



# User Manual

## JK508 / JK516

HANDHELD MULTICHANNEL TEMPERATURE TESTER

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### Statement

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### Security information



warning



**DANGER:** To avoid possible electrical shock and personal safety, follow these guidelines.

### Disclaimer

Users should read the following safety information carefully before starting to use the instrument. JinAilian Electronic Technology Co., Ltd. will not bear any responsibility for the loss of personal safety and property caused by users' failure to comply with the following provisions.

### Instrument grounding

prevent the danger of electric shock, please connect the power ground.

### Do not use instruments in explosive atmospheres.

Do not use instruments in flammable, explosive gas, steam or dusty environments. The use of any electronic device in such an environment is an adventure for personal safety.

### Do not open instrument housing.

Non professional maintenance personnel should not open the instrument case to try to maintain the instrument. The instrument still has no clean charge released for a period of time after shutdown, which may cause electric shock hazard to the human body.

Do not use the instrument exceeding the manner specified in this instruction.

Beyond the scope, the protective measures provided by the instrument will be invalid.



**Warning** Do not add more than 350V DC voltage or more than 200V AC voltage to the test end, otherwise the instrument will be damaged.

### Safety signs:



The equipment is protected by double insulation or enhanced insulation.

Waste electrical and electronic equipment (WEEE) directive 2002/96/EC



Do not discard in the trash can.

### **Limited warranty and scope of liability**

Changzhou JinAiLian Electronic Technology Co.,Ltd (hereinafter referred to as JinAiLian ) to ensure that you buy each JK500 Series/516 in quality and measurement are fully qualified.This warranty does not include fuses and damage caused by negligence, misuse, pollution, accident or abnormal use. This warranty applies only to the original purchaser and is not transferable.

From the date of shipment,JinAiLian offers 90 Day Warranty and two year free warranty, which also includes VFD or LCD. During the 90 day warranty period, the replacement clause is terminated due to damage caused by improper user operation.During the repair period, the equipment was damaged due to improper operation of users, and the maintenance cost was borne by the users.Two years later, until the instrument is life-long, JinAiLian will provide maintenance by charging. For VFD or LCD replacement, the cost is charged at the current cost price.

If product damage is found, please contact JinAiLian to get information that you agree to return or replace.After that, please send the product back to the seller. Please be sure to explain the cause of the product damage, and prepay the postage and the premium to the destination.During the warranty period, the JinAiLian will be responsible for the transportation cost of the mail for repair or replacement of the product.Repair of non warranty products, Jin Ai Lian will evaluate the cost of repairs for non-warranty products. Maintenance will be performed only with your consent. All costs incurred by the maintenance will be borne by the user, including shipping costs for return mail.

This guarantee is the only guarantee for JinAiLian and the only compensation for youThere are no express or implied warranties (including warranties of suitability for a particular purpose) and all other warranties are explicitly denied.Jin Ai Lian or any other agent has not given any oral or written expression to establish or in any way extend the scope of this warranty.Jin Ai Lian will not be liable for any particular, indirect, incidental or consequential damage or loss (including loss of information) caused by any reason outside the scope of the specification.If one of these clauses contravenes local laws or because certain jurisdictions do not permit the exclusion or restriction of implied warranties, the local laws and regulations prevail, then this clause may not apply to you. However, the ruling of this clause does not affect the validity and enforceability of other provisions.

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## 1. Installation and setup wizard

Thank you for buying our products. Please read this chapter carefully before using. The following are the main examples of JK500 Series.

In this chapter, you will learn about the following:

- Packing list
- Power requirements
- Operating environment
- Clean
- Replace the battery
- Adjustment support

### 1.1 Packing list

Before using the instrument formally, please first:

1. Check whether the appearance of the product is damaged or scratched.
2. Check the instrument packing list to check if the attachment is missing.If there is any damage or insufficient accessories, please contact the sales department or distributor of JinAilian Electronic Technology Co., Ltd.

### 1.2 Power requirements

The instrument can only use our special AC power adapter and lithium battery battery.

AC power adapter:

input voltage: 100-240V VAC, 50~60Hz

Power: Max 10VA

Warning: no other specifications of power adapters are allowed.The instrument can only use our company's power supply and rechargeable lithium battery.

### 1.3 Operating environment

JK500 Series must be used under the following environmental conditions:

Temperature:0℃~55℃ ,

Humidity: 23℃ < 70%RH

Altitude:0~2000m

### 1.4 clean

Do not clean inside the instrument.

Note: it is not possible to use solvents (alcohol or gasoline) to clean the instruments.

Please clean the shell and panel with a clean cloth and a little water.

### 1.5 Replace the battery

The built-in rechargeable lithium battery is installed in the battery compartment of the instrument. If the battery is replaced, follow these steps.

Fig. 1 1 replace batteries



1. Loosen the screws on the battery cover with a screwdriver and remove the battery cover.
2. Remove the plug on the old battery, plug in the plug of the new battery, and the main plug direction.
3. Load the new battery into the battery compartment, cover the battery cover and tighten the screws.

## 1.6 Adjustment support

The instrument supports 1 positions for user use: 60 degrees.

Figure 1. 2 Support position at 60 degrees



## 2. Summary

In this chapter, you will learn about the following:

- Introduction
- Main specifications
- major function

### 2.1 Introduction

Thank you for purchasing JK500 series hand-held multi-channel temperature tester.

JK500 Series Handheld Multi-channel Temperature Tester is controlled by high performance ARM microprocessor. It can collect multi-channel temperature data at the same time, record the data on USB memory, alarm and communication transmission, and can be extended to 128 channels of temperature data, compatible with a variety of temperature sensors, fast response speed, and stable data. It also has the function of even break detection.

The instrument is equipped with Mini-USB (Virtual Serial Port) interface. Data acquisition, analysis and printing can be realized by standard computer software. It supports USB disk storage and real-time storage of sampled data. Users can independently calibrate each path.

### 2.2 Main specifications

The technical specifications of the JK500 Series include the basic technical specifications of the instrument and the scope permitted by the instrument test. These specifications are all achieved when the instrument is out of factory.

Indexing number: thermocouple J,K,T,E,S,N,B,R ; Thermal resistance :Pt100

Test range :-200.0℃~1300.0℃(according to different thermocouple modes)

Resolution:0.1℃

Channel number : 8 channels (extended to 128channels )

Test speed: fast, medium speed, slow speed.

Display - 5.6 inch genuine color LCD

### 2.3 major function

#### 2.3.1 FUNCTION

1. comparator function settings
2. sampling speed setting
3. BEEP function settings
4. baud rate setting
5. temperature unit setting

#### 2.3.2 Sorting setting

Built in sorting data can set upper and lower limits for each temperature data.

### **2.3.3 User calibration function**

Allows users to correct data on each path.

### **2.3.4 FAT Storage function**

Allows users to create [.csv] files as suffixes and save each path of data in USB memory (no mobile hard disk support).

### **2.3.5 System setup**

- 1.Keyboard locking function
- 2.Switching between Chinese and English
- 3.Date and time settings
- 4.Backlight settings
- 5.Screen auto closing time settings

### **2.3.6 Remote control**

The baud rate, which supports the largest 115200bps, is compatible with SCPI protocol and ASCII transmission.

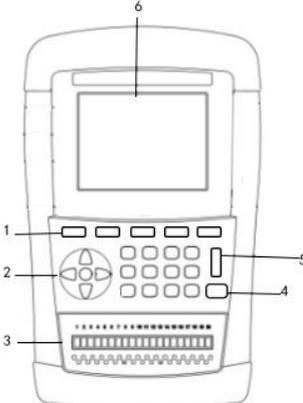
### 3. Start

In this chapter, you will learn about the following:

- front panel
- Interface panel
- Using external power supply
- Open the machine
- Connection of test end

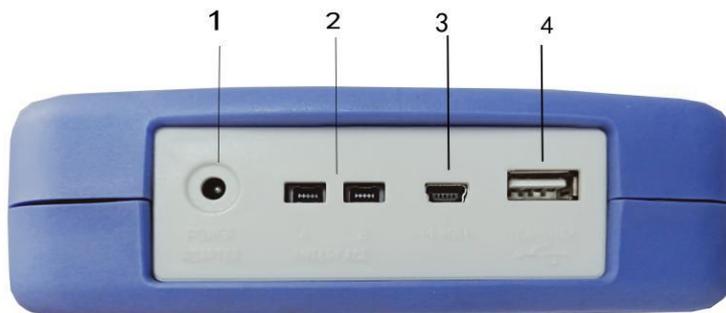
#### 3.1 Front panel

Table 3-1 Front panel function description

Front panel	Serial number	Function
	1	Taskbar function key
	2	cursor keys
	3	Test lead
	4	Power switch
	5	ESC Enter
	6	Liquid crystal display window

#### 3.2 Interface panel

Fig 3- 1 Interface panel function description



- 1.External power supply and charger interface
- 2.Mini-USB Communication interface to achieve remote communication
- 3.RS485 Expand the interface
- 4.USB Interface, save data

### 3.3 Using external power supply

The instrument is equipped with a power adapter.

In addition to power supply to the instrument, the power supply also charges lithium batteries inside the instrument, so the power adapter can not be replaced. It is recommended to use our company's special power supply.

Fig 3-2 External power adapter and instrument connection



Plug the power adapter into the instrument and input the AC adapter into the socket.

#### 3.3.1 Battery charging function

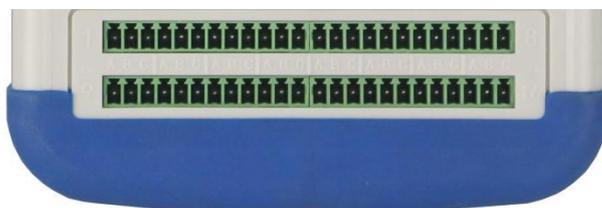
If the battery is not full, after the power adapter is plugged in, the instrument's charging circuit automatically starts to charge the internal lithium battery.

### 3.4 Open the machine

Button is for touch key, Long press power on key for 3 seconds, The instrument will start-up or close.

### 3.5 Connection thermocouple

Fig. 3-4 Thermocouple terminal



- PIN 1 channel 1 Thermocouple positive end
- PIN 2 channel 1 Thermocouple negative end
- PIN 3 NG
- PIN 4 channel 2 Thermocouple positive end
- PIN 5 channel 2 Thermocouple negative end
- PIN 6 channel 3 Thermocouple positive end
- PIN 7 channel 3 Thermocouple negative end
- PIN 8 NG

PIN 9 channel 4 Thermocouple positive end  
PIN 10 channel 4 Thermocouple negative end  
PIN 11 channel 5 Thermocouple positive end  
PIN 12 channel 5 Thermocouple negative end  
PIN 13 NG  
PIN 14 channel 6 Thermocouple positive end  
PIN 15 channel 6 Thermocouple negative end  
PIN 16 channel 7 Thermocouple positive end  
PIN 17 channel 7 Thermocouple negative end  
PIN 18NG  
PIN 19 channel 8 Thermocouple positive end  
PIN 20 channel 8 Thermocouple negative end

## 4. [Meas] Measurement display

In this chapter, you will learn all the measurement and display functions:

< measurement display > page

< curve display > page

< historical data display >Page

< curve Settings > page

### 4.1 < measurement display > page

No matter what page, you can enter the < measurement display> page by pressing the [display] shortcut key.

The < Measurement Display > page highlights the measurement results. At the same time, the current sorting results change the font color character display.

On this page, you can set up a common function, which includes:

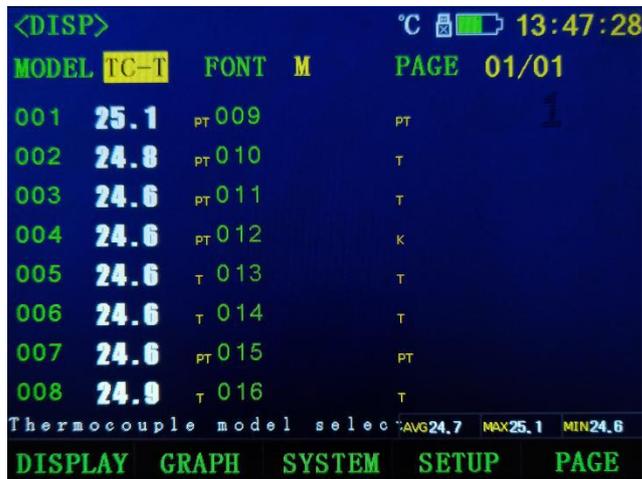
Model --- Select Thermocouple Model

001 --- Channel setting

Font --- Font Settings

Note: measurement data and sorting results are valid only in < measurement display > pages.

Figure 4-1 < measurement display > page



#### 4.1.1 Measurement [model]

The instrument supports 8 types of thermocouple: ,K,J,N,E,S,R,B, PT100

Steps to set sensor type

First steps	Press [display] key to enter < measurement display > main page	
Second steps	Use the cursor keys to select [TC-T] fields.	
Third steps	Press [ENTER] key to open options, use function keys to select	
	function keys	function
	TC-T	Set thermocouple model T type.
	TC-K	Set thermocouple model K type.
	TC-J	Set thermocouple model J type.

	TC-N	Set thermocouple model N type.
	TC-E	Set thermocouple model E type.
	TC-S	Set thermocouple model S type.
	TC-R	Set thermocouple model R type.
	TC-B	Set thermocouple model B type.
	PT100	Set thermocouple model PT100
If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.		

#### 4.1.2 Channel 【001】

Steps to close or open channels

First steps	Press [display] key to enter < measurement display > main page	
Second steps	Use the cursor key to select [001] fields;	
Third steps	Press [ENTER] Key to set ON or OFF channels.	
	Function keys	Function
	OFF	Close the current channel
	ON	Open the current channel

\*the steps to close or open other channels are the same as above.

Table 4-1 Icon function

Graphic function



The internal power supply is currently used, that is, lithium battery.



Currently, external power supply is used. At this time, the lamp beside the viewing screen is lit to indicate that the charging is in progress, and the extinction to indicate that the charging is completed.



The current unit of temperature.



Average value, maximum value, minimum value,

#### 4.1.3 Setting [Font]

Font sizes include small, medium and large

Setting font steps

First steps	Press the Display Key to enter the Main Page of <Measurement Display>	
Second steps	Use the cursor keys to select [font] fields.	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	small	Small font display
	medium	medium font display
	large	large font display
If you open the option, you do not need to choose. Press the [ESC] key to cancel the		

options bar.

As shown in the picture



#### 4.2< curve display > page

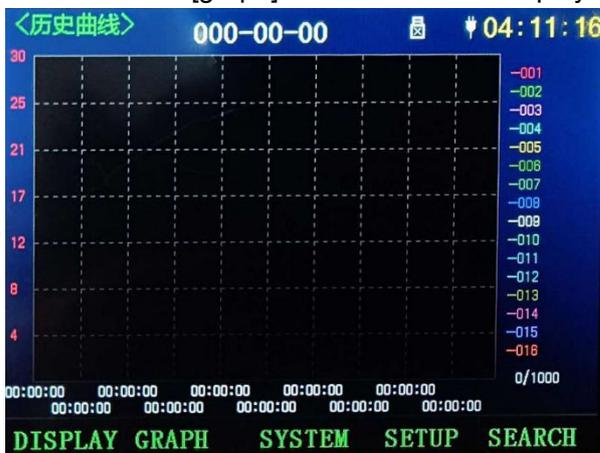
Press the [display] key and press the function key [graph] to enter < curve display> page.



#### 4.3< historical data display >Page

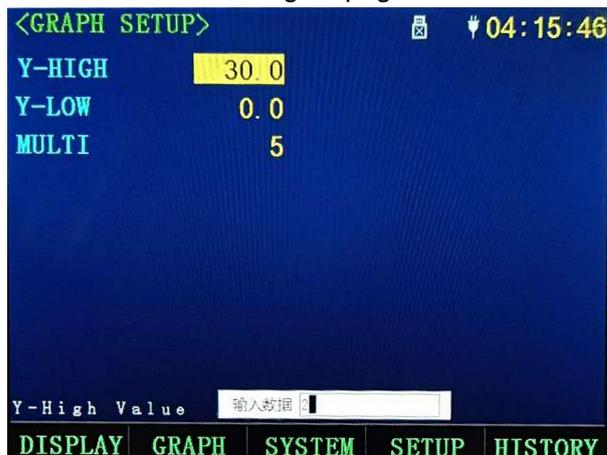
Press the [display] key and press the function key [graph],Select the taskbar [history] to enter the<historical data display > page.

Select taskbar [graph] to return < curve display > page.



#### 4.4< curve Settings > page

Press [display] key, and then press the function key [graph]. Select taskbar [curve settings] to enter < curve Settings > page.



Select taskbar [graph] to return < curve display > page.

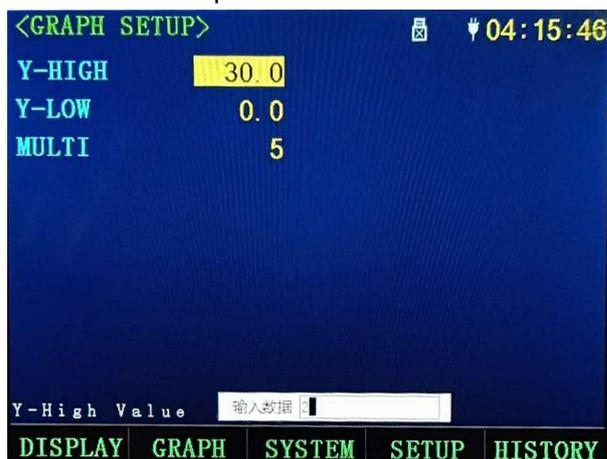
#### 4.4.1 Set [Y- upper limit]

Y axis upper limit setting:

Setting steps

First steps	Press [display] key to enter < measurement display > main page
Second steps	Press function key [curve] to enter < curve display > page.
Third steps	Select taskbar [curve settings] to enter < curve Settings > page.
Fourth steps	Use the cursor key to select the [Y- upper limit] field.
Fifth steps	Use the numeric keypad to enter the set upper limit, and then set the end by [Enter].

As shown in the picture :



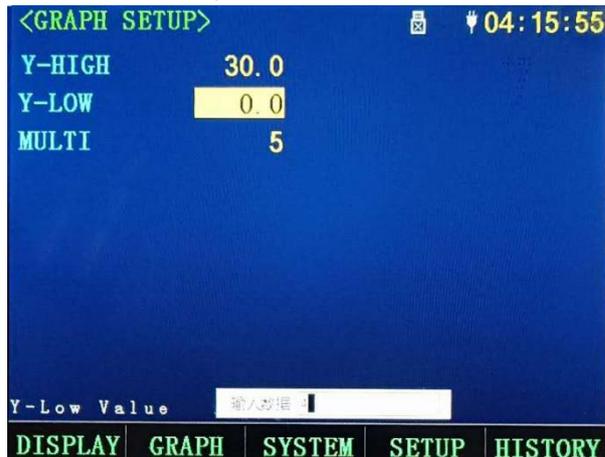
#### 4.4.2 Set [Y- lower limit]

Y axis lower limit setting:

Setting steps

First steps	Press [display] key to enter < measurement display > main page
Second steps	Press function key [curve ] to enter < curve display > page.
Third steps	Select taskbar [curve settings] to enter < curve Settings > page.
Fourth steps	Use the cursor key to select the [Y- lower limit] field.
Fifth steps	Use the numeric keypad to enter the set lower limit, and then set the end by [Enter].

As shown in the picture



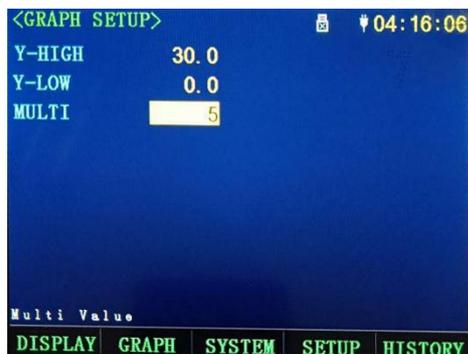
#### 4.4.3 Set [sampling point]

Setting of sampling points:

Setting steps

First steps	Press [display] key to enter < measurement display > main page
Second steps	Press function key [graph] to enter < curve display > page.
Third steps	Select taskbar [curve settings] to enter < curve Settings > page.
Fourth steps	Use the cursor key to select [sample point] fields.
Fifth steps	Use the numeric keypad to enter the set value, and then set the end by [Enter].

As shown in the picture



## 5. [Setup] Function setting

In this chapter, you will learn all the settings:

- < settings display > page
- Temperature correction
- Temperature reset

### 5.1 < settings display > page

At any time, you can enter the <Setup Display> page by pressing the [Setup] shortcut.

The <Setup Display> page allows you to complete all measurement-related settings, but the instrument does not display measurement results and sorting results, and the instrument is in a wait state. These settings include the following parameters:

Comparison - comparator function settings

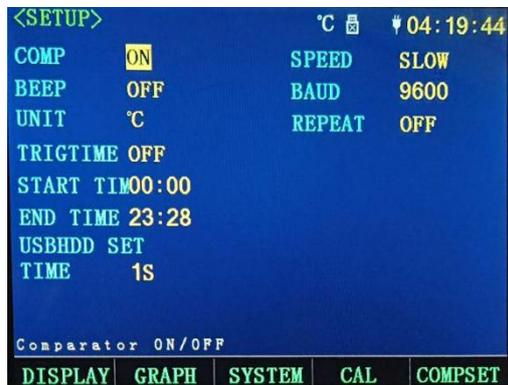
Speed -acquisition speed setting

Alarm – Buzzer settings

baud rate-baud rate setting

Unit -temperature unit settings

Figure 5- 1 < Settings Display > page



#### 5.1.1 Set [comparator]

The comparator settings include: turn on and off.

Setting comparator steps

First steps	Press the [settings] button to enter < function Settings > main page.	
Second steps	Use cursor keys to select [comparison] fields;	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	OFF	Turn off the comparator function and the icon COMP disappears
	ON	Turn on comparator function and icon COMP display
If you open the option, you do not need to choose. Press the [ESC] key to cancel the		

options bar.

As shown in the picture



### 5.1.2 Set [speed]

Speed settings include: slow, medium speed, fast.

Setup speed steps

First steps	Press the [settings] button to enter < function Settings > main page.	
Second steps	Use cursor keys to select [speed] fields.	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	slow	Set acquisition speed for slow speed.
	medium	Set acquisition speed for medium speed.
	fast	Set acquisition speed for fast speed.

If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.

As shown in the picture



### 5.1.3 Set [BEEP]

Alarm settings include: turn on and off.

Setting alarm steps

First steps	Press the [settings] button to enter < function Settings > main page.	
Second steps	Use the cursor key to select the [beep] field.	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	OFF	Turn off alarm buzzer.
	ON	Turn on alarm buzzer.
If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.		

As shown in the picture



#### 5.1.4Set [baud rate]

The instrument has built-in Mini-USB interface. The instrument communicates with the host at the set baud rate immediately after sensing the signal transformation of the Mini-USB interface, and the keyboard is locked.

In order to communicate correctly, please make sure that the baud rate is set correctly. If the baud rate of the host computer is different from that of the instrument, it will not be able to communicate correctly with Mini-USB using SCPI language for programming.

Mini-USB configuration is as follows:

Data bits: 8 bits

Stop bits: 1 bits.

Parity check: No

Baud rate: configurable

Set baud rate step:

First steps	Press the [settings] button to enter < function Settings > main page.	
Second steps	Use cursor keys to select [baud rate] fields	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	9600	If you use a communication converter with optocoupler isolation, please use this baud rate.
	19200	
	38400	
	57600	
	115200	It is recommended that you use this high speed baud rate for communication with the host computer.

If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.

As shown in the picture :



### 5.1.5 Set [unit]

Unit settings include: °C, K, °F .

Set unit steps

First steps	Press the [settings] button to enter < function Settings > main page.	
Second steps	Use the cursor keys to select [unit] fields.	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	°C	The unit temperature is centigrade.
	K	The unit of temperature is Kelvin degree.
	°F	The unit temperature is Fahrenheit.

If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.

As shown in the picture :



### 5.1.6 Repeated collection (not yet open)

Set up repeat collection steps



### 5.1.7 Timing acquisition

Timing acquisition settings include: open and close  
Set the timing acquisition step

First steps	Press the [settings] button to enter < function Settings > main page.	
Second steps	Use the cursor keys to select the [Timed Acquisition] field.	
Third steps	Press [ENTER] key to open option, function key selection	
	Function keys	Function
	ON	Turn on timing acquisition
	OFF	Turn off timing acquisition
If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.		

As shown in the picture :

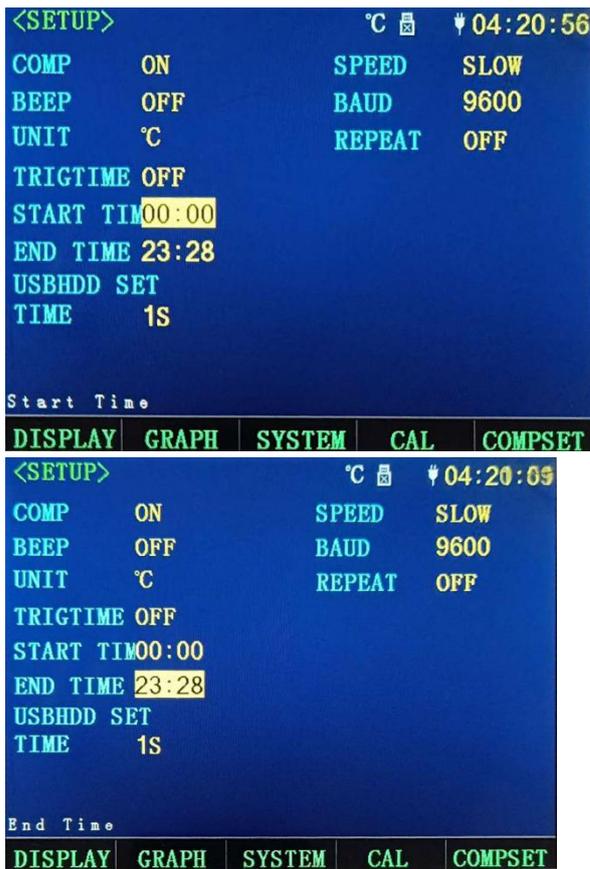


### 5.1.8 start time /end time

The start time is the start of sampling time, The end time is the end of the sampling time.  
Start time and end time setting steps

First steps	Press the [settings] button to enter < function Settings > main page.
Second steps	Use the cursor keys to select the [Start Time / End Time] field
Third steps	Press the number keys directly to input. After the input is completed, press the ESC key to exit.

As shown in the picture :



### 5.1.9 timing

Timing is to store U disk data according to the set time

Timing setup steps

First steps	Press the [settings] button to enter < function Settings > main page.
Second steps	Use the cursor keys to select the [timing] field
Third steps	Press the number keys directly to input. After the input is completed, press the ESC key to exit.

As shown in the picture

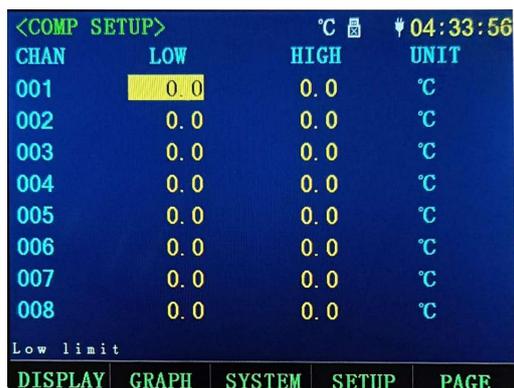


### 5.2 Sorting settings

Press the [set] key and press the function key [sorting settings] to enter < sorting setting > page.

Users can complete the upper and lower limit of each channel data under this page.

Fig 5-2<Sorting settings >page

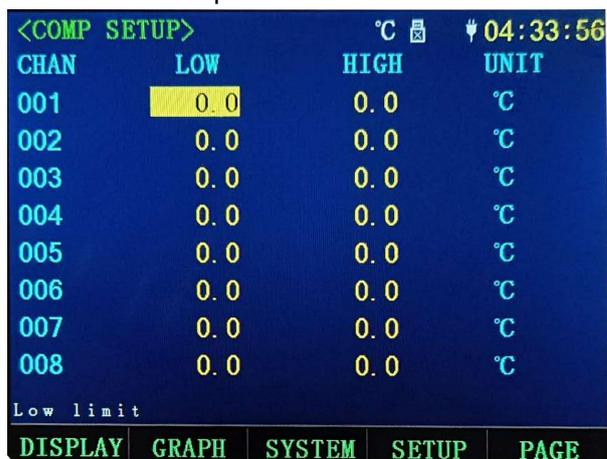


### 5.2.1 [001]

Steps to set the 001 channel lower limit:

First steps	Press [settings] to enter <function Settings > main page.
Second steps	Press the [sorting settings] key to enter <sorting Settings > page.
Third steps	Use cursor keys to select [-200] fields.
Fourth steps	Use the numeric keypad to enter the set lower limit, then press Enter to end.

As shown in the picture,



Setting the upper limit of 001 channels:

First steps	Press [settings] to enter <function Settings > main page.
Second steps	Press the [sorting settings] key to enter <sorting Settings > page.
Third steps	Use cursor keys to select [0.0] fields.
Fourth steps	Use the numeric keypad to enter the set lower limit, then press Enter to end.

As shown in the picture

<COMP SETUP>				°C	04:34:26
CHAN	LOW	HIGH	UNIT		
001	-200.0	0.0	°C		
002	0.0	0.0	°C		
003	0.0	0.0	°C		
004	0.0	0.0	°C		
005	0.0	0.0	°C		
006	0.0	0.0	°C		
007	0.0	0.0	°C		
008	0.0	0.0	°C		
High limit					
DISPLAY	GRAPH	SYSTEM	SETUP	PAGE	

\*The steps to set up the other channel upper limit and lower limit are the same as above.

Steps to switch channel pages :

First steps	Press [settings] to enter <function Settings > main page
Second steps	Press the [sorting settings] key to enter <sorting Settings > page.
Third steps	Press the function key [Page] to switch the page.

### 5.3 User correction

Press the [setup] key, and then press the function key [calibration] to enter the < user correction> page.

Users can complete the correction settings of the channel data under this page.

Figure 5- 3 <User correction>page

<CORRECTION>				°C	04:38:10
CHAN	VALUE	△	UNIT		
001	3178.4	-1178.5	°C		
002	1999.9	0.0	°C		
003	1999.9	0.0	°C		
004	1999.9	0.0	°C		
005	1999.9	0.0	°C		
006	1999.9	0.0	°C		
007	1999.9	0.0	°C		
008	1999.9	0.0	°C		
Input Temperature					
DISPLAY	GRAPH	SYSTEM	SETUP	PAGE	

#### 5.3.1 [001]

Steps to correct the 001 channel:

First steps	Press [settings] to enter <function Settings > main page	
Second steps	Press the [calibration] key to enter the <user correction> page.	
Third steps	Use cursor keys to select [0.0] fields.	
Fourth steps	Using function keys to select	
Fifth steps	Function keys	Function
	Input correction value	Input the correction temperature value of the selected channel, enter data with digital keyboard,

		and end by [Enter].
	Delete correction value	Delete correction temperature values for selected channels

\*The steps to correct other channels are the same as above.

Steps to switch channel pages:

First steps	Press [settings] to enter <function Settings > main page
Second steps	Press function key [user correction] key to enter <user correction > page.
Third steps	Press function[ page turning] key to change page

#### 5.4.2 [recording interval]

Set the recording time steps:

First steps	Press the [settings] button to enter the <function settings > page.
Second steps	Press the cursor key to select [U disk settings] to enter the <U disk Settings > page.
Third steps	Use cursor keys to select [timing] fields
Fourth steps	Using function keys to select
Fifth steps	Use the digital keyboard to enter the time value (5 seconds at the fastest and 3600 seconds at the slowest), and then press Enter to finish.

\*The steps to correct other channels are the same as above.

## 6. System setup

In this chapter, you will see the system configuration of the instrument:

System settings page

System information page

System service page

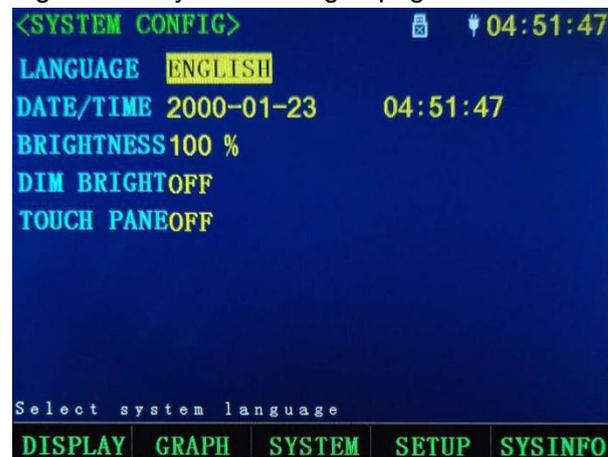
### 6.1 <System settings> page

At any time, choose the taskbar [ system] key to enter the <system Settings > page.

< System Settings > page includes the following settings:

- language
- Date / time settings
- Backlight Setting
- DIM BRIGHT
- Touch pang

Fig 6- 1<System settings> page



#### 6.1.1 System [language]

The instrument supports two languages, Chinese and English.

Set up language steps:

First steps	Press the [display] key to enter the main page.	
Second steps	Select the [system] key in the taskbar and enter the < System Settings > page.	
Third steps	Use cursor keys to select [language] fields	
Fourth steps	Press [ENTER] key to open the option,, Press the function key to set the language again.	
	Function keys	Function
	CHS	Chinese
	ENG	English
If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.		

As shown in the picture :



### 6.1.2 System [date], [time]

The instrument uses a 24-hour time system.

Date setting steps

First steps	Press the [display] key to enter the main page.	
Second steps	Select the [system] key in the taskbar and enter the < System Settings > page.	
Third steps	Use cursor keys to select [date] fields	
Fourth steps	Press [ENTER] key to open the option, Then press the function key to set the date.	
	Function keys	Function
	Year +	+1 Year
	Year-	-1 Year
	Month +	+1 Month
	Month -	-1 Month
	Day +(current page is not displayed, press more keys to display)	+1 Day
	Day -(current page is not displayed, press more keys to display)	-1 Day
If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.		

As shown in the picture :



Time settings steps:

First steps	Press the [display] key to enter the main page.	
Second steps	Select the [system] key in the taskbar and enter the < System Settings > page.	
Third steps	Use cursor keys to select [time] fields.	
Fourth steps	Press [ENTER] key to open the option, Then press the function key to set the time.	
	Function keys	Function
	Hour +	+1 Hour
	Hour-	-1 Hour
	Minute+	+1 Minute
	Minute-	-1 Minute
	second+(current page is not displayed, press more keys to display)	+1 second



### 6.1.3 System [backlight]

The darker the backlight, the lower the power consumption of the meter, and the longer the use time. This instrument has 5 backlights to meet different lighting requirements.

Setting backlight steps:

First steps	Press the [display] key to enter the main page.	
Second steps	Select the [system] key in the taskbar and enter the < System Settings > page.	
Third steps	Use the cursor keys to select the [ backlight] field.	
Fourth steps	Press [ENTER] key to open the option, Press the function key to adjust the backlight.	
	Function keys	Function
	brightness 10%	
	brightness 25%	
	brightness 50%	
	brightness 75%	Default luminance
	brightness 100%	
If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.		

As shown in the picture



#### 6.1.4 Reduce brightness

When the meter is not operated for a long time, it will automatically turn off the display screen to save electricity.

Set shutdown steps:

First steps	Press [Meas] or [Setup] shortcut key to enter the main page	
Second steps	Select the [system] key in the taskbar and enter the < System Settings > page.	
Third steps	Use cursor keys to select [Reduce brightness] fields	
Fourth steps	Press [ENTER] key to open the option, Press the function key to adjust the backlight.	
	Function keys	Function
	5 Minutes	Windows default, Save electricity
	15 Minutes	
	30 Minutes	
	OFF	

If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.

As shown in the picture:



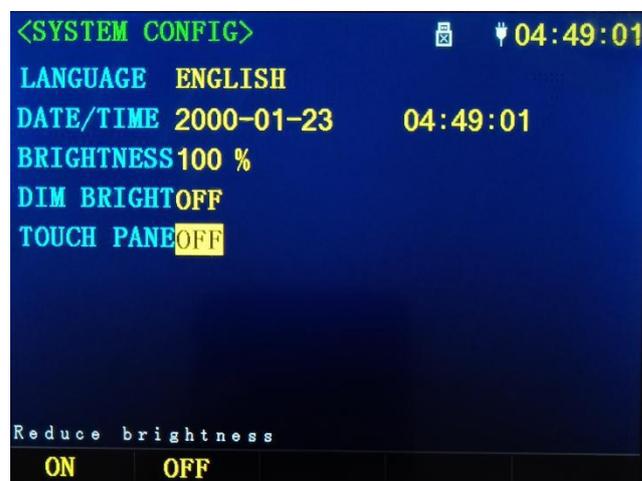
### 6.1.5 touch screen

Set the touch screen steps:

First steps	Press [Meas] or [Setup] shortcut to enter the main page.	
Second steps	Select the [System] button in the task bar to enter the <System Configuration> page.	
Third steps	Use the cursor keys to select the [Touch Screen] field	
Fourth steps	Press the [ENTER] key to open the option, then press the function key to adjust the backlight.	
	Function key	Function
	ON	Turn on the touch screen
	OFF	Turn off the touch screen

If you open the option, you do not need to choose. Press the [ESC] key to cancel the options bar.

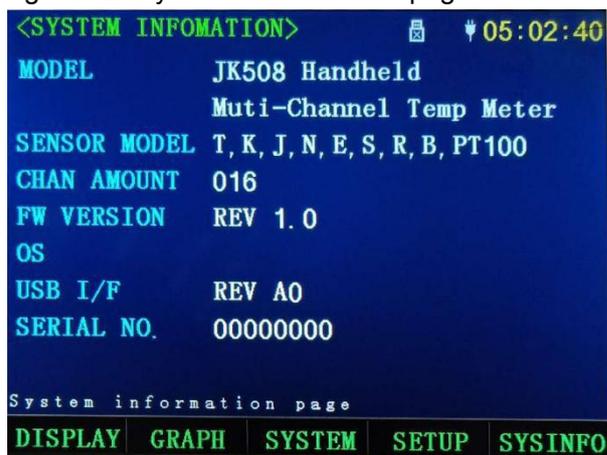
As shown in the picture :



### 6.2 < system information > page

< system info > page has no user configurable options.

Fg 6- 2< system information > page



View system information steps:

First steps Press the [display] key to enter the main page.

Second steps Select the [system] key in the taskbar and enter the < System Settings > page.

Third steps Select [system information] function key to enter the < system information > page.

## 7.Communication protocol(modbus)

### 7.1.General design of Instructions

#### 71.1 Overall design: Read data frame structure (request), 8 length as an example

constituent part	Numerical value (16-system) Examples	Description
Address bit	01	1 byte
Instruction code	03	Indicates the type of instruction,1 byte
Address	00 00	2 bytes, Parameter address
Data Address length	00 08	Number of request parameters (N=8)
Checkout bit	CRC	2 bytes (low and high): polynomial A001

Back to data frame structure (return)

constituent part	Numerical value(16 hexadecimal)Examples	Description
Address bit	01	1 byte
Instruction code	03	Indicates the type of instruction, 1 byte
Data length	10	Number of data (N=16byte)
Data body		16 bytes
Checkout bit	CRC	2 bytes (low and high): polynomial A001

### Adaptation to the USB protocol

If USB communication is made, 64 bytes of data are transmitted at one request.If the instruction length is less than 64 bytes, the subsequent complement is 00 until 64 bytes are replenished.

### 7.2 Time instruction (set command with 10)

#### 7.2.1 Setting time

constituent part	Numerical value
Address bit	01
Instruction code	10
Starting address	c0 00
Address length	00 04
Data length	08
Data body (8 ↑ byte)	Year, month, day, hour, minute, second,BCD encoding, two bytes per year, and the remaining 1 bytes.
Checkout bit	2 bytes CRC

**Examples    01   10 c 0   00   00   04   08   20   18   05   25   18   37   21   00   CRC**

The setup time is 5/25/2018 18 points 37 minutes 21 seconds.and the total length of the package is 17 bytes.

### 7.2.2 Response Instructions

constituent part	Numerical value
Address bit	01
Instruction code	10
Starting address	c0 00
Address length	00 04
Checkout bit	2 bytes CRC

**Examples 01 10 c0 00 00 04CRC**

**Set time successfully (return)**

### 7.2.3 Read time

constituent part	Numerical value
Address bit	01
Instruction code	03
Starting address	c0 00
Address length	00 04
Checkout bit	2 bytes CRC

**Examples01 03 c0 00 00 04CRC**

Read the device time, the total length of the instruction 8 bytes.

### 7.2.4 Response read time instruction

constituent part	Numerical value
Address bit	01
Instruction code	03
Starting address	c0 00
Address length	00 04
Data length	08
Data body	Year, month, day, hour, minute, second,BCD encoding, two bytes per year, and the remaining 1 bytes.
Checkout bit	2 bytes CRC

**Examples 01 03 C0 00 00 04 08 20 17 11 25 08 06 35 00 CRC**

The setup time is 25/11/2017 8 points 6 minutes 35 seconds (Supplement 1 bytes 00).

## 7.3Sensor type (not all instruments)

### 7.3.1 Read sensor type

constituent part	Numerical value
Address bit	01

Instruction code	03
Starting address	c0 20
Address length	00 01
Checkout bit	2 bytes CRC

**Examples 01 03 c0 20 00 01CRC**

### 7.3.2 Response instruction

constituent part	Bytes number
Address bit	01
Instruction code	03
Starting address	c0 20
Address length	00 01
Byte length	02
Sensor type	00 01
Checkout bit	2 bytes CRC

**Examples 01 03 02 00 01 (k type) CRC**

## 7.4 Instrument state

### 7.4.1 Read instrument status

constituent part	Bytes number
Address bit	01
Instruction code	03
Starting address	c0 10
Address length	00 01
Checkout bit	2 bytes CRC

**Examples 01 03 c0 10 00 01CRC**

### 7.4.2 Response reader status

constituent part	Bytes number
Address bit	01
Instruction code	03
Starting address	c0 10
Address length	00 01
Data length	02
State value	00 01
Checkout bit	2 bytes CRC

**Examples 01 03 02 00 01 CRC**

## 7.5 Instrument alarm upper and lower limits

### 7.5.1 Set upper and lower limit (no decimal point)

constituent part	Bytes number
Address bit	01
Instruction code	10
Starting address	01 01
Address length	00 02
Address length	04
Data body	4 bytes, upper limit and lower limit 2 bytes in turn.
Checkout bit	2 bytes CRC

#### Examples 01 10 01 01 00 02 04 00 64 00 00 CRC

Set instrument alarm limit (upper limit 100, lower limit 00)

Remarks: (Packet information) second channel:01 03 00 02 ; Third channel:01 05 00 02 and the like

### 7.5.2 Response instruction

constituent part	Numerical value
Address bit	01
Instruction code	10
Starting address	01 01
Address length	00 02
Checkout bit	2 bytes CRC

#### Examples 01 10 01 01 00 02CRC

Set instrument limit successfully (return)

### 7.5.3 Read upper and lower limits

constituent part	Numerical value
Address bit	01
Instruction code	03
Starting address	01 01
Address length	00 02(first channel)
Checkout bit	2 bytes CRC

#### Examples 01 03 01 01 00 02CRC

Remarks: two channels Starting address+Length: 01 03 00 02; three channel:01 05 00 02 and the like

### 7.5.4 Response instruction

constituent part	Bytes number
Address bit	01
Instruction code	03

Starting address	01 01
Address length	00 02(first channel)
Data length	04
Data body	4 bytes, upper limit and lower limit 2 bytes in turn.
Checkout bit	2 bytes CRC

**Examples 01 03 04 00 64 00 00 CRC**

The upper limit of the device is 100, the lower limit is 00.

**7.6 Unit**

**7.6.1 Setting unit**

constituent part	Numerical value
Address bit	01
Instruction code	10
Starting address	02 58
Address length	00 01
Bytes number	02
Data body	00 01 ,Unit type
Checkout bit	2 bytes CRC

**Examples 01 10 02 58 00 01 02 00 01CRC**

Remarks: (address) second channel: 02 59 00 01; Third channel:02 5A 00 01 ,and the like

- Unit number =0 Unit = "%"、
- Unit number =1 Unit = "K"、
- Unit number =2 Unit = "Ω"、
- Unit number =3 Unit = "‰"、
- Unit number =4 Unit = "°F"、
- Unit number =5 Unit = "°C"、
- Unit number =6 Unit = "m/s"、
- Unit number =7 Unit = "g"、
- Unit number =8 Unit = "Kg"、
- Unit number =9 Unit = "mm"、
- Unit number =10 Unit = "cm"、
- Unit number =11 Unit = "m^2"、
- Unit number =12 Unit = "m3/h"、
- Unit number =13 Unit = "r/min"、
- Unit number =14 Unit = "W"、
- Unit number =15 Unit = "mA"、
- Unit number =16 Unit = "A"、
- Unit number =17 Unit = "mV"、
- Unit number =18 Unit = "V"、
- Unit number =19 Unit = "Pa"、

Unit number =20 Unit ="KPa"、  
 Unit number =21 Unit ="MPa"、  
 Unit number =22 Unit ="Hz"

### 7.6.2 Response instruction

constituent part	Numerical value
Address bit	01
Instruction code	10
Starting address	02 58
Address length	00 01
Checkout bit	2 bytes CRC

#### Examples 01 10 02 58 00 01CRC

Success (return)

### 7.6.3 Reading unit

constituent part	Numerical value
Address bit	01
Instruction code	03
Starting address	02 58
Address length	00 01
Checkout bit	2 bytes CRC

#### Examples 01 03 02 58 0 01CRC

Read unit

### 7.6.4 Response instruction

constituent part	Numerical value
Address bit	01
Instruction code	03
Starting address	02 58
Address length	00 01
Data length	02
Data body	00 bytes, unit code
Checkout bit	2 bytes CRC

#### Examples 01 03 02 00 05 (°C) CRC

## 7.7 Real time monitoring data

### 7.7.1 Read real-time monitoring data (1 decimal places)

constituent part	Numerical value
Address bit	01

Instruction code	03
Starting address	00 00
Checkout bit	2 bytes CRC

**Examples 01 03 00 00 CRC**

### 7.7.2 Response instruction

constituent part	Numerical value
Address bit	01
Instruction code	03
Starting address	** ** (Starting address, The value is 1-128)
Address length	** ** (number of channels, The value is 1-24.)
Data body	The number of channels is *2 byte data.
Checkout bit	2 bytes CRC

#### Explain

Each packet returns up to 24 channels of data. When the number of channels is greater than 24, packets are sent to the data.

Examples 01 03 10 00 50. . . . . CRC

### 7.8 Read historical data (to be improved)

constituent part	Numerical value
Address bit	01
Instruction code	04
Packet length(Packet length)	00 01 00 07
Data body	16 bytes, each representing one way, 0: no data; 1: fetching data.
Checkout bit	2 bytesCRC
	Numerical value

**Examples 01 00 1A 0B 00 00 00 00 00 00 00 00 00 00 00 00 00 00 03 CRC**

Take first, third road monitoring data.

### 7.9 Response instruction

constituent part	Numerical value
Address bit	01
Instruction code	04
Packet length(Packet length)	00 01 00 07

Channel number	1 byte
Data identification	1 byte, 0: no data,at this time no Data body; 1: have data
Current packet length	1 byte
Data body	maximum of 48 bytes, Each two represents a temperature data and 1 decimal places.
Checkout bit	2 bytes

#### Examples

Address bit	01
Instruction code	10, 1 byte
Checkout bit	2 bytes

## 7.10 Equipment connection detection

### 7.10.1 Device connection detection command

constituent part	Bytes number
Address bit	01
Instruction code	03
Starting address	EE EE
Address length	EE EE
Checkout bit	2 bytes CRC

**Examples 01 03 EE EE EE EE CRC**

### 7.10.2 Response device connection detection command

constituent part	Bytes number
address bit	01
Instruction code	03
Starting address	EE EE
Address length	EE EE
Device identification code	12 bytes data  Equipment type + channel number, redundant bytes 00.  4A 4B 35 30 38 00 00 08 00 00 00 00 ( JK500 Series0, 8 channels )
Checkout bit	2 bytes CRC

**Examples 01 03 4A 4B 35 30 38 00 00 08 00 00 00 00 CRC**  
(JK500 Series0, 8 channels )

**Examples 01 03 4A 4B 35 30 38 00 00 10 00 00 00 00 CRC**  
(JK500 Series0, 16 channels )

## 7.11 Electrical parameters

### 7.11.1 Read electrical parameters

constituent part	Bytes number
address bit	01
Instruction code	03
Starting address	80 10
Address length	00 06
Checkout bit	2 bytes CRC

**Examples 01 03 80 10 00 06 CRC**

### 7.11.2 Response read electrical parameters

constituent part	Bytes number
address bit	01
Instruction code	03
Starting address	80 10
Address length	00 06
Data length	0C (12 bytes )
Data body	03 04 (2 bytes Voltage data) 05 03 (2 bytes Current data) 00 08 0C 14 (4 byte power data) 08 1A (2 bytes Frequency data ) 09 C0 (2 bytes power factor)
Checkout bit	2 bytes CRC

**Examples 01 03 80 10 00 06 0C 03 04 05 03 00 08 0C 14 08 1A 09 C0 CRC**

Note: part Data body is an example. Instruction code, Starting address, Address length And data length Partial fixation.

## 8. Appendix

In this chapter, you will learn about the following:  
RS485 connection method

### 8.1 RS485 connection method

A dedicated JK106 Mini USB-232 communication cable can be used to connect the external acquisition board, so that the total number of channels can be extended to 128 channels.



Insert JK106's Mini USB connector into INTERFACE's A interface or B interface.



The 232 serial port of JK106 is connected to the BUS<1> or BUS<2> of the acquisition box, and the sampling box is plugged into the 9V power supply. BUS<1> and BUS<2> are parallel, and the interfaces are universal. Other acquisition boards are connected by JK104 communication cable, and each 4 collection boards are added with a 9V power supply.

## 9. Specifications

In this chapter, you will learn about the following:

Basic technical indicators

Specifications

### 9.1 technical indicators

The following information is obtained under the following conditions:

Temperature conditions:  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$

Humidity conditions: 65% R.H.

Preheating time: >60 minutes

Calibration time: 12 months

Measuring environment:

Indicators :temperature  $15^{\circ}\text{C} \sim 35^{\circ}\text{C}$     humidity <80%RH

Operation :temperature  $10^{\circ}\text{C} \sim 40^{\circ}\text{C}$     humidity 10~90%RH

Storage: temperature  $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$     humidity 10~90%RH

mode of thermocouple:	T,K,J,N,E,S,R,B
Display digits:	Main parameter 5 bits
Test speed:	Fast, medium speed, slow speed
Maximum readings:	1800.0
Minimum readings:	-200.0
Data recording:	USB memory.
BEEP:	ON/OFF
Interface:	RS232 interface
Programing language:	SCPI
Auxiliary function:	Keyboard lock

### 9.2 Measurement accuracy

**The accuracy of the instrument does not include the accuracy of standard contact compensation.**

Mode	Test temperature range (°C)	Measurement accuracy(°C)
T Type thermocouple	$-150^{\circ}\text{C} \sim 0^{\circ}\text{C}$	$\pm 1.0^{\circ}\text{C}$
	$0^{\circ}\text{C} \sim 400^{\circ}\text{C}$	$\pm 0.8^{\circ}\text{C}$
K Type thermocouple	$-100^{\circ}\text{C} \sim 0^{\circ}\text{C}$	$\pm 1.2^{\circ}\text{C}$
	$0^{\circ}\text{C} \sim 1350^{\circ}\text{C}$	$\pm 0.8^{\circ}\text{C}$
J Type thermocouple	$-100^{\circ}\text{C} \sim 0^{\circ}\text{C}$	$\pm 1.0^{\circ}\text{C}$
	$0^{\circ}\text{C} \sim 1200^{\circ}\text{C}$	$\pm 0.7^{\circ}\text{C}$
N Type thermocouple	$-100^{\circ}\text{C} \sim 0^{\circ}\text{C}$	$\pm 1.5^{\circ}\text{C}$
	$0^{\circ}\text{C} \sim 1300^{\circ}\text{C}$	$\pm 0.9^{\circ}\text{C}$
E Type thermocouple	$-100^{\circ}\text{C} \sim 0^{\circ}\text{C}$	$\pm 0.9^{\circ}\text{C}$

	0°C ~ 850°C	±0.7°C
S Type thermocouple	0°C ~ 100°C	±4.5°C
	100°C ~ 300°C	±3.0°C
	300°C ~ 1750°C	±2.2°C
R Type thermocouple	0°C ~ 100°C	±4.5°C
	100°C ~ 300°C	±3.0°C
	300°C ~ 1750°C	±2.2°C
B Type thermocouple	600°C ~ 800°C	±5.5°C
	800°C ~ 1000°C	±3.8°C
	1000°C ~ 1800°C	±2.5°C

The standard contact compensation is added to the thermocouple measurement accuracy by + 0.5 C.

The accuracy of the thermocouple sensor should be based on the sensor manufacturer's standards.

### 9.3 Specifications

5.6 inches, true color 16M color, TFT-LCD display.

Fresh and beautiful double colored cast plastic housing

Two ways of power supply for battery and external power supply

Comparator (sorting) function: built in sorting record

Keyboard locking function

Switching between Chinese and English

Backlight adjustment

Screen auto closing settings

Built in Mini-USB communication interface

Compatible with SCPI instruction set

8.4V, Li, 2200mAh Rechargeable battery

Battery charging time < 5h

Maximum power consumption ≤ 5W

Super long continuous working time ≥ 8h

Length, width and height: 130mm\*210.76mm\*37.88mm

Weight : 650g