Professional Thermometers

User Manual

V1.5.6

Contents

Document Description

This section provides important information for using this document.

This document contains the information necessary to use this product safely and effectively. Please read the contents of this document carefully and familiarize yourself with the operation of this product.

Key Action Description

Short Press: Press the button and then lift it, there will be a prompt sound when pressed.

Long Press: Press and hold the button for about 2 seconds, then lift it up after hearing the prompt.

There will be a prompt sound when the function corresponding to the key is activated. No sound means that the current function is not available or the key sound is turned off.

Document Identification Description

Sign	Meaning	Description
‼	Note	Provide important tips and information
✓	Condition	A condition that must be met before an operation can be performed
➢, 1, 2...	Goal	Indicates the goal you want to achieve. The number is the sequence of the steps required to achieve the goal, and this sequence must always be followed
BUTTON	Button	Short press/long press the button
-	Supplement	Supplementary instructions for certain operations/items
●	Enumerate	List some details or examples related to the project
◆	Result	The result obtained when performing certain operations

1. Safety Instructions

This section describes the general rules that must be obeyed and followed in the safe use of this product.

Avoid Personal Injury/Equipment Damage
- Do not use this measuring instrument to measure on or near live parts (Especially high voltage).
- Do not use the probe to measure corrosive solvents, unless it is a designated anti-corrosion probe.

Statement on the Safety/Warranty Effectiveness of This Product
- Only operate the measuring instrument within the range specified in the technical parameters of this document.
- Always use the measuring instrument in the correct way and its intended purpose.
- Do not place the handle and cable in an environment above 80℃, unless they are explicitly allowed to be used in high temperatures. The temperature given on the probe is only related to the measuring range of the sensor.
- Only disassemble the instrument when it is clearly stated in the document that it is for maintenance and repair purposes. Only perform the maintenance and repair work described in the documentation. Perform maintenance and repair work in accordance with the prescribed steps. For safety's sake, only original parts from the original manufacturer can be used.

Proper Disposal Statement
- Send the used batteries to the battery recycling point.
- At the end of the service life of this product, please send the product back to the original factory. We promise to dispose of these recyclables in an environmentally friendly manner.

2. Intended Use

This section describes the intended use range of this product.

Use this product only for those applications for which it is designed.

This product is a dual-channel high-precision measuring instrument with calibration for temperature measurement.

Accurate Measurement: Whether it is a low-temperature cold storage or a high-temperature boiler, the flexible use of multiple types of probes can ensure accurate measurement across the entire range.

Safe and Reliable: Provide you with a safe and reliable measurement experience during the measurement process.

High Scalability: Standard thermocouple sockets can be used to connect probes of any shape.

Excellent Performance: Super large backlight display; temperature over limit alarm; maximum/ minimum/ average value display; super large dot matrix screen to display more information.

Practical Accessories: Protective soft cover, waterproof and oil-proof, when connected with temperature probe, it can reach IP52 protection level.

This product can be used for (Including but not limited to) the following tasks/applications:
- Temperature standard instrument
- Scientific experiment
- Medical
- Food
- Chemical industry
- HVAC industry

This product cannot be used (Including but not limited to) the following tasks/applications:
- Use in explosion-hazardous areas
- Use of high-voltage areas
- Smelting industry

3. Product Description

This description the product structure and its effective outline.

3.1 Display and Control Components

Instrument Overview

Probe Interface

LCD Screen

USB Interface

Button

Battery Case
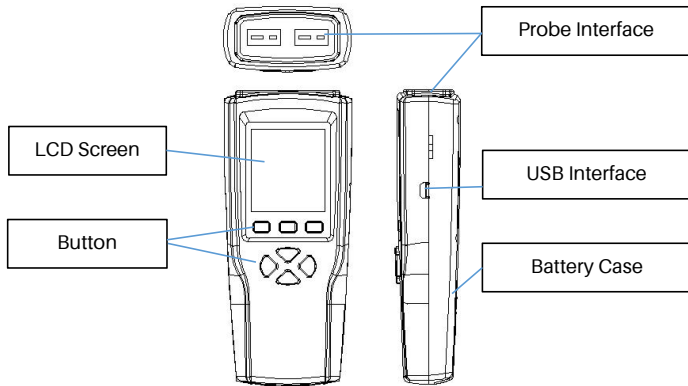
Button Function

| Button	Function
F1	Multi-function key 1, its function will be displayed at the bottom left of the screen
⏻	Turn on the instrument; turn off the instrument (Long press)
☀	Turn on/off the backlight
F2	Multi-function key 2, its function will be displayed at the bottom right of the screen
PROBE	Switch the type of probe
HOLD	Keep the current reading
MAX/MIN/AVG	Display maximum/minimum/average value
℃/℉	Switch the unit of reading

Important Display

Display	Meaning
❗	Alarm enable: Displayed when the alarm function is turned on, and combined with the next icon to indicate the enabled channel
1, 2, 12	Only channel 1 enables alarms, only channel 2 enables alarms, and both channels enable alarms
⬆, ⬇	Upper and lower limit alarm: Display when the temperature is higher than the upper limit or lower than the lower limit
L	Auto power off: Display when the auto power off function is turned on
▥	Battery capacity: Displayed when the instrument is powered by batteries

Area Division
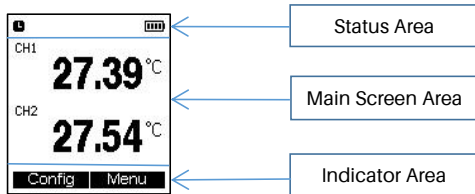
The division of the area is to facilitate you to quickly locate the position of the icon or reading you want to view.

3.2 Interface

- **Probe Interface**
  - The pluggable probe can be connected to the measuring instrument through the probe interface.
- **USB Interface**
  - The measuring instrument can be connected to a computer through a Micro USB cable.

3.3 Instrument Power Supply

- The instrument uses 3 1.5V AAA batteries or 1.2V AAA rechargeable batteries for power supply under normal conditions.

4. Operations

This section describes operations frequently performed when using this product.

4.1 Preparation

- Tear off the protective film on the display.
- Put in the battery/rechargeable battery, pay attention to the polarity of the battery.
- Connect the plug of the probe to the probe interface of the measuring instrument.

4.2 On/Off Instrument

➢ **Turn On the Instrument/Check the Version Number and Serial Number**

1. Short press the key ⏻. The instrument enters the power-on state, press and hold the ℃/℉ key in the power-on state, you can see the version number and serial number on the screen.

➢ **Turn Off the Instrument**

1. Long press the key ⏻. Raise the ⏻ key when you see "Shut down!" displayed on the screen.

4.3 Backlight

➢ **Turn On/Off the Backlight**

✓ Turn on the instrument.

1. Short press ☀ key to turn on or off the backlight. The display icon ☀ indicates that the backlight is on. After the backlight is automatically turned off due to power saving, press any key to turn on the backlight.

4.4 Multi-Function Button

- This instrument has two multi-function buttons: $\boxed{F1}$ and $\boxed{F2}$. Their specific functions will be displayed in the indicator area!

Commonly used F1 key function analysis		Commonly used F2 key function analysis	
Config	Enter the configuration interface	Menu	Enter the menu interface
Enter	Enter the next level option interface	Exit	Exit the configuration interface or menu interface
Set	Change the setting of the current option	Back	Return to the previous interface or exit the editing interface
Ok	Confirm the change of an option or value	No	Cancel an operation
Yes	Perform an action		
Edit	Edit a value		

4.5 Channel Mode

- The instrument has two thermocouple measurement channels and four channel modes, which can be used flexibly to meet various measurement needs. As shown in the following table:

Channel mode	Dual channel		Single channel	
	Merge mode	Difference mode	One mode	Two mode
Sample graph	CH1 **27.39**°C CH2 **27.54** Config | Menu	CH1-CH2 **-1.36**°C CH1: 28.99 °C CH2: 30.35 °C Config | Menu	Type-K CH1 **25.01**°C 25.78 24.44 Config | Menu	Type-K CH2 **25.04**°C 25.70 24.46 Config | Menu
Features	Dual-channel simultaneous measurement and simultaneous display	Suitable for measuring items related to temperature difference	The temperature change curve of channel 1 can be seen	The temperature change curve of channel 2 can be seen

- **Single Channel Trend Chart**

The highest temperature of the trend graph, the unit is ℃

Temperature curve

The lowest temperature of the trend graph, the unit is ℃
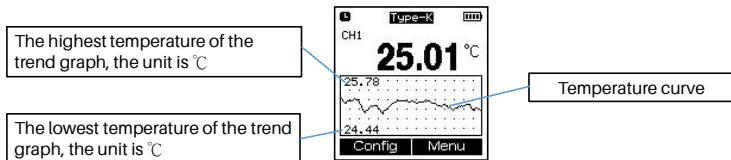
!! The maximum temperature of the trend graph is set to 105% of the maximum temperature measured in the chart. Therefore, the display may exceed the range, but it does not mean that the instrument can measure the temperature that exceeds the range. The same is true for the lowest temperature of the trend chart.

4.6 Set Up the Instrument

➤ **Open the Configuration Interface**

✓ The instrument is turned on and the indicator area is displayed Config | Menu

1. Short press the key F1 (Config). Enter the configuration interface.

!! The configuration interface is shown on the right. Can use the key ▲ / ▼ to move the cursor.

!! The settings related to the properties of the instrument are all in the configuration interface.

!! You can exit the configuration mode at any time, just short press the key F2 (Exit). The changed settings will be saved when exiting the configuration mode.

10

- ➢ **Set the Channel Mode**
  - ✓ Open the configuration interface and move the cursor to "Channel Mode".
  - 1. Short press the key `F1` (Enter) to enter.
- ➢ **Set the Key Sound**
  - ✓ Open the configuration interface and move the cursor to "Sound".
  - 1. Short press the `F1` (Set) key to switch settings.
- ➢ **Set Automatic Shutdown**
  - ✓ Open the configuration interface and move the cursor to "Auto Off".
    - ‼ After the automatic shutdown function is turned on, if no key is pressed within 10 minutes, the instrument will automatically shut down.
  - 1. Short press the `F1` (Set) key to switch settings.
- ➢ **System Language**
  - ✓ Enter the configuration interface, and move the cursor to "Language".
  - 1. Short press button `F1` (Enter), and then press `▲`/`▼` to switch settings.
- ➢ **Restore the Default Factory Configuration**
  - ✓ Open the configuration interface, move the cursor to "Recovery", short press `F1` (Enter) to enter, and wait for 5 seconds.
  - 1. Short press the `F1` (Yes) button to restore the factory configuration. Short press the `F2` (No) key to return to the configuration interface.

4.7 Set Data

- ➢ **Open the Menu Interface**
 - ✓ The instrument is turned on and the indicator area is displayed Config | Menu
  - 1. Short press the `F2` (Menu) button. Enter the menu interface.
    - ‼ The menu interface will change according to the channel mode, as shown in the table above.

- ‼ Short press $\boxed{\blacktriangle}$ / $\boxed{\blacktriangledown}$ key to switch menu options. If there is a triangle icon at the right end of the cursor, it means there are sub-options, short press the $\boxed{\blacktriangleleft}$ / $\boxed{\blacktriangleright}$ key to switch the sub-options.
- ‼ The options related to the measurement data are all in the menu interface.
- ‼ You can exit the menu interface at any time, as long as you short press the $\boxed{F2}$ (Exit) button. The changed settings will be saved when exiting the menu mode.

Channel mode	CH1 and CH2		Only CH1	Only CH2	CH1 — CH2
Option 1	High Limit-CH1	High Limit-CH2	High Limit-CH1	High Limit-CH2	Difference Limit
Option 2	Low Limit-CH1	Low Limit-CH2	Low Limit-CH1	Low Limit-CH2	Diff-Alarm
Option 3	Alarm-CH1	Alarm-CH2	Alarm-CH1	Alarm-CH2	Calibration
Option 4	Calibration				
Option 5	Logging (models with recording function)				

➢ **Set the Temperature Upper Limit Alarm Value**
  ✓ The instrument turns on and enters the menu interface.
  1. Move the cursor to "High Limit-CH1" or "High Limit-CH2", short press the $\boxed{F1}$ (Edit) key to set the upper limit temperature alarm value of the channel (In the dual-channel combination mode, the options of channel 2 are folded in the sub-options. You need to short press the button $\boxed{\blacktriangleright}$ first).
➢ **Set the Temperature Lower Limit Alarm Value**
  ✓ The instrument is turned on and enters the menu interface.
  1. Move the cursor to "Low Limit-CH1" or "Low Limit-CH2", short press the $\boxed{F1}$ (Edit) key to set the lower temperature limit alarm value of the channel (In the dual-channel combination mode, the options of channel 2 are folded in the sub-options. You need to short press the button $\boxed{\blacktriangleright}$ first).

- ➢ **Set the Temperature Alarm Switch**
  - ✓ The instrument turns on and enters the menu interface.
    - ‼ The status of the alarm enable will be directly displayed on the option. "Beep" means that the way of the alarm is the buzzer to sound the alarm.
  1. Move the cursor to "Alarm-CH1" or "Alarm-CH2", short press the ⬚F1⬚ (Set) key to turn on or turn off the temperature alarm of the channel (In the dual-channel combination mode, the options of channel 2 are folded in the sub-options. You need to short press the button ⬚►⬚ first).
- ➢ **Set the Temperature Difference Alarm Value**
  - ✓ In the dual-channel difference mode, enter the menu interface.
  1. Move the cursor to "Difference Limit", short press the ⬚F1⬚ (Edit) key to set the temperature difference alarm value.
- ➢ **Set the Temperature Difference Alarm Switch**
  - ✓ In the dual-channel difference mode, enter the menu interface.
    - ‼ The basis of the temperature difference alarm is that the absolute value of the temperature difference of the dual channels is greater than the temperature difference alarm value.
  1. Move the cursor to "Diff-Alarm", short press the ⬚F1⬚ (Set) key to turn on or off the temperature difference alarm.

4.8 Calibration Instrument

- ➢ **Open the Calibration Mode**
  - ✓ The instrument is turned on and enters the menu interface.
    - ‼ This product has two channels, and each channel can be calibrated separately. The calibration operation of each channel is the same, and each channel supports up to 10 calibration data points. **Calibration will directly affect the measurement data. Please make sure that the calibration value is the result of the correct measurement by a higher precision instrument.**
  1. Move the cursor to "Calibration" and short press ⬚F1⬚ (Enter).

13

- ➢ **Start Calibration/Check the Total Number of Data Points**
  - ✓ Open the calibration mode and enter the "Select channel" interface.
    - ‼ The number of calibration points available is displayed after the channel. For example, if the channel 1 has 2 calibration points, "CH1: 2 Points" will be displayed.
    - ‼ The operations of all channels are the same, so the following operations take calibrating a channel 1 as an example.
  1. Move the cursor to "CH1", and then short press the ⬚F1⬚ (Enter) key to start calibrating the channel 1.
- ➢ **Delete All Data Points**
  - ✓ Open the calibration mode and enter the "Select channel" interface.
    - ‼ The operations of all channels are the same, so the following operations take calibrating a channel 1 as an example.
  1. Move the cursor to "CH1", short press the ⬚▶⬚ key, and change the option to "CH1: delete" and then short press the ⬚F1⬚ (Ok) key to delete all the calibration points of the channel 1 (It will not delete the calibration point of other channels).
- ➢ **Add a Data Point**
  - ✓ Open the calibration mode, select the channel to be calibrated in the "Select channel" interface and enter the "Select Data" interface.
    - ‼ After each data point, the temperature value before calibration is displayed, such as "Point 1: -100.00℃", which means the temperature value before calibration of the first data point is -100.00℃. Each time a data point is added, it will be automatically sorted according to the temperature value before calibration from small to large.
  1. Move the cursor to "Add new data", short press the ⬚F1⬚ (Ok) key to enter the data point editing interface. The interface for editing data points is as shown in the figure below " Editing Interface".
  2. Short press the key ⬚◀⬚/⬚▶⬚ to move the cursor, and short press the key ⬚▲⬚/⬚▼⬚ to increase or decrease the number where the cursor is located. Enter the temperature value before calibration in

14

the "Before" column, and enter the temperature value after calibration in the "After" column.

3. Short press the key `F1` (Ok) to save the calibration point data. Short press the key `F2` (Back) to return to the previous interface.

   !! When the data point is in effect, the affected channel number is displayed in reverse color. As shown in the figure below, "Before Calibration" and "After Calibration".
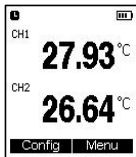
| Editing Interface | Before Calibration | After Calibration |

➢ Edit a Data Point
   ✓ Open the calibration mode, select the channel to be calibrated in the "Select channel" interface and enter the "Select Data" interface.
1. If a certain calibration point is entered incorrectly, for example, the second data point is wrong, you can move the cursor to the second data point and directly short press `F1` (Edit) to enter the edit mode to modify the calibration point data.
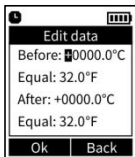
➢ Remove a Data Point
   ✓ Open the calibration mode, select the channel to be calibrated in the "Select channel" interface and enter the "Select Data" interface.
1. If you no longer need a certain data point, such as the second data point, you can move the cursor to the second data point, then short press the key `▶` to making the options change to "Delete data", then short press `F1` (Ok) to confirm the removal of the calibration point data.

4.9 Recording Data (Models With Recording Function)

➢ Turn On the Recording Mode
  - ✓ The instrument is turned on and enters the menu interface.
    - ‼ This product supports 20000 data points.
  1. Move the cursor to "Logging" and short press the $\boxed{F1}$ (Enter) key shortly.

➢ Start Recording/Abandon Recording
  - ✓ Open the logging mode and enter the "Logging" interface.
    - ‼ The internal storage will be cleared when the recording is first started, so the last recorded data will be cleared. At the same time, the automatic shutdown function is disabled.
    - ‼ During recording, the number of recorded data points will be displayed in real-time in the middle of the screen. And display the icon $\boxed{\text{E}}$.
  1. Move the cursor to "Start Logging", short press $\boxed{F1}$ (Enter) to jump to the main interface. At this time, short press the $\boxed{F1}$ (Start) button to start record; short press the $\boxed{F2}$ (Exit) button to abandon the record.

➢ Stop Recording/Save Results
  - ✓ Enter the recording mode and have started recording.
    - ‼ When the recording is stopped, the current result generation file will be automatically saved to the internal storage. Files can be viewed by connecting to a computer via USB.
    - ‼ In addition to manual stop, recording will also be stopped when the battery is low, the battery is loose, manual shutdown, and the number of recorded points reaches 20000 points.
  1. Short press the $\boxed{F1}$ (Stop) button to stop recording.

➢ View Record Information
  - ✓ Open the logging mode and enter the "Logging" interface. Before viewing, a data recording is required for at least once.
    - ‼ Connect the computer via USB to view all the record files.

!! If the user formats the USB flash disk on the computer side, the instrument must be restarted, otherwise the newly recorded data cannot be saved.

1. Move the cursor to "View", short press the $\boxed{F1}$ (View) key to enter the view information interface to view the latest recorded information. Short press $\boxed{\blacktriangle}$/$\boxed{\blacktriangledown}$ to switch the display content.

➢ View Disk Information
   ✓ Open the logging mode and enter the "Logging" interface.
1. Move cursor to "Flash", short press $\boxed{F1}$ (View) button to enter the disk usage information interface.

➢ Regenerate the File
   !! When the record file is damaged, it can be used to restore the file. If you want to generate other format files, please set the file format first and then generate again. When a new file is generated, the old file will be erased, please make a backup.
1. Move the cursor to "Regenerate File", short press the key $\boxed{F1}$ (Ok) to generate the file again.

➢ Enter the Setting Interface
   ✓ Open the logging mode and enter the "Logging" interface.
1. Move the cursor to "Settings", short press the key $\boxed{F1}$ (Set) to enter the setting interface.

➢ Set Time
   ✓ Open the record mode and enter the "Log Setting" interface.
   !! The time cannot be saved in the off state, nor can it be timed in the off state. Therefore, the time must be set after each power-on and before recording.
1. Move the cursor to "Set Time", short press the $\boxed{F1}$ (Set) key to enter the set time interface.
2. Short press the key $\boxed{\blacktriangle}$/$\boxed{\blacktriangledown}$ to select an option, short press the key $\boxed{\blacktriangleleft}$/$\boxed{\blacktriangleright}$ to modify the value of the option. Short press the $\boxed{F1}$ (Ok) button to save time.

➢ Set the Sampling Rate
   ✓ Open the record mode and enter the "Log Setting" interface.
   !! The sampling rate setting range is 1 second to 86399 seconds, that is, 23:59:59.

17

1. Move the cursor to "Set Sample Rate", and short press the $\boxed{\text{F1}}$ (Set) key to enter the set sample rate interface.
2. Short press the key $\boxed{\blacktriangle}/\boxed{\blacktriangledown}$ to select an option, and short press the key $\boxed{\blacktriangleleft}/\boxed{\blacktriangleright}$ to modifying the value of the option. Short press the key $\boxed{\text{F1}}$ (Ok) to save the short sample rate.

➢ **Set the File Format**
   ✓ Open the record mode and enter the "Log Setting" interface.
1. Move the cursor to "Set File Format", short press the key $\boxed{\text{F1}}$ (Set) to enter the text format setting interface.
2. Short press the key $\boxed{\blacktriangle}/\boxed{\blacktriangledown}$ to select the desired file format. Short press the button $\boxed{\text{F1}}$ (Ok) to save the file format.

5. Measuring

This section describes the steps required to perform measurements with this product.
   ✓ Turn on the instrument and enter the measurement interface. Insert the probe.
➢ **Perform Measurement and Read the Current Temperature Reading on the Screen**
   − When the alarm function is turned on, once the temperature is higher than the upper limit or lower than the lower limit, the instrument starts to alarm.
   − When the reading is lower than the upper limit or higher than the lower limit, the alarm stops.
   − In order to save power, the alarm will automatically stop 10 minutes after the start of the alarm.

- ➢ **Keep Reading**
  1. Short press the key `HOLD` to keep the reading of the main screen area. At the same time, the probe reading will continue to be displayed in small letters above the frozen reading.
- ➢ **View/Reset the Maximum, Minimum and Average Values**
  1. Short press the key `MAX/MIN/AVG` several times to switch the display of various values. The value will be updated in small print in real-time.
  - The following values are displayed alternately: maximum; minimum; average; current reading.
  2. In the process of viewing the maximum, minimum and average values, short press the key `F1` (Reset) to clear the statistical values.
- ➢ **Switch Unit**
  1. Short press the key `C/F` to switch between Celsius and Fahrenheit.
- ➢ **Switch Probe**
  1. In the two dual-channel modes, short press the key `PROBE` to enter the switch probe interface, and the word "PROBE" will flash in the status area. Short press the key `F1` / `F2` switch the probe type of the corresponding channel. The current probe type will be displayed on the right side of the channel number. In single-channel mode, short press the key `PROBE` to switch the probe type directly, and the current type will be displayed in the status area for 5 seconds.

6. Maintenance

This section describes steps that help maintain the functions of this product and extend its life.

➢ **Clean the Shell**
1. If the case is dirty, use a clean damp cloth to clean the case. Do not use aggressive cleaning agents or solutions!

➢ **Replace Battery/Rechargeable Battery**
✓ Turn off the instrument.
1. Remove the battery cover in the direction of the arrow marked on the battery cover.
2. Take out the used battery/rechargeable battery and put the new battery/rechargeable battery in the battery compartment. Pay attention to battery polarity!
3. Put back the battery cover, push it in the opposite direction of the arrow and fasten it.

7. FAQ

This section gives answers to frequently asked questions.

Problem	Possible reason	Possible solution
▭ The icon is bright, even flashing	• The battery of the instrument is too low	• Replace the battery
The instrument shuts down automatically	• Turned on the automatic shutdown function • Dead battery • The operating temperature exceeds the specified value	• Turn off the automatic shutdown function • Replace the battery • Transfer to a location that meets the requirements for measurement
Show "Error"	• The interface of the probe is loose and the contact is poor • Measuring temperature over the range	• Connect the probe • Replace the probe with a larger measuring range
The function is normal but the keys are silent	• Buzzer is damaged	• Please send it back to the original factory for repair
Inaccurate measurement data	• The probe is not connected correctly • The probe type does not meet the standard • The data point is set incorrectly • The internal circuit of the instrument is damaged	• Please connect the probe correctly • Please use the specified type of probe • Clear all data points • Please send it back to the original factory for repair

8. Technical Parameters

Probe type	Type-K	Type-T	Type-J
Number of channels	2		
Measurement parameters	Temperature (℃/℉)		
Range	-200~1370℃	-200~400℃	-200~1200℃
Resolution	0.01℃ (-200.00~999.99℃); 0.1℃ (1000.0~1370.0℃)		
Precision	±(0.3%|t|+0.40)℃		
Measuring rate	2 times/sec		
storage capacity	20000 sets of measured values (Models with recording function)		
Record sampling interval	1~86399 seconds adjustable (Models with recording function)		
Operating temperature	-10~50℃ (Non-condensing)		
Stored temperature	-20~60℃ (Without battery)		
power supply	3 pieces of 1.5V AAA alkaline batteries; 3 pieces of 1.2V AAA rechargeable batteries		
Protection level	IP52		
Dimensions	174*73*40mm		
Weight	About 200g (Excluding batteries and probes)		
Warranty period	12 months		

The accuracy of the system is affected by the quality of the probe! The above list is the accuracy of this machine. For more detailed technical parameters, please refer to the product specifications.
Standard Basis: JJF 1171-2007 National Standard "Calibration Specification for Temperature Circuit Detector";
JJG (Mechanical) 94-1992 Metrological Verification Regulation "Digital Temperature Measuring Instrument".