aobo
instrument

Handbook

ABDT-9700 Paperless Recorder

Weifang AOBO Instrument Technology Development Co.,Ltd

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I. Overview

Touch data acquisition and control workstation adopts the new large-scale integrated circuits to realize the reliable protection and robust anti-interference for input, output, power supply and signals. The workstation can achieve seventy-channel universal signal inputs, (The configurable and optional inputs include standard voltage, standard current, thermocouple, resistance temperature detector and millivolt.) It supports twenty-channel alarm outputs, fourteen-channel transmitting outputs and six-channel DI inputs. It has the RS232/485 communication port, EtherNet port, micro-printer port, USB drive port and SD card socket. The sensor distribution is available and the recorder enjoys a powerful display function, which can achieve real-time curve display, historical curve recalling, bar graph display and alarm status display.

II. Technical Parameters

Measurement Input	
Input Signal	Current: 0 – 20 mA, 0 – 10 mA, 4 – 20 mA, 0 – 10 mA (open square operation) and 4 – 20 mA (open square operation) Voltage: 0 – 5 V, 1 – 5 V, 0 – 10 V, ±5 V, 0 – 5 V (open square operation), 1 – 5 V (open square operation), 0 – 20 mV, 0 – 100 mV, ±20 mV, ±100 mV RTD: Pt100, Cu50, Cu53, Cu100, BA1, BA2 Liner resistance: 0 – 400 Ω Thermocouple: B, S, K, E, T, J, R, N, F2, Wre3–25 and Wre5-26 DI input: low level < 1V; 4.5V< high level < 30V
Output	
Output Signal	Analog output: 4 - 20 mA (load resistance ⩽ 380 Ω), 0 - 20 mA (load resistance ⩽ 380 Ω), 0 - 10 mA (load resistance ⩽ 760 Ω), 1 - 5 V (load resistance ⩾ 250K Ω), 0 - 5 V (load resistance ⩾ 250K Ω), 0 - 10 V (load resistance ⩾ 10K Ω)
	Alarm output: Output through normally open contacts of the relays, and the contact capacity are 1A/250VAC and 1A/24VDC (resistive load). (! NOTE: When the load exceeds the relay contact capacity, do not load directly.)
	Feed output: DC24V± 10%; load current ⩽ 50mA. Five groups in total.
	Communication output: RS485/RS232 communication ports are included; The baud rate is 1200 – 38400bps (settable); The standard MODBUS RTU communication protocol is adopted; The communication distances of the RS485 and RS232 ports are 1 km and 15 m respectively. EtherNet communication port (communication rate: 10M/100M, adaptive)
Integrated Parameters	

Measurement Precision	0.2%FS±1d
Sampling Cycle	1s
Setting Mode	The parameter can be locked by password. The set value can be saved permanently when powering off the instrument.
Display Mode	Applies 12.1-inch 800×600 lattice high brightness color graph LCD and LED backlight to create clear images and wide angle of view. Contents displayed include Chinese characters, numbers, process curves and bar graphs, etc. The screen can be changed, the historic data can be searched forward and backward, and the curve time scale can be changed by touching buttons.
Data Backup	Supports data backup and transfer storage through the USB drive and SD card. The maximum capacity is 32GB, and supports FAT and FAT32 formats.
Storage Capacity	The capacity of the internal Flash storage is 200M Byte.
Record Interval	Nine levels can be selected, including 1s, 2s, 4s, 6s, 15s, 30s, 60s, 120s and 240s
Storage Length (Continuous recording)	173 days (interval: 1 second) — 41610 days (interval: 240 seconds) Formula: $Recording\ time\ (day) = \frac{200*1024*1024*Recording\ Interval\ (s)}{Channel\ Number*2*24*3600}$ (! NOTE: Calculate the channel numbers according to the actual situation. Calculate with seven channels.)
Operation Environment	Environment temperature: -10 - +50 °C; Relative humidity: 10 - 90%RH (non-condensing); Prevented from strongly corrosive gases. (! NOTE: If the site environment is severe, special instructions must be made when ordering.)
Power Supply	AC85 - 264V (power switch), 50/60Hz
Power Consumption	⩽ 40W

III. Precautions and Installation

3.1 Precautions

3.1.1 Precautions for instrument using

● The instrument has many plastic components. Use the dry soft cloth to clean the instrument. Do not use the benzene agent, lacquer thinner, etc. to clean the instrument. Otherwise, discoloration or deformation may be caused.

● Do not make the live products near to the signal terminal. Otherwise, malfunction may be caused.

● Do not impact on the instrument.

● If any abnormality is found, for example, the instrument is smoking, or the odor is smelled, or the abnormal noise is heard, disconnect the power supply immediately and

contact the local distributor or the manufacturer in a timely manner.

● To ensure the normal working of the instrument, power on and heat the instrument for 30 min before use.

3.1.2 Precautions for external storage medium

● The storage medium is precision product. Use it carefully.

●Except inserting and withdrawing the storage drive, close the operation cover during running the instrument. Prevent the storage medium and USB ports from the dust.

● When the USB drive and SD card are used, pay attention to the electrostatic protection.

● Products manufactured by the manufacturer are recommended.

● When using the storage medium in the high temperature (higher than 40 ℃ approximately), only insert the storage medium when saving the data. After the data is saved, withdrawn the storage medium and store it appropriately. Do not insert the storage medium in the instrument for a long time.

● Before powering on/off the instrument, withdraw the storage medium.

● Refer to the user manual of the storage medium for the using precautions of the storage medium.

3.2 Instrument installation

3.2.1 Installation site

Install the instrument at the following sites.

● Installation panel

The instrument is the panel-mounting type.

● Installation site

Install the instrument indoors, and prevent it from wind, rain and direct sunlight.

● Well-ventilated places

To prevent internal temperature raise of the instrument, install it at the well-ventilated place.

● Place with less mechanical vibration

Install the instrument at the place with less mechanical vibration.

● Horizontal place

During the installation, do not tilt the instrument left or right. Keep the instrument level. (The instrument can tilted back for 30° maximally.)

! NOTES

★ When moving the instrument from a place with lower temperature and humidity to a place with higher temperature and humidity, if the temperature changes greatly, condensation sometimes occurs, and the TC input measurement errors may occur. At this time, make the instrument adopt to surrounding environment for more than 1 hour before use.

★ If the instrument is used at high temperature for a long time, the LCD lifetime will be reduced, causing screen quality decline. Do not use the instrument at high temperature (higher than 40℃ approximately).

Do not install the instrument at the following sites.

● Where is under the direct sunlight or near to the heat apparatus;

Select the place with lower temperature change and the temperature is near to the normal value (23℃) as far as possible. If the instrument is installed at a place with direct sunlight or heat appliance, a bad impact on the instrument inside may be caused.

● Places with excessive fume, steam, moisture, dust and corrosive gas;

The fume, steam, moisture, dust and corrosive gas may cause bad impact on the instrument.

● Places near to the electromagnetic source;

Do not approach magnetic appliances or magnets to this instrument. If the instrument is installed near to the strong electromagnetic source, the electromagnetic filed may cause error to the instrument.

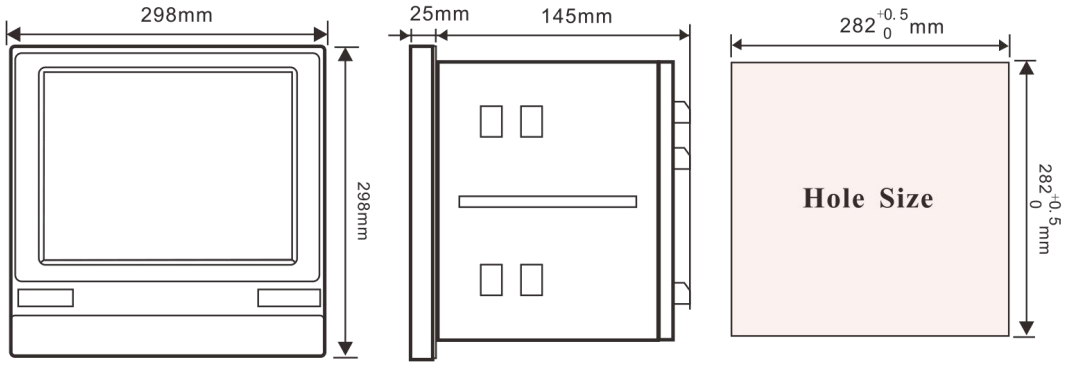
To prevent the instrument from abnormal working, when the RF generator is used at the site, keep it more then 50 cm from the instrument.

● Places uneasy to view the screen.

The display part of the instrument is a 12.1-inch TFT true color LCD. If viewing the screen from an extremely partial perspective, it will be difficult to see the display clearly. Therefore, install the instrument in a place where the observer can view the screen in the front as far as possible.

3.2.2 Installation methods

● Installation Dimension (Unit: mm)



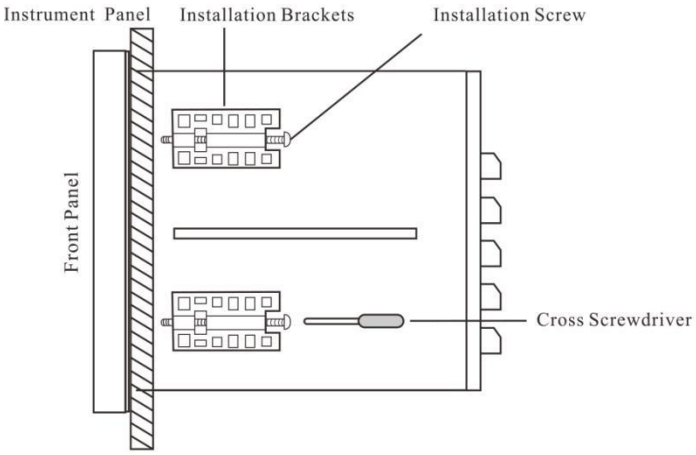
● Installing the Instrument

(1) Installation methods

A. Install the instrument at the front of the instrument panel.

B. Install the instrument by the installation brackets provided with the instrument.

Install the instrument as shown in the figure the right.

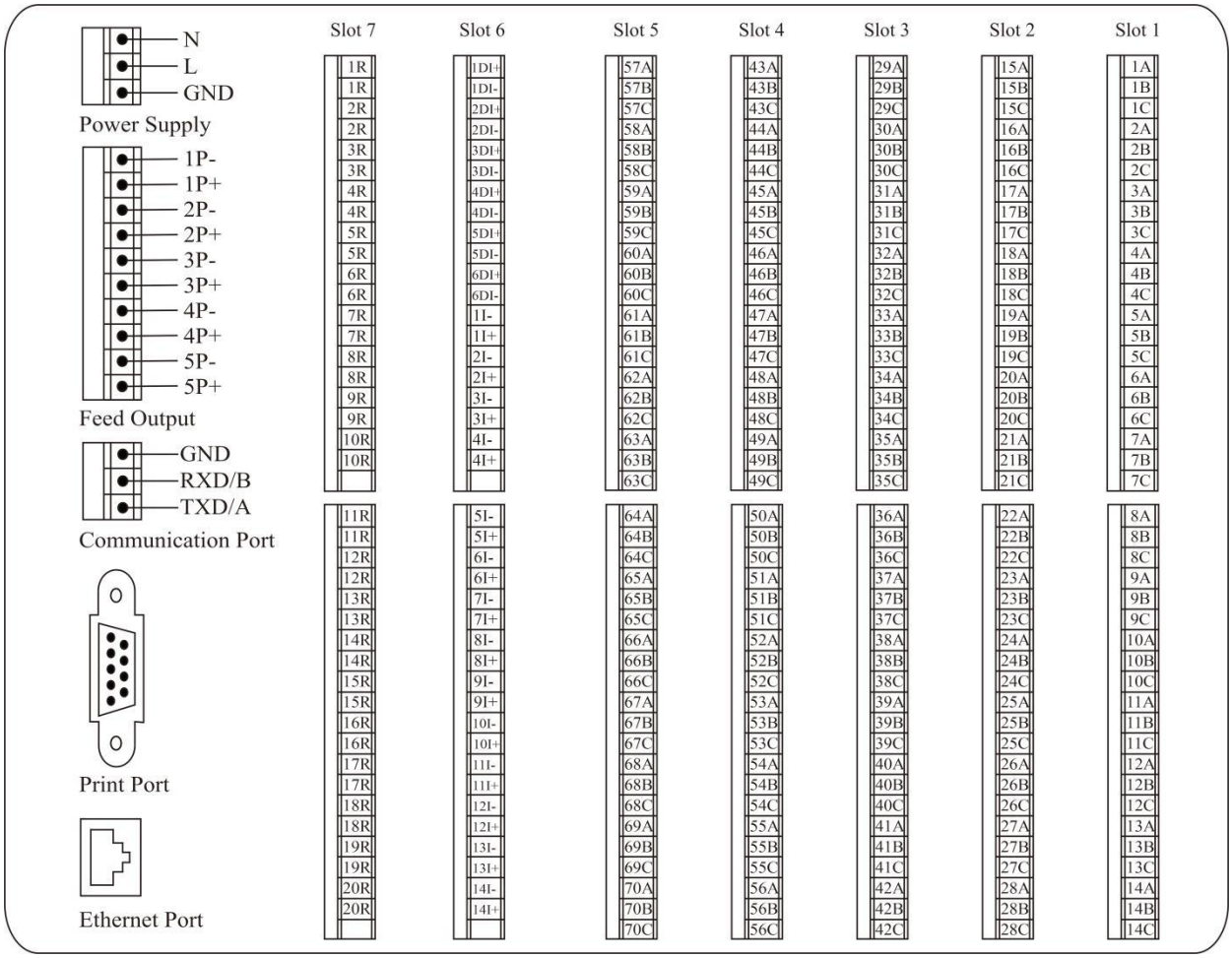


▲ Use the four installation brackets to fix the instrument at the two sides.

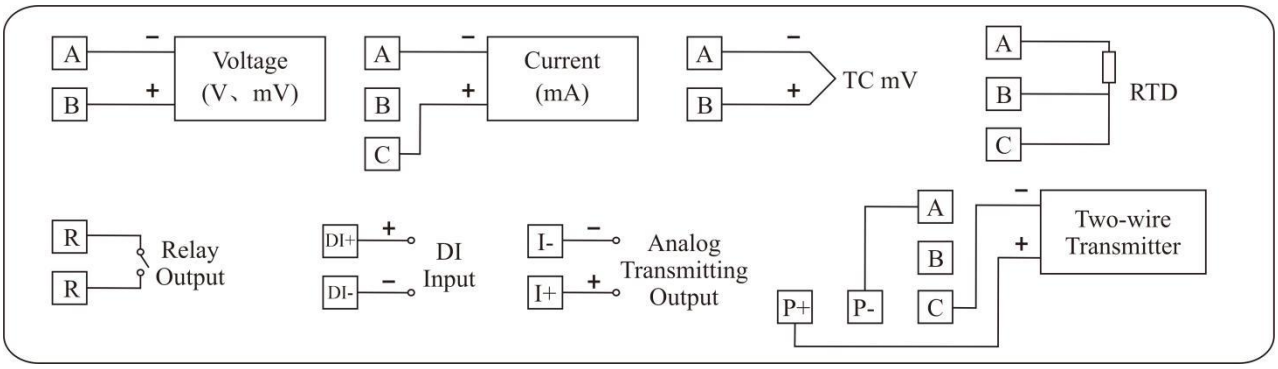
The installation diagram is in the right.

- Instrument wiring diagram

Diagram of Terminals at Instrument End



Wiring description



IV. Instrument Functions and Operation

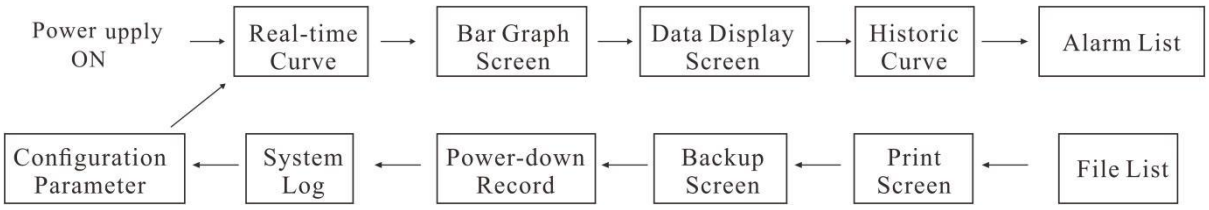
The touch data acquisition and control workstation has several operation display

screens and configuration screens. The display is clear, the information amount is large, and the configuration is convenient. Users can operate the instrument conveniently without professional training. After powering on the instrument, the system initial screen is display. When the initiation finishes, the running screen is entered. The operation display screens and all configuration screens are described in the following.

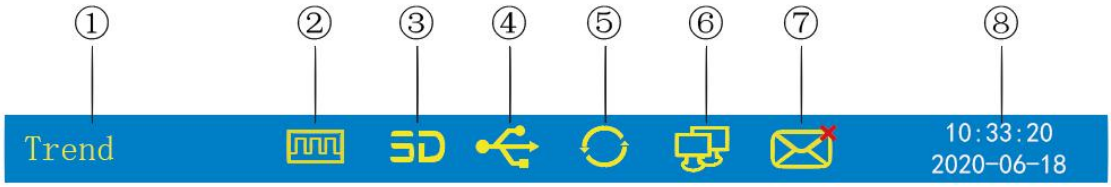
4.1 Running screen switch

The running screen consists of the real-time curve screen, bar graph screen, digital display screen, historic curve screen, alarm list, file list, print screen, backup screen, power-down record, system log and configuration parameters.

Use the "Switch" button to switch among all screens.



4.2 Status display part



① Display the names of all running screens.

② File recording icon

Displayed: Files are being recorded in cycle.

Displayed with arrow: Files are being recorded without cycle.

Hidden: Files recording stops.

③ SD card icon

Displayed: The SD card is connected.

Hidden: The SD card is disconnected.

④ USB drive icon

Displayed: The USB drive is connected to the instrument.

Hidden: The USB drive is disconnected from the instrument.

⑤ Loop display icon

Displayed: All groups are displayed in cycle.

Hidden: The screen is fixed and not displayed in cycle.

⑥ EtherNet communication icon

Displayed: EtherNet communication function is supported.

Displayed with a red X: EtherNet communication is not connected.

Hidden: EtherNet communication function is not supported.

⑦ E-mail sending icon

Displayed: E-mail is sending.

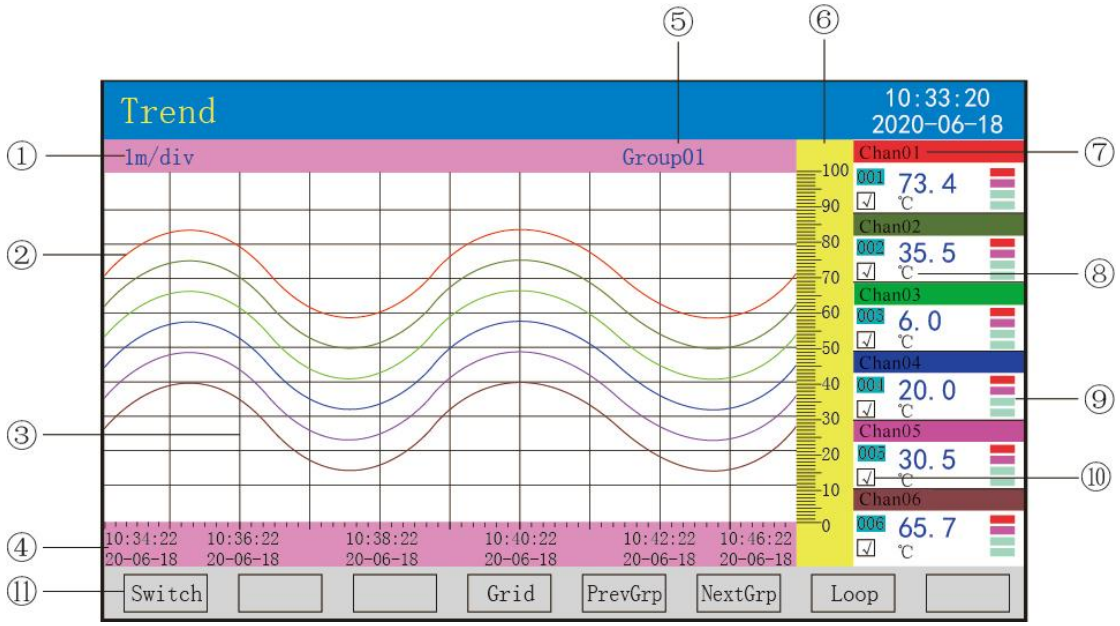
Displayed with a red X: E-mail sending fails.

Hidden: No E-mail is sending.

⑧ Display the instrument running date and time.

4.3 Real-time curve screen

Set the screen according to the curve groups. The six channels of real-time curves and data can be displayed at the same time (curve precision: 0.5%±1 character).



① Time scale: The time length of each grid. The time scale is related to record interval. Refer to the following for details.

Record Interval	1s	2s	4s	6s	15s	30s	1 min	2 min	4 min
Time scale	2 min/grid	4 min/grid	8 min/grid	12 min/grid	30 min/grid	1 h /grid	2 h /grid	4 h /grid	8 h /grid
	4 min/grid	8 min/grid	16 min/grid	24 min/grid	1 h /grid	2 h /grid	4 h /grid	8 h /grid	16 h /grid
	8 min/grid	16 min/grid	32 min/grid	48 min/grid	2 h /grid	4 h /grid	8 h /grid	16 h /grid	32 h /grid
	16 min/grid	32 min/grid	64 min/grid	96 min/grid	4 h /grid	8 h /grid	16 h /grid	32 h /grid	64 h /grid

② Data curve: At most six curves can be displayed at one screen. (The curves have six colors and the color can be set in the display configuration settings.)

③ Grid: It can facilitate users to estimate the time and data values.

④ Date and time represented by the current gird.

⑤ Curve groups: Display the current curve group name. (Each curve group includes six curves. Users can put the associated channels into one curve group according to their needs to facilitate comparing the data of channels.)

⑥ Scale: Display the percentile scale of the curve.

⑦ Channel name: The bit can be set in the channel configuration. The background colors are same with the colors of corresponding curves.

⑧ Unit: Display the unit of current channel data. It can be set in the channel configuration.

⑨ Over limit alarm indications: From top to the bottom, the blocks represents the over limit alarm indications of the uppermost limit, upper limit, lower limit and lowest limit. If the block is gray, the alarm function is not supported. If the block is green, no alarm exits. If the block is red/pink, alarm occurs.

⑩ Curve display/hiding icons: Tip the box on the screen directly and the curve can be displayed or hidden. " √ " refers to curve display. Otherwise, the curve is hidden.

⑪Operating buttons:

Tip the "Switch" button to switch to other screens.

Tip the "Time Scale" button to switch the time scale.

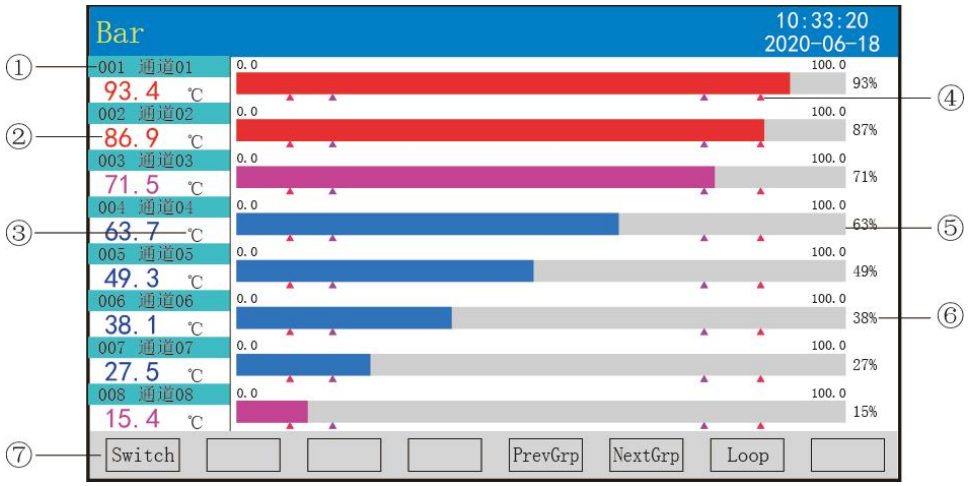
Tip the "Previous" button to view the previous curve group.

Tip the “Next” button to view the next curve group.

Tip the “Loop” button, and the loop icon “” is displayed on the screen. The next curve group can be switched automatically according to the set loop interval in the display configuration.

4.4 Bar graph screen

Data of eight channels and the percentage bar graphs can be displayed at the same time.



① Channel name: Represents the work bits of corresponding display channels. The bit can be set in the channel configuration.

② Work amount data: The current work amount data of the channel. Blue means that the measurement value does not meet the alarm output; Red or pink means that the measurement value meets the alarm output.

③ Unit: Display the unit of current channel data. It can be set in the channel configuration.

④ Alarm site icons: Alarm site icons for the uppermost limit, upper limit, lower limit and lowest limit.

⑤ Bar graph: the bar graph scale length is ten-grid. The filled length of color block is the percentile of the measurement value in the range. Blue indicates that the measurement value is not in the alarm status; Red indicates that the instrument value is on the uppermost limit alarm or lowest limit alarm status; Pink indicates that the measurement value is in the

upper limit or lower limit alarm status.

⑥: Percentage: The percentage is displayed by the bar graph.

⑦: Operating buttons:

Tip the "Switch" button to switch to other screens.

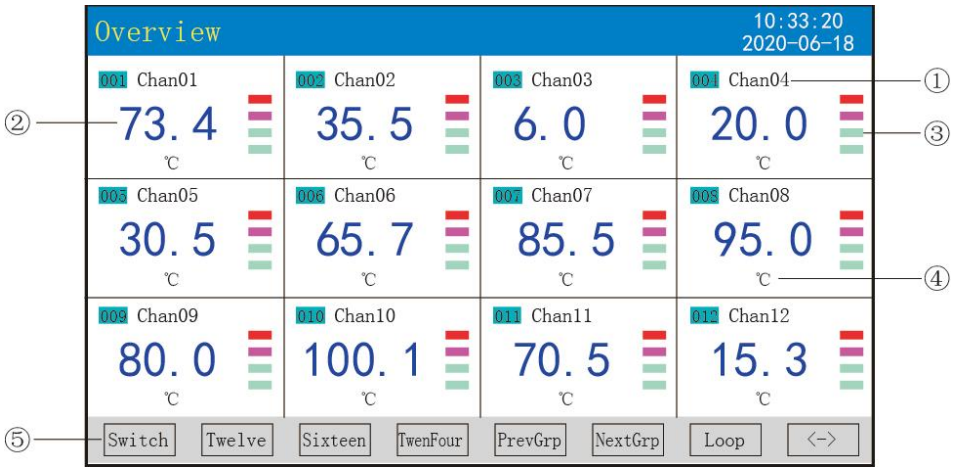
Tip the "Previous" button to view the previous bar graph group.

Tip the "Next" button to view the next bar graph group.

Tip the "Loop" button, and the loop icon "" is displayed on the screen. The next bar graph group can be switched automatically according to the set loop interval in the display configuration.

4.5 Digital display screen

The real-time data and alarm status of several channels can be displayed at the same time.



① Channel name: Represents the work bits of corresponding display channels. The bit can be set in the channel configuration.

② Work amount data: The current work amount data of the channel.

③ Over limit alarm indications: From top to the bottom, the blocks represents the over limit alarm indications of the uppermost limit, upper limit, lower limit and lowest limit. If the block is gray, the alarm function is not supported. If the block is green, no alarm exits. If the block is red/pink, alarm occurs.

④ Unit: Display the unit of current channel data. It can be set in the channel

configuration.

⑤ Operating buttons:

Tip the “Switch” button to switch to other screens.

Tip the “<—>” button to change the channel quantity displayed on the screen, including two channels, four channels, six channels, twelve channels, sixteen channels and twenty-four channels.

Tip the “Two channels” button and the channel bits, work amount data, alarm statuses and work units of two channels can be displayed at the same time.

Tip the “Four Channels” button and the channel bits, work amount data, alarm statuses and work units of four channels can be displayed at the same time.

Tip the “Six Channels” button and the channel bits, work amount data, alarm statuses and work units of six channels can be displayed at the same time.

Tip the “Twelve Channels” button and the channel bits, work amount data, alarm statuses and work units of two channels can be displayed at the same time.

Tip the “Sixteen Channels” button and the channel bits, work amount data, alarm statuses and work units of sixteen channels can be displayed at the same time.

Tip the “Twenty-four Channels” button and the channel bits, work amount data, alarm statuses and work units of twenty-four channels can be displayed at the same time.

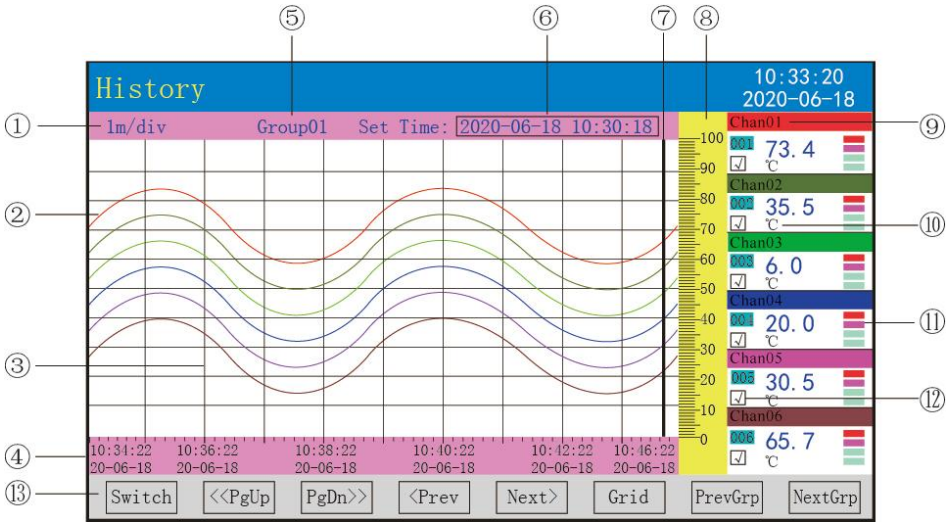
Tip the “Previous” button to view the previous digital display group.

Tip the “Next” button to view the next digital display group.

Tip the “Loop” button, and the loop icon “ ” is displayed on the screen. The next digital display group can be switched automatically according to the set loop interval in the display configuration.

4.6 Historic curve screen

Set the screen according to the curve groups. The six channels of historic data curve can be displayed at the same time (curve precision: 0.5%±1 character).



① Time scale: The time length of each grid. The time scale is related to record interval. Refer to the description in Section 4.3 Real-time Curve Screen.

② Data curve: At most six curves can be displayed at one screen. (The curves have six colors and the colors can be set in the display configuration.

③ Grid: It can facilitate the users to estimate the time and data values.

④ Date and time represented by current the gird.

⑤ Curve groups: Display the current curve group name. (Each curve group includes six curves. Users can put the associated channels into one curve group according to their needs to facilitate comparing the data of channels.)

⑥ Recalling time: yy-mm-dd h:m:s. The time is corresponding to the time indicated by the recalling cursor.

⑦ Recalling cursor: Indicates the recording time of any point on the screen. Move the recalling cursor and the data for any point on the screen can be read.

⑧ Scale: Display the percentile scale of the curve.

⑨ Channel name: The bit can be set in the channel configuration. The background colors are same with the colors of corresponding curves.

⑩ Unit: Display the unit of current channel data. It can be set in the channel configuration.

⑪ Over limit alarm indications: From top to the bottom, the blocks represents the over limit alarm indications of the uppermost limit, upper limit, lower limit and lowest limit. If

the block is gray, the alarm function is not supported. If the block is green, no alarm exits. If the block is red/pink, alarm occurs.

⑫ Curve display/hiding icons: Tip the box on the screen directly and the curve can be displayed or hidden. " √ " refers to curve display. Otherwise, the curve is hidden.

⑬ Operating buttons:

Tip the "Switch" button to switch to other screens.

Tip the "<<Forward" button to rapidly recall the historic data forward.

Tip the "Backward >>" button to rapidly recall the historic data backward.

Tip the "<Forward" button to slowly trace the historic data forward according to the set record interval for precision recalling.

Tip the "Backward>" button to slowly recall the historic data backward according to the set record interval for precision recalling.

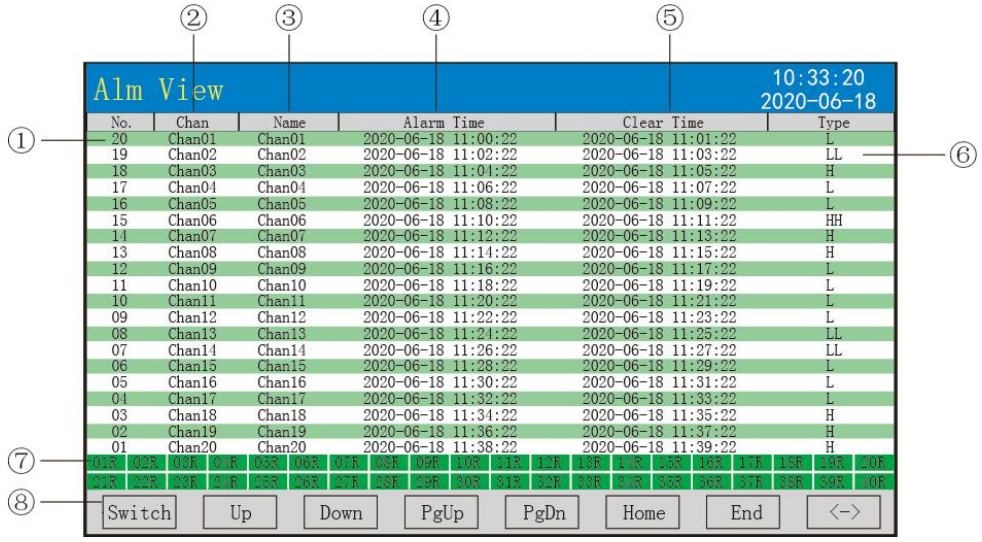
Tip the "Time Scale" button to switch the time scale.

Tip the "Previous" button to view the previous curve group.

Tip the "Next" button to view the next curve group.

4.7 Alarm list screen

Display the channel alarm information and relay output status. At most 100 alarm information can be saved. When the saving limit is reached, the newest alarm record will cover the earliest alarm record.



① No.: The alarm serial number. The numbers are arranged by time. The closer the

occurrence time is, the larger the serial number is.

② Channel: Number of input channel generating the alarm.

③ Bit: Bit of input channel generating the alarm.

④ Alarm Time: Alarm start time

⑤ Alarm Elimination Time: Display the alarm termination time or the termination method.

⑥ Type: uppermost limit, upper limit, lower limit and lowest limit

⑦ Current relay status: The current relay statuses for limit 1 to limit 40 are displayed from left to right successively. Green indicates that the relay contact is open; Red indicates that the relay contact is closed.

⑧ Operating buttons:

Tip the “Switch” button to switch to other screen.

Tip the “Up” button to move up to view the alarm list.

Tip the “Down” button to move down to view the alarm list.

Tip the “Page Up” button to turn up the page to view the alarm list.

Tip the “Page Down” button to turn down the page to view the alarm list.

Tip the “Home” button to view the alarm list on the first page.

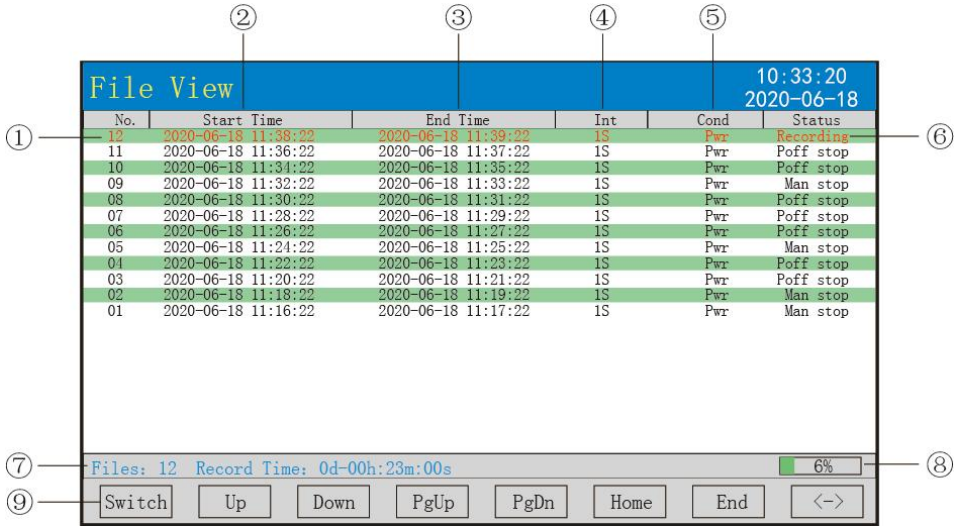
Tip the “Last” button to view the alarm list on the last page.

Tip the “<—>” button the switch between the “Curve” and “Backup” buttons. Select one list, (The selected list turns to blue.) tip the “Curve” button to skip to the historic curve screen of the alarm information generation times, and view the historic curve data of the list. Tip the “Backup” button to skip to the alarm record backup screen to back up the data. Tip the “Back” button on the “Curve” screen or “Backup” screen to back to the alarm list screen.

NOTE: Only 20 file storage records in the list can be displayed on one screen.

4.8 File list screen

Display the file storage information and statuses. At most 100 file list information can be saved. When the saving limit is reached, the newest file record will cover the earliest file record.



① No.: The serial number of the file. The numbers are arranged by time. The closer the occurrence time is, the larger the serial number is.

② Start Time: Start time of data recording in the file.

③ End Time: End time of data recording in the file.

④ Interval: Timer interval for file recording; The recording interval set in the record configuration is displayed.

⑤ Recording Triggering: Triggering condition of file recording; The triggering condition set in the record configuration is displayed.

⑥ Status: Display the current file recording status. The file statuses are shown in the following.

Recording: Data is being recorded.

Manual stop: File recording ends due to configuration data modification.

Power-down stop: File recording ends due to instrument power-down.

Alarm stop: File recording ends due to alarm elimination.

Timed stop: File recording ends due to the set end time.

⑦ File Quantity: Quantity of recorded files; Total Recording Time: Calculate the total file recording time.

⑧ Progress bar for file storage capacity (NOTE: It is displayed when the recording mode in the record configuration is non-cycling.)

⑨ Operating buttons:

Tip the “Switch” button to switch to other screens.

Tip the “Up” button to move up to view the file list.

Tip the “Down” button to move down to view the file list.

Tip the “Page Up” button to turn up the page to view the file list.

Tip the “Page Down” button to turn down the page to view the file list.

Tip the “Home” button to view the alarm list on the first page.

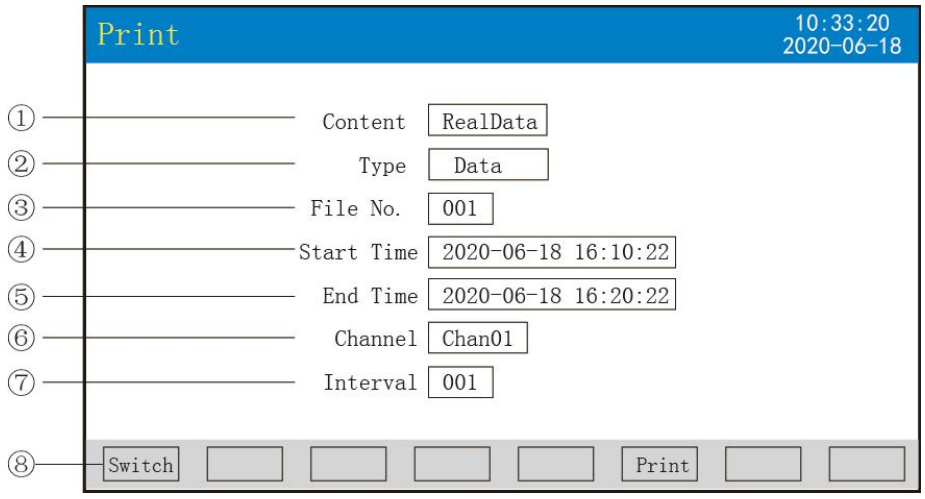
Tip the “Last” button to view the alarm list of the last page.

Tip the “<—>” button the switch among the “Curve”, “Backup” and “Print”buttons. Select one list, (The selected list turns to blue.) tip the “Curve” button to skip to the historic curve screen, and view the historic curve data of the list. Tip the “Backup” button to skip to the backup screen to back up the data. Tip the “Print” button to skip to the print screen to print the data. Tip the “Back” button on the “Curve” screen, “Backup” screen or “Print” screen to back to the file list screen.

NOTE: Only 20 file storage records in the list can be displayed on one screen.

4.9 Print screen (for instrument with print function)

The paperless recorder can be connected to the micro printer through the RS-232 print port to print the historic data and curves. Baud rate of the printer: “4800”; data bit: 8; ODD/EVEN check: none.



① Printed Content: The real-time data and historic data can be selected and printed. When the real-time data is selected, tip the “Print” button to print the data directly; When

the historic data is selected, the following contents can be changed.

② Print Mode: The data report and historic curve can be selected and printed.

③ Serial No. of File: Serial numbers of the recorded files.

④ Start Time: Start time of data segment printing.

⑤ End Time: End time of data segment printing.

⑥ Print Channel: Select the channel to be printed.

⑦ Print Interval: Select the time interval for data printing. Set the unit as print interval×record interval (effective to the data printing only).

⑧ Operating buttons:

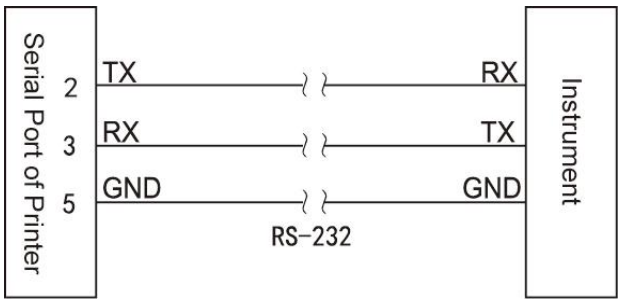
Tip the "Switch" button to switch to other screens.

Tip the "Print" button to start printing.

Tip the "Cancel" button to cancel the printing.

NOTE: In the screen, tip all contents that can be modified, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the content in the dialog box directly dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Instrument and serial printer connection diagram:



A: Manual printing

Tip the "Print" button to enable the print progress bar, and the instrument starts printing data or curves.

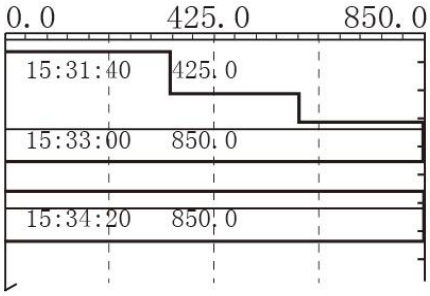
Curve print record format:

Start time: 20-06-23 15:31:40

End time: 20-06-23 15:34:20

Print interval: 1s

Channel 01: Unit: ℃



Data print format:

Start time: 20-06-23 15:31:40
End time: 20-06-23 15:32:00
Print interval: 1s
Channel 01: Unit: ℃

Time	Data	
20-06-23 15:31:40	850.0	----------Start time measurement value
20-06-23 15:31:41	850.0	
20-06-23 15:31:42	850.0	
. . . . .	. . . . .	
20-06-23 15:31:58	425.0	
20-06-23 15:31:59	425.0	
20-06-23 15:32:00	425.0	----------End time measurement value

B. Timed printing

Set the time interval and start time of the timed printing in the system configuration. When the set time interval is reached, the instrument controls the printer automatically to perform the timed printing.

Timed print format:

Print time: 20-06-23 14:30:02 ----------Date/time
Channel 01: 100.0℃ ----------Measurement value of Channel 01
Channel 02: 100.0℃ ----------Measurement value of Channel 02
. . . .
Channel 69: 100.0℃ ----------Measurement value of Channel 69
Channel 70: 100.0℃ ----------Measurement value of Channel 70

NOTE: The data and curve can be printed manually, while only the data can be printed by timed print.

4.10 Backup screen (for instrument with backup function)

The paperless recorder can back up and transfer the recorded data in the instrument by

using the USB drive or SD card. The USB port is on the left of the instrument front panel, and the SD card port is on the right of the instrument front panel. Open the operation cover and insert the USB drive or SD card for data backup.

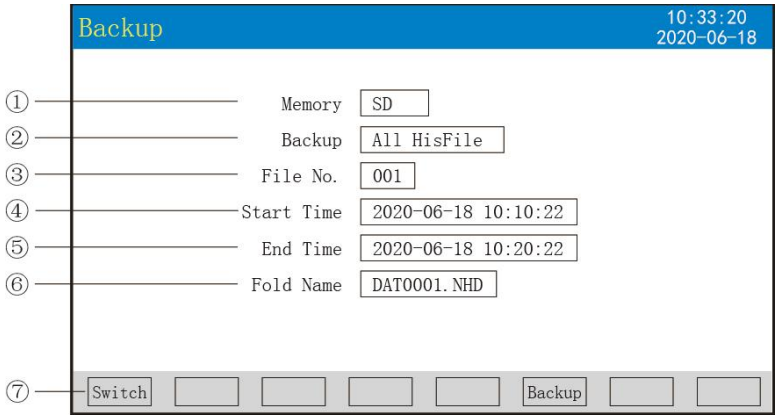
The SD card supports automatic backup function. Insert the SD card into the SD card port, and the instrument can automatically back up the historic data of of the previous day (0-24-hour) to the SD card at 0 o'clock per day. When the recording stops or the set triggering condition is achieved, the historic curve recorded before stopping recording will be backed up to the SD card.

Storage directory for automatic backup files:

Storage directory for files backed up at 0 o'clock per day: TIMEAUTO (file name)/instrument date (yy/mm/dd)/ instrument time (h/m)

Storage directory for file backed up when recording stops: RECAUTO (file name)/instrument date (yy/mm/dd)/ instrument time (h/m)

On the operation screen, you can back up the historic data of all channels recorded in the instrument to the USB drive. The backup historic data can be analyzed and printed by the host management software DTM.



① Storage Medium: Select the SD card or USB drive for storage.

② Backup Content: All files, historic files, alarm records, power-down records, file lists and system logs can be selected.

③ Serial No. of File: Serial numbers of the recorded files

④ Start Time: Start time of data segment backup.

⑤ End Time: End time of data segment backup.

(NOTE: The start time and stop time is automatically generated by the instrument in accordance with the current selected file number. If the time frame is shaded, the time cannot be changed. If the time frame is not shaded, the start time and end time can be changed. If the changed time exceeds the actual range of the curve start time and end time, an error indication is displayed.)

⑥ File Name: Select the file names for backup data in the USB drive. If the contents to be backed up are all files, the default prefix of the folder name is FD+Date; If the contents are historic files, the default prefix of the folder name is DAT; If the contents are alarm lists, the default prefix of the folder name is ALM; If the contents are power-down lists, the default prefix of the folder name is PWR; If the contents are file lists, the default prefix of the folder name is REC; If the contents are system logs, the default prefix of the folder name is LOG.

⑦ Operating buttons:

Tip the “Switch” button to switch to other screens.

Tip the “Backup” button and the indication “Back up...” is displayed. When the USB drive progress bar finishes, the indication “Backup finishes.” is displayed. If the progress bar does not finish, tip the “Cancel” button, the indication “Canceled.” is displayed and the data backup is canceled.

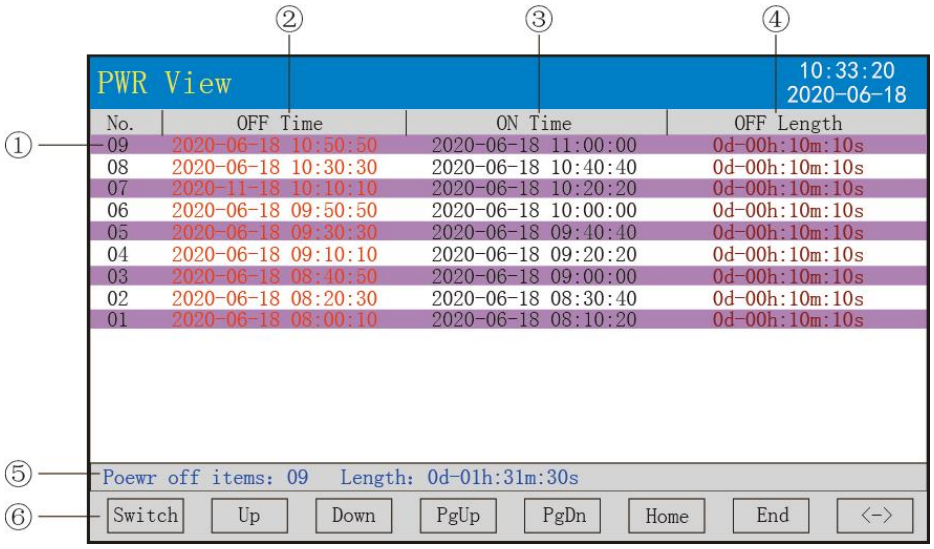
If no SD card is connected, the indication is displayed; If the SD card is connected, no indication is displayed, and the corresponding icon is displayed in the display status bar. If no USB drive is connected, tip the “Backup” button, and an indication is displayed. If the USB drive is connected, the corresponding icon is displayed in the display status bar, and all files are backed up to the NHR folder automatically.

NOTE: In the screen, tip all contents that can be modified, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box directly. Refer to Section "V."T6" Input Method"(P39) for details. For some backed up contents, the parameters below them are shaded, which indicates that the parameters cannot be set.

4.11 Power-down record screen

Display the instrument power-down and power-on time records, including the

power-on/down times, total power-down times and power-down duration. At most 100 alarm information can be saved. When the saving limit is reached, the newest power-down record will cover the earliest power-down record.



① No.: The serial number of the power-down record. The numbers are arranged by time. The closer the occurrence time is, the larger the serial number is.

② Power-down Time: Power-down time of the instrument.

③ Power-on Time: The time interval between instrument power-on to the measurement screen display.

④ Power-down Duration: The time duration for each power-down.

⑤ Power-down Times: Total power-down times; Total duration:The accumulated power-down duration

⑥ Operating buttons:

Tip the “Switch” button to switch to other screens.

Tip the “Up” button to move up to view the power-down record list.

Tip the “Down” button to move down to view the power-down record list.

Tip the “Page Up” button to turn up the page to view the power-down record list.

Tip the “Page Down” button to turn down the page to view the power-down record list.

Tip the “Home” button to view the power-down record list on the first page.

Tip the “Last” button to view the power-down record list on the last page.

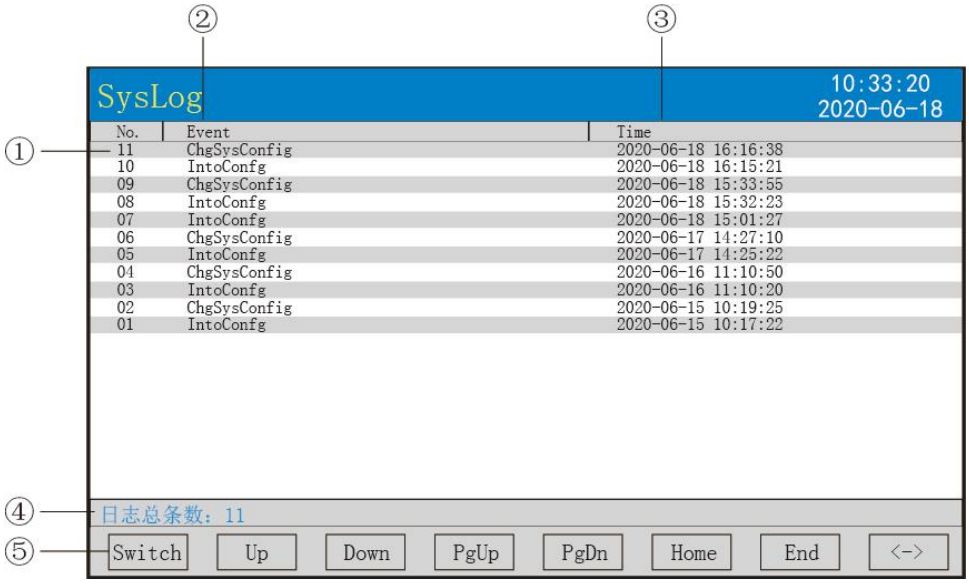
Tip the “<—>” button the switch to the “Backup” button. Select one list, (The selected

list turns to blue.) tip the “Backup” button to skip to the backup screen to back up the data. Tip the “Back” button on the “Backup” screen to back to the power-down record screen.

NOTE: Only 20 power-down records in the list can be displayed on one screen.

4.12 System log screen

Display the relevant logs of instrument operation.



① No.: The serial numbers of the operation records. The numbers are arranged by time. The closer the occurrence time is, the larger the serial number is.

② Event: Instrument operation events

③ Occurred Time: Event occurred time

④ Total Logs: Record the total numbers of event occurence.

⑤ Operating buttons:

Tip the “Switch” button to switch to other screens.

Tip the “Up” button to move up to view the operation record list.

Tip the “Down” button to move down to view the operation record list.

Tip the “Page Up” button to turn up the page to view the operation record list.

Tip the “Page Down” button to turn down the page to view the operation record list.

Tip the “Home” button to view the operation record list on the first page.

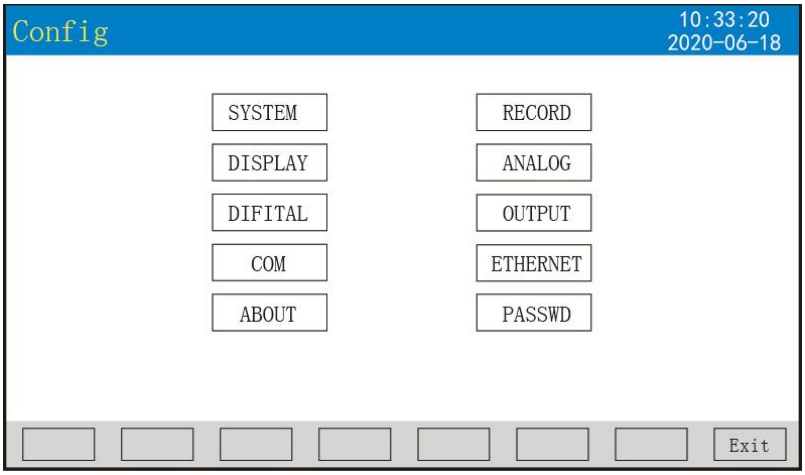
Tip the “Last” button to view the operation record list on the last page.

Tip the “<—>” button the switch to the “Backup” button. Select one list, (The selected

list turns to blue.) tip the “Backup” button to skip to the backup screen to back up the data. Tip the “Back” button on the “Backup” screen to back to the system log screen.

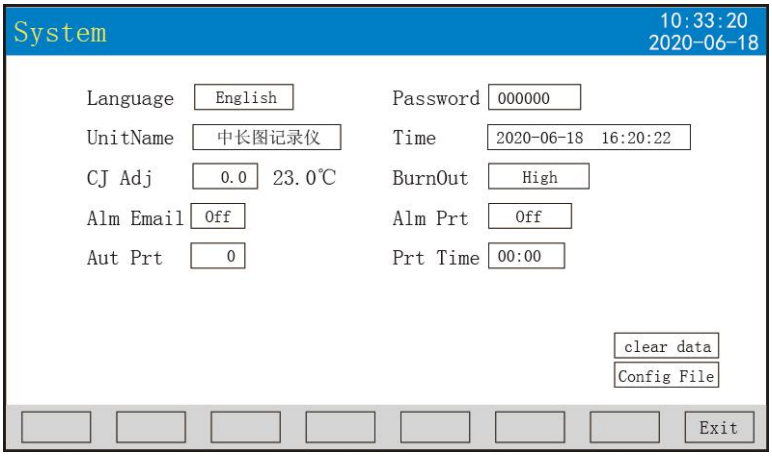
NOTE: Only 20 operation records in the list can be displayed on one screen.

4.13 Configuration screen



Before entering the configuration, the password should be checked. Tip “Password Check” and a dialog box is popped up. Enter the password into the dialog box. (Refer to Section "V."T6" Input Method"(P39) for dialog box operation.) The password consists of 6 bits. The factory default password is 000000, and you can change the check password in the “System Configuration” - “User Password”. If the password is incorrect, all configuration screens cannot be entered.

4.13.1 System configuration



★ Language Selection: simplified Chinese or English.

★ User Password: The password can be set according to your requirement.

★ Instrument Name: The instrument name can be set according to your requirement. Factory default name: Medium-length graph recorder

★ Date And Time: Displayed as yy-mm-dd h:m:s. The system time can be changed.

★ Cold Junction Adjustment: Adjust and display the cold junction temperature.

★ Treatment of Interruption: The upper range limit, lower range limit and current value keeping, and -.-- can be selected.

★ Alarm E-mail: enabled or disabled.

★ Alarm Print: enabled or disabled.

★ Timed Print: Set the timed print interval, unit: min. If the time interval is set as 0, the timed print is disabled.

★ Start Time: Set the start time of timed print.

★ Clear Data: Clear all data saved in the instrument, including the historic data, alarm list, file list and power-down list. Tip “Clear Data”, and the dialog box “The deleted data can not be restored. Sure to delete?” is popped up. Select “Yes” to clear the historic data, or select “No” to give up historic data clearing.

★ Configuration Files: Tip “Configuration File” to enter the configuration file settings screen. The storage medium can be the SD card or USB drive. After the file name is set, insert the USB drive or SD card. Tip “Export Configuration” to export the “System Configuration”, “Record Configuration”, “Display Configuration”, “Input Configuration”, “Analog Configuration” to the folder in the USB drive or SD card. Then insert the USB drive or SD card to another instrument, tip “Import Configuration”, and the configurations of the previous instrument can be imported to the instrument. If the configurations of several instruments are same, the configuration time can be reduced greatly by using this function.

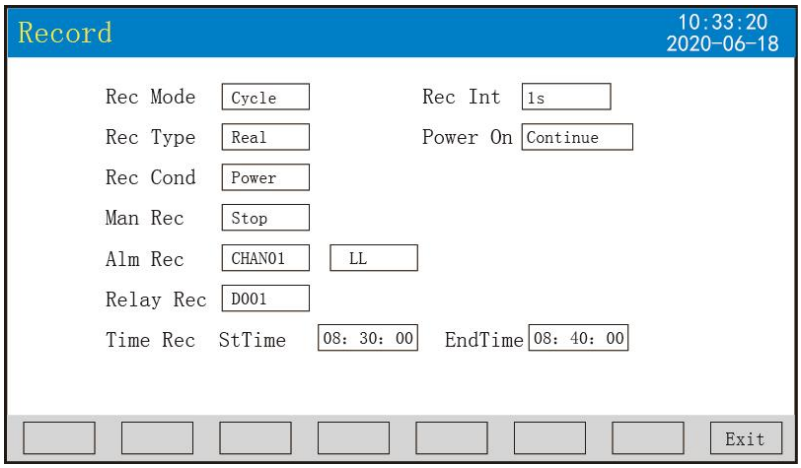
Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the “Exit” button to exit from the configuration screen. If the parameters are changed, the prompt “Save the changed parameter?” is popped up. Select “Yes” to save the

changed parameter, or select “No” to give up the parameter saving.

4.13.2 Record configuration



★ Record Mode: cycling or non-cycling

Non-cycling: When the instrument recording space is full, or 100 files are recorded, the recording stops automatically.

Cycling: When the recording space is full, the new data will cover the earliest data. The historic data will be recorded in cycle by replacing old files by new files. When 100 files are recorded, the first file will be deleted, and the serial numbers of other files will be decreased by one. Then the new file will be created for recording.

★ Record Interval: Can be selected among 1s, 2s, 4s, 6s, 15 s, 30s, 1 min 2 min, and 4 min.

★ Record Type: Can be selected among real-time value, average value, maximum value and minimum value.

Real-time value:Take the real-time value corresponding to the recording time directly.

Average value: Take the average value of the real-time data between the first and last recording points.

Maximum value: Take the maximum value of the real-time data between the first and last recording points.

Minimum value: Take the minimum value of the real-time data between the first and last recording points.

★ Power-on Record: Can be selected between new file and continuing before

power-down.

New file: Record the new files list created after powering on.

Continuing before power-down: After powering on, the file the are being recorded before powering down can be recalled and recorded again; If the function is selected, the data displayed during the power-down is -.--.

★Triggering condition: Can be selected among manual, power-on, alarm, relay and timed. (NOTE: When the triggering condition is selected, the corresponding triggering mode can be displayed and changed.)

Manual triggering: Enter the instrument storage operation screen, and the data storage and recording can be disabled or enabled manually.

Power-on: After powering on the instrument, the recording function is enabled.

Alarm triggering: It can be set that when only the certain alarm corresponding to a channel occurs, the data storage recording is enabled, and when the alarm is over, the recording stops.

Relay triggering: It can be set that when only the certain alarm corresponding to a the relay of a certain limit occurs, the data storage recording is enabled, and when the relay alarm is over, the recording stops.

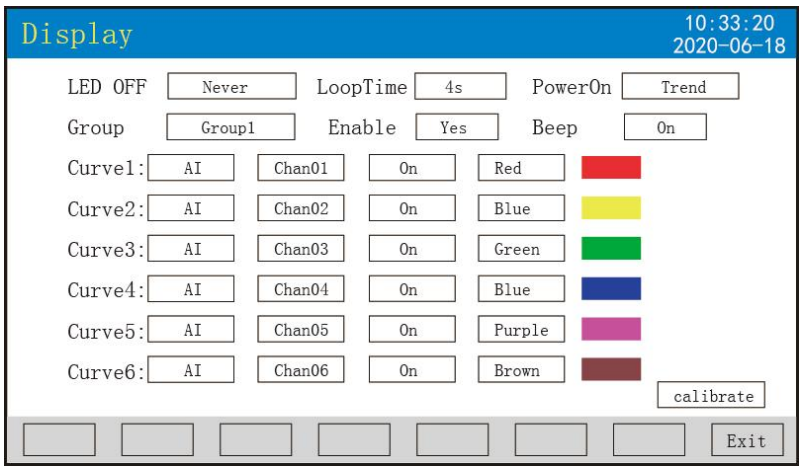
Timed triggering: The fixed timed cycling is 24 hours. Set the start time and end times to make the instrument record data storage in the set time segment.

Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the “Exit” button to exit from the screen. If the contents in the screen are changed, the prompt “Save the changed parameter?” is popped up.

4.13.3 Display configuration



★ Close LCD: Lower the backlight brightness of the LCD. The waiting time can be set as 5 min, 10 min, 30 min, 1h or never.

★ Loop Interval: The time interval to display the next group in cycle. The interval can be set as 4s, 8s, 15s or 30s.

★ Starting Screen: The starting screen can be set as the real-time curve, bar graph screen, digital display screen, historic curve, file list, power-down record and screen before power-down.

★ Curve group: Each curve group includes six curves and total 10 curve groups an be selected. You can select the group according to actual requirements and the selected curve group can be displayed in the real-time curve screen.

★ Enable: Select “Yes” and the corresponding curve groups can be displayed on the real-time curve screen. Select “No”, and the curve group is not displayed.

★ Touch Sound: Select “Yes” and a sound is made when touching the screen; Select “No”, and no sound is made.

★ Curve 1 to Curve 6: Select the input type (analog or digital), channel name, display status and curve color to be displayed.

★ Screen Check: Tip the “Screen Check” to enter the touch screen check status. Tip the “Cross” cursor displayed on the screen with your finger to check five points, and then an indication “Save the check?” is displayed. Select “Yes” to save the check, and the initial instrument touch check can be restored. Select “No” to give up saving the check. (NOTE: The touch screen should be corrected over time to prevent touch point drift.)

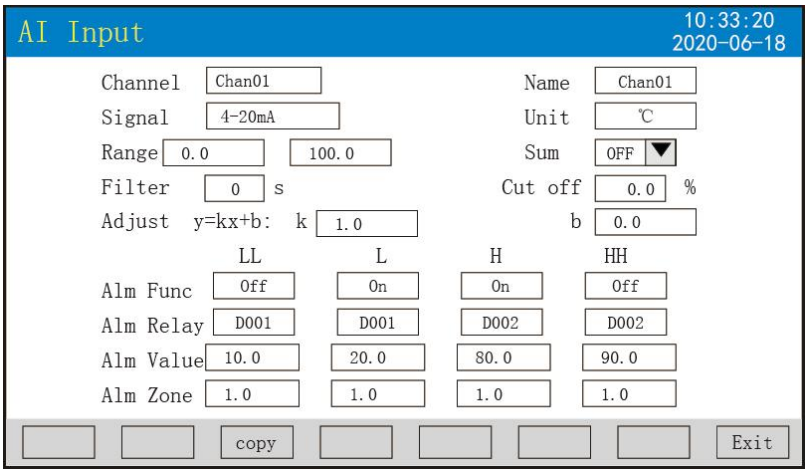
Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly.

Tip the "Exit" button to exit from the screen. If the contents in the screen are changed, the prompt "Save the changed parameter?" is popped up. Select "Yes" to save the changed parameter, or select "No" to give up the parameter saving.

Touch screen check after power-on: Severe vibrations occurred during instrument transportation or using may affect the touch screen operation. At the moment of powering on the instrument, press the touch screen with your finger tightly, until the touch screen check screen is entered. Release your finger and check the screen.

4.13.4 Analog input



★ Configuration Channel: Select the channel displaying configuration from channel 01 to channel 70.

★ Bit: The work bits of corresponding displayed channels.

★ Signal type: B, S, K, E, T, J, R, N, F2, Wre3-25, Wre5-26, Cu50, Cu53, Cu100, Pt100, BA1, BA2, 0 - 400Ω, 0 - 20mV, 0 - 100mV, ±20mV, ±100mV, 0 - 20mA, 0 - 10 mA, 4 - 20 mA, 0 - 5V, 1 - 5V, ±5V, 0 - 10V, √0 - 10 mA, √4 - 20 mA, √0 - 5V, √1 - 5V, None.

Ranges allowed by each signal are described in the following.

Signal Type	Range	Signal Type	Range	Signal Type	Range
B	400 - 1800℃	Cu50	-50.0 - 150.0℃	0 - 20mA	-9999 - 99999

S	-50 - 1600℃	Cu53	-50.0 - 150.0℃	0 - 10mA	-9999 - 99999
K	-200 - 1300℃	Cu100	-50.0 - 150.0℃	4 - 20mA	-9999 - 99999
E	-200 - 1000℃	Pt100	-200.0 - 650.0℃	0 - 5V	-9999 - 99999
T	-200.0 - 400.0℃	BA1	-200.0 - 600.0℃	1 - 5V	-9999 - 99999
J	-200 - 1200℃	BA2	-200.0 - 600.0℃	±5V	-9999 - 99999
R	-50 - 1600℃	0 - 400Ω linear resistance	-9999 - 99999	0 - 10V	-9999 - 99999
N	-200 - 1300℃	0 - 20mV	-9999 - 99999	0 - 10mA (open square operation)	-9999 - 99999
F2	700 - 2000℃	0 - 100mV	-9999 - 99999	0 - 20mA (open square operation)	-9999 - 99999
Wre3-25	0 - 2300℃	±20mV	-9999 - 99999	0 - 5V (open square operation)	-9999 - 99999
Wre5-26	0 - 2300℃	±100mV	-9999 - 99999	1 - 5V (open square operation)	-9999 - 99999

★ Unit: The work units of corresponding displayed channels.

★ Range: The upper and lower range limits of the recorded data. The set range is -99.999 - 99999. The channel decimal points can be determined by modify the decimal places of the upper range limits.

★ Accumulation: Select between “Yes” or “No”. This item is reserved.

★ Filtering Time: Modify the instrument sampling times to prevent from measurement displayed value skipping.

Relationship between the displayed value and the filtering time: For example, when the analog is input, set the filtering time as 3.0 seconds, and the instrument will average the sampled values within 3 seconds (filter time 3×sampling cycle 1 second), and the displayed values are updated by using the recursive method.

★ Small signal cutting: measurement value < (URV - LRV)×small signal cutting

percentage + LRV. The measurement value displayed is the LRV. Set it as zero to disable the small signal cutting function.

★ Linear modification: The work amount conducts the linear modification according to the formula y = Kx + b, where K is the linear coefficient, and b is the zero-point modification. In the default status, K=1.0 and b=0.0, the modification is not performed. x is the work amount of the channel before modification, and y is the channel value after modification.

★ For the lowest limit, lower limit, upper limit and uppermost limit alarms and return values of the channel , the following should be pay attention to.

The set ranges of the lowest limit, lower limit, upper limit and uppermost limit and return value are all -99.999 - 99999, and they are input by the method same to the range input method.

Alarm function: off — The alarm function is closed. On — The alarm function is open.

Alarm Contact: Select the relay contact number. D001 - D040 are corresponding to No. 1 relay contact output to No. 40 relay contact output. “No”: No output.

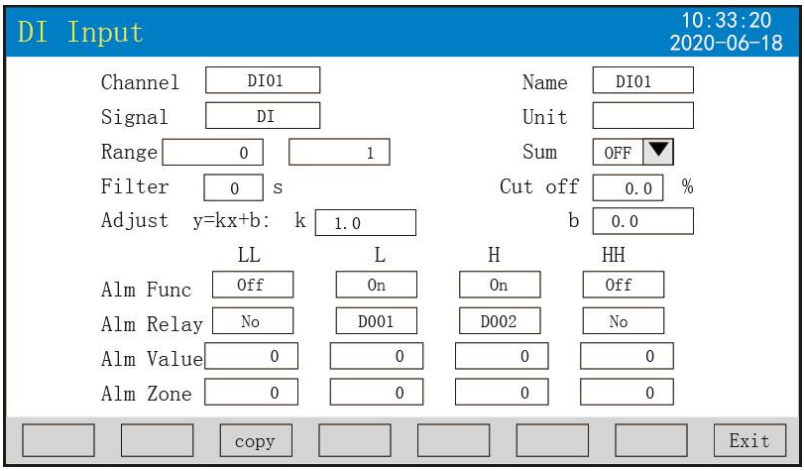
Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the “Exit” button to exit from the screen. If the contents in the screen are changed, the prompt “Save the changed parameter?” is popped up. Select “Yes” to save the changed parameter, or select “No” to give up the parameter saving.

Tip the “Copy” and “Paste” buttons, and the parameters of the configuration channel number that need to be copied can be copies to other channels. For example, if the parameters of Channel 01 are needed to be copied to Channel 02, set the configuration channel as Channel 01 and tip the “Copy” button. Then, set the configuration channel as Channel 02 and tip the “Paste” button. When the configurations of several channels are same, use this function, and the configuration time can be reduced greatly.

4.13.5 Digital input



★ Configuration Channel: Select the channel displaying configuration from channel 01 to channel 06.

★ Bit: The work bits of corresponding displayed channels.

★ Signal Type: DI and None.

★ Unit: The work units of corresponding displayed channels.

★ Range: The upper and lower range limits of the recorded data. The set range is -99.999 - 99999. The channel decimal points can be determined by modify the decimal places of the upper range limits.

★ Accumulation: Select between “Yes” or “No”. This item is reserved.

★ Filtering Time: Modify the instrument sampling times to prevent from measurement displayed value skipping.

Relationship between the displayed value and the filtering time: For example, when the analog is input, set the filtering time as 3.0 seconds, and the instrument will average the sampled values within 3 seconds (filter time 3×sampling cycle 1 second), and the displayed values are updated by using the recursive method.

★Small signal cutting: measurement value < (URV - LRV)×small signal cutting percentage + LRV. The measurement value displayed is the LRV. Set it as zero to disable the small signal cutting function.

★ Linear modification: The work amount conducts the linear modification according to the formula y = Kx + b, where K is the linear coefficient, and b is the zero-point modification. In the default status, K=1.0 and b=0.0, the modification is not performed. x is the work

amount of the channel before modification, and y is the channel value after modification.

★ For the lowest limit, lower limit, upper limit and uppermost limit alarms and return values of the channel , the following should be pay attention to.

The set ranges of the lowest limit, lower limit, upper limit and uppermost limit and return value are all -99.999 - 99999, and they are input by the method same to the range input method.

Alarm function: Off — The alarm function is closed. On — The alarm function is open.

Alarm Contact: Select the relay contact number. D001 - D040 are corresponding to No.1 relay contact output to No. 40 relay contact output. “No”: No output.

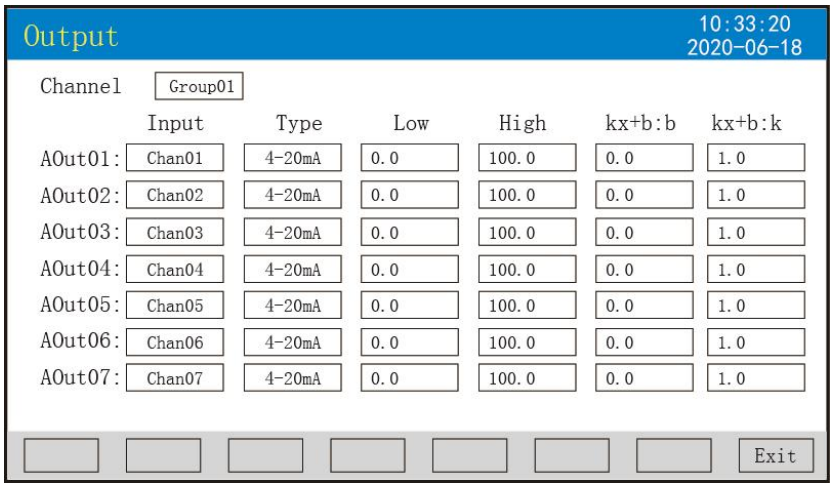
Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the “Exit” button to exit from the screen. If the contents in the screen are changed, the prompt “Save the changed parameter?” is popped up. Select “Yes” to save the changed parameter, or select “No” to give up the parameter saving.

Tip the “Copy” and “Paste” buttons, and the parameters of the configuration channel number that need to be copied can be copies to other channels. For example, if the parameters of Channel 01 are needed to be copied to Channel 02, set the configuration channel as Channel 01 and tip the “Copy” button. Then, set the configuration channel as Channel 02 and tip the “Paste” button. When the configurations of several channels are same, use this function, and the configuration time can be reduced greatly.

4.13.6 Analog output



★ Output Channel: The group 1 and group 2 can be selected. The group 1 are output 01 to output 07, and the group 2 are output 08 to output 14

★ Input channel: The input channel corresponding to the output channel. For example, "Output 02" is corresponding "Channel 05", and the analog output of Channel 02 transmits the output with the measurement value of Input channel 05.

★ Output type: 0 - 10 mA, 0 - 20 mA, 4 - 20 mA, 0 - 5V, 1 - 5V, 0 - 10V, None.

★Lower output limit/upper output limit: Adjust the upper and lower limit ranges of the transmitting output. The set range is -9999 - 19999. The channel decimal points can be determined by modify the decimal places of the upper range limits.

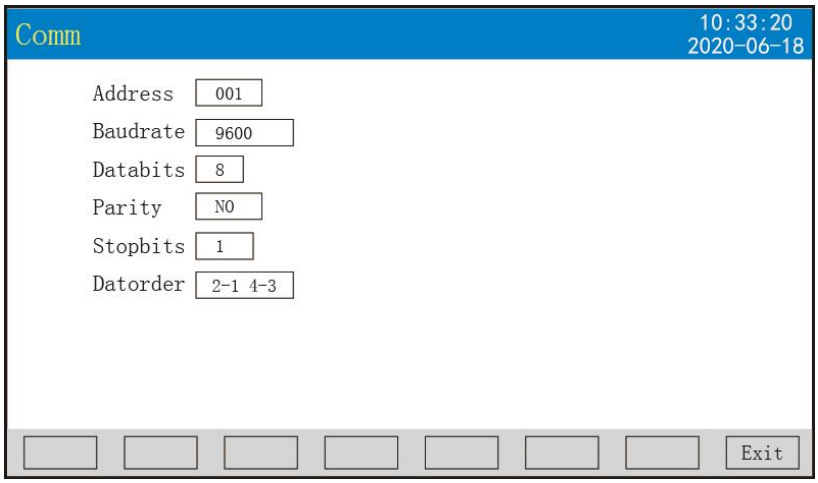
★kx+b: Analog output linear modification formula; b:zero-point shift of the analog output; k: output zoom scale.

Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the "Exit" button to exit from the screen. If the contents in the screen are changed, the prompt "Save the changed parameter?" is popped up. Select "Yes" to save the changed parameter, or select "No" to give up the parameter saving.

4.13.7 Serial port settings



Local address: Address range: 1 - 255.

★ Baud rate: 1200, 2400, 4800, 9600, 19200, 38400bps (selectable).

★Data bit: For data bits 5, 6, 7 and 8 can be selected.

★ Check bit: The no check (NO), odd check (ODD) and even check (EVEN) can be selected.

★Stop bit: Three stop bits, 1, 1.5 and 2 can be selected.

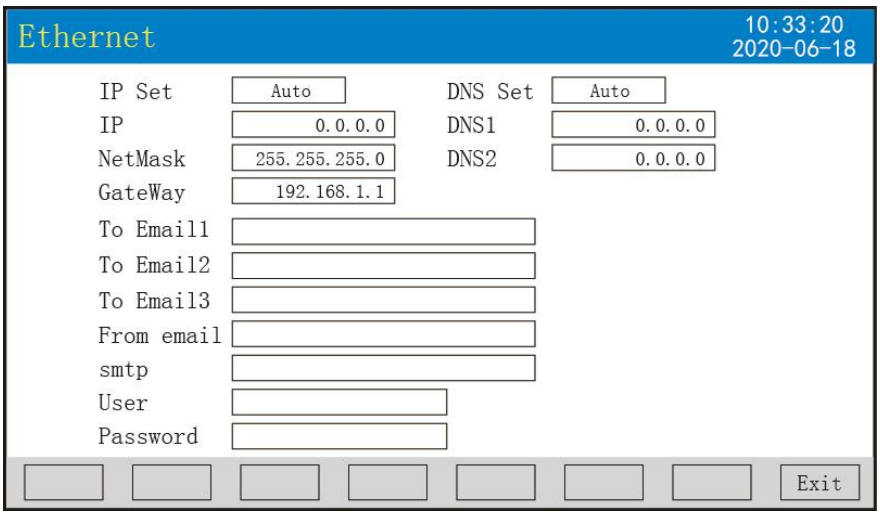
★ Byte order: Four byte orders, 1-2 3-4, 2-1 4-3, 3-4 1-2 and 4-3 2-1 can be selected.

Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the “Exit” button to exit from the screen. If the contents in the screen are changed, the prompt “Save the changed parameter?” is popped up. Select “Yes” to save the changed parameter, or select “No” to give up the parameter saving.

4.13.8 Network settings



★Get IP: The IP can be get manually and automatically. When the manual setting is selected, the IP address, subnet mask and default gateway can be set.

★ IP address: The only address the distinguishes the devices in the network.

★ Subnet mask: Set according to the different IP address. The default subnet mask is 255.255.255.0

★ Default gateway: Gateway address

★ Port: Port number of EtherNet communication

★ Get DNS: The DNS can be get manually or automatically. When the manual get is selected, the preferred DNS and alternative DNS can be set.

★ Preferred DNS: The server address of the preferred DNS.

★ Alternative DNS: The server address of the alternative DNS.

★ The receiving mailbox, sending mailbox, sending server, user name and password can be set according to your requirements.

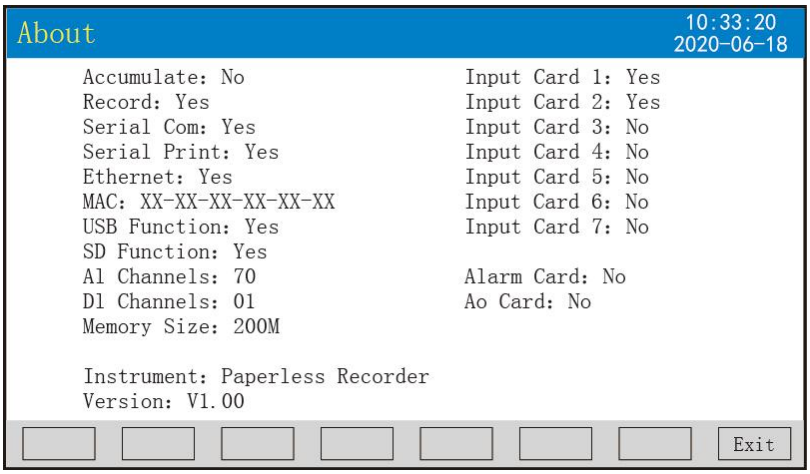
Operation: On the screen

Tip the dialog box on the right of the parameters, and a dialog box is popped up. Select the content in the dialog box directly, or modify contents in the dialog box. Refer to Section "V."T6" Input Method"(P39) for details.

Tip the “Exit” button to exit from the screen. If the contents in the screen are changed, the prompt “Save the changed parameter?” is popped up. Select “Yes” to save the changed

parameter, or select “No” to give up the parameter saving.

4.13.9 Function list



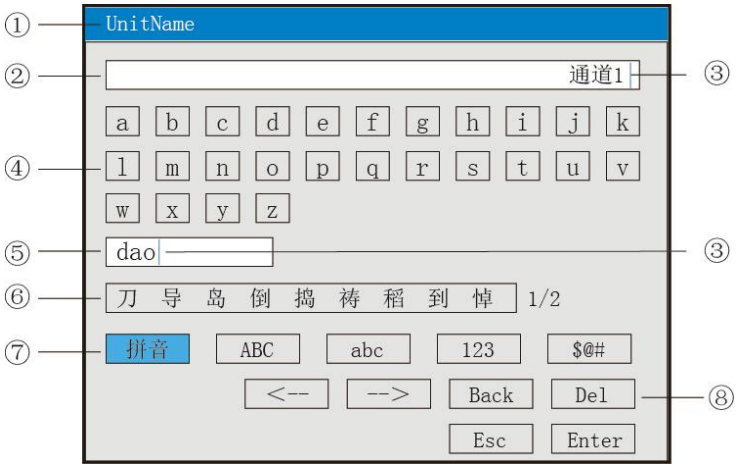
★ Instrument function viewing list: All functions of the instrument can be viewed on the screen. If one function is supported, the mark “Supported” is displayed; If a function is not supported, the mark “None” is displayed.

Operation: On the screen, tip the “Exit” button the exit from the screen.

V. “T6” Input Method

The T6 input method similar to the mobile phone input method is used in the instrument for parameter and contend input. You can input the Chinese characters, numbers, English, special symbols by using less keyboard operation. The operation is easy to learn and use. The international code is used to solve the Chinese character bit and special unit input problems.

5.1 Chinese character pinyin input method



① Parameter name: Display the current modified parameter name.

② Input display bar: Display the modified contents. Tip the parameter content, and the cursor is displayed. Then tip the "Operation" button and the "Soft keyboard" to modify the parameter where the cursor is located.

③ Cursor: Tip the "Operation" button to move the cursor to select the modification site. Or, tip any site of the parameter, and the cursor will moves to the site.

④Soft keyboard: Display the 26 pinyin letters. Tip any letter and the letter will be entered in the front of the cursor into the "Input Display Bar", or be entered in the front of the cursor into the "Pinyin Combination Display Bar".

⑤ Tip the pinyin combination display bar, and the cursor is displayed. Tip the operation buttons and the soft keyboard to change the pinyin combination, and the corresponding Chinese characters will be displayed in the character alternative bar.

⑥ Character alternative bar: Tip the required character, and the character will be entered in the front of the cursor into the input display bar.

⑦ Tip the required input method in the input method bar.

⑧ Operating buttons:

Tip the "＜--" button to move the cursor left.

Tip the "--＞" button to move the cursor right.

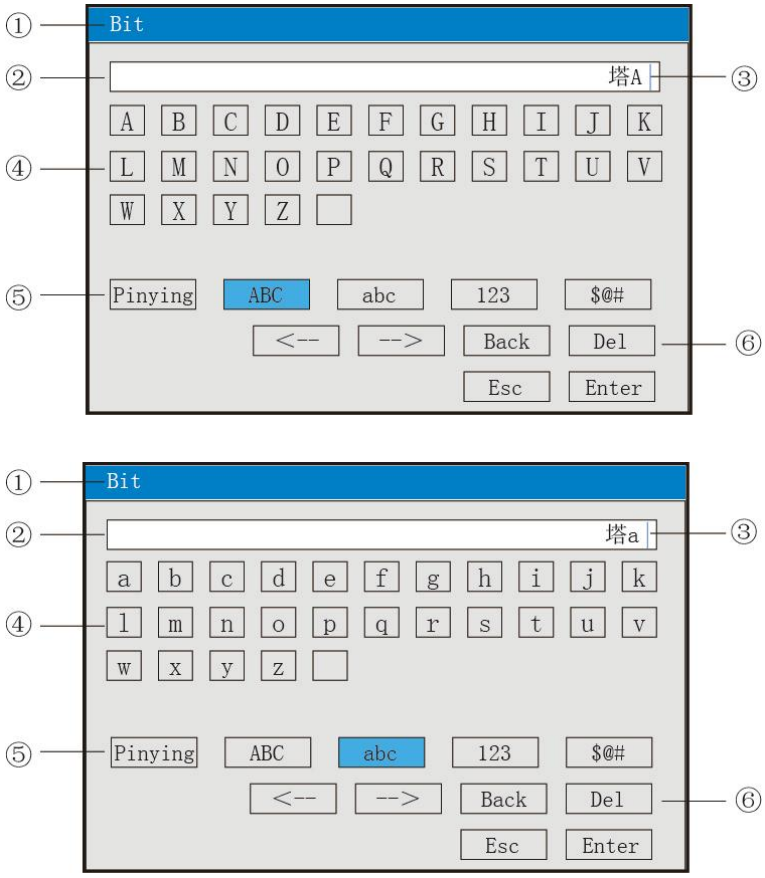
Tip the "Back" button to delete the content in front the cursor.

Tip the "Del" button to delete the content behind the cursor.

Tip the "Enter" button to confirm the content input and exit from the dialog box.

Tip the "Esc" button to exit from the dialog box.

5.2 English letter input method



① Parameter name: Display the current modified parameter name.

② Input display bar: Display the modified contents. Tip the parameter content, and the cursor is displayed. Then tip the operation buttons and the soft keyboard to modify the parameter where the cursor is located.

③ Cursor: Tip the operation buttons to move the cursor to select the modification site. Or, tip any site of the parameter, and the cursor will moves to the site.

④ Soft keyboard: Display the 26 English letters and one space key. Tip any letter and the letter will be entered in the front of the cursor into the input display bar.

⑤ Tip the required input method in the input method bar.

⑥ Operating buttons:

Tip the "＜--" button to move the cursor left.

Tip the "-->" button to move the cursor right.

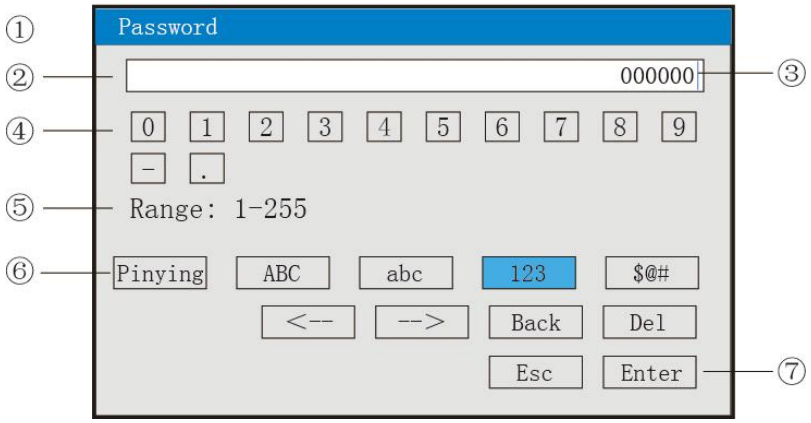
Tip the "Back" button to delete the content in front the cursor.

Tip the "Del" button to delete the content behind the cursor.

Tip the “Enter” button to confirm the content input and exit from the dialog box.

Tip the “Esc” button to exit from the dialog box.

5.3 Digital input method



① Display the current modified parameter name.

② Input display bar: Display the modified contents. Tip the parameter content, and the cursor is displayed. Then tip the operation buttons and the soft keyboard to modify the parameter where the cursor is located.

③ Cursor: Tip the operation buttons to move the cursor to select the modification site. Or, tip any site of the parameter, and the cursor will moves to the site.

④ Soft keyboard: Display the number keyboard (0 - 9). Tip any number and the number will be entered in the front of the cursor into the input display bar.

⑤ Range: Some contents are limited in a certain range. You can only input the content in the fixed range.

⑥ Tip the required input method in the input method bar.

⑦ Operating buttons:

Tip the “<--” button to move the cursor left.

Tip the “-->” button to move the cursor right.

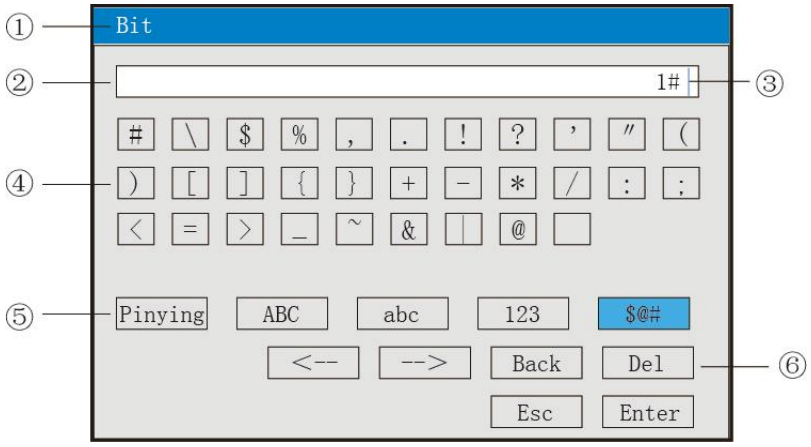
Tip the “Back” button to delete the content in front the cursor.

Tip the “Del” button to delete the content behind the cursor.

Tip the “Enter” button to confirm the content input and exit from the dialog box.

Tip the “Esc” button to exit from the dialog box.

5.4 Character Input Method



① Parameter name: Display the current modified parameter name.

② Input display bar: Display the modified contents. Tip the parameter content, and the cursor is displayed. Then tip the operation buttons and the soft keyboard to modify the parameter where the cursor is located.

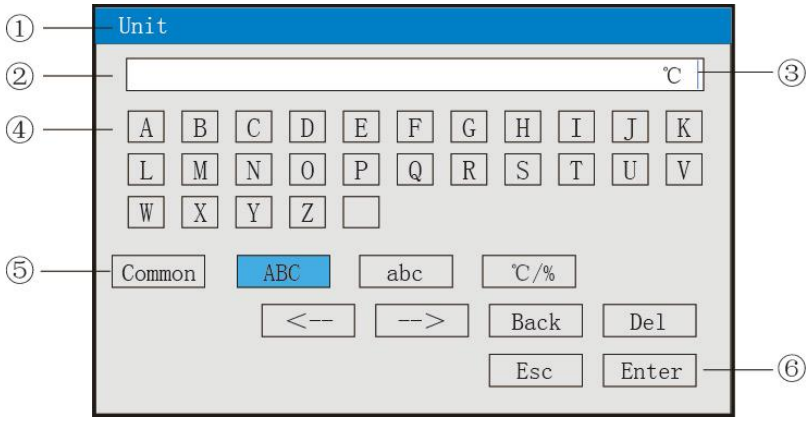
③ Cursor: Tip the operation buttons to move the cursor to select the modification site. Or, tip any site of the parameter, and the cursor will moves to the site.

④Soft keyboard: Display the 30 characters and one space key. Tip any character and the character will be entered in the front of the cursor into the input display bar.

⑤ Tip the required input method in the input method bar.

⑥ Operating buttons (ditto).

5.5 Common unit input method



Common Unit

℃	Kgf	Pa	KPa	MPa	mmHg	mmH2O	bar
t/h	Kg/h	L/h	m^3/h	Nm^3/h	t/m	Kg/m	L/m
m^3/m	Nm^3/m	t/s	Kg/s	L/s	m^3/s	Nm^3/s	t
Kg	g	Nm^3	m^3	L	KJ/h	KJ/m	KJ/s
MJ/h	MJ/m	MJ/s	GJ/h	GJ/m	GJ/s	KJ	MJ
GJ	V	A	KW	Hz	%	mm	rpm
KC/h	KC/m	KC/s	KC				

① Display the current modified parameter name.

② Input display bar: Display the modified parameters. Tip the parameter content, and the cursor is displayed. Then tip the operation buttons and the soft keyboard to modify the parameter where the cursor is located.

③ Cursor: Tip the operation buttons to move the cursor to select the modification site. Or, tip any site of the parameter, and the cursor will moves to the site.

④ Soft keyboard: Display the 26 capital letter or 26 lower-case letters or 16 special units and one space key. Tip any unit and the unit will be entered in the front of the cursor into the input display bar.

⑤ Tip the required input method in the input method bar, and then tip the “Common” button to pop up the dialog box. The common used units can be selected in the dialog box directly

⑥ Operating buttons:

Tip the “＜--” button to move the cursor left.

Tip the “--＞” button to move the cursor right.

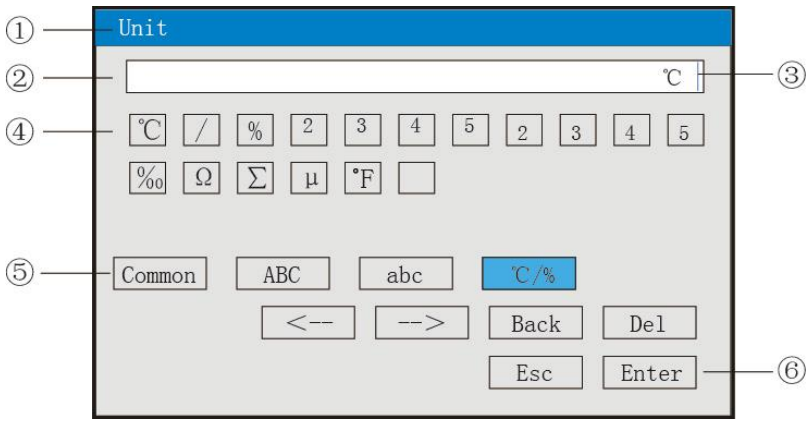
Tip the “Back” button to delete the content in front the cursor.

Tip the “Del” button to delete the content behind the cursor.

Tip the “Enter” button to confirm the content input and exit from the dialog box.

Tip the “Esc” button to exit from the dialog box.

5.6 Special unit input method



① Parameter name: Display the current modified parameter name.

② Input display bar: Display the modified parameters. Tip the parameter content, and the cursor is displayed. Then tip the operation buttons and the soft keyboard to modify the parameter where the cursor is located.

③ Cursor: Tip the operation buttons to move the cursor to select the modification site. Or, tip any site of the parameter, and the cursor will moves to the site.

④ Soft keyboard: Display the 16 special units and one space key. Tip any unit and the unit will be entered in the front of the cursor into the input display bar.

⑤ Tip the required input method in the input method bar.

⑥ Operating buttons (ditto).

VI. Communication

This instrument can communicate to the master. The master can finish the parameter setting, data capture and supervisory control for this slave. Used with the industrial control software , this instrument can realize dynamic image display, instrument data settings, chart generation, data recording and report printing under the WINDOWS of the Chinese version. The host management software manufactured by the manufacturer can also be used to achieve real-time data and curve capturing, record historic data and curves, and export the historic data and curves to the Excel for processing.

The instrument provides three standard ports, RS-232, RS-485 and EtherNet to achieve the communication between the instrument and the host.

★ If the RS-232 communication port is used, only one recorder can communicate with

the host. This communication method is applicable for users using the portable recorder to read the data in the record randomly. This port is also can be used to connect to the wireless digital transmission radio station for remote wireless transmission, or to connect to the micro serial printer to print data and curves.

★ If the RS-485 communication port is used, several recorders are allowed to communicate with the host. This communication method is applicable for making a network between the user's terminal instruments and the recorder to receive recorder data in real time, and connecting to all kinds of control systems.

★ If the EtherNet communication is used, several recorders are allowed to be connected to the host for data exchange at a 10M communication rate. It is applicable for the extensive data communication between the terminal instrument and recorder. If the communication distance exceeds 300 m, the communication can be achieved by fiber optic network. Select the IP address in the recorder system configuration, perform corresponding settings in the computer management software, and the EtherNet communication can be achieved.

Refer to the Table 1 and Table 2 for specific parameters.

Table 1: Input Register Addresses Corresponding to 0x04 Read Command

No.	Input register address (Decimal)	Parameter name	Data format	Type	Note
Dynamic variables					
1	00	Measurement value of channel 1	Float	R	
2	02	Measurement value of channel 2	Float	R	
.....	.....	.....	Float	R	
.....	2(n-1)	Measurement value of channel n	Float	R	n: channel number
.....	.....	.....	Float	R	
97	192	Measurement value of channel 97	Float	R	
98	194	Measurement value of channel 98	Float	R	
99	220	Output status of contact 1	short	R	The 0 - 15 bits represent the

					output status of the contact 1 - contact 16 respectively. 0: Open 1: Closed
100	221	Output status of contact 2	short	R	The 0 - 3 bits represent the output status of the contact 17 - contact 20 respectively. 0: Open 1: Closed

Table 2: Holding Register Addresses Corresponding to 0x03 Read Command and 0x06 and 0x10 Write Commands

No.	Input register address (Decimal)	Parameter name	Data format	Type	Note
Instrument model					
1	0	Instrument model	Char	R	Lower byte: paperless record 0x62 High byte: Version No.= 2
System parameters					
1	1	Language selection	Char	R/W	0: Chinese 1: English
2	2	1st and 2nd characters of instrument name	Short	R/W	
3	3	3rd and 4th characters of instrument name	Short	R/W	
4	4	5th and 6th characters of the instrument name	Short	R/W	
5	5	7th and 8th characters of the instrument name	Short	R/W	
6	6	9th and 10th characters of the instrument name	Short	R/W	
7	7	11th and 12th characters of the instrument name	Short	R/W	
8	8	13th and 14th characters of the instrument name	Short	R/W	NOTE: The 14th character must be 0
9	9	Cold junction adjustment	Short	R/W	The communication value is ten times bigger than the adjustment value. For example, if the cold junction adjustment value is -1.0, the communication value would be -10.
10	10	Treatment of interruption	Char	R/W	

11	11	Alarm E-mail	Char	R/W	
12	12	Alarm print	Char	R/W	
13	13	Print interval	Short	R/W	
14	14	Print start time (h)	Char	R/W	
15	15	Print start time (min)	Char	R/W	
16	16 - 29	Reserved		R/W	
Input channel parameters					
17	30	Input channel No.	Char	R/W	Analog channel: 0 - 97 Digital channel: 100 - 105 (NOTE 1)
18	31	1st and 2nd of the bit	Short	R/W	Refer to "Channel Parameters"in the instrument user manual.
19	32	3rd and 4th of the bit	Short	R/W	
20	33	5th and 6th of the bit	Short	R/W	
21	34	7th and 8th of the bit	Short	R/W	
22	35	9th and 10th of the bit	Short	R/W	
23	36	11th and 12th of the bit	Short	R/W	
24	37	13th and 14th of the bit	Short	R/W	NOTE: The 14th character must be 0
25	38	Input type	Char	R/W	
26	39	1st and 2nd characters of unit	Short	R/W	
27	40	3rd and 4th characters of the unit	Short	R/W	
28	41	5th and 6th characters of the unit	Short	R/W	
29	42	7th and 8th characters of the unit	Short	R/W	NOTE: The 8th character must be 0
30	43	Channel decimal	Char	R/W	
31	44	Lower range limit	Float	R/W	
32	46	Upper range limit	Float	R/W	
33	48	Accumulation function	Char	R/W	
34	49	Filtering coefficient	Char	R/W	
35	50	Small signal cutting	Short	R/W	Ten times bigger than the parameter value.
36	51	Linear modification scaling factor k	Float	R/W	Refer to "Channel Parameters" in the instrument user manual.
37	53	Linear modification zero-point coefficient b	Float	R/W	
38	55	Alarm type	Char	R/W	0: Lowest limit 1: Lower limit 2: Upper limit 3: Uppermost limit (NOTE 2)
39	56	Alarm function	Char	R/W	0: OFF 1: ON
40	57	Alarm contact	Char	R/W	

41	58	Alarm value	Float	R/W	
42	60	Alarm return difference	Float	R/W	
43	62 - 69	Reserved			
Transmitting output parameters					
44	70	Output channel NO.	Char	R/W	Value range: 0 - 13 (NOTE 3)
45	71	Input channel	Char	R/W	Refer to "Output Parameters" in the instrument user manual.
46	72	Output type	Char	R/W	
47	73	Lower limit of output	Float	R/W	
48	75	Upper limit of output	Float	R/W	
49	77	Output modification scaling coefficient k	Float	R/W	
50	79	Output modification zero-point coefficient b	Float	R/W	
51	81 - 89	Reserved			
Display parameters					
52	90	Turn off LCD	Char	R/W	
53	91	Loop display interval	Char	R/W	
54	92	Startup screen	Char	R/W	
55	93	Curve group No.	Char	R/W	0 - 19, including 20 curve groups
56	94	Enable or disable	Char	R/W	
57	95	Curve No.	Char	R/W	0 - 5; Six curves are included in one group.
58	96	Channel types corresponding to curves	Char	R/W	
59	97	Channel No. corresponding to curves	Char	R/W	
60	98	Display curve or not	Char	R/W	
61	99	Curve color	Char	R/W	
Record parameters					
62	100	Record mode	Char	R/W	Refer to "Record Parameters" in the instrument user manual.
63	101	Record interval	Char	R/W	
64	102	Record type	Char	R/W	
65	103	Power-on record	Char	R/W	
66	104	Record triggering	Char	R/W	
67	105	Manual triggering	Char	R/W	
68	106	Input channel for alarm triggering	Char	R/W	
69	107	Alarm type of alarm triggering	Char	R/W	
70	108	Relay for relay triggering	Char	R/W	
71	109	Start of timed triggering: h	Char	R/W	

72	110	Start of timed triggering: min	Char	R/W	
73	111	Start of timed triggering: sec	Char	R/W	
74	112	End of timed triggering: h	Char	R/W	
75	113	End of timed triggering: min	Char	R/W	
76	114	End of timed triggering: sec	Char	R/W	
77	115～119	Reserved			
Serial port parameters					
78	120	Local address	Char	R/W	
79	121	Baud rate	Char	R/W	0 - 5 represents the 1200, 2400, 4800, 9600, 19200 and 38400 successively.
80	122	Data bit	Char	R/W	0 - 3: 5 bits, 6 bits, 7 bits and 8 bits
81	123	Check bit	Char	R/W	0 - 2: No check, ODD check, and EVEN check
82	124	Stop bit	Char	R/W	位 0 - 2: 1 bit, 1.5 bits and 2 bits
83	125	Byte order	Char	R/W	0 - 3: 1-2 3-4, 2-1 4-3, 3-4 1-2, 4-3 2-1
84	126 - 129	Reserved			
EtherNet parameters					
85	130	IP address getting methods	Char	R/W	0: manual; 1: Auto
86	131	1st and 2nd bytes of IP address	Short		For example, if the IP address is 192.168.100.2, the two bytes of register address from low to high are 192 and 168 respectively.
87	132	3rd and 4th characters of the IP address	Short	R/W	As the example above, the two bytes of the register address from low to high are 100 and 2 respectively.
88	133	1st and 2nd bytes of subnet mask	Short	R/W	For example, if the subnet mask is 255.255.255.0, the two bytes of register address from low to high both will be 255 respectively.
89	134	3rd and 4th bytes of subnet mask	Short	R/W	As the example above, the two bytes of the register address from low to high are 255 and 0 respectively.

90	135	1st and 2nd bytes of the default gateway	Short	R/W	For example, if the default gateway is 192.168.1.1, the two bytes of register address from low to high are 192 and 168 respectively.
91	136	3rd and 4th bytes of the default gateway	Short	R/W	As the example above, the two bytes of the register address from low to high are 1 and 1 respectively.
92	137	DNS getting methods	Char	R/W	0: manual; 1: Auto
93	138	1st and 2nd bytes of the preferred DNS	Short	R/W	For example, if the preferred DNS is 252.34.100.13, the two bytes of register address from low to high would be 252 and 34 respectively.
94	139	3rd and 4th bytes of the preferred DNS	Short	R/W	As the example above, the two bytes of the register address from low to high are 100 and 13 respectively.
95	140	1st and 2nd bytes of the alternative DNS	Short	R/W	For example, if the alternative DNS is 252.34.100.13, the two bytes of register address from low to high would be 252 and 34 respectively.
96	141	3rd and 4th bytes of the alternative DNS	Short	R/W	As the example above, the two bytes of the register address from low to high are 100 and 13 respectively.
97	142	Serial numbers of the receiving mailboxes	Char	R/W	0 - 2, supports three receiving mailboxes.
98	143	1st and 2nd characters of the first receiving mailbox	Short	R/W	Refer to “Network Parameters” in the instrument user manual.
99	144	3rd and 4th characters of the first receiving mailbox	Short	R/W	
100	145	5th and 6th characters of the first receiving mailbox	Short	R/W	
101	146	7th and 8th characters of the first receiving mailbox	Short	R/W	
102	147	9th and 10th characters of the first receiving mailbox	Short	R/W	
103	148	11th and 12th characters of the first receiving mailbox	Short	R/W	
104	149	13th and 14th characters of the first receiving mailbox	Short	R/W	
105	150	15th and 16th characters of the first receiving mailbox	Short	R/W	
106	151	17th and 18th characters of the	Short	R/W	

		first receiving mailbox			
107	152	19th and 20th characters of the first receiving mailbox	Short	R/W	
108	153	21th and 22th characters of the first receiving mailbox	Short	R/W	
109	154	23th and 24th characters of the first receiving mailbox	Short	R/W	
110	155	25th and 26th characters of the first receiving mailbox	Short	R/W	
111	156	27th and 28th characters of the first receiving mailbox	Short	R/W	
112	157	29th and 30th characters of the first receiving mailbox	Short	R/W	
113	158	31th and 32th characters of the first receiving mailbox	Short	R/W	NOTE: The 32th character must be 0
114	159	1st and 2nd characters of the sending mailbox	Short	R/W	Refer to “Network Parameters” in the instrument user manual.
115	160	3rd and 4th characters of the sending mailbox	Short	R/W	
116	161	5th and 6th characters of the sending mailbox	Short	R/W	
117	162	7th and 8th characters of the sending mailbox	Short	R/W	
118	163	9th and 10th characters of the sending mailbox	Short	R/W	
119	164	11th and 12th characters of the sending mailbox	Short	R/W	
120	165	13th and 14th characters of the sending mailbox	Short	R/W	
121	166	15th and 16th characters of the sending mailbox	Short	R/W	
122	167	17th and 18th characters of the sending mailbox	Short	R/W	
123	168	19th and 20th characters of the sending mailbox	Short	R/W	
124	169	21th and 22th characters of the sending mailbox	Short	R/W	
125	170	23th and 24th characters of the sending mailbox	Short	R/W	
126	171	25th and 26th characters of the sending mailbox	Short	R/W	
127	172	27th and 28th characters of the sending mailbox	Short	R/W	

128	173	29th and 30th characters of the sending mailbox	Short	R/W	
129	174	31th and 32th characters of the sending mailbox	Short	R/W	NOTE: The 32th character must be 0
130	175	1st and 2nd characters of the sending server	Short	R/W	Refer to “Network Parameters” in the instrument user manual.
131	176	3rd and 4th characters of the sending server	Short	R/W	
132	177	5th and 6th characters of the sending server	Short	R/W	
133	178	7th and 8th characters of the sending server	Short	R/W	
134	179	9th and 10th characters of the sending server	Short	R/W	
135	180	11th and 12th characters of the sending server	Short	R/W	
136	181	13th and 14th characters of the sending server	Short	R/W	
137	182	15th and 16th characters of the sending server	Short	R/W	
138	183	17th and 18th characters of the sending server	Short	R/W	
139	184	19th and 20th characters of the sending server	Short	R/W	
140	185	21th and 22th characters of the sending server	Short	R/W	
141	186	23th and 24th characters of the sending server	Short	R/W	
142	187	25th and 26th characters of the sending server	Short	R/W	
143	188	27th and 28th characters of the sending server	Short	R/W	
144	189	29th and 30th characters of the sending server	Short	R/W	
145	190	31th and 32th characters of the sending server	Short	R/W	NOTE: The 32th character must be 0
146	191	1st and 2nd characters of the sending user name	Short	R/W	
147	192	3rd and 4th characters of the sending user name	Short	R/W	
148	193	5th and 6th characters of the sending user name	Short	R/W	
149	194	7th and 8th characters of the sending user name	Short	R/W	

150	195	9th and 10th characters of the sending user name	Short	R/W	
151	196	11th and 12th characters of the sending user name	Short	R/W	
152	197	3th and 14th characters of the sending user name	Short	R/W	
153	198	15th and 16th characters of the sending user name	Short	R/W	
154	199	17th and 18th characters of the sending user name	Short	R/W	
155	200	19th and 20th characters of the sending user name	Short	R/W	
156	201	21th and 22th characters of the sending user name	Short	R/W	
157	202	23th and 24th characters of the sending user name	Short	R/W	NOTE: The 24th character must be 0
158	203 - 209	Reserved			

NOTE 1: The parameters of 98 analog input channels and six digital input channels are saved in one register address, and the input channel number (register address 30) can be used to determine which channel the parameter belongs to. Therefore, to read and write parameters of a channel, you should write the input channel number in advance.

NOTE 2: Each channel has four alarm types, the lowest limit alarm, lower limit alarm, upper limit alarm and the uppermost limit alarm that share one register address. The alarm type (register address 55) can be used to determine which type the parameter belongs to. Therefore, to read and write alarm parameters of an input channel, you should write the alarm type in advance.

NOTE 3: The parameters of 18 transmitting channels are saved in one register address and the transmitting channel number (register address 70) can be used to determine which channel the parameter belongs to. Therefore, to read and write parameters of a transmitting channel, you should write the transmitting channel number in advance.

VII. Instrument Accessories

Name	Quantity	Note
Instructions for use	1	User manual
Certificate	1	Manufacture date

Installation brackets	4	Used for panel installing and fixing.
USB drive	1	Capacity 16G
SD card	1	Capacity 16G

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