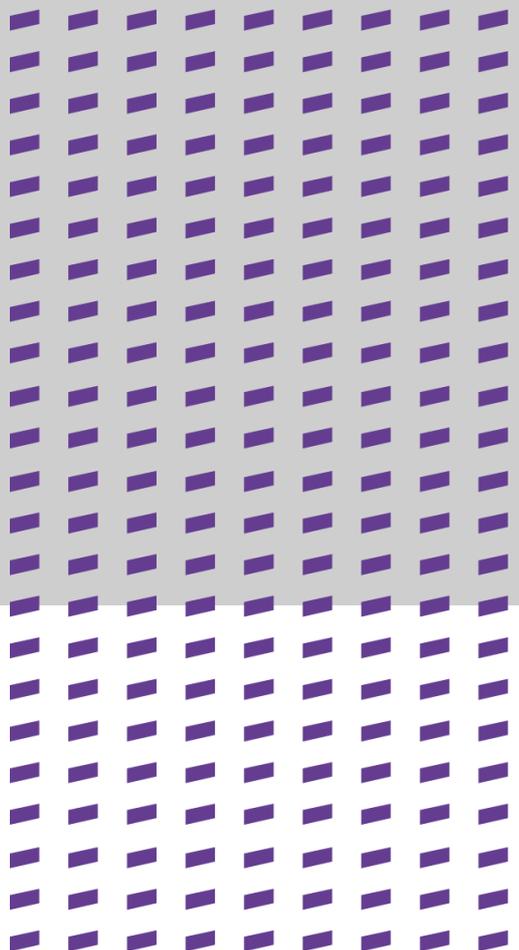


User manual & technical documentation



Document version: 1.01



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1. Disclaimer

The document contains useful information for beginners as well as detailed description of advanced functions and technical specifications of the IoT modules from the **MacIQ WM** series. Plum disclaims implied warranties, merchantability, qualification for particular purpose and does not provide any express warranties, except for written agreement with and for the customer.

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Applications for configuring Plum products are available for free in a non-modifiable version for download from the Play store on the Android operating system by Google (all rights reserved). Both the names of the applications, the Plum brand and MacIQ WM are registered trademarks in the EU and other countries.



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2. Safety

Symbols are used to mark important information in the document to facilitate understanding of the instructions. This does not exempt the user from complying with requirements not marked with graphic symbols!



Important information affecting the safety or operational features of the device.



The information provided concerns the operational features of the device.

Directive WEEE 2012/19/UE

- Dispose of packaging and product at the end of its life at an appropriate recycling company.
- Do not dispose of the product with household waste.
- **Do not burn the product.**



The device can only be used in places where the operating modem will not interfere with the operation of other equipment (e.g. medical equipment).



The device has a built-in lithium battery; it is hermetically sealed. The battery can only be replaced at an authorized Plum service department.



Do not install the device near strong electromagnetic fields.



Always use the latest version of documentation available from the manufacturer. Pay special attention to whether this documentation applies to your device version, including the program version and series.



The equipment is only suitable for mounting at a height ≤ 2 m.



Do not expose the device to temperatures above 100 °C.



Housing provides dust-tightness and protection against the effects of continuous immersion (IP68 protection class).

3. Simplified EU declaration of conformity

Hereby, Plum Sp. z o.o. declares that the radio equipment MacIQ WM is complainant with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address (**QR code**)

MacIQ WM H7.X

Radio frequency:

LTE NB2 LTE-FDD:

B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66/B70/B85

Maximum radio frequency power: 23 dBm ± 2 dB

MacIQ WM H4.X

Radio frequency:

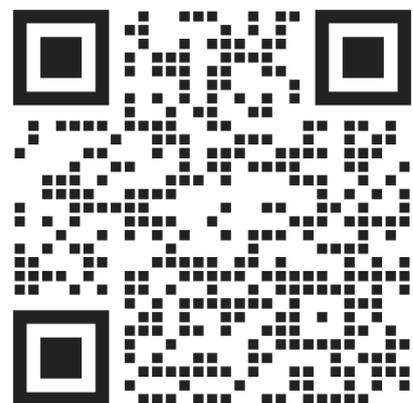
Cat M1 LTE-FDD:

B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85*

Cat NB2 LTE-FDD:

B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85*

Maximum radio frequency power: 21 dBm



The system allows you to group devices depending on the installation location, zone, company or person responsible for maintaining the network.

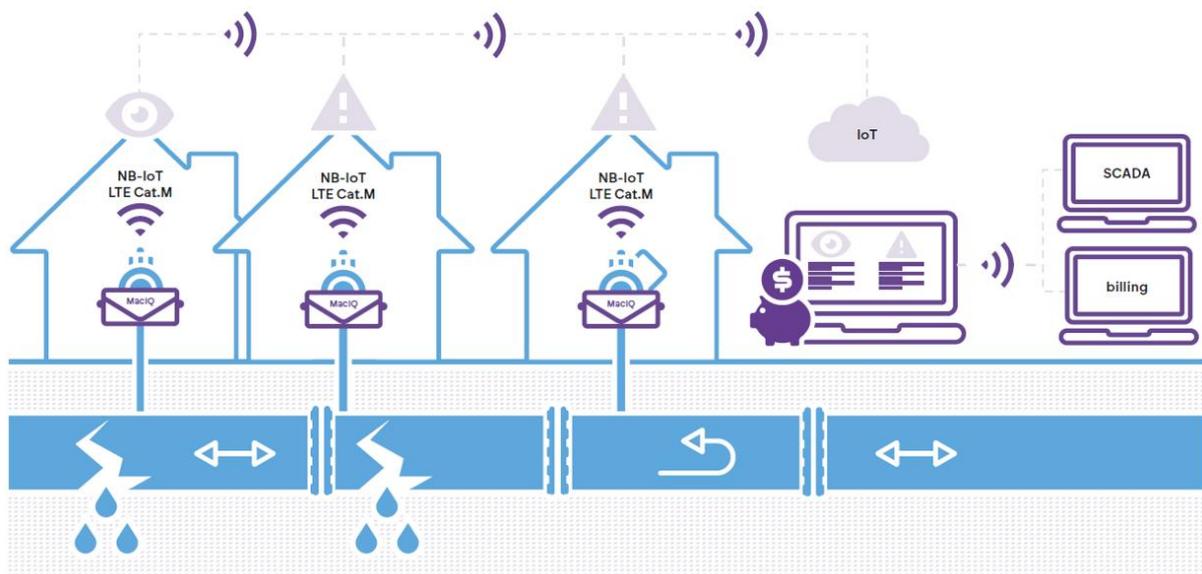
The eWebTel can be installed on the client's server, ensuring the security criteria of measurement databases. Full hardware requirements are available at: serwis@plum.pl.

eWebTel features:

- Interface compatible with PC and mobile web browsers.
- Review of archived data.
- Sending e-mail notifications when an alarm occurs.
- Simple user authorization system.
- Multilanguage interface.

6. Device features

- Counter registration from compatible water meters with data registration period of 60 minutes.
 - Value is recorded in full resolution with fractional parts of m3.
 - Each sample is identified with a time stamp and a unique record identifier
- Registered hourly data is stored in device non-volatile memory for the period of 3 months
- Instant sending of configurable alarms and events
- Built-in inductive sensor for direct installation on compatible water meter clock
- Built-in magnetic field sensor detecting attempts to tamper with magnetic clutch of mechanical water meter
- Wired counting inputs and pulse outputs (WM Pulse)
- NFC configuration with dedicated application of Android
- Built-in ambient temperature sensor
- Geolocation position register for synchronizing the location with the associated telemetry system
- The device is built to work in full submersion
- Device operation time on one battery - 11 years at ECL2



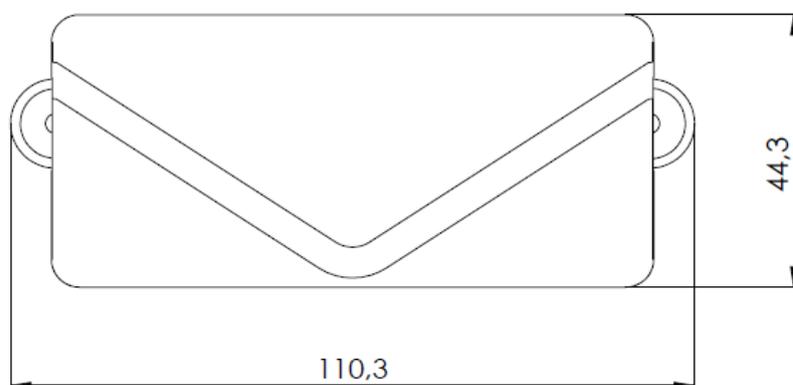
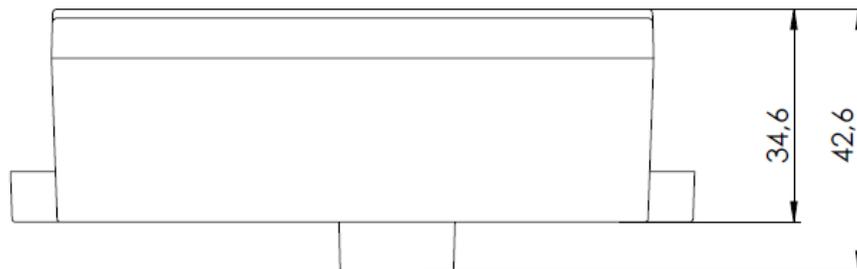
7. Technical specifications

Sensors	<p>MacIQ WM, MacIQ WMS, MacIQ WM+ have the following built-in sensors:</p> <ul style="list-style-type: none"> • Induction coils for counting pulses directly from the water meter diamagnet (Ti), • Magnetic interference, • Device disassembly, • Temperature sensor (option)
Inputs	<p>MacIQ WM Pulse 3 configurable digital inputs. Default values:</p> <ul style="list-style-type: none"> • Pulse length 35ms • Pulse length transmitted by the impulser 200ms <p>Digital Input D1</p> <ul style="list-style-type: none"> • Count pulses forward • Contact input NC • Contact input NO <p>Digital Input D2</p> <ul style="list-style-type: none"> • Count pulses backward • Contact input NC • Contact input NO • Flow direction <p>Digital Input D3</p> <ul style="list-style-type: none"> • Contact input NC • Contact input NO
Outputs	<p>MacIQ WM Pulse has 2 configurable digital outputs</p> <ul style="list-style-type: none"> • Digital Output DO1 • Digital Output DO2
Internal power supply	Battery size C, capacity 8.5 Ah
Battery life	<p>Depending on the registration period, the number of transmissions per month, the operating temperature, the network signal level.</p> <p>For example: 11 years of operation with data transmission once per day, with the RSRP signal level > -95dBm, temperature 21°C and a registration period of 60 minutes.</p>
Historical data	The device can store data logged in its memory for the last 3 months, assuming one transmission per day according to the schedule.
Modem	<p>The device is equipped either with a dual-technology or single-technology modem supporting the following technologies:</p> <ul style="list-style-type: none"> • LTE Cat M1 • LTE NB-IoT <p>The modem can operate within the full operating temperature range of the device.</p> <ol style="list-style-type: none"> 1. MacIQ WM (HWv7) / MacIQ WM+ (HWv7) / MacIQ WM Pulse Transmission frequency/band: LTE HD-FDD B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B28/B66/B70/B85 Maximum power: 23 dBm ±2,7 dB 2. MacIQ WM (HWv4) / MacIQ WM+ (HWv4) / MacIQ WM S Cat M1 LTE-FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 Cat NB2 LTE-FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85 Maximum power: Power Class 5 (21dBm)

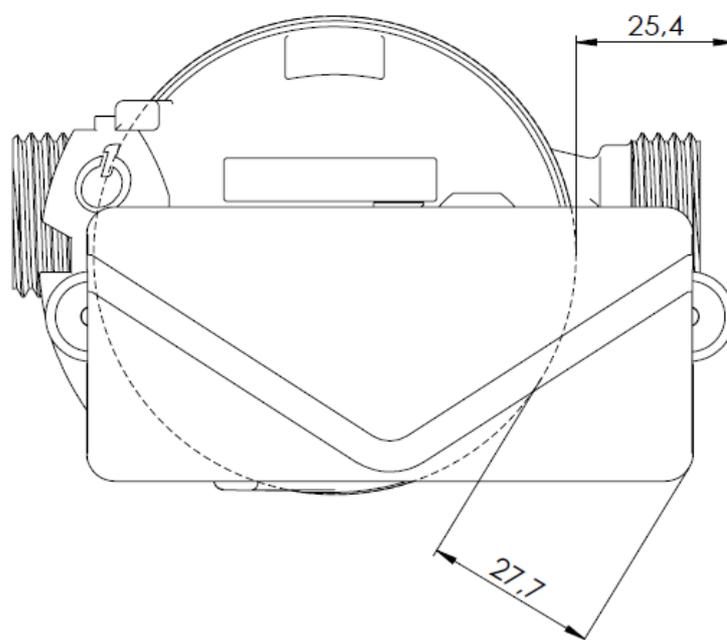
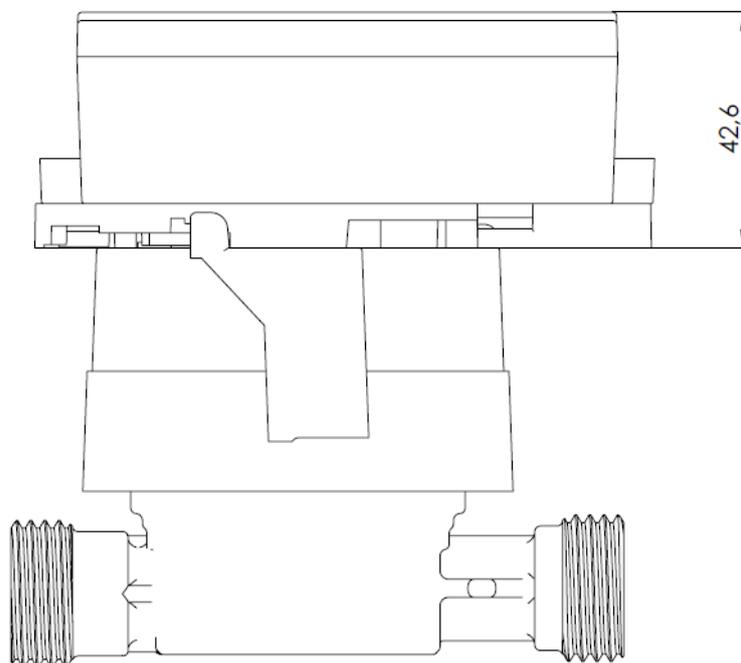
NFC	The device can be equipped with an optional NFC antenna for local communication MacIQ WM (HWv7) / MacIQ WM+ (HWv7) / MacIQ WM PULSE NFC module
Events	<ul style="list-style-type: none"> • Interference with magnetic and electromagnetic fields • Disassembly the module from the water meter • Backflow • Two-level event for exceeding the minimum flow • Two-level alarm for exceeding the maximum flow • Battery level low • Low GSM network signal • Low ambient temperature • Device installation • Input change state (MacIQ WM Pulse) • Counter value passes through 0
SIM card	Micro-SIM (3FFor soldered SIM (e-SIM)
Antenna options	Integrated external antenna with 3-meter cable of maximum energy gain 5 dBi, the antenna has a magnetic base, hermetically sealed
	Integrated short external antenna
Work temperature	$-10 \leq T_a \leq +55 \text{ }^\circ\text{C}$
Time synchronization	NTP time server or optionally the telecommunications service provider's network
IP protection level	IP68 (according to EN 60529)
Housing resistance to UV radiation	According to UL746C
Working conditions	Do not use the device near strong electromagnetic fields.
Weight	About 120 g (depending on the model)
Dimensions	109 x 40 x 45 mm

8. IoT module models

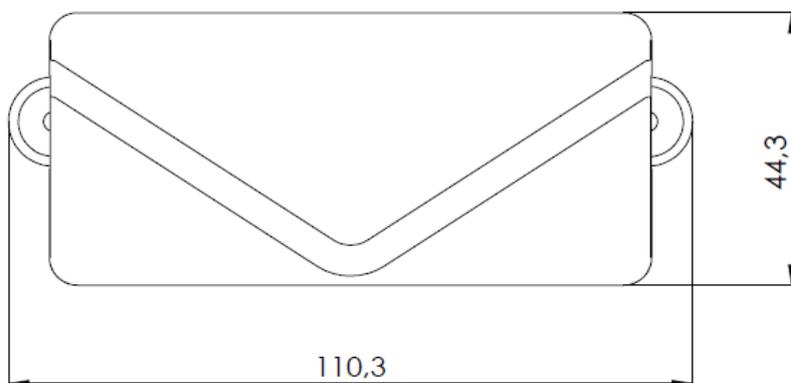
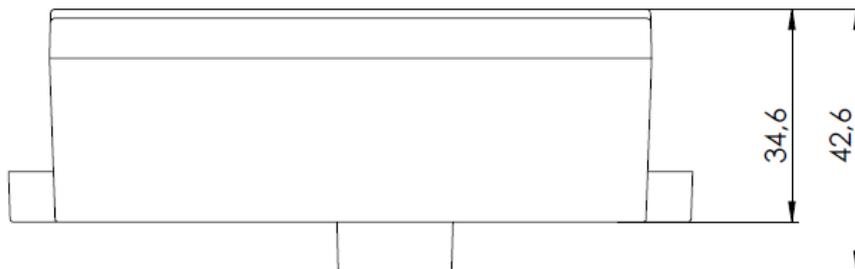
- **MacIQ WM / MacIQ WM+** – direct installation on the water meter clock with adapter.



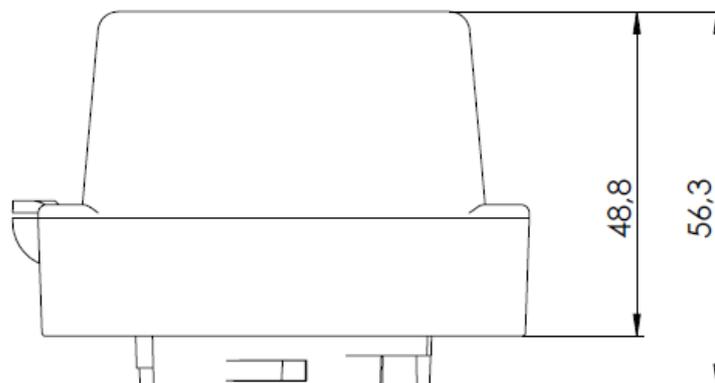
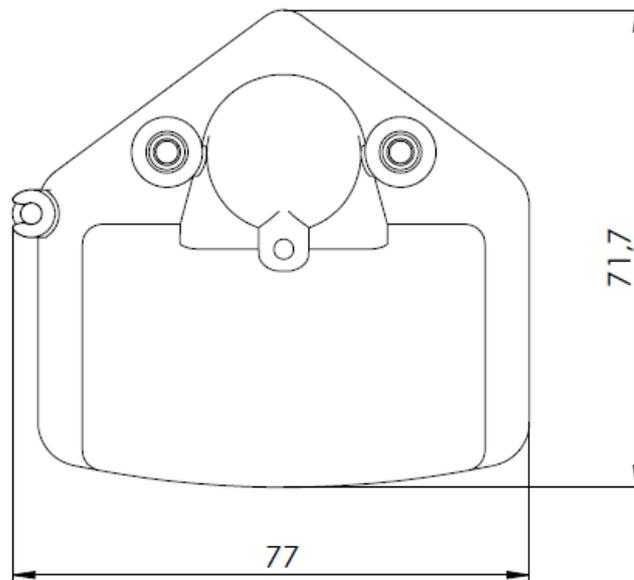
Dimensions of the module installed on Itron DN15-20



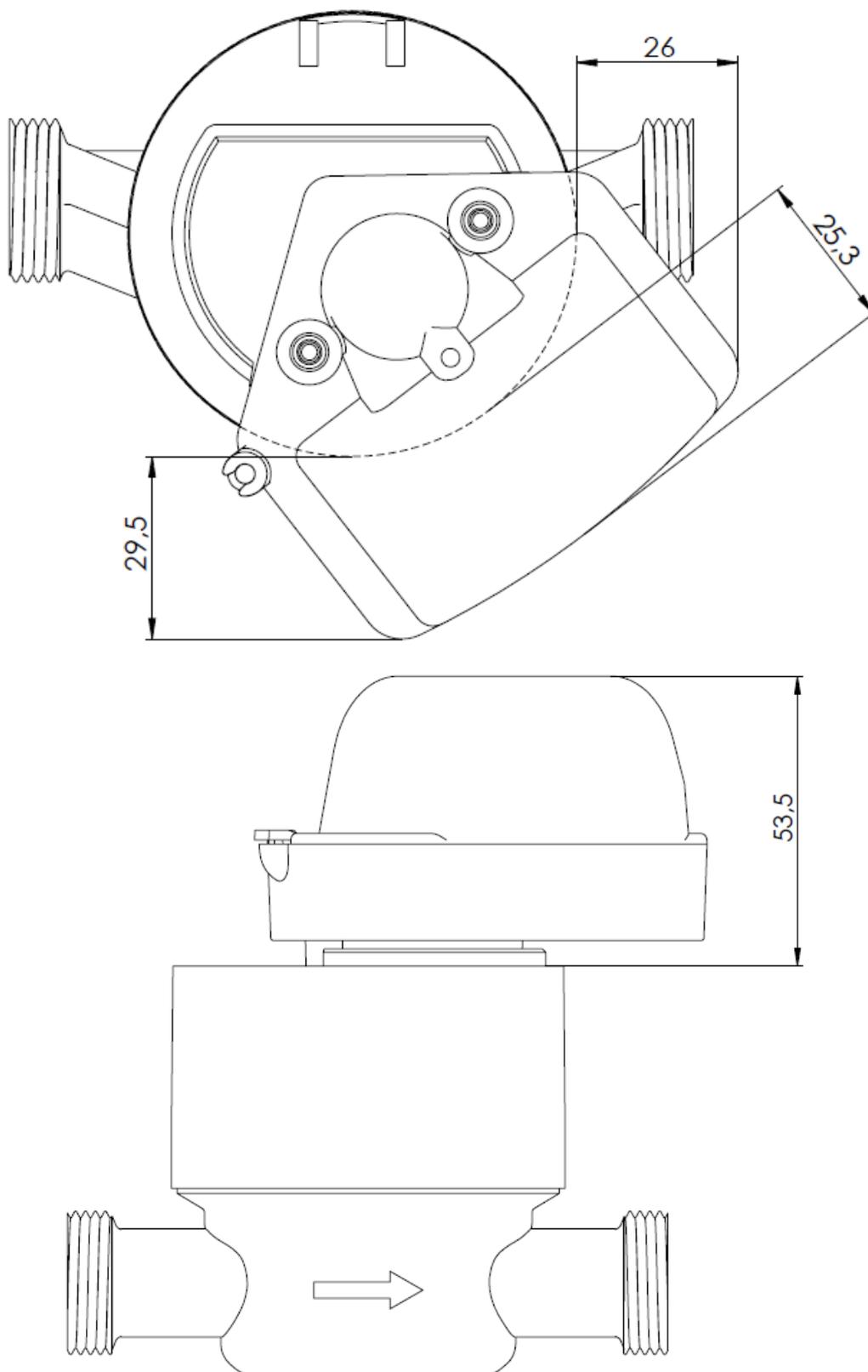
- **MacIQ WM Pulse** – wired connection with pulse generator or flowmeter



- **MacIQ WM S** – direct installation on Sensus HRI water meters without an adapter



Dimensions of the module installed on the Sensus DN15-20 water meter.



9. Compatibility

9.1 Direct installation of the water meter counter clock

Manufacturer	Type	Model MacIQ	Adapter
ITRON	Aquadis+	MacIQ WM	Itron
	Flostar	MacIQ WM	Itron
	Unimag +	MacIQ WM	Itron
	Flodis	MacIQ WM	Itron
DIEHL	Altair V3	MacIQ WM	Diehl
	Aquarius	MacIQ WM	Diehl
	Altair V4	MacIQ WM	Diehl
	Altair V5	MacIQ WM	Diehl
	Auriga	MacIQ WM	Diehl
APATOR	Smart D+	MacIQ WM	SmartD+
	Smart C+	MacIQ WM+	SmartD+
	JS Smart+ JS1.6-02 / JS4-02	MacIQ WM+	SmartD+
	Master C+	MacIQ WM+	MasterC+
	Industrial with diamagnetic	MacIQ WM+	industrial
SENSUS	HRI (120, 420, 620, 820)	MacIQ WM S	no adapter
	HRI-MEI MeiStream, MeiTwin	MacIQ WM S	MeiStream WMS
	HRI-MEI MeiStream, MeiTwin DN125+	MacIQ WM S 100	MeiStream WMS
MADDALENA JANZ	Full range with diamagnetic	MacIQ WM	Maddalena



Direct installation guarantees accurate reproduction of the mechanical water meter counter for a sampling frequency up to 5.5 Hz



The module versions marked with the number 100 (e.g. WM 100) are intended only for water meters with a pulse weight of 100 liters. It is not possible to change the pulse weight

9.2 Wired connection (MacIQ WM Pulse)

The MacIQ WM Pulse module meets the ISO 22158 standard and can count pulses at a frequency of up to 15Hz.

9.2.1 DI input configuration parameters:

Name	Description
DI1 configuration	configuration of the first input DI1 (Pulse 1A)
DI2 configuration	configuration of the second input DI2 (Pulse 1C)
DI3 configuration	configuration of the third input DI3 (Pulse 1B)
DI Impulse Length	minimum pulse length/time on pulse input or contact. configuration range 0.5ms to 100ms
DI Pause Length	minimum pulse pause length/time; configuration range 10ms to 500ms
DI Alarm Length	minimum length/time of alarm detection [ms]. configuration range 150ms to 5 minutes

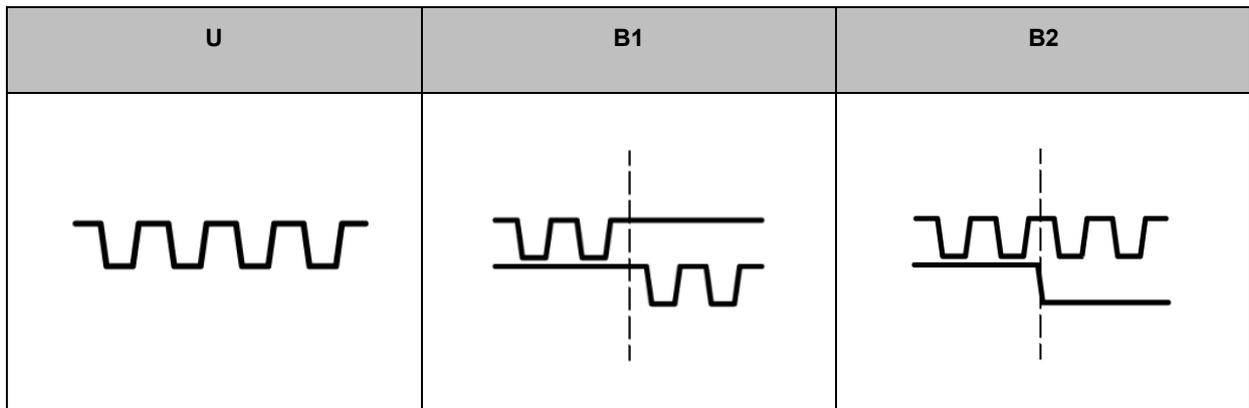


When configuring inputs as contacts, the minimum signal duration is set to 500ms (minimum is 120ms)

Detailed description of parameters **DI1 configuration**, **DI2 configuration**, **DI3 configuration**

DIx configuration Decimal value	Work mode
0	disabled
1	Pulse input (like MacR6 and MacR8)
3	NC (Normal Closed) contact input (as in MacR6 and MacR8)
7	NO (Normal Open) contact input (as in MacR6 and MacR8)
2	Flow direction
4	Alarm input (disassembly or magnetic interference)

9.2.2 Types of counter inputs:



Counting input operation mode	Input functions			Parameter configuration		
	D11 Pulse 1A	D12 Pulse 1C	D13 Pulse 1B	D11 Configuration	D12 Configuration	D13 Configuration
Jeden kierunek, typ U	forward	-	-	1		0
One direction with NC alarm on DI2, typ U	forward	alarm (NC)	-	1	3	0
One direction with NO alarm on DI2, typ U	forward	alarm (NO)	-	1	7	0
Two directions typ B1	forward	back	-	1	1	0
Two directions, with a direction line, typ B2	forward backward	flow direction	-	1	2	0

Dual Direction with NC Alarm on DI3, typ B1	forward	back	alarm (NC)	1	1	3
Two directions with NO alarm on DI3, typ B1	forward	back	alarm (NO)	1	1	7
Two directions with NC alarm on DI3, with direction line, typ B2	forward backward	flow direction	alarm (NC)	1	2	3
Two directions with NO alarm on DI3, with direction line, typ B2	forward backward	flow direction	alarm (NO)	1	2	7

Examples of impulsers compatible with MacIQ WM Pulse

- Itron Cyble Sensor V2
- IZAR Pulse 3&4 Flis



In the case of pulse generators based on technology requiring additional power supply, it must be supplied from another source.

9.2.3 DO output configuration parameters:

Name	Description
DO1 configuration	first output configuration DO1 (OC1)
DO2 configuration	second output configuration DO1 (OC1)
DO Impulse Length	output pulse length/time configuration range 0.5ms to 100ms
DO Pause Length	length/time of pause between output pulses [ms] configuration range 10ms to 500ms

DO1 Alarms	configuration of DO1 output alarms from which the contact output is active
DO2 Alarms	configuration of DO2 output alarms from which the contact output is active

10. Antenna options

The MacIQ WM IoT module can be equipped with two types of antennas that have been designed to ensure maximum data transmission efficiency from each location.

	<p>Integrated external antenna</p> <ul style="list-style-type: none"> • 3-meter cable • maximum gain 5 dBi, • magnetic base • hermetically sealed • can be equipped with SMA socket • optional well mounting kit available
	<p>Integrated short antenna</p> <ul style="list-style-type: none"> • maximum gain 3 dBi

Installation

1. Important information

The MacIQ WM device requires strict adherence to the installation procedure. Any deviation from the process can lead to issues that could require another onsite visit.

All communication with the device is realized remotely (if the module is not equipped with NFC), so the first step is to confirm that the data transmission service from our GSM network provider is running and our device is correctly added to the account in the eWebTel system.

The installation procedure consists of several steps:

- Water meter verification (cleanliness, technical condition, impulse weight)
- Adapter installation (if required)
- Installation of the IoT module and antenna
- Module configuration
- Initializing the first communication



Failure to initialize communication at the installation location will result in incorrect calibration of the module and, consequently, a difference between the water meter reading and the counter sent to the reading platform.



The equipment is only suitable for mounting at a height of ≤ 2 m

2. Before you install

- Create eWebTel account and log in via web browser.



All terms and conditions need to be accepted



User account needs to have permission to install the device

- To configure MacIQ WM devices with NFC interface, use the Confit! data loggers application
- To configure MacIQ WM devices without NFC interface, use the Confit! MacIQ WM application
- Both are Android-only applications. You can download and install the appropriate application by scanning one of the QR codes below



Confit! data loggers



Confit! MacIQ WM

3. MacIQ WM direct installation on the water meter counter

Direct installation of MacIQ WM on the water meter counter is possible using dedicated PLUM adapters. Volume counting is performed by the interaction of inductive sensors with the metalized water meter rotating dial.



Water meters equipped with optical and Hall effect readings are not compatible with Mac IQ WM. It will be necessary to use impulser from the water meter manufacturer and a wired connection to the MacIQ WM Pulse or MacR6 N module.

Each adapter is marked with the first two letters of the manufacturer's name of the water meter it is intended for.

Before installation, we must make sure that the water meter clock is as clean as possible.

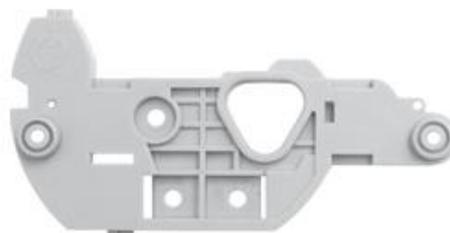


Adapters vary in shape, size, and mounting technique. Full list of adapters in the [Adapters](#) section.

DI – DIEHL



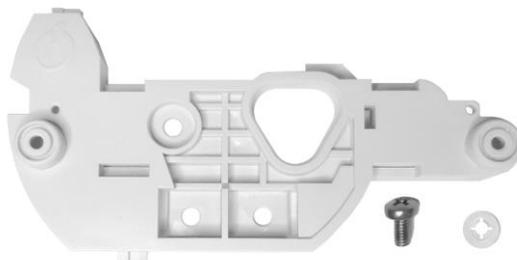
IT – ITRON



3.1 Itron

The adapter kit includes:

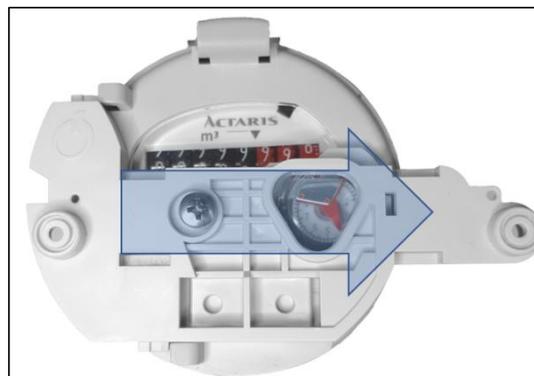
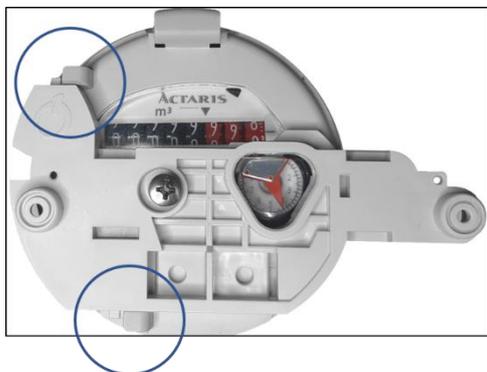
- adapter ITRON,
- 1x screw M4,0x8,0,
- 1x washer ANTI-LOSS M4,0x0,8.



1. Place the screw in the adapter and lock it with a washer as shown in the drawing below - this will prevent the screw from falling out and getting lost.



2. Install the adapter on the water meter by hooking it onto the structural elements of the counter housing, next tighten the screw. In the case of new water meters, it will be necessary to remove the dummy plug that covers the thread. The triangular window of the adapter must be aligned with the rotating pointer of the counter.



3. The bottom of the device must be flush with the adapter surface. Any gap between the adapter and the module is not allowed.



3.2 Diehl

The adapter kit includes:

- adapter DIEHL,
- 1x screw M3,0x12,0,
- 1x square washer M3 – placed in adapter.



1. Install the adapter on the water meter by aligning the triangular window with the rotating pointer of the counter. The adapter may visibly open during installation. Correct attachment will be signaled by a clicking sound.
2. Tighten the screw until the two edges of the rim are connected. Make sure that the adapter is mounted correctly - parallel to the surface of the counter.



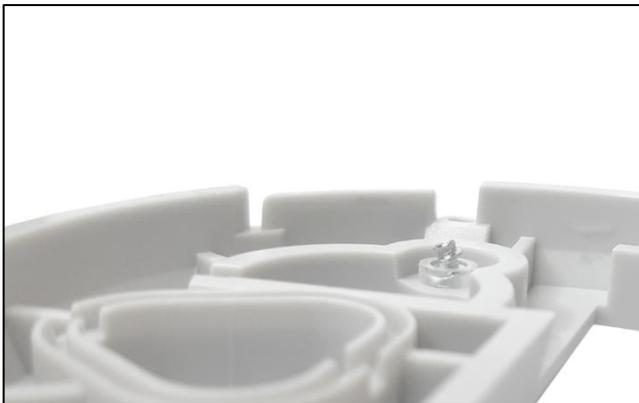
3.3 Maddalena

The adapter kit includes:

- adapter JANZ/MADDALENA,
- 1x screw B3,0x8,0,
- 1x washer ANTI-LOSS M3.



1. Place the screw into the adapter – pre-tighten the screw using a washer as shown.
2. Remove the counter cover, if present. Place the adapter in the hinge and secure it to the counter clock by screwing in the screw.



3.4 Apator Smart D+

The adapter kit includes:

- adapter Apator Smart D+,

The Apator Smart D+ water meter adapter is transparent

1. Snap the adapter into place
2. Make sure the adapter fits properly and that all the latches are fastened.

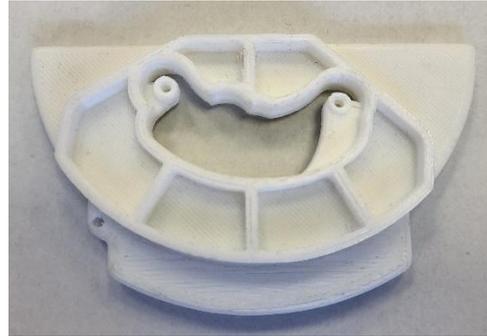


3.5 Sensus Meistream

The Sensus Meistream water meter adapter is made of powder printing. It is installed in the same way as the water meter manufacturer's pulse generator. The adapter has a hole that allows you to install a seal that protects against unauthorized disassembly of the adapter.

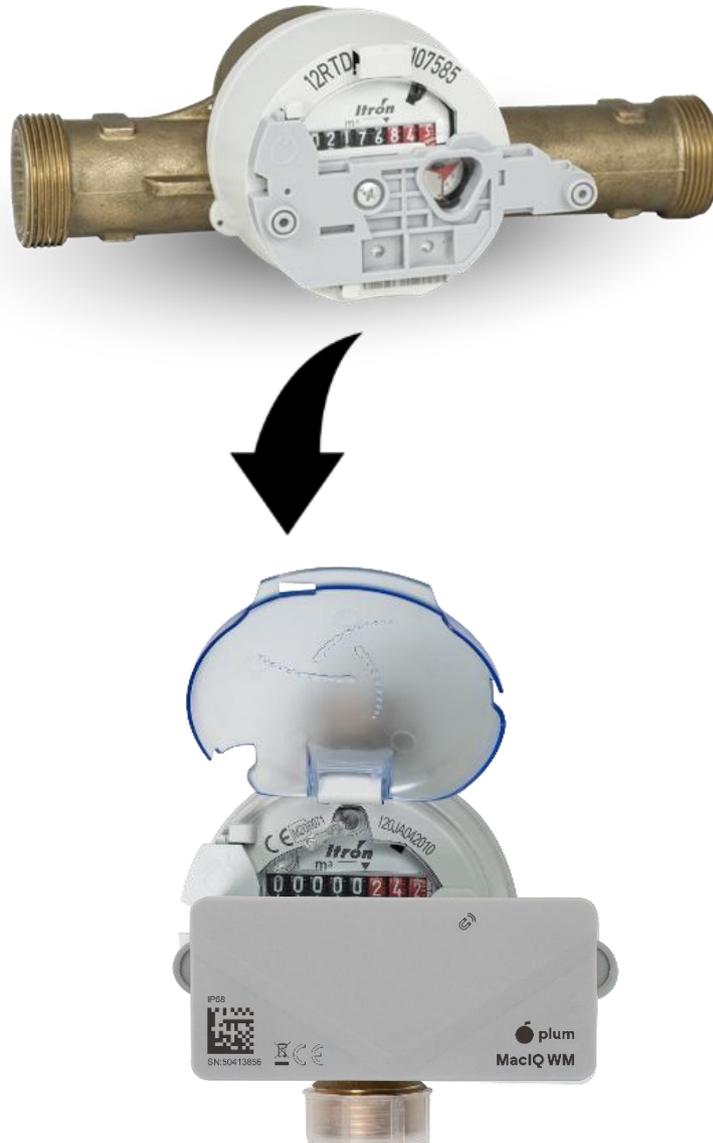
Two versions of the adapter are produced depending on the module model used. Sensus Meistream water meter measurement is supported for MacIQ WM+ and MacIQ WMS.

- Insert the adapter into the correct position
- Make sure that the adapter sits properly in place
- Slide the latch to attach the adapter to the water meter (same as OEM adapter)
- Make sure that the adapter adheres properly to the surface of the water meter and the latch is fully secured in place.



3.6 Installing the MacIQ WM module on the adapter

After the correct assembly of the selected adapter, install the recorder by securing it with two plastic rivets. Using the ITRON water meter as an example.



Make sure the rivets and the recorder are mounted correctly! This is a prerequisite for proper operation.



4. MacIQ WM S for Sensus HRI water meters

Direct installation on the water meter counter is realized with MacIQ WM S. Volume counting is performed by interaction of inductive sensors with the metalized water meter pointer. Before installation, we must make sure that the water meter counter is as clean as possible.



According to the manufacturer's recommendations Sensus the torque of the screws should be 0.6 Nm. The thread in the water meter is delicate so **special care is recommended**.



Make sure the recorder is seated properly, then tighten the two screws securing the recorder.



5. MaclQ WM / WM S configuration

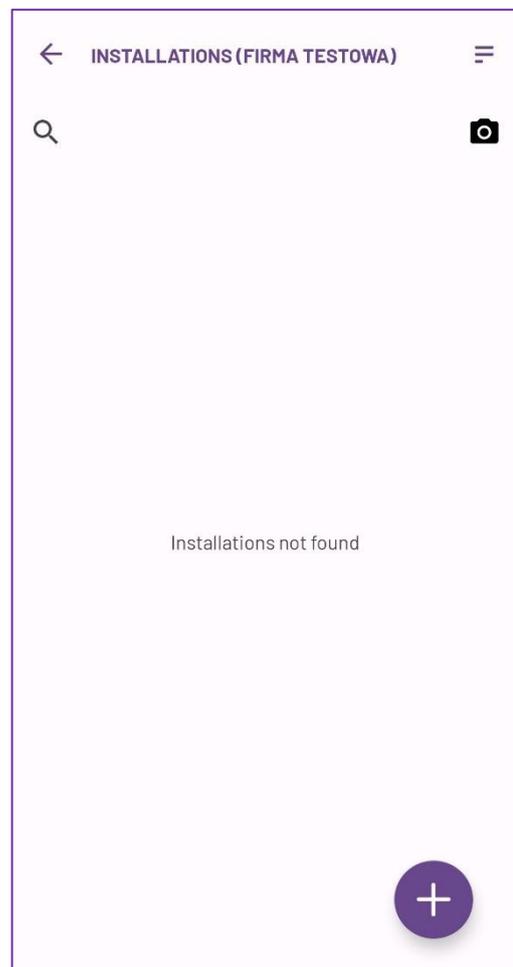
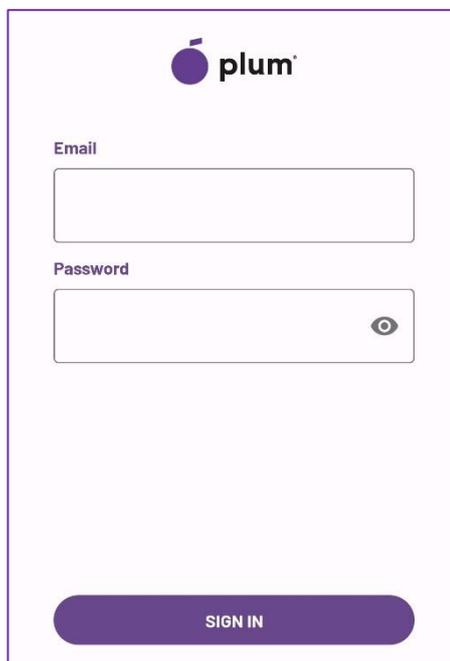
MaclQ WM is delivered factory configured according to the specification provided by the customer. The IoT module is compatible with various types of water meters using an automatic calibration mechanism. The device is glued and secured against tampering. The SIM card is non-replaceable and must be delivered to the manufacturer before the order is fulfilled.

Configuration comes down to setting the counter value, pulse weight, water meter serial number and geolocation data. To carry out the process, the following are required:

- Phone/tablet with Android OS
- Application Confit! MaclQ

Step by step instructions

- Run application **Confit! MaclQ**
- Log in to the application using your **eWebTel** account and select the **Company** to which the modules will be installed.

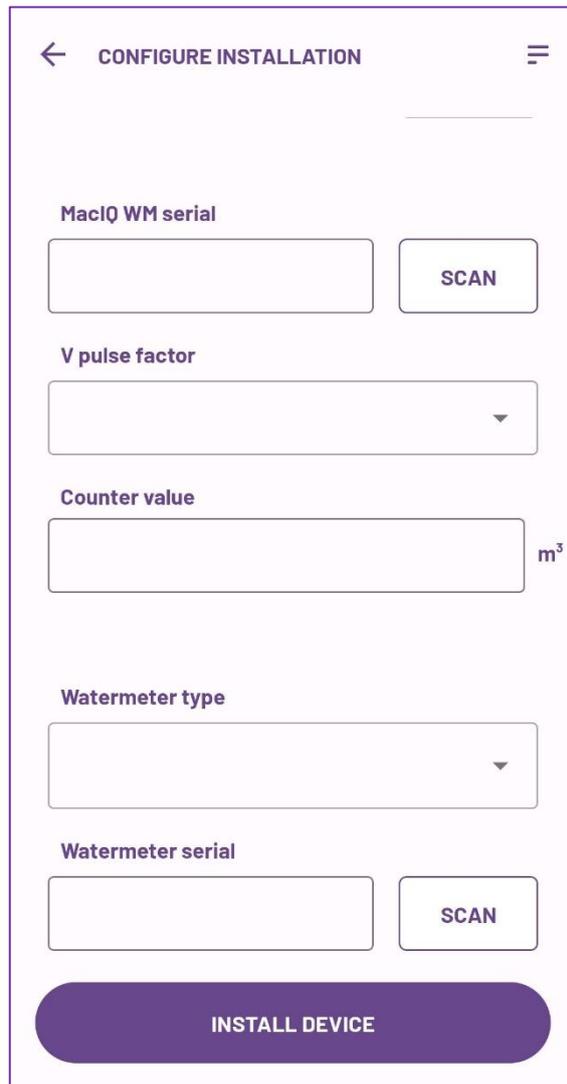


 minimum required permission level: installer, first login and account activation required using a web browser.

- Add device using „+“
- Scan the MaclQ module QR code or enter the serial number manually.

 Make sure that the device is correctly added to the eWebTEL platform and that the measurement points have been created correctly.

- Fill in or scan the serial number of the assigned water meter,
- Select the pulse weight (decimal places),
- Enter the "Value of the counter V" manually according to the water meter counter readings, considering the number of digits after the dot (for an imp. weight of 1L, i.e. 0.001 m³, enter 3 digits after the dot)
- **Click the "change" button and then "AUTOCOMPLETE LOCATION" to fill in the address data.** The address data will be completed using the GPS sensor built into the phone or tablet.
- Select the start installation button. Do not close the application. **Wait until the application communicates with eWebTel.**
- The application will display the message "Waiting for the order to be executed. Start installation mode on your device."
- The module is ready to start installation mode.



← CONFIGURE INSTALLATION

MacIQ WM serial

V pulse factor

Counter value

m³

Watermeter type

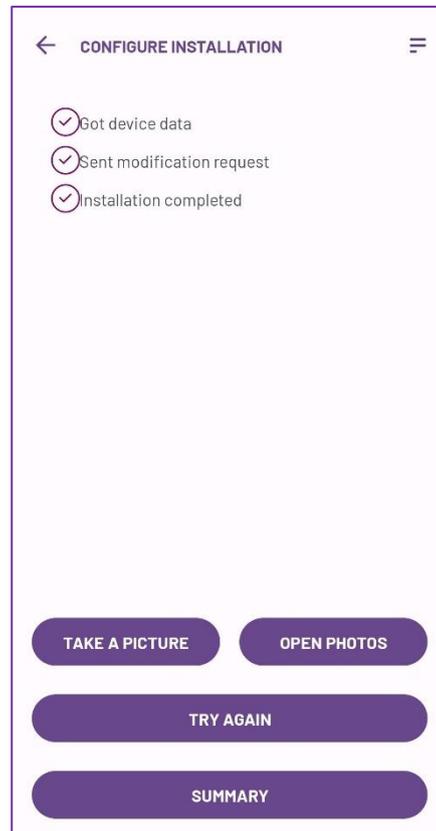
Watermeter serial

5.1 Initialization of the IoT module – Installation mode

- Place the magnetic element on the front surface until the LED element starts to glow continuously and then starts to pulse regularly. Then remove the magnetic element.
- The device will start searching for an available LPWAN NB-IoT or LTE Cat. M1 network. The LED indicator will flash during this time.
- Detection of the network and correct connection to the IT system processing the data will result in continuous LED signaling.
- Once the recorder is properly configured, the Confit! MacIQ application will display the message "Installation completed successfully".
- The values of the modified parameters will be visible after clicking the "Summary" tab.
- We check whether the data we entered is consistent with that displayed by the system. We refresh the displayed data by swiping from the top to the bottom of the screen. We check whether the time rate is consistent with the installation date.



*Magnet placement location
(marked with Magnet icon for MacIQ WM, WM S)*



The device is configured and ready to use.



The Confit! MacIQ application displays in the list only the recorders installed using our Android device.

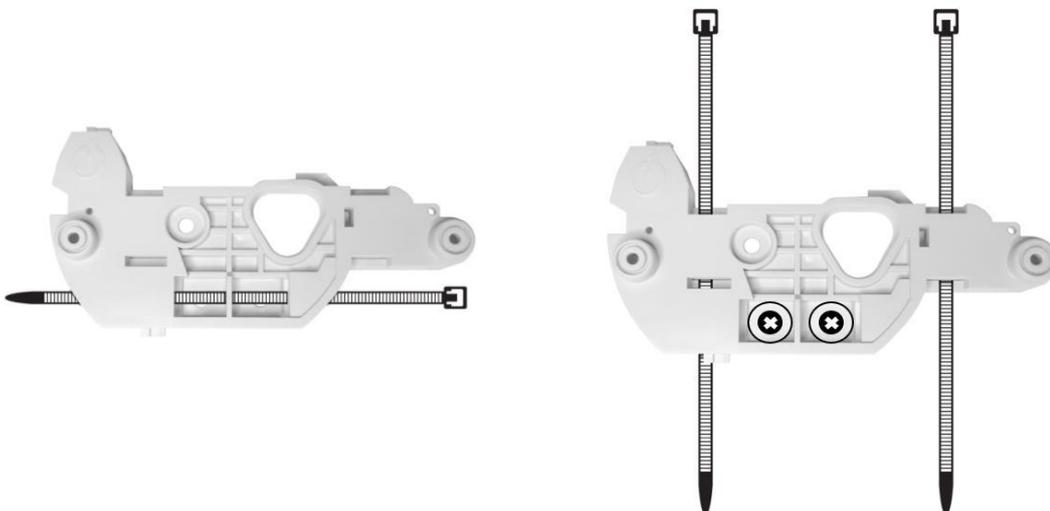


Failure to initialize communication at the target location will result in incorrect calibration of the module and, consequently, a difference between the water meter reading and the counter sent to the reading platform.

6. MacIQ WM Pulse



Mount the module on the wall or with a band on the holder using the adapter.



Mount the recorder on the adapter using the mounting rivets.

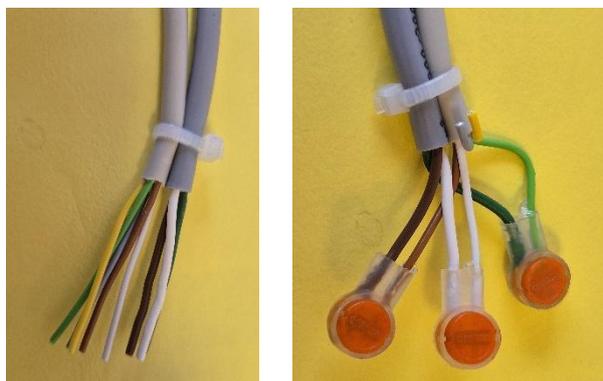
6.1 Wired connection

Connect the module's pulse input to the transmitter output, paying attention to the input polarity.

For correct flow direction recognition, connect the direction status line or the input of a separate reverse counter.

To connect the module cables to the flowmeter cable, it is recommended to use clamp connectors with gel sealing as shown on the picture below.

Color	Description
White/Gray	Pulses forward
Brown	Pulses backward or direction
Green	GND
Yellow	Alarm (Flow)



6.2 Sample connection diagrams for different impluser manufacturers

Sensus HRI-Mei B2		
Wire connection	MacIQ WM Pulse	Sensus HRI-Mei B2
Pulses forward	White	White
Pulses backward	Brown	Yellow
GND	Green	Gray
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-LF pulses backward	DI3-off

Sensus HRI B2		
Wire connection	MacIQ WM Pulse	Sensus HRI B2
Pulses forward	White	White
Pulses backward	Brown	Yellow
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-LF pulses backward	DI3-off

Maddalena QuadraPlus		
Wire connection	MacIQ WM Pulse	QuadraPlus
Pulses forward	White	White
Pulses backward	Brown	Yellow
alarm	Yellow	Green
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-direction	DI3-contact input NC

Itron Cyble Sensor		
Wire connection	MacIQ WM Pulse	Itron Cyble Sensor
Pulses forward	White	Black or Gray
Pulses backward	Brown	Yellow
alarm	Yellow	Green
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-direction	DI3- contact input NC

Diehl Hydrus		
Wire connection	MacIQ WM Pulse	Diehl Hydrus
Pulses forward	White	Yellow
Pulses backward	Brown	Green
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1- LF pulses	DI2- direction	DI3-off

6.3 NFC configuration

The device is equipped with an NFC (Near Field Communication) interface operating at a frequency of 13.56 MHz in accordance with the ISO/IEC 14443 standard.

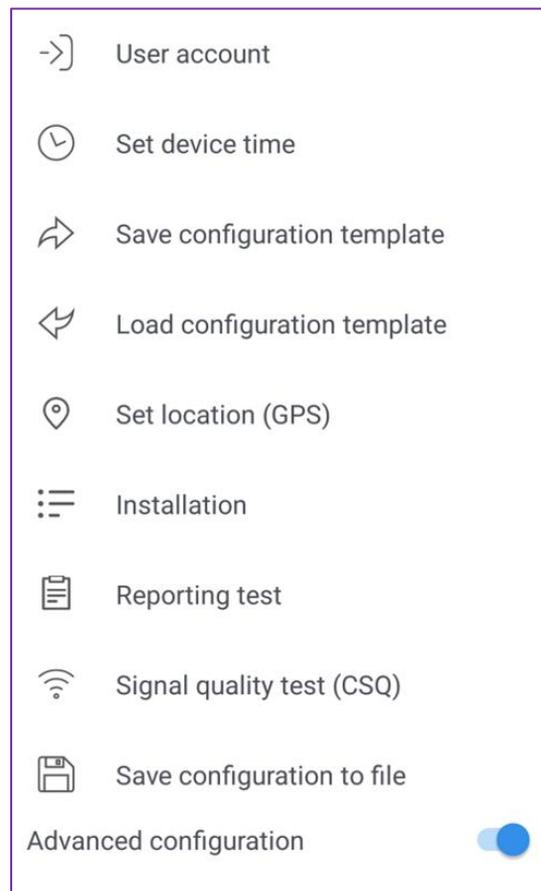
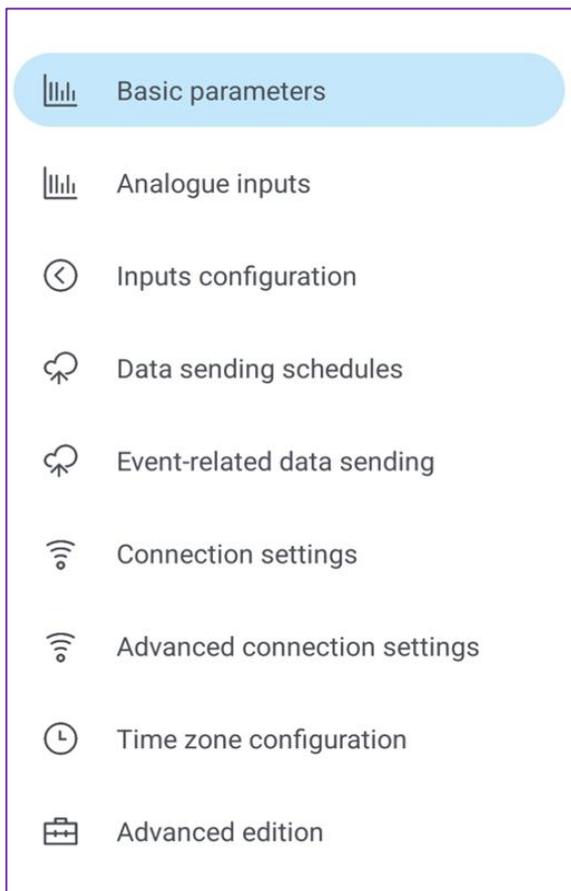
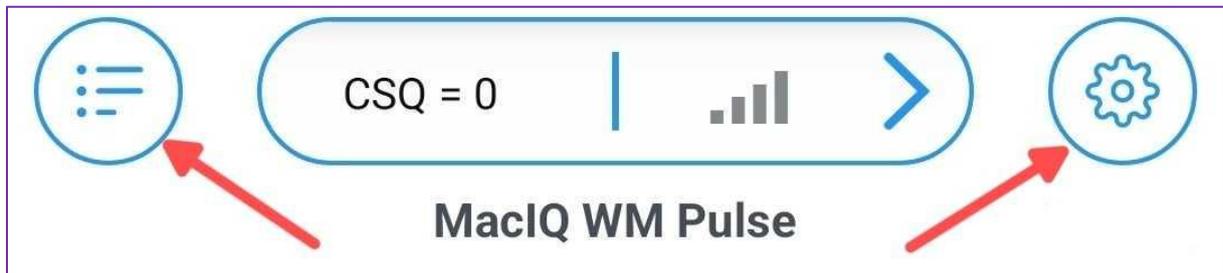
Before configuring the MacIQ WM Pulse module, download and install the Confit! Recorders mobile application

The application can be obtained by sending an email inquiry to service.gas@plum.pl or downloaded directly from the application in the Google Play Store.

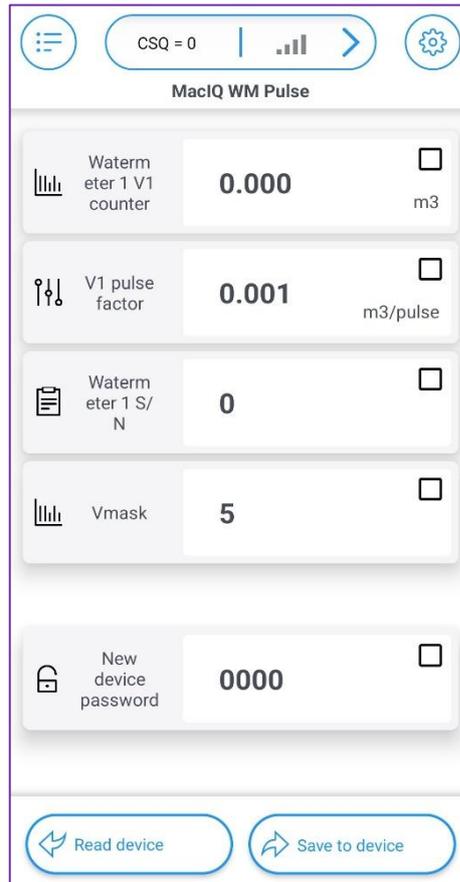
- Run application **Confit! Data loggers**
- After activating the NFC menu, place your phone on the module surface to read its configuration
- The positioning of the phone depends on the location of the antenna



Using the two icons located in the upper corners of the screen, we can open the menu for selecting parameters and configuring the device on any screen of the ConFIT! Data Loggers application.



- Go to the basic **parameters section**
- Set the flow meter/water meter counter
- Configure the pulse weight,
- It is recommended to configure the serial number of the water meter/flow meter.



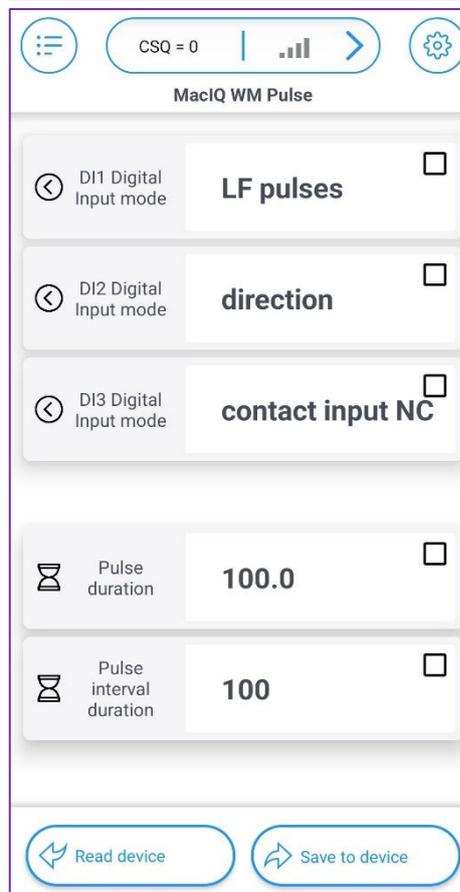
CSQ = 0 | .lll > ⚙️

MacIQ WM Pulse

Watermeter 1 V1 counter	0.000	<input type="checkbox"/>
V1 pulse factor	0.001	<input type="checkbox"/>
Watermeter 1 S/N	0	<input type="checkbox"/>
Vmask	5	<input type="checkbox"/>
New device password	0000	<input type="checkbox"/>

↩️ Read device ↶ Save to device

- Perform the **input configuration** according to the wired connection
- If the flowmeter requires a different pulse duration or interval duration, we can change these values here.



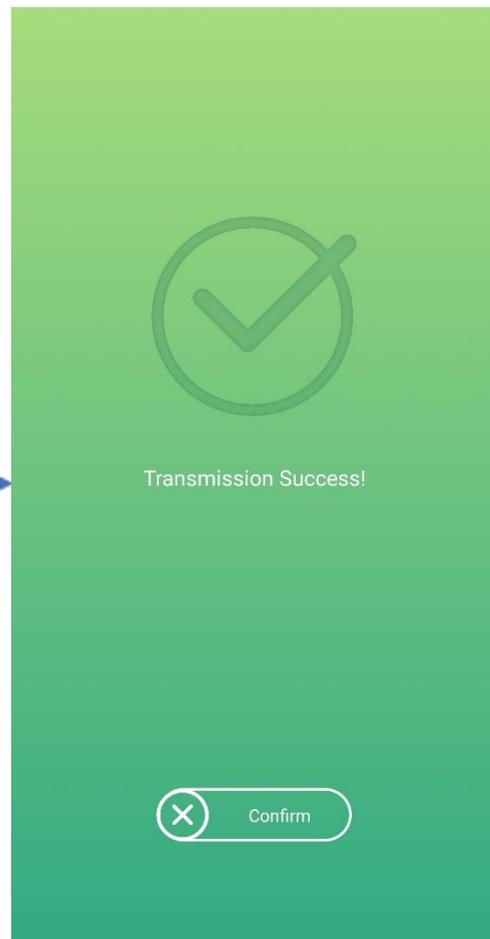
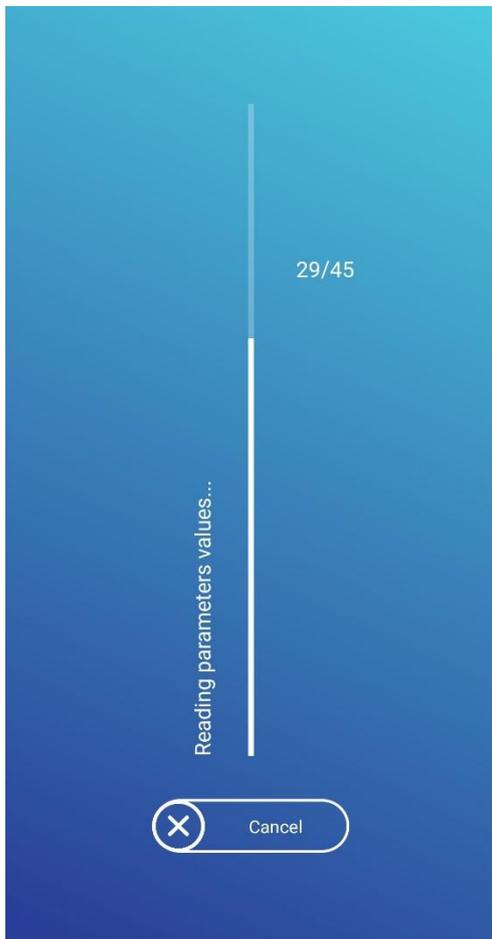
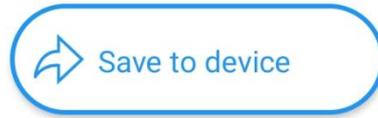
CSQ = 0 | .lll > ⚙️

MacIQ WM Pulse

D11 Digital Input mode	LF pulses	<input type="checkbox"/>
D12 Digital Input mode	direction	<input type="checkbox"/>
D13 Digital Input mode	contact input NC	<input type="checkbox"/>
Pulse duration	100.0	<input type="checkbox"/>
Pulse interval duration	100	<input type="checkbox"/>

↩️ Read device ↶ Save to device

- Select **Save to Device** at the bottom of the screen and save the configuration by placing the phone on the module surface.



- Press **Read Device** and hold the phone close to the recorder to confirm that the data has been sent correctly

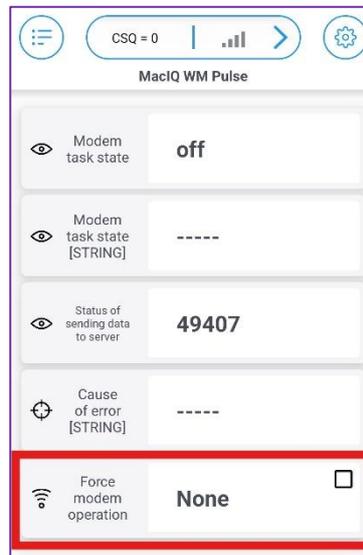
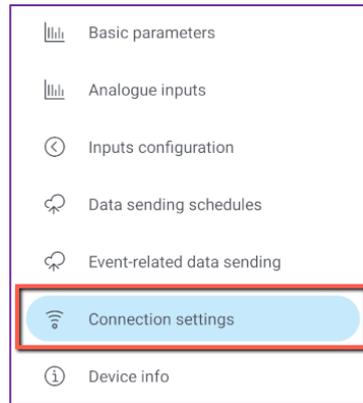


6.4 Initiating communication

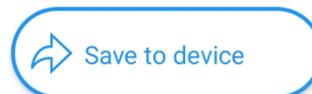
The sending can be initiated by applying a magnetic element similarly to other MacIQ WM models or using **Confit! Data Loggers** application.



1. Go to the *Connection Settings* tab.
2. In the *Force Modem Operation* tab, select one of the commands and save it to the device:
 - **Installation – send full report.**
The module will send the complete data to the server as confirmation of correct installation and first communication with the system.
 - **Send billing report.**
The module will only send billing data as per predefined scheduled transmission.
 - **Send billing report and test network signal**
The network coverage is expressed as dashes on the top header (CSQ) and numerically (CSQ: from 0 to 31). Each refresh of the indications requires reading the module again after successful transmission.
 - **Force remote firmware update**
Log in to the Upl! server to download firmware if available.
 - **Force update of downloaded firmware**
Force installation of remotely downloaded firmware
 - **Send billing report and synchronize time**
Forcing internal clock synchronization



3. Select **accept** and then **save to device**



7. Antenna installation

Antenna installation is **essential** for the correct operation of the device. The cable cannot be coiled or twisted. It should be as straight as possible and free of loops.

It is highly recommended that the IoT module installed in the well has its antenna placed in the highest possible location. Water meter wells extend deep below the ground surface, which suppresses the GSM network range. Using an antenna with a long cable, or a module with SMA port to connect the cable with an external antenna, reduces the impact of recorder being located underground. An antenna with a magnetic base allows for installation on the bottom to the manhole cover as well as its collar.

It is recommended to protect the antenna cable from falling to the bottom of the water meter chamber by securing it with a cable tie, e.g. to a ladder rung.

Whether a short or long antenna is used, the active component of the antenna **must not touch other elements of the environment**.



8. Other installation notes

Below is a list of points to pay attention to when installing the device to avoid problems during its operation. The manufacturer declares the reliability of measurements, battery life and continuity of work in the GSM network when the following conditions are met.

- **RANGE AND QUALITY OF THE RECORDER'S GSM NETWORK.**

Make sure that the GSM network operator whose SIM card will be used provides coverage at the installation site. There are "blank spots" on maps where the network signal level is very low, unstable or there is no signal at all. It is recommended to perform a GSM test at the installation site with the well cover closed.

The device installation process may be extended at a particularly low range.

- **GSM NETWORK RANGE AND QUALITY OF ANDROID DEVICES.**

If there are problems with the GSM network coverage, we suggest using a WiFi router or other access point that will provide data transmission on the device with ConfiT! MacIQ application.

Operation

1. Introduction

Properly installed MacIQ WM does not require further maintenance. We only periodically verify if the mechanical water meter counter clock is showing the same value as the IoT module.

The operating time of the recorder depends mainly on the frequency of data sending. PLUM declares uninterrupted operation for 11 years under the following conditions:

- Sufficiently high level of GSM network coverage.
- One transmission per day
- No excess number of alarms sent.
- No damage to the antenna or grounding of the active element
- No water flooding of the antenna.

2. Remote configuration - eWebTel

IoT module remote configuration is possible via any web browser (including mobile ones) using the eWebTel data acquisition system.

Detailed description of the system can be found in the document "eWebTel user manual" available on the website www.water.plum.pl. This chapter will discuss the parameters that are saved in the non-volatile memory of the device and can be modified remotely.

To make changes, go to the Advanced Edit section. A complete table of Available Parameters (DP) will be displayed, containing raw values without explanations. This function is intended for advanced users only.



Unauthorized changes to board parameters **may cause device failure**.

The screenshot shows the 'Advanced edition of DP device parameters' page for a MacIQ WM device (ID: 1005296779). The page is divided into two main sections: 'User and password settings for modifying device parameters' and 'Device parameters'.

The 'Device parameters' section contains a table with the following data:

Index DP	Parameter name	Value	Unit (from dp table)	Date of registration in the database	
0	V	565.123	[m3]	5/27/2025 10:52:26 AM	
1	Process Events	0		5/27/2025 10:52:26 AM	
2	System Events	0		5/27/2025 10:52:26 AM	
3	System Status	103415809		5/27/2025 10:52:26 AM	
4	Mobile Data Status	505349489		5/27/2025 10:52:26 AM	
5	Sensor Status	65536		5/27/2025 10:52:26 AM	
6	Battery	90	[%]	5/27/2025 10:52:26 AM	
7	Temperature	24.75	[°C]	5/27/2025 10:52:26 AM	

The parameter can be modified by clicking the **Edit icon** . We can only configure the device parameters where this icon is displayed, and the other ones are read-only displayed for diagnostic purposes.



Our changes will only be implemented when the device sends the data according to the programmed schedule or the device installation mode is started locally.

In the next window we will be asked to enter the username and password for the device. Service functions are available only for the SERVICE user and the service password that is generated for a given day. The default password for standard USER-000 to 4096.

i Editing the parameter: V x

User	<input type="text" value="USER-000"/>	Password	<input type="password" value="••••"/>
Old parameter value	<input type="text" value="565.123"/>		[m3]
New parameter value	<input type="text" value="1236.321"/>		[m3]

i eWebtel x

The parameter change request has been added. It will be forwarded during the next communication session of the device.

Then the eWebTel system will show **red exclamation mark**  next to the modified parameter confirming acceptance of the command for execution.

Index DP 	Parameter name 	Value	Unit (from dp table)	Date of registration in the database 	
0	V	565.123 	[m3]	5/27/2025 10:52:26 AM	

Moving the cursor over it will display a description with the value that will be modified.

The parameter can not be edited. Next modification will be available after comuncation with device, or after removing changes using "Delete" button. The target value of the device parameter: '1236.321'.

Modifications can be undone using the **Delete** . Once our changes are executed by the IoT module, the **red exclamation mark**  will disappear and we should see desired value in the system. To modify the value again we will have to start the whole process from the beginning.

2.1 DP table

List of the most frequently used editable items of the Available Parameters table (DP)

Number	Name	Editable field description
1	V	Water meter counter
17	Watermeter S/N	Water meter serial number
18	Q min alarm	Minimum flow alarm threshold in m ³ /h. Event generated after 60 minutes cycle end
19	Q max alarm	Maximum flow alarm threshold in m ³ /h. Event generated after 60 minutes cycle ends
20	Q min warning	Minimum flow warning threshold in m ³ /h. Event generated after 60 minutes cycle ends
21	Q max warning	Maximum flow warning threshold in m ³ /h. Event generated after 60 minutes cycle ends
22	Leakage Threshold	Night leakage threshold at which an event is generated
25	RAT 1	RAT of the main GSM data transmission technology
26	RAT 2	RAT backup GSM data transmission technology
27	Band RAT 1	Band of the main GSM data transmission technology
28	Band RAT 2	Band backup GSM data transmission technology
29	PIN	SIM card PIN
33	Server Address	IP address of the server receiving the data
34	Server Port	Port of the server receiving the data
47	Work Mode	Entering storage mode. 0 off, 1 on
51	Imp LF	Water meter pulse weight in dm ³ /pulse
52	V mask	Number of places on the water meter before the decimal point

2.2 Remote change of impulse weight

To change the pulse weight remotely, modify the DP table parameters according to the list below. The values will be written to the device when communication with the platform is established.

	Imp LF	V mask
1 liter	1	5
10 liters	10	6
100 liters	100	7

3. Local communication

MaclQ WM series devices which are equipped with optional NFC are clearly marked on the housing. Another way of initializing local communication is to start one of two operation modes of the IoT module using a magnetic element placed near the location clearly marked with a magnet icon. Communication with the eWebTel data acquisition platform will be forced, which will send the necessary data. Values can be entered using a web browser or a dedicated **Confit! MaclQ** installation application.

IoT modules with NFC can be fully configured without the eWebTel platform using **Confit! Data Loggers** application that is available for download from the Play Store on the Android platform. Detailed instructions of the configuration process using NFC can be found in the chapter **6.3 NFC configuration**.

3.1 Installation mode

Installation Mode sends Current Data and full Registered Data, forces the start of calibration of the device with the water meter and performs the first login to the GSM network. Starting the Installation Mode is **critical** when installing the telemetry module on the water meter for the first time and initiating the first data transmission in a new location.



If we add a new device to our Company's account in the eWebTel platform, before carrying out the module installation and configuration process, we must send full data to the system using Installation Mode.

Procedure for starting the Installation Model

- Place the magnetic element to light up the LED diode with continuous light. Wait until it starts to flash regularly.
- Remove the magnetic element.
- The device searches for an available GSM network and performs a full login process. During this time, the LED diode flashes regularly.
- Detection of the GSM network will cause the LED diode to flash slower.
- Correct connection to the IT system will cause the LED diode to light up with a continuous light.

3.2 Sending registered data

To force the sending of Registered Data which is sent according to predefined schedule user should perform the following procedure.

- Place the magnetic element to light up the LED diode with continuous light. Wait until it starts to flash regularly.
- After 10 flashes, the LED will start flashing faster.
- Remove the magnetic element.
- Wait until the LED stops flashing

3.3 Verification of the water meter counter value

The device records the full water meter counter in internal memory. MaclQ WM can precisely verify that the correct counter value is being sent to data acquisition platform. To verify stored value, follow these steps:

- Make sure there is no water flow. If possible, turn off the supply.
- Place the magnetic element to light up the LED diode with continuous light. Wait until it starts to flash regularly.
- After 10 flashes, the LED will start flashing faster.
- Remove the magnetic element.
- Wait until the LED stops flashing
- Compare the data in the eWebTel platform with the reading from the water meter counter – make sure that the time and date in the system by the counter value is current and that the data has been processed by the system correctly.



If it is not possible to stop the water flow, we will not be able to accurately verify the counter reading due to the delay associated with data transmission. We will get an approximate number due to delay from data transmission.

3.4 Water meter counter value correction

To correct the water meter counter value, perform the first module installation procedure described in the Configuration section once again.

If the device that we want to correct is on the list in our application **Confit! MacIQ**, it is not necessary to add it again as new device. You only need to use the "reinstall" button to perform the counter correction process.

4. Water meter replacement

The water meter replacement procedure assumes two scenarios:

- replacement of the complete set with a new water meter + new IoT module
- replacement of the water meter while maintaining the previous IoT module

In both cases it is possible to save historical data of the measuring point.

4.1 Replacing the water meter and the IoT module as a set

Before setting off to the location where the device will be installed, you need to prepare a water meter + IoT module set. Then, you perform the installation procedure using the **Confit! MacIQ** application, which will allow you to enter new water meter serial number into the IoT module memory. Next you can hand over the set to the installer.

After completing the necessary installation work at the target location, the IoT module should be initialized using a magnetic element to calibrate it and confirm that the GSM network is available and the antenna installed correctly.

- Place the magnetic element to light up the LED diode with continuous light.
- Wait until it starts to flash regularly.
- Wait until the LED stops flashing.
- Correct connection to the IT system will cause the LED diode to light up with a continuous light.

Next the replacement procedure should be carried out in the eWebTel system, which will ensure the continuity of historical data of the measuring point. The procedure should be carried out within seven days from the date of installation.

4.2 Preservation of historical measurement data procedure



The module replaces only the measuring points it is equipped with. MacIQ WM usually has one measuring point. Example. An old device with measuring points V1, V2 is replaced with a new one that only has point V. The data of point V2 **will be lost!!**



Measurement Points must be named appropriately. The point name ends with ", V" for a flow measurement point, ", P" for a pressure measurement point and ", E" for an energy measurement point to maintain data continuity in the system. If integration with a SCADA system is necessary, it is recommended to avoid **diacritical marks**



If the name of the old device's measuring point matches the device's serial number (default value), it is **necessary** to change it before starting the procedure.

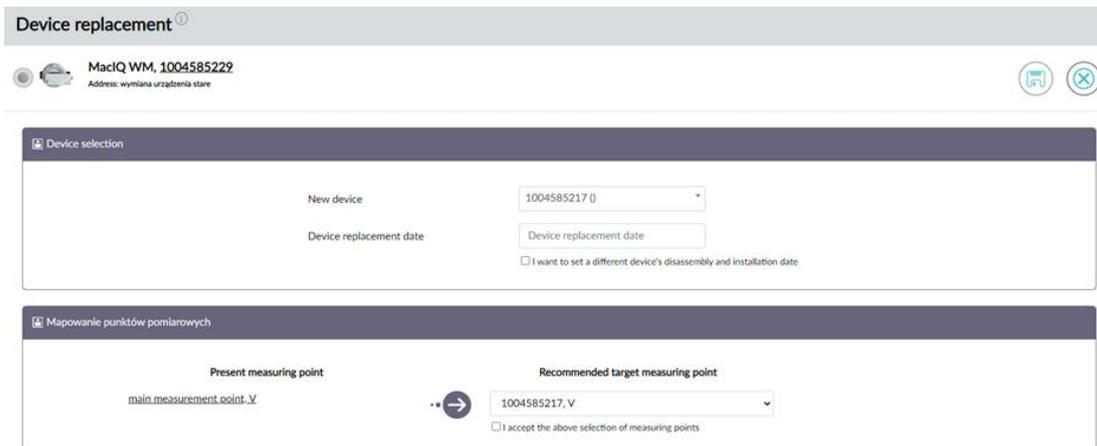


Before removing the old module, it is recommended to send installation report or send data according to a schedule. This will allow us to maintain continuity of recorded data.

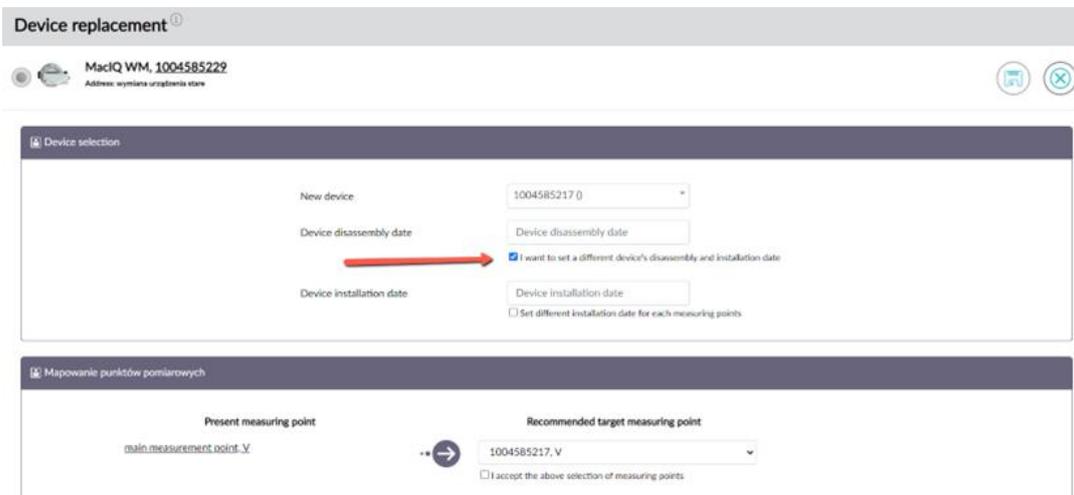
Then we select the new module and on the details page we select the „**Replace Device**” icon located in the right corner of the screen.



The **Device Replacement** main screen contains information about the new device, device replacement date, and measurement point data.



We can specify a different removal and installation date of the device by ticking the box.

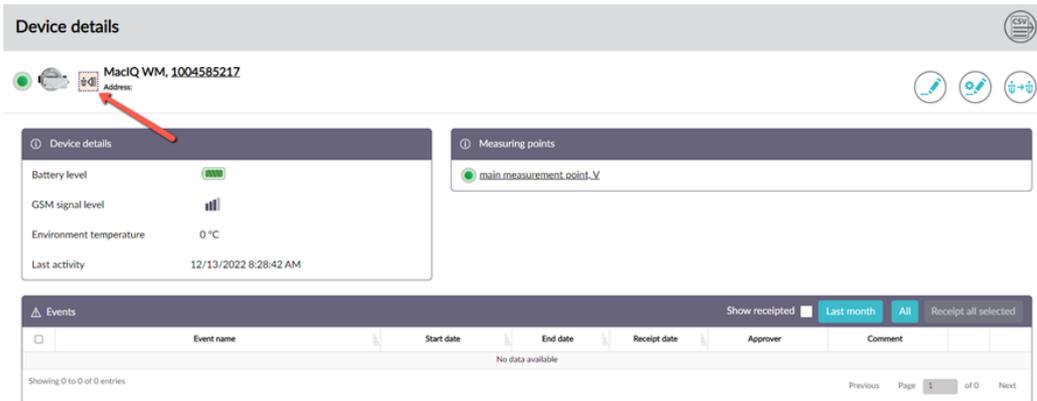


Then we select the target measurement point that is to replace the current one. Saving changes is possible only after ticking the box “I accept selection”.



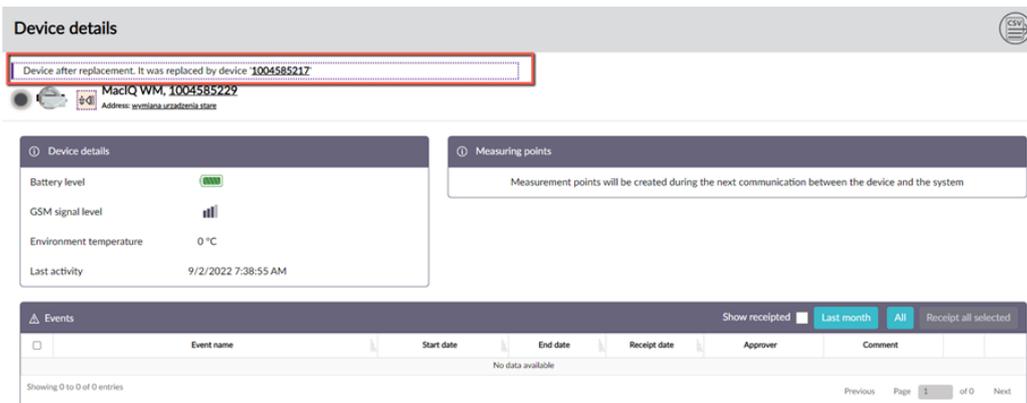
If the new device did not create the measurement point correctly, it will not be on the list and assigning the point will be impossible.

After confirming the changes, we are taken to the details page of the new device. An icon will appear that will help us recognize this device. When we hover the cursor, we will see information about which device has been replaced.



Even if the replaced device tries to communicate with the platform, the data will not show in eWebTel to maintain the cohesion of the measuring point.

The detail view of the old device contains a note of the replacement. The measurement points section is empty because they were assigned to the new device during the replacement procedure.



Device List view, the old device still appears, but is marked in black

Serial Number	Address	Device type	Status	Battery Level	Range	ICCID	GSM Operator	Environment temperature	Last Report Date	Parse priority	Data count from previous communication day (KB)	Previous communication day	Installation Date	First activity
1008195701	Poland	MacIQ WM S						25	5/8/2025 12:54:30 PM		1.544	2025-05-08		12/17/2022 4:52:48 PM
1008399836	Poland	MacIQ WM S					T-Mobile #5GBardziej	20	5/8/2025 2:56:31 AM		0.826	2025-05-08		2/26/2025 9:27:05 AM
1008399824	Poland	MacIQ WM S					T-Mobile #5GBardziej	19	5/8/2025 2:45:02 AM		0.792	2025-05-08		2/26/2025 10:33:25 AM
1008195661		MacIQ WM S					T-Mobile #5GBardziej	14	4/22/2025 6:03:05 PM		0.21	2025-04-22		12/18/2022 4:28:39 AM
1006300881	Poland	MacIQ WM Pulse						18	4/14/2025 5:42:14 AM		0	2025-05-26		1/23/2025 1:44:19 PM
1008146285	Poland	MacIQ WM S					T-Mobile #5GBardziej	12	4/14/2025 5:05:55 AM		0	2025-05-26		11/26/2022 4:10:46:35 AM
1008334557	Poland	MacIQ WM Pulse						5	4/11/2025 5:16:03 AM		0	2025-05-26		2/10/2025 2:25:37 PM
1008408643	Poland	MacIQ WM S						24	3/12/2025 12:47:46 PM		0.632	2025-03-12		3/12/2025 12:47:46 PM

If a device has been replaced for technical reasons, it is recommended not to remove it from your account for diagnostic purposes.

However, if we plan to reinstall the removed device at a different point, we must delete it from the system and add it again to the **Company** account

4.3 Water meter replacement preserving old IoT module

After carrying out the necessary installation work related to water meter and checking for leaks, the procedure should be identical to that for installing a new module.

The only information that would be edited is the counter value, water meter serial number and legalization date (if required).



It is recommended to include information in the **Description** field in the **Basic Edition** containing the date of water meter replacement.

5. IoT module replacement

If it is necessary to replace the device before installation on the water meter, it is required to add the new device to the **Company's** account in the eWebTel

After adding the device to your account, you need to initiate communication with magnetic element.

Next verify correct communication with the reading platform and that full DP Table has been sent in the Advanced Configuration of the module. We can proceed to install the module on the water meter counter as before.

6. IoT module alarms

Events generated by the device are divided into two types – **process** alarms and **instant**.

Instant alarms are sent by the device when an incident occurs. These are critical events that are essential for the correct measurement and operation of the device. The end of the alarm is recorded when it does not recur until the next scheduled communication. This group includes:

- Reverse Flow – detection of reverse flow above a specified threshold
- Maximum or minimum flow threshold exceeded – detection of water flow above or below a specified value in given period
- Device disassembly alarm – detection of module removal from the water meter
- Magnetic interference – detection of a strong external magnetic field occurring during given period

Process alarms are sent during planned transmission according to predefined schedule. This group of events includes:

- Low battery – detects low battery counter value
- Low GSM network level – no correct communication with the device within the specified period
- Device installation procedure – information about the performed installation process or meter counter correction

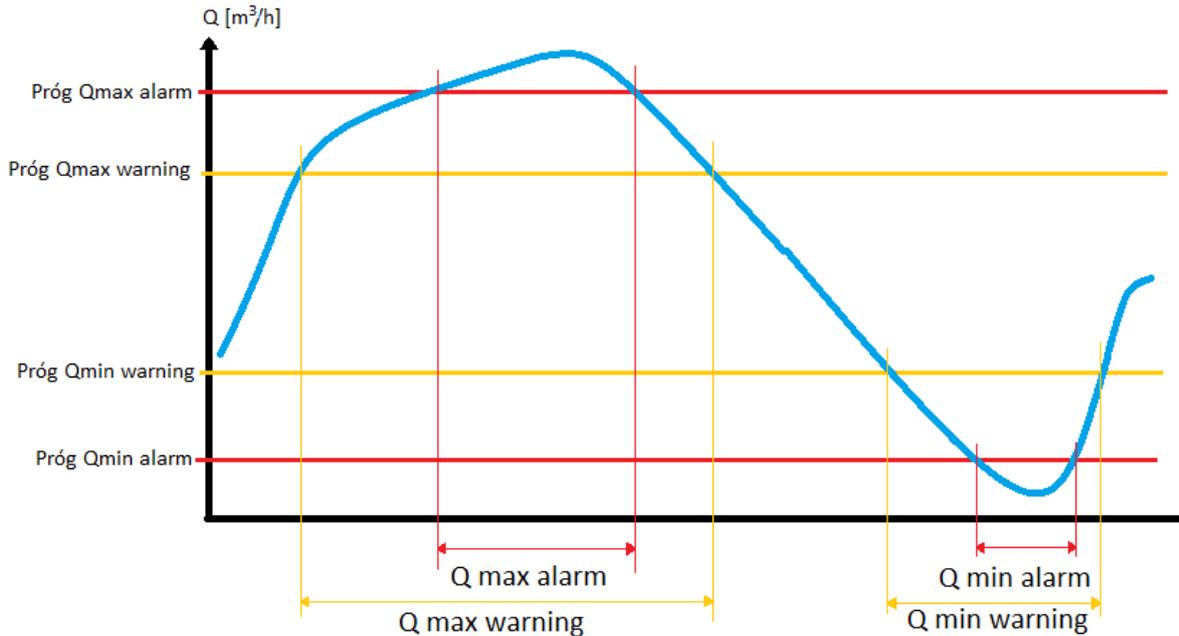


Alarms may be generated by incorrect operation or configuration of the telemetry module

IoT module has 4 events related to exceeding flow thresholds::

Q max alarm	alarm is reported if the water flow in [m3/h] exceeds the threshold value Q max alarm
Q min alarm	alarm is reported if the water flow in [m3/h] drops below the Q min alarm threshold
Q min warning	warning is reported if the water flow in [m3/h] exceeds the threshold value Q max warning
Q max warning	warning is reported if the water flow in [m3/h] falls below the Q min warning threshold

Sequence of alarms is illustrated in the graph below:



Detection of exceeding the alarm and warning flow thresholds is correlated with the device registration period (“**Reg. period**” parameter) and depends on the value of the “**Q events delay**” parameter.

At the time of registration (by default on the full hour, when Reg. period = 60min), the alarm and warning thresholds of the flow from the previous registration period are checked. If the registration period is less than an hour, the flow is converted to hourly flow. For example, with a 5-minute registration period, if $dV = 0.2\ m^3$ flowed in the last 5 minutes, the hourly flow is calculated using the formula:

$$Q = dV * (60min / \text{registration period in minutes})$$

in this case:

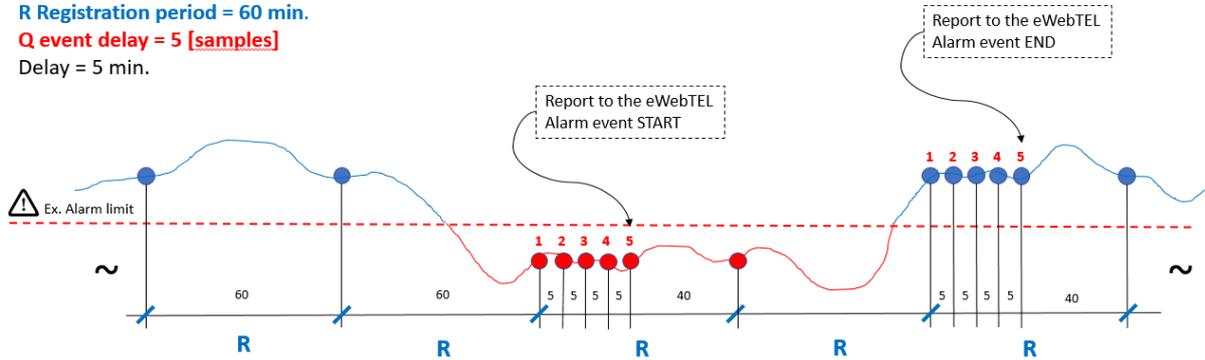
$$Q = 0,2 * (60 / 5) = 2,4\ [m^3/h]$$

When the alarm threshold is exceeded, the stage of checking whether the exceedance is not momentary begins. The flow is checked again every 5 minutes. If the flow exceedance persists for the next times specified in the “**Q events delay**” parameter (default 5), then an alarm is generated for the given exceedance.

If the “**Q events delay**” parameter has a value of 5 and the recording period is 60 minutes, the alarm will be generated 20 minutes after the full hour. Which means that after 5 exceedance events, counting detection on the full hour.

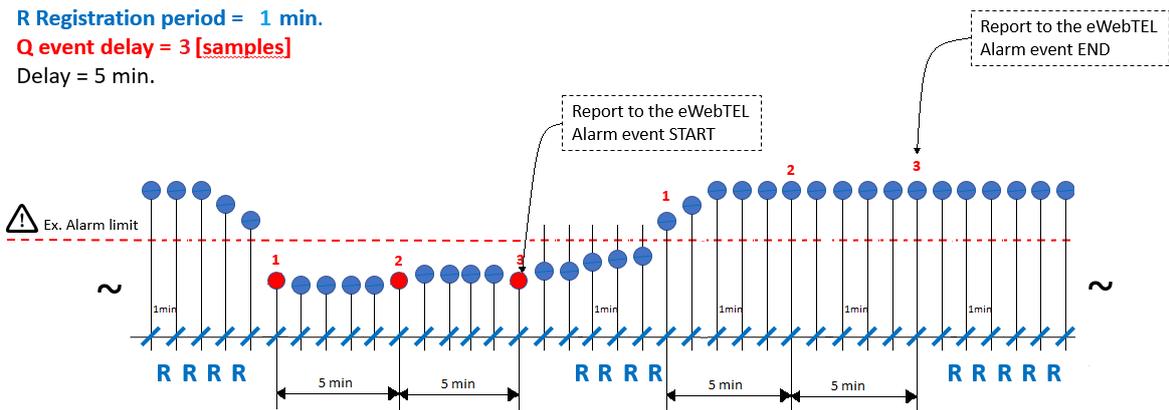
Example of Qmin Alarm with 60 minute registration period and “Q event delay” = 5 minutes

R Registration period = 60 min.
 Q event delay = 5 [samples]
 Delay = 5 min.



Example of Qmin Alarm with 1 minute registration period and “Q event delay” = 3 minutes

R Registration period = 1 min.
 Q event delay = 3 [samples]
 Delay = 5 min.



A report about an alarm can only be generated once per day due to preserving battery life of the IoT module which is highly affected by generating too many reports.

7. Setting the GSM network data limit

Data limits define the average daily amount of data that IoT module can send to the system. This approximate value allows you to define whether the device is working properly. Only the **Administrator** can take action to prevent the system from overloading if the device is unable to meet the assigned limit.

Administration -> **Device data limit** section can display a summary for all equipment, divided into individual module types.

Device data limits - Company

Device type: Show newest versions:

Device hardware number: Device software number:

Device type	Hardware and software number	Device profile version	Daily transmitted data limit [kB]	Company data limit [kB]
MacIQ WM	H2.0.0_5006	3	---	---
MacIQ WM	H2.0.0_5005	5	---	---
MacIQ WM	H2.0.0_5007	2	---	---
MacIQ WM	H1.4.1_5008	4	---	---
MacIQ WM	H2.0.0_5009	4	---	---
MacR6 N	H1.7.0_5018	1	---	---
MacR6 N	H1.7.0_5020	1	---	---
MacR6 N	H1.7.0_5023	1	---	---
MacR6-IoT	H4.0.0_5001	2	---	---
MacREJ 5 W	H1.3.0_5012	2	---	---
MacREJ 5 W	H1.8.0_5013	4	---	---

Showing 1 to 11 of 11 entries (filtered from 16 total entries) Previous Next

To configure the data limit for a specific device, go the **Basic Edition** section.

8. Data transmission

8.1 GSM network transmission

IoT module data is sent via the LTE Cat M1, LTE NB-IoT network using the built-in modem. The device sends at a user-specified time:

- current data,
- registered data

After the transmission is complete, the modem switches to listening mode – at this time it can receive reconfiguration commands issued earlier via the eWebTel system. This means that any change to the recorder parameters performed remotely via the reading system takes place during each report sent based on the schedule.

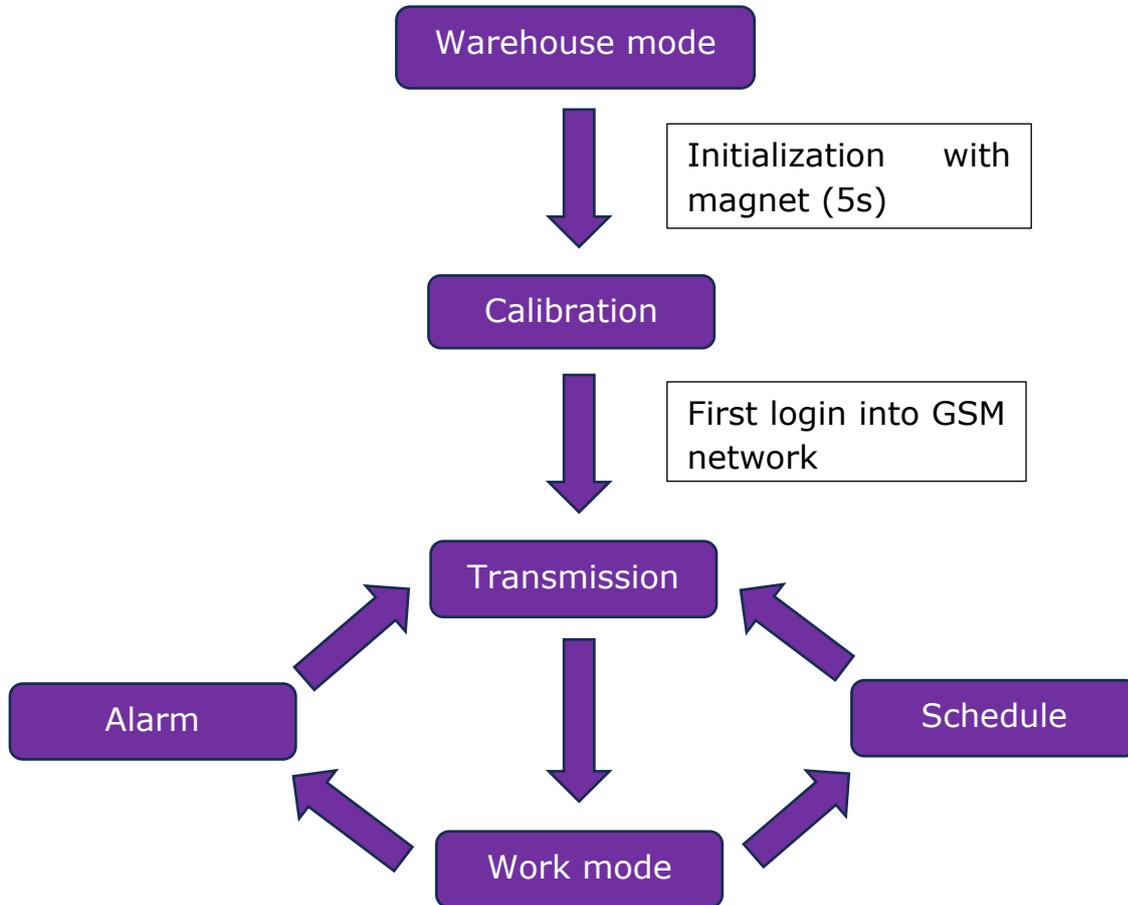
In the case of the MacIQ WM module, a single daily data transmission according to the schedule uses only 0.2 kB of data, which is particularly important in the case of poor GSM network coverage

If MacIQ WM does not receive commands from the server within 1 minute, the modem turns off until the next report according to the data sending schedule.

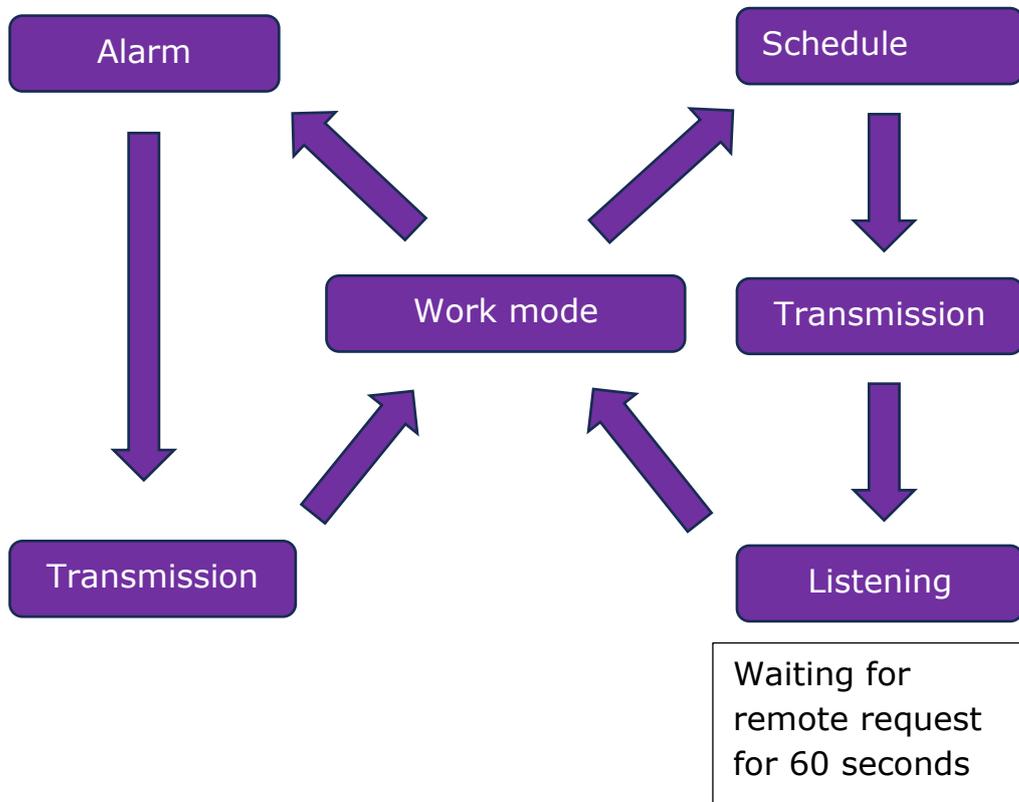


Alarms and events are sent immediately regardless of schedule configuration.

8.2 GSM network block diagram



8.3 Standard work mode block diagram



8.4 GM3 transmission protocol

The transmission protocol used in MacIQ WM is GM3.

Data transmission is realized in the table system: DP table – Available Parameters – contains the entire list of data saved in memory including service counters, GSM network parameters, configuration data. ZD table – Events and Alarms – contains a list of alarms recorded in the device along with the date and time of occurrence and parameters additionally recorded at the time of occurrence.

8.4.1 DP Table values description

The document contains a description of all parameters from the DP table in MacIQ WM group devices WM.

The parameter numbers in the table below do not correspond to the numbers in the actual device, only for representative purposes!

Status	Decimal values	Hexadecimal value
GM_BRAK_DANEJ	0	0x00
GM_Z_POMIAROW	1	0x01
GM_ALARM_PROCESOWY	2	0x02
GM_ALARM_SYSTEMOWY	4	0x04
GM_Z_OBLICZEN	8	0x08
GM_WARTOSC_STALA	16	0x10
GM_KOREKTA_ZEGARA	32	0x20
GM_NIECIAGLOSC	64	0x80

Option	Description
O	Parameter to read (visible in DP table)
M	The parameter can be modified
R	Registered parameter
D	Parameter recorded daily

Type	In C	Description
byte	uint8	parameter on 1 byte unsigned [0; 255]
int8	int8	parameter on 1 byte with sign [-127; 127]
int16	int16	parameter on 2 bytes unsigned
int32	int32	parameter on 4 bytes unsigned
word	uint16	parameter of 2 bytes unsigned
dword	uin32	parameter of 4 bytes unsigned
short	float	4-byte floating point parameter
long	double	8-byte floating point parameter
string	char table	ascii character array terminated byte 0x00

The **exponent** is the value of x in the **expression parameter value * 10^x**

Idx	Name	St	Value	E	Unit	Info
0	V	8	262	-	m3	RMO ^uint32
1	Process Events	10	0	0		O ^uint32
2	System Events	10	0	0		O ^uint32
3	System Status	10	69664769	0		O ^uint32
4	Mobile Data Status	10	709101791	0		O ^uint32
5	Sensor Status	10	16777216	0		O ^uint32
6	Battery	8	91	0	%	MO ^uint8
7	Temperature	1	24,5	0	'C	O ^float
8	CSQ	1	10	0		O ^uint8
9	RSRP RSRQ RSSI SINR ECL	10	-111,-13,-86,6,-	0		O ^string
10	Operator Name	10	Orange	0		O ^string
11	CGI	10	26003,E8D0,4880E0C,LTE- M,0,(1,1),B20	0		O ^string
12	IMEI	10	864486062047119	0		O ^string
13	ICCID	10	89882280666137300000	0		O ^string
14	IMSI	10	901405113734441	0		O ^string
15	Serial Number	10	1007869865	0		MO ^uint32
16	Device Name	10	MacIQ WM	0		O ^string
17	Program Version	10	H4.0.1_S010.01_R521_C1.1	0		O ^string
18	Loader Version	10	H4.0.1_S001.02	0		O ^string
19	Watermeter S/N	10	-----	0		MO ^string
20	Q Min Alarm	10	0	0	m3/h	MO ^float
21	Q Max Alarm	10	0	0	m3/h	MO ^float
22	Q Min Warning	10	0	0	m3/h	MO ^float
23	Q Max Warning	10	0	0	m3/h	MO ^float
24	Leakage Threshold	10	0	0	m3/h	MO ^float
25	Backflow Threshold	10	5	0	imp	MO ^float
26	Antenna	10	0	0		O ^uint8
27	Operator Mode	10	0	0		MO ^uint8
28	Operator Code	10	0	0		MO ^uint32
29	RAT 1	10	5	0		MO ^uint8
30	RAT 2	10	6	0		MO ^uint8
31	Band RAT 1	10	20	0		MO ^uint32
32	Band RAT 2	10	20	0		MO ^uint32
33	PSM T3324	10	15	0		MO ^uint8
34	PSM T3412 (TAU)	10	71	0		MO ^uint8
35	eDRX value	10	255	0		MO ^uint8
36	eDRX PTW value	10	255	0		MO ^uint8
37	PIN	10	*****	0		MO ^string
38	APN	10	internet	0		MO ^string
39	APN User	10	-----	0		MO ^string
40	APN Pass.	10	*****	0		MO ^string

41	Server Address	10	82.12.34.3	0		MO ^string
42	Server Port	10	1602	0		MO ^uint16
43	Data Protocol	10	2	0		MO ^uint8
44	Transmission Protocol	10	0	0		MO ^uint8
45	Report Composition	8	17	0		MO ^uint16
46	Synch.Mode Interval	10	1	0		MO ^uint8
47	Report Hour	10	8192	0		MO ^uint32
48	Report Week Day	10	1	0		MO ^uint8
49	Report Month Day	10	2147483647	0		MO ^uint32
50	Report Delay	10	5	0	min	MO ^uint8
51	Report Repeat Number	10	0	0		MO ^uint8
52	Report Repeat Cycle	10	6	0	h	MO ^uint8
53	Alarm Report Cnf.	10	2042	0		MO ^uint32
54	Update Server Address	10	upit.ewebtel.com	0		MO ^string
55	Update Server Port	10	7003	0		MO ^uint16
56	Update Report Hour	10	15	0		MO ^uint8
57	Update Report Month Day	10	0	0		MO ^uint32
58	Update Report Delay	10	15	0	min	MO ^uint8
59	Work Mode	10	0	0		MO ^uint8
60	Command	10	0	0		MO ^uint8
61	Date/Time	10	2025-03-26 12:28:44	0		O ^string
62	NTP Server	10	213.222.200.99	0		MO ^string
63	Imp LF	10	1	0	dm3/imp	MO ^uint32
64	V Mask	10	5	0		MO ^uint8
65	V Offset	10	0	0	m3	MO ^double
66	Hist.Min	10	60	0	%	MO ^uint8
67	ETL	10	11	0	y	O ^float
68	EPSM	10	0	0		MO ^uint8
69	EPSM Report Month Day	10	1	0		MO ^uint32
70	Cnt.Lifetime	10	215	0	d	O ^uint32
71	Cnt.Resets	10	1	0		O ^uint32
72	Cnt.VDrop	10	0	0		O ^uint32
73	Cnt.M.GSM Err	10	0	0		O ^uint32
74	Cnt.M.Report	10	244	0		O ^uint32
75	Cnt.M.Inst.Report	10	1	0		O ^uint32
76	Cnt.M.Alarm Report	10	4	0		O ^uint32
77	Cnt.M.Update Report	10	0	0		O ^uint32
78	Cnt.M.Get Firmw.	10	0	0		O ^uint32
79	Cnt.M.Send Data	10	27864	0	B	O ^uint32
80	Cnt.M.Recv.Data	10	1255	0	B	O ^uint32
81	Cnt.M.ECL1 Report	10	22	0		O ^uint32
82	Cnt.M.ECL2 Report	10	29	0		O ^uint32
83	Cnt.M.Work Time	10	14038	0	s	O ^uint32
84	Cnt.M.Work Time ECL1	10	3715	0	s	O ^uint32
85	Cnt.M.Work Time ECL2	10	911	0	s	O ^uint32

86	Cnt.M.PSM After Report	10	18	0		O ^uint32
87	Cnt.M.NoAck	10	0	0		O ^uint32
88	Cnt.M.OnVTimeout	10	0	0		O ^uint32
89	Cnt.M.UnexpctEn	10	0	0		O ^uint32
90	Cnt.M.WorkTimeout	10	0	0		O ^uint32
91	Cnt.M.DCDC On	10	5741	0	s	O ^uint32
92	Cnt.Temp.Above Range	10	0	0	h	O ^uint32
93	Cnt.Temp.Below Range	10	0	0	h	O ^uint32
94	Cnt.Trans.Serv.	10	4997	0	s	O ^uint32
95	Cnt.M.Battery	10	16561000	0		O ^uint32
96	PomVbat Min	1	3,50736	0	V	O ^float
97	PomVbat Min Last Report	1	3,54606	0	V	O ^float

9. Troubleshooting

PROBLEM	SUGESTIA
Login error	<ul style="list-style-type: none"> • Make sure that the account has been set up correctly in the eWebTel system • Make sure that all consents are accepted • Make sure that the account has not been deactivated by the administrator
The device does not count correctly	<ul style="list-style-type: none"> • Make sure that the device is properly attached to the water meter counter • When installing a water meter + recorder set, it is necessary to start the module installation mode in the target location
Device installation error in app	<ul style="list-style-type: none"> • The device is already added to the system to the account of another Company • No network coverage in the Android device we are using for installation • Clear the app data in Android and try the process again
No data sent to server	<ul style="list-style-type: none"> • Make sure the server address is set correctly in the Confit! MacIQ application • Make sure that the module installation mode has been started in the target location • Make sure the device is within the operator's service range • Make sure that the active element of the antenna does not touch other elements of the environment <p>In the case of a virtual operator service, temporary interruptions in data transmission are possible due to the terms of the roaming agreement with the main operator.</p>
Device replacement procedure error	<ul style="list-style-type: none"> • Make sure both devices generate the same number of compatible measurement points

10. IoT module storage recommendations

MacIQ WM telemetry module is equipped with a lithium battery. The devices are supplied in storage mode. From the moment of initialization, the device transmits data to the reading platform.

- When active, store your device in the best possible radio conditions to ensure the longest possible battery life.
- The induction coils are located on the reverse side of the device. Keep the device away from metal and magnetic elements.
- Store the device within the temperature range +5°C do +35°C



Failure to exercise caution may result in redundant alarms and lead to battery drain.

To re-enter the recorder into storage mode, change the Work Mode parameter value in the Advanced Edition to 1 and then run the recorder's installation mode. The device will communicate with the eWebTel platform and then go into sleep mode.

Verification of proper IoT module installation

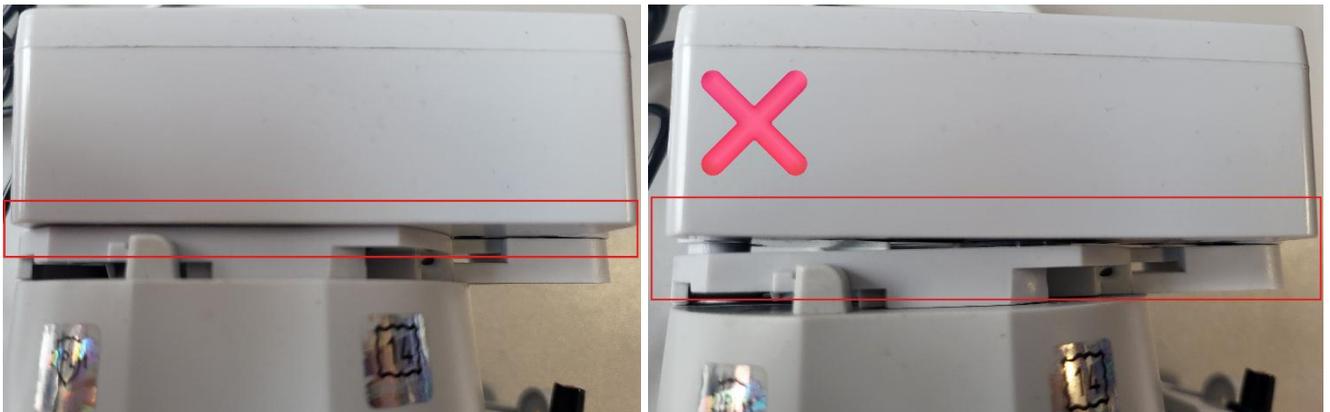
1. Documentation in the field

Before taking any action we strongly recommend documenting the condition of the installation location. Based on our experience we created step by step procedures that will allow us to verify if the IoT module has been installed correctly and optimize troubleshooting process.

1. Photo of the module with the serial number and the state of the water meter counter



2. Photo of the module showing whether the module is properly attached to the adapter and whether the adapter is attached to the water meter



3. Picture of the IoT Plum module antenna or any damage to the antenna cable. The antenna cable must not be coiled up and its active component must not touch any element of the environment. The antenna should be away from metal objects that could negatively affect radio waves.



4. Photos of the mounting rivets – are the rivets fully tightened? If using cable ties, do the ties properly secure the device to the adapter?



2. Couter reading verification

To verify the counter value stored in the device memory, follow these steps:

- Place the magnetic element to light up the LED diode with continuous light. Wait until it starts to flash regularly.
- Remove the magnetic element.
- The device searches for an available GSM network and performs a full login process. During this time, the LED diode flashes regularly.
- Detection of the GSM network will cause the LED diode to flash slower.
- Correct connection to the IT system will cause the LED diode to light up with a continuous light.

Next, we compare the data sent to the eWebTel system. We can achieve this in multiple ways.

1. Application **ConfIT MacIQ**
 - a. Search for the module using serial number (UID)

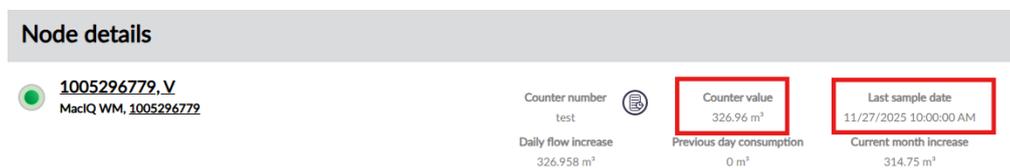


- b. check the time and date of last activity



- c. We compare the value read in the moment of initiating of the communication to the counter value in the app.

2. **eWebTel** (required permission level higher than installer)
 - a. search the Flow List for the measurement point number or the device serial number.
 - b. Click the Measurement Point number



- c. We confirm the date of the last sample and read the counter value.

- d. Using Advanced Edition view advanced users can confirm the counter value and the date of the last IoT module registration as well.

Index DP	Parameter name	Value	Unit (from dp table)	Date of registration in the database
0	V	326.96	[m3]	11/27/2025 10:18:57 AM

- e. If you are performing more than one verification, click the device's serial number and confirm the exact time and minute of the IoT module transmission. This value is visible both in the mobile app and in several places on the web platform.

Device details

MacIQ WM, 1005296779
Address: Poland, 16-005 Jasniki, Wesołna 12
 Company: Firma Testowa

Installation report PDF
Registered data report CSV

Device details

Battery level 🔋

GSM signal level 📶

Environment temperature 24.25 °C

Last activity 11/27/2025 10:18:57 AM

Parse priority Set priority

Additional information

Measuring points

1005296779_V 📍



If it is not possible to stop the water flow, we will not be able to accurately verify the meter reading due to the delay associated with data transmission.

3. Counter discrepancy found

3.1 Validation of proper installation



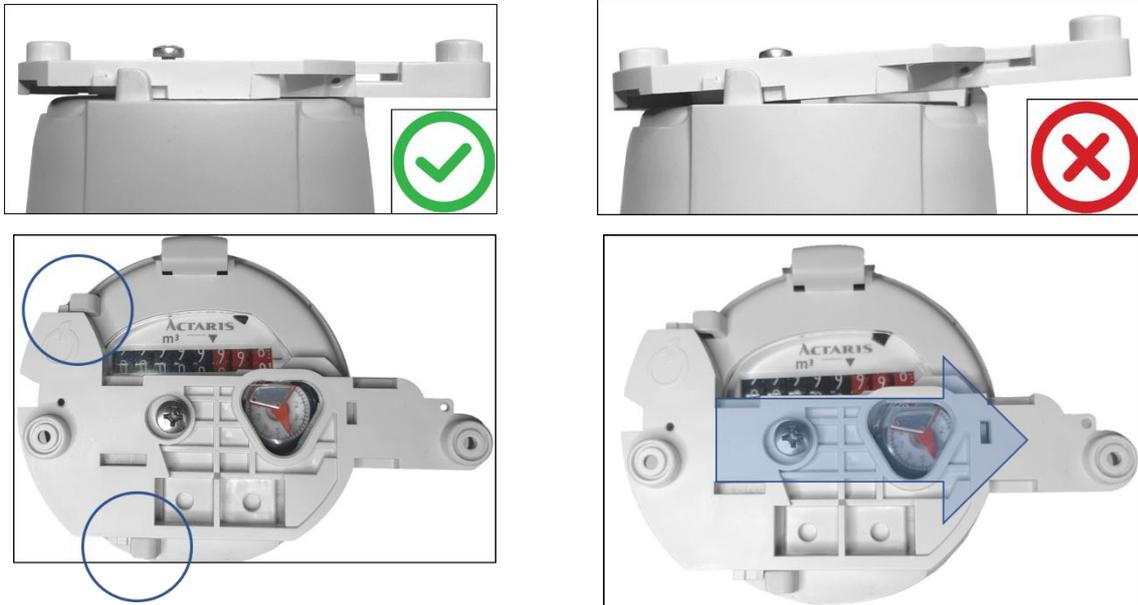
Water meters equipped with optical and Hall effect readings are not compatible with the MacIQ WM direct installation. Use of water meter manufacturer pulse module is required paired with MacIQ WM Pulse or MacR6 N.



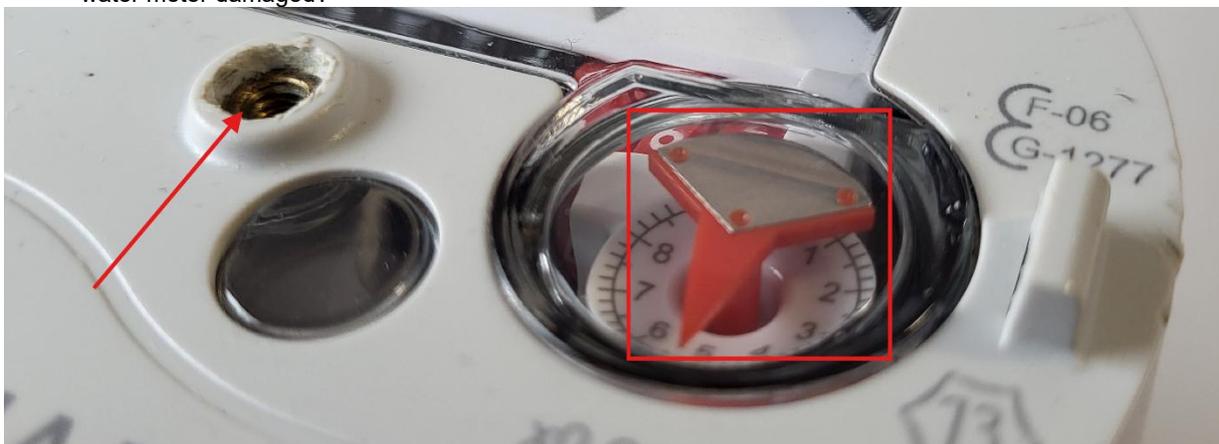
Water meters with a pulse weight of 100 liters (one decimal place) require dedicated **MacIQ WM 100** module for correct operation.

If any discrepancies are detected, it is necessary to disassemble the IoT module and the adapter from the water meter. After disassembly, check the cleanliness of the water meter counter. Solids that cause poor adhesion between the module and the water meter may cause the recorder to improperly adhere to the diamagnetic element and result in erroneous readings.

- Make sure that the water meter is not mechanically damaged, all hooks are in good condition, and the adapter adheres properly to the surface of the water meter.



- Make sure the water meter's diamagnetic element is undamaged, rotates properly, and does not vibrate or shake. Is one full rotation of the diamagnetic element correctly registered by the water meter's counter?
- Check the thread of the screw holding the adapter – was the screw properly installed? Is the thread in the water meter damaged?



After completing the above steps, we proceed to install the IoT module and carry out the installation procedure from the beginning.

If possible, initiate the flow of water so that the diamagnetic element completes at least 20 full rotations to ensure that the IoT module calibration process has been carried out correctly.

Once the calibration process is completed, force the transmission by placing the magnetic element and leaving it on until the module begins flashing rapidly. After it stops confirm that the counter value has been received by the data acquisition system.



If during the counter reading verification process any difference is noticed between the water meter counter value and the value in the system, it should be recorded in the report. so that the device does not have to be dismantled again during the next inspection.

3.2 Lack of installation issues, counter discrepancy found

In case there are no installation defects or damage to the water meter that we can determine, record the difference between the system reading and the physical meter counter reading. Repeat the inspection after a minimum of 30 days.

1. The difference is **constant** –it results from the constant water flow that was present during the installation procedure. This is the difference between the time the picture was taken and the actual data sent to the reading system.
2. The difference **has changed** significantly – the recorder is damaged and needs to be replaced. To maintain data measurement continuity, the device must be replaced in the eWebTel.

4. No counter discrepancy found

If no discrepancies are found, complete the description field in the eWebTel with the date and the note:

"XYZ day site visit was performed, the counter value is XYZ, and no discrepancies were found between the water meter counter value and the IoT module.

5. No GSM network coverage

The following section describes several actions that we can perform at the jobsite to exclude any technical problems with the IoT module and how to maximize the effectiveness of transmission and the device's battery life.



We have noticed several cases where the installation process is carried out correctly, but after closing the door or manhole cover, transmission is impossible.

5.1 On-site network coverage test using the IoT module

We apply the magnetic element for 10 seconds and then move remove it from the device to wake up the module and enter installation mode. As soon as the LED begins flashing regularly the device starts scanning for GSM network.



ConfIT MacIQ mobile app is not required for the coverage test.

- When GSM network is detected, the LED flashing slows down significantly. Correct response from the eWebTel platform results in the LED lighting up continuously for approximately one minute. The mobile app will also confirm the successful completion of the module installation process.
- In case the module does not log in into the GSM network, the LED will flash regularly and then turn off. The mobile app will display an installation error.

If you notice that device cannot attach to the network, you should initiate the installation process again. If the service is still not available, you need to wake up another module to rule out any potential technical issues.

5.2 Offsite network coverage test using the IoT module to check GSM service availability and antenna selection.

The test can be performed using an IoT module or a Narrowband network meter. If the on-site test fails, it is recommended to perform another test above ground to eliminate as many factors affecting transmission as possible.

If the service is operating correctly in an open space, we perform another measurement halfway from the installation site. If the network connection is successful, we reduce the distance by half and repeat the test.

By following this procedure, we can assess the availability of GSM network coverage in the area to ensure data transmission. The minimum recommended CSQ reported by the IoT module is 7 on a 31-point scale.

If we determine that GSM service is available in the area:

- We use IoT module with integrated external antenna with 2.5m cable. Place the antenna in the location where we previously performed the measurement. This is particularly important because the network has a checkerboard structure.
- If you determine lack of network coverage beyond 2 meters of the IoT module, it can be equipped with an SMA connector. Using the connector allows you to extend the antenna path or run the antenna cable through a hole drilled in the wall to raise the antenna into the open space.



If the antenna cable needs to be extended, the module's battery life may be shorter than stated in the warranty. The maximum recommended antenna cable length is 9 meters.

If you notice lack of service in an open space, you should:

- Report this fact to the GSM network operator – it is possible that the signal is being jammed by third parties. In this case, a representative of the operator will come on-site to determine whether a visit by the Office of Electronic Communications (UKE) will be necessary.
- Defer from installation the IoT module on this location.

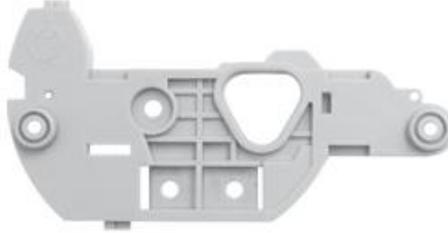
Accessories

1. Adapters

DI - DIEHL



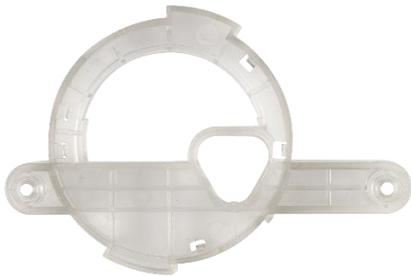
IT - ITRON



MA - MADDALENA (JANZ)



AP - APATOR



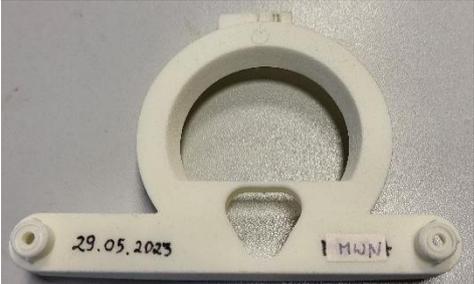
SM - SENSUS HRI-MEI



SMI - SENSUS WMS MEISTREAM

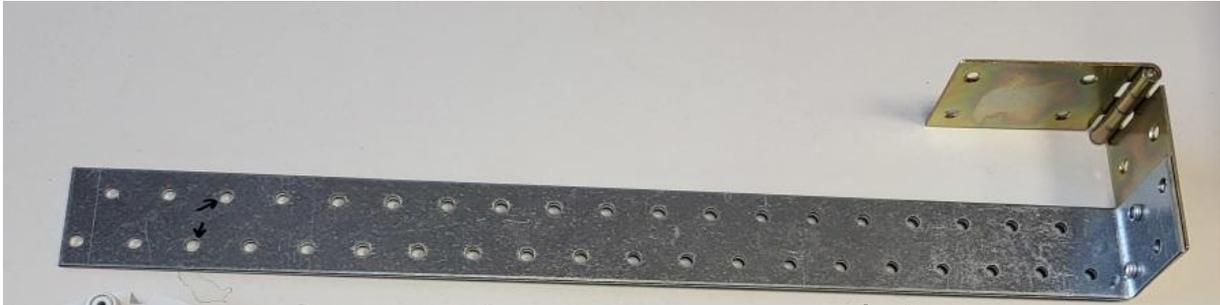


APP – APATOR INDUSTRIAL



2. Installation accessories

- Antenna mounting kit for water meter well



- MacIQ WM Pulse mount for installation in



- water meter well

- Plastic rivets



3. MacIQ WM Pulse installation instructions

MacIQ WM Pulse
Installation manual EN v1.0



Before installing the module, download and install the Confit! MacIQ mobile application

1. Installation

- 1.1. Secure the module bracket(accessory) to the water meter well using expansion bolts or provided plastic adapter on a flat surface.
- 1.2. Install MacIQ WM Pulse onto the adapter using two plastic rivets that are provided with the module.
- 1.3. Connect the module using provided connectors with the pulse generator of the water meter.

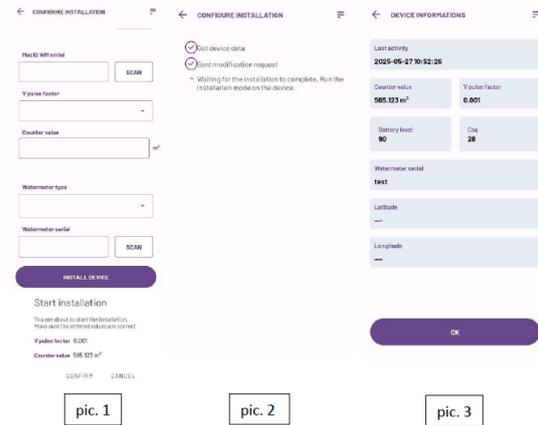
2. Configuration in Confit! MacIQ application

- 2.1. Run Confit! MacIQ application.
- 2.2. Log in to the application using your eWebTel account (minimum required installer permissions level) and then select the Company where the modules will be installed.
- 2.3. Add new device using "+".
- 2.4. Scan the MacIQ module QR code or enter the manual SN (pic.1).
- 2.5. Fill in or scan the serial number of the assigned water meter.
- 2.6. Enter the "Value of the counter V" manually according to the water meter counter readings, considering the number of digits after the dot (for an imp. weight of 1L, i.e. 0.001 m3, enter 3 digits after the dot).
- 2.7. Select "change" next to device address and „AUTOCOMPLETE LOCATION" to fill in the data.
- 2.8. Enter Measurement point ID number.
- 2.9. Select "Install Device", Confirm the entered data. Do not close the application. Wait until the application communicates with the reading platform (pic.2).

3. Initialization of the module

- 3.1. Apply the magnetic element to the front surface until the LED lights up, wait until it starts to pulse regularly. Then remove the magnetic element.
- 3.2. The module will start searching for any available LPWAN NB-IoT network. During this time, the LED indicator will flash.
- 3.3. Detection of the network and correct connection to the IT system processing the data will result in continuous LED signaling.
- 3.4. After the IoT module has been correctly configured, the Confit! MacIQ application will display the message "Installation completed successfully" The values of the modified parameters will be visible after clicking the "Summary" tab (pic.3).

IOT MODULE IS READY TO USE



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MacIQ WM Pulse connection diagrams



Color	Description
White/Gray	Pulses forward
Brown	Pulses backward or direction
Green	GND
Yellow	Alarm (Flow)



Sensus HRI-Mei B2		
Wire connection	MacIQ WM Pulse	Sensus HRI-Mei B2
Pulses forward	White	White
Pulses backward	Brown	Yellow
GND	Green	Gray
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-LF pulses backward	DI3-off

Sensus HRI B2		
Wire connection	MacIQ WM Pulse	Sensus HRI B2
Pulses forward	White	White
Pulses backward	Brown	Yellow
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-LF pulses backward	DI3-off

Maddalena QuadraPlus		
Wire connection	MacIQ WM Pulse	QuadraPlus
Pulses forward	White	White
Pulses backward	Brown	Yellow
alarm	Yellow	Green
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-direction	DI3-contact input NC

Itron Cyble Sensor		
Wire connection	MacIQ WM Pulse	Itron Cyble Sensor
Pulses forward	White	White
Pulses backward	Brown	Yellow
alarm	Yellow	Green
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1-LF pulses	DI2-direction	DI3- contact input NC

Diehl Hydrus		
Wire connection	MacIQ WM Pulse	Diehl Hydrus
Pulses forward	White	Yellow
Pulses backward	Brown	Green
GND	Green	Brown
Input configuration MacIQ WM Pulse		
DI1- LF pulses	DI2- direction	DI3-off



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