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USER MANUAL

Sensor Network

VERSION 1.00 / 2023

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Contents

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1.Introduction of the system

In our sensor network, multiple sensors can be used to monitor and collect data from a specific environment. Sensors in the network communicate with each other with the gateway device, which aggregates the data and sends it to a cloud or server for analysis.

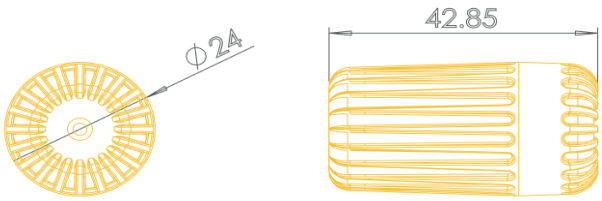
The gateway device receives the data from the sensors at 868 MHz and transmit with WiFi or 4G communication modules. The device must be located at place with good 4G network signal to allow sensor data to be transmitted over the Internet to a cloud or server for analysis.

Our sensor system enables long-distance and reliable data transmission over the Internet. The gateway acts as a bridge between the wireless sensor network and the Internet, allowing data to be transmitted in a format that is compatible with modern communication networks.

2.Specifications

2.1 Physical parameters of the sensor

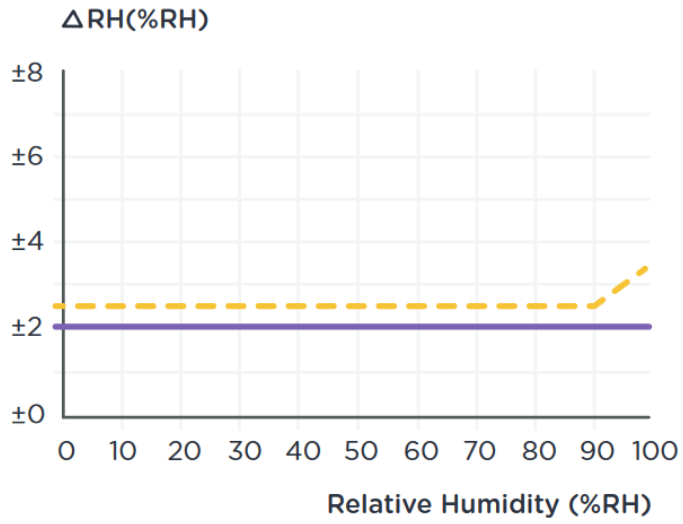
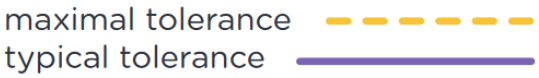
Dimensions: **22** mm diameter and **40** mm high
Weight: **30** grams



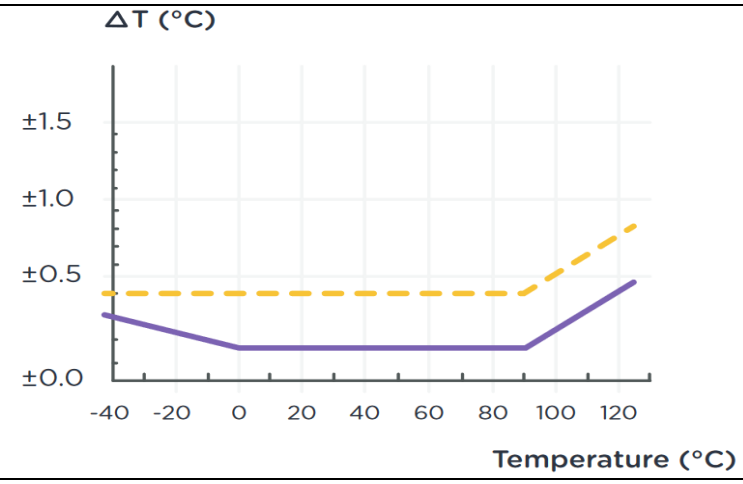
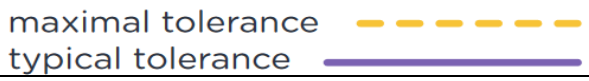
Environmental characteristics

Operating temperature range: **-20** to **60°C**
Operating relative humidity range: **5** to **100%** (direct contact with the water)
Storage temperature range: **-20** to **60**
Storage relative humidity range: **5%** to **100%** (non-condensing)
Ingress protection: IP68

Humidity measurements

Typical tolerance: **±2%** RH (In **0%** to **90%** RH range) Maximal tolerance: **±3.2%** RH (In **90%** to **100%** RH range)	
	

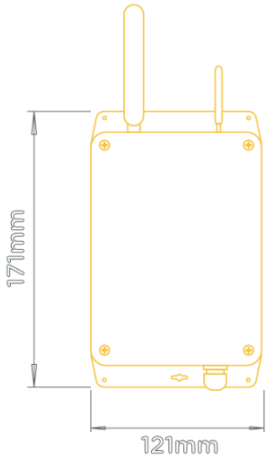
Temperature measurements

Typical tolerance: **±0.2 Deg** (In 0 to 90 RH range) Maximal tolerance: **±3.2%** RH (In **90%** to **100%** RH range)	
	

Accuracy (max): ±0.2 °C (in -10 to +40°C range)
Accuracy (min): ±0.5 °C (in -20 to +60°C range)
Resolution: 0.1 °C

2.2 Physical parameters of the gateway

Dimensions: H **55mm** x W **121 mm** x L **171mm**
Weight: 300 grams



Environmental characteristics

Operating temperature range: -20 to 60°C
Operating relative humidity range: 5 to 100%
Storage temperature range: -20 to 60
Storage relative humidity range: 5 to 100% (non-condensing)
Ingress protection: IP68

Barometric sensor

Accuracy: ±1.8%

Temperature measurements

Accuracy (min): ±0.5 °C (in -10 to +40°C range)
Accuracy (max): ±0.9 °C (in -20 to +60°C range)

Power options

Input Voltage (including -15/+20% according to IEC 62368-1): 6 to 26V DC
Input Voltage from power grid: 220 to 240V AC
Input Voltage from 20W Solar Panel at 18 V nominal voltage

Warranty period: 2 years

3.Safety installation, use and maintenance

3.1. Gateway installation

(Step 1) The Gateway device has been meticulously designed to provide an easy wall mounting process using screws passing through the slotted with 22mm hole for placement. This feature greatly simplifies the setup process, saving time and effort, and eliminating the need for complex installation procedures. (See pic 1)

Picture 1

Gateway types

SNGW4GWIFI	**Technical specification:** * Sensor frequency communication at 868 MHz * File server communication with 4G or Wifi * Max sensors connection - 50 pcs * Maximum distance from the sensors in open space - 200 meters * Internal storage of data - 475000 records * Internal battery life – 5 days * Powered with 6-24V adapter of direct connection to the grid (220V) * Local download of the data * Waterproof box with IP68 protection

3.2. Sensor installation

(Step 2) The Sensor device has been meticulously designed to provide an easy wall and floor mounting process using screws passing through the slotted with 25mm hole for placement. This feature greatly simplifies the setup process, saving time and effort, and eliminating the need for complex installation procedures. (See pic 2)

Picture 2

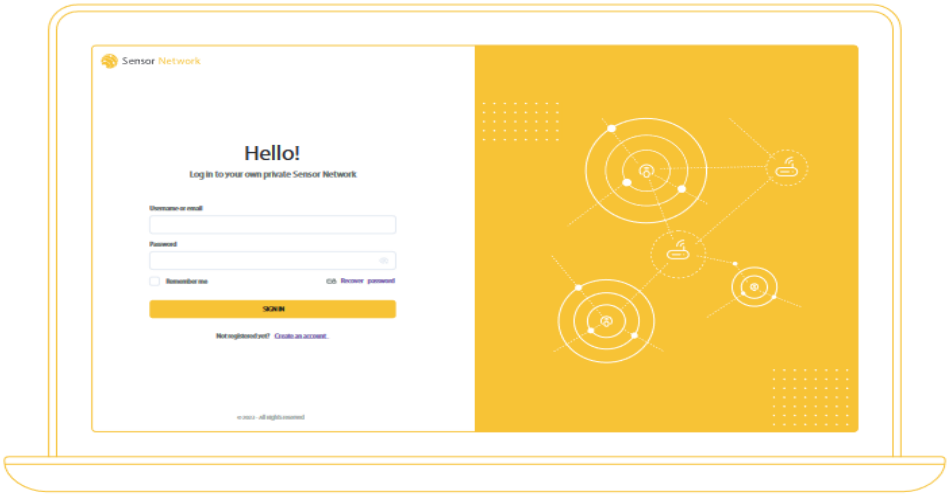
3.3 Software set up – registration and initial settings

(Step 3) After step 1 mounting the gateway device to a wall and step 2 installing the sensors in any type of concrete, stone or wooden structure and all types of flooring, step 3 is registration in the Sensor Network software system as follows:

3.3.1 Access to the software

With an e-mail notification, each customer receives information with a link to access the platform and a root key to use for registration

Picture 3 Step 3

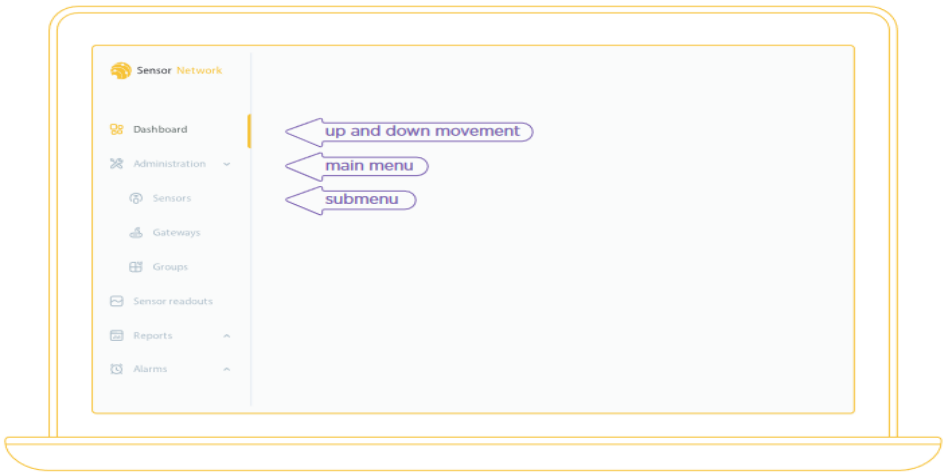


After successful registration, the client has 24-hour access to the Software system Sensor Network

4. Main menus

Five main menus are arranged vertically on the left side of the screen. Please enter in main menu Administration shown on the pic 4

Picture 4

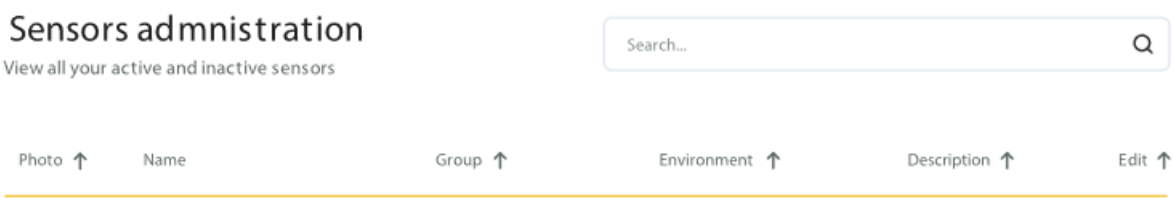


4.1 Main menu Administration

The main menu Administration Administration has 3 submenus (Sensors , Gateways, Groups).

- First, please go to submenu **Sensors** Sensors and make your initial sensor administrative settings. (See Picture 5)

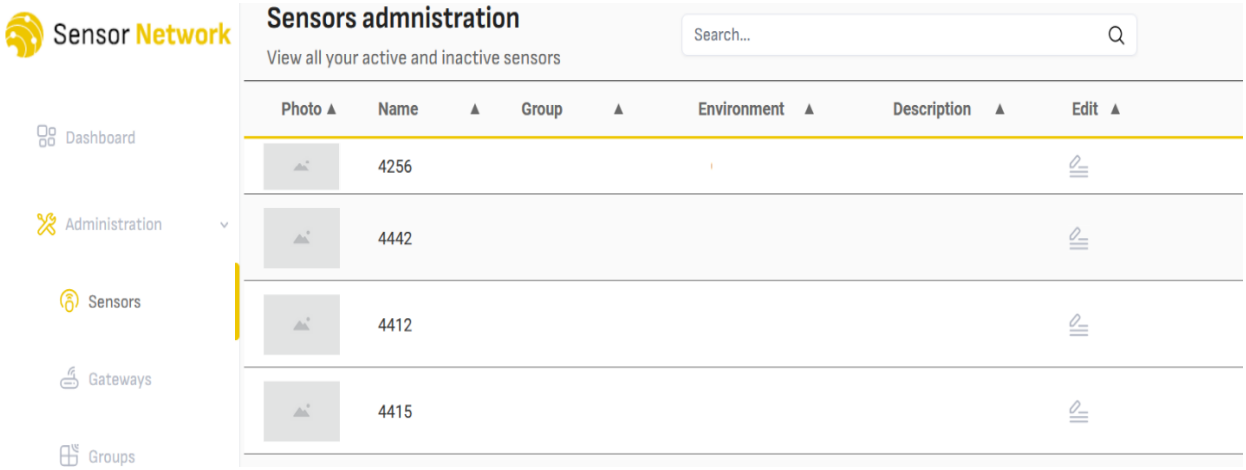
Picture 5



∗ To add to the serial numbers of the sensors a name(1) and a photo(2) of your choice, an environment (3)in which the sensor will be placed, as well as a grouping of the sensor (4), please use the button

∗On the screen is shown your sensors listed with their serial numbers in menu Name.

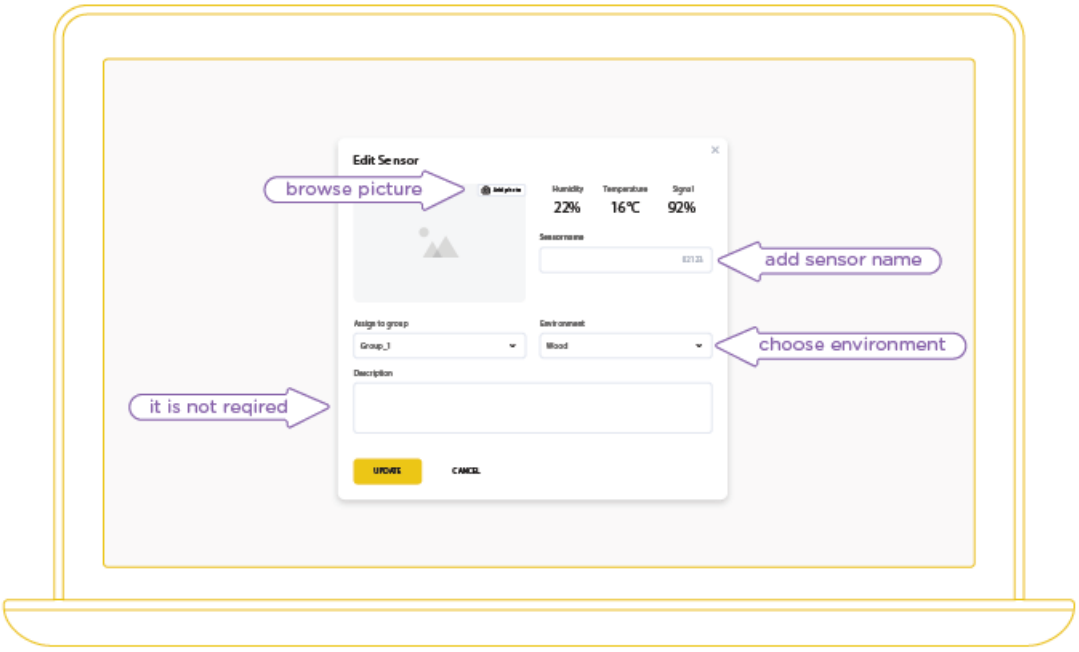
Picture 6



∗After pressing the button, the following window will be displayed on the screen (See Pic 7). Please enter the data - name of the sensor, environment and if you wish you can add a photo where the sensor is placed for easier orientation. After making the changes, please press the button UPDATE. If you do not want the changes to be saved, please press the button CANCEL.

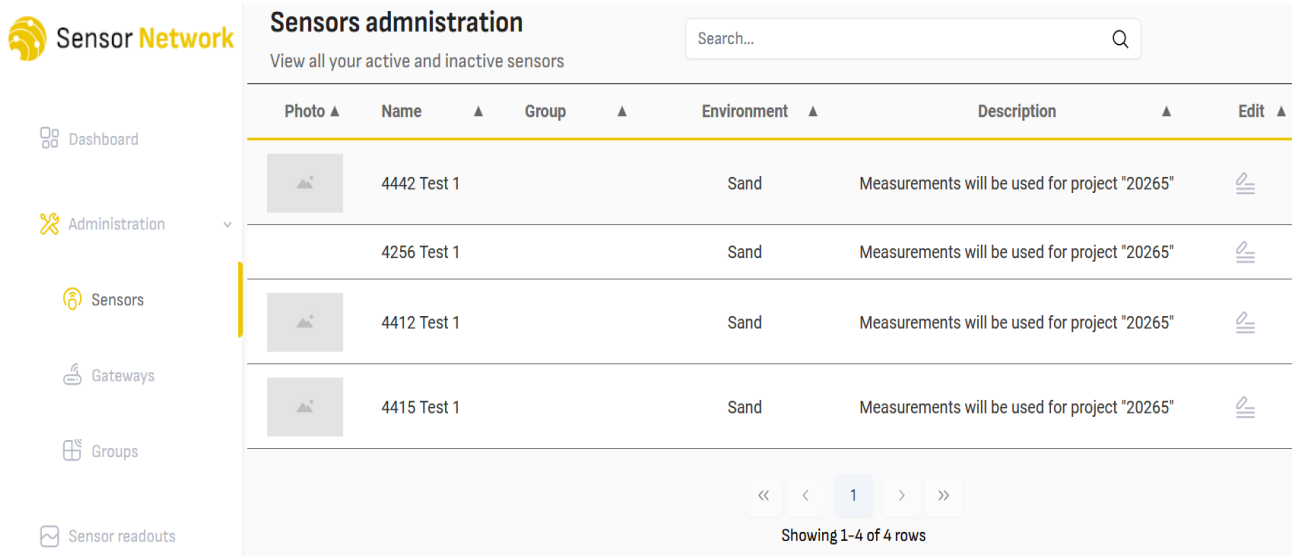
REMARK: Window "Assign to group" is still inactive, after creating a group you will return to this menu again!

Picture 7



Please see on Picture 8 an example of how the data should look after it is added by you

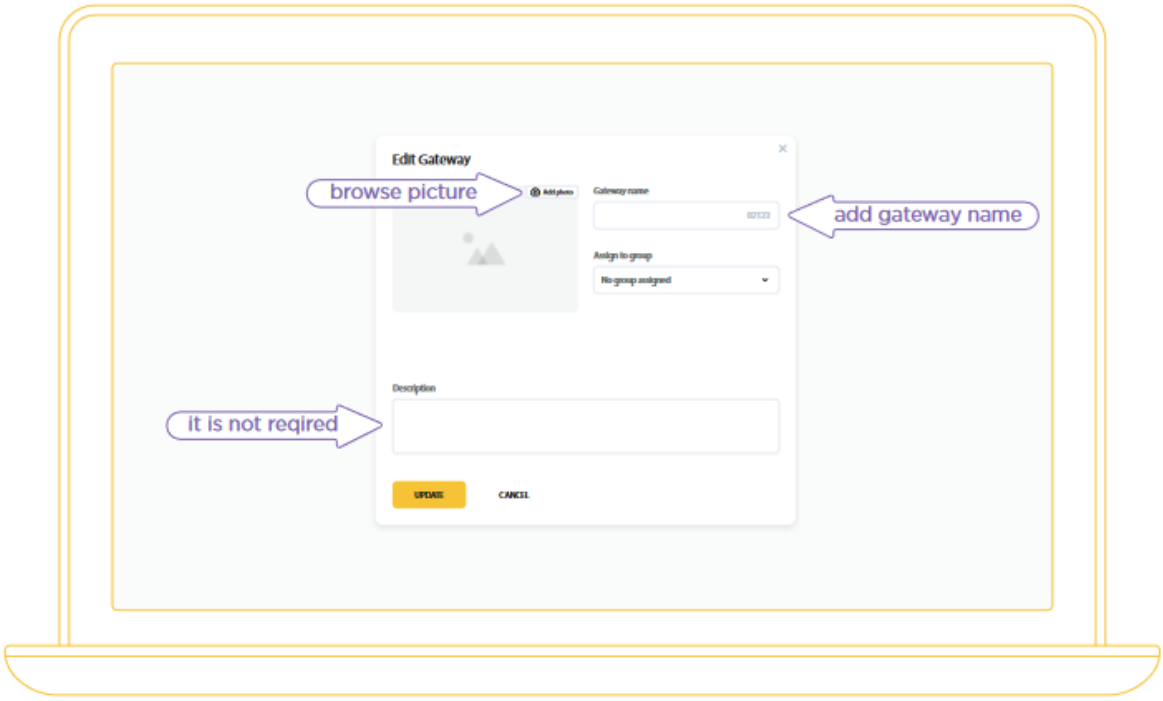
Picture 8



- Second, please go to submenu **GATEWAYS** 

The window below will appear on the screen (See Picture 9)

Picture 9

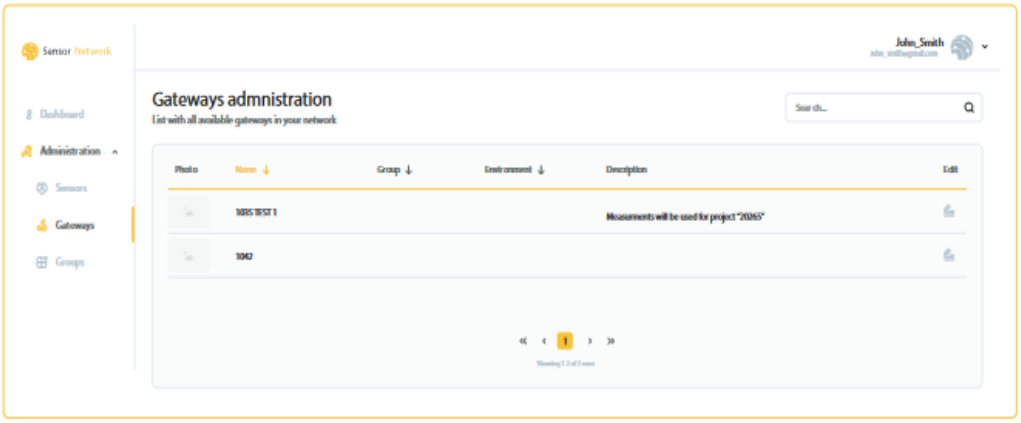


*After pressing the button, the following window will be displayed on the screen (See Pic 10). Please enter the data - name of the GATEWAY, description and if you wish you can add a photo where the GATEWAY is placed for easier orientation. After making the changes, please press the button UPDATE. If you do not want the changes to be saved, please press the button CANCEL.

Picture 10

Please see on Picture 11 an example of how the data should look after it is added by you

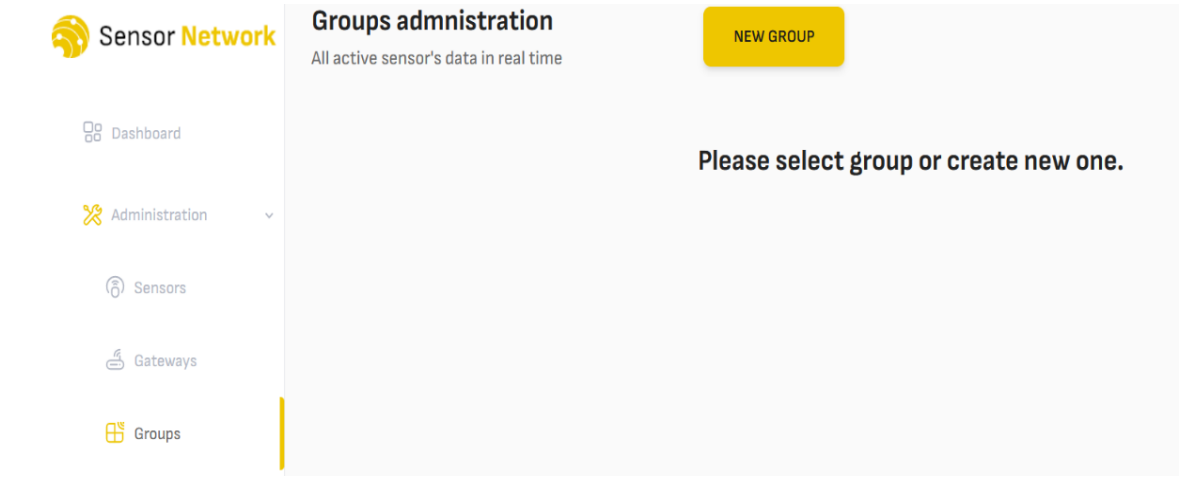
Picture 11



Groups

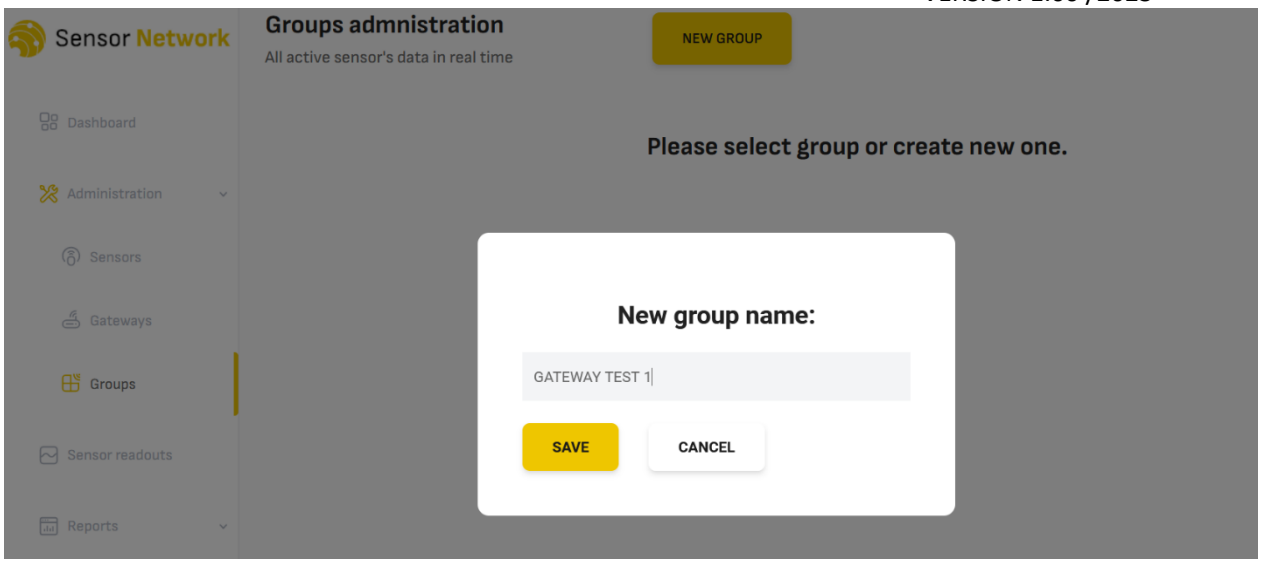
- Third, please go to submenu **Groups** The window below will appear on the screen (See Picture 12).

Picture 12



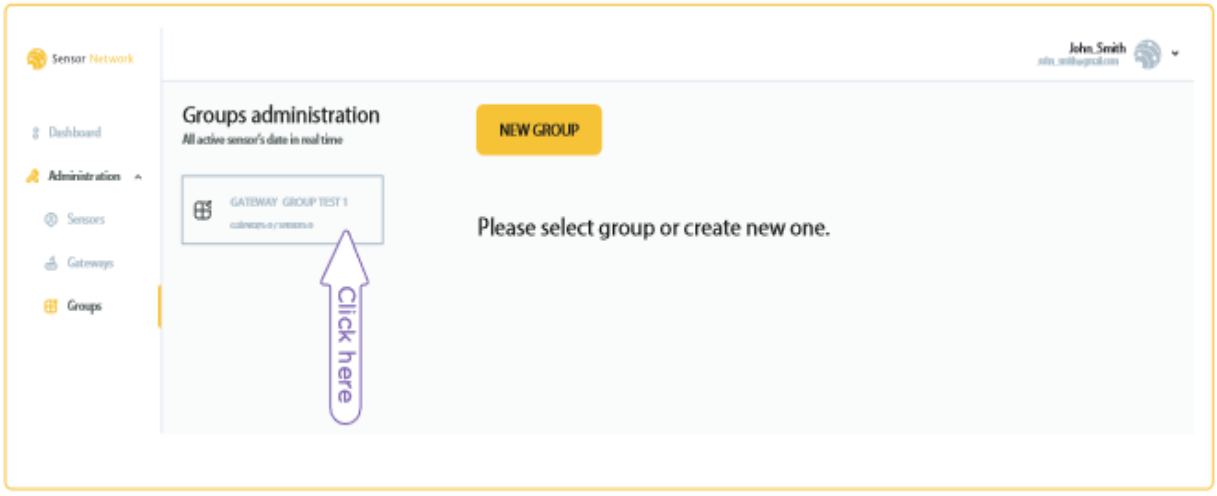
* From the button NEW GROUP you can save the name of the group of sensors that will be connected to the GATEWAY as shown on the Picture 13

Picture 13



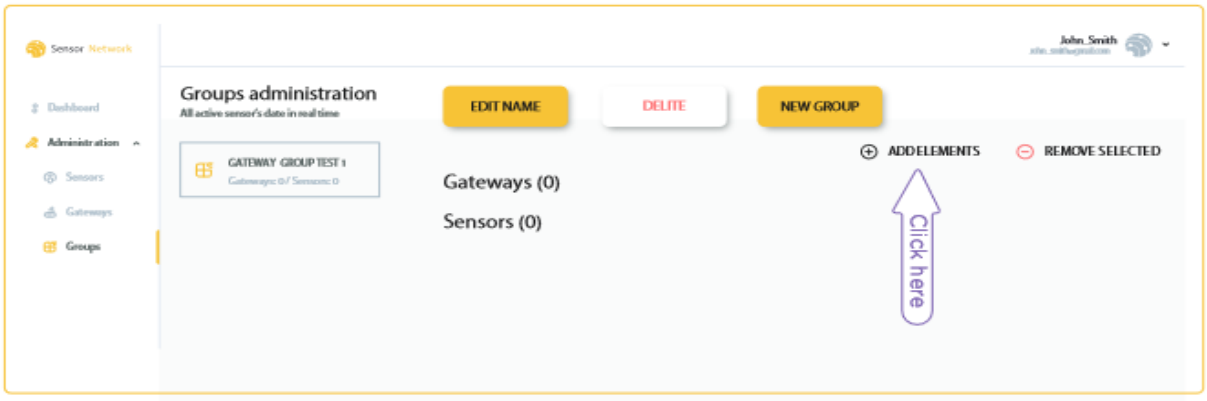
* You already have a group name set, to add sensors to the group please click on the field as shown on Picture 14

(Picture 14)



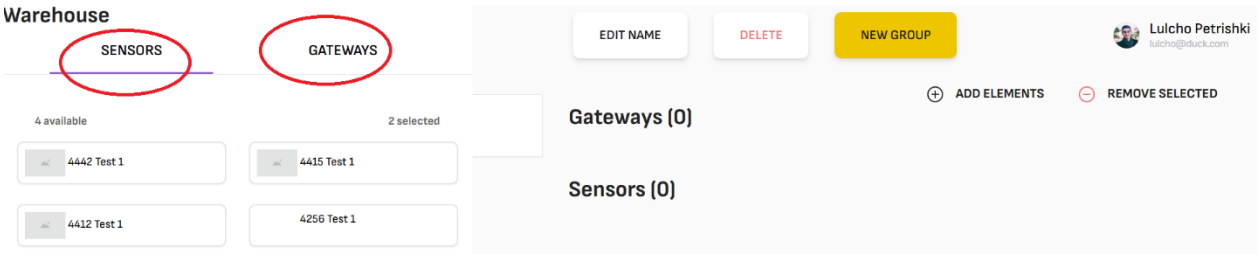
* To add sensors in a group to GATEWAY, please use the button “ADD ELEMENTS” as is shown on Picture 15

Picture 15



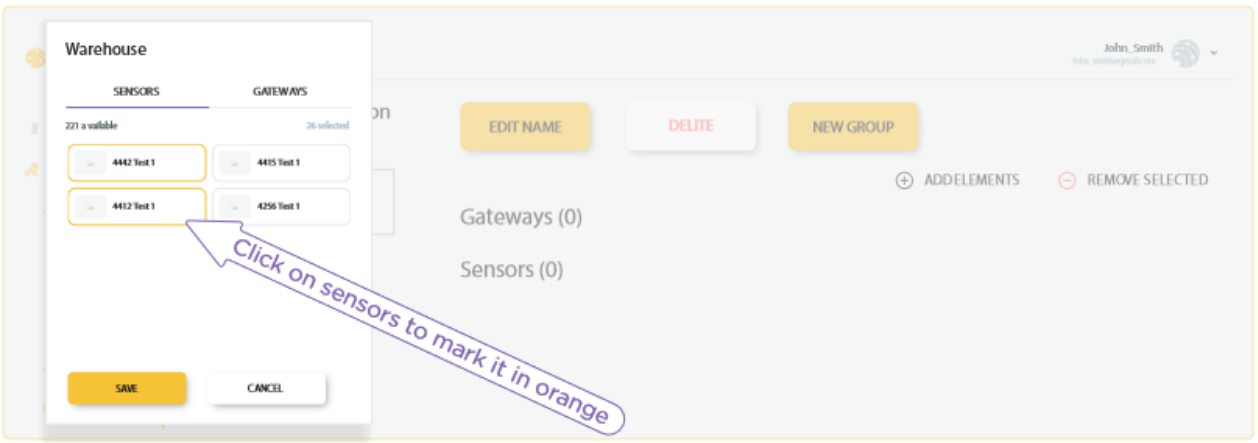
In this window there are two buttons named SENSOR and GATEWAY (SEE Picture 16)

Picture 16



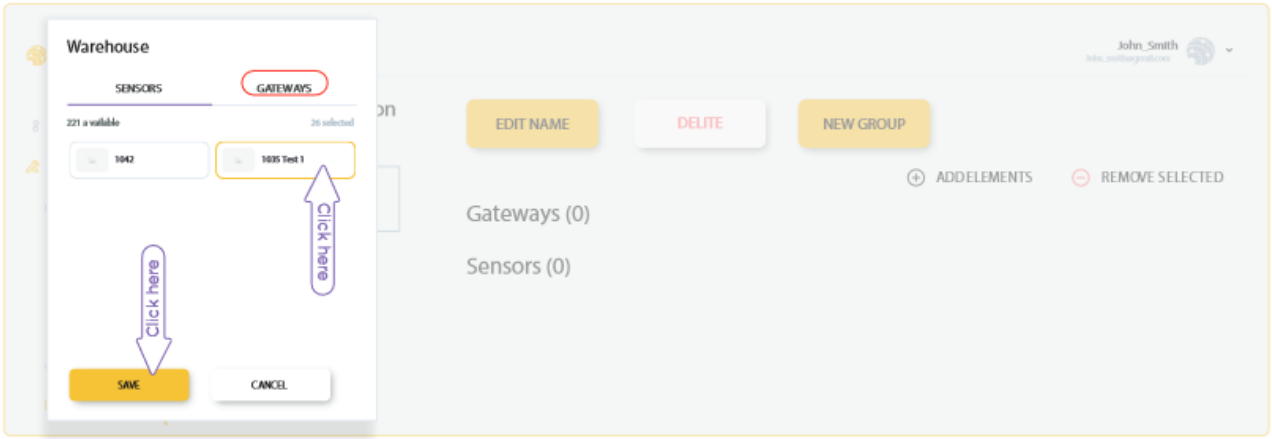
* When you click on a button SENSOR it is active when is highlighted with a purple line. A window with the renamed sensor/s appears on the screen. To select who you want to join the already existing group, please click on the sensor to highlight it in orange and then press button “SAVE” as shown on Picture 17

Picture 17



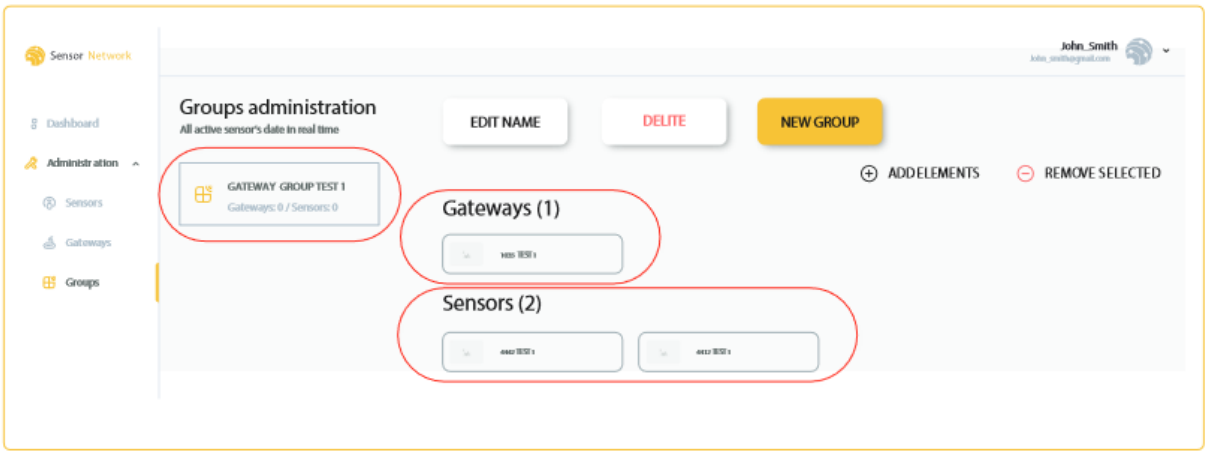
* When you click on a button GATEWAY it is active when is highlighted with a purple line. A window with the renamed gateway/s appears on the screen. To select who you want to join the already existing group, please click on the gateway to highlight it in orange and then press button “SAVE” as shown on Picture 18

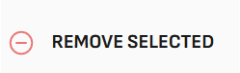
Picture 18



* On the screen you will see your renamed Gateway and the renamed sensors you have chosen to be connected to it as shown in picture 19

Picture 19



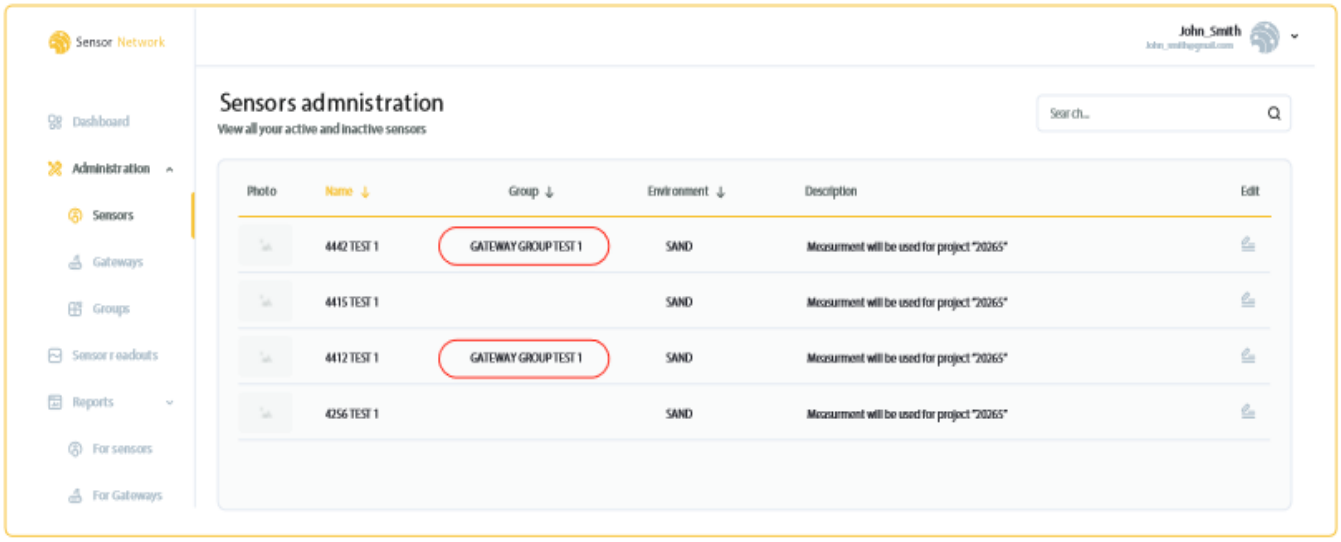
*If you want to remove a sensor from the group, please highlight the sensor by clicking on it and it turns orange and then select button 

*If you want to delete the whole group please use button

*To change the group name, please use the button

* Please return to the submenu “SENSORS”, in which the sensors you selected are automatically recorded in the GROUP field as shown in Picture 20

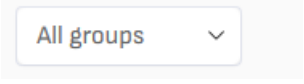
(Picture 20)



4.2 Main menu Dashboard

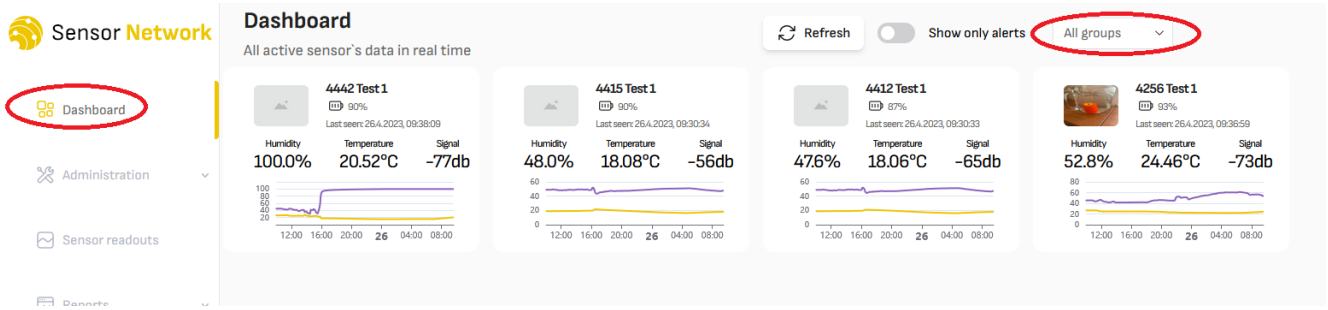
The dashboard menu is a feature that allows you to see a general monitoring of humidity, temperature and the signal of your sensors. You can use a dashboard to track, analyze and display key performance indicators, metrics and data points related to your sensors. A dashboard connects to your data sources and transforms the raw data into visualizations such as tables, charts or graphs. By using a dashboard, you can monitor the overall health of your environment, process or system in real time.

There are three active buttons on the screen that give you the following options:

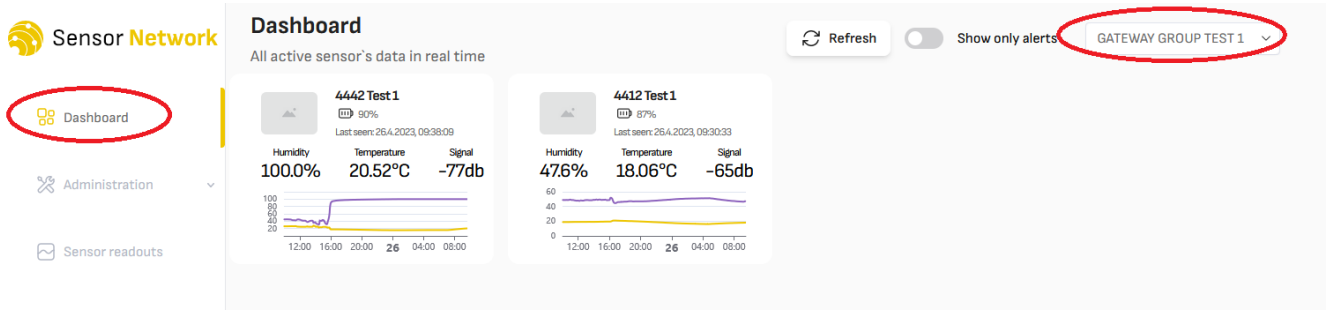
- to choose monitoring of All groups 

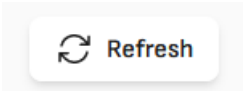
as it shown in Picture 21 or only a specific group shown in Picture 22

(Picture 21)

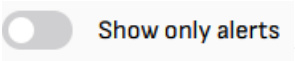


(Picture 22)

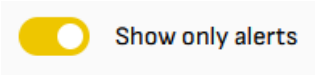


- if necessary, you can use the refresh button 

to refresh the data

- you can select the button "Show only alarms" 

to monitor on the screen only the sensors that during monitoring showed increased or decreased valuesyou can select the button "Show only alarms " to monitor on the screen only the sensors that during monitoring showed increased or decreased values. The active button must be colored orange



To display the humidity and temperature graph for a specific sensor, please click on the sensor for which you want the data to be displayed. By moving the mouse pointer along the horizontal axis, you can observe the change in temperature and humidity The graphic that appears is shown in the picture 23.

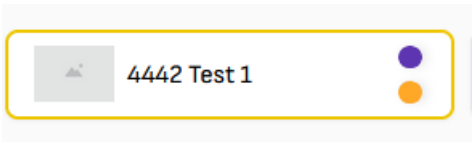
(Picture 23)

4.3 Main menu Sensor readouts

The Sensor readouts menu is a feature that allows you to visualize the data collected by your sensors. You can use this menu to compare sensors data or view single sensor graph. Comparing sensors data lets you see how different sensors behave under different conditions or locations. Viewing single sensor graph lets you see the changes in a specific sensor over time. You can use this menu to create graphs and charts from your sensor data. By using the Sensor readouts menu, you can monitor, analyze and display your sensor data with detailed information.

There are three active buttons on the screen that give you the following options:

- ✓ Select all This button allows you to select all sensors in your account, which are colored with an orange line, so you can monitor, analyze and display your sensor data with detailed information;
- ✕ Clear sellection This button allows you to remove the sensor selection you have made;
- All groups This button allows you to see on the screen all existing sensors in your account or by clicking on it you can choose to monitor your grouped sensors GATEWAY GROUP TEST 1 If you selected the option to monitor only grouped sensors, you can again make a selection by clicking on your selected sensors or selecting the button ✓ Select all and to remove the sensor selection you have made with ✕ Clear sellection ;

- To ensure that the sensors you have selected are the correct ones please ensure that they are marked in orange by you 

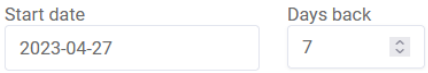
When selecting more than one sensor whose temperature and humidity graph you want to monitor, it is necessary to change the colors of your choice so that you can distinguish the graphs of the sensors. The color change process is shown in Picture 24

(Picture 24)

After clicking the button APPLY a graph of your selected sensors appears on your screen as shown in a picture 25

(Picture 25)

* Working with graphics from Picture 25 gives you the following options:



You can choose the review start date and the number of days to review from these two fields. Then go back to the graph. The horizontal and vertical lines are orange. Drag the graph by clicking on the horizontal line and adjust it to the days you selected. You can also zoom in and out by clicking on the left side of the horizontal line and move the graph sideways.

-

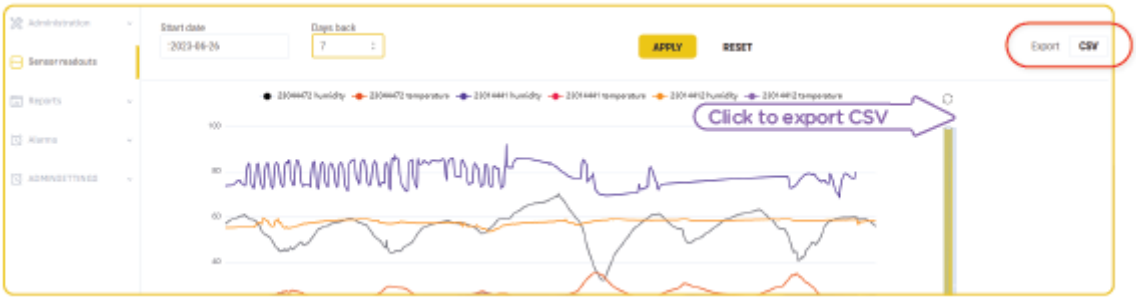
- Above the vertical orange line are the following two symbols “Restore”/ ”Save to image”

The "Restore" symbol allows you to reset the graph in the initial position of the sliders.

The "Save to image" symbol allows you to save your graphics as an image file outside the software system. This is useful if you want to share your graphics with others who may not have access to the software system. To use this feature, simply click on the "Save to image" symbol, and the software system will save your graphics as an image file. (See picture 26)

- Export CSV If it is necessary to export the information collected by the sensor in an excel table, please use the CSV button (see picture 26)

(Picture 26)



4.4 Main menu Reports

The menu Reports allows you to export the information on the groups you have created. The information that is displayed on the screen is at the last moment when information was submitted to the server and the value was recorded.

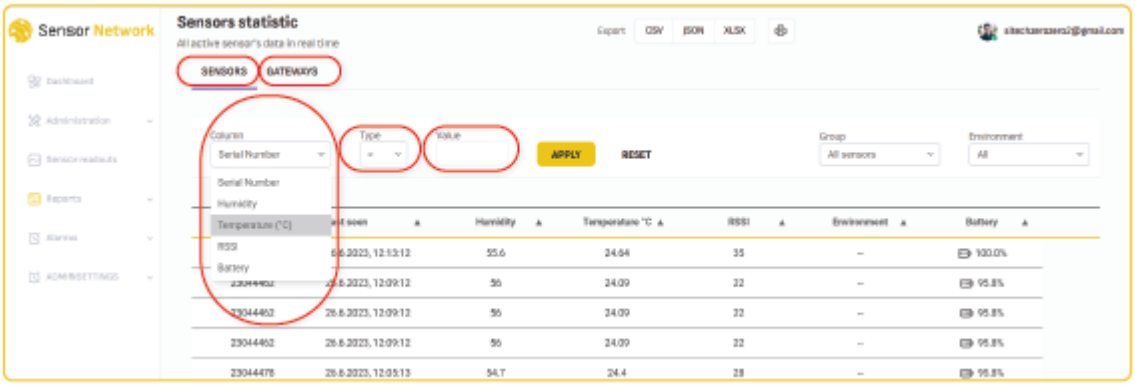
The reports you can export are for both the sensors and gateways you have in your account.

The format of the documents you can export are: CSV / JSON/XLSX

The buttons you can use for the relevant format are: CSV JSON XLSX

The software also allows you to print the information directly from a button

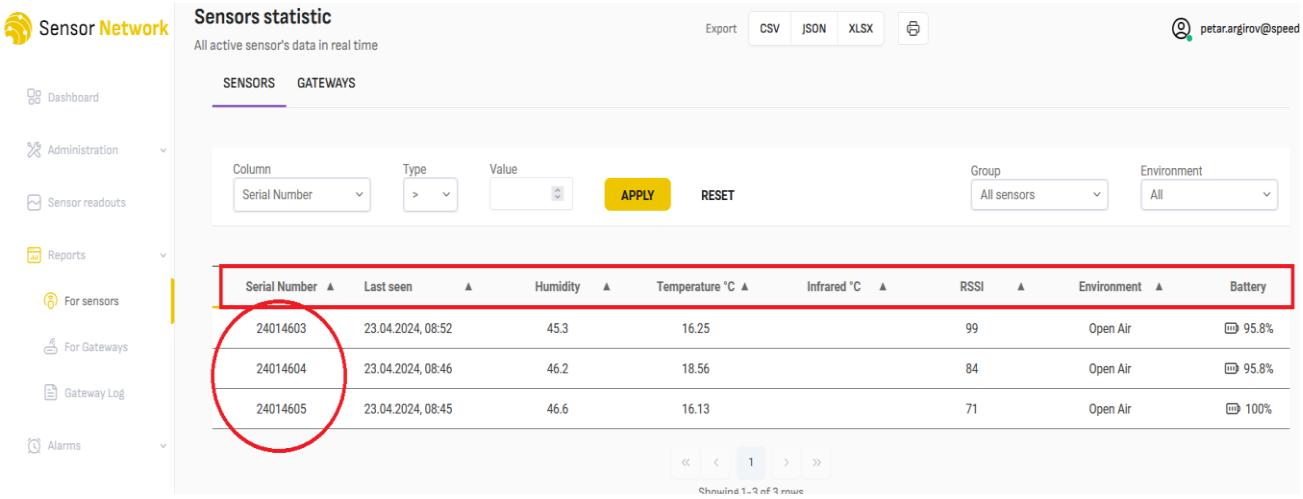
Regarding what parameters you want to make your reports on, you can make your choice from the buttons Column Pressure Type > Value as shown in Picture 27 (Picture 27)



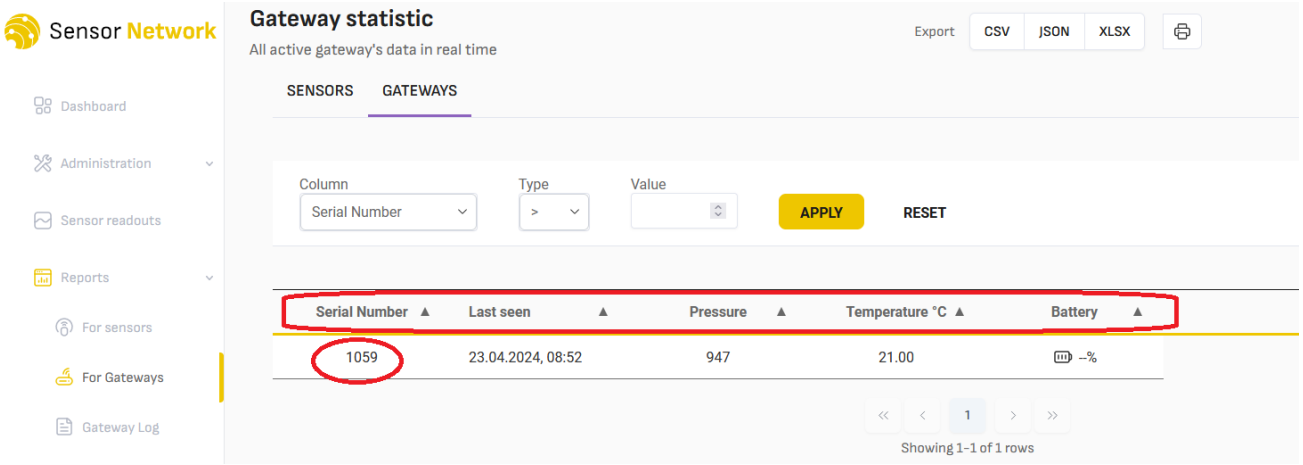
To track the parameters of all reports on a sensor or group of your preference, please use the following sub-menus: For sensors ; For Gateways ; Gateway Log **which we will examine in detail below:**

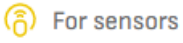
- For Gateways and For sensors - These submenus will help you see the history information of the all gateways/sensors in a different tabular form. From the drop-down menu, select the gateway/sensors for which you want the information to be displayed, as shown in Picture 28 (for all sensors) and Picture 29 (for all gateways)

(Picture 28)



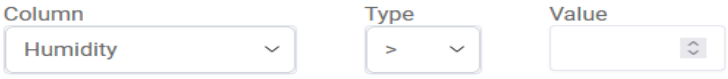
(Picture 29)



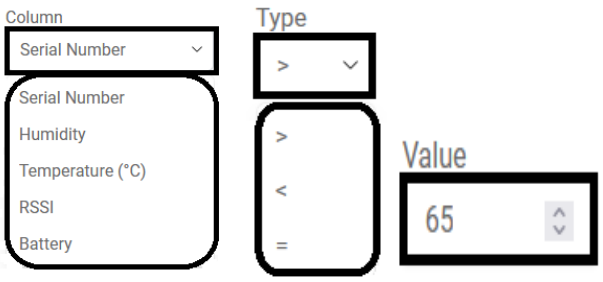
Also, from sub menus 

and 

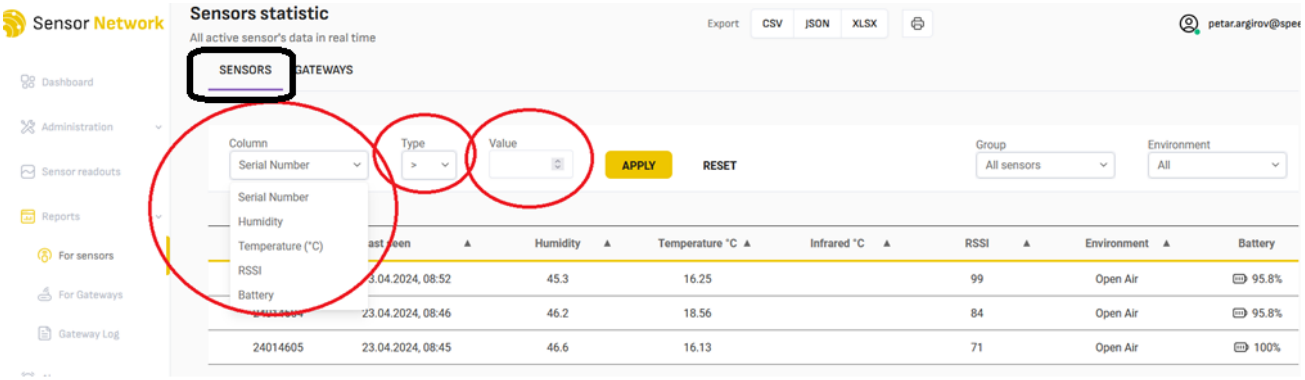
You have the flexibility to conduct your analysis using indicators of your choice (Serial Number/Temperature/Humidity/Battery/RSSI. Use the drop-down menus marked in Picture 30 – A (for sensors) and 30 – B (for gateways).

In the table you will see 

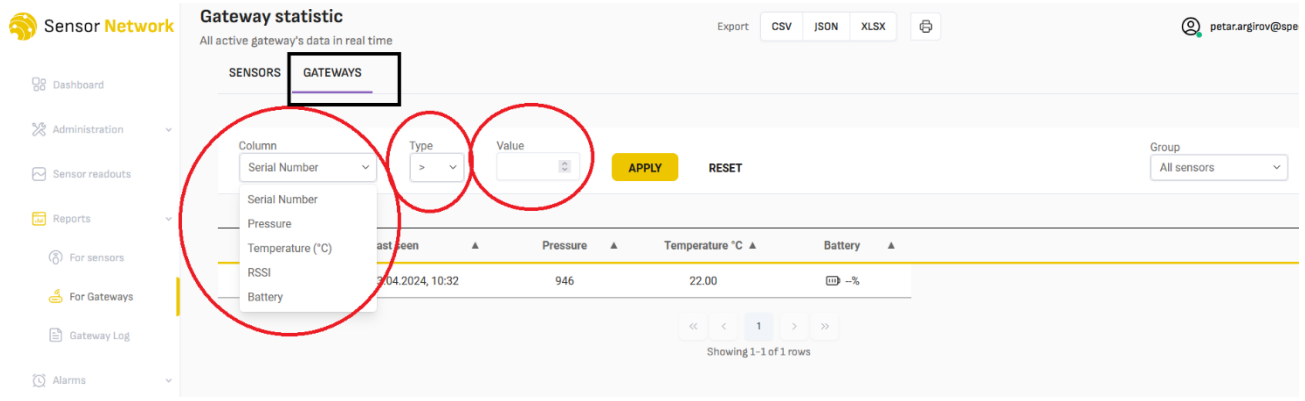
and you can select indicators to generate a report for example as shown below:



(Picture 30 -A)

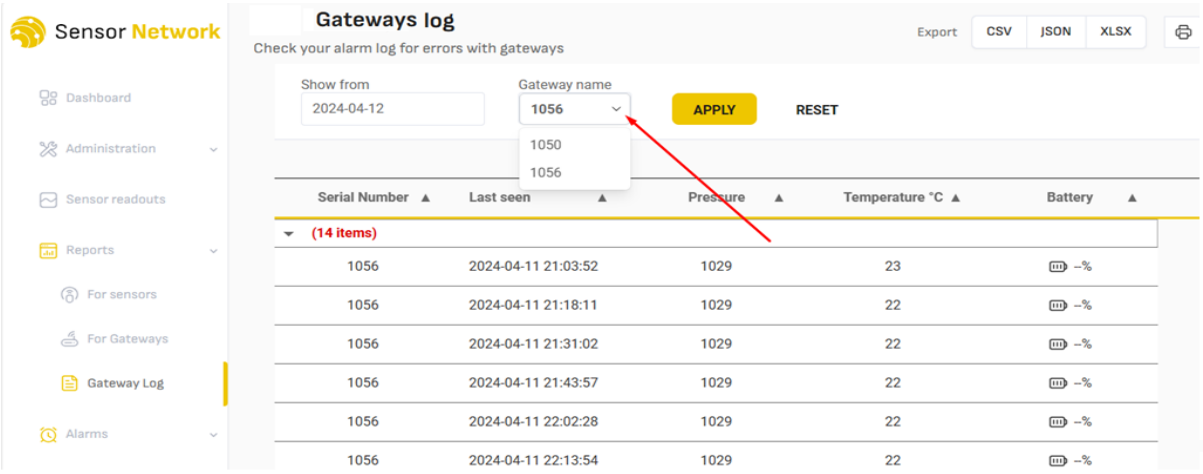


(Picture 30 -B)



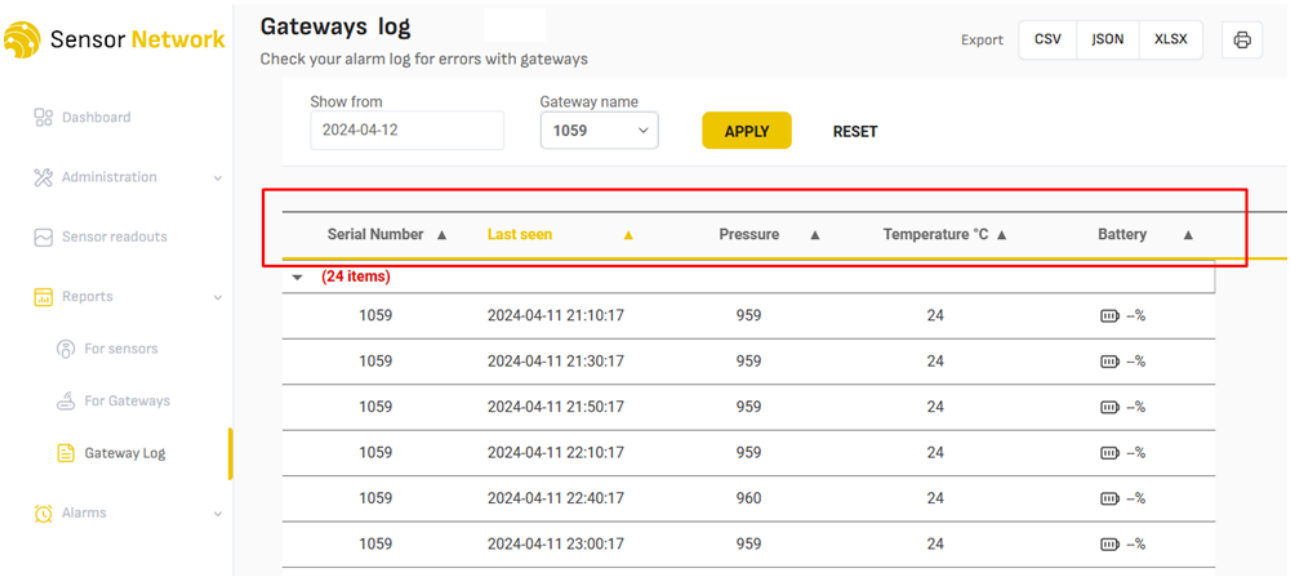
- Gateway Log - The sub-menu provided enable you to access the historical data of gateway in a distinct table format. You can choose the specific gateway you wish to review information for from the drop-down menu as shown in Picture 31

(Picture 31)



By clicking on tab Serial Number ▲ , Last seen ▲ (pressed), Pressure ▲ or Temperature °C ▲ the main menus from the table, you can select the indicator by which you want the values sorted, as shown in Picture 32. The arrow ▲ ▼ indicates the increasing or decreasing criteria of the pressed column. The sequence can be changed by a second click on the tab.

(Picture 32)



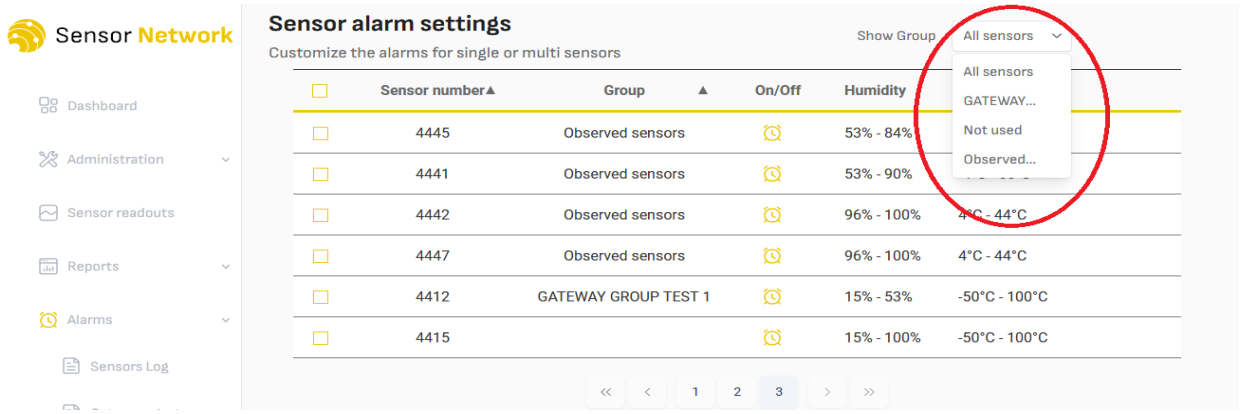
4.5 Main menu Alarms

This menu allows you to configure which values you want to enable alarms for humidity, temperature, signal strength or battery level.

To set your alarm preferences you need to use the following submeny Sensor settings or Sensors Log :

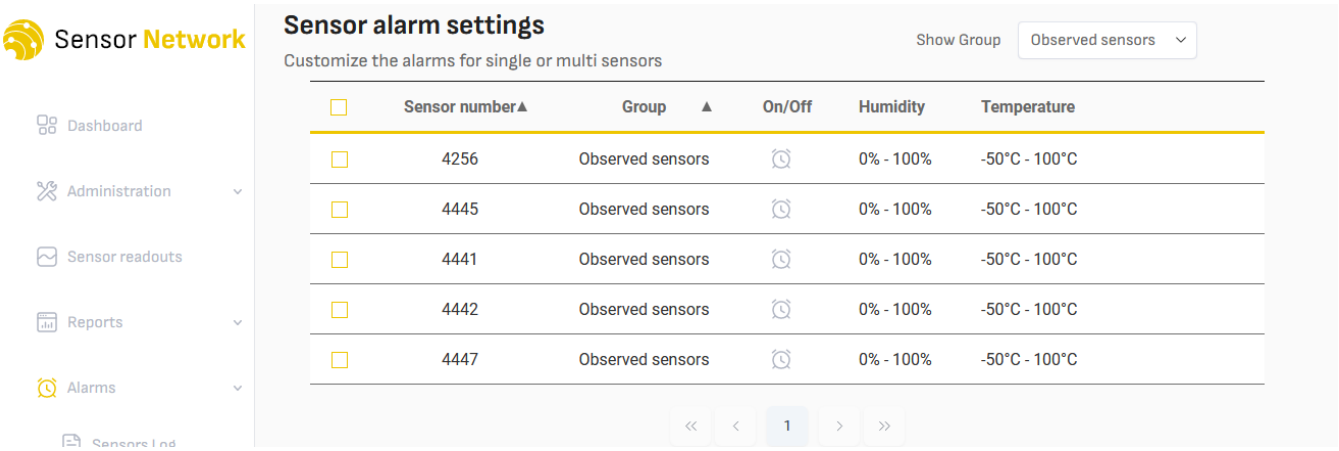
- Sensor settings - Used to set alarms to sensors you select or to sensors that belong to a group. For this purpose, please use the drop-down menu to make your selection as shown in Picture 33

(Picture 33)



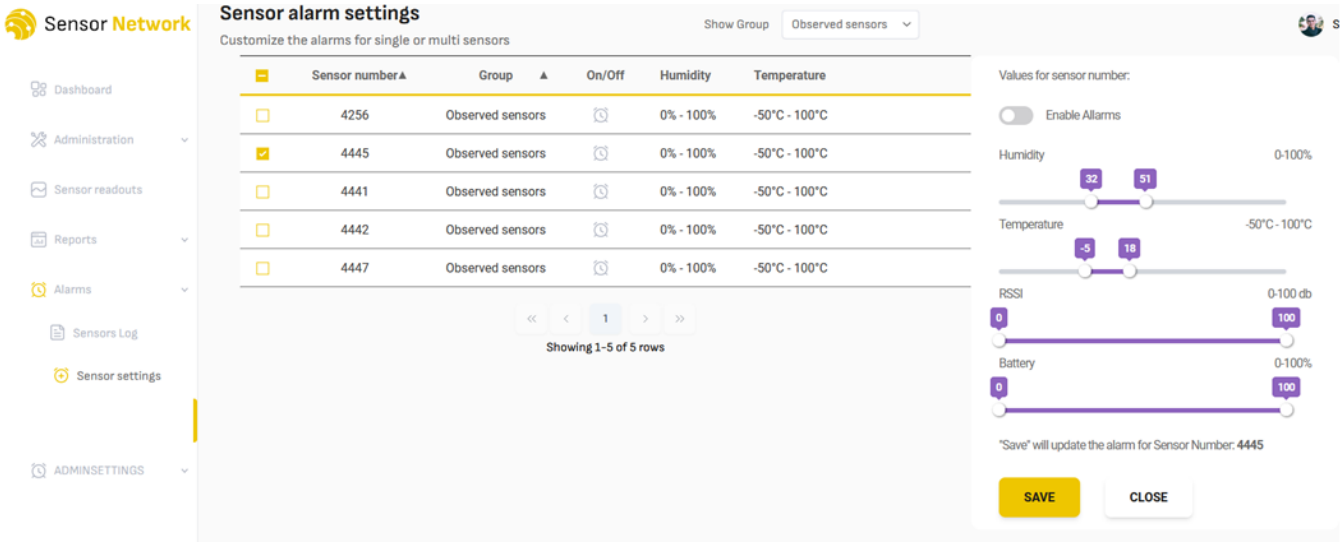
Your selection is displayed on the screen. Picture 34 shows what the screen looks like if you have chosen to display group sensors on the screen.

(Picture 34)



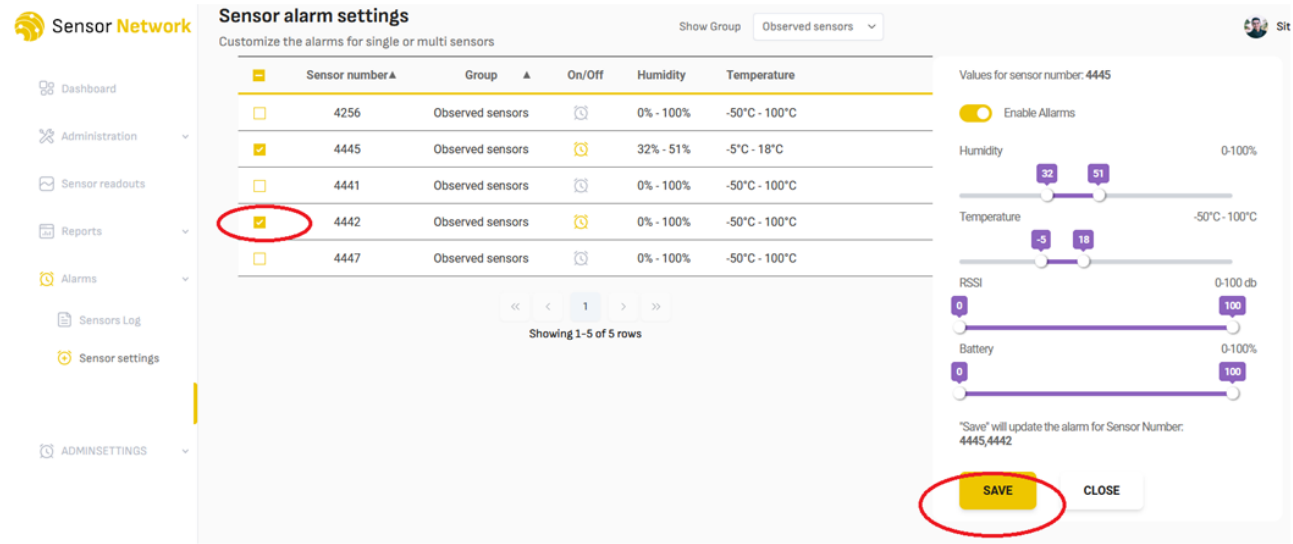
Beside each sensor's name there is a box that you need to tick with a single click to choose the sensor for which you want to set alarms. Alarm values are set by sliding left or right along the purple horizontal line on each of the indicators as shown in Picture 35.

(Picture 35)



If you want to make an alarm with the same parameters, but on several sensors, you need to click in the box in front of the sensor name and give the Save button as shown in the picture 36

(Picture 36)



After successful configuration, the icon in the menu turns in orange color

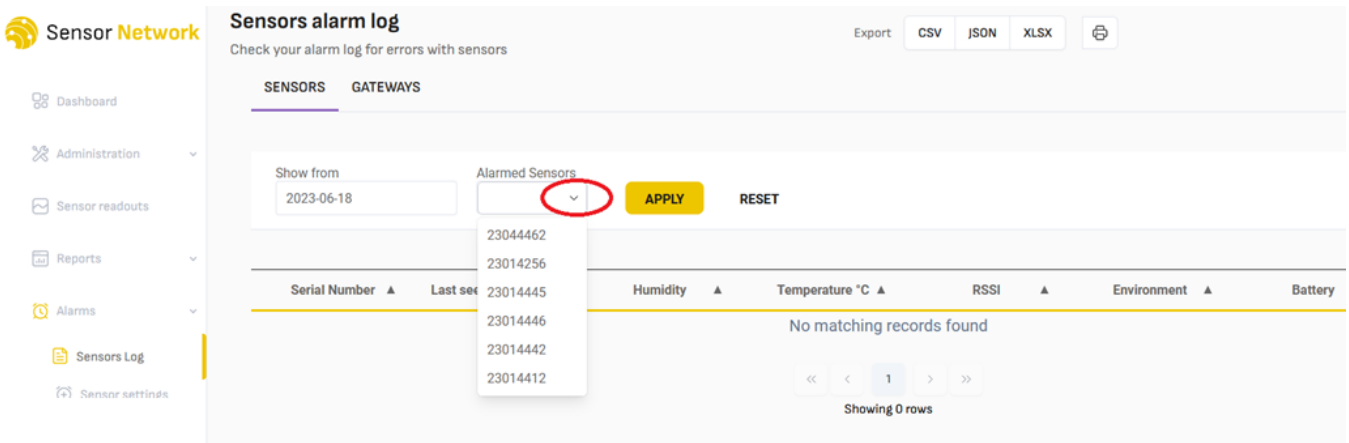
If you return to the Dashboard menu in the upper right corner of each sensor you select, the number of alarms appears in red color as shown in the picture 37

(Picture 37)

Sensors Log

- This submenu will help you, after you have set parameters for alarms, to see their information in a different tabular form. From the drop-down menu, select the sensor for which you want the information to be displayed, as shown in Picture 38.

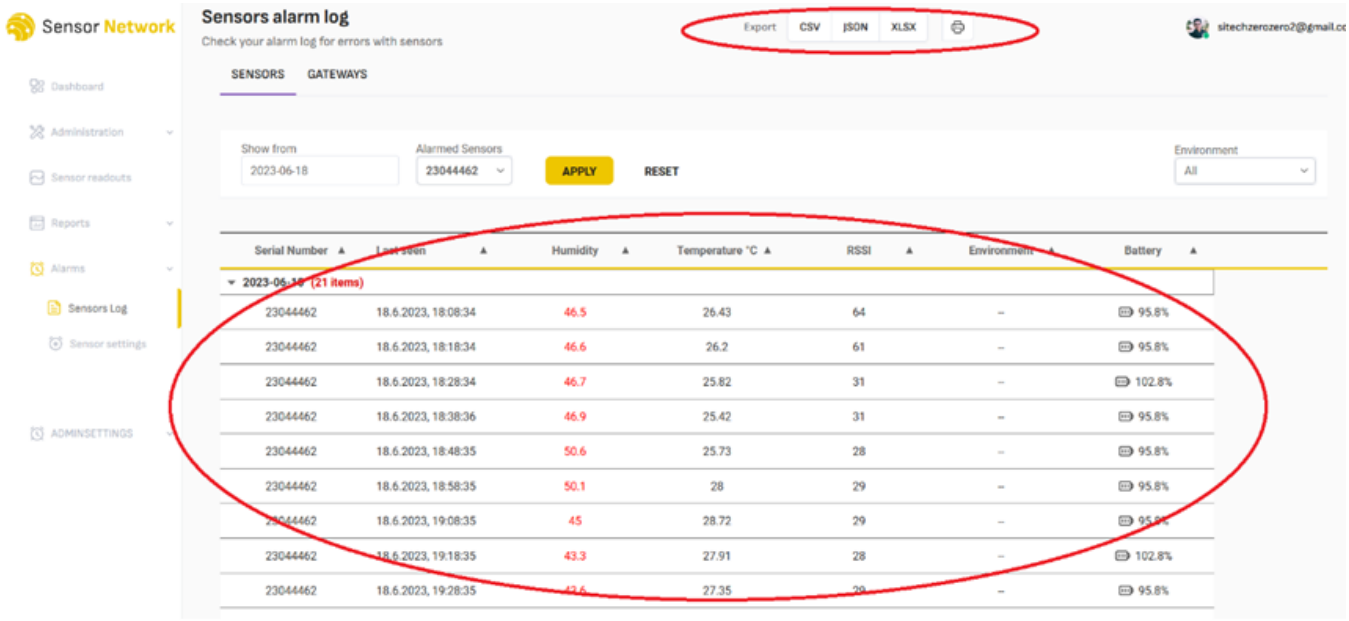
(Picture 38)



You can use the information as shown in Figure 39 or use it by exporting it in one of the formats indicated 

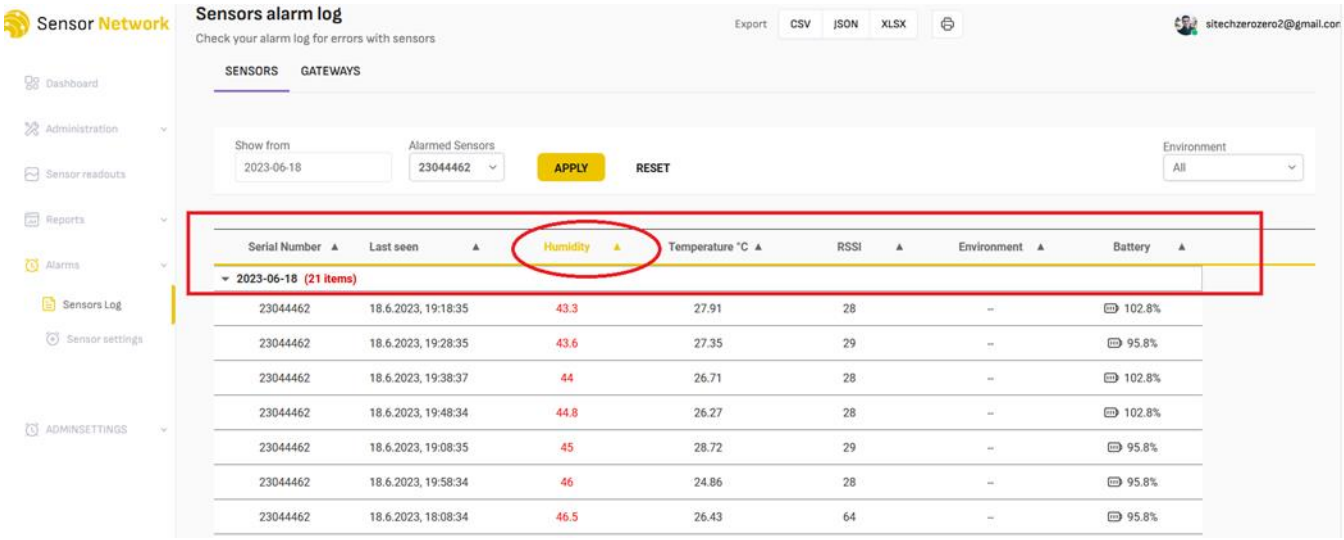
or print the information 

(Picture 39)



You can, by clicking on the main menus from the table, choose for which indicator you want the alarms to be displayed, as shown in Picture 40

(Picture 40)



5.Errors in this document

In case errors are detected in this document, please reach out to the manufacturer. Spotted errors will be corrected and this version of the document will be updated.

6. Liability Notice

Failure to comply with the conditions specified in this document relieves SiTech Consulting Ltd of any responsibility for the safety, reliability and performance of the equipment. Each operator must read this manual in its entirety before using the system. Only authorized personnel may perform assembly, modification or repair of the system. The equipment must be used in accordance with its intended purpose.

7.Terms of Warranty

• SiTech Consulting Ltd. will, at its option, repair or replace any part of its product(s) that proves defective due to improper workmanship or materials.

• Repaired or replaced parts/products will be provided by SiTech Consulting Ltd on an exchange basis. This warranty does not cover any damage to this product resulting from accident, abuse, misuse, natural or personal calamity, or unauthorized disassembly, repair or modification.

• Devices sold by SiTech Consulting Ltd have a 24-month warranty. This warranty only covers repair or replacement of defective products as stated above.

Version	Rationale	Date
1.0	Creation	10.2023