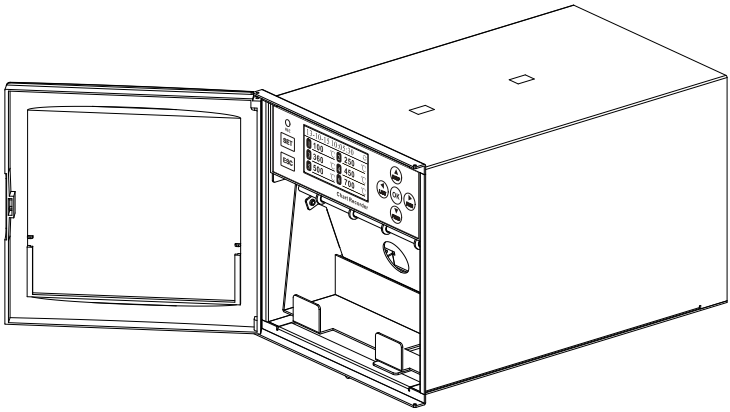
User Manual & Guide

# Multifunctional Chart Recorder

# INSTRUCTIONS



UMxK2xEN#C0 2023.11

# Table of contents

# 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 |
|  | 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.

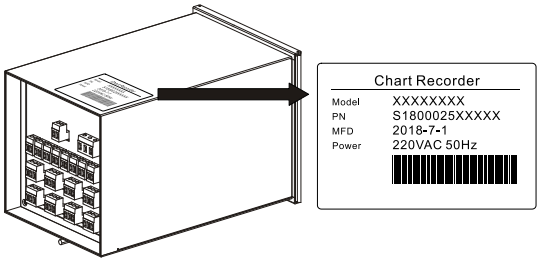
- **Do Not attempt to fix or refit the device.**

# 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.

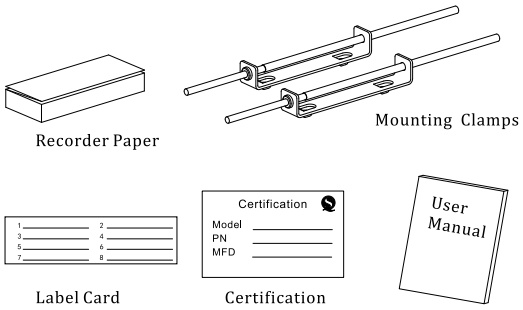
## The nameplate

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 |



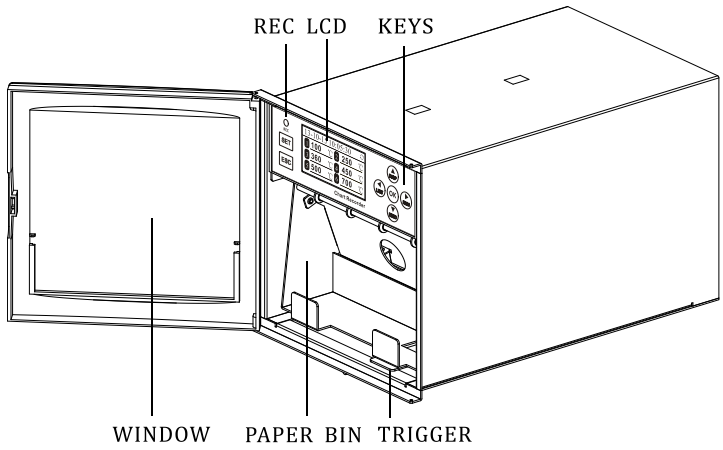
# 1. Overview

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

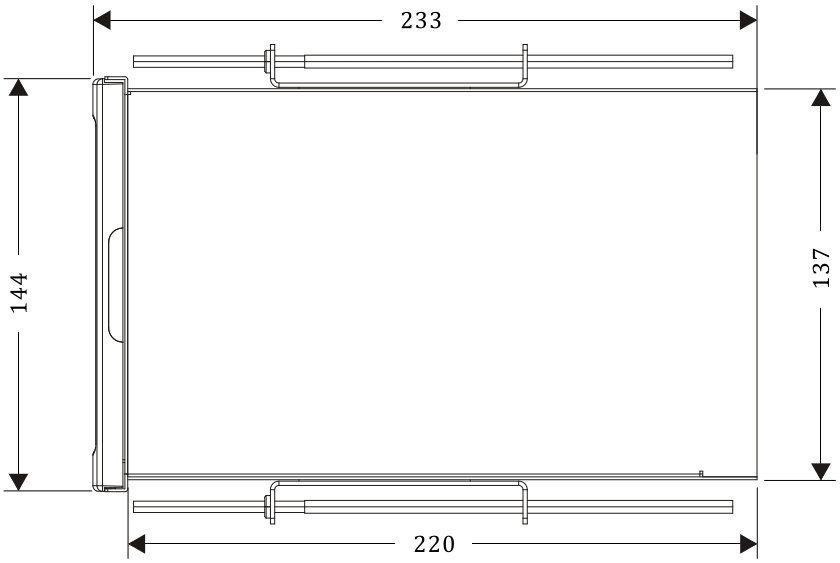
- OLED LCD screen: rich-text display.
- Universal signal input: support 8-12channel universal signal input, support current, voltage, thermocouple, thermal resistance and other types of signals.
- Alarm function: 6 relay alarm output.
- Power distribution output: one 24V power distribution output.
- Paper feeding speed: 10 ~ 450mm / h free setting.

## Structure

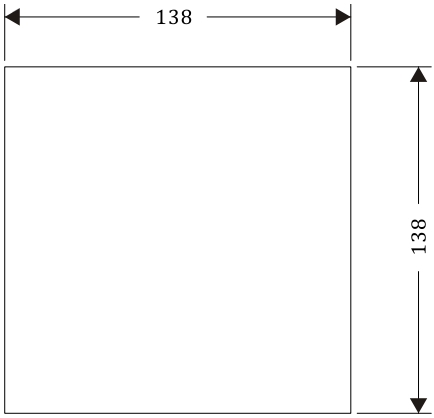


# 2. Installation

Unit:mm

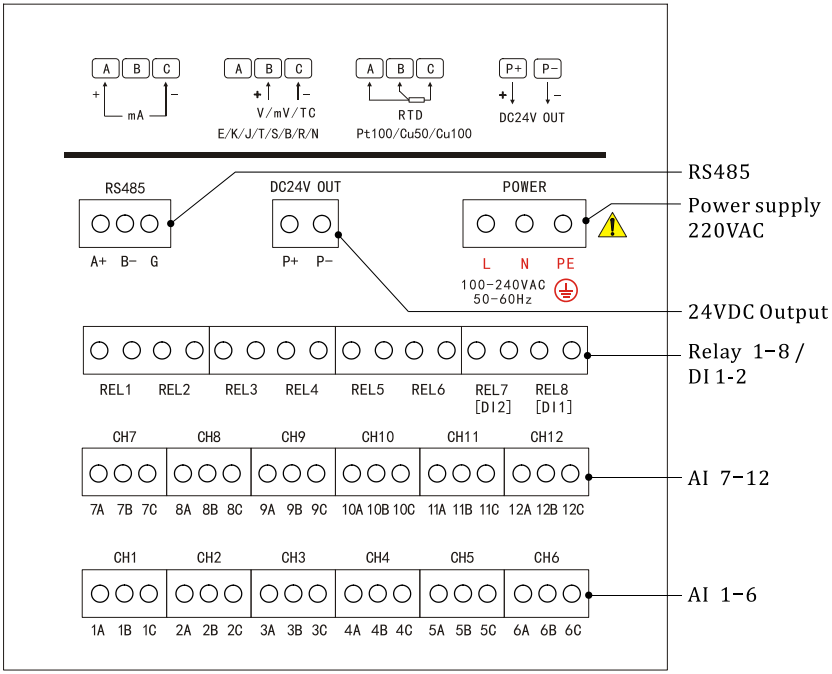


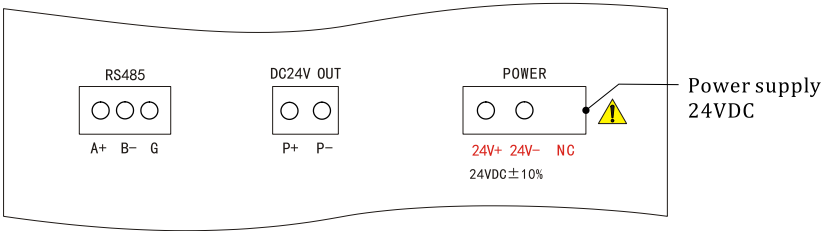

**Dimension**



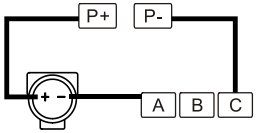

**Mounting Hole**

# 3. Electrical Connection



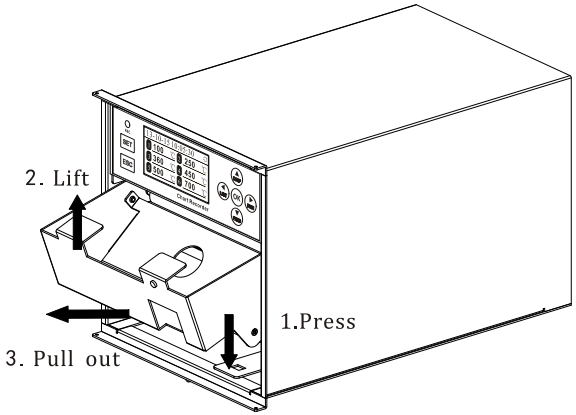




Two-Wire Transmitter

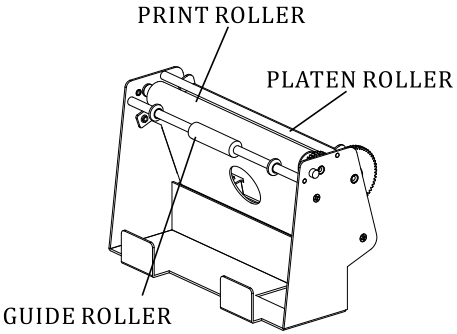


# 4. Paper loading

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.



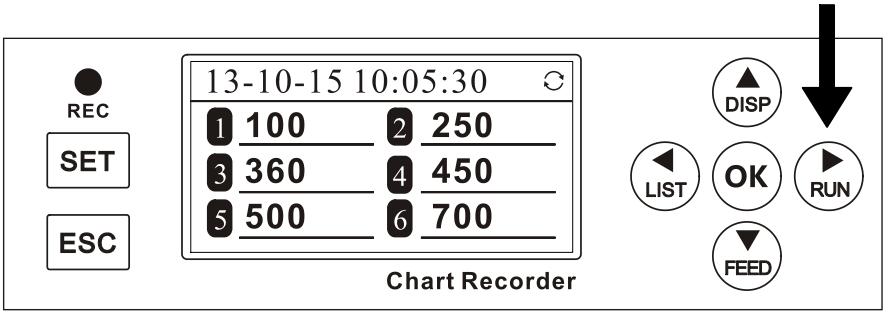

Step 2: open the cover, with the front side facing outward (use fingernail to scratch the paper surface, and the one with black mark is the front side), and load the recording paper. Then pull out 2-3 fold recording paper to pass through the paper roller, then pass through the paper guide roller, and 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.

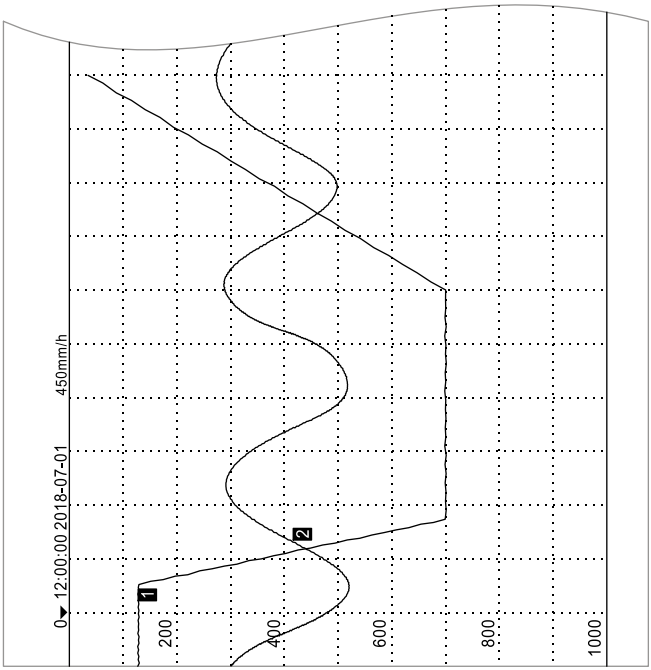
## 5.2. Remote control printing

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.

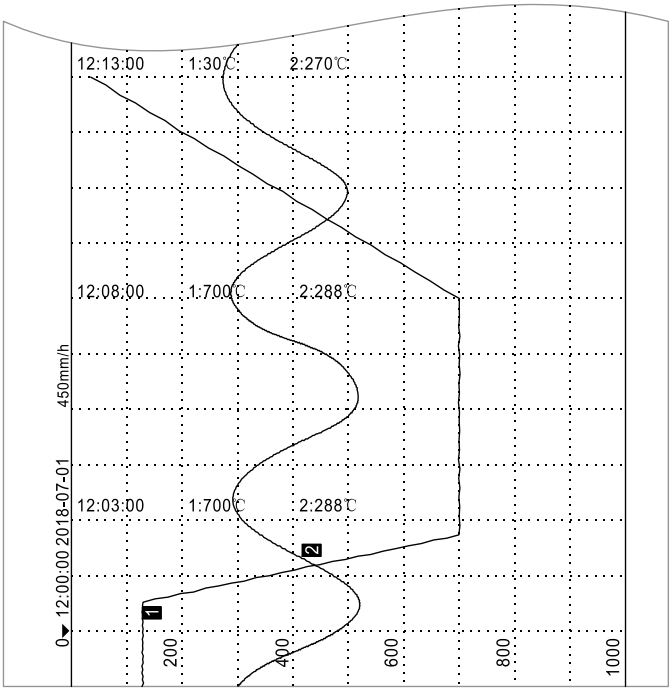
# 5.3. Printing example

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:

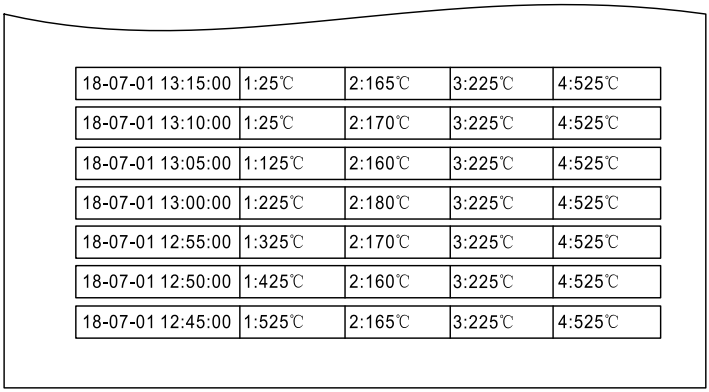
- **Curve mode**



- **Mixed mode**

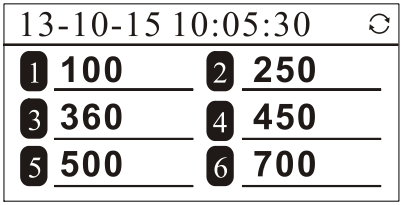


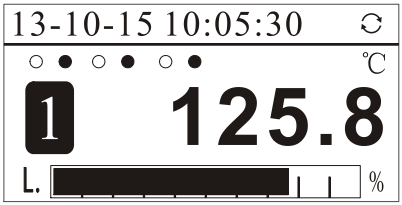

- **Data mode**



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

# 6. Data View




- Relay:Six circles represent relays 1-6 from left to right;● Indicates that the relay is closed,○ Indicates that the relay is opened
- Alarm:L. stands for deviation lower limit alarm; L stands for lower limit alarm; H stands for upper limit alarm; H stands for deviation 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)

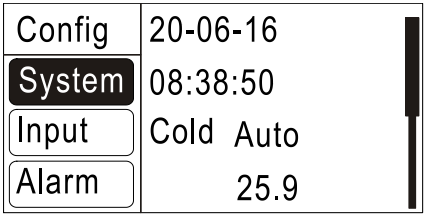
# 7. Configuration

## 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.

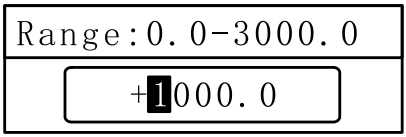
### Configuration Category

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

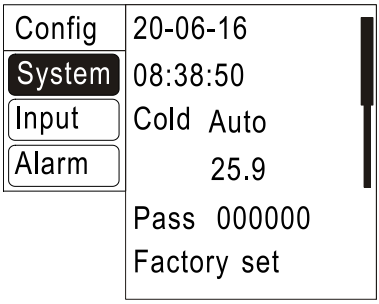



### Data and parameter editing

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.



# 7.2. System configuration




- **Date and Time**

Set meter's date and time

- **Cold-end Compensation**

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

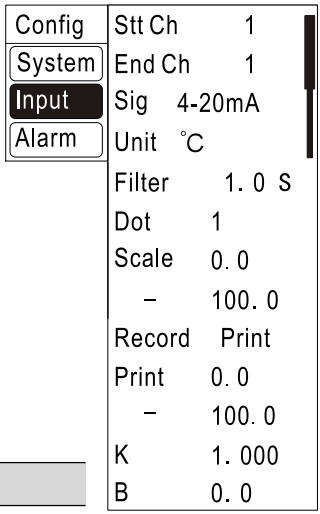
- **Password**

The initial password is 000000

- **Factory Setting**

Restore the parameters to the factory default state.

# 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/4-20mAsq |
| Voltage mV | 0-20mV/0-50mV/0-100mV |
| Voltage V | 0-5V/1-5V/1-5Vsq/0-10V |
| RTD | Pt100/Cu100/Cu50 |
| TC | T/E/K/S/B/J/R/N |

- **Unit:**

$m^3/h$, $km^3/h$, L/h, $Nm^3/h$, $kNm^3/h$, bar, mbar, $mmH_2O$, 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, %, ‰, $ppmO_2$, $ppmH_2$, $\%O_2$, %LEL, NTU, μg/h, μg/kg, rpm, μS/cm, mS/cm, MΩcm, r/min, PH, RH, N, mg/L, g/L, $kg/m^3$, $kcal/m^3$, m/min, /s, °C, °F, kg/h, t/h

- **Filter**

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

- **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.

- **Record**

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

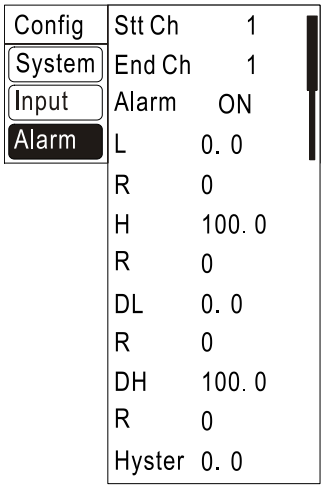
- **Print**

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

## 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.

- **Alarm limit and relays**

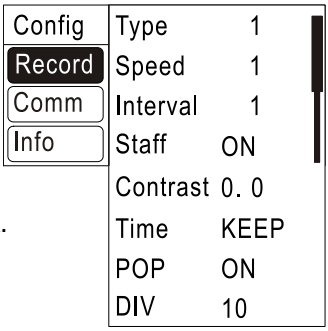
Alarm limit value and the corresponding relay number. When R is 0, there is no relay output; when R is 1, No.1 corresponding relay outputs and the like.

- **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 |
| Deviation lower limit | Channel value < lower limit - deviation lower limit | Channel value > lower limit - deviation lower limit + backlash value |
| Deviation upper limit | Channel value > upper limit + deviation upper limit | Channel value < upper limit + deviation upper limit - backlash value |

# 7.5. Record configuration




- **Record 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;
1-n: specify the channel boundary value as the curve ruler;
X: Print the channels in turn at intervals of 500mm.

- **Contrast**

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

- **Time**

Print working time at the begin of curve and the end of curve.
None:Never Print; P:Positive direction; N: Negative direction.

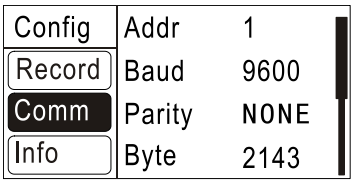
- **POP**

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

- **DIV**

The grids count of channel index printing.

# 7.6. 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.

### 32bis float data（4XXXX：03Command）

| Chnl | Offset | | Chnl | Offset | | Chnl | Offset |
|---|---|---|---|---|---|---|---|
| Chnl1 | 0000 | | Chnl5 | 0008 | | Chnl9 | 0016 |
| Chnl2 | 0002 | | Chnl6 | 0010 | | Chnl10 | 0018 |
| Chnl3 | 0004 | | Chnl7 | 0012 | | Chnl11 | 0020 |
| Chnl4 | 0006 | | Chnl8 | 0014 | | Chnl12 | 0022 |

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 | Offset | | Chnl | Offset | | Chnl | Offset |
|---|---|---|---|---|---|---|---|
| Chnl1 | 0000 | | Chnl1 | 0004 | | Chnl1 | 0008 |
| Chnl2 | 0001 | | Chnl2 | 0005 | | Chnl2 | 0009 |
| Chnl3 | 0002 | | Chnl3 | 0006 | | Chnl3 | 0010 |
| Chnl4 | 0003 | | Chnl4 | 0007 | | Chnl4 | 0011 |

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

Query: 01 04 00 00 00 01 31 CA

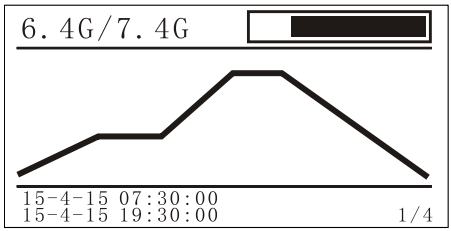
Response: 01 04 02 08 02 3F 31

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

# 8. USB and software

## 8.1. USB

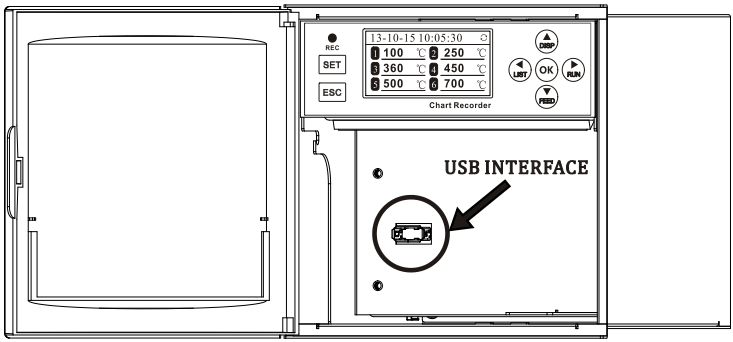
When you select the USB function, when the recorder prints, the data is stored in the USB flash disk, and stored according to the date and time. Each time a file is printed, you can select the data to print back. Press [return] on the display screen to switch to the USB curve screen.




- 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.

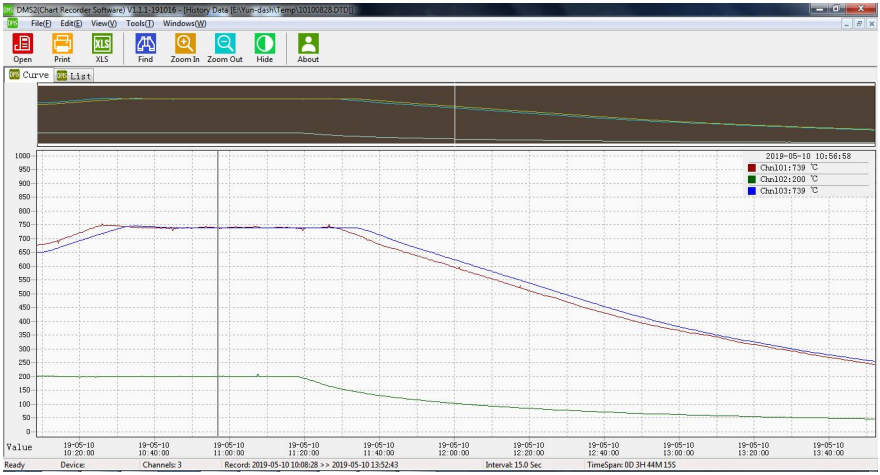


### File format

The file is stored in the folder of /hisdata, and the subdirectory is named by month and year, such as 2019-08, and the file name is named by the date D hour h serial number, such as 01D08HXX.DTD and XX as the document number.

## 8.2. Software

The software is stored in the USB stick "/DMS" directory. Double click to open the software DMS.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% |
| | 4-20mAsq | 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% |
| | 1-5Vsq | 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 | -50~1768℃ | $T_{CJ}$~1768℃ | ±3℃ |
| | B | 250~1820℃ | $T_{CJ}$~1820℃ | ±3℃ |
| | J | -210~1200℃ | $T_{CJ}$~1200℃ | ±2℃ |
| | R | -50~1768℃ | $T_{CJ}$~1768℃ | ±3℃ |
| | N | -200~1300℃ | $T_{CJ}$~1300℃ | ±3℃ |

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

| Project | Specification |
|---|---|
| Channel | 8Channels(Not isolated) / 12 Channels(Isolated) |
| Sampling period | 1second |
| Record paper | Folding industrial thermal paper, 120mmwide, 8meters long |
| Paper speed | 10~450mm/h |
| Power supply | 100-240VAC 50-60Hz / 24VDC±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)×144(H)×233(D) |
| Storage environment | -20~80°C / 0~85%RH (no condensation) |
| Relays | 250VAC 3A, 30VDC 3A (Normal open, Resistive load) |
| 24VDC Output | 24VDC±10% 60mA |
| Offset | MAX 2mm |

# 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 whether 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<br>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 |