrium state, In the half proportional control, the Ar equals coefficient/P.	
T/T	Heating period	1-300seconds	For the thyristor output it is about 1-3seconds.For those equipment that the superfluous power provided is comparatively larger, select larger T would decrease the stable error caused by PID control.	
Pb/Pb	Zero point adjust (intersection)	-100-100 -100.0-100.0	When the zero error comparatively smaller and the full point error comparatively larger, to update this value should be needed. Ordinary for pt100, updating this value is rarely needed.	
PK/PK	Full point adjust(intercept)	-1000-1000 seconds	When the zero error comparatively larger and the full point error also comparatively larger, to update this value should be needed. PK=4000×(setting value-actual value)/actual value. For pt100 adjusting this value is need at first time.	
/FN	fan control	0～100	When set to 0, the low fan work when set to 50, mid-range fan work when set to 100, the work of high-grade fan	
LK/LK	Password key	0-255	When LK=18 the parameters listed above then the above parameters can be updated.	

VIII. Wiring diagram



IX. Failure handling methods

Problems	Causes	Handling methods
1. No supply	1.The plug is not inserted well or the wire is disconnected.	1. Insert the plug and connect the wire.
	2. Fuse is open.	2. Replace the fuse.
2. The temperature in the cabinet does not increase.	1. The set temperature is low.	1. Adjust the set temperature.
	2. The electric heater does not work.	2. Replace the electric heater.
	3. The temperature control instrument does not work.	3. Replace temperature control instrument.
	4. The cyclic fan does not work.	4. Replace the fan.
3. The set temperature has a big difference from the temperature in the cabinet.	1.The temperature sensor does not work.	1. Change temperature sensor.
	2. The fine tuning potentiometer for setting temperature is not adjusted well.	2. Adjust the potentiometer.
4.The over-temperature alarm is abnormal.	1. The set temperature is low.	1. Adjust the set temperature.
	2. The temperature control instrument does not work.	2. Replace the temperature control instrument.

Packing list

No.	Type	Name	Unit	Qty.	Remarks
1	Document	Operating instructions		1	
2	Document	Packing list		1	
3	Spare part	Fuse core		2	

The articles in this list conform to those loaded in the box. Packing worker: No.2