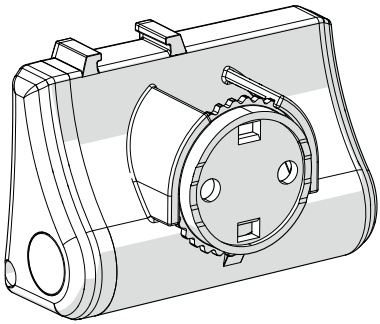
maddalena®
METERING EXPERTISE

Arrow^{EVO} Standalone

wM-Bus radio module



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 5000078C - 09/2021 - R2

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 **Arrow**EVO Standalone is compliant with the mandatory requirements of the following directives and standards:
- Directive 2014/53/EU (RED - Radio Equipment Directive)
- Directive 2011/65/EU (RoHS)

CE

The full declaration of EU 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 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.
- Carefully read this manual before using the device to ensure safe operation.
- The device must be used as defined by **Maddalena S.p.A.**, that holds no responsibility for damage to persons, animals or property due to installation, adjustment or maintenance errors or improper use of the device.
- Once the packaging has been removed, check that the product is intact and complete. If the contents do not correspond to the order, consult the local distributor that sold the device.
- The device should not be installed and used in contexts where it will be exposed to atmospheric agents.
- The device must always be protected from extreme humidity and heat. Penetration of humidity and intense heat may damage the battery and the device.
- If there are any doubts regarding conditions/functions of the device and related parts, please contact the local distributor for further information.
- Once the device is in use, report any anomalies or faults encountered to the product supplier.
- In case of complete destruction of the device with leakage of the electrolyte, avoid contact with the eyes and skin, do not inhale fumes produced, and sufficiently ventilate the room.
- The device emits radio signals that may interfere with un-shielded electronic devices or those improperly shielded, such as pacemakers, hearing aids, medical devices and other electronic devices. To resolve any interference problems, consult the manufacturers of the relative electronic devices.
- This device is not for use by persons with reduced physical or mental capabilities, or those without appropriate experience and knowledge (including children), unless supervised by a person responsible for their safety and following adequate training in how to use the product.

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 atmospheric agents.
- Place the device near to heat sources or expose it to direct sunlight.
- Install the device near other electrical equipment as this may lead to signal disturbance.
- Open 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 as domestic waste.

1.3 Device description

ArrowEVO Standalone is a radio module with pulse input compatible with **Maddalena** water meters and with those of other brands. The device allows for measuring, transmitting and remotely reading the consumption values and the alarms using a wireless transmission technology.

The following alarms are managed: maximum flow exceeded (limit can be activated and configured), backflow (limit set and configurable), leak and mechanical fraud (cable cutting).

ArrowEVO Standalone is compliant with the wM-Bus data communication protocol defined at European level by Standard EN 13757. This guarantees a high level of interoperability with various reading systems on the market, including third-party systems. **Arrow**EVO Standalone is also OMS certified (www.oms-group.org).

The factory set-up can be modified via radio signal at a later point using the special configuration kit (USB transceiver and relative software), supplied separately.

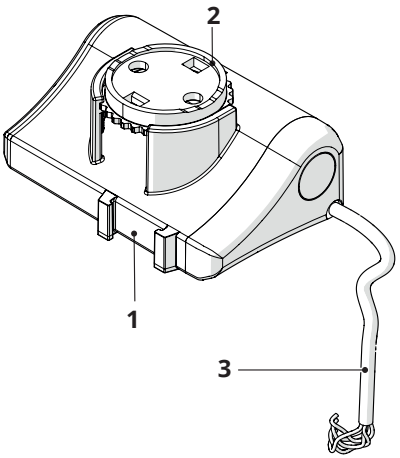
The main technical specifications of the **Arrow**EVO Standalone design are:

- **input via four-pole cable of the following signals:** pulses (flow meter revolutions), flow direction, anti-fraud, earth. Thanks to these data, the module calculates the volume (both directions), manages alarms and memorises the data in a non-volatile memory;
- M-Bus (EN 13757) 868 MHz **radio wireless communication interface** that allows remote reading in both **mobile** (walk-by) and **fixed** (AMR) scenarios, using the same factory set-up (transmission interval);
- **lithium battery** that guarantees long-term power supply (15 years + 1)
- **support ring nut** that allows the module to be attached to the QuadraPlus sensor easily. Alternatively, it can be fixed to the wall using the two plugs supplied or to the pipe using clamps.

1.4 Usage limits

The product may be used exclusively with compatible meters and in line with the corresponding usage limits (see paragraph " **Meter technical specifications**").

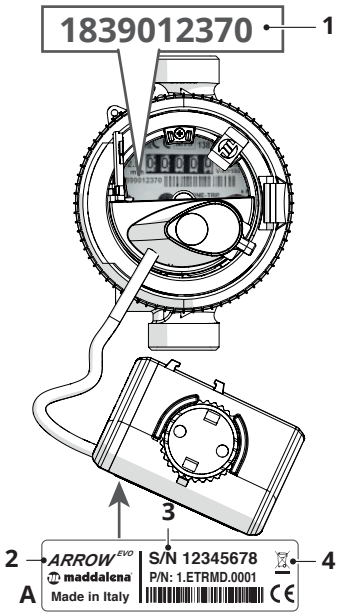
1.5 Structure



1 *Magnetic key attachment reference*
2 *Support ring nut*
3 *Four-pole wire*

1.6 Identification

The **Arrow**[EVO] Standalone module, identified by the label (A), is strictly associated with a single meter. Two elements are required for this association, performed during installation: the serial number of the mechanical meter and the serial number of module **Arrow**[EVO] Standalone.



1 *Serial number of the meter*
2 *Model*
3 *Eight-digit serial number of module* ***Arrow***[EVO] *Standalone*
4 *WEEE compliance mark*

The serial number can be read via radio signal or on the label of the module itself. If necessary, during programming it is possible to store the serial number of the mechanical meter within the radio module, so that this is available within the data transmitted.

1.7 Meter technical specifications

Features		Description
Maximum pulse frequency		<12.5Hz (nominal).
Compatible meters		Open drain transistor switch, reed switch, any type of open/closed switch
Sensor resolution		configurable (1L default)
Minimum pulse width		>40ms (nominal).
Alarms		Tampering, mechanical fraud, backflow, presumed leak, maximum flow, inverted meter
Configuration		Via radio using configuration kit
Power supply		Lithium-ion battery
Battery lifespan		15 years + 1 in storage
Certifications/Approvals		CE in compliance with European standards.
		RED 2014/53/EU, RoHS2 (EU) 2017/2102
		OMS:
Radio	Standard	Wireless M-Bus, OMS
	Modes	C1 (Default), T1 (Optional)
	Operating frequency range	868.0 - 868.6 / 868.7 - 869.2 MHz
	Radiated power	max 14dBm
	Range	500 m in line of sight
	Reference standards	EN 13757
	Radio equipment class	Class 1
	Data message frequency	Every 16 seconds
	Data sent	Frame Tiny (default): current volume, date and time, volume on billing date, billing date, errors.
		Short frame: current volume, volume on billing dates, meter serial number, alarms.
		Long frame: same as short frame with addition of values for the previous 12 months
		Frame Arrow: current volume, volume on billing date, meter serial number, billing date, alarms
Environmental conditions		Storage temperature: -20°C – +60°C
		Operating temperature: -10 °C – +55 °C
Protection rating		IP68

2 Installation

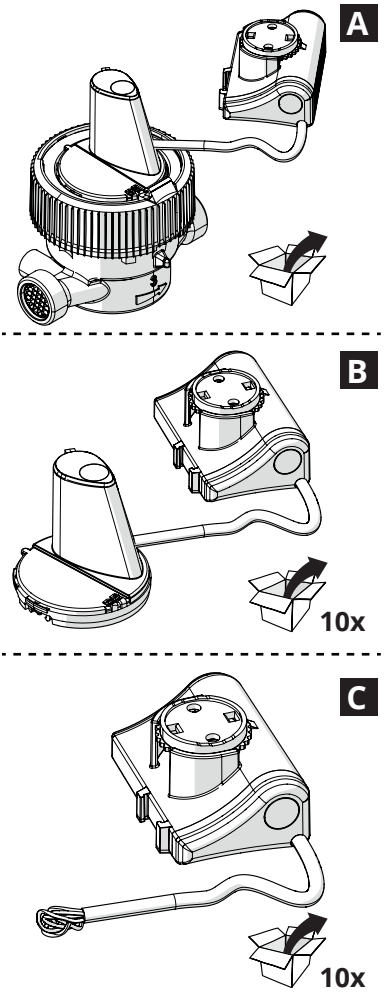
2.1 Receipt of the product

ArrowEVO Standalone modules are supplied in three different configurations:

A Already connected to the sensor and mounted on the meter. The number of pieces in the package varies depending on the size of the meter.

B Package with 10 pieces, already connected to the sensor

C Package with 10 pieces, with free four-pole wire



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

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

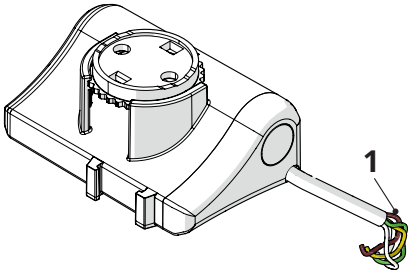
WARNING!
Installation and management of the device is permitted solely by authorised and appropriately trained personnel equipped with sufficient technical experience.

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

WARNING!
When purchasing configuration "B" (with module connected to the sensor), refer to the manual of the sensor (QuadraPlus, Flow-Pulse or Reed) for the connection to the meter.

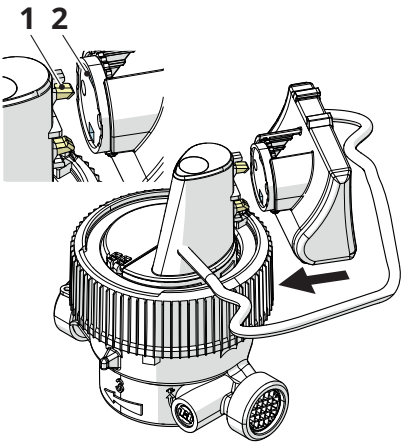
WARNING!
When purchasing configuration "C" (with free four-pole wire), the latter must be connected to a sensor or external pulse generator, by appropriately connecting the wires.

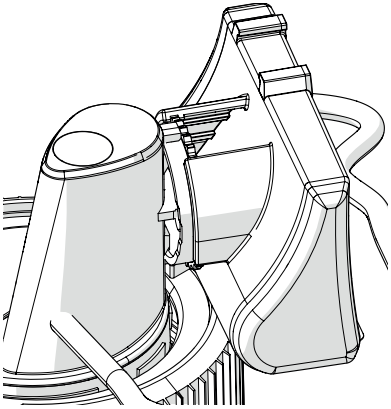
– The **Arrow**^{EVO} Standalone module is supplied with a four-pole cable with earth (1)
  - White: Impulse input. Impulse signal for both the outflow and backflow.
  - Yellow: flow direction. Contact closed = return flow.
  - Green: anti-fraud. Contact open = fraud.
  - Brown: earth. Common earth signal.



Assembly on the sensor

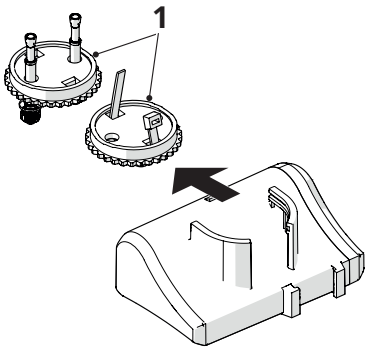
Insert the two pins (1) on the QuadraPlus sensor in the ring nut inserts (2) and fully insert the module until it locks into place

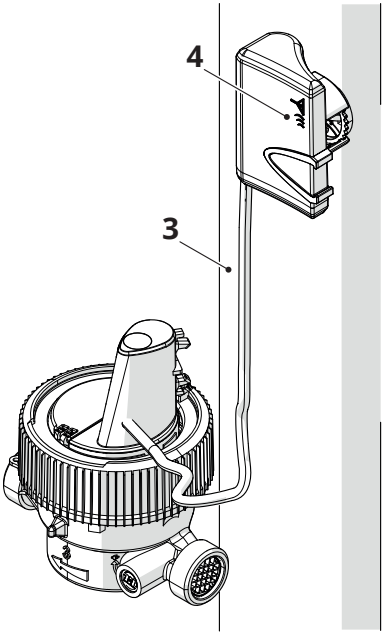


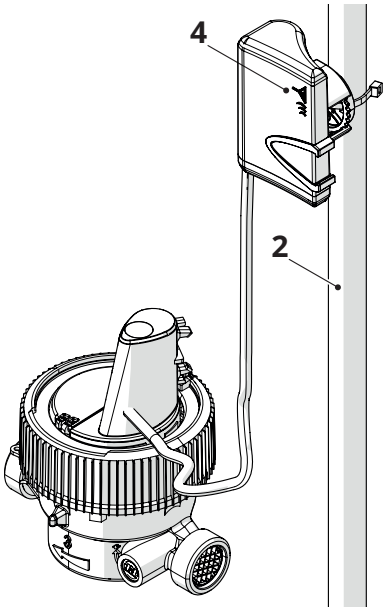


Assembly on a support

If the meter is buried, preferably position the module as close to the surface as possible.
Fix the ring nut (1) to a pipe (2) (using a clamp) or to a wall (3) (using the plugs provided). Insert the module fully into the guide. Preferably install the module with the antenna symbol (4) facing upwards.







WARNING!
To mount the sensor on the meter, refer to the manual of the sensor possessed.

3 Use

The fully operational phase involves remote meter reading via the radio modules. Each radio module transmits the reading with a settable frequency (default: reading transmitted every 16 seconds). Simply approach the meter with a suitable receiver or, if there is a fixed reading system, the data will be collected automatically.

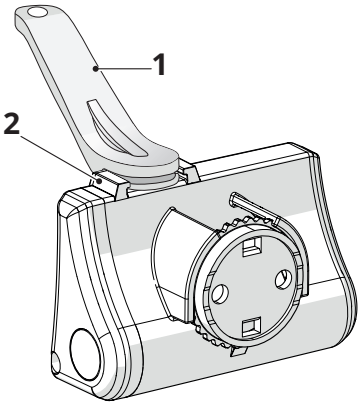
WARNING!
Reading of data can be performed using various software. Please consult the metering operator for more information on the specific use of reading software.

3.1 Synchronisation of mechanical reading

The radio module stores the volume recorded via a pulse inlet. The module is factory set with an initial volume of zero.
If the meter on which the radio module is installed has a reading other than zero, synchronisation of the mechanical meter reading and radio module is recommended using the programming kit. Simply read the value in litres on the meter and set the reading using the programming software.

3.2 Activating the radio module

The **Arrow**EVO Standalone module is deactivated by default, therefore it will not transmit nor count.
To activate the module: insert the red activation key (1) in the appropriate slot (2) and keep it there for over 10 seconds.
If the key is inserted for less than 10 seconds, the module is NOT activated.



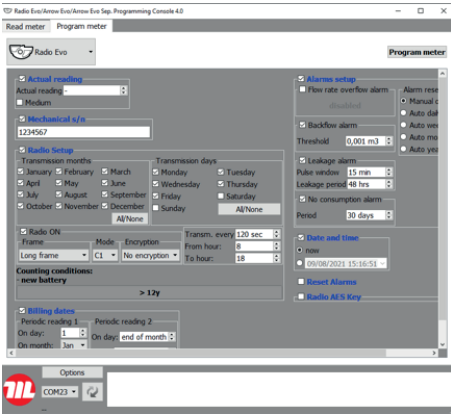
WARNING!
For a complete list of programming parameters and relative settings, refer to the specific manual.

PROHIBITED
Programming of the **Arrow**EVO Standalone module without approval of the metering operator is not permitted.

3.3 Programming on initial installation of the module

The **Arrow**^{EVO} Standalone module is supplied with a series of set-up data already set to the default values.
On first installation, after activating the module, you can change the settings if necessary using:

– Evo Console PC (MS Windows) – download from **www.maddalena.it** in the software section



– Evo app (Android OS) – download from Google Play Store

These two programs can be used to change the radio's default settings.

3.4 Troubleshooting

FAULT	CAUSE	SOLUTION
The radio module is not transmitting	Electrical or electronic devices interfere with the signal	Move devices to a sufficient distance away
		Move the receiver closer
	Battery empty	Replace the battery (contact the metering operator)
	The module is not active	Check the activation procedure has been applied correctly
The module is transmitting but the data fields are not populated	The paired sensor is faulty	Contact the metering operator
	Faulty module	Contact the metering operator

WARNING!
For a complete list of alarms, please refer to the specific manual.

4 Maintenance

4.1 Battery

The radio module is fitted with a 3.0 volt lithium battery that cannot be recharged.
The average battery life is 15 years, calculated using the factory set-up (mode C1, tiny telegram: 1 message every 16 seconds) and in the following operating conditions:

- between -10°C and +0°C for 10% of lifespan
- between 0°C and +30°C for 80% of lifespan
- between +31 °C and +55 °C for 10% of lifespan

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

The radio module calculates the residual lifespan of the battery on the basis of stored parameters, such as estimated consumption of the electronic board in stand-by mode, transmitter consumption and number of transmissions performed.
Battery life depends largely on the frequency of data transmission set.

4.2 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
Use of abrasive products, petrol or trichloroethylene is not permitted.

4.3 Disposal

The device is composed of materials of various nature including metal, plastic and electrical and electronic components. It must be disposed of in compliance with applicable local laws regarding special and industrial waste. The device cannot be disposed of as domestic waste.

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.

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