WERTH

MEASUREMENT INSTRUMENTS



THERMOSTATIC OIL BATH

1. Summary 1
2. Features 1
3. Product parameter table 7
4. Safety Precautions 8
5. Quick Use 10
6. Detail Operation 16
7. System Information 28
8. Accessory 28
9. Maintenance .....

1. Summary

KET -300 portable oil tank is an easy to carry, easy to use, can quickly provide a stable temperature field (room temperature + 30℃ ~300℃), suitable for reliable temperature calibration, widely used in machinery, chemical, food, medicine and other industries of industrial constant temperature equipment. This product through the high precision sensor temperature measurement and reliable temperature control circuit, to ensure that the accuracy is higher than other domestic manufacturers, the technology reaches the international standards. Advanced touch-type operation, simple and fast to use, constant temperature tank using a high-precision temperature sensor, can make the system resolution up to 0.001℃. Features 。

2. Features

Fast Temperature Control, strong anti-interface ability

This equipment adopts the optimized PID control algorithm, which shortens the stabilization time, and the temperature difference of 30°C can be stabilized in less than 35 minutes. Similarly, when the temperature receives external interference, it can quickly stabilize again.

Resolution 0.001°C, fluctuation ±0.02°C

The portable oil tank adopts the self-developed precision temperature control module, combined with the appropriate heating parts and mixing device, so that the working environment temperature in the oil tank can be stabilized within 0.01°C. The high precision temperature sensor used in the constant temperature oil tank can bring the resolution of the system to 0.001°C。

- **With Multiple temperature calibration points, temperature control is more accurate**

A number of calibration points are set in the system, and a standard thermometer can be used to calibrate the temperature of the device. After calibration, the temperature accuracy of the device can be greatly improved.

- **Increase the control parameter self-tuning function, which can adapt to more use environments**

The automatic parameter setting function is added to the system. When the temperature control effect of the device is poor or the ambient temperature changes greatly, users can use the automatic parameter setting function to adjust parameters.

- **functional diversity Meet all kinds of usage scenarios**

The device has a variety of functional options, including: high and low temperature alarm, high temperature warning, language switching, unit switching, brightness adjustment, automatic setting of temperature control parameters, control mode selection, serial communication (optional), file saving, sensor fault alarm, temperature stability warning and other functions.

- **Multiple sensors can be inserted at the same time for testing and calibration**

The machine has a number of slot inserts in common sizes, which can meet most of the sensor calibration use. Users can also contact the sales staff to customize the required size.

- Level temperature field, the vertical temperature field

The heating medium is liquid, and the uniformity of temperature field is excellent.

- **Touch Screen display**

Equipped with 7.0 inch screen, 16 bit true color RGB display, the temperature display in the working area eye-catching, convenient timely viewing. Full touch operation, easy to use.

➢**Sentenced to stability conditions can be set up, smart reminder after stability**

The device has the temperature stability condition. You can modify the condition as required. When the device reaches the stable condition, it will remind the user to save the waiting time

➢**Comprehensive protection function, using at ease**

With load short circuit, load break, sensor protection and other functions, when the equipment failure, the system will timely alarm and execute the corresponding action, to protect the equipment and personal safety.

Model	medium	Temperature range (℃)	Temperature field uniformity		Temperature fluctuation(℃/15 min)	work area(mm)	volume(L)	Dimension(L*W*Hmm)	weight (kg)	power(kw)
			horizontal(℃)	perpendicular(℃)						
KET 75	silicone oil	homoiothermy+30~300	0.01	0.01	±0.02	80x250	5	420x201x460	15	1.2

2. Product parameter table

The following table details the technical parameters of the thermostatic tank.

Heat up and stabilize the speed	Natural cooling speed	Hole number	pore size
<15min/50℃	<1.4℃/min	9 个	7mmx4; 10mmx4; 14mmx1

3. Safety Precautions

Please use the instrument in accordance with this manual. Otherwise the protective function of the instrument may be affected. See the security information in the warning and attention sections below.

The following definitions apply to the terms "warning" and "attention."

"Warning" indicates conditions and actions that may endanger users.

"Caution" indicates conditions and actions that may damage the instrument used.

warning

Please do not Use this instrument for other applications other than calibration. The instrument is designed for temperature calibration. Any other use can cause unpredictable harm to users.

Please do not Place the instrument under a cabinet or other object. Space needs to be left at the top so that probes can be inserted and taken

Special attention is required when using the instrument at high temperature and when running at high temperature， it is not recommended to run without monitoring, which may cause safety problems.



It is forbidden to operate the instrument in any direction other than vertical. Tilting the instrument or turning it over to the side may cause a fire incident.

Pay attention to the danger of scald

Do not touch the upper surface and motor parts of the equipment with your hands while working to prevent burns .

Never use instruments near combustible materials.

4.Quick Use

5.1prepare the items

1、Stable laboratory temperature.

2、Thermostatic bath

3、Heating medium (Generally, methyl silicone oil,, are about 5L).

4、220V AC power supply, 10A socket or wall plug

5、High temperature resistant container (for receiving liquid from overflow pipe)

6、Fan or smoking machine, because the methyl silicone oil will smoke at high temperature (above 200℃).

5.2**Operation**

1、Put instrument in the right position,then keep it horizontal and stable. Place the container connected with the overflow pipe liquid.

2、Pulling heating medium(methyl silicone oil) into the instrument slowly until it reaches the upper surface of the working area，as shown in Figure 5.2.1

3、Cover the thermometer fixing plate, insert the thermometer under test, connect the power supply, and turn on the equipment switch.

3、After turn on the instrument, it shows the current temperature and working status. The stirring motor starts, and the medium starts to cycle The screen shows main display Interface, as shown in Figure 5.2.2

Liquid can't exceed this position!!!

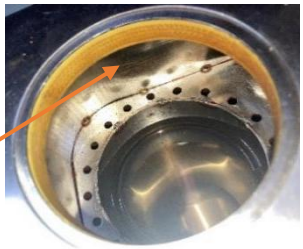


Fig 5.2.1

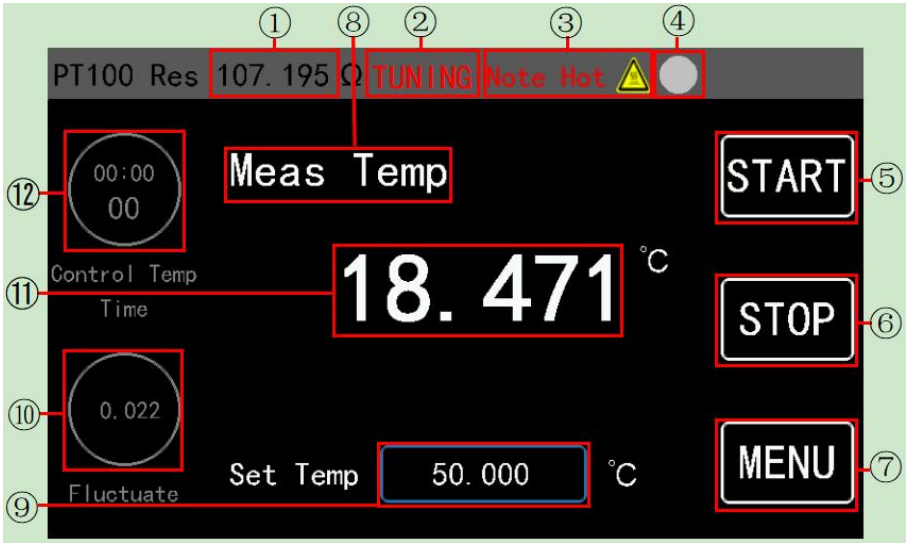


Fig5. 2. 2 main page

①Resistance value of PT100: shows the resistance value corresponding to the temperature.

②Self-adjusting status prompt word

③High temperature warning: when the medium temperature exceeds 100℃, the high temperature text and icon will be displayed, and the text flashes;

④Working status indicator icon;

⑤Start button

⑥Stop button

⑦Menu button: enter into menu interface

⑧When the temperature is stable, they turn green; (the conditions to determine whether the temperature is stable can be set in the stability determination interface)

⑨Setting work temperature

⑩Temperature fluctuation: indicate the temperature fluctuation in the last 10 minutes

⑪Heat source temperature: display the medium temperature in the last constant temperature tank measurement

⑫Duration time of equipment operation

5、Set the temperature, The equipment starts with the heating. Note that there may be media flowing out of the overflow tube during heating. When the text color of

"measuring temperature" becomes green, it indicates that the medium temperature has met the stability judgment condition.

6、After changing the temperature, you re-click the heating button

7、Click the Stop button after finishing the work, and then turn off the power.

8、About releasing the liquid in the release tank. The oil tank cavity is made of metal, and the oil can be placed in the tank for a long time; the liquid in the tank can be released through the drain valve, high temperature, and the personnel away from the drain outlet; if the oil release speed is too slow, the oil in the chamber can be heated to about 40℃; the whole oil release process takes about 30 minutes.

6. Detail Operation

6.1System Menu Structure

The specific structure of the system menu is shown in Figure 6.1.1. You can quickly understand the specific functions of the device according to this figure.

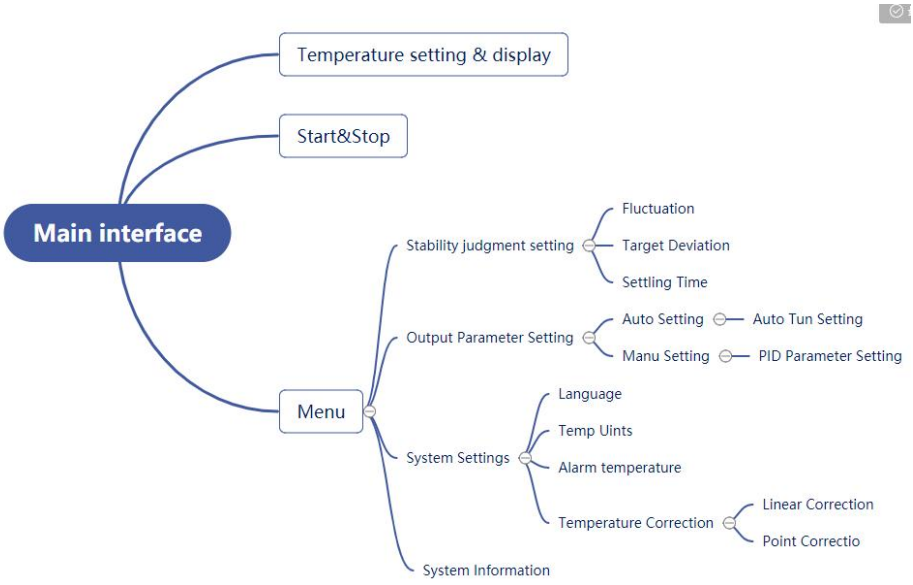


Fig 6.1.1 System structure

6.2 System Menu

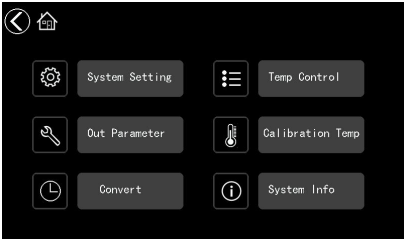


Fig6.2.1 Menu Interface

As shown in Figure 6.2.1, it is the general entrance of system operation, including stability judgment setting, output parameter setting, system setting and system information, etc. Click the corresponding text to enter the corresponding interface.

6.3 Temperature stability judgment setting

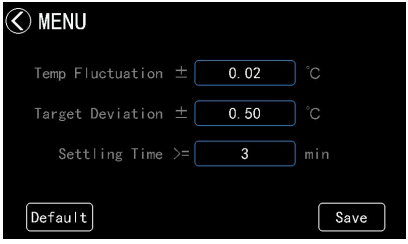


Fig6.3.1 Temp Stability Judgement Interface

This setting mainly includes fluctuation, target deviation and stability time.

Fluctuation Indicates the value of stable up-and-down fluctuations;

Target Deviation The deviation from the set

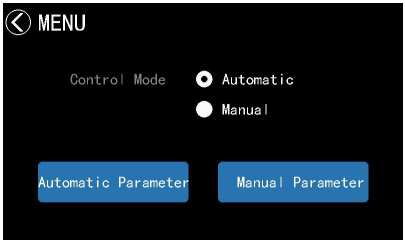
value in which the deviation range is stable can be judged to be stable.

Stable Time The time when the temperature fluctuation does not exceed the fluctuation degree

For example： The preset target temperature is 100℃, the stability judgment parameter is set to the fluctuation of 0.02, the target deviation is 0.1, and the stability time is 3 minutes. Then the judgment condition is that between 99.9℃ and 100.01℃, the temperature fluctuation of less than 0.02℃ is greater than or equal to 3 minutes

6.4 Output parameter setting

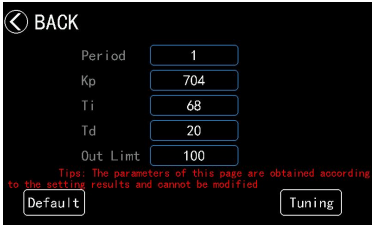
After you click parameter setting, you will enter the control mode selection interface. The system has two control modes: automatic control and manual control. Click the button below to enter the corresponding setting interface. The control mode selection interface is shown in Figure 6.4.1.



6.4.1 Control mode selection screen

6.5Automatic Control

Automatic control Mode The system controls the temperature based on default values or self-tuning parameters. The parameters cannot be changed. This mode is recommended for control. The system will choose automatic control mode by default every time it starts up. Figure 6.5.1.



6.5.1Automatic control parameter interface

6.6 Automatic Setting

Automatic setting function is an auxiliary function under automatic control mode. When the temperature control effect of the device is not good, the user can choose to self-adjust the control



6.6.1 Set the temperature range interface

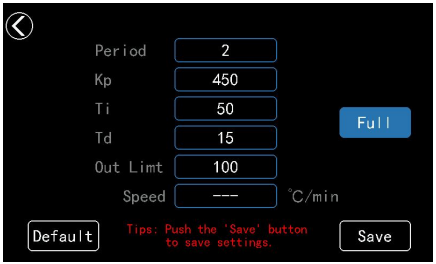
parameters. Click "Setting Settings" to set the temperature range, as shown in FIG. 6.6.1, and then click "Confirm". The system will jump back to the main page with "Setting" prompt on the interface. Until the system prompts that the setting process is complete. In the setting process, you can also click the Stop button to end the process, but this self-setting will fail.

In principle, the setting process should be completed at one time, but because it takes a long time, it can be temporarily stopped after the setting of the first temperature point. (When the calibration of the first temperature point is completed, the temperature changes to the upper temperature, and the buzzer will call once.) The system holds the data for this temperature point. It can then be stopped or turned down. The next time the operation continues, the system will automatically jump to the last unfixed point and continue to set.

6.7Manual Control

Manual Control Setting set PID parameters for full power mode and constant rate mode, as shown in Figure 6.7.1. Click the Restore Default button to restore all Settings to preset values.

Note: After the setting is complete, the setting value will be saved only by pressing "Save". Otherwise, the modification will be regarded as abandoned.



6.7.1 Manual control parameter setting interface

PID Cycle Setting

The adjustment operation period of the instrument, in seconds; The value ranges from 0 to 100. The default value is 2. This parameter has great influence on the quality of regulation, and the appropriate value can solve the overshoot and oscillation phenomenon perfectly, and obtain the best response speed. You are advised to change the value based on the preset value.

PID Proportional coefficient setting

The scale factor determines the size of the scale band. The smaller the ratio band, the stronger the adjustment effect (equivalent to increasing the amplification factor); On the contrary, the larger the ratio band, the weaker the regulation effect. You are advised to change the value based on the preset value.

PID Integration time setting

The integration time determines the integration intensity. If the integration time is short, the integration action is strong and the time to eliminate the static difference is short.

However, if the integration action is too strong, it may lead to a large oscillation when the temperature is stable. On the contrary, if the integration time is long, the integration action is weak, but the time to eliminate the static difference is longer. You are advised to change the value based on the preset value.

PID differential time setting

Differential time determines the strength of differential action. Differential time is long, differential effect is strong, reaction to temperature change Sensitive to reduce temperature overshoot. But too strong differential action may increase the temperature oscillation range and prolong the stability time.

Power limit setting

Limit the main output power. Percentage indicates that the value ranges from 0 to 100. The larger the value is, the larger the output power and the faster the heating is. However, it may not be conducive to the service life of the heating module. The default value is 100%.

6.8 System Setting (The following functions shall be used with the authorization of the manufacturer)

System Settings include language Settings, temperature scale Settings, alarm Settings, unit Settings. The system setting interface is shown in Figure 6.8.1.

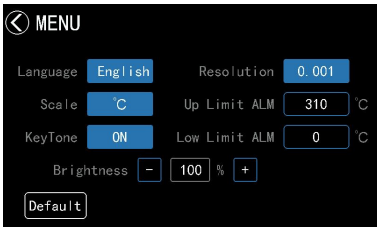


Fig 6.8.1 System Setting interface

System language setting

Supports Chinese and English system languages. Click to switch.

Set the system temperature scale

Support two system temperature scales, Celsius and Fahrenheit. Click the drop-down menu to set.

Alarm upper limit setting

Used to set upper limit alarm points. When the output is turned on, if the temperature in the furnace exceeds the alarm upper limit, the system will pop out the temperature alarm window, the buzzer will sound, and the output will be turned off. The value ranges from 0℃ ~300℃.And it cannot be lower than the alarm lower limit.

If not, set it to the maximum value.

Upper and lower alarm Settings

Used to set upper and lower alarm points. When the output is turned on, if the temperature in the furnace is lower than the alarm lower limit or higher than the upper limit during the heating process, the system will give a prompt message and carry out the corresponding operation. The value ranges from 0℃~300℃, and cannot be larger than the alarm upper limit.

If no, set it to -1.

Screen brightness setting

Percentage value Settings, from darkest to brightest, 0~100, press +/- to adjust the value.

6.9 Temperature Correction

The temperature correction function is to correct the display temperature and temperature control temperature of the device. The device display and temperature control can be closer to the actual value. Take KET-300 as an example. On the system setting screen, press "Temperature Correction" to enter the temperature correction screen, as shown in Figure 6.8.2

The system provides 11 temperature points. When there is an error between the temperature displayed by the instrument and the real temperature, the correction value is entered to correct the current display. (Correction = original correction value - (current heat source temperature value - standard thermometer value)) Click "Restore default" to restore all Settings to factory values.

Note: After the setting is complete, the setting

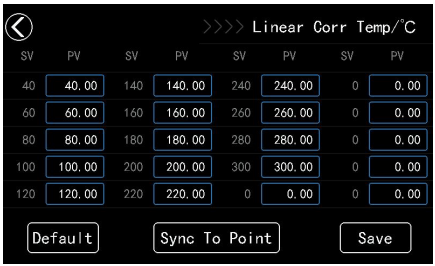


Fig 6.8.2 Linear Correction interface

value will be saved only by pressing "Save". Otherwise, the modification will be regarded as abandoned.

7.System Information

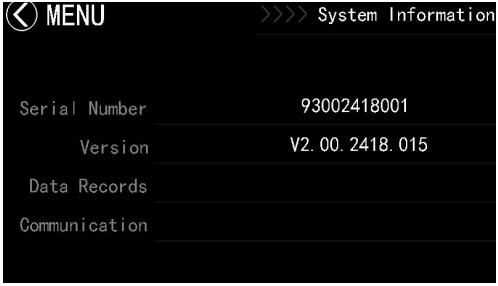


Fig 7.1.0 System Information Interface

Click the "System Information" button on the menu interface and jump to the system information interface to view the system information. include

- Serial number

- Version number
- The File function is enabled for the status of
- The communication function is enabled for the current status

8.Factory accessories

8.1standard accessory

Three core power cable

Oil header

1 power fuse (in a power outlet)

Slot insert (9 holes, customized)

User Manual

8.2 Optional attachment

USB data wire

9. Outline specification

Source：220V/50Hz

Power：1.2KW

Volume：5L

Outline dimension：420mm*210mm*460mm

Weight：15Kg

10.Maintenance and maintenance

The oil tank cavity is made of metal, which can not discharge the working medium after use. But take careful to prevent water incorporation.