Sienna MX1

Model: SMX1CS

User Manual

Document Part Number: 21042024
Document Revision: 1.2
May 05, 2025

Document Information

Document Approvals

Name	Role	Approval date	Comments
Shay Shaool	Author	21-Apr-2024	
Lior Kfir	PM	21-Apr-2024	
Moshe Nissim	Reviewer	21-Apr-2024	

Revision History

Revision Details	Date	Summary of Changes	Issued by
1.0	21-Apr-2024	Draft 1	Shay Shaool
1.1	21-Apr-2024	Update meter support list	Moshe Nissim
1.2	05-May-2025	Update system overview	Itsik

Legal Notices

TABLE OF CONTENTS

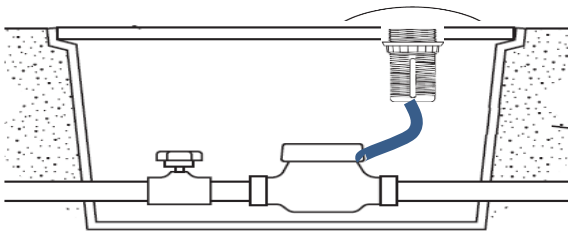
Figures

Tables

1 System Overview

The system is comprised of Sienna MX1 - a Meter Interface Unit (MIU) that is either pit mounted or in basement configurations.

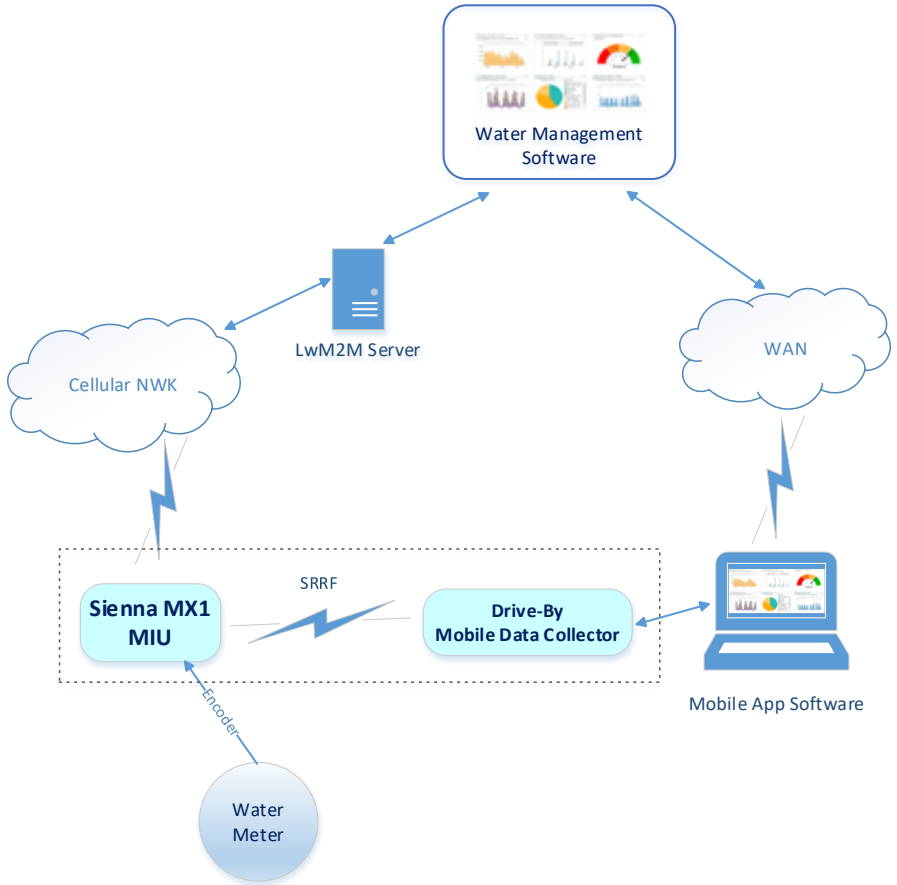
Figure 1: Pit mounted MIU Mushroom



MIU's are wirelessly connecting either to the Mobile Data Collector (MDC) using proprietary Short-Range RF (SRRF) or to cellular network.

Overview of the system Block diagram is depicted in the following figure:

Figure 2: System Functional Architecture



2 Product Description

The MIU device sends the water meter reading to the water management software via the cellular network or to a mobile drive by data collector. The MIU is wired to the water meter encoder and collects the water meter data every 15 minutes.

The main features of the MIU device are as following:

- Encoder communications to water meter
- NBIoT/LTE-M two-way wireless communication
- Information security including Firmware authentication and encrypted messages.
- Mushroom housing for pit and Wall Mounting installation
- IP68 water and humidity resistant
- Low battery alert
- Encoder error alert
- Internal logging of values, events and alarms
- Stores up to 90 days of hourly data.
- Support mobile drive-by and cellular network modes.
- Support parameters configuration over the air.
- Support firmware upgrade Over the Air (OTA).

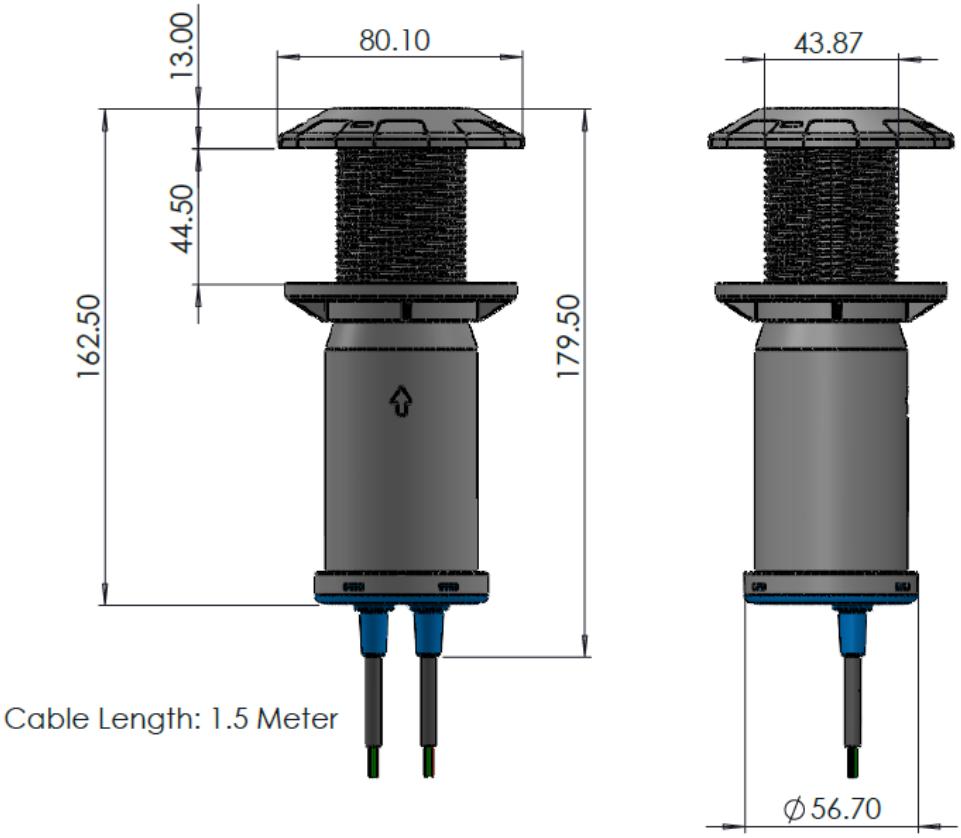
3 Technical Specification

3.1 Mechanical Characteristics

Table 1: Mechanical characteristics

Feature	Specifications
Maximum Dimensions (mm) for mushroom housing	Top diameter: 80.10mm, Length: 176.5mm, Pipe diameter: 44 mm
Connector Types	Nicor, Bare Wire

Figure 3: Dimensions



3.2 Environmental Characteristics

Table 2: Environmental characteristics

Feature	Specifications
Operating Temperature	-30°C to +70°C
Storage Temperature	+20°C to +30°C (recommended)
IP rating	IP68

3.3 Electrical Characteristics

Table 3: Electrical characteristics

Parameter	Value
Internal Battery Voltage	3.6VDC nominal
Internal Battery Capacity	19,000 mAh nominal

3.4 RF Radio Characteristics

Table 4: Cellular radio characteristics

Parameter	Value	Unit
Operating Frequency	NBIoT/LTE-M1 bands	
Protocol	LwM2M	
Maximum Transmitter output power	23	dBm
Antenna	Internal	

Table 5:Short-range RF radio characteristics

Parameter	Value	Unit
Operating Frequency	902-928 Unlicensed ISM band	MHz
Modulation	LoRa/2GFSK	
Maximum Transmitter output power	20	dBm
Antenna	Internal	

3.5 Encoder Compatibility List

Table 6: Encoder Compatibility List

Manufacture	Encoder name	Protocol
Badger	Absolute Digital Encoder	UI1203
Kamstrup	flowIQ 2100	UI1203
Xylem	IPERL	UI1203
Xylem	5/8” SR II®	UI1203
DIEHL	HYDRUS 1 (Standard)	UI1203
DIEHL	HYDRUS 1.3	UI1203
DIEHL	HYDRUS 2	UI1203
MULLER SYSTEMS	Solid State Register™ (SSR™)	UI1203
Hersey	5/8 420	UI1203
Invensys	5/8” SR II®	UI1203
Neptune	ProRead	ARB VI
Neptune	E-Coder	ARB VII

4 Installation and Storage

Read the instructions below before installing the unit. To prevent injury or damage, do not install, operate, or maintain the unit without following the instructions in this guide.

Follow all warnings and instructions marked on the product.

4.1 Unpacking

Carefully unpack the unit and inspect all contents for shipping damage upon receipt prior to storage. If any indication of physical damage is found, immediately contact the responsible transportation service and your local representative.

Table 7: Package content:

Part	Quantity	Comments
MIU main body	1	MIU pipe including cable
Plastic Top cover	1	
Plastic Nut	1	
Serial labels	2	Labels with MIU serial number

4.2 Storage

- Store the product in a cool and dry environment.
- Storage temperature should be below +30°C to save battery lifetime (between +20°C to +30°C).
- Storage of more than one year may affect product battery lifetime.

4.3 Installation

Please follow these steps to install the MIU in a Pit:

1) Remove the meter pit lid.
2) Attach the MIU cable to the meter using the appropriate Nicor or Bare wire connections (Figure 4: wires pinout connections). Verify the meter and MIU connectors are clean and dry before connection.
3) To activate the MIU attach a magnet for more than one second. (Figure 5: Magnet location for MIU activation).
4) Verify the installed unit status using the Activator BT tool to read the MIU data. (Figure 6: MIU magnet status to activator).
   For further information about Activator usage, check its user manual.
5) Pass the plastic Nut through the MIU cable and screw few turns through the MIU main body thread.
6) Insert the MIU main body through the Lid hole from the lid cover bottom.

7) Screw the plastic top cover over the top pipe body and fasten the unit to the meter pit lid using the plastic nut until the MIU pipe is tied to the pit lid.
8) The MIU main body should be beneath the meter pit lid, while the plastic top cover is tied to the top of the pit lid.
9) Verify all electrical and mechanical connections.
10) Close the meter pit lid.

Figure 4: Wire pinout connections

Wire Colour	Description
RED	VCC
GREEN	RX_DATA
BLACK	GND

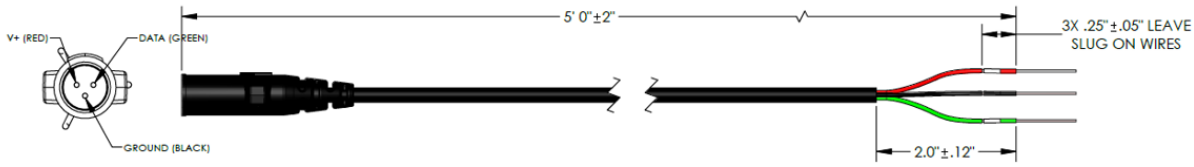


Figure 5: Magnet location for MIU activation

Figure 6: MIU magnet status to Activator

4.4 Troubleshooting

1. No MIU status in the Activator BT tool:
- Check the MIU cable connected and locked to the encoder cable.
- Attach the magnet to the MIU.
- Verify the installed unit status using the Activator BT tool to read the MIU data.

2. MIU fail to switch to Active mode after auto-detect:
- Repeat step 1.
- When MIU fail to switch to active then cable is damaged, or the encoder is not supported.

5 Maintenance

MIU requires no specific maintenance

6 Regulatory Notice

FCC and Industry Canada Class B Digital Device Notice

The digital circuit of this device has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAN ICES-3 (B)/NMB-3(B)

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numerique de la classe B est conforme a la norme NMB-003 du Canada.

Industry Canada interference Notice

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:

(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage;
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC interference Notice

This device complies with part 90 of the FCC rules.

Operation is subject to the following two conditions:

(1) This device may not cause interference; and

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

FCC and Industry Canada Radiation Hazard Warning

WARNING! To comply with FCC and IC RF exposure compliance requirements, the device should be located at a distance of at least 20 cm from all persons during normal operation. The antennas used for this product must not be co-located or operated in conjunction with any other antenna or transmitter.

Le dispositif doit être placé à une distance d'au moins 20 cm à partir de toutes les personnes au cours de son fonctionnement normal. Les antennes utilisées pour ce produit ne doivent pas être situés ou exploités conjointement avec une autre antenne ou transmetteur.

WARNING! *Changes or modifications to this equipment not expressly approved by the party responsible for compliance (ST Engineering Telematics Wireless Ltd.) could void the user's authority to operate the equipment.*