SensiLink

User Guidance

Version 1.0

Content

Section 1. General Information

Welcome to the SensiLink Configuration Tool. This tool is designed to configure the device and collect data from it.

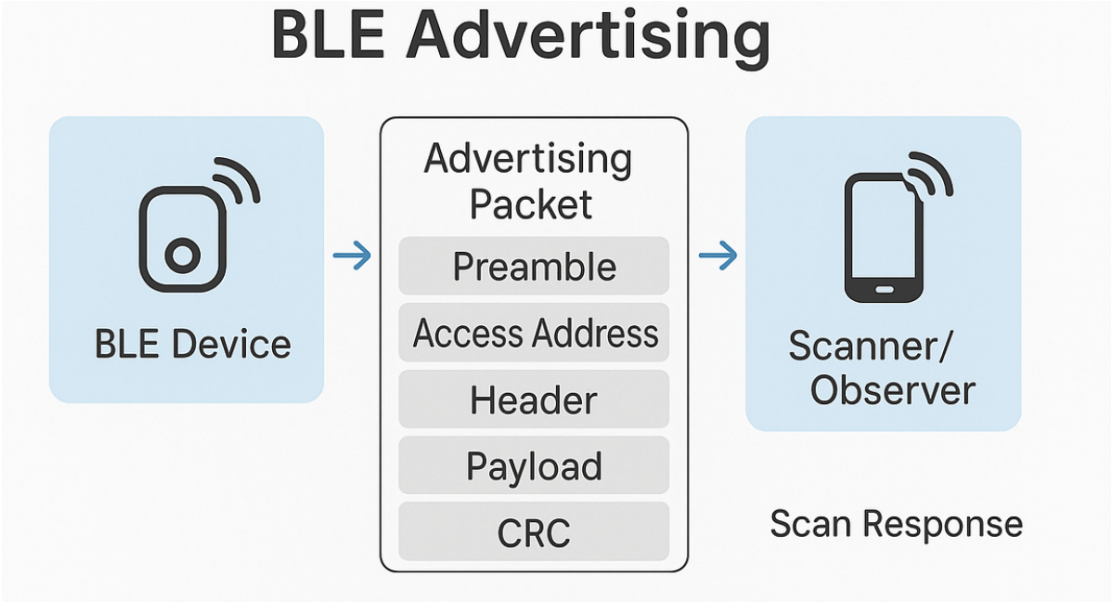
In the PC version, the Configuration Tool uses an NFC reader to customize the device.
In the Android version, the built-in NFC function of the smartphone can also be used for customization.

The Configuration Tool can obtain data through **BLE (Bluetooth Low Energy) advertising** sent by the device. It can also use the **Bluetooth Connect** function to perform further operations. However, there are some differences between the PC and Android versions — for example, downloading the data logger from the device.

Information about Bluetooth Low Energy

What is Bluetooth Low Energy (BLE)?

Bluetooth Low Energy (BLE) is a wireless communication technology developed as part of the Bluetooth 4.0 specification. It is designed to provide reliable, short-range data exchange while consuming significantly less power than Classic Bluetooth. BLE operates in the globally available 2.4 GHz ISM band, using 40 channels with adaptive frequency hopping to minimize interference and ensure robust connections.



Key Features of BLE

1. Low Power Consumption

2. Flexible Communication Modes (Advertising or Connection)
3. Efficient Data Exchange
4. Scalability

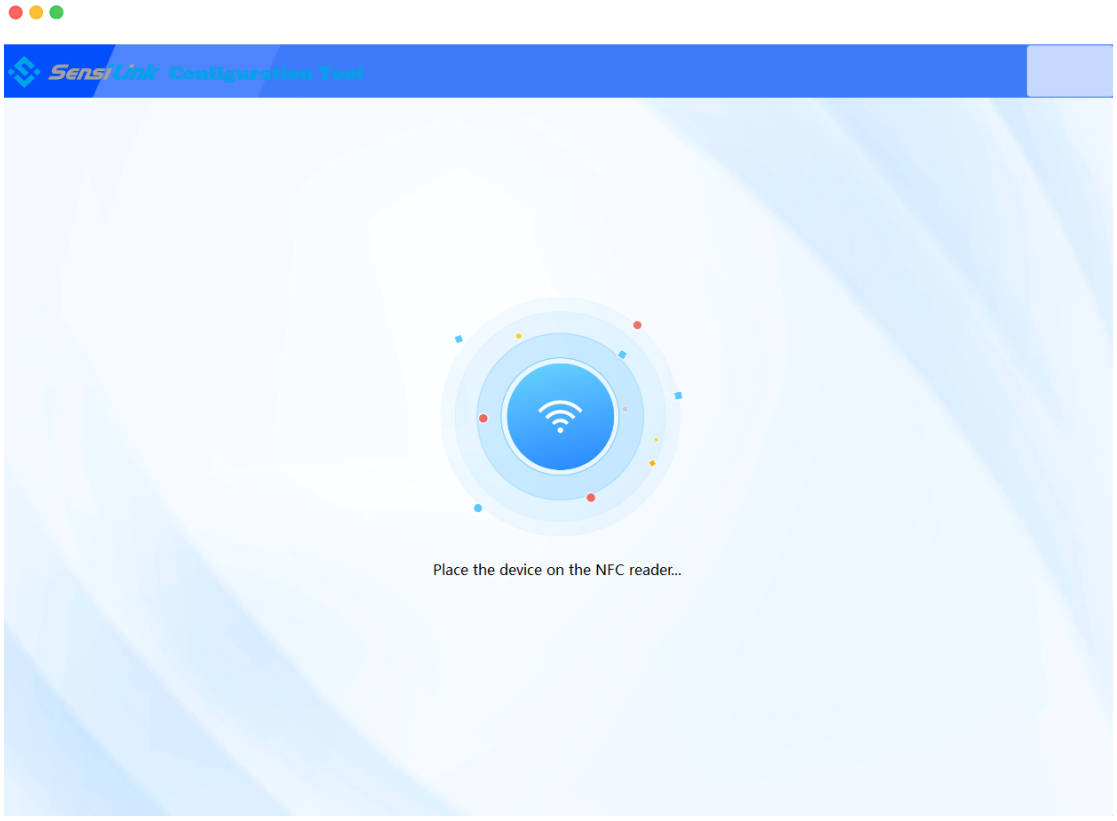
More Information about Bluetooth Low Energy:

https://www.bluetooth.com/bluetooth-le-primer/

https://www.bluetooth.com/bluetooth-resources/intro-to-bluetooth-low-energy/

Steps to use the configuration tool in PC

To configure the setting of the Bluetooth Low Energy device on PC, an NFC Reader is essential to launch the configuration tool. Otherwise, the configuration tool will not launch successfully.



Steps to Launch the SensiLink Configuration Tool for PC：

1.Plug in the NFC Reader (ACS ACR 122U in this demo)

2. Put the BLE device on the reader.

3. Waiting the LED turn to Grenn Light

4.After the configuration tool detected the device, the data configure interface will display

Compared with the PC version, the Android version offers an easier way to connect to the device, as most Android smartphones are equipped with NFC. Users simply need to place the BLE device close to the NFC area, typically located on the back of the smartphone near the camera.

Section2. Data setting

In the configuration menu, there are 7 types of data that can be customized.

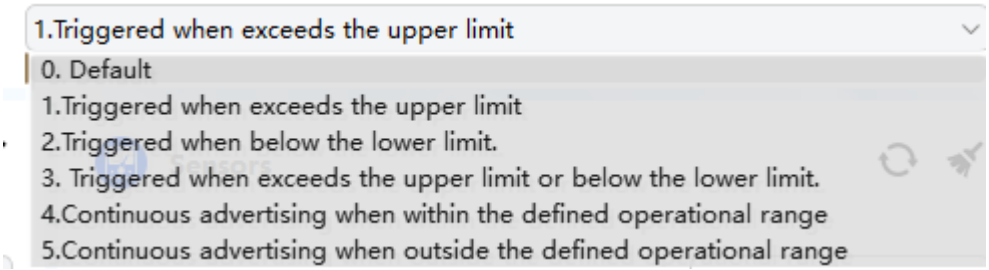
1.Power switch:

Turn On/Off the power of the device.

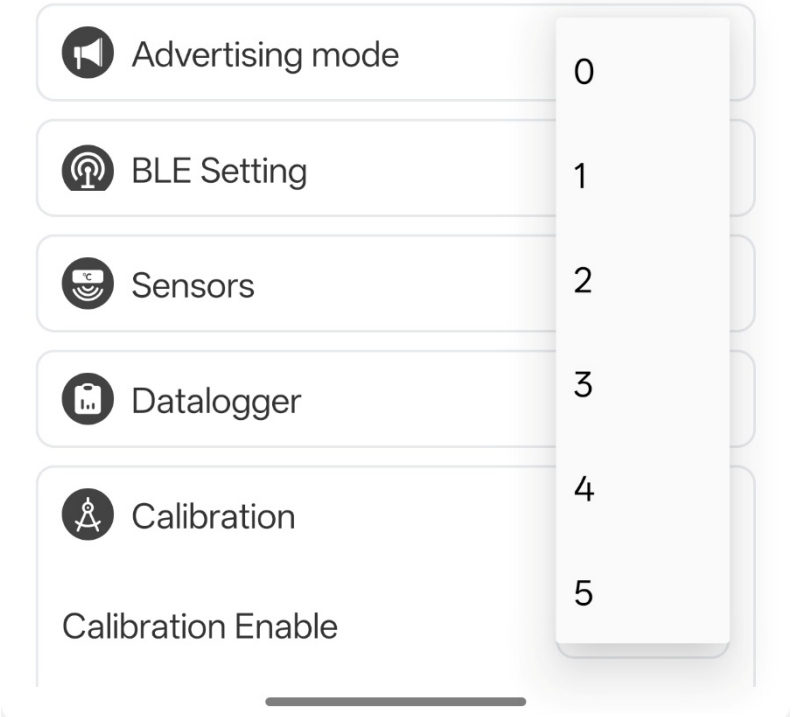
2.Bluetooth Advertising Mode：

There are 6 Bluetooth advertising mode scenarios:

Advertising Mode on PC:



Advertising Mode on Android:



Default Mode

The default Bluetooth advertising period is 3000ms(3s) and the default sensor sampling period is 8s. (Mode 0)

Event Mode：

Exceeding the upper limit triggers (Mode 1):

When the temperature or relative humidity exceeds the configured upper limit, the device will be triggered and send an alarm information.

Triggered below the lower limit (Mode 2):

When the temperature or relative humidity is below the setting limit, the device will be alarmed.

Triggered when exceeds the upper limit or below the lower limit (Mode 3) ：

When this mode is enabled, the device continuously monitors whether the temperature and humidity remain within the safe range. If the data goes beyond the configured limits, the device will immediately send an alarm advertising message.

Event Continuous Mode:

Within the range (Mode 4):

When the temperature is within the range or the humidity is within the range, the device will continuously send information that makes sure the monitor environment is in the temperature or humidity range.

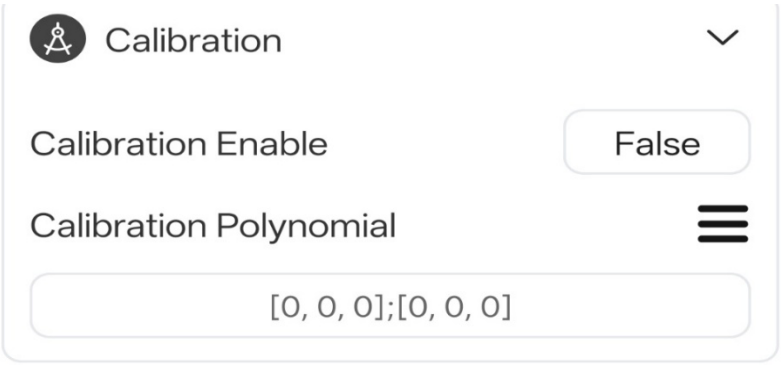
Outside the range (Mode 5) ：

When the temperature is within the range or the humidity is outside the range, the device will continuously send the alarm information to the user so that the environment status has changed.

3.Temperature Calibration:

Calibration menu on PC

Calibration menu on Android



Calibration Specification for Device Temperature Readings

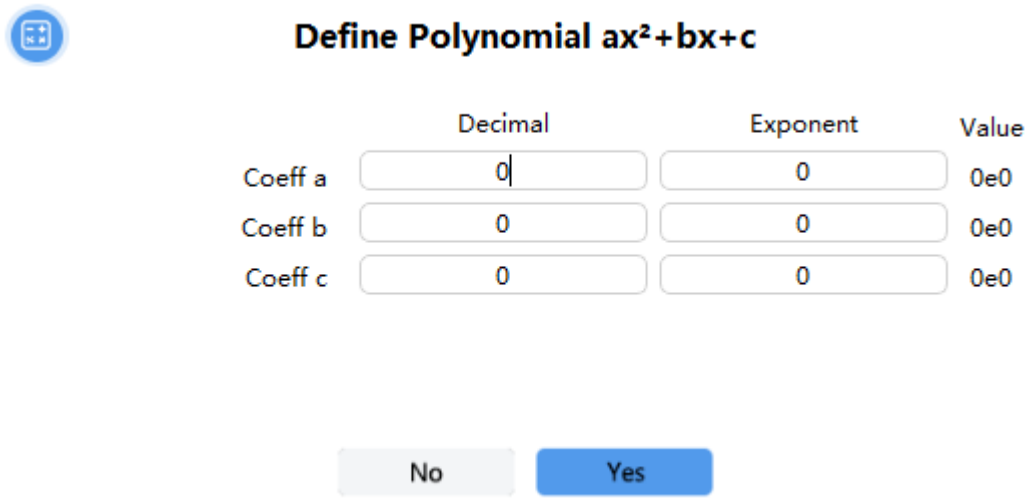
The temperature measurements obtained from the device may be calibrated using a second-degree (quadratic) polynomial equation:$\boldsymbol{T_{cal} = aT^2 + bT + c}$, where coefficients a, b, and c are user-configurable parameters, **T**: Raw (uncalibrated) temperature reading from the sensor,$\boldsymbol{T_{cal}}$: Calibrated temperature value.

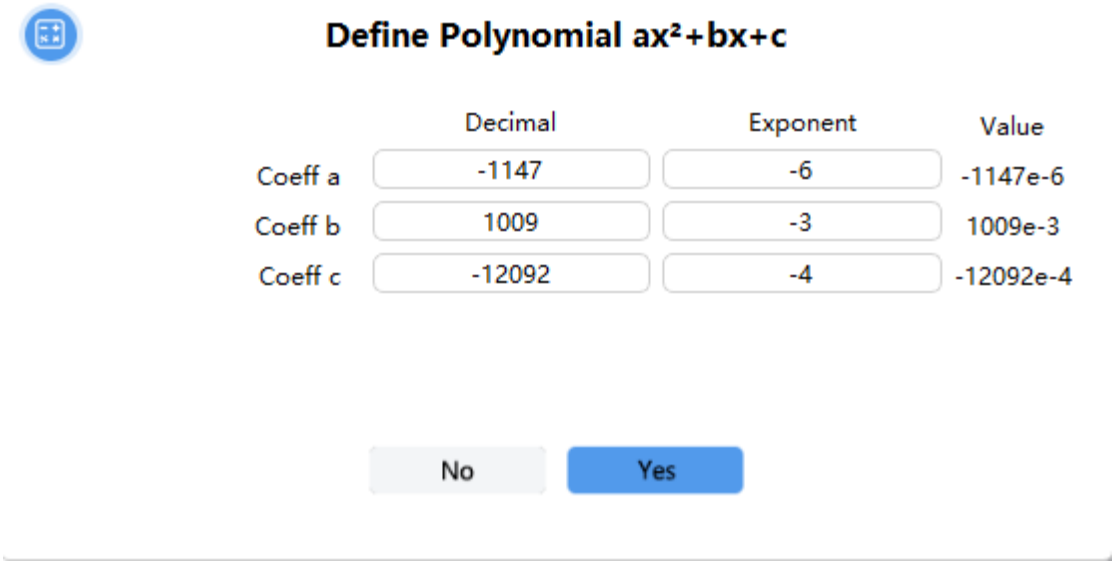
Example：

Assume the true temperatures are 0°C,25°C and 50°C ($\boldsymbol{T_{cal}}$). And assume the raw sensor output temperature are 1.2°C,26.8°C and 54.1°C(T). Now, input those temperature data into the equation. After calculation, a=-0.001147, b=1.009 and c=-1.2092.

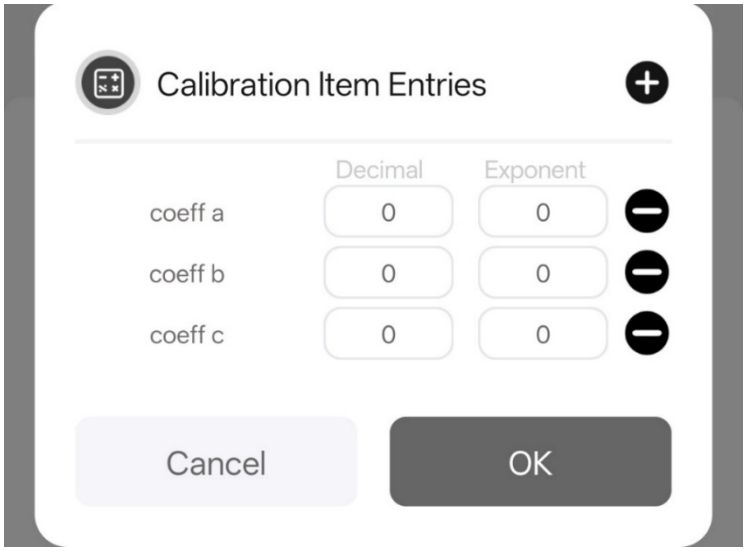
When input the coefficients into the calibrated equation in NFC configuration, the format is *XeY*. For example: a=-1147e-6. So, the Decimal is -1147,and the Exponent is -6.

Calibration equation data menu on PC





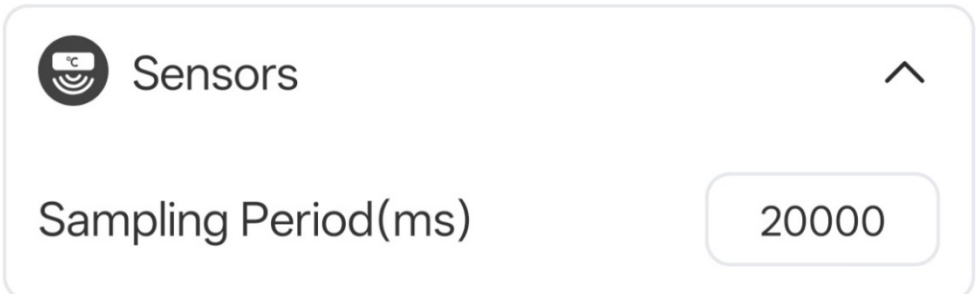
Calibration equation data menu on Android



4.Sensor Setting

PC：

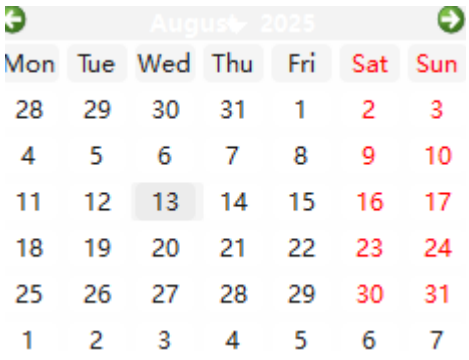
Android:



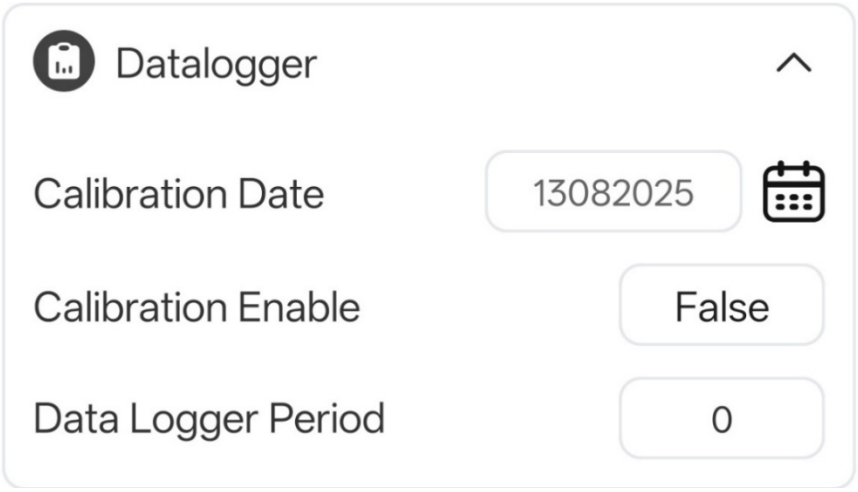
The sampling period of the sensor can be fully customized. The minimum period is 100ms and the maximum period is up to 1 day.

5.Datalogger

Datalogger setting menu on PC:



Datalogger setting menu on Android:



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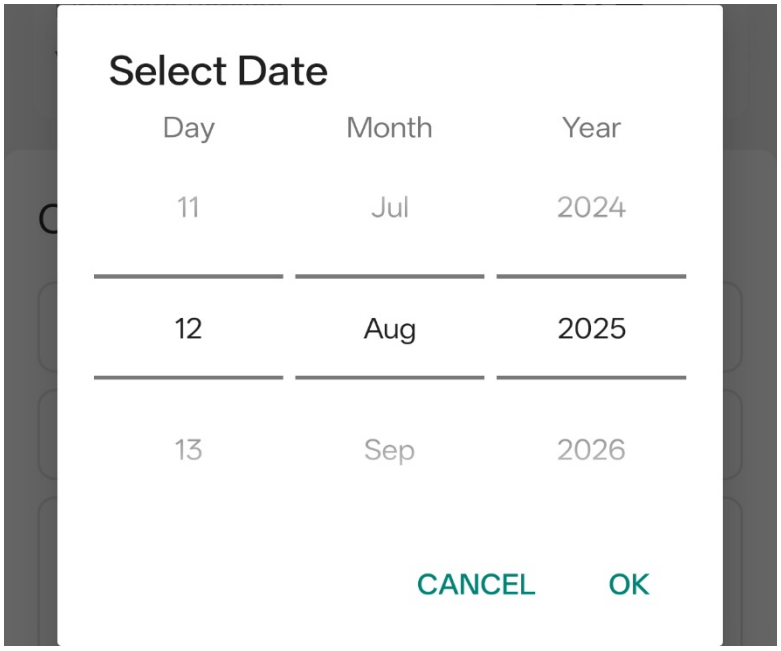


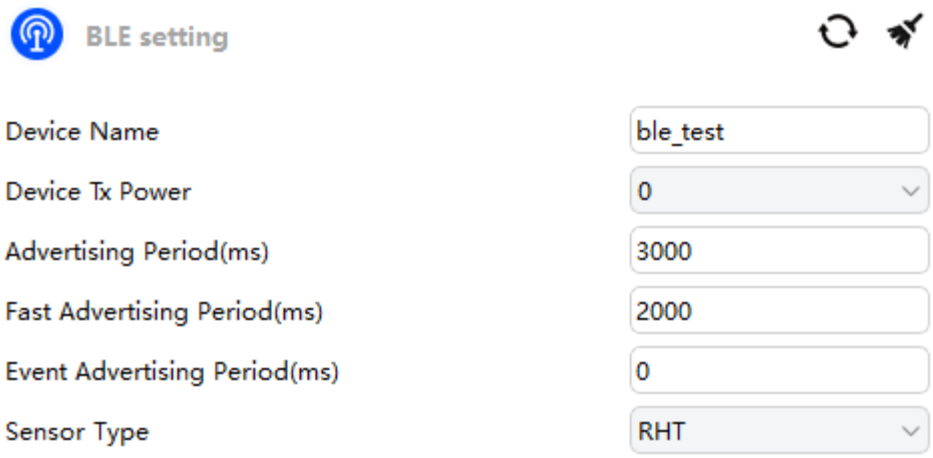
The data logger function is disabled by default. To use it, the user must set **Data Logger Enable** to **Enable** mode. Once enabled, the current data must be calibrated. After calibration is completed, the device will begin storing data in the format DD/MM/YY HH: mm: SS + Time Zone. The user must also define the recording interval (in ms). For example, if the interval is set to 1 minute, the device will store data every minute after the data logger function has been enabled.

Date Calibration:

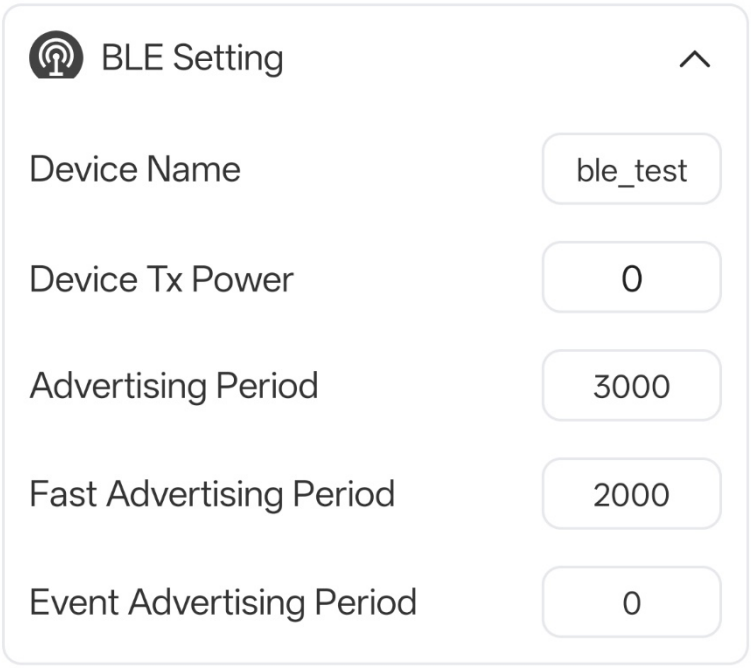
If the data logger function is enabled, the **Calibration Date** will display the last time the user performed a calibration. Once a new calibration date is selected or by clicking the , the current date will be update., the date will be updated automatically. **Note:** Due to the UI design, the calibration date on the Android version is displayed in DD/MM/YY format only.

6.Bluetooth setting

BLE setting menu on PC:



BLE setting menu on Android:



Users can customize the Bluetooth setting through the configuration tool.

Device Name:

Maximum 15 characters

Device Tx Power:

There are 9 Tx Power modes that can be selected: -40, -20, -16, -8, -4,0, +3, +4. Which will influence the performance of the device.

BLE advertising period:

There are 3 types of advertising period setting

1. Adverting Period(For Mode 0):

This is the default advertising setting. The period is from 20ms to 10240ms.

2.Fast Adverting Period

Fast advertising is only enabled when the Event advertising Mode (**Mode1,2,3)** enables. The period is also from 20ms to 10240ms.

3.Continues Adverting Period

This setting is only available when the Continues Mode (**Mode4,5)** enables. The continuous advertising period is from 10 to 180000 ms.

7.Alarm setting

Users can set the alarm temperature and humidity value.

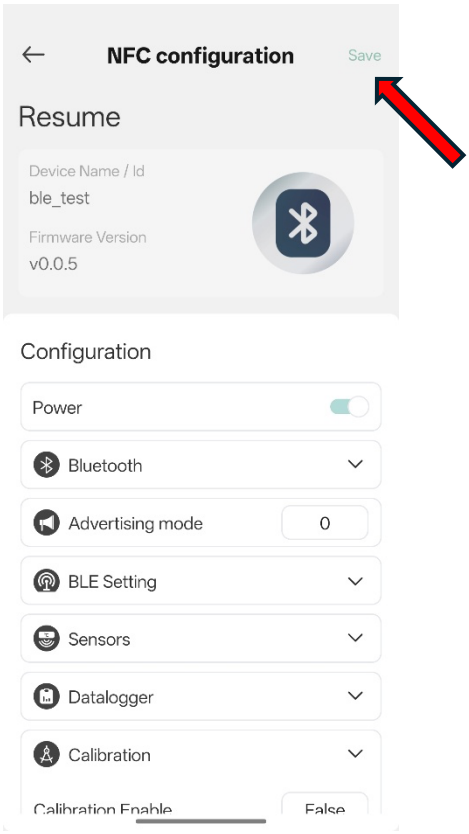
The temperature range is from -40-85°C, with two decimals (e.g. 20.25°C)

The humidity range is from 0-100%.

Enable Setting

Once all the configuration has been filled in, click the ‘write device’ at the bottom of PC version. Or click the ‘save’ on the right corner in the Android Version.

On Android Version ,please click the save on the right corner.



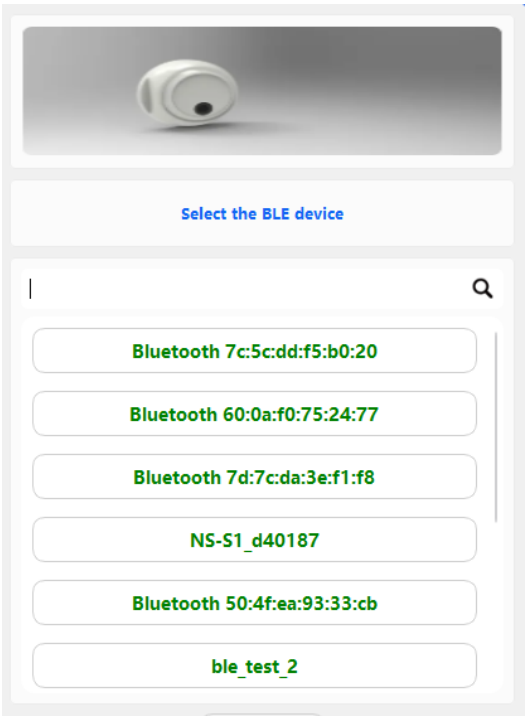
If all the configuration data is valid, the device will save those configurations.

The efficiency of NFC setting in Android

Due to hardware limitations in Android smartphones, the efficiency of NFC configuration is lower compared with the PC version. NFC performance on Android devices may vary because of differences in chipsets and antenna layouts, which affect transmission strength and sensitivity. In addition, Android's NFC framework restricts access to certain low-level commands, and background services (such as payment apps) may interfere with configuration. Environmental factors, such as antenna alignment and nearby interference, can also impact stability. For applications that require higher reliability, the PC-based SensiLink configuration tool is recommended.

Section 3.BLE Data Monitoring on Configuration Tool

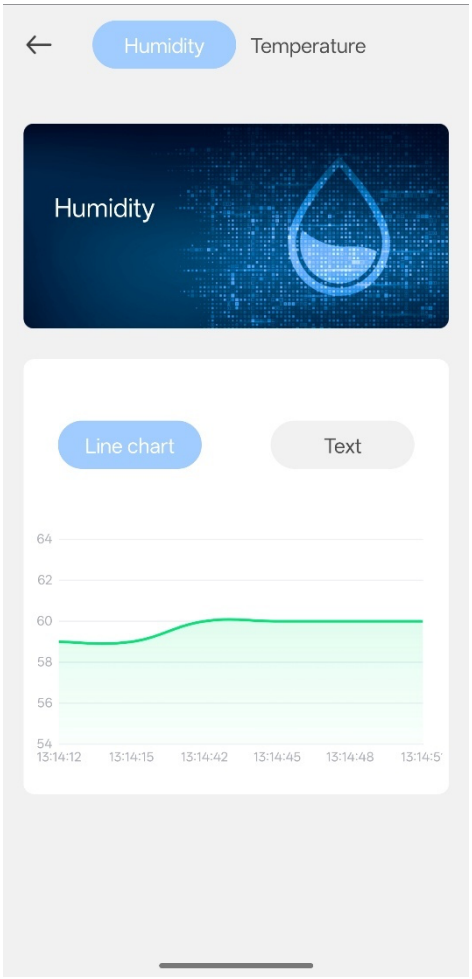
Steps on PC

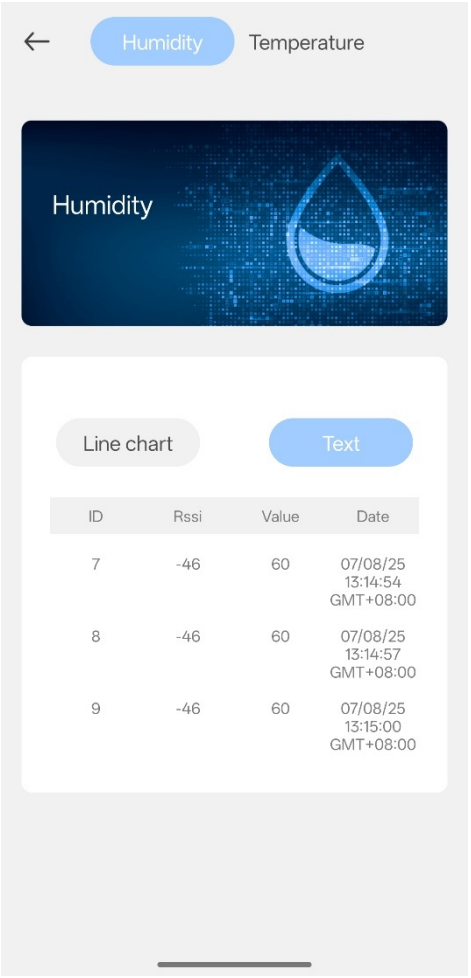


1. Click the ‘Data’ button on the menu.
2. Select the target device manually or search for it.
3. The device information and data will be displayed, including device name, MAC address, and RSSI. For RHT devices, temperature and relative humidity information will also be provided.

Steps on Android

1. Click the “Advertising Data” on the main menu
2. Select the target BLE device
3. There are two data formats (line chart and text) available for displaying the advertising data, including relative humidity, temperature, and date.

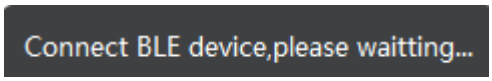




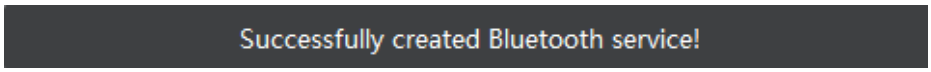
Section 4 Bluetooth Connect Mode

How to use the Bluetooth Connect Mode on PC

1. Click ‘View Datalogger’ when opening the Data menu
2. Wait for the configuration tool to connect to the BLE device



3. The device connects to the PC successfully



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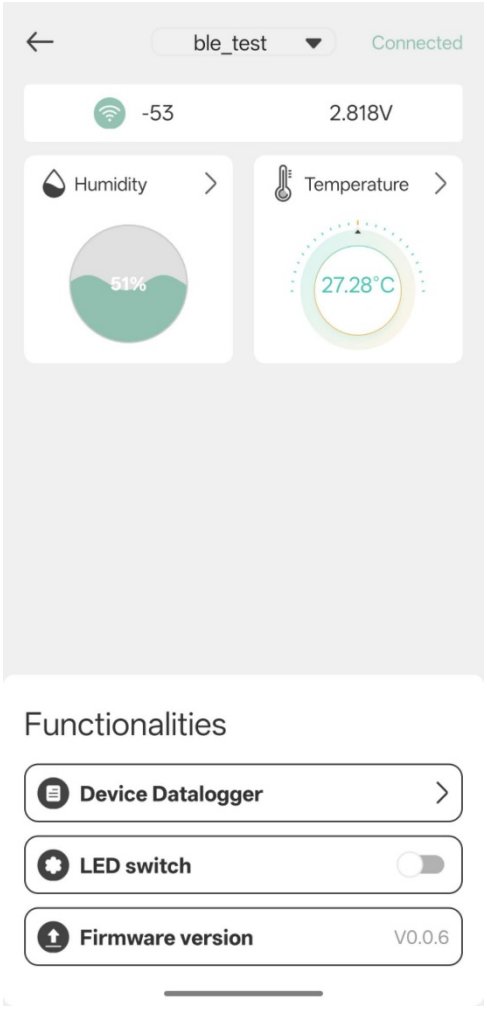
How to use the Bluetooth Connect Mode on Android

1. Select the ‘Bluetooth’ at main menu
2. Select the device that you want to connect
3. Once the device connects successfully, the Bluetooth Connect Mode interface will be shown as:



Explanations of the Bluetooth Connect Mode on Android

1.At the top of the menu, the user can select different devices. Clicking the **Connected** button will disconnect the BLE device from the smartphone.

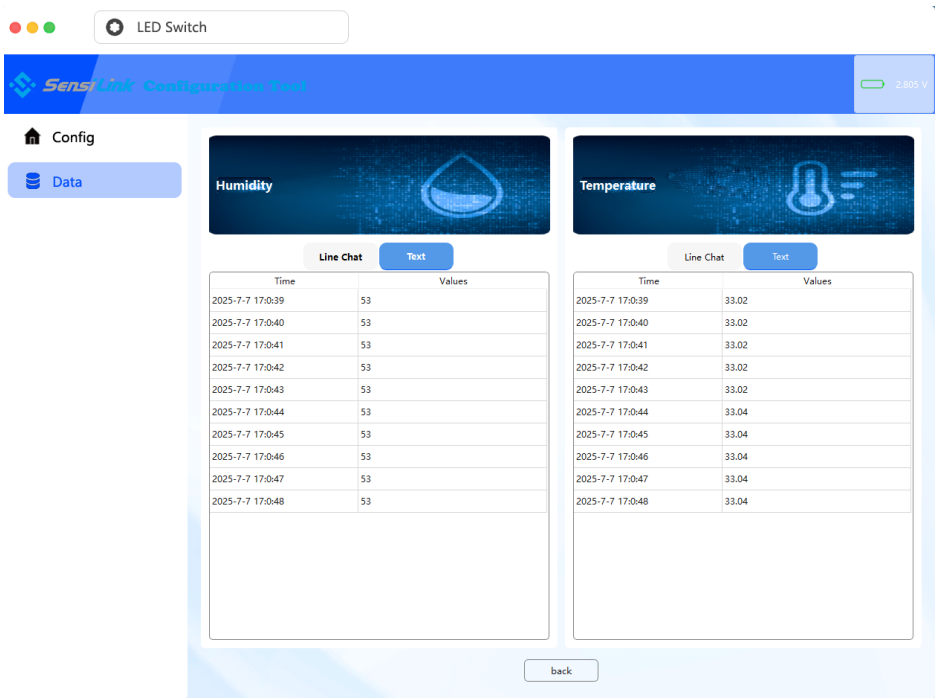
2.Information such as RSSI, battery voltage, relative humidity, and temperature is also displayed.

3.The functions will be described in detail in the following sections.

Functionalities in Bluetooth Connect Mode

Function 1: Data Logger

If the data logger function is enabled in the NFC configuration, the device will record data at user-defined intervals. Once the PC connects to the BLE device, the relative humidity and temperature data will be displayed in either line chart or text format.



In Android version is similar as the PC version, but the datalogger is available to download。

Function 2: Display the voltage of the battery (PC/Android)

When in Bluetooth connection mode, the lithium battery voltage is displayed, which can be used to roughly estimate the remaining battery capacity

Function 3: LED Flash (PC/Android)

When the user clicks the ‘LED switch’ button, the LED on the BLE device will flash, helping to quickly identify the controlled device.

Function 4:Alarm Information (Android only)

If the user selects an alarm mode (Mode 1–5), the alarm information will be displayed in Bluetooth connection mode, indicating that the environmental conditions are no longer suitable.

To Use this function, the device should be scan by the NFC first (no matter if set the alarm data in PC version). Once the configuration tool gets the data, the alarm information will be displayed on the page of Bluetooth Connect Mode.