SENSO8 NB-IoT Water Leak Sensor User Guide

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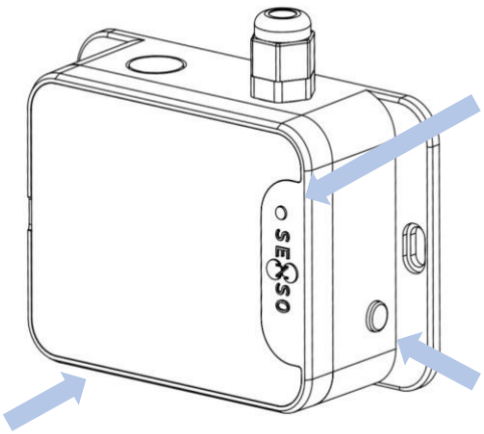
1. Introduction

Applicable Models:

- SEN20310-Wxxx
- SEN20310-0000
- SEN21310-0000
- SEN21310-Wxxx



LED Indicator

Light UP for 1 sec when power ON and report the latest data

Multi-function Button

- Press and Hold: Power On
- Short press: Report the latest data

Robust Industrial Design

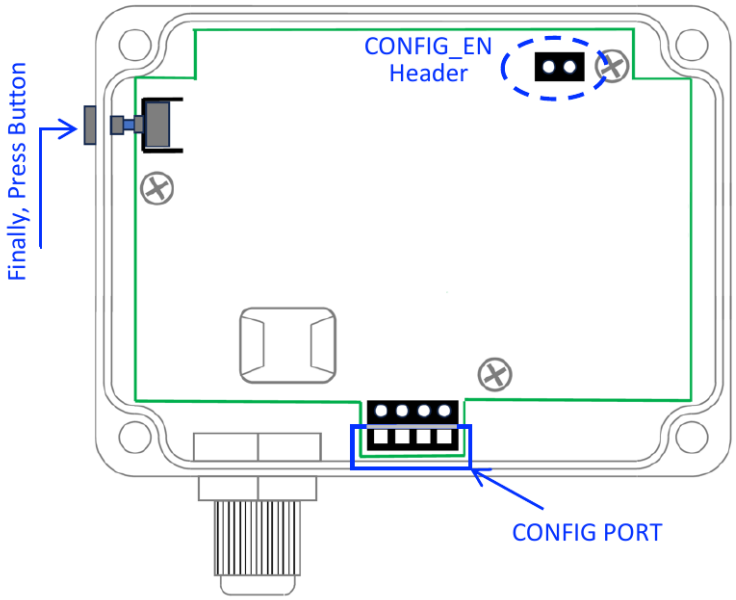
- Water-proof design

The SENSO8 water leak sensor provides a simple and efficient solution for monitoring water leakage.

2. Sensor Configuration

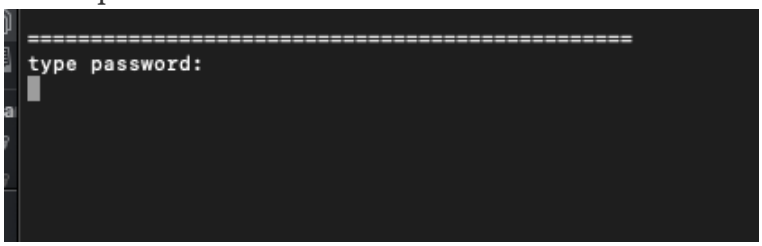
1. Unfasten the screws on the corners and open the top cover.
2. Short the CONFIG_EN header with a jumper.
3. Connect a USB-to-UART converter to CONFIG PORT.

UART-to-USB	SENSO8
VCCIO	+3.0V
TXD	CONFIG_RX
RXD	CONFIG_TX
GND	GND

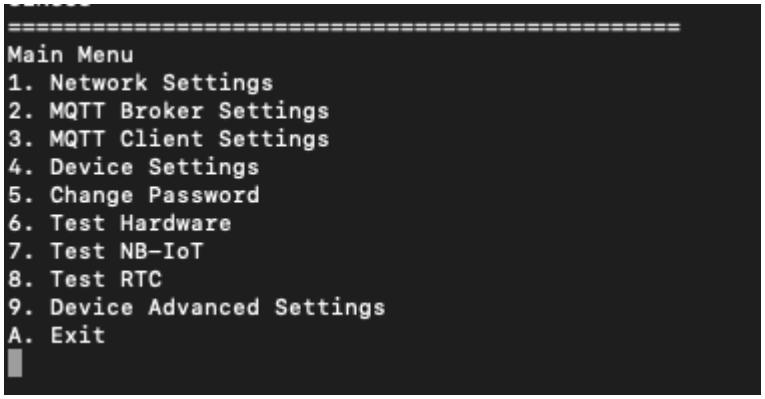


4. Open a serial terminal software on a computer and connect it to the USB-to-UART converter.
5. Insert an ER26500 battery to the battery holder and press the user button to power up the device.

6. Type the password when it prompts for it. Please contact your sales representative for the device password.



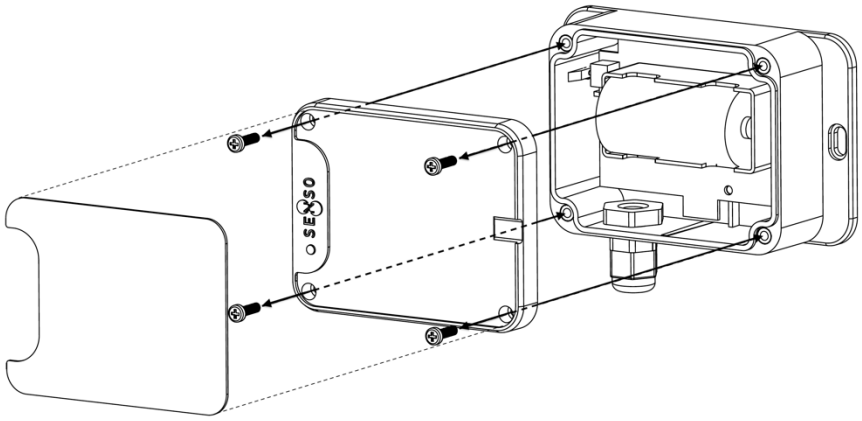
7. Then the configuration can be taken according to the requirements.



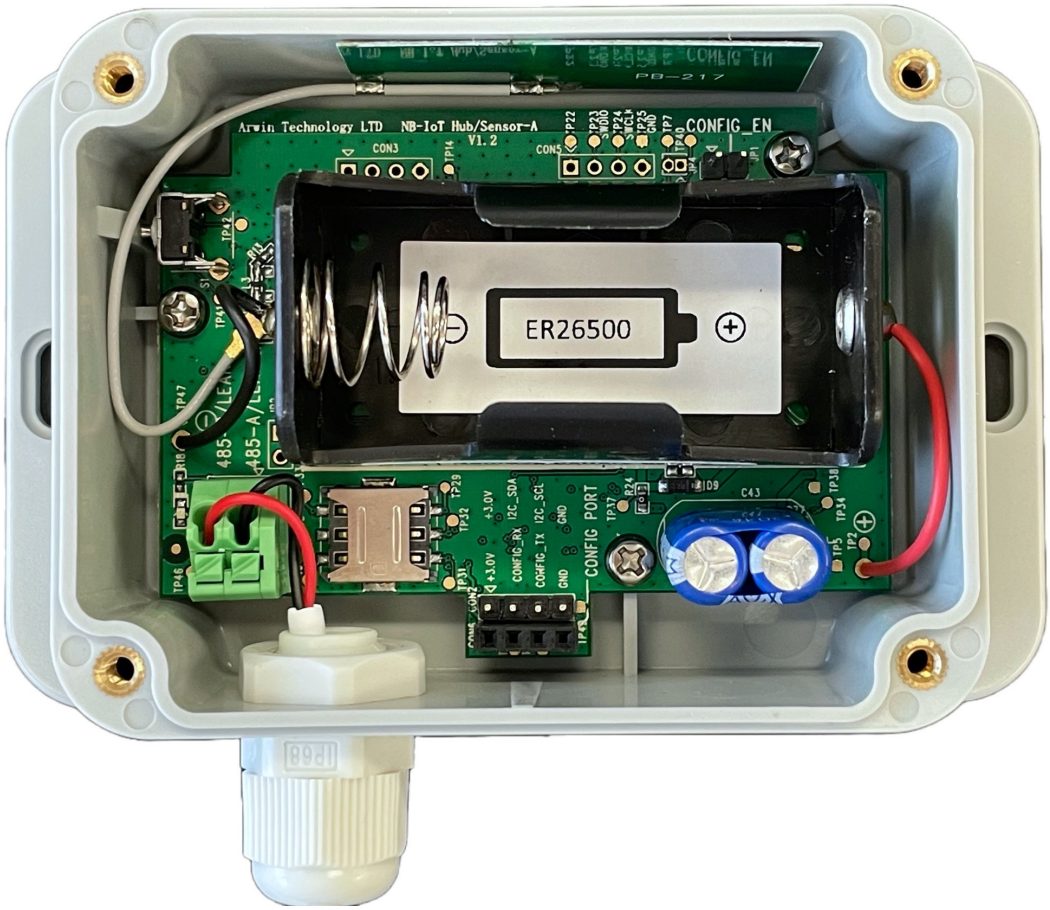
8. You can ask for the document of “SENSO8 NB-IoT UART Configuration Guide” from your sales representative for more information.

3. Sensor Installation

1. Unfasten the screws on the corners and open the top cover.



2. Remove the battery from the battery holder if it is installed.
3. Insert a nano-SIM to the SIM card socket next to the battery holder. **Make sure the direction of the nano-SIM is correct**.
4. Insert an ER26500 battery to the battery holder. **Make sure the polarity of the battery is correct as shown on the label on the battery holder**.



5. Make sure the CONFIG_EN jumper is not shorted.
6. Put on the top cover and fasten the screws on the corners.
7. Press and hold the multi-function button for a few seconds, the LED indicator on the top

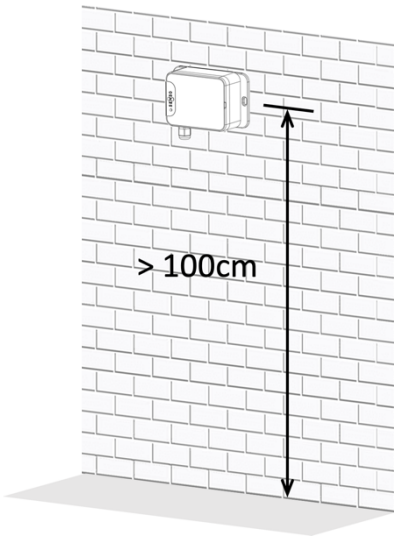
cover will light up.

8. On power up, the sensor will publish a data report and device configure report to the MQTT broker. For details of the report, please refer to the SENSO8 NB-IoT Water Leak Sensor API Document.

4. Installation Guideline

The sensor is intended for installation on interior walls of buildings. Avoid exposing the sensor to direct sunlight.

It should be installed with the cable gland facing the floor as shown below. The wires should be going through the cable gland, and make sure the cable gland is well fastened.



To ensure a good radio reception, it is suggested to install the sensor at a height of at least 100 cm from the floor. In addition, avoid installing the sensor near metal objects.

5. Operating Instruction

Power On

- Press and hold the multi-function button until the green LED indicator turn on.
- The sensor will upload a message to the data topic and a message to device configure topic.

Power Off

- The sensor does not need to power off. The SENSO8 sensor can only be powered off by removing the battery.

Report Latest Data

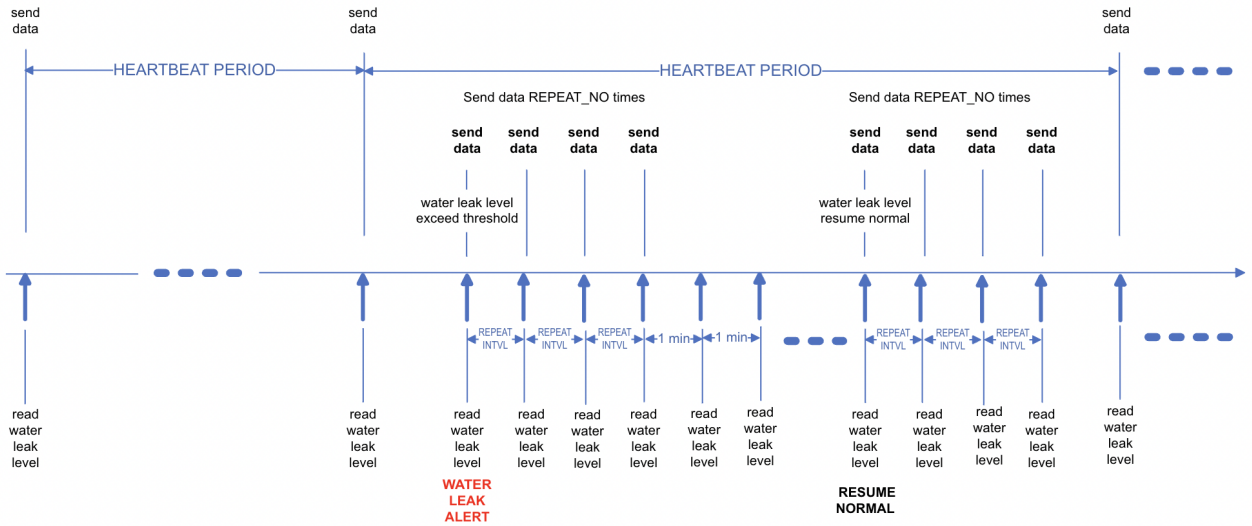
- Press the multi-function button briefly, the LED indicator will flash once. The sensor will upload a message to the data topic.

- During the upload, the sensor will not accept new request and the LED indicator will not flash on subsequent button presses. The upload lasts about 20 seconds to 2 minutes typically, depending on the signal quality and network carriers.

6. Sensor Operation

The water leak level is measured continuously by a comparator on the sensor. When the water leak level is above the threshold, the sensor will upload a message to the data topic immediately with an alert flag. In addition, there will be three more data messages uploaded each 60 seconds apart by default to ensure the alert can be received. For these additional data messages, the water leak level is measured at the time the message is transmitted. It could also help identifying false trigger situations. Similarly, when the water leak level is back to normal, there is a data message with alert flag cleared and three additional data messages afterward.

In addition, there will be a heartbeat message every hour by default for the user to monitor the health status of the sensor.



7. Configurable Sensor Settings

The following sensor settings are configurable via downlink command. The details of the data payload format can be found on the SENSO8 NB-IoT Water Leak Sensor API document.

Setting	Default Value	Unit
Heartbeat Interval	3600	second
Water Leakage Analog Input Threshold	90	-
Number of additional data uploads when an alert is triggered or cleared	3	-
Time between addition data uploads when an alert is triggered or cleared	60	second

8. LED Indicator

8.1. Device Status

Event	LED Pattern	Description
Powered Up	Single LED flash	Device Powered Up
Report Latest Data	Single LED flash	The sensor will upload the sampled data when the multi-function button is pressed. (During the data upload, new button press is ignored)

8.2. Error Status

On power up, the sensor will initialize the radio and perform a data and device configuration upload to the MQTT broker. If an error occurs (around one minute after the sensor powered up), the LED indicator will flash in five seconds period to indicate the type of the error.

Event	LED Pattern	Description	Possible Problem/Fix
SIM Error	Single flash	Error reading SIM card.	• SIM card not inserted. • Incorrect SIM card direction.
Radio Module Error	Two flashed	Error initializing the NB-IoT module.	• Remove the battery, press and hold the multi-function button for a few seconds and power on the device again. • Check the battery voltage.
Radio Connection Error	Three flashes	Cannot establish the radio connection.	• SIM card not valid. • Incorrect APN setting. • Antenna connection problem. • Poor radio coverage.
TCP Connection Error	Four flashes	Cannot establish the TCP connection to the MQTT broker.	• Incorrect MQTT broker IP/URL or port number. • MQTT broker is not running.

Event	LED Pattern	Description	Possible Problem/Fix
MQTT Connection Broker	Five flashes	Cannot establish the MQTT connection to the broker.	• Incorrect username or password. • Poor radio signal quality
MQTT Subscription Error	Six flashes	Cannot subscribe to the topic for download control command.	• Incorrect ACL setting. • Incorrect username or password. • Poor radio signal quality
MQTT Publish Error	Seven flashes	Cannot publish to the topic for data or device configuration upload.	• Incorrect ACL setting • Incorrect username or password. • Poor radio signal quality

9. Troubleshooting Guide

Symptom	Fix
The sensor cannot be configured via download command.	Check the data upload time against the MQTT broker session expiry time. If data upload time is longer than the session expiry time, the session will expire and the broker will not keep the download data.
The alert is not cleared when the reading is returned to the normal level.	For each alert, there is a hysteresis setting to prevent the alert from triggering repeatedly when the reading fluctuating around the threshold. *Example*: If the water leak threshold is 90, it will trigger an alert when analog reading is higher than 90. The alert will be cleared when the reading falls below 80 (hysteresis is 10) rather than 90.

10. Warning and Personal Injury

Do not apply this product to safety protection devices or emergency shutdown devices, nor in any other applications that may result in personal injury due to product malfunction, unless explicitly authorized. Please refer to the product datasheet and user guide before installation,

processing, use or maintenance of the product. Failure to comply with the recommendations my result in death and serious bodily harm. The company shall not be held liable for any damages resulting in personal injury or death. All the claims against the company managers and employees, agents, distributor and subsidiaries are hereby disclaimed, including all the costs and compensation costs, legal fees etc.

11. Revision History

Revision	Description	Date
1.0	Initial Release	Jul 2020
1.01	Added sensor operation and configurable settings.	Jun 2022
1.02	Added information and drawings for installation	Mar 2023
1.03	Insert information & drawings for CONFIG_EN & CONFIG PORT	Sept 2023
1.04	Add “Warning and Personal Injury” Section	Mar 2024
1.05	Added SEN21310 to supported models	Jun 2024
1.06	Updated Installation Guideline	Sep 2024
2.0	First release on docs.senso8.com	Oct 2026