



Air Quality & Sound Monitor User Manual

Revision:3 (01/10/2024)

Model: DSN0095 - *

Revision History			
Rev.	Date	Author	Description
0	16/02/2023	DNG	Initial version
1	16/07/2024	ANA	Sound Variant and decoders addition
2	23/08/2024	RAUL	English version
3	01/10/2024	HMP	Added missing Air QA sensors

Index

1 Introduction and security	6
1.1 Disclaimer	6
1.2 Copyright	6
1.3 User Description	7
1.4 Safety Symbols.....	8
1.5 Safety warnings.....	9
1.5.1 General Precautions	9
1.5.2 Precautions for assembly, installation and maintenance.....	10
1.5.3 Operating Precautions.....	10
1.6 Marking and Labeling.....	12
2 Product Information.....	13
2.1 Manufacturer Information	13
2.2 Product Description	13
2.3 Components	15
2.4 Specifications	16
2.5 Diagram	20
2.5.1 Device Exterior	20
2.5.2 Inside the device	21
2.6 Models.....	22
3 Installation.....	23
3.1 Location selection.....	23
3.2 Installation.....	24
3.2.1 Wall mounting.....	24
3.2.2 Pole Mount.....	25
3.3 Connection.....	28
3.3.1 Power supply	28

3.3.2 SIM card	33
3.4 Commissioning and configuration	35
3.4.1 Checklist.....	35
3.4.2 Configuration	36
4 Operation.....	42
4.1 Acquisition of environmental and air pollution data.....	42
4.2 Noise pollution data acquisition	43
4.3 Clock and timestamp	44
4.4 Communications.....	45
4.4.1 IP Connectivity.....	45
4.4.2 LoRaWAN Connectivity.....	46
4.5 IoTsens Platform	48
5 Maintenance	49
5.1 Scheduled Maintenance	49
5.2 Firmware update	52
6 Troubleshooting and Support.....	53
6.1 Troubleshooting	53
6.2 Support.....	55
7 EU Declaration of Conformity.....	56
8 Recycling and Disposal Information	57
9 Warranty conditions	58
Annex 1 – Device settings.....	60
Annex 2 – Factory Settings.....	68
Annex 3 – IoTsens protocol.....	70
9.1 Common Parameters	Error! Bookmark not defined.
9.2 Common Parameters	71
9.3 Example	72

1 | Introduction and security

This manual provides the information necessary for the installation and use of the Sound and Air Quality Monitor device.

Before installing and using this device, read and understand all safety precautions, warnings, and instructions contained in this user manual to ensure proper and safe installation and operation.

After reading the manual, keep it for reference on any future occasion.

1.1 | Disclaimer

This manual is provided for reference purposes only, the manufacturer assumes no responsibility for any errors that may appear in this manual.

The manufacturer reserves the right to modify or revise the information in this manual at its discretion at any time and without notice.

The manufacturer assumes no responsibility for damage caused by improper installation and misuse of the device that goes beyond the use defined in this manual.

Only the manufacturer must provide technical service or repair equipment under warranty. Third party service automatically voids the warranty.

1.2 | Copyright

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the manufacturer.

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1.3 | User Description

This manual is intended for the end user of the Sound and Air Quality Monitor device. The end user who interacts directly with the device can include:

- Installer
- Maintenance personnel
- Dismantling personnel

The device should only be handled by authorized personnel with the appropriate skills and qualifications:

- Fully read and understood this manual
- Are you aware of this device
- He has experience handling similar devices.

The "[Installation](#)" section of this document is intended for the installer of this device.

The "[Troubleshooting and Support](#)" section of this document is intended for maintenance personnel of this device.

The "[Recycling and Disposal Information](#)" section of this document is intended for disassembly personnel of this device.

1.4 | Safety Symbols

In this manual, and on the product itself, various symbols are used to ensure correct use, avoid dangers to the user and other people, and prevent damage to property.

The meanings of these symbols are described below.

It is important that you read these descriptions carefully and fully understand the content.

 DANGER	This symbol indicates high-risk safety instructions where failure to comply could affect personal safety and even cause death.
	This symbol indicates safety instructions where failure to comply could affect personal safety and even cause death.
	This symbol indicates electrical safety instructions where failure to comply could affect personal safety and even cause death.
	This symbol indicates the disconnection of the mains power supply.
	This symbol indicates an instruction that is a requirement for the correct operation of the product and must be followed.
	This symbol indicates the presence of parts and assemblies that are susceptible to electrostatic discharge damage (ESD). Take appropriate precautions.
	This symbol indicates that it is necessary to read and follow the instructions indicated in the manual.
	This sign is not a symbol of safety, but it refers to an important instruction.

1.5 | Safety warnings

Improper installation and handling of this device could result in fire, explosion, electric shock, or other hazards that could result in property damage and/or serious or fatal injury to persons.

You must follow the safety precautions below to avoid risks.

1.5.1 | General Precautions

	This equipment must be installed, adjusted, and repaired by qualified electrical maintenance personnel who are familiar with the construction and operation of the equipment and the hazards involved. Failure to follow this precaution could result in personal injury.
 	HIGH TENSION: Electric Shock Hazard. Disconnect the input power to the equipment where this device will be installed before performing installation and maintenance work.
	Please wait at least one (1) minute after turning off the input power supply before performing maintenance or an inspection. Otherwise, there is a danger of electric shock.
	This device has a built-in OPC (Optical Particle Counters) particle sensor that uses an integrated diode laser light source at a wavelength of 650nm. The particle sensor is a Class 1 laser product as the user does not have access to the laser source.

1.5.2 | Precautions for assembly, installation and maintenance

	Always protect this device from electromagnetic interference. Strong electromagnetic fields can affect sensor readings.
	Use caution during installation when performing at height. The equipment can either fall on the installer or on the people underneath.
	Use caution during installation when performing at height. There is a risk of falling at different levels.
	Mandatory use of protective gloves
	During equipment installation, keep the computer unplugged

1.5.3 | Operating Precautions

   	Keep the device within the stated temperature and power specifications
	Never disassemble or modify the device
	The product contains high-voltage components. Modification or disassembly of the device may result in fire, electric shock, or eye and skin injuries.
	Do not insert liquids or foreign items
	Penetration of these liquids or items can result in fire or electric shock. If this happens, disconnect the equipment immediately from the power supply.
	• Do not place the device near water (e.g., a bathroom, beach, or similar). • Do not expose the device to rain or moisture. • Do not place metals, fuels, or the like on or around the device. • To prevent penetration by foreign objects, do not place the equipment in a case or bag along with anything except its accessories, signal cables, and connectors.
	Do not give the device any bumps or impacts.

	If the device is bumped and/or broken, it could result in injury, and continued use could result in fire or electric shock. If the device is shocked, immediately turn off the power switch, disconnect the plug from the power outlet and contact your dealer. Be careful with the power cord connection. Improper connection of the power cord could result in fire or electric shock. Do not touch the power cord with wet hands. Check that the connection part of the power cord is clean (dust-free), before use. Use a soft, dry cloth to clean the power plug. Firmly insert the plug into a power outlet. Avoid using a loose, faulty outlet or contact fault. Failure to locate equipment in the presence of strong magnetic fields The presence of these fields can lead to equipment malfunction, erroneous measurements, or inability to communicate with the system.
	Equipment Drop Under poor installation conditions or atmospheric conditions that exceed design parameters, there is a risk of falling objects for people below.
	High concentrations of gases If the equipment is located in locations with gas concentrations that exceed the design conditions, it may be permanently damaged

1.6 | Marking and Labeling



This product is marked and compliant with Directive 2014/53/EU (EC).



This product is marked and compliant with the RoHS Directive 2011/65/EU Annex II, amending Annex (EU)2015/863 and amending Annex (EU)2017/2012.



This product is marked in accordance with Royal Decree 110/2015 of Spain based on Directive 2012/19/EU of the European Union.



- 1 Manufacturer Logo
- 2 Product Name
- 3 Product Model
- 4 Power
- 5 Identification of installed gas modules
- 6 Web address
- 7 EUI Identifier / Serial Number
- 8 Magnetic sensitive zone to enter setup mode
- 9 RAAE/WEEE Logo
- 10 RoHS Logo
- 11 CE Logo

2 | Product Information

2.1 | Manufacturer Information

- Gimeno Digital Technologies, S.L. - GIDITEK - IoTsens
- Address: Av. del Mar, 51 12003, Castelló de la Plana, Castelló - Spain
- Mail: info@iotsens.com
- Web: www.iotsens.com
- Telephone: (+34) 964 727 101

2.2 | Product Description

The Sound and Air Quality Monitor is an IoT (Internet of Things) device that consists of a set of environmental sensors capable of collecting different variables to evaluate the conditions of the air around it. In addition, it has a built-in microphone for monitoring noise levels, displaying the data collected in dBA, this information is essential in areas with restrictions on noise levels.

The device has been developed based on the guidelines set out in the Council's Framework Directive 96/62/EC and all its Secondary Directives. The purpose of this decree is to regulate air quality in order to avoid, prevent and reduce the harmful effects of the substances mentioned in the regulations on human health, the environment as a whole and other goods of any nature.

In the same way, for the monitoring of the acoustic level, the development of the device has been based on the guidelines set out in Directive 2002/49/EC of the European Parliament and of the Council, of 25 June 2002 and Law 37/2003 of 17 November published in the BOE of Spain. The purpose of this law is to regulate noise pollution in order to avoid and, where appropriate, reduce the damage it may cause to human health, property or the environment.

Characteristics

- Measurement of multiple pollutants: allows the concentration of up to 7 gases (NO₂, O₃, CO, SO₂, NO, H₂S and CO₂) and airborne particles (PM₁, PM_{2.5} and PM₁₀) to be measured.
- Recording of environmental variables: temperature, relative humidity and atmospheric pressure.
- Environmental noise level monitoring (LA_{eq}, LA_{max}, L_{amin} and L_{Ap} (01-10-50-90-99))
- Measurement of volatile organic compounds (TVOC).
- Multiple communication options: Ethernet, WiFi, LoRaWAN, NB-IoT
- Applications: taking preventive and corrective actions in areas of special interest such as green areas, school environments or Low Emission Zones.

2.3 | Components

The Sound and Air Quality Monitor device includes a main unit, a setup magnet, and a PoE power supply.



A pole mounting kit can be supplied optionally.

If any damage has occurred during transport, please contact the manufacturer.

Image	Description	Quantity	SKU
	Main Unit	1	DSN0095-*
	PoE power supply	1	19124
	Setup Magnet	1	19195
	Pole Mounting Kit(Optional)	1	19201

2.4 | Specifications

General Features

General

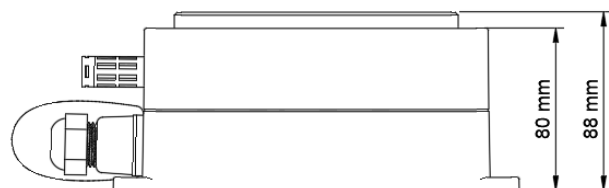
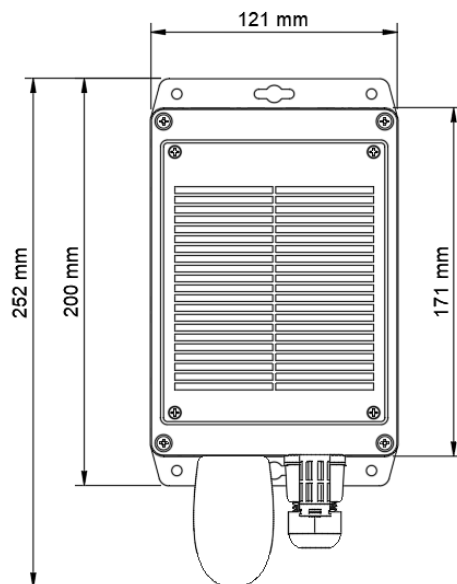
Dimensions	171 x 121 x 80 mm
Weight	800 g
Housing	UV-resistant polycarbonate
IP protection	IP53

Environmental

Operating Temperature	-20°C – 60°C
Storage temperature	-40°C – 80°C
Operating humidity	5 – 95 % HR

Electrics

Power	12-24Vdc, 0.5A PoE Passive Mode (+ pins 4-5, - pins 7-8)
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Variables

Nitrogen Dioxide (NO₂)

Range	0 to 8500ppb
Accuracy	± 15ppb
Useful life	24 months up to 50% deviation of measurement.

Ozone (O₃)

Range	0 to 4000ppb
Accuracy	± 15ppb
Useful life	24 months up to 50% deviation of measurement.

Carbon Monoxide (CO)

Range	0 to 5800ppb
Accuracy	± 20ppb
Useful life	36 months up to 50% deviation of measurement.

Sulphur Dioxide (SO₂)

Range	0 to 5800ppb
Accuracy	± 15ppb
Useful life	36 months up to 50% deviation of measurement.

Nitrogen Oxide (NO)

Range	0 to 4000ppb
Accuracy	± 80ppb
Useful life	24 months up to 50% deviation of measurement.

Hydrogen Sulfide (H₂S)

Range	0-1000ppb
Accuracy	± 5ppb
Useful life	24 months up to 50% deviation of measurement.

Carbon Dioxide (CO2)

Range	400-2000ppm
Accuracy	± 40ppm

Particles (PM1, PM2.5 y PM10)

Range	Concentration of airborne particles
Accuracy	from 0 to 1000 µg / m ³
Useful life	PM1 ±10%; PM2.5 ±15%; PM10 ±25%

Barometric Pressure

Description	MEMS Pressure Sensor
Range	300mbar – 1200mbar
Accuracy	±1,5mbar (0°C-50°C) ±3mbar (-20°C-70°C)

Humidity

Description	CMOS Humidity Sensor
Range	from 0 to 100%
Accuracy	± 2%

Temperatura

Description	± 0,2°C
Range	CMOS Temperature Sensor
Accuracy	-40°C to + 125°C

Sonido

Measuring range	30-120 dBA
Frequency Range	20Hz to 12,5Khz
Accuracy	±0,5 dBA
Response Time	200ms

Communications

Ethernet (All models)

Standard	IEEE 802.3 100Base-TX
Cable	4 twisted pairs (category 5 UTP)
PoE	Passive Mode (4-5 positive, 7-8 negative) 12-24Vdc

WiFi (All models)

Standard	IEEE 802.11b/g/n
Band	2.4 GHz
Power	+16 dBm
Sensibility	-98 dBm (802.11b, 1Mbps)
Antenna	Internal

NB-IoT (Optional)

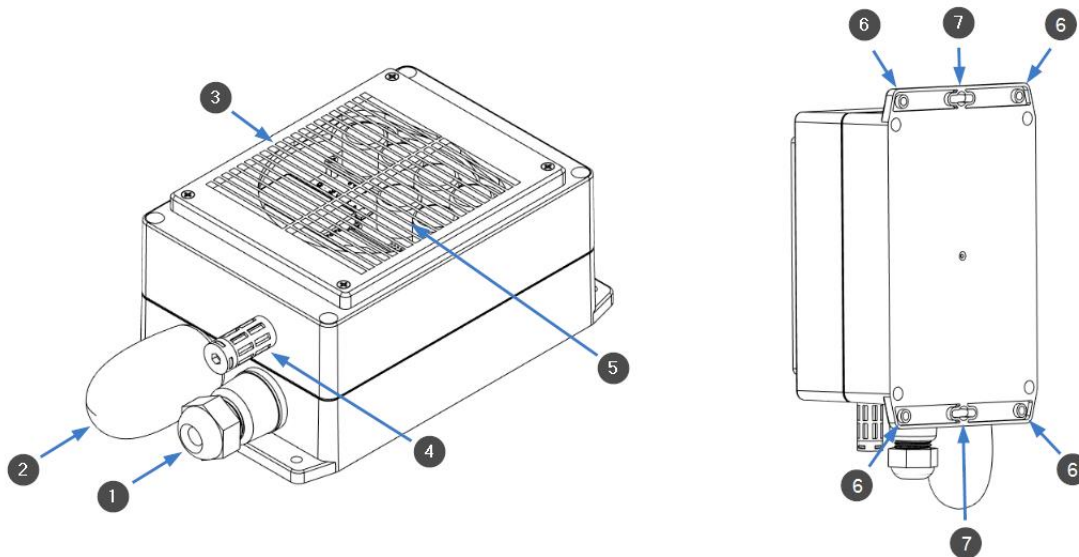
Bands	Global (B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26/B28/ B66/B70/B71)
Bandwidth	Uplink: 150Kbps Downlink: 126Kbps
Energy consumption	PSM / eDRX
Antenna	Internal
SIM	Mini SIM socket

LoRaWAN (Optional)

Region	EU868, US915, AU915, AU923
Version Specification	1.0.2
Regional Parameters	1.0.2rB

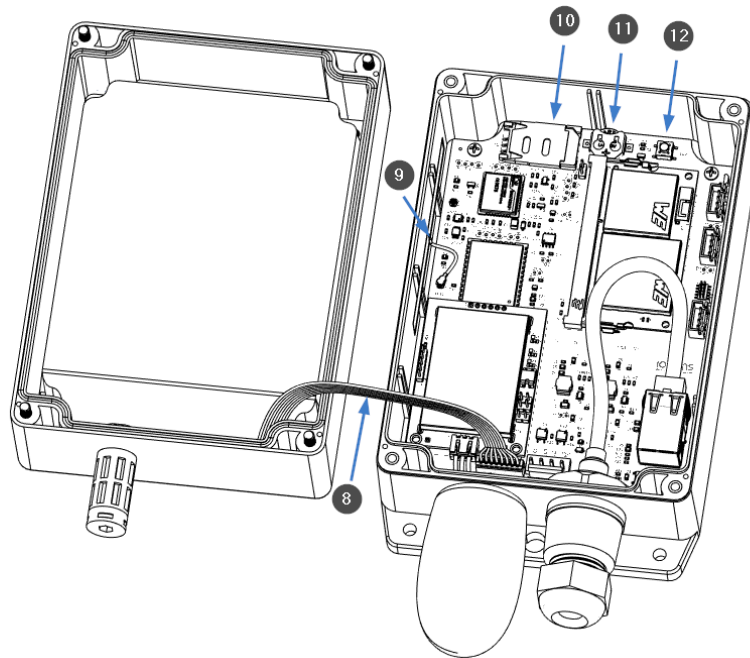
2.5 | Diagram

2.5.1 | Device Exterior



- 1 RJ45 connector: Ethernet / PoE power
- 2 Microphone
- 3 Ventilation Grille
- 4 Outdoor temperature and humidity sensor
- 5 Gas and particulate sensors
- 6 Holes for wall mounting
- 7 Pole Mount Kit Attachment Holes (Optional)

2.5.2 | Inside the device



- 8 Interior interconnection cable: Sensors-Main PCB
- 9 NB-IoT / LoRaWAN internal antenna
- 10 Mini SIM socket
- 11 CR1225 Real-Time Clock (RTC) Battery
- 12 Reset button

2.6 | Models

Sensor Configuration

	Sound	T, HR y pressure	Particles	CO2	NO2+O3	CO+SO2	NO+H2S
Sound	✓						
Basic	✓	✓	✓	✓			
Standard	✓	✓	✓	✓	✓		
Advanced 1	✓	✓	✓	✓	✓	✓	
Advanced 2	✓	✓	✓	✓	✓		✓
Full	✓	✓	✓	✓	✓	✓	✓

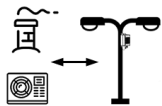
Models

	Ethernet / Wifi	Ethernet / Wifi/ LoRaWAN	Ethernet / Wifi/ NB-IoT	Ethernet / Wifi/ NB-IoT/LoRaWAN
Sound	DSN0083-A	DSN0083-B	DSN0083-C	DSN0083-D
Basic	DSN0095-A	DSN0095-B	DSN0095-C	DSN0095-D
Standard	DSN0095-E	DSN0095-F	DSN0095-G	DSN0095-H
Advanced 1	DSN0095-I	DSN0095-J	DSN0095-K	DSN0095-L
Advanced 2	DSN0095-M	DSN0095-N	DSN0095-O	DSN0095-P
Full	DSN0095-Q	DSN0095-R	DSN0095-S	DSN0095-T

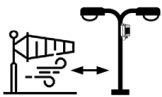
3 | Installation

3.1 | Location selection

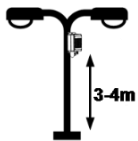
The selection of a location depends on the final application, noise pollution monitoring, road traffic monitoring, urban background, etc. However, the user should have the following considerations when selecting the final location:



Install the device away from nearby sources of contamination and without sufficient airflow (fireplaces, air conditioning, etc.), which may disturb the readings.



Install the device in a location with low wind impact, avoiding sources of vibration and avoiding electromagnetic sources so that sound monitoring is not affected.



Install the device between 3 and 4 meters high.



Do not place in locations of gas concentrations that exceed design conditions, equipment may be permanently damaged

3.2 | Installation

The Sound and Air Quality Monitor device must be mounted in a certain way due to design restrictions. The device should be mounted with the Ethernet/PoE Power connector facing down and the ventilation grill facing forward.



Keep the equipment unplugged from the power source during this process



Wear protective gloves during this procedure



The installer is responsible for selecting the most suitable location for your mounting, as well as making the mounting holes at the selected location.



Use caution during installation when performing at height. The equipment can either fall on the installer or on the people underneath.



Use caution during installation when performing at height. There is a risk of falling at different levels.

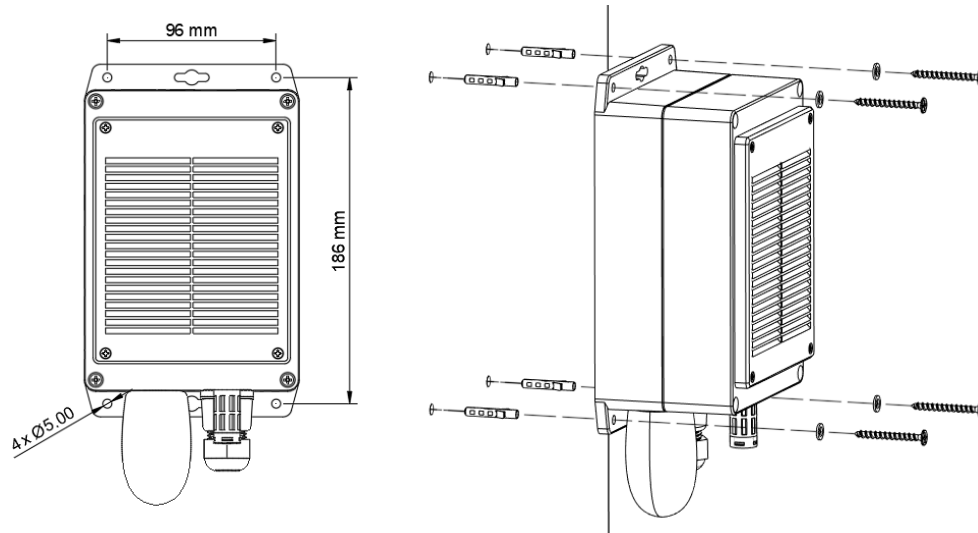
3.2.1 | Wall mounting

The device has 2 mounting brackets on the top and bottom of the case, each with 2 holes for securing to a wall with 4 screws (not included).

Tools Required

- Screwdriver
- 4 x M5 screws + washers
- 4 x wall fixing plugs

Mounting the device on the wall



- 1 Make 4 holes in the mounting wall according to the dimensions indicated.
- 2 Install 4 fixing plugs.
- 3 Mount and secure the device with screws.

3.2.2 | Pole Mount

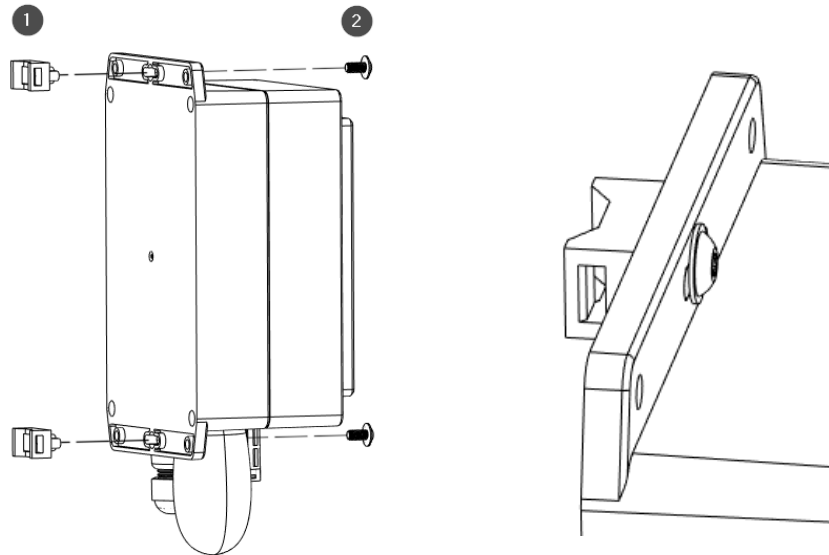
The device has 2 mounting brackets on the top and bottom of the case, which include 1 hole each, for the mounting of the [pole mount kit](#) (Optional).

This pole mounting kit allows the mounting of the device, through the use of stainless steel clamps, on vertical poles, street lamps, traffic lights, etc.

Tools Required

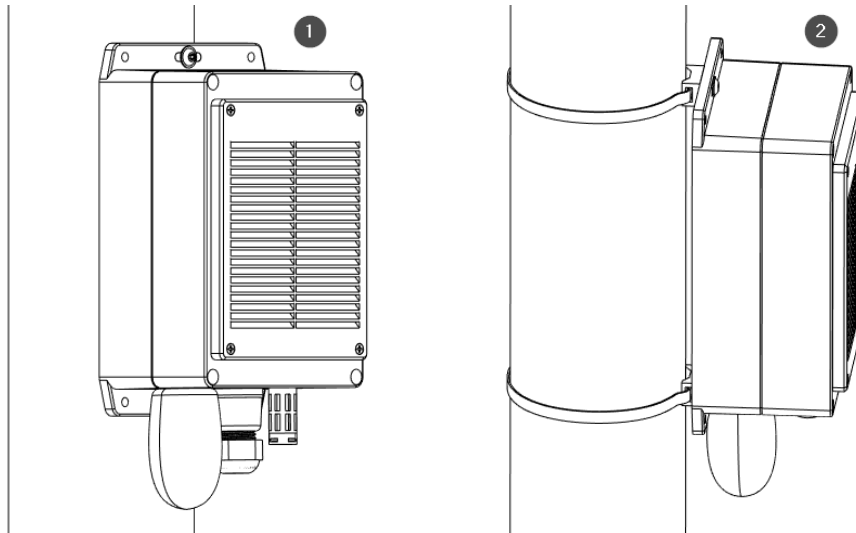
- [Pole Mounting Kit](#)
- Allen Wrench 4mm
- Cutting tool for stainless steel clamps

Mounting the Pole Mount Kit to the Device



- 1** Insert the metal clamp attachment parts from the rear of the device into the holes in the pole mount kit.
- 2** Screw the 2 screws supplied from the front of the device to secure the fastening parts to the case.

Mounting the device to the pole



- 1 Place the device in the desired position on the pole.
- 2 Insert the supplied stainless steel clamps into the slots on the pole mount kit parts and tighten them to the complete fixation of the device.
- 3 Cut off the excess stainless steel clamp.

3.3 | Connection

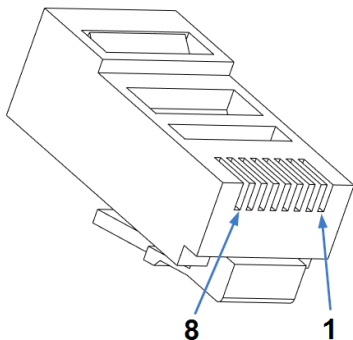
3.3.1 | Power supply

The device has an RJ45 input connector for connection of power and Ethernet communication, if required.

Along with the Sound and Air Quality Monitor device, a PoE (Power Over Ethernet) power supply is supplied that allows the device to be powered and perform Ethernet communication.



The installer is responsible for connecting the device's power supply, as well as connecting and routing the cables to the PoE power supply, power outlet and ethernet connection.



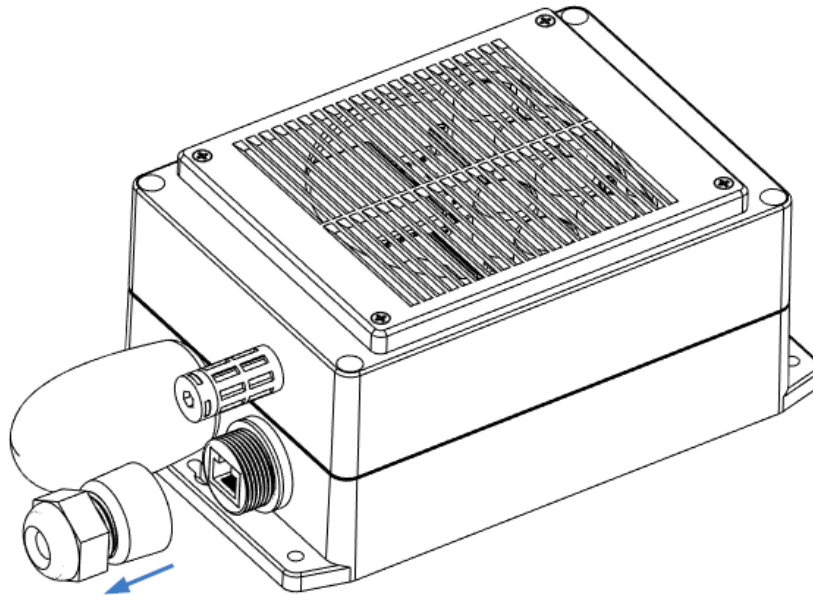
Pin	Description	Color
1	TX+	
2	TX-	
3	RX+	
4	⊕ (12-24Vdc)	
5	⊕ (12-24Vdc)	
6	RX-	
7	⊖	
8	⊖	

Distribución de pines: RJ45

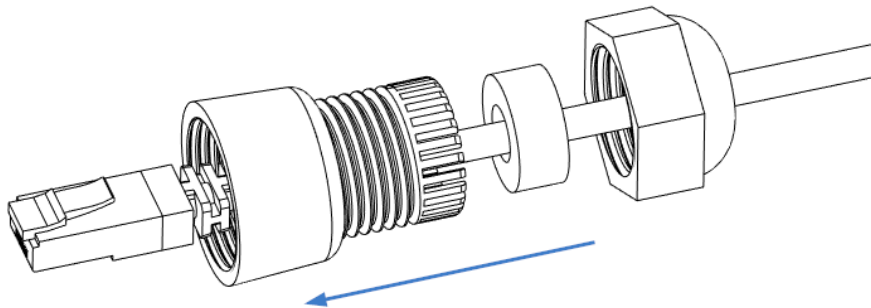


The PoE power supply supplied with the equipment complies with the pin layout required to power the equipment and provide connectivity Ethernet. If the supplied PoE power supply is not used, the indicated pin arrangement must be respected.

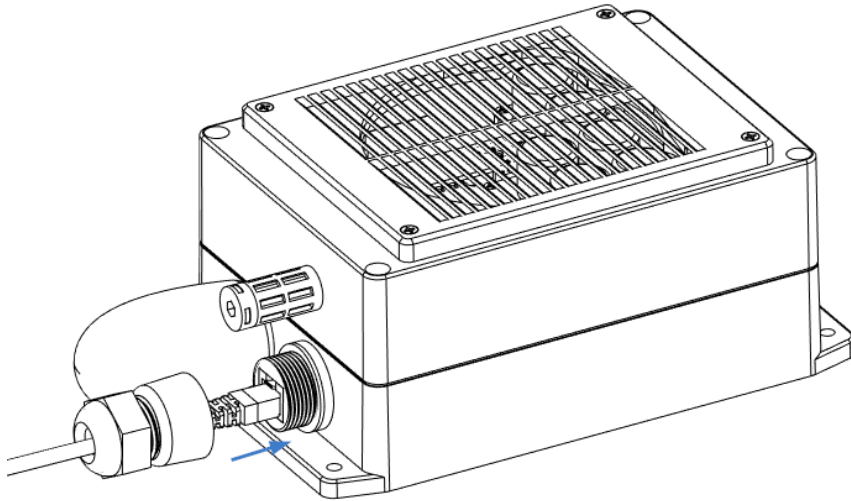
Connecting the device's power and Ethernet communication



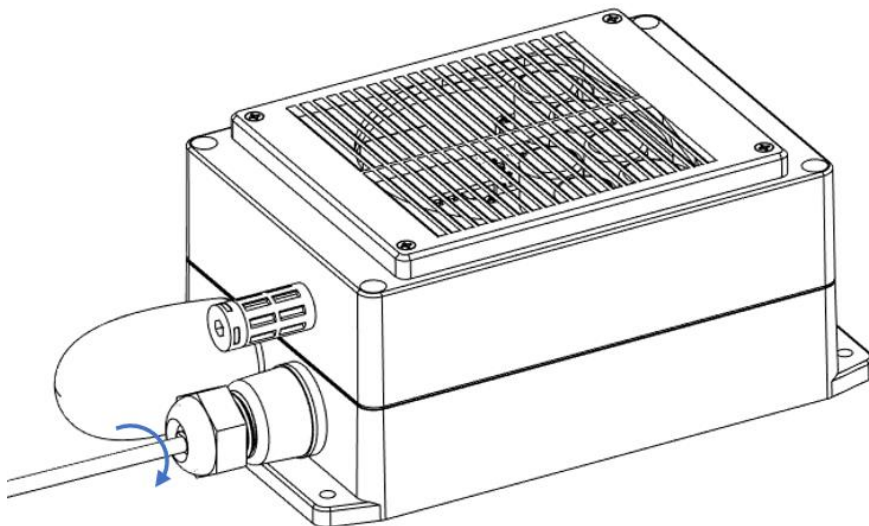
- 1 Unscrew the RJ45 connector cap assembly.



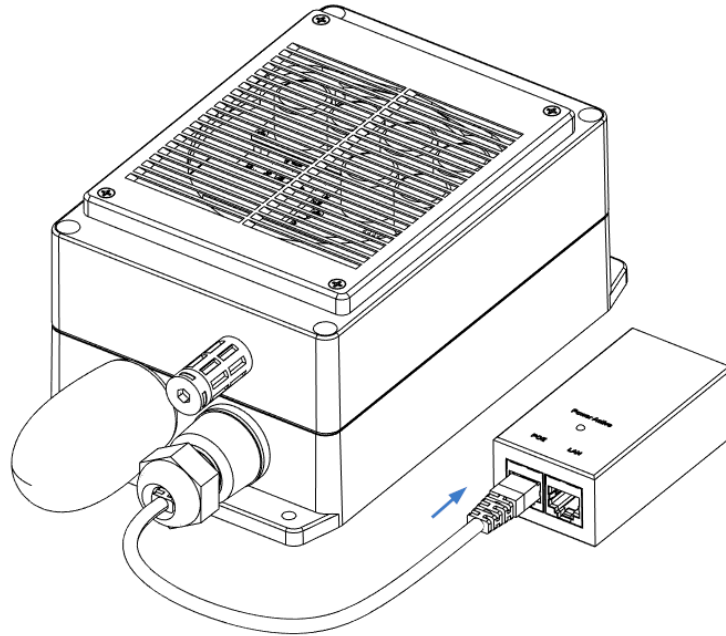
- 2 Insert one end of the ethernet cable through the different parts of the RJ45 connector cap assembly.



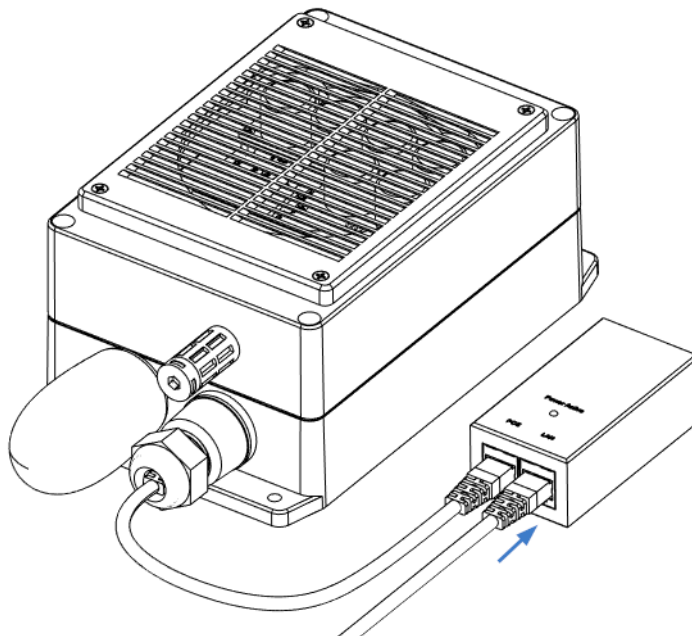
- 3** Plug one end of the ethernet cable into the RJ45 connector on the device enclosure.



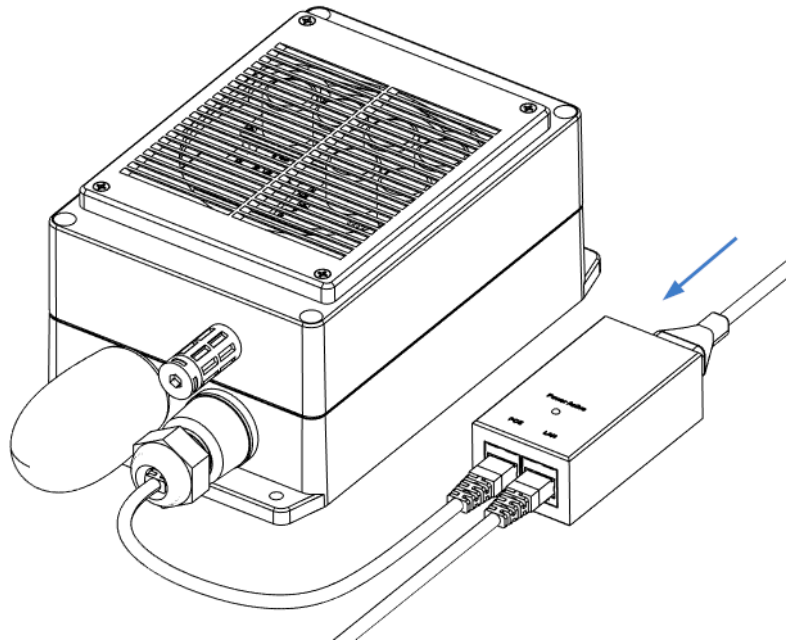
- 4** Screw on the RJ45 connector cap and tighten the sealing thread of the cable O-ring.



- 5 Plug the other end of the ethernet cable into the RJ45 connector identified as "**PoE**" of the supplied PoE power supply.



- 6 If Ethernet communication is required on the device, connect the communications cable to the RJ45 connector identified as "**LAN**" on the supplied PoE power supply.



- 7 Plug the power cord into the PoE feeder and mains voltage supply socket.

3.3.2 | SIM card



SIM card installation is only required on models with NB-IoT connectivity. Check the "[Models](#)" and "[Marking and Labeling](#)" sections to check if your device has NB-IoT connectivity.

The Sound and Air Quality Monitor device requires a Mini SIM card to have NB-IoT connectivity and carry out data transmission to the IoT platform.

On the PCB inside the device, there is a mini SIM socket for installation.

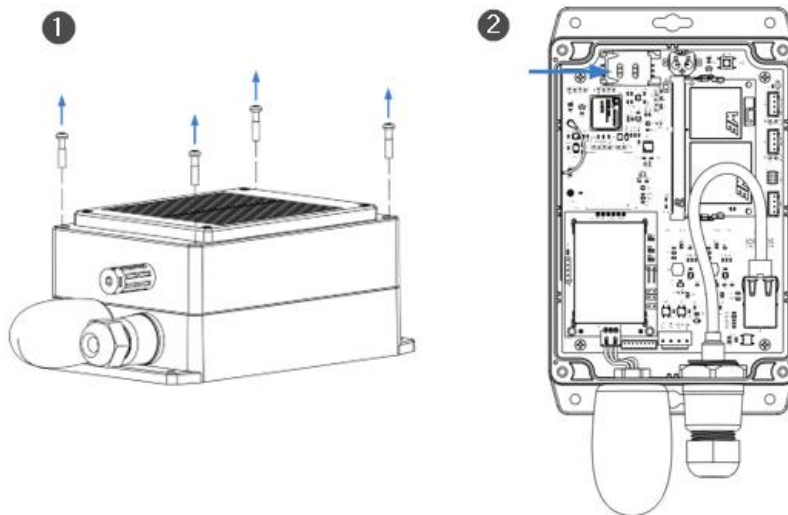
Installing the mini SIM card



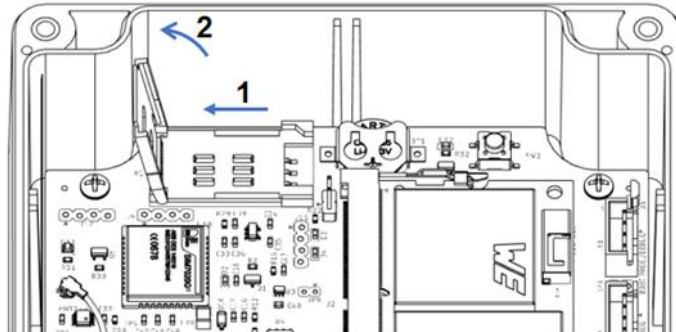
During handling or connecting the PCB, take appropriate precautions to avoid damage to the PCB from electrostatic discharge (ESD).



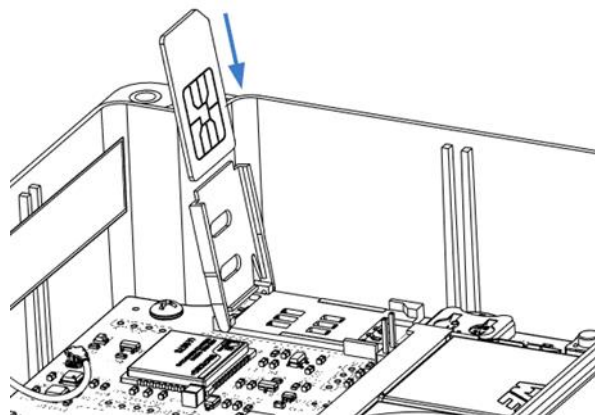
Keep the equipment unplugged from the power source during this process



- 1 Open the device cover by unscrewing the 4 screws.
- 2 Locate the Mini SIM Socket.



- 3 Open the mini SIM socket cover:
- 1 - Slide the mini SIM socket cover.
 - 2 - Lift the mini SIM socket cover.



- 4 Insert the mini SIM card into the tata of the mini SIM socket.
- 5 Close the mini SIM socket cover by following the instructions in the step 3 in reverse order.
- 6 Close the device cover and screw on the 4 screws of step 1.



The SIM card assigned to the device must not have the PIN activated and must be enabled by the network service operator.

3.4 | Commissioning and configuration

3.4.1 | Checklist

Before you start the device, perform the following checks:

- 1 | Insert the SIM card from the network service operator (NB-IoT models only): "[SIM card](#)"
- 2 | Perform the device assembly: "[Mounting](#)"
- 3 | Connect Power: "[Power](#)"

3.4.2 | Configuration

The Sound and Air Quality Monitor device has a web configuration portal through which it can be configured.



The Sound and Air Quality Monitor device is pre-configured from the factory according to the requirements requested by the customer so, unless there is a change in requirements, it does not require any initial configuration.

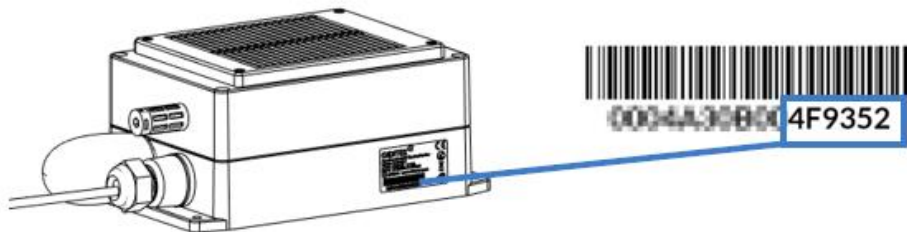
Required Materials

- Tablet / Mobile Phone / PC
- Configuration magnet (supplied)

Web configuration portal: Access



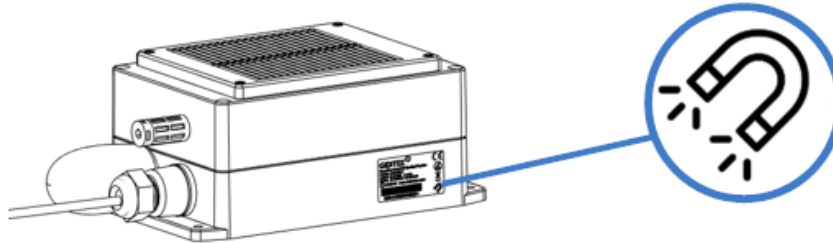
The device must be powered according to the "[Power](#)" section in order to access the web configuration portal.



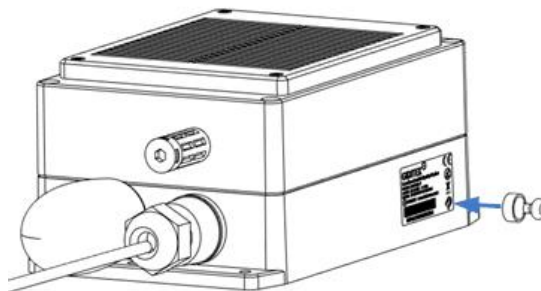
1

Locate the device's EUI identifier on the device label.

Identify the last 6 digits, they are needed to identify the WiFi access point that will generate the device.



- 2 Locate the magnetic sensitive area on the device label to enter setup mode.



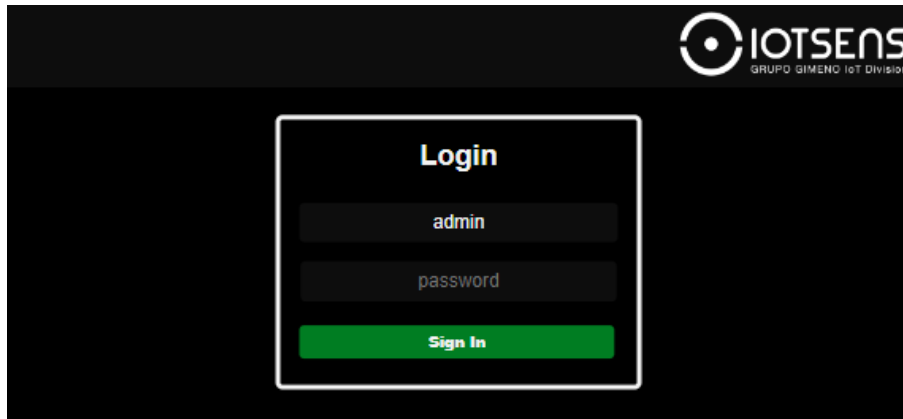
- 3 Bring the supplied setup magnet close to the magnetic sensitive area to activate a WiFi access point and web setup portal.
- 4 The device will activate a WiFi access point with the name: IOTSENS_XXXXXXDonde
XXXXXX corresponds to the 6 digits identified in step 1



- 5 Using your Tablet/Mobile Phone/PC device, scan the available WiFi networks and connect to the device's WiFi hotspot.
Password: wifiXXXXXX
Where XXXXXX corresponds to the 6 digits identified in step 1
(Note: the password must be entered in lowercase)

- 6 On your Tablet / Mobile Phone / PC device open a web browser and access the IP address:
192.168.1.1

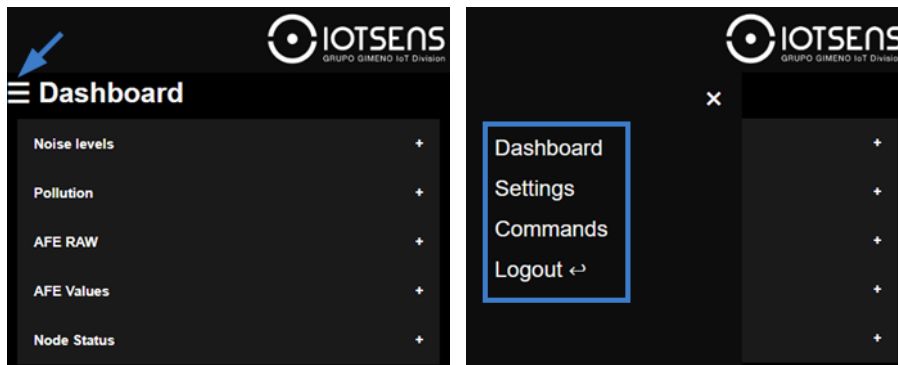
(**Note:** If you are configuring multiple devices, it is recommended that you open your web browser in incognito mode to prevent it from caching data)



- 7 The web configuration portal will request a password for access.

User: **admin**

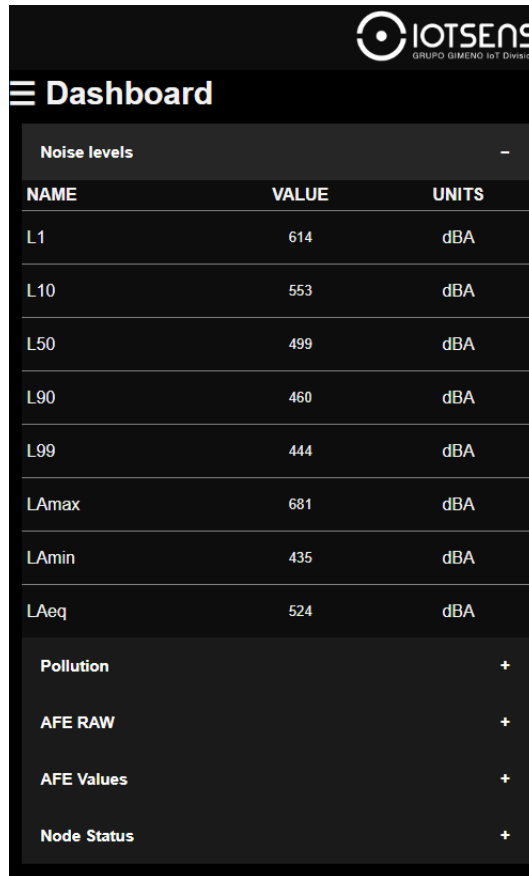
Password: **admin**



- 8 The web configuration portal has a menu to access device information and settings:

- **Dashboard:** Information panel for measured data.
- **Settings:** Device settings.
- **Commands:** Sending Control Command to the Device.
- **Logout:** Log out.

Web Configuration Portal: Dashboard



Noise levels		
NAME	VALUE	UNITS
L1	614	dBa
L10	553	dBa
L50	499	dBa
L90	460	dBa
L99	444	dBa
LAmx	681	dBa
LAmin	435	dBa
LAeq	524	dBa

Pollution	+
AFE RAW	+
AFE Values	+
Node Status	+

The information panel in the web configuration portal displays the measured data from the different sensors:

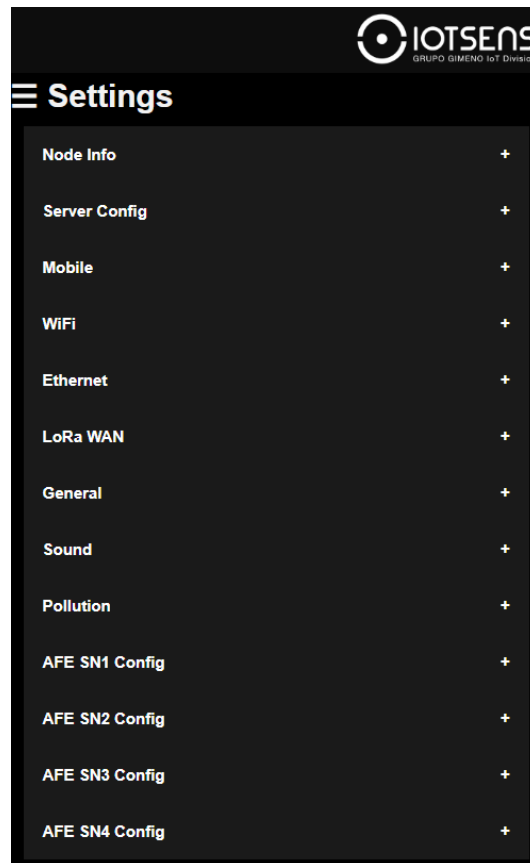
- Noise Levels: measured noise values (dBA x10).
- Pollution: measured values of pollution, temperature and humidity.
- AFE RAW: values measured by the ADC of the gas sensors.
- AFE values: Measured values of gas sensors.
- Node Status: device status values.



Some of the data displayed in the dashboard is raw values.

Some of the data needs to be processed on the visualization platform.

Web Configuration Portal: Settings

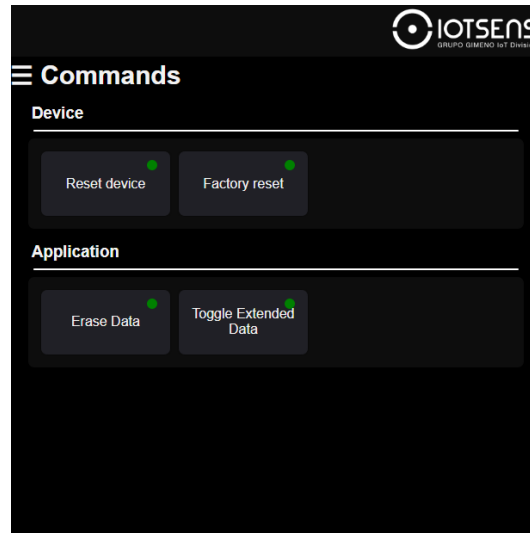


From the settings menu it is possible to view information about the hardware of the device and configure different operating parameters.



See "[Annex 1 – Device Settings](#)" for information on all configuration parameters.

Web Configuration Portal: Commands



From the commands menu it is possible to perform device and application control actions:

- **Reset device:** Performs a device reboot.
- **Factory Reset:** Restores factory settings.
- **Erase Data:** Deletes the data history stored in the device's memory.
- **Toggle Extended Data:** Enables/disables the upload of direct measurements, which are used by the equipment to calculate the concentration of gases.

4 | Operation

4.1 | Acquisition of environmental and air pollution data

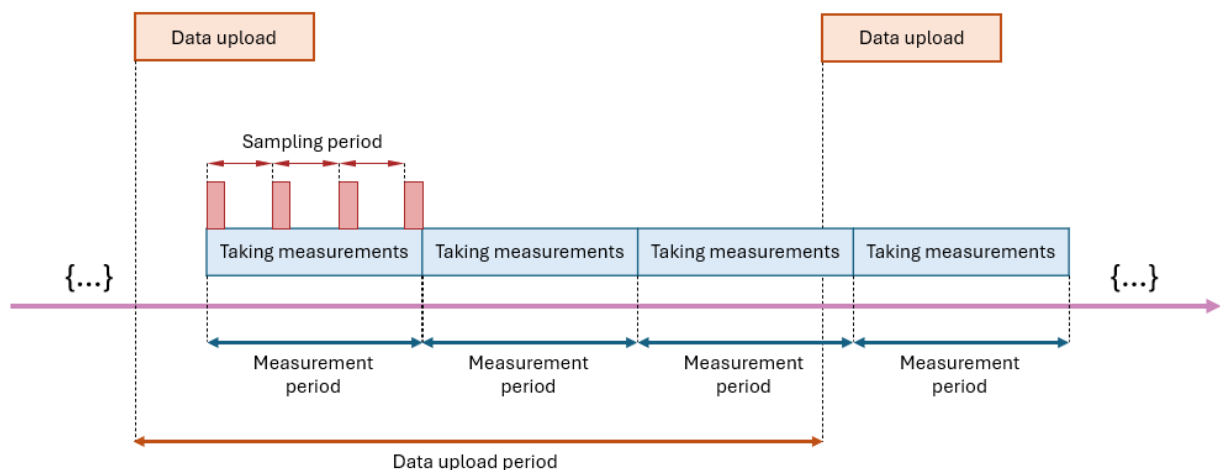
When a Sound and Air Quality Monitor device is installed at a location, it begins measuring pollutants in the atmosphere and environmental parameters based on the installed and enabled sensors. These pollutants and environmental parameters are:

- Polluting gases: NO₂, O₃, CO, H₂S, NO, SO₂ y CO₂
- Volatile organic compounds index
- Environmental parameters: temperature, relative humidity and atmospheric pressure

The acquisition, grouping and uploading of the data is carried out in accordance with the configuration established in:

- Sampling period (frequency)
- Measurement period
- Data upload period

The sampling period determines the time interval between the acquisition of two samples from the same sensor.



The device takes measurements from the sensors each sampling period. The acquired values are stored temporarily in order to calculate the average. This calculation, the average of the values acquired during the sampling process, is triggered each measurement period. At that moment, the calculated average is stored for later sending, while the data from the sampling process is eliminated from temporary memory. At the end of a sending period, the stored mean pending to be sent to the platform is transmitted. Sampling, measurement and shipping periods can be [configured](#).

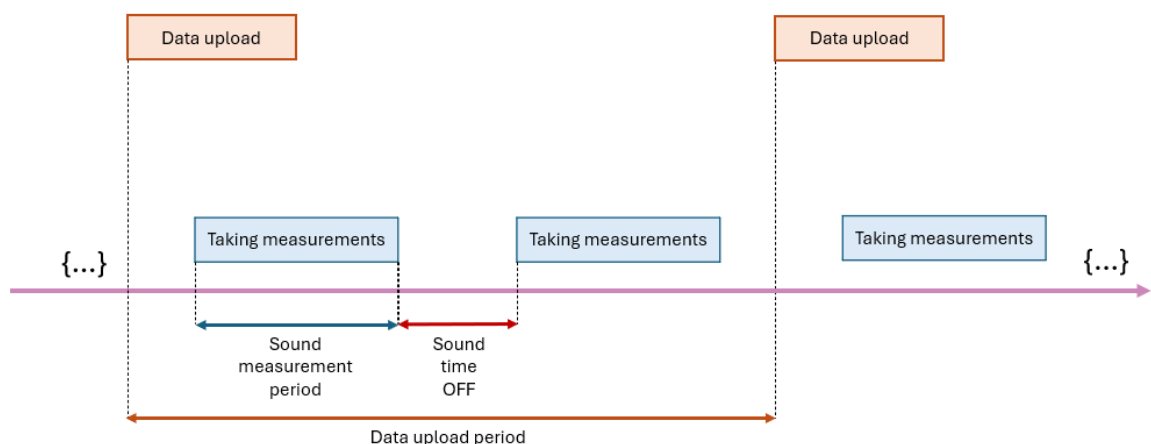
4.2 | Noise pollution data acquisition

The acquisition of data relating to noise pollution works in a similar way to that explained in the previous section. The main difference is that, in this case, the device can remain for a period of time without generating measurements. The three main configuration parameters are:

- **Time Measured Sound** – Indicates how long samples are taken. In this case, the sample rate is not configurable. At the end of this time, the computer will generate a summarized measure of the measurement period.

Time Sound OFF – Indicates how long the sensor remains without taking action. This parameter can be set to "0" so data recording would be continuous.

- **Data Upload Period** – This is the period of transmission of previously generated and stored data.



4.3 | Clock and timestamp

The time (timestamp) at which the device collects or sends data is defined by the time the device starts working.

For example, if the device starts operating at 15:02 and is set to collect and send data every 5 minutes, there will be data at 15:07, 15:12, 15:17, etc. This start time cannot be changed. Please note that there may be delays due to miscommunication.

The data is sent via the available model-based communication to the cloud network server and relayed to the IoTsens platform or a third-party platform.

The device tries to update its system time during its first boot and periodically by any of its technologies. In the case of using IP-based technology, synchronization is done against the Network Server. On the contrary, if LoRaWAN technology is used, synchronization occurs against the network using standard MAC synchronization commands.

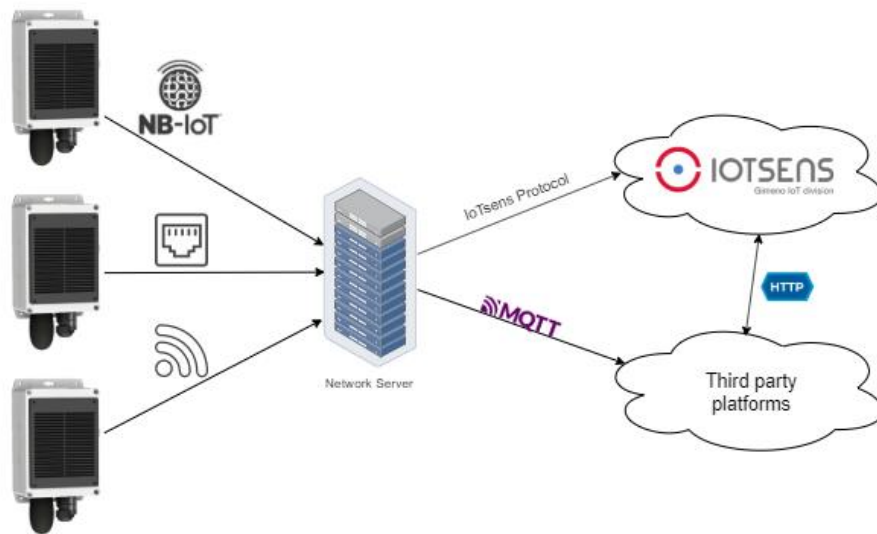


Ensure that the LoRaWAN network used has the functionality “DeviceTimeReq MAC command”

4.4 | Communications

The team can send the collected and processed information using different technologies whenever they are available. These are divided into IP and LoRaWAN technologies.

4.4.1 | IP Connectivity



The device has WiFi, Ethernet and NB-IoT connectivity. All of them operate under the same operating principle: connectivity with a service acting as a network server, and retransmission of data from it to the final applications.

This network server developed by IoTSENS manages dynamic session encryption keys for high security, is capable of managing commands to the equipment to, for example, change some operating parameter, and is capable of managing remote update deployments of the equipment.

The retransmission of the data can be either against the IoTSENS platform itself, for which it uses a proprietary protocol, or using MQTT as a transport protocol by encapsulating already decoded information in a JSON. However, it is more advisable to use the HTTP integration available on the platform developed under the guidelines of Openapi: <https://openapi.iotsens.com>

WiFi

Using the 802.11bgn standard, the equipment is able to connect to existing wireless networks in a location. The Wifi network will have to be previously configured on the equipment through its configuration portal, being able to work with both fixed and dynamic IP. If this wireless network allows the equipment to be able to communicate with the network server, the connection will be established.

Ethernet

In the same way as in its WiFi operation, the device can operate connected with an Ethernet cable to a network that has access to the configured network server. Operates with both static or dynamic IP.

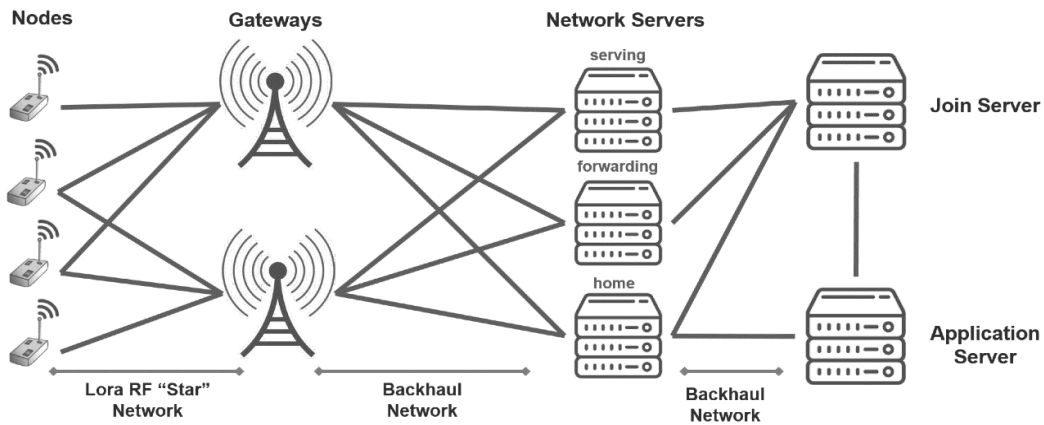
NB-IoT

This technology has been developed to enable efficient communications and high battery durability for massively distributed devices. It can be compared to 4G technology with the exception that it is aimed at low data transmission and low consumption. In the same way as in 4G, network coverage is provided by telephone operating companies.

4.4.2 | LoRaWAN Connectivity

Technology that differs greatly from the previous ones described. Modulation in LoRaWAN is a differentiating feature compared to other technologies. It is based on the “Chip Spread Spectrum” (CSS), a signal that increases in frequency over the allocated bandwidth. Commonly applied in sonar, radar and laser technologies due to its tolerance to noise, allowing a signal to be decoded even when the received power ratio between signal and noise is negative.

The architecture is based on a star of stars where the transmission of a node can be heard by several Gateways simultaneously. These Gateways strategically located to maximize their operating radius transmit the messages received by IP technology (Ethernet cable or GSM) to the network servers that receive the information, decode it and retransmit it to the application server where it is segregated according to the LoRa application to whichever the node belongs to.



The LoRaWAN Gateways to be supplied are equipment that act as a gateway between the devices and the network server located in a data center. It allows network coverage to devices scattered in the environment, this coverage is far-reaching thanks to LoRaWAN TM technology

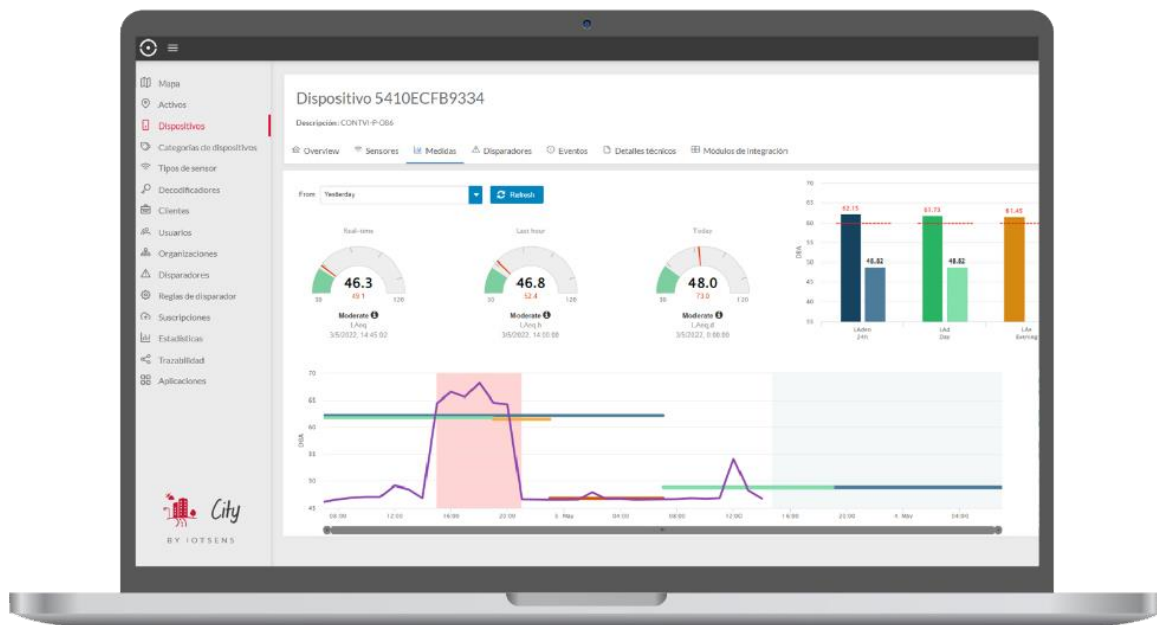
The LoRa Network Server is a software that includes all the necessary components for LoRaWAN network management.

This service manages:

- Dynamic session keys for your AES double encryption.
- Network adaptability through ADR MAC commands allowing data transmission rate, power and repetition to be changed depending on link quality conditions.
- Forwarding data to target applications
- Data bidirectionality

4.5 | IoTsens Platform

The Sound and Air Quality Monitor device has been designed to work with the IoTsens platform. This platform enables large-scale device management in a simple and efficient way. Contact [IoTsens](#) for more information on the platform's functionalities.



5 | Maintenance

5.1 | Scheduled Maintenance

The Sound and Air Quality Monitor device has been designed for the acquisition of the highest quality data over an extended period of time.

The integrated sensors offer a lifespan of between 24 and 36 months, depending on the sensor. Its service degrades due to the natural loss of optical and electrochemical capabilities.

Para garantizar el máximo rendimiento del dispositivo, es recomendable seguir las acciones de mantenimiento descritas a continuación.

Action	6 months	12 months	24 months	36 months
Ventilation grille cleaning (Locations with high pollution)	✓	✓	✓	✓
Ventilation grille cleaning		✓	✓	✓
Cleaning the microphone wind shield	✓	✓	✓	✓
Microphone wind shield replacement			✓	
Cleaning the temperature and RH sensor filter		✓	✓	✓
Replacing the particle sensor	5 years			
CO2 sensor replacement	5 years			
NO2 sensor replacement			✓	
O3 sensor replacement			✓	
CO sensor replacement				✓
SO2 sensor replacement				✓
NO sensor replacement			✓	
H2S sensor replacement			✓	

5.2 | Real-time clock (RTC) battery

The real-time clock (RTC) battery provides power for the internal clock/calendar and to maintain device configuration settings.

The device is designed so that the real time clock (RTC) battery lasts for many years, if it runs out it can be replaced. The device uses a CR1225 button cell battery.

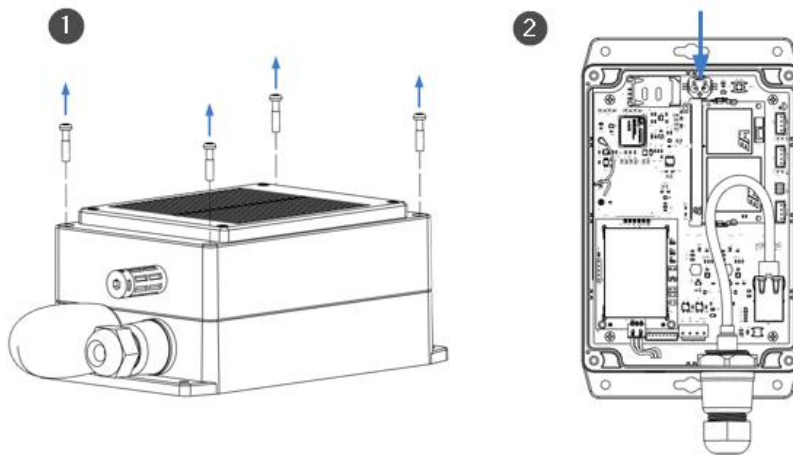
The device uses a CR1225 button cell battery:



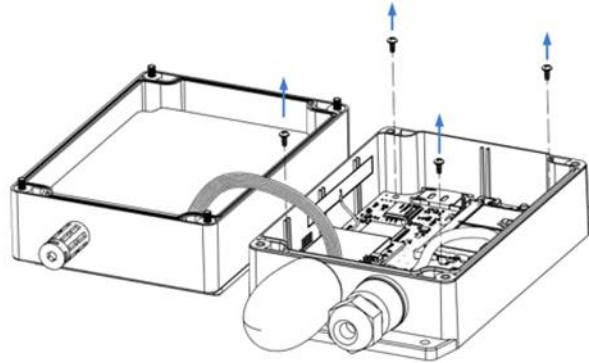
During handling or connecting the PCB, take appropriate precautions to avoid damage to the PCB from electrostatic discharge (ESD).



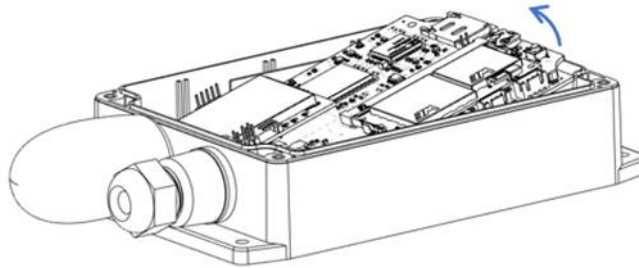
Keep the equipment unplugged from the power source during this process



- 1 Open the device cover by unscrewing the 4 screws.
- 2 Locate the clock battery in real time (RTC).



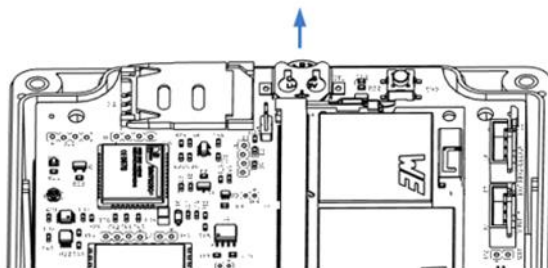
- 3 Unscrew the 4 PCB attachment screws to the base of the enclosure.



- 4 Slightly lift the PCB until the real-time clock (RTC) battery is accessible.



During the movement of the PCB, take care with the interconnection cables of the PCBs and especially with the internal antenna cable.



- 5 Remove the battery from the socket and replace it with the new CR1225 battery
- 6 Put the PCB back to its original position and screw in the PCB fixing screws following the instructions in the steps 4 and 3 in reverse order.
- 7 Close the device cover and screw in the 4 screws from step 1.

5.2 | Firmware update

The Sound and Air Quality Monitor device allows firmware update via FOTA (Firmware Over The Air).

Please contact IoTsens for the latest firmware version available for your device.

6 | Troubleshooting and Support

6.1 | Troubleshooting

The device does not turn on

The device does not turn on, no LED indicator lights up.

Possible Causes

- 1 Lack of tension in the socket.
- 2 Power Connected Incorrectly.

Solutions

- 1 Check the power supply where is connected the device
- 2 Verify that the power supply is connected according to the "[Power supply](#)"

The computer does not send data to the IoT platform

Device data is not displayed on the IoT platform.

Possibles Causes

- ❶ Lack of GPRS coverage.
- ❷ SIM card problem.
- ❸ Incorrect platform connection data.
- ❹ Problem in some cloud service.

Solution

- ❶ Change the location of the antenna to improve the coverage area.
- ❷
 - Check the correct placement of the SIM card according to the "[SIM Card](#)".
 - Check that the SIM card does not have a PIN activated.
 - Check with your network service operator that the SIM card is activated.

Check with your network service operator that the APN of the SIM card corresponds to the one configured in the device according to the "[Factory settings](#)" section. If it is necessary to modify the APN configured on the device, please refer to the "[Configuration](#)" section.

- ❸ Check that the platform connection data is correct according to the "[Factory settings](#)" section. If it is necessary to modify the connection data configured on the device, please refer to the section "[Configuration](#)".
- ❹ Contact your cloud service provider to check for any issues.

6.2 | Support

If you register problems with the operation of this computer, refer to the "[Troubleshooting](#)" section of this manual so that you can quickly resolve the problem on your own.

If you need help resolving the problem, please send an email to the address support@iotsens.com to contact the manufacturer's Technical Support team.

To help us understanding your problem from the beginning, it is very helpful to include images or a video as attachments with your email.

Once the incident has been received, the customer will be notified of its receipt and the problem will be assessed.

The IoTsens schedule to provide maintenance support to the customer is 8 hours a day, 5 days a week (8X5). The user can make a service request 24 hours a day, 7 days a week via email and IoTsens will process the request for this service during the time indicated.

7 | EU Declaration of Conformity

Hereby, Gimeno Digital Technologies, S.L. - GIDITEK - IoTsens declares that the Sound and Air Quality Monitor equipment, model DSN0096-A, complies with the essential requirements and the rest of the applicable provisions of Directive 2014/53/EU and Directive 2011/65/EU.

The full text of the EU declaration of conformity is available on the website: www.iotsens.com

8 | Recycling and Disposal Information

The disposal of this product is governed by Spain's Royal Decree 110/2015 (WEEE) based on the European Union's Directive 2012/19/EU (WEEE).

If this product is irreparably damaged or for any reason its useful life is considered to have ended, this product should not be treated as household waste.

Waste disposal laws and regulations vary across countries and regions. Find out about local, state, and European regulations regarding the proper disposal and recycling of electrical and electronic equipment (EEE), as well as collection and disposal points for these types of products.

By correctly recycling electronic devices, it helps to avoid risks to environmental health and safety.

9 | Warranty conditions

IoTSENS gives a limited warranty on this product, purchased from the manufacturer or from a manufacturer-authorized distributor in accordance with the terms and conditions set forth below.

The warranty starts from the date of delivery to a customer for the first time, as evidenced by the purchase invoice. Only the original purchaser has the right to claim a warranty.

Warranty Period:

Application as established in Directives 770/2019 and 771/2019 of the European Union.

Return service

Within seven (7) calendar days of receiving a Product, if the Product has a manufacturing defect, you may request the Return and Refund Service. You must send the Product to the designated warehouse. IoTSENS will examine the returned Product to identify the problem. If the problem does have a manufacturing defect, IoTSENS will resend you another identical product at no additional cost.

Exceptions to warranty coverage:

- Tampering with the device will void the warranty and repairs of problems arising due to this tampering, including exposure to moisture, ingress of foreign bodies (water, oil, sand, etc.), or improper installation or operation will not be covered.
- Bad device usage: The recommendations in this user manual have not been followed.
- Any defect or damage caused by an accident, including but not limited to catastrophes such as fires and human causes such as falls, collisions, and submersion in water;
- Cualquier defecto o daño causado por el uso de materiales, accesorios o software de terceros, etc.;
- Normal wear and tear.
- Use the Product for illegal purposes.
- Disassembling or repairing the product without authorization
- Consumables are not covered by the warranty

How to get warranty service:

Please submit the warranty request along with the official purchase invoice via the support@iotsens.com email address.

The claim will be confirmed within 7 business days.

If the claim is justified, IoTsens will rectify the defects free of charge in accordance with this warranty. If the defect cannot be repaired, IoTsens, within the warranty period, will replace the Warranted Part free of charge with an identical part or, if the Warranted Part is no longer manufactured, with a similar replacement of the same value or offer an appropriate replacement.

*The warranty does not include shipping costs or taxes incurred from shipping defective warranted parts for examination and/or repair, nor shipping costs or taxes for replacement or repaired warranted parts back to the claimant.

Annex 1 – Device settings

From the settings menu of the web configuration portal it is possible to view information about the hardware of the device and configure different operating parameters.



See the "[Settings](#)" section for information on accessing the device's web configuration portal.



Changing device settings will affect device functionality.

It is not recommended to perform the configuration without the necessary knowledge. If it is carried out, remember that you do so under your responsibility.

Device settings: Node Info

Node Info	
NAME	VALUE
Node ID	00 04 A3 0B 00 4F 93 52
HW Type	02 5F
FW	01 0A
Memory Map	1
EUI	00 04 A3 0B 00 4F 93 52
MAC	FF FF FF FF FF FF

Parameter	Description
Node ID	Device Identifier (Reading Only)
HW Type	Device Hardware Type (Reading Only)
FW	Device Firmware Version (Reading Only)
Memory Map	Memory map version (Reading Only)
EUI	Device EUI (Reading Only)
MAC	Device MAC Address (Reading Only)

Device settings: Server Config

Server Config	
NAME	VALUE
GW Host	iotgw01.iotsens.com
GW Port	7201
Communication Tech	Ethernet

Parameter	Description
GW Host	Gateway IP Address/URL
GW Port	Gateway port
Communication Tech	Technology used for communications (WiFi, Ethernet, LoRaWAN, Mobile) (1) WiFi (3) NB-IoT (4) Ethernet (6) LoRaWAN

Device settings: Mobile

Mobile	
NAME	VALUE
APN	ioticsens.movistar.es
User	
Pass	
IMEI	
ICCID	

Parameter	Descripción
APN	Network Service Operator APN.
User	Network Service Operator User
Pass	Network Services Operator Password
IMEI	SIM card: IMEI (Reading Only)
ICCID	SIM card: ICCID (Reading Only)

Device settings: WiFi

WiFi	
NAME	VALUE
SSID	Measure
Password	12345.G1m3n0
DHCP	Enabled
IP	192.168.1.10
Mask	24
GW IP	192.168.1.1
DNS	8.8.8.8

Parameter	Description
SSID	WiFi connection: SSID
Password	WiFi connection: Password
DHCP	WiFi connection: DHCP (0) Disabled (1) Enabled
IP	WiFi connection: Fixed IP
Mask	WiFi connection: Subnet Mask
GW IP	WiFi connection: Gateway
DNS	WiFi connection: DNS

Device settings: Ethernet

Ethernet	
NAME	VALUE
DHCP	Enabled
IP	192.168.1.10
Mask Bits	24
GW IP	192.168.1.1
DNS	8.8.8.8

Parameter	Description
DHCP	WiFi connection: DHCP (0) Disabled (1) Enabled
IP	WiFi connection: Fixed IP
Mask	WiFi connection: Subnet Mask
GW IP	WiFi connection: Gateway
DNS	WiFi connection: DNS

Device settings: LoRaWAN

LoRa WAN	
NAME	VALUE
Freq Plan	EU868
NET Type	Public NET
PKT Port	1
Join Mode	OTAA
App EUI	00 00 00 00 00 00 00 00
App Key	00 00 00 00 00 00 00 00 00 00 00 00
Dev Addr	00 00 00 00
NW SKEY	00 00 00 00 00 00 00 00 00 00 00 00
App SKEY	00 00 00 00 00 00 00 00 00 00 00 00
ADR Enabled	ADR enabled
Default DR	0
Check Session	64

Parameter	Description
Freq Plan	LoRaWAN Connection: Frequency (area) (0) LORA_DR_EU868 (1) LORA_DR_US915 (5) LORA_DR_AU915 (8) LORA_DR_AS923
NET Type	LoRaWAN Connection: Network Type (0) Private NET (1) Public NET
PKT Port	LoRaWAN Connection: Port used for sending data (Frame port) (1 – 255)
Join Mode	LoRaWAN Connection: Activation Mode (0) OTAA (1) ABP
App EUI	LoRaWAN Connection: Application Identifier
App Key	LoRaWAN Connection: Application Key
Dev Addr	LoRaWAN Connection: Device Address
NW SKEY	LoRaWAN Connection: Network Session Key
App SKEY	LoRaWAN Connection: Application Session Key
ADR Enabled	LoRaWAN Connection: Adaptive Data Rate (0) ADR disabled (1) ADR enabled
Default DR	LoRaWAN Connection: Adaptive Data Rate Value (0, 1, 2, 3, 4, 5)
Check Session	LoRaWAN Connection: Number of transmissions between session checks with the network.

Device settings: General

General		
NAME	VALUE	UNITS
Server Upload	10	minutes
Board Measure Time	5	minutes

Parameter	Description
Server Upload	Generated data submission period (minutes)
Board Measure Time	Acquisition period device status values (minutes)

Device settings: Sound

Sound		
NAME	VALUE	UNITS
Enabled	Enabled	
Measuring Time	600	seconds
Sensing Off Time	0	seconds

Parameter	Description
Enabled	Sound Sensor: Activation (0) Disabled (1) Enabled
Measuring Time	Sound Sample Acquisition Time (seconds)
Sensing Off Time	Time without sound sample acquisition (seconds)

Device settings: Pollution

Pollution		
NAME	VALUE	UNITS
Sample Time	60	seconds
Measure Time	600	seconds
AFE Module	None	
CO2_ENABLED	Disabled	
DUST_ENABLED	Disabled	

Parameter	Description
Sample Time	Sensor Sample Acquisition Period (seconds)
Measure Time	Period for Average Calculation of Sensor Samples (seconds)
AFE Module	Gas Sensor Module: activation (0) Disabled (1) Enabled
CO2_ENABLED	CO2 sensor: activation (0) Disabled (1) Enabled
DUST_ENABLED	Particle Sensor: activation (0) Disabled (1) Enabled

Device settings: AFE SNx Config

AFE SN1 Config		-
NAME	VALUE	
SN1_GAS	CO	
SN1_WE_E	0	
SN1_WE_O	0	
SN1_AE_E	0	
SN1_AE_O	0	
SN1_SENS	0	
SN1_SENS_SNX	0	
SN1_SNX	None	
AFE SN2 Config		+
AFE SN3 Config		+
AFE SN4 Config		+

Parameter	Description
SNx_GAS	Sensor x: Gas Type (0) None (1) CO (2) H2S (3) NO (4) NO2 (5) OX (6) SO2
SNx_WE_E	Sensor x: Working Electronic Offset
SNx_WE_O	Sensor x: WE Sensor Zero
SNx_AE_E	Sensor x: AE Electronic Offset
SNx_AE_O	Sensor x: AE Sensor Zero
SNx_SENS	Sensor x: Sensitivity
SNx_SENS_SNX	Sensor x: Sensitivity SNX
SNx_SNX	Sensor x: Gas sensor to subtract measurements (0) None (1) SN1 (2) SN2 (3) SN3 (4) SN4

Annex 2 – Factory Settings

Parameter	Value	Description
GATEWAY_HOST	iotgw01.iotsens.com	Gateway IP Address/URL
GATEWAY_PORT	7201	Gateway port
COMM_TECH	4	Technology used for communications (WiFi, Ethernet, LoRaWAN, Mobile) (1) WiFi (3) NB-IoT (4) Ethernet (6) LoRaWAN
MOBILE_APN	(empty)	Network Service Operator APNs.
MOBILE_USER	(empty)	Network Service Operator User
MOBILE_PASSWORD	(empty)	Network Services Operator Password
WIFI_STA_SSID	(empty)	WiFi connection: SSID
WIFI_STA_PASS	(empty)	WiFi connection: Password
WIFI_STA_DHCP	1	WiFi connection: DHCP (0) Disabled (1) Enabled
WIFI_STA_IP_ADDR	192.168.1.10	WiFi connection: Fixed IP
WIFI_STA_NET_MASK	24	WiFi connection: Subnet mask
WIFI_STA_GATEWAY	192.168.1.1	WiFi Connection: Gateway
WIFI_STA_DNS	8.8.8.8	WiFi connection: DNS
NETWORK_DHCP	1	Ethernet connection: DHCP (0) Disabled (1) Enabled
NETWORK_IP_ADDR	192.168.1.10	Ethernet connection: Fixed IP
NETWORK_MASK	24	Ethernet Connection: Subnet Mask
NETWORK_GATEWAY	192.168.1.1	Ethernet Connection: Gateway
NETWORK_DNS	8.8.8.8	Ethernet connection: DNS
LORA_FREQ_PLAN	0	LoRaWAN Connection: Frequency (area) (0) LORA_DR_EU868 (1) LORA_DR_US915 (5) LORA_DR_AU915 (8) LORA_DR_AS923
LORA_NET_TYPE	1	LoRaWAN Connection: Network Type (0) Private NET (1) Public NET
LORA_PKT_PORT	1	LoRaWAN Connection: (1 – 255) Port used for sending data (Frame port)
LORA_JOIN_MODE	0	LoRaWAN Connection: Activation Mode (0) OTAA (1) ABP
LORA_APP_EUI	(empty)	LoRaWAN Connection: Application Identifier

LORA_APP_KEY	(empty)	LoRaWAN Connection: Application Key
LORA_DEV_ADDR	(empty)	LoRaWAN Connection: Device Address
LORA_NW_SKEY	(empty)	LoRaWAN Connection: Network Session Key
LORA_APP_SKEY	(empty)	LoRaWAN Connection: Application Session Key
LORA_ADR_ENABLED	1	LoRaWAN Connection: Adaptive Data Rate (0) ADR disabled (1) ADR enabled
LORA_DEFAULT_DR	0	LoRaWAN Connection: Valor Adaptive Data Rate (0, 1, 2, 3, 4, 5)
LORA_CHECK_SESSION	64	LoRaWAN Connection: Number of transmissions between session checks with the network.
SERVER_CONN_PERIOD	10	Period of sending generated data
BOARD_MEASURE_TIME	5	Acquisition period device status values (seconds)
SOUND_MEASURE_TIME	600	Sound Sample Acquisition Time (seconds)
SOUND_SENSING_OFF_TIME	0	Time without sound sample acquisition (seconds)
POLLUTION_SAMPLE_TIME	60	Sensor Sample Acquisition Period (seconds)
POLLUTION_MEASURE_TIME	600	Period for Average Calculation of Sensor Samples (seconds)

Annex 3 – IoTsens protocol

To ensure transmissions between the multiple and different nodes and elements that make up the architecture of the communications system, IoTsens has implemented a device coding protocol located on the transport layer, giving the sensor some functionalities. Depending on the communication technology, the protocols will be either "IOTDATA" from IoTsens for the IP equipment or specific protocols of the implemented technology such as LoRaWan or SigFox.

Node transmissions reach the user from transport protocols that are typically obtained in JSON format. From them, the transmission payload and specific transport parameters such as rssi, frequencies, etc. can be extracted for subsequent decoding according to IoTsens Device Protocol.

Once the JSON data payload is extracted, it must be decoded from Base64 and decoded again based on the positions.

The first byte of the payload indicates the type of message that can be of four different types

Value	Description
0x01	Reserved
0x02	Reserved
0x04	Data Delivery
0x0A	Reserved

The "Reserved" message types are not used outside of the IoTsens environment. This is for example when using private LoRaWan networks. To obtain the information from the sensor, it is only necessary to decode the payload type "Data Delivery" (starting with 0x04).

The contents of these packages are structured as follows:

REG_ADDR	DATA_TIME	DATA_SIZE	DATA_VALUE
2 bytes	4 bytes	1 byte	N... bytes

- REG_ADDR: Address of the record containing the data of interest in the node
- DATA_TIME: 4 bytes indicating the epoch of when the data was generated on the node
- DATA_SIZE: Size of transmitted data
- DATA_VALUE: The size of this field is equal to "DATA_SIZE" and the type depends on what is indicated in the following memory records of each of the sensors

Depending on the transport layer, several data can be concatenated in the same message of type "DATA_SEND" allowing the node to optimize communications and energy consumed.

9.1 | Sensor memory map

The memory map of the different devices is as follows:

NAME	ADDRESS	SIZE	TYPE	UNITS
#MAIN BOARD				
BOARD_VOLTAGE	5000	2	UNSIGNED	mV
#SOUND SENSOR (025D/0264)				
SOUND_P1	5020	2	UNSIGNED	dBA/10
SOUND_P10	5021	2	UNSIGNED	dBA/10
SOUND_P50	5022	2	UNSIGNED	dBA/10
SOUND_P90	5023	2	UNSIGNED	dBA/10
SOUND_P99	5024	2	UNSIGNED	dBA/10
SOUND_LAMAX	5025	2	UNSIGNED	dBA/10
SOUND_LAEQ	5026	2	UNSIGNED	dBA/10
SOUND_LAMIN	5027	2	UNSIGNED	dBA/10
#POLLUTION BOARD (0263/0264)				
SHT31_TEMPERATURE	5100	2	SIGNED	°C/100
SHT31_HUMIDITY	5101	2	UNSIGNED	%RH/100
SGP40_RAW	5110	2	UNSIGNED	
SGP40_VOC_INDEX	5111	2	SIGNED	0-500
CO2_PPM	5121	2	UNSIGNED	ppm

PM_1_0	5130	2	UNSIGNED	ug/m3
PM_2_5	5131	2	UNSIGNED	ug/m3
PM_10	5132	2	UNSIGNED	ug/m3
AFE4_SN1	5140	2	SIGNED	ppb
AFE4_SN2	5141	2	SIGNED	ppb
AFE4_SN3	5142	2	SIGNED	ppb
AFE4_SN4	5143	2	SIGNED	ppb
AFE2_SN1	5144	2	SIGNED	ppb
AFE2_SN2	5145	2	SIGNED	ppb
AFE_CO	5150	2	SIGNED	ppb
AFE_H2S	5151	2	SIGNED	ppb
AFE_NO	5152	2	SIGNED	ppb
AFE_NO2	5153	2	SIGNED	ppb
AFE_OX	5154	2	SIGNED	ppb
AFE_SO2	5155	2	SIGNED	ppb
PRESSURE_PRESS	5160	4	UNSIGNED	Pa/100
PRESSURE_TEMP	5161	2	SIGNED	°C/100
MOBILE_SIGNAL_QUALITY	7000	1	SIGNED	dBm

9.2 | Example

048813A973515D02021C9C13A973515D02C7019C13A973515D025C02

The first Byte is "04" indicating that it is a data sending frame. The decoding is done as follows.

Data Block	Fields within the block	Decoding	
8813A973515D02021C	88 13	Memory Address	5000 (Battery)
	A9 73 51 5D	Data generation epoch	1565619113 Monday, August 12, 2019 2:11:53 PM GMT
	02	Data size	2 Bytes
	02 1C	Data	7170 (mV)
9C13A973515D02C701	9C 13	Memory Address	5020(Percentil P1)

	A9 73 51 5D	Data generation epoch	1565619113 Monday, August 12, 2019 2:11:53 PM GMT
	02	Data size	2 Bytes
	C7 01	Data	45.5 dBa
9C13A973515D025C02	9C 13	Memory Address	5021(Percentil P10)
	A9 73 51 5D	Data generation epoch	1565619113 Monday, August 12, 2019 2:11:53 PM GMT
	02	Data size	2 Bytes
	5C 02	Dato	60.4 dBa