Ultrimis

Ultrasonic water meter
DN15-DN50

The Ultrimis ultrasonic water meter is a modern measuring instrument with a variety of patented design and technological solutions, including the unique ultrasonic measuring method, "W-Sonic Technology". The W-Sonic Technology can provide metering indications within the R800 range, from a starting flow of 0.75 l.
This water meter is designed and built in compliance with the highest quality standards. The standard version of the water meter is fully waterproof and IP68-compliant. Due to the structure of the measurement chamber, the meter is resistant to water hammering. The applied ultrasonic measurement technology ensures full immunity to magnetic fields.

INTENDED USE

Cold water supply systems of up to 50°C and hot water systems of up to 70°C which require precise measurement of water consumption and application of reliable data communication technologies, like NFC, WM-Bus, or LoRaWAN. The water meter can be installed in any operating orientation and does not require any upstream or downstream straight piping sections.

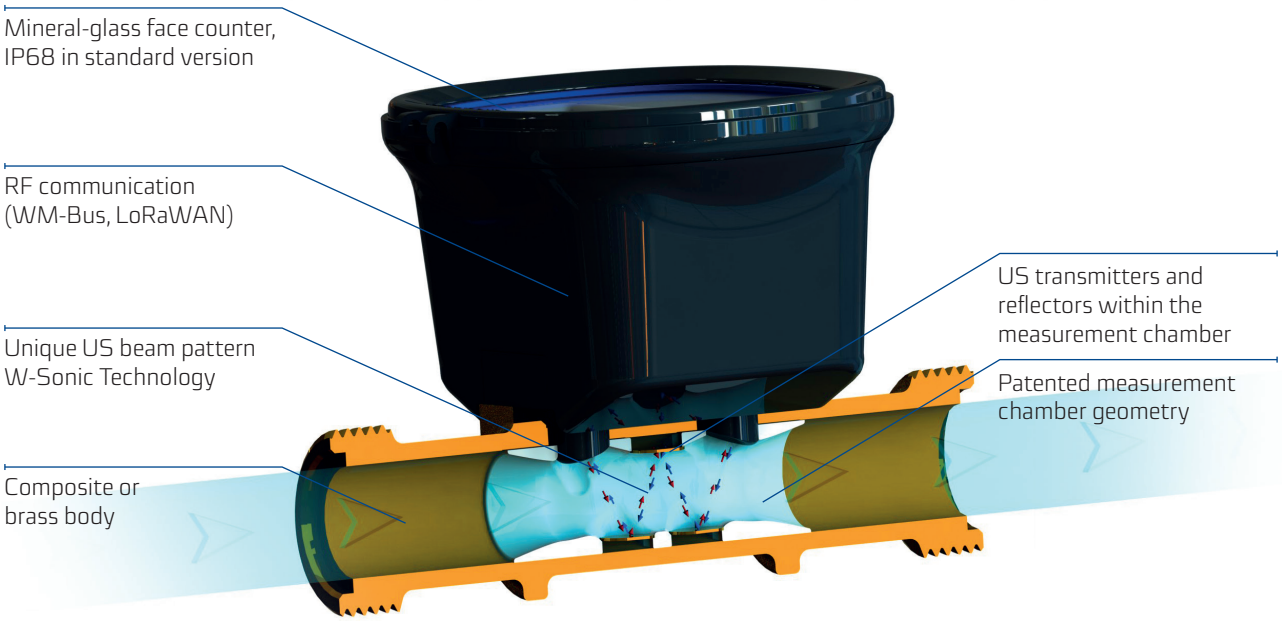
water&heat

DVGW CERT
DW-4715CU0111

LoRaWAN CERTIFIED

SONIC TECHNOLOGY

Ultrimis



ADVANTAGES

Economic

- High measurement accuracy for **efficient** water conservation: detects all water system leaks
- The measurement chamber features **no moving parts**, and is resistant to contamination
- No service inspection or maintenance work is required
- No need for **straight piping sections** upstream or downstream
- **Small overall dimensions** for easy installation in any conditions
- Robust design of the water meter, reliable electronic circuitry and **low power consumption** ensure stable operation and a long service life
- Wide **metering range,** insensitive to water conductivity (which is critical for electromagnetic water meters)
- **Negligible pressure loss** (low resistance of flow)

Convenient to use

- Hermetic water meter enclosure: **IP68** rated in the standard version
- **No wear** of the measurement chamber elements during continuous operation, even at high flow rates
- Operating pressure up to **16 bar**
- Body materials available: **brass** or **composite**
- **Immune** to strong **magnetic fields**
- Resistant to **water hammering**
- High overload flow rate resistance: Q_4

Measurement precision

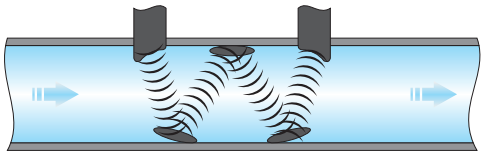
- Maximum measurement range of **R800** for every operating orientation (**H**, **V**, **H/V**)
- Starting flow from **0.75 l/h**
- High measurement **stability**, insensitive to any measurement system contamination
- **Reverse flow** measurement capable (through a symmetric design and measurement algorithms)

Sustainable

- **Very low** power consumption during operation
- Extremely low lithium content: **Li < 1.5 g**
- Expected battery operation time: up to 16 years (depending on the configuration and ambient conditions)
- Low energy input on water supply (unit pressure drop across the water meter < **0.17 bar** at Q_3)
- R800 is also available with a water meter installation length of **L = 80 mm**
- Extremely **low weight** = low transport costs
- Low carbon footprint

Innovative

The Ultrimis water meter features a measurement method based on a unique ultrasonic beam pattern through the measurement chamber, which ensures the stability is indicated for the entire measurement range. The distinctive characteristics of this technology are:



SONIC TECHNOLOGY

- The water meter can be designed with a considerably shorter length than in the case of other ultrasonic beam patterns
- No obstruction in the flow bore
- Insensitive to fouling
- Advanced algorithms control the US beam pattern to offset ageing of the components
- Requires no strainers or check valves

REGULATORY AND STANDARD COMPLIANCE

- Directive 2014/32/EC 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 13/04/2016 on market surveillance and compliance assessment systems
- EN-ISO 4064-1÷5: 2014 (E) – Water meters for cold potable water and hot water
- OIML R49:2013 – Water meters intended for the metering of cold potable water and hot water
- CE Type Test Certificate for cold water – ref. TCM 142/16-5405
- Classification of environmental climate and mechanical conditions: class B (ref. EN-- ISO 4064-1:2017 (E)).
- Classification of mechanical environmental conditions: class M1 (ref. Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014).
- Classification of electromagnetic environmental conditions: class E1 and E2 (ref. EN-ISO 4064: 2017 and Directive 2014/32/EC of the European Parliament and of the Council of 26 February 2014)
- PZH National Institute of Hygiene and ACS certificates (all materials used in the Ultrimis water meter have Hygiene Certificates for use 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 rev. 5
- WRAS certificate
- KIWA UK certificate
- DVGW certificate
- IP68 class rating proof test
- OMS compliant – DVGW certificate
- 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

- Data reading and configuration over NFC (near-field communication)
- RF indication reading prepared for WM-Bus and LoRaWAN
- RF indication reading dedicated for walk-by, drive-by, and stationary reading systems
- The Testbox module and the dedicated SPIDAP application enable secondary verification for any verification test rig

NFC

The Ultrimis water meters feature the NFC standard, which enables connectivity for operating mode configuration, reading of actual operating parameters, and a history of error and status indications (even with a failed or drained battery).

Developed specifically for the Ultrimis water meter, the interface includes a dedicated SPIDAP application and the Testbox module. The interface enables secondary verification by operators of such a service.

The data logger supported with 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

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

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

- Water meter indications (from a logged month of choice and at the time of reading)
- Reverse volume (at the time of the reading)
- Events/alarms (from a logged month of choice, the current month, and at the time of reading), including:
  - Reverse flow
  - Low flow (small leak)
  - High flow (large leak)
  - No water
  - Low battery
  - Tampering
  - Temperature limit violation
  - No 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 meters automatically switch over to WM-Bus communication. One of the following data communication methods can also be configured for permanent use:

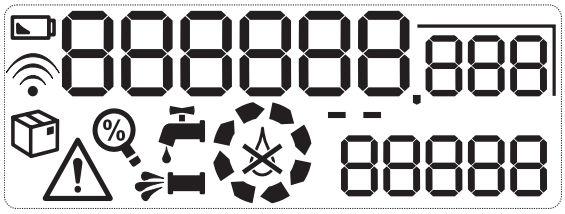
- LoRaWAN only
- WM-Bus only
- Hybrid – LoRaWAN is default; if there is no LoRaWAN service, WM-Bus is automatically selected.

The EU 868 MHz band requires no licensing 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 – FUNCTIONALITY



Water meter indication – m^3

Water meter indication – litres

Actual flow – litres/h (water meter primed)
Software version & CRC*(water meter dry)

- Low battery
- Radio ON
- **Shipping mode**
  Shipping mode disabled at a minimum flow rate of:
  5L – DN15; 8L – DN20; 12.6L – DN25; 20L – DN32; 32L – DN40;
  50L – DN50, or as commanded via NFC
- Tampering
- Test mode
- **Reverse flow**
  Alarm ON – reverse flow for > 45 s
  Counter-clockwise animated direction of flow.
- **Meter leak**
  Alarm ON – flow rate > 0.3 x Q_2 for 240 min
- **Water main leak**
  Alarm ON – flow rate >Q_4 for 30 s
- **Animated direction of flow**
  Clockwise animated direction of flow.
- **No water in the system**
  Alarm ON in 30 s
- Water meter online
- **No flow**
  Alarm ON – no flow for 8 s
  No animated direction of flow.

EVENTS NOT DISPLAYED ON THE LCD

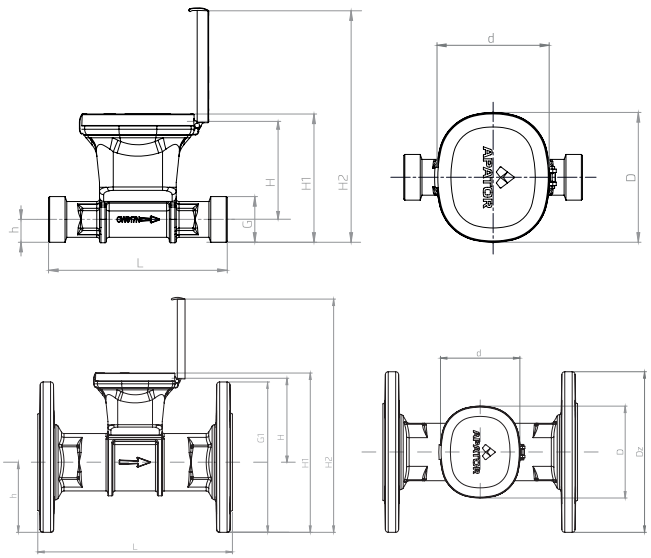
Temperature limit violation
ON
at T50: <2°C or >50°C
at T70: <2°C or >70°C

* CRC: Cyclic Redundancy Check, a checksum which verifies that the software source code is correct.

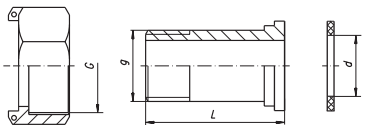
Table 1. Specifications

Parameter				Ultrimis							
				UL2,5	UL2,5-01	UL4	UL4-01	UL6,3	UL10	UL16	UL25
Nominal diameter		DN	mm	15		20		25	32	40	50
Permanent flow rate		Q_3	m^3/h	2.5		4		6.3	10	16	25
Overload flow rate		Q_4	m^3/h	3.125		5		7.875	12.5	20	31.25
Transitional flow rate		Q_2	dm^3/h	16		25.6		40.32	64	102.4	160
Minimum flow rate		Q_1	dm^3/h	10		16		25.2	40	64	100
Starting flow		–	dm^3/h	0.75		1.2		1.89	3	4.8	12
Measurement range		R	Q_3/Q_1	R250 is standard*							
Range		–	Q_2/Q_1	1.6							
Temperature class (ref. EN and OIML)		–	°C	T30, T50, T70							
Flow disturbance sensitivity class (ref. EN)		–	–	U0, D0							
Counter indicating range		–	m^3	999999							
Scale interval value		–	m^3	0.001							
Maximum permissible error range: $Q_2 \leq Q \leq Q_4$		ε	%	± 2 for cold water (T ≤30ºC) ± 3 hot water (T>30ºC)							
Maximum permissible error range: $Q_1 \leq Q < Q_2$		ε	%	± 5							
Battery		–	–	integrated, 2x 3.6 V DC size AA lithium 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							
Water pressure class	ref. EN	–	bar	MAP16							
	ref. OIML	–		0.3 to 16							
Pressure loss class at Q_3	ref. EN	ΔP	bar	ΔP40 at T30, T50				ΔP40		ΔP40	
				ΔP25 at T70				–		–	
	ref. OIML	–		0.4						0.25	
	manufacturer-specified	–		0.25		0.25		0.28	0.26	0.17	0.24
Operating orientation		–	–	H, V, H/V							
Back flow		–	–	Back flow measurement enabled water meter							
Relative humidity		–	%	≤ 100							
Ingress protection rating		–	–	IP68							
Water meter body material				brass	composite	brass	composite	brass			
Connection thread		G	Inch	¾"; ⅞ -> ¾" **		1"		1 ¼"	1 ½"	2"	flanged****
		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	69; 70***		69	71			74	77	81	86
		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			

* Versions also available: R400 & R800 for DN15-DN40 water meters; R400 & R500 for DN50 water meters
** ⅞ -> ¾" thread size only for 115 mm of installation length
*** For ⅞ -> ¾" thread size
**** Also available with G2 ½



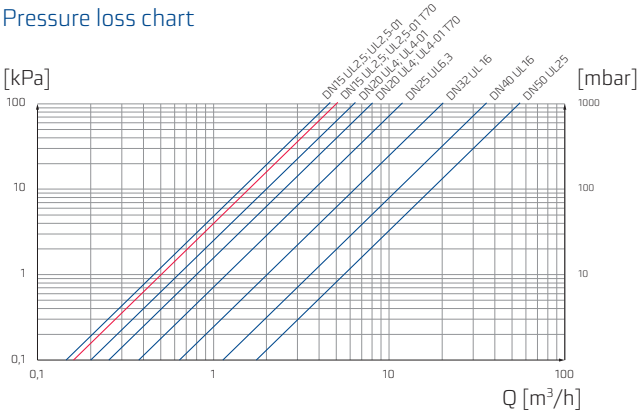
Connection fittings



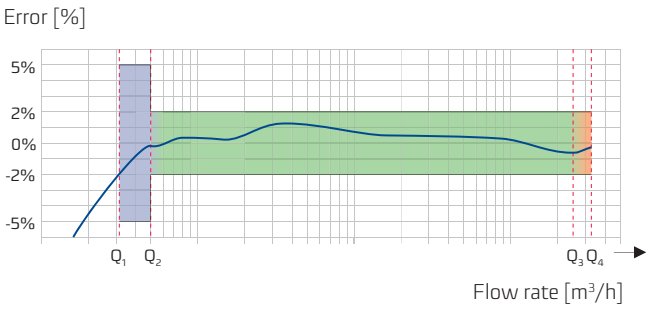
nut union washer

DN	G	g	d	L
	inch	inch	mm	mm
15	¾"	½"	17	37.5
20	1"	¾"	23	45.6
25	1¼"	1"	29	46.5
32	1½"	1¼"	36	56
40	2"	1½"	43	66
50	2½"	2"	54	74.2

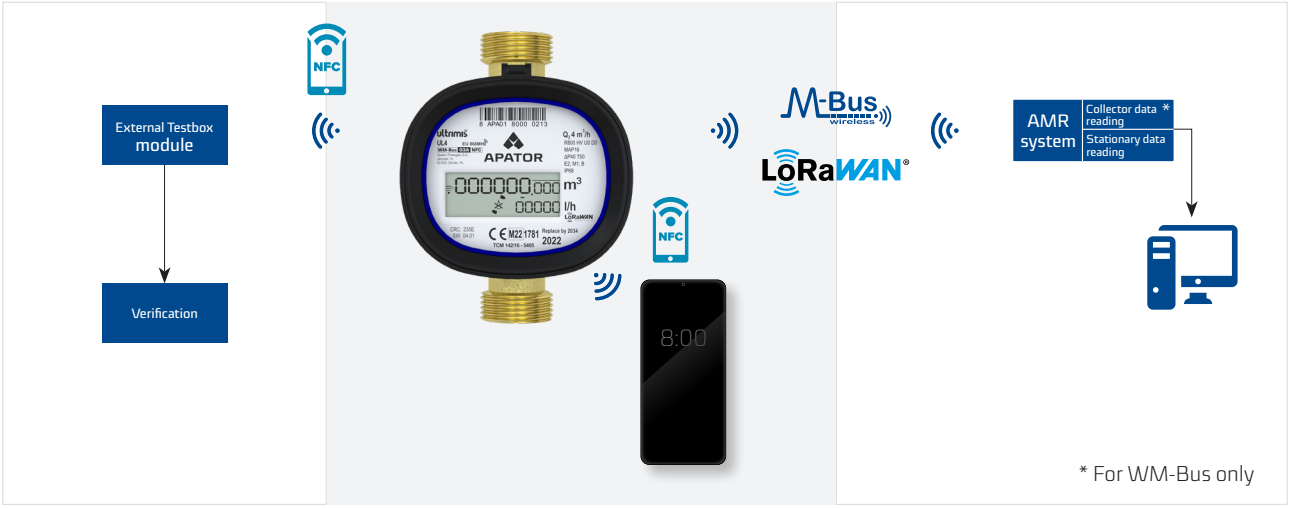
Pressure loss chart



Typical error chart



Remote indication relay & flow rate measurement



Test

Data register reading
Configuration

Remote reading

Available options:

- disposable clamps with snap-on seals made of plastic, with unique numbering
- half unions, with gaskets
- water meter brackets
- Testbox
- Bluetooth to RF or USB converter

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