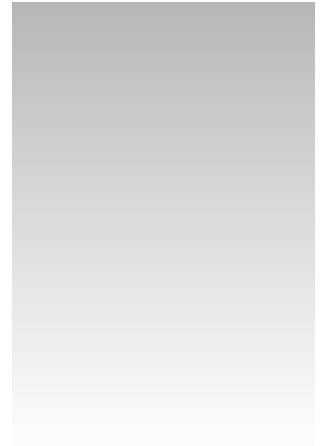# HUATO

User's Guide

S1500 Portable Multi-Channel Thermocouple Data Logger Operational Instructions

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Serial number	Version number	Document number	Revision date

⚠ Attentions

1) The waterproof grade of the product is IP34. If there is moisture on the shell, do not connect the logger with USB in order to prevent from short circuit. Short circuit may cause damage to the instrument.

2)The logger adopts ABS engineering fireproof plastic shell to prevent from the corrosion of acid, alkali and other chemicals. In case of failure, it must be repaired by authorized professionals and please do not repair or refit by yourself. One 9V alkaline battery equipped within this instrument cannot be charged and short circuit is not allowed, otherwise danger may occur. Please properly dispose of the waste battery to protect the environment.

Table of Contents

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

- Supportup to 16 channel thermocouple input with the graphical touch screen.
- Support multiple types of Thermocouple Input: K / J / E / T / R / S / N / B / C; Wide temperature detection range : - 270 ~ 1820 ℃.
- The fastest sampling frequency can reach 1s.
- It has the function of viewing real-time data curve and historical data curve.
- Large data storage capacity, 8-Channel storage capacity of 10 million records,12-channel storage capacity of 6.7 million records, 16-channel storage capacity of 5 million records.(Calculated according to the standard 32g built-in TF Card)
- A variety of external interfaces,support U disk and SD card to export the historical data.

1.4 Models

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

1.5 Applications
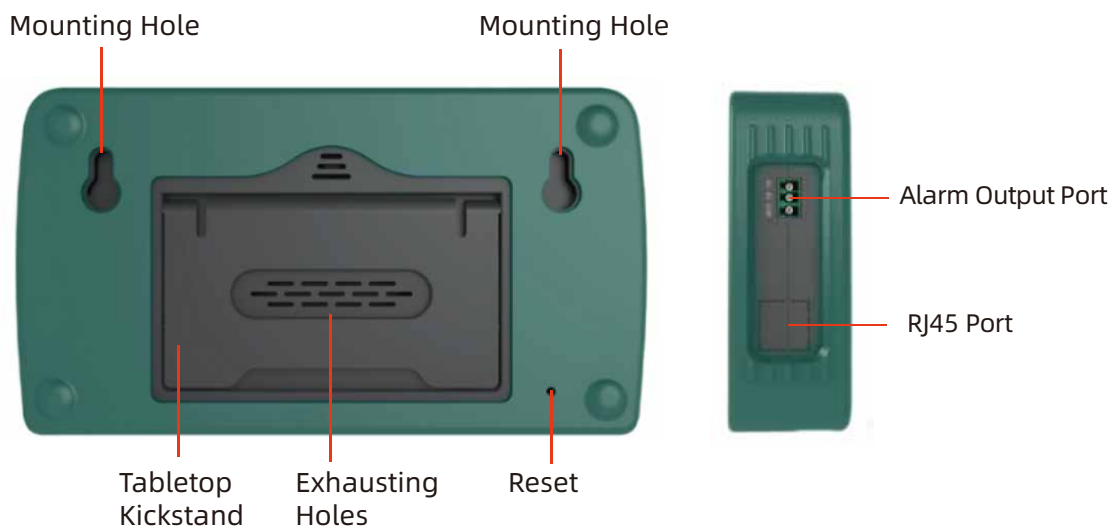
● Handheld Mode

Note：Don't block the cold junction compensation holes, which may affect the accuracy of data acquisition.

Compensation Holes

● Wall Hanging Mode

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

Mounting Hole   Mounting Hole

Alarm Output Port

RJ45 Port

Tabletop   Exhausting   Reset
Kickstand   Holes

• Tabletop Kickstand

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

1.6 Buttons and Ports

Power On/Of   Home

SD Card

Type-C

USB Card

3

Button/Ports	Details
Power button	1、To power on and power off the device, hold down the Powerbutton for a few seconds.
HOME button	1、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. 3、The USB2.0 interface can be used as the connection port with external communication modules including 4G / 5G / Lora.
SD card port	1、Internal data can be transferred to SD card. 2、The main board can be upgraded through SD card.
RJ45 port	1、The device can be used as a web server and the properties can be read and configured through the web page. 2、The device can be used as a web server and the real-time data can be viewed through the web page. 3、The device can be used as FTP server and the historical data file can be downloaded through the web page. 4、The device can be used as FTP server and the main board can be upgraded through web page.
Alarm output port	1、Support 2-way optocoupler open-drain alarm output

1.7 Operational Steps

1. Power on: Press and hold the power button for 3s to power on.
2. Insert the sensor.
3. Channel configuration: select the corresponding thermocouple type in the "Measurement" column, and click"Apply"→"Update"→"OK" (you can select ℃ / ℉ in the "Unit" column as required).
4. Start recording → you can enter the digital interface / bar graph interface / real-time curve interface to view the data information → recording is completed (stop recording) → you can export the data to USB flash disk or SD card in the data storage interface (you can view the historical data in the historical curve interface). For detailed usage, please refer to the detailed description of each interface.

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	16 channels, Thermocouple Input
Storage capacity	16 channel storage capacity of 5Million lines
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
Sampling frequency	Fastest 1s
Recording frequency	Fastest 1s
Data format	CSV file format
Working temperature	-10-50℃
Storage temperature	-20-60℃
Relative temperature	5% - 95% RH, no condensation
Shell material	PC / ABS material and TPE environmental material are used for protective sleeve
Calibration	Calibration is recommended once every 12 months

1.8.21.Input Signal

Thermocouple input (excluding cold end error), accuracy excluding cold end compensation error, cold end compensation error: ± 1.5 ℃

| Type	Measuring range（℃）	Resolution（℃）	Maximum allowable error（℃）
K	-270-1370℃	0.1	±1℃
J	-200-760℃	0.1	±1℃
E	-270-980℃	0.1	±1℃
T	-270-400℃	0.1	±1℃
R	-50-1760℃	0.5	±2℃
S	-50-1760℃	0.5	±2℃
N	-270-1300℃	0.5	±0.5℃
B	50-1820℃	0.5	±2℃
C	0-2320℃	0.5	＜425℃：±4.5℃, 425-2320℃ :1.0%

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 is lower than 10%, a red light is displayed to prompt the user to charge; When the power is lower than 1%, it will automatically shut down after a countdown of 20 seconds.

5. Do not block the cooling hole when using, so as not to affect the performance of the equipment.

6. Do not directly clean the equipment with water to prevent water droplets from entering the equipment and causing damage to the equipment.

7. 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.

8. 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.

Section 3 Thermocouple input port

3.1 Connection Mode

The following picture shows the input port of the thermocouple,the insertion

mode is shown in the interface diagram.
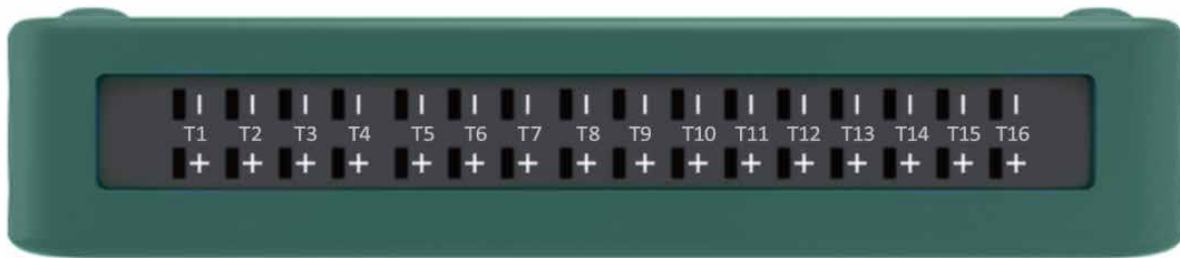
Section 4 Interface and function description

4.1 Prompt 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 becomes normal or after entering the alarm interface to view 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%.

(7)Power prompt:

The current battery power is displayed in real time. The symbol is green 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.

(8)System time indication:

In the format of hour and minute. Seconds are prompted by colon flashing.

4.2 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.
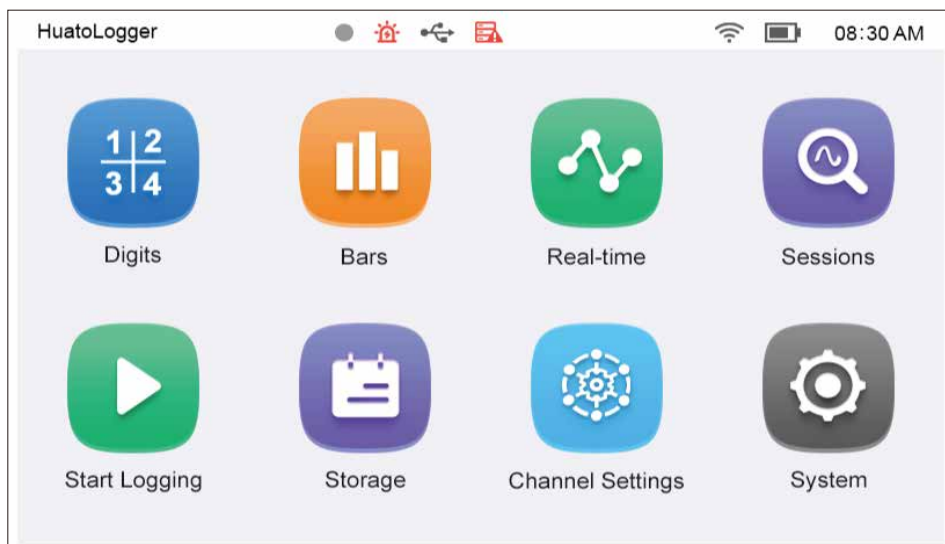
4.3 Digital Display

● 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, the background is displayed in gray. In these two cases, the channel cannot view the details.
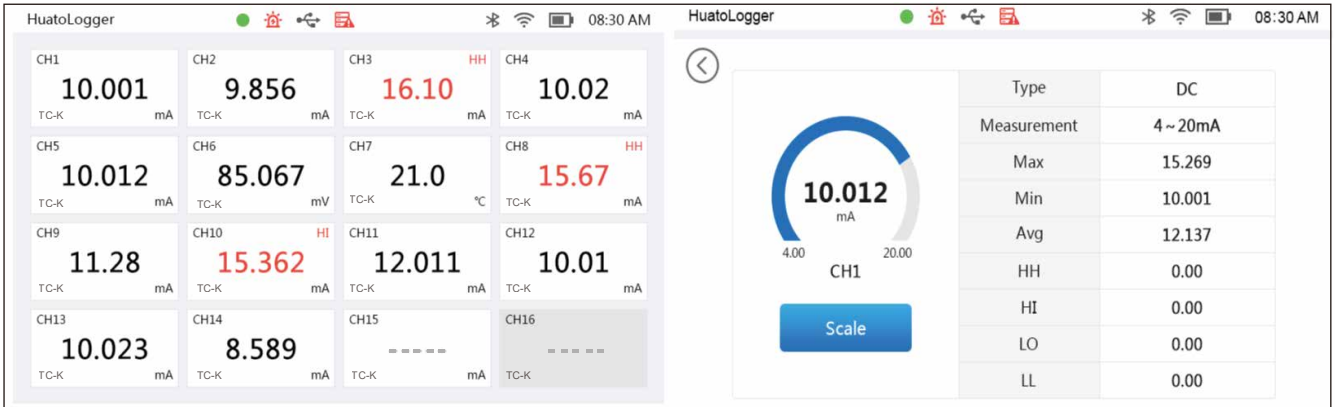
| Digital display | detailed information |

4.4 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.
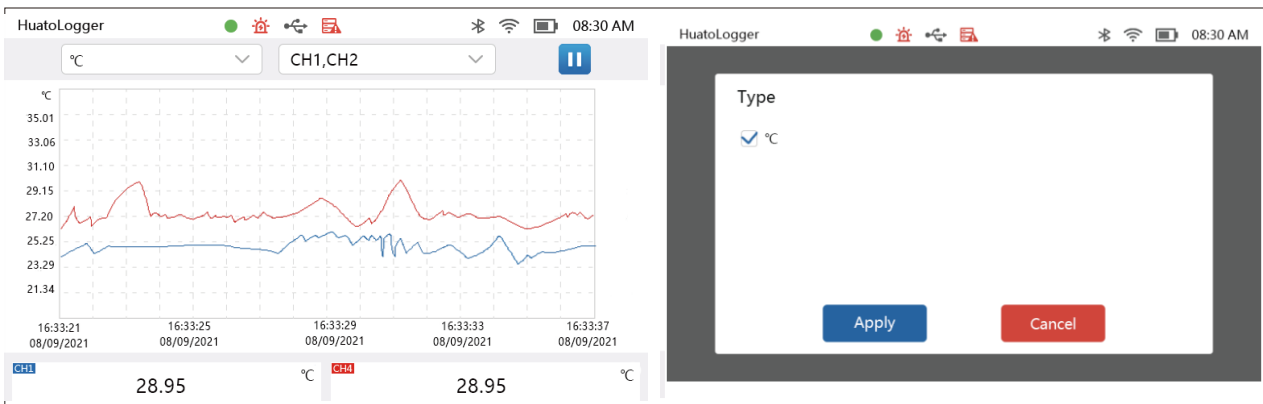
(Turn pages)
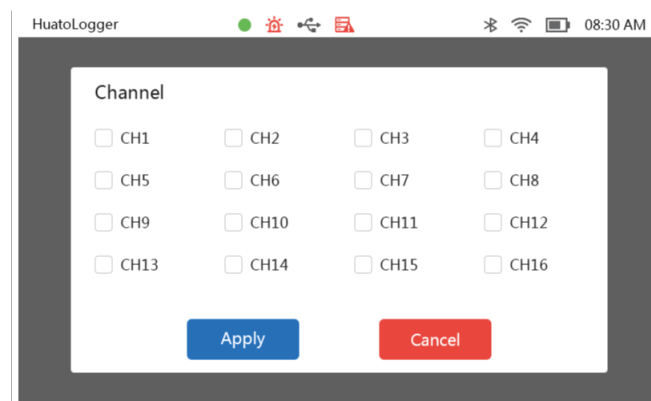
(Current page)

Bar chart screen

4.5 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.


Real time curve

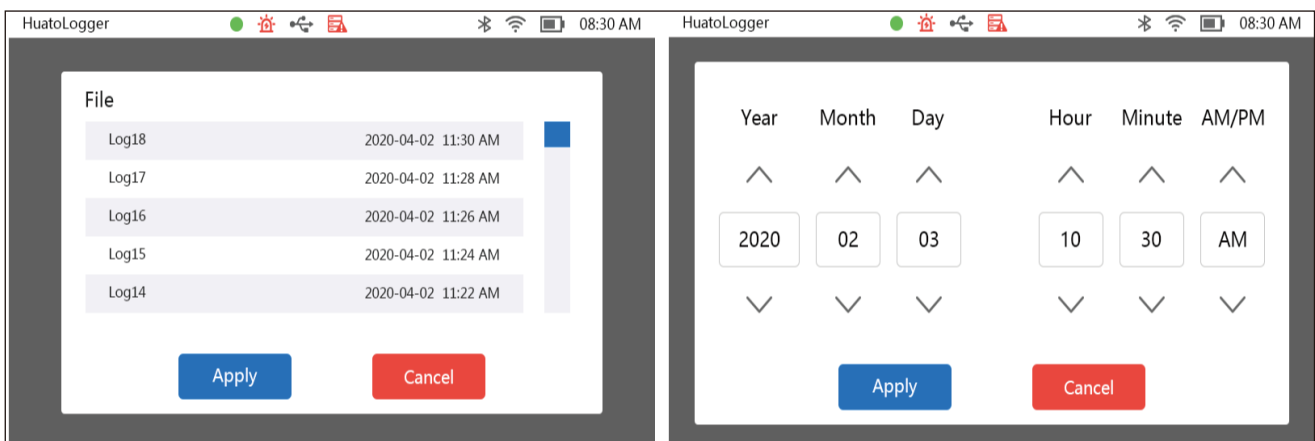

Unit selection

Channel selection

4.6 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.
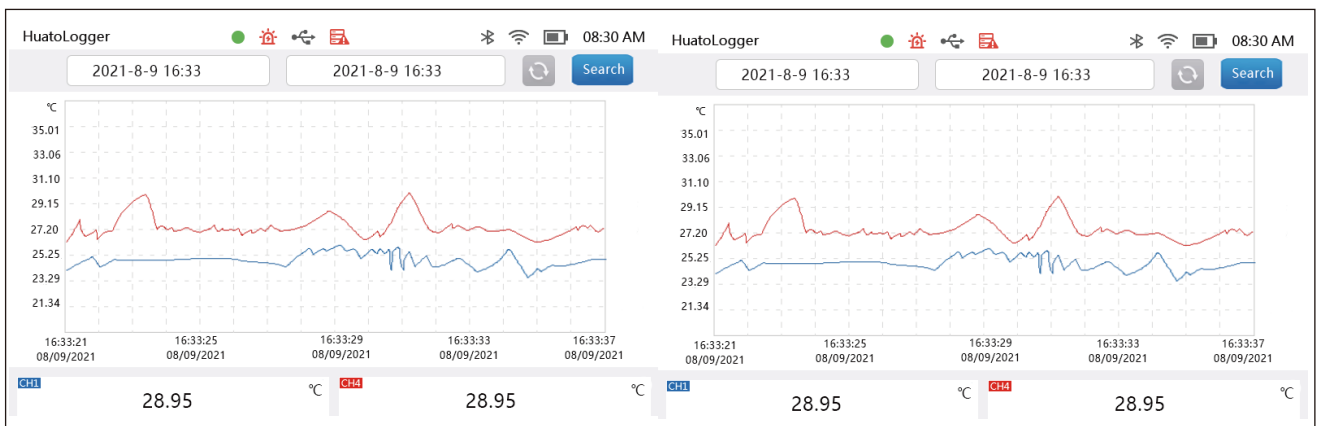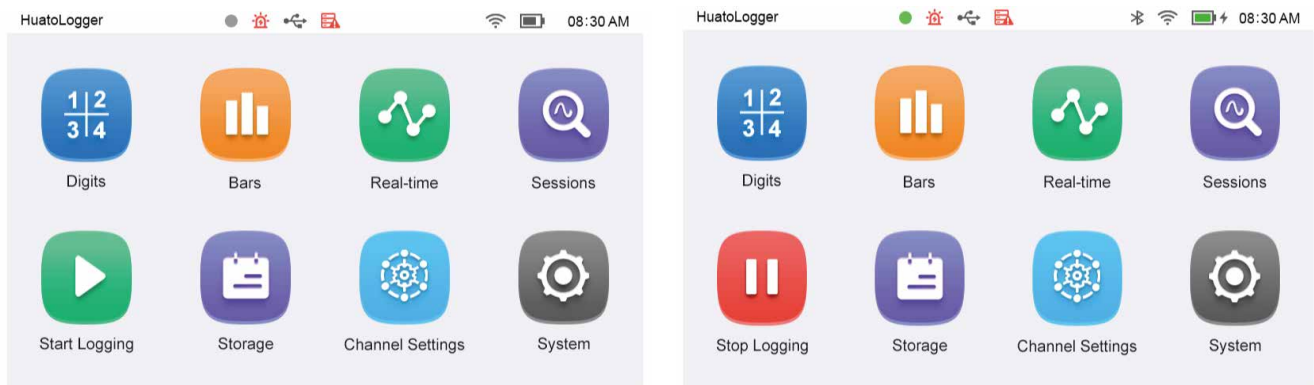

Historical curve 1   Historical curve 2

File selection   Time selection

4.7 Start / stop recording

Start recording   stop recording

(1) Record file name: customizable, up to 24 bytes. The default is Log1, log2 .

(2) Record interval: customizable, the shortest is 1 second, the longest is 86400 seconds (24h), only integer can be input.

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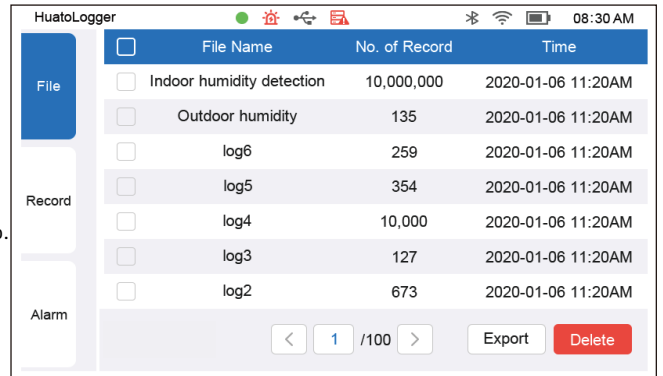
After starting recording, if return to the main interface, the start recording icon will becomes the stop recording icon. Click the stop recording icon to pop up the stop recording pop-up window.

4.8 Data Storage
4.8.1 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) 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 pop up the transfer mode

(USB, SD card) pop-up

(6) Delete: click Delete to pop up a confirmation pop-up window to
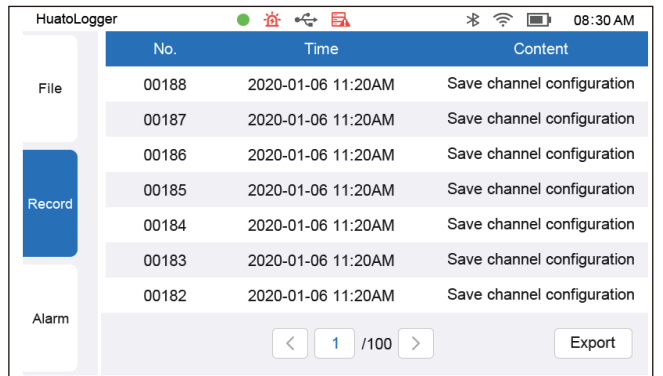
confirm whether to delete.

HuatoLogger				
		File Name	No. of Record	Time
File		Indoor humidity detection	10,000,000	2020-01-06 11:20AM
		Outdoor humidity	135	2020-01-06 11:20AM
		log6	259	2020-01-06 11:20AM
Record		log5	354	2020-01-06 11:20AM
		log4	10,000	2020-01-06 11:20AM
		log3	127	2020-01-06 11:20AM
Alarm		log2	673	2020-01-06 11:20AM
		< 1 /100 >	Export	Delete

Record file

(export will not be displayed until the transfer card is inserted)

4.8.2 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

operationlogs to U disk or SD card in CSV format. The transfer mode

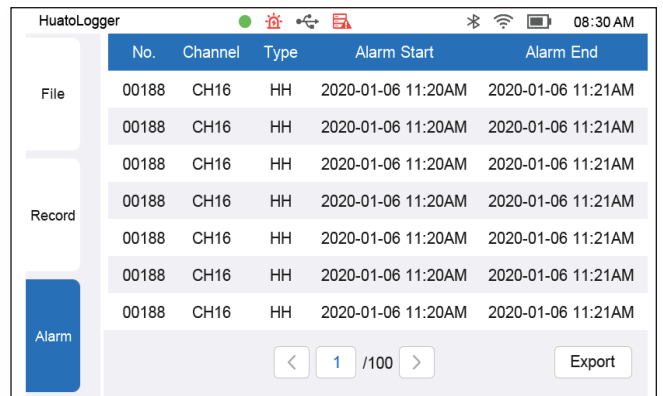(USB, SD card) pop-up window will pop up. Select the corresponding mode.

HuatoLogger			
	No.	Time	Content
File	00188	2020-01-06 11:20AM	Save channel configuration
	00187	2020-01-06 11:20AM	Save channel configuration
	00186	2020-01-06 11:20AM	Save channel configuration
Record	00185	2020-01-06 11:20AM	Save channel configuration
	00184	2020-01-06 11:20AM	Save channel configuration
	00183	2020-01-06 11:20AM	Save channel configuration
Alarm	00182	2020-01-06 11:20AM	Save channel configuration
		< 1 /100 >	Export

Operation log

(export will not be displayed until the transfer card is inserted)

4.8.3 Alarm log

Information at the bottom of the alarm log port:

(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 save all the historical alarm days

When the log file is exported to U disk or SD card in CSV file format,

it will pop up

HuatoLogger					
	No.	Channel	Type	Alarm Start	Alarm End
File	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
Record	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
Alarm	00188	CH16	HH	2020-01-06 11:20AM	2020-01-06 11:21AM
		< 1 /100 >			Export

Alarm log

(export will not be displayed until the transfer card is inserted)

4.9 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 (channel not used), TC (thermocouple).

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

4.9.1 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.

4.9.2 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: alarm settings can only be set for the current channel. If you want to set alarms for all channels, you need to click each channel to set. (when synchronizing all, the alarm settings are not synchronized)

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

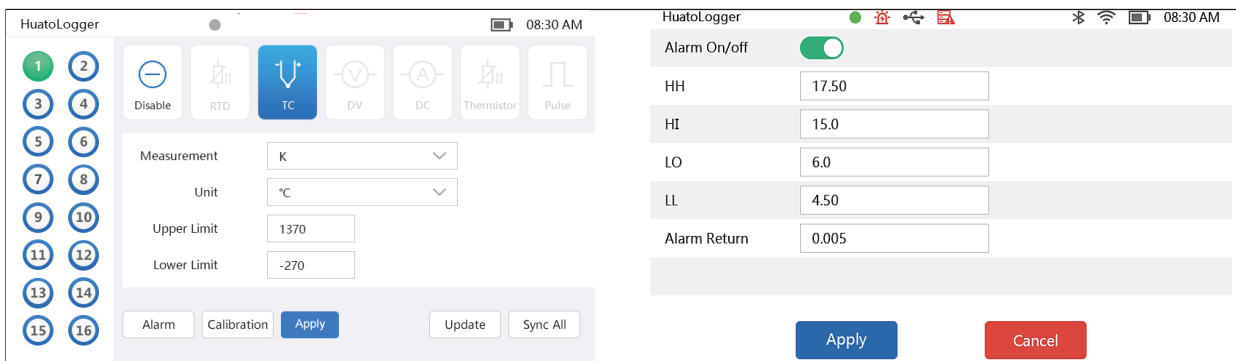# 4.9.3 Calibration setting

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.
① in order to obtain the best performance and accuracy, factory calibration should be performed at least every 12 months.
② Note: calibration settings can only be set for the current channel. If you want to calibrate all channels, you need to click on each channel to set. (synchronize all calibration settings out of sync)

Channel setting   Alarm setting
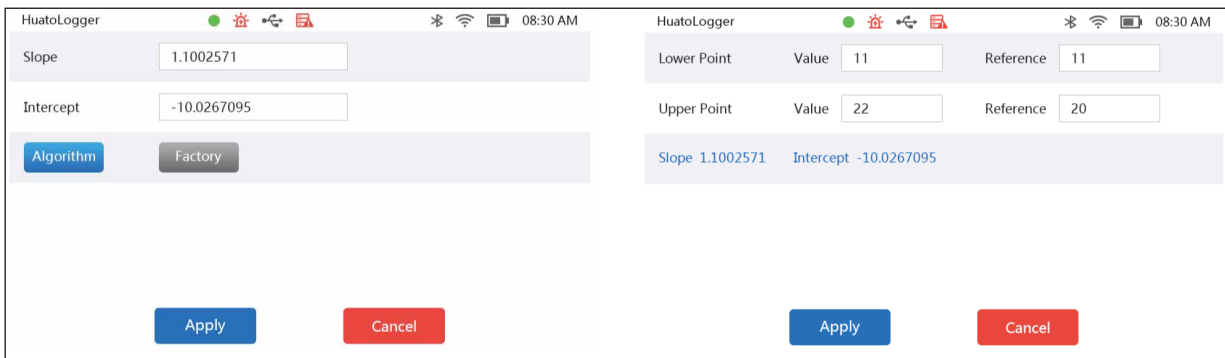
Calibration setting   calibration algorithm Wizard

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4.10 System Settings

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

# 4.10.1 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 bedisplayed)

(4) Used storage space

(5) Remaining storage space

(6) Number of records

(7) Factory calibration time

(8) Restore factory settings

system information

Program upgrade

1.Click program upgrade, and the interface below will appear. Click upgrade.
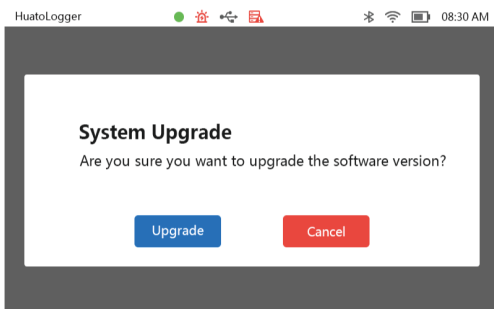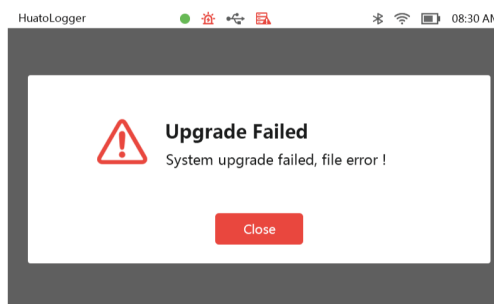
2.Downloading upgrade files.
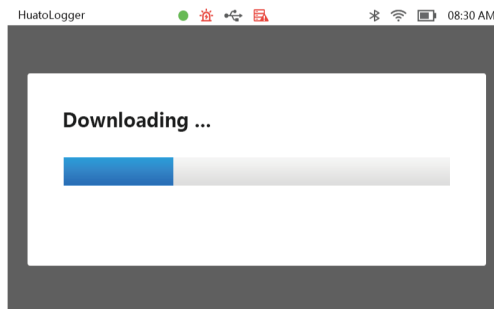
(Note: it is forbidden to power off or plug in the USB flash disk during the upgrade process)
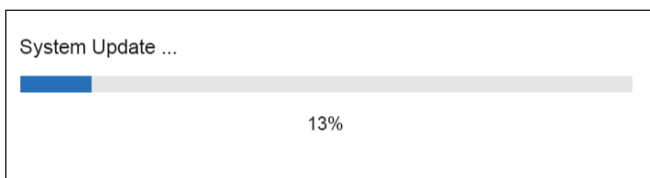
3.The device is about to restart.
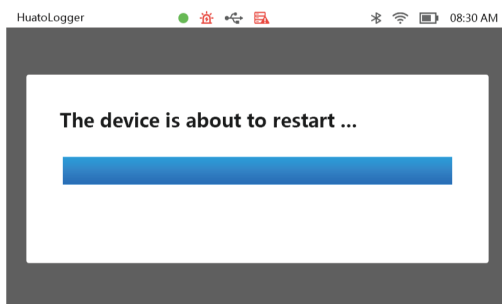
4.If the upgrade fails, click close to close the interface.

5.Upgrading, please wait patiently for the upgrade to complete.

4.10.2 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.
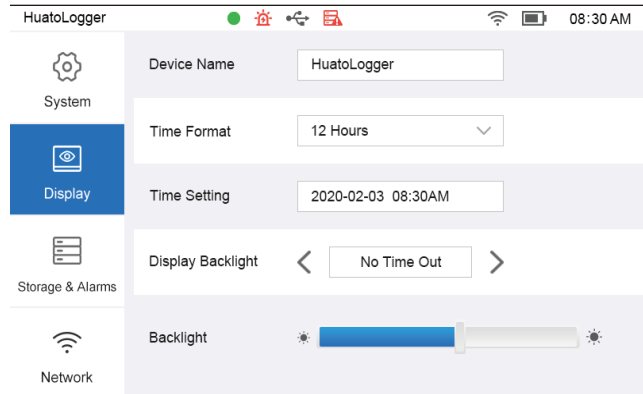
system display

4.10.3 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
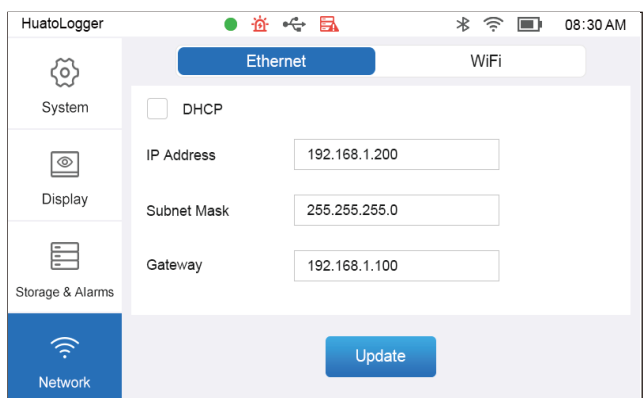(4) Delete SD card data
(5) Delete alarm data
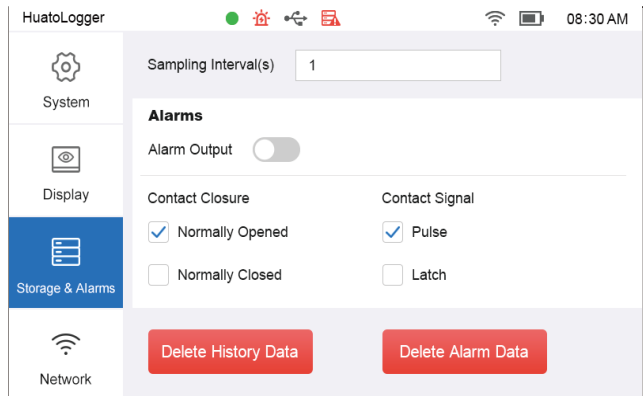
sampling storage

4.10.4 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

4.11 Web settings

Enter the IP address of the device in the address bar of the web page, and then press enter to enter the web page interface to view the data of the device in real time. Please refer to the above setting method.

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）
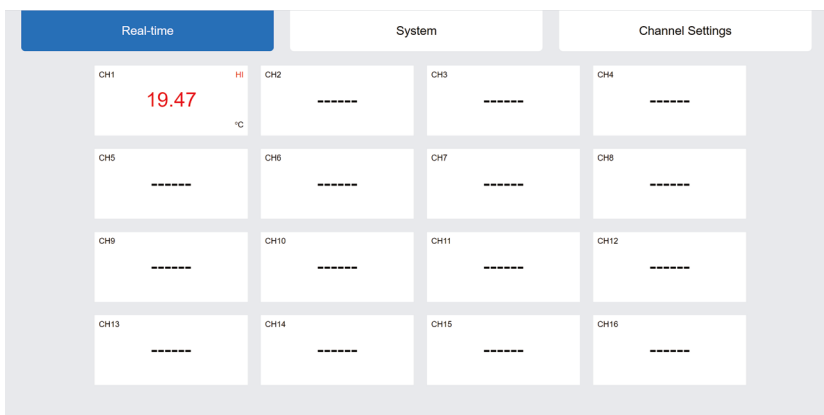
Section 5 Daily maintenance

- 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.

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