LANSEN

Configuration Manual

Ethernet Concentrator C4

Lansen Systems AB

Version 2.0, 2026-01-21

M-Bus wireless

Table of Contents

Introduction

Welcome to the configuration manual for the Ethernet Concentrator C4. This document is designed to serve as a comprehensive reference guide for installers, technicians, and technical professionals responsible for the operational setup of the device.

This manual provides the detailed, technical instructions required for configuring the Ethernet Concentrator C4 using the *C4 Configuration Tool* software.

Please note that instructions for the physical installation, mounting, and initial connection of the device are provided separately in the main User Manual.

Document conventions

This document uses the following formatting to highlight information.

Italics	Important concepts
Bold	Configuration parameters
[Text]	User interface buttons
`Monospace`	Verbatim data

The following admonitions are used throughout the document.

Note

Additional information that helps you use the product efficiently.

Important

You *must* follow this instruction to *complete a task* successfully.

Warning

You *must* follow this instruction to prevent *damage to equipment* or *injury to persons*.

About Ethernet Concentrator C4

The Concentrator 4 is an easy-to-install device used for collecting data from wM-Bus meters and sensors. The device will decrypt the data and convert it to M-Bus UDP or TCP format. Extra information to the M-Bus telegram such as RSSI, duration (age of message) and error information.

Key characteristics

- Supports up to 950 wireless M-Bus sensors or meters.
- Available as mains-powered (85–305 VAC) or Power over Ethernet (PoE).
- Internal antennas (dual, 90° apart for polarization diversity) or optional external SMA interface.
- Decrypts wM-Bus packets; encrypts stored keys; supports OMS 4 Security Profile A (mode 5).
- Ethernet (RJ45, 10/100 Mbps, auto-negotiation); M-Bus IP (TCP/UDP); configuration via Telnet.

Intended Use

The Ethernet Concentrator C4 is designed for professional use in *building automation* and *energy management systems*. Its primary function is to collect, decrypt, and convert data from *wireless M-Bus sensors* and meters. It converts data into *M-Bus IP* or *UDP format*. This enables integration with *PLCs*, *data collection units*, or substations. These integrations are used for monitoring and control purposes.

The device is intended for installation in residential buildings, commercial properties, and industrial facilities. It supports reliable data acquisition from multiple sensors. It facilitates applications such as *energy metering*, *environmental monitoring*, and *automated building control*.

Do not use this product in critical applications where failure could result in risk to life or property.

Product overview

The Concentrator 4 is available in several different hardware configurations. Find the version you have by looking at the model number on the product label.

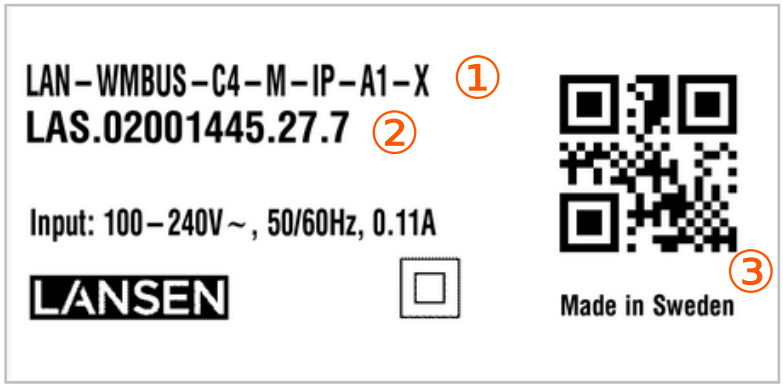


Figure 1. Product label for model LAN-WMBUS-C4-M-IP-A1-X

① Model number

② Serial number

③ QR-code

The structure of the model number is seen below.

Table 1. Concentrator 4 wM-Bus versions

Manufacturer	Input	Series	Power option	Wired interface	IP rating	Antenna
LAN	**LAN-WMBUS**	**C4**	**POE**	**IP**	**A1**	**(blank)**
Lansen	wM-Bus	Concentrator gen 4	Power Over Ethernet	Internet Protocol	IP40	Internal antenna
LAN	**LAN-WMBUS**	**C4**	**M**	**IP**	**A1**	**X**
Lansen	wM-Bus	Concentrator gen 4	Mains	Internet Protocol	IP40	SMA connector for external antenna

For example, *LAN-WMBUS-C4-M-IP-A1-X* is a *Lansen Concentrator 4 wM-Bus* model. It is a *mains-operated device* with an *Ethernet interface*, an *IP40 rating*, and has an external SMA connector for wM-Bus connection. Available hardware configurations can be found at lansen.io/.

Default network information

Find the default IP, MAC address and password on the label on the PCB cover under the *top cover*.

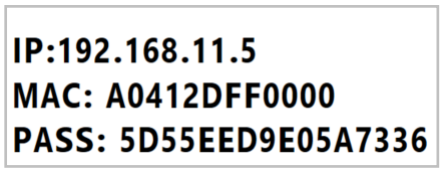


Figure 2. Network label

Physical features

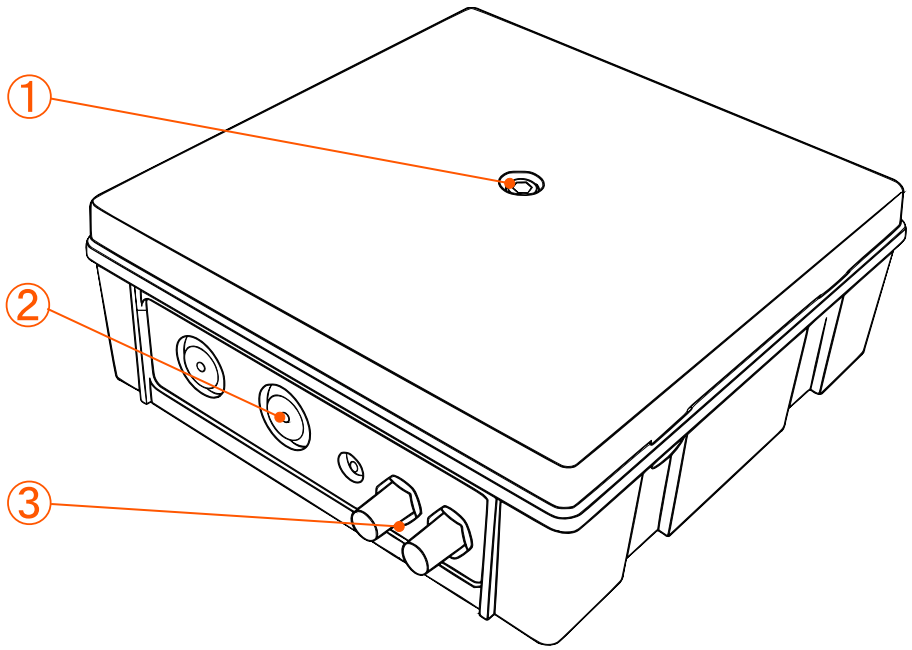


Figure 3. External overview

Concentrator 4 can have the following physical interfaces accessible by the user, depending on the hardware configuration:

① **Center screw**

Holds the *top cover* in place. Remove to release the top cover.

② **Ethernet inlet**

Inlet for Ethernet cable.

③ **Antenna connectors**

Optional *SMA connectors* for up to two external antennas used for wM-Bus or cellular communication.

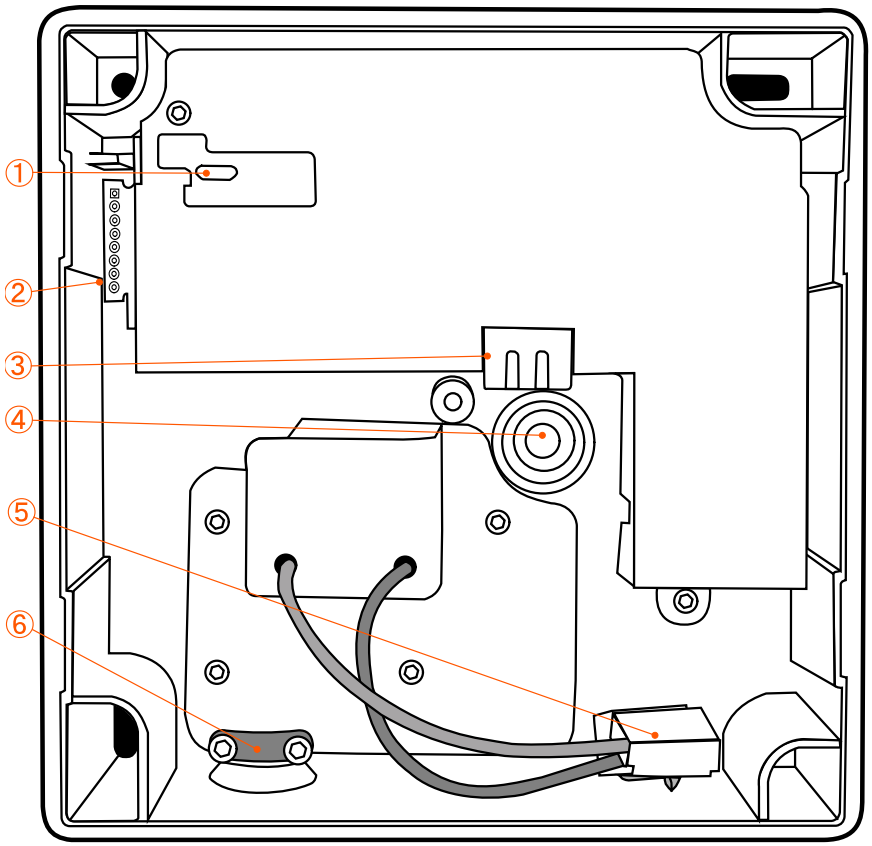


Figure 4. Internal overview

① **USB-C connector**

Located on the *main PCB*. Remove the top cover to access this connector.

② **Status LEDs**

Provides visual confirmation about the current status of the Concentrator 4.

③ **Ethernet connector**

RJ45 connector for connection to PLC

④ **Cable inlet**

Optional inlet for mains cable on *mains-operated* models. in the housing.

⑤ **Mains connector**

For *mains-operated* versions. This connector is located on the *main PCB*. Remove the *top cover* to access this connector. The cable is inserted through the *cable inlet* in the housing.

⑥ **Strain relief clamp**

For *mains-operated* versions. ALWAYS USE THIS.

Network interfaces

The Ethernet Concentrator C4 has the following network interfaces:

wM-Bus

Used for collection of meter data.

Ethernet

Wired connection for configuration of the device and communication with a PLC.

Indications of the Concentrator 4

The Concentrator 4 has seven status LEDs. Three LEDs are on the main board and four LEDs are on the shield board.

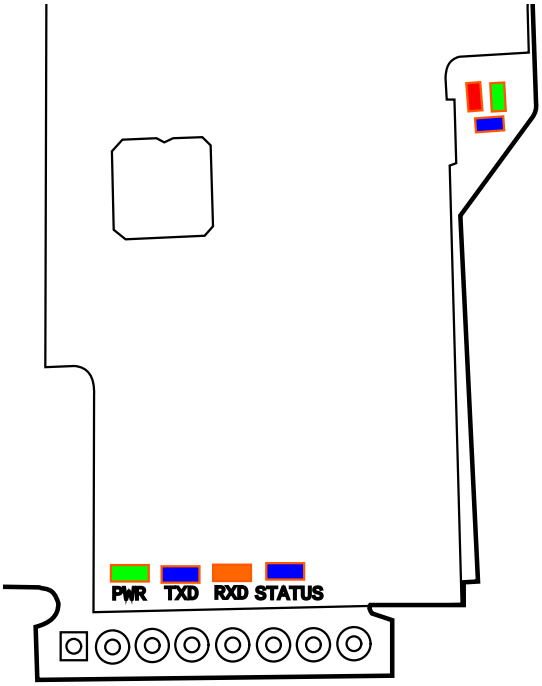


Figure 5. The positon of the status LEDs.

Table 2. Visual indications: Main board.

LED color	LED behavior		Description
Blue		Blinking	Receiving wM-Bus packets
Red	N/A	N/A	Reserved for future use
Green		Static on	Turned on

Table 3. Visual indications: Shield board.

Name	LED color	LED behavior		Description
PWR	Green		Static on	Turned on
TXD	Blue		Blinking once	Transmitted prompt
RXD	Orange		Blinking once	Received prompt

Name	LED color	LED behavior		Description
STATUS	Blue		100 ms on, 100 ms off	Application started
			1000 ms on, 1000 ms off	Application got PHY link
			400 ms on, 100 ms off	Application found upgrade power detect cable
			Static on	Bootloader will start

Setting up your network IP

Your computer must be in the same subnet as the Concentrator 4 before you connect to it. Set a static IP address on the computer to make sure it is in the correct subnet. The default subnet is `192.168.11.0/24`

Configure the network card

This procedure applies to Windows 10 and Windows 11.

If you use another operating system, configure a static IP address manually by using that system's network settings.

1. Open the Windows Settings app. Press `Windows` + `I`, or click the Start menu and select **Settings**.
2. Click **Network & Internet**.
3. Click **Ethernet**
4. Select the network interface connected to the Concentrator 4.
5. Scroll to **IP settings** and click **[Edit]**.
6. In the dialog, select **Manual** and enable IPv4.
7. Enter the following values:

IP address	`192.168.11.1`
Subnet mask	`255.255.255.0`
Default gateway	Leave empty.
Preferred DNS	Leave empty.

8. Click **[Save]**.

C4 Configuration Tool

The C4 configuration tool is a Windows application from Lansen that lets you configure the Concentrator 4 through a graphical user interface (GUI).

Installing the C4 Configuration Tool

1. Download the latest version of the C4 configuration tool from lansen.io/download.
2. Extract the downloaded ZIP file to a folder on the computer.
3. Double-click the executable file named **LansenC4ConfigTool.exe**.
   The start-up screen opens.

The C4 Configuration tool requires .NET Desktop Runtime to run. If you do not have it installed you will be requested to download and install it. If so, install .NET and click on **LansenC4ConfigTool.exe** again.

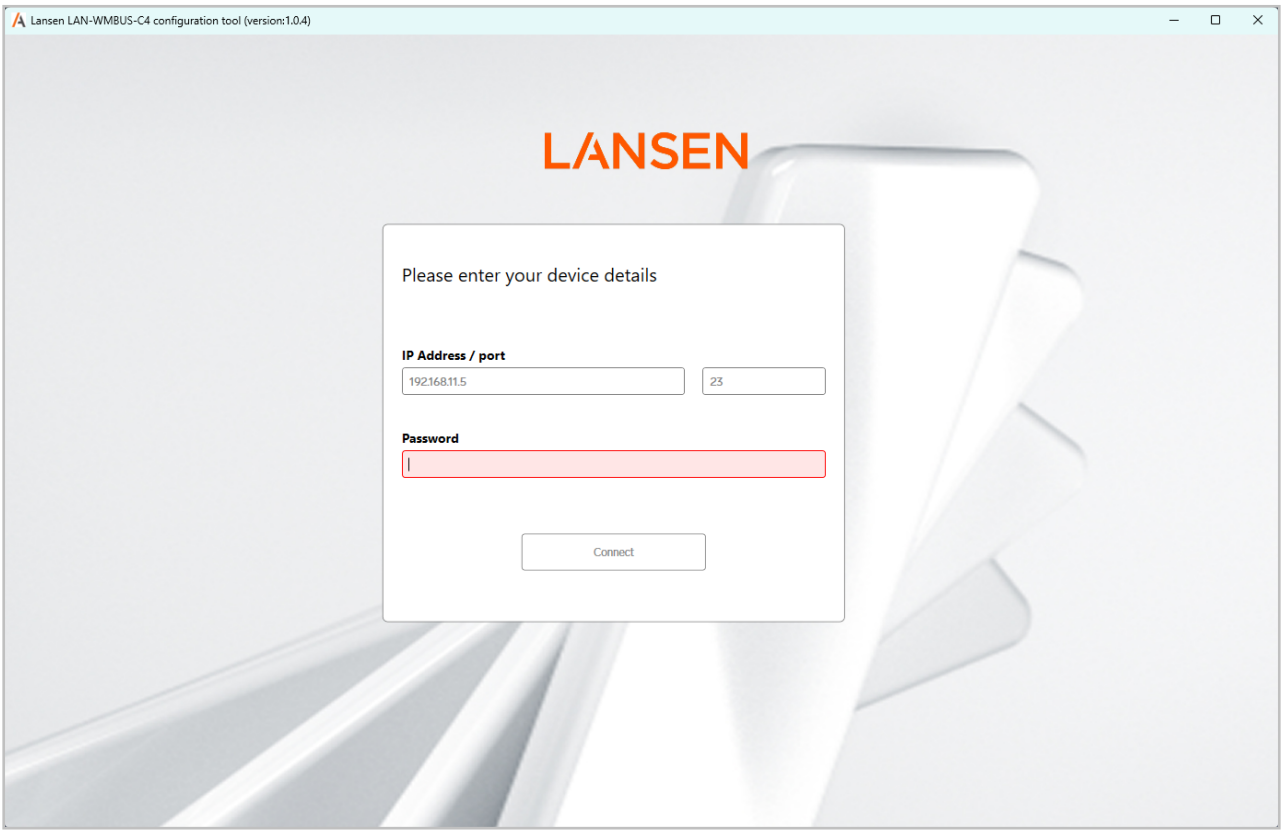


Figure 6. The C4 configuration tool start-up screen

Logging in to the device

1. Enter the IP address of the device in the **IP Address** field. The default IP address is `192.168.11.5`.
2. Enter the port number in the **Port** field. The default port is `23`.
3. Enter the password in the **Password** field. The default password is found on lansenonline.com.
4. Click **[Connect]**.
   After a successful login, the sensor view opens.

Sensor view

The sensor view is the main interface of the configuration tool. It displays all sensors added to the Concentrator 4. The list is empty at startup. It is populated after you perform an automatic search or add a sensor manually.

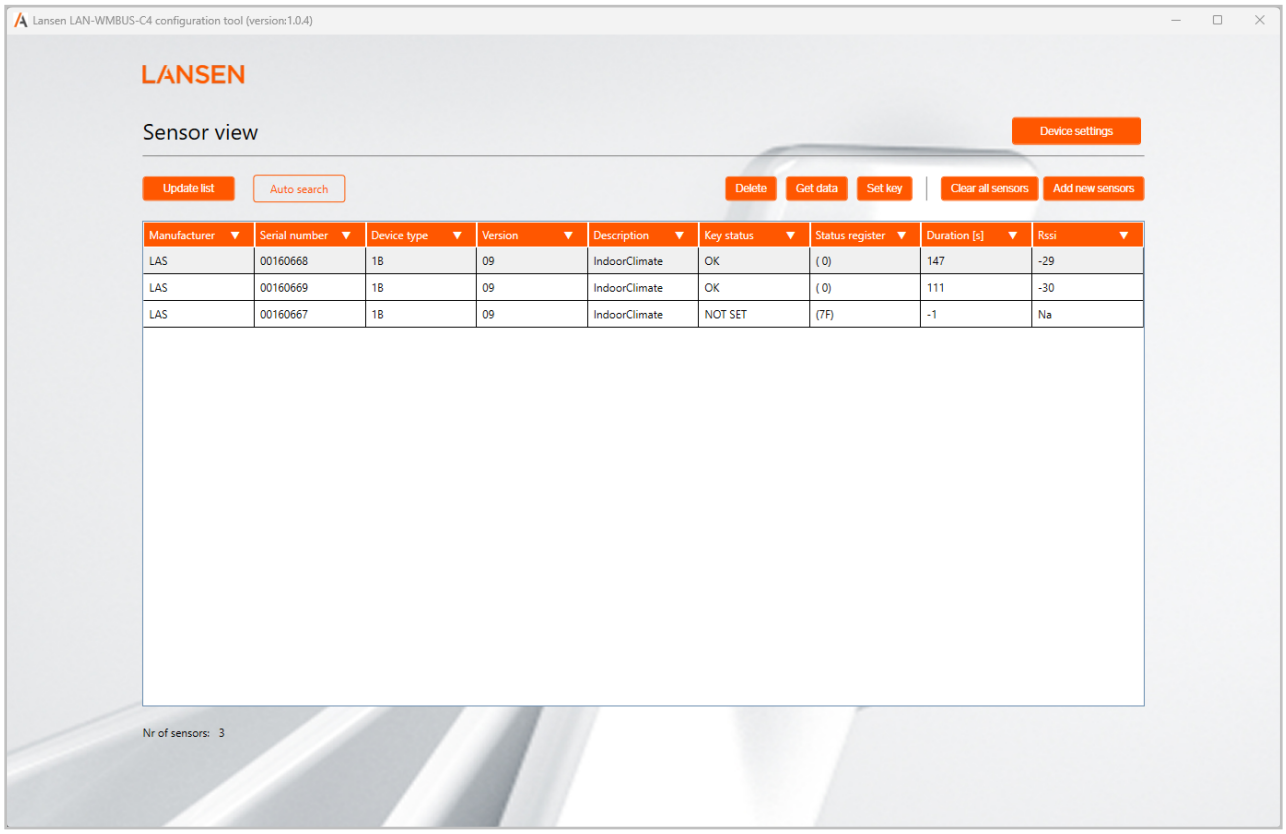


Figure 7. The sensor view displaying active sensors.

Using the sensor list

Sort the list Click a column header to sort the sensors by that parameter.

Select a sensor Click the row containing the sensor. The selected sensor is highlighted in blue.

Parameter reference

Key status The state of the AES encryption keys used to decrypt M-Bus packets.

- **OK** The key is set and verified, or no encryption is required.
- **SET** The key is saved, but the device has not yet received data to verify it.
- **NOT SET** No key is provided, and no data has been received.
- **KEY WRONG** The key is incorrect or missing for an encrypted signal.

Status register The error code for the **Key status**, displayed in hexadecimal format.

Duration The time elapsed since the Concentrator 4 last received a packet from the sensor.

RSSI (dBm) The *Received Signal Strength Indicator* showing radio signal power in dBm. A value closer to 0 shows a stronger signal.

RSSI measures signal power, not signal quality. A signal that is too strong can saturate the receiver and cause data errors. Maintain a distance of at least 1 m between the sensor and the Concentrator 4.

Managing sensors

Use the functions in the sensor view to add and delete sensors, retrieve stored data, or assign encryption keys.

Figure 8. The sensor view menu.

Adding sensors

Use this menu to add sensors to the Concentrator 4 by scanning, manual entry, or CSV upload.

Automatic scan

Use automatic scan to detect all sensors within radio range.

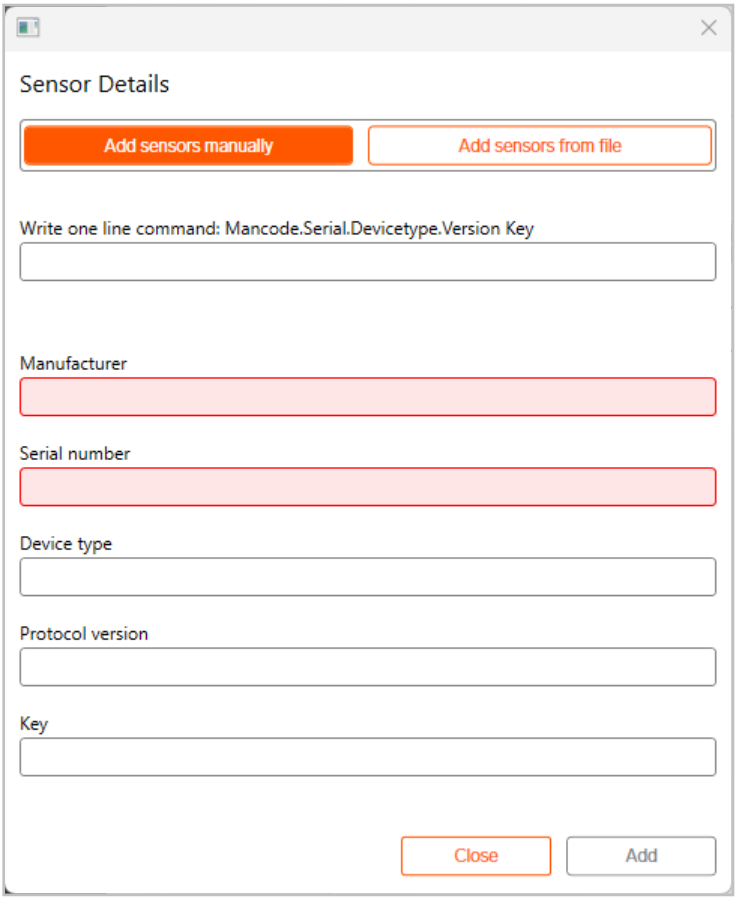
1. Click **[Auto search]** to start the scan.
   The **[Auto search]** will turn orange to indicate that the scan is running in the background.
2. Click **[Update list]** at any time to view the found sensors.
3. Click **[Auto search]** to stop the scan.

Encryption keys must be added manually after scanning. See Assign encryption keys.

Manual entry

Use manual entry to add a small number of sensors when you know their IDs.

1. Click **[Add new sensors]**.
   The *Sensor Details* dialog opens.



2. Select the **Add sensors manually** tab.
3. Enter the sensor information. *Manufacturer* and *Serial number* are required.

Manufacturer	The manufacturer code (e.g., `LAS`).
Serial number	The unique serial number (e.g., `00160668`).
Device type	The device type identification (e.g., `1B`).
Version	The version identification (e.g., `09`).
Key	The 128-bit AES encryption key.

4. Click **[Add]**.
   The program will exit to the sensor view.
5. Click **[Update list]** to view the added sensors.

Batch upload

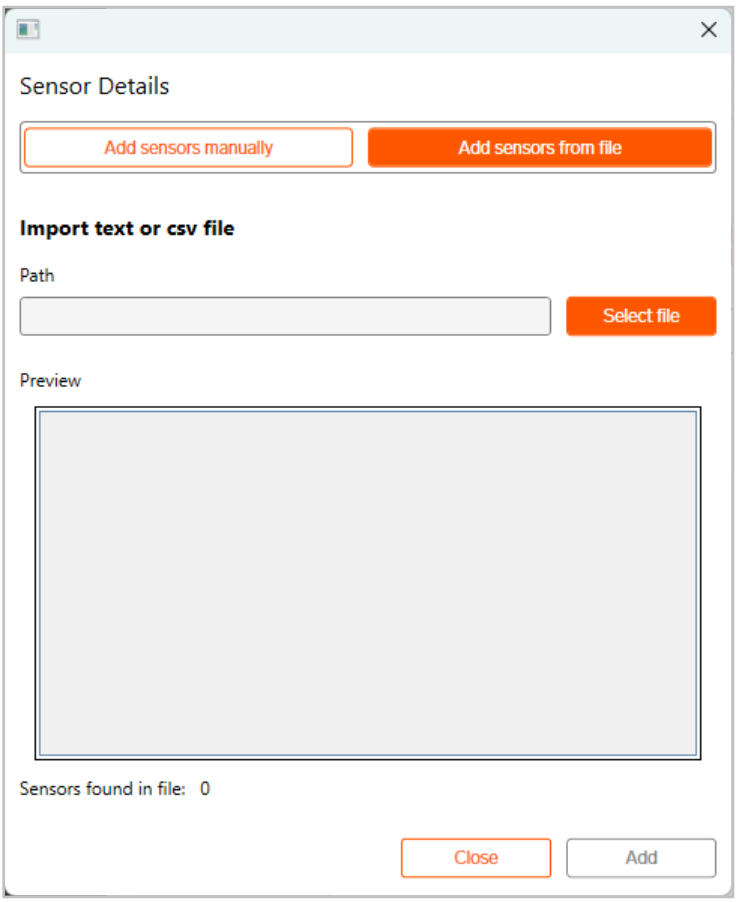
Use batch upload to add many sensors at once from a prepared CSV file.

The CSV file must contain the following headers on the first row:

```
SerialNumber;Encryptionkey
```

Files with incorrect headers cannot be uploaded.

1. Click **[Add new sensors]**.



The *Sensor Details* dialog opens

2. Select the **Add sensors from file** tab.
3. Click **[Select file]** and choose your file.
4. Click **[Add]**.
   The program will exit to the sensor view.
5. Click **[Update list]** to view the added sensors.

Delete a sensor

Remove the selected sensor from the Concentrator 4 configuration.

Click **[Delete]**.

Clear all sensors

Remove all sensors from the device.

Click **[Clear all sensors]**.

Get sensor data

Update the tool with the latest information stored on the selected sensor.

Click **[Get data]**.

Assign encryption keys

Assign an AES encryption key to enable decryption of M-Bus packets from the selected sensor.

1. Click **[Set key]**.
2. Enter the key in the **Key** field.
3. Click **[Add]**.

Device settings

The *Device Settings* menu lets you configure network communication, manage security, and perform system maintenance.

Configure device settings

1. Click **[Device Settings]** to open the settings menu.

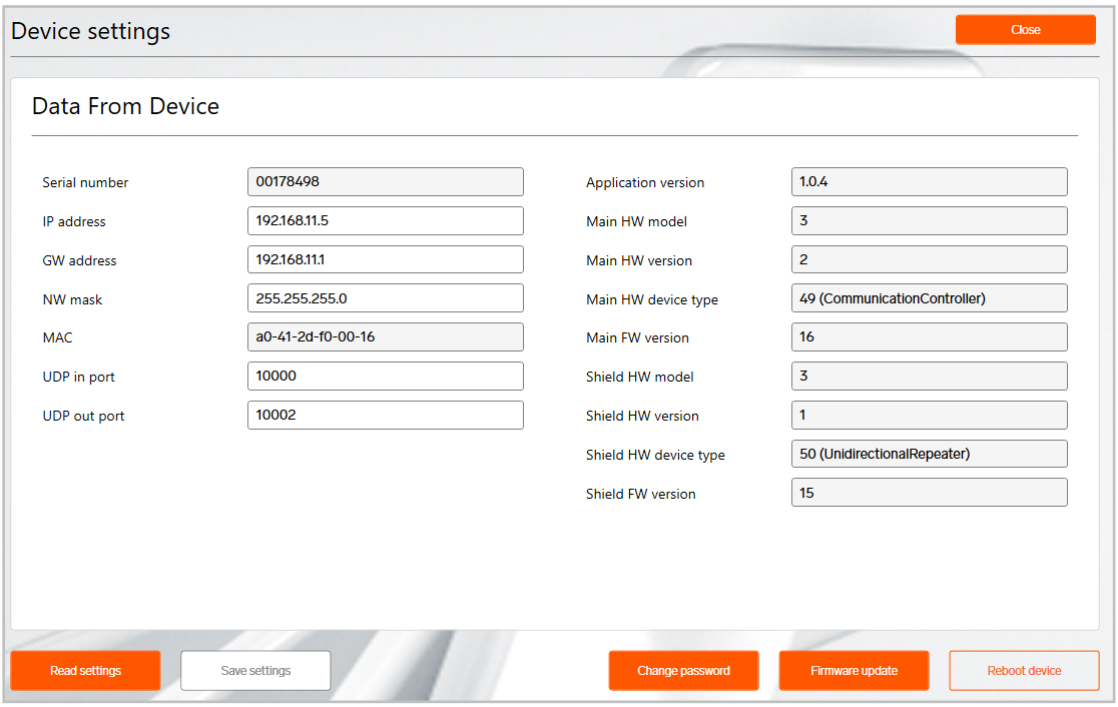


Figure 9. The device settings dialog box. Grayed-out fields are read-only.

2. Enter the required values for the IP address, gateway address, network mask, or UDP ports.
3. Use the buttons at the bottom of the page to change the password, reboot the device, or update the firmware.
4. Click **[Save settings]** to apply the changes.

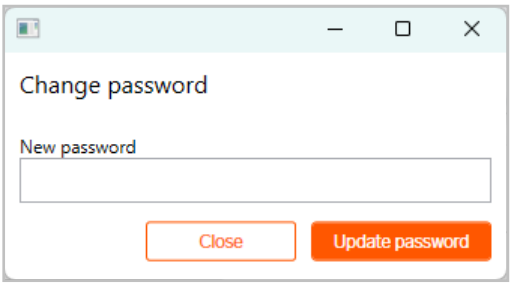
Configuration parameters

Serial number	Unique identifier of the device (read-only).
IP address	The Internet Protocol address of the device. Default: `192.168.11.5`.
GW address	The gateway address for the local network.
NW mask	The network mask used to define the sub-network.
MAC	The Media Access Control address (read-only).

UDP in port	The port used for incoming UDP traffic.
UDP out port	The port used for outgoing UDP traffic.
Application version	The version of the Lansen Config Tool (read-only).
Main HW model	The model number of the Concentrator 4 hardware (read-only).
Main HW version	The version of the Concentrator 4 hardware (read-only).
Main HW device type	The device type identification for the hardware (read-only).
Main FW version	The version of the installed firmware (read-only).
Shield HW model	The model number of the shield (read-only).
Shield HW version	The version of the shield hardware (read-only).
Shield HW device type	The type of shield hardware (read-only).
Shield FW version	The version of the shield firmware (read-only).

Change password

1. Click **[Change password]**.
   The change password dialog opens.

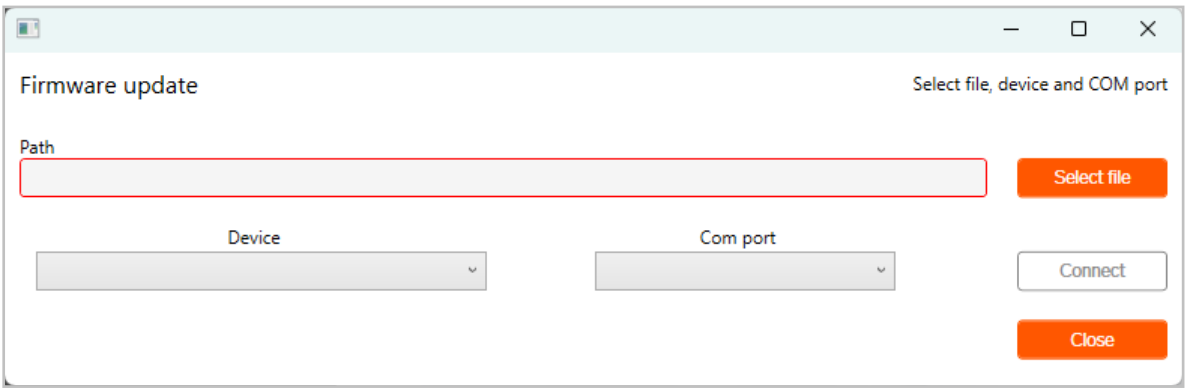


2. Enter the new password in the **New password** field.
3. Click **[Update password]**, or press `Enter`.

Firmware update

Use the firmware update function to load new firmware into the device. A Lansen-CF-Cable is required.

1. Click **[Firmware update]**.
   A new window opens.



2. Click **[Select file]** and select the firmware file in the file selection dialog.
3. Click the **Device** dropdown menu. Select the component you are updating; **LAN-WMBUS-C4-MainBoard** or **LAN-WMBUS-C4-Shield**.
4. Select the correct COM port in the dropdown menu.

If you are not sure which COM port belongs to the CF-Cable, disconnect the cable to see which port disappears, then reconnect it.

5. Click **[Connect]** to start the update.
   The progress bar in the upper-right corner shows the update status.
6. Keep the CF-Cable connected until the update is complete.

After a successful update, restart the device by power cycling it.

Reboot the device

Use the reboot function to restart the device.

1. Click **[Reboot device]**.
   A confirmation prompt opens.
2. Click **[Confirm]** to reboot the device, or click **[Cancel]** to stop the action.

The configuration tool becomes unresponsive for a short time while the device reboots.

Command-line configuration

You can configure the Concentrator 4 through a command-line interface (CLI) over the Telnet protocol. Use a terminal program such as PuTTY that supports *local line editing* (line-mode input).

All commands accept both upper-case and lower-case letters.

Connecting via Telnet using PuTTY

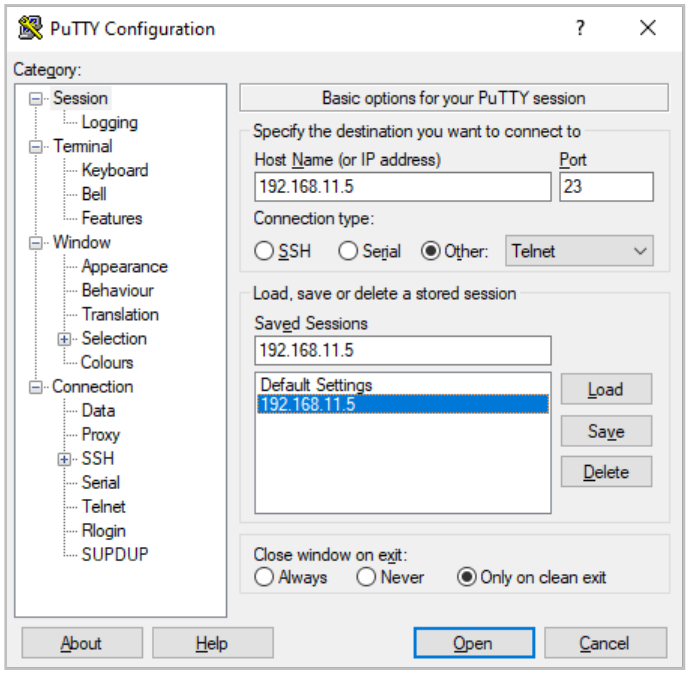


Figure 10. The PuTTY configuration screen.

1. In the **Host Name (or IP address)** field, enter the IP-address of the Concentrator 4 (default: `192.168.11.5`).
2. In the **Port** field, enter the Telnet port of the Concentrator 4 (default: `23`).
3. Select the **Other** radio-button, and select **Telnet** from the drop-down list.
4. Click **[Open]** to connect to the Concentrator 4

Getting help

To get a list of available commands enter the command:

```
> h
```

Command output from the `h` command

```
Device password for 00178498 is required!
Enter password: 1234

Device number LAS.00178498

LAN                HW Model 3     HW Version 2     SW Version 1     DeviceType 49
SVN Version 14
```

```
                    HW Model 3     HW Version 1     SW Version 1     DeviceType 50
SVN Version 15

HELP MENU
- SET IP <IP>
- SET GW <IP>
- GET IP
- GET GW
- SET IN PORT <PORT>
- SET OUT PORT <PORT>
- GET OUT PORT
- SET MASK <MASK>
- GET MASK
- SET MAC
- GET MAC
- ADD SENSOR <SANCODE> <SERIAL NUMBER> <DEVICE TYPE> <PROTOCOL VERSION> <KEY>
- LIST SENSOR <SERIAL NUMBER> <DEVICE TYPE> <PROTOCOL VERSION>
- LIST SENSORS
- NUMBER OF SENSORS
- CLEAR ALL SENSORS
- DELETE SENSOR <SANCODE> <SERIAL NUMBER> <DEVICE TYPE> <PROTOCOL VERSION>
- SET AUTO <Y/N>
- GET CONFIG
- SAVE SETTINGS*
- REBOOT
- SET PASSWORD <PASSWORD>
- LOGOUT

*Saving of new settings causes an immediate reset and must be validated within 2
minutes.
If not validated, the original settings will be restored.
```

For network configuration through Windows, see *Setting up your network IP*. For sensor management through the GUI, see Sensor view. For device settings through the GUI, see Device settings.

All commands in this chapter use example values for IP addresses, ports, sensor IDs, keys, and MAC addresses. Replace all example values with the values that apply to your installation.

Command structure: get and set

The CLI uses two primary command types:

set Use `set` commands to assign or change a configuration value.

get Use `get` commands to show the current value of a configuration parameter.

Examples

```
> set ip 192.168.11.5
> get ip
```

```
192.168.11.5
```

Most `set` commands apply changes immediately. Changes to *IP address*, *gateway*, or *netmask* *require* confirmation with `save settings`.

Command reference table

The following table lists all available CLI commands and their purpose.

Command	Description
`set ip <IP>`	Set the device IP address. Requires `save settings`.
`set gw <IP>`	Set the gateway address. Requires `save settings`.
`set mask <MASK>`	Set the netmask. Requires `save settings`.
`get ip`	Show the current IP address.
`get gw`	Show the current gateway.
`get mask`	Show the current netmask.
`set in port <PORT>`	Set the input UDP port. Applies immediately.
`set out port <PORT>`	Set the output UDP port. Applies immediately.
`get in port`	Show the input port.
`get out port`	Show the output port.
`set mac`	Reserved for service use.
`get mac`	Show the MAC address.
`add sensor <···>`	Add a sensor manually.
`list sensor <···>`	Show detailed information for one sensor.
`list sensors`	Show all sensors added to the device.
`number of sensors`	Show the number of installed sensors.
`delete sensor <···>`	Remove a specific sensor.
`clear all sensors`	Remove all sensors.
`set auto <y/n>`	Enable or disable automatic sensor detection.
`get config`	Show all network-related configuration values.
`set passwd <PASSWORD>`	Change the device password.
`save settings`	Apply IP/GW/MASK changes and restart.
`reboot`	Restart the device.
`logout`	Log out from the CLI.

Change the device password

Change the default password to secure access to the device.

1. Enter the command:

```
> set passwd 123456
```

2. Verify that the device confirms the change:

```
Password changed successfully to [123456]
```

Configure network parameters

Set the IP address, gateway, and netmask so the device can communicate on your network.

The IP address, gateway, and netmask shown in the examples are sample values. Enter the values that apply to your installation.

1. Enter the required commands:

```
> set ip 192.168.11.5
> set gw 192.168.11.1
> set mask 255.255.255.0
```

2. Save the new settings:

```
> save settings
```

3. Reconnect within 2 minutes using the new IP address.

If you do not connect within 2 minutes, the previous IP address, gateway and netmask are restored.

Show network parameters

Verify the currently configured IP address, gateway, and netmask.

1. Enter the commands:

   Example input and output

```
> get ip
192.168.11.5
> get gw
192.168.11.1
> get mask
255.255.255.0
```

   All commands reply with the current value.

Configure communication ports

Change the UDP ports used for incoming and outgoing data.

1. Enter the required commands:

```
> set in port 12000
> set out port 12002
```

2. Continue working. These changes apply immediately and do not require `save settings`.

Show communication ports

Verify the currently configured input and output ports.

1. Enter the command:

   Example input and output

```
> get in port
10000
> get out port
10002
```

   All commands reply with the current value.

Show the MAC address

Identify the device on the network or verify hardware information.

1. Enter the command:

   Example input and output

```
> get mac
a0-41-2d-f0-00-16
```

   The command replies with the current MAC address.

Show full configuration

Review all network-related configuration values in one output.

1. Enter the command:

   Example input and output

```
> get config
IP: 192.168.11.5
IN PORT: 10000
```

```
OUT PORT: 10002
NETMASK: 255.255.255.0
GW: 192.168.11.1
MAC: a0-41-2d-f0-00-16
TCP PORT: 0
```

Save pending network changes

Apply changes to IP address, gateway, or netmask.

1. Enter the command:

```
> save settings
```

2. Reconnect within 2 minutes. If you do not reconnect, the device restores the previous configuration.

Reboot the device

Restart the device after configuration changes or troubleshooting.

1. Enter the command:

```
> reboot
```

2. Wait for the device to restart and reconnect.

Log out from the CLI

End the current CLI session.

1. Enter the command:

```
> logout
```

Add a sensor

Add a sensor manually when automatic detection is disabled or when encryption keys are required.

1. Collect the required values:
   - Manufacturer code
   - Serial number
   - Device type (hex)
   - Protocol version (hex)
   - AES key
2. Enter the command:

a. If using standard format, enter:

```
> add sensor las 00160668 1b 09 0CD9FB72C55943F1EFFFFFC896479023
```

a. If using QR-code format, enter:

```
> add sensor LAS.00160668.1B.09 0CD9FB72C55943F1EFFFFFC896479023
```

Show detailed information for one sensor

Inspect a specific sensor to verify communication, key status, or signal strength.

1. Enter the command:

```
> list sensor las 00160668 1b 09
```

2. Review the output, including:
   - Key status
   - Status register
   - Duration since last packet
   - RSSI
   - Raw data

If the sensor has a unique serial number and manufacturer, you can enter:

```
> list sensor <serial number>
```

List all sensors

Verify which sensors are currently stored in the device.

1. Enter the command:

```
> list sensors
```

2. Review the overview of:
   - Key status
   - Status register
   - Duration
   - RSSI

Show the number of installed sensors

Confirm how many sensors are stored in the device, especially after bulk additions.

1. Enter the command:

```
> number of sensors
```

Remove all sensors

Clear the device before re-commissioning or redeployment.

1. Enter the command:

```
> clear all sensors
```

This action cannot be undone. All sensors must be added again after clearing.

Remove a specific sensor

Delete a sensor when replacing a meter or correcting an incorrect entry.

1. Enter the command:

```
> delete sensor las 00160668 1b 09
```

Enable or disable automatic sensor detection

Control whether the device automatically detects nearby sensors.

1. Enter one of the following commands:

```
> set auto y
> set auto n
```

Appendix A: PLC Communication for MBUS Data Retrieval

This chapter describes how a PLC requests MBUS data from the Concentrator 4. It shows the message flow and the MBUS IP/UDP data format used in the response

Example 1. MBUS data request

- PLC → Select using secondary address:

  ```
  68 0B 0B 68 53 FD 52 55 51 09 00 33 30 FF FF XX 16
  ```

- Concentrator 4 → NACK:

  ```
  FF
  ```

- Concentrator 4 → ACK:

  ```
  E5
  ```

- PLC → Request data:

  ```
  10 7B FD 78 16
  ```

- Concentrator 4 → Data response:

  ```
  68 45 45 68 08 FD 72 67 64 04 00 33 30 09 1B CA 00 00 20 0C 78 63 02 16 00 03 74 59 00 00
  01 FD 71 D0 01 FD 17 00 81 40 FD 17 00 02 65 C8 08 42 65 CA 08 82 01 65 B5 08 01 FB 1B 10
  41 FB 1B 10 81 01 FB 1B 13 02 23 B4 01 17 16
  ```

Table 4. MBUS IP/UDP Data format

DR	Description	Hex Value	Interpreted Value
0	MBUS header with meter serial	`72 67 64 04 00 33 30 09 1B CA 00 00 20`	LAS.00046467.09:1B
1	C4 fabrication number	`0C 78 63 02 16 00`	00160263
2	Age of message (seconds)	`03 74 59 00 00`	89 seconds
3	RSSI	`01 FD 71 D0`	-48 dBm
4	Sensor status byte (error flags)	`01 FD 17 00`	
5	GW information flags (error flags)	`81 40 FD 17 00`	`0x01` = encryption key is not set `0x02` = data was received, not encrypted `0x04` = no data received yet `0x08` = data could not be decrypted, wrong encryption key `0x10` = not supported WMBUS header `0x20` = not supported encryption mode `0x40` = too long WMBUS packet
6	Data copied from sensor DR1	`02 65 C8 08`	22.48 °C
7	DR2	`42 65 CA 08`	22.50 °C

DR	Description	Hex Value	Interpreted Value
8	DR3	`82 01 65 B5 08`	22.29 °C
9	DR4	`01 FB 1B 10`	16%
etc	...	...	...

Glossary

AES128

A symmetric encryption standard used to secure configuration and communication.

ALA

Application Layer Access. A field in the wM-Bus header used to select specific functions or data within the meter's application layer, often used in conjunction with a single meter address.

C-mode

A wM-Bus mode specifically designed for battery-operated devices that need to send short bursts of data frequently. It allows the meter's receiver to be active for short periods.

COM-port

A serial communication interface on a computer, often used for connecting peripheral devices.

CSV

A file format that stores tabular data (numbers and text) in plain-text form. Each line of the file is a data record, and each record consists of fields separated by commas. It is often used for importing and exporting data between different spreadsheet programs or databases.

Diversity antenna

A system that uses two or more antennas and a radio receiver to simultaneously receive a signal. The purpose is to automatically select the best signal path, thereby reducing the effect of signal fading and *multipath issues* to achieve a more reliable connection.

ENAPI Data

The configuration data structure sent to the Concentrator 4, often encrypted.

PLC

Programmable Logic Controller. A control device that runs simple logic programs. A PLC reads inputs, processes logic, and controls outputs in machines, building systems, or automation equipment.

LLA

Link Layer Access. A field in the wM-Bus header that identifies the meter's address and is typically used by the Concentrator 4 to filter or route messages.

Multipath issue

A phenomenon in wireless communication where the radio signal travels from the transmitter to the receiver along two or more different paths. This occurs when the signal reflects off surfaces (such as walls or obstacles), leading to delayed, distorted, or faded signals, which a *diversity antenna* system is designed to correct.

OMS (Open Metering System)

A standardized specification that ensures interoperability between different manufacturers' metering devices.

PCB

Abbreviation for *Printed Circuit Board*. A board used to mechanically support and electrically connect electronic components using conductive tracks, pads, and other features.

QoS (Quality of Service)

A setting in MQTT that defines message delivery guarantees.

RSSI

Abbreviation for *Received Signal Strength Indicator*. A measurement of the power present in a received radio signal.

Shield

A shield is an expansion board that plugs into a main board to add specific functions or interfaces. It extends the hardware capabilities of the base system without modifying the main board.

S-mode

A wM-Bus mode where meters transmit data less frequently (e.g., daily or weekly). This mode is optimized for stationary installations where energy saving is a priority.

SMA-connector

Abbreviation for *SubMiniature Version A connector*. A common coaxial RF (Radio Frequency) connector type used to securely attach external antennas for wM-Bus or cellular communication.

T-mode

A wM-Bus mode where meters transmit data more frequently (e.g., every few seconds to minutes). This mode is used for high-frequency data collection and testing.

TCP/IP

A set of networking protocols that handle transmission and acknowledgment of data over the internet.

USB-C

A type of USB connector used for communication and configuration of Lansen devices.

wM-Bus (Wireless M-Bus)

A wireless communication protocol used primarily for meter data transmission.

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