aquaradio® MultiCom
External radio module system Multi-protocol

User manual

Legal notice

Document release index

Version	Date	Modification(s)
Draft	20.04.2021	Draft version
0.1	05.01.2022	Initial version
0.2	06.01.2022	Corrections
0.3	07.02.2022	Adding additional information
01	24.03.2022	First Official Release
02	02.03.2023	Modifications

Original instructions

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The figures and information in these instructions are subject to technical changes that become necessary to improve the product.

Table of contents

1. Introduction

1.1. About this product

1.1.1. Product description

aquaradio® MultiCom is an external universal communication module multi-protocol used in the area of:

- Automatic reading metering
- Internet of Things solutions (IoT)
- Water, Thermal Energy and any kind of meters which are compatible
- Retro-fit installation to extend radio system

The main applications of the product are:

- System integration component with different radio interfaces can be easily integrated in subordinate energy management and building control systems.
- Offers the perfect combination for remote reading in water, thermal energy or any kind of meters for all types of applications.
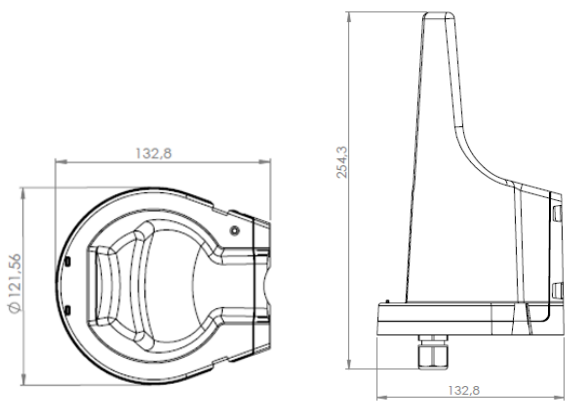
1.1.2. Product identification

The marking information face plate on the device states the following information:

(1) Manufacturer name / logo
(2) Product name
(3) NFC logo
(4) LoRaWAN logo
(5) Protection class IP68
(6) Serial number (S/N)
(7) Article number (P/N)
(8) CE marking
(9) Recycling logo
(10) Manufacturer Address
(11) DevEUI LoRa Address
(12) Wireless M-Bus Address
(13) Data Matrix
(14) M-Bus logo
(15) Wireless M-Bus logo

1.1.3. Technical data

Specifications	
Dimensions	 H x L x l : 254 x 133 x 122 mm
Weight	580g with one battery
Operation temperature	-20°C to 55°C
Storage temperature	-20°C to 70°C
Waterproof class	IP 68
Humidity	Max. 95%
Terminal	Signal connection: max 1.5 mm2 (AWG15) Screw terminals
Mounting	On a wall, on a mast (diameter 40mm min) and on our RUBIN SONIC with optional accessory
Cable inlets	2...7mm cable diameters
Input mode	Input mode configurable Pulses Inputs (2,3 or 4 wires) or wired M-Bus interface
Radio transmission protocols	WM-Bus 868MHz (OMS 4.0) or LoRAWAN 868EU Fully configurable on site
Power Supply	
Battery	1 or 2x 3.6 VDC replaceable Li-SoCl2 battery – 19Ah One battery included
Typical Life Time	Up to 16 Years (depending on environment and settings conditions)

Pulse input interface	
Configuration Mode	Fully configurable 2 wires (Pulses + GND) 3 wires (Pulses + GND + DIR) or 4 wires (Pulse + GND + DIR + Tamper)
Pulses Weight	Fully configurable: Water/Gas meters : 0,1l – 1l – 10l – 100l – 1m3 – 10m3 – 100m3 – 1000m3 Thermal Energy meters : 1Wh – 10Wh – 100Wh – 1kWh – 10kWh – 100kWh – 1000kWh
Min. pulse duration (closed contact)	2ms
Min. pause between pulses (open contact)	20ms
Max. pulse frequency	50Hz
Max. pulse frequency with 50% duty cycle	25Hz
Contact voltage	3.6V
Contact current	9μA
Pull-up resistance	400kΩ
Readout interval	Permanent
M-Bus Input interface	
M-Bus interface	M-Bus interface According to EN 13757-2/-3
Addresses	Primary address: 0 Standard secondary address: 99999999
Baudrate	300, 2'400, 9'600 Baud
Readout interval	Data is read up to 15min (default)
Communication WM-Bus	
wM-Bus interface	According to EN 13757-4 / OMS V4.x.x (OMS 3.0 compliant)
Frequency band	868.95 MHz (T1 unidirectional Mode)
Addresses	OMS address including serial number of the device (8 digits)
Transmission interval	16 seconds by default (configurable for drive-by or walk-by)
Readout interval	Permanent
Emitted Power	25 mW / (14 dBm)
Radio Range	Up to 2 km (depending on the environment conditions)
Encryption mode	Mode 5 (AES 128 bits)
Telegram content by default	Main volume Reverse volume Date/time Historic value (default monthly) Historic date Events/alarms Remaining battery lifetime

Communication LoRa Wireless	
LoRaWAN interface	According to LoRaWAN®
Frequency band	EU 868 MHz
Addresses	LoRa address (16 digits)
Connection mode	Over-The-Air Activation OTAA Activation by Personalization ABP
Transmission interval	Default Twice a day (6.00 and 18.00 UTC) Configurable up to 15min interval Value below possible with impact on battery life-time
Readout interval	Permanent
Emitted Power	25 mW (14 dBm)
Radio Range	Up to 15 km (depending on the environment conditions)
Telegram content by default	Current meter reading Returned water volume Meter number Date/Time Status info Battery life
Programming interface	NFC & BLE (Bluetooth Low Energy) NFC 13,56 MHz – BLE 2,4 GHz
Smart Phone Commissioning	
Operating system	Android >6.0; available on Google Play Store
App	ParamApp
Features	Commissioning and readout via NFC and Bluetooth interface for better usability Datalogger exportation for Analysis and Diagnostics

1.1.4. Conformity

CE Guidelines	
2014/30/EU	Electromagnetic Compatibility (EMC)
2014/35/EU	Low Voltage Directive (LVD)
2012/19/EU	Waste Electrical and Electronic Equipment (WEEE)
2011/65/EU	Restriction of hazardous substances in electrical and electronic equipment (RoHS)
2014/53/EU	Radio Equipment Directive (RED)

1.1.5. Declaration of conformity

The declaration of conformity is available by scanning the QR-Code or at https://integra-metering.com/downloads.

1.2. About the instructions

1.2.1. Purpose of this instruction

This instruction is part of the product. Keep the instruction handy so that it is always accessible at all times.
This instruction is intended to ensure that the product is used safely and for the intended purpose. The operator must ensure that the operating personnel have read and understood the instructions. The operator must ensure that the operating instructions of the associated products are also read and understood.

1.2.2. Structure of overall documentation

The following documents complete the documentation of this product:
- User manual (this document).
  Available for download on https://integra-metering.com/downloads

- Installation guide. Included in the product delivery.
  Available for download on https://integra-metering.com/downloads

- Technical data sheet.
  Available for download on https://integra-metering.com/downloads

1.2.3. Layout conventions

Symbols and text mark-ups

Symbol	Name	Function
•	Enumeration	The grey dot marks a non-numbered list.
➢	Action	The grey triangle marks actions that must be performed in the corresponding order.
➢ ➢	Reaction	The white triangle marks the reaction to an action.
(1)	Item numbers	The numbers inside the brackets refer to the items in an image.
Legal notice [> p. 2]	Cross-reference	Cross-references are used to refer to a chapter within the document. They are linked and are accessible from the PDF by a mouse click.

This document contains various symbols and text markups.

Tips are used to support the reader in handling the product.

2. Safety

2.1. Explanation of warning notices

⚠ DANGER

Danger
This safety warning indicates a hazard of high risk that will lead to serious physical injury or death.
➢ Measures to avoid the hazard.

⚠ WARNING

Danger
This safety warning indicates a hazard of medium risk that will lead to serious injury or death.
➢ Measures to avoid the hazard.

⚠ CAUTION

Caution
This safety warning indicates a hazard of low risk that will lead to minor or moderate injury.
➢ Measures to avoid the hazard.

NOTICE

Notice
The notice indicates a situation, which may cause damage to property.
➢ Measures to avoid the property damage.

2.2. Intended use

The aquaradio® MultiCom module is designed and intended exclusively for use as an external communication module for water, energy or any type of meters.
Inappropriate or improper use may result in the operational safety of the device no longer being guaranteed. We accept no liability for any resulting damage.

2.3. General safety instructions

Personal safety
Make sure that your actions do not expose anyone to risk.

Personnel requirements
Any work on the product may only be carried out by qualified personnel. Necessary instruction can be provided by the manufacturer.

Occupational safety
The operator is subject to the legal obligations of occupational safety. Compliance with all locally applicable accident prevention regulations and general rules is the responsibility of the operator.

Instructions
The operating personnel must have read and understood the instructions. All safety instructions and instructions for action must be strictly observed. The operating instructions must be kept within easy reach.

Further operating instructions
The instructions of the associated products must also be read and understood. All safety instructions and instructions for action must be strictly observed.

2.4. Technical condition of the product

Spare parts
Replace defective parts only with original spare parts from INTEGRA Metering.
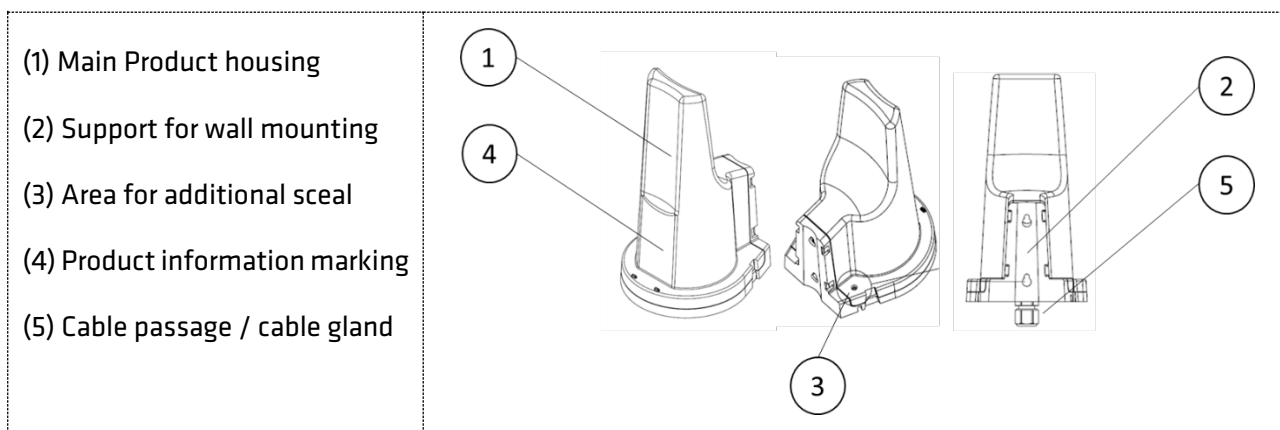
Software
The software must not be modified.

Backfitting
The product must not be backfitted. Changes of the operating mode must be agreed in writing with the Manufacturer.
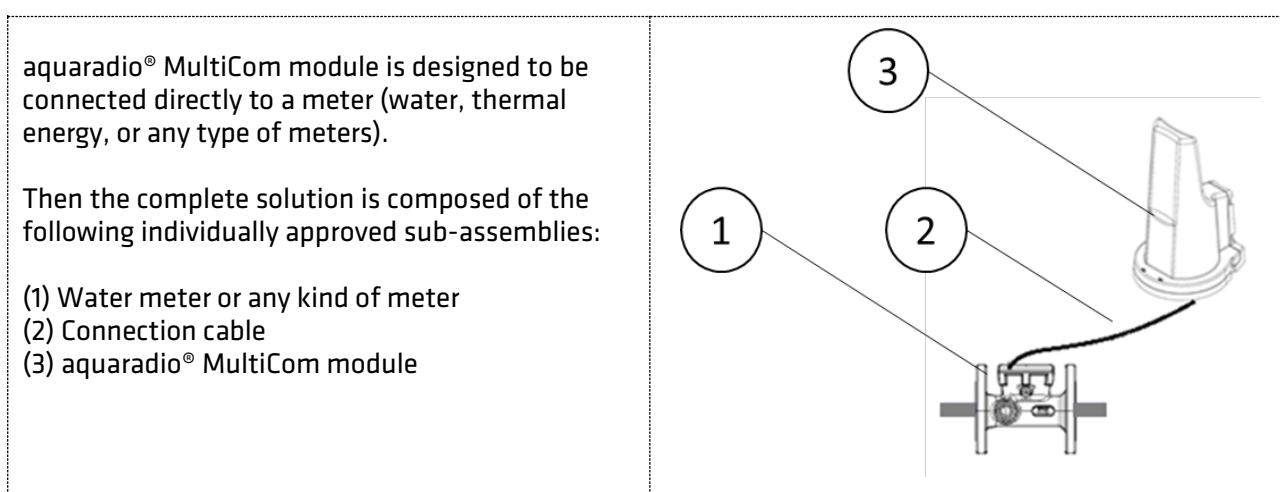
3. Product view

3.1. Product design

(1) Main Product housing

(2) Support for wall mounting

(3) Area for additional sceal

(4) Product information marking

(5) Cable passage / cable gland

3.2. Functional description

aquaradio® MultiCom module is designed to be connected directly to a meter (water, thermal energy, or any type of meters).

Then the complete solution is composed of the following individually approved sub-assemblies:

(1) Water meter or any kind of meter
(2) Connection cable
(3) aquaradio® MultiCom module

3.3. Products variants

3.3.1. aquaradio® MultiCom

The module is delivered without cable, the terminal connexion is available to managed directly cabling inside the module and then adapt the cable length accordingly to the installation requirements. The Protection Class is given by the housing and all mechanics part such as the gland and internal seal.

3.3.2. aquaradio® MultiCom Re-inforced

The module is delivered with a 7 wires cable of 1,5m length directly connecting in the electronic board. Additional potting is managed internally to increase the resistance for extreme difficult environment (i.e.: pit with water inside…).

4. Transport / scope of delivery

NOTICE

⚠️ **Transport damage**
Non-compliance with the required transport and environmental conditions can lead to transport damage and malfunctions.
- ➢ Protect the product from heat, moisture, dirt and vibration.
- ➢ Store the product in a cool and dry place.
- ➢ Do not remove the packaging until immediately before installation.

Check delivery
- ➢ Check delivery to ensure supply is complete.
- ➢ Check delivery for transport damage immediately upon receipt.

In case of externally visible transport damage, proceed as follows:
- ➢ Do not accept delivery or accept it under reserve.
- ➢ Note the extent of damage on the transport documents or on the delivery note of the carrier.
- ➢ Report any damage to INTEGRA Metering immediately.

5. Storage

The product can be stored in a dry place at temperatures between -20 °C and +70 °C for up to one year.

NOTICE

⚠️ **Product damage**
- ▪ Longer storage and storage at high temperature can result in a considerable loss of battery life time.

6. Installation

aquaradio® MultiCom can be installed on a flat wall, on a mast or directly mounted on RUBIN SONIC meters.
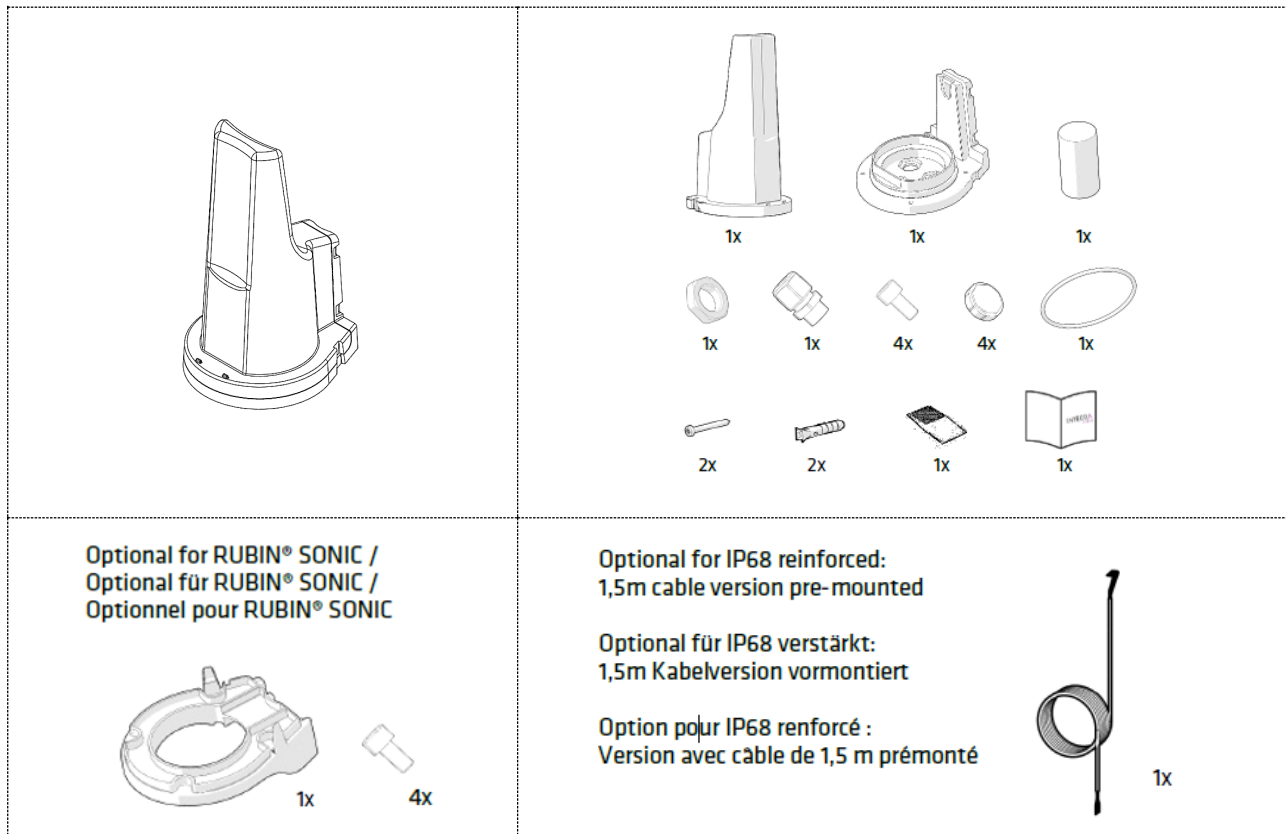
6.1. Conditions

Meet the following conditions according to the specifications in the Technical data to ensure a reliable operation:
- Space requirements
- Ambient conditions
- Dimensions
- Electrical connection

6.2. Containing

aquaradio® MultiCom package is delivered with the below listed materials:

	1x 1x 1x
	1x 1x 4x 4x 1x
	2x 2x 1x 1x
Optional for RUBIN® SONIC / **Optional für RUBIN® SONIC /** **Optionnel pour RUBIN® SONIC** 1x 4x	**Optional for IP68 reinforced:** **1,5m cable version pre-mounted** **Optional für IP68 verstärkt:** **1,5m Kabelversion vormontiert** **Option pour IP68 renforcé :** **Version avec câble de 1,5 m prémonté** 1x

6.3. Mechanical installation

⚠ DANGER

Electric shock
Touching energized system parts can cause immediate death or serious injury.
- ➢ Make sure that installation work is only carried out by authorized specialists.
- ➢ Before carrying out any work on the system, disconnect the power supply and check that no voltage is present.
- ➢ If an insulation is damaged, disconnect the power supply immediately and arrange for immediate repair.

6.3.1. Installation location

NOTICE

Material damage due to inapropriate environmental conditions
Non-compliance with the required environmental conditions can lead to material damage and malfunctions.
- ➢ Ensure that the product is accessible for installation, operation and maintenance work.
- ➢ Avoid heat, moisture, dirst and vibration.
- ➢ Install the product in a cool and dry place.
- ➢ Ensure a safe distance to source of electrical noise.
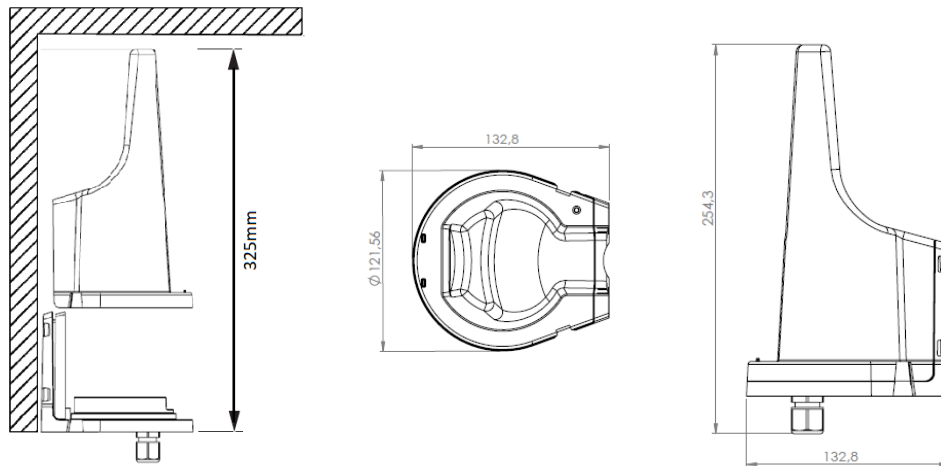
Make sure that there is a clearance of min. 325mm above the device to be able to install the bottom housing part and/or open the device properly.

6.3.2. Installation on a wall

Wall mounting tools are included in the delivery:
- 2 Screws Ø4x35
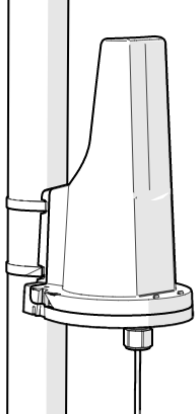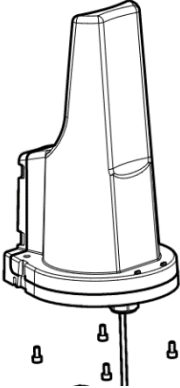- 2 Dowels Ø5x28

Drill two holes (1) Ø5 mm into the wall as explain in the picture.
- Mount dowels 2×Ø5.
- Screw the two screws and put the device.
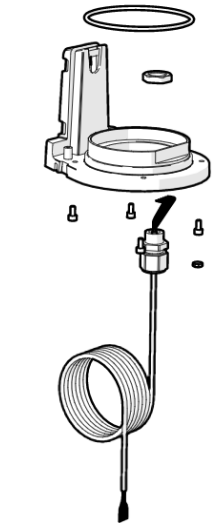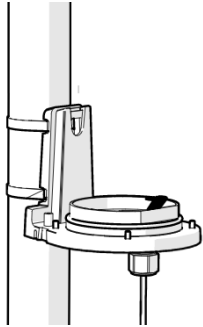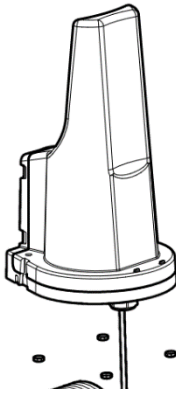
The 2 holes must be separated by 60mm.

Fixings with medium/light load in concrete, solid masonry (solid tile, tuff), hollow masonry (alveolar or semi-alveolar blocks and bricks), gypsum board, porous concrete and cellular concrete.
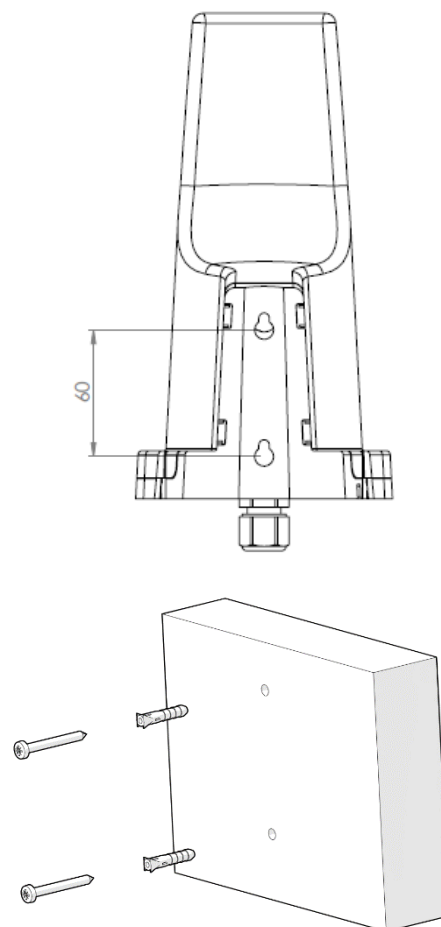
6.3.3. Installation on a mast

Preparation of the device with cable, seal, gland.	
Fix the device on the mast with the parts.	
Put the cover on the top.	
Put the 4 screws on the bottom of the device Screw tightening torque : 2Nm	

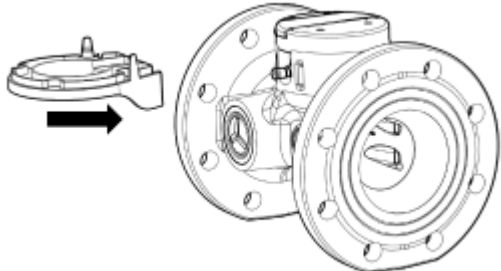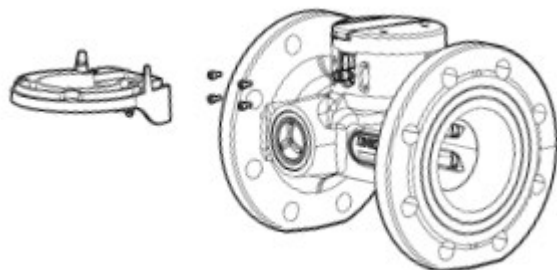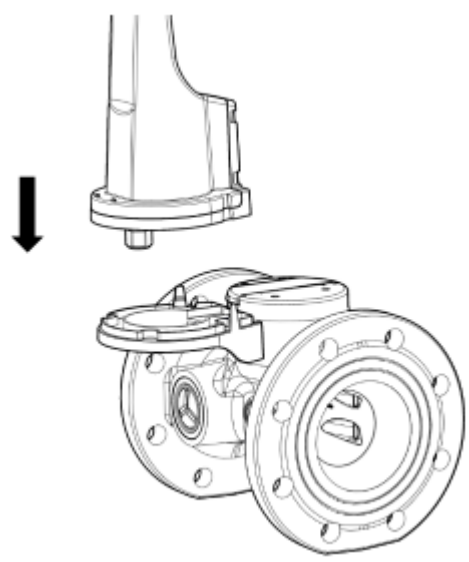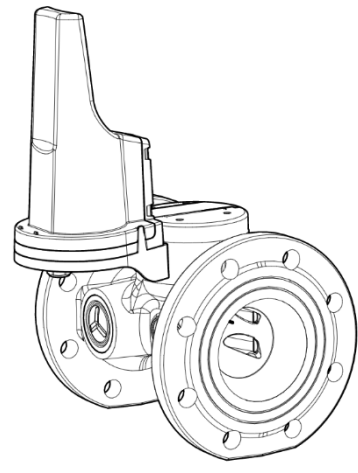| Close the housing with the seal plastic part in order to lock it and detect any tampering by dismounting. | |

NOTICE

⚠️ **Product installation**
- Max diameter must be min. 40mm in order to install the device properly and get a good fixing.

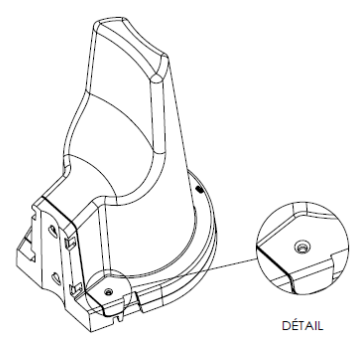### 6.3.4. Installation on a RUBIN SONIC meter

| Position the support part on the right area of the RUBIN Sonic meter. | |
| Put and screw the 4 delivered screws to fix

Screw tightening torque : 2Nm | |

| Assemble the aquaradio® MultiCom on the support | |
| The 2 parts are clipped together | |

6.3.5. Sealing the device

There is a possibility to seal mechanically the device to avoid any unexpected opening.

| Locate the hole on the side of the unit

Pass a lead wire

Lock the assembly with a lead |
DÉTAIL |

6.4. Electrical installation

The device is equipped with screw terminal connectors. Stripped rigid conductors or flexible conductors with crimped ferrules (AEH) can be plugged directly into the screw terminal.

Connectable conductors:
- Wire range (rigid or flexible): 0.14 ... 1.5 mm2 max.
- Stripping length: 4 mm +/-1
- AWG 16 – AWG 26

The functionality of different connections depends on the device settings.
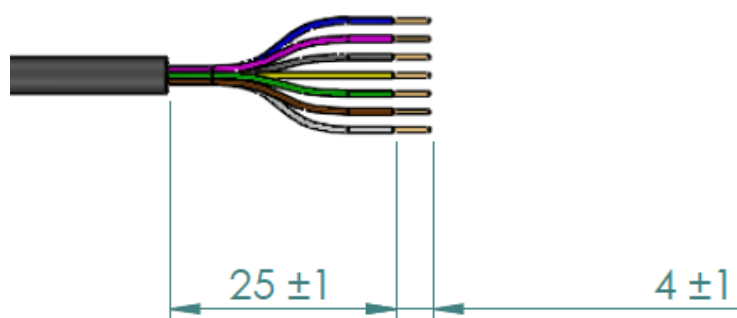
|	
For a perfect connection of the cable in the connector, it is important to respect the stripping lengths indicated above. Lengths are indicated in mm.	

6.4.1. Connecting an aquaradio® MultiCom

NOTICE

Wrong connection may destroc the device
- The function OPT1 / OPT2 depends on the settings selected with ParamApp Android Software during the commisionning.

➢ Carrefully check the selected options and connect the different wires accordingly.
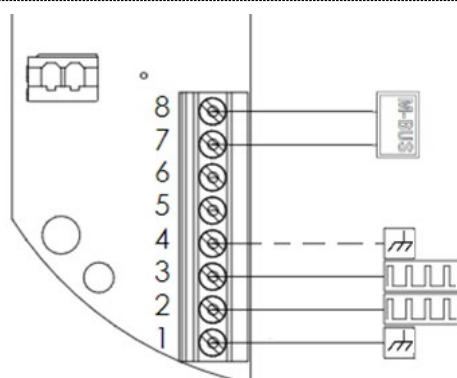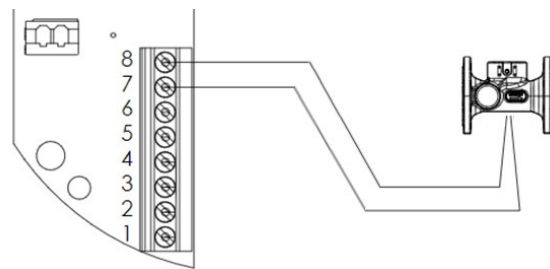

(1) GND
(2) OPT2
(3) OPT1
(4) TAMPER

(7 / 8) M-Bus

For electric signal values, please refer to the technical datasheet chapter in this User Manuel.

6.4.2. Connecting M-Bus interface

Connect the 2 M-Bus wires from the M-Bus meter interface directly to the terminal (7/8) M-Bus connection is not polarized	

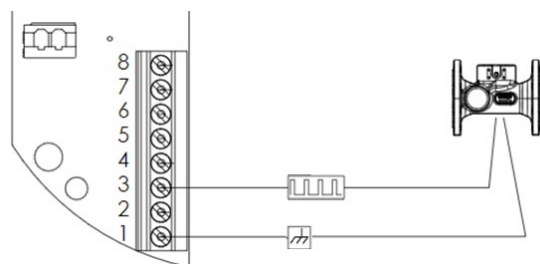### 6.4.3. Connecting Pulses interface 2 wires

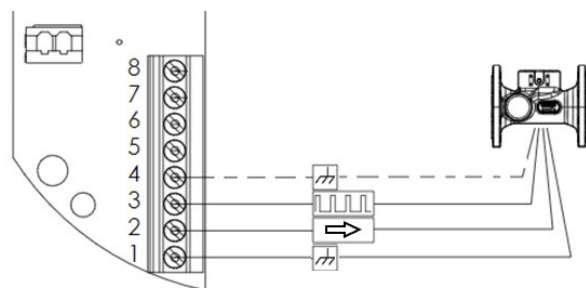|	

For connecting a meter with an 2 wires inputs signal use the terminal 3 / 1 as described below :
   -    PULSES (3)
   -    GND (1)
 	
Warning: the ground must be connected to Terminal 1.	

6.4.4. Connecting Pulses interface 4 wires

|	

For connecting a meter with 4 wires cable signal and benefits of all advance features, use the terminal 4 / 3 / 2 / 1 as described below:
 	
   -    PULSES (3)
   -    DIR (2) : signal of direction (positive or negative)
   -    GND (1)
   -    TAMPER (4)
 	
Warning: the ground must be connected to Terminal 1.	

6.4.5. Connecting Pulses interface 4 wires

For connecting a meter with 4 wires cable signal and benefits of all advance features, use the terminal 4 / 3 / 2 / 1 as described below: - PULSES + (3) : signal for positive pulses - PULSE - (2) : signal for negative pulses - GND (1) - TAMPER (4) Warning: the ground must be connected to Terminal 1.	
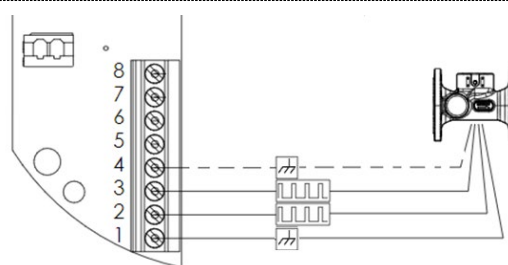
6.4.6. Connecting with cable version (IP reinforced)

With the IP68 reinforced, the terminal connector is not accessible. A pre-mounted cable with 7 wires is available to handle the connecting. The cable length is 1,5m.

The cable wires are defined as below:

	Seven wires: - Blue - Pink - Grey - Yellow - Green - Brown - White
Functions M-Bus - Brown / White 	Functions Pulses : - Blue : GND - Green : FUNC 1 - Yellow : FUNC 2 - Pink : TAMPER - Grey : FUNC GND

NOTICE
Wrong connections may destroy the device - The M-Bus interface as well the pulse interface work with low signals and voltages. Observe the connection instructions in terms of voltage, current and max. power. - Max. power 36mW, max. current 10mA, max. voltage 3,6V. - Errors in the connections could lead to the destruction of the device. - The M-Bus input and Pulse input cannot be used simultaneously.

6.4.7. Connecting the battery

The device is designed to connect up to 2 batteries in parallel in order to increase the Energy capacity for such applications where frequent emission is required.
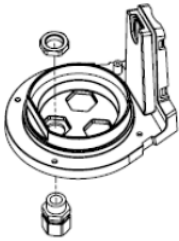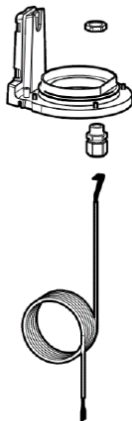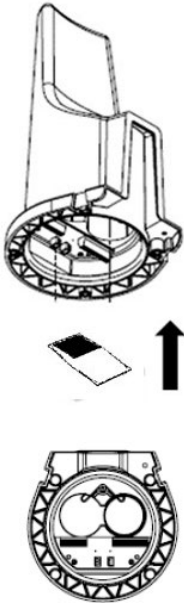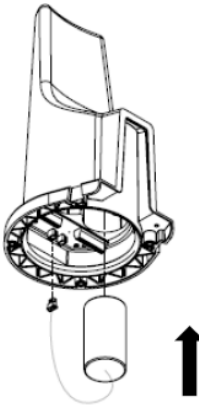
The main battery shall be connected following the below explanation.
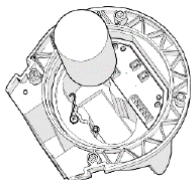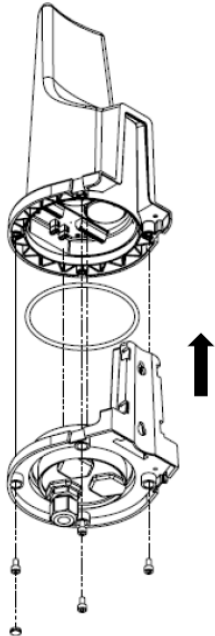
6.5. Assembly of the device

The device shall be assembled according to the different below steps.

Take the device from the box	
Remove the lower part	

Install the cable gland for the connection cable to the meter.	
Insert the cable in the gland and screw properly Screw tightening torque : 4,5Nm	
Place the desiccant bag in the bottom of the case	
Connect the battery accordingly and then put the battery in the place	

Place the battery in the compartment and lock it with the metal spring	
Close the device, by putting the seal, the lower housing part, and then screw the 4 screws. Plastic part can be added in order to lock the dismounted. Seal to be properly positioned in the device.	

NOTICE

Warning

- Failure to follow the assembly instructions will result in a reduction of the product's characteristics, in particular its resistance to water, humidity and dust, and will have a significant impact on the product's autonomy.

7. Features

7.1. Leakage Alarm

The module checks whether the average consumption over 30 minutes for 24 consecutive hours has always been higher than the threshold value (50 l/h for a DN15 meter).

The alarm is only activated if the threshold value has always been exceeded within 24 hours (otherwise, the module restarts the calculation of the 24 hours from the beginning).

Once the leak has been corrected, the alarm is automatically reset after 30 minutes.
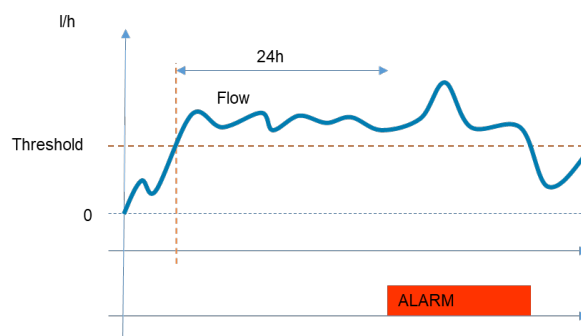
The factory setting is defined as following:

DN15	DN20	DN25	DN32	DN40	DN50
50 l/h	80 l/h	126 l/h	200 l/h	320 l/h	500 l/h

7.2. Backflow Alarm

The module analyses the direction of water flow. If it detects a consecutive negative water volume below the threshold value (13 l for a DN15 meter), the alarm is activated.

The alarm can only be reset via NFC using the ParamApp application.
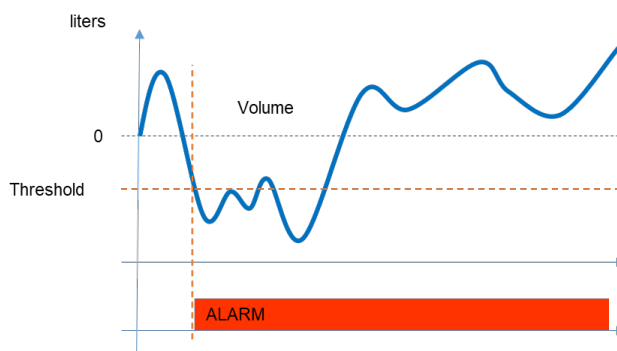
The factory setting is defined as following:

DN15	DN20	DN25	DN32	DN40	DN50
13 liters	20 liters	32 liters	50 liters	80 liters	125 liters

7.3. Burst Alarm

The module analyses the instantaneous flow rate. If it detects a high and fast flow rate (peak flow) above the threshold value (3 875 l/h for DN15), the alarm is activated immediately.

The alarm can only be reset via NFC using the ParamApp application.

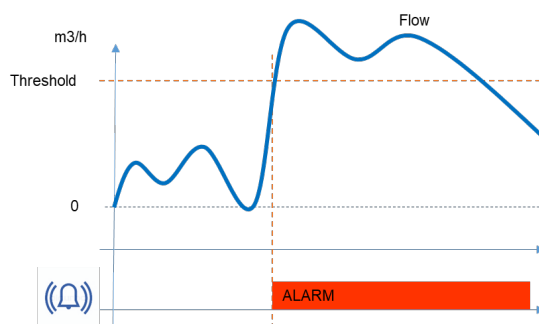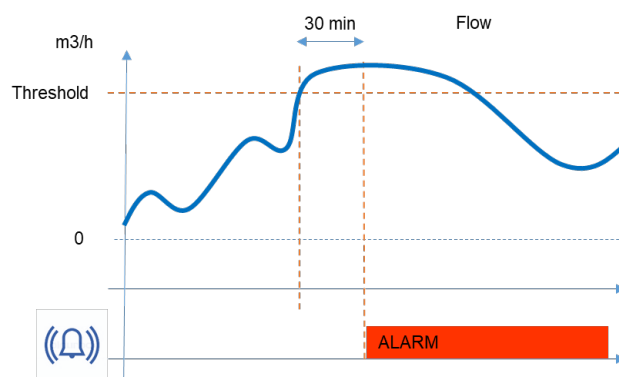The factory setting is defined as following:

DN15	DN20	DN25	DN32	DN40	DN50
3 875 l/h	6 200 l/h	9 765 l/h	15 500 l/h	24 800 l/h	38 750 l/h

7.4. Over Load Alarm

The module analyses the instantaneous flow rate. If it detects a flow rate higher than the threshold value (3125 l/h for DN15) for more than 30min, the alarm is activated.

The alarm can only be reset via NFC using the ParamApp application.

The factory setting is defined as following:

DN15	DN20	DN25	DN32	DN40	DN50
3 125 l/h	5 000 l/h	7 875 l/h	12 500 l/h	20 000 l/h	31 250 l/h

7.5. Data Logger

The aquaradio® MutiCom modules are equipped with a memory for storing values automatically.

It allows the management of the following histories:

- Start and end of event and alarms (date + event type)
- Index values (index and month-end date)

These values can be read and downloaded with ParamApp.

8. Commissioning

Initial configuration or any subsequent modifications to the aquaradio® modules must be carried out with the Android ParamApp configuration software via the NFC sensor.

ParamApp® software must be properly installed on your Android smartphone. It is available under Google Play and can be downloaded there directly and freely.

ParamApp configuration software can be downloaded directly by clicking on the following link :

GET IT ON
Google play

https://play.google.com/store/apps/details?id=com.integrametering.paramapp

NOTICE
Reference ▪ For more information about ParamApp Android Software, please refer to the ParamApp User Guide on our Website.

9. Maintenance

The aquaradio® MultiCom module requires no special maintenance.

NOTICE
Warning ▪ Do not clean the product with solvents or abrasives as they may damage the plastic cover. If necessary, use a damp cloth or sponge.

10. Service and repairs

10.1. Exchanging the battery

The device aquaradio® MultiCom has been designed with a replacement battery so the product lifetime can easily be extended by battery replacement.

- Disconnect the device from all sources of energy and cable to avoid any risks.
- Disconnect the battery.
- Remove the desiccant package
- Insert the new desiccant package in the main housing
- Reconnect the new battery
- reconnect all cables
- recommissioning is mandatory to setup all right settings

10.2. Troubleshooting

If the device does not work properly, check on the below table the different scenario.

Defect	Possible cause	Corrective measures
No NFC communication	No detection from ParamApp	Move your phone on the right NFC area of the device Restart your Smartphone Check the NFC feature of your smartphone Check if the battery of the aquaradio® MultiCom is correctly connected
No counting	No right cable connected on the device	Check the mode selected : M-Bus or Pulses depending on your application Check the wired colour according to the selected mode
No wM-Bus communication	Radio is not started Antenna is not installed in a good position	Check if the radio is ON Check if the wM-Bus mode is selected using ParamApp Move the module in a different place;
No LoRaWAN communication	Radio is not started Antenna is not installed in a good position	Check if the radio in ON Check if the LoRaWAN mode is selected using ParamApp Check if you get a joint command Move the module in a different place where LoRaWAN coverage is higher

11. Decommissioning / storage / disposal

11.1. Decommissioning

- Disconnect the device from all sources of energy.
- Disconnect the battery.
- Remove the device from the system.

11.2. Storage

- Decommissioning according to chapter Decommissioning.
- Select a suitable storage location.

11.3. Disposal

At the end of its life cycle, INTEGRA products must be disposed of in accordance with applicable local regulations. Improper disposal can have harmful effects on the environment and health.

- Decommissioning according to chapter Decommissioning.

- Disassemble the product, sort according to material and dispose of the materials in accordance with applicable local regulations and in accordance with local recycling or waste disposal regulations for electronics goods and for the batteries.

<table>
<tr><td colspan="2" align="center">NOTICE</td></tr>
<tr><td>⚠️</td><td>Warning
▪ When the battery is empty, the battery shall be recycled accordingly.
▪ The device can be used as a new product with a new battery is re-installed.</td></tr>
</table>

The separate collection and recycling of used products contributes to the conservation of natural resources and ensures that they are disposed of in a way that does not harm the environment and nature.