

# Ultrimis M-Bus

## Ultrasonic water meter

### DN15-DN20



Ultrimis M-Bus, a state-of-the-art ultrasonic water meter with the latest patented design features the W-Sonic Technology, a unique metering method. The W-Sonic Technology enables meter readings in the R800 range with the starting flow already from 0.75 l/h.

The water meter is designed and manufactured to the highest quality standards. The water meter is rated at IP68 and with a high resistance to hydraulic shock and magnetic interference. The measurement chamber is designed to provide the water meter with insensitivity to hydraulic shock. The ultrasonic measurement technology of the water meter is completely impervious to interference from magnetic fields.

### APPLICATION

Water supply systems with the maximum cold water temperature of 50°C, requiring reliable water consumption metering and reliable data communication methods, including **wired M-Bus** and remote meter reading over NFC or **WM-Bus**. The water meter can be installed in any orientation and does not require upstream and downstream sections of straight piping.

# Ultrimis M-Bus

Counter with a mineral glass face cover with IP68 protection level

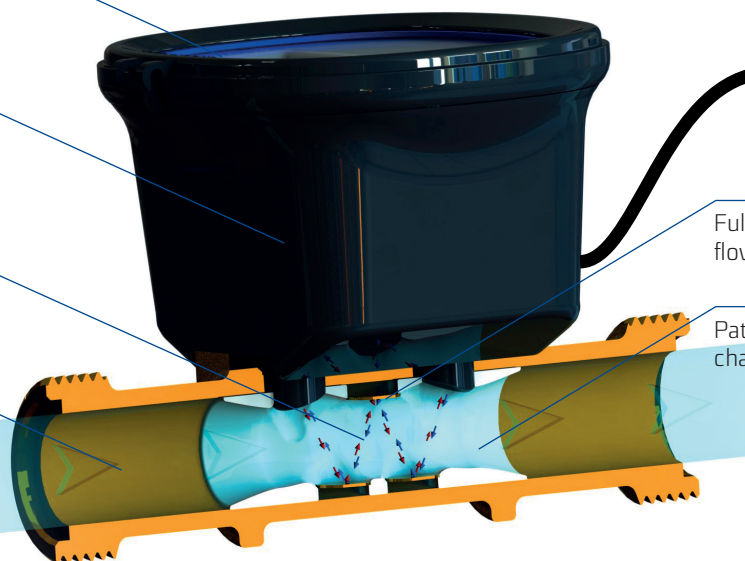
Wired data communication (M-Bus) RF (radio-frequency) data communication (WM-Bus)

Unique ultrasonic beam pattern W-Sonic Technology

Body material: composite or brass

Full bore for undisturbed flow of water

Patented measurement chamber geometry



## ADVANTAGES

### Provides savings

- High-precision measurement **improves efficiency** of water use: the water meter can detect all leaks in the supply system
- **Pass-through design** of the measurement chamber, without moving parts, **resistant to contamination** - no expenses for inspections and maintenance
- No upstream or downstream **straight sections** of piping required
- **Compact size** for easy installation in confined spaces
- Robust design, reliable electronic components and **minimum electrical power demand** for a stable, long-term operation
- A wide **measurement range** with immunity to electrical conductivity of metered water (as required for electromagnetic water meter systems)
- Extremely **low pressure loss** (and low resistance to flow)



### Convenient in operation

- Standard **IP68**-rated hermetically sealed body
- **No risk of physical wear** of the measurement chamber components during continuous operation, even at high flow rates
- MAP - **16 bar**
- Body material - **brass** or **composite**
- **Resistant** to strong **magnetic fields**
- Resistant to **hydraulic shock**
- Highly resistant to overload flow rate -  $Q_4$

### Measurement accuracy

- Optimized measurement range: up to **R800** in every operating orientation (H, V)
- Starting flow already from **0.75 l/h**
- **Stable** measurement system performance by insensitivity to fouling
- Back flow **measurement** enabled by a symmetrical structure and the applied measurement algorithms

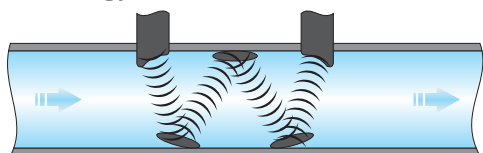
## Environmentally friendly

- Extremely **low power usage** when in operation
- Very low lithium content: **Li < 1.5 g**
- Expected battery life up to 12 years (depending on the configuration and environmental conditions - the standard version provides for up to 12 years of operation)
- Low energy output at the water supply side (the unit pressure drop across the water meter is below 0.23 bar at DN15 for Q3)
- A measurement range up to R800 is also available for the water meter installation length **L = 80 mm**
- **Very low weight:** low costs of transport
- Low carbon footprint



## Innovative

The Ultrimis M-Bus water meter features a unique measurement system: it emits an ultrasonic beam across the measurement chamber, which results in steady indications and errors in the whole measurement range. This is the W-Sonic Technology which includes distinctive characteristics:



- With its unique ultrasonic beam pattern, the Ultrimis M-Bus can be much more compact than other ultrasonic metering systems
- The full-bore design does not entrap any fouling or solids
- Insensitive to measurement bias from water contamination
- Sophisticated control algorithms of the ultrasonic beam system provide compensation for component ageing
- Requires no filters or check valves

## REGULATORY AND STANDARD COMPLIANCE

- 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
- Polish Act of 13 April 2016 on conformity assessment and market control systems
- EN-ISO 4064-1 to 5:2014(E) – Water meters for cold potable water and hot water
- OIML R49:2013 – Water meters for cold potable water and hot water
- EC Type Test Certificate TCM 142/16-5405 for cold and hot water applications
- Classification of climate and environmental requirements – Class B (EN-ISO 4064:2014)
- Classification of environmental and mechanical requirements – Class M1 (Directive 2014/32/EU of 26 February 2014)
- Classification of environmental and electromagnetic requirements – Class E1 (EN-ISO 4064:2014; Directive 2014/32/EU of 26 February 2014)
- PZH (NIH) approval (all materials of the Ultrimis M-Bus ultrasonic water meter have the appropriate Hygiene Approvals for contact with potable water)
- Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC
- WELMEC 7.2 edition 5
- WRAS certified
- KIWA U certified
- DVGW certified
- IP68 body proof testing
- OMS compliant - DVGW certified



UL2,5-01  
DN15, L80  
DN15, L110



UL4-01  
DN20, L130  
DN20, L105



UL2,5  
DN15, L80  
DN15, L110  
DN15, L115  
DN15, L165



UL4  
DN20, L130  
DN20, L105  
DN20, L115  
DN20, L190

## Communication

- Wired reading of indications compatible with M-Bus
- Water meter data reading over NFC (Near Field Communication)
- RF (radio-frequency) reading of indications compatible with WM-Bus
- Secondary verification at any suitable location with the Testbox module and a dedicated application SPIDAP Mobile

### NFC CONFIGURATION

The Ultrimis M-Bus water meters feature standard NFC data communication which enables configuration of the operating mode, reading of actual parameter values of the instrument and downloading the historical indications of statuses and errors (even at a low battery voltage or meter failure).

Developed specifically for the Ultrimis M-Bus water meter, the data communication interface includes a dedicated SPIDAP Mobile application and the Testbox module.

The data communication interface enables re-verification by secondary verification operators.

The data logger supported by NFC enables modification of the interval and range of data logging.

The data logging interval can be configured from 12 minutes to 45 days. One of the 10 predefined data acquisition sets can also be selected.

Depending on the data acquisition set selected, up to 800 unique records can be stored. The data acquired can drive histograms to evaluate whether the water meter has been specified correctly for its actual application.



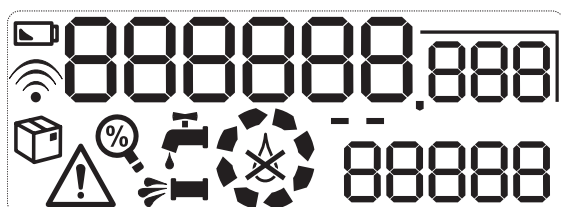
## WIRED READING

The water meter has an integrated wired data communication module for easy and efficient data reading in stationary reading systems.

The M-Bus data connectivity enables reading of the following data:

- Water meter indications (from the last logged month and at the time of reading)
- Reverse volume (at the time of the reading)
- Events/alarms (from the last logged month, the current month, and at the time of reading), including:
  - ☐ Reverse flow
  - ☐ Low flow
  - ☐ High flow
  - ☐ No water
  - ☐ Low battery
  - ☐ Tampering detected
  - ☐ Temperature limit violation
  - ☐ Zero flow

### LCD DISPLAY FUNCTIONS



Water meter indication in m<sup>3</sup>

Water meter indication in dm<sup>3</sup>

88888

Actual flow (water meter primed with water)

Software version number and CRC\* (no water detected)



Low battery



RF transmission on



Shipping mode

Shipping mode disabled when the minimum flow rate detected is:  
5L at DN15; 8L at DN20; 12.6L at DN25; 20L at DN32; 32L at DN40;  
50L at DN50; or disabled on command via NFC



Tampering detected



Test mode



Back flow

Alarm triggered after > 30 s of back flow time  
The flow direction indicator is animated counterclockwise.



Water meter leak

Alarm trigger: flow > 0.3 x Q<sub>2</sub> for 720 min



Water main leak (bypass flow)

Alarm trigger: flow > Q<sub>4</sub> for 30 s



Animated water flow direction indicator

The flow direction indicator is animated clockwise.



No water

Alarm triggered after 30 s



Metering online



Zero flow

Alarm triggered after > 8 s of zero flow  
The flow direction indicator is steady.

### EVENTS NOT INDICATED ON THE LCD

Overtemperature

Switchover thresholds:  
for T50: <2°C or >50°C

\*) CRC: a control checksum value which verifies if the software source code is correct.

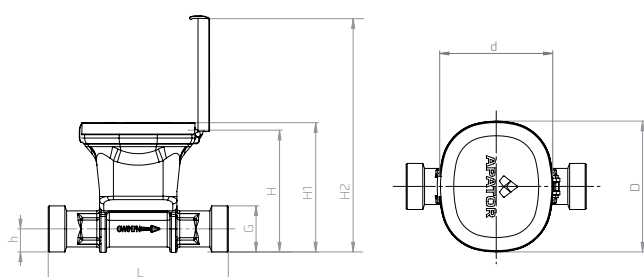
Table 1. Technical specifications

| Specification                                                                 |                             |                                | Ultrimis M-Bus                                      |                  |          |           |        |
|-------------------------------------------------------------------------------|-----------------------------|--------------------------------|-----------------------------------------------------|------------------|----------|-----------|--------|
|                                                                               |                             |                                | UL2.5                                               |                  | UL2.5-01 | UL4       | UL4-01 |
| Nominal diameter                                                              | DN                          | mm                             | 15                                                  |                  | 20       |           |        |
| Permanent flow rate                                                           | Q <sub>3</sub>              | m³/h                           | 2.5                                                 |                  | 4        |           |        |
| Overload flow rate                                                            | Q <sub>4</sub>              | m³/h                           | 3.125                                               |                  | 5        |           |        |
|                                                                               |                             |                                |                                                     |                  |          |           |        |
| Measurement range                                                             | R                           | Q <sub>3</sub> /Q <sub>1</sub> | R250 in standard                                    |                  |          |           |        |
| Transitional flow rate                                                        | Q <sub>2</sub>              | dm³/h                          | 16                                                  |                  | 25.6     |           |        |
| Minimum flow rate                                                             | Q <sub>1</sub>              | dm³/h                          | 10                                                  |                  | 16       |           |        |
| Measurement range                                                             | R                           | Q <sub>3</sub> /Q <sub>1</sub> | R400                                                |                  |          |           |        |
| Transitional flow rate                                                        | Q <sub>2</sub>              | dm³/h                          | 10                                                  |                  | 16       |           |        |
| Minimum flow rate                                                             | Q <sub>1</sub>              | dm³/h                          | 6                                                   |                  | 10       |           |        |
| Measurement range                                                             | R                           | Q <sub>3</sub> /Q <sub>1</sub> | R800                                                |                  |          |           |        |
| Transitional flow rate                                                        | Q <sub>2</sub>              | dm³/h                          | 5                                                   |                  | 8        |           |        |
| Minimum flow rate                                                             | Q <sub>1</sub>              | dm³/h                          | 3                                                   |                  | 5        |           |        |
|                                                                               |                             |                                |                                                     |                  |          |           |        |
| Starting flow for R250, R400, R500, R800                                      | —                           | dm³/h                          | 0.75                                                |                  | 1.2      |           |        |
| Range for R250, R400, R500, R800                                              | —                           | Q <sub>2</sub> /Q <sub>1</sub> | 1.6                                                 |                  |          |           |        |
| Temperature class (EN and OIML)                                               | —                           | °C                             | T30, T50                                            |                  |          |           |        |
| Flow profile sensitivity class (EN)                                           | —                           | —                              | U0, D0                                              |                  |          |           |        |
| Counter indication range                                                      | —                           | m³                             | 999999                                              |                  |          |           |        |
| Scale interval value                                                          | —                           | m³                             | 0.001                                               |                  |          |           |        |
| Maximum permissible error in the range of Q <sub>2</sub> ≤ Q ≤ Q <sub>4</sub> | ε                           | %                              | ±2 for cold water T ≤ 30°C<br>±3 for water T > 30°C |                  |          |           |        |
| Maximum permissible error in the range of Q <sub>1</sub> ≤ Q < Q <sub>2</sub> | ε                           | %                              | ±5                                                  |                  |          |           |        |
| Battery                                                                       | —                           | —                              | 2x integrated 3.6 V DC lithium AA batteries         |                  |          |           |        |
| RF                                                                            | —                           | —                              | 868 MHz up to 25 mW E.R.P.                          |                  |          |           |        |
| RF communication standard                                                     | —                           | —                              | OMS-compliant WM-Bus                                |                  |          |           |        |
| Radio transmission mode                                                       | —                           | —                              | C1                                                  |                  |          |           |        |
| Wired Communication Standard                                                  | —                           | —                              | M-Bus                                               |                  |          |           |        |
| Cable Type                                                                    | —                           | —                              | 2-wire (2×0.25 mm²)                                 |                  |          |           |        |
| Cable Length                                                                  | —                           | m                              | 1.5 (standard)                                      |                  |          |           |        |
| Water pressure class                                                          | (EN)                        | —                              | bar                                                 | MAP16            |          |           |        |
|                                                                               | (OIML)                      | —                              |                                                     | 0.3 to 16        |          |           |        |
| Pressure loss class at Q <sub>3</sub>                                         | (EN)                        | ΔP                             | bar                                                 | ΔP40 at T30, T50 |          |           |        |
|                                                                               | (OIML)                      | —                              |                                                     | 0.4              |          |           |        |
|                                                                               | manufactur-<br>er-specified | —                              |                                                     | 0.25             | 0.25     |           |        |
| Installation orientation                                                      | —                           | —                              | H, V                                                |                  |          |           |        |
| Reverse flow (manufacturer-specified)                                         | —                           | —                              | Reverse flow metering by design                     |                  |          |           |        |
| Relative humidity                                                             | —                           | %                              | ≤ 100                                               |                  |          |           |        |
| IP rating                                                                     | —                           | —                              | IP68                                                |                  |          |           |        |
| Water meter body material                                                     |                             |                                | brass                                               | composite        | brass    | composite |        |
| Connection end thread size                                                    | G                           | Inch                           | 3/4";<br>7/8 -> 3/4" *                              |                  | 1"       |           |        |
|                                                                               | G1                          | mm                             | -                                                   |                  |          |           |        |

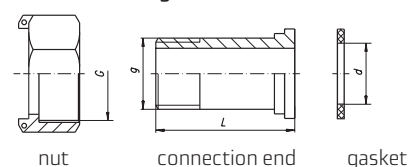
\* Thread size 7/8 -> 3/4" available for 115 mm long versions only

| Specification      |    |    | Ultrimis M-Bus |      |          |      |      |        |
|--------------------|----|----|----------------|------|----------|------|------|--------|
|                    |    |    | UL2.5          |      | UL2.5-01 | UL4  |      | UL4-01 |
| Water meter length | L  | mm | 80             | 110  | 80       | 105  | 130  | 105    |
|                    |    |    | 115            | 165  | 110      | 115  | 190  | 130    |
| Height             | H  | mm | 83; 84**       |      | 83       | 88.5 |      |        |
|                    | H1 | mm | 88             |      |          | 94   |      |        |
|                    | H2 | mm | 163            |      |          | 169  |      |        |
|                    | h  | mm | 14; 15**       |      | 14       | 17.5 |      |        |
| Counter size       | d  | mm | 87             |      |          |      |      |        |
|                    | D  | mm | 94.5           |      |          |      |      |        |
| Flange size        | Dz | mm | -              |      |          |      |      |        |
| Weight             | —  | kg | 0.48           | 0.52 | 0.29     | 0.61 | 0.63 | 0.33   |
|                    |    |    | 0.53           | 0.6  | 0.31     | 0.66 | 0.77 | 0.34   |

\*\* Applies to thread size  $\frac{7}{8} \rightarrow \frac{3}{4}$ "

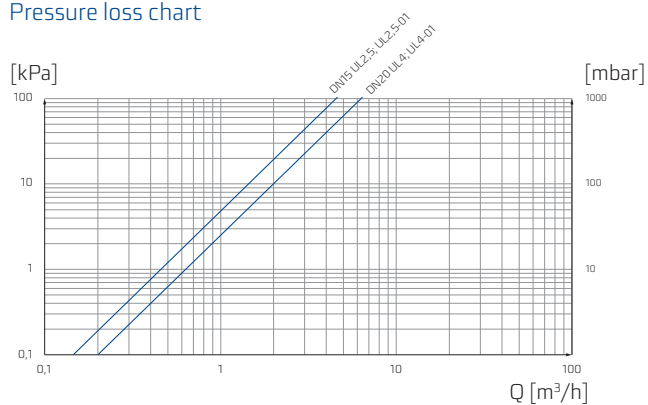


#### Connection fittings

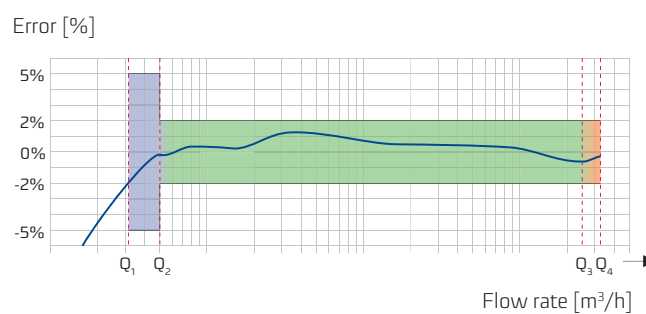


| DN | G<br>inch       | g<br>inch       | d<br>mm | L<br>mm |
|----|-----------------|-----------------|---------|---------|
| 15 | $\frac{3}{4}$ " | $\frac{1}{2}$ " | 17      | 37.5    |
| 20 | 1"              | $\frac{3}{4}$ " | 23      | 45.6    |

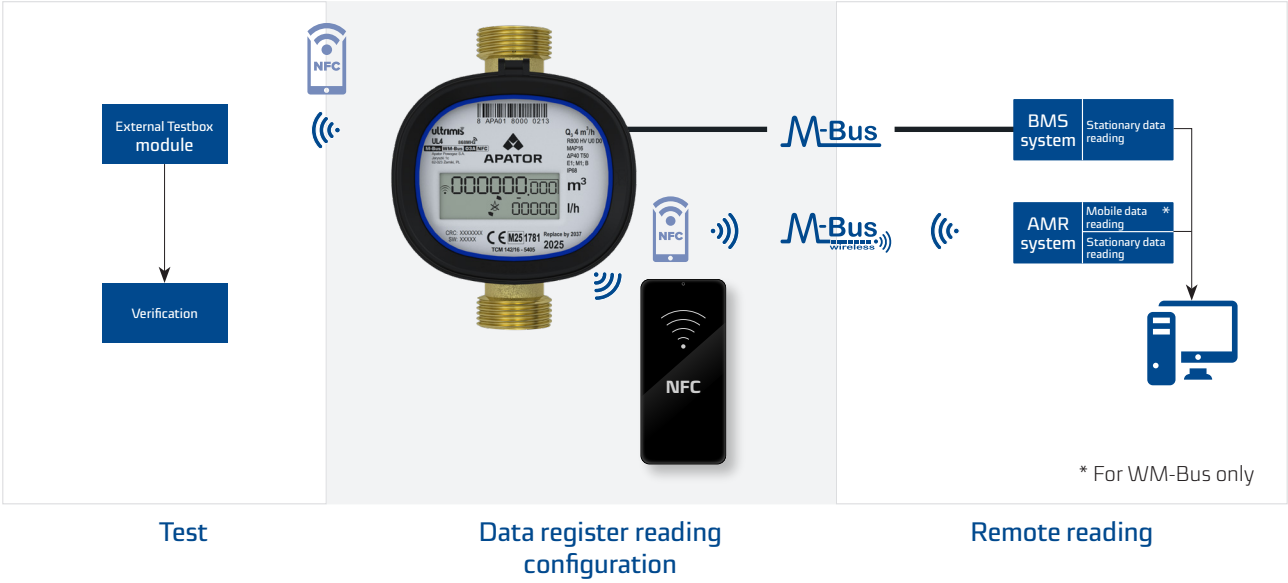
#### Pressure loss chart



#### Typical error chart



# Installation, configuration and remote reading



- Available options:
- Disposable clamps with snap-on seals made of plastic, with unique ID numbers
  - Half unions with gaskets
  - Water meter brackets
  - Testbox
  - Bluetooth to RF or USB converter

## Creating a product code

70 - X X XX X F X - XXX

| Measurement range |   |
|-------------------|---|
| R800              | 0 |
| R400              | 1 |
| R250              | 2 |

| Size | Flow [m³/h]            |
|------|------------------------|
| DN15 | Q <sub>3</sub> = 2,5 2 |
| DN20 | Q <sub>3</sub> = 4 4   |

| Size | Connection   | water meter lenght [mm] |
|------|--------------|-------------------------|
| DN15 | G3/4         | 110 02                  |
|      | G7/8 -> G3/4 | 115 04                  |
| DN20 | G1           | 115 07                  |

| Design                                         |     |
|------------------------------------------------|-----|
| Battery life up to 12 years (standard version) | 000 |
| Battery life up to 12 years (standard version) | 001 |
| Outlet with non-return valve                   | 001 |
| Battery life up to 16 years                    | 035 |

| Material     | Lid |
|--------------|-----|
| Brass CW617N | x 0 |
| Composite    | x 1 |
| Brass CW617N | ✓ 4 |
| Composite    | ✓ 5 |

| Communication | Frequency [MHz] |
|---------------|-----------------|
| Wired M-Bus   | 868 F           |

| Temperature class |   |
|-------------------|---|
| T50               | 0 |
| T30               | 1 |
| T70               | 2 |
| T50 + Strainer    | 3 |
| T70 + Strainer    | 4 |

Example number: 70-12020F4-000

In order to verify the implementation of a given design, please contact a sales representative of Apator Powogaz S.A.

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