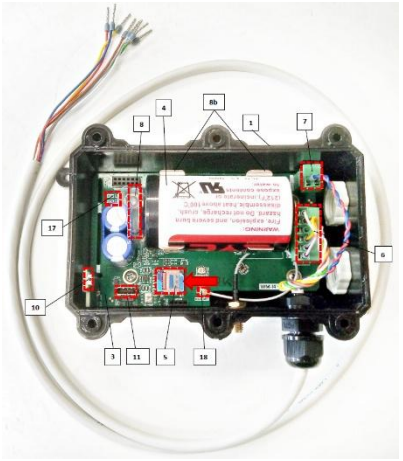
WM-i PULSE® data logger – Quick Reference Guide

CONNECTION

1 – Casing bottom part (ABS plastic with IP68 protection – where the PCB is fastened by screws)
2 – Enclosure top part
3 – 6pcs of fastening screws (to water-proof close and lock of the housing top cover)
4 – Special filled, longlife battery (Lithium-Thyonyl-Chloride, 3.6V, 19 Ah capacity, size D)
5 – Nano-SIM slot (type 4FF)
6 – Pulse input cable connector (terminal block, 6 pins) – for 2 meter pulse outputs, dry contact (electromechanical contacts)
6b – Sealed input cable and wires (Pulse) with end sleeves
8 – Battery disconnector (plastic protective part, which inhibits to supply power from the battery during the delivery/shipping)
8b – Battery socket (holding ears)
9 – External LTE Cat.M / Cat.NB antenna connector (SMA, 50 Ohm)
10 – Tamper switch (for detection the top removal) – order option
11 – USB-C connector (local configuration port)
14 – Fastening point - The enclosure can be fastened and fixed by screws here, to be mounted
15 – Silicone seal (against the ingress of moisture)
16 – Cable outlet with gland
17 – 3 operation LEDs
18 – Internal LTE antenna connection



POWER SUPPLY AND INTERFACES

- Nominal power: 3.6V DC (powered from an internal 19Ah battery or connected external Battery Pack with 3x 19Ah capacity)
- Daily current consumption (hourly reading, data transmission in every 6 hours): standby: 1.15mA / with 2 pulse input counting: 1.33mA / with data transmission: 13.4mA 8-16V DC (10V DC nominal), Consumption: max. 2W / 3.3W
- Cellular communication: Quectel BG95-M2 / BG95-M4 LTE Cat.M/NB modules:
  - Bands (BG95-M2): LTE Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/ B26/B27/B28/B66/B85, LTE Cat NB2: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/ B20/B25/B28/B66/B71/B85
  - Bands (BG95-M4): LTE Cat M1: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/ B26/B27/B28/B31/B66/B72/B73/B85, LTE Cat NB2: B1/B2/B3/B4/B5/B8/B12/ B13/B18/B19/B20/B25/B28/B31/B66/B72/B73/B85
- Interfaces: 2 independent Pulse inputs (dry contact) for energy meters / sensors (receives: open collector, open drain, reed contact signals), USB-C port (for local configuration and installation)
- Pulse input specification: Average 1 .. 2Hz, max. 100Hz / input, Low Level: 0..0.5V, High Level: 1.3..1.8V, Imax: 8µA

MECHANICAL DATA / DESIGN / ENVIRONMENTAL CONDITIONS

- Dimensions: 120 x 88 x 50mm, Weight: 315 gr
- Outfit: IP68-protected design (ABS case, cable outfit), Mounting with fastening points
- Operation temperature: -25°C* to +70°C, rel. 0-95% rel. humidity / Storage temperature: from -40°C to +85°C, rel. 0-95% rel. humidity

Pulse meter connections

White – GND of Input#1 | Brown – Input #1, wire A | Green – Input #1, wire B
Yellow – GND of Input#2 | Grey – Input #2, wire A | Pink – Input #2, wire B

INSTALLATION STEPS

- *Step #1:* Install the device to the location of the meter/sensor, and fasten/mount the casing (1) to a wall.
- *Step #2:* Remove the plastic top cover (2) by release and remove six screws (3) with a screwdriver.
- *Step #3:* Prepare the connection of the pulse output capable meters or sensors. Perform the wiring and fasten wires on the meter's side – which you are attempting to connect: pulse-signal output capable meter(s) to the relevant wires of pulse inputs on cable (6b) regarding requirements.
- *Step #4:* Insert an active Nano SIM into the SIM slot (5): Slide the metal SIM holder from the direction of the red arrow (from right to left) and open it up. Insert the SIM as it can be seen in the photo (the cutted edge of the SIM looks up and right, the SIM chip face looks down, face to the PCB). Fold back the metal holder and slide it back from left to right to lock the SIM into the holder.
- *Step #5:* Connect and mount an antenna to the external LTE antenna connector (9). We suggest to order a magnetic mount LTE antenna.

CONFIGURATION

- *Step #1:* Download WM-E Term configuration software (Microsoft Windows® compatible): https://m2mserver.com/m2m-downloads/WM-ETerm_v1_4_0.zip
- *Step #2:* Unpack the downloaded .ZIP file into a directory. Make sure you own administrator privileges to the directory where you will be executing the software from.
- *Step #3:* Open the Control Panel / Device Manager on the PC's Windows® system. Connect the USB-C cable to the internal USB slot (11). Now the device is powered. Then on the PC, the Windows® will automatically download the required driver and install it to your computer. Afterall, at **Control Panel** in **Device Manager** properties at **Port** section, the Windows® will refresh the connected devices
  - Option a.) If you are using FW version v0.1.1.43 or an older, then you'll see one COM Port, listed as „Serial USB device". That's your device. Note the port identifier – listed as **COM number**.
  - Option b.) If you are using FW version newer than v0.1.1.43, then you can see here two COM Ports, which are listed as „Serial USB device". Now open the last **USB Serial Device** entry and choose **Properties** and **Details** tab. There at **Property**, select **Bus description**. At ***Value*** field you should see the „***...config port***". If yes, then note this port identifier **COM** number – e.g. ***COM 7***. Take note, that if the port's **Bus description** value is „***debug port***", then you should close this window and select the other port (e.g. COM6) and repeat this identification query at the that port and find „***...config port***". Then note this port identifier **COM number** – e.g. COM 6.
- *Step #4:* In WM-E Term software, make the connection profile settings (**Connection type**) and configure the **COM port** to this desired COM port and **[Save]** settings. Then choose the connection profile at left bottom part of the screen.
- *Step #5:* Execute the **WM-ETerm.exe** file to start the configuration software. Allow the ***Security Risk*** – does not mean any harm.
- *Step #6:* **Login** to WM-E Term software, **choose WM-i** tile and **make a connection profile** to the device with noted **COM port**.
- *Step #7:* Set the device to **Test Operation mode** in the **Operation Mode settings** menu with the computer icon. Then push to the **Parameters write** icon.
- *Step #8:* Then choose the *gear* icon and the current configuration will be automatically read out from the WM-i PULSE® device.
- *Step #9:* **Change settings and configure** the internet module's cellular settings (APN, etc.) in **Cellular network settings** parameter group.
- *Step #10:* Configure the connecting meters, sensors and further devices by selecting the **meter icon** from the menu. Then WM-i PULSE® will automatically read out configured settings. At the end of performing setting changes, you have to perform **Parameters write** to the device.
- *Step #11:* Configure **Telemetry** parameter group (data transmission and local data storage time intervals) in WM-E Term.
- *Step #12:* Configure alarm events at **Alarm settings** parameter group in WM-E Term.
- *Step #13:* Send the configuration to the WM-i PULSE® with the **Parameters write** icon. Then the device will be automatically restarted and operating according to the configured settings.

TESTING THE DEVICE

- *Step #1:* When the cellular module will be started – if SIM and the APN settings were already configured properly – and the device can connect to the NB-IoT network (Cat.M or Cat.NB cellular network) it will be sending data to the Azure® Cloud – based on active settings.
- *Step #2:* Check the connection, operation and data sending behaviour with LEDs (17) and the transmitted data as incoming results in Azure®.
- *Step #3:* Test the device and if you want to modify any parameters, make the changes and write / send again the configuration to the WM-i PULSE® with **Parameters write** icon. Then the device will be restarted again. Repeat this step, until the configuration and operation will be exactly which you've been desired.
- *Step #4:* If you are satisfied with settings, remove the USB-C connection from the device.
- Take note, that due to the battery disconnector's (8) presence – protective plastic part – which is still placed between the battery (4) and the battery holding ear, the device is still turned off and it sleeps. This can be useful for the time of delivery of the device or until the onsite installation. But, if you want the device to be operated, remove the protective part and the device will starting its operation immediately.

INSTALLING THE DEVICE ONSITE / IMPORTANT NOTES

- *Step #1:* Remove the battery disconnector (8) – a plastic protective part – which is placed between the battery (4) and the battery holding ear. Now the device will be getting power from the battery and starting its operation according to pre-configured settings. Note, that LEDs will be inactive during operation – due to energy-saving reasons.
- If an active SIM card was inserted and cellular connection settings were configured properly (APN, mobile access technology, etc.), then the cellular module will be started and the device should be connected soon to the NB-IoT – Cat.M or Cat.NB – cellular network.
- **IMPORTANT!** In WM-E Term software, if configuring the parameter **Technology** to „***NB (preferred) and CatM***" and / or „***CatM (preferred) and NB"*** value, these can be used only if both mobile access technologies are supported by the SIM. If you don't use any preferred settings at **Technology** parameter, it does not matter which SIM type you insert, and the WM-i PULSE® will be using Cat.M with Cat.NB „fallback" based on default operation of the cellular module.
  When starting the device, it will signaling a „*Cold Start*" event to the Azure® Cloud and send consumption data (pulse count data) also to the specified address. This will be repeated at pre-configured intervals.
- *Step #2:* Check cabling (6) connection and internal antenna connection. Place the plastic top cover (2) on the top of the casing (1) and fasten the six screws (3) with the screwdriver.
- *Step #3:* Fasten the external antenna's magnetic pedestal to a metal part. Ensure that the device is getting enough celular network signal – if it's not, then change antenna position/location for a better signal reception. The signal quality (value) of the cellular communication is be measured and can be checked with the WM-E Term® software by the **Device Information** icon.
- **IMPORTANT!** Note, that the device has default valuable parameters only for the Azure® connection. Every other setting is not configured. The device will not store any measurement data, will not signal / transmit any data. Operates from battery or USB-C if its active. We highly recommend after a successful Azure connection to configure every desired parameter at the choosable parameter groups for the sake of proper and useful operation.
- *Step #4:* When you have been finished the configuration, then set the modem to **Normal Operation mode** in the **Operation Mode settings** menu with the computer icon. Then push to the **Parameters write** icon. Now the device will be transmitting data at the configured intervals. Between these intervals, the WM-I PULSE® device will be in stand-by mode.

LED SIGNALS

LEDs are presented only for testing purposes (checking the configuration settings, cellular data transmission, etc.). LED indication starts to operate after 5 seconds of booting (as USB-C cable was connected to a 5V power source) – if the device is configured to „***Test operation mode***".
During the local (serial) configuration and testing, the device will not use the internal battery source, even if it is presented. During configuration – USB-C connection – the device will getting DC power from its USB connection. The device operation will be indicated on the related LEDs.
After performing local configuration, remove the USB connection, and all LEDs will be turned off, while the device will be restarted and powered further from the internal battery as a power source.
In case setting the device to "***Normal operation mode***" (when the device is powered from the internal battery), LED signals are inactive due to energy-saving reasons.

LED INDICATION

LED 1 (BLUE) – STATUS OF USB PORT

- **Lighting**: USB cable is connected
- **Blank/off**: USB cable is disconnected

LED 2 (RED) – COMMUNICATION MODULE'S LAST OPERATION STATUS

- **Lighting**: if last operation was unsuccessful (e.g. in case of could not initialize the SIM card, could not find a network, could not synchronize time, could not log in to the server, etc.)
- **Slow flashing**: data transmission to the configured IP address. Flashing: 1 sec lighting and 1 second blank, which is repeating. It can be also indicated during FW update.
- **Blank/off**: the last operation was successful or the USB cable is disconnected

LED 3 (GREEN) – COMMUNICATION MODULE STATUS

- **Lighting**: the cellular module is active (e.g. searching for a network, establishing a PDP connection, synchronizing time, communicating with a server, etc.)
- **Blank/off**: the module is switched off or the USB cable is disconnected

LED INDICATION DURING FIRMWARE UPDATE:

During battery-powered operation, for indicating device startup or a firmware update, distinct LED signals are not presented. When the firmware was successfully installed, the WM-i PULSE® device will be rebooting automatically.

SUPPORT

The product has CE sign according to the European regulations.
The product documentation, software can be found on the product's website: https://www.m2mserver.com/en/product/wm-i-pulse/