Weather Sentri – product manual

Sentrisense - Powering up a greener future

Para versión en español clic AQUÍ

Warranty and Assistance

Sentrisense AB warrants that the Weather Sentri device will be free from defects in materials and workmanship under normal use and service for a period of five (5) years from the date of shipment, unless specified otherwise. Batteries are not covered under this warranty.

In the event of a defect, Sentrisense sole obligation under this warranty will be to repair or replace (at Sentrisense option) the defective product. The customer shall be responsible for all costs associated with removing, reinstalling, and shipping the defective product to Sentrisense. Sentrisense will return the repaired or replacement product by carrier, the cost of which will be covered by the customer.

This warranty will not apply to any Sentrisense product that has been modified, misused, neglected, damaged by natural disasters, or damaged during shipping. This warranty is in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose. Sentrisense is not liable for any special, indirect, incidental, or consequential damages. Products may not be returned without prior authorization. The maximum liability of Sentrisense will be limited to the value of the SENTRI.

For international customers residing in countries served by Sentrisense directly, please contact info@sentrisense.com for a Returned Materials Authorization (RMA) number. For customers in other countries, please visit www.sentrisense.com/distributors to determine the Sentrisense affiliate company that serves your country.

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Revision history

Revision	Date	History
v1.0	2023/08/22	Release version

Index

General and safety information

- Do not attempt to open the Weather Sentri unless instructed to do so by Sentrisense technical support.
- Avoid contact between electronic parts and steel elements to prevent injuries and burns.
- Never submerge the SENTRI in any liquid.
- Do not remove the battery unless instructed to do so by Sentrisense technical support.
- Refer to the product specifications section for the maximum allowed power voltage and current range, and only use power adapters and batteries that fall within that range. Sentrisense will not be responsible for any malfunctions caused by using the SENTRI with batteries, power supplies, or chargers other than those supplied by Sentrisense.
- Keep the SENTRI within the temperature range specified in the Appendix section.
- Do not connect or power the SENTRI with damaged cables or batteries.
- In case of an electrical failure, immediately disconnect the main switch and any other power supply that is being used.
- Ensure that the frequencies and power levels of the radio communication modules and integrated antennas are appropriate for the location in which the SENTRI will be used.
- Place the SENTRI in an area that is accessible only by maintenance personnel (restricted area).
- In case of any anomaly conditions or disturbances that may affect the SENTRI's performance, the SENTRI will automatically restart to initiate a recalibration and reconfiguration process.
- Keep children away from the SENTRI at all times.

Safety is important, so it's important to follow these instructions carefully to prevent any accidents or damage to the SENTRI. If you have any doubts or questions, please contact Sentrisense technical support.

Product Applications

Feature	Use case
Weather monitoring	• Wind speed • Wind direction • Temperature • Precipitation intensity • Humidity • Pressure

Weather Sentri description

The Weather sentri device is a telemetry device that can be used to measure a variety of weather variables such as temperature, wind speed, precipitation intensity and others.

The SENTRI is activated by pressing its single button, which also features a built-in LED indicator for displaying various status updates. Additionally, it has two antenna connectors for 4G communication, which must be installed at a 90-degree angle from each other to enhance signal quality, as can be checked in the section "Preparation of the SENTRI".

Picture 1

Each of the elements listed in picture 1 are referred below:

1. Power button
   This is the SENTRI general power button. To turn on the SENTRI, you must press this button, and it will stay in the “pressed” position. To turn it off, you need to press it again.

2. Solar Panel
   The SENTRI uses two solar panels to charge the battery and extend the life of the SENTRI. The panels will constantly charge the battery as long as they have direct sunlight.

   Notes: make sure to remove the protective cover from the two solar panels before installation. keep in mind that the battery charges even with the SENTRI turned off.

3. Screws
   The SENTRI has 4 screws on the cover, which keep the SENTRI closed and protect against the ingress of liquids and dust. DO NOT OPEN unless technical support gives you specific instructions.

4. Weather station and solar panel connectors
   These connectors are used to connect the Weather station and the solar panel to the device

   Note: The connection of these two components are detailed here.

5. Venting
   The vent will keep the interior of the SENTRI free of moisture.

6. Antenna Connectors
   The SENTRI ships with two antennas disconnected. DO NOT use unauthorized antennas. DO NOT operate the SENTRI without antennas.

   Note: the connection of the antennas is detailed here.

Built-in Battery

The SENTRI has a cylindrical 18650 Lithium-Ion battery. Unless the manufacturer indicates otherwise, comply with the following indications:

- DO NOT remove the battery.
- DO NOT replace the battery.

In case of having to replace the battery by explicit indication, check the polarity of the battery before connecting.

Picture 2

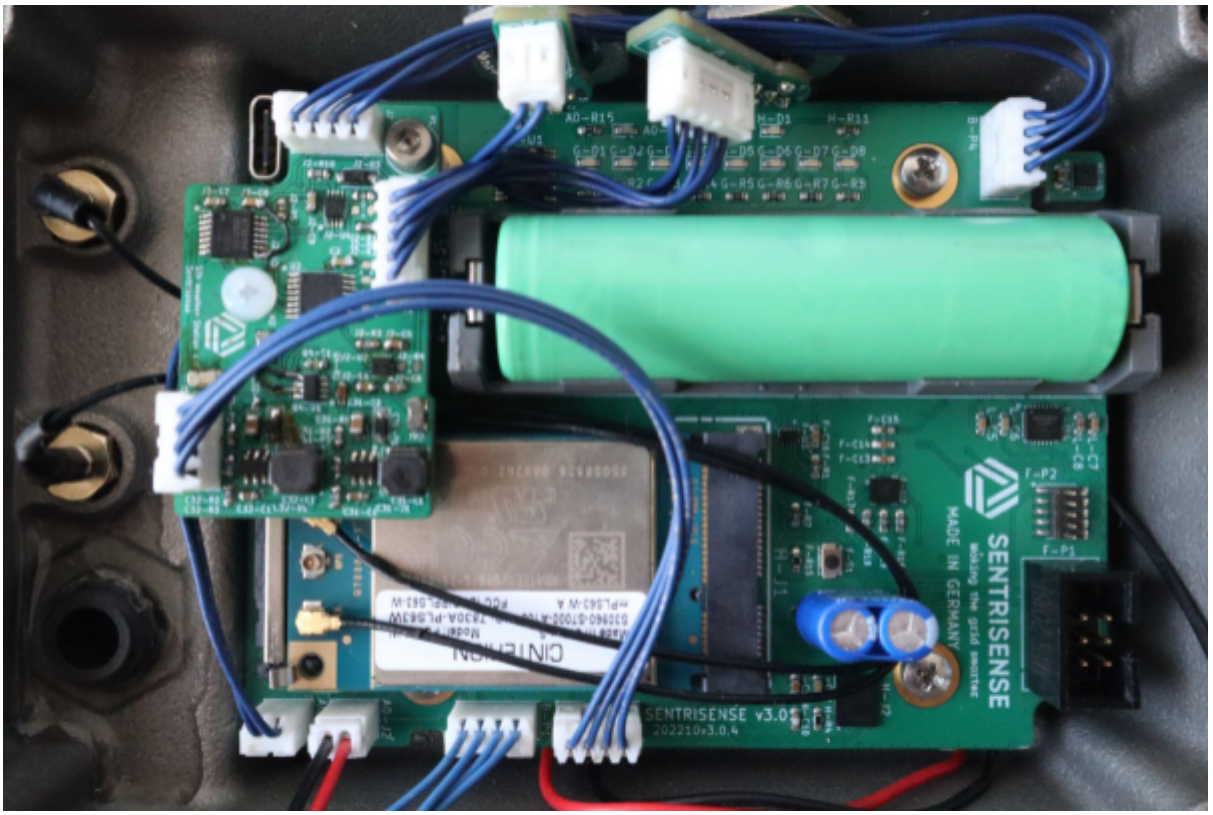
The picture is for illustrative purposes, and some physical characteristics of the battery may differ from those presented in the image. Some batteries do not have their polarity marked. In this case, it is always respected that, as in image 2, the positive corresponds to the side whose upper part is not completely flat. Instead, it has a better diameter girth than the battery body.

Sentrisense recommends a 18650 3.6V 3400mAh (flat top) lithium battery. Brands such as Panasonic, LG, Sony are good. The ideal battery is Panasonic NCR18650B 3.6V 3400mAh (flat top). Please avoid buying generic brands because it can affect the SENTRI's performance.

More information about the batteries here.

Internal view

Internal view of the SENTRI and identification



Picture 3

Picture 3 shows the complete interior of the SENTRI, with the main board and its corresponding battery holder, as well as the antenna connectors and other elements of the SENTRI (the image shows a device v3.0.4, it may change for other versions).

Unique SENTRI ID

Picture 4

Each SENTRI has a label that indicates its ID or unique identifier along with a code that redirects to a quick guide to use the SENTRI, on the outside and inside of it, as seen in the picture.

Picture 5

In the part indicated by the red box in picture 5, the type of SENTRI and its version can be identified, in this example SENTRI v3.0

Technical specs

Electrical characteristics

Characteristics	Value or condition
Power supply	Powered by solar energy
Battery Type and shape	Lithium-Ion cylindrical 18650
Battery nominal voltage	3.7 V
Battery nominal capacity (recommended)	3500 mAh
Power consumption	The SENTRI can consume as low as 45 µA while in sleep mode. Note: Sleep mode time depends on the SENTRI configuration and the kind of measurements it is performing.
SENTRI autonomy	The SENTRI runs using solar energy from its solar panels. In the event of limited sunlight, the SENTRI also has a rechargeable battery as a backup power source. When fully charged, the battery can provide enough energy to operate the SENTRI for up to eight months. The estimated battery life (the overall lifespan of the battery) is more than 10 years.

Special SENTRI features

Feature	Value or condition
Upgrading capability (Firmware over the air)	The SENTRI is fully upgradeable remotely. It can receive software updates while installed, for improving its capabilities.
Vibration detection range	3 Hz - 150 Hz
Reporting alerts	Generated by email.
Certifications and lab tests	The SENTRI is tested under: • IEC 61284 Ed.2:1997, CISPR TR 18-2 Ed.3.0:2017. Measured value of the corona extinction voltage phase-to-earth corresponds to a phase-to-phase voltage of 284 kV • Windtunnel test according to FNN Standards • UV radiation test - Accelerated aging - according to PN-EN ISO 4892-2:2013-06 • Environmental test - Change of temperature - According to PN-EN 60068-2-14:2009 • Environmental test - Corrosion resistance - According to PN-EN ISO 9227:2017-06 • Environmental test - Resistance to humidity - According to PN-EN ISO 3270-2:2018-02

	• Environmental test - Cold resistance - According to PN-EN 60068-2-1:2009 • Environmental test - Heat cycle - According to PN-EN 60068-2-30:2008
System security	Encrypted communication at SENTRI level and SSL for the web platform and API interface.
Integration with existing 3rd systems	Yes, through an API (e.g. SCADA).
Hardware version	Sentrisense v3.2.0

Connectivity capabilities

Type of networks	Supported bands
4G	Twelve Bands FDD-LTE: 700, 800, 850, 900, 1700/2100 (AWS), 1800, 1900, 2100, 2600 MHz (bands 1, 2, 3, 4, 5, 7, 8, 12, 18, 19,20, 28)
3G	Seven Bands UMTS (WCDMA/FDD): 800, 850, 900, 1700/2100 (AWS), 1800, 1900 and 2100 MHz (bands 1, 2, 4, 5, 8, 9, 19)
2G	Quad Band GSM: 850, 900, 1800 and 1900 MHz
WiFi	IEEE 802.11 b/g/n-compliant

Weather sensor

The sensor integrated with the Weather Sentri is the WDS6E

Datasheet: HY-WDS6E Compact Weather Station

Operating Manual

Physical and environmental characteristics

Characteristic	Values and ranges
SENTRI dimensions	• 100 mm x 165 mm (3.9 in x 6.5 in)
Weight	Aprox. 1 kg
Operating temperature	-20 to +60 °C Note 1: To avoid any damage to the battery or risk of explosion, if the internal temperature of the SENTRI goes above 45°C, the SENTRI will stop the battery charging process. Note 2: The SENTRI might work over 60°C but the nominal performance for the battery is not guaranteed
Environmental and electrical condition of operation	• Fully weatherproof • Corona-free operation through 284 kV rated voltage. Functional up to 330kV
SENTRI material	• Metal (aluminum) case
SENTRI lifespan	At least 10 years
SENTRI warranty	5 years for manufacturing defects

Preparation of the SENTRI

Connecting the antennas

The SENTRI uses two antennas, which are necessary for establishing communication with the cloud platform, to send data and receive settings.

Picture 6

Step 1: Place the antenna on the connector.

Step 2: Rotate the antenna clockwise.

The antennas are articulated, so they can be oriented after being adjusted. In any case, it is recommended that they be folded at 90°, as antenna “2” in picture 6 is positioned.

Turning on the SENTRI

Picture 7

Turn on sequence, calibration and expected behavior

a. Turn on the equipment by pressing the power button.

b. After 2 seconds, the button's LED will start blinking for 15 seconds, accompanied by the buzzer.

c. The button's LED will then start to flash rapidly, trying to connect to the network (this may take about 1 minute depending on the signal in your location).

*Note: If the SENTRI is downloading a firmware update, the SENTRI will be with the led turned off while downloading (this may take from 5 to 10 minutes depending on the signal in your location), when the download is complete the SENTRI will automatically reboot, returning to the step b and continue with normal behavior.

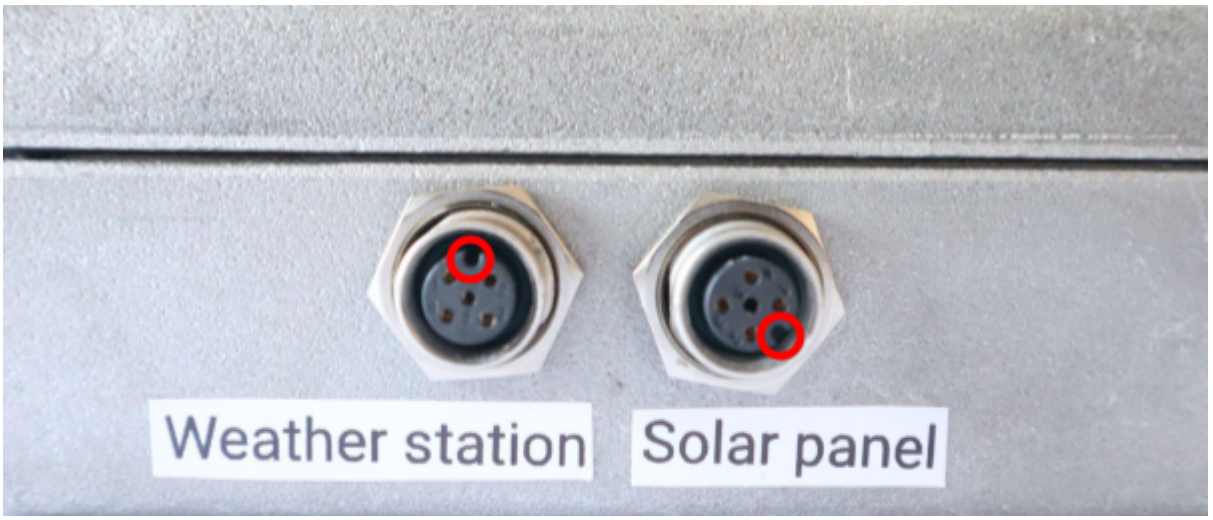
d. The LED will start blinking again while the SENTRI configures itself automatically for approximately 2 minutes, once the configuration is complete, a sequence of 5 beeps will be heard (3 short beeps followed by 2 long beeps) if successful and a sequence of 3 long beeps if the configuration fails. If the configuration fails, it's recommended to reboot the SENTRI and check for any connectivity issues.

e. When the configuration is done the SENTRI will remain in stand by for 10 seconds before entering in IMU's Calibration mode (It is not recommended to enter calibration mode unless prompted). After these 10 seconds a sequence of 4 beeps will be heard and the SENTRI will wait 30 seconds to enter the calibration mode (to skip this mode, simply wait without moving the SENTRI). After that, a sequence of 9 beeps will be heard indicating that the SENTRI is ready to use.

f. Once all of the above has happened, you can confirm that the SENTRI is sending data to the dashboard.

The side connectors

The device has two side connectors, one for the weather station and the other for the solar panel. Each one has to be strictly connected in one way (however, to avoid confusion when connecting the connectors, these have a notch that only allows them to be connected one way). And they are labeled to recognize what should be connected to which connector.
Images below for reference.



Picture 8

This picture shows the notches that need to be matched with the connector.

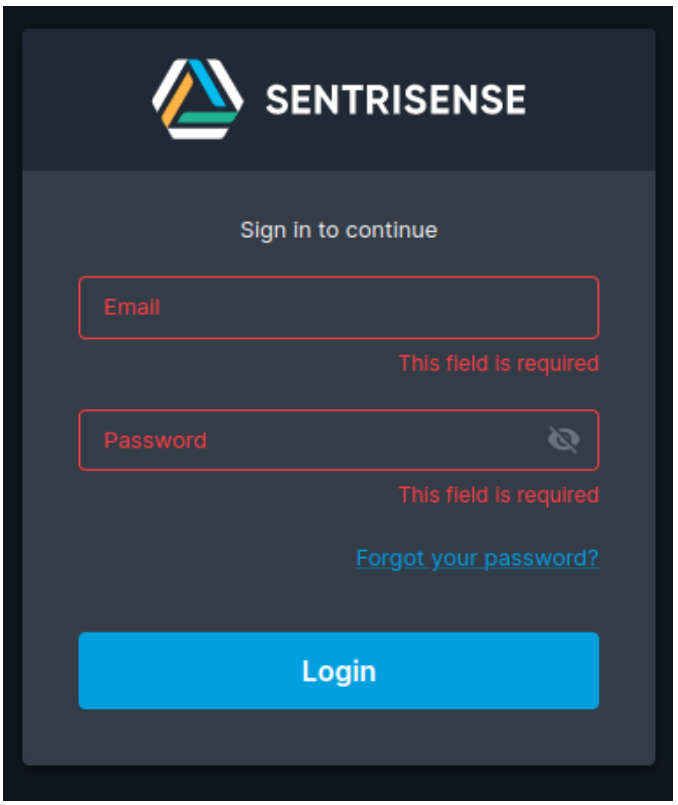
Picture 9

This picture shows how it should look like with the connectors connected.

Dashboard

Web Platform

1. The link to the platform is Sentrisense - Dashboard
2. Login



Picture 10

The login page is made up of the following:

1. Email Field:
   In this field you have to enter the registered email to be used on the platform.

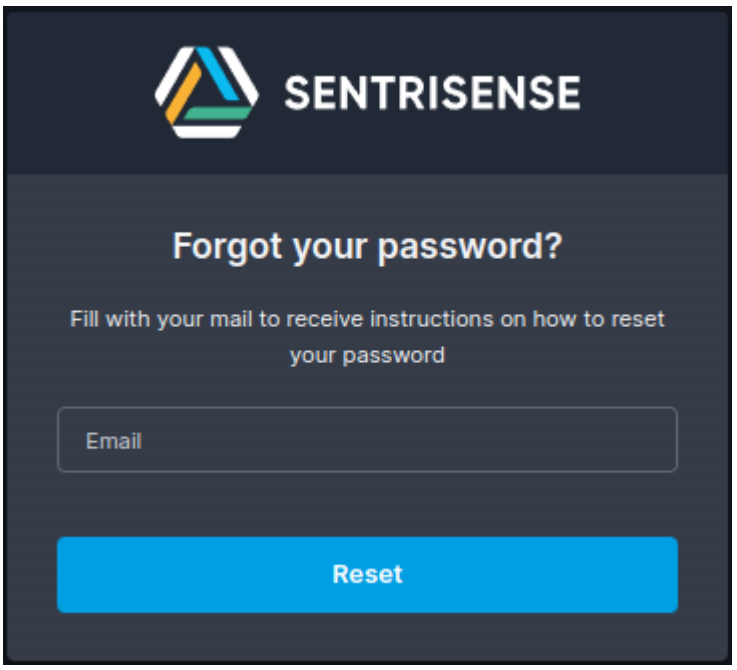
2. Password field:
   Enter the password to login.

3. “Forgot your password?”
   This button instructs you to reset your password if you forget it.

4. “Login”
   Once the required fields have been completed, sign in.

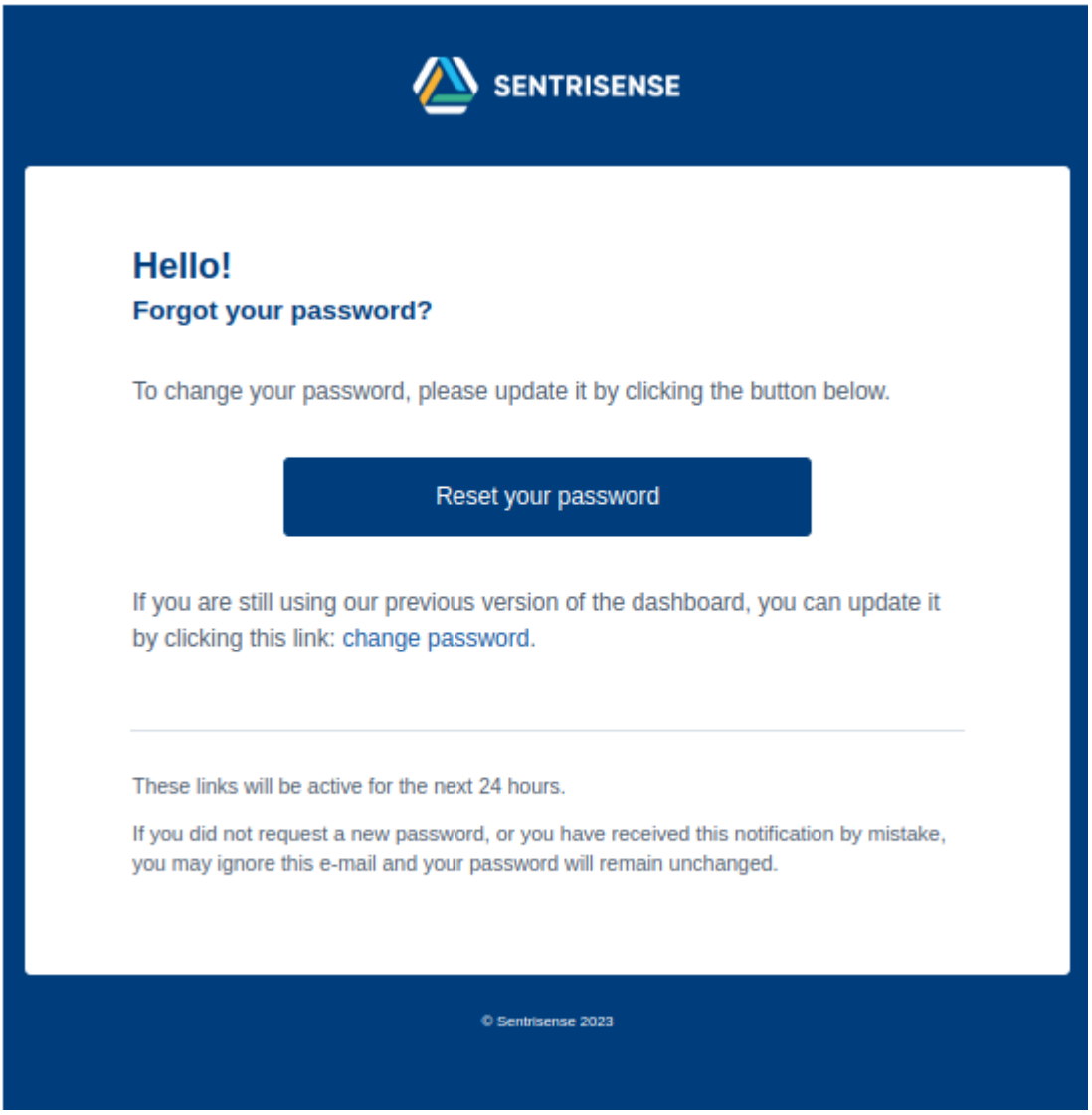
Reset password

If you forget your password, you can reset it using the “Forgot your password?” button.



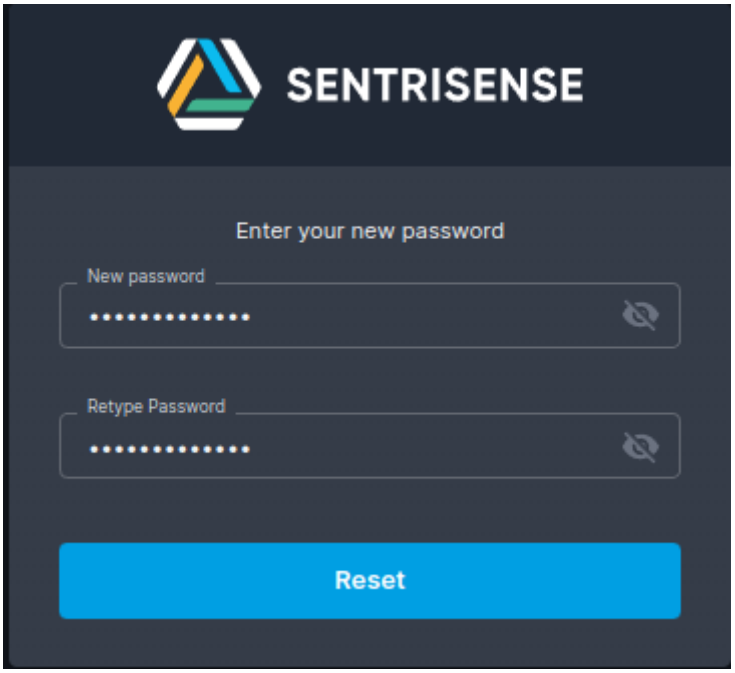
Picture 11

By filling the email field, you will receive an email with a link to reset your password.



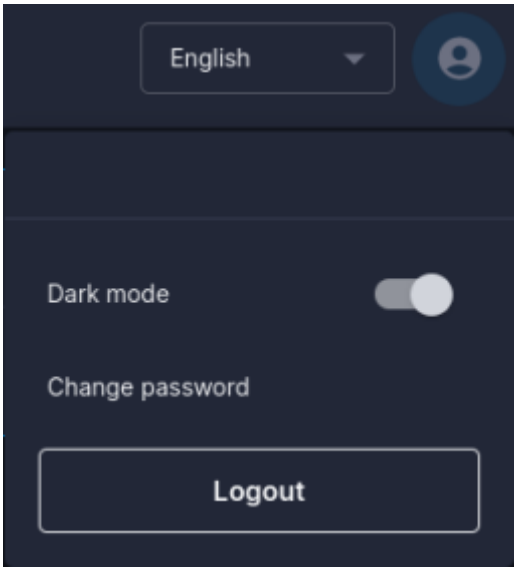
Picture 12

By entering the link in the email, you must choose a new password and enter it in the following fields (make sure you meet the strong password conditions).

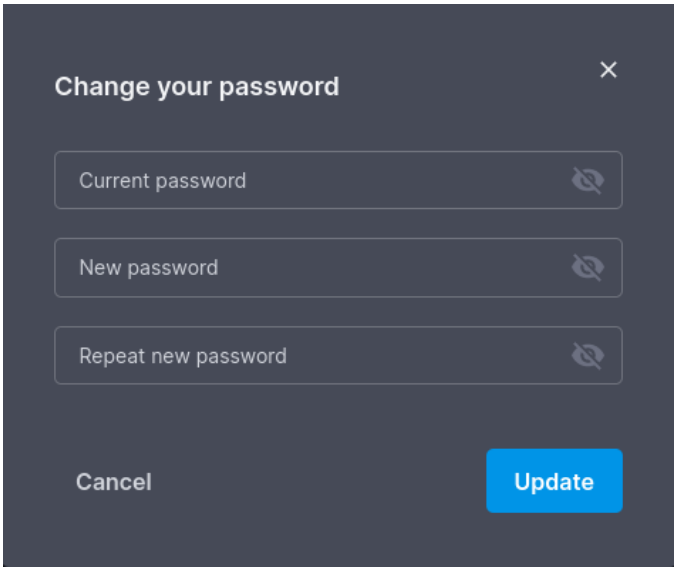


Picture 13

You can also change your password when logged in from the top-right user icon and clicking in "change password".



Picture 14

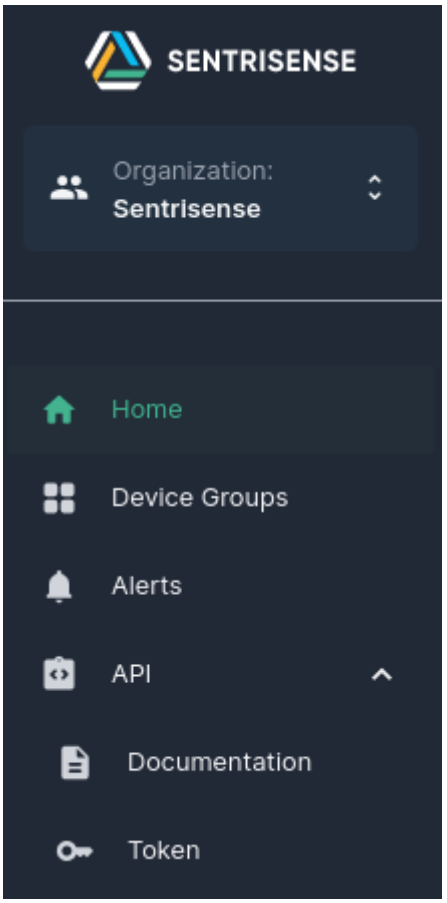


Picture 15

Create new user

To create a user that has access to the organization, follow these steps:

1. Go to the organization section on the left sidebar of the page.



Picture 16

2. Select the organization.
3. Click on “Create new user”
4. Type the new user email address

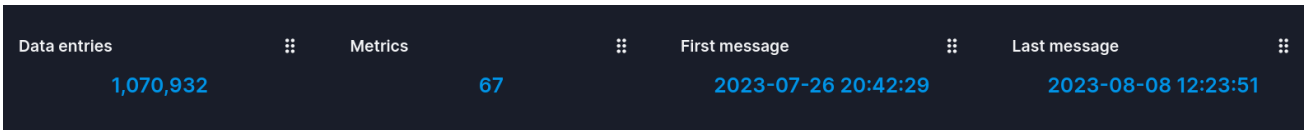
How to read data on the dashboard

Data tables will appear on the web platform with the data sent by the SENTRI:

Note: in the board the tables can be dragged and moved around the page for convenience to the user to see the most important data first with the drag icon in the top-right corner of each table, clicking this icon and dragging the table will move the table to wherever the user wants.

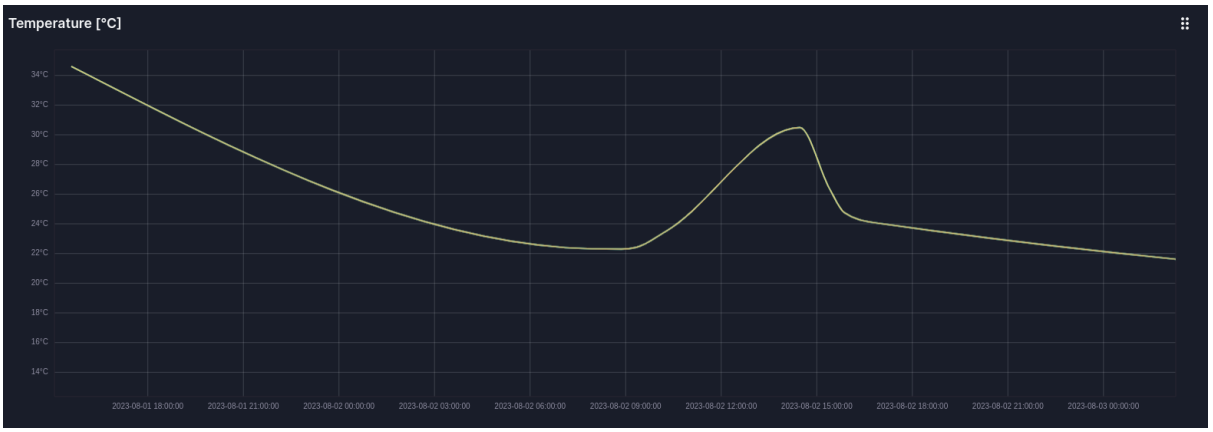
The following charts will appear in the “information” tab of the SENTRI.

Data entries: Number of times the SENTRI has sent data.
First message: Date of the first message sent by the SENTRI.
Last message: Date of the last message sent by the SENTRI.
Metrics: Number of metrics.



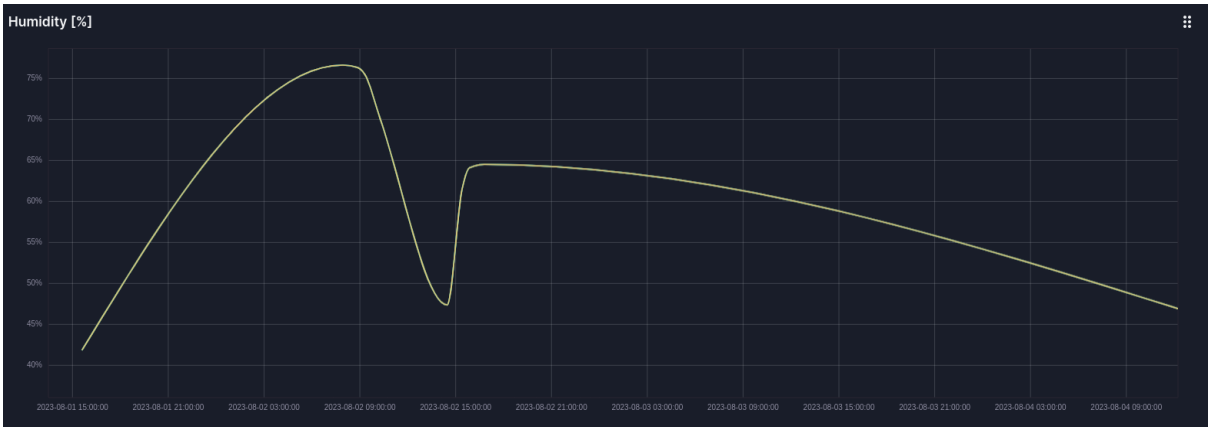
Picture 17

Temperature: Shows the temperature over time



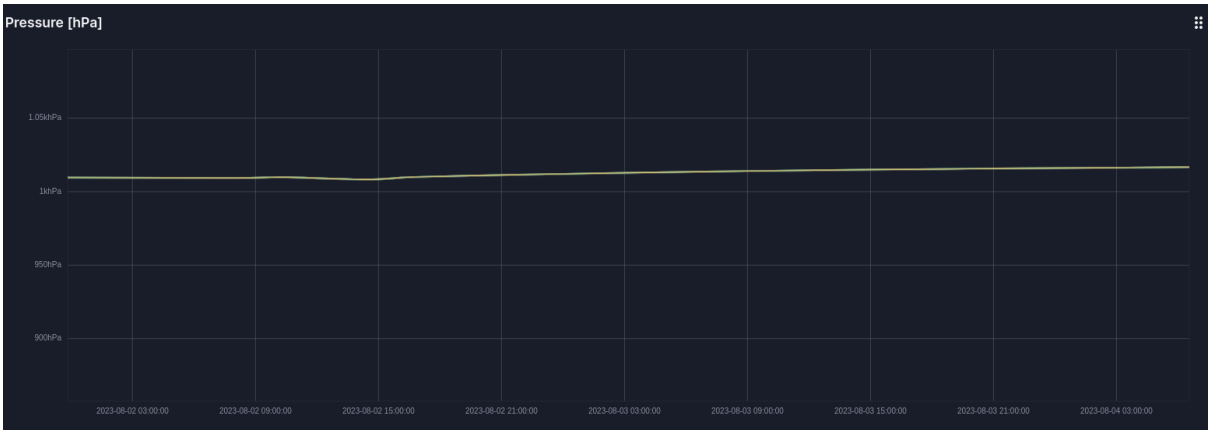
Picture 18

Humidity: Humidity over time.



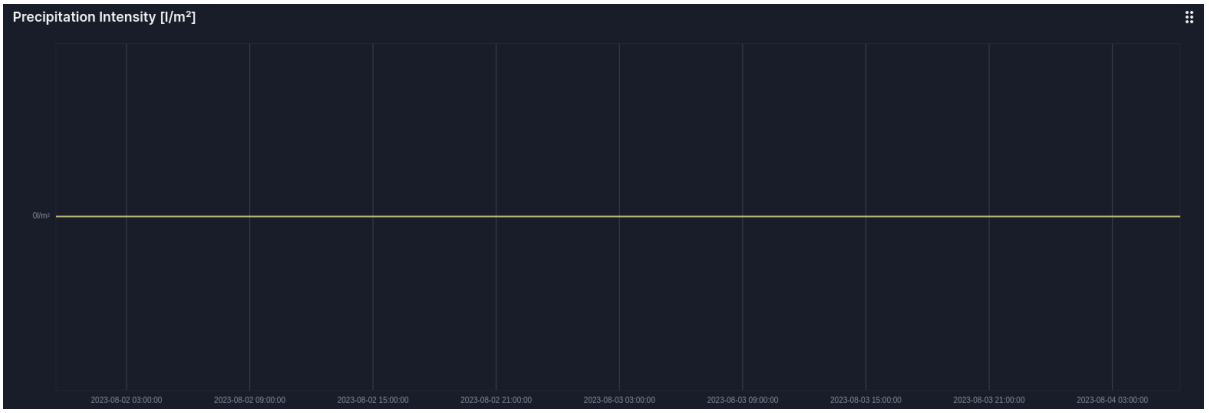
Picture 19

Pressure: Pressure over time.



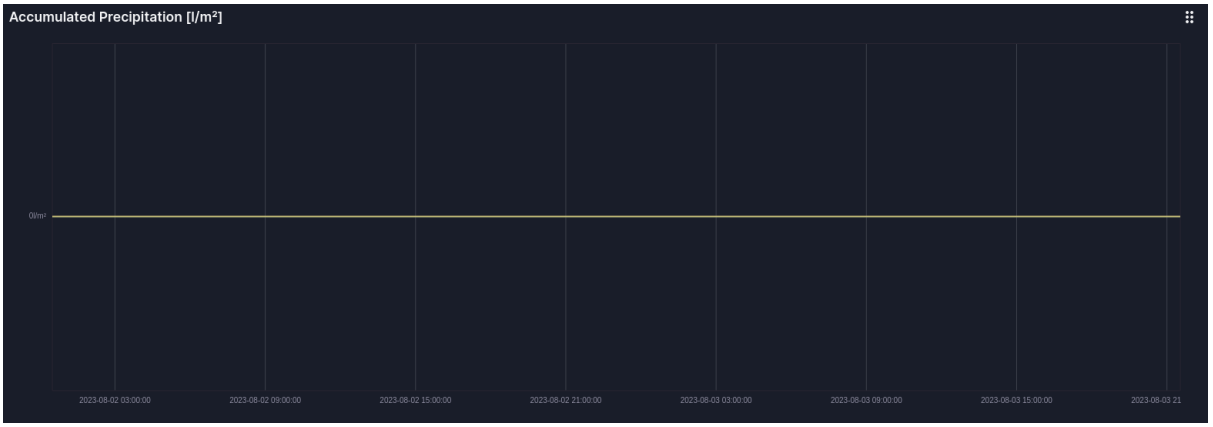
Picture 20

Precipitation intensity: precipitation intensity over time.



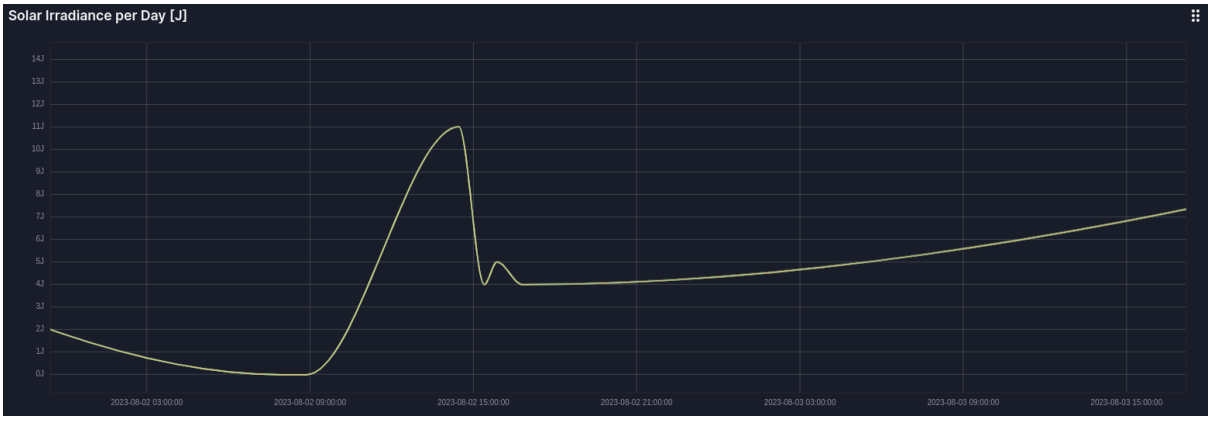
Picture 21

Accumulated precipitation: Accumulated precipitation over time.



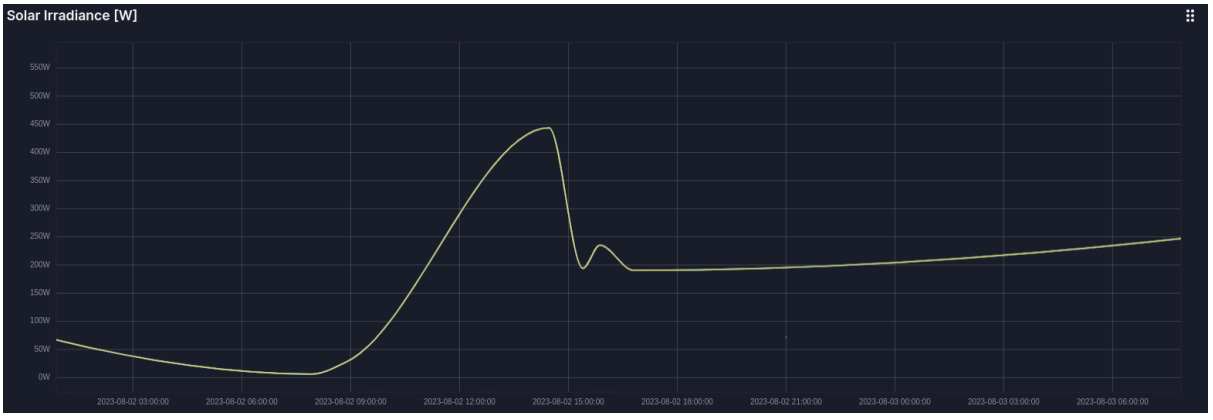
Picture 22

Solar irradiance per Day: Solar irradiance per Day over time.



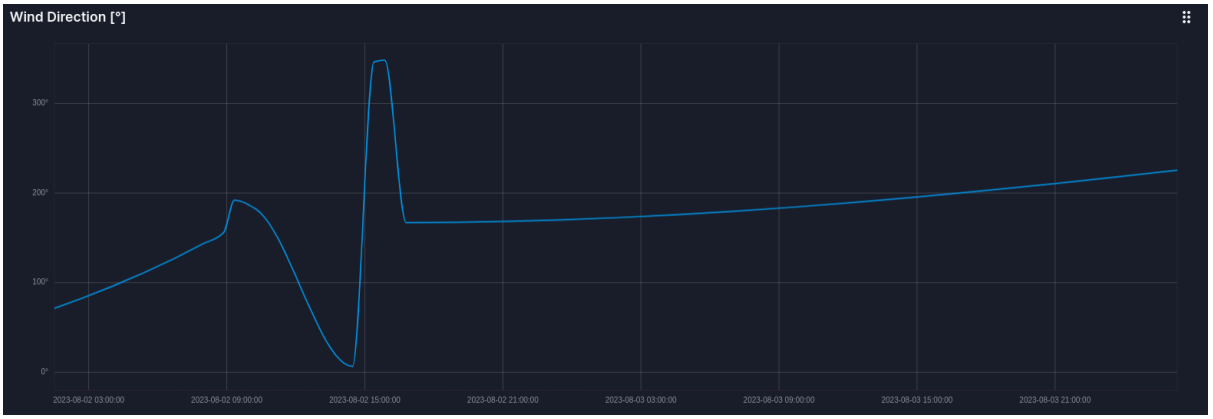
Picture 23

Solar irradiance: Solar irradiance over time



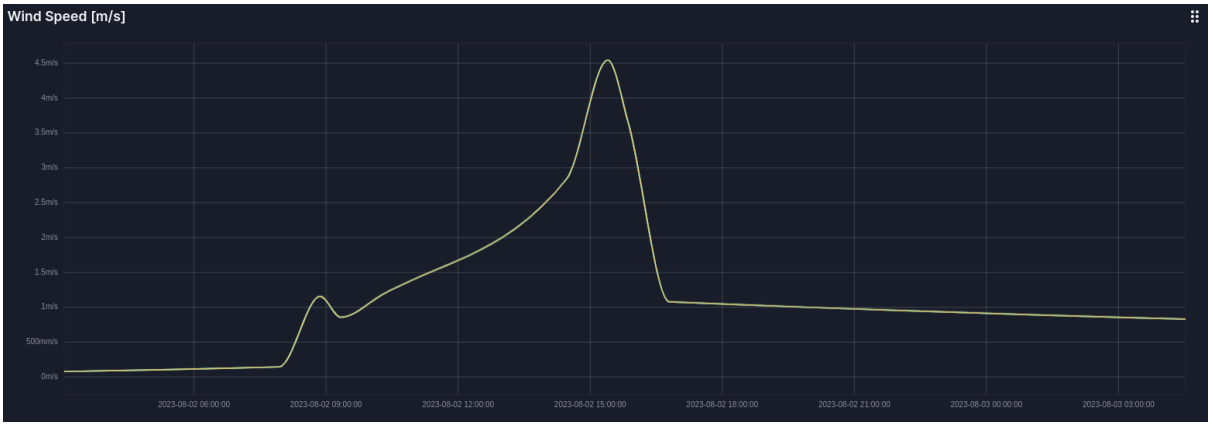
Picture 24

Wind direction: Wind direction over time.



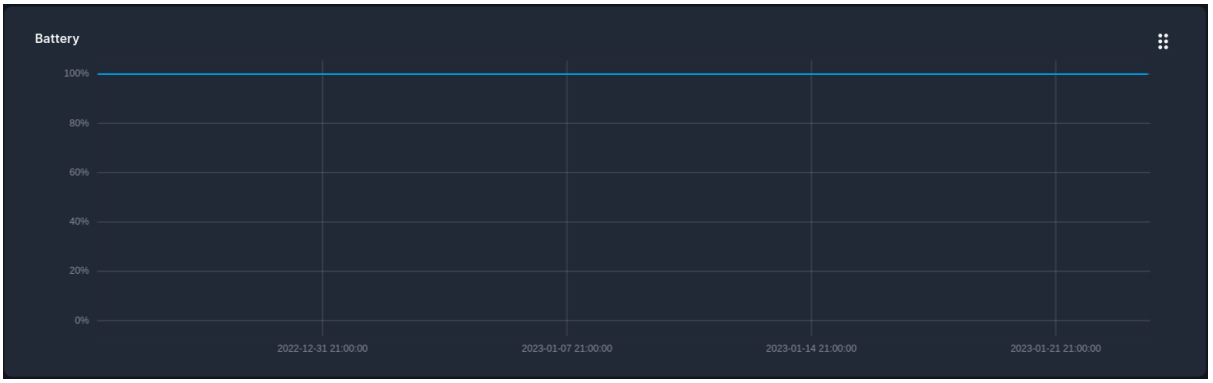
Picture 25

Wind Speed: Wind speed over time



Picture 26

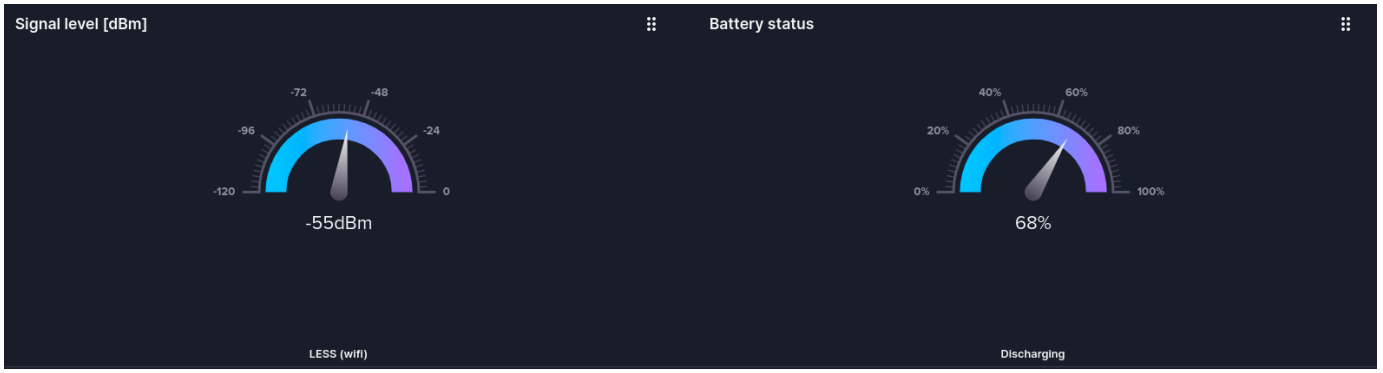
Battery: Battery over time.



Picture 27

Signal level: Shows the actual signal level of the SENTRI.

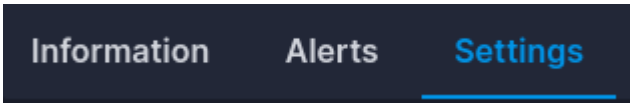
Battery status: Shows the actual battery status of the SENTRI.



Picture 28

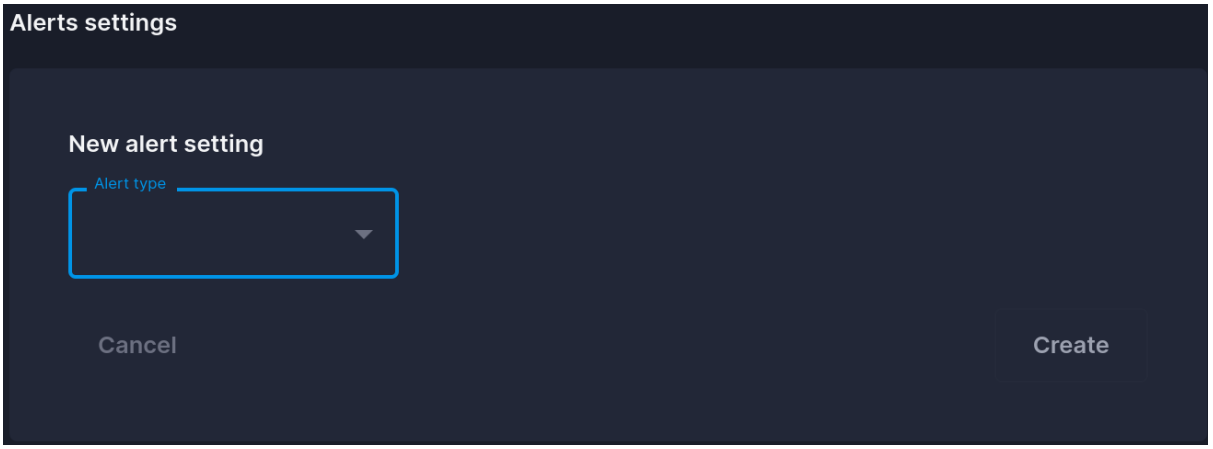
Alerts configuration

To create a new alert for the device, click in the settings tab.



Picture 29

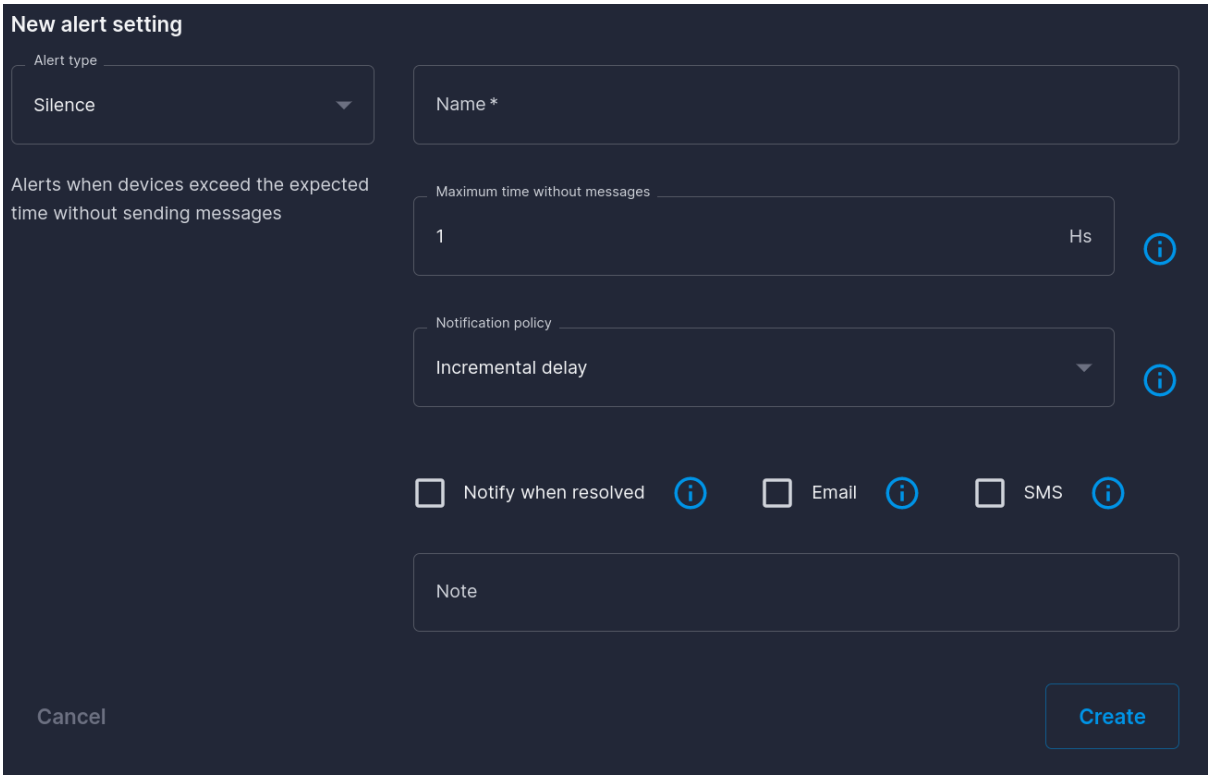
You can add an alert by clicking the “+” button and a menu will open



Picture 30

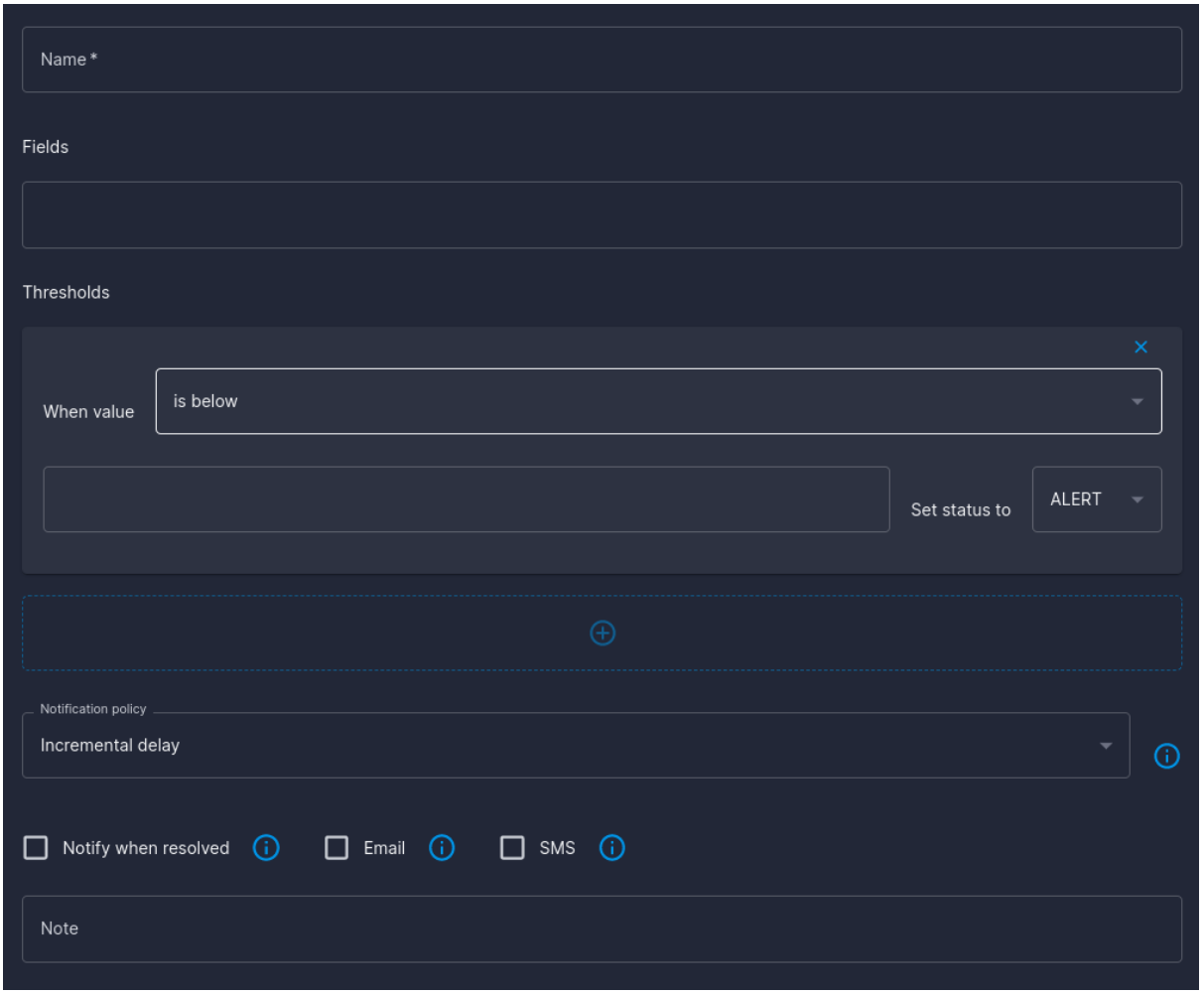
Each alert has its own set of options and can be received by email, also these have a custom name and a “note” field for custom annotations. Also every alert has the option to select the notification policy, which allows to select the delay and behavior between alert and alert.

- Silence: this alert can be used when the user wants to know when a SENTRI has been inactive for a certain time.



Picture 31

- Threshold: This alert can be used to determinate the parameters of any data that the SENTRI sends, for example in the field “fields” if you want to have a battery status alert you can fill it with “battery level in %” and define the minimum and the maximum values to receive an alert when the battery level exceeds the parameters.



Picture 32

Appendix

Specifications and operating ranges

Battery Characteristics

- 18650 Li-Ion cell, 3.7 V, 2200mAh or larger (recommended 3000mAh)
- Operating temperature range: -10°C to 60°C
- Charging temperature range: 0°C to 45°C

Note: Do not remove or replace the battery unless directed by the manufacturer. Do not use batteries other than those recommended.

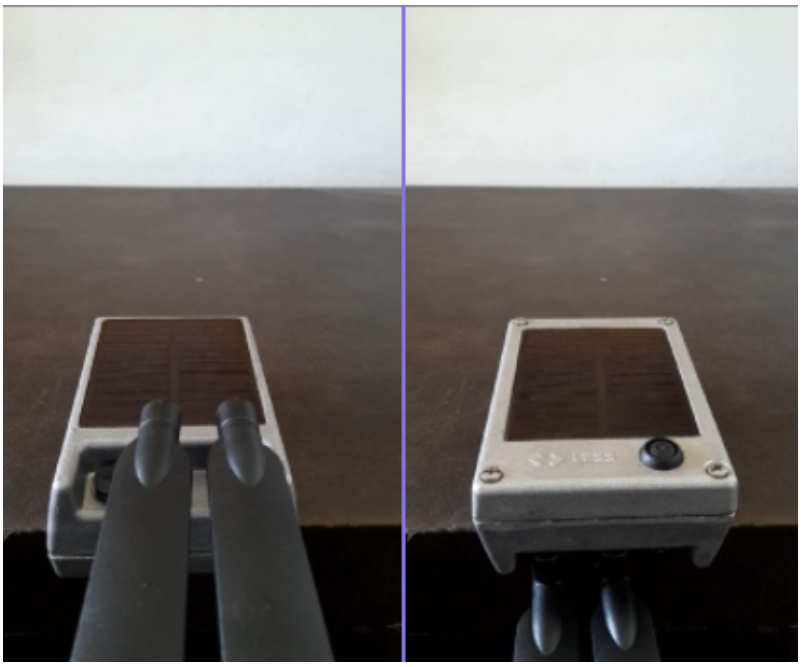
Charging voltage

- SENTRI charging voltage range: 5 V - 24 V

In case you need to charge the SENTRI battery through an external charger, you must use a standard market's charger with a USB-C interface, as it is used for charging cell phones and other mobile devices.

Calibration mode

To enter the calibration mode, the SENTRI must be flipped 180° as shown in the image below and wait a few seconds. If the calibration was successful a final sequence of 9 beeps will be heard.



Picture 33