# SENSO8 NB-IoT Open Close Sensor User Guide

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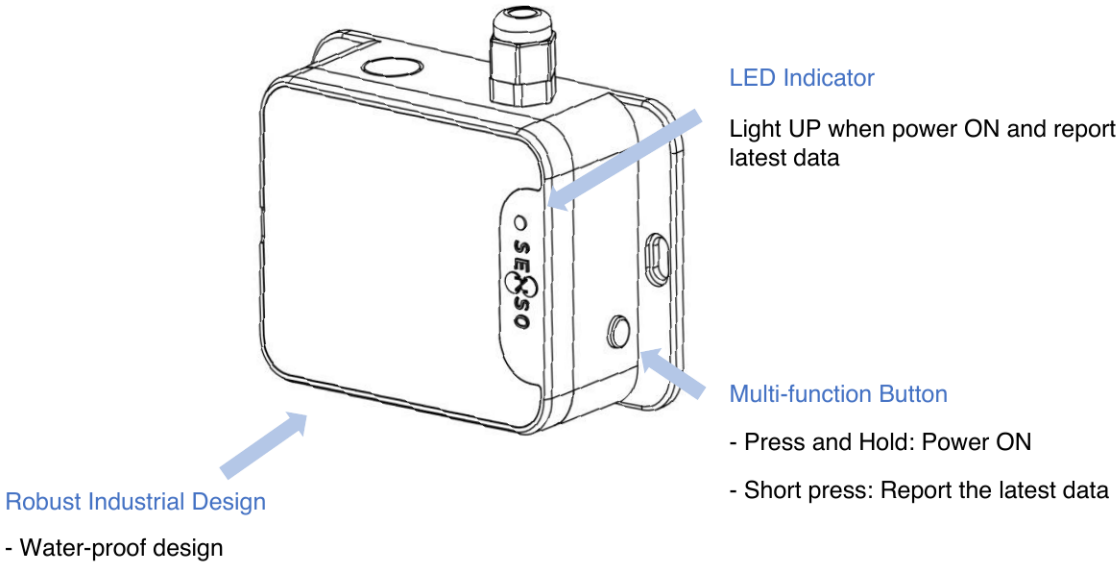
## 1. Introduction

Applicable Models:

- SEN20600-0000
- SEN20600-DRMT
- SEN21600-0000



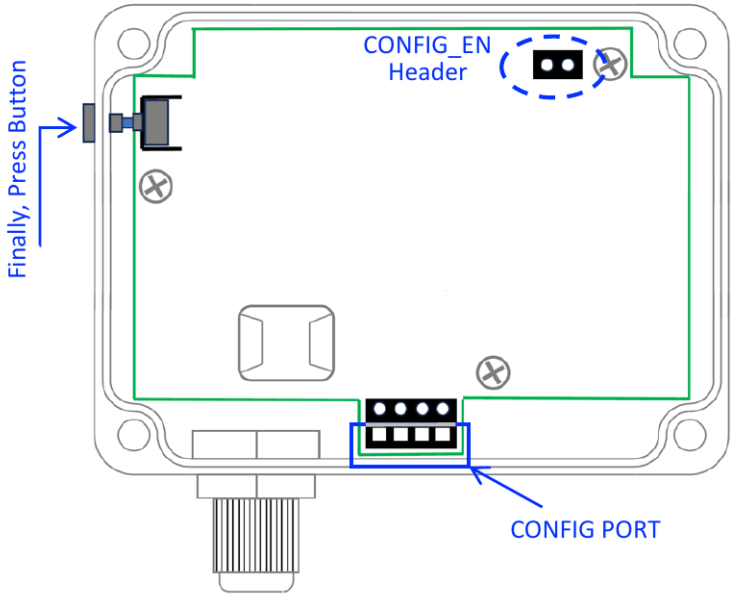

The SENSO8 NB-IoT open/close sensor provides a simple and efficient solution for monitoring

door security, motion detection or logic.

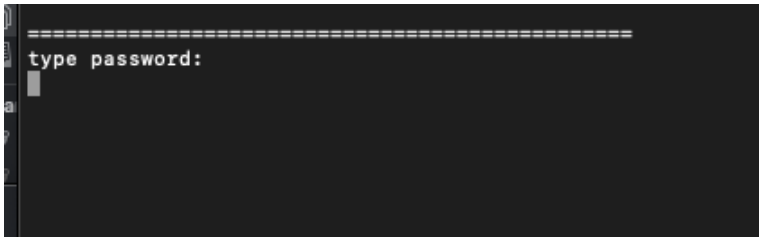
## 2. Sensor Configuration

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.



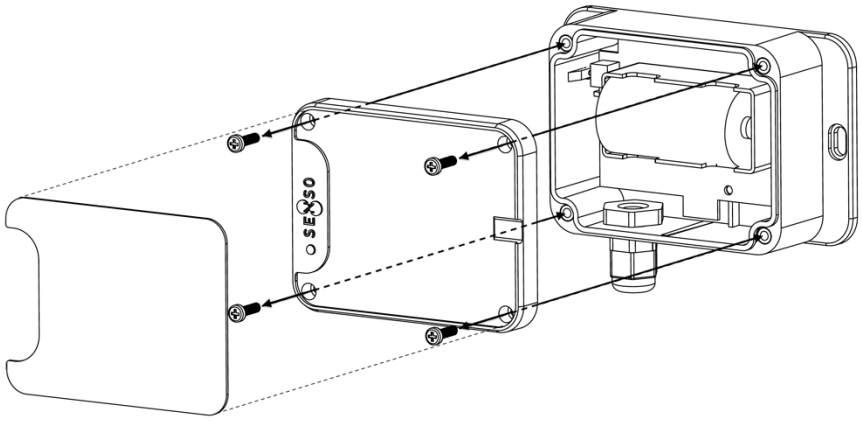

7. Then the configuration can be taken according to the requirements.

```
==========================================
Main Menu
1. Network Settings
2. MQTT Broker Settings
3. MQTT Client Settings
4. Device Settings
5. Change Password
6. Test Hardware
7. Test NB-IoT
8. Test RTC
9. Device Advanced Settings
A. Exit
```

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

Sensor Installation

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

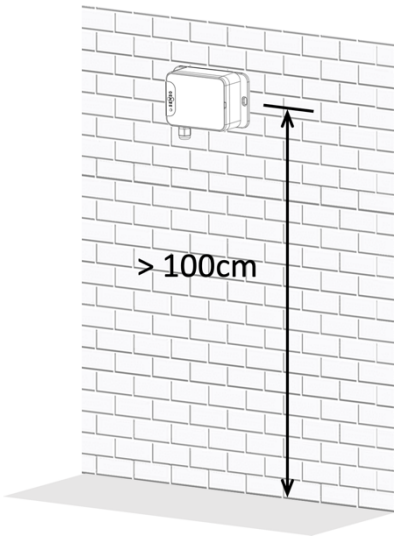


2. Remove the battery from the battery holder if it is installed.
3. Insert a nano-SIM to the SIM card socket next to the battery holder. **Make sure the direction of the nano-SIM is correct**.
4. Insert an ER26500 battery to the battery holder. **Make sure the polarity of the battery is correct as shown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

## 3. Installation Guideline

The sensor is intended for installation on interior walls of buildings. 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.

## 4. Operating Instruction

Power On

- Press and hold the multi-function button until the green LED indicator turns 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.

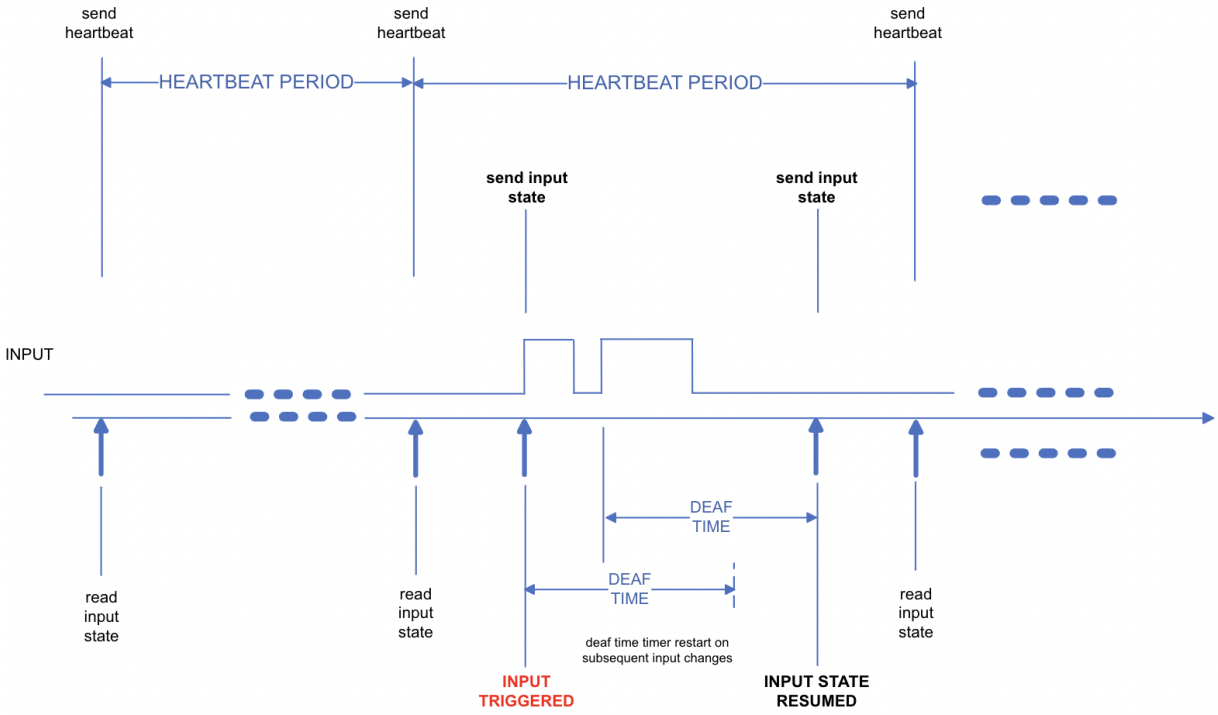
Report Latest Data

- 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.

## 5. Sensor Operation

The sensor publishes a data message in the following cases:

- Heartbeat Interval
- A state change on either dry contact input




## 6. Configurable Sensor Settings

The following sensor settings are configurable via downlink commands. The details of the data payload format can be found on the SENSO8 Dry Contact Input/Output Analog Input API document.

| Setting | Default | Unit | Remark |
|---|---|---|---|
| Heartbeat interval | 3600 | second | |
| Digital input mode | 0 | - | Detect mode |
| Digital input type<br><br>[digital_inx_type, digital_inx_invert] | [2,1] | - | NC input, rising/falling edge trigger |
| Digital input deaf time | 2 | second | |
| Digital input scheduler | Disable | - | |
| NB-IoT frequency band number | 0 | - | 0 - auto |
| SYS data report interval | 24 | hour | |

## 7. LED Indicator

## 7.1. 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.<br><br>(During the data upload, new button press is ignored) |

## 7.2. 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.<br>• 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.<br>• Check the battery voltage. |
| Radio Connection Error | Three flashes | Cannot establish the radio connection. | • SIM card not valid.<br>• Incorrect APN setting.<br>• Antenna connection problem.<br>• 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.<br>• 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.<br>• Poor radio signal quality |
| MQTT Subscription Error | Six flashes | Cannot subscribe to the topic for download control command. | • Incorrect ACL setting.<br>• Incorrect username or password.<br>• Poor radio signal quality |
| MQTT Publish Error | Seven flashes | Cannot publish to the topic for data or device configuration upload. | • Incorrect ACL setting<br>• Incorrect username or password.<br>• Poor radio signal quality |

## 8. Troubleshooting Guide

| Symptom | Fix |
|---|---|
| The sensor does not power up even the battery is inserted properly. | Check whether the SIM card is properly inserted. The sensor will not power up if it cannot detect the SIM card. |
| 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. |

## 9. 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.

# 10. Revision History

| Revision | Description | Date |
|---|---|---|
| 1.0 | Initial Release. | 10 Jun 2022 |
| 1.01 | • Added information and drawings for installation.<br>• Added sensor operation details. | 15 Mar 2023 |
| 1.02 | Insert information & drawings for CONFIG_EN & CONFIG PORT | 18 Sept 2023 |
| 1.03 | Add “Warning and Personal Injury” Section | 14 Mar 2024 |
| 1.04 | Added SEN21600 to the supported models | 20 Jun 2024 |
| 1.05 | Updated Installation Guideline | 2 Sep 2024 |
| 2.0 | First release on docs.senso8.com | Oct 2026 |