

# **WM-E8S®** **smart metering modem**

## **User Manual**



---

Rev: 1.30

2022-11-28

## Document specifications

This document was completed for the **WM-E8S®** modem device and contains the details of installation, configuration for usage of the device.

<b>Document category:</b>	User Manual
<b>Document subject:</b>	WM-E8S®
<b>Author:</b>	WM Systems LLC
<b>Document version No.:</b>	REV 1.30
<b>Number of pages:</b>	18
<b>Hardware Identifier No.:</b>	WM-E8S v1.x / v2.x / v3.x
<b>Firmware version:</b>	v5.0.82
<b>WM-E Term configuration software version:</b>	v1.3.71
<b>Document status:</b>	Final
<b>Last modified:</b>	28 November, 2022
<b>Approval date:</b>	28 November, 2022

# Chapter 1. Technical data

## 1.1 Power voltage / Current ratings

- **Power Voltage / Ratings:** ~85..300VAC (47-63Hz) / 100..385VDC
- **Current:** Stand-by: 20mA @ 85VAC, 16mA @ 300VAC / Average: 25mA @ 85VAC, 19mA @ 300VAC
- **Consumption:** Average: 1W @ 85VAC / 3.85W @ 300VAC

## 1.2 Cellular module(s)

- **Cellular modules (order options)**
  - **SIMCom A7672SA**
    - LTE: B1(2100) / B2(1900) / B3(1800) / B4(1700) / B5(850) / B7(2600) / B8(900) / B28(700) / B66(1700)
    - GSM/GPRS/EDGE: B2(1900) / B3(1800) / B5(850) / B8(900)
  - **SIMCom A7676E**
    - LTE: B1(2100) / B3(1800) / B8(900) / B20(800) / B28(700) / B31(450) / B72(450)
    - GSM/GPRS/EDGE: B3(1800) / B8(900)
  - **SIMCom SIM7070E**
    - LTE Cat.M: B1(2100) / B2(1900) / B3(1800) / B4(1700) / B5(850) / B8(900) / B12(700) / B13(700) / B14(700) / B18(850) / B19(850) / B20(800) / B25(1900) / B26(850) / B27(850) / B28(700) / B31(450) / B66(1700) / B72(450) / B85(700)
    - LTE Cat.NB: B1(2100) / B2(1900) / B3(1800) / B4(1700) / B5(850) / B8(900) / B12(700) / B13(700) / B18(850) / B19(850) / B20(800) / B25(1900) / B26(850) / B28(700) / B31(450) / B66(1700) / B85(700)
    - GSM/GPRS/EDGE: B2(1900) / B3(1800) / B5(850) / B8(900)

## 1.3 Product variations

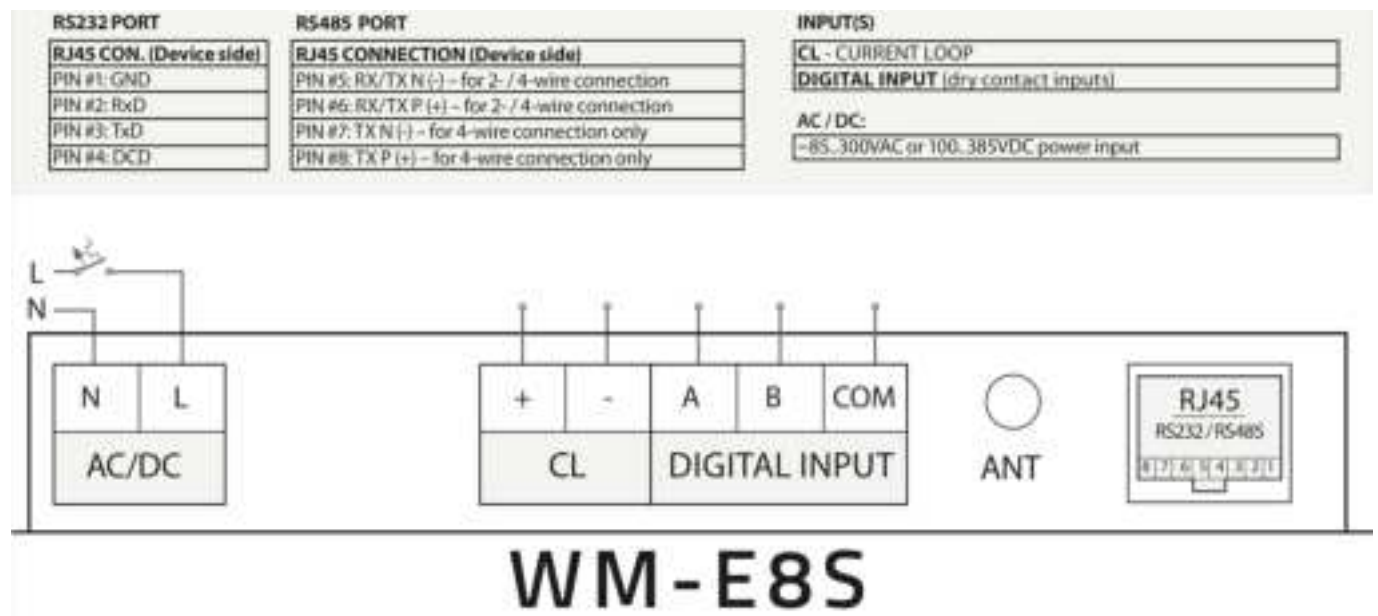
The modem can be ordered in several variations:

- without alternative RS485 (terminal block) interface, without MBus (terminal block) interface

- with alternative RS485 (2-wire, terminal block)
- with MBus (terminal block) interface, up to 4 Mbus meters/devices

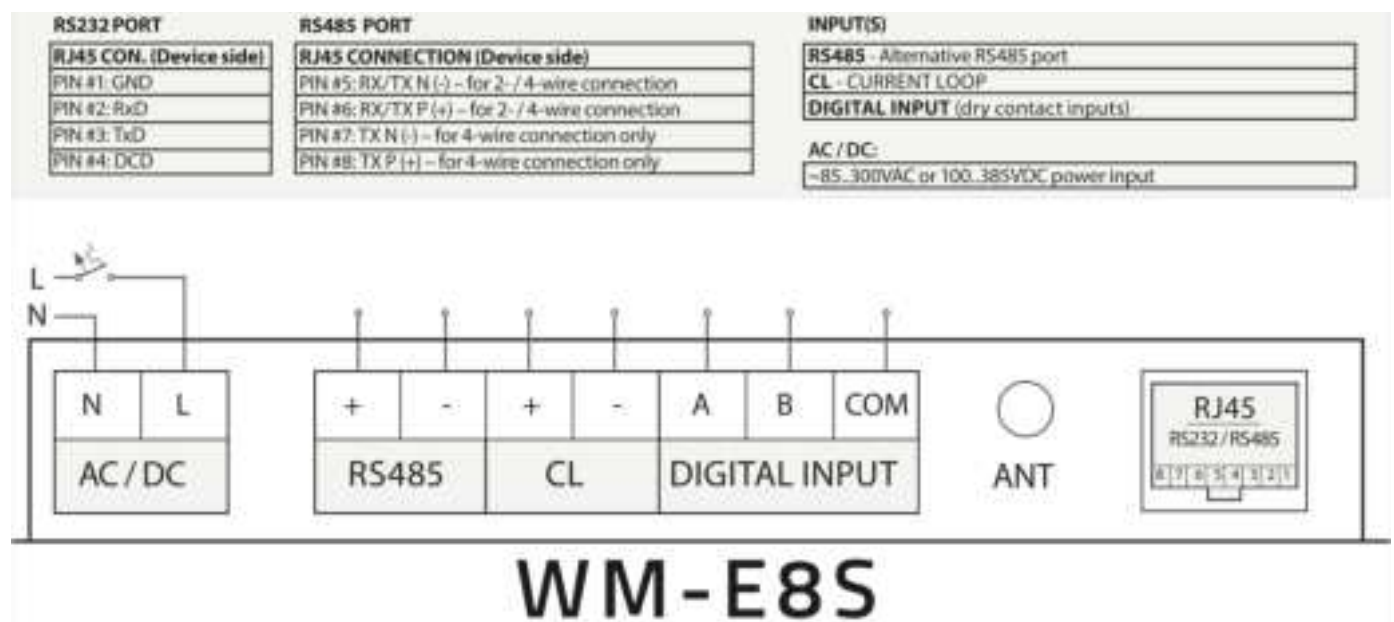
## 1.4 Power on the modem

The WM-E8S modem can be powered from ~85..300VAC / 100..385VDC power source at the N (neutric) and L (line/phase) AC connection pins (CN1 connector).



The RJ45 connector's RS485 port wiring can be ordered as 2- or 4-wired.

## 1.5 Alternative RS485 connection – order option



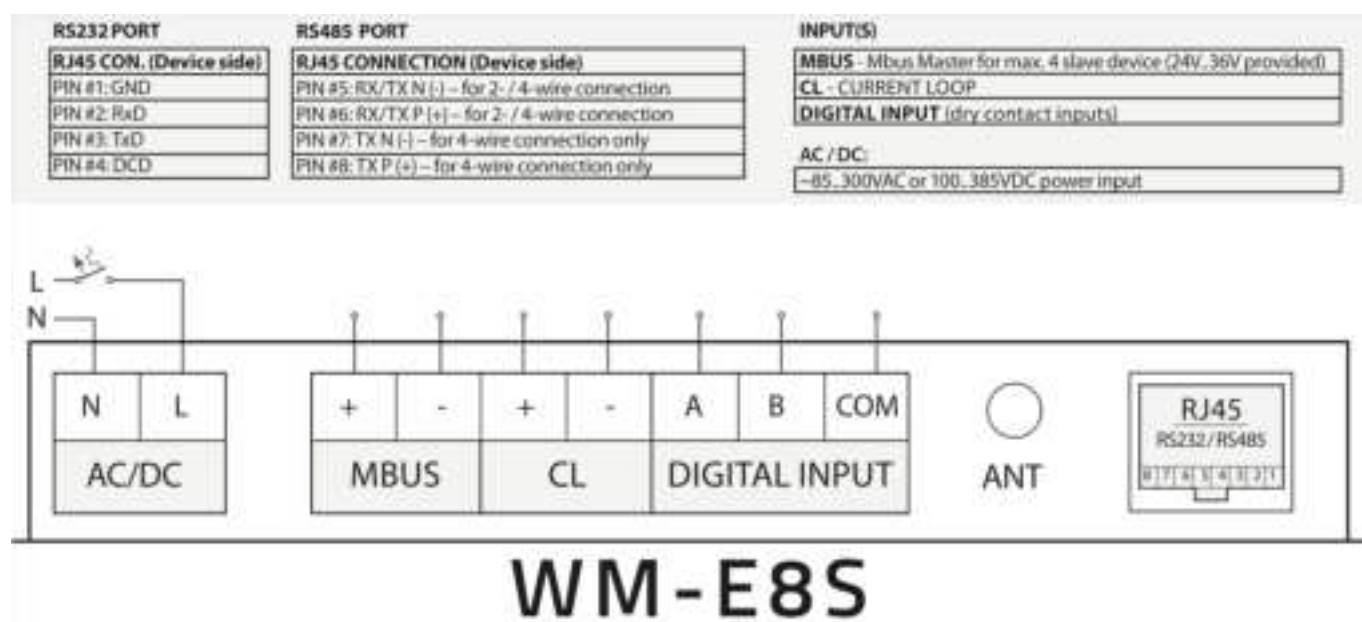
The RJ45 connector's RS485 port wiring can be ordered as 2- or 4-wired.

The alternative RS485 connector has 2-wires. The two RS485 interfaces (primary RS485 port and left terminal block RS485) are parallelised.

## 1.6 MBus connection - order option

The RJ45 connector's RS485 port wiring can be ordered as 2- or 4-wired.

The modem's Mbus master connection can be used for max. 4 slave devices, which can be connected to the MBus +/- pins. The modem provides 24-36V DC power for the connected Mbus devices.



## 1.7 Current loop connection

The modem current loop connection can be performed on the CL +/- connection pins.

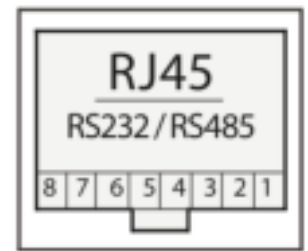
## 1.8 Digital input (DI) connection

The modem can receiver 2 digital inputs on the A, B and COM connection pins. Testing the digital inputs: short must be made between the COM and A or COM and B.

## 1.9 RS232/RS485 connection (RJ45 connector)

The modem RS232/RS485 connector is wired to the RJ45 connector.

\*The RS232 uses the pin nr. 1, 2, 3 and pin nr. 4 for DCD Control



The RS485 (for 2-wire connection) uses the pin nr. 5, 6

The RS485 (for 4-wire connection) uses the pin nr. 5, 6, 7, 8

The modem uses the TCP port nr. 9000 for the transparent communication and the port nr. 9001 for configuration. The MBus is using the TCP port nr. 9002 (speed rate should be between 300 and 115 200 baud).

\*The RS232 port can be also used for the configuration of the modem.

## 1.10 Modem configuration

The modem has a pre-installed system (firmware). The operational parameters can be configured with the WM-E Term® software (through its RJ45 connector).

The manual for the settings of the WM-E Term® software (for SIM APN configuration and force the modem into each cellular/mobile communication technology are described in the Chapter 3.4).

Further settings can be found in the software's user manual:

[https://m2mserver.com/m2m-downloads/WM-E-TERM\\_User\\_Manual\\_V1\\_93.pdf](https://m2mserver.com/m2m-downloads/WM-E-TERM_User_Manual_V1_93.pdf)

## Chapter 2. WM-E8S modem construction



*WM-E8S modem, assembled with housing and IP52 protected transparent cover*



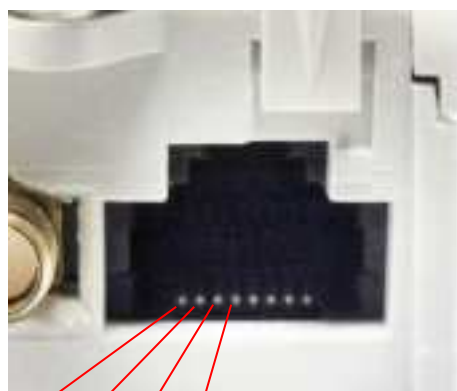
*WM-E8S modem in internal terminal enclosure – with SIM-LED board is on top*

## 2.1 Configuration cable / connection

Use the RJ45 connector for meter connection (for RS232 or RS485 connection) or serial connection (in RS232 mode) for configuration to the PC.

The pinout of the device's RJ45 port can be seen below.

### RS485 2- or 4-wire connection:



8	7	6	5
---	---	---	---

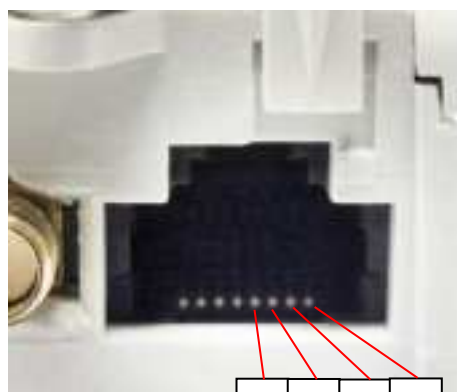
Configure the modem for RS485 meter connection – 2-wire or 4-wire mode:

PIN #5: RX/TX N (-) – for 2-wire and 4-wire connection

PIN #6: RX/TX P (+) – for 2-wire and 4-wire connection

PIN #7: TX N (-) – for 4-wire connection only

PIN #8: TX P (+) – for 4-wire connection only



4	3	2	1
---	---	---	---

### Serial RS232 connection:

PIN #1: GND

PIN #2: RxD (receiving data)

PIN #3: TxD (transmitting data)

PIN #4: DCD

Make serial connection from the modem to a PC or a meter by wiring RJ45 connector's Pin #1, Pin 2, and Pin #3 – optionally pin nr. #4.

## 2.2 Preparing to start the device

*Step #1:* In powered off status, ensure that the plastic terminal cover (marked by „I”) is placed on the device enclosure („II”) before continue.

*Step #2:* An active SIM card (2FF type) must be inserted to the modem's SIM holder. Take care to the direction of insertion (follow the hints of the next photo). The proper orientation / direction of the SIM can be seen on the product sticker.

*Step #3:* Connect the wired serial cable to the RJ45 connector (RS232) according to the pinout above.

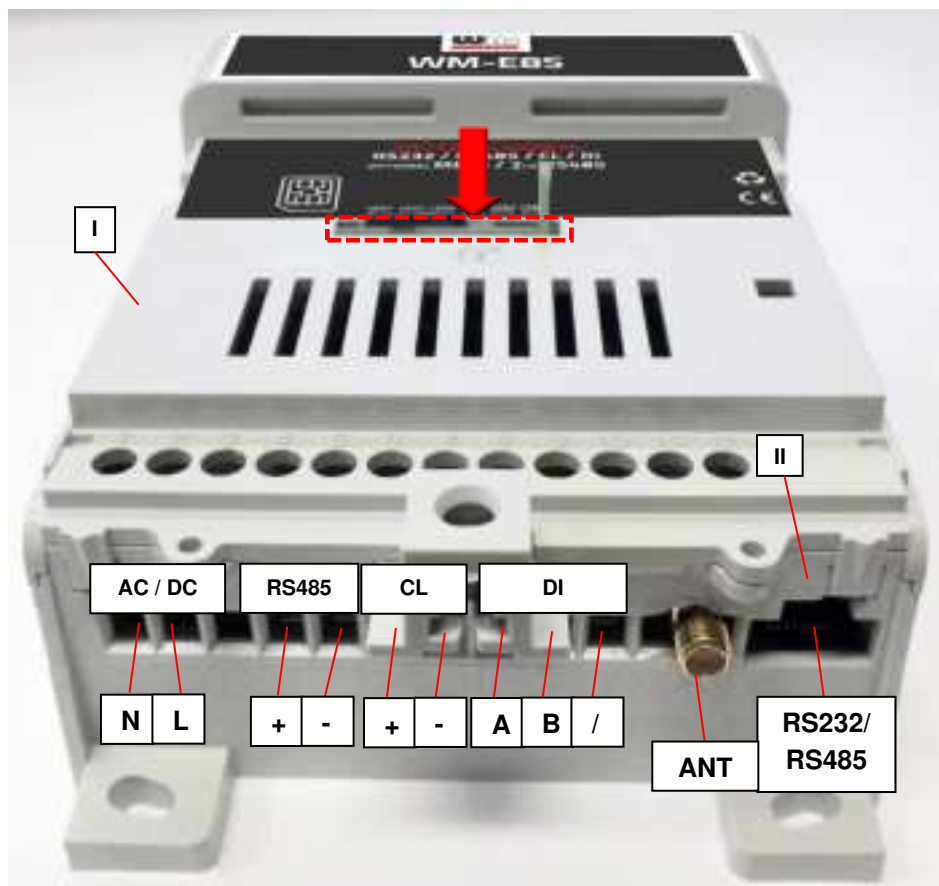


Step #4: Attach an external LTE antenna (800-2600MHz) to the SMA antenna connector.

Step #5: Add ~85-300VAC or 100-385VDC power voltage to the AC/DC titled connector and the device will starting its operation immediately.



**Caution! Please consider the following, ~85-300VAC or 100-385VDC electric shock hazard inside the enclosure! DO NOT open the enclosure and DO NOT touch the PCB or its electronical parts!**



*\* Instead of optional, alternative RS485 terminal connector shown in the picture, the modem can be ordered with an Mbus interface also.*

**AC/DC: connect ~85..300VAC or 100..385VDC power**

**/: GND of Digital inputs (DI)**

**RS485: Instead of the secondary (left terminal block) RS485 port you can order MBUS port (order option)**

## **SAFETY CAUTION!**

The IP52 immunity protection will be effective only in case of under normal usage and operation conditions with unharmed hardware conditions by using the device in the provided enclosure/chassis.

The device must be used and operated according to the related user manual. The installation can be carrying out only by a responsible, instructed and skilled person by the service team, who has enough experience and knowledge about carrying out the wiring and installing the modem device.

Its prohibited to touch or modify the wiring or the installation by the user. It is prohibited to open the device enclosure during its operation or under power connection. It is also prohibited to remove or modify the device PCB. The device and it's parts must not be changed by other items or devices. Any modification and repairation is not allowed without the permission of the manufacturer. It all causes the loss of product warranty.

## **2.3 Status LED signals**



- **LED 1:** Mobile network status (if the mobile network registration was successful, it will be flashing faster)
- **LED 2:** PIN status (if it is lighting, then PIN status is okay)
- **LED 3:** E-meter communication (only active with DLMS)
- **LED 4:** E-meter relay status (inactive) - only works with M-Bus
- **LED 5:** M-Bus status
- **LED 6:** Firmware status

## 2.4 Configuration the device

Step #1: Download the **WM-E TERM** configuration software to your computer by this link: [https://m2mserver.com/m2m-downloads/WM-ETerm\\_v1\\_3\\_71.zip](https://m2mserver.com/m2m-downloads/WM-ETerm_v1_3_71.zip)

Step #2: Unpack the .zip file into a directory and execute the **WM-ETerm.exe** file. (The Microsoft® .Net Framework v4 must be installed on your computer for the usage).



Step #3: Login to software with the following credentials:

Username: **Admin** Password: **12345678**

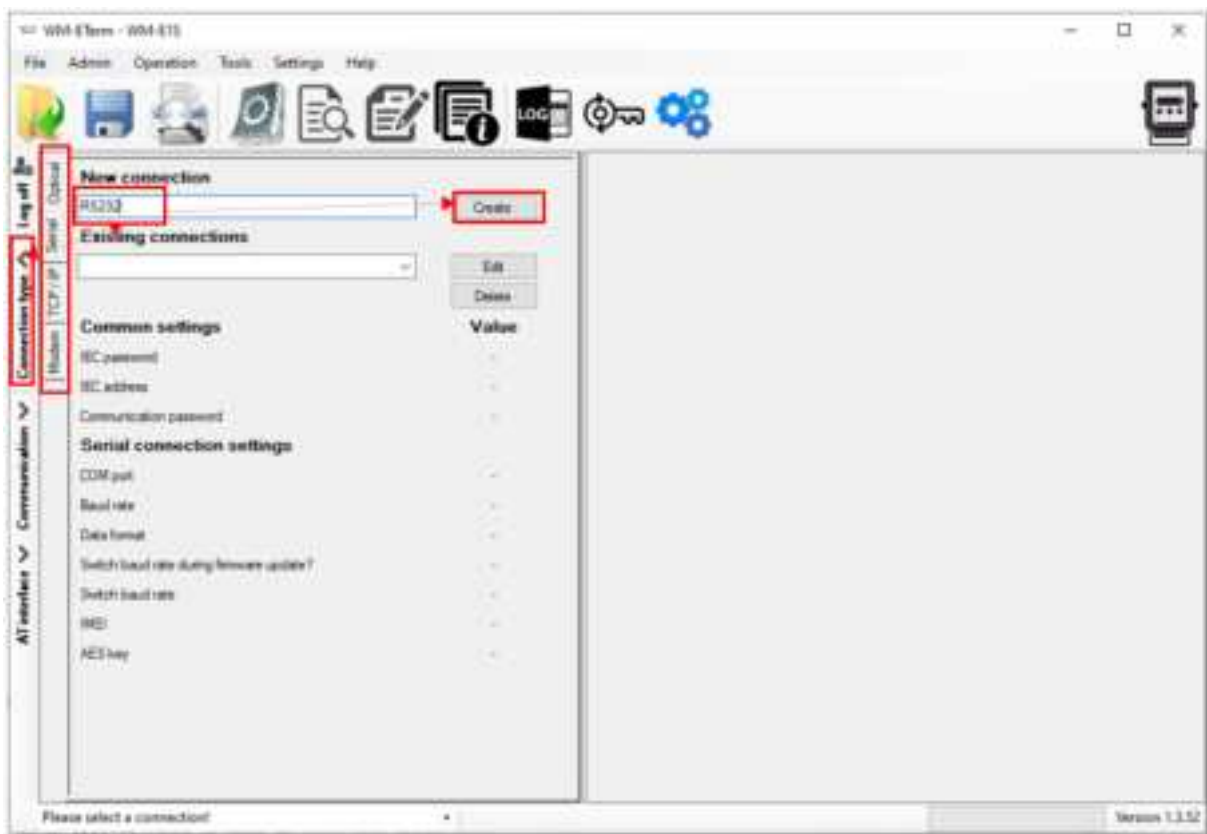
Step #4: Choose the **WM-E8S** and push to the **Select** button there.

Step #5: On the left-side of the screen, click on **Connection type** tab, choose **Serial** interface.

Step #6: Add a name for the profile at the **New connection** field and push to the **Create** button.

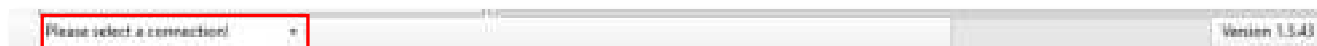
Step #7: In the next window the connection settings will appear, where you have to define the connection profile parameters.


Step #8: Add the real **COM port** of the device connection according to the available serial/USB port, the **Baud rate** should be **9 600 bps** or greater, the **Data format** should be **8,N,1**.



Step #9: Click on **Save** button to save the connection profile.


Step #10: Choose the saved connection profile at the bottom of the screen to connect to the modem before readout or configure the settings!

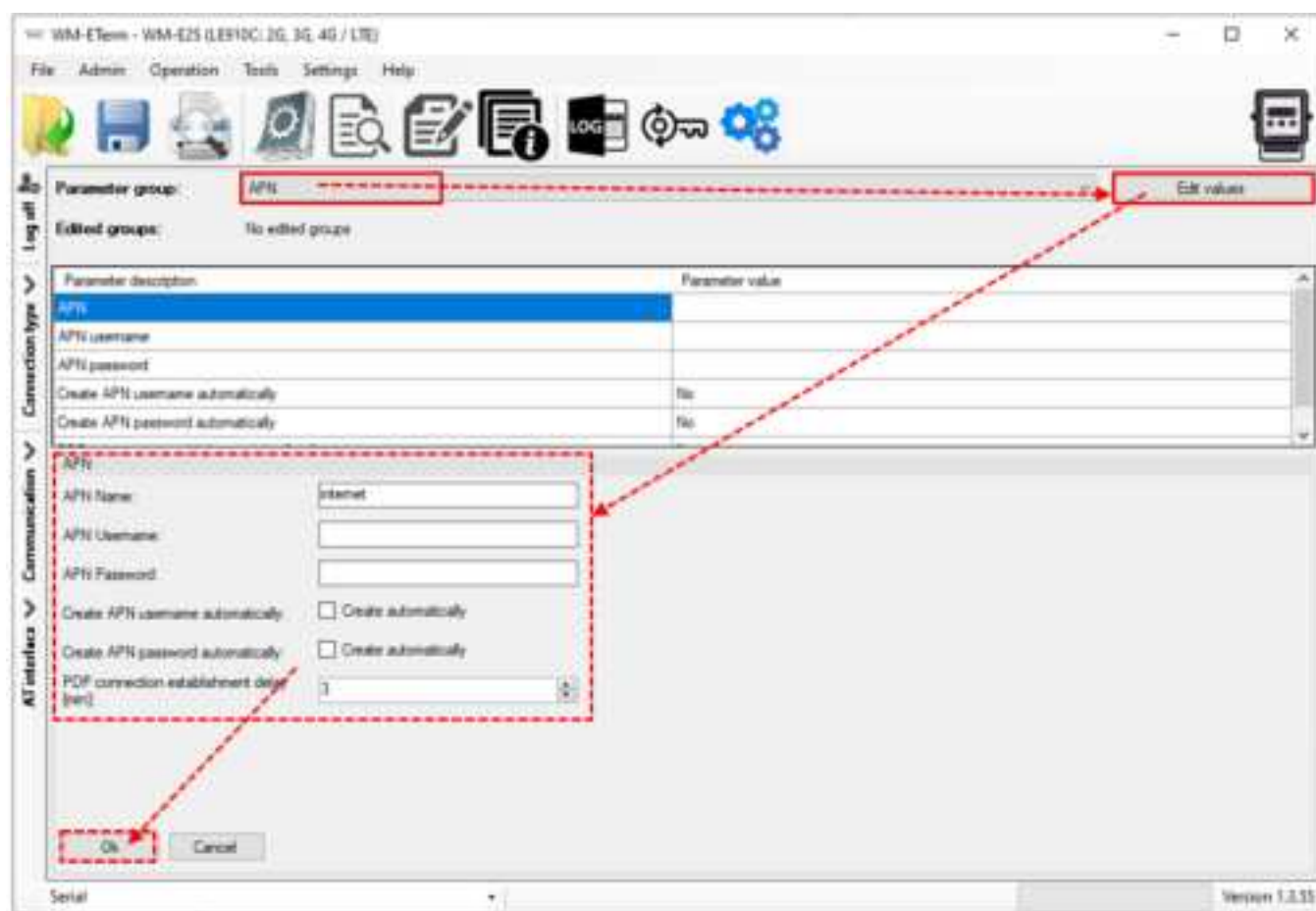


Step #11: Click on the **Parameters Read**  icon in the menu to readout the data from the modem. Then all parameter values will then be read out and visible here by selecting a parameter group. The progress will be signed by the indicator bar on the right-bottom side of the screen. At the end of the readout push to the **OK** button.

Step #12: Then select the required parameter group and push to the **Edit values** button. The editable parameters of this group will appear on the screen (bottom side).

### Main settings:

Step #1: Choose the **Parameter read**  icon to connect to readout the current settings of the modem.



Step #2: Choose the **APN** parameter group, and push the **Edit settings** button. Add the **APN server name** value, if necessary give the **APN username** and **APN password** values and push the **OK** button.

Step #3: Then choose the **M2M** parameter group, and push the **Edit settings** button. At the **Transparent (IEC) meter readout port**, give the **PORT number**, by which you try to readout the meter. Add this **PORT number** to the **Configuration and firmware download**, which you want to use for remote parameterization of the modem / for the further firmware exchange.

Step #4: If the SIM uses a *PIN* code, then choose the **Mobile network** parameter group, and add the **SIM PIN** to the field. Here you can change the **Frequency band settings** to **4G only** or **LTE to 2G** (for fallback feature), etc. You can also select here a dedicated mobile network provider (auto or manual). Then push to the **OK** button.


Step #5: For configuring the **RS232 serial port** and transparent settings, open the **Trans. / NTA** parameter group. Basic device settings are the **Multi utility mode: transparent mode**, **Meter port baud rate**: from 300 to 19 200 baud (or use the default 9600 baud), **Fixed 8N1 data format** (by checking the box at the meter). Confirm the setting with the **OK** button.

Step #6: For configuring the **RS485 parameters**,

- Open the **RS485 meter interface** parameter group. Here configure the **RS485 mode** to the right value according to the cable version you use (2-wire or the recommended **4-wire**).
- In case of using the **alternative RS485 terminal block** connector, the setting must be **2-wire!** (Otherwise it will be not working.)
- **The operation of the RJ45 port's RS485 interface and the terminal block RS485 interface are parallelised!**
- **In case of using RS232 mode only, disable the RS485 port here.**

Push the **OK** button.

Step #7 (optional): If you have ordered the device with **Mbus** interface, for the settings of the transparent Mbus port, choose the **Secondary transparent** parameter group and set the **Secondary transparent mode** to value **8E1**.

Step #8: When you have finished, choose the **Parameter write**  icon to send the changed settings to the modem. The status of the configuration process can be seen at the bottom of the screen. At the end of the upload, the modem will be restarted and operating according to the new settings.

#### Further optional settings:

- To refine the modem handling choose the **Watchdog** parameter group.
- Save the current last good configuration at the **File/Save** menu item. Later you can distribute this setting (file) to another modem device by one click.
- Firmware refresh: choose the **Devices** menu, **Single Firmware refresh** item by choosing the appropriate firmware file (with .dwl file extension).

*Attention! Ask our sales about the available newest firmware!*

## 2.5 Connecting to a meter


After the successful configuration, disconnect the RS232 cable from your PC and use an RS232 cable or a RS485 cable (2-wire or 4-wire) from the RJ45 port to the meter – which has the primary RS485 port also.

Optionally you can also use the secondary RS485 port (of the terminal block).

Any further settings can be performed by hints of the WM-E Term User Manual:

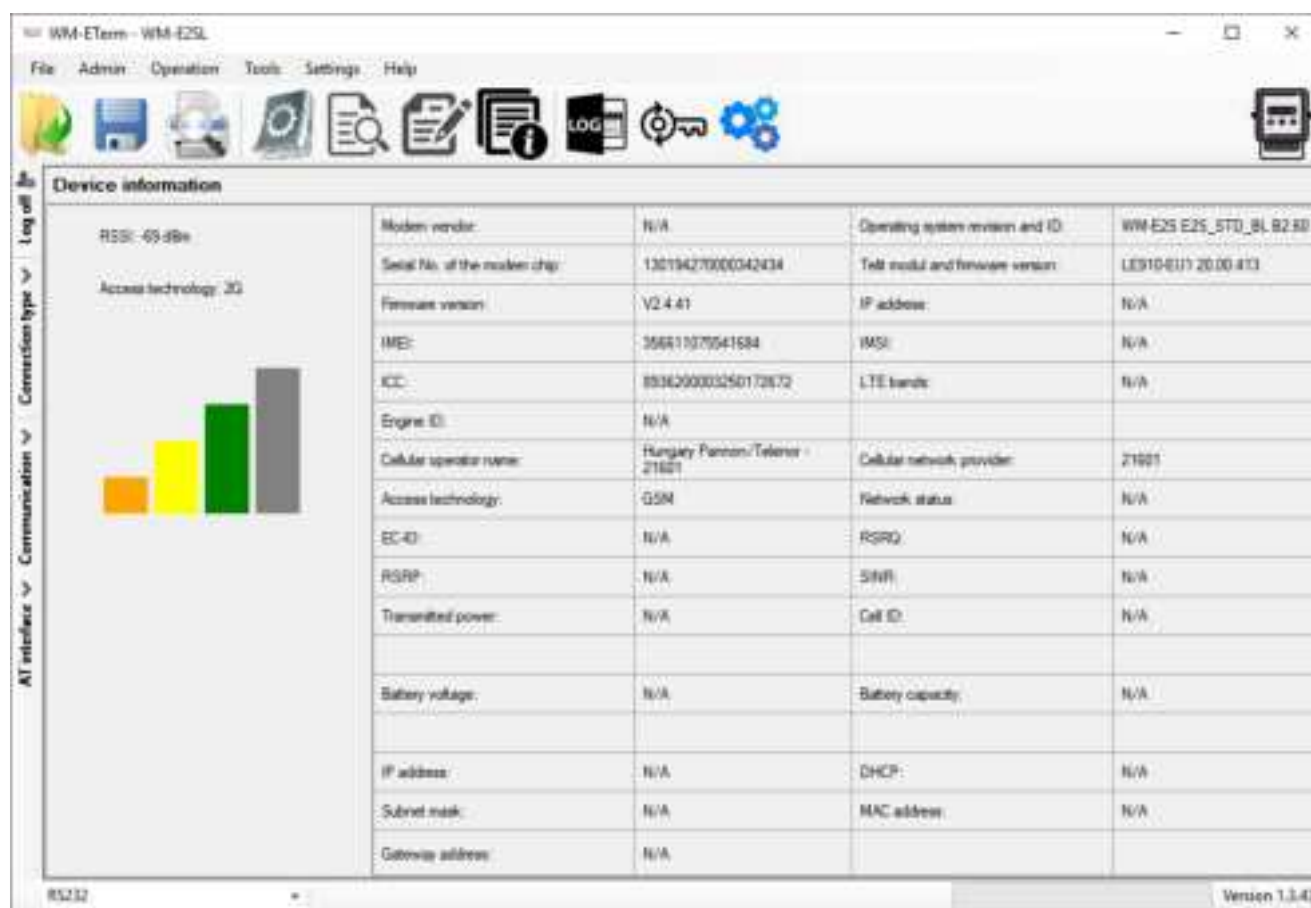
[https://www.m2mserver.com/m2m-downloads/WM-E-TERM\\_User\\_Manual\\_V1\\_93.pdf](https://www.m2mserver.com/m2m-downloads/WM-E-TERM_User_Manual_V1_93.pdf)

## 2.6 Signal strength

Check signal strength of the cellular network in the *WM-E Term*<sup>®</sup> software **Device Information** menu or by using the  icon. Check RSSI value (at least it should be yellow – which means average signal strength – or better if it is green). You can change



the antenna position while you will not receive better dBm values (the status must be readout again for refresh).



## 2.7 Power outage management

The firmware version of the modem is supporting the LastGASP feature, which means that in case of power outage the modem's supercapacitor allows to operating further the modem for a short time (a couple of minutes).

In case of detecting the loss of mains/input power source, the modem generates a "POWER LOST" event and the message will be immediately transmitted as an SMS text to the configured phone number.

In case of recovering the mains/power source the modem generates the "POWER RETURN" message and sending by SMS text.

The LastGASP message settings can be enabled by the WM-E Term® application – in the **AMM (IEC)** parameter group part.



## Chapter 3. Support

If you have a technical question regarding the usage You can find us on the following contact possibilities:

Email: [support@m2mserver.com](mailto:support@m2mserver.com)

Phone: +36 20 333-1111

### 3.1 Support

The product has a identification void which has important product related information for the support line.

**Warning!** *Damaging or removing the void sticker means the loss of product guarantee.*

Online product support available here: <https://www.m2mserver.com/en/support/>

### 3.2 Product Support

The documents and information related on the product are available here.  
<https://www.m2mserver.com/en/product/wm-e8s/>

## Chapter 4. Legal notice

©2022. WM Systems LLC.

The text of and illustrations presented in this document are under copyright. Copying, usage, replication or publication of the original document or its' parts are possible with the agreement and permission of the *WM Systems LLC*. only.

The figures in this document are illustrations, those can be different from the real appearance.

The *WM Systems LLC* doesn't take any responsibility for text inaccuracy in this document.

The presented information can be changed without any notice.

The printed information in this document are informative only. For further details contact us.

### **Warning**

Any fault or upcoming error during the software upload/refresh can lead to the device breakdown. When this situation happens call our specialists.