



OIML Member State  
SLOVAKIA

OIML Certificate No.  
R49/2013-A-SK1-2024.05

### OIML CERTIFICATE ISSUED UNDER SCHEME A

#### OIML Issuing Authority

Name: **Slovak Legal Metrology (SLM)**  
Address: Hviezdoslavova 1124/31, 974 01 Banská Bystrica, Slovakia  
Person responsible: Dušan Šmigura, Director of PCB

#### Applicant

Name: **Ningbo Water Meter (Group) Co., Ltd.**  
Address: 355, Hong Xing Road, Jiangbei District,  
Ningbo 315032, China

#### Manufacturer

Name: **Ningbo Water Meter (Group) Co., Ltd.**  
Address: 355, Hong Xing Road, Jiangbei District,  
Ningbo 315032, China

#### Identification of the certified type *(the detailed characteristics are defined in the additional pages)*

Water meter type **UL-DW PLUS**

#### Designation of the module *(if applicable)*

Ultrasonic water meter

This OIML Certificate attests the conformity of the above identified type (represented by the sample(s) identified in the OIML type evaluation report) with the requirements of the following Recommendation of the International Organization of Legal Metrology (OIML):

OIML R 49, Edition (year): 2013  
For accuracy class (if applicable): 1 and 2



**OIML Certificate No.  
R49/2013-A-SK1-2024.05**

This OIML Certificate relates only to metrological and technical characteristics of the type of measuring instrument covered by the relevant OIML Recommendation identified above.

This OIML Certificate does not bestow any form of legal international approval.

The conformity was established by the results of tests and examinations provided in the associated:  
OIML Type Evaluation Report No. 2024/ER001/SK1 dated 7<sup>th</sup> June 2024 that includes 16 pages.

The technical documentation relating to the identified type is contained in documentation file name:  
„Technical documentation file NWM\_UL-DW PLUS\_00“ dated 7<sup>th</sup> June 2024 that includes a sum of documents 166 pages.

**OIML Certificate History**

Revision No.	Date	Description of the modification
0	7 <sup>th</sup> June 2024	Certificate first issued
-	-	-

Identification, signature and stamp

**The OIML Issuing Authority**



  
.....  
Dušan Šmigura

Date: 7<sup>th</sup> June 2024

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## 1. Designation

The water meter type **UL-DW PLUS** is compact ultrasonic water meter with electronic indication device. It is designed to measure, memorise and display the volume of water passing through the measurement transducer at metering conditions. This water meter type is intended for the measurement of volume of clean water in residential use, can be installed in all positions and is not designed to measure the reverse flow. The measurement is based on ultrasonic bidirectional transit-time principle.

## 2. Description

Essential parts of the water meter type UL-DW PLUS:

Flow sensor:

- cylindrical brass body with inlet and outlet threaded connections;
- the inner plastic element (casing pipe) placed in the cylindrical brass body;
- two reflection sheeds installed in the center of the pipe at an angle of 45 degrees with the axis of the pipe section;
- two ultrasonic transducers at the upstream and downstream of the measurement channel (pipe section) to transmit and receive ultrasonic signals.

The flow is measured by the difference in time-of-flight of ultrasonic pulses with flow (downstream) and opposite to flow (upstream).

Calculator and indication device:

- plastic housing of the calculator with indication device directly mounted on the flow sensor;
- main PCB board with LCD display and optical sensor;
- electronic LCD display (scrolling with using of optical sensor) with 10 digits and indication range of 999999.9999 m<sup>3</sup>. The sub-multiples of a cubic meter are indicated on the display by the comma under the numbers. When the maximum indication range of the volume totalization is reached, the indication range will continue measuring starting from zero cubic meter.
- non-replaceable lithium battery, lifetime 16 years.

Non-essential parts of the water meters type UL-DW PLUS:

thermistor.

### 2.1 Metrological functions

- measuring, memorizing and displaying the volume of water passing through the water meter.



## 2.2 Software specification

Software version and checksum of legally relevant software:

Software version	Checksum	Remarks
S03.0.0.2H300	F7cd6b0cu	Software version digits explanation: 1 <sup>st</sup> : (S) software; 2 <sup>nd</sup> : (0) 1: with valve, 0: no valve; 3 <sup>rd</sup> - 5 <sup>th</sup> : (3.0.0) software version number; 6 <sup>th</sup> : (2) 0: M-Bus/485/LoRa; 1: NB, 2: No communication; 7 <sup>th</sup> : (H) hardware; 8 <sup>th</sup> - 10 <sup>th</sup> : (300) hardware version number.

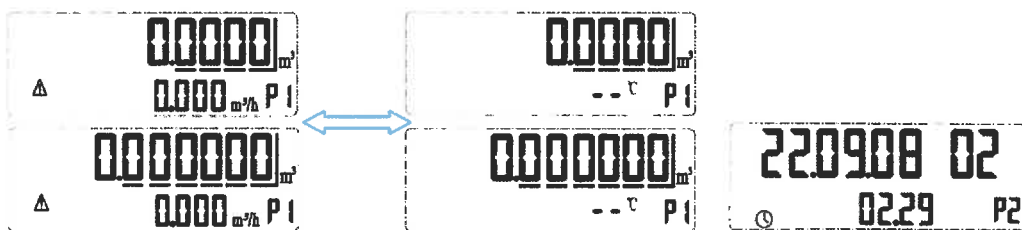
The software version and checksum can be checked through the scrolling display (see chapter 2.3, P5 and P6 water meter information mode).

## 2.3 Operation and presentation of legal data

Data is presented in five different modes (user mode, calibration mode, water meter information mode, engineering verification mode, electronic seal mode) by means of the electronic LCD display. Switching between the modes is possible by covering the photosensitive button for 5 s. Switching to the next data display (P1 ... Px) at the current mode is possible by covering the photosensitive button for 1 s.

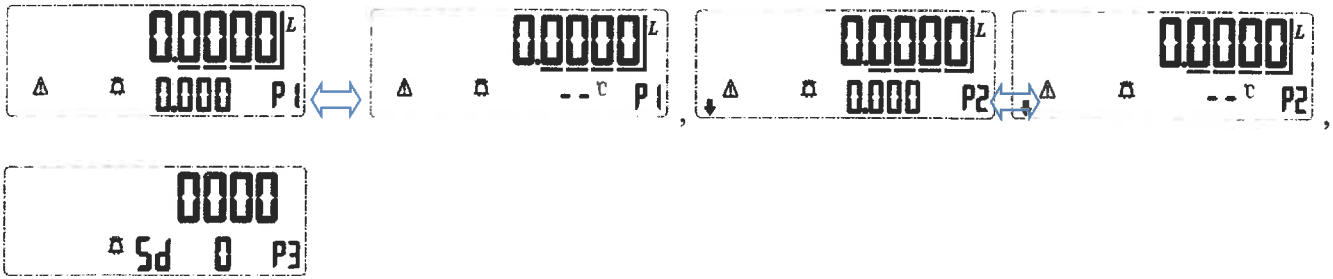
Modes:

- user mode
  - o P1:
    - cumulative flow (m<sup>3</sup>);
    - instantaneous flow rate (m<sup>3</sup>/h) and water temperature (°C) - alternately
  - o P2:
    - current time (year-month-day-hour; minute-second);



- calibration mode
  - o P1:
    - forward cumulative flow (L);
    - instantaneous flow rate; the instantaneous flow rate and temperature (°C) - alternately
  - o P2:
    - reverse cumulative flow (L);
    - instantaneous flow rate; the instantaneous flow rate and temperature (°C) - alternately
  - o P3:
    - zero point display: zero point, real time threshold of each channel; displays the time difference parameters of the upstream and downstream ultrasound.





- water meter information mode:
  - o P1:
    - cumulative flow (m<sup>3</sup>);
    - instantaneous flow rate (m<sup>3</sup>/h) and water temperature (°C) - alternately
  - o P2:
    - reverse cumulative flow (m<sup>3</sup>);
    - instantaneous flow (m<sup>3</sup>/h) and temperature (°C) - alternately
  - o P3:
    - water meter caliber (mm), battery voltage (V) and case length (mm) - alternately
  - o P4:
    - water meter parameters: baud rate, pulse number and alarm;
  - o P5:
    - water meter program CRC check;
  - o P6:
    - software version number;
  - o P7:
    - current time (year-month-day-hour; minute-second);
  - o P8:
    - water meter factory date;
    - cumulative number of hours the water meter has been used (h) and the remaining user calibration status (h) - alternately
  - o LCD screen detection interface (full brightness and full blackout);
- engineering verification mode:
  - o P1:
    - cumulative flow (L);
    - instantaneous flow rate (m<sup>3</sup>/h)
  - o P2:
    - reverse cumulative flow (L);
    - instantaneous flow rate (m<sup>3</sup>/h)
  - o P3:
    - water meter diameter (mm);
    - diameter, case length;
    - battery voltage (V) and temperature - alternately
  - o P4:
    - zero point display: zero point, real time threshold of each channel; channel; displays the upstream and downstream time difference parameters of ultrasonic conversion
  - o P5:
    - ultrasonic forward flight time
  - o P6:
    - ultrasonic reverse flight time
- electronic seal mode:
  - o P1:
    - Reserve electronic seal

- P2:
  - the modification table address record and the corresponding modification date are alternately displayed
- P3:
  - the monthly accumulated flow and the corresponding record date are alternately displayed
- P4:
  - the daily accumulated flow and the corresponding record date are alternately displayed
- P5:
  - The modified infrared password records and corresponding dates are displayed alternately.
- P6:
  - The alarm information records and alarm dates are displayed alternately.

### 3. Technical and metrological data

Table 1

Characteristics	Unit	UL-DW PLUS		
Nominal diameter DN	mm	15	20	25
Permanent flowrate $Q_3$	m <sup>3</sup> /h	2,5	4	6,3
Minimum flowrate $Q_1$	L/h	3,125/5/10	5/8/16	12,6/25,2
Transitional flowrate $Q_2$	L/h	5/8/16	8/12,8/25,6	20,16/40,32
Overload flowrate $Q_4$	m <sup>3</sup> /h	3,125	5	7,875
Ratio $Q_3/Q_1$	R	800 / 500 / 250		500 / 250
Ratio $Q_2/Q_1$	-	1,6		
Connection thread	" (inch)	G $\frac{3}{4}$ "B	G1"B	G1 $\frac{1}{4}$ "B
Construction length $L$	mm	110 to 165	130 to 195	225 to 260
Installation orientation	-	all		
Temperature class	-	T30, T50		
Maximum admissible pressure MAP	MPa	1,6		
Pressure loss class $\Delta p$	-	$\Delta p$ 40		
Maximum permissible error in upper flowrates range $Q_2 \leq Q \leq Q_4$	%	± 2 for water having a temperature ≤ 30 °C ± 3 for water having a temperature > 30 °C		
Maximum permissible error in lower flowrates range $Q_1 \leq Q < Q_2$	%	± 5		
Indicating range	m <sup>3</sup>	999999,9999		
Scale interval (resolution of the indicating device)	m <sup>3</sup>	0,0001 (user mode)		
	L	0,0001 (calibration mode)		
Accuracy class	-	2		
Mechanical class	-	M1		
Climatic class	°C	- 25 to + 55		
Electromagnetic class	-	E1		
Climatic and mechanical environmental conditions (class) according to EN ISO 4064-1/OIML R 49-1	-	B, O		
Flow profile sensitivity class	-	U0/D0		
Battery	-	non-replaceable battery with voltage range of 2 V to 3,6 V, life time 16 years		

Table 2

Characteristics	Unit	UL-DW PLUS		
Nominal diameter DN	mm	32	40	50
Permanent flowrate $Q_3$	m <sup>3</sup> /h	10	16	25
Minimum flowrate $Q_1$	L/h	20/40	32/64	50/100
Transitional flowrate $Q_2$	L/h	32/64	51,2/102,4	80/160
Overload flowrate $Q_4$	m <sup>3</sup> /h	12,5	20	31,25
Ratio $Q_3/Q_1$	R	500 / 250		
Ratio $Q_2/Q_1$	-	1,6		
Connection thread	" (inch)	G1½"B	G2"B	G2 1/2"B
Construction length $L$	mm	230 to 260	245 to 300	300 to 350
Installation orientation	-	all		
Temperature class	-	T30, T50		
Maximum admissible pressure MAP	MPa	1,6		
Pressure loss class $\Delta p$	-	$\Delta p$ 40		
Maximum permissible error in upper flowrates range $Q_2 \leq Q \leq Q_4$	%	± 2 for water having a temperature ≤ 30 °C ± 3 for water having a temperature > 30 °C		
Maximum permissible error in lower flowrates range $Q_1 \leq Q < Q_2$	%	± 5		
Indicating range	m <sup>3</sup>	999999,9999		
Scale interval (resolution of the indicating device)	m <sup>3</sup>	0,0001 (user mode)		
	L	0,0001 (calibration mode)		
Accuracy class	-	2		
Mechanical class	-	M1		
Climatic class	°C	- 25 to + 55		
Electromagnetic class	-	E1		
Climatic and mechanical environmental conditions (class) according to EN ISO 4064-1/OIML R 49-1	-	B, O		
Flow profile sensitivity class	-	U0/D0		
Battery	-	non-replaceable battery with voltage range of 2 V to 3,6 V, life time 16 years		

#### 4. Marking and inscriptions

The following data shall be marked on the water meter:

- a) unit of measurement (m<sup>3</sup>);
- b) flowrate  $Q_3$  and ratio  $Q_3/Q_1$  (R);
- c) type of water meter;
- d) manufacturers name or trademark;
- e) year of manufacture or the month and year of manufacture;
- f) serial number;
- g) direction of flow, by means of an arrow (shown on both sides of the body or on one side only provided the direction of flow arrow is easily visible under all circumstances);
- h) maximum admissible pressure (MAP);
- i) temperature class (T);
- j) pressure loss class ( $\Delta p$ );
- k) the installation sensitivity class where it different from U0D0;

- l) for a non-replaceable battery, the latest date by which the water meter shall be replaced;
- m) environmental classification (can be given on a document supplied separately);
- n) electromagnetic environmental class (can be given on a document supplied separately);
- o) type approval sign according to national regulations.

Manufacturer uses the following trademarks on the water meter:



## 5. Security measures

The water meter type series UL-DW PLUS shall be protected against unauthorized manipulation and opening by:

- one lead seal ensuring the connection of the upper cover (prevents access to the PCB and software) with the lower part of the water meter (contains the body of the water meter). (Fig.3)





## 6. Figures



Fig. 1: Illustrative views of DN15 and DN40 water meters type UL-DW PLUS



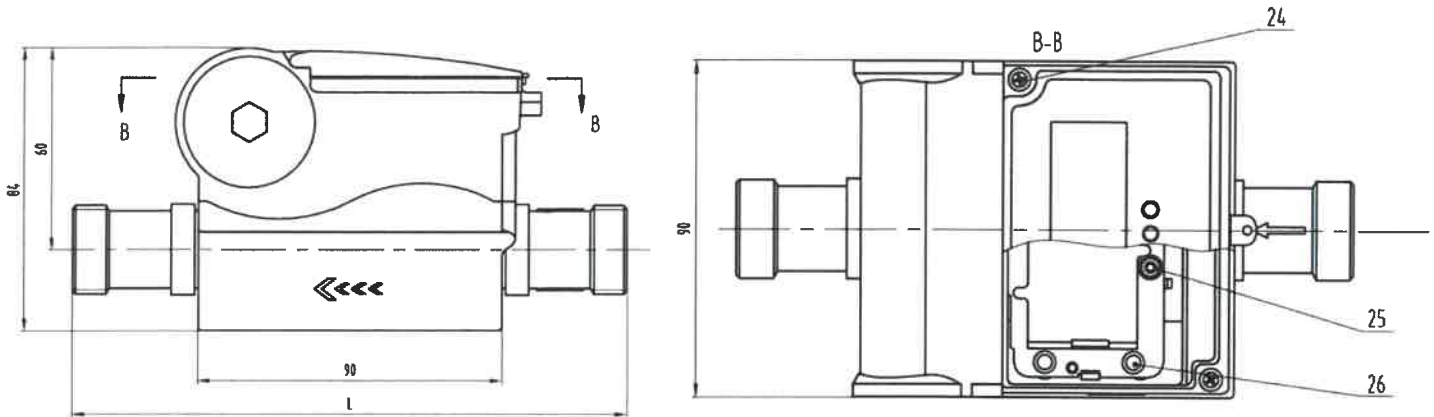


Fig. 2a: Example drawing of DN15 and DN20 water meters type UL-DW PLUS

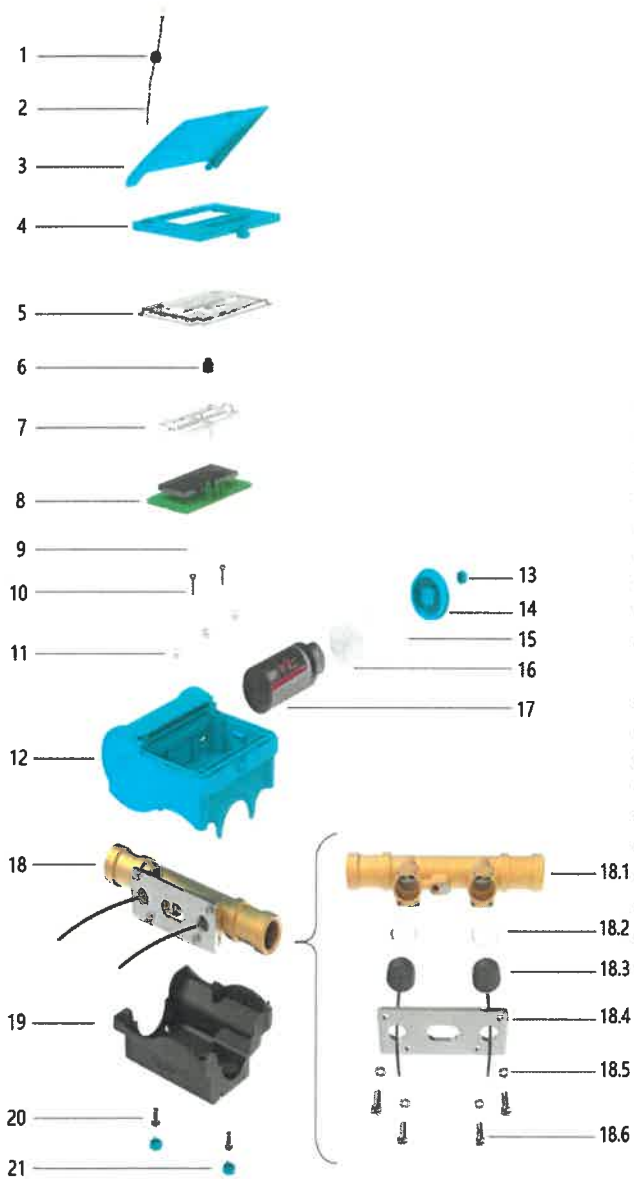
Type	DN	L	A
<b>UL-DW PLUS</b>	15	110 to 165	G $\frac{3}{4}$ "B
	20	130 to 195	G1"B
	25	225 to 260	G1 $\frac{1}{4}$ "B
	32	230 to 260	G1 $\frac{1}{2}$ "B
	40	245 to 300	G2"B
	50	300 to 350	G2 $\frac{1}{2}$ "B

Fig. 2b: Dimensions of DN15 and DN20 water meters type UL-DW PLUS



Fig. 3: The sealing of water meter type UL-DW PLUS

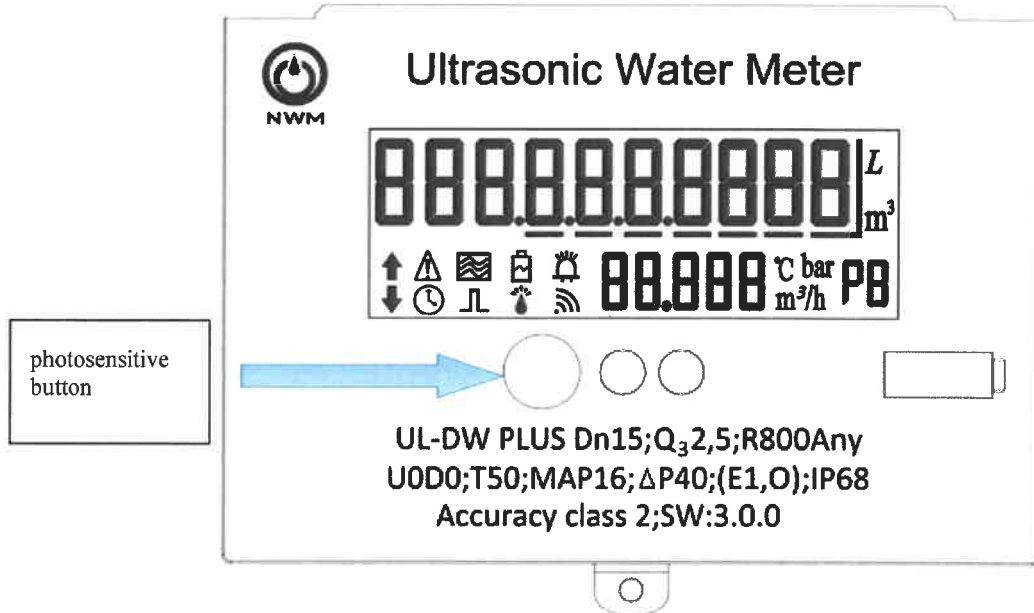




UL-DW PLUS DN15-50			
No	Drawing number	Name	Material
1	0070338001	Seal	Lead, Plastic, Aluminum alloy
2	020020	Copper wire	Copper
3	ZN8.315.569	Lid	ABS
4	ZN8.310.257	Upper cover	ABS
5	ZN8.307.1350	Transparent cover	MBS
6	ZN8.212.106	Blackout cover	NBR
7	ZN8.043.090	LCD bracket	ABS
8	ZN5.903.1607	PCB board	Assembly
9	ZN8.322.358	Sealing plug	Silicone rubber
10	GB/T818-2016	Screw M3x10	Stainless steel
11	ZN8.322.313	Sealing plug	Silicone rubber
12	ZN8.353.884	Middle case	ABS
13	ZN8.322.343	Sealing plug	ABS
14	ZN8.902.016	Cock	ABS
15	ZN8.370.1852	O-ring	Silicone rubber
16	ZN8.143.162	Battery spacer	Foam
17	1090084	D cell + Super Cap	Lithium Thionyl Chloride
18,1	ZN5.003.xxxx	Flow tube assembly	Brass/Stainless steel
18,2	ZN8.370.1756	O-ring	Silicone rubber
18,3	1991126	Ultrasonic transducer	Assembly
18,4	ZN8.065.049	Impact plate	Stainless steel
18,5	GB/T93-1987	Spring washer	Stainless steel
18,6	GB/T818-2016	Screw M4x10	Stainless steel
19	ZN5.353.778	Lower case	ABS
20	GB/T818-2016	Screw M4x8	Stainless steel
21	ZN8.322.360	Sealing plug	ABS

Fig: 4: Exploded view of water meter type UL-DW PLUS





Symbol	Description	Symbol	Description
	Forward flow		Pulse indication
	Reverse flow		Low battery
	Empty pipe (no water in the pipe)		Warning indication
	Clock indication		Infrared indication
	Water flows (water in the pipe)		Communication indication

Fig. 5: Illustrative view of LCD display and display symbols description

