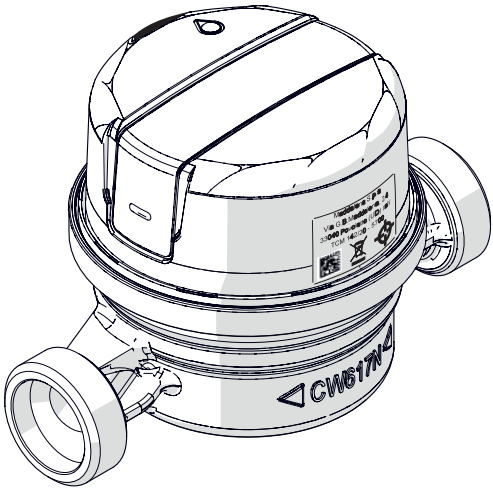
maddalena®
METERING EXPERTISE

ElecTo SJ

Electronic single jet meter



INSTRUCTIONS FOR INSTALLATION, USE AND MAINTENANCE

Translation of the original instructions.

Before installing and using the device, carefully read this manual and store it together with the product.

EN

Code 5000090C - 03/2023 - R5

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 **ElecTo SJ** is compliant with the mandatory requirements of the following directives and standards:
- Directive 2014/32 MID (Measurement and adjustment devices)
- Radio Equipment Directive (RED) 2014/53/EU
- Directive 2011/65/UE and subsequent revisions (RoHS)

CE UKCA

The full text of the Declaration of Conformity can be found on page 17 "**Compliance declaration**".

Images for demonstration purposes only: elements may vary

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

Contents

1 General information

1.1 Warnings and safety rules

WARNINGS

- This manual is the property of **Maddalena S.p.A.** and reproduction or transfer to third parties of the contents of this document is prohibited. All rights reserved. This document represents an integral part of the product; ensure that it is always together with the product, even in case of sale/transfer to another owner, allowing its consultation by the user or authorised maintenance or repair personnel.
- 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 always be protected from extreme humidity and heat. Penetration of humidity and intense heat may damage the battery and the device. The maximum allowed operating temperature is 55°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.

1.2 Restrictions

PROHIBITED

- Modify and/or attempt to repair the product. All repairs must be performed exclusively by authorised personnel.
- 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.
- Incorrectly dispose of packaging material and keep it out of children's reach as it may represent a hazard. Disposal must be performed in line with applicable laws.
- Dispose of the device with household waste.

1.3 Device description

ElecTo SJ is a single-jet meter with mechanical movement and fully electronic timing devices designed for measuring hot and cold water in residential applications.

ElecTo SJ measures the flow of water using a turbine and a magnetic drive (protected). **ElecTo SJ** is equipped with an electronic metering unit with a display showing the volume, flow rate and any active alarms.

ElecTo SJ is equipped with an integrated radio which uses Wireless M-Bus technology allowing remote data transmission. Data can be received using a special mobile reading kit or via concentrators and a fixed network.

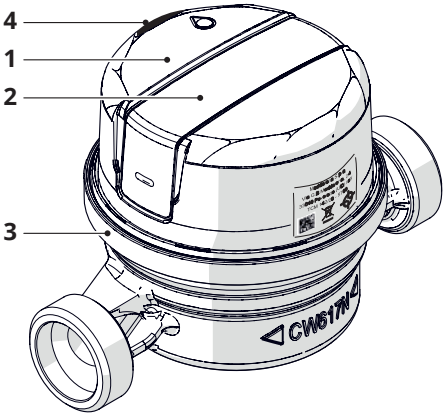
The main technical features of **ElecTo SJ** are:

- **Single electronic jet**;
- **Available in both cold and hot water versions**;
- **Accuracy class up to R160**;
- **Electronic timing device for calculating consumption, fully rotatable (360°)**;
- **LCD display**;
- **Integrated wM-Bus radio operating in the 868MHz** band;
- **Integrated lithium battery** guaranteeing a minimum service life of 7, 13 (default) or 15 years.

1.4 Usage limits

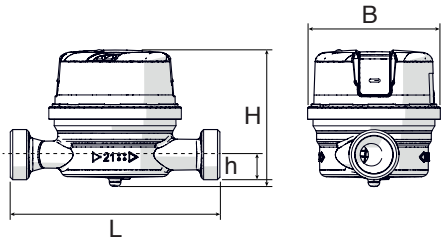
The product may only be used in accordance with the corresponding limits of use (see "**Technical specifications**").

1.5 Structure



1 *Timing device*
2 *Display*
3 *Meter housing*
4 *Coloured water-temperature indicator (optional)*

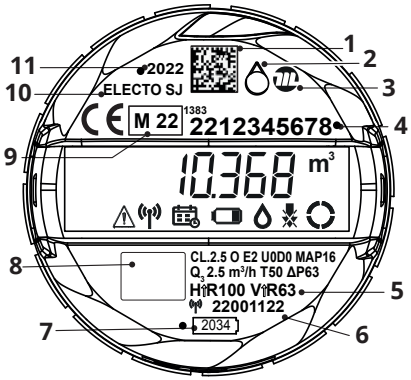
1.5.1 Dimensions



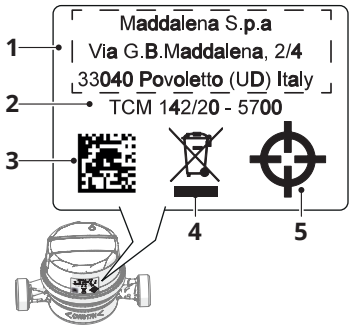
DN		15	20
	inches	1/2	3/4
Thread	inches	G 3/4 B - G 1 B	G 1 B
L	mm	80 / 110 / 115 / 120 / 130	115 / 130
H	mm	72	
h	mm	11,7	16,7
B	mm	65	

1.6 Identification

The **ElecTo SJ** meter has its identification data marked on it.

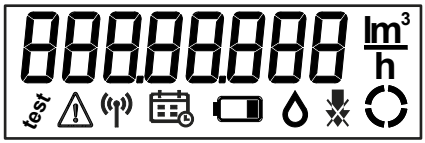


1 *QR code*
2 *LED*
3 *Manufacturer*
4 *Meter serial number*
5 *Measurements*
6 *Wireless serial number*
7 *Battery expiration date*
8 *Space for customer's logo (optional)*
9 *MID approval*
10 *Product name*
11 *Year of manufacture*



1 *Manufacturer's address*
2 *Type-approval number (certificate)*
3 *QR traceability*
4 *WEEE marking*
5 *Magnetic key symbol*

1.7 Display



The display is a passive LCD.
The display is set in fixed mode with the following automatic display cycle:
– for 60 seconds, the **Main view**;
– for 12 seconds, the **Periodic readings**;
– for a further 12 seconds, the **Display Test and firmware version**.

Icon	Description
test	**Test** Activated during test mode
⚠	**Error** Activated when an error is displayed
(•)	**Transmission antenna** Signals radio transmission or radio enabled
📅	**Calendar** Activated when billing dates are displayed
▭	**Battery** Activated when the calculated service life is coming to an end or when the voltage drops below the minimum value (in which case the error icon also lights up)
💧	**Leakage** Activated when the leakage alarm is triggered
⇩	**Backflow** Activated when the reverse flow alarm is triggered
○	**Star indicator** The indicator, consisting of 2 arc segments, follows the flow by rotating clockwise for direct flow and anticlockwise for reverse flow

1.7.1 Main view

The display cycle is automatically repeated 4 times, for a total of 60 seconds.

Volume measured
It is displayed for 12 seconds and is expressed in m^3. The value displays the decimal point for litres, therefore 5 digits for m^3 and 3 digits for litres.
The presence of a flow and its direction is displayed by the star indicator.

Range
It is displayed for 3 seconds and the value always displayed is expressed in m^3/h to 3 decimal places. If no flow is detected, the value displayed is 0.
The presence of a flow and its direction is displayed by the star indicator.

1.7.2 Periodic readings

Following an automatic sequence, billing date references are displayed:
- **Billing date 1:** displays the date for 3 seconds (e.g. 12.05.21 indicates 12 May 2021);
- **Billing value 1:** displays the volume recorded on the billing date for 3 seconds;
- **Billing date 2:** displays the date for 3 seconds (e.g. 02.09.21 indicates 2 September 2021);
- **Billing value 2:** displays the volume recorded on the billing date for 3 seconds.

Billing date 1 is set, by default, to 31/12 each year;
Billing date 2 is set, by default, to the end of each month.

1.7.3 Display test and firmware version

The display is presented as follows:
- all segments on the display are illuminated for 3 seconds;
- all segments on the display are turned off for 3 seconds;
- the installed firmware version is displayed for 3 seconds. The displayed format is **MM.mmF**, in which **MM** indicates the number (2 digits) of the main version, **mm** indicates the number (2 digits) of the secondary version and **F** represents the firmware (e.g. 01.68F);
- the firmware CRC for 3 seconds. The format displayed, using all 8 digits of the display, is 32-bit hexadecimal using both digits and letters (0-9/A-F);
- any error codes for 3 seconds (e.g. Err XXXX, where XXXX is the hexadecimal code for the error). See table "**Error codes**".

1.8 Alarms

ElecTo SJ is able to detect, store, and transmit the following alarms via radio:
- magnetic tampering;
- suspected leak;
- flow rate limit exceeded;
- backflow;
- meter blocked;
- reversed meter.

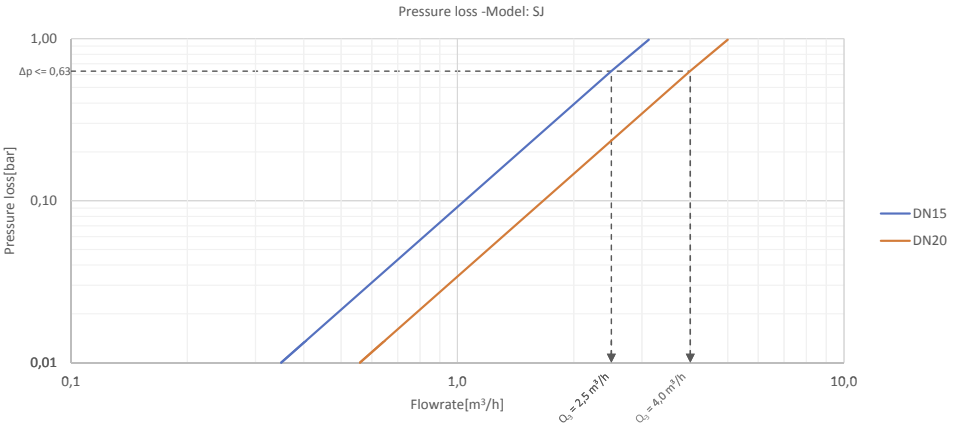
1.9 Technical specifications

Description	DN 15		DN 20		U.M.
Accuracy class	2				
Maximum reading	99999.999				m^3
Maximum working pressure	16				bar
Temperature classes	T30: from +0.1 to +30 T50: from +0.1 to +50 T30/90: from +30 to +90				°C
Sensitivity class for installation conditions	U0-D0				
Protection class	IP68*				
Power supply	Lithium battery 3.6 VDC (<1g - capacity varies based on type)				V
Useful battery life	7, 13 (default), or 15				years
Environmental class	O				
Electromagnetic class	E2				
Rated flow Q3	1,6	2,5	2,5	4,0	m^3/h
Installation positions and R (Q3/Q1)	H↑ ≤100 - H→; V↓ ≤50 - V↑ ≤40;	H↑ ≤160 - H→; V↓ ≤80 - V↑ ≤63;	H↑ ≤100 - H→; V↓ ≤50 - V↑ ≤40;	H↑ ≤160 - H→; V↓ ≤80 - V↑ ≤63;	
Pressure drop	0,63				bar
Pressure range	from 0.3 bar to 16 bar				

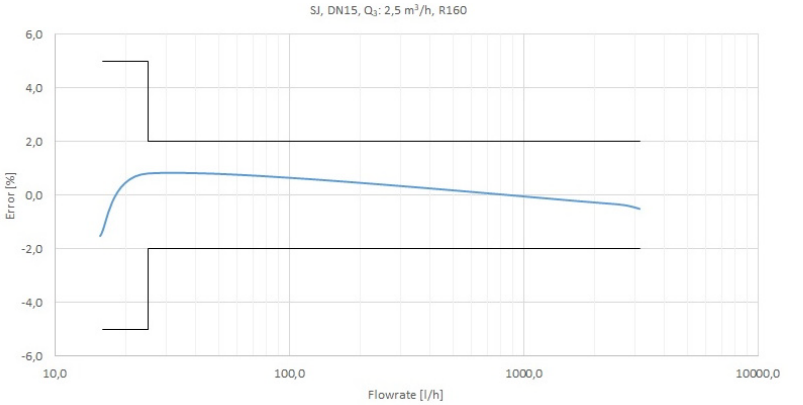
* 96h under 1 m^3 of water at ambient temperature.

1.10 Additional technical specifications

1.10.1 Pressure drop



1.10.2 Typical error curve



1.11 Technical specifications for electronic timing device

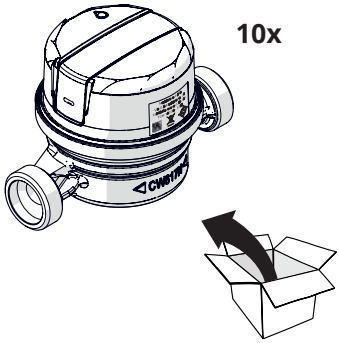
Features	Description
Environmental class	0
Mechanical class	M1
Electronic class	E2
Temperature range for storage	from -10 °C to +60 °C
Ambient temperature range	from -25 °C to +55 °C

1.12 Radio technical specifications

Features	Description
Standard	Wireless M-Bus (EN13757), OMS
Modes	T1 (Default), C1
Operating frequency range	868.0 - 868.6 / 868.7 - 869.2 MHz
Radiated power	14dBm max
Antenna gain	1 dB
Range	500 m in open air
Device class	Radio class 1
Certifications/Approvals	CE in compliance with European standards
	RED 2014/53/EU, 2011/65/UE and subsequent revisions (RoHS)
Data sent	Meter serial number, total volume, instant flow, date, alarms
Configuration	By radio, through the Android app
Data transmission frequency (default)	Every 2 minutes, from Monday to Friday, from 08:00 to 18:00
Encryption	AES mode 5, not active
Alarms (default)	Magnetic tampering Suspected leak (consumption of at least 1 litre every 15 minutes for 48 hours) Flow rate limit exceeded (disabled) Backflow (reverse flow for more than 100 litres) Meter blocked (no consumption for at least 30 days) Reversed meter (reverse flow lasts for more than 10 days) Note: The limits can be modified using the settings kit

2 Installation

2.1 Receipt of the product



– Seal + gasket kit + coloured indicator
– Fittings kit (optional)

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.

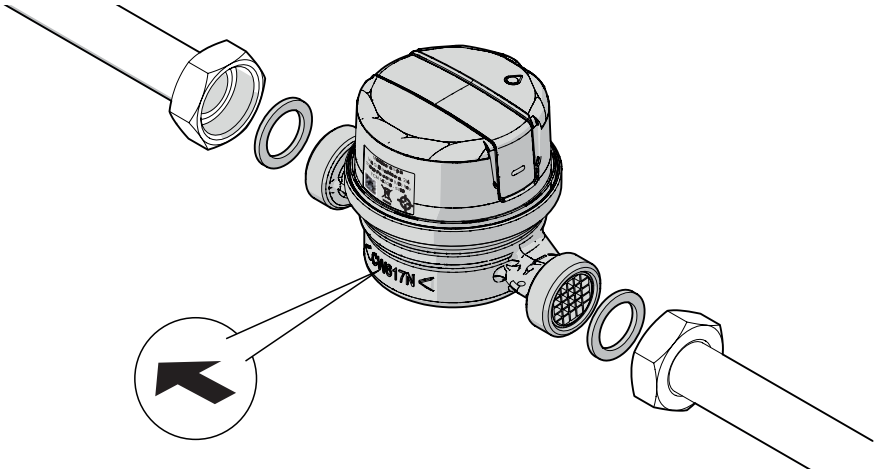
When replacing the meter, it is recommended to replace the gasket on the fitting. Recommended gasket hardness: minimum 80 Shore A.

Tighten the nut with a torque wrench and use a counter wrench to hold the meter in position. Maximum tightening torque: 40 Nm.

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.
The installation of a non-return valve inside or outside the meter is also recommended (see dedicated data sheet).

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.



WARNING!
Check the seal hold to prevent leakage.

Installation position
Observe the indications on the dial (letters H and V):
- H: the meter must be installed with the dial in a horizontal position;
- V: the meter must be installed with the dial in a vertical position;
- H and V: the meter may be installed with the dial in either a horizontal or vertical position;
- If not shown, avoid vertical installations with downward flow, or with the dial facing downwards.

Straight sections and flow straighteners
When using straight sections upstream and/or downstream of the meter, refer to letters U and D on the dial. If the letters U and/or D 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 Seals

A seal is applied to the meter: it cannot be opened without breaking it. Any intervention must therefore be carried out by a centre authorised by the manufacturer.

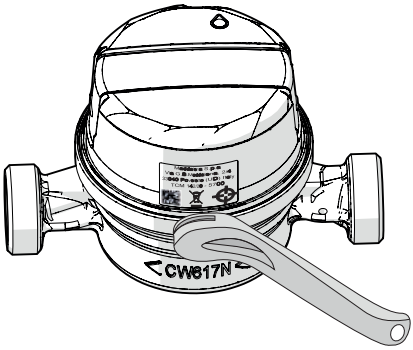
4 Use

ElecTo SJ is ideal for both cold and hot water residential use where compactness, flexibility and the availability of an integrated radio reading make the difference.

5 Programming the radio

ElecTo SJ is supplied with factory-set setup data.

The radio is activated after the passage of 10 litres of water.
Programming mode is activated by tapping the magnetic key symbol with the magnetic key.
The cumulative time for this mode is 120 minutes.



The radio settings, such as the type of radio frame and data transmission frequency, have a default factory setting. However, if necessary, they can be changed using the specific programming kit after enabling programming mode.

For further information, contact the manufacturer.

The app allows the following parameters to be read and programmed:
- Radio settings
- Radio AES key
- Periodic reading
- Alarms setting
- Alarms reset
- Date/time synchronization
- Delivery point

6 Error codes

The error code is displayed in hexadecimal format.
The instrument identifies 4 errors which may also occur simultaneously.

Hexadecimal format	Description
0080	Out Of Operating Temperature
0400	Low Battery Voltage
1000	Metrological verification period expired
4000	Metrological Wrong Checksum

Example of simultaneous errors
Low battery voltage + Metrological verification period expired: Err 1400

7 Test mode

ElecTo SJ can be temporarily set to a high resolution in order to carry out measurement tests.
Contact the manufacturer for further information.

8 Maintenance

8.1 Battery (default)

The meter is fitted with a 3.6V manganese lithium battery 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.

8.2 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.

8.3 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.

9 Compliance declaration

maddalena®
METERING EXPERTISE

DICHIARAZIONE DI CONFORMITÀ UE
EU DECLARATION OF CONFORMITY

Modello *Model*	**Electo SJ**
Descrizione *Description*	Contatore per acqua a getto unico con radio integrata *Single Jet water meter with integrated radio*
Costruttore *Manufacturer*	Maddalena S.p.A. 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.

L'oggetto della dichiarazione di cui sopra è conforme alla pertinente normativa dell'Unione:
The object of the declaration described above is in conformity with the relevant Union legislation:

2014/32/EU	Direttiva dispositivi di regolazione e misura (MID)
2014/53/EU	Direttiva apparecchiature radio (RED) *Radio equipment directive (RED)*
(EU) 2017/2102	Restrizione dell'uso di determinate sostanze pericolose (RoHS2) *Restriction of the use of certain hazardous substances (RoHS2)*

La conformità è stata verificata in accordo alle seguenti norme armonizzate e specifiche tecniche:
The conformity was checked in according to the following harmonized standards and technical specification:

EN ISO 4064 :2017	**EN 62479:2010**
EN 301 489-3 V2.1.1	**EN61000-6-3:2007+A1:2011**
EN 301 489-1 V2.2.3	**EN61000-6-2:2005+AC:2005**
EN 300 220-1 V3.1.1	**EN 62368-1:2014 + A11:2017 + AC:2017**
EN 300 220-2 V3.2.1	**EN 50581**

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N. REA - REA no. UD128629 | Export reg. UD007790 | PEC: amministrazione@maddalena.legalmail.it

MARCHIO STORICO

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METERING EXPERTISE

Nome e numero dell'organismo notificato *Name and number of the notified body*	Attività *Activity*	Certificato nr. *Certificate no.*
Czech Metrology Institute, NB 1383 Okruzni 31 638 00 Brno Czech Republic	Certificato di esame UE del tipo in accordo al Modulo B della Direttiva 2014/32/UE *EU-type certification in accordance with Module B of Directive 2014/32/EU*	TCM 142/20-5700
Czech Metrology Institute, NB 1383 Okruzni 31 638 00 Brno Czech Republic	Certificazione di prodotti, collaudo e controlli finali in accordo al Modulo D della Direttiva 2014/32/UE *Certification of production, final product inspection and testing in accordance with Module D of Directive 2014/32/EU*	0119-SJ-A010-08

Povoletto, 03/02/2022

Maddalena S.p.A.
MADDALENA S.p.A.
IL PRESIDENTE
Legale Rappresentante
Dott. Ing. Franco Maddalena
Dott. Ing. Franco Maddalena
Presidente e amministratore delegato
President and CEO

NOTES

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