SEN80310 LTE Cat-1 Inductive Sensing Water Meter Interface Unit (MIU) User Guide

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1. Introduction

SEN80310 LTE Cat-1 Inductive Sensing Water Meter MIU User Guide describes the use for the following model(s):

- SEN80310-0000-0000

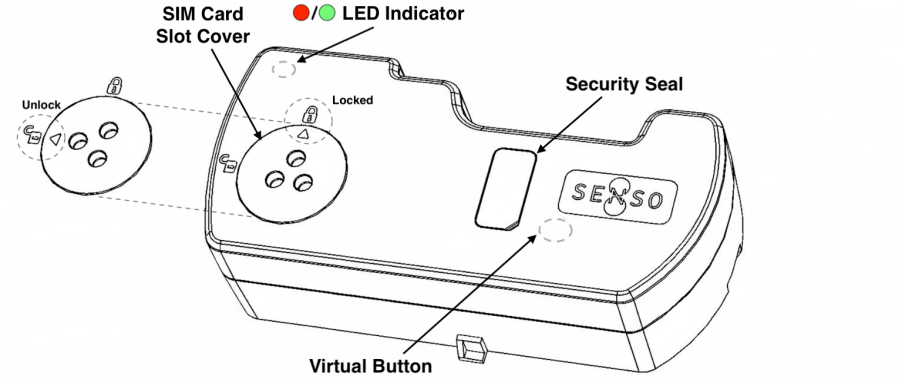

Figure 1. SEN80310-0000-0000

The SENSO8 inductive water meter MIU (Meter Interface Unit) is a compact, battery-powered device that collects water consumption data and detects events such as leakage, reverse flow, and blockage from a compatible water meter.

There is a LED indicator on the top of the MIU to show the device status and errors. The virtual button can be activated by ***tapping*** it with the provided rod (place the tip of rod and hold for 5 seconds). The virtual button is used to power up the MIU and initiate data upload.

2. Sensor Configuration

All the sensor configurations are achieved by downlink commands. See ***SEN80310 LTE Cat-1 Inductive Sensing Water Meter Interface Unit (MIU) API Document*** for details.

3. Installation Guideline

1. Open the SIM card slot cover using the provided opening tool. The cover is secured on a protrusion; turn it anti-clockwise to open.

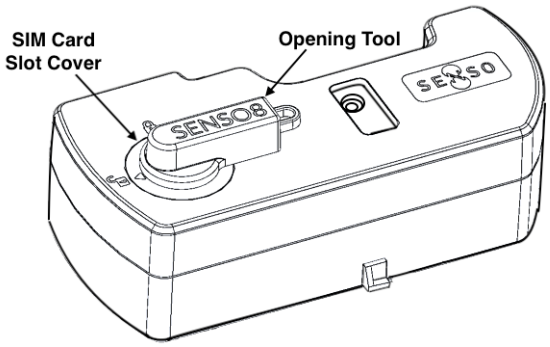

Figure 2. Open SIM Card Slot Cover

2. Push the SIM card holder down and lift it up. Insert the SIM card with the beveled edge facing upward into the holder, then return the holder to its original position.

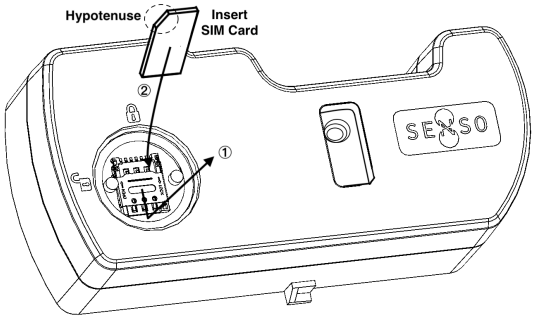

Figure 3. Insert SIM Card

3. Use the opening tool to close the SIM card slot cover. Rotate clockwise until it clicks into place. Then the red LED indicator turn on briefly.
4. Mount MIU on the top of the water meter and secure it with a screw through the hole at the center.

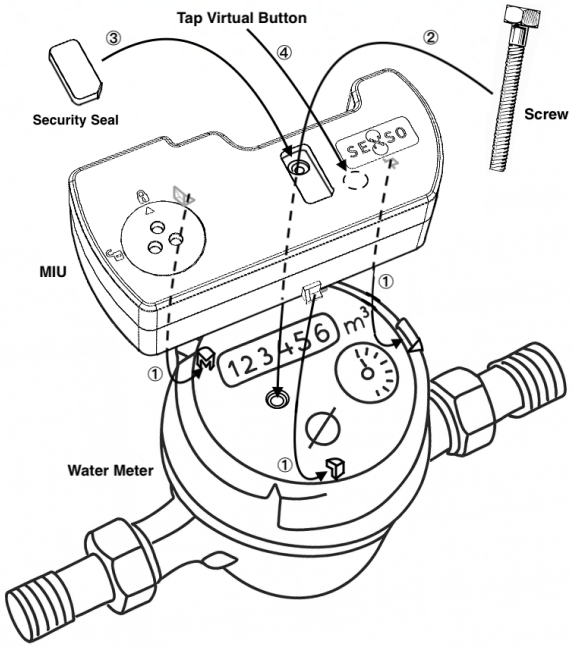

Figure 4. Mount MIU on Water Meter

5. Install the security seal onto the top of the screw hole.
6. After tapping the virtual button, the green LED indicator will turn on.
    - If MIU powers up successfully, the green LED indicator will turn off after about a minute.
    - If otherwise, the red LED indicator will be flashing.

4. Operation Instructions

Power Up

- By tapping the virtual button, the green LED indicator will turn on.
  - If MIU powers up successfully, the green LED indicator will turn off after about a minute.
  - If otherwise, the red LED indicator will be flashing.
- MIU will upload a message to the data topic and a message to the device configuration topic.

Report Latest Data

- Tap the virtual button. Then the green LED indicator will turn on for a while.
- MIU will upload a message to the data topic.
- While uploading, MIU will not accept new requests (there will be no LED indication) if the virtual button is tapped again. The upload lasts from 20 seconds to 2 minutes typically, depending on the signal quality and the network carrier.
- If the MIU is onboarded to an IoT platform, the latest data can be read from the platform dashboard.

5. Sensor Operation

The MIU continuously monitors the water meter reading in the background.

- Refer to Figure 5, if *Time Base Upload* is selected (*Time/Volume Based Upload* = 0), the MIU stores the water meter readings when *Time Base Sampling Interval* is reached.
- Refer to Figure 6, if *Volume Base Upload* is selected (*Time/Volume Based Upload* = 1), the MIU stores the water meter readings at each increment of the *Volume Base Sampling Size*.
- When *Data Upload Interval* is reached, the MIU uploads all the stored readings to the data topic.

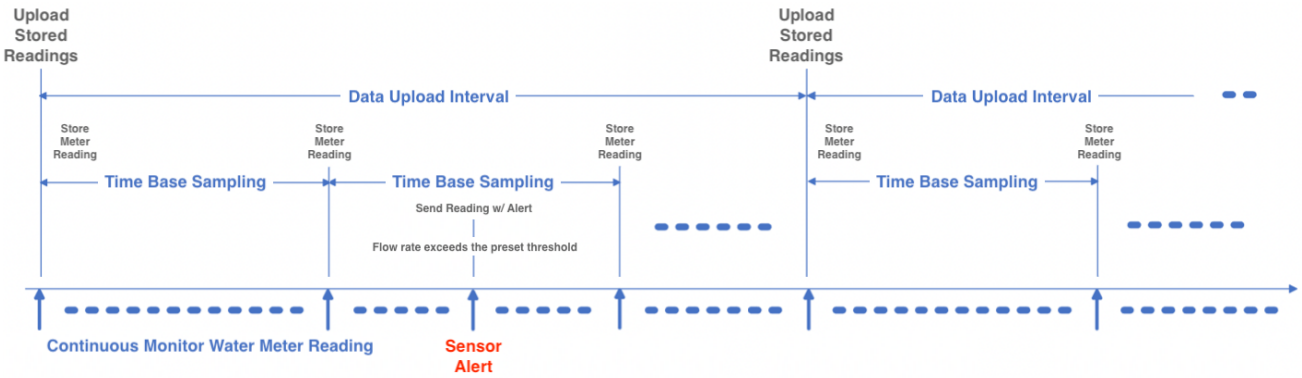

Figure 5. Time Base Upload

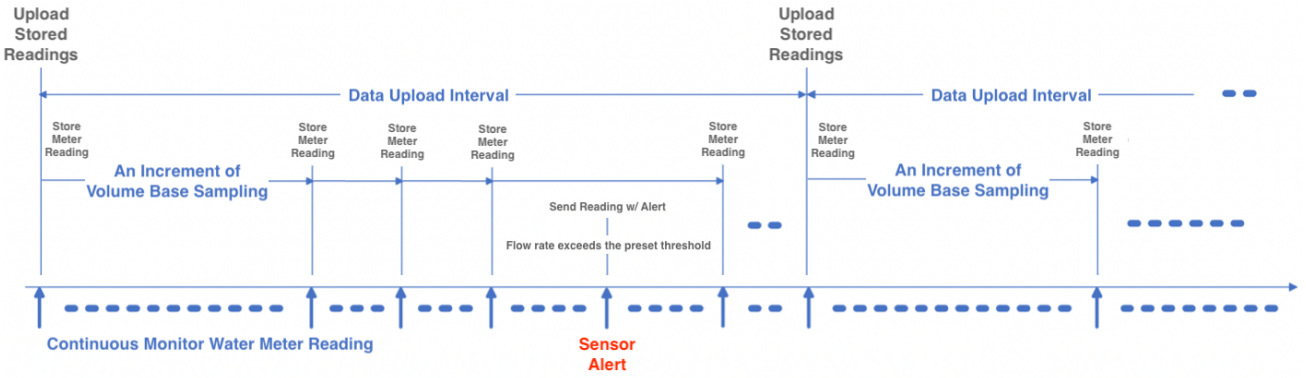

Figure 6. Volume Base Upload

In addition, the MIU immediately uploads alert messages to the device configuration topic when any of the *flow rate alert thresholds* are exceeded.

6. Configurable Sensor Settings

The following device settings are configurable via downlink commands. The details of the data payload format can be found on ***SEN80310 LTE Cat-1 Inductive Sensing Water Meter Interface Unit (MIU) API Document***.

Table 1. MIU Configurable Parameters

Setting	Key	Description
SIM Slot	sim_sel	Select the primary SIM slot (0 or 1)
MQTT Broker 1 Configuration	broker1	Set the MQTT broker 1 address, port, username, password, TLS and cert server address.
MQTT Broker 2 Configuration	broker2	Set the MQTT broker 2 address, port, username, password, TLS and cert server address.
Data Uplink Topic	top_data	Set the data uplink MQTT topic.
Device Settings Uplink Topic	top_sys	Set the device settings uplink MQTT topic.
Device Settings Downlink Topic	top_ctrl	Set the device configuration downlink MQTT topic.
Time Sync Uplink Topic	top_ts	Set the time sync uplink MQTT topic.
Wait for Downlink Time	wait2off	Set the wait for downlink time (0-5).
Meter Initial Reading	offset	Set the initial water meter reading (L).
Data Uplink Interval	up_int	Set the data uplink interval (min).
Time/Volume Based Upload	log_base	Set the data logging base (0 - time based, 1 - volume based).
High Flow Rate 1 Threshold	fwd1_th	Set the high flow rate 1 threshold (L/min).
High Flow Rate 2 Threshold	fwd2_th	Set the high flow rate 2 threshold (L/min).
High Flow Rate 3 Threshold	fwd3_th	Set the high flow rate 3 threshold (L/min).

Setting	Key	Description
Time Base Sampling Interval	time_int	Set the time base sampling interval (min).
Volume Base Sampling Size	voln_sz	Set the volume base sampling size (L).

7. LED Indications

7.1. Device Status Indication

Table 2. MIU Status Indication

Event	LED Pattern	Description
Power Up Success	GREEN LED turns off	MIU powered up successfully.
Power Up Failure	RED LED flashes	MIU power up error.
Report Latest Data	GREEN LED turns on	MIU is uploading data.
Finishing Upload	GREEN LED flashes every 0.2s	MIU is finishing the upload.
Low Battery	RED LED flashes slowly every 5s	Battery level is below the threshold.
Preparing FOTA	GREEN LED flashes once every 1.2s	Device is starting up and connecting to network for FOTA.
FOTA Downloading	GREEN LED flashes once every 0.8s	FOTA firmware is being downloaded.
FOTA Updating	GREEN LED flashes once every 0.4s	Updating FOTA firmware is in progress.
FOTA Success	GREEN LED on for 5s	FOTA completed successfully.
FOTA Fail	RED LED on for 5s	FOTA failed.
SIM Card Tamper	RED LED blinks once	Tamper on SIM card cover is detected.

7.2. Error Indication

When powering up, MIU will initialize the radio and perform the data and the device configuration upload to the MQTT broker. The green LED turns on during startup to indicate progress. If startup succeeds, the LED turns off. If an error occurs, the red LED flashes for about five minutes and then the MIU powers down automatically.

Table 3 shows the error from the red LED indicator flashing pattern.

Table 3. MIU Red LED Indicator Flashing Pattern

Event	LED Pattern	Description	Possible Problem and Fix
SIM Card Error	RED LED blinks once every 5s	Error in Reading SIM Card	• SIM card is not inserted. • SIM card inserted in the wrong direction. • SIM card is not activated.
Radio Module Error	RED LED blinks twice every 5s	Error in Initializing the Radio Module	• After powering down, restart the unit by tapping the virtual button.
Radio Connection Error	RED LED blinks 3 times every 5s	Error in Establishing the Radio Connection	• Invalid SIM Card. • Incorrect APN Setting. • Poor Radio Coverage.
TCP Connection Error	RED LED blinks 4 times every 5s	Error in Establishing the TCP Connection to the MQTT Broker	• Incorrect MQTT Broker IP/URL or Port Number. • MQTT broker is not running. • Incorrect APN Setting.
MQTT Connection Error	RED LED blinks 5 times every 5s	Error in Establishing the MQTT Connection to the Broker	• Incorrect MQTT Username or Password. • Poor Radio Signal Quality.
MQTT Subscription Error	RED LED blinks 6 times every 5s	Error in Subscribing to the Topic for the Download Control Command	• Incorrect MQTT broker ACL Setting. • Incorrect MQTT Username or Password. • Poor Radio Signal Quality.
MQTT Publish Error	RED LED blinks 7 times every 5s	Error in Publishing to the Topic for the Data or the Device Configuration Upload	• Incorrect MQTT broker ACL Setting. • Incorrect MQTT broker Username or Password. • Poor Radio Signal Quality.

8. Troubleshooting Guide

Table 4. MIU Troubleshooting Guide

Symptom	Fix
The sensor 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.

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 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..

10. Revision History

Table 5. Revision History

Revision	Description	
1.0	Initial Release	December 2025
2.0	First release on docs.senso8.com	Oct 2026