

# YLD-2000

## DIGITAL TEMPERATURE CONTROLLER INSTRUCTION MANUAL

Before using this product, please carefully read this manual for its correct use. In addition, after reading the manual, keep it available easily anytime.

### OPERATION PRECAUTIONS

Before cleaning the instrument, check that the power is turned off.

Please using the soft clothes or tissue paper to remove stains on the display unit.

Because the display unit is easily scratched, please do not scrub or touch it with a hard object.

Do not operate the front key with a pointed object such as a ballpoint pen or screwdriver, as this may scratch or damage the key.

## 1. PRODUCT CHECK

This instrument is applicable for constant temperature control for the electro thermal dryness, constant temperature water groove, germ cultivation, biochemistry cultivation and etc. This instrument can be also used in the temperature control of medicine appliances, laboratory apparatus and so on.

Check whether the delivered product is as specified by referring to the following model code list.

### Model code

YL□-□□□□ □ □-□

① ②③④⑤ ⑥ ⑦

① Panel Dimensions (mm)

D: 96×96 ; E: 72×72

② Series code

③ Type of heating control

3: half proportional control

4: On-off PID control with auto tuning

④ Type of refrigeration control

1: refrigeration control with time delayed function

(used to control compressor)

⑤ Type of the sensor

2: Thermo-resistance(RTD)

⑥ Calibration of the sensor Pt100

⑦ The range of measurement

## 2. MOUNTING

### 2.1 Mounting cautions

(1) This instrument is intended to be used under the following environmental condition  
Ambient pressure: 86 kPa to 106 kPa. Ambient temperature: 0 °C to 50 °C. Ambient humidity: 45% to 85% RH.

(2) Following cautions must be kept in mind while mounting:

Rapid changes in ambient temperature, which may cause condensation.

Corrosive or inflammable gases.

Direct vibration or shock to the mainframe.

Water, oil, chemicals, vapor or steam splashes.

Excessive dust, salt or iron particles.

Excessive induction noise, static electricity, magnetic fields or noise.

Direct airflow from an air conditioner.

Should be used indoors where the system is not exposed to direct sunlight.

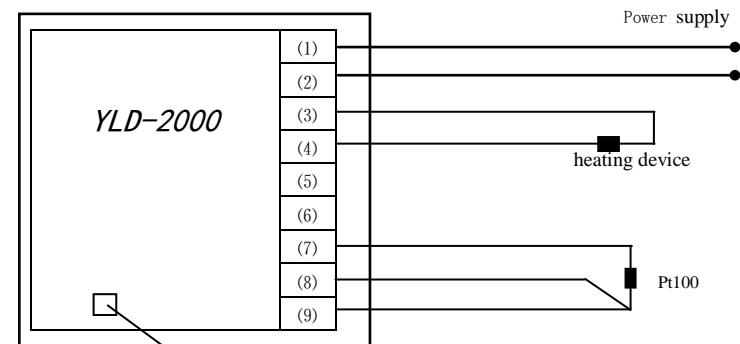
Shanghai Yatai  
Instrumentation Co., Ltd.

Address: No.1851 North Sichuan Road, Shanghai, China  
Tel: 021-51053127 51053128 Fax: 086-021-51053123  
Email: jieji@online.sh.cn Mail Code: 200081

## 2. 2 Principle technical performances

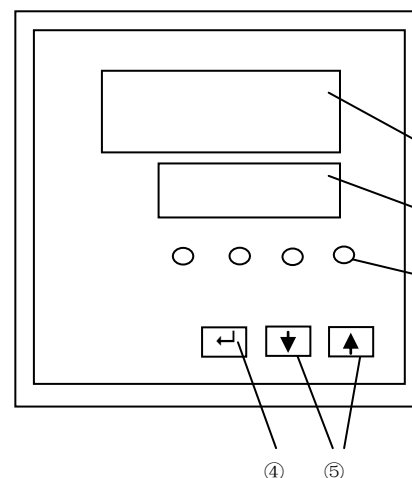
- (1) Power supply voltage: 198 to 242 VAC(50/60Hz)(rated voltage 220VAC)
- (2) Power consume: less than 5VA
- (3) Control mode: Half proportional or on-off PID control
- (4) The load power for heating output  $\leq 0.8KW$
- (5) The refrigeration output: Relay 240VAC, 5A to drive the immediately switch
- (6) The size of panel hole: 91×91(mm)
- (7) external thyristor(Max41A) (10) (11) (12)。

## 3. WIRING



After pulling out it the buzzer will be open current, the sound will cease.

## 4. Configuration of the Instrument Panel



① PV display unit(Red)

• Displays measured value or the various characters depending the statue of the instrument

② SV display unit(Green)

• Displays the set value or the timing and rated parameters

③ Indicators

• RUN working indicator(Green), Flashes during auto-tuning execution.

• HAT heating output indicator(Green), turned on when outputs operate

• ALM alarming indicator(Red),

turned on when alarming output operate and the buzzer sounds

• COL refrigeration output(Green) turned on when the refrigeration is working

④ Function key

• Used for displaying the change and confirm of the parameters

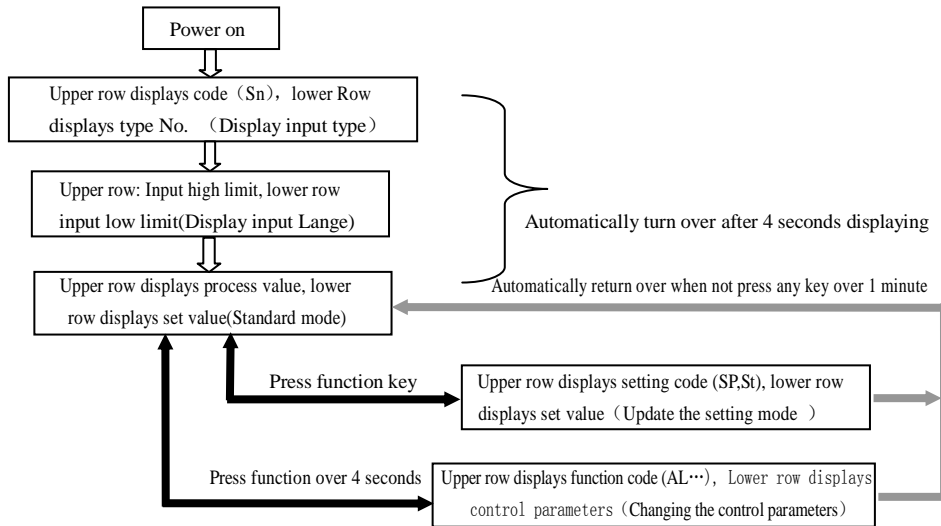
⑤ Add or Subtract key for changing the digital code

and/or the key to express entering the auto-tuning state

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

## 5. OPERATION

### 5.1 Sequence to pick up the functions of the instrument



### 5.2 The detail description for every function

- If upper row displays "OVER" the sensor is in open circuit or the input signal exceeds the range of measurement.
- The method for changing set value:  
Press  $\leftarrow$ /set key the upper row displays SP. Press  $\blacktriangle$  or  $\blacktriangledown$  key, the low row displays the needed value. Again press  $\leftarrow$  the upper row displays st key. Press  $\blacktriangle$  or  $\blacktriangledown$  key, the lower row displays the timing time needed. Again press  $\leftarrow$ key, the instrument return to the standard display mode.
- Timing function  
When the value of St is setting to zero, the timing function is canceled. Otherwise when the value of St is not setting to zero the timing function is available.  
When the power is turned on, the timing function starts. In case of achieving the setting timing the heating output is close. and the buzzer sounds four times to notice the operator.  
But the refrigeration output is working continuously. When the system is starting with auto tuning, the timing function is also canceled. When the auto tuning process is completed, the timing function would start again. During the operating period of the instrument, it is allowed to update the value of St online, and the time passed can be memorized and the instrument will operate the updated timing time. When the updated time is less than the passed accumulative time, the heating output close immediately, the buzzer sounds 4 times. The refrigeration output is working continuously.
- The method for changing control parameter:  
After press  $\leftarrow$ key over 4 seconds, find LK. Then press  $\blacktriangle$  or  $\blacktriangledown$  key to the lower displayer display 18. Again press the  $\leftarrow$ key to find the symbol character for the needed parameter. Through press the  $\blacktriangle$  or  $\blacktriangledown$  key till the high row displays display the parameter needed is reached. Some parameters may be setting at once. Press the  $\leftarrow$ key over 4 seconds the instrument returned to the standard mode. If no key is press down the instrument return to its standard mode after 1 minute.

### 5.3 The function of the controller Auto-tuning

- After pressing  $\blacktriangle$ /TIME key, The instrument displays the time have operated.  
After pressing  $\blacktriangledown$ /AT key 20 seconds the AT indicator flashes and the auto-tuning press starts; after the end of auto-tuning the AT indicator then be turned out. A set of PID parameters can be got automatically for overcoming temperature overshoot. The controller operates according to this set of PID parameters.  
The controller operates according to this set of PID parameters.  
is working continuously.
- In the period of auto tuning, if press  $\blacktriangledown$ /AT key beyond 20 seconds the AT indicator turn out and the auto tuning process is canceled. The instrument operated according to the original PID parameters.
  - Following table lists the function parameters

Symbol	Name	Setting range	Description	factory set value
$\overline{AL}$ AL	Alarming setting	0~Full Range 0.0~Full Range	When temperature is beyond SP+AL, the ALM indicator turn on. The buzzer sounds and the heating power turn off.	50 (50.0)
$\overline{CL}$ 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.	50 (50.0)
$\overline{P}$ 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.	30 (30.0)
$\overline{I}$ I	Integral Time	0~3600 seconds	Integrated time constant. I larger, then the integrated action is smaller.	240
$\overline{d}$ d	Derivative Time	0~3600 seconds	Derivative time constant. D larger, then the derivative action is also larger. D can overcome overshoot. I=0 and D=0 is called half proportional control.	60
$\overline{Ar}$ Ar	Overshoot Control (re-setting)	0~100%	At on-off PID control, the value of Ar is a constant which equals 1.5~2 times 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.	100
$\overline{T}$ T	heating period	1~300 seconds	For the thyristor output it is about 1~3 seconds. For those equipment that the superfluous power provided is comparatively larger, select larger T would decrease the stable error caused by PID control.	3
$\overline{Pb}$ 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.	0
$\overline{PK}$ 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.	0
$\overline{Ct}$ Ct	Refrigeration control Time delayed	0~3600 seconds	When measuring value reaches its alarm value, the alarm relay output will be delayed this time..	60
$\overline{dP}$ dP	The decimal Point setting	0; 1	When D=0 the display resolving power is 1°C and when DP=1 the display resolving power is 0.1°C	1
$\overline{rH}$ rH	The range setting	0~400°C 0.0~99.9°C	Adjusting rH can make the instrument range equals 0~rH(°C)	Range
$\overline{LK}$ LK	Password key	0~255	when Lk=18 the parameters listed above then the above parameters can be updated.	0