

# Ultrimis

## Ultrasonic water meter DN15-DN50



Ultrimis, 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 and the maximum hot water temperature of 70°C, requiring reliable water consumption metering and reliable data communication methods, including remote meter reading over NFC, WM-Bus or LoRaWAN. The water meter can be installed in any orientation and does not require upstream and downstream sections of straight piping.

# Ultrimis

Counter with a mineral glass face cover with IP68 protection level

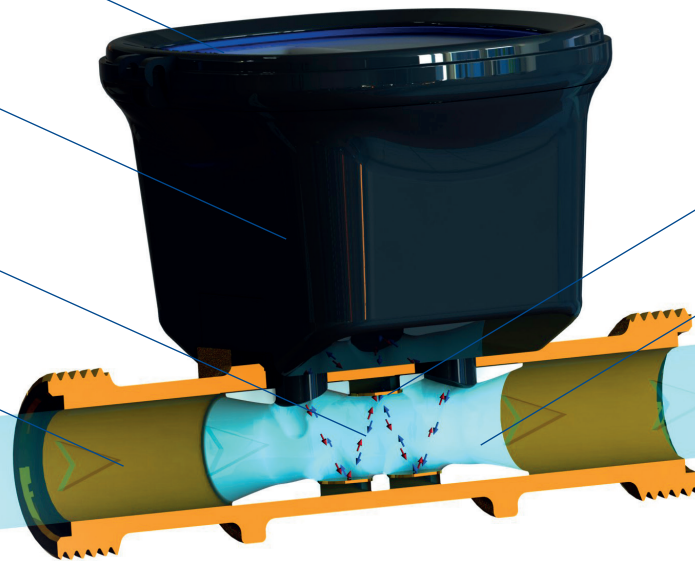
RF (radio-frequency) data communication (WM-Bus, LoRaWAN)

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

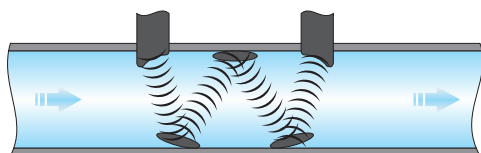
## Environmentally friendly

- Extremely **low power usage** when in operation
- Very low lithium content: **Li < 1.5 g**
- Expected battery life up to 16 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 **0.17 bar** for  $Q_3$ )
- 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 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 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, E2 (EN-ISO 4064:2014; Directive 2014/32/EU of 26 February 2014)s
- PZH (NIH) approval (all materials of the Ultrimis 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
- LoRaWAN Specification Version V1.0.4 compliance certificate



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

- Water meter data reading over NFC (Near Field Communication)
- RF (radio-frequency) reading of indications compatible with WM-Bus and/or LoRaWAN
- RF indication reading for walk-by, drive-by and stationary reading systems
- Secondary verification at any suitable location with the Testbox module and a dedicated application SPIDAP Mobile

### NFC CONFIGURATION

The Ultrimis 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 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.







UL6,3  
DN25, L260  
DN25, L165

UL10 - DN32, L260  
UL16 - DN40, L300

UL25 - DN50, L200  
UL25 - DN50, L270  
UL25 - DN50, L300

## RF READING

The water meter has an integrated RF data communication module for easy and efficient remote data reading in walk-by, drive-by and stationary reading systems.

The WM-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 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

## Wireless M-Bus + LoRaWAN

The Ultrimis LoRaWAN + WM-Bus water meter versions are intended for stationary reading systems. They facilitate default data communication over LoRaWAN with a long range and a low power consumption. If there is no LoRaWAN service, the water meter automatically switches over to WM-Bus communication. One of the following data communication methods can also be configured for permanent use:

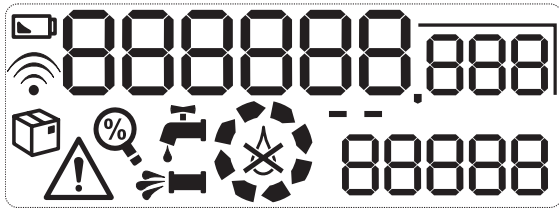
- LoRaWAN only
- WM-Bus only
- Hybrid – LoRaWAN is default; if there is no LoRaWAN service, WM-Bus is automatically switched to.

The EU868MHz band used does not involve any license fees.

The LoRaWAN communication is divided into two areas:

- Standard data communication, each with an RF data frame output every 7 hours and holding the data from the previous 14 hours
- Emergency data communication is triggered instantly when a predefined event emerges.

### LCD DISPLAY FUNCTIONS



888888

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

888

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 > 45 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  
for T70: <2°C or >70°C

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

Table 1. Technical specifications

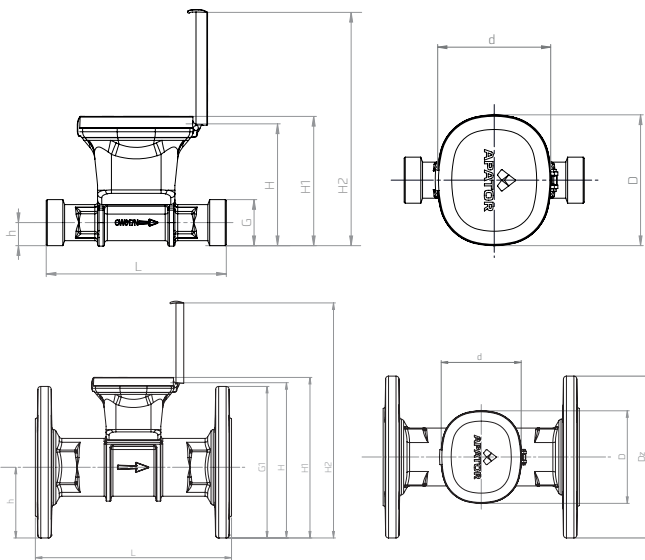
Specification			Ultrimis							
			UL2.5	UL2.5-01	UL4	UL4-01	UL6.3	UL10	UL16	UL25
<b>Nominal diameter</b>	<b>DN</b>	<b>mm</b>	<b>15</b>		<b>20</b>		<b>25</b>	<b>32</b>	<b>40</b>	<b>50</b>
<b>Permanent flow rate</b>	<b>Q<sub>3</sub></b>	<b>m<sup>3</sup>/h</b>	<b>2.5</b>		<b>4</b>		<b>6.3</b>	<b>10</b>	<b>16</b>	<b>25</b>
<b>Overload flow rate</b>	<b>Q<sub>4</sub></b>	<b>m<sup>3</sup>/h</b>	<b>3.125</b>		<b>5</b>		<b>7.875</b>	<b>12.5</b>	<b>20</b>	<b>31.25</b>
Measurement range	R	Q <sub>3</sub> /Q <sub>1</sub>	<b>R250 in standard</b>							
Transitional flow rate	Q <sub>2</sub>	dm <sup>3</sup> /h	16		25.6		40.32	64	102.4	160
Minimum flow rate	Q <sub>1</sub>	dm <sup>3</sup> /h	10		16		25.2	40	64	100
Measurement range	R	Q <sub>3</sub> /Q <sub>1</sub>	R400							
Transitional flow rate	Q <sub>2</sub>	dm <sup>3</sup> /h	10		16		25	40	64	100
Minimum flow rate	Q <sub>1</sub>	dm <sup>3</sup> /h	6		10		16	25	40	62.5
Measurement range	R	Q <sub>3</sub> /Q <sub>1</sub>	R500							
Transitional flow rate	Q <sub>2</sub>	dm <sup>3</sup> /h	-		-		-	-	-	80
Minimum flow rate	Q <sub>1</sub>	dm <sup>3</sup> /h	-		-		-	-	-	50
Measurement range	R	Q <sub>3</sub> /Q <sub>1</sub>	R800							
Transitional flow rate	Q <sub>2</sub>	dm <sup>3</sup> /h	5		8		13	20	32	-
Minimum flow rate	Q <sub>1</sub>	dm <sup>3</sup> /h	3		5		8	13	20	-
Starting flow for R800	-	dm <sup>3</sup> /h	0.75		1.2		1.89	3	4.8	12
Starting flow for R250, R400, R500	-	dm <sup>3</sup> /h	0.15 x Q <sub>2</sub>							
<b>Range for R250, R400, R500, R800</b>	-	<b>Q<sub>2</sub>/Q<sub>1</sub></b>	<b>1.6</b>							
Temperature class (EN and OIML)	-	°C	T30, T50, T70				T30, T50			
Flow profile sensitivity class (EN)	-	-	U0, D0							
Counter indication range	-	m <sup>3</sup>	999999							
Scale interval value	-	m <sup>3</sup>	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 ±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. EU868 MHz LoRa up to 25 mW E.R.P. 434 MHz up to 10 mW E.R.P.							
RF communication standard	-	-	OMS-compliant WM-Bus OMS-compliant WM-Bus + LoRaWAN							
Radio transmission mode	-	-	T1 or C1							
Water pressure class	(EN)	-	MAP16							
	(OIML)	-	0.3 to 16							
Pressure loss class at Q <sub>3</sub>	(EN)	ΔP	ΔP40 at T30, T50				ΔP40		ΔP40	
	(EN)	ΔP	ΔP25 at T70				-		-	
	(OIML)	-	0.4							
	manufacturer-specified	-	0.25	0.25	0.28	0.26	0.17	0.24		
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	brass			

Specification			Ultrimis																	
			UL2.5		UL2.5-01		UL4		UL4-01				UL6.3		UL10		UL16		UL25	
Connection end thread size	G	Inch	$\frac{3}{8}$ "; $\frac{7}{8}$ -> $\frac{3}{4}$ "*				1"				1 1/4"		1 1/2"		2"		flanged ends***			
	G1	mm	-																155	
Water meter length	L	mm	80	110	80	105	130	105	165	260	300	200; 270; 300								
			115	165	110	115	190	130	260											
Height	H	mm	83; 84**		83		88.5		95		102.5		111		158					
	H1	mm	88				94				100		107		117		164			
	H2	mm	163				169				175		182		192		240			
	h	mm	14; 15**		14		17.5		21		25		30.5		72					
Counter size	d	mm	87																	
	D	mm	94.5																	
Flange size	Dz	mm	-																165	
Weight	-	kg	0.48	0.52	0.29	0.61	0.63	0.33	1.05	1.68	2.15	6.29; 6.75; 6.95								
			0.53	0.6	0.31	0.66	0.77	0.34	1.39											

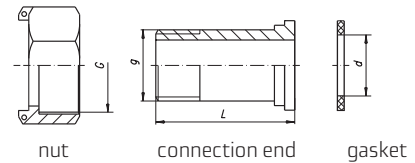
\* Thread size  $\frac{7}{8}$  ->  $\frac{3}{4}$ " available for 115 mm long versions only

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

\*\*\*Also available in a G2 1/2 version

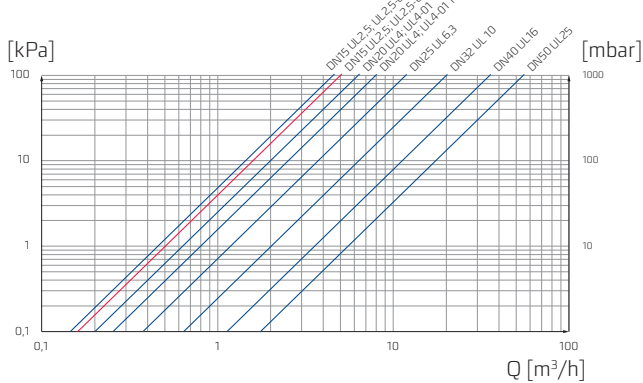


Connection fittings

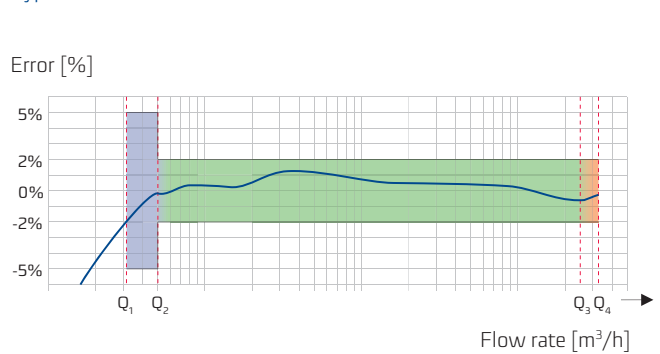


DN	G	g	d	L
	inch	inch	mm	mm
15	$\frac{3}{4}$ "	$\frac{1}{2}$ "	17	37.5
20	1"	$\frac{3}{4}$ "	23	45.6
25	1 1/4"	1"	29	46.5
32	1 1/2"	1 1/4"	36	56
40	2"	1 1/2"	43	66
50	2 1/2"	2"	54	74.2

Pressure loss chart



Typical error chart





# Installation, configuration and remote reading



TECHNICAL SPECIFICATIONS

\* For WM-Bus only

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

Measurement range	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
<b>Measurement range</b>	R800	R400	R250													
<b>Size</b>	DN15	DN20														
<b>Thread [inch]</b>	G 3/4	G 7/8 -> G3/4	G 3/4													
<b>Water meter length [mm]</b>	80	110	115	130	165	190										
<b>Design</b>	Standard (battery life up to 12 years)	Standard (battery life up to 12 years)	Outlet with non-return valve	Battery life up to 16 years	Battery life up to 16 years	Outlet with non-return valve										
<b>Material</b>	Brass CW617N	Composite	Brass CW617N	Composite	Brass CW510L	Brass CW510L										
<b>Lid</b>	x	✓	✓	x	✓											
<b>Communication</b>	Wired M-Bus															
<b>Frequency [MHz]</b>	868															
<b>Temperature class</b>	T50	T30	T50 + Strainer	T70 + Strainer												
	0	1	2	3												

Example number: 70-2202030-000

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

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