

Operation manual



APULSE x1F6

IoT Data Logger
for Smart Water Metering



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2025/03/27

APULSE x1F6

OPERATION MANUAL

CONTENTS

PRECAUTIONS

We encourage you to read the user manual and familiarize yourself with the benefits of our device. Failure to follow the instructions provided in this document may result in the loss of warranty. If the manual describes different types of APULSE data loggers, any differences will be indicated in the relevant sections of the text.

Before first use, check the device for any visible damage. Do not use the device if it is damaged. In case of any issues, contact customer support. Familiarize yourself with and follow this manual as well as any other documents provided with the device. Keep this documentation for future reference or for the use of a future owner.

SAFETY INSTRUCTIONS

The following safety information and warnings are intended to minimize the risk of injuries and material damage in your environment. Nevertheless, it is important to take preventive measures and exercise appropriate caution during the installation, maintenance, cleaning, and use of the device.

- Keep the device away from fire, extreme temperatures, and chemicals.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the device.
- Never rub the enclosure surface of APULSE using a dry cloth because of the danger of electrostatic discharge.
- The product must be used in accordance with the manufacturer's instructions and with the tools recommended by the manufacturer.
- When replacement parts are required, make sure that only replacement parts specified by the manufacturer are used.
- Every item removed from the multipack must be properly secured (e.g. with bubble wrap) for further transport.
- Scraping, rubbing, or dropping the device may result in its damage.
- Any abnormal functioning of the device should be reported to the manufacturer.

ENVIRONMENT

- Do not throw away the device with the normal household waste at the end of its life, but hand it in at an official collection point for recycling. By doing this you help to preserve the environment (Fig. 1)
- Always remove the battery before you discard or hand in the device at an official collection point. Dispose of the battery at an official collection point for batteries (Fig.2).



Fig. 1



Fig. 2



CERTIFICATES

The product meets the essential requirements of the following EU directives:

- RED (directive 2014/53/UE)
- RoHS (directive 2011/65/UE)

The product was designed and is manufactured by a company holding the following certifications:

- ISO 9001:2015
- ISO/IEC 27001:2022
- ISO 45001:2018
- ISO 14001:2015
- PN EN ISO/IEC 80079-34:2011

GENERAL INFORMATION

APULSE x1F6 is an autonomous, battery-powered IoT data logger designed for various AMR-ready water meters. It gathers detailed consumption profiles and monitors unauthorized activities, providing comprehensive support for water infrastructure management.

The device transmits recorded data using LoRa or Sigfox technologies, ensuring efficient long-range communication with very low energy consumption. The use of such communication methods eliminates the need for investing in expensive network infrastructure, providing nationwide coverage through the selected operator.

The APULSE x1F6 features low energy consumption, resulting in a long battery life and low system operating costs. Thanks to bidirectional data transmission, users can not only receive consumption information but also configure the device on-site and perform diagnostics using a dedicated mobile application.

The collected data is transmitted to a server, where it can be further processed by external analytical systems.



MANUFACTURER

Designed and manufactured in Poland by:

AIUNEO

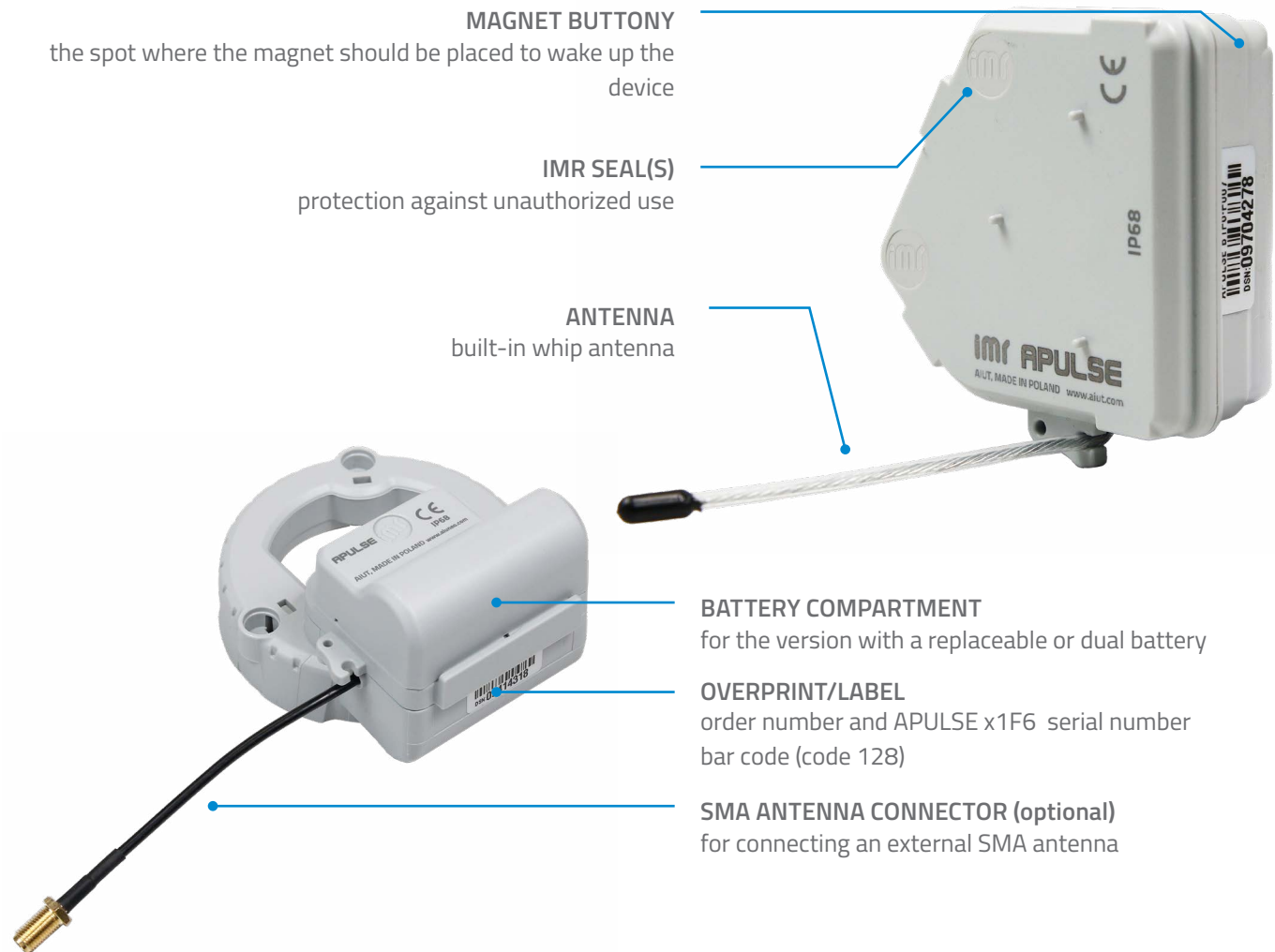
AIUT Sp. z o.o.

Poland, 44-109 Gliwice, ul. Wyczółkowskiego 113

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tel.: +48 32 775 40 00, e-mail: biuro@aiut.com

DEVICE STRUCTURE



ORDER NUMBER

APULSE v1F6-xy**

xy	battery	antenna	for water meter
F0	single, non-replaceable	built-in whip	Diehl, Itron, Sensus, Baylan, Honeywell
F5	single, non-replaceable	external SMA (fig.1)	Diehl, Itron, Sensus, Baylan, Honeywell
IZ	double, non-replaceable	built-in whip	Diehl, Itron
IV	double, non-replaceable	external SMA (fig.1)	Diehl, Itron
LZ	pojedyncza, wymienna	built-in whip	Diehl, Itron
LV	pojedyncza, wymienna	external SMA (fig.1)	Diehl, Itron

v - device type

- D** - Diehl water meter
- B** - Baylan water meter
- S** - Sensus water meter
- I** - Itron water meter
- E** - Honeywell water meter

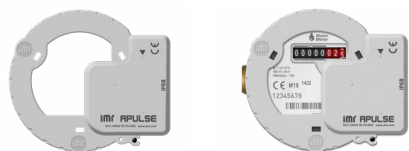


Fig.1

NOTE Details about the available versions of the device can be found in the chapter [Device versions](#)

VARIANTS AND COMPATIBILITY

To ensure proper integration of the APULSE with water meters, it is crucial to match the data logger model to the technical specifications of the water meter, including its type, series, and manufacturer. The table below provides a detailed list of compatible solutions, making it easier to choose the appropriate device for your water meter.



APULSE D1F6-xxxx

| DIEHL

Supported water meters

- Altair V4, Altair V3, Aquarius V3, Aquila V3, Aquila V4, Wesan WPVG, Wesan WP G

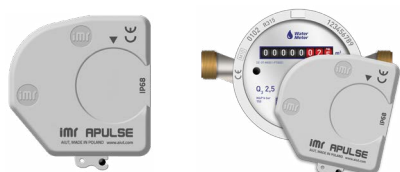


APULSE I1F6-xxxx

| ITRON

Supported water meters

- Flodis, Aquadis+, Flostar, Woltex M, Unimag Cyble, MSD Cyble



APULSE S1F6-1xxx

| SENSUS

Supported water meters

- 120, 120C, 405S, 420, 420PC, 620, 820

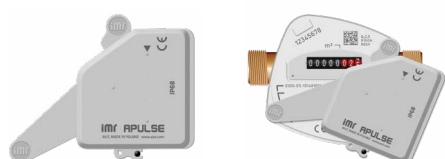


APULSE B1F6-1xxx

| BAYLAN

Supported water meters

- KK-1, KK-12, KK-12s, KK-13, KK-14, KK-16, KK-17, TK-2, VK-6, VK-10 and VK-11



APULSE E1F6-1xxx

| ELSTER

Supported water meters

- S150, S220, V200, V200P, V210, V210P, C4000

DEVICE VERSIONS

The table below provides a detailed overview of the available APULSE x1F6 data loggers, including technical parameters such as battery or antenna type. Choose the solution that best matches the characteristics of your infrastructure and operational needs.

Order number	Whip antenna (built-in)	SMA connector	Non-replaceable single battery	Replaceable single battery	Non-replaceable double battery
APULSE D1F6 - for DIEHL water meters					
APULSE D1F6-F007	✓	-	✓	-	-
APULSE D1F6-IZ07	✓	-	-	-	✓
APULSE D1F6-IV07	-	✓	-	-	✓
APULSE D1F6-LZ07	✓	-	-	✓	-
APULSE D1F6-LV07	-	✓	-	✓	-
APULSE I1F6 - for ITRON water meters					
APULSE I1F6-F007	✓	-	✓	-	-
APULSE I1F6-IZ07	✓	-	-	-	✓
APULSE I1F6-IV07	-	✓	-	-	✓
APULSE I1F6-LZ07	✓	-	-	✓	-
APULSE I1F6-LV07	-	✓	-	✓	-
APULSE S1F6 - for SENSUS water meters					
APULSE S1F6-F007	✓	-	✓	-	-
APULSE S1F6-F507	-	✓	✓	-	-
APULSE B1F6 - for BAYLAN water meters					
APULSE B1F6-F007	✓	-	✓	-	-
APULSE B1F6-F507	-	✓	✓	-	-
APULSE E1F6 - for ELSTER water meters					
APULSE E1F6-F007	✓	-	✓	-	-
APULSE E1F6-F507	-	✓	✓	-	-

TECHNICAL PARAMETERS

LOW POWER COMMUNICATION

LoRa

Power +14dBm

Protocol LoRa WAN, specification 1.0.2

Regional parameters EU868, IN865, AU915

Activation type OTAA i ABP

Sigfox

Power +14dBm

Protocol Radio specification 1.5

Regional parameters RC1 / RC2 / RC4 / RC6

IMR

Moc +14dBm

WMBUS T1

Power +14dB

Protocol EN-13757:2018, OMS 4.1.2

Encryption mode Mode 0 and mode 5 (by default)

BLUETOOTH LOW ENERGY COMMUNICATION

Standard Bluetooth LE 5.2

Power +8 dBm

Frequency 2,4 GHz

ENVIRONMENTAL PARAMETERS

Operating temperature -25°C do +55°C

Storage temperature -25°C do +55°C

Ingress protection IP68

POWER SUPPLY

Battery type single, non-replaceable
single, replaceable
double, non-replaceable

Battery lifetime up to 10 years (depending on the device's target configuration)

DIMENSIONS (H x W x D)

APULSE B1F6 67,6 mm x 71,5 mm x 38,8mm (83mm with built-in antenna)

APULSE D1F6 101,1mm x 88,5mm x 36,6mm (81,5mm with built-in antenna)

APULSE D1F6 (double battery) 101,9mm x 88,6mm x 60,4mm (81mm with built-in antenna)

APULSE E1F6 96,8mm x 75,9 mm x 34,8mm (79,6mm with built-in antenna)

APULSE I1F6 81,3mm x 69,8 mm x 35,5mm (80mm with built-in antenna)

APULSE I1F6 (double battery) 81,9mm x 69,8mm x 61mm (80mm with built-in antenna)

APULSE S1F6 69,8mm x 64,8 mm x 37,3mm (74,6mm with built-in antenna)

DEVICE INSTALLATION

The installation procedure is highly intuitive and can be completed within minutes. The APULSE data logger is installed on the water meter in just a few simple steps, secured with plastic seals.

The entire process is supported by the SITA mobile application, which guides you through the installation step by step and registers the APULSE device at the selected location.

NOTE The particular steps of the installation procedure may vary depending on the type of APULSE. Identify the type of your water meter and the type of APULSE data logger, and then follow the steps described on the following pages.

NOTE After installing the APULSE data logger, make sure that the **reading on the water meter is clearly visible**.

NOTE The seal should be **placed below the brim** to prevent its accidental removal

SEALING SMA CONNECTOR WITH SELF-AMALGAMATING TAPE

For devices equipped with an external SMA antenna, the connector should be protected from moisture using self-amalgamating tape.



1. Make sure that the surface for applying is clean and dry (no dust, grease, oil, or petroleum-type solvent).
2. Wrap the tape around the object, stretching it to the point that its width reduces to about 2/3, and make 50% overlap.
3. When insulating the connector, start wrapping the tape approximately 2 cm before the connector and finish approximately 2 cm beyond it.

NOTE Depending on the ambient temperature, the layers will self-amalgamate within a few hours after the tape is applied..

MECHANICAL ASSEMBLY OF APULSE B1F6

Supported BAYLAN water meters

- Baylan KK-1*
- Baylan KK-12*
- BaylanKK-12s
- Baylan KK-13
- Baylan KK-14*
- Baylan KK-16
- Baylan KK-17
- Baylan TK-2*
- Baylan VK-6
- Baylan VK-10
- Baylan VK-11

*water meters requiring anti-tampering plates

Necessary equipment

- APULSE B1F6
- 2 x IMR seal
- 2 x cheese head nylon screw
- a flat-head screwdriver
- anti-tampering plate (optional)

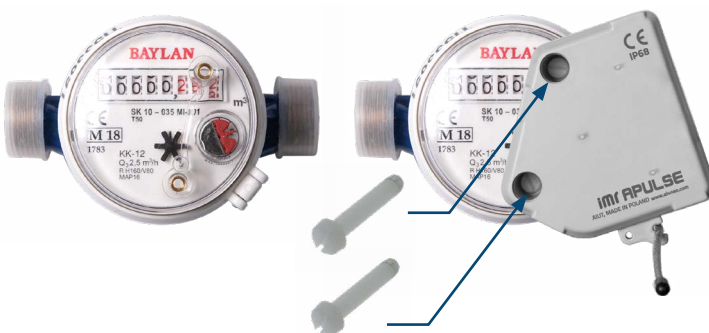
STEP 1 | ATTACH THE PLATE (OPTIONAL)

If anti-tampering plate is required, mount it to the back of APULSE
-Was presented in the picture beside.



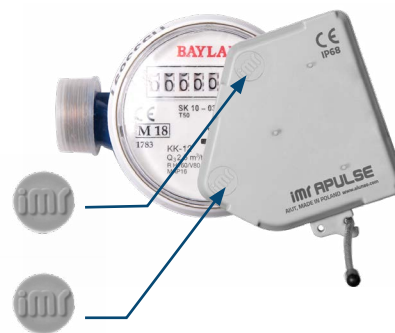
STEP 2 | ATTACH APULSE TO WATER METER

Install the APULSE on Baylan water meter with two plastic screws



STEP 3 | SEAL APULSE

Secure APULSE with two plastic seals.



MECHANICAL ASSEMBLY OF APULSE I1F6

Supported ITRON water meters

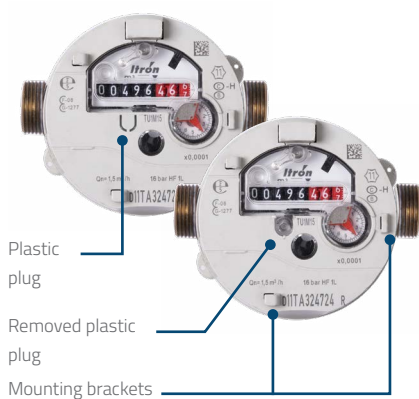
- Flodis
- Aquadis+
- Flostar
- Woltex M
- Unimag Cyble
- MSD Cyble

Necessary equipment

- APULSE I1F6
- 1 x IMR seal
- 1 x cheese head nylon screw
- a flat-head screwdriver

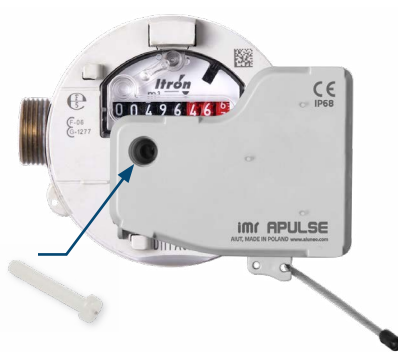
STEP 1 | REMOVE PLASTIG PLUGS

Remove the plastic plug located on the totalizer surface.



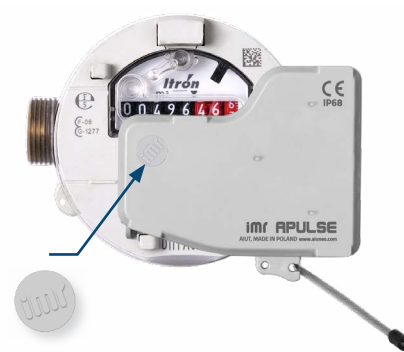
STEP 2 | FIX APULSE

Fix APULSE to the mounting brackets of water meter with a cheese head nylon screw.



STEP 3 | SEAL APULSE

Seal APULSE with an IMR plastic seal.



MECHANICAL ASSEMBLY OF APULSE E1F6

Supported ELSTER water meters

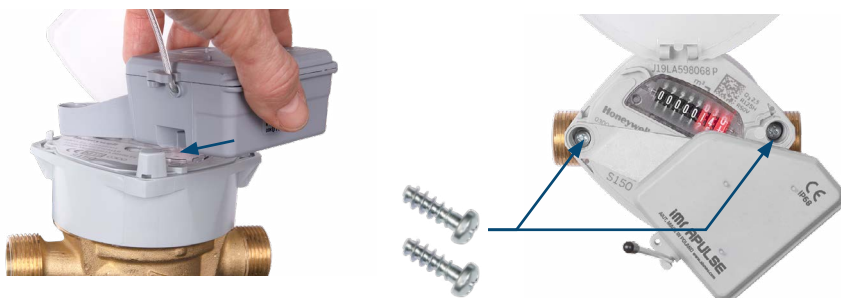
- Elster: S150, S220, V200, V200P, V210, V210P, C4000

Necessary equipment

- APULSE E1F6
- 2 x IMR seal
- 2 x Philips head screw
- a Philips head screwdriver

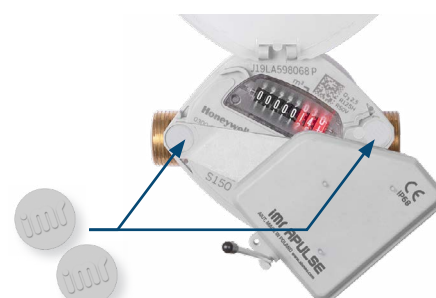
STEP 1 | FIX APULSE

Attach APULSE to the mounting bracket of the water meter and fix it with two Philips head screws.



STEP 2 | SEAL APULSE

Secure APULSE with two IMR plastic seals.



MECHANICAL ASSEMBLY OF APULSE S1F6

Supported SENSUS water meters

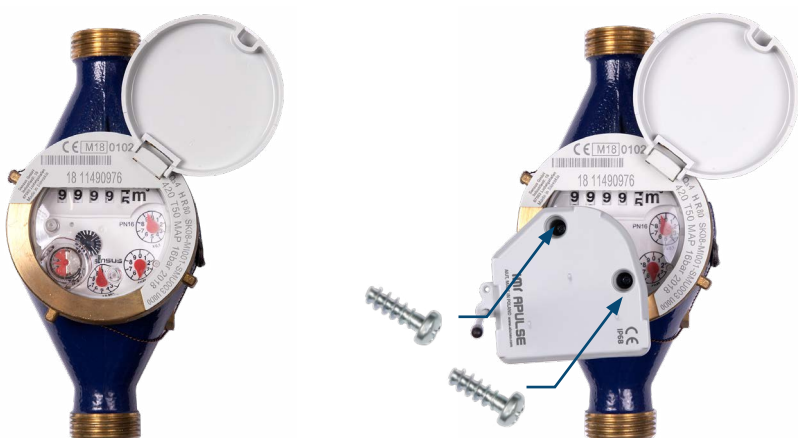
- Sensus: 120, 120C, 405S, 420, 420PC, 620, 820

Necessary equipment

- APULSE S1F6
- 2 x IMR seal
- 2 x Philips head screw
- a Philips head screwdriver

STEP 1 | FIX APULSE

Attach APULSE to the water meter and fix it with two Philips head screws.



STEP 2 | SEAL APULSE

Secure APULSE with two plastic IMR seals.



MECHANICAL ASSEMBLY OF APULSE D1F6

Supported DIEHL water meters

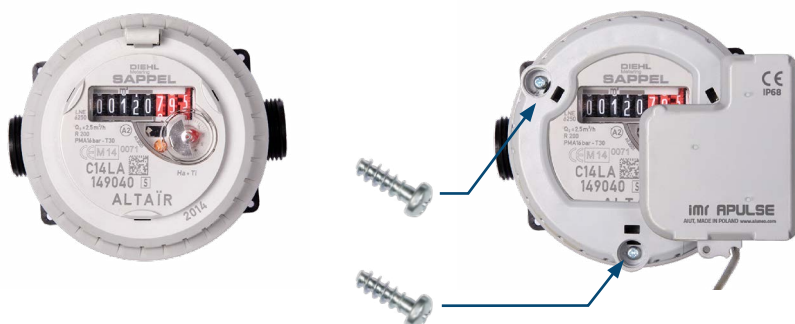
- Altair: V4, V3,
- Aquarius V3,
- Aquila: V3, V4,
- Wesan: WPVG, WP G

Necessary equipment

- APULSE D1F6
- 2 x IMR seal
- 2 x Philips head screw
- a Philips head screwdriver

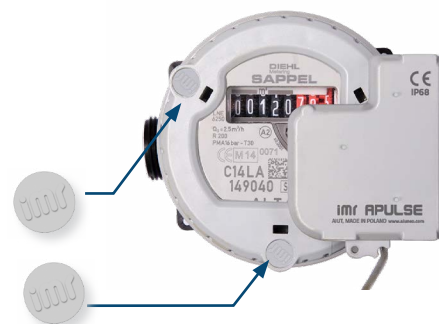
STEP 1 | FIX APULSE

Attach APULSE to the water meter and fix it with two Philips head screws.



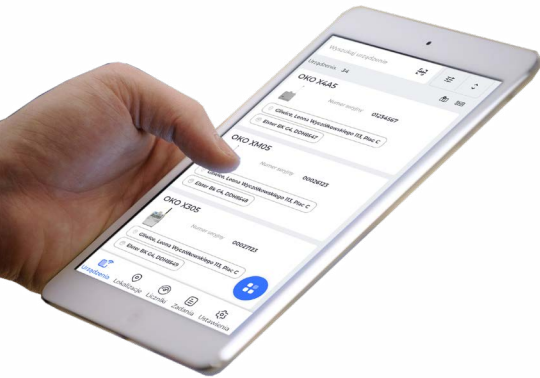
STEP 2 | SEAL APULSE

Secure APULSE with two plastic IMR seals.



DEVICE OPERATION IN THE SITA APPLICATION

DEVICE REGISTERING IN THE SYSTEM WITH SITA APPLICATION

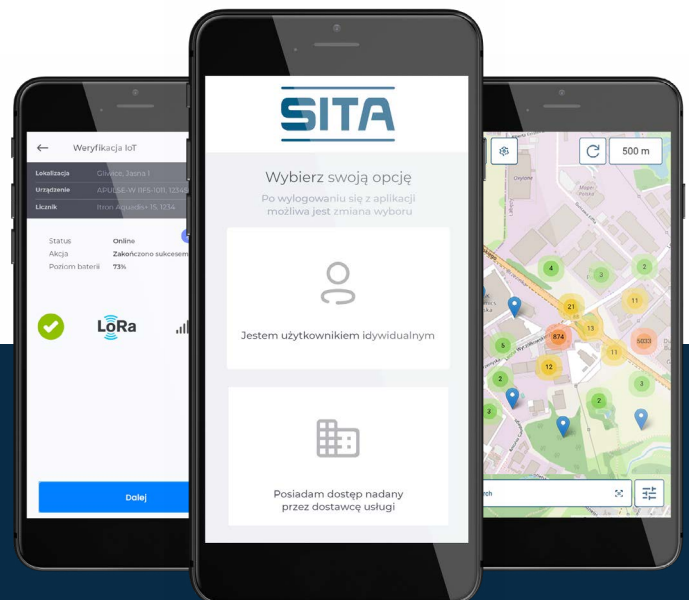


After the mechanical assembly of the APULSE device, an action must be performed to register the device in the selected location. The operation is performed using the SITA application. The procedure involves completing the installation form in the app, where you input details about the location, water meter parameters, and readings. The installation steps in the app may vary depending on the system settings, configuration, and specific client requirements.

SITA - CONVENIENT DATA ACCESS AND CONFIGURATION

SITA is a mobile application designed for Android devices, supporting on-site procedures such as installation and configuration of various IoT data loggers and gateways.

Communication between the SITA application and the APULSE data logger is carried out using Bluetooth communication.



**With the SITA application
you can perform the following
procedures in the APULSE x1F6:**

Device installation/
uninstallation

Reading current data
from the data logger

Meter index
synchronization

Synchronization of the
device clock with the
selected time zone

Reading archive data
from selected time
period

Configuration
of schedules for
automatically executed
commands

Setting
communication
schedules
(LoRa, WMBUS T1)

Review and
configuration
of alarms recorded
by the device

Device firmware
update

Verification of
IoT communication

Conducting the
battery replacement
procedure

NOTE For more detailed information, please refer to the *SITA. User Guide*.

ARCHIVE DATA

The APULSE x1F6 is equipped with a large archive (up to 10 years, depending on the configuration). The device offers two main types of archives: daily and monthly. The archives can be accessed remotely or locally using the SITA mobile application.

Daily archive

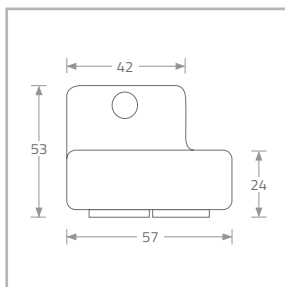
- Daily device status
- Water day index value & timestamp
- Maximum hourly flow value & timestamp of the day
- 24 x hourly water consumption
- Battery level [%]
- Current signal quality
- Ambient temperature
- Device clock

Monthly archive

- Monthly device status
- Water month index value & timestamp
- 28 to 31 daily water consumption (depending on the number of calendar days in the month)
- Maximum hourly flow value & timestamp of the month
- Battery level [%]
- Current signal quality
- Ambient temperature
- Device clock

ACCESSORIES

ABAT APULSE-W I1XX-2XXX



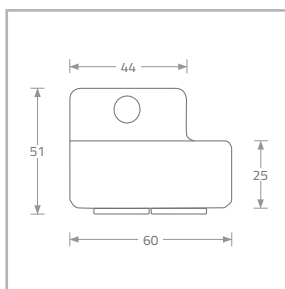
Rated capacity : 2600 mAh

Rated voltage: 3,6 V

Type of connection: Scotchlock connector (SL-UY-2)

Dimensions [mm]: 53x57

ABAT APULSE-W D1XX-2XXX



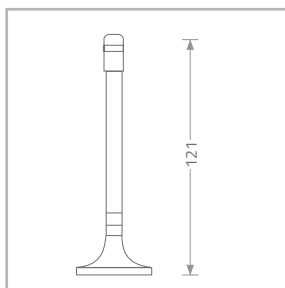
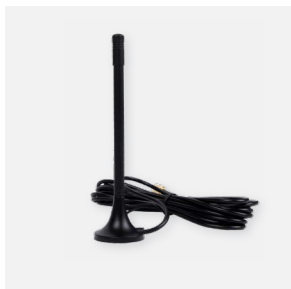
Rated capacity : 2600 mAh

Rated voltage: 3,6V

Type of connection: Scotchlock connector (SL-UY-2)

Dimensions [mm]: 51x60

ANT 868MHZ MAGNETIC 3M



Technology: GSM

Frequency [MHz]: 868MHz

Gain: 2,0 dBi

Impedance: 50 Ω

Connector: SMA male

Cable length: 300cm

ST D100



A tool to facilitate the removal of APULSE D1F6 data loggers from Diehl brand water meters.

REF 100



A tool enhancing the signal strength of APULSE x1xx devices in challenging site locations.