plum® WATER

plum WATER portfolio

automating water meter readings

flowing operations

plum® WATER

table of contents

we are a leading manufacturer of electronics for smart energy management in IoT systems within the water and wastewater industry

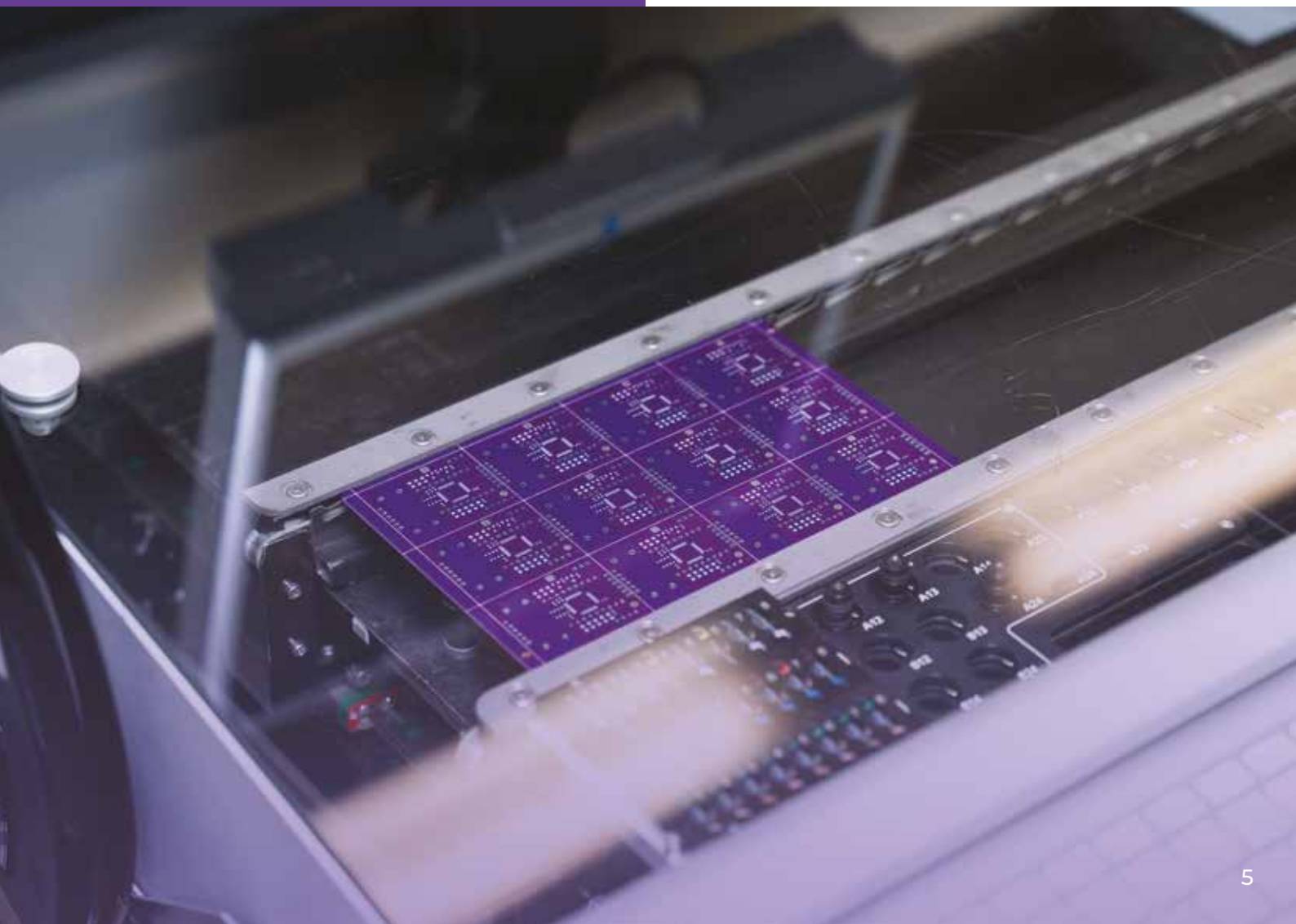
Our objective is to provide water utilities with equipment that optimises billing efficiency and monitoring.

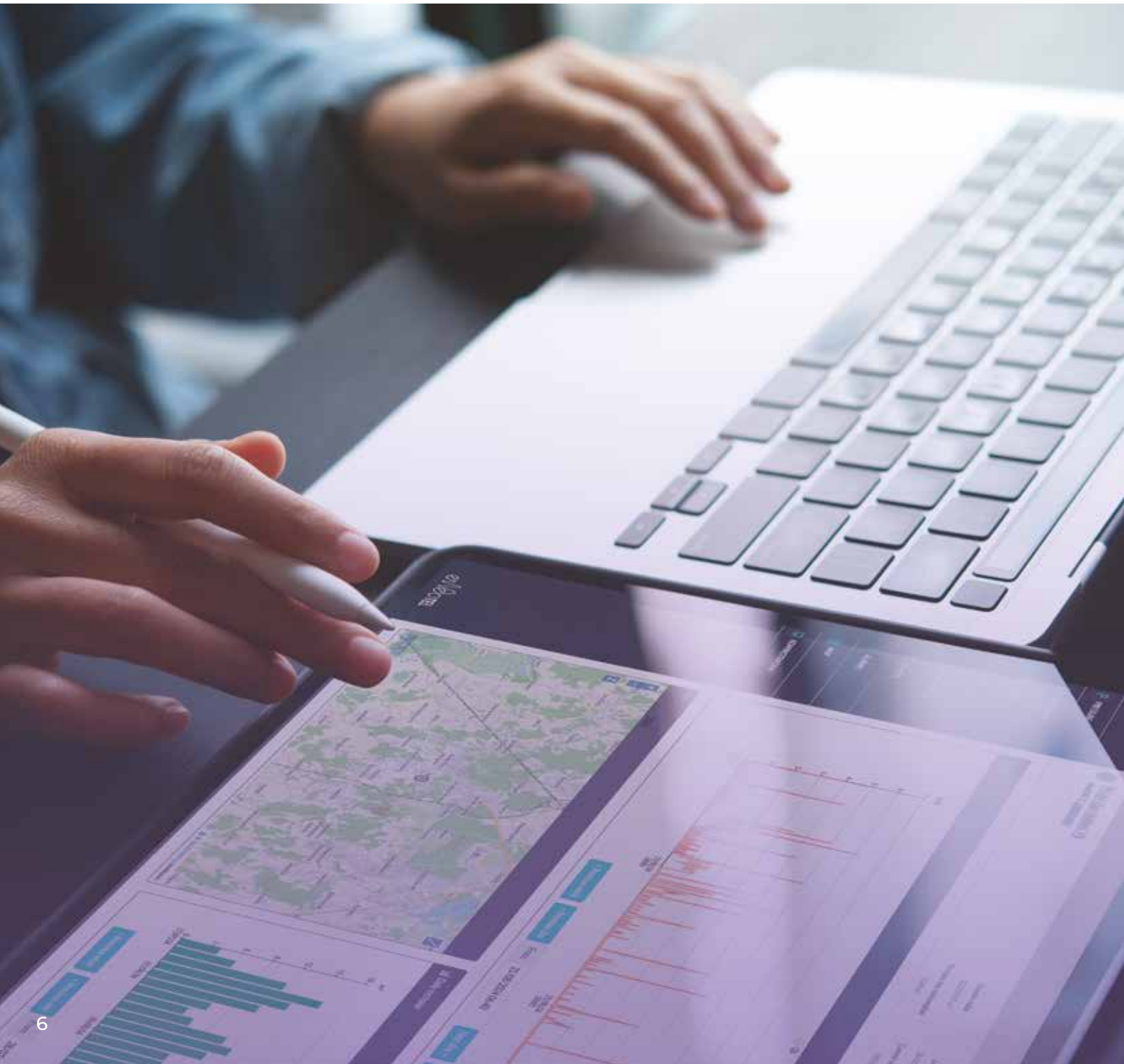
We deliver solutions that meet the technical requirements of European and global markets. We provide original equipment manufacturer (OEM) solutions tailored to the specific requirements of our customers in the areas of remote billing and monitoring of water and wastewater networks. We provide comprehensive implementation and post-sales support for product development and maintenance.

We specialise in the development and delivery of electronic solutions that facilitate effective water resource management through the utilisation of IoT technology.

By combining IoT-based technologies with the simplicity of a plug-and-play system, we can deliver easy-to-use and comprehensive electronic solutions that are designed for installation on water meters. These solutions provide remote access to data, billing, maintenance and configuration of the water network, offering customers greater control and visibility over their water supply. Plum devices are equipped with technology that enables the implementation of IoT concepts using the existing transmission infrastructure of telecommunication network operators.

Our manufacturing facility is located in Poland, what ensures product delivery reliability through local manufacturing and comprehensive quality control. Our devices are designed to be competitive and interoperable, meaning they can be used with equipment from other vendors.





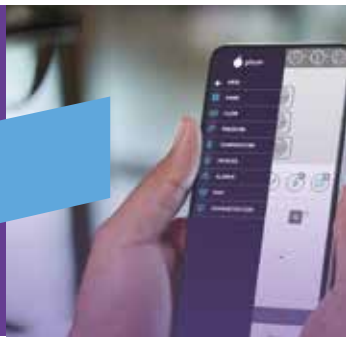
our solutions

In developing solutions for remote meter reading, monitoring and diagnostics of water supply networks, our objective has been to meet the needs of a range of customers, including manufacturers, integrators of metering systems, providers of comprehensive smart city solutions and water utilities.

Our objective is to provide our customers with a remote, cost-effective, user-friendly and secure solution for managing and billing water consumption. This directly translates into savings and increases the company's competitiveness in the market. By using IoT-based technology, we optimise the processes and efficiency of water supply systems.

monitoring, diagnostics, and configuration of the water supply network

remote data access (IoT)



devices compatible with water meters from well-known manufacturers

remote management of water supply network

We provide remote reading of water meters, monitoring, and diagnostics of the water supply grid. Our devices offer a range of remote data reading capabilities, with the three main functionalities being:

- IoT telemetry of the traditional water meters with MacIQ WM
- IoT telemetry of the water and flow meters with pressure grid diagnostics with MacR6 N
- real-time monitoring of the water supply grid with MacREJ 5 W

Our solutions are intended for:

- **water companies with the need to automate water meter reading and increase company efficiency through technological optimisation and cost reduction**
- **manufacturers of water meters and wastewater system integrators who are looking for ready-to-implement electronics for water meters**
- **providers of comprehensive Smart City solutions who deliver complete telemetry solution to water utilities**

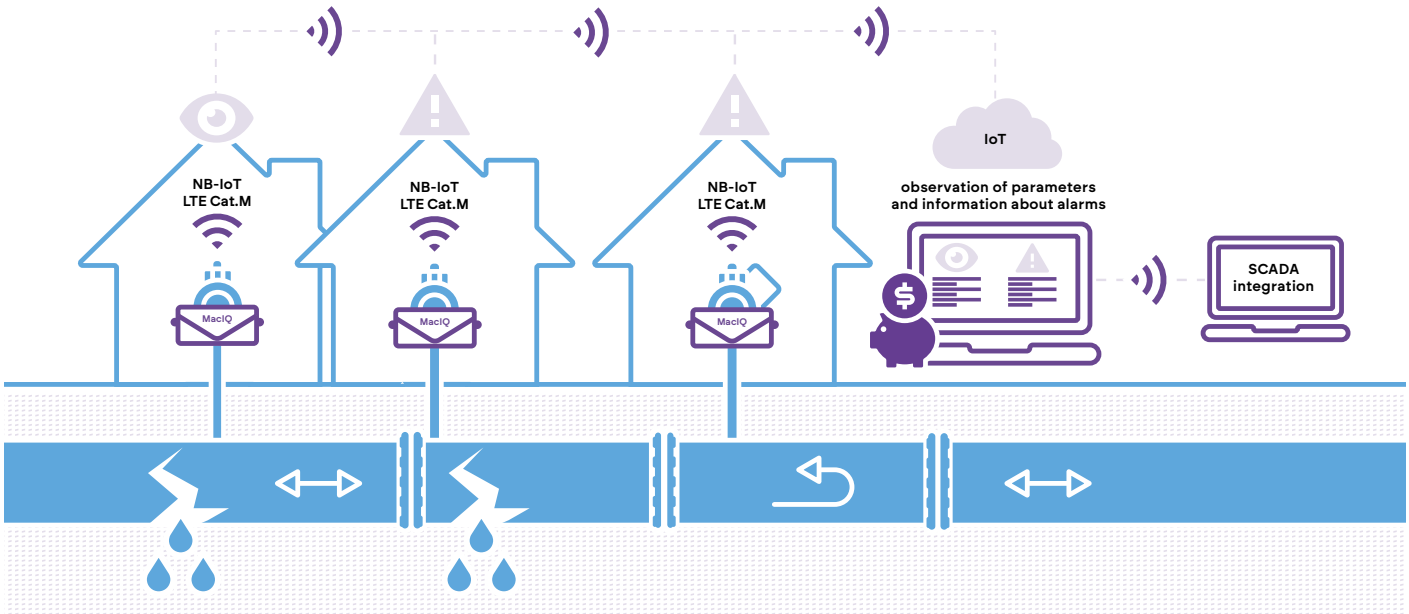
IoT telemetry of the traditional water meters with MacIQ WM

Application of the MacIQ WM telemetry module on water meters serves both billing and diagnostic functions. Using dedicated Internet platform eWebtel it is possible to obtain remote access to the billing data, intuitive configuration and control of device operation.

Communication modem used in the devices, tailored to smart city solutions, ensures security and the high efficiency in data transmission. Thanks to the NB-IoT technology, devices provide long lifetime on a single battery and the system operation does not require construction of a dedicated transmission infrastructure.

key benefits

- unparalleled range and over 10 years of battery efficiency thanks to NB-IoT network operation
- available in the customized, private label versions
- Plug & Play system that allows installation directly on the water meters of various manufacturers
- easy access to water meter archival consumption data



IoT telemetry of the water and flow meters with pressure grid diagnostics with MacR6 N

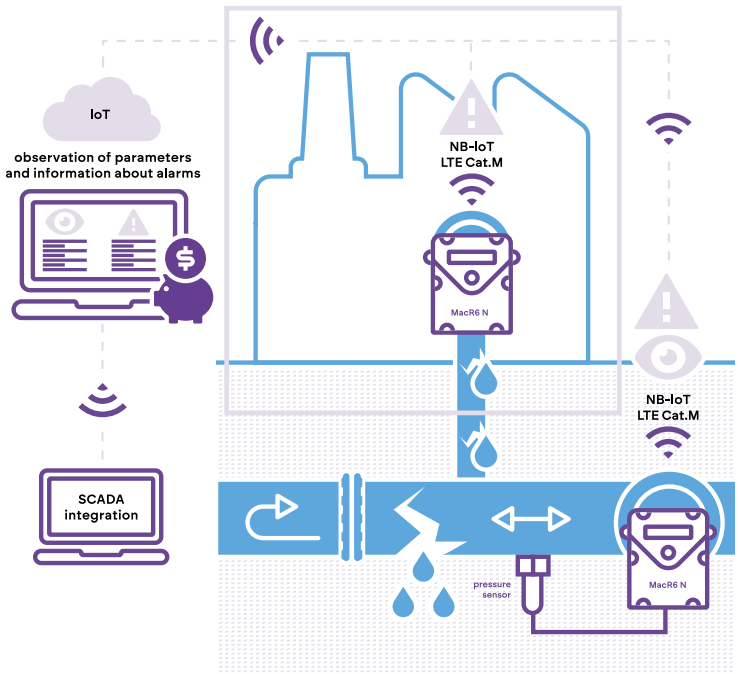
MacR6 N data logger becomes a complete tool for supervision and diagnostics of the water supply network, extending the options of remote data transmission on water consumption to monitoring network pressure and alerting in cases of sudden changes.

Solution supporting NB-IoT, LTE Cat. M1 technologies, is dedicated to challenging locations, especially basements, buildings, or water wells where standard radio systems may fail.

Solution ensures the detection of leaks, area management (DMZ), and enables cost savings while increasing the efficiency of the water supply company. eWebtel system for acquiring measurement data allows, among other things, the quick detection of faults and irregularities in the water supply network through remote access to data.

key benefits

- remote leak and tamper detection through constant monitoring of network pressure
- real-time emergency alerting to eWebtel
- solution dedicated to difficult locations - basements, buildings or water wells
- strong reception thanks to NB-IoT technology and LTE Cat. M1
- 2G technology as a fallback for locations without range of NB-IoT or LTE Cat. M1



real-time monitoring of the water supply grid with MacREJ 5 W

Solution with MacREJ 5 W enables remote meter readings, complete diagnostics, network pressure monitoring, and crisis alerting. Real-time data is transmitted to higher-level systems.

MacREJ 5 W solution is dedicated to industrial facilities, such as water pumping stations, that require the transmission and analysis of large amounts of data in real-time. By monitoring the proper operation of control systems, MacREJ 5 W helps identifying potential issues and prevent serious damage, ensuring smooth operation of the water supply network.

key benefits

- uninterrupted data transmission thanks to 4G LTE/2G
- easy access to advanced archives and historical data - up to 5 years of data storage
- management and configuration through smartphone interface
- possibility to feed the device using external power supply adding possibility to have real time access to data

products

data loggers

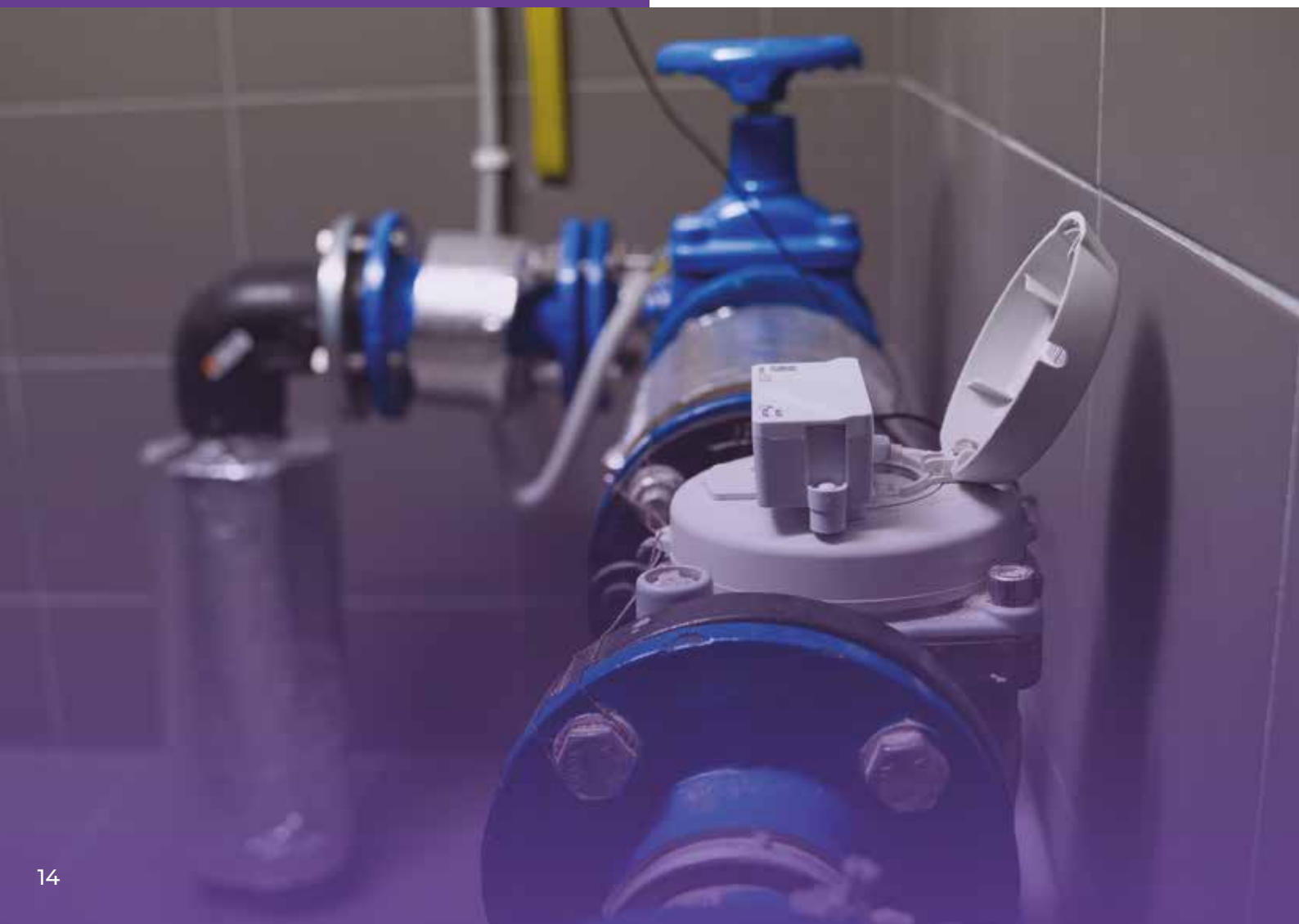
data acquisition system

configuration tools

accessories

data loggers

- **MacIQ WM**
- **MacR6 N**
- **MacREJ 5 W**



MacIQ WM

IoT telemetry module

MacIQ WM is a compact telemetry module which is an element of stationary water meter reading system.

This simple plug-and-play solution does not require construction of an infrastructure. Product utilises cutting-edge technology aligned with the Internet of Things (IoT) trend, with an enhanced radio signal propagation and a particular focus on coverage. The device operates in licensed telecommunication networks in the NB-IoT or LTE Cat.M1 standard.

Module ensures effective data transmission even from challenging locations, and is tailored to the real-time system requirements, enabling immediate incident reporting. It allows for optimised water network efficiency and the generation of reports.

key benefits

- easy solution to enable remote readouts from the mechanical water meters
- readouts efficiency independent from environmental factors like constantly flooded water meter chamber
- readouts always in time guaranteed by the remote transmission
- eliminating risk of human mistake when manually reading the meter or illegible water meter totalizer
- immediate alarm action when consumption profile suddenly changes - leaks monitoring

accessories

- eWebtel p. 26
- ConfIT! MacIQ WM p. 29

main features
of the MacIQ WM module

- communication standard based on NB-IoT or Cat. M protected bands
- efficient two-way communication with low level signal
- working period of more than 10 years
- multiplanar magnetic field interference detection
- optical indicator of connection with data platform

compatibility
of the MacIQ WM module

Diehl water meters

Itron water meters

Apator water meters in the MacIQ WM+ version

Sensus HRI water meters (120, 420, 620, 820) in the MacIQ WMS version

antennas
of the MacIQ WM module

internal antenna

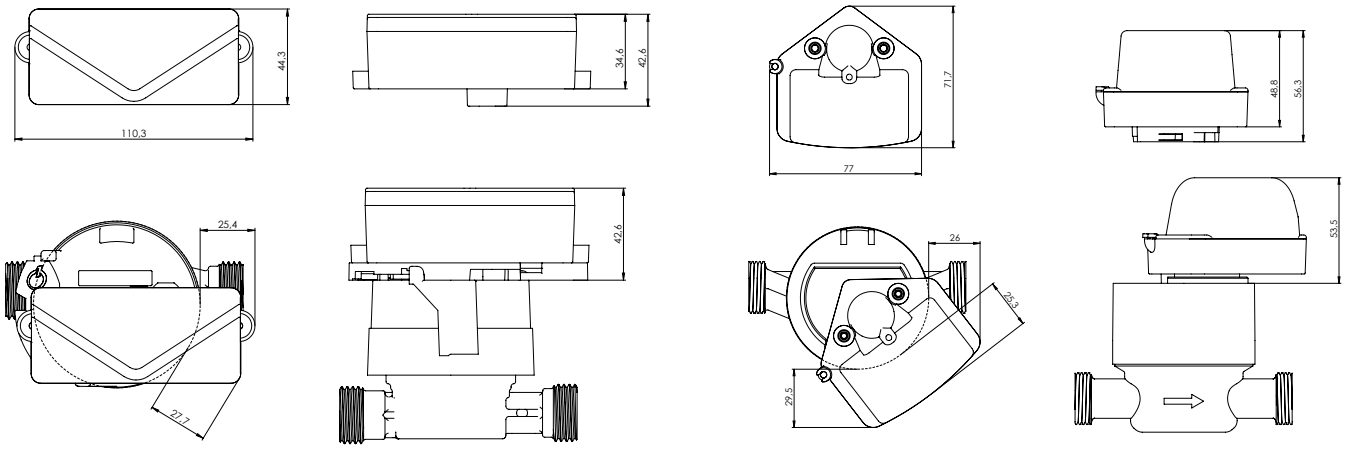
- designed for installation in dry locations above ground level
- protection class IP 65

external antenna

- designed for installation in water meter wells and locations with poor coverage
- designed to work in full submersion – reports until the antenna is submerged
- protection class IP 68
- version equipped with SMA connector available on request

technical data
of the MacIQ WM module

dimensions	MacIQ WM: 109.2 x 40 x 44.7 mm MacIQ WMS: 76.8 x 71.7 x 48.1 mm
housing material	polycarbonate
protection level	IP68 in accordance with the requirements of EN 60529
operating temperature	storage from -25 °C to +50 °C; operation from -5 °C to +50 °C
display	Optical Display Server Communication Indicator
communication with water meter	inductive sensor allows for direct installation on water meters
supply	• lithium battery with nominal voltage of 3.6 V, size C according to IEC 60086-1 with 8 Ah capacity • service life: 10+ years depending on frequency of synchronization of data to the server
data transmission	• NB-IoT or NB-IoT + LTE Cat. M1 modem • support for transmission protocols depending on the technology: TCP, UDP, http, LwM2M • built-in internal antenna or external antenna without connectors
data registration period	• data recorded at a 60-minute interval • unique identifier for each record • registered data is stored in internal memory (1920 records)
configurable alarms	• minimum and maximum flow alarm thresholds • minimum and maximum flow warning thresholds • leakage threshold • backflow • integration of magnetic and electromagnetic fields • mechanical dismantling of the water meter • discharged battery
reporting period	can be configured to send reports at a specific hour or hours, on a specific day of the week or weeks, on a specific day or days of the month, and special functions on the last day of the month, smart mechanism predicting remaining battery capacity and automatically adjusting reporting frequency to last even more than 10 years
time synchronization	NTP server or telecommunications service delivery network
accessories	eWebtel - measurement data acquisition system ConfIT! MacIQ WM - telemetry module configuration application



MacR6 N

water flow and pressure data logger

MacR6 N is a compact device which records pressure and the water flow. It uses the current GSM network infrastructure for remote data transmission. MacR6 N data logger can be installed directly on the water meter and record the volume using built-in inductive sensors.

It is also equipped with two configurable inputs that can be used as: pulse inputs to connect water meters using dedicated adapters of the water meter producer, pressure sensor inputs, digital binary inputs.

MacR6 N data logger transmits data remotely to eWebtel platform by default. Thanks to open protocol it can be adapted into other platforms.

Device is also equipped with an NFC interface for local configuration and reading of the device's recorded data using the ConfIT! data loggers mobile application.

accessories

- eWebtel p. 26
- ConfIT! desktop p. 28
- ConfIT! data loggers p. 29
- Mac-PW p. 31
- Mac-HS p. 31

key benefits

- single type of the device with adjustable software to cover different measurement scenarios with water meters and pressure monitoring
- mobility of the device and easy adjustment between GSM networks without losing any features
- real-time water leak detection
- fully adjustable logging properties like frequency of reporting, sampling, alarming thresholds
- possibility to prioritize the alarms by giving them flags of only warning or alarm
- communication in newest industrial transmission standards
- can work as stationary data logger for local data collection by mobile phone

compatibility
of the MacR6 N data logger

Diehl water meters

Itron water meters

Maddalena/Janz water meters

technical data
of the MacR6 N data logger

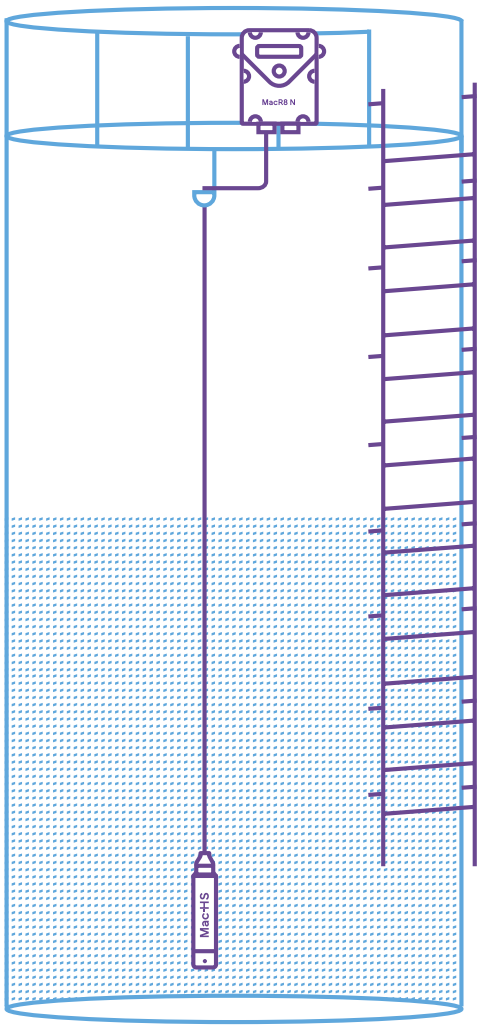
dimensions	114 x 110 x 45 mm
supply	lithium battery with a nominal voltage of 3.6 V, size D according to IEC 60086-1 and a maximum capacity of 14 Ah; battery life: 10 years depending on frequency of synchronization of data to the server
protection level	IP68 in accordance with the requirements of EN 60529
operating temperature	from -25 °C to +50 °C
inputs	• inductive sensor for compatible water meters: ITRON, DIEHL METERING, MADDALENA/ JANZ • flood sensor • magnetic field sensor • 2 measurement inputs: voltage 0.5 to 4.5 V • 4 digital inputs: binary – signaling or counting
pressure sensor	• option 1: pressure sensor 0-10 bar (measurement accuracy: 0.5% FS) • option 2: pressure sensor 0-26 bar (measurement accuracy: 0.5% FS) operating temperature: from 0 °C to +30 °C
data registration period	measurement data from 1 to 60 minutes, events with timestamp when event started and ended
reporting frequency	configurable from 1 to N times per day, direct report after occurrence of the alarm
data transmission	• local data readout via mobile device with NFC • integrated LTE Cat. M1/ NB IoT/ 2G modem • support for transmission protocols: TCP, UDP, HTTP, FTP
clock	built-in clock with time zone adjustment; synchronized with the GSM network operator or NTP time server
accessories	eWebtel - measurement data acquisition system ConfIT! data loggers - telemetry module configuration application Mac-PW - industrial pressure sensor Mac-HS - hydrostatic liquid level sensor

configurable alarms of the MacR6 N data logger

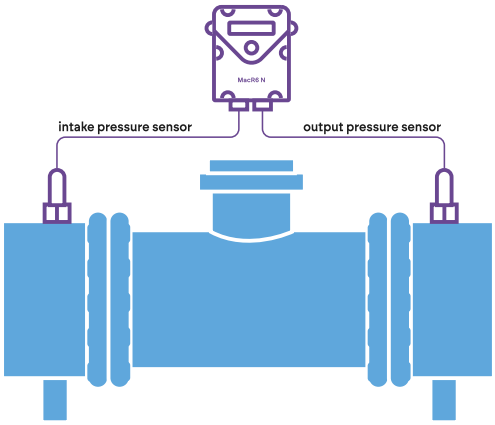
- two-level identification of exceeding minimum and maximum flow rates independently for both cooperating water meters/ flow meters – 4 thresholds in total
- two-level identification of exceeding lower and upper water pressure levels or its level, independently for both measurement inputs – 4 thresholds in total
- alarm for detecting programmed water leakage
- reverse water flow
- motion detection
- housing opening
- removal from the water meter
- flooding of the water meter chamber
- status alarm from up to four binary sensors, e.g., opening, position, level, with the possibility of label assignment
- no GSM network coverage

application of the MacR6 N data logger

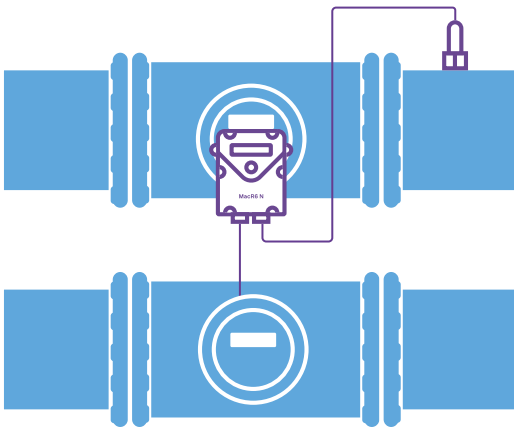
- **water level monitoring**
  Remote water level monitoring.



- **pressure measurement**
  Pressure measurement before and after reduction.

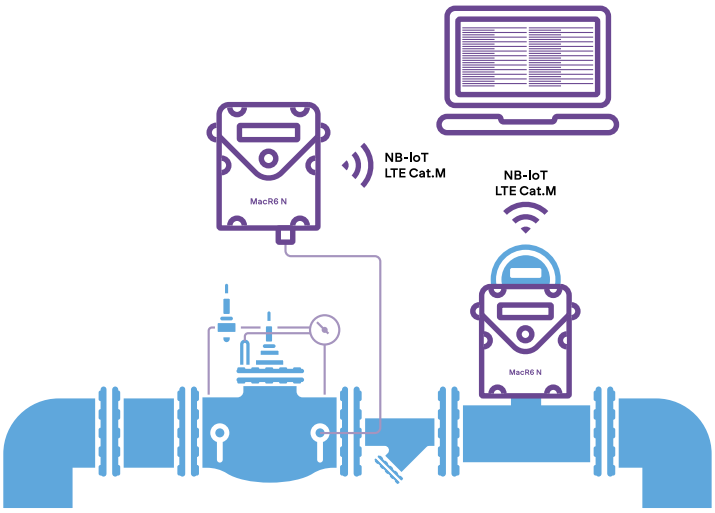


- **two water meters**
  Remote measurement and registration of flow from two water meters.

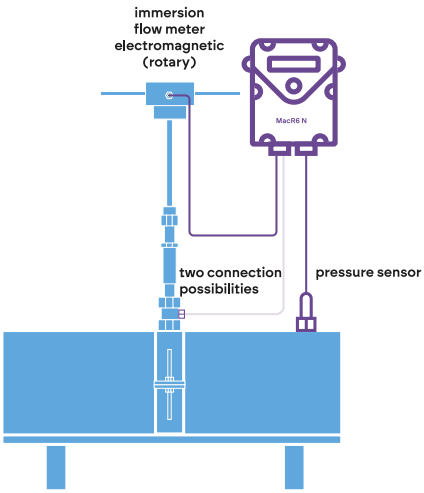


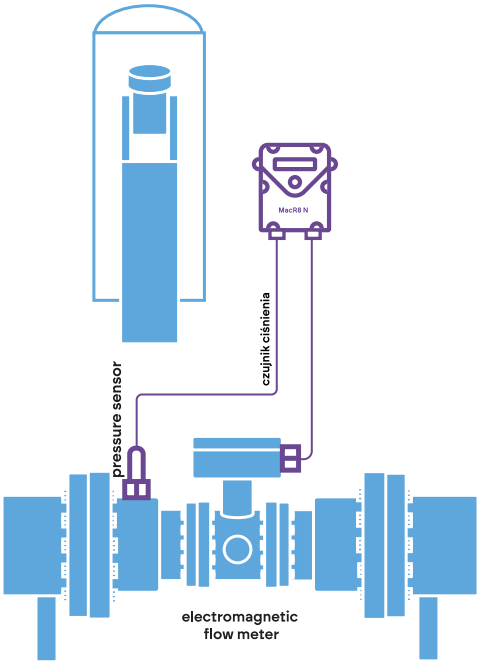
- **forward and reverse flow monitoring**

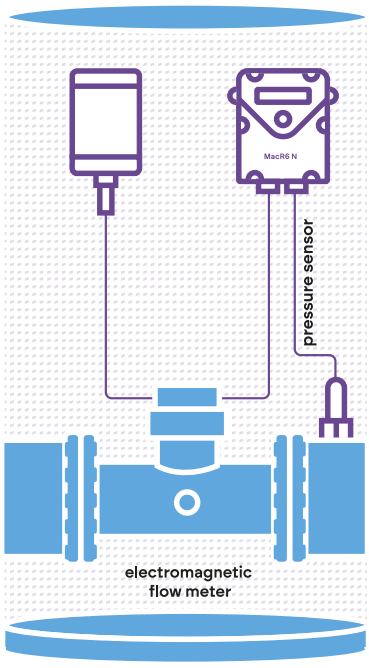
  Remote measurement and registration of two way direction flow with data record.

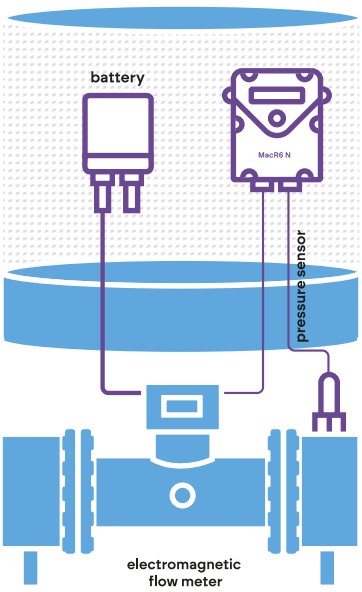


- **other examples of installations with the MacR6 N data logger**









MacREJ 5 W

water supply network parameter data logger

MacREJ 5 W is designed to monitor the flow and pressure in water distribution networks. It enables cooperation with two independent water meters. Device enables online access to the data after connecting external power supply.

When working on built in battery, it transmits data in accordance with the schedule and in the event of an alarm condition. It is possible to create up to 9 independent transmission schedules, which make the device behaves differently in each scenario.

MacREJ 5 W can be made in accordance with the ATEX Directive 2014/34/EU and can be used for cooperation with flow meters in the wastewater environment.

key benefits

- real-time SCADA communicating water network parameters
- multiple independent transmission interfaces for work with multiple systems in parallel
- immediate alarming of water networks service when programmed quantities are out of ranges
- significance level of the alarms - thresholds with flag of alarm and warning
- interface-free configuration using NFC
- configurable bar graphs presenting trends of the pressure or water consumption profile directly on device display
- possibility to add any sensor communicating with Modbus protocol

accessories

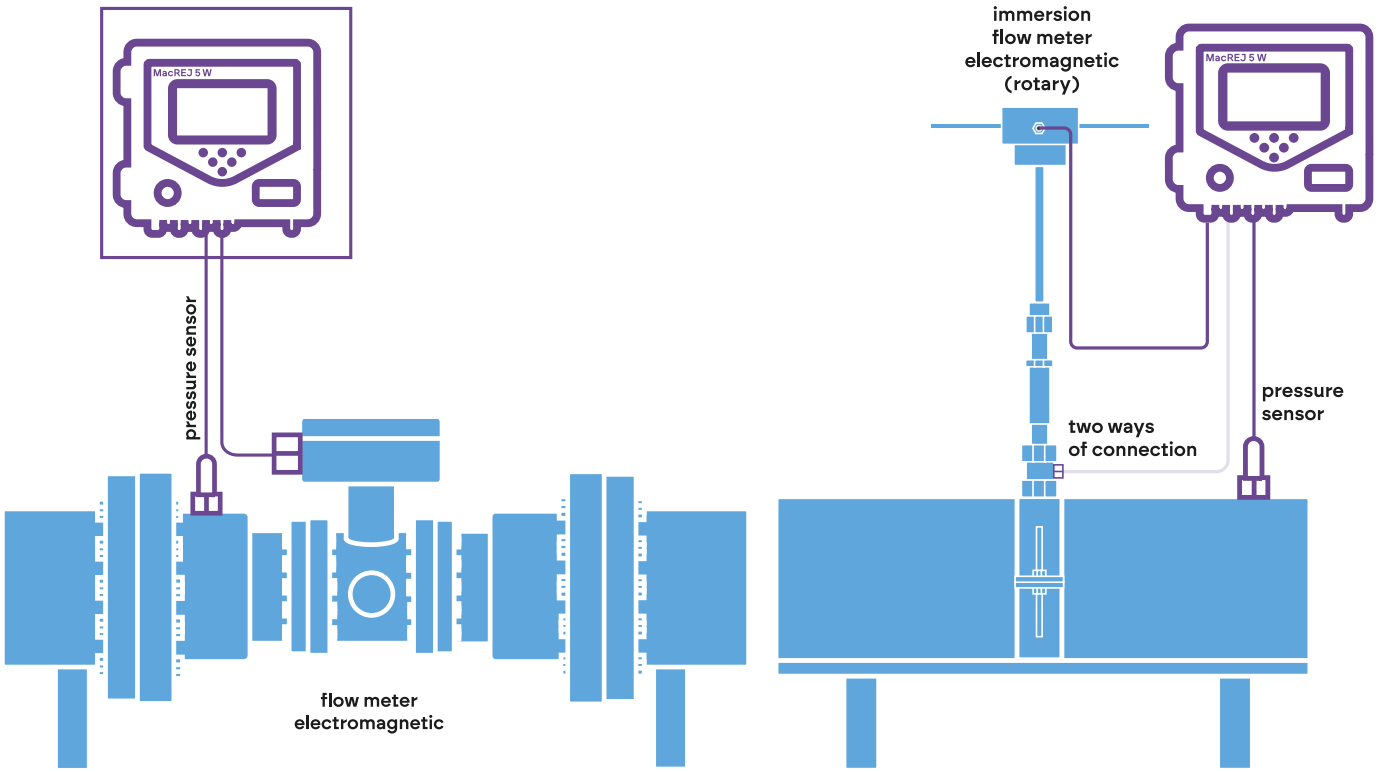
- eWebtel p. 26
- ConfIT! desktop p. 28
- ConfIT! data loggers p. 29
- OptoBTEx p. 31
- Mac-PW p. 31

functionalities
of the MacREJ 5 W data logger

- SIM card replacement without IP66 loss
- graphical, 4", backlight, operation in full range of operating temperatures
- customizable widgets on the main screen presenting daily/monthly graphs in the form of bar graphs
- cooperates with various IT systems: eWebtel, SCADA, billing systems
- housing opening sensor, magnetic interference sensor
- possibility of connecting external power supply
- low operating cost thanks to use of standard lithium batteries
- remote configuration and access to water flow and pressure data
- local access to archived data directly from device display
- built-in modem operating in 4G LTE Cat.1 and 2G networks
- support for NFC standard
- Modbus RTU Master function for autonomous communication with external devices or sensors, e.g. water level sensor
- external pressure sensors
- support for up to two water meters using pulse transmitters or one bidirectional flow meter
- disturbances detection in water distribution networks: pressure peaks and drops, leakages

application
of the MacREJ 5 W data logger

- **electromagnetic flowmeter**

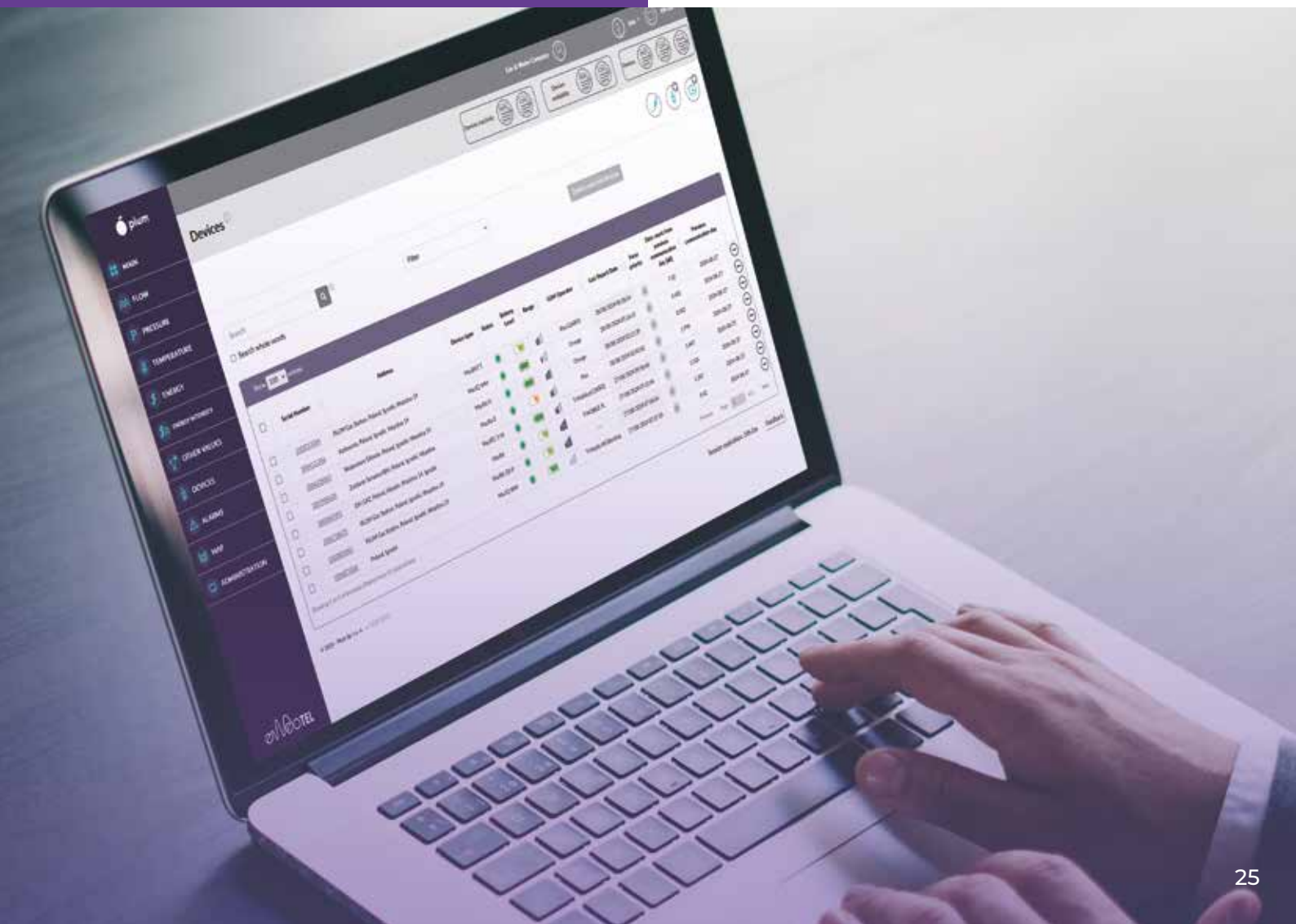


technical data
of the MacREJ 5 W data logger

dimensions/ weight	207 x 194 x 77 mm/ 1.3 kg
housing material	polycarbonate
relative humidity	maximum 95% at 70 °C
ambient temperature range	from -25 °C to 70 °C
enclosure protection class	IP66 for outdoor installations
keyboard	6 pushbuttons
display	graphical, 4", backlight, operation in the full range of operating temperatures
Ex feature	II 1G Ex ia IIB T4 Ga certification: FTZU 17 ATEX 0047X (Ex design is optional)
internal power supply	3 lithium D-size batteries: • 1 battery to supply data logger • 2 batteries to supply internal modem
external power supply	• for operation in non-hazardous areas: 5.1÷6.1 V DC power supply (typically 5.7 V DC) • for operation in explosion hazardous areas (contaminated water): INT-S3 communication interface-switchable RS485 port, intrinsically safe power supply, two digital OC inputs/ outputs; interface supply voltage 11÷30 V DC
transmission protocols	Modbus RTU, Modbus TCP, Modbus RTU in MASTER mode, GAZ-MODEM 1,2,3, other protocols on request
transmission ports	• two independent serial transmission ports, speed up to 256000 b/s, RS485 standard; COM1, COM2 (shared with Modbus MASTER) • IEC 62056-21 optical interface • NFC interface IEC 14443 • built-in 4G Cat.1/ 2G module
resistance to mechanical and electromagnetic conditions	M2/E2
horizon of data recording	• data registered in period 1-60 minutes – 36000 records (over 4 years @60min) • hourly data – over 16 months • daily data – over 4 years • monthly data – over 10 years • alarms/ events memory – over 6000 records
inputs	• 8 programmable digital inputs: - 2 reed inputs LF/ differential - 4 reed switch inputs - 2 NAMUR inputs in standard EN60947 5-6, battery operation possible • two 0÷5 V inputs for the connection of two 0÷10 bar pressure sensors • digital input (shared with COM2) for external transmitters/ devices- operation in Modbus RTU in MASTER mode, reading of up to 16 different parameters/ devices
control outputs	• up to 4 intrinsically safe, configurable digital outputs (OC type): - 1 configurable as binary or frequency (0÷5000 Hz) output - 3 binary outputs • binary outputs triggered by alarm/event or counter (Vm1, Vm2) • frequency output triggered by measured value (p1, p2, Qm1, Qm2) • 2 4÷20mA outputs triggered by measured value (p1, p2, Qm1, Qm2) realized by extension module EM-1
accessories	eWebtel - measurement data acquisition system ConfIT! data loggers - telemetry module configuration application OptoBTEx - optical interface Mac-PW - industrial pressure sensor

data acquisition system

- **eWebtel**



eWebtel

measurement data acquisition system

eWebtel system is a measurement data acquisition system, operating both on the internet and in a dedicated private network. eWebtel is designed to handle billing, monitor network parameters, and assess the selection of measurement devices.

System enables graphical presentation of received data, which is displayed in the form of functional charts, tables, and text-graphic reports.

related devices

- MacIQ WM
- MacR6 N
- MacREJ 5 W

key benefits

- monthly water consumption reports for individual recipients or recipient groups
- notifications about alarm events, such as pressure exceedance or water leakage
- access to consumption history for individual recipients or recipient groups
- compatibility with all Plum GAS & WATER devices

functionalities

- e-mail notifications for alarm events
- adaptation for both computer and mobile browsers
- ability to define the scope and type of transmitted data
- creation of measurement points and groups
- remote configuration of devices, including setting flow and pressure limits and scheduling data transmissions
- easy data analysis
- available as SaaS or installation at your own server
- visualization of devices on a map using geolocation
- data export capabilities to CSV, XML, Excel files
- support for encrypted TCP protocol
- simple user account management system

configuration tools

- ConfIT! PC
- ConfIT! data loggers
- ConfIT! MacIQ WM

ConfIT! PC

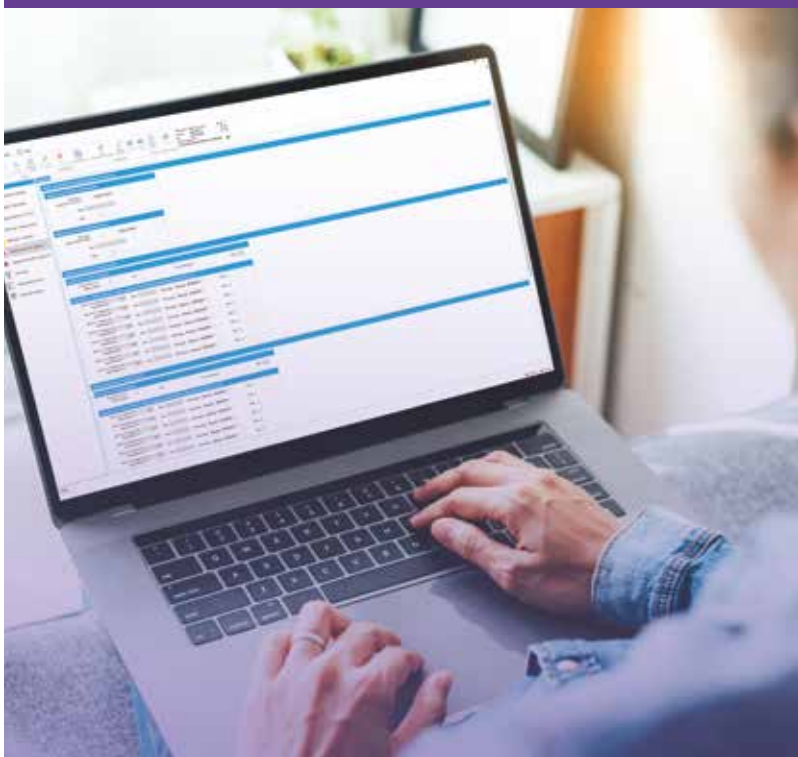
software
for PC configuration

The ConfIT! PC software enables configuration of Plum products through a clear graphical interface that can be customized if needed.

The basic functionality of graphical device profiles allows configuration in both basic and advanced modes. Table based configuration is also available. Each modified and unsaved value is highlighted with a distinct color, ensuring the user is aware of every change made. Firmware can be upgraded on Plum devices without the need for additional interfaces or softwares. ConfIT! PC remembers the list of recently used devices, eliminating the need to search for a new device each time. The software is designed for installation and operation in the Windows operating system.

key
benefits

- complete platform for devices configuration, data readout and firmware upgrade
- implemented mechanisms to configure devices remotely using TCP
- configuration template creator for multiple device types
- devices performance report



download
the ConfIT! PC application

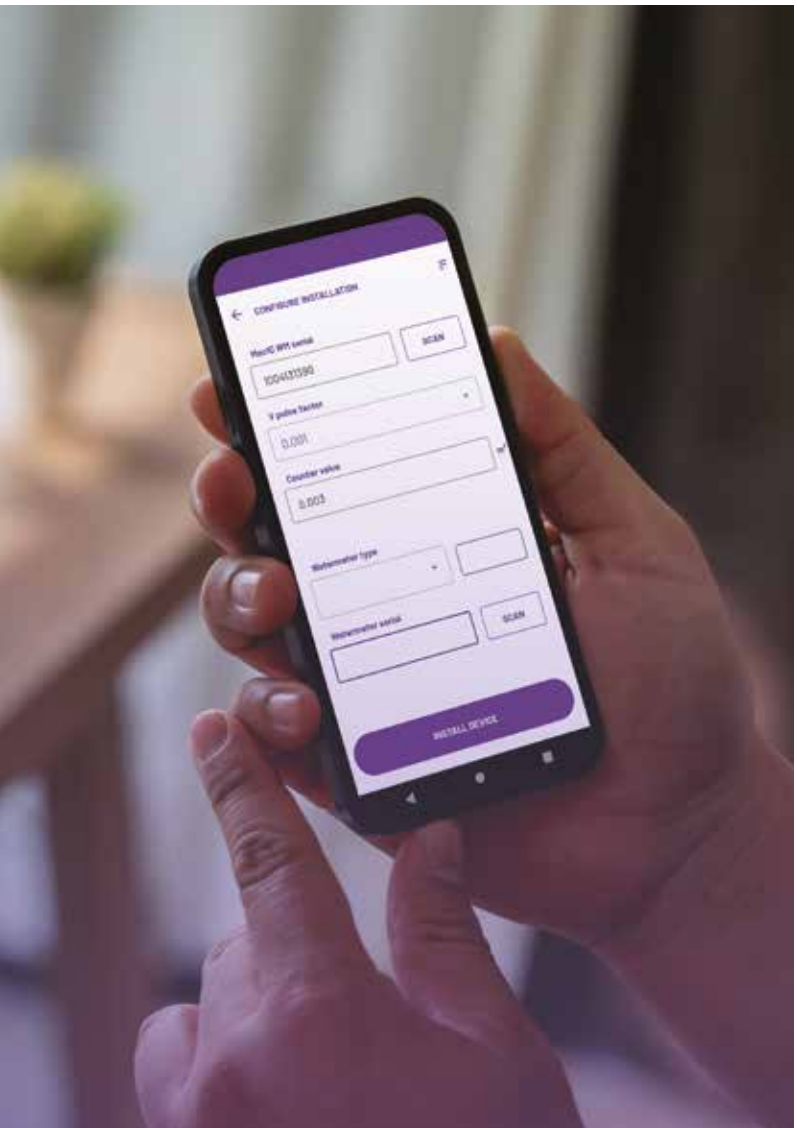
ConfIT! data loggers

mobile application for data loggers configuration

Mobile application ConfIT! data loggers is designed for configuring telemetry modules and pressure recorders produced by Plum. The application supports on-site installation and allows for configuration of the device and editing of basic logger parameters. The application communicates with devices via bluetooth standard, using the OptoBTEx head through the optical channel, and directly using NFC.

download
the ConfIT! data loggers application

GET IT ON Google Play



ConfIT! MacIQ WM

mobile application

ConfIT! MacIQ WM is an application created to configure Plum's IoT telemetry module, MacIQ WM. The application was designed to simplify the process of installing the MacIQ WM module in the eWebtel system. With the application, you can easily and conveniently enter the necessary data related to the water meter on which the MacIQ WM module is mounted.

download
the ConfIT! MacIQ WM

GET IT ON Google Play

accessories

- **Mac-PW**
- **Mac-HS**
- **OptoBTEx**

Mac-PW

industrial pressure sensor

- compatible with MacR6N/ MacREJ 5W
- sensor for testing and control of industrial processes, pneumatics, hydraulics, etc.
- durable metal pressure sensor diaphragm
- available in 10 bar and 26 bar versions
- precisely calibrated over the entire measuring range
- accuracy of measurement 0.5%
- anti-corrosion steel body
- wide operating temperature range and small size

Mac-HS

hydrostatic liquid level sensor

Industrial hydrostatic liquid level sensor dedicated to measuring the level of treated wastewater, water in reservoirs, ponds, rivers, wells, boreholes, and adits.

- ambient pressure compensated for by using a capillary tube (protected by a moisture proof membrane)
- excellent resistance to impact, overload, vibration, and corrosion
- moisture-proof and protected from electromagnetic interference
- low power consumption

OptoBTEx

optical interface

OptoBTEx is a wireless transmitter of data from compatible devices. The communication is performed in Bluetooth Low Energy Standard. Data is transmitted from device, which is compatible with IEC 62056-21 standard to the readout software installed (usually a device running MS Windows or Android operating system).

Interface is powered by an internal rechargeable battery.

Ex feature: II 3G Ex ic IIA T4 Gc

why you should choose our measurement solutions

- complex approach to the entire implementation process
- provide a technically refined product, providing remote data transfer from the system, operating in battery mode
- dedicated technical training
- marketing support
- easy configuration and operation through dedicated communication interfaces, web systems and mobile applications
- focus on business partnership, that is, we help solve technical problems and technological challenges

We develop complete telemetry solutions for the water meter readings. Products are developed according to the needs and technical standards of the installation and the customer. Cooperation with us means, in addition to products, a full package of additional services such as marketing activities and dedicated training from the technical departmant.

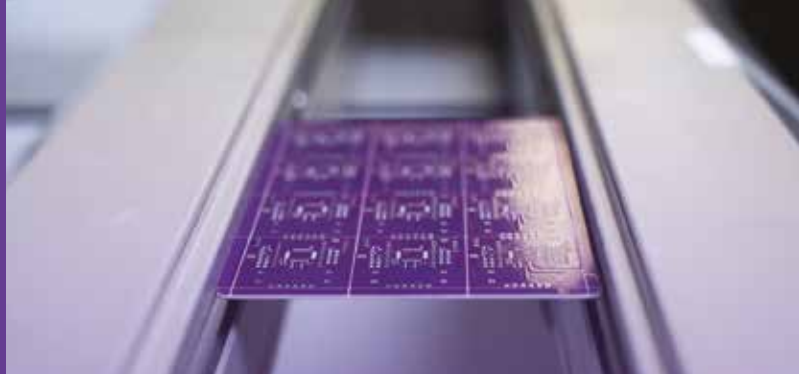
cooperation process

We create OEM solutions. However, we treat each product and its implementation individually. We guarantee full implementation and post-sales support from our R&D department.

We are Agile. We develop all our projects in SCRUM methodology, which allows us to implement our devices faster and more effectively.

We design competitive and interoperable devices, meaning they cooperate with devices from other suppliers.

We manufacture in Poland. We ensure product delivery reliability through local production.



cooperation process

step 1.

establishing technical requirements

Analysis of technical requirements of end customers.

step 2.

testing

Start of testing, pilots with our active participation and preparation for operation with information systems.

step 3.

acceptance of solutions

After testing period, we wait for acceptance of solutions.

step 4.

bidding

Negotiation of business terms and conditions.

step 5.

order

Our customers service department proceed with your order.

step 6.

production

Your devices are being produced and tested in our headquaters in Poland.

step 7.

technical support

We guarantee implementations, training and technical support.

what sets us apart

The interdisciplinary nature of our activities enables us to draw conclusions and implement the best solutions across all our brand products. We gather experience and utilize knowledge in the most effective way possible.

Quality of Plum solutions is confirmed by many years of cooperation and trust with the various water distribution and management companies all over the world.

plum® LAB

Accredited Laboratories

We operate an Accredited Calibration Laboratory AP 074, and an Accredited Electromagnetic Compatibility (EMC) Laboratory AB 1765.

plum® EMS

electronics
assembly on demand

We provide comprehensive electronics assembly services on demand. We handle the entire production process from design, purchasing necessary materials, assembling printed circuit boards, soldering wires, to assembling finished device enclosures. We cater to both small and large production runs as well as prototypes. We produce over a million printed circuit boards annually and serve companies from all around the world.

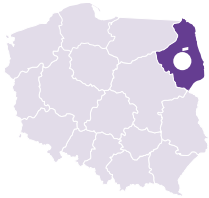
about Plum

We are an electronics manufacturer focusing on the development of systems for intelligent energy management in hvac, gas, and water areas using IoT technology.

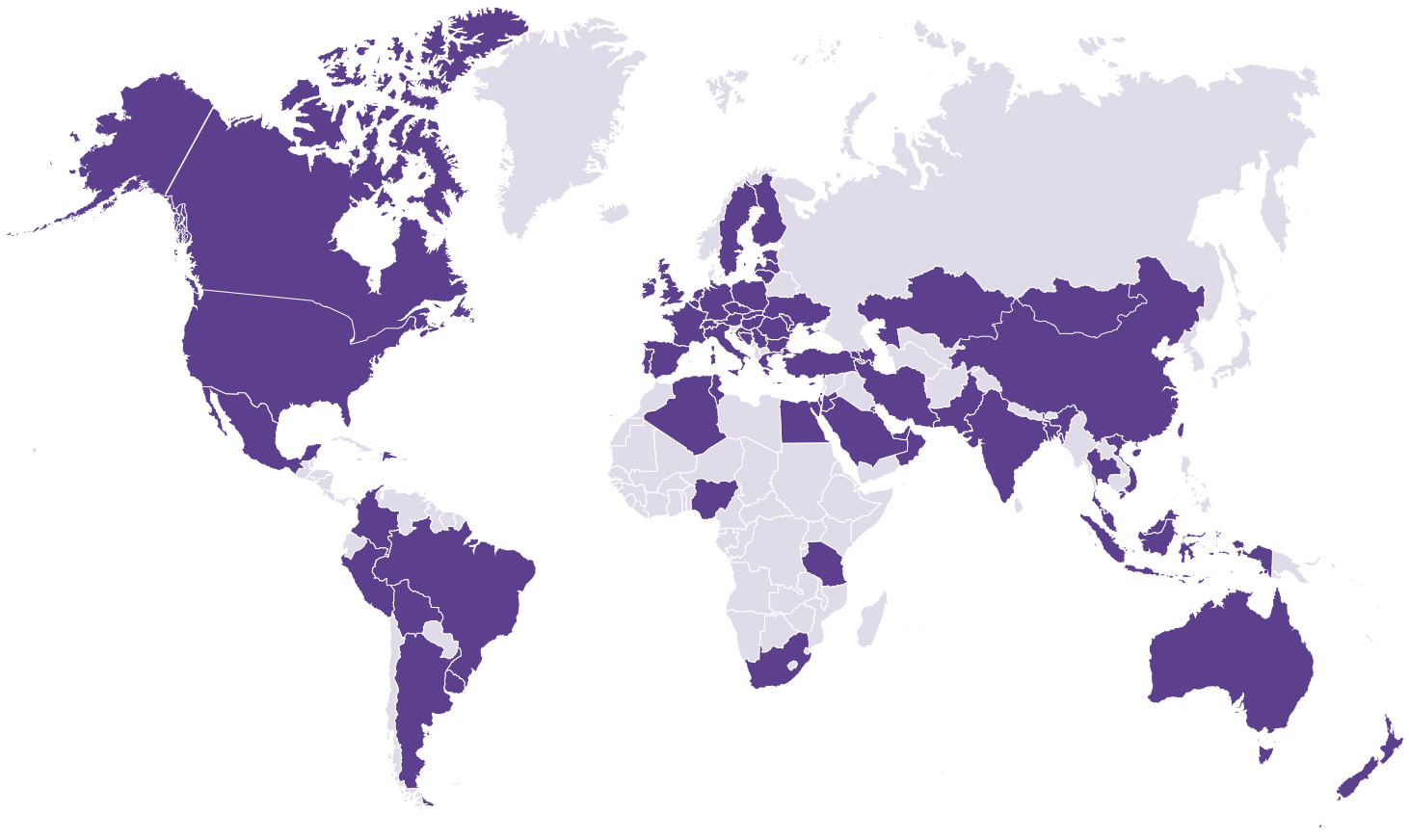
We continuously improve the efficiency of our design and production processes to quickly respond to changing market requirements and customer needs.

- **the electronics manufacturer and provider of energy management systems utilizing IoT technology**
- **solutions dedicated to the hvac, gas, and water industries**
- **accredited calibration and testing laboratories**
- **family-owned business**
- **company established in 1986**
- **integrated ISO management system**

We develop our electronics with several areas in mind. We manage 5 brands: plum HVAC, plum GAS, plum WATER, plum LAB, plum EMS. The accumulated experience serves as added value for all our activities and projects.



Our headquarters are located in Ignatki near Białystok. We sell our products both domestically and internationally.



get in touch with us

Customer service and Sales department:

water@plum.pl

Scan the QR code to access detailed contact information:

water.plum.pl/en/contact/

Go to our website.

water.plum.pl

plum®

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