FOREWORD

- Thank you for purchasing the paperless recorder!
- The use's manual contains useful information about the functions of the instrument, installation, wiring, operation procedures, and troubleshooting . To ensure correct use, please read this manual thoroughly before operation.
- Keep this manual in a safe place for quick reference in the event a question arises.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact us.
- Copying or reproducing all or any part of the contents of this manual without our permission is strictly prohibited.

Revisions

MR80V09C16X

Packing goods

After you open the packing box, please confirm the following before you use it. Please contact our company or sales network once you have received products with incorrect quantity or physical damage in appearance.

No	Name	Unit	QTY	NOTE
1	paperless recorder	pcs	1	
2	User Manual	book	1	
3	Mounting bracket （with screws）	pcs	2	For disc mounting and fixing
4	Application	pcs	1	
5	Standard Software（CD）	pcs	1	
6	U disk	pcs		optional
7	RS232C lines	pcs		optional
8	RS232C/485 convert modula	pcs		optional
9	Micro printer（accessory）	pcs		optional

Matters need attention

- If you find that the instrument is damaged by transportation, please contact the manufacturer
- This series of instruments is suitable for general industrial occasions. If you have special use requirements, please set up a separate protective device
- For the safety of you and the instrument, please do not live installation. Please use the rated voltage power supply, the correct wiring, properly grounded, after the power supply, please do not touch the back of the instrument wiring terminal, in case of electrical shock
- The instruments should be installed indoors, and the installation position is to ensure that the ventilation is smooth (in case the temperature inside the instrument is too high), avoid the wind and rain and direct sunlight, do not install in the following situations:
- An occasion where temperature and humidity exceed the conditions of use
- An occasion in which a corrosive, flammable or explosive gas is present.
- Occasions with large amounts of dust, salt and metal powder
- Occasions where water, oil and chemical liquids are easily spattered
- An occasion of direct vibration or shock.
- Electromagnetic source
- The instrument should take appropriate shielding measures when it is close to power line, strong electric field, strong magnetic field, static electricity, noise or AC contactor, etc.
- In order to avoid measuring error, when the sensor is thermocouple, when the sensor is thermal resistance, use three copper conductors of the same size and resistance value less than 10 Ω , otherwise the

measurement error will be caused.

- In order to extend the service life of the instrument, please carry out regular maintenance and maintenance. Do not repair and disassemble the instrument by yourself. When wiping the instrument, please use a clean soft cloth, do not dip in alcohol, gasoline and other organic solvents cleaning, may cause discoloration or deformation
- If the meter has influent, smoke, smell, noise and so on, please immediately cut off the power supply, stop using and get in touch with the supplier or our company in time.

Catalogue

Chapter 1 Summary

■Summary

With the increasing scale, centralization and complexity of the industrial site, applications such as multi-channel data acquisition, processing and control, color display of complex information, touch screen operation, etc. are more and more popular with on-site instrument users. Therefore, it is necessary to develop an excellent product with strong data processing capacity, high operation reliability, large recording and storage capacity, rich display content, excellent computing performance and rapid response to system events. The medium and long chart color paperless recorder developed by our company has excellent performance, which enables the system to maintain high stability for a long time while applying higher intensity tasks and more complex data processing in the industry. It is mainly used in petroleum and petrochemical, chemical industry, paper-making plastics, textile printing and dyeing, metallurgy and building materials, science, education and national defense, biomedicine, municipal environmental protection, energy measurement, food, grain and oil, tobacco, alcohol and beverage, equipment manufacturing Complete equipment and agriculture, forestry, animal husbandry, fishery and other industries.

■Function

- **Diversified display functions**

The instrument information is displayed by a variety of different elements such as the general picture, bar chart picture, real-time trend curve picture, historical curve recall picture and list query picture. The display information is large, the resolution is high, the picture is clear and the interface is friendly

- **Complete input function**

Fully isolated universal input, can input a variety of signals at the same time, without replacing the module, can be configured by software, and has strong versatility

- **Rich optional / additional functions**
  - Optional functions: data backup, serial port communication, serial port printing, alarm function, feed output, transmission output, flow accumulation, Ethernet function, PID control, etc
  - Additional functions: batch control, relay delay, alarm delay, etc
- **Strong applicability and reliability**

The daily maintenance workload is very small, the operation cost is low, the application field is wide, the anti-interference performance is good, the stability is high, the response speed is fast, and the compatibility of the transferred data is strong

Chapter 2 Technical indicators

▪Show

Screen: 10.4 inch true color TFT LCD (800 * 600 dot matrix)
Accuracy: Real time display: ±0.2% F.S.
Recall accuracy: ±0.2% F.S.
(note: thermocouple should remove cold end error)

▪Processor

High performance arm Cortex-M3 32 bit RISC core can be used to collect, record, display and alarm multiple signals at the same time.

▪Memory module

Large capacity parallel NAND FLASH flash chips are used to store historical data, and serial FRAM storage chips are used to store key parameters such as configuration parameters.

▪Input function

Input specification: fully isolated universal input, maximum support 48 analog input
Voltage input: 0-5V, 1-5V, 0-20mV, 0-100mV
Current input: 0-10mA,4-20mA,0-20mA
Resistor input: Res
Frequency input: frequency signal (PI) (frequency range: 0-30000HZ)
Thermal resistance: PT100, Cu50, G53, Cu100, BA1, BA2 (three-wire resistance balance, lead resistance < 10Ω)
Thermocouple:S,B,K,T,R,E,N,J
Radiation pyrometer:F1,F2

Tungsten rhenium: WRe3-25,WRe5-26

Attention

⊙Other input signals (such as switch input (DI), pulse input (PI) or indexing (e.g. PT1000) need to be indicated when ordering

▪Output function

Distribution output: Up to 16 channels of transmitter isolation power distribution + 24VDC, standard power distribution≤ 30mA (maximum load capacity can be customized), supporting other specifications of isolated power distribution (such as 12VDC, 5VDC power distribution output)

Transmission output: support up to 8 channels standard current output, load capacity 750Ω(maximum), convenient display instrument or DCS / PLC acquisition, achieve long distance signal transmission

Relay alarm output: up to 24 relay alarm output, contact capacity 1A@250VAC / 1A@30VDC , can be configured upper limit, lower limit alarm.

▪Communication printing

Communication interface: providing RS232C and RS485 ,supporting Modbus RTU protocol, baud rates----(1200,4800,9600,19200,38400,57600)

Ethernet interface: Standard RJ-45 Ethernet interface

Print interface: RS232C direct connection to micro printer, baud rate 1200

▪Recording function

Recording capacity: 64/128/192/248MB (flash capacity optional);

Recording interval: 1 to 240 seconds, divided into 11 files: 1,2,4,4,8,12,24,36,60,120,180,240 seconds.

Recording time: the length of recording time is related to flash

memory capacity, input points, and recording intervals. The formula is as follows (the unit in which the value is substituted is consistent with the formula):

$$\text{Record days} = \frac{\text{FLASH volume(MB)}*1024*1024*\text{interrecord gap(second)}}{\text{Number of channels}*16*24*3600}\ \text{(Day)}$$

▪Data transfer

Data backup and storage: support USB 1.1 USB 2.0 USB disk, support 1G to 32GB U disk for data transfer, strong compatibility, compatible with most of the U disk on the market (industrial version recommended)

▪Power Supply Voltage

Power supply: 100~240VAC (rated 220VAC), 50 / 60HZ AC power supply, 24VDC (18VDC-36VDC) DC power supply, 12VDC (9VDC-18VDC) DC power supply (DC power supply to be indicated when ordering)

▪Defencive function

Power off protection: built-in memory protection parameters and historical data, permanent storage after power off

Clock protection: integrated hardware clock, can also run accurately after power down

▪Error precision

Compensation error at cold end of thermocouple: ±2 ℃

Clock error: ±2 seconds / day

▪Working environment [prohibited from working in flammable, corrosive]

Working temperature: 0℃~50℃ (avoid direct sunlight)

Relative humidity: 0~85%R.H (without condensation)

Altitude: < 2000m (other than special specifications)

■ **Transport and storage environment**

Transport and storage temperature: -20℃~60℃ (avoid direct sunlight)

Transport and storage humidity: 5~95%R.H (no condensation)

■ **Instrument net weight**

Net weight: ≤ 6.5 kg

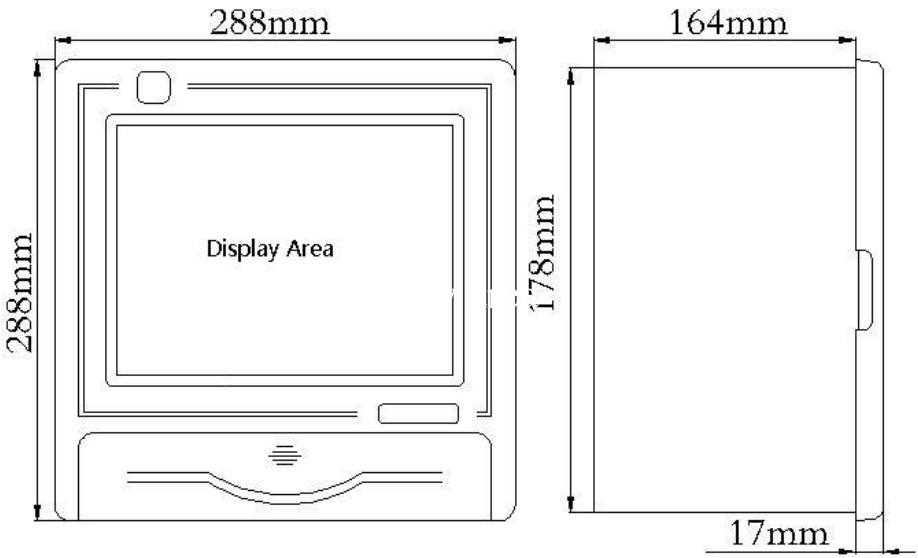
Attention

⊙The technical index is the general index of this series instrument, the function configuration please take the material object as the standard.

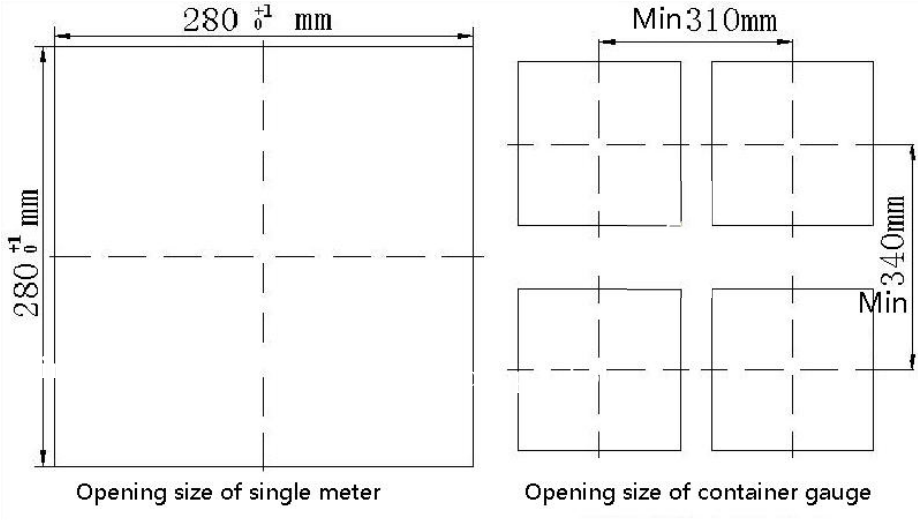
⊙If the technical index is inconsistent with the physical instrument , please take the object in kind .

Chapter 3 Installation Wiring

3.1 Instrument Dimensions



3.2 Size Of Opening

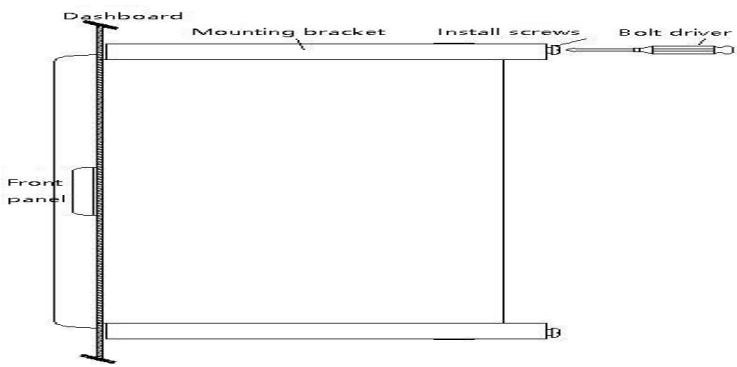


Attention

⊙When assembling the meter, refer to the minimum spacing between meters recommended in the above table to ensure the necessary heat dissipation and loading and unloading space.

3.3 Instrument Installation

Installation method:



⊙Step 1: push the meter into the installation hole from the front of the mounting panel (please use the steel plate). The thickness of the mounting panel is (2.0 ~ 6.0) mm.

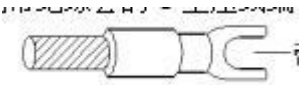
⊙ Step 2: install the mounting bracket with the instrument as shown above (two supports on both sides of the instrument and M6 standard screw for the instrument panel mounting bracket).

⊙Step 3: after the meter body is installed, the signal line and power line can be connected.

3.4 Instrument Wiring

3.4.1 Wiring Methods

U-type voltage terminal with insulated sleeve (M 3 screw for power supply and signal terminal) is recommended.



Wire pressing terminal with insulating sleeve

In order to improve the safety of the instrument, please follow the following warning when wiring.

Attention

⊙ To prevent electrical shock, make sure the power supply is cut off before connecting.

⊙To prevent fire, use double insulated wires (lines with cross sectional area $\geqslant 0.75mm^2$; conductors with high voltage resistance and cross section $\geqslant 0.5mm^2$) are recommended for relay output wiring.

⊙Please set the air switch in the power supply loop to separate the table from the total power supply.

⊙ Tighten the terminal screw firmly. Tightening torque: 0.5N.m (5kgf.cm).

⊙ After the power line is connected, the power supply should be connected to check whether the instrument is normal or not. Please

do not connect the signal line until it has been confirmed that the instrument can work normally, and then disconnect the power supply and carry on the connection of the signal line.

⊙The measuring circuit and the power circuit need to be laid separately, the object of measurement should not be an interference source, once it is unavoidable, please insulate the measuring object from the measuring circuit, and grounding the measuring object.

⊙For electrostatic interference, the use of shielding lines is better.

⊙For the interference caused by electromagnetic induction, it is better to equip the measuring circuit with equal distance.

⊙If the input wiring is connected in parallel with other instruments, the measurement value will be affected. Be careful not to switch off the power supply of one of the instruments when you have to run in parallel. This will have a negative impact on other instruments. The thermal resistance cannot be paralleled in principle, and the current signal can not be parallel in principle.

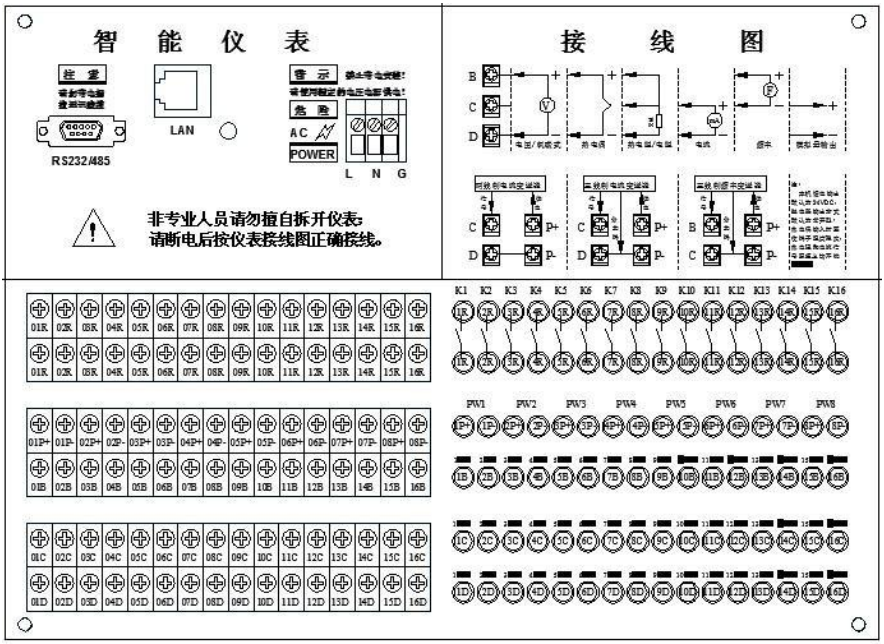
⊙ When entering thermocouples, please do not use thick lines with good heat dissipation (cross sectional area<0.5mm²), and try not to cause external temperature changes (especially if the switches of nearby exhaust fans will cause larger temperature changes). Platinum resistance input should be less than 10 Ω per lead resistance (lead resistance value is the same).

3.4.2 Terminal Description

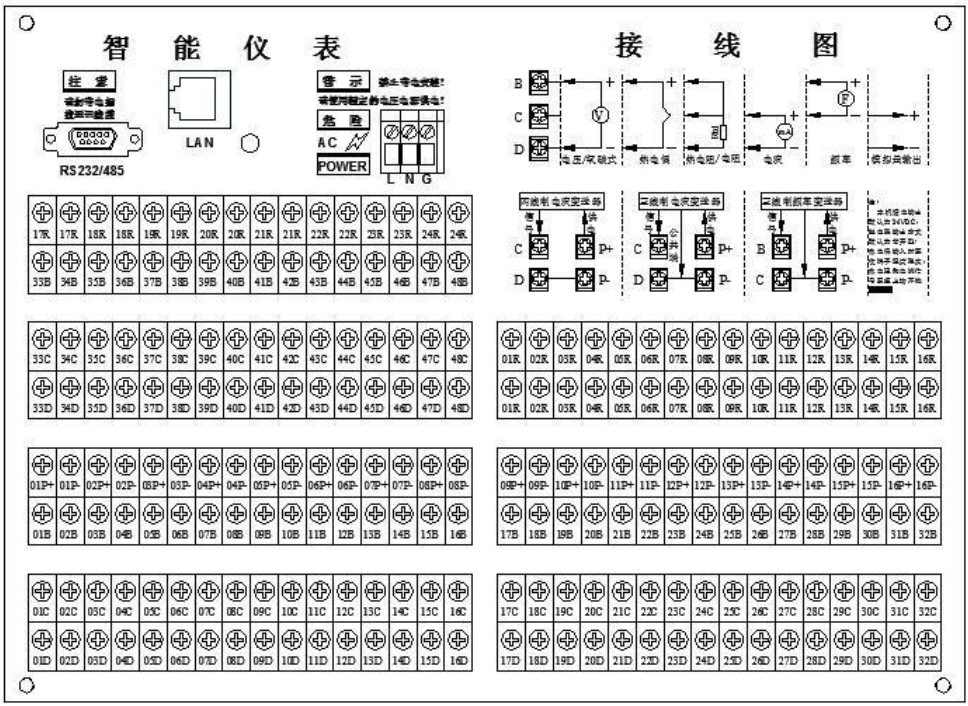
Terminal name	Explain
L/+,N/-, ⏚	L is the AC power source phase line end,N is the AC power source zero end, ⏚ is the ground end, + is the DC power source positive end, - is the DC power supply

	negative end, when the DC power supply, please indicate when ordering.
Serial communication interface	RS232C communication interface/serial port print interface (where 2 pin are RXD instrument signal receiving terminal,3 pin is TXD instrument signal transmitter terminal ,5 pin is signal ground end,7 pins are 485a and 8 pins are 485b, RS232C and RS485 communication cannot be used at the same time)
LAN port	Ethernet RJ45 interface
R01~R24	Relay output interface, specification 1A/ 250VAC@1A /30VDC
P+,P-	24VDC feed output positive, negative,
B,C,D	Sampling signal terminal, specific signal wiring see related wiring diagram

3.4.3 Terminal Schematic (Whichever Is In Kind)

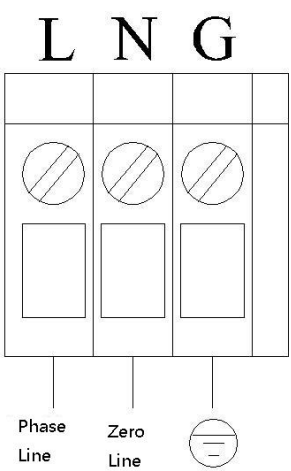


1-16 Channel version

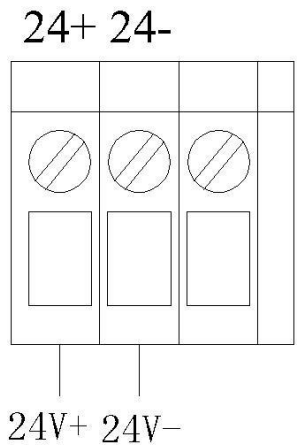


17-48Channel version

3.4.4 AC/DC Input Wiring



AC power supply: 220VAC

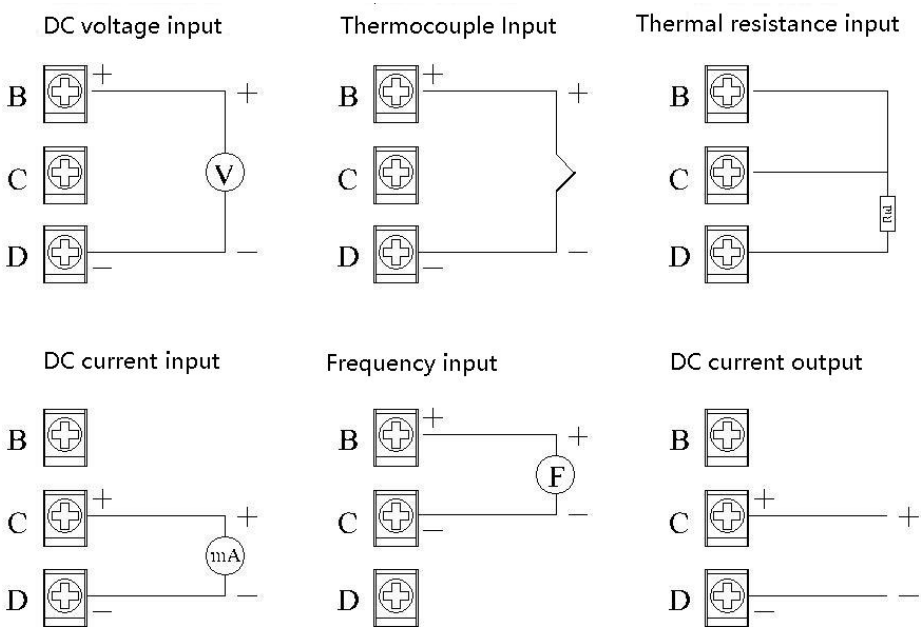


DC power supply: 24VDC

Attention

The power input mode of the project site must be consistent with the power input mode provided by the instrument itself.

The power supply voltage at the project site shall be limited to the withstand voltage range of the instrument.



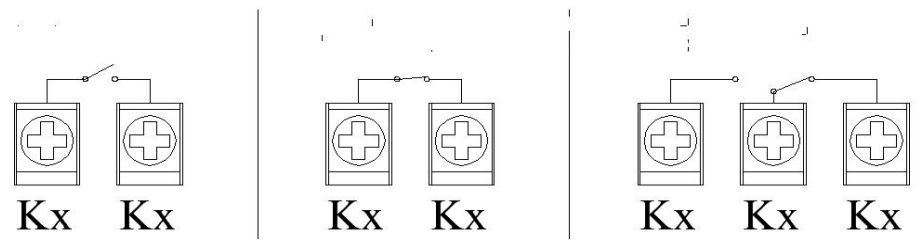
3.4.5 Input / Output Signal Wiring

Attention

The switch input should be explained when ordering, once a certain channel input signal is switch quantity signal, the channel will no longer support analog quantity, thermal resistance, thermocouple and so on.

Other signals, such as PT1000, 0-10 V need to be specified when ordering.

3.4.6 Relay Contact Output Wiring

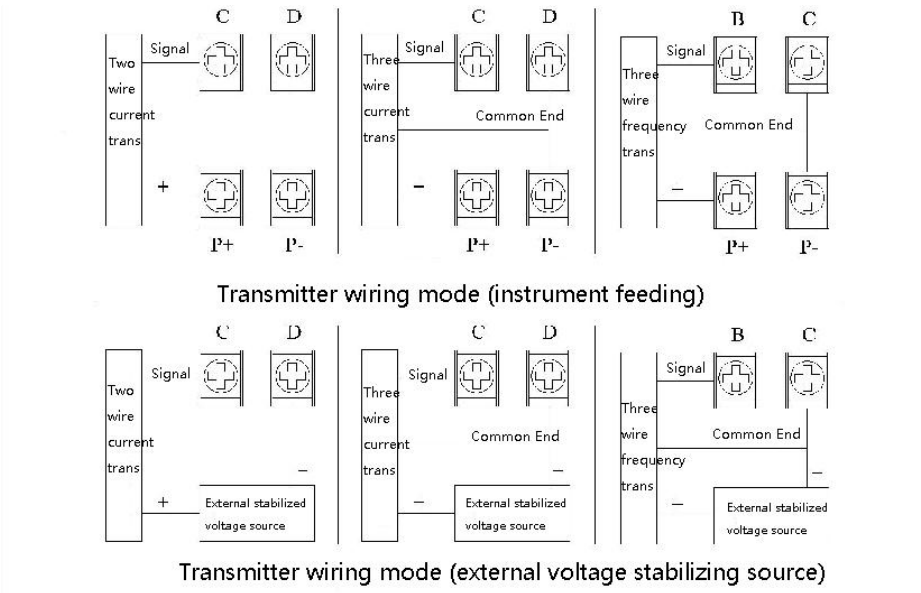


Attention

The cross-sectional area of the wire is 0.5~2.5mm² , and the torque is 50Nm. This machine often opens the factory by default, the other way to leave the factory please indicate when ordering.

The default contact capacity of the machine is 1A@250VAC/1A@30VDC, and the other higher contact capacity is specified in the order.

3.4.7 Transmitter Wiring



Transmitter wiring mode (instrument feeding)

Transmitter wiring mode (external voltage stabilizing source)

Attention

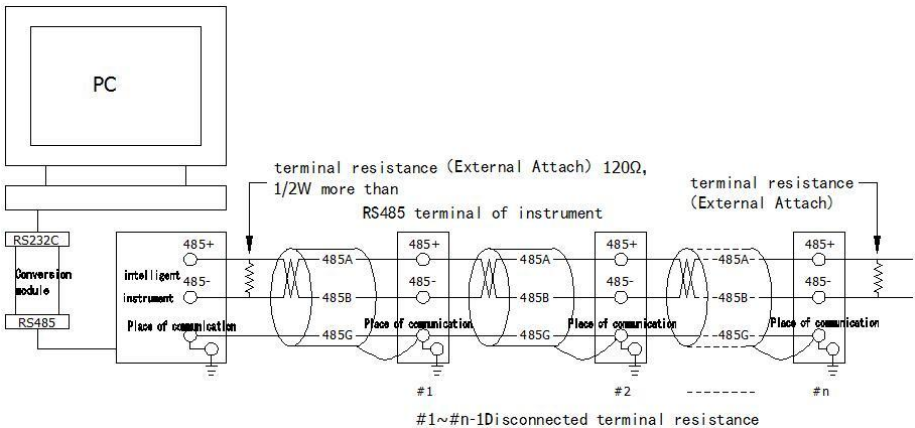
The default 24VDC feeder factory, other specifications please indicate when ordering.

When the transmitter power consumption exceeds the load capacity of the machine, please use an external voltage regulator.

3.4.8 Communication Wiring

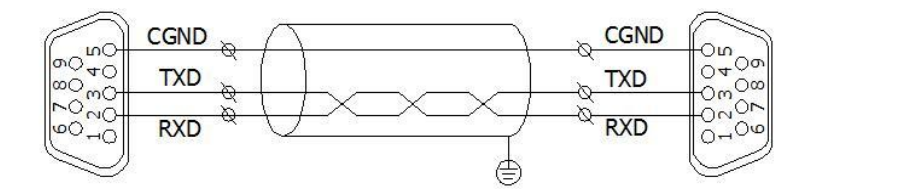
•RS-485 connection mode

Use shielded twisted pair wire (no more than 1000 meters in length) with one end.The RS-232/485 conversion module is connected to the serial communication port of the computer and the other end to the 485 communication terminal of the instrument.



•RS-232C connection mode

The user only needs to connect one end of the RS-232C communication line to the instrument RS-232C,the other end is connected to the serial port of the portable computer (or PDA), the RS-232C communication connection can be realized. The communication line should be made of shielded twisted-pair wire, and the length of the communication line should not exceed 10 meters.

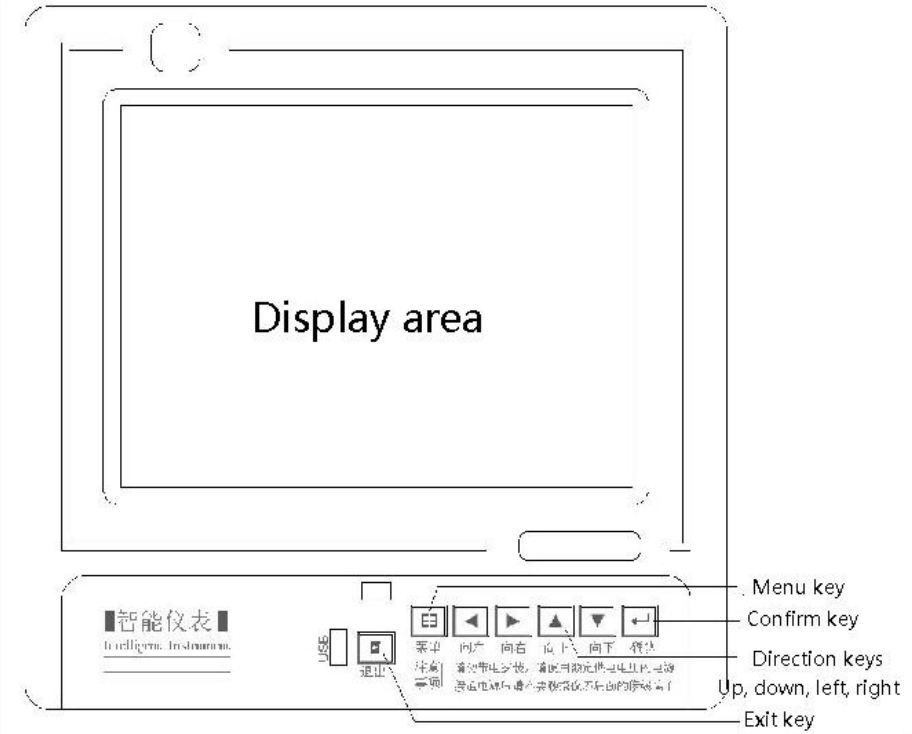


Attention

Please do not plug and unplug the communication cable with power. If necessary, please do it after the power supply of the instrument is turned off.

Chapter 4 Basic Operation And Running Picture

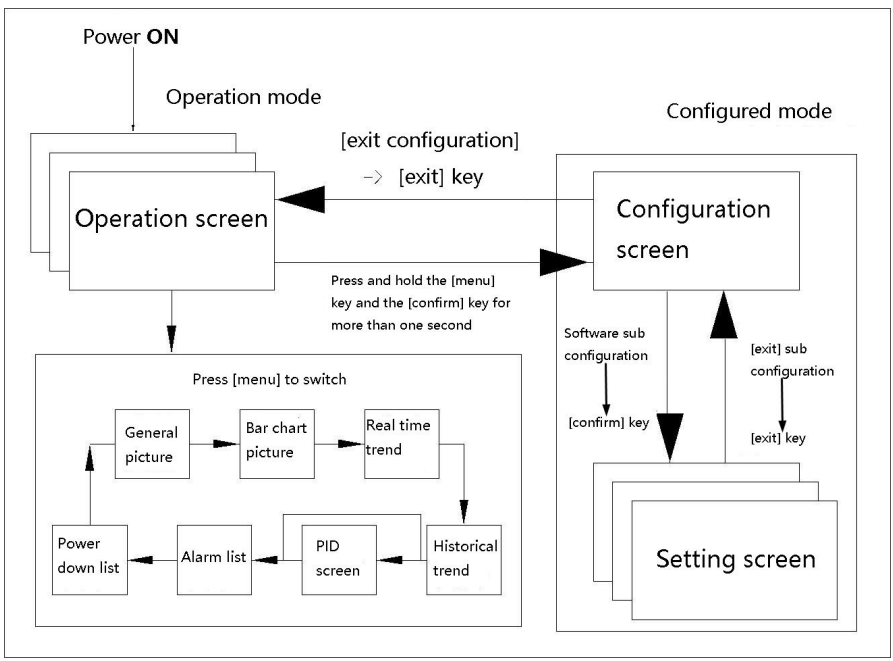
4.1 Instrument Keys



■Keyboard function

Symbol	Name	Function
	Menu key	Switch the main display screen or decimal places or Pinyin alphabet input or Chinese character selection, page turning, etc
	Left key	Switch channels or move the cursor or list forward to page turning or Pinyin selection page turning, etc
	Right key	Switch the time scale or move the cursor or list backward to page turning or Pinyin selection to page turning, etc
	Up key	Switch, select or increase the data value of the cursor
	Down key	Switch, select or reduce the data value of the cursor
	Confirm key	Execute the function where the cursor is located or edit the data where the cursor is located
	Exit key	Exit the current interface or tag number custom editing, backspace deletion, etc
	Key combination	Press and hold for more than 1 second to enter the configuration interface

4.2 Usage Patterns



Attention

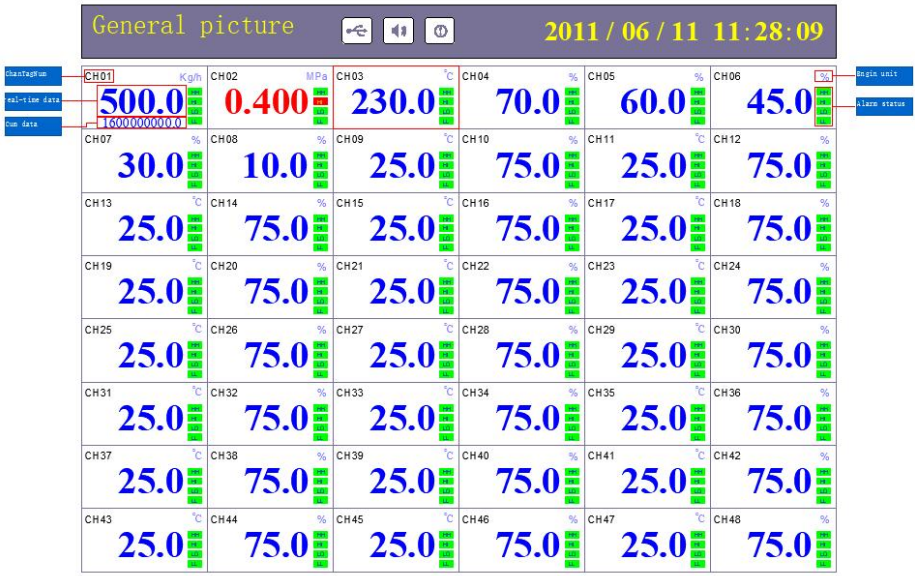
The PID screen can be displayed in the operation main display screen only after the system configures the PID function.

4.3 Status Markers

符号	名称	说明
	USB Device logo	USB and instrument connection detected
	Cycle switching	Cycle to switch some operation screens
	Allow sound sign	The buzzer is allowed to sound when the key is
	No sound sign	When operating the key, the buzzer is
	System alarm sign	The system generates an alarm

4.4 General Appearance / Flow Screen

As shown in the following figure, the real-time data channel screen of 48 channels is described as follows:



◆ Tag number: displays the corresponding project tag number / channel serial number of the channel, which can be configured freely.

◆ Unit: displays the engineering unit of the channel, which can be configured freely.

◆ Time and date: displays the current system time and date of the instrument.

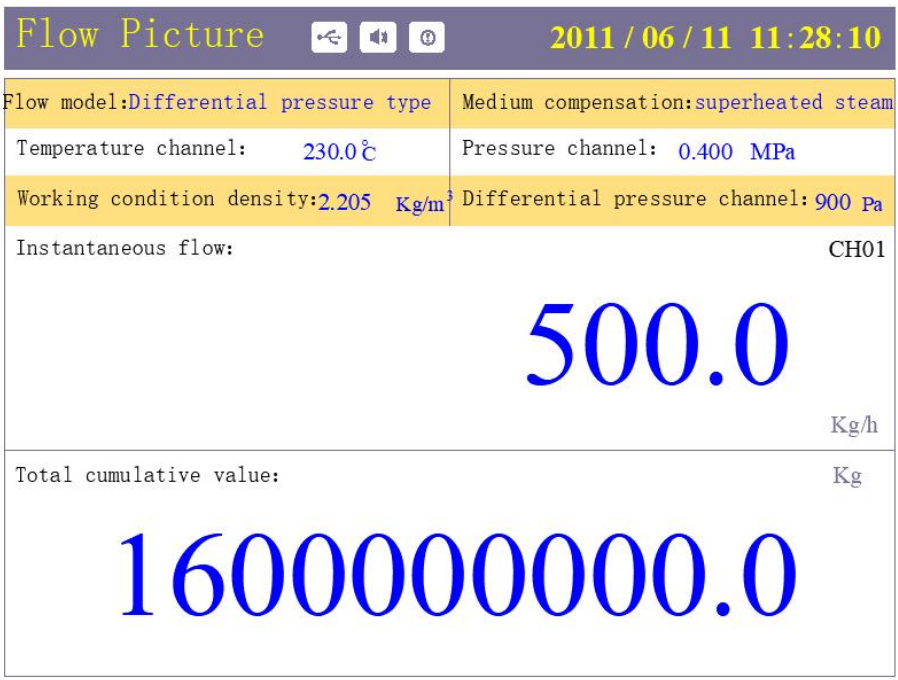
◆ Real time data: display the quantity measurement / calculation data of this channel. If the current channel is in alarm state, the measurement / calculation data will turn red.

◆ Cumulative data: displays the total cumulative value of the project of this channel.

◆ Alarm status: from top to bottom, it is the upper limit / upper limit / lower limit / lower limit respectively. Green is the normal state and red is the over limit alarm. When the system is in alarm state, the system alarm flag will appear in the status bar.

◆ Flow monitoring screen switching / channel amplification function: in the general picture, press [left key] or [right key] to move the cursor, that is, the cursor moves to a certain channel, and the corresponding channel outer frame turns red (depending on the system function), as shown in the figure CH03 channel. If the selected channel is a flow calculation channel [the system needs to turn on the flow function], then press [OK] to enter the flow monitoring screen, and press [OK] or [exit] again to return to the general picture. If it is not a flow calculation channel, the single channel picture enlargement function will be performed

[whether the channel amplification function is included is related to the total number of channels in the system], and the flow monitoring screen is as shown in the following figure:



◆ Instantaneous flow: the instantaneous flow calculation value of the current channel.

◆ Total cumulative value: the total cumulative value of the current channel flow.

◆ Temperature channel: the working condition temperature at the time of compensation; if it is not compensated, it will display [none].

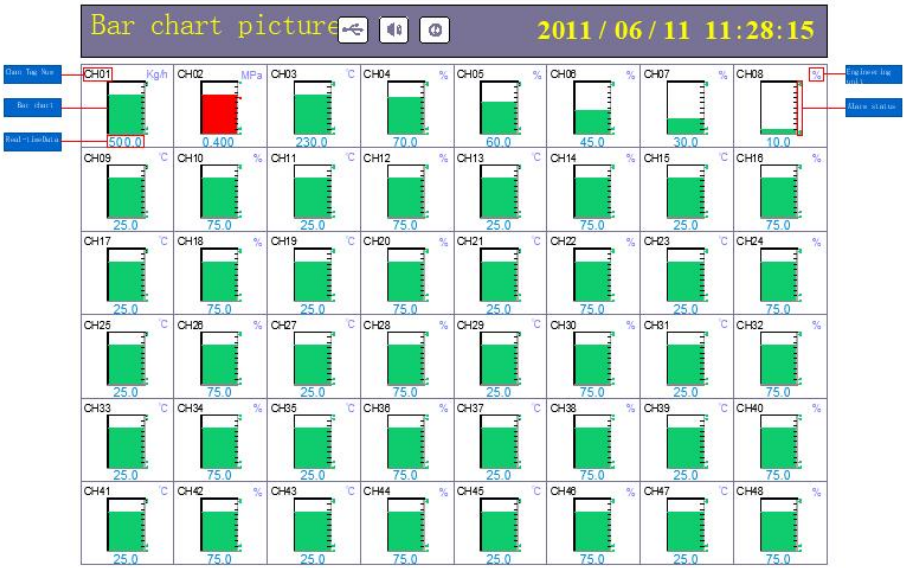
◆ Pressure channel: working condition gauge pressure during compensation; if not, it will display [none].

◆ Differential pressure channel: the input value of differential pressure model differential pressure flowmeter is [frequency channel] in frequency vortex street model and [flow channel] in linear model.

◆ Operation: Press [left key] or [right key] to move the cursor;
Press [OK] to switch the general appearance and flow screen or enlarge the channel display;
Press [menu key] to switch to bar chart screen.

4.5 Bar Chart Screen

As shown in the following figure, the data percentage bar graph of 48 channels is described as follows:



◆ Tag number: displays the corresponding project tag number / channel serial number of the channel, which can be configured freely.

◆ Unit: displays the engineering unit of the channel, which can be configured freely.

◆ Time and date: displays the current system time and date of the instrument.

◆ Real time data: display the engineering measurement / calculation data of the channel.

◆ Range upper and lower limits: the user-defined range can be freely configured. Whether the range upper and lower limits are displayed is related to the number of channels.

◆ Alarm status: from top to bottom, it is upper upper limit / upper limit / lower limit / lower limit, green indicates normal status, and red indicates over limit alarm.

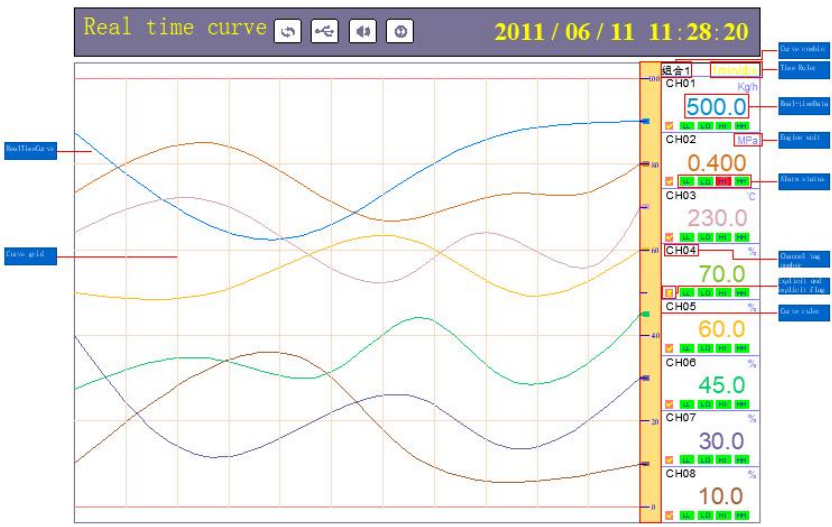
◆ Filling percentage: the filled area of the bar chart indicates the

percentage of the current data in the total range. When the system is in the alarm state, the filled area turns red.

◆ Operation: press [menu key] to switch to real-time curve screen.

4.6 Real Time Curve

As shown in the figure below, the 8-channel real-time curve and data screen are described as follows:



◆ Time ruler: indicates the time of each curve grid. The curve grid helps users estimate time.

◆ Curve scale: the scale that displays the percentage of the curve.

◆ Display / blanking mark: " √ " indicates the display curve “ × ” Represents a hidden curve.

◆ Real time curve: the display value of the current measurement / calculation data corresponds to the rightmost end of the curve.

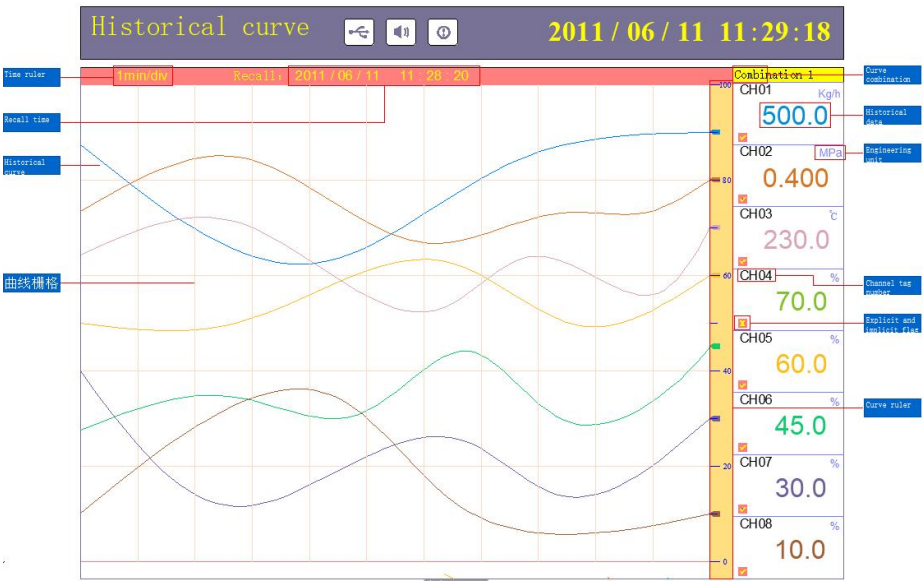
◆ Cycle flag: cycle to switch the screen of each curve group.

◆ Curve combination: displays the name of the current curve combination, which can be configured.

◆ Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch curve groups;
Press [OK] to display / hide the curve (when the cursor is at the hidden flag);
Press [menu key] to switch to the historical curve screen.

4.7 Historical Curve

As shown in the following figure, the 8-channel historical curve and data screen are described as follows:



◆ Time ruler: indicates the time of each curve grid. The curve grid helps users estimate time.

◆ Recall time: the time and date that the user needs to recall.

◆ Recall data: the instrument records the channel display value corresponding to the current recall time and date.

◆ Historical curve: a section of historical curve recorded by

instruments in multiple curve grids can have its own configuration curve / data color.

◆ Operation: Press [left key] or [right key] to move the cursor;

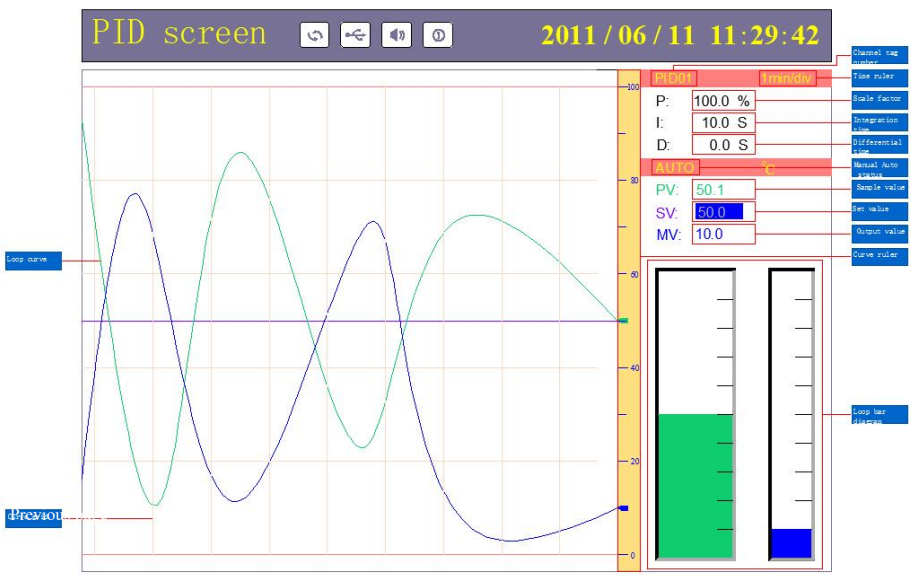
Press [up] or [down] to adjust data or switch curve groups;

Press [OK] to display / hide the curve (when the cursor is at the hidden flag); Press [confirm] to realize fixed-point recall (the cursor is at the recall time);

Press [menu key] to switch to the PID control screen (if there is no PID control screen, switch to the alarm list screen).

4.8 PID Screen

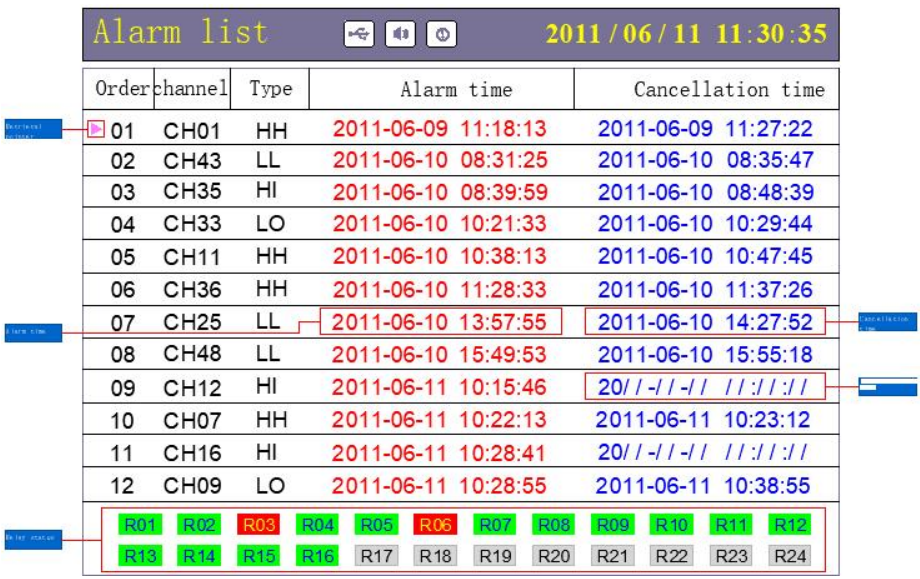
As shown in the following figure, the single screen displays PID control loop parameters, curves, numerical bar charts, etc. the picture is described as follows:



①P: the ratio coefficient value, the bigger the value, the weaker the proportion effect.
②I: the integral time is zero, otherwise the greater the value, the weaker the integral action.
③D: the differential time is zero, otherwise the greater the value, the stronger the differential action.
④AUTO/ MAN: automatic state / manual state.
⑤PV : Sample value .
⑥V: set a value.
⑦MV: loop output value.
⑧Operations: press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch selection;
Press [menu key] to switch to the alarm list screen.

4.9 Alarm List

A single screen can display up to 12 alarm messages, the screen is described as follows:



◆ Channel: the channel tag number / serial number that generates the current alarm information.

◆ Type: upper limit HH, upper limit Hi, lower limit lo, lower limit LL.

◆ Serial number: it can save up to 48 pieces of alarm and alarm cancellation time information, and a single screen can display up to 12 pieces of information at the same time.

◆ Alarm / Alarm cancellation time: red is the alarm time, blue is the alarm cancellation time, and 20 //-//-// //://://.

◆ Relay status: displays the current relay output status. Red indicates the alarm status, green indicates the normal status, and gray indicates that the user has not configured the current relay hardware.

◆ Operation: Press [left key] or [right key] to search the alarm information by page;
Press [up] or [down] to retrieve alarm information by item;
Press [menu key] to switch to the power down screen.

4.10 List Of Power Outages

A single screen can display up to 12 power loss information, the screen is described as follows:

◆ Pointer: a mark pointing to the search result when the serial number or page number is searched.

◆ Serial number: up to 24 pieces of power down time information can be saved, and a single screen can display up to 12 pieces of information at the same time.

◆ Power down / power on time: red is the power down time, and blue is the power on time.

◆ Operation: Press [left key] or [right key] to search the power down information by page;

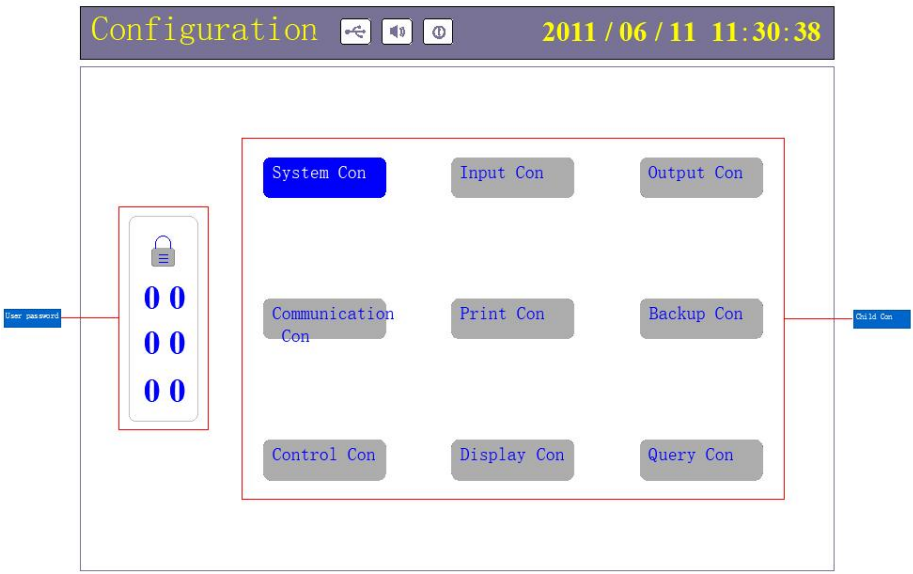
Press [up key] or [down key] to retrieve power down information by item;

Press [menu key] to switch to the general picture.

Chapter 5 Configuration and Auxiliary Operation

5.1 Configuration

Press and hold [menu] and [confirm] for one second at the same time, and then enter the [configuration] screen, as shown in the figure:

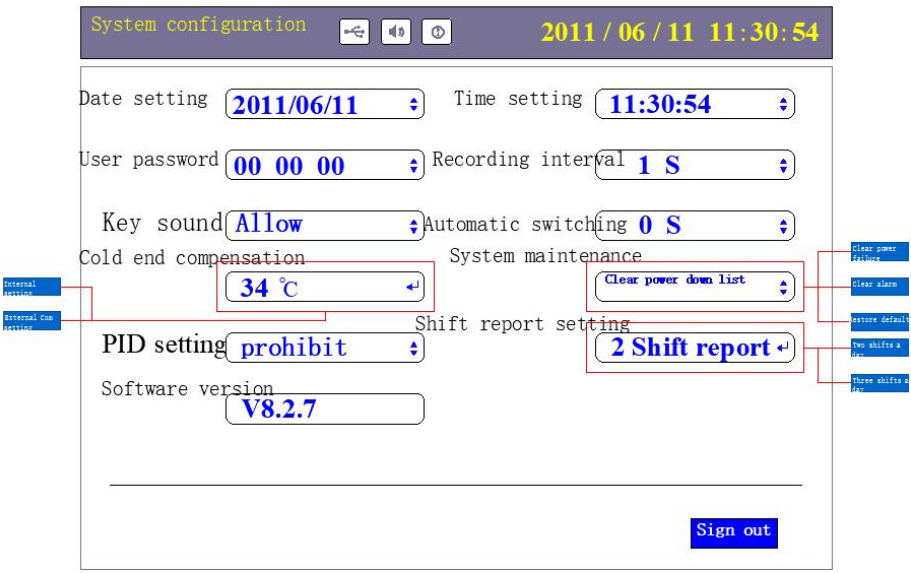


◆ Configuration: it adopts hierarchical menu structure, with functions such as user password input, system configuration, input configuration, output configuration, communication configuration, print configuration, backup configuration, control configuration, display configuration and query configuration.

◆ Operation: the initial password of the system is "00 00 00". When the user enters the correct password, press [confirm] to confirm that the password will jump to [system configuration] by default. Press [exit] to exit the configuration screen and return to the general appearance screen.

5.2 System Configuration

[configuration] after decryption, move the cursor to [system configuration], press [confirm] to enter [system configuration], and the screen is shown as follows:



◆ User password: the user enters the configuration screen to modify or view the password of the parameter. The initial default is 00 00 00。

◆Recording interval: can be set to 1 / 2 / 4 / 8 / 12 / 24 / 36 / 60 / 120 / 180 / 240 seconds. The larger the recording interval, the longer the recording time; conversely, the smaller the recording interval, the shorter the recording time. In general, when the measured signal changes rapidly, the recording interval should be smaller. On the contrary, when the measured signal changes slowly, the recording interval can be larger.

◆Key sound: the system allows / prohibits the buzzer to sound when the key is operated.

◆ Automatic switching: the time cycle value of each group of curves / bar charts and other images is displayed in a cycle. When it is 0s, it means that automatic switching is not possible. You can press [OK] to enter the auxiliary image for rapid adjustment of the number.

◆ Cold end compensation: when the cursor is in the cold end compensation setting box, press [OK] to switch between [internal supply] and [external supply]. When it is in the internal supply, the cold end value can be freely set and it is in the external supply

The system automatically captures the temperature of the cold end during time compensation.

◆System maintenance: including system maintenance functions such as [clear power down list] or [clear alarm list] or [restore default settings]. After selecting the corresponding system maintenance subfunction, press [confirm] after confirmation and selection, the corresponding system maintenance sub functions can be realized. Once the operation is successful, the power down list information / alarm list information / system parameter information saved by the original system will be cleared / restored to the default. Please operate with caution.

◆PID setting: allows / disables the parameter adjustable function of the PID screen, that is, when it is set to [allow], the parameter in the PID screen [the loop state needs to be set to [enable] in the control configuration] is allowed to be adjusted, otherwise, it is not allowed. When the system is not configured with the PID control function, this parameter setting box will be automatically skipped when moving the optical beacon.

◆Shift report setting: set the shift and start time of the cumulative shift report, starting from the setting time of shift 01, in the sequence of shift 01 → shift 02 → shift 03 → shift 01, and ending at the start of the

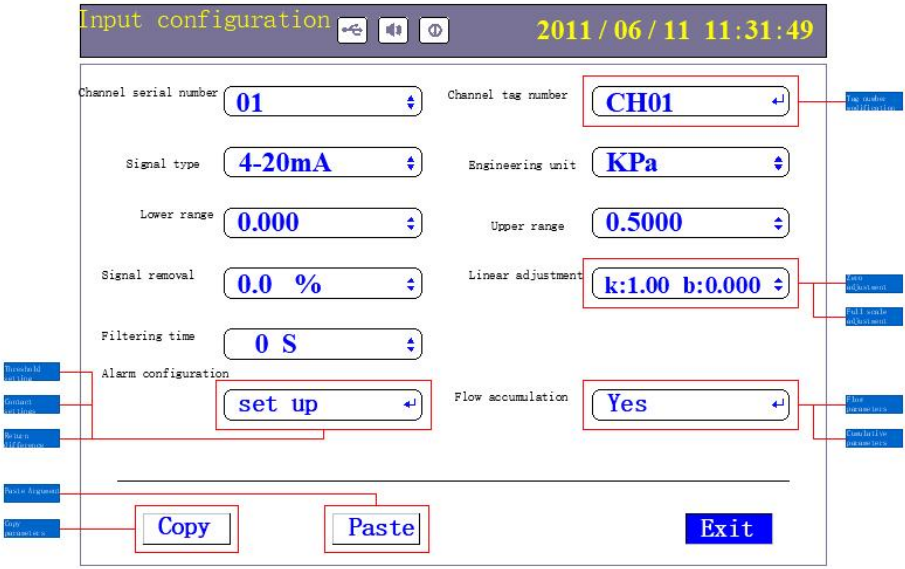
next shift 01. It is a cycle of 24 hours. The normal operation of the shift report depends on the start time setting of each shift. The setting should follow the following principles: shift 01 < shift 02 < shift 03. When the system is not configured with the flow accumulation function, this parameter setting box will be automatically skipped when the cursor is moved.

◆ Software version: the software version information of the current instrument system cannot be configured.

◆Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch selection;
Press [OK] to confirm the selection or switch the cold end compensation mode;
Press [exit] to quickly exit the system configuration.

5.3 Input Configuration

[Configuration] after decryption, move the cursor to [input configuration], press [confirm] to enter [input configuration], and the screen is shown as follows:



◆ Channel serial number: enter the serial number of the channel. The number of selectable channels is limited by hardware.

◆ Channel tag number: enter the tag number of the channel. See Appendix I for the modification of the tag number (temporarily customized).

◆Signal type: it supports signal input such as universal analog quantity (0-10V, when ordering), frequency (when ordering), switching value (when ordering). When setting the signal type, it should be consistent with the signal of the primary instrument or detection element. Special graduation table or signal type can be customized.

◆ Engineering unit: the user-defined engineering unit, which has nothing to do with the measurement signal calculation. It supports the user-defined expansion unit (which needs to be customized at present) and operates the same tag number modification function.

◆Signal range: freely set the signal acquisition range within the full range of the signal.

◆Channel decimal places: Calculation and display accuracy, 0-3 digits, cursor in signal range (upper and lower limits of measuring range) press [menu key] to switch the decimal places.

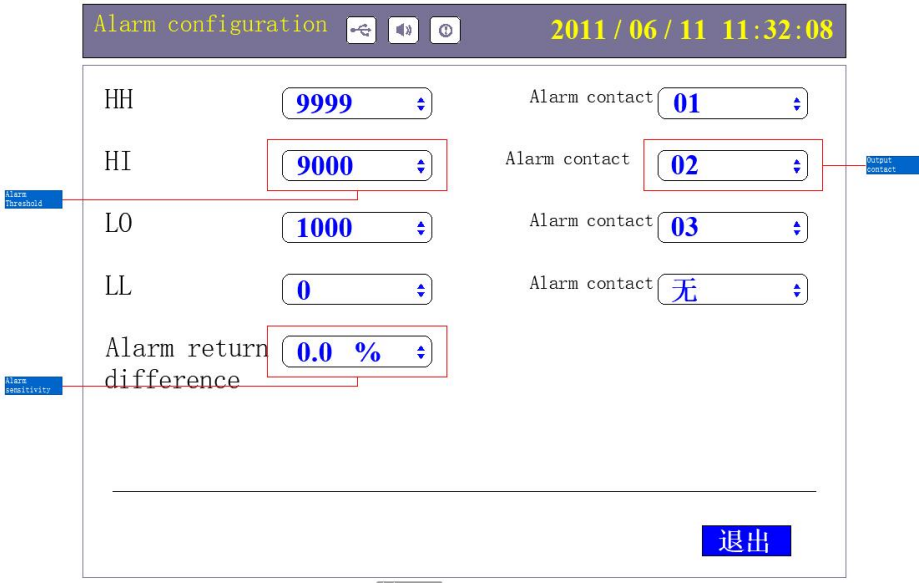
◆ Signal removal: when the measurement signal is small, the measurement error is large. In engineering, it is generally treated as zero, that is, small flow is removed. When a certain percentage is set, signals less than the range percentage are forced to be set to the lower range limit.

◆Linear adjustment: the user is allowed to adjust the deviation value of the display value. The display value = k * measured value + B, where k is full adjustment and B is zero adjustment.

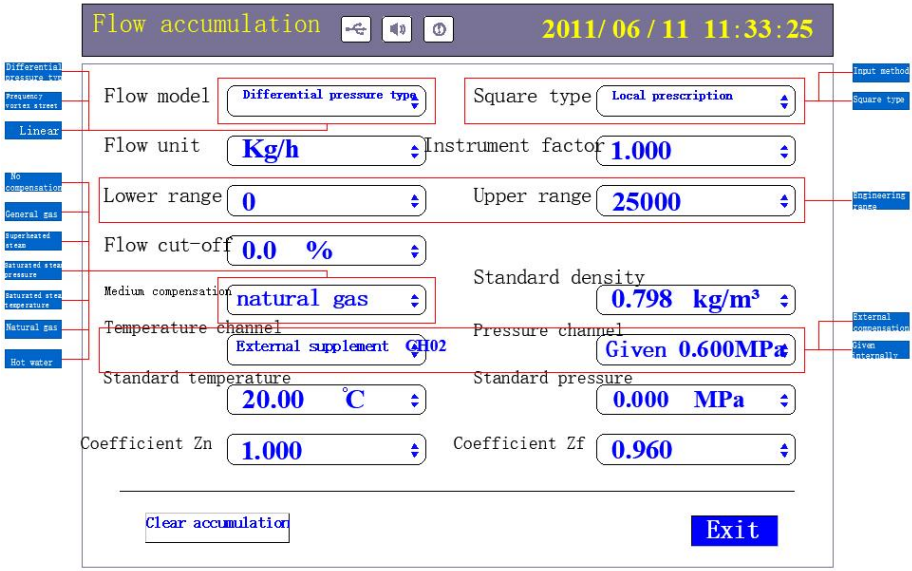
◆ Filtering time: the filtering time setting can improve the signal smoothness. The longer the time, the smoother the signal and the slower the response.

◆ Copy and paste: copy the current channel parameters, switch the channel serial number and paste it to other channels;

◆ Alarm configuration: when the cursor is in the alarm setting box, press [OK] to enter the secondary alarm configuration interface to set the alarm related parameters [when the flow accumulation function is enabled for a channel, the channel alarm is instantaneous flow alarm], and the alarm configuration is as shown in the figure:



- Alarm contact: relay number, for example, contact 01 represents 01 relay.
- Alarm return difference: prevent the relay from frequently acting when the signal oscillates near the alarm threshold value. It can set a difference (lag) between the occurrence value and the release value of the alarm.
- Flow accumulation: when the system opens the flow accumulation function, move the cursor to the flow accumulation setting box, press [up] or [down] to select [yes], and then press [OK] to enter the flow accumulation parameter setting screen, as shown in figure 5.3-3;



◆ Flow model: different flow meters can choose different calculation models. This instrument temporarily provides three calculation models. The differential pressure model is applicable to differential pressure flow meters, such as standard orifice plates and standard nozzles. The frequency type vortex street model is applicable to pulse frequency flow meters, such as vortex street and vortex flowmeter. The linear model is applicable to current output type vortex street flowmeter and electromagnetic flowmeter. See Appendix II for the mass flow calculation formula.

◆ Square type: optional for differential pressure model: local square or differential square.

◆ Input mode: optional for frequency model: count frequency value or count pulse number.

◆ Flow unit: M ^{3}/h, m ^{3}/min, m ^{3}/s, L/h, L/min, L/s, t/h, t/min, t/s, kg/h, kg/min, kg/s, k m ^{3}/h, N m ^{3}/h, kN m ^{3}/h. Units participate in the calculation.

◆ Instrument coefficient: instrument coefficient K is based on a group of signals output by the transmitter and the corresponding flow Quantity and some design parameters can be obtained by back calculation with the flow model. See Appendix II for details.

◆ Upper and lower limits of flow range: the user-defined flow range can be freely configured.

◆ Medium compensation: the medium compensation methods are divided into: non compensation, general gas, superheated steam, saturated steam (temperature), saturated steam (pressure), natural gas and hot water. See Appendix III for the meaning of each compensation type.

◆ Temperature channel: select the source channel during external compensation, and set the given compensation value at the given time.

◆ Pressure channel: select the source channel during external compensation, and set the given compensation value at the given time.

◆ Standard condition density: fluid density under standard conditions (e.g. 20.00 ℃, 0.000mpa (gauge pressure)), unit: kg / M ³ 。

◆ Standard temperature: refers to the temperature corresponding to the volume flow after compensation. When the calculation result is volume flow, the rated temperature shall be set, and its parameters shall be determined by the user. The default value of the instrument is 20.00 ℃. The calculation result of mass flow is independent of the standard temperature.

◆ Standard pressure: refers to the pressure corresponding to the volume flow after compensation. When the calculation result is volume flow, the rated pressure shall be set, and its parameters shall be determined by the user. The default value of the instrument is 0.000mpa. The calculation result of mass flow is independent of the standard pressure.

◆ Compressibility coefficient Zn and ZF: Zn is the compressibility coefficient of the gas in the standard state, and ZF is the

compressibility coefficient of the gas in the flowing state.

◆ Clear accumulation: clear all previous accumulated data of the current channel, including the accumulated value in the overview / flow screen, the shift accumulation, daily accumulation and monthly accumulation reports in the query configuration. This instrument supports up to 16 channels of flow accumulation.

◆Operation: Press [left key] or [right key] to move the cursor;

Press [up] or [down] to adjust data or switch selection;

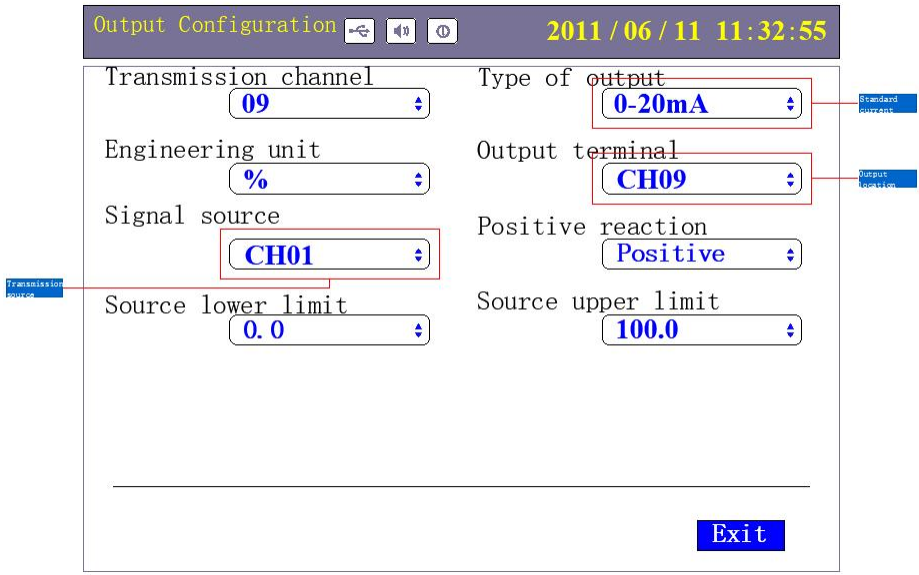
Press [OK] to confirm the input;

Press [menu key] to switch the number of decimal places (the cursor needs to be at the upper and lower range setting box);

Press [exit] to quickly exit the input / alarm / flow accumulation configuration.

5.4 Output Configuration

[configuration] after decryption, move the cursor to [output configuration], press [confirm] to enter [output configuration], and the screen is shown as follows:



◆ Transmission channel: the serial number of the output channel. The number of selectable channels is limited by hardware.

◆ Output type: select the output signal type of the transmission output channel.

◆ Engineering unit: transmission output engineering unit, independent of measurement signal calculation.

◆ Output terminal: the position of the output signal on the instrument terminal (i.e. the position of the wiring terminal);

◆ Upper and lower limits of source range: user defined, upper and lower limits of transmission output range of signal source channel [sampling channel].

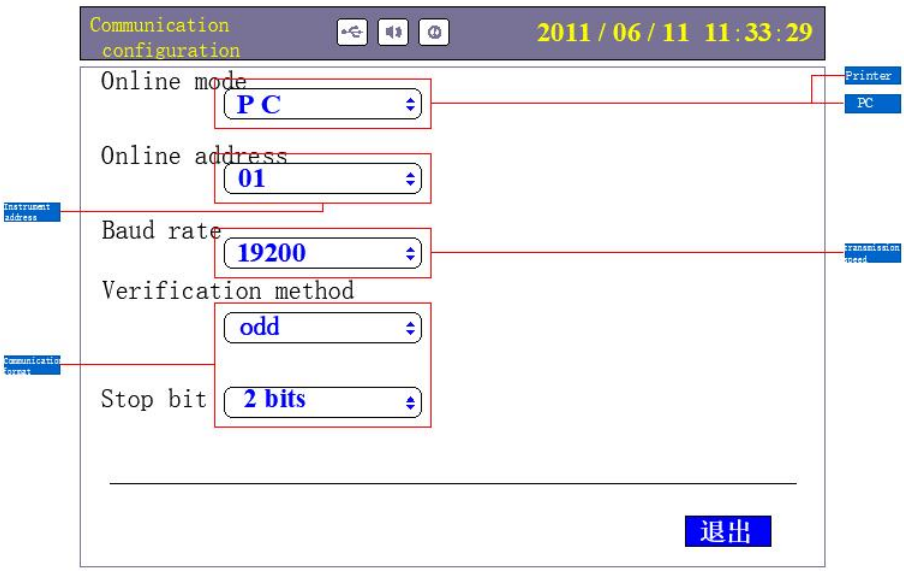
◆ Positive and negative effects: the linear positive and negative relationship between source input and transmission output.

◆ Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch selection;

Press [OK] to confirm the input;
Press [menu key] to switch decimal places;
Press [exit] to quickly exit the output configuration.

5.5 Communication Configuration

[configuration] after decryption, move the cursor to [communication configuration], press [confirm] to enter [communication configuration], and the screen is shown as follows:



◆ Online mode: including PC and printer. Before entering the print configuration, the online mode must be set to printer before it can take effect.

◆ Online address: the communication online address is used to distinguish when the instrument forms a network. It is the identification of the instrument in the network. The upper computer software accesses the instrument; The local address in the same communication

network can be set between 001 and 255 and cannot be repeated.

◆ Baud rate: when the communication mode is [printer] mode, the baud rate cannot be changed. When the communication mode is [PC], the baud rate can be selected (1200, 4800, 9600, 19200, 38400, 57600)

◆ Verification method: no verification / odd verification / even verification, default odd verification, and cannot be changed in [printer] mode.

◆ Stop bit: 2 bits / 1 bit, 2 bits by default. It cannot be changed in [printer] mode.

◆Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch selection;
Press [exit] to quickly exit the communication configuration.

Attention

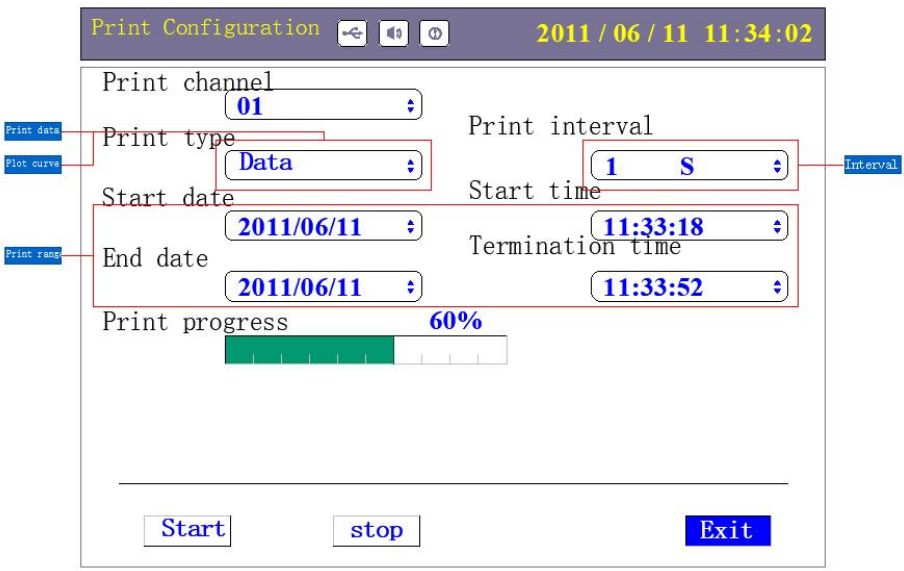
- The baud rate, verification mode, stop bit and other parameters shall be consistent with the settings in the upper computer software.
- Instrument RS232C interface uses DB9 interface, wherein DB9 interface 2->RXD,3->TXD,5->GND。
- Instrument RS485 interface uses 7 + and 8 - pins in DB9 interface.
- If the user has ordered RS232C and 485 functions at the same time, please do not use the 9-core connecting wire to connect the instrument with the PC. the two pins of RS485 will interfere with the communication of RS232C and cause communication failure. Please use the 3-core wire to connect.
- The shield layer of the double core shield wire is used as the communication ground wire, and it shall not be connected with the equipment protection ground. When the transmission distance is long, a 120 Ω terminal resistor shall be added at both ends of the transmission trunk line to connect between "+" and "-" of RS-485

communication line.

- When multiple recorders are connected to one computer, the network topology is the bus line, and each recorder is connected to the trunk line through the branch line. It should be noted that the terminal resistance should be connected to both ends of the communication trunk line, and the branch transmission line should be as short as possible to reduce interference. The relay module can be selected when the communication distance is long.

5.6 Print Configuration

[Configuration] after decryption, move the cursor to [Print Configuration], press [confirm] to enter [Print Configuration], and the screen is shown as follows:



◆Print channel: the user needs to print the channel number of data / curve.

◆Print type: the type of content to be printed by the user, including data and curve.

◆Printing interval: the time interval when printing data / curve, which is related to the recording interval.

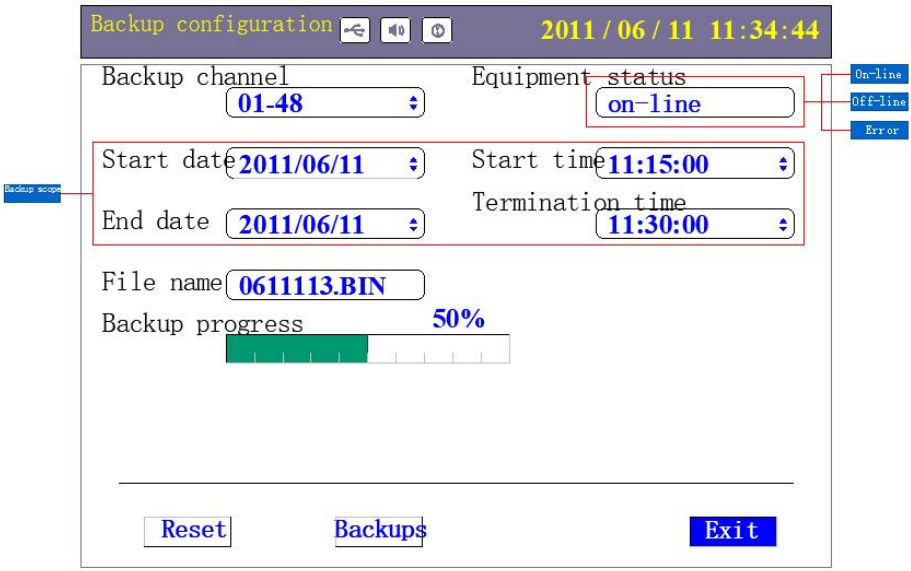
◆Printing progress: display the progress of the current printing process in real time. The filled area is the currently printed part. The upper right part of the progress bar is the value of the printing progress percentage.

◆ Print range start / end time: the start time and date must be earlier than the end time and date. Otherwise, printing cannot be performed.

◆ Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch selection;
Press [confirm] to confirm the content or jump quickly (the cursor needs to be at the start / end time of printing);
Press [exit] to quickly exit the printing configuration.

5.7 Backup Configuration

[Configuration] after decryption, move the cursor to [backup configuration], press [confirm] to enter [backup configuration], and the screen is shown as follows:



◆ Backup channel: the channel number that the user needs to back up historical data. For example, 01-01 means only backup 1 channel, 01-48 indicates that 1-48 channels need to be backed up.

◆ Equipment status: displays the status of the U disk, including online, offline and error status. If the U disk is not detected, it displays "offline", and if an error occurs during the backup process, it displays "error".

◆Backup progress: display the progress of the current printing process in real time. The filled area is the currently backed up part. The upper right part of the progress bar is the backup progress percentage value.

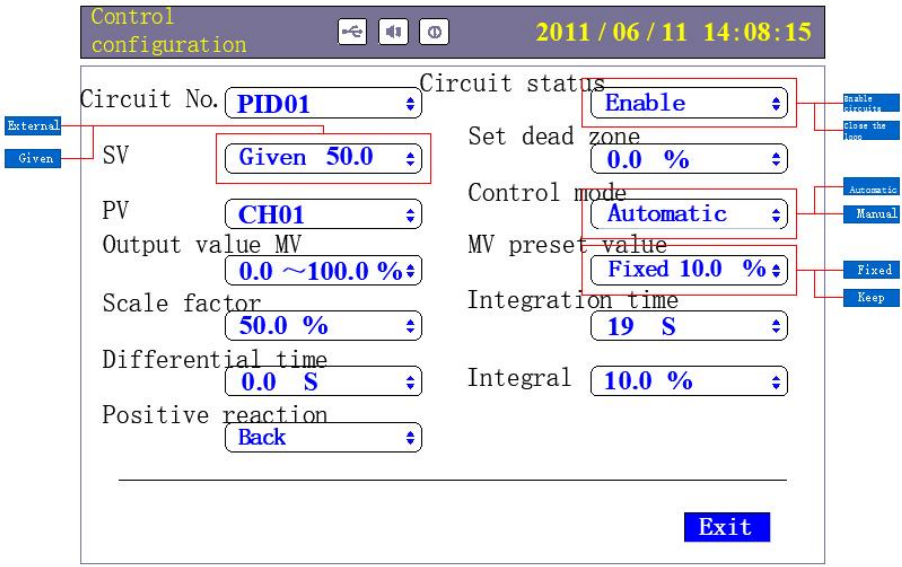
◆Reset: press this button if there is an error during the backup or if you want to restart the backup.

◆ Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to adjust data or switch selection;

Press [confirm] to confirm the content or jump quickly (the cursor needs to be at the start / end time of backup); Press [exit] to quickly exit the backup configuration.

5.8 Control Configuration

[Configuration] after decryption, move the cursor to [control configuration], press [confirm] to enter [control configuration], and the screen is shown as follows:



◆Loop serial number: the channel serial number of the control loop, limited by the configuration, up to 8 channels.

◆ Circuit status: select the working status of the channel.

◆ Set value sv: select the source and value of the set value.

◆ Sampling value PV: select the signal source of sampling measurement value.

◆ Output value MV: set the upper and lower limit amplitude of circuit output.

◆ MV preset value: set the initial value of MV during cold start.

◆ Set dead zone: set the dead zone value (the controlled variable is allowed to change within the specified range). If the dead zone is too large, the system control is delayed, and the dead zone is too small, the actuator will act frequently.

◆ Control mode: manual and automatic control mode after setting cold start or start control configuration.

◆ Proportional coefficient: set the proportional band coefficient P value.

◆ Integration time: set the value of integration time I.

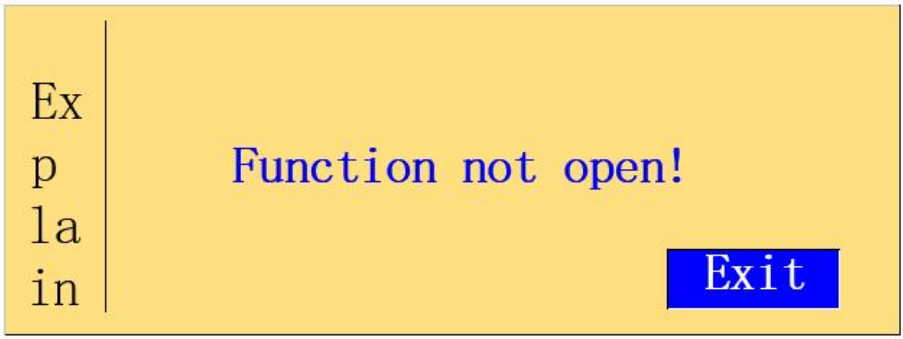
◆ Differential time: set the differential time D value.

◆ Integral separation: set the integral separation value. When there is a large deviation in the system, the integral function will be canceled. When the system deviation is small (the adjusted value is close to the given value), the integral will function.

◆ Positive and negative reaction: select the action mode of the control circuit.

◆ Operation: Press [Left key] or [right key] to move the cursor;
Press [Up] or [down] to adjust data or switch selection;
Press [OK] to confirm the selection or switch the selection;
Press [Exit] to quickly exit the control configuration.

5.9 Prompt Description And Auxiliary Interface

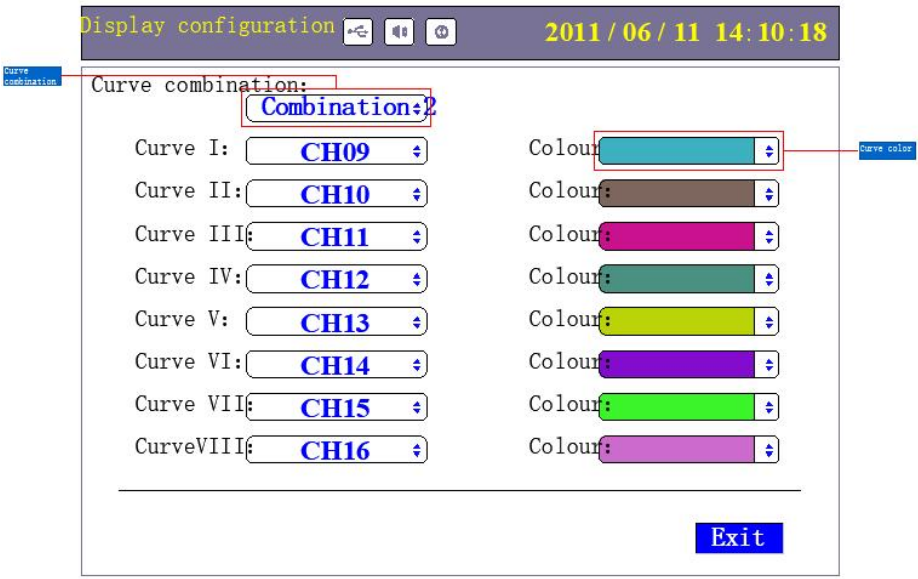


If the function is not enabled, a prompt description dialog box will pop up, as shown in the figure.

The auxiliary interface is mainly used to automatically switch the time length setting, alarm upper and lower limit setting, range upper and lower limit setting, etc. enter the auxiliary interface to quickly adjust the multi bit value. Once the set value exceeds the settable range, the system will prompt that the parameter is beyond the settable range. Press the key to operate the reference keyboard function.

5.10 Display Configuration

[Configuration] after decryption, move the cursor to [display configuration] and press [confirm] to enter [display configuration]. The display configuration is mainly used to change the color of each channel. The picture is shown as follows:



◆ Curve combination: switch the selection of various curve combinations.

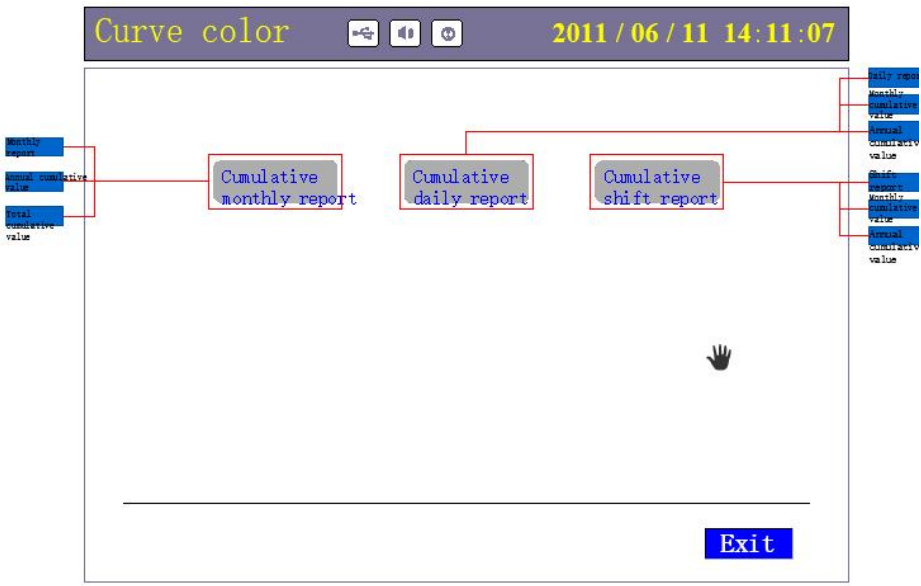
◆ Curve correlation: the combination of correlation curve and any channel.

◆ Curve color: select the display color of each curve.

◆ Operation: Press [left key] or [right key] to move the cursor;
Press [up] or [down] to switch selection;
Press [exit] to quickly exit the display configuration.

5.11 Query Configuration

The query configuration is mainly used to query cumulative reports. The picture is shown as follows:



The cumulative monthly report shows the cumulative details of the monthly flow in the last month of the previous year and the middle of the year, the annual cumulative value and the current total cumulative value of the instrument; The cumulative daily report shows the cumulative details of daily flow on the last day of the previous month and the current month, the monthly cumulative value and the annual cumulative value of the year; The cumulative shift report displays the cumulative details of each shift on the last day of the previous month and the current month, the monthly cumulative total

value and the annual cumulative value of the year. The cumulative report is not refreshed in real time.

Operation: [left] or [right] to move the cursor or refresh the report, [up] or [down] to switch selection, [confirm] to confirm selection and [exit] to exit quickly.

Attention

- After resetting or switching the shift report in [system configuration], the accumulated clearing of each channel is required before use.
- The monthly report can display the cumulative records of 13 months at most, and the daily report and shift report can display the cumulative records of 32 days at most. After the cross month and cross year, the system will automatically delete the data recorded in the previous month and the previous year.

Chapter 6 Fault Analysis and troubleshooting

The paperless recorder adopts advanced production technology and carries out strict test before leaving the factory, which greatly improves the reliability of the instrument. Common failures are generally caused by improper operation or

parameter setting. If you find a failure that can not be handled, please record the failure and contact us in time. The following are some troubleshooting and handling measures for this instrument in its daily application:

Fault phenomenon	nalysis of causes	Treatment measures
The instrument does not work when it is electrified	1》Poor contact with power cord 2》Power switch is not closed	Check power supply
The signal display does not match the actual situation.	2》Signal setting error in configuration 2》wiring error	1》Inspection configuration 2》Check signal line
Alarm output abnormal	1》Alarm limit setting error 2》Alarm points shared by other channels	1》Reset the limit 2》Cancel other alarm points
Problems in distribution output	1》Transmitter and instrument wiring error 2》Power distribution with multiple transducers exceeding the standard distribution of this instrument (power distribution ≤ 30mA) 3》Interference between digital and analog signals during distribution	1》Correct wiring 2》Use external voltage stabilizer to supply power or return to plant to customize maximum load 3》Use independent power supply or return to factory
USB Transfer failure	1》Incorrect start and end time settings 2》U disk format is incorrect 3》U disk incompatibility 4》Insufficient spare space on U disk 5》Misoperation during backup	1》Setting time correctly 2》Format U disk to FET32 3》Use a genuine compatible U disk 4》Use larger capacity U disk or clear redundant files in U disk. 5》proper operation
No data or abnormal display in	1》No data for the time period selected by the user	1》Select the time to have a data segment 2》Erasing the primary data area

USB transfer file	2》User changed system time 3》User changed signal type 4》The user sets the record interval too big, but the backup time is very short 5》U disk incompatibility 6》The time period of the data is too long, which exceeds the maximum read time domain of the upper computer software.	3》No impact on data recording 4》Record interval is set to be small or backup time is longer 5》Use a genuine compatible U disk 6》The time period for backing up the data is smaller, piecewise and batch backup
No communication.	1》The communication cable is not connected 2》Communication parameter setting error 3》Serial communication setup error	1》Properly connected communication line 2》The setting of the communication parameters of the recorder and PC is consistent. 3》Set up the correct com port (make sure it is not occupied by another program)

Chapter 7 Service Guide

Respected user: Hello! Thank you for choosing the instrument of our department. Our company will thank you for your trust in our company with excellent service. For the first time, check whether the actual configuration of the product is consistent with the instrument configuration sheet, random data, accessories and other packing items are complete. If you have any objection, please contact us first.

■ **Matters need attention**

- Read random materials: please read random materials and warranty principles carefully, and complete storage.
- After purchasing machines, properly keep the invoices.

■ **Warranty principle**

➢ **Maintenance cycle**

Five working days from the date of receipt of the product.

➢ **Maintenance and repair cost**

- This series of ultra-thin wide-screen color paperless recorder free warranty for one year (product quality issues).
- The warranty period shall be calculated from the date of purchase and shall be supported by the customer's purchase invoice (indicating the product model, host serial number) or photocopy. If the invoice is not available, it will be calculated from the date of our production.
- Warranty period, due to improper use of the customer damaged products, or the customer has opened the product qualified seal, a certain fee. After product repair, free warranty for six months.

➢ **Customer advice**

- Please be sure to send back the product with product breakdown instructions to help the engineer fix it as soon as possible.
- Please fill in the telephone / fax number, correspondence address

and contact person accurately for the return of maintenance products.

- If you want the engineer to go to the site to carry out repairs, you will have to bear the expenses incurred therefrom.
- We usually send it back by express (not with insurance). If you need to ship it by other party, please indicate it in the form and pay the related expenses.