Datasheet and User manual
WM-E2S® smart metering modem
for PME-PMI® electicity meters

Document specifications

This documentation was made to present the installation and configuration steps of the **WM-E2S PME-PMI**® electricity metering modem.

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Hardware Type/Version:	**WM-E2S PME-PMI® modem** **for PME-PMI® electricity meters with DC power supply** **(Itron® ACE6000, Landis+Gyr® ZMG516, Enedis® NOI CPT-36E meter types)**
Hardware Version:	**V 5.02 (Quectel EG915N-EU, BG95-Mx version),** **V 5.20 (Quectel EC200A-EU version)**
Firmware Version:	**V 5.3.40.1 TLS**
WM-E Term® config. software version:	**V 1.4.3.5**
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Chapter 1. Introduction

The **WM-E2S 4G**® is a modem, which is suitable for automated remote reading of electricity meters, on the 4G LTE-based cellular network.

You can save money by using our modem, because there is no further need of manual readout of the meter systems.

Wireless communication

The modem can be ordered with different cellular module types:

- LTE Cat.4 / 3G / 2G module
- LTE Cat.1 module with 2G "fallback"
- LTE Cat.M / Cat.NB module with 2G "fallback"

Over the LTE 4G communication, all versions of the device having a 2G mode or 2G "fallback" feature, therefore in case of outage/inaccessibility of the LTE 4G network, it is further communicating on the 2G network.

Depending on the client's needs, the modem can be set to which network it uses (e.g. only LTE 4G or 3G, etc.) or the best available network (Auto mode).

It can also be set that only GSM-CSData connection - e.g. in the case of a CSData supported module, by initiating CSData calls.

The modem supports multi-operator SIM and the roaming feature.

The device provides a SIM-card independent- and mobile operator independent solution.

The modem has been designed to provide "Pull" operating mode, which means that the modem has a transparent communication data sending from the meter to the HES (smart metering center/server).

Design and installation

This modem was especially developed for 3-phase **PME-PMI**® electricity meters (**Itrón**® **ACE6000, Landis+Gyr**® **ZMG416** and **Enedis**® **NOI CPT-E36 meters**), which can be connected to the meter by its design and its RJ45 connection RS232 interface. It is

installable to the meter as an external modem – due its 35mm DIN-rail adapter (provided to the modem) - which allows to fix the device.

Operation properties, features

The modem is suitable to read the meter's actual and stored consumption values, access the recorded event log, read the load profile data, and read or modify the parameter set of the meter - remotely. It can be accessed remotely through the cellular network (by the embedded Quectel® cellular module) and it is able to send data on the Internet by using an APN.

Power source

The modem is powered by DC power (8-16V DC) from the meter's via its RJ45 connection (the modem is getting 10V DC power from the meter for its operation).

Supercapacitor

The device can be equipped with internal supercapacitor part, which prevent the intermittent power cuts also help decrease power peaks. This enables to keep the module in operation during small power outages.

After a few minutes of charging, the supercapacitor becomes capable of normal operation and even frequent data transmission of a few minutes.

After the supercapacitor exhausting, it must be charged and the modem can be automatically started after this and able to send data again.

The modem can also be ordered in a version without supercapacitor.

Connection / Configuration

The modem is configurable locally via its RS232 port (RJ45 connector). For that a USB Dongle converter is also required to be used to connect the modem on its RJ45 connector via USB connection to a computer.

The device is also configurable remotely via CSData call or on LTE connection via TCP/UDP port (or via local serial connection) and operates on the wireless network by configuring the APN, username and password (APN information is provided by your local mobile operator).

All settings can be configured with our administration tool (the WM-E Term®
software), but also API available so that our partner may easily adapt their current
administration environment.

The configuration is possible to one device or a group of devices.

The WM-E Term® tool is password protected and user management is also possible.

The configuration tool requires Windows® platform to be executed, and it is available
in several languages – as well the French.

Firmware refresh

The WM-E Term® also provides safe firmware change for one modem or a group of
devices – locally (via RJ45 connection) or remotely (via cellular connection).

Security

The modem performs HW identification during firmware replacement and when
starting its operation. The modem is protected against installing a 3rd party made or a
modified firmware. Likewise, the modem cannot be operated from a 3rd party made
or a modified firmware due to its integrity and compatibility checking.

The external flash- and the internal flash content of the device are encrypted.

This product's firmware is encrypted and with a unique AES-256 encryption key
therefore its prevented against uploading or using any 3rd party made or modified
firmware.

data from other devices. The modem cannot be upgraded by any other 3rd party
firmware – its safe.

The modem uses a special and unique communication protocol. The data
communication with the meter and the meter readout is also safe due to the applied
double checksum when recepting any communication package or the data telegram.

The control port of the modem is encrypted by AES - optional.

The modem can be configured to be used with a unique configuration password and
an optional communication password during its operation to increase the security to
high level.

The firmware is using TLS protocol to increase the security to maximum.

Status and notification

The modem is continuously monitoring the mobile network and device communication health, and can send status information (signal strength, QoS).
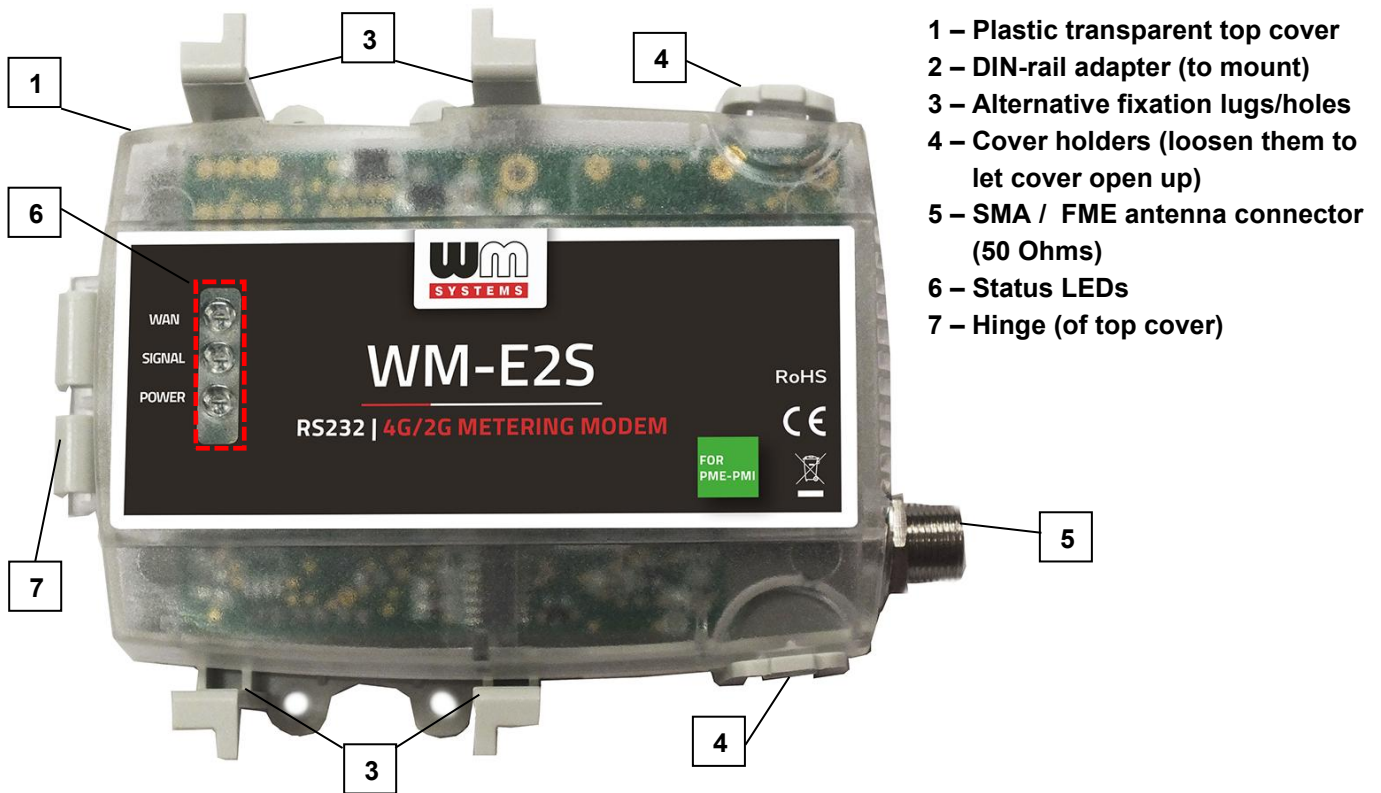
By the configured features, the device is able to send SMS alarm notification, Last Gasp notification – depending on the used cellular network and mobile operators (if the SMS notification is not disallowed on the network, then it can be used).
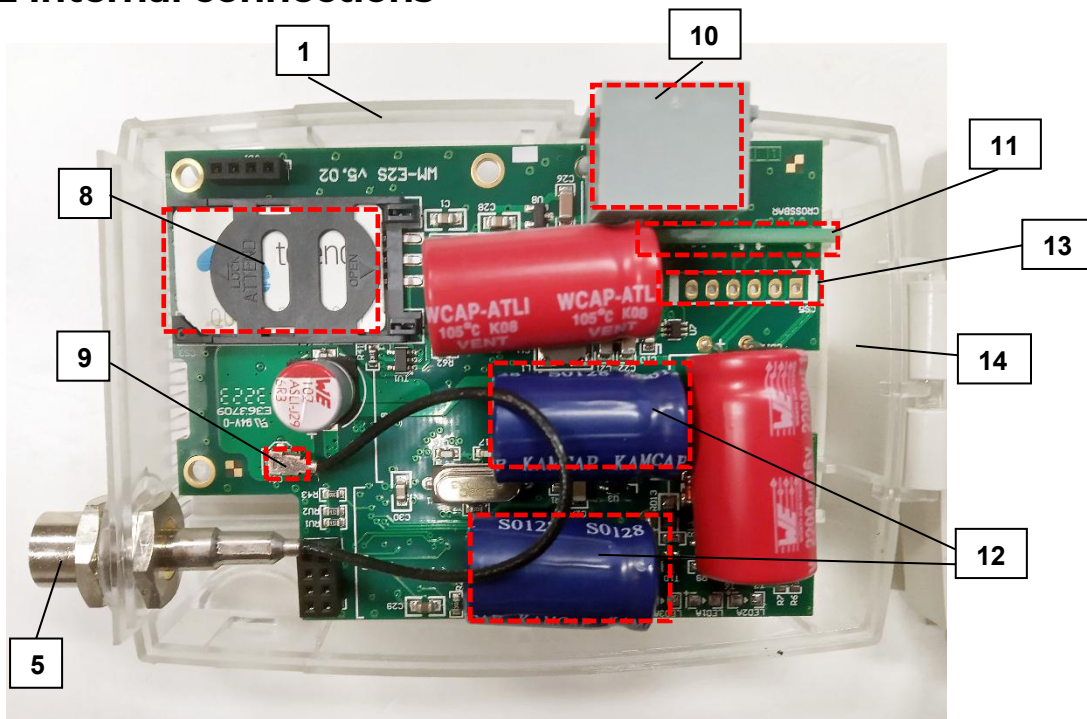
Certification

According to the CE certification, the modem complies with the Radio Equipment Directive (ReD) standard 2014/53/EU – part 3.a, 3.b, 3.c and ReD Cybersecurity part 3.3(d). The product is RoHS and CE certified.

Chapter 2. Connections

2.1 External outfit

1 – Plastic transparent top cover
2 – DIN-rail adapter (to mount)
3 – Alternative fixation lugs/holes
4 – Cover holders (loosen them to let cover open up)
5 – SMA / FME antenna connector (50 Ohms)
6 – Status LEDs
7 – Hinge (of top cover)

2.2 Internal connections

8 – SIM card slot (push left and spin up)
9 – Internal antenna wire (with U.LF – SMA / FME connection)
10 – RJ45 connector (data and DC power)
11 – Jumper crossboard (for proper meter communication)
12 – Supercapacitor parts
13 – External connector (do not use!)
14 – Holder of the top cover (part of modem enclosure)

2.3 Installation steps

Step #1: Ensure that the device is not powered on, remove the RJ45 connector (10).


Step #2: The modem is provided with an anodized aluminum DIN-rail adapter for 35mm DIN rails (2). The fixation part can be found on the bottom side of the modem enclosure.
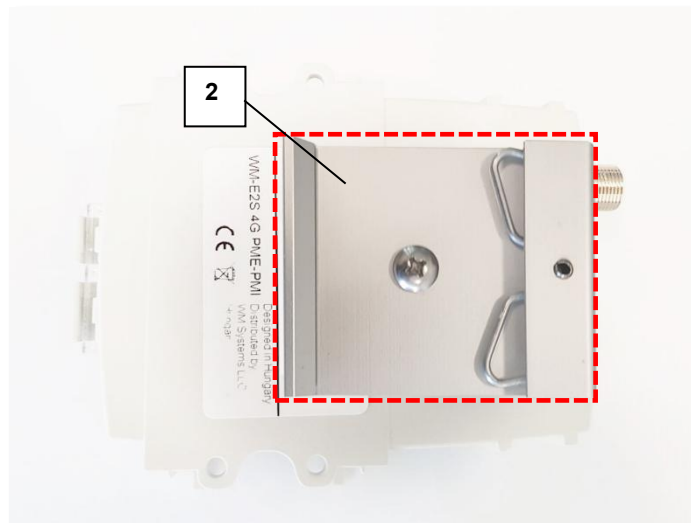
Step #3: For SIM-card insertion you need to loosen cover plastic lugs (3) and holders (4) on the white plastic bottom part (1b) of the enclosure - at the edges - while pull and lift-up the semi-transparent plastic top cover (1a) from the antenna connector side (see the figure hereunder), and open the cover until the PCB (2) will be visible.

Step #4: Now the PCB will be located on the left side – see the photo.

Step #5: Slide and open up the plastic SIM card holder (8) - push from left to right, and lift it up until released.
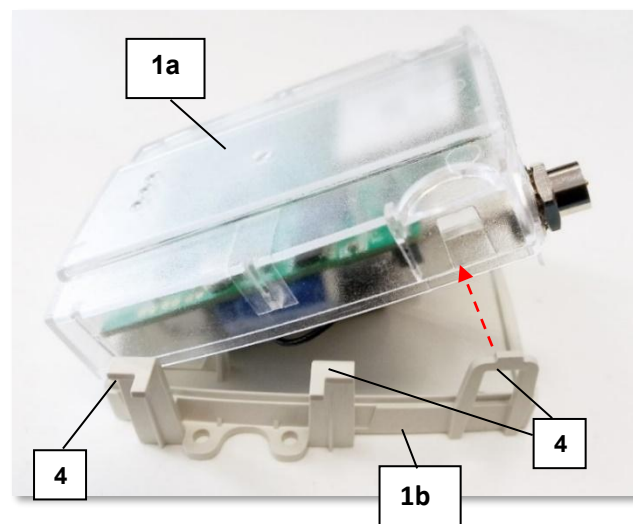
Step #6: Insert a replaceable and active SIM card (with APN access) into the SIM-holder (8) - the chip looks down, the cut edge of the SIM is oriented towards the antenna side.

Step #7: Close down the SIM holder (8) and push it from right to left until it is fastened, and close back the PCB-side of the enclosure (semi-transparent plastic) to the white plastic part of the enclosure from left to right.

Step #8: Ensure that the internal antenna U.FL - black - cable is connected to the U.FL connector (9)!

Step #9: Close the top of the enclosure – taking care of its exact positioning on the lugs and holders - until it is fastened (you will hear a click when it is closed).

Step #10: The data connection between the modem and the PME-PMI electricity meter (Itron®, Landis+Gyr® or Enedis® type meter) can be established with an RS232 interface by the provided 1m long grey RJ45 cable connected to the RJ45 connector (see Nr. 10 on the figure hereunder),

Step #11: Close the plastic cover (1) of the product case and install the modem by fixing the enclosure onto the 35mm DIN-rail.

Step #12: Mount a LTE antenna (you can use an SMA or FME-type on the SMA the antenna connector (5) or you can use an SMA-type antenna on FME connector with an FME-to-SMA converter).
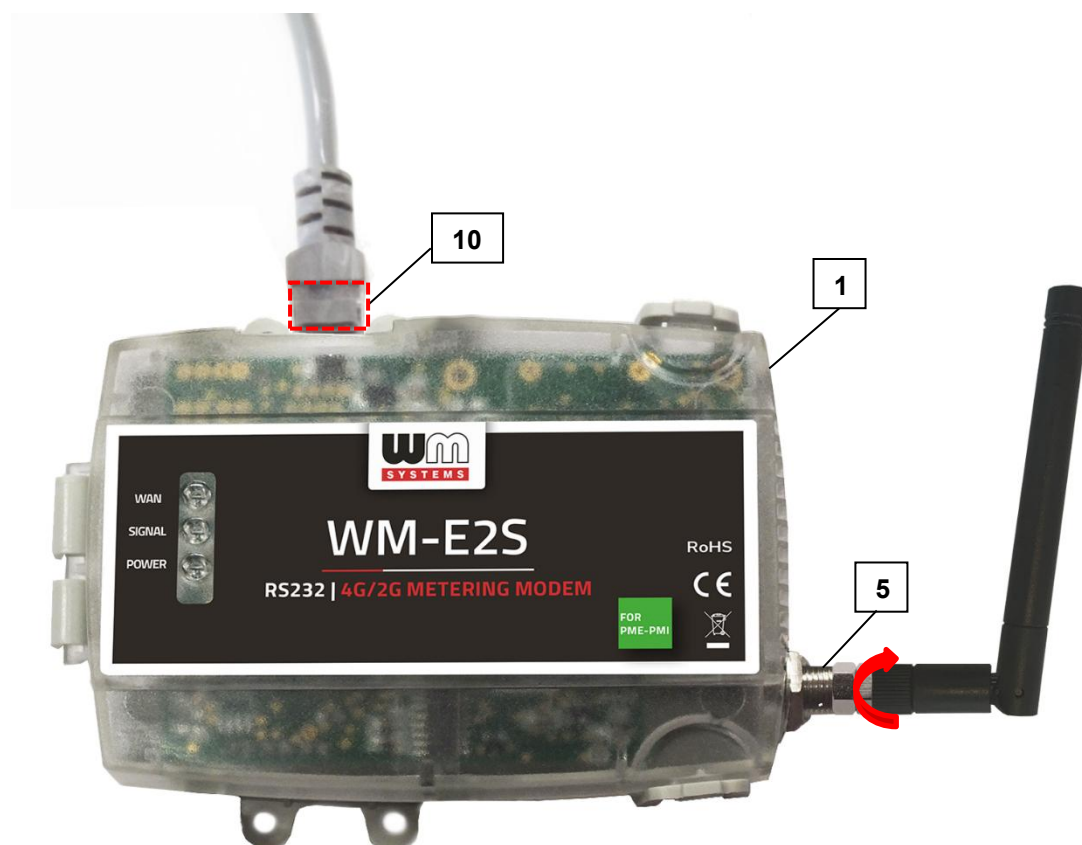
Step #13: For configuration, connect the RJ45 cable to the modem's RJ45 port (10) and connect the cable's opposite side with an RJ45-USB adapter (USB dongle) to your computer. See Chapter 3.1 for more.

Step #14: Configure the modem with the WM-E Term® configuration software.

Step #15: After the configuration, remove the RJ45 cable from your computer (and USB Dongle) and connect it to the modem's RJ45 port (10) of the electricity meter's RS232 port.

Step #16: Remove the PME-PMI® meter's communication module plastic enclosure (bottom side) by releasing the screw from the top of the plastic cover part– according to the meter's installation manual.

Step #17: Power on the meter, and the connected modem will be started (due to the RJ45 connection power source). The modem will start its operation and the LED signals show the current activity. Now you can configure the modem for the usage.

2.4 Description of the RJ45 connector

Connect the provided RJ45-RJ45 (grey) cable to the modem's RJ45 communication interface (10).

The PME-PMI (Itrón® ACE6000, Landis & Gyr® ZMG416) meter's RJ45 connection pinout can be seen in the following table. Note, that the modem side of the connector pinout is the opposite / counterpart to the meter's side.

Pin # (RJ45)	Signal name
1	Modem Power out (VDCM out)
2	DCD - Signal detection
3	DTR - Data terminal / Reset (CPL)
4	GND – Signal ground
5	RX - Data reception
6	TX – Data transmission
7	Ready to transmit/slot indicator CTS/TX_DATA
8	RTS – Transmission request

2.5 Status LED signals

If the WM-E2S PME-PMI® modem was not supplied by power source since a long time, it needs to be charged before the usage/installation. The charge takes about ~2-5 minutes if the supercapacitor was exhausted / discharged.

OPERATION LED SIGNALS - <u>IN CASE OF CHARGING SUPERCAPACITORS</u>

LED	Description
LED 3	During the charging of the exhausted supercapacitors, only **green** upper LED will flashing quickly. Only this LED is active during the charge. Wait until the device will be fully charged.

Important! *The LED number we've listed here are the same as can be found on the PCB LED title (as LED3 (**green**, top), LED1 (**blue**, middle), LED2 (**red**, bottom).*

*At the first power on - during the charge – the **green** LED is flashing quickly. After a few minutes the LED will be blank, then qill be flashing quickly again. When the **green** LED will be flashing slowly and the other LEDs will be lighting according the NORMAL operation, then the modem will be charged completely and it will be ready for congfiuring and to operate.*

OPERATION LED SIGNALS – <u>IN CASE OF NORMAL OPERATION</u>
<u>Factory default LED signals:</u>

In the case of charged supercapacitors, the following LED operation applies.

LED identifier	Events
LED 3 **E-METER status**	• **By general**: the *led is inactive* • **During communication**: the *led is active (flashing)*
LED 1 **GSM / GPRS status**	• **During** network **registration**: led is *active* • **During** network **searching**: *blinking once per second* • When **connected to the network** and the **IP connection** is okay: *blinking twice per second*

	• If **there is no available cellular network** detected: the led will be **blank** • **During the CSD call and IP data forwarding, the LED is ligthing continuously**

LED 2
SIM status / SIM or PIN failure)
	• Continuously lighting, until the device is not on the cellular network and RSSI cannot be detected (SIM okay)
	• When the **SIM PIN is** okay: led is **active**
	• If there is **no SIM** detected or **SIM PIN is wrong**: *blinking once per second* (slow flashing)
	• **The RSSI (signal strength) value is signed also by this led. Flashing by "N" times in every 10-15 seconds, depending on the RSSI refresh period. The RSSI value can be 1,2,3 or 4 on the current cellular network.**
	The numbers of RSSI flashing is different on every available network technology, by the following:
	   o <u>**on 2G network:**</u>
	      o **1 flashing: RSSI >= -98**
	      o **2 flashings: RSSI between -97 and -91**
	      o **3 flashings: RSSI - between 90 and -65**
	      o **4 flashings: RSSI > -64**
	   o <u>**on 3G network:**</u>
	      o **1 flashing: RSSI >= -103**
	      o **2 flashings: RSSI between -102 and -92**
	      o **3 flashings: RSSI - between 91 and -65**
	      o **4 flashings: RSSI > -64**
	   o <u>**on 4G LTE network:**</u>
	      o **1 flashing: RSSI >= -122**
	      o **2 flashings: RSSI between -121 and -107**
	      o **3 flashings: RSSI between -106 and -85**
	      o **4 flashings: RSSI > -84**
	   o <u>**on LTE Cat.M1 network:**</u>
	      o **1 flashing: RSSI >= -126**
	      o **2 flashings: RSSI between -125 and -116**
	      o **3 flashings: RSSI between -115 and -85**
	      o **4 flashings: RSSI > -84**
	   o <u>**on LTE Cat. NB-IoT (Narrow Band) network:**</u>
	      o **1 flashing: RSSI >= -122**
	      o **2 flashings: RSSI between -121 and -107**
	      o **3 flashings: RSSI between -106 and -85**
	      o **4 flashings: RSSI > -84**

Over the factory defaults, the operation and the sequence of the LED signals can be changed by the **WM-E Term®** *configuration tool, in* **Standard Meter Interface** *parameter group.*

There you can define one of the following functions of the leds (LED1..LED3) according the next list:

Selectable LED status (in the WM-E Term program)
Not used
GSM / GPRS status
SIM status (wrong PIN flashing slow or without SIM)
E-meter status
Firmware status

Network status and access technology
Meter status with IEC polling
AMM (IEC) client state (not usable here)

LED status	Events
Firmware status	• When the modem firmware was started, the led will be turned on (ligthing). • When the meter ←→modem connection was built up then the led will be flashing 2x per seconds.

Network status and access technology	• Network registration: *the led is active (lighting)*.
	• During network searching: *the led is flashing 1x per seconds*.
	• When it was connected to the network and the IP connection is okay: *the led is flashing 2x per seconds*.
	• If the mobile access technology was changed – it will be signed by quick flashing:
	    ○ 2G → *2 flashing / seconds*
	    ○ 3G → *3 flashing / seconds*
	    ○ 4G → *4 flashing / seconds*
	• If there is no available network: *the led is inactive (blank)*

Meter status with IEC polling – Meter status during the IEC communication	• When the modem←→meter starting the communication, *the led will be flashing 1x per seconds*. • When the meter is answering to the modem during the communication, it will *turns on the led*. • When the modem←→ meter cannot communicate with each other, the *led will be turned off*.
AMM (IEC) client state	• By general or in case of closing the modem←→EI client communication the *LED is turned off*. • In case of building up the modem←→ EI client** connection the *led is flashing shorty 1x per seconds* (*then 1 second of pause will be progressed between the flashings*) • In case of EI client** login request attempt– *the led is flashung 1x per seconds*. • When the connection was built up successfully between the EI client**←→modem– *the led is active (ligthing)*.

The EI client is the transparent output TCP channel from the modem to the EI server

LED SIGNALING DURING FIRMWARE UPDATE

During the firmware uploading the LEDs are operating as it is normal – there is no significal LED signal for the FW refresh progress.

After the FW installation all LEDs will be blank. Then the modem will be restarted automatically, and will be operating by the new firmware.

At starting the LED3 will be flashing quickly by green for 15 seconds. The starting requires 2-3 minutes while the modem will be available on its interfaces.

Afterall, the LED will be operating ordinary as it is listed in the LED operation behaviour description.

2.6 Operation of the modem

The complete readout and data sending mechanism to the HES centre and the other direction for the configuration and maintenance tasks can be realized on the defined paths.
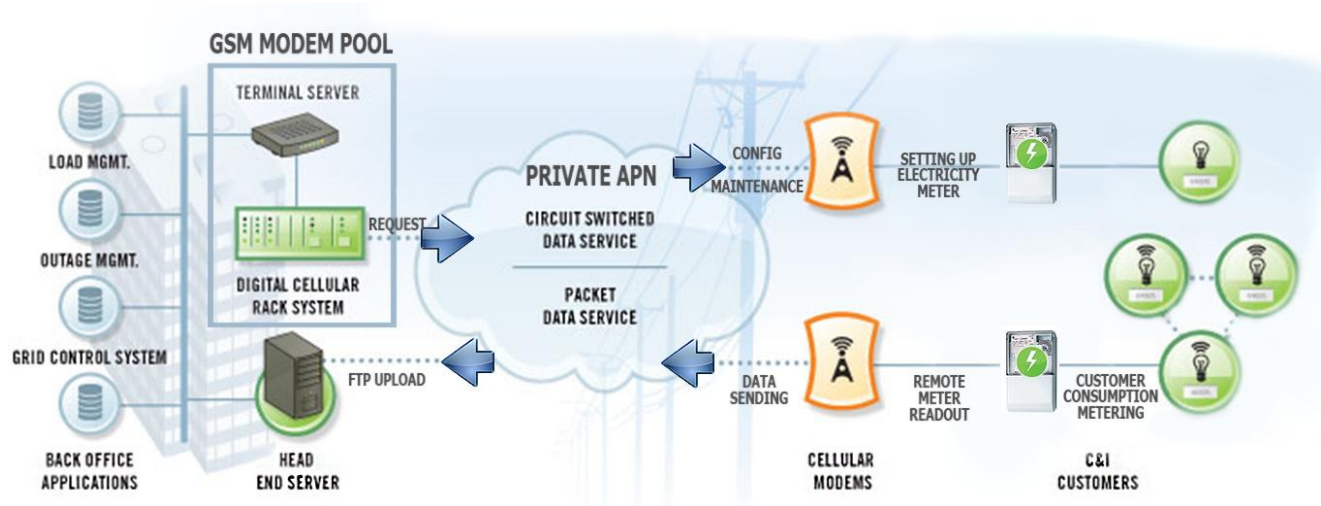
There is another option and meter data sending mode to initiate a remote readout automatically in pre-defined intervals. It is also possible to start the data sending in case of different events (e.g. removal of meter cover, incoming SMS message from the centre).

In this situation, the modem is connected to the mobile data network only during the time of the data transmission.

The device needs to be connected to cellular network for the proper operation.

2.7 LED operation during CSD call

During the CSD call two operation option types can be used:

a.) When the meter would be read out / configured in transparent mode

b.) When modem configuration / firmware refresh is attempted to make

<u>When the meter would be read out / configured in transparent mode:</u>

- The GSM / GPRS status configured LED will be continously lighting during the CSD call.

- The e-Meter status configured LED will be operating according the CSD call status by the following:

- Will be flashing twice per seconds from the connection attempt until closing the connection
- If the meter interface is not configured to 9600 baudrate, then it will be ligthing continuously from the connection attempt until closing the connection
- After the connection close the LED will be switched off

<u>When modem configuration / firmware refresh is attempted to make</u>

- The GSM / GPRS status configured LED will be continously lighting during the CSD call.

- The other LEDs will not change their operation because of the CSD mode

Chapter 3. Modem Configuration

3.1 Configuration

The modem must be configured by the WM-E Term® software by setting its parameters which must be performed before the normal operation and usage.

Before the configuration, you have to remove the meter←→modem RJ45 connection cable's (14) meter side (16) from the RS232/RS485 port of the meter. Connect the modem by the USB/RS232 DONGLE® adapter (17) to your computer's USB port by following the next hints.
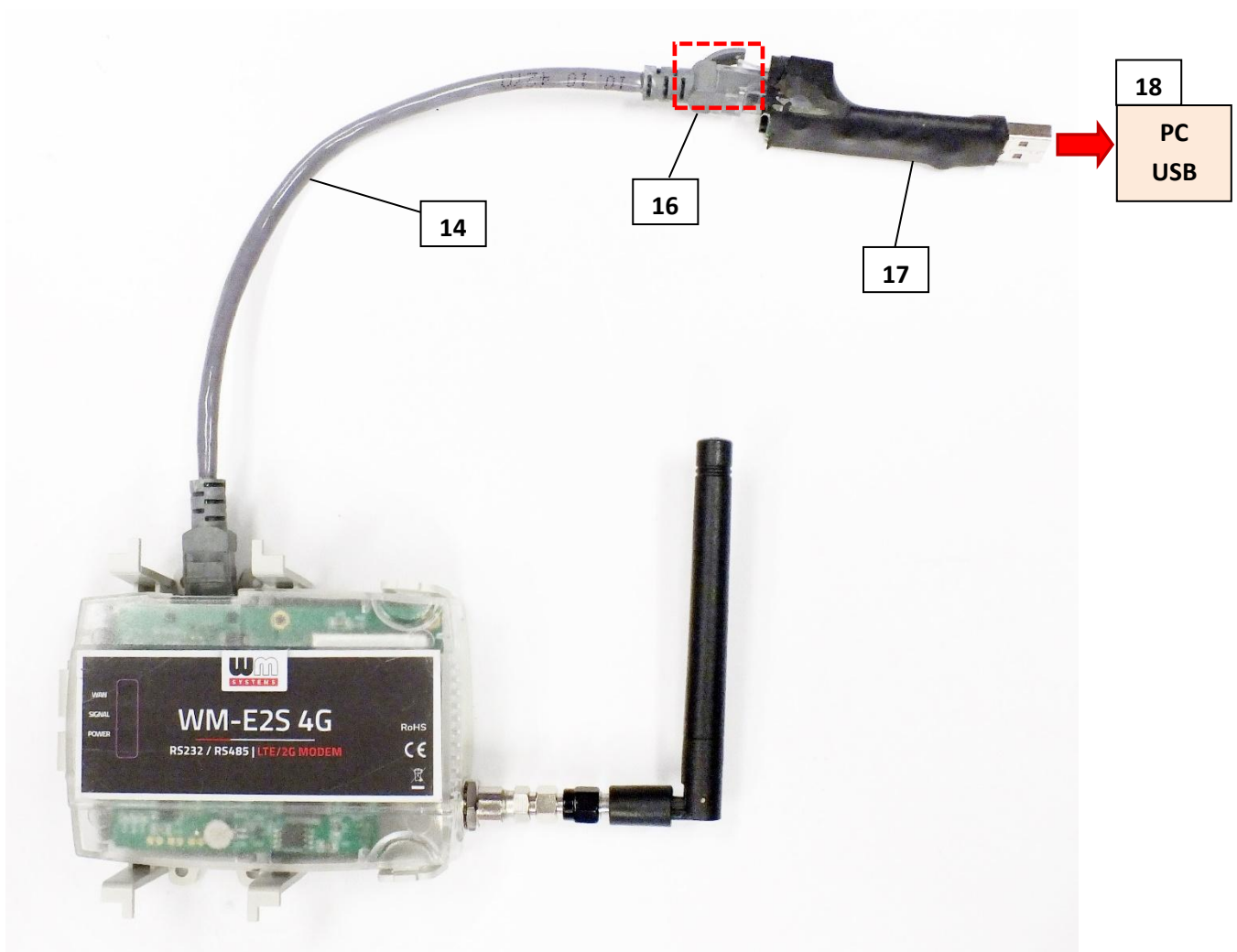
Important! *Note that until the configuration the modem is not connecting to the meter, therefore it cannot readout parameter values through the RJ45 interface during the configuration.*

The configuration can be made by CSData call (by selecting a mobile access technology which uses 2G network). Or you can do it through mobile internet (TCP) connection – therefore you don't need to connect the modem to your PC.

Important! *During the configuration, the power supply of the modem is assured by this converter board, on USB connection. Some computers can sensitive for USB current changes. In this case you should use an external power supply with special connection.*

For the serial cable connection configure COM port settings of the connected computer according to the modem serial port properties. In the Windows® it can be found in the **Start** / **Control Panel** / **Device Manager** / **Ports** (**COM and LTP**) menu Properties:

- o *Baud: 9600*
- o *Databits: 8*
- o *Parity: No*
- o *Stopbits: 1*
- o *Bandwith control: no*

Warning!

If the COM port will not visible after connecting the device to the computer, and you cannot found the COM port number in the Windows Device Manager, then you need to install the proper driver - *FTDI VPC* – to your computer, which can be downloaded from here:

http://www.ftdichip.com/Drivers/VCP.htm

For the proper communication of the modem, you have to configure the APN settings of the SIM – as PIN code, APN, username and password. These all can configured by using the WM-E Term® software through the RJ45 connection.
For the successful operation of the communication module it is necessary to have appropriate signal strength.

If you want to readout the meter parameter values during the PC-modem connection,

after the RJ45-configuration you made, then you should select a different configuration port to the meter as TCP/IP or Optical, etc.

For newer modem firmware versions it is mandatory to use the **Communication password** for the modem configuration. Ask your sales about the default password of your modem type! You can check the written password by the Show option at right. (Note that you can change the communication password of the modem anytime by choosing the ⊚⚷ icon from the menu.)

Over the parameter settings of meter, modem and communication, etc., you can also test the modem communication and execute AT-commands on the modem by the WM-E Term® configuration program - see *AT commands* description for the description useful commands.

3.2 Configuring the modem by WM-E Term®

The Microsoft .NET framework runtime environment is required on your computer. For modem configuration and testing you will need an APN/data package enabled, active SIM-card.

The configuration is possible without a SIM card, but in this case the modem is performing restart periodically, and some modem features will be not available until the SIM card is inserted (e.g. remote access).

If the WM-E2S PME-PMI® modem was not supplied by power for a long time, it needs to be charged before usage. It takes about ~2-5 minutes to charge if it the supercapacitor was exhausted / discharged.
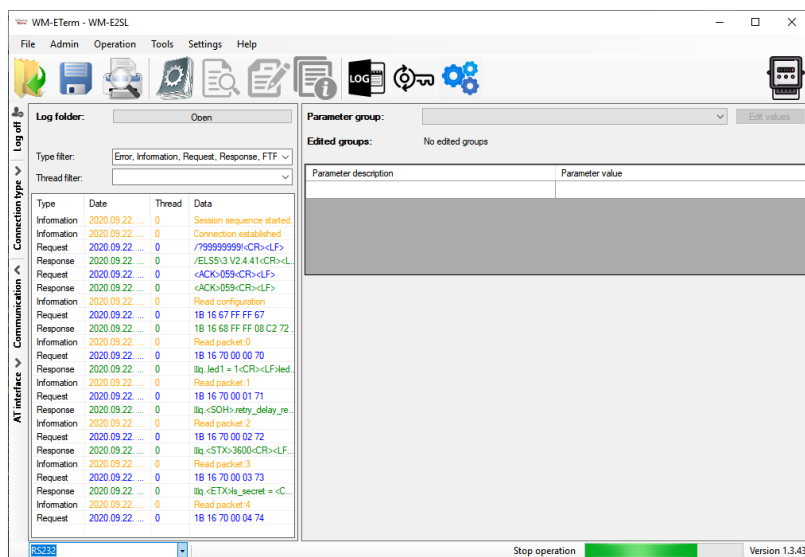
Download the WM-E Term® software to your computer by a browser from the following link: https://www.m2mserver.com/m2m-downloads/WM_ETerm_v1_4.zip

Extract the .zip file to e directory and execute the **WM-ETerm.exe** file.

The configuration software is supporting the usage of user accounts and the password change feature.

You can login to the software by a password. Read the **WM-E Term® User Manual** for further details!

WM-E term User Manual:

https://m2mserver.com/m2m-downloads/WM-E-TERM_Manual_for_WM-E2S_WM-E2SL_V1_97B.pdf

3.3 Parameter configuration

The general operation requires that the cellular communication settings and SIM settings of the modem (APN, APN username, password and PIN code, network usage method) are made.

The meter communication requires to define the communication port, the RS232 settings (transparent mode, baudrate, data format, transmitting speed), LEDs settings and to save the settings by the WM-E Term® software then upload/send them to the modem by the *User Manual* of the software.

Main settings:

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

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.

3. Choose Then 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 exhange.

4. If you have to use *SIM PIN* then choose the **Mobil network *parameter group***, and add the **SIM PIN** to the field. Here you can change a **Frequency band** to **4G only** or **LTE to 2G** (for fallback feature), etc. You can also select here a dedicated mobile network provider (auto or manual). Push then the **OK** button.

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**: to the standard *9600)*, **Fixed 8N1** data format (by checking the box at the meter). Confirm the setting with the **OK** button.

6. Then open the **RS485 meter interface** *parameter group*, configure the **RS485 mode** to the *Disable* value. Then push the **OK** button.

7. 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 options

- 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!

3.4 Configuring from CSD connection

If the modem restarts due to an incorrect configuration, it is possible to access it with a CSD call. Its operation can be fine-tuned in the WM-E Term software with a value that can be specified in the **PDP connection delay** field in the **APN** parameter group.

For more information, see Chapter 3.1 of the *WM-E Term User Manual*.

3.5 Data control direction (DCD) feature

In case of using the PME-PMI version, Itrón® SL7000 meter (through RS232 connection), you can use the **DCD** feature to declare the direction of the data control – according the following parameter setting.

For configuring the **DCD** feature, choose the **RS485 interface settings** parameter group.

Note that it is valid for the RS232 port!

DCD parameter values:

- **Fix 0** (provides logical 0 value as result for the connected meter)
- **Fix 1** (provides logical 1 value as result for the connected meter)
- **Standard**
- **Inverted** (opposite direction)

3.6 Automatic network reconnection

If the mobile network provider drops the modem from the cellular network due to the device's network inactivity, there are available parameters if these are set, then automatic and periodical connection connection rebuild can be caused.

If the network provider sends a message to the modem that the data connection has been lost, the connection will be restored automatically. If you do not send a message, you can choose from these two workarounds to follow:

a.) <u>Active mode - Use periodical ping, set the ping:</u>
   1. For setting this, set the **Watchdog** parameter group's ping parameters as **Ping IP-address**, **Number of ping retries**, **Ping wait-time (for reply)** and **Wait-time (for next).**
   2. If there is no ping response, it reconnects to the network after the time interval specified in the **Seconds, GPRS connection closed and restored after this time** parameter.

***Attention!** In case of frequent ping using, the data traffic will be higher, but the chances are higher that the device will remain on the cellular network.*

b.) <u>Passive mode - If you don't use the ping - set the connection retry:</u>

1. For setting this, use the **Watchdog** parameter group's **Seconds, gprs connection closed and restored after this time** parameter.

2. Here you can define that after the network drops out the modem, how long does the modem wait before trying to reconnect to the mobile network again. Ask your mobile provider about the offered settings.

***Attention!** If there is less data traffic and there is no ping configured, the device may not stay on the network for a long time. If you set this parameter to a low value that can cause frequent network reconnections.*

Therefore under no circumstances should you set this value lower than what your mobile service provider recommends. (e.g. there are mobile network providers that limit the number of times a modem can logon to the network in a given time).

3.7 Signal strength

Check signal strength of the cellular network in the *WM-E Term*® software **Device Information** menu or by using the icon. At the end of the process, the current status information will be updated.

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).

Device information				
RSSI: -73 dBm				
Access technology: 2G				
Modem vendor:	N/A	Operating system revision and ID:	WM-E2S WM-E2S 3.1.6
Serial No. of the modem chip:	N/A	Module and firmware version:	LE910-EU V2 20.00.405
Firmware version:	5.1.23	IP address:	37.234.69.215
IMEI:	353529102666311	IMSI:	N/A
ICC:	8936200003250172672	LTE bands:	N/A
Engine ID:	N/A		
Cellular operator name:	Hungary Pannon/Telenor/Yettel - 21601	Cellular network provider:	21601
Access technology:	GSM / EGPRS	Network status:	N/A
EC-IO:	N/A	RSRQ:	N/A
RSRP:	N/A	SINR:	N/A
Transmitted power:	N/A	Cell ID:	N/A
Battery voltage:	N/A	Battery capacity:	N/A
IP address:	N/A	DHCP:	N/A
Subnet mask:	N/A	MAC address:	N/A
Gateway address:	N/A		

RS_232

3.8 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.

3.9 Restart the modem

There cannot be found a direct option for modem restart in WM-E Term. But it is very easy to push the modem to be restarted.

1. Choose any parameter from the read out values.

2. Change a parameter value

3. Push to the **Save** button.

4. Send the settings by **Parameters Write** icon to the modem.

5. At the end of the writing process, the modem will be restarted.

6. The restart of the device is signed by the **LED3**, which will be flashing quickly by **green** for 15 seconds. The starting requires 2-3 minutes while the modem will be available on its interfaces.

7. Afterall, the LED will be operating ordinary as it is listed in the LED operation behaviour description.

3.10 Two meter readout ports

Every WM-E modem has two ports for meter communication, configuration and FW updates. You can configure all the two to control their operation by its priority.

The first port is, the **Utility communication port for (Primary)**, which you can use for meter readout and configuration. This port has higher priority for meter readout over the secondary port, therefore the operation of this primary port will always overrid**e** the secondary port's operation (e.g. if you configured these ports and when the meter will be read out via the primary port (**Utility comm. port**), then the secondary port's operation (**Customer comm. port**) will be hanging – e.g. meter reading – until the primary port is not finished with the current read out.

This priorization at operation is not effecting the firmware updates or configuration processes of the modem.

The second port. the Customer communication port for (Secondary)* can be also used with lower priority for meter communication, configuration and FW updates.

Important! The two ports should be set to different port numbers.

This feature can be configured in the WM-E Term software in **Standard settings** mode, or you can also edit it in **Advanced settings** mode in the **M2M** parameter group.

Important! *Note, that this feature is available in modem firmware v5.3.4.1 or in newer firmware versions!*

3.11 Automatic protocol detect and switch

The **Data format for meters** value (E-Meter serial port) can be configured in the WM-E Term software in **Standard settings** mode, or you can also edit it in **Advanced settings** mode in the **Transp. / NTA** parameter group.

Over the usual data formats (as *7E1*, *8N1*, *7O1*, *7N2*, *8E1*, *8O1*, *8N2*) you can choose the **'Auto'** mode setting.

In this case, the first data packet of the incoming connection is checked by the firmware. It will automatically decode the incoming communications and if it is detecting that as IEC protocol, then the modem will switch to data mode **7E1** towards the meter. In all other cases, the data mode remains at **8N1** mode.

Important! *Note, that this feature is available in modem firmware v5.3.4.1 or in newer firmware versions!*

Chapter 4. AT command settings - description (Configuring the Modem by AT commands)

4.1 General information about the commands

In this part of the documentation we have collected the standard Hayes™ AT commands which you can use for programming the modem manually with any terminal application.

During the configuration the modem accepts commands with upper or lower case characters. The modem accepting commands in N81 or E71 format.

When you are attempted to use AT commands for the modem, first you have to declare the modem interface and GPRS settings.

For the GPRS communication settings you can use the AT command syntax at table – Chapter 3. The AT commands and parameter values must be divided with semicomma: e.g. Command;answer;timeout(msec)

The minimal modem configuration settings for connectiong an Itrón® meter:

- AT+0   enabling the 9600,8,n,1 operation for the modem
- AT&W   saving the settings

4.2 AT command set

The AT+ command can be used individually, these cannot be chained!

AT+ command	Description
ATA	The modem is receiving the incoming call – *local interface only* The modem answers for the call after ther third ringing.
ATD	Dial command – *local interface only* The modem connects to the network and performing a call to the defined phone number, e.g.: ATDT 12345 123456^m "D" = dial, "T" = tone (compatible mode), ^m = carrier return.
ATE	Commmand local Echo

	ATE0	Local Echo off
	ATE1	Local Echo on (echo)
ATH		Hang up command – *local interface only*
		The modem is disconnecting the dial connection.
ATI		Module identification (example for the answer: WM-E2 2G V2.44)
ATO		Return to online state command - *local interface only*
		The modem switches back from command mode to data mode
ATQ		Silent mode
		You can allow to the modem that it doesn't send the results
	ATQ0	Silent mode off – it does NOT send the results
	ATQ1	Silent modem on – it sends the results
ATV		Verbose mode (Turned off) means a number
		Text or numeric format.
	ATV0	Verbose mode disabled: number
	ATV1	Verbose mode enabled: text
ATX		Connection (CONNECT) result codes
		Generated code by the modem when connecting or hanging up
	ATX0	the connection.
	ATX1	Selects the basic code set
	ATX2.3.4	Selects the extended code set
		Same as ATX1
ATZ		Modem Reset
		Resets the modem without changing any parameters.
AT&C		Carrier control
		This parameter defines the operation of pin 1 (DCD) of the 9-pin RS232C interface.
	AT&C0	Always ON
	AT&C1	Fixed to this settings – DCD turning on, when online
	AT&C2	in command mode is OFF – DCD is turned on only when the modem is online
AT&D		Determines how the ME responds if the pin 4 (DTR) is changed from ON to OFF state during data connection (the firmware is supporting, but it is not wired by default)
	AT&D0	Ignores the status of the DTR line – eg. not connected
	AT&D1	DTR ON→OFF: Change to command mode while retaining the data connection. (like +++ escape sequence)
	AT&D2	DTR ON→OFF: Disconnect the data connection (only for CSD)
AT&K		Flow-control selection (hardware configuration must matche with settings)
	AT&K0	DCD and DTR line can be used for signaling
	AT&K3	RTS and CTS line can be used

AT+I	Reports modem type, firmware version number, local settings E.g. WM-E2S v2.48
AT+IP?	Reports current GPRS Listen mode address E.g. IP: 192.168.0.100
AT+R	Resets modem and causes the modem to execute a 10 second power cycle
AT+S	Displays Signal Strength Toggles on / off (default off).
Remote AT+S	Reports the last known signal strength

4.3 Commands which can be used only for the local interface

AT+ parancs	Leírás
AT+CBST?	Signaling format This command gives information regarding the cellular network bearer channel. Response: 7,0,1 (9600 bps rate, Asynchronous, Non transparent).
AT+CBST=n,0,1	CBST change
n=0	analog auto baud (automatic baud rate selection)
n=4	V.22bis
n=6	V.32
n=7	V.32
n=70	V.110 or X.31
n=71	V.110 or X.31
AT+CPIN?	SIM card PIN-code status report
AT+CLCC	Reports the current CSD call list
AT+COPS	Reports the mobile operator and network registration status
AT+CIMI	Delivers the International Mobile Subscriber Identity (IMS)
AT+CGSN	Delivers the International Mobile Equipment Identity (IMEI)

4.4 Modem result codes

Number (VO)	Answer (V1)	Legend
1	OK	Command line executed without errors.
2	CONNECT	Connection.
3	RING	Ringing signal detected.

4	NO CARRIER	Carrier lost or never present.
5	ERROR	Invalid Command.
6	NO DIAL TONE	No dial tone detected.
7	BUSY	Busy signal detected.
8	NO ANSWER	No answer from remote modem.

4.5 Configure the TCP/IP (GPRS) connection

Check the modem answer by executing the AT+I command and listen for the answer!

The execution of the following commands are necessary for the TCP/IP (GPRS) connection settings:

AT+ command	Legend
AT+CGDCONT=1,"IP","APNNAME"	Change the APNNAME part to the APN name you are attempted to use
AT+CGDCONT?	Checking the current APN settings

Chapter 5. Support

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

Email: support@m2mserver.com

Phone: +36 20 333-1111

5.1 Support

The product has an 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/

5.2 Product Support

The documents and information related on the product are available here. https://m2mserver.com/en/product/wm-e2s-modem-for-pme-pmi-meters/

Chapter 6. Legal notice

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