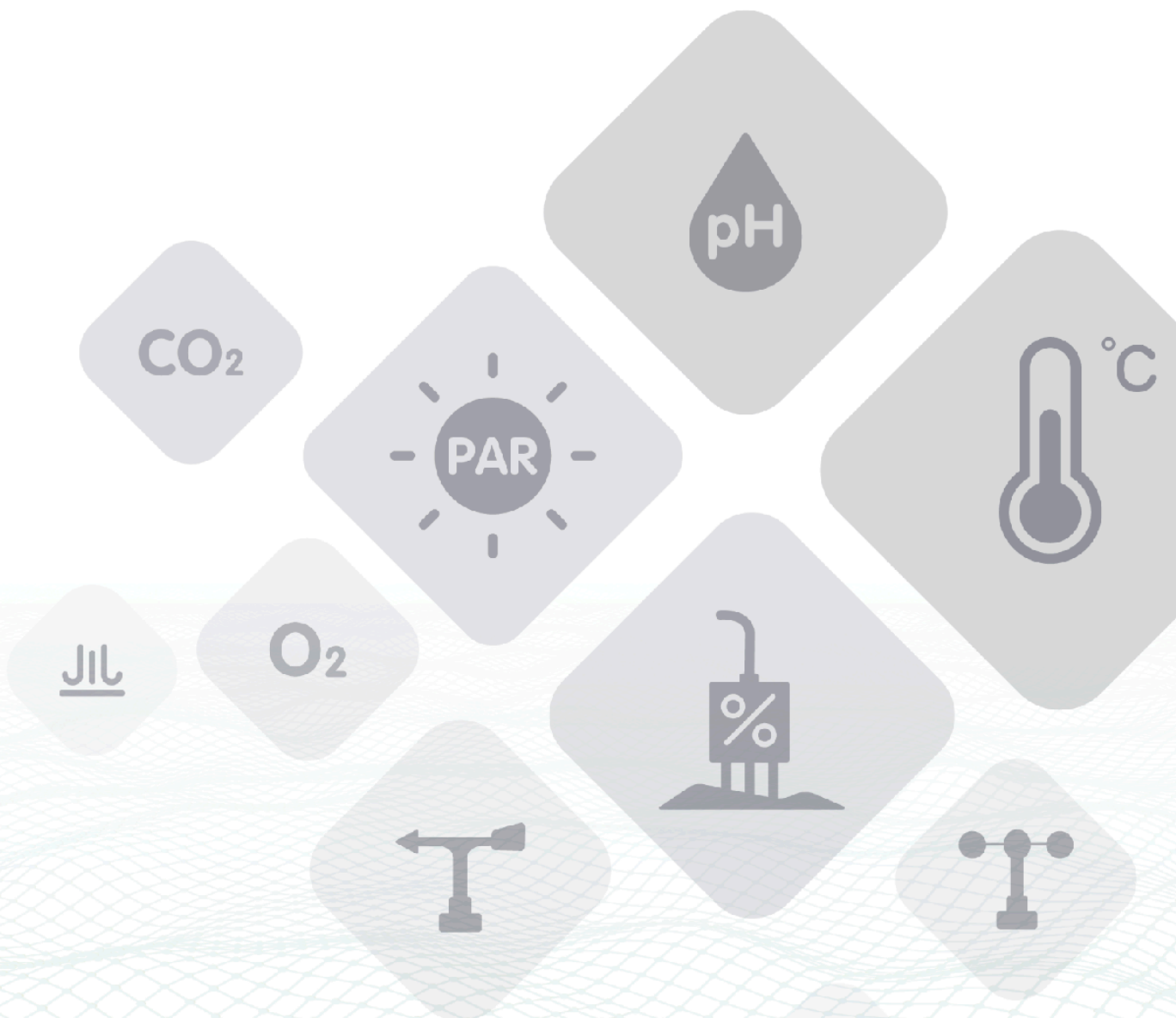




SENSECAP

SenseCAP Combo 5-in-1 Sensor with 4G User Guide

VERSION : V1.2



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1. Introduction



SenseCAP Combo 5-in-1 Sensor with 4G is an easy-to-use, stable, and low-power device designed for multi-parameter environmental monitoring. It measures such as temperature, humidity, atmospheric pressure, light intensity, CO₂. Additionally, it can connect up to 10 external Modbus-RTU RS485 sensors with [Splitter](#), offering high compatibility with most sensors on the market.

For data transmission, the device uses **4G Cat.1 connectivity** and the **MQTT** protocol to upload data to your user server. It is equipped with a **solar panel** and a 5200mAh **rechargeable Li-ion battery**, ensuring over 2 weeks of continuous operation during power outages or rainy weather. It also supports direct DC power supply. To prevent data loss, the device can cache up to 500,000 data records locally when the signal is weak or interrupted. Once communication is restored, the data is automatically uploaded. Users can also export historical data directly via a local connection.

Designed for a plug-and-play deployment, the device supports both hanging and pole-mount installation, making deployment simple even for beginners. Built with waterproof and UV-resistant materials, it meets strict durability standards and is ideal

for harsh environments like greenhouses.

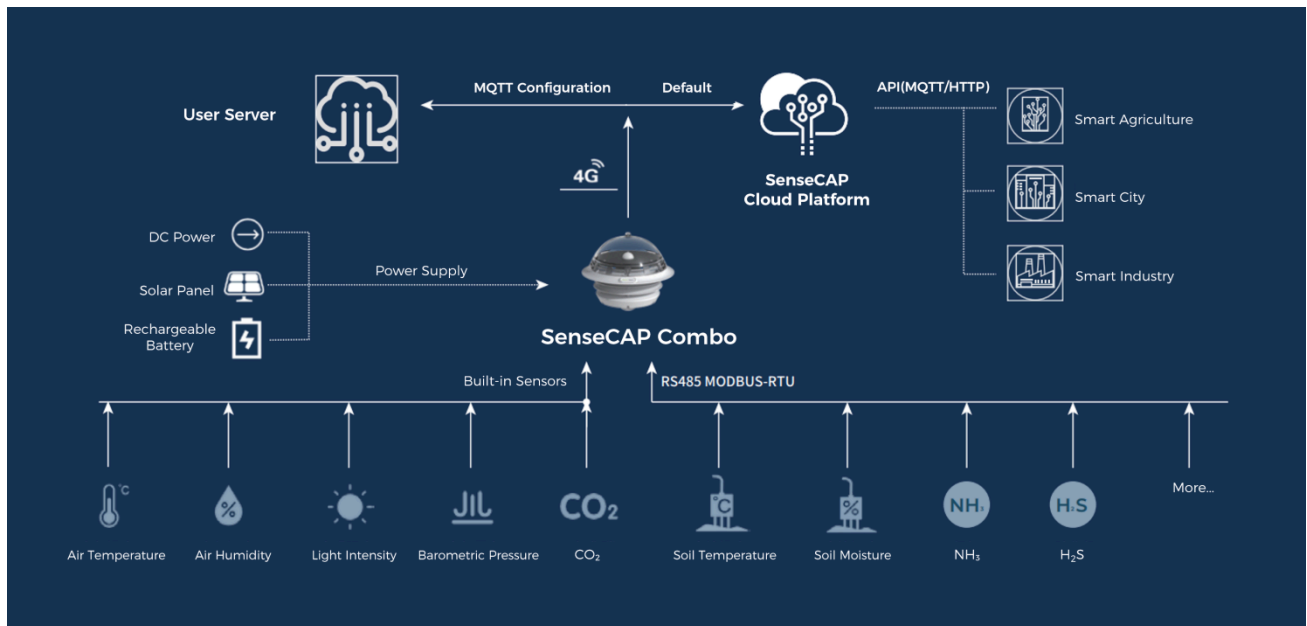
SenseCAP also provides a user-friendly cloud platform and services. You can simply scan a QR code with the mobile app to bind the device to your account, manage your hardware, and view real-time data. The platform offers API, allowing you to easily retrieve data and complete rapid integration or development.

Feature

- **Integrated Multi-Sensors:** The device includes built-in sensors for air temperature, humidity, atmospheric pressure, light intensity, and CO₂ etc. (available options vary by customization).
- **High Scalability:** It provides an RS485 interface that can connect up to 10 external sensors via [Splitter](#). And it supports standard Modbus-RTU RS485 sensors and provides both 5V and 12V power outputs to power external devices.
- **Reliable Data Caching:** When 4G signals are weak or unavailable, the logger can store up to 500,000 data records locally. Data auto-uploads once connectivity restores, and historical files can be exported to Excel.
- **Flexible Power Options:** The device is primarily powered by an integrated solar panel and built-in battery, but also supports an external DC power supply.
- **Low Power Consumption:** With a built-in 5200mAh battery, the device can operate for over two weeks without solar charging or during power outages.
- **Easy Maintenance:** It supports OTA (Over-the-Air) remote firmware updates, reducing the need for on-site maintenance.
- **Greenhouse Operation:** Designed for greenhouse and indoor agricultural environments, it operates reliably from 0°C to 40°C.
- **Weatherproof Design:** Featuring an IPX5 rating and UV-resistant materials, the device is protected against rain and aging, making it perfect for greenhouses and outdoor use.

NOTE: For projects requiring additional environmental parameters, customized configurations with extended sensor options are also available. For customization inquiries, please contact techsupport@seeed.io

System Architecture



Specification

General Parameters	
Power Supply	Type-C interface, 5V / 2A input
Expansion Interface	1x RS485 (Modbus-RTU)
Number of Connectable Sensors	Supports up to 10 external sensors using a Splitter
External Sensor Power Output	12V / 0.35A, 5V / 0.35A
Protocol	MQTT protocol; supports user-configured servers via Sensor Hub Configuration Tool NG
4G Cat.1	Global frequency bands / APN configurable; Micro SIM card / 3FF
	LTE-FDD: B1 / B2 / B3 / B4 / B5 / B7 / B8 / B12 / B13 / B14 / B17 / B18 / B19 / B20 / B25 / B26 / B28
	LTE-TDD: B34 / B38 / B39 / B40 / B41 / B66 / B71
Data Caching	Local storage for up to 500,000 cached records / Supports local export
Antenna	Built-in antenna
Switch / LED Indicators	1x Power Switch, 2x LED Indicators
IP Rating	IPX5, PCBA Waterproof Treatment

UV Resistance Rating	F1
Enclosure Material	PC/ASA
Operating Temperature	0°C ~ 40°C Note: The operating temperature of the device is limited by the included power adapter, which supports an operating temperature range of 0°C to 40°C. The power adapter is designed for indoor use only. Do not expose the power adapter directly to outdoor environments. The power adapter must be installed inside a waterproof enclosure or electrical cabinet to ensure proper protection.
Charging temperature	0°C ~ 40°C
Operating Humidity	0 ~ 100 %RH (non-condensing)
Battery	5200mAh, 3.7V rechargeable Li-ion battery
Solar Panel	Maximum power 1W
Installation	Hanging or Pole-mount (Requires wire for hanging; brackets for pole-mount. Not included in package)
Dimensions	202 * 202 * 175 mm
Net Weight	0.8 kg

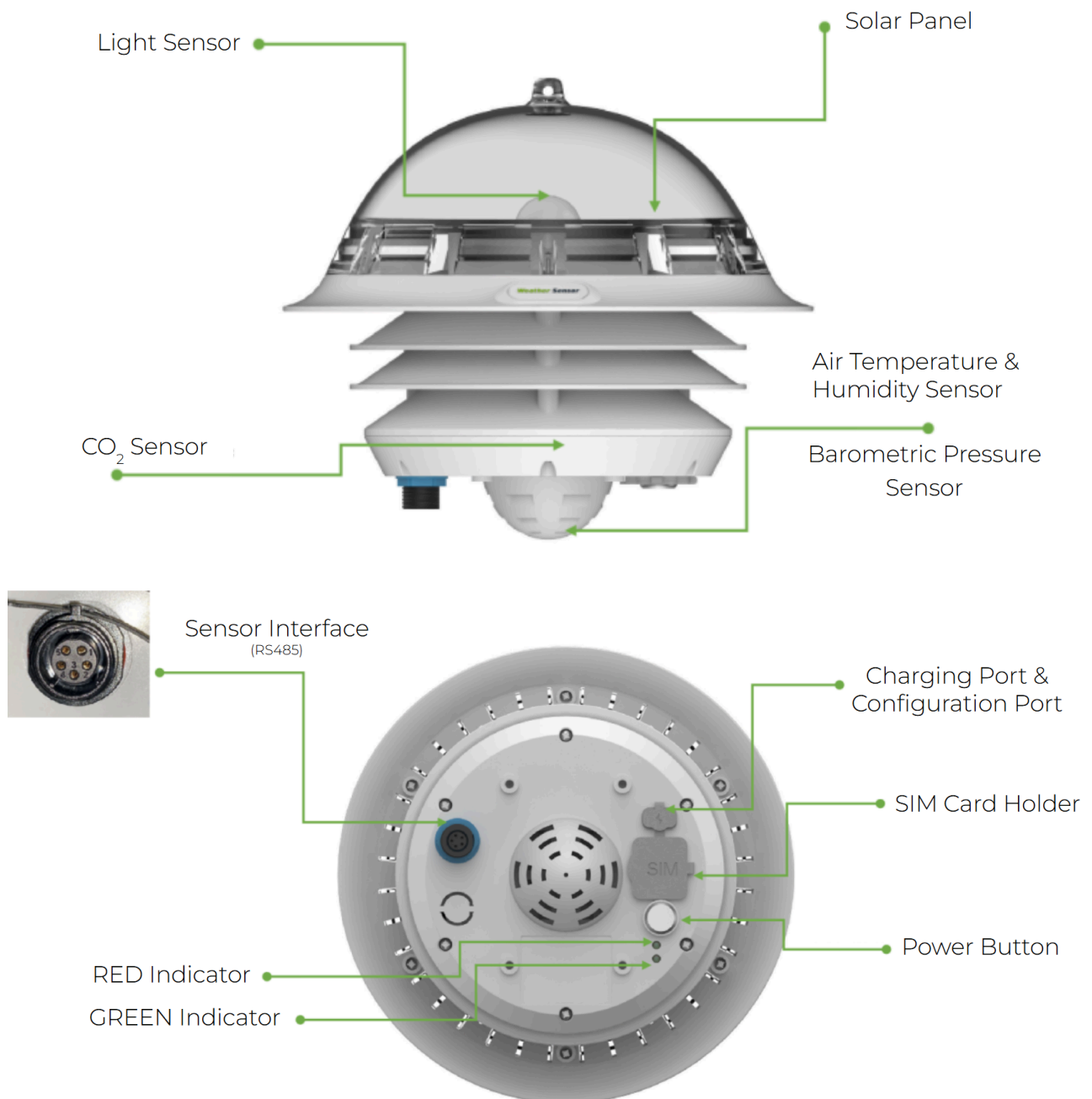
Sensor Specifications			
Parameter	Range	Accuracy	Resolution
Air Temperature	-40°C ~ +85°C	±0.2°C	0.01°C
Air Humidity	0 ~ 100%RH (non-condensing)	±2%RH	0.01%RH
Dew Point (calculated by T/H algorithm)	-100°C ~ 80°C	±2°C	0.01°C
Barometric Pressure	300 ~ 1200 hPa	1 hPa	10 Pa
Light Intensity	0 ~ 200,000 Lux	±5%	5 Lux
CO ₂	0 ~ 10,000 ppm	±50ppm ±3%*reading (0~5000ppm); ±5% (5000~10000ppm)	1 ppm

2.Part List

Photo	Name	Quantity
	SenseCAP Combo 5-in-1 Sensor with 4G	1
	USB Type-C Cable	1
	Power Adapter	1

3. Quick Start

3.1 Hardware Overview



- **Interface Pin Description :**

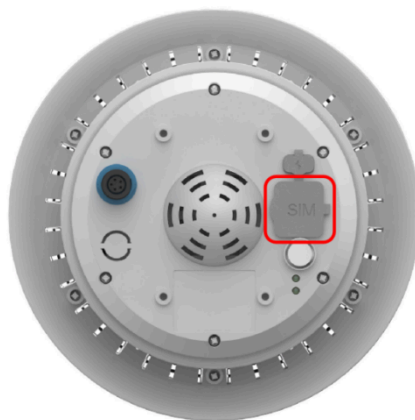
No.	Pin	Description
1	12V	For 12V sensors, solder this pin. Please note that an external power adapter must be used to provide sufficient power for 12V sensors.
2	5V	For 5V sensors, solder this pin.
3	RS485 A	-
4	RS485 B	-
5	GND	Ground

- **LED Indicator Status :**

Color	Status	Description
RED Indicator	Power-on	Solid for 5s, then off
	Firmware Update	Flashes quickly every 1s
GREEN Indicator	Data Collection	Solid until collection is complete
	Command Execution	When command takes effect

3.2 Install SIM Card

1. Open the rubber cover labeled “SIM” and lift the metal holder.
2. Insert the SIM card into the slot, secure it with the metal holder, and close the rubber cover tightly.

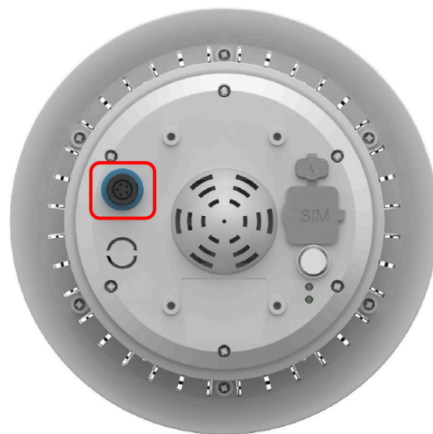


Note: After installing the SIM card, make sure the rubber cover is fully sealed. Otherwise, the waterproof performance of the device may be affected

3.3 Sensor Connection

- Unscrew the protective cap of the interface and connect the sensor to the RS-485 port.

Note: After connecting the sensor, make sure the aviation connector is fully tightened. If the connector is not in use, it must also be tightened to prevent water and device damage.



Note:

1. Connect the sensors before powering on the device. Otherwise may cause them not to be detected. In this case, restart the device.
2. When using a splitter, do not connect sensors with the same Modbus address to the RS-485 interface.
3. If you connect a 12V sensor, the device must be powered by an external DC power supply.

4. Configure to the SenseCAP Cloud Platform

Before deployment, make sure the device can operate normally and upload data.

4.1 Bind Device

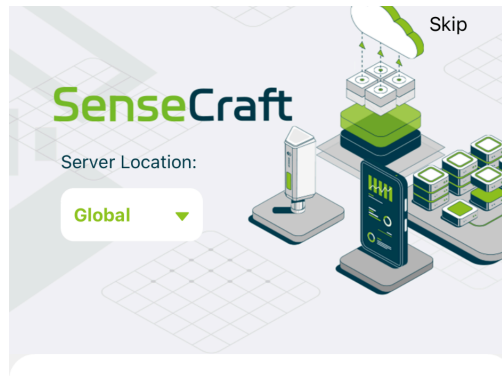
4.1.1 Download SenseCraft APP



4.1.2 Create New Account

Please create an account via the SenseCraft APP or PC on the SenseCAP cloud platform: <https://sensecap.seeed.cc/portal>

- 1) Click “Register”, enter your email, and submit. A verification email will be sent.
- 2) Open the email from “SenseCAP”, click the link, and complete the registration.
- 3) Open the app, select “Global Server”, enter your account and password, and log in.



Email

test@seeed.cc

Password

☒ I have read and agree to [Privacy Policy](#)

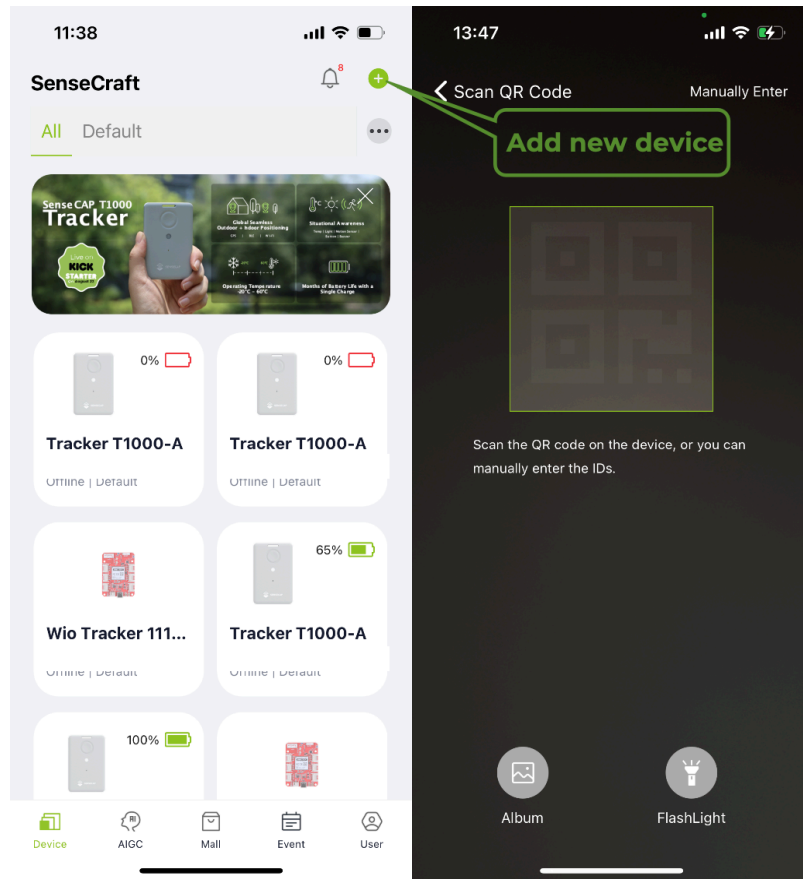
Login

Register

[Forgot Password](#)

4.1.3 Bind Device

1. Go to the “Devices” page. Click the “+” icon in the top right corner.
2. Scan the QR code on the device label to bind the device.

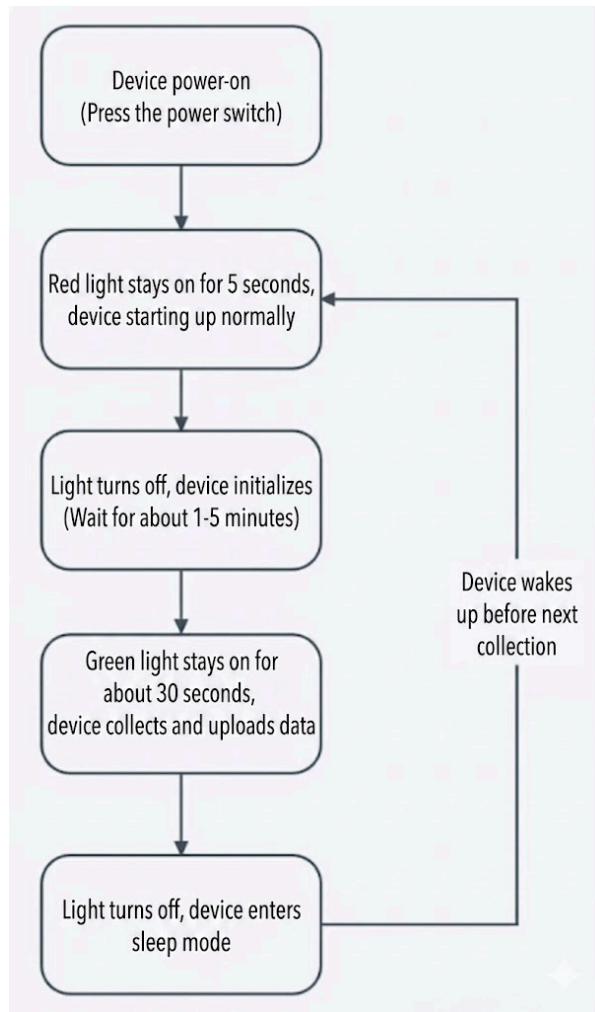


4.2 Power On the Device (Indicator Status)

Before powering on, make sure the sensors and SIM card are installed.

When installing sensors, ensure the device is powered off. Otherwise, external sensors may not be detected.

Press the metal button at the bottom of the device. The red indicator will light up. Wait about 3 minutes for the device to come online. (The time depends on the number and type of sensors. More sensors require longer time.)



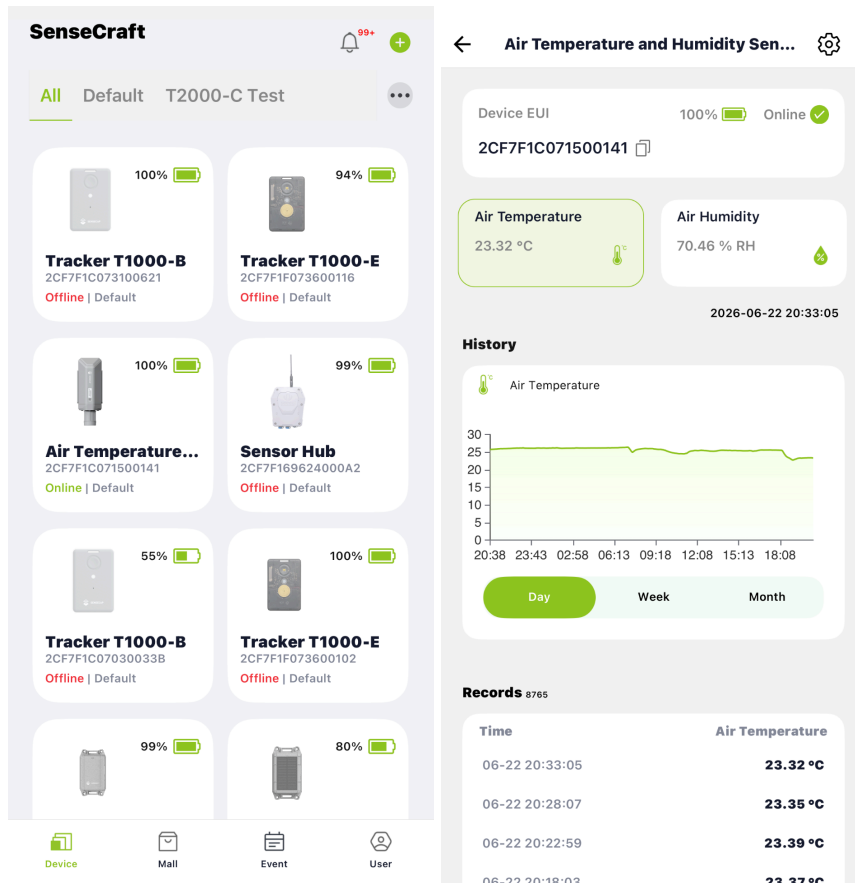
Note:

1. The device includes a built-in solar panel for charging.
2. When using 12V sensors, an external adapter is required. Ensure proper waterproof protection when using an adapter.

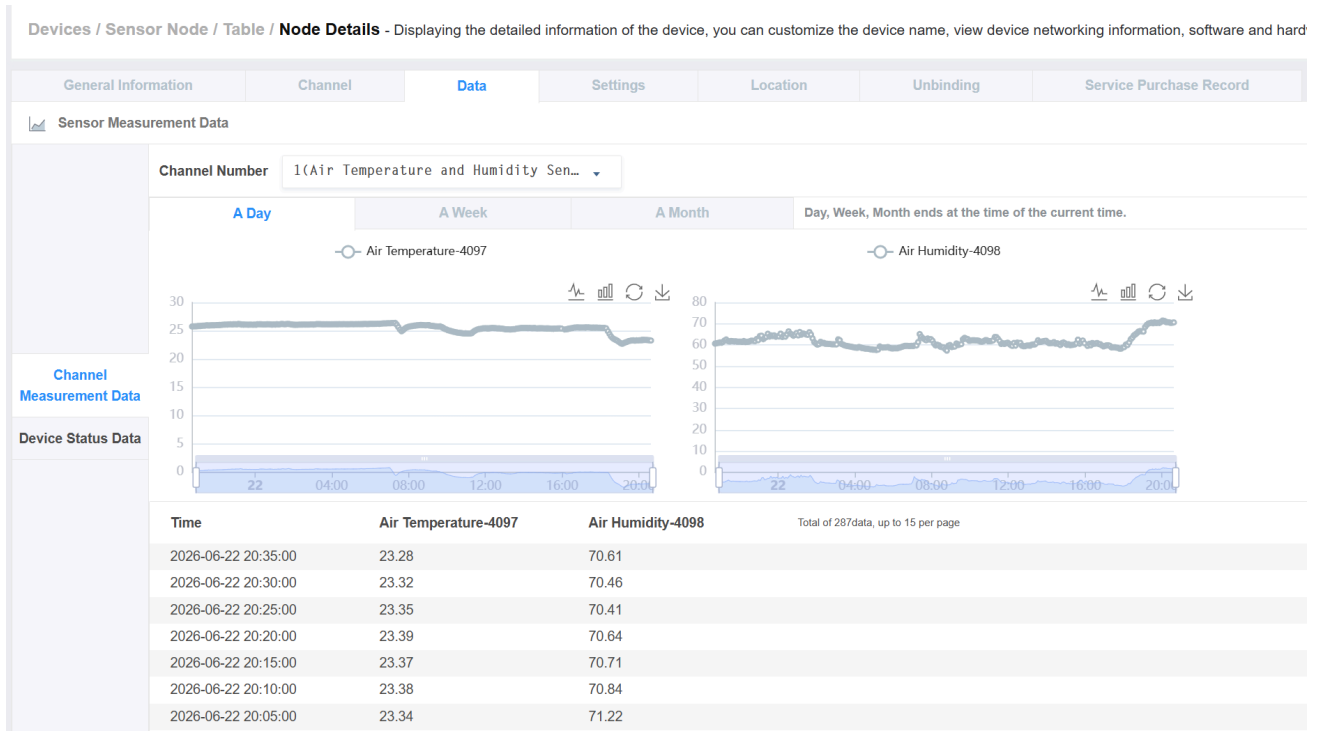
4.3 View Data and Status

You can view device data and status via the app or PC.

1. View data directly in the app:



- Go to <https://sensecap.seeed.cc> and log in. Click “Data” to check if data is uploaded successfully.



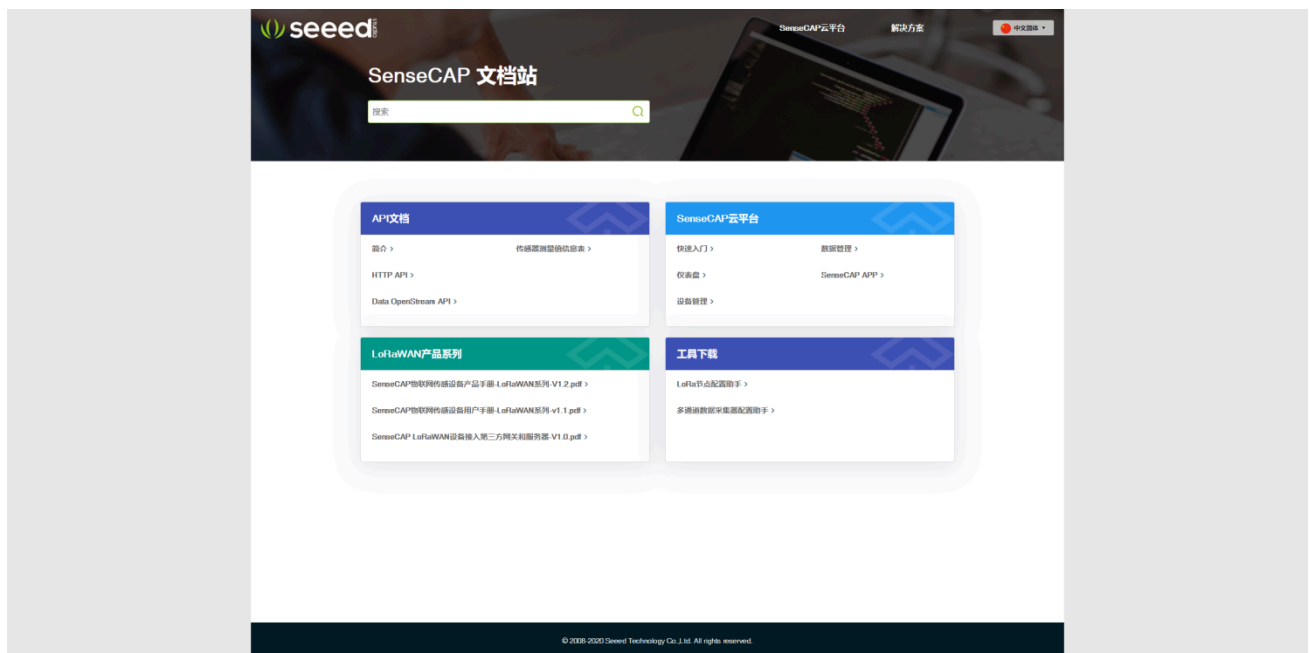
4.4 API Document

SenseCAP API is designed for device management and data access. It supports three methods:

- HTTP API: Manage devices and retrieve raw or historical data.
- MQTT API: Subscribe to real-time sensor data.
- WebSocket API: Receive real-time sensor data.

For details, refer to:

<https://sensecap-docs.seeed.cc/index.html>



5. General Settings

To configure server address, add sensors, or change reporting intervals, use the PC configuration tool:

Download tool:

<https://github.com/Seeed-Solution/SenseCAP-Sensor-Hub-Configuration-Tool-NG/releases>

▼ Assets

14

 latest-linux.yml	414 Bytes	last month
 latest-mac.yml	560 Bytes	last month
 latest.yml	393 Bytes	last month
 sensecap_sensorhub_cfg_tool_ng_2.0.6_amd64.deb	57.2 MB	last month
 Sensor-Hub-Configuration-Tool-NG-2.0.6-mac.zip	82.5 MB	last month
 Sensor-Hub-Configuration-Tool-NG-2.0.6.AppImage	83.7 MB	last month
 Sensor-Hub-Configuration-Tool-NG-2.0.6.dmg	85.4 MB	last month
 Sensor-Hub-Configuration-Tool-NG-2.0.6.dmg.blockmap	92.5 KB	last month
 Sensor-Hub-Configuration-Tool-NG-2.0.6.exe	104 MB	last month
 Sensor-Hub-Configuration-Tool-NG-Setup-2.0.6.exe	105 MB	last month

Mac

Windows

- Driver (first-time use): https://wch-ic.com/downloads/CH341SER_EXE.html

CH341SER.ZIP

The scope of application	version	upload time	size
CH340G, CH340T, CH340C, CH340N, CH340K, CH340E, CH340B, CH341A, CH341F, CH341T, CH341B, CH341C, CH341U	3.8	2023-03-16	553KB
CH340/CH341 USB to serial port Windows driver, supports Windows XP/Vista/7/8/8.1/10/11/ SERVER 2003/2008/2012/2016/2019/2022 -32/64bit, Microsoft WHQL Certified, supports USB to 3-line and 9-line serial port.			

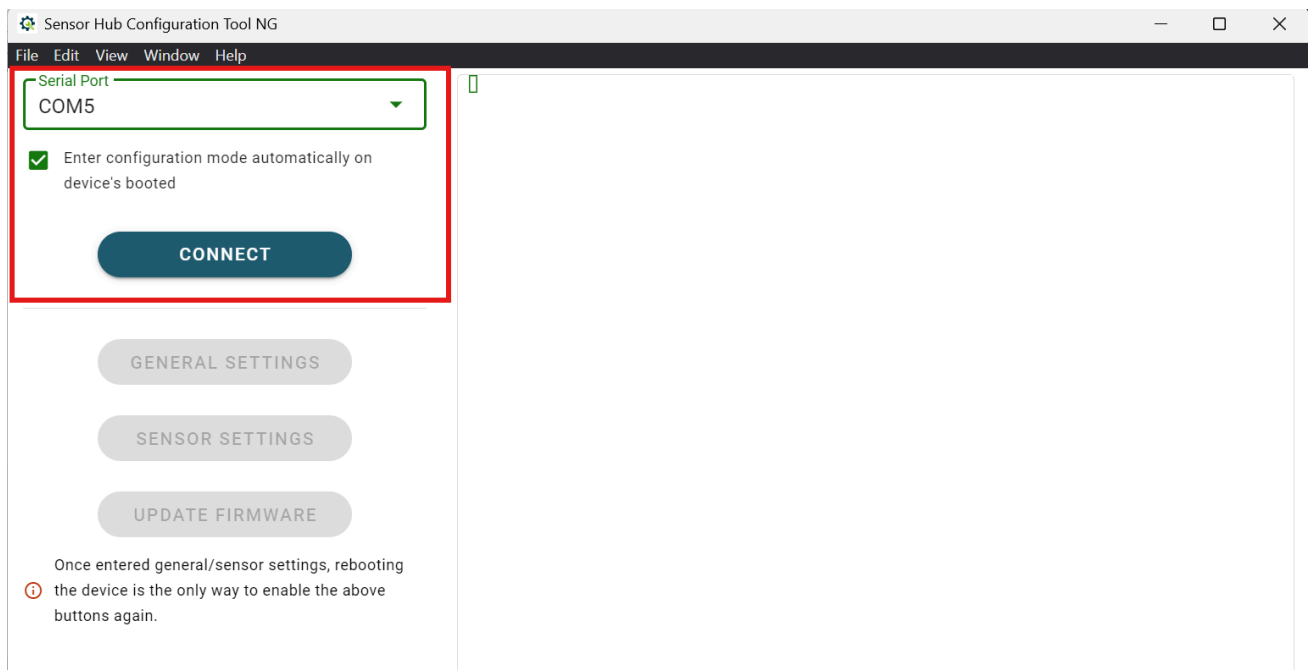
 download

点击下载

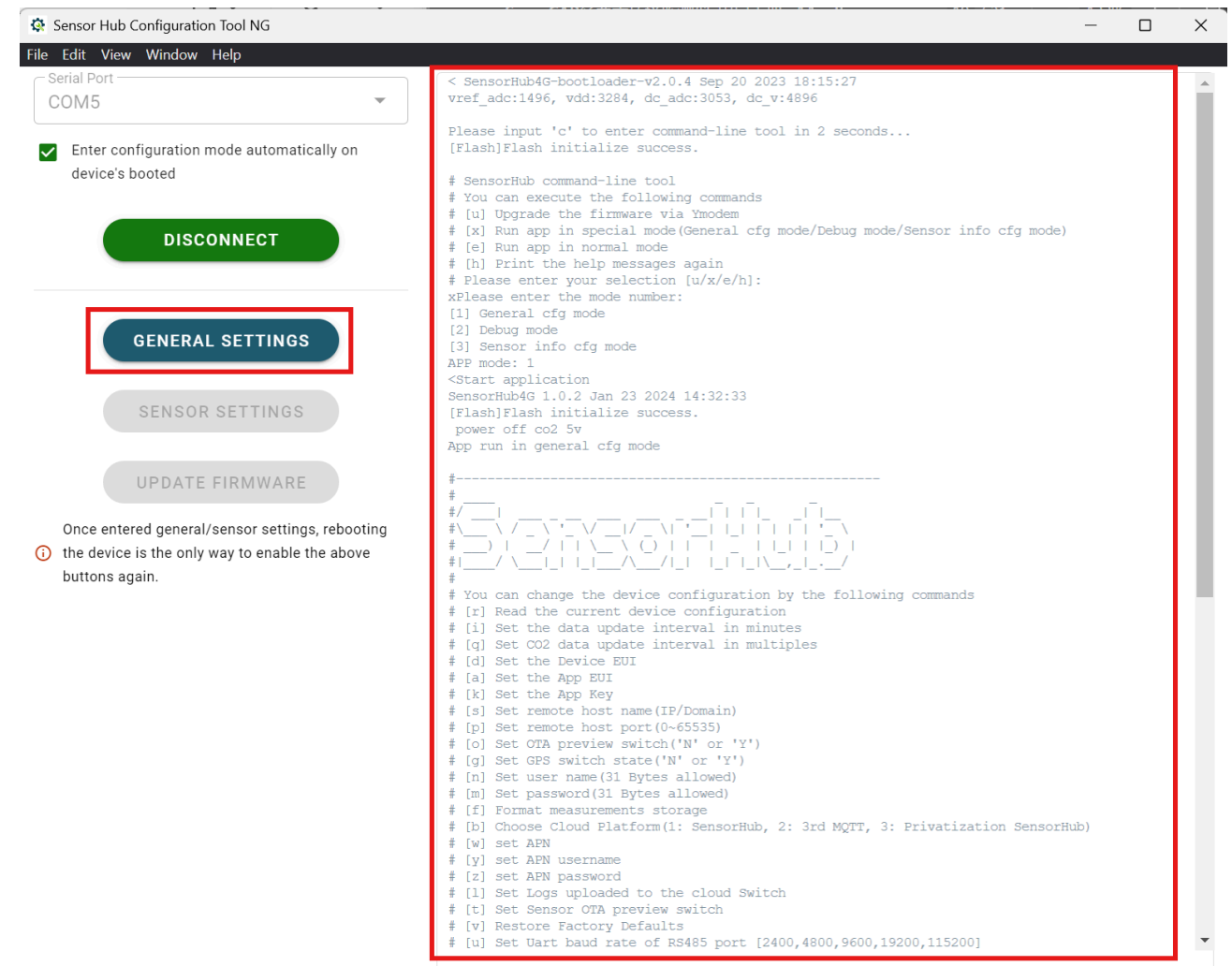
5.1 Parameter Configuration

5.1.1 MQTT Server Configuration

- (1) Connect the device to a PC using a USB Type-C cable.
- (2) Open the tool, select the COM port, enable “Enter configuration mode automatically on device's booted”, click “Connect” then press the metal button.(the "General Settings" and "Sensor Settings" buttons will turn dark blue.)



- (3) Click “General Settings”. Debug messages will appear on the right panel.



(4) Click the input area and type: **b**



(5) After entering the command: **2**, press Enter. As shown in the figure, it indicates that you have switched to the new cloud platform 2

Note: 1 is the SenseCAP cloud platform (default), 2 is the user's third-party MQTT server, and 3 is the SenseCAP private deployment

```
# Please Enter your command with Enter  
b  
Please param, '1': 'Sensecap Platform', '2': '3rd Part MQTT Platform', '3': 'Sensecap Privat  
ization Deployment',end with "Enter"  
2  
New cloud platform: 2
```

(6) Click “General Settings”. Enter MQTT server address, port, username, and password. Click “Write”.

Sensor Hub Configuration Tool NG - General

Device EUI: 2CF7F16974710006

Card ICCID: [Empty]

Battery: 28 %

Signal RSSI: -120 dBm

Data Interval: 5 minutes

CO2 Interval: 2 10 minutes ?

Server Address: 8.8.8.8

Server Port: 1088

Username: ***

Password: ***

☐ Enable GPS

APN: CMNET

APN Username: [Empty]

APN Password: [Empty]

Hardware Version: 1.0.3

Software Version: 1.0.2

READ **WRITE** **EXPORT DATA** **CLEAR DATA**

5.1.2 Data Reporting Interval & CO2 Reporting Interval

- Reporting interval: for all sensors except CO₂
- CO₂ interval: multiple of the reporting interval

Click “Write” after setting.

(**Note:** Short intervals may cause the solar charging rate to be lower than the discharging rate, resulting in the device not being able to charge.)

Sensor Hub Configuration Tool NG - General

Device EUI: 2CF7F16974710006

Card ICCID: [Empty]

Signal RSSI: -120 dBm

Battery: 28 %

Data Interval: 5 minutes

CO2 Interval: 2 10 minutes ?

CO2 Interval is a multiple of the Data Interval, Please enter the multiple value.

Server Address: 8.8.8.8

Server Port: 1088

Username: [Empty]

Password: [Empty]

☐ Enable GPS

APN: CMNET

APN Username: [Empty]

APN Password: [Empty]

Hardware Version: 1.0.3

Software Version: 1.0.2

WRITE

READ EXPORT DATA CLEAR DATA

5.1.3 APN Configuration

- Enter APN, username, and password if required. Default is automatic.

5.1.4 Export Cache Data

- Click “Export Cache Data” to export all historical data.

Sensor Hub Configuration Tool NG - General

Device EUI
2CF7F16974710006

Card ICCID

Signal RSSI
-120 dBm

Battery
28 %

Data Interval
5 minutes

CO2 Interval
2 10 minutes ?

Server Address
8.8.8.8

Server Port
1088

Username

Password

☐ Enable GPS

APN
CMNET

APN Username

APN Password

Hardware Version
1.0.3

Software Version
1.0.2

READ WRITE EXPORT DATA CLEAR DATA

5.1.5 Verify Data Upload to the Server

After configuring the server:

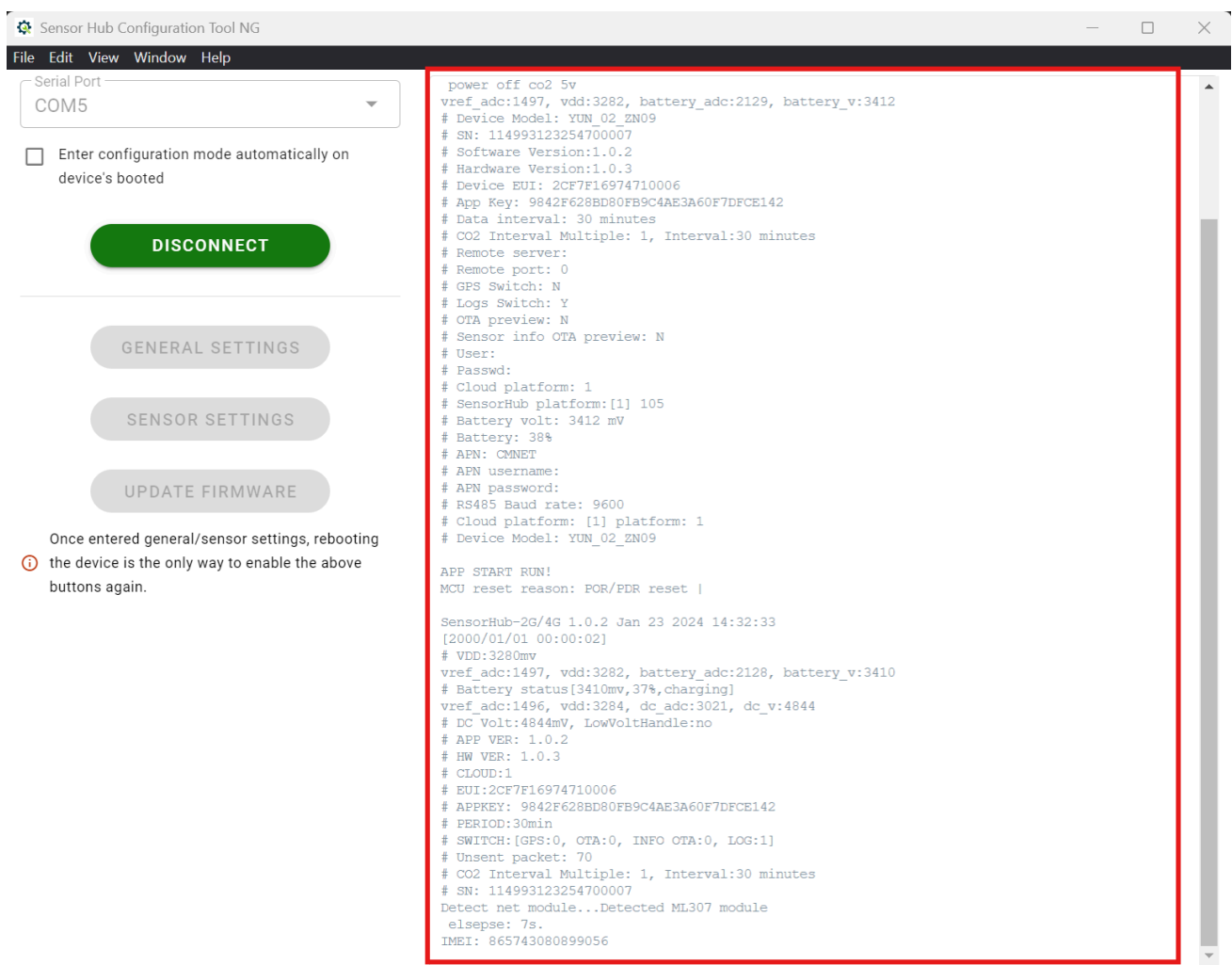
- 1) Close the tool
- 2) Disconnect the USB cable
- 3) Press the metal button to restart the device

Wait a few minutes, and then subscribe to messages according to the topic format using the MQTT subscription tool to see if you can receive device data.

5.2 View Logs and Log Analysis

5.2.1 How to View Device Logs

- Connect the device to a PC via USB Type-C cable
- Open the tool and select the COM port
- Disable “Enter configuration mode automatically on device's booted” mode
- Click “Connect” and press the metal button
- Logs will appear in the right panel



v2.0.6

5.2.2 Log Analysis

Enter working mode, print software and hardware version:

```
< SensorHub4G-bootloader-v2.0.2 Jul 27 2023 11:20:44  
vref_adc:1488, vdd:3302, dc_adc:2847, dc_v:4590
```

Please input 'c' to enter command-line tool in 2 seconds...

[Flash]Flash initialize success.

<Start application

SensorHub4G 0.9.9 Nov 2 2023 10:23:51

[Flash]Flash initialize success.

Basic device configuration information:

power off co2 5v

vref_adc:1490, vdd:3297, battery_adc:2287, battery_v:3682

Device Model: YUN_03_ZN09

SN:

Software Version:0.9.9

Hardware Version:1.0.3

Device EUI: 2CF7F16953110000 // Unique device EUI

App Key: 3E0BD6370A017DD6DDA4A0EFA4584477

Data interval: 5 minutes // Data collection interval

CO2 Interval Multiple: 2, Interval:10 minutes // CO2 sensor collection interval

Remote server: *** // IP/domain name when configured with user server

Remote port: 0 // Port number when configured with user server

GPS Switch: N // GPS switch: N means disabled, Y means enabled, default is disabled

Logs Switch: Y // Log output switch: N means disabled, Y means enabled, default is enabled

OTA preview: N // Remote firmware test switch: N means disabled, Y means enabled, default is disabled

Sensor info OTA preview: N // Remote sensor information test switch: N means disabled, Y means enabled, default is disabled

User: *** // Username of user server, leave blank if not required

Passwd: *** // Password of user server, leave blank if not required

Cloud platform: 1 // Data upload server: 1 means SenseCAP Cloud, 2 means user server, 3 reserved

SensorHub platform:[0] 108

Battery volt: 7236 mV // Built-in battery voltage

Battery: 56% // Built-in battery percentage

APN configuration information:

APN: CMNET

APN username:

APN password:

RS485 Baud rate: 9600 // RS485 sensor baud rate

Cloud platform: [1] platform: 0

Device Model: YUN_03_ZN09

Application starts running

APP START RUN!

MCU reset reason: POR/PDR reset |

SensorHub-2G/4G 0.9.9 Nov 2 2023 10:23:51

[2000/01/01 00:00:05]

VDD:3300mv

vref_adc:1490, vdd:3297, battery_adc:2288, battery_v:3684

Battery status[3684mv,62%,charging]

vref_adc:1489, vdd:3300, dc_adc:2828, dc_v:4556

DC Volt:4556mV, LowVoltHandle:no

APP VER: 0.9.9

HW VER: 1.0.3

CLOUD:1

EUI:2CF7F16953110000

APPKEY: 3E0BD6370A017DD6DDA4A0EFA4584477

PERIOD:5min

SWITCH:[GPS:0, OTA:0, INFO OTA:0, LOG:1]

Unsent packet: 0

CO2 Interval Multiple: 2, Interval:10 minutes

SN:

Detect net module...Detected ML307 module

elsepse: 7s.

Registered, home network.Time sync (ntp1.aliyun.com)ok!

register network ok,elsepse: 13s. // Network registration successful

[2023/11/08 15:36:59]

syn time sucessful // Time synchronization successful

Checking sensor information list:

[2023/11/08 15:36:59]Check that the sensor infor is up to date...

This is the latest info, ver:26!

=====

sinfo list: total:55 =>

[1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,50,51,52,53,55,56,57,]

En list: total:55 =>

[1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,50,51,52,53,55,56,57,]

Scanning data acquisition channel information:

RS485 Baud rate: 9600

=====

[!Find] I2C light sensor , virtual channel 10// Built-in light sensor detected on channel 10

=====

[!Find] I2C humiture sensor , virtual channel 11

=====

[!Find] I2C pressure sensor , virtual channel 13

=====

[!Find] CO2 sensor(1), virtual channel 12

[2023/11/08 15:37:01] power on co2 5v

=====

Check to see if there are sensors from last time

Scan port: 2/Channel 2, corresponding to channel 2 of the data logger

=====

Scan port: 2

Always-powered sensor information:

5V UPS num:0, 12V UPS num:0, list:

port2 UPS power:

Channel usage status:

The channel number consists of the main channel + sub-channel. This field is included in the sensor measurement value for identification.

<Channel status

channel: 10, saddr: 1, sensorID: 0x1003, status: NORMAL // channel 10 represents main channel 1, sub-channel 0;

// saddr represents the Modbus address;

// sensorID represents the sensor ID;

// status has three states: IDLE (unused) / NORMAL (working normally) / ABNORMAL (abnormal)

channel: 11, saddr: 2, sensorID: 0x2048, status: NORMAL

channel: 12, saddr: 3, sensorID: 0x1004, status: NORMAL

channel: 13, saddr: 4, sensorID: 0x1005, status: NORMAL

channel: 14, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 15, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 16, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 17, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 18, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 19, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 20, saddr: 19, sensorID: 0x0000, status: IDLE

channel: 21, saddr: 3, sensorID: 0x0000, status: IDLE

channel: 22, saddr: 20, sensorID: 0x0000, status: IDLE

channel: 23, saddr: 34, sensorID: 0x0000, status: IDLE

channel: 24, saddr: 17, sensorID: 0x0000, status: IDLE

channel: 25, saddr: 45, sensorID: 0x0000, status: IDLE

channel: 26, saddr: 21, sensorID: 0x0000, status: IDLE

channel: 27, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 28, saddr: 0, sensorID: 0x0000, status: IDLE

channel: 29, saddr: 0, sensorID: 0x0000, status: IDLE

Finish RS485 scanning, elapse 60s.

>ST MEASURE

Read light BH1721FVC...

Detect eeprom

Light Factor: (Scale2:27177, Scale1:3746, Offset:-2)

Actual sensor measurement values

[2023/11/08 07:38:02 T32]channel: 10, addr: 1, meas id:4099, decimals: 0,value: 14 (4.167, Scale2:27177, Scale1:3746, Offset:-2)

ch: 10, st:normal

[2023/11/08 07:38:03 T32]channel: 11, addr: 2, meas id:4097, decimals: 2,value: 26.68(26.68+(0.00))

[2023/11/08 07:38:03 T32]channel: 11, addr: 2, meas id:4098, decimals: 2,value: 58.28

[2023/11/08 07:38:03 T32]channel: 11, addr: 2, meas id:4202, decimals: 2,value: 17.81

ch: 11, st:normal

[2023/11/08 07:38:03 T32]channel: 13, addr: 4, meas id:4101, decimals: 0,value: 100700

ch: 13, st:normal

CO2 collect:0, 2

[2023/11/08 15:38:03]sleep wait 61...

lwdg

cnt:1

lwdg

cnt:2

lwdg

cnt:3

co2 collect timer done
cnt:4
[2023/11/08 15:39:05]co2 collect wakeup, sleep tick: 61587 = 61593-6
ZG09 ABC:400, 0
[2023/11/08 07:39:05 T32]channel: 12, addr: 3, meas id:4100, decimals: 0,value: 747
ch: 12, st:normal
power off co2 5v
elapse:4s

Network information

>ST NETWORK
Registered, home network.Time sync (ntp1.aliyun.com)ok!
register network ok.
ICCID: 898604261023C0073416 // SIM card ICCID
IMEI: 864606064634677
[2023/11/08 15:39:19]
syn time sucessful
net rssi: -51 // Network signal strength
network latency:92ms // Network latency
>ST APP OTA
OTA elapse: 1s

Communication log with server

>ST CONNECT SERVER
[2023/11/08 15:39:21]need get token
server_url: 39.108.230.236
server_port: 1883
elapse: 2s
>ST DOWNLINK CFG
elapse: 1s
>ST SEND ST
send status successful
elapse:1s
>ST SEND CH
send channel info successful
elapse:0s
>ST SEND DATA
RecordCount: 1
Read measurement data from local buffer, packet_size=103
CRC check success
[2023/11/08 07:38:02 T32]channel: 10, saddr: 1, meas id:4099, timestamp: 1699429082221, value: 14
[2023/11/08 07:38:03 T32]channel: 11, saddr: 2, meas id:4097, timestamp: 1699429083286, value: 26.68
[2023/11/08 07:38:03 T32]channel: 11, saddr: 2, meas id:4098, timestamp: 1699429083286, value: 58.28
[2023/11/08 07:38:03 T32]channel: 11, saddr: 2, meas id:4202, timestamp: 1699429083286, value: 17.81
[2023/11/08 07:38:03 T32]channel: 13, saddr: 4, meas id:4101, timestamp: 1699429083376, value: 100700
[2023/11/08 07:39:05 T32]channel: 12, saddr: 3, meas id:4100, timestamp: 1699429145211, value: 747
Publish, meas cnt = 6
send measurement data sucessful // Indicates that data was successfully sent to the server
elapse:0s
>ST LOG
elapse:6s
>ST INFO OTA
This is the latest info, ver:26!

elapsed:1s

>ST WORK LIST:

meas_count:1, unsent:0

cycle:300s, work:165s, sleep:135s

net_reg:1, net_err:0, net_elapsed:26s

average_work_tm:165s,285s

[2023/11/08 15:39:32]==== RUN END{1699429172}-0====

6.Troubleshooting

6.1.1 Abnormal Sensor Channel Status on Cloud Platform

- Usually caused by a sensor being disconnected during operation.

6.1.2 [ERROR] No sensor found. Is the sensor connected

Please check the following:

- Verify that the sensor wiring sequence (positive/negative/RS485 A, B) is correct;
- Ensure that the sensor Modbus address matches the address set in "Sensor Settings";
- Verify that the sensor power supply type is configured correctly;
- Ensure that the warm-up time, startup time, and response timeout time meet the sensor requirements;
- Check that the function code and registers for the measured values are configured correctly;

6.1.3 [ERROR] RS485 err code: XX XX

Some sensors require a warm-up time. If communication is initiated before this warm-up time is reached, the sensor will return a function code error.

When testing a sensor, the first step is to check if the sensor exists. This check only requires waiting for the startup time, not the warm-up time. For example, if the sensor startup time is 1 second and the warm-up time is 5 minutes, and the data acquisition unit attempts to communicate after powering on the sensor but only waits 1 second, a function code error will be received. The window will display "[ERROR] rs485 err code". When acquiring data, the warm-up time will be waited before communication to ensure data acquisition.

7. Installation and Notes

7.1 Using the Built-in Battery in Low-Temperature Environments

- Discharge range: 0°C ~ 50°C
- Charging range: 0°C ~ 40°C (limited by the operating temperature range of the power adapter)

Please note that because the device has a built-in lithium battery, when using solar power or an adapter:

- 1) If the ambient temperature remains below 0 °C, the battery will remain uncharged until the ambient temperature rises above 0 °C.
- 2) During the period when charging is stopped, if the battery is completely depleted, the device cannot operate using solar power or an adapter. It will require waiting for the ambient temperature to rise above 0 °C and for the li-ion battery to charge to a safe level before the device can function normally.

7.2 Installation Examples

- Two mounting methods: hanging or pole mounting

Hanging Installation:



Pole Mounting:



Version	Description	Date	Author
v1.0	First release	2026-07-21	Janet Zhang
v1.1	Added image descriptions	2026-08-12	Janet Zhang
v1.2	Modify image	2026-08-14	Janet Zhang