

Multifunctional Chart Recorder

INSTRUCTIONS

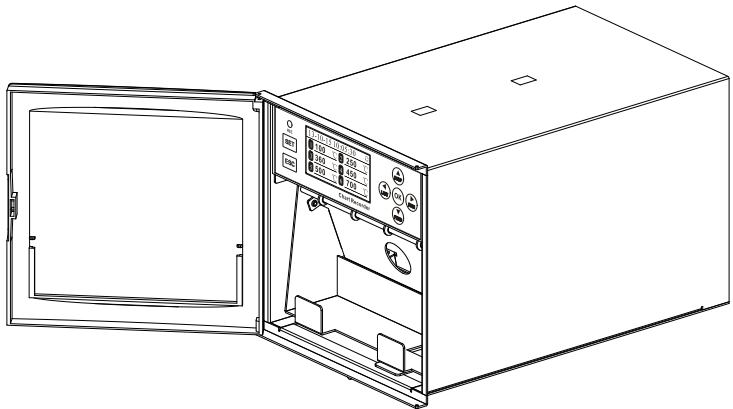


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Preface

Appreciate for purchasing our company's chart recorders. This manual illustrates how to install, wire and operate the device. In order to accurately operate the recorder, please read the manual before any operation.

Safety instructions

● Installation environment

The device is not allowed to be operated or stored in a place where is flammable or vaporous.

● Safety marks

Mark	Name
	Power warning
 /PE	Earth Ground connection point
100~240VAC 50/60Hz	Power specifics

● Reliable Earth Ground connection

To avoid the possible electric shock, please make sure that the grounding is effective and reliable before turning on the power.

● Power off in case of any breakdowns

When abnormal scent, sound, smoke, or high temperature is found, please shut down the power supply.

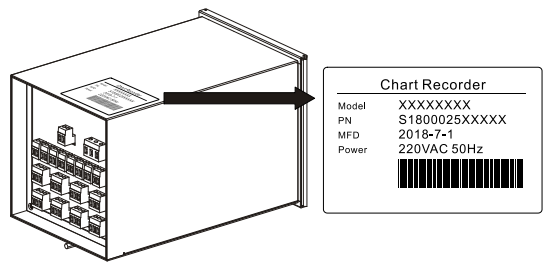
● Do Not attempt to fix or refit the device.

Unpacking

Please confirm the contents of the package after opening the box. If you find the wrong model, quantity or physical damage on the appearance, please contact our company or the distributor who sells this product.

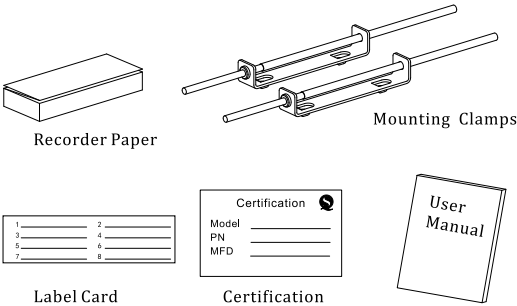
The nameplate

Please confirm whether the model and specification code written on the nameplate is consistent with the product you ordered.



Accessories

Ind.	Part	Qty
1	Recorder paper	1
2	Mounting Clamps	2
3	User Manual	1
4	Label Card	1



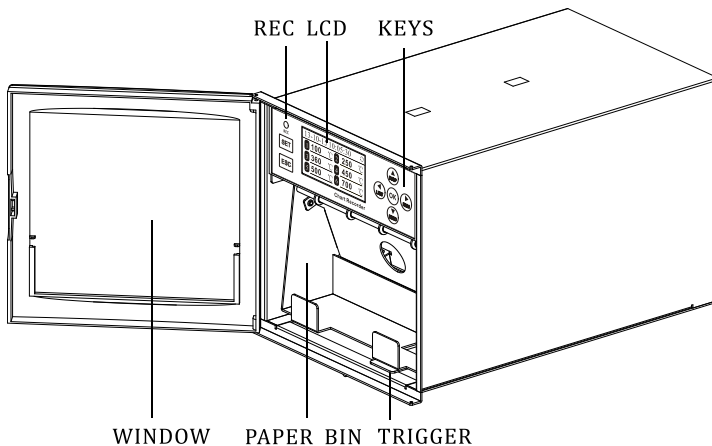
1. Overview

This chart recorder is designed for industrial field. Provide multi-channel high-precision analog signal input channel, configure multi-channel alarm, provide sensor power distribution; use high-precision thermal printer to achieve data, curve and mixed printing; equipped with high-resolution OLED LCD screen to provide real-time data display.

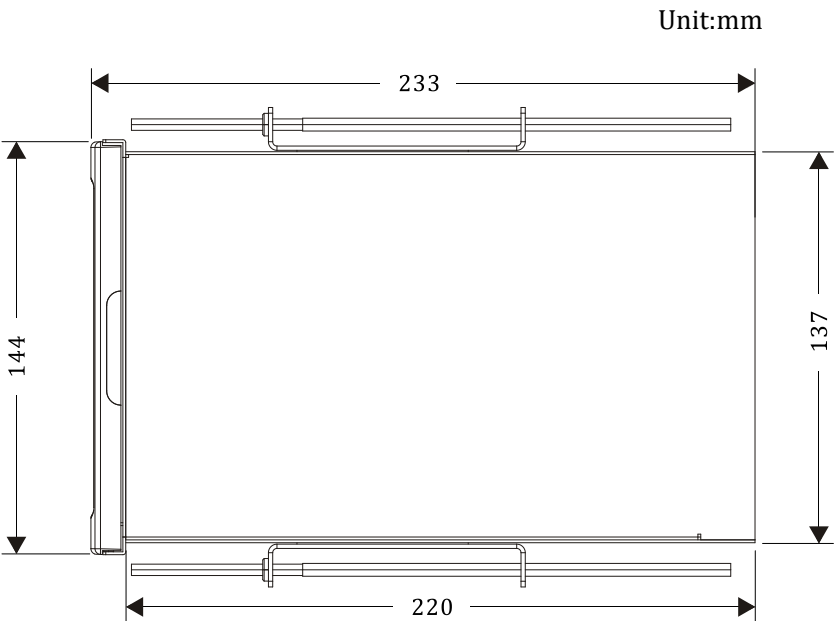
Features

- OLED LCD screen: rich-text display.
- Universal signal input: support 12channel universal signal input, support current, voltage, thermocouple, thermal resistance and other types of signals.
- Alarm function: 6 relay alarm output.
- Power distribution output: one 24V power distribution output.
- Paper feeding speed: 10 ~ 450mm / h free setting.

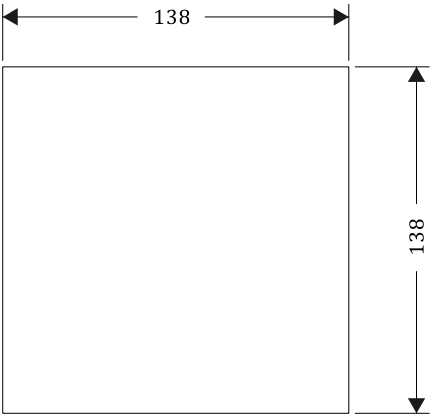
Structure



2. Installation

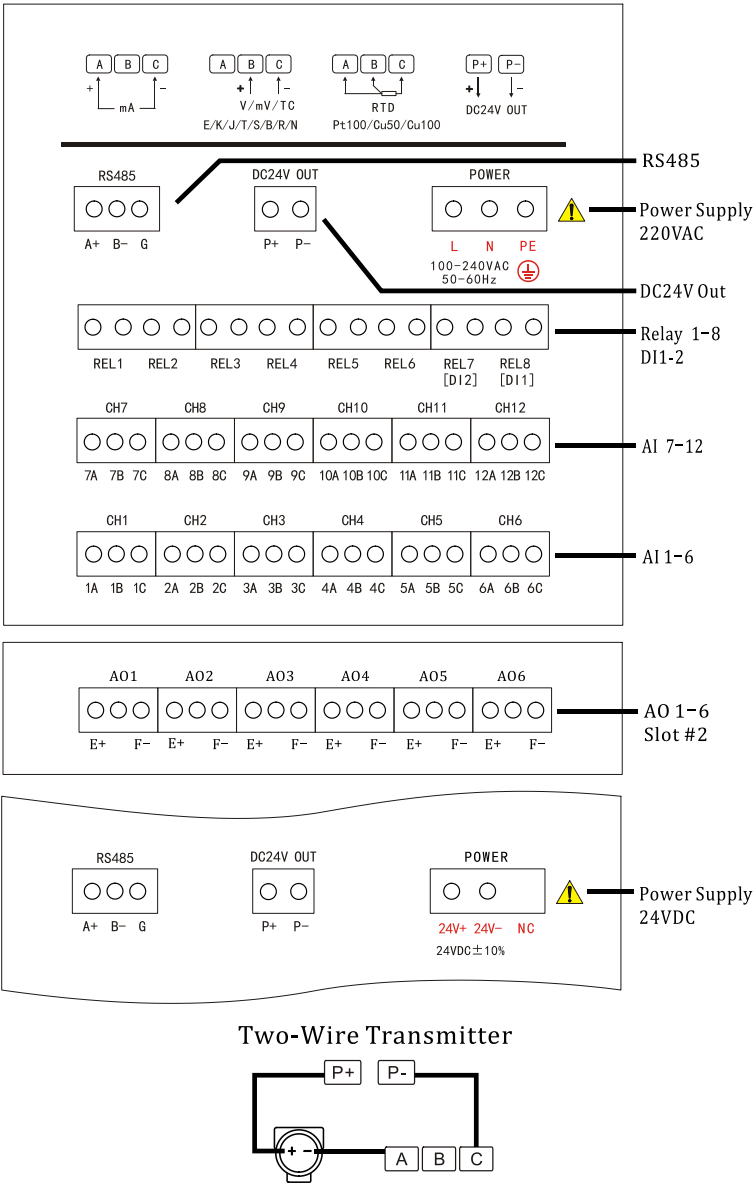


Dimension



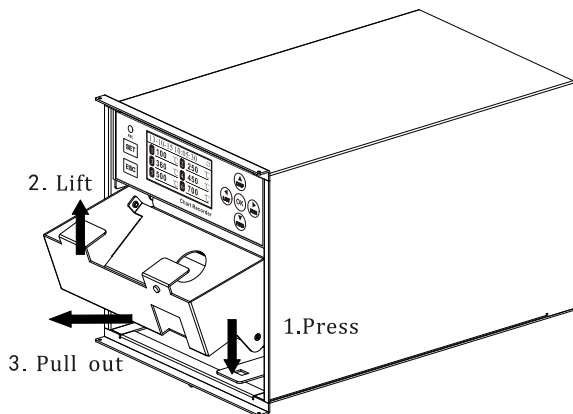
Mounting Hole

3. Electrical Connection

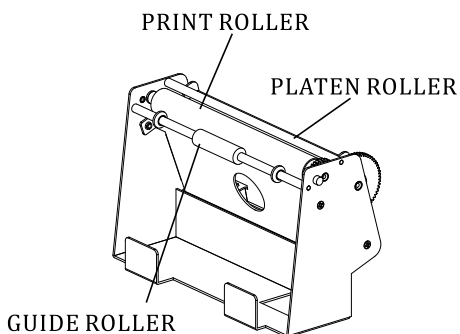


4. Paper loading

Step 1: press the paper bin trigger gently, the paper bin will automatically spring up, lift the paper bin to the position of 90 degrees, and then pull out the paper bin.



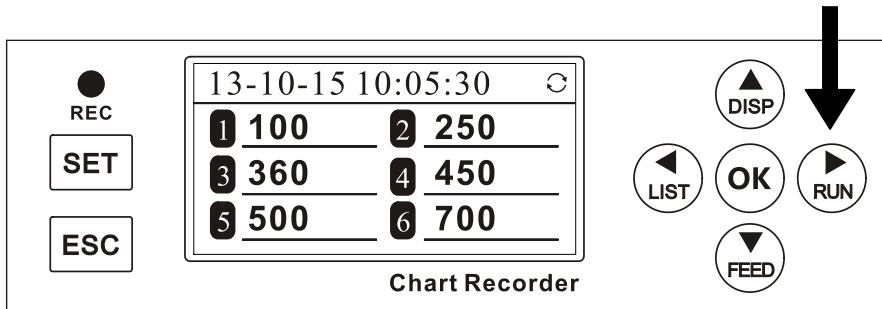
Step 2: open the cover, with the front side facing outward (use fingernail to scratch the paper surface, and the one with black mark is the front side), and load the recording paper. Then pull out 2-3 fold recording paper to pass through the paper roller, then pass through the paper guide roller, and then turn the big gear clockwise to tighten the recording paper. It is necessary to ensure that the recording paper is placed in the middle without deflection.



Step 3: after placing the paper bin in parallel, turn the paper bin downward and clip it into the bin buckle. The installation is completed when you hear a clear "click".

5. Keys and printing

5.1. Key functions



Keys	Function
RUN	Start or stop printing, light on when printing
LIST	Print configuration
DISP	Start or stop cycle display
FEED	Feed paper, 120mm, automatic stop
OK	Confirm
SET	Press 3 seconds, enter configuration
ESC	Return Or Switch display

Press [RUN] on the digital display screen to start data printing and recording, and the red light of rec is on. Press [RUN] again to stop data printing, and the red light of rec goes out.

5.2. Remote control printing

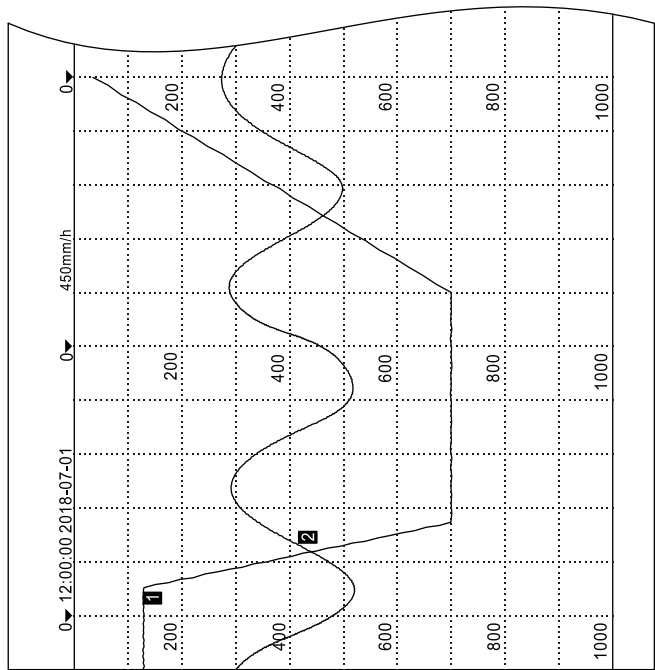
This instrument supports the external dry contact signal control the instrument to print, the signal is dry contact type. When the signal is connected, the instrument will print and record, and stop printing and recording when it is disconnected.

The connection terminal is DI1.

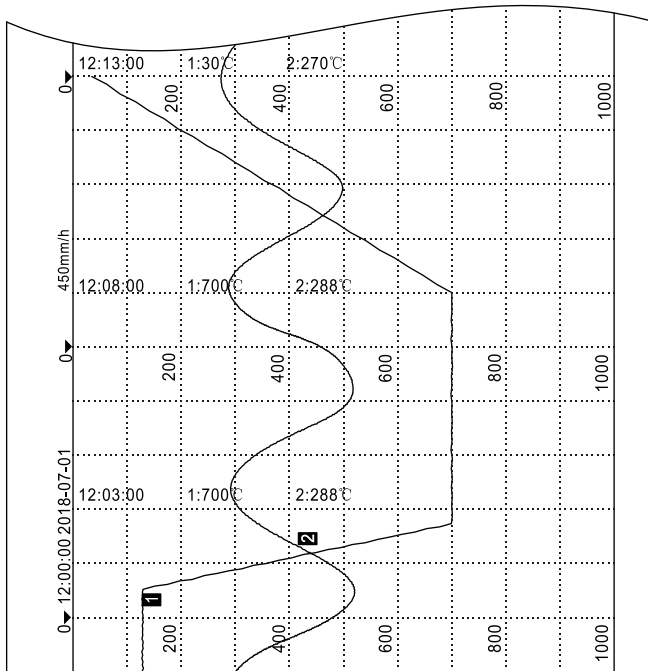
5.3. Printing example

The printing mode is optional: curve mode, data mode and mixed mode, which are set in the record configuration. The specific printing examples are as follows:

● **Curve mode**



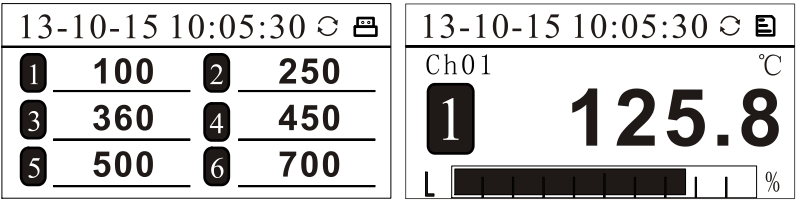
● Mixed mode



● Data mode

18-07-01 13:15:00	1:25°C	2:165°C	3:225°C	4:525°C
18-07-01 13:10:00	1:25°C	2:170°C	3:225°C	4:525°C
18-07-01 13:05:00	1:125°C	2:160°C	3:225°C	4:525°C
18-07-01 13:00:00	1:225°C	2:180°C	3:225°C	4:525°C
18-07-01 12:55:00	1:325°C	2:170°C	3:225°C	4:525°C
18-07-01 12:50:00	1:425°C	2:160°C	3:225°C	4:525°C
18-07-01 12:45:00	1:525°C	2:165°C	3:225°C	4:525°C

6. Data View



- Alarm: LL stands for lower-lower limit alarm; L stands for lower limit alarm; H stands for upper limit alarm; HH stands for upper-upper limit alarm.
- Cycle display: Press the key [DISP], displaying current channel without Circular Display mark. Press [DISP] key again, displaying every channel with Circular Display mark.
- Press [ESC] to switch to the following screen of USB stick (it can be operated when there is a USB stick inserted)
- USB Icon: “”, Icon shown during USB insert.
- Record Icon: “”, Icon shown during recording.

7. Configuration

7.1. Log in

Long press the [Set] key for 3 seconds in the digital display to enter the configuration password screen, the initial password is 000000, and press the [OK] key to enter the configuration.

Configuration Category

Press the [up] and [down] keys to select the configuration category, such as system, input, alarm, etc., press the [OK] key to enter the configuration setting, and press the [return] key to return

Config	Date	25-03-28
System	Time	23:05:00
Input	Lang	English
Alarm	Cold	Auto

Data and parameter editing

Press [up] and [down] to modify the parameter, press [up] and [down] to increase or decrease the value; press [OK] to open the value input box, press [left] and [right] to move the cursor, press [OK] to confirm the input, and press [return] to cancel the input.

Range: 0.0-3000.0
+1000.0

7.2. System configuration

- **Date and Time**

Set meter’s date and time.

- **Language**

Language toggle: Chinese / English.

- **Cold-junction**

Automatic: according to temperature of temperature sensor.
Manual: set the fixed temperature value of cold-junction.

- **Password**

The initial password is 000000.

- **Factory Setting**

Restore the parameters to the factory default state.

- **USB Formatting**

Formatting a USB Flash Drive.

- **Upgrade**

Firmware Update.

Config	Date	25-03-28
System	Time	23:05:00
Input	Lang	English
Alarm	Cold	Auto
		21.5
	Passwd	000000
		Factory set
		U formatting
		Upgrade

7.3. Input configuration

● Start / End Channel

Set channel values in batch. To set channels 1-3 to the same parameters, the start channel is set to 1 and the end channel is set to 3.

● Signal

Select the channel signal type. When the signal is off, the channel will not be enabled, displayed or printed.

Cat.	Signal
Current	0-10mA/0-20mA/4-20mA
Voltage mV	0-20mV/0-50mV/0-100mV
Voltage V	0-5V/1-5V/0-10V
RTD	Pt100/Cu100/Cu50
TC	T/E/K/S/B/J/R/N

Config	Stt Ch	1
System	End Ch	1
Input	Sig	4-20mA
Alarm	Tag	CH01
	Dot	1
	Scale L	0
	Scale H	100
	Unit	°C
	Filter	0.0 s
	Mode	Print
	Print L	0
	Print H	100
	K	1.00
	B	0
	Vacuum	Off

● Tag

Supports alphanumeric format with 8-character length.

● Dot

Channel decimal point, RTD and TC is 0~1 and that of other signals is 0~3.

● Scale

Channel signals indicate scale. Configuration setting range of current and voltage is -9999~30000; not applicable for RTD and TC.

● **Unit:**

°C、°F、kg/h、t/h、m³/h、km³/h、L/h、Nm³/h、kNm³/h、bar、mbar、mmHg、Pa、kPa、MPa、atm、kgf/cm²、mm、cm、m、km、Wh、kWh、W、kW、MW、kJ、Hz、kHz、MHz、g、kg、t、mV、V、kV、mA、A、kA、kJ/h、MJ/h、GJ/h、ppm、%、‰、ppmO₂、ppmH₂、%O₂、%LEL、NTU、μg/h、μg/kg、rpm、μS/cm、mS/cm、MΩcm、r/min、PH、%RH、N、mg/L、g/L、kg/m³、kcal/m³、m/min、m/s、ppb

● **Filter**

$$Value = \frac{LastValue \times Filter + ThisValue}{Filter + 1}$$

● **Mode**

Three options: Print/Show/OFF. Print: Show and print data; Show: Just Show data without print; OFF: Neither show nor print.

● **Print**

The Boundary limit. Upper limit and lower limit respectively correspond to printing paper's left boundary and right boundary. Boundary lower limit corresponds to chart paper's zero point; boundary upper limit corresponds to chart paper's calibration 100%. Boundary setting can realize curve shift.

● **Adjust K,B**

Linear adjustment; displayed value = measured value*K+B.

● **Vacuum**

Vacuum algorithm.

7.4. Alarm Configuration

● Start / End Channel

Set channel values in batch. To set channels 1-3 to the same parameters, the start channel is set to 1 and the end channel is set to 3.

● Alarm

When alarm is ON, the alarm function of this channel is enabled; when it is OFF, the function is disabled.

Config	Stt Ch	1
System	End Ch	1
Input	Alarm	ON
Alarm	L	0.0
	Relay	OFF
	H	300.0
	Relay	OFF
	LL	0.0
	Relay	R1
	HH	0.0
	Relay	R1
	Hyster	0

● Alarm limit and relays

Alarm limit value and the corresponding relay number. When Relay is OFF, there is no relay output; when Relay is 1, No.1 corresponding relay outputs and the like.

● Hyster

Alarm backlash setting, avoiding frequent alarms in the event of signal vibration around alarm setting value.

ALARM TYPE	ALARM CONDITION	CANCELLATION CONDITION
Lower limit	Channel value < lower limit value	Channel value > lower limit + backlash value
Upper limit	Channel value > upper limit value	Channel value < upper limit - Backlash value
Lower-lower limit	Channel value < lower-lower limit	Channel value > lower-lower limit + backlash value
Upper-upper limit	Channel value > upper-upper limit	Channel value < upper-upper limit - backlash value

7.5. Print configuration

● Print Type

Three types: curve, data or mixed

● Speed

The output speed of the recording paper, in mm/h, can be set in the range of 10-450mm/h.

If the speed is 20 mm/h, the length of paper is 20 mm in 1 hour.

● Interval

Configuration setting range is 1-9999 minutes. The recorder processes data print in terms of printing time intervals.

● Staff

%The percentage is used as the curve ruler;

CH1-CHn: specify the channel boundary value as the curve ruler;

Auto: Print the channels in turn at intervals of 500mm.

● Grid

The grids count of channel index printing.

● Time

Print: Print working time at the begin of curve and the end of curve.

Not Print: Never Print.

● POP

Auto start printing on power.OFF: Start print manual; ON: Auto start printing on power; KEEP: Keep the print state before power on.

● Contrast

Print contrast: 0-3. Larger the number is, deeper the printing depth is.

Config	Type	Mix
Print	Speed	450
Record	Interval	10
Comm	Staff	Auto
	Grid	10
	Time	ON
	POP	ON
	Contrast	1

7.6. Record configuration

The data logging function will be enabled only when the instrument is equipped with a USB port and a USB drive is inserted.

Config	Record	Intvl
Print	RecIntvl	1s
Record		
Comm		

● Record

OFF: All data logging functions are disabled.

Sync: Data records only during printing operations.

Intvl: Automatic recording at preset time intervals.

● Record Intvl

1s、2s、5s、10s、15s、30s、1m、2m、5m、10m、30m、1h.

7.7. Comm configuration

RS485 communication function adopts standard Modbus-RTU protocol.

Addr: 1-247

Baudrate: 2400/4800/9600/19200/115200

Parity: None/Odd/Even

Byteswap: 1234/2143/3412/4321; 4 byte float type.

Config	Addr	1
Print	Baud	9600
Record	Parity	None
Comm	Byte	2143

32bits float data (4XXXX: 03Command)

Chnl	Register		Chnl	Register		Chnl	Register
Chnl1	40001		Chnl5	40009		Chnl9	40017
Chnl2	40003		Chnl6	40011		Chnl10	40019
Chnl3	40005		Chnl7	40013		Chnl11	40021
Chnl4	40007		Chnl8	40015		Chnl12	40023

Example:Read Data of channel 1(32bits,float)

Query: 01 03 00 00 00 02 C4 0B

Response: 01 03 04 00 00 41 A4 CB D8

Analyze: [00 00 41 A4] => 20.50

16bits signed short data (3XXXX: 04Command)

Chnl	Register	Chnl	Register	Chnl	Register
Chnl1	30001	Chnl1	30009	Chnl1	30017
Chnl2	30003	Chnl2	30011	Chnl2	30019
Chnl3	30005	Chnl3	30013	Chnl3	30021
Chnl4	30007	Chnl4	30015	Chnl4	30023

Example: Read data of channel 1(16bits, short)

Query: 01 04 00 00 00 01 31 CA

Response: 01 04 02 08 02 3F 31

Analyze: [08 02] => 20.50 (2 decimal point, same with channel setting)

7.8. Output configuration

The transmitter output linearly converts the percentage of span from the source input channel into a 4-20mA current signal. This signal can be used as an input by other instruments or systems. When the output is disabled, it maintains a fixed 4mA output.

Config	Output	1
Output	Source	1
Info	K	1. 000
	B	0. 000

● Output

Output channel: 1 - 6.

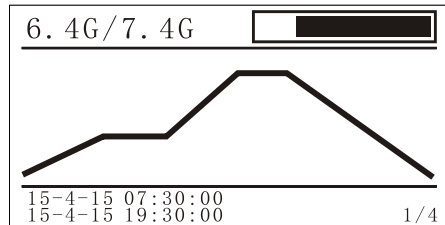
Source channel: OFF, 1 - n.

Output Current (mA) = Measured Current (mA) × K + B

8. USB and software

8.1. USB

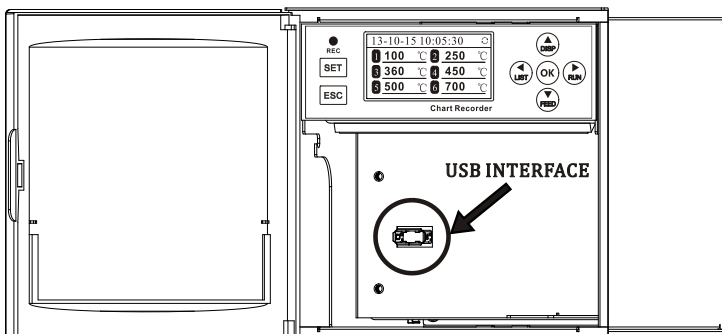
When you select the USB function, when the recorder prints, the data is stored in the USB flash disk, and stored according to the date and time. Each time a file is printed, you can select the data to print back. Press [return] on the display screen to switch to the USB curve screen.



- Press [left] and [right] to switch the record file, and press [up] and [down] to switch the viewing channel.
- Press the [OK] key to print the data stored in the USB flash disk again.

USB Position

The USB interface is located at the back of the paper bin. When the paper bin is removed, you can see the USB interface.



File format

The file is stored in the folder of /PLR, and the subdirectory is named by month and year, such as 2024-08, filename format: MMDDHHMMXX.PLR (e.g. 01111223.PLR, where 23 is the daily sequence number)

8.2. Software

The software is stored in the USB stick "/PLR" directory.
Double click to open the software PLR.exe .



9. Specification

Category	Signal	Measuring range		Accuracy /25℃
Current	0-10mA	0.00~10.00mA		±0.2%
	0-20mA	0.00~20.00mA		±0.2%
	4-20mA	4.00~20.00mA		±0.2%
Voltage mV	0-20mV	0.00~20.00mV		±0.2%
	0-50mV	0.00~50.00mV		±0.2%
	0-100mV	0.00~100.00mV		±0.2%
Voltage V	0-5V	0.000~5.000V		±0.2%
	1-5V	1.000~5.000V		±0.2%
	0-10V	0.00~10.00V		±0.2%
RTD	Pt100	-200.0~650.0℃		±0.5℃
	Cu100	-50.0~150.0℃		±0.5℃
	Cu50	-50.0~140.0℃		±0.5℃
TC		Isolated	Not Isolated	
	T	-200~400℃	T _{CJ} ~400℃	±2℃
	E	-200~1000℃	T _{CJ} ~1000℃	±2℃
	K	-200~1372℃	T _{CJ} ~1372℃	±2℃
	S	-50~100℃	T _{CJ} ~100℃	±4℃
		100~1768℃	100~1768℃	±3℃
	B	250~500℃	250~500℃	±5℃
		500~1820℃	500~1820℃	±3℃
	J	-210~1000℃	T _{CJ} ~1000℃	±2℃
	R	-50~100℃	T _{CJ} ~100℃	±4℃
		100~1768℃	100~1768℃	±3℃
	N	-200~1300℃	T _{CJ} ~1300℃	±3℃

[NOTE] T_{CJ}: The temperature of cold junction.

9. Specification

Project	Specification
Channel	12 Channels
Sampling period	1second
Record paper	Folding industrial thermal paper, 120mmwide, 8meters long
Paper speed	10~450mm/h
Power supply	100-240VAC 50-60Hz / 24VDC $\pm 10\%$ 45W
Work environment	-10~60°C / 0~85% RH (no condensation)
Preheating time	30 minutes after power-on
Installation	Panel-mounting, indoor
Panel thickness	2-12mm
Weight	3kg
Dimension	144(W) $\times$ 144(H) $\times$ 233(D)
Storage environment	-20~80°C / 0~85%RH (no condensation)
Relays	250VAC 3A, 30VDC 3A (Normal open, Resistive load)
24VDC Output	24VDC $\pm 10\%$ 60mA
Offset	MAX 2mm
Transmitter	4-20mA 0.2% Accuracy

10. Trouble shooting

The user must carefully read this manual before installation and use, operate the instrument correctly according to the contents of this manual, and confirm whThis function is a customized option and is not included in standard products. ether the installation and use environment meet the requirements. The following table shows the possible faults of the paper recorder. Users can solve the problems according to the faults.

Trouble	Troubleshooting
Wrong signal data Or display #####	Wiring error: please check whether the input signal wire is connected correctly
	Configuration error: whether the signal type and range are configured correctly.
LCD no display	Check the power supply
Curve wrong	Check whether the configuration of recording boundary and paper feeding speed is correct
Alarm wrong	Check whether the alarm upper and lower limit values and relay numbers are correct

Appendix A — F0 Sterilization Function

This function is a customized option and is not included in standard products.

1. Function Introduction

This function is customized for the F0 sterilization process. In the sterilization process recording, F0 value integration shall be performed when the temperature is above the threshold; no F0 value shall be accumulated when the temperature is below the threshold.

2. F0 Value Principle

The F-value refers to the equivalent sterilization time in minutes (Min) required to achieve the same sterilization effect at a given temperature (T) with a specified Z-value, as that achieved at the reference temperature (T₀) with the same Z-value. The mathematical expression of the F-value is as follows:

$$F = \sum \Delta t \cdot 10^{(T-D)/Z}$$

$Z = 10\text{ }^{\circ}\text{C}$, reference temperature $T_0 = 121\text{ }^{\circ}\text{C}$

3. Digital Display

On the display screen, the current temperature value is shown on the left, and the F0 value on the right.

When “Record” is activated, the F0 value starts counting from 0 and the curve begins printing.

When recording stops, the F0 value stops accumulating. The F0 value is automatically cleared to zero for each new recording session.

13-10-15 10:05:30	
1	123.5 44.55

4. Parameter Setting

Config	Chnl	1	THR	100
System	F0	ON	Upper	100
Input	D	121	Relay	1
F0	Z	10		

Chanl: Configurable channels are available for selection.

F0: F0 function switch, ON for enable, OFF for disable.

D: Default value is 121 °C, adjustable according to actual conditions.

Z: Default value is 10, adjustable according to actual conditions.

Threshold: F0 value accumulates when temperature exceeds the threshold; no accumulation below this value.

Upper Limit: Upper limit of the F0 value.

Relay: Assign corresponding relay output; 0 means disabled.

Note: F0 value is not displayed in the curve.

