

SEN22600 LTE Cat-1 Open/Close/Pulse Count Sensor User Guide

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1. Introduction

SEN22600 LTE Cat-1 Open/Close/Pulse Count Sensor User Guide describes the use for the following model(s):

- SEN22600-0000-0000

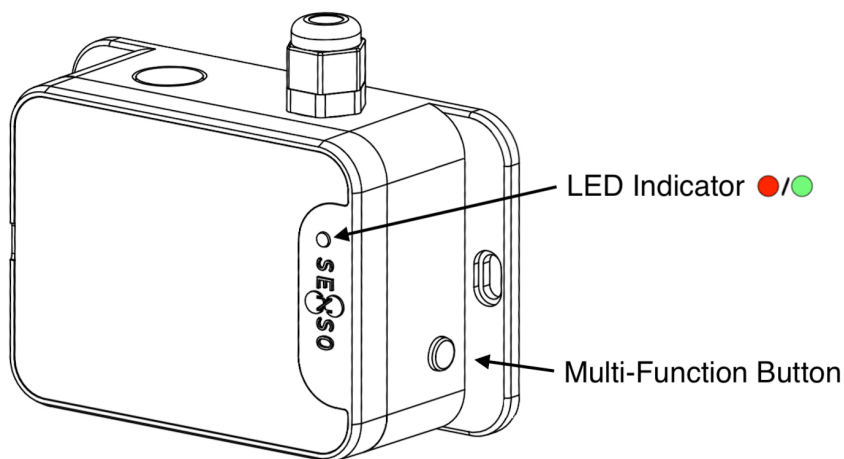


Figure 1. SEN22600-0000-0000

SEN22600 LTE Cat-1 Open/Close/Pulse Count Sensor is a compact, battery-powered device that collects water consumption data from a MIU (or a water meter) and detects events such as leakage, reverse flow and blockage.

There is an LED indicator on the top cover of the device to show the device status and errors. The multi-function button is used to power up the device and initiate data uploading.

2. Device Configuration

1. Unfasten the screws on the corners and open the top cover.
2. Disconnect the power and then short the CONFIG_EN header with a jumper.

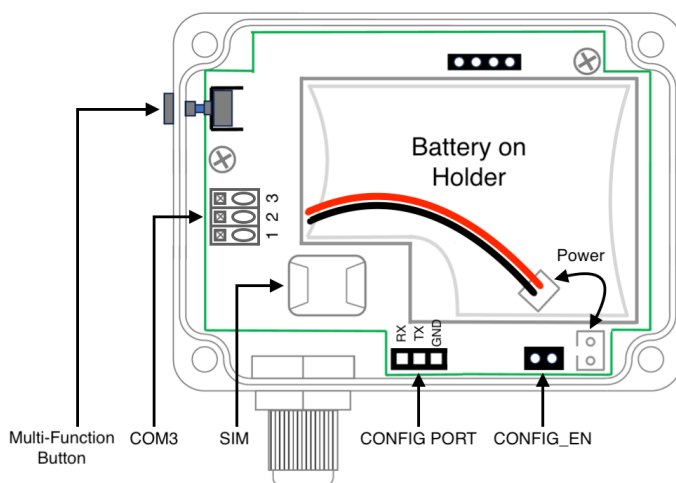


Figure 2. Inside SEN22600

3. Connect the CONFIG PORT to a computer by means of a USB-to-UART converter.

Table 1. Connections for CONFIG PORT

UART-to-USB Converter	CONFIG PORT
VCCIO	—
TXD	RX
RXD	TX
GND	GND

4. Open a serial terminal software (e.g. PuTTY) in the computer.
5. Connect the power.
6. Type the password when it prompts for it. (Please contact your sales representative for the device password.)

```
=====
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. Sensor Settings
6. Change Password
7. Test Hardware
8. Test LTE CAT1
9. Advanced Settings
x. Exit
```

Remark: You can ask for **SENSO8 Sensor UART Configuration Guide** from your sales representative for more information.

3. Device Installation

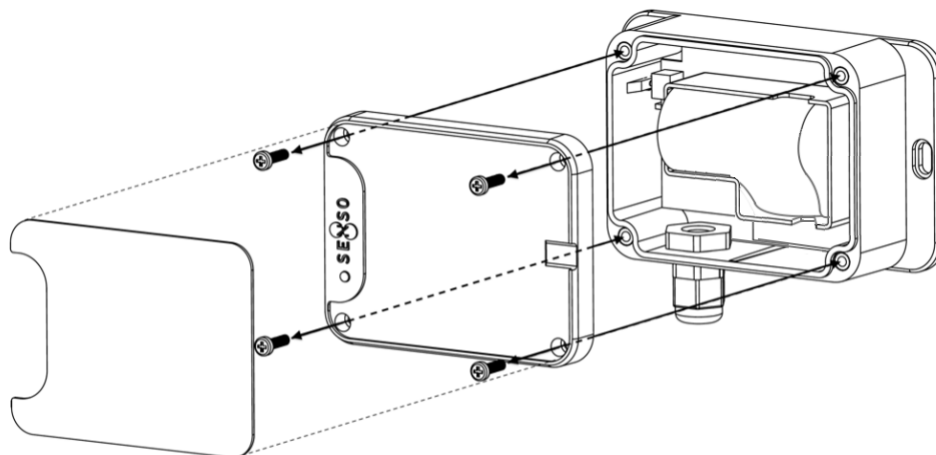


Figure 3. SEN22600 Assembly

1. Unfasten the screws on the corners and open the top cover.
2. Disconnect the power.
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. The CONFIG_EN jumper should not be shorted.
5. Pass the MIU (or the water meter) cable with the pulse count outputs through the cable gland. Refer to [Table 2](#), connect it to COM3 next to the multi-function button (see [Figure 2](#)). Tighten the cable gland afterward.

Table 2. Connections for COM3

Pulse Count Output	COM3
<i>Forward Flow Count</i>	Pin 1
GND (COMMON)	Pin 2
<i>Backward Flow Count</i>	Pin 3

6. Connect the power.
7. Put on the top cover and fasten the screws on the corners.
8. Press & hold the multi-function button for a few seconds. The LED indicator in **GREEN** will light up.
9. After powering up, the device will publish a data report and a device configure report to the MQTT broker.

4. Installation Guideline

Mount the sensor on an interior wall or secure it to a sturdy and stable object to ensure the safe and reliable installation. The sensor is installed with the cable gland facing the floor. Pass the cable from the water meter through the cable gland. Ensure the cable gland is well fastened.

For optimal radio performance, position the sensor at least 100 cm above the floor where conditions allow. Ensure the chosen mounting surface is clean, dry and free of vibrations before securing the device. Avoid installing the sensor near sources of extreme heat, moisture or direct sunlight as these environmental factors may affect sensor longevity.

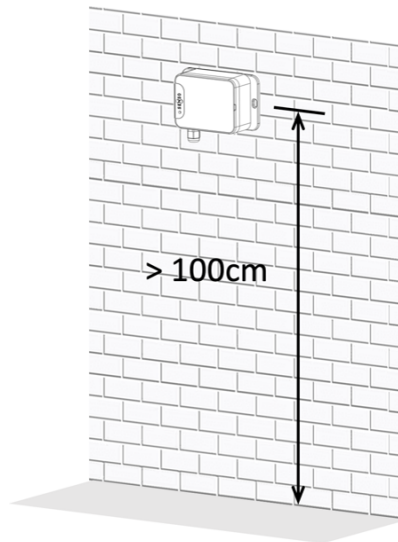


Figure 4. SEN22600 Installation

5. Operation Instructions

Power On

- Press & hold the multi-function button until the LED indicator in **GREEN** turns on.
- The device will upload a message to the data topic and a message to the device configure topic.

Power Off

- By default, the device does not need to power off. It can only be powered off by removing the battery.

Report Latest Data

- Press the multi-function button briefly, the LED indicator in **GREEN** will flash once. The device will upload a message to the data topic.
- During the upload, the device 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. Device Operation

The device will continuously monitor the pulse count inputs (*Forward Flow Count* and *Backward Flow Count*) in the background. The inputs will be converted to the water meter reading.

- If **Time Base Upload** is selected (**Time/Volume Based Upload = 0**), the device stores the water meter readings when *Time Base Sampling Interval* is reached.

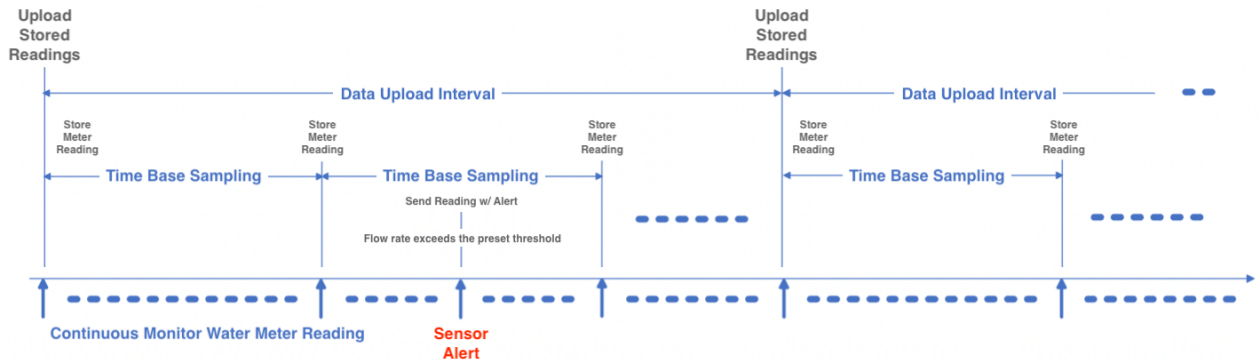


Figure 5. Time Base Upload

- If **Volume Base Upload** is selected (**Time/Volume Based Upload = 1**), the device stores the water meter readings at each increment of the *Volume Base Sampling Size*.

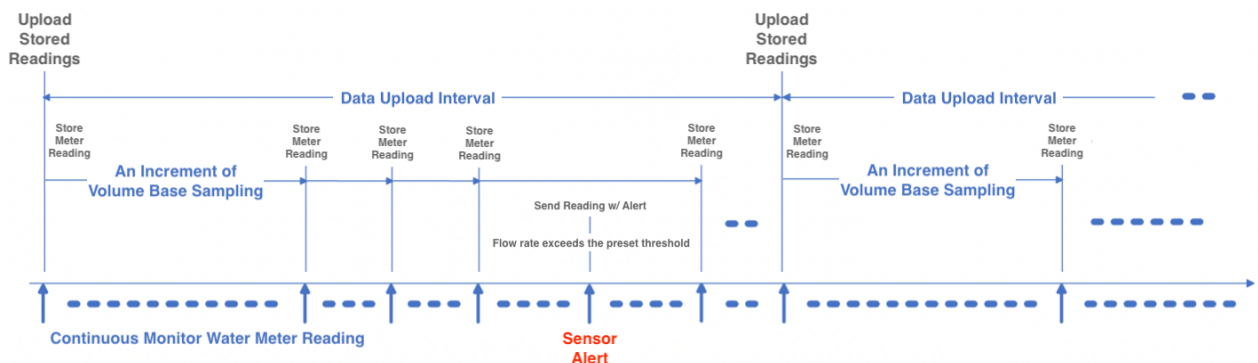


Figure 6. Volume Base Upload

- When *Data Upload Interval* is reached, the device uploads all the stored readings to the data topic.
- In addition, the device immediately uploads alert messages to the data topic when any of *flow rate alert thresholds* are exceeded.

7. Configurable Device Settings

The device settings in [Table 3](#) are configurable via downlink commands. The details of the data payload format can be found on **SEN22600 LTE Cat-1 Pulse Count Input Device API Document**.

Table 3. Device Configurable Parameters

Setting	Key	Description
<i>MQTT Broker 1 Configuration</i>	broker1	Set the MQTT broker 1's IP/URL, port number, username, password, TLS and cert server address.
<i>MQTT Broker 2 Configuration</i>	broker2	Set the MQTT broker 2's IP/URL, port number, username, password, TLS and cert server address.
<i>Data Uplink Topic</i>	top_data	Set the data uplink MQTT topic.
<i>Device Settings Uplink Topic</i>	top_sys	Set the device settings uplink MQTT topic.
<i>Device Settings Downlink Topic</i>	top_ctrl	Set the device configuration downlink MQTT topic.
<i>Time Sync Uplink Topic</i>	top_ts	Set the time sync uplink MQTT topic.
<i>Wait for Downlink Time</i>	wait2off	Set the wait for downlink time (0-5).
<i>Meter Initial Reading</i>	offset	Set the initial water meter reading (L).
<i>Data Uplink Interval</i>	up_int	Set the data uplink interval (min).
<i>Time/Volume Based Upload</i>	log_base	Set the data logging base (0 - time based, 1 - volume based).
<i>High Flow Rate 1 Threshold</i>	fwd1_th	Set the high flow rate 1 threshold (L/min).
<i>High Flow Rate 2 Threshold</i>	fwd2_th	Set the high flow rate 2 threshold (L/min).
<i>High Flow Rate 3 Threshold</i>	fwd3_th	Set the high flow rate 3 threshold (L/min).
<i>Time Base Sampling Interval</i>	time_int	Set the time base sampling interval (min).
<i>Volume Base Sampling Size</i>	voln_sz	Set the volume base sampling size (L).

8. LED Indications

8.1. Device Status Indication

Table 4. Device Status Indication

Event	LED Indicator	Description
Power Up Success	GREEN LED turns off	Device powers up successfully.
Power Up Failure	RED LED flashes	Device powers up with error.
Report Latest Data	GREEN LED turns on	Device is uploading data.
Finishing Upload	GREEN LED turns off	Device finishes the upload.

8.2. Error Indication

When powering up, the device will initialize the radio and perform the data and the device configuration upload to the MQTT broker. The LED indicator in **GREEN** turns on during startup to indicate progress. If startup succeeds, the LED indicator will turn off. If an error occurs, the LED indicator in **RED** will flash and then the device will power down automatically. [Table 5](#) shows the error states corresponding to the flash patterns of the LED indicator.

Table 5. Flash Patterns of LED Indicator

Event	LED Pattern	Description	Possible Problem and Fix
SIM Card Error	RED LED flashes once every 5s	Error in Reading SIM Card	<ul style="list-style-type: none"> • SIM card is not inserted. • SIM card is inserted in a wrong direction. • SIM card is not activated.
Radio Module Error	RED LED flashes twice every 5s	Error in Initializing the Radio Module	<ul style="list-style-type: none"> • Disconnect the battery, press & hold the multi-function button for a few seconds, reconnect the battery and press & hold the multi-function button for a few seconds again. • Check the battery voltage.
Radio Connection Error	RED LED flashes 3 times every 5s	Error in Establishing the Radio Connection	<ul style="list-style-type: none"> • Invalid SIM card. • Incorrect APN setting. • Poor radio coverage.
TCP Connection Error	RED LED flashes 4 times every 5s	Error in Establishing the TCP Connection to the MQTT Broker	<ul style="list-style-type: none"> • Incorrect MQTT broker IP/URL or port number. • MQTT broker is not running. • Incorrect APN setting.
MQTT Connection Broker	RED LED flashes 5 times every 5s	Error in Establishing the MQTT Connection to the Broker	<ul style="list-style-type: none"> • Incorrect MQTT broker username or password. • Poor radio signal quality.
MQTT Subscription Error	RED LED flashes 6 times every 5s	Error in Subscribing to the Topic for the Download Control Command	<ul style="list-style-type: none"> • Incorrect MQTT broker ACL setting. • Incorrect MQTT broker username or password. • Poor radio signal quality.

Event	LED Pattern	Description	Possible Problem and Fix
MQTT Publish Error	RED LED flashes 7 times every 5s	Error in Publishing to the Topic for the Data or the Device Configuration Upload	<ul style="list-style-type: none">• Incorrect MQTT broker ACL setting.• Incorrect MQTT broker username or password.• Poor radio signal quality.

9. Troubleshooting Guide

Table 6. Device Troubleshooting Guide

Symptom	Fix
The device does not power up even the battery is inserted properly.	Check whether the SIM card is properly inserted. The device will not power up if it cannot detect the SIM card.
The device cannot be configured via downlink command.	Check the data upload interval against the MQTT broker session expiry time. If data upload interval is longer than the session expiry time, the session will expire and the broker will not keep the downlink data.

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 may 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, distributors and subsidiaries are hereby disclaimed, including all the costs and compensation, legal fees, etc.

11. Revision History

Table 7. Revision History

Revision	Description	
1.0	Initial Release	April 2026
2.0	First release on docs.senso8.com	Oct 2026