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Multi-channel temperature recorder MTR-2000 User Manual

MATRIX TECHNOLOGY INC.

Foreword

Thank you for purchasing our products. In order to ensure the correct use of this product, please read this product manual carefully before use. Check the packing list in this manual to confirm the product and accessories. If not, please contact our company or agent.

Precautions

1. The contents of this manual are used together with the instrument, and are subject to change without further notice due to version upgrade.
2. The content of this manual has been confirmed to be correct, and it has been written in the simplest way to express the user's understandability of the manual. In case of any incorrectness or unclear description, please contact our company or agent.

Version: V1.0

Warning

For your personal safety and correct use of this instrument, please be sure to follow the requirements of this manual for operation and measurement. And pay strict attention to the following safety regulations.

1. Power supply and grounding protection. The working power supply of this product is AC86-265V. Before turning on the power supply, make sure that the power supply matches the rated voltage, and make sure that the power supply has been connected to the protective ground wire to prevent electric shock. The shell of this instrument has been connected to the ground wire end of the power socket.
2. Do not operate in an explosive environment to avoid personal injury caused by explosion.
3. Please do not open the instrument shell by yourself. There is high voltage in some parts of the instrument to prevent electric shock.
4. It is not allowed to plug and unplug the wiring terminal under live condition to avoid electric shock.
5. If the instrument is damaged due to violation of safety regulations, the company will not be responsible for the task.

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1. Overview

The multi-channel temperature collector adopts a 32-bit high-speed CPU for data processing, adopts a 5-inch industrial display screen, supports K, J, E, T, N, S, R and B-type thermocouple input, and has various display modes, so that a user can more intuitively read various parameters, and the instrument has the characteristics of perfect functions, superior performance and simple operation. It can meet the needs of production, laboratory and R & D measurement.

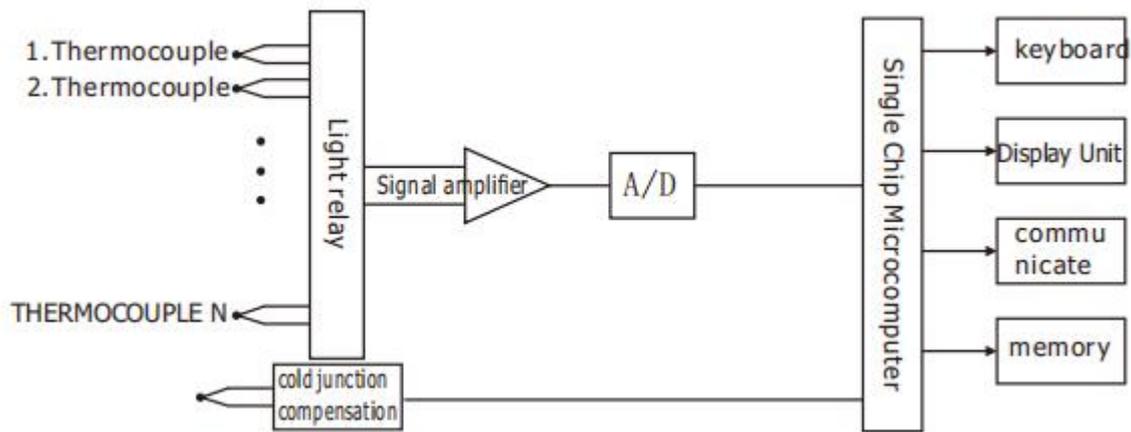
Widely used in lighting appliances, electric tools, household appliances, motors, electric heating appliances, medicine, petroleum, chemical industry, metallurgy, electric power and other industries and scientific research units and other fields of production lines, laboratories, quality inspection departments of production enterprises.

It can also customize various measurement functions according to the needs of real users to meet higher applications.

MTR-2000 series multi-channel temperature recorder has the following features:

- ▲ HD 5-inch IPS industrial LCD touch screen, resolution 854X480.
Adopt 32-bit high-speed MCU data processing + 24-bit high-speed AD measurement chip, fast response, high precision, stable and reliable.
- ▲ Multi-interface display, file list, real-time list display, bar chart display, real-time/record/analysis curve display, alarm list, system settings, etc.
- ▲ Support 4/8/16/32 multi-interface real-time value display.
- ▲ Support multiple sensor inputs: K J E T N S R B
- ▲ Each channel can be set to use different thermocouple types.
- ▲ You can customize the name of each channel and export the custom name to EXCEL.
- ▲ The voltage difference between channels can be up to AC/DC 350 V, with strong anti-interference capability.
- ▲ Each channel can independently set the over-high and over-low alarm value, and has the sound and light alarm function.
- ▲ Independent error correction for each channel $Y = KX + B$.
- ▲ Built-in 8G large memory, file list display, support up to 64 files, 130,000 sets of data for each file, 1 second interval can be continuously recorded for up to 97 days.
- ▲ Record files can be deleted and exported by single or multiple selections, and EXCEL files can be directly exported by U disk and PC.
- ▲ Standard USB and RS485 communication interfaces.
- ▲ With communication address code setting, it can be used in parallel with multiple machines in many places, and communication protocol can be provided.
- ▲ Modular design, 8 channels for each module, maximum support for 64 channels, capacity expansion and automatic identification.
- ▲ Alarm indication, and the function of viewing historical alarm records.

2. Basic principles



Basic artwork block diagram

As shown in the figure, the instrument is composed of thermocouple, photoelectric switch selector, amplifier, A/D, single-chip microcomputer, keyboard, display, communication, data memory, cold junction compensation, etc.

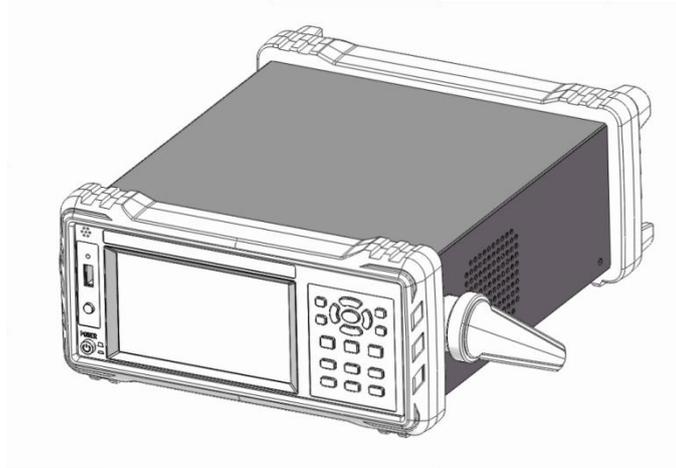
A photoelectric switch selector selects a corresponding channel signal, the signal is amplified by a signal amplifier, an analog signal is converted into a data signal by an AD converter, the data signal is processed by a single-chip microcomputer, a cold-end compensation circuit performs normal-temperature measurement to obtain a cold-end temperature value, the measured signal and the cold-end temperature value are processed by the single-chip microcomputer, Finally, the correct measured temperature value is displayed on the display screen.

The keyboard, communication and data memory can set, store and analyze the data on the display screen. It can also be connected to a computer through a communication interface for direct data analysis by the computer.

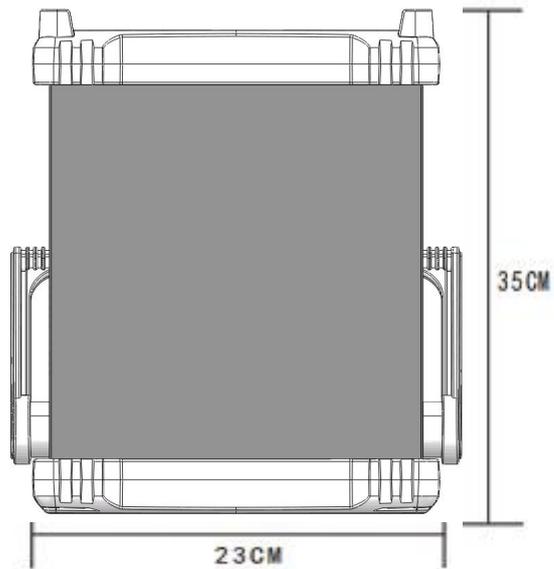
3. Technical indicators

Display mode	5-inch TFT true color LCD industrial touch screen 854 * 480 pixels
Display form	Real-time list, curve (historical curve), bar chart, current alarm (historical alarm), file record, Record the list.
Record the query	The machine can view the recorded curve, historical alarm records, and computer software analysis and query.
Number of channels	8 channels per module, up to 64 channels
Thermocouple	K J E T N S R B
Basic accuracy	0.2 °C + 2 words (excluding thermocouple error)
Measuring range	-200 ~ 1820 °C (subject to the graduation range of thermocouple)
Cold junction compensation	Accuracy: 0.5 °C
Resolution	0.1 °C
Correction	Individual error correction per channel $Y = KX + B$ (X = measured value)
Number of files	64 (circular record)
File capacity	One file can record 130,000 groups (regardless of the number of channels)
U disk interface	Export record files, second change U disk function (instrument is U disk), directly view files and software.
Record the duration	The recording interval of 1 second can be continuously recorded for 97 days, and the calculated total duration = recording interval X 97 days.
Sampling speed	Fast per channel: 0.1 S, Slow: 1 S
Channel-to-channel isolation	AC/DC up to 350 V, high voltage live measurement, superior anti-interference capability
Control output	/
Alarm sound	One way of buzzer sound (sound in case of any alarm, mute can be set)
Recording interval	1-9999 seconds arbitrary settings
Communication interface	Standard USB, RS 485
Power supply	AC 85-265 V ± 10, frequency 50 Hz/60 Hz < 10 W%
Thermocouple	Each channel is equipped with a 2m K-type thermocouple.
Size	W23 X D35 X H11 CM
Weight	Approx. 3 Kg (different configurations)
Environmental conditions	5 ~ 40 °C, 20 ~ 80 RH (no condensation)%

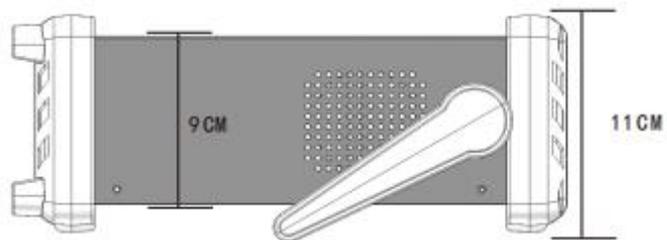
4. Overall dimension (unit: CM)



Heads

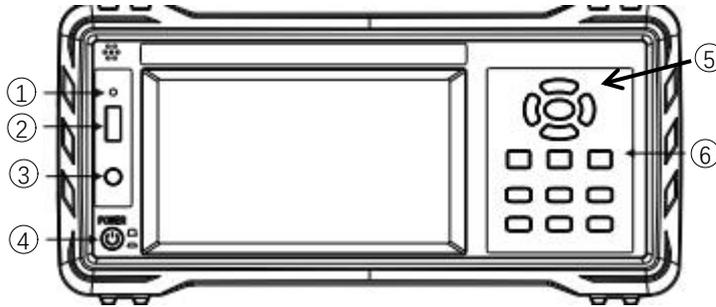


Side view



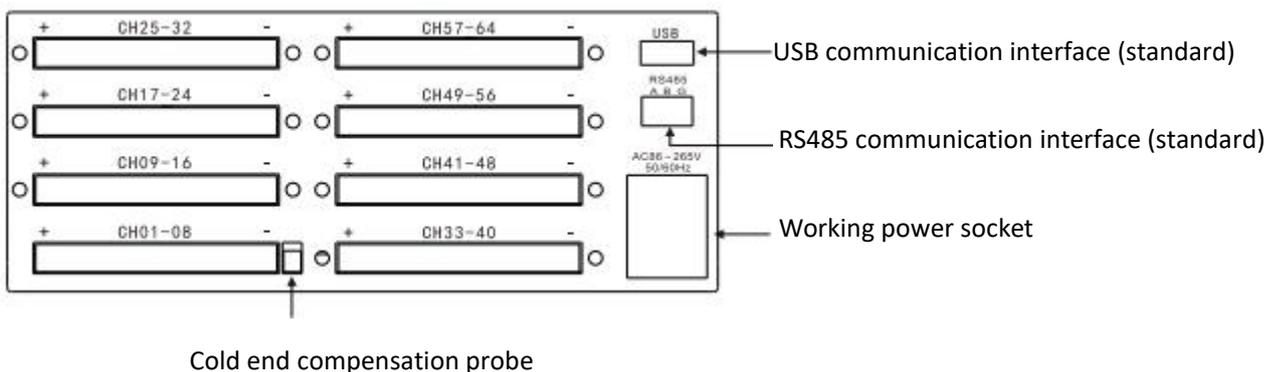
5. Panel description

Front panel



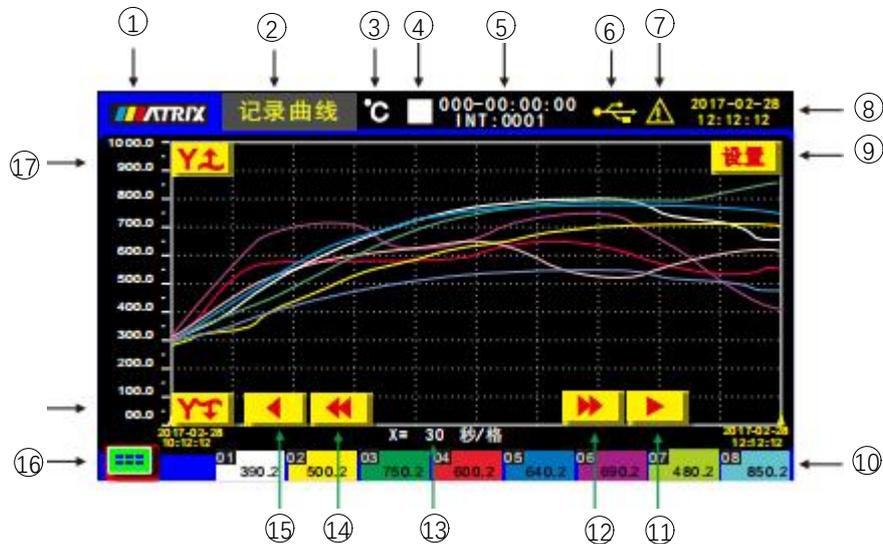
- ① Recording indicator
- ② Internal and external U disk interface
- ③ Quickly start recording
- ④ Power switch
- ⑤ Direction operation keyboard (record, stop key, left, right, up and down keys: used to switch pages, there are prompts on each page)
- ⑥ Function shortcut key: (setting key, exit key, real-time list, file list, alarm list, curve prompt, bar chart display, mute key)

Rear panel (Three-layer plate structure is used below 48, and four-layer plate structure is used above 48.)



6. Display and operating instructions

6.1 Description of display interface



- ① Brand information
- ② Page name
- ③ Unit
- ④ Recording symbol On the record, stop recording
- ⑤ Record cumulative time/interval
- ⑥ USB flash disk indication
- ⑦ Alarm indication
- ⑧ Perpetual calendar
- ⑨ Curve parameter settings
- ⑩ Real-time measurement value display
- ⑪ Curve moves to the right (thin)
- ⑫ The curve moves to the right (thick)
- ⑬ Duration of each gear
- ⑭ The curve moves to the left (thick)
- ⑮ Curve moves to the left (thin)
- ⑯ The curve moves downward
- ⑰ The curve moves up

6.2 Startup interface

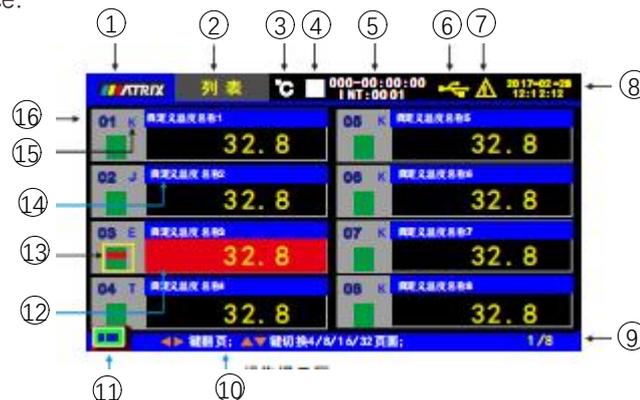


Display the startup interface when powering on, and display the LOGO, company name and product type of the company No. Information

6.3 Real-time parameter list display

Real-time parameter list, multiple measurement parameters can be displayed at the same time. The display interface is divided into 4-channel data display, 8-channel data display, 16-channel data display and 32-channel data display. The data of each channel can be displayed by page turning. Use ▲▼ key to switch the 4/8/16/32 channel display page. Use ◀▶ keys to page through the display.. The 4-channel page can display the maximum and minimum values.

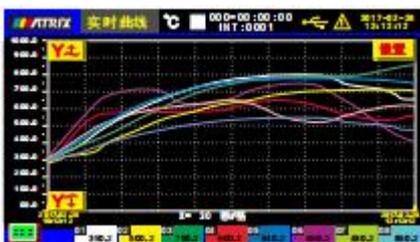
Press the key to enter the menu selection, and press the keyboard shortcut key to quickly enter the corresponding interface.



- ① Brand information
- ② Page name
- ③ Unit
- ⑧ Recording symbol ▶ On the record, □ stop recording
- ④ Record cumulative time/interval
- ⑤ USB flash disk indication
- ⑥ Alarm indication
- ⑦ Perpetual calendar
- ⑧ Page number/total pages
- ⑨ Operation indication area
- ⑩ Menu key
- ⑪ Alarm indication: in case of overrun, it turns red.
- ⑫ Alarm indication: from top to bottom: HH H L LL
- ⑬ Custom name
- ⑭ Thermocouple type
- ⑮ Channel number



6.4 Curve display



Real-time graph

Real-time curve is only displayed for real-time viewing Show. Only 8-channel curves can be displayed on one page. And real-time measurements can be displayed.

Touch control The key may move the curve up or down.

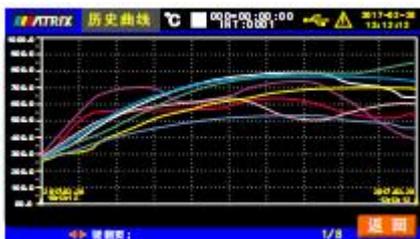
Touch control Key Enter the curve setting page.



Record the graph

The recording curve is displayed when recording is started. For the real-time curve shown, you can also use the left and right movement keys in the touch screen to move and view the curve changes. In case of multiple pages, use the

Press the key to turn the page.



Historical graph

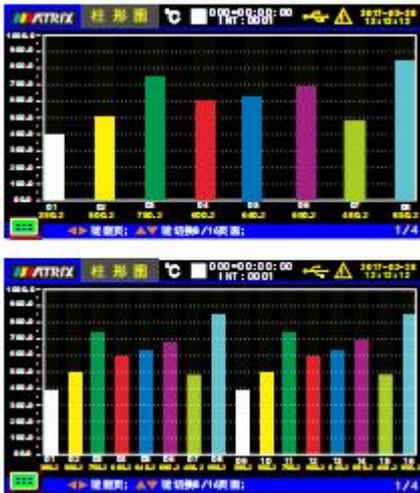
The historical curve can be paged in time, However, it cannot be set, and only the total curve picture of the whole file can be displayed.



Curve settings

The curve settings boundary includes curves in The range of Y-axis curve display, and whether the curve of each channel is displayed or shielded.

6.5 Real-Time Histogram



Live column chart

It can be compared by using the column chart. The ratio of each channel is large or small.

Note: The Y-axis display temperature range is the same as the curve setting range, which is only set in the curve setting.

Use Key to switch the 8/16 channel display page. Use

Press the key to turn the page.

6.6 Alarms

序号	通道	类型	报警开始时间
01	01	H	2017-3-3 11:12:12
02	03	H	2017-3-3 11:12:02

Current alarm graph

The current status can be viewed in the alarm interface All alarm status information, including channel number, type and occurrence time, can be viewed by turning pages in case of multiple records.

序号	通道	类型	报警开始时间	报警恢复时间
01	01	H	2017-3-3 11:12:12	2017-3-3 12:12:12
02	03	H	2017-3-3 11:12:02	2017-3-3 12:12:02

Historical alarms

You can view all alarms that have been recovered Status information, including channel number, type, occurrence time and recovery time, which can be viewed by turning pages in case of multiple records.

The delete key can be used for batch deletion.

6.7 Document List Page

序号	文件名	起始时间	数量 (次)	操作
01	0307121212	2017-3-7 12:12:12	100	<input type="checkbox"/> 记录
02	0307121212	2017-3-6 12:12:13	5523	<input checked="" type="checkbox"/> 历史曲线
03	0307121212	2017-3-5 12:12:14	60000	<input type="checkbox"/> 导出
04	0307121212	2017-3-4 12:12:15	50000	<input type="checkbox"/> 删除
05	0307121212	2017-3-3 12:12:16	10000	<input type="checkbox"/>

File list chart

Provides a recording start and stop button. Key, file history curve view, file export and delete function. Click the corresponding position to select one or more, or export and delete the current page quickly.



6.8 System settings



System setup diagram

6.8.1 Seconds to USB flash disk



Second change U disk

6.8.2 Input Settings



This machine can record 64 files circularly (CSV files, which can be opened directly with EXCEL). Each file can record up to 130000 data (regardless of the number of channels). The file can be directly exported to the U disk (only supports less than 32G/FAT32), or transferred to the internal U disk space of the instrument. Use the function of "changing U disk in seconds" (in the setting page), connect the PC to the U disk interface on the front panel of the instrument, and directly read the record file.

System settings provide a rich set of dishes. Single, clear and easy to use. Respectively provide date and time, measurement speed, display language, measurement unit, buzzer sound, communication address, communication baud rate, backlight time (0 is long on, 1-999 seconds off backlight), recording interval, automatic recording when starting up, and about. Note: Time, date, measurement speed, measurement unit and sensor cannot be changed when recording is started. The configured software communication address is 1 and the baud rate is 9600. If it is changed, the connection with the computer software will fail.

When entering the second change U disk page, the instrument will Equivalent to a USB flash drive. Connect the USB cable to the USB interface on the front panel of the instrument, wait for 5 seconds, and the PC detects the U disk. Instructions and PC software are stored in the instrument by default at the factory. Use this feature to copy to a PC to use.. It is not recommended to open and use directly.

The input settings provide a check on whether each channel Enable display function, custom name input and thermocouple type selection. Click the corresponding position to change the settings for each item. Use full keyboard spelling for custom name Input method, can input Chinese, English, symbols .



Keyboard Full View

Thermocouple Type Selection

6.8.3 Calibration settings



This interface provides the calibration settings of each channel and can display the current measured temperature value of each channel. When the calibration value is changed, you can see the change of the current value in real time and correct it to the actual measured value.

Correction value formula $Y = KX + B$ (X = measured value)
Click the corresponding position to change the settings for each item.

7. Software operating instructions

Find the file Temp_Setup in the CD and run the installation directly. The installation method is as follows.

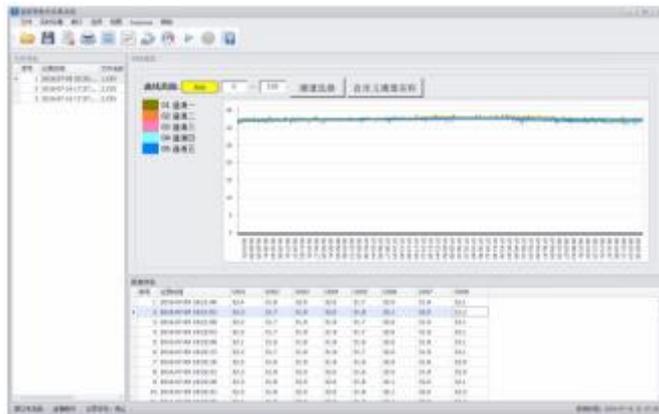


After the installation is complete, install the USB driver

When you see an icon  on the desktop after the installation is complete, press the icon to run the software program



Enter the startup interface

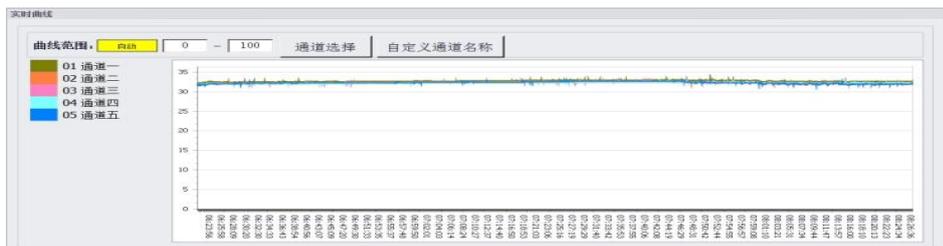


First connect the computer and the instrument, install the driver in the file list, and then select the correct com port in the soft interface. The lower left corner of the main interface shows that the communication connection is successful.

The computer interface provides rich display and analysis functions, such as file list, curve analysis display, data list, real-time temperature list and instrument operation key function. You can also print graphic curves.

序号	记录时间	文件名称	数据个数	文件大小
1	2016-07-09 20:35:...	1.CSV	7	820
2	2016-07-16 17:37:...	2.CSV	2	416
3	2016-07-16 17:37:...	3.CSV	1500	157992

File list: serial number, record time, file name, number of data, file size. Click the file directly to open the corresponding file data.



The curve tab can analyze all the data in the file in detail, and you can directly use the mouse to zoom in and out of the curve and translate left, right, up and down.



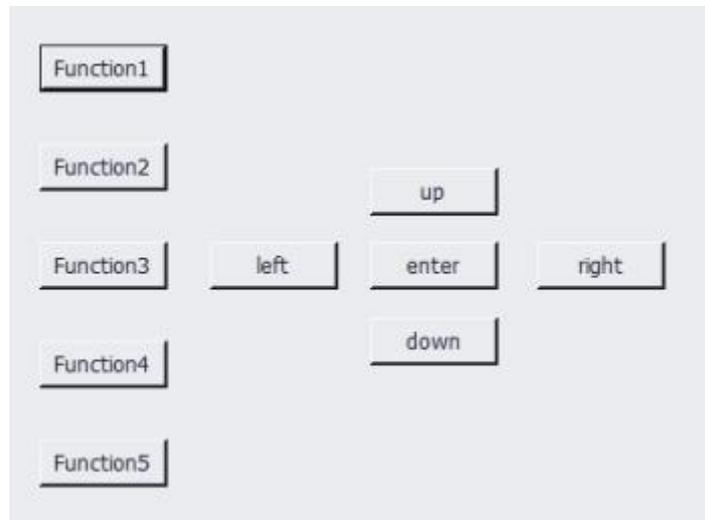
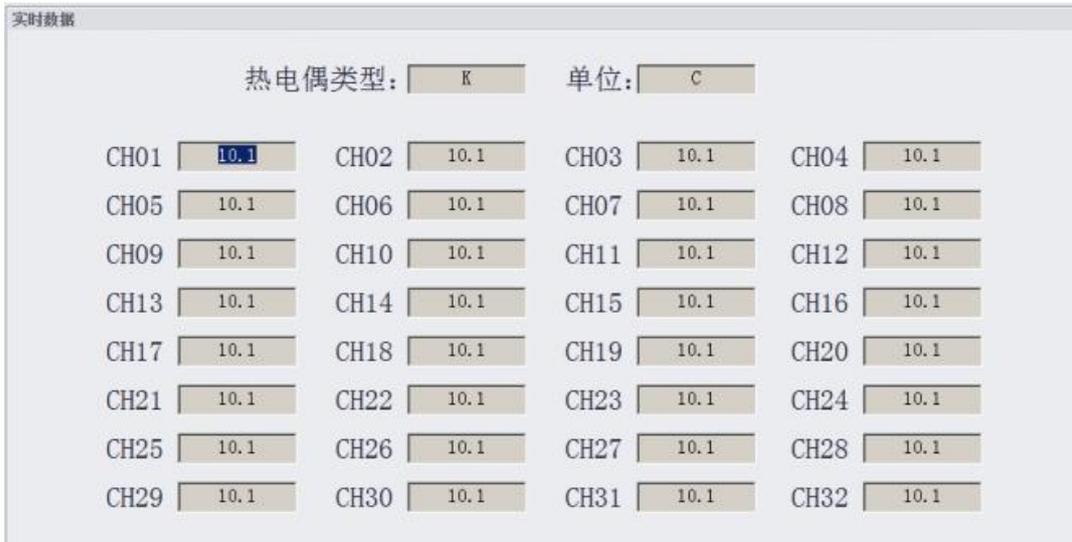
You can change the display color for each channel of the curves



You can customize the name of each channel

数据列表										
序号	记录时间	CH01	CH02	CH03	CH04	CH05	CH06	CH07	CH08	
1	2016-07-09 18:21:48	32.4	31.8	32.0	32.0	31.7	32.0	31.9	32.1	
2	2016-07-09 18:21:53	32.3	31.7	31.9	32.0	31.8	32.1	32.0	32.2	
3	2016-07-09 18:21:58	32.2	31.7	31.9	31.9	31.7	32.0	31.9	32.1	
4	2016-07-09 18:22:03	32.3	31.7	31.9	31.9	31.7	32.0	31.9	32.1	
5	2016-07-09 18:22:08	32.1	31.6	31.8	31.8	31.6	32.0	31.8	32.1	
6	2016-07-09 18:22:13	32.2	31.7	31.9	31.9	31.7	32.0	31.9	32.1	
7	2016-07-09 18:22:18	32.2	31.6	31.9	31.9	31.6	32.0	31.8	32.0	
8	2016-07-09 18:22:23	32.3	31.8	32.0	32.0	31.6	32.0	31.8	32.0	
9	2016-07-09 18:22:28	32.3	31.8	32.0	32.0	31.8	32.1	32.0	32.1	
10	2016-07-09 18:22:33	32.3	31.8	32.0	32.0	31.8	32.1	32.0	32.2	
11	2016-07-09 18:22:38	32.4	31.8	32.0	32.0	31.8	32.1	32.0	32.2	

The data list can be displayed for each channel and each time interval. Users can directly use EXCEL software to open directly under the installation file. The suffix name is *.CSV.



The real-time data list can display the current measurement value in real time. The instrument can be remotely operated directly by using the key page of the instrument

8. Verification conditions

Project	Reference value or range	Reference value or range
Ambient temperature °C	20	±5
Ambient Humidity% RH	45~75	
Atmospheric pressure KPa	86~106	
AC supply voltage V	220	±2%
AC supply voltage Hz	50	±1%
AC power supply waveform	Sine wave	β=0.05
External electromagnetic field interference	Should be avoided	
Ventilation	Good	
Sunlight	Avoid direct fire	



Warranty Card

What the warranty covered:

If the machine break down due to its defectiveness, MATRIX will provide free maintenance during warranty period. If the machine break down due to wrong operation or carelessness, then Matrix provide paid service within warranty period.

How long does this warranty last:

This warranty lasts for 3 years from the date of original purchase of all MATRIX branded products.

Who is covered:

This warranty covers only the original purchaser of this product. This warranty is not transferable to subsequent owners or purchasers of this product.

What do customers need to do to get repairs/service under the warranty policy?

If the machine get problem, please contact our local distributor. If you cannot find the local distributor, you can contact us directly, our email is service@szmatrix.com, our telephone No. is 0086 755 2836 4276.

What information do customers need to supply?

Model No.	
Serial No.	
Problem description	
Picture	
Video if necessary	