



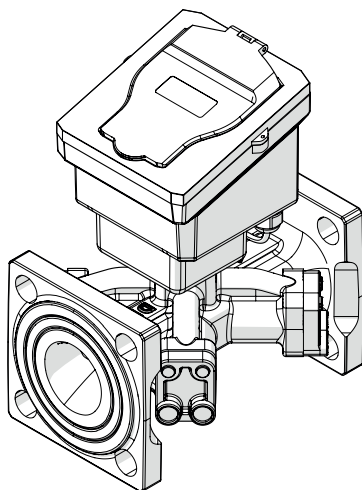
maddalena®

METERING EXPERTISE

Instrumentteam PLUS as

E-BULK

E-BULK meter



INSTRUCTIONS FOR INSTALLATION, USE AND MAINTENANCE

Translation of the original instructions.

Before installing and using the device, please read this manual carefully and keep it with the product.

Symbols used in this manual and relative meaning



WARNING!

Indicates particularly important information.



DANGER!

Identifies actions that may lead to injury or damage to the device if not performed correctly.



PROHIBITED

Indicates actions that **MUST NOT** be performed.

Compliance

Maddalena S.p.A. declares that **E-BULK** is compliant with the mandatory requirements of the following directives and standards:

- Directive 2014/32/EU MID (Measurement and adjustment devices)
- Directive 2011/65/UE and subsequent revisions (RoHS)



The full declaration of compliance is available from the following website: **www.maddalena.it**.

Warranty

Conditions of sale and warranty

The conditions of sale and warranty are available on the website **www.maddalena.it**.

Warranty limitations

Maddalena S.p.A. declines all responsibility, with immediate invalidation of the warranty in relation to:

- Damage or defects caused by transport or loading/unloading
- Incorrect installation caused by a failure to observe the instructions provided
- Use for purposes other than those indicated in this manual
- Use by unqualified or untrained personnel

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1 General information

1.1 Warnings and safety rules



WARNINGS

- This manual is the property of **Maddalena S.p.A.** and may not be reproduced or transferred to third parties: all rights reserved. It is an integral part of the product; make sure it is always with the device, even if it is sold/transferred to another owner, so that it can be consulted by the user or by personnel authorised to carry out maintenance and repairs.
- Read this manual carefully before using the device to ensure safe operation.
- The device must be used as intended by **Maddalena S.p.A.**, which is not liable for damage caused to persons, animals or property by installation, adjustment or maintenance errors or improper use of the device.
- After unpacking, ensure the delivery is intact and complete. If it does not correspond to what was ordered, contact the local distributor who sold you the device.
- The device must be installed and used in an area protected from freezing.
- The device must be protected against extreme humidity and heat: intense weather conditions can damage the battery and the device. The maximum permissible temperature during operation is 50°C.
- If in doubt about the condition and/or functionality of the device and its parts, please contact your local distributor for further information.
- Once the device has been commissioned, report any faults or malfunctions found to the product supplier.
- In the event of complete destruction of the device, with the electrolyte escaping, avoid skin and eye contact with the electrolyte. Do not inhale the vapours produced and ventilate the room adequately.
- This device is not intended for use by persons with reduced mental or motor capacities, or lack of experience and knowledge (including children), unless they are supervised by a person responsible for their safety and given appropriate instruction on how to use the device.



WARNING!

Images for demonstration purposes only: elements may vary.

1.2 Restrictions



PROHIBITED

- Make modifications and/or attempt to repair the product. Any intervention may only be carried out by authorised personnel.
- Shorten or lengthen the pulse output cable in order not to impair meter performance.
- Leave the device exposed to the weather.
- Place the device near heat sources and expose it to direct sunlight.
- Place the device close to sources of electromagnetic interference.
- Use the device in environments where the temperature drops below 0°C.
- Open the device and/or replace the battery.
- Use solvents to clean the device.
- Dispose of the packaging material in the environment and leave it within reach of children, as it can be a potential source of danger: it must be disposed of in accordance with current legislation.
- Dispose of the device with household waste.

1.3 Device description

E-BULK is an electronic cold water meter. It measures the flow volume, flow rate and other parameter values using ultrasonic technology. The electronic meter continuously monitors the status of operating and installation parameters. In the event of a fault, it triggers the dedicated alarms.

The managed alarms are the following: circuit fault, transducer fault, and air in channel (see section “**Faults and errors**”).

The main technical specifications of the **E-BULK** design are:

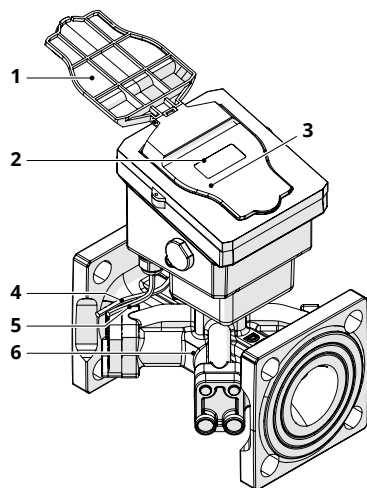
- **Liquid crystal display;**
- **Extremely low starting flow rate.** The minimum flow rate is one third that of conventional water meters. The device starts metering water at a flow rate of 10L/h;
- **Temperature detection and fault reporting.** Reporting of abnormal water consumption and ultrasonic signal quality detection;
- **Absence of moving parts.** Resistance to wear and constant functioning over time;
- **Lithium battery.** Ensures long-lasting power supply (13 years);
- **Integrated pulse output;**
- **Available with integrated 868wM-Bus radio;**
- **Available with 4-20mA output to measure the flow rate.**

1.4 Usage limits

The product can be used exclusively with diameters from DN 50 to DN 200* and with a maximum operating temperature of +50°C.

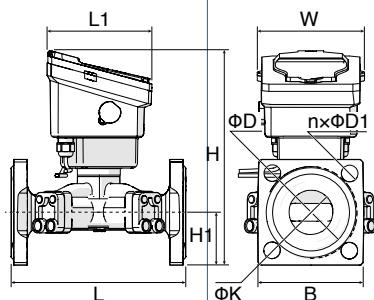
* Max DN400 on request

1.5 Structure



- 1 Cover
- 2 Display
- 3 Magnetic key door
- 4 Cable for connecting pulse reader and 4-20mA (optional)
- 5 Radio antenna (optional)
- 6 Meter housing

1.5.1 Dimensions

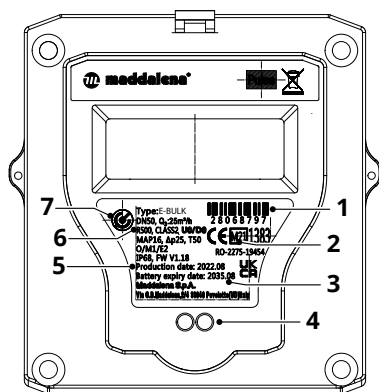


DN	50	65	80	100	125	150	200	250	300	U.M.
L	200 270* 300*	200 300*	225 300* 350*	250 360*	250	300	350	400 450*	450 500*	mm
L1	120	120	120	120	123	120	120	120	120	mm
H	245	250	275	290	380	400	470	525	575	mm
H1	65	70	90	100	125	130	170	198	223	mm
W	123	123	123	123	123	123	123	123	123	mm
B	172	190	205	230	250	285	340	396	446	mm
D	165	185	200	220	250	285	340	395	446	mm
K	125	145	160	180	210	240	295	350	400	mm
n× ØD1	4× Φ18	4× Φ18	8× Φ18	8× Φ18	8× Φ18	8× Φ22	8× Φ22	12× Φ22	12× Φ22	

(*) Non-standard. Available on request

1.6 Identification

The **E-BULK** meter has its identification data marked on it.



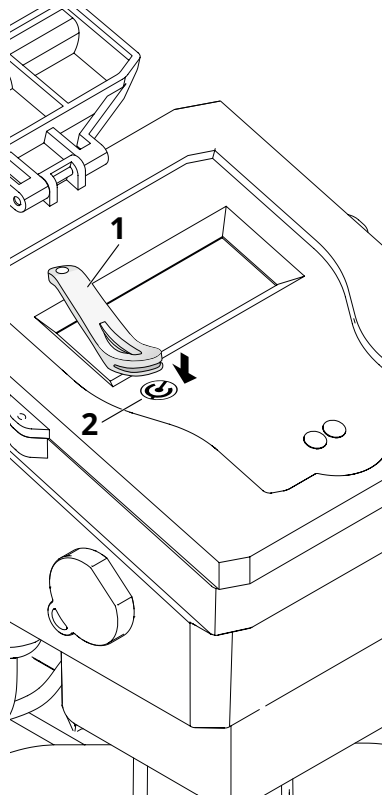
- 1 Meter serial number
- 2 MID approval
- 3 Battery expiration date
- 4 Optical interface
- 5 Year of manufacture
- 6 Technical entries
- 7 Magnetic interface

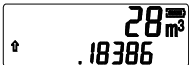
1.7 Display

The display shows the data on volume, flow rate and water temperature cyclically, as well as any active error codes.

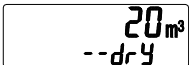
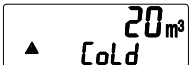
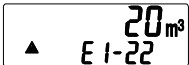
Hold the magnetic key (1) close to the door (2) to change the data displayed, forcing the cyclical reading.

The segment tests on the display can also be viewed.



Description	Screenshots
Flow volume (standard display)	
Water temperature/Instant flow	
Display test	

1.7.1 Faults and errors

Faults	Screenshots
Empty tube	
The temperature of the water is low (the error message appears when the temperature is below 4°C)	
Overflow	
Errors	Screenshots
E1-11: measuring channel 1 - circuit fault	
E1-22: measuring channel 1 - faulty transducer, air or dirt in the measuring channel or reduced flow signal	
E2-11: measuring channel 2 - circuit fault	
E2-22: measuring channel 2 - faulty transducer, air or dirt in the measuring channel or reduced flow signal	

Seals

Two seals are attached to the meter: opening the device causes them to break. Interventions must be carried out by a centre authorised by the manufacturer.

Do not alter or remove the meter seals, otherwise the warranty will be invalidated.

1.8 Technical specifications

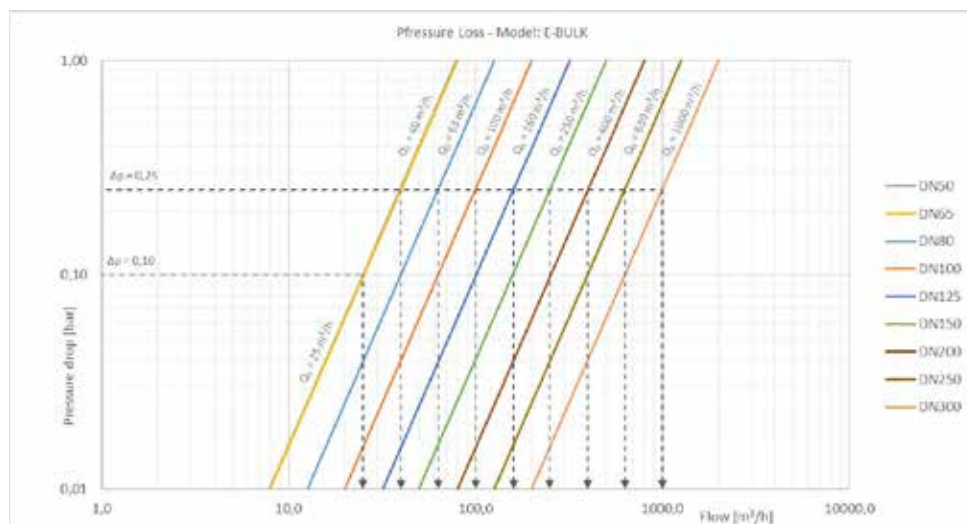
Common parameters	Description	U.M.
Accuracy class	2	
Ratio Q ₃ /Q ₁	500	
Maximum working pressure	1,6	MPa
Temperature class	T50	
Sensitivity class for installation conditions	U0-D0	
Protection class	IP68*	
Power supply	3.6 lithium battery	Vcc
Useful battery life	13 (default)	years
Environmental and mechanical conditions	Class O	
Electromagnetic class	MID M1, E1	
Liquid	Water	
Installation position	Any	
Pressure drop	25	KPa

*720h under 1m³ of water at 20°C.

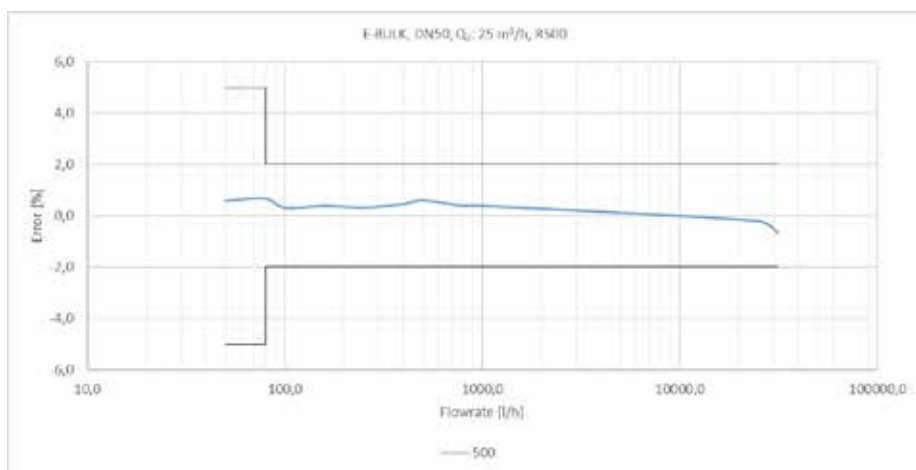
Characteristic	Description				U.M.
	DN50	DN65	DN80	DN100	
Maximum reading	9999999.99999				m³
Indicative starting flow rate	0,021	0,055	0,066	0,070	m³/h
Impulses/litres	1P=10L				P=L
Pulse duration	with frequency impulses generated by flow <=4Hz 125				ms
	with frequency impulses generated by flow >4Hz half of remaining period				

Characteristic	Description					U.M.
	DN125	DN150	DN200	DN250	DN300	
Maximum reading	99999999.99999					m³
Indicative starting flow rate	0,120	0,120	0,240	0,280	0,320	m³/h
Impulses/litres	1P=100L					P=L
Pulse duration	with frequency impulses generated by flow <=4Hz 125					ms
	with frequency impulses generated by flow >4Hz half of remaining period					

1.8.1 Pressure drop

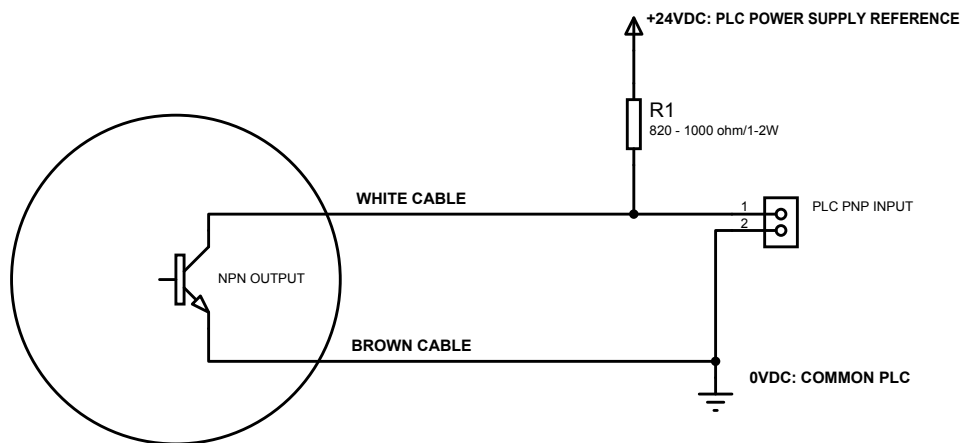


1.8.2 Error curve



1.9 Additional technical specifications

1.9.1 PLC-PNP input diagram for connecting the pulse output



CONNECTIONS

Conductor	Signal	Description
White	Impulses	Signal with forward and inverse flow
Yellow	Direction	Contact closed = inverse flow
Green	Tampering	Contact open = tampering
Brown	Ground	Common
Grey	Impulse counter forward	In case of inverse flow, the meter internally records the volume. When normal flow is restored, impulses are not generated until the total volume value recorded previously resets to zero.

Features

Digital outputs (5 wires)	Impulses output, direction flow, tampering, ground, meter impulses forward
Maximum frequency of impulses	10Hz
Output type	Collector open NPN, 30Vdc, 50mAdc
Cable length	3m

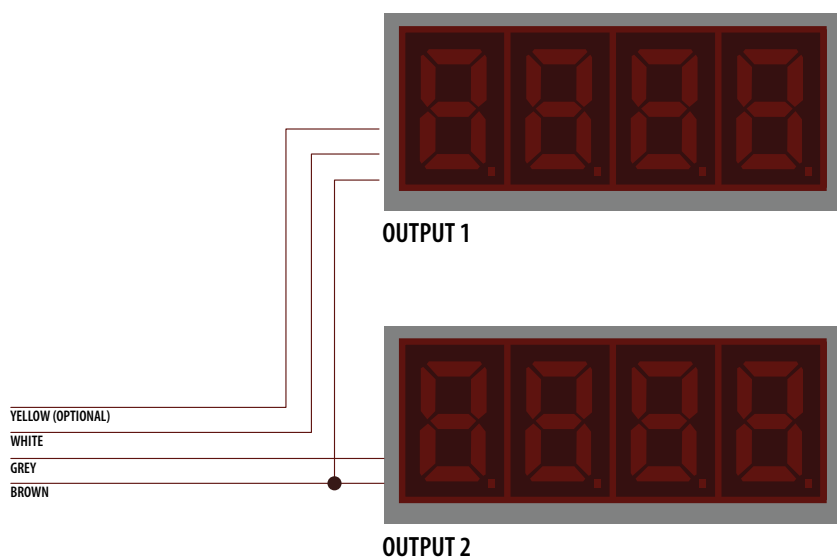
1.9.2 Split pulse output

The meter has two pulse outputs which can be connected to two different devices.

First output (white wire): pulses are generated regardless of flow direction. When combined with the direction output (yellow wire) it is also possible to distinguish the direction of flow.

Second output (grey wire): compensated output. In the case of reverse flow, no pulses are generated and the measured reflux volume is compensated before the normal pulse generation is restored.

Demonstration diagram



1.10 Analogue output 4-20mA (optional)

The 4-20mA analogue output is optional and is used for measuring the flow rate.

The output current varies linearly to the flow rate between 4mA and 20mA.

The 4mA value represents the null flow rate while the 20mA value is the maximum flow rate (Q₄) which varies according to the diameter of the meter.

The 4-20mA output of the **E-BULK** is a passive circuit and must be powered by an external device not supplied to the customer.

Parameter	Value	U.M.
Power supply	24	VDC
Red wire	Positive (+)	
White wire	Ground (-)	
Cable length	3	m

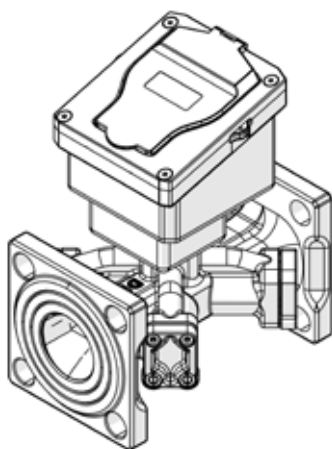
The two-wire analogue output 4-20mA is separate and insulated from the 5-wire pulse output.

1.11 Optional radio modules

1.11.1 Integrated module

Integrated modules are available for radio communication via the wMBus protocol (with 868MHz frequency) or LoRa (IN865 or AU915).

These modules are self-powered and enclosed within the electronics housing and have an external antenna. It is not possible to separate the radio part from the meter body, nor is it possible to replace the radio when the battery is depleted..



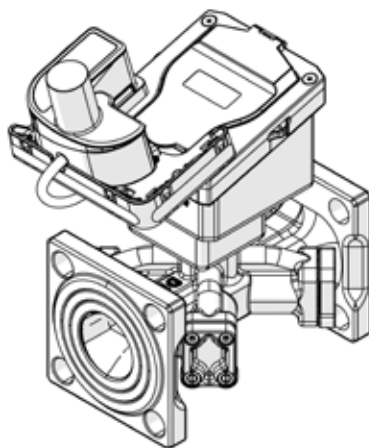
1.11.2 Separated module

Using the always-integrated pulse output on the E-BULK meter, it is possible to factory-install (via a watertight connector) the **Maddalena** split radios.

Any radio module with pulse input can be installed.

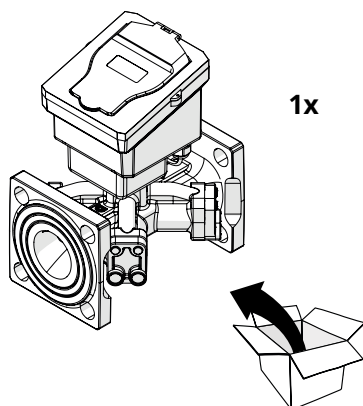
By using a plastic bracket, the Arrow WAN 2 split module (with wMBus and/or LoRaWAN communication) can be securely fixed above the meter housing, while still allowing the protective cover to be opened and closed.

For more information, please refer to the 'Arrow WAN 2 split' radio installation manual at www.maddalena.it



2 Installation

2.1 Receipt of the product



WARNING!

The instruction manual is an integral part of the device and should therefore be read and stored carefully.



PROHIBITED

Packaging material must be properly disposed of and kept out of children's reach as it may represent a hazard. Disposal must be performed in line with applicable laws.

2.2 Assembly

Authorised personnel: specialised installer or plumber, assigned by the metering operator.



WARNING!

Only authorised and suitably trained personnel with sufficient technical experience may install and operate the device.

Before installing the device, make sure that the two sections of tube are even to prevent mechanical stress, clean them with care (especially in the case of empty tubes) and let water run for a while, using a stub pipe on the tube instead of the meter.

If there is no water in the pipeline, open the valve upstream of the device before installing it. This is necessary because opening the valve after installation is complete may cause air suction that could damage the device.

Before using the meter, first fully remove air from the pipe and the device itself. The interception/adjustment valves must be fully open when doing this. Open the valve at the start first and then the valve at the end.

Install the meter:

- protected from frost (insulate it if necessary with insulation material) and in the lower part of the system to prevent air accumulation;
- protected from blows and tampering, where readings are easy to make;
- so that the direction of the arrow on the device coincides with the flow direction.

Install proper interception valves upstream and downstream of the meter to permit maintenance operations and inspections on the device, as well as to check the system.

**WARNING!**

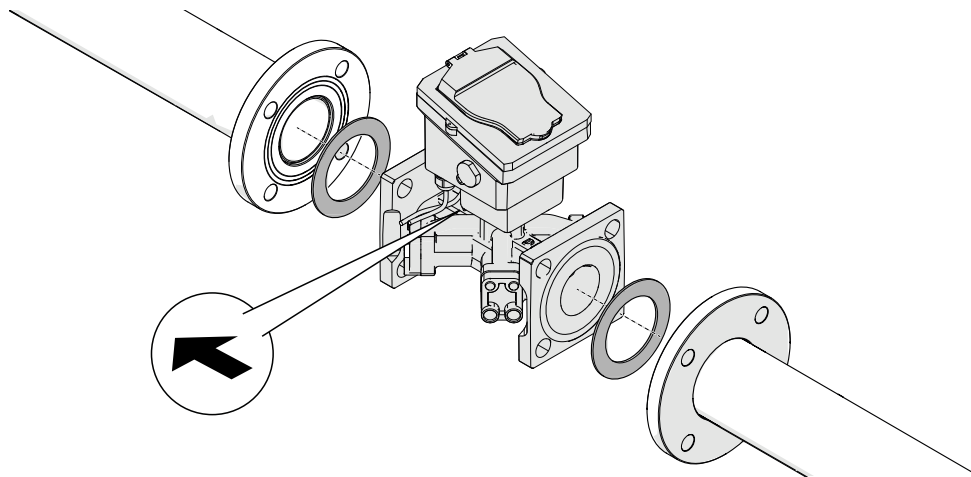
Before positioning the seal, make sure that it is not damaged.

Make sure that the seal is not damaged during installation.

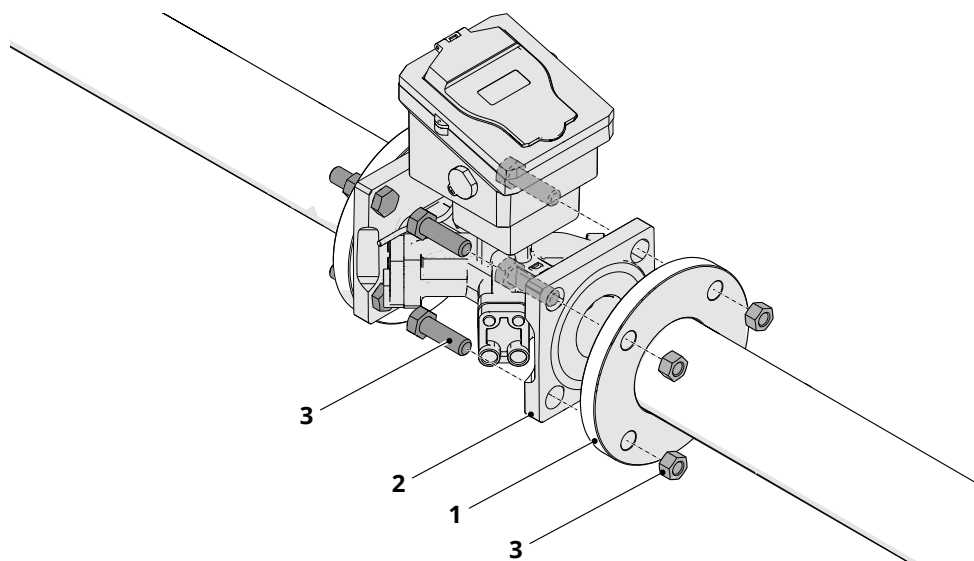
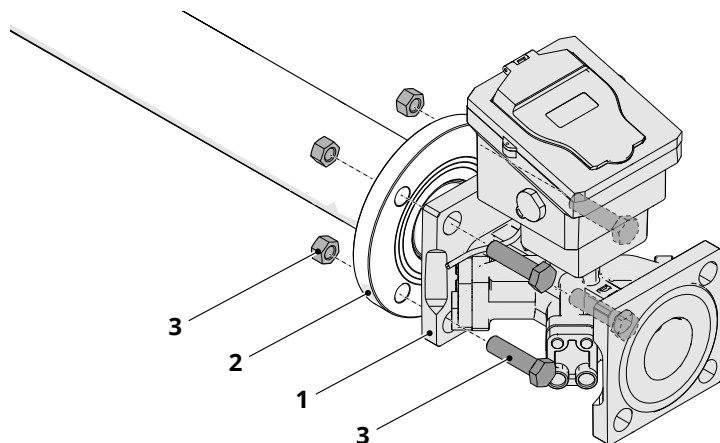
Make sure that the level of the seal matches that of the tubing.

Check that the seal does not protrude from the tube.

Make sure that the surfaces of the flange are clean and undamaged.

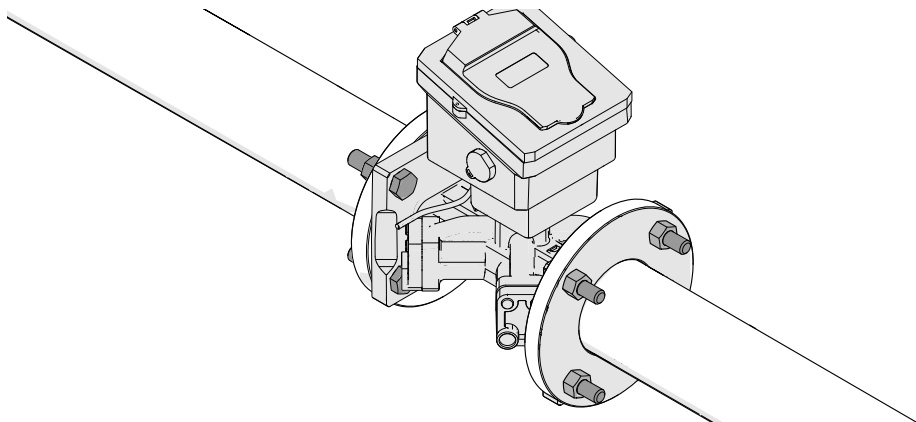


- Fasten the meter flange (1) to the counterflange (2) using nuts and bolts (not provided) (3). Make sure that the seal is positioned correctly and that it is level with the flange.

**WARNING!**

Make sure that the flange and counter-flange holes are aligned.

- Tighten the bolts.

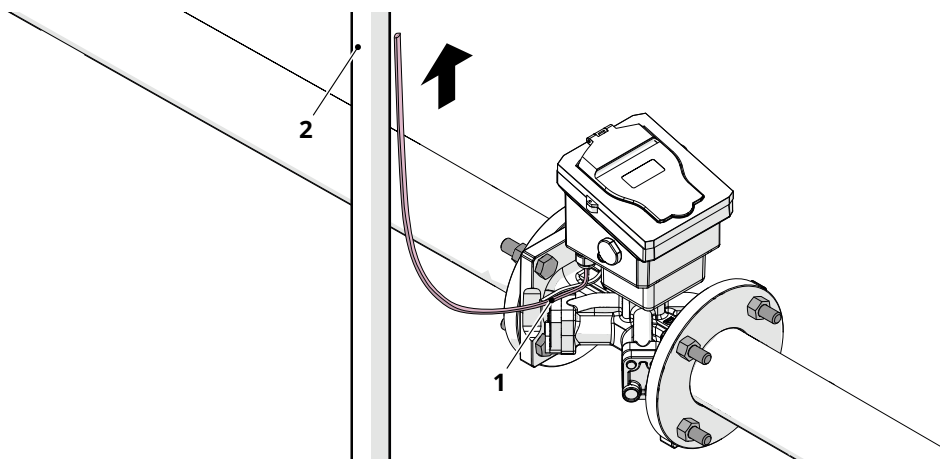
**WARNING!**

Check the seal hold to prevent leakage.

The antenna cable (1) is fitted with a slot for a fastening screw.

Fasten the cable to a support (not provided) (2) in a vertical position as high as possible to maximize radio-signal range.

If the meter is installed underground, take the antenna out of the underground space or as close to the exit as possible. (Only for **E-BULK** integrated radio version).

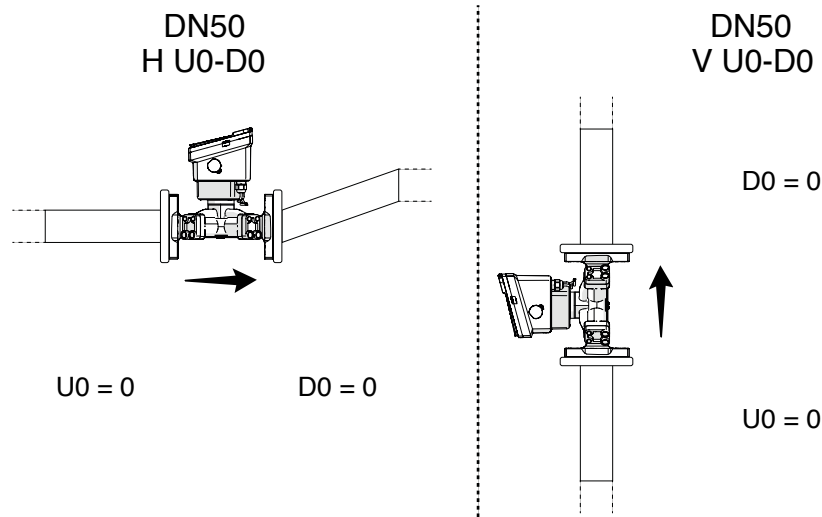
**WARNING!**

With metallic closures on manholes, keep the antenna at least 30cm away from the metal part.

**WARNING!**

Sensitivity class in installation conditions: H U0-D0, V U0-D0

If the U and/or D letters are followed by the letter S, install a flow straightener.

**Allowable water pressure (ISO 4064-1)**

The maximum allowable pressure (MAP) is 16 bar, and is displayed on the meter dial. If not indicated on the dial, it must be 10 bar. These values must never be exceeded. The maximum allowable pressure (MAP) downstream of the meter must be greater than or equal to 0.03 Mpa (0,3 bar).

Commissioning

Before putting the meter into operation, completely vent the air from both the pipe and the meter itself (rotate it if necessary). The interception/adjustment valves must be fully open when doing this. Open the valve at the start first and then the valve at the end.

3 Use

The ultrasonic water meter is ideal for significant usage and, thanks to the absence of moving parts, it is resistant to wear and grants constant functioning over time.

The measurements taken by the meter are shown cyclically on the display and they are also available on other interfaces.

- Data can be transmitted continuously using the wM-Bus 868MHz radio (optional).
- The pulse output, available as standard, allows the transmission of pulses for the metering of the water volume. Various transmission systems using different technologies can be connected to this output.
- The optional analogue output 4-20mA makes it possible to measure the flow rate: it can be connected to a local flow measurement system.

The water meter is not indicated for installations with especially heavy water, water with algae or sludge and debris.



WARNING!

It is recommended to keep the lid closed once the installation steps are completed.

4 Configuration

The water meter **E-BULK** is supplied with a default configuration.

The default settings can be changed via:

- The ElecTo Bulk app (Android, downloadable from Google Play Store);
- a Bluetooth or USB optical reading head.

The app allows the following parameters to be read and programmed:

Impulse outlet

- Pulse duration (1) (default 125ms)
- Pulse weight (2) (100L per DN>100, 10L in all other cases)



WARNING!

The pulse output parameter cannot be changed after water has been continuously flowing through the device for 7 days.

General parameters

- Date and time (3)
- Periodic reading (4) (default: 28)

Electo Bulk Connected! UniCo21804003

READ **PROGRAM**

Synchronise clock

2021-12-09 09:39 • 3

Synchronise clock

Billing day

15 • 4

Set billing day

Pulse counter Radio General

Internal radio parameters

- Activation / deactivation (5)
- Mode (6) (default: T1)
- Frame (7) (default: short)
- Encryption (8) (default: NO)
- Encryption key (9) (default: default)
- Transmission frequency (10) (default: 16 seconds)
- Transmission window (11) (default: 8:00-18:00)
- Transmission months (12) (default: Jan-Dec)
- Transmission days (13) (default: Mon-Fri)

Electo Bulk Connected! UniCo21804003

READ **PROGRAM**

Radio ON/OFF 5 radio transmission is active

Mode 6

T1 C1

Frame 7

Short Long

Encryption 8

AES 128 no encryption

Aes key 9

Default Custom AES key

Transmission every 10

16 seconds

Transmission interval 11

from 08:00 to 18:00

10 hours

Transmission months 12

January-December

12 months

Transmission days 13

Monday-Friday

5 days

Pulse counter Radio General

5 Maintenance

5.1 Battery

The meter is fitted with 3.6V lithium batteries that cannot be recharged or replaced. The estimated lifespan of the battery is 13 years, calculated using factory set-up and with the following operating conditions:

- from -10°C to +0°C for 10% of the lifespan
- from 0°C to +30°C for 80% of the lifespan
- from +31°C to +55°C for 10% of the lifespan



WARNING!

Humidity and intense heat may damage the battery and reduce its lifespan.

The device calculates the useful remaining life of the battery based on memorized parameters, for example, estimated consumption of the electronic board in standby, consumption in transmission and the number of transmissions made.

Battery life depends on the data transmission frequency you choose to set.

5.2 Cleaning

No particular cleaning procedures are required. However, the installation area should be kept clean and periodic checks should be performed to ensure the required environmental conditions are met.



PROHIBITED

It is forbidden to use abrasive products, methyl alcohol, hydrochloric acid (35%), sodium bicarbonate (10%), tricresyl phosphate, benzol, concentrated ethanol, toluol, industrial petrol, methylisobutylketone, acrylonitrile, cosmetic solvents, sodium hydrate (10%), ammonium hydrate (10%), nitric acid (40%), potassium dichromate, acetone, diesel naphtha, petrol.

5.3 Disposal

The device is made from various materials such as: metal and plastic materials, electrical and electronic components. It must be disposed of in accordance with current local regulations on industrial and special waste. It must not be disposed of with household waste.

The device does not contain any toxic/hazardous substances or elements, including lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl.

At the end of the product's life, ensure safe removal and responsible disposal of components, including recycling of batteries, in compliance with applicable environmental laws in the country of installation.



6 Certified and approved



DICHIARAZIONE DI CONFORMITÀ UE / UKCA EU / UKCA DECLARATION OF CONFORMITY

Modello **E-BULK (DN 50÷400 mm)**
Model
Nome e indirizzo del fabbricante **Maddalena S.p.A.**
Name and address of the manufacturer **Via G.B. Maddalena 2/4 – 33040 Povoletto (UD), Italy**

La presente dichiarazione di conformità è emessa sotto la responsabilità esclusiva del fabbricante.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Oggetto **Contatore per acqua ultrasonico**
Object **Ultrasonic water meter**

L'oggetto della dichiarazione di cui sopra è conforme alla pertinente normativa di armonizzazione dell'Unione: Direttiva 2014/32/UE, Allegato MI-001.

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation: Directive 2014/32/EU, Annex MI-001.

Norme armonizzate pertinenti, documenti normativi e riferimenti alle altre specifiche tecniche utilizzate per la dichiarazione **UNI EN ISO 4064:2017**

Relevant harmonised standards and normative documents and references to other technical specifications used for declaration

Restrizione dell'uso di determinate sostanze pericolose (RoHS) e successivi aggiornamenti **(EU) 2017/2102**
Restriction of the use of certain hazardous substances (RoHS) and subsequent updates

Nome e numero dell'organismo notificato <i>Name and number of the notified body</i>	Attività <i>Activity</i>	Certificato nr. <i>Certificate no.</i>
Romanian Movement for Quality, NB 2275 Srt.Parului nr.8 Craiova, Dolj Romania	Certificato di esame UE del tipo in accordo al Modulo B della Direttiva 2014/32/UE <i>EU-type certification in accordance with Module B of Directive 2014/32/EU</i>	RO-2275-19454
Czech Metrology Institute, NB 1383 Okružní 31 638 00 Brno Czech Republic	Certificazione di prodotti, collaudo e controlli finali in accordo al Modulo D della Direttiva 2014/32/UE <i>Certification of production, final product inspection and testing in accordance with Module D of Directive 2014/32/EU</i>	0119-SI-A010-08

Povoletto, 19/04/2023

Maddalena S.p.A.


Dott. Ing. Franco Maddalena
Amministratore Delegato
Chief Executive Officer

MADDALENA S.p.A.

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NB 2275

Certificat de examinare UE de tip EU-type examination certificate

Număr RO-2275-19454, revizia 2
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Eliberat de
Issued by

MIȘCAREA ROMÂNĂ PENTRU CALITATE/ ROMANIAN MOVEMENT FOR QUALITY
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În conformitate cu
According to

Directiva 2014/32/UE a Parlamentului European și a Consiliului din 26 februarie 2014 privind armonizarea legislației statelor membre referitoare la punerea la dispoziție pe piață a mijloacelor de măsurare (reformare), Anexa III Contoare de apă (MI – 001), Anexa II Modulul B: Examinarea UE de tip
Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments (recast), Annex III – Water meters (MI-001), Annex II Module B: EU-Type Examination

Producător
Manufacturer

MADDALENA SpA.
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Referitor la
Concerning to

Contor de apă tip E-BULK, seria DN 50...DN 400
Water meter E-BULK type DN 50...DN 400 series

Caracteristici
Characteristics

Clasa de temperatură/ *Temperature class* T30; T50
Caracteristici descrise în Anexă/
Characteristics described in Annex

Descriere și
documentație
*Description and
documentation*

Mijlocul de măsurare corespunde cu cerințele Directivei 2014/32/UE și este descris în Anexă, parte integrantă din prezentul certificat.
The measuring instrument meets the requirements of Directive 2014/32/EU and it is described in Annex, a part of this certificate.

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10.11.2022

Valabil până la
Valid until

11.11.2029

Organism notificat nr. 2275
Notified Body no. 2275

PhD eng. Maria-Magdalena POENARU
EXECUTIVE DIRECTOR



Certificatul fără semnătură și ștampilă nu este valabil. Prezentul certificat este valabil numai însoțit de Anexă. Certificatul are 16 pagini, inclusiv anexa.
Certificate without signature and stamp is not valid. The present certificate is valid only accompanied by Annex. The certificate has 16 pages, including the annex.



MADDALENA spa

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