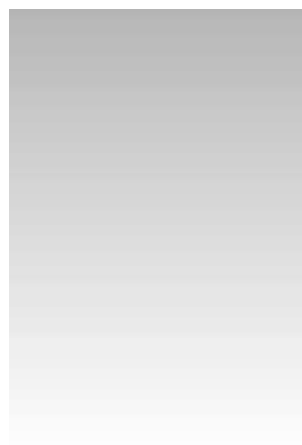




HUATO

User's Guide



S1500 paperless recorder Data Logger Operational Instructions



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Introduction

Serial number	Version number	Document number	Revision date
1	V1.0		



Attentions

1) If there is water on the shell of the recorder, do not pull and insert USB, type-C, sensor and USB flash disk, so as to prevent the electronic circuit from short circuit in case of water. Short circuit may cause damage to the instrument..

2)The recorder adopts ABS + PC synthetic engineering plastic, which is comfortable to handle, scratch resistant, durable and easy to scrub and clean. In case of failure, it must be repaired by authorized professionals. Please do not repair or refit yourself.

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Section 1 Product Introductions

1.1 Introductions

S1500 Series portable multi-channel thermocouple data logger with Graphical touch screen, supports up to 16 channels input and multiple thermocouple types working simultaneously. This logger enables real-time data viewing of multi-channels on device and web page through RJ45 LAN synchronously. It is an integrated and intelligent recorder. It also has the functions of external data transfer, web page viewing, WiFi Feature and so on.

1.2 Appearance



1.3 Features

1. Support multi-channel input and up to 16 channel thermocouple input.
2. Support multiple types of Thermocouple Input: K / J / E / T / R / S / N / B / C;
Wide temperature detection range : - 270 ~ 2320 °C.
3. The fastest sampling frequency can reach 1s.
4. It has the function of viewing real-time data curve and historical data curve.
5. Large data storage capacity, Single record capacity:100000 records;
total data recording eapacity:8million records.
6. A variety of external interfaces,support U disk and SD card to export the historical data,meet various needs of users.
7. Support USB flash disk and SD card to upgrade the program, which is convenient for users.

1.4 Models

Models	Function description
S1508T	8 Channels thermocouple Logger
S1512T	12 Channels thermocouple Logger
S1516T	16 Channels thermocouple Logger

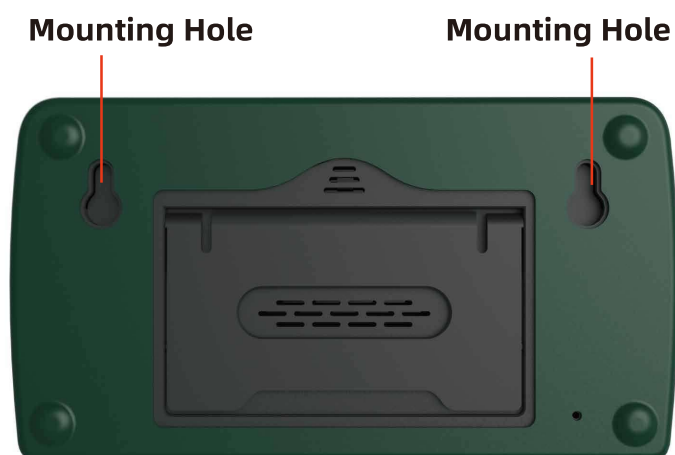
1.5 Applications

- Handheld Mode



- Wall Hanging Mode

The device is suspended on the wall by two hanging holes on the back of the device.

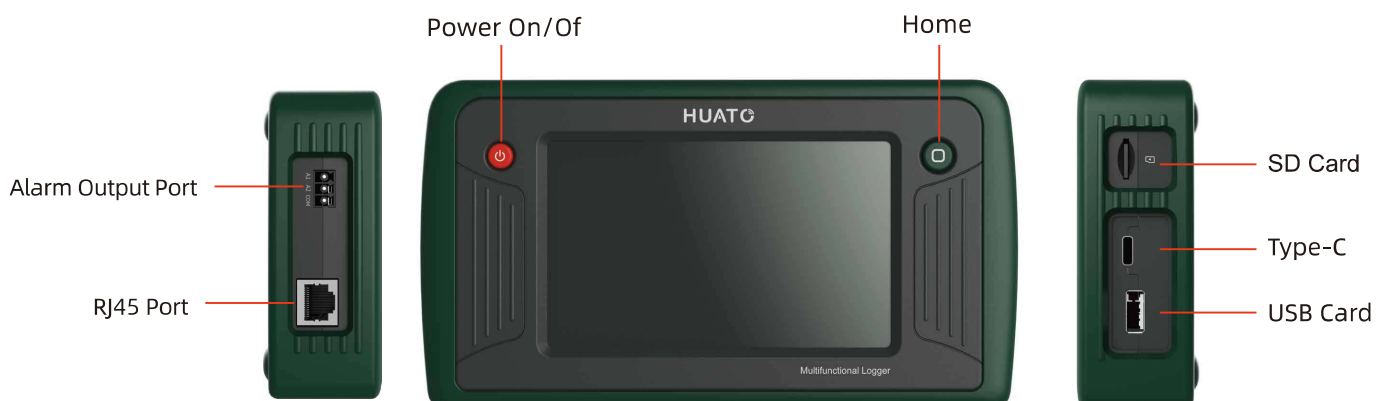


- Tabletop Kickstand

Use the supporting plate on the back to make the device stand on the desktop

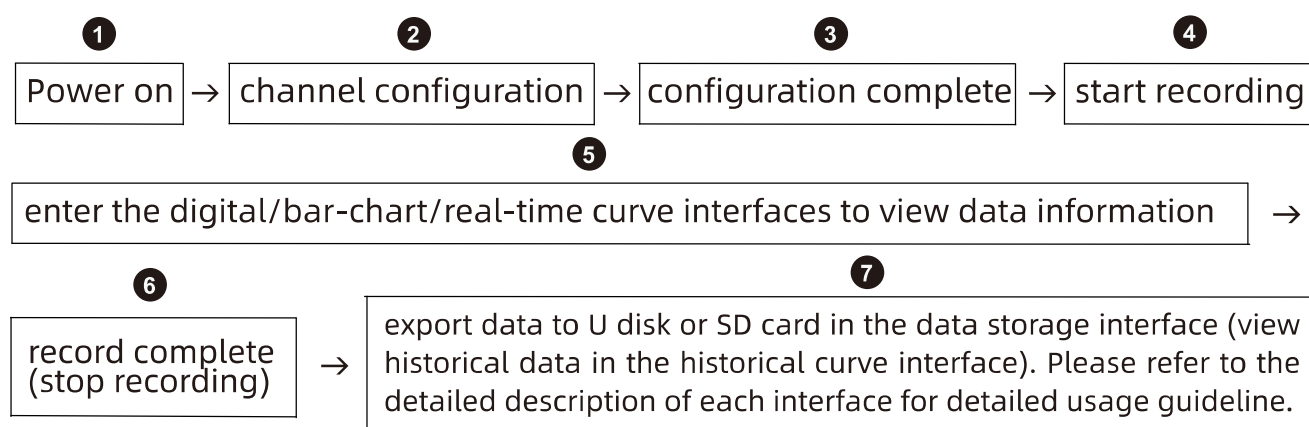


1.6 Buttons and Ports



Button/Ports	Details
Power button	To power on and power off the device, hold down the Powerbutton for a few seconds.
HOME button	The Home button will return the user to the home screen
TYPE-C port	1、To charge the internal rechargeable lithium battery 2、To serve as power supply to the device and save its battery's power. (It can only be used for charging, not transmitting data)
USB 2.0 port	1、To transfer the internal data to the U disk. The format of transfer file is CSV. 2、The main board can be upgraded through U disk.
SD card port	1、Internal data can be transferred to SD card. 2、The main board can be upgraded through SD card.
RJ45 port	The device can be used as a web server and the real-time data can be viewed through the web page.
Alarm output port	Support 2-way optocoupler open-drain alarm output

1.7 Operational Steps



Note: Please configure the channels before starting recording, otherwise cannot view digits/bar charts/real-time curves may not show correctly in corresponding interfaces.

1.8 Technical Specifications

1.8.1 General Specifications

Main parameters	
Dimensions	189.3*103.5*39mm (With Protection)
Display	5 inch capacitive touch screen, resolution 800 * 480
Number of channels	8-channel/12-channel/16-channel thermocouple input
Storage capacity	Single record capacity: 100000 records ; Total data recording capacity: 8 million records
Internal storage	32GB
External transfer	U disk (standard USB2.0 communication interface), SD card
Ethernet	Transmission rate: 10m / 100M bit / s , full duplex and half duplex
Battery capacity	5000mAh
Battery life	One quick charge per day, 3-5 years life time
Battery type	Rechargeable lithium battery pack
Battery working hours	5 ~ 8 hours, the actual working time is related to the brightness of the display screen and the setting of sampling time
Sampling frequency	Fastest 1s
Recording frequency	Fastest 1s
Data format	CSV file format
Working temperature	-10-50°C
Storage temperature	-20-60°C
Relative temperature	5% - 95% RH, no condensation
Shell material	PC + ABS material and The protective sleeve is made of 68 degree silicone

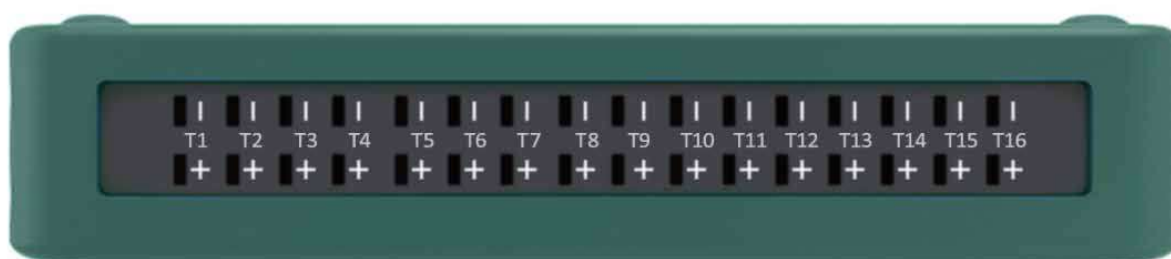
1.8.2 Input Signal

Thermocouple input (excluding cold end error), accuracy excluding cold end compensation error, cold end compensation error: $\pm 1.5^{\circ}\text{C}$

Type	Measuring range ($^{\circ}\text{C}$)	Resolution($^{\circ}\text{C}$)	Maximum allowable error ($^{\circ}\text{C}$)
K	-270 to +1370 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 0.5^{\circ}\text{C}$ (probe dependent)
J	-200 to +760 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 0.5^{\circ}\text{C}$ (probe dependent)
E	-270 to +980 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 0.5^{\circ}\text{C}$ (probe dependent)
T	-270 to +400 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 0.5^{\circ}\text{C}$ (probe dependent)
R	-50 to +1760 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 2^{\circ}\text{C}$ (probe dependent)
S	-50 to +1760 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 2^{\circ}\text{C}$ (probe dependent)
N	-270 to +1300 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 2^{\circ}\text{C}$ (probe dependent)
B	600 to +1820 $^{\circ}\text{C}$ (probe dependent)	0.01	$\pm 2^{\circ}\text{C}$ (600~1820) (probe dependent)
C	0 to +2320 $^{\circ}\text{C}$ (probe dependent)	0.01	< 425 $^{\circ}\text{C}$: $\pm 4.5^{\circ}\text{C}$, 425-2320 $^{\circ}\text{C}$:1.0% (probe dependent)

1.8.3 Connection Mode

The following picture shows the input port of the thermocouple, the insertion mode is shown in the interface diagram.

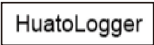
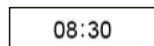


Section 2. Attentions

1. The system time cannot be changed during recording.
2. After the data is transferred, the internal stored data will not be deleted automatically and needs to be deleted manually.
3. Please turn off the equipment when it is not used for a long time.
4. When the power display is red, it indicates that the battery is lower than 10%, and the countdown is more than 20 seconds. It will shut down automatically.
5. Do not block the cooling hole when using, so as not to affect the performance of the equipment.
6. When the internal storage has been used to 90% ~ 97%, following prompt: prompt:The device memory is over 90%,move or delete stored data before continuing.
When 100% is used, following prompt:The device memory is 100% full,move or delete stored data before continuing.
7. When connecting the signal wire, please connect it according to the wiring diagram, and pay attention to distinguish the positive and negative poles.
8. When the internal storage prompt is insufficient, please clean up the internal storage data in time. If the storage is full, the first recorded data will be overwritten by the later recorded data.
9. Do not cover the cold end compensation hole when in use (especially when holding, do not cover the cold end compensation hole with your fingers), otherwise the accuracy of measurement data will be affected.
10. Alarm backlash can only enter a value greater than or equal to 0
11. Frequently switching on and off the machine may lead to the disordered code state of the screen pixels of the instrument. If there is, restart the instrument to recover.
12. The accuracy of equipment time will decrease with time, and the time error is ± 1 minute / month.

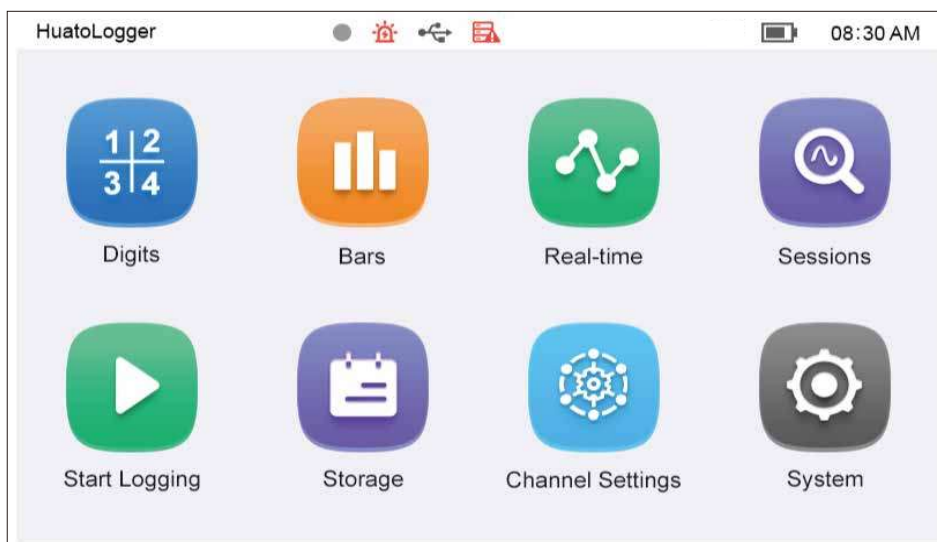
Section 3 Interface and function description

3.1 Menu Bar

-  **(1) Device Name:**
User defined, 24 characters, LOGGER by default.
-  **(2) Recording status indicator**
Standby: gray;
Recording / auto stop: green flashing;
Delay recording: yellow flashing.
-  **(3) Alarm prompt:**
This icon appears when there is alarm information; when the device is normal or enters the alarm interface.
After viewing the alarm information, the alarm prompt icon disappears.
-  **(4) U disk prompt:**
The icon will be displayed after the U disk is inserted and successfully identified. The icon will disappear after the U disk is pulled out.
-  **(5) SD card prompt:**
After the SD card is inserted and successfully identified, the icon will be displayed. After the SD card is pulled out, the icon will disappear.
-  **(6) Storage status prompt:**
When the percentage of internal storage reaches 90%, the storage icon becomes yellow. The percentage reaches 100%, the icon becomes red. The icon does not display unless the percentage of storage >90%.
-  **(8) Power prompt:**
The current battery power is displayed in real time. The symbol is black when normal; yellow when the power is less than 20% and more than 10%, to remind the user to charge; red when the power is less than 10%, and there is a charging symbol when charging.
-  **(9) System time indication:**
It is expressed in the form of hour and minute, and the second is prompted by the flashing colon. Set 12h to display PM, and set 24h not to display PM.

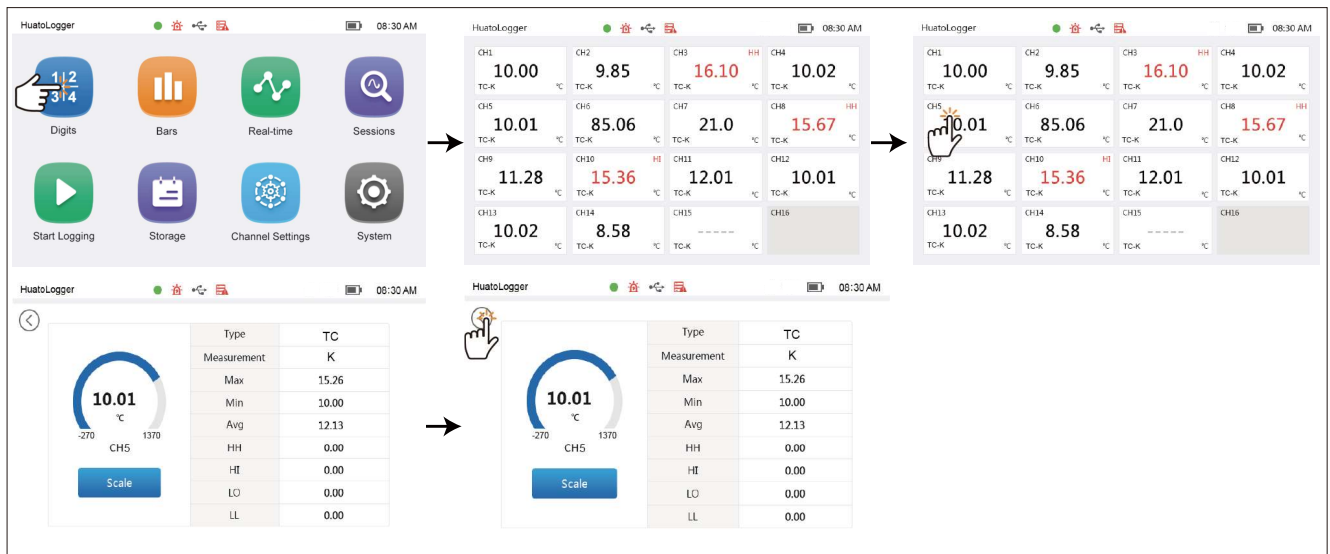
3.2 Main interface

The main interface displays 8 function icons: digital display, bar chart screen, real-time curve, historical curve, start / stop recording, data storage, channel setting and system setting.



3.3 Digital Display

- Click digital display in the main interface to enter the digital display interface. The digital display interface displays each channel number (CH1~CH16), corresponding value (up to 6 digits), unit (° F, ° C) and alarm status (HH/HI/LO/LL). For over limit alarm, the font display is marked in red. The red color of HI and LO alarm status does not flash, and the red color of HH and LL alarm status flashes.
- Click the corresponding channel to view the detailed information of the channel. The detailed information of the instrument panel includes the upper and lower limits of the range, the real-time value, the unit and the channel number. The information on the right side of the instrument panel includes the channel type, the upper and lower limits of the range, the maximum value, the minimum value, the average value and the corresponding value of each alarm type. Click "scale" to clear the value (click carefully), and click the arrow icon in the upper left corner to return to the digital display interface.
- When the channel is disconnected, it is indicated by "-----". When the channel is not configured, there is no data display.



Digital display

3.4 Bar Chart Screen

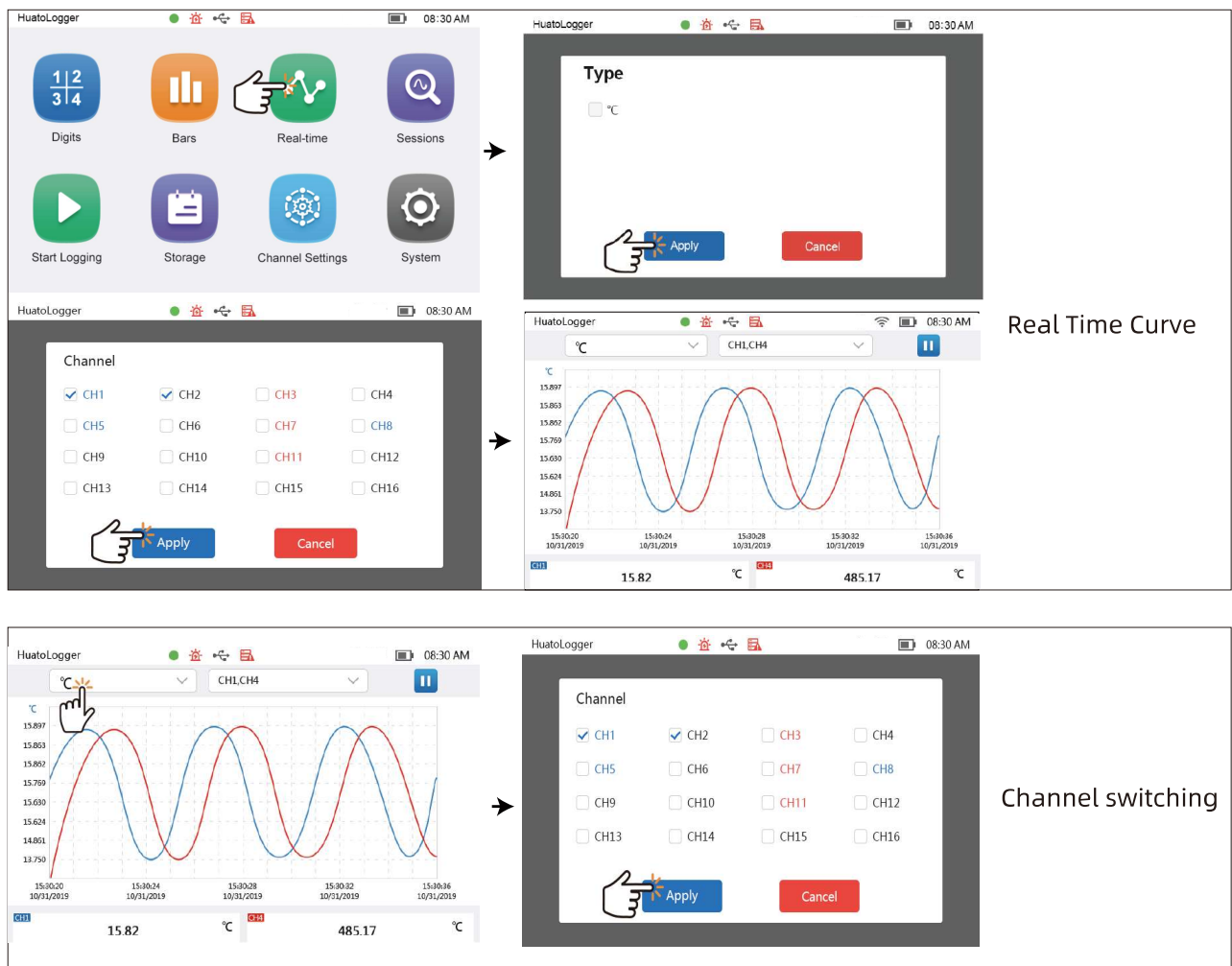
- Click the bar graph screen in the main interface to enter the bar graph display interface. The bar graph display interface has two arrangement modes: 1 * 8 and 1 * 6. The arrangement mode is automatically switched according to the number of channels of the equipment.
- The channel number (ch1 ~ ch16), real-time value, unit, upper and lower limits of signal and alarm status of analog input are displayed. When the value is normal, it will be blue, and when the value exceeds the limit, it will be red.
- When there are two pages displayed, there are two small circles at the bottom, and the small circle filled represents the current page. Click the arrow on the right side of the interface to turn the page.



Bar chart screen

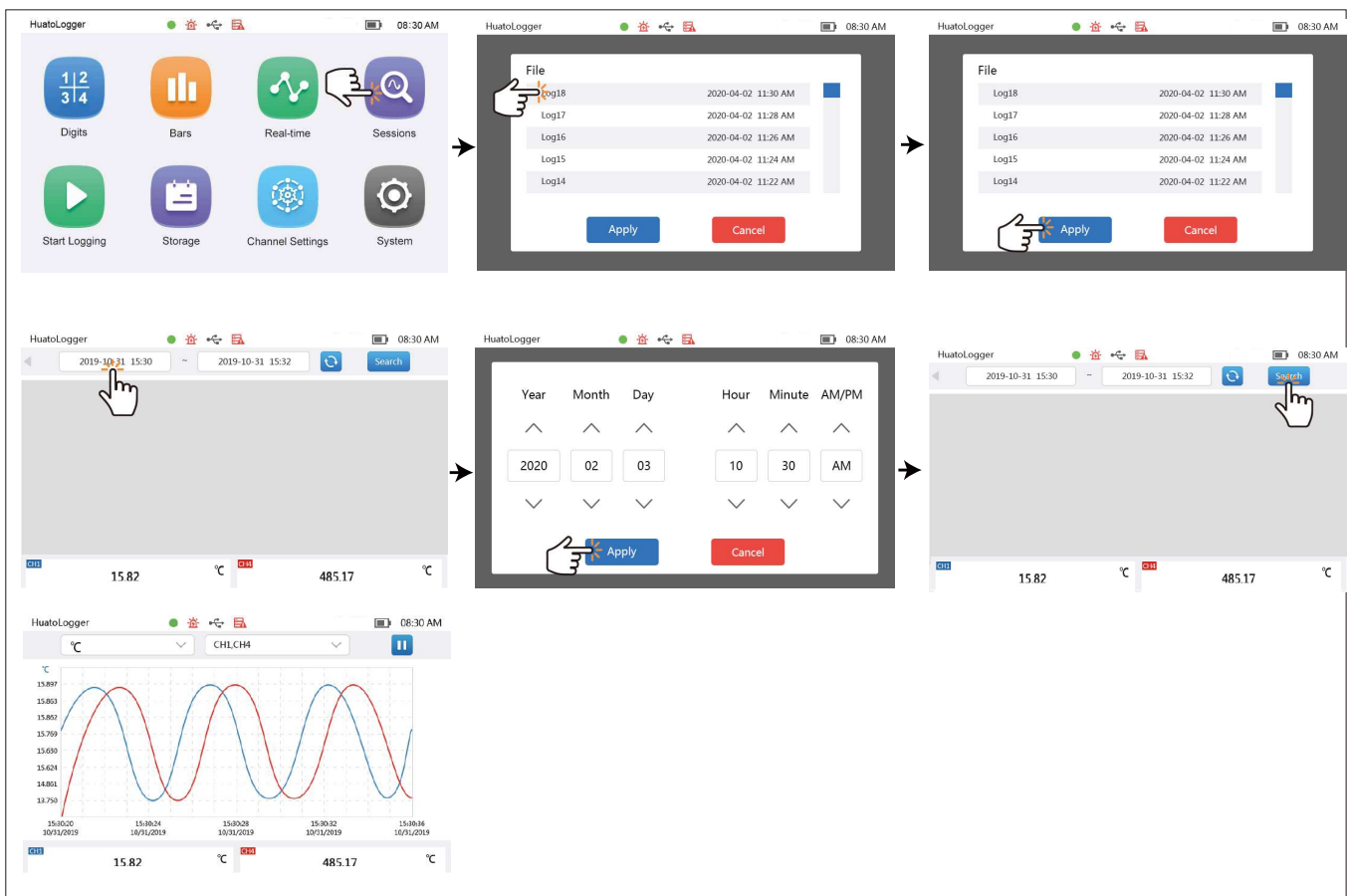
3.5 Real Time Curve

- As shown in the figure below, from left to right at the top of the interface are: unit selection, channel selection, start / pause icon. The bottom is the channel number and the latest real-time value. The color of the channel number is the same as that of the corresponding channel curve, and the bottom channel unit is corresponding to the left and right ordinates.
- Unit selection:** click the type selection drop-down arrow to open the type selection interface. Click the box in front of the type to check the type to be displayed, and then click apply. At most, two different type can be checked to display at the same time.
- Channel selection:** click the channel selection drop-down arrow to open the channel selection interface. Click the box in front of the channel to check the channel to be displayed, and then click apply. You can only check 6 corresponding channels at most.
- Start / pause:** click the start / pause icon. At the beginning, the real-time curve will be updated in real time. When pausing, the real-time curve will stop on the current page and will not be updated.



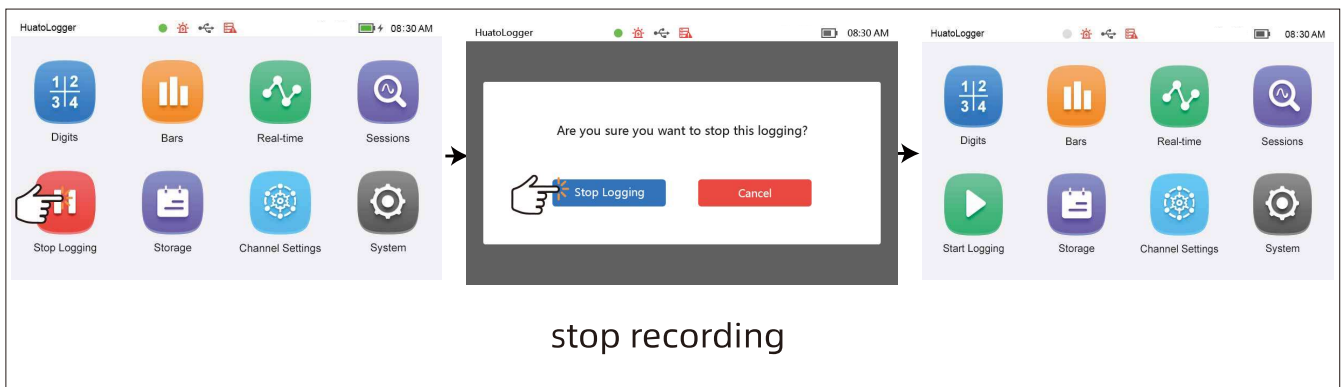
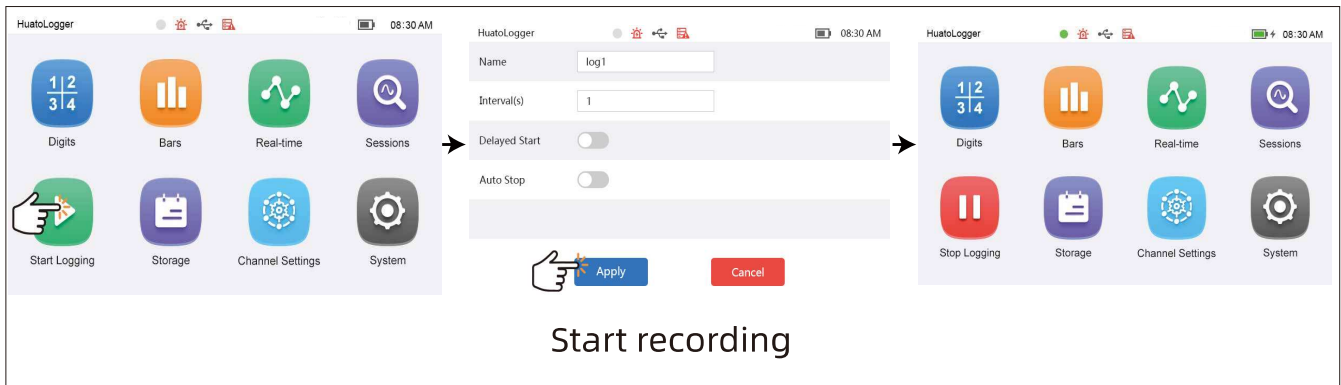
3.6 Historical Curve

- As shown in the figure below, from left to right at the top of the interface are: record file selection, unit selection, channel selection; channel number and maximum / minimum value are displayed at the bottom (click the channel box to switch the maximum and minimum values), the digits' color of channel in box is consistent with the curve's color of corresponding channel, and the unit at the bottom is consistent with the left and right ordinate unit.
- Click the right arrow in the upper right corner to set the start and end time of data query, click the refresh symbol to refresh the data, and click search to search the historical data.
- The mode of unit and channel selection is the same as that of real-time curve.
- File selection is shown in the figure below, slide up and down the right slider to view the file, click the file you want to select, and then click apply.
- Time selection is shown in the figure below. Click the up and down arrows to set the time. Click apply to confirm the set time.



Historical Curve

3.7 Start / stop recording



- (1) Record file name: customizable, up to 24 bytes. The default is Log1, log2 .
- (2) Recording interval: customizable, the shortest is 1s the recording interval cannot be less than the sampling interval, and the longest is 86400s (24h).
- (3) Delayed start: click the on / off icon to turn on / off the delayed start. The delayed start time can be set when it is turned on.
- (4) Auto stop: click the on / off icon to turn on / off auto stop. When it is turned on, you can set the time of auto stop.

Set record

After setting the corresponding information, click apply to start recording, click Cancel to cancel the operation, and then return to the main interface.

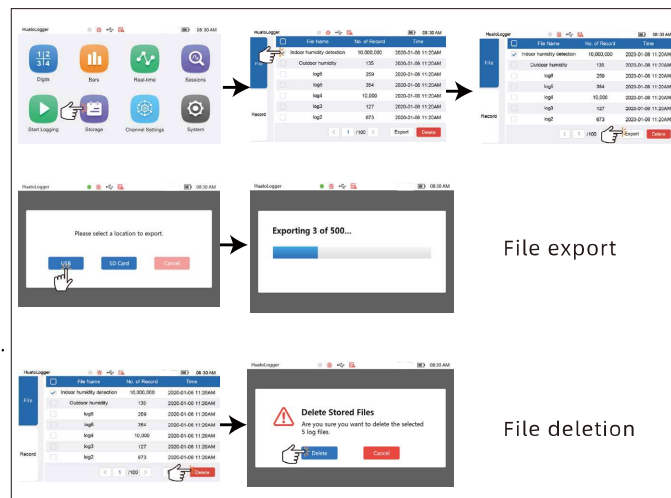
After starting recording, if return to the main interface, the start recording icon will becomes the stop recording icon. Click the stop recording icon to pop up the stop recording pop-up window.

3.8 Data Storage

3.8.1 Record documents

Click the box in front of the file to check the corresponding file. Click the top box to check all the files on the current page. Record the corresponding information at the bottom of the file interface

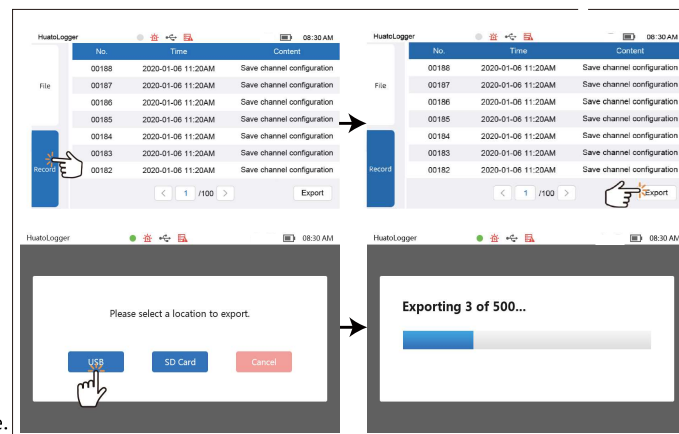
- (1) SD card: select the data of the SD card
- (2) Page forward
- (3) Current page number: Click to enter the page number you want to jump to.
- (4) Total number of pages
- (5) Page backward
- (6) Transfer (Export): Click this icon, the transfer method (USB, SD card) will pop up. Click the pop-up window and select the corresponding method.
- (7) Delete: Click Delete, a confirmation pop-up window will pop up to confirm whether you want to delete.



3.8.2 Operation log

Information at the bottom of the operation log interface:

- (1) Page forward
- (2) Current page number: Click to enter the page number you want to jump to.
- (3) Total pages
- (4) Page back
- (5) Transfer (export): click this icon to export the records of all historical operation logs to U disk or SD card in CSV format. The transfer mode (USB, SD card) pop-up window will pop up. Select the corresponding mode.



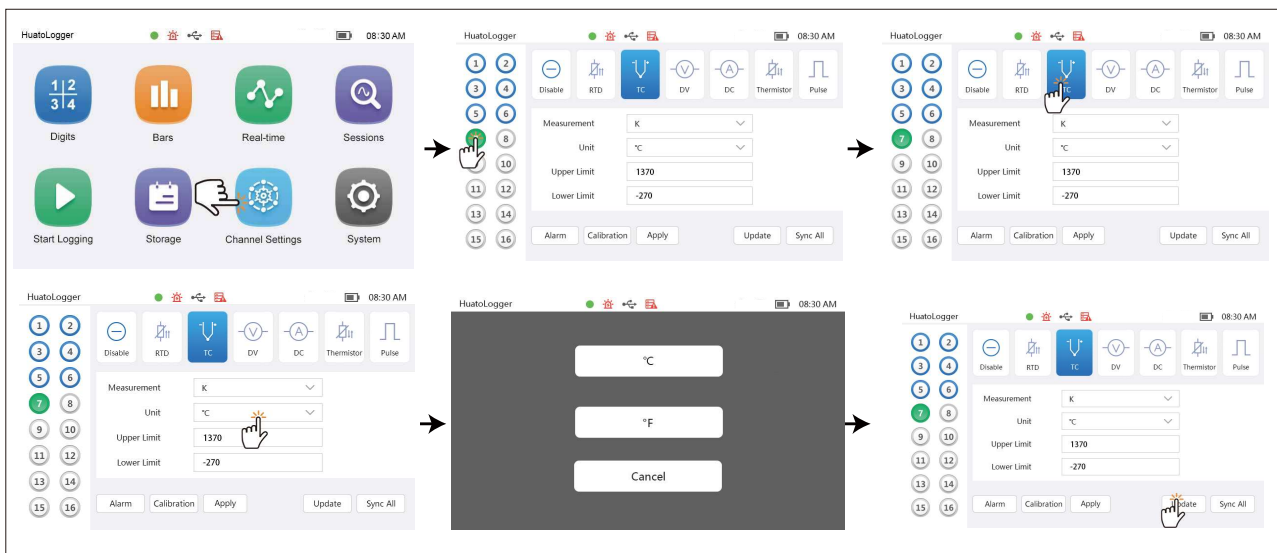
3.9 Channel Setting

The numbers on the left side of the channel setting ports are CH1 ~ CH16, Channel disabled / channel not configured: Ring gray; Channel configured successfully: Ring Blue; Currently selected channel: Green filling.

The icon on the top of the interface is signal type, which indicates from left to right: Disabled (the channel is not used), RTD (PT100), TC (thermocouple), DC voltage, DC current, thermistor, pulse (only used on channel 1).

The four icons at the bottom of the interface from left to right are: alarm, calibration, update and synchronization.

In channel settings, after clicking synchronize all, you must click the update button. If you need to exit the channel setting, exit after about 1s after clicking the update button.



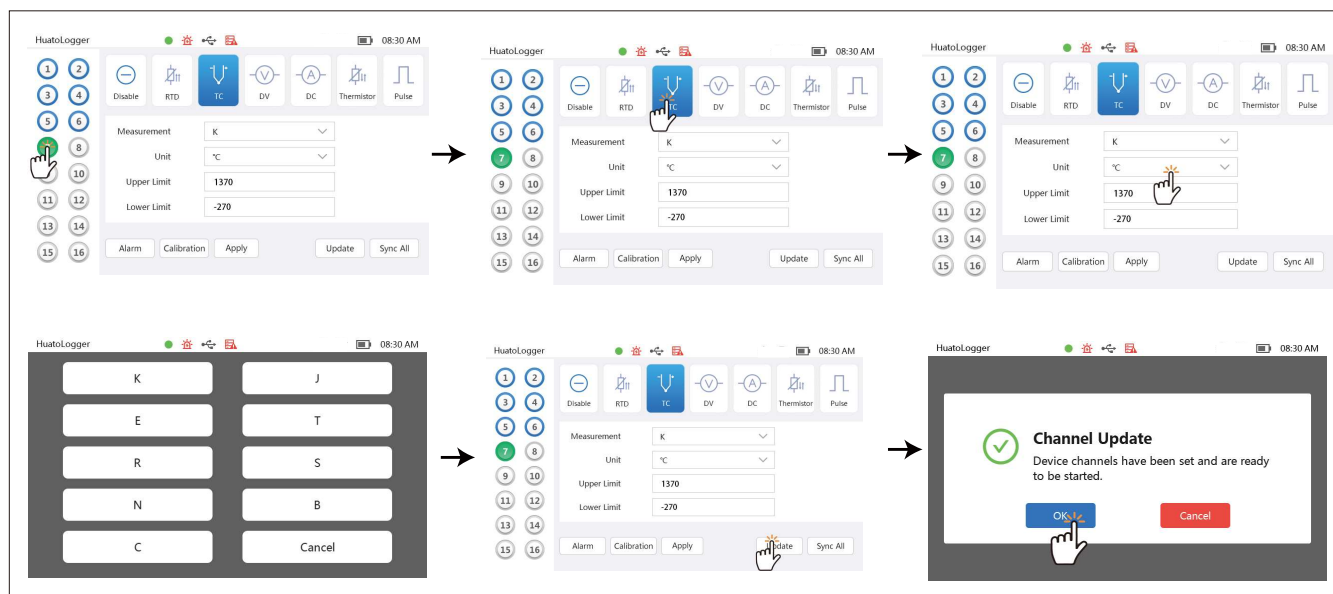
3.9.1 Channel setting

Steps: click the corresponding channel → select the corresponding signal type → set the signal measurement type → set alarm and calibration (this item is set according to personal needs) → click Update (complete the channel configuration, if you want all channels to be the same, click sync all, and then click Update to set successfully).

Note: the pulse / frequency signal is only available on channel 1.

Note: ① pulse / frequency signal is only available in channel 1.

② Only odd channel can set PT100 three wire and PT100 four wire channel modes. When the channel is set to PT100 three wire or PT100 four wire, the adjacent even channel will be occupied, and the channel connector will appear between the two channels. If it is changed to other modes, the channel connector will disappear.



3.9.2 Alarm setting

Click the alarm to enter the alarm interface, and click the alarm on / off button (green means open, gray means close). If the alarm is opened, the alarm value and return value can be set. Click apply to set successfully.

Note: the alarm setting can only be set for the current channel. If you want to set the alarm for all channels, save the information of the channel and click sync all to synchronize the alarm information of all channels.

Alarm types	Alarm value range
HH	-999999~999999
HI	-999999~999999
LO	-999999~999999
LL	-999999~999999
Alarm Return	0~999999

(The alarm return difference can only enter a value greater than or equal to 0)

3.9.3 Calibration setting

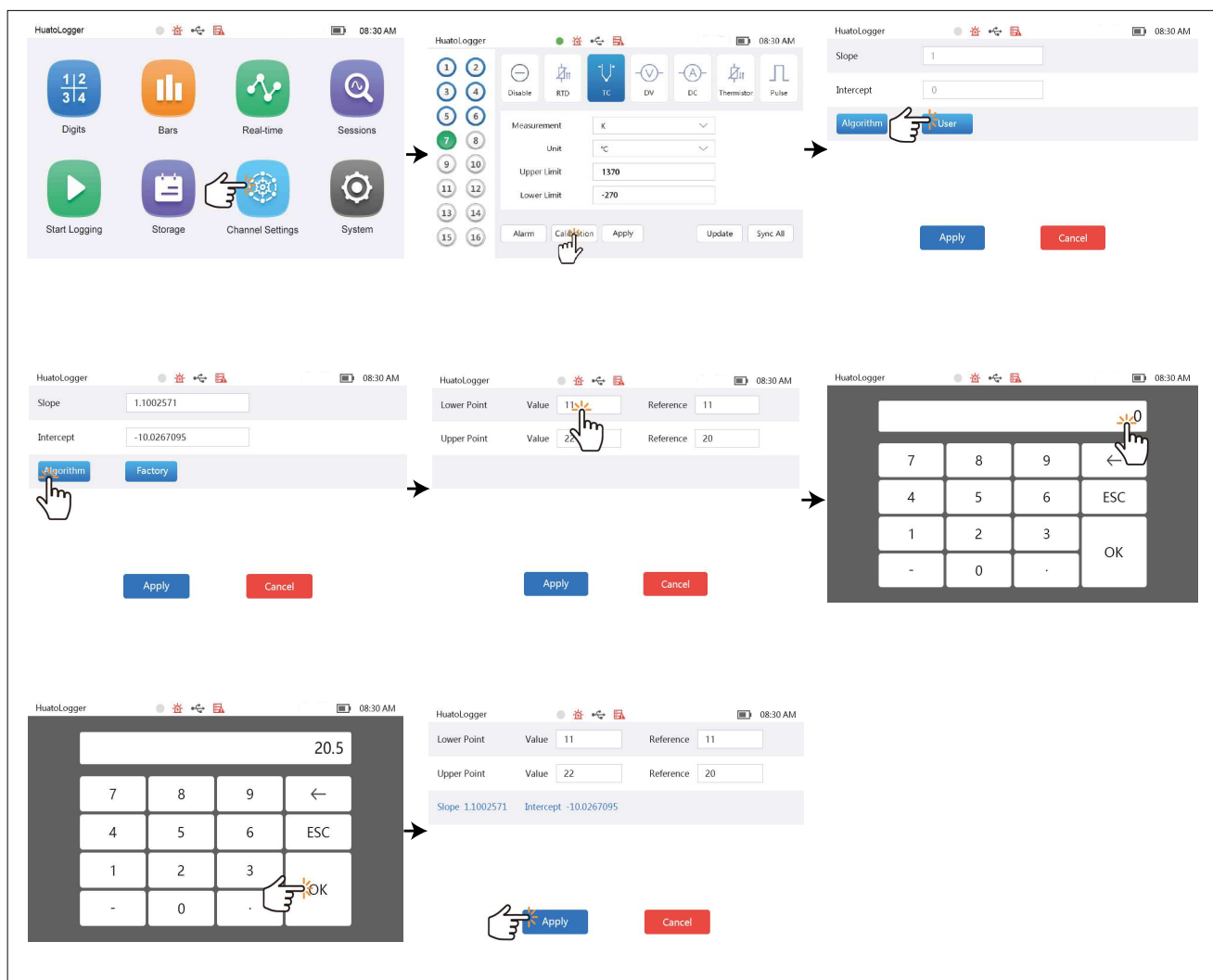
Slope: the slope value can be input.

Intercept: intercept value can be entered.

Algorithm: click the icon to enter the calibration algorithm wizard interface. In the algorithm wizard interface, you only need to input the measured values and standard values of the low calibration point and the high calibration point to calculate the calibration slope and intercept. Click apply to automatically fill the calculated calibration parameters into the calibration parameters in the calibration setting interface. Click Apply in the calibration setting interface, the calibration parameter values will be saved.

Factory calibration: when the default slope and intercept are modified, the factory calibration option will be displayed. Click factory calibration to calibrate with factory parameters.

Note: The calibration setting can only be set for the current channel. If you want to calibrate all the channels, need to click to each channel to set.



3.10 System Settings

On the left side of the system setting interface are four functional options: system information, system display, sampling storage and network setting.

3.10.1 system information and program upgrade

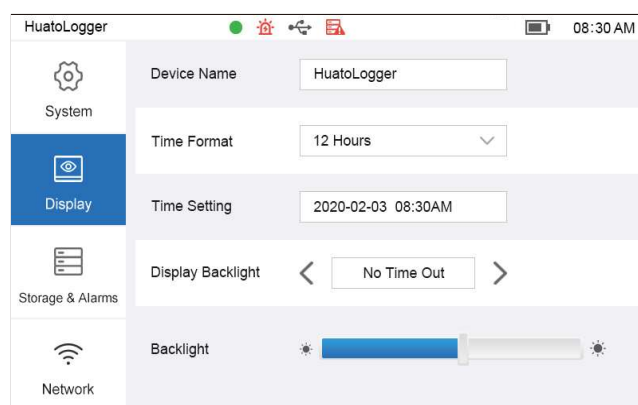
- (1) Serial number
- (2) Hardware version number
- (3) software version number; program upgrade
(when u disk / SD card is inserted, When the upgrade program is detected in the USB flash disk / SD card, Program upgrade options will be displayed)
- (4) Used storage space
- (5) Remaining storage space
- (6) Number of records
- (7) Factory calibration time
- (8) Restore factory settings



system information

3.10.2 system display

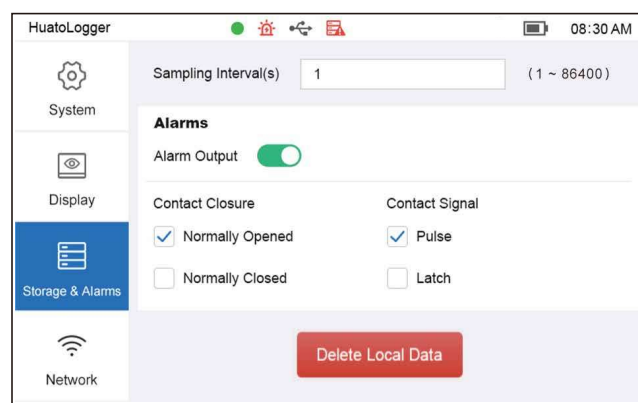
- (1) Click time format to set 12 hours / 24 hours mode.
- (2) Click time setting, click up and down arrow to set year, month, day, hour, minute, morning and afternoon.
- (3) Click the left and right arrows on the backlight display to adjust the information screen time (1min, 10min, 30min, no time out).
- (4) Slide the backlight brightness slider left and right to adjust the backlight brightness.



system display

3.10.3 sampling storage

- (1) Sampling interval: Click to set the sampling interval in seconds.
- (2) Storage location: click the drop-down arrow to select the local / SD card as the storage location.
- (3) Delete local data
- (4) Delete SD card data
- (5) Delete alarm data



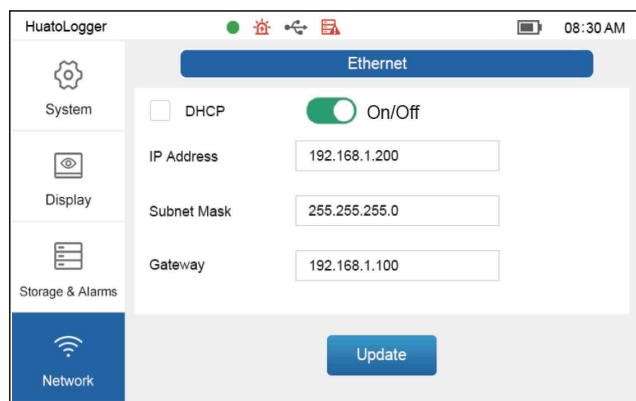
sampling storage

3.10.4 network settings

Ethernet settings (this mode DHCP option cannot be checked)

(1) Enter the corresponding IP address, subnet mask and gateway information.

(2) Click Update to update to the latest information.



network settings

3.11 Web settings

Under the same LAN, enter the IP address of the device in the address bar of the PC web page, and then press enter to enter the web page interface. You can view the data of the device in real time. Please refer to the above setting method.

Note: Note: the IP address of the device can be viewed in system settings → network settings. IP can be assigned automatically or manually.

(Web real-time data graph)

CH1 22.48 TC-K °C HH	CH2 23.29 TC-K °C HH	CH3 22.92 TC-K °C HH	CH4 23.95 TC-K °C HH
CH5 23.58 TC-K °C HI	CH6 25.12 TC-K °C HI	CH7 23.91 TC-E °C	CH8 24.31 TC-J °C
CH9 23.37 TC-N °C	CH10 24.35 TC-T °C	CH11 37.37 TC-E °C	CH12 24.85 TC-T °C
CH13 23.70 TC-K °C LL	CH14 23.70 TC-K °C LL	CH15 22.85 TC-K °C LL	CH16 23.65 TC-K °C LL

Section 5 Daily maintenance

- When there is any foreign matter on the display screen, use a soft cloth to wipe the foreign matter away gently.
- When there is residual foreign matter on the protective sleeve, use soft cloth and soft detergent to remove the foreign matter.
- Please do not place the equipment under the sun, so as to avoid damage to the equipment shell or color change.

FCC Caution:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF Exposure guidelines, This equipment can be used as portable exposure. Use only the supplied antenna.